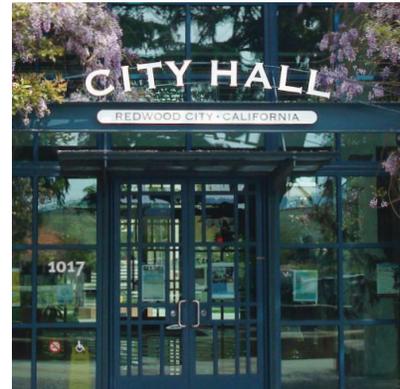




City of Redwood City

2010 Urban Water Management Plan

*Building
a Great
Community
Together*



Adopted June 13, 2011

CITY OF REDWOOD CITY

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TABLE OF CONTENTS

	PAGE
List of Acronyms.....	i
Executive Summary	ES-1
CHAPTER 1 – PLAN DEVELOPMENT	1-1
1.1 Purpose of Urban Water Management Plan.....	1-1
1.2 Plan Development	1-1
1.2.1 Agency Coordination.....	1-1
1.2.2 Public Participation	1-2
1.3 Plan Adoption, Submittal and Implementation.....	1-3
1.4 Relationship of UWMP to Other Planning Efforts	1-4
1.4.1 Redwood City General Plan.....	1-4
1.4.2 Water Supply Assessments	1-7
1.4.3 BAWSCA and SFPUC	1-7
1.5 Local, Regional and State Changes Since 2005 UWMP Adoption	1-8
1.6 UWMP Format and Organization	1-9
CHAPTER 2 – WATER SYSTEM DESCRIPTION.....	2-1
2.1 Introduction.....	2-1
2.2 Description of Service Area	2-1
2.3 Climate	2-1
2.4 Population and Demographics	2-2
2.5 Other Demographic Factors Affecting Water Planning.....	2-3
CHAPTER 3 – WATER SYSTEM DEMANDS	3-1
3.1 Introduction.....	3-1
3.2 Historic and Future Water Use by Customer Class	3-1
3.2.1 Customer Classes.....	3-1
3.2.2 Historic Accounts and Water Use.....	3-1
3.2.3 Future Accounts and Water Use	3-3
3.3 Requirements of Water Conservation Bill of 2009.....	3-6
3.3.1 Estimate of Service Area Population.....	3-7
3.3.2 Base Daily Per Capita Water Use	3-7
3.3.3 Urban Water Use Target.....	3-9
3.3.4 Urban Water Use Target to 5-Year Baseline.....	3-9
3.3.5 Interim Water Use Target.....	3-9
3.4 Water Conservation Implementation Plan.....	3-9
CHAPTER 4 – WATER SUPPLY SOURCES	4-1
4.1 Introduction.....	4-1
4.2 SFPUC Supply	4-1
4.2.1 SFPUC Regional Water System	4-1
4.2.2 SFPUC Water System Improvement Program	4-2
4.2.3 2009 Water Supply Agreement	4-3
4.2.4 Redwood City Water Supply Contract.....	4-4
4.2.5 Description of BAWSCA and Its Role.....	4-5
4.2.6 Description of Redwood City Potable Water Distribution System	4-6

4.3	Groundwater	4-8
4.4	Water Transfer Opportunities.....	4-8
4.5	Desalinated Water Opportunities	4-9
4.6	Recycled Water Supply	4-10
4.6.1	Introduction.....	4-10
4.6.2	Wastewater Collection, Treatment, and Disposal.....	4-10
4.6.3	Description of Redwood City Recycled Water Project	4-12
4.6.4	2005 UWMP Recycled Water Use Projection vs. 2010 Actual Use	4-14
4.6.5	Current and Projected Recycled Water Use.....	4-16
4.6.6	Opportunities for Expanding Recycled Water Use	4-18
4.7	Other Future Water Project Opportunities.....	4-20
4.7.1	Recycled Water	4-20
4.7.2	Groundwater	4-21
4.7.3	Water Transfers	4-21
CHAPTER 5 – WATER SUPPLY RELIABILITY AND WATER SHORTAGE CONTINGENCY		
	PLANNING	5-1
5.1	Introduction.....	5-1
5.2	SFPUC 2018 Interim Supply Limitation.....	5-1
5.2.1	Interim Supply Allocations.....	5-1
5.2.2	Environmental Enhancement Surcharge.....	5-1
5.3	BAWSCA Long Term Reliable Water Supply Strategy	5-2
5.4	Tier 1 and Tier 2 Water Shortage Allocations.....	5-2
5.4.1	Tier One Drought Allocations	5-2
5.4.2	Tier Two Drought Allocations	5-3
5.5	Reliability of the Regional Water System	5-4
5.5.1	Water Supply – Normal and Dry Years	5-4
5.5.2	Water Supply – Dry-Year Types.....	5-5
5.5.3	Projected Regional Water System Supply Reliability.....	5-5
5.5.4	Impact of Recent SFPUC Actions on Dry Year Reliability of RWS Supplies....	5-5
5.6	Drought Planning.....	5-7
5.6.1	Water Supply Reliability	5-8
5.6.2	Water Supply and Demand Comparison	5-8
5.6.3	Climate Change Effects on Water Supply	5-9
5.7	Water Shortage Contingency Planning	5-11
5.7.1	Introduction.....	5-11
5.7.2	Stages of Action.....	5-11
5.7.3	Catastrophic Supply Interruption Plan	5-13
5.7.4	SFPUC Planning, Training, and Exercise.....	5-14
5.7.5	Emergency Drinking Water Planning	5-14
5.7.6	Power Outage Preparedness and Response	5-15
5.7.7	Capital Projects for Seismic Reliability and Overall System Reliability	5-16
5.7.8	Water Quality Effects on Water Management and Supply.....	5-16
5.7.9	Mandatory Prohibitions and Penalties for Excessive Use.....	5-16
5.7.10	Revenue and Expenditure Impacts of Water Shortages.....	5-17
5.7.11	Water Shortage Contingency Ordinance.....	5-17
5.7.12	Resource Maximization and Import Minimization Plan	5-17
CHAPTER 6 – WATER DEMAND MANAGEMENT MEASURES		
6.1	Introduction.....	6-1
6.2	Regional Coordination on Demand Management	6-1

- 6.3 Active Water Conservation 6-1
 - 6.3.1 Water Survey Programs for Single- and Multiple-Family Residential Customers 6-2
 - 6.3.2 Residential Plumbing Retrofit..... 6-2
 - 6.3.3 System Water Audits, Leak Detection, and Repair..... 6-2
 - 6.3.4 Metering with Commodity Rates for all New Connections and Retrofit of Existing Connections 6-2
 - 6.3.5 Large Landscape Conservation Programs and Incentives 6-3
 - 6.3.6 High-Efficiency Washing Machine Rebate Programs 6-3
 - 6.3.7 Public Information Programs..... 6-3
 - 6.3.8 School Education Programs..... 6-4
 - 6.3.9 Conservation Programs for Commercial, Industrial, and Institutional Accounts..... 6-4
 - 6.3.10 Wholesale Agency Programs..... 6-5
 - 6.3.11 Conservation Pricing..... 6-5
 - 6.3.12 Water Conservation Coordinator..... 6-5
 - 6.3.13 Water Waste Prohibition 6-5
 - 6.3.14 Residential Ultra-Low Flush Toilet Replacement Programs..... 6-5
- 6.4 Additional Water Conservation Demand Management Measures 6-6
 - 6.4.1 Residential Water Allocation Program..... 6-6
 - 6.4.2 Meter Replacement Program Using Advanced Metering Infrastructure 6-6
 - 6.4.3 Pre-Rinse Spray Nozzle Replacement Program 6-6
 - 6.4.4 Smart Rebates Program 6-7
 - 6.4.5 Bay Area Green Gardener Program..... 6-7
 - 6.4.6 Artificial Turf Replacement Program..... 6-7
 - 6.4.7 Residential Landscape Education 6-7
- 6.5 Future Water Conservation..... 6-8
 - 6.5.1 Leak Detection and Notification..... 6-8
 - 6.5.2 Single-Family Budget-Based Water Rates 6-9
- 6.6 Evaluation of DMM Effectiveness and Estimate of Conservation Savings 6-9
- CHAPTER 7 – REFERENCES..... 7-1
- CHAPTER 8 – DEPARTMENT OF WATER RESOURCES UWMP CHECKLIST 8-1

LIST OF TABLES

- Table 2-1 Redwood City Climate..... 2-2
- Table 2-2 Current and Projected Residential Population 2-2
- Table 2-3 Current and Projected Employee Population..... 2-3
- Table 3-1 Historic Number of Water Accounts by Customer Class 3-2
- Table 3-2 Historic Water Use by Customer Class 3-2
- Table 3-3 Projected Water Use for Lower Income Households 3-3
- Table 3-4 Projected Number of Accounts by Customer Class 3-4
- Table 3-5 Water Use Factors by Customer Class 3-5
- Table 3-6 Projected Water Use by Customer Class 3-5
- Table 3-7 Daily Per Capita Water Use 3-8
- Table 3-8 SBX7-7 Compliance Target Values for Per Capita Water Use..... 3-9
- Table 4-1 Current and Planned Water Supplies 4-1
- Table 4-2 Redwood City Potable Water Purchase History..... 4-5
- Table 4-3 ADWF Capacity Allocation for SBSA..... 4-11
- Table 4-4 Wastewater Collection and Treatment..... 4-11

Table 4-5 Wastewater Disposal and Reuse 4-12

Table 4-6 Recycled Water Use Ordinance Requirements 4-14

Table 4-7 2005 UWMP Projected Recycled Water Use Compared to 2010 Actual Use . 4-16

Table 4-8 Summary of Projected Future Recycled Water Use 4-19

Table 4-9 Methods to Encourage Recycled Water Use 4-20

Table 5-1 Tier One Plan Allocation of Water During Shortages 5-3

Table 5-2 Water Deliveries in SFPUC Service Area 5-6

Table 5-3 SFPUC Supply Reliability 5-8

Table 5-4 Water Supply and Demand Comparison 5-9

Table 5-5 Water Shortage Stages of Action 5-12

Table 5-6 Water Cutbacks by Customer Sector 5-13

Table 6-1 Irrigated Acreage Converted to Artificial Turf 6-7

Table 6-2 Leakage Reduction in Single-Family Houses 6-8

Table 6-3 Landscape Water Rates for FY 2010-11 6-9

Table 6-4 Budget-Based Water Rates for Single-Family Homes 6-9

LIST OF FIGURES

Figure 3-1 Redwood City Water Service Area 3-8

Figure 3-2 Redwood City Water Use Targets 3-10

Figure 4-1 SFPUC Regional Water System..... 4-2

Figure 4-2 SFPUC Water System Improvement Program 4-3

Figure 6-1 Reduction in Over Budget Water Use..... 6-10

Figure 6-2 Annual Water Consumption per Service Connection 6-10

APPENDICES

- Appendix A: Agency Coordination and Public Outreach
- Appendix B: 60-day Notification Letter
- Appendix C: City Council Resolution Adopting 2010 UWMP
- Appendix D: Letter from SFPUC to BAWSCA Regarding Regional Water System Supply Reliability (March 31, 2011)
- Appendix E: Water Shortage Contingency Ordinance
- Appendix F: Letter from Redwood City to BAWSCA Regarding Water Purchase Projections (February 17, 2011)

LIST OF ACRONYMS

Act	California Urban Water Management Planning Act
ADWF	average dry weather flow
AFY	acre-feet per year
AMI	advanced metering infrastructure
BAWSCA	Bay Area Water Supply and Conservation Agency
BOR	United States Department of the Interior, Bureau of Reclamation
CCR	California Code of Regulations
CDPH	California Department of Public Health
CEQA	California Environmental Quality Act
CII	commercial, industrial, and institutional
CPUC	California Public Utilities Commission
CUWCC	California Urban Water Conservation Council
DMM	Demand Management Measure
DOE	Department of Energy
DWR	California Department of Water Resources
EIR	Environmental Impact Report
EOC	Emergency Operations Center
EOP	Emergency Operations Plan
EPA	United States Environmental Protection Agency
ERRP	Emergency Response and Recovery Plan
FY	Fiscal Year
GPCD	gallons per capita per day
GPD	gallons per day
HOA	Homeowner's Association
ISA	Interim Supply Allocation
ISG	Individual Supply Guarantee
ISL	Interim Supply Limitation
IWSAP	Interim Water Shortage Allocation Plan
JPA	Joint Powers Authority
LOS	level of service
LTRWSS	Long Term Reliable Water Supply Strategy
MGD	million gallons per day
MOU	Memorandum of Understanding
NPDES	National Pollutant Discharge Elimination System
OES	Office of Emergency Services
PCRC	Peninsula Conflict Resolution Center
PEIR	Program Environmental Impact Report
PVC	polyvinyl chloride
PWWF	peak wet weather flow
RWS	Regional Water System
RWQCB	Regional Water Quality Control Board
SB	Senate Bill
SBSA	South Bayside System Authority
SCVWD	Santa Clara Valley Water District
SEMS	Standardized Emergency Management System
SFPUC	San Francisco Public Utilities Commission
SWRCB	State Water Resources Control Board
UAFW	Unaccounted for Water
UWMP	Urban Water Management Plan
WCIP	Water Conservation Implementation Plan
WSA	Water Supply Agreement (SFPUC), Water Supply Assessment (SB 610)
WSAP	Water Shortage Allocation Plan
WSIP	Water System Improvement Program

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Executive Summary

Purpose

This 2010 Urban Water Management Plan (UWMP) has been prepared pursuant to the State of California's Urban Water Management Planning Act (Act), which is contained in the California Water Code, Division 6, Part 2.6, Section 10610. The Act requires that urban water suppliers serving more than 3,000 customers or providing more than 3,000 acre-feet of water annually to develop an UWMP every fifth year ending in five and zero. Consistent with the purpose of the Act, this UWMP will facilitate local and regional water planning activities and support Redwood City's long-term water resource planning goals. The 2010 UWMP will also help ensure adequate water supplies are available to meet community water needs of today and the future.

Coordination and Community Participation

Consistent with goals and values of the community, Redwood City went to great lengths to ensure agency coordination and community participation during the development of the 2010 UWMP. Coordination occurred among appropriate Redwood City departments as well as other public agencies, including the Bay Area Water Supply and Conservation Agency and its member agencies. Local water retailers, public agencies, and special interest groups were notified of the City's intent to prepare the 2010 UWMP via letters delivered by the United States Postal Service and personal communication delivered via email. To encourage active involvement of the community, two public workshops were held, the first on March 3, 2011 to receive input as the Draft UWMP was being prepared, and the second on May 4, 2011 to receive input and comment on the first Draft 2010 UWMP. The City also initiated a website for the 2010 UWMP in February 2011 (www.redwoodcity.org/UWMP). More than 20,000 workshop invitations (in both English and Spanish) were sent to Redwood City homes, in addition to press releases and mass-emails delivered via City email-distribution lists. A newsletter was included in the February and March 2011 utility bills, which described the UWMP and invited participation in the two public workshops.

2010 UWMP and Future Growth

The 2010 UWMP was prepared using the growth projections that were developed for Redwood City's new General Plan, adopted October 11, 2010. The population projections and growth assumptions contained in the new General Plan have been calibrated to fit the California Department of Water Resources (DWR) requirements for population projections in this 2010 UWMP. The General Plan contains a substantial section on Water Resources, and includes several goals, policies and programs related to water supply and integration with land use planning, all of which have been adhered to in the preparation of this UWMP.

Compliance with the Water Conservation Bill of 2009

In November 2009, the Water Conservation Act of 2009 was signed into California law as part of a comprehensive water legislation package. The purpose of the legislation is to reduce urban per capita water use statewide by twenty percent by the year 2020. As an urban water supplier, Redwood City is required by law to reduce its per capita water use to 124 gallons per capita per day, as outlined in Chapter 3. Because of Redwood City's extensive water conservation and recycling programs, however, the City has already complied with 2020 water demand reduction targets. In fact, Redwood City's

urban per capita water use was eight percent below the 2020 target at the close of fiscal year 2009/10, and is projected to stay well below the target value until at least 2030.

Future Water Supply, Demand, and Reliability

Redwood City receives one hundred percent of its drinking water supply from the San Francisco Public Utilities Commission (SFPUC). In July 2009 Redwood City signed an individual Water Supply Agreement (WSA) with SFPUC; its term is 25 years with provisions for two, five-year extensions. The WSA guarantees Redwood City a supply of 10.93 million gallons per day of water on an annual-average basis during a normal year. The guarantee, equivalent to 12,243 acre-feet of water per year, can be reduced during periods of water shortages, such as drought. The water demand projections for Redwood City that are contained in Chapter 3 stay well below the SFPUC supply amount until at least 2030, dependent upon continued expansion and utilization of the City's Recycled Water Program (described in Chapter 4) and the implementation of water demand management measures (described in Chapter 6). If a 20 percent system-wide shortage occurred, however, Redwood City could face severe cutbacks of as much as 27 percent in the year 2030.

Programs to Ensure Future Water Supply Reliability

In addition to the goals, policies, and programs related to water supply in the City's new General Plan (summarized in Chapter 1 of this UWMP), the exploration of groundwater and water transfer opportunities described in Chapter 4 and the implementation of the water demand management measures described in Chapter 6 will help ensure future water supply reliability and sustainability for the community.

Organization of the UWMP

The format and contents of this UWMP conform to the guidelines provided by DWR, which reflect the requirements of the Urban Water Management Planning Act. Chapter 1 summarizes the City's development of the UWMP, including its relationship with the 2010 General Plan and other local and regional planning efforts, and describes public participation activities and interagency coordination regarding the UWMP. Chapter 2 describes the City's water system, including its service area, climate, population and other demographic factors affecting water supply planning. Chapter 3 describes past, current and projected water system demands and includes the information and analysis required by the Water Conservation Bill of 2009. Chapter 4 describes the City's water supply sources, water transfer opportunities, and groundwater and desalinated water opportunities and includes a comprehensive description of the City's recycled water project. Chapter 5 assesses the reliability of the City's water supply and describes the City's water shortage contingency planning. Chapter 6 describes the comprehensive water demand management measures employed by the City, including active water conservation measures and regional coordination regarding demand management. Chapter 7 references the documents and materials reviewed or relied on in the preparation of the UWMP, and Chapter 8 includes the checklist developed by DWR to assist in preparation of the UWMP.

Chapter 1

Chapter 1 – Plan Development

1.1 Purpose of Urban Water Management Plan

Since 1984, the State of California has required all urban water suppliers serving more than 3,000 customers or providing more than 3,000 acre-feet of water annually for municipal purposes to develop an Urban Water Management Plan (UWMP). Redwood City owns and operates a water utility that serves 84,557 people by supplying approximately 11,000 acre-feet of water annually. The Urban Water Management Planning Act (the “Act,” contained in California Water Code, Division 6, Part 2.6, Sections 10610-10656) therefore requires the City to prepare an UWMP. The required contents of the UWMP are set forth in the Act. The Act directs urban water suppliers to describe and evaluate existing, and potentially available, sources of water supply, projected population and future water demand, demand management measures, strategies for responding to water shortages, and other relevant information and programs.

Under the Act, the normal UWMP submittal cycle requires that they be prepared and submitted in December of the years ending in five and zero. However, because of changes in UWMP requirements resulting from legislation passed in November 2009, State law extended the deadline for the 2010 plans to July 1, 2011. Although submitted in 2011, 2010 UWMPs will be referred to as 2010 UWMPs to retain consistency with the five-year submittal cycle.

The primary purpose of the 2010 UWMP is to comply with State water planning law. The UWMP is required in order for a water supplier to be eligible for DWR-administered State grants and loans as well as assistance during droughts. But more importantly, the UWMP will enable water agencies and, in turn, the State of California, to set targets and track progress toward decreasing daily per capita urban water use throughout the state. The UWMP is not just a State-required document. It reflects local and regional water planning activities, and supports the community’s long-term water resource planning to help ensure that adequate water supplies are available to meet today’s water needs as well as future water demands. The UWMP is just one component of the City’s long-term planning process, and it is not the singular driver for community policy making. Instead, the UWMP more narrowly sets policy direction for securing and protecting the quality of our water supply for today and the future.

1.2 Plan Development

This section summarizes actions taken by the City of Redwood City to ensure agency coordination and public participation during the development of the 2010 UWMP. These actions further the purposes of the Urban Water Management Planning Act.

1.2.1 Agency Coordination

Coordination with appropriate City departments and other public agencies has occurred with preparation of this UWMP. The UWMP has been prepared under the direction of the Redwood City Public Works Services Department. Other City departments consulted during the preparation of this plan include Planning, Housing and Economic Development; Building, Infrastructure and Transportation (these departments are

collectively known as Community Development); the City Manager's Office, and the City Attorney.

Redwood City also coordinated with the Bay Area Water Supply and Conservation Agency (BAWSCA) and its member agencies on this 2010 UWMP. BAWSCA is a public agency representing the interests of Redwood City and 25 other cities and other public and private water suppliers that purchase water on a wholesale basis from the San Francisco Public Utilities Commission (SFPUC). Further description of the role of BAWSCA is provided in Section 1.4.3 below. Both directly and through BAWSCA, the City coordinated preparation of this UWMP with the SFPUC, including exchange of information regarding supply and demand projections and demand management measures and receipt of information regarding expected deliveries from the SFPUC Regional Water System, including supplies in normal, single-dry and multiple-dry years over the 20-year planning period. Also directly and through BAWSCA, the City coordinated preparation of its plan with the cities, water districts and private utilities that obtain water supplies from the SFPUC's Regional Water System. In addition to BAWSCA, the City notified local water retailers, public agencies, and special interest groups of the City's intent to prepare this 2010 UWMP, as well as of the public meetings regarding the UWMP (see sample letter in Appendix A). The following list identifies the water retailers and agencies notified; none of these agencies provided comments.

Alameda County Water District	City of San Jose
BAWSCA	City of Santa Clara
Cal Water Service Company	City of Sunnyvale
City of Brisbane	Coastside County Water District
City of Burlingame	Mid-Peninsula Water District
City of Daly City	North Coast County Water District
City of East Palo Alto	Purissima Hills Water District
City of Foster City	San Francisco Public Utilities
City of Hayward	Commission
City of Menlo Park	San Mateo County
City of Millbrae	South Bayside System Authority
City of Milpitas	Stanford University
City of Mountain View	Town of Hillsborough
City of Palo Alto	Tuolumne River Trust
City of San Bruno	Westborough Water District

1.2.2 Public Participation

The California State Water Code recommends that urban water suppliers encourage the active involvement of diverse social, cultural and economic elements within the service area prior to and during UWMP preparation. Redwood City is committed to the active engagement and participation by its citizens, and developed a "Roadmap for an Effective Plan" as the framework for public engagement in the UWMP. The roadmap identified two public workshops for the 2010 UWMP process and content. One was conducted on March 3, 2011 to receive input as the Draft UWMP was being prepared, and the second was conducted on May 4, 2011 to receive input and comment on the Draft 2010 UWMP. The City also initiated a website for the 2010 UWMP in February 2011 (www.redwoodcity.org/UWMP). The Final 2010 UWMP is available on the website, along with other relevant documents and notices.

Following is a brief description of the public workshops held on March 3 and May 4, 2011. A copy of the invitation announcing the March 3 public workshop is included in Appendix A; this invitation was mailed to all City water customers and posted on the City's website. In addition, the City issued press releases regarding both workshops; copies of the press releases are also included in Appendix A. The 2010 UWMP process was described in the City's February-March 2011 Water Newsletter, which also was mailed to all City water customers; a copy of the newsletter is included in Appendix A.

March 3, 2011 Public Workshop on 2010 UWMP

To solicit the input and participation of Redwood City citizens in the 2010 UWMP preparation, the City engaged the Peninsula Conflict Resolution Center's (PCRC) Civic Engagement Initiative to facilitate the community workshop on March 3, 2011. The purposes of the workshops were:

- To build on the City's ongoing commitment to community engagement by providing an opportunity for Redwood City residents to explore and discuss core policies reflected in the UWMP and provide thoughtful input to be used in updating the UWMP, so that the updated document reflects the values of the community.
- To build on the community input gathered in recent public forums for other projects that addressed the issue of water supply and demand.

The format of the workshop included a brief presentation by City staff, followed by breakout into small group discussions, and ended with the breakout groups reporting to all of the participants. The small groups focused on one of three primary issues: 1) water supply and projected demand; 2) water supply reliability; and 3) water supply for new development. The table facilitators asked a series of questions for each issue to generate discussion. Notes from this workshop were compiled and are included in Appendix A.

May 4, 2011 Public Workshop on Draft 2010 UWMP

Following issuance of the Draft 2010 UWMP on April 13, 2011, the City hosted a second public workshop on the Draft UWMP on May 4, 2011. The objective of the second workshop was to discuss the contents of the Draft UWMP and provide an opportunity for community members to ask questions and provide comments on the Draft UWMP. A copy of the meeting notes from the May 4 workshop is also included in Appendix A.

1.3 Plan Adoption, Submittal and Implementation

Consistent with the City's outreach plan for the UWMP, the first Draft 2010 UWMP was posted on the City's website on April 13, 2011 for public review and comment. The second Draft 2010 UWMP was posted on the City's website on May 13, 2011, to incorporate changes to the first draft made subsequent to the second workshop but prior to the City Council's consideration of adopting the UWMP. The required 60-day notice was also issued on April 13, 2011 and is included in this UWMP as Appendix B. The City Council held a noticed public hearing on the 2010 UWMP on June 13, 2011. Record of the published notice is included in Appendix B. The Resolution that was adopted by the City Council at the June 13, 2011 hearing is included as Appendix C. Pursuant to California Water Code Section 10644(c), Redwood City will submit the 2010 UWMP to DWR no later than 30 days after adoption; Redwood City will also submit the UWMP to the California State Library and San Mateo County. Copies of any amendments to the

UWMP will be submitted to the same entities within 30 days after adoption. Redwood City has made the UWMP available for public review during normal business hours, and it is also be posted on the City's website.

Redwood City will implement this UWMP in accordance with the Urban Water Management Planning Act. Implementation will occur through ongoing implementation and/or enforcement of the following:

- Water conservation programs
- Policies and programs of the General Plan (see Section 1.4 below)
- Compliance with SB 610 (Water Supply Assessments)
- Operation and possible expansion of the City's recycled water project
- Water Supply Agreement with SFPUC

1.4 Relationship of UWMP to Other Planning Efforts

1.4.1 Redwood City General Plan

Redwood City adopted a new General Plan in October 2010. The previous General Plan had been adopted in 1990. The new General Plan represents a complete new policy document for Redwood City and is a blueprint for the City's future development. There are two key elements of the General Plan that are important to and integrated into this 2010 UWMP. First, the water supply and demand impacts associated with build-out under the General Plan were evaluated in an Environmental Impact Report (EIR) in accordance with the California Environmental Quality Act (CEQA). The EIR was certified by the City at the same time that the General Plan was adopted (October 2010). The population projections and growth assumptions contained in the new General Plan have been calibrated to fit the DWR requirements for population projections in this 2010 UWMP (see Chapter 3, Water System Demands, for detailed information about these projections). Therefore, the General Plan and the 2010 UWMP are integrated documents from a land use and water supply planning perspective. State law requires the integration of land use and water supply planning, and the City's General Plan and this 2010 UWMP are now consistent with that requirement.

Second, the General Plan now contains a substantial section on Water Resources (contained in the Natural Resources [NR] chapter of the General Plan), and includes several goals, policies and programs related to water supply and integration with land use planning. The Built Environment (BE) chapter also contains policies and programs related to water resources. The following General Plan policies and programs specifically address items that are also addressed in this 2010 UWMP:

Policy NR-1.1 requires the City to maintain or increase its SFPUC Supply Assurance with SFPUC. This will ensure that SFPUC potable supplies are secured into the future.

Policy NR-1.2 requires the City to continue to explore the possibility of developing additional water sources, including the use of groundwater, that are cost-effective and do not result in long-term unacceptable environmental damage.

Policy NR-1.4 requires the City to explore surface water transfers from areas outside of the BAWSCA service area, and *Policy NR-1.5* requires the City to explore the potential for transferring recycled water in exchange for potable water, and to explore the potential for increasing recycled water for local use.

Policies NR-2.1 through NR-2.4 require aggressive implementation of water conservation policies and programs. The implementation of these policies will help minimize the impacts of potential shortage through water demand management.

Policy NR-3.1 requires that new development in Redwood City demonstrate that adequate water is available before project approval, and to fund its fair-share costs associated with the provision of water service. Implementation of this policy would preclude the City from approving any new development project that did not demonstrate that adequate water supplies were available to serve the project.

Program NR-2 requires the City to track overall water use in Redwood City and provide an annual report that measures use against a baseline of UWMP demand projections. This water usage monitoring is intended to link the allowable amount of new development to the City's assured supply of water.

Program NR-3, consistent with State law, requires the City to continue to update the UWMP every five years, further ensuring that future supplies meet anticipated demands.

Program NR-4 encourages developers to work with City staff and BAWSCA to offset new water demand by transferring supply assurances from other agencies to Redwood City. The 2009 Water Supply Agreement between Redwood City and SFPUC allows for these transfers to occur. Implementation of this program could serve to bring new potable supplies to Redwood City in the future.

Program NR-7 requires the City to develop a standardized method to track and analyze water demand and available supply for new developments, and to consider expanding the City's Water Supply Assessment requirements to a broader range of projects for monitoring ability. The intent of this program is to review the City's total water demand and supply annually to ensure that adequate water supplies are available for new development anticipated by the General Plan.

Program NR-11 requires the City to maintain its BAWSCA membership and to consult with BAWSCA to explore the potential for water transfers of recycled water for potable water.

Program NR-12 requires the City to continue to comply with the water supply planning requirements of SB 610 and SB 221 to ensure that adequate water supplies are available to new development.

Policy BE-22.2 requires the City to apply certain performance criteria and standards to all new development projects, including the following:

- Adequate long-term water supplies must be available to serve the development without impinging upon service to established and approved uses and developments. Adequacy must be fully documented to the satisfaction of the responsible City departments.

Program BE-27 requires the City to track the number of new residential units and square footage of non-residential development and limit new development to available water resources, taking into account the demands of existing and planned uses, including agricultural and industrial uses.

Policy BE-40.6 requires the City to support the expansion of the City's Recycled Water Service Area, and actively promote widespread use of recycled water in and around Redwood City.

Program BE-138 requires that the City complete a Water Master Plan that would include recommendations to improve water distribution capacity and utilize water demand assumptions from future UWMPs and the General Plan. As noted in Section 1.5 below, the Water Master Plan is expected to be adopted in 2011.

Program BE-139 encourages the expansion of recycled water use in the City by expanding services to the majority of the City and exploring opportunities to export recycled water to adjacent communities and/or exchange recycled water for drinking water.

Implementation of the adopted General Plan policies and programs described above, together with the future responsibility of the City to re-evaluate its water demand projections on an ongoing basis through the UWMP process and in coordination with BAWSCA, will serve to ensure that the City has adequate water supplies to serve its anticipated demands and does not approve developments for which an adequate water supply is not available. The integration of the General Plan with this 2010 UWMP provides substantial enforcement capability on the part of the City to ensure the policies and programs are implemented.

As with the new General Plan, this UWMP does not account for potential development at the Cargill salt crystallizer ponds. DMB Associates submitted a project application outlining preliminary plans for development of the 1,436-acre Cargill property in May 2009. The proposed development would require significant amendments to the General Plan, adoption of a Specific Plan, and zoning and other discretionary land use approvals. The City will not make a decision regarding these approvals until the environmental review process has been completed and an environmental impact report has been certified. Therefore, water demands associated with the DMB project application are not accounted for in this 2010 UWMP. Pursuant to General Plan policies, any proposed development at the Cargill property will be required to demonstrate that adequate water is available before project approval and to fund its fair share of costs associated with the provision of water service. The same policies preclude the City from approving any development that does not demonstrate that adequate water supplies are available to serve the project.

1.4.2 Water Supply Assessments

In 2001, the California Legislature enacted two laws, Senate Bills (SB) 610 and 221, each designed to achieve greater coordination during the land use planning process between water suppliers and local land use agencies when considering certain large-scale development projects. SB 610 requires the preparation of a Water Supply Assessment (WSA) for any development whose approval is subject to CEQA and which meets the definition of “project” in Water Code Section 10913, i.e., residential development projects of more than 500 dwelling units or other types of developments (e.g., hotels and motels, commercial buildings, industrial parks, etc.) using a comparable amount of water. The Water Supply Assessment must describe the proposed project’s water demand over a 20-year period, identify the sources of water available to meet that demand and include an assessment of whether or not those water supplies are, or will be sufficient to meet the demand for water associated with the proposed project, in addition to the demand of existing customers and other planned future development. If the conclusion is that water supplies are or will be insufficient, then the Water Supply Assessment must describe plans (if any) for acquiring additional water supplies, and the measures that are being undertaken to acquire and develop those supplies.

SB 221 is similar in many respects to SB 610. However, it applies only to residential projects of 500 units or more and requires the land use planning agency to include as a condition of approval of a tentative map, parcel or development agreement a requirement that “sufficient water supply” is available. Proof of a sufficient water supply must be based on a written verification from the public water system that will serve the development. SB 610 requires preparation of the Water Supply Assessment sufficiently early in the development review process to allow incorporation in the CEQA evaluation and documentation of the project. SB 221, by contrast, becomes operative when the City is considering approval of a tentative subdivision map.

For Redwood City, the “water supplier” for SB 610 purposes is the Public Works Services Department, which is responsible for the City’s Water Enterprise Fund. The “governing body,” as used in SB 610, refers to the City Council, which is required to approve the WSA and make required findings that adequate water supplies are available for developments to move forward.

The UWMP is the primary information and planning tool in assessing water supply adequacy and is coordinated closely with the City’s Planning Division. As noted above, to enable the City to comply with SB 610 and 221, the 2010 UWMP uses the same land use and demographic build-out assumptions that were included in the General Plan and its EIR. Future Water Supply Assessments will rely on the data and information contained in those two documents as well as this UWMP.

1.4.3 BAWSCA and SFPUC

The Bay Area Water Supply and Conservation Agency (BAWSCA) was created in May 2003 to represent the interests of the 26 agencies that include cities (including Redwood City), water districts, a water company, and a university, in Alameda, Santa Clara and San Mateo Counties that purchase water on a wholesale basis from the San Francisco Public Utilities Commission (SFPUC). Compliance with the Urban Water Management Planning Act lies with each agency that delivers water to its customers. In this instance, the responsibility for completing an UWMP lies with the individual BAWSCA member agencies, like Redwood City. BAWSCA’s role in the development of the 2010 UWMPs

is to work closely with its member agencies and the SFPUC to maintain consistency among the multiple documents being developed. A more detailed discussion of SFPUC water supply planning and BAWSCA's role is provided in Chapter 4 of this UWMP.

1.5 Local, Regional and State Changes Since 2005 UWMP Adoption

A significant number of changes have occurred at the local, regional, and statewide level since the 2005 UWMP was adopted. These changes are highlighted in the list below and are reflected in this 2010 UWMP.

Local Changes – Redwood City

- New General Plan adopted in October 2010
 - The General Plan includes buildout projections for the year 2030 for housing, population and employment. The 2010 UWMP is based on these projections.
 - The General Plan includes new policies and programs related to water supply (see discussion in Section 1.4 above).
 - The General Plan EIR impact analysis for water supply identified a potential shortfall in potable supply for anticipated growth by the mid-term year of the General Plan (i.e., 2020). The EIR identified that the 2010 UWMP (and subsequent UWMPs) would help to refine this analysis by using updated water use factors and more detailed understanding of contributions of conservation and water recycling. See Chapter 3 for description of these updated use factors and resulting analysis.
- New Downtown Precise Plan adopted January 2011
 - The Downtown Precise Plan reconfirmed the assumptions of the 2005 UWMP that most new development in Redwood City would occur in the downtown area and along transit corridors, and that new housing would be in the form of high-density mixed use developments. The 2010 UWMP also uses this assumption.
- Recycled Water Project now fully operational
 - In 2005, the Recycled Water Project was just under construction and only the First Step project was operational. Phase 1 of the project was completed in 2010.
 - Redwood City now has several years of operating data about the Recycled Water Project, which has helped to refine the projected delivery volume of recycled water, as well as projected new customers (see Chapter 4).
 - Redwood City adopted a Recycled Water Use Ordinance in 2008 and associated Recycled Water Service Area Map – this ordinance sets forth requirements for recycled water use in Redwood City.
 - Redwood City has received \$4.2 million in State and Federal funding to support construction of the recycled water project.
- Continued aggressive water conservation programs
 - Redwood City has implemented aggressive water conservation programs above and beyond those identified in the 2005 UWMP.
- Water Master Plan underway and due to be adopted in 2011
 - The Water Master Plan will serve as a Capital Improvement Program for the City's potable water distribution system.

Regional Changes – SFPUC/BAWSCA/Redwood City

- A new Water Supply Agreement between SFPUC and BAWSCA agencies was adopted in 2009.
- Redwood City approved its Individual Supply Contract with SFPUC in 2009, with confirmed Individual Supply Guarantee of 12,243 acre-feet per year (AFY, same as assumed in 2005 UWMP).
- Redwood City's purchase of SFPUC potable supply has been decreasing since the 2005 UWMP was adopted – this represents an achievement of a major goal of the 2005 UWMP.
- New Water Shortage Allocation Plan (Tier 1 and Tier 2) adopted in 2010 (available at www.redwoodcity.org/UWMP).
- SFPUC adopted the Water System Improvement Program (WSIP) (approval document available at www.redwoodcity.org/UWMP) and its Program EIR (available at <http://www.sf-planning.org/index.aspx?page=1829>) in October 2008. WSIP projects are underway with construction, including the Bay Division Pipeline #5 project through Redwood City.
- BAWSCA is preparing a Long Term Reliable Water Supply Strategy to address the SFPUC interim limitation adopted as part of the WSIP.
- BAWSCA has also prepared a Water Conservation Implementation Plan (available at: http://bawasca.org/docs/WCIP_FINAL_Report.pdf) to assist its member agencies in meeting demand management goals.

State Changes – California Department of Water Resources (DWR)

- DWR issued new Guidelines for preparation of 2010 UWMP. The new Guidelines are intended to standardize water reporting throughout the state; this UWMP has been prepared in accordance with the requirements of the new Guidelines.
- The new Guidelines address significant new water use reduction targets and water conservation goals established by SBX7-7 (also known as the Water Conservation Bill of 2009). This UWMP has been prepared in accordance with the requirements of that bill.

1.6 UWMP Format and Organization

This UWMP includes all of the substantive elements required by the Urban Water Management Planning Act, as recommended by the Department of Water Resources in its *Guidebook to Assist Urban Water Suppliers to Prepare a 2010 Urban Water Management Plan*. It has been written as a reader-friendly document for the citizens and decision-makers of the City of Redwood City, and other interested local, regional, and state agencies. Following is a brief description of the chapters in this UWMP and what they contain.

Chapter 1 – Introduction

This chapter provides an overview of the Urban Water Management Planning Act requirements, agency coordination and public participation in the 2010 UWMP, the UWMP adoption process, and the organization of the UWMP.

Chapter 2 – Water System Description

Chapter 2 provides information on Redwood City's water service area characteristics, including a description of the physical extent of the service area, its climate, and population and demographic characteristics.

Chapter 3 – Water System Demands

This chapter describes Redwood City's water customer sectors, and includes detailed information about the City's historical, current and projected future water use, also called demand. The chapter also describes how Redwood City will meet the requirements of the Water Conservation Bill of 2009, along with compliance and reporting for SBX7-7.

Chapter 4 – Water Supply Sources

Chapter 4 provides an assessment of Redwood City's current and projected sources of water supply. These sources include the SFPUC's Hetch Hetchy regional system for potable water and the City's Recycled Water Project. Also discussed are other potential water supplies, including transfers/exchanges, groundwater, and desalination.

Chapter 5 – Water Supply Reliability and Water Shortage Contingency Planning

Chapter 5 provides an assessment of the current and projected reliability of Redwood City's water supply, including the SFPUC 2018 Interim Supply Limitation and the BAWSCA Long Term Reliable Water Supply Strategy. Included in this chapter are the City's current water supply reliability picture and a description of the factors affecting that reliability (climate, water quality, and catastrophic interruption). Water shortage contingency planning is also discussed.

Chapter 6 – Water Demand Management Measures

Chapter 6 contains information on the City's water conservation programs. Existing and future measures and programs for the efficient use of water are described, including evaluation of the effectiveness of the programs and their water savings. Coordination with BAWSCA on demand management is also described.

Chapter 7 – References

This chapter provides a list of references and materials reviewed and used in the preparation of this UWMP.

Chapter 8 – Department of Water Resources UWMP Checklist

The DWR 2010 UWMP Guidebook includes a checklist for water agencies to use in preparing their UWMP, to ensure all required elements are included. Redwood City's checklist is included in Chapter 8.

Chapter 2

Chapter 2 – Water System Description

2.1 Introduction

A variety of demographic factors may affect water use, including current and projected population, climate, population density, and the mix of customer types. This chapter provides information on Redwood City's water service area characteristics, including a description of the service area, its climate, and population demographics. The mix of customer types and their past, current, and projected water use is provided in Chapter 3.

2.2 Description of Service Area

The Redwood City water distribution system provides water retail services to Redwood City and portions of San Mateo County outside the corporate limits, including Cañada College and the Emerald Lake Hills area. The City's water service area presently covers approximately 17 square miles. Service is provided to areas between Interstate 280 (I-280) and U.S. 101, between Whipple Avenue and Marsh Road in the area east of U.S. 101, and in the non-contiguous Redwood Shores area. The City's service area varies in elevation, from about mean sea level along Seaport Boulevard to over 900 feet in the Emerald Lake Hills area. The City's water service area is shown in Figure 3-1 in Chapter 3.

2.3 Climate

The basic controlling factor in the climate of northern California is the semi-permanent atmospheric high pressure cell (Pacific High) over the eastern Pacific Ocean. During the summer, the Pacific High is well established and usually deflects Pacific storms to the north of California. During the winter, the Pacific High weakens and shifts farther to the south. As a result, summers are generally clear and dry, while winters are cool with moderate rainfall. During the spring and summer, a low layer of stratus clouds frequently extends inland from the coast in the evening, night, and morning. A sea breeze is common during the daytime. The predominant wind direction at Redwood City is northwesterly, due to the winds west of the Pacific coastline drawn into the interior through the Golden Gate and over the lower portion of the San Francisco peninsula.

Table 2-1 provides climate data for Redwood City, including average maximum and minimum temperatures, and average rainfall. The average annual precipitation in Redwood City is approximately 20 inches and is generally confined to the "wet" season from late October to early May. A significant portion of Redwood City's water demand originates from irrigation of landscapes, and irrigation demands are greatest from May through September.

Table 2-1: Redwood City Climate			
Month	Max. Temp (degrees F)	Min. Temp (degrees F)	Rainfall (in.)
Jan	58	39	4.21
Feb	62	42	4.06
Mar	65	44	3.39
Apr	70	45	1.06
May	74	49	0.43
Jun	79	53	0.12
Jul	81	55	0.04
Aug	80	55	0.12
Sep	78	53	0.20
Oct	73	49	1.06
Nov	63	43	2.64
Dec	57	39	2.91
Annual avg.	70	47	20.24

Source: U.S. Climate Data 2011 (www.usclimatedata.com)

2.4 Population and Demographics

As discussed in Chapter 1, the population projections reported in this section have been coordinated with the City Planning Division and the General Plan that was adopted by the City Council in October 2010. The City’s General Plan used federal, state, and local population reports and projections, which are the foundational building block for calculating the per capita water use values required by Section 10606.20(f) of the California Water Code. These reports were used for population values within the City’s jurisdictional borders. However, because the City’s water service area includes some adjacent areas located outside of the City’s jurisdictional boundaries, estimates for these areas were calculated by multiplying the number of single family and multiple family dwelling units in these areas by average persons-per-household values (2.74 for single family and 2.6 for multiple family), which are consistent with those used in the City’s General Plan for existing development. By adding the City population data to the outside-the-city population estimates, the total service area population estimate is achieved. Table 2-2 shows current and projected population for the City’s water service area through 2030.

Table 2-2: Current and Projected Residential Population (Redwood City Water Service Area)					
	FY 2009/10	FY 2014/15	FY 2019/20	FY 2024/25	FY 2029/30
Residential Population	84,557	87,696	89,756	91,815	93,875

Source: Redwood City General Plan, October 2010, calibrated to match the City’s water service area.

2.5 Other Demographic Factors Affecting Water Planning

Most future growth in Redwood City is expected to be associated with new and infill large multiple unit and mixed use developments, located in the City’s Downtown area, along transit corridors, and in the emerging mixed-use waterfront neighborhood centered on Bair Island Road. The density of new residential development is expected to be higher than the dwellings or other development they replace. While these new developments will be more water-efficient because of regulatory requirements, the higher densities are expected to result in more water usage per acre of land. A sharp increase in employee population is expected to occur between 2009/10 and 2029/30 as these mixed use areas in the City’s downtown are developed. Table 2-3 shows current and projected employee population for the City’s water service area through 2030. Demographic factors affecting future water demands are further described in Chapter 3.

Table 2-3: Current and Projected Employee Population (Redwood City Water Service Area)					
	FY 2009/10	FY 2014/15	FY 2019/20	FY 2024/25	FY 2029/30
Employee Population	54,602	60,357	66,113	71,868	77,623
Source: Redwood City General Plan, October 2010.					

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Chapter 3

Chapter 3 – Water System Demands

3.1 Introduction

This chapter describes the various categories of customers using water in Redwood City and their associated future water demands. Section 3.2.2 provides a historic summary of Redwood City water utility accounts and water use by customer class while Section 3.2.3 provides 5-year water use projections out to 2030. The projections are based on anticipated customer growth in residential and employee populations using appropriate water use factors. Section 3.3 of this chapter describes Redwood City's regulatory requirements regarding the Water Conservation Bill of 2009. The 2009 legislation sets a goal of reducing urban per capita water use state-wide by 10 percent by 2015 and 20 percent by 2020.

3.2 Historic and Future Water Use by Customer Class

This section summarizes both historic and future water use by customer class.

3.2.1 Customer Classes

Redwood City's water customers are divided into the following classes:

- Single Family Residential: Attached or detached dwelling units that are individually metered.
- Multiple Family Residential: Two or more dwelling units served by a common water meter. Water use is predominately for indoor water uses; irrigation meters for multiple family sites are separately listed.
- Commercial: Includes commercial and industrial customers. Irrigation meters for these sites are separately listed.
- Municipal: Includes meters severing City of Redwood City sites.
- Other: Includes schools, churches, and miscellaneous customers not listed elsewhere.
- Irrigation Residential: Water meters used exclusively for outdoor uses associated with multiple family residential customers (i.e., Homeowner Associations [HOA]).
- Irrigation Commercial: Water meters used exclusively for outdoor uses not included in Irrigation Residential.
- Recycled: Water meters providing recycled water. Almost all recycled water is currently used for landscape irrigation. This class includes both residential and commercial irrigation customers
- Fire Service: Water meters used for fire suppression. Meters occasionally record water use, mostly for system maintenance.

3.2.2 Historic Accounts and Water Use

Table 3-1 shows the number of water accounts by customer class for the last five fiscal years. Single family homes account for about 80 percent of accounts. Over the last five years, Redwood City experienced only minor changes in the number of customer accounts. The most significant change occurred during the phase-in of the City's recycled water project (see Chapter 4), which has led to an ongoing conversion of potable water irrigation accounts to recycled water irrigation accounts.

Customer Class	FY 2005/06	FY 2006/07	FY 2007/08	FY 2008/09	FY 2009/10
Single Family	18,541	18,608	18,593	18,611	18,650
Multiple Family	1,703	1,697	1,694	1,690	1,682
Commercial	1,517	1,556	1,552	1,538	1,547
Municipal	16	16	17	18	18
Other	71	71	71	73	74
Irrigation-Residential	168	166	164	166	168
Irrigation-Commercial	331	326	333	301	286
Recycled	11	11	55	58	108
Fire	591	603	611	612	618
Total	22,949	23,054	23,090	23,067	23,151

Table 3-2 shows water use by customer class for the last five fiscal years. Water use in FY2008/09 and FY2009/10 has been lower than previous years, partly as a result of rainy spring weather. Ongoing water conservation programs have also been a factor in reducing water use.

Customer Class	FY 2005/06	FY 2006/07	FY 2007/08	FY 2008/09	FY 2009/10
Single Family	5,526	5,811	5,762	5,411	4,975
Multiple Family	2,200	2,210	2,112	2,047	1,998
Commercial	2,071	2,172	2,028	1,920	1,870
Municipal	17	18	18	19	14
Other	121	129	150	147	141
Irrigation-Residential	491	509	500	552	389
Irrigation-Commercial	1,003	1,094	956	818	503
Recycled	26	32	195	280	380
Fire	11	9	18	8	29
Unaccounted for Water	745	1,120	791	666	845
Total Water Use	12,212	13,103	12,530	11,868	11,144
Total Less Recycled Water Use	12,186	13,072	12,335	11,589	10,764

Table 3-2 includes a line for unaccounted for water (UAFW). UAFW is the difference between the amount of water Redwood City receives from SFPUC, recorded at the production meters at SFPUC turnouts, and the actual metered potable water customer consumption in Redwood City. UAFW includes water used for incidental purposes, such as hydrant testing, fire-fighting, system flushing, and construction water, and also includes other unintended uses or sources, such as system leaks, water main breaks,

and meter measurement error. UAFW has averaged about 7 percent of total SFPUC water purchases in recent years.

3.2.3 Future Accounts and Water Use

Table 3-4 shows projections in the number of water accounts by customer class in 5-year increments to 2030. The future growth in water accounts is directly related to projected growth in population, dwelling units, and employment identified in the Redwood City General Plan, adopted in October 2010.

Nearly all future residential growth is assumed to occur in multiple family developments within the Downtown Area, along transit corridors, and in the emerging mixed use waterfront neighborhood centered on Bair Island Road. For the multiple family water customer class, Table 3-4 lists the expected number of dwelling units instead of accounts. The number of dwelling units is expected to increase significantly, by 53 percent from FY2009/10 to FY2029/30. The City estimates that as much as 10 to 15 percent of future housing construction will potentially be affordable to lower income households. This is based on recently constructed housing in Redwood City during the first three years of the current Housing Element cycle, which runs from 2007 to 2014. The most reasonable basis for an estimate of future activity is to project the past ratio forward. It is important to note that the City’s land use policies (particularly the Zoning Ordinance and the General Plan) have capacity for much more affordable housing development; however, the actual amount that will be constructed by 2030 is difficult to determine due to unknown factors including the availability of financing for affordable projects and the difficulty in assembling sites, among other limitations. For the purposes of this UWMP, it is assumed that 15 percent of future residential development will be affordable to lower income households. Projected water use for lower income households is identified in Table 3-3.

Table 3-3: Projected Water Use for Lower Income Households (AFY)			
FY 2014/15	FY 2019/20	FY 2024/25	FY 2029/30
41	83	124	166
Projected water use for lower income households is a combination of potable and recycled water supplies and is included in Table 3-6 as multiple-family demand.			

Employment is also projected to increase significantly, by 45 percent from FY2009/10 to FY2029/30. This growth in employment results in a proportional increase in commercial water accounts. In contrast, no increase is projected for municipal or other accounts.

Irrigation accounts, both residential and commercial, are projected to increase in step with multiple family dwelling units and employees, respectively. More than half of these new irrigation accounts, however, are expected to be served by recycled water.

Table 3-5 shows the current water use factors associated with existing accounts. Because of year-to-year fluctuations (e.g., caused by weather), water use factors for single family, commercial, municipal, other, and fire accounts are based on the average water use per account over the last five fiscal years. For example, average single family home water use was 0.296 AFY from FY2005/06 through FY2009/10.

Table 3-4: Projected Number of Accounts by Customer Class (Multiple Family is shown in Units)					
Customer Class	Actual		Projected		
	FY 2009/10	FY 2014/15	FY 2019/20	FY 2024/25	FY 2029/30
Single Family	18,650	18,650	18,650	18,650	18,650
Multiple Family (Units)	13,465	15,335	17,204	19,074	20,944
Commercial	1,547	1,710	1,873	2,036	2,199
Municipal	18	18	18	18	18
Other	74	74	74	74	74
Irrigation- Residential	168	144	153	163	172
Irrigation- Commercial	286	208	190	205	226
Recycled	108	230	299	339	376
Fire	618	654	690	726	762
Total	34,934	37,023	39,152	41,285	43,421

The multiple family water use factor has been calculated differently than other water use factors. This is because new residential growth in Redwood City is expected to occur within high-density multiple family residential projects; hence, the multiple family water use factor is based on existing multiple family accounts serving more than 25 dwelling units (Redwood City has many 2-4 unit accounts that are less representative of the large new residential development anticipated under the General Plan). The historical water use factor is 0.148 AFY per multiple family dwelling unit. This translates to 132 gallons per day per dwelling unit; this amount does not include the outdoor irrigation meters that also serve new multiple family developments, which are included under “Irrigation Residential.”

Similar to multiple family units, water demands for irrigation customer classes (irrigation-residential, irrigation-commercial, and recycled) are also handled somewhat differently than other categories, as there have been dramatic shifts in irrigation water usage in the last two years with the conversion to recycled water, rainy weather, and with effective conservation programs. For the irrigation accounts, the water use factor for FY2009/10 was adjusted or “weather-normalized” to account for irrigation requirements being 18 percent lower than historic norms.

Table 3-6 shows water use projections by customer class for the 20-year time frame of this UWMP (2030) in 5-year increments. The projections are calculated by taking the water use accounts shown in Table 3-4 and multiplying by the water use factors shown in Table 3-5. Unaccounted for water is assumed to be 7 percent of total potable water use.

Water use associated with the multiple family and commercial customer classes is projected to increase substantially over the next 20 years. Recycled water use will also grow substantially, especially with respect to meeting the water demands of new customers.

Customer Class	Unit	AFY per Unit
Single Family	Per Account	0.296
Multiple Family	Per Dwelling Unit	0.148
Commercial	Per Account	1.305
Municipal	Per Account	1.030
Other	Per Account	1.909
Irrigation-Residential	Per Dwelling Unit	0.035
Irrigation-Commercial	Per Employee	0.020
Fire	Per Account	0.025

Multiple family water use factor is based on analysis of accounts serving over 25 dwelling units. Irrigation accounts are based on FY2009/10 water use that have been weather normalized. All other water use factors are based on the 5-year average water use per account from FY2005/06 to FY2009/10.

Customer Class	Actual		Projected		
	FY 2009/10	FY 2014/15	FY 2019/20	FY 2024/25	FY 2029/30
Single Family	4,975	5,512	5,512	5,512	5,512
Multiple Family	1,998	2,237	2,482	2,728	2,973
Commercial	1,870	2,161	2,303	2,496	2,688
Municipal	14	19	19	19	19
Other	141	141	141	141	141
Irrigation-Residential	389	407	433	460	486
Irrigation-Commercial	503	446	408	439	484
Recycled	380	987	1,280	1,453	1,611
Fire	29	16	17	18	19
Unaccounted for Water	845	823	852	889	927
Total Water Use	11,144	12,749	13,446	14,153	14,860
Water Efficiency Standards	(0)	(161)	(279)	(366)	(430)
Future Water Conservation ¹	(0)	(158)	(239)	(730)	(730)
Total Potable Water Use²	10,764	11,443	11,648	11,604	12,089

¹ Future Water Conservation is described in Chapter 6, Section 6.5.
² Total Potable Water Use is equal to Total Water Use less Recycled and Future Water Conservation.

Table 3-6 includes a water efficiency standards offset regarding future water use. This offset, growing from 161 AFY in 2014/15 to 430 AFY in 2029/30, factors in the ongoing replacement of less water efficient water fixtures with more water efficient water fixtures. Toilets and clothes washers are the two most significant fixtures where this is occurring. The savings do not require any action from the City—replacement naturally occurs as

current fixtures wear out or are replaced because of remodeling, etc. The table also includes and offset for Future Water Conservation. As described in Chapter 6 (see Section 6.5), future potable water use reductions are attributed to the implementation of Automated Metering Infrastructure with leak detection and budget-based rates for single-family customers.

Prior to 1983, most toilets were designed to use five or more gallons per flush. In 1983, the California Plumbing Code changed requiring no more than 3.5 gallons per flush toilets in all new construction. In 1992, the California Plumbing Code was changed again requiring no more than 1.6 gallons per flush toilets in new construction. Because toilet manufacturers were still producing higher volume toilets for other states, however, such toilets were available for both new construction and replacement of existing toilets. It was not until a federal plumbing code change in January 1994 (as part of The Energy Policy Act of 1992), combined with another California Plumbing Code change (SB 1224, Killea), that 1.6 gallons per flush toilets became the effective standard for all installations. In 2007, an additional change to the California Plumbing Code (AB715 & Health and Safety Code 17921.4) began requiring toilets to be rated to use no more than 1.28 gallons per flush by 2014. In October 2009 the governor signed SB 407 which requires efficient toilets (rated up to 1.6 gallons per flush), faucets, and showerheads in all buildings. The law covers remodeled properties by 2014, all single-family homes by 2017, and multi-family and commercial buildings by 2019. It also requires sellers of property to disclose whether the property is in compliance with the law.

These legislative activities will lead to an even greater increase in the water efficiency of toilets throughout Redwood City, the state and the nation. The penetration rate of toilets rated to use up to 1.6 gallons per flush in Redwood City is estimated to range between 60 and 74 percent depending on customer class. To accelerate the conversion, Redwood City has implemented programs to assist with replacing 9,653 toilets since FY 2004/05 (see Chapter 6 for more detail on toilet replacements).

In February 2004, the California Energy Commission adopted water efficiency standards for clothes washers. In 2006, however, the Department of Energy (DOE) denied the California's request to institute standards more stringent than the federal government. The State of California filed suit in 2007, and in October of 2009, the Ninth Circuit Court of Appeals overturned DOE's judgment, and ordered DOE to re-consider its ruling. As of this writing, it remains to be seen whether the federal government will allow California to put in place more stringent clothes washer standards, or will create national standards similar to those proposed by California. In any case, the water efficiency of clothes washers on the market has improved significantly in the last 10 years with the gallons-per-load decreasing from about 40 to 20 gallons per load. The transformation of replacing old inefficient clothes washers with more efficient ones is expected to continue.

3.3 Requirements of Water Conservation Bill of 2009

In November 2009, SBX7-7, the Water Conservation Act of 2009, was signed into California law as part of a comprehensive water legislation package. The Water Conservation Act addresses both urban and agricultural water conservation. The urban provisions reflect the approach taken in California's 20x2020 Water Conservation Plan, which sets a goal of reducing urban per capita water use statewide by 10 percent by 2015 and 20 percent by 2020.

The DWR *Guidebook to Assist Urban Water Suppliers to Prepare a 2010 Urban Water Management Plan* states four overall steps a water supplier needs to complete to meet the requirements of the Water Conservation Bill of 2009 in the 2010 UWMPs:

- Step 1: Determine Base Daily Per Capita Water Use
- Step 2: Determine Urban Water Use Target
- Step 3: Compare Urban Water Use Target to the 5-year Baseline
- Step 4: Determine Interim Urban Water Use Target

The Guidebook also provides four methods for calculating base daily per capita water use (defined below). This section identifies Redwood City's water use reduction goals necessary to comply with the legislation using DWR's *Methodology 3: Base Daily Per Capita Water Use*, and provides the supporting information that was used in determining those goals.

3.3.1 Estimate of Service Area Population

A preliminary step in determining base daily per capita water use is defining the service area and estimating its population. The population projections in this 2010 UWMP use federal, state, and local population reports and projections as the foundational building block for calculating per capita values consistent with Section 10606.20(f) of the California Water Code (Code) and the City's new General Plan. These reports were used for population values within the City's jurisdictional borders. Because the City's water service area includes some adjacent areas located outside of the City's jurisdictional boundaries, estimates for these areas were calculated by multiplying the number of single family and multiple family dwelling units in these areas by average persons-per-household values (2.74 for single family and 2.6 for multiple family), consistent with projections made in the City's General Plan for existing development. By adding the City population data to the outside-the-city population estimates, the total service area population estimate is achieved. Figure 3-1 shows the City's water service area (for which the population projections were prepared); this figure also shows the City's jurisdictional boundary and its Sphere of Influence.

3.3.2 Base Daily Per Capita Water Use

Per capita water is calculated by dividing the total service area population by gross water use. Gross water use equals the total volume of water (SFPUC purchases, groundwater, recycled water, etc.) that enters the distribution system of an urban retail water supplier, with some exclusions. Gross water use must be calculated over a continuous 12-month period (calendar or fiscal year) for the purposes of determining base per capita water use. The only applicable exclusion for the calculation of gross water use in Redwood City's case is recycled water.

The DWR Guidebook defines Base Daily Per Capita Water Use as the average gallons-per-capita-per-day (GPCD) use over a continuous 10-year period. The period must end no earlier than December 31, 2004 and no later than December 31, 2010. Redwood City used the baseline period FY1999/00 through FY2008/09 to calculate an average value of 141 GPCD. As shown in Table 3-7, which summarizes historical daily per capita water use for Redwood City, per capita water use has ranged between 114 and 153 gallons GPCD over the last 11 fiscal years.

Figure 3-1: Redwood City Water Service Area

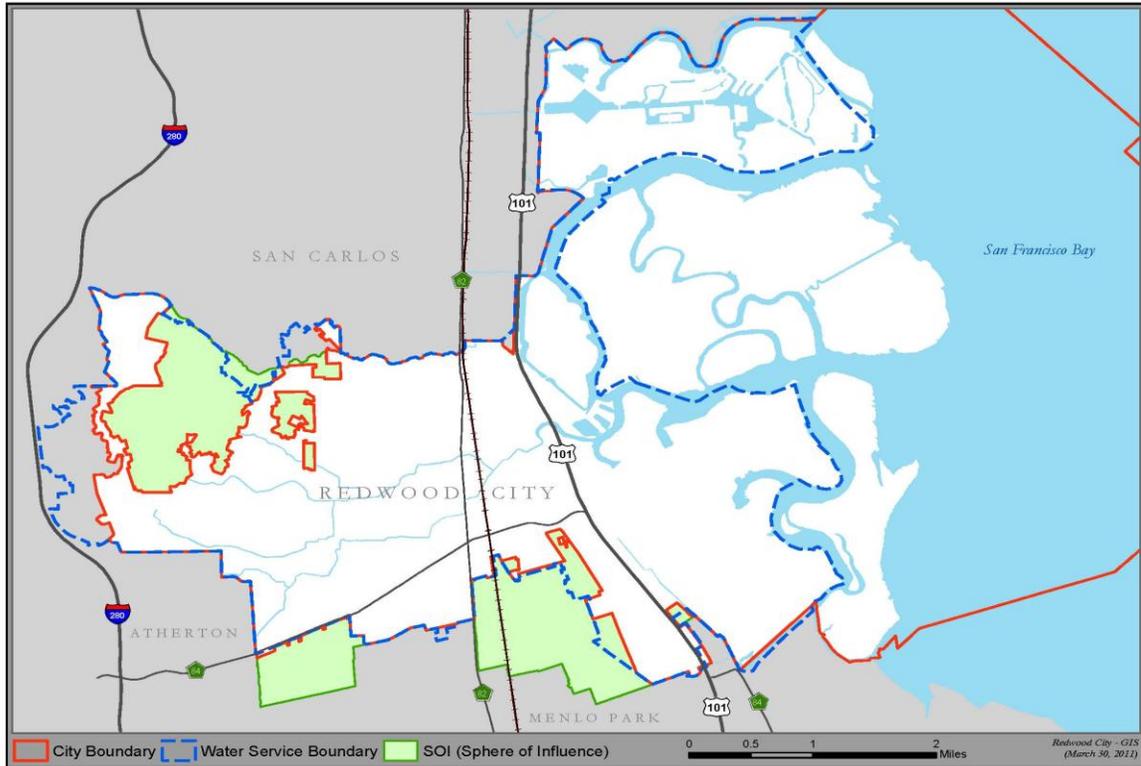


Table 3-7: Daily Per Capita Water Use

Fiscal Year	Population	Total Water Use AF	Recycled Water Use AF	Gross Water Use AF	Per Capita Water Use GPCD
1999/00	82,021	13,278	0	13,278	145
2000/01	81,945	13,213	14	13,199	144
2001/02	80,964	13,054	17	13,037	144
2002/03	80,265	12,796	28	12,768	142
2003/04	79,870	13,686	27	13,659	153
2004/05	79,785	12,480	30	12,450	139
2005/06	80,087	12,212	26	12,186	136
2006/07	80,461	13,103	32	13,072	145
2007/08	81,577	12,530	195	12,335	135
2008/09	83,067	11,868	280	11,589	125
2009/10	84,557	11,144	380	10,764	114

Gross water use equals Total Water Use minus Recycled Water Use. Per Capita Water Use equals Gross Water Use divided by Population (converted into gallons per day).

3.3.3 Urban Water Use Target

As noted above, the DWR Guidebook outlines four methodologies for determining the 2020 urban water use target for each water supplier. Redwood City selected *Methodology 3: Base Daily Per Capita Water Use*; it provides a 2020 target for the City of 124 GPCD, which is 95 percent of the 2020 Urban Water Use Target for the San Francisco Bay Hydrologic Region (DWR, October 2010).

3.3.4 Urban Water Use Target to 5-year Baseline

The SBX7-7 legislation includes a minimum water use reduction requirement. The requirement ensures that each water agency’s 2020 urban water use target is below 95 percent of its 5-year base per capita water use. Agencies have flexibility in defining their 5-year base, but it must be a continuous five-year period ending no earlier than December 31, 2007, and no later than December 31, 2010.

Redwood City’s 5-year base period is FY2004/05 to FY2008/09. The average water use for this period (136 GPCD) is multiplied by 0.95 under the methodology; the result is 129 GPCD. This value is then compared to Redwood City’s 2020 per capita water use target of 124 GPCD to ensure that 124 GPCD is at least 95 percent of the 5-year base. Because 95 percent of the 5-year base value (129 GPCD) is greater than Redwood City’s 2020 target (124 GPCD), the 2020 target value does not need to be reduced to achieve at least 95 percent of the base. Redwood City’s 2020 target for compliance with SBX7-7 therefore remains at 124 GPCD, which is 95 percent of the 2020 Urban Water Use Target for the San Francisco Bay Hydrologic Region.

3.3.5 Interim Urban Water Use Target

The legislation sets forth an interim urban water use target to ensure progress toward the 2020 target. The interim target focuses on the year 2015. At this point, water suppliers are required to reduce water demand to the midpoint between their 10-year baseline urban water use and their 2020 urban water use target. For Redwood City, the interim target is 133 GPCD (midpoint between 141 and 124 GPCD). Table 3-8 summarizes the GPCD values associated with SBX7-7 legislation.

Table 3-8: SBX7-7 Compliance Target Values for Per Capita Water Use	
SBX7-7 Requirement	Daily Per Capita Water Use (GPCD)
10-Year Base FY1999/00 to FY2008/09	141
5-Year Base FY2004/05 to FY2008/09 multiplied by 0.95	129
2015 Interim Water Use Target	133
2020 Water Use Target	124

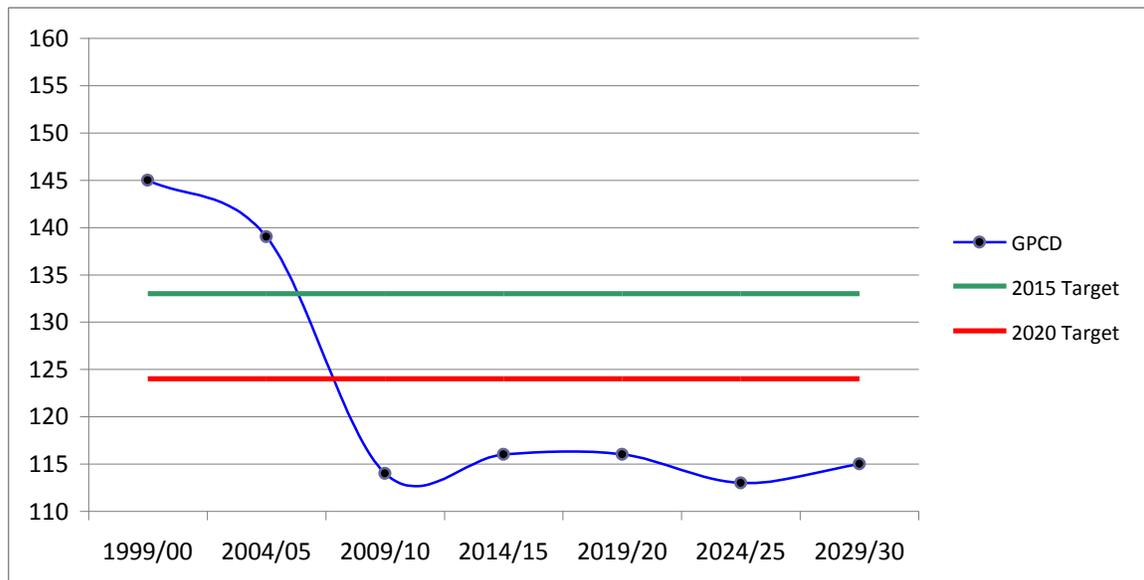
3.4 Water Conservation Implementation Plan

Retail water suppliers are required to develop an implementation plan for compliance with the Water Conservation Bill of 2009. The plan is to provide a general description of how the supplier intends to reduce per capita water use to meet its urban water use target while discussing any potential economic impacts that may result from the water

use reduction program. Since FY2008/09, Redwood City has been meeting its 2015 target; and is meeting its 2020 target as of FY2009/10. Projections show that the City will continue to meet those targets to 2030 and beyond. As a result, Redwood City will not implement any programs for the specific purpose of complying with the 2009 bill. Instead, the City will continue to reduce potable water demands above and beyond targets delineated in SBX7-7.

Potable water demand reductions will occur through the City’s recycled water program (further described in Chapter 4) and its comprehensive set of demand management measures outlined in Chapter 6. Redwood City will also implement General Plan policies NR-2.1 through NR 2.4 which require aggressive implementation of water conservation policies and programs. The implementation of these policies will help minimize the impacts of potential water supply shortfalls through effective water demand management. The City will continuously monitor GPCD values to ensure compliance targets are being met.

Figure 3-2: Redwood City Water Use Targets



Chapter 4

Chapter 4 – Water Supply Sources

4.1 Introduction

This chapter describes Redwood City’s existing and planned sources of water supply. Table 4-1 is a summary of the existing and planned water supply sources discussed in this chapter, and the current and planned quantities available to Redwood City from the present (2010) to 2030 in five-year increments. Sections 4.2 through 4.6 provide details of the water supplies summarized in Table 4-1.

Table 4-1: Current and Planned Water Supplies (AFY)					
Water Supply Sources	FY 2009/2010	FY 2014/2015	FY 2019/2020	FY 2024/2025	FY 2029/2030
SFPUC	12,243	12,243	12,243	12,243	12,243
Groundwater ¹	0	0	0	0	0
Transfers/Exchanges	0	0	0	0	0
Desalination	0	0	0	0	0
Recycled Water ²	2,000	2,000	3,238	3,238	3,238
TOTAL	14,243	14,243	15,481	15,481	15,481

¹ Defined as municipal potable source only. Does not include existing or future private wells.
² Redwood City recycled water is not a potable supply and is currently available for non-potable uses only.

4.2 SFPUC Supply

4.2.1 SFPUC Regional Water System

Redwood City receives 100 percent of its potable water supply from the City and County of San Francisco’s Regional Water System (RWS), operated by the San Francisco Public Utilities Commission (SFPUC). This supply is predominantly from the Sierra Nevada, delivered through the Hetch Hetchy aqueducts, but also includes treated water produced by the SFPUC from runoff from its local watersheds which is stored in reservoir facilities in Alameda and San Mateo Counties. Rainfall and runoff collected from the Alameda Watershed (which spans parts of Alameda and Santa Clara Counties) are collected in the Calaveras and San Antonio Reservoirs. On the San Francisco Peninsula, the SFPUC utilizes Crystal Springs Reservoir, San Andreas Reservoir, and Pilarcitos Reservoir to capture local watershed runoff. In addition to capturing runoff, these facilities also provide storage for Hetch Hetchy diversions, and serve as an emergency water supply in the event of an interruption to Hetch Hetchy diversions. The Bay Area reservoirs provide, on average, approximately 15 percent of the water delivered by SFPUC’s RWS. The remaining supply consists of water diverted from the Tuolumne River and conveyed through the Hetch Hetchy system to the Bay Area. The Regional Water System is shown in Figure 4-1. A comprehensive description of the Regional Water System is contained in the Program EIR for the SFPUC’s Water Improvement Program, available at <http://www.sf-planning.org/index.aspx?page=1829> (Chapter 2 – Existing Regional Water System).

Through the Regional Water System, SFPUC supplies both retail and wholesale customers. Its retail customers include the residents, businesses and industries located

within the City and County of San Francisco (San Francisco). SFPUC also provides retail water service to other customers located outside of San Francisco, including Treasure Island, the Town of Sunol, San Francisco International Airport, and Lawrence Livermore Laboratory. The SFPUC sells water on a wholesale basis to Redwood City and other public and private water suppliers in San Mateo, Santa Clara and Alameda Counties.

The amount of imported water available to SFPUC retail and wholesale customers is constrained by hydrology, physical facilities, and the institutional parameters that allocate the water supply of the Tuolumne River. Due to these constraints, the SFPUC is very dependent on reservoir storage to firm-up its water supplies. Reservoir storage provides the SFPUC with year-to-year water supply carry-over capability, which is important during drought cycles since it enables SFPUC to carry over water supply from wet years to dry years.

The SFPUC serves its retail and wholesale water demands with an integrated operation of local Bay Area water production and imported water from Hetch Hetchy. In practice, the local reservoir facilities are operated to capture local runoff. Water from the regional system is delivered to Redwood City via 13 metered connections to four SFPUC pipelines (called the Bay Division Pipelines) located in Redwood City.

Figure 4-1: SFPUC Regional Water System



4.2.2 SFPUC Water System Improvement Program

In order to enhance the ability of the SFPUC water supply system to meet identified service goals for water quality, seismic reliability, delivery reliability, and water supply, the SFPUC has undertaken the Water System Improvement Program (WSIP), approved October 31, 2008. The WSIP will include capital improvements aimed at enhancing the SFPUC's ability to meet its water service mission of providing high quality water to customers in a reliable, affordable and environmentally sustainable manner. Many of the water supply and reliability projects evaluated in the WSIP were originally put forth in the SFPUC's Water Supply Master Plan (2000).

A Program Environmental Impact Report (PEIR) (available at www.sf-planning.org/index.aspx?page=1829) was prepared in accordance with the California Environmental Quality Act (CEQA) for the WSIP. The PEIR, certified in 2008, analyzed the broad environmental effects of the projects in the WSIP at a program level and the water supply impacts of various alternative supplies at a project level. Individual WSIP projects are also undergoing individual project specific environmental review as required.

In approving the WSIP, the SFPUC adopted a Phased WSIP Variant for water supply that was analyzed in the PEIR. This Phased WSIP Variant established a mid-term water supply planning milestone in 2018 when the SFPUC would reevaluate water demands through 2030. The SFPUC also imposed the Interim Supply Limitation which limits the volume of water that the member agencies and San Francisco can collectively draw from the RWS to 265 million gallons per day (MGD) until at least 2018. Although the Phased WSIP Variant included a mid-term water supply planning milestone, it did include full implementation of all proposed WSIP facility improvement projects to ensure that the public health, seismic safety, and delivery reliability goals are achieved as soon as possible.

The WSIP, discussed further in Chapter 5, is scheduled to be completed in December 2015. The WSIP projects are shown in Figure 4-2.

Figure 4-2: SFPUC Water System Improvement Program



4.2.3 2009 Water Supply Agreement

The water supply relationship between San Francisco and its wholesale customers is largely defined by the “Water Supply Agreement between the City and County of San Francisco and Wholesale Customers in Alameda County, San Mateo County and Santa Clara County” (www.sfwater.org/detail.cfm/MC_ID/13/MSC_ID/165/C_ID/4502) entered into in July 2009 (WSA). The new WSA replaced the Settlement Agreement and Master Water Sales Contract that expired in June 2009. Under the WSA, the SFPUC is responsible for maintaining the Regional Water System and delivering water that meets all applicable drinking water standards (including all treatment necessary to meet those standards). The agreement also requires SFPUC to complete the Water System

Improvement Program. The WSA addresses rate-making methodology used by SFPUC in setting wholesale water rates for its wholesale customers in addition to addressing water supply and water shortages for the San Francisco Regional Water System. The WSA has a 25 year term, with provisions for two, five-year extensions.

In terms of water supply, the WSA provides for a 184 MGD (expressed on an annual average basis) "Supply Assurance" to SFPUC's wholesale customers, subject to reduction, to the extent and for the period made necessary by reason of water shortage, due to drought, emergencies, or by malfunctioning or rehabilitation of the regional water system. It also provides for the agencies' Individual Supply Guarantees (which are transferable among the agencies). The WSA does not guarantee that SFPUC will meet peak daily or hourly customer demands when their collective annual usage exceeds the Supply Assurance. The SFPUC's wholesale customers have agreed to the allocation of the 184 MGD Supply Assurance among themselves, with each entity's share of the Supply Assurance, expressed as an Individual Supply Guarantee, set forth on Attachment C to the WSA. The Supply Assurance survives termination or expiration of the WSA and Redwood City's Individual Water Sales Contract with San Francisco.

The Water Shortage Allocation Plan (WSAP) between the SFPUC and its wholesale customers, adopted as part of the WSA in July 2009, provides a method and process by which the SFPUC intends to allocate water resources between its retail customers and wholesale customers during system-wide water shortages of up to 20 percent resulting from drought. The Tier 1 Shortage Plan allocates water from the RWS between San Francisco retail and wholesale customers during system-wide shortages of 20 percent or less. The Tier 2 Shortage Plan, adopted by the wholesale customers, allocates the available water from the RWS among the wholesale customers (see Chapter 5 for additional details on the WSAP, and can also be found at www.redwoodcity.org/UWMP).

4.2.4 Redwood City Water Supply Contract

As mentioned above, Redwood City, along with 25 other Bay Area water suppliers signed a Water Supply Agreement (WSA) with San Francisco, supplemented by an individual Water Supply Contract. These contracts, which expire in 25 years (unless extended by their terms for an additional 10 years), provide for a 184 million MGD Supply Assurance to the SFPUC's wholesale customers collectively. Redwood City has an Individual Water Supply Contract with the SFPUC under which Redwood City's Individual Supply Guarantee (ISG) is 10.93 MGD on an annual average basis (or approximately 12,243 acre feet per year [AFY]). Although the WSA and Individual Water Supply Contract expire in 2034, the 184 MGD Supply Assurance (which quantifies San Francisco's obligation to supply water to its individual wholesale customers) survives their expiration and continues indefinitely, as noted above in Section 4.2.3.

Table 4-2 summarizes Redwood City water purchases from SFPUC over the last decade relative to the Individual Supply Guarantee of 12,243 AFY. As shown in the table, the SFPUC has made available, and the City has purchased, water above the ISG for most of the years. Consistent with existing agreements, this has been possible because other BAWSCA agencies have not used their full contractual supply. The purchase fluctuations are influenced by a number of factors, including weather, commercial building occupancy, and implementation of increasingly active water conservation measures. Reductions are attributed to several factors, including the City's aggressive water conservation programs, replacing potable water use with recycled water use, and

the effects of the national economic downturn resulting in less local business activity and greater real estate vacancies.

Table 4-2: Redwood City Potable Water Purchase History		
Fiscal Year	Redwood City Individual Supply Guarantee (AFY)	Potable Water Purchase in Excess of Individual Supply Guarantee (AFY)
1999/2000	12,243	1,028
2000/2001	12,243	950
2001/2002	12,243	794
2002/2003	12,243	524
2003/2004	12,243	1,410
2004/2005	12,243	207
2005/2006	12,243	(57) ^(a)
2006/2007	12,243	829
2007/2008	12,243	93
2008/2009	12,243	(654) ^(a)
2009/2010	12,243	(1,478) ^(a)

(a) Values in parentheses reflect that Redwood City purchased **less** than its ISG.

Redwood City does not consider purchasing water in excess of its ISG to be a long-term solution. As reflected in the 2010 General Plan, the City has adopted the goal of eliminating these surplus water purchases through a combination of augmentation of supply and reduction of demand through water conservation measures and expanded use of recycled water. Adopted General Plan policies intended to implement these goals include maintaining or increasing the City’s contractual water entitlements from SFPUC (Policy NR -1.1), seeking out new sources of potable water, including groundwater and surface water transfers from outside of the Bay Area (NR 1.2; 1.4), and exploring (directly and through BAWSCA) the potential for exchanges of recycled water for potable water, as well as increasing recycled water supply for local use (NR 1-5; NR-11).

4.2.5 Description of BAWSCA and Its Role

The Bay Area Water Supply and Conservation Agency (BAWSCA) was established by statute (AB 2058, Water Code Sections 81300 et seq.) to represent the interests of the 26 agencies that purchase water on a wholesale basis from the San Francisco Regional Water System (RWS). Collectively, the BAWSCA agencies are referred to as the wholesale customers.

BAWSCA is the only entity that has the authority to directly represent the needs of the wholesale customers that depend on the RWS. Through BAWSCA, the wholesale customers can work with the SFPUC to ensure the RWS is rehabilitated and maintained and to collectively and efficiently meet local responsibilities.

BAWSCA has the authority to coordinate water conservation, supply and recycling activities for its agencies; acquire water and make it available to other agencies on a wholesale basis; finance projects, including improvements to the regional water system;

and build facilities jointly with other local public agencies or on its own to carry out the agency's purposes.

Responsibility for compliance with the Urban Water Management Planning Act lies with each agency that delivers water to its customers. In this instance, the responsibility for completing an UWMP lies with the individual BAWSCA member agencies, including Redwood City. BAWSCA's role in the development of the 2010 UWMPs is to work closely with its member agencies and the SFPUC to maintain consistency among the multiple documents being developed.

4.2.6 Description of Redwood City Potable Water Distribution System

Because treated water purchased from SFPUC does not require further water treatment, water distribution is the City's primary potable water resource function. This section describes the City's potable water distribution system, including descriptions of the City's leak detection and water quality monitoring and control programs.

Water Distribution System

The City water system serves the City of Redwood City and some areas outside the City limits, including Cañada College and the Emerald Lake Hills area. The City's service area covers approximately 17 square miles. Service is provided to areas between Interstate 280 (I-280) and U.S. 101, between Whipple Avenue and Marsh Road in the area east of U.S. 101, and in Redwood Shores. The City's service area varies in elevation, from about mean sea level along Seaport Boulevard to over 900 feet in the Emerald Lake Hills area. The City's water service area is shown in Figure 3-1 in Chapter 3.

There are 13 metered connections to four SFPUC pipelines located in Redwood City. There are also 10 emergency interties with California Water Service Company, Mid-Peninsula Water District, and the City of Menlo Park. The potable water system has 265 miles of distribution mains, 12 storage reservoirs, 10 pump stations, 2,397 fire hydrants, and 26 pressure reducing valves ranging from two to six inches in diameter.

Approximately 34 percent of the City's distribution mains are fabricated of cast iron; approximately 2.5 percent of the mains are galvanized iron pipe; 29 percent are polyvinyl chloride (PVC) pipe; and some 15 percent are asbestos-cement pipe. Other pipe materials make up of the remainder of the piping system. The City has an ongoing Capital Improvement Program for water main replacement in which undersized, aged and deteriorated mains are replaced with PVC pipe.

The total capacity of Redwood City's 12 water storage facilities is 21.24 million gallons. The storage facilities are in excellent condition and are properly secured against unauthorized entry. The storage tanks and reservoirs are cleaned and inspected once every three years. Recoating, repairs, and structural work are performed as needed. All storage tanks have cathodic protection to prevent corrosion. Additional water storage tanks are planned.

Ten pump stations are located throughout the system. Four of the pump stations have permanent standby generators; the City also has four portable generators and a portable pump for emergency use. Most pump stations are contained within structures. The City plans to eventually build enclosures around the remaining two pump stations to protect

them from weathering and vandalism. Rehabilitation of existing older pump stations is also planned. The City is currently in the process of preparing a Water Master Plan to address ongoing and future needs for water system improvements. The objective of the Plan is to develop a 20-year Water Capital Improvement Plan. Future water demand for the Plan will be based, in part, on the 2010 General Plan land use and population projections. A new hydraulic model of the City's water system will also be developed, to identify needed improvements in water conveyance, reliability, and storage.

Leak Detection

The City's unaccounted-for water rate varies from 4 to 9 percent. This rate is below the industry standard of 10 percent established by the U.S. Environmental Protection Agency (EPA) and also by the California Urban Water Conservation Council (CUWCC). The City monitors its unaccounted-for rate continually and repairs system leaks immediately when found. The City owns an electronic leak detector unit and City personnel have participated in leak detection trainings sponsored by the American Water Works Association; City staff performs surveys on water mains and service lines on an ongoing basis.

Water Quality Monitoring and Control

The current SFPUC water supply delivered to Redwood City comes from the Tuolumne River and local Bay Area reservoirs. The majority of the water supply originates in the upper Tuolumne River Watershed high in the Sierra Nevada, which is remote from human development and pollution. This water (referred to as "Hetch Hetchy water"), is conveyed through pipes and tunnels to the Bay Area and requires only primary disinfection and pH adjustment to control corrosion in the pipelines. Monitoring the quality of the imported Hetch Hetchy supply is conducted by the SFPUC. The SFPUC treats the Hetch Hetchy supply by lime addition at Rock River for corrosion control, chloramination at Tesla Portal for primary disinfection, and fluoridation at Sunol Valley. Water that is delivered to Bay Area reservoirs receives filtration and disinfection treatment at either the Sunol or the Harry Tracy filtration plants. Filtered water from these treatment plants may be commingled with unfiltered Hetch Hetchy water in Bay Area transmission pipelines. Water is continuously monitored and tested by SFPUC to ensure that water delivered to customers meets or exceeds federal and state drinking water and public health requirements.

The SFPUC and its wholesale customer agencies were granted filtration avoidance for the Hetch Hetchy supply under Federal and State regulations. Under revisions to the Surface Water Treatment regulations (California Code of Regulations), which became effective in July 1998, public water systems serving water from the Hetch Hetchy supply must demonstrate to the California Department of Public Health (CDPH) that the supply meets the State criteria for filtration avoidance. Redwood City confirms, in its certification to the CDPH, that the Hetch Hetchy water supply it distributes will be in compliance with the State criteria for filtration avoidance.

In addition to the conducting the treatment processes described above, the SFPUC collects and tests water samples from reservoirs and sampling locations throughout Regional Water System to ensure that the water meets or exceeds federal and state drinking water standards. The SFPUC also has online instruments providing continuous water quality monitoring at numerous locations. Monitoring of the water quality within the City distribution system is the responsibility of Redwood City. The City routinely

monitors its system for bacteriological quality, chlorine residual, general physical parameters and trihalomethanes. The City also conducts lead and copper tap sampling, water quality parameter monitoring, and public education as required by the EPA's Lead and Copper Rule. The City's potable water quality consistently meets primary and secondary drinking water standards. The City also has a proactive program to flush the distribution pipelines to remove deposits, encrustations, sediments, and other materials. This flushing prevents water quality problems related to taste, odor, and turbidity, among others. The City maintains a database recording the schedule and length of time for each flushing. During times of water shortage, the City may suspend flushing activities to conserve water resources. The City also has a Cross Connection Control Program and has certified staff to ensure that all backflow prevention devices are tested and maintained annually.

4.3 Groundwater

The feasibility of developing groundwater supply to supplement the City's Hetch Hetchy water supply was evaluated in a technical report prepared for the City by Todd Engineers in March 2003. Historically, groundwater has not been a source of supply for the City because of water quality, reliability, and long-term production capacity concerns. Local groundwater does exist, however, and is currently used by a limited number of private well owners for domestic and irrigation uses. For example, Sequoia High School in Redwood City currently irrigates some of its landscape with groundwater, and the Pacific Shores development at the eastern end of Seaport Boulevard also uses groundwater for irrigation.

With regard to future development of groundwater supplies, the Todd Engineers technical report concluded that the aquifers under the Redwood City area are considered marginal as sources of municipal supplies, but may be adequate to provide small amounts of supplemental water. Use of groundwater in the area is minimal, so there is little competition for the resource. Existing data indicate that the expected yield from a properly sited and designed production well in the area would likely be less than 500 gallons per minute (gpm), and probably would be on the order of 200 gpm. The estimated annual recharge to groundwater in the Redwood City area is between 1,700 and 2,800 AFY. With a network of properly sited and designed wells, the City might feasibly recover between 500 and 1,000 AFY of supplemental water. Groundwater quality is acceptable for potable and/or irrigation uses; however, to address aesthetic concerns, groundwater treatment and blending would be required for potable use. The presence of contaminated sites and the costs of such a system would need to be evaluated and considered in the well siting process.

4.4 Water Transfer Opportunities

A water transfer is essentially a reallocation of water among water users. There are a wide variety of water transfer types, and they provide substantial flexibility in the allocation and use of water in California (SWRCB, 2002). Some water transfers require the construction of new water conveyance facilities to actually move water from one location to another, while other water transfers involve reallocation of water through "paper" mechanisms (e.g., contracts, etc.). Water transfers generally involve import or export of water from one basin or county to another.

The SFPUC Water Supply Agreement allows for the transfer or exchange of water among parties, both inside and outside of the Regional Water System. Within the

SFPUC system, it is possible to transfer water entitlements and/or unused portions of Individual Supply Guarantees among contracting agencies. The Water Shortage Allocation Plan adopted by SFPUC and its wholesale customers provides for voluntary transfers of water among wholesale customers during periods when mandatory rationing is in effect within the Regional Water System. Some wholesale customers have the capacity to draw more heavily on local groundwater (or other surface water supplies, such as the State Water Project) during dry years and thus may be willing to agree to transfer some portion of their San Francisco Individual Supply Guarantee to other customers who are willing to pay for a back-up supply. Transfers are a possible source of relief from rationing at levels more severe than those required in neighboring communities.

Both the Water Supply Agreement and state law allow the purchase and transfer of water from outside the SFPUC service area. State laws enacted in the 1980s allow for “wheeling” of water from willing sellers to willing buyers through transmission systems owned by third parties. Under these laws, additional water could be secured either by SFPUC or by Redwood City to augment its water supply. Such an arrangement would require both a contract with the third-party water supplier (such as an irrigation agency), and an agreement between Redwood City and the SFPUC on the water quality, price, and operational terms.

As described previously in this chapter, BAWSCA has statutory authority to assist the wholesale customers of the Hetch Hetchy regional water system to plan for and acquire supplemental water supplies. Transfer opportunities may be easier to initiate and implement under the auspices of this agency.

4.5 Desalinated Water Opportunities

In addition to studying the feasibility of developing groundwater supply, the City also explored the feasibility of seawater desalination as an option for supplemental water supply in 2003. Desalination involves converting seawater or brackish water into fresh water by removing salt and other minerals. The feasibility study concluded that due to high capital and operational costs, siting constraints, and environmental requirements, desalination was not a viable option for near-term resolution of Redwood City’s potable water supply needs.

The SFPUC, Santa Clara Valley Water District, East Bay Municipal Utility District, Contra Costa Water District, and Zone 7 Water Agency are jointly exploring developing regional desalination facilities that could benefit the 5.4 million Bay Area residents and businesses served by these agencies. The project is called the Bay Area Regional Desalination Project and information on the project can be found at www.regionaldesal.com. In March 2008, a consultant was selected to build a pilot desalination plant in Contra Costa County to test pretreatment options, membrane performance, and approaches for brine disposal. The California Department of Water Resources awarded the agencies a \$1 million grant to help fund the pilot project. A site for the full-scale desalination plant has not yet been selected. Although regional desalination facilities are not considered a near-term supply option for Redwood City, the City will continue to monitor the progress of the Regional Desalination Project.

4.6 Recycled Water Supply

4.6.1 Introduction

This section of the Plan describes the existing and future recycled water opportunities available in the Redwood City water service area. In August 2003 the City Council approved a broadly defined and flexible recycled water project that was further refined through efforts of a Community Task Force on Recycled Water. The City embarked on the design and construction of the recycled water project in July 2004 and the system has been operational since 2007. This section describes the wastewater treatment facilities within Redwood City, where recycled water is generated, and summarizes Redwood City's history of recycled water use. The recycled water project and the City's incentives and optimization plans to encourage recycled water use are described below.

The recycled water supply and demand values in this section were developed from calendar year 2010, rather than using fiscal year (FY) 2009/2010. Because the recycled water customer retrofit program was underway through the end of 2010, using FY values would not reflect recycled water demands for the most current customer base. Therefore, some of the values in this section may appear inconsistent with the values provided in Chapter 3 of this UWMP; these inconsistencies are due to using calendar year demands versus fiscal year demands.

4.6.2 Wastewater Collection, Treatment, and Disposal

Redwood City's wastewater is conveyed to the sub-regional wastewater treatment plant, South Bayside System Authority (SBSA), located at the eastern end of the Redwood Shores peninsula in Redwood City. SBSA is a joint powers authority (JPA) comprised of four member agencies: Redwood City, Belmont, San Carlos, and the West Bay Sanitary District which serves Menlo Park, Atherton, Portola Valley, and portions of East Palo Alto. Terms of the JPA entitle each member agency to a portion of ownership of SBSA. Redwood City's ownership portion totals approximately 52 percent, which is the largest of the four members.

Redwood City owns, operates and maintains a wastewater collection system comprised of 280 miles of sewer mains and 29 pump stations that serves both residential and commercial customers. Wastewater flow from the City is conveyed from the Redwood City pump station (located at 1585 Maple Street) through the SBSA-operated conveyance system, comprised of four pump stations and nine miles of force main, serving all four of the member agencies. Wastewater collected in the Redwood Shores area does not enter the SBSA-operated conveyance system and is conveyed separately to SBSA through City-operated facilities.

The SBSA treatment plant has a permitted operating capacity of 29 million gallons per day (MGD) average dry weather flow (ADWF) and a peak wet weather flow (PWWF) design capacity of 71 MGD. Pursuant to the JPA, Redwood City has maximum capacity rights of 13.775 ADWF and 30.5 PWWF. Table 4-3 summarizes the ADWF allocation of the four member agencies. Current and projected wastewater flows collected within Redwood City and the SBSA service area, and treated at SBSA, are summarized in Table 4-4. Also included in Table 4-4 are the current and projected amounts of wastewater treated and available for recycled water use.

Table 4-3: ADWF Capacity Allocation for SBSA (MGD)					
	Belmont	San Carlos	West Bay Sanitary District	Redwood City	Total
Capacity Allocated	2.779	4.471	7.975	13.775	29.0

Table 4-4: Wastewater Collection and Treatment (AFY)					
	2010	2015	2020	2025	2030
Wastewater collected in Redwood City ¹	9,420	9,723	10,014	10,283	10,540
Wastewater collected and treated in SBSA service area ¹	19,714	20,498	21,282	22,066	22,626
Quantity of wastewater meeting "unrestricted use" recycled water criteria, for Redwood City recycled water customers ²	490	987	1,280	1,453	1,611
Quantity of wastewater meeting "unrestricted use" recycled water criteria, for use in SBSA landscape impoundment ³	92	92	92	92	92
¹ Whitley Burchett & Associates. Technical Memorandum on SBSA Service Area Wastewater Flow Projections. Prepared for SBSA, 6 June 2008. ² Projected recycled water demands are from values developed for and shown in Tables 4-8 and 4-9 in Section 4.6.5. ³ SBSA uses recycled water to fill its onsite landscape impoundment. This is listed as a separate line item to avoid confusion with Redwood City recycled water customers who use recycled water as potable water offset.					

Through the use of filtration, wastewater at SBSA is treated to advanced secondary standards. A portion of the secondary effluent is diverted and treated to disinfected tertiary recycled water criteria (Title 22 of the California Code of Regulations [CCR]) established by the California Department of Public Health (CDPH). The recycled water is delivered into City-owned and operated storage tanks (located at the SBSA plant) for use in the City’s recycled water system. The remaining secondary effluent is discharged through an outfall into the San Francisco Bay in accordance with the National Pollutant Discharge Elimination System (NPDES) permit issued by the San Francisco Regional Water Quality Control Board (RWQCB) in January 2007. Table 4-5 summarizes the current and projected amounts of wastewater treated and disposed either via the outfall or for recycled water use.

Table 4-5: Wastewater Disposal and Reuse (AFY)						
	Treatment Level	2010	2015	2020	2025	2030
Wastewater discharged through outfall ¹	Advanced secondary	19,132	19,420	19,910	20,521	20,923
Wastewater treated and used for Redwood City recycled water customers ²	Disinfected tertiary	490	987	1,280	1,453	1,611
Wastewater treated and used for SBSA landscape impoundment ³	Disinfected tertiary	92	92	92	92	92
¹ Discharged wastewater is calculated from wastewater collected and treated in SBSA service area (see Table 4-3) minus the wastewater treated and used for Redwood City recycled water customers and SBSA landscape impoundment. ² Projected recycled water demands are from values developed for and shown in Tables 4-8 and 4-9 in Section 4.6.5. ³ SBSA uses recycled water to fill its onsite landscape impoundment. This is listed as a separate line item to avoid confusion with Redwood City recycled water customers who use recycled water as potable water offset.						

4.6.3 Description of Redwood City Recycled Water Project

In 1997 the RWQCB, concurrent with its approval of the NPDES permit for the Stage 2 Wastewater Treatment Facilities Expansion project, encouraged SBSA to take a leadership role in the development of a pilot water recycling project. This led to the creation of the First Step Project initiated by Redwood City and SBSA in the spring of 2000. The purpose of the project was to demonstrate the feasibility of producing recycled water to meet CDPH standards and using recycled water, primarily for landscape irrigation, within the City. The First Step Project was a two-year project and consisted of production of up to 0.25 MGD of disinfected tertiary recycled water suitable for unrestricted use. The recycled water was produced at temporary treatment facilities at SBSA. Recycled water was delivered to customers for landscape irrigation at the eastern end of the Redwood Shores peninsula, near SBSA, via underground pipelines. Of the ten landscape irrigation customers served, eight were City-owned landscaped street medians and two served common landscape areas at an apartment and office building complex. A portion of the recycled water produced was also used by SBSA to fill a landscape impoundment and to supply a truck fill station used for dust control.

The success of the First Step Project resulted in extending the project for two additional two-year periods (2002-2004, 2004-2006). All recycled water quality requirements during this period were met, and in 2002-03 improvements were completed at SBSA to increase reliability and efficiency while maintaining the original treatment capacity (0.25 MGD). The First Step Project ended with the commencement of the Redwood City Recycled Water Project. Existing customers of the First Step Project became customers of the City-wide project.

Design and construction of the Redwood City Recycled Water Project was initiated in 2004, and included permanent recycled water treatment and storage facilities at SBSA, a recycled water distribution system, and on-site customer retrofit facilities. Treatment facilities at SBSA can produce up to 9,000 gpm of disinfected tertiary recycled water, reservoirs at SBSA provide 4.36 million gallons of storage, and the pump station at SBSA can deliver up to 13,100 gpm of recycled water to the transmission system.

The City's environmental documentation for the recycled water project includes a system capable producing and delivering up to 3,238 AFY. Therefore, the recycled water facilities have been designed with the intention of eventually delivering up to 3,238 AFY. The facilities installed to date were constructed to supply the initial phases of the project, up to 2,000 AFY, while providing the flexibility to cost-effectively deliver up to an annual delivery rate of 3,238 AFY if needed. Installed treatment, pumping, and pipeline facilities have been sized for project build-out. However, additional storage facilities would be required to reach full intended project capacity.

The distribution system portion of the project includes two phases. Phase 1 has already been constructed and includes pipelines and customers east of Highway 101 in Redwood Shores, the Greater Bayfront Area, and the Seaport Area. Phase 2 is eventually expected to include pipelines and pumping facilities to serve customers west of Highway 101. The recycled water pipeline distribution system for Phase 1 was divided into nine discrete projects and construction was completed from 2007 to 2010. Phase 1 includes 14.75 miles of pipelines and, as of April 2011, currently delivers recycled water to 50 irrigation sites and two non-irrigation sites.

Redwood City has been successful in taking advantage of state and federal grants to supplement City funds for the recycled water project. Approximately \$5 million in grants have been obtained for the project; total project construction cost is about \$72 million. The largest source of grant monies came from the State Clean Water Bond Act. The City has received a \$2.9 million grant for construction of the Seaport area distribution pipelines. An Integrated Regional Water Management grant of \$972,800 was also used for construction of the Bayfront area pipeline. Federal funds of \$1.1 million from the U.S. Bureau of Reclamation Title XVI program have also been appropriated by Congress for pipelines in the Seaport Area.

Redwood City adopted a Recycled Water Use Ordinance in July 2008. The Ordinance established the Recycled Water Service Area and requirements for recycled water use within the service area. The purpose of the Ordinance is to ensure that the City remains consistent with the California Water Code by achieving the maximum public benefit from the use of the City's recycled water supply. The Ordinance identifies the required and voluntary uses of recycled water, including requirements for dual plumbing to accommodate the use of recycled water. Table 4-6 summarizes the requirements of the Ordinance.

Table 4-6: Recycled Water Use Ordinance Requirements				
	Landscaping	Internal Separate Plumbing	Internal Cooling	Industrial Processes
Existing/remodeled commercial/industrial buildings	Required	Consider/encouraged	Consider/encouraged	Consider/encouraged
New commercial, industrial, institutional, and government projects	Required	Required	Required	Consider/encouraged
Existing/remodeled apartments and condos	Consider/encouraged	Consider/encouraged	Consider/encouraged	Not applicable
New apartments and condos	Required	Required	Required	Not applicable
Single-family homeowner associations (HOAs)	Consider/encouraged	Not applicable	Not applicable	Not applicable

4.6.4 2005 UWMP Recycled Water Use Projection vs. 2010 Actual Use

The 2005 UWMP projected that build-out of the recycled water project by 2030 would serve 108 customers, 93 of which were existing potable water customers and 15 were anticipated future developments. The 2005 UWMP projected that 922 AFY of recycled water would be delivered by 2010 for 61 sites (49 landscape irrigation sites and 12 industrial sites).

After the 2005 UWMP recycled water projections were developed, significant changes to the customer base and associated demands have occurred, as described below.

- Commercial Cooling:** The 2005 UWMP projections assumed commercial buildings within the Phase 1 area would retrofit their cooling towers to use recycled water. Cooling towers are considered a non-irrigation use of recycled water and the required retrofits are at the customer’s expense (customer retrofits for irrigation customers are paid for by the City). Non-irrigation customers receive recycled water at a 40 percent discount from potable water rates to help offset the cost of retrofit. Due to the complexity and high cost of retrofitting cooling towers, especially those located on rooftops, only one customer has since pursued a cooling tower retrofit since the 2005 UWMP was adopted (the project is still being considered and is not using recycled water as of the development of this UWMP). This has resulted in a lower use of recycled water by commercial customers than was projected for 2010.
- Residential Irrigation:** The 2005 UWMP projections did not include irrigation of residential common areas because, in the early stages of the project, the City’s approach to customer retrofit focused on commercial and City-owned landscape irrigation sites. In recent years, however, several homeowners association (HOA) boards and apartment building managers have approached the City about using recycled water for landscape irrigation. This increased interest has resulted in a change to the customer base and has affected the actual 2010

recycled water use. To date, three residential developments have retrofitted their sites to use recycled water in common areas and 15 more are slated for retrofit (see Section 4.6.5.2); this has resulted in actual use for residential irrigation being higher than was projected in the 2005 UWMP.

- **Commercial Irrigation Sites:** Several commercial irrigation sites that were included in the 2005 UWMP projections are not yet receiving recycled water due to complexity of the retrofit or concerns about reliability. This resulted in a smaller customer base in this use category than was projected for 2010.
- **Industrial Sites:** Twelve industrial sites were included in the 2005 UWMP recycled water use projections. As noted above, retrofit costs for non-irrigation customers are the responsibility of the customer rather than the City. Due to the economic downturn, many of the non-irrigation customers placed their non-essential capital improvement projects on hold and were unable to fund recycled water retrofits. This resulted in a significantly lower use of recycled water by industrial customers than was projected by the 2005 UWMP for 2010.
- **Water Conservation:** In an effort to reduce potable water use to below its Individual Supply Guarantee before negotiating the Water Supply Agreement with SFPUC in 2009, Redwood City implemented an aggressive conservation program in concert with implementation of the recycled water project. In 2002, the City launched a program aimed at reducing water waste and improving the health of landscape areas throughout the city. The conservation program included performing voluntary audits of irrigation systems, providing water use budgets to irrigation customers, and implementing programs that are aimed at improving water conservation for large landscape customers (see description of this in Chapter 6). Through these efforts, the City experienced sizeable decreases in water used for landscape irrigation from 2002 to 2010. The recycled water demand estimates in the 2005 UWMP were based on 2000 irrigation meter data. These demand estimates did not account for the City-sponsored conservation measures that ultimately reduced landscape irrigation demands. Therefore, actual recycled water use in 2010 was less than was projected in the 2005 UWMP for sites that are now connected to the system.
- **Net Irrigation Requirements:** Irrigation requirements vary from year to year, depending on rainfall, temperature, and other weather factors. In Redwood City, the net irrigation requirement for 2010 was 82 percent lower than the average of the previous 10 years. The projections in the 2005 UWMP were based on an average irrigation year. Therefore, irrigation demands were significantly lower in 2010 than the 2005 UWMP projection. Had 2010 been a “normal” irrigation year, recycled water demands are likely to have been approximately 22 percent higher than the demands shown in Table 4-7, or 597 AFY. The revised figure (597 AFY) is reflected in Table 4-8.

By the end of 2010, 52 sites were connected to the recycled water system (50 landscape irrigation sites and two industrial sites). Table 4-7 summarizes the recycled water use projected for 2010 from the 2005 UWMP and actual recycled water use in 2010.

Table 4-7: 2005 UWMP Projected Recycled Water Use Compared to 2010 Actual Use

Use Type	Description	2010 Use (AFY)	
		Actual	2005 UWMP Projection
Landscape Irrigation	First Step Project		30
	Commercial/City ¹	481	766
	Residential	9	0
Non-Irrigation Use	Industrial Uses	< 1	97
	Cooling	0	29
Other	New Development	0	0
Total Redwood City Recycled Water Use		490	922
¹ Actual use includes First Step customers.			

4.6.5 Current and Projected Recycled Water Use

This section discusses current uses of recycled water in Redwood City and the potential for additional uses in the future.

4.6.5.1 Current Recycled Water Use

The mandated use of recycled water is covered by the Recycled Water Use ordinance. For customers located near the Phase 1 pipeline distribution system, however, the City has thus far made recycled water use voluntary, relying on customer outreach and education as a means to build relationships with site managers rather than using the ordinance as an enforcement tool. Approved uses are landscape irrigation (including commercial, residential, City-owned, and Caltrans sites) and non-irrigation uses (toilet flushing and cooling towers in commercial buildings, and industrial processes).

During preliminary planning and development of the project, some community members expressed concerns about the safety of recycled water, specifically with respect to exposure to children. As a result, the City Council adopted a policy not to use recycled water in areas where children play; therefore, no schools or parks in the Recycled Water Service area currently use recycled water for irrigation or non-irrigation uses.

Currently, recycled water is being used for irrigation of landscaping on commercial properties, common areas of residential sites, and City-owned streetscapes. Recycled water is also being used for dust control at an industrial site and for wash down at a sanitary sewer lift station. SBSA uses recycled water to fill its onsite landscape impoundment. In 2010, approximately 30 million gallons (92 AFY) was used for this purpose. However, this is not considered an offset to potable water demands because the impoundment was not previously using potable water.

4.6.5.2 Projected Recycled Water Use

This section describes the potential for future recycled water use in three categories: conversion of existing potable water customers within the Phase 1 area, conversion of existing potable water customers within the central Redwood City area (Phase 2), and potential new customers associated with build-out under the City's new General Plan.

Within the Phase 1 area, 15 additional residential HOA customers have submitted applications for recycled water service. The City is developing retrofit plans for those sites and anticipates completing the retrofits by summer 2011. These planned retrofits limit the use of recycled water to the common landscape areas of HOAs. The irrigation demands for all 15 HOAs are estimated to be 94 AFY.

In addition to the HOA retrofits underway, there are opportunities to serve additional recycled water within the Phase 1 area, as follows:

- During initial project implementation and as noted in Section 4.6.4, several commercial customers in the Phase 1 area opted out of receiving recycled water due to complexity of the retrofit or concerns about reliability. These sites are required to use recycled water under the Recycled Water Use Ordinance. Therefore, the City anticipates that these sites will eventually be converted to recycled water in the future, in accordance with the Ordinance.
- Additional HOAs in the Redwood Shores area might request recycled water service in the future. Recycled water service laterals have already been installed for most HOAs, so onsite retrofit cost would be the only capital expenditure. Use of recycled water at existing HOAs remains voluntary under the Ordinance. Therefore, financial incentives (25 percent discount from potable water rates), reliability of recycled water (no mandatory cutbacks during droughts), and the successful use of recycled water on neighboring properties will be the most effective methods to encourage other residential sites to connect to the recycled water system. The irrigation demands for these HOAs are estimated to be nearly 200 AFY, but are not included in the future projected recycled water demands shown in Table 4-8 due to the uncertainty that the sites will voluntarily connect to the recycled water system.
- Twelve existing non-irrigation/industrial sites in the Phase 1 area have expressed strong interest in using recycled water. Potential uses include toilet flushing, commercial cooling, truck washing, concrete mixing, asphalt production, and dust control for metal and concrete recycling. Recycled water service laterals have been installed for these sites as part of Phase 1, but non-irrigation customers are responsible for the cost of on-site retrofit. Use of recycled water at industrial sites is voluntary under the Ordinance, so City outreach and financial incentives (40% discount from potable water rates) are the City's most useful tools to encourage customers to connect to the recycled water system. The industrial community has been very supportive of Redwood City's recycled water project and the City anticipates that these sites will eventually be converted to recycled water once the economic outlook improves and stabilizes.
- There are several parks and schools in the Redwood Shores area near the existing pipeline alignment. If the City were to modify its policy related to using

recycled water in areas where children play, it could increase the use of recycled water within the Phase 1 area with very little capital cost. The recycled water demands in Table 4-8 assume that existing parks and schools will eventually connect to the recycled water system for landscape irrigation.

The City plans to eventually expand the recycled water project to the central area of Redwood City, west of Highway 101 (Phase 2). The existing customer base in this area of the City is more dispersed than the Phase 1 area, would require significant infrastructure to reach the customers, and has relatively low demands. Serving all of these sites is not feasible due to the infrastructure that would be required. The capital costs would be high and the potable demand reduction would be relatively low.

Because of the relatively low existing demands in the central Redwood City area, the recycled water project is ultimately planned to expand as development occurs, allowing the City to target specific developments for recycled water service and construct pipelines on an as-needed basis to support development in the recycled water service area. The City anticipates that new recycled water pipelines will be constructed to serve the major development areas as identified in the City's General Plan adopted in October 2010. Chapter 3 of this UWMP provides water use projections based on the new General Plan's development potential (including recycled water demands).

It is not economically feasible to serve recycled water to 100 percent of the City's potable water customers due to the infrastructure that would be required. Furthermore, recycled water pipeline expansion will be reliant on the pacing and location of future development. The City has developed a conceptual backbone pipeline alignment in the Phase 2 area that is expected to serve approximately 60 percent of future development. Table 4-8 provides a summary of the projected recycled water use over the next 20 years, taking into account the conceptual pipeline alignment and feasibility of serving particular customers in the Phase 1 and Phase 2 project areas.

4.6.6 Opportunities for Expanding Recycled Water Use

Opportunities to expand and maximize the use of recycled water in Redwood City are summarized below:

- **System Expansion**: The alternatives being considered for Phase 2 of the project aim to optimize recycled water use by locating new pipelines to serve as many customers as are economically feasible. Furthermore, new pipelines may be sized to include flexibility for serving known and future recycled water demands. Future demands may include new development or redevelopment within Redwood City or sites outside the City's recycled water service area. Existing facilities are sized such that the City's recycled water program has some flexibility to expand and serve neighboring communities as part of a sub-regional or regional project.
- **Customer Incentives**: The City will continue its customer outreach program to encourage and assist potable water customers with connecting to the recycled water system. Additionally the City will continue to evaluate financial incentives for customers using recycled water. The primary incentive currently offered by the City is the discounted rate: recycled water service charges and fees cost 25 percent less than potable water for irrigation use and 40 percent less than

potable water for non-irrigation use. Recycled water offers a drought-proof supply, so recycled water customers are protected from mandatory cutbacks during drought conditions (described in Chapter 5). This is a significant incentive for customers that have invested in highly visible and high-value landscaping. As part of the Phase 1 project, the City has been paying for site retrofit of irrigation customers that have voluntarily agreed to use recycled water. This, in conjunction with the rate discount, provides a substantial incentive for customers to pursue using recycled water.

Use Type	Description	2015	2020	2025	2030
Landscape Irrigation	Existing Recycled Water Customers ²	597	597	597	597
Landscape Irrigation	Existing Commercial Sites, Phase 1 Project Area	10	20	20	20
	Existing Residential Sites, Phase 1 Project Area	94	94	94	94
	Existing Parks/Schools, Phase 1 Project Area	69	69	69	69
	Existing Commercial Sites, Central Redwood City	8	69	69	69
	Existing Parks/Schools, Central Redwood City	0	13	27	27
	New Commercial Sites, per General Plan	68	136	204	272
	New Residential Sites, per General Plan	40	79	119	158
Non-Irrigation and Industrial Reuse	Existing Indoor/Industrial Uses, Phase 1 Project Area	50	100	100	100
	New Indoor Uses, Commercial Sites, per General Plan	20	41	61	82
	New Indoor Uses, Residential Sites, per General Plan	31	62	93	123
	Total	987	1,280	1,453	1,611

¹ This table reflects demands for those customers that are considered feasible to serve.
² Recycled water use in 2010 was 490 AFY. However, in Redwood City, the net irrigation requirement for 2010 was 82% lower than the average of the previous 10 years. Therefore, irrigation demands were significantly lower in 2010 than would be expected in a “normal” irrigation year. In a “normal” irrigation year, recycled water demands for existing recycled water customers are expected to be 597 AFY.

- **Recycled Water Use Ordinance:** The City will continue to implement the Recycled Water Use Ordinance. By requiring certain customers to use recycled water or consider its use, as noted in Table 4-6 above, the City anticipates

increasing recycled water use within the service area. The Ordinance also provides a tool for the City to use to increase and optimize recycled water use when approached by developers about potential new projects.

- New Development:** When the City is approached with proposals for new development, water supply is a key issue to be evaluated before approval of the new developments. SB 610 requires that Water Supply Assessments be performed for all projects that are subject to CEQA and of a certain size. The Water Supply Assessment thus allows the City to influence the developer’s proposal for water supply, and allows the City to bring recycled water into the planning process. The City’s Recycled Water Use Ordinance provides a mechanism for ensuring that developers maximize recycled water use through installation of piping for irrigation and approved indoor uses. Although the City does not provide developers financial incentives to use recycled water, the availability of recycled water improves the chances for new development to be approved since it reduces dependence on limited potable water resources.
- Exporting:** While no plans currently exist for exporting recycled water beyond the City’s service area, the City may consider exporting recycled water to neighboring communities in the future. Though this offers no potable water reduction for the City, exporting would provide a regional benefit by reducing regional potable water use and optimizing the recycled water infrastructure already in place.

It is anticipated the optimization methods will result in increase recycled water use, as summarized in Table 4-9.

Table 4-9: Methods to Encourage Recycled Water Use					
Methods	Projected Use (AFY)¹				
	2010	2015	2020	2025	2030
System Expansion, Customer Incentives, Recycled Water Use Ordinance, Development Agreements	490	987	1,280	1,453	1,611
¹ Does not include recycled water available for exportation to outside agencies.					

4.7 Other Future Water Project Opportunities

This section describes other potential future water project opportunities for Redwood City, including additional discussion of the potential for recycled water expansion.

4.7.1 Recycled Water

As the Redwood City recycled water project expands to meet demands in the Phase 2 project area, the City will continue to seek new opportunities to increase recycled water use. The 3,238 AFY of projected demand associated with the recycled water project approved in 2003 was used to plan and design the facilities; however, it may be possible that the existing facilities can produce more recycled water depending on how certain

facility elements are operated, modified and/or expanded. Pumping and pipeline facilities were sized to deliver peak hour demands for all the customers associated with the 3,238 AFY demand. Some additional capacity was provided in the major transmission system by slightly increasing pipeline diameters in the major pipelines located between SBSA and the Seaport area. The additional capacity was approved by City Council to build flexibility into the system should the system evolve to serve additional customers in the future. However, no specific additional demand target or system capacity was established for the conveyance system upsizing.

Member agencies of SBSA are each entitled to a share of SBSA's effluent and may eventually wish to exercise their entitlement. The treatment facilities at SBSA are located within Redwood City limits, making access to the effluent somewhat complicated because it would involve trenching through residential neighborhoods and streets. Redwood City is in a position to serve these agencies with high quality recycled water using the existing recycled water treatment and distribution facilities already installed by the City.

Neighboring communities of Belmont, San Carlos, Foster City, Atherton, Menlo Park, and Woodside rely primarily on potable water from the SFPUC regional water system. These communities will likely be facing some of the same water supply issues that Redwood City is currently addressing. The Redwood City recycled water system has the potential to be at the center of a regional or sub-regional system that reduces potable water demands and improves water supply reliability on the San Francisco peninsula.

4.7.2 Groundwater

As mentioned in Section 4.3, the potential exists to construct a network of groundwater wells in Redwood City for a potential normal year supply of 500 to 1,000 AFY. Local aquifers are considered marginal sources, but may be adequate to provide small amounts of supplemental water. Groundwater quality in Redwood City is believed to be acceptable for potable and irrigation uses, but would require treatment and blending for aesthetics if used as a potable source. Acceptable sites have not been identified, nor have yield, schedule, and costs been confirmed.

4.7.3 Water Transfers

As discussed in Section 4.4, exploration of surface water transfers as an additional source of supply is among the General Plan policies supporting the goal of ensuring adequate and sustainable water supplies. Within the SFPUC Regional Water System, water entitlements may be transferred or exchanged between SFPUC customers. Additionally, as permitted by the Water Supply Agreement and state law, water may be purchased from outside of the Regional Water System and conveyed to the SFPUC and/or Redwood City through third-party transmission systems. Additional water could thereby be secured either by SFPUC or by Redwood City to augment regional or individual water supplies. As described in Section 4.2.5, BAWSCA has statutory authority to assist its member agencies in planning for and acquiring supplemental water supplies through water transfers. Pursuant to General Plan policies, the City will continue to explore water transfer opportunities as a potential source of additional supply.

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Chapter 5

Chapter 5 – Water Supply Reliability and Water Shortage Contingency Planning

5.1 Introduction

Chapter 5 describes regional reliability of SFPUC wholesale potable water supplies and addresses specific impacts relevant to Redwood City. Section 5.7 covers water shortage contingency planning and how the City will cope with shortages of varying magnitude.

5.2 SFPUC 2018 Interim Supply Limitation

As part of its adoption of the Water System Improvement Program (WSIP) in October 2008, discussed in Section 4.2.2, the SFPUC adopted a water supply element, the Interim Supply Limitation (ISL), which limits sales from San Francisco Regional Water System (RWS) watersheds to average annual deliveries of 265 million gallons per day (MGD) through 2018. 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 provides a framework for administering the ISL.

BAWSCA has developed a strategy to address each of its member agencies' unmet needs resulting from the ISL through its Water Conservation Implementation Plan (WCIP) (available at http://bawasca.org/docs/WCIP_FINAL_Report.pdf). A key objective of the WCIP is to identify how BAWSCA member agencies can use water conservation as a way to continue to provide reliable water supplies to their customers through 2018 given the 184 MGD Interim Supply Limitation. Redwood City was, and is, an active participant in the development and implementation of the WCIP in addition to the Long-term Reliable Water Supply Strategy discussed in Section 5.3 below.

5.2.1 Interim Supply Allocations

The Interim Supply Allocations (ISAs) refers to each individual wholesale customer's share of the ISL. On December 14, 2010, the SFPUC established each agency's ISA through 2018, and plans to impose a surcharge (the Environmental Enhancement Surcharge) discussed in Section 5.2.2) on agencies that exceed their ISA. Redwood City's ISA is 10.88 MGD. In general, the SFPUC based the allocations on the lesser of the projected fiscal year 2017-18 purchase projections or Individual Supply Guarantees. The ISAs are effective only until December 31, 2018 and do not affect the Supply Assurance or the Individual Supply Guarantees, both discussed in Chapter 4.

As stated in the Water Supply Agreement, the wholesale customers do not concede the legality of the SFPUC's establishment of the ISL or the ISAs (or the Environmental Enhancement Surcharge), and expressly retain the right to challenge these, if and when imposed, in a court of competent jurisdiction.

5.2.2 Environmental Enhancement Surcharge

The SFPUC plans to establish the Environmental Enhancement Surcharge concurrently with the budget-coordinated rate process. This surcharge will be unilaterally imposed by SFPUC on individual wholesale customers, and SFPUC retail customers, when each agency's use exceeds its Interim Supply Allocation and when sales of water to the

wholesale customers and San Francisco retail customers, collectively, exceed the Interim Supply Limitation of 265 MGD. The SFPUC is in the process of developing the methodology and amount of this volume-based charge. The Environmental Enhancement Surcharge will become effective beginning fiscal year 2011-12.

5.3 BAWSCA Long Term Reliable Water Supply Strategy

BAWSCA's water management objective is to ensure that a reliable, high quality supply of water is available where and when people within the BAWSCA service area need it. A reliable supply of water is required to support the health, safety, employment, and economic opportunities of the existing and expected future residents in the BAWSCA service area and to supply water to the agencies, businesses, and organizations that serve those communities. BAWSCA is developing the Long-Term Reliable Water Supply Strategy (Strategy) to meet the projected water needs of its member agencies and their customers through 2035 and to increase their water supply reliability under normal and drought conditions.

The Strategy is proceeding in three phases. Phase I was completed in 2010 and defined the magnitude of the water supply issue and the scope of work for the Strategy. (The Long-Term Reliable Water Supply Strategy Phase I Scoping Report is available at http://bawasca.org/docs/BAWSCA_Strategy_Final_Report_2010_05_27.pdf). Phase II of the Strategy is currently under development and will result in a refined estimate of when, where, and how much additional supply reliability and new water supplies are needed throughout the BAWSCA service area through 2035, as well as a detailed analysis of the water supply management projects, and the development of the Strategy implementation plan. Phase II will be complete by 2013. Phase III will include the implementation of specific water supply management projects. Depending on cost-effectiveness, as well as other considerations, the projects may be implemented by a single member agency, by a collection of the member agencies, or by BAWSCA in an appropriate timeframe to meet the identified needs. Project implementation may begin as early as 2013 and will continue throughout the Strategy planning horizon, in coordination with the timing and magnitude of the supply need.

The development and implementation of the Strategy will be coordinated with the BAWSCA member agencies and will be adaptively managed to ensure that the goals of the Strategy (i.e., increased normal and drought year reliability) are efficiently and cost-effectively being met.

5.4 Tier 1 and Tier 2 Water Shortage Allocations

5.4.1 Tier One Drought Allocations

In July 2009, in connection with adoption of the Water Supply Agreement, the wholesale customers and San Francisco adopted a Water Shortage Allocation Plan (WSAP), to allocate water from the regional water system to retail and wholesale customers during system-wide shortages of 20 percent or less (the "Tier One Plan"). The Tier One Plan replaced the prior Interim Water Shortage Allocation Plan, adopted in 2000, which also allocated water for shortages up to 20 percent. The Tier One Plan also 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, which allocates water between San Francisco retail customers and the wholesale customers collectively, distributes water based on the level of shortage, as shown in Table 5-1.

Table 5-1: Tier One Plan Allocation of Water During Shortages		
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 will expire at the end of the term of the Water Supply Agreement (June 30, 2034), unless extended by San Francisco and the wholesale customers.

5.4.2 Tier Two Drought Allocations

The wholesale customers have negotiated, and 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. This Tier Two allocation is based on a formula that takes multiple factors for each wholesale customer into account, including:

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

The water made available to the wholesale customers collectively will be allocated among them 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 wholesale customer’s Individual Supply Guarantee, as stated in the WSA, and is fixed. The second component, the Base/Seasonal Component, is variable and is calculated using the monthly water use for three consecutive years prior to the onset of the drought for each of the wholesale customers for all available water supplies. The second component is accorded twice the weight of the first, fixed 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 sufficient supply for certain wholesale customers.

The Allocation Basis is used in a fraction, as numerator, over the sum of all wholesale customers’ Allocation Bases to determine each wholesale customer’s Allocation Factor. 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. However, for long-term planning purposes, each wholesale customer shall use as its Allocation Factor, the value identified in the Tier Two Plan when adopted. The Tier Two Plan will expire in 2018 unless extended by the wholesale customers.

5.5 Reliability of the Regional Water System

The SFPUC's Water System Improvement Program (WSIP) provides goals and objectives to improve the delivery reliability of the Regional Water System (RWS) including water supply reliability. The goals and objectives of the WSIP related to water supply are:

Program Goal	System Performance Objective
<p>Water Supply – <i>meet customer water needs in non-drought and drought periods</i></p>	<ul style="list-style-type: none"> • 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% 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 adopted WSIP had several water supply elements to address the WSIP water supply goals and objectives. The following provides the water supply elements for all normal and dry year types and the dry-year projects of the adopted WSIP to augment all year type water supplies during drought.

5.5.1 Water Supply – Normal and Dry Years

SFPUC historically has met demand in its service area in all year types from its watersheds. They are the:

- 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.

5.5.2 Water Supply – Dry-Year Types

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:

- Restoration of Calaveras Reservoir capacity
- Restoration of Crystal Springs Reservoir capacity
- Westside Basin Groundwater Conjunctive Use
- Water Transfer with Modesto Irrigation District (MID)/Turlock Irrigation District (TID)

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

5.5.3 Projected Regional Water System Supply Reliability

SFPUC has provided information regarding the projected RWS supply reliability (see table in Appendix D). The table assumes that the wholesale customers purchase 184 MGD from the RWS through 2030 and the implementation of the dry-year water supply projects included in the WSIP. The numbers in the table represent the wholesale share of available supply during historical year types per the Tier One Water Shortage Allocation Plan. The table does not reflect any potential impact to RWS yield from the additional fishery flows required as part of Calaveras Dam Replacement Project and the Lower Crystal Springs Dam Improvements Project discussed below.

5.5.4 Impact of Recent SFPUC Actions on Dry Year Reliability of RWS Supplies

In adopting the Calaveras Dam Replacement Project and the Lower Crystal Springs Dam Improvements Project, SFPUC committed to providing fishery flows below Calaveras Dam and Lower Crystal Springs Dam 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 3.9 MGD and 3.5 MGD respectively, with an annual average total of 7.4 MGD. These fishery flows could potentially create a shortfall in meeting SFPUC demands of 265 MGD and slightly increase SFPUC's dry-year water supply needs. If a shortfall occurs, it is anticipated to occur at the completion of construction of both the Lower Crystal Springs Dam Improvement and the Calaveras Dam Replacement Project in approximately 2013 and 2015, respectively, when the SFPUC will be required to provide the fishery flows.

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 2013 and 2018 without: 1) a reduction in demand, 2) an increase in rationing, or 3) a supplemental supply. Following is a description of these actions.

Reduction in Demand

The current projections for purchase requests through 2018 remain at 265 MGD. In the last few years, however, SFPUC deliveries have been below this level as a result of lower demands, as illustrated in Table 5-2. If this trend continues, SFPUC may not need

265 MGD from its watersheds to meet purchase requests through 2018. As a result, the need for supplemental supplies of 3.5 MGD starting in 2013 and increasing to 7.4 MGD in 2015 to offset the water supply loss associated with fish releases may be less than anticipated.

Table 5-2: Water Deliveries in SFPUC Service Area¹					
	2005/06	2006/07	2007/08	2008/09	2009/10
Total deliveries (MGD)	247.5	257	254.1	243.4	225.2
¹ Reference: SFPUC FY09-10 J-Table Line 9 "Total System Usage" plus 0.7 MGD for Lawrence Livermore National Laboratory use and 0.4 MGD for Groveland. No groundwater use is included in this number. Unaccounted-for-Water is included.					

Increase in Rationing

The adopted WSIP provides for a dry year water supply program that, when implemented, would result in system-wide rationing of no more than 20 percent. The PEIR identified the following drought shortages during the design drought: 3.5 out of 8.5 years at 10 percent rationing and 3 out of 8.5 years at 20 percent rationing. If the SFPUC did not develop a supplemental water supply in dry years to offset the effects of the fishery flows on water supply, rationing would increase during dry years. If the SFPUC experiences a drought between 2013 and 2018 in which rationing would need to be imposed, rationing would increase by approximately 1 percent in shortage years. Rationing during the design drought would increase by approximately 1 percent in rationing years.

Supplemental Supply

The SFPUC may be able to manage the water supply loss associated with the fishery flows through the following actions and considerations:

- Development of additional conservation and recycling
- Development of additional groundwater supply
- Water transfer from MID and/or TID
- Increase in Tuolumne River supply
- Revising the Upper Alameda Creek Filter Gallery Project capacity¹
- Development of a desalination project

The SFPUC has stated a commitment to meeting its contractual obligation to its wholesale customers of 184 MGD and its delivery reliability goal of 265 MGD with no

¹ The adopted WSIP included the Alameda Creek Fishery Enhancement project, since renamed the Upper Alameda Creek Filter Gallery (UACFG) project, which had the stated purpose of recapturing downstream flows released under a 1997 California Department of Fish and Game MOU. Implementation of the UACFG project was intended to provide for no net loss of water supply as a result of the fishery flows bypassed from ACDD and/or released from Calaveras Dam. At the time the PEIR was prepared, the UACFG was described in the context of recapturing up to 6,300 acre-feet per year. The UACFG will undergo a separate CEQA process in which all impacts associated with the project will be analyzed fully.

greater than 20 percent rationing in any one year of a drought. In Resolution No. 10-0175 adopted by the Commission on October 15, 2010, the Commission directed staff to provide information to the Commission and the public by March 31, 2011 on how the SFPUC has the capability to attain its water supply levels of service and contractual obligations. This directive was in response to concerns expressed by the Commission and the Wholesale Customers regarding the effect on water supply of the instream flow releases required as a result of the Lower Crystal Springs Dam Improvement Project and the Calaveras Dam Replacement Project. In summary, the SFPUC has a projected shortfall of available water supply to meet its LOS goals and contractual obligations. SFPUC has stated that current decreased levels of demand keep this from being an immediate problem, but that in the near future, the SFPUC must resolve these issues. Various activities are underway by the SFPUC to resolve the shortfall problem. SFPUC staff will report back to the Commission by August 31, 2011 to provide further information on actions to resolve the shortfall problem.

5.6 Drought Planning

The reliability of SFPUC's water supply system is expressed in terms of the system's ability to deliver water during periods of drought. Reliability is assessed in terms of the amount and frequency of water delivery reductions (deficiencies) required to balance customer demands with available supplies in drought periods. SFPUC's "Design Drought" analysis, used for planning and modeling of future drought scenarios, is based on historic droughts and hydrology. It posits a drought sequence more severe than what the SFPUC RWS has historically experienced. The 1987-92 drought – the most severe recorded drought for SFPUC water deliveries – establishes the basis for the Design Drought sequence. Under the Design Drought analysis, SFPUC assumes its "firm" capability to be the amount the system can be expected to deliver during historically experienced drought periods. In estimating this firm capability, SFPUC assumes the potential recurrence of a drought such as occurred during 1987-92, plus an additional period of limited water availability.

SFPUC plans its water deliveries anticipating that a drought worse than the 1987-92 drought may occur. As a result, the SFPUC system operations are designed for providing sufficient carry-over water in SFPUC reservoirs after six years of drought. This design allows SFPUC to continue delivering water, although at significantly reduced levels, during and after such a drought.

As discussed further below, SFPUC drought planning anticipates three stages of response to water supply shortages, ranging from voluntary customer actions to enforced rationing; the third stage is envisioned to occur only during a drought period worse than previously experienced. At current demand levels the SFPUC system can expect shortages of at least 10 to 20 percent in the first three multiple-dry water years.

Redwood City seeks to minimize the magnitude and frequency of future water shortages. Customers place a high value on water reliability, and shortages can be very disruptive to the community. This section describes the current and future water supply reliability issues facing the City. Reliability can change over time from a variety of factors, including climate change.

Redwood City has been increasing its use of recycled water. This improves the community's ability to cope with shortages that will occur, at some point, with SFPUC

purchases. Given ample recycled water supply capacity at the SBSA wastewater treatment plant, recycled water customers are likely to be only slightly impacted, if at all, by future SFPUC water supply shortages.

5.6.1 Water Supply Reliability

When the SFPUC declares a water shortage, Redwood City will be required to make relatively large water use cutbacks. Table 5-3 shows the current level of water supply reliability based on a set of operational, engineering, and hydrological assumptions. Although the City has a contractual Individual Supply Guarantee (ISG) of 12,243 AFY, this amount relates to a legal definition and not an absolute guarantee. In times of shortage, the SFPUC will provide less than the ISG.

Table 5-3: SFPUC Supply Reliability					
Description	Purchases Year 2010 AFY	One Critical Dry Year	Multiple Dry Years		
			Year 1	Year 2	Year 3
SFPUC System-Wide Shortage %	0%	10%	10%	20%	20%
BAWSCA Wholesale Allocation AFY	206,106	170,934	170,934	148,419	148,419
Redwood City Allocation Factor %		5.97%	5.97%	5.97%	5.97%
Redwood City Allocation AFY	12,243	10,205	10,205	8,861	8,861
Redwood City Allocation as % of Water Supply Assurance		83%	83%	72%	72%
Frequency (1920 to 2002 hydrology)		7.2%	7.2%	2.4%	2.4%
Source: SFPUC letter to Nicole Sandkulla dated March 31, 2011. The Allocation Factor is based on the current Tier 2 Drought Implementation Plan (DRIP) value of 5.97%. The Allocation Factor will be recalculated by BAWSCA each year as it is based on a variety of factors including historical water purchases over last 3 years (BAWSCA Tier 2 Drought Implementation Plan letter from Arthur Jensen dated November 5, 2010). The drought frequency percentages are based on a repeat of the actual historic hydrologic period 1920 through 2002.					

Table 5-3 is based on SFPUC operating its system with a series of 10 and 20 percent system-wide cutbacks over a repeat of the historical hydrologic period 1920 through 2002. Based on this information, Redwood City can expect about a 7.2 percent chance of a 10 percent system-wide cutback and a 1.2 percent chance of a 20 percent system-wide cutback. A given system-wide cutback, however, translates into more severe percentage cutbacks for Redwood City. A 10 percent system-wide cutback, for example, would lead to a 17 percent cutback from Redwood City’s ISG of 12,243 AFY given these circumstances. This means that Redwood City will be exposed to either a 10 or 20 percent supply reduction in about one out of every ten years.

5.6.2 Water Supply and Demand Comparison

To gauge the overall impact of SFPUC supply cutbacks to Redwood City, future water supplies are compared to water demands as shown in Table 5-4.

Table 5-4: Water Supply and Demand Comparison (AFY)				
	FY 2014/15	FY 2019/20	FY 2024/25	FY 2029/30
Total Potable Water Demand	11,443	11,648	11,604	12,089
SFPUC Water Supply				
Normal Year (No Cutback)	12,243	12,243	12,243	12,243
Single Dry Year	10,205	10,205	10,205	10,205
Multiple Dry Year	8,861	8,861	8,861	8,861
Supply - Demand				
Normal Year (No Cutback)	800	595	639	154
Normal Year (No Cutback) %	107%	105%	106%	101%
Single Dry Year	-1,238	-1,443	-1,400	-1,884
Single Dry Year %	89%	88%	88%	84%
Multiple Dry Year	-2,582	-2,788	-2,744	-3,229
Multiple Dry Year %	77%	76%	76%	73%
Total potable water demands are from Table 3-6.				

In years without a SFPUC cutback, Redwood City’s Individual Supply Guarantee of 12,243 AFY will be sufficient to meet its potable water demands. In the case of a single dry year, defined as a 10 percent SFPUC system-wide cutback, Redwood City will see progressively more severe cutbacks in future years, ranging from 11 percent in 2014/15 to 16 percent in 2029/30. The cutbacks become more severe as more and more potable water customers are added to the system. The single dry year scenario is estimated to occur about six out of every 83 years, or 7.2 percent of the time.

The multiple dry year scenario will necessitate dramatic water curtailment actions by Redwood City. The magnitude of cutbacks would grow from 23 percent in 2014/15 to 27 percent in 2029/30. The multiple dry year scenario is estimated to occur about one out of every 83 years, or 1.2 percent of the time.

5.6.3 Climate Change Effects on Water Supply

The issue of climate change has become an important factor in water resources planning in the State, and is frequently being considered in urban water management planning purposes, though the extent and precise effects of climate change remain uncertain. As described by the SFPUC in its Final Water Supply Availability Study for the City and County of San Francisco, dated October 2009, there is evidence that increasing concentrations of greenhouse gases 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, there is evidence that a warming trend occurred during the latter part of the 20th century and will likely 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
- 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
- Changes in urban and agricultural water demand

According to the SFPUC, other than the general trends listed above, there is no clear scientific consensus on exactly how climate change will quantitatively affect the state's water supplies, and current models of water systems in California generally do not reflect the potential effects of climate change.

Initial climate change modeling completed by SFPUC indicates that about seven percent of runoff currently draining into the Hetch Hetchy Reservoir will shift from the spring and summer seasons to the fall and winter seasons in the Hetch Hetchy basin by 2025. This percentage is within the current interannual variation in runoff and is within the range accounted for during normal runoff forecasting and existing reservoir management practices. The predicted shift in runoff timing is similar to the results found by other researchers modeling water resource impacts in the Sierra Nevada due to warming trends associated with climate change.

SFPUC has stated that, based on this preliminary analysis, the potential impacts of climate change are not expected to affect the water supply available from the San Francisco Regional Water System (RWS) or the overall operation of the RWS through 2030. 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. To refine its climate change analysis and expand the range of climate parameters being evaluated, as well as expand the timeframes being considered, SFPUC is currently undertaking two additional studies. The first utilizes a newly calibrated hydrologic model of the Hetch Hetchy watershed to explore sensitivities of inflow to different climate change scenarios involving changes in air temperature and precipitation. The second study will seek to utilize state-of-the-art climate modeling techniques in conjunction with water system modeling tools to more fully explore potential effects of climate change on the SFPUC water system as a whole. Both analyses will consider potential effects through the year 2100.

5.7 Water Shortage Contingency Planning

5.7.1 Introduction

Hydrologic water shortages, such as the 1976-77 and 1987-92 droughts, can span months and years. When City potable water demands exceed SFPUC water supplies, the City must intervene to moderate its demands or acquire supplemental supplies. Although purchasing supplemental supplies is conceptually possible, neighboring water agencies will likely be in similar water shortage conditions, and obtaining timely supplemental water supplies may be impossible. Hence, the City's water shortage contingency plan focuses on mechanisms necessary to reduce internal water demands to balance the demand/supply situation.

The City's water shortage contingency plan has two guiding principles:

- Water cutbacks will focus on outdoor water use. Outdoor water use is an important, but relatively discretionary end use in comparison to indoor water uses related to drinking, cooking, and sanitary activities. Outdoor water use supplied with recycled water, however, may not need to be cut back as ample supplies of recycled water are likely to be available even during a drought.
- Water cutbacks are to be based on water needs, not historical water use, whenever possible. Customers knowing water shortage allocations are based on historic water use may tend to overuse water during non-drought periods so as to provide them with a greater allocation during a shortage. Expressed in a different way, customers implementing water conservation activities ("demand hardened") should not be penalized by receiving the same percentage cutback as non-conserving customers.

5.7.2 Stages of Action

Table 5-5 identifies the stages of action that Redwood City will take in response to a water supply shortage. There are five stages that successively address cutbacks of greater magnitude. The City will largely rely on its Water Allocation Program (described in Chapter 6) to allocate maximum water use for its customers during shortages. Customers exceeding their water allocations will face higher water rates, especially during the higher stages of the plan.

Based on the first guiding principle of the water shortage contingency plan, Table 5-6 shows anticipated water cutbacks by customer class associated with 10, 15 and 20 percent cutback scenarios. The irrigation class would be burdened with the largest percentage reductions. The single-family residential sector would have cutbacks almost equaling the total percentage reduction. The commercial sector would have smaller cutbacks. The multiple-family residential sector would experience the smallest percentage cutbacks because their water uses are largely related to indoor purposes. Recycled water customers would likely not be impacted by a SFPUC water shortage.

Table 5-5: Water Shortage Stages of Action

Stage	Water Reduction	City Actions
1	0 to 10%	<ul style="list-style-type: none"> • Public education and voluntary cutback request. • Purchase additional SFPUC supplies as needed and available, at perhaps increased prices. • Cut back flushing of water distribution mains for water quality purposes.
2	10 to 20%	<ul style="list-style-type: none"> • Aggressive public conservation education and voluntary cutback request. • Accelerate water conservation program implementation. • Water Allocation Program combined with moderate water rate incentives. • Landscapes using potable water cutback up to 68%. • Moratorium on new water connections. • Cut back flushing of water distribution mains for water quality purposes.
3	20 to 30%	<ul style="list-style-type: none"> • Aggressive public conservation education. • Accelerate water conservation program implementation. • Water Allocation Program combined with significant water rate incentives. • Landscapes using potable water cutback up to 90%. • Moratorium on new water connections. • Cut back flushing of water distribution mains for water quality purposes.
4	30 to 50%	<ul style="list-style-type: none"> • Aggressive public conservation education. • Accelerate water conservation program implementation. • Water Allocation Program combined with severe water rate incentives. • Ban potable water used for irrigation of turf grass or all outdoor uses. • Moratorium on new water connections. • Cut back flushing of water distribution mains for water quality purposes.
5	50% or greater	<ul style="list-style-type: none"> • Aggressive public conservation education. • If system is operational, prohibit all but water used for basic drinking, cooking, and necessary human hygiene. • If system is not operational, establish basic water distribution stations/nodes for essential living conditions. • Moratorium on new water connections. • Cut back flushing of water distribution mains for water quality purposes.

Table 5-6: Water Cutbacks by Customer Sector			
Customer Sector	10% Total Cutback Scenario	15% Total Cutback Scenario	20% Total Cutback Scenario
Single Family	9.7%	14.5%	19.3%
Multiple Family	4.1%	6.1%	8.2%
Commercial	8.7%	13.0%	17.4%
Irrigation	34.0%	51.1%	68.1%
Other	15.0%	22.5%	30.0%
Recycled	0.0%	0.0%	0.0%

5.7.3 Catastrophic Supply Interruption Plan

The Potable Water Emergency Plan was developed to prepare cities and towns and the San Mateo County/Operational Area for a planned response to emergency situations that affect water utilities, i.e., natural disasters, technological incidents, and national security/terrorism emergencies. The plan is not designed for responding to every conceivable contingency, but it addresses the major known hazards and general response/recovery considerations. Catastrophic interruption to the Regional Water System from earthquakes is one scenario that could occur. The City is also vulnerable to local failures in its water distribution system from such occurrences.

The plan serves to guide the City’s emergency management and Water Coordinator in an organized response to water treatment and distribution emergencies, which affect Redwood City (Office of Emergency Services, 2004). Detailed information is provided on personnel roles, responsibilities, emergency services, communication, recovery, and reporting procedures. Specifically, the plan describes the following:

- San Mateo County/Operational Area emergency management organization to assist in mitigating any significant emergency or disaster.
- Authorities, policies, responsibilities, and procedures required, protecting the health and safety of San Mateo County.
- Operational concepts and procedures associated with field response to emergencies, Emergency Operations Center (EOC) activity, and the recovery process.
- Standardized Emergency Management System (SEMS) for use within the City of Redwood City, San Mateo County/Operational Area, State Office of Emergency Services (OES) Coastal Region and state systems.
- Multi-agency and multi-jurisdictional coordination, particularly between local government (Redwood City) and San Mateo County; San Francisco Water Department and local, state, and federal agencies during emergency operations.
- Pre-event emergency planning as well as emergency operations procedures. This plan has been designed for conformance with SEMS (Government Code

Section 8607) and should be used in conjunction with the State Emergency Plan and local emergency plans.

The procedures are designed to facilitate the acquisition and distribution of alternative potable water to Redwood City in the event of a local, Operational Area and/or Regional water emergency. These procedures require the support of public, private, and volunteer agencies.

5.7.4 SFPUC Planning, Training, and Exercise

Following San Francisco's experience with the 1989 Loma Prieta Earthquake, the SFPUC created a departmental SFPUC Emergency Operations Plan (EOP). The SFPUC EOP, originally released in 1992, and has been updated on average every two years. The latest plan update will be released in Spring, 2011. The EOP addresses a broad range of potential emergency situations that may affect the SFPUC and that supplements the City and County of San Francisco's Emergency Operations Plan prepared by the Department of Emergency Management and most recently updated in 2008. Specifically, the purpose of the SFPUC EOP is to describe the department's emergency management organization, roles and responsibilities and emergency policies and procedures.

In addition, SFPUC divisions and bureaus have their own EOPs that are in alignment with the SFPUC EOP and describe each division's/bureau's specific emergency management organization, roles and responsibilities and emergency policies and procedures. The SFPUC tests its emergency plans on a regular basis by conducting emergency exercises. Through these exercises the SFPUC learns how well the plans will or will not work in response to an emergency. Plan improvements are based on exercise and sometimes real world event response and evaluation. Also, the SFPUC has an emergency response training plan that is based on federal, state and local standards and exercise and incident improvement plans. SFPUC employees have emergency training requirements that are based on their emergency response role.

5.7.5 Emergency Drinking Water Planning

In February 2005, the SFPUC Water Quality Bureau published a City Emergency Drinking Water Alternatives report. The purpose of this project was to develop a plan for supplying emergency drinking water in San Francisco after damage and/or contamination of the SFPUC raw and/or treated water systems resulting from a major disaster. The report addresses immediate response after a major disaster. Since the publication of this report, the SFPUC has implemented a number of projects to increase its capability to support the provision of emergency drinking water during an emergency. These projects include:

- Public information and materials for home and business.
- Designation and identification of 67 emergency drinking water hydrants throughout San Francisco.
- Purchase of emergency related equipment including water bladders and water bagging machines to help with distribution post disaster.

- Coordinated planning with City Departments, neighboring jurisdictions and other public and private partners to maximize resources and supplies for emergency response.

With respect to emergency response for the SFPUC Regional Water System, the SFPUC has prepared the SFPUC Regional Water System Emergency Response and Recovery Plan (ERRP), completed in 2003 and updated in 2006. The purpose of this plan is to describe the SFPUC RWS emergency management organizations, roles and responsibilities within those organizations, and emergency management procedures. This contingency plan addresses how to respond to and to recover from a major RWS seismic event, or other major disaster. The ERRP complements the other SFPUC emergency operations plans at the Department, Division and Bureau levels for major system emergencies.

The SFPUC has also prepared in an SFPUC-Suburban Customer Water Supply Emergency Operations and Notification Plan. The plan was first prepared in 1996 and has been updated several times, most recently in July 2010. The purpose of this plan is to provide contact information, procedures and guidelines to be implemented by the following entities when a potential or actual water supply problem arises: the SFPUC Water Supply and Treatment Division, Water Quality Bureau, and SFPUC wholesale customers, BAWSCA, and City Distribution Division (considered to be a customer for the purposes of this plan). For the purposes of this plan, water quality issues are treated as potential or actual supply problems.

5.7.6 Power Outage Preparedness and Response

SFPUC's water transmission system is primarily gravity fed, from the Hetch Hetchy Reservoir to the City and County of San Francisco. Within San Francisco's in-city distribution system, the key pump stations have generators in place and all others have connections in place that would allow portable generators to be used.

Although water conveyance throughout the RWS would not be greatly impacted by power outages because it is gravity fed, the SFPUC has prepared for potential regional power outages as follows:

- The Tesla disinfection facility, the Sunol Valley Water Treatment Plant, and the San Antonio Pump Station have back-up power in place in the form of generators or diesel powered pumps. Additionally, both the Sunol Treatment Plant and the San Antonio Pump Station would not be impacted by a failure of the regional power grid because it runs off of the SFPUC hydro-power generated by the RWS.
- Both the Harry Tracy Water Treatment Plant and the Baden Pump Station have back-up generators in place.
- Additionally, as described in the next section, the WSIP includes projects which will expand the SFPUC's ability to remain in operation during power outages and other emergency situations.

5.7.7 Capital Projects for Seismic Reliability and Overall System Reliability

As discussed previously in Section 4.2.2 the SFPUC is also undertaking a WSIP in order to enhance the ability of the SFPUC water supply system to meet identified service goals for water quality, seismic reliability, delivery reliability, and water supply. As illustrated previously in Figure 4-2, the WSIP projects include several projects located in San Francisco to improve the seismic reliability of the in-city distribution system, as well as many projects related to the SFPUC RWS to address both seismic reliability and overall system reliability. All WSIP projects are expected to be completed by 2016.

In addition to the improvements that will come from the WSIP, San Francisco has already constructed the following system interties for use during catastrophic emergencies, short-term facility maintenance and upgrade activities, and in times of water shortages:

- A 40 MGD system intertie between the SFPUC and the Santa Clara Valley Water District (Milpitas Intertie); and
- One permanent and one temporary intertie to the South Bay Aqueduct, which would enable the SFPUC to receive State Water Project water.

The WSIP includes intertie projects, such as the EBMUD-Hayward-SFPUC Intertie. The SFPUC and EBMUD have completed construction of this 30 MGD intertie between their two systems in the City of Hayward, as part of the WSIP.

The WSIP also includes projects related to standby power facilities at various locations. These projects will provide for standby electrical power at six critical facilities to allow these facilities to remain in operation during power outages and other emergency situations. Permanent engine generators will be provided at four locations (San Pedro Valve Lot, Millbrae Facility, Alameda West, and Harry Tracy Water Treatment Plant), while hookups for portable engine generators will be provided at two locations (San Antonio Reservoir and Calaveras Reservoir).

5.7.8 Water Quality Effects on Water Management and Supply

While the water quality of SFPUC supplies could theoretically be compromised to be unusable for potable purposes, the likelihood of this scenario is low and not able to be quantified. If such a situation occurred, Redwood City would need to go to emergency operations as specified in Section 5.7.2.

It is also possible, although unlikely, that the recycled water system could be subject to water quality degradations making it unsuitable for its purposes. The City could use potable SFPUC supplies to offset such an emergency, especially during non-drought circumstances.

5.7.9 Mandatory Prohibitions and Penalties for Excessive Use

Redwood City's mandatory prohibitions and penalties for excessive water use are illustrated in the City's Water Shortage Contingency Ordinance adopted in 1990 (see Appendix E).

5.7.10 Revenue and Expenditure Impacts of Water Shortages

Implementation of water shortage contingency measures results in a decrease in water use and demand, with a corresponding decline in water sales revenues. During drought periods, water wholesale costs may also be higher due to increased drought rates. Water-related expenditures may also increase as a result of acceleration of water conservation program measures and implementation of public conservation education and cutback measures. Without a plan in place to offset the impacts of these revenue decreases and cost increases, the City could face significant financial consequences due to a drought.

Pursuant to longstanding policies reflected in its guiding principles for managing the Water Enterprise Fund, Redwood City maintains an emergency reserve fund to address the potential financial impacts of severe drought and implementation of water conservation measures. Under its Water Financing Plan, the City is committed to maintaining a minimum fund reserve comprised of two components: (a) emergency operating reserves (\$2 million, per City Council policy) and (b) 25 percent of operation and maintenance expenditures, to provide the City with a cushion for moderating the financial impacts of a drought. The City Council adjusts water rates and charges each fiscal year as necessary to maintain appropriate drought reserves while sustaining balanced Water Enterprise Fund revenues. The City's Water Financing Plan is also substantially driven by the policies described in this UWMP, including (1) the aggressive implementation of recycling and related water conservation projects to minimize adverse financial impacts during periods of drought; and (2) structuring of water rates to encourage customers to conserve water (with higher unit prices for increasing increments of water use).

Water Enterprise Fund reserves should be sufficient to compensate for lower revenues and/or higher expenditures during anticipated periods of drought. However, if sustained periods of drought require the City to remain in Stage 2 or Stage 3 for multiple years, or trigger higher stages of water reduction, the City may be required to increase water rates to compensate for financial impacts of drought measures.

5.7.11 Water Shortage Contingency Ordinance

Redwood City's Water Shortage Contingency Ordinance was adopted in 1990 and is included in this UWMP as Appendix E.

5.7.12 Resource Maximization and Import Minimization Plan

Section 10620(f) of the State Water Code requires the UWMP to discuss how water management tools and options are used to maximize resources and minimize an agency's need to import water. In order to maximize resources and minimize the need to be 100 percent reliant on SFPUC water (a majority – though not all – of which is imported), Redwood City has initiated both a local recycled water project (described in detail in Chapter 4) and more active water conservation measures (described in Chapter 6). Each of these efforts is reflected in the policies and programs contained in this 2010 UWMP. There are no other water supply projects on the horizon for Redwood City beyond those described in this UWMP.

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Chapter 6

Chapter 6 – Water Demand Management Measures

6.1 Introduction

This chapter describes Redwood City's water demand management measures (DMMs). Redwood City is implementing all the relevant DMMs described in the Urban Water Management Planning Act, among others. The City has been, and continues to be, a leader in water use efficiency, improving water supply reliability and sustainability for the community.

6.2 Regional Coordination on Demand Management

BAWSCA and Redwood City, as a member agency, explore opportunities to work with other water agencies, including the SFPUC and the Santa Clara Valley Water District (SCVWD), and leverage available resources to implement water use efficiency projects. For example, in 2005, BAWSCA and the SFPUC entered into a Memorandum of Understanding (MOU) regarding the administration of a Spray Valve Installation Program. Through this MOU, BAWSCA and the SFPUC worked cooperatively to offer and coordinate the installation of water conserving spray valves to food service providers throughout the BAWSCA service area. In addition, BAWSCA participates in the Bay Area Efficient Clothes Washer Rebate Program, which is a residential rebate program offered by all of the major Bay Area water utilities. Through participation in this program, BAWSCA and its participating member agencies were the recipients of \$187,500 in Proposition 50 grant funds, which became available in Fiscal Year 2006/2007.

More recently, as part of the Bay Area Integrated Regional Water Management Plan, BAWSCA and the other major Bay Area water utilities submitted a Proposition 84 Implementation Grant Proposal in January 2011 to support regional water conservation efforts that offer drought relief and long-term water savings. The proposed project includes a package of water conservation programs to improve water use efficiency throughout the San Francisco Bay Area. The project provides direct funding, financial incentives (rebates), and/or subsidies for the implementation of programs that achieve reduced water demand, by all classes of water users: residential, commercial, industrial and institutional. Four specific programs were selected for the project because they were determined to provide the most quantifiable and sustainable water savings, including: 1) Water-Efficient Landscape Rebates, Training and Irrigation Calculator, 2) High-Efficiency Toilet/Urinal Direct Install and/or Rebates, 3) High-Efficiency Clothes Washer Rebates, and 4) Efficient Irrigation Equipment Rebates.

Redwood City, through BAWSCA, will continue to explore partnerships with other member agencies and other Bay Area water utilities, as appropriate, to develop regional water conservation efforts that extend beyond local interests to examine costs, benefits and other related issues on a system-wide level. The goal is to maximize the efficient use of water regionally by capitalizing on variations in local conditions and economies of scale.

6.3 Active Water Conservation

This section describes Redwood City's active water demand management measures (DMMs). As mentioned before, Redwood City is implementing all the relevant DMMs applicable to retail water suppliers described in the Act, among others.

6.3.1 Water Survey Programs for Single- and Multiple-Family Residential Customers

Since 1994, the City has offered free residential water use surveys. Surveys are conducted by City staff and include checking toilets, showers, and faucets for leaks and distributing free showerheads and faucet aerators as needed. The survey also provides advice on outdoor irrigation efficiency by measuring landscape areas, testing sprinkler systems for irrigation efficiency, teaching customers how to set the irrigation controller, developing a monthly irrigation schedule (based on soil type, evapotranspiration, and irrigation system characteristics), recommending sprinkler system repairs or improvements, and providing brochures on water efficient landscaping, design, and plants.

6.3.2 Residential Plumbing Retrofit

Since 2000, the City mails and distributes kits that include efficient showerheads and sink aerators, and toilet tank leak detection tablets. The City also gives these kits to its customers at various community events and fairs. At these events, the City also distributes water use surveys and conservation educational materials.

6.3.3 System Water Audits, Leak Detection, and Repair

The City's unaccounted-for water rate ranges from four to nine percent, which is below the ten percent limit set forth by the California Urban Water Conservation Council (CUWCC) in its *Memorandum of Understanding Regarding Urban Water Conservation Best Management Practices* (MOU) in 1992. The City has always monitored its unaccounted-for water and repairs system leaks immediately when found. The City owns an electronic leak detector unit and City personnel have participated in leak detection trainings sponsored by the American Water Works Association; the City surveys water mains and service lines on an ongoing basis.

6.3.4 Metering with Commodity Rates for all New Connections and Retrofit of Existing Connections

Since the 1980s, the City meters water use for all of its customers and uses conservation-promoting inclining block rates. The City requires separate irrigation meters for customers with large landscaped areas to distinguish outside water use from interior water use and for the facilitation of future recycled water conversions. Commercial/industrial/institutional customers are required to have fire sprinkler systems, and since 1999, the City has required residential fire sprinklers in all new single- and multi-family construction. Redwood City requires separate meters for fire sprinkler systems with associated monthly service charges.

Beginning in 2008, the City began installing Advanced Metering Infrastructure (AMI). This advanced metering technology is a fixed-based system that uses a Federal Communications Commission licensed spectrum. Meter reading data is fed from the new meters to strategically placed collectors throughout the City, which transmit meter reads via the Internet to City computers. The information is then transformed into customer reports that detail water usage, time of use, and leak detection. The system increases meter reading accuracy and efficiency and provides hour-by-hour meter reads, significantly improving customer service levels. The City will continue to install this new metering technology on all new services and will retrofit all existing meters over a five-year period between 2011 and 2015.

6.3.5 Large Landscape Conservation Programs and Incentives

Since 2003, Redwood City has participated in a regional landscape program administered by BAWSCA. The program influences large urban landscape sites to irrigate more efficiently by improving metrics and communications. The program calculates and distributes ongoing water use reports comparing actual water use to a budget benchmark based on site-specific characteristics and real-time weather. To facilitate communication, the site reports are distributed to bill payers, site managers, board members, landscapers, and any other designated decision maker interested in irrigation efficiency at a site. The reports include normative statements comparing a site's performance to peer sites, as well as social statements designed to influence those not financially motivated. For targeted sites needing additional help, the program also includes on-site landscape field surveys by an irrigation expert to document cost-effective recommendations for improvements.

The City has hosted landscape irrigation auditor workshops for landscape professionals. These workshops deal directly with the issue of wise water management and teach irrigation professionals how to perform field tests on irrigation systems to determine their efficiency, and how to combine plant water use, soils and local weather data to calculate accurate water schedules for irrigation systems. The workshops prepare landscapers for the Landscape Irrigation Auditor Certification exam.

In January 2009, the City embellished and advanced its landscape program. By that time, the City had installed Advanced Metering Infrastructure (AMI) for all of the City's dedicated irrigation meters. This allowed irrigation meter readings to be collected via radio waves instead of the conventional walk/read method. The new irrigation meters allow irrigation customers to view hourly water use information through the City's Water Allocation Program web-tool. This enables the City to provide irrigation customers with daily water budget and consumption information in near real-time.

The City also adopted budget-based water rates for its landscape sites in January 2009. With budget-based rates, water price doubles for each water unit used over the water budget amount, and triples if water use exceeds 200 percent of water budget. In addition, the City is able to provide automated email notifications to these customers. Daily email alerts are sent to any customer who has a continuous water leak, allowing the customer to locate and repair the leak as soon as possible. A weekly "over budget alert" and custom "My Water Use" report is also emailed to customers to help them manage their water use. This allows customers to reset irrigation timers or address inefficiencies within their irrigation systems before exceeding their budgeted amount of water. Redwood City received the Silicon Valley Water Conservation award for innovation for its Landscape Budget-Based Rates Program in 2009.

6.3.6 High-Efficiency Washing Machine Rebate Programs

The City has participated in a regional program administered by BAWSCA since August 2001, in addition to a program administered by the California Urban Water Conservation Council, to provide rebates to both residential and commercial customers who purchase high-efficiency clothes washers.

6.3.7 Public Information Programs

The City promotes water conservation through a variety of outreach efforts. Since May 2001, the City has produced a bimonthly newsletter distributed with the utility bill that

includes water conservation as a primary topic. The City also participates in several public fairs and events distributing water conservation brochures, water saving devices, and information regarding appropriate plantings, irrigation, and ways to conserve water. City utility bills were redesigned in 1996 to show gallons used per day and water use for the previous 12 months. The City has developed customized water use budgets shown on the utility bill for all single-family homes based on its Water Allocation Program. The City's award-winning website is available at any time and helps customers understand what conservation programs are available and how they can participate. The City places banners at the corner of a busy intersection displaying conservation messages and promoting water conservation programs. The City has placed advertisements on shopping carts at grocery stores throughout the City to promote its programs. Finally, the City hires student summer interns who promote various water conservation programs for the City and help educate the City's youth. In 2010, the City developed an innovated Leak Detective Kit that the students distributed at various public events. The kit included a detective badge, a water saving activity that allowed students to look for and detect leaks, and a "ticket" book for issuing tickets to parents and neighbors for their inefficient water use practices.

6.3.8 School Education Programs

Since 1994, the City has worked with public and private schools in Redwood City to promote water conservation at school facilities and to educate students about water issues. The City provides educational materials for several grade levels including Hetch Hetchy water system maps, posters, activity books, teacher's guides, and videos. The City participates in a BAWSCA program whereby students are educated through the Water-wise School Education Kits Program. Through this program, kits are distributed to 5th grade students that enable them to install water saving devices and perform a water audit in their home. Included with the kit is a curriculum for the teacher. The water conservation curriculum is easily implemented by teachers, easily understood and taken back into the home by the students, and includes methods to quantify the water savings as a result of taking the actions in the curriculum. Students take kits home to share their water conservation learning experience with their family members. The energy and water efficient devices contained in the kits are installed in the home and the family is able to calculate the water savings resulting from each device. Essentially the kit allows the student to perform in-home water audit.

The City also sponsors an annual Water Conservation Poster Contest for students and awards prizes for the best entries in various categories. Students and teachers are publicly recognized for their work at an annual ceremony held during a City Council meeting. Redwood City offers school assemblies in concert with the annual poster contest. The goal of the program is to increase student awareness of the City's annual contest while promoting water efficiency. The school assemblies combine age-appropriate state science standards with circus skills, juggling, music, storytelling, comedy, and audience participation to teach environmental awareness, water science and conservation. The assemblies are designed to include local water source and watershed education.

6.3.9 Conservation Programs for Commercial, Industrial, and Institutional Accounts

The City provides landscape irrigation conservation programs to the commercial, industrial, and institutional customer (CII) class as described above in Section 6.3.5 and

rebates for high efficiency toilets and washing machines, described in Sections 6.3.6 and 6.3.14. The City also provides tiered rate pricing for CII customers with dedicated irrigation meters (see Sections 6.3.4 and 6.4.2), and newsletters inserted in the utility bill (see Section 6.3.7). In the past, the City implemented a direct-install toilet replacement program whereby the City installed high-efficiency toilets for CII customers free of charge.

6.3.10 Wholesale Agency Programs

The City does not provide wholesale potable water to any other retail agencies; thus, this program is not applicable to Redwood City.

6.3.11 Conservation Pricing

Since the 1980s, the City has used an increasing block rate structure where the per unit price of water increases with increasing increments of water use. The City revised the increasing block rate structure in 2007 for all customer classes, and again in 2008 specifically for irrigation customers. The new rate structure for irrigation customers is explained in greater detail in Section 6.4.2 below.

Regarding sewer service charges, the City uses a single price rate structure based on water use for non-residential customers; this price varies with customer sector depending on wastewater flow characteristics. For residential customers, the City uses a flat rate that is unrelated to an individual customer's water use.

6.3.12 Water Conservation Coordinator

Since 1992, the Public Works Water Utility Superintendent serves as the City's Water Conservation Coordinator. Tasks include oversight and implementation of the conservation programs, program reporting, and communication of water conservation issues within the City organization and to the public.

6.3.13 Water Waste Prohibition

The City established a "No-Waste" ordinance that includes numerous water use restrictions and prohibitions, including prohibitions against use of defective irrigation equipment, flooding of gutters, streets or drainage systems, and use of water hoses without a shut-off valve. This ordinance took effect in 1992 (see Appendix E).

6.3.14 Residential Ultra-Low Flush Toilet Replacement Programs

The City has implemented a variety of high-efficiency toilet replacement programs. In September 2004, the City implemented a "Toilet Give-Away" event providing 1,000 free high-efficiency dual-flush toilets and also 308 pressure-assist toilets in exchange for old toilets (the old toilets were recycled by the City). The City then implemented a free Direct Install Program that provided more than 8,000 residential and commercial customers with free toilets, free installation, and free hauling of the old toilets. At the same time, the City implemented a toilet rebate program that offered assistance to customers who would rather select and install their own qualifying high-efficiency toilet. The City continues to provide rebates for qualifying high-efficiency toilets through BAWSCA and the California Urban Water Conservation Council. The City boosts its water savings by installing and rebating toilets that use less than the standard 1.6 gallons per flush rating (known as Ultra-Low Flush Toilets).

6.4 Additional Water Conservation Demand Management Measures

In addition to the active conservation DMMs described above, the City implements additional programs, which are described in this section.

6.4.1 Residential Water Allocation Program

Since 2001, the City has used its Water Allocation Program to produce informational water budgets printed on each single-family customer's utility bill. The water budget reflects what each household should use if common water efficient technologies and practices are employed. Factors used to calculate the budget include number of occupants, landscape type and area, weather, and whether or not the property has a swimming pool. In 2001 and again in 2008, the City sent out surveys to all single-family homes to collect information needed to calculate water budgets. For those not replying to the survey, the program uses default assumptions. The budget data is continually being updated via contact with customers and by customer participation in other water conservation programs (e.g., residential water survey).

Currently, the water budgets for single-family customers are informational only. They are not linked to water rates as they are for the landscape customers. The City would, however, use water budgets as a basis for allocating water during a future shortage (see water shortage contingency plan in Chapter 5).

6.4.2 Meter Replacement Program Using Advanced Metering Infrastructure

Since 2008 the City has, and will continue to replace, commercial and residential meters in the City with improved meter technology. AMI is new metering technology that will increase conservation by improving water management throughout the City. More than 20,000 new meters with AMI will be installed through the City's Meter Replacement Program over a five-year period from 2011 through 2015. The new water meters will use radio waves to send hourly meter readings directly to an antenna; water use is then transmitted to City offices via an Internet connection.

This technology will significantly increase communication with customers and allow them to view water use in near real-time through the City's innovative web-based water management tool. By having near real-time access to water consumption information, customers can compare their actual use to their budgeted use and make adjustments in their use patterns to decrease consumption. This increase in communication will improve water management within the City and increase conservation and water use efficiency through timely notifications and alerts. This program goes hand-in-hand with the City's Residential Water Allocation Program (see Section 6.4.1) and Large Landscape Program (see Sections 6.3.5).

6.4.3 Pre-Rinse Spray Nozzle Replacement Program

The statewide "Rinse and Save" program is co-founded by the California Public Utilities Commission (CPUC) and participating water agencies, and administered by the CUWCC. This program consists of the installation of water-efficient pre-rinse spray nozzles in dishwashing facilities of restaurants, cafeterias, and other food service providers. Redwood City provided funding in the amount of \$50 per installed valve and CPUC funding of \$131 per valve. Hundreds of these valves (which reduce flow to 1.6

gallons per minute) were installed at restaurants and other eating establishments to replace high-volume pre-rinse spray nozzles beginning in 2003.

6.4.4 Smart Rebates Program

Smart Rebates is a statewide program administered by the California Urban Water Conservation Council. Redwood City has participated in the Smart Rebates Program since 2007 and offers residential and commercial customers rebates on cooling tower conductivity controllers; high-efficiency clothes washers; pressurized water brooms; and x-ray film processor recirculation systems.

6.4.5 Bay Area Green Gardener Program

Redwood City is a founding member of the Bay Area Green Gardener Program. Starting in 2009, the program educates and certifies residential landscapers in resource efficient and pollution prevention landscape practices. Certified Green Gardeners utilize practical, sustainable landscaping skills to reduce water use, to select the most appropriate plants including California natives, to build nutrient rich soils by promoting a plant's natural cycles, and to prune selectively and properly to compliment the natural form and needs of the plant. Participants are also trained in integrated pest management and the use of alternatives to pesticides and herbicides. The certification level training consists of a ten-week series and is offered in both English and Spanish.

6.4.6 Artificial Turf Replacement Program

In 2002, Redwood City initiated the artificial turf replacement program to achieve potable water demand reductions; this program involves the conversion of natural grass playing fields to synthetic turf. Since 2002, nearly 22 acres of parks and playing fields have been converted to synthetic turf as shown in Table 6-1.

Table 6-1: Irrigated Acreage Converted to Artificial Turf	
Playing Field	Acreage
Red Morton (3 fields)	7.1
Sandpiper	2.1
Marlin	2.5
Hawes	1.4
Hoover	4.0
Sequoia	2.2
Canada	2.5
TOTAL	21.8

6.4.7 Residential Landscape Education

Since 2006 Redwood City has offered on its own, and now through BAWSCA, residential landscape education classes that are designed to introduce homeowners, commercial property managers, landscape service providers, and others to the concepts of sustainable landscaping, focusing on creating beautiful, water-efficient gardens. A variety of these free, informative classes are offered in the Spring and Fall to Redwood City residents. In addition, Redwood City offers a free WaterWise Gardening CD-ROM

to its customers. The CD includes garden tours and a photo gallery with a plant database, gardening guide, and more.

6.5 Future Water Conservation

As part of its ongoing efforts to maximize potable water savings, Redwood City encouraged input from participants at the 2010 UWMP workshops regarding additional measures that could be implemented to achieve additional savings. As discussed below, the two principal measures on which consensus emerged at the workshop are expansion in recycled water use and implementation of budget-based water rates.

6.5.1 Leak Detection and Notification

By 2015, the City will have AMI installed in place of its existing water meters. Through the collection of hourly meter reads and web-based water management tools, the City will provide customers with automated email notifications when a customer has a continuous water leak, allowing the customer to locate and repair the leak as soon as possible. This capability is already active with respect to large landscape customers.

Although all customer classes converted to AMI will eventually have leak detection and notification capabilities, the focus of the following discussion is on the single-family customer class via the Residential Water Allocation Program.

The water savings derived from leak detection can be significant. A recent research project utilizing advanced data loggers at 59 homes in Redwood City showed leaks averaged 26.0 gallons per day per home in 2007 (Aquacraft, Inc., 2011). This compares to 30.7 gallons per day per home for 732 California homes participating in the same study, and 21.9 gallons per day per home for 1,200 homes participating in a 1996 national study. (AWWARF, 1999). Assuming 26.0 gallons per day per home and multiplying by the 18,650 single-family homes in Redwood City, there is an estimated 544 AFY of leakage.

AMI combined with the Water Allocation Program can greatly improve the speed at which leaks are identified and repaired. Before AMI, customers might wait 60 days (because of the City’s bi-monthly billing cycle) before seeing a spike on their utility bill from undetected leaks; with AMI, most leaks will be identified in as little as 24 hours.

The water savings from leak repair is hard to quantify, but a conservative assumption is that leakage can be reduced by one-third in the single-family customer class as shown in Table 6-2. The addition of other customer classes will add to this savings, but leakage data and rates from these classes are unknown.

Table 6-2: Leakage Reduction in Single-Family Homes (AFY)			
2014/15	2019/20	2024/25	2029/30
143	179	179	179

6.5.2 Single-Family Budget-Based Water Rates

The City currently has the capability to implement budget-based water rates for its single-family customers through its Water Allocation Program. The City currently implements such rates for its landscape customers as shown in Table 6-3.

Table 6-3: Landscape Water Rates for FY 2010-11	
Percent of Water Use Budget	Cost per CCF (100 cu. ft.)
0 - 100%	\$3.92
101 - 200%	\$7.84
>200%	\$11.76

As described in the water shortage contingency plan in Section 5.7, the City plans to utilize such a rate structure for single-family homes to allocate water during a shortage. One of the advantages of this rate structure is that when properly applied it can target and financially motivate customers to stay under their water budget. The current residential water rate structure does not account for customer specific circumstances; instead, it increases the water price with increasing increments of water use each period.

Research studies show that budget-based rates can influence customers to conserve water—up to 37 percent (Mayer et al., May 2008). The precise amount of water savings that could be attained by single-family customers in Redwood City would depend on specific circumstances and require detailed research. Assuming a modest ten percent reduction in single-family water use, however, would produce substantial potable water savings. A budget-based rates pilot program will be initiated for the single-family customer class on a volunteer basis to allow the program to be refined as it is implemented; it will then be gradually phased in and the savings will be realized over time as shown in Table 6-4.

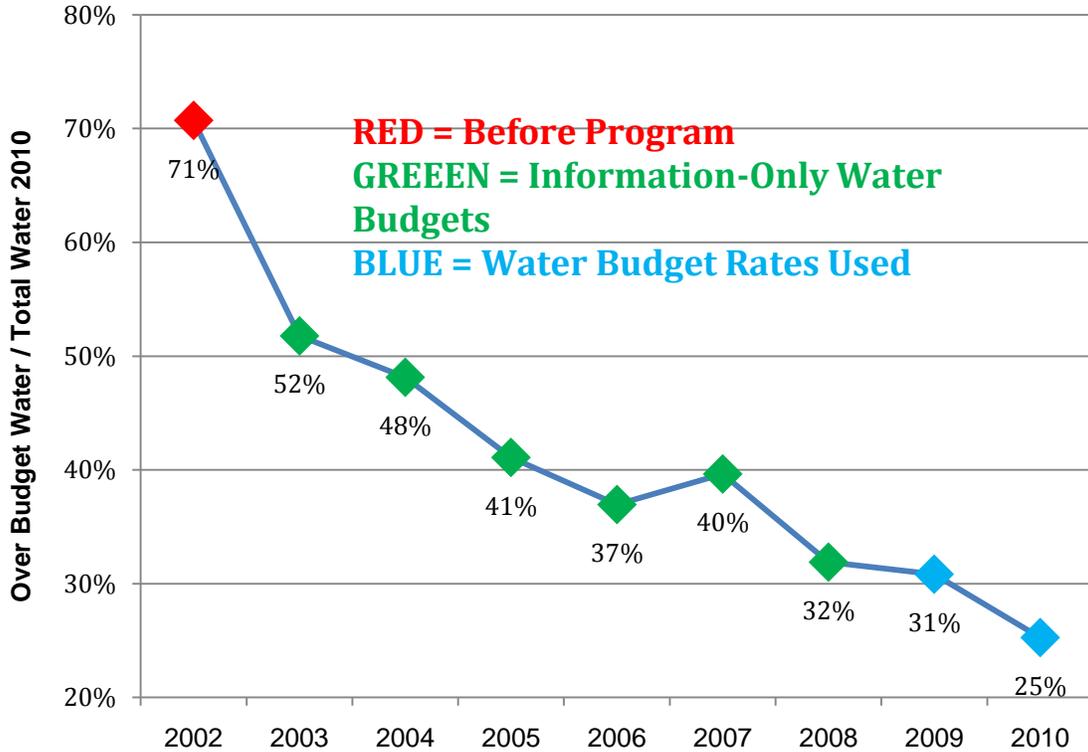
Table 6-4: Budget-Based Water Rates for Single-Family Homes				
Fiscal Year	2014/15	2019/20	2024/25	2029/30
Number of Accounts	500	2,000	18,650	18,650
Assumed Savings (%)	10	10	10	10
Assumed Savings (AFY)	15	60	551	551

6.6 Evaluation of DMM Effectiveness and Estimate of Conservation Savings

Water savings for most programs are difficult to quantify with a reasonable level of certainty. Savings associated with the City’s large landscape program, however, have been actively monitored. Figure 6-1 shows the percentage reduction in overwatering which occurred between 2002 and 2010 at large landscape customer sites. In 2002, before the start of the landscape program, overwatering was 71 percent of total water use. Between 2003 and 2008, when the informational-only water budgets were in effect,

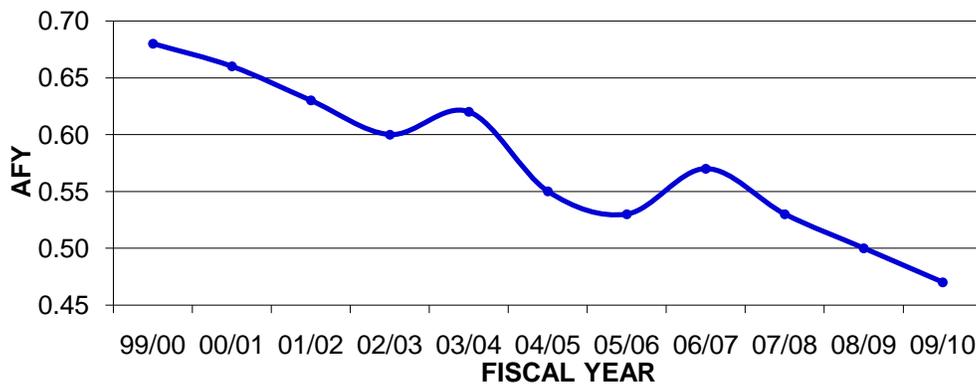
overwatering gradually decreased down to 32 percent of total water use. After instituting budget-based rates, overwatering declined to 31 percent in 2009 and 25 percent in 2010.

Figure 6-1: Reduction in Over Budget Water Use



On a macro level, the City evaluates the effectiveness of its DMMs and estimates their conservation savings by dividing annual potable water demand by total number of service connections. Since FY1999/00, the City has reduced potable water consumption by 31 percent, from 0.68 AFY per service connection to 0.47 AFY per service connection (see Figure 6-2).

Figure 6-2: Annual Water Consumption per Service Connection (AFY)



Chapter 7

Chapter 7 – References

The following documents and materials were reviewed and/or used in the preparation of this Plan.

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Chapter 8

Chapter 8 – DWR Checklist

In its *Guidebook to Assist Urban Water Suppliers to Prepare a 2010 Urban Water Management Plan*, DWR provides two versions of a checklist to support water suppliers in preparation of the UWMP. One checklist is organized according to the UWMP Act and the second is organized according to subject matter. The water supplier is encouraged to use whichever checklist is more convenient or useful to the supplier. Redwood City is using the subject matter checklist, and it is included in this section starting on the following page. The checklist identifies the UWMP required element, and where that element is addressed in the Redwood City 2010 UWMP. If the element does not pertain to Redwood City, the notation “not applicable” is used.

DWR Urban Water Management Plan Checklist (organized by subject)

No. ¹	UWMP Requirement	Calif. Water Code reference	Redwood City 2010 UWMP location
PLAN PREPARATION			
4	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.	10620(d)(2)	Chapter 1, Section 1.2.1
6	Notify, at least 60 days prior to the public hearing on the plan required by Section 10642, 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. Any city or county receiving the notice may be consulted and provide comments.	10621(b)	Chapter 1, Section 1.3. Appendix B has copy of notice.
7	Provide supporting documentation that the UWMP or any amendments to, or changes in, have been adopted as described in Section 10640 et seq.	10621(c)	Chapter 1, Section 1.3. Appendix C has copy of Resolution.
54	Provide supporting documentation that the urban water management 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 this urban water management plan.	10635(b)	Chapter 1, Section 1.3
55	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.	10642	Chapter 1, Section 1.2.2. Appendix A has copy of all outreach materials.
56	Provide supporting documentation that the urban water supplier made the plan available for public inspection and held a public hearing about the plan. For public agencies, the hearing notice is to be provided pursuant to Section 6066 of the Government Code. The water supplier is to provide the time and place of the hearing to any city or county within which the supplier provides water. Privately-owned water suppliers shall provide an equivalent notice within its service area.	10642	Chapter 1, Section 1.2.2. Appendix A has outreach materials; Appendix B has 60-day notice.
57	Provide supporting documentation that the plan has been adopted as prepared or modified.	10642	Chapter 1, Section 1.3. Appendix C has copy of City Council Resolution.
58	Provide supporting documentation as to how the water supplier plans to implement its plan.	10643	Chapter 1, Section 1.3
59	Provide supporting documentation that, in addition to submittal to DWR, the urban water supplier has submitted this UWMP to 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. This also includes amendments or changes.	10644(a)	Chapter 1, Section 1.3
60	Provide supporting documentation that, not later than 30 days after filing a copy of its plan with the department, the urban water supplier has or will make the plan available for public review during normal business hours	10645	Chapter 1, Section 1.3
SYSTEM DESCRIPTION			
8	Describe the water supplier service area.	10631(a)	Chapter 2, Section 2.2

¹ Numbers are according to Table I-2 of the DWR 2010 UWMP Draft Guidebook.

No. ¹	UWMP Requirement	Calif. Water Code reference	Redwood City 2010 UWMP location
9	Describe the climate and other demographic factors of the service area of the supplier	10631(a)	Chapter 2, Section 2.3
10	Indicate the current population of the service area	10631(a)	Chapter 2, Section 2.4
11	Provide population projections for 2015, 2020, 2025, and 2030, based on data from State, regional, or local service area population projections.	10631(a)	Chapter 2, Section 2.4
12	Describe other demographic factors affecting the supplier's water management planning.	10631(a)	Chapter 2, Section 2.5
SYSTEM DEMANDS			
1	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.	10608.20(e)	Chapter 3, Section 3.3
2	<i>Wholesalers:</i> Include an assessment of present and proposed future measures, programs, and policies to help achieve the water use reductions. <i>Retailers:</i> Conduct at least one public hearing that includes general discussion of the urban retail water supplier's implementation plan for complying with the Water Conservation Bill of 2009.	10608.36 10608.26(a)	Chapter 1, Section 1.3. Appendix B has copy of public hearing notice.
3	Report progress in meeting urban water use targets using the standardized form.	10608.40	Chapter 3, Section 3.3
25	Quantify past, current, and projected water use, identifying the uses among water use sectors, for the following: (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, conjunctive use, and (I) agriculture.	10631(e)(1)	Chapter 3, Section 3.2
33	Provide documentation that either the retail agency provided the wholesale agency with water use projections for at least 20 years, if the UWMP agency is a retail agency, OR, if a wholesale agency, it provided its urban retail customers with future planned and existing water source available to it from the wholesale agency during the required water-year types	10631(k)	Copy of letter in Appendix F
34	Include projected water use for single-family and multifamily residential housing needed for lower income households, as identified in the housing element of any city, county, or city and county in the service area of the supplier.	10631.1(a)	Chapter 3, Section 3.2.3
SYSTEM SUPPLIES			
13	Identify and quantify the existing and planned sources of water available for 2015, 2020, 2025, and 2030.	10631(b)	Chapter 4
14	Indicate whether groundwater is an existing or planned source of water available to the supplier. If yes, then complete 15 through 21 of the UWMP Checklist. If no, then indicate "not applicable" in lines 15 through 21 under the UWMP location column.	10631(b)	Chapter 4, Section 4.3
15	Indicate whether a groundwater management plan 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.	10631(b)(1)	Not applicable
16	Describe the groundwater basin.	10631(b)(2)	Not applicable
17	Indicate whether the groundwater basin is adjudicated? Include a copy of the court order or decree.	10631(b)(2)	Not applicable

No. ¹	UWMP Requirement	Calif. Water Code reference	Redwood City 2010 UWMP location
18	Describe the amount of groundwater the urban water supplier has the legal right to pump under the order or decree. If the basin is not adjudicated, indicate "not applicable" in the UWMP location column.	10631(b)(2)	Not applicable
19	For groundwater basins that are not adjudicated, provide information as to whether DWR 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. If the basin is adjudicated, indicate "not applicable" in the UWMP location column.	10631(b)(2)	Not applicable
20	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	10631(b)(3)	Not applicable
21	Provide a detailed description and analysis of the amount and location of groundwater that is projected to be pumped.	10631(b)(4)	Not applicable
24	Describe the opportunities for exchanges or transfers of water on a short-term or long-term basis.	10631(d)	Chapter 4, Sections 4.4 and 4.7.3
30	Include a detailed description of all 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, excluding demand management programs addressed in (f)(1). Include specific projects, describe water supply impacts, and provide a timeline for each project.	10631(h)	Chapter 5, Sections 5.7.4, 5.7.5, 5.7.6, and 5.7.7, and Chapter 6, Section 6.4 for additional water conservation programs that will be implemented by the City.
31	Describe desalinated water project opportunities for long-term supply, including, but not limited to, ocean water, brackish water, and groundwater.	10631(i)	Chapter 4, Section 4.5
44	Provide information on recycled water and its potential for use as a water source in the service area of the urban water supplier. Coordinate with local water, wastewater, groundwater, and planning agencies that operate within the supplier's service area.	10633	Chapter 4, Section 4.6 and Section 4.7.1
45	Describe 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.	10633(a)	Chapter 4, Section 4.6.2
46	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.	10633(b)	Chapter 4, Section 4.6.2
47	Describe the recycled water currently being used in the supplier's service area, including, but not limited to, the type, place, and quantity of use.	10633(c)	Chapter 4, Section 4.6.5
48	Describe and quantify 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.	10633(d)	Chapter 4, Section 4.6.5
49	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.	10633(e)	Chapter 4, Sections 4.6.4 and 4.6.5

No. ¹	UWMP Requirement	Calif. Water Code reference	Redwood City 2010 UWMP location
50	Describe the 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.	10633(f)	Chapter 4, Section 4.6.6
51	Provide 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.	10633(g)	Chapter 4, Section 4.6.6
WATER SHORTAGE RELIABILITY AND WATER SHORTAGE CONTINGENCY PLANNING			
5	Describe water management tools and options to maximize resources and minimize the need to import water from other regions.	10620(f)	Chapter 5, Section 5.7.12
22	Describe the reliability of the water supply and vulnerability to seasonal or climatic shortage and provide data for (A) an average water year, (B) a single dry water year, and (C) multiple dry water years.	10631(c)(1)	Chapter 5, Sections 5.5 and 5.6
23	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.	10631(c)(2)	Chapter 4, Sections 4.3, 4.4, and 4.7, and Chapter 6, Section 6.4
35	Provide an urban water shortage contingency analysis that specifies stages of action, including up to a 50-percent water supply reduction, and an outline of specific water supply conditions at each stage	10632(a)	Chapter 5, Section 5.7
36	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's water supply.	10632(b)	Chapter 5, Section 5.6
37	Identify 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.	10632(c)	Chapter 5, Section 5.7.3
38	Identify 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.	10632(d)	Chapter 5, Section 5.7.9
39	Specify 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.	10632(e)	Chapter 5, Section 5.7.2
40	Indicate penalties or charges for excessive use, where applicable.	10632(f)	Chapter 5, Section 5.7.9
41	Provide an analysis of the impacts of each of the actions and conditions described in subdivisions (a) to (f), 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.	10632(g)	Chapter 5, Section 5.7.10
42	Provide a draft water shortage contingency resolution or ordinance.	10632(h)	Chapter 5, Section 5.7.11, Ordinance contained in Appendix E.

No. ¹	UWMP Requirement	Calif. Water Code reference	Redwood City 2010 UWMP location
43	Indicate a mechanism for determining actual reductions in water use pursuant to the urban water shortage contingency analysis.	10632(i)	Chapter 5, Section 5.7
52	Provide information, to the extent practicable, relating to the quality of existing sources of water available to the supplier over the same five-year increments, and the manner in which water quality affects water management strategies and supply reliability	10634	Chapter 5, Section 5.7.8
53	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, in five-year increments, for a normal water year, a single dry water year, and multiple dry water years. Base the assessment on the information compiled under Section 10631, including available data from state, regional, or local agency population projections within the service area of the urban water supplier.	10635(a)	Chapter 5, Sections 5.5 and 5.6
DEMAND MANAGEMENT MEASURES			
26	Describe how each water demand management measure is being implemented or scheduled for implementation. Use the list provided.	10631(f)(1)	Chapter 6, Sections 6.3 and 6.4
27	Describe the methods the supplier uses to evaluate the effectiveness of DMMs implemented or described in the UWMP.	10631(f)(3)	Chapter 6, Section 6.5
28	Provide an estimate, if available, of existing conservation savings on water use within the supplier's service area, and the effect of the savings on the ability to further reduce demand.	10631(f)(4)	Chapter 6, Section 6.5
29	Evaluate each water demand management measure that is not currently being implemented or scheduled for implementation. The evaluation should include economic and non-economic factors, cost-benefit analysis, available funding, and the water suppliers' legal authority to implement the work.	10631(g)	Not applicable
32	Include the annual reports submitted to meet the Section 6.2 requirements, if a member of the CUWCC and signer of the December 10, 2008 MOU.	10631(j)	Not applicable, Section completed in lieu of attaching BMP report

APPENDIX A

AGENCY COORDINATION AND PUBLIC OUTREACH

Included in this Appendix are the following documents for the Draft 2010 UWMP:

- 1) January 25, 2011 letter to interested agencies
- 2) Redwood City Water Newsletter February-March 2011
- 3) Flyer announcing March 3, 2011 community workshop
- 4) Press release for March 3, 2011 community workshop
- 5) Meeting notes from March 3, 2011 community workshop
- 6) Meeting notes from May 4, 2011 community workshop



January 25, 2011

Name
Address one
Address two

RE: REDWOOD CITY 2010 URBAN WATER MANAGEMENT PLAN UPDATE

Dear <name>:

The City of Redwood City has begun the process of updating its Urban Water Management Plan pursuant to the California Urban Water Management Planning Act (Water Code Section 10610–10657).

Redwood City invites your agency to participate in reviewing our current Plan, which was last updated in 2005, especially as it relates to opportunities to expand water conservation measures and the regional use of recycled water. The attached "Roadmap for an Effective Plan" delineates how and when Redwood City will consider changes to the Plan and make it available for public input and review. An initial draft will be available in April 2011, followed by a public hearing and City Council action prior to July 1, 2011. You will be provided with notice of the Redwood City Council meeting at which the Urban Water Management Plan will be considered.

If you have any questions about Redwood City's Plan or the process for updating it, please do not hesitate to contact me. Additional information can be found at www.redwoodcity.org/uwmp.

Sincerely,

A handwritten signature in black ink, appearing to read "Justin Ezell".

JUSTIN EZELL
Public Works Superintendent
Water Utility Services Division
1400 Broadway
Redwood City, CA 94063
(650) 780-7474

Attachments: *Roadmap for an Effective Plan*

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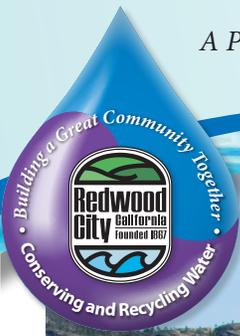
City of Redwood City
Public Works Services Department
Roadmap for an Effective Plan
January 25, 2011

PROCESS STEPS AND MAJOR MILESTONES

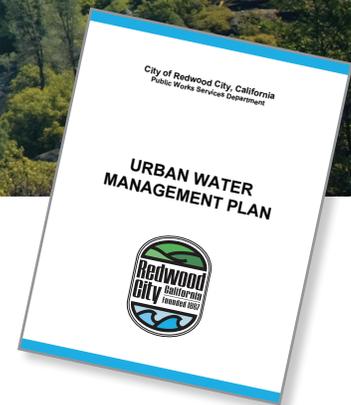
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|---|--------------------------|
| 1. Utilities Committee authorizes Notice of Preparation | January 19, 2011* |
| 2. Staff develops City webpage for 2010 UWMP | January 2011 |
| 3. First public workshop on 2010 UWMP process and content | February 2011* |
| 4. Staff begins compiling, editing, and producing Draft 2010 UWMP | February 2011 |
| 5. Utilities Committee update | March 9, 2011 |
| 6. Draft Plan made available for public review | April 8, 2011* |
| 7. 60-day Public Notice for City Council hearing distributed | April 8, 2011* |
| 8. Second public workshop on Draft 2010 UWMP | May 4, 2011* |
| 9. Public hearing for City Council adoption and SBX7-7 compliance | June 6, 2011* |
| 10. Submit 2010 UWMP to DWR and make available for public review | July 6, 2011* |

**Indicates major milestone*

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Our Water Supply



Redwood City is Updating its **Urban Water Management Plan** *Planning for the future of our water supply*

Water has always been California's most valuable natural resource – more than almost any other commodity, our communities depend on it, many industries run on it, and our hospitals, schools, and public services require it. Redwood City has a number of programs for conserving water, most notably our Recycled Water Project and our multitude of water conservation tools and activities.

Given the utmost importance of this limited resource, all California cities are required to produce an Urban Water Management Plan (UWMP), and update it every five years. This UWMP supports our community's long-term water resource planning and helps to ensure that adequate water supplies are available to meet today's water needs, as well as future water demands.

Water is a much more complicated issue than most people realize, and the UWMP

provides a summary of the variety of water resource policy and planning elements involved for Redwood City - water demands, water supplies, water delivery infrastructure, reliability of our water supply, projections of future water demand and identification of future sources of water, water conservation, and water recycling, among others.

In the broader view, the UWMP is just one component of the City's long-term planning process, and it is not the singular driver for community policy making. Instead, the UWMP more narrowly sets policy direction for securing and protecting the quality of our water supply for today, and for the generations to come.

Producing an UWMP is a very complex and lengthy undertaking. For Redwood City, preparation of the UWMP got underway in January, and is expected to take approximately seven months

to complete, before being submitted to the California Department of Water Resources for approval. Once the plan is approved, then the City will use the UWMP as a framework and visionary tool for meeting our community's long-term water supply objectives.

The City cannot create the UWMP alone! Those who live and work in Redwood City play an important role in producing the UWMP, to help ensure it reflects the community's needs. Through two public workshops (March and May) a public hearing (June), the City invites the community to participate and offer their unique insight and valuable perspective that will make this UWMP most useful, practical, and effective for the City and the entire community.

Please visit www.redwoodcity.org/uwmp for updated information and schedules for the process of developing the UWMP.

Register Now for Free Water-Efficient Landscape Classes This Spring!

Redwood City invites you to attend **FREE Spring 2011 Landscaping Classes** during March and April. Email landscape@bawasca.org or call 349-3000 today to reserve your place for one or more of these fun and informative Saturday workshops. All workshops are 10 am to 1 pm. Space is limited and pre-registration is required, so call today.

And...for a complete listing of many other great water-efficient landscape classes throughout the peninsula and beyond, be sure to visit <http://bawasca.org>. With classes covering everything from **"Kid-Friendly Water-Wise Gardening"** to "Edible Landscaping" you're sure to find something that'll pique your interest!

**MARCH
12TH**

Use of California Natives in the Landscape

This is a home gardener's introduction to designing a sustainable, low maintenance, and water conserving garden. You'll learn how to start visualizing your native garden, how to incorporate native plants, and which native plants are right for your yard.

Replace your Thirsty Lawn with California Natives

You'll gain great insight from this introduction on how to replace lawns with a California meadow and native plants. A meadow is a softer look that gives a more interesting transition between hardscape and house. It can also save you water, fertilizer, and work.

**MARCH
26TH**

**APRIL
9TH**

Water-Efficient Drip Irrigation

Discover all about basic drip irrigation design and installation, choosing the right components, watering techniques, and system maintenance for your landscaping. By installing a drip system you'll be maintaining a beautiful landscape with a much smaller amount of water.

Reduce Water Use with Native Landscapes

(Note: This workshop is presented in Spanish - Spanish speakers call 650-780-7436 to register)

This workshop will teach you great, easy techniques for long-lasting, self-sustaining landscapes so that you'll get the maximum use and pleasure from your small (or not-so-small!) patch of earth - while using a lot less water (and saving money, too!).

**APRIL
16TH**

Reduzca el uso del agua con Paisajes Nativos

(Nota: Este taller es presentado en español - hablantes de español llamen al 650-780-7436 para registrarse)

Este taller le enseñará técnicas de gran facilidad para paisajes de larga duración y auto-sostenibles, para que usted obtenga el máximo uso y placer de su pequeño (o no tan pequeño!) trozo de tierra - al mismo tiempo mientras usa mucho menos agua (y ahorra dinero, también!).

(Please note: we know that some of you will not receive this newsletter until after some of the workshops have already taken place - we apologize! Due to the two-month schedule of utility bill distribution, which includes this newsletter, it is unavoidable. Please check www.redwoodcity.org/conservation frequently for information on upcoming events. For more workshops visit www.bawasca.org)



You've Got a Rebate Coming - and You'll Save Water!

Act now - rebate programs end July 1, 2011

Attention Redwood City residential water customers and business owners: great rebates are available when you install a high efficiency toilet or clothes washer!

Get a rebate of up to \$150 just by replacing your old water-wasting toilet with a high efficiency toilet (HET), or get up to \$100 when you replace your clothes washer with a new high-efficiency model. Some restrictions and qualifications apply - please go to www.redwoodcity.org/conservation to learn whether you may qualify for a rebate.



HETs are modern water-efficient toilets that are designed to use 1.3 gallons per flush (GPF) or less. They use less water AND they perform exceptionally well, and remove waste efficiently. The toilet rebate program is taking place from through June 30, 2011, and is coordinated with the Bay Area Water Supply and Conservation Agency (BAWSCA).

Redwood City partners with PG&E for a rebate program for customers who purchase qualifying, high-efficiency clothes washing machines. (Note: rebates not available for washing machines using "Active Fresh" or "Silver Ion" technology.) High-efficiency washing machines deliver excellent performance while reducing water and energy use by up to 50% over conventional top-loading washers, and require less detergent. The average household can save up to 5,100 gallons of water and reduce their energy bill by \$78 per year. Install your new high-efficiency washing machine by July 1, 2011 to ensure your timely rebate of up to \$100!

Visit www.redwoodcity.org/conservation to learn more - you'll soon be claiming your rebate, and saving a lot of water every day!



City of Redwood City
Water Utility Services Division
1400 Broadway
Redwood City, CA 94063

PRSR STD
US POSTAGE
PAID
Permit No. 632
San Mateo

YOUR INPUT NEEDED—2010 URBAN WATER MANAGEMENT PLAN UPDATE

JOIN US: Thursday, March 3rd from 6 pm—8 pm (Refreshments provided)
Redwood Shores Library Community Room
399 Marine Parkway
RSVP: (650) 780-5991 or tmaluia@redwoodcity.org

For additional information please visit: www.redwoodcity.org/uwmp

Redwood City's **Urban Water Management Plan** is a blueprint for the community's water supply, for today and the future; a visionary tool for meeting long-term water supply objectives. This 20-year document is updated every 5 years.

Your ideas, opinions and suggestions are needed for updating the Plan! You know the vital importance of a long-term water supply for our homes, businesses, parks, and schools – we want to ensure that your perspective is considered and referenced in our Plan. Join us to discuss these essential water supply topics: reliability and impacts of drought; impacts of projected demand; water conservation; water reuse; and more.

El Plan de Administración del Agua Urbana de Redwood City es un plan maestro del abasto de agua de la comunidad, para hoy y el futuro; una herramienta visionaria para lograr los objetivos de abasto de agua a largo plazo. Este documento a 20 años es actualizado cada 5 años.

Sus ideas, opiniones y sugerencias son necesarias ¡para actualizar el Plan! Usted sabe la importancia vital de contar con un abasto de agua a largo plazo para nuestros hogares, negocios, parques, y escuelas – queremos asegurarnos de que su perspectiva sea considerada y se haga referencia a ella en nuestro Plan. Únase a nosotros para discutir estos tópicos esenciales sobre el abasto de agua: confiabilidad e impactos de la sequía; impactos de la demanda pronosticada; conservación del agua; reutilización del agua y mucho más.

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PWS-Justin Ezell

From: MGR-Malcolm Smith
Sent: Tuesday, February 22, 2011 3:09 PM
To: mgr-newsreleases@listserv.redwoodcity.org
Subject: Community Invited to Discuss Long Term Water Plan

For Immediate Release
February 22, 2011

Contact:
Justin Ezell
Public Works Services
650-780-7474

Redwood City Invites Community to Help Update the Urban Water Management Plan

Redwood City, CA – Redwood City’s Urban Water Management Plan (UWMP) is a blueprint for our community’s water supply, for today and the future – it’s an important visionary tool for meeting our long-term water supply objectives. This 20-year document is updated every five years, and right now the community’s ideas, opinions and suggestions are needed as the City moves forward with drafting the updated plan. A special UWMP workshop is scheduled, and interested members of the community are encouraged to attend and be part of updating this plan for the future of our most precious resource – our water supply:

- Thursday, March 3rd, 6 - 8 pm
Redwood Shores Library Community Room
399 Marine Parkway
RSVP to (650) 780-5991 or tmaluia@redwoodcity.org

An additional workshop is expected to be scheduled for May, 2011.

The vital importance of a long-term water supply for our homes, businesses, parks, and schools is clear – and as we move forward, Redwood City wants to ensure that the community’s perspective is fully considered and referenced in the updated Plan. Those who live and work in Redwood City play an important role in producing the UWMP, to help ensure it reflects the community’s needs. To gain that perspective, the entire community is invited to join the discussion of these essential water supply topics: reliability and impacts of drought; impacts of projected demand; water conservation; water reuse; and more.

The UWMP supports our community’s long-term water resource planning and helps to ensure that adequate water supplies are available to meet today’s water needs, as well as future water demands. It provides a summary of the variety of water resource policy and planning elements involved for Redwood City - water demands, water supplies, water delivery infrastructure, reliability of our water supply, projections of future water demand and identification of future sources of water, water conservation, and water recycling, among others. Updated information and schedules for the process of developing the UWMP are available online at www.redwoodcity.org/uwmp.

Visit Redwood City’s award-winning website at www.redwoodcity.org for information about the City and its services, the community, recreation programs, education, and local business. Subscribe to Redwood City’s electronic newsletter or other City documents at www.redwoodcity.org/egov.

(end)

(sent by)

Malcolm Smith

Public Communications Manager
City of Redwood City, California

~

Office: 650.780.7305
Cell: 408.472.8536
Fax: 650.780.7225
Email: malcolm.smith@redwoodcity.org
Web: www.redwoodcity.org
Street: 1017 Middlefield Road
Redwood City, CA 94063

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City of Redwood City
Public Works Services Department
Urban Water Management Plan - 2010 Update
Community Input Agenda
March 3, 2011
Redwood Shores Library Community Room
399 Marine Parkway
6:00-8:00 PM

Community Input Meeting Notes prepared by PCRC

Justin Ezell, Redwood City Public Works Superintendant, welcomed 30 members of the public to a Community workshop on the update to the Urban Water Management Plan (UWMP)

Mr. Ezell introduced other City staff present as additional resources: Evan Boyd, Public Works Services Director; Debra Ivazes, water conservation staff; Peter Vorametsanti, City Engineer; Russell Narahara, Management Analyst; Valerie Young, City consultant; and facilitators from the Peninsula Conflict Resolutions Center available to facilitate small group discussion.

The purpose and outcomes for the meeting were outlined:

Meeting Purpose:

To build on the City's ongoing commitment to community engagement by providing an opportunity for Redwood City residents to explore and discuss core policies reflected in the UWMP and provide thoughtful input to be used in updating the plan, so that the updated document reflects the values of the community.

To build on the community input gathered in recent public forums that addressed the issue of water supply and demand.

Desired Outcome(s):

- Members of the community will have participated in this planning process and questions raised during this meeting will be considered as the UWMP is updated
- Redwood City residents will better understand issues related to water resource management and the final plan will reflect the will and values of the community

Presentation on UWMP

Mr. Ezell provided a presentation highlighting the current UWMP and issues to be considered during this meeting

- Water Supply and Projected Demand – projected use exceeds guarantee, conservation program; use of recycled water
- Water Supply Reliability - shortage contingency plan and drought measures, what drought impacts mean

- New Development – How future new connections that could affect supply and reliability are assessed; nexus to General Plan

There was a brief question and answer period before participants discussed the three topic areas in small group discussion.

❖ **Small Group Discussion Notes:**

Table #1: Water Supply Reliability

1. *Have any of you experienced a drought or water shortage?*

- *How was your life impacted? What changes did you have to make?*
- *Were you prepared for the drought? If so, how did you prepare?*
- *What could have lessened the impact that the drought had on you, your family, your household or business?*
- *What would you do differently if you had to prepare for a drought now?*
 - Cut backs in irrigation
 - Barrels collecting rain water
 - Reduced water use (washing, toilet, etc.)
 - Restrictions in shower heads – low flow
 - Low flow toilets
 - No time to prepare for last drought
 - During drought people were more conscious about not leaving water running
 - Recycled wash water
 - More efficient appliances
 - Lessening the impact+

Do Differently

1. Plant draught tolerant plants
2. Less grass/no grass
3. Native vegetation
4. Plant different things to minimize use of water

2. *How do you think that a drought or water shortage would impact your life if it were to happen now?*

- Might shorten shower
- Do same as #1
- Focus on reducing use each year
- There wouldn't be great impact
- (depends who you ask-people at this table are conservers)
- question of equity-everyone should have to cut back at same %

3. *How can the City help residents and businesses prepare for a possible drought?*

- *Community education? What would this look like? What would help you?*
- *Incentives? What would motivate you to prepare or conserve?*

➤ *Other ideas?*

- Landscape education classes
- Providing landscape materials
- Greater incentives for conserving
- Helping people understand where water supply comes from
- Lower %--reward (\$ off of bill)
- Feedback/heads-up on water usage
- Price tiers differently

4. ***What are your concerns when you think about water supply reliability?***

- *What is your biggest concern?*
- *What do you think the concerns are of your neighbors? Co-workers?*
- *Where does disaster preparedness rate in your list of concerns for the City's water management plan?*
 - As water supply gets tighter we may have less concern about contaminants
 - Evaporation loss in open aqueducts
 - Time of day water waste
 - New developments without guaranteed water source beyond certain # of years
 - Have to raise taxes to rebuild/maintain infrastructure

5. ***What kind of disaster could affect Redwood City's water supply?***

- *How can you prepare for this possibility?*
- *How can the city prepare for this possibility?*
- *What are you willing to do for the community as a whole in order to prepare for the event of a disaster?*
 - Pipes breaking in earthquake
 - Disaster possibilities: Cargill, terrorists
 -

6. ***Are you confident that the City is taking the right steps to ensure that water is available for current and future needs?***

- Not necessarily confident

7. ***How comfortable are you with RWC's reliance on Hetch Hetchy for its water supply?***

- what choices do we have?
- Hetch Hetchy a good choice

8. ***Do you have any other thoughts related this topic of water supply reliability?***

- Water wars
- Companies buying water we have

- Danger of private water systems

Table #2: Water Supply: Projected Demand

1. *Where do you think the community would be willing to cut back on personal water usage? Where would you be willing to cut back? Do you think businesses are willing? Are Pubic Agencies willing?*

a. Landscaping

- Requirements of Home Owners Association limit choices to reduce watering in front yard or lawn. Home owners can reduce watering in their back yard
- Can City encourage Home Owners Associations to change covenants regarding watering?
- Consider changing covenants by Home Owners Association vote
- Make recycled water available to homes
- Recycled water, hard sell, need more education
- Need to study costs of delivering recycled water
- Replace lawn with synthetic turf costs more than drought-tolerant plantings
- Water bill same for every household in HOA-no incentive to cut back
- Renters-no incentive

b. Household

- Stop using dishwasher-uses too much water cycles too long
- Run dishwasher only when full
- Cut down shower time
- Keep Acterra Green @ Home program
- promote low-flow shower heads
- Hot water recirculation system/tank less water heater
- Incentive program
- Utilize grey water
- Use rainwater
- Oak barrel for down spots
- Make methods user friendly
- Incorporate in building codes
-

2. *How would you feel if the City was forced to impose water rationing? How would your life change?*

- Ok if legitimate, not political
- Limit population to water supply
- New developments use recycled/grey water
- Needs to be fair-not all the same-water conservers vs. water wasters. Make water wasters conserve more
- Base on water budget -# of people equal # of bedrooms
- Should NOT be based on prior year use

- Require individual vs. group meters
3. *Should the City set some kind of limits on water use?
For each household? For Businesses? For Public Agencies?
If so, how might that limit be determined?
A water rate structure for:*
 - # of people-how to know? How to avoid cheating?
 - Businesses-gym/clubs-towel use? Require fee?
 - Businesses require drought-resistant landscaping-recycled water and low flow toilets
 4. *Should the City continue to use incentives to encourage water conservation?(Examples provided: provide low flush toilets; rebates for washers and dishwashers; rebates for installing drip irrigation; rebates or reduced prices for plants that require little water)*
 - YES
 5. *Should the City set up fines or penalties for overuse (or not reducing water usage)?*
 - Yes, otherwise it doesn't hurt, no incentive
 - How to account for
 - Teen forgetfulness
 - Guests from out of town
 - Maybe based on annual/not monthly usage-vacation-banks-quests overage covered

How can the City increase the Water Supply?

Recycled Water:

- The City should encourage the use of Recycled water.
 - Educate public about recycled water and water issues
 - Ecowaters.org
6. *Do you have thoughts about using recycled water on the grounds of businesses, public buildings, parks and public gardens?*
 7. *What would you need to know in order to consider the use of recycled water at City parks and playgrounds – areas where children play?*
 8. *Should the City be using recycled water at parks and schools now?*
 9. *Do you have any other thoughts related to this topic of water supply and demand?*

Table #3 Water Supply/New development

1. *Given what we know about Redwood City's current water supply, what are your thoughts about how new development, if approved and implemented, might affect your own water usage?*
 - Plan ahead for source of water
 - Detailed water supply plan (before approval) prove adequate water
 - 1st question relevant because of State Law. New development must supply adequate water

2. *Is it important for the City to limit water usage for new businesses, industries and developments?*
 - Yes , need to take into consideration the effect of lower water supply
 - Incentives and penalties to enforce water usage for new development.
 - Tiered pricing
 - Incentives to use grey water

3. *How should projected water usage impact the consideration and approval process for new developments?*
 - (98% of decision is based on water usage, depends on what kind of water
 - case by case basis
 - factor in water used for construction of the project
 - balance other community benefits against water usage
 - collect rain water
 - collect water off of roofs
 - permeable surface to let water not aquifer

4. *Should water conservation be required for new developments or proposed development already in the pipeline? If so how? If not why?*
 - More emphasis on conservation on front end of development
 - Landscaping required to be water efficient
 - For pipeline projects-retroactive requirement
 - New projects agree to disclose
 - Water usage TRANSPARENT

5. *How should the systems designed to provide water for new development be paid for? How should new recycled water infrastructure be paid for?*
 - New water system-paid for by developer, NOT city
 - New water efficient system
 - Low interest loans
 - Forgive part of the mortgage
 - Rebates
 - Tax incentives, accelerated depreciation

6. *Do you have any other thoughts related this topic of water supply and new development?*
- Show me the Water!
 - Water plan integral part of general plan
 - Using solar power to convert Bay water to clean water

Report Out:

Each Group reported out on priorities or dilemmas identified under each topic area:

Table # 1: Water Supply Reliability

- How to get the general population to conserve
- look to ourselves for solutions
- people need to feel it's our problem
- no magic solutions

Table # 2 Water Supply: Projected Demand

- Recycling. Encourage recycled water usage
- Educate about water issues: ecowaters.org

Table # 3 Water Supply/New development

- Factor in water used for construction of the project
- Show me the Water
- Rebates tax incentives encouraging water conservation
- Water plan integral part of general plan

Next Steps:

- **Notes from the meeting and each table discussion will be transcribed and submitted to Public Works Department staff**
- **Redwood City will complete the draft of the 2010 UWMP by April 8th.**
- **Staff will schedule a follow-up workshop in May**
- **The Plan will be adopted by Council in June.**

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City of Redwood City
Public Works Services Department
Urban Water Management Plan - 2010 Update
Community Input Agenda
May 4, 2011
Public Works Department
6:00-8:00 PM

Community Input Meeting Notes prepared by PCRC

Justin Ezell, Redwood City Public Works Superintendant, welcomed 14 members of the public to a Community workshop on the update to the Urban Water Management Plan (UWMP)

Mr. Ezell introduced Evan Boyd, Public Works Services Director and Valerie Young, City consultant as additional resources, as well as Shauna Mora and Susan Swope from the Peninsula Conflict Resolutions Center as facilitators.

The purpose and outcomes for the meeting were outlined:

Meeting Purpose:

To build on the City's ongoing commitment to community engagement by providing an opportunity for Redwood City residents to explore and discuss core policies reflected in the UWMP and provide thoughtful input to be used in updating the plan, so that the updated document reflects the values of the community.

To understand the community's interest in using recycled water for reducing potable demands.

Desired Outcome(s):

- Members of the community will have participated in this planning process and questions raised during this meeting will be considered as the UWMP is updated
- Redwood City residents will better understand issues related to water resource management and the final plan will reflect the will and values of the community

Mr. Ezell provided two presentations highlighting the current UWMP and issues to be considered during this meeting. Each presentation was followed by a question and answer session and group discussion.

➤ **Staff Presentation # 1 on UWMP and Recycled Water**

- Water supply and projected demand before and after draft
- 20x2020 water use targets
- Water Supply Reliability
- Common themes from first workshop
- First water reduction proposal - recycled water
 - Information provided in reference to bridging the gap between supply and demand using recycled water

The question and answer session on recycled water was followed by group discussion guided by the following questions:

1. *Should Redwood City provide incentives to industrial customers to use recycled water? If so, what kind of incentives?*
 - Yes, Carrots are better than sticks
 - Incentives probably need to combine carrots and sticks, creating a tipping point
 - There are hidden costs with our natural water supply from the river. The actual costs of using our natural resource water should be calculated. We need to create a accurate playing field of costs
 - Does Redwood City have resources to assist with the costs of retrofitting for recycled water?
 - Industry needs less potable water than residential
 - Look into grants and Federal and State money
 - Green Star

2. *Should Redwood City expand the recycled water service area?*
 - Yes - expand area
 - Inequitable that developments outside of service area do not have to take on dual plumbing costs
 - Maybe require all of certain types of units be dual plumbed in and out of current service area

3. *Should Redwood City use recycled water at existing parks, schools, and playgrounds?*
 - Allow but do not make mandatory
 - Use carrots
 - Remove prohibition on existing facilities where children play
 - Need really good public outreach on safety and advantages of recycled water.

➤ **Staff Presentation # 2 on Budget Based Rates**

- Second water reduction proposal - residential budget based rates and the use of AMI
- Information provided in reference to bridging the gap between supply and demand using budget-based rates for residential customers and the use of AMI

The question and answer session on budget-based rates was followed by group discussion guided by the following questions:

4. *How would you feel about changing the policy?*
 - Allow residents to choose

- Make budget-based an option
 - Looks equitable
 - Like per capita allocations to point, should not be for an unlimited number of children. Consider capping the budget-based allocations at 2 children/household
5. *What should the City consider before changing the policy?*
- Get exception for large families. Should not be automatic
 - Different rates for pool/hot tub vs. people
 - Indoor/outdoor rate
 - Landscaping penalty could backfire
 - Cap on landscaping?
 - Tiers based on type of landscaping
 - Encourage rainwater harvesting
 - Incentive for rain barrels
 - Look at website AquaJust.com
6. *Does the potential of a water supply shortage demand immediate change?*
- Yes
 - Rate tiers seem fair
 - Consider more rate tiers
 - Look into on-line tools
 - More emails notifications of problems or leaks
 - Water sensors for large irrigations
 - Like on-line tools

Next Steps: Redwood City will complete the draft of the 2010 UWMP and the Plan will be brought to the City Council in June.

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APPENDIX B

60-DAY NOTIFICATION

**NOTICE OF PUBLIC HEARING
CITY COUNCIL OF THE CITY OF REDWOOD CITY
URBAN WATER USE TARGETS AND
URBAN WATER MANAGEMENT PLAN UPDATE**

NOTICE IS HEREBY GIVEN that the City Council of Redwood City will hold, in conjunction with the adoption of an update to the City's Urban Water Management Plan, an opportunity for the community to provide input on Redwood City's urban water use target for compliance with SBX7-7, also known as the Water Conservation Bill of 2009, any impacts to the local economy, and Redwood City's method of determining its urban water use target. The Urban Water Management Plan prepared by the Public Works Services Department of the City of Redwood City describing and specifying the proposed urban water use target is available for inspection at the office of the City Clerk, City Hall, 1017 Middlefield Road, Redwood City, California or online at www.redwoodcity.org/uwmp.

The public hearing will be held on Monday, June 13, 2011, at 7:00 o'clock p.m., or soon thereafter as the matter may be heard, in the City Council Chamber, City Hall, 1017 Middlefield Road, Redwood City, California, at which time and place all interested persons shall have the opportunity to present their concerns to the City Council.

Dated: April 8, 2011
Published: Wednesday, April 13, 2011
Wednesday, April 20, 2011

Silvia Vonderlinden
City Clerk, City of Redwood City

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April 13, 2011

Name
Address one
Address two

RE: UPDATE REGARDING REDWOOD CITY'S 2010 URBAN WATER MANAGEMENT PLAN

Dear <name>:

This is an update regarding Redwood City's process of updating its Urban Water Management Plan pursuant to the California Urban Water Management Planning Act (Water Code Section 10610-10657).

Redwood City initiated the update earlier this year and a preliminary draft is now available for review at www.redwoodcity.org/uwmp. A public hearing at which the Urban Water Management Plan will be considered will occur on June 13, 2011 during a regularly scheduled City Council Meeting.

If you have any questions about Redwood City's Plan or the process for updating it, please do not hesitate to contact me.

Sincerely,

A handwritten signature in black ink, appearing to read 'Justin Ezell', is written over a horizontal line.

JUSTIN EZELL
Public Works Superintendent
Water Utility Services Division
1400 Broadway
Redwood City, CA 94063
(650) 780-7474

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APPENDIX C

CITY COUNCIL RESOLUTION ADOPTING 2010 URBAN WATER MANAGEMENT PLAN

June 13, 2011

ORIGINAL

RESOLUTION NO.15119

**RESOLUTION OF THE COUNCIL OF THE CITY OF REDWOOD CITY
ADOPTING THE 2010 URBAN WATER MANAGEMENT PLAN**

WHEREAS, the Urban Water Management Planning Act, contained in the California Water Code, Division 6, Part 2.6, Section 10610, requires that urban water suppliers serving more than 3,000 customers or providing more than 3,000 acre-feet of water annually to develop an Urban Water Management Plan every fifth year ending in five and zero; and

WHEREAS, the City of Redwood City is an urban supplier of more than 3,000 acre-feet of water annually to greater than 3,000 customers; and

WHEREAS, Public Works Services has prepared Redwood City's 2010 Urban Water Management Plan pursuant to the State of California's Urban Water Management Planning Act; and

WHEREAS, the Urban Water Management Plan will facilitate local and regional water planning activities and support the City of Redwood City's long-term water resource planning goals; and

WHEREAS, pursuant to Section 10642 of the California Water Code, the active involvement of diverse social, cultural, and economic elements of the population within the service area prior to and during the prepare of the plan was encouraged through extensive public outreach including 20,000 invitations in English and Spanish to City residents in addition to press releases and mass e-mail distribution and notices included in the February and March 2011 utility bills; and

WHEREAS, local water retailers, public agencies, and special interest groups were also notified of the City's intent to prepare a 2010 Urban Water Management Plan through letters and electronic communications; and

WHEREAS, two public workshops were held on March 3, 2011 to receive input on the preparation of the Urban Water Management Plan and on Marcy 4, 2011 to receive input and comment on the draft Plan; and

WHEREAS, SBX7-7, otherwise known as the Water Conservation Bill of 2009, requires a public hearing to discuss the method of determining urban water use targets and the impacts to the local economy from meeting said requirements; and

WHEREAS, the City of Redwood City has prepared and circulated for public review a draft 2010 Urban Water Management Plan, and a duly noticed public hearing pursuant to the requirements of Cal. Water Code s. 10642 and Cal. Gov't Code s. 6066 regarding said Plan and aforesaid Bill was held by the City Council on June 13, 2011.

NOW, THEREFORE BE IT RESOLVED BY THE COUNCIL OF THE CITY OF REDWOOD CITY, AS FOLLOWS:

1. That certain Plan entitled, "City of Redwood City 2010 Urban Water Management Plan," a copy of which is on file in the offices of the Public Works Services Department and on the City of Redwood City's website, to which copy reference is hereby made for the full particulars thereof, is hereby adopted.
2. The Public Works Services Department is hereby authorized and directed to file the aforesaid Plan with the California Department of Water Resources, the California State Library, and the County of San Mateo within thirty (30) days of the adoption of this resolution.
3. The Public Works Services Department is hereby authorized and directed to implement the Plan adopted hereby, including the Water Conservation and Recycling Programs set forth therein.

Passed and adopted by the Council of the City of Redwood City at a Joint City Council/Redevelopment Agency Board Meeting thereof held on the 13th of June, 2011 by the following votes:

A YES, and in favor of the passage and adoption of the foregoing resolution,
Council Members: Bain, Foust, Gee, Pierce, Seybert and Vice Mayor Aguirre

NOES: None

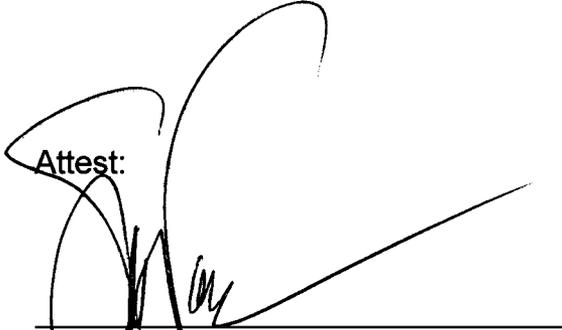
ABSTAIN: None

ABSENT: Mayor Ira



ALICIA AGUIRRE
Vice Mayor of the City of Redwood City

Attest:



Silvia Vonderlinden
City Clerk of Redwood City

I hereby approve the foregoing
resolution this 15th day of June 2011.

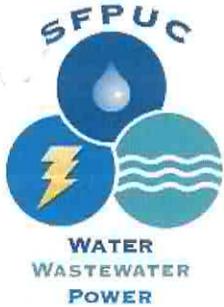


ALICIA AGUIRRE
Vice Mayor of the City of Redwood City

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APPENDIX D

**Letter from SFPUC to BAWSCA Regarding
Regional Water System Supply Reliability
March 31, 2011**



SAN FRANCISCO PUBLIC UTILITIES COMMISSION

1145 Market St., 4th Floor, San Francisco, CA 94103 • Tel. (415) 554-3271 • Fax (415) 554-3161 • TTY (415) 934-5770



March 31, 2011

Nicole Sandkulla
Senior Water Resources Engineer
Bay Area Water Supply and Conservation Agency
155 Bovet Road, Suite 302
San Mateo, CA 94402

EDWIN M. LEE
MAYOR

FRANCESCA VIOTOR
PRESIDENT

ANSON MORAN
VICE PRESIDENT

ANN MOLLER CAEN
COMMISSIONER

ART TORRES
COMMISSIONER

VINCE COURTNEY
COMMISSIONER

ED HARRINGTON
GENERAL MANAGER

Dear Nicole,

Attached please find additional information through 2035 on the Regional Water System's supply reliability for use in the Wholesale Customer's 2010 Urban Water Management Plan updates. The SFPUC has assessed the water supply reliability under the following planning scenarios:

- Projected Single dry-year supply for 2010
- Projected Multiple dry-year supply beginning 2010; and
- Projected supply reliability for years 2010-2035.

Table 1 summarizes deliveries to the Wholesale Customers for projected single dry-year supply for 2010 and projected multiple dry-year supply beginning 2010.

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 2035.

Concerning allocation of supply during dry years, the Water Shortage Allocation Plan ("Plan") was utilized to allocate shortages between the SFPUC and the Wholesale Customers collectively. The Plan implements a method for allocating water among the individual Wholesale Customers which has been adopted by the Wholesale Customers. The 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.

Finally, the SFPUC estimated the frequency and severity of anticipated shortages for the period 2010 through 2035. 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 1920 through 2002. The results of this analysis are summarized in Table 3.

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,

A handwritten signature in blue ink that reads "Paula Kehoe". The signature is written in a cursive style with a long horizontal flourish at the end.

Paula Kehoe
Director of Water Resources



Table 1
Projected Deliveries for Three
Multiple Dry Years

	2010	One Critical Dry Year	Deliveries during Multiple Dry Years in mgd		
			Year 1	Year 2	Year 3
System-Wide Shortage in Percent	0%	10%	10%	20%	20%
Wholesale Allocation (mgd)	184.0	152.6	152.6	132.5	132.5

Table 2

UWMP Studies: Water Supply Reliability Water Supply Options for Years 2010 through 2030						
	2010	2015	2020	2025	2030	2035
Crystal Springs Reservoir (20.28bg)		x	x	x	x	x
Westside Basin Groundwater afa		8,100	8,100	8,100	8,100	8,100
Calaveras Reservoir Recovery (31.5 bg)		x	x	x	x	x
Districts' Transfer afa		2240	2240	2240	2240	2240

Table 3: Projected System Supply Reliability Based on Historical Hydrologic Period

Allocation by Year	Wholesale Demand in mgd					
	184.0	184.0	184.0	184.0	184.0	184.0
Projected Wholesale Allocation in mgd						
Delivery for Fiscal Year	2010	2015	2020	2025	2030	2035
1920	184.0	184.0	184.0	184.0	184.0	184.0
1921	184.0	184.0	184.0	184.0	184.0	184.0
1922	184.0	184.0	184.0	184.0	184.0	184.0
1923	184.0	184.0	184.0	184.0	184.0	184.0
1924	184.0	184.0	184.0	184.0	184.0	184.0
1925	154.6	184.0	184.0	184.0	184.0	184.0
1926	184.0	184.0	184.0	184.0	184.0	184.0
1927	184.0	184.0	184.0	184.0	184.0	184.0
1928	184.0	184.0	184.0	184.0	184.0	184.0
1929	184.0	184.0	184.0	184.0	184.0	184.0
1930	184.0	184.0	184.0	184.0	184.0	184.0
1931	184.0	184.0	184.0	184.0	184.0	184.0
1932	132.5	152.6	152.6	152.6	152.6	152.6
1933	184.0	184.0	184.0	184.0	184.0	184.0
1934	184.0	184.0	184.0	184.0	184.0	184.0
1935	154.6	184.0	184.0	184.0	184.0	184.0
1936	184.0	184.0	184.0	184.0	184.0	184.0
1937	184.0	184.0	184.0	184.0	184.0	184.0
1938	184.0	184.0	184.0	184.0	184.0	184.0
1939	184.0	184.0	184.0	184.0	184.0	184.0
1940	184.0	184.0	184.0	184.0	184.0	184.0
1941	184.0	184.0	184.0	184.0	184.0	184.0
1942	184.0	184.0	184.0	184.0	184.0	184.0
1943	184.0	184.0	184.0	184.0	184.0	184.0
1944	184.0	184.0	184.0	184.0	184.0	184.0
1945	184.0	184.0	184.0	184.0	184.0	184.0
1946	184.0	184.0	184.0	184.0	184.0	184.0
1947	184.0	184.0	184.0	184.0	184.0	184.0
1948	184.0	184.0	184.0	184.0	184.0	184.0
1949	184.0	184.0	184.0	184.0	184.0	184.0
1950	184.0	184.0	184.0	184.0	184.0	184.0
1951	184.0	184.0	184.0	184.0	184.0	184.0
1952	184.0	184.0	184.0	184.0	184.0	184.0
1953	184.0	184.0	184.0	184.0	184.0	184.0
1954	184.0	184.0	184.0	184.0	184.0	184.0
1955	184.0	184.0	184.0	184.0	184.0	184.0
1956	184.0	184.0	184.0	184.0	184.0	184.0
1957	184.0	184.0	184.0	184.0	184.0	184.0
1958	184.0	184.0	184.0	184.0	184.0	184.0
1959	184.0	184.0	184.0	184.0	184.0	184.0

Delivery for Fiscal Year	2010	2015	2020	2025	2030	2035
1960	184.0	184.0	184.0	184.0	184.0	184.0
1961	152.6	184.0	184.0	184.0	184.0	184.0
1962	132.5	152.6	152.6	152.6	152.6	152.6
1963	184.0	184.0	184.0	184.0	184.0	184.0
1964	184.0	184.0	184.0	184.0	184.0	184.0
1965	184.0	184.0	184.0	184.0	184.0	184.0
1966	184.0	184.0	184.0	184.0	184.0	184.0
1967	184.0	184.0	184.0	184.0	184.0	184.0
1968	184.0	184.0	184.0	184.0	184.0	184.0
1969	184.0	184.0	184.0	184.0	184.0	184.0
1970	184.0	184.0	184.0	184.0	184.0	184.0
1971	184.0	184.0	184.0	184.0	184.0	184.0
1972	184.0	184.0	184.0	184.0	184.0	184.0
1973	184.0	184.0	184.0	184.0	184.0	184.0
1974	184.0	184.0	184.0	184.0	184.0	184.0
1975	184.0	184.0	184.0	184.0	184.0	184.0
1976	184.0	184.0	184.0	184.0	184.0	184.0
1977	152.6	184.0	184.0	184.0	184.0	184.0
1978	136.2	152.6	152.6	152.6	152.6	152.6
1979	184.0	184.0	184.0	184.0	184.0	184.0
1980	184.0	184.0	184.0	184.0	184.0	184.0
1981	184.0	184.0	184.0	184.0	184.0	184.0
1982	184.0	184.0	184.0	184.0	184.0	184.0
1983	184.0	184.0	184.0	184.0	184.0	184.0
1984	184.0	184.0	184.0	184.0	184.0	184.0
1985	184.0	184.0	184.0	184.0	184.0	184.0
1986	184.0	184.0	184.0	184.0	184.0	184.0
1987	184.0	184.0	184.0	184.0	184.0	184.0
1988	152.6	184.0	184.0	184.0	184.0	184.0
1989	132.5	152.6	152.6	152.6	152.6	152.6
1990	132.5	152.6	152.6	152.6	152.6	152.6
1991	132.5	132.5	132.5	132.5	132.5	132.5
1992	132.5	152.6	152.6	152.6	152.6	152.6
1993	136.2	132.5	132.5	132.5	132.5	132.5
1994	184.0	184.0	184.0	184.0	184.0	184.0
1995	154.6	184.0	184.0	184.0	184.0	184.0
1996	184.0	184.0	184.0	184.0	184.0	184.0
1997	184.0	184.0	184.0	184.0	184.0	184.0
1998	184.0	184.0	184.0	184.0	184.0	184.0
1999	184.0	184.0	184.0	184.0	184.0	184.0
2000	184.0	184.0	184.0	184.0	184.0	184.0
2001	184.0	184.0	184.0	184.0	184.0	184.0
2002	184.0	184.0	184.0	184.0	184.0	184.0

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APPENDIX E

WATER SHORTAGE CONTINGENCY ORDINANCE

O R D I N A N C E N O. 2062

ORDINANCE ESTABLISHING VOLUNTARY WATER CONSERVATION PROGRAM, ENACTING REGULATIONS PROHIBITING CERTAIN USES OF WATER, ESTABLISHING PENALTIES FOR VIOLATION THEREOF, AND PROVIDING FOR IMPLEMENTATION OF WATER CONSERVATION LANDSCAPE AND IRRIGATION GUIDELINES; AND REPEALING ORDINANCES 2018 AND 2037 RELATING TO WATER SHORTAGE EMERGENCY

THE COUNCIL OF REDWOOD CITY DOES ORDAIN AS FOLLOWS:

SECTION 1. FINDINGS AND DETERMINATION. The Council of Redwood City hereby finds and determines that:

- (a) Pursuant to agreement dated as of August 8, 1984, by and between the City of Redwood City, California, and the City and County of San Francisco, California, the City of Redwood City purchases water for municipal purposes and for resale to customers and users of its water system.
- (b) As a result of a general prevailing condition of drought which had seriously reduced the supply of water available to the City and County of San Francisco and the availability thereof for resale to the City of Redwood City pursuant to the aforesaid agreement, on June 25, 1990, this Council adopted Ordinance No. 2018 entitled, "Ordinance Determining and Declaring Water Shortage Emergency, Establishing Regulations and Restrictions on the Delivery and Consumption of Water, and Establishing Penalties for Violations Thereof", Section 7 of which was subsequently amended by Ordinances No. 2019 adopted July 9, 1990, and No. 2037, adopted June 24, 1991, respectively, (collectively, "Ordinance No. 2018").
- (c) As of February 23, 1993, the Public Utilities Commission of the City and County of San Francisco determined and declared that the water shortage emergency which theretofore had been in effect, no longer existed in light of precipitation which had produced stormwater runoff, or snowpack which in turn would produce runoff, which replenished or would replenish reservoirs sufficiently to alleviate the aforesaid water shortage emergency.
- (d) As a result of the replenishment to the water supply of the City and County of San Francisco which serves as a source of water for this City,

sufficient water now exists to provide for the ordinary demands and requirements of water customers and users of the water system of the City of Redwood City; provided, that due regard be given to the periodic occurrences of drought conditions in the region which supplies this City with water.

- (e) In light of the frequency of drought conditions in said water source region, and recognizing that the supply of water to customers and users of the water system of the City of Redwood City is limited, notwithstanding that the aforesaid water shortage emergency has ceased, the public health, welfare and safety require the establishment and implementation of the water conservation measures hereinafter specified.
- (f) Pursuant to Resolution No. 11830 adopted August 31, 1992, entitled, "Resolution Approving and Authorizing Execution of Memorandum of Understanding Regarding Urban Water Conservation in California", this City entered into said Memorandum of Understanding ("MOU") by and among certain urban water suppliers, under which MOU the parties agreed, collectively, to implement urban water conservation practices to assist in the protection of streams, wetlands and estuaries, and to provide urban water supply reliability, in furtherance of which the hereinafter specified water conservation program and measures are enacted.

SECTION 2. VOLUNTARY CONSERVATION. All customers and uses of the water system of the City of Redwood City are hereby requested and urged to reduce their consumption of water furnished by the City of Redwood City by not less than 15% of the amount consumed during the Base Year. "Base Year", as used herein means calendar year 1987; provided, that for users whose bi-monthly billing period includes the months of December - January, the Base Year is February 1, 1987 - January 31, 1988.

The Director of General Services (hereinafter, references to the "Director" shall mean said Director of General Services, or his or her designee, unless otherwise specified) is hereby

authorized and directed (subject to availability of funds) to prepare and disseminate such information and guidelines and take such other action as he or she deems appropriate to advise and assist users of the water system of the City of Redwood City to achieve and maintain the aforesaid voluntary reduction. Nothing in this Section contained shall be deemed to excuse or relieve any customer or user of said water system from complying with the requirements of Section 4 (Prohibited Uses).

SECTION 3. RETAINED CREDITS. Credits established for customers and users of the water system of the City of Redwood City which, as of April 1, 1993, represent an accrued balance of water allotments (expressed in "units", of which one unit equals 100 cubic feet of water or 748 gallons) which, but for the repeal of Ordinance No. 2018, could have been credited toward any use of water in excess of the individual monthly allotments of said customers or users in any succeeding months pursuant to the provisions of Section 5(a)(5) of Ordinance No. 2018, shall remain as such credits from and after April 1, 1993, through and including March 31, 2003. If, during said period mandatory water use rationing is reestablished by ordinance duly adopted by this Council as a result of a recurrence of generally prevailing drought conditions, said customers or users may apply their respective balances of credits toward the use of water in excess of their individual monthly allotments established and provided under any such reestablished rationing program; provided, that said credits shall be applied in each instance against the amount of excess usage to the greatest effect to reduce the amount of

excess, such that credits shall not be retained or accumulated when excess usage occurs.

Notwithstanding the foregoing, the aforesaid balances of credits shall be retained only for customers or users to whom or which such credits have been provided as of April 1, 1993, and with respect to the premises to which such credits pertain as of said date. "Premises" as used herein means any parcel of land or any improvement thereon, or any portion of such parcel or such improvement to which water is furnished by the City's water system, and for which water quantity charges are assessed. No such balance of credits shall be transferrable between premises.

SECTION 4. PROHIBITED USES. The following methods, types, or techniques of use, or activities or circumstances relating to, or associated with, the use of water furnished by the water system of the City of Redwood City are, and each of them is, prohibited; and it shall be unlawful to use water in violation thereof:

- (1) Defective Equipment - Use of water through, with, or by any plumbing, sprinkler, watering or irrigation system, or other device, equipment or appliance which is broken or defective, or which, for any reason, consumes or fails to use water in the ordinary and customary manner or quantity for which it was designed, constructed or manufactured.
- (2) Surface Flow - Any use of water in any manner which causes, allows or permits the flooding of any premises, or any portion thereof, or which causes, allows, or permits water to escape freely from any premises or any portion thereof and flow therefrom into gutters, streets, or any surface water drainage system.
- (3) Vehicles - The use of any hose or similar device without a nozzle, valve, or other shut-off mechanism attached thereto, for washing or

cleaning any automobile, truck, trailer, trailer house, boat, mobile home, camper, recreational vehicle, or any other vehicle by directing water at or upon such vehicle; or for washing or cleaning the exterior surface of any dwelling, garage, commercial or industrial building, or appurtenance thereto, including, but not limited to, sidewalks, walkways, driveways, patios, parking lots, tennis courts, or similar or like hard-surfaced areas; or the use of any such hose with such nozzle, valve, or other shut-off mechanism attached thereto for such purpose, but without activating such mechanism so as to control the flow of water to the minimum amount necessary to complete the task.

SECTION 5. ADMINISTRATIVE CHARGE. Upon a determination by the Director that a customer or other user (collectively, "user") of the water system of the City of Redwood City has consumed or used water in violation of any of the provisions of Section 4, above, the Director may issue an order to cease and desist from such violation, and further order such user to comply forthwith with the prohibitions specified therein. If, after the issuance of such cease and desist order, such user continues to consume, or use, or again consumes or uses water in violation of any provision of said subdivision, the Director may impose an administrative enforcement charge in the amount of Fifty Dollars (\$50.00) for each such violation. Said administrative enforcement charge is hereby established at the foregoing amount to compensate the City for the costs of enforcing the foregoing provisions of this ordinance, and shall be added to, and collected with, the water quantity charges periodically billed to the user found to be in violation of said provisions. Nothing contained in this section shall be deemed a limitation upon the enforcement of other provisions of this ordinance with respect to

the violations herein specified.

SECTION 6. FLOW RESTRICTING DEVICES. Upon a determination by the Director that a user has consumed or used water in violation of any of the provisions of Section 4, the Director may issue an order to cease and desist from such violation, and further order such user to comply forthwith with such provisions or otherwise to take appropriate remedial or preventative action. If, after the issuance of such cease and desist order, such user continues to consume or use, or again consumes or uses water in violation of any such provision the Director may order the installation of a flow restricting device upon the water service line to the premises of such user. Such flow restricting device shall be installed and maintained for a period of not less than three days nor more than ten days for a first violation, and shall be installed and maintained for not less than ten days for each succeeding violation, and may be ordered to remain installed and maintained for a period of one year upon a finding by the Director that any user is habitually in violation of any of the provisions of said Section 4.

There are hereby established, and there shall be imposed and levied, charges for the installation and removal of flow restricting devices under this Section in accordance with the following schedule:

<u>Water Meter Size</u>	<u>Installation Charge</u>	<u>Removal Charge</u>
5/8" to 1", inclusive	\$50	\$50
1-½" to 2", inclusive	\$100	\$100
3" and larger	Actual cost, determined by the Director	Actual cost determined by the Director

SECTION 7. DISCONTINUANCE OF SERVICE. Upon a determination by the Director that a user has consumed water in violation of any of the provisions of Section 4 of this ordinance, the Director may issue an order to cease and desist from such violation, and further order such user to comply forthwith with such provisions or otherwise to take appropriate remedial or preventative action. If, after the issuance of such cease and desist order, such user continues to consume or use, or again consumes or uses water in violation of any such provision the Director may, subject to the provisions for notification and hearing hereinafter set forth, discontinue water service to the premises of such user.

Prior to the discontinuance of water service to any premises, the Director shall give written notice of intention to discontinue such service, and of hearing to be held by the Director upon the question of termination, not less than ten days prior to such hearing. A user determined to be in violation of the provisions of Section 4 of this ordinance, the owner of the premises to which such violation pertains (if the owner is not said user), and such other persons as the Director may deem appropriate, shall be heard at the hearing on the question of termination. If, upon completion of the hearing, the Director finds that no violation has occurred, the Director shall order that the service shall not be terminated. If, upon completion of the hearing, the Director determines that such violation has occurred, or is occurring, the Director may order the water service to be terminated, or may order that service be terminated

within a specified period of time unless such violation or the conditions or activities causing such violation cease forthwith, or within a specified period of time, or the Director may make such other order as he or she deems appropriate under the circumstances and in furtherance of the purposes and intent of this ordinance. The order of the Director shall be final.

SECTION 8. PENALTY. Any person violating, or causing the violation, of any of the provisions of Section 4 of this ordinance, shall be guilty of an infraction, and upon conviction thereof shall be punishable by: (i) a fine not exceeding One Hundred Dollars (\$100.00) for a first violation; (ii) a fine not exceeding Two Hundred Dollars (\$200.00) for a second violation of the same provision within one (1) year; (iii) a fine not exceeding Five Hundred Dollars (\$500.00) for each additional violation of the same provision within one (1) year.

Every day, or any portion thereof, any violation of any provision of said Section 4 shall continue, shall constitute a separate offense.

SECTION 9. REMEDIES CUMULATIVE. The remedies and penalties provided for in this ordinance shall be cumulative and not exclusive, and shall be in addition to any or all other remedies available to the City.

SECTION 10. NOTICES. Notices required to be given pursuant to the provisions of this ordinance shall be in writing, may be combined with water service bills or other written communications, and shall be delivered personally, or by posting with the United States Mail Service, first class postage prepaid,

and addressed to the last known address of the user to whom given, or to the owner of the premises to which the water service of such user pertains, shown on the last equalized assessment roll of the County Assessor, County of San Mateo.

SECTION 11. IMPLEMENTATION. The Director is hereby authorized and empowered to delegate his or her authority hereunder to such deputies, officers, employees, or agents of the City as he or she shall designate, and to establish such rules, regulations, and procedures, and to prepare or furnish such forms, as he or she deems necessary or appropriate to carry out the provisions of Sections 2 through 10 of this ordinance.

SECTION 12. LANDSCAPE AND IRRIGATION GUIDELINES. Notwithstanding the cessation of the water shortage emergency declared pursuant to Ordinance No. 2018, those certain Water Conservation Landscape and Irrigation Guidelines approved and adopted pursuant to Resolution No. 11308, adopted June 11, 1990, by this Council, and as said guidelines may be amended, superceded, or revised from time to time, shall remain in full force and effect as water conservation measures in furtherance of the public health, welfare and safety. The Director of Community Development is hereby authorized and directed to implement and enforce said guidelines with respect to the review, approval, and/or issuance of land use permits or other entitlements to which they pertain.

SECTION 13. REPEALER. Ordinance No. 2018, above-entitled, and Ordinance No. 2037 entitled, "Ordinance Amending Section 7 of Ordinance No. 2018 Relating to Water Use Charges Imposed Under Regulations and Restrictions on the Delivery and Consumption of

Water During Water Shortage Emergency and Repealing Ordinance No. 2019", adopted June 24, 1991, are, and each of them is, hereby repealed. Nothing in this Section contained shall be deemed to affect the retention of individual balances of water allotment credits and the use thereof pursuant to Section 3 of this ordinance.

SECTION 14. EFFECTIVE, OPERATIVE DATES. This Ordinance shall be effective thirty (30) days from the date of its adoption; provided that this Ordinance shall be operative retroactively from and after April 1, 1993.

* * *

ORDINANCE NO. 2062

at a regular meeting thereof held on the 2nd, day of August
19 93, by the following votes:

AYES, and in favor of the passage and adoption of the foregoing ordinance:

Council Members Claire, Gasparini, Greenalch, La Berge, Sanfilipo, Steinfeld,
and Mayor Buchan

NOES: None

ABSENT: None

Judy Buchan
Mayor of the City of Redwood City

Attest:

Arlyn C. Jorgenson
Clerk of the City of Redwood City

I hereby approve the foregoing Ordinance
this 3rd day of August, 19 93.

Mayor of the City of Redwood City

Judy Buchan

Arlyn C. Jorgenson, City Clerk of the
City of Redwood City, California, does hereby
certify that the above and foregoing is a fully,
true and correct copy of ORDINANCE NO. 2062

In Witness Whereof, I have hereunto set my hand
and the Seal of said City this 3rd day of
August, 19 93

ARLYN C. JORGENSON
City Clerk

By Arlyn C. Jorgenson

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APPENDIX F

LETTER FROM REDWOOD CITY TO BAWSCA REGARDING WATER PURCHASE PROJECTIONS (February 17, 2011)



February 17, 2011

Nicole M. Sandkulla, P. E.
Water Resources Planning Manager
Bay Area Water Supply and Conservation Agency
155 Bovet Road, Suite 302
San Mateo, CA 94402

RE: SAN FRANCISCO PUBLIC UTILITIES COMMISSION REQUEST FOR PROJECTIONS

Dear Ms. Sandkulla:

This letter is in response the San Francisco Public Utilities Commission (SFPUC) request for projections from each of its wholesale customers of purchases from the San Francisco Regional Water System (System) in five year increments from 2015 to 2030 (or 2035). The SFPUC will use this information to prepare its Wholesale Urban Water Management Plan for the System.

Redwood City adopted a New General Plan in 2010. Water demand projections in Redwood City's New General Plan (NGP) exceed the City's Individual Supply Guarantee by an estimated 1,585 acre-feet per year by 2030. These demand assumptions are somewhat higher than those made in the November 10, 2005 *Revised Redwood City Best Estimate of Water Purchases* letter from Mr. Peter Ingram to Ms. Paula Kehoe. The purchase projections made in the November 10, 2005 letter were based on water demands identified in the City's 1990 General Plan, exclusive of newly identified changes in land use patterns and designations.

Water demand projections for growth under the new General Plan incorporate high growth assumptions which result in an extremely conservative water demand estimate. These water demand projections were prepared using the same methodologies used in Redwood City's 2005 UWMP (i.e. demand by customer type, including assumptions for water conservation and recycling). These new projections are inclusive of the newly identified changes in land use patterns and designations that are assumed under the NGP (i.e. growth expected within the City's water service area, to include the City limits and some portions of the Sphere of Influence). Also of note is that the growth projections prepared by the land use planners for the NGP were established to allow for a conservative analysis of the impacts of the NGP. Thus, the projections assumed significant reuse of already developed properties (up to 30% of the land area in the higher density and intensity land-use designations). The potential for this much change over the plan's twenty year horizon is very unlikely, however, making these high growth assumptions was considered prudent in that it resulted in a conservative evaluation of the impacts of the plan, including elevated water demand projections.

Redwood City's 2010 UWMP is currently under development and is scheduled for adoption on June 6, 2011. The City's 2010 UWMP will further refine demand projection methodologies above and beyond those used for the NGP; they will encompass new regulations such as Senate Bill x7 - 7 which requires the State of California as a whole to achieve a 20% reduction in per capita water use by 2020. Therefore, projected water demands as expressed in the NGP are expected to be higher and more conservative than demands as will be expressed in the City's 2010 UWMP.

Despite the conservative nature of the NGP projections, staff continues to develop strategies which account for potential shortfalls in water supply. Among these, is the Long-term Reliable Water Supply Strategy (LTRWSS) that Redwood City is participating in with your agency, the Bay Area Water Supply and Conservation Agency (BAWSCA). The LTRWSS investigates options to increase supply reliability under both normal and drought conditions.

In addition to the LTRWSS, Redwood City continues to study, develop, and implement additional water conservation programs, expanded recycled water use, transfers and exchanges (securing water from willing sellers inside and outside of the Hetch Hetchy water system), and development of groundwater and desalination to meet projected water needs and potential shortfalls through 2030.

The following table represents Redwood City's best estimate of future water purchases from the San Francisco Public Utilities Commission as identified in the City's New General Plan:

YEAR	2015	2020	2025	2030
PROJECTED MGD	10.8	11.3	11.8	12.3

Please do not hesitate to contact me regarding this matter at (650) 780-7474.

Sincerely,



JUSTIN EZELL
Public Works Superintendent

Enclosed: Email dated February 4, 2011 from Ms. Nicole Sandkulla
November 10, 2005 letter from Mr. Peter Ingram to Ms. Paula Kehoe

PWS-Justin Ezell

From: Nicole Sandkulla <NSandkulla@bawasca.org>
Sent: Friday, February 04, 2011 12:03 PM
To: Alan Kurotori (akurotori@santaclaraca.gov); Alex Ameri (alex.ameri@hayward-ca.gov); Art Morimoto (amorimoto@burlingame.org); Cari Lemke; Carrasco, Anthony; cathya@midpeninsulawater.org; David Dickson (ddickson@coastsidewater.org); dbarrow@westboroughwater.com; eric.cartwright@acwd.com; Flegel, Elizabeth; Gregg Hosfeldt (gregg.hosfeldt@mountainview.gov); Henry Young (henryy@midpeninsulawater.org); James Craig; Jerry Flanagan; PWS-Justin Ezell; Kathleen Phalen (kphalen@ci.milpitas.ca.gov); Klara Fabry (kfabry@sanbruno.ca.gov); koconnell@nccwd.com; ksteffens@menlopark.org; M. L. Gordon (acmoffice2415@yahoo.com); Mansour Nasser (Mansour.Nasser@sanjoseca.gov); Marty Laporte (martyl@bonair.stanford.edu); Marvin Rose (mrose@ci.sunnyvale.ca.us); HRSMC-Martha Debry; Patrick Sweetland (psweetland@dalycity.org); Patrick Walter (pwalter@purissimawater.org); paulr@midpeninsulawater.org; Procos, Nicolas; Randy Breault; Rebecca Fotu (rlfotu@menlopark.org); rpoppp@ci.millbrae.ca.us; rtowne@fostercity.org; Thomas.Niesar@acwd.com; Tim McAuliffe (tmcauliffe@burlingame.org)
Cc: Art Jensen; Allison C. Schutte; Anona Dutton; (mbolzowski@calwater.com); Alicia Sargiotto; Allison turner (alison.turner@mountainview.gov); Aparna Chatterjee; Brendan McCarthy; Brent Chester; Cathleen Brennan (cbrennan@coastsidewater.org); Cindy Bertsch; croyer@dalycity.org; Dana Jacobson; ECooney@HILLSBOROUGH.NET; Elvert, Catherine; gnathan@amwater.com; Howard Salamanca (hsalamanca@ci.milpitas.ca.gov); Jade Williams (jawilliams@calwater.com); Jeanette Kalabolas (jeanettek@midpeninsulawater.org); Krista Kuehnnackl; Leah Edwards; marilyn.mosher@hayward-ca.gov; Nicole Quesada (Nicole.Quesada@sanjoseca.gov); Nina Hawk (nhawk@santaclaraca.gov); Norm Dorais (NDORAIS@fostercity.org); Shelly Reider (sreider@ci.millbrae.ca.us); Stephanie Nevins (stephanie.nevins@acwd.com); Toni Harris; Tracy Ingebrigtsen (tracyi@bonair.stanford.edu); Val Conzet (vconzet@ci.sunnyvale.ca.us); Virginia Parks; William Lai; Zach Goldberg
Subject: Projected SFPUC Purchases for UWMP Preparation Needed by February 17, 2011
Importance: High
Follow Up Flag: Follow up
Due By: Wednesday, February 16, 2011 4:00 PM
Flag Status: Flagged

Dear BAWSCA Water Management Representatives,

The San Francisco Public Utilities Commission (SFPUC) has requested projections from each of its wholesale customers of purchases from the San Francisco Regional Water System (System) in five year increments from 2015 to 2030 (or 2035). The SFPUC will use this information to prepare its Wholesale Urban Water Management Plan for the System.

SFPUC's request is consistent with the requirements of Section 10631 of the California Water Code which states:

(k) Urban water suppliers that rely 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).

Historically, the SFPUC has relied on each agency's water purchase projections reported in the BAWSCA Annual Report. However, past purchase projections may not be appropriate for a variety of reasons:

- Changes in the economy and overall water use characteristics in the region
- Agencies are updating their projected needs and use of sources as they prepare their UWMP's
- Projections in the FY 2008-2009 Annual Report do not include the results of the Water Conservation Implementation Plan and the status of each agency's conservation programs

The SFPUC will need to document estimated water sales, including amounts for Wholesale Customers that are exempt from filing UWMP's. We recommend that those agencies that are not required to prepare UWMP's provide BAWSCA with the five-year projected purchases you wish the SFPUC to use in preparing its report.

As in the past, BAWSCA will support providing this information to the SFPUC in a coordinated fashion. To meet the SFPUC's deadline, please provide BAWSCA your projected SFPUC purchases in 5-year increments by close-of-business on Thursday, February 17, 2011. In addition to the numbers themselves, BAWSCA will forward to the SFPUC any qualifications that you wish to have associated with the data you provide at this time (e.g. that the data is draft and subject to modification as part of finalizing your agency UWMP). BAWSCA will forward information received to SFPUC on Friday, February 18th.

BAWSCA will only send to the SFPUC data that it receives from each of your agencies specifically for this purpose. No data will be provided to the SFPUC for agencies that do not provide data to BAWSCA.

Lastly, please note that BAWSCA will also utilize these purchase projections provided by each BAWSCA agency to prepare and submit the water purchase projections through 2018 due to the SFPUC by June 30, 2011 in compliance with Section 4.05 of the 2009 Water Supply Agreement unless otherwise notified of a change in the numbers by individual member agencies.

If you have any questions, please call me or Anona Dutton.

Sincerely,
Nicole Sandkulla

Nicole M. Sandkulla, P. E.
Water Resources Planning Manager
Bay Area Water Supply and Conservation Agency
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Ph: (650) 349-3000 Fax: (650) 349-8395
EMail: NSandkulla@BAWSCA.org
Website: WWW.BAWSCA.org

November 10, 2005

Paula Kehoe
 Manager of Water Resources Planning
 San Francisco Public Utilities Commission
 1145 Market Street, Suite 401
 San Francisco, CA 94103

SUBJECT: REVISED REDWOOD CITY BEST ESTIMATE OF WATER PURCHASES

Dear Ms. Kehoe,

On April 8, 2005, Redwood City provided its best estimate of future purchases from the SFPUC regional water system in five-year increments. Those projections showed a range of purchases for 2025 and 2030, consistent with the August 2004 "Best Estimate" for planning purposes submittal to the SFPUC. At the time, the 1.0 MGD difference represented the pending approval of recycled water use to offset potable water demand on the regional system. Subsequently, the City Council of Redwood City has approved the implementation of the Redwood City Recycled Water Project, and staff has refined the purchase projections accordingly. The table below has been revised to show the new projections, which will be incorporated into the 2005 Redwood City Urban Water Management Plan. Please ensure that the revised amounts are incorporated into the SFPUC's long-term planning process and, as applicable, reflected in the San Francisco Urban Water Management Plan.

Year	Projected SFPUC Purchases – MGD (lower)	Projected SFPUC Purchases – MGD (higher)
2010	10.8	-
2015	10.3 11.2	-
2020	10.7 11.4	-
2025	11.4 11.5	12.1
2030	11.6	12.6

If you have any questions, please feel free to call me at 650-780-7466.

Sincerely,

PETER C. INGRAM
 Public Works Services Director

Copy: Karen Hurst, SFPUC
 Nicole Sandkulla, BAWSCA
 Manny Rosas, Public Works Superintendent
 Chu Chang, Engineering & Construction Manager
 John Whitcomb, UWMP Consultant

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