



CITY OF SAN DIEGO

Recycled Water Pricing Study Report

June 19, 2013

DRAFT



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1.0 EXECUTIVE SUMMARY

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The City of San Diego (City) commissioned Raftelis Financial Consultants (RFC) to conduct the Recycled Water Pricing Study (Pricing Study). The purpose of the study was to review all financial aspects of the recycled water operations and capital program to:

- Calculate the true cost of producing and distributing recycled water
- Recommend a pricing structure that promotes use and recovers costs associated with producing and distributing recycled water
- Review alternative rate structures to encourage recycled water demand
- Determine appropriateness and amount of revenue and expenses that should be allocated among potable water, wastewater and recycled water programs and the resultant impacts on customers
- Develop a user-friendly computer Pricing Model that could be used to model rates in future years and train City staff on its use

The Pricing Study included extensive review of the current and projected recycled water demands, operating and capital expenses, and policy issues related to allocation of costs among recycled water, potable water and wastewater enterprises.

The following sections document the background, cost of service review, analysis, findings, and recommendations that are the product of the study.

1.1. Background

This section describes the regulatory background, the state of the current recycled system and current rates for recycled water.

1.1.1. Regulatory

Since 1963, the City has treated its wastewater at the Point Loma Wastewater Treatment Plant (PLWTP). Wastewater is currently being treated to advanced primary standards. In 1972, the federal Clean Water Act (CWA) was adopted and it required wastewater treatment plants provide a minimum of secondary treatment. However, Section 301(h) of the CWA allowed facilities that discharge to certain marine waters to apply for a waiver from secondary treatment standards by 1982. The City originally applied for the waiver but withdrew it, and in 1987 the US Environmental Protection Agency (EPA) along with other environmental groups sued the City for not meeting the provisions of the CWA. The Ocean Pollution Reduction Act (OPRA) was passed in 1994, which allowed the City to reapply for a Section 301(h) waiver. The City reapplied and received a waiver from treating wastewater to secondary standards as required by the CWA. One of the conditions of the OPRA required a commitment by the City to implement a water reclamation program that would create a system capacity to treat 45 million gallons per day (MGD) by 2010. The City has fulfilled the treatment capacity requirement with the

completion of the 30 MGD North City Water Reclamation Plant (NCWRP) in 1997 and the 15 MGD South Bay Water Reclamation Plant (SBWRP) in 2002.

The City received approximately \$69.5 million in construction grants from the United States Environmental Protection Agency (EPA) for the construction of the NCWRP. Conditions of that grant included the following goals:

- A minimum of 75 percent of the plants design capacity (at least 22.5 MGD) must be treated at NCWRP. Of these flows the City will beneficially reuse 10 percent upon certification
- The City will attempt to reuse 25 percent of the flows (5.6 MGD) into the plant by December 31, 2003
- The City will attempt to reuse 50 percent of the flows (11.25 MGD) into the plant by December 31, 2010

As long as the City is making attempts at maximizing beneficial reuse of recycled water, the EPA does not include penalties for failing to meet the 50 percent reuse goal. Fiscal year (FY) 2010 averaged approximately 6.3 MGD of recycled water use from the NCWRP, including in-plant usage. However, peak month (July 2009) usage during the dry summer weather was 9.3 MGD, with a peak day demand of 13 MG.

A 1995 federal court order further required the City to construct an optimized recycled water distribution system in conjunction with building the NCWRP. The distribution facilities that comprise the Optimized System were installed between 1995 and 1998 with Public Utilities Department Water Branch (Water Branch) funds to enable delivery of recycled water upon completion of the reclamation plant. The Optimized System, also known as the “backbone system”, is composed of recycled water facilities built to store and distribute recycled water produced at the NCWRP to the area north of Highway 52, south of Mira Mesa Boulevard, west of Interstate 15, and an area east of Interstate 15 in the Miramar Ranch North community. The total cost of the Optimized System is approximately \$69.8 million and it consists of the following facilities:

- 66 miles of pipeline ranging from 4” – 18” in diameter
- 9 MG Reservoir
- 2 pump stations

Since 2001, the Water Branch has expanded the Optimized System by connecting additional recycled water customers to the backbone system. Excluding the costs of the treatment plants, the City has invested about \$69.8 million in the optimized system and about \$15.1 million in retrofits so that customers could use recycled water. In addition, the City has invested about \$52.9 million in expanding the entire recycled water system. Out of the total costs of about \$137.8 million, \$25.6 million was grant funded, \$62 million was debt financed and the remaining \$50.2 million was cash financed.

1.1.2. Current Recycled Water System

To increase use of recycled water, the City continues to expand the distribution system to connect other retail customers. Recycled water distribution facilities are currently in place to serve the northern section of the system extending from the coast to the City of Poway (Poway). Additionally, through the Recycled Water Retrofit Program¹, the City has invested approximately \$15.1 million over 10 years to retrofit customers enabling them to use recycled water. The current distribution system in the northern section of the system now consists of 83 miles of pipeline, 9 MG and 3 MG reservoirs, and 3 pump stations. When the program expired in 2001, recycled water commodity rates were reduced from 90 percent of the potable rate, from \$1.34 per hundred cubic feet (HCF) to \$0.80 per HCF to encourage retail customers to convert to recycled water use. The City currently sells recycled water produced at NCWRP to the City of Poway, Olivenhain Municipal Water District and to approximately 560 retail customers. Additionally, the City started recycled water sales from SBWRP to the International Boundary Water Commission (IBWC) in 2006, Otay Water District in 2007, and to Caltrans in 2008.

The Recycled Water “distribution system” and all its related costs have always been the responsibility of the Water Enterprise Fund, while all of the treatment costs through tertiary and treatment plant costs have been funded by the Metro Wastewater Fund.

In addition to the volumetric rate, the City collects monthly base fees based on the size of the meter serving each customer. At the current volumetric rate of \$0.80 per HCF, if considered independent of the potable water fund, the recycled system is operating in significant deficit. In FY 2012, total revenue requirements including operation and maintenance (O&M) expenses, rate funded capital costs and debt service costs were approximately \$63.7 million. Operating and non-operating revenues and credits from the Metropolitan Water District of Southern California (MWD) and the San Diego County Water Authority (SDCWA) were approximately \$7.1 million, resulting in a net deficit of approximately \$56.6 million.

1.2. Projections

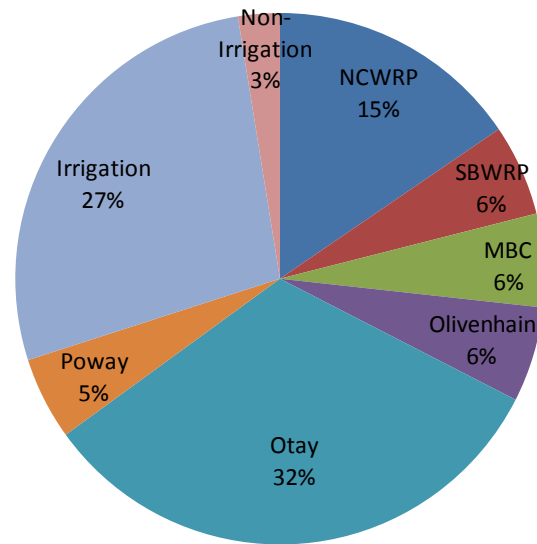
To determine rates, it is necessary to review the user and usage characteristics, revenue requirements, and miscellaneous revenue offsets.

¹ Recycled Water Retrofit Program more fully explained on pages 16 and 29.

1.2.1. Customers

The entire recycled water distribution system comprised of North City and South Bay service areas currently has about 570 customers with meters ranging in size from 1-inch to 10-inch. Most are retail (irrigation and non-irrigation) customers; however, the City sells recycled water to a few agencies including Otay Water District, Olivenhain Municipal Water District, and the City of Poway. A significant quantity of recycled water is used at the NCWRP and SBWRP for internal treatment processes which use the recycled water for filter backwashing and irrigation. Recycled water is used at the Metro Biosolids Center (MBC) for process water for sludge treatment and irrigation purposes.

FY 2012 Actual Recycled Water Usage*

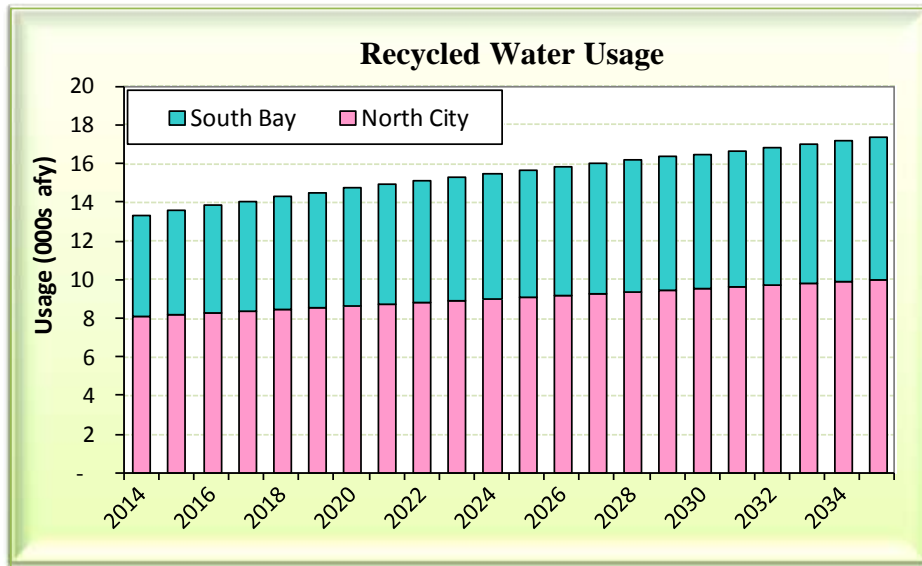


* FY 2012 = July 2011 to June 2012

1.2.2. Usage

Recycled water commodity rates are very sensitive to usage, (i.e. given the low volume levels, a relatively small change in demand has a significant impact on unit costs), and this emphasizes the importance of accurately estimating future sales. For example, in August 2012, the combined output of the reclamation plants exceeded 18 MGD, while during the winter months, production drops to 4 – 5 MGD. Future sales are dependent upon several factors including the expansion of the distribution system, seasons and weather conditions as most of the recycled water is used for landscape irrigation. Based on current planning, recycled water sales are projected to grow at a stable rate as the distribution system is expanded by the City and wholesale agencies. The current projected recycled water usage from NCWRP and SBWRP is shown in Figure ES-1 and includes recycled water usage within the reclamation plants.

Figure ES-1

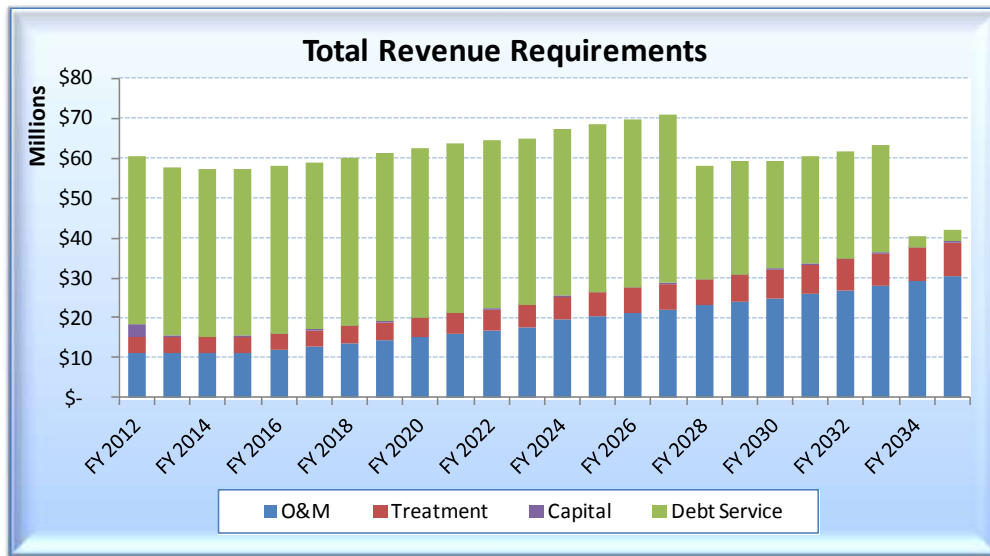


Average increase over the planning horizon is approximately 1.5 percent per year.

1.2.3. Gross Revenue Requirements

Projected revenue requirements include all operating and capital expenses of the recycled water system. Gross revenue requirements include recovery of operating and maintenance (O&M), pay-as-you-go capital (PAYGO), and debt service costs related to the recycled distribution system. The City’s effort to meet the goal of beneficially reusing 50 percent of wastewater flow at NCWRP will require additional capital investment. However, these additional investments have not been determined and thus are not part of this analysis. The budgeted capital expenses will be partially funded by PAYGO funds recovered through rates. The City’s policy is to fund 80 percent of the capital costs through debt funding and the balance through PAYGO and other sources. Figure ES-2 shows the projected gross revenue requirements for the recycled water system.

**Figure ES-2
Total Annual Revenue Requirements**



Note: Decreases in debt service costs in FY 2028 and FY 2034 reflect the time when the treatment plants debt are paid off

Net revenue requirements, which are the gross revenue requirements less offsets, are revenues to be potentially derived from rates for recycled water. The offsets are discussed below.

1.2.4. Revenue Offsets

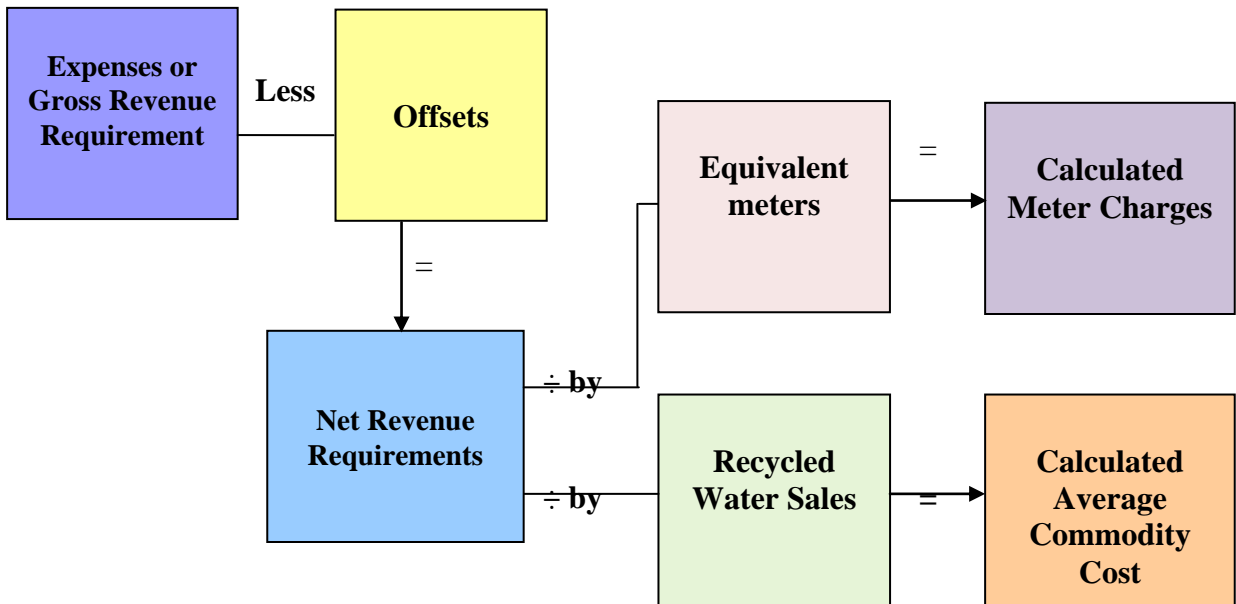
Recycled water rates are determined from net revenue requirements and take into account offsets from several sources including:

- Incentives from MWD and SDCWA in the amount of up to \$250 and \$200 per acre foot (AF) of recycled water sales, respectively, for all sales at NCWRP and only SDCWA incentives for retail sales at SBWRP;
- Fees of \$25 per AF from Olivenhain Municipal Water District (Olivenhain) for sales in its service area because it is not a party to the Metro Agreement. The \$25 per AF fee, per Olivenhain’s contract, only applies to sales to Olivenhain’s initial connection and does not apply to the recycled water it sells to any customers within the city limits of San Diego;
- Revenues collected from recycled water sales to Poway based upon a negotiated contract rate;
- Capacity charges collected from new customers; and
- Meter installation costs from retail customers.

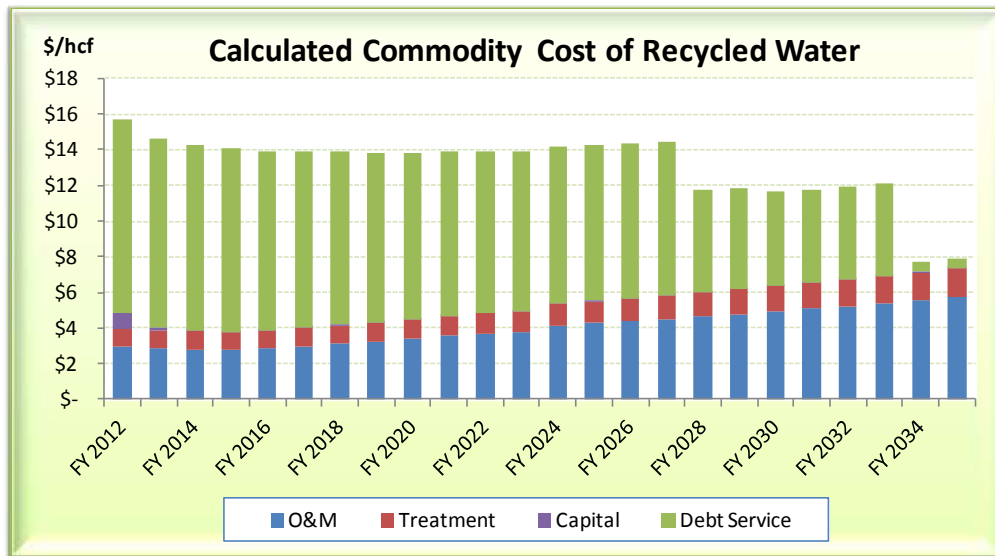
1.2.5. Cost of Service Rates

The net revenue requirement (the difference between the gross revenue requirements and the revenue offsets) for each year is divided by the projected recycled water sales in that year to derive the average commodity cost to all customers of recycled water as shown in Figure ES-3. The calculated average commodity cost projection is shown in Figure ES-4.

Figure ES-3
Calculation of Rates



**Figure ES-4
Calculated Rates**



1.3. Observations

This section of the Executive Summary outlines some findings and observations that will enhance the viability of the recycled water program.

1. The current commodity rate for recycled water is \$0.80 per HCF. The Water Branch began selling recycled water in October 1997 at \$1.34 per HCF and reduced the rate to its current level in July 2001 to encourage recycled water use and thereby reduce the demand on the supply of imported water. Since that time, over 350 customers have been added to the system through FY 2013.
2. Recycled water rates are very sensitive to the quantity of recycled water sold. Most of the costs of the recycled water system are fixed, including debt service and most of the O&M costs; spreading these costs over a larger usage base would result in lower rates.
3. To make recycled water available to more users, the City has planned for moderate capital investments in the distribution system. Capital costs will be funded on a PAYGO basis from rates, new debt, capacity fees, and federal and state grants.
4. By substituting recycled water for potable water, the City’s potable water system has benefited from the expansion of the recycled water system through the creation of additional capacity and the resultant reduction in potable water costs:
 - a. Since the recycled water system is a **sunk cost**—a cost that has been incurred and cannot be reversed—for the most part, using it to its full potential provides the City with an alternate water supply. It frees up

capacity in the potable system that becomes available to new users. This freed up water supply is key part of the City's overall long range water supply planning process. Recycled water customers benefit from rates lower than potable water rates and also from a relatively reliable (more drought proof) supply.

- b. Since the potable water system loses customers, there is a reduction in operating revenue to the potable water system until new users come on line and use up the freed capacity. The loss of revenue is small when compared to the potable water revenues. In the long-term, the recycled water capacity allows the City greater flexibility to add customers.
 - c. Use of recycled water reduces potable water purchase costs, as well as treatment and delivery costs. In addition, use of recycled water has been instrumental in meeting the City's overall demand reduction targets associated with recent water supply allocations from SDCWA.
5. The City receives credit from MWD and SDCWA for recycled water sales at the NCWRP. MWD and SDCWA provide incentives of up to \$250 and \$200 per AF, respectively, to encourage agencies to develop alternate sources of water because it releases demand on the imported water. These incentives will expire in FY 2023 for NCWRP. The City receives the SDCWA incentive for sales to customers other than Otay Water District at SBWRP. The incentive at SBWRP will expire in FY 2032. Otay receives these credits directly for its usage from MWD and SDCWA through its agreements with those agencies. Given the recent substantial increases in MWD water rates, the MWD rebate is projected to reduce with time.
 6. The 1998 Regional Wastewater Disposal Agreement between the City and the Participating Agencies of the Metropolitan Sewerage System (Metro System) stipulated that the revenues from the sale of recycled water from the NCWRP should first be used to pay the cost of the distribution system, then the tertiary treatment costs, and that revenue from sales from the SBWRP will stay with the Metro System. The agreement says revenues from the sales of recycled water would accrue to the Metro System; it is interpreted this to mean net revenues, i.e., revenues net of operating and capital expenses incurred by the Water Branch.
 7. As demand increases, NCWRP will need to expand demineralization capacity to ensure that product water total dissolved solids (TDS) is under 1,000 mg/l. The plant's current Electro Dialysis Reversal demineralization capacity is approximately 12 MGD depending on water and wastewater sources. TDS reduction at the SBWRP has not been necessary thus far. If this situation changes, all options for bringing the TDS levels back in line will be evaluated.

1.4. Assumptions/Recommendations

This section of the Executive Summary outlines the assumptions and the resulting recommendations to enhance the viability of the recycled water program as a system that recovers more of its ongoing costs.

1. The recycled water system should be considered a unitary system such that all the costs, operating and capital, of the system should be proportionately shared by irrigation, non-irrigation, and wholesale customers receiving recycled water from the NCWRP and SBWRP. This means that all users should share in all the costs of the recycled water system, provided that these users are within the Metropolitan Wastewater (Metro) service area. The rationale for the unitary recycled water system are:
 - a. The Metro System is a unitary system, and all wastewater users proportionately share in the costs of this system irrespective of their location, the collection system, or the proximity to the specific treatment plant into which they discharge.
 - b. The NCWRP and SBWRP plants were constructed to meet the Ocean Pollution Reduction Act (OPRA) requirements. The costs related to the construction and operation of these plants are part of the unitary Metro System. The City received a federal construction grant for the NCWRP; and grant conditions require the City to meet certain reuse targets. Capital costs incurred for the recycled water distribution system to meet these reuse targets are therefore considered to be part of the integrated system that benefits all recycled water customers. All customers share in the costs and benefits of the system, which means that all users share in the costs of the recycled water system, provided that these users are within the Metro wastewater service area. Rates to customers outside of the wastewater service area, such as Olivenhain Municipal Water District (Olivenhain), could include an incremental fee since these outside users do not share in the costs of the wastewater system.
 - c. The true cost of producing recycled water includes the operating and capital costs of all the facilities – treatment and distribution. Cash expenses already incurred are excluded from the analysis. Ongoing debt service costs for the treatment plants and distribution system are included in the revenue requirements to determine the cost of producing recycled water.
 - d. The City has entered into agreements with the City of Poway, Olivenhain Municipal Water District, and Otay Water District (Otay). Poway has a contractual rate with the City for its recycled water. The agreements with the latter two agencies specify that the same rates charged to City customers will apply to these customers. The language of these agreements implies a unitary system, wherein all the costs of the recycled water system would be shared by all customers. Olivenhain pays a small premium for portions of their recycled water not sold to customers within the city limits of San Diego, because Olivenhain is not a party to the Metro Agreement. It should be noted that Otay receives a similar benefit because it discharges a relatively small quantity (average of less than 1 MGD) of wastewater in the Metro system while drawing on average more than twice that amount of recycled water (2.8 MGD) from the system.

2. The Pricing Model assumes that recycled water used at the treatment plants will not be billed as it is needed to produce the recycled water end product at these facilities.
3. Recycled water used at MBC will not be billed because it is part of the Metro wastewater system. Recycled water is used as process water for sludge treatment and irrigation purposes at MBC. Thus, recycled water usage at MBC, NCWRP and SBWRP is not included as part of the total recycled water sales to determine the unit cost.
4. Bond financing will continue to be made through the Water Branch fund.
5. The costs related to Indirect Potable Reuse (IPR) are not included in the analysis.
6. Additional assumptions of technical nature are listed in Appendix A.
7. To ensure that the recycled water is marketable, we recommend that the commodity rate for recycled water be lower than the potable irrigation rate. Most agencies in California charge a recycled water rate between 75 to 90 percent of the potable water rate. The City's recycled water commodity rate is currently 20 percent of the June 2013 irrigation rate of \$4.014 per HCF. The true cost of service includes all capital and operational costs of the NCWRP, SBWRP, and the recycled water distribution system costs. The true cost of service rate exceeds the potable water rate and therefore we recommend a modified cost of service which considers only the capital costs of the demineralization facilities at the NCWRP, the tertiary treatment operating costs at NCWRP and SBWRP, and distribution system capital and operating costs. Implicit in this modified cost analysis is the understanding that Metro wastewater customers will bear the capital and operating costs related to the primary and secondary facilities as well as the tertiary capital costs at NCWRP and SBWRP. We recommend a recycled water rate of \$2.241 per HCF for the next four years based on the modified cost of service rate for recycled water. This rate is approximately 56 percent of the June 2013 irrigation rate. It should be noted that the recommended rate is not the true cost of service rate. The recommended rate is designed to provide a good balance between incentives for recycled water use and cost of service. As costs and sales can be projected with reasonable certainty for only a few years, the City should consider reviewing the recycled water rate periodically with available updated information.
8. The recycled water base fees or meter charges have not been revised for several years. Base fees include costs of customer service, billing, meter maintenance and a portion of the costs to provide capacity. The cost allocation process provides a reasonable basis to calculate the base fees and the calculated base fees are reasonably close to those for potable service. The differences in the larger meters result from use of the latest capacities of the larger meters shown in the AWWA M22 Manual Sizing Water Service Lines and Meters. The proposed monthly meter charges and rates are shown in Table ES-1.

**Table ES -1
Recommended Recycled Water Rates**

	Existing	Proposed 1/1/2014	Proposed 1/1/2015	Proposed 1/1/2016	Proposed 1/1/2017
Monthly Base Fee					
<u>Meter Size</u>					
5/8"	\$ 8.63	\$ 23.69	\$ 24.04	\$ 24.73	\$ 25.72
3/4"	\$ 8.63	\$ 23.69	\$ 24.04	\$ 24.73	\$ 25.72
1"	\$ 8.63	\$ 23.69	\$ 24.04	\$ 24.73	\$ 25.72
1-1/2"	\$ 43.27	\$ 42.91	\$ 43.55	\$ 44.80	\$ 46.59
2"	\$ 65.96	\$ 65.98	\$ 66.96	\$ 68.89	\$ 71.65
3"	\$ 246.93	\$ 139.03	\$ 141.10	\$ 145.16	\$ 150.97
4"	\$ 411.53	\$ 246.67	\$ 250.34	\$ 257.55	\$ 267.85
6"	\$ 925.93	\$ 542.71	\$ 550.79	\$ 566.64	\$ 589.31
8"	\$ 1,234.59	\$ 927.17	\$ 940.97	\$ 968.05	\$ 1,006.77
10"	\$ 1,646.12	\$ 1,465.41	\$ 1,487.22	\$ 1,530.03	\$ 1,591.23
12"	\$ 2,263.42	\$ 1,926.76	\$ 1,955.43	\$ 2,011.71	\$ 2,092.18
16"	\$ 3,703.75	\$ 3,849.04	\$ 3,906.32	\$ 4,018.76	\$ 4,179.51
Uniform Commodity Rate (\$/hcf)	\$ 0.80	\$ 2.241	\$ 2.241	\$ 2.241	\$ 2.241

9. Consistent with OPRA and NPDES permit requirements, the Wastewater Branch has borne the cost of constructing the capital facilities required to produce recycled water, including the demineralization facilities at NCWRP. We recommend that the Wastewater Branch continue to be responsible for the replacement and refurbishment (R&R) of the NCWRP and SBWRP facilities.
10. Since the recycled water system will experience some growth over the next several years the estimates of O&M and capital costs may need to be revised. We recommend that the City review these figures, as conditions change in the future, to ensure that they are consistent with the actual costs.
11. With the potential of implementing an indirect potable reuse (IPR) water purification project, the City should analyze, when conditions change in the future, the economic effectiveness of investments in the distribution system to increase sales.
12. We recommend that the City set capacity fees for **new** (not existing potable users converted to recycled water) retail recycled water connections (excluding existing potable water customers) equal to the potable rate, currently \$3,047 per equivalent dwelling unit (EDU). This is consistent with the 2007 water rate case recommendations which included the potable and recycled system costs as part of an integrated water system to determine the capacity fees. The revenues will accrue to the recycled water system and will be used to offset capital costs for the recycled system.

2.0 INTRODUCTION

The City of San Diego (City) engaged Raftelis Financial Consultants (RFC) to conduct a recycled water cost of service rate study to identify the cost of providing recycled water service and develop a financial plan considering alternatives for recovering the costs incurred in providing recycled water service.

This study reviews several pricing objectives and policy issues related to the cost of providing recycled water service, cost allocations between the Public Utilities Department's Water and Wastewater Branches (Water Branch and Wastewater Branch), which are both impacted by the production, use and sale of recycled water, and the impacts on customers.

2.1. Background

The City of San Diego (City) is the eighth largest city in the United States and the second largest city in the State of California. The City's population is approximately 1.3 million. The City is located on the southernmost coast of California and covers a geographical area of about 330 square miles.

The Recycled Water Distribution System is currently managed and operated by the Water Branch. However, the production and some of the costs are shared with the Wastewater Branch. It is, therefore, important to gain some background and perspective on both the Water and the Wastewater Systems.

2.2. Water System History

The water system is owned and operated by the City and managed by the Water Branch. The water system consists of three treatment plants, nine surface raw water storage reservoirs, and about 3,300 miles of transmission and distribution lines. The water system services the City and some surrounding areas through over 270,000 retail service connections. Approximately 91 percent of the connections serve residential customers and the balance serve commercial, industrial, and other customers. In addition to retail customers, the City sells potable or raw water on a wholesale basis to the California-American Water Company, and the Santa Fe and San Dieguito Irrigation Districts.

2.2.1. *Water Supply*

The water system currently receives its water supply from two sources: local runoff and water imported by the San Diego County Water Authority (SDCWA). An average of 6 to 10 percent of the water supply comes from local runoff. This source is seasonal and variable in nature. The balance of the water system water supply is purchased from SDCWA. In turn, SDCWA currently imports approximately 90 percent of its water supply from Metropolitan Water District of Southern California (MWD).

The City has conducted several major studies addressing its water supply needs. The City's projected water demands and recommended future supplies are developed through

the Strategic Plan for Water Supply which was adopted by the City Council in August 1997. In 2000, the Strategic Plan estimated water demand through 2015 and identified infrastructure requirements necessary to ensure that facilities were in place to store, treat, and distribute water in an effective and efficient manner. Also, in 2000, the City initiated an update of the Strategic Plan, known as the Long-Range Water Resources Plan (LRWRP) adopted by Council in December 2002. The LRWRP extended water demand projections through 2030 and developed a decision-making framework for evaluating water supply options. The LRWRP identified several options, including water reclamation to meet the mid- to long-term demands.

The City operates the water system as a self supporting enterprise. Revenue and costs are accounted for separately under the water fund. Recycled water distribution and retail costs, as well as recycled revenues, are accounted for as part of the water enterprise fund.

2.3. Wastewater System

The City’s Wastewater Branch operates a regional wastewater system that provides wastewater collection, conveyance and treatment services to the City and a number of Participating Agencies (PAs) outside the City. The PAs are:

1. City of Coronado	5. City of La Mesa	9. City of Poway
2. City of Del Mar	6. Lemon Grove	10. City of Chula Vista
3. City of El Cajon	7. City of National City	11. Otay Water District
4. City of Imperial Beach	8. Padre Dam Municipal Water District	12. County of San Diego (Lakeside/Alpine, Wintergardens, Spring Valley, East Otay)

The regional wastewater system infrastructure currently includes three wastewater treatment plants, Point Loma Wastewater Treatment Plant (PLWTP), North City Water Reclamation Plant (NCWRP) and South Bay Water Reclamation Plant (SBWRP); two ocean outfalls, Point Loma Ocean Outfall and South Bay Ocean Outfall; a biosolids processing center, the Metropolitan Wastewater’s Metro Biosolids Center (MBC); three major pump stations; and several miles of force mains and gravity flow interceptors. The City operates the regional wastewater system under two National Pollutant Discharge Elimination System (NPDES) permits that stipulate standards of discharge for the PLWTP and the SBWRP. To comply with the discharge standards and to meet other requirements of the federal Clean Water Act, the City had to undertake various capital project initiatives including the enhancement of existing wastewater treatment facilities and the construction of North City and South Bay water reclamation plants. The City operates the wastewater system as a self-supporting enterprise and costs are accounted for separately under the wastewater enterprise fund.

Some elements of the recycled water program are required elements in the wastewater program (see section 2.4.2). It is important to understand these elements that are required

for the wastewater system so that the cost sharing between the recycled and wastewater system is clearly defined.

2.3.1. Legal and Regulatory Background

Since 1963, the City has treated its wastewater at the PLWTP, which provides advanced primary treatment before disposal in an ocean outfall. In 1972, the federal Clean Water Act (CWA) was adopted which requires that wastewater plants provide a minimum of secondary treatment. Section 301(h) of the CWA allowed facilities that discharge to certain marine waters to apply for a waiver from secondary treatment standards by 1982. The City originally applied for the waiver, but then withdrew it. In 1987, the U.S. Environmental Protection Agency (EPA) and environmental groups sued the City for not meeting the provisions of the CWA. The Ocean Pollution Reduction Act (OPRA) was passed by the U.S. Congress in 1994 to allow San Diego to reapply for the Section 301(h) waiver.

As part of the requirement of OPRA, the City committed to implementing a water reclamation program that would create a system capacity to treat 45 million gallons per day (MGD) by 2010. The City has fulfilled the treatment capacity requirement with the completion of the 30 MGD NCWRP in 1997 and the 15 MGD SBWRP in 2002. A 1995 federal court order further required the City to construct an optimized recycled water distribution system in conjunction with building the NCWRP. The majority of the distribution facilities that comprise the optimized system were installed between 1995 and 1998 to enable delivery of recycled water upon completion of the NCWRP.

The EPA provided a grant that helped fund the construction of the NCWRP. Conditions of the grant award are quoted as follows:

“Upon certification of the NCWRP, flows into the plant will constitute a minimum of 75 percent of the plant’s design capacity (i.e. at least 22.5 MGD). Of these flows the City will beneficially reuse at least 10 percent upon certification and shall attempt to meet the following goals:

a. Beneficial reuse of 25 percent of the flows treated at the NCWRP by December 31, 2003.

b. Beneficial reuse of 50 percent of the flows treated at the NCWRP by December 31, 2010. “

In FY 2012, NCWRP treated 22.9 MGD (76 percent of capacity) of wastewater to secondary standards. The requirement to reuse 10 percent of the treated flows was achieved in 1998, when about 2.4 MGD of recycled water was distributed. In FY 2013, through February, about 7.4 MGD of recycled water was beneficially reused at the NCWRP, or about 32 percent of treated flows. There is no penalty for failing to meet the EPA goals as long as the City is making efforts to maximize recycled water reuse.

It is important to understand the implications of this section. Because of the requirement to construct 45 MGD of water reclamation capacity, the conditions of the NCWRP grants, and the unitary nature of the Metropolitan Wastewater (Metro) System, it is necessary to treat the recycled water system as a unitary system as well. This allows the

costs and benefits of the whole system to be shared by all the users of recycled water. The City has been bearing the costs of system improvements for several years. One of the objectives of the study is to make the recycled water system more self sufficient and this can be achieved through a pricing study that appropriately allocates the costs of the recycled water system to all users fairly under a unitary approach.

2.4. Recycled Water Program History

The City first produced recycled water in 1981. The 25,000-gallon per day (GPD) Aqua I pilot aquaculture plant began operation in Mission Valley. The plant's production water was used to irrigate a sod farm adjacent to Jack Murphy Stadium (now Qualcomm Stadium). In 1984, the Aqua II Water Reclamation Facility, a second, larger pilot research installation, began treating 180,000 GPD of wastewater. This water was sold to Caltrans for use in irrigating freeway landscaping beginning in 1987. In 1991, the Aqua III Water Reclamation Facility and Aqua 2000 Research Center were relocated in the San Pasqual Valley, north of Rancho Bernardo, where the City continued to use aquaculture treatment to reclaim wastewater. This facility had the capacity to treat 1 MGD for agricultural use and irrigation until 2001 when the facility was decommissioned due to high operational costs.

2.4.1. Current Recycled Water System

The current recycled water system consists of two plants, NCWRP and SBWRP, both owned and operated by the Wastewater Branch. However, the distribution system that distributes recycled water to customers is owned and operated by the Water Branch. Due to this separation of ownership, there exist several issues related to the cost sharing between the Wastewater Branch and the Water Branch, which are further explained in section 2.4.2.

The City has been delivering recycled water since the NCWRP was completed in September 1997. In FY 2013, through February, an average of 7.4 MGD of recycled water was beneficially reused at NCWRP, including in-plant usage. The NCWRP provides recycled water to retail customers in the northern area of the City, to MBC, and wholesale service to the City of Poway and Olivenhain Municipal Water District (Olivenhain) for irrigation, industrial, and other non-potable uses. The total capacity at the NCWRP is 30 MGD and the existing capacity of the demineralization process, called Electro Dialysis Reversal, is 12 MGD for a sustained time period. The demineralization process is used to reduce the total dissolved solids (TDS) in the recycled water when it exceeds 1,000 milligrams per liter (mg/l). The City has committed to recycled water customers that the TDS of recycled water will not exceed 1,000 mg/l.

To encourage use of recycled water so that EPA goals could be reasonably achieved, the Water Branch funded approximately \$15.1 million in irrigation system retrofits for existing potable customers to convert to recycled water use. Retrofits are required to modify plumbing systems that are set up to use potable water so that there is no intertie between potable and recycled water. The funding of private property retrofits was discontinued in 2001. The Water Branch also invested approximately \$69.8 million in the optimized recycled water distribution system, of which about \$14.3 million was grant

funded. An additional \$52.9 million (of which \$11.3 million was grant funded) has been invested to expand the recycled water system to its current status.

In addition to the 30 MGD of recycled water design capacity provided at the NCWRP, the City has completed the SBWRP with a treatment capacity of 15 MGD. Sales of recycled water from SBWRP started in FY 2007. In FY 2013, through February recycled water usage from the SBWRP averaged approximately 4 MGD. The plant provides wholesale service to Otay, the International Boundary Water Commission (IBWC) and CalTrans in the South Bay area. Because TDS levels have not exceeded 1,000 mg/l at the SBWRP, there is no demineralization process on location at this time.

In FY 2013, the City has approximately 570 recycled water meters, including three wholesale recycled water meters in operation. Excluding use of the recycled water at the NCWRP and SBWRP, recycled water sales for FY 2012 were about 5,730 AF from NCWRP and 3,750 AF from SBWRP. Recycled water distribution system extensions are projected to modestly increase sales in the coming years. Projections of sales and a more detailed discussion of recycled system growth assumptions are provided in Section 6.2 – System Growth Projections.

On July 1, 2001, coinciding with the conclusion of the retrofit program, the City Council reduced the commodity rate for recycled water from \$1.34 to \$0.80 per hundred cubic feet (HCF) to encourage more customer connections to the recycled water system. The rate has remained at that level except for a couple of months starting January 2002 when it was set at \$0.812 per HCF. The rate for recycled water is currently 20 percent of the City's June 2013 potable irrigation rate of \$4.014 per HCF. The monthly base charges for recycled water service have not changed since January 2002 when they were reduced slightly. The recycled water rate history is presented in Table 2-1 along with the June 2013 potable irrigation water rate for comparison purposes.

**Table 2-1
Recycled Water Rate History**

Meter Size	Recycled Water Rate History				Potable Water	
	Monthly Rate				Monthly Rate	
	Effective				Effective	
	1-Mar-00	1-Jul-01	20-Jan-02	28-Mar-02	1-Sep-10	1-Jun-13
5/8"	\$ 9.63	\$ 9.63	\$ 8.63	\$ 8.63	\$ 18.86	\$ 19.33
3/4"	\$ 9.63	\$ 9.63	\$ 8.63	\$ 8.63	\$ 18.86	\$ 19.33
1"	\$ 10.23	\$ 10.23	\$ 8.63	\$ 8.63	\$ 27.66	\$ 28.46
1-1/2"	\$ 46.27	\$ 46.27	\$ 43.27	\$ 43.27	\$ 47.79	\$ 49.34
2"	\$ 71.16	\$ 71.16	\$ 65.96	\$ 65.96	\$ 72.95	\$ 75.44
3"	\$ 256.53	\$ 256.53	\$ 246.93	\$ 246.93	\$ 132.04	\$ 136.74
4"	\$ 427.93	\$ 427.93	\$ 411.53	\$ 411.53	\$ 216.30	\$ 224.15
6"	\$ 655.93	\$ 655.93	\$ 925.93	\$ 925.93	\$ 425.08	\$ 440.73
8"	\$ 1,286.59	\$ 1,286.59	\$ 1,234.59	\$ 1,234.59	\$ 676.59	\$ 701.64
10"	\$ 1,724.12	\$ 1,724.12	\$ 1,646.12	\$ 1,646.12	\$ 970.89	\$ 1,006.94
12"	\$ 2,395.42	\$ 2,395.42	\$ 2,263.42	\$ 2,263.42	\$ 1,808.47	\$ 1,875.82
16"	\$ 3,989.75	\$ 3,989.75	\$ 3,703.75	\$ 3,703.75	\$ 3,150.36	\$ 3,267.86
Commodity Rate (per HCF)						
Non-Irrigation	\$ 1.34	\$ 0.80	\$ 0.81	\$ 0.80	\$ 3.547	\$ 3.757
Multi-Family	\$ 1.34	\$ 0.80	\$ 0.81	\$ 0.80	\$ 3.698	\$ 3.917
Cal-Trans	\$ 1.19	\$ 0.80	\$ 0.81	\$ 0.80		
Potable Water Irrigation Rate					\$ 3.790	\$ 4.014

2.4.2. Institutional

Recycled water spans both water and wastewater systems because it is produced by the Metro System and sold by the Water Branch for non-potable applications, e.g. irrigation, which offsets potable water demand. As a result, there are institutional issues related to cost sharing by the Water Branch and Metro System.

The Regional Wastewater Disposal Agreement (Agreement) date May 18, 1998, between the City and the Participating Agencies stipulated how the revenues from the sales of recycled water should be distributed. To quote Section V.B.2.a of the Agreement:

“(2) All compensation or receipts from the sale or other conveyance or transfer of any Metro System by-products, including, but not limited to gas, electrical energy, sludge products, and **Reclaimed Water** excepting any receipts allocated pursuant to subsection 2.a.(3) below.

(3) The distribution of revenue from the sale of recycled water from the North City Water Reclamation Plant including incentives for the sale of Recycled Water, shall be first used to pay for the cost of the Recycled Water Distribution System, the cost of the Operation and Maintenance of the Tertiary Component of

the North City Water Reclamation plant that can be allocation to the production of Recycled Water, and then to the Metro System.”

This agreement was drafted when only the “optimized system” was in place and this Distribution system was defined to include a list of eight projects identified in the Agreement. Subsequently the City’s Water Branch expanded the recycled water distribution network in the NCWRP area and constructed some distribution facilities in the SBWRP area as well. Since the recycled water system has grown to more than the “optimized system”, the Agreement is assumed to apply to the entire recycled water system.

Implicit in Distribution System costs is reimbursement of any operating costs related to the recycled water system incurred by the Water Branch as well as any outstanding capital costs, both ongoing and debt service costs, before Metro receives any revenues. In other words, Metro will receive net revenues from the sale of recycled water. The City has assumed this interpretation to determine the costs of providing recycled water service.

The Metro System benefits from recycled water use at the MBC, NCWRP and the SBWRP. Since this use at the plants is required to produce recycled water, this use is excluded from the sales of recycled water used to calculate rates.

Since the reclamation plants were built as a condition of the NPDES permit for the PLWTP (which helped to mitigate the estimated upgrade costs in the range of \$1.5 to \$3 billion at the time), the Metro System has borne all the capital costs associated with producing recycled water, including the operating costs of tertiary treatment at both the NCWRP and SBWRP. The capital and operating costs of demineralization at NCWRP are also borne by the Metro System because grant conditions required sale of recycled water and the City has committed to the recycled water customers that the TDS content will not exceed 1000 mg/l. Since all of these costs are required to produce recycled water, both the operating and capital costs would be considered the total cost of providing recycled water service. When all these costs are considered, the true cost of providing recycled water would exceed the cost of potable water. However, it is imperative to understand this true cost of producing and serving recycled water.

3.0 PRICING OBJECTIVES AND POLICY CONSIDERATIONS

In any pricing study, several factors have to be considered before the final implementation of rates. In this section, the pricing objectives that are important are reviewed along with policy considerations. Some pricing objectives will conflict with others and a good rate structure will provide a balance among these objectives so that the Utility's goals are met. In balancing the objectives, we seek to ensure a rational and reasonable basis for deciding amongst these objectives.

In some instances, it is necessary to make policy decisions based on the City's goals and objectives. Policy consideration plays an important part in revenue requirements and rate design. This section addresses both pricing objectives and policy considerations.

3.1.Pricing Objectives

The first step in developing a recycled water pricing structure is to identify and prioritize pricing objectives. The Pricing Study has six major pricing objectives. These pricing objectives may conflict with each other; for example, marketability requires a lower rate to sell as much recycled water as possible. However, that would conflict with financial sufficiency, which aims to set rates at a level which recovers the costs of service. As a result, the pricing objectives have to be balanced to meet the City's requirements.

3.1.1. *Financial Sufficiency*

A major objective of the Pricing Study is to put the recycled water program on a more self-sufficient financial footing. The Study must demonstrate that recycled water will be able to supply its own cash needs through revenue collected from its own fees and charges. The City's Water Branch has been making investments in the recycled water distribution system and covering ongoing operating deficits. The City seeks to recover ongoing future costs through the recycled water rates. Moreover, in FY 2023, the MWD and SDCWA credits for NCWRP usage will expire. These additional costs will cause a significant increase in the costs of providing recycled water service. Thus, the City will need to decide how to handle these step changes in revenue requirements in the future. This study only focuses on the recycled water rates in the next four years, starting in FY 2014.

3.1.2. *Fairness and Equitability*

This pricing objective dictates that users should pay in proportion to the cost of providing service. All users share in those costs in proportion to the demands they place on the system. There are two important issues that need to be addressed here – unitary system and peaking demands.

Unitary System: As discussed in Section 1.4, for a variety of reasons, including the following, the recycled water system is considered to be a unitary system:

- the unitary nature of the Metro wastewater system

- the OPRA requirements, and
- the conditions of the grants used to fund the tertiary treatment facilities

In a unitary system, all costs are shared by all customers irrespective of their location, or which specific tertiary treatment or recycled water system facility is used. The agreements with the wholesalers also reinforce the unitary nature of the recycled water system wherein the wholesalers agreed that “the commodity rate for recycled water will escalate at the same rate adopted by the San Diego City Council for all recycled water customers”².

Peaking Demands: It is a well established practice in the water industry that a fair and equitable method of allocating costs to customer is based on their peaking demands. The M1 Manual – Principles of Water Rates and Charges published by the American Water Works Association (AWWA) states that “cost allocation procedures should recognize the particular service requirements of the customers for total volume of water, peak rates of use, and other factors.”³

Peaking demands have been determined and considered in an effort to differentiate the costs to irrigation, non-irrigation, and wholesale customers. However, in this study, the same rate for all customer classes is recommended due to several factors, which are explained in details in Section 3.2.5, including the relatively small customer base and the difficulty in separating recycled water usage into distinct categories as some customers who use recycled water for industrial purposes, i.e. cooling towers, also irrigate their landscapes from the same connection.

3.1.3. *Simplicity*

Since most customers of the recycled water system are irrigation customers with similar characteristics, the rate structure can be simplified by calculating a uniform rate for all customers. A simple rate structure can be readily communicated to users and implemented easily.

The design of the rate structure requires a balancing act amongst different and sometimes contradictory pricing objectives. Although fairness and equity require differentiation of rates to different customer classes based on their peaking demands, but because of the unique characteristics of the recycled water system, we recommend that the City implements the same rate structure for all its customers.

3.1.4. *Legality and Adherence to Interagency Agreements*

The production, distribution, and sale of recycled water were, in part, dictated by several inter-governmental agreements. Production and sales goals were established in grant

² Section 2.1 from both of the separate agreements between the City and Otay Water District and the Olivenhain Municipal Water District for the purchase of recycled water from the South Bay and North City Water Reclamation Plants respectively

³ AWWA M-1 Manual, p. 49

agreements with the EPA. The City has negotiated wholesale agreements that cover rates and capacity for recycled water services. Agreements are in place with MWD and SDCWA for incentive credits for recycled water usage to expand local supplies and relieve demand from the strained potable water supply. All of these agreements have been incorporated into the development of the recycled water pricing structure.

Proposition 218 passed in 1996, and clarified by the California Supreme Court in 2006 as applicable to consumption-based fees for water and wastewater service, requires the following:

- Revenues derived from fees may not exceed the funds required to provide the service;
- The amount of the fee may not exceed the proportional cost of the service attributable to the parcel upon which the fee is imposed; and
- The fee may not be imposed unless the service is actually used by, or immediately available to, the owner of the property.

Article X, Section 2 of the State Constitution requires water resources to be put to the maximum beneficial use. This article states the following:

“It is hereby declared that because of the conditions prevailing in this State the general welfare requires that the water resources of the State be put to beneficial use to the fullest extent of which they are capable, and that the waste or unreasonable use or unreasonable method of use of water be prevented, and that the conservation of such waters is to be exercised with a view to the reasonable and beneficial use thereof in the interest of the people and for the public welfare. ...”

Water Code Sections 370 – 374 (AB 2882) provides that the cost of production and distribution of recycled water is an “incremental cost” of water service that can be passed on to potable water customers. This is a legal justification for charging potable water users a portion of the cost of producing and distributing recycled water.

Water Code Section 13550(a)(2) provides that the State may approve the mandatory use of recycled water (after notice and a public hearing) if the cost of the recycled water “is comparable to, or less than, the cost of supplying potable domestic water,” among other requirements. It is also the City’s policy (SDMC 64.0802) that reclaimed water be used within the City “wherever feasible.” These are two legal justifications for not charging reclaimed water customers the full actual cost of producing and distributing reclaimed water, and instead establishing a marketable rate.

Considering these statutes together allows some flexibility in designing a system of rates that encourages the use of recycled water so that it is beneficially used especially in view of the current water supply situation in the State as long as the rates are reasonable. The market based approach is widely practiced in California and across the US. The City implemented the market based approach to incentivize the voluntary use of recycled water so that it could meet the grant conditions. It is not unreasonable to implement such an approach in the City so that potable water rates support the recycled water system in

the short run and recover costs in the long run. However, this study examines the applicability of the cost of service approach as well.

The City has signed agreements with three wholesale agencies: Otay Water District, Olivenhain Municipal Water District, and the City of Poway. Otay is under an annual take-or-pay contract with the City and agreed to pay the City Council adopted recycled water rate for the length of the agreement, which lasts until 2026. Additionally, Otay, because of its successful application process, receives both MWD credits (up to \$250/AF) and SDCWA credits (up to \$200/AF) directly for its recycled water purchases, effectively and significantly reducing its net recycled water costs.

The 2004 agreement with Olivenhain on its first connection stipulated that it will pay the City Council adopted recycled water rate plus an additional \$25 per AF, except for recycled water sales to customers within the city limits of San Diego, because it is not a party to the Metro Agreement. Olivenhain is also under an annual take-or-pay contract with the City. In December 2009, Olivenhain added a second connection to the system, but opted to have that connection be considered a retail connection and paid full capacity fees, so it does not pay the \$25 per AF premium on this connection.

In a 1998 agreement, Poway opted not to pay a capacity fee, but agreed to pay a rate starting at \$450 per AF for its recycled water. The rate is inflated annually based on the San Diego Region Consumer Price Index for the previous 12 month period. Poway's FY 2013 recycled water rate is \$695.84 per AF or \$1.597 per HCF. Since Poway is under a contractual rate, the revenue received from the sale of recycled water to Poway is considered a revenue offset in the calculation of the cost of service rate for all other customers.

3.1.5. Marketability

The goal of a financially sufficient enterprise fund is to recover annual cash needs through revenue generated by rates and charges. Current sales are relatively small and keeping rates relatively low compared to potable water would incentivize more customers to switch to recycled water. Recycled water has to compete with raw and potable water and its use is currently limited to irrigation and commercial uses. Recycled water cannot command premium pricing and expect to grow or even maintain its customer base even though recycled water has a nutrient value for irrigation and offers advantages of greater reliability than potable water during times of drought when non-essential usage such as irrigation is subject to mandatory conservation. Instead, recycled water needs to be at a lower price. In addition, customers typically have to bear costs related to retrofitting their plumbing for recycled water. Recycled water rates have to be lower than potable water rates for end users to recover these costs. Many agencies set recycled water rates between 75 and 100 percent of the potable water rate. The City's current recycled water rate is approximately 20 percent of the June 2013 potable irrigation rate. Since the City's recycled water rate is significantly lower than the potable rate, there is potential to raise it to recoup more of the costs of service and still maintain an incentive to recycled water users.

3.1.6. Customer Impact

Finally, recycled water pricing must be cognizant of the impacts higher rates would have on customer bills. The City is aware that recycled water rates would have to increase to meet the objective of financial sufficiency; however, the rates must be carefully structured to continue to incentivize new customers.

3.2. Policy Considerations

The recycled water system is a unique system with many parameters that affect the financial picture and rates. As such, it is necessary to obtain guidance on many of these parameters so that the number of alternatives to be evaluated is manageable and decision makers can choose from a finite number of alternatives.

There are several policy considerations that were reviewed to arrive at the final alternatives presented. These are discussed below.

3.2.1. Past City Capital Investment in the Recycled Water Distribution System

The City’s Water Branch has made major investments in the recycled water distribution system; some of these expenses were grant funded and a portion was debt funded. The details of these expenditures are shown in the following table. The Water Branch has invested approximately \$50.2 million in the recycled water system to incentivize users to join the system so that it could meet the grant conditions. The City’s potable water customers have borne these costs to the benefit of all users in the recycled water system. However, for this study only costs going forward are used to calculate the costs of providing service.

EXPENDITURES	TOTALS
Optimized System	\$69.8 million
Retrofits	\$15.1 million
All other reclaimed	\$52.9 million
TOTAL EXPENDITURES	\$137.8 million

LESS GRANTS	
Optimized System	\$14.3 million
Non Optimized System	\$11.3 million
TOTAL GRANTS	\$25.6 million
TOTAL EXPENDITURES NET OF GRANTS	\$112.2 million

Optimized System Amount Financed via debt	\$37.0 million
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Additional Debt Financing (Expansion)	\$25.0 million
NET CITY INVESTMENT	\$50.2 million

3.2.2. Past Operating Deficits of the Recycled Water System

In an effort to meet the grant conditions requiring the City to sell 25 percent of the water produced at the NCWRP by 2003 and 50 percent by 2010, the City decreased its recycled water rates in FY 2002 and has not adjusted these rates since then. As a result, if considered as a standalone enterprise, the City has operated the recycled water system at a loss since inception. However, since the recycled water distribution system is part and parcel of the overall potable water system, these costs have been included with the financial accounting of the water enterprise fund and the Water Branch has borne those costs. There were no net revenues for Metro since the recycled water rates were not recovering costs. Past deficits are not considered or recovered in the proposed rates.

3.2.3. Capacity Fees from New City Customers

Most of the users joining the recycled water system are existing potable water customers that are being retrofitted to use recycled water. These customers have already paid capacity fees to the potable water system. As a matter of policy, capacity fees from future new customers (as opposed to retrofits) that connect to the recycled water system are credited to the recycled water system under the pricing structures proposed. This follows from the calculation of capacity fees which were based on the costs of both the potable and recycled water systems as part of an integrated system to determine the capacity fees. In our analysis, we have assumed that 15 percent of projected future recycled water connections will be new and 85 percent will be retrofits.

3.2.4. Cost Sharing with Wastewater Branch/Metro System

As discussed earlier in Section 2.4.2, the wastewater agreement with the PAs states that revenues from the sale of recycled water accrue to the Metro System. As discussed in the Section 2.4.2, the net revenues would accrue to Metro; that being the case, the costs of tertiary treatment are included in the rate calculations. The Metro System will recover revenues after the Water Branch recovers its ongoing operating and capital costs at SBWRP and operating, capital, and debt service expenses at NCWRP.

3.2.5. Rates by Customer Class

The primary differentiator of rates amongst different customer classes is based on the demand that they put on the system. This demand is expressed in terms of the maximum day and maximum hour factors⁴. These are the maximum demands expressed as a multiple of the average demands of the customer class. Larger customers generally have

⁴ Maximum day represents the maximum water demand in any given day. Maximum hour represents the maximum water demand in any given hour during the maximum day. Maximum day and maximum hour factors are expressed as multiples of average day demand.

lower peaking factors than smaller customers. In our case, we would expect to have peaking factors that are fairly close for the two customer classes in this study – retail and wholesale. Because we did not have the maximum day or maximum hour factors we used the maximum month as a proxy for the maximum day factor. The peaking factors, shown in the following table, were determined from the average monthly usage in FY 2013 for the two customer classes. Generally, larger customers tend to have lower peaking factors; however, surprisingly, wholesale customers (Otay and Olivenhain) have the higher peaking factors according to water usage records. Since Poway is billed quarterly, its monthly usage data was not available. Moreover, its rates are set by agreement; thus, Poway’s demand is not included in the analysis.

Customer Class	Peaking Factor
Retail	1.49
Wholesale	1.91

The distribution system including pumping stations, reservoirs, pipelines are designed to handle peak usage. Therefore, costs related to the distribution system, both capital and operating are allocated on the basis of peaking. In the wholesale class, Poway and to some extent Olivenhain, use the City’s distribution system. Otay, on the other hand, uses little of the distribution system. To develop rates by customer class based on peaking factors that may or may not apply to a specific class seems to be problematic. Also, some retail accounts have mixed usage that includes irrigation and cooling towers, which tend to have different usage patterns. Because the customer base is small, especially in the wholesale class, and the accuracy and reliability of the peaking factors is uncertain, we recommend that the peaking factors not be considered at this time, and the City use the same rates for all customer classes. More information on peaking factors is included in Appendix C.

3.2.6. Rates Tied to City’s Potable Irrigation Rate

Generally, when the full costs of service are considered, recycled water rates are higher than potable water rates. In that case, to promote use of recycled water, most agencies set their recycled water rates as a percentage of potable water rates, typically in the range of 75 to 100 percent of the potable rates. As stated previously, the current recycled water rate is only 20 percent of the potable irrigation rates. In order for recycled water to be marketable, we recognize that the recycled water rate has to be lower than the potable water rate. Our calculated modified cost of service rate for recycled water is \$2.241 per HCF which is about 56 percent of the June 2013 potable irrigation rate. This rate will allow the Metro System and its customers who are currently paying the treatment costs to recover the tertiary capital and treatment costs and the Water Branch to recover the operation costs of the distribution system while still encouraging recycled water use. For a variety of reasons, potable water rates have been increasing significantly over the last few years. Tying recycled water rates to potable water would cause recycled water rates to increase rapidly as well. The modified cost of service approach provides a reasonable method to calculate recycled water rates. Thus, we are not recommending that the recycled water rate be tied to the City’s potable irrigation rate.

4.0 DEVELOPMENT OF REVENUE REQUIREMENTS

Every water utility must receive sufficient total revenue to ensure proper operation and maintenance (O&M), development and perpetuation of the system, and preservation of the utility's financial integrity⁵ to provide adequate water service to its customers.

Revenue requirements may be established either by the utility approach or the cash-needs approach. The utility approach to determine revenue requirements is followed by most investor owned utilities and government utilities that are regulated by a state public utilities commission. The utility approach allows the utility to recover operating requirements, depreciation, and a return on capital as determined by generally accepted accounting principles. In the cash-needs approach, followed by most unregulated governmental utilities, user charges are structured to recover specific operations and capital cash requirements. The Pricing Study utilizes the cash-needs approach for development of revenue requirements. Therefore, revenue requirements for the recycled water program may be defined as the gross cash needs of the recycled water system for operations and capital expenditures. It should be noted that while the Pricing Study follows a more formal cost of service approach, the recycled water system will continue to be part of the water utility in order to save on financing costs as the recycled water program currently has insufficient revenue to bond finance on its own.

4.1. Operating Costs

The O&M expense component is usually developed based on actual expenditures and adjusted to reflect anticipated changes in expenditures during the projection period. Adjustments to historical O&M expenses are determined by incorporating known and measurable changes to recorded expenses, and by using well-considered estimates of future expenses.

O&M expenses include salaries and wages, fringe benefits, energy, rent, chemicals, materials, small equipment, other supplies and services, and general overhead. For a government-owned utility, other elements of O&M expenses might also include the costs of support services rendered by the municipality, such as the use of computer facilities, assistance in billing and customer service, or office rental. The Study has grouped operating expenses into five major categories:

- Treatment costs
- Demineralization costs
- Recycled water program costs
- Recycled water meter services costs
- Recycled water customer service and billing costs

⁵ AWWA M-1 Manual, p.3

Operating costs are itemized in the Pricing Model in Appendix B, Table 2.

4.1.1. Treatment Costs

In order to produce recycled water, wastewater entering the treatment plant has to go through primary, secondary and tertiary treatment processes. Primary treatment removes most large particles and solids from the wastewater using a bar screen and a sedimentation tank to remove the oils and grease that would float to the top and the sludge that would settle on the bottom. Secondary treatment removes dissolved and suspended biological matter that remained in the water after primary treatment. Tertiary treatment, the final step in Title 22 recycled water treatment, removes very small particles including bacteria and viruses, and certain toxins that are not affected by conventional treatment. All costs of treatment are included in the cost of service analysis to determine the true cost of providing recycled water.

In the modified cost of service approach, only the costs of tertiary treatment (including demineralization) are included in the cost of providing recycled water.

4.1.2. Demineralization Costs

Electro Dialysis Reversal is included as part of the treatment at NCWRP to ensure that TDS does not exceed 1,000 mg/l. Lowering TDS is considered an additional treatment step beyond Title 22 requirements for tertiary treatment. However, this demineralization step does not meet potable water standards. There has not been a problem with TDS at the SBWRP and therefore it does not have demineralization facilities. In the future, the City may seek a capital solution, employ a demineralization process, or some other process solution for TDS control at the SBWRP.

4.1.3. Recycled Water Program Costs

The Recycled Water Program is charged with managing and expanding the use of recycled water in order to maximize local water resources while reducing the City's dependence on imported water. This also benefits the Metro System, because of the reduction of wastewater flows to the ocean outfall. The Program serves four major functions: customer development, plan and engineering review of proposed on-site recycled water systems, regulatory inspections and testing at customer sites to ensure public health is maintained, and recycled water pipeline project development. Also included in the program costs are the marketing endeavors undertaken to reach prospective clients.

4.1.4. Recycled Water Meter Services Costs

These costs include operation and maintenance of the recycled water system. The meter services group is also responsible for removing meters, responding to emergency main break or leaks for the entire recycled water system, assisting in shutting down and re-energizing the recycled water system, assisting in operational acceptance of all recycled water work done by contractors, and providing recommendations and assistance for any special connections to any customer sites as may be required. Additionally, staff handles

installation of recycled water services and recycled water meters ranging from 1-inch to 12-inch, testing of backflow devices, and periodic maintenance of associated appurtenances, pump stations, pressure reducing stations and tanks or reservoirs.

4.1.5. Recycled Water Customer Service and Billing Costs

The costs related to customer support and billing services are shown separately. All customers share in these costs equally as they benefit from these services equally.

4.2. Capital Costs

Under the cash-needs approach, it is important to identify the cash that is needed from user charges to support the Capital Improvement Program (CIP) and related capital expenditures. Capital expenses are different from O&M expenses in that they relate to tangible assets that will be utilized over an extended useful life. For the purposes of this Study, cash financed capital costs related to prior capital investments in the recycled water system are considered sunk costs. However, ongoing debt service costs for treatment and distribution facilities are included along with other CIP costs.

Capital expenditures include design, and construction of pumps, pipelines, and storage. Expenditures for engineering and financing the capital program may also be included.

Capital expenditures and capital funding sources are itemized in the Pricing Model found in Appendix B, Tables 3 and 4.

4.2.1. Treatment Plant Costs

The advanced primary, secondary, and tertiary treatment processes are all required to produce recycled water. Therefore, the capital costs of the NCWRP and SBWRP are considered in determining the cost of recycled water under the cost of service approach. The Wastewater Branch documentation shows that capital spending on NCWRP and SBWRP treatment facilities, net of grant funding, was approximately \$207 million and \$342 million, respectively. The debt service costs associated with these plants are included in the cost of service analysis, as shown in the next section.

The NCWRP and SBWRP were constructed to avoid secondary treatment at Point Loma, which saved wastewater customers the estimated upgrade costs in the range of \$1.5 to \$3 billion. Therefore it is reasonable to expect wastewater customers to bear the capital costs associated with the treatment plants. The demineralization facilities at NCWRP were not needed for wastewater treatment but rather to meet recycled water quality standards. Therefore under the modified cost of service approach, demineralization capital costs are included in the cost of producing recycled water.

4.2.2. Debt Service

Starting in FY 2014, the recycled water distribution system capital costs captured in the Pricing Model include debt service costs for assets already placed in service as well as prospective projects for service extensions in the CIP. Existing debt service payments for the recycled water system includes the ongoing payments on the original \$37 million debt

issue for the optimized system and the additional \$25 million for the expansion of the recycled water system. Debt service also includes ongoing payments on debt incurred to fund past capital costs, a total of \$549 million excluding grants, of both the NCWRP and SBWRP that the City had invested.

4.2.3. Capital Funding Sources

Funding for the capital plan may come from many sources. Funding may come directly from rates in the form of pay-as-you-go capital, some from development or capacity fees, some from fund balance contributions, and some from financing costs over time as debt service. A balanced capital portfolio usually contains funding from many sources. Water Branch guidelines suggest that 20 percent of the CIP be funded through rates as pay-as-you-go capital. The Pricing Model considers capacity fees as accruing to recycled water for new retail recycled water customers and this revenue is used as a capital funding source. Capacity charges from all new (excluding retrofitted) customers are computed at the rate of \$3,047 per EDU (0.56 AF per year) based on the 2007 water rate case. As mentioned earlier, the Water Branch and Metro funds were utilized for initial capitalization of the distribution and tertiary treatment, respectively. Finally, the pricing model assumes the remaining distribution system capital costs will be financed through new debt issues by the Water Fund at a rate of 5.5 percent over 30 years. Metro would be responsible for capital costs and funding of improvements to the treatment plants.

4.2.4. Retrofitting Existing Customers

Many potential customers of recycled water are existing potable water customers. Such customers already have the plumbing facilities, including irrigation systems, for potable water use on their properties. To convert these customers to recycled water use requires them to segregate current plumbing into potable water and recycled water systems. The primary reason for this is that there cannot be direct contact between recycled and potable water systems. As a result, existing potable water customers wanting to use recycled water are required to install backflow prevention devices so that there is no accidental mixing of potable and recycled water. In addition, all above ground irrigation heads, valve boxes and other appurtenances must be changed to reflect the use of recycled water. Depending on the configuration, more extensive modifications may be required to their plumbing systems to separate the potable and the recycled water pipelines. A change required to an existing customer's plumbing system is referred to as retrofitting.

When NCWRP came on line in 1998, the City initiated a Retrofit Program that provided approximately \$15.1 million to fund the costs of retrofitting existing customers so that they could be converted to recycled water. To meet the conditions of its EPA grant, the City needed to encourage and promote use of recycled water for the overall public good. The City discontinued executing new retrofit program agreements in 2001 and does not anticipate renewing this program.

4.3. Extraordinary Item

One item of interest that is not incorporated in the rate analysis is the nutrient value resulting from nitrates in recycled water used for irrigation purposes. In the eighties, the

California State Water Resources Control Board (SWRCB) determined that recycled water provides nutrient value that reduced the need for fertilizers. This value was determined to be \$40 per AF of recycled water. The SWRCB continued to use this value in determining the economics of recycled water projects. This benefit is not factored into the calculation of recycled water rates which are focused on the cost of providing recycled water and not benefits derived from its use.

5.0 DEVELOPMENT OF REVENUE OFFSETS

Revenue offsets refer to cash the utility derives from sources other than commodity rate revenue. This additional cash offsets revenue requirements and thus reduces the amount of revenue that must be recovered through rates. This study has categorized revenue offsets into:

- Credits
- Installation revenues

5.1.Credits

Generally speaking, credits are revenues collected outside the standard rate structure that are used to offset costs. Credits against capital costs are structured payments from new customers to buy into the capacity of the recycled water system. These are known as capacity fees. Credits against general costs are ongoing revenues that may be used to offset either capital or operating costs. These include MWD and SDCWA incentives.

5.1.1. Credits against Capital Costs

In the past wholesale customers paid capacity reservation fees to receive recycled water service. These fees compensate the Water Branch for capital investments made in constructing distribution system. By contract, the Water Branch has received a capacity fee from the IBWC, capacity reservation fees from Olivenhain, and Otay, and is expecting to receive capacity fees from new users connecting to the system. Existing potable water retail customers who connect to the recycled water system will not pay capacity fees if they are acquiring the same or lower capacity in the recycled water system than they had in the potable system. However, capacity fees from new customers are credited to the recycled water system within the pricing model. Since these fees are collected to compensate for investment in capital infrastructure, they are used as offsets to capital costs.

5.1.2. Credits against General Costs

Olivenhain and Poway are contract wholesale customers of the recycled water system. Since Poway pays a contractual rate for its recycled water usage, revenue collected from the sale of recycled water to Poway is not included in the calculation of recycled water rates. Since Olivenhain is not a member of the regional wastewater system, their wholesale price, by agreement, includes a premium of \$25 per AF on its first connection, except for recycled water sales to customers within the city of San Diego limits. The revenues from Poway and premium payment from Olivenhain are used in the Pricing Model as an offset to revenue requirements.

As mentioned earlier, the City has signed agreements with SDCWA and MWD that provide credits for recycled water sales because these sales relieve pressure on the potable water supply. As such, these agencies are willing to pay incentives for the

development of recycled water use by providing credits to the Water Branch. The maximum MWD and SDCWA credits are \$250 per AF and \$200 per AF, respectively. The agreements with SDCWA and MWD for credits on recycled water sales will expire either in 25 years after the starting date of operations, which is in 2023 for the NCWRP and in 2032 for the SBWRP, or until the cost of producing recycled water is lower than the cost of purchasing water from MWD. Since potable water rates are projected to increase significantly in the near term, the City should monitor the continued receipt of these credits. Given the potable water rates projections, the Pricing Model assumes that the City will receive the \$250 per AF MWD credits for the NCWRP through FY 2015. In subsequent years, the credit is estimated to reduce by approximately \$40 per AF per year. The City receives only SDCWA credits for SBWRP water to retail customers. Otay receives MWD and SDCWA credits directly for its recycled water usage. Thus, there are no credits for recycled water used at the NCWRP, SBWRP, and sales to Otay. The credits are used in the Pricing Model as an offset to revenue requirements.

5.1.3. Installation Revenues

The City charges nominal fees for meter installation and shut-off services whenever a new customer connects into the recycled water system. This revenue is used as a credit or offset against the meter services costs.

Table 5-1 shows the revenue requirements, less all applicable offsets, of the recycled water system.

**Table 5-1
Revenue Requirements**

Line No.		Budgeted FY 2014	Projected FY 2015	Projected FY 2016	Projected FY 2017	Projected FY 2018
<u>Revenue Requirements</u>						
1	O&M Costs	\$ 2,966,987	\$ 3,010,580	\$ 3,106,970	\$ 3,231,248	\$ 3,360,498
2	Treatment Costs	\$ 15,679,533	\$ 15,836,328	\$ 15,994,691	\$ 16,634,479	\$ 17,299,858
3	Capital Costs					
4	Existing Debt Service	\$ 41,841,032	\$ 41,841,057	\$ 41,878,671	\$ 41,820,392	\$ 41,820,177
5	Proposed Debt Service	\$ 47,873	\$ 95,745	\$ 95,745	\$ 149,089	\$ 202,433
6	Pay-as-you-go Capital	\$ 36,145	\$ 39,423	\$ 91,551	\$ 96,189	\$ 101,011
7	Total Revenue Requirements	\$ 60,571,569	\$ 60,823,133	\$ 61,167,629	\$ 61,931,397	\$ 62,783,978
<u>Less: Revenue Offsets</u>						
8	Credits from MWD and CWA	\$ 2,758,715	\$ 2,786,300	\$ 2,564,380	\$ 2,337,740	\$ 2,106,313
9	Poway Contract Revenue	\$ 462,046	\$ 471,332	\$ 480,806	\$ 505,038	\$ 530,491
10	Fees from Olivenhain (1)	\$ 15,941	\$ 15,941	\$ 15,941	\$ 15,941	\$ 15,941
11	Interest Revenue	\$ -	\$ -	\$ -	\$ -	\$ -
12	Meter Installation Revenue	\$ 100,000	\$ 105,000	\$ 25,000	\$ 25,000	\$ 25,000
13	Capacity Fee Revenue	\$ 73,128	\$ 73,128	\$ 24,376	\$ 24,376	\$ 24,376
14	Subtotal Revenue Offsets	\$ 3,409,829	\$ 3,451,702	\$ 3,110,503	\$ 2,908,095	\$ 2,702,121
15	Net Revenue Requirements	\$ 57,161,740	\$ 57,371,432	\$ 58,057,126	\$ 59,023,302	\$ 60,081,857

(1) Fees from Olivenhain are a premium of \$25/ac-ft for not being a member agency of Metropolitan Wastewater.

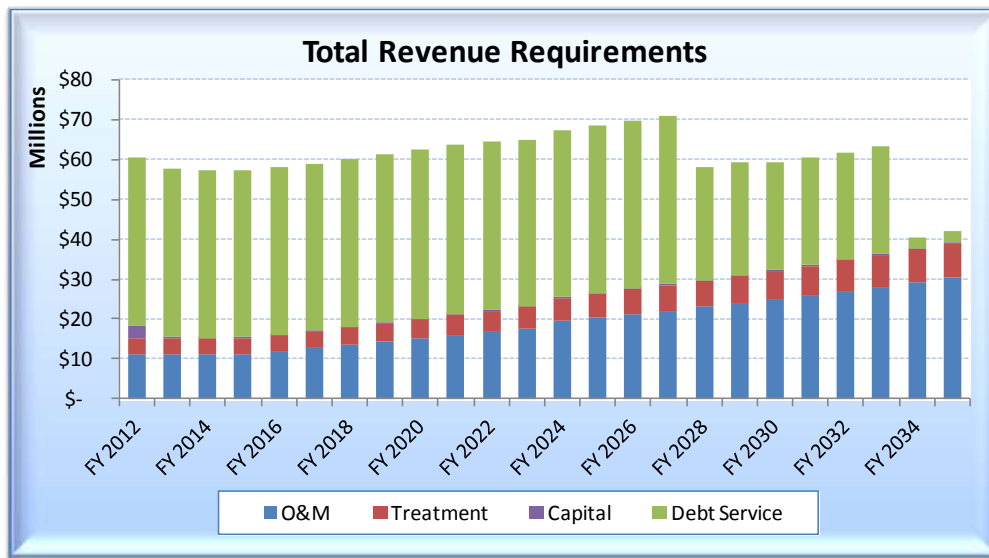
6.0 FINANCIAL PLAN

The financial plan presents projected cash flow of the recycled water program and the economic impact on customers as a result of achieving the goals and objectives identified in the planning process. The intent of the financial plan is to demonstrate how changes in demand, costs, and pricing structure impact the financial position of the utility over a specific time horizon.⁶ Taking a long-term approach to financial planning allows utilities to address problems before they become critical and smooth short-term fluctuations in rates. The keys to developing a solid financial plan are reliable projections of future costs and system growth.

6.1. Cost Projections

Figure 6-1 shows a projection of the total net cost or revenue requirements of producing recycled water from FY 2014 through 2035. Projections of operating and capital costs, the major components of the gross revenue requirements, are described below.

Figure 6-1



Note: Decreases in debt service costs in FY 2028 and FY 2034 reflect the time when the treatment plants debt are paid off

6.1.1. Operating Costs

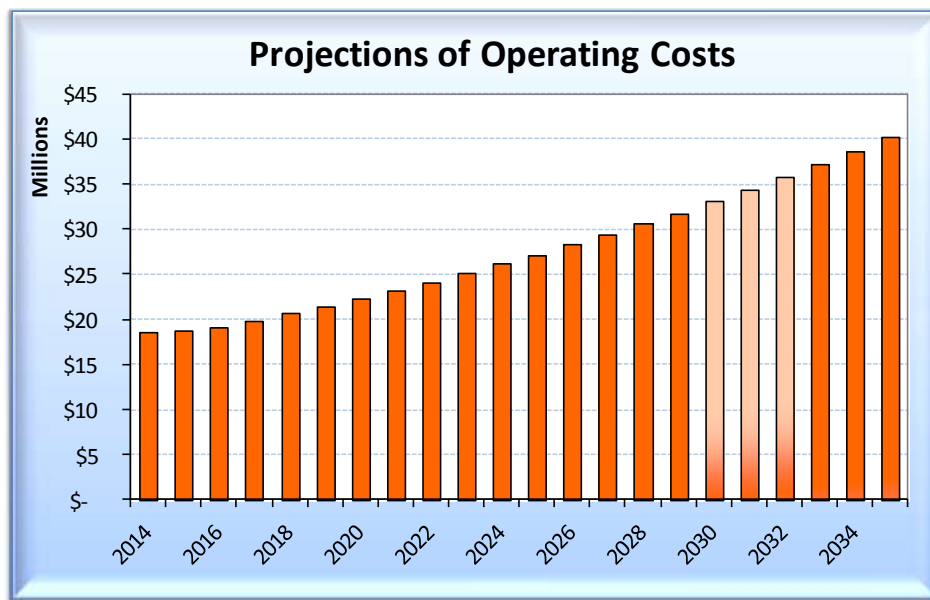
As discussed in Section 4.1, operating costs for the recycled water system were categorized by function into several different components. Cost escalation factors were estimated for these components to project future costs.

⁶ Raftelis, G. Water and Wastewater Finance and Pricing – A Comprehensive Guide, Third Edition.

- Personnel costs for salaries are projected to remain constant until FY 2015, and will increase at four percent per year thereafter. Personnel costs for fringe benefits are projected to increase at four percent per year.
- Energy costs are projected to increase at five percent per year until FY 2017 and four percent per year thereafter for inflation. Additionally, energy costs are projected to change proportionally to the sales of water.
- Treatment operating costs are projected to increase at one percent per year until FY 2016 and four percent annually thereafter.
- All other operating costs are projected to increase at one percent per year until FY 2016 and four percent per year thereafter.

Figure 6-2 shows operating cost projections for the recycled water program through FY 2035. Operating costs include recycled water program costs, meter services costs, customer service and billing costs, and total treatment costs from primary treatment through tertiary treatment.

Figure 6-2



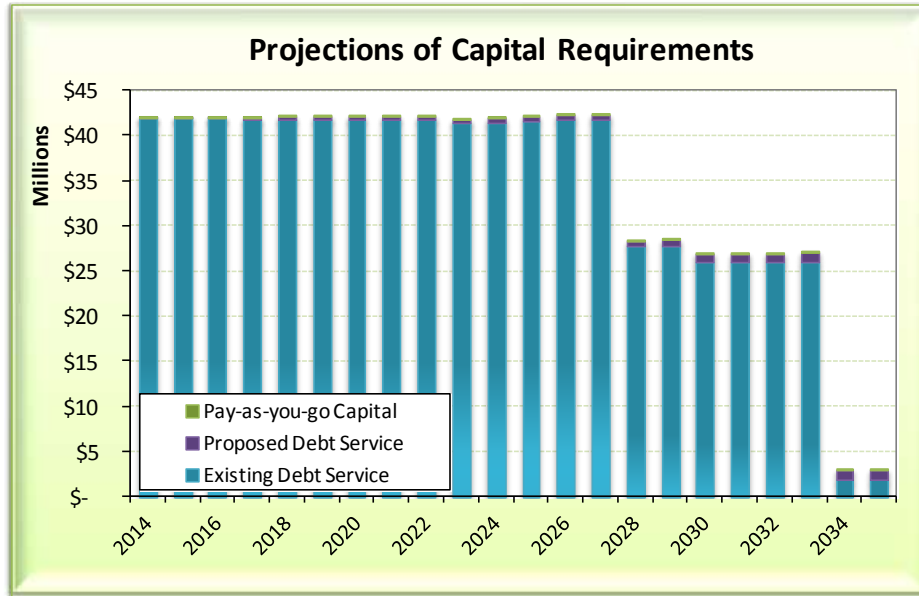
6.1.2. Capital Costs

The CIP for the recycled water system includes a forecast of capital projects and their associated cost outlays in current year dollars. The actual requirements, therefore, must be escalated for price inflation. These escalated projections from the CIP represent the capital component of future revenue requirements.

Figure 6-3 shows capital cost projections for the recycled water program through FY 2035. Capital costs are broken down into repayment for debt funded historical

investment (existing debt service) in the system and prospective investment (proposed debt service) in system growth identified in the CIP.

Figure 6-3



6.2. System Growth Projections

System growth projections are another key element in the financial planning process. System growth, measured increases in usage of recycled water, drives many of the cost increases discussed above. The expectation is that increases in usage outpace costs and yields a lower unit rate over time.

Usage projections are dependent on many variables. Distribution line extensions must be completed to allow customers to utilize recycled water service. Marketing and public information efforts must be in place to introduce prospective customers to recycled water benefits. Finally, the recycled water rate must be cost-effective as compared to available alternatives.

The Pricing Model projects an annual growth rate of one percent in recycled water usage, starting in FY 2014, to account for the estimated 20 additional new customers per year. For customers who are under a take-or-pay contract with the City, the Model assumes the greater of their current recycled water usage or the contracted amount. The total usage shows increases from approximately 13,389 AF per year in FY 2014 to about 14,976 AF per year in FY 2020 and 17,583 AF in FY 2035. This growth is characterized by an increase in retail sales coupled with bulk contracts with regional wholesale customers.

Figure 6-4 and Table 6-1 show recycled water usage projections from the NCWRP and SBWRP plants, including in-plant usage. Over the study period, recycled water usage is projected to grow on average approximately 1.5 percent per year.

Figure 6-4

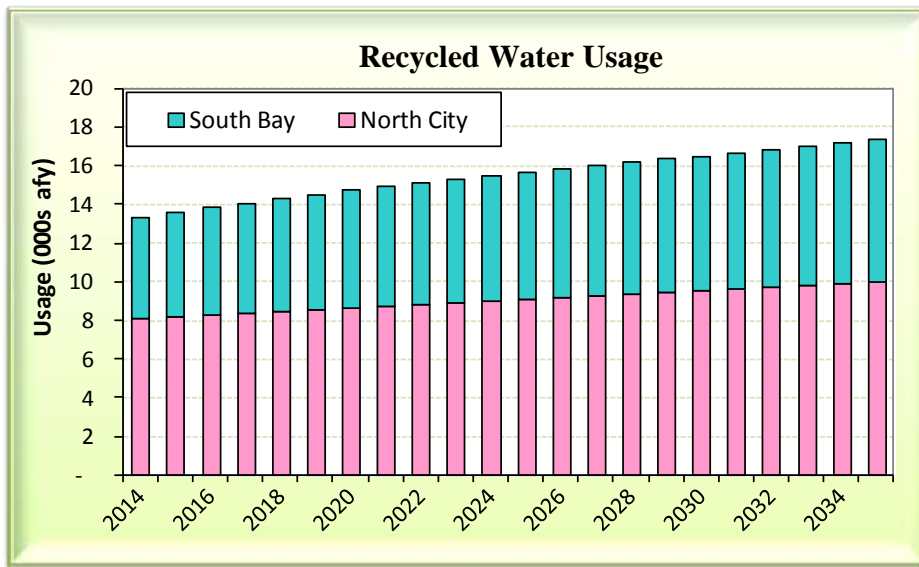


Table 6-1
Recycled Water Usage (HCF)

Line No.	Budgeted	Projected	Projected	Projected	Projected	
	FY 2014	FY 2015	FY 2016	FY 2017	FY 2018	
North City WRP						
1	Optimized System					
2	Irrigation	1,104,833	1,115,881	1,127,040	1,138,310	1,149,693
3	Non-Irrigation	142,947	144,376	145,820	147,278	148,751
4	Metrobiosolids (MBC)	327,648	330,924	334,233	337,575	340,951
5	Wholesale	-	-	-	-	-
6	Contract (Poway)	290,019	292,919	295,848	298,806	301,794
7	NCWRP Use (1)	889,999	898,899	907,888	916,967	926,137
8	Subtotal Optimized System	2,755,446	2,782,999	2,810,829	2,838,936	2,867,326
Non-Optimized System						
9	Irrigation	463,860	468,499	473,184	477,916	482,695
10	Non-Irrigation	3,333	3,366	3,400	3,434	3,468
11	Wholesale (OMWD)	333,912	337,251	340,624	344,030	347,470
12	Sorrento Mesa (Commercial)	-	-	-	-	-
13	Subtotal Non-Optimized System	801,105	809,116	817,208	825,380	833,633
14	Total North City WRP	3,556,551	3,592,115	3,628,037	3,664,316	3,700,959
South Bay WRP						
15	Irrigation	8,739	8,826	8,914	9,003	9,093
16	Non-Irrigation	-	-	-	-	-
17	Wholesale (Otay)	1,946,696	2,005,502	2,074,327	2,132,262	2,190,632
18	SBWRP Use (1)	320,353	323,557	326,793	330,061	333,362
19	Total South Bay WRP	2,275,788	2,337,885	2,410,034	2,471,326	2,533,087
20	TOTAL USAGE	5,832,339	5,930,000	6,038,071	6,135,642	6,234,046

(1) Usage at North City and South Bay WRP is not billed.

7.0 RATE DEVELOPMENT

Rate development for the Pricing Study considered three major objectives:

- Pricing should be set to ensure greater financial sufficiency more in-line with the cost of providing service
- The rates should be relatively easy to implement and simple to explain to customers
- The rates should be based upon a fair and equitable approach so that users pay in proportion to the cost of providing service

The first objective recognizes the City's desire to make recycled water a more financially self-sufficient operation. If all the past investments made by the City are included in the analysis, generally accepted cost-of-service (COS) based rates may result in rates that are too high for a new service like the City's recycled water program. COS based rates are developed by dividing net allocated revenue requirements in a given year by the projected user and usage units over that same year, thus ensuring financial sufficiency on an annual basis. This approach generally works well in a mature system that experiences incremental growth in costs and usage on an annual basis. Start-up utilities, such as the recycled water system, typically experience high start-up costs and low sales. Initial capital investments are required for production and distribution. Initial operating costs are required for administration and customer service. High costs spread over low initial consumption yields a high unit cost-of-service. As the fixed costs are spread over more and more consumption, the unit cost eventually decreases and stabilizes.

The second objective recognizes the advantages of developing a simple, equitable rate that applies to all customer classes. A simple rate structure that reasonably recovers the cost of providing service is a uniform rate structure wherein all users pay the same variable rate based on consumption.

The third objective recognizes that different customer classes have different demands that they place on the system. Since the costs of constructing and maintaining a system depend on the demands, allocations based on these demands provide a rationale for differentiating among customer classes. City staff was able to gather usage data in an effort to distinguish different customer classes in the recycled water system. Analysis shows that the demands of irrigation, non-irrigation, and wholesale customers are sufficiently different to calculate separate rates for the three classes of customers. However, due to the relatively small size of the customer base and the instance of mixed use amongst different customers, the equitability of the calculated rates for each customer class is uncertain. Thus, we recommend that the City implements the same rate for all recycled water customers.

7.1. Cost of Service Rate Development

Recycled water customers have enjoyed significantly lower rates for the last several years as the City decreased the rates to encourage more users to convert to recycled water. As potable water supplies have become scarcer and long term drought predictions become more real, the real value of the recycled water needs to be communicated to the end users. Setting rates more consistent with a traditional COS would be ideal if the rates compare favorably with potable water rates.

The financial plan integrates the operating and capital costs along with non operating revenues and expenses to provide the total revenue requirements. These revenue requirements are then used as the basis to develop unit rates.

7.1.1. Cost of Service to be Allocated

The annual revenue requirements or costs of service to be recovered from commodity charges include operation and maintenance (O&M) expenses, costs associated with annual renewal and replacements, and other capital related costs. O&M expenses include costs directly related to the operations and maintenance as well as routine maintenance of system facilities.

The COS analysis is based upon the premise of generating adequate annual revenues to meet the estimated annual revenue requirements. As part of the COS analysis, revenues from customers with contractually based rates such as the City of Poway are deducted from the appropriate cost elements.

The following section describes the allocation of the operating and capital costs of service to the selected parameters of the recycled water system.

7.1.2. Functional Cost Components

The total cost of recycled water service is analyzed by system function in order to equitably distribute costs of service to customers. COS analysis requires costs to be assigned to basic functional cost components including base commodity⁷ costs, extra capacity costs, and customer service related costs. This methodology is consistent with industry practices and is described in the M1 Manual – *Principles of Water Rates and Charges*, published by the AWWA.

Base commodity costs are those operating and capital costs of the recycled water system associated with serving customers to the extent required for a constant average rate of use. Extra capacity costs represent those operating costs incurred to meet customer peak demands for recycled water in excess of average day usage, plus those capital costs for extra plant and system capacity beyond that required to supply recycled water at the average rate of use. Total extra capacity costs are typically represented by maximum day and maximum hour demands. Since we are calculating uniform rates for all customer classes, extra capacity costs are included in the base commodity costs to develop a

⁷ The standard industry terminology is base costs, however, we are calling the base costs “base commodity costs” to distinguish from the monthly base fees the City charges per meter size.

uniform variable commodity rate. For this study, allocation to extra capacity is included in the analysis to show the standard cost allocation process.

Customer service costs include customer and meter related costs. Customer costs are uniform for all customers and include such costs as meter reading, billing, collecting, and accounting. Meter service costs include maintenance and capital costs associated with meters and services costs. These costs are assigned based on meter size or meter capacity.

7.1.3. Determination of Allocation Percentages

Allocation percentages are usually derived from actual historical production as is the case in this Study. RFC performed the following steps to derive the allocation percentages for apportioning the City's O&M and capital costs. Customer service related costs are allocated directly to their cost component so no allocation percentages are necessary. Volume related costs are allocated based on the demands placed on the system.

The first step is to assign system peaking factors. Base commodity is equal to average daily demand (ADD) and assigned a value of 1.0. Typically, maximum day and maximum hour demands are used for cost allocation purposes. However, in the recycled water system, maximum month usage is readily available and is used as the basis for cost allocation. The recycled water system's maximum month demand is 1.57 times the ADD based on usage records for FY 2013. Maximum month is therefore assigned a value of 1.57. Capacity allocations are calculated based on these factors. Allocation percentages are calculated by dividing the number of units by the peaking factor for the design basis. Cost categories that are solely Base related, such as source of supply, are allocated 100 percent to Base. Cost categories that are designed to meet maximum month peaks, such as the distribution system, are allocated to base commodity and max month factors. Therefore the allocations are as follows:

$$\text{Base Commodity:} \quad 63.7\% = (1.0/1.57) \times 100$$

$$\text{Maximum Month:} \quad 36.3\% = (0.57/1.57) \times 100$$

These percentages are used to spread the operating and capital improvement costs amongst base commodity and maximum month parameters for COS calculations.

7.1.4. Allocation of Revenue Requirements and Revenue Offsets

O&M expenses, which include the recycled water program costs and treatment costs for the test year, are allocated to base commodity since these costs are incurred to provide for the average usage in the system.

Capital costs, including capital improvements financed from annual revenues, debt service and other sources, net of capacity fees revenue, are allocated to base commodity and max month since these costs are used to provide capacity in the system.

Recycled Water Meter Services costs, net of any meter installation revenue collected from customers, are allocated equally between commodity costs (base commodity and max month) and meter related costs. These costs include costs to serve meters and maintain the distribution system. Customer service and billing costs are allocated to customers.

Revenue offsets including Poway contract revenue, fees from Olivenhain, and credits from MWD and SDCWA are allocated on the same basis as the total of the other costs are allocated to base commodity and max month.

Table 7-1 shows the allocation of O&M and capital costs to various cost components.

Table 7-1
Allocation of Revenue Requirements

Allocation of Peaking Costs	Commodity Rates		Monthly Base Fees		2014 Total
	Base	Max Month	Meters	Customer	
O&M and Treatment Costs	\$ 17,371,896				\$ 17,371,896
RW Meter Services Costs	\$ 364,202	\$ 207,595	\$ 571,797		\$ 1,143,593
Billing Costs				\$ 31,031	\$ 31,031
Capital Costs	\$ 26,657,275	\$ 15,194,647			\$ 41,851,922
TOTAL COST OF SERVICE	\$ 44,393,372	\$ 15,402,242	\$ 571,797	\$ 31,031	\$ 60,398,441
Poway & Olivenhain Revenue	\$ (354,866)	\$ (123,120)			\$ (477,986)
Credits from MWD and CWA	\$ (2,048,121)	\$ (710,594)			\$ (2,758,715)
TOTAL COST OF SERVICE	\$ 41,990,385	\$ 14,568,527	\$ 571,797	\$ 31,031	\$ 57,161,740

7.1.5. Unit Costs of Service

In order to determine rates, unit costs of service need to be developed for each cost category. The unit costs of service are developed by dividing the total annual costs allocated to each parameter by the total annual units of the respective category. Table 7-2 shows the units of service and the development of the FY 2014 unit costs for each of the cost categories.

Different units are used for the different cost categories. The volume related costs categories are based on volumetric units of one hundred cubic feet or HCF (about 748 gallons). The extra capacity categories of maximum month are based on a rate of usage so they are calculated in HCF per day. Meter related costs are based on equivalent meters which are based on the hydraulic capacity of the different meters. Customer related cost categories are based on the number of accounts.

Once the total number of units is known they can be used to calculate unit costs. The allocated costs are simply divided by the total number of units for each category to determine the unit costs of each category as shown in Table 7-2. Since we are calculating the same rates for all customer classes, the extra capacity or maximum month costs are included with the base commodity costs to develop the uniform rate. The calculated unit rate is over \$14 per HCF and represents the true cost of producing and distributing recycled water and assumes that all the costs are borne by recycled water. This COS rate is impractical to implement and therefore the market based approach is reasonable.

**Table 7-2
Unit Cost Calculation FY 2014**

Unit Costs	Base Commodity	Meters	Customer	2014 Total
Total Cost of Service	\$ 56,558,912	\$ 571,797	\$ 31,031	\$ 57,161,740
Units of Service	4,004,320	29,746	6,948	
Units of Measure	hcf	equiv meters/yr	bills/yr	
Unit Costs	\$ 14.12	\$ 19.22	\$ 4.47	

7.2. Market Driven Alternative Rate Development

Marketability and customer impacts were among the pricing objectives cited at the onset of our study. The City has a valuable resource in recycled water. Encouraging more users to switch to recycled water by providing a competitive pricing plan is in the interests of the City and the users, and helps meet regional goals. Recognizing that recycled water users incur costs in retrofitting and therefore need incentives to convert to recycled water, it is only reasonable to provide them a lower rate than potable water. If rates are based on cost of service, there would be little incentive for existing customers to use recycled water or new customers to convert to recycled water use since the recycled water rate would be significantly higher than potable water rates. Market-driven rate alternatives may be designed to address the problems of a cost-of-service rate. Since such alternative rates are not constrained by the requirement to meet cash needs every year, they can be more competitive with potable irrigation water pricing. Since recycled water is used mainly for irrigation purposes, it is more appropriate to target the recycled water rate to a specific percentage of the irrigation rate rather than the commercial potable water rate.

The drawback of alternative rates is their ability to meet the objective of financial sufficiency in the short term. If revenues from the sale of recycled water do not recover costs of producing and distributing recycled water, potable water and/or wastewater users will have to make up the difference.

Most agencies in California charge a recycled water rate between 75 to 90 percent of the potable water rate. The recycled water commodity rate is currently 20 percent of the June 2013 irrigation rate of \$4.014 per HCF. We recommend the recycled water rate be set at \$2.241 per HCF for the next four years based on the modified cost of service taking into consideration only demineralization capital, tertiary treatment and capital and operating costs of the distribution system. This rate equals 56 percent of the June 2013 potable irrigation water rate. It should be noted that the recommended rate is not the true cost of service rate. The true cost of service rate is much higher than the recommended rate. The recommended rate will continue to provide an incentive to new users and allow the Water Branch and Metro Wastewater to partially recover their costs. Water and wastewater users will bear the remaining costs of the system not recovered from recycled water users based on the terms set in the Metro Agreement. Table 7-3 shows the

calculation of the recommended recycled water rate of \$2.241 per HCF for the next four years.

The recommended rate is designed to provide a good balance between incentives for recycled water use and cost of service. As costs and sales can be projected with reasonable certainty for only a few years, the City should consider reviewing the recycled water rate periodically with available updated information.

**Table 7-3
Modified Cost of Service Recycled Water Rate Calculation**

	Budgeted FY 2014	Projected FY 2015	Projected FY 2016	Projected FY 2017
<u>Revenue Requirements</u>				
O&M Costs	\$ 2,966,987	\$ 3,010,580	\$ 3,106,970	\$ 3,231,248
Treatment Costs	\$ 4,032,913	\$ 4,073,242	\$ 4,113,975	\$ 4,278,534
<u>Capital Costs</u>				
Existing Debt Service	\$ 5,104,219	\$ 5,104,243	\$ 5,141,858	\$ 5,083,578
Proposed Debt Service	\$ 47,873	\$ 95,745	\$ 95,745	\$ 149,089
Pay-as-you-go Capital	\$ 36,145	\$ 39,423	\$ 91,551	\$ 96,189
Subtotal: Capital Costs	\$ 5,188,236	\$ 5,239,411	\$ 5,329,154	\$ 5,328,856
Total Revenue Requirements	\$ 12,188,136	\$ 12,323,234	\$ 12,550,099	\$ 12,838,638
<u>Less: Revenue Offsets</u>				
Credits from MWD and CWA	\$ 2,758,715	\$ 2,786,300	\$ 2,564,380	\$ 2,337,740
Poway Contract Revenue	\$ 462,046	\$ 471,332	\$ 480,806	\$ 505,038
Fees from Olivenhain	\$ 15,941	\$ 15,941	\$ 15,941	\$ 15,941
Interest Revenue	\$ -	\$ -	\$ -	\$ -
Meter Installation Revenue	\$ 100,000	\$ 105,000	\$ 25,000	\$ 25,000
Capacity Fee Revenue	\$ 73,128	\$ 73,128	\$ 24,376	\$ 24,376
Subtotal Revenue Offsets	\$ 3,409,829	\$ 3,451,702	\$ 3,110,503	\$ 2,908,095
TOTAL NET REVENUE REQUIREMENTS	\$ 8,778,307	\$ 8,871,532	\$ 9,439,596	\$ 9,930,543
Total Sales (HCF)	4,004,320	4,083,701	4,173,309	4,252,233
Calculated Recycled Water Rate, \$/HCF	\$ 2.19	\$ 2.17	\$ 2.26	\$ 2.34
Average 4 year rate	\$ 2.241	\$ 2.241	\$ 2.241	\$ 2.241

7.3.Recommended Rates

Table 7-4 shows the recommended recycled water rates. The monthly base fees are calculated based on the meter capacity ratio derived from the AWWA M22 Manual – Sizing Water Service Lines and Meters.

**Table 7-4
Recommended Recycled Water Rates**

	Existing	Proposed 1/1/2014	Proposed 1/1/2015	Proposed 1/1/2016	Proposed 1/1/2017
Monthly Base Fee					
<u>Meter Size</u>					
5/8"	\$ 8.63	\$ 23.69	\$ 24.04	\$ 24.73	\$ 25.72
3/4"	\$ 8.63	\$ 23.69	\$ 24.04	\$ 24.73	\$ 25.72
1"	\$ 8.63	\$ 23.69	\$ 24.04	\$ 24.73	\$ 25.72
1-1/2"	\$ 43.27	\$ 42.91	\$ 43.55	\$ 44.80	\$ 46.59
2"	\$ 65.96	\$ 65.98	\$ 66.96	\$ 68.89	\$ 71.65
3"	\$ 246.93	\$ 139.03	\$ 141.10	\$ 145.16	\$ 150.97
4"	\$ 411.53	\$ 246.67	\$ 250.34	\$ 257.55	\$ 267.85
6"	\$ 925.93	\$ 542.71	\$ 550.79	\$ 566.64	\$ 589.31
8"	\$ 1,234.59	\$ 927.17	\$ 940.97	\$ 968.05	\$ 1,006.77
10"	\$ 1,646.12	\$ 1,465.41	\$ 1,487.22	\$ 1,530.03	\$ 1,591.23
12"	\$ 2,263.42	\$ 1,926.76	\$ 1,955.43	\$ 2,011.71	\$ 2,092.18
16"	\$ 3,703.75	\$ 3,849.04	\$ 3,906.32	\$ 4,018.76	\$ 4,179.51
Uniform Commodity Rate (\$/hcf)	\$ 0.80	\$ 2.241	\$ 2.241	\$ 2.241	\$ 2.241

8.0 RATE IMPACTS

Depending on the rates implemented there are impacts on the water and wastewater enterprises and on recycled water customers. This section briefly discusses these impacts.

8.1.Impacts on Water and Metro System

The potable water (Water Branch) and Metro System systems have been supporting the recycled water system for several years because the recycled water rates have not been increased or set at a point that is based upon the goal of recovering the costs of service. Given the City's interpretation of the Metro Agreement, the Water Branch will be reimbursed going forward, for the O&M costs of distributing recycled water to customers and the debt service costs of the distribution lines and infrastructure at the NCWRP, from the sale of recycled water from the NCWRP, and the O&M costs of distributing recycled water to customers at the SBWRP from the sale of recycled water from the SBWRP. Past debt service payments for investments made to the recycled water system by the Water Branch will not be reimbursed. In the past, the Water Branch has been absorbing the loss since recycled water revenue is not sufficient to cover the operating costs of the distribution system, including debt service costs. Under the recommended rates, the Water Branch will not fully recover its costs from FY 2014 through 2017 (since rates for subsequent years are not set now, the impacts are only provided for the four years) because revenues from the sale of recycled water at NCWRP are not sufficient to cover all expenses. However, potable water customers would still realize some benefits under the recommended rates since the revenue loss would be significantly lower.

All South Bay revenues, net of the reimbursements to the Water Branch, will accrue to the Metro System, pursuant to the Agreement.

Table 8-1 shows the projected recycled water revenue and the distribution of that revenue to the Water and Metro System on lines 16 and 17, respectively.

Table 8-1
Recycled Water Revenue Projections

Line No.	Budgeted FY 2014	Projected FY 2015	Projected FY 2016	Projected FY 2017	
Recycled Water Revenue					
North City					
1	Commodity Revenue	\$ 3,115,330	\$ 4,637,465	\$ 4,683,842	\$ 4,730,679
2	Base Charge Revenue	\$ 619,565	\$ 602,890	\$ 619,874	\$ 645,178
3	Other Miscellaneous Revenue	\$ 3,405,817	\$ 3,447,649	\$ 3,106,410	\$ 2,903,961
4	South Bay				
5	Commodity Revenue	\$ 2,973,240	\$ 4,514,110	\$ 4,668,544	\$ 4,798,575
6	Base Charge Revenue	\$ 20,252	\$ 19,311	\$ 19,734	\$ 20,414
7	Other Miscellaneous Revenue	\$ 4,012	\$ 4,052	\$ 4,093	\$ 4,134
8	Total Recycled Water Revenue	\$ 10,138,216	\$ 13,225,477	\$ 13,102,496	\$ 13,102,941
Water Branch Expenses					
9	North City				
10	Water Branch O&M Expenses	\$ 2,791,146	\$ 2,832,414	\$ 2,922,756	\$ 3,039,723
11	Water Branch Capital Expenses	\$ 5,188,236	\$ 5,239,411	\$ 5,329,154	\$ 5,328,856
12	South Bay				
13	Water Branch O&M Expenses	\$ 175,841	\$ 178,167	\$ 184,214	\$ 191,526
14	Water Branch Capital Expenses	\$ -	\$ -	\$ -	\$ -
15	Total Water Branch Expenses	\$ 8,155,223	\$ 8,249,992	\$ 8,436,124	\$ 8,560,104
16	Revenue Accrued to Water Branch	\$ (838,671)	\$ -	\$ -	\$ (88,760)
17	Revenue Accrued to Metro System	\$ 2,821,664	\$ 4,975,486	\$ 4,666,372	\$ 4,631,597

8.2. Impacts on Recycled Water Customers

Recycled water customers have enjoyed low rates for a number of years as potable customers have supported the costs of the recycled water system as a part of the strategic water supply planning efforts of the water enterprise fund. The recycled water rates have not been revised since July 2001. During that time potable water rates have increased from \$1.493 per HCF to \$4.014 (June 2013) for irrigation water, an increase of 169 percent. The January 1, 2014 recycled water rate of \$2.241 per HCF represents an increase of 180 percent from the current rate of \$0.80 per HCF, but only a 67 percent increase from its original rate of \$1.34/HCF prior to July 2001, and is about 56 percent of the June 2013 potable irrigation rate.

APPENDICES

APPENDIX A – RATE MODEL ASSUMPTIONS

Inflation and Costs Assumptions

1. O&M (includes non-personnel and tertiary O&M) Inflation: 1% per year until FY 2016, 4% per year thereafter. Personnel: salary inflation is 4% per year from FY 2016, fringe benefits inflation is 4% per year.
2. Energy Inflation: 5% per year until FY 2017, 4% per year thereafter
3. Capital Inflation: 3% per year until FY 2014, 4% per year thereafter
4. Debt Issue Interest Rate: 5.5% per year
5. New Debt Term: 30 years
6. Debt Issuance Cost: 3%
7. Potable Rate Escalation: 4% per year starting FY 2014 – this is used in the revenue projections for recycled water when recycled rates are a percentage of potable rates.
8. Capacity Fees Escalation: 0% per year, capacity fees are equal to the potable water capacity fees.
9. SDCWA reimbursements are assumed to be available each year through the term of the agreements with SDCWA. MWD reimbursements are assumed to decrease by \$40/AF per year starting in FY 2016. No MWD/SDCWA reimbursement at South Bay for Otay’s recycled water use.

Model Settings/Scenarios

1. Capital projects funding, based on City policy, is assumed to be 80% debt and 20% cash.

APPENDIX B – RECYCLED WATER PRICING MODEL

Model Tables

Table 1	Recycled Water Rates History
Table 2	O&M Expenses
Table 3	Inflated Capital Improvement Program
Table 4	Capital Financing Plan
Table 5	MWD & CWA Credits
Table 6	Revenue Requirements

**Table 1
Recycled Water Rate History**

Meter Size	Recycled Water Rate History				Potable Water	
	Monthly Rate				Monthly Rate	
	Effective				Effective	
	1-Mar-00	1-Jul-01	20-Jan-02	28-Mar-02	1-Sep-10	1-Jun-13
5/8"	\$ 9.63	\$ 9.63	\$ 8.63	\$ 8.63	\$ 18.86	\$ 19.33
3/4"	\$ 9.63	\$ 9.63	\$ 8.63	\$ 8.63	\$ 18.86	\$ 19.33
1"	\$ 10.23	\$ 10.23	\$ 8.63	\$ 8.63	\$ 27.66	\$ 28.46
1-1/2"	\$ 46.27	\$ 46.27	\$ 43.27	\$ 43.27	\$ 47.79	\$ 49.34
2"	\$ 71.16	\$ 71.16	\$ 65.96	\$ 65.96	\$ 72.95	\$ 75.44
3"	\$ 256.53	\$ 256.53	\$ 246.93	\$ 246.93	\$ 132.04	\$ 136.74
4"	\$ 427.93	\$ 427.93	\$ 411.53	\$ 411.53	\$ 216.30	\$ 224.15
6"	\$ 655.93	\$ 655.93	\$ 925.93	\$ 925.93	\$ 425.08	\$ 440.73
8"	\$ 1,286.59	\$ 1,286.59	\$ 1,234.59	\$ 1,234.59	\$ 676.59	\$ 701.64
10"	\$ 1,724.12	\$ 1,724.12	\$ 1,646.12	\$ 1,646.12	\$ 970.89	\$ 1,006.94
12"	\$ 2,395.42	\$ 2,395.42	\$ 2,263.42	\$ 2,263.42	\$ 1,808.47	\$ 1,875.82
16"	\$ 3,989.75	\$ 3,989.75	\$ 3,703.75	\$ 3,703.75	\$ 3,150.36	\$ 3,267.86
Commodity Rate (per HCF)						
Non-Irrigation	\$ 1.34	\$ 0.80	\$ 0.81	\$ 0.80	\$ 3.547	\$ 3.757
Multi-Family	\$ 1.34	\$ 0.80	\$ 0.81	\$ 0.80	\$ 3.698	\$ 3.917
Cal-Trans	\$ 1.19	\$ 0.80	\$ 0.81	\$ 0.80		
Potable Water Irrigation Rate					\$ 3.790	\$ 4.014

Note: The recycled water rates have not changed since March 2002.

Table 2
O&M Expenses

Line No.		Budgeted FY 2014	Projected FY 2015	Projected FY 2016	Projected FY 2017	Projected FY 2018
Recycled Water Program Costs						
1	Personnel Costs					
2	Salaries	\$ 840,981	\$ 840,981	\$ 874,620	\$ 909,605	\$ 945,989
3	Fringe Benefits	\$ 537,053	\$ 558,535	\$ 580,877	\$ 604,112	\$ 628,276
4	Subtotal Personnel Costs	\$ 1,378,034	\$ 1,399,516	\$ 1,455,497	\$ 1,513,717	\$ 1,574,265
5	Non-Personnel Costs					
6	Supplies	\$ 25,897	\$ 26,156	\$ 26,418	\$ 27,474	\$ 28,573
7	Contracts	\$ 288,432	\$ 291,316	\$ 294,229	\$ 305,999	\$ 318,239
8	Other	\$ -	\$ -	\$ -	\$ -	\$ -
9	Subtotal Non-Personnel Costs	\$ 314,329	\$ 317,472	\$ 320,647	\$ 333,473	\$ 346,812
10	Total Recycled Water Program Costs	\$ 1,692,363	\$ 1,716,988	\$ 1,776,144	\$ 1,847,190	\$ 1,921,077
Recycled Water Meter Services						
11	Personnel Costs					
12	Salaries	\$ 441,261	\$ 441,261	\$ 458,911	\$ 477,268	\$ 496,359
13	Fringe Benefits	\$ 354,488	\$ 368,668	\$ 383,414	\$ 398,751	\$ 414,701
14	Subtotal Personnel Costs	\$ 795,749	\$ 809,929	\$ 842,326	\$ 876,019	\$ 911,059
15	Non-Personnel Costs					
16	Supplies	\$ 146,354	\$ 147,818	\$ 149,296	\$ 155,268	\$ 161,478
17	Contracts	\$ 145,217	\$ 146,669	\$ 148,136	\$ 154,061	\$ 160,224
18	Other	\$ 156,273	\$ 157,836	\$ 159,414	\$ 165,791	\$ 172,422
19	Subtotal Non-Personnel Costs	\$ 447,844	\$ 452,322	\$ 456,846	\$ 475,119	\$ 494,124
20	Total Recycled Water Meter Services	\$ 1,243,593	\$ 1,262,251	\$ 1,299,171	\$ 1,351,138	\$ 1,405,184
21	Customer Service & Billing Costs	\$ 31,031	\$ 31,341	\$ 31,655	\$ 32,921	\$ 34,238
22	TOTAL O&M COSTS	\$ 2,966,987	\$ 3,010,580	\$ 3,106,970	\$ 3,231,248	\$ 3,360,498
23	TREATMENT COSTS	\$ 15,679,533	\$ 15,836,328	\$ 15,994,691	\$ 16,634,479	\$ 17,299,858

Table 3
CIP - inflated

Line No.		Budgeted FY 2014	Projected FY 2015	Projected FY 2016	Projected FY 2017	Projected FY 2018
1	AA - Reclaimed Water Extension	\$ 546,364	\$ 562,754	\$ 579,637	\$ 602,823	\$ 626,935
2	Camino del Sur RW Pipelines - Part Agmt	\$ -	\$ -	\$ -	\$ -	\$ -
3	Carmel Valley Recycled Waterline	\$ -	\$ -	\$ -	\$ -	\$ -
4	Pacific Highlands RWP - Part Agmt	\$ -	\$ -	\$ -	\$ -	\$ -
5	Recycled Water System Upgrades	\$ -	\$ -	\$ -	\$ -	\$ -
6	Camino del Sur RW Project - E&CP Rd. Improv	\$ -	\$ -	\$ -	\$ -	\$ -
7	Los Penasquitos Recycled Waterline	\$ -	\$ -	\$ -	\$ -	\$ -
8	RW PS Drain Line Relocation	\$ -	\$ -	\$ -	\$ -	\$ -
9	3 MG Black Mountain Ranch RW Steel Tank	\$ -	\$ -	\$ -	\$ -	\$ -
10	9 MG Miramar Recycled Water Tank	\$ -	\$ -	\$ -	\$ -	\$ -
11	Camino del Sur Pipeline - North of SR56	\$ -	\$ -	\$ -	\$ -	\$ -
12	Sorrento Mesa/Qualcomm Pipelines	\$ -	\$ -	\$ -	\$ -	\$ -
13	750,000 gal Southbay IBWC Steel Tank	\$ -	\$ -	\$ -	\$ -	\$ -
14	Total CIP - inflated	\$ 546,364	\$ 562,754	\$ 579,637	\$ 602,823	\$ 626,935

Table 4
Capital Financing Plan

Line No.		Budgeted	Projected	Projected	Projected	Projected
		FY 2014	FY 2015	FY 2016	FY 2017	FY 2018
Sources of Funds						
1	Transfers from Capital Reserve Fund	\$ -	\$ -	\$ -	\$ -	\$ -
2	Capacity Charges	\$ 73,128	\$ 73,128	\$ 24,376	\$ 24,376	\$ 24,376
3	Pay-as-you-go Capital	\$ 36,145	\$ 39,423	\$ 91,551	\$ 96,189	\$ 101,011
4	Debt Funding	\$ 437,091	\$ 450,204	\$ 463,710	\$ 482,258	\$ 501,548
5	Total Sources of Funds	\$ 546,364	\$ 562,754	\$ 579,637	\$ 602,823	\$ 626,935
Uses of Funds						
6	Capital Improvement Projects	\$ 546,364	\$ 562,754	\$ 579,637	\$ 602,823	\$ 626,935
7	Transfers to Capital Reserve Fund	\$ -	\$ -	\$ -	\$ -	\$ -
8	Total Uses of Funds	\$ 546,364	\$ 562,754	\$ 579,637	\$ 602,823	\$ 626,935

Table 5
MWD and CWA Credits

Line No.	Budgeted	Projected	Projected	Projected	Projected	
	FY 2014	FY 2015	FY 2016	FY 2017	FY 2018	
Credits for North City WRP (1)						
1	Credits from MWD (\$/ac-ft)	\$ 250	\$ 250	\$ 210	\$ 170	\$ 130
2	Credits from CWA (\$/ac-ft)	\$ 200	\$ 200	\$ 200	\$ 200	\$ 200
3	Total Credits from CWA and MWD (\$/ac-ft)	\$ 450	\$ 450	\$ 410	\$ 370	\$ 330
4	Total Credits for North City WRP	\$ 2,754,702	\$ 2,782,248	\$ 2,560,287	\$ 2,333,607	\$ 2,102,138
Credits for South Bay WRP						
5	Credits from MWD (\$/ac-ft)					
6	Credits from CWA (\$/ac-ft) (2)	\$ 200	\$ 200	\$ 200	\$ 200	\$ 200
7	Total Credits from CWA and MWD (\$/ac-ft)	\$ 200	\$ 200	\$ 200	\$ 200	\$ 200
8	Total Credits for South Bay WRP	\$ 4,012	\$ 4,052	\$ 4,093	\$ 4,134	\$ 4,175
9	TOTAL CREDITS FROM MWD AND CWA	\$ 2,758,715	\$ 2,786,300	\$ 2,564,380	\$ 2,337,740	\$ 2,106,313

(1) Credits for North City WRP expire in FY 2023. Includes Poway and MBC.

(2) Credits for South Bay WRP expire in FY 2032, applicable to Users other than Otay WD.

Table 6
Revenue Requirements

Line No.	Budgeted FY 2014	Projected FY 2015	Projected FY 2016	Projected FY 2017	Projected FY 2018	
<u>Revenue Requirements</u>						
1	O&M Costs	\$ 2,966,987	\$ 3,010,580	\$ 3,106,970	\$ 3,231,248	\$ 3,360,498
2	Treatment Costs	\$ 15,679,533	\$ 15,836,328	\$ 15,994,691	\$ 16,634,479	\$ 17,299,858
3	Capital Costs					
4	Existing Debt Service	\$ 41,841,032	\$ 41,841,057	\$ 41,878,671	\$ 41,820,392	\$ 41,820,177
5	Proposed Debt Service	\$ 47,873	\$ 95,745	\$ 95,745	\$ 149,089	\$ 202,433
6	Pay-as-you-go Capital	\$ 36,145	\$ 39,423	\$ 91,551	\$ 96,189	\$ 101,011
7	Total Revenue Requirements	\$ 60,571,569	\$ 60,823,133	\$ 61,167,629	\$ 61,931,397	\$ 62,783,978
<u>Less: Revenue Offsets</u>						
8	Credits from MWD and CWA	\$ 2,758,715	\$ 2,786,300	\$ 2,564,380	\$ 2,337,740	\$ 2,106,313
9	Poway Contract Revenue	\$ 462,046	\$ 471,332	\$ 480,806	\$ 505,038	\$ 530,491
10	Fees from Olivenhain (1)	\$ 15,941	\$ 15,941	\$ 15,941	\$ 15,941	\$ 15,941
11	Interest Revenue	\$ -	\$ -	\$ -	\$ -	\$ -
12	Meter Installation Revenue	\$ 100,000	\$ 105,000	\$ 25,000	\$ 25,000	\$ 25,000
13	Capacity Fee Revenue	\$ 73,128	\$ 73,128	\$ 24,376	\$ 24,376	\$ 24,376
14	Subtotal Revenue Offsets	\$ 3,409,829	\$ 3,451,702	\$ 3,110,503	\$ 2,908,095	\$ 2,702,121
15	Net Revenue Requirements	\$ 57,161,740	\$ 57,371,432	\$ 58,057,126	\$ 59,023,302	\$ 60,081,857

(1) Fees from Olivenhain are a premium of \$25/ac-ft for not being a member agency of Metropolitan Wastewater.

APPENDIX C – ALTERNATIVE RATE SCENARIO

As discussed throughout the report, the Pricing Model provides for alternative rate scenario in order to explore different options available to the City and the resulting recycled water rates and customer impacts. This Appendix discusses the rates by customer class alternative.

Alternative Rates by Customer Class

The primary differentiator of rates amongst different customer classes is based on the demand that they put on the system. This demand is expressed in terms of the maximum day and maximum hour factors. These are the maximum demands expressed as a multiple of the average demands of the customer class. Larger customers generally have lower peaking factors than smaller customers. In our case, most we would expect to have peaking factors that are fairly close for the two customer classes in this study – retail and wholesale. Because we did not have the maximum day or maximum hour factors we used the maximum month as a proxy for the maximum day factor. The peaking factors, shown in the following table, were determined from the average monthly usage in FY 13 for two customer classes. Generally, larger customers tend to have lower peaking factors; however, surprisingly, wholesale customers (Otay and Olivenhain) have the highest peaking factors according to water usage records. Since Poway is billed quarterly, its monthly usage data was not available. Moreover, its rates are set by agreement; thus, Poway’s demand is not included in the analysis.

Customer Class	Peaking Factor
Retail	1.49
Wholesale	1.91

It is important to note that since recycled water is mainly used for irrigation purposes, which is heavily dependent on weather, it is difficult to definitively determine the accurate peaking factor for different customer classes. Moreover, many retail customers have mixed use, such as irrigation and cooling towers, which tend to have different peaking patterns. Additionally, given the relatively small customer base, especially for wholesale customers, the accuracy and reliability of these peaking factors is uncertain. Thus, while we do calculate the recycled water rates based on these peaking factors for these two customer classes, we recommend that the City implements the same commodity rate for all customer classes until the customer base is expanded or more data can be collected to verify the validity and accuracy of the calculated peaking factors.

APPENDIX D – LIST OF ABBREVIATIONS

AF	acre-feet
AWWA	American Water Works Association
CIP	Capital Improvement Program
CWA	Clean Water Act
EDU	Equivalent Dwelling Unit
EPA	United States Environmental Protection Agency
GPD	Gallons per day
HCF	Hundred Cubic Feet
IBWC	International Boundary Water Commission
IPR	Indirect Potable Reuse
LRWRP	Long Range Water Resources Plan
MBC	Metro Biosolids Center
Mg/l	milligrams per liter
MGD	million gallons per day
MJPA	Metropolitan Joint Powers Authority
MWD	Metropolitan Water District of Southern California
NCWRP	North City Water Reclamation Plant
NPDES	National Pollutant Discharge Elimination System
O&M	Operations & Maintenance
OPRA	Ocean Pollution Reduction Act
PLWTP	Point Loma Wastewater Treatment Plant
PA	Participating Agency
PAYGO	Pay-as-you-go
SBWRP	South Bay Water Reclamation Plant
SDCWA	San Diego County Water Authority
SWRCB	State Water Resources Control Board
TDS	Total Dissolved Solids
WRP	Water Resources Plan