METRO TAC AGENDA
(Technical Advisory Committee to Metro JPA)

TO: Metro TAC Representatives and Metro Commissioners

DATE: Wednesday, May 18, 2011

TIME: 11:00 a.m. to 1:30 p.m.

LOCATION: MWWD, 9192 Topaz Way, (MOCII Auditorium) – Lunch will be provided

PLEASE DISTRIBUTE THIS NOTICE TO METRO COMMISSIONERS AND METRO TAC REPRESENTATIVES

1. Review and Approve MetroTAC Action Minutes for the Meeting of April 20, 2011 **(Attachment)**
2. Metro Commission/JPA Board Meeting Recap (Standing Item)
3. Financial Update (Karyn Keese)
4. Metro Wastewater Update
5. MetroTAC Work Plan (Standing Item) (**Attachment**)
6. Recycled Water Master Plan - TM#8 (**Attachment**)
7. Recycled Water Revenue (**Attachment**)
8. Atkins 2011-2012 Contract (Attachment to be provided at meeting)
9. Review of Items to be Brought Forward to the Metro Commission/Metro JPA Meeting of June 2, 2011
10. Other Business of Metro TAC
11. Adjournment (To the next Regular Meeting, June 15, 2011)

Metro TAC 2011 Meeting Schedule

January 19	May 18	September 21
February 16	June 15	October 19
March 16	July 20	November 16
April 20	August 17	December 21

AGENDA ITEM 1
Attachment

METRO WASTEWATER JPA

Metro TAC
(Technical Advisory Committee to Metro JPA)

ACTION MINUTES

DATE OF MEETING: April 20, 2011

TIME: 11 AM

LOCATION: MWWD, MOC II, Auditorium

MEETING ATTENDANCE:

Roberto Yano, Chula Vista
Scott Huth, Coronado
Dan Brogadir, County of San Diego
Erin Bullers, La Mesa
Dennis Davies, El Cajon
Manuel De Rosa, City of San Diego
Amy Dorman, City of San Diego
Pamela Galan, City of San Diego
Tom Howard, Poway
Greg Humora, La Mesa
Hwang, Guann, City of San Diego
Mike James, Lemon Grove
Augie Caires, Padre Dam MWD
Al Lau, Padre Dam MWD
Kristen Crane, Poway
Lee Ann Jones-Santos, City of San Diego
Christopher McKinney, City of San Diego
Peggy Merino, City of San Diego
Eric Minicilli, City of Del Mar
Edgar Patino, City of San Diego
Jamie Richards, City of San Diego
Ann Sasaki, City of San Diego
Augie Scalzitti, Padre Dam
Joe Smith, National City
Karyn Keese, PBS&J/Atkins

1. **Review and Approve MetroTAC Action Minutes for the Meeting of March 16, 2011**
   - Minutes were approved

2. **Metro Commission/JPA Board Meeting Recap**
   - There was no Metro Commission/JPA Board meeting.

3. **Financial Update**
   - 2010 CAFR delayed until August 30, 2011
   - Exhibit E audit to start within 90 days of CAFR completion

4. **Metro Wastewater Update**
   - Transportation Agreements need to be put on Metro TAC agenda as a standing item
   - Final drafts are out of Transportation Agreement

5. **MetroTAC Work Plan (Standing Item)**
   - Work plan will be updated prior to Strategic Planning Meeting

6. **Purchase of Chemicals, Supplies, and Services for Peroxide Regenerated Iron – Sulfide Control**
   - The Wastewater Treatment and Disposal Division requested approval to award a contract to US Peroxide for the purchase of ferrous chloride, supplies, and services necessary for Peroxide Regenerated Iron-Sulfide Control. This project is budgeted. Fiscal Impact: $326k in FY2011, $2.75 million in FY2012 & $820k in FY 2013.
   - Metro TAC unanimously approved the project and recommended moving it forward to Metro JPA/Commission for their approval.

7. **MBC Odor Control Facility Upgrades**
   - This project is to modify, adapt, and add facilities to the existing ventilation system to bring them acceptable standards. This project has already been before the Metro JPA/Commission. Total project cost is estimated to be $5.2 million.
   - Metro TAC unanimously approved the project and recommended moving it forward to Metro JPA/Commission for their approval.

8. **Recycled Water Master Plan Study**
   - TM #8 is scheduled to be released the first week in May prior to the next stakeholders meeting scheduled for May 10, 2011.
   - Draft report will be released the end of June and the stakeholders workshop is scheduled for July 28, 2011.
   - Consensus of Metro TAC members to push for a holistic regional approach.

9. **Strategic Planning Workshop**
   - Workshop will be held on Thursday 5/5/11, from 11 AM to 3 PM at the Coronado Community Center
   - All TAC members are requested to promptly return the survey. Period is 2011 to 2013
   - Key elements
     - Survey results
     - Validate goals/initiative
     - Policies
   - Mike Uhrhammer of PDMWD will facilitate the workshop

10. **Review of Items to be Brought Forward to the Metro Commission/Metro JPA Meeting of May 5, 2011**
    - Item No. 6

11. **Other Business of Metro TAC**
    - None.

12. **Adjournment (To the Next Regular Meeting, May 18, 2011)**

Item #6

METRO JPA/TAC
Staff Report

Subject Title: Purchase of Ferrous Chloride, Supplies and Services for Peroxide Regenerated Iron - Sulfide Control (PRI-SC/PRI-CEPT)

Requested Action: The Wastewater Treatment and Disposal (WWTD) Division requests approval to award a contract to US Peroxide for the purchase of ferrous chloride, supplies, and services necessary for Peroxide Regenerated Iron-Sulfide Control (PRI-SC).

In 2006, a demonstration study verified that the PRI-SC™ program and the Peroxide Regenerated Iron for Chemically Enhanced Primary Treatment (PRI-CEPT™) program optimized use of iron salts (specifically ferrous chloride, $FeCl_2$, and ferric chloride, $FeCl_3$) in the wastewater treatment process. PRI-SC™ optimizes use of iron salts for sulfide control (i.e. odor control) via upstream hydrogen peroxide (H_2O_2) addition to regenerate iron ions which have reacted with odorant hydrogen sulfide (H_2S) molecules. The regenerated iron ions may then react with more H_2S, thus reducing the amount of $FeCl_3$ ultimately added to the system. This reduction has financial benefits (approximately $1.2 million per year in net reduced chemical costs) and environmental benefits (less iron in the effluent water and a more efficient disinfection process). The current program adds $FeCl_2$ at Pump Station 1, H_2O_2 at Pump Station 2, and H_2O_2 at the influent to the Point Loma Wastewater Treatment Plant (PLWTP). The financial savings are realized by elimination of $FeCl_3$ addition at Pump Station 2 and a reduction of $FeCl_3$ used at the PLWTP.

Via this proposed contract, the Department plans to introduce this program at other wastewater treatment plants, specifically the North City Water Reclamation Plant and its feeder facilities. US Peroxide will provide technical expertise, mechanical equipment, and sensors necessary to install the process, monitor it, and optimize chemical use. Following full implementation of the process, the Department will have a system-wide, optimized process for sulfide control.

Recommendations:

Metro TAC:	Submitted for consideration on April 20, 2011
IROC:	N/A- This contract is included in the approved Metro operating budget and does not require IROC review.
Prior Actions: (Committee/Commission, Date, Result)	Submitted for consideration by the Natural Resources and Culture Committee on April 20, 2011; tentatively scheduled for consideration by the full Council on May 10, 2010.

Fiscal Impact: $326,000 in FY 2011; $2,750,000 in FY 2012; $820,000 in FY 2013

Is this projected budgeted?	Yes _X_ No ___
Cost breakdown between Metro & Muni:	98.3% Metro
Financial impact of this issue on the Metro JPA:	$3,830,500 over part of three fiscal years (FY 2011, FY 2012, FY 2013)

Capital Improvement Program: N/A

New Project?	Yes ___ No ___
Existing Project?	Yes ___ No ___ upgrade/addition ___ change ___

Comments/Analysis:

Previous TAC/JPA Action: None.

Additional/Future Action: Pending Metro TAC Approval, consideration by the Metro Commission on May 5, 2011

Item #4

METRO JPA/TAC
Staff Report

Subject Title: MBC Odor Control Facility Upgrade

Requested Action: Recommendation from TAC Committee to the Metro Commission to select and award a Consultant Engineering firm to prepare the construction documents.

Recommendations:

Metro TAC:	Present to JPA for approval of the design.
IROC:	N/A- This project is included in the approved Metro CIP budget and does not require IROC review
Prior Actions: (Committee/Commission, Date, Result)	Not applicable

Fiscal Impact:

Is this project budgeted? Yes _X__ No ___

Cost breakdown between Metro & Muni:	100% Metro
Financial impact of this issue on the Metro JPA:	33.5% of $5,200,000.00 = $1,742,000.00

Capital Improvement Program:

New Project? Yes _X__ No ___

Existing Project? Yes ___ No _X__ upgrade/addition ___ change ___

Comments/Analysis:

Previous TAC/JPA Action: NA

Additional/Future Action: Present it to NR&C prior to City Council

City Council Action: Present it to City Council for authorization to Advertise and Award for construction.

CITY OF SAN DIEGO
ENGINEERING AND CAPITAL PROJECTS DEPARTMENT

Project Name: MBC ODOR CONTROL FACILITY UPGRADE, (WBS# S-00323)

Name of Project Presenter: Idalmiro Manuel da Rosa, Project Manager

Project Background:

The City of San Diego's Public Utilities Department operates the Metro Biosolids Center (MBC), a regional biosolids processing facility located adjacent to the City's Miramar Landfill in Kearny Mesa. MBC consists of anaerobic digestion, solids thickening and dewatering, and waste energy cogeneration processes. Foul air from the plant's process areas is collectively ducted, treated, and exhausted by two (2) Odor Control Systems, (OCS).

The primary OCS is in the Chemical Building (Area 60) treats the foul air from the pre- and post-digestion processes. Post-digestion was designed to extract 16,000 cfm of foul air from the Dewatered Biosolids Storage Building (Area 86), the Centrifuge Building (Area 76), and the Digester Complex (Area 80). Pre-digestion was designed to extract 36,000 cfm from the Grit Removal Facility (Area 76), the Centrifuge Building (Area 76), and the Receiving Tank Complex (Area73). The Odor Control Facility (Area 60) consists of three (3) three-stage odor control scrubber trains. Foul air from the post-digestion processes is sent to the first-stage ammonia scrubbers, after which it is combined with incoming foul air from the pre-digestion processes. The combined foul air stream is then sent to the second-stage hypochlorite scrubbers and finally to the third-stage activated carbon scrubbers before being released to the atmosphere.

The second OCS was designed to extract 9,000 cfm of foul air from the wetwells in the Wastewater Pump Station (Area 94). Similarly to the Area 60 OCS, the foul air is treated in a three-stage odor control system before being discharged to the atmosphere.

The odor control and ventilation systems for the various MBC processing areas were constructed under different contract packages, hampering the ability of these systems to be balanced as a whole. Because of this, neither post-digestion nor pre-digestion systems in Area 60 are able to operate at their designed air flow capacities. This results in inadequate foul air collections and prevents the development of negative air pressure in the process units and buildings. Ineffective capture of foul air at Truck Loading Area (Area 86) has also resulted in fugitive emissions from process vessels, occasionally making some work areas unpleasant and causing odors to linger in some outdoor locations at the MBC site.

Access Platforms to major components in elevated areas of the OCS of Area 60 and 94 were never provided making it Operation and Maintenance (O&M) access unsafe.

The selection of a Professional Engineering Firm for Design and Construction Assistance with the Odor Control System Upgrade at MBC is thru a competitive selection process.

Project Description

The Project requires the following consultant design and construction support services in Areas 60, 73, 76, 86, 80, and 94:

- Provide O&M access platforms/catwalks to the overhead equipment and control instruments in Areas 60 and 94.
- Readjust fan speeds, upsize motors, and modify existing ductwork as required to comply with the required airflow capacities.
- In Area 76 Separate the Grit/Screenings Removal facility into a general ventilation area and foul air collection area. Revise the system to comply with each of the areas ventilation requirements.
- In Area 86, design foul air collection "fume hood" at each of the two truck loadout areas/lanes (including emergency loadout areas), increase airflow capacities, and modify ductwork accordantly.
- Balance the OCS airflows.
- Modify the Distributed control System (DCS) control strategy to ensure that sufficient foul air is being collected from the odor sources and treated.

Cost:

The costs associated with this project are as following:

Administration	$ 470,000.00
Design Costs	$ 680.000.00
Construction	$3,600,000.00
Contingency	$ 450,000.00
Total Projected Costs	$5, 200,000,.00

The Administration costs includes the planning costs incurred to date for in-house planning, preparation and process for the competitive selection, and future administrative support.

The funding will come from the MBC Odor Control Upgrade Facility WBS # S-00323, Sewer Fund 41509.

Schedule:

The schedule for MBC Odor Control Facility Upgrade is as follows:

Design Selection and Agreement Process	June 2011 - September 2011
Design	October 2011- October 2012
Advertise and Award for Construction	November 2012 – July 2013
NTP for Construction	August 2013
Construction Complete	January 2015

AGENDA ITEM 5
Attachment

MetroTAC
2010/2011 Work Plan

MetroTAC Items	Description	Subcommittee Member(s)
Advanced Water Purification Demonstration Project	San Diego engaged CDM to design/build/operate the project for the water repurification pilot program. *2/8/11: Equipment arrived 3/2011; tours will be held when operational (June/July 2011 timeframe)*	Al Lau
Fiscal Items	The Finance committee will continue to monitor and report on the financial issues affecting the Metro System and the charges to the PAs. The debt finance and reserve coverage issues have been resolved. Refunds totaling $12.3 million were sent to most of the PA's.	Greg Humora Scott Huth Karen Jassoy Karyn Keese
Recycled Water Revenue Issue	Per our Regional wastewater Agreement revenues from SBWTP are to be shared with PA's. 4/11: City has agreed to pay out revenue to Wastewater Section and PA's credit will be on the Exhibit E adjustments at year end Open issues: Capacity reservation lease payments and North City Optimized System Debt service status.	Scott Huth Scott Tulloch Karyn Keese
Water Reduction - Impacts on Sewer Rates	The MetroTAC wants to evaluate the possible impact to sewer rates and options as water use goes down, and consequently the sewer flows go down, reducing sewer revenues. Sewer strengths are also increasing because of less water to dilute the waste. We are currently monitoring the effects of this. *2/2011:wastewater revenues are declining due to conservation and flow reductions and agencies are re-prioritizing projects to be able to cover annual operations costs*	Eric Minicilli Manny Magaña Karyn Keese
"No Drugs Down the Drain"	The state has initiated a program to reduce pharmaceuticals entering the wastewater flows. There have been a number of collection events within the region. The MetroTAC, working in association with the Southern California Alliance of Publicly-owned Treatment Works (SCAP), will continue to monitor proposed legislation and develop educational tools to be used to further reduce the amount of drugs disposed of into the sanitary sewer system. 8/2010: County Sheriff and Chula Vista have set up locations for people to drop off unwanted medications and drugs.4/11: *Local law enforcement has taken a proactive role and is sponsoring drug take back events. 3/11: TAC to prepare a position for the board to adopt; look for a regional solution; watch requirements to test/control drugs in wastewater*	Greg Humora
Flushable Items that do not Degrade	Several PAs have problems with flushable products, such as personal wipes, that do not degrade and cause blockages. MetroTAC is investigating solutions by other agencies, and a public affairs campaign to raise awareness of the problems caused by flushable products. We are also working with SCAP in their efforts to help formulate state legislation to require manufacturers of products to meet certain criteria prior to labeling them as "flushable." Follow AB2256 and offer support.	Eric Minicilli
Grease Recycling	To reduce fats, oils, and grease (FOG) in the sewer systems, more and more restaurants are being required to collect and dispose of cooking grease. Companies exist that will collect the grease and turn it into energy. MetroTAC is exploring if a regional facility offers cost savings for the PAs. The PAs are also sharing information amongst each other for use in our individual programs. *3/11: get update on local progress and status of grease rendering plant near Coronado bridge*	Eric Minicilli

MetroTAC Items	Description	Subcommittee Member(s)
"Power Tariff"	Power companies are moving to a peak demand pricing scheme which negatively impacts PAs with pump stations and other high energy uses. MetroTAC wants to evaluate the new legislation and regulations, and to identify and implement cost savings efforts for the PAs. (8/2010): John Helminski at the City of San Diego is working on a sustainability project for CoSD *3/11: Prepare a position paper for the JPA board to consider 4/11: John Helminski no longer works for the City. Request update from Paula.*	Tom Howard Paula de Sousa
Recycled Water Study	As part of the secondary waiver process, San Diego agreed to perform a recycled water study within the Metro service area. That study is currently underway, and MetroTAC has representatives participating in the working groups. TM #8 Costs estimates is out and we are currently in the comment period. Draft report due out mid-summer.	Scott Huth Al Lau Karyn Keese Jennifer Duffy
Recycled Water Rate Study	San Diego is working on a rate study for pricing recycled water from the South Bay plant and the North City plant. MetroTAC, in addition to individual PAs, have been engaged in this process and have provided comments on drafts San Diego has produced. We are currently waiting for San Diego to promulgate a new draft which addresses the changes we have requested. *draft study still not issued*	Karyn Keese Scott Huth Rita Bell
Metro JPA Strategic Initiatives	MetroTAC to develop success measures for the JPA strategic initiatives and suggest a schedule to complete certain items.	Scott Huth Dan Brogadir Karyn Keese
Salt Creek Diversion	9/2010: OWD, Chula Vista and San Diego met to discuss options and who will pay for project; Chula Vista and OWD are reviewing options. 2/2011: OWD and PBS&J reviewed calculations with CoSD staff; San Diego to provide backup data for TAC to review. This option is also covered in the Recycle Water Study.	Roberto Yano Manny Magaña Karyn Keese Rita Bell
Recycled Water Study Cost Allocation	*A small working group was formed to discuss options to allocate PLWTP offset project costs among the water and wastewater rate payers; Concepts will be discussed at TAC and JPA Board in near future.*	Scott Huth Roberto Yano Al Lau Karyn Keese
Board Members' Items		
Metro JPA Strategic Plan	*2/2011: committee to meet 2/28/11 to plan for retreat to be held on 5/5/11*	Augie Caires Ernie Ewin Mark Robak
Rate Case Items	San Diego is starting the process for their next five-year rate case. As part of that process, MetroTAC and the Finance Committee will be monitoring the City's proposals as we move forward.	Karyn Keese
Schedule E	MetroTAC and the Finance Committee are active and will monitor this process. Individual items related to Schedule E will come directly to the Board as they develop.	Karen Jassoy Karyn Keese
Future bonding	MetroTAC and the Finance Committee are active and will monitor this process. Individual items related to bonding efforts will come directly to the Board as they develop.	Karen Jassoy Karyn Keese
Changes in water legislation	MetroTAC and the Board should monitor and report on proposed and new legislation or changes in existing legislation that impact wastewater conveyance, treatment, and disposal, including recycled water issues	Paula de Sousa
Role of Metro JPA regarding Recycled Water	As plans for water reuse unfold and projects are identified, Metro JPA's role must be defined with respect to water reuse and impacts to the various regional sewer treatment and conveyance facilities	Scott Huth Dean Gipson
Border Region	Impacts of sewer treatment and disposal along the international border should be monitored and reported to the Board. These issues would directly affect the South Bay plants on both sides of the border.	

MetroTAC Items	Description	Subcommittee Member(s)
IROC Performance Audits	Work with IROC to identify areas to be audited; participate in audit process. 8/2010: provide the top 5 areas to audit by September IROC meeting	Augie Caires

Completed Items	Description	Subcommittee Member(s)
Debt Reserve and Operating Reserve Discussion	In March 2010, the JPA approved recommendations developed by Metro JPA Finance Committee, MetroTAC, and the City of San Diego regarding how the PA's will fund the operating reserve and debt financing. MetroTAC has prepared a policy document to memorialize this agreement. **Project complete: 4/10**	Scott Huth Karyn Keese Doug Wilson
State WDRs & WDR Communications Plan	The Waste Discharge Requirements (WDRs), a statewide requirement that became effective on May 2, 2006, requires all owners of a sewer collection system to prepare a Sewer System Management Plan (SSMP). Agencies' plans have been created. We will continue to work to meet state requirements, taking the opportunity to work together to create efficiencies in producing public outreach literature and implementing public programs. **Project complete: 5/10**	Dennis Davies Patrick Lund
Ocean Maps from Scripps	Schedule a presentation on the Sea Level Rise research by either Dr. Emily Young, San Diego Foundation, or Karen Goodrich, Tijuana River National Estuarine Research Reserve **Project complete: 5/10**	Board Member Item
Secondary Waiver	The City of San Diego received approval from the Coastal Commission and now the Waiver is being processed by the EPA. The new 5 year waiver to operate the Point Loma Wastewater Treatment Plant at advanced primary went into effect August 1, 2010. **Project complete 7/10**	Scott Huth
Lateral Issues	Sewer laterals are owned by the property owners they serve, yet laterals often allow infiltration and roots to the main lines causing maintenance issues. As this is a common problem among PAs, the MetroTAC will gather statistics from national studies and develop solutions. 4/11: There has been no change to the issue. We will continue to track this item through SCAP and report back when the issue is active again.. **Efforts closed 3/11**	Tom Howard Joe Smith

AGENDA ITEM 6
Attachment

Prepared for: City of San Diego Public Utilities Department

Project Title: Recycled Water Study

Project No: 137921

Technical Memorandum No. 8

Subject: Financial Analysis of Recycled Water Project Alternatives

Date: May 3, 2011

To: Amer Barhoumi, Project Manager, City of San Diego

From: Victor Occiano, Co-Project Manager, Brown and Caldwell

Prepared by: _____

Alberto Morales, Consultant
Black & Veatch Management Consulting

Reviewed by: _____

Ann Bui, Director
Black & Veatch Management Consulting

Reviewed by: _____

James Strayer, Co-Project Manager, CA PE C56943, EXP 6/30/2011
Black & Veatch

Reviewed by: _____

Dave Cover, Senior Engineer, CA PE C57916, EXP 6/30/2012
Black & Veatch

LIST OF FIGURES

LIST OF TABLES

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1. INTRODUCTION

This Technical Memorandum (TM) was developed as part of the City of San Diego's (City) Recycled Water Study (Study). TM 8 is a summary of the financial analyses performed on the non-potable reuse and indirect potable reuse options. This section first presents an overview of the Recycled Water Study, and then describes the purpose of this TM within the context of the Study.

1.1 Study Background

The United States Environmental Protection Agency (USEPA) recently made a decision to grant the City of San Diego a waiver to its National Pollutant Discharge Elimination System Permit. The waiver allows the City to continue to operate the Point Loma Wastewater Treatment Plant (PLWTP) as a chemically-enhanced primary treatment facility for five years rather than requiring an upgrade to secondary treatment. The waiver must be renewed every five years. Members of the environmental community (San Diego Coastkeeper and Surfrider Foundation) have traditionally opposed past permit waiver issuance, advocating the conversion of the PLWTP to full secondary treatment and thereby reducing solids loading into the ocean. However, during the 2008-2010 permit waiver process and in lieu of such opposition, San Diego Coastkeeper and the San Diego Chapter of Surfrider Foundation entered into a Cooperative Agreement (Agreement) with the City to conduct a Recycled Water Study (a copy of the Agreement is included in TM 4, Appendix A). In accordance with the Agreement, both of these organizations provided their support to the USEPA's decision to grant the waiver. The City's responsibility per the Agreement is to execute the Study.

1.2 Study Purpose and Approach

The purpose of the Study is to evaluate non-potable and indirect potable reuse opportunities to meet the City and project stakeholder goals through a 2035 planning horizon. These goals vary, and are not always consistent amongst stakeholders. The study process aims to address these shared and differing goals by developing various project alternatives, developing associated costs and benefits, and facilitating informed decision making through work sessions and stakeholder update meetings. Developing the projects and the overall plan is based on two fundamental principals summarized below.

1. Projects (especially the early phase projects) must have enough technical information to determine that they appear feasible, safe, and provide a valuable local water resource. Projects must be defined to the point that comparative costs and benefits can be developed.
2. The plan must address the PLWTP benefits associated with the environmental community's goal of reducing flows treated at the PLWTP by maximizing the use of recycled water, reducing solids loading into the ocean , and meeting the City and Participating Agency's (PA's) goal of managing Metropolitan Sewerage System capital and operations and maintenance (O&M) costs.

The City has one recycled water system that consists of the Northern service area and the Southern service area. Expansion of the recycled water system has the potential to offload the PLWTP. The Study will consider recycling options throughout the region.

1.2.1 Study Project Components

The Study includes a number of technical evaluations and coordination steps to identify and evaluate reuse alternatives within the City as well as areas served by the Participating Agencies. Throughout the study, regular stakeholder briefing sessions are held to present progress and to receive input and feedback on the

activities. A series of TMs are being developed (as described below) to document information and project progress. These efforts will be encapsulated into a final recycled water study report.

1.2.1.1 Technical Memorandum Overview

The Recycled Water Study will consist of eight TMs and one comprehensive report. The eight TMs and the Study Report will be forwarded to project stakeholders for review and comment. The title of each TM and a brief description are provided below.

- **TM No. 1: Non-potable Reuse Market Assessment.** Non-residential market assessment within the City of San Diego limits are examined, including irrigation customers as well as cooling towers, car washes, and laundromats. Furthermore, discussions on potential demands offered by individual PAs are included.
- **TM No. 2: Regional Non-potable Reuse Recycled Water Demand.** Non-residential market demands within the PAs of the Metropolitan Sewerage System are assessed but limited to information received from PAs on questionnaires distributed by the Study Team.
- **TM No. 3: Framework Planning.** A summary of the Framework Planning Session held to align the City and consultant team on key project issues, processes, and future steps.
- **TM No. 4: Wastewater Supply and Treatment.** Discussion of projected recycled water supplies within the Metropolitan service area and examination of various treatment technologies.
- **TM No. 5: Recycled Water Demand and Delivery.** Evaluation of the projected recycled water demand and the various methods of delivery.
- **TM No. 6: Coarse Screening.** A summary of the Coarse Screening Session where project components will be narrowed down.
- **TM No. 7: Fine Screening.** A summary of the Fine Screening Session where final solutions and steps needed to move ahead will be discussed.
- **TM No. 8: Financial Analysis of Recycled Water Project Alternatives.** An evaluation of the proposed project components based on cost.

1.2.2 Study Stakeholders

As stated earlier, the stakeholders for this project are comprised of the San Diego Coastkeeper, the San Diego Chapter of the Surfrider Foundation, and the PAs of the Metro Wastewater Joint Power Authority (Metro JPA), who have capacity rights in the Metropolitan Sewerage System pursuant to the provisions of the 1998 *Regional Wastewater Disposal Agreement Between the City of San Diego and the Participating Agencies in the Metropolitan Sewerage System*. San Diego County Water Authority (SDCWA), the agency that has primary responsibility for water supply planning efforts, and Independent Rates Oversight Committee are also stakeholders in the Study. SDCWA representative provides regular updates on SDCWA activities related to the Study. These updates include data from neighboring agencies, issues and guidelines related to brine management, and policies related to Constituents of Emerging Concern.

1.3 The Purpose of this TM

The Study will produce a stand-alone Final Study Report (Report) and a separate, compiled set of final TMs. The TMs will be used as key components of the Study to document tasks identified in the scope of work, to be used by the City for communication to stakeholders and others, and to provide detailed technical backup for the Report. The purpose of this TM is to present the financial analysis conducted on the selected non-potable reuse and indirect potable reuse options and help decision-makers weigh costs in the selection of different reuse approaches.

2. THEMES

2.1 Development of Themes

In TM 5 Recycled Water Demand and Delivery, two themes were developed to meet the project goals. Theme A and Theme B each combined with C2 targeted to offset a minimum of 101 mgd of PLWTP flow. The themes subdivided into alternatives referred to as A1, A2, B1, B2, and B3. The Theme alternatives relate to whether the Advance Water Purification Facility (AWPF) is located separately from the Pump Station 2 site (A1, B1) or whether it is co-located at the Pump Station 2 site (A2, B2, B3), and whether an additional facility could be constructed at Mission Gorge (B3). The following elements are common to all themes:

- North City and South Bay baseline non-potable demands
- North City Water Purification Demonstration Project
- An initial North City IPR project
- South Bay C2 Option included including a diversion at the Spring Valley 8 Metro Connection

2.1.1 Theme A Overview

The "A" themes were developed to maximize the secondary treatment potential at the North City Water Reclamation Plant (WRP). The North City WRP was master planned to have an ultimate secondary capacity of 45 mgd. Reaching this potential requires pumping additional wastewater to the plant. Based on the Coarse Screening Session, the Morena Pump Station was identified as a means to direct additional wastewater to the North City WRP. To reach the 101 mgd offset threshold, an additional reclamation facility is needed. Harbor Drive was identified for this purpose since it is located at a point where a majority of the region's wastewater collects prior to pumping to the PLWTP. Themes A1 and A2 differ only in where the AWPF is located. Theme A1 assumes that the AWPF is located in the stadium area. Theme A2 assumes that the AWPF is co-located with the tertiary facility at the Harbor Drive site. Themes A1 and A2 are shown on Figures 2-1 and 2-2, and have the following characteristics:

- Maximization of the secondary treatment potential at the North City WRP to a capacity of 45 mgd.
- Implementation of Morena Pump Station and forcemain to divert additional wastewater to the North City WRP.
- Implementation of a second AWPF near the airport, alongside Harbor Drive, or potentially split a tertiary plant and AWPF between the airport and Mission Valley (near Camino Del Rio). Pumping of advanced treated recycled water from the second AWPF to the San Vicente Reservoir.

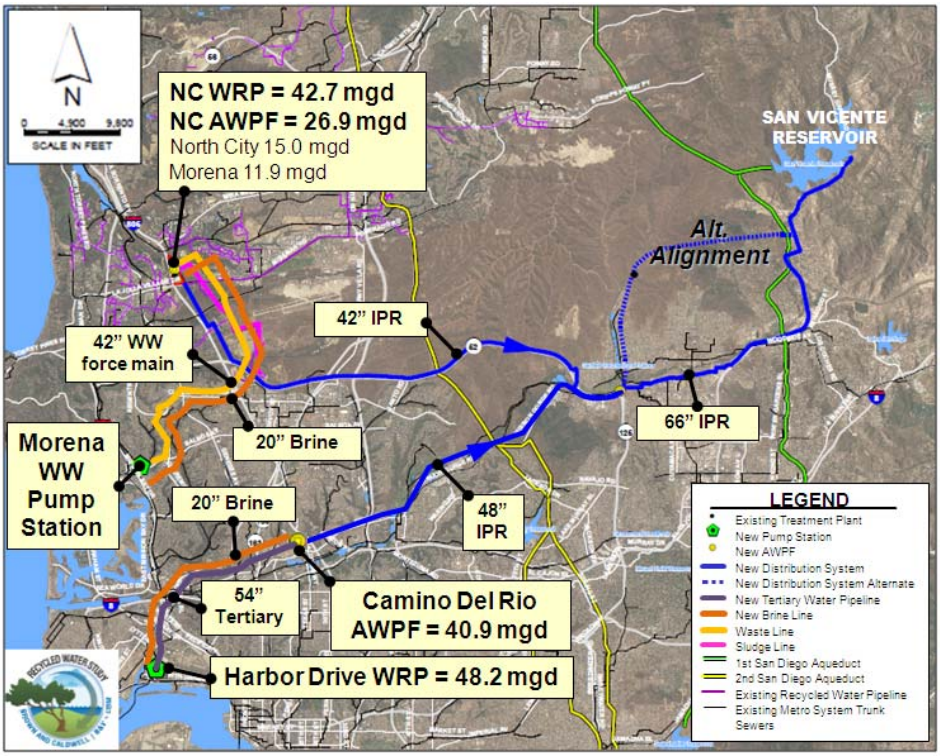


Figure 2-1. Theme A1

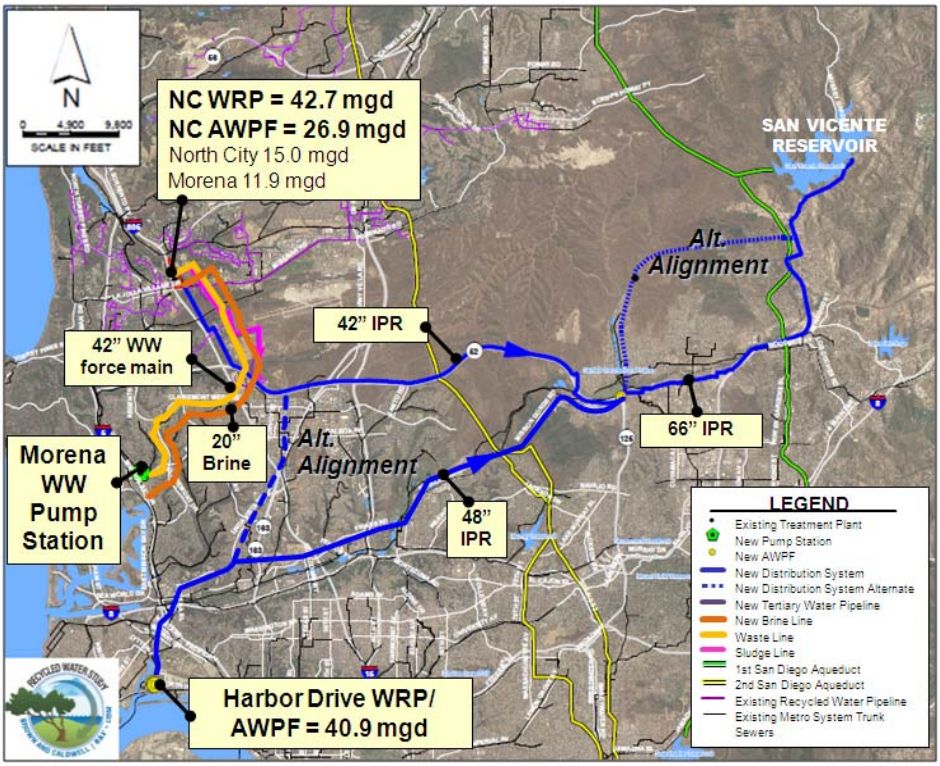


Figure 2-2. Theme A2

2.1.2 Theme B Overview

The "B" themes were developed to maximize the existing average treatment capacity of 30 mgd at the North City Water Reclamation Plant. The current service area is expected to provide a sufficient amount of flow to utilize the existing plant capacity. To reach the 101 mgd offset threshold, an additional reclamation facility is needed. The area near Harbor Drive was again identified for this purpose. The plant is larger since there is no diversion at Morena. In the same manner as described for the "A" Themes, Themes B1 and B2 differ only in where the AWPF is located. Theme B3 is a subset of B2, and is discussed later in this section. Theme B1 and B2 are shown on Figures 2-3 and 2-4, and have the following characteristics:

- Maximization of the existing secondary treatment at North City WRP to a capacity of 30 mgd.
- Implementation of a second AWPF near the airport, alongside Harbor Drive, or potentially split a tertiary plant and AWPF between the airport and Mission Valley (near stadium). Pumping of advanced treated recycled water from the second AWPF site to the San Vicente Reservoir.

During the Fine Screening Session a modified B2 alternative was discussed. This alternative is identical to Theme B2, except that it includes an additional 9.2 mgd WRP and a 6.8 mgd AWPF. The plant would be located in the Mission Gorge area or adjacent to the existing Padre Dam Municipal Water District Water Reclamation Facility. The plant would treat local wastewater flows available at the East Mission Gorge Wastewater Pump Station. The IPR water produced would be combined with flows from North City and Harbor Drive, and delivered to the San Vicente Reservoir. The inclusion of the Mission Gorge plant adds an additional plant, but slightly reduces the Harbor Drive WRP/AWPF plant compared to Theme B2. The Mission Gorge alternative is referred to as Theme B3, and is shown in Figure 2-5.

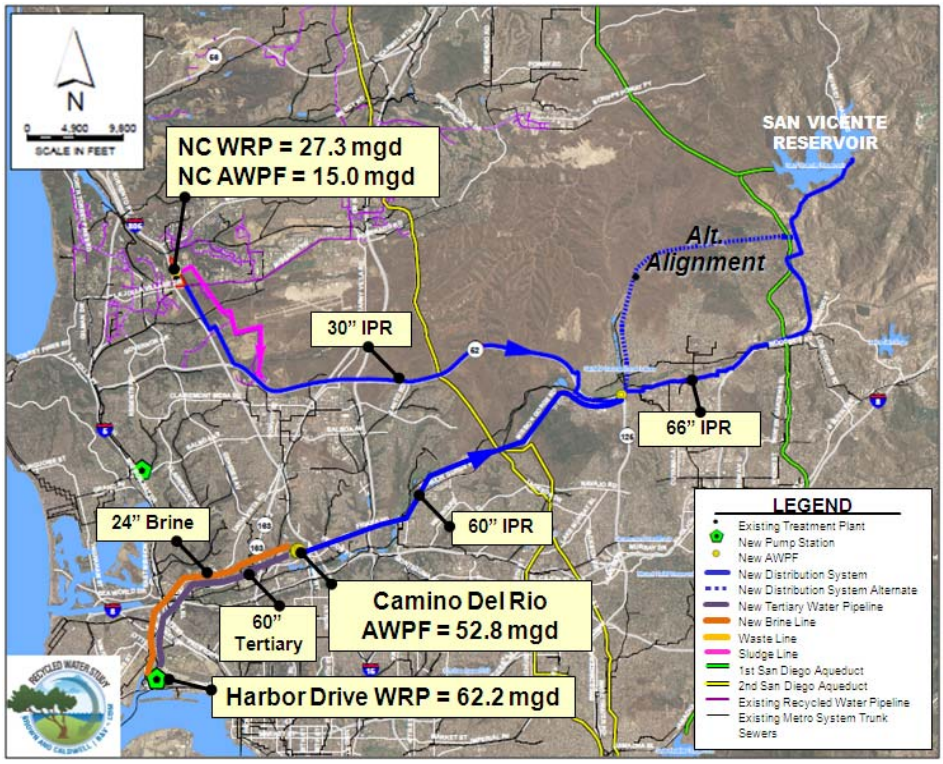


Figure 2-3. Theme B1

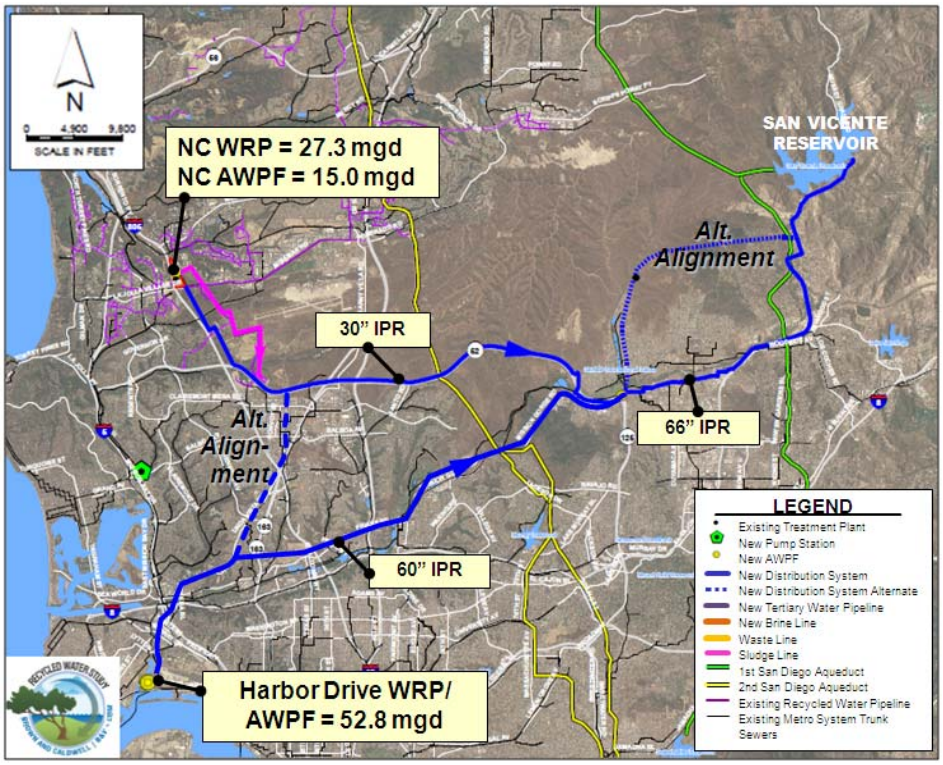


Figure 2-4. Theme B2

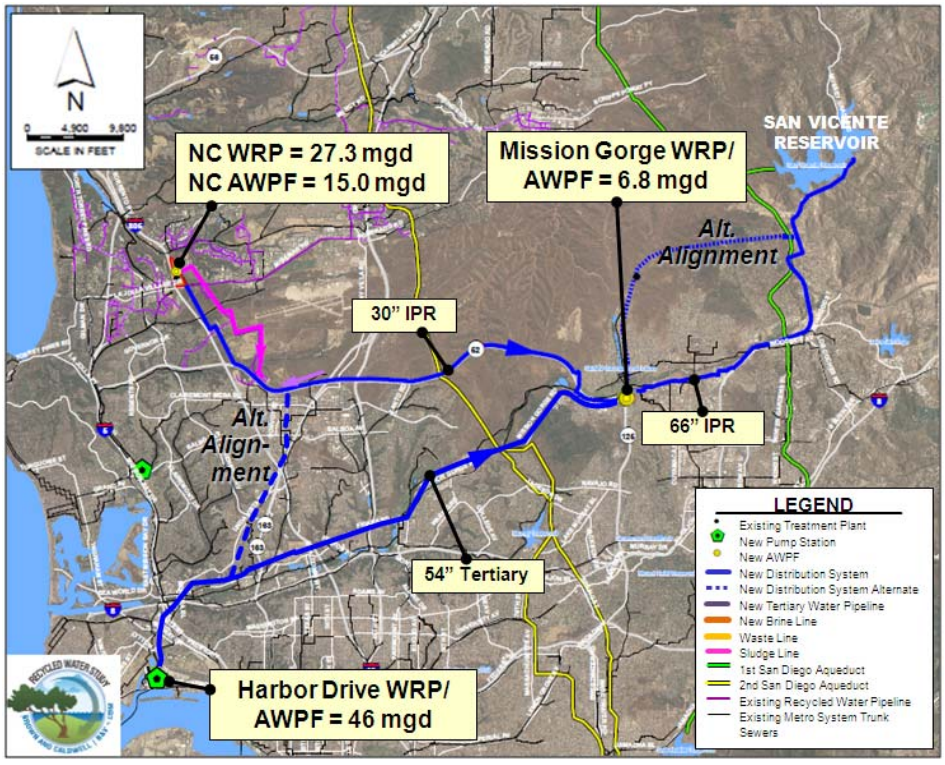


Figure 2-5. Theme B3

2.1.3 South Bay Alternative C-2 Overview (Common to all Themes)

The South Bay "C" Alternative was discussed in the Coarse Screening Session and was developed to divert wastewater flow along the Metro inceptor going to the PLWTP and redirect it to the South Bay Wastewater Reclamation Plant (SBWRP). The diversion is intended to further help serve future non-potable reuse and indirect potable reuse opportunities at Otay Lakes. With the current configuration and outfall capacity at the SBWRP, treated wastewater can be diverted to help offset the 101 mgd threshold. The area adjacent to the SBWTP was identified to have sufficient land to meet the needs of a new AWPF. Theme C2 is shown in Figure 2-6 and displays the potential diversion points and flows.

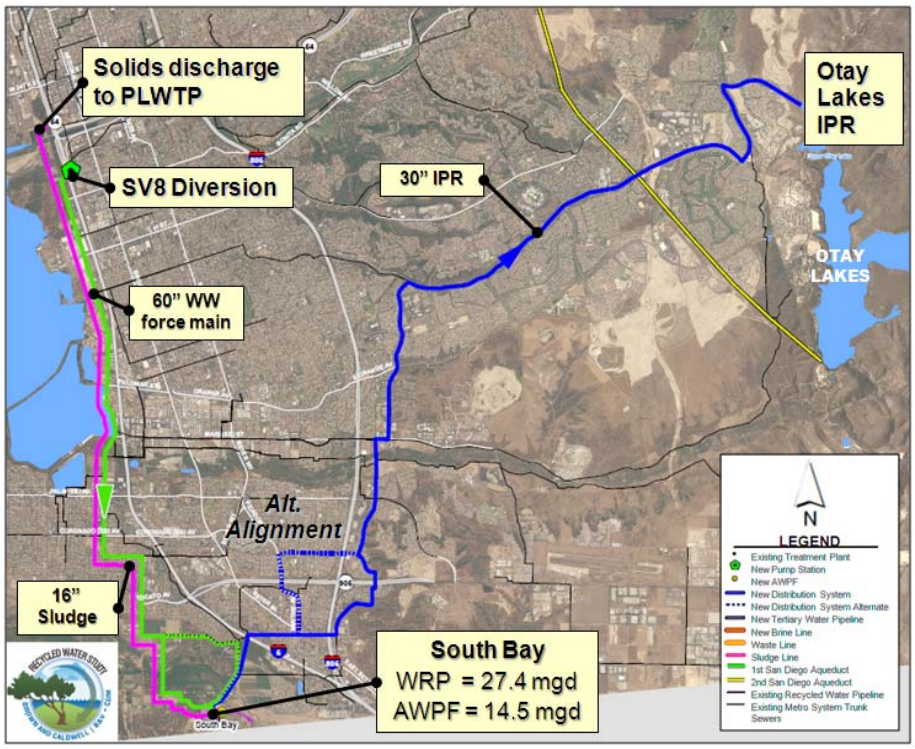


Figure 2-6. South Bay Alternative C2 (common to all themes)

2.2 Sequencing and Timing

Figure 2-7 includes the concept implementation plan originally developed as part of TM 5. The implementation plan outlines the expected sequencing of project elements common to all alternatives, and projects specific to each theme alternative. This concept plan formed the basis for the project implementation schedule used in the financial model.

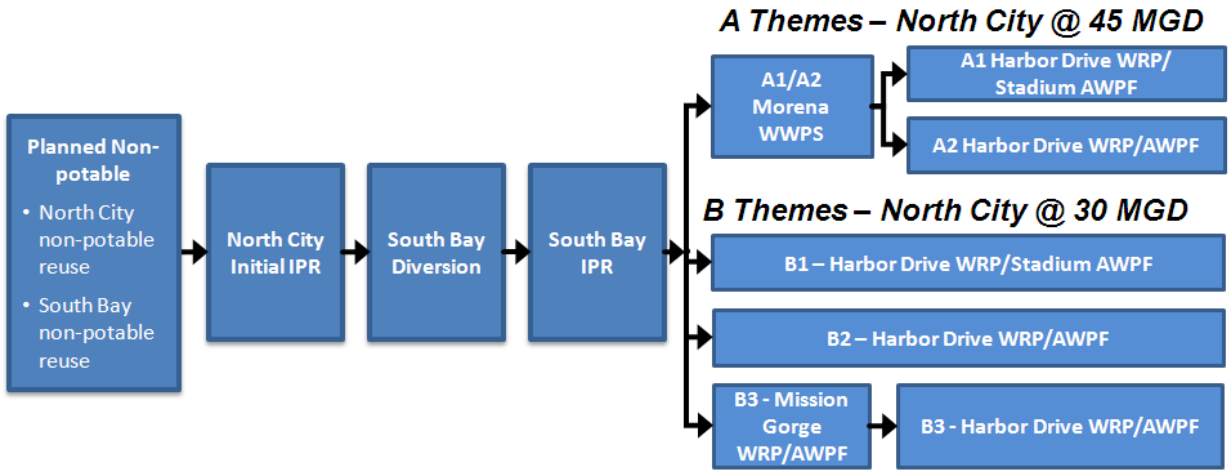


Figure 2-7. Concept Implementation Plan

The concept project implementation plan sequences projects to achieve the study objectives. Sequencing shown is based on anticipated start dates for project operation (i.e., post construction).

A more detailed implementation schedule was developed for the financial modeling effort based on the concept implementation plan shown above. The implementation schedule, shown on Figure 2-8, was presented to the project stakeholder group during Status Update Meeting No. 9 held on March 29, 2011. In the timing and sequencing of the themes, there were two distinct elements: 1) Planning, Permitting, and Design; and 2) Construction. It is anticipated that upon completion of the construction element, the facilities will begin to produce non-potable reuse and/or indirect potable reuse water. In some cases, particularly for North City, full reuse output will not occur until the basin builds out to the 2035 projected flows.

2.3 Reuse Water Produced

The timing, amount and allocation of non-potable and indirect potable reuse produced in the plan affects the financial model. Key considerations include:

- Reuse water production is assumed to commence at the end of each treatment plant's construction period. While it is anticipated that the full production may ramp up, the financial analysis uses the full allocation upon completion of construction.
- Only "newly created" non-potable and indirect potable reuse totals are included in the financial model. This approach is appropriate from an accounting perspective since only new water created should be credited to the new facilities. For example, non-potable water served by the existing North City or South Bay infrastructure is not included in the model.

Non-potable and indirect potable reuse water production amounts are constant regardless of the selected themes. The differentiation between the themes lies in when the water is produced and where the water originates from. The following summarizes the non-potable and indirect potable quantities in the model.

Table 2-1. Recycled Water Produced

Water Type	MGD	Acre-Feet per Year
Indirect Potable Reuse	82.8	92,800
Non-Potable Reuse (OWD 2026 – 2040)	3.0	3,400

Note: IPR totals do not include the 5 mgd HWD/PDMWD El Monte Valley Project.

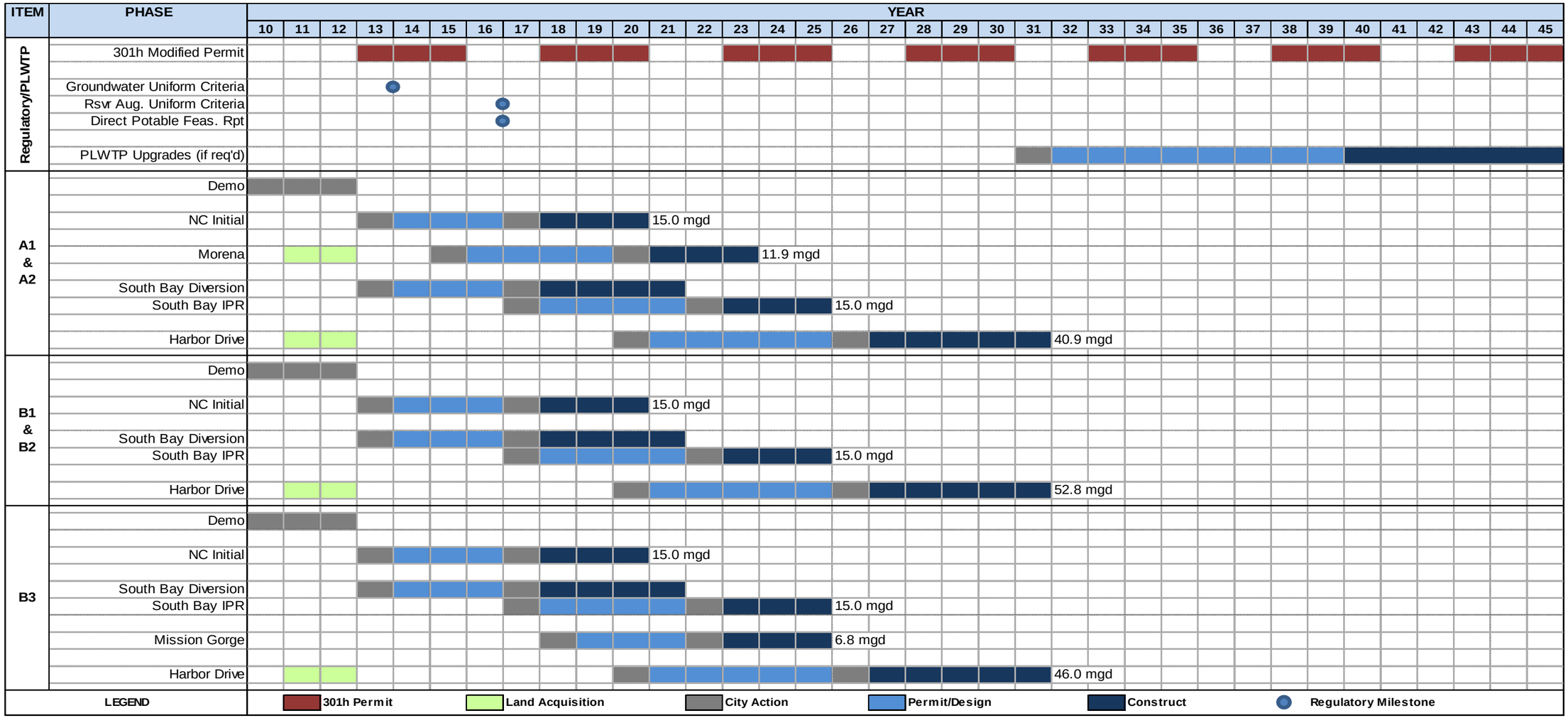


Figure 2-8. Implementation Schedule

The implementation schedule was used to phase projects within the financial model.

3. METHODOLOGY

In performing the financial analysis and deriving the unit costs, Net Present Value (NPV) was used as the financial methodology to evaluate the themes. This section provides a background on the methodology and the key parameters.

3.1 Net Present Value

The use of a NPV analysis is commonly used in capital budgeting to determine the profitability of an investment or project. NPV represents the difference between the present value of cash inflows and the present value of cash outflows. For projects that don't have annual cash inflows, the NPV are simply the present value of future cash outflows plus the initial investment. To determine the present values, the cash flows are discounted by using a discount rate over the life of the project. By discounting the cash flows, the time value of money is incorporated. The basic equation in an NPV analysis is:

$$\mathrm{NPV} = \sum_{k=0}^{K} \frac{\mathrm{CF_k}}{(1+\mathrm{r})^{\mathrm{k}}} - \mathrm{C_0}$$

K = time frame of project (years)
CF_k = net cash flow at time k ($)
C_0 = initial investment at time 0 ($)
r = discount rate or cost of capital (%)

In general terms, based on results of the NPV analysis, the following guidelines can be followed. Projects that only have costs components can still use NPV and should be compared to each other rather than to the table below.

If...	It means...	Then...
NPV > 0	the investment would add value to the agency	the project may be accepted
NPV < 0	the investment would subtract value from the agency	the project should be rejected
NPV = 0	the investment would neither gain nor lose value for the agency	We should be indifferent in the decision whether to accept or reject the project. This project adds no monetary value. Decision should be based on other criteria, e.g. strategic positioning or other factors not explicitly included in the calculation.

Source: Investopedia, Net Present Value Rule http://www.investopedia.com

3.2 Parameters

Incorporated in the NPV equation are two main parameters: 1) discount rate; and 2) escalation. These parameters are further discussed in this section.

3.2.1 Discount Rate

The discount rate has several meaning, but in this context it represents the cost of capital. To determine the discount rate, the Weighted Cost of Capital (WACC) calculation can be used to arrive at the value. The following is the WACC.

- **WACC.** The WACC is used in financial analysis and represents a calculation of a firm's cost of capital in which each category of capital is proportionately weighted. The capital sources include stock, bonds and any other long-term debt. The equation is:

$$WACC = \frac{E}{V} r_e + \frac{D}{V} r_d (1 - T_c)$$

r_e = cost of equity (%)
r_d = cost of debt (%)
E = market value of the firm's equity ($)
D = market value of the firm's debt ($)
V = E + D ($)
E/V = % of financing that is equity
D/V = % of financing that is debt
T_c = corporate tax rate (%)

Based on the City's financials, the cost of capital was determined to be 5.5 percent.

3.2.2 Escalation Factors

To incorporate the concept of time value of money which states that money at the present time is worth more now than in the future due to its potential earning capacity, the need to incorporate escalation is necessary. In NPV, the net cash flows incorporate escalation factors that represent inflation or cost escalations. The use of escalation factors are important as the analysis as prices of goods and services increase over time and in order to maintain the same worth, they need to be escalated. Based on discussions with the City, we incorporated the following escalation factors into the analysis.

Cost Description	Escalation Factor
Chemicals – O&M	4.0%
Energy – O&M	4.0%
Labor – O&M	4.0%
Other – O&M	4.0%
Capital Costs	3.0%
PLWTP – O&M	4.0%

It is expected that the escalation factors will not remain constant for the life of the analysis, but given the high level of this analysis, the values were kept constant.

4. FINANCIAL ANALYSIS

The goal of this section is to present the financial analysis conducted on the selected non-potable reuse and indirect potable reuse options and help decision-makers weigh costs in the selection of different reuse approaches.

4.1 Costs, Offsets, and Credits

The development of the unit costs relies on capital and operation and maintenance costs developed in the design of the themes. These costs were presented at the Fine Screening Meeting on October 19, 2010 and further refined thereafter. The detailed costs are described in TM 7. In addition, there are additional costs and cost offsets that are incorporated in the financial analysis to obtain refined unit costs.

4.1.1 Capital

The capital costs associated with the themes include upgrades to existing facilities and the construction of new facilities. It was determined that the plan, permit and design phase constitutes roughly 30 percent of the total capital costs while construction constitutes the remaining 70 percent. In addition, the to the hard capital costs were soft costs that typically associated with additional expenses such as architectural, engineering, financing, and legal fees, and other pre- and post-construction expenses. The following percentages were applied to the hard costs of each project subtotal.

- 40 percent Contingency
- 20 percent Engineering, Legal and Administrative
- 20 percent Environmental
- 10 percent Construction Management
- 4 percent Land Acquisition
- $1 million for Interagency coordination and agreements (B3 only)

4.1.2 Operation and Maintenance

The O&M costs associated with the themes include additional labor, chemical, energy, and materials to operate the upgraded and new facilities. It is assumed that the new facilities will benefit from economies of scale where applicable, but will none the less additional O&M expenses to the City. The following percentages were applied to arrive at the O&M costs.

- O&M is 1 percent of pipeline capital cost
- O&M is 1.5 percent of pipeline capital cost (steel and concrete)
- O&M is 2.5 percent of pump station capital cost
- An electricity cost of $0.12/kWh was used to develop O&M costs.

4.1.3 Capital Financing Costs

The capital financing costs associated with the themes originates from the need to finance the capital project costs with borrowed funds. Capital financing consists of loans or bonds obtained from public or private financial institutions that are paid back based with interest. The interest component of the borrowed funds adds costs to the project, but it also provides the City with immediate access to cash which can be paid back over a set time frame. The following are the financing terms used on borrowed funds.

- Interest rate is 5.5 percent on revenue bonds and 2.5 percent on SRF loans
- Repayment period is 30 years on revenue bonds and 20 years on SRF loans
- Issuance costs is 2.5 percent on revenue bonds and 1.0 percent on SRF loans
- Debt coverage is 1.25 on revenue bonds and 1.2 on SRF loans
- Maximum loan under SRF is set at $50 million per year
- Revenue bonds require a reserve amount equal to one payment to be set aside at issuance

4.1.4 Revenue Offset

To help offset the costs associated with the themes, the City has the option to finance a portion of the capital costs through revenue derived from rates and connection fees. This is common practice among municipal utilities. Typically utilities allocate a percentage of revenue derived from rates and fees while others fund projects on as needed basis. It is the practice of the City to finance 20 percent of all capital projects with rate and fee revenues. Revenue derived from rates are the main source of funds for day-to-day O&M costs and debt coverage requirements, while fees are associated with the capital projects.

4.1.5 Grants Offset

To help offset the costs associated with the themes, the City can use grants to help finance a portion of the capital projects. Grants usually consist of funds that are obtained from state or federal agencies and don't need to be paid back. This is the preferred option among municipal utilities. The grants typically have stipulations regarding the type of projects that can be included and how the money is managed; therefore, additional administrative costs also come with the funds. Typically, grant amounts vary based on the project type. Based on similar projects by a neighboring utility in Orange County, the analysis assumes that 25 percent of the total capital costs will come from grants.

4.1.6 Local Resource Program Credit

To help offset the costs associated with new water projects, the City has participated in the Local Resource Program (LRP) offered by Metropolitan Water District of Southern California (MWD) and the San Diego County Water Authority (SDCWA). The LRP was developed to promote the development of water recycling and groundwater recovery projects in order to replace an existing demand or prevent a new demand on imported water supplies. Since the City relies indirectly on imported water from MWD/SDCWA, it may be eligible to receive a credit of $0 to $450 per acre-foot produced. The program is dependent on available funding and agency approvals, and usually comes with a fixed term. For this project, a 25-year term and a funding level of $250 per acre-foot was assumed. One caveat is that when the cost to produce the alternative water supply source becomes cheaper than the imported water cost, the LRP credit is discontinued.

4.2 Avoided Costs

In further defining the unit costs, there are avoided costs that can be incorporated to demonstrate the benefit of implementing the themes. Avoided costs are costs that don't represent an actual cash injection or cash offset on a yearly basis, but rather represent a cost that was avoided as a result of implementing the selected theme. The detailed avoided costs are described in TM 7.

4.2.1 PLWTP Avoided Costs

The primary avoided cost associated with the themes is the PLWTP avoided costs. If the City and PAs do not pursue a theme presented herein, then it is anticipated that there would be capital and O&M costs associated

with upgrading the PLWTP to meet secondary treatment standards at its current full capacity as part of the regulatory permit process. Table 4-1 summarizes the cost to upgrade the PLWTP to secondary treatment standards at different capacities. Developing recycled water projects (as outlined in this study) offload the required PLWTP upgrades - the higher the offload, the greater the savings. In addition, there are two key thresholds where offloading allows a significantly less costly treatment approach at the PLWTP. The secondary treatment processes are shown on the left of the table, and are based on the capacity needed at the PLWTP. The key savings "jumps" are highlighted on the right of the table. Based on the analysis presented in TM 5 and TM 7, it was determined that the City and PAs would see a notable jump in cost benefits by offloading 101 mgd at the PLWTP.

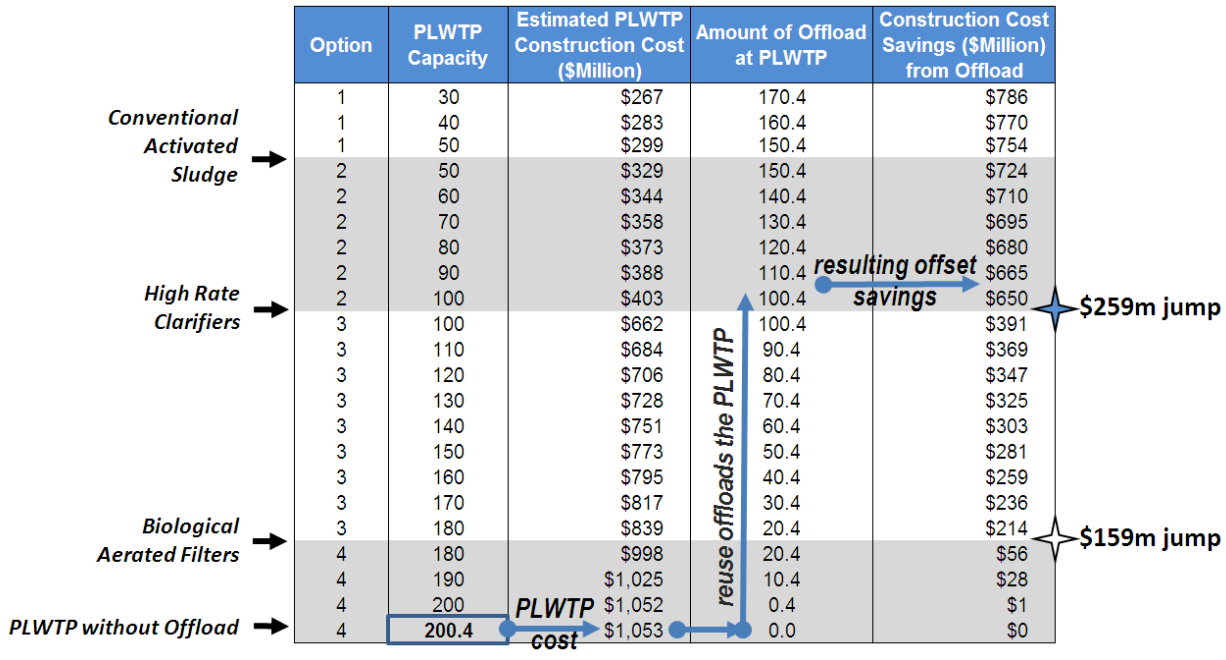
The 101 mgd PLWTP offload target formed the basis of the plans that were vetted in the Fine Screening Session. The total projected offload for future projects is estimated at approximately 104 mgd. This includes approximately 68 mgd for new IPR projects at San Vicente, 5 mgd for the El Monte Valley IPR project, and 31 mgd for the Spring Valley 8 Diversion (SV8) to the South Bay WRP. The 104 mgd offload value was used in Table 4-1 to identify the total offload savings at the PLWTP. However, only a portion of this avoided cost can be included in the financial model. The total was determined based on the following:

$$Offload\ Ratio = \frac{San\ Vicenete\ IPR + SV8\ Diversion}{San\ Vicenet\ IPR + SV8\ Diversion + El\ Monte\ Valley\ IPR} = \frac{99\ mgd}{104\ mgd}$$

The resulting PLWTP avoided secondary cost savings attributable to this study is approximately $624 million for design, permitting and construction, and approximately $15 million per year for avoided O&M costs. The PLWTP upgrade costs shown in Table 4-1 were developed using an approach similar to previous estimates, which included the total capital costs and soft costs (e.g. admin, engineering). They do not include financing costs. As compared to previous estimates, the PLWTP upgrade costs were refined in this study based on the new sewer unit generation rates and wastewater load projections provided by the City.

Table 4-1. PLWTP Offset Cost Savings

Option	PLWTP Capacity	Estimated PLWTP Construction Cost ($Million)	Amount of Offload at PLWTP	Construction Cost Savings ($Million) from Offload
1	30	$267	170.4	$786
1	40	$283	160.4	$770
1	50	$299	150.4	$754
2	50	$329	150.4	$724
2	60	$344	140.4	$710
2	70	$358	130.4	$695
2	80	$373	120.4	$680
2	90	$388	110.4	$665
2	100	$403	100.4	$650
3	100	$662	100.4	$391
3	110	$684	90.4	$369
3	120	$706	80.4	$347
3	130	$728	70.4	$325
3	140	$751	60.4	$303
3	150	$773	50.4	$281
3	160	$795	40.4	$259
3	170	$817	30.4	$236
3	180	$839	20.4	$214
4	180	$998	20.4	$56
4	190	$1,025	10.4	$28
4	200	$1,052	0.4	$1
4	200.4	$1,053	0.0	$0



The avoided cost values shown in Table 4-1 reflect converting PLWTP to secondary treatment at its ultimate ADWF capacity of 200 mgd, as described in other Technical Memoranda for this study. However, the Wastewater Master Plan includes other scenarios that should be considered since additional avoided cost benefits may be recognized that would benefit the overall reuse program costs. One key challenge in developing comparable alternatives in the Wastewater Master Plan is that the Wastewater Master Plan options were based on maintaining CEPT status while the Recycled Water Study base assumption is that secondary treatment would be required (the Recycled Water Study also included CEPT considerations as described below, but this is not considered the baseline). To reconcile this difference, the Wastewater Master Plan scenarios were converted to secondary treatment scenarios. The scenarios were then considered in the sensitivity analysis of this Technical Memorandum.

4.2.2 Salt Avoided Costs

Similar to the 2005 Water Reuse Study, a salt credit was discussed. The Salt Credit basis is from the 1999 Salinity Management Study (Metropolitan Water District of Southern California (MWD), U.S. Bureau of Reclamation). The basis of the credit is that there are financial benefits to the community by reducing salt in the water and wastewater systems. The San Vicente and Otay Lakes Reservoirs could see dramatic reductions in salt content with the proposed IPR projects. Besides the local homeowner benefits, treatment at the downstream AWPFs would also benefit from
reduced salinity.

The 1999 Salinity Management Study provides an estimate of the economic benefits that the MWD may realize through the reduction of source water salinity levels. Simply put high salt levels in the influent streams carried by water distribution systems and entering water production facilities increases corrosion. Starting from the source of supply and running through end customer use, the analysis determined that approximately $95 million of indirect and direct cost savings (1998 dollars) for a 100 mg/l total dissolved solids (TDS) reduction. In the analysis conducted herein, we have not included benefits accrued by end user customers (homeowners, agriculture, commercial, industrial) because of reduced TDS levels. Although these benefits are real, they are not benefits that the City realizes and as such, the inclusion of third-party indirect avoided costs are excluded from the analysis.

According to the 1999 Salinity Management Report, Technical Appendix 5 (Technical Appendix 5), the impact of increased salinity on water and wastewater facilities is controllable. Since corrosion in wastewater facilities is primarily due to sulfides not TDS levels, Technical Appendix 5 does not address the impact of TDS levels in wastewater facilities. Section 6 of Technical Appendix 5 calculates expected life of water facilities (production and distribution) as a function of increasing salinity levels as well as the capital value of these facilities. Table 4-3 presents the findings from Technical Appendix 5 regarding the effect of salinity on the useful lives of water production and distribution facilities.

Table 4-3. Useful Life of Water Production and Water Distribution System

Salinity TDS (mg/l)	Water Production Facilities (yrs)	Water Distribution Facilities (yrs)
0	30.83	111.00
100	30.50	105.70
200	30.17	101.76
300	29.87	98.17
400	29.51	94.88
500	29.18	91.88
600	28.85	89.14
700	28.52	86.63
800	28.19	84.34
900	27.86	82.24
1,000	27.53	80.33
1,100	27.20	78.58
1,200	26.87	76.98

Source: 1999 MWD of Salinity Management Study

Examining only the supply-side of the situation, that is, excluding the distribution system, the increase in expected life is determined to be 1.32 years.

$$\text{Water Production Facility Expected Life} = 30.83 - (0.0033 * TDS)$$

TDS = salinity level in mg/l

The water production facilities include source of supply facilities, treatment plants, wells, pumps, and transmission facilities.

Table 6-2 of Technical Appendix 5 summarizes the estimated per capita replacement costs (in 1996 dollars) of production and distribution facilities for each of the study areas. Excluding the cost of MWD facilities and applying an ENR escalation factor, the estimated per capita replacement cost (in 2010 dollars) of water production facilities in the San Diego subarea is $990/capita. According to the 2010 US Census, the City of San Diego has a population of 1,307,402. Applying this value, plus the projected total IPR/NPR volume, we arrive at an estimated salt credit benefit of $259/AF.

Black & Veatch recognizes since the development of the data in Table 6-2 of Technical Appendix 5, significant water and wastewater facility development has taken place in the San Diego region. Consequently, the analyses conducted herein use a salt credit based on the current costs invested into the City's water production facilities. Data provided by the City indicates that as of March 31, 2011, the value of water production facilities is approximately $233.8 billion. Applying the increase in expected life (1.32 years) and then dividing by the produced water provides an estimated salt credit benefit of $105/AF.

4.2.3 CEPT Avoided Costs

Implementing the Recycled Water Study will reduce the PLWTP capacity to approximately 100 mgd and reduce mass emissions from the outfall. After these improvements are complete, the remaining PLWTP capacity may not require secondary treatment upgrades based on meeting mass emission standards. While this study does not aim to determine whether or not secondary upgrades are needed, it does attempt to answer what the additional financial offset savings would be if the remaining capacity at the PLWTP was allowed to remain as a Chemically Enhanced Primary Treatment (CEPT) plant. The financial model includes a separate calculation section specific to this potential cost savings.

4.3 Net Present Value

In conducting the NPV on the themes, the inputs described in Section 3 and 4 were incorporated. For reference, Table 4-4 represents the entire inputs.

Table 4-4. Assumptions

General			***Beginning Balance***	
Interest Earnings	2.50%		Operating Fund	0
Discount Rate	5.50%		Capital Fund*	0
NPV - Yrs	50		Reserve Fund	0
			Reserve Req (of O&M) - Days	90
Escalation Factors				
O&M Other	4.00%		***Capital Funding****	
O&M Chemical	4.00%		Pay Go	20.00%
O&M Energy	4.00%		Grants	20.00%
O&M Labor	4.00%		SRF Loan [1]	25.00%
SDCWA (Beyond 2020)	3.00%		Grants - PLWTP	0.00%
Salt	3.00%		[1] Max amount is $50 million per year	
PLWTP O&M	4.00%			
Capital - ENR	3.00%		***Replacement Costs***	
			Asset Replacement - %	1.00%
Debt*			PLWTP and CEPT Asset Repl. - %	0.00%
Revenue Bond				
Interest Rate	5.50%		***Credits***	
Term of Bond - Yrs	30		LRP - $/AF	250
Issue Costs	2.50%		LRP Duration - Yrs	25
Reserve Fund	Yes			
Debt Coverage Ratio	1.25		***Avoided Cost***	
Payment Factor	6.88%		Salt - $/AF	105
			PLWTP Capital Costs - $*	623,799,600
SRF Loan			PLWTP O&M Costs - $/yr	15,637,800
Interest Rate	2.50%		CEPT Capital Costs - $*	397,826,900
Term of Bond - Yrs	20		CEPT O&M Costs - $/yr	15,258,300
SRF Loan Cap - $/Yrs	50,000,000			
Issue Costs	1.00%		***SDCWA (FY2011)***	
Debt Coverage Ratio	1.20		Untreated M&I Supply Rate - $/AF [2]	904
Payment Factor	6.41%		[2] Includes Fixed and Variable Charges	

4.3.1 NPVs for the Themes

In accordance with the key inputs shown in Table 4-4, the NPV's for the themes are shown in Table 4-5. The table identifies the benefit and costs items that makeup the overall NPV. The values represented are positive for simplicity. In a traditional NPV, these values would be negative since it is based on the costs only. The analysis concentrated on a 50-year time horizon which extended about 5-years beyond the last debt financing repayment period.

Table 4-5. Theme NPV Results

Element	Theme A1	Theme A2	Theme B1	Theme B2	Theme B3
Operating Fund					
Revenue	37,697,711	37,904,174	34,904,357	35,046,236	37,858,235
O&M	2,292,235,117	2,288,073,707	2,124,066,166	2,111,556,069	2,311,765,765
Debt	1,313,620,896	1,319,798,192	1,166,007,563	1,170,241,868	1,274,115,313
Total PV Cost	$3,568,158,303	$3,569,967,725	$3,255,169,372	$3,246,751,702	$3,548,022,843
Total Cost, Annual Payments	$210,740,604	$210,847,471	$192,255,023	$191,757,864	$209,551,374
Capital Fund					
Pay Go Financing	393,961,221	395,745,266	350,214,408	351,440,521	381,536,942
Total PV Cost	$393,961,221	$395,745,266	$350,214,408	$351,440,521	$381,536,942
Total Cost, Annual Payments	$23,267,921	$23,373,289	$20,684,171	$20,756,587	$22,534,125
Offsets					
LRP Credit	134,380,500	134,380,500	122,726,303	122,726,303	125,871,726
Total PV Cost PV	$134,380,500	$134,380,500	$122,726,303	$122,726,303	$125,871,726
Total Cost, Annual Payments	7,936,707	7,936,707	7,248,393	7,248,393	7,434,167
Salt Credit	210,059,005	210,059,005	146,015,256	146,015,256	149,008,984
PLWTP O&M Avoided Costs	129,323,191	129,323,191	129,323,191	129,323,191	129,323,191
PLWTP PayGo/Debt Avoided Costs	202,407,526	177,013,162	205,445,257	205,793,453	197,146,343
Total PV Cost PV	$541,789,723	$516,395,359	$480,783,704	$481,131,900	$475,478,519
Total Cost, Annual Payments	31,998,887	30,499,059	28,395,783	28,416,348	28,082,451
CEPT O&M Avoided Costs	126,184,748	126,184,748	126,184,748	126,184,748	126,184,748
CEPT PayGo/Debt Avoided Costs	193,027,881	193,027,881	193,027,881	193,027,881	193,027,881
Total PV Cost PV	$319,212,629	$319,212,629	$319,212,629	$319,212,629	$319,212,629
Total Cost, Annual Payments	$18,853,161	$18,853,161	$18,853,161	$18,853,161	$18,853,161
Total					
Total NPV	$3,962,119,523	$3,965,712,991	$3,605,383,780	$3,598,192,223	$3,929,559,785
Total Cost, Annual Payments	$234,008,525	$234,220,760	$212,939,194	$212,514,450	$232,085,499

In interpreting Table 4-5, there are three distinct elements that build upon each other to arrive at a NPV for the specific Theme.

- **Operating Fund.** The operating fund represents a traditional operating fund used by utilities to characterized day-to-day operations. Items included are revenue, O&M and debt. Revenue consists of interest on bond reserve and the release of the debt reserve. O&M represents the O&M expenses associated with the new water facilities. Debt represents the debt service on the revenue bond and/or SRF loans.
- **Capital Fund.** The capital fund represents a traditional capital fund used by utilities to characterized long-term capital needs. The sole item included is pay-go financing from funds on hand.
- **Offsets.** The offsets represents the credits and/or avoided costs that can be obtained to offset the operating or capital costs. Items included are the LRP credit, the Salt credit, PLWTP and CEPT avoided costs.

Based on the three elements, the NPV for each of the selected themes is derived. The indicated NPV doesn't incorporate the offsets. Offsets are included in the Table 4-6.

4.4 Unit Costs

To develop a unit costs for the selected themes, the NPV was annualized to represent an average costs that would be incurred over the time span assuming equal payments. Using the annualized payment and dividing it by the total water produced, then we arrive at a unit cost for non-potable reuse and indirect potable reuse water for each theme as shown in Tables 4-6.

Table 4-6. Theme Unit Costs

Element	Theme A1	Theme A2	Theme B1	Theme B2	Theme B3
With LRP Credit					
Total Costs NPV	$3,827,739,023	$3,831,332,491	$3,482,657,476	$3,475,465,919	$3,803,688,059
Total Cost, Annual Payments	$226,071,817	$226,284,053	$205,690,801	$205,266,057	$224,651,333
Total Water Produced	96,162	96,162	96,162	96,162	96,162
Total Cost/AF	$2,351	$2,353	$2,139	$2,135	$2,336
With Avoided Costs with Salt/PLWTP					
Total Costs NPV	$3,285,949,301	$3,314,937,133	$3,001,873,772	$2,994,334,019	$3,328,209,540
Total Cost, Annual Payments	$194,072,931	$195,784,994	$177,295,018	$176,849,709	$196,568,882
Total Water Produced	96,162	96,162	96,162	96,162	96,162
Total Cost/AF	$2,018	$2,036	$1,844	$1,839	$2,044
With Avoided Costs with CEPT					
Total Costs NPV	$2,966,736,671	$2,995,724,503	$2,682,661,143	$2,675,121,390	$3,008,996,911
Total Cost, Annual Payments	$175,219,770	$176,931,833	$158,441,857	$157,996,549	$177,715,721
Total Water Produced	96,162	96,162	96,162	96,162	96,162
Total Cost/AF	$1,822	$1,840	$1,648	$1,643	$1,848

In interpreting Table 4-6, there are three distinct elements that build upon each other to arrive at unit costs for the specific themes.

- **LRP Credit.** This represents the operating and capital costs minus the LRP credit.
- **Above + Baseline PLWTP Avoided Costs and the Salt Credit.** This represents the operating and capital costs minus the LRP and Salt credits as well as PLWTP avoided costs for the ~100 mgd of offload created by the reuse program.
- **Above + Additional PLWTP Avoided Costs.** This represents the operating and capital costs minus the LRP and Salt credits as well as avoided PLWTP secondary costs through allowance of maintaining CEPT status after 100 mgd of offload occurs.

The LRP credit was separated from the other because it represents a true and tangible credit that will be seen on the cash flow. The salt credit, PLWTP and CEPT avoided costs are intangible credits that have been monetized and will provide future benefit over the duration of the analysis.

4.4.1 Comparative Cost

Based on the results of the NPV, the unit costs for the themes can be compared to other water supply sources, specifically purchased water and desalination. The unit costs are developed in $/acre-feet ($/AF). The comparative water source within the City service area is imported water from MWD through the San Diego County Water Authority (SDCWA). The FY 2011 Untreated M&I Water Supply rates is $904/AF. This rate represents the fixed and variable charge to the City.

Based on the low rate scenario provided by SDCWA, the rate is expected to increase according to Table 4-7. The low rate scenario is SDCWA's Finance Department estimate.

Table 4-7. SDCWA Untreated Projections

Calendar Year	Rate Increase Percentage
2012	9.5%
2013	5.6%
2014	5.1%
2015	4.7%
2016	10.9%
2016-2020	4.0%
Beyond 2020	3.0% (CPI)

4.4.2 Sensitivity Analysis

As part of the evaluation of alternatives, project evaluators should always assess the sensitivity of assumptions used in the analysis. For the purposes of this part of the analysis, the team examined the following two alternative situations:

- **Very Favorable Theme (Upper Bookend).** The following assumptions were assumed for this scenario:
  - Salt Credit at $200/AF. This value would reflect the additional benefits seen through wastewater treatment assets not included in the estimated $105/AF figure.
  - LRP Credit at $450/AF. This is the highest amount of LRP credit currently available.
  - Grant Funding at 30 percent. In the event that additional State and Federal funds become available or priority is given to those projects that promote the development of alternative water sources, more grant monies may be identified by the City.
- **Unfavorable Theme (Lower Bookend).** The following assumptions were assumed for this scenario:
  - Salt Credit at $50/AF. Under this case, only a limited number of water production facilities realize the benefit of reduced TDS levels.
  - LRP Credit at $100/AF. This assumes that limited funding is available at MWD / SDCWA for incentives.
  - Grant Funding at 10 percent. Under this scenario, State and Federal funds are reduced and grant programs are cut back.
- **Common to Upper and Lower Bookends.** The following assumptions were assumed for PLWTP scenarios:
  - Option 1 (Baseline): This option represents the full 200 mgd secondary conversion, no offloading, and minimal additional WWMP facilities.

- Option 2 (Modified Baseline): The modified baseline represents 125 mgd secondary conversion, 75 mgd offloading, and addition of all related WWMP facilities.

Tables 4-8 and 4-9 summarize the NPV results for these two bookend cases. Table 4-8 shows how certain levels of credits, funding, and offsets would improve the total cost per AF for all themes and would, therefore, allow any theme to reach the breakeven point (where per unit recycled water costs = imported raw water costs) earlier than 2046. As compared to Table 4-8, Table 4-9 illustrates how the assumed reductions in credits and available grant monies would increase the per unit cost of recycled water.

Table 4-8. Most Favorable Theme Unit Costs

Element	Theme A1	Theme A2	Theme B1	Theme B2	Theme B3
With LRP Credit					
Total Cost/AF	$2,152	$2,153	$1,960	$1,955	$2,145
Option 1 (Baseline)					
With Avoided Costs with Salt/PLWTP					
Total Cost/AF	$1,691	$1,706	$1,574	$1,569	$1,760
With Avoided Costs with CEPT					
Total Cost/AF	$1,495	$1,509	$1,378	$1,373	$1,564
Option 2 (Modified Baseline)					
With Avoided Costs with Salt/PLWTP					
Total Cost/AF	$1,299	$1,316	$1,182	$1,177	$1,368
With Avoided Costs with CEPT					
Total Cost/AF	$1,103	$1,120	$986	$981	$1,172

Table 4-9. Unfavorable Theme Unit Costs

Element	Theme A1	Theme A2	Theme B1	Theme B2	Theme B3
With LRP Credit					
Total Cost/AF	$2,534	$2,537	$2,303	$2,299	$2,512
Option 1 (Baseline)					
With Avoided Costs with Salt/PLWTP					
Total Cost/AF	$2,277	$2,298	$2,062	$2,058	$2,276
With Avoided Costs with CEPT					
Total Cost/AF	$2,081	$2,102	$1,866	$1,862	$2,080
Option 2 (Modified Baseline)					
With Avoided Costs with Salt/PLWTP					
Total Cost/AF	$1,885	$1,908	$1,670	$1,666	$1,884
With Avoided Costs with CEPT					
Total Cost/AF	$1,689	$1,712	$1,474	$1,470	$1,687

REFERENCES

Metropolitan Water District of Southern California, Salinity Management Study Final Report, June 1999.

City of San Diego
Recycled Water Study
Technical Memorandum #8
Financial Analysis of Recycled Water Project Alternatives

NO.	REFERENCE	COMMENT	ACTION

AGENDA ITEM 7
Attachment

METRO JPA/TAC
Staff Report

Subject Title: Reclaimed Water Revenue

Requested Action: Review, discuss, and provide direction to Reclaimed Water Revenue Subcommittee of the Metro TAC

Recommendations:

Metro TAC:	
IROC:	
Prior Actions: (Committee/Commission, Date, Result)	

Fiscal Impact:

Is this project budgeted? Yes ___ No _X__	
Cost breakdown between Metro & Muni:	2009 audited cost breakdown
Financial impact of this issue on the Metro JPA:	$1,237,942

Capital Improvement Program: N/A

New Project? Yes ___ No ___	
Existing Project? Yes ___ No ___ upgrade/addition ___ change ___	

Comments/Analysis: In a letter dated April 22, 2011, Roger Bailey, Director of Public Utilities agreed that the Regional Wastewater Disposal Agreement addresses the issue of reclaimed water sales revenue and that it provides for revenue sharing between the City of San Diego and the Participating Agencies (letter attached to this staff report). Included with the letter is a spreadsheet showing the reclaimed water sales since the inception of the South Bay plant's reclaimed sales starting in 2007 to the end of fiscal year 2009. It is anticipated that the "catch-up" will be treated as an "income credit" to the 2009 year-end reconciliation and then will annually be included as part of the Exhibit E audit process.

Atkins staff has met with City internal audit staff to review the calculations. The sales figures in the spreadsheet have been audited by the County Water Authority as part of their Incentive Reconciliation Program. Back-up to the operating expenses has been provided and Atkins staff is

in the process of auditing it. The operating expenses are costs incurred by the Water Department for the maintenance of the reclaimed water distribution system. These costs have not been charged to the Metro system in the past.

In addition staff provided a draft reconciliation (see attached) showing the impact on the 2009 year-end reconciliation of the credit both for recycled water sales and interest to date (per the 2009 protocol). The total $1.24 million credit serves to reduce the amount owed by many of the PAs from fiscal year 2009. However, it should be cautioned that this table does not include the impacts of any adjustments to Padre Dam's flows and loads for 2009. The negotiations on this issue are still in process and may delay the 2009 billings and/or refunds past the 4th quarter of 2011.

Previous TAC/JPA Action: Multiple letters and a Meeting with PUD staff on March 3, 2011

Additional/Future Action: Other still outstanding reclaimed water revenue issues are the capacity reservation lease payments from Otay Water District and Olivenhain Municipal Water District and the credits from the North City Plant reclaimed water sales to the repayment of the Optimized System Debt. These will be ongoing in 2012 and should be resolved by the close of the 2010 Exhibit E audit.

City Council Action: None required.

THE CITY OF SAN DIEGO

April 22, 2011

Mr. Scott Huth
Metro TAC Chairman
Metro Commission/Metro Wastewater JPA
276 Fourth Avenue
Chula Vista, CA 91950

Dear Mr. Huth:

Subject: Letter dated March 24, 2011 – Follow-up to March 3, 2011 Joint Meeting

Thank you for meeting with me and my team to discuss the outstanding issues which, from the Metro Wastewater JPA's perspective, remain unresolved. This letter is in response to both your letter of March 24, 2011 and to our joint meeting of March 3, 2011, in which I indicated that the Public Utilities Department would review these matters in detail and get back with you.

Subsequent to that meeting, I have had several internal meetings with our City team and we agree that the Regional Wastewater Disposal Agreement addresses the issue of reclaimed water sales revenue and that it provides for revenue sharing between the City of San Diego and the Participating Agencies (PA). Based on our assessment, we have developed a spreadsheet calculating the amount that should be credited from the Water Fund to the Wastewater Fund for revenues at South Bay. The amount of transfer is $3,242,046.57 as of FY2009 and is detailed in the attached spreadsheet. The PA share of this amount will be processed along with the FY09 Exhibit E results prior to June 30, 2011. Going forward, the amount will be calculated annually and included as an income credit in the Exhibit E report.

Now that the issue above is coming to completion, we can now focus on executing successor Transportation Agreements with the relevant Participating Agencies, which have been at issue for some time. Although not a Metro Wastewater JPA issue specifically, we have agreed to work jointly on this issue and we look forward to their resolution. We believe this will also help to strengthen our ongoing partnership.

Sincerely,

Roger S. Bailey, P.E.
Director of Public Utilities

Attachment: Spreadsheet detailing calculation net recycled water revenues

DIVERSITY

DIRECTOR OF PUBLIC UTILITIES
9192 Topaz Way • San Diego, CA 92123
(858)292-6401

South Bay Water Reclamation Plant (SBWRP)

NET CASH FLOWS CALCULATION - ALL YEARS

FY End	Retail Sales AFY (1)	Wholesale Sales AFY (2)	Operating Expenses (3)	Total Expenses	Reclaimed Water Sales (4)	CWA Contrib. (5)	Total Revenue	Annual Net Revenue (Expense)	Cumulative Net Balance
1992									
1993									
1994									
1995									
1996									
1997									
1998									
1999									
2000									
2001									
2002			$ 4,018.32	$ 4,018.32				$ (4,018.32)	$ (4,018.32)
2003			$ 4,070.98	$ 4,070.98				$ (4,070.98)	$ (8,089.30)
2004			$ 4,624.34	$ 4,624.34				$ (4,624.34)	$ (12,713.64)
2005			$ 4,567.78	$ 4,567.78				$ (4,567.78)	$ (17,281.42)
2006			$ 10,765.16	$ 10,765.16				$ (10,765.16)	$ (28,046.58)
2007	451.2	653.1	$ 174,206.14	$ 174,206.14	$ 398,165.90	$ 81,823.00	$ 479,988.90	$ 305,782.76	$ 277,736.18
2008	640.3	3,595.2	$ 165,039.27	$ 165,039.27	$ 1,508,030.56	$ 128,060.00	$ 1,636,090.56	$ 1,471,051.29	$ 1,748,787.47
2009	653.1	3,657.8	$ 170,227.39	$ 170,227.39	$ 1,532,866.49	$ 130,620.00	$ 1,663,486.49	$ 1,493,259.10	$ 3,242,046.57
2010									
2011									
2012									
2013									
2014									
2015									
Totals:	1,744.6	7,906.1	$ 537,519.38	$ 537,519.38	$ 3,439,062.95	$ 340,503.00	$ 3,779,565.95		

Credit to PAs	1,091,921.28

Notes: (1) Retail customers consist of IBWC and CalTrans for all years

(2) Wholesale customers consist of Otay Water District only

(3) Includes both Water Ops system expenses related to reclaimed water and Recycled Water section expenses or $67k (Water Ops - FY02-09) and $470k (Recycled Water - FY07-09). Water Ops O&M expenses are based on number of miles of pipe, or 1% of total expenses. Recycled Water Section expenses are allocated 10% SBWRP/90% NCWRP

(4) Based on actual revenues, unadjusted for 85% of potable water rates as reported to CWA

(5) Credit received on bill from CWA to City of San Diego for water purchases

Fiscal Year 2009 Flows and Loads with Operating Reserve

Based on 2009 Flows

Final

ALLOCATION OF COSTS BY FLOW, SUSPENDED SOLIDS (SS) AND CHEMICAL OXYGEN DEMAND (COD)

AGENCY	Total Cost	Amount Paid	TOTAL %	DIFFERENCE Amount Paid - Total Flow	Recycled Water Revenue Credits FY07-09	Interest on Recycled Water Revenue Credits FY07-09	Total Recycled Water Revenue FY 07-09	Net
CHULA VISTA	$16,848,305	$16,418,852	29.403%	($429,453)	$ 321,062	$ 42,935	$ 363,997	($65,456)
CORONADO	$1,651,915	$1,933,484	2.883%	$281,569	$ 31,479	$ 4,210	$ 35,689	$317,258
DEL MAR	$608,011	$646,076	1.061%	$38,065	$ 11,586	$ 1,549	$ 13,136	$51,201
EAST OTAY MESA	$4,213	$5,380	0.007%	$1,167	$ 80	$ 11	$ 91	$1,258
EL CAJON	$6,958,958	$7,387,872	12.145%	$428,914	$ 132,610	$ 17,734	$ 150,344	$579,258
IMPERIAL BEACH	$2,190,452	$1,939,344	3.823%	($251,108)	$ 41,741	$ 5,582	$ 47,323	($203,785)
LA MESA	$4,590,116	$4,433,748	8.011%	($156,368)	$ 87,470	$ 11,697	$ 99,167	($57,201)
LAKESIDE/ALPINE	$2,811,310	$2,783,612	4.906%	($27,698)	$ 53,572	$ 7,164	$ 60,737	$33,039
LEMON GROVE	$2,012,655	$1,945,616	3.512%	($67,039)	$ 38,353	$ 5,129	$ 43,482	($23,557)
NATIONAL CITY	$4,018,814	$4,492,652	7.014%	$473,838	$ 76,583	$ 10,241	$ 86,824	$560,662
OTAY	$1,305,026	$1,043,540	2.278%	($261,486)	$ 24,869	$ 3,326	$ 28,194	($233,292)
PADRE DAM	$3,882,426	$5,410,652	6.776%	$1,528,226	$ 73,984	$ 9,894	$ 83,877	$1,612,103
POWAY	$3,212,522	$2,686,544	5.606%	($525,978)	$ 61,218	$ 8,187	$ 69,405	($456,573)
SPRING VALLEY	$6,393,551	$5,402,040	11.158%	($991,511)	$ 121,836	$ 16,293	$ 138,129	($853,382)
WINTERGARDENS	$812,209	$720,548	1.417%	($91,661)	$ 15,478	$ 2,070	$ 17,547	($74,114)
SUBTOTAL PARTICIPATING AGENCIES	$57,300,483	$57,249,960	100%	($50,523)	$ 1,091,921	$ 146,021	$ 1,237,942	$1,187,419

(1) Positive = Check/Negative = Invoice

(2) Interest on Recycled Water FY10-April 2011

out

in

Net