CITY OF SAN JOSE
CAPITAL OF SILICON VALLEY

Office of the City Auditor

Report to the City Council
City of San José

SOUTH BAY WATER RECYCLING: BETTER INFORMATION AND RENEGOTIATION OF CONTRACTUAL OBLIGATIONS WILL INCREASE TRANSPARENCY AND AID PROGRAM SUCCESS

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CITY OF SAN JOSE
CAPITAL OF SILICON VALLEY

Office of the City Auditor
Sharon W. Erickson, City Auditor

March 28, 2016

Honorable Mayor and Members
Of the City Council
200 East Santa Clara Street
San José, CA 95113

South Bay Water Recycling: Better Information and Renegotiation of Contractual Obligations Will Increase Transparency and Aid Program Success

For the past fifteen years, San José has operated a water recycling program as part of its operation of the San José Regional Wastewater Facility. The recycled water program, South Bay Water Recycling, started as and remains a wastewater diversion program, but now also serves as a useful part of the region's water supply, providing non-potable water to over 700 large-scale water users. This past fiscal year, for the first time, the Wastewater Facility was able to earn more in operating revenue from the sale of recycled water than it expended on operating costs for its South Bay Water Recycling program. It is expected that South Bay will be able to break-even on its operating costs into the foreseeable future.

Finding 1: Improvements to South Bay Expense Tracking Will Improve Program Managers' Ability to Effectively Operate the Water Recycling Program

Over the past several years, South Bay program managers have worked to improve expense tracking for South Bay. Previously, South Bay expenses had not been rigorously separated from other Wastewater Facility expenses. San José has a Strategic Plan performance goal of covering all South Bay operating expenses with sales revenues, and a Green Vision goal of using all wastewater for beneficial purposes. Because of these goals and to make informed business decisions, South Bay's managers need easy access to comprehensive financial information about South Bay's revenues and expenses throughout the year. Further, San José has entered in to an agreement with the Santa Clara Valley Water District that requires audited financial statements and other financial information concerning recycled water costs and revenues to be exchanged each year.

South Bay expense tracking is currently time-intensive, requiring manual entries of financial information into the South Bay expense tracking spreadsheet that program management maintains. If South Bay were accounted for separately from other aspects of the Wastewater Facility, in separately budgeted funds, it would be significantly easier to obtain timely and accurate financial information which would aid managers.

Finding 2: Contractual Obligations with the Water District Limit South Bay's Ability to Cover Capital Costs

To date, South Bay capital costs have totaled roughly $250 million. The Wastewater Facility (whose primary source of revenue is from sanitary sewer ratepayers in San José, Santa Clara, and neighboring jurisdictions) provided more than two-thirds of that construction cost because of the Facility's need to reduce its flows to the bay. San José, Santa Clara, and the tributary agencies are obligated to pay an average of $9 million per year until 2021 when the debt is paid off.

In 2010, the City of San José entered into an agreement with the Water District to build the Advanced Facility; a facility on Wastewater Facility land that would test operations of advanced water purification (wastewater that has been purified to the point that it exceeds drinking water standards) and could further augment the South Bay water supply. The Wastewater Facility provided $11 million in funding and in-kind services to build the facility, and the City agreed to contract terms that share recycled water net revenue with the Water District.

The ongoing cost sharing formula limits South Bay's ability to use operating revenues to offset debt service payments or fund infrastructure needs. We recommend that the Integration Agreement be renegotiated to ensure sufficient funding of South Bay capital needs.

This report includes four recommendations. We will present this report at the April 4, 2016 meeting of the Transportation and Environment Committee. We would like to thank the Environmental Services Department and the City Attorney's Office for their time and insight during the audit process. The Administration's response will be distributed under separate cover.

Respectfully submitted,

Sharon W. Erickson
City Auditor

finaltr
SE:lg

Audit Staff: Jazmin LeBlanc
Ani Antanesyan

cc: Norberto Dueñas
Kerrie Romanow
Jeff Provenzano
Dave Sykes
Rosa Tsongtaatarii
Rick Doyle
Michele Young
Darlene Van der Zon
Laura Burke

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Abbreviations

Advanced Facility	*Silicon Valley Advanced Water Purification Center*
Discharge Permit	*National Pollutant Discharge Elimination System*
FMS	*City's Financial Management System*
Integration Agreement	*Recycled Water Facilities and Programs Integration Agreement between the City of San José and the Santa Clara Valley Water District*
Ratepayers	*Sanitary Sewer Ratepayers from the City of San José*
Silver Creek Agreement	*Agreement between the City of San José and the Santa Clara Valley Water District Relating to Management and Operation of the South Bay Water Recycling System, Including the Silver Creek Pipeline*
South Bay	*South Bay Water Recycling*
Strategic Plan	*South Bay Water Recycling Strategic and Master Planning Report (Volumes I and II)*
Wastewater Facility	*San José-Santa Clara Regional Wastewater Facility*
Water District	*Santa Clara Valley Water District*
Tributary Agencies	*Wastewater Facility Tributary Agencies*

Units of Measurement

This report uses both acre-feet (A/F) and million gallons per day (MGD). When referring to daily volumes, millions of gallons per day are used; and when referring to yearly volumes, acre-feet are used. For a sense of scale 1 million gallons would fill about 1.52 Olympic sized swimming pools and 1 acre-foot would fill about half of an Olympic sized swimming pool.

Introduction

The mission of the City Auditor's Office is to independently assess and report on City operations and services. The audit function is an essential element of San José's public accountability and our audit reports provide the City Council, City management, and the general public with independent and objective information regarding the economy, efficiency, and effectiveness of City operations and services.

In accordance with the City Auditor's Fiscal Year (FY) 2015-16 Audit Work Plan, we have completed an audit of South Bay Water Recycling which is a program administered by the City of San José (City). The purpose of our audit was to analyze the cost recovery of South Bay.

We conducted this performance audit in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives. We limited our work to those areas specified in the *Audit Objective, Scope, and Methodology* section of this audit report.

We thank the Environmental Services Department; City Manager's Budget Office and City Attorney's Office for their time, information, insight, and cooperation during the audit process.

Background

The City of San José, together with the City of Santa Clara,[1] owns and operates a regional wastewater treatment facility known as the San José-Santa Clara Regional Wastewater Facility[2] (Wastewater Facility). This facility manages the wastewater from San José and Santa Clara as well as six other local cities, towns, and unincorporated areas which are represented by five tributary agencies – the City of Milpitas, West Valley Sanitation District, Cupertino Sanitary District, County Sanitation District 2-3 and the Burbank Sanitary District.[3]

[1] The City of Santa Clara is roughly a 20 percent owner of Wastewater Facility and the City of San José is majority owner and operator.

[2] Formerly known as the San José-Santa Clara Regional Water Pollution Control Plant; it is located in North San José.

[3] The cities of Milpitas, Campbell, Cupertino, Los Gatos, Saratoga, and Monte Sereno.

The Wastewater Facility is regulated by a National Pollutant Discharge Elimination System permit (Discharge Permit). The Discharge Permit program is a federal permit program under the Clean Water Act that is administered in the Bay Area by the San Francisco Bay Regional Water Quality Control Board (Regional Board).

Wastewater enters the facility exactly as one may imagine — as raw sewage. As Exhibit 1 shows, three major steps are involved in treating raw sewage to an acceptable water quality level to protect the habitat of vulnerable plants and animals in the San Francisco Bay.

Exhibit 1: Water Treatment Steps at the Wastewater Facility

The first step pulls large items such as baby wipes and other debris out of the mix and sends them to the landfill. The next step, **primary filtration**, uses sedimentation tanks to allow suspended particles of sewage to settle out of the water. That sediment is allowed to further dry out and is used as landfill cover.

Secondary filtration is up next, which moves wastewater through a series of tanks that add either aerobic or anaerobic bacteria or nitrogen to allow more suspended matter to settle out of the water. This is the end of the process for many wastewater treatment facilities, but in San José, wastewater goes through another treatment step.

San José's **tertiary step** filters wastewater through sand, gravel and coal to remove almost all of the remaining solids in the water. Once water reaches the bottom of these filtration tanks the water is slowly moved through a **serpentine chlorine contact tank** to kill remaining pathogens through disinfection. Finally, water is dechlorinated and sent into the south end of the San Francisco Bay.

Source: Auditor's Office; Environmental Services Department

In 1990, the amount of water discharged during the dry season[4] was found by the State Water Resources Control Board to be impacting the South Bay marsh environment, changing it from a saltwater marsh to a freshwater marsh and negatively impacting two endangered species – the California Clapper Rail and the Salt Water Harvest Mouse. To address this problem, the Wastewater Facility created a plan which was incorporated into its Discharge Permit – to discharge no more than 120 million gallons per day to protect the marshland and the habitat of local plants and animals.[5]

The City established a multi-part plan to limit dry weather discharge from the Wastewater Facility and address salt marsh conversion, including:

- Purchasing about 380 acres of land to restore to saltwater marsh to mitigate past land conversion;
- Implementing indoor water conservation programs to reduce the amount of sewage entering the Wastewater Facility; and
- Creating a recycled water program, called South Bay Water Recycling (South Bay) to reuse a portion of effluent for irrigation, landscaping, and industrial uses.[6]

In part due to these efforts, average dry weather flow from the Wastewater Facility to the San Francisco Bay decreased from 130 million gallons per day in 1997 (the year South Bay began operations) to only 70 million gallons per day in 2015.

[4] Wastewater facilities typically monitor flow using "dry weather flows." They do this in order to accurately capture sewer use only and not inadvertently include stormwater as well. All flow data presented in this report uses dry weather flow. San José calculates dry weather flow as any three consecutive months from May 1 through October 31 of each calendar year. Average dry weather flow is the measurement that the Wastewater Facility uses to meet Discharge Permit requirements.

[5] The recycled water process modification was implemented in response to a 1990 State Water Resources Control Board order directing the Regional Board to limit flows from the Wastewater Facility to 120 MGD or to flows that would not further impact endangered species. At the time that the State Board order was issued, the Wastewater Facility was discharging an average dry weather flow of 120 MGD, and the State Board found that the 47 MGD increase in flow during the period from 1970 to 1985 had resulted in the loss of approximately 220 acres of salt marsh habitat.

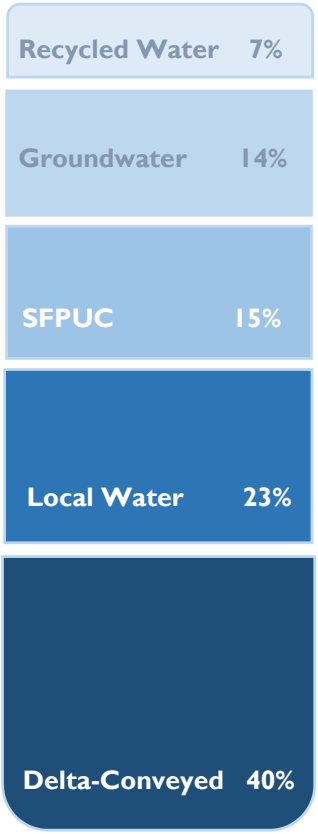
[6] The tasks outlined in the plan were incorporated into the Discharge Permit in lieu of a flow cap in 1993, including requirements that the City begin operation of non-potable water reclamation projects to divert up to 21 MGD by November 1, 1997 (South Bay Phase I); and begin operation of a 24-30 MGD expanded project area by December 31, 2000 (South Bay Phase II). In 1996, after estimating the cost of South Bay Phase II as proposed in the San José Action Plan at $350 million, the City proposed revising the Action Plan to replace South Bay Phase II with a series of projects that were projected to reduce effluent flows up to 60 MGD at an estimated cost of $150 million. This revised plan, which continued to include the requirement that the City "continue to develop a project to use reclaimed water for potable water supply" was accepted and incorporated into the Discharge Permit in 1997. This process was further modified in 2014, when an advanced water purification facility (Advanced Facility) began operation adjacent to the Wastewater Facility to further treat about one-third of the South Bay water.

Recycled Water and Water Supply

California's recent drought has had a big impact on the South Bay. Recycled water has become an important local source of water; its use has grown dramatically and is expected to continue to grow. By 2010, recycled water accounted for over four percent of the water supply in the region served by the Santa Clara Valley Water District (Water District), with South Bay currently being the largest supplier of recycled water in Santa Clara County.

By 2035, the Water District plans to nearly double recycled water use to at least seven percent of the water supply in the area that it serves, as Exhibit 2 shows to the right.[7] Toward that end, the Water District is funding recycled water projects with the Wastewater Facility as well as projects in Gilroy and Sunnyvale.

Exhibit 2: Projected Water Supplies in 2035



Source: Water Master Plan 2012

Within the area served by the Water District, including San José, drinking water comes from several sources:

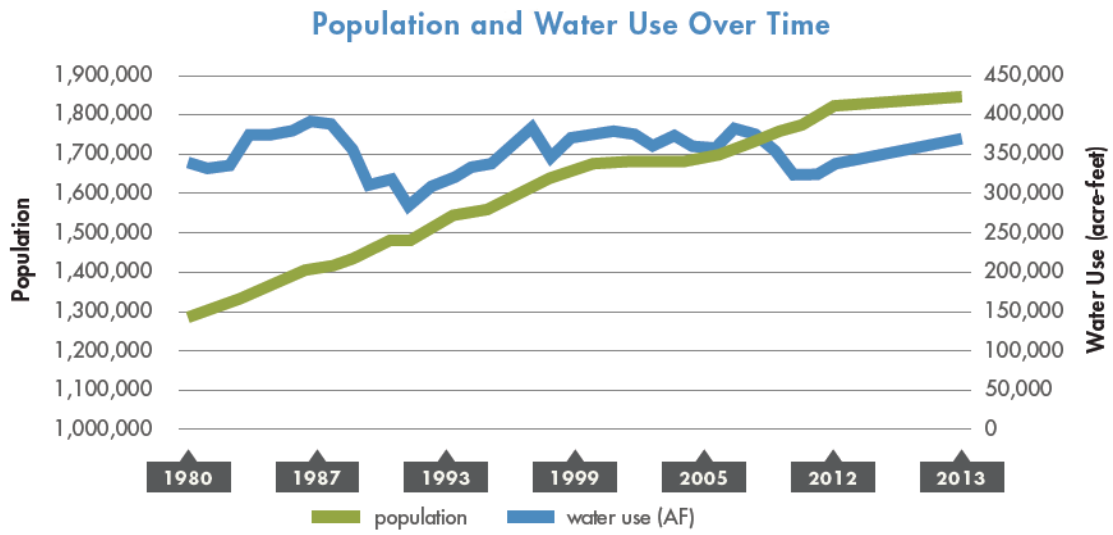
- groundwater,
- local reservoirs and other surface water sources (such as streams), and
- water imported from the Sierras through the Hetch Hetchy Reservoir and the California Delta.

There are environmental consequences to using these sources. Water suppliers around the State are looking for alternatives to augment these sources and protect groundwater supplies. As described below, potential options for reducing reliance on imported and local water sources include **conservation**, **desalinization** and **wastewater recycling**.

Conservation has had a great impact in the area's water use as Exhibit 3 indicates. While the Bay Area's population has grown over 25 percent since 1992, total water use has remained relatively flat. In 2015, San José residents were asked to reduce water usage by 30 percent over the summer and residents met that goal. Conservation is a powerful strategy; by 2030, the Water District expects that demand will be 20 percent lower through conservation than it would otherwise be but still short of wholly meeting the gap between needed and available water.

[7] Note, the percentages by water type have been rounded and converted from A/F, therefore, may not add to 100%.

Exhibit 3: Historic Population and Water Use in the Water District's Region



Source: Water District Water Conservation 2012-13 Annual Report

Desalinization is also an option that many California communities are contemplating; it is the process of removing dissolved salts and minerals from water (typically brackish or ocean water) through filtration or distillation. Desalinization typically is expensive, requiring high energy inputs to obtain drinkable water, nonetheless, it is an option when other sources are not available.

Wastewater Recycling is an option that treats wastewater to the point that it can be used for potable or non-potable purposes. South Bay is an example of a program that meets non-potable treatment requirements, which means that the water can be used for purposes including landscaping, irrigation and industrial uses such as for cooling towers.

South Bay water has historically met state requirements for recycled water by modifying the tertiary (final) steps of the wastewater treatment process at the Wastewater Facility. However, since 2014, South Bay has blended its processed water with water from a Water District operated advanced water purification facility (Advanced Facility). The South Bay process modifies the normal Wastewater Facility process by speeding up the final filtration through sand and activated carbon and the chlorine added at the end of the usual process is not removed for South Bay water. The Wastewater Facility houses six tertiary filtration tanks and generally uses two of them for South Bay. For more details on the regulatory agencies and allowed uses of recycled water and types of recycled water production see Appendix B.

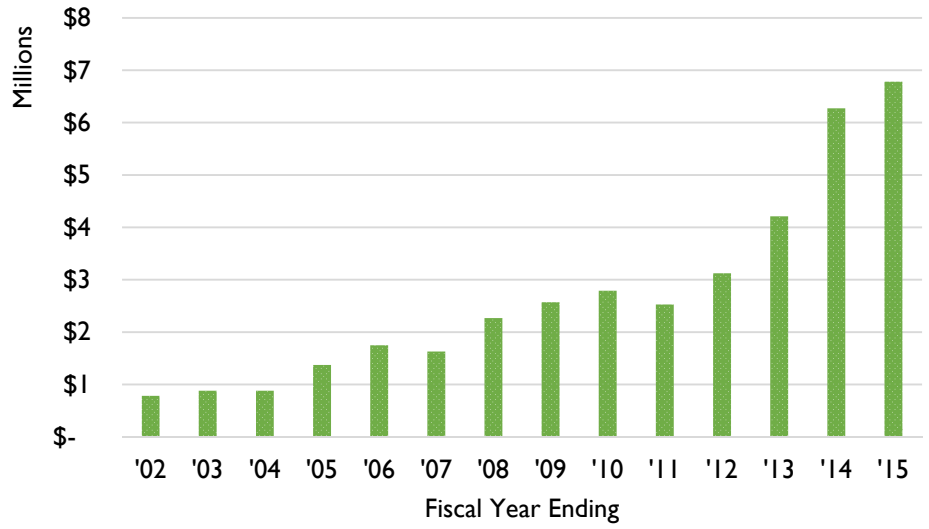
Exhibit 4 below, shows an overview of the Wastewater Facility, South Bay and the Advanced Facility.

Exhibit 4: Aerial Flow Map of Wastewater Facility, South Bay and Advanced Facility

Source: Google Earth Pro

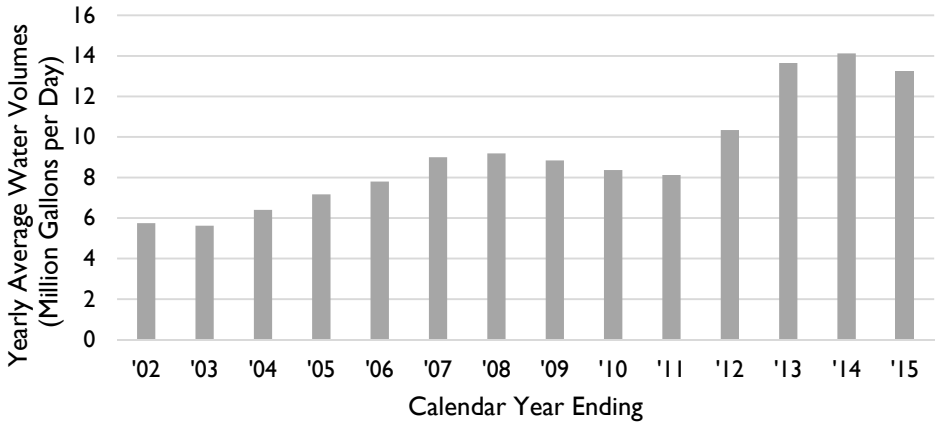
After filtration and chlorination, South Bay water is brought to a pumping station where it blends with Advanced Facility water and is pumped through a network of purple pipes to water retailers in San José, Santa Clara, and Milpitas. These retailers supply over 740 customers throughout the region. Exhibit 5 shows recycled water sales revenue since FY 2001-02 and Exhibit 6 shows historical recycled water volumes.

Exhibit 5: South Bay Historical Recycled Water Sales Revenue



Source: Environmental Services Department

Exhibit 6: South Bay Historical Recycled Water Volumes[8]



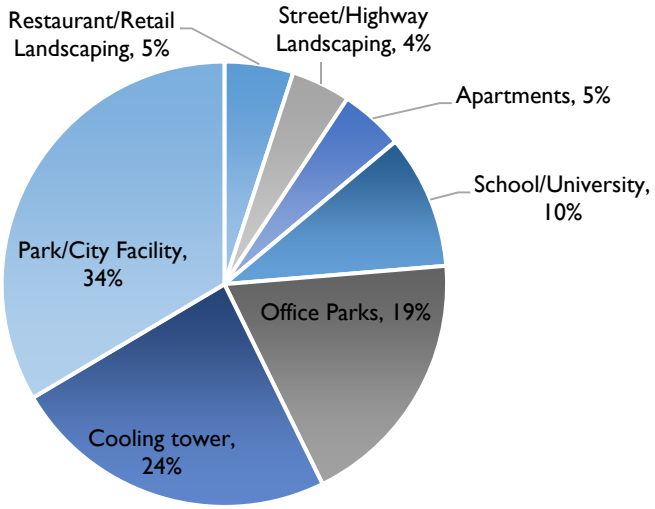
Source: Environmental Services Department

[8] Note, starting from March 2014, the volumes include Advanced Facility purified water blended with South Bay water.

South Bay Recycled Water Usage

In FY 2014-15, approximately 61 percent of recycled water was used for irrigation, and about 39 percent was used for industrial purposes (less than 1 percent of all recycled water use was used for agricultural purposes). As Exhibit 7 shows many types of customers used South Bay water.

Exhibit 7: Types of South Bay End Users



Source: Environmental Services Department

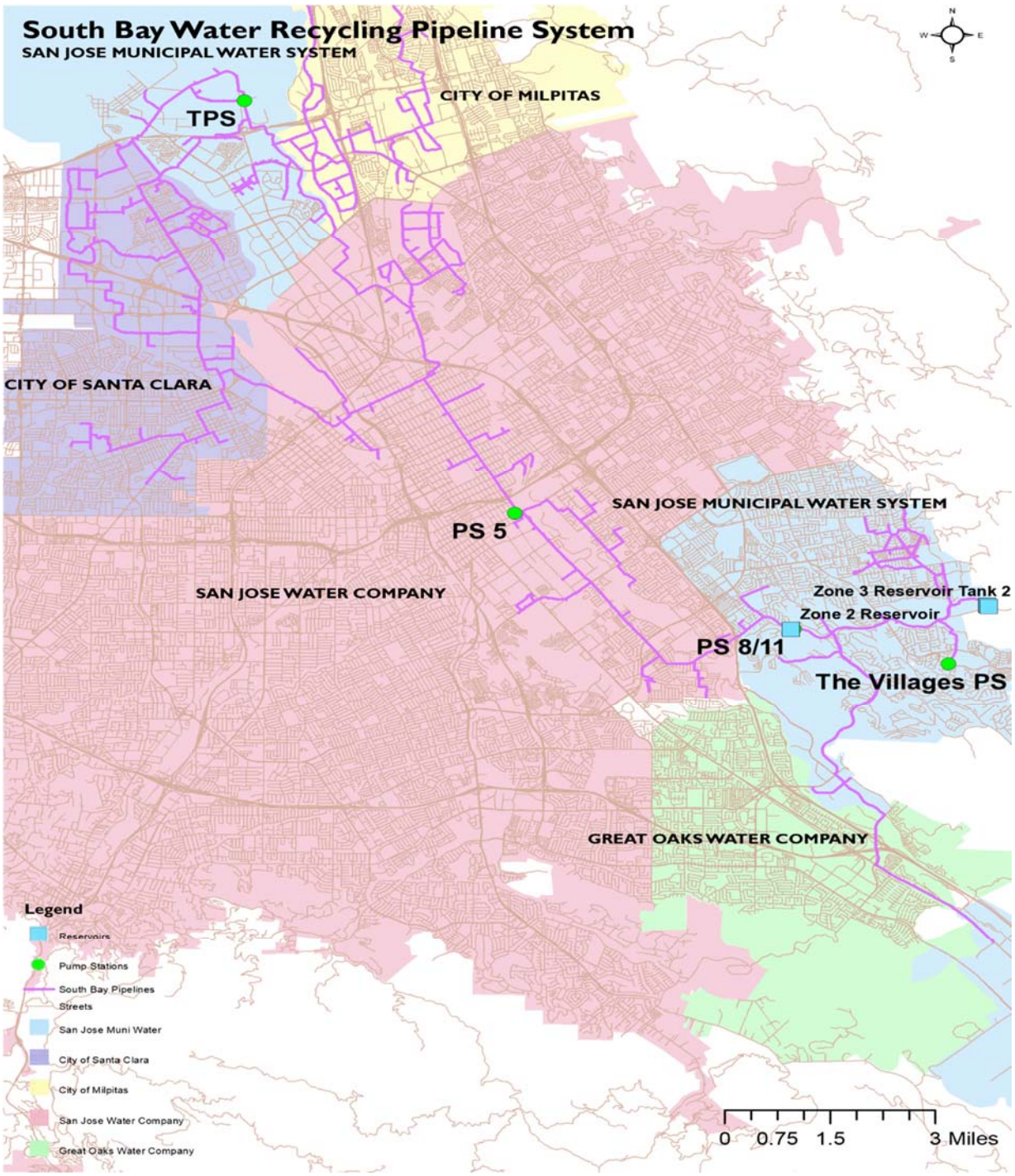
South Bay now has quite a large footprint in San José and the surrounding areas with 140 miles of distribution pipes, 5 pump stations[9] and 3 reservoirs.[10] The majority of the infrastructure was constructed in the mid-1990s and expanded in the mid-2000s. South Bay's maximum capacity at its main transmission pump station (TPS) is 40 million gallons per day, reaching as high as 48 million gallons per day with all duty and standby pumps operational; however, storage capacity is only about 9.5 million gallons.

South Bay water is sold wholesale by the Wastewater Facility to four water retailers: San Jose Municipal Water, San Jose Water Company, City of Milpitas Water and Sewer, and City of Santa Clara Water and Sewer Utility. In FY 2014-15, recycled water demand was about 11,000 acre-feet (A/F) from all retailers. The map below shows the extent of recycled water pipes, the major retailers in the area, South Bay's pump stations, and reservoirs.

[9] Transmission Pump Station; Pump Stations 5, 8, 11 (PS 5, 8, 11); Villages Pump Station (VPS).

[10] Zone 2 has one reservoir (Yerba Buena) and Zone 3 has two – the Evergreen reservoirs.

Exhibit 8: Map of the South Bay Water Recycling Distribution System[11]



Source: Auditor created through ArcGIS

[11] Great Oaks Water Company is not a recycled water retailer but is included in the map because it serves a portion of San José. PS 8, PS 11 and Zone 2 Reservoir are co-located on Yerba Buena Road, therefore, there is only one symbol on the map for all features. PS is a pump station, and TPS is the transmission pump station located adjacent to the Wastewater Facility in north San José.

Strategic Plan and Long Range Goals

In 2012, representatives of the City, Water District, the City of Santa Clara and the tributary agencies formed a committee to identify short and long-term goals for recycled water in the region.[12] The result of the collaboration was a South Bay Water Recycling Strategic and Master Planning Report (Strategic Plan) prepared by RMC Water and Environment engineering company, published in December 2014 by the City and the Water District. The Strategic Plan identified the following guidelines for South Bay to help set future goals:

Near Term (2015-2020)

- Recognize there is no longer a wastewater-driven need to expand South Bay
- Achieve cost recovery as soon as practical
- Maintain the system as a reliable supply to support existing customers

Long Term (2020-2035)

- Alternatives balance the needs of wastewater management and water supply perspectives
- Costs should be shared proportionally across all who benefit
- Master Planning will provide basis for identifying alternative governance frameworks and associated funding strategies for non-potable and potable reuse

Source: Strategic Plan

The Strategic Plan identifies long-term (between 2020 and 2035) recycled water reuse projects at an estimated cost of $243 million for non-potable reuse projects, and an additional $522 million for potable reuse projects. These projects are not anticipated to be funded by the Wastewater Facility or South Bay; the projects are being driven by the Water District. The Wastewater Facility would provide source water for the projects.

The City's capital improvement program for 2016-2020, which can be found in the City's Adopted Capital Budget, includes approximately $4.7 million for system reliability projects identified in the Strategic Plan's near term capital projects. These projects are proposed to be funded through sources other than sewer rate funds.

[12] The SBWR Task Advisory Steering Committee

South Bay Program Goals

San José has a Green Vision goal to recycle or beneficially reuse 100 percent of San José's wastewater by 2022. Currently about 14 percent of wastewater leaving the Wastewater Facility is being beneficially reused by recycled water customers.[13] San José also has a Strategic Plan performance goal to achieve cost recovery as soon as practical.

South Bay's Operational and Governance Structure

Operators, Owners and Tributaries to South Bay

South Bay is operated by the City of San José as the administering agency for the Wastewater Facility and authorized by the San José City Council. The Wastewater Facility co-owners, San José and Santa Clara, first entered into a Sewage Treatment Plant Agreement in 1959 for operating and ownership rights of the Wastewater Facility. Six other cities and towns now use the Wastewater Facility to treat their wastewater through agreements between San José and Santa Clara and the five tributary agencies. Each tributary agency has its own capacity shares in the Wastewater Facility and pays for capital costs based on those shares.[14] Under the tributary agency wastewater agreements, operating costs are paid based on volume and strength of flow, not capacity. Since South Bay was established as a Discharge Permit requirement and treats wastewater from all tributary agencies, it is considered a part of the Wastewater Facility and is required to be funded under the Wastewater Facility's agreements.

Governance of South Bay

The Treatment Plant Advisory Committee (TPAC), serves as an advisory body to all stakeholders on the operation, maintenance, repair and improvement of the Wastewater Facility (including South Bay) and the development and administration of related programs and policies. TPAC has members from both the cities of San José and Santa Clara as well as three of the five tributary agencies. Aside from TPAC, the Joint Recycled Water Policy Advisory Committee comprised of Water District representatives and members of San José and Santa Clara city councils, advises the parties on policy matters relating to the production, distribution and use of recycled water from South Bay.[15]

[13] The remaining treated water is discharged to the South Bay where it provides some beneficial value to the many plant and animal species that rely on fresh water being added to the South Bay. Many natural fresh water sources (mostly creeks) have been diverted or lost volume over time so treated water provides a reasonable replacement.

[14] Tributary agencies are allowed to discharge no more than allowed in their Master Agreement and are monitored based on four parameters (flow, biochemical oxygen demand, suspended solids, and ammonia.)

[15] The Committee was formed as part of the Integration Agreement.

South Bay's Organizational Structure and Management Oversight

The Environmental Services Department (ESD) of the City of San José operates the Wastewater Facility and the South Bay program. It has over 500 employees out of which 7 positions are dedicated for South Bay. ESD operates six core services: Natural and Energy Resources Protection, Portable Water Delivery, Recycled Water Management, Recycling and Garbage Services, Stormwater Management, and Wastewater Management. Internally, the Department accounts for its operations in 9 programs: Administrative Services, Environmental Compliance, Office of Sustainability, Technical Services, Integrated Waste Management, Water Resources, Watershed Protection, Communications, and Water Pollution Control.

South Bay Water Recycling is situated in ESD's Water Resources program (Program 6); the seven dedicated positions include a program manager, engineers, technicians, a supervisor and an environmental services specialist. The Water Resources Program includes South Bay Water Recycling and the San José Municipal Water System. South Bay Water Recycling activities are also supported by staff from other programs as needed.

Audit Objective, Scope, and Methodology

The objective of our audit was to assess the cost-recovery status of South Bay Water Recycling. We sought to understand the relevant management controls over South Bay and have performed the following to achieve the audit objective:

- We reviewed the South Bay Water Recycling Strategic and Master Planning Report Volumes I and II to identify South Bay's future goals and how they fit into the regional water reuse goals. We also reviewed the City's Green Vision Report to identify recycled water policy goals.
- We reviewed federal, state and local laws and regulations concerning recycled water, particularly its quality standards and allowed uses.
- We reviewed historical City Council, Treatment Plant Advisory Committee as well as Joint Recycled Water Advisory Committee agendas and informational memoranda to identify key policy decisions, fiscal impact analyses and the original purpose of South Bay.
- We reviewed Wastewater Facility User Agreements to identify the structure of agreements between the City and Santa Clara and the tributary agencies.
- We reviewed the Discharge Permit as well as South Bay's Permit (Order No. 95-117) to understand diversion and water quality requirements of South Bay.
- We reviewed best practices for developing indirect potable reuse projects and brine disposal options.

- We interviewed ESD staff to understand current cost-tracking practices of South Bay, its cost recovery methodology and its budgeting.
- We analyzed the estimated program costs for South Bay for the past three fiscal years for comprehensiveness, reasonableness and accuracy. We reviewed debt service schedules, as well as official statements for bonds and loans.
- We reviewed historical budget documents for the Wastewater Facility Capital Fund to identify South Bay capital projects.
- We reviewed and analyzed fund revenue reports for FY 2014-15 using the City's Financial Management System software to understand sources and uses for funds related to South Bay.
- We reviewed historical ESD budgeted labor distribution reports to analyze how South Bay has been budgeting staff time.
- We evaluated contract terms, specifically, pertaining to the Integration Agreement, the Silver Creek Pipeline Agreement and the 1998 Reimbursement Agreement, all between City and the Water District to identify historical funding support provided by the Water District for South Bay and current revenue-sharing terms for recycled water.
- We analyzed historical influent, effluent, South Bay non-blended and blended water, and Advanced Facility product water as well as brine volumes.
- We reviewed and analyzed trends in the City's wholesale recycled water rates, and utilized projected groundwater rates provided by the Water District to analyze net revenues and the sustainability of capital project development.
- We reviewed FY 2014-15 recycled water sales data to identify total sales and major types of customers.
- We reviewed grant documents from program inception to date to identify federal and state shares in South Bay.
- We reviewed and compiled revenue source reports from FMS to identify Water District and total ratepayer contributions to South Bay.
- We reviewed financial information concerning the Advanced Facility's construction and operating costs provided by Water District staff.
- We interviewed staff from the Budget and Attorney's Offices to understand financial and legal implications of contracts and pricing structures related to South Bay.

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Finding I Improvements to South Bay Expense Tracking Will Improve Program Managers' Ability to Effectively Operate the Water Recycling Program

Summary

Over the past several years, South Bay program managers have worked to improve expense tracking for South Bay. Previously, South Bay expenses had not been rigorously monitored as distinct from other Wastewater Facility expenses. San José has a Strategic Plan performance goal of covering all South Bay operating expenses with sales revenues, and a Green Vision goal of using all wastewater for beneficial purposes. Because of these goals and to make informed business decisions, South Bay's managers need easy access to comprehensive financial information about South Bay's revenues and expenses throughout the year. Further, San José has entered into an agreement with the Santa Clara Valley Water District that requires audited financial statements and other financial information concerning recycled water costs and revenues to be exchanged each year.

South Bay expense tracking is currently time-intensive, requiring manual entries of financial information into the South Bay expense tracking spreadsheet that program management maintains. If South Bay were accounted for separately from other aspects of the Wastewater Facility, in separate budgeted funds, it would be significantly easier to obtain timely and accurate financial information which would aid managers.

ESD Should Budget for South Bay in Separate Operating and Capital Funds

South Bay Capital and Operating Costs Are Intermingled Within Wastewater Facility Funds

South Bay revenues and expenditures have been included in two Wastewater Facility funds: Fund 512 for capital expenditures and Fund 513 for operating expenditures. The biggest revenue sources for both of these funds are service and use charges of San José's sanitary sewer system (transferred from Fund 541) with funds from Santa Clara and tributary agencies making up the second largest revenue source, and recycled water sales making up the third largest revenue source.

It is difficult to isolate South Bay's costs within the complicated fund flows, which hamper transparency. Some South Bay expenses can be identified with knowledge of specific appropriations. For instance, Fund 512 (San José/Santa Clara Treatment Plant Capital Fund) shows a South Bay Master Plan Grant on the source-side and South Bay capital costs on the use-side. Even though South Bay capital costs have, historically, been more clearly itemized within Fund 512 than its operational costs within Fund 513 (San José/Santa Clara Treatment Plant Operating Fund), it still

takes considerable time for one without program knowledge to understand the true capital costs of South Bay since it is not housed in its own separate fund.

Fund 513 shows recycled water sales in its funding sources. However, most South Bay expenses are intermingled within Fund 513 with all other Wastewater Facility expenses. It takes considerable skill, time and program knowledge to follow the flow of South Bay's funds in the City's budget. Although a memo fund for South Bay exists (along with two other memo funds that have tracked program grants), it has not been active in recent years. Furthermore, memo funds are primarily intended for internal accounting purposes only and do not appear in the City's external financial statements or budget documents and thus do not publish information directly to the public and other program stakeholders.

ESD staff are making progress on comprehensively budgeting for South Bay. The efforts they have already made and the recommendations we identify in this report will enable the City to have the detailed financial information necessary for program managers to maintain success.

Cost Tracking Is Time Consuming and Has Changed Over Time

Because costs are intermingled with other Wastewater Facility expenses and are not clearly identified, South Bay staff have to sift through myriad financial reports, and converse with management to understand South Bay's estimated costs – all in a time-consuming and confusing manner, susceptible to minor errors, due to manual entry and undocumented changes to cost accounting.

South Bay's primary program analyst spends at least **eight hours** per month (about 5 percent of their time) creating the spreadsheets that track South Bay costs. If South Bay established separate funds, the amount of time required to create automated expense reports that track the same information would likely occur within minutes, freeing up additional time for South Bay's analyst to focus on data analysis rather than data gathering.

Financial Information Requirements in in the Integration Agreement with the Water District

Now that the Advanced Facility is operational, the Integration Agreement[16] stipulates that South Bay and the Water District exchange audited financial

[16] The Recycled Water Facilities and Programs Integration Agreement between the City of San José and the Santa Clara Valley Water District

statements and other financial information each year.[17] Tracking expenses in separate funds would facilitate this requirement by making it easier to track expenses.

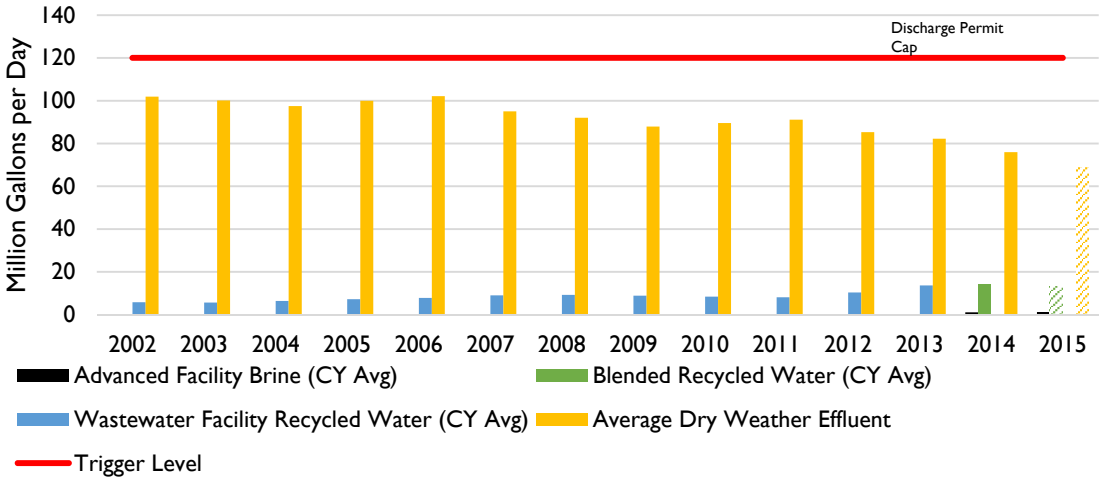
The South Bay Program Has Multiple Stakeholders Who Have an Interest in Easy Access to Program Cost Information

South Bay was established and funded as part of the sewage treatment process because of the Discharge Permit's diversion requirement. If the South Bay program evolves to facilitate other goals (e.g. replenishing groundwater or other potable uses), any incremental cost to the program would need to be clearly identified for all stakeholders. This would also be made easier through tracking in separate funds.

Decreasing Effluent Flows and South Bay's Mission in Transition

As Exhibit 9 shows below, average dry weather flows from the Wastewater Facility to the San Francisco Bay have been decreasing since their peak in 2006. In fact, in CY 2014, average dry weather flow to the Bay was only about 75 million gallons per day, well below the 120 million gallon average dry weather flow targeted in the Discharge Permit. CY 2015 is expected to be even lower.

Exhibit 9: Historical Water Levels for the Wastewater Facility and South Bay[18]



Source: Auditor analysis of ESD data

[17] The Integration Agreement states that no later than January 15th of each year, beginning with the year after the Advanced Facility becomes operational, the Wastewater Facility and Water District shall exchange audited financial statements for the immediately preceding fiscal year which cover the operations subject to the Integration Agreement; provided, however, that if audited financial statements are not available, unaudited statements shall be provided by January 15th and audited statements shall be provided as soon as available. In addition, the Integration Agreement states that commencing in the first full fiscal year after the AWTF (Advanced Facility) becomes operational; the Wastewater Facility and the Water District shall exchange Statements of Net Operating Costs within thirty days after the exchange of audited financial statements that year.

[18] CY 2014 includes Advanced Facility purified water and brine and CY 2015 includes data until September.

The Discharge Permit requires the maintenance of a recycled water diversion program, which means that South Bay is a part of the Wastewater Facility, but the changing landscape of recycled water in the region also needs to be considered.

South Bay's Future as a Water Supplier

The climatic changes and growing population in the regional landscape have made recycled water an important part of the regional water supply. Its drought-resistant qualities have been recognized and demand is growing. These points have triggered a strategic change for South Bay, as it has evolved from *solely* being a diversion program to becoming a part of the regional water supply. Going forward, as it will likely be able to cover its own operational costs with water sales, there will be less need to rely on sanitary sewer ratepayers for program funding.

Accounting for South Bay's operations through funds that are distinct from other Wastewater Facility funds, will allow South Bay managers to make informed and strategic decisions about the impacts of demand changes and new reuse programs as they relate to future program costs and opportunities.

Recommendation #1: The Department of Environmental Services should work with the Budget Office and Finance Department to establish operating and capital funds for South Bay separate from other Wastewater Facility operating and capital funds.

South Bay Needs a Comprehensive Chart of Accounts and Operating Expense Methodology

We worked with ESD staff to understand the last three years of South Bay operating expenses. ESD staff were able to easily provide capital expenditures and operating revenues for our review, but struggled to provide clear evidence for how operating expenditures for South Bay are identified separately from other Wastewater Facility operating expenses. Instead, ESD staff maintained a complicated spreadsheet that parsed particular expenses from the City's financial management system (FMS) and other expense reports. As described below, the methodology used in any given year changed without clear documentation.

By following the methodologies that ESD described for each fiscal year, South Bay appears to have achieved operational cost recovery in FY 2014-15, with roughly $925,000 in net revenues. However, through our efforts to understand South Bay expenditures we identified several important methodology improvements to fully capture all costs. These improvements will aid staff in creating separate funds and will give program managers assurance of true program costs when making decisions.

A Comprehensive Chart of Accounts and Documented Operating Cost Methodology Is Needed

As the Background section of this report explains, ESD tracks costs by Program; so we reviewed each of the nine ESD Programs to determine whether any costs attributable to South Bay were missed when staff compiled the South Bay spreadsheets for FY 2014-15. What we found was:

- ESD general administration costs (Program 1): There were no direct staff charges to South Bay, instead, staff used a percentage of total Program 1 charges to attribute to South Bay. This has typically been around 5 percent of the program's total cost for each year, but there is not written justification for this percentage and anecdotally, ESD staff believe the percentage may not be high enough. We recommend implementing a more rigorously determined estimation or switching to direct charges.
- Compliance (Program 2): This program had direct charge codes since 2013-14, however, staff show costs in this program only since 2014-15. We recommend attributing to South Bay all applicable Program 2 costs.
- Sustainability (Program 3): A small amount (approximately $2000) of direct charges in 2013-14 were not included in ESD's cost tracking sheets, otherwise, this program's tracking appears sufficient.
- Technical Services (Program 4): This program provides IT assistance to ESD staff but has never attributed any charge to South Bay. It seems unlikely that South Bay staff have never needed any tech support assistance and as such, we recommend that ESD create a written explanation as to future South Bay charges.
- Integrated Waste Management (Program 5): This Program has also never charged to South Bay but that is expected; this is ESD's Program for operating garbage and recycling services.
- Recycled Water (Program 6): This is generally used for South Bay administrative staff costs and the methodology seemed clear.
- Watershed Protection (Program 7): In 2014-15, this $8 million Program did not have direct charges to the South Bay program. According to ESD staff, future laboratory services costs will be housed here. Again, there should be a clear, written explanation.
- Marketing and Communication (Program 8): This program has the ability to directly charge South Bay; however, we found that in 2013-14 there were direct charges (about $25,000) in ESD's financial management reports that were not included in the ESD spreadsheet of South Bay expenses. We recommend written explanation of whether or not there would be marketing or communications charges.
- Wastewater Facility (Program 9): There are more than 120 different functional charge codes for this Program – only 10 are considered in the

South Bay cost capture. Additionally, certain costs, such as those for Management, Computer Room and Disinfection only show personal costs and exclude non-personal ones. We recommend a clear, written explanation as to which non-personal charges should or should not be included for certain functions and whether any other codes should also be attributed to South Bay.

Further, we identified a relatively new pension benefit code that had been inadvertently left out of all the Program costs. If this code had been included in ESD's South Bay spreadsheet for 2014-15, it would have added an additional $15,000 of cost to the program.

Although we did not find inappropriate charges to the South Bay program, nor did we find that ESD made accounting errors in tracking Wastewater Operations, what we found was that ESD staff did not rigorously tease out all South Bay expenses to their cost tracking spreadsheet. The improvements in cost tracking we identified should aid program managers in compiling expenses to present in their audited financial statements and should provide assurance over costs.

Keeping the above itemized methodology improvements in mind, we reviewed ESD's spreadsheets for the past three fiscal years and summarized their cost estimates in the following exhibit. Exhibit 10 shows ESD's estimate of South Bay revenues, operating, and capital expenses over the past three years.

Exhibit 10[19]: ESD's Estimated Operating Costs and Revenues for South Bay Water Recycling for Fiscal Years 2012-13 Through 2014-15 as of January 29, 2016 (Unaudited)[20]

ESD Program	Operating Expenses	FY 2012-13	FY 2013-14	FY 2014-15
Program 1	Administrative Services[21]	$200,000	$250,000	$200,000
Program 2 and 3	Environmental Compliance and Office of Sustainability[22]	$75,000	$50,000	$25,000
Program 6	Water Resources - Recycled Water Management	$1,700,000	$2,000,000	$1,700,000
	Water Resources - San José Municipal Water Support for Recycled Water Management	$950,000	$2,000,000	$1,300,000
Program 8	Communications[23]	$150,000	$25,000	$0
Program 9	Water Pollution Control[24]	$2,175,000	$1,775,000	$1,700,000
	Overhead Allocation[25]	$525,000	$600,000	$475,000
	Capital Planning and Engineering[26]	$400,000	$600,000	$425,000
	Total Operating Expenses	**$6,175,000**	**$6,675,000**	**$5,850,000**
	Operating Revenues			
	Recycled Water Sales	$4,200,000	$6,275,000	$6,800,000
	Total Operating Revenues	**$4,200,000**	**$6,275,000**	**$6,800,000**
	Net Operating Revenue or Loss	**-$1,975,000**	**-$400,000**	**$925,000**

Source: Environmental Services Department; City's Financial Management System (FMS)

[19] These numbers are rounded to the nearest $25,000 and will not necessarily match with the financial statements prepared for the Integration Agreement, as recommended changes from this audit are not reflected in the table. Because the numbers are rounded, the columns will not necessarily sum. Additionally, this table does not match with the City's Operating Budget core service expenditure for Recycled Water Management, which captures expenses from Program 6.

[20] The personal costs above are based on both full direct staff charges and estimated charges. We adjusted the costs, where possible, to reflect year-end actuals according to the City's Financial Management System (FMS) software.

[21] Administrative Services costs for South Bay are based on an estimated percentage of staff time spent on South Bay out of total ESD Administrative Services staff time; FY 2012-13: 6 percent, FY 2013-14: 5 percent, FY 2014-15: 5 percent.

[22] Not all programs had charges in all years.

[23] The original costs provided by ESD staff did not account for Communications costs for FY 2013-14; we included them in this analysis.

[24] Water Pollution Control includes estimated and direct charges.

[25] Overhead Allocation figures as presented by ESD.

[26] Capital Planning and Engineering figures as presented by ESD.

See Appendix A for an in-depth look at the current practices and suggested improvements for South Bay's cost-tracking.

Recent Efforts to Improve South Bay's Chart of Accounts

Recently, ESD has made strides to improve South Bay cost tracking in order to meet requirements in the Integration Agreement with the Water District and aid in program management decision making.[27] The recent effort has focused on improving the existing chart of accounts and adding new charge codes where none existed in order to more comprehensively track staff time spent on South Bay operations. Some aspects of the new system are already in place and ESD expects to implement them soon. These changes have improved South Bay's cost tracking; however, additional improvements are needed to fully and accurately identify program costs.

Recommendation #2: To improve South Bay's operating and capital accounting, the Department of Environmental Services should:

a) Establish South Bay staff time allocations for all ESD programs with corresponding charge codes and ensure that they are incorporated in the budgeting process and consistently used by staff.

b) Establish clearly documented cost methodologies for South Bay that include all costs associated with the program and as detailed in Appendix A of this report.

Recommendation #3: ESD should prepare annual financial statements for South Bay, to be audited by the City's external financial auditor.

[27] In the recent years, ESD staff have mainly been focused on tracking program costs to satisfy the Integration Agreement requirement which requires specific elements, excluding current debt-service, in determining cost-recovery for South Bay.

Finding 2 Contractual Obligations with the Water District Limit South Bay's Ability to Cover Capital Costs

Summary

To date, South Bay capital costs have totaled roughly $250 million. The Wastewater Facility (whose primary source of revenue is from sanitary sewer ratepayers in San José, Santa Clara, and neighboring jurisdictions) provided more than two-thirds of that construction cost because of the Facility's need to reduce its flows to the bay. San José, Santa Clara, and the tributary agencies are obligated to pay an average of $9 million per year from revenues of the Wastewater Facility until 2021 when the debt is paid off.

In 2010, the City, on behalf of the Wastewater Facility, entered into an agreement (the Integration Agreement) with the Water District to build the Advanced Facility – a facility on Wastewater Facility land that would test operations of advanced water purification (wastewater that has been purified to the point that it exceeds drinking water standards) and further augment the South Bay water supply with water that would reduce the salinity of the recycled water supply.[28] The Wastewater Facility provided $11 million in funding and in-kind services to build the facility, and agreed to contract terms that use recycled water net revenue to offset Water District net operating costs for the Advanced Facility.

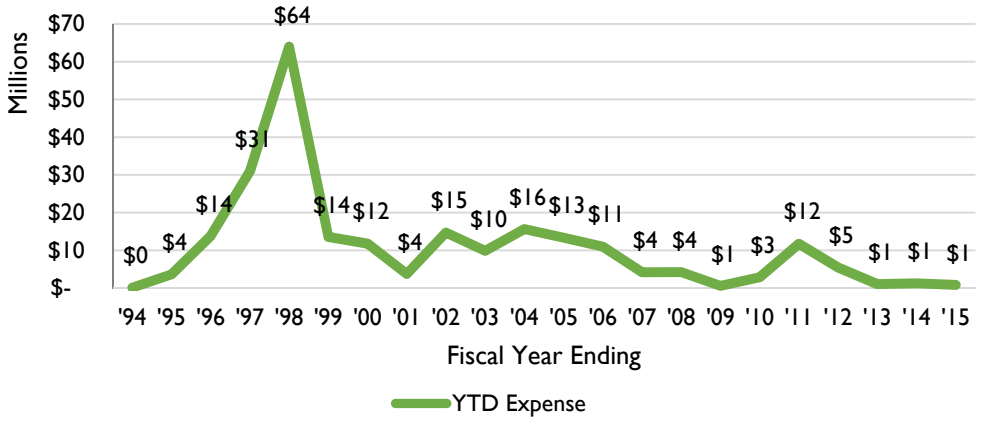
The cost sharing formula in the Integration Agreement requires San José to make payment of approximately two-thirds of South Bay's net revenues to the Water District FY 2014-15 Advance Facility operations and requires future payments that will limit South Bay's ability to use operating revenues to offset debt service payments or fund infrastructure needs. We recommend that the Integration Agreement be renegotiated to ensure sufficient funding of South Bay capital needs.

Funding Structure of South Bay

To date, the South Bay capital costs have totaled roughly $250 million. Exhibit 11 shows these costs by fiscal year.

[28] The Advanced Facility also served the purpose of offsetting some Wastewater Facility treatment costs by reducing the amount of water going through tertiary treatment.

Exhibit 11: South Bay Capital Costs from FY 1993-94 to FY 2014-15



Source: Auditor analysis of budget information

These costs have been housed in Wastewater Facility Capital Fund 512 and have been borne through multiple sources including:

- State and federal grants ($60 million to date);[29]
- Subsidies by the Water District (about $17 million to date);[30]
- Wastewater Facility connection fees; and
- Sanitary sewer ratepayers represented by the cities of San José, Santa Clara, and the tributary agencies. [31]

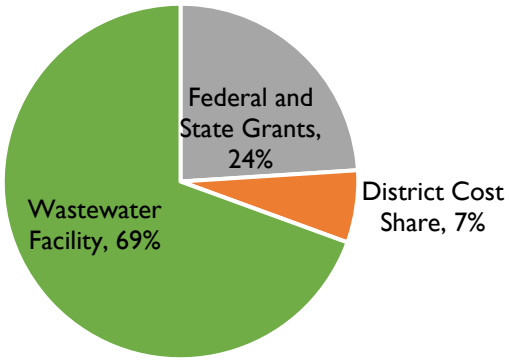
Exhibit 12 shows the breakdown of various stakeholders in South Bay's capital costs over the life of South Bay program.

[29] Federal grants include those provided by the U.S. Bureau of Reclamation; a state grant was provided by the California State Water Resources Control Board.

[30] Includes contributions as presented in Exhibit 14 of this report. Note, the Water District costs have been gathered from, both, Operating and Capital funds of the Wastewater Facility and do not include Water District funding for the Advanced Facility.

[31] The San José sanitary sewer ratepayers and tributary agencies account for the biggest revenue source for the City's investment in South Bay.

Exhibit 12: Various Stakeholders in South Bay Through FY 2014-15[32]



■ Federal and State Grants ■ District Cost Share ■ Wastewater Facility

Source: Auditor analysis of budget information and Water District Data

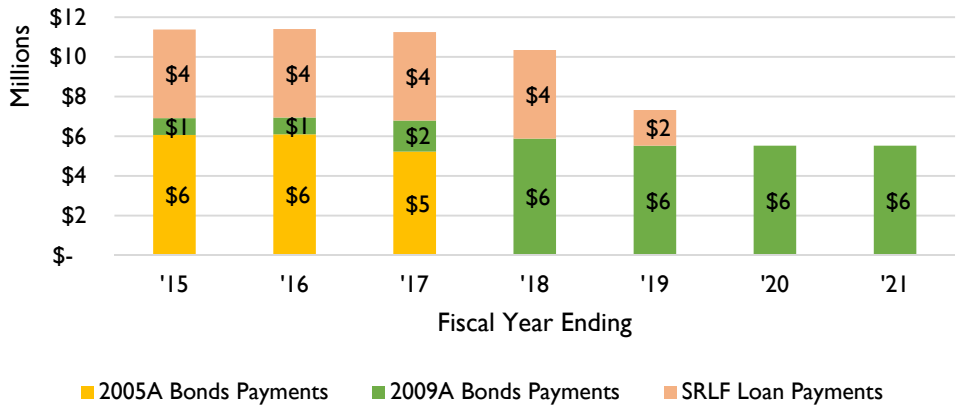
Debt Service Continues Through 2021

Sanitary sewer ratepayers from San José, Santa Clara, and all of the tributary agencies have paid for initial capital costs of South Bay through Sewer Revenue Bonds, loans, and cash contributions. Currently, there are two active bond series – 2005A and 2009A, which were issued by the San José-Santa Clara Clean Water Financing Authority and a loan from the State Revolving Loan Fund.[33] Exhibit 13 below shows debt service obligations through FY 2020-21. San José, Santa Clara, and tributary agencies are obligated to pay an average of $9 million per year from revenues of the Wastewater Facility until 2021 when the debt is paid off.

[32] The Wastewater Facility investment includes all capital costs to date for South Bay including the $11 million contribution to the Advanced Facility.

[33] The 2005A series proceeds were in the amount of $54,020,000, the 2009A series proceeds were in the amount of $21,420,000, and the State Revolving Fund Loan was in the initial amount of $73,566,018.

Exhibit 13: Sewer Revenue Bond and State Revolving Fund Loan Annual Debt Service



Source: Auditor analysis of Budget information

Collaboration with the Water District

The City of San José and the Water District have collaborated on recycled water initiatives since the early 1990s, although each have a unique perspective on water reuse. The City's primary water recycling objective has been to maintain the South Bay system as a wastewater diversion program; the Water District's primary objective has been to expand sustainable local water supplies.

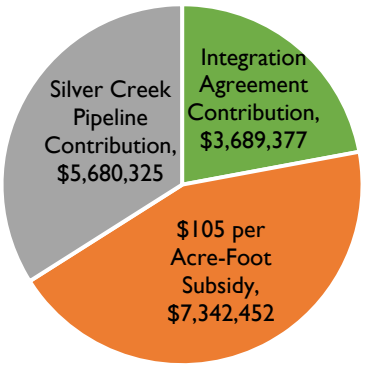
Until FY 2009-10, the Water District helped support the City's recycled water initiatives by subsidizing recycled water delivered by the South Bay system.[34] In FY 2005-06, the Water District also provided the City with roughly $5.7 million for the Silver Creek pipeline, in support of expanding the South Bay system.[35] Most recently, the Water District, with the help of the City of San José, built the Advanced Facility and provided roughly $3.7 million of support payments for South Bay while the Advanced Facility was being built, and the Wastewater Facility contributed $11 million ($8.5 million in cash and $2.5 million in kind) toward the construction of the Advanced Facility.

[34] This support totaled approximately $7.3 million from 1998 through 2009 and was based upon South Bay water sales. The terms of the subsidy are available in more detail in the *South Bay Water Recycling Reimbursement Agreement for Development and Utilization of Nonpotable Recycled Water* between the Santa Clara Valley Water District and City of San José (commonly referred to as the 1998 Reimbursement Agreement).

[35] The terms of the reimbursement are available in more detail in the *Agreement between the City of San José and the Santa Clara Valley Water District Relating to Management and Operation of the South Bay Water Recycling System, Including the Silver Creek Pipeline.*

Exhibit 14 shows contributions by the Water District in supporting South Bay, about $17 million to date; this graph does not include its funding of the Advanced Facility.

Exhibit 14: Water District Operating and Capital Contributions Toward South Bay[36]



Source: Auditor analysis of Budget information

The Advanced Facility Increased the Capacity of South Bay

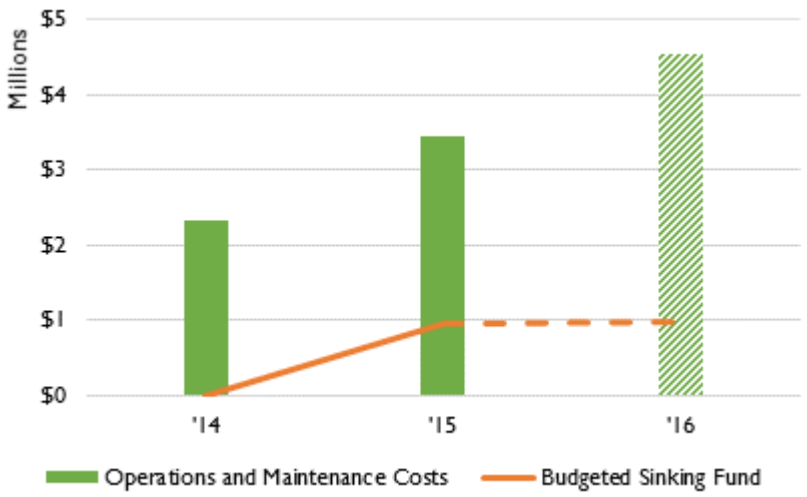
In March 2010, the City of San José and the Water District signed the Integration Agreement to partner on an advanced treatment facility for recycling water. The Water District wanted to construct the facility to evaluate its treatment capacity of producing highly purified water with an aim to construct similar facilities in the future for potable reuse projects. The Advanced Facility's water is not used for potable reuse, it is blended with existing South Bay recycled water (reducing salinity) and delivered to South Bay customers for non-potable uses. Construction of the facility began in October 2010 and the facility began operations in March 2014.

During peak summer months (months when demand for landscaping and irrigation are highest), the Advanced Facility processes roughly 7 million gallons of wastewater per day; less in rainier months. Exhibit 15 shows the operational and maintenance costs of the Advanced Facility; it is projected that the District will spend about $3.5 million to operate the facility in FY 2015-16 and will place about $1 million in a sinking fund for replacement of treatment equipment.[37] The Water District has spent about $75 million to date on the Advanced Facility, including about $14 million in state and federal grant funds.

[36] Note, the $105 per acre-foot subsidy has been received in Wastewater Facility Operating Fund 513, while the other two categories of contributions have been housed in Wastewater Facility Capital Fund 512.

[37] Under the Integration Agreement, the sinking fund contribution cannot exceed $810,000 per year, as adjusted for inflation from 2010.

Exhibit 15: Estimated Operational and Maintenance Costs for the Advanced Facility for FY 2014-16[38]



Source: Auditor analysis of Advanced Facility financial information

Advanced Facility Water Treatment Process

As Exhibit 16 shows below, the Advanced Facility takes wastewater that has completed the secondary treatment process at the Wastewater Facility and runs it through a three part process before sending it to the South Bay transmission pump station to mix with South Bay water. As described on the Water District's website, the process is as follows:

[38] Note FY 2013-14 was the start-up year for the facility, with testing beginning in January 2014 and the facility serving South Bay in March 2014. FY 2014-15 was the first full- year of operation (actual cost). Cost for FY 2015-16 show the Water District adopted budgeted costs.

Exhibit 16: Advanced Water Purification Processes at the Advanced Facility

MICROFILTRATION

Wastewater is forced through filtration membrane modules made up of thousands of hollow fibers, similar to straws. These fibers have very fine pores in the sides that are about 1/300th the width of human hair. As the water is drawn through the pores into the center of the fibers, solids, bacteria, protozoa and some viruses are filtered out of the water.

REVERSE OSMOSIS

Water is forced under high pressure through membrane sheets with holes so small that a water molecule is almost the only substance that can pass through. The process removes constituents such as salts, viruses and most contaminants of emerging concern, such as pharmaceuticals, personal care products and pesticides.

ULTRAVIOLET LIGHT

The water is sent through chambers that emit strong ultraviolet light to break down any remaining trace organic compounds. Ultraviolet light is a powerful disinfection process that creates water of very high quality. The technique often sterilizes medicines, food and fruit juices.

Source: Auditor's Office summary of Water District information

Advanced Facility Costs and Benefits

The Wastewater Facility contributed to the construction costs of the Advanced Facility by providing a combination of services and cash totaling $11 million from the Wastewater Facility Capital Fund 512 (see Appendix E for details about Fund 512). The City also provided a $10 per year ground lease for the Advanced Facility; agreed to provide secondary effluent at no charge to the District; and to allow the District to discharge its waste product (brine) from the Advanced Facility at the Wastewater Facility.[39]

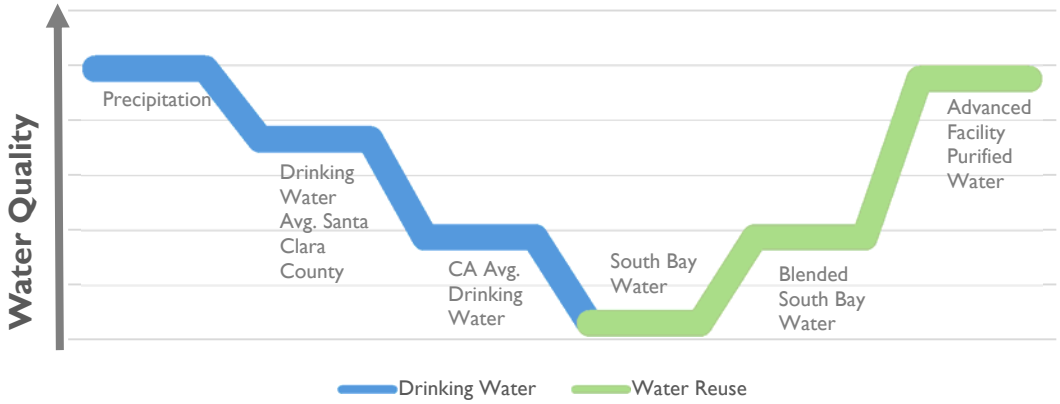
South Bay receives up to 8 million gallons per day of highly purified water to blend with its recycled water. This makes the entire "blend" of water purer. In the environmental assessment, the purpose of the Advanced Facility was to: expand existing water service, increase the marketability of existing recycled

[39] There are no charges because there have been no violations to date.

water, and serve as a demonstration project for the Water District to determine whether or not to enter into the potable water reuse market. The assessment noted that the project would also reduce the salinity of the recycled water supply which would be beneficial to the underlying groundwater in locations where recycled water was applied.

As Exhibit 17 shows, South Bay water quality improved with the addition of blended Advanced Facility water and the addition benefits both recycled water customers and sewer ratepayers.

Exhibit 17: Levels of Quality for Drinking Water and Recycled Water Based on Total Dissolved Solids (TDS)[40] Found in Water



Source: Auditor analysis of State Water Resources Control Board and Water District Data

Revenue Sharing Terms of the Integration Agreement

The Integration Agreement outlines the terms and conditions of operating the Advanced Facility and South Bay. A major part of the Integration Agreement outlines terms for cost-sharing between the two parties with a purpose of equalizing costs borne by the City and the Water District for operating and maintaining both facilities. The Integration Agreement stipulates that:

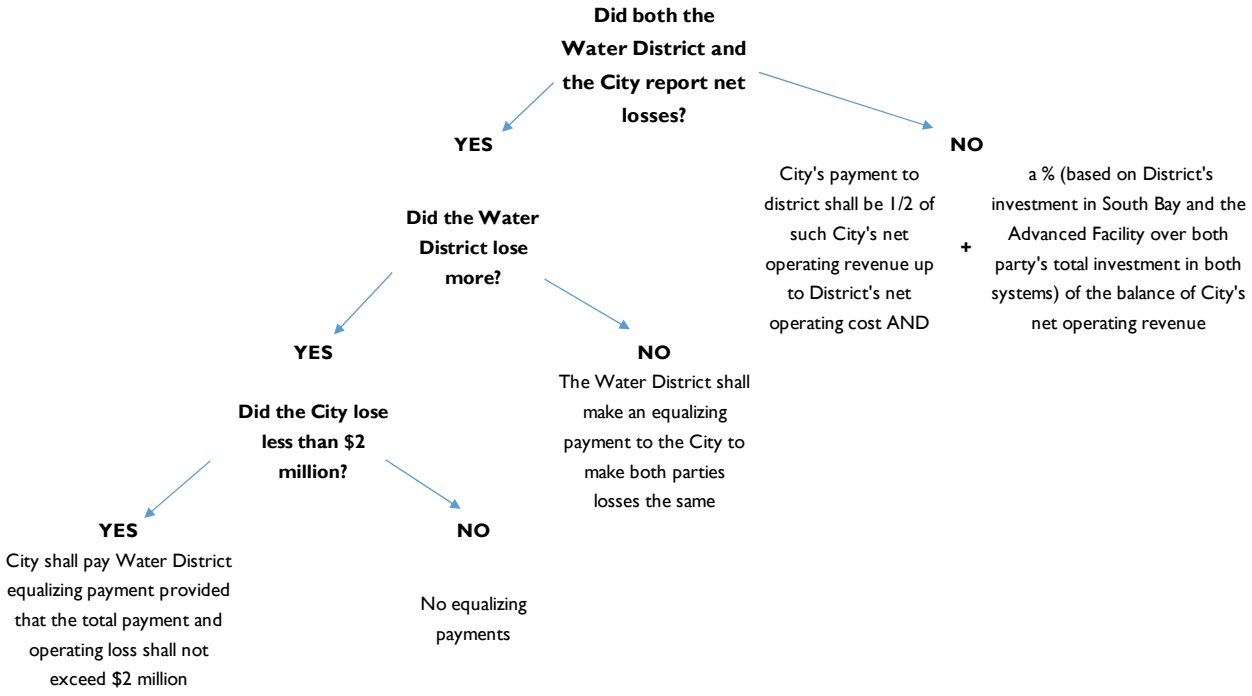
- The Water District will operate the Advanced Facility for 40 years by purifying up to 12 MGD of Wastewater Facility secondary effluent, and in return, provide the City with up to 8 MGD of highly purified water.

[40] One measurement of water quality is to identify the salinity content – the amount of dissolved particles and ions in water. TDS is a measure of all dissolved substances in water, including organic and suspended particles that can pass through a very small filter; it is measured in a laboratory and reported as mg/L. The following are the approximate TDS in mg/L found in the water categories in Exhibit 17: Precipitation (10); Drinking Water Avg. Santa Clara County (215); CA Avg. Drinking Water (500); None Blended South Bay Water (750); Blended South Bay Water (500) and Advanced Facility Water (40).

- The Water District would make payments of $1 million per year to the City to support expanding usage of South Bay water up until the Advanced Facility commenced operations; this resulted in four years of payments totaling about $3.7 million.
- The City and the District share the operating cost of the Advanced Facility based on revenue from South Bay recycled water sales.[41]

Exhibit 18 below is a simplified outline of the cost sharing terms of the Integration Agreement.

Exhibit 18: Integration Agreement Net Revenue/Loss Cost Sharing Terms of Recycled Water Sales of South Bay



Source: Auditor analysis of Integration Agreement terms

[41] Beginning in the first full fiscal year after the Advanced Facility became operational, the City became obligated to make operational support payments to the District if the City's net operating costs for South Bay were less than $2 million and less than the District's operating costs for the Advanced Facility. The amount of such payments are capped at $2 million minus the City's net operating costs. Once the City had net operating revenue, the City became obligated to pay the District half of net operating revenue up to District's net operating costs, plus an additional payment equal to the percentage of net operating revenue that is represented by the value of the District's investment in South Bay and the Advanced Facility divided by the value of the Parties total investment in South Bay and the Advanced Facility. Unless the Integration Agreement is amended, the District will never report revenue, as it cannot sell the purified water produced by the Advanced Facility, but South Bay's net financial position can result in a net operating loss or revenue depending on the given year.

The Integration Agreement's Current Revenue-Sharing Terms Limit South Bay's Use of Recycled Water Revenue to Offset Debt Service Payments or Meet Future Capital Needs

Sewer ratepayers (from San José, Santa Clara, and the tributary agencies) were the parties that paid the majority of capital costs for South Bay,[42] however unless the Integration Agreement terms are renegotiated, a significant share of South Bay revenue which may have been available to offset debt service costs and invest in capital improvements, will instead be used to support the Water District's operation of the Advanced Facility.

$60 Million in Identified Capital Improvement Needs

In the short term, the Agreement limits the ability to use recycled water revenue to offset the cost of Strategic Plan reliability projects. Although the City's Capital Improvement Program's (CIP) Budget for 2016-2020 for South Bay has identified only about $4.7 million in reliability projects to be funded, the Strategic Plan identified a broader plan of about $50 to $60 million for reliability projects to be completed in the next five years, with the most expensive project being a storage tank or reservoir totaling at least $40 million. (See Appendix C for more details).

The Impact of Revenue-Sharing on South Bay's Projected CIP

We created two scenarios to assess the Integration Agreement's impact on South Bay's ability to fund on-going operations and infrastructure improvement projects. The scenarios are built under similar assumptions as the wholesale recycled water rate models provided in the appendices of the Strategic Plan, but also consider the Integration Agreement's revenue sharing requirements, and focus on the Strategic Plan's list of system reliability improvements. It is our understanding that the purpose of these projects is to maintain existing system productivity – not system expansion – and thus fall within the original intent of the South Bay program. The scenarios use projected groundwater rates provided by the Water District (other assumptions pertaining to the scenarios can be found in Appendix D and footnotes to Scenario I).[43]

As shown below, the current cost-sharing terms of the Integration Agreement mean that even if South Bay increased its recycled water rates, it likely will not be able to accumulate sufficient net revenue to fully offset its projected $60

[42] It is important to note that South Bay was already meeting the water quality requirements of California Code of Regulations Title 22, Division 4, Chapter 4, Section 60335 and diverting approximately 14 million gallons of wastewater per day before partnering on the Advanced Facility.

[43] Water District Report, Protection and Augmentation of Water Supplies, 2015-16

million capital improvement costs, nor any unanticipated costs or debt repayment.

Scenario I: Rate Structure Stays the Same

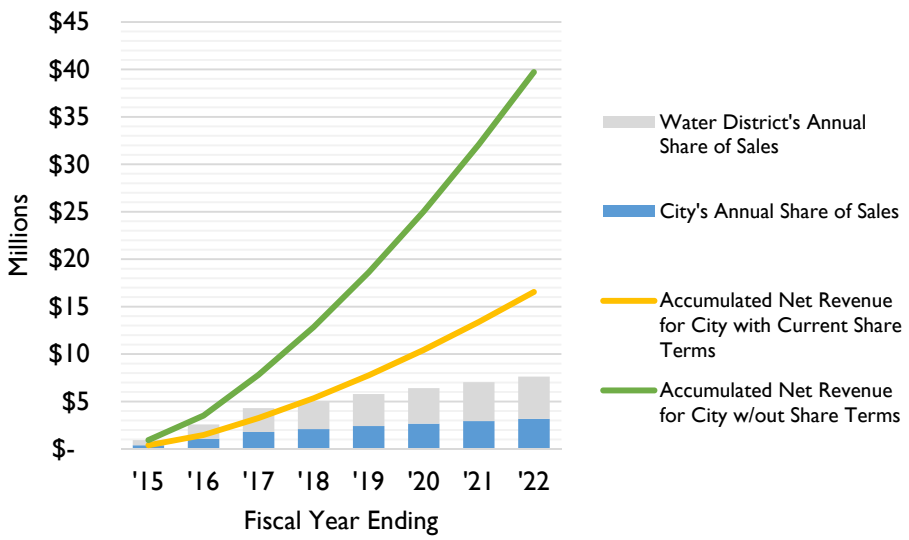
Scenario 1 (shown in Exhibit 19 below) depicts projected *annual* and *accumulated* net revenues of recycled water sales for the City and Water District and maintains the current **$105 per acre foot of discount** on groundwater rates (as of January 4, 2016). The *annual* share of sales are represented through the bars on the graph which under the current terms of the Integration Agreement favor the Water District.

The *accumulated* net revenues, shown through the two lines below, show how much the City can accumulate with the current cost share terms of the Integration Agreement and without. As can be seen, the City would accumulate more net revenue without the Integration Agreement terms.[44]

Under the terms of the Integration Agreement, the Water District will receive a payment that substantially reduces accumulated net revenues. As is shown below, ESD would only be able to offset its Strategic Plan five year CIP with recycled water revenue in the next few years, if the Integration Agreement shares are **not taken into account** (e.g. the City renegotiates the terms of revenue-sharing with the Water District). Otherwise, given the conditions of this scenario, the City would only realize about $17 million in net revenue by FY 2021-22, which will not be enough to fully offset Strategic Plan reliability improvements.

[44] Demand for recycled water is kept steady from FY 2014-15 to FY 2021-22 (at 11,000 A/F per year). In 2002, the City and the Water District entered into the Silver Creek Pipeline Agreement (*Agreement between the City of San José and the Santa Clara Valley Water District Relating to Management and Operation of the South Bay Water Recycling System, Including the Silver Creek Pipeline*) which was a plan to provide 5 million gallons of tertiary water to the Water District for Water District to use in a South San José groundwater recharge program. Should this program begin operations, it would have a big effect on recycled water volumes, and likely revenue as well.

Exhibit 19: Projected Annual Recycled Water Sales and Resulting Accumulated Net Revenue with a $105 per Acre-Foot Discount[45]



Source: Auditor analysis of Strategic Plan, Water District and ESD data

Scenario II: Increase in Water Rates

Scenario II holds the same variables as Scenario I, but assumes higher rates for recycled water (instead of the $105 per acre-foot discount, it projects a lower **$50 discount per acre foot starting** in FY 2016-17). In this scenario, we assume no loss in customers from changing recycled water prices.

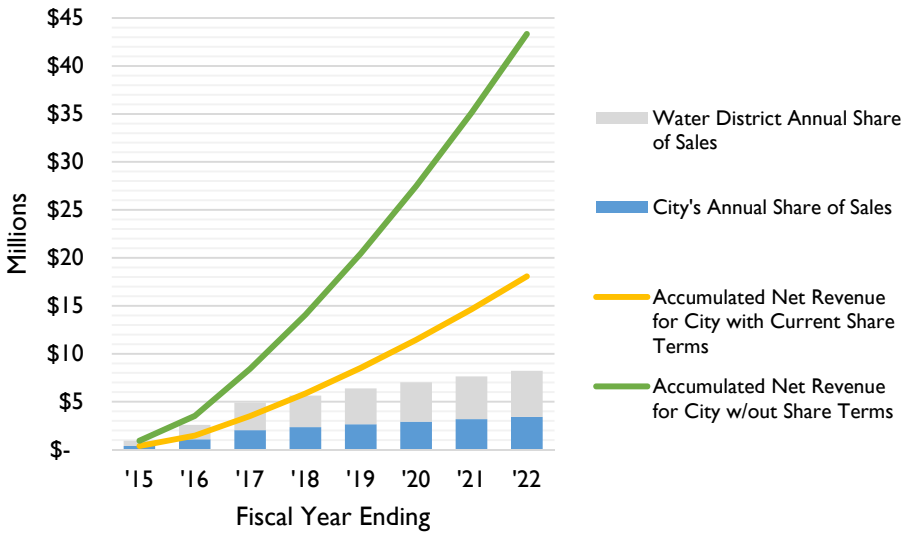
However, even this rate increase would not sufficiently fully offset identified reliability improvements. In this scenario, the City would only realize approximately $18 million in accumulated net revenue by FY 2021-22 – still not

[45] The scenarios shown in Exhibit 19 and 20 assume the following (those with an * are also built into the rate models presented in the Strategic Plan):

- Projected North County Groundwater Rates provided by the Water District with a $105 per acre-foot discount applied.
- Estimated South Bay operational costs starting at $5.9 million for FY 2014-15 and projected into the future with a 3% inflation rate*.
- Accumulated net revenues based on recycled water sales.
- The Zone 1 Storage Tank is considered a reliability project as hydraulic modeling suggests that increased storage is needed in Zone 1 (the zone with the highest demand) to provide an operable system during high demand periods (e.g. minimize the chance of empty storage tanks, dropping system pressures, etc.).
- The net-revenue share percentages for the City and the Water District are based on Exhibit C of the Integration Agreement. We have assumed that after splitting net-revenue up to the District's net operating cost, the Water District receives 16.66% of City's net remaining revenue. Therefore, we have assumed that the Water District's total share of net revenue is 58.33% and the City's share is 41.67%.

enough to fully offset identified reliability improvement costs without renegotiating the Integration Agreement's revenue sharing terms.

Exhibit 20: Projected Annual Recycled Water Sales and Resulting Accumulated Net Revenue with a $50 per Acre-Foot Discount



Source: Auditor analysis of Strategic Plan, Water District and ESD data

As both scenarios above show, the City needs to renegotiate the terms of the Integration Agreement with the Water District in order to establish terms that will allow South Bay to operate at operational and capital cost recovery through recycled water sales.

South Bay Should Secure a Cost of Service Study and Develop a Simple Rate Model

Historically, South Bay has indexed its wholesale recycled water rates to the Water District's untreated groundwater rate, regardless of actual costs, and as of FY 2014-15, it provided an equal, $105-per acre-foot discount for all water use types (irrigation, agricultural and industrial).[46]

A cost of service study would be valuable to determine revenue needs for maintaining South Bay's functionality as a water system with minimal reliance on sewer ratepayers.

[46] Prior to FY 2014-15, industrial and agricultural users received a larger discount than irrigations users. However, starting in FY 2015-16, the discount to all water use types was equalized to $105 per acre-foot.

Currently, South Bay does not have a rate setting model. And as can be seen from the scenario analyses above, any analysis of rate options is exacerbated by the stringent revenue-sharing terms that restrict its timely capital improvement project development.

Best practices show that effective rate models contain variables that balance economic, equity and environmental perspectives in order to arrive at an optimal pricing strategy. A study on rate models identifies that an effective utility rate model should consider the following questions, as applicable:

- Do revenues cover costs?
- Does it consider the structure of cost allocation of uses and users?
- Does the price structure encourage conservation?
- Are revenues stable?
- Is the pricing model understandable and does it provide a clear price signal?
- Is the pricing model fair and equitable to all users and does it consider the extent of cross subsidies?

With only four customers, ESD staff should be able to create a simple rate model. There may be a business case to discount prices to ensure that rates are always less than groundwater or imported water costs to encourage use, but this should not preclude ESD from considering actual unit costs in their rate-setting process. In addition, system expansions, upgrades, or sharing of resources (e.g. wastewater) with the Water District or any other organization should be considered from a cost-benefit perspective with costs and program goals considered.

Recommendation #4: To sustain South Bay's operating and capital cost recovery status in the future, ESD should:

a) Renegotiate the revenue sharing terms of the Integration Agreement to allow the City to access South Bay revenue to fund South Bay's projected capital costs sooner than is projected to occur under the Agreement as currently written.

b) Secure a recycled water wholesale cost of service study that can be used to maximize the ability to maintain cost recovery for South Bay.

Conclusion

For the past fifteen years, San José has operated a water recycling program through the San José Regional Wastewater Facility. That program started as a wastewater diversion program but has grown into a part of the region's water supply, providing non-potable water to over 700 large scale water users and has generated net revenue for the first time in its history. San José needs to set up better accounting structures including separate funds for the program in order to ease decision making for managers and provide clarity around revenues and expenses for stakeholders. Additionally, San José needs to renegotiate the Integration Agreement improve access to funding for capital needs in the near future.

RECOMMENDATIONS

Recommendation #1: The Department of Environmental Services should work with the Budget Office and Finance Department to establish operating and capital funds for South Bay separate from other Wastewater Facility operating and capital funds.

Recommendation #2: To improve South Bay's operating and capital accounting, the Department of Environmental Services should:

a) Establish South Bay staff time allocations for all ESD programs with corresponding charge codes and ensure that they are incorporated in the budgeting process and consistently used by staff.

b) Establish clearly documented cost methodologies for South Bay that include all costs associated with the program and as detailed in Appendix A of this report.

Recommendation #3: ESD should prepare annual financial statements for South Bay, to be audited by the City's external financial auditor.

Recommendation #4: To sustain South Bay's operational and capital cost recovery status in the future, ESD should:

a) Renegotiate the revenue sharing terms of the Integration Agreement to allow the City to access South Bay revenue to fund South Bay's projected capital costs sooner than is projected to occur under the Agreement as currently written.

b) Secure a recycled water wholesale cost of service study that can be used to maximize the ability to maintain cost recovery for South Bay.

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APPENDIX A

Current Cost-Tracking Practices of South Bay and Recommendations

Throughout its history, South Bay's expenses have been paid through Wastewater Facility funds. South Bay recycled water revenue and capital costs have been clearly tracked. This appendix provides more detail on how South Bay expenses have been or should be tracked to improve access to more detailed financial information.

Staff Time Costs

To identify program personal costs, ESD staff use a cost tracking methodology that is based on using existing South Bay direct and estimated staff time charges. Staff time that is estimated does not have a clearly documented methodology; ESD staff have gathered the estimated charges based on conversations with program managers. The charge codes that do exist for the South Bay program are based on both manual time charges and automatic charges.[1]

To minimize estimations for South Bay expenses, ESD staff should implement South Bay specific time allocation codes for all programs that have staff working on South Bay. This includes creating new time allocation codes for Program 1 – Administrative Services, Program 7 – Watershed Protection and the Operational/Management portion of Program 9 – Water Pollution Control, as currently, there are no South Bay codes for staff in those programs. As the first part of Finding 1 details, the latter do not have South Bay specific budgeted time allocations in the Labor Distribution Report (LDR). Our audit recommends budgeting these programs in the LDR with South Bay time allocations, and enforcing accurate time charging for employees that log their time on a daily basis. On the other hand, budgeted South Bay time allocations should be used to track staff time costs for management level positions that do not require daily time logging.

The rest of ESD programs that relate to South Bay, Programs 2, 3, 6, 8 and 9 currently have South Bay specific time codes, but staff should closely analyze usage of these codes to see if any should be improved. Accurate time code usage should be enforced by program management to better reflect program costs.

Other Costs

Other South Bay major expense categories are: (1) power and air; (2) chemicals used to treat the recycled water to quality standards; and (3) lab services that monitor the quality of the water. All of these costs are housed in Program 9 (the Water Pollution Control category). To identify South Bay's portion out of total Wastewater Facility costs, ESD staff have used estimates based on water and electricity processing volumes. For instance, South Bay's estimated power and air usage out of total Facility costs, is based on the amount of non-renewable electricity that the main transmission pump station for South Bay water uses as a percentage of total Plant power usage. Instead of tracking these costs based on estimates of South Bay from total costs of the Wastewater Facility, ESD staff should implement new charge codes or use existing ones to account for these costs, as applicable.

[1] Staff time that is automatically charged is based on a budgeted allocation amount that is decided annually.

Overhead Allocation

In developing the Budget for an upcoming fiscal year, the Budget Office calculates departmental overhead allocations at the beginning of the year based on budgeted salaries and factoring in the overhead rate provided by the Finance Department for a given budgeted fund. Because South Bay does not have its own separate fund, Finance does not calculate a separate overhead rate for South Bay, so ESD staff have been calculating the South Bay overhead allocation themselves in order to fully allocate South Bay program costs.

The methodology[2] that ESD staff have used to determine South Bay's overhead allocation incorporates personal costs from budgeted salary reports by specific categories called core services[3] and as well as actual personal costs of Program 9 that pertain to South Bay.

The current overhead calculation methodology hinges on including budgeted salaries for the core service Recycled Water Management (housed in Program 6), actual salaries for maintenance and operations staff at the Wastewater Facility (housed in Program 9 – Water Pollution Control), and applying the overhead rate for the Wastewater Facility. For lack of clearly budgeted staff time at the Wastewater Facility, ESD staff use *actual* staff salaries for operations and maintenance staff in the overhead calculation for South Bay. This is a deviation from the methodology used by the Finance Department. We recommend ESD staff ensure that overhead allocation for South Bay uses the same methodology as the allocation to the Wastewater Facility until such time as the separate funds are established. At that point, the Budget Office would allocate South Bay's overhead while the Finance department will calculate its overhead rate.

Treatment of Capital Costs According to the Integration Agreement and for the City's Purposes in the Future

A specific line item called, Capital Planning and Engineering is required to be explicitly categorized as part of South Bay's operating costs according to the Integration Agreement terms. The South Bay cost compilation spreadsheets, presented to us by ESD staff, tracked this category; however, the methodology behind the calculation was not clearly documented. For instance, one of the costs (among others) in this Capital Planning and Engineering category was the Strategic Planning appropriation. A different percentage of this appropriation was pulled into the category each year with no documentation as to the cost methodology.

Furthermore, it is the intention of this audit that as separate funds are created to house South Bay operational and capital costs. As such, we recommend that the cost methodology arrived at by ESD staff, be clearly and thoroughly documented (since it may include expenses from two separate funds).

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[2] Note, the overhead allocation methodology for FY 2012-13 only used budgeted amounts, not actual staff charges.

[3] The City organizes the services it provides to residents into core services. The City's Environmental Services Department is divided into six core services: Natural and Energy Resources Protection, Potable Water Delivery, Recycled Water Management, Recycling and Garbage Services, Stormwater Management and Wastewater Management. The Budget Office annually reports budgeted amounts for all of the core services.

ESD Should Account for Employee Benefit Costs for South Bay

Our audit found that the three year financial tracking did not include personal costs related to employee post-employment benefits (OPEB) – a substantial expense that should have been included in the transactional category called Net Other Pension Employee Benefits. This is an example of how the elements constituting as part of South Bay's expenses were still a work in progress. The OPEB cost omission from South Bay's accounting structure is an example of why separately budgeting and reporting for South Bay is of utmost importance for transparency and public accountability.

Future South Bay Costs Related to the Advanced Facility

Currently, South Bay does not charge the Advanced Facility for return water[4] or brine,[5] because these costs are incidental and do not require any further treatment. Although both of these processes are under control, in that they do not create additional costs for the Wastewater Facility, should they become costly in the future or violate any toxicity limits of discharge water – they should be charged to the Water District according to stipulations found in the Integration Agreement.

[4] The return water travels from its microfiltration filters back to the Wastewater Facility's beginning stages of treatment.

[5] The Advanced Facility channels its brine to the same discharge point that is used by the Wastewater Facility. Prior to discharge, water quality is monitored by staff at the Wastewater Facility to identify any violations of the Discharge Permit.

APPENDIX B
Recycled Water Regulations

Recycled Water Regulations

In California, the following state agencies are involved with regulating recycled water in the following ways:

California Department of Public Health

It is charged with the protection of public health and drinking water supplies and with the development of uniform water recycling criteria appropriate to particular uses of water. Regional water quality control boards rely on its expertise for the establishment of permit conditions needed to protect human health.

State Water Resources Control Board

It is charged with establishing general policies governing the permitting of recycled water projects consistent with its role of protecting water quality and sustaining water supplies. The Board exercises general oversight over recycled water projects, including review of Regional Water Board permitting practices, and leads the effort of meeting state recycled water use goals. It is also charged by statute with developing a general permit for irrigation uses of recycled water.

Regional Water Quality Control Boards are the regional counterparts to the State Water Board; the City of San José recycled water projects are governed by the San Francisco Bay Regional Water Quality Control Board. These Regional Boards are charged with protection of surface and groundwater resources and with the issuance of permits that implement Department of Public Health recommendations, the State's Recycled Water Policy, applicable law and encouraging the use of recycled water. South Bay's current permit, Order No. 95-117, was granted by the Regional Board in 1995.

California Department of Water Resources

It is charged with reviewing and, (every five years,) updating the California Water Plan, including evaluating the quantity of recycled water presently being used and planning for the potential future uses of recycled water.
California regulates recycled water through its Code of Regulations, specifically, Titles 17 and 22.

Recycled Water Quality Levels

Highly purified: The Advanced Facility meets this quality standard which uses advanced treatment types to purify the water including microfiltration, reverse osmosis, and UV light treatment. Water meeting this quality level can be used as potable water, although it is not used that way at the Advanced Facility.

Disinfected tertiary: South Bay water meets this quality standard which using oxidation, filtration and disinfection to treat water. Water meeting this quality level can be used for many purposes including irrigation, landscaping, golf courses, cooling towers and flushing toilets.

Disinfected secondary: Many wastewater treatment facilities stop at this treatment level (although ESD's Wastewater Facility purifies further) which uses oxidation and disinfection to treat water. Water meeting this quality level can be used for many purposes including cemetery and freeway landscaping.

APPENDIX C
Strategic Plan Capital Improvements

South Bay's 5-Year CIP as Identified in the Strategic Plan

The Strategic Plan lays out a five year CIP to maintain reliability for the South Bay system which would cost between $45 and $60 million to fund, as shown in the exhibit below.

	Estimated Cost Range	
Project Name	*Minimum Amount Needed*	*Maximum Amount Needed*
Increase Production Capacity		
TPS Capacity Upgrade	$1,000,000	$1,300,000
Filter Flux Rate	$75,000	$75,000
Free Chlorine Disinfection Studies/Implementation	$500,000	$1,000,000
Improve Distribution System Stability		
Upgrade Pump Station 5 Bypass	$300,000	$500,000
Zone 1 Storage	$40,000,000	$50,000,000
Restore/Rehabilitate Existing Condition-Related Deficiencies		
PS 5 VFDs	$60,000	$60,000
Other Condition Assessment Projects (2014-2015 Projects)	$2,000,000	$2,000,000
Valve Exercising Program	$100,000/year	$500,000
PS 5 and PS8/11 Electrical Room HVAC Replacement	$150,000	$250,000
Update Control Strategies/Equipment to Improve Operational Efficiency		
Filter Backwash Automation	$100,000	$500,000
Distribution System Automation	$650,000	$2,150,000
Automate Zone Bypass Valve at Pump Station 8/11	$50,000	$50,000
Provide Operations Support		
Update SBWR Systems Operations Manual	$100,000	$200,000
TOTAL COST OF CIP	$45,085,000	$58,585,000

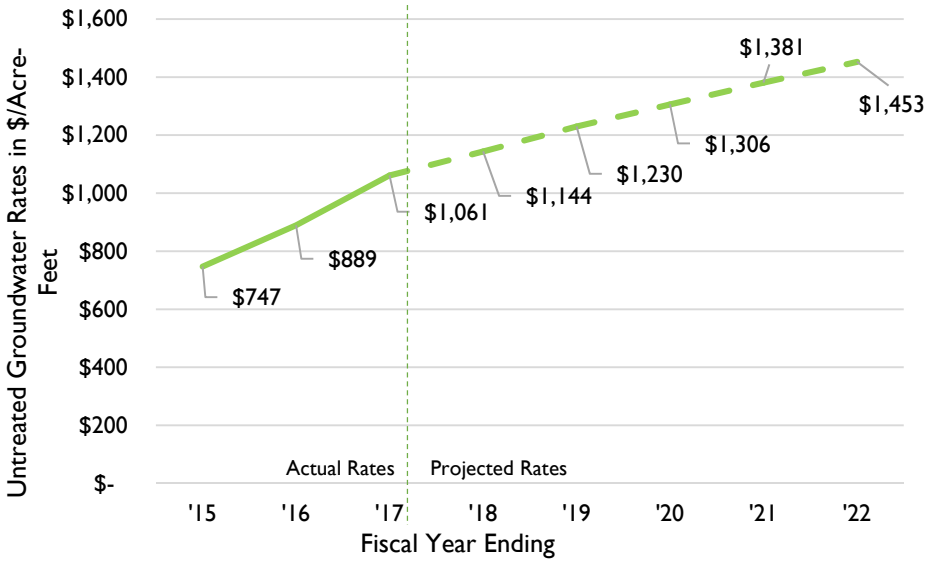
Source: Strategic Plan

APPENDIX D

Projected Water Supply Wholesale Rates

The Water District establishes rate projections of various types of water (e.g. treated water, untreated groundwater, etc.) for a ten year period. South Bay wholesale recycled water rates, have historically, been indexed to the Water District's groundwater rates. Since FY 2011-12, the rates increased at about 9% per year, until FY 2015-16 saw an increase of 19%. The exhibit below shows Water District provided groundwater rate projections[1] from FY 2016-17 to FY 2021-22. The two scenarios in this report utilize these projected rates.

Water District's Projected Untreated Groundwater Rates ($/AF)



Source: Water District projections

[1] The rate projections are taken from the Water District's Protection and Augmentation of Water Supplies Report 2015-16. It should be noted, that preliminary projections for FY 2016-17 are slightly higher.

APPENDIX E
Funding Sources

Historically, South Bay has been funded through several Wastewater Facility funds:

Sewer Service and Use Charge Fund 541

The Sewer Service and Use Charge Fund accounts for Sewer Service and Use Charges used for the financing, construction, operation, and maintenance of the City's sewage collection system and for San José's share of the Wastewater Facility. Revenues for this fund come from fees for San José's Sewer Service and Use Charge levied and paid by residential, commercial, and industrial users of the sanitary sewers and interest earnings.[1]

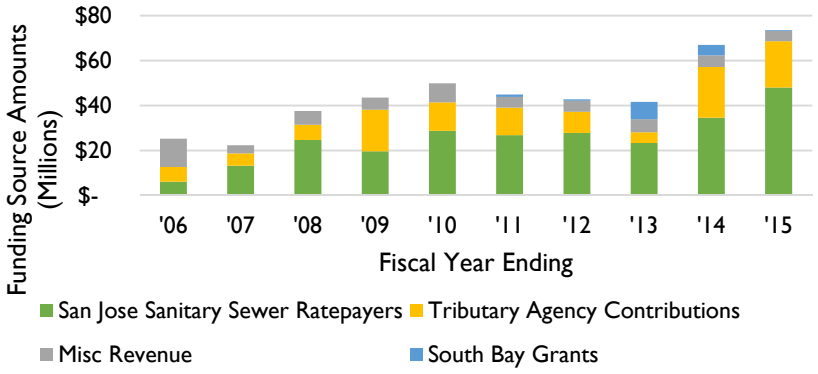
San José – Santa Clara Treatment Plant Operating Fund 513

The San José - Santa Clara Treatment Plant Operating Fund accounts for the revenues and expenditures required for operation and maintenance of the Wastewater Facility including the South Bay Water Recycling System and associated regulatory compliance activities. This fund is governed by the March 30, 1959 Sewage Treatment Plant Master Agreement between the City of San José and the City of Santa Clara and Master Agreements with each of the Plant tributary agencies. The fund balance of this fund is based on each participating agency's proportional share of the operations and maintenance budget as apportioned to treatment parameters and as recommended by the TPAC and approved by the City of San José, the administering agency. Sources of funds include transfers from Fund 541, contributions from participating tributary agencies, and interest earnings.

San Jose – Santa Clara Treatment Plant Capital Fund 512

The Wastewater Facility Capital Fund (Fund 512) is used to provide funding for all capital programs of the Wastewater Facility, including South Bay. As the exhibit below shows, the biggest sources of revenue for Fund 512 have been sanitary sewer ratepayer and tributary agency contributions, which have averaged about 80 percent of total revenues for the past decade. Other sources of miscellaneous revenue have included Wastewater Facility connection fees, Water District contributions to South Bay, interest revenue, etc.

Historical Sources of Funds for Wastewater Facility Capital Fund 512[2]



Source: Auditor analysis of FMS

[1] Proposition 218, officially titled the "Right to Vote on Taxes Act" was approved by California voters on November 5, 1996. It contains many parts, but as it relates to this audit, Proposition 218 requires that property-related fees and charges have a direct relationship to property-ownership. Proposition 218 applies to sanitary sewer use and charge fees that have, since South Bay's inception, been used, in part, to cover operational and capital costs of the program, on the basis that property owners were deriving a direct benefit by the City's compliance with the Discharge Permit requirements for operating and maintaining a water diversion program.

[2] Note, the category South Bay Grants in this exhibit only lists those capital grants that were received in Fund 512; it does not include all grants for the South Bay program.