

SEWER AUTHORITY MID-COASTSIDE
Staff Report

Subject / Title

Receive Update on Recycled Water Planning Study

Staff Recommendation:

Receive Update on Recycled Water Planning Study

Fiscal Impact:

None.

Discussion/Report:

Staff and SRT Consultants continued the development of alternatives for the Recycled Water Project. The project alternatives include water recycling alternatives, non-recycled water alternatives, and a no project alternative. In addition, cost estimates for recycled water alternatives will be presented to the Board for review and consideration. The evaluation of alternatives will be completed upon receiving comments from the Board. The evaluation will result in a recommendation of the most viable alternative as the preferred alternative.

Attached is a memo from SRT Consultants providing additional detail on the status of the Recycled Water Planning Study.

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Memorandum

DATE: October 20, 2009

TO: John F. Foley III, Manager, Sewer Authority Mid-Coastside

FROM: Tanya Yurovsky, P.E., SRT Consultants

SUBJECT: SAM Recycled Water Facilities Planning Study – Project Alternatives

Background

The Sewer Authority Mid-Coastside (SAM) contracted SRT Consultants to complete a Recycled Water Facilities Planning Study (Study), with the goal of developing a comprehensive Recycled Water Facility Plan (Facility Plan) based on evaluating all appropriate alternatives.

Development and evaluation of project alternatives for the Recycled Water Project is required by the State Water Resources Control Board (SWRCB) Water Recycling Facilities Planning Grant Program agreement. The project alternatives include water recycling alternatives, non-recycled water alternatives, and a no-project alternative. The evaluation will result in a recommendation of the most viable alternative. Parameters and assumptions have been established by researching pressure, flow, storage, and water quality data.

Recycled Water Alternatives

Potential customers, treatment options, and storage options were evaluated to create recycled water project alternatives. Results from the marketing study of potential customers were used to determine the recycled water facility (Facility) sizing and to evaluate treatment and storage options on a customer-specific basis. The recycled water alternatives were developed based on the assumption that the Facility will be located within the current SAM WWTP site. The two water recycling alternatives under consideration were presented to the Board at its September 2009 meeting and include the following:

- A 0.8 million-gallon-per-day (MGD) facility with membrane filtration and ultraviolet disinfection treatment train, delivery pipelines, and storage, and
- A 1.6 MGD facility with membrane filtration and ultraviolet disinfection treatment train, delivery pipelines, and storage.

Recycled Water Alternative 1

In Recycled Water Alternative 1 (RW1), an 0.8 MGD facility would be built to provide tertiary-treated unrestricted use recycled water to users that have expressed strong interest in purchasing recycled water and are expected to be able to connect to the system as soon as it becomes available.

Potential Users and Facility Sizing

Upon initial evaluation, the Ocean Colony Golf Courses (hereinafter OCP), Nurserymen's Exchange Lot Number 1 (the northern most lot), and Daylight Farms appear to be the most feasible potential customers to initially connect to the SAM tertiary treatment facility based on demand, proximity of the pipeline tie-in, environmental benefits and expressed motivation to connect. OCP presently pumps approximately 0.5 MGD from their 5 wells located along Pilarcitos Creek and delivers the water through their own pipeline to the golf course irrigation water storage and distribution system. Since OCP had stated that they were willing to use the existing pipeline to convey recycled water, connecting this customer to the SAM tertiary treatment facility would require a relatively small amount of new infrastructure improvements. In addition, OCP has been an active participant in providing information for this Study and expressed its willingness to work with SAM to connect to the recycled water source.

The facility would be designed to initially handle the production of 0.8 MGD and provide water to OCP, Nurserymen's Lot No.1, and Daylight Farms, with an option to increase production when other potential customers are ready to commit to the project and start paying for the project costs.

This alternative includes the following key components:

- A new 0.8 MGD tertiary treatment facility located on the SAM WWTP site
- Conversion of the existing Aeration Basin No. 4 to an equalization storage tank prior to tertiary treatment
- Conversion of the existing Secondary Clarifier No. 2 to a tertiary treated water storage facility during dry weather when this clarifier is not utilized for treatment
- Secondary effluent booster pump station from storage to tertiary treatment
- Tertiary water booster pump station to deliver recycled water to customers

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- Utilization of the existing pipeline owned and operated by OCP for delivery of recycled water to OCP
 - Installation of a Pillarcitos Creek crossing to connect the new tertiary water booster pump station with the existing OCP pipeline
 - Installation of a shared pipeline from the tertiary water booster pump station to Daylight Farms and Nurserymen's Lot No. 1, including possible installation of a new 4-inch line inside the existing abandoned 10-inch CCWD pipeline
 - Chemical addition to address specific customer water quality concerns

Level of Treatment

The level of treatment for the Facility must comply with the following requirements:

- Meet or exceed Title 22 guidelines for recycled water tertiary unrestricted use; and
- Address specific constituent levels in the secondary effluent discharged from SAM WWTP to make it acceptable for irrigation use

To produce a reliable supply of high quality water that will satisfy the requirements of potential customers, membrane filtration followed by UV disinfection has been established as the most feasible treatment technology.

Storage Locations

The most efficient and cost-effective recycled water storage option for the 0.8 MGD plant would utilize a combination of existing SAM WWTP storage and on-site customer storage. Since the demand from OCP would be for a period of about 6 hours through the night, and the peak of SAM's secondary effluent supply is during the day, several flow equalization storage locations in the treatment and delivery processes are necessary. Adding two other customers with differing usage patterns aids in reducing storage requirements. Based on SAM's average dry weather effluent flow trend, an effective storage and delivery system would include the following processes:

- Secondary effluent will flow into the existing 250,000-gallon Aeration Basin No.4 (not required for wastewater treatment) converted to equalization storage prior to tertiary treatment,

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- Secondary effluent will then be treated by the membrane filtration system followed by UV disinfection at a flow rate designed for effective treatment and to meet customer demands,
- Tertiary treated water will flow into either the existing Secondary Clarifier No. 2 temporarily converted to a storage tank and/or directly to the on-site customer storage facilities, depending on the customer demands and other factors.

Recycled Water Alternative 2

In this alternative (RW2), a 1.6 MGD facility would treat the total SAM WWTP average dry weather flow (ADWF) and serve the needs of all the potential customers evaluated in the Study. A 1.6 MGD plant will improve the Midcoast water supply portfolio, provide environmental benefits, and promote economic sustainability for some of the region's largest employers.

Potential Users and Facility Sizing

The 1.6 MGD facility would produce water to be pumped to the six potential customers, including the three included in RW1 and three additional that appear less committed at this time, through a recycled water distribution system. All distribution pipelines, with the exception of the OCP pipeline, would need to be newly constructed for this alternative. Connecting all customers would decrease the demand on several high production groundwater wells in the area, which would decrease water draw on the local aquifers and on Pillarcitos Creek. In addition, SAM would have the capacity to treat the entire ADWF, and therefore decrease the amount of secondary effluent that is released into the ocean.

This alternative includes the following key components:

- A new 1.6 MGD tertiary treatment facility located on the SAM WWTP site
- Conversion of the existing Aeration Basin No. 4 (not needed for wastewater treatment) to an equalization storage tank prior to tertiary treatment
- Conversion of the existing Secondary Clarifier No. 2 to a tertiary treated water storage facility during dry weather when this clarifier is not utilized for treatment
- Secondary effluent booster pump station from storage to tertiary treatment
- Tertiary water booster pump station to deliver recycled water to customers
- Utilization of the existing pipeline owned and operated by OCP for delivery of recycled water to OCP, Bay City Flow Company, Nurserymen's Lot No.2, and Guisti Farms
- Installation of a Pillarcitos Creek crossing to connect the new tertiary water booster pump station with the existing OCP pipeline

- Installation of a shared pipeline from the tertiary water booster pump station to Daylight Farms and Nurserymen's Lot No. 1, including possible installation of a new 4-inch line inside the existing abandoned 10-inch CCWD pipeline
- Installation of a shared pipeline from the OCP pipeline to Bay City Flow Company, Nurserymen's Lot No.2, and Guisti Farms
- Rehabilitation of the existing OCP pipeline to accommodate additional users
- Installation of a steel pipeline and a booster pump station to deliver tertiary treated water to the Skylawn Memorial Park
- Chemical addition to address specific customer water quality concerns

Level of Treatment

The level of treatment desired for the Facility must comply with the following:

- Meet or exceed Title 22 guidelines for tertiary unrestricted use recycled water treatment; and
- Address specific constituent levels in the secondary effluent discharged from SAM WWTP to make it acceptable for irrigation use

To produce a reliable supply of high quality water that will satisfy the requirements of all potential customers, membrane filtration has been established as the most feasible treatment technology.

Storage Locations

The most efficient water storage option for the 1.6 MGD plant would be to utilize SAM Facility storage as well as on-site customer storage. Since the demands of the potential customers are currently unknown, both in quantity and time of day demand periods, the storage options are myriad. Depending on the amount of on-site customer storage, there may or may not be sufficient equalization storage at the SAM Facility. Thus, there are several options for storage. Similar to the 0.8 MGD plant in RW1, an effective storage and delivery system for RW2 could include the following processes:

- Secondary effluent will flow into the 250,000-gallon existing Aeration Basin No.4 converted to equalization storage to be stored prior to tertiary treatment,

- Secondary effluent will flow from the converted Aeration Basin No. 4 through the membrane filtration and UV disinfection system at a flow rate designed for effective treatment and to meet customer demands,
- Tertiary treated water will flow into either the temporary converted Secondary Clarifier No. 2 or directly to the on-site customer storage facilities, depending on the customer demand.

Additional storage at the SAM Facility may need to be constructed and used in conjunction with both the Aeration Basin and Secondary Clarifier as equalization storage. The exact storage volume would depend on the customer demands, on-site customer storage availability, and rate of tertiary treatment.

Due to the extremely high estimated construction and anticipated operations and maintenance costs of delivering tertiary-treated effluent to Skylawn Memorial Park, two sub-alternatives have been developed for RW2, as follows:

RW2-A: This sub-alternative addresses all treatment, storage, and delivery needs for all customers with the exception of the Skylawn Memorial Park

RW2-B: This sub-alternative serves all six potential customers.

Estimated Costs

The table on the following page provides a summary of estimated costs for recycled water alternatives and sub-alternatives.

Estimated Total Project Costs

Components	Alternative RW1 0.8 MGD	Alternative RW2-A 1.6 MGD, five customers	Alternative RW2-B 1.6 MGD, 6 customers
Treatment¹			
UF Membranes with UV Disinfection	\$6,000,000	\$8,000,000	\$8,000,000
Transmission & Distribution			
● OCP Existing pipeline ² and New NSE pipeline ³	\$2,500,000	\$2,500,000	\$2,500,000
● Rehabilitation of existing OCP pipeline	-	\$600,000	\$600,000
● New customer combined usage pipeline ⁴	-	\$2,000,000	\$2,000,000
● New pipeline and pump station to Skylawn Memorial Park	-	-	\$10,800,000
TOTAL Capital Cost⁵	\$8,500,000	\$13,100,000	\$23,900,000

Notes:

1. Cost of delivery to SAM WWTP fence, including conversion of existing secondary clarifier and aeration basin to seasonal recycled water storage
2. OCP pipeline used by OCP only
3. Installing new 4" pipe inside of existing 10" CCWD pipeline that runs adjacent to Hwy 1. Utilized for NSE Lot #1 and Daylight Farms
4. Assumed shared use of existing OCP pipeline by OCP, BCF, Giusti Farms, NSE Lot #2 and construction of an additional 1.5 mile shared pipeline for BCF, Giusti Farms and NSE Lot #2
5. Total project cost including Administration, Legal, Planning, Coastal Act Compliance, CEQA, Design, Permitting, Construction Management and 25% Contingency

Non-Recycled Water Alternatives

According to the information received from the Coastside County Water District (CCWD) water demand for service area in 2015 is estimated to match the average supply at one billion gallons, based on the growth rates and water use trends. Supporting the projected population growth as stipulated in the Local Coastal Program will require additional water supply.

According to the 2008 CCWD Water Supply Summary, the projected water demand for 2030 would be 1.2 billion gallons per year at a one-percent population growth rate or 1.3 billion gallons per year at a 1.5-percent population growth rate. The required additional supply to meet the 2030 demand would be approximately 200 to 300 MG per year. This required additional supply is based on the historical average yield from local sources and the assumption that the SFPUC contract amount remains at 800 MG/yr. It is also possible that the amount of water allocation to CCWD from SFPUC could be reduced given potential future cost constraints or reduction in SFPUC supply due to drought.

Although recycled water is a feasible supply option to relieve some of this deficit, non-recycled water project alternatives could also address the future potable water supply demands. Non-recycled water project alternatives that were evaluated for the study area include desalination and groundwater exploration.

Desalination

Desalination is a high-energy treatment technology that removes excess salt and other minerals in order to produce potable water from seawater or brackish water. Desalination provides a drought-resistant supply alternative, which would increase potable water supply and decrease the demand on local streams and groundwater aquifers. However, the energy demand of desalination treatment technologies may outweigh the benefit of this drought-resistant supply. Large-scale desalination typically uses extremely large amounts of energy and complex technology making it very costly compared to the use of fresh water from surface sources or groundwater.

Groundwater Exploration

CCWD has currently budgeted funds beginning FY08-09 for the rehabilitation of existing wells and adding a new well at the Pilarcitos Well Field. These measures could restore Pilarcitos Well Field production to 50 to 80 million gallons per year.

Groundwater supplies can decrease dramatically during extended drought conditions. CCWD would need to secure a source of supply that is unaffected by drought to augment those conditions.

No Project Alternatives

There is also the option to not develop a project to address the projected water supply deficit and continue to draw on the sources presently used. No project alternatives include increased water importation from SFPUC and increased production from existing sources.

Increased Water Importation

SFPUC has allocated 800 MG annually to CCWD through a Master Agreement, which expires in 2009. CCWD on average relies on SFPUC for over 80 percent of its total supply. In 2007, CCWD used 96 percent of its maximum allocation of SFPUC water or 767.3 million gallons. The SFPUC has indicated that they will not consider increasing the allocations to suburban wholesale customers until water system seismic improvements are complete.

Water rates also limit the feasibility of increased water importation. Currently, CCWD purchases water from SFPUC at a wholesale rate of \$1.43 HCF. SFPUC has stated that wholesale rates are to increase 300 percent by 2015 to \$5.72 HCF.

Increased Source Production

CCWD has the potential to increase source production at the existing well fields and surface water diversions. CCWD has budgeted rehabilitation of existing wells at the Pilarcitos Well Field. CCWD could develop a previously undeveloped diversion at San Vincente Creek, which is permitted to divert up to 2 cubic feet per second. Dredging of the Denniston creek intake, which has been negatively impacted by the build-up of silt, may improve both quality and quantity of water at the existing diversion.

Increased source production is not a particularly reliable alternative, as groundwater and surface water supplies can decrease dramatically during extended drought conditions and CCWD should consider a supply source that is relatively unaffected by drought.