



Agenda Date: 3/16/2016
Agenda Placement: 7C

Napa Sanitation District Board Agenda Letter

TO: Honorable Board of Directors

FROM: Timothy Healy - General Manager
NS-Technical Services/Engineer

REPORT BY: Kyle Broughton, Associate Engineer - 258-6000 x530

SUBJECT: Approve the Project and Authorize General Manager to Issue Notice Inviting Bids for the Aeration Basin Diffusers, Instrumentation & Controls Project (CIP 15713)

RECOMMENDATION

Approve the Project, concur with Staff's determination that the Project is categorically exempt, and Authorize the General Manager to Issue Notice Inviting Bids for the Aeration Basin Diffusers, Instrumentation & Controls Project (CIP 15713), when appropriate.

EXECUTIVE SUMMARY

This project will replace the existing Aeration Basin diffuser equipment and provide for the optimization of the Activated Sludge process.

Due to the critical schedule to replace the existing diffuser equipment prior to the 2016 river discharge season and diffuser equipment manufacturing lead time, District Staff has issued Requests for Proposals to pre-qualified firms in order to pre-purchase the diffuser equipment. The diffuser equipment supplier with the lowest upfront capital cost will be selected and the design engineer will complete the design documents based on the selected equipment.

Staff anticipates the following project schedule moving forward:

- | March 22, 2016: Pre-Purchase Proposals Due from Diffuser Manufacturers
- | March 23, 2016: Diffuser Manufacturer Selection Process
- | March 31, 2016: Design Documents Finalized
- | April 1, 2016: Advertise for Public Bids for Construction
- | April 6, 2016: Board Award Diffuser Equipment Pre-Purchase Agreement

- | May 3, 2016: Public Bids for Construction Due
- | May 18, 2016: Board Award Construction Contract
- | May 19, 2016: Construction Notice to Proceed
- | August 9, 2016: Delivery of Diffuser Equipment
- | October 15, 2016: Project Completion

Plans are available for review at the District's office and will be available at the District Board meeting on March 16, 2016.

FISCAL IMPACT

Is there a Fiscal Impact?	Yes
Is it currently budgeted?	Yes
Where is it budgeted?	The engineer's estimated construction cost is \$833,000. \$649,850 is currently budgeted in the FY 15/16 capital improvement program. Sufficient savings from other approved projects in the CIP can be made available to pay for the balance. Staff will propose additional budget for this project as part of the 16/17 CIP.
Is it Mandatory or Discretionary?	Discretionary
Discretionary Justification:	The existing Aeration Basin diffusers have reached the end of their service life and require replacement prior to the 2016 river discharge season. The Activated Sludge process can be optimized with continuous influent flow balancing and refining dissolved oxygen controls. Replacement of the diffusers and refining the Activated Sludge process will result in energy savings.
Is the general fund affected?	No
Future fiscal impact:	Staff is proposing \$300,000 in the Fiscal Year 17/18 budget for this Project for Staff to add instrumentation and control improvements. Staff anticipates energy and chemical savings as a result of the aeration diffuser equipment replacement and the optimization of dissolved oxygen control in the Activated Sludge process.
Consequences if not approved:	The existing diffusers, which have reached the end of their service life will not be replaced. Some panels have failed and others are expected to fail in the future if not replaced. This condition would adversely affect the Activated Sludge process and increase blower energy consumption due to poor dissolved oxygen control in the Aeration Basins. The blowers are one of the largest energy consumers at the Soscol Water Recycling Facility.
Additional Information:	

ENVIRONMENTAL IMPACT

Staff performed a preliminary CEQA review of this project and determined the project is Categorically Exempt. This project consists of replacement of existing equipment involving negligible expansion of capacity, which

corresponds to Categorical Exemption 15301 (b) of the California Environmental Quality Act (CEQA) Guidelines.

BACKGROUND AND DISCUSSION

This project combines two Capital Improvement Plan projects scheduled for the Aeration Basins: 1) Diffuser equipment replacement, and 2) Activated Sludge process optimization.

Diffuser Equipment Replacement

Originally installed in 2000 and refurbished in 2008, the existing Aeration Basin panel-type diffuser equipment has reached the end of its service life and requires replacement. Due to their age and normal wear their performance has deteriorated to the extent that replacement is required prior to the 2016 river discharge season. The existing diffusers have become inefficient; increased air flow from the blowers is required to maintain dissolved oxygen levels in the Aeration Basins. The blowers are one of the largest energy consumers at the Soscol Water Recycling Facility.

Diffuser manufacturers were pre-qualified based on up front capital costs, replacement costs, air transfer efficiency, energy consumption and operations and maintenance considerations. In order to meet the project schedule, Staff will enter into a pre-purchase agreement with a diffuser manufacturer. Requests for proposals have been issued to pre-qualified diffuser manufacturers and the District will select the diffusers with the lowest up front capital cost. The design engineer, Hazen and Sawyer, will then complete a design based on the selected diffuser equipment and the District will publicly advertise bids for installation.

Activated Sludge Process Optimization

In recent years the District has transitioned its Activated Sludge process to a "step-feed" mode. In this mode, primary effluent and return activated sludge streams are introduced into two anoxic zones in the Aeration Basins. The transition has proven effective in lowering the solids loading rate on the secondary clarifiers, discouraging unfavorable bacteria, improving reliability in nitrification, and reducing sludge production. The process, however, will benefit from continuous influent flow balancing. The step-feed process is disrupted when the two influent streams, which are manually controlled, become disproportionate to each other. Influent streams into the Aeration Basins are affected by diurnal fluctuations and high hydraulic loading. Staff has installed temporary flow metering capability in the basins' influent channels that has proven effective in the short-term, but automated influent controls will benefit the Activated Sludge process. As part of a plant-wide motor-operated valve replacement project, the existing slide gates at the Aeration Basin influent channels will be retrofitted with motor operators and new flow meters to provide continuous and automated influent flow balancing.

Dissolved oxygen is currently introduced into individual compartments in the Aeration Basins through manually controlled air valves; this results in less-than-optimal control and wide fluctuations in observed dissolved oxygen concentrations. Proper dissolved oxygen concentrations are required for nutrient uptake, which is under increasing regulatory scrutiny. Excessive addition of dissolved oxygen adds to blower unit operating costs; the blowers are one of the largest energy consumers in the plant. Through the addition of air control valves, air flow meters, new dissolved oxygen monitoring instruments, and ammonia monitoring, the Activated Sludge process efficiency will be improved. District operations staff expects energy savings and a decrease the amount of chemical addition to the Activated Sludge process as a result of the improvements. District Staff will attempt to obtain PG&E cost incentives, under existing PG&E programs, based on energy savings for the project.

These improvements will be incorporated into a publicly advertised bid that includes the replacement of the existing diffuser equipment noted above. The construction contractor will perform the specialty mechanical work and the electrical "backbone" of the project; to save costs District staff will add the control instruments and incorporate them into the system following construction.

SUPPORTING DOCUMENTS

A . CIP 15713 Notice of Exemption

Napa Sanitation District: Approve

Reviewed By: Timothy Healy