



**DATE:** May 8, 2018

**TO:** Mayor and City Council

**FROM:** Director of Utilities & Environmental Services

**SUBJECT** Water Pollution Control-Facility Final Clarifier and Gravity Belt Thickener Sludge Blending Tank Rehabilitation Project: Approval of Plans and Specifications and Call for Bids

### **RECOMMENDATION**

That Council adopts the attached resolution approving the plans and specifications for the Water Pollution Control Facility (WPCF) Final Clarifier and Gravity Belt Thickener (GBT) Sludge Blending Tank Rehabilitation Project and calling for bids to be received on June 5, 2018.

### **SUMMARY**

The WPCF Final Clarifier and GBT Sludge Blending Tank Rehabilitation Project (Project) consists of the following four project elements:

1. Final Clarifier Structure Repair and Mechanism Recoating
2. GBT Sludge Blending Tank Structure Repair
3. Primary Clarifier Effluent Box Capacity Increase
4. Drying Bed Filtrate Pipeline By-Pass

Improvements and rehabilitation to the existing aged facilities are needed to enable WPCF to continue improving efficiency and enhancing safety and reliability. The design work, including preparation of plans and specifications has been completed. Staff is requesting Council's approval of plans and specifications and calling for bids to be received on June 5, 2018.

### **BACKGROUND**

An annual average of 12 million gallons per day (MGD) of wastewater from the City's residential and business properties is conveyed to the City's WPCF that provides treatment prior to discharge to the Bay. The treatment process at the WPCF is comprised of Vacuators, Primary Clarifiers (PC), Trickling Filters/Solids Contact Basins (TF/SC), Final Clarifiers (FC) and Hypochlorite Disinfection. Biosolids are thickened by Gravity Belt Thickener (GBT), mixed with Fats, Oil, and Grease (FOG) and sent to Digesters. The digested sludge is sent to Drying Beds for reducing the water content before disposal.

The Final Clarifier and GBT Sludge Blending Tank Rehabilitation Project is intended to address the needed improvements and process enhancements to maintain the treatment system functionality, so the existing treatment systems can continue to perform as intended. The Project includes the following project elements.

### 1. Final Clarifier Structure Repair and Mechanism Recoating

The Final Clarifiers (FC) are settling tanks built with a mechanical scraper mechanism to allow sludge to settle and be removed while the clean water is discharged to the receiving stream. When the Final Clarifiers were taken out of service for annual inspection in 2016, staff noticed that Final Clarifier No.1's structure exhibited some concrete cracking and areas of spalling toward the bottom of the concrete wall. The City contracted Concrete Science Inc., (CSI) to perform field inspections and laboratory testing to assess the concrete's condition. It was concluded that the delaminated concrete wall should be repaired to restore the service life of the clarifier. In addition to the structure issue, the mechanical scraper mechanism of the clarifiers, which is made of galvanized carbon steel, shows evidence of corrosion damage.

### 2. GBT Sludge Blending Tank Structure Repair

The Gravity Belt Thickener (GBT) facility is utilized for sludge volume reduction prior to digestion. The GBT machine is continuously fed by sludge from the Sludge Blending Tank which blends sludge streams from the Primary Clarifiers and Final Clarifiers. The concrete structure of the Sludge Blending Tank has a structure failure at the bottom of the concrete walls, resulting in water leaks through the joints. The interior coatings have also failed due to the corrosive environment.

### 3. Primary Clarifier Effluent Box Capacity Increase

The Primary Clarifiers (PC) are preliminary sedimentation tanks, which remove solids contained in the wastewater by gravitational settling. After the preliminary treatment, the effluent from the Primary Clarifiers is sent to the Trickling Filters (TF) for biological secondary treatment via the Primary Effluent Box. The plant operating data shows the capacity of the Primary Effluent Box is not adequate to handle the wet weather peak flow. Staff has identified that the outlet opening of the Effluent Box is the cause of the hydraulic bottleneck.

### 4. Drying Bed Filtrate Pipeline By-Pass

The Drying Beds facility dewateres the sludge from the Digesters by drainage and evaporation. The water drained from the beds (Filtrate) is currently pumped to the Primary Effluent Flow Equalization (EQ) pond via two 6-inch pipes. Suspended solids from the drying bed filtrate and primary effluent settles and accumulates at the bottom of the EQ pond. A routine pond cleaning to remove the settled solids is required to minimize resuspending the settled solids and organic matters. The current operating procedure is to shut down the filtrate flow during the pond cleaning. To avoid shutting down the filtrate flow and therefore improve treatment efficiency, staff identified that a new filtrate pipeline can be added to allow by-passing the EQ pond and sending the filtrate from the Drying Beds to the Primary Clarifiers.

## DISCUSSION

In February 2018, Council approved Resolution 18-020, authorizing the City to enter into a Professional Services Agreement with Black & Veatch (B&V) Corporation for design and engineering services for the Project. The improvements identified and recommended by B&V to address the needs described in the project elements are summarized in the table below.

	<b>Project Elements</b>	<b>Improvements</b>
1	Final Clarifier Structure Repair and Mechanism Recoating	<ul style="list-style-type: none"><li>• Final Clarifier No.1 repair of delaminated 100-foot section of the concrete wall</li><li>• Final Clarifier No. 1 concrete crack repair</li><li>• Coating Rehabilitation of Final Clarifier No. 1 and No. 2</li></ul>
2	GBT Sludge Blending Tank Structure Repair	<ul style="list-style-type: none"><li>• Structure concrete crack repair</li><li>• Interior concrete repair</li><li>• Interior surface lining</li></ul>
3	Primary Clarifier Effluent Box Capacity Increase	<ul style="list-style-type: none"><li>• Enlarging the existing opening</li><li>• Replacing the existing gate</li></ul>
4	Drying Bed Filtrate Pipeline By-Pass	<ul style="list-style-type: none"><li>• Constructing a new 500-foot, 6-inch filtrate pipeline</li></ul>

The notice to proceed for the construction work is anticipated to be issued in early July. The construction work will be sequenced to coordinate with the plant operations and maintenance schedule. The contractor will be required to conduct work in a manner that will not impair the operations and result in the least disruption. Only one Final Clarifier can be taken out of service to maintain the facility operation at all times and only during dry weather conditions when the WPCF influent flow is low. Since the work will be performed for both Final Clarifiers, the goal is to have Final Clarifier No.1 completed in the summer of 2018, and Final Clarifier No. 2 completed in the summer of 2019. The overall project completion is anticipated to be in September 2019.

## ECONOMIC IMPACT

The treatment systems of WPCF are a valuable and complex part of the City's infrastructure. Effective O&M and rehabilitation is essential to preserving and maintaining the substantial investment in infrastructure that WPCF represents. By rehabilitating or replacing aging components before they fail, the sewer system customers would avoid costs such as emergency contractor fees, staff overtime, and unplanned repairs. The community will enjoy the benefits of the Project, including reliable system operations, lower capital replacement costs, and lower health and environmental risks.

## STRATEGIC INITIATIVES

All project work is related to operations and maintenance of the existing WPCF aged facilities, therefore no strategic initiatives are impacted by this project.

## FISCAL IMPACT

The total estimated costs for the Final Clarifier and GBT Sludge Blending Tank Rehabilitation Project are as follows:

<b>Project Tasks</b>	<b>Costs</b>
Design and Engineering Services – Consultant	\$ 156,000
Construction Contract (estimate)	\$2,138,000
Construction Management and Inspection – City Staff (estimate)	\$ 50,000
Total	<u>\$2,344,000</u>

The Capital Improvement Program (CIP) includes a budget of \$2,325,000 for this Project in the sewer improvement fund for FY 2108. The estimate was based on separate projects as follows:

<b>Fund</b>	<b>Project No.</b>	<b>Description</b>	<b>Budget</b>
612	07680	Sluice Gate Repair/Replacement & Actuation	\$ 460,000
612	07703	Final Clarifier No. 1 & 2 Equipment Coatings	\$ 910,000
612	07704	Final Clarifier No. 1 Structure Repairs	\$ 620,000
612	07705	Gravity Belt Thickener Sludge Blending Tank Coatings	\$ 175,000
612	07706	Sludge Pipeline from Equalization Pond to Site Waste Pump Station	\$ 160,000
		Total	<u>\$2,325,000</u>

The construction cost will be determined after the construction bids have been received. If additional monies are needed, staff will ask Council to consider the increased funding from the Water Improvement and Sewer Improvement Funds. An adequate fund balance is available to cover any necessary additional appropriation.

## SUSTAINABILITY FEATURES

All project work is related to operations and maintenance of the existing WPCF aged facilities; therefore, no sustainability features are included in this project.

## PUBLIC CONTACT

All project work will be within the WPCF plant boundary; therefore, no public contact is necessary for this project.

## NEXT STEPS

Following Council approval, staff will advertise the project for public bidding. Staff will return to the City Council for award of the construction contract after bids have been received and reviewed. The following schedule has been developed for this project:

Receive Bids	June 5, 2018
Award Construction Contract	July 3, 2018
Construction Completion	September 2019

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*Recommended by:* Alex Ameri, Director of Utilities & Environmental Services

Approved by:



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Kelly McAdoo, City Manager