



DATE: December 5, 2023

TO: Mayor and City Council

FROM: Director of Public Works

SUBJECT Adopt a Resolution Authorizing the City Manager to Amend the Professional Services Agreement with Brown and Caldwell to Increase the Contract Amount by \$8,023,117 to a Not-to-Exceed Amount of \$16,672,828 for Final Design Services for the Water Pollution Control Facility (WPCF) Improvements Phase II Project No. 07760, and Authorize Use of Contingency Funds for Design of the Existing Final Clarifiers Retrofit

RECOMMENDATION

That Council adopts a resolution (Attachment II) authorizing the City Manager to amend the Professional Services Agreement with Brown and Caldwell to Increase the Contract Amount by \$8,023,117 to a Not-to-Exceed Amount of \$16,672,828 for Final Design Services for the WPCF Facility Improvements Phase II Project No. 07760, and Authorize use of Contingency Funds for Design of the Existing Final Clarifiers Retrofit.

SUMMARY

The Water Pollution Control Facility (WPCF) core infrastructure was originally constructed in 1952 to treat wastewater flows from the City of Hayward's residents and businesses prior to discharge into the San Francisco Bay. Over the years, the WPCF has undergone several major upgrades to meet more stringent discharge requirements, as well as increasing capacity as the City's population and industry has grown. The WPCF now treats an average flow of approximately eleven million gallons per day (MGD) and meets current regulatory requirements for discharge of treated effluent to the deep waters of the San Francisco Bay (Bay).

Preliminary design for the Phase II Project will be complete in December 2023. Staff previously negotiated the scope and not-to-exceed fee for the entire project in the amount of \$24,737,324, which includes preliminary and final design services, bid period services, engineering services during construction, optional services and design contingency for all three bid packages. Staff is requesting authorization of remaining final design services for the Phase II Project, bidding services for the Administration Building and Primary Effluent Equalization Tanks, and authorization of contingency funds for design of the existing final

clarifiers retrofit. This authorization in the amount of \$8,023,117 will increase the total authorized to date funding to \$16,672,828.

The existing final clarifiers, originally commissioned in 2007 as part of the WPCF Improvements – Phase I Project have experienced issues with failure caused by high groundwater levels and failure of the perimeter groundwater relief system. The preliminary design called for a hydrological study to see if dewatering wells could be installed to lower groundwater levels prior to dewatering and removing a clarifier from service for maintenance. Dewatering wells and concrete patching would have been an economical way to repair and restore the service life of the existing clarifiers; however the hydrogeological investigation determined dewatering of the surrounding grade was not feasible.

Brown and Caldwell evaluated options to shore up the structural integrity of the clarifiers and recommended installing micropiles under the clarifier slabs to reduce buoyant uplift and install thicker walls and slab to both counteract the buoyant load and to resist external hydrostatic loading on the exterior of the walls. This option also requires installation of new clarifier mechanisms due to the change in the depth and diameter of the clarifier. Staff are requesting authorization of the use of \$706,537 of contingency funds for final design and engineering services during construction for this additional design work. The design cost for dewatering wells and concrete patching was deducted from the fee estimate for the design of the clarifier rehabilitation. Both of the existing final clarifiers are critical to the treatment process and are required to meet the WPCF discharge permit requirements. The proposed retrofits will restore structural integrity to the clarifiers.

BACKGROUND

In May 2019, the Regional Water Quality Control Board (Water Board) announced upcoming regulatory requirements limiting discharge of nutrients (nitrogen) to the Bay. In June 2020 the City completed a comprehensive master plan update, the WPCF Phase II Facilities Plan (Facilities Plan), to identify improvements required for the WPCF to upgrade its treatment process to incorporate nutrient reduction in the treated effluent to meet the upcoming requirements.

In March 2022, staff issued requests for proposals and selected Brown and Caldwell to perform final design services and engineering services during construction for the project. Staff negotiated the scope and not-to-exceed fee for the project in the amount of \$24,737,324 which includes preliminary and final design services, bid period services, engineering services during construction, optional services, and design contingency. The project will be constructed in three separate bid packages; the first bid package will include the Administration Building and Laboratory, the second bid package will be for the Primary Effluent EQ Tanks Project, and the third bid package will be for the remaining WPCF Improvements – Phase II, which includes the biological nutrient removal process upgrades.

On July 5, 2022¹, Council authorized an agreement with Brown and Caldwell (B&C) in an amount not-to-exceed \$3,849,711 for preliminary design services for the Phase II Project. Preliminary design for the entire project will be complete in December 2023.

Early bid packages are required for the Administration Building Project and the Primary Effluent Equalization (EQ) Tanks Project. On December 6, 2022², Council authorized an amendment to the Professional Services Agreement (PSA) with B&C to increase the contract amount by \$4,800,000 to \$8,649,711 which included authorizing final design of the Administration Building and Primary Effluent EQ Tanks Projects, as well as the geotechnical investigation for the WPCF Improvements – Phase II Project.

The preliminary design for the WPCF Improvements – Phase II is anticipated to be completed in December 2022, and staff are seeking authorization of final design services.

DISCUSSION

Preliminary design for the Phase II Project will be completed in December 2023 after which final design can begin. Staff is requesting authorization of remaining final design services for the Phase II Project, bidding services for the Administration Building and Primary Effluent EQ Tanks, and authorization of contingency funds for design of the existing final clarifiers retrofit. This authorization in the amount of \$8,023,117 will increase the total authorized funding to \$16,672,828.

Design elements included in the Phase II Project are summarized in Table 1.

Table 1 – Summary of Project Elements in the WPCF Improvements – Phase II Project	
Project Element	Description
New Grit Facility	A new grit facility consisting of two parallel vortex-type grit removal systems, grit pumps, grit washing system, and odor control facility is planned to replace the existing North Vacuator process which is undersized and past its useful life. Demolition of the West Trickling Filter (WTF) is included as the grit facility will be constructed in the location currently occupied by the WTF.
Nutrient Upgrades	The nutrient upgrades include construction of biological nutrient removal (BNR) basins, construction of a third final clarifier, modifications to the existing solids contact tanks (SCT), a primary effluent pump station, a new blower building with electrical substation and motor control centers, modifications to the existing blower building, and related site work.
Existing Final Clarifiers Retrofits	The existing final clarifiers retrofits includes installation of micropiles (a foundation system improvement) designed to resist uplift, construction of new slab, walls, and replacement of the interior clarifier mechanisms.
Site Waste Pump Station (SWPS) Improvements	The existing headworks facility is designed to pump approximately 42 million gallons per day which is less than the current peak flows at the

¹ <https://hayward.legistar.com/LegislationDetail.aspx?ID=5714864&GUID=9ED75AE9-FEB6-4BC4-ACD9-915A6B3F458B&Options=&Search=>

² <https://hayward.legistar.com/LegislationDetail.aspx?ID=5955245&GUID=00AFFC5A-9512-4A36-8AF4-D7F5022920FD&Options=&Search=>

Table 1 – Summary of Project Elements in the WPCF Improvements – Phase II Project	
	plant. During peak flows a portion of the influent flows can be bypassed to the SWPS where under emergency flow conditions the pumps can serve as a backup to the headworks influent pumps. Improvements are needed to handle wet weather flows, as well as coatings to prolong the life of the structure.
3W System Upgrades	Utility water (disinfected filtered secondary effluent) or 3W is used at the WPCF for housekeeping services as well as foam control in the secondary treatment units. An expansion to the system is needed to provide additional capacity for the new BNR basins.

Staff will return to Council in June 2024 to award the remaining services for the project that include bid period services for the Phase II Project, engineering services during construction for all three projects, development of the plant Operations and Maintenance (O&M) manual, commissioning and training services, and optional services tasks as needed.

Existing Final Clarifier Retrofits

Two 120-foot diameter final clarifiers were constructed and commissioned as part of the WPCF Improvements - Phase I Project in 2007. The clarifiers are very deep, extending well below the normal groundwater level. Groundwater control measures incorporated into the design of the final clarifiers included vertical and horizontal wick drains under each clarifier designed to control buoyancy and upheaval. WPCF staff empty the clarifiers annually during the dry season to inspect the clarifier mechanisms and perform minor repairs. The wick drain system was designed to relieve groundwater pressure around and under the clarifiers by draining groundwater through relief valves in the lower sidewalls of the clarifiers as they are emptied.

Each final clarifier contains a steel truss structure which support sludge collectors designed to sweep the bottom of the clarifier to remove settled solids, as well as a center flocculating well designed to disperse influent wastewater into the clarifier, and effluent troughs that collect and convey effluent out of the clarifiers. The clarifier mechanisms were specified to be galvanized steel. Subsequent correspondence from the design engineer, Brown & Caldwell (B&C), informed the City that a similar installation installed prior to the Phase I Project had failed due to corrosion. If left unchecked corrosion can cause premature failure of the clarifier mechanism. Standard design practice for secondary clarifiers is to specify epoxy coatings for the steel for long-term protection. As a result, WPCF staff subsequently began performing routine inspections that included review of the condition of the galvanizing so that a coatings project could be planned before any significant damage occurred to the underlying steel.

During a routine clarifier inspection, the coatings inspector observed that a significant section of concrete (approximately 95-feet long) in one of the final clarifiers (Final Clarifier (FC) No. 1) had deteriorated and appeared to be delaminating in the lower 3-feet of wall. Further it was observed that concrete was crumbling or breaking apart near the wall-slab interface. In addition to the delaminated section, numerous cracks were also observed along the entire perimeter of the clarifier. In 2016, the City hired Concrete Science

Incorporated (CSI) to perform a condition assessment and evaluation of the damaged concrete, determine the cause of the failure, and to make recommendations on repairs to prolong the life of the clarifier. CSI concluded that the bottom portion of the wall may have delaminated as a result of weak aggregate to cement paste bond that could have been caused by a cold joint during the wall construction. A cold joint results if there is a delay between concrete pours which can lead to structural weakness. CSI also noted the underlying reinforcing steel corroded likely due to groundwater migration through cracks in the concrete. CSI recommended repairing the delaminated section and repairing cracks by injecting them with water repellant material, typically epoxy, with the intent to stop the migration of groundwater through the wall section.

On February 27, 2018³, as part of the Facilities Plan, Council awarded design services for the repairs and recoating of the final clarifiers to Black and Veatch (Final Clarifier and GBT Sludge Blending Tank Rehabilitation Project). On June 19, 2018⁴, Council awarded the construction contract to GSE Construction Company, Inc. The project included coatings and repairs to the concrete in Final Clarifier No. 1 in accordance with CSI's recommendations, and coatings for the clarifier mechanism in Final Clarifier No. 2. Repairs included both reconstruction of the concrete in the delaminated section in Final Clarifier No. 1, and crack injection for both clarifiers.

Repairs and coatings in Final Clarifier No. 1 were completed in 2018. During the next dry season in 2019, the City removed Final Clarifier No. 2 from service and coated the clarifier mechanism and performed crack injection. After the work was completed, it was noticed that deterioration of the concrete including cracking and spalling similar to Final Clarifier No. 1 was also occurring in Final Clarifier No. 2. In addition, cracks that were filled with epoxy and/or foam sealed temporarily, however over time some cracks had reappeared in the same location. In addition, new cracks were observed to occur adjacent to the repairs. It was also observed that the exterior perimeter groundwater pressure relief valves failed to relieve groundwater pressure through the valves causing groundwater to build up on the outside of the wall. This condition led to slab upheaval and additional cracking. This was noticed when attempts were made to return the clarifier to service and the mechanism was unable to turn due to being out of balance. Slab groundwater relief wells were installed in Final Clarifier No. 2 to alleviate groundwater pressure so that the clarifier mechanism could be re-leveled and returned to service. The groundwater relief wells in the slab appeared to help temporarily with the slab upheaval but did not resolve the issue with water seeping into the clarifier through cracks in the walls. Further, upon comparison of photographs taken in previous years to those taken after each clarifier was out of service for prolonged periods for the coatings project revealed a significant increase in the number of cracks in the walls and slab sections.

It is believed that failure of the wick drain system and perimeter flapper type groundwater relief wells installed during the original construction caused the cracks to form in the concrete which has led to groundwater intrusion. As part of the request for proposals for

³ <https://hayward.legistar.com/LegislationDetail.aspx?ID=3354003&GUID=015931F3-41B1-45E5-8345-F8440FF11A26&Options=&Search=>

⁴ <https://hayward.legistar.com/LegislationDetail.aspx?ID=3531846&GUID=E3ED155E-2131-42DA-8D33-3B487153EA58&Options=&Search=>

the design of the WPCF Improvements – Phase II Project, staff included in the scope of work for the Consultant to perform a condition assessment and a hydrogeological study on the dewaterability of the surrounding grade so that the groundwater levels outside the clarifiers could be lowered before taking the clarifiers out of service for maintenance. B&C subcontracted with a geotechnical firm who installed test wells to determine if this would be feasible. Unfortunately, the hydrogeological study proved dewatering wells would be ineffective at lowering the groundwater levels around the clarifiers due to the low permeability of the surrounding soils.

The condition assessment found that the clarifiers were continuing to deteriorate with the repaired section installed during the Final Clarifier and GBT Sludge Blending Tank Rehabilitation Project also showing signs of weakness at the repaired section and continued groundwater migration through cracks. B&C presented several options for extending the life of the clarifiers from continuing to patch weakened concrete sections and repairing cracks to rehabilitation, to full replacement of the clarifiers. Staff selected the rehabilitation option which includes installing micropiles and rebuilding the interior of the clarifiers with new walls, slabs, and clarifier mechanisms. This option is designed to resist buoyant uplift and will control migration of groundwater through the re-built clarifiers with thicker slabs and walls, with water resistant concrete coatings placed between the existing and the new walls. While the lowest cost option to repair and fill cracks could extend the life of the clarifiers by 10 years or more, it does not alleviate the continued issues with failed groundwater dewatering systems and damage from continued hydrostatic pressure from groundwater external to the structure. The selected option is anticipated to extend the useful life of the structure by 50-years or more.

Environmental Review

Staff are seeking funding assistance under both the California Clean Water State Revolving Fund (CWSRF) loan program and the U.S. Environmental Protection Agency (USEPA) Water Infrastructure Finance and Innovation Act (WIFIA) program. As part of that effort, an environmental review of the Project will be performed including CEQA+ documentation as required by the CWSRF and WIFIA funding applications.

ECONOMIC IMPACT

Many of the Phase II improvements were identified in the 2014 Master Plan update and funded in the adopted Capital Improvement Program. The Phase II Project includes a new biological nutrient removal facility to address the nutrient load limits in the 2nd watershed permit, as well as related projects from the City's CIP. This proactive approach will result in the City being identified as an "early actor" by the Water Board and provide protection against having to implement additional, potentially more costly improvements if the regulations change.

The total estimated construction cost for the project at the planning stage was estimated to be between \$125 and \$169 million. The costs have been further refined during the preliminary design effort that is currently underway. The current estimated construction cost for the project is now estimated to be between \$173 and \$350 million (see summary of

construction costs presented in Table 2). It is anticipated that these improvements will affect sewer service rates and sewer connection fees; however, the extent to which rates will need to be adjusted cannot be determined with certainty at this point, however it is anticipated that customers could see a significant impact of 20% or more over the current rates.

Funding assistance for the project is included in the consultants' scope of work. Staff has also consulted with the City's financial advisors, NHA Advisors, on funding opportunities, such as funding efforts through both the CWSRF loan program and the WIFIA program. WIFIA funding is typically at a slightly higher interest rate than SRF, however payback period is deferred by up to 5 years after substantial completion of the project. SRF loans payback period begins one year after substantial completion. Up to 49% of the project cost is eligible under WIFIA funding; therefore staff will pursue both avenues of funding as part of this project.

Because WIFIA utilizes federal funds, engineering services are included for the Consultant to provide environmental review and documentation (most likely CEQA+) in support of the funding applications.

Table 2 – Estimated Construction Cost⁽¹⁾⁽²⁾	
Project Element	Estimated Construction Cost
New Grit Facility	\$ 21.0 million Range \$15 - \$32 million
New Primary Equalization (PE EQ) Tanks	\$21.3 million Range \$15 - \$32 million
Nutrient Upgrades	\$133.7 million Range \$94 - 201 million
Existing Final Clarifiers Retrofits	\$25.1 million Range 18 - 38 million
New Administration Building and Laboratory	\$31.9 million Range \$27 - \$38 million
Site Waste Pump Station (SWPS) Improvements	\$1.5 million Range 1.0 to 2.2 million
3W System Upgrades	\$4.8 million Range 3.4 to 7.2 million
Total Estimated Construction Cost	\$239 million Range \$173 to \$350 million
Notes: (1) Soft costs including design, engineering services during construction, construction management, inspection, materials testing, etc. are not included in the above costs. (2) Range reflects the accuracy of the estimate based on the level of design at the preliminary design stage (Class 4) with a typical level of accuracy between -30% to +50%. The Administration Building and Laboratory estimate is more refined (Class 2) with a typical level of accuracy between -15% to +20%.	

FISCAL IMPACT

On July 5, 2022, Council authorized \$3,849,711 for preliminary design services for the Phase II Project. On December 6, 2022, Council authorized an additional \$4,800,000 for an amended not-to-exceed professional services contract amount of \$8,649,711. The authorization requested herein in the amount of \$8,023,117 will increase the total authorized funding to \$16,672,828. This includes final design of the Phase II Project as well as bid period services for the Administration Building and PE EQ Tanks Projects. This is part of a multi-year contract that covers design through the completion of construction including startup assistance and training with a total professional services agreement fee of \$24,737,324. This project is anticipated to take six years to complete. The funding for this contract will be allocated from the Sewer Improvement Fund, 612-07660 (WPCF Nutrient Upgrades Design), 612-07749 (New Primary EQ Basin), 612-07750 (New Final Clarifier), and 612-07786 (WPCF New Administration Building & Lab Project).

As noted above, staff has consulted with NHA Advisors, and plans to apply for a CWSRF loan, and funding from WIFIA to finance the project, as well as selling bonds if feasibility and advisable by the City's financial advisors. WIFIA funding can be applied to fund multiple projects, as well as retroactively reimburse for engineering design services, however will only cover 49% of the project cost. Only the Phase II Project is likely to score high enough to be eligible for CWSRF funding, however loans are currently limited to \$50 million in the FY 23-24 funding cycle, and competition is very high with many projects already included on the eligible funding list ahead of the City's project. Further CWSRF has announced a funding hiatus that will be in effect for several years starting in FY 2025, therefore staff is pursuing financing through bonds as part of the funding strategy. Staff continue to seek grants opportunities as well.

STRATEGIC ROADMAP

This agenda item supports the various goals of Council's Strategic Roadmap. The WPCF Improvements Phase II Project will address infrastructure needs and improvements to increase the reliability of the City's treatment plant, and construct process improvements to meet more stringent nutrient limits in accordance with upcoming regulatory requirements, while supporting the goals of the City Council. Specifically, this item relates to the implantation of the following projects:

Confront Climate Crises & Champion Environmental Justice.

Mitigate Climate Crisis Impacts through Resilient Design and Community Engagement
Project C14b: Implement Shoreline Master Plan, including mitigating sea level rise in the industrial corridor through building requirements and outreach

Invest in Infrastructure.

Invest in Water Supplies, Sanitation Infrastructure & Storm Sewers
Project N19: Update Water Pollution Control Facility Phase II Plan

SUSTAINABILITY FEATURES

The WPCF Improvement Project Phase II will help maintain and improve the biology and health of the Bay which is vital for the region and the State. The Phase II Project will also satisfy the early actor requirements specified in the Water Board's 2nd Watershed Permit to reduce nitrogen loads to the Bay.

The effects and risks of rising sea water levels will be reviewed and incorporated into the design of the new facilities.

The Administration and Laboratory Building will be reviewed by the Building Division for conformance with State and local requirements related to sustainability (i.e., California Building Code, California Energy Code, etc.) which require a minimal level of energy efficiency, resource conservation, material recycling, etc. In addition, the building will be designed and constructed to meet Leadership in Energy and Environmental Design (LEED) standards for a Silver Certification, or better.

PUBLIC CONTACT

As part of the funding process, an environmental study (CEQA and/or Initial Study and Mitigated Negative Declaration) will be posted for public review and comment. In addition, a public hearing will be held to review the environmental study.

The project will include a web page to be hosted on the City's website with periodic updates throughout the multi-year duration of the project.

NEXT STEPS

The following schedule has been developed for this project:

City Council Authorization to Award Final Design and Engineering Services During Construction for the Phase II Project	December 2023
Award of Professional Services Agreement for Third Party Construction Management including Value Engineering and Constructability Review for the Phase II Project	February 2024
Approval of Environmental Study – IS/MND or CEQA	July 2024
Approval of Plans and Specifications and Call for Bids for the Administration and Laboratory Building	August 2024
Approval of Application for CWSRF Loan	October 2025
Approval of Application for WIFIA Loan	February 2025
Award of Construction Contract for the Administration and Laboratory Building Project	October 2024
Approval of Plans and Specifications and Call for Bids for the EQ Basin Relocation Project	September 2024

Award of Construction Contract for the EQ Basin Relocation Project	November 2024
Approval of Plans and Specifications and Call for Bids for the Phase II Improvements Project	April 2025
Award of Construction Contract for the Phase II Improvements Project	July 2025
Administration and Laboratory Building Project Construction Completion	October 2026
EQ Basin Relocation Project Construction Completion	June 2026
Phase II Improvements Project Construction Completion	July 2028

Prepared by: Suzan England, Utilities Engineering Manager

Recommended by: Alex Ameri, Director of Public Works

Approved by:



Kelly McAdoo, City Manager