THE METROPOLITAN WATER DISTRICT OF SOUTHERN CALIFORNIA

BOARD ACTION

- **Board of Directors**
  Engineering, Operations, and Technology Committee

3/14/2023 Board Meeting

7-4

Subject

Authorize an increase of $500,000 in change order authority for the contract to replace the overhead bridge cranes at the five Colorado River Aqueduct pumping plants; the General Manager has determined that the proposed action is exempt or otherwise not subject to CEQA

Executive Summary

Metropolitan's construction contracts are typically completed with final change order amounts falling well within the General Manager's Administrative Code authority which is the greater of $250,000 or five percent of the initial contract amount. In September 2020, Metropolitan's Board awarded a $13,419,000 contract to replace the original overhead cranes at all five Colorado River Aqueduct (CRA) pumping plants. During construction, the contractor encountered several issues that caused additional labor and material costs to be incurred. Additionally, staff recommends changes to the original contract to increase the functionality and operational efficiency of the crane systems beyond that which was considered in the original design of the project. Based on current and anticipated field conditions, the extent of required extra work under the subject contract is projected to exceed the General Manager's current change order authority of $670,950. Staff recommends that the General Manager's change order authority for this construction contract be increased by $500,000 at this time so the contractor can complete the remaining work without delay and at the lowest overall cost.

Details

Background

The CRA is a 242-mile-long conveyance system that transports water from the Colorado River to Lake Matthews. It consists of five pumping plants, 124 miles of tunnels, 63 miles of canals, and 55 miles of conduits, siphons, and reservoirs. The aqueduct was constructed in the late 1930s and was placed into service in 1941.

Each of Metropolitan's five pumping plants has one overhead bridge crane located on the main floor of the pump room. The existing cranes were installed during the original CRA construction. Each crane spans the width of the entire floor, running along tracks that are anchored to the building at a height of 45 feet above the ground floor. Each bridge assembly has two hoists, with ratings up to 45 tons for the main and 15 tons for the auxiliary. These ratings vary at the different pump houses based on the respective weights of the equipment. These cranes have performed well over the last 80 years; however, they show signs of deterioration and require frequent repair, and staff must custom fabricate many of the replacement parts since original or substitute off-the-shelf parts are no longer available.

Replacement of the overhead bridge cranes at the five CRA pumping plants is also an important precursor project to support a comprehensive, multi-year program to rehabilitate all 45 CRA main pumps and to perform maintenance activities as necessary. In September 2020, Metropolitan's Board awarded a $13,419,000 contract to J. F. Shea Construction, Inc. to begin the overhead crane replacement work at all five CRA pumping plants. Construction is currently approximately 20 percent complete and is scheduled to be completed in fall 2023.

Metropolitan's Administrative Code authorizes the General Manager to execute change orders on construction contracts in an aggregate amount not to exceed five percent of the initial amount of the contract or $250,000, whichever is greater. Change orders to construction contracts are issued for a variety of reasons, including: (1) owner-initiated changes because they increase the overall project quality and efficiency; (2) to address design

errors and/or omissions discovered after construction began; (3) to address field conditions that differ from those shown on the contract drawings and specifications; and (4) changes needed to benefit other related construction projects. Metropolitan staff negotiates the cost and schedule impacts of all change orders before they are formally authorized.

Metropolitan's construction contracts are typically completed with final change order amounts falling well within the General Manager's Administrative Code authority. Since the beginning of 2018, Metropolitan has completed 104 public works contracts with a total awarded amount of approximately $440 million, and total earnings after net extra work of $457 million. The average change order authority utilized over this period is 3.9 percent. All but three of the 104 contracts have stayed within their originally awarded change order authority amount.

For this contract, the original change order authority based on the construction contract amount is $670,950. If changes occur on a construction contract that exceeds this total, additional authorization from the Board is required. At this time, the subject contract has experienced circumstances that were unforeseen when the contract was originally advertised for construction bids. Staff anticipates that the timely resolution of these issues will exceed the General Manager's Administrative Code authority.

CRA Overhead Crane Replacement – Increase in Change Order Authority (Contract No. 1946)

The contract requires the new overhead cranes to be replaced sequentially within a six-week outage period at each of the pumping plants to minimize disruption to the plant's operations and ensure reliable water deliveries. This strategy also allows Metropolitan and the contractor to utilize lessons learned from the previous installation(s) and apply them to the next upcoming plant's replacement. The contractor has completed the first overhead crane installation at the Gene Pumping Plant, as required per the contract. As the testing and commissioning of the Gene Pumping Plant crane progressed, it became apparent that enhancements to the cranes, beyond those that were initially specified in the contract documents, would be necessary to optimize the operational functionality of the systems, improve the ability of staff to conduct maintenance activities with the cranes, and minimize equipment downtime during equipment installation. As a result, the contractor has incurred additional costs from the owner's directed enhancements and from differing site conditions encountered during the construction, as discussed below.

- **Radio control enhancements:** Each crane is equipped with a wireless radio control system that is used to operate the main and auxiliary hoists remotely. The current controller design allows the main and auxiliary hoists to operate individually or together in sync to lift and lower equipment, which is the current crane industry standard. During the testing and commissioning of the Gene Pumping Plant crane, staff realized the need for the main and auxiliary hoists to operate concurrently but not in sync with each other. For example, to lift a discharge valve actuator from the lower floor, the main hoist may be needed to lift while the auxiliary hoist lowers to fit the actuator through the opening in the pump house floor. Additionally, the new cranes have a third hoist that is part of an independent monorail attachment to the main crane. The hoist for this attachment currently operates independently from the other two hoists and has a separate controller. It is recommended that the operation of the three hoists be combined in one controller to enhance the functions of the hoists and provide the most flexibility to operations staff.
- **Pendant enhancements:** In addition to the crane’s radio control features, each crane is also equipped with a pendant controller for the main and auxiliary hoists. The pendant controller provides for a local, hard-wired backup to the radio controllers. The pendant is centrally located on a reel mount to allow the crane operator to maintain visual contact with the hoists as the crane moves throughout the building. The reel for the pendant uses a manual retraction mechanism and is designed to clear the pumping plant equipment located below when the pendant is fully retracted. If the pendant is inadvertently left in a lowered position, it could damage equipment within the building. The pendant controller does not automatically retract when not in use. The crane manufacturer is proposing a design change from a centrally mounted reel to a festoon track for the pendant controller. This feature will provide for increased safety when operating the cranes by relocating the pendant controller away from all equipment and allowing the pendant to travel with the crane trolley as it moves throughout the building in a safe manner. The pendant modifications will also include hoist control changes that are necessary to match the radio controller enhancements.

In addition, as the contractor prepared for the Eagle Mountain Pumping Plant work, unanticipated field conditions were encountered that required additional work to be performed. To expedite the crane replacement, the contractor was requested to change the construction plan to accommodate the unforeseen changes as detailed below.

- **Eagle Mountain Pumping Plant differing site conditions:** During construction, the contractor encountered a deviation from the contract record drawings at Eagle Mountain Pumping Plant. The roof truss system in the pump house was expanded in the early 1990s as part of a seismic retrofit project. The seismic retrofit placed structural beams intermittently along the north portion of the longitudinal wall of the pump house. These beams will interfere with the new crane's movement. The presence of these structural beams was not disclosed to the contractor in the original set of design drawings. As a result, the contractor will need to reduce the crane's height by modifying crane girders, wheel sizes, and various ancillary features. The contract specifications required that the contractor field verify all measurements, and staff is currently negotiating the differing site condition with the contractor.
- **Electrification modifications:** During the testing and commissioning of the Gene Pumping Plant crane, staff discovered that the location of the crane's electrical system interfered with the main hoist's ability to reach the pump house's westernmost floor opening. These access openings are used to remove and install various equipment beneath the pump house's main floor. Modifying the crane's electrical system will enhance the safe operation of the cranes by providing the necessary space for the hoist to comfortably reach the far ends of the access openings to facilitate ease of maintenance activities.

The changes described above and other less significant changes to the contract have utilized most of the existing change order authority. Several months of work are required to implement the crane enhancements, complete fabrication, construction, start-up, and commissioning at the remaining four CRA pumping plants. Consequently, it is expected that there will be additional unanticipated changes to the construction contract. Therefore, it is recommended that the original change order authority be increased to accommodate these potential future issues in addition to the crane modifications listed above.

Per Metropolitan's Administrative Code, the General Manager has the authority to execute change orders for this contract up to a maximum of $670,950. To date, approximately $527,000 in charge orders have been executed. To fully resolve these issues and complete the fabrication, construction, testing, and commissioning of the overhead bridge cranes at all five CRA pumping plants, staff recommends that the change order authority be increased by $500,000 for a new maximum amount of $1,170,950. This increase will enable all remaining work to be performed expeditiously without delaying the contract completion.

This action authorizes an increase in the General Manager's authority to execute change orders from $670,950 to an aggregate amount not to exceed $1,170,950 for the overhead bridge crane replacement at all five CRA pumping plants.

Alternative Considered

Staff investigated two approaches to address the additional work identified for the project. The first approach would complete contract changes generated through differing site conditions only. The radio control and pendant enhancements would be completed under a separate stand-alone contract. This approach would reduce the requested increase by approximately $389,000 for a not-to-exceed limit of $781,950, and a Board-authorized increase to the original change order authority would still be required to complete the project. With this approach, a separate future contract would be required. Furthermore, this change would increase the final overall costs of the project, delay the completion of all identified work, and potentially void the crane warranty. Additionally, staff would need to mobilize additional support equipment and personnel to safely perform the maintenance activities while the radio control and pendant enhancements are pending.

Use of the current contractor to complete owner's directed enhancements and from differing site conditions allows all identified work to be completed in a timely and cost-effective manner. Additional benefits to the recommended approach include eliminating the need for staff to learn two radio control systems and providing staff with the necessary equipment to perform their work efficiently as soon as possible.

Summary

This action authorizes an increase of $500,000 in the General Manager's authority to execute change orders for Contract No. 1946 with J. F. Shea Construction, Inc. for unforeseen events during construction.
See **Attachment 1** for the Financial Statement and **Attachment 2** for the Location Map.

Project Milestone

October 2023 – Construction completion

Policy

Metropolitan Water District Administrative Code Section 5108: Appropriations

Metropolitan Water District Administrative Code Section 8121: General Authority of the General Manager to Enter Contracts

Metropolitan Water District Administrative Code Section 11104: Delegation of Responsibilities

By Minute Item 52113, dated September 15, 2020, the Board awarded a $13,419,000 construction contract to J. F. Shea Construction, Inc. to replace the overhead bridge cranes at all five CRA pumping plants.

By Minute Item 21997, dated April 11, 2022, the Board appropriated a total of $600 million for projects identified in the Capital Investment Plan for Fiscal Years 2022/23 and 2023/24.

California Environmental Quality Act (CEQA)

CEQA determination for Option #1:

The Overhead Bridge Cranes replacement was previously determined to be categorically exempt under Classes 1 and 2 (Sections 15301 and 15302) of the State CEQA Guidelines on September 15, 2020. With the current board action, there is no substantial change to the nature or scope of work proposed since the original project was first approved in 2020. Furthermore, the fiscal action of a change order is not subject to CEQA because it involves other government fiscal activities which do not involve any commitment to any specific project which may result in a potentially significant physical impact on the environment (Section 15378(b)(4) of the State CEQA Guidelines). Accordingly, no further CEQA documentation is necessary for the Board to act with regard to the proposed action.

CEQA determination for Option #2:

None required

Board Options

Option #1

Authorize an increase of $500,000 in change order authority for the contract to replace the overhead bridge cranes at the five Colorado River Aqueduct pumping plants.

Fiscal Impact: Expenditure of up to $500,000 in capital funds. All costs will be incurred in the current biennium and have been previously authorized.
Business Analysis: This option will allow the timely completion of all remaining work for the replacement of the overhead bridge cranes at all five CRA pumping plants.

Option #2

Do not authorize an increase in change order authority.
Fiscal Impact: Additional costs would likely be incurred in the future as an additional contract(s) will need to be authorized to complete the work that was planned in the original contract.
Business Analysis: This option is unlikely to result in lower costs for the extra work performed and would delay the project's completion.

Staff Recommendation

Option #1

2/21/2023

John V. Bednarski *Date*
Manager/Chief Engineer

2/27/2023

Adel Hagekhalil *Date*
General Manager

Attachment 1 – Allocation of Funds

Attachment 2 – Location Map

Ref# ES12694140

Allocation of Funds for CRA Overhead Cranes Replacement Project

	Current Board Action (Mar. 2023)
Labor	
Studies & Investigations	$ -
Final Design	-
Owner Costs (Program mgmt., envir. monitoring)	-
Submittals Review & Record Drwgs.	-
Construction Inspection & Support	-
Metropolitan Force Construction	-
Materials & Supplies	-
Incidental Expenses	-
Professional/Technical Services	-
Right-of-Way	-
Equipment Use	-
Contracts	
J. F. Shea Construction, Inc	500,000
Remaining Budget	-
Total	**$ 500,000**

The total amount expended to date to replace the CRA Overhead Cranes is approximately $8.7 million. The total estimated cost to complete the CRA Overhead Cranes Replacement Project, including the amount appropriated to date, funds allocated for the work described in this action, and future construction costs, is anticipated to range from $20.3 million to $20.8 million.

Location Map