



● **Board of Directors**
Engineering and Operations Committee

11/9/2021 Board Meeting

7-5

Subject

Award a \$3,280,920 contract to J.F. Shea, Construction, Inc. for the lining of the Cholla Wash cut-and-cover conduit at Mile Marker 126 on the Colorado River Aqueduct; the General Manager has determined that the proposed action is exempt or otherwise not subject to CEQA

Executive Summary

The Cholla Wash cut-and-cover conduit epoxy lining project has been developed as a pilot project to determine the potential to maximize flows in the Colorado River Aqueduct (CRA) conveyance system. This project will line approximately 500 feet of the Cholla Wash conduit. Staff will subsequently collect data during 2022 aqueduct operations to determine if epoxy lining increases the hydraulic carrying capacity of the conduit. A successful pilot project may lead to more extensive use of the epoxy lining in other portions of the aqueduct. This action awards a construction contract to epoxy line the Cholla Wash cut-and-cover conduit located at Mile Marker 126 within the CRA conveyance system.

Details

Background

The CRA is a 242-mile-long conveyance system that transports water from the Colorado River to Lake Mathews. It consists of five pumping plants, 97 miles of tunnels, 61 miles of canals, 29 miles of siphons, and 55 miles of conduits. The aqueduct was constructed in the late 1930s and was placed into service in 1941.

Each of the five pumping plants has nine main pumps. These pumps were installed in several phases over time to meet increasing water demands. In 1959, when all pumps were installed, the hydraulic capacity of the CRA totaled 1,605 cubic feet per second (cfs). In 1962, Metropolitan initiated a program to increase the capacity of the CRA pumps. Pump unit performance was improved by enlarging the impeller diameters and modifying the angle of the vanes at the impeller discharge. At the present time, the hydraulic capacity of the CRA pumps is approximately 1,800 cfs.

The CRA conveyance system is routinely and thoroughly cleaned during the annual shutdown in February to ensure that delivery capabilities of the aqueduct system are maintained. However, with warmer aqueduct temperatures, biological fouling of concrete surfaces decreases velocity due to increased friction, which results in higher water elevations. When the aqueduct is operating at maximum capacity, it becomes challenging to manage flows with these higher water elevations, especially in those portions of the aqueduct that are either open canals or buried siphons. The higher water elevation reduces hydraulic freeboard and can result in water spill in canal sections and potential over-pressurization of enclosed conduits. When these conditions occur, staff is required to conduct more frequent patrols to monitor the freeboard and system flow, increase maintenance (scraping and cleaning), and add chlorine to reduce biological fouling of concrete surfaces that reduce flows.

As a pilot project, staff plans to install epoxy lining within the 16-foot-high and 22.5-foot-wide Cholla Wash cut-and-cover conduit. The enclosed cut-and-cover conduits are unreinforced concrete horseshoe-shaped structures placed upon an invert slab. Due to the unreinforced nature of this and other siphons, staff closely monitors water surface elevations in the siphons when maximum aqueduct flows are being delivered. Since the siphons are unreinforced, it is important to avoid pressurizing the siphon under maximum water flow conditions. It is anticipated that the epoxy lining will provide smoother wall surfaces and allow increased water flow through

these sections with lower water surface elevation, thereby avoiding the pressurization of the siphons. The demonstration project will enable staff to evaluate the effectiveness of the epoxy liner, assess the amount of surface preparation necessary to apply the liner, and confirm application sequence and concrete repair timing, since this work can only be performed during a shutdown of the CRA system. Lessons learned from the demonstration project will be applied to future lining projects. Staff recommends the award of a construction contract now for the work to take place during the upcoming February 2022 CRA shutdown.

In accordance with the April 2020 action on the biennial budget for Fiscal Years 2020/21 and 2021/22, the General Manager will authorize staff to proceed with the lining, pending board authorization as described below. Based on the current Capital Investment Plan (CIP) expenditure forecast, funds for the work to be performed pursuant to this action during the current biennium are available within the Appropriation for Fiscal Years 2020/21 and 2021/22 (Appropriation No. 15517). This project has been reviewed in accordance with Metropolitan's CIP prioritization criteria and was approved by Metropolitan's CIP evaluation team to be included in the CRA Reliability Program.

CRA Cholla Wash Cut-and-Cover Conduit Lining – Construction

The scope of the construction contract for the conduit lining includes: (1) epoxy lining of an approximately 500 linear feet section; (2) surface preparation; (3) concrete crack repairs; and (4) installation of a temporary ventilation system to support construction activities. Metropolitan force activities will include shutting down the aqueduct pumping system, dewatering and re-watering the aqueduct, and providing contractor access into the conduit.

A total of \$4.5 million has been budgeted for this work; besides the amount of the contract, other allocated funds include \$350,000 for construction management and inspection; \$200,000 for Metropolitan force activities as described above; \$165,000 for Metropolitan staff to review submittals, respond to requests for information, provide technical support, and prepare record drawings; \$210,000 for contract administration, environmental monitoring, project management and 3-D survey of the remaining unlined portion of the conduit to capture existing conditions; and \$294,080 for remaining budget.

Award of Construction Contract (J.F. Shea Construction, Inc.)

Specifications No. 2016 for the lining of the CRA Cholla Wash cut-and-cover conduit was advertised for bids on September 2, 2021. As shown in **Attachment 2**, 2 bids were received and opened on October 12, 2021. One bidder did not meet licensing requirements and was deemed non-responsive. The second low bid from J.F. Shea Construction, Inc. in the amount of \$3,280,920 complies with the requirements of the specifications. The engineer's estimate was \$2 million. Staff attributes the difference between the engineer's estimate and the second low bid on the contractor's anticipation of extensive abrasive blasting, crack repair and surface preparation required to apply the epoxy lining. As a result, the contractor would be required to expend additional labor, time, and materials to prepare the surface for the epoxy lining. For this contract, Metropolitan established a Small Business Enterprise participation level of at least 5 percent of the bid amount. J.F. Shea Construction, Inc. has committed to meet this level of participation. The subcontractors for this contract are listed in **Attachment 3**. This action awards a \$3,280,920 contract to J.F. Shea Construction, Inc. for the lining of the Cholla Wash cut-and-cover conduit on the CRA.

The total cost of construction for this project is \$3,480,920, which includes the amount of the contract (\$3,280,920), and Metropolitan force activities (\$200,000). Engineering Services' goal for inspection of projects with construction greater than \$3 million is 9 to 12 percent. For this project, the anticipated cost of inspection is approximately 10.1 percent of the total construction cost.

Alternatives Considered

In light of the higher than expected bids, staff considered cancelling the project. However, staff identified important project benefits with awarding a contract at this time. By performing this work on a relatively short length of the siphon, staff will be able to confirm the production rates and efficiencies of the lining process prior to commencing the full-scale effort. Additionally, staff will perform detailed 3-D surveys of the remaining length of the siphon to capture the existing as-is interior wall condition, which will reduce risks and costs of future contracts.

Various liner products were evaluated and considered for this demonstration project, such as polyurethane, polyester, vinyl, and different types of epoxies. The epoxy liner was selected because it can be easily applied to concrete surfaces in moist and damp conditions and provides a smooth finish and long-term durability after its final application. The demonstration project will validate these results. The demonstration project will also verify the liner application required procedures and sequencing, which will help staff plan the future lining projects in a cost-effective and efficient manner.

Summary

This action awards a \$3,280,920 contract to J.F. Shea Construction, Inc. for the lining of the CRA Cholla Wash cut-and-cover conduit on the CRA. See **Attachment 1** for the Allocation of Funds, **Attachment 2** for the Abstract of Bids, **Attachment 3** for the listing of Subcontractors for Low Bidder, and **Attachment 4** for the Location Map.

Project Milestone

April 2022 – Completion of lining at the Cholla Wash conduit

Policy

Metropolitan Water District Administrative Code Section 11104: Delegation of Responsibilities

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

By Minute Item 51963, dated April 14, 2020 the Board appropriated a total of \$500 million for projects identified in the Capital Investment Plan for Fiscal Years 2020/21 and 2021/22.

California Environmental Quality Act (CEQA)

CEQA determination for Option #1:

The proposed action is categorically exempt under the provisions of CEQA and the State CEQA Guidelines. In particular, the proposed action consists of repair and maintenance of existing public facilities with negligible or no expansion of existing or former use and no possibility of significantly impacting the physical environment. Accordingly, this proposed action qualifies as a Class 1 Categorical Exemption (Section 15301 of the State CEQA Guidelines).

CEQA determination for Option #2:

None required

Board Options

Option #1

Award \$3,280,920 contract to J.F. Shea Construction, Inc. for the lining of Cholla Wash cut-and-cover conduit along the Colorado River Aqueduct.

Fiscal Impact: \$4.5 million in capital funds. All costs will be incurred in the current fiscal year and have been previously authorized.

Business Analysis: This option will improve operational efficiency and enhance CRA reliability of the conveyance system.

Option #2

Do not proceed with the project at this time.

Fiscal Impact: None

Business Analysis: This option would forego an opportunity to improve the reliability of the CRA.

Staff Recommendation

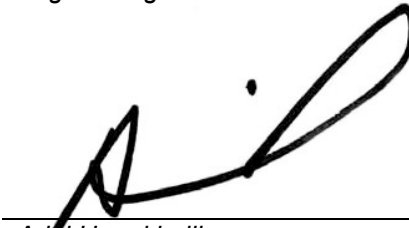
Option #1



John V. Bednarski
Manager/Chief Engineer
Engineering Services

10/14/2021

Date



Adel Hagekhalil
General Manager

10/25/2021

Date

Attachment 1 – Allocation of Funds

Attachment 2 – Abstract of Bids

Attachment 3 – Subcontractors for Low Bidder

Attachment 4 – Location Map

Ref# es12685072

Allocation of Funds for CRA Cholla Wash Cut-and-Cover Conduit Lining

	Current Board Action (Nov. 2021)
Labor	
Studies & Investigations	\$ -
Final Design	-
Owner Costs (Program mgmt., envir. monitoring)	210,000
Submittals Review & Record Drwgs.	165,000
Construction Inspection & Support	350,000
Metropolitan Force Construction	200,000
Materials & Supplies	-
Incidental Expenses	-
Professional/Technical Services	-
Right-of-Way	-
Equipment Use	-
Contracts	-
J.F. Shea Construction, Inc.	3,280,920
Remaining Budget	294,080
Total	\$ 4,500,000

The total amount expended to date for the CRA Cholla Wash Cut and Cover Conduit Lining is approximately \$67,000. The total estimated cost to complete this project, including the amount appropriated to date and funds allocated for the work described in this action, is \$4.6 million.

The Metropolitan Water District of Southern California**Abstract of Bids Received on October 12, 2021, at 2:00 P.M.****Specifications No. 2016
Colorado River Aqueduct
CRA Cholla Wash Cut and Cover Conduit Lining**

The work consists of applying an epoxy lining to approximately 500 linear feet of a large horseshoe-shaped concrete conduit, surface preparation and repair of the conduit prior to lining, and temporary ventilation.

Engineer's estimate: \$2,000,000

Bidder and Location	Total	SBE \$	SBE %	Met SBE¹
Hartman Walsh Painting Co. Saint Louis, MO ²	\$1,968,984	—	—	—
J.F. Shea Construction, Inc. Walnut, CA	\$3,280,920	\$1,998,000 <u>\$256,000</u>	8%	Yes

¹ Small Business Enterprise (SBE) participation level established at 5% for this contract.

² Non-responsive bid

The Metropolitan Water District of Southern California**Subcontractors for Low Bidder****Specifications No. 2016****Colorado River Aqueduct****CRA Cholla Wash Cut-and-Cover Conduit Lining**

Low bidder: J.F. Shea Construction, Inc.

Subcontractor and Location
F.D. Thomas, Inc. Central Point, CA

Location Map

