



- Board of Directors  
*Engineering and Operations Committee*

12/10/2019 Board Meeting

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**7-1**

## **Subject**

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Authorize an agreement with Industrial Electric Machinery in an amount not-to-exceed \$350,000 to provide condition assessments for the main pump motors at the Colorado River Aqueduct pumping plants; the proposed action is in furtherance of a project that the Board previously determined is exempt or otherwise not subject to CEQA

## **Executive Summary**

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This action authorizes an agreement with Industrial Electric Machinery (IEM) to conduct detailed condition assessments for 25 selected main pump motors across all five Colorado River Aqueduct (CRA) pumping plants. Staff has initiated a long-term comprehensive program to rehabilitate all 45 main pumps, motors and their support systems in order to extend their service life and maintain reliability. The services of a specialized testing firm are required to assess the condition of the pump motors. The results of this testing and condition assessment will provide the basis for determining the scope of rehabilitation for all 45 motors.

## **Details**

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### **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, 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 nine main pumps and motors that were installed in four stages between 1941 and 1959. In the mid-1980s, a major effort was undertaken to rehabilitate and refurbish all 45 main pumps. Since that time, Metropolitan staff has performed regular maintenance on these 45 units. While all pump units continue to operate reliably, recent inspections have identified that the pumps, motors and their related equipment are showing signs of wear and deterioration.

In October 2016, Metropolitan's Board authorized a long-term comprehensive program to rehabilitate the pumps, their motors, and ancillary support systems in order to extend the service life and maintain overall reliability of the CRA system. Comprehensive assessments are being performed on all the aforementioned equipment. Metropolitan staff are assessing the pumps and their ancillary support systems. Staff recommends that a specialty consultant, familiar with testing and assessing electrical motors of comparable size to those on the CRA, perform the motor investigations. This action will authorize a new agreement for specialized technical services to perform a condition assessment on 25 of the 45 main pump motors at Metropolitan's five pumping plants. The information gained from these assessments will aid in the planning for the eventual rehabilitation of all 45 motors.

In October 2018, the Board appropriated funds and authorized the General Manager to initiate or proceed with work on all capital projects identified in the Capital Investment Plan (CIP), subject to any limits on the General Manager's authority and CEQA requirements. This project has been reviewed with Metropolitan's CIP prioritization criteria, and was approved by Metropolitan's CIP Evaluation Team to be included in the Colorado River Aqueduct Reliability Program.

In accordance with the October 2018 action, the General Manager will authorize staff to proceed with the assessments of the main motors at each CRA pumping plant, pending board authorization to enter into the

agreement described below. No additional allocation of funds is required for this work, as sufficient funds were previously allocated.

### **CRA Main Pump Reliability – Main Motor Condition Assessment**

The scope of work includes performing detailed condition assessments on 25 of the 45 main pump motors, spread across all five CRA pumping plants. Two types of testing will be performed:

1. Electrical diagnostic testing will be performed to measure the condition of the stator and rotor field windings. Also, comprehensive visual inspections will be performed on the stator, stator lamination, rotor field windings, exciter, commutator, and slip rings. This work will require each motor to be out of service for approximately two weeks while the motors are disassembled and tested. Metropolitan forces will perform the disassembly and re-assembly of these motors.
2. Electromagnetic Interference (EMI) tests will be conducted to detect potential defects and deterioration of motor components. EMI testing is an innovative technology that will analyze and evaluate the condition of the motors based on radio frequency patterns. EMI testing can be performed while the motors remain in operation.

These comprehensive assessments will be sequenced and performed over an 18-month period to ensure an eight-pump flow capability is maintained on the CRA system. The types of tests to be conducted, and the number of motors to be tested has been carefully selected to ensure that a representative equipment sample is examined. Findings from this testing will be the basis of determining the recommended rehabilitation measures on all 45 main plant motors.

### **Specialized Technical Services by Industrial Electric Machinery (IEM) – New Agreement**

Specialized technical services are recommended to be provided by IEM under a new professional services agreement. IEM was selected via Request for Proposal (RFP) No. 1227. The RFP was issued on July 29, 2019, to solicit an experienced and qualified service provider to perform a detailed motor condition assessment of 25 main motors at Metropolitan's five CRA pumping plants. Three proposals were received on August 20, 2019. One proposal was deemed non-responsive due to an incomplete submission. Staff evaluated the remaining two proposals. The proposal from IEM, in an amount not to exceed \$350,000, complied with the requirements of RFP No. 1227. IEM was selected based on the established best value proposal evaluation criteria, which included their technical approach and experience with similar equipment.

This action authorizes an agreement with IEM in an amount not to exceed \$350,000. For this agreement, Metropolitan established a Small Business Enterprise participation level of 25 percent. IEM has agreed to meet this level of participation. The planned subconsultants for this agreement are ABB Leap and Kent N. Smith Consulting.

### **Alternatives Considered**

During the planning process for this project, staff considered performing condition assessments of all 45 of the CRA's main motors. This approach would provide very definitive data on all of the pumps. However this approach would add an additional 12-18 months to this portion of the project schedule. After a thorough evaluation, staff determined that testing the 25 main motors would be the most cost effective and efficient path moving forward and would provide sufficient information from which the next phases of the rehabilitation program could be planned. Through this selective testing approach of the representative motors, staff will be able to gather all the necessary data for future work, while avoiding duplicative efforts and potential delays to the overall rehabilitation program.

### **Summary**

This action authorizes an agreement with IEM in an amount not to exceed \$350,000. See **Attachment 1** for the Location Map.

### ***Project Milestone***

June 2021 – Completion of conditional assessment of 25 main motors at all five CRA pumping plants

## Policy

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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 50610 dated October 11, 2016, the Board authorized preliminary investigations to rehabilitate the 45 main pumps at Metropolitan's Colorado River Aqueduct pumping plants; design to rehabilitate a single main pump; and an agreement with Northwest Hydraulic Consultants, Inc.

By Minute Item 51353 dated October 9, 2018, the Board appropriated a total of \$290 million for projects identified in the Capital Investment Plan for Fiscal Years 2018/19 and 2019/20.

## California Environmental Quality Act (CEQA)

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### CEQA determination for Option #1:

The proposed action is in furtherance of a project that was previously determined to be exempt under Class 1 (Section 15301), Class 2 (Section 15302), Class 6 (Section 15306), and Class 9 (Section 15309) of the State CEQA Guidelines on October 11, 2016. With the current board action, there is no substantial change proposed since the original project was first approved in 2016. Hence, the project fully complies with CEQA and the State CEQA Guidelines. Accordingly, no further CEQA documentation is necessary for the Board to act on the proposed action.

### CEQA determination for Option #2:

None required

## Board Options

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### Option #1

Authorize an agreement with Industrial Electric Machinery in an amount not to exceed \$350,000.

**Fiscal Impact:** Expenditure of \$350,000 that was previously authorized. Approximately \$100,000 will be incurred in the current fiscal year and has been previously authorized. The remaining funds from this action and for future construction costs will be accounted for and appropriated under the next biennial budget.

**Business Analysis:** This option will enable the collection of data necessary to evaluate replacement or rehabilitation options for the CRA main motors. The option will guide staff in the selection of the most cost effective and reliable option.

### Option #2

Do not proceed with the project at this time.

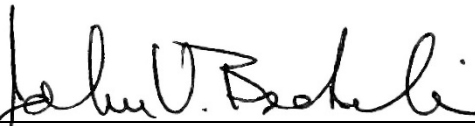
**Fiscal Impact:** None

**Business Analysis:** This option would defer the refurbishment of the main pumps and their related systems, which would forego an opportunity to reduce the risk of unplanned outages of the CRA.

**Staff Recommendation**

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Option # 1

  
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John V. Bednarski 11/21/2019  
Manager/Chief Engineer, *Date*  
Engineering Services

  
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Jeffrey Kightlinger 11/26/2019  
General Manager *Date*

**Attachment 1 – Location Map**

Ref# es12668530

### Location Map

