



- Board of Directors  
*Engineering and Operations Committee*

10/14/2014 Board Meeting

---

**8-2**

---

## **Subject**

Appropriate \$3.06 million; and authorize final design to rehabilitate the sump systems at each Colorado River Aqueduct pumping plant (Approp. 15438)

---

## **Executive Summary**

This action authorizes final design to rehabilitate the main and auxiliary sump systems at Metropolitan's five Colorado River Aqueduct (CRA) pumping plants. The sump systems include parallel pumps and piping which circulate cooling water and collect drainage water from several sources: spent cooling water after it has been used to cool the main CRA pumps; washwater from plant maintenance activities; used backwash water from the plants' potable water treatment systems; and leakage from the main CRA pumps.

### **Timing and Urgency**

Recent inspections of the CRA pumping plants' main and auxiliary sump systems have identified significant corrosion and deterioration of the piping and equipment within the sump basins. Each CRA pumping plant has two main and five auxiliary sump basins which collect drainage and used water from several sources. Two separate pumped systems are associated with these sumps: the sump discharge system and the circulating water system. These 75-year-old systems are deteriorated and need to be replaced. Failure of the circulating water systems could result in flooding and overheating of the main CRA pumps, while failure of the sump discharge systems could result in overflow of the sump basins and flooding of the CRA pump bays. Such failures could negatively impact water deliveries from the CRA. Staff recommends moving forward to rehabilitate the sump systems at this time to maintain reliable water deliveries.

This project has been reviewed with Metropolitan's Capital Investment Plan (CIP) prioritization criteria, and is categorized as an Infrastructure Reliability project. Funds for this action are available within Metropolitan's capital expenditure plan for fiscal year 2014/15.

---

## **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, 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 the five CRA pumping plants has two main sumps and five auxiliary sumps that collect water leakage from the main CRA pumps, backwash flows from the domestic water treatment system, washwater from plant maintenance activities, and spent cooling water after it has been used to cool the main CRA pumps. These flows can at times exceed 2,700 gallons per hour. The sumps are located in the bottom of the four-level pumphouse. Each main sump is approximately 9 feet wide, 20 feet long and 35 feet deep, while the auxiliary sumps are approximately 8 feet wide, 10 feet long and 6 feet deep. The main sump basins are located at either end of each pumping plant's main building, and the five auxiliary sump basins are located between the main CRA pumps.

The sump basins contain portions of two separate piping systems: the sump discharge system and circulating water system. Each of these systems includes 16-inch diameter piping, pumps, valves and couplings. The sump discharge system pumps water from the sump basins back to the CRA or to the pumping plant forebay, depending on the pumping plant. The circulating water system pressurizes water from the pumping plant's 16-foot-diameter inlet pipe, located upstream of the plant, into a closed piping system which passes through the sump basins. This water is delivered to separate storage tanks for the fire protection, potable water, and main pump cooling water systems. The circulating water system is also used to dewater the plant inlet pipe during shutdowns.

The sump discharge systems and circulating water systems were installed in the 1930s. These systems are partially submerged and operate in a humid and corrosive environment. Pipe leaks have become more frequent in recent years, requiring immediate system shutdowns for repairs by divers. If the sump discharge or circulating water systems were to fail, water could potentially overflow from the sump basins into the CRA pump bays, damaging electrical and mechanical equipment and impacting deliveries from the CRA.

In February 2011, Metropolitan's Board authorized preliminary design for rehabilitation of the sump collection, discharge, and circulating water equipment and piping systems. Preliminary design has been completed, and staff recommends proceeding with final design phase activities at this time.

### **CRA Pumping Plant Sump System Rehabilitation – Final Design Phase (\$3,060,000)**

Rehabilitation of the pumping plant sump and circulating water systems will include replacement of pumps, piping, and valves within the sumps, and the accompanying electrical systems. The planned work also includes replacement of corroded catwalks, ladders, and handrails within the sump basins, in accordance with current building codes.

Final design phase activities will include detailed engineering design; preparation of drawings and specifications; investigations of buried circulating water piping, as discussed below; development of a construction cost estimate; receipt of bids; and all other activities in advance of award of the construction contract. All final design phase activities will be performed by Metropolitan staff.

The suction piping that conveys aqueduct water from the main CRA inlet pipe to the circulating water pumps at each plant is buried approximately 30 feet deep. An investigation of this 75-year-old cast iron piping will be performed including robotic camera surveys, potholing, and sample testing at select locations. After this piping's condition has been determined, staff will return to the Board for further authorization, if needed, to perform additional repairs.

This action appropriates \$3.06 million and authorizes final design phase activities to rehabilitate pumps, piping, and access features within the main and auxiliary sumps at the five CRA pumping plants. Requested funds include: \$1.97 million for final design; \$300,000 for investigations of buried circulating water system piping at all five pumping plants; \$75,000 for value engineering; \$324,000 for hazardous materials testing, project management, and development of a construction cost estimate; and \$391,000 for remaining budget. The final design cost as a percentage of the estimated construction cost is approximately 12 percent. Engineering Services' goal for design of projects with construction cost greater than \$3 million is 9 percent to 12 percent. For this project, the anticipated construction cost is expected to range from \$16.5 million to \$18.5 million.

The total estimated cost to complete the sump rehabilitation project, including the amount authorized to date, current funds requested, and future construction cost, is anticipated to range from \$20 million to \$22 million.

This project has been evaluated and recommended by Metropolitan's CIP Evaluation Team, and funds are available within the fiscal year 2014/15 capital expenditure plan. See [Attachment 1](#) for the Financial Statement and [Attachment 2](#) for the Location Map.

This work is included within the CRA Reliability Appropriation – FY 2006/07 Through FY 2011/12 (Appropriation No. 15438), which was initiated in fiscal year 2006/07. With the present action, the total funding for Appropriation No. 15438 will increase from \$37,454,000 to \$40,514,000.

***Project Milestone***

June 2016 – Completion of final design

**Policy**

---

Metropolitan Water District Administrative Code Section 5108: Appropriations

**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. The proposed project involves authorization and funding of final design and investigatory activities, which do not result in a serious or major disturbance to an environmental resource. This may be strictly for information gathering purposes, or as part of a study leading to an action which a public agency has not yet approved, adopted, or funded. The project also involves the reconstruction and replacement of existing public facilities with no expansion of use and no possibility of significantly impacting the physical environment. Accordingly, the proposed action qualifies for Class 6, Class 1 and Class 2 Categorical Exemptions (Sections 15306, 15301 and 15302 of the State CEQA Guidelines).

The CEQA determination is: Determine that pursuant to CEQA, the proposed action qualifies under three Categorical Exemptions (Class 6, Section 15306; Class 1, Section 15301; and Class 2, Section 15302 of the State CEQA Guidelines).

CEQA determination for Option #2:

None required

**Board Options**

---

**Option #1**

Adopt the CEQA determination that this action is categorically exempt, and

- a. Appropriate \$3.06 million; and
- b. Authorize final design to rehabilitate the sump systems at each CRA pumping plant.

**Fiscal Impact:** \$3.06 million in capital funds under Approp. 15438

**Business Analysis:** This option will enhance CRA reliability and reduce the risk of unplanned outages.

**Option #2**

Do not proceed with rehabilitation of the CRA pumping plant sump systems at this time.

**Fiscal Impact:** None

**Business Analysis:** This option would forgo an opportunity to reduce the risk of equipment damage in the event of piping or pump failure in the CRA sumps, potentially resulting in an interruption of CRA deliveries.

**Staff Recommendation**

---

Option #1

  
\_\_\_\_\_  
Gordon L. Johnson  
Manager/Chief Engineer  
Engineering Services

9/30/2014

*Date*

  
\_\_\_\_\_  
Jeffrey Kightlinger  
General Manager

10/1/2014

*Date*

**Attachment 1 – Financial Statement**  
**Attachment 2 – Location Map**

Ref# es12632700

### **Financial Statement for CRA Reliability Appropriation – FY 2006/07 Through FY 2011/12**

A breakdown of Board Action No. 27 for Appropriation No. 15438 to rehabilitate the sump systems at each CRA pumping plant<sup>1</sup> is as follows:

	<b>Previous Total Appropriated Amount (Oct. 2014)</b>	<b>Current Board Action No. 27 (Oct. 2014)</b>	<b>New Total Appropriated Amount</b>
Labor			
Studies & Investigations	\$ 2,246,800		2,246,800
Final Design	2,822,900	1,970,000	4,792,900
Owner Costs (Program mgmt., bidding, haz. materials testing)	3,180,090	324,000	3,504,090
Submittals Review & Record Drwgs	596,600	-	596,600
Construction Inspection & Support	2,452,500	-	2,452,500
Metropolitan Force Construction	3,835,600	300,000	4,135,600
Materials & Supplies	2,995,405	-	2,995,405
Incidental Expenses	138,800	-	138,800
Professional/Technical Services	2,891,000	75,000	2,966,000
Equipment Use	25,505	-	25,505
Contracts	15,216,370	-	15,216,370
Remaining Budget	1,052,430	391,000	1,443,430
<b>Total</b>	<b>\$ 37,454,000</b>	<b>\$ 3,060,000</b>	<b>\$ 40,514,000</b>

### **Funding Request**

<b>Appropriation Name:</b>	CRA Reliability Appropriation – FY 2006/07 Through FY 2011/12		
<b>Source of Funds:</b>	Revenue Bonds, Replacement and Refurbishment or General Funds		
<b>Appropriation No.:</b>	15438	<b>Board Action No.:</b>	27
<b>Requested Amount:</b>	\$ 3,060,000	<b>Budget Page No.:</b>	280
<b>Total Appropriated Amount:</b>	\$ 40,514,000	<b>Total Appropriation Estimate:</b>	\$ 73,300,000

<sup>1</sup> The total amount expended to date on the CRA Pumping Plant Sump System Rehabilitation project is approximately \$450,000. The total cost to complete this project, including the amount authorized to date, current funds requested, and future construction costs, is estimated to range from \$20 million to \$22 million.

### Location Map

