



- Board of Directors  
*Engineering and Operations Committee*

4/9/2013 Board Meeting

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**7-1**

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## **Subject**

Appropriate \$310,000; and authorize preliminary design to refurbish or replace eight radial gates on the Colorado River Aqueduct (Approp. 15438)

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## **Executive Summary**

This action authorizes preliminary design for refurbishment or replacement of eight radial gates on the Colorado River Aqueduct (CRA). The gates are needed to dewater and isolate various reaches of the CRA for maintenance and repairs.

### **Timing and Urgency**

Eight hydraulic radial gates located along the CRA were recently inspected and determined to be in need of refurbishment or replacement after more than 70 years of service in the harsh desert environment. The purpose of the gates is to manage the shutdown of various reaches of the CRA. The radial gates are opened or closed to divert water into diversion channels or spillways to isolate reaches for maintenance or repairs, and to quickly dewater the aqueduct in case of blockage or an emergency event. Recent inspections identified that the gates' protective coatings are deteriorating and the metallic components have corroded. Due to the importance of this equipment in maintaining reliable CRA deliveries, staff recommends proceeding with preliminary design to refurbish or replace these gates.

This project has been reviewed with Metropolitan's Capital Investment Plan (CIP) prioritization criteria, and is categorized as an Infrastructure Rehabilitation and Replacement project. Funds for this action are available within Metropolitan's capital expenditure plan for fiscal year 2012/13.

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## **Details**

### **Background**

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

There are a total of 14 hydraulic radial gates located along the CRA. The purpose of the radial gates is to shut down, isolate, and divert flows from the aqueduct. Each gate is constructed of a steel framework that resembles a slice of pie, with a curved plate that rotates to block flow when the gate is in the closed position. An electric motor actuator is used to pivot the gate upward from the closed to the open position. The electric motor, hoisting mechanism, and radial gate are mounted on a concrete structure. The gates have widths ranging from 10 to 22 feet, and heights ranging from 11 to 19 feet.

Recent inspections have identified that eight gates are corroded and require refurbishment or replacement. These eight gates are located at the Rice Wasteway, Vidal Junction Wasteway, Coxcomb Wasteway, Iron Wasteway, Hinds Sand Trap, Eagle Sand Trap, Eagle Wasteway, and Eagle Spillway. Protective coatings on various components of the gates have begun to fail. Several of the gates have a fiberglass laminate applied to the face of

the curved plate that is in contact with water. This laminate is deteriorating and has pulled away from the curved plate in several instances. Significant metal loss has occurred on portions of the steelwork and mounting brackets. The existing motor actuators used to open and close the gates have also deteriorated from 70 years of use in the harsh desert environment.

The inspections also identified that the concrete diversion channels are in need of repair. The 10-foot-wide reinforced concrete channels are used to reduce velocities and direct discharge flows away from the gates. The channels vary from 200 to 1,000 feet in length. Most are severely cracked and have voids in the subgrade beneath the concrete. Repair of the channels is recommended to be included under the radial gate refurbishment work.

### **CRA Radial Gate Refurbishment – Preliminary Design Phase (\$310,000)**

Planned upgrades involve refurbishment or replacement of eight radial gates located in open canal segments of the aqueduct. The motor actuators and the gates' electrical and control equipment will also be replaced. In addition, the scope will include repair of the concrete walls and floors within the diversion channels. The work will be completed over multiple CRA shutdowns.

Preliminary design phase activities will include hydraulic testing and field investigations to determine whether individual gates may be refurbished or will need to be replaced; testing for hazardous materials; assessing gate and guide materials and metallurgy; evaluating alternate gate configurations in case full replacement is required; preparing conceptual design drawings; preparing environmental documentation; and developing a construction cost estimate.

This action appropriates \$310,000 and authorizes preliminary design for the refurbishment or replacement of eight radial gates on the CRA. The requested funds include \$168,000 for the technical activities described above; \$60,000 for a value engineering review of the work; \$50,000 for preparation of environmental documentation and for project management; and \$32,000 for remaining budget. All preliminary design phase activities will be performed by Metropolitan staff.

Staff will return to the Board at a later date for authorization of final design.

This project has been evaluated and recommended by Metropolitan's CIP Evaluation Team, and funds are available within the fiscal year 2012/13 capital expenditure plan. See [Attachment 1](#) for the Financial Statement and [Attachment 2](#) for the Location Map.

The project is included within the CRA Reliability Program - Phase 2 (Appropriation No. 15438), which was initiated in fiscal year 2006/07. Past work authorized under Appropriation No. 15438 includes the CRA 6.9 kV Fault Current Protection Upgrades, CRA 230 kV Disconnect Switches Replacement, the Eagle Mountain and Iron Mountain Standby Generator Replacements, and the CRA Canal Improvements. With the current action, the total appropriated amount for this program will increase from \$32,424,000 to \$32,734,000.

### **Project Milestone**

December 2013 - Completion of preliminary design for refurbishment or replacement of eight radial gates

### **Policy**

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Metropolitan Water District Administrative Code Section 5108: Appropriations

### **California Environmental Quality Act (CEQA)**

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CEQA determination for Option #1:

The proposed action is categorically exempt under the provisions of CEQA and the State CEQA Guidelines. The proposed action involves the funding of a study and minor modifications to existing public facilities with negligible or no expansion of use and no possibility of significantly impacting the physical environment. In addition, the proposed action consists of basic data collection and resource evaluation activities which does 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. Accordingly, the proposed action qualifies for both Class 1 and Class 6 Categorical Exemptions (Sections 15301 and 15306 of the State CEQA Guidelines).

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

CEQA determination for Option #2:

None required

**Board Options**

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**Option #1**

Adopt the CEQA determination and

- a. Appropriate \$310,000; and
- b. Authorize preliminary design to refurbish or replace eight radial gates on the Colorado River Aqueduct.

**Fiscal Impact:** \$310,000 in capital funds under Approp. 15438

**Business Analysis:** This option will protect Metropolitan’s assets, enhance CRA reliability, and reduce the risk of costly emergency repairs.

**Option #2**

Do not proceed with the radial gate project at this time.

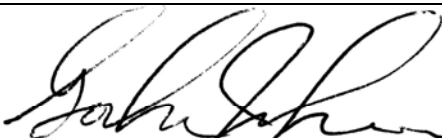
**Fiscal Impact:** None

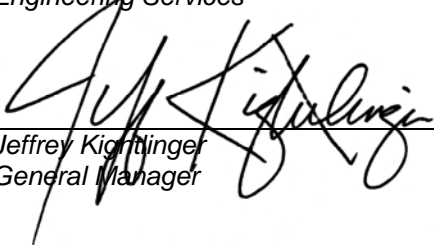
**Business Analysis:** This option would forgo an opportunity to enhance reliability of the CRA. This project could lead to higher repair costs, more extensive repairs, and additional system shutdowns.

**Staff Recommendation**

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Option #1

  
 \_\_\_\_\_ 3/18/2013  
 Date  
 Gordon Johnson  
 Manager/Chief Engineer,  
 Engineering Services

  
 \_\_\_\_\_ 3/20/2013  
 Date  
 Jeffrey Kightlinger  
 General Manager

**Attachment 1 – Financial Statement**

**Attachment 2 – Location Map**

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

A breakdown of Board Action No. 22 for Appropriation No. 15438 for refurbishment of radial gates on the CRA<sup>1</sup> is as follows:

	<b>Previous Total Appropriated Amount (Jan. 2013)</b>	<b>Current Board Action No. 22 (Apr. 2013)</b>	<b>New Total Appropriated Amount</b>
Labor			
Studies & Investigations	\$ 2,053,800	\$ 168,000	2,221,800
Final Design	2,496,900	-	2,496,900
Owner Costs (Program mgmt., environ. doc.)	2,685,090	49,000	2,734,090
Submittals Review & Record Drwgs	501,600	-	501,600
Construction Inspection & Support	2,122,000	-	2,122,000
Metropolitan Force Construction	3,218,700	-	3,218,700
Materials & Supplies	2,592,405	-	2,592,405
Incidental Expenses	135,800	1,000	136,800
Professional/Technical Services	1,852,000	60,000	1,912,000
Equipment Use	25,505	-	25,505
Contracts	14,155,340	-	14,155,340
Remaining Budget	574,860 <sup>2</sup>	32,000	606,860
<b>Total</b>	<b>\$ 32,414,000</b>	<b>\$ 310,000</b>	<b>\$ 32,724,000</b>

### **Funding Request**

<b>Program Name:</b>	CRA Reliability Program – 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>	22
<b>Requested Amount:</b>	\$ 310,000	<b>Budget Page No.:</b>	292
<b>Total Appropriated Amount:</b>	\$ 32,734,000	<b>Total Program Estimate:</b>	\$ 64,826,000

<sup>1</sup> This is the initial appropriation for the CRA Radial Gate Refurbishment Project.

<sup>2</sup> Includes previous allocation of \$705,000 from remaining budget to the Julian Hinds Pumping Plant standby generator replacement for procurement of additional equipment required for periodic testing of the new standby generator (\$140,000); to the Iron Mountain Pumping Plant standby generator replacement for site verification and for hazardous materials sampling and testing (\$155,000); to the Eagle Mountain Pumping Plant standby generator replacement to relocate the generator to avoid conflicts with unknown utilities (\$290,000); and to the Gene Pumping Plant storage building replacement for relocation of the building to eliminate interferences with existing facilities (\$120,000).

### Location Map

