



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

5/8/2018 Board Meeting

8-4

Subject

Adopt CEQA determination and appropriate \$3.1 million; authorize design to replace Casa Loma Siphon Barrel No. 1; and authorize agreement with Carollo Engineers, Inc., in an amount not to exceed \$2.2 million, to provide specialized design services (Appropriation No. 15480)

Executive Summary

This action authorizes design and preparation of environmental documentation to replace Barrel No. 1 of the Casa Loma Siphon on the Colorado River Aqueduct (CRA). This project will mitigate leaks associated with long-term ground subsidence and will improve seismic resilience of the siphon as it crosses the Casa Loma Fault. This action also authorizes a professional services agreement to provide engineering design services.

Timing and Urgency

Recurring leaks have occurred since the 1960s in Barrel No. 1 of the Casa Loma Siphon as it crosses the Casa Loma Fault. Numerous repairs have been attempted over the years, including replacement of the pipe, installation of external flexible couplings, and installation of internal seals. These efforts have not been successful in eliminating the leaks. This action authorizes design of long-term repairs that will replace the siphon with a type of pipe whose joints are flexible and can accommodate relatively large ground displacements. Due to the importance of this pipeline as a component of the CRA, staff recommends proceeding with design of permanent repairs to the siphon at this time.

This project has been reviewed with Metropolitan's Capital Investment Plan (CIP) prioritization criteria and is included within the Distribution System Reliability Program. Funds are available within Metropolitan's capital expenditure plan for fiscal year 2017/18.

Details

Background

Casa Loma Siphon Barrel No. 1 was constructed in 1935 as a component of the CRA. The siphon extends five miles west from the San Jacinto Diversion Structure to the Bernasconi Tunnel near Lake Perris. The entire length was originally constructed of 148-inch-diameter concrete pipe. In the early 1960s, cracks and leakage developed in the pipe as a result of ground movement due to subsidence where the siphon crosses the Casa Loma Fault. In 1968, 300 feet of the concrete pipe were replaced with 148-inch-diameter steel pipe, joined by external sleeve-type couplings. These couplings were installed across the fault to permit minor movement of pipe segments without leaking. However, since that time, the ground movement has continued to produce leaks that have required numerous repairs. In November 1996, internal seals were installed at several locations within the steel pipe portion of the siphon to address the leakage.

In November 2016, new leaks were observed on the ground surface above the steel pipe portion of the siphon. In January 2017, Metropolitan's Board authorized interim repairs of the leaks, along with preliminary investigations to assess options for permanent repairs to the siphon. Recently completed internal surveys of the line within the vicinity of the Casa Loma Fault indicate that an 800-foot-long portion of the siphon has experienced vertical displacement of over five feet. Staff recommends that the permanent repairs include replacement of the existing

pipe and couplings with a type of pipe referred to as earthquake-resistant ductile iron pipe (ERDIP). This type of pipe features a joint configuration that can absorb relatively large displacements. ERDIP joints allow a pipeline to remain intact, even as individual segments move due to long-term subsidence or a seismic event.

ERDIP is a unique and proprietary technology developed by the Kubota Corporation. At present, there are no other ductile iron pipe manufacturers that offer a comparable product for large pipes that have a similar capability for flexibility and displacement at the pipe joint.

ERDIP was first introduced in Japan in 1974. Installations of this type of pipe have operated successfully for over forty years, and have withstood several major earthquakes. The use of ERDIP began in the United States in 2013. Since that time, four agencies in the United States and Canada, including the Los Angeles Department of Water and Power, have installed more than five miles of ERDIP. The diameters have ranged from six to 72 inches.

For the Casa Loma Siphon Barrel No. 1, staff has held several technical discussions with Kubota Corporation to date. Following approval of this action, staff will negotiate with Kubota Corporation on a procurement contract that would: (1) furnish the ERDIP and appurtenant materials; (2) provide installation training; and (3) provide technical oversight during the construction. Upon successful completion of negotiations to furnish the ERDIP, staff would return to the Board to award the pipe procurement contract. The pipe would then be furnished by Metropolitan to a contractor for installation under a future competitively bid construction contract.

Replacement of Casa Loma Siphon Barrel No. 1 – Design Phase (\$3,100,000)

The planned work includes replacement of approximately 800 feet of 148-inch-diameter steel and concrete pipe segments that cross the Casa Loma Fault zone. The new siphon will consist of two parallel barrels of 104-inch-diameter ERDIP segments that are designed to withstand an aggregate horizontal displacement of up to ten feet, as well as ongoing ground settlement.

Design phase activities will include: (1) conducting field investigations, topographic surveys, and geotechnical investigations; (2) geo-hazard characterization and structural analysis of pipe performance under both seismic shaking and permanent deformation due to subsidence and fault rupture; (3) preparation of technical requirements and specifications for procurement of the pipe, along with drawings and specifications for the installation/construction contract; (4) development of a construction cost estimate; (5) a third-party value engineering assessment; and (6) advertisement and receipt of competitive bids for the construction.

Detailed design is recommended to be performed by Carollo Engineers, Inc., and the value engineering assessment will be performed by a specialized consultant, as described below. All other activities will be performed by Metropolitan staff.

This action appropriates \$3.1 million and authorizes design to replace Casa Loma Siphon Barrel No. 1. Requested funds include: \$2.2 million for preliminary and final design activities by Carollo Engineers, Inc.; \$348,000 for technical oversight and design review by Metropolitan staff; \$132,000 for field surveys, modeling, and preparation of environmental documentation; \$72,000 for the value engineering assessments; \$227,000 for permitting, bidding, development of the procurement contract, and project management; and \$121,000 for remaining budget. The anticipated cost of final design as a percentage of the estimated construction cost is approximately 10.5 percent. Engineering Services' goal for design of projects with construction greater than \$3 million is 9 to 12 percent.

The estimated construction cost for this project is anticipated to range from \$12 million to \$13 million. Staff will return to the Board for award of the procurement and construction contracts.

Specialized Design Services (Carollo Engineers, Inc.) – New Agreement

Carollo Engineers, Inc. is recommended to perform detailed design to replace Casa Loma Siphon Barrel No. 1 under a new professional services agreement. Carollo Engineers, Inc. was prequalified through a competitive process via Request for Qualifications No. 1131. Subsequently, Carollo Engineers, Inc. was selected for this project based on its expertise and recent experience in the design of a large-diameter ERDIP installation that crossed geo-hazard zones with potentially large ground displacement.

The planned scope of work includes: (1) geotechnical and geo-hazard investigations, including drilling of borings and laboratory testing; (2) finite element soil-pipe interaction modeling using site-specific geotechnical data; (3) development of design criteria to meet the structural demands; (4) utility investigations and determination of right-of-way needs; (5) preparation of the pipe procurement specification; (6) preparation of construction drawings and specifications; (7) preparation of a construction cost estimate; and (8) technical assistance during the bid period. The estimated cost for these services is \$2.2 million.

This action authorizes an agreement with Carollo Engineers, Inc., in an amount not to exceed \$2.2 million, for design to replace Casa Loma Siphon Barrel No. 1. For this agreement, Metropolitan has established a Small Business Enterprise (SBE) participation level of 25 percent. Carollo Engineers, Inc. has agreed to meet this level of participation. The planned subconsultants for this agreement are listed in **Attachment 2**.

Value Engineering Support – No Action Required

The third-party value engineering assessment for the replacement of Casa Loma Siphon Barrel No. 1 will be performed by a specialty firm under an agreement planned to be executed under the General Manager's Administrative Code authority to award contracts of \$250,000 or less. The estimated cost for this support is \$72,000.

Summary

This action appropriates \$3.1 million, authorizes design to replace Casa Loma Siphon Barrel No. 1, and authorizes an agreement with Carollo Engineers, Inc. This project is included within capital Appropriation No. 15480, Conveyance and Distribution System Rehabilitation Appropriation – FY 2012/13 Through FY 2017/18. With the present action, the total funding for this appropriation will increase from \$66.3 million to \$69.4 million. The total estimated cost to complete the project, including the amount appropriated to date, current funds requested, and future procurement and construction costs, is anticipated to range from \$16.5 million to \$17.5 million.

This project has been evaluated and recommended by Metropolitan's CIP Evaluation Team, and funds are available within the fiscal year 2017/18 capital expenditure plan. See **Attachment 1** for the Financial Statement, **Attachment 2** for the listing of Subconsultants for the Agreement with Carollo Engineers, Inc., and **Attachment 3** for the Location Map.

Project Milestones

March 2019 – Award of procurement contract for the earthquake-resistant pipe

October 2019 – Award of pipe installation/construction contract

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

By Minute Item 50698, dated January 10, 2017, the Board authorized: (1) installation of internal seals within Casa Loma Siphon Barrel No. 1; and (2) preliminary investigations for long-term repairs to the Casa Loma Siphon.

California Environmental Quality Act (CEQA)

CEQA determination for Option #1:

The proposed action is exempt under the provisions of CEQA and the State CEQA Guidelines. The proposed action consists of the installation of a new pipeline or the maintenance, repair, replacement, removal, or demolition of an existing pipeline of less than one mile in length within a public right-of-way. Accordingly, the proposed action qualifies under a statutory exemption (Section 21080.21(a) of the California Public Resources Code and Section 15282(k) of the State CEQA Guidelines). Additionally, the proposed action is categorically exempt under the provisions of CEQA and the State CEQA Guidelines. In particular, the proposed action consists

of the funding, design, minor alterations, and reconstruction or replacement of existing public facilities with negligible or no expansion of use and no possibility of significantly impacting the physical environment. Accordingly, the proposed action qualifies under Class 1 and Class 2 Categorical Exemptions (Sections 15301 and 15302 of the State CEQA Guidelines).

The CEQA determination is: Determine that pursuant to CEQA, the proposed action qualifies under a statutory exemption (Section 21080.21(a) of the California Public Resources Code and Section 15282(k) of the State CEQA Guidelines) and two Categorical Exemptions (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 the proposed action is statutorily and categorically exempt, and

- a. Appropriate \$3.1 million;
- b. Authorize design to replace Casa Loma Siphon Barrel No. 1; and
- c. Authorize agreement with Carollo Engineers, Inc., in an amount not to exceed \$2.2 million, for specialized design services.

Fiscal Impact: \$3.1 million of capital funds under Appropriation No. 15480

Business Analysis: This option will resolve long-term leakage and settlement issues with the siphon, enhance delivery reliability of the CRA, and reduce the risk of unplanned outages and costly urgent repairs.

Option #2

Do not proceed with the project at this time.

Fiscal Impact: None

Business Analysis: This option would not address long-term leakage and settlement of the Casa Loma Siphon, and would not reduce the risk of higher repair costs and unplanned shutdowns. Staff would continue to monitor and inspect the siphon, and to make repairs when leaks are found.

Staff Recommendation

Option #1


 _____ 4/19/2018
 Date
 Gordon Johnson
 Manager/Chief Engineer,
 Engineering Services


 _____ 4/24/2018
 Date
 Jeffrey Knightinger
 General Manager

Attachment 1 – Financial Statement

Attachment 2 – Subconsultants for Agreement with Carollo Engineers, Inc.

Attachment 3 – Location Map

Financial Statement for Conveyance and Distribution System Rehabilitation Appropriation – FY 2012/13 Through FY 2017/18

A breakdown of Board Action No. 39 for Appropriation No. 15480¹ is as follows:

	Previous Total Appropriated Amount (Apr. 2018)	Current Board Action No. 39 (May 2018)	New Total Appropriated Amount
Labor			
Studies & Investigations	\$ 3,568,504	\$ 132,000	\$ 3,700,504
Final Design	9,433,915	348,000	9,781,915
Owner Costs (Envir. doc., bidding, program mgmt.)	5,339,279	227,000	5,566,279
Submittals Review & Record Drwgs.	1,270,000	-	1,270,000
Construction Inspection & Support	3,843,000	-	3,843,000
Metropolitan Force Construction	4,877,000	-	4,877,000
Materials & Supplies	3,305,000	-	3,305,000
Incidental Expenses	322,000	-	322,000
Professional/Technical Services	3,005,000	-	3,005,000
Carollo Engineers, Inc.	-	2,200,000	2,200,000
Value engineering firm	-	72,000	72,000
Right-of-Way	330,000	-	330,000
Equipment Use	5,000	-	5,000
Contracts	26,804,611	-	26,804,611
Remaining Budget	4,196,691	121,000	4,317,691
Total	\$ 66,300,000 ²	\$ 3,100,000	\$ 69,400,000

Funding Request

Appropriation Name:	Conveyance and Distribution System Rehabilitation Appropriation – FY 2012/13 Through FY 2017/18		
Source of Funds:	Revenue Bonds, Replacement and Refurbishment or General Funds		
Appropriation No.:	15480	Board Action No.:	39
Requested Amount:	\$ 3,100,000	Budget Page No.:	214
Total Appropriated Amount:	\$ 69,400,000	Total Appropriation Estimate:	\$ 332,500,000

¹ The total amount expended to date for the long-term repair of joints on Casa Loma Siphon Barrel No. 1 is approximately \$1 million. The total estimated cost to complete this project, including the amount appropriated to date, current funds requested, and future construction cost, is anticipated to range from \$16.5 million to \$17.5 million.

² Includes correction for Item 7-5 in April 2018, for the Lower Feeder Service Connection CENB-29 equipment relocation. The previous Total Appropriated Amount should be \$66.3 million, instead of the \$66.2 million that was shown.

The Metropolitan Water District of Southern California
Subconsultants for Agreement with Carollo Engineers, Inc.

Subconsultant and Location
Lettis Consultants International, Inc., Walnut Creek, CA
Hushmand Associates, Inc., Irvine, CA
Ballantyne Consulting, LLC., Tacoma, WA
JDH Corrosion Consultants, Inc., Concord, CA
Degenkolb Engineers, Inc., San Francisco, CA

Distribution System

