THE METROPOLITAN WATER DISTRICT OF SOUTHERN CALIFORNIA

BOARD ACTION

- Board of Directors
  *Engineering and Operations Committee*

3/13/2012 Board Meeting

**7-11**

## Subject

Appropriate $460,000; and authorize two rehabilitation projects at the F. E. Weymouth Water Treatment Plant (Approp. 15369)

## Description

This action authorizes preliminary design to replace the filter valves in Filter Building No. 1 at the F. E. Weymouth Water Treatment Plant, and preliminary design of the third phase to rehabilitate the plant's drop gates.

**Timing and Urgency**

The filter valves at the Weymouth plant's Filter Building No. 1 have been in continuous service over 40 years and have reached the end of their service life. Despite receiving regular maintenance and repairs, most of the valves presently leak. Based on inspections conducted by staff during the plant's most recent shutdowns, all 99 valves in Filter Building No. 1 need to be replaced.

Drop gates are used to isolate channels within the Weymouth plant to allow dewatering in order to perform needed maintenance and equipment repairs. As a result of continuous exposure to water treatment chemicals, most of the carbon steel gate guides are corroded and allow leakage through the openings. Replacement or relocation of several drop gates is needed for routine maintenance and to allow the valve replacement work at Filter Building No. 1 to move forward.

These projects will enhance the reliability and performance of the filters at the Weymouth plant, and will minimize impacts on plant operation resulting from failure of aged equipment. Both projects have been reviewed with Metropolitan's updated Capital Investment Plan (CIP) prioritization criteria and are categorized as Infrastructure Rehabilitation projects. Funds for this action are available within Metropolitan's capital expenditure plan for fiscal year 2011/12.

**Background**

The Weymouth plant was placed into service in 1941 with an initial capacity of 100 million gallons per day (mgd), and was expanded twice to its current capacity of 520 mgd. The plant delivers a blend of waters from the Colorado River Aqueduct and State Water Project to Metropolitan's Central Pool portion of the distribution system.

In a typical filtration cycle, filters are operated by opening and closing a series of valves which allow water to flow in and out of the filter beds during filtration and backwashing operations. These valves are designed to close tightly and thereby prevent leakage into the washwater reclamation system, and to prevent the mixing of filtered and unfiltered water. Over the life of the Weymouth plant's filters, staff has performed regular maintenance to enable continued operation. The original valves at Filter Building No. 1, which were installed in the 1940s, were replaced in 1970 with new valves whose body parts matched the dimensions of the original valves. These valves do not conform to the current American Water Works Association (AWWA) standard for butterfly valves and are no longer manufactured.

Staff initiated a study in 2005 to evaluate the condition of the filter valves and their actuators, and to provide recommendations for valve/actuator replacement. This effort concluded that while the valves were suitable for continued operation in the short term, planning should commence for a replacement program. Recent inspections indicate that the valves have deteriorated further. As a result, replacement of the 99 filter valves in Filter Building No. 1 should now move forward.

Staff has also assessed the condition of the Weymouth plant's existing drop gates and gate guides, which are corroded and leaky due to continuous exposure to water treatment chemicals. Rehabilitation of the Weymouth gates and guides has been prioritized based on their condition. Under Phases 1 and 2 of the project, six new gates and guides were fabricated and installed during December 2006 and March 2011 plant shutdowns. For the remaining portion of the work (Phase 3), new drop gates will be provided to isolate channels within Filter Building No. 1. This work is needed in order for the filter valve replacement project to move forward. Additional gates and guides are needed to permit maintenance and future equipment repairs.

**Project No. 1 – Filter Building No. 1 Valve Replacement – Preliminary Design Phase ($375,000)**

Weymouth Filter Building No. 1 contains a total of 24 filters. Filters Nos. 1 to 12 have been in continuous service since 1941, while Filters Nos. 13 to 24 were added in 1949. Each filter contains one 54-inch wide by 54-inch high drain gate and four filter valves which range in diameter from 16 to 48 inches. These valves are operated in conjunction with three isolation valves in the backwash system. There is a total of 24 drain gates and 99 valves in Filter Building No. 1.

Recent inspections indicate that the valves in Filter Building No. 1 have deteriorated due to corrosion of the valve bodies and worn rubber seats. Most of the valves no longer provide a water-tight seal and do not operate reliably. Staff recommends proceeding with preliminary design to replace the 99 filter valves in Filter Building No. 1 with new AWWA-standard butterfly valves. AWWA Standard No. C504-06 establishes the design requirements which represent a consensus of the water industry to provide uniform, suitable and economical valves. The dimensions of the existing valves are different from the replacement AWWA-standard valves. As a result, changes will be required to existing piping, supports, and actuator mounts to accommodate the new valves. In some cases, existing electrical conduits will also need to be rerouted. Further studies are needed to determine if the actuators and drain gates should be replaced along with the valves.

Preliminary design phase activities will include: field investigations using 3-dimensional survey technology to efficiently detail the physical dimensions of the existing valves and adjacent piping; evaluation of alternatives for the rehabilitation or replacement of the actuators and drain gates in Filter Building No. 1; testing for hazardous materials; developing final design criteria; and preparing a cost estimate for the replacement.

This action appropriates $375,000 and authorizes preliminary design phase activities to replace valves and gates in Weymouth Filter Building No. 1. Requested funds include $180,000 for survey, hazardous materials testing, and field inspections of the valves, piping, drain gates and actuators; $107,000 for structural analyses of drain gates anchorage, assessment of alternatives for actuator replacement, evaluation of electrical modifications, and preparation of a preliminary design report; $40,000 for project management; and $48,000 for remaining budget. All work will be performed by Metropolitan staff.

**Project No. 2 – Drop Gates Rehabilitation, Phase 3 – Preliminary Design Phase ($85,000)**

The Weymouth plant utilizes drop gates to isolate concrete channels within the plant to allow dewatering in order to perform needed maintenance and repairs. Each drop gate consists of a carbon steel plate or gate, approximately 12 feet wide by 10 feet tall, that fits into a carbon steel U-shaped guide located at the channel isolation point. When channels are to be isolated, gates are dropped by crane into their guides and the isolated channels are dewatered.

Six of the Weymouth plant's gates have been replaced or rehabilitated to date under the first two phases of the Drop Gates Rehabilitation project. Recent inspections of the remaining gates have identified that ten carbon steel guides within the channels of Filter Building No. 1 have deteriorated from corrosion due to 70 years of continuous service. Tthe gates can no longer fit into these ten guides, while four other guides do not seal tightly and allow water to leak through the openings.

Due to the configuration of the Weymouth plant, Filter Building No. 1 must be hydraulically isolated in order to remove and replace the filter valves. Staff recommends proceeding with the third and final phase for rehabilitation of the plant's drop gates, which will include installation of six new gates and guides, and minor rehabilitation of 14 existing guides to support the Filter Building No. 1 Valve Replacement project.

Planned preliminary design phase activities include: conducting site surveys; testing for hazardous materials; assessing gate and guide materials and metallurgy; developing final design criteria; preparing a schedule for design, fabrication, and installation; and preparing a construction cost estimate.

This action appropriates $85,000 and authorizes preliminary design phase activities for the final phase of drop gate rehabilitation at the Weymouth plant. Requested funds include $61,000 for the materials investigation, hydraulic analyses, and preparation of a preliminary design report; $16,000 for program management and shutdown planning; and $8,000 for remaining budget. All work will be performed by Metropolitan staff.

**Summary**

This action appropriates $460,000 and authorizes preliminary design phase activities to replace valves and gates at Filter Building No. 1, and to complete the rehabilitation of drop gates at the Weymouth plant. Both projects have been evaluated and recommended by Metropolitan's CIP Evaluation Team, and funds are available within the fiscal year 2011/12 capital expenditure plan. See **Attachment 1** for the Financial Statement and **Attachment 2** for the Location Map.

The two projects are included within capital Appropriation No. 15369, the Weymouth Improvements Program, which was initiated in fiscal year 2001/02. Other projects authorized under Appropriation No. 15369 include the Coagulant Tank Farm Modifications; Junction Structure Seismic Upgrades; Rapid Mix System; and Electrical Upgrades. With the present action, the total funding for Appropriation No. 15369 will increase from $162,982,000 to $163,442,000.

***Project Milestones***

March 2013 – Completion of preliminary design for the Filter Building No. 1 Valve Replacement

March 2013 – Completion of preliminary design for the Drop Gates Rehabilitation, Phase 3

## Policy

Metropolitan Water District Administrative Code Section 5108: Appropriations

## California Environmental Quality Act (CEQA)

CEQA determination for Option #1:

**Project No. 1 – Filter Building No. 1 Valve Replacement – Preliminary Design Phase**

The proposed action is categorically exempt under the provisions of CEQA and the State CEQA Guidelines. The proposed action consists of basic data collection and resource evaluation 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. Accordingly, the proposed action qualifies as a Class 6 Categorical Exemption (Section 15306 of the State CEQA Guidelines).

The CEQA determination is: Determine that pursuant to CEQA, the proposed action qualifies under a Categorical Exemption (Class 6, Section 15306 of the State CEQA Guidelines).

**Project No. 2 – Drop Gates Rehabilitation, Phase 3 – Preliminary Design Phase**

The proposed action is categorically exempt under the provisions of CEQA and the State CEQA Guidelines. The proposed action consists of basic data collection and resource evaluation 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. Accordingly, the proposed action qualifies as a Class 6 Categorical Exemption (Section 15306 of the State CEQA Guidelines).

The CEQA determination is: Determine that pursuant to CEQA, the proposed action qualifies under a Categorical Exemption (Class 6, Section 15306 of the State CEQA Guidelines).

CEQA determination for Option #2:

None required

## Board Options

**Option #1**

Adopt the CEQA determination and

a. Appropriate $460,000;
b. Authorize preliminary design to replace filter valves in Weymouth Filter Building No. 1; and
c. Authorize preliminary design to complete the rehabilitation of the Weymouth plant's drop gates.

**Fiscal Impact:** $460,000 of budgeted funds under Approp. 15369

**Business Analysis:** This option will enhance reliability of the Weymouth plant upgrade the plant's filter valves to be in compliance with industry standards.

**Option #2**

Do not proceed with the two rehabilitation projects at this time.

**Fiscal Impact:** None

**Business Analysis:** This option would forego an opportunity to enhance plant reliability and improve filter operating efficiency in Filter Building No. 1. Staff would replace the existing valves as they fail. There would be an increased risk of reduced plant capacity if filters are taken out of service as a result of valve failure. During regular maintenance activities, the plant would take temporary measures to reduce leakage through an isolation drop gate**,** such as dropping gravel and sand behind the gate, which would likely impact the efficiency of maintenance.

## Staff Recommendation

Option #1

2/21/2012
*Gordon Johnson* *Date*
*Manager/Chief Engineer, Engineering Services*

2/29/2012
*Jeffrey Kightlinger* *Date*
*General Manager*

**Attachment 1 – Financial Statement**

**Attachment 2 – Location Map**

Ref# es12615975

## Financial Statement for Weymouth Improvements Program

A breakdown of Board Action No. 38 for Appropriation No. 15369 to replace filter valves at Filter Building No. 1, and for the third phase of rehabilitation of Weymouth plant drop gates[1] is as follows:

| | Previous Total Appropriated Amount (Mar. 2012) | Current Board Action No. 38 (Mar. 2012) | New Total Appropriated Amount |
|---|---|---|---|
| Labor | | | |
| Studies & Investigations | $ 2,254,477 | $ 302,000 | $ 2,556,477 |
| Final Design | 8,990,141 | - | 8,990,141 |
| Owner Costs (Program mgmt, shutdown planning) | 7,322,424 | 56,000 | 7,378,424 |
| Submittals Review & Record Drwgs | 2,752,723 | - | 2,752,723 |
| Construction Inspection & Support | 11,530,704 | - | 11,530,704 |
| Metropolitan Force Construction | 7,206,280 | - | 7,206,280 |
| Materials & Supplies (3-D survey eqpt.) | 3,605,848 | 42,000 | 3,647,848 |
| Incidental Expenses | 384,900 | 4,000 | 388,900 |
| Professional/Technical Services | 12,506,032 | - | 12,506,032 |
| Contracts | 99,571,838 | - | 99,571,838 |
| Remaining Budget | 6,856,633 | 56,000 | 6,912,633 |
| **Total** | **$ 162,982,000** | **$ 460,000** | **$ 163,442,000** |

**Funding Request**

| | | | |
|---|---|---|---|
| **Program Name:** | Weymouth Improvements Program | | |
| **Source of Funds:** | Revenue Bonds, Replacement and Refurbishment, or General Funds | | |
| **Appropriation No.:** | 15369 | **Board Action No.:** | 38 |
| **Requested Amount:** | **$** 460,000 | **Capital Program No.:** | 15369-I |
| **Total Appropriated Amount:** | **$** 163,442,000 | **Capital Program Page No.:** | 329 |
| **Total Program Estimate:** | **$** 237,725,000 | **Program Goal:** | I-Infrastructure & Reliability |

[1] This action is the initial appropriation for the Weymouth Filter Building No. 1 Valve Replacement project. The total amount expended to date to rehabilitate the Weymouth plant's drop gates is approximately $980,000.


F.E. Weymouth Water Treatment Plant
F. E. Weymouth Water Treatment Plant
CASTAIC DAM & LAKE
LOS ANGELES COUNTY
SAN BERNARDINO COUNTY
N
W
E
S
SILVERWOOD LAKE
VENTURA COUNTY
LOS ANGELES COUNTY
Upper Feeder
LIVE OAK RESERVOIR
Rialto Pipeline
Santa Ana
Feeder
Upper
Middle
GARVEY RESERVOIR
Valley
SAN BERNARDINO COUNTY
RIVERSIDE COUNTY
Lower
Pipeline
LAKE PERRIS
Aqueduct
Feeder
Colorado River
LAKE MATHEWS
SANTIAGO RESERVOIR
PACIFIC OCEAN
DIAMOND VALLEY LAKE
EL TORO RESERVOIR
ORANGE COUNTY
RIVERSIDE COUNTY
LAKE SKINNER
RIVERSIDE COUNTY
SAN DIEGO COUNTY