



- Board of Directors  
*Engineering and Operations Committee*

2/12/2013 Board Meeting

---

**8-2**

## **Subject**

---

Appropriate \$4.78 million; and authorize (1) preliminary design to rehabilitate treatment basins at the F. E. Weymouth Water Treatment Plant; and (2) final design to rehabilitate treatment basins at the Robert B. Diemer Water Treatment Plant (Approps. 15440 and 15380)

## **Executive Summary**

---

This action authorizes preliminary design to rehabilitate equipment in the flocculation and sedimentation basins at the F. E. Weymouth Water Treatment Plant's Basins Nos. 5-8, and final design of similar work at the Robert B. Diemer Water Treatment Plant's Basins Nos. 1-8. The equipment is aging and needs to be rehabilitated to maintain treated water quality and treatment plant capacity.

### **Timing and Urgency**

Reliable operation of the flocculation and sedimentation processes is essential for water treatment plants to produce water that meets federal and state drinking water regulations and to comply with their operating permits. The mechanical components of the flocculation and sedimentation basins at the Weymouth and Diemer plants are deteriorating from 50 years of continuous use. The equipment needs to be replaced or refurbished in order to restore its condition and maintain plant reliability.

These projects have been reviewed with Metropolitan's Capital Investment Plan (CIP) prioritization criteria and are categorized as Infrastructure Reliability projects. Funds for this work are available within Metropolitan's capital expenditure plan for fiscal year 2012/13.

## **Details**

---

### **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 treatment capacity of 520 mgd. The Diemer plant was placed into service in 1963 with an initial capacity of 200 mgd, and was expanded in 1969 to its present capacity of 520 mgd. Both plants deliver a blend of waters from the Colorado River Aqueduct and State Water Project to Metropolitan's Central Pool portion of the distribution system, and to plant-exclusive service areas.

Flocculation and sedimentation are two important unit processes within a conventional water treatment plant. Flocculation follows immediately after the initial chemical addition, and is designed to gently mix small particles and colloids in the water so that they agglomerate to form settleable or filterable particles that can be subsequently removed by sedimentation and filtration. The Weymouth and Diemer plants each have eight flocculation/sedimentation basins: four on the east side and four on the west side. The Weymouth plant's Basins Nos. 5-8 and all of the Diemer basins share a similar design approach and similar configuration. Each of these basins is 500 feet long by 100 feet wide, and is further divided into a 100-foot-long flocculation section and a 400-foot-long sedimentation section.

The flocculation section of each basin is partitioned by wooden baffle walls into a number of long and narrow compartments. Within each compartment, flocculation is enabled through gentle mixing by a series of horizontal paddle wheels. Water flows over and under the 13-foot-high baffle walls, which are comprised of stacked 2-inch by 10-inch wooden boards, held in place by steel guides embedded in the concrete floor.

After passing the last set of baffle walls, the water enters the sedimentation section, where large particles settle on the basin floor. Each sedimentation section contains four subsections with a clarifier/turntable assembly and a catwalk that spans either half-way or completely across the basin. The catwalks provide access to the top of the turntable assemblies for maintenance of motors, electrical panels, and controls for the solids scraping and collection mechanism. Settled solids are swept by the rotating scraping arms into center hoppers, where they are pumped to the thickeners for further processing. Clarified water is collected in launder troughs and is then conveyed to each plant's filters.

### **Project No. 1 – Weymouth Basins Nos. 5-8 Rehabilitation – Preliminary Design Phase (\$300,000)**

The Weymouth plant's eight flocculation/sedimentation basins were constructed in three periods. Basins Nos. 1 and 2 were built in 1940 as part of the original plant construction; Basins Nos. 3 and 4 were added in 1949 during the first plant expansion; and Basins Nos. 5-8 were constructed during the second plant expansion in 1962. Basins Nos. 3 and 4 were refurbished in 2005 and are presently in good operating condition. The other six basins all show signs of deterioration, as can be expected after 50 to 70 years of continuous service. Needed rehabilitation work at these basins must be phased to minimize impacts on plant operation, and to coordinate with other planned improvements at the Weymouth plant.

While the Weymouth plant's recent water deliveries have been less than the plant's rated capacity and are projected to remain flat over the next several years, it is important that refurbishment of the basins moves forward. Operational reliability is needed to maintain system flexibility for seasonal peak demands, to accommodate scheduled shutdowns of the Jensen and Diemer plants, to maintain the capability of treating source waters of varying quality and availability, and to comply with the plant's operating permit issued by the state Department of Public Health. Since Basins Nos. 5-8 require fewer and less-complex upgrades than Basins Nos. 1 and 2, staff recommends proceeding with rehabilitation of Basins Nos. 5-8 at this time. The more extensive upgrades required at Basins Nos. 1 and 2 will follow at a later date.

In September 2011, Metropolitan's Board authorized limited refurbishment of Basins Nos. 5-8 to address deficiencies identified at that time, including steel guide repairs, baffle board replacement, catwalk refurbishment, and installation of sloping concrete fillets at the sedimentation basin corners. Recent detailed inspections have identified that basin equipment needs to be refurbished, including the coal-tar-coated steel scraping arms, the flocculator drive shaft assemblies, the steel launder troughs, and the clarifier drives and gear boxes. With the improvements identified under both inspections, staff anticipates that all of the equipment in Weymouth Basins Nos. 5-8 will be restored to reliable operating condition. Planned preliminary design activities include: investigating the life cycle and maintenance cost of alternate materials for the equipment, consistent with current industry practice; evaluating sandblasting and recoating alternatives for corrosion protection; developing final design criteria; conducting a third-party value engineering review; and developing a cost estimate for the rehabilitation work.

This action appropriates \$300,000 and authorizes preliminary design phase activities to rehabilitate Weymouth Basins Nos. 5-8. Requested funds include \$143,000 for the alternative material investigations; \$59,000 for hazardous materials testing and project management; \$60,000 for the value engineering review; and \$38,000 for remaining budget. The work will be performed by Metropolitan staff.

### **Project No. 2 – Diemer Basin Rehabilitation – Final Design Phase (\$4,480,000)**

The four flocculation/sedimentation basins on the east side of the Diemer plant were constructed in 1963, while the four west basins were completed in 1969. Despite receiving regular maintenance, the equipment has deteriorated after 45-50 years of continuous operation.

The Diemer Basin Rehabilitation project was initially authorized by Metropolitan's Board in November 2001 to perform limited refurbishment of the basin equipment. Minor repairs were performed during this phase of the

project to ensure that the basins would remain operational on an interim basis. Final design of refurbishment work was authorized in 2004 but was rescheduled in 2005 to minimize interferences with the Diemer Oxidation Retrofit Program (ORP) construction. That construction is expected to be completed in 2013.

In October 2008, Metropolitan detected polychlorinated biphenyls (PCBs) in the sealant of concrete joints in Basin No. 4 of the Diemer plant. Subsequent concrete sampling in May 2011 confirmed that PCBs had migrated into the concrete surface adjacent to the basin floor joints. PCB abatement through sealant and concrete removal at the joints is required to comply with federal Resource Conservation and Recovery Act regulations. A similar situation was previously encountered at the Jensen plant when its Basin No. 3 was under repair; remediation of Jensen Basin No. 3 was successfully completed in 2009. Staff is currently in discussions with the U. S. Environmental Protection Agency (EPA) for development of a PCB abatement plan for Diemer Basin No. 4, and for the other basins should more PCBs be discovered. The PCB remediation work must be phased into the overall scope of basin rehabilitation.

Since completion of the Diemer ORP is imminent, staff recommends proceeding with final design to rehabilitate the basins at this time. The effort will address needed upgrades to the basin equipment and structural components, along with required remediation of PCBs. Key components of the basins to be upgraded include: basin inlet gates; basin perimeter water lines; flocculator drive trains, shafting, and bearing housing; baffle boards and supports; clarifier turntable assemblies, drives, rakes, catwalks, and corner fillets; and launders.

This action appropriates \$4.48 million and authorizes final design phase activities to rehabilitate the Diemer plant's east and west treatment basins. Requested funds include \$3,208,000 for preparation of drawing and specifications; \$140,000 for PCB remediation permitting; \$463,000 for preparation of environmental documentation, receipt of bids, and project management; \$60,000 for third-party value engineering review; and \$609,000 for remaining budget. The total cost for final design, including the previously authorized design activities, is approximately 6.8 percent of the estimated construction cost. Engineering Services' goal for design of projects with construction cost greater than \$3 million is 9 to 12 percent. The construction cost for this project is anticipated to range from \$60 million to \$70 million. Final design will be performed by Metropolitan staff, with specialized permitting assistance from Ninyo & Moore for the PCB remediation, as described below.

#### **Technical Permitting Support (Ninyo & Moore) – No action required**

Preparation of the EPA permit application for remediation of the Diemer treatment basins is recommended to be performed by Ninyo & Moore under an existing professional services agreement. Ninyo & Moore was selected through a competitive process via Request for Qualifications No. 962. For this agreement, Metropolitan has established a Small Business Enterprise participation level of 18 percent. No amendment to the existing agreement with Ninyo & Moore is required. The estimated cost for these services is \$50,000.

#### **Summary**

This action appropriates \$4.78 million, and authorizes preliminary and final design to rehabilitate treatment basins at the Weymouth and Diemer plants. These projects have been evaluated and recommended by Metropolitan's CIP Evaluation Team, and are categorized as Infrastructure Reliability projects. Funds for this work are available within the fiscal year 2012/13 capital expenditure plan. See [Attachment 1](#) for the Financial Statements and [Attachment 2](#) for the Location Map.

The Weymouth Basins Nos. 5-8 Rehabilitation project is included within capital Appropriation No. 15440, the Weymouth Improvements Program - Phase 2, which was initiated in fiscal year 2006/07. Appropriation No. 15440 also includes projects such as the Filter Outlet Chemical Trench and the Filter Outlet Conduit Repairs. With the present action, the total funding for Appropriation No. 15440 will increase from \$13,272,000 to \$13,572,000.

The Diemer Basin Rehabilitation project is included within capital Appropriation No. 15380, the Diemer Improvements Program, which was initiated in fiscal year 2001/02. Other projects authorized under Appropriation No. 15380 include the Diemer Electrical Upgrades, the North Access Road, and the South Slope Stabilization. With the present action, the total funding for Appropriation No. 15380 will increase from \$107,666,600 to \$112,216,600.

***Project Milestones***

August 2013 – Completion of preliminary design to rehabilitate Weymouth Basins Nos. 5-8

March 2014 – Completion of final design to rehabilitate all eight of the Diemer treatment basins

**Policy**

---

Metropolitan Water District Administrative Code Section 5108: Appropriations

**California Environmental Quality Act (CEQA)**

---

**Project No. 1 – Weymouth Basins Nos. 5-8 Rehabilitation – Preliminary Design Phase**

CEQA determination for Option #1:

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 Options #2 and #3:

None required

**Project No. 2 – Diemer Basin Rehabilitation – Final Design Phase**

CEQA determination for Options #1 and #2:

The project was previously determined to be categorically exempt under the provisions of CEQA and State CEQA Guidelines. The Board found the project to be exempt under Class 2, Section 15302 of the State CEQA Guidelines on November 20, 2001. A Notice of Exemption (NOE) was filed on the project at that time and the statute of limitations has ended. With the current board action, there are no substantial changes proposed to the project since the original NOE was filed. Hence, the previous environmental documentation in conjunction with the project fully complies with CEQA and the State CEQA Guidelines. Accordingly, no further CEQA documentation is necessary for the Board to act with regards to the proposed action.

The CEQA determination is: The proposed action has been previously addressed in the 2001 NOE (Class 2, Section 15302 of the State CEQA Guidelines) and no further environmental analysis or documentation is required.

CEQA determination for Option #3:

None required

**Board Options**

---

**Option #1**

Adopt the CEQA determinations and

- a. Appropriate \$4.78 million;
- b. Authorize preliminary design to rehabilitate Basins Nos. 5-8 at the Weymouth plant; and
- c. Authorize final design to rehabilitate Basins Nos. 1-8 at the Diemer plant.

**Fiscal Impact:** \$300,000 in capital funds under Approp. 15440; and \$4.48 million in capital funds under Approp. 15380

**Business Analysis:** This option will enhance reliability of the Weymouth and Diemer plants.

**Option #2**

Adopt the CEQA determination and

- a. Appropriate \$4.48 million;
- b. Do not authorize preliminary design to rehabilitate Basins Nos. 5-8 at the Weymouth plant at this time; and
- c. Authorize final design to rehabilitate Basins Nos. 1-8 at the Diemer plant.

**Fiscal Impact:** \$4.48 million in capital funds under Approp. 15380

**Business Analysis:** This option would address needed rehabilitation work at the Diemer plant, including PCB abatement. This option would forego an opportunity to enhance treatment reliability at the Weymouth plant and increase the risk of unplanned basin outages at this plant.

**Option #3**

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

**Fiscal Impact:** None

**Business Analysis:** This option would forego an opportunity to enhance treatment reliability at the Weymouth and/or Diemer plants and would likely increase the frequency of unplanned basin outages at the two plants.

**Staff Recommendation**

---

Option #1

	1/23/2013
Gordon Johnson Manager/Chief Engineer Engineering Service	Date
	1/29/2013
Jeffrey Lightlinger General Manager	Date

**Attachment 1 – Financial Statements**

**Attachment 2 – Location Map**

**Financial Statement for Weymouth Improvements Program – Phase 2**

A breakdown of Board Action No. 16 for Appropriation No. 15440 for the Weymouth Basins Nos. 5-8 Rehabilitation project <sup>1</sup> is as follows:

	<b>Previous Total Appropriated Amount (Aug. 2012)</b>	<b>Current Board Action No. 16 (Feb. 2013)</b>	<b>New Total Appropriated Amount</b>
Labor			
Studies & Investigations	\$ 905,500	\$ 141,000	\$ 1,046,500
Final Design	1,604,593	-	1,604,593
Owner Costs (Program mgmt, envir. doc.)	1,341,474	59,000	1,400,474
Submittals Review & Record Drwgs	204,100	-	204,100
Construction Inspection & Support	902,100	-	902,100
Metropolitan Force Construction	571,100	-	571,100
Materials & Supplies	483,000	-	483,000
Incidental Expenses	65,800	2,000	67,800
Professional/Technical Services	889,000	-	889,000
Value Engineering Consultant		60,000	60,000
Equipment Use	2,500	-	2,500
Contracts	5,558,903	-	5,558,903
Remaining Budget	743,930 <sup>2</sup>	38,000	781,930
<b>Total</b>	<b>\$ 13,272,000</b>	<b>\$ 300,000</b>	<b>\$ 13,572,000</b>

**Funding Request**

<b>Program Name:</b>	Weymouth Improvements Program – Phase 2		
<b>Source of Funds:</b>	Revenue Bonds, Replacement and Refurbishment or General Funds		
<b>Appropriation No.:</b>	15440	<b>Board Action No.:</b>	16
<b>Requested Amount:</b>	\$ 300,000	<b>Capital Program No.:</b>	15440-I
<b>Total Appropriated Amount:</b>	\$ 13,572,000	<b>Capital Program Page No.:</b>	93
<b>Total Program Estimate:</b>	\$ 139,772,000	<b>Program Goal:</b>	I- Infrastructure & Reliability

<sup>1</sup> The total amount expended to date on the Weymouth Basins Nos. 5-8 Rehabilitation project is \$97,000.

<sup>2</sup> Includes previous reallocation of \$74 from Remaining Budget for the Weymouth Filter Outlet Conduit Repairs upon project closure.

### Financial Statement for Diemer Improvements Program

A breakdown of Board Action No. 23 for Appropriation No. 15380 for the Diemer Basin Rehabilitation project<sup>1</sup> is as follows:

	<b>Previous Total Appropriated Amount (Dec. 2012)</b>	<b>Current Board Action No. 23 (Feb. 2013)</b>	<b>New Total Appropriated Amount</b>
Labor			
Studies & Investigations	\$ 1,930,200	\$ -	\$ 1,930,200
Final Design	5,137,900	3,144,000	8,281,900
Owner Costs (Program mgmt., envir. doc., permitting)	7,521,159	547,000	8,068,159
Submittals Review & Record Drwgs.	186,204	-	186,204
Construction Inspection and Support	6,278,168	-	6,278,168
Metropolitan Force Construction	2,211,600	-	2,211,600
Materials & Supplies	831,916	-	831,916
Incidental Expenses	343,167	20,000	363,167
Professional/Technical Services	10,793,375	-	10,793,375
Value Engineering Consultant		60,000	60,000
Process Equipment Consultant	-	50,000	50,000
Ninyo and Moore		50,000	50,000
Equipment Use	96,608	-	96,608
Contracts	71,220,553	-	71,220,553
Remaining Budget	1,115,750	609,000	1,724,750
<b>Total</b>	<b>\$ 107,666,600</b>	<b>\$ 4,480,000</b>	<b>\$ 112,146,600</b>

### Funding Request

<b>Program Name:</b>	Diemer Improvements Program		
<b>Source of Funds:</b>	Revenue Bonds, Replacement and Refurbishment or General Funds		
<b>Appropriation No.:</b>	15380	<b>Board Action No.:</b>	23
<b>Requested Amount:</b>	\$ 4,480,000	<b>Capital Program No.:</b>	15380-I
<b>Total Appropriated Amount:</b>	\$ 112,146,600	<b>Capital Program Page No.:</b>	51
<b>Total Program Estimate:</b>	\$ 285,285,000	<b>Program Goal:</b>	I-Infrastructure Reliability

<sup>1</sup> The total amount expended to date on the Diemer Basin Rehabilitation project is approximately \$1,586,000.

# Distribution System

