

- **Board of Directors**
Engineering and Capital Programs Committee

December 9, 2008 Board Meeting

7-2

Subject

Appropriate \$865,000; and authorize final design of two seismic upgrade projects at the Diemer plant (Approp. 15380)

Description

This action authorizes final design of two projects at the Robert B. Diemer Water Treatment Plant: (1) Seismic upgrades to the Finished Water Reservoir; and (2) Seismic upgrades to the East Washwater Tank. These projects are categorized as Infrastructure Upgrade projects and are budgeted within Metropolitan's Capital Investment Plan (CIP). Both projects have been reviewed with Metropolitan's updated CIP prioritization criteria, and staff recommends moving forward at this time due to the critical nature of the facilities.

Background

The Diemer plant was placed into service in 1963 with an initial capacity of 200 million gallons per day (mgd). In 1969, the plant was expanded to its present treatment capacity of 520 mgd. The plant treats a blend of waters from the Colorado River and State Water Project and delivers treated water to Metropolitan's Central Pool portion of the distribution system.

The Diemer plant is located on the top of a hill in Yorba Linda. The plant was originally constructed in the early 1960s by cutting approximately 55 to 70 feet of native material from the site's ridge and placing the materials in adjacent ravines to produce a large level pad. While the fill material placed in these ravines was engineered to the practices of that time, it was not benched into competent rock as modern practices would dictate. Further, the Whittier Fault is located approximately one-half kilometer north of the Diemer plant, and has the capability of generating a 6.8 magnitude earthquake. In order to maintain reliability of the Diemer plant, staff initiated a seismic program June 2004 to identify and upgrade facilities which are potentially at risk of movement or failure during a credible seismic event. Several upgrade projects have already been completed or are currently underway. For example, in May 2008, construction of a seismically stable foundation for the future ozone contactors, the Ozone Generation Building, and the plant inlet conduits was completed. Of the 31 structures and major conduits at the Diemer plant, 23 structures have been evaluated and found to be structurally adequate, and eight facilities require upgrades. Seismic upgrades of the Finished Water Reservoir and East Washwater Tank are addressed in this action. Upgrades to the plant's Administration Building, two Filter Buildings, northeast Filter Outlet Conduit, Chlorinator/Maintenance Building, and a portion of the Second Lower Feeder will be the subject of future actions.

In January 2007, Metropolitan's Board authorized preliminary design of seismic upgrades to the Finished Water Reservoir and the East Washwater Tank. Preliminary design has been completed and staff recommends proceeding with final design at this time. Staff also recommends combining the two projects into a single construction contract to reduce cost and to simplify coordination with other planned and ongoing work at the Diemer plant, including the Diemer Oxidation Retrofit Program (ORP) and ongoing work by Metropolitan forces.

Project No. 1 - Diemer Finished Water Reservoir Seismic Upgrades – Final Design Phase (\$322,000)

The Diemer plant has a single finished water reservoir that provides 75.6 acre-feet of treated water storage. The reservoir is constructed of reinforced concrete and is classified as a dam by the California Division of Safety of Dams (DSOD). Portions of the reservoir's south wall straddle two soil-filled ravines and are supported by cast-in-place caissons. These caissons extend from the reservoir floor down through fill material and into the bedrock.

Recent examinations of the fill material have determined that this fill is non-engineered as it was not initially placed in a manner that is currently recognized as suitable for supporting a structure like the reservoir. Seismic analyses of the Diemer Finished Water Reservoir indicate that the non-engineered fill of the south-facing slope would slide down-slope during a maximum credible earthquake event, and the two deepest caissons could fail. The analyses concluded that the structural integrity of the reservoir itself would not be compromised by either the slope and/or caisson failures. The reservoir would be expected to remain intact, and there would not be an uncontrolled release of water. However, a section of the reservoir's concrete floor would experience minor to moderate cracking. As a result, the reservoir would need to be shut down for inspection and repairs, which would impact operation of the Diemer plant. The shutdown duration could exceed seven days.

To mitigate this risk and stabilize the slope to prevent the caissons from failing during a seismic event, staff recommends construction of an external retaining wall at the south slope. In addition, staff recommends thickening a portion of the reservoir floor slab to mitigate potential cracking, to prevent leakage, and to enhance operational reliability for the plant. This upgrade of the floor slab would be performed during an upcoming, planned shutdown of the reservoir.

Project No. 2 - Diemer East Washwater Tank Seismic Upgrades – Final Design Phase (\$543,000)

The Diemer plant has two washwater tanks, one on each side of the plant, which store water used to backwash the plant's filters. The East Washwater Tank is a cylindrical welded steel structure with a diameter of 60 feet and a height of 80 feet, holding 1.5 million gallons of filtered water. As with the nearby Finished Water Reservoir, the fill material under this tank is now considered inadequate to support the tank under major seismic events. Seismic analyses have concluded that in a maximum credible earthquake, soil underneath the East Washwater Tank would slide toward the southeast, leaving voids under the tank's concrete foundation. These voids would result in tilting or toppling of the tank. This movement could lead to rupture and/or catastrophic failure of the tank, which would impact the Diemer plant's ability to backwash filters, resulting in reduced plant treatment capacity.

The seismic analyses conducted during preliminary design evaluated various remediation alternatives. Staff recommends use of retaining walls to maintain the soil in place and to support the north, northeast, and south edges of the tank foundation. A third-party technical constructability review has validated the feasibility of the recommended option.

Summary

This action appropriates \$865,000 and authorizes final design of seismic upgrades to the Finished Water Reservoir and to the East Washwater Tank at the Diemer plant. Each project has been evaluated and recommended by Metropolitan's CIP Evaluation Team, and funds have been included in the fiscal year 2008/09 capital budget.

Due to the similar nature of work to be conducted under each project and proximity of their locations, staff recommends consolidating the final design activities for these two projects. This consolidation will reduce costs and optimize project coordination. Construction will be performed under a single contract. Final design of the combined projects will be performed by Metropolitan staff, with specialized technical support by URS Corporation. URS performed the geotechnical investigations and seismic analyses for both projects during the preliminary design phase, and will perform structural design of the project under an existing board-authorized agreement. No amendment to the existing URS agreement is required for this work. For this agreement, Metropolitan has established an SBE participation level of 12 percent.

Final design activities include: engineering design, preparation of drawings and specifications, permitting, development of a construction cost estimate, receipt of bids, and all other activities in advance of award of a construction contract. The cost of final design is approximately 15 percent of the total estimated construction cost. Engineering Services' goal for design of projects with construction cost less than \$3 million is 9 to 15 percent. The combined construction cost for the two projects is anticipated to range from \$2.7 million to \$3 million. Staff will return to the Board at a later date for award of the construction contract.

See [Attachment 1](#) for the Financial Statement, and [Attachment 2](#) for the Location Maps.

These projects are consistent with Metropolitan's goals for sustainability by enhancing the reliability of the existing treatment and distribution system, in order to maintain reliable water deliveries in the future.

Project Milestones

September 2009 – Completion of final design of the two Diemer Seismic Upgrades projects

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

California Environmental Quality Act (CEQA)

CEQA determinations for Option #1:

Diemer Finished Water Reservoir Seismic Upgrades – Final Design Phase

The environmental effects from the funding, design, procurement of equipment, construction and operation of the Diemer Finished Water Reservoir Seismic Upgrades were evaluated in Addendum No. 3 to the Robert B. Diemer Treatment Plant Improvements Project Subsequent Environmental Impact Report (SEIR), certified by the Board on July 8, 2008. The current board action is to appropriate budgeted funds and authorize final design for the East Washwater Tank Seismic Upgrade project, and does not propose any significant changes to the approved project itself. Therefore, the previous environmental documentation acted on by the Board in conjunction with the proposed action fully complies with CEQA and the State CEQA Guidelines. Accordingly, no additional CEQA review or documentation is required.

The CEQA determination is: Determine that the potential environmental effects associated with the design, construction, and operation of the Project, were addressed previously in Addendum No. 3 to the Diemer Improvements Program SEIR certified by the Board on July 8, 2008.

Diemer East Washwater Tank Seismic Upgrades – Final Design Phase

The proposed action is categorically exempt under the provisions of CEQA and the State CEQA Guidelines. The proposed action involves the funding, design, and installation of equipment within existing public facilities along with the construction of minor appurtenant structures 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 3 Categorical Exemptions (Sections 15301 and 15303 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 3, Section 15303) of the State CEQA Guidelines.

CEQA determinations for Option #2:

Diemer Finished Water Reservoir Seismic Upgrades – Final Design Phase

None required

Diemer East Washwater Tank Seismic Upgrades – Final Design Phase

None required

Board Options

Option #1

Adopt the CEQA determinations and

- a. Appropriate \$865,000;
- b. Authorize final design of the Diemer Finished Water Reservoir Seismic Upgrades; and
- c. Authorize final design of the Diemer East Washwater Tank Seismic Upgrades.

Fiscal Impact: \$865,000 of budgeted funds under Approp. 15380.

Business Analysis: This option will enhance reliability and continued operation of the Diemer plant in the event of a significant earthquake. Both projects have been reviewed with Metropolitan’s updated CIP prioritization criteria, and staff recommends moving forward at this time due to the critical nature of the facilities.

Option #2

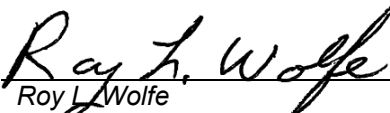
Do not proceed with the two Diemer projects at this time.

Fiscal Impact: None

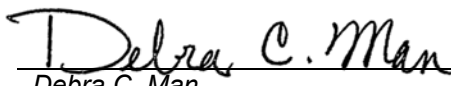
Business Analysis: This option would forego an opportunity to mitigate the risk of seismic failure of the two facilities and potentially affect the ability to deliver water following a significant seismic event.

Staff Recommendation

Option #1


Roy L. Wolfe
Manager, Corporate Resources

11/17/2008
Date


Debra C. Man
for Jeffrey Kightlinger
General Manager

11/20/2008
Date

Attachment 1 – Financial Statement

Attachment 2 – Location Maps

BLA #6045

Financial Statement for Diemer Improvements Program

A breakdown of Board Action No. 16 for Appropriation No. 15380 is as follows:

	Previous Total Appropriated Amount (July 2008)* **	Current Board Action No. 16 (Dec. 2008)	New Total Appropriated Amount
Labor			
Studies and Investigations	\$ 1,419,500	\$ -	\$ 1,419,500
Owner Costs (Program mgmt, environ. monitoring)	5,555,368 *	224,000	5,779,368
Final Design	1,502,900	246,000	1,748,900
Construction Inspection and Support	4,542,966	-	4,542,966
Metropolitan Force Construction	1,944,268	-	1,944,268
Materials and Supplies	785,416	-	785,416
Incidental Expenses	280,767 *	13,000	293,767
Professional/Technical Services	8,959,375 *, **	-	8,959,375
URS	-	209,000	209,000
Value Engineering firm	-	60,000	60,000
Equipment Use	96,608	-	96,608
Contracts	57,991,300	-	57,991,300
Remaining Budget	1,778,132 *, **	113,000	1,891,132
Total	\$ 84,856,600	\$ 865,000	\$ 85,721,600

* Reflects redistribution of \$191,300 from Remaining Budget for the Diemer Northeast Filter Outlet Conduit Seismic Upgrade Project.

** Reflects redistribution of \$1.2 million from Remaining Budget, per Board-authorized settlement of lawsuit over Diemer North Access Road in July 2008.

*** Reflects redistribution of \$27,625,600 from Diemer ORP, as authorized by Board in July 2008.

Funding Request

Program Name:	Diemer Improvements Program		
Source of Funds:	Revenue Bonds, Replacement and Refurbishment or General Funds		
Appropriation No.:	15380	Board Action No.:	16
Requested Amount:	\$ 865,000	Capital Program No.:	15380-I
Total Appropriated Amount:	\$ 85,721,600	Capital Program Page No.:	E-24
Total Program Estimate:	\$ 144,100,000	Program Goal:	Infrastructure Reliability



Finished Water Reservoir South Slope

East Washwater Tank