



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

5/11/2010 Board Meeting

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**7-1**

**Subject**

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Appropriate \$180,000; and authorize final design to replace four sodium hydroxide tanks at the Mills plant (Approp. 15452)

**Description**

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This action authorizes final design for the replacement of four deteriorated sodium hydroxide tanks at the Henry J. Mills Water Treatment Plant. Sodium hydroxide is added to the water to raise its pH to minimize deterioration of downstream concrete structures and corrosion of piping systems.

**Timing and Urgency**

Replacement of the four sodium hydroxide tanks is needed at the Mills plant to provide sufficient chemical storage capacity to allow uninterrupted operation in the event of peak chemical usage, chemical shortages, or unexpected delivery problems. Metropolitan's goal for storage of primary treatment chemicals is to provide 14 days of storage capacity for anticipated dosages at the full plant flowrate. Currently, the amount of sodium hydroxide storage at the Mills plant is five days, at the current full plant flowrate of 220 mgd, because three of the four existing storage tanks have deteriorated beyond repair and have been taken out of service. Insufficient sodium hydroxide storage capacity could result in plant flow restrictions, an unplanned plant outage, or possible violation of water quality regulations.

This project has been reviewed with Metropolitan's updated Capital Investment Plan (CIP) prioritization criteria, and staff recommends moving forward with final design activities to enhance plant reliability. This project is categorized as an Infrastructure Refurbishment project and is budgeted within Metropolitan's CIP for fiscal year 2010/11.

**Background**

The Mills plant exclusively treats water from the East Branch of the State Water Project. The plant was placed into service in 1978 with an initial capacity of 75 mgd, and has been expanded twice. The plant is currently rated to treat 220 mgd, and is planned to be upgraded to its maximum capacity of 326 mgd within the next five to seven years.

Metropolitan has established a goal of 14 days of storage capacity for primary treatment chemicals for anticipated dosages at the full plant flowrate. This goal has been established to allow uninterrupted operation in the event of peak chemical usage, chemical shortages, or unexpected delivery problems. This capacity goal has been applied at all five of Metropolitan's treatment plants, and has proven beneficial during periods of chemical supply instability.

**Sodium Hydroxide Tank Replacement – Final Design Phase (\$180,000)**

During the treatment process, sodium hydroxide is added to the combined filter outlet channel to raise the pH of the finished water to minimize corrosion in the distribution system, in accordance with the U.S. Environmental Protection Agency regulations. The Mills filter outlet sodium hydroxide tank farm was constructed in 1996 and contains sodium hydroxide feed equipment with four 20,000-gallon fiberglass reinforced

plastic (FRP) storage tanks. The combined volume of three tanks meets the 14-day goal for storage of sodium hydroxide. The fourth tank provides backup storage capacity. The Mills plant is now relying on this backup capacity because the three main FRP tanks have been removed from service due to deterioration of their interior lining. The current sodium hydroxide storage capacity is only five days at the current plant flowrate of 220 mgd. While the fourth tank remains operational, it requires frequent inspections to ensure that its interior lining is still intact. Failure of this tank would leave the plant without sodium hydroxide storage for the combined filter outlet channel.

Deterioration of the interior tank linings was caused by exposure to hot sodium hydroxide delivered by the chemical supplier. Metropolitan staff has contacted the chemical supplier to request that sodium hydroxide be delivered at a lower temperature. However, due to the nature of the chemical production process, it is not practical to deliver the sodium hydroxide at a temperature low enough to prevent further deterioration of the tank's FRP lining. The interior linings of these tanks have been repaired nine times in the last ten years to support ongoing plant operation. At this time, the interior linings are beyond repair. Deterioration of FRP tank linings in sodium hydroxide service has also occurred previously at the Skinner plant. While FRP continues to be used within the industry for this chemical, Metropolitan and many other users now utilize different tank materials for sodium hydroxide. It is recommended to use steel tanks for Mills, which is consistent with Metropolitan's four other water treatment plants.

Staff recommends replacing the four FRP tanks with four 20,000-gallon steel tanks which can withstand exposure to sodium hydroxide at elevated temperatures. While only three tanks are needed to meet the 14-day storage goal, the fourth tank would provide standby capacity if one of the three tanks is taken out of service for inspection or repairs. The fourth tank would provide operational flexibility and enhanced plant reliability.

Staff recommends proceeding with final design at this time. Final design phase activities will include preparation of drawings and specifications, preparation of procurement documents to pre-purchase the tanks, development of a construction cost estimate, receipt of bids, and all other activities in advance of award of a construction contract. As part of the final design, staff will conduct a structural analysis of the tanks in accordance with current seismic codes, and will design modifications to the tank farm roof structure and tank foundations. The scope will also include provisions for staging and demolition of the existing tanks; relocation of piping and electrical conduits to accommodate new tanks; and replacement of tank instrumentation.

This action appropriates \$180,000 and authorizes final design phase activities for the replacement of four sodium hydroxide tanks at the Mills plant. Requested funds include: \$98,000 for final design; \$56,000 for permitting, receipt of bids, and project management; and \$26,000 for remaining budget. The anticipated cost of final design is approximately 12 percent of the estimated total construction cost. Engineering Services' goal for design of projects with construction cost less than \$3 million is 9 to 15 percent. The construction cost for this project is anticipated to range from \$800,000 to \$900,000. Final design activities will be performed by Metropolitan staff.

This project has been evaluated and recommended by Metropolitan's CIP Evaluation Team, and funds have been included in the fiscal year 2009/10 capital budget. See [Attachment 1](#) for the Financial Statement and [Attachment 2](#) for the Location Map.

This project is consistent with Metropolitan's goals for sustainability by enhancing the reliability of the Mills plant, in order to maintain reliable water deliveries in the future.

### ***Project Milestones***

December 2010 – Completion of procurement documentation

June 2011 – Completion of final design

June 2012 – Completion of construction

### **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 overall activities involve the funding, design, minor alterations and 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 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**

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**Option #1**

Adopt the CEQA determination and

- a. Appropriate \$180,000; and
- b. Authorize final design to replace four sodium hydroxide tanks at the Mills plant.

**Fiscal Impact:** \$180,000 of budgeted funds under Approp. 15452

**Business Analysis:** Replacing the existing tanks will provide 14 days of chemical storage capacity, which will allow uninterrupted operation in the event of peak chemical usage, chemical shortages, or unexpected delivery problems.

**Option #2**

Do not proceed with the replacement of the Mills sodium hydroxide tanks at this time.

**Fiscal Impact:** None

**Business Analysis:** This option would not meet Metropolitan’s 14-day storage goal for sodium hydroxide.

This option would expose the plant to increased risk of plant flow restrictions, an unplanned plant outage, and possible violation of water quality regulations.

**Staff Recommendation**

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Option #1

  
 Roy L. Wolfe  
 Manager, Corporate Resources

4/23/2010  
 Date

  
 Jeffrey Nightlinger  
 General Manager

4/26/2010  
 Date

**Attachment 1 – Financial Statement**

**Attachment 2 – Location Map**

**Financial Statement for Mills Improvements Program – Phase II**

A breakdown of Board Action No. 7 for Appropriation No. 15452 for the Sodium Hydroxide Tank Replacement project\* is as follows:

	<b>Previous Total Appropriated Amount (Jan. 2010)</b>	<b>Current Board Action No. 7 (May 2010)</b>	<b>New Total Appropriated Amount</b>
Labor			
Studies and Preliminary Design	\$ 703,100	\$ -	\$ 703,100
Final Design	405,000	93,000	498,000
Owner Costs (Program mgmt., envir. doc.)	565,200	56,000	621,200
Construction Inspection and Support	61,000	-	61,000
Metropolitan Force Construction	676,000 **	-	676,000
Materials and Supplies	550,000 **	3,000	553,000
Incidental Expenses	47,700 **	2,000	49,700
Professional/Technical Services	47,000	-	47,000
Equipment Use	50,000	-	50,000
Contracts	-	-	-
Remaining Budget	273,000 **	26,000	299,000
<b>Total</b>	<b>\$ 3,378,000</b>	<b>\$ 180,000</b>	<b>\$ 3,558,000</b>

**Funding Request**

<b>Program Name:</b>	Mills Improvements Program – Phase II		
<b>Source of Funds:</b>	Revenue Bonds, Replacement and Refurbishment or General Funds		
<b>Appropriation No.:</b>	15452	<b>Board Action No.:</b>	7
<b>Requested Amount:</b>	\$ 180,000	<b>Capital Program No.:</b>	15452-I
<b>Total Appropriated Amount:</b>	\$ 3,558,000	<b>Capital Program Page No.:</b>	309
<b>Total Program Estimate:</b>	\$ 12,900,000	<b>Program Goal:</b>	I- Infrastructure Upgrade

\* This action is the initial appropriation for the Mills Sodium Hydroxide Tank Replacement project.

\*\* Includes a correction for Remaining Budget total reflected in Action No. 6 in January 2010

# Location Map

