



- Board of Directors
Engineering and Operations Committee

9/13/2011 Board Meeting

8-2

Subject

Appropriate \$3.8 million; and authorize: (1) final design of staged implementation for the Weymouth Oxidation Retrofit Program; (2) preliminary design of hypochlorite and sulfuric acid feed facilities; and (3) amendment of an existing agreement with Tetra-IBI Group (Approp. 15392)

Description

This action authorizes final design of staged ozonation facilities at the F. E. Weymouth Water Treatment Plant. Under this staged approach, the Weymouth Oxidation Retrofit Program (ORP) ozonation facilities will be constructed in two phases to meet treated water demands for the Weymouth service area as projected over the next 25 years under the 2010 Integrated Resources Plan (IRP). The Weymouth plant will be the final plant to receive ozonation facilities, consistent with Metropolitan's board-adopted policy to implement ozone at all five treatment plants. This action also authorizes preliminary design of hypochlorite and sulfuric acid feed facilities to support the ozonation process, and authorizes an amendment to an existing professional services agreement to provide architectural support for the Weymouth ORP.

Timing and Urgency

At Metropolitan's water treatment plants, the ozonation process is extremely effective in providing reliable disinfection, reducing the formation of chlorinated disinfection by-products (DBPs), and controlling taste-and-odor causing compounds which are occasionally present in the source water. In addition to these overall water quality benefits, the use of ozone at the Weymouth plant will provide important operational advantages, allowing Metropolitan to eliminate blend restrictions of State Water Project (SWP) and Colorado River Aqueduct (CRA) source waters. Moving forward with the Weymouth ORP is consistent with Metropolitan's board-adopted policy to implement ozone at all five treatment plants, which will provide consistent treated water quality throughout Metropolitan's service area.

Final design of the Weymouth ORP originally commenced in April 2005. At that time, the ozonation facilities were planned to have a treatment capacity of 520 million gallons per day (mgd), which matches the plant's rated capacity. Based on the 2010 IRP, long-term demand projections for the Central Pool and the Weymouth plant are lower than previous projections, providing an opportunity to stage and down-size some components of the ORP during initial construction. Moving forward with staged implementation of the Weymouth ORP will enable Metropolitan to meet its treated water quality and reliability goals, while reducing initial capital expenditures.

The Weymouth ORP has been reviewed with Metropolitan's updated Capital Investment Plan (CIP) prioritization criteria and is categorized as a Water Quality project. All work is budgeted within Metropolitan's CIP for fiscal year 2011/12.

Background and Status of Weymouth ORP

The Weymouth plant was placed into service in 1941 with an initial capacity of 100 mgd, and was expanded twice to its current capacity of 520 mgd. The plant delivers a blend of waters from the CRA and SWP to Metropolitan's Central Pool portion of the distribution system. Some areas within the distribution system receive water solely from the Weymouth plant.

The addition of ozone as the primary disinfectant at each of Metropolitan's treatment plants will substantially lower DBP levels for compliance with the U.S. Environmental Protection Agency's Disinfectants/Disinfection By-Products Rule. Use of ozone will also enhance Metropolitan's ability to treat water with varying source-water quality, and will provide critical operational flexibility to meet treatment challenges resulting from periodic water supply events such as drought or other source-water limitations. Further, ozonation will provide the capability to control taste-and-odor causing compounds which may be present from time to time, as well as pharmaceuticals/personal care products (PPCPs), endocrine disruptors (EDCs), and algal toxins. The ozonation process is currently in use at the Mills, Jensen, and Skinner plants, while construction is underway at the Diemer plant.

In December 2007, Metropolitan's Board authorized final design of three Weymouth ORP predecessor projects: (1) The plant inlet conduit relocation and rapid mix systems; (2) Plant electrical upgrades, including an electrical switchgear building for the ORP; and (3) Fire and domestic water system upgrades. In August 2009, the Board awarded a construction contract for a new rapid mix system, water system upgrades, and a new inlet conduit which will route incoming raw water to the ozone contactors. Construction is nearly complete, and the new inlet conduit has been in service since March 2011. In September 2009, the Board authorized staff to complete remaining final design activities for the Weymouth ORP, which are currently in progress. In November 2009, the Board awarded a construction contract for the electrical upgrades, including the ORP Switchgear Building. Construction of the electrical upgrades is presently underway.

Lower Demand Projections

Based on the 2010 IRP, demands on the Weymouth plant are expected to be lower than previously projected. In 2010, the maximum flowrate treated by the Weymouth plant was 290 mgd, while the average flow was 200 mgd. Over the next 25 years, demands on the Weymouth plant are expected to remain relatively flat as the region moves towards compliance with regulations to reduce per capita water usage by 20 percent by 2020.

In consideration of these trends, staff concluded that under most circumstances, a maximum ozonation capacity of 345 mgd at the Weymouth plant would be adequate for normal operation to serve the Weymouth-exclusive service area and a portion of the Central Pool. However, to maintain operating system flexibility, the existing hydraulic capacity of 520 mgd through the plant should be preserved. This staged-capacity approach is the most cost-effective means to meet Metropolitan's water quality goals while preserving the overall distribution system flexibility and capacity. In the infrequent circumstance that either high Central Pool demands or flow restrictions at the Jensen or Diemer plants would require the Weymouth plant to operate at flows greater than 345 mgd, staff could temporarily switch to chlorine as the primary disinfectant and adjust source water blends to control DBP formation. When future flows through the Weymouth plant reach sustained levels near 345 mgd, staff will return to the Board for authorization to proceed with the final stage of the Weymouth ORP, which will expand the ozonation capacity to match the plant's hydraulic capacity of 520 mgd. Under current projections, sustained Weymouth demands greater than 345 mgd are not expected to occur until approximately 2029.

Status of Ozone Generation Equipment Procurement Contract

In December 2005, Metropolitan's Board awarded a procurement contract to Ozonia North America for ozone generation equipment for both the Weymouth ORP and the Diemer ORP. The Weymouth ozone generation equipment has been fabricated and is currently being stored in a bonded and climate-controlled facility in Southern California, under a board-authorized agreement. The liquid oxygen (LOX) storage tanks and vaporizers have been stored on-site at the Weymouth plant. Upon award of the main ORP construction contract, the ozone generation and LOX equipment will be furnished to the main Weymouth ORP contractor for installation under that contract.

Provisions of the procurement contract required that Metropolitan would make final payment no later than April 2010 for all equipment and services specified in that contract. However, prior to April 2010, staff negotiated a credit to Metropolitan for services not yet provided, including start-up support, testing, supply of LOX during testing, and training. Upon award of the main ORP construction contract, staff will return to the Board to authorize a new contract with Ozonia North America for these services.

Status of Proposition 50 Grant Funding

In July 2007, Metropolitan's Board adopted a resolution to accept \$20 million of state Proposition 50 "The Water Security, Clean Drinking Water, Coastal and Beach Protection Act of 2002" grant funding for the Weymouth ORP. The California Department of Public Health (CDPH) and Metropolitan subsequently executed a Letter of Commitment to provide \$20 million for grant-eligible Weymouth ORP activities, including design, ozone equipment procurement, and inlet conduit construction costs, since relocation of the Weymouth inlet conduit is necessary in order to retrofit the plant with ozone contactors.

In January 2011, the CDPH executed the Weymouth ORP grant funding agreement. In July 2011, Metropolitan received an initial payment of \$14,318,073.19 for a portion of the design, ozone equipment fabrication, and inlet conduit/electrical facilities construction costs. Staff will submit invoices quarterly to CDPH for reimbursement of the remaining \$5.68 million provided by the grant.

Project No. 1 – Weymouth ORP Staged-Capacity – Final Design Phase (\$2,720,000)

The Weymouth ozonation facilities will include two fully functional ozone contactors and two bypass contactors to maintain the hydraulic capacity of 520 mgd through the plant. The staged-capacity ORP will provide a maximum ozonation treatment capacity of 345 mgd following the initial construction. The scope of the initial construction contract will remain as previously defined, with the exception of: (1) Those ORP components deferred to the future Stage 2 construction; and (2) Two updated features of the project involving energy management and storm water discharge containment. These updated features are discussed below.

The future second stage of the Weymouth ORP will add ozone diffusers and ozone gas piping inside the two bypass contactors, along with related piping, electrical equipment, and instrumentation and control devices located in the piping gallery adjacent to those two contactors. The ozone off-gas treatment and discharge system will be expanded, and the supervisory control and data acquisition (SCADA) system will be modified.

Two features of the Weymouth ORP scope will be updated for the initial stage of construction. Due to new storm water regulations prohibiting any additional storm water from leaving the Weymouth site, staff recommends adding storm water detention basins on the south side of the plant. These detention basins will be designed to temporarily contain any plant inlet overflows in case of hydraulic rejection at the ozone contactors. Finally, consistent with Metropolitan's board-adopted energy management policy, staff will pursue Leadership in Energy and Environmental Design (LEED) certification for the Ozone Generation Building.

In order to move forward with the Weymouth ORP, a series of final design tasks must be completed to reflect the updated scope of the project. These tasks include: engineering design and preparation of modified drawings for ozone system piping, instrumentation, electrical systems, off-gas system, and SCADA; revisions to the ozone cooling system; design of storm water detention basins; LEED evaluation and incorporation into the drawings and specifications; LEED commissioning requirements for the project's HVAC, lighting, domestic hot water, and renewable energy systems; energy modeling for the Ozone Generation Building in order to optimize building energy performance; development of a construction cost estimate; and permitting. Permits are anticipated to be required from CDPH, Los Angeles County Department of Public Works, US Army Corps of Engineers, Regional Water Quality Control Board, California Department of Fish and Game, California Division of Safety of Dams, and city of La Verne Fire Department.

This action appropriates \$2.72 million and authorizes final design phase activities to stage the capacity of the Weymouth ORP. Final design will be performed by Metropolitan staff, with specialized assistance from Carollo Engineers and Tetra-IBI Group, as described below. Requested funds include \$2.14 million for final design, including pursuit of LEED certification; \$315,000 for owner's costs including permitting, receipt of bids, and project management; and \$265,000 for remaining budget. The total cost for final design, including the \$21 million for design work previously authorized, is approximately 12 percent of the total 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 \$170 million to \$190 million.

Project No. 2 – Weymouth Hypochlorite and Sulfuric Acid Feed Facilities – Preliminary Design Phase (\$1,080,000)

At the Weymouth plant, chlorine is currently added upstream of the filters to provide disinfection. Once the ozonation facilities are in operation, chlorine will instead be added downstream of the filters, allowing the filters to become biologically active. Chlorination of the filter backwash water will then be needed to control filter biomass buildup and to prevent excessive pressure drop through the filters. To accomplish this, a new sodium hypochlorite storage and feed facility located near the washwater storage tanks is recommended.

Sulfuric acid is presently used at the Weymouth plant to lower the pH of the incoming raw water, which enhances the coagulation process. After the ozonation facilities are in operation, sulfuric acid had been planned to be added at the inlet to the ozone contactors to improve the efficiency of the ozonation process and to control the formation of bromate, which is a DBP. Staff has identified an alternate strategy to control bromate formation involving the application of chloramines instead of pH adjustment. This new bromate control strategy is the subject of a separate board action in September 2011. Due to the projected lower plant flows in the future and the likelihood that sulfuric acid will no longer be needed for bromate control, staff recommends adopting an alternate approach for sulfuric acid feed facilities at the Weymouth plant. Under this alternate approach, the plant's existing temporary sulfuric acid feed facility will be upgraded to meet expected needs, rather than building a new, larger facility.

The revised project will include a new hypochlorite storage and feed facility, and modifications to the existing sulfuric acid storage and feed facility. The new hypochlorite storage and feed facility will consist of two storage tanks, a containment area with roof, an unloading facility, chemical feed pumps, and instrumentation and controls. The scope will also include replacement of the plant's vehicle washrack, which required relocation due to ORP construction. Staff recommends proceeding with preliminary design, which includes the following activities: siting and preliminary equipment layout of the hypochlorite facility and the vehicle washrack; developing final design criteria; assessing needed safety and reliability improvements to the sulfuric acid facility, including potential replacement of the storage tanks; update of record drawings for the sulfuric acid facility; construction sequencing; and preparing a construction cost estimate.

This action appropriates \$1.08 million and authorizes preliminary design phase activities for the Weymouth Hypochlorite and Sulfuric Acid Feed Facilities. Preliminary design will be performed by Metropolitan staff with architectural design by Tetra-IBI Group, as described below. Requested funds include \$861,000 for geotechnical and field investigations, hazardous materials survey, preliminary layouts, materials and metallurgy assessment, and preparation of a preliminary design report; \$81,000 for owner's costs including preparation of environmental documentation and project management; and \$138,000 for remaining budget. The construction cost for this project is anticipated to range from \$4 million to \$5 million.

Architectural Support (Tetra-IBI Group) – Amendment to Existing Agreement

Tetra-IBI Group performed final architectural design of the Weymouth ozonation facilities. Staff recommends that Tetra-IBI Group modify its existing design drawings to reflect the staged ORP construction and LEED certification, and provide design support for the new hypochlorite facility. Tetra-IBI was selected through a competitive process via Request for Qualifications No. 555, and amendment of the existing agreement is consistent with the agreement's scope of work and with the planned approach for project implementation. For this agreement, Metropolitan has established an SBE participation level of 20 percent.

This action authorizes an increase of \$100,000 to the existing agreement with Tetra-IBI, for a new not-to-exceed total of \$2,758,000, to provide architectural support to complete the Weymouth ORP.

Technical Engineering Support (Carollo Engineers) – No action required

Carollo Engineers performed final design of the Weymouth ozone generation and LOX systems. Staff recommends that Carollo modify the ozone generation cooling system and support the LEED certification process. Carollo was selected through a competitive process via Request for Qualifications No. 719. These design services are consistent with the agreement's scope of work and represent the most cost-effective means to complete the ORP design. For this agreement, Metropolitan has established an SBE participation level of 20 percent. No amendment to the existing agreement is required. The estimated cost for these services is \$175,000.

Summary

This action appropriates \$3.8 million and authorizes final design of staged implementation for the Weymouth ORP, and preliminary design of hypochlorite and sulfuric acid feed facilities. Both projects have been evaluated and recommended by Metropolitan's CIP Evaluation Team, and funds have been included in the fiscal year 2011/12 capital budget. During preparation of Metropolitan's fiscal year 2011/12 budget, staff incorporated a revised Weymouth ORP budget reflecting the staged-capacity approach. As a result, the present action is consistent with the fiscal year's board-adopted budget. See [Attachment 1](#) for the Financial Statement and [Attachment 2](#) for the Location Map.

Both projects are included within capital Appropriation No. 15392, the Weymouth Oxidation Retrofit Program, which was initiated in fiscal year 2001/02. Appropriation No. 15392 also includes work such as the ozone equipment procurement, inlet conduit relocation, and ORP Switchgear Building. With the present action for the two ORP projects, the total funding for Appropriation No. 15392 will increase from \$70,612,000 to \$74,412,000.

These two projects are consistent with Metropolitan's goals for sustainability by enhancing the reliability of the Weymouth plant, in order to maintain reliable water deliveries and meet drinking water regulations in the future.

Project Milestones

February 2012 – Completion of preliminary design of hypochlorite and sulfuric acid feed facilities

June 2012 – Staff recommendation to award construction contract for the main ORP, reflecting the staged-capacity approach

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:

Project No. 1 – Weymouth ORP Staged-Capacity – Final Design Phase

The environmental effects of the Weymouth ORP Project (Project) were evaluated in the F. E. Weymouth Filtration Plant Ozonation Facilities and Site Improvements Program Final Environmental Impact Report (Final EIR), which was certified by the Board on April 12, 2005. The Board also adopted the Findings of Fact (Findings), the Statement of Overriding Considerations (SOC), and the Mitigation Monitoring and Reporting Program (MMRP), along with approving the overall Program (including the Project). The current board action is solely based on appropriating funding for final design and not on any changes to the approved Project. Hence, 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 further CEQA documentation is necessary for the Board to act on the proposed action.

The CEQA determination is: Determine that the proposed action has been previously addressed in the certified 2005 Final EIR, findings, SOC, and MMRP and that no further environmental analysis or documentation is required.

Project No. 2 – Weymouth Hypochlorite and Sulfuric Acid Feed Facilities – Preliminary Design Phase; and Architectural Support (Tetra-IBI Group) – Amendment to Existing Agreement

The proposed action consists of funding, preliminary design, and contractual arrangements for the Weymouth Hypochlorite and Sulfuric Acid Feed Facilities Project, and is therefore 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). In addition, part of the proposed action, funding and contractual matters, is not subject to CEQA because it involves other government fiscal activities, which do not involve any commitment to any specific project which may result in a potentially significant physical impact on the environment (Section 15378(b)(4) 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) and Section 15378(b)(4) of the State CEQA Guidelines.

CEQA determination for Option #2:

None required

Board Options

Option #1

Adopt the CEQA determinations and

- a. Appropriate \$3.8 million;
- b. Authorize final design of staged ozonation facilities at the Weymouth plant;
- c. Authorize preliminary design of hypochlorite and sulfuric acid feed facilities; and
- d. Authorize increase of \$100,000 to the existing agreement with Tetra-IBI Group, for a new not-to-exceed total of \$2,758,000.

Fiscal Impact: \$3.8 million of budgeted funds under Approp. 15392

Business Analysis: Completion of the Weymouth ORP will remove blend restrictions and enhance the plant's ability to treat water with variable source-water quality.

Option #2

Do not proceed with the Weymouth ORP at this time.

Fiscal Impact: By not proceeding with the Weymouth ORP, Metropolitan may violate the terms of the Proposition 50 grant funding agreement, which could require that Metropolitan return the grant funds received to date (\$14,318,073.19) to CDPH. In addition, the pre-purchased ozone generation equipment (\$7,661,000), which is currently in storage, would become stranded equipment.

Business Analysis: Under this option, chlorine would continue to be used as the primary disinfectant at the Weymouth plant. The Weymouth plant would continue to comply with water quality regulations. However, the Weymouth service area would continue to have elevated chlorinated DBP levels compared to other portions of the distribution system; little or no ability to control taste and odors; and greater than 500 mg/L TDS levels due to the addition of a large amount of treatment chemicals, and due to the need to operate at lower SWP blends to comply with DBP regulations. Any future limitations on the availability of CRA water could result in Weymouth plant capacity restrictions. Without ozone, the Weymouth plant would be Metropolitan's only treatment plant that would not be able to reduce or remove pharmaceuticals/personal care products, endocrine disruptors, and algal toxins.

Staff Recommendation

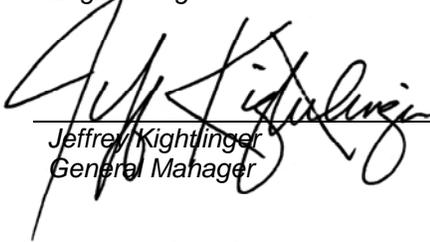
Option #1



Gordon Johnson
Manager/Chief Engineer,
Engineering Services

8/26/2011

Date



Jeffrey Kightlinger
General Manager

8/29/2011

Date

Attachment 1 – Financial Statement

Attachment 2 – Location Map

Ref# es12613531

Financial Statement for Weymouth Oxidation Retrofit Program

A breakdown of Board Action No. 8 for Appropriation No. 15392 for the Weymouth ORP* is as follows:

	Previous Total Appropriated Amount (Nov. 2009)	Current Board Action No. 8 (Sept. 2011)	New Total Appropriated Amount
Labor			
Studies & Investigations	\$ 661,000	\$ 803,000	\$ 1,464,000
Final Design	14,427,000	1,895,000	16,322,000
Owner Costs (Program mgmt, permitting, receipt of bids)	4,551,400	347,000	4,898,400
Submittals Review, Record Drwgs	1,045,600	-	1,045,600
Construction Inspection & Support	4,091,600	-	4,091,600
Metropolitan Force Construction	510,000	-	510,000
Materials & Supplies	8,633,650	-	8,633,650
Incidental Expenses	310,000	28,000	338,000
Professional/Technical Services	13,631,432 **	-	13,631,432
Carollo Engineers	-	175,000	175,000
Tetra-IBI Group	-	100,000	100,000
Geotechnical consultant	-	25,000	25,000
Environmental consultant	-	24,000	24,000
Contracts	20,701,800	-	20,701,800
Remaining Budget	2,048,518 **	403,000	2,451,518
Total	\$ 70,612,000	\$ 3,800,000	\$ 74,412,000

Funding Request

Program Name:	Weymouth Oxidation Retrofit Program		
Source of Funds:	Revenue Bonds, Replacement and Refurbishment, or General Funds (\$315,301,000) and Proposition 50 Grant Funds (\$20,000,000)		
Appropriation No.:	15392	Board Action No.:	8
Requested Amount:	\$ 3,800,000	Capital Program No.:	15392-W
Total Appropriated Amount:	\$ 74,412,000	Capital Program Page No.:	331
Total Program Estimate:	\$ 335,301,000	Program Goal:	WQ/Compliance

* The total amount expended to date on the Weymouth ORP is approximately \$63.5 million.

** Includes previous reallocation of \$1,642,332 from remaining budget to professional/technical services for Weymouth ORP final design.

F.E. Weymouth Water Treatment Plant

