



● **Board of Directors**  
***Water Quality and Operations Committee***

July 14, 2009 Board Meeting

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**7-1**

**Subject**

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Appropriate \$390,000; and authorize Phase Two of the Two-Way Radio System Upgrade (Approp. 15376)

**Description**

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This action initiates Phase Two of the Two-Way Radio System Upgrade, which includes preliminary system design and selection of a vendor for implementation of the system. Preliminary design includes radio site surveys and development of detailed technical requirements and specific frequency coverage maps. A reliable two-way radio system is critical to ensuring effective communications during a major regional emergency when other forms of communications, such as cell phones, will likely not be available.

Tests of the existing radio system have indicated that radio coverage is lacking in a number of Metropolitan's service areas, and the system has insufficient capacity to handle the communications traffic expected during a major emergency. These tests were conducted using Patrol Run and Emergency Response Exercises, such as the "Golden Guardian 2008 Statewide Emergency Exercise." Not only was coverage poor, but it was found that the existing system becomes overwhelmed with calls during an emergency situation, which would create significant operational difficulties during a regional emergency. It is critical that the current radio system be upgraded to minimize disruptions in communications during disasters to help ensure an effective response to assess and repair damage to Metropolitan's conveyance and distribution systems. Metropolitan's existing two-way radio communications system was originally designed and installed 18 years ago to support communication internal to individual facilities, not for regional coverage.

**Timing and Urgency**

Staff recommends moving forward with the Two-Way Radio System Upgrade because there is a significant risk that in the event of a regional disaster, the existing radio system could hinder Metropolitan's ability to respond to emergencies because of deficiencies in coverage and capacity. The two-way radio system is a critical communications system, and it is imperative that this project move forward expeditiously to ensure effective Emergency Response capability.

**Background**

The two-way radio system is an important element of Metropolitan's communication strategy and emergency response plan. The system is primarily used for daily operational communications by Water System Operations field staff at the treatment plants, Colorado River Aqueduct (CRA) pumping plants, along the conveyance and distribution system, and at Metropolitan's Headquarters building. Metropolitan has more than 250 employees using two-way radios during routine operational activities, and may have as many as 500 users during emergencies. Radio communication is particularly vital during disasters such as earthquakes, when staff must be able to respond quickly and effectively to assess any damage to water conveyance, treatment, and distribution facilities. Cellular phone services become overloaded and are not a reliable means of communication during major regional events. Therefore, it is particularly important that Metropolitan have a reliable two-way radio system with sufficient capacity for mission-critical communication during emergencies.

Metropolitan's existing two-way radio communications system was initially designed and installed 18 years ago to support communication internal to individual facilities. Licensed radio frequencies were acquired with the local needs in mind. As the distribution system evolved, and its operations became centralized, communication

between the treatment plants became more crucial in order to coordinate efforts, especially in the event of a major disaster impacting more than one region of Metropolitan's service area. While the radio system has been expanded to partially address this need for expanded coverage, the current system design has significant limitations including its inability to provide complete geographic coverage of Metropolitan's service area. Additionally, Metropolitan does not enjoy exclusive use of two-way radio frequencies, which can result in interference from other entities.

### **Phase One – Performance Specification**

Metropolitan's Board authorized \$557,000 for Phase One of the Two-Way Radio System Upgrade project in July 2006. The planned scope of work was to document user requirements; identify operational specifications; examine options and analyze needed UHF or VHF frequencies to provide comprehensive coverage of the service area; determine the feasibility and cost of obtaining necessary UHF or VHF frequencies; and return to the Board with a recommendation to obtain frequency licenses and implement the new system. This phase was prolonged by extensive frequency negotiations, as discussed below. At this time, all of the previously appropriated funds have been expended on the project.

A consulting firm with expertise in two-way radio system development was chosen to provide specialized technical expertise to assist staff/s efforts to accomplish Phase One objectives. The firm completed a conceptual design and recommended that Metropolitan acquire licensed "clear channel" UHF frequencies for its exclusive use in Southern California as the optimum solution to complete the upgrade. A "clear channel" frequency would allow Metropolitan to broadcast at higher power to cover a larger area with fewer frequencies and radio repeaters. This use is based on Federal Communications Commission (FCC) license provisions allowing use in all counties where Metropolitan has facilities. Such frequencies are rare and are in high demand in the Southern California region.

After a comprehensive search, Metropolitan identified only one licensee of such frequencies, and engaged in negotiations to obtain rights to its clear channel UHF frequencies. The existing licensee was unwilling to reduce the price to a point that made the clear channel approach economical for Metropolitan, and was also unwilling to clear the frequencies of current users. In conjunction with the consultant's recommendation, staff elected not to pursue the clear channel approach and instead developed an alternative UHF frequency strategy that utilized a combination of smaller-range frequencies already licensed by Metropolitan; access to frequencies licensed to other agencies; and additional licensed frequencies that Metropolitan will seek from the FCC at no cost. This second conceptual design is analogous to a cell phone network, where more repeaters are used to provide end-to-end coverage via shorter-range UHF frequencies. It should be noted that Metropolitan uses Low Band VHF and UHF frequencies. The VHF system cannot be changed to a trunked radio system recommended by the consultant, whereas the current/future UHF infrastructure can be trunked with enhancements. A "trunked" radio network fosters cost-effective and efficient utilization of limited radio frequency resources by allowing multiple conversations per site, very wide area communications between users, and featuring intuitive user input.

The various efforts to finalize agreements, FCC licensing, and frequency mapping are now sufficiently complete to move forward with finalizing the preliminary design and to select a vendor to complete design and installation of the upgraded two-way radio system based on the revised approach.

### **Two-Way Radio Upgrade, Phase Two – Preliminary Design and Vendor Selection (\$390,000)**

This phase of the project will include completing the preliminary system design, conducting radio site surveys to assess equipment and infrastructure needs, defining specific technical requirements, and generating detailed frequency coverage maps. All of this information is needed by prospective vendors interested in submitting proposals for this work. Phase Two also includes selection of a vendor to complete the design and installation of the upgrade. After the vendor is selected, staff will return to the Board to obtain authorization for an agreement with the recommended vendor to complete the upgrade.

This action appropriates \$390,000 in budgeted funds; authorizes completion of the detailed preliminary system design, radio site surveys, and frequency coverage maps; and selection of a vendor to complete the design and implementation of the Two-Way Radio System Upgrade project. The total program cost inclusive of Phase One,

Phase Two, and design and installation of the upgrades, is estimated to be \$5.9 million to \$6.9 million. Design and installation of the upgraded radio system will make up the third and final phase of the project, and will be considered by the Board once the solicitation process is completed.

This project has been evaluated and recommended by Metropolitan's Capital Investment Plan Evaluation Team, and funds have been included in the fiscal year 2009/10 capital budget. This project is consistent with Metropolitan's goals for sustainability by enhancing the reliability of the two-way radio system in order to maintain reliable communications during a major emergency.

See [Attachment 1](#) for the financial statement.

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## Policy

Metropolitan Water District Administrative Code Section 5108: Appropriations  
(By Minute Item 46735, dated July 11, 2006, the Board authorized Phase One of the Two-Way Radio Upgrade project.)

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## California Environmental Quality Act (CEQA)

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 Option #2:

None required

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## Board Options

### Option #1

Adopt the CEQA determination and

- a. Appropriate \$390,000; and
- b. Authorize Phase Two of the Two-Way Radio System Upgrade project.

**Fiscal Impact:** \$390,000 in budgeted funds under Approp. 15376

**Business Analysis:** It is critical that the current radio system be upgraded to minimize disruptions in communications during disasters. A reliable two-way radio system will help ensure an effective emergency response to assess and repair damage to Metropolitan's facilities. The upgraded system will meet emergency response plan goals established by Water System Operations.

### Option #2

Do not upgrade Metropolitan's two-way radio system.

**Fiscal Impact:** None

**Business Analysis:** Deferral of this project will require continued use of the existing system, which may result in ineffective communications during regional emergencies, and delays in meeting emergency response plan communication goals.

**Staff Recommendation**

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Option #1

  
Roy L. Wolfe  
Manager, Corporate Resources

6/29/2009  
Date

  
Jeffrey Knightlinger  
General Manager

6/30/2009  
Date

**Attachment 1 – Financial Statement**

BLA #6714

**Financial Statement for the ITSP Infrastructure Program**

A breakdown of Board Action No. 11 for Appropriation No. 15376 for the Two-Way Radio System Upgrades as follows:

	<b>Previous Total Appropriated Amount * (Feb. 2008)</b>	<b>Current Board Action No. 11 (July 2009)</b>	<b>New Total Appropriated Amount</b>
Labor	\$ 15,537,146	\$ 274,000	\$ 15,811,146
Materials and Supplies	10,386,989	-	10,386,989
Incidental Expenses	151,493	-	151,493
Professional/Technical Services	5,358,608	81,000	5,439,608
Equipment Use	43,231	-	43,231
Contracts	269,266	-	269,266
Remaining Budget	2,124,267	35,000	2,159,267
<b>Total</b>	<b>\$ 33,871,000</b>	<b>\$ 390,000</b>	<b>\$ 34,261,000</b>

\* Total February 2008 appropriated amount remains unchanged. Funds have been redistributed as follows:

- \$41,880 budgeted for Materials in the Data Network Upgrades Project was redistributed into other budget categories to better reflect the distribution of actual expenditures for the project.
- \$459,000 included in Remaining Budget was redistributed into other budget categories to complete the following projects: Phonemail Replacement, Field Emergency Generator Replacement, IT Business System / Data Recovery, and Exchange Replacement.
- \$14,514 was transferred to Remaining Budget from other budget categories because Phase I of the IT network upgrade was completed under budget

**Funding Request**

<b>Program Name:</b>	ITSP Infrastructure Program		
<b>Source of Funds:</b>	Revenue Bonds, Replacement and Refurbishment or General Funds		
<b>Appropriation No.:</b>	15376	<b>Board Action No.:</b>	11
<b>Requested Amount:</b>	\$ 390,000	<b>Capital Program No.:</b>	15376-I
<b>Total Appropriated Amount:</b>	\$ 34,261,000	<b>Capital Program Page No.:</b>	E-35
<b>Total Program Estimate:</b>	\$ 34,261,000	<b>Program Goal:</b>	Reliability & Efficiency