



- Board of Directors
Engineering and Operations Committee

11/8/2011 Board Meeting

7-1

Subject

Appropriate \$1.12 million; authorize five pipeline cathodic protection projects; and award \$274,000 contract to Unique Performance Construction, Inc. for cathodic protection of West Valley Feeder No. 2 (Approp. 15441)

Description

This action authorizes five pipeline protection projects within Metropolitan's distribution system: (1) installation of stray current drain stations on West Valley Feeder No. 2, including award of a construction contract; (2) replacement of stray current drain stations on Lake Skinner Bypass Pipeline No. 2 by Metropolitan forces; (3) final design of stray current drain stations on the Sepulveda Feeder North and the Second Lower Feeder; and (4) preliminary design of impressed current cathodic protection system on the Orange County Feeder.

Timing and Urgency

Recent corrosion surveys of the Sepulveda Feeder North, West Valley Feeder No. 2, Lake Skinner Bypass Pipeline No. 2, Second Lower Feeder, and the Orange County Feeder have identified that these pipelines are experiencing corrosion due to stray current interference from other utilities' cathodic protection systems. While the corrosion damage is not yet extensive, further deterioration of these pipelines may lead to eventual leakage and possible rupture. The planned cathodic protection systems are a proactive and cost-effective measure to mitigate against stray current interference, and will reduce the risk for costly emergency repairs. Given the importance of these pipelines in delivering water to Metropolitan's member agencies, staff recommends moving forward with the five projects at this time.

These projects have been reviewed with Metropolitan's updated Capital Investment Plan (CIP) prioritization criteria and are categorized as Infrastructure Rehabilitation projects. These five projects are budgeted within Metropolitan's CIP for fiscal year 2011/12.

Background

Buried metallic pipelines are often protected from corrosive soils by the installation of cathodic protection systems. These systems may in turn cause corrosion on other adjacent pipelines through the introduction of stray currents into the surrounding soil. Stray currents may flow onto adjacent pipelines in one area, travel along the pipeline, and then leave the pipe (with resulting corrosion) to re-enter the earth.

The induced stray currents are known to cause corrosion on welded steel pipe and prestressed concrete cylinder pipe (PCCP). Corrosion affects these two types of pipes differently. Corrosion in welded steel pipe can lead to pinhole leaks in the steel, while corrosion in PCCP segments causes deterioration of the prestressing wire and could potentially lead to failure of PCCP segments.

Metropolitan's water delivery system includes approximately 830 miles of pipelines, which are measured for stray currents every one to two years. When stray currents are detected, staff typically installs cathodic protection systems to extend the life of the pipelines and to alleviate the potential for emergency repairs. Two types of cathodic protection systems are used: galvanic cathodic protection and impressed current cathodic protection. Under galvanic cathodic protection systems, which are also referred to as current drain stations, anodes are

electrically connected to the pipeline metal without using a power source. Because the anodes are composed of metals that are more easily oxidized than the metals in welded steel pipe and in PCCP, the anodes corrode first and continue to corrode until they need to be replaced. Impressed current cathodic protection systems use an external power source to apply a protective current to the pipeline. This protective current is then discharged through anodes as in the current drain system.

Impressed current systems cost more to install and maintain than current drain stations because an external power source is used. However, impressed current systems are more effective when stray current levels are high and in areas where stray currents fluctuate. Replacement intervals for both systems typically range from 10 to 20 years. The type of cathodic protection to be used is determined based on the level of stray current interference, soil conditions, installation and maintenance costs, and availability of a power source.

The five projects included in this action will install cathodic protection systems on three welded steel pipelines and two PCCP lines over a total length of 79 miles. A majority of the work sites are located within public rights-of-way.

Project No. 1 – West Valley Feeder No. 2 Cathodic Protection – Construction (\$407,000)

The West Valley Feeder No. 2 delivers treated water from the Joseph Jensen Water Treatment Plant to Las Virgenes Municipal Water District and Calleguas Municipal Water District. The feeder is approximately nine miles long and was installed in 1974. The line consists of six miles of 103-inch-diameter steel pipe and approximately three miles of 96-inch-diameter PCCP. West Valley Feeder No. 2 is located within an urbanized area.

A recent corrosion survey of West Valley Feeder No. 2 indicated that the existing cathodic protection system on the steel pipe reach may be creating interference and associated corrosion damage to the adjacent PCCP segments. Installing sacrificial anodes will provide effective corrosion protection to the steel portion of the pipeline and will help protect the PCCP portion from stray current interference. This project will install 26 current drain stations to protect approximately 5.8 miles of pipeline. The work includes installation of anodes, reference electrodes, test station cabinets, and conduits.

Specifications No. 1695 for the West Valley Feeder No. 2 Stray Current Drain Station project was advertised for bids on August 17, 2011. As shown in [Attachment 2](#), 11 bids were received and opened on September 15, 2011. The low bid from Unique Performance Construction, Inc., in the amount of \$274,000, complies with the requirements of the specifications. The 10 higher bids ranged from \$288,351 to \$774,390. The engineer's estimate was \$510,000. Staff investigated the difference between the engineer's estimate and the lower bids, and believes it reflects the current highly competitive bidding environment and aggressive scheduling of the work by contractors. For this project, Metropolitan did not establish a Small Business Enterprise participation level due to the limited scope of work and short construction duration.

This action appropriates \$407,000 in budgeted funds and awards a \$274,000 contract to Unique Performance Construction, Inc. for the installation of stray current drain stations on West Valley Feeder No. 2. In addition to the amount of the contract, the requested funds include \$21,450 for Metropolitan force construction, which includes final connection of the anodes to the pipeline, and start-up testing. Requested funds also include \$38,750 for construction inspection; \$4,650 for submittals review; \$6,500 for preparation of record drawings; \$25,200 for local agency permitting and project management; and \$36,450 for remaining budget. The total estimated cost of construction for this project is \$295,450.

Metropolitan staff will perform inspection of the construction contract. For this project, the anticipated cost of inspection is approximately 13.1 percent of the total construction cost. Engineering Services' goal for inspection of construction contracts less than \$3 million is 9 to 15 percent.

Project No. 2 – Lake Skinner Bypass Pipeline No. 2 Cathodic Protection – Construction (\$127,000)

Lake Skinner Bypass Pipeline No. 2 conveys untreated water from the San Diego Canal to the Skinner Plant No. 2 Inlet Conduit. The pipeline is one mile long and was installed in 1992. This line is constructed of welded steel pipe and is located entirely on Metropolitan property. The existing sacrificial anode cathodic protection system

was also installed in 1992, and consists of magnesium anodes and test stations at 18 locations along the length of the pipeline.

A recent corrosion survey of Lake Skinner Bypass Pipeline No. 2 indicated that the effectiveness of the cathodic protection system has diminished because the magnesium anodes have reached the end of their service life. Replacing the depleted anodes will provide effective corrosion protection to the pipeline. The planned scope of work includes procuring and installing new magnesium anodes at 18 locations along Lake Skinner Bypass Pipeline No. 2. Procurement and installation of the new anodes will be performed by Metropolitan forces. The existing test stations are in good condition and do not require replacement.

Planned activities include procurement of anodes, conducting biological surveys prior to and during construction, installation of anodes, and preparation of record drawings. The biological surveys will be performed by a specialized consultant under an existing professional services agreement, while all other activities will be performed by Metropolitan staff.

This action appropriates \$127,000 in budgeted funds and authorizes procurement and installation activities to replace magnesium anodes on the Lake Skinner Bypass Pipeline No. 2. The requested funds include: \$95,500 for Metropolitan force construction; \$13,040 for procurement of materials and project management; \$6,500 for preparation of record drawings; \$1,500 for biological surveys; and \$10,460 for remaining budget.

Project No. 3 – Sepulveda Feeder North Cathodic Protection – Final Design Phase (\$191,000)

The Sepulveda Feeder conveys treated water from the Jensen plant through an urbanized area to an interconnection with the Second Lower Feeder in the city of Torrance. The feeder is approximately 42 miles long and was installed in the early 1970s. Approximately 37 miles of the feeder is comprised of PCCP. The feeder has a relatively high operating pressure (280 psi).

In 1998, Metropolitan installed 20 stray current drain stations on the northern portion of the Sepulveda Feeder to mitigate stray current interference detected during routine monitoring. Recent testing performed by staff has identified that most of these drain stations are no longer able to effectively mitigate stray currents because they have reached the end of their service life. In addition, the need for nine new drain stations was identified to mitigate newly detected stray current interference.

Staff recommends proceeding with final design to replace the 15 existing stray current drain stations and install nine new stations along the Sepulveda Feeder North to protect the feeder for approximately 33 miles. Planned activities include engineering design, preparation of drawings and specifications, local agency permitting, receipt of competitive bids, development of a construction cost estimate, and all other activities in advance of award of a construction contract. All work will be performed by Metropolitan staff.

This action appropriates \$191,000 in budgeted funds and authorizes final design phase activities for the Sepulveda Feeder North stray current drain stations. The requested funds include \$10,500 for utility investigations; \$116,850 for final design; \$47,000 for permitting, bidding and project management; and \$16,650 in remaining budget. The final design cost as a percentage of the estimated construction cost is approximately 12.6 percent. Engineering Service's 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 \$900,000 to \$1.1 million. Staff will return to the Board at a later date for award of a construction contract.

Project No. 4 – Second Lower Feeder Cathodic Protection – Final Design Phase (\$266,000)

The Second Lower Feeder conveys treated water from the Robert B. Diemer Water Treatment Plant in Yorba Linda through an urbanized area to Palos Verdes Reservoir in the city of Rolling Hills Estates. The feeder is approximately 39 miles long and was installed in the early 1970s. Approximately 30 miles of the feeder is comprised of PCCP.

In 1998, Metropolitan installed stray current drain stations at 33 sites on the Second Lower Feeder to mitigate stray current interference detected during routine monitoring. Recent testing performed by staff has identified that most of these drain stations are no longer able to effectively mitigate stray currents because they have reached the

end of their service life. In addition, the need for 13 new drain stations was identified to mitigate newly detected stray current interference.

Staff recommends proceeding with final design to replace the 26 existing stray current drain stations and install 13 new stations along the Second Lower Feeder to protect the feeder for approximately 21.4 miles. Planned activities include engineering design, preparation of drawings and specifications, local agency permitting, receipt of competitive bids, development of a construction cost estimate, and all other activities in advance of award of a construction contract. All work will be performed by Metropolitan staff.

This action appropriates \$266,000 in budgeted funds and authorizes final design phase activities for the Second Lower Feeder stray current drain stations. The requested funds include \$18,000 for utility investigations; \$179,250 for final design; \$47,000 for permitting, bidding, and project management; and \$21,750 in remaining budget. The final design cost as a percentage of the estimated construction cost is approximately 12 percent. Engineering Service's 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 \$1.6 million to \$1.8 million. Staff will return to the Board at a later date for award of a construction contract.

Project No. 5 – Orange County Feeder Cathodic Protection – Preliminary Design Phase (\$129,000)

The Orange County Feeder conveys treated water from the F. E. Weymouth Water Treatment Plant through primarily urban areas to its terminus at service connection CM-1 in the city of Newport Beach. The feeder is approximately 41 miles long and was installed in 1942. The feeder has reaches of welded steel pipe, precast concrete pipe, and PCCP.

In 1974, Metropolitan installed an impressed-current cathodic protection system on the 8.8-mile-long welded steel portion of the feeder. The impressed-current cathodic protection system consists of four deep-well anode groundbeds, rectifiers, and other associated equipment. Recent testing performed by staff has identified that three of the deep-well anode groundbeds located in the cities of Anaheim and Fullerton are no longer able to effectively provide corrosion protection to the pipeline, because they have reached the end of their service life.

Staff recommends proceeding with preliminary design to replace the existing cathodic protection system on the Orange County Feeder to protect the feeder for approximately 8.8 miles. Planned activities include site surveys; preparation of a preliminary design report and environmental documentation; local agency permitting; securing power supplies at two locations; and development of a preliminary construction cost estimate. All work will be performed by Metropolitan staff.

This action appropriates \$129,000 in budgeted funds and authorizes preliminary design phase activities for the Orange County Feeder cathodic protection system. The requested funds include \$69,500 for site surveys, utility investigations, and preliminary design; \$42,450 for environmental documentation and project management; and \$17,050 in remaining budget. Staff will return to the Board at a later date for authorization of final design.

Summary

This action appropriates \$1.12 million; awards a \$274,000 contract to Unique Performance Construction, Inc.; and authorizes four other pipeline cathodic protection projects. All work has been evaluated and recommended by Metropolitan's CIP Evaluation Team, and funds have been included in the fiscal year 2011/12 capital budget. See [Attachment 1](#) for the Financial Statement, [Attachment 2](#) for the Abstract of Bids, and [Attachment 3](#) for the Location Map.

These projects are included within capital Appropriation No. 15441, the Conveyance and Distribution System Rehabilitation Program - Phase 2, which was initiated in fiscal year 2006/07. Appropriation No. 15441 also includes projects such as PCCP repairs of the Calabasas Feeder, Lake Skinner Outlet Conduit, Rialto Pipeline, San Diego Pipeline No. 5, and Sepulveda Feeder. With the current action, the total funding for Appropriation No. 15441 will increase from \$32,059,000 to \$33,179,000.

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

Project Milestones

July 2012 – Completion of construction of West Valley Feeder No. 2 Cathodic Protection System.

June 2012 – Completion of construction of Lake Skinner Bypass Pipeline No. 2 Cathodic Protection System.

July 2012 – Completion of final design of cathodic protection systems for the Sepulveda Feeder North and Second Lower Feeder.

July 2012 – Completion of preliminary design of cathodic protection system for the Orange County Feeder.

Policy

Metropolitan Water District Administrative Code Section 5108: Appropriations

California Environmental Quality Act (CEQA)

Project No. 1 – West Valley Feeder No. 2 Cathodic Protection - Construction

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 West Valley Feeder No. 2 Cathodic Protection was found to be exempt under Class 1 Section 15301 of the State CEQA Guidelines on December 8, 2009. 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 is no substantial change 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: Determine that the proposed action has been previously addressed in the 2009 NOE (Class 1, Section 15301 of the State CEQA Guidelines) and that no further environmental analysis or documentation is required.

CEQA determination for Option #3:

None required

Project No. 2 – Lake Skinner Bypass Pipeline No. 2 Cathodic Protection – Construction

CEQA determination for Options #1 and #2:

The proposed action is categorically exempt under the provisions of CEQA and the State CEQA Guidelines. The proposed project involves the funding; final design; and minor alterations, reconstruction or replacement of existing public facilities along with the construction of minor appurtenant structures with no expansion of use and no possibility of significantly impacting the physical environment. In addition, the proposed project involves minor modifications in the condition of land, water, and/or vegetation which does not involve removal of healthy, mature, scenic trees. Accordingly, the proposed action qualifies under Class 1, Class 2, Class 3, and Class 4 Categorical Exemptions (Sections 15301, 15302, 15303, and 15304 of the State CEQA Guidelines).

The CEQA determination is: Determine that pursuant to CEQA, the proposed action qualifies under four Categorical Exemptions (Class 1, Section 15301; Class 2, Section 15302; Class 3, Section 15303; and Class 4, Section 15304 of the State CEQA Guidelines).

CEQA determination for Option #3:

None required

**Project No. 3 – Sepulveda Feeder North Cathodic Protection – Final Design Phase; and
Project No. 4 – Second Lower Feeder Cathodic Protection – Final 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 project involves the funding; final design; and minor alterations, reconstruction or replacement of existing public facilities along with the construction of minor appurtenant structures with no expansion of use and no possibility of significantly impacting the physical environment. In addition, the proposed project involves minor modifications in the condition of land, water, and/or vegetation which does not involve removal of healthy, mature, scenic trees. Accordingly, the proposed action qualifies under Class 1, Class 2, Class 3, and Class 4 Categorical Exemptions (Sections 15301, 15302, 15303, and 15304 of the State CEQA Guidelines).

The CEQA determination is: Determine that pursuant to CEQA, the proposed action qualifies under four Categorical Exemptions (Class 1, Section 15301; Class 2, Section 15302; Class 3, Section 15303; and Class 4, Section 15304 of the State CEQA Guidelines).

CEQA determination for Options #2 and #3:

None required

Project No. 5 - Orange County Feeder Cathodic Protection – Preliminary Design Phase

CEQA determination for Option #1:

The proposed action is statutorily exempt under the provisions of CEQA and the State CEQA Guidelines (Section 15282(k)). The maintenance, repair, restoration, removal, or demolition of an existing pipeline as set forth in Section 21080.21 of the Public Resources Code is exempt, as long as the project does not exceed one mile in length. The proposed action is also categorically exempt under the provisions of CEQA and the State CEQA Guidelines. The proposed project involves the funding; design; and minor alterations, reconstruction or replacement of existing public facilities along with the construction of minor appurtenant structures with no expansion of use and no possibility of significantly impacting the physical environment. In addition, the proposed project involves minor modifications in the condition of land, water, and/or vegetation which does not involve removal of healthy, mature, scenic trees. Accordingly, the proposed action qualifies under Class 1, Class 2, Class 3, and Class 4 Categorical Exemptions (Sections 15301, 15302, 15303, and 15304 of the State CEQA Guidelines).

The CEQA determination is: Determine that pursuant to CEQA, the proposed action qualifies under one Statutory Exemption (Section 15282(k) of the State CEQA Guidelines) and four Categorical Exemptions (Class 1, Section 15301; Class 2, Section 15302; Class 3, Section 15303; and Class 4, Section 15304 of the State CEQA Guidelines).

CEQA determination for Options #2 and #3:

None required

Board Options

Option #1

Adopt the CEQA determinations and

- a. Appropriate \$1.12 million;
- b. Award \$274,000 contract to Unique Performance Construction, Inc. to install current drain stations on West Valley Feeder No. 2;
- c. Authorize construction of current drain stations on Lake Skinner Bypass Pipeline No. 2;
- d. Authorize final design of current drain stations for the Sepulveda Feeder North and Second Lower Feeder; and
- e. Authorize preliminary design of cathodic protection for the Orange County Feeder.

Fiscal Impact: \$1.12 million in budgeted funds under Approp. 15441

Business Analysis: These projects will protect Metropolitan’s assets, increase service reliability to member agencies, and reduce the risk of costly emergency repairs.

Option #2

Adopt the CEQA determinations and

- a. Appropriate \$534,000;
- b. Award \$274,000 contract to Unique Performance Construction, Inc. to install current drain stations on West Valley Feeder No. 2;
- c. Authorize construction of current drain stations on Lake Skinner Bypass Pipeline No. 2; and
- d. Do not authorize preliminary and final design of cathodic protection projects on the Sepulveda Feeder North, Second Lower Feeder, and Orange County Feeder.

Fiscal Impact: \$534,000 in budgeted funds under Approp. 15441

Business Analysis: Under this option, staff will continue to monitor stray current levels and will replace current drain stations on an individual basis as warranted. This option could lead to higher costs and more extensive repairs.

Option #3

Do not authorize the cathodic protection projects at this time.

Fiscal Impact: None

Business Analysis: Under this option, staff will continue to monitor levels of stray current and corrosion. This option would forego an opportunity to enhance reliability and extend the service life on five pipelines, and could lead to higher costs, more extensive repairs, and unplanned shutdowns.

Staff Recommendation

Option #1


 _____ 10/26/2011
 Gordon Johnson Date
 Manager/Chief Engineer,
 Engineering Services


 _____ 10/26/2011
 Jeffrey Kightlinger Date
 General Manager

Attachment 1 – Financial Statement

Attachment 2 – Abstract of Bids

Attachment 3 – Location Map

Financial Statement for Conveyance and Distribution System Rehabilitation Program – Phase 2

A breakdown of Board Action No. 36 for Appropriation No. 15441 for five cathodic protection projects for the West Valley Feeder No. 2, Lake Skinner Bypass Pipeline No. 2, Sepulveda Feeder North, Second Lower Feeder and Orange County Feeder¹ is as follows:

	Previous Total Appropriated Amount (Oct. 2011)	Current Board Action No. 36 (Nov. 2011)	New Total Appropriated Amount
Labor			
Studies & Investigations	\$ 2,050,000	\$ 69,500	\$ 2,119,500
Final Design	2,416,400	324,600	2,741,000
Owner Costs (Project mgmt, permitting, bidding process)	3,969,160 ²	168,690	4,137,850
Submittals Review & Record Drwgs	13,100	17,650	30,750
Inspection & Support	1,464,300	38,750	1,503,050
Metropolitan Force Construction	7,746,360 ²	86,150	7,832,510
Materials & Supplies	1,438,100	21,300	1,459,400
Incidental Expenses	770,400	7,500	777,900
Professional/Technical Services	1,543,500	1,500	1,545,000
Equipment Use	228,200	8,000	236,200
Contracts	8,381,730 ²	274,000	8,655,730
Remaining Budget	2,037,750 ²	102,360	2,140,110
Total	\$ 32,059,000	\$ 1,120,000	\$ 33,179,000

Funding Request

Program Name:	Conveyance and Distribution System Rehabilitation Program – Phase 2		
Source of Funds:	Revenue Bonds, Replacement and Refurbishment or General Funds		
Appropriation No.:	15441	Board Action No.:	36
Requested Amount:	\$ 1,120,000	Capital Program No.:	15441-I
Total Appropriated Amount:	\$ 33,179,000	Capital Program Page No.:	281
Total Program Estimate:	\$ 106,335,000	Program Goal:	I-Infrastructure Reliability

¹The total expended to date on the five cathodic protection projects is approximately \$529,000.

²Includes previous reallocation from Remaining Budget to (1) \$115,000 for Upper Feeder Service Connection due to repair of a leaky flange that was discovered during construction; (2) \$30,250 for Calabasas Feeder Stray Current Station due to additional coordination with local agencies during construction; (3) \$840,620 for Calabasas Feeder Stage 2 Repairs due to repair of a broken back PCCP section that was discovered during construction.

The Metropolitan Water District of Southern California
Abstract of Bids Received on September 15, 2011 at 2:00 P.M.
Specifications No. 1695
West Valley Feeder No. 2 Cathodic Protection

The work consists of installing twenty-six stray current drain stations to protect the West Valley Feeder No. 2.

Engineer's Estimate: \$510,000

Bidder and Location	Total	SBE \$	SBE %	Met SBE*
Unique Performance Construction, Inc., Costa Mesa, CA	\$ 274,000	N/A	N/A	N/A
Corrpro Companies Inc., Santa Fe Springs, CA	\$ 288,351	-	-	-
Farwest Corrosion Control Company, Gardena, CA	\$ 405,559	-	-	-
Unispec Construction, Inc., San Pedro, CA	\$ 406,000	-	-	-
J.M. Communications, Inc., Van Nuys, CA	\$ 409,790	-	-	-
Kaveh Engineering & Construction, Inc., Anaheim, CA	\$ 444,888	-	-	-
Mehta Mechanical Co. Inc., dba MMC, La Palma, CA	\$ 548,151	-	-	-
American Construction and Supply, Inc., Corte Madera, CA	\$ 570,715	-	-	-
Garcia Juarez Construction, Inc., Brea, CA	\$ 575,000	-	-	-
EXARO Technologies Corp., Burlingame, CA	\$ 578,000	-	-	-
Henkels & McCoy, Inc., Pomona CA	\$ 774,390	-	-	-

*No SBE (Small Business Enterprise) participation was established for this contract.

Cathodic Protection System

