THE METROPOLITAN WATER DISTRICT OF SOUTHERN CALIFORNIA

BOARD ACTION

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

8/16/2022 Board Meeting

7-3

Subject

Authorize the following new agreements with: (1) Pure Technologies U.S. Inc. in an amount not to exceed $7 million for inspection and monitoring services for prestressed concrete cylinder pipe; and (2) Brown and Caldwell in an amount not to exceed $900,000 for preliminary design to rehabilitate the prestressed concrete cylinder pipe Calabasas Feeder; and authorize an increase of $6 million to an existing agreement with HDR Engineering, Inc. for preliminary design to rehabilitate the Sepulveda Feeder; and adopt CEQA determination that the Calabasas Feeder and Sepulveda Feeder rehabilitation project was previously addressed in the certified 2017 Prestressed Concrete Cylinder Pipe Rehabilitation Program Final Programmatic Environmental Impact Report (This action is part of a series of projects that are being undertaken to improve the supply reliability for State Water Project dependent member agencies)

Executive Summary

The Prestressed Concrete Cylinder Pipe (PCCP) Rehabilitation Program is a comprehensive, long-term effort to manage the rehabilitation of Metropolitan's PCCP feeders. This action authorizes a professional service agreement to provide inspection services for PCCP pipelines to enable monitoring and prioritization of PCCP rehabilitation work. This action also authorizes an engineering services agreement to complete preliminary design to rehabilitate the Calabasas Feeder, which consists entirely of PCCP, and authorizes an amendment to an existing consultant agreement to provide engineering design services to complete preliminary design to rehabilitate the PCCP and steel portions of the Sepulveda Feeder. The Sepulveda Feeder may play a key role in delivering Colorado River Water to the west side of Metropolitan's service area. As such, the design work for this scheduled rehabilitation effort is being advanced at the current time in anticipation of this future use.

Details

Background

In response to several PCCP failures experienced within the water industry, Metropolitan's Board authorized the PCCP Rehabilitation Program in September 2011 to develop a comprehensive, long-term plan for replacement or relining of Metropolitan's at-risk PCCP lines. Metropolitan's strategy for maintaining PCCP reliability consists of four coordinated elements: (1) continued assessment and monitoring of PCCP lines; (2) monitoring of stray currents near PCCP lines and installation of cathodic protection as necessary; (3) near-term repair of PCCP segments as needed; and (4) long-term rehabilitation of priority pipelines. This action authorizes consultant services agreements related to the first and fourth of these PCCP reliability strategies.

Metropolitan currently inspects all 146.4 miles of the PCCP lines within its distribution system every three to seven years. The frequency is based on the condition and history of repairs for each pipeline and operational constraints. The intent of these inspections is to allow staff to proactively monitor the condition of the PCCP lines, identify changes to the pipelines' baseline condition, track prestressing wire breakage over time, and identify distressed PCCP segments. These inspections are a critical component of efforts to prioritize the order of PCCP sections to be relined. At present, electromagnetic inspection continues to be the industry's primary technique for identification of PCCP wire breaks.

Metropolitan has been performing systematic inspections of its PCCP lines since the 1990s. In August 2017, Metropolitan's Board authorized the fourth cycle of PCCP inspections since the inception of the PCCP

Rehabilitation Program. Data from this current cycle of inspections has been used to prioritize and schedule PCCP rehabilitation work, including the recently completed rehabilitations along the Second Lower Feeder and the Allen-McColloch Pipeline. A new cycle of inspections is needed to continue monitoring PCCP conditions and prioritize future rehabilitation work in accordance with the latest available data.

Previous assessments of Metropolitan's 27 PCCP feeders led to five lines being identified as priority lines to be addressed under the PCCP Rehabilitation Program. These priority pipelines include: (1) Allen-McColloch Pipeline; (2) Calabasas Feeder; (3) Rialto Pipeline; (4) Second Lower Feeder; and (5) Sepulveda Feeder. These five lines were selected based on the number of wire breaks, pipeline characteristics, and operating pressures. A proactive, long-term program to rehabilitate these five feeders has been incorporated into Metropolitan's Capital Investment Plan (CIP). This proactive approach begins with preliminary designs to rehabilitate these pipelines, including site investigations, construction sequence planning, and preliminary design drawings. This action authorizes engineering services agreements for preliminary designs for two of these at-risk PCCP pipelines, Calabasas Feeder and Sepulveda Feeder, as discussed below. Due to the current and potential future water supply challenges on the State Water Project, the schedule for relining the north portion of the Sepulveda Feeder has been advanced from its original timeline. This schedule advancement will support the potential future pumping of water from Metropolitan's Central Pool to State Water Project dependent agencies in the San Fernando Valley and Ventura County.

In accordance with the April 2022 action on the biennial budget for fiscal years 2022/23 and 2023/24, the General Manager will authorize staff to proceed with the actions described below, pending board award of the agreements. Based on the current CIP expenditure forecast, funds for the work to be performed pursuant to this action during the current biennium are available within the CIP Appropriation for Fiscal Years 2022/23 and 2023/24. These projects have been reviewed in accordance with Metropolitan's CIP prioritization criteria and were approved by Metropolitan's CIP Evaluation Team to be included in the PCCP Reliability Program.

Electromagnetic Pipeline Inspections and Assessments

Planned activities for the electromagnetic inspections over the next five years include scheduling and coordinating pipeline shutdowns; conducting the electromagnetic inspections; conducting internal visual inspections; shutting down and dewatering the pipelines; returning the pipelines back to service; analyzing the inspection results; and preparing comprehensive inspection reports. The electromagnetic inspections will be performed by Pure Technologies U.S. Inc. (Pure Technologies), as discussed below. Metropolitan staff will conduct the remainder of the activities.

A total of $9.1 million is required for this work. Funds to be allocated include $7 million for the electromagnetic inspections by Pure Technologies; $870,000 for internal visual inspections by Metropolitan forces; $477,000 for shutdown planning and analysis of inspection results over the five-year period; $200,000 for traffic control drawings; $310,000 for local agency permitting and project management; and $243,000 for remaining budget. Traffic control drawings required for local agency permitting will be performed by a specialty firm on an as-needed basis under the General Manager's administrative authority to award contracts of $250,000 or less. See **Attachment 1** for the Allocation of Funds.

Pipeline Inspections (Pure Technologies) – New Agreement

Pure Technologies is recommended to perform electromagnetic inspections of Metropolitan's 146.4 miles of PCCP pipelines. Pure Technologies was prequalified via Request for Qualifications No. 1313 and was selected based upon its demonstrated expertise in this area. The scope of work includes conducting electromagnetic testing of four to six PCCP pipelines per year (averaging 25 miles per year) over a five-year period. After each inspection, the results will be analyzed and compared with previous inspection results to determine the condition of the pipeline based on the number of prestressing wire breaks. The estimated cost for Pure Technologies to perform electromagnetic testing of 125 miles of Metropolitan's PCCP lines over the five-year timeframe is $7 million.

This action authorizes an agreement with Pure Technologies, in an amount not to exceed $7 million, to perform inspections and assessments of PCCP pipelines over a five-year timeframe. Based on the specialized nature of the work, Metropolitan did not establish a Small Business Enterprise (SBE) participation level for this agreement. The planned subconsultant for this work is American Rescue Concepts, LLC.

Calabasas Feeder PCCP Rehabilitation – Preliminary Design

The Calabasas Feeder extends from Chatsworth to the city of Calabasas and delivers treated water to a Las Virgenes Municipal Water District service connection. This 54-inch diameter PCCP line was constructed in 1975, is approximately 9 miles long, and operates at pressures up to 210 pounds per square inch (psi).

In January 2018, Metropolitan's Board authorized preliminary design to rehabilitate the entire length of the Calabasas Feeder. Metropolitan staff initiated this effort and performed assessments of design alternatives, hydraulic analyses, field investigations, utility research, field surveys, and identification of access portal locations. Consultant services are required to finalize preliminary design, identify construction phasing opportunities, prepare construction cost estimates, and complete the preliminary design report.

Planned activities for completion of preliminary design to rehabilitate PCCP portions of the Calabasas Feeder will focus on identifying construction reaches, identifying isolation locations, determining construction packaging and sequencing, locating, and evaluating pipe access sites, developing shutdown requirements, and evaluating construction impacts to the community. These considerations will be addressed in a comprehensive preliminary design report and are recommended to be performed by Brown and Caldwell, as discussed below.

A total of $1.5 million is required for this work. Funds to be allocated include $900,000 for engineering services by Brown and Caldwell; $263,000 for technical review by Metropolitan staff; $254,000 for project management and permitting; $50,000 for value engineering; and $33,000 for remaining budget. See **Attachment 1** for the Allocation of Funds.

Engineering Services (Brown and Caldwell) – New Agreement

Brown and Caldwell is recommended to perform preliminary design for PCCP rehabilitation of the Calabasas Feeder. Brown and Caldwell was selected through a competitive process via Request for Proposal No. 1312 based on the firm's staff expertise, technical approach and methodology, and cost proposal. The planned activities include evaluating information provided by Metropolitan staff, performing calculations, initiating permitting with local agencies, finalizing preliminary design-drawings, developing construction cost estimates, and preparing a preliminary design report.

This action authorizes an agreement with Brown and Caldwell in an amount not to exceed $900,000 to perform preliminary design to rehabilitate the Calabasas Feeder. For this agreement, Metropolitan has established an SBE participation level of 25 percent. Brown and Caldwell has agreed to meet this level of participation. The planned subconsultants for this work are included in **Attachment 2**.

Sepulveda Feeder North Reach - Preliminary Design

The Sepulveda Feeder delivers treated water from the Jensen plant to an interconnection with the Second Lower Feeder in Torrance. This 84-inch to 150-inch diameter, 42-mile-long pipeline was installed in the early 1970s and operates at pressures up to 280 psi. Approximately 35 miles of the feeder is comprised of PCCP. The feeder crosses several freeways, roads, and flood control channels through urban areas of Los Angeles County, passing through areas of corrosive soils and crossing oil and gas pipelines with impressed current corrosion protection systems. Stray currents from cathodic protection systems and prestressed wire breaks are particularly concentrated in the southern 15 miles of the Sepulveda Feeder (South Reach), from Venice Pressure Control Structure (PCS) to the interconnection with the Second Lower Feeder.

In January 2018, Metropolitan's Board authorized preliminary design for Sepulveda Feeder PCCP Rehabilitation. A general preliminary design of the entire Sepulveda Feeder was completed in 2020, and a detailed preliminary design for the more at-risk South Reach was completed in 2021.

In February 2022, Metropolitan's Board authorized preliminary investigations for the West Area Water Supply Reliability Improvements. This project will evaluate the potential to develop two new pump stations along the Sepulveda Feeder (Westside Pump Stations) at the Venice PCS and the Sepulveda Canyon PCS. These pump stations would enable water deliveries north along Sepulveda Feeder, from Metropolitan's Central Pool to the West San Fernando Valley and Ventura County. Initial conclusions from the hydraulic analyses reveal that hydraulic pressures along 19.5 miles of the Sepulveda Feeder north of Venice PCS are likely to increase significantly, putting a greater strain on both existing PCCP and steel pipe sections. This conclusion has prompted a re-prioritization of PCCP rehabilitation work along the Sepulveda Feeder. Originally not planned

until later this decade, staff now recommends proceeding with a detailed evaluation and preliminary design for the northern 20-mile reach of the Sepulveda Feeder, including both steel and PCCP portions of the pipe and appurtenances. This proactive start of preliminary design will ensure that the Westside Pump Stations project does not result in adverse impacts to the Sepulveda Feeder, and that completion of the Westside Pump Stations would not be delayed by PCCP rehabilitation of the Sepulveda Feeder.

Planned activities include preliminary design and the preparation of a design report for the North Reach of the Sepulveda Feeder. Included in the design is the analysis of upgrades needed for the higher pressures if new pumping facilities are constructed for reverse pumping during drought conditions. The rehabilitation work will include relining or replacement of the pipeline, replacement of existing valves, flow meters, appurtenant structures and other work, and the addition of two new valves for seismic risk mitigation. The goal of the planned program is to restore the PCCP portion of the Sepulveda Feeder to a "like new" condition and to increase the structural integrity of the steel pipeline north of Venice PCS to withstand increased hydraulic pumping pressures.

A total of $8.5 million is required for this work. Funds to be allocated include $6 million for engineering services by HDR Engineering, Inc.; $930,000 for surveying, mapping, and technical review by Metropolitan staff; $120,000 for permit fees; $150,000 for shutdown planning; $523,000 for environmental planning, project controls, and project management; and $777,000 for remaining budget. See **Attachment 1** for the allocation of funds.

Preliminary Design Services (HDR Engineering, Inc.) – Agreement Amendment

HDR Engineering, Inc. performed the preliminary design for the South Reach of the Sepulveda Feeder and the final design for the Sepulveda Feeder Reach 2 under board-authorized agreements. HDR is recommended to perform preliminary design services for the 19.5-mile northern portion of the Sepulveda Feeder based on their familiarity with the project and performance to date.

HDR Engineering, Inc. was selected through a competitive process via Request for Proposals No. 1168 based on the firm's experience with PCCP and with large diameter pipelines, and specifically for their expertise in traffic control in dense urban settings and experience in permitting with multiple local agencies. The planned activities include preparation of a preliminary design report and associated drawings for the portion of the Sepulveda Feeder between the Jensen Water Treatment Plant and Venice PCS. The work will include evaluation of the steel portion of the pipeline between Venice PCS and the Santa Monica Feeder, and potential upgrade of previously lined PCCP sections needed to accommodate the higher pressures from the potential West Side Pump Station project.

This action authorizes an increase of $6 million to the existing agreement with HDR Engineering, Inc. for a new not-to-exceed amount of $12.5 million to provide engineering design services to rehabilitate PCCP portions of the Sepulveda Feeder. For this agreement, Metropolitan has established an SBE participation level of 25 percent. HDR Engineering, Inc. has agreed to meet this level of participation. The planned subconsultants for this work are included in **Attachment 2.**

Alternatives Considered

Alternatives considered for completing design activities for the PCCP Rehabilitation Program included assessing the availability of in-house Metropolitan staff to conduct this work. The PCCP Rehabilitation Program's staffing strategy for utilizing consultants and in-house Metropolitan staff has been: (1) to assess current work assignments for in-house staff to determine the potential availability of staff to conduct this work; and (2) for long-term rehabilitation projects, when resource needs exceed available in-house staffing or require specialized technical expertise, typically staff uses project-specific professional services agreements in order to provide a concentrated engineering effort over an extended duration.

This strategy relies on the assumption that in-house engineering staff will handle the baseload of work on capital projects, while professional services agreements are selectively utilized to handle projects above this baseload or where specialized needs are required. This strategy allows Metropolitan's staff to be strategically utilized on projects to best maintain key engineering competencies and to address projects with special needs or issues. After assessing the current workload for in-house staff and the relative priority of this project, staff recommends the use of a professional services agreement for the subject projects. This approach will allow for the completion of not

only these projects, but also other budgeted capital projects within their current schedules and ensure that the work is conducted in the most efficient manner possible.

Summary

This action authorizes two new agreements and authorizes an amendment to an existing agreement related to the PCCP Rehabilitation Program with: (1) Pure Technologies U.S. Inc. in an amount not to exceed $7 million to perform PCCP pipeline inspections and assessments; (2) Brown and Caldwell in an amount not to exceed $900,000 to provide engineering services to rehabilitate PCCP portions of Calabasas Feeder; and (3) an amendment to an existing agreement with HDR Engineering, Inc. in an amount not to exceed $12.5 million to provide engineering services to rehabilitate PCCP and steel portions of the Sepulveda Feeder. See **Attachment 1** for the Allocation of Funds, **Attachment 2** for a Listing of Subconsultants, and **Attachment 3** for the Location Map.

Project Milestones

September 2023 – Completion of preliminary design to rehabilitate Calabasas Feeder

September 2028 – Completion of the fifth round of PCCP inspections

December 2023 – Completion of preliminary design to rehabilitate the Sepulveda Feeder North Reach

Policy

Metropolitan Water District Administrative Code Section 8121: General Authority of the General Manager to Enter Contracts

By Minute Item 48801, dated September 13, 2011, the Board authorized initiation of the PCCP Rehabilitation Program.

By Minute Item 50699, dated January 10, 2017, the Board certified the Final PEIR for the PCCP Rehabilitation Program, and approved the program for the Second Lower Feeder, Sepulveda Feeder, Calabasas Feeder, Rialto Pipeline, and AMP for the purposes of CEQA.

By Minute Item 50919, dated August 15, 2017, the Board authorized the fourth round of electromagnetic inspections of PCCP pipelines.

By Minute Item 51072, dated January 9, 2018, the Board authorized preliminary design to rehabilitate PCCP portions of Calabasas Feeder and Sepulveda Feeder.

By Minute Item 52703, dated February 8, 2022, the Board amended the current CIP to include planning and implementation of West Area Water Supply Reliability Improvements.

By Minute Item 52790, dated April 12, 2022, the Board appropriated a total of $600 million for projects identified in the Capital Investment Plan for Fiscal Years 2022/23 and 2023/24.

California Environmental Quality Act (CEQA)

CEQA determination for Option #1 and Option #2:

The environmental effects from the design, construction, and operation of the proposed project were evaluated in the Prestressed Concrete Cylinder Pipe Rehabilitation Program Final Programmatic Environmental Impact Report (SCH No. 2014121055), which was certified by the Board on January 10, 2017. The Board also approved the Findings of Fact (Findings), the Statement of Overriding Considerations, the Mitigation Monitoring and Reporting Program, and the Program itself. The current actions authorize an increase to the maximum amount payable for an existing agreement and enter into new agreements related to the existing projects, and do not result in any changes to the approved program itself. 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.

CEQA determination for Option #3:

None required

Board Options

Option #1

Adopt the CEQA determination that the Calabasas Feeder and Sepulveda Feeder rehabilitation projects were previously addressed in the certified 2017 Prestressed Concrete Cylinder Pipe Rehabilitation Program Final Programmatic Environmental Impact Report, and:

a. Authorize an agreement with Pure Technologies U.S. Inc. in an amount not to exceed $7 million to perform PCCP pipeline inspections.
b. Authorize an agreement with Brown and Caldwell in an amount not to exceed $900,000 to provide preliminary design engineering services to rehabilitate PCCP portions of Calabasas Feeder.
c. Authorize a $6 million increase to an agreement with HDR Engineering, Inc. for a new not-to-exceed amount of $12.5 million to rehabilitate PCCP and steel portions of the Sepulveda Feeder.

Fiscal Impact: Expenditures of $19.1 million in capital funds. Approximately $13 million will be incurred in the current biennium and has been previously authorized. The remaining capital expenditures will be funded from future CIP budgets following board approval of those budgets.
Business Analysis: This option will advance Metropolitan's long-term plan to rehabilitate PCCP portions of Calabasas and Sepulveda Feeders. This option will also enhance the reliability of Metropolitan's other PCCP feeders and reduce the risk of costly urgent repairs.

Option #2

Adopt the CEQA determination that the Calabasas Feeder and Sepulveda Feeder rehabilitation projects were previously addressed in the certified 2017 Prestressed Concrete Cylinder Pipe Rehabilitation Program Final Programmatic Environmental Impact Report, and:

a. Authorize an agreement with Pure Technologies U.S. Inc. in an amount not to exceed $7 million to perform PCCP pipeline inspections.
b. Do not authorize an agreement with Brown and Caldwell to provide engineering services to rehabilitate PCCP portions of Calabasas Feeder.
c. Do not authorize an amendment to an agreement with HDR Engineering, Inc. to rehabilitate PCCP and steel portions of the Sepulveda Feeder.

Fiscal Impact: Expenditures of $9.1 million in capital funds. Approximately $3.5 million will be incurred in the current biennium and has been previously authorized. The remaining capital expenditures will be funded from future CIP budgets following board approval of those budgets.
Business Analysis: This option will generally enhance the reliability of Metropolitan's PCCP feeders and reduce the risk of costly urgent repairs. However, this option will forego an opportunity to specifically enhance reliability and extend the service life of Calabasas and Sepulveda Feeders. This option could lead to higher repair costs and unplanned shutdowns and outages and could also result in potential delays to the operation of West Side Pump Stations.

Option #3

Do not proceed with PCCP inspections or engineering work to rehabilitate Calabasas Feeder or Sepulveda Feeder at this time.
Fiscal Impact: None
Business Analysis: This option would reduce the monitoring of PCCP pipelines for potential deterioration and would defer PCCP rehabilitation of Calabasas and Sepulveda Feeders, potentially increasing the risk of pipeline failures due to PCCP deterioration. This option could also result in potential delays to the operation of West Side Pump Stations.

Staff Recommendation

Option #1

7/28/2022

John V. Bednarski *Date*
Manager/Chief Engineer
Engineering Services

8/2/2022

Adel Hagekhalil *Date*
General Manager

Attachment 1 – Allocation of Funds

Attachment 2 – Listing of Subconsultants

Attachment 3 – Location Map

Ref# ES12685020

Allocation of Funds for Electromagnetic Pipeline Inspection

	Current Board Action (Aug. 2022)	
Labor		
Studies & Investigations	$	1,247,000
Final Design		-
Owner Costs (Program mgmt., envir. monitoring)		310,000
Submittals Review & Record Drwgs.		-
Construction Inspection & Support		-
Metropolitan Force Construction		-
Materials & Supplies		50,000
Incidental Expenses		50,000
Professional/Technical Services		-
Pure Technologies US, Inc.		7,000,000
Traffic controls consultant		200,000
Right-of-Way		-
Equipment Use		-
Contracts		-
Remaining Budget		243,000
Total	**$**	**9,100,000**

The total amount expended since 2011 for electromagnetic pipeline inspections is approximately $9.6 million. The total estimated cost to complete three cycles of electromagnetic pipeline inspections, including the amount appropriated to date, funds allocated for the work described in this action is anticipated to range from $18 million to $19 million.

Allocation of Funds for Calabasas Feeder PCCP Rehabilitation

	Current Board Action (Aug. 2022)
Labor	
Studies & Investigations	$ 263,000
Final Design	-
Owner Costs (Program mgmt., permitting)	254,000
Submittals Review & Record Drwgs.	-
Construction Inspection & Support	-
Metropolitan Force Construction	-
Materials & Supplies	-
Incidental Expenses	-
Professional/Technical Services	-
Brown and Caldwell	900,000
VE Consultant	50,000
Right-of-Way	-
Equipment Use	-
Contracts	-
Remaining Budget	33,000
Total	**$ 1,500,000**

The total amount expended to date to rehabilitate PCCP on the Calabasas Feeder is approximately $1.8 million. The total estimated cost to complete the rehabilitation of this pipeline, including the amount appropriated to date, funds allocated for the work described in this action, and future construction costs, is anticipated to range from $122 million to $142 million.

Allocation of Funds for Sepulveda Feeder PCCP Rehabilitation

	Current Board Action (Aug. 2022)
Labor	
Studies & Investigations (survey, tech. oversight)	$ 930,000
Final Design	-
Owner Costs (Program mgmt., envir. monitoring)	523,000
Submittals Review & Record Drwgs.	-
Construction Inspection & Support	150,000
Metropolitan Force Construction	-
Materials & Supplies	-
Incidental Expenses	120,000
Professional/Technical Services	-
HDR Engineering, Inc.	6,000,000
Right-of-Way	-
Equipment Use	-
Contracts	-
Remaining Budget	777,000
Total	**$ 8,500,000**

The total amount expended to date to rehabilitate PCCP on the Sepulveda Feeder is approximately $27.92 million. The total estimated cost to complete the rehabilitation of this pipeline, including the amount appropriated to date, funds allocated for the work described in this action, and future construction costs, is anticipated to range from $700 million to $800 million.

The Metropolitan Water District of Southern California

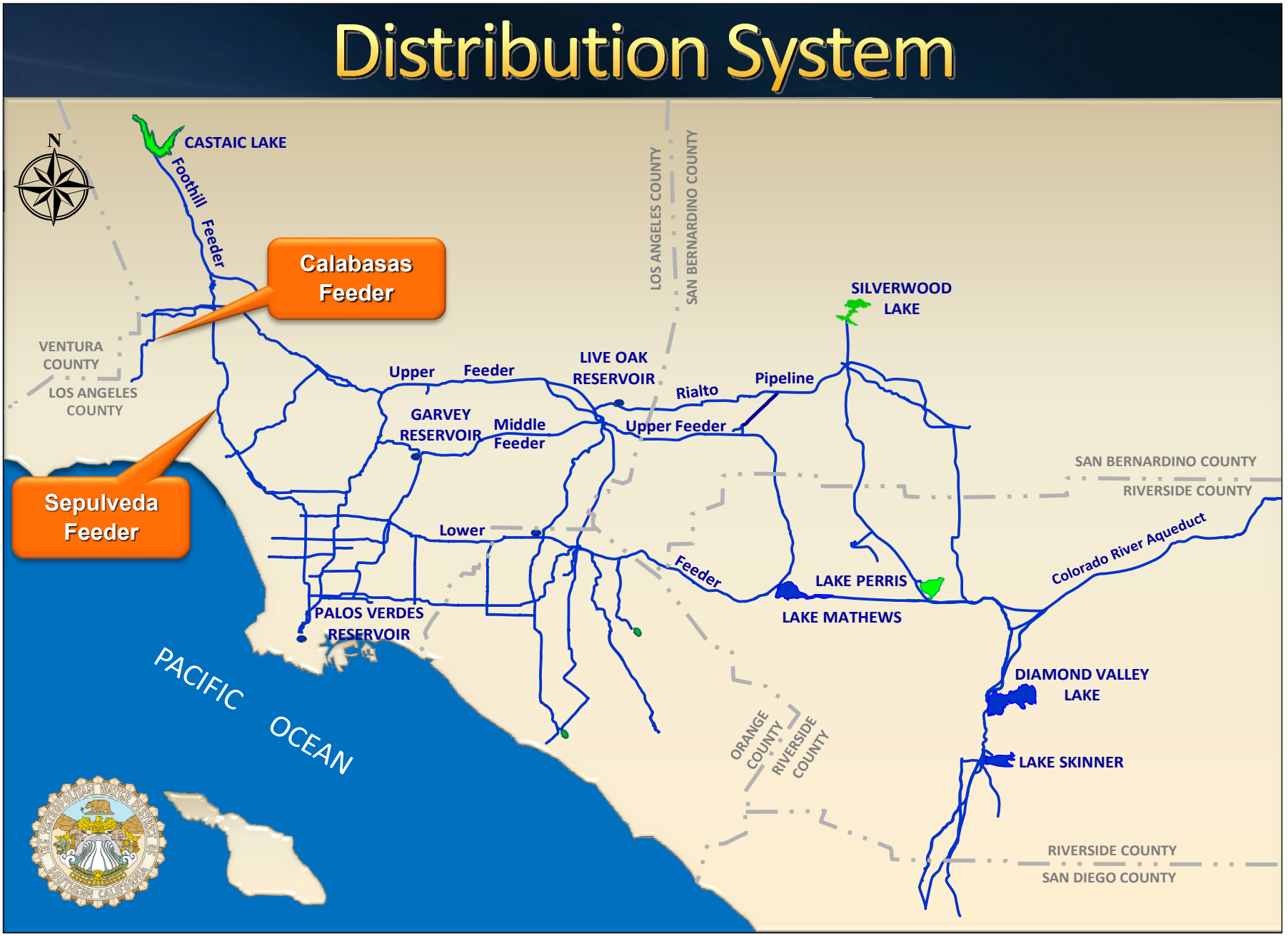
Subconsultants for Agreement with Brown and Caldwell
Calabasas Feeder PCCP Rehabilitation

Subconsultant
Boudreau Pipeline Corporation Corona, CA
Dewberry Long Beach, CA
DH Environmental Lake Forest, CA
DRP Engineering Monterey Park, CA
FPL & Associates Irvine, CA
Lettis Consultants International Valencia, CA
Ninyo & Moore Irvine, CA
Scott Foster Engineering La Canada, CA

The Metropolitan Water District of Southern California

Subconsultants for Agreement with HDR Engineering, Inc.
Sepulveda Feeder PCCP Rehabilitation

Subconsultant
Brierley Associates Corp. Denver, CO
C Below, Inc. Chino, CA
CDM Smith, Inc. Boston, MA
Cotton, Shires & Associates, Inc. Thousand Oaks, CA
DRP Engineering, Inc. Alhambra, CA
Henry H. Bardakjian Glendale, CA
KOA Corporation Monterey Park, CA
Scott Foster Engineering, Inc. La Canada Flintridge, CA
SC Solutions Sunnyvale, CA


Distribution System
N
CASTAIC LAKE
Foothill Feeder
Calabasas Feeder
Sepulveda Feeder
VENTURA COUNTY
LOS ANGELES COUNTY
LOS ANGELES COUNTY
SAN BERNARDINO COUNTY
SILVERWOOD LAKE
LIVE OAK RESERVOIR
Upper Feeder
Rialto Pipeline
GARVEY RESERVOIR
Middle Feeder
Upper Feeder
SAN BERNARDINO COUNTY
RIVERSIDE COUNTY
Lower Feeder
Colorado River Aqueduct
LAKE PERRIS
LAKE MATHEWS
PALOS VERDES RESERVOIR
PACIFIC OCEAN
DIAMOND VALLEY LAKE
ORANGE COUNTY
RIVERSIDE COUNTY
LAKE SKINNER
RIVERSIDE COUNTY
SAN DIEGO COUNTY