

THE METROPOLITAN WATER DISTRICT OF SOUTHERN CALIFORNIA

Board Report

Engineering Services Group

• Engineering Services Monthly Activities for May 2024

Summary

This monthly report provides a summary of Engineering Services Group activities for May 2024 in the following key areas:

- Distribution System Reliability Program
- Prestressed Concrete Cylinder Pipe (PCCP) Reliability Program
- Colorado River Aqueduct (CRA) Reliability Program
- Treatment Plant Reliability Program
- System Reliability Program
- Safety of Dams
- Value Engineering Program
- Pure Water Southern California Program
- System Flexibility/Supply Reliability
- Partner with Interested Parties and the Communities We Serve

Purpose

Informational

Attachments

Attachment 1: Detailed Report - Engineering Services Group's Monthly Activities for May 2024

Engineering Services Key Activities Report May 2024

Engineering Services manages and executes projects within the Capital Investment Plan (CIP) to maintain infrastructure resiliency, ensure regulatory compliance, enhance sustainability, and provide flexibility in system operations to address uncertain water supply conditions.

Recent activities on CIP programs and other key engineering functions are described below.

Protect public health, the regional economy and
Metropolitan's assets

Distribution System Reliability Program

This capital program maintains reliable water deliveries through specific rehabilitation and upgrade projects on Metropolitan's pipelines, reservoirs, and control structures. Recent activities include the following:

- Garvey Reservoir Rehabilitation—This project will replace the aging reservoir floating cover and liner, structurally strengthen the inlet/outlet tower, upgrade the on-site water quality laboratory building, rehabilitate the junction structure, and replace the existing standby generator and a portion of the security perimeter fence. The draft Environmental Impact Report (EIR) for this rehabilitation effort, is scheduled to be released in July 2024, which will be followed by a presentation to the Monterey Park City Council. Final design is approximately 28 percent complete and is scheduled to be complete in April 2025.
- Foothill Hydroelectric Plant and Control Building Seismic Upgrade—This project rehabilitates and strengthens the Foothill Hydroelectric Plant and Control Building to withstand a major earthquake and retain its functionality as an essential facility. A construction contract was awarded in April 2023. The contractor completed the structural strengthening of the roof and began installation of shoring soldier piles around the building. Construction is approximately 55 percent complete and is scheduled to be complete in December 2024.

- Upgrades at Three Sepulveda Feeder Structures—This project replaces deteriorated electrical components, makes other upgrades at three Sepulveda Feeder underground structures, and installs two blind flanges after removing a spool on the West Valley Feeder No. 1. The contractor completed installation of the power pedestal, lighting, and receptacles in all vaults and cutover of electrical devices to the new power pedestal. Construction is complete and a notice of completion was issued in May 2024.
- Santa Monica Feeder Cathodic Protection—This project will install cathodic protection for the Santa Monica Feeder to address corrosion observed during a 2018 inspection of the pipeline. This project will install two 400-foot-deep anode wells along with rectifiers and remote monitoring equipment along the feeder. The project has been advertised and a construction contract is scheduled for board award in June 2024.

Prestressed Concrete Cylinder Pipe (PCCP) Reliability Program

This capital program was established to enhance the reliability of Metropolitan's water distribution system and to reduce the risk of costly emergency repairs of PCCP. The priority pipelines included in the program are the Second Lower Feeder, Sepulveda Feeder, Calabasas Feeder, Rialto Pipeline, and the Allen-McColloch Pipeline. A total of 100 miles of PCCP pipelines will be refurbished under this multi-year program. Recent activities include the following:

- Allen-McColloch Pipeline Urgent PCCP Rehabilitation—This project will perform urgent relining of approximately three miles of distressed PCCP segments of the Allen-McColloch Pipeline (AMP) that were discovered during an inspection in 2023. Relining of the AMP is being performed in stages to minimize impacts to member agencies by installing a bulkhead and returning the northern portion of the pipeline to service while the southern portion remains under construction. Stage 1 includes carbon fiber reinforced polymer (CFRP) lining of four segments and steel relining of approximately 4,500 feet of pipeline. Construction of the CFRP and 2,100 feet of steel liner within the northern portion of the AMP was successfully completed in April 2024. The remaining 2,300 feet of steel liner installation in the southern portion is underway and will be completed by October 2024. Stage 2 work consists of 12,600 feet of steel liner installation and appurtenant work. The Board awarded the Stage 2 contract in May 2024, and pipeline work is planned to be complete by December 2024.
- Valve Warehouse—This project constructs an 18,160 square-foot pre-engineered metal building on a reinforced concrete slab at Lake Mathews for valve and equipment storage related to the PCCP relining program. The contractor has completed the assembly of the building structure, the water line tie-in for the building, and installation of the fire water pipe and building sprinkler system. Construction is 98 percent complete and is scheduled to be complete by June 2024.
- Electromagnetic Inspections—Regular inspections of the PCCP feeders are a critical step in evaluating the condition of each pipeline and assist staff in prioritizing the relining work on each feeder. This project conducts the fifth cycle of electromagnetic and visual inspections of Metropolitan's approximate 146.4 miles of PCCP pipelines. The San Jacinto Pipeline was inspected in March 2024. The results were recently analyzed and indicate that no urgent repairs are needed.

Colorado River Aqueduct (CRA) Reliability Program

This capital program maintains the reliability of Metropolitan's CRA conveyance system. Recent activities include the following:

- **Conduit Structural Protection**—This project consists of installing new reinforced concrete slab protection crossings over portions of the cut-and-cover conduits on the Colorado River Aqueduct. Metropolitan's Board awarded a construction contract in April 2024. The contractor is currently performing grading and installing protective crossings and retaining walls at the remaining two sites, as well as installing load restriction signs and Caltrans markers at all sites. Construction is 90 percent complete. While the contractual completion date is January 2025, all work is currently expected to be complete ahead of schedule in June 2024.
- Overhead Cranes—This project consists of replacing the overhead bridge cranes and retrofitting the support structures within the pump bays located at all five of Metropolitan's Colorado River Aqueduct pumping plants. The contractor has completed the installation of the new cranes at the Gene, Iron Mountain, Eagle Mountain, and Hinds pumping plants. Installation of the new crane at the Intake pumping plant began in April 2024. Testing and startup of the crane at Intake is underway. Construction is 97 percent complete and is scheduled to be complete in June 2024.
- Main Pump Access Improvements—This project will enhance access for maintenance activities on the main pumps at each of the five CRA pumping plants. Improvements will consist of new platform systems, fixed ladders, elevated walkways, and guardrails for pump plant staff to perform both routine and as-needed maintenance. Preliminary design is 60 percent complete and is scheduled to be complete in December 2024.



Conduit Structural Protection—Concrete girder installation at aqueduct tunnel portal access road

Treatment Plant Reliability Program

This capital program was initiated to maintain reliability and improve the operating efficiency of Metropolitan's water treatment plants through specific improvement projects. Recent activities include the following:

- Weymouth Basins 5–8 and Filter Building No. 2 Rehabilitation—This project rehabilitates major mechanical and structural components of Basins 5–8 and Filter Building No. 2 at the Weymouth plant, including the flocculation/sedimentation equipment, sludge pumps, baffle boards and walls, launders, inlet gates, and outlet drop gates. Rehabilitation work also includes seismic upgrades of basin walls and inlet channel, hazardous material abatement, and replacement of filter valves and actuators in Filter Building No. 2. The contractor completed all rehabilitation work in Basins 7 and 8, and continued construction activities in Basins 5 and 6 and Filter Building No. 2. Overall construction for this contract is approximately 65 percent complete and is scheduled to be complete in June 2025.
- Weymouth Administration Building Upgrades—This project upgrades the Weymouth Administration Building to withstand a significant earthquake. The planned upgrades include structural strengthening consistent with current seismic standards for essential facilities as well as accessibility and fire/life safety improvements, architectural modifications near the areas of structural upgrades, and improvements associated with the preservation of historic architectural features. Final design is approximately 45 percent complete and is scheduled to be completed in April 2025.
- Mills Electrical Upgrades—This project upgrades the electrical system with dual-power feeds to key process equipment to comply with current codes and industry practice, improve plant reliability, and

enhance worker safety. Stage 1 construction is complete. Stage 2 improvements will add a second incoming 12 kV service from Riverside Public Utilities, reconfigure the existing 4160-volt switchgear, and replace the standby generator switchgear and the emergency generator programmable logic controller. The contractor completed installation of the electrical conduits at the standby generator building, cable trays and fixtures inside the ORP Switchgear Building, and continued the fiber optic cable and electrical conduit installation. Construction is approximately 55 percent complete and is scheduled to be complete in August 2025.

• Jensen Ozone PSUs Replacement—This project rehabilitates the ozone generation system at the Jensen plant by replacing four existing ozone power supply units (PSUs) and four sets of generator dielectrics. The project also makes required modifications to the associated electrical, control, and cooling water systems. Metropolitan's Board awarded a construction contract in June 2022. All PSUs and dielectrics have been manufactured and delivered. Replacement of the PSUs has been staged to ensure continuous use of ozone during construction. The contractor completed replacement of two PSUs and the ozone generator dielectrics and is currently finishing installation and startup testing of the two remaining PSUs and PSU chiller pipeline modifications. Construction is approximately 95 percent complete and is scheduled to be complete in July 2024.



Termination of Power Supply Control Wires



Weymouth Basins 5–8 and Filter Building No. 2 Rehabilitation Coating abatement at Basin 6 clarifier bridges



Weymouth Basins 5–8 and Filter Building No. 2 Rehabilitation Dismantling backwash piping at filter gallery for installation of new 30-inch backwash valve

System Reliability Program

The System Reliability Program consists of capital projects to improve or modify facilities located throughout Metropolitan's service area to use new processes and/or technologies and improve facility safety and overall reliability. Recent activities include the following:

- Headquarters Physical Security Upgrades—This project implements comprehensive security upgrades for the Metropolitan Headquarters Building. These upgrades are consistent with federally recommended best practices for government buildings. The work has been prioritized and staged to minimize rework and impacts on day-to-day operations within the building. Stage 1 work is complete and provides enhanced security related to perimeter windows and doors. Stage 2 work is complete and provides security system upgrades inside the building with a focus on the main entry rotunda area, boardroom, executive dining lounge, and security control room. Construction of Stage 3 improvements is underway and will provide security system upgrades around the perimeter of the building. The contractor continued installation of the ornamental fence within the courtyard and concrete placement for the fixed bollards. Construction is 80 percent complete and is scheduled to be complete in August 2024.
- Headquarters Building Fire Alarm and Smoke Control System Upgrades—This project upgrades the Metropolitan Headquarters Building fire life safety systems, which includes replacement of the fire detection and alarm system and HVAC system improvements for smoke control. The fire alarm and smoke control systems in Metropolitan's Headquarters Building provide detection, notification, and control of building functions so that occupants and visitors can safely exit in the event of a fire. The contractor continued final testing and sign-off of the fire alarm and smoke control systems by the LAFD and Los Angeles Department of Building and Safety. Construction is 99 percent complete and will be complete upon final certification by these agencies.
- SCADA System Upgrades—This project will upgrade Metropolitan's entire control system in incremental stages, spanning the Colorado River Aqueduct, the five water treatment plants, and the conveyance and distribution system. The first stage of this project replaces the control system at the Mills plant, starting with a pilot effort on one of the plant's remote terminal units to demonstrate the proposed technology and the consultant's approach for the plant and the overall project. Staff continued evaluating the results of the recently installed pilot equipment. The pilot phase is approximately 99 percent complete and is scheduled to be complete in July 2024. The system upgrades at the Mills plant are scheduled to be complete in October 2026.



Headquarters Physical Security Upgrades-Exterior Security-Slab Concrete Placement Bollards

Protecting the Public and Metropolitan's Assets-Safety of Dams

Metropolitan and Dam Safety Program Manager Bashar Sudah were recognized for dam safety excellence during the 2024 United States Society on Dams (USSD) annual conference in Seattle during the last week of April. USSD is the one of the largest dam associations in the US, and the conference was attended by approximately 800 dam safety professionals from the US and around the world. Both Bashar and Metropolitan received USSD's 2024 annual award for Public Safety, Security, and Emergency Management.



Value Engineering Program

Dam Safety Program Manager at USSD Conference

CRA Power Cable Units 6-9 Replacement-Contracting Workshop

In early May, Engineering completed an internal Contracting Workshop to determine the best contracting strategy and construction work schedule to successfully complete the CRA Power Cable Units 6–9 Replacement Project. This 3-day hybrid workshop, including a trip to the Hinds Pumping Plant, involved Metropolitan staff from Engineering, General Counsel, and Operations.



Hinds Pumping Plant Switch House

Diemer Water Treatment Plant Filter & Chemical Systems Rehab-VE-CR Workshop

In late May, Engineering began a joint Value Engineering (VE) and Constructability Review (CR) workshop for four projects at the Diemer Water Treatment Plant. Three projects, including (1) Filter Rehabilitation, (2) Filter Valve Actuator Refurbishment, and (3) Chemical Tank Farm Improvements, are in final design and are expected to be in construction concurrently; the fourth project, Chemical Feed System Improvements, is in preliminary design. This VE-CR workshop examined strategies to best coordinate these four projects over three construction contracts with overlapping construction schedules, limited access, and available laydown areas. The VE-CR team included Metropolitan and consultant staff specializing in construction management, construction costs, and scheduling. This 5-day hybrid workshop included on-site meetings at the Diemer plant.



Robert B. Diemer Water Treatment Plant

Adapt to changing climate and water resources

Pure Water Southern California

The Pure Water Southern California (PWSC) Program is a large regional recycled water project that will provide a new local source of safe and reliable drinking water for Southern California. PWSC currently focuses in four areas: demonstration testing, environmental planning, technical studies, and preliminary design of initial pipeline reaches. PWSC will produce 150 million gallons per day (mgd) of purified water from the Advanced Water Purification Facility (AWPF) in Carson, for indirect potable reuse (IPR) and direct potable reuse (DPR) applications, with the initial deliveries by 2030 and completion by 2035.

- **Demonstration Testing:** Demonstration testing began in 2019 with N-only tertiary membrane bioreactor (tMBR) testing completed in 2021 and secondary MBR (sMBR) testing completed in 2023. Modifications for tMBR optimization testing have been completed. The system is online and currently operating in the nitrification/denitrification mode.
- Environmental Planning: The Environmental Planning Phase began in 2020 with the goal of preparing an Environmental Impact Report (EIR) for approval in 2025. Various technical studies have been prepared to support the effort. The draft EIR is currently scheduled for publication in late 2024 or early-2025, with board certification of the document in the third quarter of 2025. Staff continues to review individual draft technical sections and to prepare the few remining technical studies.
- **Program Management:** PWSC program management efforts lead the planning for the Program, including project controls, scheduling, budget development, risk management, coordination with Program partners and stakeholders, grants and funding, and preparation of various plans and studies.
 - A PWSC cost estimate update was presented to the PWSC/Regional Conveyance Subcommittee in November 2023 with a cost estimate methodology technical memorandum documenting cost methodology details developed for the AWPF and conveyance systems and provided to the Subcommittee in January 2024.
 - A draft construction sequencing memorandum has been prepared to identify the milestones and construction contracts needed to meet the projected completion of the AWPF, the backbone pipeline, and full delivery for IPR in 2032. The memorandum will be finalized after the impacts of the Large-Scale Water Recycling (LSWR) grant and Los Angeles County Sanitation Districts' (LACSD's) MBR responsibilities are determined.
 - An LSWR grant application requesting \$125 million was submitted to the US Bureau of Reclamation (USBR) in November 2023. Successful applicants are expected to be notified in May 2024. To receive funding, Metropolitan prepared and submitted a feasibility study in January 2024 to meet the USBR requirements. A single comment was received, and a response has been submitted.

- A summary of LSWR funding and budget impacts was presented to the Subcommittee in March 2024. Up to \$500 million in total PWSC spending will be required if the full \$125 million grant request is provided.
- Advanced Water Purification Facility: The AWPF will purify wastewater from LACSD's A.K Warren facility (formerly the JWPCP) using membrane bioreactors (MBRs), reverse osmosis (RO), and ultraviolet/advanced oxidation (UV/AOP).
 - A draft conceptual facilities plan has been prepared to document key assumptions of AWPF components. The draft plan has been reviewed and a final draft is currently being prepared.
 - The progressive design build implementation methodology will be employed to design and construct the treatment plant facilities.
 - A proposed Request for Qualifications (RFQ) from qualified firms to design and construct the AWPF is scheduled for the third quarter of 2024. Authorization of this procurement is planned for late 2024, pending award of federal grant funds.
 - The AWPF team has finalized the Method of Services (MOS) study agreements with Southern California Edison (SCE) for SCE to evaluate SCE infrastructure needed to meet AWPF power requirements. The MOS investigation should be complete in the next four to five months.
 - The AWPF team met with several water districts to discuss relevant operational practices and lessons learned for product water stabilization.
- Direct Potable Reuse (DPR): The California Division of Drinking Water (DDW) published the final DPR regulations in December 2023. Metropolitan has completed bench-scale testing to screen the potential DPR treatment processes that could be used for the program. Planning of pilot-scale testing is in progress. A technical workshop was held with the Independent Scientific Advisory Panel (ISAP) on March 5 and 6, 2024, to discuss bench-scale testing data and proposed DPR treatment train. A DPR white paper is being developed to establish Metropolitan's DPR implementation approach via the PWSC Program. The white paper is currently in review. Potential opportunities for treated water augmentation (TWA) are also be investigated and a technical memorandum is being prepared.
- Conveyance Pipeline System: The program's backbone conveyance system consists of over 40 miles of pipeline and two pump stations. Metropolitan's Board authorized consulting agreements for preliminary design of the first two pipeline reaches in March 2023. Metropolitan surveyors used a new high-definition mobile LiDAR system, which is mounted to the back of a truck, to survey all 14 miles of the proposed alignment for Reaches 1 and 2 in one day. This device captures over 500,000 survey measurements per second. The data is being processed and will assist with project planning and preliminary design.
 - Reach 1—This reach is approximately 6 miles long and runs through the city of Carson. Current work includes utility field investigation and geotechnical work, as well as the completion of the draft preliminary design report and associate engineering drawings. Preliminary design is 60 percent complete and is scheduled to be complete by late 2024.

 Reach 2—This reach is approximately 8 miles long and runs through the cities of Long Beach and Lakewood. Current work includes utility field investigation and geotechnical work, as well as coordination with Caltrans and other permitting entities for the major tunnel crossing of the I-710 and Los Angeles River. Preliminary design is 25 percent complete and is scheduled to be complete by late 2024.

System Flexibility | Supply Reliability Program

Projects under this capital program will enhance the flexibility and/or increase the capacity of Metropolitan's water supply and delivery infrastructure to meet current and projected service demands. Projects under this program address climate change affecting water supply, regional drought, and alternative water sources for areas dependent on State Project Water.

- Wadsworth Pumping Plant Bypass—This project installs a bypass pipeline and an isolation valve to interconnect the Wadsworth Pumping Plant with the Eastside Pipeline. This is one of several projects needed to deliver water from Diamond Valley Lake (DVL) to the Rialto Pipeline. The contractor completed all pipeline tie-in work during a shutdown in April 2024. Remaining work consists mostly of installing long-lead electrical items. Construction is approximately 85 percent complete and is scheduled to be complete in July 2025.
- Inland Feeder-Badlands Tunnel Surge Protection—This project installs a new open-to-atmosphere surge tank at the south portal of the tunnel, which will protect the Inland Feeder from hydraulic transients when pumping water from DVL to the Rialto Pipeline through the Inland Feeder. The contractor has mobilized and started foundation excavation. Construction is approximately 5 percent complete and is scheduled to be complete in August 2025.
- Inland Feeder-Rialto Pipeline Intertie—This project installs an interconnection pipeline and isolation valve structure between the Inland Feeder and Rialto Pipeline, so that water can be delivered from DVL to the Rialto Pipeline. The contractor has mobilized and started shoring installation. Construction is approximately 10 percent complete and is scheduled to be complete in March 2025.
- Sepulveda Feeder Pumping Stations, Stage 1—This project installs new pump stations at the existing Venice and Sepulveda Canyon pressure control facilities, providing the ability to reverse flow in the Sepulveda Feeder and deliver 30 cubic feet per second from the Central Pool to portions of the Jensen plant-exclusive area. This project utilizes a progressive design-build (PDB) project delivery method. The Board awarded a Phase 1 PDB agreement in September 2023. The contractor and Metropolitan are coordinating with both Southern California Edison and the Los Angeles Department of Water and Power on upgrades to the incoming power service at both locations. Phase 1, which includes site investigation, design to the level needed to develop a guaranteed maximum price, environmental planning, and preparation of long-lead-item procurement documents, is scheduled to be complete in September 2024. The design-build firm is obtaining procurement bids on the long-lead equipment. Summer and Fall 2024 board actions are planned to procure this equipment.



Bureau of Reclamation-Glen Canyon Dam Support

Glen Canyon Dam, which forms Lake Powel, is a concrete arch dam constructed as one of the storage units of the Colorado River Storage. Water can be released from Glen Canyon Dam through the penstocks, river outlet works, and spillways. At lower lake elevations, the river outlets must be used. However, these outlets were not initially designed for long-term water conveyance. Metropolitan assembled a team of twelve engineers to review and assist the Bureau of Reclamation address concerns with low-water operation of the Glen Canyon Dam. Two primary concerns were outlined in the discussion. The potential for cavitation damage in the river outlet works and the impact of sediment scour, and sediment deposition generated from the operation of the river outlet works on the powerplant. On April 30, 2024, four team members attended a meeting at the Denver Federal Center in Lakewood, Colorado. They learned that the Bureau has constructed two models to study the system. Based on this information, the Bureau plans to consider physical system modifications or operational modifications to sustain long-term releases through Glen Canyon Dam's river outlets. As operation at low elevations is essential for Metropolitan's ability to receive water supplies in the future, Metropolitan staff will remain engaged with Bureau of Reclamation technical staff to understand and vet the best approaches to allow reliable and sustainable water deliveries from Lake Powell.



June 2024 Engineering Services Group Monthly Report

Engineering News Record's Ground Braking Women in Construction Conference

At Engineering News Record's Ground Braking Women in Construction Conference, over 700 hundred attendees shared the latest developments, innovative practices, and emerging trends in the construction industry with a focus on empowering women in all sectors of the construction industry. Mai Hattar, Assistant Group Manager for Engineering Services, moderated a panel which discussed the role of the public sector in addressing the challenges of climate change and infrastructure management. Panel members from US General Services Administration Region 9, the Port Authority of New York and New Jersey, Los Angeles World Airports, and the City of South Bend, highlighted the generational projects and transformational policies underway at their agencies.



Assistant Group Manager Mai Hattar (seated far right) at Groundbreaking Women in Construction Conference



From left to right: Yvette Roque, Mai Hattar, Elisha Alejandre, and Valerie Maciel Groundbreaking Women in Construction Conference

Member Agency Engineering Manager Annual Meeting

Engineering staff planned and held our Member Agency Engineering Manager annual meeting at Long Beach Utilities on May 9. The meeting was attended by more than 40 engineering managers from 20 Member Agencies. The attendees discussed ongoing challenges, Metropolitan's coatings and construction management expertise, Long Beach Utility's water replenishment program, City of San Fernando's recently completed stormwater capture project, and tips for engineers when communicating with our elected and appointed governing boards. The group will meet next year at Western Municipal Water District's offices in Riverside.



Member Agency Engineering Managers Forum

2024 State Apprenticeship Contest

As part of outreach efforts associated with the Project Labor Agreement, John Bednarski, John Vrsalovich, and Doaa Aboul-Hosn attended the 2024 State Apprenticeship Contest on April 25 at A & J `Training Center in Santee, California, sponsored by the A & J Training trust for pipe trades. Top apprentices from United Association local unions from across California competed in the contest, which took place on April 24 and 25 in the categories of HVAC-R, irrigation pipefitting, general pipefitting, plumbing, sprinkler fitting, and welding. The winners from each category compete in a regional contest to display their talents all in one place.



2024 State Apprenticeship Contest

Operations—Engineering Partnership

Since 2019, Engineering and Operations staff have conducted a formal partnering program to foster open and frequent communication at all levels, proactively enhance our business processes, and collaborate as a team to provide the best possible solutions for Metropolitan. The partnering working group is committed to the values of safety, communication, reliability, teamwork, and stewardship. The ninth workshop was hosted by Conveyance and Distribution's Western Region Unit at Soto Street and focused topics of interest in this area. The attendees from Engineering, Operations, and Safety, Regulatory, and Training Services discussed safety, system operations, project prioritization, Engineering's lessons learned program, and the success of the recent Upper Feeder San Gabriel Tower inspections. Breakout sessions in five topic areas allowed small groups to brainstorm process enhancements and prioritize projects.



Engineering and Operations Partnering-Western Region Workshop