THE METROPOLITAN WATER DISTRICT OF SOUTHERN CALIFORNIA

Board Report

Engineering Services Group

- **Engineering Services Monthly Activities Report for February 2024**

Summary

This monthly report for the Engineering Services Group provides a summary of activities for February 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
- Protecting the Public and Metropolitan's Assets
- Pure Water Southern California Program
- System Flexibility/Supply Reliabillity
- American Society of Civil Engineers (ASCE) Engineers Week—Girl Day

Purpose

Informational

Attachments

Attachment 1: Detailed Report—Engineering Services Group's Monthly Activities for February 2024

Date of Report: March 11, 2024

Engineering Services Key Activities Report

February 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:

- La Verne Shops Building Completion Stage 4 – This project will complete the La Verne Shops building improvements and install Metropolitan-furnished shop equipment. The contractor continued installing electrical conduits for branch circuits and accessways for the new electrical ductbank, and began installing reinforcing steel for the new blast booth, foundation concrete formwork for the blast booth pit walls, new underground natural gas lines. Construction is approximately 78 percent complete and is scheduled to be complete in August 2024.
- Orange County Feeder Lining Repairs – This project replaces the deteriorated internal lining along an 11-mile portion of the Orange County Feeder within the cities of Santa Ana, Costa Mesa, and Newport Beach. Rehabilitation was completed in mid-February.
- 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. Final design is approximately 18 percent complete and is scheduled to be complete in April 2025. A notice of preparation was issued in January 2024 for the environmental documentation for this rehabilitation effort, and a presentation to the Monterey Park city council was made on this same subject.

- Lakeview Pipeline Rehabilitation, Stage 2 – This project will rehabilitate approximately 3.7 miles of 11-foot-diameter steel pipe. Final design is approximately 70 percent complete and is scheduled to be complete by July 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:

- Second Lower Feeder Valves – This procurement contract provides 13 conical plug valves for the Second Lower Feeder PCCP rehabilitation. Metropolitan's Board awarded a procurement contract for the valves in December 2018. Ten valves have been delivered as of January 2024. The eleventh and twelfth valves are scheduled to be shipped in the Fall of 2024. Fabrication of the final valve will be completed in late 2024 and delivery is projected for early 2025.
- Second Lower Feeder PCCP Rehabilitation Reach 3B – This project installs steel lining and three conical plug valves (described above) along a 3.7-mile-long portion of the Second Lower Feeder that traverses the cities of Lomita, Los Angeles, and Torrance. A temporary bypass line serving two service connections at the Palos Verdes Reservoir was completed and placed into service. Dewatering of the Second Lower Feeder was completed, the pipeline turned over to the contractor, and rehabilitation of the pipeline is in progress. The current shutdown is scheduled to be complete in April 2024. A second shutdown is planned for next winter. Construction is 42 percent complete and is scheduled to be completed in September 2025.
- Lake Mathews PCCP Valve Warehouse – This project constructs a 18,160 square-feet pre-engineered metal building on a reinforced concrete slab at Lake Mathews for valve and equipment storage related to the PCCP Rehabilitation Program. The contractor is currently installing the 10-inch fire protection line and the building fire sprinkler system. Construction is 97 percent complete and is scheduled to be complete in May 2024.
- Sepulveda Feeder Reach 1 – This project rehabilitates PCCP segments of the Sepulveda Feeder. Reach 1 of the Sepulveda Feeder spans 4.7 miles through several cities including the cities of Hawthorne, Inglewood, and Los Angeles. Final design is approximately 75 percent complete and is scheduled to be complete in June 2024.
- Electromagnetic Inspection – 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. Inspections of the West Valley Feeder No. 2 and Calabasas Feeder were completed in January 2024 and inspection reports received in March 2024.

Colorado River Aqueduct (CRA) Reliability Program

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

- Flow Level Monitoring Stations – This project will install 12 flow monitoring stations at remote locations along the Colorado River Aqueduct. The contractor has delivered two precast concrete to the construction site. The contractor is currently placing concrete for the building slab and excavating for installation of the electrical ductbanks. Construction is nine percent complete and is scheduled to be complete in July 2024.
- Overhead Cranes Replacement – 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 will begin in April, following the March 2024 CRA Shutdown. Construction is 80 percent complete and is scheduled to be complete in June 2024.
- CRA Storage Buildings – This project furnishes and installs storage buildings at Hinds, Eagle Mountain, and Iron Mountain and constructs associated site improvements. The contractor has mobilized at Iron Mountain and Eagle Mountain and is performing initial site work. Construction is five precent complete and is scheduled to be completed in January 2026.
- Copper Basin Discharge Valve Replacement – This project installs a new 54-inch fixed cone valve and actuator at the base of the dam, refurbishes a slide gate and the existing valve house, and upgrades all associated electrical systems and access ladders at the Copper Basin Reservoir. This project will also include the replacement of the access ladders at the Gene Wash Dam. Final design is complete, and the acquisition of environmental permits are in progress. Construction contract is expected to be advertised in June 2024.
- Iron Mountain Switchgear – This project replaces the 2.3 kV Station Light and Power switchrack with a 4.16 kV indoor switchgear, a 2.3 kV emergency generator with a 4.16 kV generator, and upgrades the auxiliary distribution system at the Iron Mountain Pumping Plant. Preliminary design is 95 percent complete and scheduled to be complete by February 2024. A March 2024 Board action is planned for authorization of final design.

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 construction of new clarifier and flocculator equipment in Basins 7 and 8, continued installation of baffle walls, handrails, piping and electrical conduits, and startup testing of filter valves, piping, and electrical components in Filter Building No. 2. Construction is 60 percent complete and is scheduled to be complete in June 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 roofing and HVAC systems and continued installation of the electrical conduits inside the ORP Switchgear Building. Construction is approximately 47 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 installation of two PSUs, two sets of dielectrics, the new cooling water system connections, and is preparing for PSU startup testing. Construction is 75 percent complete and is scheduled to be complete in June 2024.

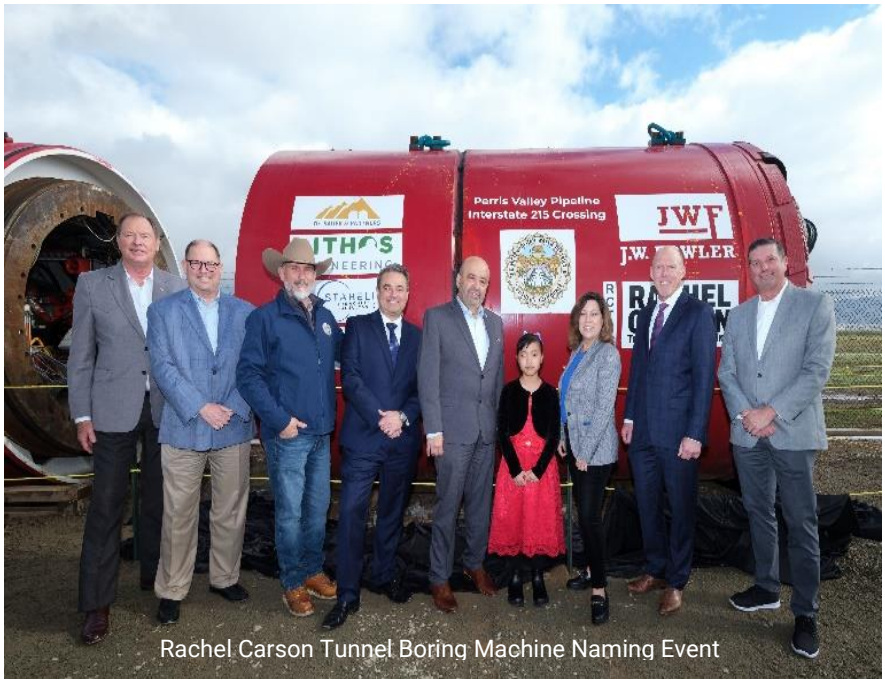
System Reliability Program

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

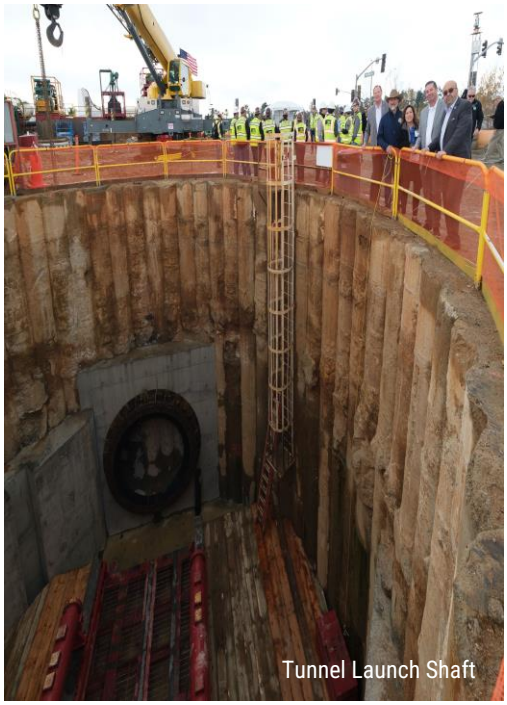
- Headquarters Physical Security Upgrades – This project implements comprehensive security upgrades for Metropolitan's Union Station Headquarters. These upgrades are consistent with federally recommended best practices for government buildings. This work has been prioritized and staged to minimize rework 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. Stage 3 improvements will provide security system upgrades around the perimeter of the building. Metropolitan's Board awarded the third and final contract in December 2022. The contractor began fabrication of the ornamental fence within the courtyard and began concrete placement for the fixed bollards. Construction is 60 percent complete and is scheduled to be complete in June 2024.
- Headquarters Building Fire Alarm and Smoke Control System Upgrades – This project upgrades Metropolitan's Union Station Headquarters 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 97 percent complete and is scheduled to be complete in March 2024.
- Headquarters Building Fire Sprinkler Level P1 Replacement – This project replaces a portion of the fire sprinkler piping network components in level P1 of the Headquarters Building. The work includes replacement of ancillary isolation valves, fire hydrant connections, and installation of new control valves. Metropolitan's Board awarded the contract in July 2023. Construction is complete.
- 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. The consultant has installed the pilot equipment, and staff is currently evaluating the results of the pilot unit. The pilot phase is approximately 98 percent complete and is scheduled to be complete in April 2024. The system upgrades at the Mills plant are scheduled to be complete in October 2026.
- Foothill Hydroelectric Plant and Control Building Seismic Upgrade – This project strengthens the Foothill Hydroelectric Plant and Control Building to withstand a significant earthquake, by removing and replacing the roofing system; adding encasements to enlarge and strengthen concrete columns; and reinforcing shallow foundations. The contractor continued performing abatement activities on the building's roof, and installation of structural steel roof plates. Construction is approximately 37 percent complete and is scheduled to be complete in December 2024.

Perris Valley Pipeline – This project will complete construction of the Perris Valley Pipeline and provide service connections to Eastern and Western Municipal Water Districts. This project installs 3,000 linear feet of tunnel which crosses the Interstate 215 freeway. The Contractor has excavated three of four shafts and completed construction of the main drive shaft. An event to commemorate the naming of the tunnel boring machine (TBM), "Rachel Carson", was held at the March Air Field Museum in Riverside on January 25, 2024, and contest winner Jessica Wang (3rd grader) and 115 guests were in attendance. With the launch of this TBM, excavation of the first tunnel reach commenced on the eastern side of Interstate 215 in early February 2024. Overall construction is 35 percent complete and is scheduled to be complete in early 2025.

Perris Valley Pipeline- Shop Fabrication of Portal Access Pipe



Rachel Carson Tunnel Boring Machine Naming Event



Tunnel Launch Shaft

TBM Lowered into Launch Shaft

Protecting the Public and Metropolitan's Assets

Engineering Services continued to develop state-mandated Emergency Action Plans (EAPs) for Metropolitan's state-regulated dams to help ensure long-term public safety. In January, the EAPs for Live Oak Reservoir, Weymouth Finished Water Reservoir, and the Goodhart Canyon Detention Basin were submitted to the Cal OES and are currently under review. To date, ten of Metropolitan's 13 state required EAPs have been fully approved by Cal OES.

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 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. Maintenance and 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 early-2025, with board certification of the document in the third quarter of 2025. Staff continues to finalize the project description, perform additional technical studies, incorporate changes to the program due to inclusion of the LADWP Operation NEXT pipe upsizing, and development of the draft EIR.
- 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. A cost estimate methodology technical memorandum was prepared to document the cost 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 by March 2024.
    - A Large-Scale Water Recycling grant application requesting $125 million was submitted to the US Bureau of Reclamation (USBR) in November 2023. Successful applicants will be notified in early 2024. To receive funding, Metropolitan prepared and submitted a feasibility study in January 2024 to meet the USBR requirements.

- 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 ultra violet/advanced oxidation (UV/AOP).
    - A draft conceptual facilities plan has been prepared to document key assumptions of AWPF components.
    - The AWPF team is evaluating the use of progressive design build 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 April 2024. Authorization of this procurement is planned for late 2024.
    - The AWPF team is coordinating with Southern California Edision (SCE) to finalize the Method of Services (MOS) study agreement for SCE to evaluate SCE infrastructure needed to meet AWPF power requirements.
- 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. Technical workshop has been scheduled with Independent Scientific Advisory Panel (ISAP) in March 2024 to discuss bench-scale testing data and proposed DPR treatment train.
- 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 six miles long and runs through the city of Carson. Current work includes utility field investigation and geotechnical work. Preliminary design is 37 percent complete and is scheduled to be complete by mid-2024.
    - Reach 2 – This reach is approximately 8 miles long and runs through the cities of Long Beach and Lakewood. Current work includes ground penetrating radar and obtaining permits for geotechnical work. Preliminary design is 12 percent complete and is scheduled to be complete by late-2024.

Mobile LiDAR Truck


Mobile LiDAR point cloud

System Flexibility/Supply Reliability

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 is currently erecting the valve structure and relocating interfering utilities. Construction is approximately 45 percent complete and is scheduled to be complete in August 2024.
- 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 clearing and grubbing of the work site. Construction is approximately three 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 clearing and grubbing the work site. Construction is approximately two 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. Engineering and Operations staff are reviewing initial submittals and collaborating through a series of design workshops, planned through the end of the year, to support upcoming design work. The contractor and Metropolitan are coordinating with both Southern California Edison and 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 70 percent level, environmental planning, and preparation of long-lead-item procurement documents, is scheduled to be complete in September 2024. Work progress is on track to complete the first major milestone, delivery of the 30 percent design package and the Basis of Design Report (BODR), in April 2024.
- Allen-McColloch Pipeline Urgent Relining – This project will perform urgent relining of distressed PCCP segments of the Allen-McColloch Pipeline (AMP). Relining of the AMP will be performed in stages to minimize impacts to member agencies. Stage 1 will steel line all critical distressed PCCP pipe segments upstream of the OC-88 Pump Station with approximately 2,120 feet of welded steel liner pipe and steel line approximately 2,320 feet of PCCP with welded steel liner pipe downstream of the OC-88 Pump Station. The work upstream of the OC-88 Pump Station will be completed by May 2024. Metropolitan's Board authorized change orders to three existing contracts to expedite the relining work in February 2024. Stage 2 work will reline all remaining PCCP pipe segments downstream of the OC-88 Pump Station with approximately 2.6 miles of welded steel liner pipe during a July through December 2024 shutdown.

Partner with interested parties and the communities we serve

American Society of Civil Engineers (ASCE) Engineers Week – Girl Day

Staff participated in the 11th Annual ASCE Engineers Week – Girl Day event at Metropolitan's Headquarters Building on February 22, 2024. This event represents one of several events that ASCE rolls out each year to help inspire future generations of female engineers from disadvantaged and underrepresented backgrounds and provides opportunities for 6th graders through 12th graders to learn about science, technology, engineering, and mathematics through professional panels and various engineering craft activities. With the overarching theme this year of "Building Tomorrow, Today," two engineering staff members and one engineering college student intern spoke about their journey and how they decided to study engineering and embark on a career in engineering. They also shared their role and contributions on various projects that included the Greg Avenue Pump Plant, Perris Valley Pipeline, and Pure Water projects. Other activities included students making "pure water" through a filtration process using water bottles and other materials and a presentation from the California High-Speed Rail Authority.

ASCE Engineers Week – Girl Day event at Metropolitan's Headquarters

Johanna Clemens, Laura Abarca (college intern), Mai Hattar, and Hedieh Esfahani getting ready to welcome students

Laura Abarca sharing her engineering internship experience at Metropolitan