



2022-23



Water Infrastructure Plan

Introduction

The Los Angeles Department of Water and Power (LADWP) maintains a vast Water System with about 7,340 miles of mainlines and trunk lines, along with related infrastructure and storage facilities that are critical to delivering high quality water to Los Angeles residents and businesses. The Water Infrastructure Plan (WIP) describes infrastructure accomplishments and goals that are a part of LADWP's \$5.6 billion five-year water system capital plan. All major water infrastructure components are evaluated through the ongoing Asset Management (AM) Program to systematically manage assets to achieve the lowest cost of ownership, including capital, and operations and maintenance costs. The AM Program data and analysis is continuously being improved and refined.



With the completion of the Los Angeles Reservoir Ultraviolet Disinfection Plant, a major infrastructure project completed in 2022, all LADWP reservoirs have achieved compliance for drinking water protection.

Distribution Mainline

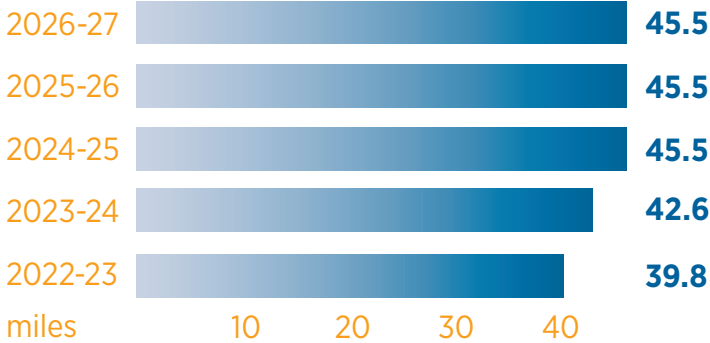
Distribution mainlines (pipes 20 inches or less in diameter) constitute the backbone of LADWP’s water distribution system. There are approximately 6,800 miles of mainline throughout the City of Los Angeles. Over 30% of LADWP’s mainlines are over 80 years old. LADWP has set goals to ramp up the replacement of aging water distribution mainlines to achieve an anticipated life cycle of 150 years.

2021-22 Achievements

- Installed over 37 miles of mainline pipe exceeding target.
- Installed 127.5 miles of mainline from 2018 to 2021, exceeding the Mayor’s Mainline Replacement Goal to replace 108 miles of mainline.
- Achieved an average leak rate of 16.8 leaks per 100 miles, which was better than the national industry average of 25 leaks per 100 miles. (Water Research Foundation, 2017)

Mainline Replacement Goals

fiscal year



Long-Term Goals

- Replace 39.8 miles of mainline pipe in 2022-23 and up to 45.5 miles per year by 2024-25.
- Complete the installation of an additional 10 miles of earthquake resilient pipe by FY 2023-24.
- Reduce distribution life cycle costs, including capital and operations and maintenance costs.

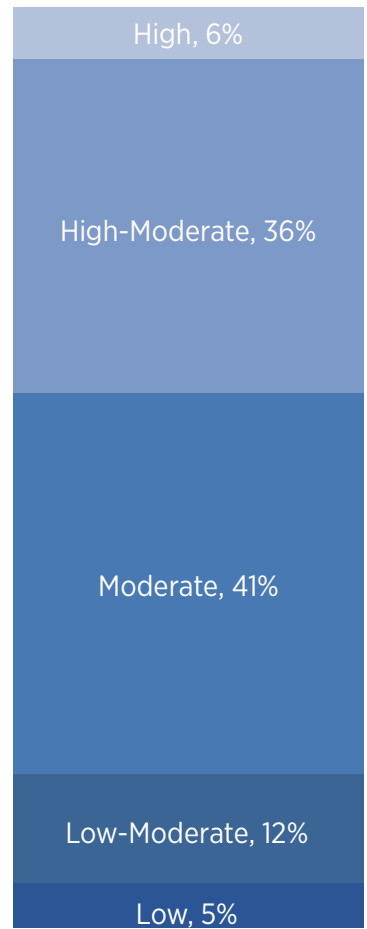


Prioritizing Mainline Replacements

Based on LADWP’s analysis, about 6% of LADWP’s water distribution mainlines are classified as a high priority for replacement. The factors considered include:

- Leak history (number and type of leaks, time between leaks).
- Age of pipe (design and construction method used at time of installation).
- Soil conditions (corrosiveness, hillside, landslide, fault line, and liquefaction potential).
- Risk of service interruption and community disruptions.
- Coordination with planned projects by Streets LA and other Water System improvement projects.

Mainline Replacement Priority



Trunk Lines

Trunk lines are pipes greater than 20 inches in diameter, and provide the transmission capacity to move large amounts of water around the city – from reservoirs and tanks to smaller distribution mainlines. There are approximately 544 miles of transmission pipelines throughout the City of Los Angeles. Prioritization for trunk line replacement is similar to the process for mainlines, taking into account leak history, soil conditions, and pipe age, along with other factors.

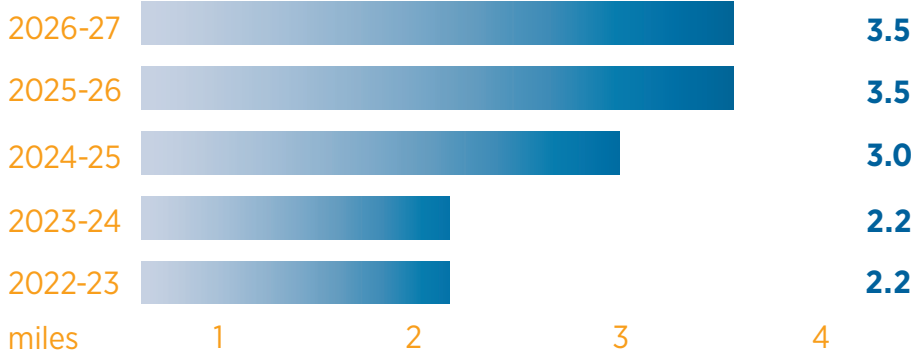


2021-22 Achievement

Replaced 1.8 miles of trunk line pipe.

Trunk Line Replacement Goals

fiscal year



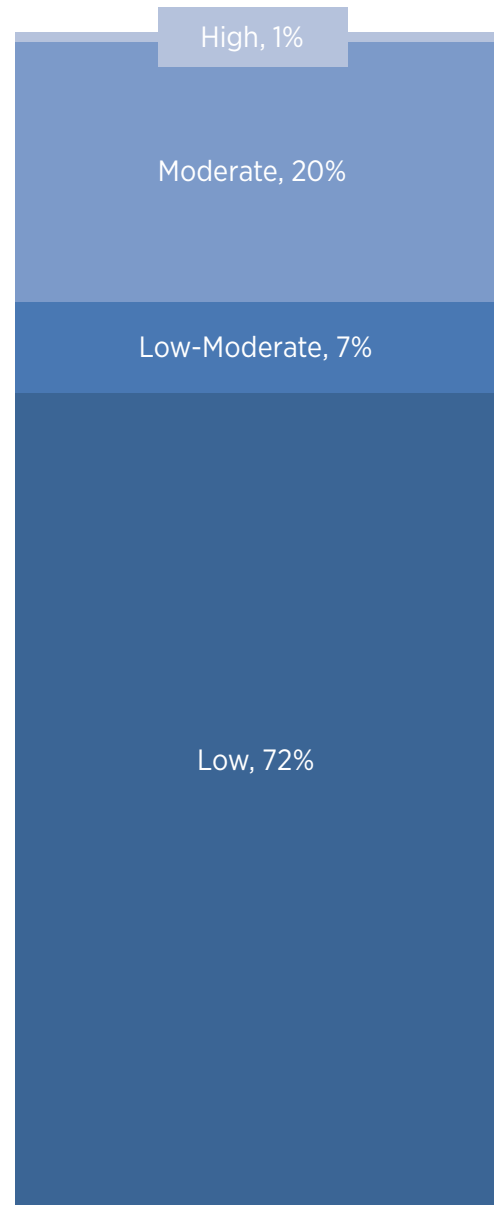
2022-23 Goal

Replace 2.2 miles of trunk line, including a portion of Foothill Trunk Line with new earthquake resilient pipe.

Long-Term Goals

- Accelerate design and construction of trunk line projects to replace high-risk trunk lines.
- Continue the corrosion protection program.
- Continue pipe replacements required to meet drinking water regulatory compliance.
- Enhance trunk line resilience through the use of earthquake resilient pipe.
- Continue to work with stakeholders to raise awareness about projects in their communities and minimize impacts due to construction.
- Identify and implement mitigation measures as needed during construction.

Trunk Line Replacement Priority





Large Valves

LADWP has over 2,800 large valves (16 to 144 inches in diameter) in the Water System network. Large valves are flow control devices that are critical for Water System operations. In addition to valves replaced under other Water System improvements, LADWP continues to replace at least five large valves per year as part of the Large Valve Replacement Program. There are currently 30 valves identified for replacement. LADWP's plan is to continue with the targeted Large Valve Replacement Program that strategically prioritizes replacements of large valves in the Water System based on operational needs, water shutdown and valve availability.

2021-22 Achievement

Replaced seven large valves; more were replaced as part of leak repairs, as well as mainline and trunk line replacement programs.

2022-23 Goal

Replace five large valves as part of the Large Valve Replacement Program, along with additional large valve replacements under other Water System improvements.

Long-Term Goals

- Continue to maintain and update a complete list of broken and difficult to operate valves.
- Continue the periodic valve exercise program to minimize valve damage and extend the valves' useful life.
- Continue the installation and renewal of large valves in conjunction with trunk line construction projects.
- Continue the large valve vault assessments and rehabilitations.



Headworks Reservoir Complex

In-City Reservoirs and Tanks

Within the Los Angeles basin, LADWP operates nine major active reservoirs and over 108 smaller storage facilities, all of which create operational flexibility to balance water supplies and customer demands. With the Los Angeles Reservoir Ultraviolet Disinfection Plant operational as of January 2022, all LADWP reservoirs have achieved compliance with regulations to protect drinking water in reservoirs.

Eagle Rock, Elysian, Lower Franklin No. 2, Green Verdugo, Santa Ynez, Upper Stone Canyon, and Lower Van Norman Bypass are protected with a floating membrane or roof; Headworks East is a buried structure; and Los Angeles Reservoir utilizes shade balls and ultraviolet (UV) disinfection. Headworks West is a new buried reservoir currently in testing and commissioning and adjacent to Headworks East.

Additionally, the following six large reservoirs are no longer in-service but contain non-potable water: Encino, Upper Hollywood, Lower Hollywood, Ivanhoe, Silver Lake, and Lower Stone Canyon. Various levels of maintenance are necessary at these locations to allow for potential emergency use.

Similar to the in-city reservoirs, storage tanks provide the needed daily and emergency supplies for the community. Steel and concrete storage tanks have capacity ranging from 9,000 gallons to 30 million gallons, and their typical useful life is 60 years and 100 years, respectively.

Objectives for in-city reservoirs and tanks include:

- Preserve water quality and structural integrity.
- Replace floating covers based on a 20-year useful life or earlier if needed due to deterioration and damage, or as required by the Division of Drinking Water.
- Retrofit or replace tanks based on condition assessment of structural and mechanical elements, materials, and safety seismic stability.
- Maintain dam safety surveillance on reservoirs as required by the Division of Safety of Dams.
- Continue inspection and maintenance program for reservoirs and tanks.



Upper Stone Canyon Reservoir



Los Angeles Reservoir

2021-22 Achievements

- Completed Eagle Rock and Santa Ynez floating cover repairs.
- Completed development and received State approval of all 19 mandated Inundation Maps and Emergency Action Plans.
- Installed Upper Stone Canyon floating cover.
- Placed Los Angeles Reservoir Ultraviolet Disinfection Plant in-service.
- Developed Water System Dams Emergency Action Plans online training.

2022-23 Goals

- Place Headworks West buried structure in-service.
- Complete Green Verdugo floating cover installation.

Long-Term Goals

- Install De Soto Tank.
- Replace Elysian Park Tank.

Pump Stations

There are 86 pump stations that pump water to customers or storage tanks at higher elevations in the city. Pump station maintenance objectives include:

- Preventing service disruptions.
- Maintaining operations during construction or replacement.
- Minimizing operational costs.
- Reducing repair costs through appropriate preventative maintenance.

2021-22 Achievement

Replaced or rehabilitated 17 pumps and motors, exceeding the 12 planned for the fiscal year.

2022-23 Goal

Replace or rehabilitate 12 pumps and motors.

Mission Wells Pump Station



Before



After

4th and Detroit Regulator Station



Before



After

Pressure Regulator and Relief Stations

There are 358 regulator and relief stations that control water pressure by adjusting for changes in flow and accommodating customer peak usage. Maintenance objectives include:

- Preventing service disruptions.
- Maintaining system operations during construction.
- Minimizing life cycle costs.

2021-22 Achievements

- Achieved fiscal year goal to retrofit eight stations that were highly corroded, leaking, and inoperable.
- Replaced two regulator stations and headers.

2022-23 Goals

- Retrofit eight regulator stations.
- Evaluate existing regulator station replacement to meet structural requirements and operational needs.
- Replace two regulator stations and headers.

Water Meter Replacement Program

LADWP maintains over 7,300 large meters (3 inches and larger) and approximately 700,000 small meters (2 inches and smaller). Accurate metering is necessary to fully account for water use by all customers as well as quantify water loss within the distribution system. Since completing the cycle for large meter replacements, LADWP has focused on replacing small meters, which constitute the vast majority of the Water System's meter inventory.

The industry average life cycle of a small meter is 20 years, before wear and tear on its moving parts cause loss of measuring accuracy. Over the next five years, LADWP plans to ramp up to a replacement cycle of 20 years.

2021-22 Achievement

Replaced over 34,300 meters exceeding target of 32,500 meters.

2022-23 Goal

Replace 33,500 meters.

Priorities for Water Meter Replacement

- Increase to a long-term replacement rate of 34,000 meters per year.
- Continue to explore and evaluate new meter technologies.
- Achieve at least 80% completion rate for repair or replacement of stuck or defective meters within 30 days after the service order is released by the Field Investigations Group.

Small Meter Replacement Goals

	fiscal year
34,000	2026-27
34,000	2025-26
34,000	2024-25
34,000	2023-24
33,500	2022-23





Los Angeles Aqueduct (LAA) Reservoirs & Dams

There are eight reservoirs and dams along the Los Angeles Aqueduct, beyond the city limits. We evaluate and maintain the integrity of these dam structures by conducting site-specific stability studies. We also maintain a reservoir surveillance program, as required by the Division of Safety of Dams.

2021-22 Achievements

- Completed design for seismic improvements to North Haiwee Dam No. 2.
- Completed replacement of the Walker Lake Dam Outlet Structure to improve reliability of the structure and prevent spills.
- Completed South Haiwee Reservoir Bypass Channel lining repairs to prevent failure of the concrete channel lining.

2022-23 Goals

- Complete the planning for seismic improvements to Tinemaha Dam.
- Replace Long Valley Dam Emergency Outlet Tunnel stem and operator.
- Complete the design for the Grant Lake Spillway Modification Project, which will allow for controlled release of water to the Lower Rush Creek.

Long-Term Goal

Design and build a sedimentation facility at Fairmont Reservoir to meet long-term water quality requirements for water supplied through the LAA and east branch of the State Water Project.

Los Angeles Aqueduct System

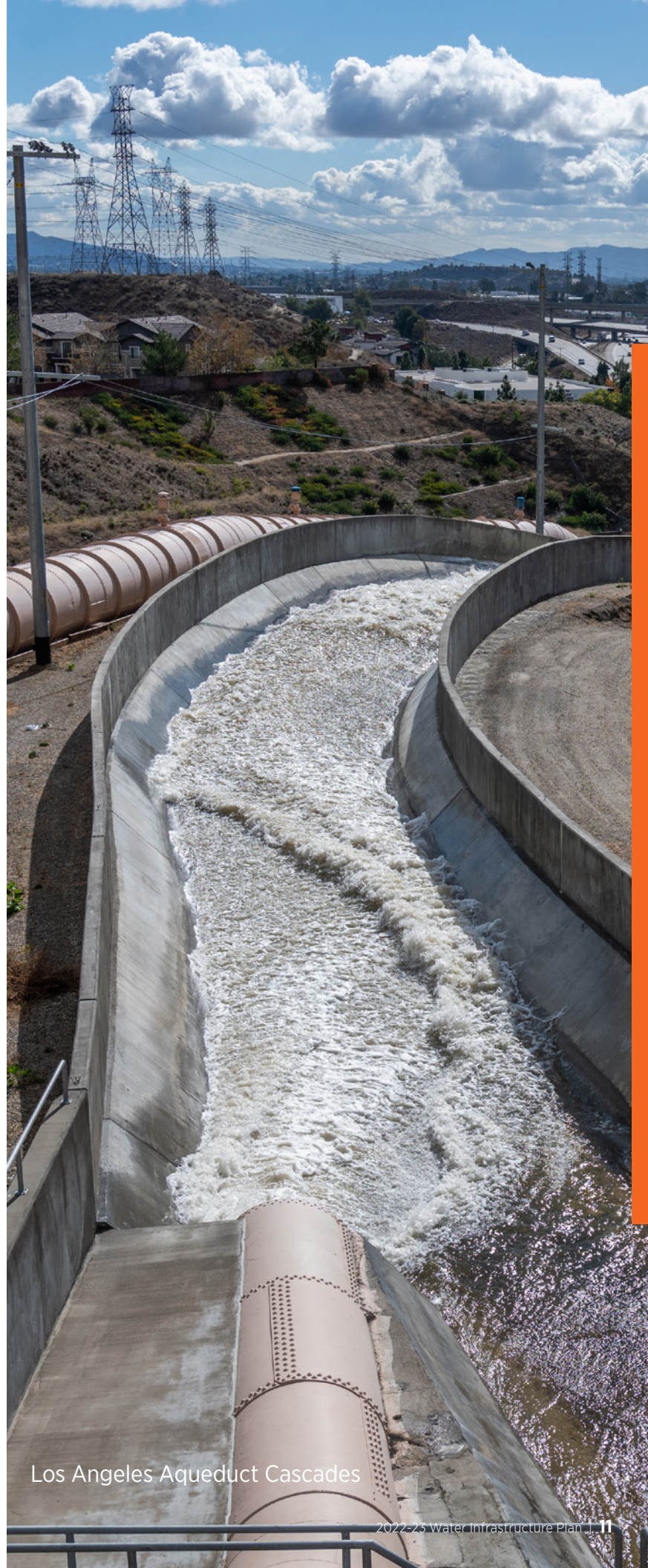
There are approximately 300 miles of LAA tunnels, open channels, covered channels, and sag pipes that convey water from the Eastern Sierra and Owens Valley to Los Angeles. Our objective is to maintain operations through in-place refurbishment of the entire LAA system.

2021-22 Achievements

- Completed major rehabilitation of the First Los Angeles Aqueduct Cascades originally constructed in 1913. Over 700 feet of the aging infrastructure spanning up to 29 feet in width was replaced, ensuring safe and reliable conveyance of Aqueduct water to the City of Los Angeles for generations to come.
- Completed removal of over two miles of Aqueduct original top in the Rose Valley area.
- Completed recoating the exterior of No Name Sag Pipe (1,280 feet) on both the First and Second Aqueducts.
- Created a working group to support asset management of LAA facilities and ensure a more efficient operation and reliability of wells throughout the Owens Valley.
- Designed and tested new Ramp Flume standards for use in open channel water flow measurement along the Aqueduct System.
- Replaced 10 water diversion and measurement structures.

Long-Term Goals

- Replace an average of three miles of original top on the covered channels annually.
- Complete the exterior recoating of five miles of sag pipe.
- Design mitigation for a San Andreas Fault rupture at the Elizabeth Tunnel.
- Replace Tinemaha Dam Outlet Structure Control Gate to improve dam safety.
- Replace aged and failing water diversion and measurement infrastructure along the Aqueduct System at the rate of 5 to 10 facilities per year.
- Re-drill and replace groundwater wells in the Owens Valley averaging two per year.



Los Angeles Aqueduct Cascades



River Supply Conduit Improvement Upper Reach – Unit 7

2022-23



Water Infrastructure Plan