Colorado Lagoon Restoration: Open Channel

City Council Meeting

April 21, 2026



Overview

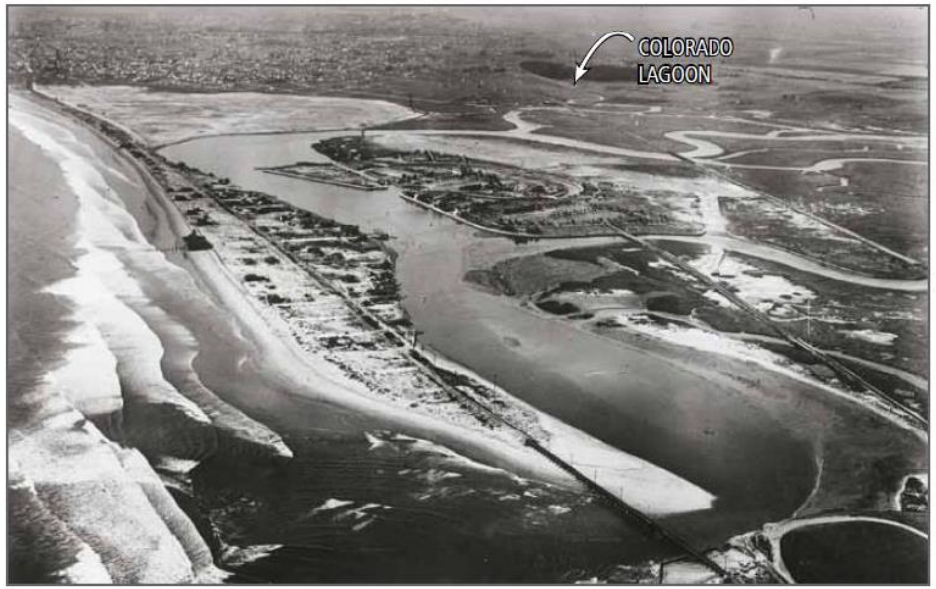
- History and Background
- Summary of Previous Restoration Efforts
- Open Channel Overview
- Key Project Complexities
- Schedule Impacts
- Financial Summary
- Lessons Learned
- Recent Project Activity



Colorado Lagoon History

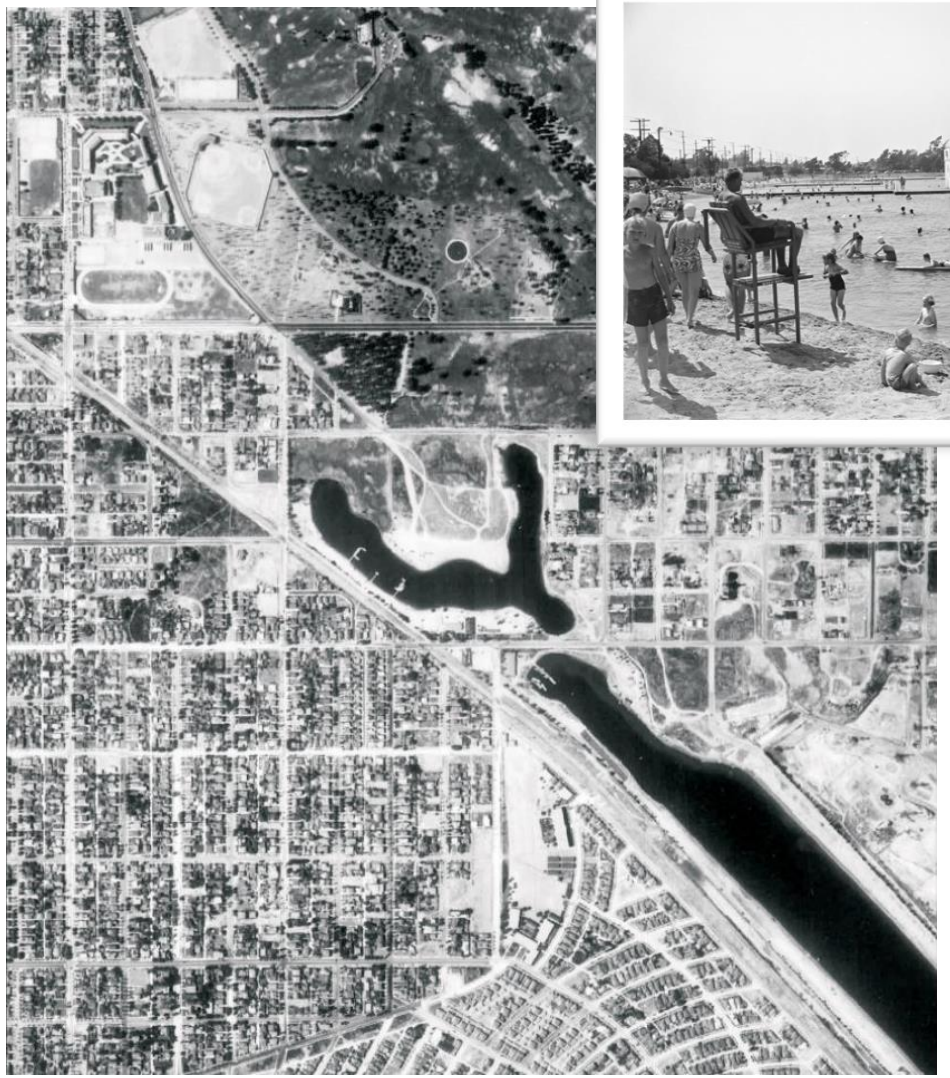
- 2,400-acre expanse of estuarine habitat historically inhabited by the native Tongva and Gabrielino tribes.
- In 1923, Colorado Lagoon and Marine Stadium were dredged taking on its characteristic shape





Colorado Lagoon History

- In the 1920s and 1930s the first impediment to tidal access was introduced with the connection of Colorado St., the first culvert and tidal gate allowing control of water depths.
- In 1932 the LA Olympic diving trials took place.
- In the 1960s, the north end of Marine Stadium was filled, and a 900 foot box culvert was constructed in anticipation of the Pacific Coast Freeway.
- The freeway never materialized, and the area became what is now known as Marina Vista Park.
- The filling of wetlands would lead to water quality and habitat degradation over the decades to come.



Restoration Need

- The culvert was too small resulting in reduced tidal circulation and oxygenation of the lagoon
- The lagoon was the outlet for 11 stormwater drains being the natural low point
- In 2006, the lagoon became an impaired waterbody pursuant to Section 303(d) of the Clean Water Act
- Listed on Heal the Bay's Beach Bummers List for beaches with the worst water quality
- In 2009, the Water Board took action and adopted TMDL's for the Colorado Lagoon for bacteria, trash, metals, pesticides, PAHs, and PCBs

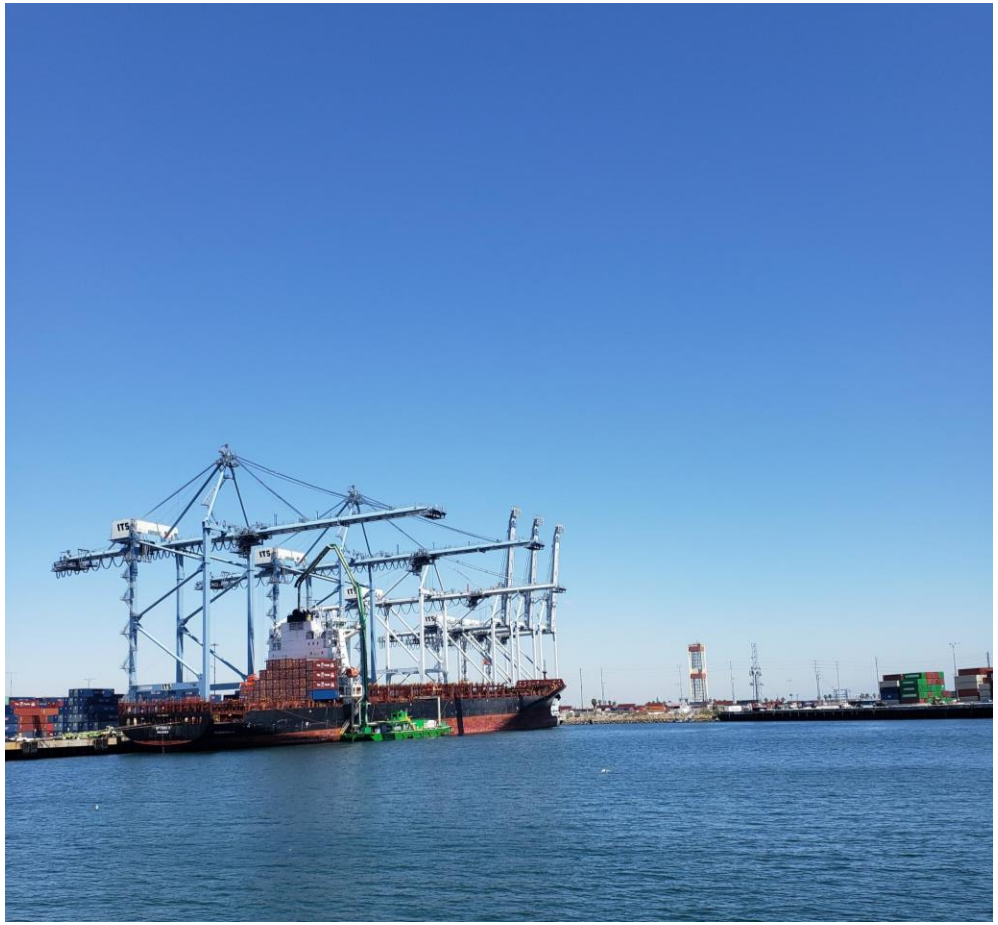


Colorado Lagoon Restoration Summary

YEARS	Description
2001-2002	Community concerns over County Project sparked a partnership between the City, Friends of Colorado Lagoon, State Coastal Conservancy and Rivers & Mountains Conservancy and other stakeholders to develop a Feasibility Study to restore the lagoon
2002-2005	Colorado Lagoon Feasibility Study (Master Restoration Plan) was developed
2005-2007	Port of Long Beach and City executed an MOU for first rights to mitigation credits and support funding for early planning and environmental review EIR/CEQA
2007-2010	Environmental Review, restoration planning, and regulatory permitting.
2010-2011	**Phase 1** Install low flow diverters, trash capture systems, and conduct culvert cleaning
2012-2013	**Phase 2** Dredge, remediate and remove 72,000 cu yd of contaminated sediments. Demolish abandoned restrooms and parking lot
2016-2017	**Phase 3** Lagoon expansion, subtidal and intertidal habitat creation and restoration, mitigation for other projects, walking path and park enhancements
2022-2026	**Phase 4 (Final)** Creation of Open Channel, 2 new bridges and roadways, Colorado Lagoon central basin habitat fill, new sewer siphon, new utilities, and Marina Vista Park Improvements

Continued Partnership With The Port

- In 2007, the Port and City entered into an MOU for mitigation credits and Port provided $235,000 for planning and environmental review
- In 2009, Port provided $1,300,000 in advance funding for Phase 1 Restoration efforts
- In 2013, the Port provided approximately $785,000 for the development of the mitigation bank.
- In 2019 (after the mitigation bank was approved), the Port and City entered into an MOU providing $30.5 million in exchange for mitigation credits to fund the open channel project.
- In 2031, the release of mitigation credits are anticipated following the 5-year performance period, which the Port can elect to reserve or use to offset impacts from other development projects.



Restoration Phase 1 (2009-2010)

- Installation of low flow divertors and trash capture wells to capture debris and trash and divert water to the sanitary sewer
- Removed accumulated marine growth in the culvert to improve tidal flows





Restoration Phase 2 (2011-2012)

- Dredging of 72,000 cu yds of sediment and contamination from the lagoon
- Dredged sediment was placed in the Middle Harbor at the Port
- Demolition and removal of dilapidated structures

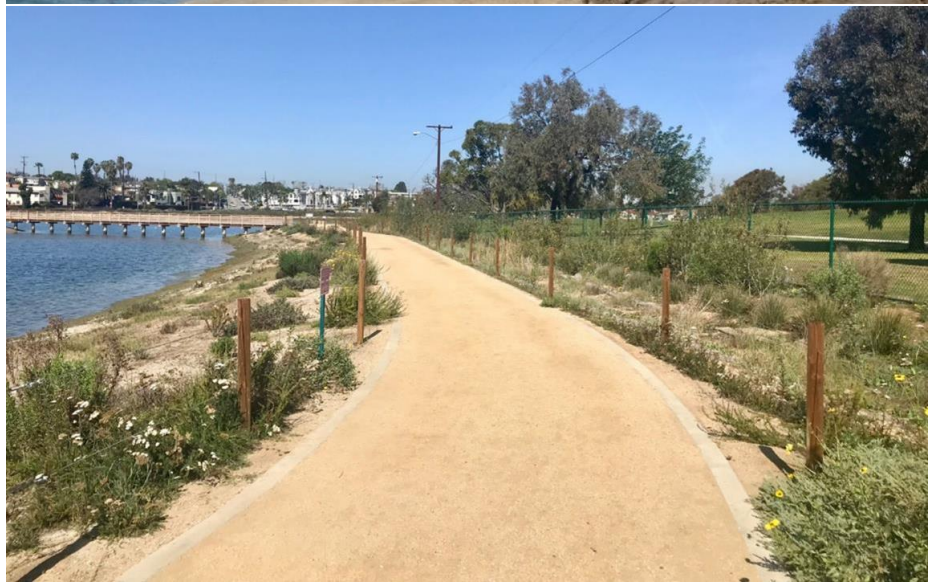




Restoration Phase 3 (2016-2017)

- Dredge and fill to create eelgrass habitat in the north arm
- Site grading and contouring to expand lagoon and create more favorable conditions for marsh plantings
- Extension of pedestrian and footbridge pier
- Removal of access road in lieu of pedestrian trail, creation of gathering areas and seating
- Installation of marsh plantings and upland vegetation
- New habitat created supporting subtidal mitigation requirements for the Naples Seawalls project





Restoration Phase 4 (2022-2026)

- Introduce an open channel connection between Marine Stadium and Colorado Lagoon
- Demolish the underground, 900-ft long box culvert
- Construct two new pedestrian and vehicle bridges
- Reconstruction/ relocation of utilities
- Enhancements and reconstruction of Marina Vista Park

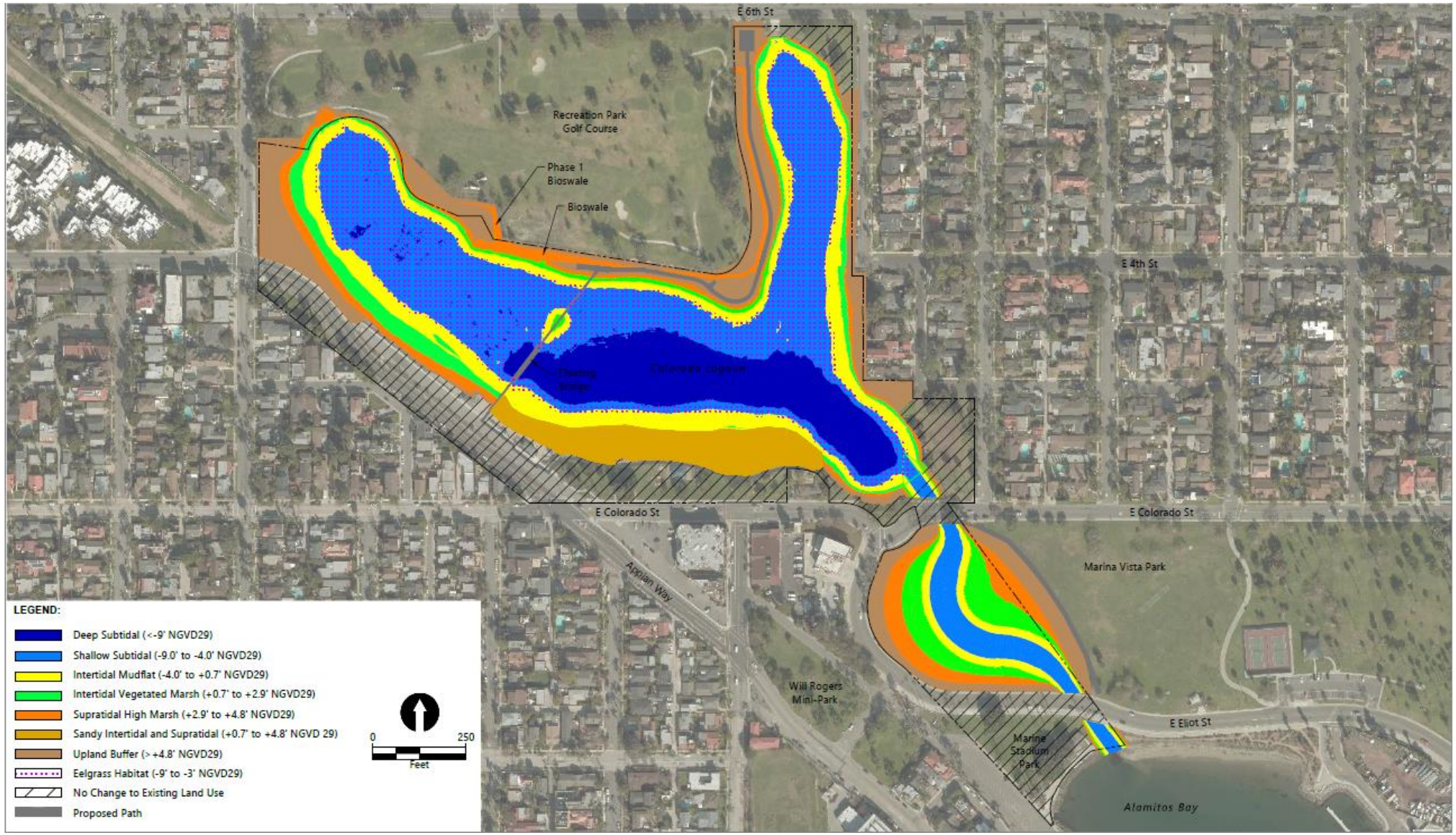


Open Channel Project Goals

- Maximize the volume of water exchanged, providing greater flushing of the lagoon, increased water quality and a healthier ecosystem.
- Maximize habitat restoration
- Reconfigure Marina Vista Park for better usability
- Enhance pedestrian connections



Habitat Value



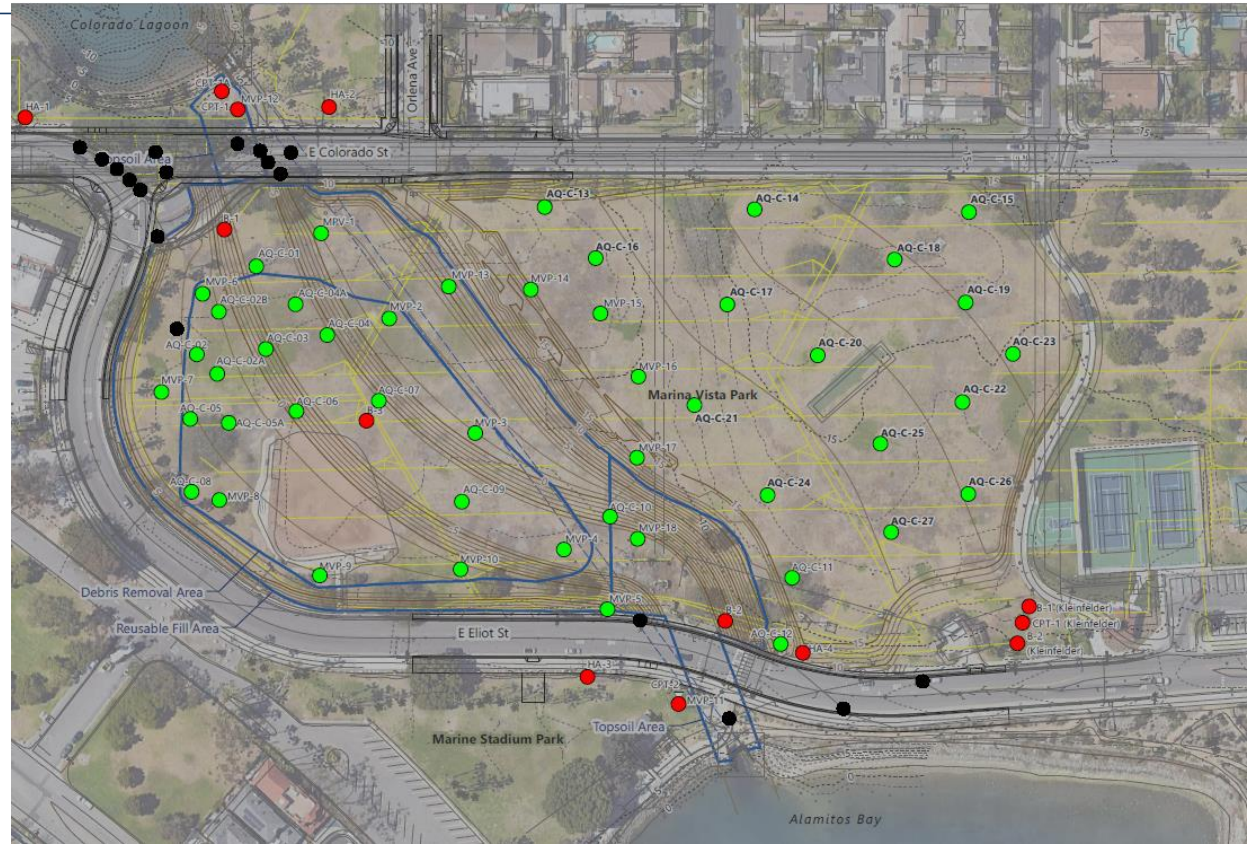
Pre-Design Investigations

Material Investigation (Green + Red)

- 60 borings and cores were tested and analyzed

Utility Investigation (Black)

- Conducted research and met with 11 utility agencies and 5 oil operators
- 18 pothole locations via air vacuum excavation to expose and confirm precise location of known utilities
- The project site was characterized prior to development of project plans and designs.
- Results informed soil management approaches including reuse of soils, structural competency of soils for bridge foundations



Potholing for utility confirmation

Soils sample and analysis for environmental management

Geotechnical analysis

Key Project Complexities

- Balancing excavation materials - managing cut and fill on-site
- Maintain operational utilities – install new utilities before decommissioning old
- Maintain hydraulic connection to lagoon to preserve habitat and existing ecosystem
- Maintain a pedestrian path through the construction site



Each will be further reviewed on the following slides

Balancing Excavation Materials

- Stockpile topsoil for future use
- Topsoil had high levels of salt requiring extended periods of leeching and soil amendments
- Excavate east Marina Vista Park (MVP) to place open channel excavation cuts
- Utilize east MVP cuts to fill Colorado Lagoon per permit requirements
- Excavate channel without removing the culvert





Maintaining Utilities

- Excavation and shoring systems were required to reconstruct various utilities
- Prior to any excavation, sewer systems, water lines, recycled water lines and electrical lines were temporarily bypassed
- Excavating to the deepest elevation for the sewer siphon required clearing existing known and unknown utilities
- New utilities had to be installed underneath the existing culvert



Maintaining Hydraulic Connection

- Prior to excavation for Eliot Street bridge, a portion of the underground culvert had to be removed to construct the bridge
- Temporary water flow diversions had to be activated to keep the lagoon tidally connected





Maintaining Pedestrian Access

- A temporary pedestrian path was maintained through the center of the construction dividing the site in two.
- In 2024 the Eliot Street bike and pedestrian path was opened
- Removing the temporary pedestrian path allowed utility reconstruction at Colorado Street to begin



General Schedule/ Risk Management

- Critical Path Methodology identifies the critical path (CP) which is the longest sequence of work activities required to complete the project.
  - If one task on the CP slips, the entire project is delayed
- Common factors that impact the CP and often lead to cost and/or time impacts include:
  - Weather delays
  - Unforeseen/ differing site conditions
  - Changes to scope of work by Authorities Having Jurisdiction/ Owner
  - Defects in construction/ equipment/ materials
- Each item is reviewed for merit by the Construction Management team
  - The contractor may be entitled to additional money and/or time
  - The City may be entitled to a refund and/or liquidated damages
- Delegating all risk to the contractor significantly increases cost making projects infeasible

Most Impactful Project Elements

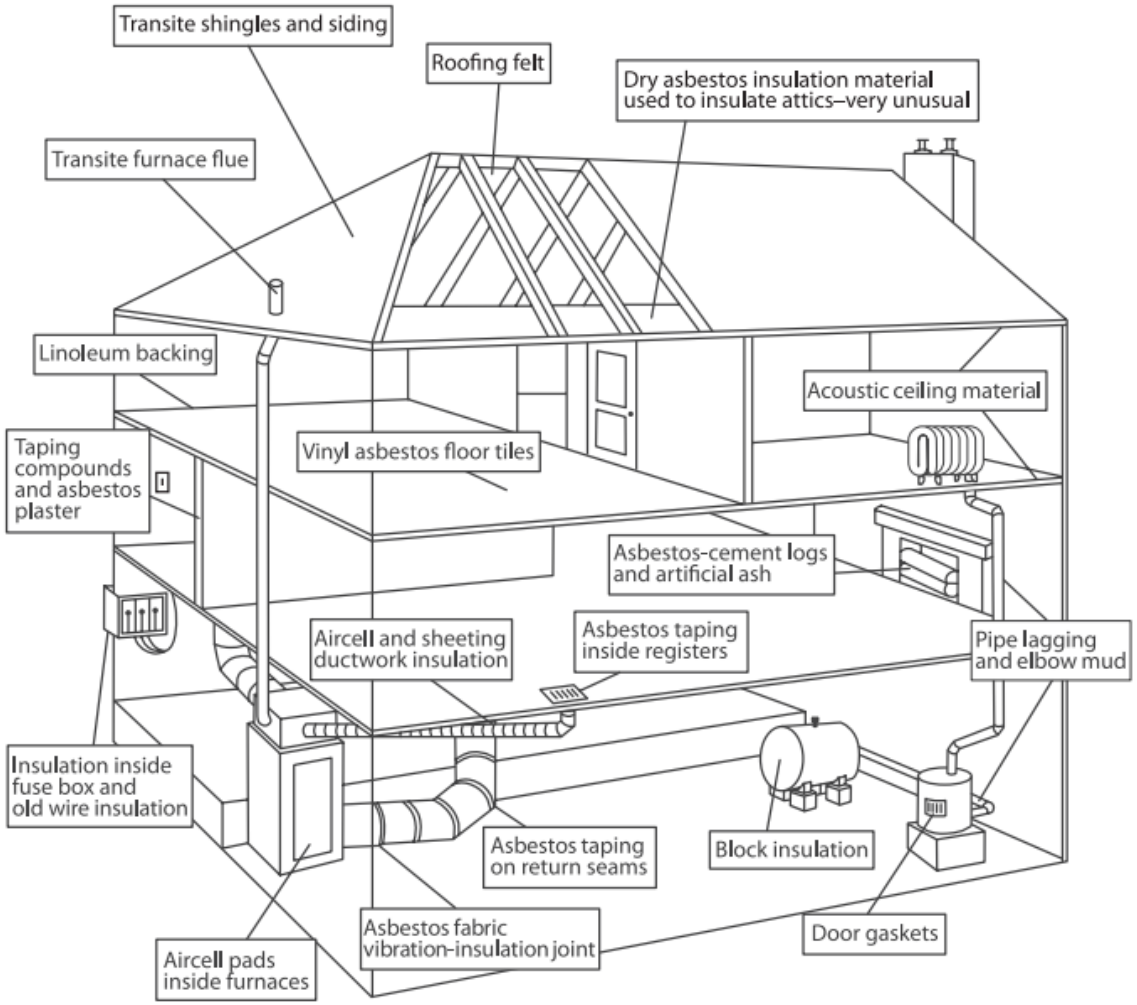
Description	Time Impact
16 Unanticipated ACM debris/utilities and 20 instances of utilities not reflected in records	5-7 months
Sewer Siphon Construction Delays	4-6 months
Agency Impacts/ Changes	4-6 months
Inclement Weather	3 months
Abandoned Corrugated Metal Pipe	2 months – Merit TBD
Sewer Bypass	4 months - Merit TBD

Note: This is draft only as construction is still underway and not all impacts have been finalized and agreed to with the Contractor. Each are reviewed further on the following slides. This is for illustrative purposes only. Some of the items noted above were concurrent with other delays.

Unforeseen Conditions – Asbestos

What is asbestos?

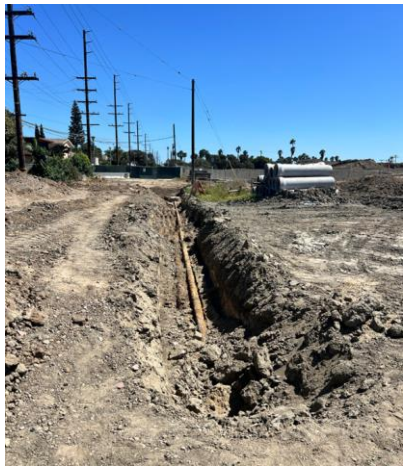
- A naturally occurring fibrous mineral (long thin crystals) found throughout the world.
- California state rock is serpentine and is known to contain asbestos chrysotile.
- Chrysotile asbestos was commonly used in building materials due to strength, heat resistance, and insulating properties.
- Asbestos-containing material (ACM), means any material containing more than one percent asbestos.
- ACMs are routinely encountered in utility and building construction work.
- Established regulations are followed for abatement work in coordination with AQMD.



Unforeseen Conditions – Asbestos

- The project encountered 16 instances of asbestos-containing materials (ACMs), primarily associated with debris and/or utilities not reflected in available records
- ACMs also appeared in fragmented building materials likely associated with historic fill activities
- ACMs were not discovered in any boring samples taken during pre-design investigations
- The project site is not considered hazardous
- AQMD Rule 1403 (Asbestos Emissions from Demolition and Renovation Activities) is used for discovery of incidental ACM through a P5 permit requiring agency concurrence on the abatement approach prior to proceeding with removal activities.







Asbestos Procedures

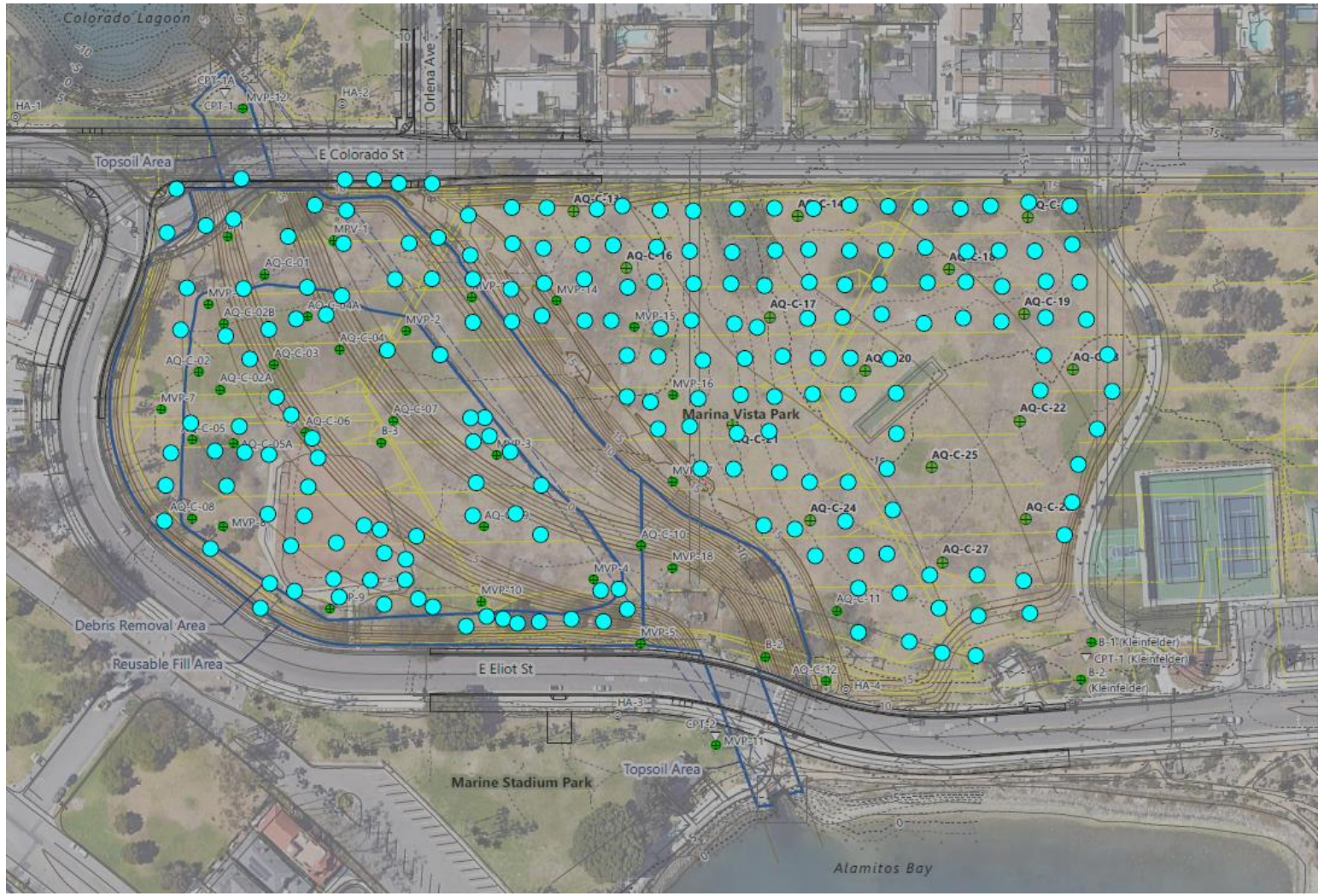
- If ACM is suspected, testing is performed by the City's Certified Asbestos Consultant.
- If confirmed, a procedure is submitted to the AQMD for approval (on average this takes 30 days)
- The affected soils are screened to separate and remove ACM
- ACM fragments are bagged or wrapped and transported to an approved disposal facility
- The remaining soils are retested
- This adds costs for environmental testing, consultant oversight, licensed abatement subcontractors, specialized handling and disposal, air monitoring, and associated contractor impacts







Asbestos Sampling and Investigations



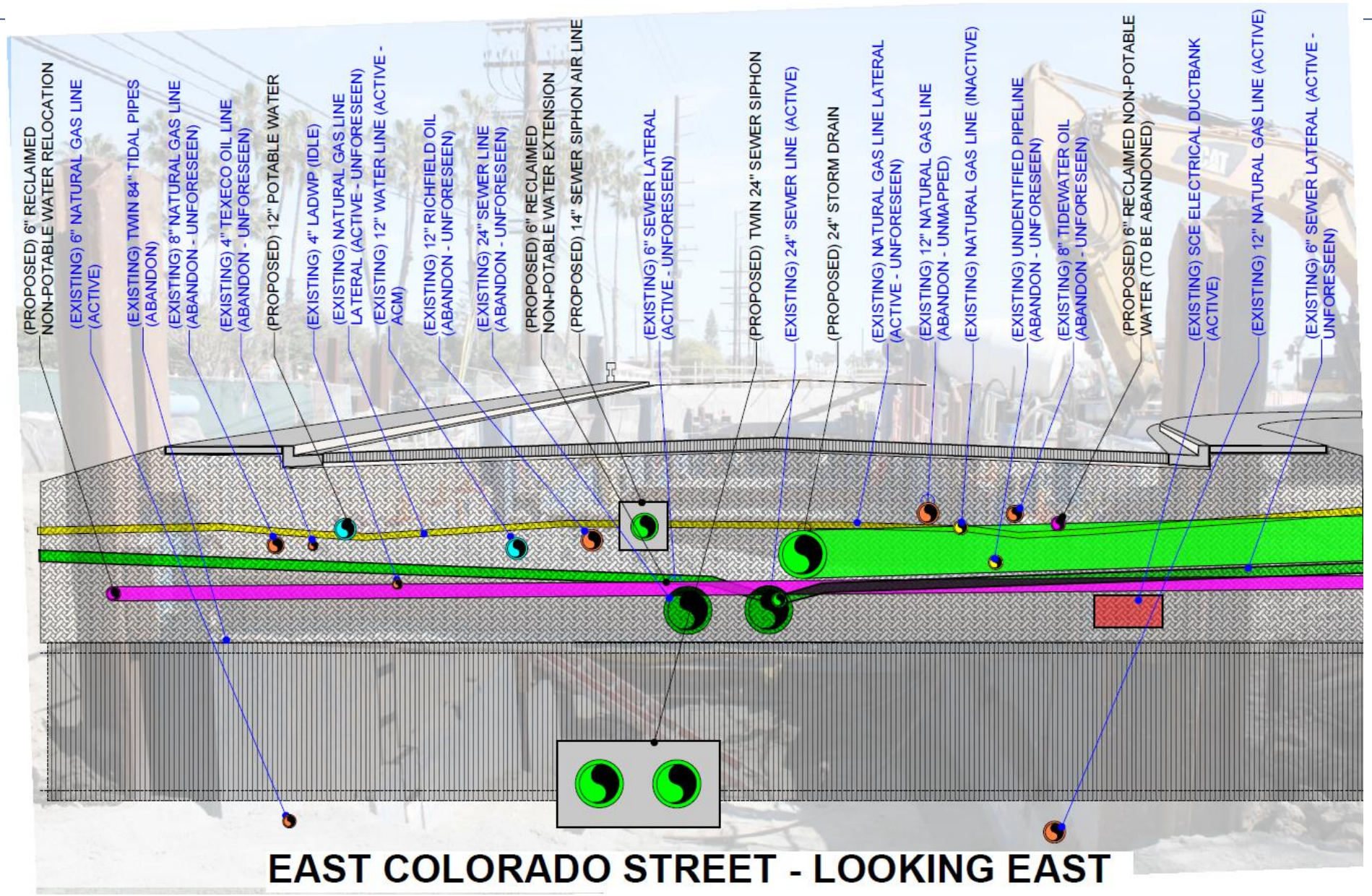
- After the 2024 discoveries of ACM, the City's Certified Asbestos Consultant took over 200 soil samples at the site
- None came back positive, validating the soils were not impacted by asbestos

Utilities Not Reflected in Available Records

- Despite investigations, 20 utilities were discovered requiring identification, ownership, abatement, and removal:
  - Multiple water lines
  - Multiple sewer lines
  - Multiple gas lines
  - Multiple oil lines
  - Electrical duct banks
  - Electrical lines
- Conflicts between proposed new systems and utilities not reflected in available records has introduced delays

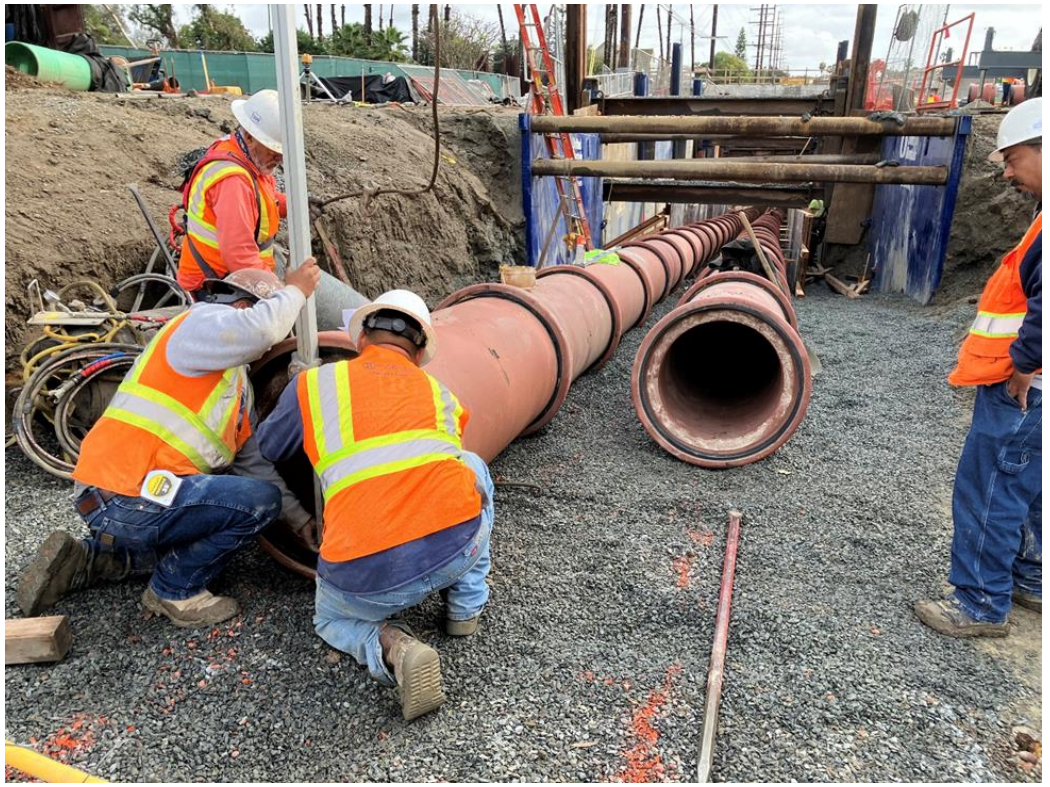


Utilities – Cross Section

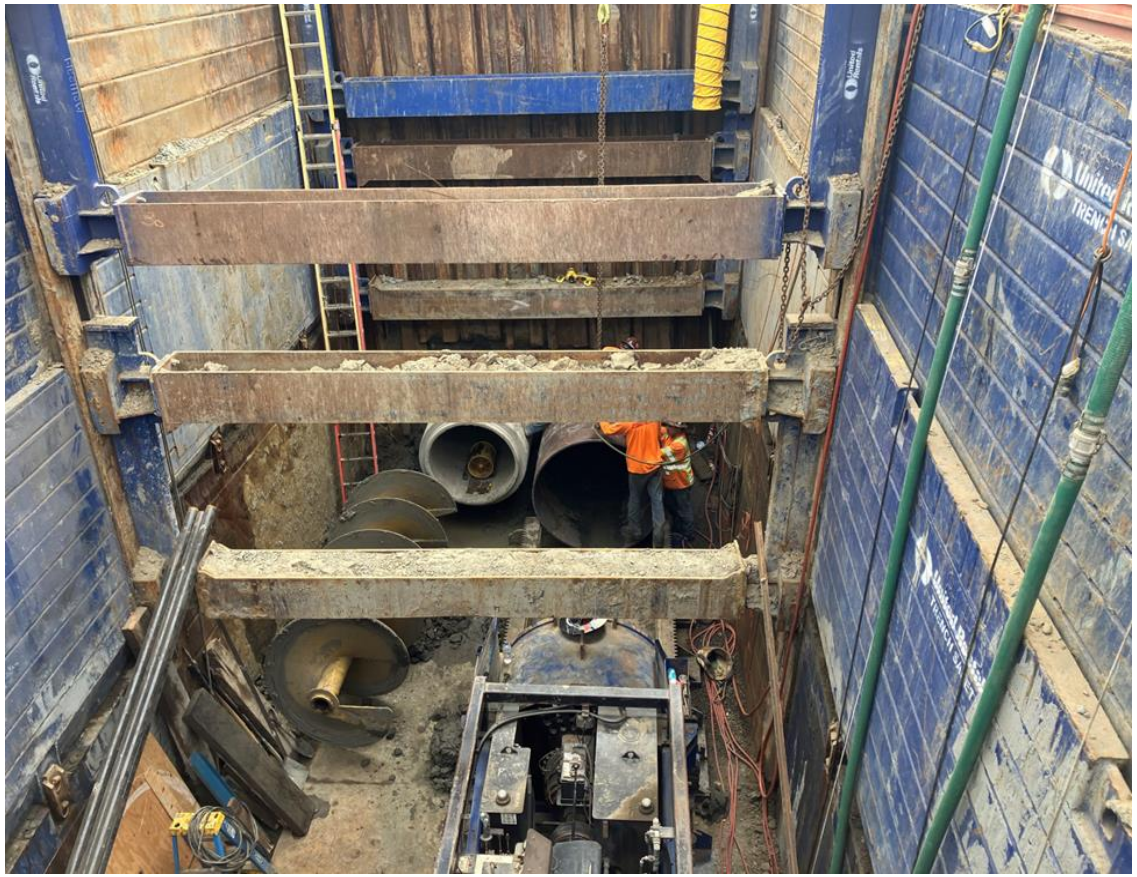


Sewer Siphon Challenges

- Needed to be complete prior to constructing the Colorado Street bridge
- The contractor elected to utilize jack-and-bore operations to push sewer piping and their encasements beneath the active box culvert
- Excavation was paused due to discoveries of utilities not reflected in available records and asbestos fragments
- Relocation or removal of utilities by agencies impacted the start of these activities
- The double-barrel system had to be encased in concrete originally proposed for sand
- Final pressure testing and commissioning is expected to occur in May/ June 2026



Sewer Siphon Construction





Completing the installation of the sewer siphon in the bridge footprint first, allowed for bridge construction to proceed while remaining sewer siphon construction continued

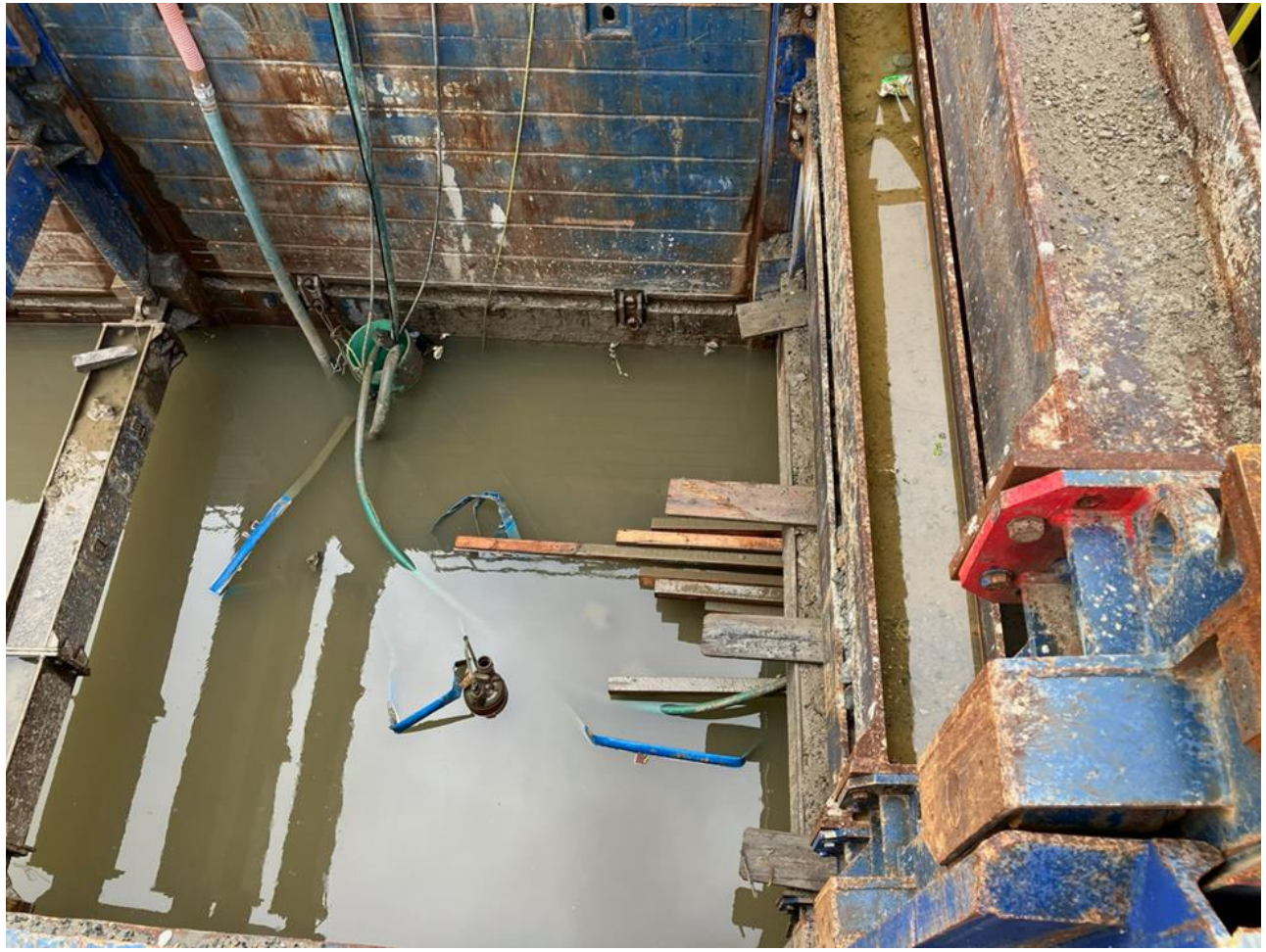
Sewer Siphon Construction



Crews prepare for bridge construction over installed sewer siphon with backfill and slurry material (summer 2025)

Inclement Weather

- Major rain events require dewatering of work areas and allowing site conditions to dry
- To date there have been 60 working days (3 months) of impact due to weather events
  - Late 2022 atmospheric river
  - Early 2023-Spring 2023 atmospheric river and heavy storms
  - Late 2023 post-tropical storm Hilary and atmospheric river
  - Early 2024 atmospheric river
  - Late 2025 storm event
  - Winter 2026 rain events (pictured)



Changes to Scope/ Delays from AHJ's

- SCE – delay from weather impacts and power cutover
- LADWP – delay in removal of idle oil line, not considered abandoned, for future planning purposes
- County Sanitation
  - Field changes due to differences in site conditions
  - Field changes in siphon encasement materials
  - Request for additional survey resources
- AQMD – multiple rounds of reviews on Procedural P5's and stop work orders





Construction Schedule Overview

- The 2020 estimates showed 18-24 months of active construction
- From July-October 2022 the Contractor submitted iterations of the baseline schedule outlining a 29-month construction duration, due to COVID supply issues/material availability and sequencing of work
- The City worked with the contractor to reduce from 29 months to 22-months which was reflected within the contract
- In October 2022, notices were mailed and the project website conveyed 22 months of construction work.
- The original contractual start date was November 2022 with a completion date of September 2024
- Due to the unanticipated delays outlined, the anticipated completion date is now September 2026



Remaining Project Milestones

UTILITIES
- Activate new sewer line and remove temporary bypass system
- Install new storm drain lines
- Install new potable and reclaimed water lines
- Electrical adjustments

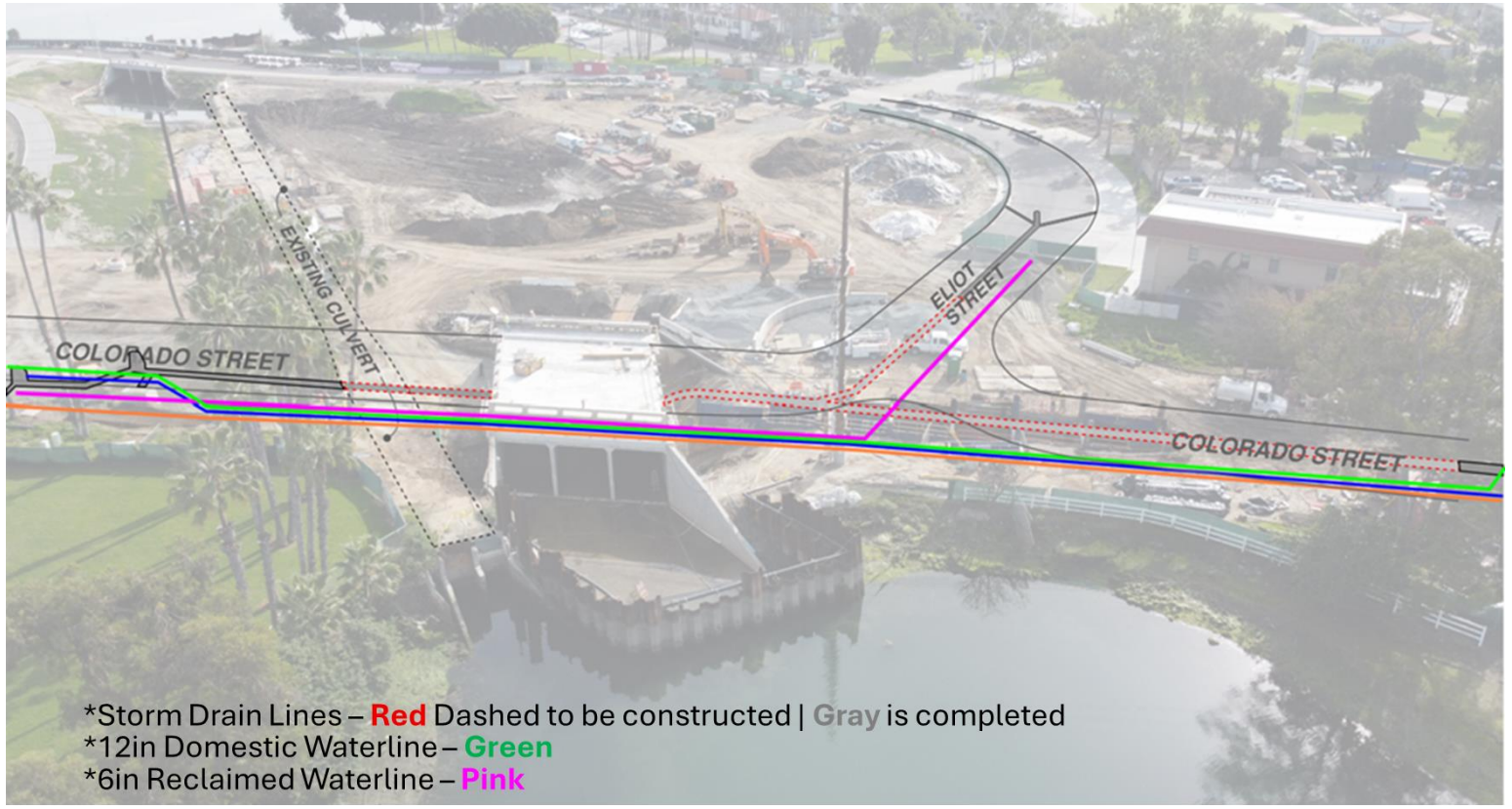
EARTHWORK AND GRADING
- Colorado Street trenching for remaining utilities
- Culvert demolition
- Open channel final grading and marsh planting

PAVING
- Eliot Street Final Surface Paving
- Colorado Street backfill, curb, gutter and Paving

Marina Vista Park Open - July 2026
Colorado and Eliot Streets Open – September 2026

Opening of Eliot Street

- Opening of Eliot Street requires all utilities to be completed along Colorado Street
- The sewer system connection is beyond the Eliot and Colorado intersection
- Backfilling can only be completed once utilities are tested, commissioned, and accepted by agencies
- New systems must be live before temporary systems are decommissioned



Financial Summary

FUNDING SOURCES	AMOUNT
Port of Long Beach MOU	$30.5M
Tidelands Funds	$6.89M
Additional Tidelands appropriation	$2.0M
RMC Grant for Marina Vista Park	$1.5M
RMC Grant Match for Marina Vista Park	$800K
Long Beach Utilities	$775K
Measure A	$150K
TOTAL FUNDING	**$42.6M**

Financial Summary

PROJECT COSTS	AMOUNT
Original Construction Contract	$24.56M
Contract Amendment #1	$2M
Proposed Contract Amendment #2	$4.5M
Total Revised Construction Contract	**$31.06M**
Design, Permitting, & Regulatory Support	$6.9M
Construction Management, Inspections, Testing, Permit & Connection Fees	$3.08M
PM Fees, Percent for Arts, PLA Compliance, Overhead	$1.52M
Project Delivery Costs	**$11.5M**
TOTAL ANTICIPATED PROJECT COST*	**$42.56M**

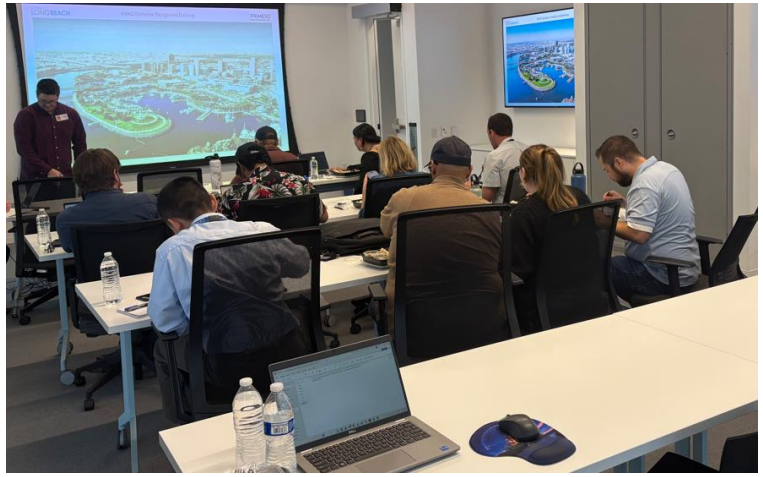
*This is an estimate as not all Change Orders have been submitted, reviewed, and approved

Lessons Learned – Project Related

- Unique, coastal, once-in-a-generation projects are challenging and are subject to unique issues and challenges
- Standard soil testing and subsurface investigations were conducted, but certain conditions may only become apparent during construction and are addressed in accordance with applicable regulatory and project requirements
- Most available subsurface investigations including vacuum excavation, geotechnical testing and geophysical tools such as ground penetrating radar (GPR) all have inherent limitations and may not detect all underground conditions, particularly in coastal environments with higher groundwater levels
- Project scheduling and public communications were developed based on standard assumptions at the time of design and bid
- Additional analysis will be performed after completion to incorporate lessons learned into future projects

Lessons Learned - Introspective

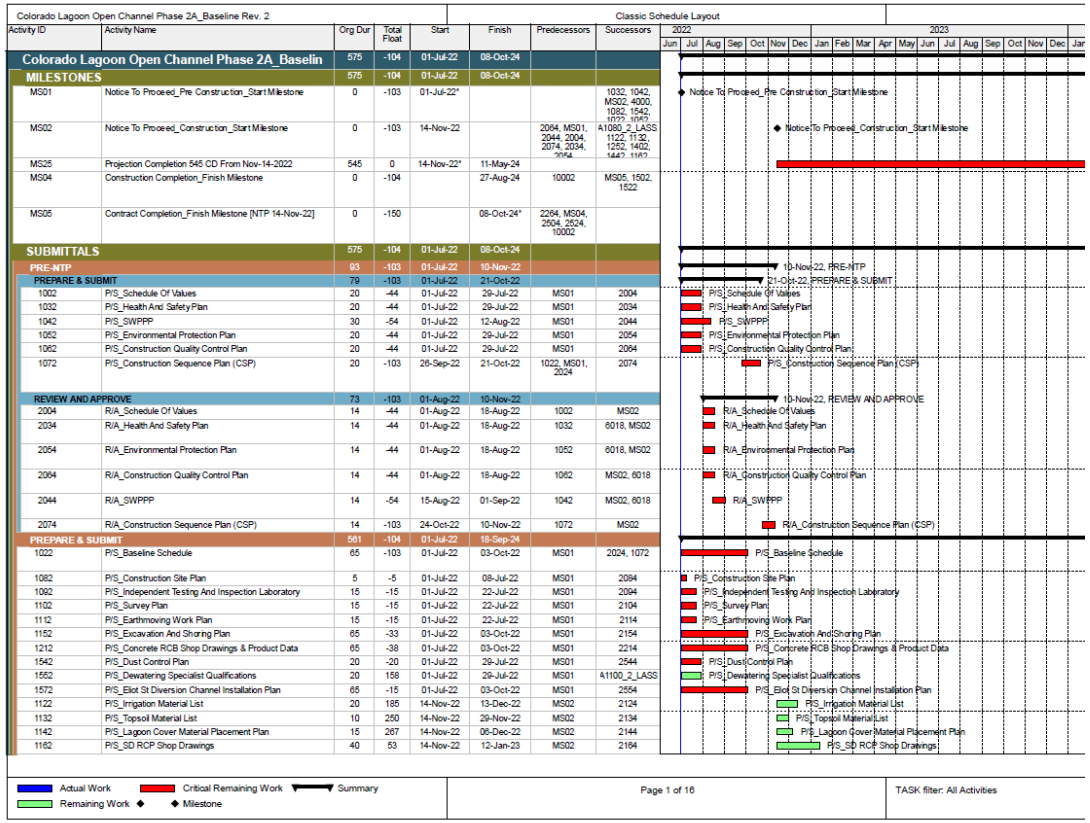
- Continue to host project management trainings led by industry experts: schedule, risk, claims management, and specifications development
- Apply Project Management Institute (PMI) risk register documentation and other best management practices
- When reviewing projects nationally, most large public projects experience delays due to a combination of factors including:
  - Interagency coordination
  - Market conditions and supply chain volatility
  - Design complexity including unknown conditions
  - Regulatory coordination
  - Stakeholder processes and coordination





Opinions of Probable Duration

- Opinions of probable construction duration are developed by the engineers and estimators
- Developed using industry standards for production rates, materials and quantities derived from plans and specifications, material production schedule, and site and access constraints
- Construction durations do *not* account for time associated with unforeseen conditions
- Each unforeseen encounter (or change) is negotiated on a case-by-case basis for merit and time
- Weather impacts or rain events are considered unforeseen conditions
- Smaller, easier to replicate projects have a higher probability of coming in on time and on budget (within ~1-3 months). Examples shown on the following slides.



Case Study – Routine Projects

MacArthur Park Renovation

Scope: Parkwide renovation including the construction of a new full-size basketball court, picnic shelters, seating, lighting, walking trail, playground renovation/expansion, new custom shade structures, fitness equipment, parkour equipment, new grassy areas and irrigation system, ADA improvements to parking lot, exterior painting of existing buildings, landscaping and planting.

Total Budget: $10.5M | **Construction Costs**: $8.3M

Timeline: construction commenced late Spring 2024 and was completed summer 2025 as published.

- Only 6 weather days impacted the work
- Did not encounter any significant challenges that impacted critical path – challenges were resolved concurrent to other activities/work including mis-fabrication of shade structures
- Work did not require any new utility connections





Case Study – Routine Projects

Ramona Park Signature Playground

Scope: Significant upgrade to the park since its last renovation in 1997. The new design features inclusive play equipment for children of all ages, along with shade structures, misters, and improved seating areas, creating a more welcoming, engaging, and accessible space for families.

Total Budget: $2.8M | **Construction Costs**: $1.65M

Timeline: construction commenced Winter 2025 and was completed fall 2025 as published.

- Zero impacts to critical path due to weather
- Did not encounter any significant challenges that impacted construction including park equipment availability
- Did not require any new utility services or connections or encounter unforeseen conditions subsurface





Case Study – Routine Projects

Davenport Park Expansion

Scope: Expanded the existing 5.5-acre park to 11.5 acres, including construction of a multi-use sports field, fitness stations, outdoor seating areas, a walking trail, and additional parking capacity.

Total Budget: $9.4M | **Construction Costs**: $6.5M

Timeline: construction commenced Summer 2023 and was completed fall 2024 as published.

- Zero weather impacts to critical path
- Did not encounter any significant challenges that impacted construction including material availability or long lead times
- Did not require any new utility services or connections





Case Study – Routine Projects

Silverado Park Signature Playground

Scope: Add new, inclusive play equipment and site furnishings with accessible pathways and ADA-compliant amenities. The playground encourages sensory, physical, and imaginative play, with two distinct areas for tots (ages 2–5) and school-age children (ages 5–12).

Total Budget: $2.45M | **Construction Costs**: $1.38M

Timeline: construction commenced Winter 2025 and was completed fall 2025 as published.

- Zero weather impacts to critical path
- Did not encounter any significant challenges that impacted construction including material availability or long lead times
- Did not require any new utility services or connections







Case Study – Routine Projects

Junior Lifeguard Facility

Scope: Construct new facility on beach to support Junior Lifeguard program and operations. New utility laterals including electrical, plumbing, water, and sewer.

Total Budget: $2.8M | **Construction Costs**: $1.99M

Timeline: construction commenced late fall 2022 and opened summer 2023.

- While this project was impacted by long lead times, the building was procured ahead, and separately, of construction contract to avoid significant delays. A long-lead time for electrical equipment was addressed through provision of temporary systems.
- Did not encounter any differing site conditions that delayed the critical path schedule





Case Study – Routine Projects

Loynes Drive Improvements

Scope: Project improvements will include roadway resurfacing, sidewalk replacement, new curbs/gutters, driveway replacements, American Disabilities Act (ADA) compliant curb ramps, in addition to bike lane and traffic improvements along the 0.25-mile corridor

Total Budget: $2M

Timeline: construction commenced summer 2022 and completed late 2022.

- The project did not encounter unforeseen conditions that caused any schedule delays
- Routine roadway resurfacing, sidewalk replacement and curbs and gutters, and ADA compliance curb ramps were able to be performed without any conflicts to utilities





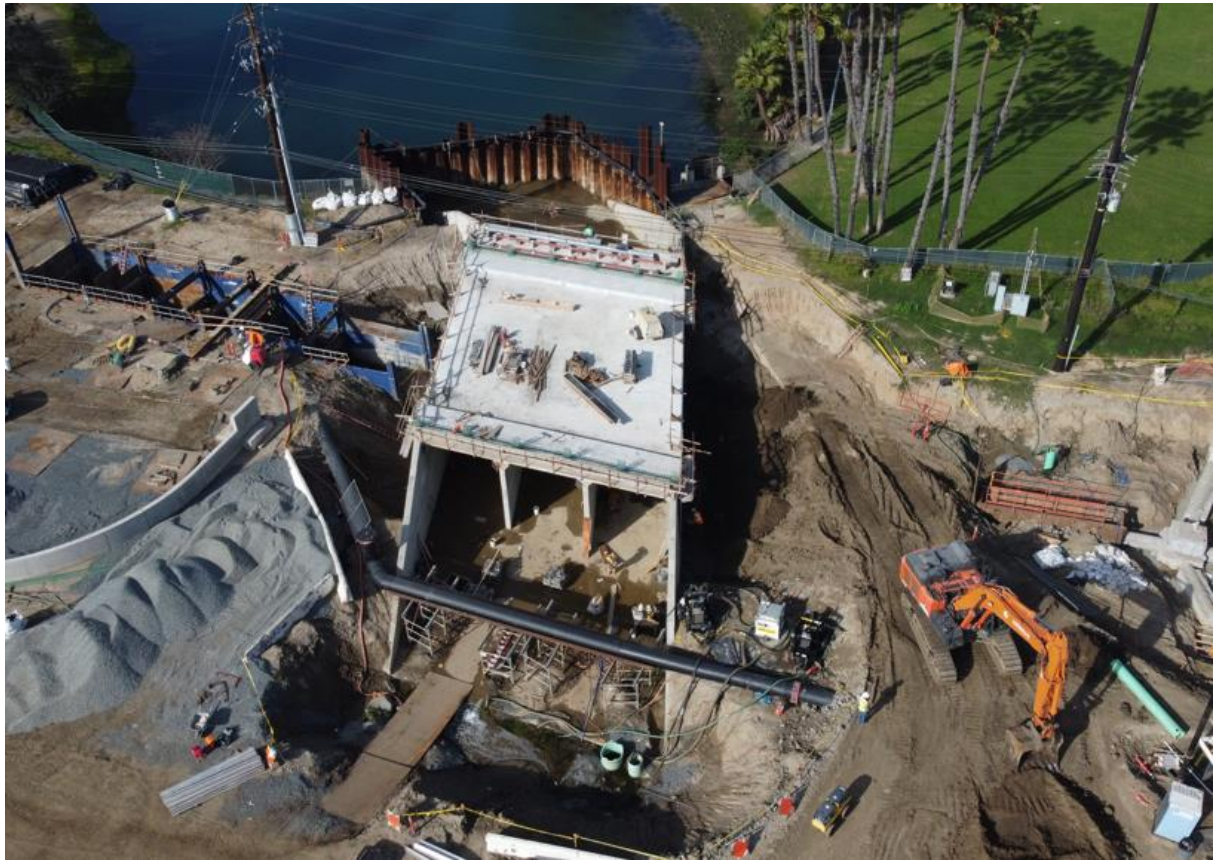
Community Considerations

- Davies Bridge Rehabilitation
  - Postpone until after 2028
  - Minimize closures in the area
  - Minimize risk of construction delays impacting 2028 Olympics
- Davies Boat Launch Ramp
  - Launch ramp closing April 27, 2026
  - No streets are closed
  - Reopening in 2027



Colorado Bridge Construction





Recent Activity – Storm Drain Installation and Roadway Backfill





Recent Activity – Landscaping





Recent Activity - Landscaping



Project Benefits - Habitat Value

- More than 22 acres of restored habitat
  - Eelgrass
  - Intertidal Mudflat
  - Vegetated Marsh
  - Shallow Subtidal
  - Deep Subtidal
  - Supratidal Marsh
  - Sandy Intertidal and Supratidal
  - Native Upland Buffer
- Restored tidal regime in Colorado Lagoon
- Runoff filtration through bioswales
- Hands on education, improved coastal resources and enhanced public access



Questions

THANK YOU


Colorado Lagoon North Arm