

# Independent Evaluation and Audit ( Peer Review) of Water Main Pipeline Projects

48" Patuxent Raw Water Main Project  
Audit Findings and Recommendations

Public Meeting  
2/11/2026



# Welcome!

- 💧 This hybrid meeting is enabled by the Microsoft Teams platform
- 💧 For those online, do your best to be in a **quiet, stationary** environment.
- 💧 For those online, use the “**raise hand**,” **chat** and **reaction** functions to communicate throughout the meeting. For those in person, please hold all questions until the end.
- 💧 For those online, remain on “mute” until the Q&A Session. During this time, raise your hand and upon being called on you may ask your question, for those online, unmute yourself when called upon.
- 💧 Respect others, please practice mutual respect for all present during this meeting, both in-person and online.
- 💧 To make sure we hear from as many people as possible, **please keep questions to two minutes** .

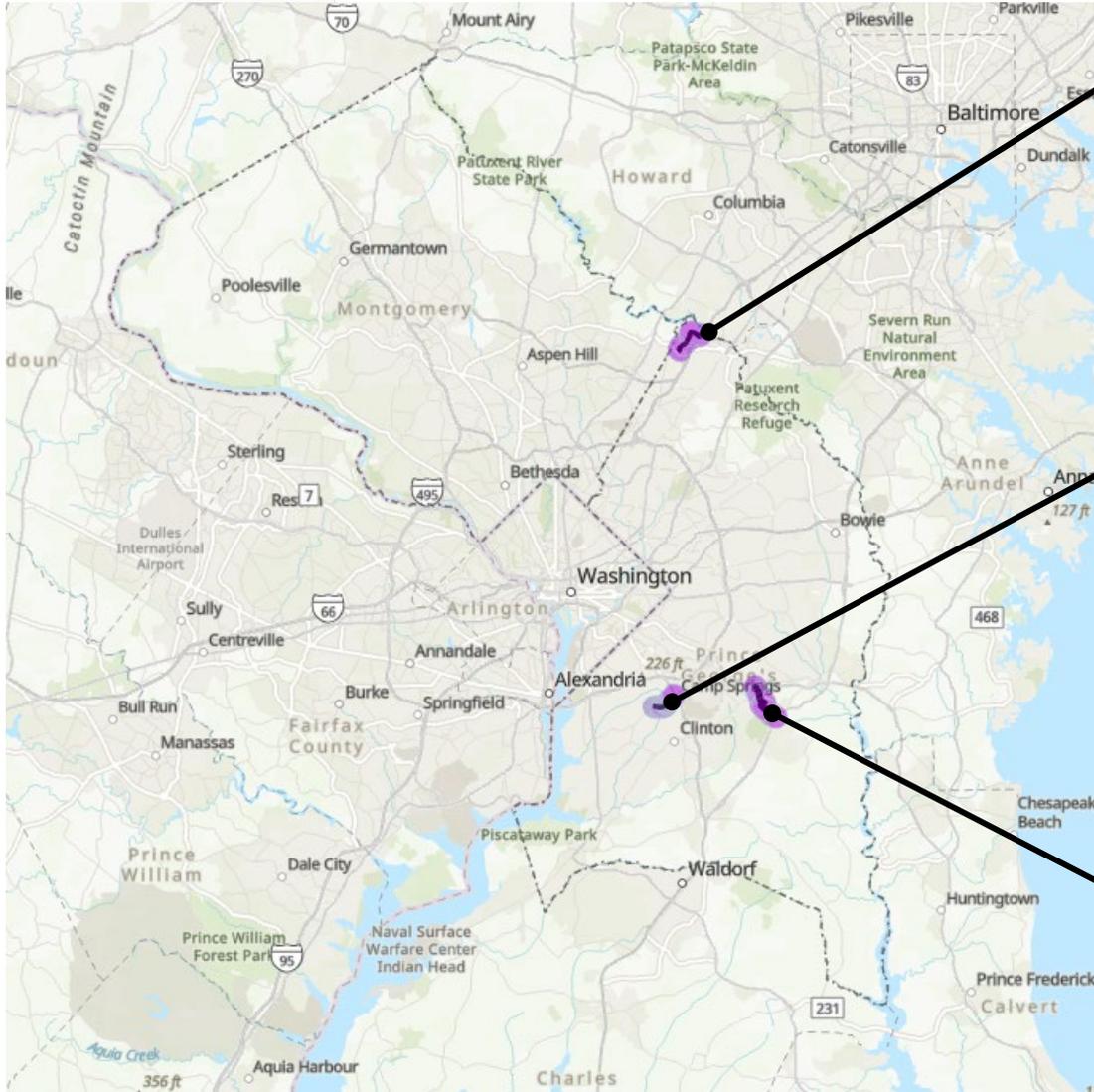
# Agenda

- ◆ Contract Scope
- ◆ Project Overview
- ◆ Methodology
- ◆ Planning & Design
- ◆ Procurement & Contracting
- ◆ Construction Execution
- ◆ Construction Schedule Evaluation
- ◆ Cost and Financial Analysis
- ◆ Internal and External Coordination
- ◆ Community Engagement
- ◆ Lessons Learned
- ◆ WSP Q&A
- ◆ WSSC Water Update
- ◆ WSSC Water Q&A

## Contract Scope

WSSC Water requires a consultant to evaluate and audit the project delivery for the Patuxent Raw Water, Allentown Road Water Main Replacement and Osborne Road Water Main Replacement projects. The Consultant shall provide recommendations for process improvements across planning, design, construction, and inspections as well as community communications.

# Three Water Main Projects



## Patuxent 48" Raw Water Pipeline (Bond Mill Road Project)

Installation of 2.5 miles of 48" raw water pipeline from Rocky Gorge Pumping Station to Patuxent Filtration Plant

## Allentown Road Water Main Replacement

Replacement of 3.57 miles of water mains (4" - 42"); upgrading from 20" existing pipes to 42" water mains

## Osborne Road Water Main Replacement

Replacement of 2.43 miles of 30" water mains and 1.24 miles of 4" to 24" water mains

# Project Overview

## Project Purpose:

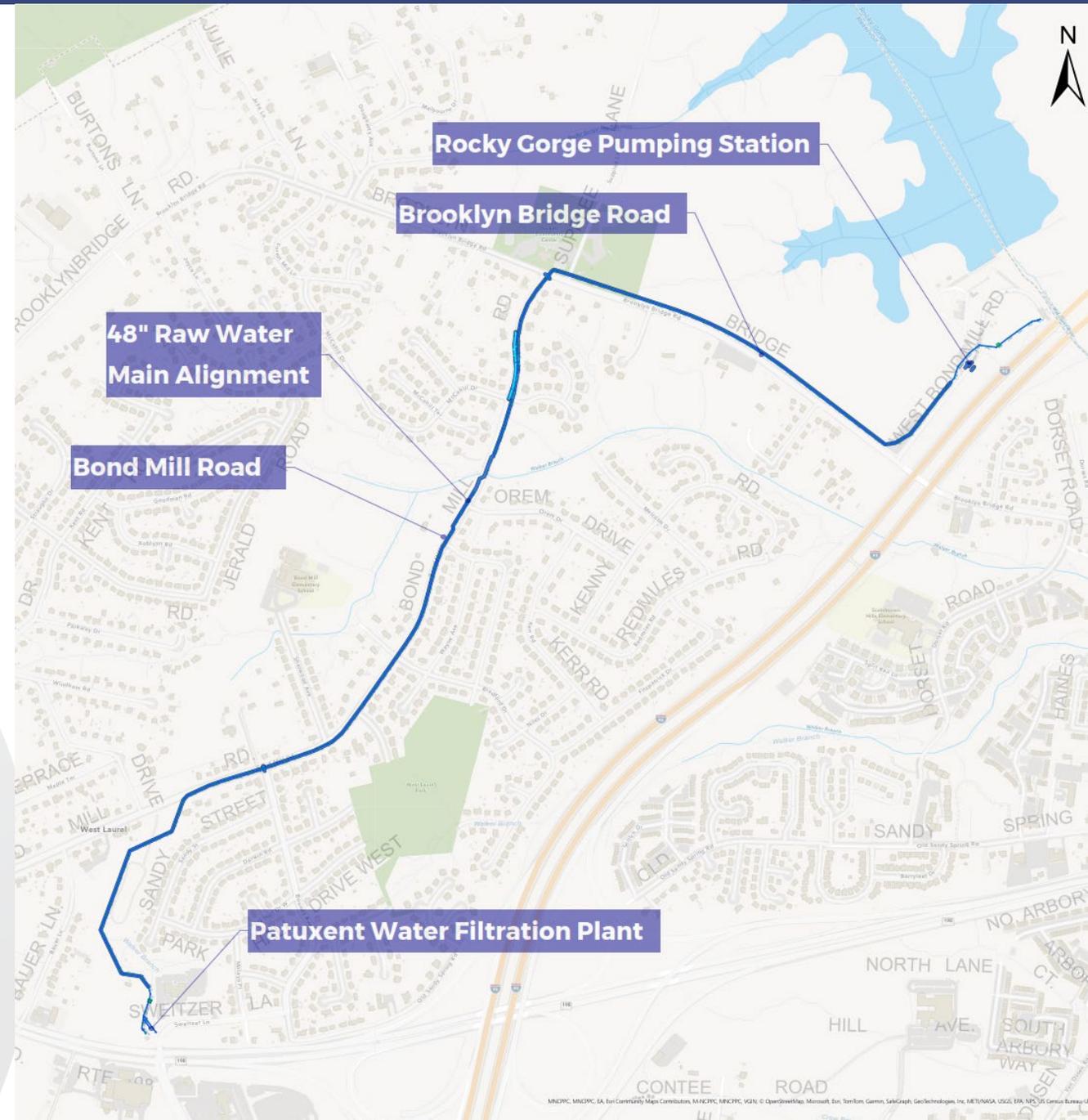
The project involves installing 2.5 -mile, 48 -inch diameter pipeline to connect pumping and filtration facilities, enhancing water delivery. The new pipeline increases water system capacity from 72 to 110 million gallons per day, improving water system resiliency.

## Project Challenges:

The project faced challenges including extended timelines, change orders, and stakeholder dissatisfaction requiring audit oversight.

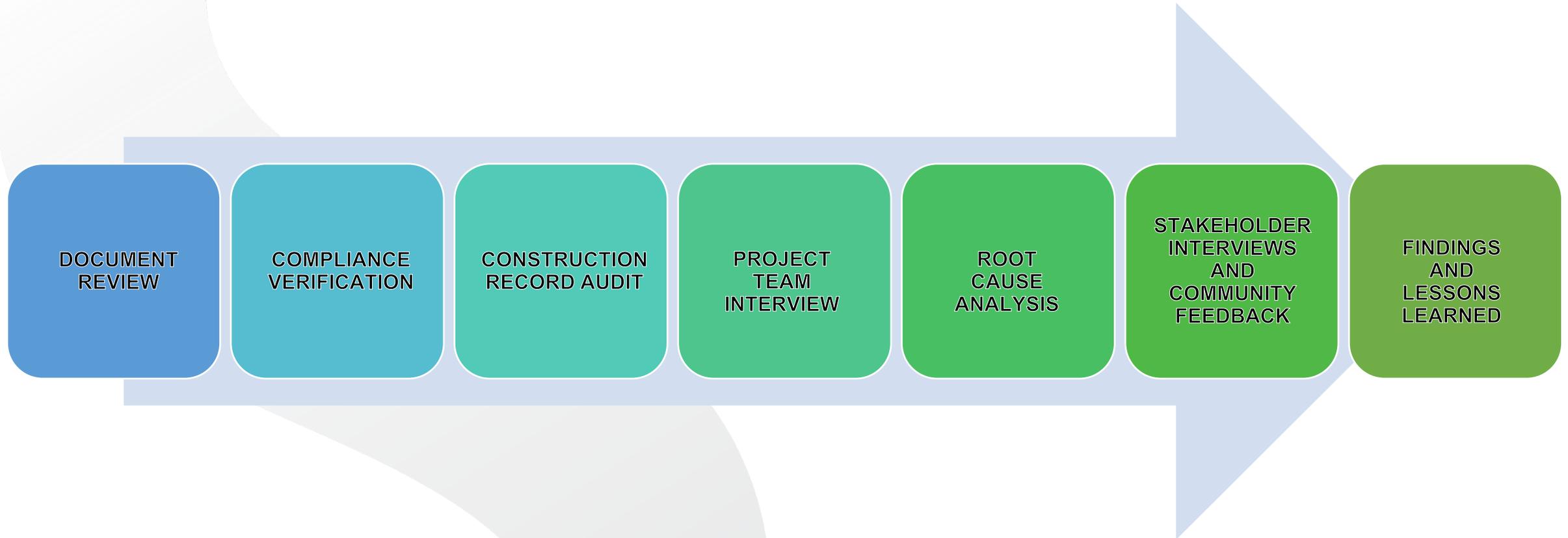
## Project Audit:

An independent audit was commissioned by WSSC Water to ensure transparency, accountability, and continuous improvement in project delivery.



# Methodology

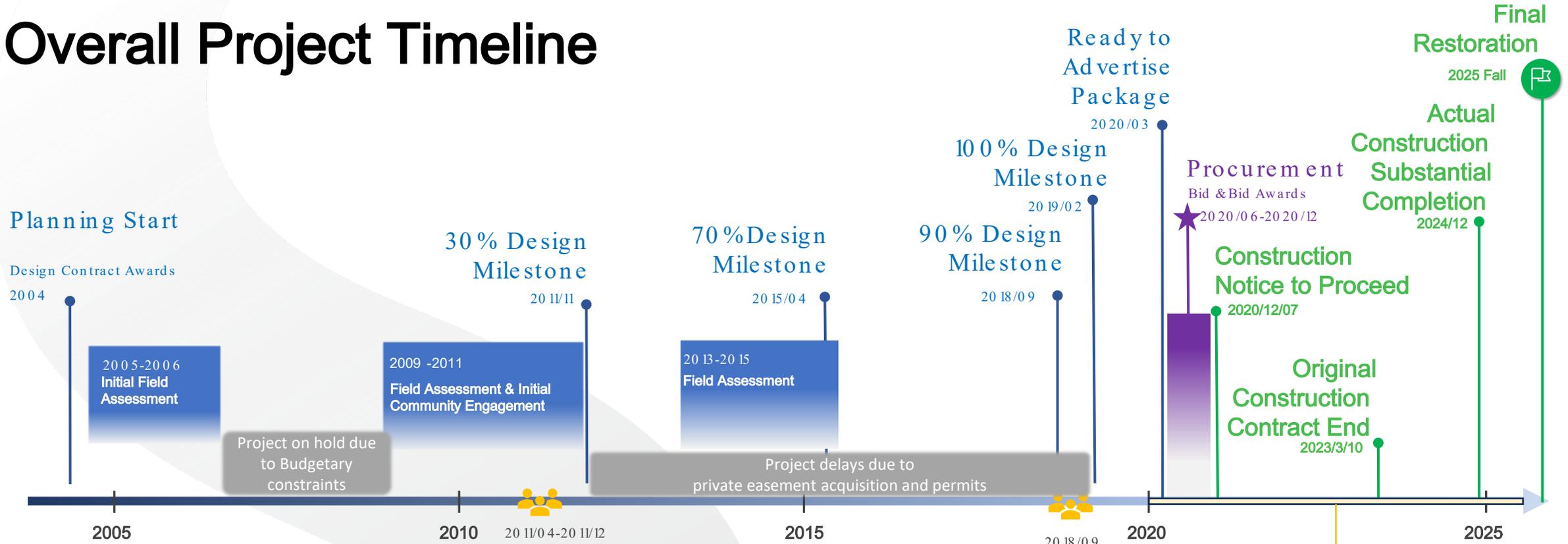
# Methodology



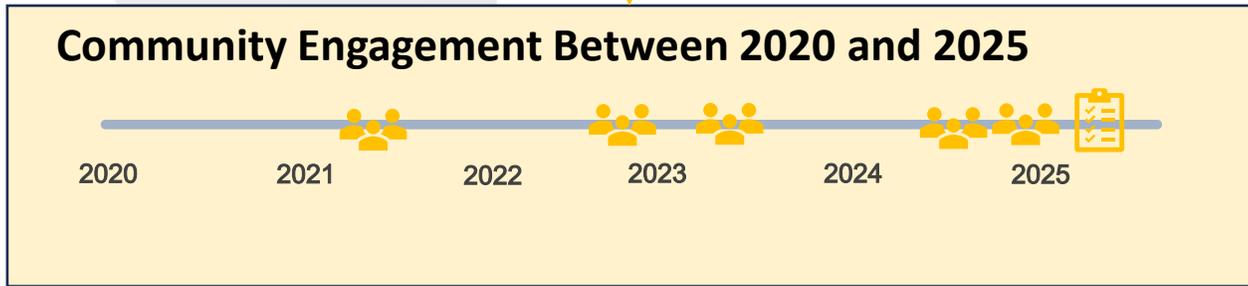
- 💧 Independent audit is an **Objective** and **Impartial** review, grounded in **Verifiable Evidence**.
- 💧 **Unbiased, Evidence -Based, and Free from subjective interpretations**

# Planning & Design

# Overall Project Timeline



- Planning & Design
- Procurement
- Construction
- 👥 Community Meeting
- 📋 Task Force Meeting



# Planning Phase: 2004 - 2011

## Alignment Planning and Community Engagement

- WSSC Water proactively engaged community and stakeholders (Elected officials, BGE and SHA) on alignment planning

## Long timeline adding challenges

- Long Delays weakened early stakeholder engagement
- Disconnect of Community Commitments in Construction Execution
- Outdated Site Baseline Conditions



## Recommendation for future projects

- Commitments should be clearly written into construction contracts along with construction oversight to ensure they are followed during execution.
- Reduce pre -construction period to minimize changes in field condition; update outdated baseline conditions for long planning projects.

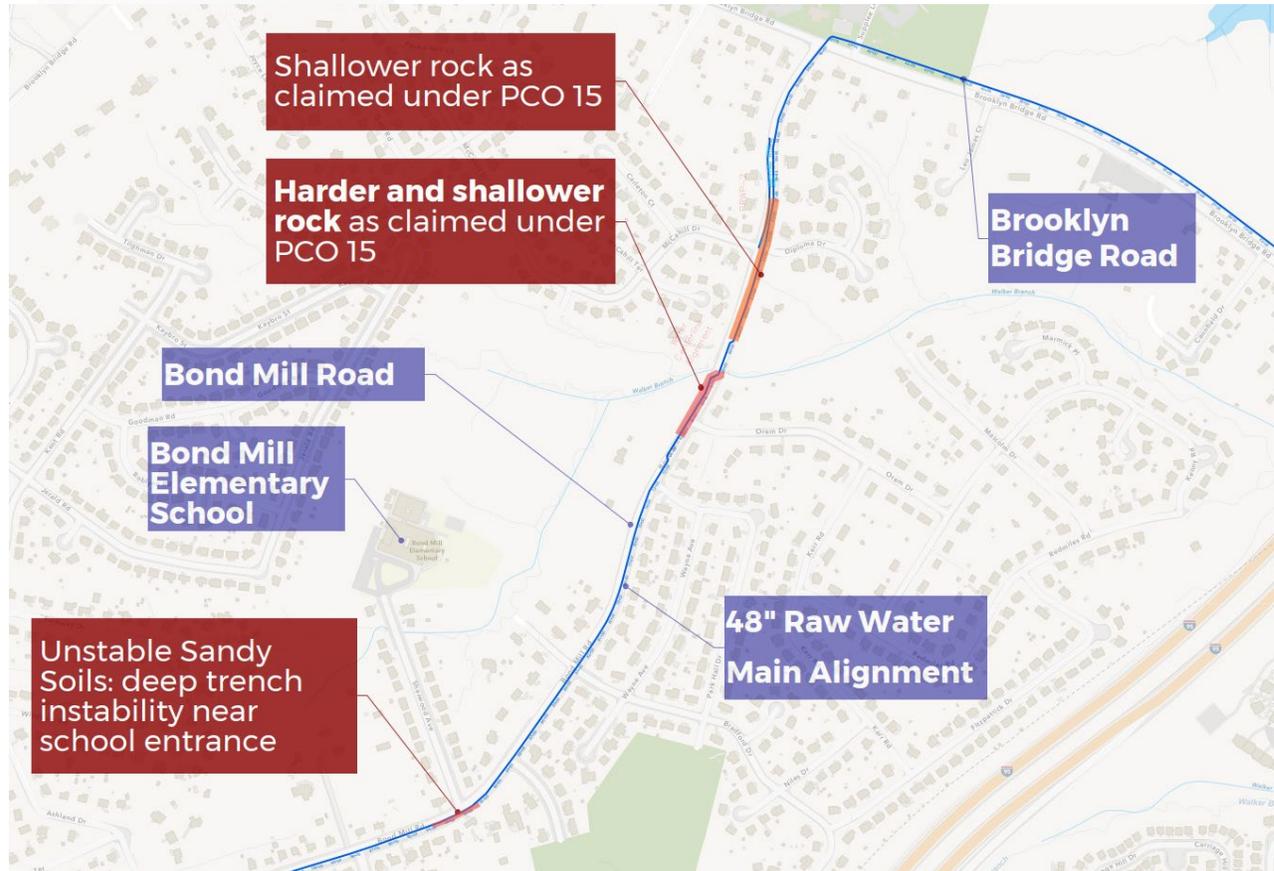
# Design Phase: 2011 -2020

## 💧 Subsurface Utility Engineering Gaps

Conflict Type	Underlying Cause	Impact on Project
Sewer Laterals (SHCs)	Several unmapped or mislocated sewer house connections due to outdated records	Major rework and delays; ~\$307k change orders; ~51 days delay
Gas Mains	Incorrect utility data or new installations post -design	Work with Design modifications; ~\$93k; ~8 days delay
Water House Connections (WHC)	Not all identified or correctly marked by Miss Utility	Repairs/Clean up: ~\$22K, ~4 days
Storm Drain/Other	Conflicts with drainage structures or uncharted small mains	Cost Adjustment ~\$21K; no significant delay
Communication Cables	Unrecorded or unexpected telecom lines	Negligible impact; no delay

# Design Phase: 2011 -2020

## Key Geotechnical Challenges



## Unanticipated Subsurface Issues

### Rock

- Encountered rock was **harder** and at a **higher** elevation than Geotech Report indicated, causing major construction challenges, change orders, and delays.

### Unstable Sandy Soils

- Deep trench instability (near Bond Mill Elementary School) due to saturated sand at the pipeline low point.

# Design Phase: 2011 -2020

## 💧 Geotechnical Investigation Gaps

### Insufficient Geotechnical Coverage & Depth

- Missed local bedrock high points.
- Original Investigation did not reflect later design changes

### Gaps in Design & Documentation on key Warnings

- Key warnings of Geotech challenges not clearly communicated
- Geotechnical reports and addenda not included

# Design Phase: 2011 -2020

## • Constructability Review & Risk Assessment –Key Gaps

### Pipe Schedule and Material Procurement:

- Limited Flexibility on Field Changes
- No Intermediate Valves/Breaks: Unforeseen obstructions halted progress
- Sequential Dependencies: Impact pavement timing, and inability to isolate sections

### Pavement Restoration Issues related to Design/Planning:

- Lack of phased testing/paving in design consideration
- Permanent patching deferred to after entire pipeline testing
- Temporary patches exceeded 60 -day limit specified

# Design



## Recommendation for future projects

### Utility Coordination

- Conduct high -quality utility investigations
- Update findings if data outdated
- Early and continuous engagement with utility owners.
- Improve record research.
- Invest in asset management for sewer and water house connection data.

### Geotechnical Risk Management

- Perform extra investigations at key locations or when design changes.
- Share geotechnical risks prior construction .
- Include all geotechnical reports and updates.
- Define clear safety requirements in project plans.

### Constructability & Risk Management

- Proactive risk management
- Thorough Constructability Review with experienced construction manager.
- Provide construction flexibility.
- Plan for phased water main installation with pavement restoration.
- Include detailed sequencing and safety measures.
- Coordinate closely with community stakeholders to minimize disruption.

# Procurement & Contracting

# Procurement

## 💧 Procurement Package & Material Procurement - Gaps

### Contract Procurement: Missing Documentations

- Critical supporting documents (Geotechnical studies, plumbing cards) were not included in the bid package.

### Material Procurement: Supply Chain Challenges

2022 supply chain disruptions led to bulk delivery of all remaining pipeline materials, causing:

- Lease BGE ROW for storage.
- Inefficient and loss of productivity.
- Storage and inspection challenges



### Recommendation for future projects

- Include critical reports to the bid documents or add notes for Contractor to request for information.
- Proactive plan for supply chain disruption mitigation

# Construction Execution

# Construction Execution

## 💧 Documentation / Process

Document Type	Quality	Risk Identification	Approval Process	Timeliness
Plans/Specifications	✓	✓	✓	✓
Pre-construction Meeting Minutes	✓	✓	✓	✓
Pre-construction Submittals	Missing a handful of preconstruction submittals.			
Request for Information (RFIs)	✓	✓	✓	p
Submittals	-	-	✓	-
Monthly Progress Meetings	✓	✓	N/A	p
Daily Inspection Reports (DIRs)	Not always	p	✓	✓
QC Reports (Compaction Test)	p	p	✓	p
QA Reports	p	✓	✓	p
Schedule Updates	✓	✓	Occasionally	✓

# Construction Execution

## Key Findings:

### High Importance:

- Quality irregularities: backfilling material, compaction, pavements, inspection.
- Gaps in project schedule control.
- Insufficient data regarding existing underground utilities.
- Geotechnical data not sufficient.

### Medium Importance:

- Missing important pre - construction submittals
- Delayed responses to Requests For Information, Submittals (construction drawings, materials list, etc.).
- Irregular/ Insufficient progress meetings.

### Moderate Importance:

- Lacking trench safety enforcement.
- Daily Inspection Reports missing information such as depth of excavation, type of material used, and record of personnel and machinery use time.
- Contradictions between Quality Assurance, Quality Control and Daily Inspection Reports.
- No documented Maintenance of Traffic oversight.
- Missing follow -up on utility strike incidents.

# Construction Schedule Evaluation

# Construction Schedule Evaluation

## Original vs Actual Timeline

Milestone	Original (2021)	Actual (End of 2024)
Notice to Proceed (NTP)	Dec 7, 2020	---
Substantial Completion	Oct 4, 2022	Dec 10, 2024
Contract Required Completion	Mar 10, 2023	—
Duration (Calendar Days)	823	1,464
Total Delay	—	641

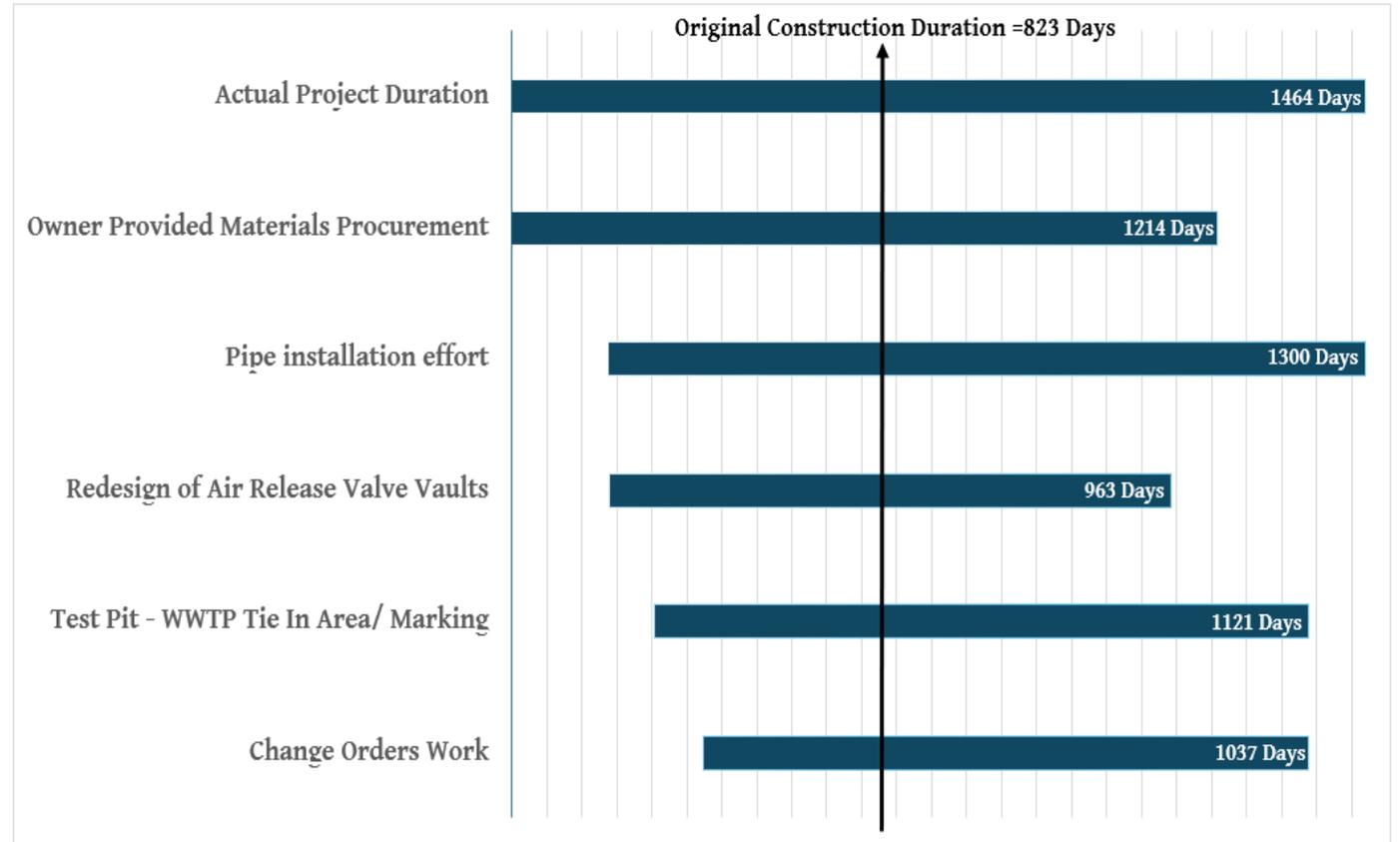
Original: 157 calendar days available buffer  
 Delay: 641 calendar days

# Construction Schedule Evaluation

## Root Cause of Delays

### Major Contributors to Delays:

1. Reduced productivity
  - a. Due to encountered rock.
  - b. Due to soil conditions.
  - c. Due to rehandling of material.
2. Contractor demobilized .
3. Redesigned Air Release Valve Vaults.
4. Periodic utility conflicts.
5. Adjustments to lay schedule.
6. Delayed delivery of fittings .
7. Utility Marking inside WSSC Water Facilities.



Independent Evaluation and Audit of Water Main Replacement Project

## 48" Patuxent Raw Water Main Project

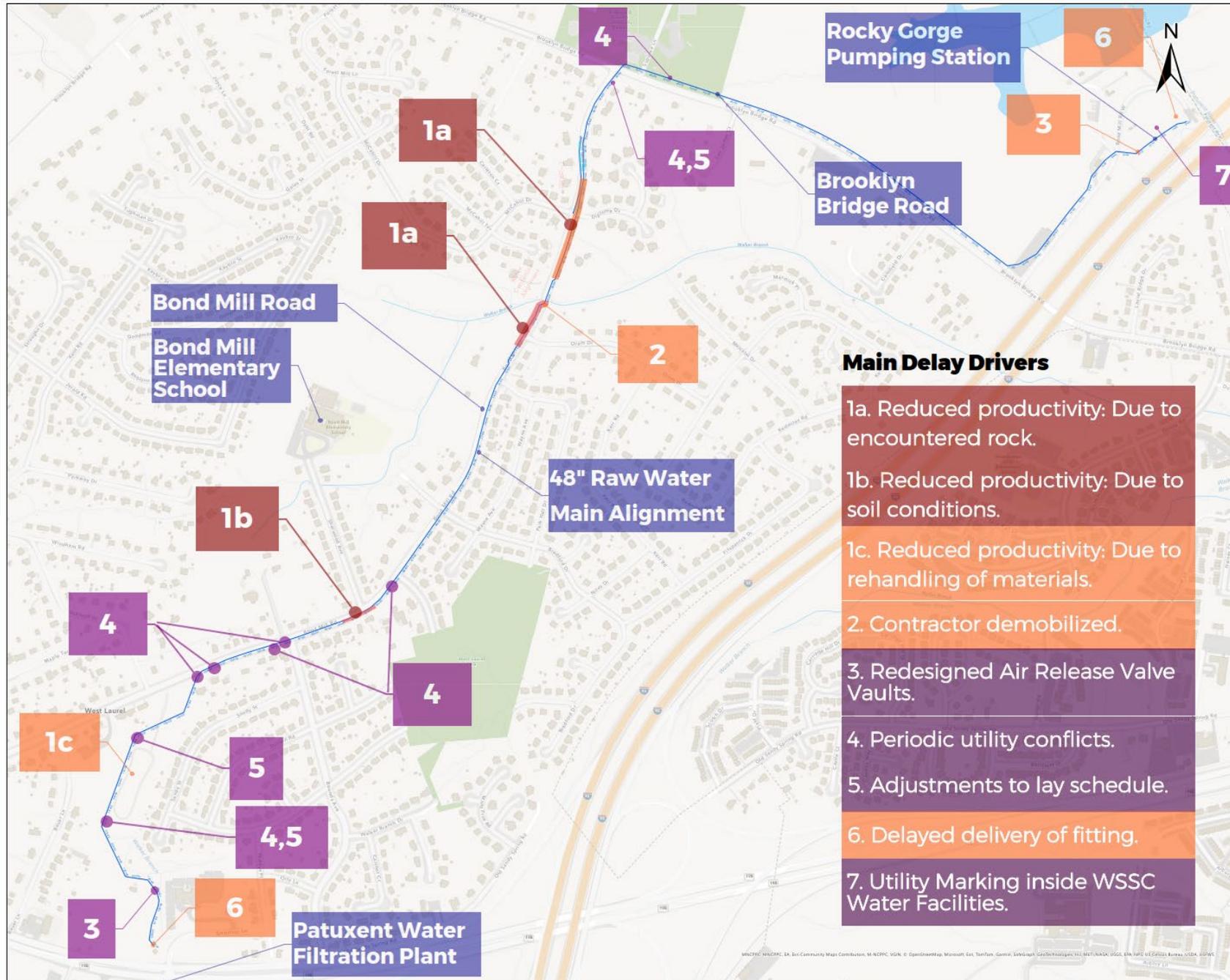
### Legend

Project Water Mains

Geotech Related Challenges

Utility Conflicts

Other Challenges



### Main Delay Drivers

- 1a. Reduced productivity: Due to encountered rock.
- 1b. Reduced productivity: Due to soil conditions.
- 1c. Reduced productivity: Due to rehandling of materials.
- 2. Contractor demobilized.
- 3. Redesigned Air Release Valve Vaults.
- 4. Periodic utility conflicts.
- 5. Adjustments to lay schedule.
- 6. Delayed delivery of fitting.
- 7. Utility Marking inside WSSC Water Facilities.

600 300 0 600 Feet



# Cost and Financial Analysis

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## Planned Budget vs Cost at Completion

Item	Amount (USD)	Notes
Original Engineer's Estimate	\$10,400,000.00	-
Original Contract Price	\$8,393,777.00	NTP, the selected contractor was the lowest bid, other bids were estimated at \$12-13M.
Approved Change Orders (CO #1-7)	\$1,093,280.05	As of Pay Request No. 49 (May 2025) 13% Overbudget.
Current Total (Contract + CO #1 -7)	\$9,487,057.05	Does not include pending PCO #15
Pending Proposed Change Order (PCO) #15	TBD	Rock excavation costs under negotiation

# Construction Execution, Schedule and Cost



## Recommendation for future projects

### Strengthening QA/QC

- Require contractor QC plans at the project outset.
- Internal QA Plan.
- Timely sharing of non-compliances and track corrective actions.
- Hold regular QA/QC meetings and track submittals.

### Change Management for unforeseen conditions

- Agile change management.
- Cost benefit analysis of potential alternative options.
- Establish regular Change Control review meetings.
- Documentation of Time and Material for Change Orders in DIRs.

### Integrate Schedule & Contract Requirements

- Align baseline schedules with contract constraints.
- Review and approve schedule updates.
- Update the community on schedule changes and/or delays.

### Improve Documentation & Process Management

- Implement RFI closure checklist.
- Enforce timeliness of submittals/RFI responses.
- Track material deliveries, QC tests, safety incidents, pavement incidents, and neighbor impacts.
- Document correspondence for consistent risk management.

# Internal and External Coordination

# Internal and External Coordination

## Internal Gaps

- Personnel Turnover/Continuity Gaps
- Design –Construction Handoff Issues
- Delayed Response to Unforeseen Conditions
- Reactive Communication
- Delayed Internal Escalation
- Difficulty Enforcing Corrective Actions

## External Challenges

- Multi -agency Involvement With Long Permitting Process
- Traffic Control, Work Hour Restrictions Limitation
- Utility Company Coordination Challenges

# Internal and External Coordination



## Recommendation for future projects

### Internal

- **Cross-functional project teams** from the start.
- Improve **handoff of documents** between departments.
- Structured **risk management** and joint problem solving and **track updates and risks**.
- Hold **regular coordination meetings** and escalate issues early.
- Improved communication on **enforcing corrective actions**.
- Ensure **public -facing teams have accurate, timely** info from internal sources.

### External

- **Early Engagement:** Initiate permit applications early and align with county, state, and federal review cycles to avoid delays.
- **Dedicated Coordination Plan:** For complex project that required multiple agencies involvements, develop a formal **interagency coordination plan** that includes timelines, responsibilities, and escalation paths.
- **Regular Joint Meetings:** Schedule recurring meetings with agencies and utility owners to discuss upcoming projects and navigate potential conflicts.

# Community Engagement

# Community Engagement

## Stakeholder Interviews and Community Engagement

### Project Team

- WSSC Water Internal Team
- Design Contractor
- Construction Contractor

### 4 Elected Official Interviews

- Delegate Mary Lehman
- Senator Jim Rosapepe
- Council Member Tom Dernoga
- Delegate Ben Barnes

### 3 Community and Resident Interviews

### 17 Completed Comment Forms

### Site Visit and Door Knocking

# Community Engagement

## 💧 Key Findings

Outreach lacked consistency, breadth, inclusiveness, and proactiveness

- Limited Outreach Scope
- Limited Proactive Communication
- Long Communication Gaps

Oversight and contractor performance were inadequate

- Limited Oversight
- Impacts of Poor Temporary Patching
- Trash and Construction Debris Concerns

Agency collaboration was limited and reactive

- Lack of Early Agency Coordination
- Need for Early Collaboration
- Opportunity for Added Benefits

# Community Engagement



## Recommendation for future projects



Community engagement training for WSSC Water planning, design, and construction project managers



Improve external agency coordination



Establish regular communication protocols with Elected Officials



Increase the Frequency of community engagement



Enhance proactive and inclusive community engagement practices



Implement Project Task Force(s) for major projects



For major projects, phase construction to be less disruptive

# Lessons Learned

# Lesson Learned

## 💧 Pre-Construction Phase

Long planning and design phase

Utility Conflicts

Geotechnical Investigation Gaps

Rigid Lay Schedule & Material Procurement

Sequence of Construction and Pavement restoration timeline gaps

Permitting & Agency Coordination

# Lesson Learned

## 💧 Construction Phase

Preconstruction Meeting Gaps

Utility Conflicts

Geotechnical Investigation Gaps

Bulk Delivery/ Handling of Material

Documentation & Reporting Gaps

Site Health and Safety

Delayed RFI Responses & Change Management

Schedule Delays

Quality Control/ Quality Assurance Issues

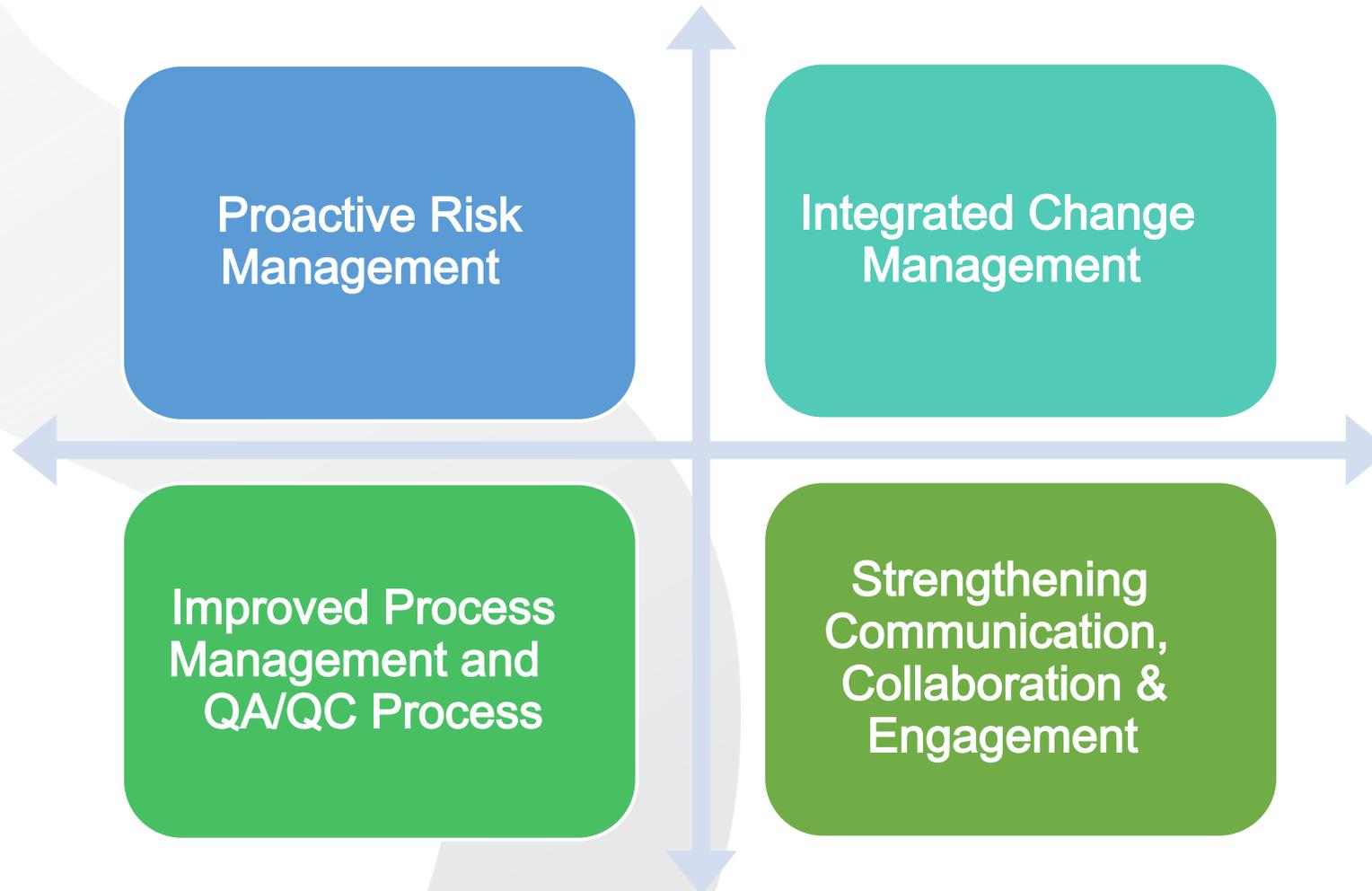
Customer Notification Issues

Risk Management

# Lessons Learned



## Key Recommendations for future projects





# Questions?

# WSSC Water Update



# Questions?