

Collection Systems 2: Digging on the Dock of the Bay

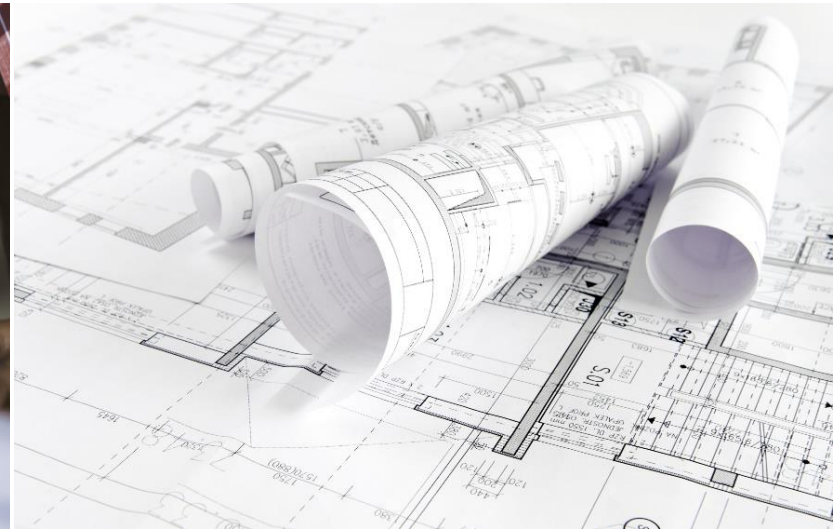
Route 28 East Sewer Expansion Project in Barnstable, MA – The Cornerstone of the Future for a Cape Cod Community



New England Water Environment Association
2023 Annual Conference – Marriott Copley Place, Boston, MA
January 24, 2023

Introduction

- Project Team
- Project Background
- Design Challenges
- Construction

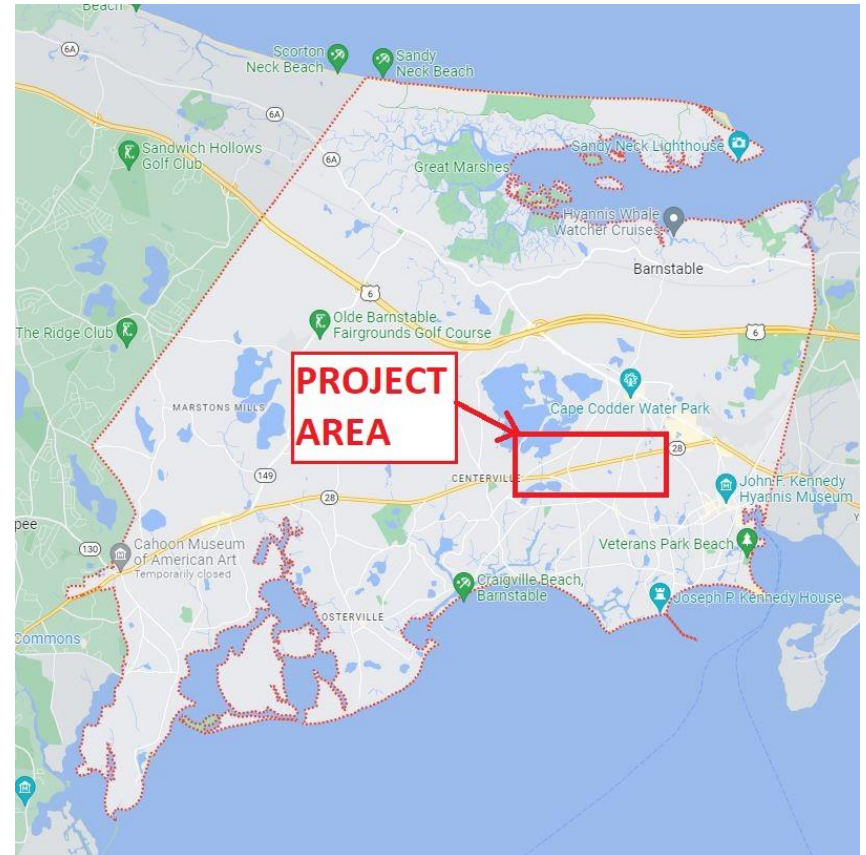
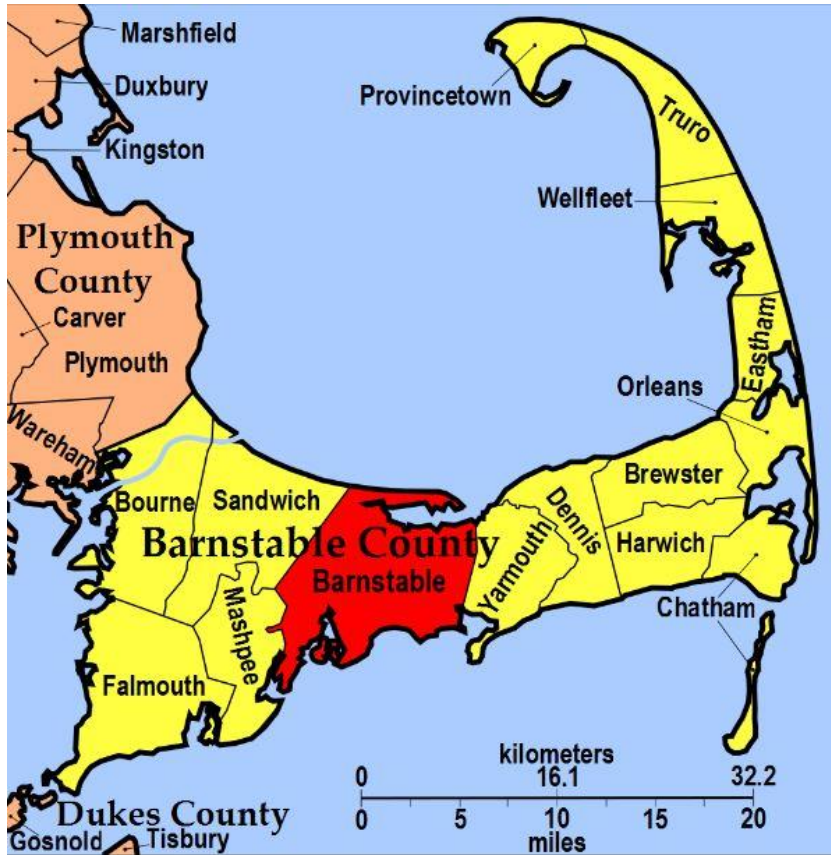


Project Team

- Town of Barnstable, DPW
- Weston & Sampson Engineers, Inc.
- Department of Environmental Protection (DEP)
- Department of Transportation (DOT)

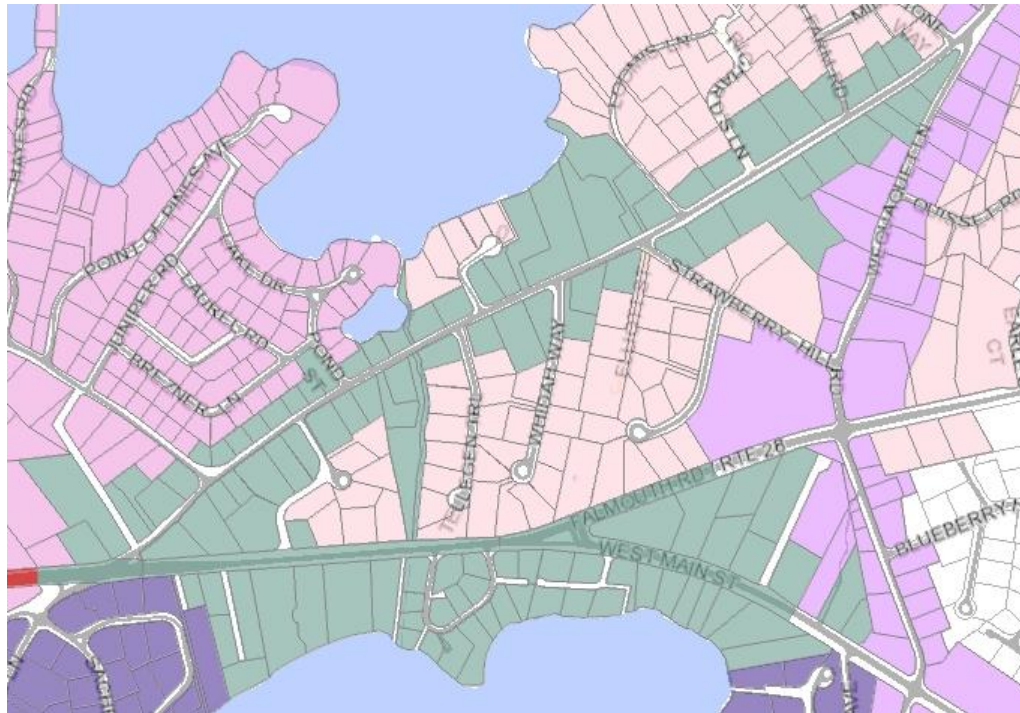


Project Background



Project Background

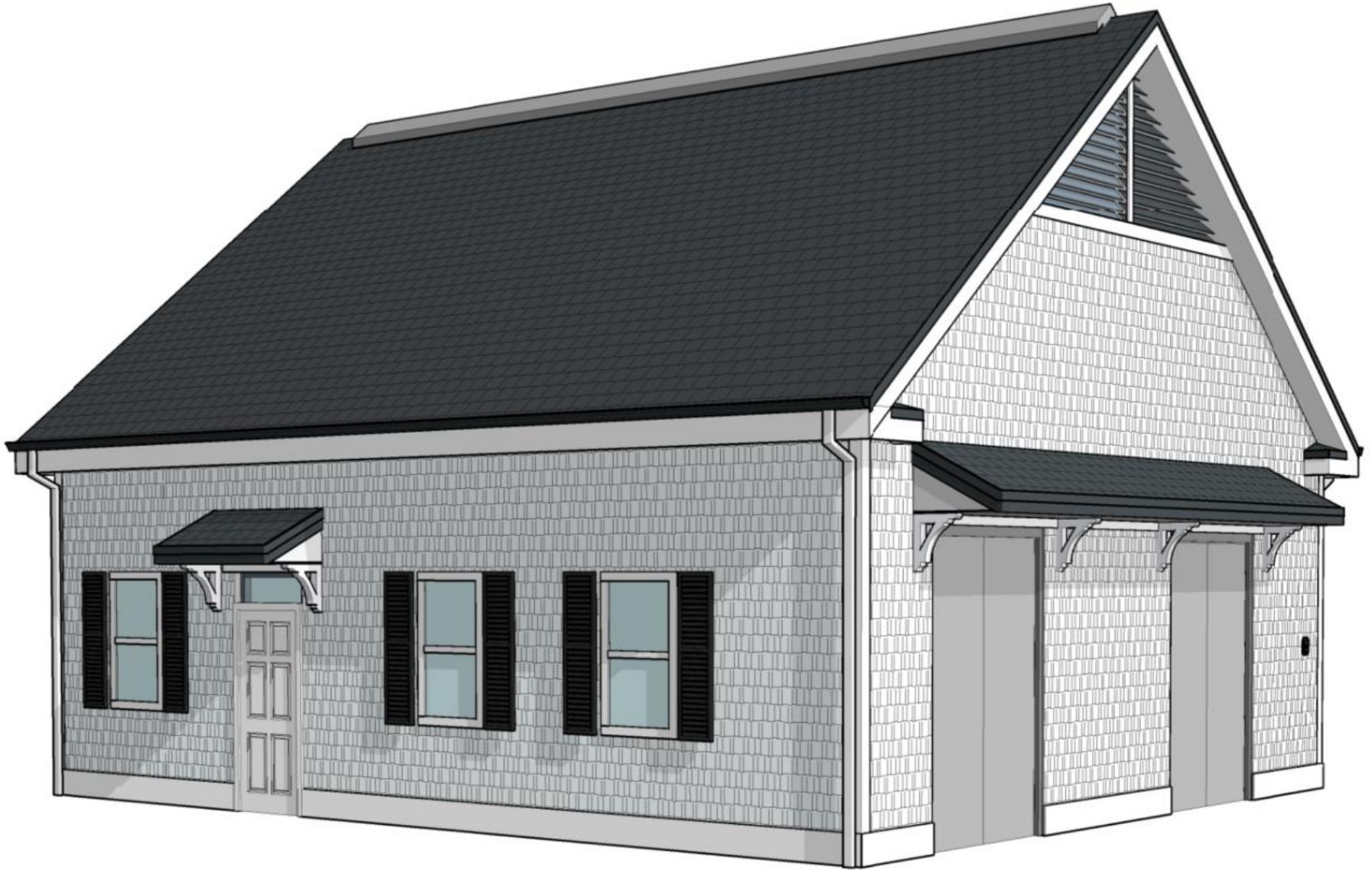
- Approx. 11,000 feet of Gravity Sewer
- Approx. 12,000 feet of Force Main Route
- Phinney's Lane Pump Station
- Backbone of the Town's Sewer Expansion Program



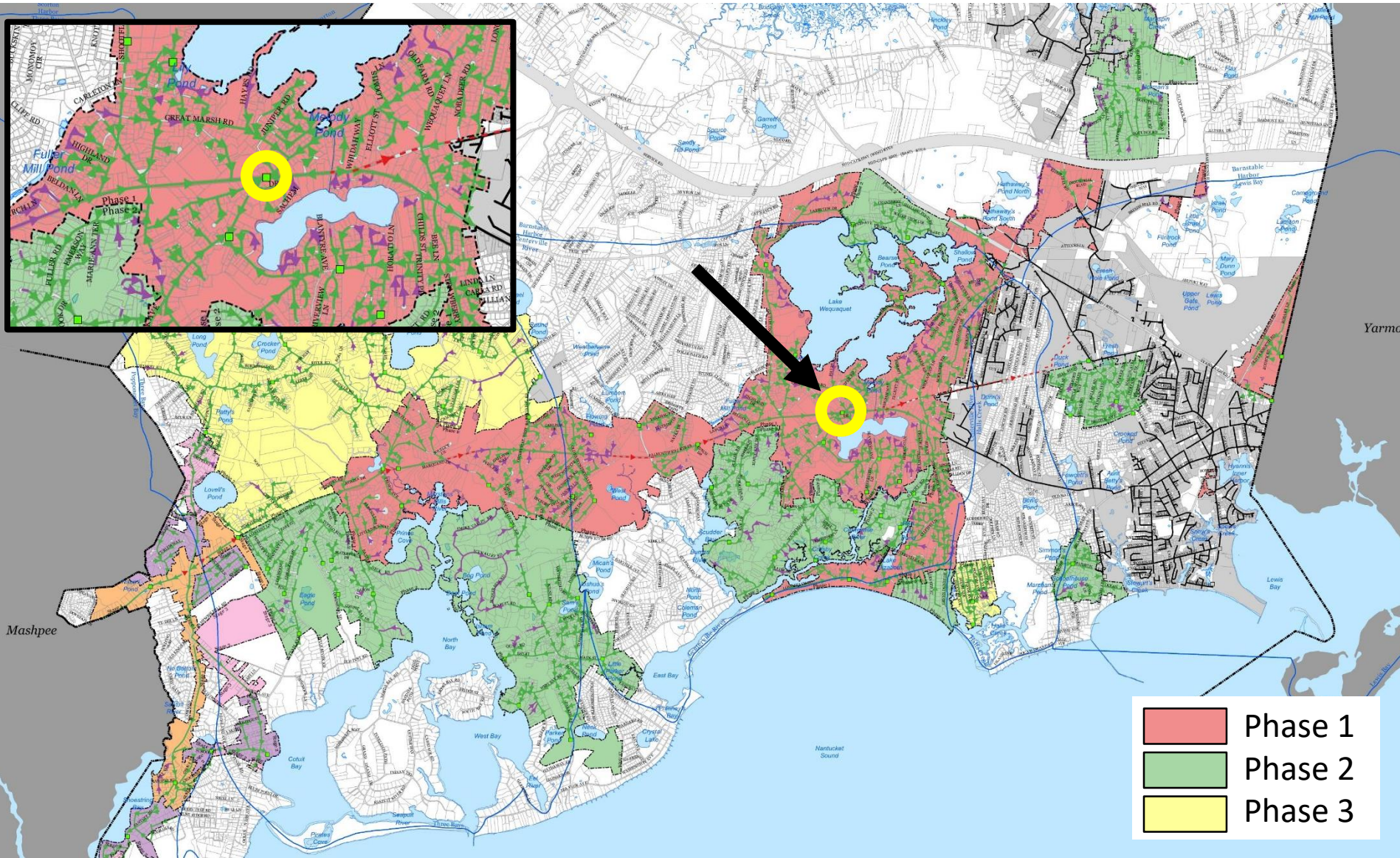
Design Challenges

- Multiple Flow Considerations
- Pipeline Alignment/Corridor
- Herring Run Crossings (Centerville River)
- Connection at Water Pollution Control Facility
- Permitting
- Traffic Management
- Budget Management/Bidding Climate

Phinney's Lane Pump Station



Catchment Buildout

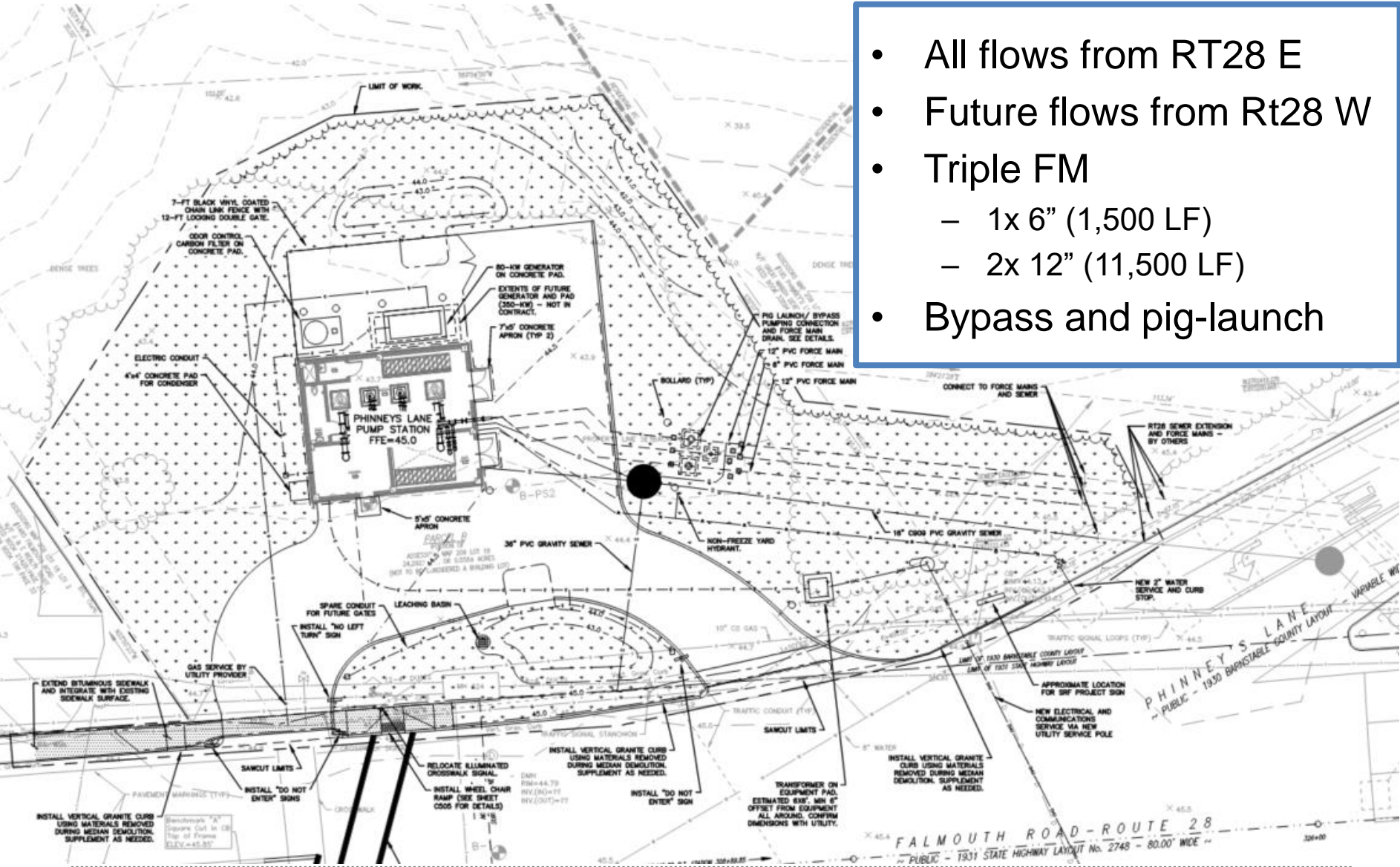


Flow Planning

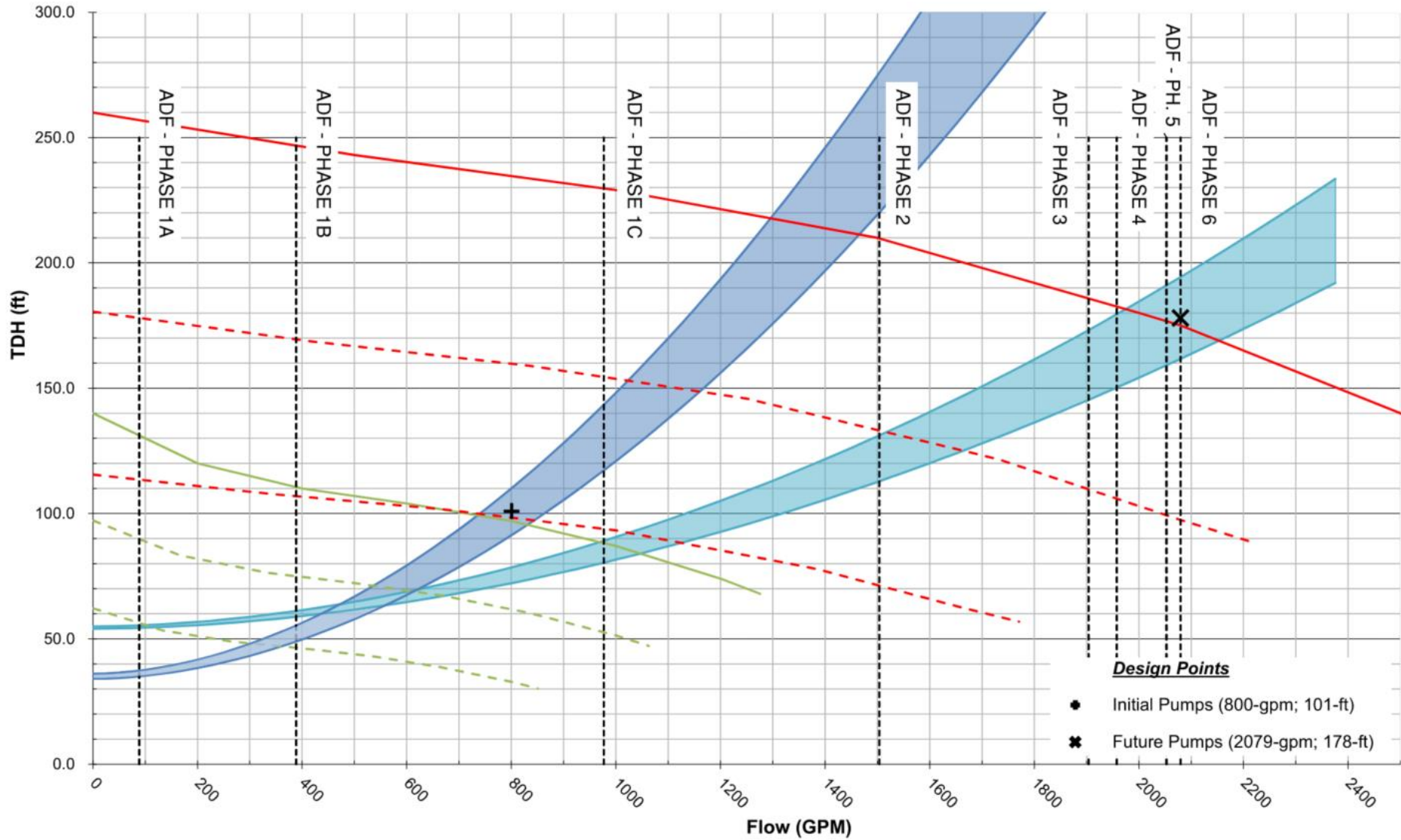
PHASE	TIMING	DWELLING UNITS	COMMERCIAL SPACE [SF]	ADF
1A	2026 (2 Yrs)	100	20,000	0.1 MGD
1B	2029 (5 Yrs)	500	25,000	0.6 MGD
1C	2034 (10 Yrs)	3,000	1,200,000	2.8 MGD
2	2044 (20 Yrs)	5,000	1,900,000	4.3 MGD
3	2054 (30 Yrs)	7,000	2,500,000	5.5 MGD
4:6	>2054 (>30 Yrs)	8,000	2,700,000	6.0 MGD

Site Layout

- All flows from RT28 E
- Future flows from Rt28 W
- Triple FM
 - 1x 6" (1,500 LF)
 - 2x 12" (11,500 LF)
- Bypass and pig-launch



System Hydraulics



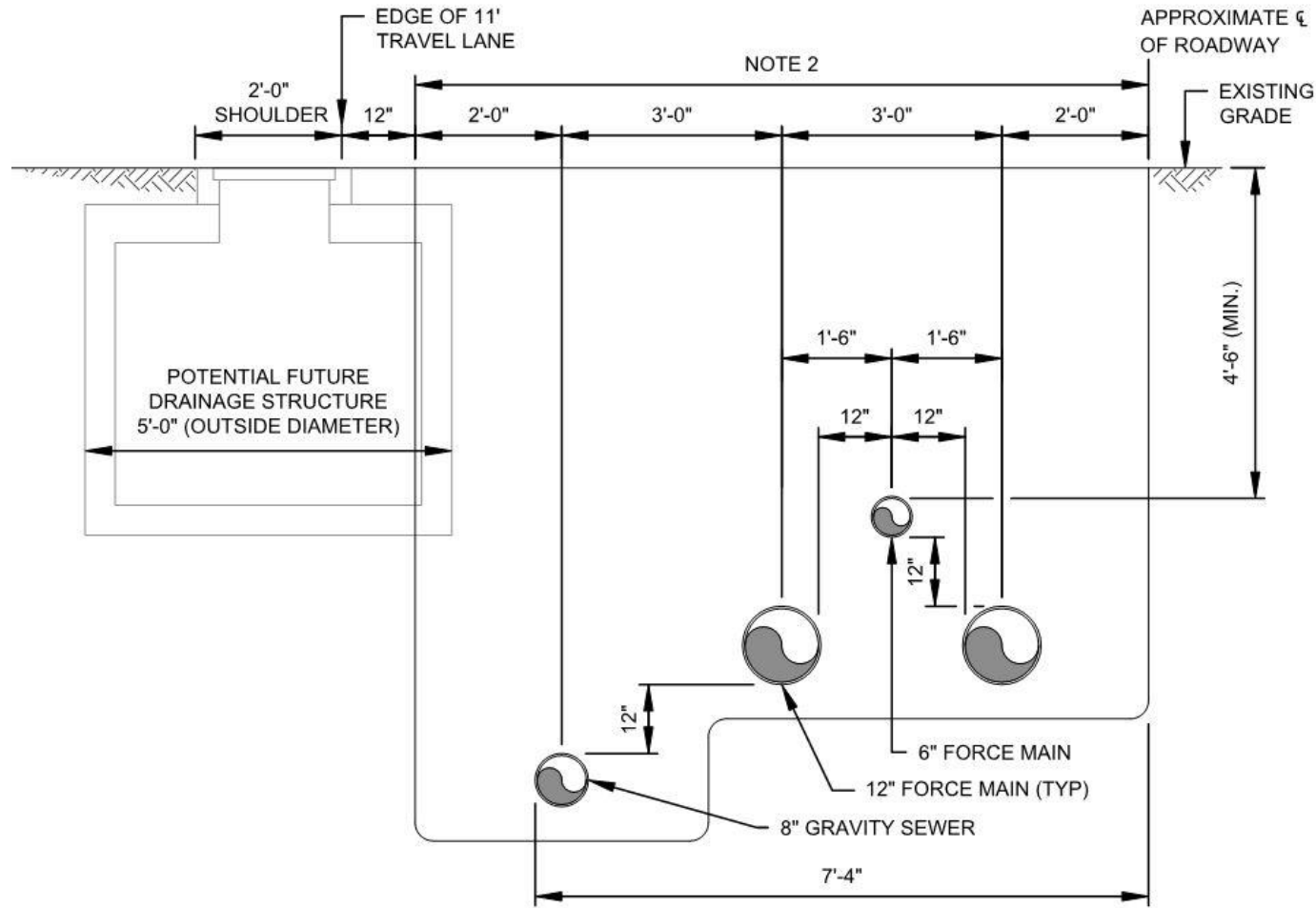
Pipeline Alignment/Corridor

- Travelled Way vs. Shoulder
- Existing Utilities
- Gravity Sewer plus Multiple Force Mains
- Traffic Management
- Connection at WPCF



Pipeline Alignment/Corridor

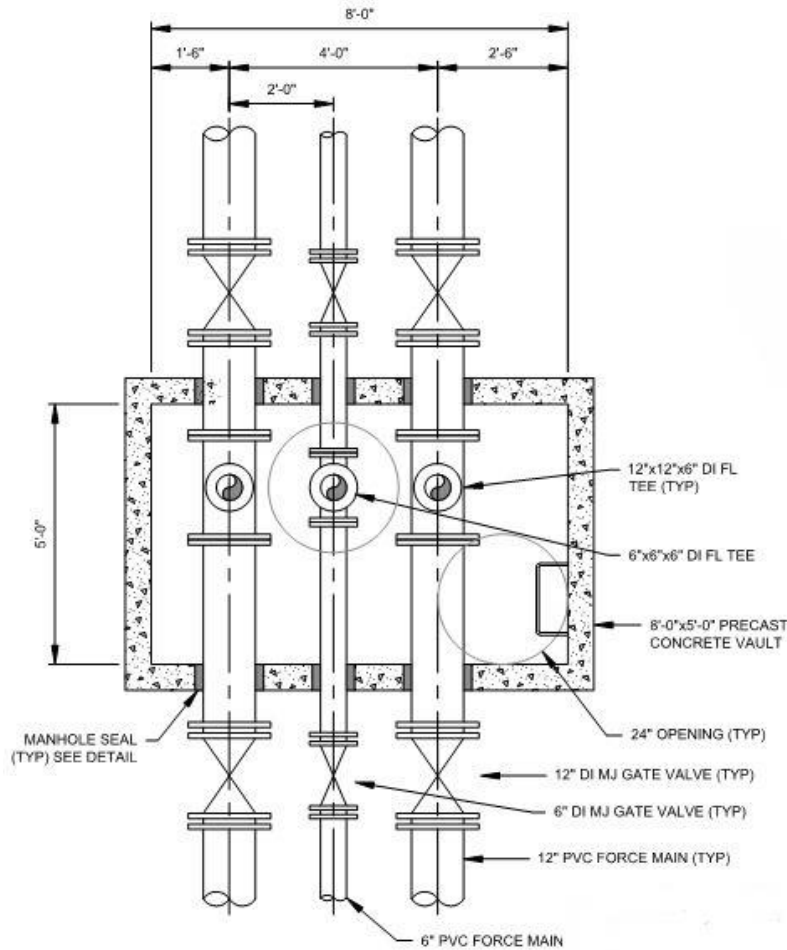
- Gravity Sewer plus Multiple Force Mains



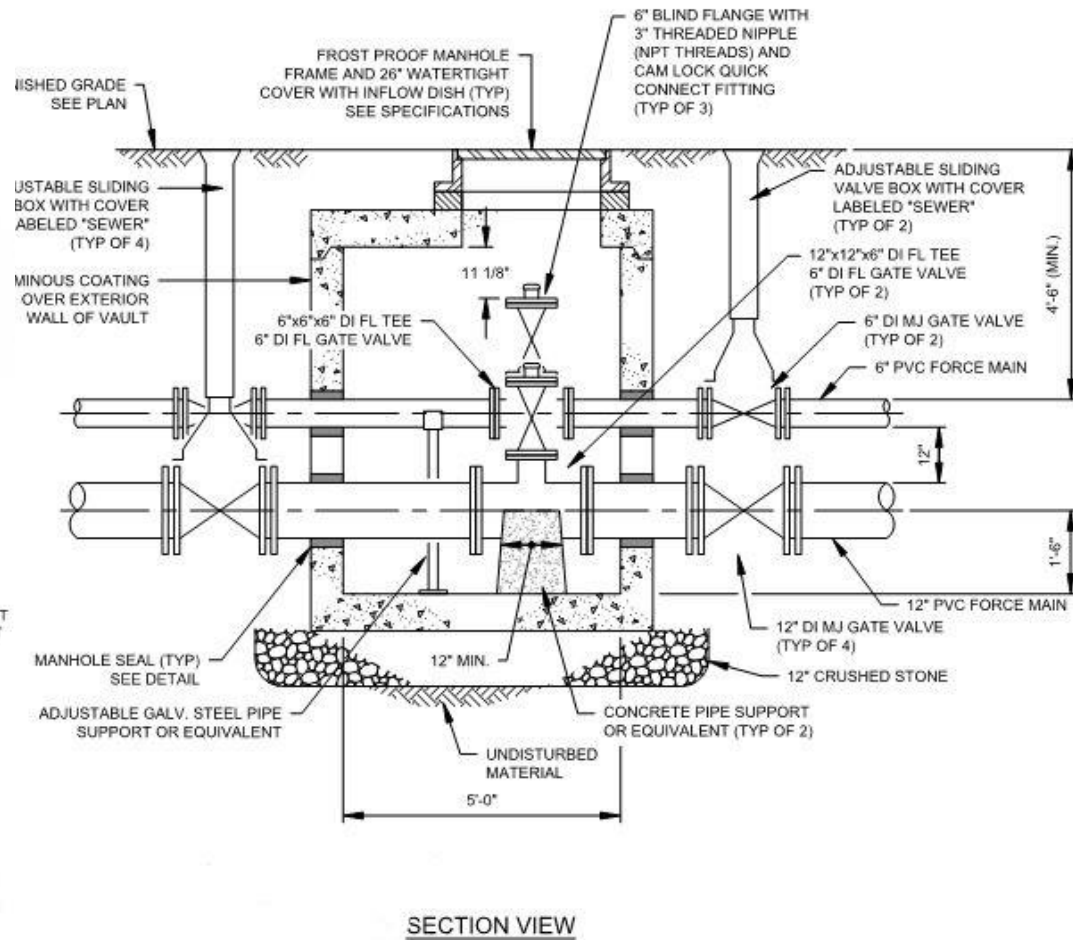
Trench Detail

Pipeline Alignment/Corridor

- Force Main Cleanout Structures



PLAN VIEW



SECTION VIEW

Triple Force Main Cleanout Structure Detail

Herring Run Crossings

- Centerville River



Phinney's Lane



Falmouth Road (Route 28)

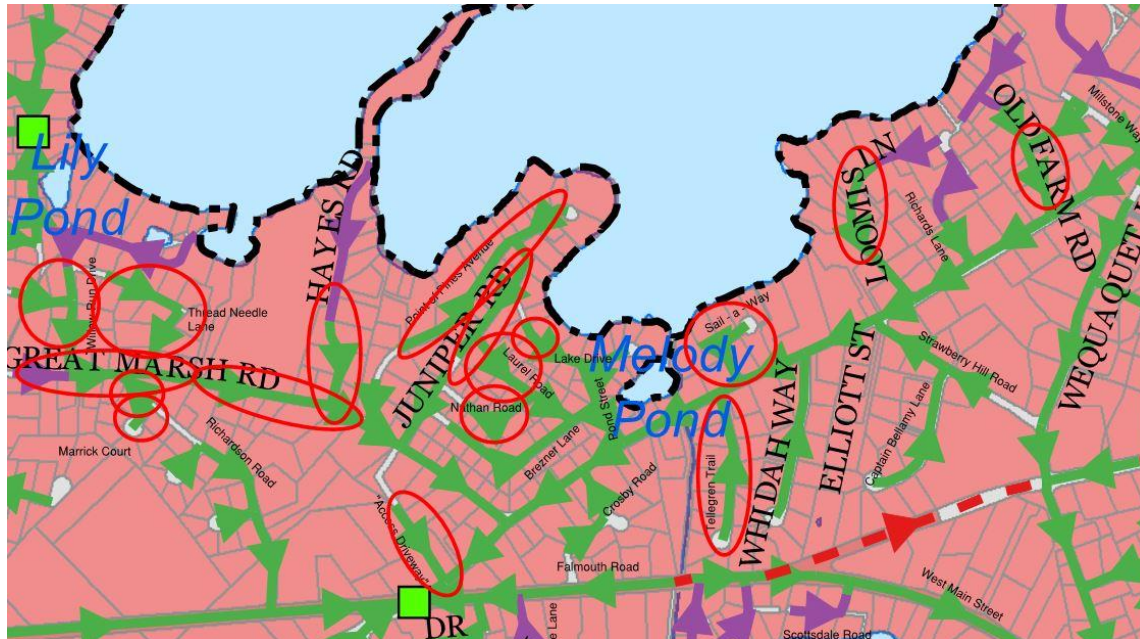
Herring Run Crossings

- Phinney's Lane Crossing – Test Pit



Herring Run Crossings

- Alternatives Analysis
 - Grinder Pump Impacts (Shallow Sewers)
- Deep Sewer Alternative to Minimize Pumps
 - Gravity Sewers approximately 21 feet deep at PS
 - Pump Station approximately 35 feet deep

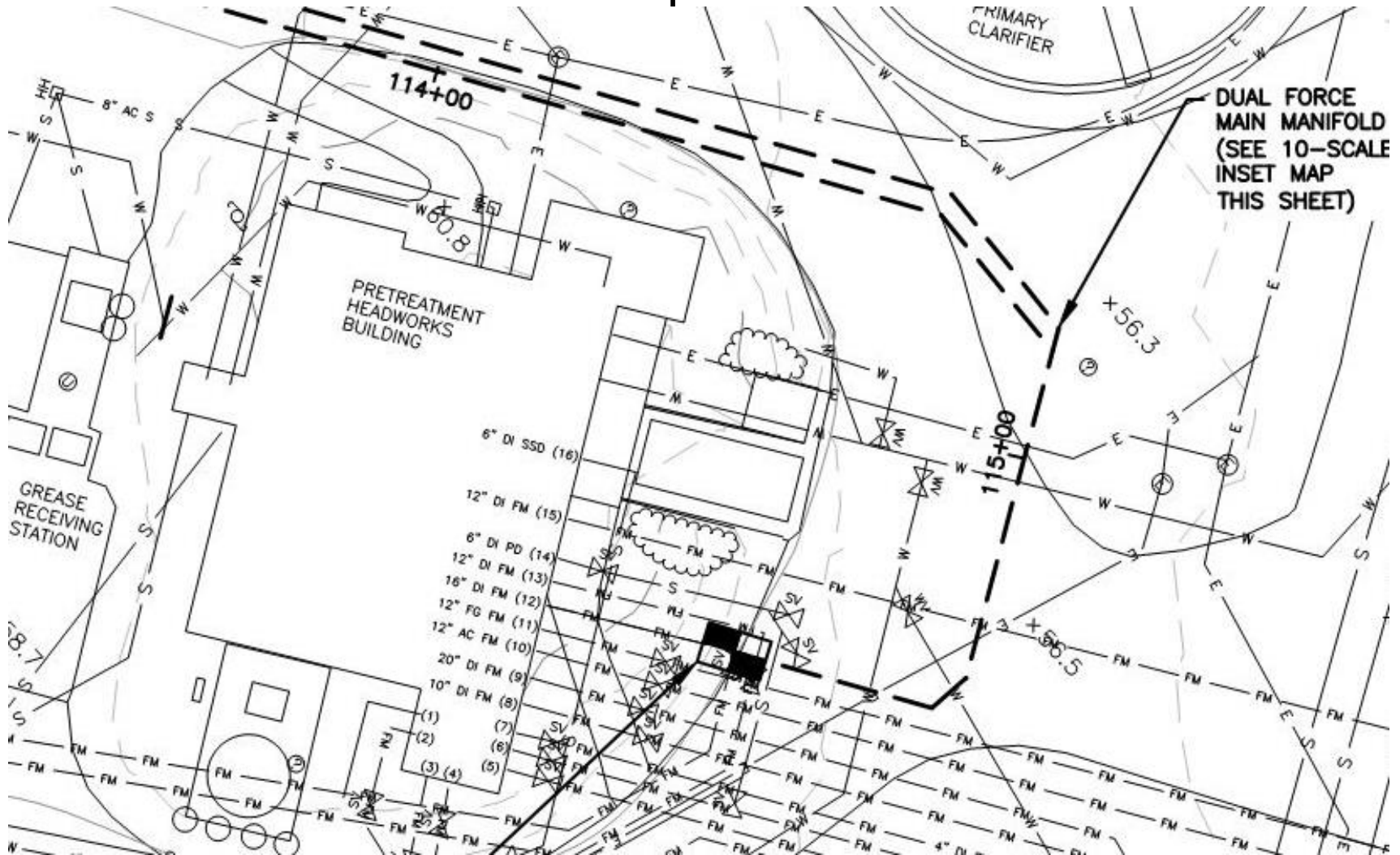


Connection at WPCF



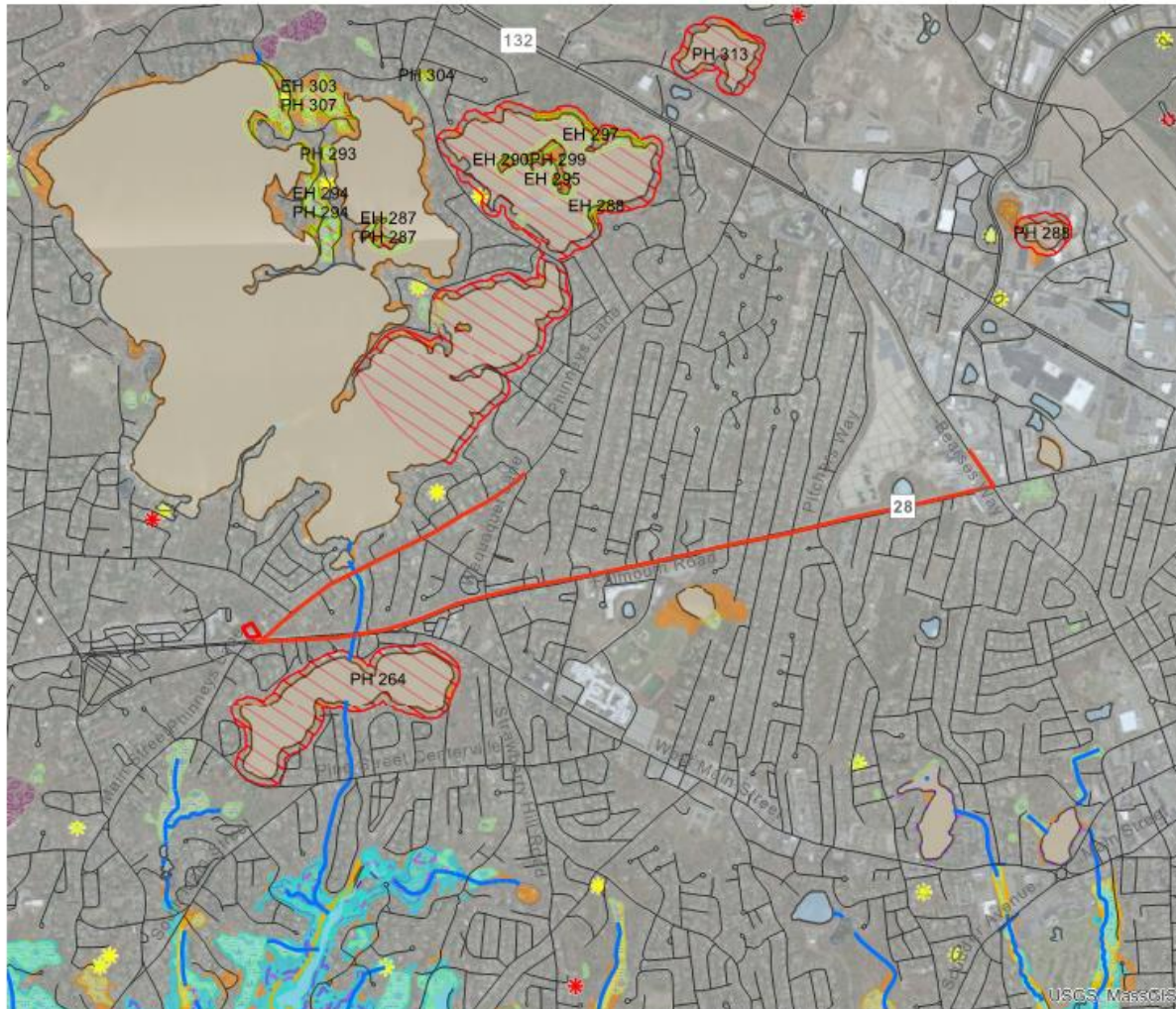
Connection at WPCF

- Coordination with Plant Operations



Permitting

Path: \\base03\local\WSE\Depts\Water\Water Resources Group\GIS - Constraints Mapping\Barnstable\1456 Falmouth Rd PS 2020\Environmental Receptor - Barnstable PS ZOOM OUT.mxd User: higginsm Saved: 4/14/2020 10:05:13 AM Opened: 4/14/2020 10:05:46 AM



Legend

- new sewer main
- Perennial Stream
- Intermittent Stream
- Marsh/Bog
- Wooded marsh
- Cranberry Bog
- Salt Marsh
- Open Water
- Reservoir (with PWSID)
- Tidal Flats
- Beach/Dune
- Parcel
- Public Way
- Marsh Boundary - landward
- Landlocked Tidelands
- Jurisdiction
- Historic High Water
- Marsh Boundary - seaward
- Contemporary High Water
- Inferred Contemporary High Water
- Inferred Historic High Water

ACECs

- ACECs

NHESP Habitats

- NHESP Estimated Habitats of Rare Wildlife
- NHESP Priority Habitats of Rare Species
- NHESP Certified Vernal Pools
- NHESP Potential Vernal Pools

FEMA National Flood Hazard Layer

Flood Zone Designations

- A: 1% Annual Chance of Flooding, no BFE
- AE: 1% Annual Chance of Flooding, with BFE
- AE: Regulatory Floodway
- AH: 1% Annual Chance of 1-3ft Ponding, with BFE
- AD: 1% Annual Chance of 1-3ft Sheet Flow Flooding, with Depth
- VI: High Risk Coastal Area
- D: Possible But Undetermined Hazard
- X: 0.2% Annual Chance of Flooding
- X: Reduced Flood Risk due to Levee
- Area Not Included
- Area with no DFIRM - Paper FIRMs in Effect

FIGURE 1
1456 Falmouth Road
Barnstable, MA

Environmental
Resource Map

Data Source: Office of Geographic and Environmental Information (MassGIS), Commonwealth of Massachusetts Executive Office of Environmental Affairs



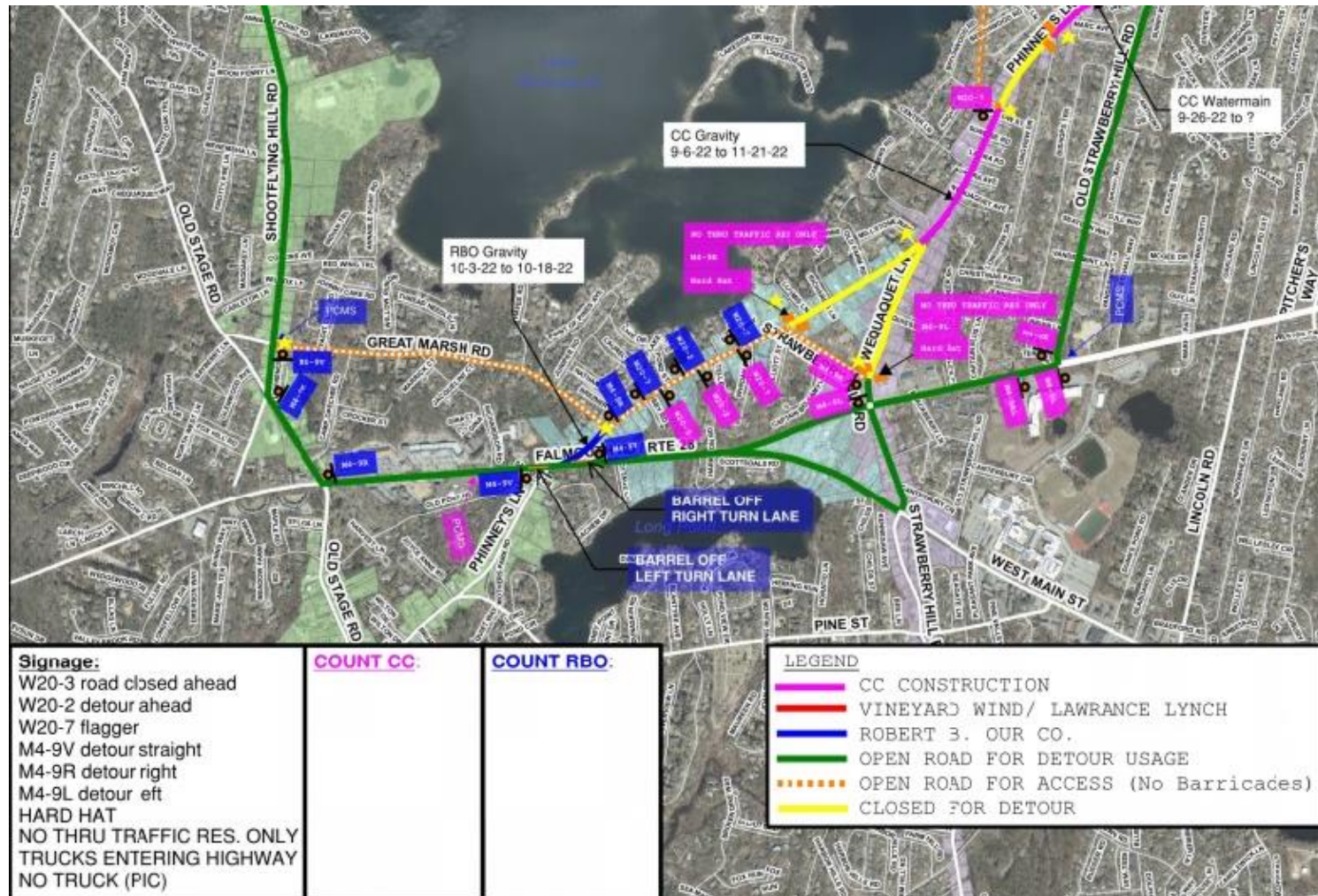
Permitting

- Coordination with MassDOT
 - Time of Year and Time of Day Restrictions
 - Pavement Replacement Requirements
 - Thickness/Width
 - CDF Waiver
 - Curb Cut at Pump Station
 - Traffic Management Plan



Traffic Management

- Detour/Traffic Details Planning



Budget Management/Bidding Climate

- Opinion of Probable Construction Cost
- Final Bid Documents
 - One Contract vs. Two Contracts
- SRF Financing
 - Clean Water SRF Loan Program
 - Principal Forgiveness



Project Schedule

Task	Relevant Date/Completion Date
Design Phase	July 2020 through March 2022
Bid Opening (Route 28 East)	April 13, 2022
Bid Opening (Phinney's Lane PS)	April 20, 2022
Authorization to Award from MassDEP	June 8, 2022
Notice to Proceed	July 22, 2022 (Pump Station) September 13, 2022 (Sewers)
Anticipated Construction Completion (540 day duration, both Contracts)	January 2024 (Pump Station) March 2024 (Sewers)

Budget Management/Bidding Climate

- Opinion of Probable Construction Cost
 - Route 28 East Sewer Expansion Project: \$12M
 - Phinney's Lane Pump Station: \$6.6M
 - Total Combined Project Cost Estimate \$18.6M
- Bid Results
 - Route 28 East Sewer Expansion Project: \$10.2M
 - Phinney's Lane Pump Station: \$7.9M
 - Total Combined Bid Price: \$18.1M
 - Robert B. Our Low Bidder (Both Contracts)



Construction



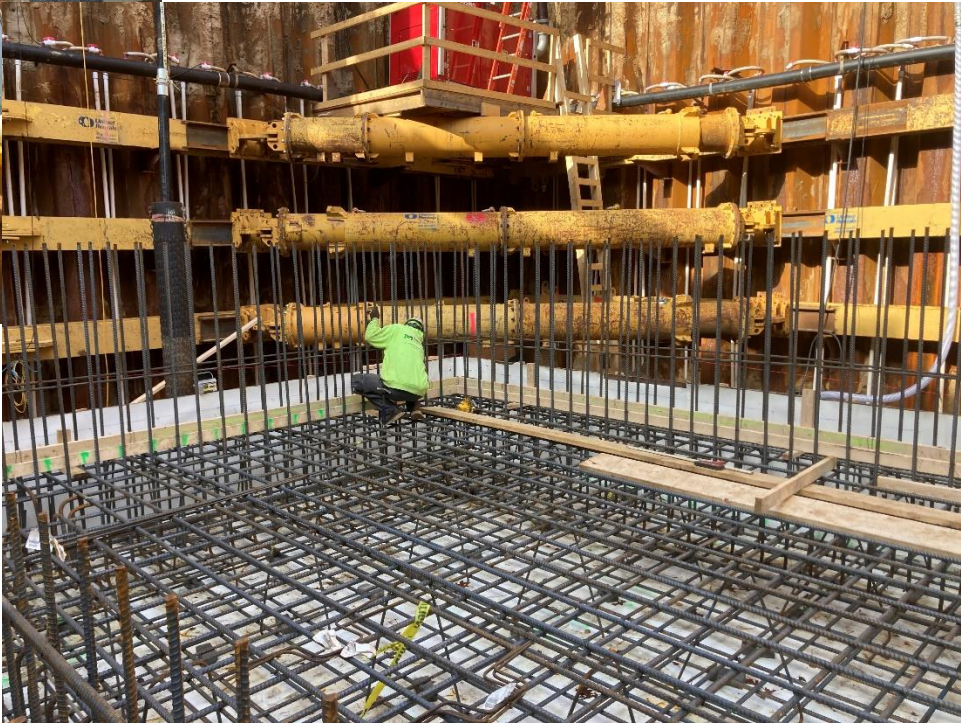
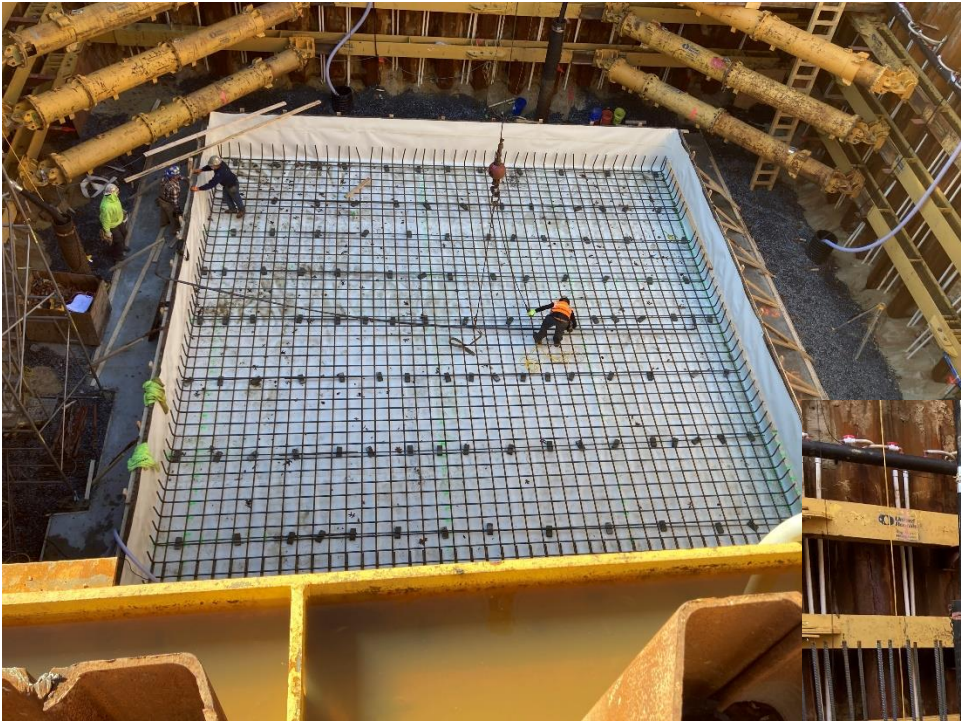
Construction



Construction



Construction



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Final Comments & Questions

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Thank You

