



Big Sewer Break = Big Problem

Presented by:

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Agenda

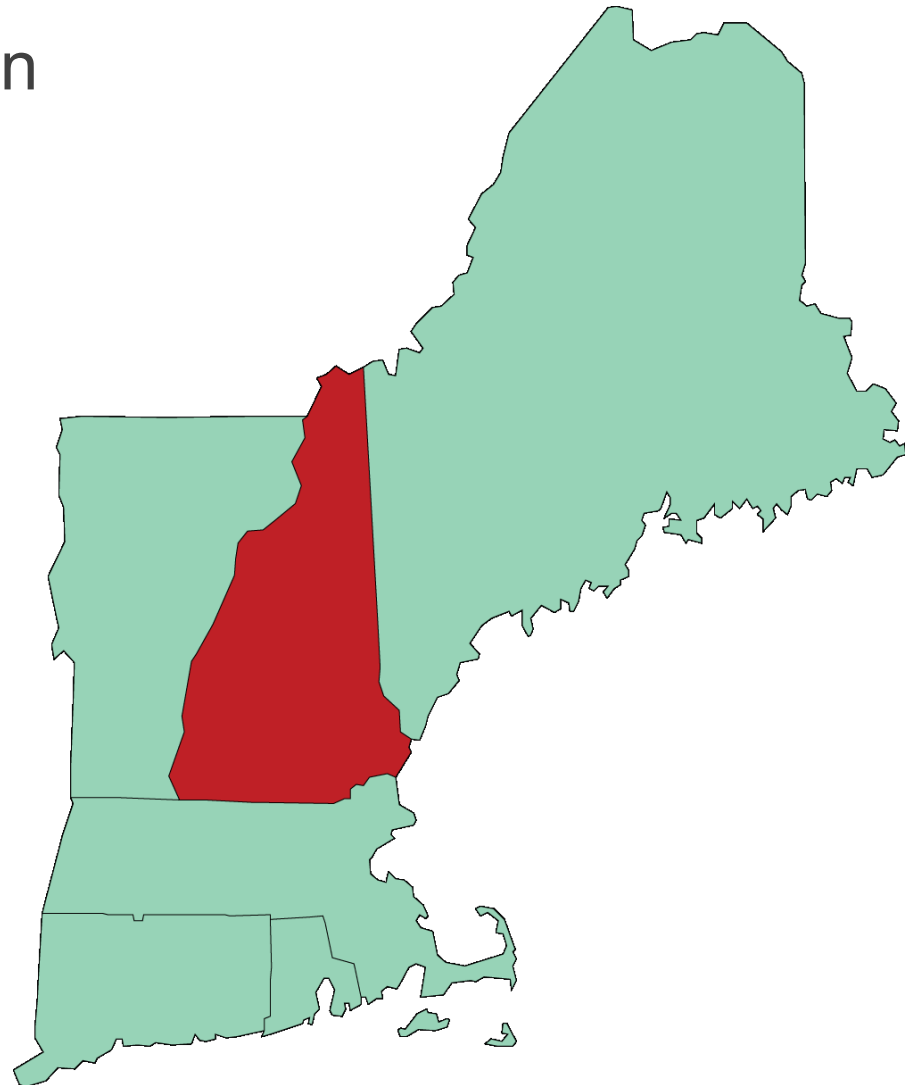
1. Background
2. Response
3. Investigation
4. Design
5. Construction
6. Conclusions and Lessons Learned
7. Q&A

New Hampshire Background

Population 1.32 million
(9th smallest)

Area 9,300 sq. miles
(5th smallest)

“Live Free or Die”



City of Manchester Background

Population 109,000

Industrialized early 1800s

Amoskeg Mills – largest single mill in the world

Post industrial depression 1930 to 1945

Revitalization

1990 to present

ManchVegas



Wastewater Infrastructure - WWTP

1975 – 26 mgd

1994 – Upgrade to 34 mgd

2015 – Upgrade to 42 mgd

Serves four communities

Bedford

Goffstown

Londonderry

Manchester

Metro population 172,000



Wastewater Infrastructure – Pipelines

385 Miles of Sewer

50% “combined” system

11,000 SMHs

15 CSO
outfalls



Wastewater Infrastructure – Pump Stations

12 pump stations

Constructed from 1973 to 2014

100,000 gpd to 25 mgd



Stormwater Infrastructure - Pipelines

185 Miles of Drains

14,000 CBs

3,000 DMHs



Big Sewer Break = Big Problem - April 22, 2018



Wellington Road Impact Area



City of Manchester, NH
ENVIRONMENTAL PROTECTION DIVISION



Hazen

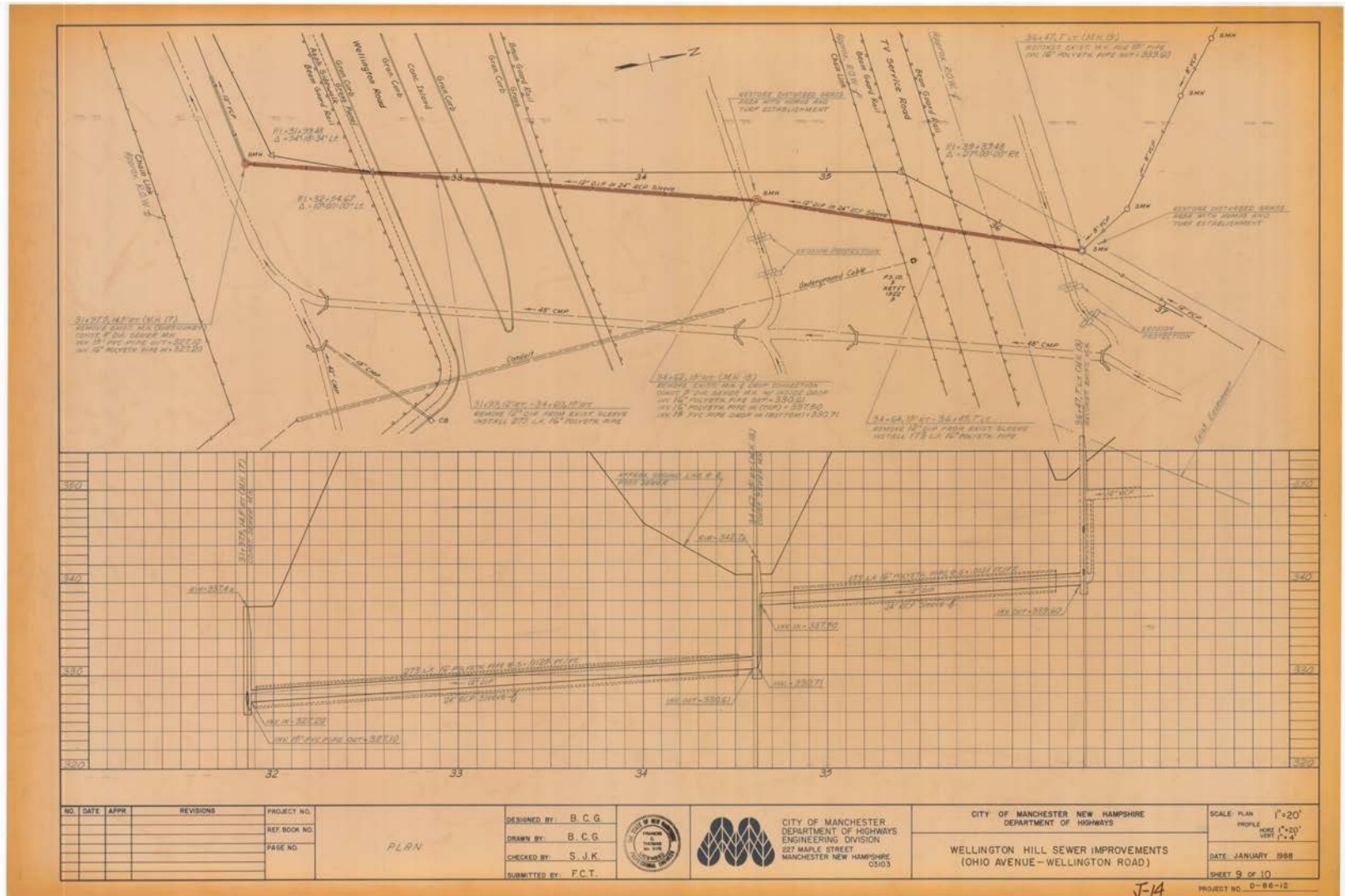
24 Federal Street, 5th Floor, Boston, MA 02110

CMOM PHASE II
SEWER REHABILITATION AND REPLACEMENT PROJECT
CONTRACT NO. 2

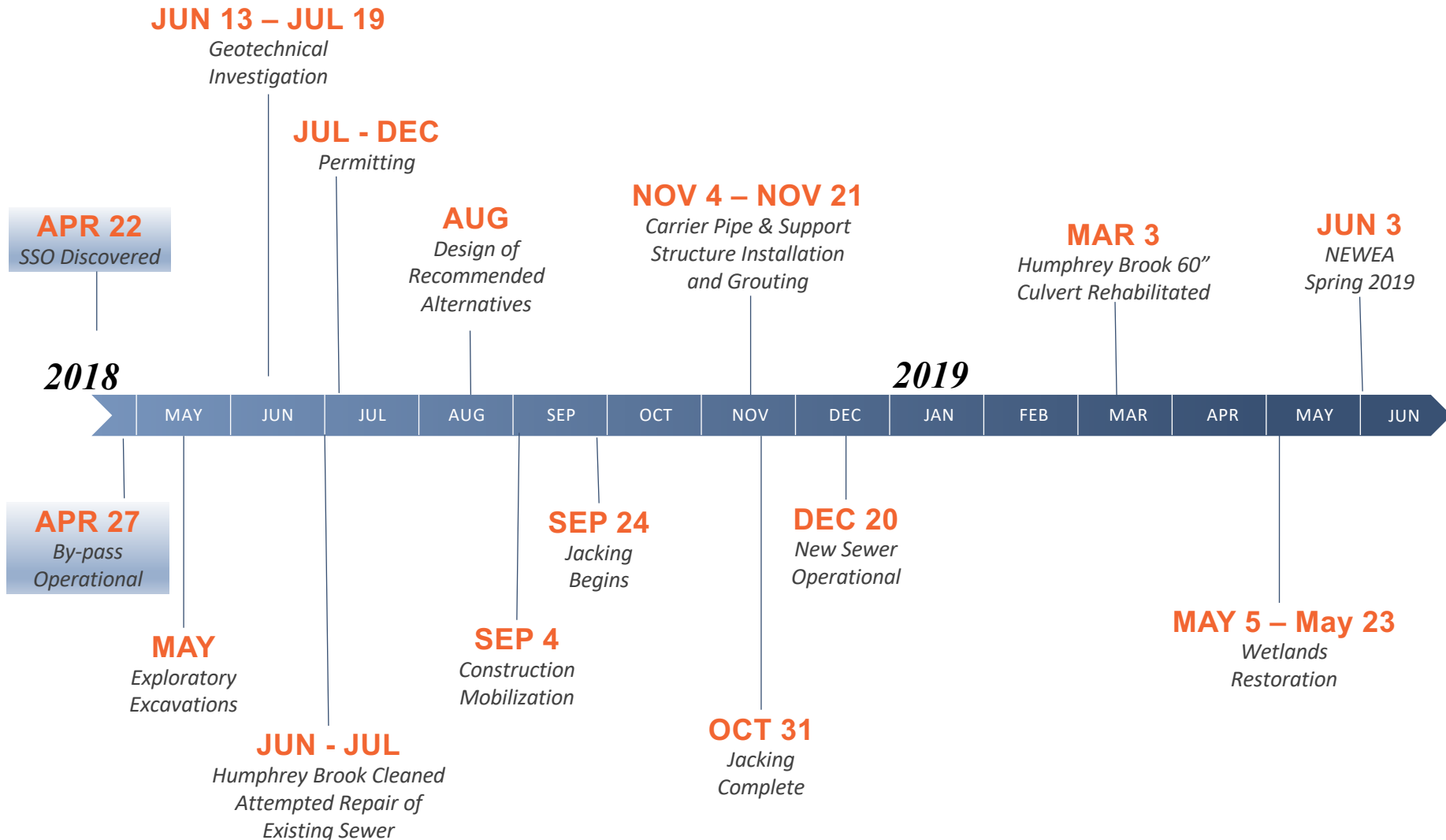
Wellington Road
Project Area



Record Drawings From 1988



Response

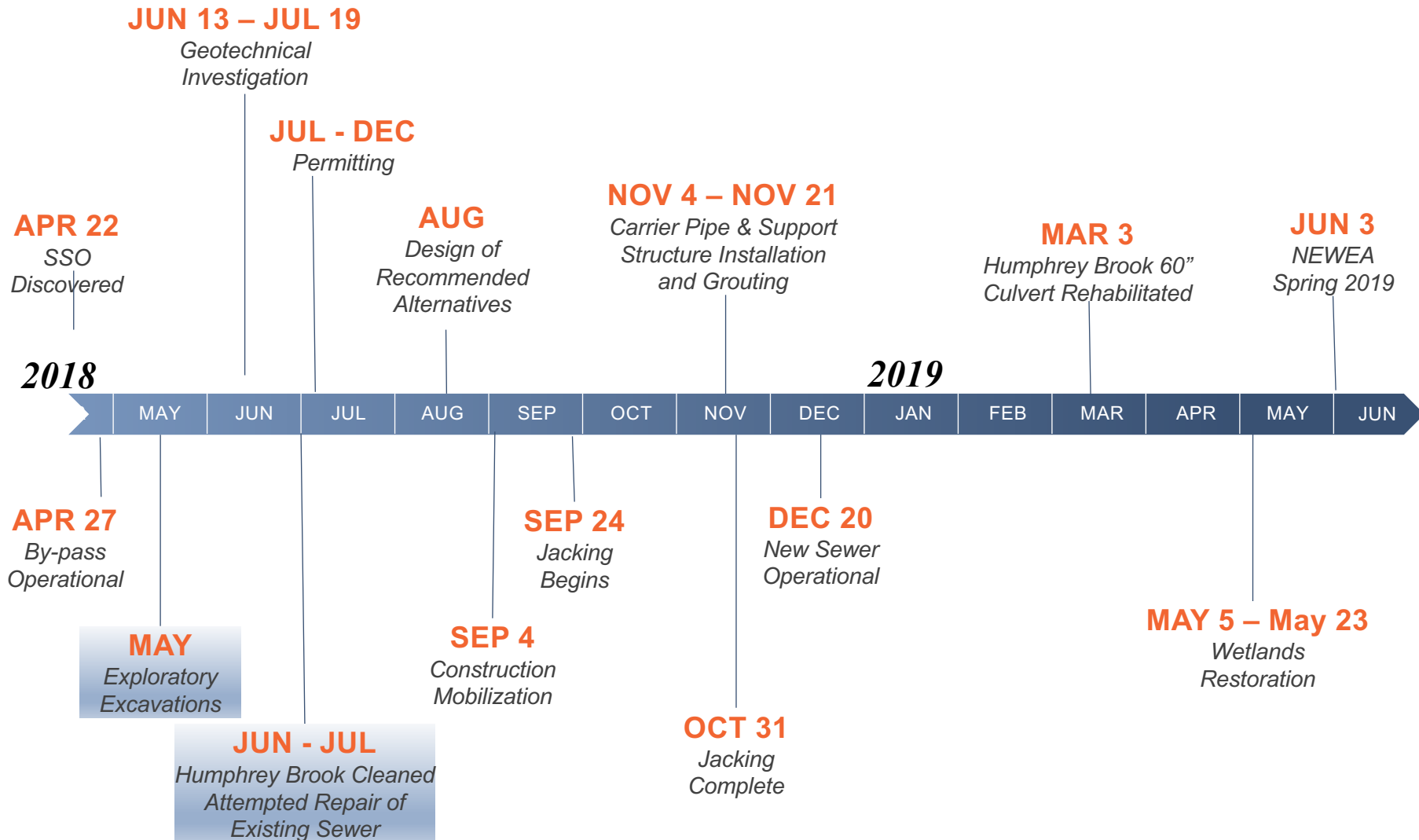


Response

- The City's Initial Containment of the SSO
- Agency Notification
- Engineer and Contractor Recruitment
- Site Access
- Establishing a Long Term Bypass
- Water Quality Monitoring
- Records Collection



Investigation



Investigation

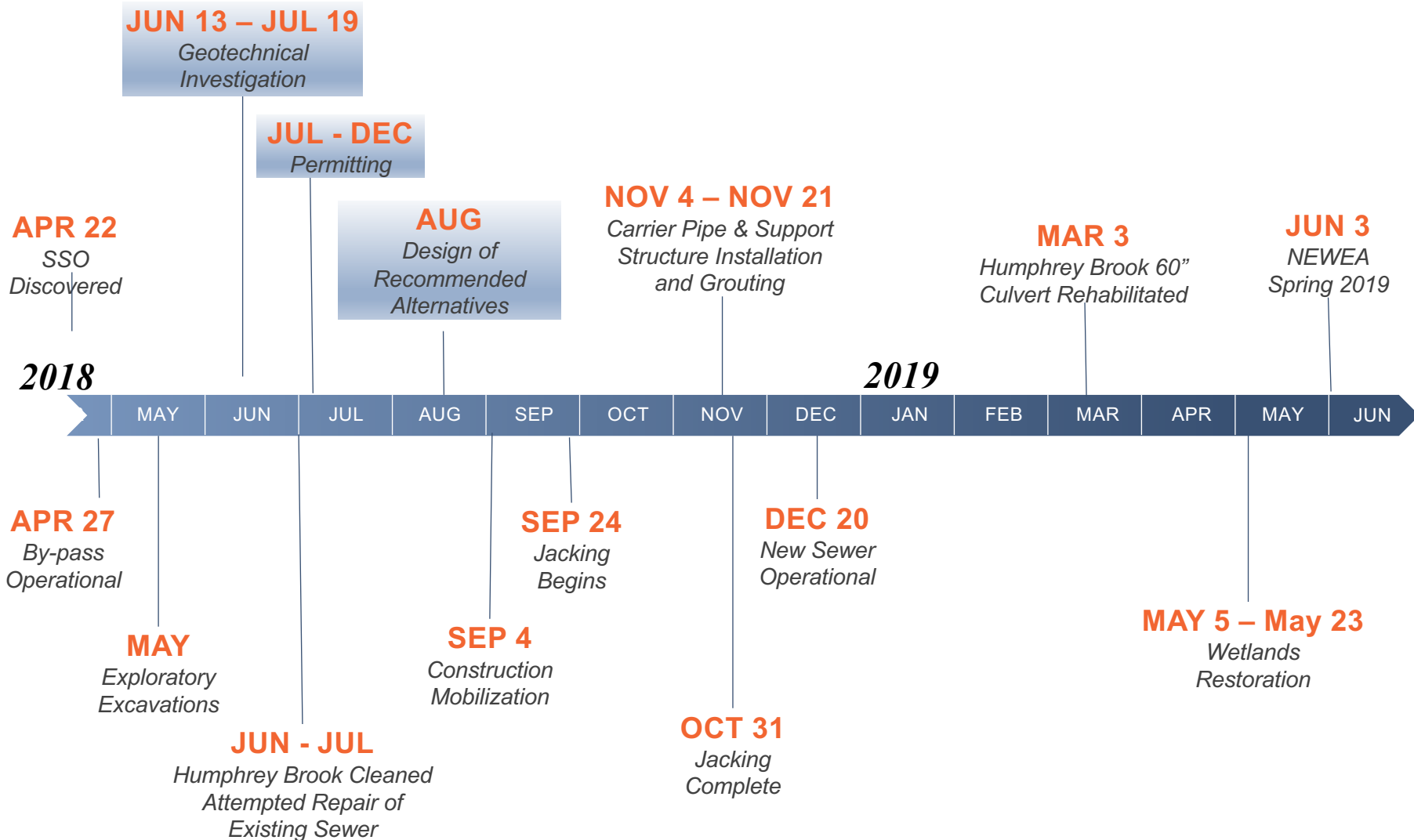
- Exploratory Excavations
 - Excavations at Each End.
 - Found Existing 16" HPDE Collapsed Within the 24" Casing.
- Parallel Tract
 - Review of Adjacent Sewers
 - Save Existing Infrastructure
 - Prepare For Design / Construction of New Infrastructure



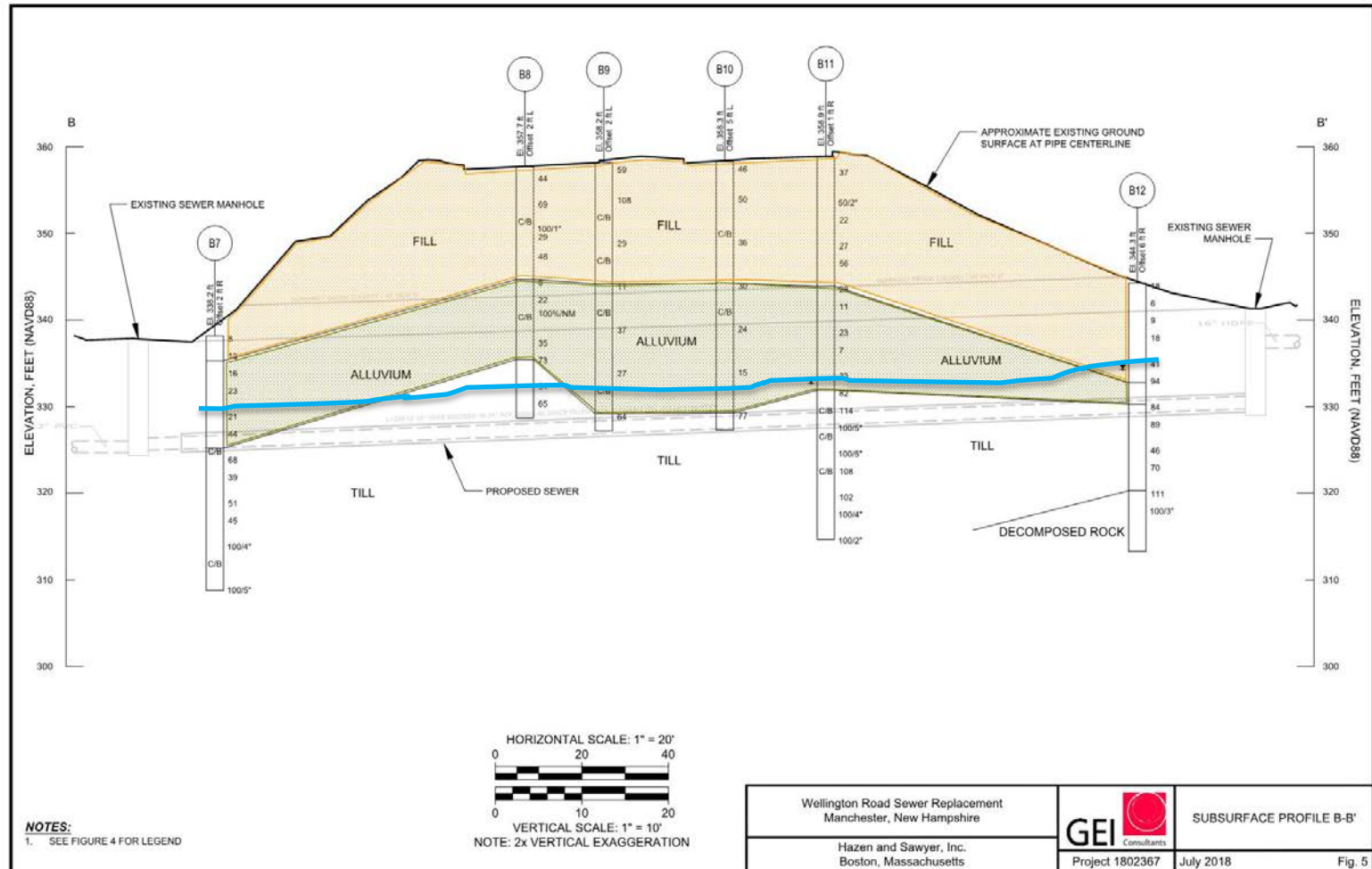
Collapsed Sewer – 16” HDPE in 24” RCP Sleeve



Design and Permitting



Geotechnical Investigation – June 13, 2018 Required for Design Timing was Critical – Busy Summer Season



\\geiconsulta\B1\Working\HAZEN AND SAWYER\1802367 Wellington Rd Sewer\00_CAD\Figures\Fig 4-5 subsurface profile.dwg - 7/17/2018

Replacement Alternatives

- Reuse the Existing 24" RCP Casing
- Open Cut
- Trenchless

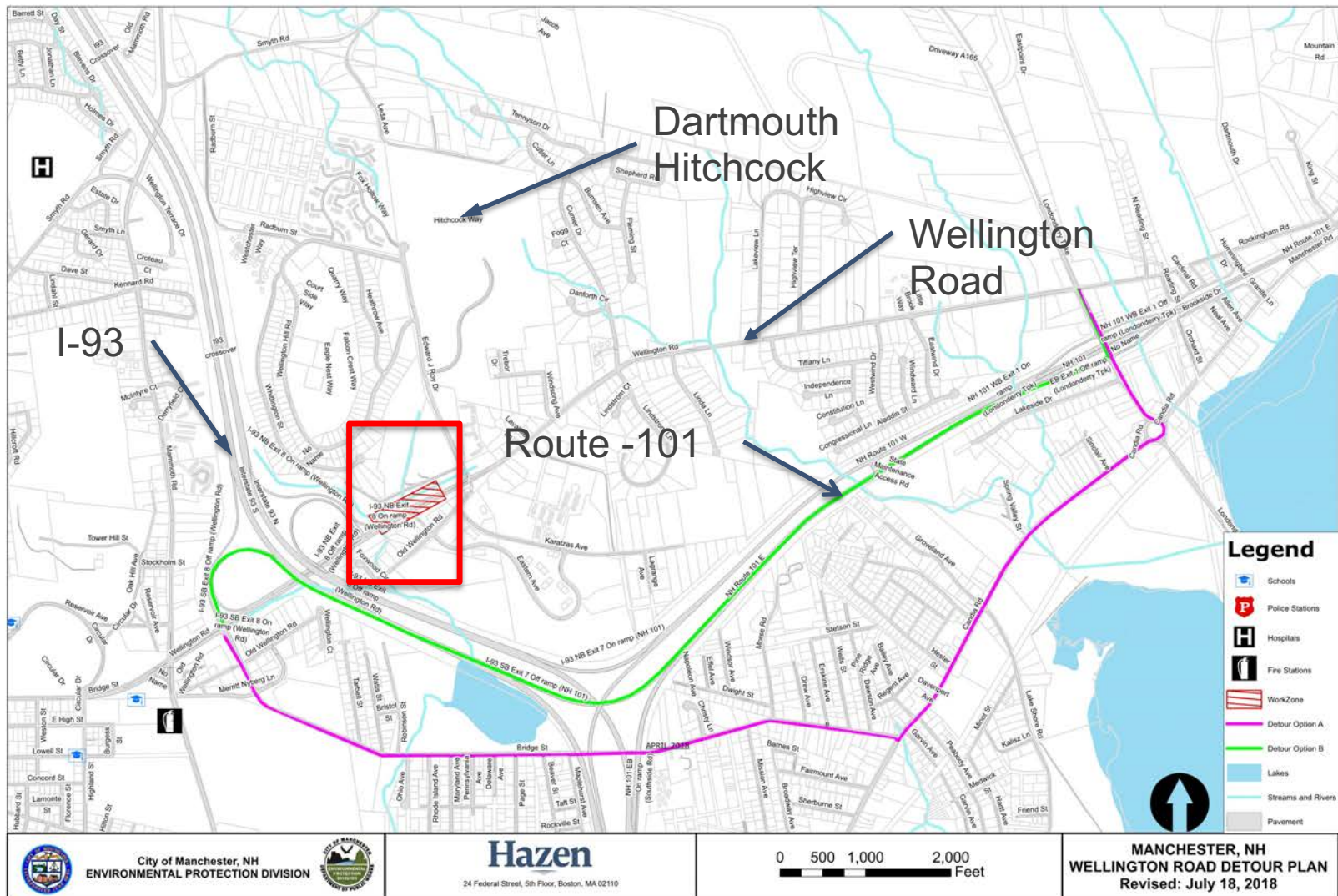


Utilize Existing 24" RCP Casing Alternatives

- Cut out the Failed Sewer – The Shark
- Pipe Reaming
- Pipe Bursting



Open Cut Alternative



Trenchless Alternatives

- Pipe Jacking With Shield
- Jack and Bore (Horizontal Auger Boring)
- Microtunneling
- Horizontal Directional Drilling (HDD)



Preferred Options



Open Cut

Estimated Cost – \$1.3 Million

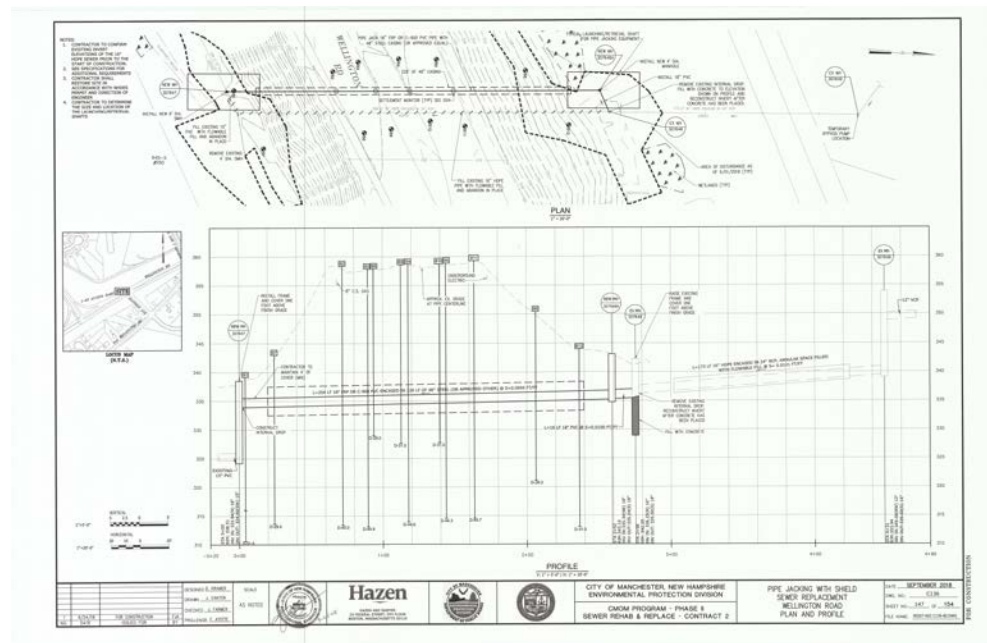


Pipe Jacking with Shield

Estimated Cost - \$1.5 Million

Finalize Design – Pipe Jacking with Shield

- Fast Track Design
 - (Two Weeks)
- Change Order into Existing CMOM Contract
- Drawings
- Specifications
- Permitting



Wetlands Permitting & Agency Coordination

NHDES

- Emergency Authorization
- Major Wetlands Impact Permit
- Adjacent Humphrey Brook

NHDOT

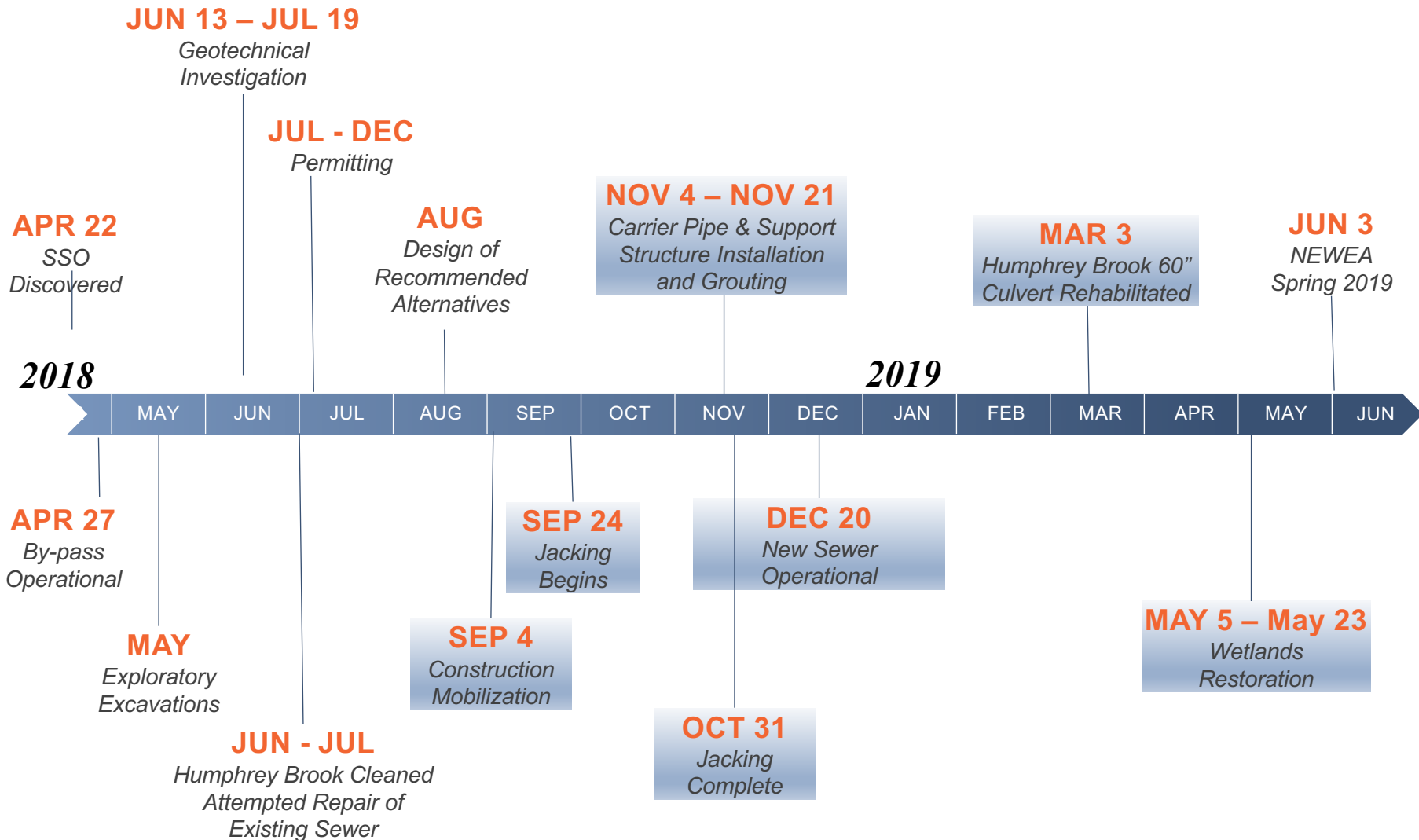
- Right-of-Way

Humphrey Brook = Additional Benefit



- Downstream end of the 220 LF 60" CMP Humphrey Brook Culvert
- Used for 8" HDPE Bypass
- Filled with Sediment
- Required Cleaning and Inspection

Construction

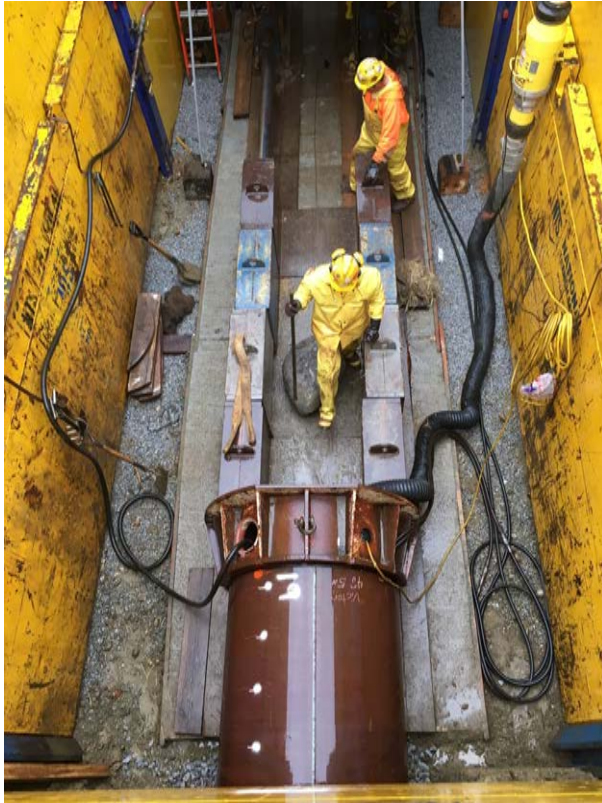


Start of Construction – September 4, 2018

- Expedited Shop Drawing Review
- Team Orientated Approach
- Agency Coordination



Pipe Jacking with Shield



Jacking Pit



- Manned Entry
- Hand Excavation
- Internal Rail System for Spoils Removal
- Averaged Approx. 8 LF per day

Humphrey Brook Rehabilitation



- 2 Week of Cleaning and Sediment Removal Under NHDES Permit
- Lining Completed in Winter to Take Advantage of Low Flows.
- Staging for the Rehabilitation of the 60” CMP Humphrey Brook Culvert.

Wetland Restoration – May 2019

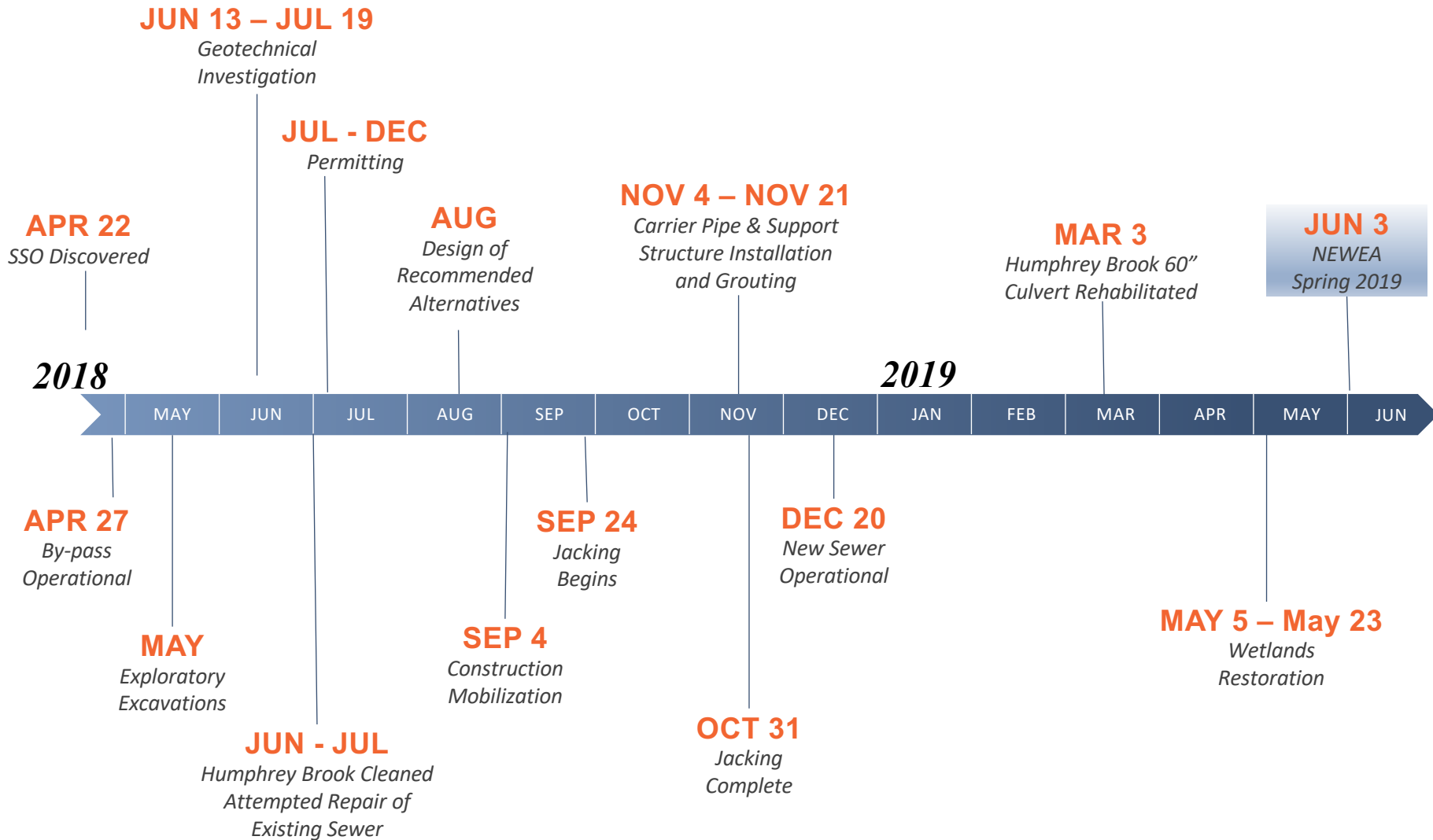


Prior to Restoration



Restoration in Progress

Conclusion and Lessons Learned

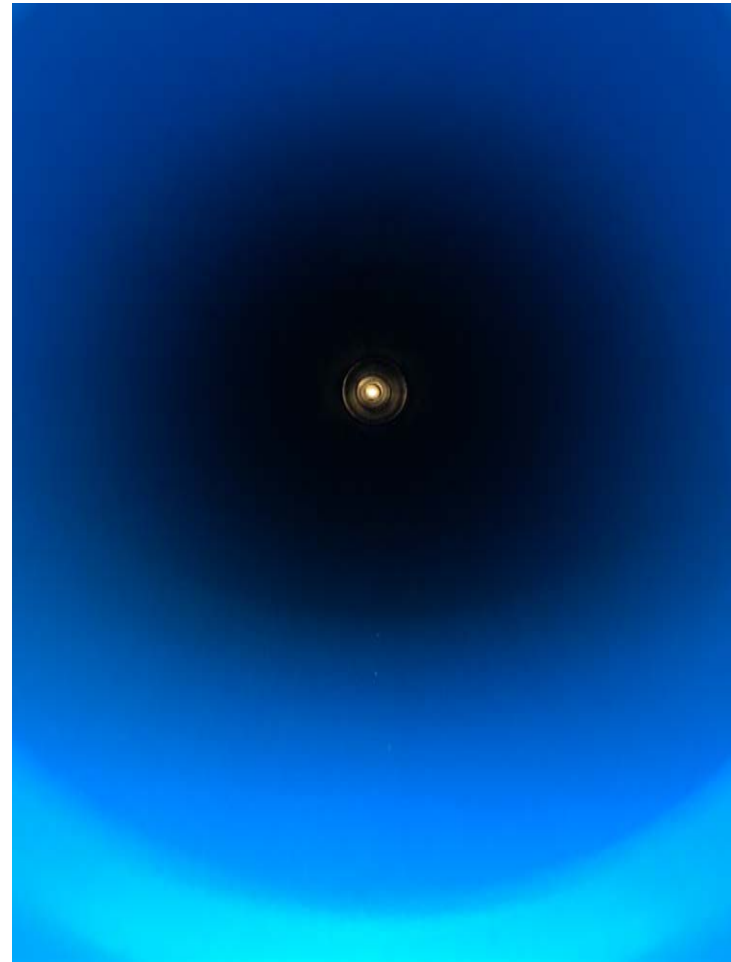


Wellington Road Sewer Repair Costs

Description	Cost
Engineering Services	\$ 375,000
Construction Costs for Investigations and Bypass Pumping	\$ 500,000
Construction Costs For Pipe Jacking and Restoration	\$ 1,750,000
Construction Costs for Humphrey Brook Rehabilitation	\$ 325,000
Total Cost	\$ 2,950,000

Lessons Learned

- Emergency Response Planning
- Emergency Allowance in Construction Contracts
- Murphy's Law
- Collaborative and Cooperative Approach with Stakeholders
- Cross-Country Sewer Inspection as part of the City's CMOM Program



Proper Construction Techniques



- Improper Grouting Methods
- No Post Installation CCTV



- Proper Grouting Methods
- Post CCTV

The Wellington Road Team Would Like to Extend a Special Thank You to Our Partners!

Agency's

City of Manchester, NH

New Hampshire Department of Environmental Services

New Hampshire Department of Transportation

Engineers

Hazen and Sawyer

GEI Consultants

Contractors

GVC Construction, Inc

Green Mountain Pipeline Services

M & P Pipe Jacking Corporation

Godwin Pumps

Eastern Pipe Service

Questions?



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