

Session #29 – Collection System 3: Rehabilitation Issues

“A PENNEY (ROAD) SAVED IS A LESSON (L)EARNED”



New England Water Environment Association
2019 Annual Conference – Marriot Copley Place, Boston, MA
January 30, 2019

CITY OF



MELROSE

Weston & SampsonSM

Project Team

- City of Melrose, Massachusetts
 - John V. Scenna, Director, Public Works
 - Elena Proakis Ellis, P.E., BCEE, City Engineer
 - Scott Dixon, Project Engineer

- Weston & Sampson Engineers, Inc.
 - John C. Potts, P.E., Senior Project Manager
 - Ryan D. Henley, Project Engineer



Overview

- Background of I/I Issues in Melrose
- Recent I/I Projects - CIPP Work on Penney Road
- Penney Road Pump Station Issue
- Penney Road Emergency Project
 - Timeline of Events (Design & Bidding)
 - Design Change (open-cut v. pipe bursting)
 - Construction
 - Pipe Bursting Process
- Penney Road Pump Station Operation Pre- and Post-Construction
- Questions

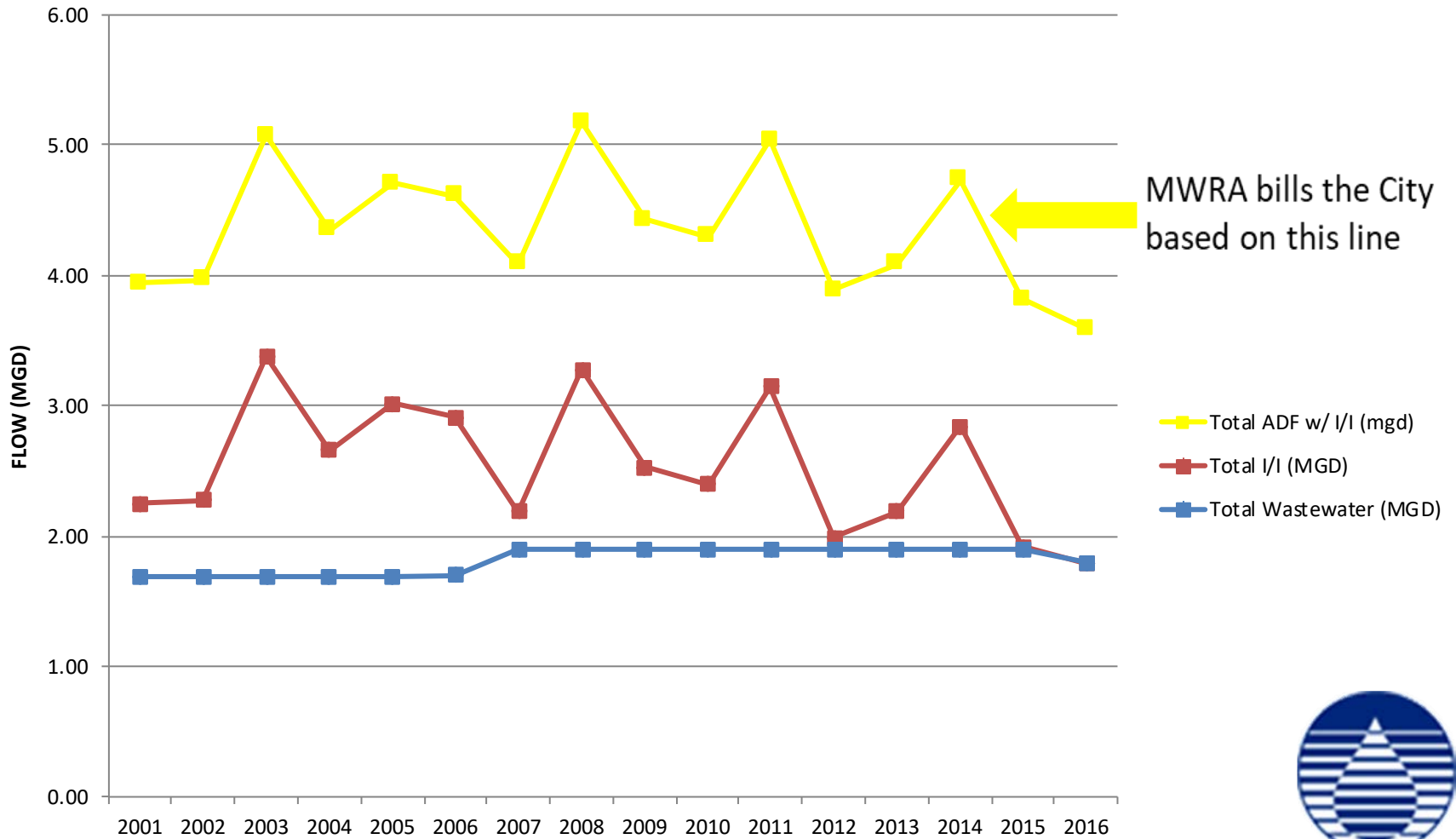


City of Melrose, MA

- City's existing wastewater collection system is comprised of:
 - Approximately 390,000-feet (almost 74 miles) of gravity sewers
 - Sewers range from 6- to 36-inches in diameter
 - High percentage of vitrified clay (VC) sewers
 - Over 2,000 sewer manholes
 - 5 sewer pump stations
 - Approximately 28,000 sewer users



Infiltration/Inflow (I/I)



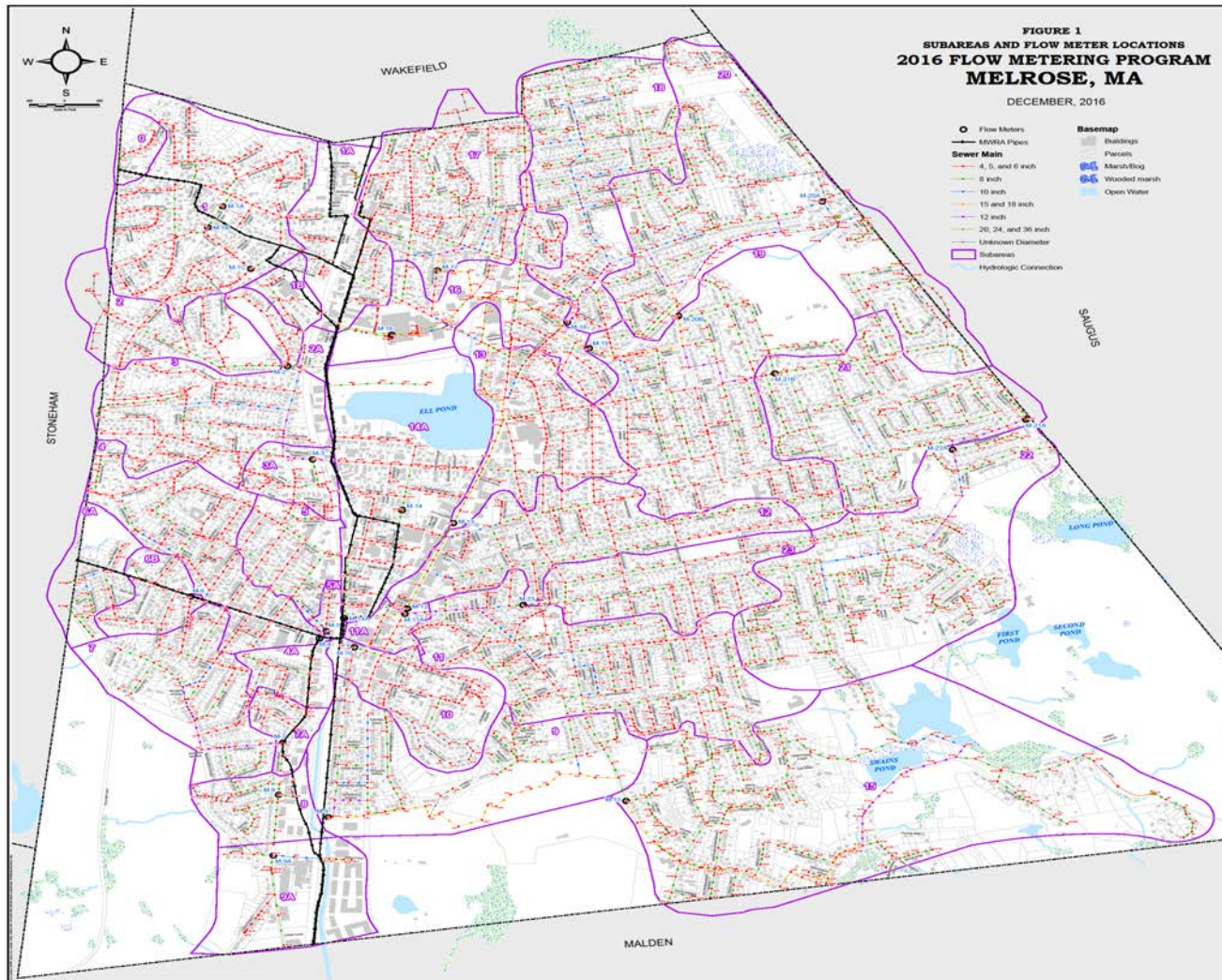
Infiltration/Inflow (I/I)

- Compared to the other 42 MWRA communities in gallons per day per inch-mile (GPDIM):

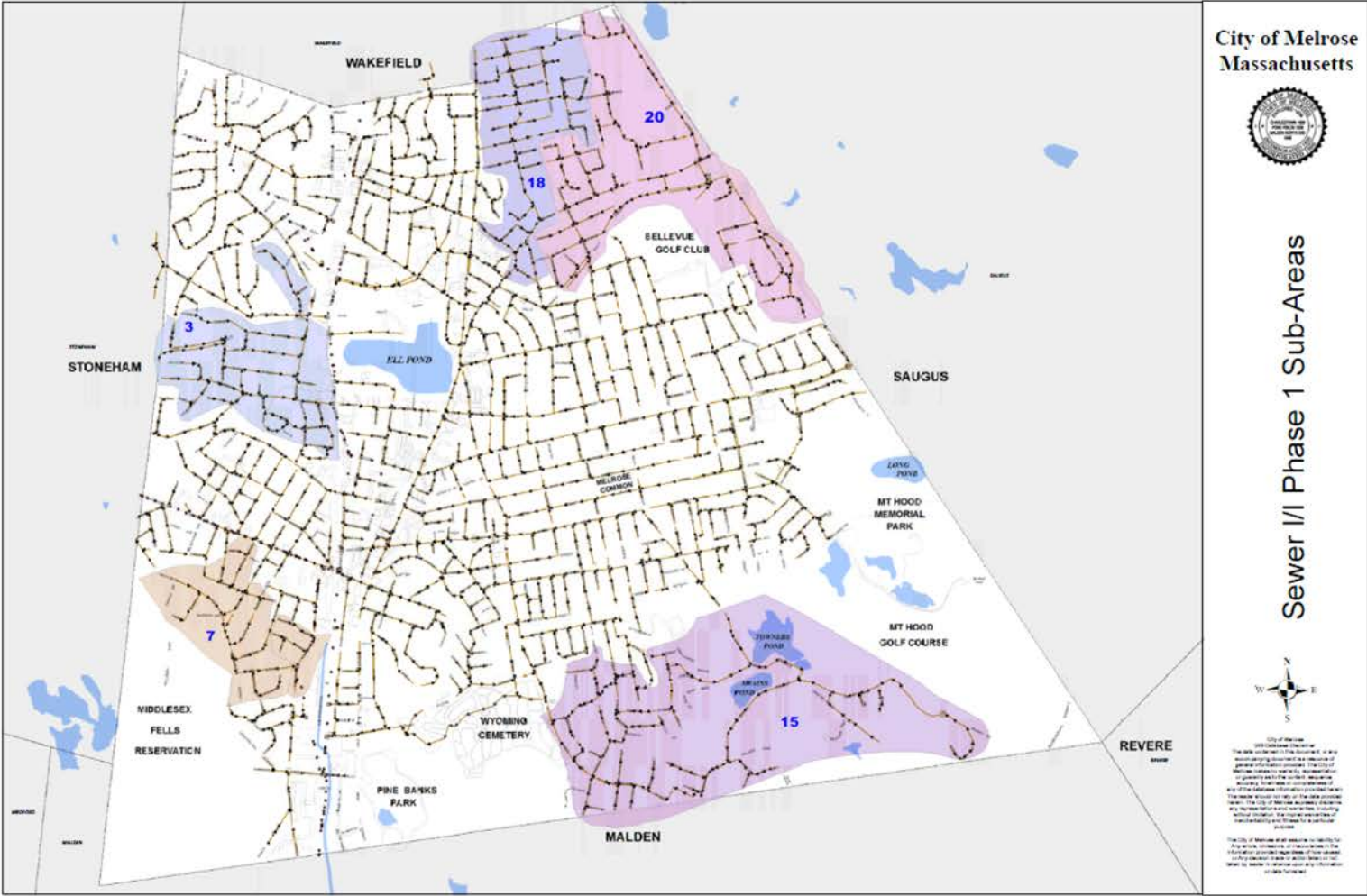
YEAR	TOTAL I/I	INFILTRATION	INFLOW
2011	#4	#4	#6
2012	#2	#2	#7
2013	#2	#2	#12
2014	#1	#1	#5
2015	#3	#2	#4
2016	#2	#2	#8



2016 Flow Metering



Phase 1 Sub-Areas



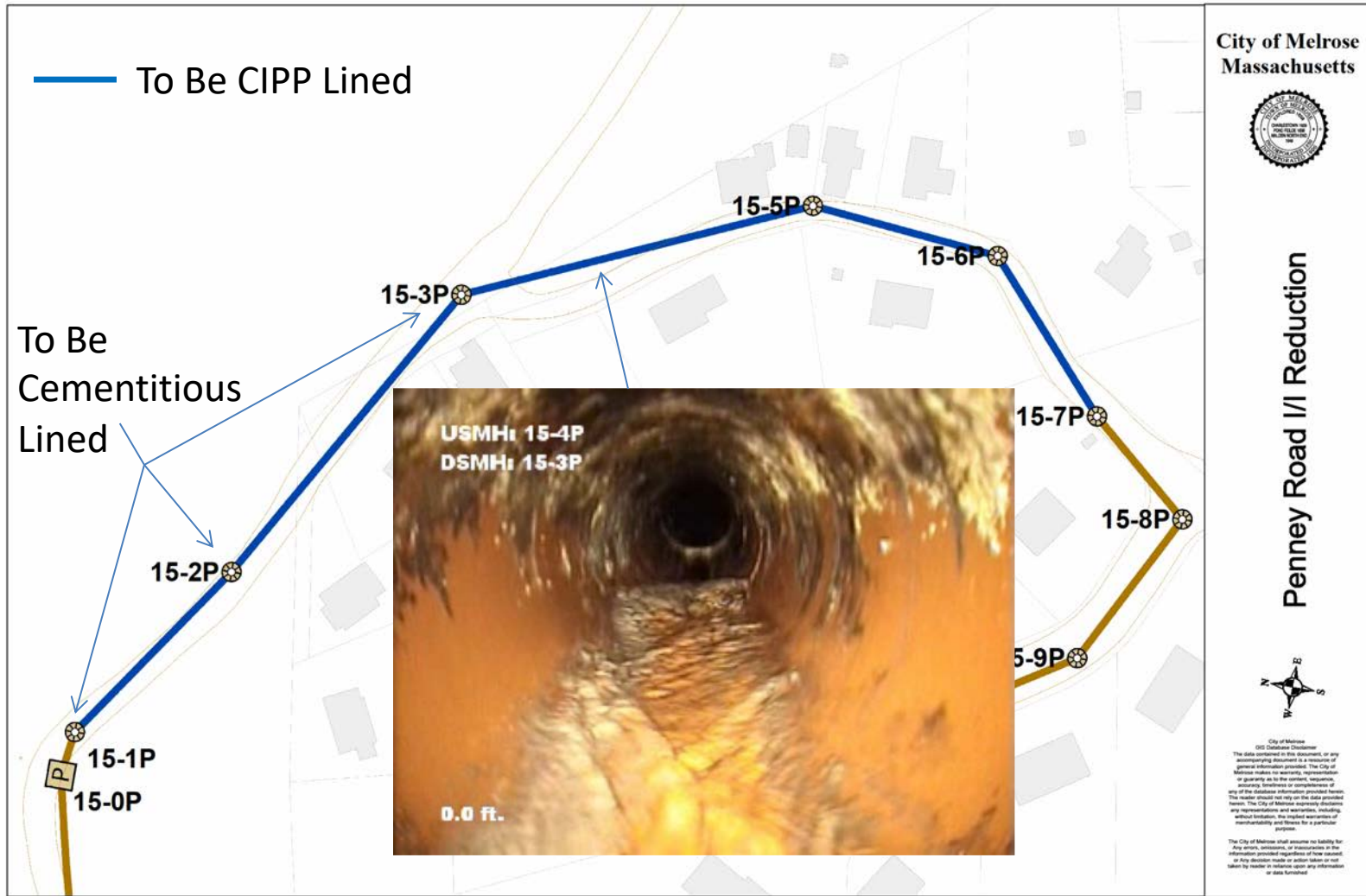
Investigatory Work

- CCTV Inspection of Sewer Mains
- Manhole Inspections
- Flow Isolation
- Smoke Testing

I/I Reduction Methods

- Cured-In-Place-Pipe Lining
- Cementitious Manhole Lining
- Open Cut Sewer Repair/Replacement

Penney Road Repairs



City of Melrose
Massachusetts



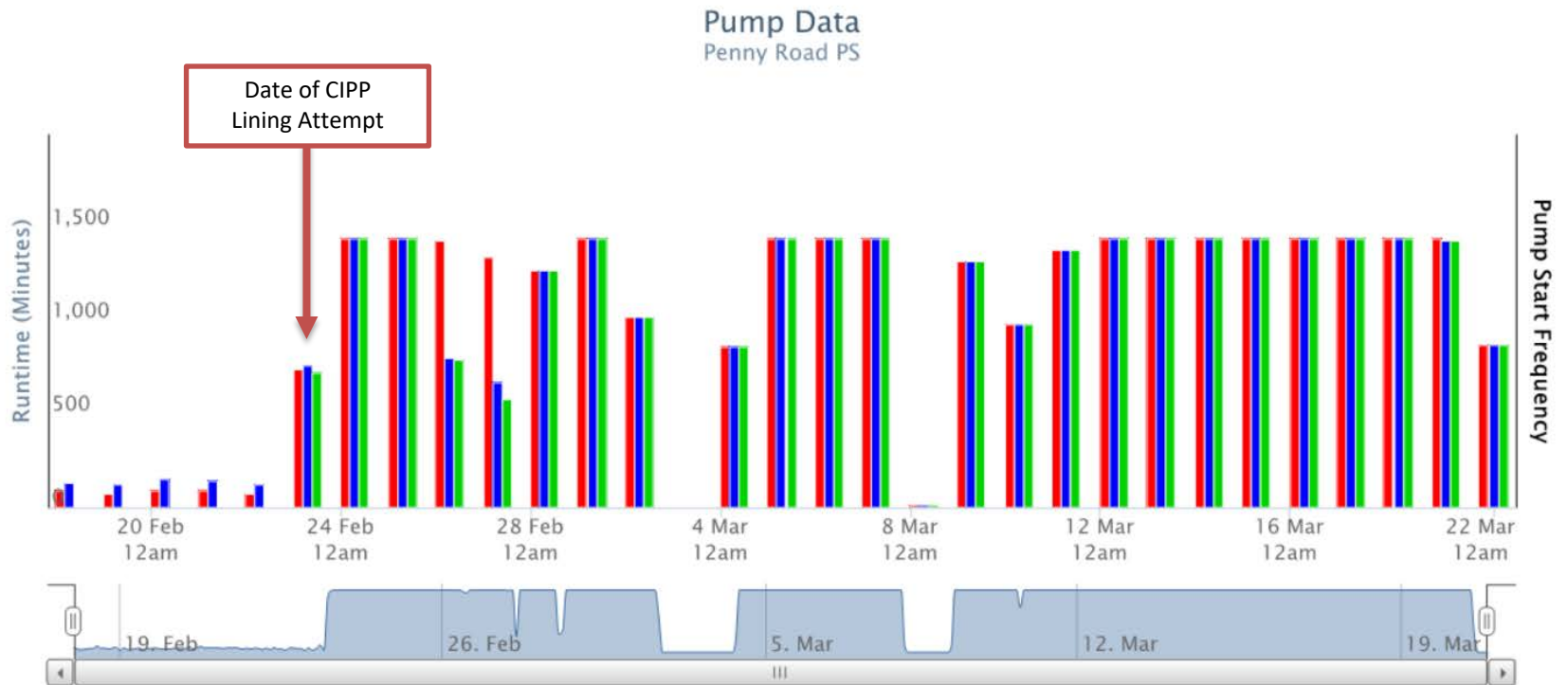
Penney Road I/I Reduction



City of Melrose
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Penney Road Pump Station Pre Construction Pump Data



Penney Road Pump Station

- At the end of February 2018, Melrose DPW staff noticed that the pumps at the Penney Road Pump Station were running 24/7.
- City determined that the cause was large amounts of infiltration (groundwater) entering the pipes upstream of the station.
- Began procedure for emergency repairs to the existing sewers before the pump station failed.



Penney Road Emergency Repair

Design & Bidding –

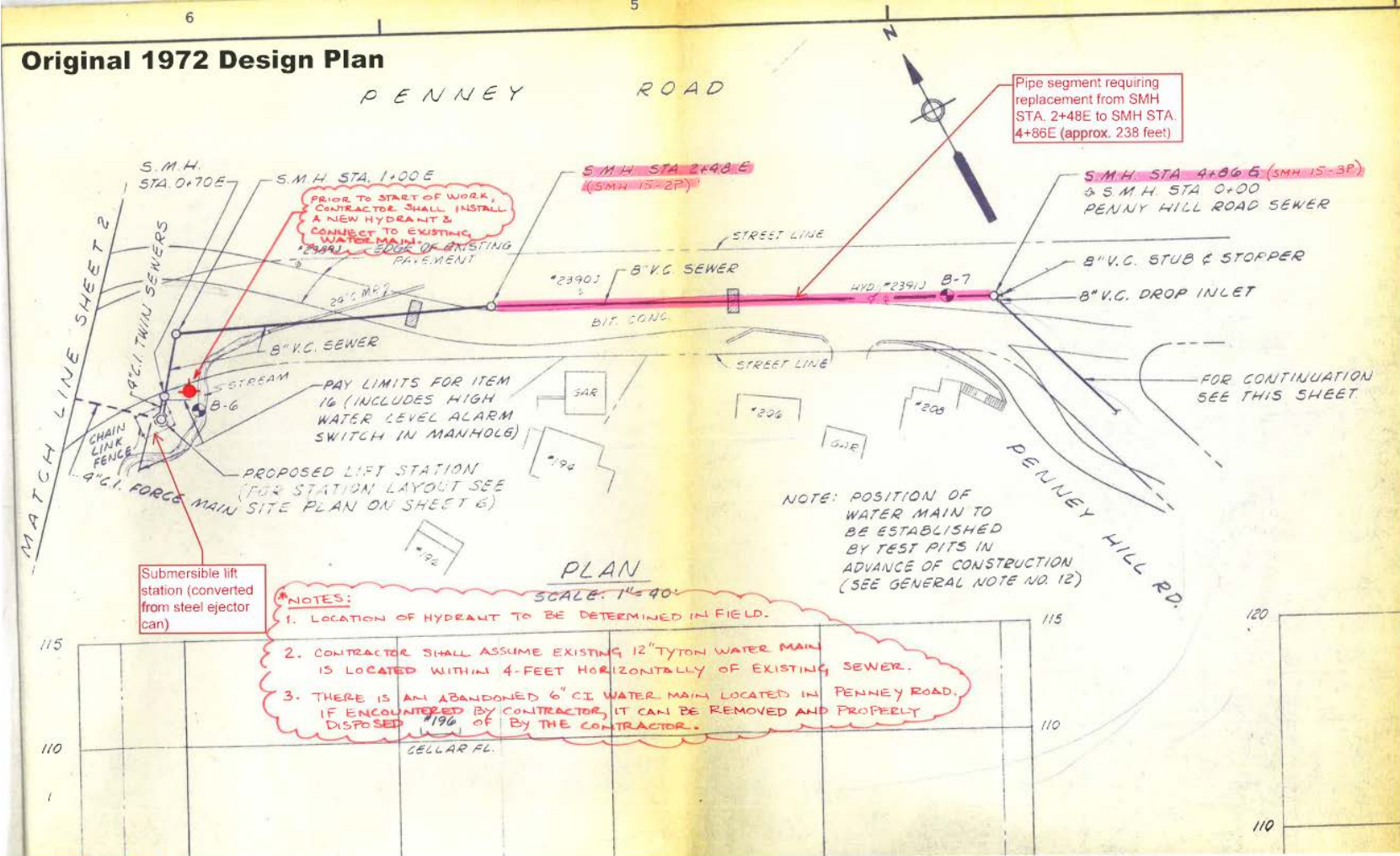
- Expedited preparation of construction documents as part of an emergency bid procurement
- Total of one week between notification of emergency and bid opening:
 - Communication with potential contractors
 - Prepared plans and specifications
 - Site walk with prospective bidders
 - Two addenda issued
 - Snow storm on the morning of bid opening



Project Timeline

- March 1st – City notified Weston & Sampson of sewer and pump station issue
- March 2nd – Calls to prospective contractors; Existing sewer plans utilized for bid package
- March 5th – Finalized bid package and distributed to prospective bidders
- March 6th – Contractor site visit to Penney Road
- March 7th – Bid package re-issued with addenda
- March 8th – Bid opening
- March 9th – Recommendation to award, contracts to Contractor (C. Naughton Corp.)
- March 15th – Preliminary construction mobilization

Design



Scope of Work (As-bid)

- Removal of existing 8” VC sewer and its replacement with new 8” PVC sewer – approx. 240-feet
- Re-connection of 3 existing sewer service connections
- Removal and replacement of existing 12” water main (including temporary water and a new hydrant) – approx. 240-feet
- Normal and special dewatering anticipated due to high groundwater conditions



Construction

- Day #1 –



Proposed Design Change

- As the mobilization of the project began, C. Naughton Corp. suggested pipe bursting of the existing sewer as an alternative to open-cut construction

Construction



Benefits of Pipe Bursting

- Lower price - \$246k to \$205k
- Eliminated 240-feet of 12" water main relocation including the need for temporary water service during winter months
- Eliminated open-cut except for the 3 sewer services and entrance pit for the pipe bursting method
- Eliminated majority of dewatering including special dewatering



Pneumatic Pipe Bursting

- Utilizes a pneumatic hammer head to burst through existing pipe and soil
- Bursting head guided through existing pipe using a winch and pulling cable
- Fused HDPE pipe replaces existing pipe

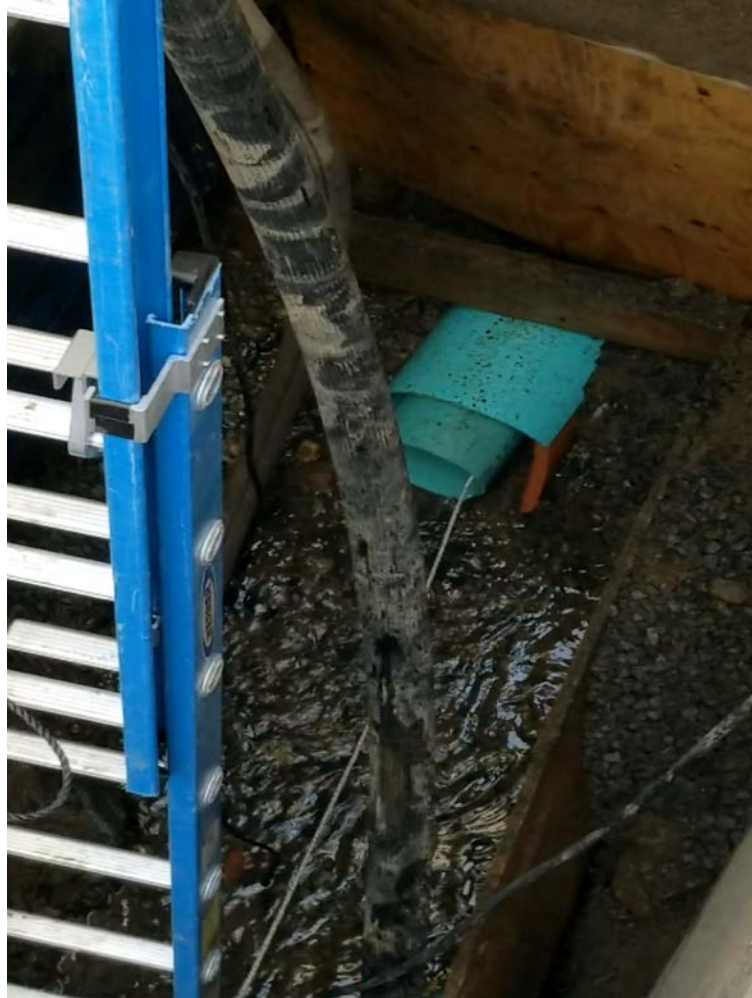


Pipe Bursting Construction

- Entrance and Receiving pits established – entrance pit excavated near upstream manhole, wall of downstream manhole widened
- Excavation pits at each sewer service along pipe for reconstruction



Groundwater



Pipe Bursting Process



Pipe Bursting Process



Pipe Bursting Process



Pipe Bursting Process



Pipe Bursting Process



Pipe Bursting Process



Post Pipe Bursting Construction

- Re-establishment of service connections
- Backfill and paving of excavation pits



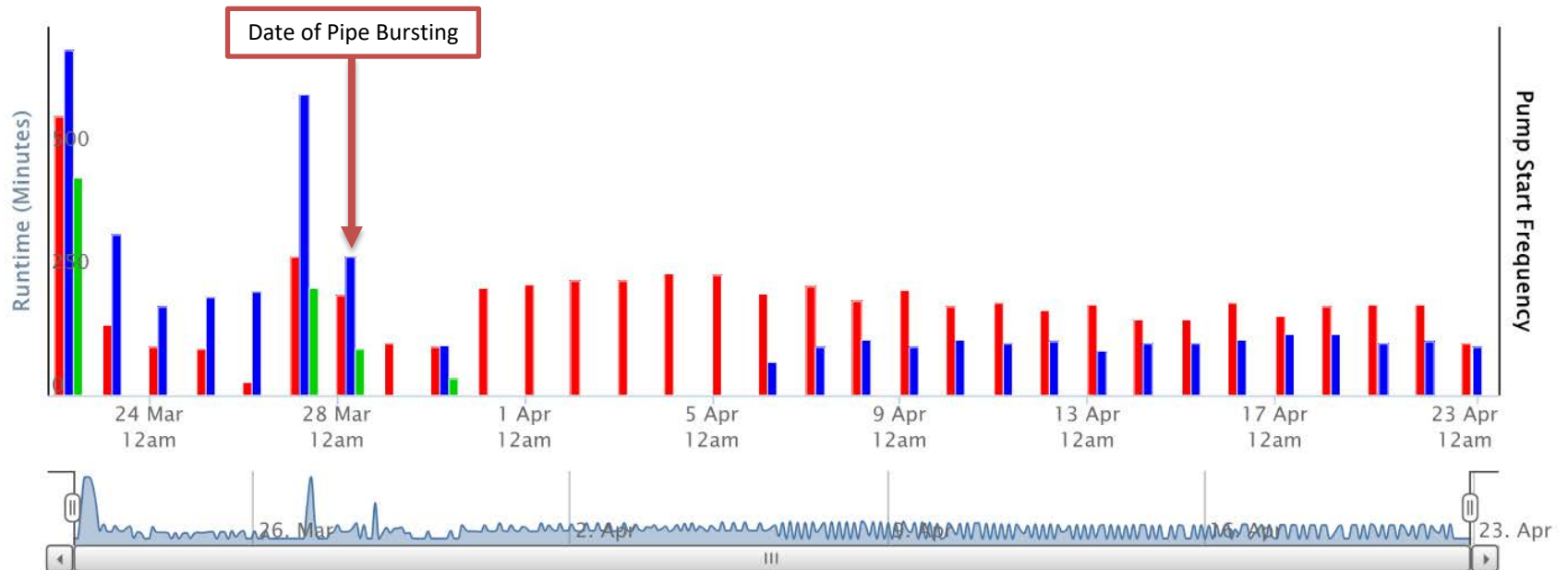
Penney Road Pump Station Pre Construction Pump Data

Pump Data
Penny Road PS



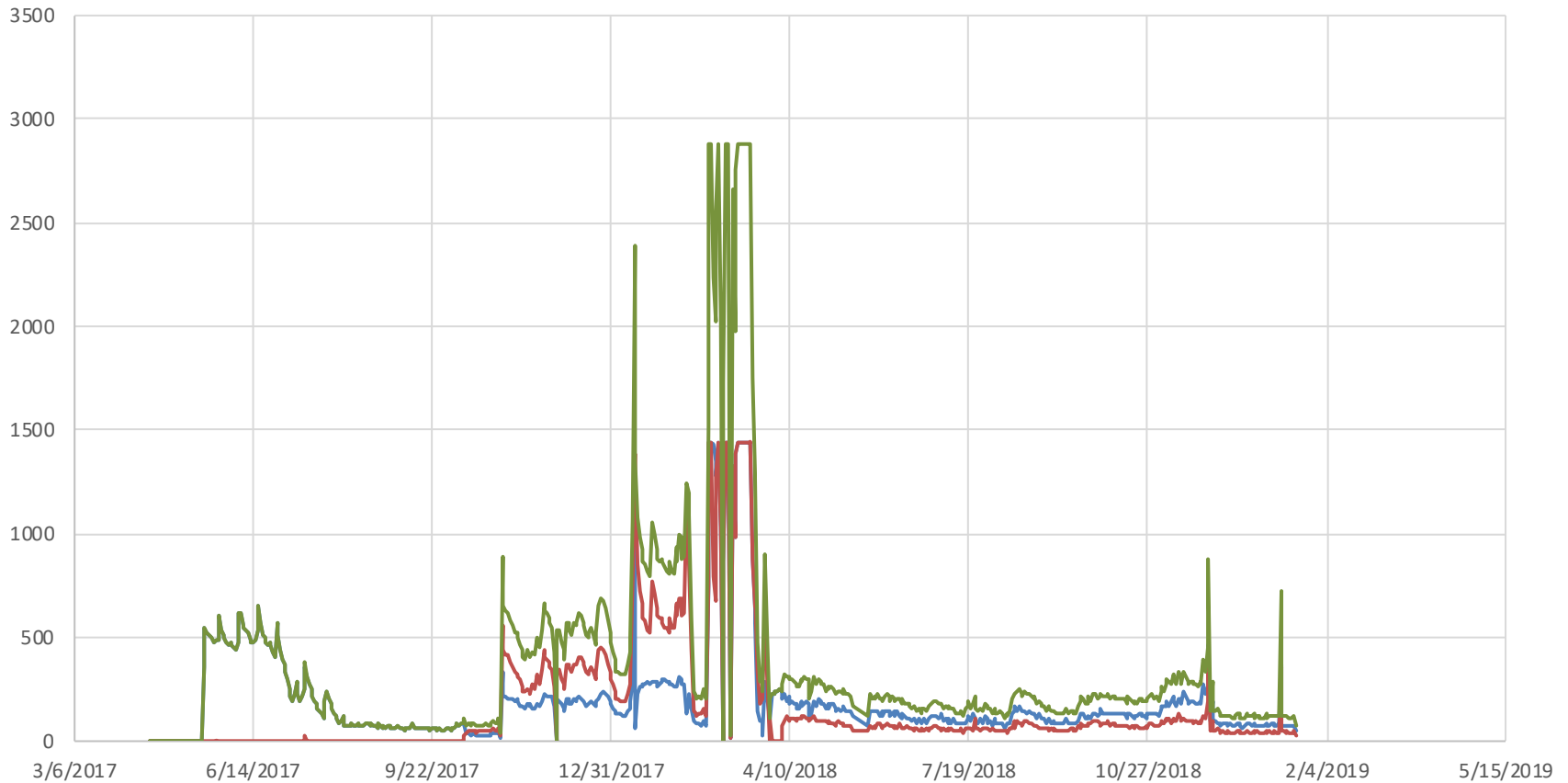
Penney Road Pump Station Post Construction Pump Data

Pump Data
Penny Road PS



Penney Road Pump Station Runtime Summary

Pump Run Time Summary



Questions





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