Sectional CIPP of Sanitary Sewer Force Main Preserves Historic Hull Waterfront

Charles Tripp, P.E.
Project Manager

November 16, 2017

KLEINFELDER
Bright People. Right Solutions.

COOPERSTOWN, NY
NOV 15-16
NASTT
NORTHEAST REGIONAL CHAPTER
TRENCHLESS CONFERENCE

Background

- **History of Hull**
  - The Town of Hull, MA is a suburban ocean-side community of roughly 11,000 people located on a peninsula just south of Boston Harbor
  - Favorite seasonal and year-round community for it three-mile-long sandy beach on the Atlantic Ocean
  - Having a land area of only 2.5 square miles, 99 percent of the Town is connected to the municipal sewer system which dates to 1860
  - Due to long travel times in interceptors, and several force mains these pipe systems are prone to deterioration due to hydrogen sulfide attack

Background

- **Focus of Project**
  - Nantasket Avenue forced main - 1974
    - 14” ductile iron force main
    - 4,700 linear feet
    - From P.S. #3 to discharge at 30” RCP sewer
    - Conveys significant portion of Town’s flow to Hull WWTF
  - P.S. #3
    - Pump capacities = 1700 GPM
    - Pump operating flows = 240 GPM
      - Flow velocity = 0.75 ft/sec
      - Not sufficient flushing velocity

Background


George Washington Boulevard
Pipeline Route Through Parking Lot
Pumping Station No.3
Google earth
©2016 Google
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Background


Nantasket Ave
George Washington Boulevard
Google earth
© 2016 Google
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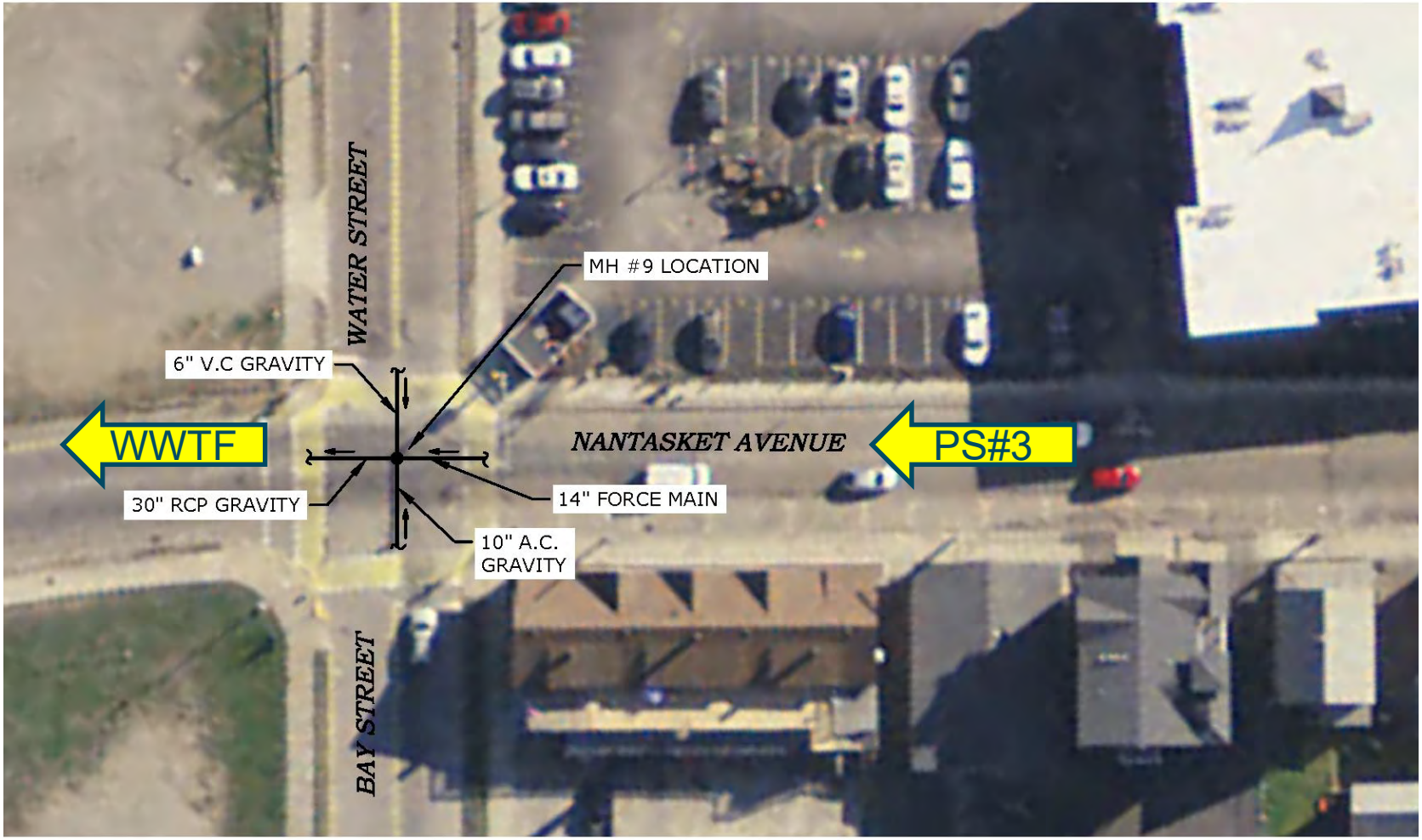
Background

Background


WATER STREET
MH #9 LOCATION
6" V.C GRAVITY
WWTF
NANTASKET AVENUE
PS#3
30" RCP GRAVITY
14" FORCE MAIN
10" A.C.
GRAVITY
BAY STREET

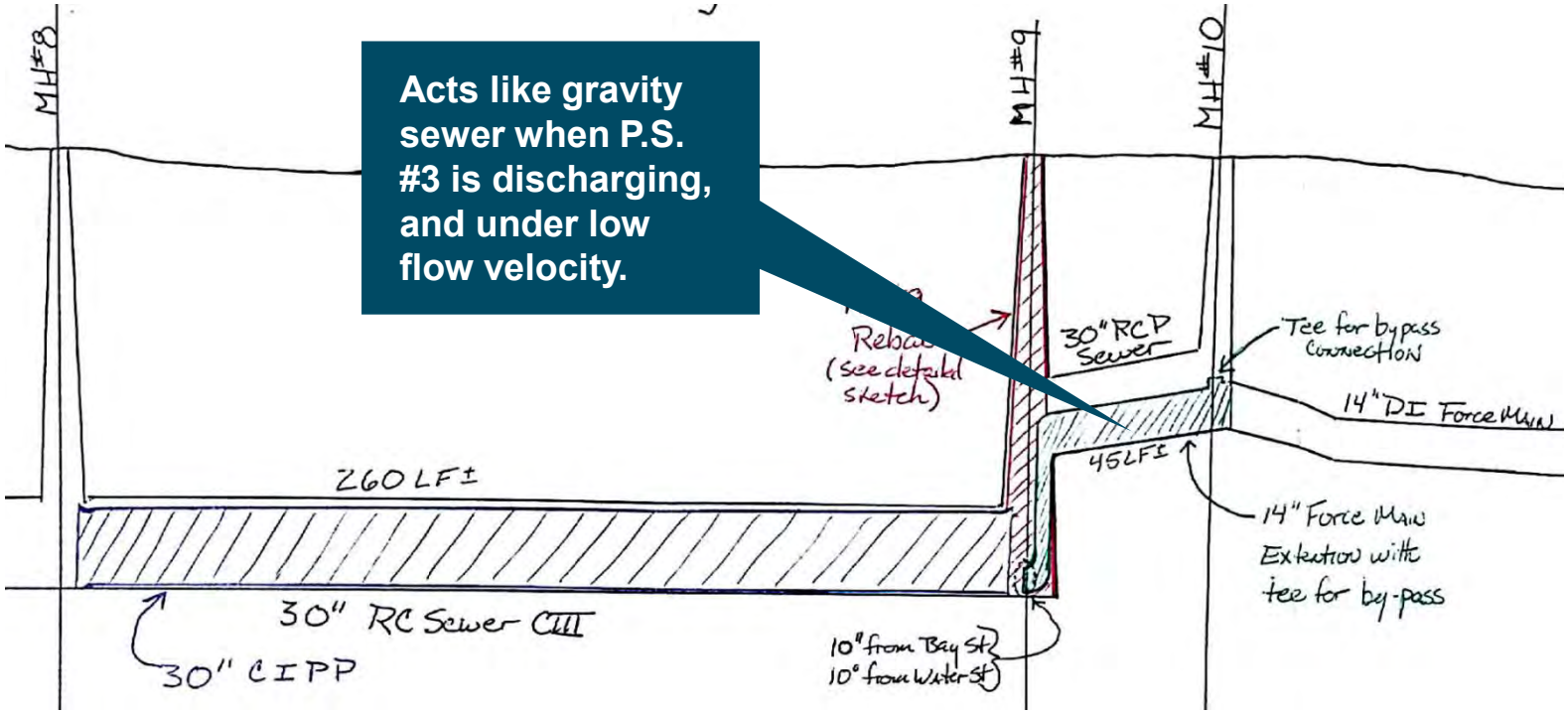
Background

- **Investigation**
  - Sewer Operator decides to temporarily shut down P.S. #3 and CCTV inspect forced main
    - Spurred by December 2015 sewer failures in Plymouth, MA

30” steel pipe deteriorated due to H_2S corrosion resulting from low buildout and low flow velocity.

Background

- **Investigation**
  - In 2002, Town extends 14” DI forced main 45 LF down existing 30” RCP sewer and abandons existing valve manhole
  - CIPP line downstream sewer, and line discharge manhole



Background

- **Investigation**
  - In June 2016, Town CCTV inspects 14” DI force main from discharge manhole over length of 45 LF extension
  - Downstream-most 15 LF are found to be deteriorated from H_2S corrosion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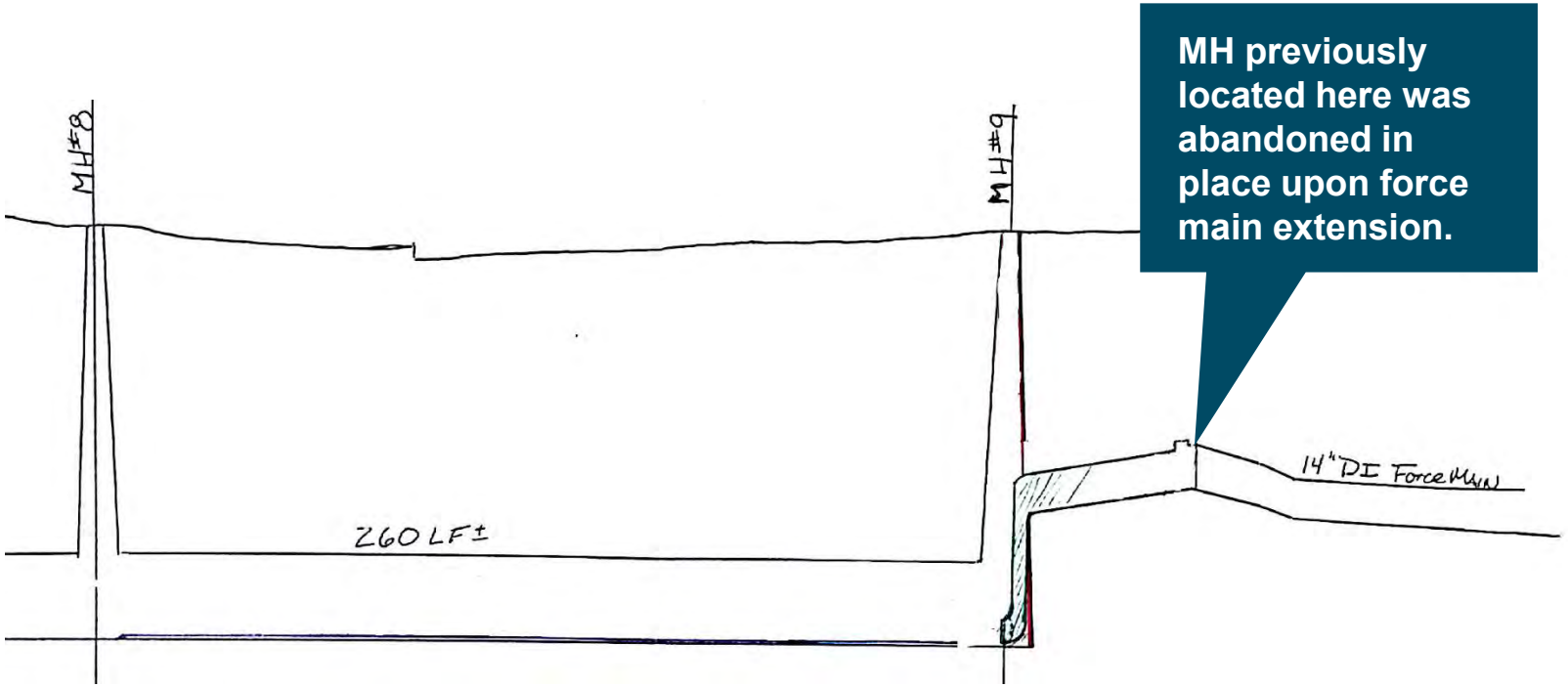
Issues

- **Newly Paved Intersection at Bay Street**
  - Under MassDOT moratorium

Issues

- **Access**
  - Only discharge manhole at Bay Street intersection is available for access to complete work



Repair Alternatives Discussed

- **Spin-Cast Pipe Lining Repair**
  - Was not believed to be viable, as it would be tough to seal voids between DI pipe and RCP host pipe outside of DI

Repair Alternatives Discussed

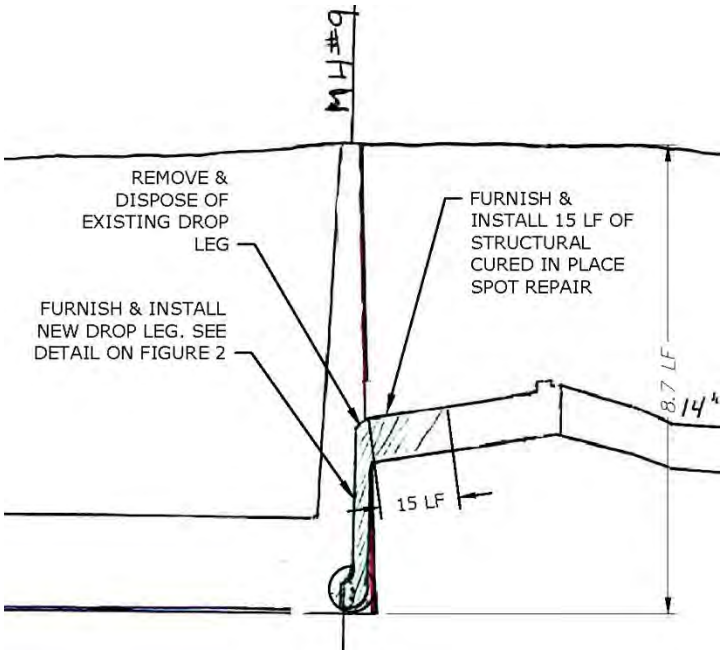
- **Spin-Lining Repair**
  - Was not believed to be viable since only one point of access was available, and it would be difficult to seal the annular space

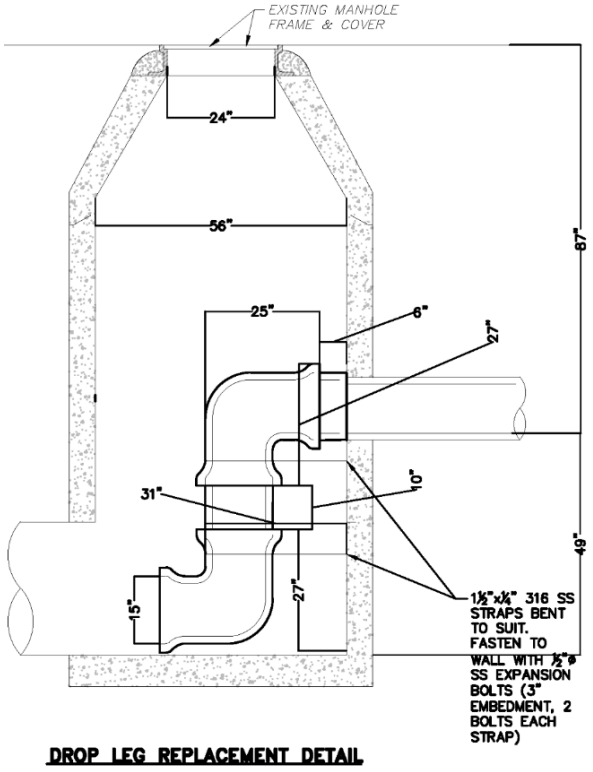
Repair Alternatives Discussed

- **Sectional CIPP Repair**
  - Typically requires two points of access, but in relatively short distances, can be performed with one point of access

Repair Design

- **Sectional CIPP Repair**
  - Repair 15 LF from downstream manhole location using Sectional CIPP repair
  - Replace DI drop leg with 15” PVC



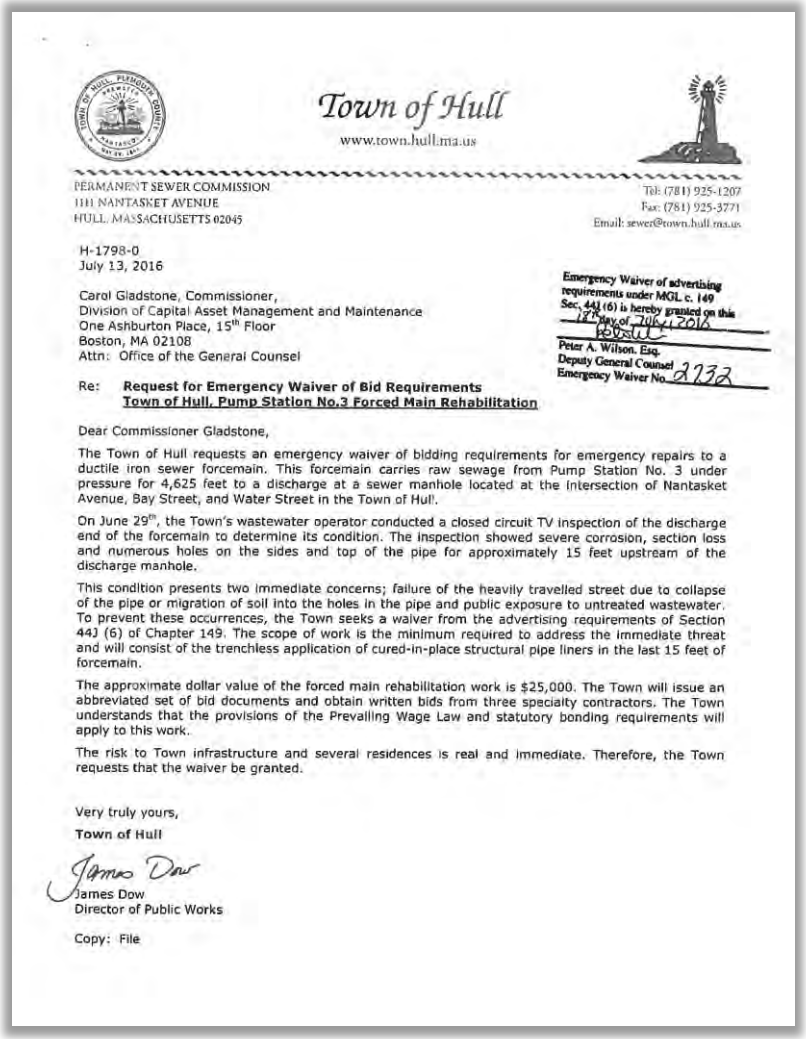


Repair Design

- **Temporary Bypass Pumping**
  - Town decides to avoid time and costs associated with setting up temporary bypass pumping around location of repair
  - Sewer Operator contracts with septic hauler over estimated three nights of work
- **Working Hours**
  - Flow data at PS #3 indicated that from 11:00 PM to 7:00 AM was best time
- **Public Notice**
  - Town uses letter boards and mailers to local residents for notification prior to construction
- **Police Detail Coverage**
  - Costs covered by the Town

Emergency Bid Waiver

- **Time Was of the Essence**
  - Town wanted to forego the traditional bid process, due to situation found via CCTV inspection
  - A waiver was requested from DCAMM to obtain 3 quotes from appropriate vendors in lieu of public bid
  - Waiver was granted!



Town of Hull
www.town.hull.ma.us

PERMANENT SEWER COMMISSION
181 NANTASKET AVENUE
HULL, MASSACHUSETTS 02045

Tel: (781) 925-1207
Fax: (781) 925-3771
Email: sewer@town.hull.ma.us

H-1798-0
July 13, 2016

Carol Gladstone, Commissioner,
Division of Capital Asset Management and Maintenance
One Ashburton Place, 15th Floor
Boston, MA 02108
Attn: Office of the General Counsel

Emergency Waiver of advertising requirements under MGL c. 149 Sec. 44J (6) is hereby granted on this 18th day of July, 2016
Peter A. Wilson, Esq.
Deputy General Counsel
Emergency Waiver No. 2232

Re: **Request for Emergency Waiver of Bid Requirements**
Town of Hull, Pump Station No.3 Forced Main Rehabilitation

Dear Commissioner Gladstone,

The Town of Hull requests an emergency waiver of bidding requirements for emergency repairs to a ductile iron sewer forcemain. This forcemain carries raw sewage from Pump Station No. 3 under pressure for 4,625 feet to a discharge at a sewer manhole located at the intersection of Nantasket Avenue, Bay Street, and Water Street in the Town of Hull.

On June 29th, the Town's wastewater operator conducted a closed circuit TV inspection of the discharge end of the forcemain to determine its condition. The inspection showed severe corrosion, section loss and numerous holes on the sides and top of the pipe for approximately 15 feet upstream of the discharge manhole.

This condition presents two immediate concerns; failure of the heavily travelled street due to collapse of the pipe or migration of soil into the holes in the pipe and public exposure to untreated wastewater. To prevent these occurrences, the Town seeks a waiver from the advertising requirements of Section 44J (6) of Chapter 149. The scope of work is the minimum required to address the immediate threat and will consist of the trenchless application of cured-in-place structural pipe liners in the last 15 feet of forcemain.

The approximate dollar value of the forced main rehabilitation work is $25,000. The Town will issue an abbreviated set of bid documents and obtain written bids from three specialty contractors. The Town understands that the provisions of the Prevailing Wage Law and statutory bonding requirements will apply to this work.

The risk to Town infrastructure and several residences is real and immediate. Therefore, the Town requests that the waiver be granted.

Very truly yours,
Town of Hull

James Dow
Director of Public Works

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Contract Award

- **Summary**
  - DCAMM waiver received on July 18, 2016
  - Three quotes were requested
  - Two Bids Received
  - Awarded to Low Bid on August 1, 2016

Repair Construction Highlights

Repair Construction Highlights

Repair Construction Highlights

Repair Construction Highlights

Before

After

Repair Construction Highlights

Outcomes

- **Project Summary**
  - Bid Date: August 1, 2016
  - Award Date: August 3, 2016
  - Construction Period: August 30-31, 2016
  - Sectional CIPP Repair Cost (~14LF): $14,130
  - Status: Success!

Continued Proactive Efforts by Town in 2017

- Discharge Piping at Pump Station #3 has been replaced to include an isolation valve, new fittings, and a “wye” connection for launching of internal inspection technologies.
- Town contracts to perform test-pits over 4,625 LF length of entire force main to perform soil corrosivity testing, and pipe thickness testing.
- Sectional CIPP repair re-inspected by Town Sewer Operator in July 2017 to confirm integrity


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Questions & Discussions