

Improving Infrastructure While Protecting the Great South Bay

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6/8/23



**CDM
Smith**

NYWEA-NEWEA JOINT SPRING TECHNICAL
CONFERENCE AND EXHIBITION



Suffolk County Sewer District No. 3 - Southwest

- Bergen Point Wastewater Treatment Plant

- 40.5 MGD WWTP
- Constructed between 1978 and 1980

- Outfall

- Overall Length: 32,500 feet
- Bay Portion of Outfall:
 - 72-inch Pre-stressed Concrete Cylinder Pipe
 - 14,200 feet of Price Brothers Pipe
 - 1,100 feet of Interpace Pipe
- Ocean Portion of Outfall:
 - 17,200 feet of Concrete Lined Steel Pipe
 - 72-inch to 36-inch



2003 Outfall Concerns

- Failures of PCCP Manufactured during Same Time Elsewhere in the Country
- Single Pipe with no Backup
- Was the Pipe Leaking?
- Overall Condition of Pipe?

Phase I - Outfall Monitoring

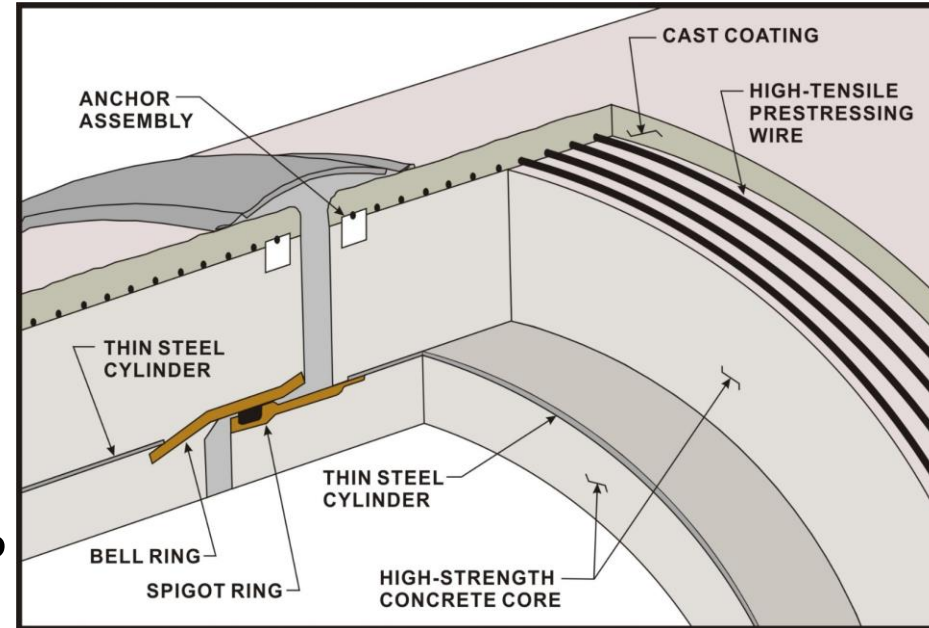
- Suffolk County Initiated an Outfall Monitoring Program with Pure Technologies
 - Two Arrays of Hydrophones
 - 5,000 Feet of Price Brothers Pipe
 - 1,100 Feet of Interpace Pipe
 - Monitored for Three Months

Results of 130 Days

- Hydro Array 1- 717 Wire Breaks
- Hydro Array 2 – 55 Wire Breaks
- Pure Technologies Rates Outfall as One of the Three Worst Pipelines that Pure Technologies ever Monitored at the Time

What is PCCP?

- Composite Pipe Material: Mortar, High Strength Steel, Concrete and Mild Steel
- Developed during WWII to Minimize Steel by Substituting High Strength Steel and Concrete for Mild Steel
- Catastrophic Failures (Category I) are More Common with PCCP than with Other Pipe Materials due to **Wire Failure**



Phase 2 - Outfall Evaluation

- External Inspection of Pipe on the Barrier Island Pipe Segments
- Cathodic Protection System Tested
- Structural Analysis of Pipe Integrity Performed
 - No Additional Load Can be Applied to Pipe
 - Concern if Pipe is Dewatered It Could Collapse



Alternatives Analysis

- Tunnel with Carrier Pipes
- **Tunnel without Carrier Pipes**
- Open Cut Pipe Installation Across Great South Bay
- New Outfall Discharging to Great South Bay
- Lining of Existing Outfall while Using Temporary Outfall
- Replace Outfall with Upland Recharge

Tunnel Design Contract Requirements

- Maintain Final Effluent Pump Station Operation Throughout Construction
- Replace Final Effluent Pump Station Discharge Piping in a Sequenced Manner
- New Tunnel within Existing Outfall Easement
- Connect New Outfall to Existing Outfall on Barrier Island
- Restoration per Regulatory Authorities

Outfall Tunnel Project Information

- Tunnel

- ID: 10 ft
- Length: ≈ 14,200 ft
- Depth: ≈ 100 ft

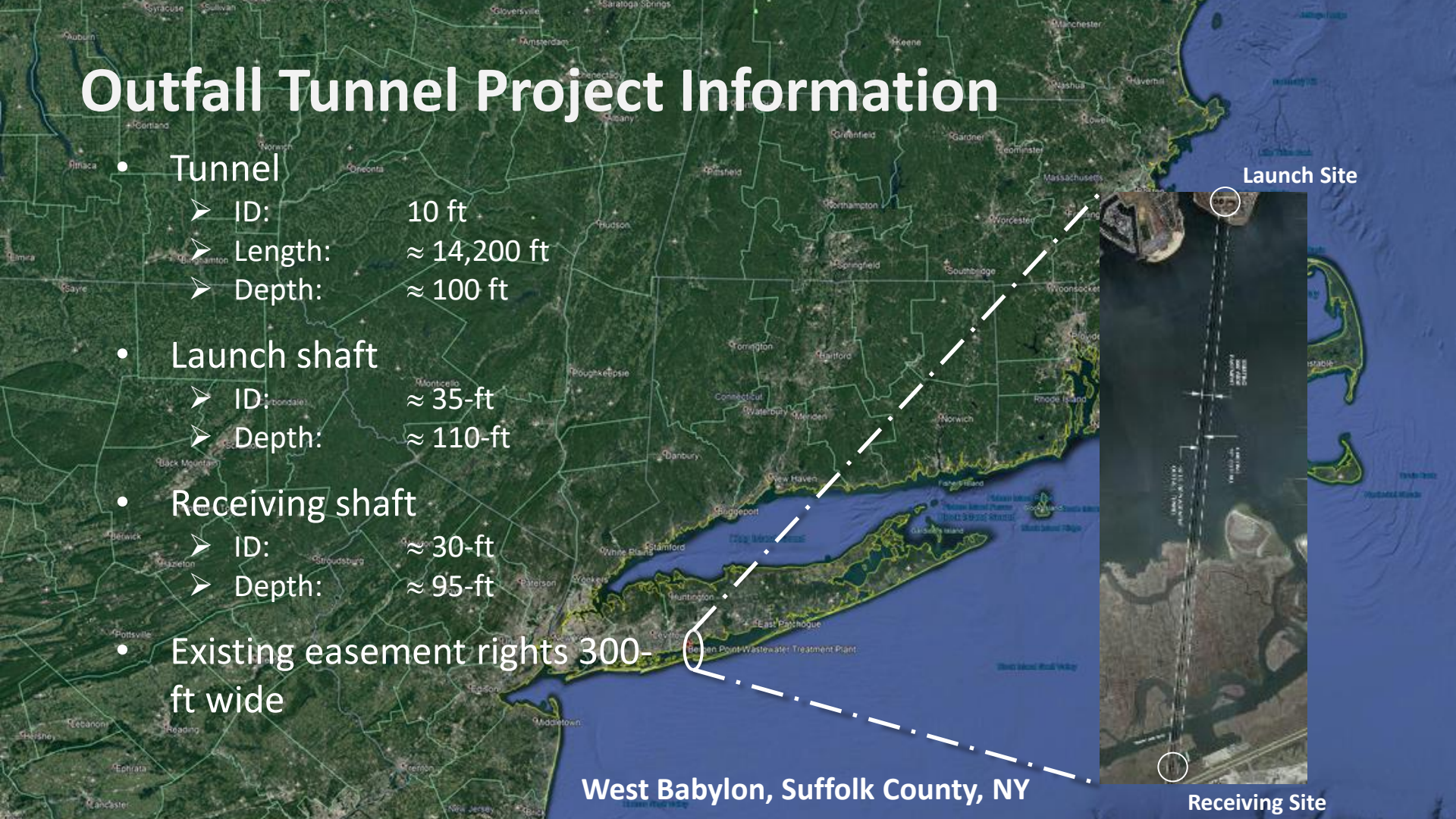
- Launch shaft

- ID: ≈ 35-ft
- Depth: ≈ 110-ft

- Receiving shaft

- ID: ≈ 30-ft
- Depth: ≈ 95-ft

- Existing easement rights 300-ft wide



Launch Site

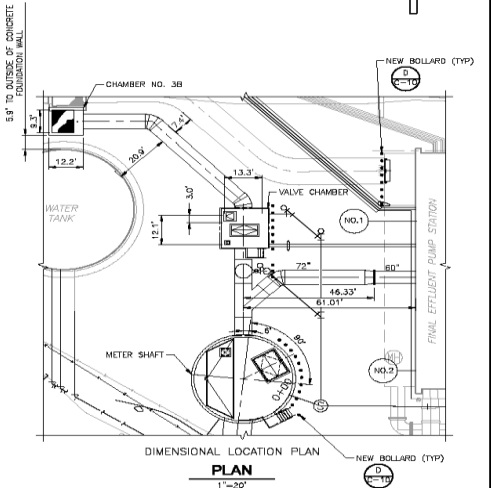
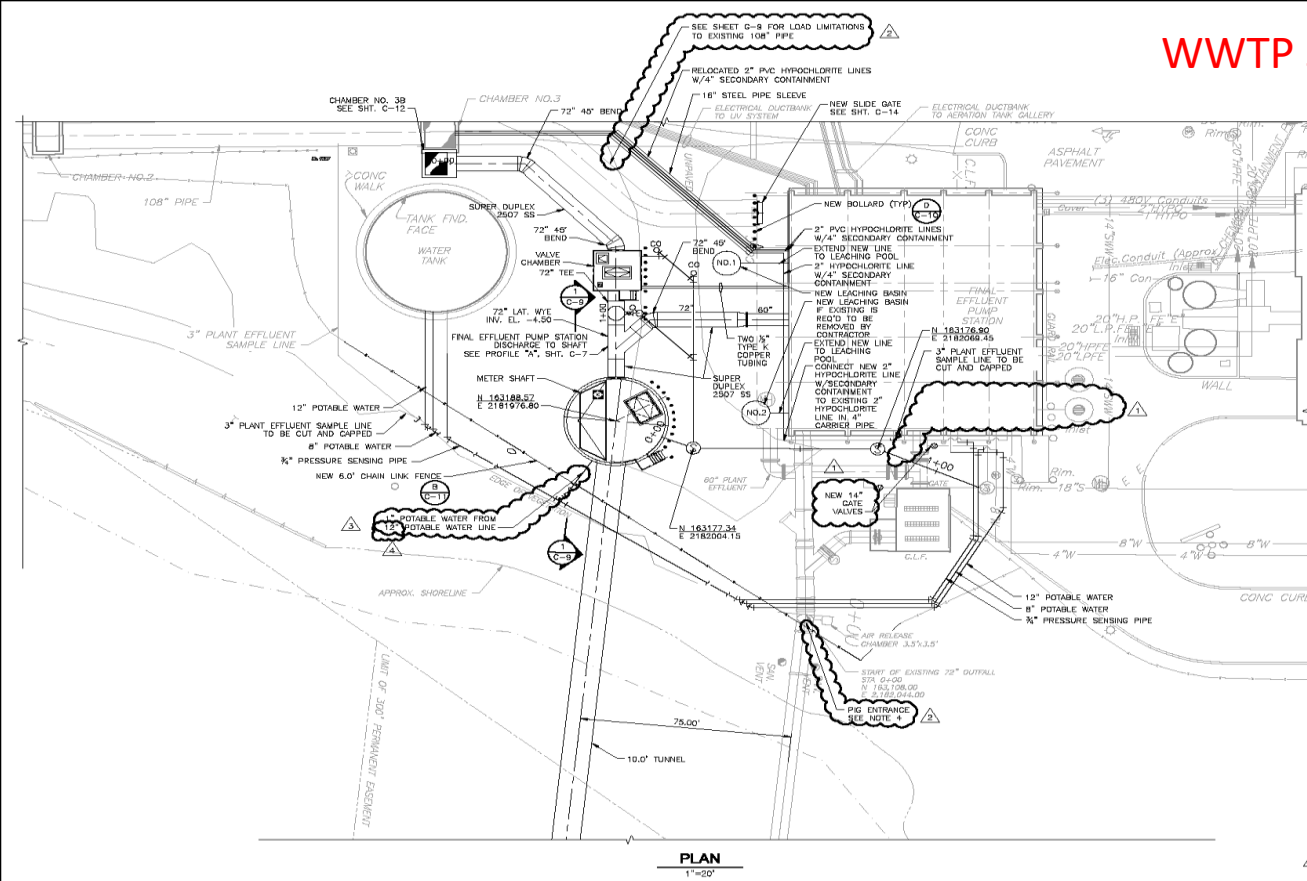
West Babylon, Suffolk County, NY

Receiving Site

Outfall Alignment



WWTP Site



PLAN
1"=20'

PLAN
1"=20'

- NOTES:
- THE LOCATION OF ALL PIPING AND UTILITIES AS SHOWN ON THE DRAWINGS IS APPROXIMATE. THE CONTRACTOR MUST PERFORM A TEST PIT PROGRAM TO LOCATE ALL PIPING, VALVING AND UTILITIES THAT ARE TO BE RELOCATED OR DEMOLISHED, CAPPED OR REMOVED AND/OR A POTENTIAL INTERFERENCE TO PROPOSED WORK ON THE PROJECT. THE PROGRAM SHALL INCLUDE BOTH HAND DIGGING OF ELECTRICAL CONDUIT AND CHEMICAL PIPING AND OTHER SMALL PIPING. THE TEST PIT PROGRAM SHALL ALSO LOCATE ANY VALVING TO BE REPLACED. THE PROGRAM SHALL BE CONDUCTED AT THE INITIATION OF THE PROJECT TO ALLOW THE CONTRACTOR TO PROPERLY PLAN WORK WHILE MAINTAINING PLANT FACILITIES AND OPERATIONS.
 - LEACHING PISOLS
NO. 1
10.0' DIAMETER
8.0' DEEP
PIPE INVERT 11.6 (TO BE VERIFIED IN FIELD)
NO. 2
10.0' DIAMETER
8.0' DEEP
PIPE INVERT 11.8 (TO BE VERIFIED IN FIELD)
 - SEE SHT. C-39 FOR BOLLARD SPACING.
 - THE PIG ENTRANCE IS A 7.5" DIAMETER WYE WITH A BLIND FLANGE THAT PROVIDES ACCESS TO THE OUTFALL PIPE. SEE SHEET C-2 AND SPECIFICATION SECTION 01310 FOR ACCESS REQUIREMENTS.



WARNING
IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO VERIFY THE LOCATION AND DEPTH OF ALL UTILITIES BEFORE ANY EXCAVATION OR OTHER FIELD ACTING UNDER THE SUPERVISION OF A REGISTERED PROFESSIONAL ENGINEER. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS AND SPECIFICATIONS FOR ANY WORK TO BE PERFORMED ON OR AROUND ANY UTILITIES.

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REV.	DATE	DRWN	CHKD	REMARKS
1	6/14/17	RJG	KFK	ADDENDUM NO. 7
2	6/16/17	RJG	KFK	ADDENDUM NO. 5
3	1/25/17	RJG	KFK	ADDENDUM NO. 3
4	12/27/16	RJG	KFK	ADDENDUM NO. 1

DESIGNED BY: J. VILGA
 DRAWN BY: D. GORVETZ
 SHEET CHECKED BY: J. MILSA
 GROSS CHECK BY: W. REYK
 APPROVED BY: C. KELLY
 DATE: JANUARY, 2017



SUFFOLK COUNTY DEPARTMENT OF PUBLIC WORKS
 SEWER DISTRICT NO. 3 - SOUTHWEST
SUFFOLK COUNTY
OUTFALL REPLACEMENT

WWTP SITE
NEW PIPING PLAN

PROJECT NO. 9175-38012
 FILE NAME: CDMSP17
 SHEET NO.
C-6

Tunnel Design Criteria

- Depth of Tunnel
 - Consistent Soil conditions
 - Minimum of 2 Diameters Below Bottom of Bay Dredge Depth
- Slope Upward for drainage
- Size – Minimum Size is 10-foot diameter to account for HVAC, piping, electrical and train
- Maintenance Stops –
 - Need to replace cutters/perform Maintenance in front of TBM
 - Requires Specialty Firm and Hyperbaric Chamber



WWTP Plant/Launch Shaft

Bergen Point WWTP Site Prior to Construction



Staging Area
approximately 3.5
acres

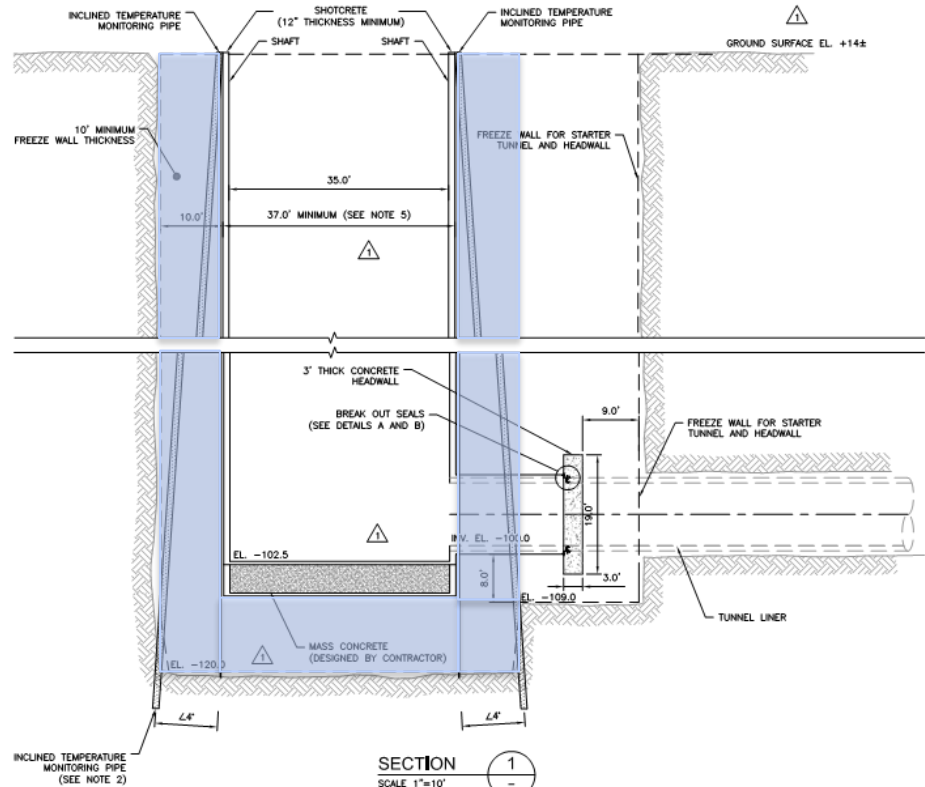
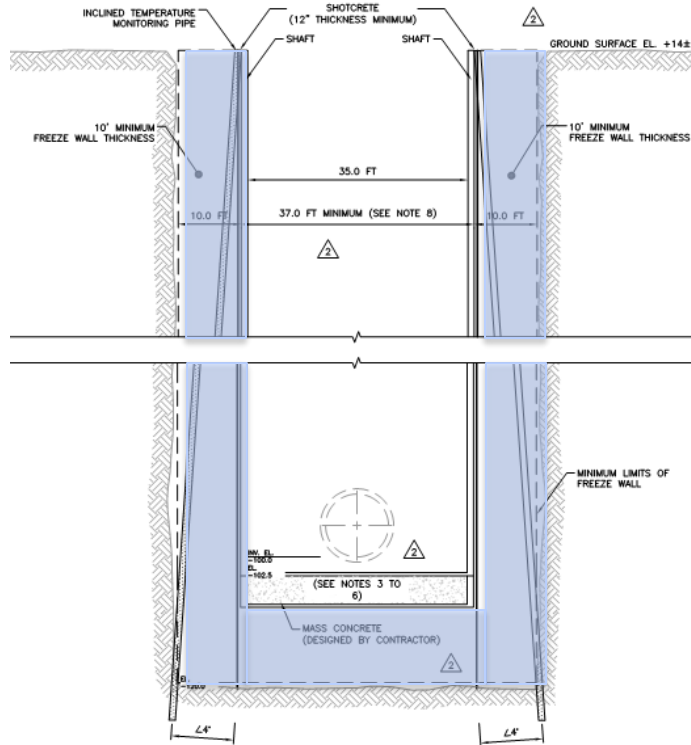
Site Preparation for Ground Freeze Installation



Launch Shaft Design Alternatives

- Depth - 110 feet
- Ground Freezing Required
 - Eliminates Dewatering
 - Compact Area and Reduced Impact on Surrounding Infrastructure

Ground Freezing – Freeze Walls



Ground Freeze At Launching Shaft



October 18

Ground Freeze System



WWTP Site February 2019



Launch Shaft Excavation



WWTP April 2019



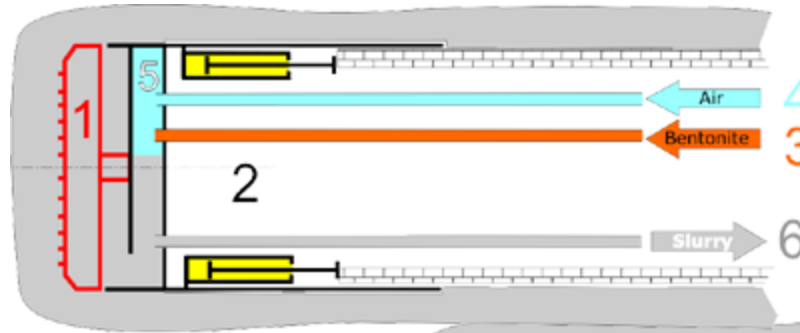
WWTP June 2019



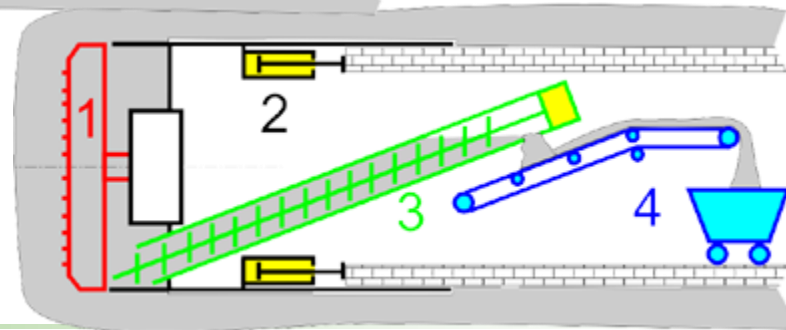
Tunnel Boring Machine

- Two Types for Soft Ground – Type Selected by Contractor Based on GDR and GBR

- Slurry



- Earth Pressure Balance



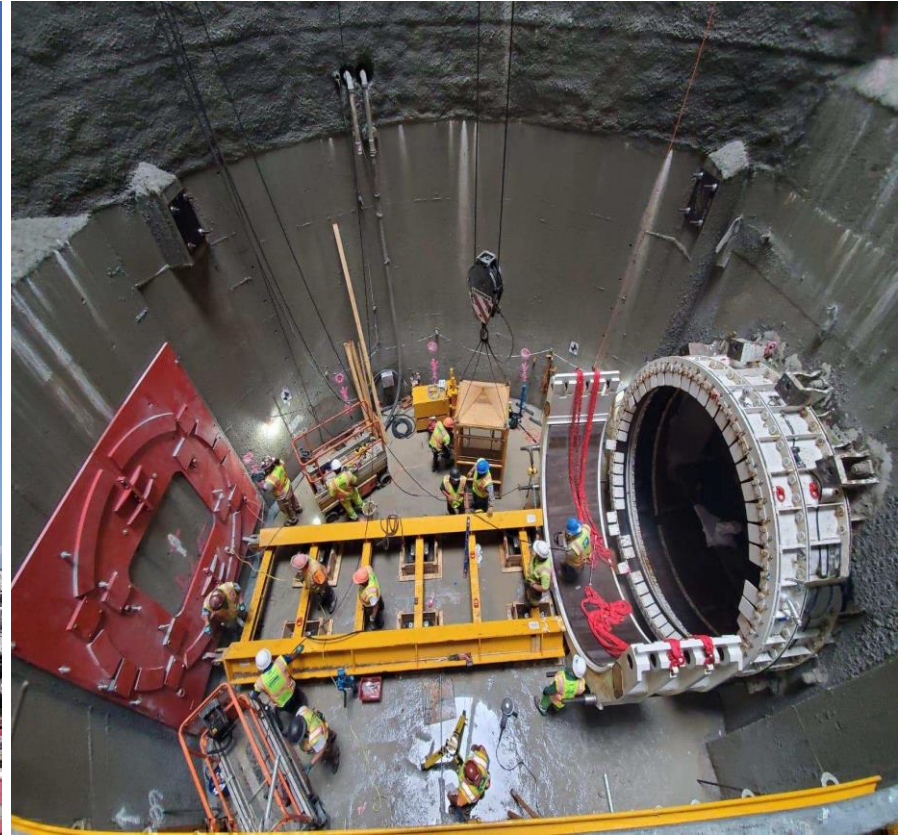
TBM (Slurry Machine)



September 2019 Launch of TBM/Pipe Jacking



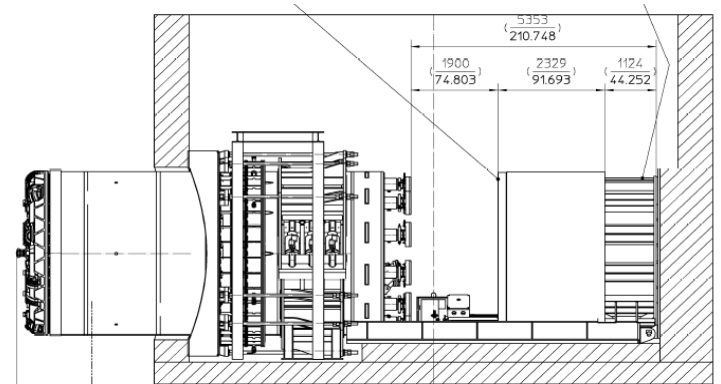
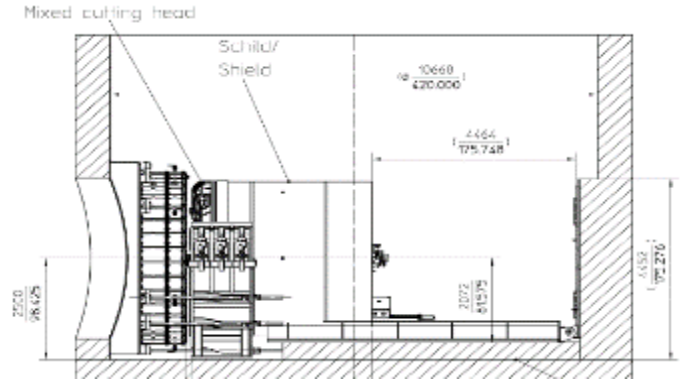
TBM Being Lower into Shaft and Shaft Bottom



Launching Approach

Pipe jacking

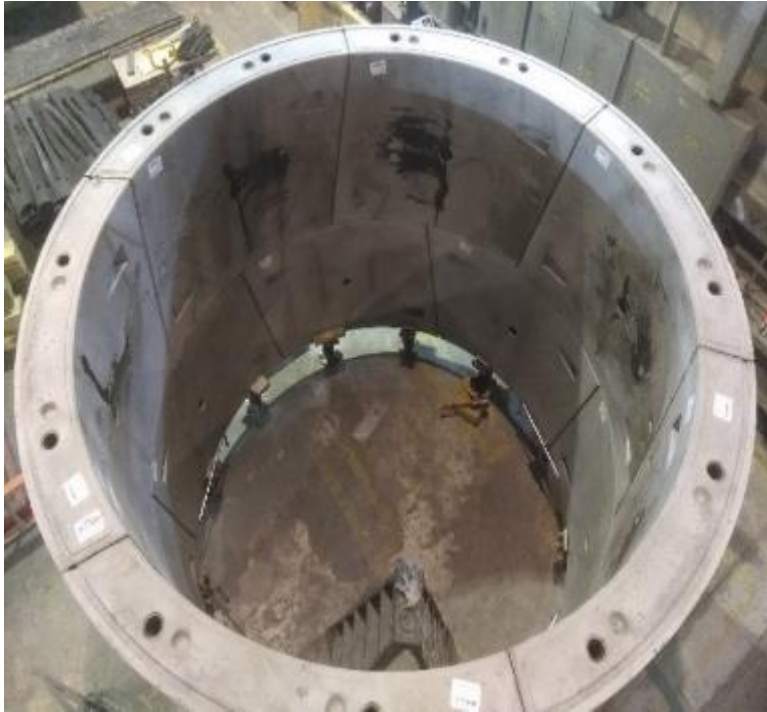
- *Colleen* starts journey – September 14, 2019
- Gantry 1 and Bridge 1 installed after the 6 pipe
- Jacking completed October 22, 2019



Adapter Installation



Tunnel Lining



WWTP December 2019



WWTP November 2020



Gantry Crane



Slurry Treatment Plant



Inside TBM



Tunnel Lining – Segmental Section



Tunnel Lining – Pipe Section



Site Piping

- Had to last 100 years of more
- Had to withstand being in Salt Water
- No Reduction in Pipe Size from Existing Outfall to Maintain Original Capacity of 180 MGD
- Duplex Stainless Steel – 2507 selected



WWTP September 2021





Barrier Island – Receiving Shaft

Barrier Island Site



Barrier Island September 2019



Barrier Island January 2020



Barrier Island July 2020



Barrier Island October 2020



Bypass Piping and Outfall Demolition



New Outfall Piping Connection to Existing Outfall



Barrier Island February 2021



Barrier Island April 2021



Barrier Island July 2021



October 2021

- Status
 - New Outfall has been Tested and used for Gravity Flow
 - FEPS Piping is being Replaced on Pumps 1 and 2 while Pumps 3 and 4 Operate with Existing Outfall



January 2022



November 2022



November 2022



November 2022



November 2022



Questions