

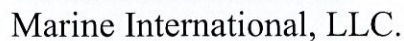


Appendix F: Horizontal Directional Drill Installation Manual

**INSTALLATION MANUAL
FOR SEGMENTS 17 EM&CP
HORIZONTAL DIRECTIONAL DRILL (HDD)
AT PUTNAM STATION, CEMENTON and
CONGERS**

**ON THE
CHAMPLAIN HUDSON POWER EXPRESS
SUBMARINE CABLE SYSTEM
30 NOVEMBER 2022**





for NKT

**INSTALLATION MANUAL
FOR SEGMENT 17 EM&CP
HORIZONTAL DIRECTIONAL DRILL
AT STONY POINT**

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1.0 LIST OF ACRONYMS

ABS	American Bureau of Shipping
AC	Alter Course
AIS	Automatic Identification System
CD	Chart Datum
CHPE	Champlain Hudson Power Express Project
CMI	Caldwell Marine International, LLC
DGPS	Differential Global Positioning System
DP	Dynamic Positioning
DWT	Deadweight Tonnage
ECI	Environmental Crossing Inc. (d.b.a. Huxted Trenchless, LLC)
ECR	Equipment Calibration Record
EM&CP	Environmental Management & Construction Plan
EPP	Environmental Protection Plan
ERP	Emergency Response Plan
GA	General Arrangement
HDD	Horizontal Directional Drill
HDPE	High Density Polyethylene
HPU	Hydraulic Power Unit
HT	Huxted Trenchless, LLC
IMO	International Maritime Organization
ITP	Inspection and Test Plan
KP	Kilometer Point (along cable route)
LBE	Linear Belt Engine
LCE	Linear Cable Engine
LLW	Lower Low Water
MOP	Method of Procedure
OB	Over Board
PLC	Programmable Logic Controller (computer system)
QA	Quality Assurance
RLM	Running Line Monitor
ROV	Remote Operated Vehicle
RPL	Route Position List
SDO ₂	Surface Decompression Oxygen
SOW	Scope of Work
UPS	Uninterruptible Power Supply
USBL	Ultra Short Baseline
USCG	United States Coast Guard
VBS	Virtual Base Station
VHF	Very High Frequency
VTC	Vessel Traffic Control
WAAS	Wide Area Augmentation System

2.0 EXECUTIVE OVERVIEW

The work to be undertaken is associated with the State of New York Public Service Commission Case 10-T-0139 for the Champlain Hudson Power Express project for the construction of a 1250 MW high voltage direct current circuit from the Canadian Border to New York City. The cable route extends approximately 330 miles over land and marine pathways.

The EM&CP process for this project will be divided into multiple segments to allow for interim approvals, with directed notices to proceed (NTP) in support of the overall project schedule. This document is part of the quality plan and is an appendix to the Segment Seventeen Environmental Management & Construction Plan (EM&CP) submittal to NY Public Service Commission (NYPSC) pursuant to the Article VII permit for the Horizontal Directional Drills (HDD) at Putnam Station (Washington County), Cementon (Greene County), and Congers (Rockland County).

This document describes the methods and materials to be used for the HDDs prior to the cable installation in New York State, specifically:

- **Horizontal Directional Drilling at Shoreline Crossings - Segment Seventeen EM&CP (Putnam Station, Cementon, and Congers).**

A comprehensive quality assurance program has been developed to ensure that all phases of the program, from cable construction to installation and burial, are conducted in a controlled and predictable manner in full conformance with standard industry practices.

3.0 SYSTEM OVERVIEW

In support of the Champlain Hudson Power Express Project, *Caldwell Marine International LLC. (CMI)* has contracted with NKT Inc. to install 1250 MW HVDC submarine transmission cables. The transmission cables will connect New York City with Hydroelectric Power from the Canadian Border, see Figure 2-1. Transmission Supply Route. The transmission cables are divided into segments and will be spliced into one continuous length concurrent with their installation. The transitional HDD locations are summarized below. This Installation Manual will address the procedures and installation for the stated HDD locations.

- **HDD Location**
 - Shoreline Crossing in Putnam Station, NY, Cementon, NY, and Congers, NY to transition the submarine cable laid in the Hudson River to the approved underground route. Underground cable outside of the HDD on land/terrestrial side will not be installed by CMI and will be covered in a separate EM&CP submitted by others.

- **Protection Strategies**

- Submarine Cable installation procedures are covered in the Submarine Cable Installation Manual – Segment 5 furnished under separate cover, respectively.

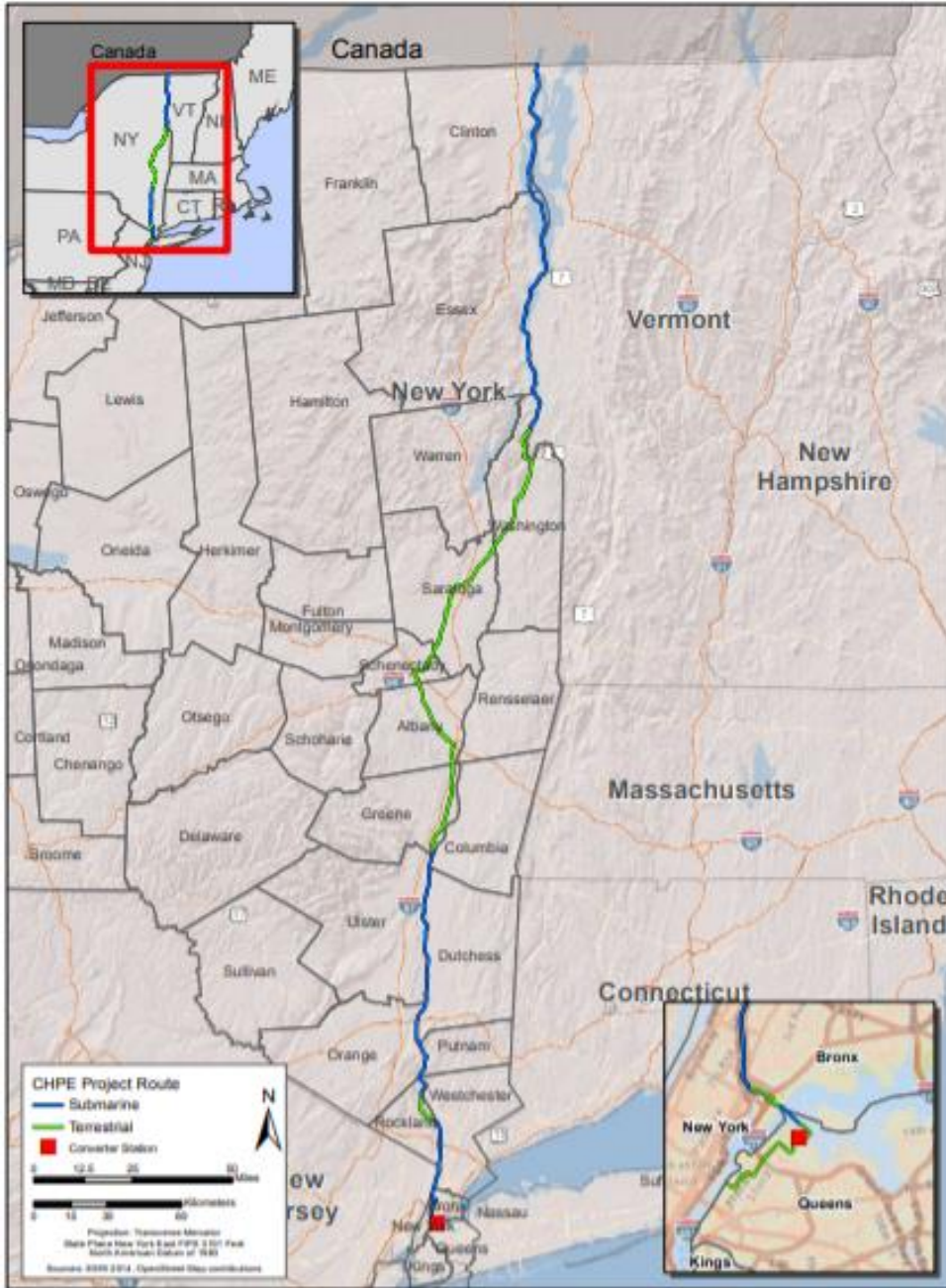


Figure 1 -Transmission Supply Route

4.0 SCOPE OF WORK – HDD

This installation manual provides a comprehensive description of the Horizontal Directional Drills to be performed as part of the infrastructure construction to be done in New York State, and is an appendix to the NY, EM&CP plan for Putnam Station, Cementon, and Congers. The document was prepared in accordance with the permits and plans that regulate this project including the NY Public Service Commission (Article VII) Permit for Case 10-T-0139.

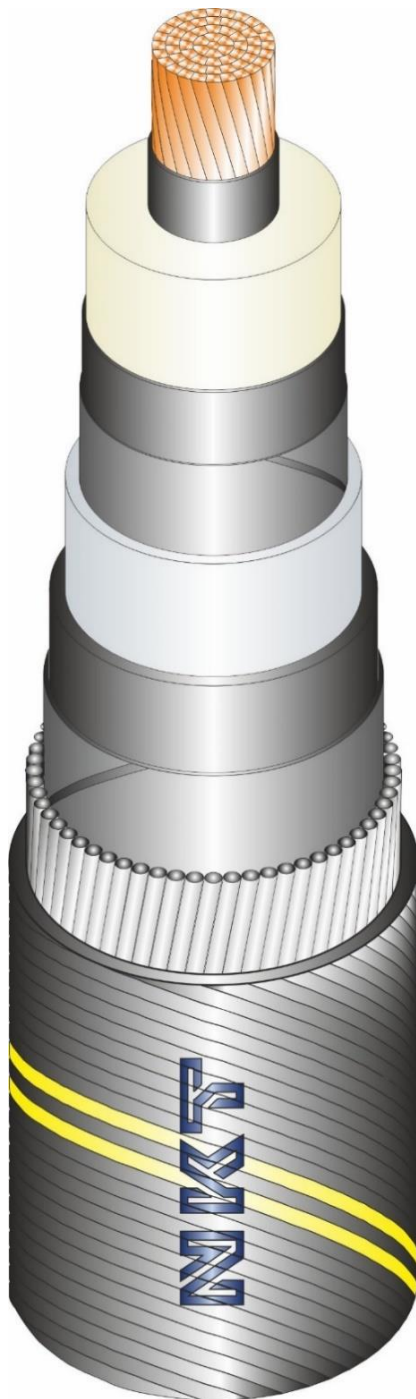
This document is designed to be easily read in both paper and electronic formats. The document contains links to key figures, and embedded files. When printing or altering the file format of the document be sure to consider the embedded files.

This document is intended to explain the methods and procedures used to install two (2) 12" DR-09 High-Density Polyethylene (HDPE) pipes, approximately 900 lineal feet (LF) at Putnam Station, 800 LF at Cementon, and 2,500 LF at Congers. Construction is expected to take place during the Summer of 2023. Caldwell Marine International, LLC (CMI) will assist Huxted Trenchless, LLC (HT) with all offshore, marine support activities.

5.0 TRANSMISSION CABLES

The installation procedures and equipment are designed to comply with the mechanical and electrical characteristics of the transmission cable to be installed; therefore, a discussion of methods and materials is not complete without a description of the characteristics of the transmission cables.

5.1 Submarine Cable



DC Voltage	±400 kV	
Conductor	Profiled wires	
Type / material	Copper, Compound Water-Blocked	
Cross-section	4935 kcmil	2500 mm ²
Water blocking	compound	
Diameter	2.28 in	57.8 mm
Conductor binder	semi-conductive swelling tape	
Material	semi-conductive swelling tape	
Thickness	22 mils	0.6 mm
Conductor shield	semi-conductive polymer	
Material	semi-conductive polymer	
Thickness	59 mils	1.5 mm
Insulation	cross-linked DC polymer	
Material	cross-linked DC polymer	
Thickness	839 mils	21.3 mm
Insulation shield	semi-conductive polymer	
Material	semi-conductive polymer	
Thickness	55 mils	1.4 mm
Longitudinal water barrier	semi-conducting swell-able tape	
Material	semi-conducting swell-able tape	
Thickness	26 mils	0.7 mm
Metallic sheath	extruded / lead alloy	
Type / material	extruded / lead alloy	
Thickness	118 mils	3 mm
Inner sheath	high-density polyethylene	
Material	high-density polyethylene	
Thickness	98 mils	2.5 mm
Tensile armour	wire / steel	
Type / material	wire / steel	
Thickness	197 mils	5 mm
Outer serving	polypropylene yarn, 2 layers	
Material	polypropylene yarn, 2 layers	
Thickness	157 mils	4 mm
Complete cable		
Diameter	5.44 inches	138.1 mm
Weight in air	36.4 lbf./ft.	54.2 kg/m
Weight in water	26.9 lbf./ft.	40.1 kg/m

Note: All data shall be considered nominal

Figure 2 Submarine Cable

Rated continuous DC voltage, U_0	400 kV
Switching impulse withstand level (SIWL) started from U_0	900 kV
Subtractive SIWL started from U_0 to voltage at opposite polarity	400 kV
Rated continuous current under the installation conditions	1,638 A
Maximum conductor temperature in normal operation	70 °C
DC resistance at 20 °C	0.0022 ohm/1,000 ft. (0.0072 ohm/km)
DC resistance at maximum conductor temperature	0.0026 ohm/1,000 ft. (0.0086 ohm/km)
Losses at rated current	7.6 W/ft. and cable (25.0 W/m)
Capacitance	0.081 μ F/1,000 ft. (0.265 μ F/km)
Inductance (between conductor and metallic sheath)	0.040 mH/1,000 ft. (0.132 mH/km)
Surge impedance	22.3 ohm

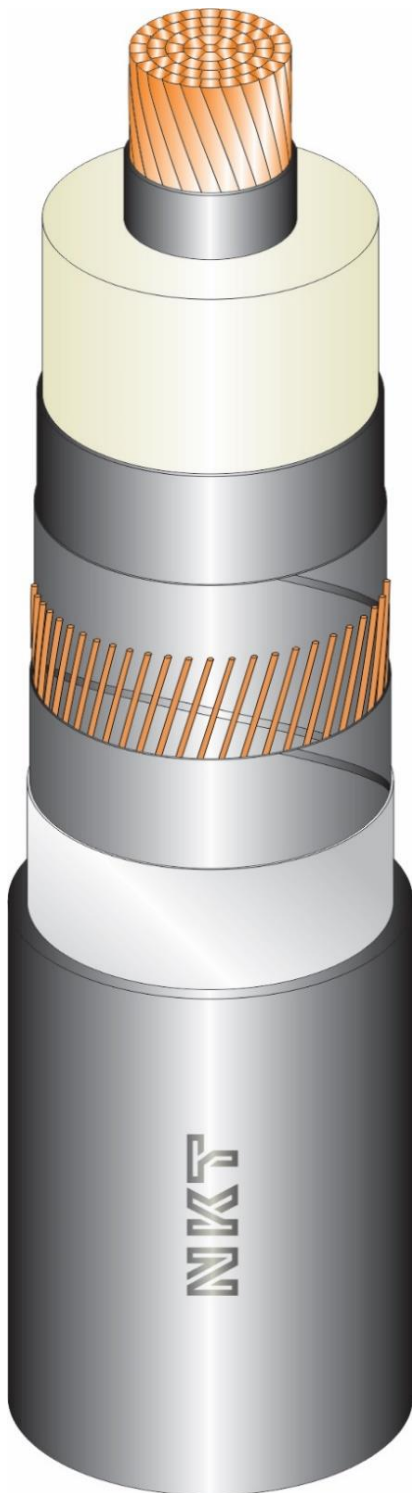
Table 1 Submarine Cable Electrical Data

Maximum Water Depth	400 feet (121.92 m)
Minimum bending radius	
- at laying (tension less than or equal 20 kN)	5.9 feet (1.8 m)
- at handling (tension greater than 20 kN)	6.9 feet (2.1 m)
- installed	5.9 feet (1.8 m)
Minimum bending radius for Chute	13.8 feet (4.2 m)
Minimum bending radius for turntable	6.9 feet (2.1 m)
Minimum coiling diameter 200 meters away from factory flexible joint	83 feet (25.3 m)
Minimum coiling diameter within 200 meters of a factory flexible joint	83 feet (25.3 m)
Maximum pulling force in conductor	
Straight Pull with conductor weld	54853lbs. (244kN)
Max permissible tension during bending MBR = 4.2 meters	47210lbs. (210kN)
Maximum side wall pressure	$SWP = \frac{PullingForce}{BendingRadius}$ 11240 lbs./ft. (50kN/m)

Table 2 Submarine Cable Mechanical Cable Properties

Full Technical Specifications for the Submarine Cable are illustrated in Appendix C

5.2 Land Cable



DC Voltage		±400 kV	
Conductor			
Type	Profiled Wire		
Material	Cu, Water-Blocked		
Cross-Section	4935 kcmil	2500 mm2	
Diameter	2.28 in	57.8 mm	
Conductor Shield/Screen			
Material	Semiconducting PE		
Thickness	59 mils	1.5 mm	
Insulation			
Type	Triple Extruded, Dry Cured		
Material	XLPE		
Thickness	839 mils	21.3 mm	
Diameter	4.11 in	104.5 mm	
Insulation Shield/Screen			
Material	Semiconducting PE		
Thickness	55 mils	1.4 mm	
Diameter	4.22 in	107.3 mm	
Metallic Shield/Sheath			
Material	Semiconducting Swelling Tape		
Thickness	51 mils	1.3 mm	
Type	Round Concentric Wires		
Material	Copper		
Cross-Section	150 kcmil	75 mm2	
Longitudinal Moisture Barrier			
Material	Semiconducting Swelling Tape		
Thickness	53 mils	1.35 mm	
Radial Moisture Barrier			
Material	Al-laminate		
Thickness	8 mils	0.2 mm	
Jacket/Outer Sheath			
Material	HDPE		
Thickness	197 mils	4.8 mm	
Conductive Layer	8 mils	.2 mm	
Complete Cable			
Diameter	4.94 in	125.6 mm	
Weight	20.9 lbs/ft	31.4 kg/m	
<i>All values should be considered indicative!</i>			

All values should be considered indicative!

Figure 3-Land Cable

Rated continuous DC voltage, U_0	400 kV
Switching impulse withstand level (SIWL) started from U_0	900 kV
Subtractive SIWL started from U_0 to voltage at opposite polarity	400 kV
Rated continuous current under the installation conditions.	1,638 A
Maximum conductor temperature in normal operation	70 °C
DC resistance at 20 °C	0.0022 ohm/1,000 ft. (0.0072 ohm/km)
DC resistance at maximum conductor temperature	0.0026 ohm/1,000 ft. (0.0086 ohm/km)
Losses at rated current	7.6 W/ft. per cable (25.0 W/m)
Capacitance	0.081 μ F/1,000 ft. (0.27 μ F/km)
Inductance (between conductor and metallic screen)	0.040 mH/1,000 ft. (0.131 mH/km)
Surge impedance	22.2 ohm

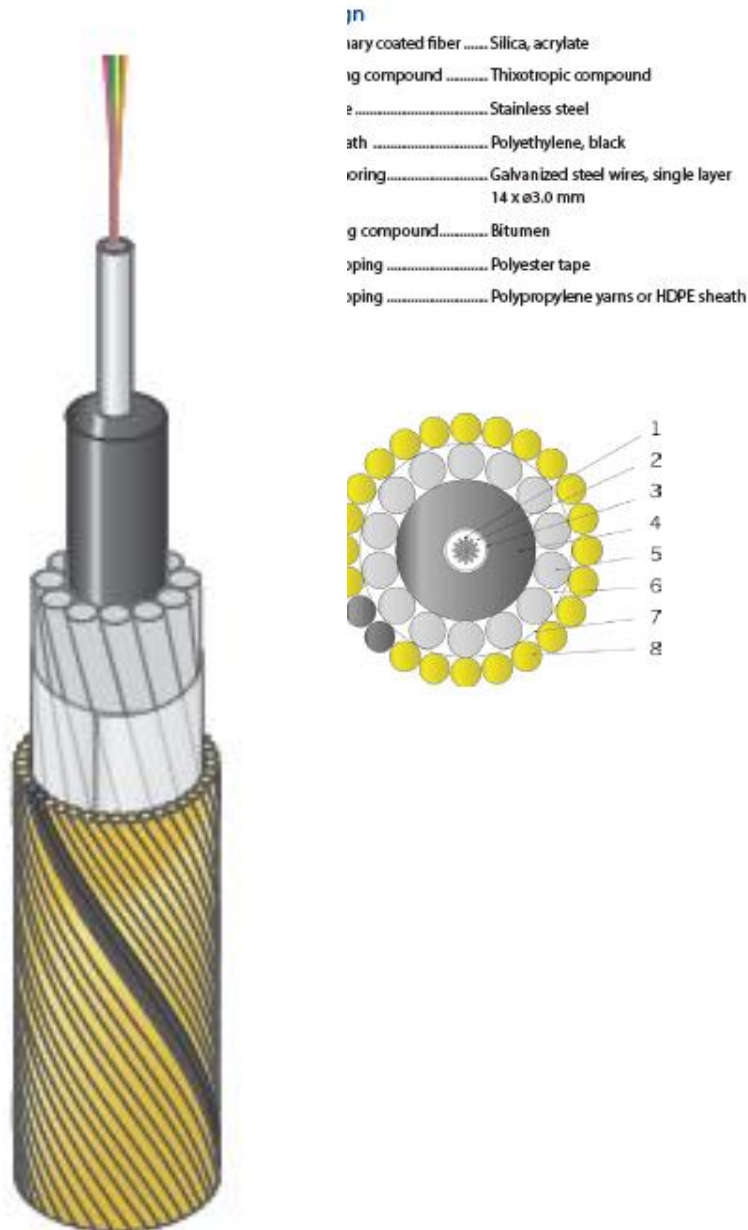
Table 3 - Land Cable Electrical Properties

Weight of cable	
- in air	≈ 20.9 lbs/ft(31.4 kg/m)
Minimum bending radius	
- at laying	7.4 feet (2.27 m)
- at handling (low tension)	5 feet (1.51 m)
- installed	5 feet (1.51 m)
Maximum pulling force	39342 feet (175 kN)
Maximum side wall pressure ¹⁾	1200 lbs./ ft.(17.5 kN/m)
¹⁾ SWP = Pulling Force / Bending Radius	

Table 4 - Mechanical Properties of Land Cable

Full Technical specifications for the land cable are illustrated in Appendix C

5.3 Submarine Fiber Optic Cable



Typical Data

Temperature range
 Operation-30 till +60°C
 Storage-40 till +70°C
 Installation-15 till +40°C

Maximum water depths
3000 m

Bend radius
 No tensile load≥ 0.5 m
 With tensile load≥ 1.5 m
 Coiling≥ 1.5 m

Dimensions
 Diameter22 mm

Weight
 In air1.1 kg/m
 In seawater0.8 kg/m

Tensile force
 UTS≥ 130 kN
 FBL≥ 130 kN
 NTTS100 kN
 NOTS70 kN
 NPTS50 kN

Crush resistance
≤ 10 kN/10 cm

Impact resistance
≤ 200 J

Mechanical and environmental test in accordance with IEC 60794-1-21 and IEC 60794-1-22

Electroding conductor
 Electrical resistance7 Ω/km

Figure 4 - Submarine Fiber Optic Cable

6.0 HORIZONTAL DIRECTIONAL DRILLING

Horizontal Directional Drilling (HDD) is part of the Marine Cable Installation for CHPE. This method statement contains a written interpretation of the construction methods and procedures planned by Huxted Trenchless, LLC (HT) to be endorsed prior to and during this project.

The drilling methodology and equipment is similar for the three installations, with the primary drilling equipment located on land for the Putman Station and Cementon HDD's and on marine barges for the Congers HDD. All three locations will utilize a temporary pile supported 30" diameter steel casing riser pipe in the water into the seabed that extends upwards on an angle onto the barge as the preferred method to capture the drilling fluid. In addition to this casing, an enclosed trench box (gravity cell) will be placed over each drill's exit location in the water to serve as a secondary means of confinement for any migrating drilling fluids. Since the drilling fluid is heavier than water, it will naturally collect in this gravity cell and can be easily pumped and stored on the barge should a breach at the steel casing occur. Sections of the 12" HDPE DR9 conduits are fused and de-beaded on land to form one continuous conduit string equal in length to each HDD. Once the bore hole is complete, the conduit is floated out in the water where it is pulled back to land with the drill equipment. Please see Appendix O of this document for further reference and detail.

6.1 *HDD Overview*

To facilitate the initial landing of the submarine cables, Horizontal Directional Drilling (HDD) will be employed to install two separate conduits commencing from the shore landing and ending in Lake Champlain (Putnam Station) and the Hudson River (Cementon, Stony Point and Congers).

- Putnam Station 2 Ea. @ 900 LF HDD 12" DR9 HDPE Conduits
- Cementon 2 Ea. @ 800 LF HDD 12" DR9 HDPE Conduits
- Stony Point 2 Ea. @ 2,400 LF HDD 12" DR9 HDPE Conduits
- Congers 2 Ea. @ 2,500 LF HDD 12" DR9 HDPE Conduits

The drilling aspect of the operation will be performed by Huxted Trenchless, LLC (HT). Caldwell Marine International, LLC (CMI) will provide marine support, permanent materials, supervision, and management of the operation. This installation manual is written for Putnam Station, Cementon, Congers. The methodology for Stony Point was provided in a separate Installation Manual and submitted under an earlier EM&CP submission.

6.2 Pre-Installation Procedures, Site Logistics, Environmental Considerations

6.2.1 Pre-Installation Procedures

As per the Marine Traffic Management Plan, prior to any marine activity, a Notice to Mariners will be issued to the US Coast Guard.

This will be accomplished by submitting to the US Coast Guard a narrative description along with a drawing of intended vessel/barge layout, together with details of the work including but not limited to work hours, safety lighting plan, anchor plan, etc. Work barges to be utilized are intended to have spud anchor systems. Upon notice of start of work to the US Coast Guard, the NY Port – District 1 will issue a Notice to Mariners for the specified duration of the work.

Caldwell Marine International shall post standard day shapes and lighting in accordance with the USGC regulations concerning vessels limited in their ability to maneuver and or vessels at anchor. Furthermore, CMI vessel crews shall maintain daily communications with Vessel Traffic Control and all commercial vessels in the area.

Prior to the start of operations all existing utilities will be marked and mapped on the site plan. One Calls per 16 NYCRR 753 (Protection of Underground Facilities) and contact with private landowners will be used to ensure all existing utilities are well marked. The drill entry and exit locations will be staked out. The immediate area occupied by the HDD spread will be surrounded by a silt fence per the approved SWPP plan. Silt fence material to meet NYSDEC standards and to be installed per manufacturer's instructions.

6.2.2 Site Logistics

- Access to the site(s) will be via the public Roads and ROW's, and defined access roads. Access across or onto private property will be done in accordance with permissions and easements provided by Owner.
- No topsoil stripping will be allowed. The access road will be constructed from $\frac{3}{4}$ " clean stone – 6" thick placed over a bed of filter fabric. The access road follows the path of an existing driveway; therefore, terrain is favorable, and no earth grading is needed to prepare same.
- Parking, if not provided on site, will be as shown on drawings for approval.
- The site will be secured by temporary construction fencing furnished by CMI, and the access gate(s) will be locked, rendering the site inaccessible to the general public.
- CMI and HT will have safe and unfettered access to the installation locations at any time.

- Construction Traffic during Mobilization is expected to be:
 - Approximately 6-8 Standard over the road Tractor and Trailers. The Tractor and Trailers are anticipated to arrive over the course of 3 days.
 - The Drilling Rig and Mud System will require over the road permits, special Permits are not anticipated for additional loads. HT and CMI will handle permits associated with the transportation of our equipment.
 - Approximately 9 Pickup/Utility trucks approximately 2-3 trips each day.
 - No disruption to local traffic is expected

6.2.2.1 Maintenance and Protection of Traffic (MPT)

Prior to the start of the planned operations for the Horizontal Directional Drills (HDD), CMI will implement traffic management measures in accordance with the New York Department of Transportation standards for the Putnam Station HDD. Notification for construction and road closure signage, as well as Type-III barricades will be installed along State Route 3 in advance of the planned HDD construction area and planned drill entry location. MPT is not required for the Cementon HDD as the construction activities will be conducted on private property under an Owner's property agreement and easement. MPT will be implemented for the Congers HDD to alert motorists travelling along Route 9W for construction vehicles entering and exiting the planned Congers HDD location at 'Clarkstown Carting Associates, Inc' at 142 Route 9W, Congers, NY 10920. Please reference Appendix R for typical traffic control notes as well as the planned road closure (Putnam Station) and shoulder closure (Congers).

6.2.2.2 Construction Traffic during Operations

- Workers coming to and from the site each day
 - Approximately 9 Pickup/Utility trucks approximately 2-3 trips each day
- Inspectors visiting the site
 - Anticipate one car one round trip per day
- Fuel delivery by tandem axle truck one round trip once daily, or, every two days, as needed.
- Disposal of HDD Cuttings by tandem axle truck one round trip every two days
- Miscellaneous unexpected deliveries and or inspections with passenger car / pickup.
- No disruption to local traffic is expected

6.2.2.3 Nighttime Construction Provisions

- Operations are expected to be during both daylight hours and nighttime operations (as schedule requires).
- During nighttime operations, generators and area lighting will be used.
- For noise sensitive areas, a sound barrier will be utilized.

6.2.3 Environmental Considerations for HDD

- The site will be kept in a neat and orderly manner and all trash and debris will be removed as appropriate. It will be transported and disposed of by an approved trash service provider.
- Fugitive Dust and Airborne Debris Control measures are not anticipated to be required
- HDD entry pit will be stabilized with earthen berms and straw bales
- Work area will be surrounded by a silt fence
- Soil Management Plan
- Stockpiled Soils (drill entry pit & Deadman anchors)
 - Small stockpiles approximately 3 yd³ each will be located adjacent to entry pits
 - Material will be protected from run-off
 - Approval / Acceptability: Appendix F describes the criteria used to determine which location the excavated material will be transported to for processing and possible reuse.
 - Material must meet acceptability criteria at the facility and comply with local, state, and federal regulations as well as facility permit requirements. Contractor will provide a completed non-hazardous profile sheet, sampling diagram, appropriate analysis per facility permit requirements and additional certifications as required.

6.2.3.1 HDD Cuttings

- HDD cuttings will be separated from the drilling fluid and stored in 20 yd³ containers. Since the cuttings are wet the 20 yd³ container will be filled with 10 yd³ of material so that the weight is manageable without the need for special permits.
 - Installation of a 1,000-foot crossing of 12-inch pipe will produce approximately 65 cubic yards of drill cuttings. There will always be two containers on site for storage and removal of the drill cuttings. The maximum volume of cuttings to be stored on site at any time will be 40 cubic yards.
- Material will be disposed of accordingly.
 - Approval / Acceptability.
 - Material must meet acceptability criteria at the facility and comply with local, state, and federal regulations as well as facility permit requirements.
 - Please refer Appendix F – Drilling Fluid Containment Plan and Erosion/Mud Control Plan (Inadvertent Returns).
 - Mud disposal tickets will be collected for project record and provided via submittal, as required.

6.2.3.2 Drilling Fluids

- Drilling fluids will be kept on-site during the entire drilling operation, as they are continuously being re-circulated and processed for re-use in the boreholes using a closed loop system.
- Groundwater Dewatering is not anticipated
- Sound attenuation will be utilized as and where required by project specific noise study to meet local and jurisdictional noise ordinances, and as detailed in Appendix L of this document.

6.2.3.3 Fuel Storage & Refueling (Appendix F, Paragraph 4.2)

- All fuel will be stored in the machineries built in tanks
- Machinery will be refueled from a fuel supplier. Additional fuel may be stored in an approved and properly bonded fuel storage cell, located on site.
- Fuel will be transferred in accordance with the fuel supplier's plan.
- Contractor will ensure that at least two of its people will participate/observe fueling operations.
- At least one person will always man the pump's shut off valve.
- All hose joints (if used) will be observed during fueling for any leaks.
- Spill response kits will be on site and readily available.
- Fire extinguishers will be on site and readily available.
- Site Clean up
 - The site shall be returned to a clean state.

6.3 HDD Personnel and Equipment

6.3.1 Personnel

The supervisory personnel proposed by HT on this project have an average 20 years' experience in HDD. All the supervisory personnel have worked on underwater exits in the HDD industry.

A list of the personnel, including key personnel and resumes will be provided as part of this installation manual prior to commencement of each HDD.

Drill Crew (per shift):

(Congers Drill site will be completed using the intersect method for steering. A drill spread will be located on land and on a barge near the exit location. The crew size will be double at the Congers location.)

Superintendent	1
Driller	1
Mud Operator	1
Heavy Equipment Operators	2 - 4
Drill hands	2 - 4
Driver	1
Steering Engineer	1

6.3.2 Equipment

1. Drilling Rig (minimum 240,000 lb push/pull)
2. Mud Systems (147 BBL capacity each)
3. Mud Pumps 446 (325-350 gpm)
4. Control Cab (10' x 8')
5. Vac. Trailer
6. Excavator & Track Hoe
7. Frac-Tanks
8. Tool Van
9. 6-inch transfer pumps

6.4 Typical HDD Construction

6.4.1 Pre-Construction Survey

A surveyor, on behalf of Huxted Trenchless, LLC, will arrive on site prior to the arrival of the equipment. The surveyor will layout the centerline(s) of the crossings and install the surface tracking system for all drills where needed.

6.4.2 Rig Up

The drilling spread will arrive on site in a predetermined order and will be assembled and set up according to the site layout. A small 6'x6'x4' pit will be excavated at the drill entry; the excavated soil (approximately 3 yd³) will be stockpiled (adjacent to the entry pit) and or used to build a berm surrounding the drill entry pit, additionally straw bales will surround the drill entry pit, followed by orange safety fencing.

To secure the drill rig temporary Deadman anchors will be placed and consist of steel I-Beams driven in the ground.

6.4.3 Pilot Hole

The bottom hole assembly (BHA) for the pilot hole will consist of a tri-coned Drill Bit connected to the jetting assembly and Non-Magnetic Drill Collar containing steering probe and extend about 40 feet behind drill bit. The Non-Magnetic Drill Collar will be connected to the steel drill pipe utilizing the bolt-on connector. Soil borings collected (Appendix T) have determined a harder rock formation for both the Cementon and Congers HDD locations and thus requiring the use a mud motor and rock reamers.

The pilot hole will enter the ground at the predetermined entry point and will follow the design path in both the profile and plan view. This will be accomplished by utilizing the tracking information established by the surveyor along with the calculated information received from downhole steering equipment.

Prior to exiting in the river bottom, the entire drill string will be flushed with fresh water to the eliminate the drilling mud from entering the water on punch out. Once the bit and steering tool has exited, a dive crew will assist in bringing the drill stem up to the working barge using a winch and tag line. On the Congers Drill, a second drilling rig will be on a barge and the pilot hole will start within the casing previously installed in the river. This

crossing will be completed using the intersect method. The pilot hole is drilled from both directions and meet, completing the bore path. The pilot hole assembly is removed, and the drill pipe is re-attached to the winch line. A Conductor Casing will remain over the entry hole and embedded into the river bottom – essentially extending the bore hole through the water column to prevent any loss of drilling fluid during the drilling operations. In addition, a gravity cell is set over the exit location to capture any residual drill fluid that might escape. See Appendix O of this document for further detail.

6.4.4 Transition Pilot Hole to Ream/Pullback

For the Putnam Station Drill and the Cementon Drill, the drill crew will install an 18” reamer at the rig on land and ream towards the water and barge. This is commonly called forward reaming and will force most mud back to the drill entry location on land. However, for the Congers Drill, the elevation on land is significantly higher than the water and forward reaming from the land is not recommended. As such, for the Congers Drill, HT will place will use a pull ream method, pulling the reamer with the drill rig on land up hill to the work area. The drilling fluid will naturally (gravity) return to the barge via the conductor casing previously installed the water. The drilling fluid is then recycled on the barged and reused in the same manner as if the drilling equipment was located on land.

6.4.5 Reaming

While reaming, the drill rig will exert minimum push pressure on the reamer allowing the rotary torque to dictate the penetration rate. For the Putman Station Drill and the Cementon Drill, a winch and cable system located on the barge and connected to the drill steel will assist pulling the reamer through the bore hole. For the Congers Drill the land rig will provide the needed pull force to advance the reamer from the water to the land. In both cases, the operator of the winch, second drill rig or excavator will be in constant contact with the drill operator to ensure the proper pulling force is always applied. As each new section of drill pipe is installed at the drill rig and the reamer is advanced, a crew located at the far end will be removing a section of drill pipe.

6.4.6 Swabbing

After the hole is reamed, HT will swab the hole. The swab pass is used to clean out the bore hole and make sure it is conditioned properly to accept the proposed HDPE product pipe. This might include multiple passes to make sure the reamed hole is free of any obstruction before pullback. HT intends to swab all the bore holes from water to land (same direction as the HDPE product pipe installation) with a 14” barrel reamer.

6.4.7 Ream/Pullback

During the drilling and reaming process, a separate crew will be fusing, de-beaded and mandrel testing the HDPE product pipe onshore. A marine support crew will tow the assembled product pipe offshore and line it up with the exit location. The coast guard will be notified prior to launching the HDPE conduit string into the water. When the product pipe reaches the exit location, it will be mechanically connected to a swivel and

lifted above the barge to be pulled into the bore hole. The marine support at this time will be on constant patrol of the floating HDPE pipe.

Pullback will continue, uninterrupted, as drill pipe is removed at the drill rig located on land. Once the product pipe has reached the entry/exit pit, the pulling assembly will be removed, and the pipe allowed to relax. The product pipe will be proofed and pull line installed for future cable pulling operations.

6.4.8 Rig Down/Demobilization

Once the product pipe has been successfully installed, all equipment, mud, cuttings, and debris will be removed from the work site. The used drilling fluid and cuttings will be hauled and disposed of at an approved facility. The work area will be returned to pre-drill conditions for final restoration.

6.5 HDD Marine Support

The marine support for the HDD operation will consist of the following activities:

- Support barge(s) with a crane for all drills.
- Jack-up barge for drilling equipment at Drill #4 - Congers
- Dive support for recovery of the down hole tooling
- Affix the HDPE conduit string to the reamer assembly
- Connect the reamer or HDPE assembly to the drill string
- Support for the reaming operation
- Handling and feeding of the HDPE conduit(s) into the HDD bores
- Clean up and disposal of surplus offshore drilling fluids

6.5.1 Marine Support Equipment

- Deck Barge with Spuds
 - 150–200-ton Crane
 - ICE 416 & HPSI 400 Vibratory Driver / Extractor
 - Environmental Clamshell Bucket
 - Generator
 - Tool Room
 - SDO2 Dive Spread
 - Broco Underwater Burning Rig
 - Diesel Welder
 - Deck Lighting
 - Emergency Spill Response Kit
 - Porta-John
 - Office Trailer
 - Lunchroom
- Materials Deck Barge – as required
- Jack-up Barge
- Scow Barge – as required
- Tugboat - as required
- Work Skiffs

6.5.2 Fusing Support Equipment

- HDPE Fusion Machine
- Generator
- Excavator

6.5.3 Land Support Equipment

- Office and tool trailers

6.5.4 Permanent Materials

- 12" DR9 HDPE Pipe (conduit) in 50' lengths

6.6 Procedures for Marine Support

6.6.1 Recovery of Down Hole Tooling

After the drill head has penetrated lake or river bottom, divers will locate and connect the tooling to the crane on the support barge. The crane will take up the load until the tooling is recovered on the deck of the support barge. Once on deck, the tooling can be removed or replaced as needed to complete the HDDs.

6.6.2 Reaming / Pullback

CMI will assist with the connection or removal of the reamers and HDPE conduit string assembly. For the pullback operation, CMI will provide direction and assistance for the pull back and to ensure that the trailing end of the HDPE conduit is pulled below the lake or river bottom to the desired depth.

6.7 Procedures for Land Support

6.7.1 HDPE Fusion

The HDPE conduit will be delivered by truck in (50' lengths) and stored at each staging yard local to the respective drill site. CMI's intention is to fuse the conduit at the staging yard in one continuous length. Each of the HDPE strings will be approximately; 900 LF for Putnam Station, 800 LF for Cementon and 2,500 LF for Congers. The fusion machine and generator will be staged in a strategic location in each staging area and the HDPE segments will be moved to the machine for fusion. CMI will have the HDPE manufacturer supply a representative to QC the operation. After the bore hole is swabbed, the HDPE pipe will be launched and towed to the HDD exit location for pullback. The coast guard will be notified prior to launching the HDPE conduit string and movement of the same from waterside to site. A Notice to Mariners (NTM) will be issued.

Transmission Developers, Inc.
Champlain Hudson Power Express
Putnam Station, New York
Drill 1B - Putnam Station Profile - Option 2

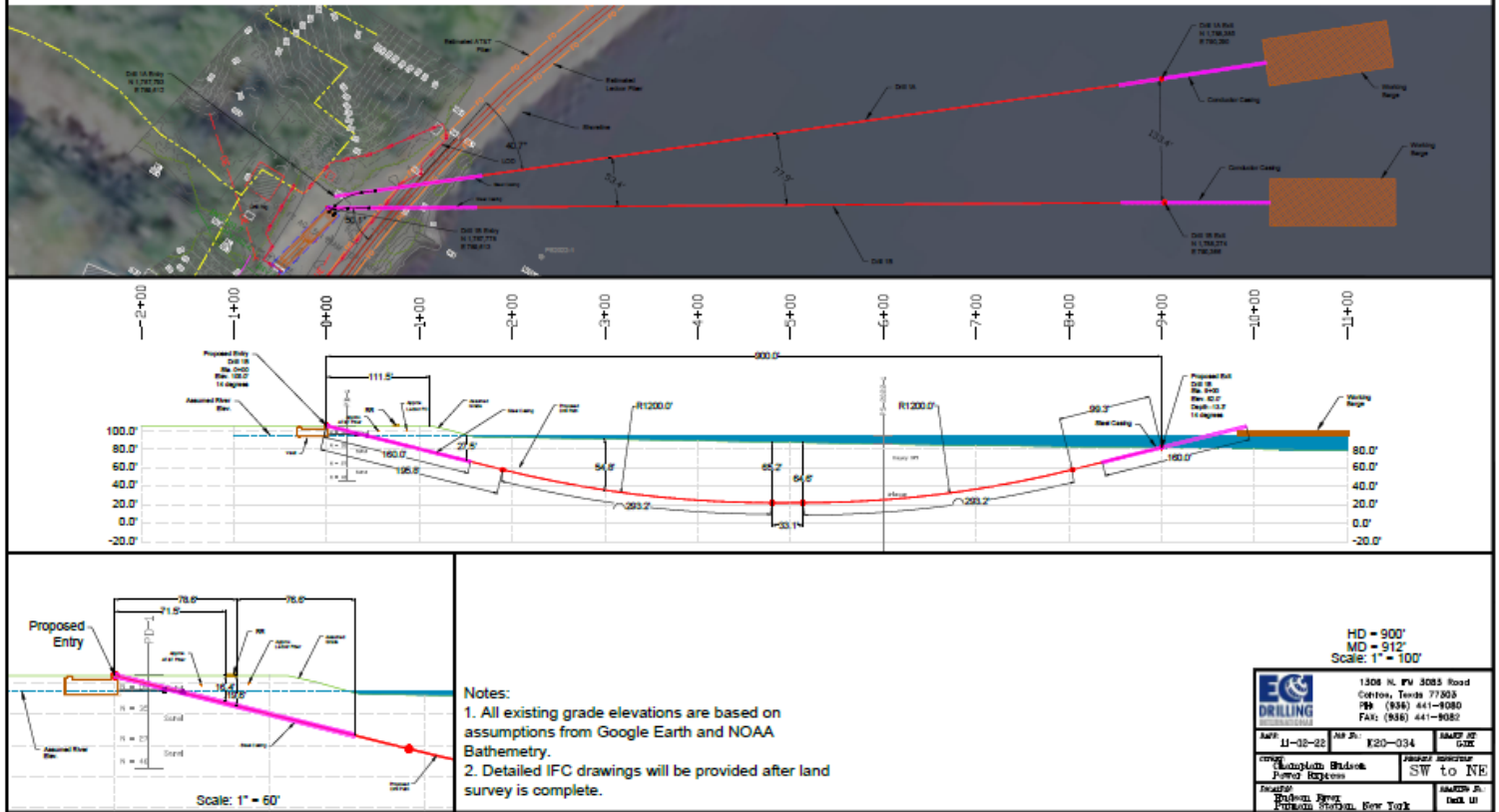


Figure 5 HDD Plan and Profile Drill - Putnam Station, NY

Transmission Developers, Inc.
Champlain Hudson Power Express
Drill 2 - Cementon, New York

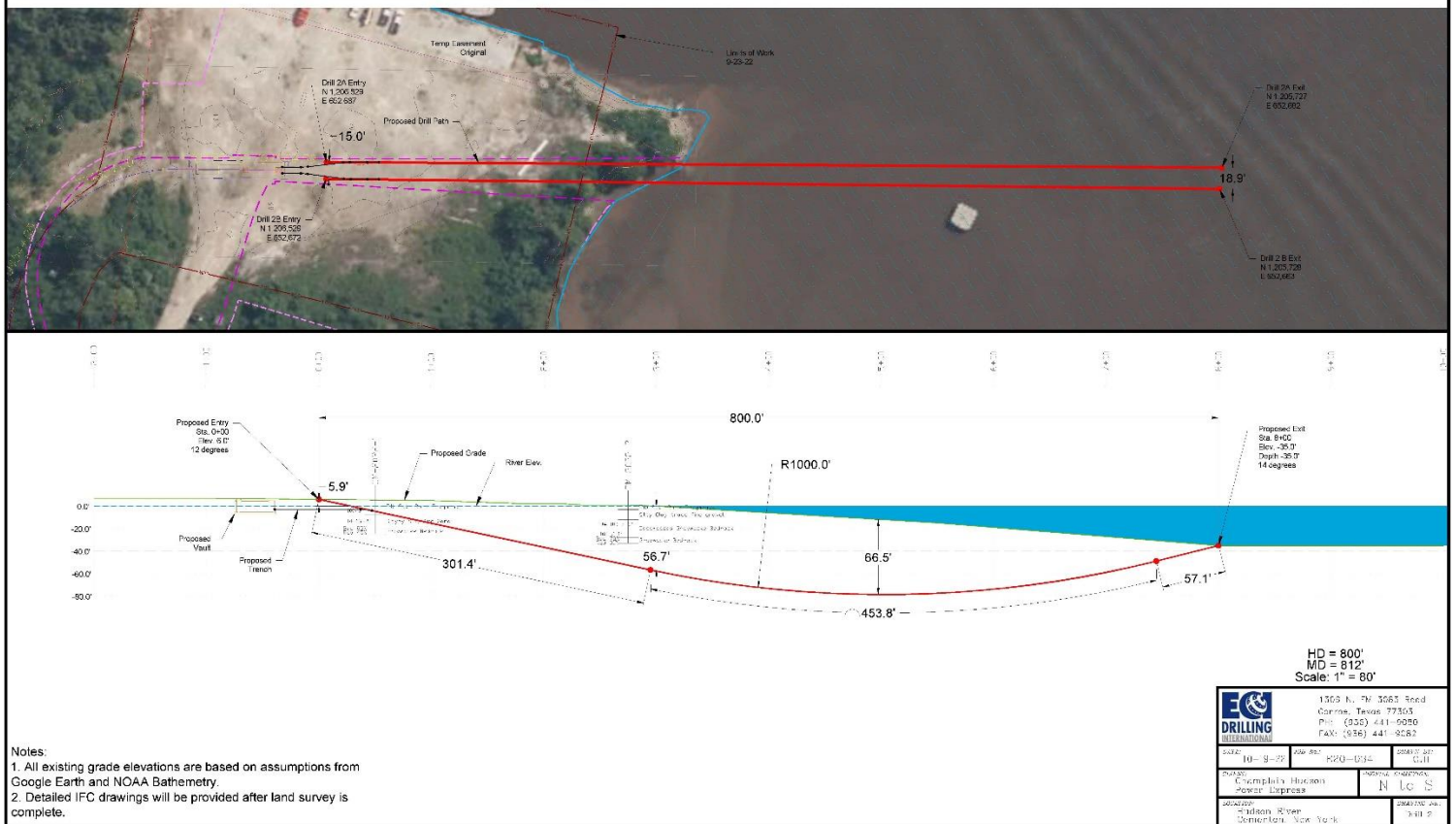


Figure 6 HDD Plan and Profile Drill - Cementon, NY

Transmission Developers, Inc. Champlain Hudson Power Express Drill 4 - Congers

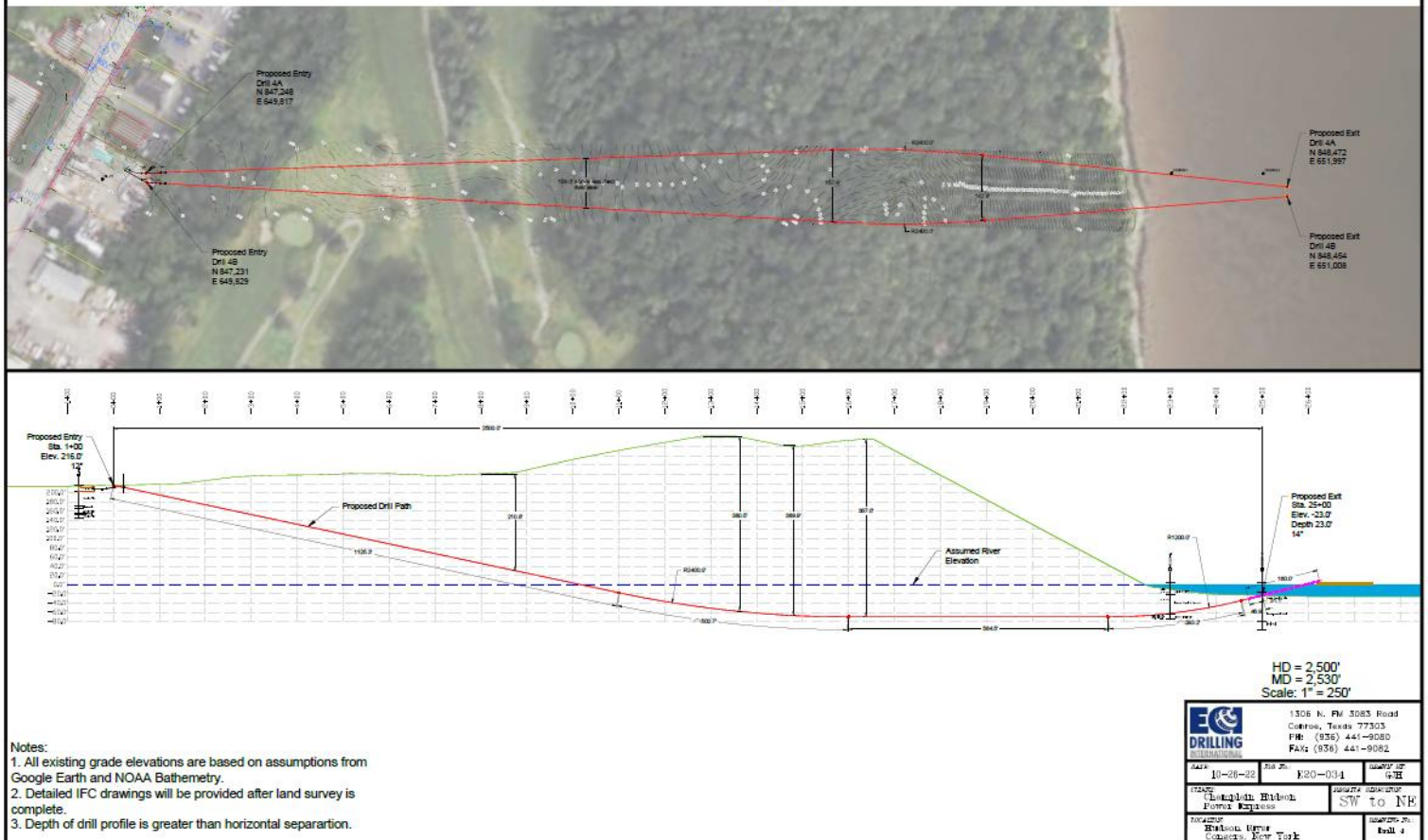


Figure 7 HDD Plan and Profile Drill - Congers, NY

7.0 INSTALLATION QUALITY ASSURANCE

This section describes *CMI's* quality assurance system, from project organization to task-oriented Inspection and Test Plans (ITP's), calibration methods and reporting procedures.

7.1 HDD Shoreline Crossings Project Organization

The *CMI* organizational chart for the HDD Shoreline Crossing Work is shown in **Figure 8**. The responsibilities of each key member of the installation team are described below in Table 5. *CMI* Organizational responsibilities.

Position	Responsibility
<i>General Manager Brett Bailey</i>	Reports to the Executive Vice President, and oversees the management, execution, and financial aspects of the project.
<i>Project Executive Thomas F. Ulisse</i>	Reports to the General Manager and is responsible for the overall management of the project. The Project Executive oversees and controls the performance of the work. He is responsible for project coordination, liaison with the Client, and for all financial, logistic, quality assurance and safety aspects of the work.
<i>Equipment Manager John S. Gutierrez</i>	Provides project support, and coordinates directly with the Project Manager and Superintendent. The Equipment Manager is responsible equipment resources.
<i>Operations Manager Ed Phillips</i>	Provides project support and is responsible for the performance of the work. The Operations Manager reports to the General Manager.
<i>Cable Superintendent Paul Larrabee</i>	Provides project support and reports directly to the Cable Division Manager.
<i>HDD Operations Manager John Langford</i>	Provides project support for HDD operations and reports directly to the CMI Operations Manager.
<i>Project Engineer Dominic Palermo</i>	Provides project support and reports directly to the Contract Executive.
<i>Brett Bryant Adam Brown</i>	Responsible for the daily work and reports directly to the Superintendent
<i>Health & Safety Officer Lucky Abernathy</i>	The Health & Safety Officer is tasked with ensuring that all aspects of the <i>CMI</i> Safety Plan are followed. He reports directly to the Project Superintendent.

Table 5 - *CMI* Organizational Responsibilities

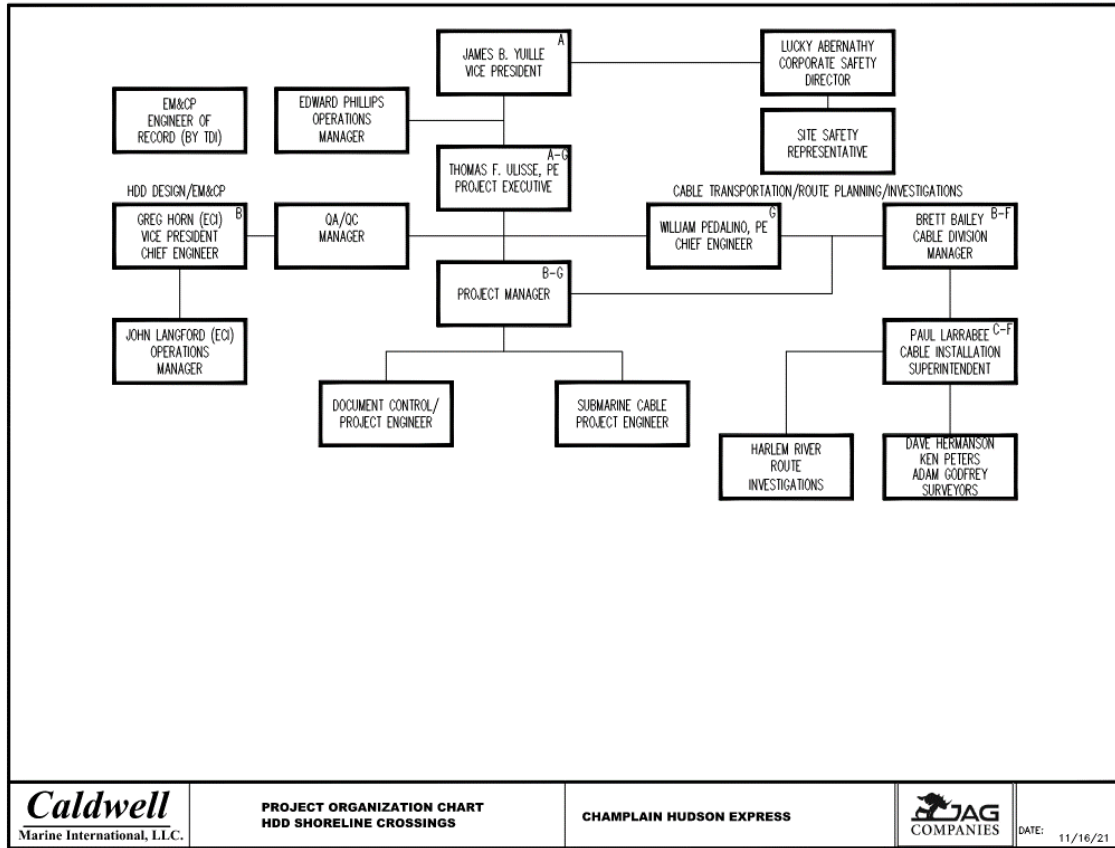


Figure 8 CMI Project Organizational Chart

7.2 Daily Reporting

A sample Daily Operations Report (DOR) format is included in Appendix A. A copy of this report will be submitted for signature to the on-site representative daily by the *CMI* Field Project Superintendent. A second DOR will be completed when concurrent work is being done and the logistics make one report impractical. The signed reports will then be e-mailed to the respective project parties daily, after operations are completed, or at the soonest opportunity.

7.3 Milestone Meetings

Periodic meetings will be held by the *CMI* Project Manager at specific milestones in the operation. These meetings will be held to review procedures for the specific task to be accomplished and, if the task is repetitive, to review previous procedures with the aim of improving the procedure.

7.4 Installation Inspection and Test Plans (ITP)

Installation and Test Plans (ITP) are part of the quality control monitoring system. ITPs are included in Appendix I. The Inspection plan shall include verification of depth of the HDD conduit following installation to prove that it meets the required burial depth of submarine cable of 4' for the Putnam Station segment in Lake Champlain and 7' for the Cementon and Congers segments in the Hudson River.

7.5 Calibration Methods

The gyro will be calibrated prior to use in the HDD work.

7.6 Contingency Plans

The best contingency plan is to plan ahead to avoid emergency situations. Planning includes following a thorough equipment maintenance plan, monitoring weather forecasts and planning activities accordingly, and reliance on past experience to avoid situations that could require the use of a contingency plan. The following section describes the options available in the event of specific system failures.

7.7 Non-conformance Reporting Process

CMI has developed a non-conformance report format to document non-conformances to the specifications. The non-conformance report includes proposed disposition and/or corrective actions taken to remedy the non-conformance. A sample non-conformance report is attached in Appendix G.

7.8 Marine Traffic Management Plan

Standard CMI policy is to issue a Notice to Mariners prior to commencement of any marine work at each respective HDD marine support location. CMI guidelines for marine work follow standard industry practice.

8.0 ENVIRONMENTAL ASPECTS

8.1 Weather Operational Limits

CMI will consult the publicly available weather forecasts and tidal forecasts daily for the planned operations. Examples of these forecasts and reports are provided in Appendix J of this document. Estimated operational limits for specific phases are shown in Table 6, maximum operating limits for wind speed at wave height will vary depending on the direction of the wind and waves. These are only estimated operating windows and the actual maximum wind speeds and wave heights are highly dependent on the location of the site relative to the wind and wave direction.

Should conditions exceed the operating windows the course of action will be decided on-site by the supervisor in charge of each task.

PHASE	SUPERVISOR	ESTIMATED MAXIMA	
		Wind (kts)	Wave Ht (m)
Marine Work	Superintendent	15 – 20	<2.5ft
Land Work	Superintendent	20-25	NA

Table 6 - Estimated operating weather parameters for the marine installation

8.2 Environmental Considerations

CMI will ensure that all work is completed in accordance with the permits, the forthcoming Environmental Monitoring and Construction Plan (EM&CP), the USCOE permit, and common industry practices.

8.3 Environmental Monitoring and Sampling

Environmental monitoring and sampling where required by any operation, permit, or regulatory authority will be completed by other third parties with the understanding that the results of analysis generated from any sample collection will be made available within a timely manner.

8.4 Cultural Resources

Archaeological work is not anticipated during this project, however, should archaeological materials, including human remains, be encountered during construction, CMI will stabilize the area and cease construction activities in the immediate vicinity and contact the CMI and NKT Project Managers and the CMI Project Executive.

8.5 Spill Prevention

CMI has developed a comprehensive spill prevention plan designed specifically to prevent spills in marine operations. The plan can be found in Appendix E (Spill Prevention Plan).

9.0 APPENDICES

Appendix A– Daily Operations Report

**1229 – Champlain Hudson Power
Express Daily Operations Report**
DOR: 10
Tuesday, January xxth 20xx
Client: NKT

CMI Representative	CMI	Email address
CMI Representative	CMI	
CMI representative	CMI	
CMI Representative	CMI	
CMI Representative	CMI	
CMI Representative	CMI	
NKT Representative	NKT	

A. Summary of Activities to Date:

- Support of Manholes 7 & 8

B. Today's Activities:

- Welding of Manhole Covers

C. 5- Day Look Ahead:

1/16/19	Demobilization

D. Safety:

	Today	Cumulative	
Incidents	0		
Accidents	0		
Near Miss Events	0		
Safety Meetings	0	0	

E. Weather:

Time	Wind Dir.	Speed MPH	Vis (mi)	Temp	Conditions/ Remarks
0600	S	8	10	34	Partly Cloudy
1200	S	6	10	37	Partly Cloudy
1800	S	6	10	34	Partly Cloudy

F. Diary of Events:

Time	Activity
0800	Start of Shift
0830	Setup at Manholes
830-1930	Support of Manholes
2000	End of Shift

G.CMI Personnel on Site:

	Name	Title	ST	OT	DT	
1						
2						
3						
4						

H. Equipment:

EQ #	Description	Location	Owner
	1997 Ford F-800 22' Box Truck		NRC
	(50) Traffic Cones		NRC
	(2) Manhole protection rails		NRC
	(2) 16' extension ladders		NRC
	Powerwasher		NRC
	(2) portable generators, one with light stand attached		NRC
	(3) 2" submersible pump		NRC
	(1) 300 gallon empty water tank		NRC
	Windmaster signs: (2) arrows, (4) Road Work Ahead, (2) Merge Right, (2) Merge Left, (1) Flagman Ahead		NRC
	(2) Stop/Slow traffic paddles		NRC
	(30) Traffic Cones		CMI
	(2) 2" Trash Pumps		CMI

Contractor Comments: Welding of

Manholes Client Comments:

CMI Representative Client: _ Caldwell Marine Int.OCUA

Appendix B– HDPE Specifications



Iron Pipe Size (IPS) and Dimension Data Pipe for Municipal and Industrial Applications

PE4710

Pressure Ratings are calculated using 0.63 design factor for HDS at 73°F as listed in PPI TR-4 for PE 4710 materials. HDPE can accommodate up to 1.5 times the pipe pressure rating for a recurring surge and up to 2.0 times the pipe pressure rating for an occasional surge. Temperature, Chemical, and Environmental use considerations may require use of additional design factors.

Pressure Rating		335 psi DR 7.0			250 psi DR 9.0			200 psi DR 11.0			160 psi DR 13.5			Nominal Pipe Size
Nominal Pipe Size	IPS OD (in)	Minimum Wall (in)	Average ID (in)	Weight (lbs/ft)	Minimum Wall (in)	Average ID (in)	Weight (lbs/ft)	Minimum Wall (in)	Average ID (in)	Weight (lbs/ft)	Minimum Wall (in)	Average ID (in)	Weight (lbs/ft)	
1 1/4"	1.660	0.237	1.158	0.46	0.184	1.270	0.37	0.151	1.340	0.31	0.123	1.399	0.26	1 1/4"
1 1/2"	1.900	0.271	1.325	0.61	0.211	1.453	0.49	0.173	1.533	0.41	0.141	1.601	0.34	1 1/2"
2"	2.375	0.339	1.656	0.95	0.264	1.815	0.77	0.216	1.917	0.64	0.176	2.002	0.53	2"
3"	3.500	0.500	2.440	2.06	0.389	2.675	1.66	0.318	2.826	1.39	0.259	2.951	1.16	3"
4"	4.500	0.643	3.137	3.40	0.500	3.440	2.75	0.409	3.633	2.31	0.333	3.794	1.92	4"
6"	6.625	0.946	4.619	7.37	0.736	5.065	5.96	0.602	5.349	5.00	0.491	5.584	4.15	6"
8"	8.625	1.232	6.013	12.50	0.958	6.594	10.11	0.784	6.963	8.47	0.639	7.270	7.04	8"
10"	10.750	1.536	7.494	19.42	1.194	8.219	15.70	0.977	8.679	13.16	0.796	9.062	10.93	10"
12"	12.750	1.821	8.889	27.31	1.417	9.746	22.08	1.159	10.293	18.51	0.944	10.749	15.38	12"
14"	14.000	2.000	9.760	32.93	1.556	10.701	26.63	1.273	11.301	22.32	1.037	11.802	18.54	14"
16"	16.000	2.286	11.154	43.01	1.778	12.231	34.78	1.455	12.915	29.15	1.185	13.488	24.22	16"
18"	18.000	2.571	12.549	54.43	2.000	13.760	44.02	1.636	14.532	36.89	1.333	15.174	30.65	18"
20"	20.000	2.857	13.543	67.20	2.222	15.289	54.34	1.818	16.146	45.54	1.481	16.860	37.84	20"
22"	22.000	3.143	15.337	81.32	2.444	16.819	65.75	2.000	17.760	55.10	1.630	18.544	45.79	22"
24"	24.000	3.429	16.731	96.77	2.667	18.346	78.25	2.182	19.374	65.58	1.778	20.231	54.49	24"
26"	26.000				2.889	19.875	91.84	2.364	20.988	76.96	1.926	21.917	63.95	26"
28"	28.000				3.111	21.405	106.51	2.545	22.605	89.26	2.074	23.603	74.17	28"
30"	30.000				3.333	22.934	122.27	2.727	24.219	102.47	2.222	25.289	85.14	30"
32"	32.000				3.556	24.462	139.12	2.909	25.833	116.58	2.370	26.976	96.87	32"
34"	34.000				3.778	25.991	157.05	3.091	27.447	131.61	2.519	28.660	109.36	34"
36"	36.000				4.000	27.520	176.07	3.273	29.061	147.55	2.667	30.346	122.60	36"
42"	42.000							3.818	33.906	200.84	3.111	35.405	166.88	42"
48"	48.000													48"
54"	54.000													54"

This size and dimension chart is intended for reference purposes. It should not be used in place of the advice from a licensed Professional Engineer. Pipe weights are calculated in accordance with PPI TR-7. Average inside diameter is calculated using IPS OD and Minimum wall plus 6% for use in estimating fluid flows. Actual ID will vary. When designing components to fit the pipe ID, refer to pipe dimension and tolerances in the applicable pipe manufacturing specification.

Table 7 - Typical Sizes and Dimensions HDPE

High Density Polyethylene



TYPICAL PROPERTIES

HDPE CHARACTERISTICS
TYPICAL PROPERTIES
[CHEMICAL RESISTANCE CHART](#)
[SIZE AND DIMENSION CHARTS BY APPLICATION](#)
[CALCULATION PROGRAMS](#)

HIGH DENSITY POLYETHYLENE PIPE Typical Physical Properties***

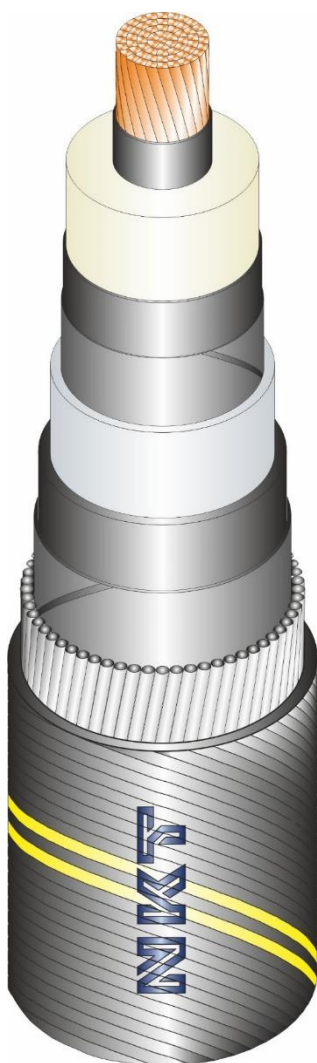
Property	Specification	Unit	Nominal Value
Material Designation	PPI / ASTM		PE 3408
Material Classification	ASTM D-1248		III C 5 P34
Cell Classification	ASTM D3350-99		345464C
-Density (3)	ASTM D-1505	gm/cm ³	0.955
-Melt Index (4)	ASTM D-1238 (216 kg/190iC)	gm/10 min.	0.11*
-Flex Modulus (5)	ASTM D-790	psi	135,000
-Tensile Strength (4)	ASTM D-638	psi	3,200
PENT (6)	ASTM F-1473	Hours	>100
-HDB @73i F (4)	ASTM D-2837	psi	1,600
-HDB @ 140 Deg F	ASTM D-2837	psi	800
-U-V Stabilizer (C)	ASTM D-1603	% C	2.5
Hardness	ASTM D-2240	Shore "D"	65
Compressive Strength (yield)	ASTM D-695	psi	1,600
Tensile Strength @ Yield (Type IV Spec.)	ASTM D-638 (2"/min.)	psi	3,200
Elongation @ Yield	ASTM D-638	%, minimum	8
Tensile Strength @ Break (Type IV Spec.)	ASTM D-638	psi	5,000
Elongation @ Break	ASTM D-638	%, minimum	750
Modulus of Elasticity	ASTM D-638	psi	130,000
PENT (6)	ASTM F-1473	Hours	>100
(Cond. A, B, C: Mold. Slab)	ASTM D-1693	Fo, Hours	>5,000
(Compressed Ring - pipe)	ASTM F-1248	Fo, Hours	>3,500
Slow Crack Growth	Battelle Method	Days to Failure	>64
Impact Strength (IZOD) (.125" Thick)	ASTM D-256 (Method A)	In-lb / in notch	42
Linear Thermal Expansion Coef.	ASTM D-696	in / in/iF	1.2x10 ⁻⁴
Thermal Conductivity	ASTM D-177	BTU-in/ft ² / hrs/ degrees F	2.7
Brittleness Temp.	ASTM D-746	degrees F	< -180
Vicat Soft. Temp.	ASTM D-1525	degrees F	257
Heat Fusion Cond.	ASTM D-1525	@ psi degrees F	75 @ 400

*** This list of typical physical properties is intended for basic characterization of the material

Table 8- Typical Properties HDPE (ISCO Industries)

Appendix C– Submarine Cable Technical Specifications

Submarine Cable Design Sheet – 1,250 MW



DC Voltage	±400 kV	
Conductor	Profiled wires	
Type / material	Copper, Compound Water-Blocked	
Cross-section	4935 kcmil	2500 mm ²
Water blocking	compound	
Diameter	2.28 in	57.8 mm
Conductor binder		
Material	semi-conductive swelling tape	
Thickness	22 mils	0.6 mm
Conductor shield		
Material	semi-conductive polymer	
Thickness	59 mils	1.5 mm
Insulation		
Material	cross-linked DC polymer	
Thickness	839 mils	21.3 mm
Insulation shield		
Material	semi-conductive polymer	
Thickness	55 mils	1.4 mm
Longitudinal water barrier		
Material	semi-conducting swell-able tape	
Thickness	26 mils	0.7 mm
Metallic sheath		
Type / material	extruded / lead alloy	
Thickness	118 mils	3 mm
Inner sheath		
Material	high-density polyethylene	
Thickness	98 mils	2.5 mm
Tensile armour		
Type / material	wire / steel	
Thickness	197 mils	5 mm
Outer serving		
Material	polypropylene yarn, 2 layers	
Thickness	157 mils	4 mm
Complete cable		
Diameter	5.44 inches	138.1 mm
Weight in air	36.4 lbf./ft.	54.2 kg/m
Weight in water	26.9 lbf./ft.	40.1 kg/m

Note: All data shall be considered nominal

Electrical Cable Properties

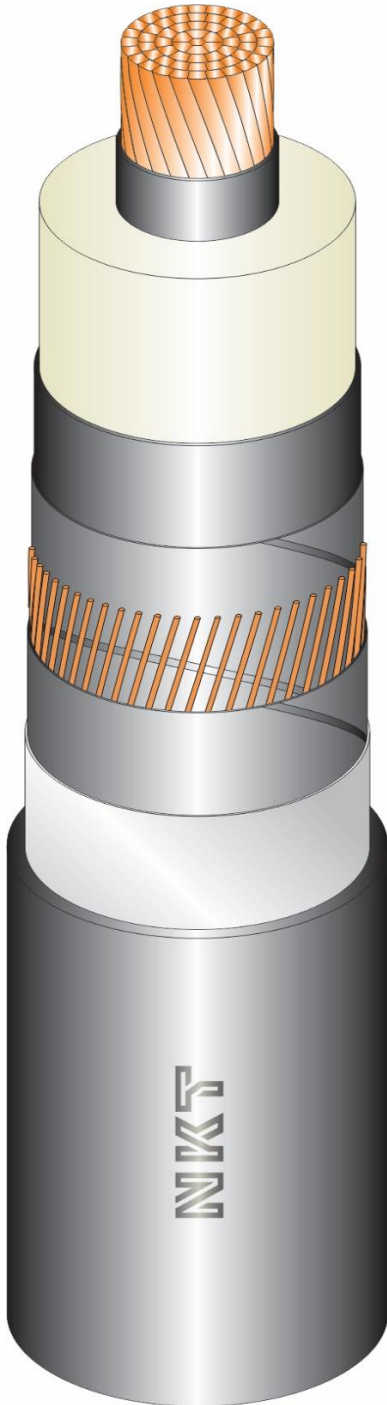
The submarine cable has the following electrical properties:

Rated continuous DC voltage, U_0	400 kV
Switching impulse withstand level (SIWL) started from U_0	900 kV
Subtractive SIWL started from U_0 to voltage at opposite polarity	400 kV
Rated continuous current under the installation conditions	1,638 A
Maximum conductor temperature in normal operation	70 °C
DC resistance at 20 °C	0.0022 ohm/1,000 ft. (0.0072 ohm/km)
DC resistance at maximum conductor temperature	0.0026 ohm/1,000 ft. (0.0086 ohm/km)
Losses at rated current	7.6 W/ft. and cable (25.0 W/m)
Capacitance	0.081 μ F/1,000 ft. (0.265 μ F/km)
Inductance (between conductor and metallic sheath)	0.040 mH/1,000 ft. (0.132 mH/km)
Surge impedance	22.3 ohm

Mechanical Cable Properties

Maximum Water Depth	400 feet (121.92 m)
Minimum bending radius	
- at laying (tension less than or equal 20 kN)	5.9 feet (1.8 m)
- at handling (tension greater than 20 kN)	6.9 feet (2.1 m)
- installed	5.9 feet (1.8 m)
Minimum bending radius for Chute	13.8 feet (4.2 m)
Minimum bending radius for turntable	6.9 feet (2.1 m)
Minimum coiling diameter 200 meters away from factory flexible joint	83 feet (25.3 m)
Minimum coiling diameter within 200 meters of a factory flexible joint	83 feet (25.3 m)
Maximum pulling force in conductor	
Straight Pull with conductor weld	54853lbs. (244kN)
Max permissible tension during bending MBR = 4.2 meters	47210lbs. (210kN)
Maximum side wall pressure	$SWP = \frac{PullingForce}{BendingRadius}$ 11240 lbs./ft. (50kN/m)

Land Cable Design Sheet – 1,250 MW



DC Voltage

±400 kV

Conductor

Type	Profiled Wire	
Material	Cu, Water-Blocked	
Cross-Section	4935 kcmil	2500 mm ²
Diameter	2.28 in	57.8 mm

Conductor Shield/Screen

Material	Semiconducting PE	
Thickness	59 mils	1.5 mm

Insulation

Type	Triple Extruded, Dry Cured	
Material	XLPE	
Thickness	839 mils	21.3 mm
Diameter	4.11 in	104.5 mm

Insulation Shield/Screen

Material	Semiconducting PE	
Thickness	55 mils	1.4 mm
Diameter	4.22 in	107.3 mm

Metallic Shield/Sheath

Material	Semiconducting Swelling Tape	
Thickness	51 mils	1.3 mm
Type	Round Concentric Wires	
Material	Copper	
Cross-Section	150 kcmil	75 mm ²

Longitudinal Moisture Barrier

Material	Semiconducting Swelling Tape	
Thickness	53 mils	1.35 mm

Radial Moisture Barrier

Material	Al-laminate	
Thickness	8 mils	0.2 mm

Jacket/Outer Sheath

Material	HDPE	
Thickness	197 mils	4.8 mm
Conductive Layer	8 mils	.2 mm

Complete Cable

Diameter	4.94 in	125.6 mm
Weight	20.9 lbs/ft	31.4 kg/m

All values should be considered indicative!

Electrical Cable Properties

The land cable has the following electrical properties:

Rated continuous DC voltage, U_0	400 kV
Switching impulse withstand level (SIWL) started from U_0	900 kV
Subtractive SIWL started from U_0 to voltage at opposite polarity	400 kV
Rated continuous current under the installation conditions.	1,638 A
Maximum conductor temperature in normal operation	70 °C
DC resistance at 20 °C	0.0022 ohm/1,000 ft. (0.0072 ohm/km)
DC resistance at maximum conductor temperature	0.0026 ohm/1,000 ft. (0.0086 ohm/km)
Losses at rated current	7.6 W/ft. per cable (25.0 W/m)
Capacitance	0.081 μ F/1,000 ft. (0.27 μ F/km)
Inductance (between conductor and metallic screen)	0.040 mH/1,000 ft. (0.131 mH/km)
Surge impedance	22.2 ohm

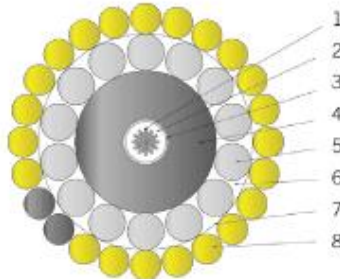
Land Cable Mechanical Cable Properties

Weight of cable	
- in air	≈ 20.9 lbs/ft(31.4 kg/m)
Minimum bending radius	
- at laying	7.4 feet (2.27 m)
- at handling (low tension)	5 feet (1.51 m)
- installed	5 feet (1.51 m)
Maximum pulling force	39342 feet (175 kN)
Maximum side wall pressure ¹⁾	1200 lbs./ ft.(17.5 kN/m)
¹⁾ SWP = Pulling Force / Bending Radius	

Submarine Fiber optic cable

Design

1. Primary coated fiber Silica, acrylate
2. Filling compound Thixotropic compound
3. Tube Stainless steel
4. Sheath Polyethylene, black
5. Armoring Galvanized steel wires, single layer
14 x \varnothing 3.0 mm
6. Filling compound Bitumen
7. Wrapping Polyester tape
8. Wrapping Polypropylene yarns or HDPE sheath



Typical Data

Temperature range

Operation -30 till +60°C

Storage -40 till +70°C

Installation -15 till +40°C

Maximum water depths

..... 3000 m

Bend radius

No tensile load ≥ 0.5 m

With tensile load ≥ 1.5 m

Coiling ≥ 1.5 m

Dimensions

Diameter 22 mm

Weight

In air 1.1 kg/m

In seawater 0.8 kg/m

Tensile force

UTS ≥ 130 kN

FBL ≥ 130 kN

NTTS 100 kN

NOTS 70 kN

NPTS 50 kN

Crush resistance

..... ≤ 10 kN/10 cm

Impact resistance

..... ≤ 200 J

Mechanical and environmental test in accordance with IEC 60794-1-21
and IEC 60794-1-22

Electroding conductor

Electrical resistance 7 Ω /km

Appendix D– Emergency Response Plans

Fire Project: Installation of the CHPE Transmission Cable System:

Emergency: Fire on Board Floating Plant.

Overview

This Emergency Response Plan (ERP) has been developed specifically to support the Caldwell Marine International, LLC (CMI) marine operations. The purpose of this plan is to provide a precise set of procedures and protocols that will be used by CMI during a fire on board floating plant. Most fires start small and can be extinguished quickly. The crew must stay alert for smoke at all times. Keep flammable materials in the proper storage containers, maintain good housekeeping, and know the location of the on-board fire extinguishers.

Organization	Phone Number	Alternate
US Coast Guard	212-668-7000	VHF channel 16
Fire Department	911	
Ambulance	911	
Corporate Safety Director Lucky Abernathy	732-557-6100	908-433-3755 cell

Procedure

1. Alert the rest of the crew to the fact that there is smoke and or fire.
 - a. Location of fire
 - b. Type of fire A, B,C,
 - c. Size of fire
 - d. Source of fire
2. The barge superintendent/vessel master will quickly muster the crew, get a head count, and then provide help to the first responder.
3. Locate the nearest fire extinguisher and attempt to put out the fire.
4. Establish communications with local rescue agency (if necessary).
5. If the fire cannot be contained the barge superintendent/vessel master will evacuate the crew to safety.

After Action Report

Provide the Caldwell Marine International with a detailed chronological situation report ASAP. The formal report must be to the Health and Safety Officer within 24 hours of the incident, no exceptions.

Make a full detailed entry of the incident and all actions taken in the Daily Logs. (It is impossible to provide too much detail.)

Interview all crew and have them prepare and sign witnessed statements attesting to or denying knowledge of particulars of incident.

Emergency Response Plan - Injury

Project: Installation of the CHPE Transmission Cable System:

Emergency: Crewmember Injury

Overview

This Emergency Response Plan (ERP) has been developed specifically to support the Caldwell Marine International, LLC (CMI) marine operations. The purpose of this plan is to provide a precise set of procedures and protocols that will be used by CMI during an injury of a crewmember.

Organization	Phone Number	Alternate
US Coast Guard	212-668-7000	VHF channel 16
Fire Department	911	
Ambulance	911	
Corporate Safety Director Lucky Abernathy	732-557-6100	908-433-3755 cell

Procedure

First Responder provide First Aid to the victim and notify the barge Superintendent. When the superintendent is notified of an injury of a crewmember IMMEDIATELY:

- Begin chronological documentation.
- Log head count.
- Contact local rescue agency (If necessary).
- Start arranging for transportation to the dock. (If necessary)
- **Monitor stages of patients' condition and update the local rescue agency and Caldwell Marine International if they have been notified.**
- **Release the victim to the EMT with as much information about the accident as possible record what Hospital the victim is taken to.**

After Action Report

Provide the Caldwell Marine International with a detailed chronological situation report ASAP. The formal report must be to the Health and Safety Officer within 24 hours of the incident, no exceptions. Ensure the report includes not only how the incident occurred, but also "WHAT WAS DONE FOR THE CREWMAN AND HIS RESPONSES TO ATTEMPTED TREATMENT"

Make a full detailed entry of the incident and all actions taken in the Daily Logs. (It is impossible to provide too much detail)

Interview all crew who knew where the crewman was at the time of injury and have them prepare and sign witnessed statements attesting to or denying knowledge of:

- What the crewman was doing and any statements he made before, during, and after the incident.
- What took place around and for the crewman before, during and after the incident.
- What safety gear the person was or was not wearing.
- Did the witness believe the person knew he was in a hazardous situation and why did the incident occur.
- Were all available preventable measures attempted by the crewman before the incident occurred?

Emergency Response Plan – Man Overboard

Project: Installation of the CHPE Transmission Cable System:

Emergency: Man Overboard

Overview

This Emergency Response Plan (ERP) has been developed specifically to support the Caldwell Marine International, LLC (CMI) marine operations. The purpose of this plan is to provide a precise set of procedures and protocols that will be used by CMI during a Man Overboard Incident.

Organization	Phone Number	Alternate
US Coast Guard	212-668-7000	VHF channel 16
Fire Department	911	
Ambulance	911	
Corporate Safety Director Lucky Abernathy	732-557-6100	908-433-3755 cell

Procedure

IF A PERSON IS WITNESSED FALLING OVER THE SIDE:

Spotter notifies barge superintendent of the incident immediately by any means so as not to lose sight of victim. Spotter designated and has visual contact of person in water and has no other assigned task that would require him to ever lose visual contact.

If the barge is spud down or the vessel anchored, and the victim is able to help themselves back to the vessel assist them in the up and over process.

If underway turn stern hard over away from the side the person fell over.

Flotation devices and light markers thrown overboard.

Begin a written chronological record of the event. Record latitude and longitude

If victim does not give the "OK" signal, begin establishing communications with the nearest rescue facility to standby for medical evacuation.

Rescue Crew:

Complete a head count of all personnel aboard. (Ensure only one person missing.)

Rescue boat and boat crew rigged and ready to launch.

One member of rescue boat crew outfitted as rescue swimmer, rigged with retrieval harness and retrieval line.

Medical equipment standing by ready to treat for hypothermia and/or possible blunt trauma from the fall.

Utilize rescue swimmer to bring victim to ladder mounted on beam.

No matter the rescued victim's verbal description of his/her medical condition, perform primary and secondary medical survey.

Update the rescue facility it they were initially called. If they are already enroute to your position, have them continue to take the person to a medical facility.

Provide the Caldwell Marine International with a detailed chronological situation report ASAP. The formal report must be to the companies Health and Safety Officer within 24 hours of the incident, no exceptions.

IF PERSON IS ASSUMED MISSING OVERBOARD:

Immediately establish contact with, and provide detailed chronological situation report with the nearest search and rescue agency.

Begin search as advised by assisting rescue agency.

Call for any vessels in the vicinity to assist in search if willing. Determine water temperature, water current direction and speed.

Interview crew under witness, have them prepare and signed witnessed statements attesting to or denying knowledge of following:

- Last area person was seen.
- Last time the person was seen.
- What the person was wearing.
- Any preexisting medical or mental condition.
- What task the person was last assigned to.
- His/her perceived mental state.

Provide the Caldwell Marine International with a detailed chronological situation report ASAP. The formal report must be to the companies Health and Safety Officer within 24 hours of the incident, no exceptions.

Appendix E– Spill Prevention Plan/Spill Response Plan

Project: Performing HDD for the CHPE Transmission Cable System:

Overview

Caldwell Marine International (CMI) recognizes that reducing the risk of hazardous material spills is the most appropriate strategy for minimizing impacts to the environment. The purpose of this plan is to provide a description of the Best Management Practices (BMP) that will be followed by CMI marine personnel to reduce the risk of spills.

Should a spill occur, despite the best efforts of the CMI management and crew, the response will follow the Emergency Response Plan for Spills, under separate cover.
Procedure

The most likely operational spill will result from fueling operations, consequently, the focus of this plan is to prevent spills during fueling. Additional procedures discuss the BMP's for storage and handling of hazardous materials.

Fueling

The following practices will be used to minimize the potential for spillage during fuelling.

- CMI will ensure that re-fuelling activities are monitored at all times
- During re-fuelling oil/fuel absorbent pads will be placed under the filling port to mitigate spillage
- All containers, hoses, and nozzles will be in good condition with no loose covers, cracks, kinks, soft spots, or bulges, free of leaks, and visually inspected prior to fuelling
- All fuel nozzles will be equipped with functional automatic shut-off devices
- Hoses will be long enough to allow vessel movements within the limits of the mooring
- Before filling a fuel tank, its available capacity will be verified by the operator
- In the event of a leak, all fuelling operations will be halted until the cause of the leak has been identified and the leak repaired
- CMI will ensure that all employees involved in fuel handling have the appropriate training in transfer and emergency spill response procedures.

Hazardous material storage and disposal

In addition to the above measures for fuel and oil handling, CMI will follow the following measures for storage and disposal of hazardous materials.

- Site personnel will be adequately trained in the handling and transportation of hazardous materials
- Material Safety Data Sheets (MSDS) for hazardous materials used on the project will be made available on site
- Hazardous materials will be labelled and stored in a secure area
- Hazardous materials used or generated in the course of the project will be disposed of in compliance with relevant acts and regulations
- A adequate number of members of the installation crew at all sites will be trained in Workplace Hazardous Materials Information System (WHMIS)

SPILL RESPONSE PLAN

Table of Contents

1. Introduction
2. Emergency Response
3. CMI Spill Response Plan
4. CMI Spill Reporting Notification Chart
5. Environmental Release Reporting
Standard

Appendix A - Environmental Release Report (ERR)

Appendix B - How to Report A Hazardous Substance or Oil Spill

Appendix C -Site Specific Emergency Response Plan

SPILL RESPONSE PLAN

1.0 INTRODUCTION

The information contained herein details the provisions made to minimize the hazards to human health or the environment from fires, explosions, or any unplanned sudden or non-sudden release of hazardous or petroleum based materials to air, soil, surface water, or groundwater. This plan, in conjunction with the JAG Companies Corporate Health and Safety Plan Spill Prevention and Response Plan (HSE Section 022), is to be invoked by the emergency coordinator at each site (Project Manager) or his/her designee (Project Superintendent) should there be an imminent or actual emergency situation involving the aforementioned events.

This plan details the guidelines to be followed in the event of a non-routine occurrence such as a fire, explosion, or release of hazardous substance into the air, water, soil, or groundwater which poses or potentially poses a threat to human health and/or the environment.

2.0 Emergency Response

Hazardous waste spills can pose serious health risks to workers exposed, cause serious threats to the environment, and cost the company money. Health hazards will vary depending upon the material and size of the spill. Any person discovering a fire, explosion, or release of hazardous substance into the air, water, soil, or groundwater is to report the event to the Project Manager.

This information is to be immediately relayed to the emergency coordinator listed in 3.1.

Should the emergency involve a fire, explosion, or release of hazardous substance (including reactions from incompatible materials), the emergency coordinator/project manager will notify the local fire department.

A decision by the emergency coordinator will be made as to whether evacuation of non-essential personnel during the event is necessary.

The emergency coordinator shall keep the facility manager (or his designee) informed of the situation during the emergency. If any portion of the facility or all of the facility must be shut down, the emergency coordinator is to contact the facility manager, area supervisor, and departmental supervisor (if applicable).

3.0 CMI Spill Response Plan

EMPLOYEE SPILL PROCEDURES

(a) **SPILL DETECTION ACTIONS.** Anyone detecting a spill, shall notify the emergency coordinator or alternate emergency coordinator. If the amount of the release is known, ensure the emergency coordinator is notified. The following categories apply:

Minor Spill: A minor spill is one that involves the release of five gallons or less of a material, other than water, which does not go into any drain system.

Major Spill: A major spill is one that involves the release of (A) five gallons or less of a material that goes into a drain system, or (B) over five gallons of a material, other than water.

(b) **SPILL CONTROL ACTIONS.** To prevent further pollution, the spill source shall be determined and additional spillage curtailed, if possible, and it is safe to do so. In no case should any person attempt to stop a spill without proper equipment or personnel backup.



Spill Response Steps

If a spill of fuels, oils, lubricants or other harmful substances occurs, the following procedures are to be implemented.

3.1 ENSURE SAFETY

3.2 STOP THE FLOW

3.3 SECURE THE AREA

3.4 CONTAIN THE SPILL

3.5 NOTIFY/REPORT

3.6 CLEAN-UP

3.1 ENSURE SAFETY

- Notify the CMI Superintendent immediately of any spill or chemical incidents .
- Ensure Personal/Public, Electrical and Environmental Safety.
- Wear appropriate Personal Protective Equipment (PPE).
- Assess the situation. Never rush in; always determine the product spilled before acting.
- Determine if it is a minor or major spill.
- Warn people in the immediate vicinity.
- Ensure no ignition sources if spill is a flammable material.

3.2 STOP THE FLOW

- Act quickly to reduce the risk of environmental impacts.
- Close valves, shut off pumps or plug holes/leaks.
- Stop the flow or the spill at its source.

3.3 SECURE THE AREA

- Limit access to the spill area.
- Prevent unauthorized entry onto the site.

3.4 CONTAIN THE SPILL

- Block off and protect drains and culverts.
- Prevent spilled material from entering drainage structures (ditches, culverts, drains).
- Use spill sorbent material to contain the spill.
- If necessary, use a dyke or any other method to prevent any discharge on site.
- Make every effort to minimize contamination.

3.5 NOTIFY/REPORT

- Notify appropriate Field Manager or alternate of incident (provide spill details).
- When necessary, the first external call should be made to: Corporate Safety Director
- Provide necessary spill details to other external agencies. (See Appendix A - How to Report)
- Complete a *CMI* Environmental Release Report (ERR).

3.6 CLEAN-UP

- Technical assistance is available from *CMI* on clean-up procedures and residue sampling and to ensure compliance with regulations.
- All equipment and/or material used in clean up (e.g., used sorbent, oil containment materials, etc.) must be disposed of in accordance with requirements.
- Accidental spills may produce hazardous wastes (e.g., material with > 3% oil by mass) and contaminated soil. All waste disposals must comply with the Environmental Management Act and Regulations. The Environmental Monitor will assist in complying with the requirements.
- Subject to prior approval, waste sorbent material may be disposed of in a landfill.
- Contaminated soil must be treated and dealt with as required on a site-specific basis.

3.7 SPILL REPORT

The spill report should include the following information:

- Name and phone number of person reporting the spill
- Name and phone number of person involved with the spill
- Location and time of the spill
- Type and quantity of material spilled
- Cause and effect of spill
- Details of action taken or proposed to contain the spill and minimize its effect
- Names of agencies on the scene
- Names of other persons or agencies advised
- Report must be filed in Corporate Headquarters within 24 hours

3.8 SPILL CONTAINMENT AND CLEAN-UP SUPPLIES

Contractors shall have emergency spill response equipment in supply. Oil spill response kits, vehicle kits, and aggressive liquid kits (acids and caustics) appropriate for the quantities and types of materials and receiving environment, shall be supplied by all Contractors. Some local suppliers are listed below.

3.9 SPILL RESPONSE EQUIPMENT SUPPLIERS

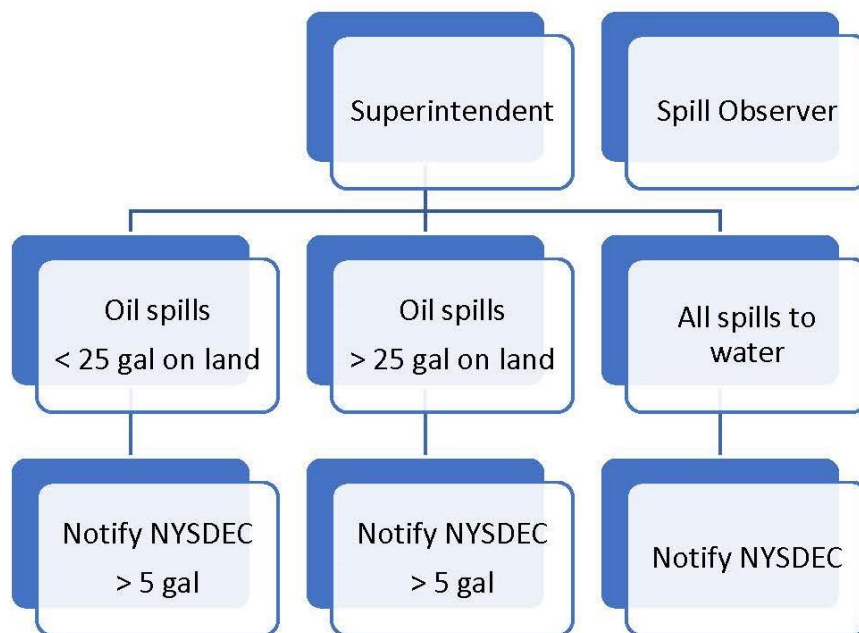
Sorbent materials are designed for specific uses and purposes (e.g., oil only sorbents vs. general sorbents). Ensure that the appropriate materials are ordered for the Project.

Spill containment booms, sorbent sweeps and pads are also available from the companies listed below. Custom made kits and supplies are also available upon request.

4.0 CMI Spill Reporting Notification Chart

All spills to water are reportable. If in doubt as to whether or not to report a spill to a regulatory agency, err on the side of caution and report the spill. Check the MSDS for Reporting Quantity and consult the Corporate Safety Director for additional information.

Petroleum Products



Chemical Products

Determine if the chemical spill has left the containment area and if it is released to land, sanitary sewer, storm drain or water. If spill is outside containment areas:

- Notify Corporate Safety Director and Superintendent
- Determine if Reportable Quantity is exceeded by checking the MSDS and with the Safety Director.
- If its determined to be a minor spill clean-up.
- Major spills require notifying clean up contractors and reporting spill to applicable agencies.

Note: **All spills to water are reportable.** If in doubt as to whether or not to report a spill, err on the side of caution and report the spill. All spills must be reported to the Corporate Safety Director.

EMERGENCY CONTACTS

EMERGENCY CONTACTS		
Name	Agency	Number
Lucky Abernathy CMI Safety Director	Caldwell Marine International	908-433-3755
Paul Larrabee Cable Operations Manager	Caldwell Marine International	732-620-3938
Ed Phillips Civil Works Operations Manager	Caldwell Marine International	732-620-4906
Mike Shaw Cable Installation Manager	Caldwell Marine International	604-785-3745
Thomas Ulisse Project Executive	Caldwell Marine International	732-620-3470
Greg Gashlin Project Manager	Caldwell Marine International	732-620-3133
Dominic Palermo Project Engineer	Caldwell Marine International	732-742-9326
US Ecology DBA NRC East	Emergency Spill Response/Clean up	1-800-899-4672
Michael Henssler Project Manager	NKT, Inc.	917-287-3989
MSRC	Marine Spill Response Organization	480-991-5599
Clean Harbors	Spill Response Contractor	1-800-645-8265
Coast Guard MCTS (NY)	New York Coast Guard	1-718-354-4088/9
Coast Guard Group Burlington (VT)	Vermont Coast Guard	1-802-951-6760
NYDEC Hotline	New York State Spill Hotline	1-800-457-7362 (within NY State) 1-518-457-7362 (outside NY State)
NJDEP Hotline	New Jersey State Spill Hotline	1-877-927-6337
VTDEC Hotline	Vermont State Spill Hotline	1-802-828-1138
National Response Center (NRC)	USEPA & USCG	1-800-424-8802

5.0 Environmental Release Reporting Standard

5.1 PURPOSE

This plan describes CMI's procedures and systems for recording and posting Environmental Incidents as they occur. This procedure ensures timely communication and reporting to senior management and to appropriate technical individuals that may be impacted by the incident.

Incident reporting benefits *CMI* by:

- Alerting managers so they can manage contacts and pressures (e.g., from employees, agencies, communities or media) with timely and accurate information.
- Meeting specific obligations and legal standards of care.
- Providing a source of data that can be used to identify trends and to provide justification for actions to correct the underlying problem and prevent future incidents.

This standard applies to all work, including work performed by Contractors, and all events which affect CMI.

5.2 REPORTING REQUIREMENTS

This plan specifies internal CMI Incident Reporting requirements only. Additional legal obligations to report certain spills to regulatory agencies may be necessary.

Releases of gases that are sudden and uncontrolled are considered spills and must be reported internally. Controlled release of gases or release of gases through maintenance are not considered incidents and are thus not reportable in the ERR system.

In the event of an emergency (e.g., flood, forest fire, extreme storm, earthquake or dam breach, etc.) the reporting responsibilities governed by *Emergency Preparedness Plans take precedence*.

5.3 DEFINITION

An Environmental Incident is one that has caused, or has the potential for causing, one or more of the following:

- Adverse impact on the quality of air, land or water, wildlife, aquatic species or species at risk.
- Exceedance of permit or external reporting requirement.
- Notification of external agencies due to emergency/beyond normal circumstances.
- Adverse publicity with respect to environment.
- Legal or regulatory action with respect to violation of statutes or environmental damage.
- Alteration of, or damage to, heritage or archeological resources.

Examples of Environmental Incidents include, but are not limited to:

- Spills of oil, fuel, PCB or chemicals.
- Visible damage to equipment where the public may believe there is an environmental effect.
- Sudden and uncontrolled emission or discharge of air pollutants (e.g., NO_x) or sudden and uncontrolled gaseous releases (e.g., SF₆, H₂, propane, compressed CO₂, natural gas).
- Discharge of deleterious substances into fish-bearing water.
- Landslides, erosion, or floods as they affect environmental quality.
- Dust storms in drawn-down reservoirs.
- High or low flows, or flow changes, that adversely affect fish or fish habitat, wildlife or recreation.
- Adverse impacts on notable fish or wildlife species (e.g., sturgeon, eagles).
- Any ground disturbance (i.e., setting a new pole) where an archeological site is encountered.
- Work and/or removal of vegetation in or near water bodies without regulatory approval.
- Violation of pesticide use, storage or application regulations and approvals.
- Violation of other environmental regulations, permits, or approvals.

All environmental incidents require communication within CMI including immediate notification to the Corporate Safety Director. Discretion should be exercised and consultation undertaken with environment staff when in doubt, to ensure that all appropriate incidents are reported. This will ensure timely reporting and updating of incidents to senior management when required.

5.4 PROCEDURE

NEW ENVIRONMENTAL RELEASE REPORTS

- CMI Environmental Release Reports (ERR) (Appendix A) are to be prepared as soon as possible by the Project Manager/Emergency Coordinator. The target timeline for reporting is within 24 hours of the occurrence. Some incidents may have a higher degree of sensitivity, severity, or critical circumstances. In those cases, senior management must be notified immediately. Refer to the Critical Notification section for more details. **It is the responsibility of the Contractor to ensure any notification as required by the Law is undertaken within the prescribed time limits of applicable Law.** The *Environmental Release Report* is to be prepared by Project Manager or emergency coordinator with input from the Contractor's Site Supervisor.
- The Project Manager or emergency coordinator shall notify the appropriate personnel based on the severity of the incident. A preset list of people including vice-presidents, managers, environmental specialists, Legal, and Corporate communications and environmental staff is available within the ERR system.

CRITICAL NOTIFICATION

- On certain occasions, an incident may be elevated in stature by site specific circumstances, the severity of its environmental impact, the public, the media, or government representatives. When this happens, immediate notification of senior management must be initiated.
- The target for this type of notification is within one hour of the incident, or its escalation to severe status.
- Notification may be made via Telephone, Fax or Microsoft Outlook, but preference is for personal contact.

ERR UPDATES

- The responsible supervisor or manager at the site of the incident (with input from any subsequent operations or environmental staff that become involved) shall maintain a record of incident updates. This person is also responsible for exercising discretion and forwarding the significant updates on the incident to appropriate personnel. A preset list of people including vice-presidents, managers, environmental specialists, Legal, Corporate communications and environmental staff is available within the ERR system.

ERR UPDATES

- All ERRs will require closure by the Project Manager or emergency coordinator. All fields of the ERR reports must be completed. Before closure, the Environmental Officer must verify that the environmental response is appropriate and complete (i.e., to review cleanup, waste disposal, lessons learned, accuracy of report).
- An ERR should be closed only after completing all of the following actions:

- i. Verification that physical aspects of the incident have been remediated;
 - ii. Verification that any associated wastes have been disposed of legally;
 - iii. Lessons learned (if any) have been captured and transmitted;
 - iv. Root cause analysis and corrective action plan (if applicable) have been identified and initiated; and
 - v. Report has been reviewed for consistency and completeness (e.g., lab results, regulators notified).
- The closed ERR must be forwarded to the preset list (including Corporate Safety Director, Senior Managers, Environmental Specialists and Legal) within the ERR and the *CMI* Project Manager, and Engineering Project Manager. Pending the nature of the incident and the involvement of other staff during its resolution, the notification of closure should also be communicated to other applicable staff. The latter is left to the discretion of the originator and the Engineering Project Manager.

TRAINING

The Engineering Project Manager shall coordinate with the Corporate Safety Director to:

- Identify positions that require knowledge of environmental incidents and the ERR system; and
- Provide ERR training to those positions identified.
- Site specific emergency response training will be conducted at each site prior to commencing work.
- Quarterly drills will be conducted and documented
- Weekly Toolbox talks will be used to supplement formal training

ERR training may include a formal training program, one on one mentoring or supervision, or other means deemed appropriate for the Project. All ERR training will be documented. The target for ERR training for new employees (new hires, rehires, transfers, etc.) is six months from the date of hire. Refresher training will be provided as deemed appropriate. All training sessions will be documented and available at the site.

Appendix A

Environmental Release Report (ERR)

Environmental Release Report (ERR)

PART 1 - INITIAL NOTIFICATION (To Be Completed By The Facility Supervisor On-Duty)

FACILITY/CONTACT INFORMATION:

Reporting Supervisor: _____ Facility Phone: _____

Location: _____

Spill Location (facility/building): _____

Address: _____

FACILITY INVOLVEMENT:

☐

Yes

☐

No

Facility/Contractor Responsible (if any): _____ Contract # _____

Company Contact: _____ Phone: _____

SPILL INFORMATION:

Start Date, Time of Event ____ / ____ / ____ AM / PM End Date, Time of Event ____ / ____ / ____ AM / PM

Chemical Name: _____ CAS No: _____

Trade Name: _____ Concentration (if applicable) _____

Source: ☐ Tank ☐ Tank Truck ☐ Drums ☐ Pipe ☐ Other: _____

PBS # _____ Tank # _____ Tank Size _____ Leak Rate _____ Vehicle # _____

Amount Spilled: _____ ☐ gal ☐ lbs. Amount Recovered: _____ ☐ gal ☐ lbs.

How Calculated: ☐ Daily Inventory Record ☐ Meter ☐ Scale ☐ Estimate (how): _____

Weather: _____ Temp.: _____ Wind Direction/Speed: _____

Spilled to: ☐ Secondary Containment ☐ Sewer ☐ Storm Drain ☐ Catch Basin ☐ Air
☐ Surface Water * ☐ Soil ☐ Groundwater ☐ Other (list): _____

* Water Body: _____

Spill Impact: ☐ Fire ☐ Injury *** ☐ Fatality *** ☐ Evacuation

☐ Road Closed ☐ Track Closed ☐ Waterway Closed ☐ SPDES Violation

☐ Damages (describe): _____

 ***No./Type of Injuries/Fatalities: _____

NOTIFICATION INFORMATION:

Regulatory Authorities Contacted: _____ Date Reported: _____ Time _____ AM / PM

Rep. Contacted (date and time): _____ Local RQ: _____ lb/gal Ref. No.: _____

Remediation Rep. Contacted (date and time): _____ State RQ: _____ lb/gal Spill No: _____

NRC Rep. Contacted (date and time): _____ Federal RQ: _____ lb/gal Spill No: _____

Signature _____ Date _____

Release Report Information	Attach a list of all employees providing information used to complete Part I. Where feasible, such personnel should be shown the completed Part I to verify its accuracy prior to its being signed by the Reporting Supervisor.
----------------------------	---

PART 2 - INVESTIGATION/REPORT (To Be Completed By The Investigator or Team)

Date Investigation Started:

Time Started:

AM / PM

**DESCRIPTION OF
INCIDENT**

*Provide a summary of the incident, material Spilled, contaminate found, personnel involved (name/title), etc. What, when, where, who, how, and why. Describe operations being conducted. **Fact ONLY.** Avoid speculation.*

☐ Continued - see attached

**CONTRIBUTING
FACTORS**

List and explain all factors potentially contributing to the incident. Consider procedures, training, equipment, communications, human factors, environment or any other factors that contributed to the occurrence or severity.

☐ Continued - see attached

Root Cause & Contributing Factors:

☐ Procedures ☐ Training ☐ Process Design and Controls ☐ Inspection and Prevent Maint.

☐ Equipment, Materials or Changes ☐ Human Action ☐ External

☐ Other: Explanation

CLEANUP

Describe who cleaned up, when, how, and any verification/testing.

☐ Continued - see attached

**CORRECTIVE
ACTIONS**

List each recommendation to prevent reoccurrence. Complete first 3 columns for Investigation and the last 2 columns after implementation (all recommendations must be resolved to close out the case).

Description of Corrective Action and Intent	Assigned to	Target Date	Date Resolved	Resolution/ Comments

CONCLUSIONS

Summarize investigation conclusions below.

--

**INVESTIGATION
TEAM**

The incident investigation team members who sign below have reviewed and agree with the conclusions of this Spill investigation report.

Name	Signature	Title/Affiliation	Date

**REPORTS
SUBMITTED:**

Written reports must be sent to CMI within 3 days, State within 7 days and NRC as soon as possible for Spills above their respective RQs.

Sent by PM/ Rep.: _____ Dates: ☐ _____ ☐ State ☐ CMI

Name: _____ Signature: _____ Date: _____

DEFINITIONS USED FOR ROOT CAUSE AND CONTRIBUTING FACTORS

1. Procedures may include, but are not limited to, Policies, procedures, work instructions and plans. Types of procedures may include Environmental, Health & Safety, Administrative, Operating or Maintenance. A Procedural Root Cause or Contributing Factor can be attributed to an incident if:

- procedures that could have prevented the incident from occurring have not been written.
- procedures are in place; however, they did not consider the situation in which the incident occurred or contained errors
- procedures were drafted, but not approved.
- Procedures exist, but are not typically followed or enforced

A Procedural Root Cause or Contributing Factor does not include conditions in which training was not performed or was inadequate.

2. A Training Root Cause or Contributing Factor can be attributed to an incident if:

- training that could have reasonably prevented the incident was not provided.
- training was significantly late
- training did not address the tasks assigned to the position.
- training was performed, but not checked to ensure the person understood (e.g. passing a test or observed for proficiency)

3. A Process Design and Controls Root Cause or Contributing Factor can be attributed to an incident if:

- The process was not designed to address normal operating conditions
- Insufficient safeguards were in place (this does not include if safeguards were bypassed)
- The process does not have controls to manage design parameters, such as level or pressure

4. An Inspection and Preventive Maintenance Root Cause or Contributing Factor can be attributed to an incident if inspection and preventive maintenance were not in accordance with applicable procedures, manufacturer's recommendations, government standards and industry standards and are adequate for the service conditions. If Preventive Maintenance procedures do not exist, it is considered a Procedural Root Cause.
5. An Equipment, Materials or Change Root Cause or Contributing Factor can be attributed to an incident if:
 - the equipment, parts, and materials procured were not as initially specified,
 - the equipment, parts and materials were defective
 - the equipment, parts and materials did not meet or exceeded the applicable specifications.
 - the process has been changed from its design (excluding changes approved by Engineering).
6. A Human Action Root Cause or Contributing Factor can be attributed to an incident if personnel actions, activities and decisions were in accordance with procedures, training and expected workplace standards. This includes both errors and willfully not following standards.
7. An External Root Cause or Contributing Factor can be attributed to an incident if external items, such as weather or third parties (excluding contractors) did not cause or contribute to the incident.
8. An Other Root Cause or Contributing Factor can be attributed to an incident if the incident has not been satisfactorily classified in one or more of the above categories. The Other cause must be identified.

Appendix B

How to Report A Hazardous Substance or Oil Spill

A report of a hazardous substance release or oil spill takes only a few minutes. To report a release or spill, contact the federal government's centralized reporting center, the [National Response Center \(NRC\)](#), at 1-800-424-8802. The National Response Center is staffed 24 hours a day by U.S. Coast Guard personnel, who will ask you to provide as much information about the incident as possible, including:

- Your name, location, organization, and telephone number
- Name and address of the party responsible for the incident
- Date and time of the incident
- Location of the incident
- Source and cause of the release or spill
- Types of material(s) released or spilled
- Quantity of materials released or spilled
- Medium (e.g. land, water) affected by release or spill
- Danger or threat posed by the release or spill
- Number and types of injuries or fatalities (if any)
- Weather conditions at the incident location
- Name of the carrier or vessel, the railcar/truck number, or other identifying information
- Whether an evacuation has occurred
- Other agencies notified or about to be notified
- Any other information that may help emergency personnel respond to the incident

If reporting directly to the National Response Center is not possible, reports also can be made to the EPA Regional office or the U.S. Coast Guard Marine Safety Office in the area where the incident occurred. In general, EPA should be contacted if the incident involves a release to inland areas or inland waters, and the U.S. Coast Guard should be contacted for releases to coastal waters, the Great Lakes, ports and harbors, or the Mississippi River. The EPA or U.S. Coast Guard will relay release and spill reports to the National Response Center promptly.

A report of a release of an [extremely hazardous substance](#) should be made to the state emergency response commission (SERC) or the local emergency planning committee (LEPC) established for the location where the incident occurred. To identify the appropriate SERC and LEPC, contact the EPCRA Hotline at 1-800-535-0202.

Appendix C

Emergency Response Plan

Project: Performing HDD for the CHPE Transmission Cable System

Emergency: Spill

Overview

Caldwell Marine International (CMI) recognizes that reducing the risk of hazardous material spills is the most appropriate strategy for minimizing impacts to the environment. The purpose of this plan is to provide a description of the Best Management Practices (BMP) that will be followed by CMI marine personnel to reduce the risk of spills.

Should a spill occur, despite the best efforts of the CMI management and crew, the response will follow the Emergency Response Plan for Spills, under separate cover. Procedure he most likely operational spill will result from fueling operations, consequently, the focus of this plan is to prevent spills during fueling. Additional procedures discuss the BMP's for storage and handling of hazardous materials.

Organization	Phone Number	Alternate
Coast Guard MCTS (NY)	1-718-354-4088/9	VHF channel 11,12,14 & 16
US Ecology DBA NRC East Emergency Spill Response/Cleanup	1-800-899-4672	1-802-923-1445
Clean Harbors Spill Response Contractor	1-800-645-8265	
CMI Safety Director Lucky Abernathy	732-557-6100 (office)	908-433-3755 (cell)

Procedures

Whenever a spill of oil occurs it is the duty of the person finding the spill to immediately inform the project superintendent/emergency coordinator, who should call out the vessel's pollution prevention procedures. Remember that an oil spill may create a fire or explosion hazard, requiring safety requiring safety precautions to be observed.

OPERATIONAL SPILLS OF OIL

The most likely operational spill will result from:

- Pipeline leakages, including transfer hoses
- Cargo tank or bunker tank overflows
- Hull leakages

Pipeline Leakage During Discharging or Loading of Oil Cargoes, or During Bunkering

Measures to be implemented immediately:

- Stop all cargo and bunkering operations, and close manifold valves
- Sound the emergency alarm, and initiate emergency response procedures
- Inform terminal/ loading master/ bunkering personnel about the incident

Further measures:

- Consider whether to stop air intake into accommodation and non-essential air intake to engine room.
- Locate source of leakage, and begin clean-up procedures.
- Drain affected section of pipeline into an empty or slack tank (e.g. the slop tank or another cargo tank).
- Prepare portable pumps where it is possible to transfer spilled liquid into a slack or empty tank.
- If the source of the leakage is located in the pump-room at the sea-valves the necessary measures must be taken to relieve the pressure from the relevant section of the pipeline.

If the spilled liquid is contained on board and can be handled on board then:

- Use sorbents and permissible solvents to clean up liquid spilled on board.
- Ensure that any residues collected, and any contaminated absorbent materials used in the clean-up operation are stored carefully prior to disposal.

After dealing with the cause of the spill it may be necessary to obtain permission from local authorities or the terminal (or both) to continue normal operations.

Tank Overflow During Loading Or Bunkering

Measures to be implemented immediately:

- Stop all cargo and bunkering operations, and close manifold valves.
- Sound the emergency alarm, and initiate emergency response procedures.
- Inform terminal/ loading master/ bunkering personnel about the incident.

Further measures:

- Consider whether to stop air intake into accommodation and non-essential air intake to engine-room.
- Reduce the tank level by dropping cargo or bunkers into an empty or slack tank.
- Prepare pumps for transfer of cargo/bunkers to shore if necessary.
- Begin clean-up procedures.
- Prepare portable pumps if it is possible to transfer the spilled liquid into a slack or empty tank.

If the spilled liquid is contained on board and can be managed:

- Use sorbents and permissible solvents to clean up the liquid spilled on board.
- Ensure that any residues collected, and any contaminated absorbent materials used in the clean-up operation are stored carefully prior to disposal.

After remediating the spill it may be necessary to obtain permission from local authorities or the terminal (or both) to continue normal operations.

Appendix F – Drilling Fluid Containment Plan and Erosion/Mud Control Plan

INADVERTENT RETURN AND CONTAINMENT OF BENTONITE DRILLING FLUIDS MATERIALS

In the HDD industry, the ability to respond and handle inadvertent returns must be a part of the construction procedures. Huxted Trenchless, LLC (HT) is experienced and completely prepared for their responsibility regarding eliminating or reducing the possibility of an inadvertent return to surface.

ALL DRILLING OPERATIONS WILL BE SUSPENDED IF DRILLING FLUIDS POSE A THREAT TO THE RESOURCE OR PUBLIC HEALTH AND SAFETY. Huxted Trenchless' s standard procedure for containment of an inadvertent return of bentonite drilling fluids during drilling operations:

Cease drilling operations immediately

- Notify Site Inspector, NYSDEC and additional permitting agencies
- Contain any surface release
- Place pump or vacuum equipment
- Document (within 48 hours a report will be provided to the NYSDEC)
- Review options with on-site inspectors
- Implement procedures
- Resume drilling

During drilling operations should HT experience partial loss of mud returns, or a visible inadvertent return is encountered, HT will immediately cease pumping of drilling fluids and commence placing containment barriers around the release. If necessary, pumps or vacuum trucks will be positioned at the location for transfer of mud back to the recycling system or to a pre-approved disposal site. During this operation the client's site inspector, NYSDEC or engineer will be notified and consulted to ensure the removal will not cause additional adverse impacts to the natural resources. The drilling superintendent will then provide all necessary documentation as to time, location, pump and bit pressures and estimated volumes of the inadvertent return to the proper authorities. Once contained, HT will review the situation and provide all options to the client for approval. (See attached Inadvertent Return report)

Equipment and hand tools will be present on site to assist in any clean-up that might be necessary. Vac-trailers and pumps will be on site along with various hand tools (ie. Shovels, rakes, brooms, silt fence and hay bales.

In the event of an inadvertent return to the lake or river, the stand-by dive team will immediately be called on to assist in the cleanup effort. For small quantities of drill fluid

released the divers will remove the material with hydraulic pumps. For a larger release in water, an additional gravity cell will be installed over the disturbed area to contain the release from spreading. The cleanup effort will include recovering the drilling fluid to the surface containment tanks and where it will be stored until it is disposed of at an approved location. The area disturbed by the release and subsequent clean-up will be restored to preexisting condition to the extent possible.

Along with our standard inadvertent return procedures, other methods can be implemented to avoid or reduce a surface release. The design of the crossing should be reviewed for sufficient depths in various soil and rock conditions. In addition, some loss circulation materials (LCM) and special drilling techniques can provide the contractor some assistance in reducing inadvertent returns and or loss circulation down hole.

HT considers any inadvertent return as priority and will ensure that there are protective measures in place to contain or quickly recover any bentonite drilling fluids that may migrate to the surface. In addition, HT will make every effort during the drilling operations to prevent the possibility of a release. However, when drilling in subsurface conditions with limited geotechnical data, no drilling contractor can guarantee that inadvertent returns will not occur.

Erosion & Mud Control Plan

1.0 Erosion Control

Prior to drilling operations, HT will implement erosion control procedures and containment for disposal of rainwater, drilling fluids and alluvial soils.

1.1 Erosion Control

On the operations site, earthen berms are constructed for containment and flow direction of any fluids back to the containment pit which is located in front of the drilling rig. Silt fencing is installed around all possible contamination areas. The containment pit is approximately 6 foot wide, 6 foot long and 4 foot deep. This fluid can be pumped back to the mud system for recycling down hole.

If excessive amounts of rainwater are encountered, hay bales, straw and silt fencing can be placed on or around the erosion site to provide some stabilization of the ground. Should heavy runoffs occur, a deflection or containment berm or shallow pit can be constructed, and any fluids pumped back to holding tanks or our mud system.

Should drilling fluids create any erosion along the drill path, HT will cease pumping drilling fluid down hole and notify our client for immediate consultation.

1.2 Disposal of Materials

Prior to commencement of drilling operations, an HT superintendent will arrive on site to meet with our client, contact vendors and establish a method for transportation and disposal of drilling fluids and cuttings. In addition, vacuum trucks and holding tanks are identified which can be put on notice for containment and disposal assistance.

2.0 Drilling Mud

2.1 Introduction

The following paragraphs describe the drilling fluid handling and containment procedures typically practiced by HT. These procedures have been implemented to minimize the potential for environmental disturbance during the directional drilling process.

The drilling fluid is an essential element of any directionally drilled pipeline installation.

Amongst other benefits, the fluid serves many purposes including:

- Removal of the drilled cuttings from the borehole.
- Maintaining the integrity of the borehole.
- Lubricating and cooling the drill bit.

The drilling fluid typically used by HT in completing directionally drilled installations is a naturally occurring non-toxic, colloidal clay called sodium montmorillonite, or bentonite that is mined principally in Wyoming. Bentonite swells in water by absorbing the water, thus providing a viscous fluid to carry cuttings. The desired viscosity of the non-toxic bentonite fluid will vary with differing formations. By monitoring the mud, the HDD contractor can determine the correct properties needed for drilling in the different types of formations, i.e. maximum cleaning, loss circulation and inadvertent return control.

2.2 Drilling Mud Standards

Two concerns develop from the use of drilling fluids at a given location. These are the handling of the fluid on-site and the disposal of the excess fluid at the completion of the job. Both of these concerns are simplified if the products entering the mud system are of a non-toxic nature.

To ensure that the drilling fluid meets the required disposal and environmental standards, HT adopts the following guidelines:

- HT identifies in advance of drilling, the proposed drilling fluid products and the local water source to be used.
- HT will not add any other products to the mud system without prior approval.
- Under no circumstances will HT use petroleum-based products.

- HT ensures that petroleum products such as hydraulic oil, used oil or fuel will not migrate into the mud fluid system.
- HT produces and maintains daily reports showing the amount and type of products used.
- HT tests the drilling fluid on a regular basis to identify the mud properties such as, viscosity, water content, gel strength, solids content, hydrogen ion content (P.H.)
- HT purchases all mud products from a reputable supplier who will supply Material Safety Data Information that adheres to all regulations and assures the products are non-toxic.

The Material Safety Data Sheets will further describe these products.

2.3 Drilling Fluid Handling Equipment and Containment

HT utilizes a **closed loop** drilling fluid system whereby the fluid exiting the borehole is cleaned and re-circulated. The **closed loop** system offers a number of advantages including reducing the amount of fluid that must be made up to complete a project and reducing the amount of fluid to be disposed of upon conclusion of the pipeline pull-through.



A typical **closed loop** system begins with drilling fluid being prepared to desired viscosity and stored in a mud mixing tank. The fluid is then pumped, via mud pumps, at desired pressure and flow to the drill rig and down the drill pipe. The mud pumps are controlled either by the driller from the operations cab at the rig or from the mud mixing tank.

The mud is pumped down the drill string, through the downhole motor, if employed, and then released through the nozzles of the bit or jet. The fluid then returns along the annulus between the borehole and drill string carrying, in suspension, the drilled cuttings. The fluid then flows into a sump prepared at surface at the borehole entry point. From this sump, the fluid is pumped to desanders and shakers where the drilled cuttings are removed. The cuttings are contained within metal roll-off dumpsters alongside the cleaning unit and transported to an approved disposal site. The size and particulars of the desanders and shakers will be subject to the particulars of the project. Following removal of the drilled cuttings, the clean fluid is pumped to the mud storage tank to be re-used.

HT does not believe any additional procedures, other than prudent operating practices, will be necessary for the control of drilling fluids at the entry locations. The drilling fluid will be contained at all times within surface tanks and sumps. Consequently, there should not be any drilling fluid elsewhere on the location.



The drilling fluid hoses, transfer lines and pumps will be carefully laid out and regularly inspected to avoid any failures and inadvertent release of fluid. The mud tanks and cleaning units will be of appropriate sizes to ensure adequate capacities. Cuttings will be contained within on-site metal roll-off containers. Through careful planning and attentive operations, HT is able to maintain a clean and environmentally responsible working area.

2.4 Drilling Mud Disposal

Prior to commencement of drilling operations, the drilling superintendent will establish a landfill or off-site facility for disposal of all excess drilling fluids and cuttings.

Solids Disposal

During the pilot hole and reaming operations, bentonite drill fluids will carry the solids from the formation back to the entry pit. The fluids and cuttings will be pumped back to the recycling system for separation and containment. The solid materials (maximum of 50% water by volume) will be placed in a metal roll-off dumpster and prepared for hauling to an approved site.

Bentonite Disposal

The bentonite drilling fluids are continually being cleaned and recycled back down hole to reduce drilling costs. If multiple drills are planned at the same location or in close proximity, the bentonite will be either stored or transported to the next site. After the project is completed, the drilling fluids will be sucked up in a vacuum truck to be transported to the approved site for disposal.

The vendor that supplied the roll-off containers is equipped with special haul trucks for loading and unloading of the containers. Unless other arrangements are made, HT will contract the vendor to supply and haul solid materials and remaining drilling fluids to the disposal site.

3.0 Avoiding Environmentally Sensitive Areas

The most appropriate method to avoid fluid migration to environmentally sensitive areas is through careful design of the borehole profile, careful attention to drilling progress and fluid pressures, and through environmentally responsible working practices.

HT endeavors to avoid drilling fluid migration by designing an appropriate borehole profile well removed from the sensitive area and maintaining fluid pressures within acceptable limits while drilling the initial portion of the pilot hole.

4.0 Environmental Responsibility

HT will also implement procedures to minimize the potential for environmental disruption within other areas of the project. These areas include site preparation, site restoration, and attentive material handling/storage of fuels, including noise abatement. The following paragraphs further describe procedures which may be implemented to limit environmental disruption in these areas.

4.1 Site Preparation/Site Restoration

The layout of equipment and materials at the entry and exit locations must be carefully prepared to limit the required working area. In this way, the amount of site preparation and the resulting environmental disturbance can be minimized. Spill kits will be present on-site during drilling activities. These kits will contain at a minimum, absorbent pads and socks, disposable bags, gloves, safety glasses, etc. With the proposed crossing, it is likely that certain site preparations will be required at the proposed entry and exit locations. Further site restorations will be performed as required.

4.2 Containment and Disposal of Fuels and Other Materials

HT has reviewed the potentially hazardous materials that may be on-site. The oil-based products to be used on-site consist of:

- * Diesel fuel
- * Gasoline
- * Lube Oil Products
- * Bearing Grease
- * Pipe Lubricant
- * Hydraulic Oil
- * Used Oil Products
- * Garbage
- * Used Filters, Rags etc.

Diesel Fuel

Required to fuel drill rig motor and heaters, will be transported by approved bulk trucks. To ensure spillage does not occur, all engines are connected to one fuel supply with approved hoses or steel lines. Limited amounts of fuel will be stored on-site. Refueling operations will not be permitted any closer to water courses than the entry location.

Gasoline

Will be required for remote water pump engines, including other support pumps and/or generators. This will be supplied and transported in barrels or other approved containers. The transfer of gas from barrels to the engines will be carried out with barrel pumps that fit solidly into the barrel opening.

Lube Oil

Will be required for all engines to maintain oil levels and oil changes. Oil will be supplied in approved containers or cans, in case lots, or pails. This reduces the chance of sizable spills and makes handling easier. Used oil will be caught in containers designed to fit below the drain opening. The used oil will then be placed in a barrel which can be sealed. The contained used oil will be removed from the site at the end of the project and disposed of in an approved manner.

Bearing Grease

This will be required in very limited amounts. The packaging of the product will be in container tubes which are placed directly into the grease guns.

Pipe Thread Lubricant

Required for the lubrication of the drill string connections to eliminate thread galling and excessive joint tightening. As any excessive lubricant on the drill string threads can be washed into the water, HT recommends the use of a lubrication that is comprised of a bentonite-based material and other non-toxic material. This lubricant is used extensively on water well drilling or other areas where foreign substances of a toxic nature cannot be allowed to mix with the local water sources.

Hydraulic Oil

Will be required on a limited basis for the drill rigs hydraulic system. This system is used for drill pipe rotation, pull and push capacity and the break-out or make-up of drill pipe. Again, limited quantities will be required and will be transported in sealed containers or barrels. The initial filling of the rigs reservoirs will be required on-site once the rig is assembled. Filling will only be required in the remote event that a leak develops.

HT will ensure that there are protective measures in place to contain or quickly recover any oil that may leak from the units by ensuring that all hydraulic hoses and fittings are in good shape and designed for cold weather applications. All hydraulic pump bearing seals will be checked for leaks and repaired as necessary.

Absorbent oil spill padding will be on-site and will be placed under areas of the drill rig where the possibility of an oil leak might occur. This will absorb any oil that may escape before the leak is discovered and repairs can be made.

Used Oil

The handling and containment of used oil is always a potential problem at any temporary work site. In this case the short duration required for each

drill will reduce to a very minimum, the volume of used oil. However, even in this case, used oil will accumulate throughout the project and must be accommodated.

HT will provide sufficient containers on-site to hold all used oil accumulated. These containers will have openings that can be sealed shut when full. This will allow them to be transported without any possibility of leaking enroute.

Used oil should be taken to a proper treatment plant where it can be disposed of in an approved manner.

Garbage

Any construction or drilling site will accumulate a reasonable amount of garbage that requires disposal. HT will collect all garbage of a non-toxic nature in approved dumpsters that will be supplied by and removed by an authorized collection company within the general area.

Used Filters, Oily Rags of a Toxic Nature

To transport this material safely, HT recommends containers that can be sealed against leakage once they are filled. These containers will be identified by clearly marking on the barrel, the nature of the contents within. Once filled, they will be taken to an approved licensed disposal area.

The handling of waste during this project will adhere to all applicable regulations.

5.0 Responsibility for Reporting & Responding to Spills

In undertaking a directional drilled pipeline installation, the ability to respond and handle spills is an important part of the work procedures. HT is fully knowledgeable of our responsibility in ensuring that spills do not occur. However, should a spill occur, the impact must be limited by rapid containment of the product, by minimizing the amounts of fluid on-site, by ensuring the availability of clean-up products/equipment on-site to immediately contain, control, and clean-up the spill and by notifying immediately the proper authorities.

The quantity of fluid on a directional drilling site shall be kept to a minimum. Fuels and lubricants are contained in appropriate containers that reduce any single quantity to minimal amounts. Diesel fuel tanks are part of the equipment housing module and could amount to two or three separate tanks, again reducing the quantity in any one container. Lube oils are delivered to the sites in their marked containers, which might be barrels, pails, or cans.

Drilling fluids on surface, although not of a toxic nature, cannot be ignored if a spill occurs. The containment surface equipment consists of steel tanks that are divided into three or more compartments. These mud containment tanks are part of the total enclosed re-circulating drilling fluid process, which is used successfully on drilling rigs worldwide without major spills occurring.

An excavated containment pit is dug directly adjacent to the drilling fluid surface tanks. This pit is designed to catch all drilled cuttings, desander overflows and whatever drilling fluid that adheres to the solid particles.

Both the entry and exit sites will have shovels, pickaxes, containers, and absorbent materials available that will immediately be put to the task of containing and recovering any fluids that might escape from the equipment or storage containers.

The entire drill crew will be aware of their responsibility to maintain a spill free environment. The crew will also be aware of the required response should a spill occur. The crew will have responsibility to report spills of any size to their immediate supervisor, who in turn will advise the Client.

Appendix G– Non-Conformance Report

Caldwell Marine International	CHPE SUBMARINE CABLE INSTALLATION NON-CONFORMANCE (NC) CORRECTIVE ACTION AND CLEARANCE REPORT (NCR)		Project: CHPE Location: Ny, Job #
NC Report No:		Date:	
Location:			
Project phase:			
PART 1: DESCRIPTION OF NON-CONFORMANCE			
NC Importance	<input type="checkbox"/> Major <input type="checkbox"/> Minor	Relevant requirement:	
Signature - NKT representative:		Date:	
Name/Title - NKT representative:			
Signature - CMI representative:		Date:	
Name/Title - CMI representative:			
PART 2: PROPOSED CORRECTIVE ACTION			
PART 3: COMPLETED CORRECTIVE ACTION			
PART 4: CORRECTIVE ACTION VERIFIED AND CLEARED			
Signature - NKT representative:		Date:	
Name/Title - NKT representative:			
Signature - CMI representative:		Date:	
Name/Title - CMI representative:			

Appendix H– Equipment Calibration Documentation

Equipment calibration of gyroscope documentation to be submitted upon completion of calibration operations.

Appendix I— Inspection and Test Plans

Material Inspection

Caldwell Marine International 1333 Campus Parkway Wall Township, NJ 07727 732-557-6100	CHPE SUBMARINE CABLE INSTALLATION	Project: CHPE
	INSPECTION & TEST PLAN	Location: NY
	HDD Shore Crossings	Job # 1229 Prime: NKT Inc.

[illegible]

PM-Project Manager, PS-Project Superintendent, PE-Project Engineer, BS-Barge Superintendent, BC-Barge Captain, BM-Beach Master.

Caldwell Marine International 1333 Campus Parkway Wall Township, NJ 07727 732-557-6100	CHPE SUBMARINE CABLE INSTALLATION INSPECTION & TEST PLAN		Project: CHPE
			Location: NY
			Job # 1229
	HDD Shore Crossings		Prime: NKT Inc.

R: REVIEW - document and records shall be available for verification at any time by the QA representative (QAR) / Purchaser Representative (PR).

W: WITNESS - a critical step in installation or testing where it is desirable for the QAR/PR inspect the material/equipment/activity/operation in order to ascertain compliance with the project requirements. The operation may proceed without the presence of the above representatives, as long as they have been informed prior to the start of operations.

H: HOLD - a critical step in installation or testing where it is essential for the QAR/PR inspect the material/equipment/activity/operation in order to certify compliance with the project requirements. The operation may not proceed without the presence of the above representative.

A HOLD point may not be waived unless this has specifically been confirmed in writing.

QA By: Indicates the designated inspector/auditor within the manufacturer/supplier/contractor's organization responsible for the QA activity.

Int: Indicates R/W/H points internal to the Manufacturer/Supplier/Contractor.

Ext:

Code	Description	Code	Description
A	Place where task/activity is to be performed	B	Person to be present for the activity, inspection, audit, witness review, or hold point
	1: At NKT Facility		1: NKT QAR
	2: At installation site		2: BEC Design Representative
	3: At contractor facility		3: 3rd Party Inspector/Consultant
	4: At manufacturer/supplier facility		4: Other customer - end client's representative
	5: Other customer or end-client facility		5: Hold point with no specified external witness
C	Report required by/for	D	Project specific use
	1: NKT QAR		
	2: BEC Design Representative	E	Scope for which the task/activity applies
	3: 3rd Party Inspector/Consultant		F: First piece inspection
	4: Other customer - end client's representative		R: Random check to be determined by the inspector
			S: Sample inspection, as per NKT accepted plan
			X: Full scope

Prepared and submitted by
Caldwell Marine International.

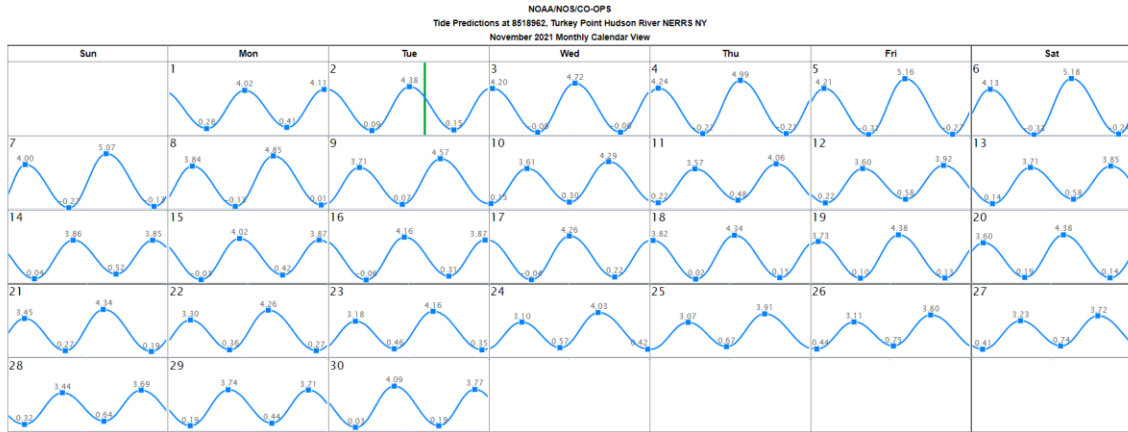
Accepted by:

Received by:

Date:	Date:	Date:
Project Manager: Caldwell Marine Int.	QA Manager - TBD	Project Manager: NKT Inc.

Appendix J– Tidal Forecast

Typical tidal range during a full moon.



TRIMBLE VX SPATIAL STATION

KEY FEATURES

Now available with **Trimble VISION** technology for video robotic control and scene documentation

Surveying, imaging and 3D scanning in **one powerful solution**

Increase your **agility to adapt to any situation**

Create **enhanced 2D and 3D deliverables** for rich information management

Capture and combine scanning, imaging and surveying deliverables with the singular solution designed for surveyors. Integrating the technologies of advanced optical surveying, metric imaging and 3D scanning, the Trimble® VX™ Spatial Station is the only surveying instrument that does it all and does it with ease.

CAPTURE THE SHAPE OF THE REAL WORLD – EVERY DAY

Expectations from surveying customers are evolving. To improve the efficiency of capturing advanced Spatial Imaging deliverables, Trimble provides an integrated solution for bringing these technologies together within the traditional workflows surveyors already use. So you have the flexibility to perform feature-rich scans every day, without the complexity of setting up a separate scanning system or switching to specialized field software.

With the Trimble VX Spatial Station, you can efficiently capture the information you need to create digital terrain models (DTMs), volume calculations, and perform topographic measurements faster than with traditional surveying methods.

HARNESS THE POWER OF TRIMBLE REALWORKS SOFTWARE

Advanced 3D models and image-rendered 3D surfaces are within your reach with the rich data delivered by Trimble Spatial Imaging sensors. With the ability to capture metric images with the Trimble VX in the field, you are also able to make additional measurements and attribute the data back in the office. It's all accessible to surveyors with the Trimble VX and Trimble RealWorks® software. Your clients will immediately see the detail of your work via 3D walkthroughs of the job site using your survey data, images, and scanned information all from the Trimble VX.

VIDEO-ASSISTED CONTROL

Trimble VISION™ gives you the power to see everything the instrument sees. Direct your work with live video images on the controller. Now you are free to capture measurements to prism or reflectorless surface with a point and click.

COMBINE GNSS AND OPTICAL DATA

Take your productivity even further by adopting Trimble Integrated Surveying™ workflows – simply add your GNSS receiver to your robotic rod and powerful Trimble field software will seamlessly take care of the rest. This allows you to collect GNSS and optical data while simultaneously scanning a surface or site. With the built-in imaging and 3D scanning capabilities, you can capture the shape of objects of interest, such as a nearby building or power lines while you perform your traditional survey work.

With the long range capabilities of the Trimble DR Plus EDM, you measure further with fewer instrument set-ups and enhance your scanning performance.



GENERAL SPECIFICATIONS

PERFORMANCE

Scanning (not enabled on all models)

Range ^{1,2}	from 1 m up to 250 m (3.28 ft–820 ft)
Speed ³	up to 15 points/sec, typical 5 points/sec
Minimum point spacing	10 mm (0.032 ft)
Standard deviation	3 mm @ ≤150 m (0.0098 ft @ ≤492 ft)
Single 3D point accuracy	10 mm @ ≤150 m (0.032 ft @ ≤492 ft)
Angle accuracy	.1° (0.3 mgon)
Sensor type	Absolute encoder with diametrical reading
Automatic level compensator	
Type	Centered dual-axis
Accuracy	0.5° (0.15 mgon)
Range	±5.4' (±100 mgon)

Other distance measurement

Accuracy (RMSE)

Prism mode	
Standard	2 mm + 2 ppm (0.0065 ft + 2 ppm)
Standard deviation according to ISO17123-4	1 mm + 2 ppm (0.003 ft + 2 ppm)
Tracking	4 mm + 2 ppm (0.013 ft + 2 ppm)
DR mode	
Standard	2 mm + 2 ppm (0.0065 ft + 2 ppm)
Tracking	4 mm + 2 ppm (0.013 ft + 2 ppm)
Measuring time	
Prism mode	
Standard	1.2 sec
Tracking	0.4 sec
DR mode	
Standard	1–5 sec
Tracking	0.4 sec

Range

Prism mode (under standard clear conditions^{4,5})

1 prism	2,500 m (8,202 ft)
1 prism Long Range mode	5,500 m (18,044 ft) (max. range)
Shortest possible range	0.2 m (0.65 ft)

DR mode

	Good (Good visibility, low ambient light)	Normal (Normal visibility, moderate sunlight, some heat shimmer)	Difficult (Haze, object in direct sunlight, turbulence)
White card (90% reflective) ²	1,300 m (4,265 ft)	1,300 m (4,265 ft)	1,200 m (3,937 ft)
Gray card (18% reflective) ²	600 m (1,969 ft)	600 m (1,969 ft)	550 m (1,804 ft)

Shortest possible range 1 m (3.28 ft)

DR Ranges (typically)

Concrete	600–800 m (1,968–2,624 ft)
Wood construction	400–800 m (1,312–2,624 ft)
Metal construction	400–500 m (1,312–1,640 ft)
Light rock	400–600 m (1,312–1,968 ft)
Dark rock	300–400 m (984–1,312 ft)
Reflective foil 20 mm	1,000 m (3,280 ft)

Extended Range Mode

White Card (90% reflective) ²	2,000–2,200 m
Gray Card (18% reflective) ²	900–1,000 m
Accuracy	10 mm + 2 ppm (0.033 ft + 2 ppm)

ROBOTIC OPERATION

Range⁵

Passive prisms	500–700 m (1,640–2,297 ft)
Trimble MultiTrack Target	800 m (2,625 ft)

Autolock pointing precision at 200 m (656 ft) (Standard deviation)⁵

Passive prisms	<2 mm (0.007 ft)
Trimble MultiTrack Target	<2 mm (0.007 ft)

Shortest search distance 0.2 m (0.65 ft)

Type of radio internal/external 2.4 GHz frequency-hopping, spread-spectrum radios

Search time (typical)⁶ 2–10 sec

GENERAL SPECIFICATIONS

SYSTEM SPECIFICATIONS

Leveling	
Circular level in tribrach	8/2 mm (8/0.007 ft)
Electronic 2-axis level in the LC-display with a resolution of	0.3" (0.1 mgon)
Servo system	MagDrive servo technology, integrated servo/angle sensor electromagnetic direct drive
Rotation speed	115 degrees/sec (128 gon/sec)
Rotation time Face 1 to Face 2	2.6 sec
Positioning speed 180 degrees (200 gon)	2.6 sec
Clamps and slow motions	Servo-driven, endless fine adjustment
Centering	
Centering system	Trimble 3-pin
Optical plummet	Built-in optical plummet
Magnification/shortest focusing distance	2.3x/0.5 m to infinity (1.6 ft to infinity)
Telescope	
Magnification	30x
Aperture	40 mm (1.57 in)
Field of view at 100 m (328 ft)	2.6 m at 100 m (8.5 ft at 328 ft)
Shortest focusing distance	1.5 m (4.92 ft) to infinity
Illuminated crosshair	Variable (10 steps)
Autofocus	Standard
Camera	
Chip	Color Digital Image Sensor
Resolution	2048 x 1536 pixels
Focal length	23 mm (0.07 ft)
Depth of field	3 m to infinity (9.84 ft to infinity)
Field of view	16.5° x 12.3° (18.3 gon x 13.7 gon)
Digital zoom	4-step (1x, 2x, 4x, 8x)
Exposure	Automatic
Brightness	User-definable
Contrast	User-definable
Image storage	Up to 2048 x 1536 pixels
File format	JPEG
Compression ratio	User-definable
Video streaming ⁷	5 frames/sec
Operating temperature	-20 °C to +50 °C (-4 °F to +122 °F)
Dust and water proofing	IP55
Power supply	
Internal battery	Rechargeable Li-Ion battery 11.1 V, 4.4 Ah
Operating time ⁸	
One internal battery	Approx. 5 hours
Three internal batteries in multi-battery adapter	Approx. 15 hours
Robotic holder with one internal battery	Approx. 12 hours
Weight	
Instrument	5.25 kg (11.57 lb)
Trimble CU controller	0.4 kg (0.88 lb)
Tribrach	0.7 kg (1.54 lb)
Internal battery	0.35 kg (0.77 lb)
Trunnion axis height	196 mm (7.71 in)
Communication	USB, Serial, Bluetooth ^{®9}
Security	Dual-layer password protection

EDM SPECIFICATIONS

Light source	Pulsed Laser diode 905 nm; Laser class 1
Laser pointer coaxial	Laser class 2
Beam divergence Prism mode	
Horizontal	4 cm/100 m (0.13 ft/328 ft)
Vertical	8 cm/100 m (0.13 ft/328 ft)
Beam divergence DR mode	
Horizontal	4 cm/100 m (0.13 ft/328 ft)
Vertical	8 cm/100 m (0.13 ft/328 ft)
Atmospheric correction	-130 ppm to 160 ppm continuously

- Leica RTK DGPS



Appendix L– Equipment Specifications

ENVIRONMENTAL CROSSINGS, INC. RIG NO. 7

AMERICAN AUGERS DD-210 (1999) EQUIPMENT LIST



American Auger DD-210

AMERICAN AUGERS DD-210:

RATED TO 210K PUSH AND PULL
RATED TO 30K TWO SPEED ROTARY TORQUE
3306 CAT POWERED
CONTROLS SAUER SUNSTRAND JOYSTICKS
OPEN BREAK OUT TRAVEL VISES
ROTARY BRAKES
HYDRAULIC OIL HEAT EXCHANGER
TRAILER LOW BOY (45 FT) PERMIT LOAD
HYD. 8,000 LB CAPACITY CRANE

ECI MUD SYSTEM:

ECI DESIGN AND BUILT
147 BBL CAPACITY
3406 CAT POWERED
285 KW GENERATOR
3 - 5" X 6" (50 HP) CHARGE AND MIXING PUMP
DE-SILTERS (1000 GPM)
DE-SANDERS (1000 GPM)
LINEAR THREE PANEL SHAKERS
3 - 3.5' X 7.5' SCALPER, DESANDER, DESILTER SHAKERS
200 GALLON FUEL CAPACITY
TRAILER MOUNTED (48 FT) NON PERMIT LOAD



Mud System

ECI MUD PUMP: ELLIS WILLIAMS 446 MUD PUMP (CAPACITY 460 GPM)
 DROPDECK TRAILER
 POWERED BY 3406 CAT
 REMOTE CONTROL CONSOLE
 FUEL CAPACITY 400 GAL.
 MISC. MUD LINES

CONTROL UNIT: ECI. BUILT 10' FT X 8 FT CONTROL UNIT
 MOUNTED SAUER SUNSTRAND DRILLER CONTROLS
 STEERING EQUIPMENT

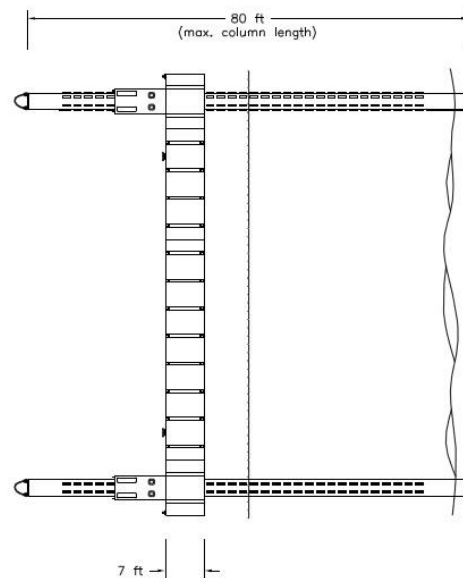
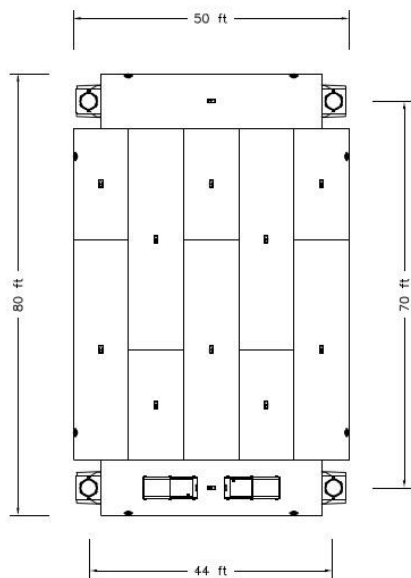
TOOL VAN: 20'X 8' CONTAINER
 LUFKIN FLATBED TRAILER (40 FT)

MISCELLANEOUS EQUIPMENT:
 TENSOR STEER PROBE (SUPER PROBE)
 2-30 FT MONEL DRILL COLLARS
 JETTING ASSEMBLIES
 ASSORTED FLY CUTTERS (REAMERS)
 ASSORTED BARREL REAMERS
 9000 FT S-135 (19.5 LB PER FT) **NEW DRILL PIPE**
 PIPE TRAILERS
 FLAT MUD HOSE (1500 FT) AND CAM LOCK FITTINGS
 EXTRA HYD HOSES AND FITTINGS
 EXTRA HYD PUMPS AND FITTINGS
 EXTRA HYD MOTORS AND FITTINGS
 SUBS
 TONGS
 HAND TOOLS
 MISC SPARE PARTS: PUMP, HYD
 (ESTIMATED \$30K SPARES)
 WELDER/UTILITY TRUCK (CREW CAB) CHEVY
 ¾ TON EXT. CAB TRUCK
 6" CENTRIFUGAL PUMP GORMAN-RUPP
 4" CENTRIFUGAL PUMP GORMAN-RUPP

ALL ENVIRONMENTAL CROSSINGS' EQUIPMENT IS MAINTAINED IN EXCELLENT OPERATIONAL AND COSMETIC CONDITION.



Flexi-Float Jack Up Barge



- Series S-70 Equipment**
- 7 Quadrafloats, 40' x 10' x 7'
 - 5 Duofoats, 20' x 10' x 7'
 - 4 Elevating Spud Wells, 36" dia.
 - 4 Elevating Columns, 80' x 36" dia.
 - 2 Hyd. Pumping Units, 115 hp
 - 16 Hyd. Hose HP, 30' length
 - 8 Hyd. Hose LP, 30' length
 - 8 Deck Cleats

WARNING: The use of Flexi-Float equipment requires competent personnel and the application of engineering principles. The improper use, operation, modification, maintenance or repair of Flexi-Float equipment can be dangerous and result in property damage, injury or death. Contact Robishaw Engineering, Inc. (REI) or other qualified personnel for assistance prior to use. REI offers its engineering services free of charge to all Flexi-Float users. Equipment used on or with Flexi-Float barges must have the manufacturer's approval for use in marine applications.

PROPERTY OF ROBISHAW ENGINEERING, INC.
This drawing is confidential and contains trade secrets and other information proprietary to REI. Disclosure to you is expressly conditional upon your signed acknowledgment that it is not to be copied, reproduced or utilized in other parties, without consent, but is to be used only with reference to contracts or proposals of this company. If or any system thereof shall be returned promptly upon request.

Robishaw Engineering, Inc.
Houston, Texas 800.777.1756
www.flexifloat.com
Flexifloat Self-Elevating Platform Assembly
DRAWN: SS DATE: 06/06/16 SKETCH NO: I-7300CA

Flexi-Float Jack Up Barge Configuration

**ECI Drilling International, LLC
RIG NO. 9**

**ECI 330,000 LB RIG (1999)
EQUIPMENT LIST**



ECI DD-330

**Manufactured By:
AMERICAN AUGERS DIRECTIONAL DRILL:**

THRUST - PULL BACK FORCE: 476,139 FT. LBS OF FORCE AT 6,000-PSI MAXIMUM HYDRAULIC PRESSURE.

ROTARY TORQUE: 50,419 FT LBS OF FORCE AT 4,500-PSI MAXIMUM HYDRAULIC PRESSURE.

RACK AND PINION THRUST/PULLBACK, TWO PINION DRIVE PIPE SUPPORTS, HYDRAULICALLY OPERATED

INDEPENDENT CONTROLS AND HYDRAULIC CIRCUITS FOR THRUST/PULLBACK, TORQUE AND AUXILIARY OPERATIONS PERMITS SIMULTANEOUS FULL POWER OPERATION.

ADJUSTABLE TORQUE LIMITER FOR ROTARY AND MAKE UP FORCE.

CATERPILLAR DIESEL POWER

ADJUSTABLE FORCE LIMITER FOR THRUST AND PULLBACK

WRENCH/CLAMP SEPARATION 0-12 INCHES (0-305 MM)

TRAVELS FULL LENGTH OF RACK

TRAILER MOUNTED ON AIR RIDE SUSPENSION, HIGH LEGAL LOAD.

WIRELINE COMMUTATOR FOR SPEEDY HOOKUP WIRELINE GUIDANCE EQUIPMENT WITH TERMINALS AT DRILL CONSOLE.

ESILOK LOCKOUT SYSTEM.

DRILLER'S CABIN WITH HEAT AND AIR CONDITIONING.



Mud System

ECI MUD SYSTEM:

E.C.I. DESIGN AND BUILT
 200 BBL CAPACITY
 3408 CAT POWERED
 ALLISION TRANSMISSION (5 SPEED)
 5 4" X 5" (50 HP) CHARGE AND MIXING PUMPS
 ELLIS WILLIAMS 446 MUD PUMP (CAPACITY 460 GPM)
 DE-SILTERS (1000 GPM)
 DE-SANDERS (1000 GPM)
 4 LINEAR TWO PANEL SHAKERS
 150 GALLON FUEL CAPACITY
 TRAILER MOUNTED (52 FT) NON PERMIT LOAD

DRILL PIPE: 31 FT AVG. S135 5" DRILL PIPE PREMIUM DOUBLE WHITE
 4 ½ I.F. CONNECTION

CONTROL UNIT: WITH HEAT AND AIR CONDITIONING, POWER DISTRIBUTION
 PANEL WITH CIRCUIT BREAKERS, SURVEYOR'S TABLE.
 EXTERIOR STEEL SIDING. INSULATION 3-1/2" IN WALLS.
 EXTRA LARGE WINDOWS WITH VANDALISM SHIELDS. LIFTING
 EYES FOR JOB SITE MOBILITY.

TOOL VAN: 20' CONTAINER
 AIR COMPRESSOR
 MECHANICS SHOP
 PARTS HOUSE

ROTARY DRIVE: PINION AND GEAR DRIVE INFINITY VARIABLE TORQUE.
 50,419 FT-LB (65,000 NM) @ 0-45 RPM ROTARY (HIGH
 TORQUE). 24,000 FT-LB (32,000 NM) @ 0-90 RPM ROTARY LOW
 TORQUE.
 90 RPM MASIMUM ROTARY SPEED.

CARRIAGE DRIVE: MAXIMUM THRUST/PULLBACK - 476,139 FT-LBS AT 6,000 PSI
MAXIMUM HYDRAULIC PRESSURE. RACK AND PINION, TWO
PINION DRIVE, WITH ADJUSTABLE FORCE LIMITER CARRIAGE
SYSTEM. 150 FT (45.7 M)/MIN MAXIMUM CARRIAGE SPEED.

PROTECTIVE EQUIPMENT:

DRILL COMES WITH SAFETY MATS AND ELECTRICAL
GROUNDING RODS. A ZAP-ALERT SYSTEM IS STANDARD
EQUIPMENT. EMERGENCY SHUT DOWN SWITCH AT DRILLER"
CONSOLE AND AT REMOTE CONTROL CONSOLE. CARRIAGE
OVER RIDE SWITCH DISABLES CARRIAGE DURING WIRELINE
HOOKUP, MAINTENANCE, ETC. DRILL IS EQUIPPED WITH
ESLOK EXIT SIDE LOCKOUT SYSTEM.

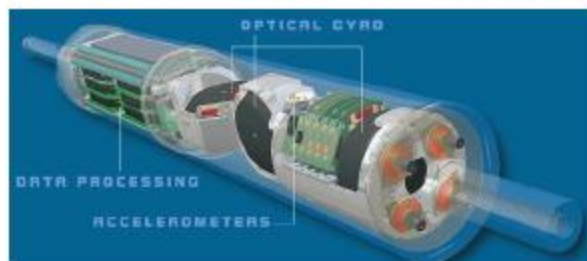
MISCELLANEOUS EQUIPMENT:

TENSOR STEER PROBE (SUPER PROBE)
2-30 FT MONEL DRILL COLLARS
JETTING ASSEMBLIES
ASSORTED FLY CUTTERS (REAMERS)
ASSORTED BARREL REAMERS
9000 FT S-135 (19.5 LB PER FT) NEW DRILL PIPE
PIPE TRAILERS
6" CENTRIFUGAL SUMP PUMP

MISCELLANEOUS EQUIPMENT CONTINUED:

FLAT MUD HOSE (1500 FT) AND CAM LOCK FITTINGS
EXTRA HYD HOSES AND FITTINGS
EXTRA HYD PUMPS AND FITTINGS
EXTRA HYD MOTORS AND FITTINGS
SUBS
PIPE TONGS
HAND TOOLS
MISC SPARF, PARTS: PUMP, HYD
(ESTIMATED \$30K SPARES)
CHEVY PICK UP (E.C.I. CREW CABS)
CHEVY PICKUP (WELDING TRUCK)
CATERPILLAR 3412 12-CYLINDER TURBO DIESEL, ENGINE
AFTERCOOLED. RATED 740 HP (552 KW) CONTINUOUS DUTY.
300 U.S. GALLON (1135 LITRES) FUEL CAPACITY.
TRIAXLE TRAILER WITH AIR RIDE SUSPENSION, FIFTH WHEEL
HITCH. [APPROXIMATE SHIPPING WEIGHT: 81,500 LB (37.00
KG).
WEIGHT WITHOUT WRENCHES: 74,650 LB (33,890 KG)].

**ALL ECI EQUIPMENT IS MAINTAINED IN EXCELLENT
OPERATION AND COSMETIC CONDITION.**



Technical Specifications –

Tool OD	6-5/8-inches	*	8-1/2-inches
API Tool Joint Connection (Box Up x Pin Down)	4-1/2 IF	*	6-5/8 FH
Maximum Allowed Torque (on Tool Housing)	18,000-ftlb	*	22,000-ftlb
Maximum Allowed Push/Pull (on Tool Housing)	75,000-pounds	*	105,000-pounds
Hole Size	8-1/2 – 9-7/8	*	10-5/8 – 12-1/4
Tool Weight	750-lbs	*	1,200-lbs
Tool Length (Shoulder to Shoulder)	8.7-ft		
Annular Pressure Sensor Position (From Pin Shoulder)	8.0-ft		
Electric Power (Input on Surface)	110-Volts AC / 60 Hz		
Electric Power (Output to Downhole Tool)	48 or 56-Volts DC		
Maximum Allowed Temperature (on Tool)	150-f		
Maximum Allowed Shock (on Tool)	50-g (half sine wave)		
Maximum Allowed Vibration (on Tool)	20-g up to 200-Hz		
Maximum Allowed Inner Mud Pressure (on Tool)	1250-psi		
Maximum Allowed Side Load (on Tool Housing)	33,000-pounds		

Sensor(s) Accuracy –

Azimuth	0.04°
Inclination	0.01°
Tool Face	0.02°

Tool Joint Recommended Makeup Torque –

6-5/8 GST	Housing = 18,000-ftlb	4-1/2 API Regular = 21,000-ftlb	4-1/2 API IF = 22,000-ftlb
8-1/2 GST	Housing = 22,000-ftlb	6-5/8 API Regular = 50,000-ftlb	6-5/8 API FH = 66,000-ftlb

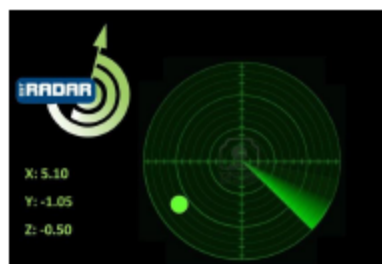
For additional information - <http://www.drillguide.com>



RADAR INTERSECT ASSEMBLY

The Drillguide GST guidance system is now expanded with the RADAR system. With this new system directly behind the GST it's possible to drill from both sides to make an underground intersect.

When the assemblies approach each other, the RADAR systems are activated. The systems determine their position relative to each other within tenths of feet. This makes it possible to drill one system to the borehole of the other, until the intersect is completed and both trajectories match.



Technical Specifications –

Tool OD	6-5/8-inches	*	8-1/2-inches
API Tool Joint Connection (Box Up x Pin Down)	4-1/2 IF	*	6-5/8 FH
Maximum Allowed Torque (on Tool Housing)	18,000-ftlb	*	22,000-ftlb
Maximum Allowed Push/Pull (on Tool Housing)	75,000-pounds	*	105,000-pounds
Hole Size	8-1/2 – 9-7/8	*	10-5/8 – 12-1/4
Tool Weight	750-lbs	*	1,200-lbs
Tool Length (Shoulder to Shoulder)	8.7-ft		
Electric Power (Input on Surface)	110-Volts AC / 60 Hz		
Electric Power (Output to Downhole Tool)	48 or 56-Volts DC		
Maximum Allowed Temperature (on Tool)	150-f		
Maximum Allowed Shock (on Tool)	50-g (half sine wave)		
Maximum Allowed Vibration (on Tool)	20-g up to 200-Hz		
Maximum Allowed Mud Pressure (on Tool)	650-psi		
Maximum Allowed Side Load (on Tool Housing)	33,000-pounds		

Tool Joint Recommended Makeup Torque –

6-5/8 GST	Housing = 18,000-ftlb	4-1/2 API Regular = 21,000-ftlb	4-1/2 API IF = 22,000-ftlb
8-1/2 GST	Housing = 22,000-ftlb	6-5/8 API Regular = 50,000-ftlb	6-5/8 API FH = 66,000-ftlb

For additional information - <http://www.drillguide.com>

Behrens and Associates, Inc.

Environmental Noise Control



ECI Drilling Intl.

April 20, 2017


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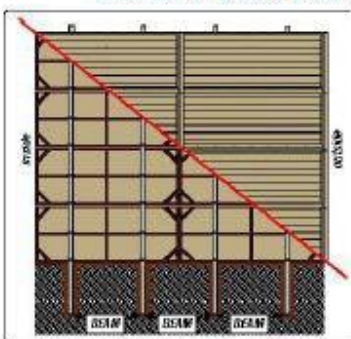
Attachment 2 – Product Specification Sheet



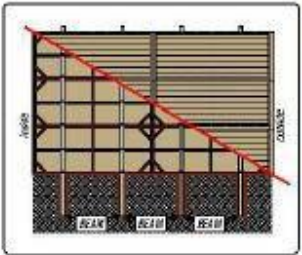
Behrens and Associates, Inc.
Environmental Noise Control



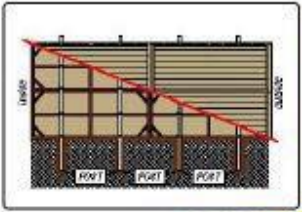
**TEMPORARY ACOUSTICAL
NOISE BARRIER SOUND WALLS**

TEMPORARY SOUND WALL SYSTEMS FROM 6 to 40 FEET HIGH

ENVIRONMENTAL
NOISE CONTROL, INC.

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www.environmental-noise-control.com







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Denver, Colorado ~ Mead, Colorado ~ Washington, Pennsylvania ~ Calgary, Alberta, Canada
Phone 800-679-8633 ~ Fax 310-331-1538
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Behrens and Associates, Inc.

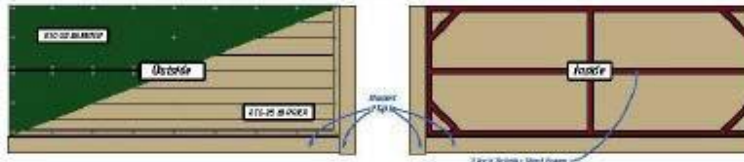
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Attachment 2 – Product Specification Sheet (Continued)



ENC Style Temporary Noise Barrier sound wall systems are designed to provide optimum sound control in blocking and absorbing unwanted noise. At the heart of our sound wall systems are our ENC acoustical noise barrier blankets which are manufactured using state-of-the-art acoustical composite materials. The sound blankets are fabricated with polyvinyl-chloride coated outer shells, two layers of noise absorbing and blocking material, a specially developed inner core and septum barrier.

The modular design of ENC's temporary sound wall systems allow for quick and easy delivery, installation and removal of the temporary noise wall while meeting or

exceeding structural code design requirements. The modular design of the temporary noise walls allows us to install noise barrier walls with heights ranging from 8 foot high to 40 foot high with gates, doors and emergency exits.

An independent acoustical laboratory has conducted tests in accordance with ASTM E-90 and ASTM E-413 requirements, to measure sound transmission loss and validating the Sound Transmission Class rating of STC-25 and STC-32.

The ENC composite banded/absorber blankets, which are laboratory tested and certified, meet or exceed the specifications in the following tables:

BARRIER BLANKET SPECIFICATIONS

UV resistant, UV resistant and anti-fungal, self-drying Polyvinyl-chloride outer shells

Flame retardant to California Fire Marshal E-413.0.1 specifications

Conforms to California Construction Codes

After flame: 2 seconds

Length of clear: 3.5

Working temperature:

-40°F to +200°F

Sound Transmission Class rated at STC-25 and STC-32 in accordance with ASTM E-413

SOUND TRANSMISSION LOSS DATA (dB)

1/3 Octave Band Center Frequency	63 Hz	80 Hz	100 Hz	125 Hz	160 Hz	200 Hz	250 Hz	315 Hz	400 Hz	500 Hz	
Transmission Loss	8 dB	10 dB	11 dB	10 dB	7 dB	7 dB	13 dB	17 dB	23 dB	28 dB	STC 25
1/3 Octave Band Center Frequency	63 Hz	80 Hz	100 Hz	125 Hz	160 Hz	200 Hz	250 Hz	315 Hz	400 Hz	500 Hz	
Transmission Loss	33 dB	30 dB	39 dB	41 dB	41 dB	40 dB	41 dB	44 dB	40 dB	50 dB	STC 32
1/3 Octave Band Center Frequency	63 Hz	80 Hz	100 Hz	125 Hz	160 Hz	200 Hz	250 Hz	315 Hz	400 Hz	500 Hz	
Transmission Loss	16 dB	20 dB	18 dB	16 dB	16 dB	17 dB	20 dB	23 dB	26 dB	32 dB	STC 32
1/3 Octave Band Center Frequency	63 Hz	80 Hz	100 Hz	125 Hz	160 Hz	200 Hz	250 Hz	315 Hz	400 Hz	500 Hz	
Transmission Loss	14 dB	15 dB	35 dB	36 dB	36 dB	36 dB	37 dB	39 dB	40 dB	48 dB	

PRINCIPAL OFFICES

TEXAS: COLLEGE STATION, TEXAS
(800) 679-8633
INTERNATIONAL: +1 310 679-28 27

SATELLITE OFFICES

FLORIDA: MIAMI, FLORIDA
LOUISIANA: NEW ORLEANS, LOUISIANA
CALIFORNIA: LOS ANGELES, CALIFORNIA

WEBSITE: www.environmental-noise-control.com

ENVIRONMENTAL NOISE CONTROL, INC.

For more information on applications or any of our quality products and services that we offer, please see our web site or call and speak to one of our ENC representatives. Rapid deployment to US and International.

Hawthorne, California ~ Aledo, Texas ~ Napa California ~ Shreveport, Louisiana
 Denver, Colorado ~ Mead, Colorado ~ Washington, Pennsylvania ~ Calgary, Alberta, Canada
 Phone 800-679-8633 ~ Fax 310-331-1538
www.environmental-noise-control.com ~ www.drillingnoisecontrol.com

Appendix M– Marine Traffic Management Plan

CHPE SUBMARINE CABLE INSTALLATION Marine Traffic Management Plan

Notice to Mariners

Prior to the start of operations CMI will issue a Notice to Mariners to the following agencies:

- Port Authority
- Vessel Traffic Control (VTC)
- US Coast Guard

The Notice to Mariners will include the following information:

- Vessels and equipment on site
- Work areas
- VHF contact channels for project vessels
- Nature of the work
- Identification and position of temporary can buoys at anchor locations

At the completion of the project an ending notice will be sent to the above agencies.

Automatic Identification System (AIS)

The support tug and the lay barge will both be equipped with AIS systems registered to each individual vessel.

Marine Communications

During the cable installation the support tug will be on the site at all times, and will be responsible for communication with other marine traffic and the VTC. At a minimum, daily reports will be made to the VTC regarding the schedule and nature of planned activities.

The support tug will maintain a radio watch on VHF Channels 16, 13, and the project working channel. The lay barge will maintain a radio watch on the working channel.

Ferries

Ferries will be advised daily of activities along the job site. Radio contact will be established with the ferries prior to crossing the ferry traffic lanes.

Appendix N– HDD Plan and Profile/Site Access Plan

CHAMPLAIN HUDSON POWER EXPRESS PUTNAM STATION, CEMENTON, AND CONGERS HDD PLAN & PROFILE DRAWINGS

PROPERTY OWNER TABLE

LOCATION	LANDS NOW OR FORMERLY OF	BOOK, PAGE NO.	TAX MAP ID NO.
PUTNAM STATION LAYDOWN AREA	TOWN OF PUTNAM	3114, 323	5.-2-4.6
PUTNAM STATION HDD	DELAWARE & HUDSON RAILWAY CO.	639, 168	9.-1-10
	ROBERT G. ST. ARMOUR	719, 336	13.-3-21.1
CEMENTON HDD	GLENS FALLS LEHIGH CEMENT CO.	923, 221	213.00-2-3
TOMKINS COVE LAYDOWN AREA	SOUTHERN ENERGY LOVETT, LLC	NA	10.04-2-7
CONGERS HDD	ISABELLA ROSE REALTY LLC	NA	44.12-2-44
	PALISADES INTERSTATE PARK COMMISSION	739, 1165	44.08-1-8
		741, 554	45.09-1-2
		741, 561	45.05-1-2
		NA	45.05-1-1

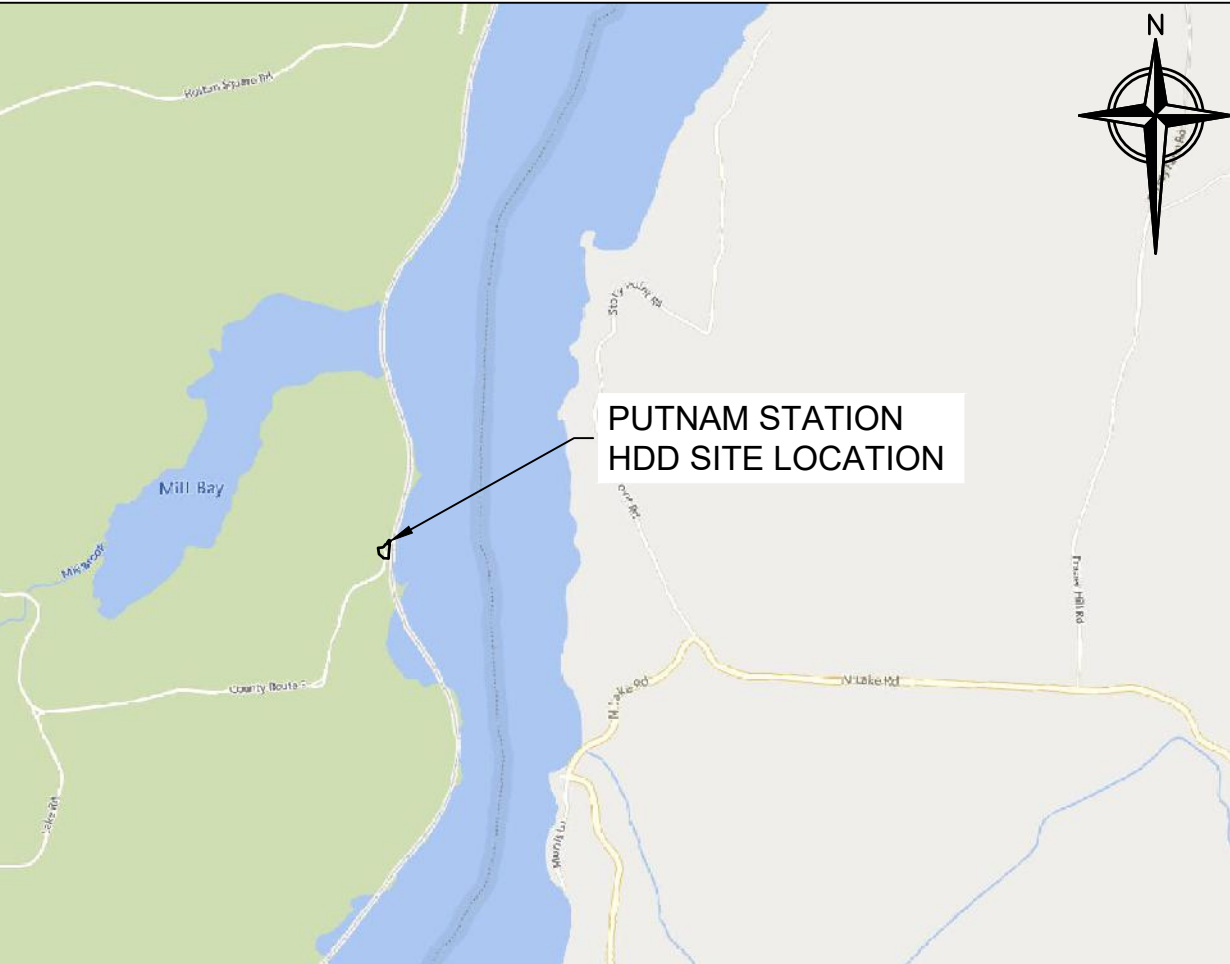
PREPARED FOR:
CALDWELL MARINE INTERNATIONAL
1333 CAMPUS PARKWAY
WALL, NEW JERSEY 07753

NOVEMBER 29, 2022

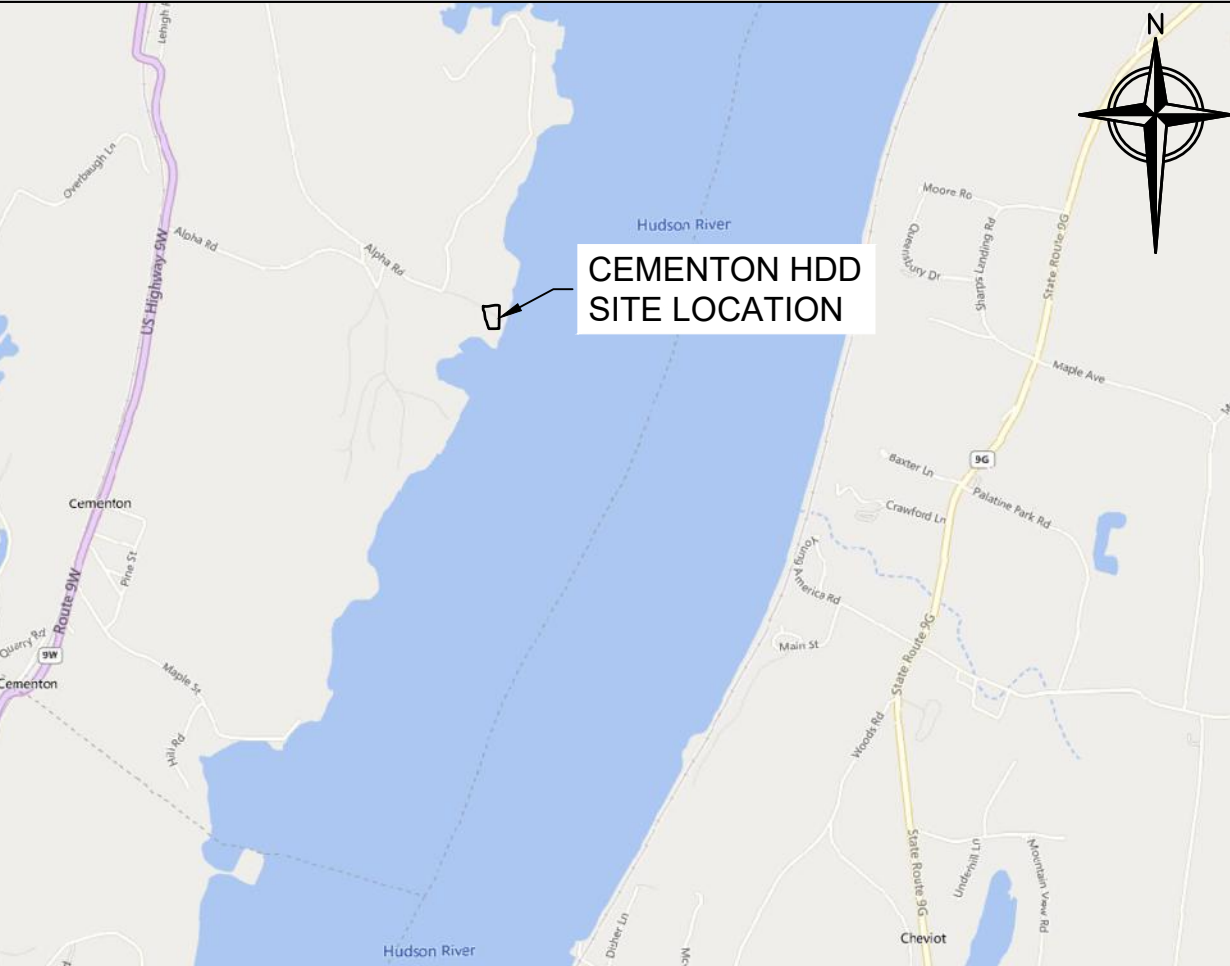
PREPARED BY:



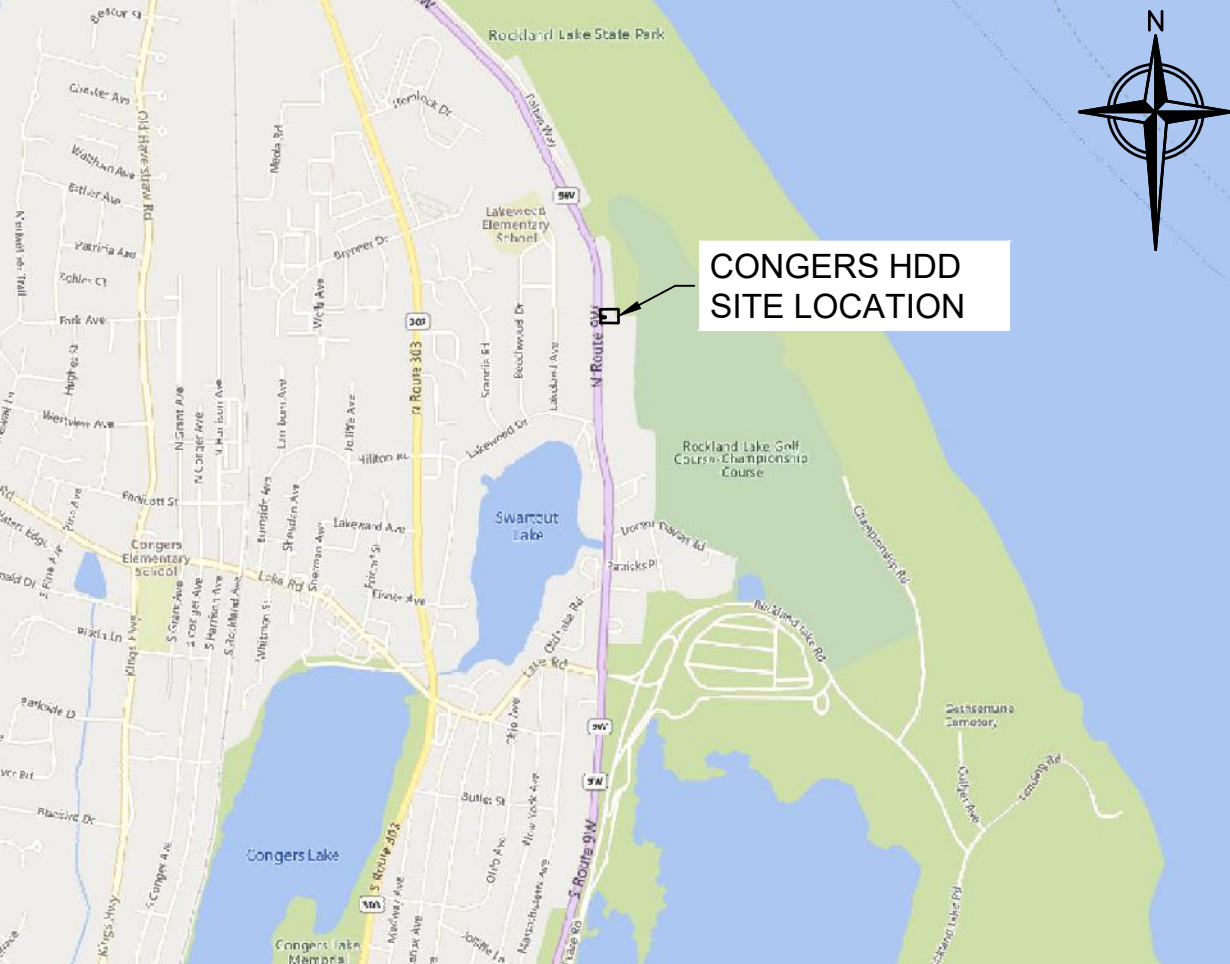
FIRM REGISTRATION NO.:
NY 0010187



PUTNAM STATION, NEW YORK LOCATION MAP SCALE 1"=2000'



CEMENTON, NEW YORK LOCATION MAP SCALE 1"=2000'



CONGERS, NEW YORK LOCATION MAP SCALE 1"=2000'



PUTNAM LAYDOWN LOCATION MAP SCALE 1"=2000'



TOMKINS COVE LOCATION MAP SCALE 1"=2000'

DRAWING INDEX

SHEET NUMBER	DRAWING NUMBER	SHEET TITLE
1	-	COVER
2	N-1	NOTES & LEGEND
3	HDD-001	PUTNAM STATION LAYDOWN AREA PLAN
4	HDD-002	PUTNAM STATION HDD 1 PLAN AND PROFILE
5	HDD-003	PUTNAM STATION HDD 2 PLAN AND PROFILE
6	HDD-004	PUTNAM STATION HDD LAYOUT PLAN
7	HDD-005	PUTNAM STATION HDD EQUIPMENT LAYOUT PLAN
8	HDD-006	PUTNAM STATION RAILROAD CROSSING PLAN
9	HDD-007	TOMKINS COVE LAYDOWN AREA PLAN
10	HDD-008	CEMENTON HDD 1 PLAN AND PROFILE
11	HDD-009	CEMENTON HDD 2 PLAN AND PROFILE
12	HDD-010	CEMENTON HDD ACCESS ROAD PLAN
13	HDD-011	CEMENTON HDD LAYOUT PLAN
14	HDD-012	CEMENTON HDD EQUIPMENT LAYOUT PLAN
15	HDD-013	CONGERS HDD 1 PLAN AND PROFILE
16	HDD-014	CONGERS HDD 2 PLAN AND PROFILE
17	HDD-015	CONGERS HDD LAYOUT PLAN
18	HDD-016	CONGERS HDD EQUIPMENT LAYOUT PLAN
19	HDD-017	PUTNAM STATION & CEMENTON CONDUCTOR PIPE/GOAL POST/GRAVITY CELL INSTALLATION
20	HDD-018	CONGERS CONDUCTOR PIPE/GOAL POST/GRAVITY CELL INSTALLATION
21	HDD-019	DETAILS

FOR PERMITTING ONLY

GENERAL NOTES:

1. IT IS THE CONTRACTOR'S RESPONSIBILITY TO COORDINATE ALL NECESSARY CONSTRUCTION NOTIFICATIONS, PERMITS AND ACTIVITIES WITH THE CERTIFICATE HOLDERS PRIOR TO AND DURING CONSTRUCTION.
2. IT IS THE CONTRACTOR'S RESPONSIBILITY TO MAKE NECESSARY ARRANGEMENTS IF TRAFFIC CONTROL PLANS AND/OR RAILROAD REPRESENTATION ARE REQUIRED.
3. CONTRACTOR TO LOCATE, MARK AND POTHOLE FOREIGN LINES AS NECESSARY PRIOR TO EXCAVATION (AND MONITOR DURING DRILLING).
4. CONTRACTOR TO DEVELOP A CROSSING PLAN WITH THE OWNER OF ANY FOREIGN PIPELINE CROSSED WITH DRILLING EQUIPMENT.
5. LOCATIONS OF EXISTING FACILITIES SHOWN ARE APPROXIMATE. CONTRACTOR TO LOCATE AND/OR CONFIRM THE LOCATIONS AND DEPTH OF ALL UTILITIES, PIPELINES OR OTHER OBSTACLES PRIOR TO EXCAVATION. CONTRACTOR TO INFORM ENGINEER OF ANY UTILITY FOUND THAT MAY AFFECT HDD DESIGN.
6. CONTRACTOR TO SUPPORT EXISTING UTILITIES, PIPELINES AND/OR OTHER FEATURES.
7. CONTRACTOR TO GRADE EXCAVATION AREA AND RESTORE TO ORIGINAL CONDITIONS.
8. CONTRACTOR TO CONTACT STATE ONE CALL SYSTEM AT LEAST 72 HOURS PRIOR TO DRILLING.

REFERENCE NOTES

1. AERIAL PHOTOGRAPHY ON PLAN AND PROFILE SHEETS HDD-002, HDD-003, HDD-008, HDD-009, HDD-013, & HDD-014 OBTAINED FROM MICROSOFT CORPORATION BING IMAGERY.
2. BASE PLAN REFERENCES A ROW, UTILITY & WETLAND SURVEY PREPARED IN THE FIELD BY CONTROL POINT ASSOCIATES, INC.
3. BASE PLAN HAS BEEN SUPPLEMENTED WITH INFORMATION PROVIDED BY CALDWELL MARINE, CLOUGH HARBOR ASSOCIATES AND NEW YORK GIS CLEARING HOUSE.
4. LAKE CHAMPLAIN BATHYMETRIC DATA PROVIDED BY OCEAN SURVEYS INC. IN OCTOBER 2022.

























PROJECTION SYSTEM

1. NAD83 / NEW YORK EAST (U.S. SURVEY FEET).














INSTALLATION NOTES:




1. ACCESS: ALL EQUIPMENT MUST ACCESS THE LIMITS THE DISTURBANCE FROM PREVIOUSLY IMPROVED PUBLIC OR APPROVED PRIVATE ROADS.
2. WORK SPACE: LIMITS OF DISTURBANCE ARE DEPICTED HEREIN. LIMITED TREE CLEARING IS REQUIRED FOR PUTNAM STATION HDD OPERATIONS AND VEGETATION REMOVAL WILL BE LIMITED TO PRUNING OF LIMBS AND TRIMMING OF UNDERGROWTH AS NEEDED AROUND THE LIMITS OF THE CEMENTION AND CONGERS HDD OPERATIONS AREA. CLEARING BETWEEN THE ENTRY AND EXIT POINTS IS NOT ANTICIPATED. THE DEBRIS GENERATED FROM THE LIMITED PRUNING OF TREES AND THE TRIMMING OF UNDERGROWTH WILL BE COLLECTED IN A ROLL OFF DUMPSTER AND DISPOSED OF BY A LOCAL LICENSED WASTE DISPOSAL COMPANY.
3. WATER SOURCE: DRILL WATER SHALL BE OBTAINED FROM AN APPROVED SOURCE. THE CONTRACTOR WILL MAKE ARRANGEMENTS TO OBTAIN WATER FROM A LOCAL FIRE HYDRANT. WATER USAGE SHALL BE METERED AND OBTAINED THROUGH AN APPROVED BACK FLOW PREVENTER.
4. SPILL-PREVENTION: THE MOST RECENT VERSION OF THE SPILL PREVENTION PLAN (SPP) IS INCLUDED AS APPENDIX E OF THE CALDWELL MARINE HDD INSTALLATION MANUAL. THE CALDWELL MARINE HDD INSTALLATION MANUAL IS INCLUDED AS APPENDIX F OF THE ENVIRONMENTAL MANAGEMENT AND CONTROL PLAN (EM&CP). ALL REFUELING AND STORAGE IS ADDRESSED IN THE SPP. ALL PUMPS SHALL BE SET IN SECONDARY CONTAINMENT AND IN ACCORDANCE WITH THE SPP. EQUIPMENT AND PUMPS OPERATING WITHIN 100 FEET OF ANY WATER BODY OR WETLAND SHALL BE OPERATED AND REFUELED IN ACCORDANCE WITH THE SPP. EQUIPMENT REFUELING AND STORAGE OF HAZARDOUS MATERIALS, FUELS, ETC. SHALL BE CONDUCTED AT LEAST 100 FEET FROM WATER BODIES AND WETLAND WHERE PRACTICAL. EACH CONSTRUCTION CREW SHALL HAVE ON HAND SUFFICIENT TOOLS AND MATERIALS TO STOP LEAKS AND HAVE SUPPLIES OF ABSORBENT AND BARRIER MATERIALS TO ALLOW RAPID CONTAINMENT AND RECOVERY OF SPILLED MATERIALS.
5. EROSION AND SEDIMENT CONTROL: CONTRACTOR SHALL SUPPLY, INSTALL AND MAINTAIN SEDIMENT CONTROL STRUCTURES IN ACCORDANCE WITH CONTRACT DOCUMENTS. CONTRACTOR SHALL INSTALL ADDITIONAL EROSION CONTROL STRUCTURES AS DIRECTED BY THE ENVIRONMENTAL INSPECTOR OR AS NEEDED TO ENSURE SEDIMENT-LADEN RUNOFF FROM NEWLY DISTURBED AREAS IS PREVENTED FROM FLOWING OUTSIDE THE LIMITS OF DISTURBANCE.
6. MUD DISPOSAL: CONTRACTOR SHALL DISPOSE OF EXCESS DRILLING MUD AS DIRECTED BY THE COMPANY REPRESENTATIVE IN ACCORDANCE WITH PERMIT CONDITIONS. UNDER NO CIRCUMSTANCES SHALL DRILLING FLUID BE DISPOSED OF IN WATER BODIES OR WETLANDS. ANY DRILLING MUD WHICH INADVERTENTLY EXISTS AT POINTS OTHER THAN THE ENTRY AND EXIT POINTS SHALL BE CONTAINED AND COLLECTED TO THE EXTENT PRACTICAL AND DISPOSED OF AS DIRECTED BY THE COMPANY REPRESENTATIVE IN ACCORDANCE WITH PERMIT CONDITIONS. DRILLING MUD WILL BE DISPOSED OF AT CLEAN EARTH NEW JERSEY, IN KEARNY, NJ OR AT AN ALTERNATE APPROVED FACILITY.
7. CLEANUP/STABILIZATION/RESTORATION: ALL DISTURBED AREAS SHALL BE RETURNED TO THE ORIGINAL CONDITIONS. DISTURBED AREAS SHALL BE SEEDD AND TEMPORARY EROSION/SEDIMENT CONTROL DEVICES SHALL BE REMOVED ONCE THE CONTRIBUTING DISTURBED AREAS ARE STABILIZED AND APPROVED BY THE QUALIFIED INSPECTOR. REFER TO THE SEED MIXTURES LISTED IN TABLE 4.4 OF APPENDIX G OF THE STORMWATER POLLUTION PREVENTION PLAN (SWPPP). THE SWPPP IS INCLUDED AS APPENDIX I OF THE EM&CP.
8. CONTRACTOR SHALL USE A GYROSCOPIC DRILL HEAD ON THE PILOT DRILL TO ENSURE ACCURATE EXIT LOCATION WITHIN THE TEMPORARY MODULAR GRAVITY CELLS.

PROPOSED LEGEND

	LOD		LOD		LIMITS OF DISTURBANCE
	SF				SILT FENCE
					LAYDOWN AREA
					PERMITTED DEVIATION ZONE
					TEMPORARY EASEMENT
					HDD CONDUIT
					HDD ENTRY/EXIT POINTS
					GEOTECH BORE HOLE LOCATIONS

EXISTING LEGEND

	EXISTING TREE LINE
	RAILROAD TRACKS
	OVERHEAD WIRES
	UNDERGROUND UTILITY
	DRAINAGE CULVERT
	EXISTING FENCE
	MAJOR CONTOUR
	MINOR CONTOUR
	WETLAND
	100-FOOT WETLAND ADJACENT AREA
	PARCEL BOUNDARIES
	EXISTING NATURAL VEGETATION
	EXISTING UTILITY POLE

				  11-29-22	REFERENCE DRAWINGS			REVISIONS					DRAWING APPROVALS		 <small>FIRM REGISTRATION NO.: NY 0010187</small>				
					DWG. NO.	TITLE	NO.	DESCRIPTION	DATE	DRAWN	CHK	APPR	DRAWN	DATE					
													MMO	11/1/2022					
													CHECKED	DATE		<h3>NOTES & LEGEND</h3>			
													GJR	11/8/2022					
													ENGINEER	DATE					
													KCB	11/29/2022		SCALE	PROJECT NO.	DRAWING NO.	SHT. NO.
																NTS	496182	N-1	2

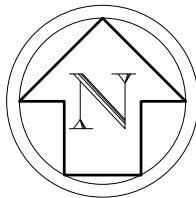
NY 0010187

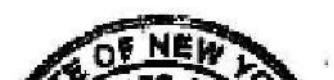


PROPOSED WORK NOTES:

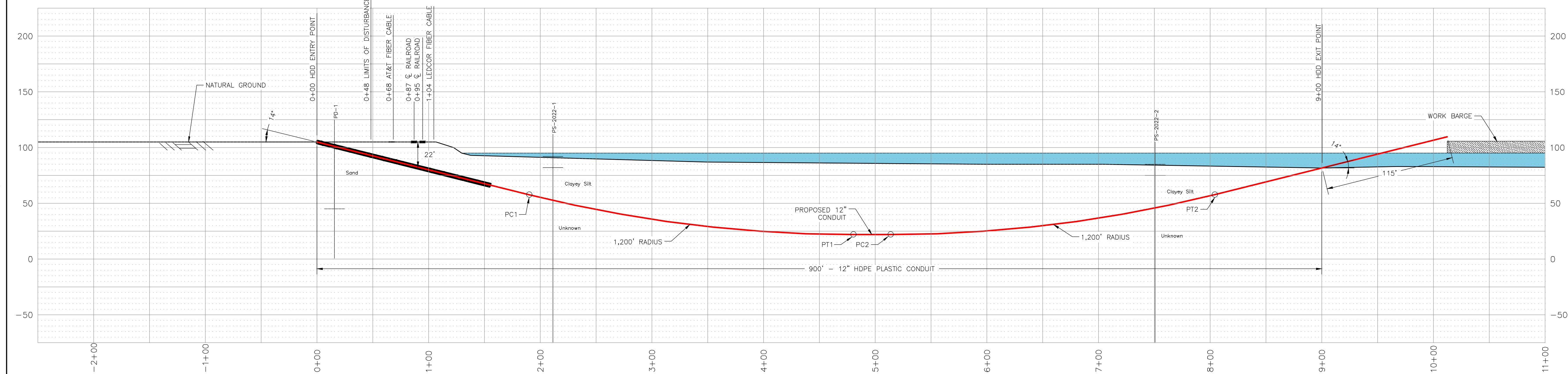
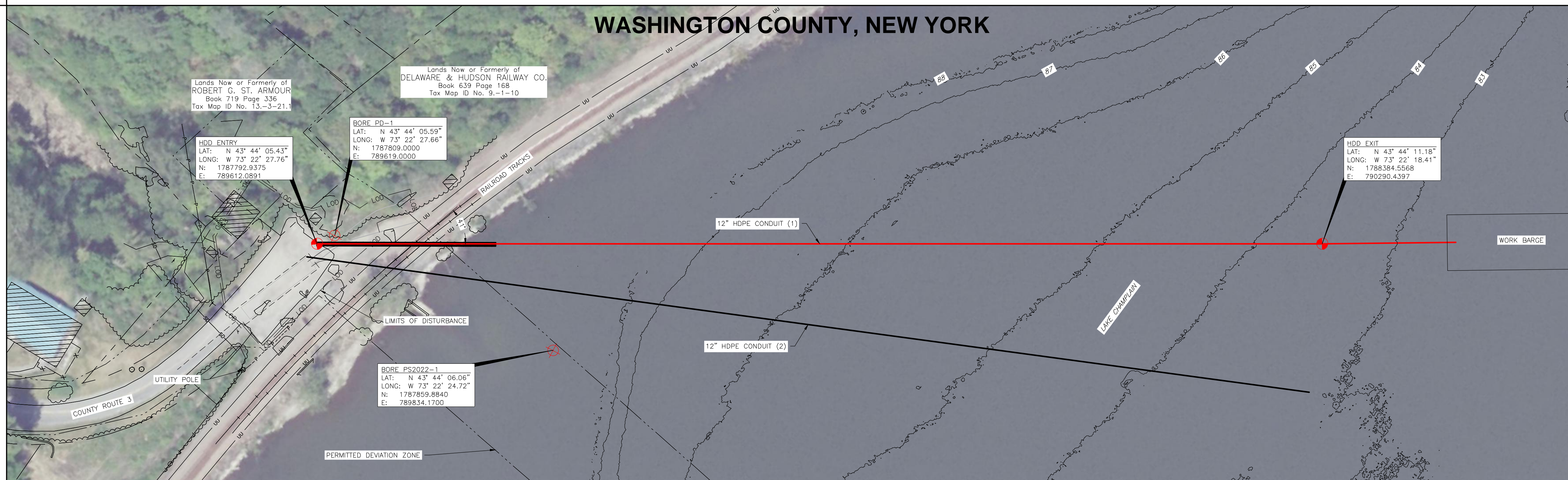
- 1. LAND DISTURBANCE IS NOT ANTICIPATED. AREAS OF AGRICULTURAL FIELD TO BE USED FOR PIPE FUSING OPERATIONS WILL BE COVERED WITH TIMBER MATTING.
- 2. THE EXISTING ACCESS ROAD AND LAYDOWN AREA IS ANTICIPATED TO SUPPORT THE PIPE FUSING OPERATION IN IT'S CURRENT CONDITION. MINOR ACCESS SURFACE IMPROVEMENTS AND INSTALLATION OF ADDITIONAL EROSION CONTROLS WILL BE IMPLEMENTED AS NECESSARY TO PREVENT SEDIMENT-LADEN RUNOFF FROM FLOWING OUTSIDE OF THE LAYDOWN AREA.
- 3. TEMPORARY 'CONSTRUCTION TRAFFIC AHEAD' WARNING SIGNS WILL BE INSTALLED 100- FEET FROM THE EXISTING ACCESS VIA LAPOINTE LANE TO THE TOWN OF PUTNAMS PROPERTY ON BOTH LOWER ROAD APPROACHES. FINAL SIGN TEXT AND LOCATIONS TO BE APPROVED BY THE OWNER AND COORDINATED WITH THE TOWN OF PUTNAM.

REFERENCE NOTES:

- 1. AERIAL PHOTOGRAPHY OBTAINED FROM THE NEW YORK GIS CLEARINGHOUSE, STATEWIDE DIGITAL ORTHOIMAGERY PROGRAM, DATED SEPTEMBER 2017.
- 2. PARCEL DATA OBTAINED FROM NEW YORK GIS CLEARINGHOUSE, DIGITAL MAPS DATABASE, NYS STATEWIDE 2021 PARCEL LAYER, PUBLISHED OCTOBER 2022.
- 3. LIMITS OF LAYDOWN AREA PROVIDED BY CALDWELL MARINE INC. IN SEPTEMBER 2022.



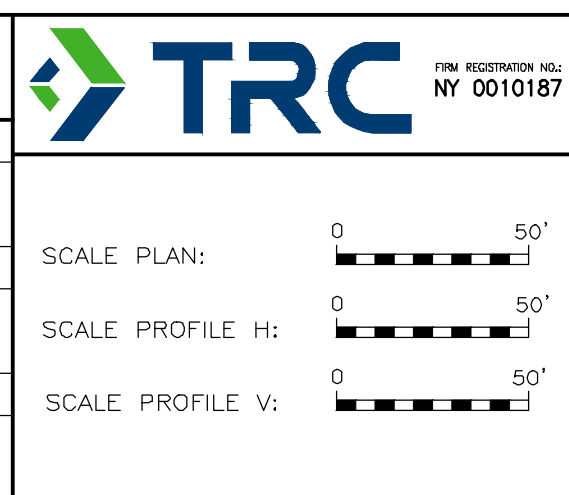
				REFERENCE DRAWINGS		REVISIONS							DRAWING APPROVALS		 <div>TRC PROFESSIONAL ENGINEERING NEW YORK NEW YORK REGISTRATION NO. NY 0010187</div>	PUTNAM STATION LAYDOWN AREA PLAN				
				DWG. NO.	TITLE	NO.	DESCRIPTION	DATE	DRAWN	CHK	APPR.	DRAWN	DATE	SCALE PLAN: 						



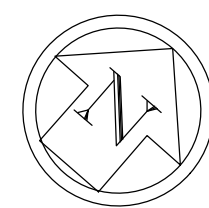
HORIZONTAL DIRECTIONAL DRILL DATA			HORIZONTAL DIRECTIONAL DRILL PARAMETERS	
DESCRIPTION	STA.	ELEV.		
ENTRY ANGLE @ 14"	0+00	106.0'	1.) PIPE: 12.75" O.D. x 1.417" W.T. DESIGN FACTOR:	<u>HDP DR9-IPS</u> <u>0.63</u>
POINT OF CURVATURE (1,200 FT. RADIUS) (PC1)	1+90	57.6'	2.) LENGTH OF CROSSING:	<u>900' HORIZONTAL DISTANCE</u>
POINT OF TANGENCY (PT1)	4+80	22.0'	3.) TYPE OF PIPE JOINT: LENGTH OF PIPE:	<u>BUTT FUSION</u> <u>915' L.C.</u>
POINT OF CURVATURE (1,200 FT. RADIUS) (PC2)	5+13	22.0'	4.) ESTIMATED PULL FORCE: ALLOWABLE PULL FORCE:	<u>9,096 LBS.</u> <u>53,428 LBS.</u>
POINT OF TANGENCY (PT2)	8+04	57.6'	5.) CASING PIPE: 24" O.D. x 0.375" W.T.	<u>STEEL X52</u>
EXIT ANGLE @ 14"	9+00	81.7'		

[illegible]

DRAWING APPROVALS	
DRAWN	DATE
AWF	09/14/22
CHECKED	DATE
GJR	11/29/22
ENGINEER	DATE
KCB	11/29/22



<div style="text-align: center;"> PUTNAM STATION HDD 1 PLAN AND PROFILE </div>			
SCALE	PROJECT NO.	DRAWING NO.	SHT. NO.
1"=50'	496182	HDD--002	4



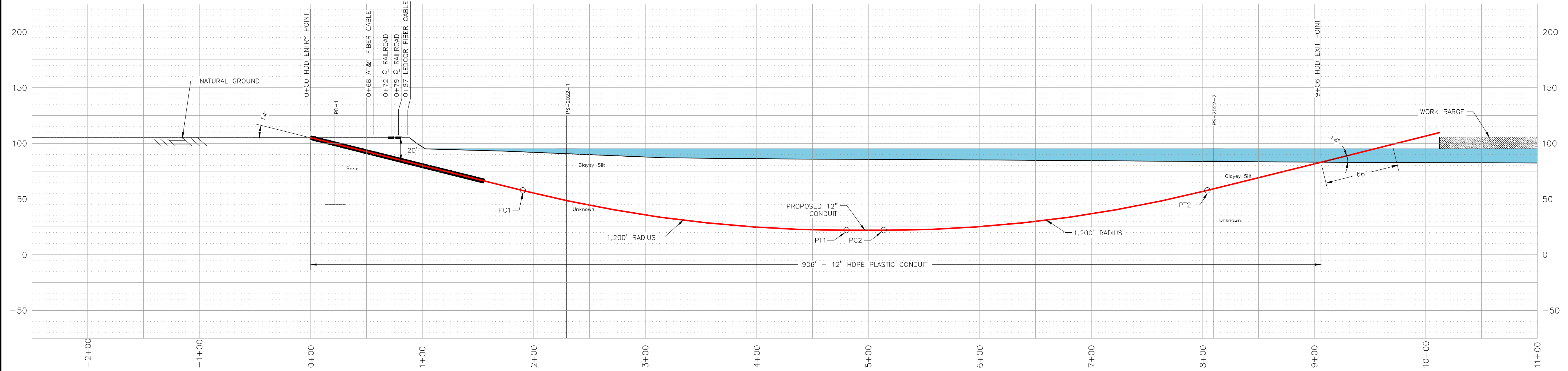
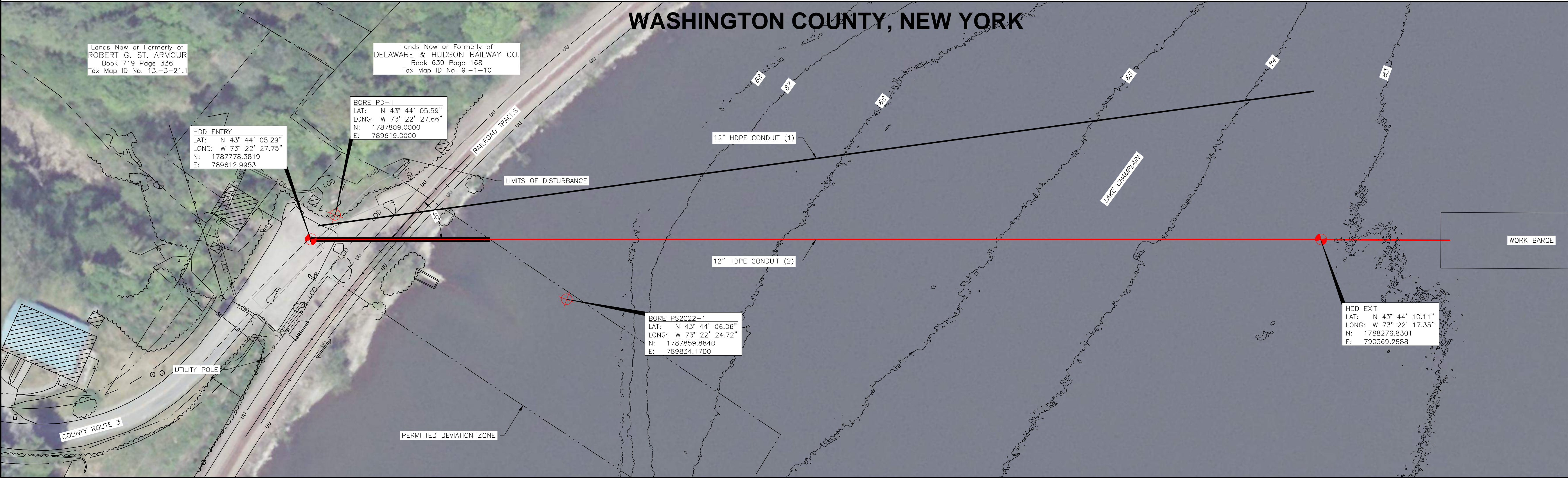
NY 2022-11-29-22 (11/29/22)

PIPE STATIONING

PLAN

PROFILE

0+00 HDD ENTRY POINT
0+68 AT&T FIBER CABLE
0+72 ½ RAILROAD
0+79 ½ RAILROAD
0+87 LEDCOR FIBER CABLE
1+00
3+00
4+00
5+00
6+00
7+00
8+00
9+06 HDD EXIT POINT



HORIZONTAL DIRECTIONAL DRILL DATA		
DESCRIPTION	STA.	ELEV.
ENTRY ANGLE @ 14°	0+00	105.0'
POINT OF CURVATURE (1,200 FT. RADIUS) (PC1)	1+90	57.6'
POINT OF TANGENCY (PT1)	4+80	22.0'
POINT OF CURVATURE (1,200 FT. RADIUS) (PC2)	5+13	22.0'
POINT OF TANGENCY (PT2)	8+04	57.6'
EXIT ANGLE @ 14°	9+06	83.1'

HORIZONTAL DIRECTIONAL DRILL PARAMETERS		
1.) PIPE: 12.75" O.D. x 1.417" W.T. DESIGN FACTOR:	HDPE DR9 IPS 0.63	
2.) LENGTH OF CROSSING:	906' HORIZONTAL DISTANCE	
3.) TYPE OF PIPE JOINT: LENGTH OF PIPE:	BUTT FUSION 921' L.E.	
4.) ESTIMATED PULL FORCE: ALLOWABLE PULL FORCE:	9,096 LBS. 53,428 LBS.	
5.) CASING PIPE: 24" O.D. x 0.375" W.T.	STEEL X52	

REFERENCE DRAWINGS

DWG. NO.	TITLE

REVISIONS

NO.	DESCRIPTION	DATE	DRAWN	CHK	APPR

DRAWING APPROVALS	
DRAWN	DATE
AWF	09/14/22
CHECKED	DATE
GJR	11/29/22
ENGINEER	DATE
KCB	11/29/22

TRC THE TRC GROUP INC. NY 0010187

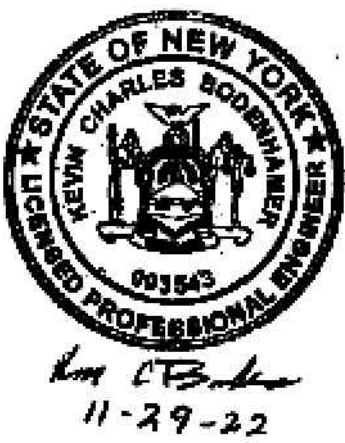
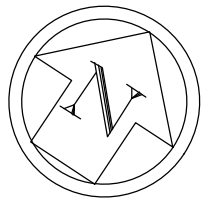
SCALE PLAN:

SCALE PROFILE H:

SCALE PROFILE V:

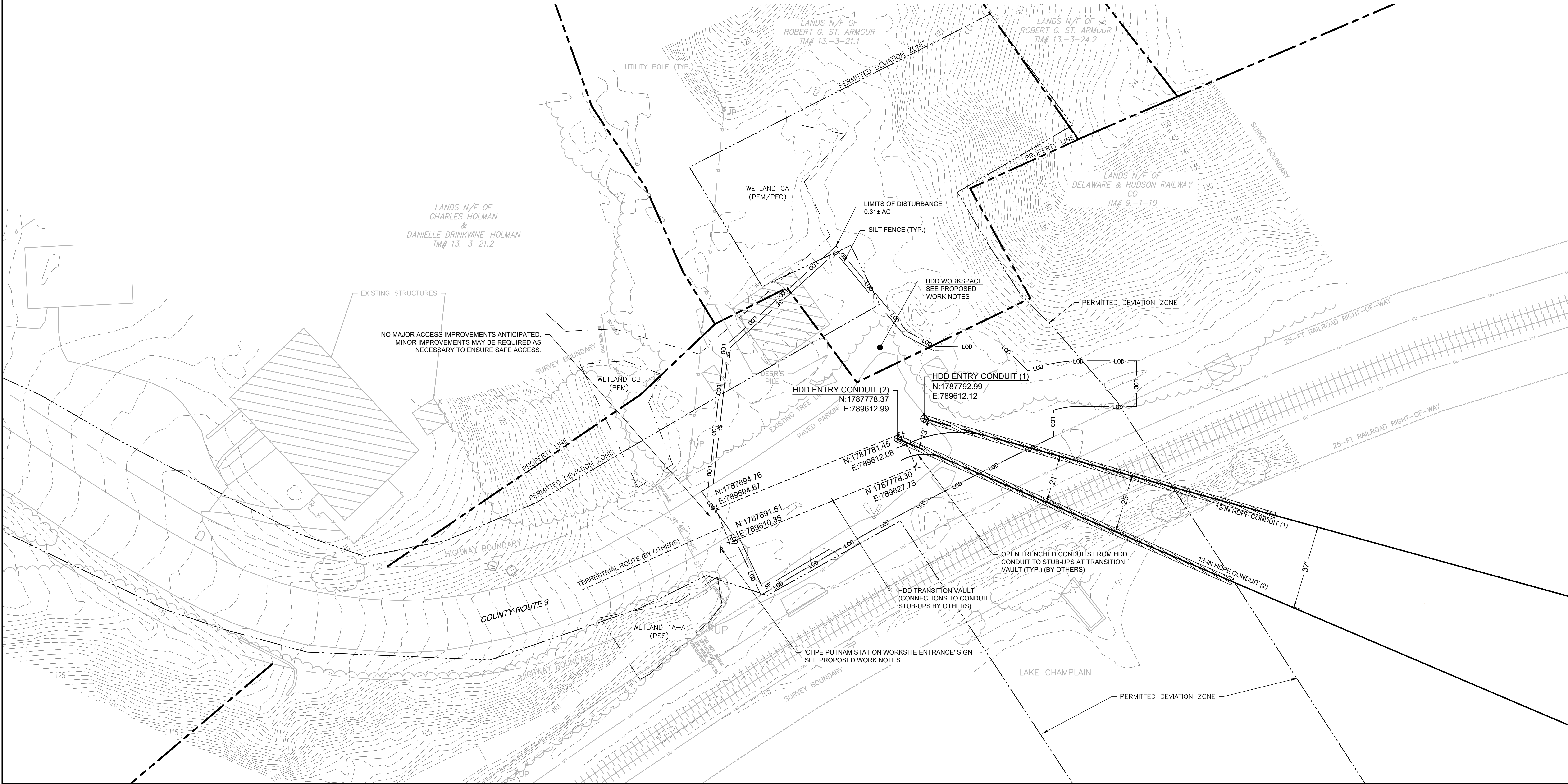
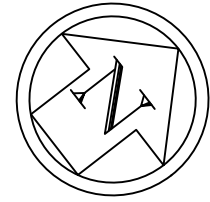
PUTNAM STATION HDD 2
PLAN AND PROFILE



SCALE	PROJECT NO.	DRAWING NO.	SHT. NO.
1"=50'	496182	HDD-003	5

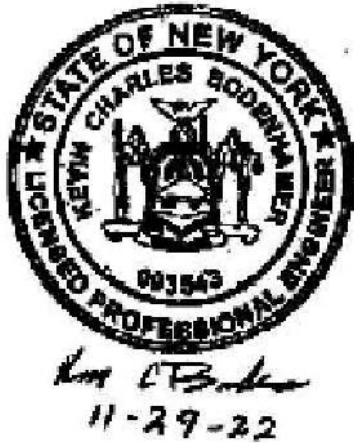


- PROPOSED WORK NOTES:
1. ALL HDD CONSTRUCTION OPERATIONS AND PARKING WILL BE CONTAINED WITHIN THE LIMITS OF DISTURBANCE. SIGNIFICANT LAND GRADING IS NOT ANTICIPATED. VEGETATION REMOVAL IS ANTICIPATED TO BE LIMITED TO THE REMOVAL OF THE TREES WITHIN THE IMMEDIATE VICINITY OF THE BUILDING REMAINS TO THE EAST OF THE PAVED PARKING AREA, PRUNING OF LIMBS AND TRIMMING OF UNDERGROWTH ALONG THE PERIMETER OF THE HDD WORKSPACE, NO HERBICIDE USE IS PERMITTED. ALL DISTURBED AREAS SHALL BE RESTORED AFTER CONSTRUCTION.
 2. NO EXISTING ACCESS IMPROVEMENTS ARE ANTICIPATED. THE PAVED PARKING AREA SHALL BE RE-SURFACED AS NECESSARY TO SUPPORT HDD CONSTRUCTION OPERATIONS AND PREVENT SEDIMENT-LADEN RUNOFF TO FLOW OUTSIDE OF THE LIMITS OF DISTURBANCE.
 3. TEMPORARY 'CONSTRUCTION TRAFFIC AHEAD' WARNING SIGN WILL BE INSTALLED IN THE SHOULDER OF COUNTY ROUTE 3 100- FEET FROM THE END OF THE DOUBLE YELLOW LINE. FINAL SIGN TEXT AND LOCATION TO BE APPROVED BY THE OWNER, DELAWARE AND HUDSON RAILWAY CO, AND COORDINATED WITH WASHINGTON COUNTY.

- REFERENCE NOTES:
1. BASE PLAN REFERENCES A ROW, UTILITY & WETLAND SURVEY PREPARED IN THE FIELD BY CONTROL POINT ASSOCIATES, INC.
 2. BASE PLAN HAS BEEN SUPPLEMENTED WITH INFORMATION PROVIDED BY CALDWELL MARINE, CLOUGH HARBOR ASSOCIATES AND NEW YORK GIS CLEARING HOUSE.

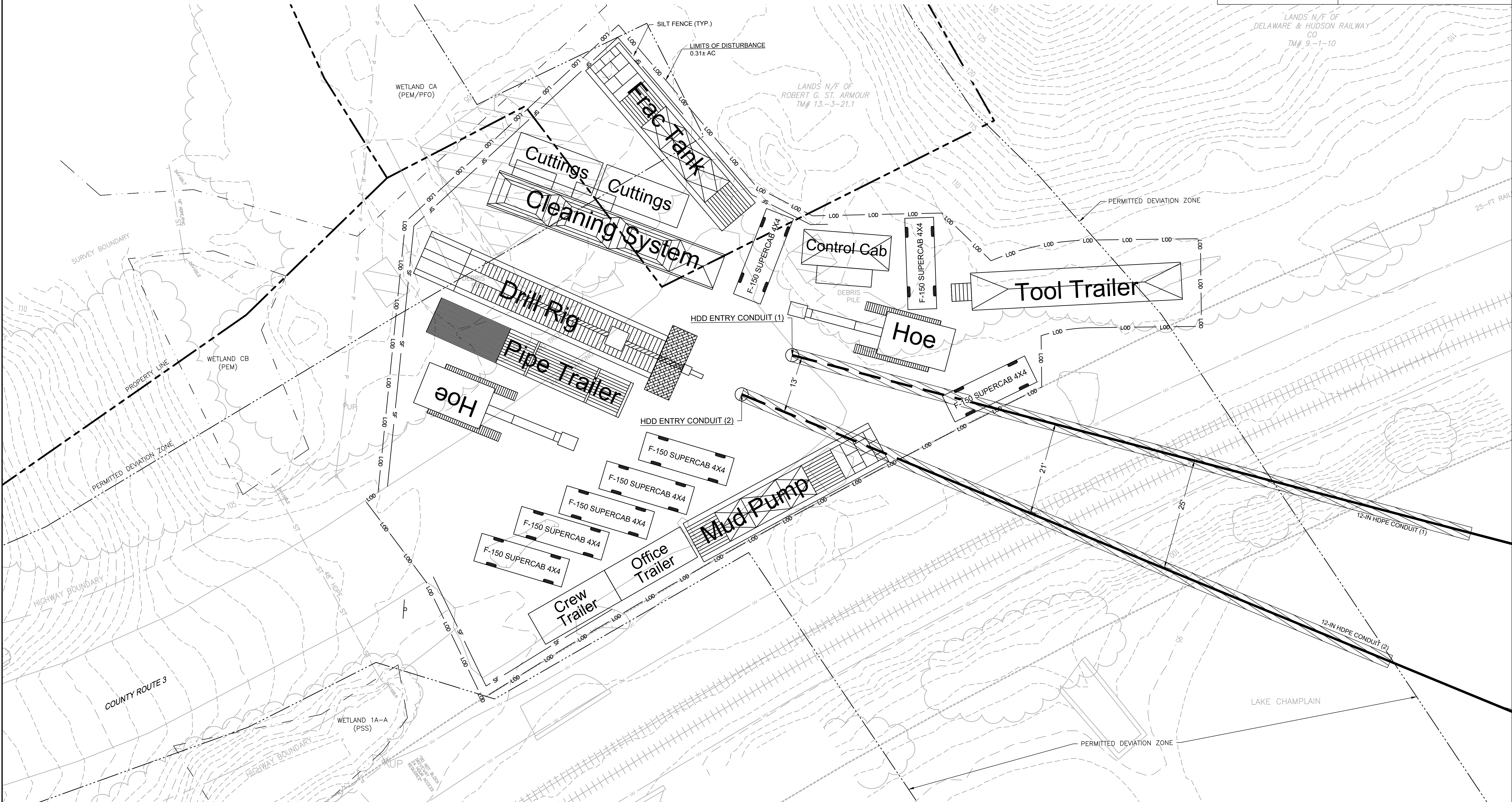
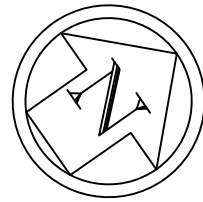





									REFERENCE DRAWINGS		REVISIONS							DRAWING APPROVALS		 <div>TRC NEW YORK REGISTRATION NO. 0010187</div>		PUTNAM STATION HDD LAYOUT PLAN			
								DWG. NO.	TITLE	NO.	DESCRIPTION	DATE	DRAWN	CHK	APPR	DRAWN	DATE	SCALE PLAN: 	SCALE	PROJECT NO.	DRAWING NO.				
																	MMO		11/1/2022	1"=20'	496182	HDD-004	6		
																	CHECKED		DATE						
																	GJR		11/7/2022						
																	ENGINEER		DATE						
																	KCB	11/29/2022							



NY 0010187 (24x36)

- REFERENCE NOTES:
1. BASE PLAN REFERENCES A ROW, UTILITY & WETLAND SURVEY PREPARED IN THE FIELD BY CONTROL POINT ASSOCIATES, INC.
 2. BASE PLAN HAS BEEN SUPPLEMENTED WITH INFORMATION PROVIDED BY CALDWELL MARINE, CLOUGH HARBOR ASSOCIATES AND NEW YORK GIS CLEARING HOUSE.
 3. HDD EQUIPMENT LAYOUT PROVIDED BY CALDWELL MARINE IN NOVEMBER 2022.



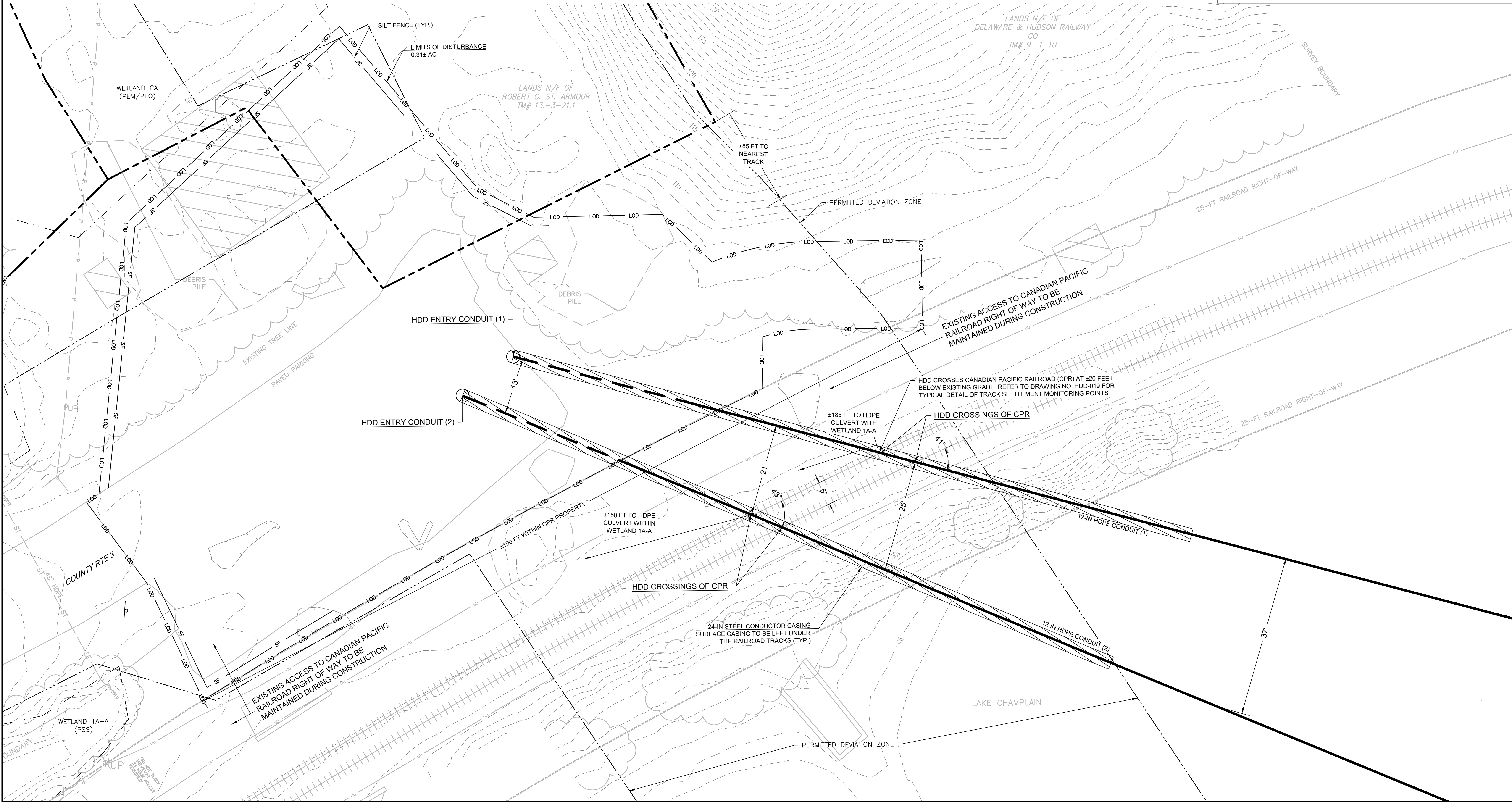
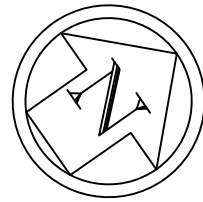
			 <i>Eng. C. B. ...</i> 11-29-22	REFERENCE DRAWINGS		REVISIONS							DRAWING APPROVALS		 <small>NEW YORK REGISTRATION NO. NY 0010187</small> SCALE PLAN: 	PUTNAM STATION HDD EQUIPMENT LAYOUT PLAN						
				DWG. NO.	TITLE	NO.	DESCRIPTION	DATE	DRAWN	CHK	APPR	DRAWN	DATE	SCALE						PROJECT NO.	DRAWING NO.	SHT. NO.





USER_DWGNAME

NY 0010187 (24x36)

- REFERENCE NOTES:
1. BASE PLAN REFERENCES A ROW, UTILITY & WETLAND SURVEY PREPARED IN THE FIELD BY CONTROL POINT ASSOCIATES, INC.
 2. BASE PLAN HAS BEEN SUPPLEMENTED WITH INFORMATION PROVIDED BY CALDWELL MARINE, CLOUGH HARBOR ASSOCIATES AND NEW YORK GIS CLEARING HOUSE.



			REFERENCE DRAWINGS		REVISIONS					DRAWING APPROVALS		 <small>NEW YORK STATE NO. 0010187</small> SCALE PLAN: 	PUTNAM STATION HDD RAILROAD CROSSING PLAN			
			DWG. NO.	TITLE	NO.	DESCRIPTION	DATE	DRAWN	CHK	APPR	DRAWN	DATE				
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											CHECKED	DATE				
											GJR	11/7/2022				
											ENGINEER	DATE				
											KCB	11/29/2022	SCALE	PROJECT NO.	DRAWING NO.	SHT.NO.
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USER_DWGNAME

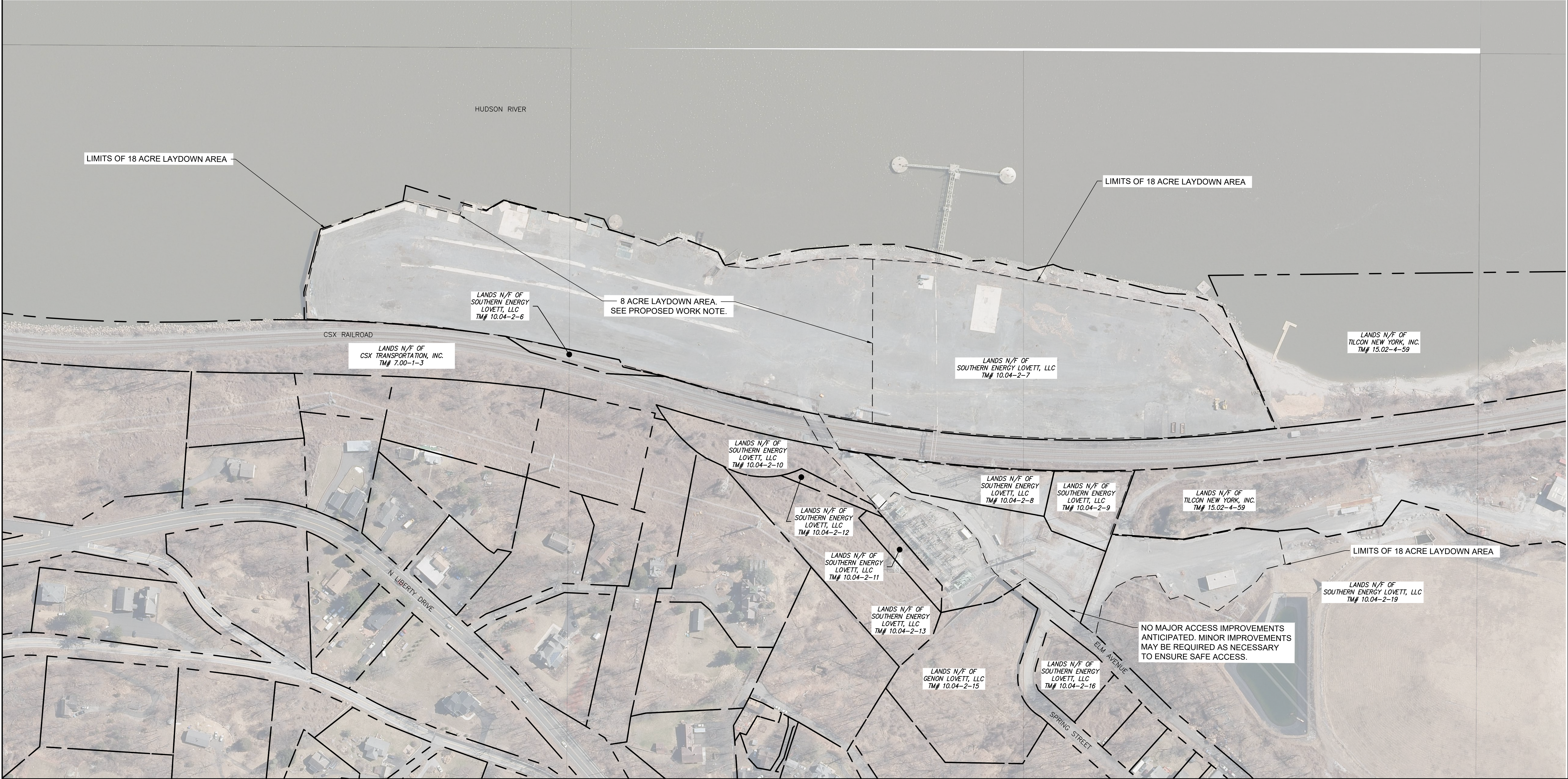
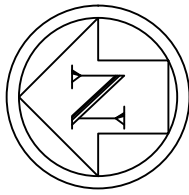
WE AREA: 0-250' (0-400')

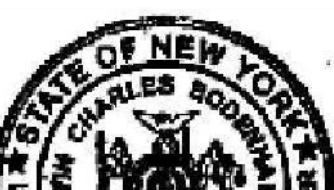


PROPOSED WORK NOTE:

1. LAND DISTURBANCE IS NOT ANTICIPATED. 8 ACRES OF THE LARGER 18 ACRE LAYDOWN TO BE USED TO SUPPORT CEMENTON, STONY POINT AND CONGERS HDD CONSTRUCTION. THE REMAINING 10 ACRES WILL BE USED FOR ASPECTS OF THE CHPE PROJECT NOT RELATED TO HDD CONSTRUCTION.

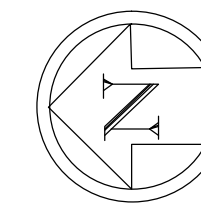
REFERENCE NOTES:

1. AERIAL PHOTOGRAPHY OBTAINED FROM THE NEW YORK GIS CLEARINGHOUSE, STATEWIDE DIGITAL ORTHOIMAGERY PROGRAM, DATED SEPTEMBER 2017.
2. PARCEL DATA OBTAINED FROM NEW YORK GIS CLEARINGHOUSE, DIGITAL MAPS DATABASE, NYS STATEWIDE 2021 PARCEL LAYER, PUBLISHED OCTOBER 2022.
3. LIMITS OF LAYDOWN AREA PROVIDED BY TRANSMISSION DEVELOPERS INC. IN SEPTEMBER 2022.



			 <i>Kevin E. Barber</i> 11-29-22	REFERENCE DRAWINGS			REVISIONS							DRAWING APPROVALS		 <div>NEW YORK STATE REG. NO. 0010187</div> <div>SCALE PLAN: </div>	TOMKINS COVE LAYDOWN AREA PLAN			
DWG. NO.	TITLE	NO.		DESCRIPTION	DATE	DRAWN	CHK	APPR.	DRAWN	DATE										

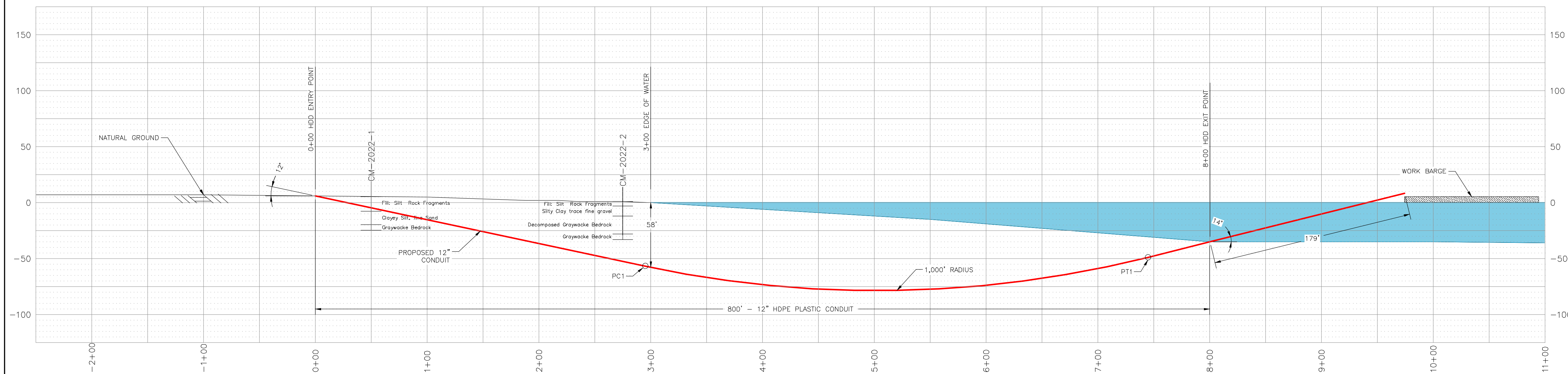
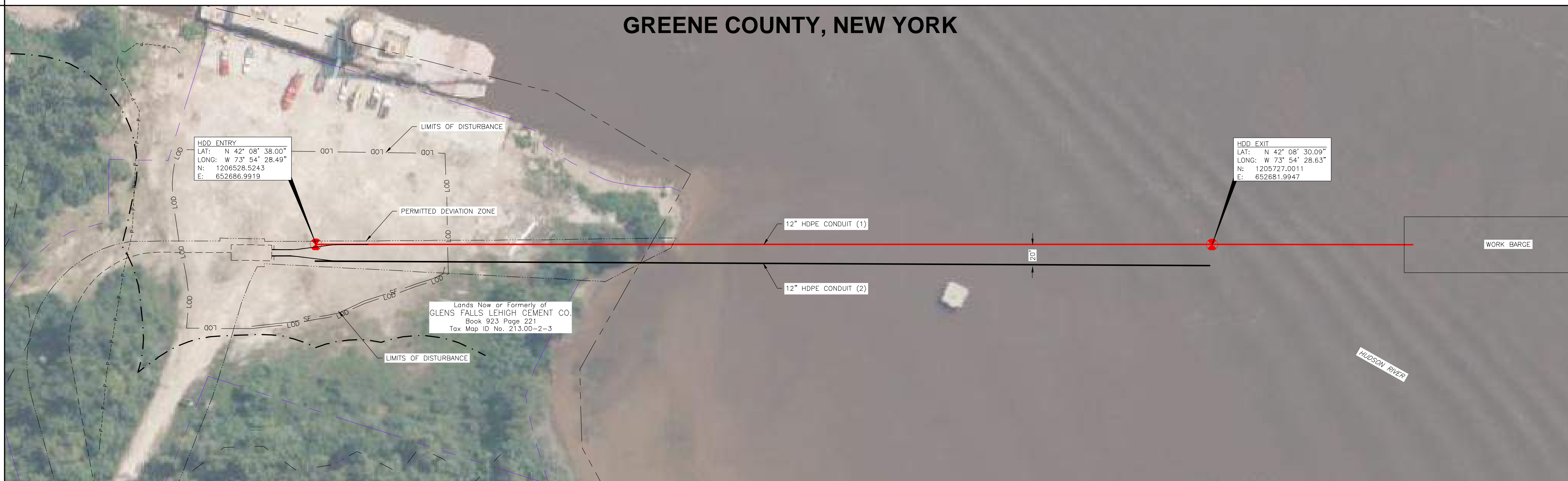





GREENE COUNTY, NEW YORK

PLAN

PROFIL



HORIZONTAL DIRECTIONAL DRILL DATA			HORIZONTAL DIRECTIONAL DRILL PARAMETERS		REFERENCE DRAWINGS		REVISIONS							DRAWING APPROVALS		 <div>FIRM REGISTRATION NO.: NY 0010187</div>	<div>CEMENTON HDD 1 PLAN AND PROFILE</div>
DESCRIPTION	STA.	ELEV.	1.) PIPE: 12.75" O.D. x 1.417" W.T. DESIGN FACTOR:	HDPF DB9 IPS 0.63	DWG. NO.	TITLE	NO.	DESCRIPTION	DATE	DRAWN	CHK	APPR	DRAWN	DATE			
ENTRY ANGLE @ 12"	0+00	6.0'												AWF	09/14/22		
POINT OF CURVATURE (PC) (1,000 FT. RADIUS)	2+95	-56.8'	2.) LENGTH OF CROSSING:	800' HORIZONTAL DISTANCE										CHECKED	DATE		
POINT OF TANGENCY (PT1)	7+45	-48.8'	3.) TYPE OF PIPE JOINT: LENGTH OF PIPE:	BUTT FUSION 812 L.F.										GJR	11/29/22		
EXIT ANGLE @ 14"	8+00	-35.0'	4.) ESTIMATED PULL FORCE: ALLOWABLE PULL FORCE:	7,971 LBS. 53,428 LBS.										ENGINEER	DATE		
														KCB	11/29/22		

SCALE PLAN:

0

50'

SCALE PROFILE H:

0

50'

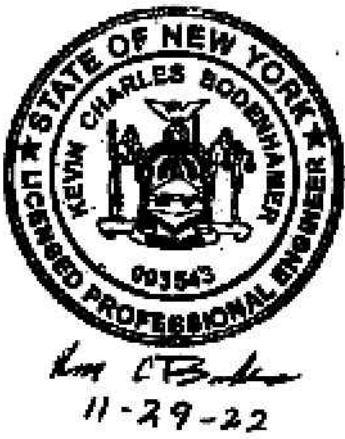
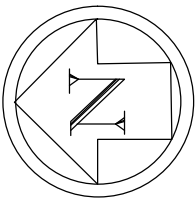
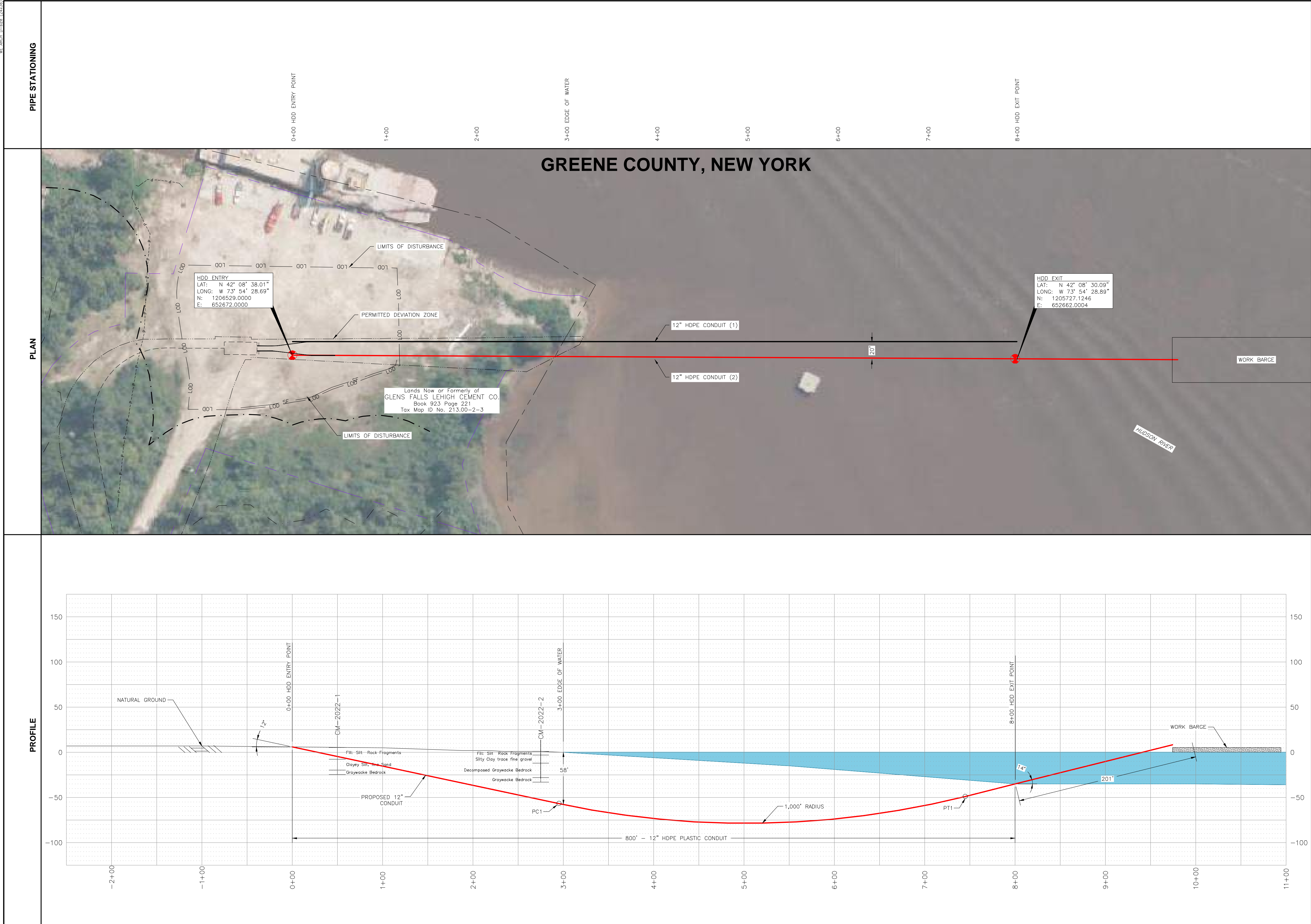
SCALE PROFILE V:

0

50'

SCALE	PROJECT NO.	DRAWING NO.	SHT. NO.
1"=50'	496182	HDD-008	10

NY 496182 11-29-22



HORIZONTAL DIRECTIONAL DRILL DATA			HORIZONTAL DIRECTIONAL DRILL PARAMETERS		REFERENCE DRAWINGS		REVISIONS						DRAWING APPROVALS		<div> <small>FORM REGISTRATION NO. NY 0010187</small></div> <div><div>SCALE PLAN: SCALE PROFILE H: SCALE PROFILE V:</div><div><div><div>0'50'</div><div>0'50'</div><div>0'50'</div></div></div></div>		CEMENTON HDD 2 PLAN AND PROFILE			
DESCRIPTION	STA.	ELEV.	1.) PIPE: 12.75" O.D. x 1.417" W.T. DESIGN FACTOR: <div>HDPE DR9 IPS 0.63</div>	2.) LENGTH OF CROSSING: <div>800' HORIZONTAL DISTANCE</div>	3.) TYPE OF PIPE JOINT: LENGTH OF PIPE: <div>BUTT FUSION 812 L.F.</div>	4.) ESTIMATED PULL FORCE: ALLOWABLE PULL FORCE: <div>7,971 LBS. 53,428 LBS.</div>	DWG. NO.	TITLE	NO.	DESCRIPTION	DATE	DRAWN	CHK	APPR						
ENTRY ANGLE @ 12°	0+00	6.0'															AWF	09/14/22		
POINT OF CURVATURE (PC1) (1,000 FT. RADIUS)	2+95	-56.8'															CHECKED	DATE		
POINT OF TANGENCY (PT1)	7+45	-48.8'															GJR	11/29/22		
EXIT ANGLE @ 14°	8+00	-35.0'															ENGINEER	DATE		
																	KCB	11/29/22		

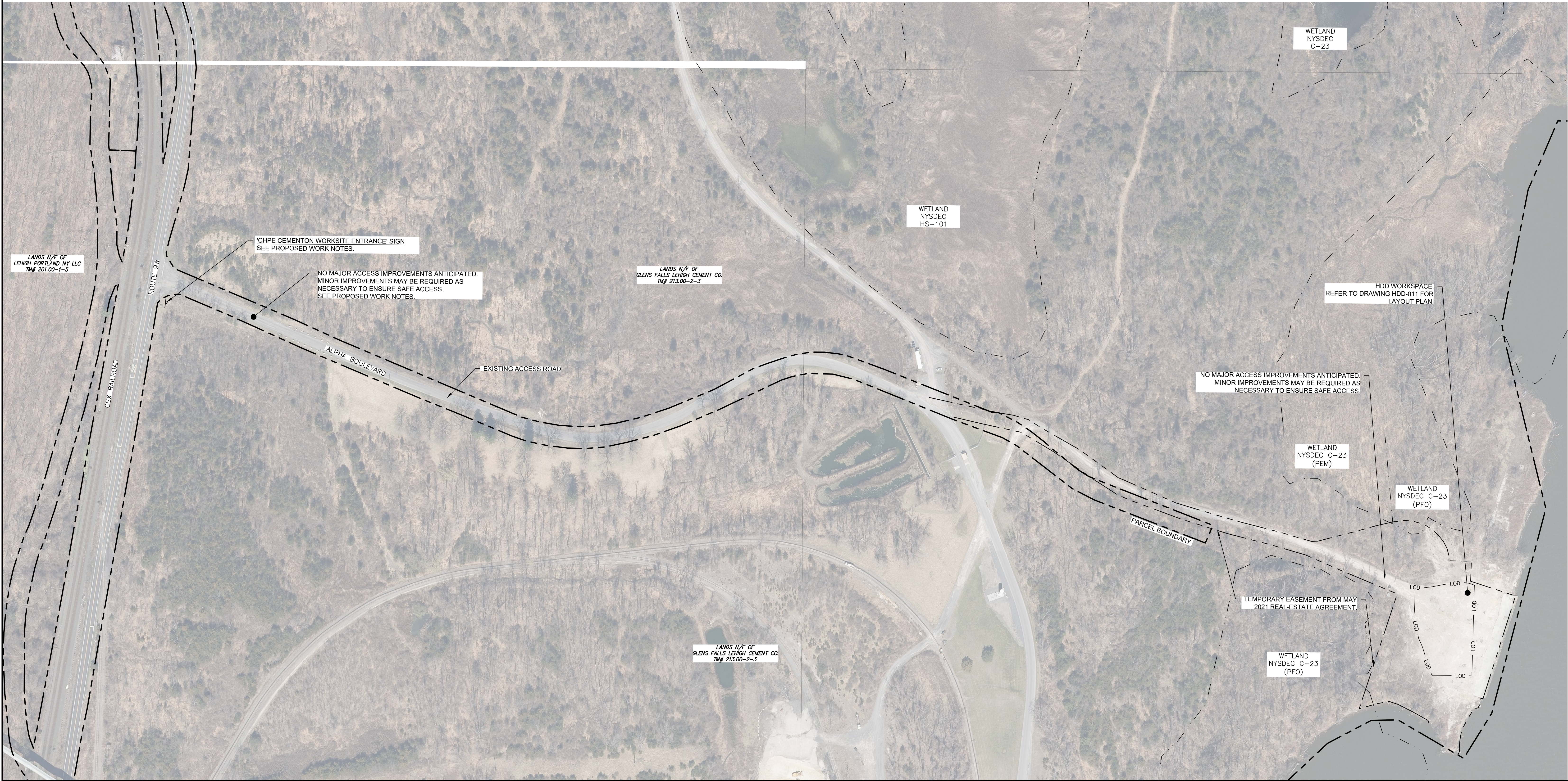
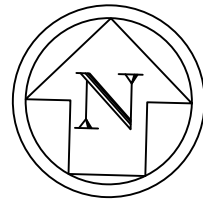
SEE SHEET C-23 FOR CONTINUATION




PROPOSED WORK NOTES:

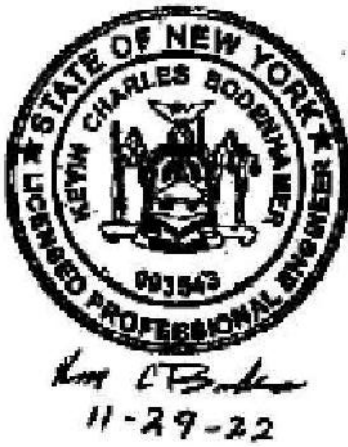
1. THE EXISTING ACCESS ROAD IS ANTICIPATED TO SUPPORT HDD CONSTRUCTION OPERATIONS IN IT'S CURRENT CONDITION. MINOR ACCESS SURFACE IMPROVEMENTS AND INSTALLATION OF ADDITIONAL EROSION CONTROLS WILL BE IMPLEMENTED AS NECESSARY TO PREVENT SEDIMENT-LADEN RUNOFF FROM FLOWING OUTSIDE OF THE LIMITS OF DISTURBANCE.
2. TEMPORARY 'CONSTRUCTION TRAFFIC AHEAD' WARNING SIGNS WILL BE INSTALLED 100- FEET FROM THE EXISTING ACCESS VIA ALPHA BOULEVARD TO GLENS FALL LEHIGH CEMENT CO PROPERTY ON BOTH ROUTE 9W APPROACHES. FINAL SIGN TEXT AND LOCATIONS TO BE APPROVED BY THE OWNER AND COORDINATED WITH THE GREENE COUNTY HIGHWAY DEPARTMENT.

REFERENCE NOTES:

1. AERIAL PHOTOGRAPHY OBTAINED FROM THE NEW YORK GIS CLEARINGHOUSE, STATEWIDE DIGITAL ORTHOIMAGERY PROGRAM, DATED SEPTEMBER 2017.
2. PARCEL DATA OBTAINED FROM NEW YORK GIS CLEARINGHOUSE, DIGITAL MAPS DATABASE, NYS STATEWIDE 2021 PARCEL LAYER, PUBLISHED OCTOBER 2022.
3. WETLANDS DELINEATED IN THE FIELD BY CHA AND SUPPLEMENTED WITH NYSDEC FRESHWATER WETLANDS GIS DATA.



					REFERENCE DRAWINGS		REVISIONS							DRAWING APPROVALS		 <div>NEW YORK STATE REG. NO. 0010187</div> <div>SCALE PLAN: </div>	CEMENTON HDD ACCESS ROAD PLAN							
					DWG. NO.	TITLE	NO.	DESCRIPTION	DATE	DRAWN	CHK	APPR	DRAWN	DATE	SCALE						PROJECT NO.	DRAWING NO.	SHT. NO.	
									</															



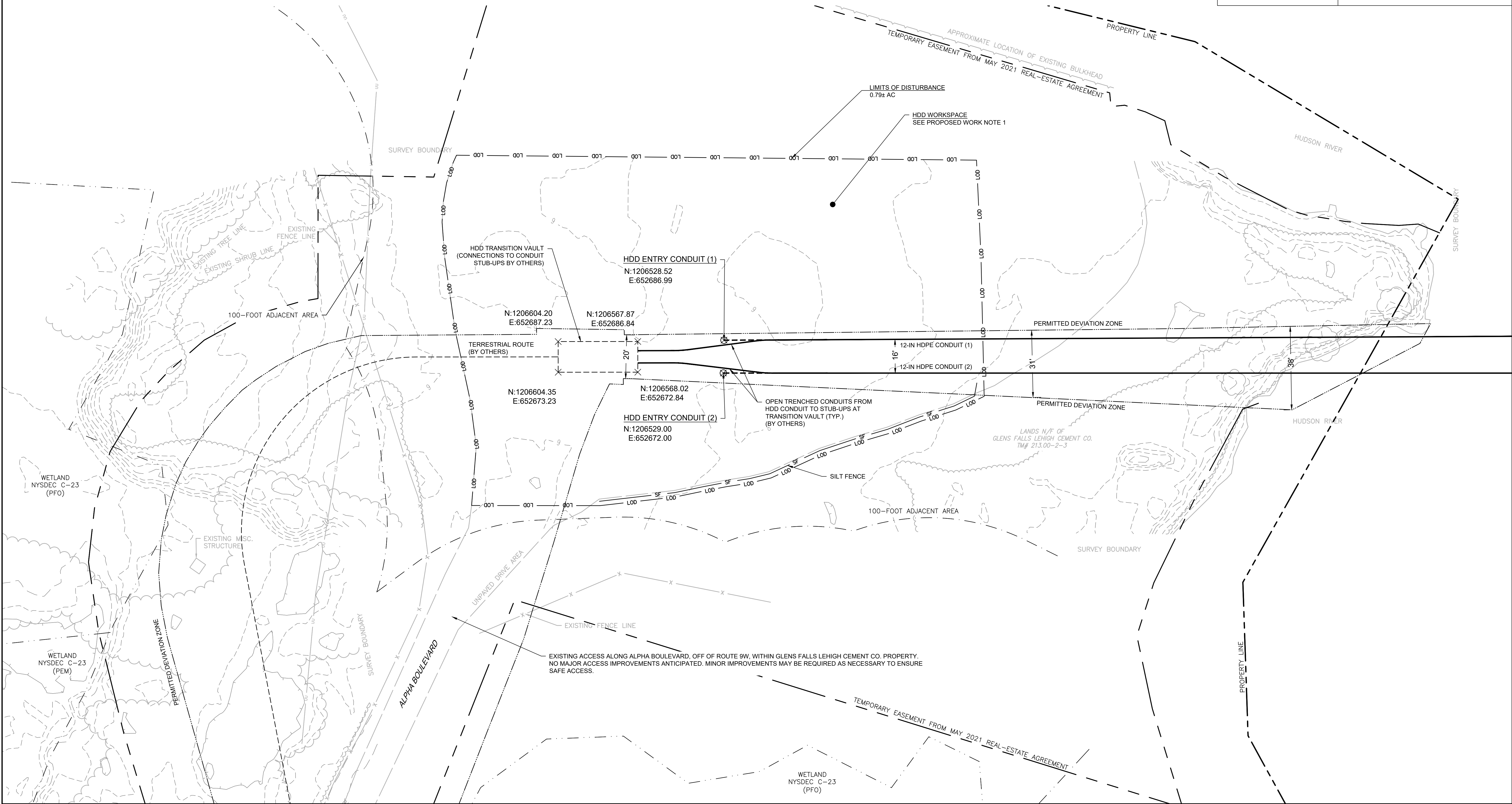
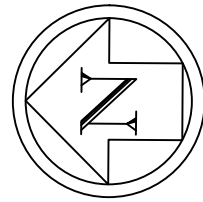
WE AREA: 0-352 (24x36)



PROPOSED WORK NOTES:

1. ALL HDD CONSTRUCTION OPERATIONS AND PARKING WILL BE CONTAINED WITHIN THE LIMITS OF DISTURBANCE. TREE CLEARING, VEGETATION REMOVAL AND SIGNIFICANT LAND GRADING IS NOT ANTICIPATED. ALL DISTURBED AREAS SHALL BE RESTORED AFTER CONSTRUCTION.

REFERENCE NOTES:

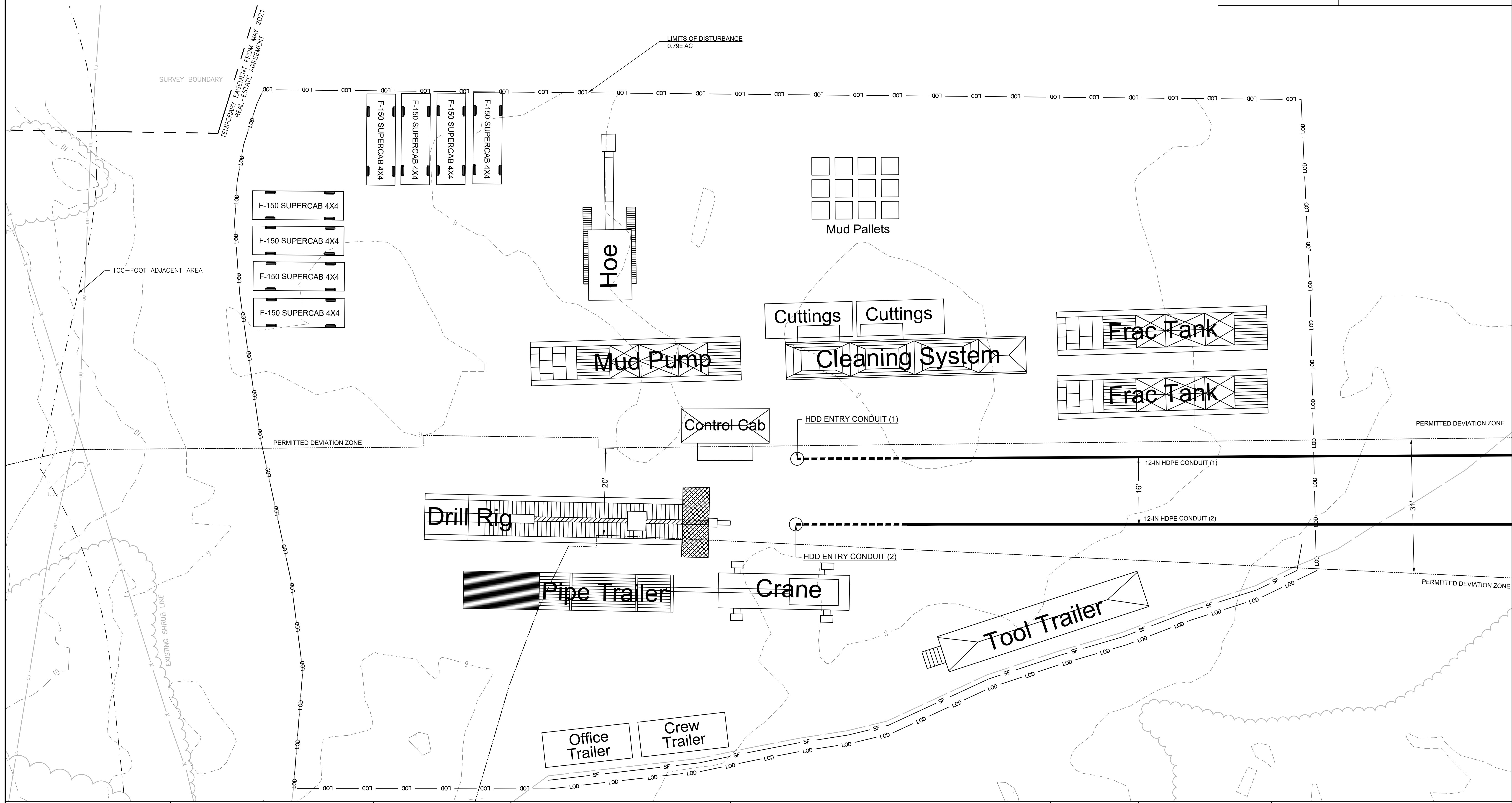
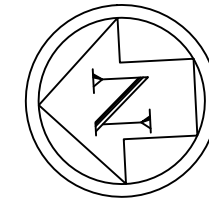
1. BASE PLAN REFERENCES A ROW, UTILITY & WETLAND SURVEY PREPARED IN THE FIELD BY CONTROL POINT ASSOCIATES, INC.






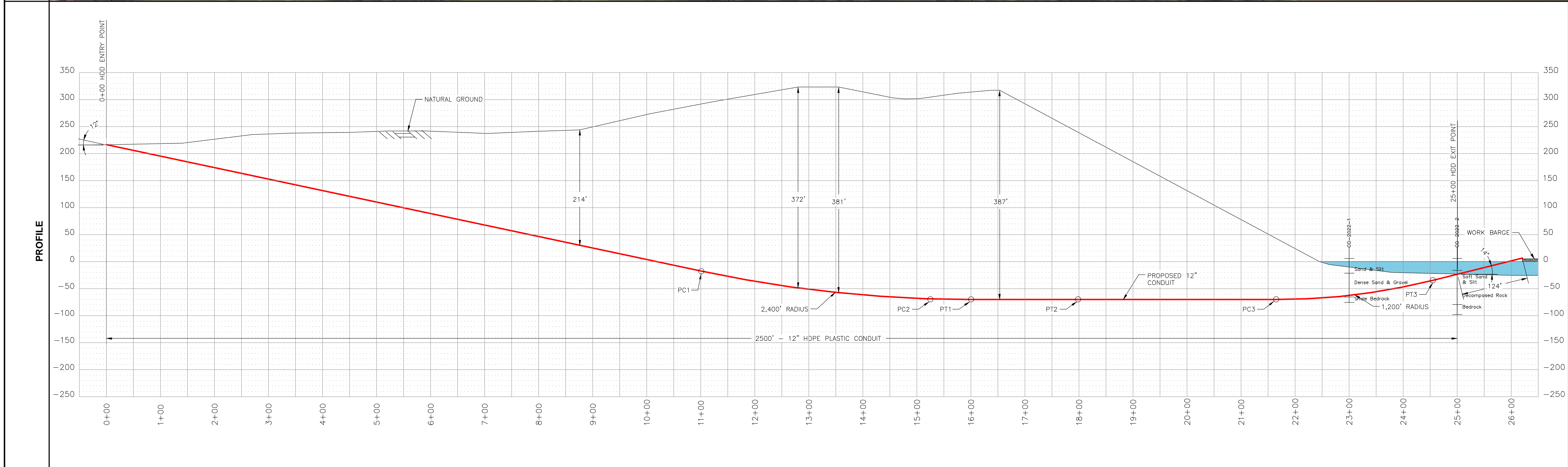
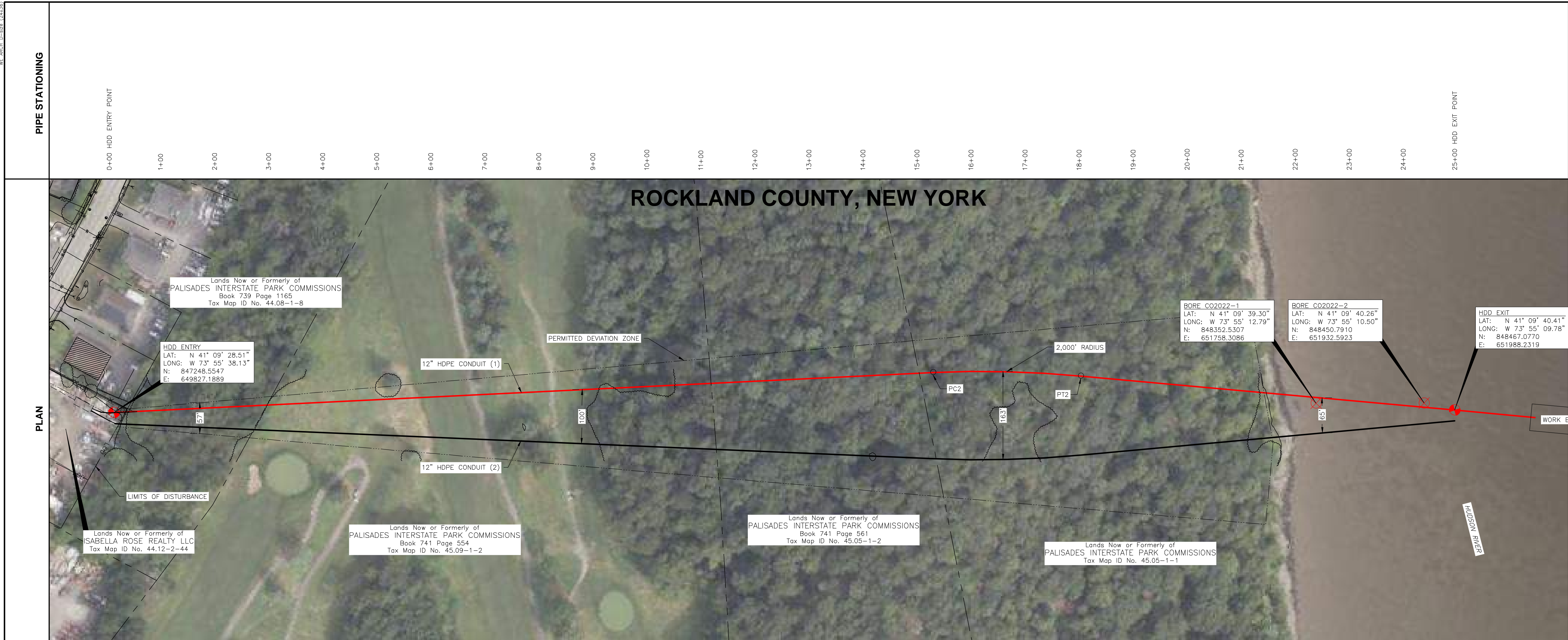
						REFERENCE DRAWINGS		REVISIONS							DRAWING APPROVALS		 <div>NEW YORK STATE REGISTERED NO. NY 0010187</div>	<div>CEMENTON HDD LAYOUT PLAN</div>			
						DWG. NO.	TITLE	NO.	DESCRIPTION	DATE	DRAWN	CHK	APPR.	DRAWN	DATE						



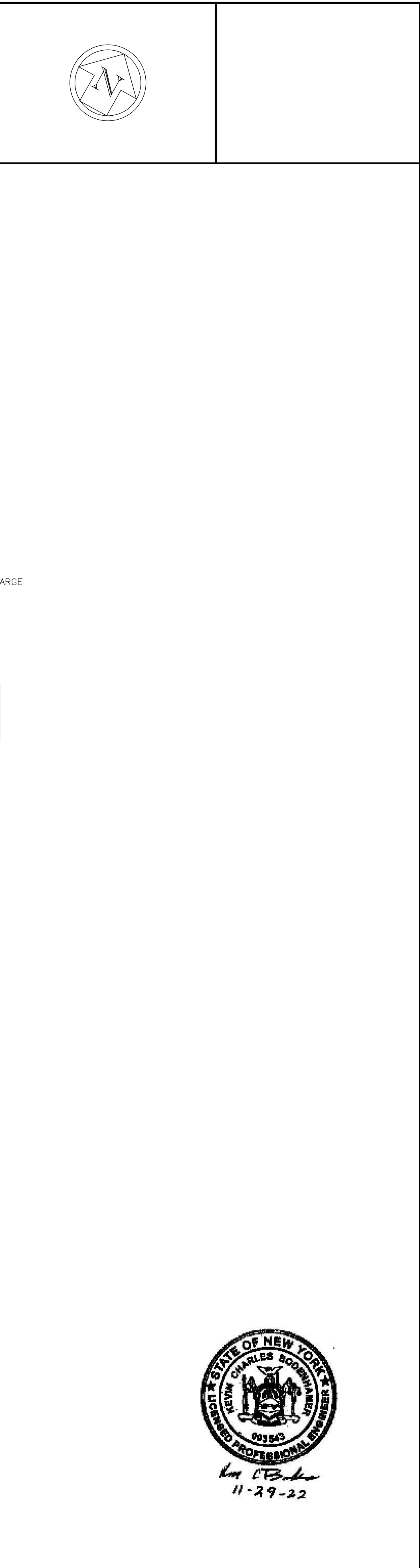
USER_DWGNAME





			 <i>Kevin C. Bonomo</i> 11-29-22	REFERENCE DRAWINGS		REVISIONS							DRAWING APPROVALS		 <small>TRC REGISTERED NO.: NY 0010187</small>	CEMENTON HDD EQUIPMENT LAYOUT PLAN			
				DWG. NO.	TITLE	NO.	DESCRIPTION	DATE	DRAWN	CHK	APPR	DRAWN	DATE	SCALE PLAN: 					
																CHECKED	DATE		
																GJR	11/7/2022		
																ENGINEER	DATE		
														KCB		11/29/2022			
															SCALE	PROJECT NO.	DRAWING NO.	SHT.NO.	
															1"=10'	496182	HDD-012	14	



HORIZONTAL DIRECTIONAL DRILL DATA			HORIZONTAL DIRECTIONAL DRILL PARAMETERS				REFERENCE DRAWINGS		REVISIONS						DRAWING APPROVALS		<div><div></div><div>FORM REGISTRATION NO.: NY 0010187</div></div> <div><div>SCALE PLAN: 0 100'</div><div>SCALE PROFILE H: 0 100'</div><div>SCALE PROFILE V: 0 100'</div></div>		CONGRERS HDD 1 PLAN AND PROFILE			
DESCRIPTION	STA.	ELEV.			DWG. NO.	TITLE	NO.	DESCRIPTION	DATE	DRAWN	CHK	APPR	DRAWN	DATE								
ENTRY ANGLE @ 12°	0+00	216.4'	1.) PIPE: 12.75" O.D. x 1.417" W.T. DESIGN FACTOR:	<u>HDD9 DR9 IPS</u> <u>0.63</u>																		
POINT OF CURVATURE (PC1)	11+01	-17.6'	2.) LENGTH OF CROSSING:	<u>2,500' HORIZONTAL DISTANCE</u>																		
POINT OF HORIZ. CURVATURE (PC2) (2,000 FT. RADIUS)	15+25	-68.8'	3.) TYPE OF PIPE JOINT: LENGTH OF PIPE:	<u>BUTT FUSION</u> <u>2,635 L.F.</u>																		
POINT OF TANGENCY (PT1)	16+00	-70.0'	4.) ESTIMATED PULL FORCE: ALLOWABLE PULL FORCE:	<u>40,504 LBS.</u> <u>53,428 LBS.</u>																		
POINT OF TANGENCY (PT2)	17+98	-70.0'																				
POINT OF CURVATURE (PC3) (1,200 FT. RADIUS)	21+64	-70.0'																				
POINT OF TANGENCY (PT3)	24+54	-34.6'																				
EXIT ANGLE @ 14°	25+00	-20.0'																				



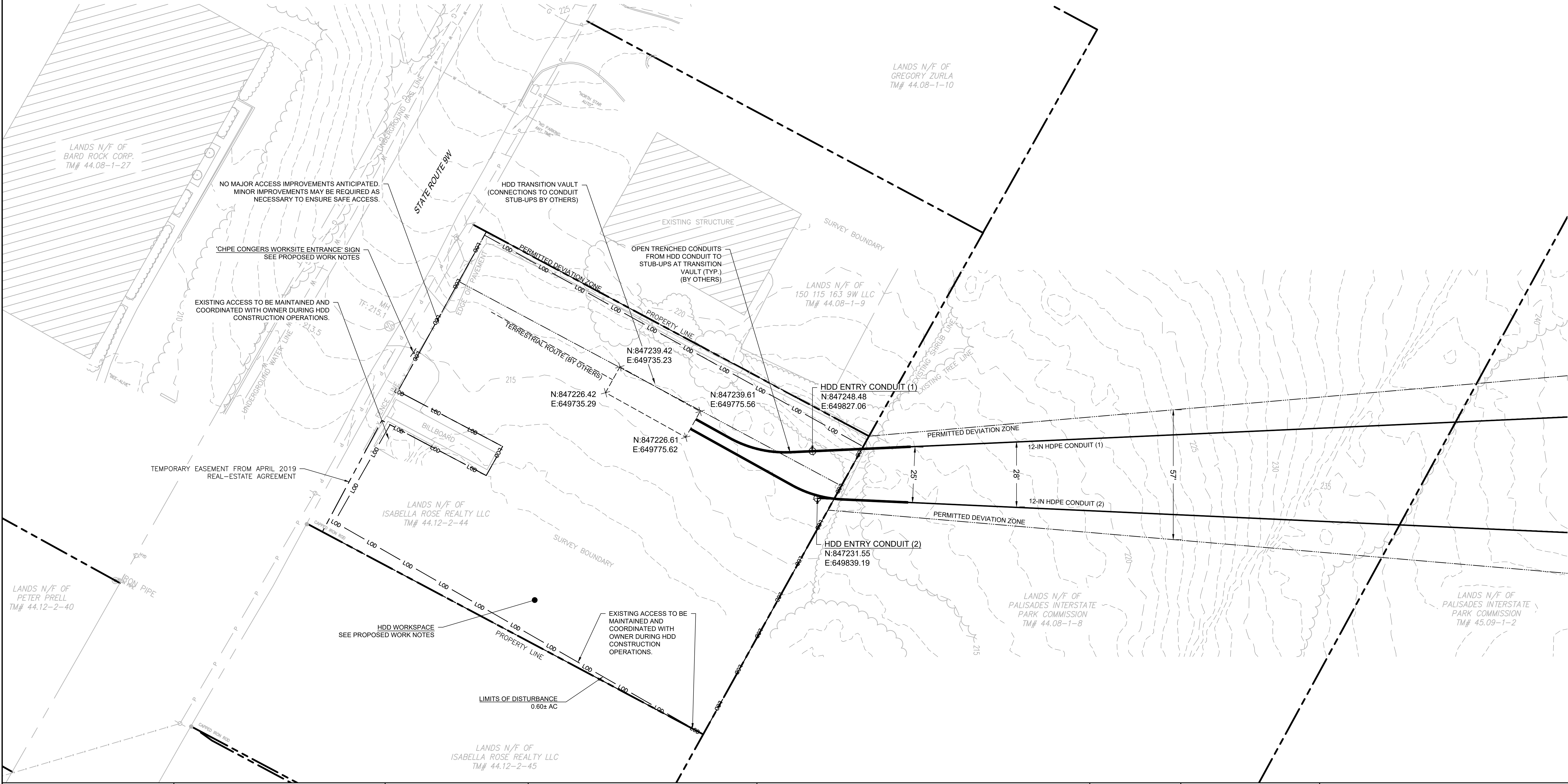
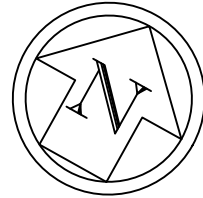
HORIZONTAL DIRECTIONAL DRILL DATA			HORIZONTAL DIRECTIONAL DRILL PARAMETERS		REFERENCE DRAWINGS		REVISIONS							DRAWING APPROVALS		<div><div>FORM REGISTRATION NO. NY 0010187</div></div> <div><div>SCALE PLAN: </div><div>SCALE PROFILE H: </div><div>SCALE PROFILE V: </div></div> <div><table><tr><th>SCALE</th><th>PROJECT NO.</th><th>DRAWING NO.</th><th>SHT. NO.</th></tr><tr><td>1"=100'</td><td>496182</td><td>HDD-014</td><td>16</td></tr></table></div>		SCALE	PROJECT NO.	DRAWING NO.	SHT. NO.	1"=100'	496182	HDD-014	16
SCALE	PROJECT NO.	DRAWING NO.	SHT. NO.																						
1"=100'	496182	HDD-014	16																						
DESCRIPTION	STA.	ELEV.	1.) PIPE: 12.75" O.D. x 1.417" W.T. DESIGN FACTOR:	HDD DR IPS 0.63	DWG. NO.	TITLE	NO.	DESCRIPTION	DATE	DRAWN	CHK	APPR.	DRAWN	DATE											
ENTRY ANGLE @ 12"	0+00	216.4'	2.) LENGTH OF CROSSING: (2,400 FT. RADIUS)	2,500' HORIZONTAL DISTANCE									AWF	09/14/22											
POINT OF CURVATURE (PC1)	11+01	-17.6'	3.) TYPE OF PIPE JOINT: LENGTH OF PIPE:	BUTT FUSION 2,535 L.F.									CHECKED	DATE											
POINT OF HORIZ. CURVATURE (PC2) (2,000 FT. RADIUS)	15+25	-68.8'	4.) ESTIMATED PULL FORCE: ALLOWABLE PULL FORCE:	40,504 LBS. 53,428 LBS.									GJR	11/29/22											
POINT OF TANGENCY (PT1)	16+00	-70.0'											ENGINEER	DATE											
POINT OF TANGENCY (PT2)	17+98	-70.0'											KCB	11/29/22											
POINT OF CURVATURE (PC3) (1,200 FT. RADIUS)	21+64	-70.0'																							
POINT OF TANGENCY (PT3)	24+54	-34.6'																							
EXIT ANGLE @ 14"	25+00	-20.0'																							




PROPOSED WORK NOTES:

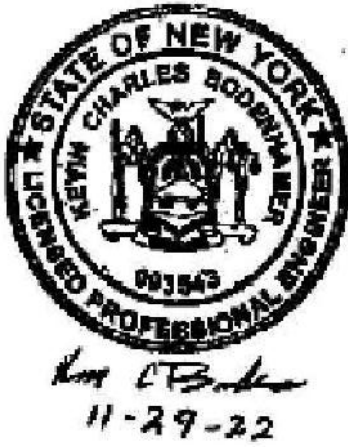
1. ALL HDD CONSTRUCTION OPERATIONS, LAYDOWN, AND PARKING WILL BE CONTAINED WITHIN THE LIMITS OF DISTURBANCE. TREE CLEARING AND SIGNIFICANT LAND GRADING IS NOT ANTICIPATED. VEGETATION REMOVAL IS ANTICIPATED TO BE LIMITED TO PRUNING OF LIMBS AND TRIMMING OF UNDERGROWTH ALONG THE PERIMETER OF THE HDD WORKSPACE, NO HERBICIDE USE IS PERMITTED. ALL DISTURBED AREAS SHALL BE RESTORED AND RE-VEGETATED AFTER CONSTRUCTION.
2. THE EXISTING ACCESS TO THE PROPERTY SHALL SUPPORT HDD CONSTRUCTION OPERATIONS AND PREVENT SEDIMENT-LADEN RUNOFF TO FLOW OUTSIDE OF THE LIMITS OF DISTURBANCE. THE EXTENT OF THE TEMPORARY CONSTRUCTION AREA WILL BE COORDINATED WITH THE LAND OWNER, ISABELLA ROSE REALTY LLC.
3. TEMPORARY 'CONSTRUCTION TRAFFIC AHEAD' WARNING SIGNS WILL BE INSTALLED IN THE SHOULDER OF ROUTE 9W 100- FEET FROM THE EXISTING ACCESS TO ISABELLA ROSE REALTY PROPERTY ON BOTH STATE ROUTE 9W APPROACHES. FINAL SIGN TEXT AND LOCATIONS TO BE APPROVED BY THE OWNER, ISABELLA ROSE REALTY LLC, AND COORDINATED WITH THE STATE OF NEW YORK.

REFERENCE NOTES:

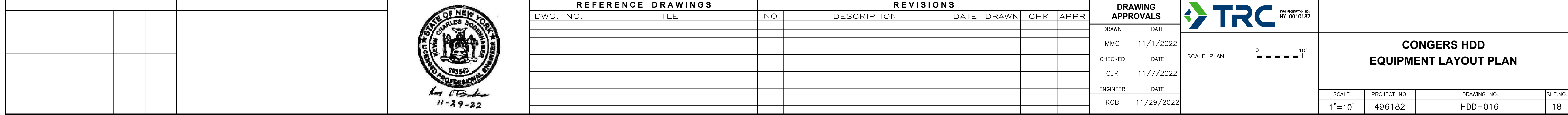
1. BASE PLAN REFERENCES A ROW, UTILITY & WETLAND SURVEY PREPARED IN THE FIELD BY CONTROL POINT ASSOCIATES, INC.
2. BASE PLAN HAS BEEN SUPPLEMENTED WITH INFORMATION PROVIDED BY CALDWELL MARINE INC AND NEW YORK GIS CLEARING HOUSE.



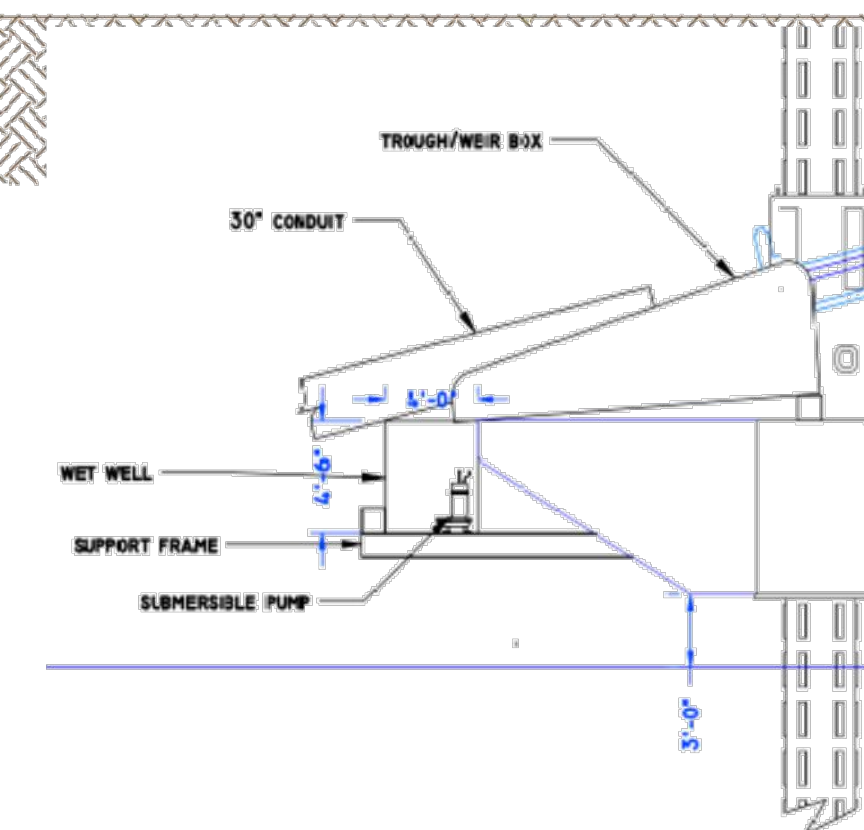
			 <i>Kevin C. Bonser</i> 11-29-22	REFERENCE DRAWINGS		REVISIONS							DRAWING APPROVALS		 NEW YORK REGISTERED NO. 0010187	CONGERS HDD LAYOUT PLAN			
				DWG. NO.	TITLE	NO.	DESCRIPTION	DATE	DRAWN	CHK	APPR	DRAWN	DATE	SCALE PLAN: 					
																CHECKED	DATE		
																GJR	11/7/2022		
																ENGINEER	DATE		
														KCB		11/29/2022			
																SCALE	PROJECT NO.	DRAWING NO.	SHT. NO.
																1"=20'	496182	HDD-015	17



1. BASE PLAN REFERENCES A ROW, UTILITY & WETLAND SURVEY PREPARED IN THE FIELD BY CONTROL POINT ASSOCIATES, INC.
2. HDD EQUIPMENT LAYOUT PROVIDED BY HUXTED TRENCHLESS IN OCTOBER 2022.



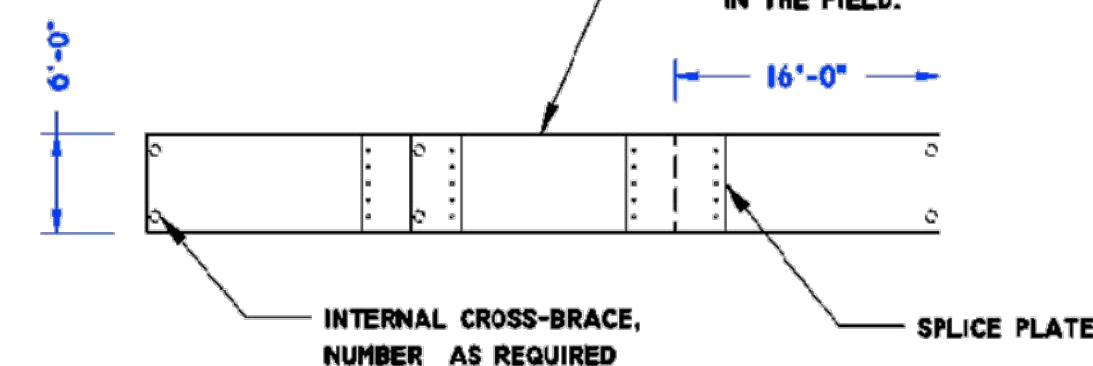
1. GRAVITY CELL TO BE PLACED AT MUD LINE TO ENCOMPASS PILOT HOLE PUNCH-OUT LOCATION.
2. PILOT HOLE TO BE DRILLED FROM SHORE TO IN-RIVER PUNCH-OUT LOCATION.
3. PIN PILES TO BE DRIVEN SIMULTANEOUS TO PILOT HOLE DRILLING OPERATION.
4. CONDUIT CROSS SUPPORTS TO BE INSTALLED AT EACH PILE BENT AT CORRECT ELEVATIONS TO ENSURE 14-DEGREE VERTICAL ANGLE.
5. UPON PILOT DREDGE THROUGH WILL BE ATTACHED TO THE DRILL STRING AND 1ST CONDUIT PIPE.
6. FIRST CONDUIT PIPE TO BE POSITIONED UPON THE UPPER GOAL POST CROSS MEMBERS, SLID DOWN AND SECURED IN PLACE.
7. SECOND CONDUIT PIPE TO BE POSITIONED WITHIN THE GOAL POSTS UPON THE CROSS MEMBERS TO MEET THE FIRST CONDUIT PIPE.
8. PIPE TWO IS WELDED TO PIPE ONE AND THE WELDED ASSEMBLY SLID DOWN THROUGH THE GOAL POSTS TO ACCOMMODATE THE NEXT CONDUIT SECTION.
9. SUBSEQUENT CONDUIT PIPE SECTIONS TO BE INSTALLED AND WELDED SIMILARLY UNTIL THE LOWER END OF THE CONDUIT PENETRATES THE MUD LINE, SURROUNDING THE DRILL STRING.
10. FINISH PILES TO BE DRILLED TO CONDUIT TO DIAGONALLY DRIVEN UNTIL THE ASSEMBLY PENETRATES THE MUD LINE AS SHOWN.
11. DRILL STRING, WITH ITS TAG LINE IS FED UP TO DECK LEVEL AND READY FOR SUBSEQUENT REAMING PASSES.
12. THE "TEMPORARY GOAL POSTS" WILL BE LAID OUT BY SURVEY. THE WIDE FLANGE BEAM OR H-PILE GOAL POSTS WILL BE DRIVEN TO THE INDICATED DEPTH BELOW THE SEABED UTILIZING VIBRATORY PILE HAMMER



OPEN TOP, WELDED STEEL CONTAINMENT
BOX, SIZE AS REQUIRED, PITCH TOWARD
WET WELL







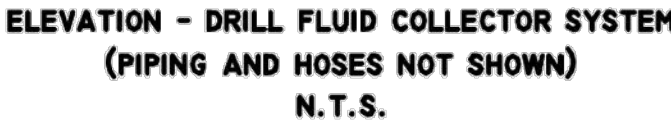
— ANCHOR WINCH (IF REQUIRED) FOR
OPTIONAL ANCHOR SYSTEM



CONDUCTOR PIPE/GOAL POST/GRAVITY CELL INSTALLATION INFORMATION SHOWN HEREIN
PROVIDED BY CALDWELL MARINE IN NOVEMBER 2022

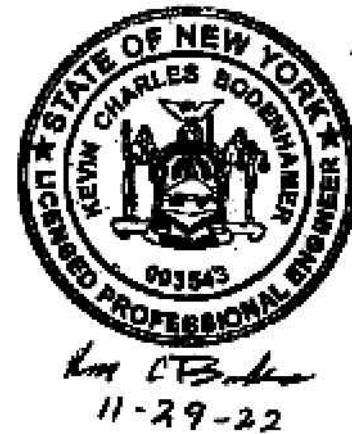



REFERENCE DRAWINGS		REVISIONS							DRAWING APPROVALS		<div><div>TRC TECHNICAL RESOURCES CORP. NEW YORK, NY 0010187</div></div>		PUTNAM STATION & CEMENTON CONDUCTOR PIPE/GOAL POST/ GRAVITY CELL INSTALLATION			
DWG. NO.	TITLE	NO.	DESCRIPTION	DATE	DRAWN	CHK	APPR	DRAWN	DATE							
HDD-002	PUTNAM STATION 12" HDPE CONDUIT (1)							AWF	06/28/22							
HDD-003	PUTNAM STATION 12" HDPE CONDUIT (2)							CHECKED	DATE							
HDD-008	CEMENTON 12" HDPE CONDUIT (1)							GJR	11/29/22	<div>SCALE PLAN: <div>010' N.T.S.</div></div> <div>SCALE PROFILE H: <div>010' N.T.S.</div></div> <div>SCALE PROFILE V: <div>010' N.T.S.</div></div>		SCALE	PROJECT NO.	DRAWING NO.	SHT. NO.	
HDD-009	CEMENTON 12" HDPE CONDUIT (2)							ENGINEER	DATE			N.T.S.	496182	HDD-017	19	
								KCB	11/29/22							



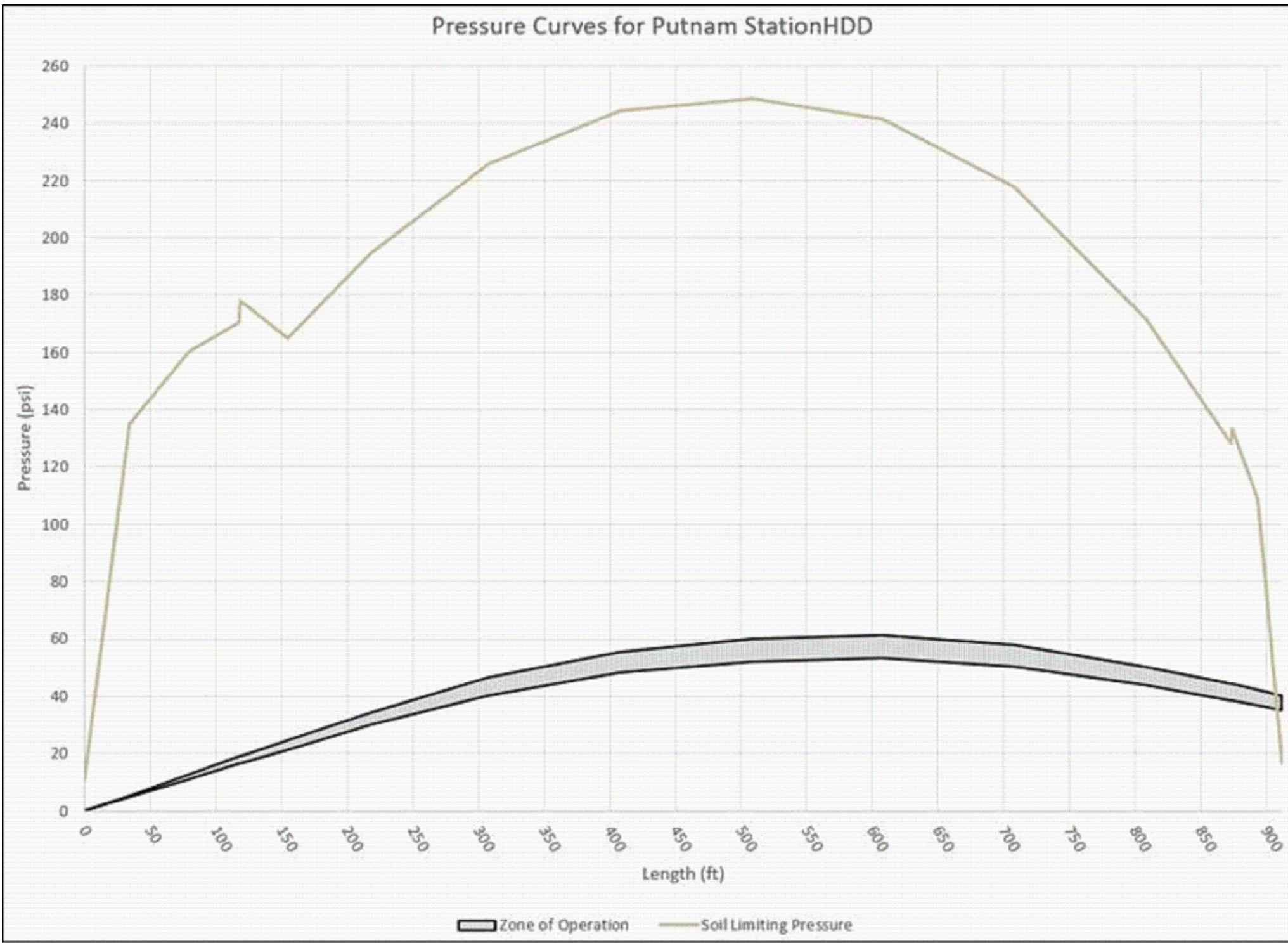
NOTE:

CONDUCTOR PIPE/GOAL POST/GRAVITY CELL INSTALLATION INFORMATION
SHOWN HEREIN PROVIDED BY CALDWELL MARINE IN NOVEMBER 2022

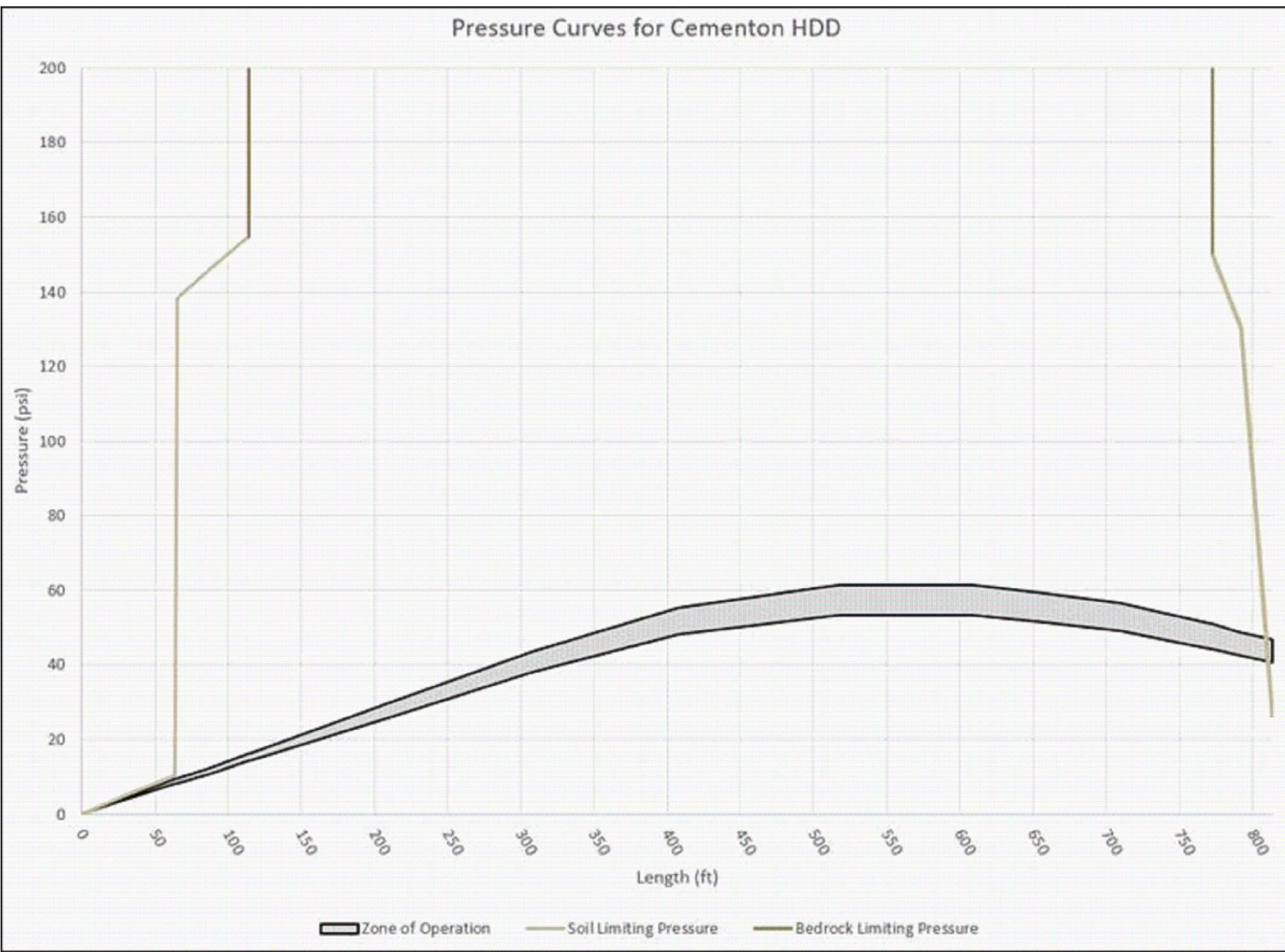


REFERENCE DRAWINGS		REVISIONS						DRAWING APPROVALS		<div><div>FORM REGISTRATION NO.: NY 0010187</div></div>		<div>CONGRERS</div> <div>CONDUCTOR PIPE/GOAL POST/ GRAVITY CELL INSTALLATION</div>							
DWG. NO.	TITLE	NO.	DESCRIPTION	DATE	DRAWN	CHK	APPR	DRAWN	DATE										
HDD-013	CONGRERS HDD 1 PLAN AND PROFILE								AWF	06/28/22	<div>SCALE PLAN: <div><div>0</div><div></div><div>N.T.S.</div></div></div> <div>SCALE PROFILE H: <div><div>0</div><div></div><div>N.T.S.</div></div></div> <div>SCALE PROFILE V: <div><div>0</div><div></div><div>N.T.S.</div></div></div>	<div>SCALE</div> <div>N.T.S.</div>		<div>PROJECT NO.</div> <div>496182</div>		<div>DRAWING NO.</div> <div>HDD-018</div>		<div>SHT. NO.</div> <div>20</div>	
HDD-014	CONGRERS HDD 2 PLAN AND PROFILE							CHECKED	DATE										
								GJR	11/29/22										
								ENGINEER	DATE										
								KCB	11/29/22										

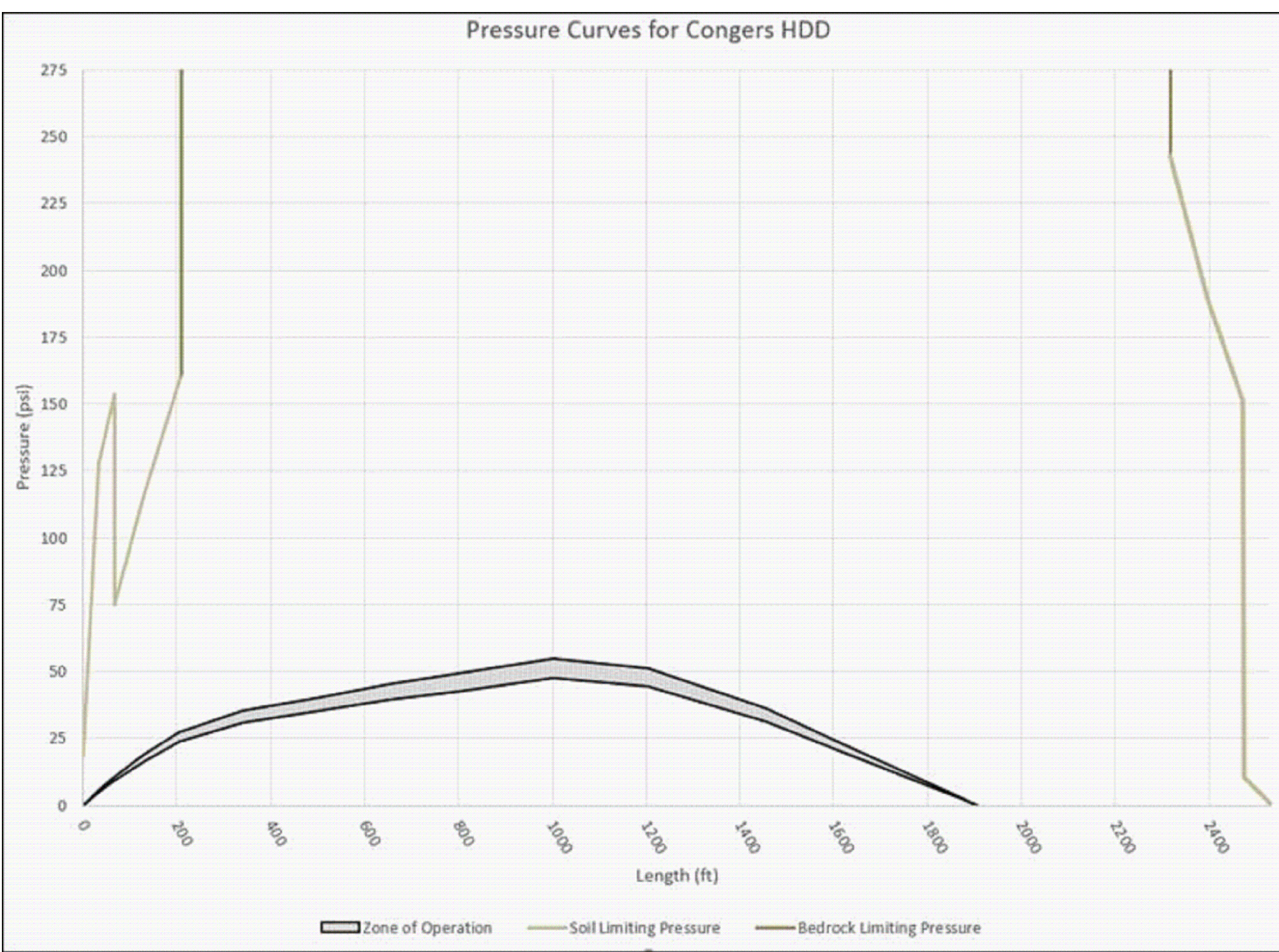
NY 00187, 11-29-22, 24x36



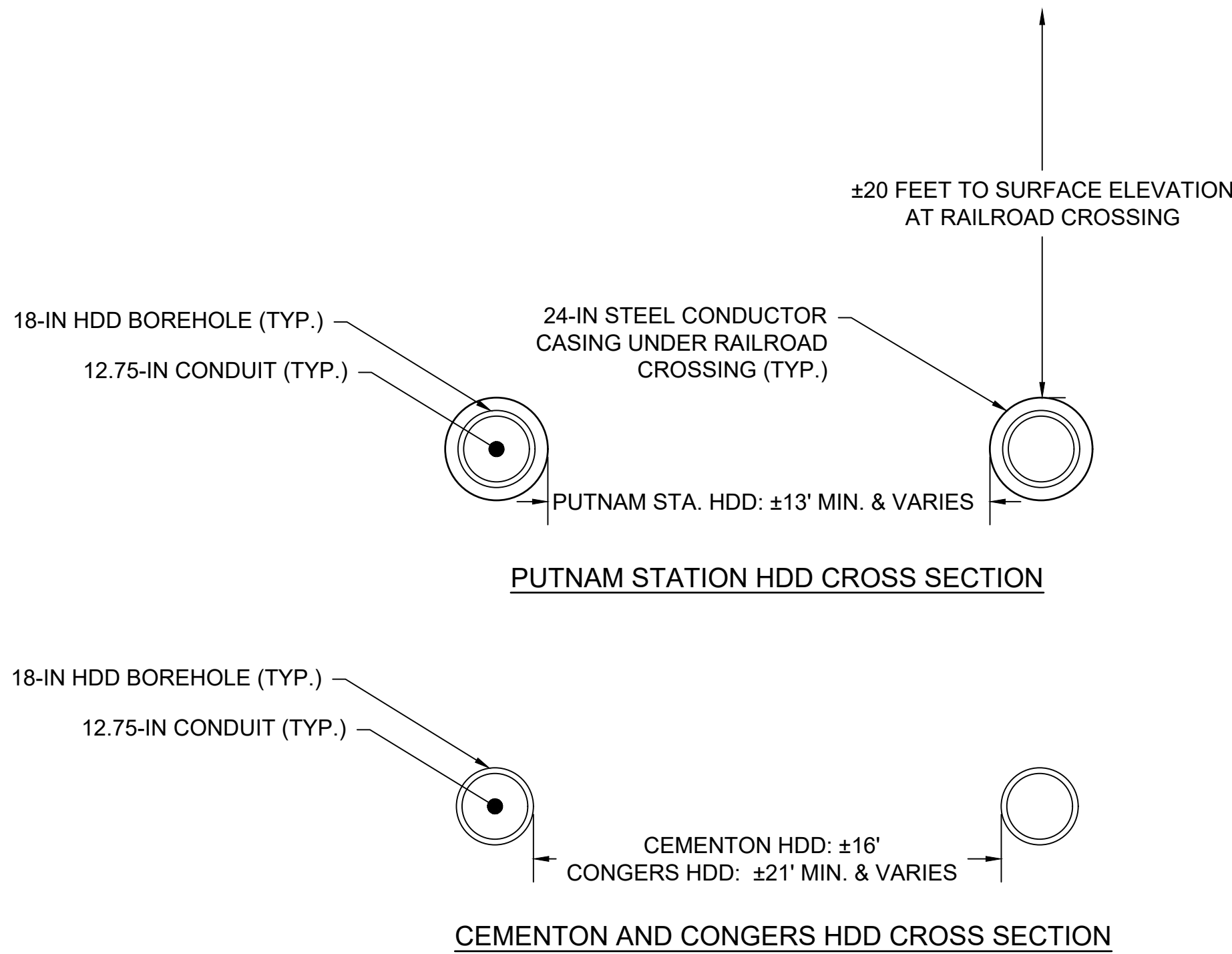
1 PUTNAM STATION HDD PRESSURE CURVE
21 SCALE: NTS



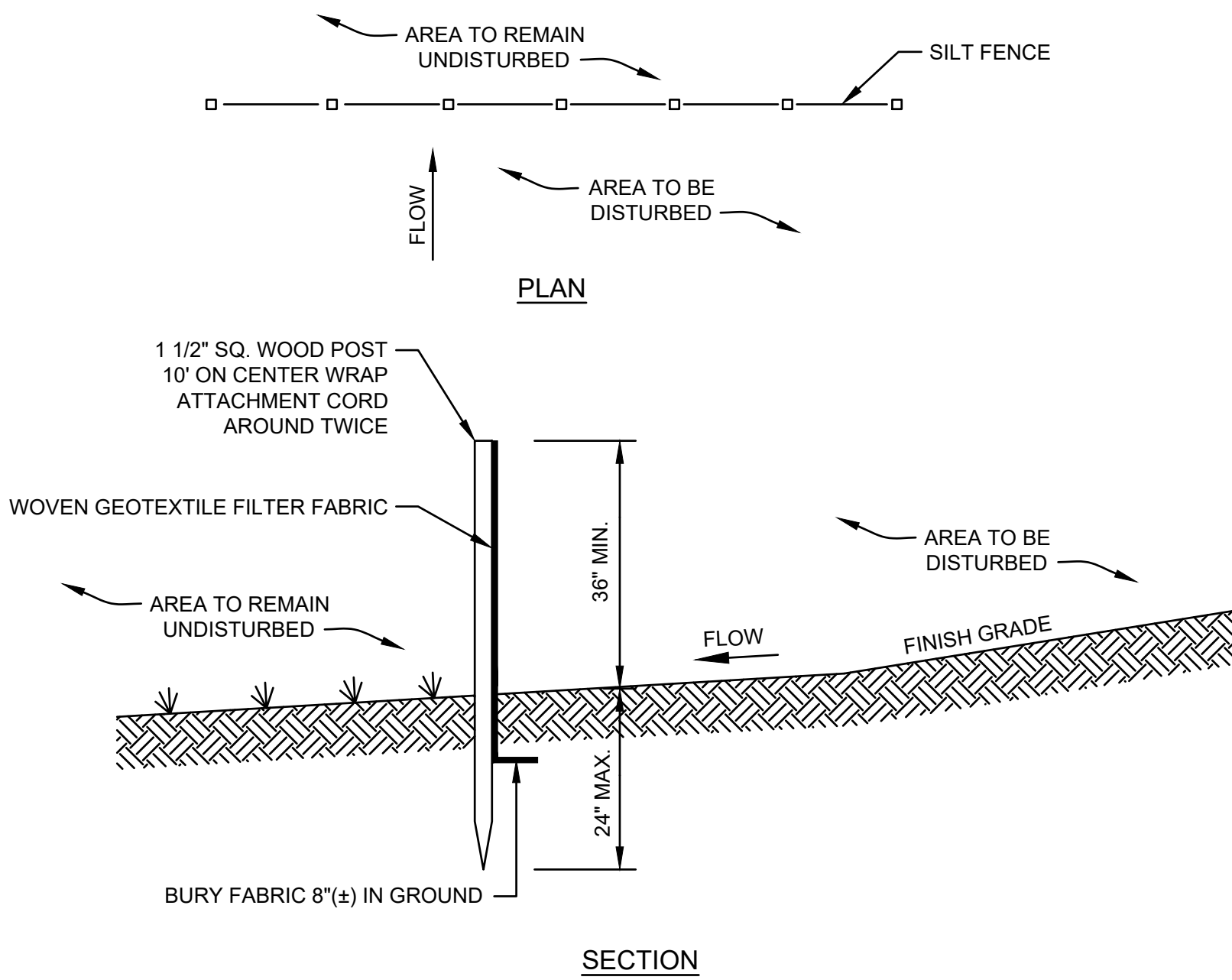
2 CEMENTON HDD PRESSURE CURVE
21 SCALE: NTS



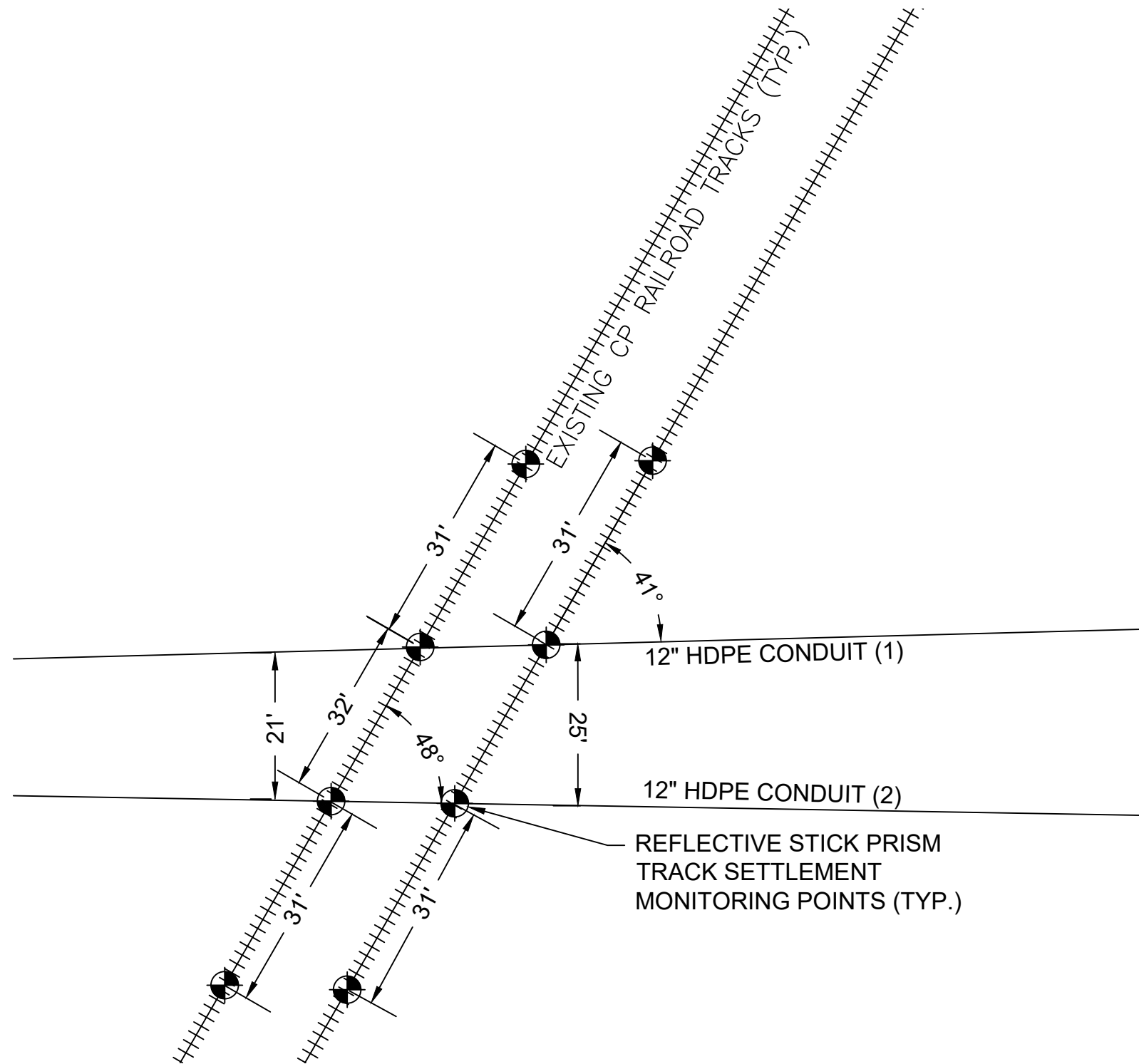
3 CONGERS HDD PRESSURE CURVE
21 SCALE: NTS





4 TYPICAL HDD CROSS SECTION
21 SCALE: NTS

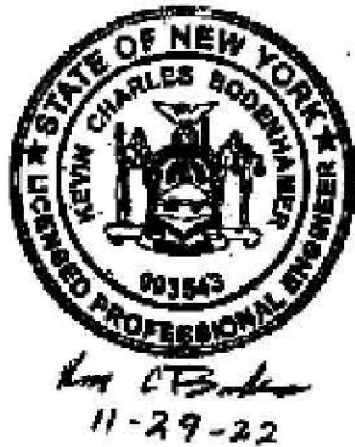


5 TYPICAL SILT FENCE
21 SCALE: NTS



6 PUTNAM STATION HDD RAILROAD CROSSING MONITORING LOCATIONS SCHEMATIC
21 SCALE: NTS

				REFERENCE DRAWINGS			REVISIONS							DRAWING APPROVALS		 <div>TRC FIRM REGISTRATION NO.: NY 0010187</div>				
				DWG. NO.	TITLE	NO.	DESCRIPTION	DATE	DRAWN	CHK	APPR	DRAWN	DATE	DETAILS						
														SCALE	PROJECT NO.		DRAWING NO.	SHT.NO.		
														NTS	496182		HDD-019	21		



USER_DWGNAME