CHPE LLC
623 Fifth Avenue, 20th Floor
New York, NY 10022

Champlain Hudson Power Express ("CHPE")
Environmental Management & Construction Plan
Notice of Major Change

Project: Champlain Hudson Power Express
Segment: 13, 14, 15
Notice Number: 264
PSC Case: 10-T-0139
USACE Permit Number: NAN-2009-01089-M12
Location (Milepost, Town/County): Randall's Island, NY, 40°47'52"N, 73°55'5"W
Drawing References: Segment 13, 14, 15 (Package 8) Appendix C: C-103, C-104, C-203, C-313, C-314, C-315, C-316, C-402, C-403
Other Documents/References: N/A
Component(s) Impacted by Change: Segment 13,14,15 (Package 8) Appendix C, Appendix E and Appendix J

Description of Change:

This change involves a revision to the installation methodology from a trenched cable installation beneath a paved pathway in Randall's Island Park to a trenchless horizontal directional drill (HDD) method from STA 80035+00 to 80044+70 to cross under Randall's Island NYC Parks Field 46 and Field 48.

This requested change has been reviewed extensively with NYC Parks & Recreation; the agency has no objection to this proposed change, which is designed to reduce overall impacts to the park, including the period of time needed for construction, dewatering burdens and other impacts which would have resulted from trenching. An amendment to the Parks Construction Permit No. M104.20240105 will be obtained from NYC Parks prior to beginning construction of the new HDD 134A, in parallel with consideration of this major change notice.

See Reviewer Supplement Form for full description of the changes. There are no changes to wetland or tree clearing impacts. Overall, this change will result in the same or reduced impacts to various resources on Randall's Island. However, because this change will shift the alignment outside of the deviation zone, a major change is required from the Commission.

Updates to Segment 13,14,15 Excursion Table

Excursion	Parcel ID	Sheet (Approximate – See Drawings for Details)	Stationing Start	Stationing End	Justification for Revision	Change in Environmental Impact
S13-6	Block: 1819 Lot: 203	C-103	80035+00	80035+30	Shifting of trench a few feet for alignment into new HDD 134 entry pits.	None
S13-7	Block: 1819 Lot: 203	C-103	80035+60	80036+00	Start of new HDD 134A replacement of open cut trench	None
S13-7A (NEW)	Block: 1819 Lot: 203	C-103 C-104	80036+20	80044+70	New HDD 134A replaces open cut trench	Recreation (see below)

CHPE LLC
623 Fifth Avenue, 20th Floor
New York, NY 10022

New Excursion S13-7A

1. Description of the Excursion
   The length of the excursion is approximately 850 linear feet. The entirety of the excursion will be installed via HDD below grade with no anticipated surface disturbance.
2. Justification
   The primary purpose of HDD 134A is to reduce the quantity of dewatering required during excavation to construct the previously designed open cut trench.
3. Environmental Impact
   - Recreation – *Excursion S13-7A will result in an overall reduction in construction duration on or near recreational areas. Pursuant to CHPE's revocable consent, HDD work will be completed in the off-season to minimize impacts on recreational uses at the park.*
   - Agricultural Resources -- *Excursion S13-7A will not impact any agricultural areas.*
   - Cultural Resources -- *Excursion S13-7A will not impact any cultural resources.*
   - Threatened and Endangered Species – *Excursion S13-7A will not impact any threatened or endangered species.*
   - Wetlands and Streams – *Excursion S13-7A will not impact any wetlands or streams.*

Lastly, CHPE has the necessary land rights to construct and operate the Facility in this location through its Revocable Consent from the City of New York. Any future updates to that Revocable Consent will be filed on DMM upon receipt.

CC Requirements for Modifying an EMCP

#	Certificate Condition	Description of the Proposed change
158	The EM&CP approved by the Commission may incorporate modifications from the EM&CP proposed by the Certificate Holders. No change to the approved EM&CP may thereafter be made except in accordance with the following procedures:	
158(a)	For a proposed change that: (i) would involve a site listed or eligible for listing on the New York State or National Register of Historic Places, the Certificate Holders shall give at least two (2) weeks prior notice to the Field Service Bureau of OPRHP. (ii) would involve any State-regulated wetland or protected stream or water body, the Certificate Holders shall give at least two weeks prior notice to NYSDEC, and, if within the Adirondack Park, to APA. (iii) would affect the occupied habitat of a TE species, the Certificate Holders shall give at least two weeks prior notice to NYSDEC and to the USFWS or NMFS (where applicable) prior to providing notice to DPS staff of the proposed change. (iv) would affect the individual or habitat supporting RTE plants, the Certificate Holders shall give at least two (2) weeks prior notice to NYSDEC and DPS. (v) would involve agricultural land, the Certificate Holders shall give at least two (2) weeks prior notice to Ag & Mkts. (vi) would involve the herbicides planned for use (including mixed proportions, additives or method of application), the Certificate Holders shall give at least thirty (30) days prior notice to NYSDEC. (vii) would affect land or water owned or controlled by CNY, the Certificate Holders shall give at least two (2) weeks prior notice to CNY.	(i)This change does not involve a site listed in the NYS or National Register of Historic Places. (ii)This change does not result in an increased impact to any federal or State-regulated wetland or waterbody and is not located in the Adirondack Park. (iii)This change does not affect an occupied habitat of a TE species. (iv) This change does not affect individual species or habitat supporting RTE plants. (v)The change does not involve Agricultural Land. (vi)There are no changes in herbicide use as result of the requested revision. (vii) The change is on land owned or occupied by New York City.

CHPE
Champlain Hudson Power Express

CHPE LLC
623 Fifth Avenue, 20th Floor
New York, NY 10022

158(b)	The Certificate Holders shall report any proposed changes to the EM&CP to DPS Staff. DPS Staff will refer to the Commission for approval any proposed changes that cause a substantial increase in environmental impact, after consultation with NYSDEC, any proposed changes that relate to contested issues decided during the proceeding, and any proposed changes affecting State highways (but need not do so if the report indicates NYSDOT's agreement to such proposed changes). DPS Staff is authorized to approve all other proposed changes, in accordance with the procedure outlined herein, and will submit reports of such changes to the Secretary or the Secretary's designee, which reports will be posted on the Commission's website under this case number.	See description above.
158(c)	Upon being advised that DPS Staff will refer a proposed change to the Commission, the Certificate Holders shall notify all active parties that have requested to be so notified, as well as property owners or lessees whose property is affected by the proposed change. The notice shall: (i) describe the original conditions and the requested change; (ii) provide documents supporting the request; and (iii) state that persons may comment by writing to the Commission within twenty-one (21) days of the notification date.	N/A
158(d)	The Certificate Holders shall not execute any proposed change until they receive written approval from the Commission (if Commission approval is required pursuant to subparagraph (a) of this paragraph) or oral or written approval from DPS Staff (in the case of a change that Staff has authority to approve) except in emergency situations threatening personal injury, property damage, or severe adverse environmental impact, or as specified in the EM&CP. When the Certificate Holders have obtained oral approval from DPS Staff for a change, DPS Staff will confirm such approval in writing within ten (10) business days.	CHPE anticipates receiving oral or written approval from DPS staff.

Proposed Change Involves New/Additional Impacts to:

☐Site listed or eligible for listing on the New York State or National Register of Historic Places [CC 158(a)(i)]
☐State-regulated wetland or protected stream or water body [CC 158(a)(ii)]
☐Occupied habitat of a TE species [CC 158(a)(iii)]
☐Individual or habitat supporting RTE plants [CC 158(a)(iv)]
☐Agricultural land [CC 158(a)(v)]
☐Herbicides planned for use (including mixed proportions, additives or method of application) [CC 158(a)(vi)]
☒Land or water owned or controlled by CNY [CC 158(a)(vii)]
☐Federally regulated wetland or protected stream or water body [Requires Transmittal to ACOE]

List of References and Attachments:

FDC-0050: Reviewer Supplement Form
Segments 13, 14, 15 (Package 8) Appendix C: Revised Sheets
Segments 13, 14, 15 (Package 8) Appendix E: Updates
Segments 13, 14, 15 (Package 8) Appendix J: HDD Design Summary Report Changes

CHPE LLC
623 Fifth Avenue, 20th Floor
New York, NY 10022

Signoff by: CHPE Overland Team Date: _____

Approvals

Position	Name	Signature	Date
Segment Engineer:	Eric Schlosser	Electronically signed by Eric.Schlosser Date: 10/15/2024 4:54:48 PM	10/15/2024
Segment Manager:	Tyler Weber	Electronically signed by Tyler.Weber Date: 10/15/2024 5:07:12 PM	10/15/2024
CHPE, LLC Approval:	Paul Weske	Paul Weske	10/16/2024
Transmitted to DPS by:			
DPS Approval By:			
Transmitted to ACOE by:			

CHPE LLC
623 Fifth Avenue, 20th Floor
New York, NY 10022

Segment 13,14,15 (Package 8)

EM&CP Appendix C Sheet Revisions

Sheet No.	Rev No.	Revision Description	Summary
G-001	2	FDC-0050: HDD 134A Addition	Update to sheet index to include new sheets from added HDD 134A
G-003	1	FDC-0050: HDD 134A Addition	Update to general notes sheet adding notes from 3rd party coordination.
C-103	3	FDC-0050: HDD 134A Addition	Update to plan and profile to incorporate added HDD 134A (entry side) along with utility updates based on additional pothole investigation to facilitate the new HDD design.
C-104	2	FDC-0050: HDD 134A Addition	Update to plan and profile to incorporate added HDD 134A (exit side) along with utility updates based on additional pothole investigation to facilitate the new HDD design.
C-203	0	FDC-0050: HDD 134A Addition	New sheet to show the LOW expansion southeast of the added HDD 134A exit pits to facilitate HDD pull back operations.
C-313	0	FDC-0050: HDD 134A Addition	New sheet for added HDD 134A Conduit 1 plan view.
C-314	0	FDC-0050: HDD 134A Addition	New sheet for added HDD 134A Conduit 1 profile view.
C-315	0	FDC-0050: HDD 134A Addition	New sheet for added HDD 134A Conduit 2 plan view.
C-316	0	FDC-0050: HDD 134A Addition	New sheet for added HDD 134A Conduit 2 profile view.
C-402	3	FDC-0050: HDD 134A Addition	Update to erosion and sediment control plan to incorporate added HDD 134A.
C-403	2	FDC-0050: HDD 134A Addition	Update to erosion and sediment control plan to incorporate added HDD 134A.

Summary of Affected Easement (s)

- NYC Parks and Recreation Block: 1819, Lot: 203

SHEET LIST TABLE	
SHEET NUMBER	SHEET TITLE
PACKAGE 8: GENERAL SHEETS	
G-000	COVER SHEET
G-001	SHEET INDEX
G-002	PROJECT WIDE GENERAL NOTES 01
G-003	PACKAGE 8 SPECIFIC GENERAL NOTES
G-004	PACKAGE 8 SPECIFIC GENERAL NOTES
G-005	LEGEND & ABBREVIATIONS
G-006	PLAN AND PROFILE KEY MAP & SPLICE LOCATION TABLE
G-007	EM&CP DATA TABLES 01
G-008	EM&CP DATA TABLES 02
PACKAGE 8: PLAN AND PROFILE SHEETS	
C-101	STA. 80000+00 TO STA. 80013+00 PLAN AND PROFILE
C-102	STA. 80013+00 TO STA. 80028+00 PLAN AND PROFILE
C-103	STA. 80028+00 TO STA. 80038+00 PLAN AND PROFILE
C-104	STA. 80038+00 TO STA. 80053+00 PLAN AND PROFILE
C-105	STA. 80053+00 TO STA. 80067+00 PLAN AND PROFILE
C-106	STA. 80067+00 TO STA. 80081+00 PLAN AND PROFILE
C-107	STA. 80081+00 TO STA. 80095+00 PLAN AND PROFILE
C-108	STA. 80095+00 TO STA. 80107+90 PLAN AND PROFILE
C-109	RANDALL'S ISLAND NYC PARKS PROPOSED SIDEWALK
C-110	GROUND WATER DISPOSAL PLAN – RANDALL'S ISLAND
PACKAGE 8: ACCESS AND CONSTRUCTION STAGING PLANS	
C-201	STAGING AND WORK AREA – BRONX
C-202	STAGING AND WORK AREA – ASTORIA
C-203	LOW EXTENTS AND PULLBACK AREA – RANDALL'S ISLAND
PACKAGE 8: HDD TRENCHLESS PLANS	
C-301	HDD #134 CROSSING, CONDUIT 1
C-302	HDD #134 CROSSING, CONDUIT 1
C-303	HDD #134 CROSSING, CONDUIT 2
C-304	HDD #134 CROSSING, CONDUIT 2
C-305	HDD #135 CROSSING, CONDUIT 1
C-306	HDD #135 CROSSING, CONDUIT 1
C-307	HDD #135 CROSSING, CONDUIT 1
C-308	HDD #135 CROSSING, CONDUIT 1
C-309	HDD #135 CROSSING, CONDUIT 2
C-310	HDD #135 CROSSING, CONDUIT 2
C-311	HDD #135 CROSSING, CONDUIT 2
C-312	HDD #135 CROSSING, CONDUIT 2
C-313	HDD #134A CROSSING, CONDUIT 1
C-314	HDD #134A CROSSING, CONDUIT 1
C-315	HDD #134A CROSSING, CONDUIT 2
C-316	HDD #134A CROSSING, CONDUIT 2
PACKAGE 8: EROSION AND SEDIMENT CONTROL PLANS	
C-400	E&SC KEY SHEET
C-401	STA. 80000+00 TO STA. 80013+00
C-402	STA. 80027+00 TO STA. 80038+00
C-403	STA. 80038+00 TO STA. 80053+50
C-404	STA. 80094+00 TO STA. 80107+90
C-405	RANDALL'S ISLAND NYC PARKS PROPOSED SIDEWALK
PACKAGE 8: MAINTENANCE AND PROTECTION OF TRAFFIC PLANS	
C-501	WORK ZONE TRAFFIC CONTROL NOTES, LEGEND AND ABBREVIATIONS
C-502	WORK ZONE TRAFFIC CONTROL PLAN 01 – BRONX
C-503	WORK ZONE TRAFFIC CONTROL PLAN 02 – RANDALL'S ISLAND
C-504	WORK ZONE TRAFFIC CONTROL PLAN 02 – RANDALL'S ISLAND PROFILE AND SECTION VIEW
C-505	WORK ZONE TRAFFIC CONTROL PLAN 03 – RANDALL'S ISLAND BIKE & PEDESTRIAN TRAFFIC CONTROL, OUTSIDE OF RECREATION PERIOD
C-506	WORK ZONE TRAFFIC CONTROL PLAN 03 – RANDALL'S ISLAND BIKE & PEDESTRIAN TRAFFIC CONTROL, PEAK RECREATION PERIOD
C-507	WORK ZONE TRAFFIC CONTROL PLAN 04 – ASTORIA

PACKAGE 8: CIVIL DETAILS: ESC DETAILS	
C-601	EROSION AND SEDIMENT CONTROL DETAILS
C-602	EROSION AND SEDIMENT CONTROL DETAILS
C-603	EROSION AND SEDIMENT CONTROL DETAILS
C-604	EROSION AND SEDIMENT CONTROL DETAILS
C-613	WETLAND WORKING SURFACE
PACKAGE 8: CIVIL DETAILS: CONSTRUCTION AND INSTALLATION DETAILS	
C-621	TRENCHING DETAILS
C-622	DETAILS
C-622.1	PROPOSED FIRE HYDRANT RELOCATION
C-622.2	DRAINAGE RELOCATION DETAIL
PACKAGE 8: CIVIL DETAILS: RESTORATION DETAILS	
C-631	SURFACE RESTORATION DETAILS
PACKAGE 8: STRUCTURAL DETAILS	
S-700	SPLICE VAULT PLAN AND ELEVATION
S-701	SPLICE VAULT SECTION AND DETAILS
S-702	SPLICE VAULT ANCHOR AND EMBED DETAILS
S-703	SPLICE VAULT DETAILS
S-705	STRUCTURAL GENERAL NOTES AND ABBREVIATIONS
S-720	REINFORCING TRAY STRUCTURE DETAILS I
S-721	REINFORCING TRAY STRUCTURE DETAILS II
S-730	TRANSITION VAULT PLAN AND ELEVATION
S-731	TRANSITION VAULT SECTION AND DETAILS
S-732	TRANSITION VAULT ANCHOR AND EMBED DETAILS
S-733	TRANSITION VAULT DETAILS
PACKAGE 8: ELECTRICAL DETAILS	
C-801	ABOVE GROUND MARKING DETAILS
C-802	TYPICAL VAULT SNAKING DETAILS
C-803	TYPICAL VAULT GROUNDING DETAILS
C-805	TYPICAL TRANSITION VAULT SNAKING DETAILS
C-806	TRANSITION VAULT GROUNDING DETAILS
C-807	SPLICE VAULT AND CABLE MARKING DETAILS
C-812	VAULT CONNECTION DETAILS
PACKAGE 8: COMMUNICATIONS DETAILS	
C-850	TRANSITION VAULT FIBER OPTIC DETAIL
C-852	ENCLOSED VAULT W/ FIBER OPTICS
C-855	FIBER OPTIC SPLICE DIAGRAM
C-856	FIBER OPTIC SLACK ENCLOSURE DETAIL
PACKAGE 8: OTHER DETAILS	
C-901	TYPICAL UTILITY SEPARATION DETAILS

CHPE Champlain Hudson Power Express

PROJECT NO.: 21162 | PROJECT NO.: 120174 | ALTERED ON: | AFFIXED ON: 10/15/2024

Kiewit | Engineering and Land Surveying, P.C.

STATE OF NEW YORK · CHAKRADHAR VALLEM · 105203 · LICENSED PROFESSIONAL ENGINEER

No.	DATE	SUBMITTAL / REVISION DESCRIPTION	DB	APP
----	----	----	----	----
----	----	----	----	----
----	----	----	----	----
----	----	----	----	----
----	----	----	----	----
2	10/15/2024	FDC-0050 HDD 134A ADDITION	BL	CV
1	04/03/2024	NDC-0036: 3RD PARTY UPDATES	MK	CV
0	07/31/2023	ISSUED FOR CONSTRUCTION SUBMISSION	MK	CV

CHAMPLAIN HUDSON POWER EXPRESS
SEGMENTS 13 TO 15 - PACKAGE 8
TRANSITION VAULT 5 TO ASTORIA CONVERTER STATION

SHEET INDEX

DRAWN BY: MK | DESIGNED BY: MK | APPROVED BY: CV | SCALE AS SHOWN | DATE: 07/31/2023

PERMIT DRAWING NO.

N/A

DRAWING NO.

G-001

ADDITIONAL GENERAL NOTES

1. CONTRACTOR SHALL OBTAIN TREE WORK PERMIT AS PER NYCDPR TREE PROTECTION PROTOCOL FOR ALL WORK TO BE PERFORMED ON OR WITHIN 50 FEET OF A TREE UNDER NEW YORK CITY JURISDICTION.
2. ALL EXISTING TREES WHICH ARE WITHIN LIMIT OF WORK AND ARE IMPACTED BY THE PROPOSED WORK SHALL BE REPLACED IN ACCORDANCE WITH APPLICABLE STANDARDS FROM NYCDOT AND NYCDPR AND THE CERTIFICATE CONDITIONS.
3. IT IS ASSUMED THAT ALL EXISTING UTILITIES WILL REMAIN IN PLACE AND BE PROTECTED. PROPOSED CONDUIT'S ALIGNMENT SHALL BE DESIGNED TO AVOID EXISTING UTILITY RELOCATIONS.
4. ALL EXISTING LIGHT POLES WHICH ARE WITHIN LIMIT OF WORK AND ARE IMPACTED BY THE PROPOSED WORK SHALL BE REMOVED WITH PRIOR SHUTDOWN PERMISSION FROM AUTHORITY AND STORED OFF-SITE, AND RE-INSTALLED AT THE CONCLUSION OF THE PROJECT, IN ACCORDANCE WITH APPLICABLE STANDARDS FROM NYCDOT DEPARTMENT OF STREET LIGHTING AND NYCDPR. STADIUM LIGHT POLES ARE TO REMAIN IN PLACE AND BE PROTECTED. ALL LIGHTING CIRCUITS SHALL MAINTAIN CONTINUITY AND SUPPLY UNINTERRUPTED POWER TO ALL OTHER LIGHT FIXTURES. STADIUM LIGHT POLES WITHIN THE LOW ARE NOT REQUIRED TO BE REMOVED.
5. ALL EXISTING CURBS WHICH ARE WITHIN LIMIT OF WORK AND ARE IMPACTED BY THE PROPOSED WORK SHALL BE REPLACED IN ACCORDANCE WITH APPLICABLE STANDARDS FROM NYCDOT, NYCDPR AND AS PER THE DETAIL SHOWN ON C-631. 1
6. ALL EXISTING ROAD SIGNS WHICH ARE WITHIN LIMIT OF WORK AND ARE IMPACTED BY THE PROPOSED WORK SHALL BE REPLACED IN ACCORDANCE WITH THE APPLICABLE STANDARDS FROM NYCDOT AND MUTCD.

UTILITY NOTES

1. THE SUBSURFACE UTILITY INFORMATION SHOWN HERON IS BASED ON A FIELD INVESTIGATION COMPLETED BY BLOODHOUND UTILITY LOCATORS ON JANUARY 26, 2022 AND BY McVAC IN AUGUST 2022.
2. THE SUBSURFACE UTILITY INVESTIGATION WAS PERFORMED IN AREAS OF ANTICIPATED EXCAVATION AS SPECIFIED BY REPRESENTATIVES OF MJ ENGINEERING AND LAND SURVEYING, P.C. ADDITIONAL SUBSURFACE UTILITIES MAY EXIST BEYOND THE EXCAVATION AREA, WHICH WERE NOT INVESTIGATED.
3. SELECT STORM MANHOLES AS WELL AS CATCH BASINS WERE NOT ABLE TO BE INVESTIGATED DUE TO A LARGE AMOUNT OF DEBRIS OBSTRUCTING THE STORM LINES.
4. THE SUBSURFACE UTILITIES SHOWN HEREON ARE OF QUALITY LEVEL "B" AS DEFINED BY THE AMERICAN SOCIETY OF CIVIL ENGINEERS (ASCE) IN THE "STANDARD GUIDELINES FOR THE COLLECTION AND DEPICTION OF EXISTING SUBSURFACE UTILITY DATA."
5. THE SUBSURFACE UTILITY INVESTIGATION WAS PERFORMED UTILIZING RADIO FREQUENCY (RF) AND GROUND PENETRATING RADAR (GPR) METHODOLOGIES. ELECTROMAGNETIC INTERFERENCE AND SUBSURFACE SOIL AND GROUNDWATER CONDITIONS IMPACT THE ABILITY TO IDENTIFY AND TRACE SUBSURFACE UTILITIES. THE SUBSURFACE UTILITIES HEREON REPRESENT THE UTILITIES THAT WERE IDENTIFIED UTILIZING THE RF AND GPR METHODOLOGIES. THE SUBSURFACE UTILITIES WERE NOT EXCAVATED TO CONFIRM THEIR PRESENCE, DEPTH, OR COMPOSITION.
6. THE UTILITY DEPTHS SHOWN HEREON WERE DERIVED USING RADIO FREQUENCY (RF) METHODOLOGIES AND ARE APPROXIMATE. IF PRECISE DEPTHS ARE REQUIRED, EXPOSING SUBSURFACE UTILITIES UTILIZING VACUUM EXCAVATION OR OTHER NON-DESTRUCTIVE TECHNIQUES SHOULD BE CONSIDERED.
7. DESIGNATED SUBSURFACE UTILITIES WERE SURVEYED UTILIZING CONVENTIONAL SURVEYING TECHNIQUES.
8. FIELD INVESTIGATED UTILITY INFORMATION SUPPLEMENTED BY PROVIDING RECORD UTILITY MAPPING.

RECORD UTILITY MAP REFERENCES

1. "TOPOGRAPHICAL SURVEY OF RANDALL'S AND WARD'S ISLANDS", CONTRACT M-T-104-131, DECEMBER 15 1994.
2. 'RANDALL'S ISLAND IMPROVEMENTS FIELD DEVELOPMENT PROJECT", OCTOBER 5 2006.
3. 'WARD'S ISLAND INTERCEPTING SEWERS RECORD DRAWING", CONTRACT 3, JUNE 30 1938.
4. "NEW 20" SUB-AQUEOUS WATER MAIN EXTENSION AND NEW 12" HIGH PRESSURE GAS MAIN FROM THE BRONX TO RANDALL'S ISLAND", PROJECT HED-568, OCTOBER 3 2014.

SURVEY NOTES

1. NORTH IS ORIENTED TO GRID NORTH FROM GPS OBSERVATIONS.
2. ELEVATIONS BASED ON THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88) IS US SURVEY FEET.
3. INFORMATION SHOWN HEREON GENERATED FROM A CONVENTIONAL FIELD SURVEY CONDUCTED BY M.J. ENGINEERING AND LAND SURVEYING, P.C. DURING DECEMBER / JANUARY 2022. .
4. UNITS ARE MEASURED IN U.S. SURVEY FEET.
5. ALL COORDINATES ARE IN NEW YORK STATE PLANE, NAD83, LONG ISLAND, US FOOT.

EXCAVATION IN THE VICINITY OF CON EDISON FACILITIES

1. SUPPORT OF EXCAVATION NEAR CON EDISION FACILITY SHALL BE DESIGNED MEETING OSHA STANDARDS.
2. REFERENCE CON EDISON SPECIFICATION EO-8085 FOR BACK FILLING AROUND CON EDISON FACILITIES.
3. ALL EXCAVATION IN THE VICINITY OF CON EDISON FACILITIES SHALL BE PERFORMED BY HAND USING HAND TOOLS.
4. MAINTENANCE AND SUPPORT OF CON EDISON FACILITIES SHALL ADHERE TO THE MOST RECENT VERSION OF 'JOINT BIDDING SPECIFICATIONS.'
5. MAINTENANCE AND SUPPORT OF CON EDISON OIL-O-STATIC FACILITIES MUST COMPLY WITH SPECIFICATION CE-DI1080.
6. A CON EDISON REPRESENTATIVE MUST BE IN ATTENDANCE DURING ALL EXCAVATION IN PROXIMITY TO CON EDISON FACILITIES.

1

NYCDEP NOTES

1. THE DETAILED DESIGN SHALL COMPLY WITH NYCDEP STANDARDS AND DETAILS TO THE FULLEST EXTENT POSSIBLE AND ANY DEVIATION SHALL BE APPROVED BY NYCDEP.
2. WHERE A CHPE DUCT BANK OR STRUCTURE THAT IS PLANNED FOR CONSTRUCTION VIA OPEN-CUT MEANS AND METHODS THAT IS CROSSING UNDER AN EXISTING NYCDEP SEWER, THE SEWER IS TO BE REPLACED BETWEEN MANHOLES PER NYCDEP STANDARDS, IF REQUIRED AND AS DIRECTED BY THE ENGINEER. THE CONTRACTOR MAY PROPOSE A NEW MANHOLE LOCATION FOR CONSIDERATION BY NYCDEP. A ONE-FOOT SIX-INCH (1'-6") MINIMUM VERTICAL CLEARANCE BETWEEN THE BOTTOM OF THE NYCDEP SEWER FOUNDATION AND TOP OF THE CHPE DUCT BANK OR STRUCTURE SHALL BE ACHIEVED.
3. WHERE A CHPE DUCT BANK OR STRUCTURE THAT IS PLANNED FOR CONSTRUCTION VIA OPEN-CUT MEANS AND METHODS THAT IS CROSSING ABOVE AN EXISTING NYCDEP SEWER, A ONE-FOOT SIX-INCH (1'-6") MINIMUM VERTICAL CLEARANCE SHALL BE ACHIEVED BETWEEN THE BOTTOM OF THE CHPE DUCT BANK OR STRUCTURE AND THE TOP OF NYCDEP SEWER STRUCTURE.
4. WHERE A CHPE DUCT BANK OR STRUCTURE THAT IS PLANNED FOR CONSTRUCTION VIA OPEN-CUT MEANS AND METHODS THAT IS CROSSING UNDER AN EXISTING NYCDEP DUCTILE IRON PIPE WATER MAIN, A ONE-FOOT SIX-INCH (1'-6") MINIMUM VERTICAL CLEARANCE SHALL BE ACHIEVED BETWEEN THE BOTTOM OF THE NYCDEP DUCTILE IRON PIPE WATER MAIN STRUCTURE AND THE TOP OF THE CHPE DUCT BANK OR STRUCTURE.
5. WHERE A CHPE DUCT BANK OR STRUCTURE THAT IS PLANNED FOR CONSTRUCTION VIA OPEN-CUT MEANS AND METHODS THAT IS CROSSING UNDER AN EXISTING NYCDEP CAST IRON PIPE WATER MAIN, THE IMPACTED NYCDEP CAST IRON PIPE WATER MAIN SHALL BE REPLACED WITH A NEW DUCTILE IRON PIPE WATER MAIN IF REQUIRED AND AS DIRECTED BY THE ENGINEER, PER NYCDEP STANDARDS. A ONE-FOOT SIX-INCH (1'-6") MINIMUM VERTICAL CLEARANCE BETWEEN THE TOP OF CHPE DUCT BANK OR STRUCTURE AND THE BOTTOM OF THE NYCDEP WATER MAIN SHALL BE ACHIEVED. THE GROUND COVER FROM TOP OF FINAL GRADE TO THE TOP OF THE REPLACEMENT WATER MAIN SHALL BE THREE-FEET (3'-0") TO FOUR-FEET (4'-0").
6. WHERE A CHPE DUCT BANK OR STRUCTURE THAT IS PLANNED FOR CONSTRUCTION VIA OPEN-CUT OR TRENCHLESS MEANS AND METHODS WILL BE PARALLEL TO AN EXISTING NYCDEP CAST IRON PIPE WATER MAIN, A TWO-FOOT (2'-0") MINIMUM EDGE-TO-EDGE CLEARANCE BETWEEN THE CHPE DUCT BANK OR STRUCTURE AND NYCDEP CAST IRON PIPE WATER MAIN SHALL BE ACHIEVED.
7. WHERE A CHPE DUCT BANK OR STRUCTURE THAT IS PLANNED FOR CONSTRUCTION VIA OPEN-CUT OR TRENCHLESS MEANS AND METHODS WILL BE PARALLEL TO AN EXISTING NYCDEP DUCTILE IRON PIPE WATER MAIN, A TWO-FOOT (2'-0") MINIMUM EDGE-TO-EDGE CLEARANCE BETWEEN THE CHPE DUCT BANK OR STRUCTURE AND THE NYCDEP DUCTILE IRON PIPE WATER MAIN.
8. WHERE A CHPE DUCT BANK OR STRUCTURE THAT IS PLANNED FOR CONSTRUCTION VIA OPEN-CUT OR TRENCHLESS MEANS AND METHODS WILL BE PARALLEL TO AN EXISTING NYCDEP, A TWO-FOOT (2'-0") MINIMUM EDGE-TO-EDGE CLEARANCE BETWEEN THE CHPE DUCT BANK OR STRUCTURE AND THE NYCDEP SEWER AND SEWER FOUNDATION STRUCTURE IS TO BE ACHIEVED.
9. WHERE A CHPE DUCT BANK OR STRUCTURE IS PLANNED FOR CONSTRUCTION VIA TRENCHLESS MEANS AND METHODS IS CROSSING UNDER AN EXISTING NYCDEP SEWER SUPPORT ON A DEEP FOUNDATION STRUCTURE, THE SEWER IS TO BE REPLACED, IF REQUIRED AND AS DIRECTED BY THE ENGINEER, PER NYCDEP STANDARDS.
10. WHERE A CHPE DUCT BANK OR STRUCTURE IS PLANNED FOR CONSTRUCTION VIA OPEN-CUT OR TRENCHLESS MEANS AND METHODS IS CROSSING UNDER AN EXISTING NYCDEP CATCH BASIN CONNECTION, THE EXISTING CATCH BASIN CONNECTION SHALL BE REPLACED WITH A TWELVE-INCH (12") CLASS 56 DUCTILE IRON PIPE PER NYCDEP STANDARDS AND SHALL ACHIEVE A MINIMUM ONE-FOOT SIX-INCH (1'-6") VERTICAL CLEARANCE.
11. WHERE A CHPE DUCT BANK OR STRUCTURE IS PLANNED FOR CONSTRUCTION VIA OPEN-CUT OR TRENCHLESS MEANS AND METHODS IS CROSSING UNDER AN EXISTING NYCDEP FIRE HYDRANT OR CONNECTION, THE EXISTING HYDRANT, VALVE, AND CONNECTION SHALL BE REPLACED, WITH THE CONNECTION BEING REPLACED WITH A SIX-INCH (6") CLASS 56 DUCTILE IRON PIPE PER NYCDEP STANDARDS AND SHALL ACHIEVE A MINIMUM ONE-FOOT SIX-INCH (1'-6") VERTICAL CLEARANCE FROM THE CHPE DUCT BANK OR STRUCTURE.
12. THE ELEVATION OF THE EXISTING GRADE MAY NOT BE INCREASED ABOVE AN EXISTING NYCDEP OWNED GAS MAIN, SEWER MAIN, OR WATER MAIN.
13. NYCDEP SHALL BE NOTIFIED BY THE CONTRACTOR AT LEAST THIRTY (30) DAYS PRIOR TO ANY PLANNED WORK WITHIN TWENTY-FEET (20'-0") OF ANY NYCDEP WASTEWATER TREATMENT PLANT ELECTRICAL FEEDER.
14. NYCDEP OWNS THE 12-INCH HIGH DENSITY POLYETHYLENE GAS MAIN DISTRIBUTION NETWORK ON RANDALL'S ISLAND AND CON EDISON MAINTAINS THIS GAS MAIN NETWORK. THE CONTRACTOR SHALL COORDINATE WITH NYCDEP, NYCDPR, AND CON EDISON FOR ANY ANTICIPATED SERVICE INTERRUPTIONS PRIOR TO CONSTRUCTION. WHERE A CHPE DUCT BANK OR STRUCTURE IS PLANNED FOR CONSTRUCTION VIA OPEN-CUT OR TRENCHLESS MEANS AND METHODS WILL BE PARALLEL TO AN EXISTING NYCDEP OWNED 12-INCH HIGH DENSITY POLYETHYLENE DISTRIBUTION GAS MAIN, A TWO-FOOT (2'-0") MINIMUM EDGE-TO-EDGE CLEARANCE BETWEEN THE CHPE DUCT BANK OR STRUCTURE AND THE GAS MAIN SHALL BE ACHIEVED. WHERE A CHPE DUCT BANK OR STRUCTURE IS PLANNED FOR CONSTRUCTION VIA OPEN-CUT OR TRENCHLESS MEANS AND METHODS IS CROSSING ABOVE OR BELOW AN EXISTING NYCDEP OWNED 12-INCH HIGH DENSITY POLYETHYLENE DISTRIBUTION GAS MAIN, A ONE-FOOT AND SIX INCH (1'-6") MINIMUM VERTICAL CLEARANCE BETWEEN THE CHPE DUCT BANK OR STRUCTURE AND THE NYCDEP GAS MAIN SHALL BE ACHIEVED.
15. DETAILED DESIGN DRAWINGS FOR THE PLANNED CHPE FACILITIES WITH RESPECT TO NYCDEP INFRASTRUCTURE MUST BE SUBMITTED TO NYCDEP FOR REVIEW AND APPROVAL PRIOR TO CONSTRUCTION OF CHPE. NYCDPR SHALL NOT ISSUE A CONSTRUCTION PERMIT UNTIL AFTER NYCDEP'S APPROVAL HAS BEEN GRANTED AND CONSTRUCTION PERMIT HAS BEEN ISSUED. ALL NYCDEP OWNED STRUCTURES THAT ARE REQUIRED TO BE REPLACED OR RELOCATED DUE TO CONFLICT WITH THE PROPOSED CHPE FACILITIES SHALL BE COORDINATED, DESIGNED, AND CONSTRUCTED AT NO COST TO THE CITY OF NEW YORK.

GENERAL CON EDISON NOTES

1. CONTRACTOR SHALL REFER/CONFORM TO CON ED SPECIFICATION CE-SI 1080 FOR SUPPORT OF "OIL-O-STATIC" PIPES.
2. DAMAGE TO ANY TRANSMISSION PIPE COATING MUST BE REPORTED TO CON EDISON. CHPE IS RESPONSIBLE FOR ANY REPAIRS TO THE COATING IN CONFORMANCE WITH CON EDISON SPECIFICATIONS.
3. CONTRACTOR SHALL PROVIDE DETAILS, SECTIONS OF PROPOSED SUPPORT OF EXCAVATION TO INCLUDE MAINTENANCE AND PROTECTION OF CON EDISON FACILITIES, AND TO DEMONSTRATE COMPLIANCE WITH ANGLE OF REPOSE REQUIREMENTS CONFORMING TO CON EDISON SPECIFICATION 920-1.
4. CONTRACTOR SHALL PROVIDE ANTICIPATED STIPULATION COMPLIANCE WITH RESPECT TO LENGTH OF TRENCH OPENINGS FOR SPECIFIC DURATIONS.
5. ALL PROPOSED MANHOLE LOCATIONS AND EXISTING CON EDISON FACILITIES MUST BE TEST PITTED PRIOR TO CONSTRUCTION TO DEMONSTRATE CLEARANCES.
6. ANY PROPOSED RELOCATIONS OF CON EDISON FACILITIES MUST BE DETAILED AND COORDINATED WITH CON EDISON.
7. CONTRACTOR SHALL PROVIDE ALL RELEVANT TEST PIT DATA TO CON EDISON FOR REVIEW OF CLEARANCES.
8. CONTRACTOR SHALL MAINTAIN AND PROTECT ALL CON EDISON AERIAL FACILITIES DURING CONSTRUCTION.

1

NYCDPR NOTES

1. CHPE LLC IS RESPONSIBLE FOR APPLYING FOR AND OBTAINING A NYCDPR CONSTRUCTION PERMIT BEFORE ANY WORK ASSOCIATED WITH THE SITE INVESTIGATION FOR OR THE INSTALLATION OF THE PLANNED CHPE FACILITIES, INCLUDING BUT NOT LIMITED TO SITE PREPARATION AND STAGING, CAN COMMENCE WITHIN RANDALL'S ISLAND PARK. THE PERMIT APPLICATION WILL REQUIRE IDENTIFICATION AND LOCATION OF ALL TREES AND PARK ASSETS WITHIN 50-FEET OF THE TRENCHING AREA, WORK ZONE, ACCESS PATHWAYS OR ROADWAYS, AND STAGING AREAS. A TREE SURVEY PREPARED BY A CERTIFIED ARBORIST WILL BE REQUIRED WITH THE APPLICATION FOR A SEPARATE NYCDPR FORESTRY PERMIT. RESTORATION OF PARK AREAS DISTURBED WILL REQUIRE RESTORATION ACCORDING TO NYCDPR REQUIREMENTS AND STANDARDS AND WILL BE SPECIFIED IN THE PERMIT.
2. IF CHPE OR ITS CONTRACTOR WILL BE PERFORMING WORK ON OR WITHIN 50-FEET OF A TREE UNDER CITY JURISDICTION, A TREE WORK PERMIT FROM NYCDPR WILL BE REQUIRED PRIOR TO THE START OF CONSTRUCTION AND ALL WORK WILL BE PERFORMED IN COMPLIANCE WITH NYCDPR TREE PROTECTION PROTOCOL AS IN EFFECT UPON A TREE WORK PERMIT APPLICATION. ANY TREES THAT ARE ENVISIONED TO BE IN CONFLICT WITH THE CABLE ROUTE SHALL BE BROUGHT TO NYCDPR'S ATTENTION FOR A PRELIMINARY EVALUATION PRIOR TO SUBMISSION OF A TREE WORK PERMIT. IN THE CASE OF TREE REMOVAL, TREE RESTITUTION VALUES SHALL BE DETERMINED AS PER THE NYC TREE VALUATION METHOD WILL BE REQUIRED.
3. NYCDPR ASSETS THAT ARE ADJACENT TO AND IN PROXIMITY WITH THE CHPE ALIGNMENT THAT WILL OR MAY REQUIRE PROTECTION, RESTORATION, OR RECONSTRUCTION SHALL INCLUDE, BUT ARE NOT LIMITED TO: CHAIN LINK FENCE, PARK SIGNAGE, PARK PATHWAY, BLEACHERS, PARK ROADWAY, GRASS LAWN, TREES, LIGHT POLES, BASEBALL FIELD FENCING, BASEBALL FIELD, AND UTILITY LINES. THESE ELEMENTS ARE DEPICTED ON THE 2010 CONSTRUCTION DRAWINGS [RANDALL'S ISLAND IMPROVEMENTS FIELD DEVELOPMENT PROJECT] PROVIDED BY NYCDPR TO CHPE LLC, AND WHICH WILL BE PROVIDED TO THE CONTRACTOR, AND ARE MADE PART OF THIS REVOCABLE CONSENT AGREEMENT.
4. RESTORATION OF AFFECTED AREAS WILL BE REQUIRED TO BE COMPLETED PER THE 2010 BALLFIELDS AND IRRIGATION PLAN SET DEPICTING THE PARK PATHWAYS AND NEARBY PARK AMENITIES. THE RESTORATION REQUIREMENTS WILL BE DETERMINED UPON APPLICATION TO NYCDPR FOR THE CONSTRUCTION PERMIT ASSOCIATED WITH PLANNED CHPE FACILITIES.

AMTRAK NOTES

1. ALL WORK ON OR ADJACENT RAILROAD PROPERTY MUST COMPLY WITH AMTRAK ENGINEERING PRACTICES EP3014 – SAFETY AND PROTECTION OF RAILROAD TRAFFIC AND PROPERTY.
2. DESIGN AND CONSTRUCTION MUST COMPLY WITH AMTRAK ENGINEERING PRACTICES EP3005 – PIPELINE OCCUPANCY. ANY VARIANCE REQUIRES AMTRAK APPROVAL. PRIOR TO CONSTRUCTION OPERATIONS, CONTRACTOR MUST SUBMIT, AT A MINIMUM, THE FOLLOWING TO AMTRAK FOR REVIEW AND APPROVAL: CONSTRUCTION PROCEDURE MEANS AND METHODS, SCHEDULE, DEWATERING SYSTEM (IF ANY), AND CALCULATIONS, AS APPLICABLE. ALL CALCULATIONS MUST BE SIGNED AND STAMPED/SEALED BY A LICENSED ENGINEERING REGISTERED IN THE STATE.
3. ALL UNDERGROUND UTILITIES, CABLE, AND FACILITIES MUST BE LOCATED AND PROTECTED BEFORE ANY EXCAVATING, DRILLING, BORING/DIRECTIONAL DRILLING, GROUND PENETRATING ACTIVITIES, OR CONSTRUCTION TAKES PLACE. THIS INCLUDES RAILROAD AND COMMERCIAL UTILITIES, CABLES, DUCT LINES, AND FACILITIES. THESE ACTIVITIES WILL NOT BE PERFORMED IN CLOSE PROXIMITY TO THE RAILROAD DUCT LINES UNLESS MONITORED BY ON-SITE AMTRAK COMMUNICATIONS AND SIGNAL (C&S) DEPARTMENT PERSONNEL. HAND DIGGING MAY BE REQUIRED, AS DIRECTED BY AMTRAK THROUGH THE ON-SITE AMTRAK C&S SUPPORT PERSONNEL. AMTRAK MAINTAINS THE RIGHT TO ACCESS ALL EXISTING CABLES AND CONDUITS THROUGHOUT CONSTRUCTION; AMTRAK ALSO RESERVES THE RIGHT TO UPGRADE AND INSTALL NEW CABLES AND CONDUITS IN THE AFFECTED AREA. THE "ONE-CALL" PROCESS MUST BE FOLLOWED. BE AWARE THAT AMTRAK IS NOT PART OF THE ONE-CALL PROCESS; CONTACT AMTRAK ENGINEERING TO HAVE ALL RAILROAD UNDERGROUND UTILITIES AND ASSETS LOCATED. IF REQUESTED BY AMTRAK, EXISTING DEPTHS OF UTILITIES BEING CROSSED MUST BE VERIFIED THROUGH TEST PITS PERFORMED BY THE CONTRACTOR AS DIRECTED BY AND UNDER THE DIRECT SUPERVISION OF AMTRAK C&S SUPPORT PERSONNEL. PRECAUTIONS MUST BE TAKEN TO PREVENT ANY INTERRUPTION TO RAILROAD OPERATION.
4. ANY WORK (OR EQUIPMENT BEING STAGED ONSITE DURING CONSTRUCTION) PERFORMED AT OR NEAR A RAILROAD CROSSING MUST NOT OBSTRUCT THE VIEW OF FLASHING LIGHT UNITS OR GATES TO ONCOMING TRAFFIC.
5. PRIOR TO ENTERING AMTRAK'S PROPERTY FOR ANY WORK, THE CONTRACTOR MUST EXECUTE AMTRAK'S STANDARD TEMPORARY PERMIT TO ENTER UPON PROPERTY (PTE). THE FULLY EXECUTED PTE, WRITTEN NOTICE TO PROCEED FROM AMTRAK THAT ALL REQUIREMENTS OF THE PTE HAVE BEEN MET AND PROOF OF SAFETY TRAINING MUST, AT ALL TIMES, BE FURNISHED BY THE CONTRACTOR AT THE PROJECT SITE.
6. ALL PERSONS THAT ARE ON OR ADJACENT TO THE RAILROAD PROPERTY MUST SUCCESSFULLY COMPLETE THE CONTRACTOR ORIENTATION TRAINING. ALL CONTRACTORS MUST CARRY THEIR "AMTRAK CONTRACTOR ROADWAY WORKER PROTECTION" CARD WITH THEM AT ALL TIMES WHILE ON OR ADJACENT TO RAILROAD PROPERTY.
7. ANY DEBRIS OR DAMAGE RESULTING FROM WORK SHALL BE IMMEDIATELY REPORTED TO THE RAILROAD. RAILROAD SHALL BE REPAIRED BY RAILROAD FORCES AT PROJECT EXPENSE.
8. ELECTROMAGNETIC INTERFERENCE (EMI) CAUSED BY HIGH VOLTAGE TRANSMISSION LINES CAN HAVE AN IMPACT ON BURIED PIPELINES AND COMMUNICATION CABLE. EMI CAN HAVE AN IMPACT ON RAILROAD TRACK CIRCUITS, SIGNAL CIRCUITS AND FREQUENCIES ASSOCIATED WITH APPROACH OVERLAY AND ISLAND CIRCUITS FOR GRADE CROSSING EQUIPMENT. THE TRANSMISSION OWNER IS RESPONSIBLE FOR THE ELECTROMAGNETIC COMPATIBILITY BETWEEN THE TRANSMISSION LINES INSTALLED AND THE AMTRAK C&S SYSTEM TO MITIGATE THE RISK OF UNINTENTIONAL GENERATION, PROPAGATION AND RECEPTION OF ELECTROMAGNETIC WAVES THAT CAN CAUSE EMI OR EVEN PHYSICAL DAMAGE.
9. SHOULD EMI BE FOUND AT THIS LOCATION, THE TRANSMISSION OWNER MUST CONDUCT APPROPRIATE EMI/EMF STUDIES AND PROVIDE REMEDIES TO CORRECT ANY INDUCTIVE INTERFERENCE WITH RAILROAD FACILITIES AT OWNER'S EXPENSE.

1

Dig Safely. New York Call 811 before you dig

CHPE Champlain Hudson Power Express

PROJECT NO.: 21162	PROJECT NO.: 120174	ALTERED ON:	AFFIXED ON: 10/15/2024
Kiewit	Engineering and Land Surveying, P.C.		STATE OF NEW YORK CHAKRADHAR VALLABH 105203 LICENSED PROFESSIONAL ENGINEER

No.	DATE	SUBMITTAL / REVISION DESCRIPTION	DB	APP
----	----	----	----	----
----	----	----	----	----
----	----	----	----	----
----	----	----	----	----
----	----	----	----	----
----	----	----	----	----
1	10/15/2024	FDC-0050 HDD 134A ADDITION	BL	CV
0	07/31/2023	ISSUED FOR CONSTRUCTION SUBMISSION	MK	CV

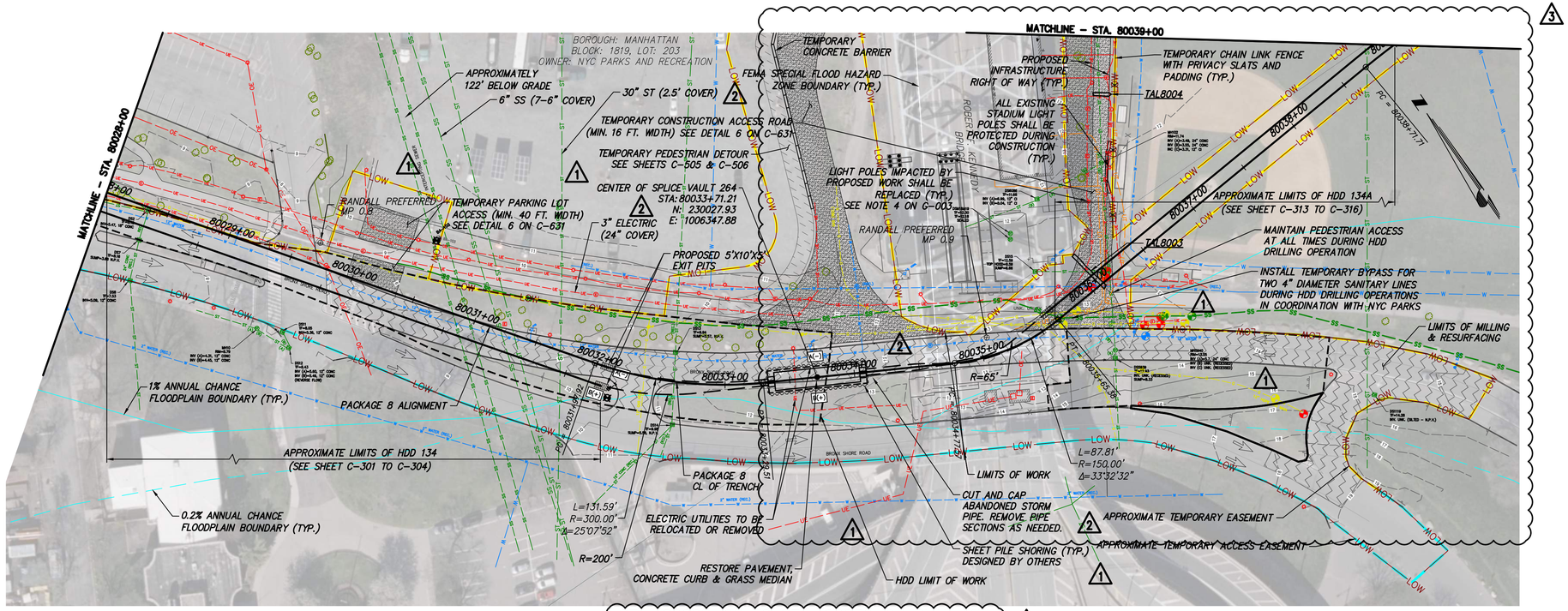
CHAMPLAIN HUDSON POWER EXPRESS
SEGMENTS 13 TO 15 - PACKAGE 8
TRANSITION VAULT 5 TO ASTORIA CONVERTER STATION

PACKAGE 8 SPECIFIC GENERAL NOTES

DRAWN BY: MK | DESIGNED BY: MK | APPROVED BY: CV | SCALE AS SHOWN | DATE: 07/31/2023

PERMIT DRAWING NO.: **N/A**

DRAWING NO.: **G-003**

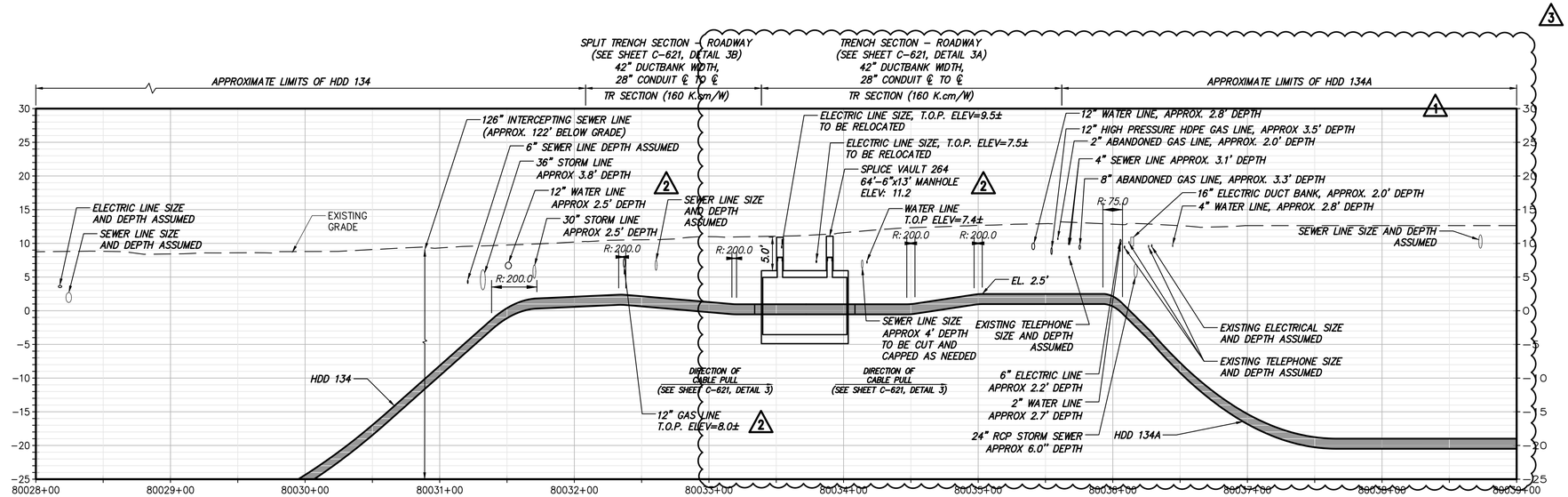


STA. 80028+00 TO STA. 80039+00 PLAN VIEW 3

SCALE: 1" = 50'

NOTES:

1. CONTRACTOR SHALL RESTORE ALL AFFECTED ASPHALT AND GREEN AREAS TO ORIGINAL CONDITION TO THE SATISFACTION OF NYC PARKS.
2. ALL WORK SHALL BE CONTAINED WITHIN LOW SHOWN.



STA. 80028+00 TO STA. 80039+00 PROFILE 3

SCALE: H: 1" = 50' V: 1" = 10'

CHPE Champlain Hudson Power Express

Kiewit

Engineering and Land Surveying, P.C.

PROJECT NO.: 21162	PROJECT NO.: 120174	ALTERED ON:	AFFIXED ON: 10/15/2024

STATE OF NEW YORK · CHAKRADHAR V. ALLAM · 105203 · LICENSED PROFESSIONAL ENGINEER

No.	DATE	SUBMITTAL / REVISION DESCRIPTION	DB	APP
----	----	----	----	----
----	----	----	----	----
----	----	----	----	----
----	----	----	----	----
3	1015/2024	FDC-0050: HDD 134A ADDITION	BL	CV
2	06/28/2024	FDC-0052: SV264 RELOCATION	MK	CV
1	04/03/2024	NDC-0036: PROFILE REVISIONS & 3RD PARTY UPDATES	MK	CV
0	07/31/2023	ISSUED FOR CONSTRUCTION SUBMISSION	MK	CV

CHAMPLAIN HUDSON POWER EXPRESS

SEGMENTS 13 TO 15 - PACKAGE 8

TRANSITION VAULT 5 TO ASTORIA CONVERTER STATION

STA. 80028+00 TO STA. 80039+00 3

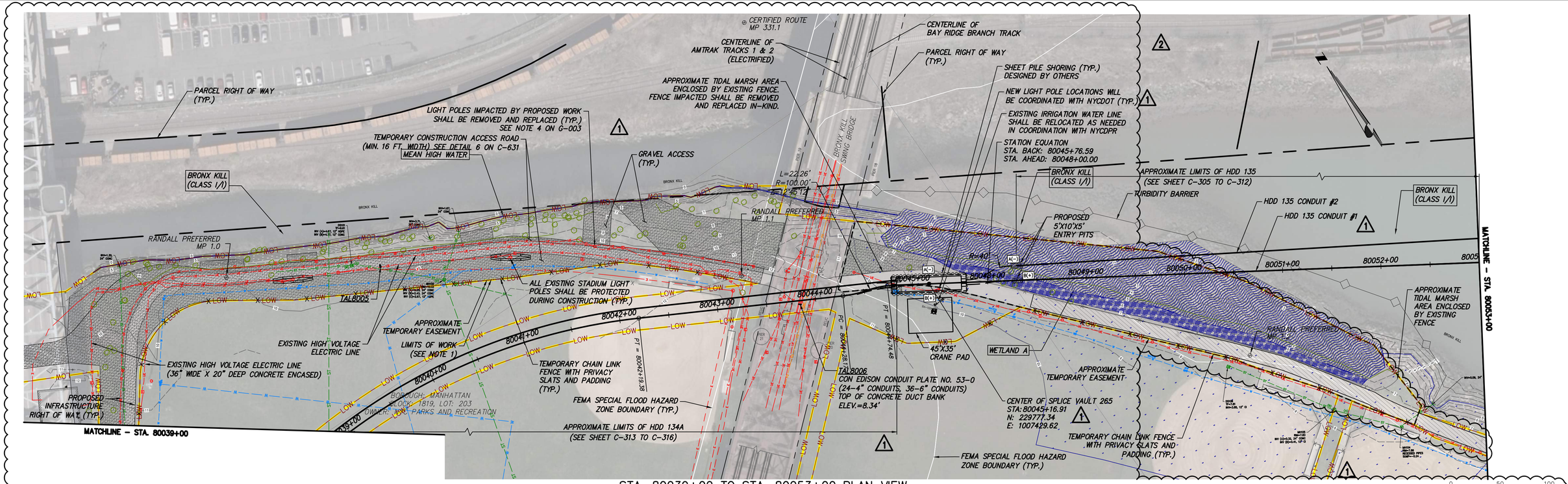
DRAWN BY: MK | DESIGNED BY: MK | APPROVED BY: CV | SCALE AS SHOWN | DATE: 07/31/2023

PERMIT DRAWING NO.

N/A

DRAWING NO.

C-103



STA. 80039+00 TO STA. 80053+00 PLAN VIEW

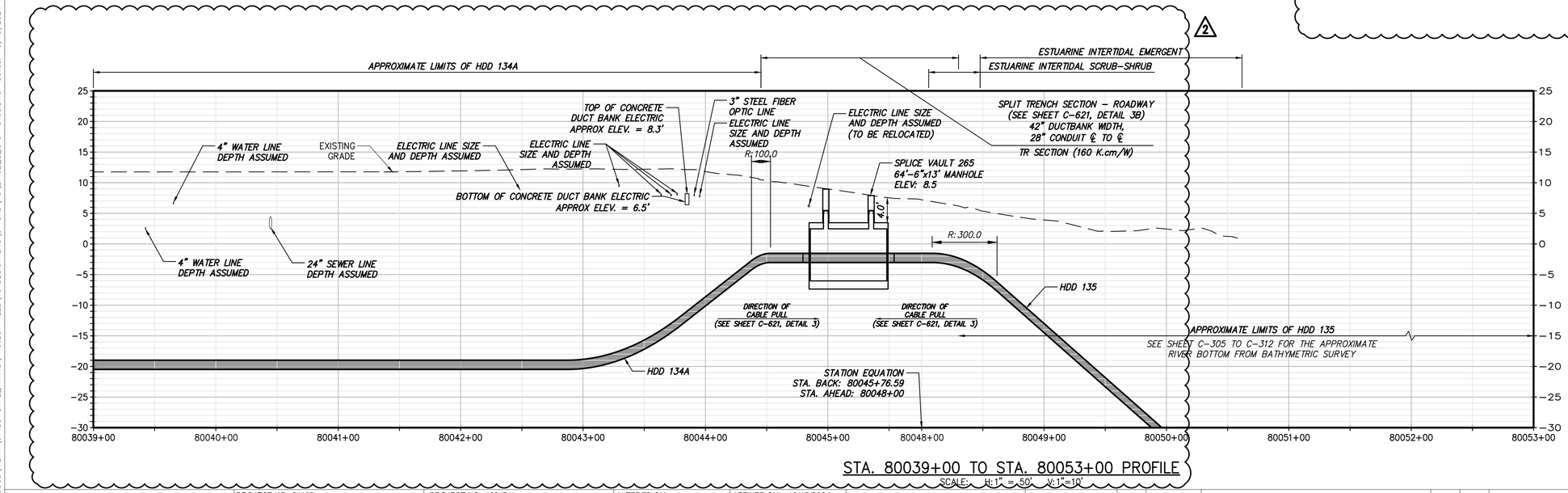
SCALE: 1" = 50'

0 50 100

Scale in feet

NOTES:

1. LIMIT OF WORK SHOWN IS COMBINATION OF WORKSPACES REQUIRED DURING PEAK AND OFF-PEAK SEASONS OF SUMMER AND WINTER MONTHS. SEE SHEETS C-505 AND C-506 FOR ADDITIONAL DETAILS.



STA. 80039+00 TO STA. 80053+00 PROFILE

SCALE: H:1" = 50' V:1"=10'

CHPE Champlain Hudson Power Express

PROJECT NO.: 21162 — Kiewit

PROJECT NO.: 120174 — Engineering and Land Surveying, P.C.

ALTERED ON:

AFFIXED ON: 10/15/2024

STATE OF NEW YORK · CHAMUDHAR VALLABH · LICENSED PROFESSIONAL ENGINEER · 105203

No.	DATE	SUBMITTAL / REVISION DESCRIPTION	DB	APP
----	----	----	----	----
----	----	----	----	----
----	----	----	----	----
----	----	----	----	----
----	----	----	----	----
2	10/15/2024	FDC-0050: HDD 134A ADDITION	BL	CV
1	04/03/2024	NDC-0036: PROF & HDD135 REVISIONS & 3RD PARTY UPDATES	MK	CV
0	07/31/2023	ISSUED FOR CONSTRUCTION SUBMISSION	MK	CV

CHAMPLAIN HUDSON POWER EXPRESS

SEGMENTS 13 TO 15 - PACKAGE 8

TRANSITION VAULT 5 TO ASTORIA CONVERTER STATION

STA. 80039+00 TO STA. 80053+00 (2)

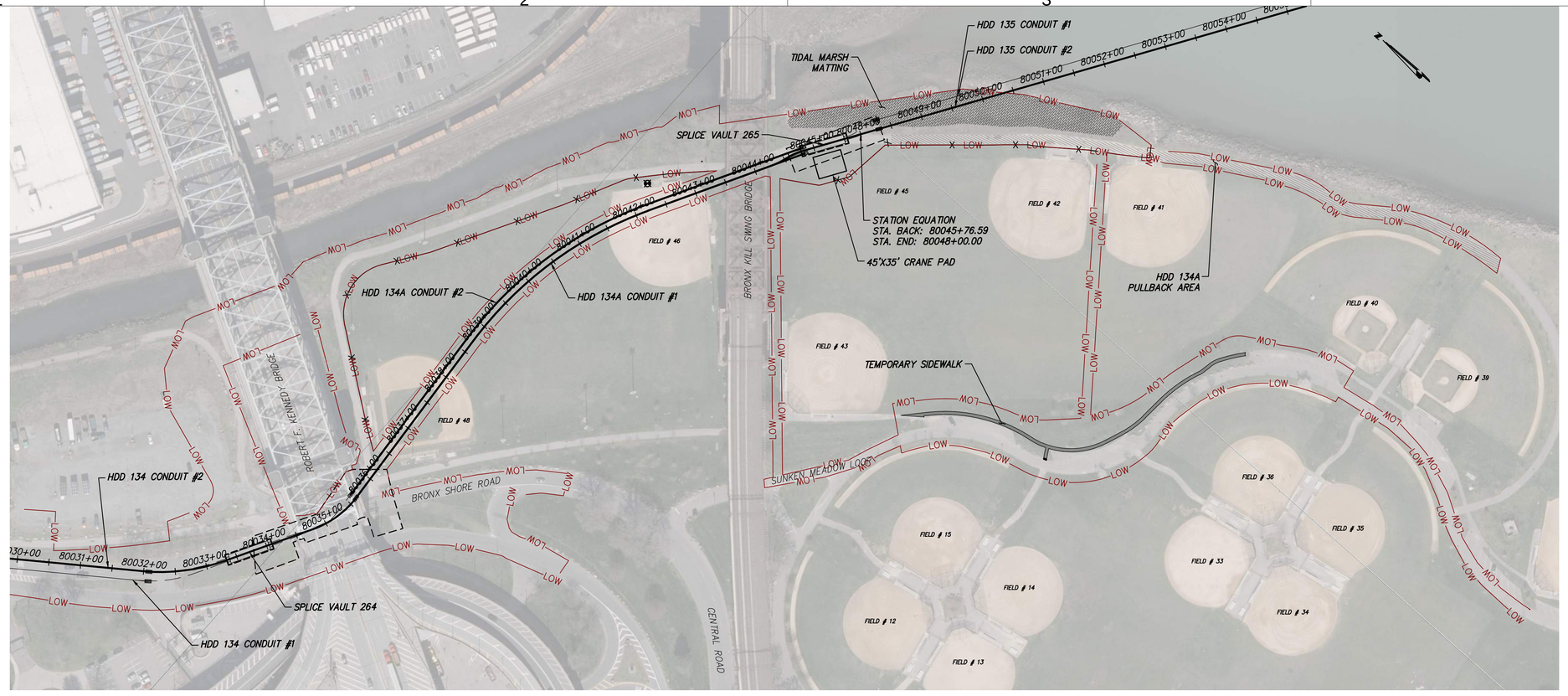
DRAWN BY: MK | DESIGNED BY: MK | APPROVED BY: CV | SCALE AS SHOWN | DATE: 07/31/2023

PERMIT DRAWING NO.

N/A

DRAWING NO.

C-104



LOW EXTENTS AND PULLBACK AREA – RANDALL'S ISLAND

SCALE: 1" = 100'

0 100 200
Scale in feet

PROJECT NO.: 21162	PROJECT NO.: 120174	ALTERED ON:	AFFIXED ON: 10/15/2024	

CHPE Champlain Hudson Power Express

Kiewit

Engineering and Land Surveying, P.C.

STATE OF NEW YORK · CHAKRADHAR VALLABH · 105203 · LICENSED PROFESSIONAL ENGINEER

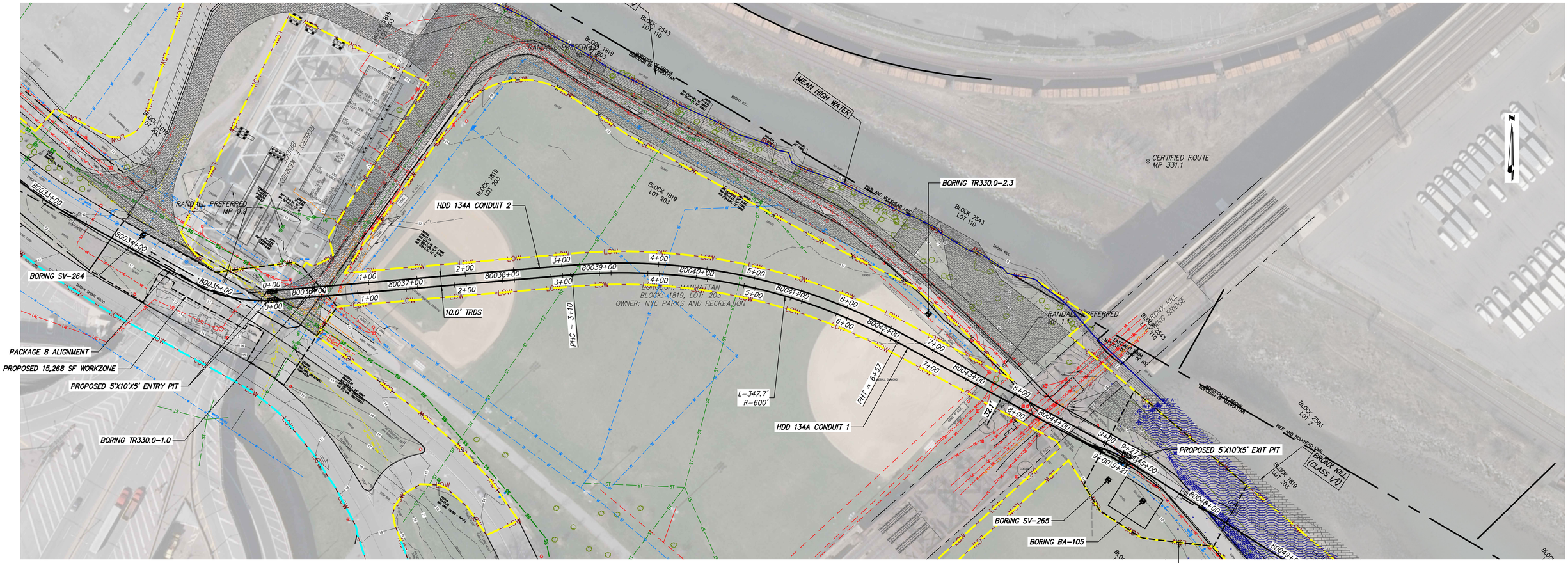
No.	DATE	SUBMITTAL / REVISION DESCRIPTION	DB	APP
----	----	----	----	----
----	----	----	----	----
----	----	----	----	----
----	----	----	----	----
----	----	----	----	----
----	----	----	----	----
----	----	----	----	----
0	10/15/2024	FDC-0050: ISSUED FOR CONSTRUCTION SUBMISSION	BL	CV

CHAMPLAIN HUDSON POWER EXPRESS

SEGMENTS 13 TO 15 - PACKAGE 8
TRANSITION VAULT 5 TO ASTORIA CONVERTER STATION
LOW EXTENTS AND PULLBACK AREA - RANDALL'S ISLAND

DRAWN BY: BL | DESIGNED BY: MK | APPROVED BY: CV | SCALE AS SHOWN | DATE: 10/01/2024

PERMIT DRAWING NO.
N/A
DRAWING NO.
C-203



0 50 100
Scale in feet

PROPOSED HDD 134A PLAN VIEW
CONDUIT 1

NOTE:
1) THE EXISTING GEOTECHNICAL DATA AND GEOTECHNICAL ASSUMPTIONS SUPPORTING THIS DRAWING ARE CONSISTENT WITH FEASIBILITY OF SUCCESSFULLY COMPLETING THE BORE. ADDITIONAL GEOTECHNICAL AND SUBSURFACE DATA WILL BE OBTAINED. THIS DRAWING ONLY REPRESENTS THE ANALYSIS AND DATA AVAILABLE WHEN SEALED. THIS DRAWING IS FOR INTERIM AND PLANNING PURPOSES, DO NOT USE THIS DRAWING FOR SUBSURFACE CONSTRUCTION ACTIVITIES. A MORE DETAILED GEOPHYSICAL EXPLORATION AND ANALYSIS OF THIS AREA WILL BE AVAILABLE IN LATE 2024.
2) THE USE OF CONDUCTOR CASINGS AT BOTH ENDS OF THE BORE IS RECOMMENDED TO GET THROUGH THE FILL LAYER AND MITIGATE THE POTENTIAL RELEASE OF THE DRILLING FLUID.
3) THE FINAL AS–BUILT VERTICAL SEPARATION BETWEEN CONDUIT 1 AND CONDUIT 2 SHALL NOT BE LESS THAN 4 FEET BASED ON NKT COOKBOOK.

CHPE Champlain Hudson Power Express

PROJECT NO.: 21162 | PROJECT NO.: 066076 | ALTERED ON: | AFFIXED ON: 10/15/2024

Kiewit

CHA
III Winners Circle, PO Box 5269
Albany, NY 12205-0269
518.453.4500 · www.chacompanies.com

STATE OF NEW YORK · JEFFREY O'DONNELL · 087450 · LICENSED PROFESSIONAL ENGINEER

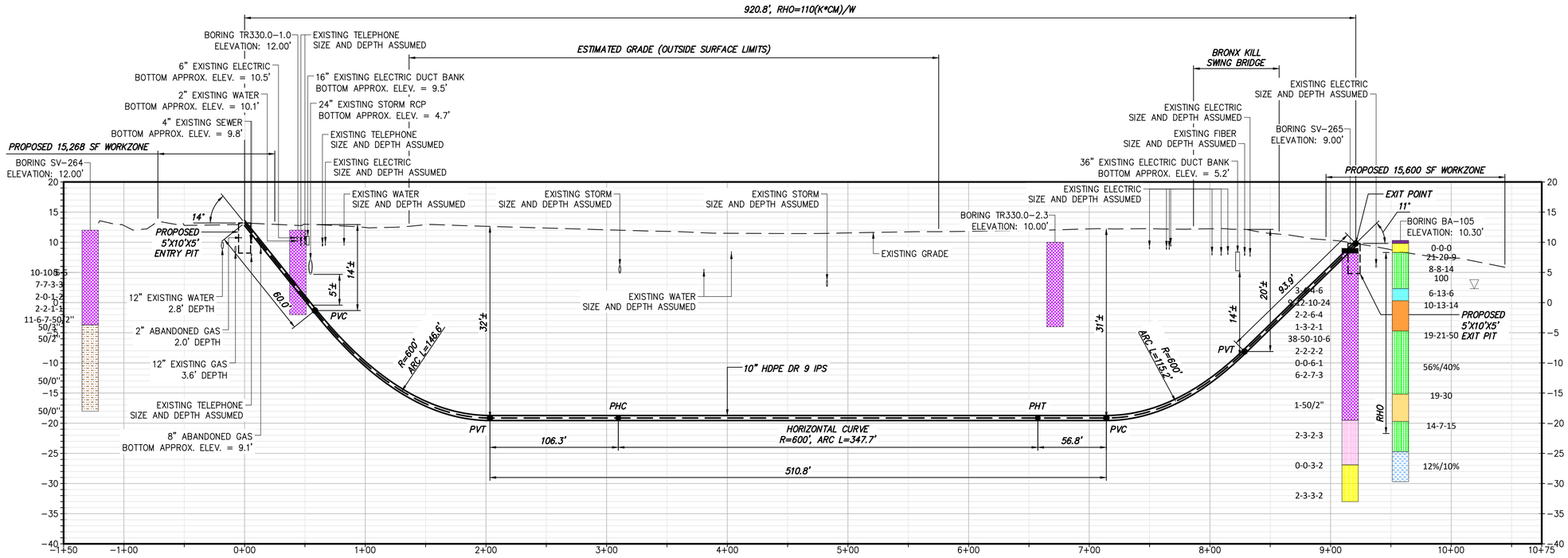
No.	DATE	SUBMITTAL / REVISION DESCRIPTION	DB	APP
0	10/15/2024	FDC-0050: ISSUED FOR CONSTRUCTION SUBMISSION	MCS	JEO

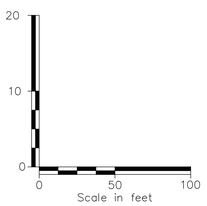
CHAMPLAIN HUDSON POWER EXPRESS
SEGMENTS 13 TO 15 - PACKAGE 8
TRANSITION VAULT 5 TO ASTORIA CONVERTER STATION
PLAN VIEW - HDD 134A, CONDUIT 1

DRAWN BY: JDL | DESIGNED BY: MCS | APPROVED BY: JEO | SCALE | DATE: 07/31/2023

PERMIT DRAWING NO. **C-313**

DRAWING NO. **C-313**





PROPOSED HDD 134A PROFILE
CONDUIT 1

NOTE:
1) THE EXISTING GEOTECHNICAL DATA AND GEOTECHNICAL ASSUMPTIONS SUPPORTING THIS DRAWING ARE CONSISTENT WITH FEASIBILITY OF SUCCESSFULLY COMPLETING THE BORE. ADDITIONAL GEOTECHNICAL AND SUBSURFACE DATA WILL BE OBTAINED. THIS DRAWING ONLY REPRESENTS THE ANALYSIS AND DATA AVAILABLE WHEN SEALED. THIS DRAWING IS FOR INTERIM AND PLANNING PURPOSES, DO NOT USE THIS DRAWING FOR SUBSURFACE CONSTRUCTION ACTIVITIES. A MORE DETAILED GEOPHYSICAL EXPLORATION AND ANALYSIS OF THIS AREA WILL BE AVAILABLE IN LATE 2024.
2) THE USE OF CONDUCTOR CASINGS AT BOTH ENDS OF THE BORE IS RECOMMENDED TO GET THROUGH THE FILL LAYER AND MITIGATE THE POTENTIAL RELEASE OF THE DRILLING FLUID.
3) THE FINAL AS-BUILT VERTICAL SEPARATION BETWEEN CONDUIT 1 AND CONDUIT 2 SHALL NOT BE LESS THAN 4 FEET BASED ON NKT COOKBOOK.

BORING LOG STRIP LEGEND
B101
Blow Counts per 6" = 10-10-10
Recovery %/RQD % = 95%/90%
11000psi=UCS
2D strip logs shown at 10x exaggeration
3D strip logs have no exaggeration

Legend	
ASPHALT	Asphalt
Bedrock	Bedrock
Boulder	Boulder
CH	Fat CLAY
CH-MH	SILTY Fat CLAY
CL	Lean CLAY
CL-ML	SILTY CLAY
CONCRETE	Concrete
Fill	Fill
GC	CLAYEY GRAVEL
GC-GM	SILTY CLAYEY GRAVEL
GM	SILTY GRAVEL
GP	Poorly Graded GRAVEL
GP-GC	Poorly Graded Gravel with CLAY
GP-GM	Poorly Graded GRAVEL with SILT
GW	Well Graded GRAVEL
GW-GC	Well Graded GRAVEL with CLAY
GW-GM	Well Graded GRAVEL with SILT
Limestone	Limestone
MH	Elastic SILT
ML	SILT
OH	ORGANIC Fat CLAY
OL	ORGANIC Lean CLAY
OL/OH	ORGANIC SOIL
PT	PEAT
Rock	Rock
Sandstone	Sandstone
SC	CLAYEY SAND
SC-SM	SILT, CLAYEY SAND
SHALE	Shale
SILTSTONE	Siltstone
SM	SILTY SAND
SP	Poorly Graded SAND
SP-SC	Poorly Graded SAND with CLAY
SP-SM	Poorly Graded SAND with SILT
SW	Well graded SAND
SW-SC	Well Graded SAND with CLAY
SW-SM	Well Graded SAND with SILT
Topsoil	Topsoil
USGS 601	Gravel or Conglomerate 1
USGS 654	Subgraywacke
USGS 670	Interbedded Sandstone and Shale
USGS 702	Quartzite
USGS 705	Schist
USGS 705	Schist
USGS 708	Gneiss
USGS 708	Gneiss
USGS 718	Granite 1
Void	Void
Water	Water
Weathered Rock	Undefined
Water Table	Water Table during drilling
Delayed Water Table	Water Table after drilling

CHPE Champlain Hudson Power Express

PROJECT NO.: 21162 | PROJECT NO.: 066076 | ALTERED ON: | AFFIXED ON: 10/15/2024

Kiewit

CHA
111 Winners Circle, PO Box 5269
Albany, NY 12205-0269
518.453.4500 - www.chacompanies.com

STATE OF NEW YORK · JEFFREY O'DONNELL · 087450 · LICENSED PROFESSIONAL ENGINEER

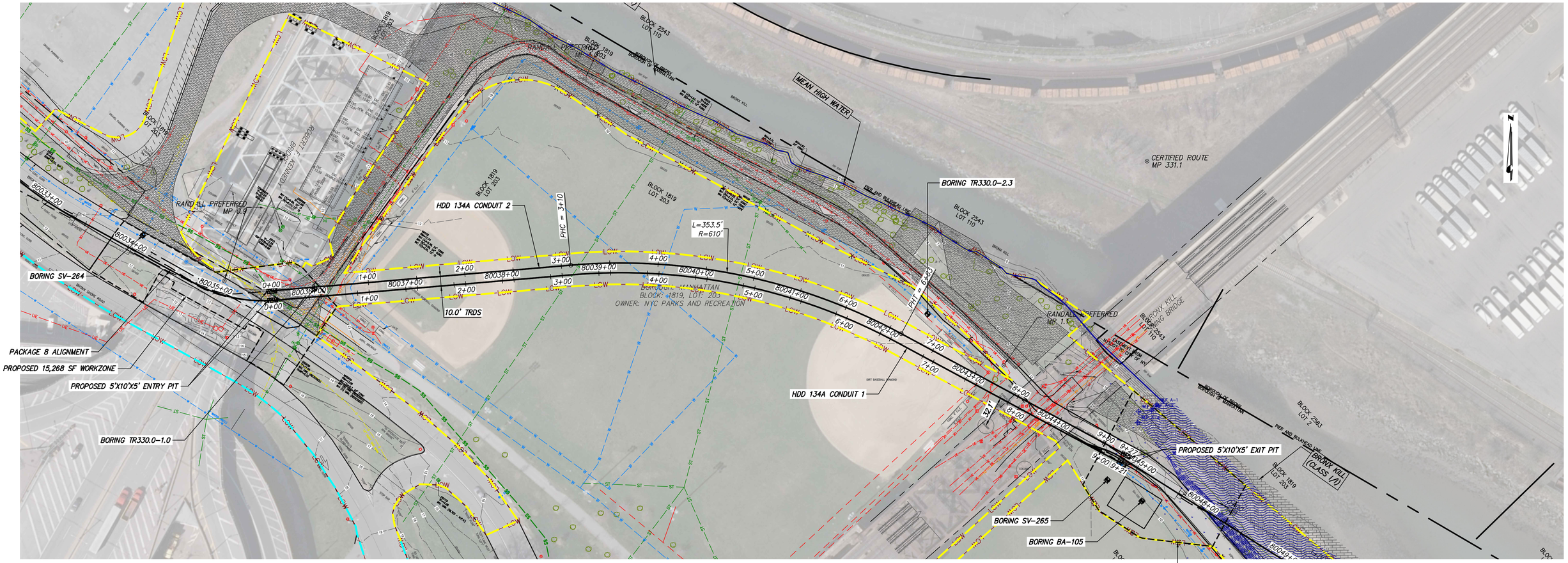
No.	DATE	SUBMITTAL / REVISION DESCRIPTION	DB	APP
0	10/15/2024	FDC-0050: ISSUED FOR CONSTRUCTION SUBMISSION	MCS	JEO

CHAMPLAIN HUDSON POWER EXPRESS
SEGMENTS 13 TO 15 - PACKAGE 8
TRANSITION VAULT 5 TO ASTORIA CONVERTER STATION
PROFILE VIEW - HDD 134A, CONDUIT 1

DRAWN BY: JDL | DESIGNED BY: MCS | APPROVED BY: JEO | SCALE | DATE: 07/31/2023

PERMIT DRAWING NO.
C-314

DRAWING NO.
C-314



PROPOSED HDD 134A PLAN VIEW
CONDUIT 2

NOTE:
1) THE EXISTING GEOTECHNICAL DATA AND GEOTECHNICAL ASSUMPTIONS SUPPORTING THIS DRAWING ARE CONSISTENT WITH FEASIBILITY OF SUCCESSFULLY COMPLETING THE BORE. ADDITIONAL GEOTECHNICAL AND SUBSURFACE DATA WILL BE OBTAINED. THIS DRAWING ONLY REPRESENTS THE ANALYSIS AND DATA AVAILABLE WHEN SEALED. THIS DRAWING IS FOR INTERIM AND PLANNING PURPOSES, DO NOT USE THIS DRAWING FOR SUBSURFACE CONSTRUCTION ACTIVITIES. A MORE DETAILED GEOPHYSICAL EXPLORATION AND ANALYSIS OF THIS AREA WILL BE AVAILABLE IN LATE 2024.
2) THE USE OF CONDUCTOR CASINGS AT BOTH ENDS OF THE BORE IS RECOMMENDED TO GET THROUGH THE FILL LAYER AND MITIGATE THE POTENTIAL RELEASE OF THE DRILLING FLUID.
3) THE FINAL AS–BUILT VERTICAL SEPARATION BETWEEN CONDUIT 1 AND CONDUIT 2 SHALL NOT BE LESS THAN 4 FEET BASED ON NKT COOKBOOK.

CHPE Champlain Hudson Power Express

PROJECT NO.: 21162 | PROJECT NO.: 066076 | ALTERED ON: | AFFIXED ON: 10/15/2024

CHA
111 Winners Circle, PO Box 5269
Albany, NY 12205-0269
518.453.4500 · www.chacompanies.com

STATE OF NEW YORK · JEFFREY O'DONNELL · 087450 · LICENSED PROFESSIONAL ENGINEER

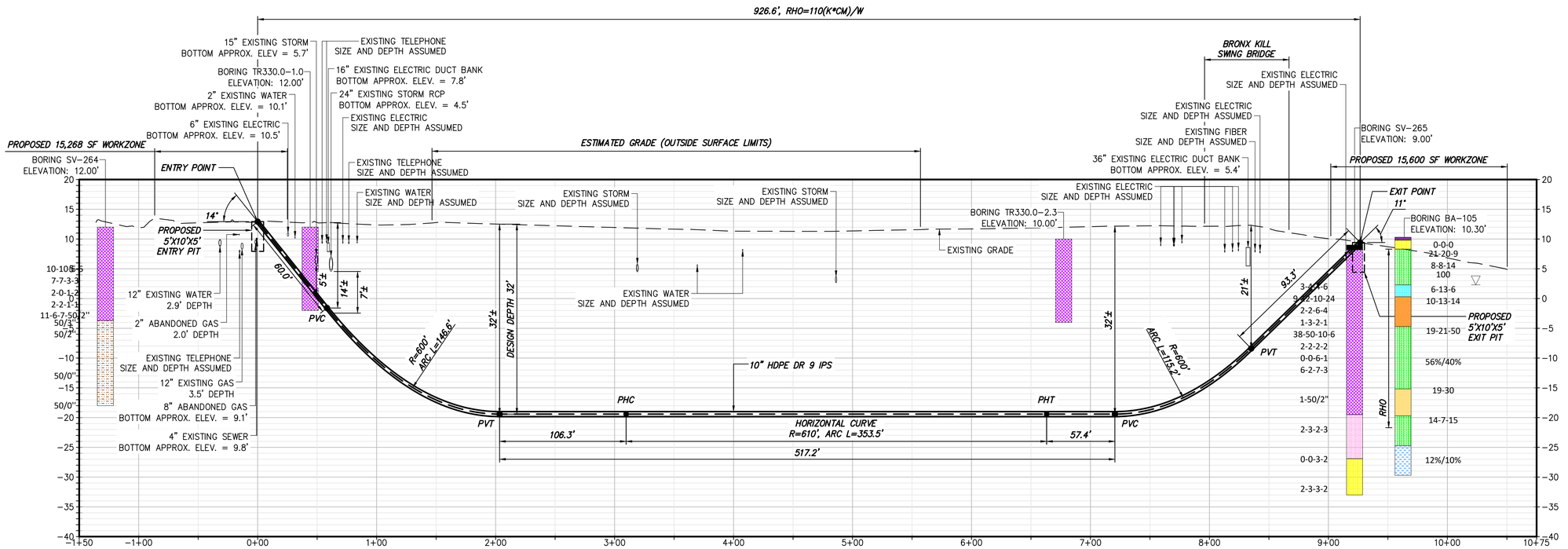
No.	DATE	SUBMITTAL / REVISION DESCRIPTION	DB	APP
0	10/15/2024	FDC-0050: ISSUED FOR CONSTRUCTION SUBMISSION	MCS	JEO

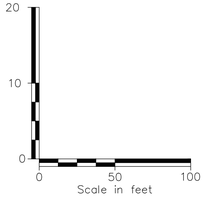
CHAMPLAIN HUDSON POWER EXPRESS
SEGMENTS 13 TO 15 - PACKAGE 8
TRANSITION VAULT 5 TO ASTORIA CONVERTER STATION
PLAN VIEW - HDD 134A, CONDUIT 2

DRAWN BY: JDL | DESIGNED BY: MCS | APPROVED BY: JEO | SCALE | DATE: 07/31/2023

PERMIT DRAWING NO. **C-315**

DRAWING NO. **C-315**





PROPOSED HDD 134A PROFILE

CONDUIT 2

NOTE:

1) THE EXISTING GEOTECHNICAL DATA AND GEOTECHNICAL ASSUMPTIONS SUPPORTING THIS DRAWING ARE CONSISTENT WITH FEASIBILITY OF SUCCESSFULLY COMPLETING THE BORE. ADDITIONAL GEOTECHNICAL AND SUBSURFACE DATA WILL BE OBTAINED. THIS DRAWING ONLY REPRESENTS THE ANALYSIS AND DATA AVAILABLE WHEN SEALED. THIS DRAWING IS FOR INTERIM AND PLANNING PURPOSES, DO NOT USE THIS DRAWING FOR SUBSURFACE CONSTRUCTION ACTIVITIES. A MORE DETAILED GEOPHYSICAL EXPLORATION AND ANALYSIS OF THIS AREA WILL BE AVAILABLE IN LATE 2024.
2) THE USE OF CONDUCTOR CASINGS AT BOTH ENDS OF THE BORE IS RECOMMENDED TO GET THROUGH THE FILL LAYER AND MITIGATE THE POTENTIAL RELEASE OF THE DRILLING FLUID.
3) THE FINAL AS-BUILT VERTICAL SEPARATION BETWEEN CONDUIT 1 AND CONDUIT 2 SHALL NOT BE LESS THAN 4 FEET BASED ON NKT COOKBOOK.

BORING LOG STRIP LEGEND

2D strip logs shown at 10x exaggeration
3D strip logs have no exaggeration

Legend	
ASPHALT	Asphalt
Bedrock	Bedrock
Boulder	Boulder
CH	Fat CLAY
CH-MH	SILTY Fat CLAY
CL	Lean CLAY
CL-ML	SILTY CLAY
CONCRETE	Concrete
FILL	Fill
GC	CLAYEY GRAVEL
GC-GM	SILTY CLAYEY GRAVEL
GM	SILTY GRAVEL
GP	Poorly Graded GRAVEL
GP-GC	Poorly Graded Gravel with CLAY
GP-GM	Poorly Graded GRAVEL with SILT
GW	Well Graded GRAVEL
GW-GC	Well Graded GRAVEL with CLAY
GW-GM	Well Graded GRAVEL with SILT
Limestone	Limestone
MH	Elastic SILT
ML	SILT
OH	ORGANIC Fat CLAY
OL	ORGANIC Lean CLAY
OL/OH	ORGANIC SOIL
PT	PEAT
Rock	Rock
Sandstone	Sandstone
SC	CLAYEY SAND
SC-SM	SILT, CLAYEY SAND
SHALE	Shale
SILTSTONE	Siltstone
SM	SILTY SAND
SP	Poorly Graded SAND
SP-SC	Poorly Graded SAND with CLAY
SP-SM	Poorly Graded SAND with SILT
SW	Well graded SAND
SW-SC	Well Graded SAND with CLAY
SW-SM	Well Graded SAND with SILT
Topsoil	Topsoil
USGS 601	Gravel or Conglomerate 1
USGS 654	Subgraywacke
USGS 670	Interbedded Sandstone and Shale
USGS 702	Quartzite
USGS 705	Schist
USGS 705	Schist
USGS 708	Gneiss
USGS 708	Gneiss
USGS 718	Granite 1
Void	Void
Water	Water
Weathered Rock	Undefined
Water Table	Water Table during drilling
Delayed Water Table	Water Table after drilling

CHPE Champlain Hudson Power Express

PROJECT NO.: 21162 | PROJECT NO.: 066076 | ALTERED ON: | AFFIXED ON: 10/15/2024

Kiewit
CHA
111 Winners Circle, PO Box 5269
Albany, NY 12205-0269
518.453.4500 - www.chacompanies.com

STATE OF NEW YORK · JEFFREY O'DONNELL · 087450 · LICENSED PROFESSIONAL ENGINEER

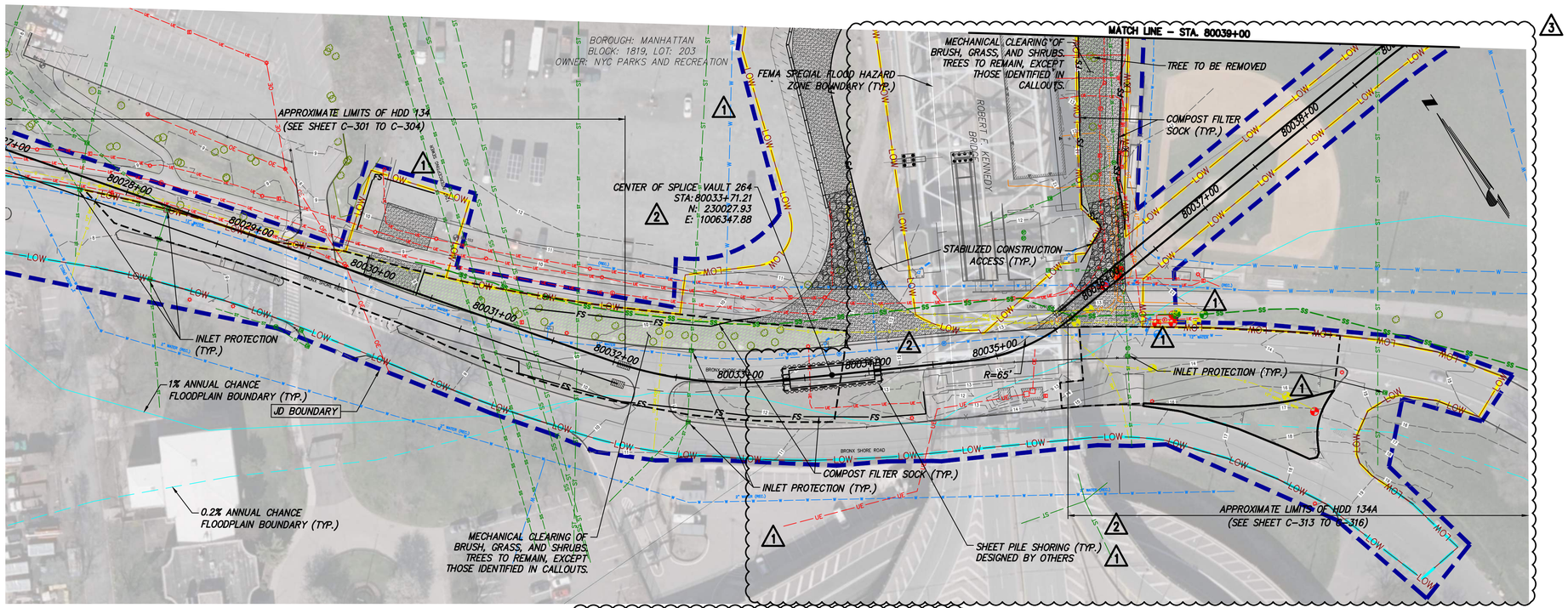
No.	DATE	SUBMITTAL / REVISION DESCRIPTION	DB	APP
0	10/15/2024	FDC-0050: ISSUED FOR CONSTRUCTION SUBMISSION	MCS	JEO

CHAMPLAIN HUDSON POWER EXPRESS
SEGMENTS 13 TO 15 - PACKAGE 8
TRANSITION VAULT 5 TO ASTORIA CONVERTER STATION
PROFILE VIEW - HDD 134A, CONDUIT 2

DRAWN BY: JDL | DESIGNED BY: MCS | APPROVED BY: JEO | SCALE | DATE: 07/31/2023

PERMIT DRAWING NO. **C-316**

DRAWING NO. **C-316**



STA. 80027+00 TO STA. 80039+00 PLAN VIEW ③
SCALE: 1" = 50'

0 50 100
Scale in feet

----	----	----	----	----	
----	----	----	----	----	
----	----	----	----	----	
----	----	----	----	----	
3	10/15/2024	FDC-0050: HDD 134A ADDITION	BL	BD	
2	06/28/2024	FDC-0052: SV264 RELOCATION	MK	BD	
1	04/03/2024	NDC-0036: 3RD PARTY UPDATES	MK	BD	
0	07/31/2023	ISSUED FOR CONSTRUCTION SUBMISSION	MK	BD	
No.	DATE	SUBMITTAL / REVISION DESCRIPTION	DB	APP	

CHPE Champlain Hudson Power Express

PROJECT NO.: 21162 | PROJECT NO.: 120174 | ALTERED ON: | AFFIXED ON: 10/15/2024

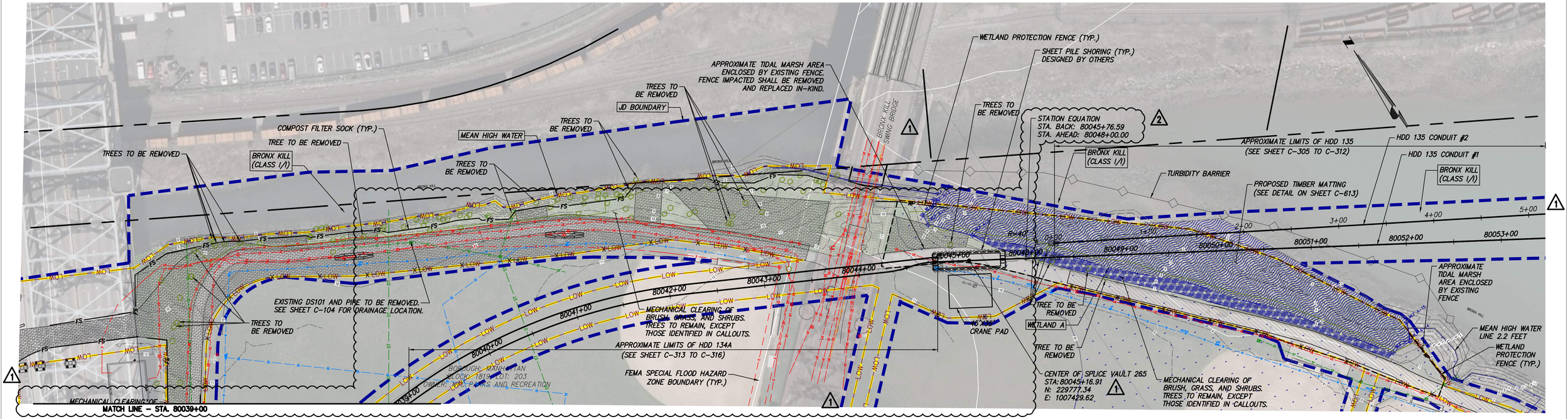
Kiewit | Engineering and Land Surveying, P.C.

STATE OF NEW YORK · DANIT BIRBAL SINGER · LICENSED PROFESSIONAL ENGINEER · 105756

CHAMPLAIN HUDSON POWER EXPRESS
SEGMENTS 13 TO 15 - PACKAGE 8
TRANSITION VAULT 5 TO ASTORIA CONVERTER STATION
STA. 80027+00 TO STA. 80039+00 ③

DRAWN BY: MK | DESIGNED BY: SC | APPROVED BY: BD | SCALE AS SHOWN | DATE: 07/31/2023

PERMIT DRAWING NO.
N/A
DRAWING NO.
C-402



0 50 100
Scale in feet

STA. 80039+00 TO STA. 80053+50 PLAN VIEW
SCALE: 1" = 50'

----	----	----	----	----
----	----	----	----	----
----	----	----	----	----
----	----	----	----	----
----	----	----	----	----
2	10/15/2024	FDC-0050: HDD 134A ADDITION	BL	BD
1	04/03/2024	NDC-0036: HDD135 REVISIONS & 3RD PARTY UPDATES	MK	BD
0	07/31/2023	ISSUED FOR CONSTRUCTION SUBMISSION	MK	BD
No.	DATE	SUBMITTAL / REVISION DESCRIPTION	DB	APP

CHPE Champlain Hudson Power Express

PROJECT NO.: 21162 | PROJECT NO.: 120174 | ALTERED ON: | AFFIXED ON: 10/15/2024

Kiewit | Engineering and Land Surveying, P.C.

STATE OF NEW YORK · DAMIT BIRBAL SINGH · LICENSED PROFESSIONAL ENGINEER · 105756

CHAMPLAIN HUDSON POWER EXPRESS
SEGMENTS 13 TO 15 - PACKAGE 8
TRANSITION VAULT 5 TO ASTORIA CONVERTER STATION
STA. 80039+00 TO STA. 80053+50

PERMIT DRAWING NO.: N/A

DRAWING NO.:

DRAWN BY: MK | DESIGNED BY: SC | APPROVED BY: BD | SCALE AS SHOWN | DATE: 07/31/2023

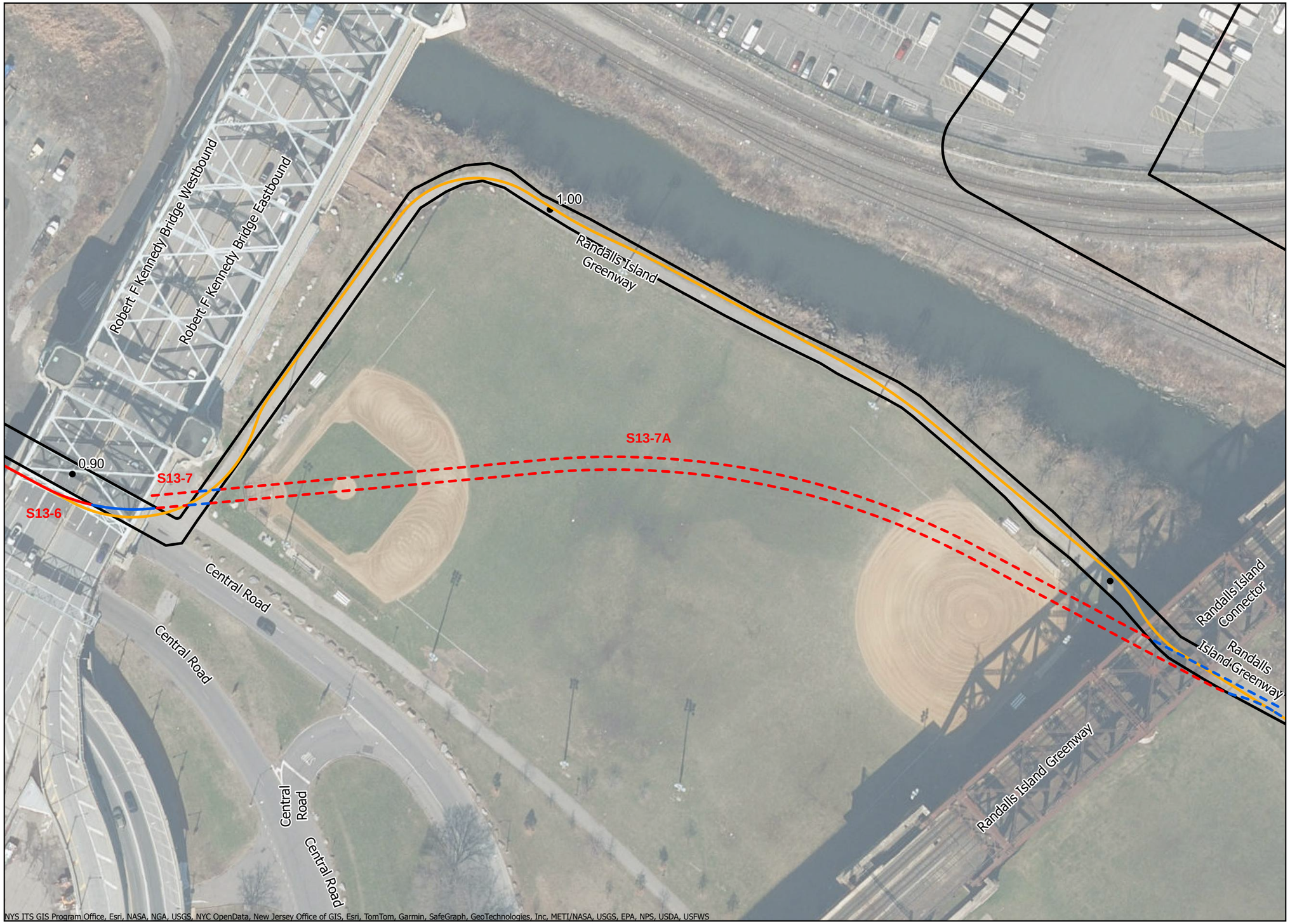
CHPE LLC
623 Fifth Avenue, 20th Floor
New York, NY 10022

Segment 13,14,15 (Package 8)

EM&CP Appendix E Updates

APPENDIX E. PACKAGE 8 - SEGMENT 13 DEVIATION ZONE EXCURSIONS

NEW EXCURSION

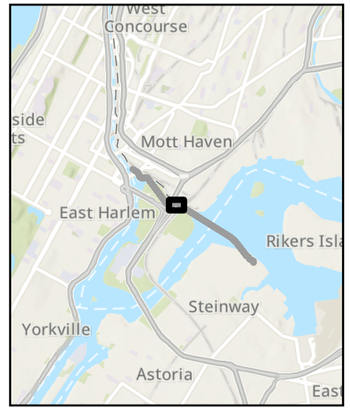


CHPE EM&CP

New York County, New York

Deviation Zone Analysis

- Segment 13 Trench Excursion
- Segment 13 HDD Excursion
- Segment 13 Trench
- Segment 13 HDD
- Segment 13 Approved Trench
- Segment 13 Approved HDD
- Mile Post
- Deviation Zone



0 30 60 120 180

Feet

Prepared 10/11/2024
Basemap NYSDOP *2021* map service

CHPE LLC
623 Fifth Avenue, 20th Floor
New York, NY 10022

Segment 13,14,15 (Package 8)

EM&CP Appendix J

HDD Design Summary Report Changes

HDD Report Revision Memo for HDD Design Change

HDD #: 134A

Date: 10/15/24

Design Change Number(s): FDC-0050

Revision Description:

HDD 134A as an added feature to CHPE Section 8, Engineered by CHA.

For the typical report sections indicated below, information and analysis regarding HDD 134A provided in this in this memo:

Design Summary Report

Section	Section Title	Refer to IFC Submittal	Revised Herein	Notes:
1.0	**Introduction**	NA	**X**	
2.0	**Project Description**	NA	**X**	
3.0	**Background**	NA	**X**	
4.0	**Site Conditions**	NA	**X**	
5.0	**Design Summary**	NA	**X**	
6.0	**Construction Considerations**	NA	**X**	
7.0	**References**	NA	**X**	
	Work Zones			Note Included
	Overview Map	NA	**X**	
	HDD Geotechnical Data Reports	NA	**X**	
	Calculations	NA	**X**	BoreAid Report
	HDD Drawings	NA	**X**	
	Proposed Soil Properties	NA	**X**	

Inadvertent Release Contingency Plan

Section	Section Title	Refer to IFC Submittal	Revised Herein	Notes:
1.0	**Introduction**	NA	**X**	
2.0	Description of HDD Process	NA	**X**	
3.0	Organization and Staffing Responsibilities	NA	**X**	
4.0	Fluid Release Minimization Measures	NA	**X**	
5.0	Inadvertent Release Monitoring and Notifications	NA	**X**	
6.0	Inadvertent Release Response (Upload and Road Areas)	NA	**X**	
7.0	Inadvertent Release Response (Wetland, railroad, and open water body areas)	NA	**X**	
8.0	Drill Hole Abandonment Plan	NA	X	
9.0	**Crossing Specific Discussion**	NA	**X**	
	Calculation Package	NA	**X**	BoreAid Report
	HDD Design Drawings	NA	**X**	

Overview Map HDD 134A

Table of Contents

I. DESIGN SUMMARY REPORT

HDD Design Summary Report
Crossing HDD 134A
in Segments 13 to 15 – Package 8

Harlem River Yard to Astoria
New York County, New York

CHA Project Number: 066076

Prepared for:
Transmission Developers Inc.
1301 Avenue of the Americas, 26th Floor
New York, NY 10019

Prepared by:
CHA Consulting, Inc.
III Winners Circle
Albany, New York 12205
(518) 453-4500

October 2024

THE ENGINEERING SUPPORTING THIS REPORT SUGGESTS ADDITIONAL GEOTECHNICAL AND SUBSURFACE DATA WOULD BE BENEFICIAL TO HDD#134A, AND ONLY REPRESENTS THE ANALYSIS AVAILABLE WHEN SEALED. DO NOT USE THIS REPORT RELATIVE TO HDD#134A FOR SUBSURFACE CONSTRUCTION ACTIVITIES.

TABLE OF CONTENTS

1.0 INTRODUCTION

1.1 PURPOSE

The Champlain Hudson Power Express (CHPE) project consists of installing a pair of HVDC electrical transmission cables with an associated telecommunications line from Canada to New York City. The portion of the work addressed herein is located in the upland portion of the route from the south end of Lake Champlain to New York City along the uplands of the Hudson River Valley. This Design Summary Report addresses the design for the HDD 134A Package 8.

The purposes of this Design Summary Report are to provide the following:

- Review of the existing geological, hydrogeological, and geotechnical conditions for HDD 134A.
- Provide a descriptive narrative of the HDD Crossings in support of the attached design drawings and technical specifications.
- Present stress and inadvertent release analyses that support the proposed designs.
- Evaluate construction considerations including inadvertent return mitigation.

2.0 PROJECT DESCRIPTION

The HDD crossing addressed in this report are located as shown in Table 1 below:

Table 1: HDD Locations, Lengths, and Description

HDD #	Start Station	End Station	HDD Length, ft	Obstruction Crossed
134A	80035+62	80044+83	920	Bridges, Utilities, Public Space

3.0 BACKGROUND

The underground construction of two HVDC electrical transmission cables is proposed to be housed in individual 10-inch-diameter DR 9 HDPE conduits spaced a distance dependent on depth and soil Thermal Resistivity (TR) values provided by NKT and as shown on drawing plans. A third, 3-inch-diameter DR 9 conduit will be bundled with one of the 10-inch diameter conduits for

a telecommunications line. HDD is a widely used trenchless construction method to install conduits with limited disturbance to the ground around the bore alignment, minimal ground surface impacts above the alignment, and to minimize the potential of inadvertent releases of drilling fluids while boring. The goal for using HDD methods is to install the conduits while controlling and minimizing the amount of impact to congested areas, existing underground obstructions, and to the adjacent wetlands to the extent possible.

4.0 SITE CONDITIONS

4.1.1 Project Datum and Topography

HDD #134A

HDD #134A consists of horizontal curved HDD bores, approximately 920 feet long. Both bores start under the Robert F Kennedy Bridge, cross under the Randall's Island Fields 46 and 49 and under the Bronx Kill Swing Bridge. The bores end in the northern corner of Randall's Island Field #45 at approximately El. 10 reference datum NAVD 1988). The ground surface elevations along the path of HDD #134A relatively flat approximately starting El. 13 (reference datum NAVD 1988).

4.1.2 Geotechnical Data

HDD #134A

Subsurface investigations were conducted in 2022 by AECOM, in 2022 by Brierley Associates, and in 2024 by GZA GeoEnvironmental. There are seven borings to date near HDD #134A: BR-3, BA-103, BA-105, SV-264, TR330.0-1.0, TR330.0-2.3, and SV-265, which extended to depths of 40, 65, 40, 30, 14, 14, and 42 feet below grade, respectively. There appears to be an 8-foot layer of gravelly sand (fill) over a 4.5-foot layer of medium dense sand and gravel, over a 2.5-foot layer of soft to stiff silty clay, over a 7-foot layer of sand, all over moderately weathered to slightly fractured schist which reaches to the bore termination in boring BR-3. There appears to be a 2-foot layer of dense silty sand, over a 6-foot layer of very dense silty sand, over a 2-foot layer of firm clayey silt, over a 5-foot layer of very dense silty sand, over a 1-foot layer of very soft silty clayey peat, all over highly weathered to strong schist in boring BA-103. There appears to be a 0.5-foot

layer of top soil, over a 1.5-foot layer of fine sand, over a 6-foot layer of dense to very dense silty sand with possible cobbles/boulders, over a 2-foot layer of medium dense sandy silt, over a 5-foot layer of medium dense gravel, over a 10-foot layer of dense sand with gravel with highly weathered schist, over a 5-foot layer of dense gravel, over a 5-foot layer of medium dense silty sand, over a layer of peat in boring BA-105. There appears to be a 15.7-foot layer of medium dense fill over decomposed rock with no recovery in boring SV-264. There appears to be fill (fine to coarse sand with little gravel and little silt) in both borings TR330.0-1.0 and TR330.0-2.3. There appears to be a 28.5-foot layer of fill (loose to medium dense sand and dense to medium stiff silt and clay) over a 7.4-foot layer of medium stiff to soft silty clay, over loose sand in boring SV-265. The Geotechnical Data Report for this location is provided at the end of this document.

Based on the borings, the soil profile for the HDD #134A BoreAid analyses will be divided into four [4] layers: loose fill, medium stiff clay, loose sand, and rock. The soil profiles used for BoreAid analyses for the HDD in this segment are included in Part III Section B of this report.

5.0 DESIGN SUMMARY

The HDD construction process generally consists of three steps:

Step 1: Drill a small diameter (approximately 7 to 9 inches diameter) pilot hole along the preplanned bore path. During the pilot hole boring, the location of the drill bit is tracked to confirm that it is following the planned path. If the drilling is observed to start to deviate from the planned path, corrections are made using a “bent” lead drilling section and controlled rotation of drill pipe string. The drill bit is designed to cut through the soil in combination with pressurized drilling fluid assisting the cutting of the soil, and transport of the cuttings to the entry pit for removal. The drilling fluid is generally a combination of bentonite (a clay mineral) and water, combined with NSF certified additives to support sides of the borehole and to better carry the cuttings to the entry pit at lower pressures and velocities. The drilling fluids used under waterbodies and wetland areas are typically required in the project specifications to be “non-toxic and environmentally friendly”. Once the pilot bore reaches the exit point, the next step of the process, hole enlargement begins.

Step 2: Enlarge the pilot hole to the diameter required for insertion of the conduits. This is accomplished by using successively larger reaming bits pulled through the pilot bore to gradually enlarge the bore from about 8 inches diameter to 16 to 22 inches diameter to accommodate in this case a HDPE conduit about 10 inches in diameter in one bore and a bundle of two conduits, one

10 inches diameter and the other 3 inches diameter, that are to be pulled into the enlarged bore hole. We estimate that one, and possibly a second reaming pass, will be used to create the 16-to-22-inch diameter borehole. This pulling in of a bundle of conduits is sometimes referred to as a slick bore. During this step, the borehole is still filled with drilling fluid to support the sides of the bore hole in preparation for Step 3, the insertion of the conduit.

Step 3: Pull the conduits into the enlarged hole. While the pilot hole and reaming operations are ongoing, the contractor will also be fabricating the conduits to be installed. The conduits come in about 40-foot-long sections and need to be fusion butt welded, debeaded internally, and arranged for the pullback into to the borehole. Ideally, the complete conduit (or bundle of conduits) will be welded (and bundled) into one long length for insertion. The goal is usually to pull the bundle into the bore in one, continuous, smooth, around the clock, operation. However, depending on work area and access constraints, sometimes the pipe is assembled in 2 or 3 lengths that then joined (welded), "on the fly" as the conduit (bundle) is slowly pulled into the borehole. As the conduit (bundle) is pulled into the hole it is usually ballasted with clean water, and some of the drilling fluid supporting the sides of the hole is displaced by the conduit and collected for eventual disposal. Upon completion of the conduit installation, the conduit will be allowed to relax and come to equilibrium in the hole, and the conduit will be cleaned and capped as described in the HDD technical specifications.

5.1 GEOMETRY AND LAYOUT

The HDD profiles are generally defined by the following parameters:

- Entry point location;
- Exit point location;
- Entry angle;
- Exit angle;
- Horizontal and vertical radius of Curvature;
- Lengths of tangent sections;
- Length of crossing;
- Depth of crossing and depth of cover;
- Site constraints and obstructions; and
- Available work and layout areas

The proposed bore paths entry angle, exit angle, and a vertical and horizontal design radii of curvature for each HDD crossing in this segment are shown in the design drawings attached. Inadvertent release prevention and mitigation plans for each HDD crossing are provided as separate documents.

The design drawings to summarize the proposed HDD installations are attached. The HDD technical specifications are found in Section 330507.13 of the Technical Specifications. Inadvertent release prevention and mitigation plans for each HDD crossing are provided as separate documents.

The site conditions posed various challenges in developing a design that is both constructible and minimizes the potential for negative environmental impacts. The proposed design has entry and exit pits areas constrained by available easements and traffic constraints. Available work areas may limit the lengths of the conduit that can be pre-assembled, necessitating having to pre-assemble the bundle several segments that will have to be welded together during the pull back. HDD specific work areas at the entry and exit ends of the bores are noted on the HDD drawings. In addition, space and easement constraints will require that during pullback, the above ground sections of the conduit will not be straight and will require rollers to accommodate a horizontal bend. Conduit assembly is expected to be performed at the ends of the alignment shown on the HDD drawings. In some cases, the limited work area at the one end of the HDD alignment, may require that the drilling and reaming prior to pullback be performed by the HDD rig located at the one end of the alignment, but the HDD rig may need to be relocated to the other end of the alignment for the pullback/conduit installation phase of the work. In addition, for some longer bores in soft/weak ground conditions, the intersection bore method may be used to better control the risk of inadvertent drilling fluid releases.

5.2 SUBSURFACE MODEL DEVELOPMENT

A subsurface model was developed based on the boring logs as approximate representation of subsurface conditions along the proposed HDD alignment. BoreAid Version 5.0.14 (2015) modeling software (a product of Vermeer) was used to model the HDD. Geotechnical input parameters of the soil were estimated as described below.

The internal friction angles (AASHTO LRFD, Ed. 7) were estimated using the Standard Penetration Test (SPT) blow counts. The shear modulus (G) of each layer was estimated using soil density or consistency based on SPT blow count (N-value) and representative soil layer descriptions were used to estimate Young's Modulus (E) using Hunt (1986). The shear modulus was estimated using the relationship $G = E/[2(1+\nu)]$, taking Poison's Ratio (ν) equal to 0.3. Dry and saturated unit weights were selected based on soil type using Table 2-8 from the Manual on Estimating Soil Properties for Foundation Design (EPRI, 1990). For cohesive soils, cohesion was estimated based on empirical correlations with SPT blow counts (EPRI 1990). Tables for soil properties that will be used for the HDDs in are presented in at the end of this report.

5.2.1 BoreAid Analysis

For the BoreAid analyses, the pipe configuration analyzed was for a pipe with a dimension ratio (DR) of 9 which is assumed to not be ballasted with water during pullback to create a near neutral buoyancy. The following conduit configurations will be used:

1) An individual 10-inch-diameter DR 9 HDPE conduit, and

2) A bundle consisting of a 10-inch-diameter DR 9 HDPE conduit and a 3-inch-diameter DR 9 HDPE conduit. The stresses and deflections of the pipe are evaluated and compared to allowable values as shown on the BoreAid runs presented here.

In addition, a run where 3-inch-diameter DR 9 HDPE conduit is modeled alone was performed to check stresses in that conduit.

5.2.2 Inadvertent Return and Hydro-fracture Analysis

BoreAid modeling software was used to perform inadvertent return analyses for each HDD alignment. The bore path alignment was selected and checked so that the allowable bore pressures are greater than the static and circulating pressures throughout most of the alignment except at the ends. The allowable pressures are related to in-situ ground and water stresses around the bore hole, and the strength of the ground. The Limiting Formation Pressure Figure indicates a generally

acceptable factor of safety against the potential for inadvertent return along the proposed bore paths except at the ends.

Based on the bore path selection process, areas with the greatest potential for an inadvertent return were examined and adjusted during the design process to further limit the risks associated with an inadvertent return when possible. The entry and exit points exhibited the greatest potential for inadvertent returns. The depth of the entry/exit pits should be considered by the Contractor to increase the effective soil stress and provide a storage volume for returns to and near the entry and exit points. Note that while the potential for inadvertent return has been reduced through the design process, inadvertent returns are still possible through existing fissures in the soil or rock, shrinkage cracks, weak soils, or porous deposits of coarse gravel.

Fractures within and/or inadvertent releases through the surrounding soils may cause loss of drilling fluid pressures or inadvertent return of drilling fluid into the wetlands. The areas of greatest concern are reduced soil cover over the bore alignment and where there is a risk of release to the wetlands. The contractor will be required to institute pre-emptive measures in this area to mitigate the effects of a release in the event that one should occur. Such measures may include containment booms and a standby vacuum truck to collect any released drilling fluids immediately. Ground heave or settlement from inadvertent releases also pose risks to structures such as roadways. The HDD alignment was designed with geometries to providing enough soil cover to reduce the risk of inadvertent return. The Inadvertent Release Contingency Plan details additional methods for mitigating inadvertent returns.

5.3 LIMITATIONS

The structural analysis and inadvertent return mitigation analysis were performed using the proposed design bore paths and typically anticipated equipment and means and methods. The HDD subcontractor must submit structural and inadvertent return mitigation calculations and analysis for each bore path, including their final bore path geometry reflecting its specific equipment and contractor's specific means, methods, drilling fluids, and proposed final contractor refined final planned alignment. It is important to note that the Kiewit Design Team's analysis has been done without consideration for point loading due to unpredictable subsurface features such as

encountering rocks, boulders, or other extremely dense material that may damage the conduit. The risk of such conduit damage is low yet has been reported on some projects in recent years.

6.0 CONSTRUCTION CONSIDERATIONS

6.1 RISK AWARENESS AND ASSESSMENT

The risks to be aware of during HDD include: inadvertent returns or fluid loss; any potential obstructions blocking or causing large deviations from the planned bore path; and electromagnetic effects on the HDD steering equipment from nearby high voltage power lines.

6.2 SITE ANALYSIS

A site analysis must be performed prior to commencing HDD operations. Considerations might need to be taken for items such as for site access, construction of HDD entry and exit pits, and layout area for equipment and supplies.

6.3 EROSION CONTROL

The proposed bore paths typically cross under roads, parking lots, water, stormwater and gas and electric utility lines, as well as under streams/wetlands, bodies of water, and railroads. The soil erosion control drawing will show where primary soil erosion control measures are required. The technical specifications and Inadvertent Release Contingency Plan both detail the requirements for both primary and secondary sediment and erosion control measures to be followed in case of an inadvertent return, which ultimately could deposit the fine bentonite sediment into the stream or wetland or bodies of water if not controlled. Construction of the exit pit will be close to the stream/wetlands. Silt fence, straw bales, and other soil erosion control measures will be required to be installed as shown in the construction drawings. Secondary control measures are to be readily accessible at or near the work areas in accordance with the project specifications and Inadvertent Release Contingency Plan.

6.4 SURVEILLANCE AND MONITORING

During installation of the pipe by HDD, monitoring the stream, wetlands, waterbodies and bore alignment for indications of potential inadvertent returns or inadvertent releases will be necessary. The contractor will have primary responsibility for this monitoring and associated response and reporting in real-time. This will be accomplished as detailed in the Inadvertent Release Contingency Plan. Continuous visual inspection of the entire path is the most significant method

of detection. However, an experienced drill crew can often prevent a return by monitoring drilling fluid pressures. A loss of pressure may indicate inadvertent release has occurred. Regardless of the level of preparation, inspection, monitoring, etc., inadvertent returns are not always possible to predict or prevent. However, a significant effort can minimize the possibility but not eliminate it.

7.0 REFERENCES

American Association of State Highway and Transportation Officials. (2014). AASHTO LRFD bridge design specifications, Seventh edition, U.S. customary units. Washington, DC: American Association of State Highway and Transportation Officials.

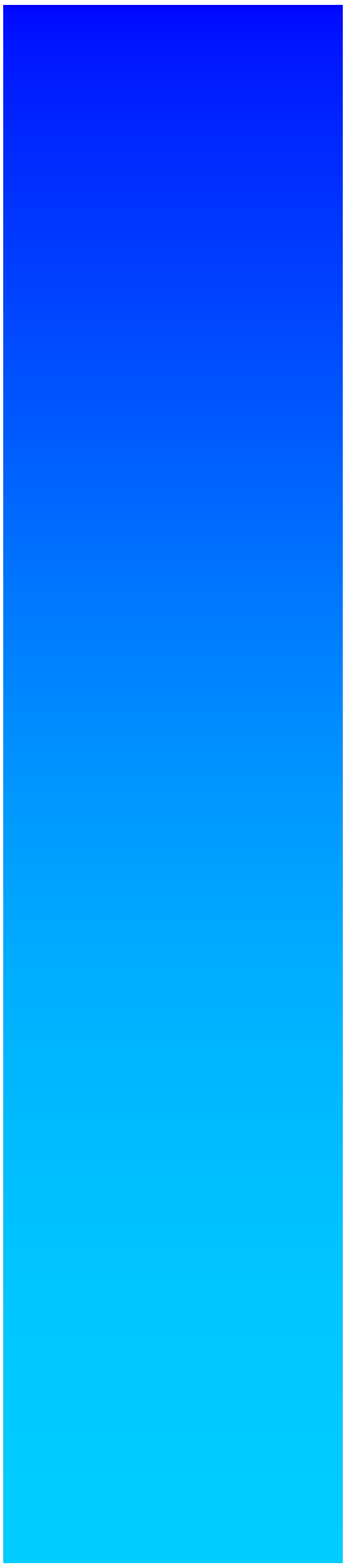
Mayne, P.W., and Kulhawy, F.H. (1990). Manual on Estimating Soil Properties for Foundation Design. Electric Power Research Institute (EPRI).

Hunt, R.E. (1986). Geotechnical Engineering Analysis and Evaluation, McGraw-Hill Book Company, New York.

Proposed Soil Properties for CHPE Package 8 HDD 134A

Soil Type	N	Wet unit wgt, pcf	Dry unit wgt, pcf	Bouyant unit wgt, pcf	Φ, °	Undrained Shear strength, su, psf	Maximum Shear Modulus, psi*
Loose Sand	4-10	115	105	53	30	---	200
Med. Dense Sand	10-30	125	110	63	34	---	500
V Soft to Soft clay	0-4	100	70	38	---	450	200
Med Stiff Clay (approx. 40 feet deep)	4-8	110	80	48	---	800	300
Stiff Clay (approx. 80 ft deep)	8-16	120	100	58	---	1200	400
Loose Silt	4-10	100	80	38	28	---	50
Med Dense Silt	10-30	110	90	48	32	---	100
Rock Fill/Highly Weather Rock	>50	140	120	80	37	---	1000
Jointed Rock Mass – Shale	---	170	160	110	37	3000 psi	2000 psi

- where BoreAid default values are less than these shear moduli, can use the default values, but may tend to be overly conservative.



II. INADVERTENT RELEASE CONTINGENCY

Inadvertent Release Contingency Plan For Horizontal Directional Drilling Crossing HDD 134A Segments 13 to 15 - Package 8

Harlem River Yard to Astoria
New York County, New York

CHA Project Number: 066076

Prepared for:
Transmission Developers Inc.
1301 Avenue of the Americas, 26th Floor
New York, NY 10019

Prepared by:
CHA Consulting, Inc.
III Winners Circle
Albany, New York 12205
(518) 453-4500

October 2024

THE ENGINEERING SUPPORTING THIS REPORT SUGGESTS ADDITIONAL GEOTECHNICAL AND SUBSURFACE DATA WOULD BE BENEFICIAL TO HDD#134A, AND ONLY REPRESENTS THE ANALYSIS AVAILABLE WHEN SEALED. DO NOT USE THIS REPORT RELATIVE TO HDD#134A FOR SUBSURFACE CONSTRUCTION ACTIVITIES.

TABLE OF CONTENTS

1.0 INTRODUCTION

This Inadvertent Release Contingency Plan (IRCP) is for HDD 134A of Package 8.

HDD is a widely used trenchless construction method to install conduits with limited disturbance to the ground around the bore alignment and minimal ground surface impacts above the alignment. The goal for using HDD methods is to install the conduits while controlling and minimizing the amount of impact on water bodies, to congested areas, to existing underground obstructions, and to wetlands, to the extent possible.

A primary potential environmental concern associated with HDD involves the inadvertent release of drilling fluids, also referred to as drilling mud, during the drilling process, which is addressed in this plan. The purpose of this plan is to establish general procedures to prevent a fluid release (sometimes referred to as a frac-out) during HDD construction and to present steps to manage, control and minimize the impacts if an inadvertent release of drilling fluid occurs. The objectives of this plan are to:

- Provide an overview of the HDD process with a specific focus on the composition, management and use of drilling fluids;
- Identify controls to be implemented during construction to minimize the potential of an inadvertent release;
- Identify the planned means of monitoring to permit early detection of inadvertent releases;
- Identify planned means to protect areas that are considered environmentally sensitive (rivers, wetlands, other biological resources or cultural resources);
- Establish site-specific environmental protection measures to be utilized prior to, during, and following drilling and conduit installation activities to minimize and control erosion and sediment releases to adjoining wetlands or watercourses;
- Have site specific preplanned general response programs in place at the start of construction that is understood and can be implemented immediately by all field crews in the event of an inadvertent release of drilling fluid occurs; and
- Establish a chain of command for reporting and notifying, in a timely manner, the construction management team, the Certificate Holders, and the proper authorities in the event of an inadvertent release of drilling fluid and of the preplanned mitigation actions that are to be implemented.

It is important to note that the plan in this document serves as the guiding framework for

confirming that the HDD Construction Subcontractor (HDD Subcontractor) is adhering to the specifications and provisions to be protective of the environment. Since there are a variety of potential measures listed in this document available for preventing inadvertent releases and mitigating the effects of a release should one occur. The specifications require that each HDD Subcontractor submit to the project design team, for its review and acceptance, a supplemental site and HDD Subcontractor specific means and methods plan for each HDD crossing reaffirming and detailing how the HDD Subcontractor will conform with the requirements of this plan and the project specifications to prevent inadvertent releases and to mitigate any effects of a release should one occur. The supplemental plan by the HDD Subcontractor shall be consistent with the site conditions and constraints, and the Subcontractor's selected means, methods and equipment. The selected HDD Subcontractor will be responsible for incorporating specific permit conditions, applicable regulatory requirements, site specific environmental features and geotechnical information not available at this time into its submittal. The submittal shall be reviewed and approved by the design team and the Environmental Inspector prior to the start of construction of a specific HDD location.

2.0 DESCRIPTION OF THE HDD PROCESS

The Horizontal Directional Drilling process begins by mechanically excavating shallow (approximately 5 feet wide by 10 feet long by 4 to 5 feet deep entry and exit pits at either end of the directional bore alignment within a designated work area. Typical work areas and equipment layouts are discussed in the Design Summary Report. However, final individual work areas and equipment layouts will be site specific and depend on the length of bore, size of drill rig to be used, and site constraints. A small diameter (on the order of 5 to 9 inches in diameter) pilot bore is then drilled from the entry pit using directional boring methods. During the pilot bore, a drilling fluid (typically bentonite and water based with selected, NSF certified (formally National Sanitation Foundation) additives to improve and modify fluid stability, carrying capacity, and drilling properties to address site-specific ground characteristics and HDD Subcontractor preferences is pumped through nozzles in the drill head to support the hole and to hydraulically transport drill cuttings from the drill bit back to the entry pit. Environmentally NSF certified, additives are required by specification for use on this project and those planned for use by the HDD Subcontractor will be checked for compliance by the design team prior to their use.

A guidance system is mounted immediately behind the drilling head to allow the crew to track and steer the path of the drilling so that it follows the preplanned alignment within the specification's permitted tolerances. The drilling fluid holds the cuttings in suspension and carries the drill cuttings back through the annular space between the drill rods and the bore hole wall to the entry pit where it is collected and processed for re-used by a recycling system. The cuttings are separated from the bentonite, using screens, centrifuges, and desanding units which prepares the bentonite for re-use. Once the pilot bore reaches the exit pit, a larger diameter, back-reaming head is then attached to the drill string and pulled back through the pilot hole to enlarge the hole. Depending on the size of the conduit to be installed and the ground conditions, several successively larger reaming passes may be needed. Again, a slurry (bentonite and water) is pumped into the bore hole during reaming to remove cuttings and to stabilize the bore hole. Lastly, the drill string is pulled back through the bore hole with the new, preassembled conduit attached to it in one continuous process until the lead end of the conduit emerges at the entry pit. Final reaming or swabbing and conduit pull back may be combined.

Specific to this plan, it is important to have an awareness of the function and composition of the HDD drilling fluids. The drilling fluid composition and drilling fluid management are integral components of the HDD process with the following primary purposes:

- Support and stabilize the drill hole,
- Suspend and transport cuttings from drill bit through the drill hole annulus,
- Control fluid loss through the bore's side walls by forming a filter cake on the bore hole walls,
- Managing and modifying the drilling fluid mix to improve its cutting carrying characteristics, its pumpability, and its hole stabilization and support characteristics,
- Power the downhole cutting tools (e.g., via mud motors if required); and,
- Serve as a coolant and lubricant to the drill bit during the drilling process and lubricant during the conduit insertion process.

The drilling fluids are composed primarily of potable water, which will likely be obtained from nearby sources selected and permitted by the HDD Subcontractor. As mentioned above, the drilling fluid also contains bentonite clay as a viscosifier. Bentonite is a naturally occurring, nontoxic, inert substance that meets NSF/ANSI 60 NSF Drinking Water Additives Standards and is frequently used for drilling potable water wells. While bentonite is non-toxic and commonly used in farming practices, it has the potential to impact plants, fish and their eggs if discharged

to waterways in significant quantities. Frequently, additives are used to: amend the drilling fluid, improve its compatibility with the ground and groundwater chemical characteristics, improve its cutting suspension and carrying characteristics, improve its hole stabilization ability, and reduce seepage loss through the ground characteristics. Environmentally acceptable (i.e. NSF certified) additives are required by specification for this project and before the start of work at a specific HDD, the HDD Subcontractor is required to submit for each crossing, environmental and toxicity data including Safety Data Sheets (SDS) regarding any additives for review and acceptance by the design team.

During the HDD process and subsequent conduit insertion, the drilling fluid pumped downhole will tend to flow along the path of least resistance. Generally, this will be though the annulus between the drill string and the drill hole side wall. However, the bore alignment may encounter ground conditions where the path of least resistance is an existing fracture, fissure, hole of anthropogenic origin, areas with low overburden confinement, areas of hole collapse, or coarse gravel zones in the soil or rock substrate. When this occurs, circulation can be lost or reduced. This is a common occurrence in the HDD process but does not necessarily prevent completion of the bore or result in a release to the environment. However, the environment may be impacted if the fluid inadvertently releases to the surface at a location on a waterway's banks or within a waterway or wetland. Again, additives to amend the properties of the drilling fluid may be used as necessary to prevent and limit releases and losses through such paths of lower flow resistance.

3.0 ORGANIZATION AND STAFFING RESPONSIBILITIES

The organizational chart shown below lists the contact information of the principal organizations involved in this project. The remainder of Section 3 discusses the roles and responsibilities of these principal organizations.

Organizational Chart

Entity	Contact Information
Certificate Holders	Name, Title TDI Phone Email
Construction Manager	TBD
HDD Design Engineer Team	TDB - CHA contact
HDD Construction Subcontractor	
	TBD
Environmental Inspector	TBD
U.S. Army Corps of Engineers, New York District Office	**USACE** New York District Upstate Regulatory Field Office ATTN; CENAN-OP-UR, Bldg. 10, 3rd Floor North 1 Buffington Street Watervliet, NY 12189-4000 518-266-6350 cenan.rfo@usace.army.mil
New York State Department of Public Service	Matthew Smith Department of Public Service Empire State Plz 3 Albany, NY 12223 (518) 402-5141 matthew.smith@dps.ny.gov
New York State Department of Environmental Conservation	Regional Office(s) Information
	NYSDEC Division of Environmental Permits 625 Broadway, 4th Floor Albany, NY 12233-1750 518-402-9167 depenergy@dec.ny.gov
New York State Department of Environmental Conservation (Spills)	NYS Spill Hotline: 1-800-457-7362

3.1 RESPONSIBILITIES OF VARIOUS ORGANIZATIONS

The principal organizations involved in this project include the Regulatory Agencies, Certificate Holders, Design Engineer, HDD Construction Subcontractor, Construction Manager, and Environmental Inspector. The roles and responsibilities of the principal organizations are discussed in the following subsections and are shown in the organizational chart included above.

3.2 REGULATORY AGENCIES

The Certificate of Conditions issued by the NY Public Service Commission is the primary regulatory agency for the requirements associated with the project. The Champlain Hudson Power Express (CHPE) Route Project also has permits from the Department of Energy, and the US Army Corps of Engineers, and the New York Water Quality Certification. Various HDDs within this package take place within or adjacent to wetlands, underneath or adjacent to bodies of water, and underneath or adjacent to roads (DOT, public & private) and rails. Measures are discussed throughout this report to control/mitigate any potential releases before environmentally sensitive boundaries are reached or impacted.

3.3 CERTIFICATE HOLDERS

The project Certificate Holder is TDI. TDI's Project Manager will have the overall responsibility to coordinate this project for TDI. The Project Manager, will be responsible for correspondence and coordination among all parties and will have the authority to stop work as necessary.

3.4 DESIGN ENGINEER

The Front End Engineering and Design (FEED) Design Engineer for the HDD Design is CHA and Kiewit in collaboration with BCE. During construction, the Design Engineer will be responsible for reviewing and approving required Subcontractor submittals, shop drawings, and material certificates. Transmission Developers Inc will also take responsibility for review and acceptance of submittals, and documenting the materials and methods used in performance of the construction work to document that the construction complies with the contract documents.

3.5 THIRD-PARTY ENGINEER

The Third-Party Engineer for the HDD inadvertent return analysis has yet to be confirmed. During construction, selected Third Party engineer will be assisting Transmission Developers Inc. with the review of the HDD Subcontractors Inadvertent Release Plan and providing technical assistance as needed with the HDD installation.

3.6 CONSTRUCTION MANAGER

The Construction Manager for this project has yet to be selected. The Construction Manager will be responsible for on-site management of the project for the Certificate Holders to ensure overall Subcontractor compliance with the EM&CP documents, environmental permits, and, local and federal regulations.

3.7 HDD CONSTRUCTION SUBCONTRACTOR

The HDD Construction Subcontractors (HDD Subcontractors) for the various HDD crossing of this project have yet to be selected. The Subcontractor will be responsible for completion of the conduit installation by HDD methods in accordance with the design criteria, contract documents, environmental compliance permits and federal regulations. The Subcontractor will be expected to use the appropriate construction procedures and techniques to complete the project, including supplemental site specific and means and methods specific Inadvertent Release Prevention and Contingency Plans reviewed and accepted by the design team for each crossing in accordance with the contract documents.

The HDD Drill Operator (Drill Operator) will be responsible for operating the HDD drill rig and observing and managing changes in annular fluid pressure or loss of circulation. The Drill Operator will communicate with other members of the drill crew as needed when issues arise. The Subcontractor will be responsible for developing the specific lines of communication within their organization and shall dedicate a responsible person(s) for monitoring and communicating inadvertent releases to the Construction Management team and Environmental Inspector.

3.8 ENVIRONMENTAL INSPECTOR

The Environmental Inspector for this project has not yet been determined. In general, the Environmental Inspector will perform full-time observation and documentation during the HDD activities at a specific site. The Environmental Inspector will be responsible for coordination with all county, state and federal resource agencies, compliance with and changes to any environmental permits.

The Environmental Inspector shall have the authority to stop work when the environmental permit conditions are not being followed or when appropriate environmental precautions are being disregarded by the HDD Subcontractor.

3.9 LINES OF COMMUNICATION AND AUTHORITY

Formal lines of communication will generally follow the established lines of authority. However, open communications between all parties will be encouraged to facilitate more efficient communication and coordination.

3.10 TRAINING

The HDD Subcontractor will verify and document that all construction personnel have appropriate environmental training before they begin work. The Environmental Inspector will also conduct a project orientation meeting for staff assigned with specific roles during the HDD installation and will review the site-specific environmental concerns and permit conditions. The Certificate Holders and Design Engineer will also attend the orientation meeting to review the procedures that will be used to document inadvertent releases in accordance with the HDD specifications.

4.0 FLUID RELEASE MINIMIZATION MEASURES

4.1 GEOTECHNICAL INVESTIGATION

The first steps taken to minimize the potential risk of an inadvertent release included conducting a geotechnical investigation at the site to develop an understanding of the ground around the planned HDD bores. Test borings were conducted near the proposed cable alignment within or immediately adjacent to the HDD sites. We understand that each boring has been backfilled and sealed with cement or cement/bentonite grout, and located off the planned bore path, to limit the risk of a release through an abandoned bore hole during the HDD construction. Some historical project bores were made for purposes other than HDD geotechnical investigations and were unavoidable in HDD design. These bore locations need to be included in site specific plans for periodic monitoring.

4.2 HDD DESIGN

Each HDD crossing is designed to reduce the potential risk of an inadvertent fluid release during construction. General design considerations for HDD include:

- Depth of cover during profile design (based on soilt borings) to limit the potential inadvertent break through to the water body, road, wetlands, or ground surface;
- Typically, potential exists for releases near the entry and exit pits of a bore. The distance where there is a potential for releases at the ends depends on the soil conditions, the slope of the ground surface and the length of the bore. Generally, the longer and deeper the bore the greater the slurry pressures required to hold the borehole open and to carry the cuttings back to the entry or exit pit;
- Specific provisions regarding exit pit design for underwater cable installation (i.e. via the use of temporary dredged cofferdams or steel conduit riser pipes for pressure relief);
- Generally, for the formation of inadvertent releases, the more critical stage of the HDD process tends to be during the initial pilot hole drilling when the annular space between the bore sidewall and the drill string is the smallest and therefore requires larger slurry pressures to overcome flow resistance to carry cuttings back to the entry pit;
- Adjusting the drill alignment to miss existing infrastructure including

existing utilities, and other obstacles;

- Establishing a drill alignment line that allows for gradual angular changes to minimize pressure build-up and limit pull back stresses and bending stresses in the conduit, as well as being compatible with the bending capacity of the drill steel;
- Requiring drilling fluid composition, and drilling procedures that minimize drilling fluid pressures;
- Requiring drilling fluids that adequately address site-specific drilling concerns while posing the least threat to the environment;
- Recommending the use of conductor casings/conduits at the entry and exit ends of bores when ability of the ground to provide sufficient confinement to resist the drilling slurry pressures is expected;
- Requiring monitoring and controlling drilling fluid pressures with down-the-hole sensors during pilot hole drilling; and
- Requiring that, during the performance of any HDD waterbody crossing, contractors monitor the use of NSF certified drilling slurry additives (Article VII: General Condition No. 114 [m]) and, in the event of a detected release of fluid, implement the procedures specified in the approved EM&CP. For any release occurring in a waterbody, the Certificate Holders shall immediately notify DPS Staff and NYSDEC Region 5 Staff of details of the release and the course of action they recommend taking.

4.3 CONTINGENCY PLAN

As mentioned above, prior to construction the selected Subcontractor will be required to submit a supplemental site and Subcontractor-Specific Inadvertent Release Contingency Plan for review and approval by design team. The project specifications require that the following major elements be addressed in detail in the HDD Subcontractor's Plan:

- Work plan and detailed description of the drilling program (details for executing pilot hole, reaming, pull-back operations, and schedule), this plan shall include necessary procedures for addressing problems that are typically encountered during HDD installations through the anticipated subsurface for each drill location and to prevent inadvertent releases of drilling fluid;
- Drilling fluid composition design and on-hand amendments to alter fluid properties to reduce pressures, potential for plugging, and seepage losses;
- Description of the planned drilling equipment and drill site layout;

- SDS information for all drilling fluid products proposed for use;
- Procedures for drilling fluid pressure control, and fluid and pressure loss monitoring and management to aid in prevention and the detection of an inadvertent release (i.e., metering of makeup water, recording of drilling fluid product quantities utilized, fluid return volumes, fluid and cuttings disposal quantities, turbidity of river water, etc.);
- Contingency plans for addressing inadvertent releases into wetlands, or other sensitive areas, which includes the specific procedures used to halt the release and then contain, clean-up, and remove materials from the release site;
- Notification procedures and chain-of-command in the event of a release;
- Criteria for evaluating the need for a drill hole abandonment and the associated plan for sealing the drill hole if abandoned;
- Drilling fluid management and disposal procedures;
- The work plan and detailed drilling program description should include documentation regarding site restoration, vegetation management, sedimentation and erosion control, and hazardous material usage (if applicable). The intended approach shall be in compliance with those measures presented in the Project EM&CP.
- Notice shall be provided to residents, businesses, and building, structure, and facility (including underground, above ground and underwater facilities) Certificate Holders and operators within one hundred (100) feet of any HDD staging area or trenching activity with an offer to inspect foundations before, during, and after construction. Additional detail regarding this notice, associated inspections, intended benefits, proof of notice, cost reimbursements and associated construction initiation schedule is included in General Condition 154.

In addition to providing a site-specific Inadvertent Release Contingency Plan, the specifications require that the Subcontractor implement the additional necessary safeguards to minimize the likelihood of a fluid release and management/control should a release occur. This includes having a readily available supply of spill response devices (containment booms, pumps, straw bales, silt fence, sediment logs, sandbags, vacuum trucks, and storage tanks) and any other materials or equipment necessary to contain and clean up inadvertent releases. To maximize protection to sensitive environmental areas these measures shall be pre-positioned at the site, readily available and operational prior to the start of any drilling. If needed, additional spill response measures shall be employed immediately, as secondary measures, in the event of a fluid release.

The workspace layout for HDD materials and equipment will be configured to reduce the

likelihood of a release. Final dimensions and equipment layouts are to be adjusted based on actual space available and constraints shown on the drawings for each HDD crossing.

4.4 DRILLING FLUIDS MANAGEMENT

As described in the Project EM&CP document, drilling fluid (typically bentonite and water based with selected additives) will be NSF certified and all recycling and reuse regulations will be followed where applicable. The drilling fluid management system and subsequent disposal is the responsibility of the subcontractor performing the HDD. However, the drilling fluid management system and subsequent disposal will adhere to the following requirements:

- Drilling fluid will be processed through an initial clearing that separates the solid materials from the fluid;
- Solids will be sifted out by a screening apparatus/system and the solids deposited into a roll-off or a dump truck and periodically transported off-site and disposed of at an approved disposal facility determined by the HDD construction subcontractor;
- Drilling fluid that is deemed unacceptable to be reused during construction or left over at the end of drilling will be collected and transferred into a tanker truck for disposal at an approved disposal facility determined by the HDD construction subcontractor;
- Petroleum-based fluids and other potentially hazardous materials associated with drilling operations that are spilled during HDD construction will be contained following the mitigation measures described in the SPCC (Appendix K of the EM&CP) and disposed of at an approved disposal facility as determined by the HDD construction subcontractor and included in the EM&CP;
- Supply of spill containment equipment and measures shall be maintained and readily available around drill rigs, drilling fluid mixing system, entry and exit pits and drilling fluid recycling system, if used, to prevent spills into the surrounding environment. Pumps, vacuum trucks, and/or storage of sufficient size will be in place to contain excess drilling fluid; and,
- Under no circumstances will drilling fluid that has escaped containment be reused in the drilling system.

An overview of the drilling fluid system will be submitted to the Environmental Inspector for approval once determined and prior to any HDD installation activities. The role of the Environmental Inspector is discussed in Chapter 3 of the EM&CP.

4.5 EARLY FLUID RELEASE DETECTION

The HDD method has the potential for seepage or fluid loss into pervious geologic formations that the bore path crosses. This may occur due to the presence of fractures in the rock, low overburden confinement, or from seepage through porous soils such as coarse gravels or via prior exploratory boreholes. It is important to note that inadvertent releases of drilling fluid can occur even if the down-hole pressures are minimal. Subsurface conditions that could be conducive and lead to inadvertent releases or drill difficulties include:

- Highly permeable soil such as cobbles and gravel;
- Presence of rock joints, solution features, or other subsurface fractures;
- Considerable differences in the elevations of HDD entry and exit points (typically greater than 50 feet);
- Disturbed soil, such as unconsolidated fill;
- Soft/weak soils with low overburden confining capacity;
- Low density soils in areas where the HDD bore is relatively shallow;
- Longer bore alignments; and,
- The presence of archeological or anthropogenic features such as, existing wells, piles and culverts, in close proximity to the HDD bore that may provide a preferential path for the drilling slurry to escape from the bore path.

Risks associated with the above conditions at specific crossings are discussed in Section 9 of this report.

An experienced drill crew is the most effective approach to detecting reaction to drilling fluid seepage prior to a surface release. They can promptly stop the drilling, modifying the drilling fluid composition, fluid properties, and pressures to address indications of loss of drill fluid. The HDD Subcontractor is required to utilize experienced drill crews particularly in and adjacent to environmentally sensitive areas. The following factors can be used for identifying the potential for drill fluid release:

- The loss of pressure within the drill hole utilizing a downhole pressure monitoring

system;

- A large rapid buildup of pressure within the drill hole utilizing a downhole pressure monitoring system or at the drill rig;
- A substantial reduction in the volume of return fluid (loss of circulation); and
- The lack of drill cuttings returning in the drill fluid.

In addition to an experienced drill crew, the HDD Subcontractor will be required to perform periodic (at least twice a day) visual inspection and monitoring of the stream channel bottom and wetlands in the vicinity of the drill bit or reaming bit for signs of an inadvertent release. The Environmental Inspector will monitor the status of each HDD waterbody crossing while construction activities are underway until the crossing has been completed and the stream and stream banks have been restored. In the event of any potential or actual failure of the crossing, the Certificate Holders shall have engaged adequate staff, materials, and equipment to take necessary steps to prevent or avoid adverse environmental impacts. If visual monitoring indicates a potential release, additional measures such as turbidity measurements and bentonite accumulation measurements both upstream and downstream of the current active location of the drill bit are required.

5.0 INADVERTENT RELEASE MONITORING AND NOTIFICATIONS

The HDD Subcontractor is responsible for monitoring of the drilling operation to detect a potential inadvertent release by observing and documenting the flow characteristics of drilling fluid returns to the HDD entry/exit pits and by visual inspection along the drill path. If drilling fluid to the HDD entry/exit pits are lost, the Subcontractor shall implement the following steps:

- The Drill Operator will monitor and document pertinent drilling parameters and conditions and observe and monitor the drill path for evidence of an inadvertent release, if there is evidence (typically visual) of a release, the Subcontractor will be required to stop the drilling immediately;
- The Subcontractor shall notify the lead Environmental Inspector of any significant loss of drilling fluid returns at the drill rig; and, in the event of a detected release of drilling fluid during the performance of any HDD waterbody crossing, implement the procedures specified in the approved EM&CP. The Certificate Holders shall immediately notify New York State Department of Public Service (NYSDPS) Staff and New York State Department of Environmental Conservation of details of the release and the course of action they recommend taking.
- The subcontractor will take steps to modify the drill fluid properties and pressures to reduce the potential of drill fluid loss or release; and
- The Drill Operator will take steps to restore drilling fluid circulation in accordance with the requirements of the HDD technical specifications.

If a fluid release is identified, an immediate response is necessary and the Subcontractor is required to take proper corrective actions to minimize impacts, particularly to environmentally sensitive resources (e.g. watercourse, waterbodies, and wetlands).

6.0 INADVERTENT RELEASE RESPONSE (UPLAND AND ROAD AREAS)

A common reason for upward movement and release of drill fluid is a borehole collapse or blockage and a resulting increase in the pressure exerted by drill pumps. Lowering drill fluid pressure is a first step to limiting the extent of a release and can be accomplished by stopping drill rig pumps and allowing pressure to bleed off. With no pumping pressure in the hole, surface seepage will generally stop, then the Subcontractor can trip the drill steel back a selected distance and attempt to clear cuttings from the annulus to re-establish circulation.

The HDD Subcontractor will be required to contain/isolate and remove any fluid that has migrated from the surface. On land this can be done through use of berms, straw bales, shovels as needed, or silt fence to contain the release in conjunction with excavating a small sump pit and/or use of vacuum collection equipment, if needed. Sufficient spill-absorbent material will also be required on-site.

If a release is identified in an upland area, the Subcontractor will be required to immediately respond as described above to limit the extent of the release. After containment is established, cleanup and removal can be conducted by hand, with vacuum trucks, or other equipment. The Environmental Inspector will be present during clean up and removal activities, as they may need to be conducted outside of the pre-authorized temporary workspace areas. The Environmental Inspector, Construction Manager, and the HDD Subcontractor will work closely to determine the best course of action for inadvertent releases occurring within upland areas.

Upon containment of the release, the HDD Subcontractor will be required to evaluate the cause of the seepage and develop mitigation strategies to limit the likelihood of recurrence. The location of the seepage and the area around the seep will be monitored upon the re-start of the HDD operations for changes in conditions. The segments of borehole nearest the entry and exit points and other areas of low overburden cover tend to be the most susceptible to surface seepage as they have the least amount of soil confinement. These locations will generally be in areas of dry land where seepage detection is easily identified and contained. If areas of high risk for inadvertent releases are identified during the HDD design phase, they can be protected from an uncontrolled release through use of strategically placed confinement/filter beds, straw bales, silt fence, or earth berms place prior to the start of drilling or the use of conductor conduits if at entry and exit areas.

7.0 INADVERTENT RELEASE RESPONSE (WETLAND, RAILROAD, AND OPEN WATER BODY AREAS)

For any release occurring in a waterbody, the Certificate Holders shall immediately notify DPS Staff and NYSDEC of details of the release and the course of action they recommend taking. During the performance of any HDD waterbody crossing, contractors monitor the use of an approved drilling solution and, in the event of a detected release of fluid, implement the procedures specified in the approved EM&CP. If an inadvertent release occurs when working beneath the waterway, wetland, or railroad the HDD Subcontractor will be required to cease drilling operations and reduce pressures in borehole immediately, and notify the Environmental Inspector, the Railroad (i.e. when within railroad property), the construction management team and the Certificate Holders. The Environmental Inspector, with input from the Drill Operator, will evaluate the potential impact of the release on a site-specific basis and will determine the appropriate course of action. Prior to construction, the HDD Subcontractor is required to develop a detailed, site-specific submittal for general in-stream or in-rail response methods and pre-place necessary materials and equipment at or near the site prior to construction. Specific response actions will be determined in consultation with the Environmental Inspector and HDD Subcontractor and could include the following:

- Shutting down or slowing the drill fluid pumps;
- Modifying the drill fluid properties, add agents to reduce drilling fluid pressures and/or to plug/seal release path;
- Tripping the drill steel back a selected distance and attempt to clear cuttings from the annulus to re-establish circulation
- Stopping drilling activities for 24 hours to allow the bentonite in the subsurface pathways to gel and seal the pathways;
- Evaluate the current drill methods to identify site specific improvements to lower the risk of additional inadvertent releases and,
- Implementation of proper in-wetlands and in upland, road and railroad, hand-placed sedimentation control measures including, but not limited to straw bales, vacuum trucks, silt curtains, containment cells, turbidity curtains, or if suitable, sand bags and confinement/filter beds. These activities will require that qualified construction personnel and other support equipment, and supplies be prepositioned and readily available at or near the site.
- Use of a relief well installed at the location of the release. A well or pit

equipped with a subsurface pump to control slurry pressures and future releases at that location by evacuating drilling fluid as it accumulates can also be used. The relief well can be utilized to immediately lower the borehole pressures in the event of an inadvertent release and later to control and manage the release as the drilling continues.

8.0 DRILL HOLE ABANDONMENT PLAN

In the event the HDD Subcontractor must abandon the drilled hole, a plan to fill the abandoned hole will be implemented as detailed in the HDD Subcontractor's supplemental Inadvertent Release Contingency Plan and an alternative plan/alignment for crossing shall be evaluated. If it becomes necessary to abandon a partially completed hole, the abandoned hole will be filled with a mixture of high-yield bentonite, water, and drill spoil. The first ten feet of the bore path will be compacted and filled with soil or a cement-bentonite mix to prevent future settlement. The Subcontractor submitted site-specific abandonment plan shall be approved by the Design Engineer and the Construction Manager prior to being performed in the field.

After the abandoned hole has been filled, an alternative entry and exit hole and bore path alignment will be evaluated by the HDD Subcontractor, Construction Manager, and the Design Engineer. The new alignment shall be offset from the abandoned hole by at least 10 feet (except at the ends where a 5- foot offset may be used) to help limit the risk of steering difficulties due to the presence of a hydraulic connection causing drill fluid loss to the abandoned hole.

9.0 CROSSING SPECIFIC DISCUSSION

9.1 HDD CROSSING #134A

HDD #134A consists horizontal curved HDD bores, approximately 920 feet long. Both bores start under the Robert F Kennedy Bridge, cross under the Randall's Island Fields 46 and 49 and under the Bronx Kill Swing Bridge. The bores end in the northern corner of Randall's Island Field #45 at approximately El. 10 reference datum NAVD 1988). The ground surface elevations along the path of HDD #134A relatively flat starting at approximately El 13 (reference datum NAVD 1988).

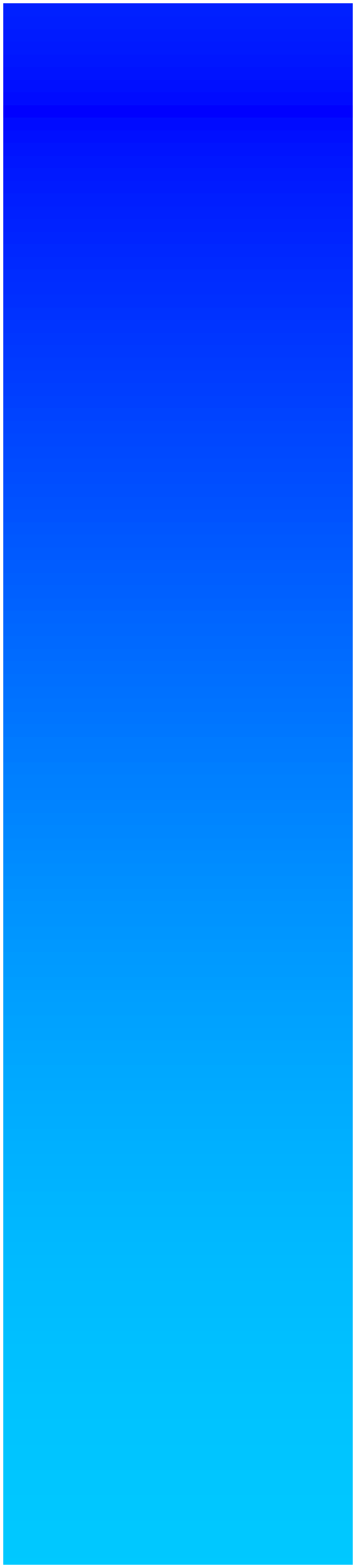
Given the presence of waterways near the work areas, we recommend the use of barriers to contain potential releases to the ground surface near the exit pits and work area. The proposed work for HDD 134A must be constructed in accordance with the Article VII Certificate and associated EM&CP.

Ground conditions at HDD #134A - Based on the borings, the soil profile for the HDD #134A BoreAid analyses will be divided into four [4] layers: loose fill, medium stiff clay, loose sand, and rock. The soil profiles used for BoreAid analyses for the HDD in this segment are presented in Part III Section B of this report.

Specific design considerations for HDD #134A currently include:

- General depth of cover under the ground surface is around 32 feet. Preliminary analyses of the bore indicate the lowest maximum allowable pressure capacity in the middle of the bore to be approximately 70 psi. The total circulating pressure estimated to occur in the middle portion of the bore is approximately 24 psi assuming standard HDD drilling methods. In the remainder of the bores the maximum allowable pressure ranges from approximately 0 to 75 psi and the approximate applied slurry pressure during drilling ranges from 0 to 30 psi. Sketches showing the maximum allowable pressure and the applied pressure is provided in the summary BoreAid analyses in Part III Section B of this report.
- It appears that a potential for releases in the ending 15 feet of each bore near the exit pits exist. These should be relatively easily controlled through the use of conductive conduit, straw bales, silt fences, erosion control measures and vacuum trucks.
- Generally, for the formation of inadvertent releases, the more critical stage of the HDD process tends to be during the initial pilot hole drilling when the annular space between the bore sidewall and the drill string is the smallest.

- Adjusting the drill alignment to miss existing infrastructure including existing utilities, and other obstacles,
- Establishing a drill alignment line that allows for gradual angular changes to minimize pressure build-up,
- Requiring drilling fluid composition and drilling procedures that minimize drilling fluid pressures,
- Requiring drilling fluids that adequately address site-specific drilling concerns while posing the least threat to the environment,
- Requiring monitoring and controlling drilling fluid pressures with down-the-hole sensors during pilot hole drilling, and
- Recommended the use of conductor casings, temporary steel casing, at both ends of the bore to get through the fill layer and mitigate the potential release of the drilling fluid.



III. APPENDICES

Appendix A

HDD Geotechnical Data Report for HDD 134A

Kiewit

MEMORANDUM

DATE: October 14, 2024

TO: Morgan Snyder, P.E.; CHA Consulting, Inc.

FROM: Matthew Hawley, P.E.; Kiewit Engineering (NY) Corp. MKH
Jaren Knighton; Kiewit Engineering (NY) Corp.

SUBJECT: Geotechnical Data: Segment 14 – Package 8 – HDD Crossing 134A
Champlain Hudson Power Express Project
Randall's Island, New York

Kiewit Engineering is providing the attached geotechnical data for use in the horizontal direction drill (HDD) design for the Champlain Hudson Power Express project in New York. This HDD crossing is located on Randall's Island in New York City. The approximate station for the start of HDD crossing number 134A is STA 80035+50 (40.7978° N, 73.9196° W).

The geotechnical data near this HDD crossing is attached. The available data is taken from the investigations by AECOM, Brierley, and GZA, referenced below.

- AECOM, Geotechnical Data Report (Rev. 2), Downstate Segment: Randall's Island, Bronx and Queens Counties, NY, Champlain Hudson Power Express, dated August 11, 2022.
- Brierley Associates, Geotechnical Data Report, Champlain Hudson Power Express – Segment 8, Randall's Island, New York, dated August 12, 2022.
- GZA GeoEnvironmental, Geotechnical Data Report, Champlain Hudson Power Express (CHPE), High-Voltage Direct Current (HVDC) Cable Line, Area 5, Segments 12, 14, and 15, Bronx to Queens, New York, dated February 16, 2024.

Contact us if you have questions or require additional information.

HDD 134A
Borings BR-3, BA-103, BA-105, SV-264, TR330.0-1.0, TR330.0-2.3, SV-265
Segment 14 - Design Package 8

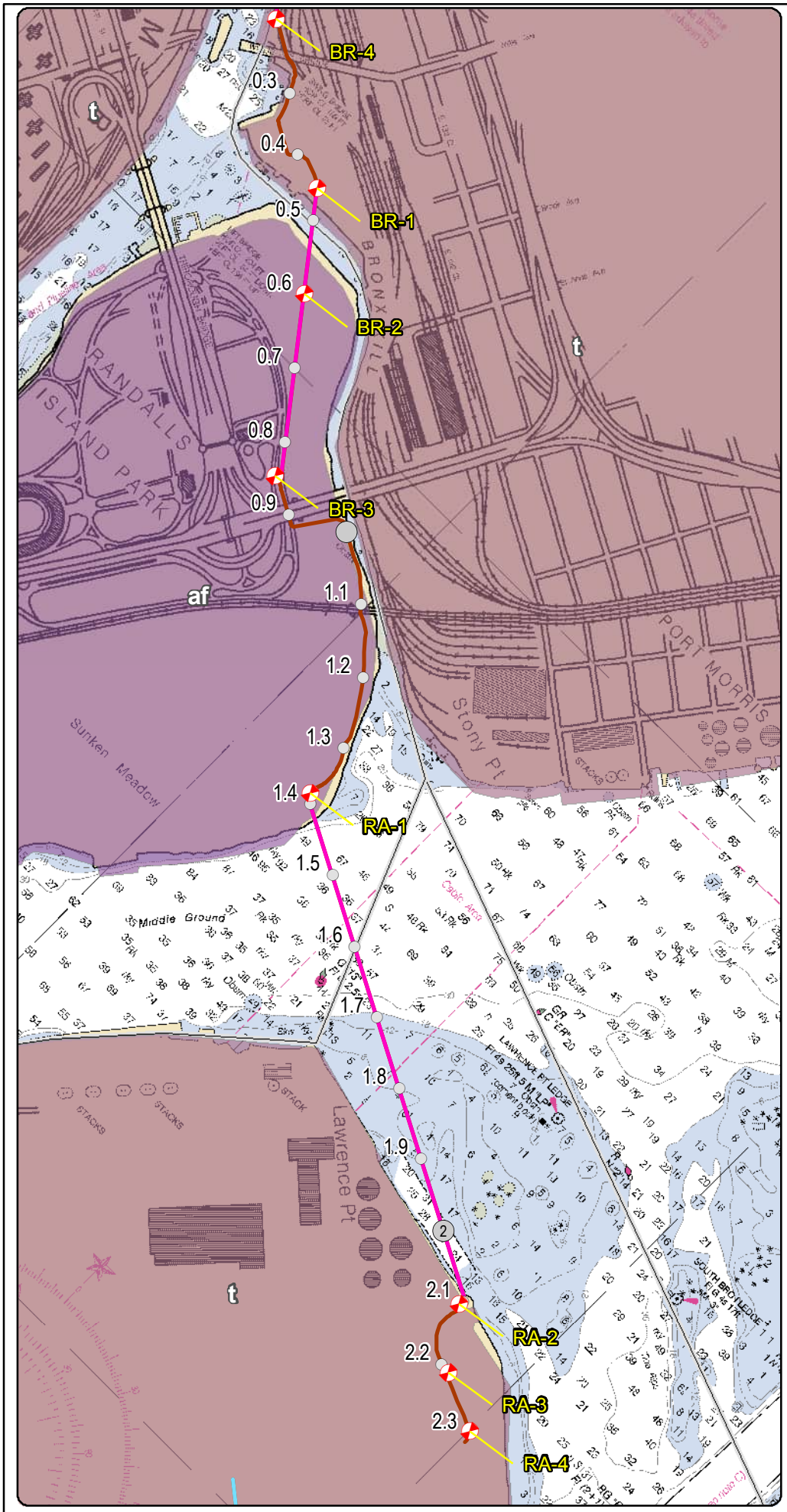
CHPE Segment 14 Package 8
Soil Boring Coordinates and Elevations

Firm	Boring	Northing (feet)	Easting (feet)	Ground Surface Elevation (feet)
AECOM	BR-3	230106.9	1006207.6	10.4
Brierley	BA-103	230281.0	1006168.1	10.4
	BA-105	229752.4	1007419.7	10.3
GZA*	SV-264	230026.2	1006388.5	12.0
	TR330.0-1.0	229971.0	1006566.0	12.0
	TR330.0-2.3	229945.0	1007198.7	10.0
	SV-265	229773.5	1007384.4	9.0

Notes:

- Northings and Eastings are provided in NAD83 New York Long Island State Plane Zone 3104.
- Elevations are referenced to the NAVD88 datum.

* Coordinates on GZA boring logs are UTM Zone 18T and have been translated to State Plane Zone 3104 for inclusion in this table.



LEGEND

- Boring Location
- Terrestrial Route HVDC
- Submarine Route HVDC
- Terrestrial Route HVAC
- Preliminary HDD Locations
- Preliminary Pipe Bridge Location
- Town Boundary
- County Boundary

Surficial Geology

- af - Artificial fill
- t - Till

0.1 0.05 0 0.1 Miles

Transmission Developers Inc.

Champlain Hudson Power Express Project

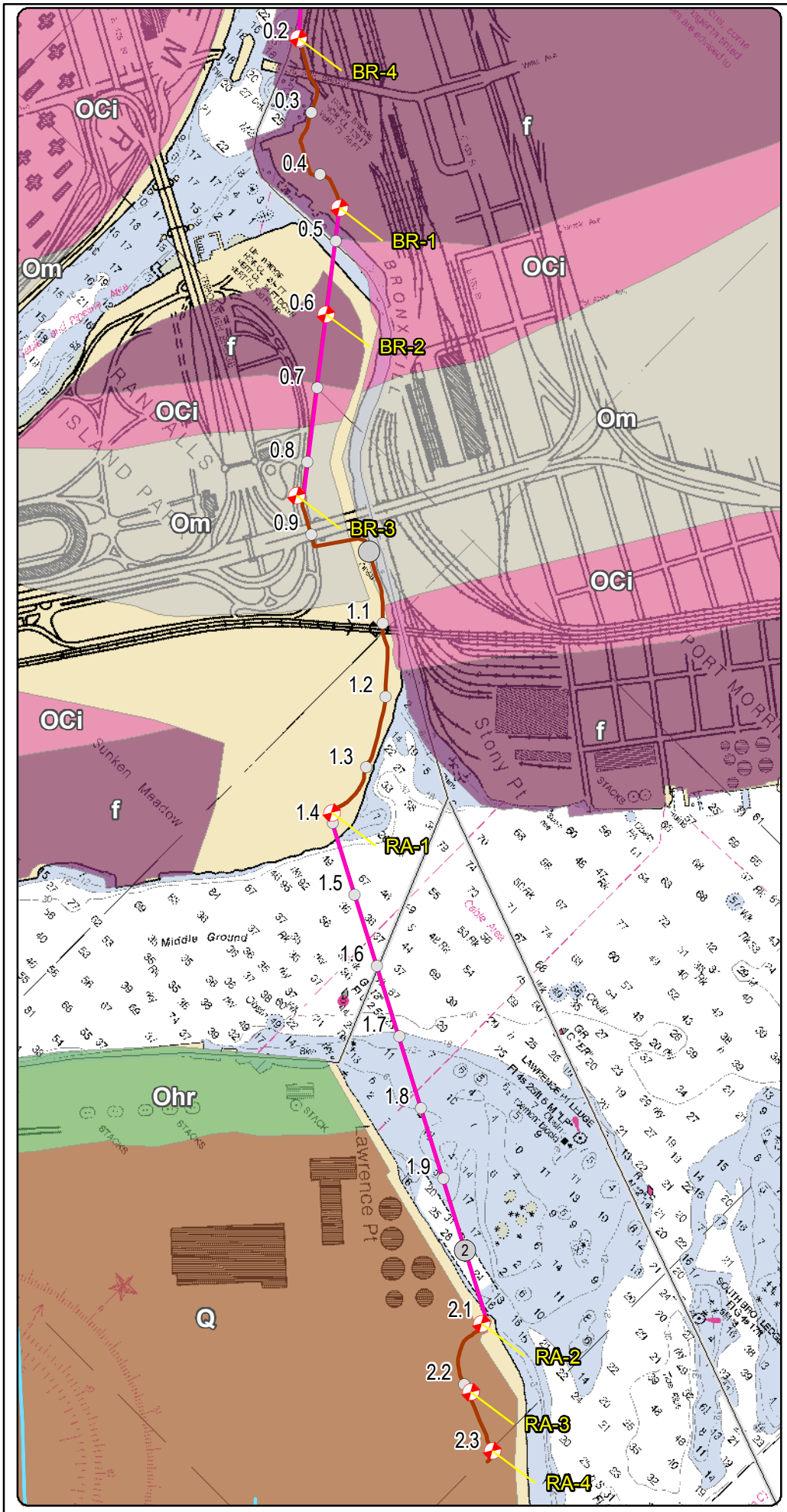
Champlain Hudson Power Express Inc.

Surficial Geology and Geotechnical Borings
Randall's Island
Figure 3

Prepared on 5/23/2022
by: AECOM

DATA SOURCES: ESRI, NYSDOT, NOAA, USACE, NYDOS, TDI, TRC

Y:\Projects\CHPE\Route\Consensus_Alternative_Routes\MXD\Alt_5_Routes\Boring_Locations\Maps_for_May_2022_Report\Alt_Route_Randalls_Island_Boring_Locations_Surficial_20220512.mxd



LEGEND

- Boring Location
- Terrestrial Route HVDC
- Submarine Route HVDC
- Terrestrial Route HVAC
- Preliminary HDD Locations
- Preliminary Pipe Bridge Location
- Town Boundary
- County Boundary

Bedrock Geology

- OCi - Inwood Marble
- Ohr - Harrison Gneiss
- Om - Manhattan Formation
- Q - Glacial and Alluvial Deposits
- f - Fordham Gneiss

0.1 0.05 0 0.1 Miles

Transmission Developers Inc.

Champlain Hudson Power Express Project

Champlain Hudson Power Express Inc.

Bedrock Geology and Geotechnical Borings Randall's Island Figure 4

Prepared on 5/23/2022

by: AECOM

DATA SOURCES: ESRI, NYSDOT, NOAA, USACE, NYDOS, TDI, TRC

Y:\Projects\CHPE\IRoute\Consensus_Alternative_Routes\MXD\Alt_5_Routes\Boring_Locations\Maps_for_May_2022_Report\Alt_Route_Randalls_Island_Boring_Locations_Bedrock_20220512.mxd

BORING CONTRACTOR: ADT	AECOM		SHEET 1 OF 1
DRILLER: Chris Chaillou			PROJECT NAME: CHPE -
SOILS ENGINEER/GEOLOGIST: Michael Izdebski			PROJECT NO.: 60323056
			HOLE NO.: **BR-3**
	Boring Log		START DATE: 06/08/21
LOCATION: Randall's Island, NY, MP 0.86			FINISH DATE: 06/08/21
			OFFSET: N/A

GROUND WATER OBSERVATIONS		CASING	SAMPLER	DRILL BIT	CORE BARREL	DRILL RIG: CME LC-55
Groundwater ~10 ft. bgs	TYPE	Flush Joint Steel	California Modified	Tricone Roller Bit	NQ	BORING TYPE: SPT
	SIZE I.D.	4"	2.5"	- -	1 7/8"	BORING O.D.: 4.5"
	SIZE O.D.	4.5"	3"	3 7/8"	3"	SURFACE ELEV.: 10.4' (NAVD88)
	HAMMER WT.	140 lbs	140 lbs			NORTHING: 230106.946
	HAMMER FALL	30"	30"			EASTING: 1006207.642

DEPTH	CORING RATE MIN/FT	SAMPLE DEPTHS FROM - TO (FEET)	SAMPLE TYPE AND NO.	PEN. in	REC. in	BLOWS PER 6 in ON SAMPLER (ROCK QUALITY DESIGNATION)	N Corr.(2)	USCS CLASS.	STRAT. CHNG. DEPTH	FIELD IDENTIFICATION OF SOILS
						Hand Cleared				
1.0									Gravelly Sand/Fill	Brown fine to coarse SAND, some fine to coarse gravel, trace clayey silt, trace organics (FILL)
2.0										
3.0										
		3'-5'	S-1							TR-1; 3'-6'
4.0										
5.0										4'; Gray fine to coarse(+) SAND, some fine to coarse gravel; angular
6.0										
		6'-8'	S-2	24"	7"	5 3 3 2	4			Brown fine to coarse SAND, some silt, little fine to coarse (+) gravel; subrounded
7.0										7'; Gray coarse (+) to fine SAND, some fine to medium gravel; angular
8.0										
		8'-10'	S-3	24"	15"	3 2 3 4	3			Black coarse angular GRAVEL, trace fine to coarse sand
9.0									Sand and Gravel	
10.0										
		10'-12'	S-4	24"	5"	6 8 6 3	9	SW		Black fine to coarse SAND, some fine to medium gravel; angular
11.0										
12.0										
		12'-14'	S-5	24"	12"	2 2 1 1	2			SAA
13.0								OH	Silty Clay	12.5'; Gray silty CLAY, little organics
										TR-2; 13.0'-13.5'
14.0										
		14'-16'	S-6	24"	2"	23 18 18 11	23			
15.0										
16.0								SP/SM	Sand	15.5'; Brown fine to medium SAND, some silty clay, little fine to coarse gravel; sunrounded
17.0										
18.0										
19.0										
20.0										

NOTES:

(1) Thick-wall ring lined drive sampler (California sampler) used for SPT samples. Rings dimensions = 2-1/2" O.D. by 2-7/16" I.D. by 6" length.

(2) Correction factor: $N_{corr}=N*(2.0^2-1.375^2)in./(3.0^2-2.4^2)in. = N*0.65$.

Soil description represents a field identification after D.M. Burmister unless otherwise noted.

The information contained on this log is not warranted to show the actual subsurface condition. The contractor agrees that he will make no claims against AECOM if he finds that the actual conditions do not conform to those indicated by this log.

SAMPLE TYPE: S= SPLIT SPOON U=SHELBY TUBE R=ROCK CORE

PROPORTIONS: TRACE=1-10% LITTLE=10-20% SOME=20-35% AND=35-50%

BORING CONTRACTOR: ADT

DRILLER: Chris Chaillou

SOILS ENGINEER: Michael Izdebski

LOCATION: Randall's Island, NY, MP 0.86

AECOM

Boring Log

SHEET 2 OF 2

PROJECT NAME: CHPE -

PROJECT NO.: 60323056

HOLE NO.: **BR-3**

START DATE: 06/08/21

FINISH DATE: 06/08/21

OFFSET: N/A

DEPT	CORING RATE MIN/FT	DEPTHS FROM - TO (FEET)	TYPE AND NO.	PEN. in	REC. in	BLOWS PER 6 in ON SAMPLER (ROCK QUALITY DESIGNATION)	N Corr.	USCS CLASS.	STRAT. CHNG. DEPTH	FIELD IDENTIFICATION OF SOILS
		20'-22'		5"	5"	50/5"		SP/SM	Sand	Brown fine to coarse SAND, some fine to coarse gravel; subangular
21.0										
22.0										
23.0										
24.0										
25.0										
		25'-30'	R-1	60"	51.5"	RQD= 39"/60"= 65%				Lightly fractured, moderately weathered, white-grey low grade SCHIST; hard, oxidation staining present in most fractures
26.0										
27.0										TR-3; 27.8'-28.35'
28.0										
29.0										
30.0										
		30'-35'	R-2	60"	40.5"	RQD=4"/60"=7%			MANHATTAN SCHIST	Dark gray SCHIST, moderately fractured, moderately weathered, very hard, oxidation staining
31.0										
32.0										TR-4; 33.5'-34.10'
33.0										
34.0										
35.0										34.4'; White-gray-orange SCHIST, moderately fractured, moderately weathered, oxidation staining, hard
		35'-40'	R-3	60"	58.5"	RQD=49"/60"=82%				
36.0										
37.0										36.3'; SAA Schist, lower grade, slightly fractured
38.0										
39.0										TR-5; 38.7'-39.25'
40.0										
41.0										Boring terminated at 40' bgs, grouted to surface
42.0										
43.0										
44.0										
45.0										

NOTES:

Soil description represents a field identification after D.M. Burmister unless otherwise noted.

The information contained on this log is not warranted to show the actual subsurface condition. The contractor agrees that he will make no claims against AECOM if he finds that the actual conditions do not conform to those indicated by this log.

SAMPLE TYPE: S= SPLIT SPOON U=SHELBY TUBE R=ROCK CORE

PROPORTIONS: TRACE=1-10% LITTLE=10-20% SOME=20-35% AND=35-50%

Table 3: Summary of Geotechnical Laboratory Test Results: Soil Samples
Bronx, Randall's Island to AGC Receiving Pit Segment

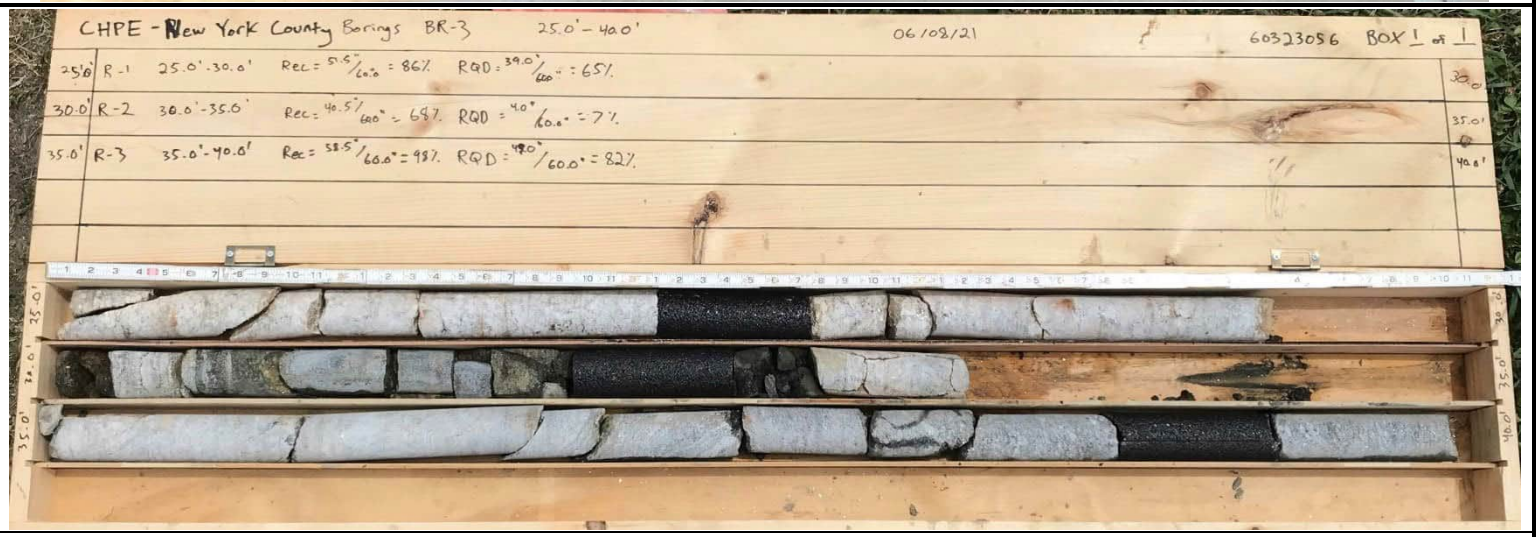
Boring ID	Sample ID	Depth (ft)	USCS Symbol	% Gravel	% Sand	% Silt	% Clay	LL [(1)] (%)	PL [(2)] (%)	PI [(3)] (%)	Water Content (%)	Org. Content (%)
BR-1	S-3	7-9	SW-SM	16	76	5	3	-	-	-	16.6	
	-	15-17	SM	0	86.8	10.2	3	-	-	-	21.7	
BR-2	S-5	20-22	SW-SM	36	52	9	3	-	-	-	10.7	-
	S-7	44.5-46.5	SC	17	59	17	7	26	15	11	8.9	-
BR-3	S-4	10-12	SW	38	61	1	0	-	-	-	22.8	-
	S-5	12-14	OH	2	4	61	33	99	35	64	73.1	4.2
	S-7	20-22	SP-SM	38	55	6	1	-	-	-	8.4	-
BR-4	S-6	20-22	GP	79	19	1	1	-	-	-	7.2	-
	S-7	25-27	CH	0.1	5.3	94.6	-	77	30	47	56.1	-
	S-8	30-32	SP-SM	0.8	87.7	8.5	3	-	-	-	26.3	-
	S-10	40-42	SP-SM	4	94	1	1	-	-	-	19.4	-
	S-15	60-61.5	ML	0	32.1	67.9	-	-	-	-	26.5	-
	S-16	61.5-62	CL	0	4.5	95.5	-	36	18	18	32.6	-
RA-1	No lab testing conducted on soil from this boring due to insufficient sample recovery											
RA-2	S-1	5-7	SC	18	60	19	3	-	-	-	28.2	-
	S-7	20-22	GP	95	4	1	0	-	-	-	9.4	-
	S-11A	40-41.5	CH	6	34	39	21	70	32	38	71.0	3.2
	S-12	45-47	SM	40	45	12	3	-	-	-	14.0	-
RA-3	S-2	5-7	GP-GM	63	31	5	1	-	-	-	11.9	-
	S-3	7-9	GW	85	13	2	0	-	-	-	4.9	-
	S-6	13-15	CL	7	25	58	10	38	22	16	35.3	2.6
	S-9	26-26.5	GP-GM	61	33	5	1	-	-	-	6.6	-
RA-4	S-4	9-11	SM	21	65	11	3	-	-	-	16.6	-
	S-6	15-17	GP	79	19	2	0	-	-	-	4.2	-
	S-9	30-32	SW-SM	7	87	5	1	-	-	-	15.1	-
	S-11	36-37	SP-SM	0	89.5	8.5	2	-	-	-	25.8	-
	S-12	45-46	SP	0.9	94.9	3.2	1	-	-	-	24.5	-

Notes:
(1) LL = Liquid Limit
(2) PL = Plastic Limit
(3) PI = Plasticity Index
(4) SG = Specific Gravity

Table 4: Summary of Geotechnical Laboratory Test Results: Rock Samples Bronx, Randall's Island to AGC Receiving Pit Segment													
Boring ID	Core Run	Depth (ft)	Rock Type	RQD %	Water Content %	Dry Unit Weight (pcf)	Mohs Hardness	Unconfined Compressive Strength Test			Point Load Test		
								Compressive Strength (psi)	Axial Strain (%)	Estimated Elastic Modulus (psi)	Sample Orientation	Strength Index (Is50) (psi)	Estimated Compressive Strength (psi)
BR-1	R-1	20-25	Gneiss	47	-	-	-	-	-	-	-	-	-
	R-2	25-30		79	0.1	166	5	27930	0.32	9.00E+06	-	-	-
	R-3	30-33		100	-	-	-	-	-	-	-	-	-
	R-4	33-35		65	-	-	-	-	-	-	-	-	-
	R-5	35-40		91	-	-	-	-	-	-	-	-	-
	R-6	40-45		78	-	-	-	-	-	-	-	-	-
	R-7	45-50		86	0.2	164	6	30720	0.39	8.00E+06	-	-	-
	R-8	50-55		92	-	-	-	-	-	-	-	-	-
	R-9	55-60		79	-	-	-	-	-	-	-	-	-
	R-10	60-65		93	-	-	-	-	-	-	-	-	-
	R-11	65-70		98	0.2	162	5	31050	0.35	9.00E+06	-	-	-
BR-3	R-1	25-30	Schist	65	0.3	164	9	8040	0.26	4.00E+06	-	-	-
	R-2	30-35		7	-	-	-	-	-	-	-	-	-
	R-3	35-40		82	0.2	167	8	12030	0.21	7.00E+06	-	-	-
RA-1	R-1	32-35	Gneiss	93	0.2	177	8	20100	0.24	9.00E+06	-	-	-
	R-2	35-40		96	-	-	-	-	-	-	-	-	-
	R-3	40-45		98	0.2	178	9	17510	0.21	9.00E+06	-	-	-
	R-4	45-40		64	-	-	-	-	-	-	-	-	-
	R-5	50-55		90	0.1	186	8	21120	0.2	1.00E+07	-	-	-
	R-6	55-60		95	-	-	-	-	-	-	-	-	-
	R-7	60-65		100	-	-	-	-	-	-	-	-	-
	R-8	65-70		92	0.1	177	9	14130	0.21	8.00E+06	-	-	-
	R-9	70-75		94	-	-	-	-	-	-	-	-	-
	R-10	75-80		90	-	-	-	-	-	-	-	-	-
RA-2	R-1	55-60	Gneiss	38	-	-	-	-	-	-	-	-	-
	R-2	55-60		81	0.2	173	8	8990	0.25	4.00E+06	-	-	-
	R-3	70-75		83	-	-	-	-	-	-	-	-	-
	R-4	70-75		90	-	-	-	-	-	-	-	-	-
	R-5	70-75		100	0.2	168	9	8880	0.22	5.00E+06	-	-	-
	R-6	70-75		74	-	-	-	-	-	-	-	-	-
RA-3	R-1	31.8-34.0	Gneiss	53	-	-	-	-	-	-	-	-	-
	R-2	34-39		40	0.1	172	7-8	10280	0.18	6.00E+06	-	-	-

ROCK CORE PHOTOGRAPHIC LOG

AECOM Project No: **60323056**
Project Name: **CHPE Geotechnical Investigation**
Location: **Bronx, Randall's Island to AGC Receiving Pit Segment, Bronx and Queens Co's, NY**

Boring No.	Depth (ft.)	
BR-1	60.0-70.0	
Boring No.	**Depth (ft.)**	
BR-3	25.0 to 40.0	

Note: Black foam inserts represent core pieces that were removed for geotechnical and/or thermal resistivity laboratory testing

4.0 TEST BORING PROGRAM

Three (3) land-based test borings, designated as BA-103, BA-104 & BA-105, were drilled and sampled onsite on Randall's Island to depths of 40 to 65 feet below grade, at the locations shown in Figure 2. The land-based test borings were conducted between May 23 and May 27, 2022. Note that these borings were originally designated K-103 through K-105, but were later changed at the request of Kiewit. However, the core photographs (Appendix B) and laboratory test results (Appendices C and D) show the original K- prefix for these boreholes.

Figure 2: Land-based Boring Location Plan. Scale Approximate. Photograph from www.googleearth.com.

Three (3) marine borings were completed in the East River between June 1, 2022, to June 16, 2022. Designated as BA-101, BA-102 & BA-106, these borings were drilled and sampled to depths of 108 to 125 feet below the river mudline. The locations of the marine test borings are shown on Figure 3.

Figure 3: Marine Boring Location Plan. Scale Approximate. Photograph from www.googleearth.com.

Test boring logs presenting descriptions of the materials encountered are included in Appendix A, along with a soil and bedrock classification key. The as-drilled coordinates and elevations of each borehole are presented in Table 1.

Table 1: Borehole Coordinates and Elevations

Boring ID	Easting	Northing	Elevation
BA-101	1009905	227831	-18
BA-102	1010122	227509	-12
BA-103 (K-103)	1006168	230281	10.4
BA-104 (K-104)	1005980	230572	9.5
BA-105 (K-105)	1007420	229752	10.3
BA-106	1008320	229287	-22
State Plane Zone 3104, US Survey Feet, NAVD88			

The onshore and offshore test borings were supervised by a Brierley field engineer, who directed drilling activities, logged the samples, photographed the rock cores, and prepared the field logs. Field sampling, laboratory testing, soil classifications and strata descriptions are in general accordance with methods, procedures, and practices set forth by 1) the Unified Soil

BORING NUMBER BA-103 (K-103)

BRIERLEY ASSOCIATES
Creating Space Underground

CLIENT Kiewit Engineering (NY) Corp.
PROJECT NAME Champlain Hudson Power Express
PROJECT NUMBER 322004.001
PROJECT LOCATION Randall's Island, NY
DATE STARTED 5/26/22 **COMPLETED** 5/26/22
GROUND ELEVATION 10.36 ft NAVD88 **NORTHING** 230281
DRILLING CONTRACTOR Warren George, Inc.
GROUND WATER LEVELS: **EASTING** 1006168.1
DRILLING METHOD Mud Rotary
▽ **AT TIME OF DRILLING** 8.50 ft / Elev 1.86 ft
DRILL RIG Acker Soil Max **DRILLER** Greg Williams
AT END OF DRILLING ---
LOGGED BY Colby Jesset, P.E. **CHECKED BY** Dave Sackett, P.G.
AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	N VALUE)	UCS (psi)	CERCHAR	BULK DENSITY (pcf)	FINES (%)
0		Silty fine-medium SAND, dense, gray, moist, few coarse sand, trace fine gravels	SPT S-1	42	14-22-27 (49)				
		8.4 Sandy SILT, very dense, blackish gray, moist, few medium to coarse gravels, rounded to sub-rounded	SPT S-2	50	25-34-38 (72)				
		6.4 - 4.0' - 4.5' silty layer, red, with little coarse sand	SPT S-3	58	35-46-44 (90)				
5		-4.5' to 6', Silty fine to coarse SAND, gray							
		Fine SAND with Silt, very dense, black to brown gray, trace fine gravel, rounded	SPT S-4	38	76-8-4 (12)				
		2.4 ▽ Clayey SILT, firm, gray, wet, few fine to coarse sand, trace fine gravel, angular	SPT S-5	50	2-4-4 (8)				
10		0.4 Silty fine SAND, very dense, gray, wet	SPT S-6	4	100				
		-4.6 Silty Clayey PEAT, very soft, dark gray, wet, strong odor, partially decomposed organic material	SPT S-7A	83	0-0-0/0"				
15		-5.6 SCHIST, very weak, grey white black, highly weathered	SPT S-7B	83	76-66 (142)				
			NR S-8	0	100				
20		20.0' - 30.0' medium strong, lightly fractured, redish brown staining on joints	RC R-1	90 (87)					
25		-29.4' - 30' highly weathered, moderately fractured	RC R-2	100 (78)					
30		-30' - 35' slightly fractured							
		-fresh below 31.0'	RC R-3	95 (95)					
35									

(Continued Next Page)

BORING NUMBER BA-103 (K-103)

BRIERLEY ASSOCIATES
Creating Space Underground

CLIENT Kiewit Engineering (NY) Corp.
PROJECT NAME Champlain Hudson Power Express
PROJECT NUMBER 322004.001
PROJECT LOCATION Randall's Island, NY

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	N VALUE)	UCS (psi)	CERCHAR	BULK DENSITY (pcf)	FINES (%)
35		SCHIST, strong, gray white, fresh, redish brown staining on joints - 35' to 40' moderately fractured, slight weathering of joints	RC R-4	98 (87)					
40		-40' - 45' moderately fractured - highly weathered from 44.2' to 44.7'	RC R-5	100 (92)					
45		-45' - 50' slightly fractured	RC R-6	100 (92)					
50		-50' - 55' moderately fractured - 50.4' to 53.6' feldspar in pegmatite intrusions, pink	RC R-7	100 (100)		8114	4.12	161	
55		-55' - 60' moderately fractured - 56.6' to 56.8' feldspar in pegmatite intrusions, pink	RC R-8	97 (92)					
60		-60' - 65' slightly fractured	RC R-9	100 (97)					
65		Bottom of borehole at 65.0 feet.							

-Boring coordinates are in State Plane System:
State Plane Zone 3104
US Survey Feet

BORING NUMBER BA-105 (K-105)

BRIERLEY ASSOCIATES
Creating Space Underground

CLIENT Kiewit Engineering (NY) Corp.
PROJECT NAME Champlain Hudson Power Express
PROJECT NUMBER 322004.001
PROJECT LOCATION Randall's Island, NY
DATE STARTED 5/27/22 **COMPLETED** 5/27/22
GROUND ELEVATION 10.3 ft NAVD88 **NORTHING** 229752.4
DRILLING CONTRACTOR Warren George, Inc.
GROUND WATER LEVELS: **EASTING** 1007419.7
DRILLING METHOD Mud Rotary
▽ **AT TIME OF DRILLING** 8.00 ft / Elev 2.30 ft
DRILL RIG Acker Soil Max **DRILLER** Greg Williams
AT END OF DRILLING ---
LOGGED BY Colby Jesset, P.E. **CHECKED BY** Dave Sackett, P.G.
AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	N VALUE)	UCS (psi)	CERCHAR	BULK DENSITY (pcf)	FINES (%)
0		Top Soil 9.8							
		Fine SAND, brown, moist 8.3	SPT S-1	17					
		Silty fine to medium SAND, dense to very dense, gray/brown, moist, trace fine to coarse gravel	SPT S-2	67	21-20-9 (29)				
5			SPT S-3		8-8-14 (22)				
		-Possible cobble/boulder, split spoon bouncing	NR S-4	0	100				
		▽ 2.3							
		Sandy SILT, medium dense, brown, wet, little red gravel 0.3	SPT S-5	17	6-13-6 (19)				
10		Silty fine to coarse GRAVEL, medium dense, red black white, wet, some silty brown fine sand	SPT S-6	29	10-13-14 (27)				
15		-4.7							
		Silty fine to medium SAND with gravel, dense, trace fine to coarse gravel	SPT S-7	88	19-21-50 (71)				
		-16.5' cobble fragment of highly weathered schist							
20		-20.0 driller switched to rock coring							
		-20.0' - 20.5' - cobble fragment of weathered schist	RC R-1	56 (40)					
25		-15.1							
		Silty fine to coarse GRAVEL, dense, black, wet,sub-rounded to sub-angular, little fine to medium sand	SPT S-8	50	19-30				
30		-19.7							
		Silty fine to medium SAND, medium dense, black, wet, little coarse sand, some fine to coarse gravel	SPT S-9	42	14-7-15 (22)				
		- 31' to 32' light chatter while drilling, possible gravel							
		- 33' top of possible cobble/boulder							
35		-24.7							

(Continued Next Page)

BORING NUMBER BA-105 (K-105)

BRIERLEY ASSOCIATES
Creating Space Underground

CLIENT Kiewit Engineering (NY) Corp.
PROJECT NAME Champlain Hudson Power Express
PROJECT NUMBER 322004.001
PROJECT LOCATION Randall's Island, NY

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	N VALUE)	UCS (psi)	CERCHAR	BULK DENSITY (pcf)	FINES (%)
35		PEAT, black, wet, odorous 35.0' driller switched to rock coring 35.0' to 35.8' small cobble of weathered schist	RC R-2	12 (10)					
40		-29.7							

Bottom of borehole at 40.0 feet.

-Boring coordinates are in State Plane System:
State Plane Zone 3104
US Survey Feet

CORE PHOTOGRAPHS

Dry:

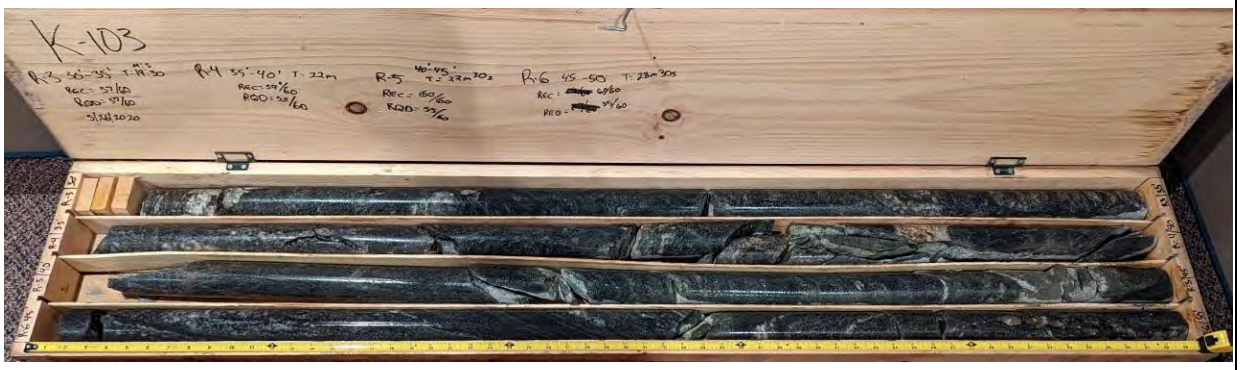
Wet:

BA-103 (K-103) (R-1, R-2) – lower two rows of core box only

CORE PHOTOGRAPHS

Dry:

Wet:



BA-103 (K-103) (R-3, R-4, R-5, R-6)

CORE PHOTOGRAPHS

Dry (does not include K-105):

Wet:

BA-103 (K-103) (R-7, R-8, R-9), first three rows of core box only

CORE PHOTOGRAPHS

BA-105 (K-105) (R-1)

BA-105 (K-105) (R-2)

summary of the results of the geotechnical laboratory testing program are presented in Appendix C.

Thermal resistivity testing of recovered soil and rock samples was performed by GeothermUSA in their Cypress, Texas laboratory during July 2022. Four rock core samples were tested "as is". The soil samples were recompacted at the "as received" moisture content and at 95% of the single point standard Proctor density as directed by Brierley. A complete summary of the results of the thermal resistivity laboratory testing program are presented in Appendix D.

5.1 Soil Geotechnical Test Results

Geotechnical laboratory testing was performed on select samples from Borings BA-103 and BA-105. The summaries are listed below. The grain size test was performed on a composite sample from boring BA-105. An Atterberg Limits test was performed on a potentially clayey sample from Boring BA-103, but the sample was described by the lab to be non-plastic.

Table 2: Moisture Content Results

Moisture Content		
Boring ID	Depth (Ft BGS)	Value (%)
BA-103 (K-103)	8.0-10.0	13.1

Table 3: Grain Size Distribution Results

Grain Size				
Boring ID	Depth (Ft BGS)	Value (% GRAVEL)	Value (%, SAND)	Value (%, Fines)
BA-105 (K-105)	Mix of Sample 6 and Sample 9	64.6	30.6	4.8

Table 4: Atterberg Limits Results

Atterberg Limits		
Boring ID	Depth Ft BGS)	Value (#, NP)
BA-103 (K-103)	8.0-10.0	Non-Plastic

5.2 Rock Geotechnical Laboratory Test Results

Unconfined Compressive Strength (UCS) testing (ASTM D7012) was performed on twelve (12) recovered rock core samples from Borings BA-101, BA-102, BA-103, BA-104, and BA-106. Table 5 presents a summary of the sample depths, bulk density, and strength test values.

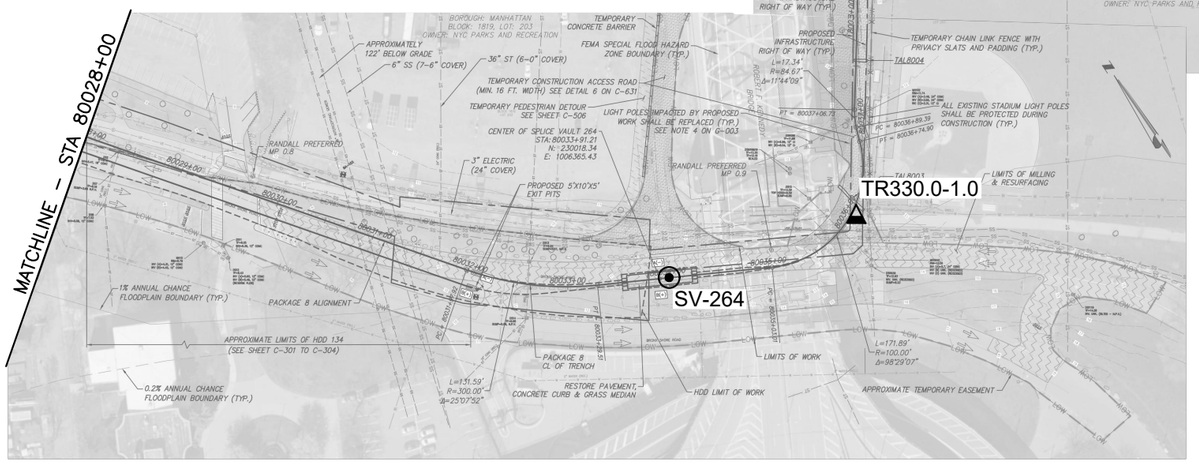
Table 5: Unconfined Compressive Strength Results

Unconfined Compressive Strength (UCS) and Bulk Density			
Boring ID	Depth (ft BGS)	Bulk Density Value (pcf)	UCS Value (psi)
BA-101	41-41.39	170	7,594
BA-101	80.26-80.63	165	12,471
BA-101	111.51-111.87	173	6,025
BA-102	78.59-78.97	178	12,363
BA-102	91.37-91.75	170	16,387
BA-102	100.56-100.89	162	19,499
BA-102	101.65-102.03	174	15,501
BA-103 (K-103)	52.78-53.15	161	8,114
BA-104 (K-104)	55.39-55.77	169	2,814
BA-106	40.04-40.37	169	17,245
BA-106	87.26-87.64	166	16,264
BA-106	104.51-104.88	163	14,240

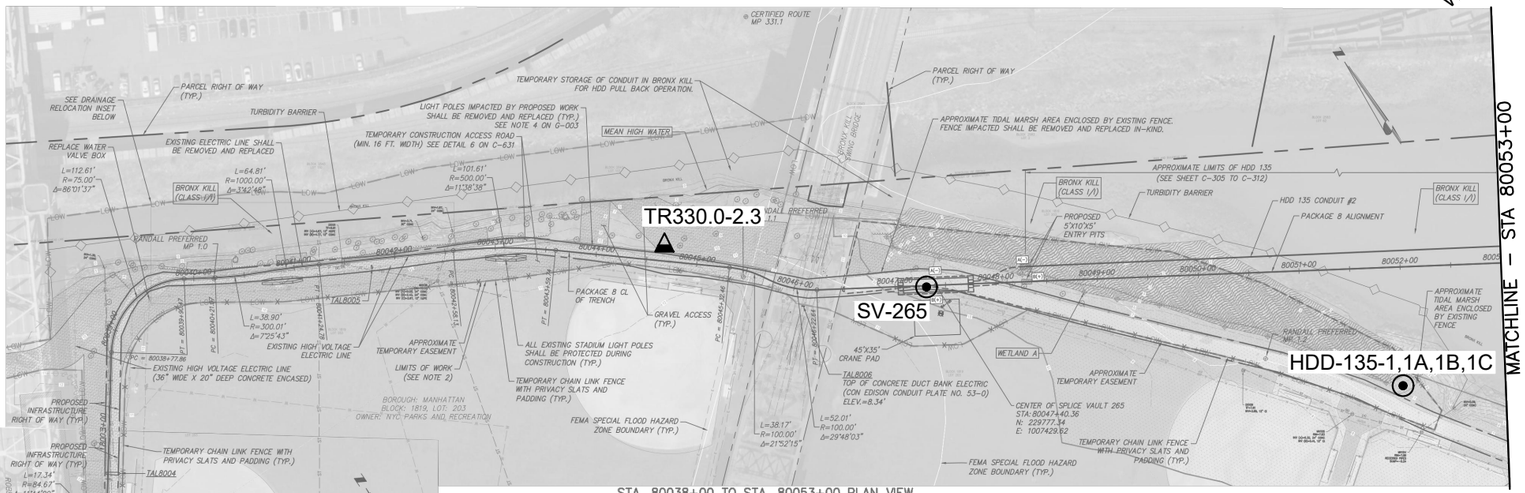
Cerchar abrasivity index (CAI) tests were performed in accordance with ASTM D7625 on twelve (12) rock core samples. Table 6 presents the range of CAI Index Values as assigned by ASTM D7625. The CAI test results are summarized in Table 7. D7625.

Table 6: Cerchar Abrasivity Index Value Ranges per ASTM D7625

Cerchar Values Based on ASTM D7625 (2010)	
Very low abrasiveness	0.30-0.50
Low abrasiveness	0.50-1.00
Medium abrasiveness	1.00-2.00
High abrasiveness	2.00-4.00
Extremely abrasiveness	4.00-6.00
Quarzitic	6.00-7.00



STA. 80028+00 TO STA. 80038+00 PLAN VIEW
SCALE: 1" = 50'



STA. 80038+00 TO STA. 80053+00 PLAN VIEW
SCALE: 1" = 50'

0 75 150 300
SCALE IN FEET

GENERAL NOTES

1. BASE MAP DEVELOPED FROM DRAWING TITLED "CHAMPLAIN HUDSON POWER EXPRESS SEGMENTS 13 TO 15–PACKAGE 8 TRANSITION VAULT 5 TO ASTORIA CONVERTER STATION", PREPARED BY "KIEWIT ENGINEERING AND LAND SURVEYING, P.C.", ORIGINAL SCALE 1"=50', DATED 07/31/2023.
2. EXPLORATION LOCATIONS SHOWN ARE ESTIMATED BASED ON GPS DATA OBTAINED FROM HANDHELD EQUIPMENT. THE LOCATIONS SHOULD BE CONSIDERED ACCURATE ONLY TO THE DEGREE IMPLIED BY THE METHOD USED.

LEGEND

⊙ TV-XX	APPROXIMATE TEST BORING LOCATION AT TRANSITION VAULT
⊙ SV-XX	APPROXIMATE TEST BORING LOCATION AT SPLICE VAULT
▲ TR-XX	APPROXIMATE THERMAL RESISTIVITY SOIL BORING
⊙ HDD-XX	APPROXIMATE HORIZONTAL DIRECTIONAL DRILLING SOIL BORING

NO.	ISSUE/DESCRIPTION	BY	DATE

TRANSITION VAULT 5 TO ASTORIA CONVERTER STATION
CHPE SEGMENTS 13, 14, AND 15

BORING LOCATION PLAN

PREPARED BY: GZA GeoEnvironmental of NY Engineers and Scientists www.gza.com		PREPARED FOR: KIEWIT ENGINEERING GROUP, INC.	
PROJ MGR: DSP	REVIEWED BY: DSP	CHECKED BY: MHK	FIGURE 2
DESIGNED BY: ND	DRAWN BY: ND	SCALE: 1"=150"	
DATE: FEBRUARY 2024	PROJECT NO. 41.0163205.10	REVISION NO. -	SHEET NO. 3 OF 4

TEST BORING LOG

GZA GeoEnvironmental of New York
Engineers and Scientists

Kiewit Engineering Group, Inc.
CHPE - HVDC Segments 13, 14, and 15
Queens, NY

EXPLORATION NO.: SV-264
SHEET: 1 of 2
PROJECT NO: 41.0163205.10
REVIEWED BY: D. Patel

Logged By: M. Sisodiya
Drilling Co.: Craig Geotechnical Testing. Inc
Foreman: G. Zackman
Date Start: 12/6/2023 **Finish:** 12/6/2023

Type of Rig: Truck
Rig Model: CME 75
Drilling Method: Mud Rotary

Boring Location: See Plan
Stationing (ft.): **Offset (ft.):**
Ground Surface Elevation (ft.): 12
Final Boring Depth (ft.): 30

H. Datum: NAD 83
V. Datum: NAVD 88
Northing: 4516896.42
Easting: 591103.69

Hammer Type: Automatic Hammer
Hammer Weight (lb.): 140
Hammer Fall (in.): 30
Auger or Casing O.D./I.D Dia (in.): 4"

Sampler Type: SS
Sampler O.D. (in.): 2.0
Sampler Length (in.): 24
Rock Core Size: N/A

Groundwater Depth (ft.)

Date	Time	Water Depth	Stab. Time
12/14/2023	9:00am	12	Estimated

Depth (ft)	Casing Blows/ Core Rate	Sample No.	Sample Depth (ft.)	Sample Pen. (in)	Sample Rec. (in)	Sample Blows (per 6 in.)	SPT Value	Sample Description and Identification (Modified Burmister Procedure)	Remark	Field Test Data	Stratum Depth (ft.)	Stratum Description	Stratum Elev. (ft.)
									1				
5		S-1	6.0-8	24	23	10 10 6 5	16	S-1: Medium dense, brown, fine to coarse SAND, little Gravel, little Silt, brick fragments.					
		S-2	8.0-10	24	11	7 7 3 3	10	S-2: Medium dense, brown, fine to coarse SAND, little Gravel, little Silt, brick fragments.				FILL (NYCBC 7)	
10		S-3	10.0-12	24	0	2 WOH 1 2	1	S-3: No recovery.					
		S-4	12.0-14	24	0	2 2 1 1	3	S-4: No recovery.					
		S-5	14.0-15.7	20	9	11 6 7 50/2"	13	S-5: Medium dense, brown-gray, fine to coarse SAND, little Gravel, little Silt, micaceous.			15.7		-3.7
15		S-6	16.0-16.2	3	3	50/3"	R	S-6: Very dense, brown-gray, fine to coarse SAND, some Gravel, little Silt, micaceous.	2				
		S-7	18.0-18.1	2	0	50/2"	R	S-7: No recovery.					
20												DECOMPOSED ROCK (NYCBC 1d)	
25		S-8	25.0-25	0	0	50/0"	R	S-8: No recovery.					
30											30		-18.0

REMARKS

1 - Borehole was hand excavated to 5 feet.
2 - Rig chattering from approximately 16 feet to 18 feet.

See Log Key for exploration of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

Exploration No.: SV-264

GZA TEMPLATE TEST BORING - GZA 2016_01_26.GDT - 2/14/24 13:50 - J:\GINT PROJECT DATABASES\41.0163200\41.0163205.10.GPJ

TEST BORING LOG

GZA GeoEnvironmental of New York
Engineers and Scientists

Kiewit Engineering Group, Inc.
CHPE - HVDC Segments 13, 14, and 15
Queens, NY

EXPLORATION NO.: SV-264
SHEET: 2 of 2
PROJECT NO: 41.0163205.10
REVIEWED BY: D. Patel

Logged By: M. Sisodiya
Drilling Co.: Craig Geotechnical Testing. Inc
Foreman: G. Zackman
Date Start: 12/6/2023 **Finish:** 12/6/2023

Type of Rig: Truck
Rig Model: CME 75
Drilling Method: Mud Rotary

Boring Location: See Plan
Stationing (ft.): **Offset (ft.):**
Ground Surface Elevation (ft.): 12
Final Boring Depth (ft.): 30

H. Datum: NAD 83
V. Datum: NAVD 88
Northing: 4516896.42
Easting: 591103.69

Hammer Type: Automatic Hammer
Hammer Weight (lb.): 140
Hammer Fall (in.): 30
Auger or Casing O.D./I.D Dia (in.): 4"

Sampler Type: SS
Sampler O.D. (in.): 2.0
Sampler Length (in.): 24
Rock Core Size: N/A

Groundwater Depth (ft.)

Date	Time	Water Depth	Stab. Time
12/14/2023	9:00am	12	Estimated

Depth (ft)	Casing Blows/ Core Rate	Sample No.	Sample Depth (ft.)	Sample Pen. (in)	Sample Rec. (in)	Sample Blows (per 6 in.)	SPT Value	Sample Description and Identification (Modified Burmister Procedure)	Remark	Field Test Data	Stratum Depth (ft.)	Stratum Description	Stratum Elev. (ft.)
		S-9	30.0-30	0	0	50/0"	R	S-9: No recovery. End of exploration at 30 feet.	3				
35													
40													
45													
50													
55													
60													

REMARKS

3 - Upon completion, borehole was backfilled with soil cuttings and bentonite.

See Log Key for exploration of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

Exploration No.: SV-264

GZA TEMPLATE TEST BORING - GZA 2016_01_26.GDT - 2/14/24 13:50 - J:\GINT PROJECT DATABASES\41.0163200\41.0163205.10.GPJ

TEST BORING LOG

GZA GeoEnvironmental of New York
Engineers and Scientists

Kiewit Engineering Group, Inc.
CHPE - HVDC Segments 13, 14, and 15
Queens, NY

EXPLORATION NO.: TR330.0-1.0
SHEET: 1 of 1
PROJECT NO: 41.0163205.10
REVIEWED BY: D. Patel

Logged By: M. Sisodiya
Drilling Co.: Craig Geotechnical Testing. Inc
Foreman: G. Zackman
Date Start: 12/6/2023 **Finish:** 12/6/2023

Type of Rig: Truck
Rig Model: CME 75
Drilling Method: Mud Rotary

Boring Location: See Plan
Stationing (ft.): **Offset (ft.):**
Ground Surface Elevation (ft.): 12
Final Boring Depth (ft.): 14

H. Datum: NAD 83
V. Datum: NAVD 88
Northing: 4516880.24
Easting: 591157.95

Hammer Type: Automatic Hammer
Hammer Weight (lb.): 140
Hammer Fall (in.): 30
Auger or Casing O.D./I.D Dia (in.): 4"

Sampler Type: U
Sampler O.D. (in.): 3.0
Sampler Length (in.): 24
Rock Core Size: N/A

Groundwater Depth (ft.)

Date	Time	Water Depth	Stab. Time
12/6/2023	12:00pm	12	Estimated

Depth (ft)	Casing Blows/ Core Rate	Sample No.	Sample Depth (ft.)	Sample Pen. (in)	Sample Rec. (in)	Sample Blows (per 6 in.)	Sample SPT Value	Sample Description and Identification (Modified Burmister Procedure)	Remark	Field Test Data	Stratum Depth (ft.)	Stratum Description	Stratum Elev. (ft.)
								12" Asphalt	1		1	ASPHALT	11.0
		S-1	1.0-3					S-1: Brown, fine to coarse SAND, little Gravel, little Silt.					
		S-2	3.0-5					S-2: Brown, fine to coarse SAND, little Gravel, little Silt.					
5		S-3	6.0-8					S-3: Brown, fine to coarse SAND, little Gravel, little Silt.				FILL (NYCBC 7)	
10		S-4	9.0-11					S-4: Brown, fine to coarse SAND, little Gravel, little Silt.					
		S-5	12.0-14					S-5: Brown, fine to coarse SAND, little Gravel, little Silt.			14		-2.0
15								End of exploration at 14 feet.	2				
20													
25													
30													

REMARKS

1 - Soil samples were collected for thermal resistivity testing. Standard Penetration and Testing (SPT) was not performed in this test boring.
2 - Upon completion, borehole was backfilled with soil cuttings and bentonite, and surface patched with asphalt cold patch.

See Log Key for exploration of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

Exploration No.: TR330.0-1.0

TEST BORING LOG

GZA GeoEnvironmental of New York
Engineers and Scientists

Kiewit Engineering Group, Inc.
CHPE - HVDC Segments 13, 14, and 15
Queens, NY

EXPLORATION NO.: TR330.0-2.3
SHEET: 1 of 1
PROJECT NO: 41.0163205.10
REVIEWED BY: D. Patel

Logged By: M. Frey
Drilling Co.: Craig Geotechnical Testing. Inc
Foreman: S. Schute
Date Start: 12/14/2023 **Finish:** 12/14/2023

Type of Rig: Geoprobe
Rig Model: 7822DT
Drilling Method: Direct Push

Boring Location: See Plan
Stationing (ft.): **Offset (ft.):**
Ground Surface Elevation (ft.): 10
Final Boring Depth (ft.): 14

H. Datum: NAD 83
V. Datum: NAVD 88
Northing: 4516874.52
Easting: 591350.87

Hammer Type: Automatic Hammer
Hammer Weight (lb.): 140
Hammer Fall (in.): 30
Auger or Casing O.D./I.D Dia (in.): 4"

Sampler Type: U
Sampler O.D. (in.): 3.0
Sampler Length (in.): 24
Rock Core Size: N/A

Groundwater Depth (ft.)

Date	Time	Water Depth	Stab. Time
12/14/2023	Not	Measured	

Depth (ft)	Casing Blows/ Core Rate	Sample No.	Sample Depth (ft.)	Sample Pen. (in)	Sample Rec. (in)	Sample Blows (per 6 in.)	Sample SPT Value	Sample Description and Identification (Modified Burmister Procedure)	Remark	Field Test Data	Stratum Depth (ft.)	Stratum Description	Stratum Elev. (ft.)
		S-1	0.5-2					6" Asphalt S-1: Brown, fine to coarse SAND, some Gravel, little Silt.	1		0.5	ASPHALT	9.5
		S-2	3.0-5					S-2: Brown, fine to coarse SAND, some Gravel, little Silt, brick fragments.					
5		S-3	6.0-8					S-3: Brown, fine to coarse SAND, some Gravel, little Silt, brick fragments.				FILL (NYCBC 7)	
10		S-4	9.0-10.5					S-4: Brown, fine to coarse SAND, some Gravel, little Silt, brick fragments.					
		S-5	12.0-14					S-5: Brown, fine to coarse SAND, some Gravel, little Silt, brick fragments.			14		-4.0
15								End of exploration at 14 feet.	2				
20													
25													
30													

REMARKS

1 - Soil samples were collected for thermal resistivity testing. Standard Penetration and Testing (SPT) was not performed in this test boring.
2 - Upon completion, borehole was backfilled with soil cuttings and bentonite, and surface patched with asphalt cold patch.

See Log Key for exploration of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

Exploration No.: TR330.0-2.3

TEST BORING LOG

GZA GeoEnvironmental of New York
Engineers and Scientists

Kiewit Engineering Group, Inc.
CHPE - HVDC Segments 13, 14, and 15
Queens, NY

EXPLORATION NO.: SV-265
SHEET: 1 of 2
PROJECT NO: 41.0163205.10
REVIEWED BY: D. Patel

Logged By: M. Sisodiya
Drilling Co.: Craig Geotechnical Testing. Inc
Foreman: G. Zackman
Date Start: 12/5/2023 **Finish:** 12/5/2023

Type of Rig: Truck
Rig Model: CME 75
Drilling Method: Mud Rotary

Boring Location: See Plan
Stationing (ft.): **Offset (ft.):**
Ground Surface Elevation (ft.): 9
Final Boring Depth (ft.): 42

H. Datum: NAD 83
V. Datum: NAVD 88
Northing: 4516823
Easting: 591408

Hammer Type: Automatic Hammer
Hammer Weight (lb.): 140
Hammer Fall (in.): 30
Auger or Casing O.D./I.D Dia (in.): 4"

Sampler Type: SS
Sampler O.D. (in.): 2.0
Sampler Length (in.): 24
Rock Core Size: N/A

Groundwater Depth (ft.)

Date	Time	Water Depth	Stab. Time
12/5/2023	3:00pm	8	Estimated

Depth (ft)	Casing Blows/ Core Rate	Sample No.	Sample Depth (ft.)	Sample Pen. (in)	Sample Rec. (in)	Sample Blows (per 6 in.)	Sample SPT Value	Sample Description and Identification (Modified Burmister Procedure)	Remark	Field Test Data	Stratum Depth (ft.)	Stratum Description	Stratum Elev. (ft.)
								9" Asphalt.	1		0.8	ASPHALT	8.2
5		S-1	6.0-8.0	24	8	3 4 4 6	8	S-1: Loose, brown, fine to coarse SAND, little Gravel, little Silt, brick fragments.					
		S-2	8.0-10.0	24	11	9 12 10 24	22	S-2: Medium dense, brown-gray, fine to coarse SAND and GRAVEL, trace Silt, brick fragments.					
10		S-3	10.0-12.0	24	0	2 2 6 4	8	S-3: No recovery.	2				
		S-4	12.0-14.0	24	7	1 3 2 1	5	S-4: Loose, dark gray, fine to carse SAND and SILT, trace Gravel, brick fragments.	3				
15		S-5	14.0-16.0	24	9	38 50 10 6	60	S-5: Very dense, gray, fine to coarse SAND, little Gravel, trace Silt.	3			FILL (NYCBC 7)	
		S-6	16.0-18.0	24	15	2 2 2 2	4	S-6: Soft, dark gray, SILT and CLAY, little Gravel, little Sand.	3				
		S-7	18.0-20.0	24	13	WOH WOH	6	S-7: Medium stiff, dark gray, SILT and CLAY, little Gravel, little Sand.					
20		S-8	20.0-22.0	24	10	6 1 6 2 7 3	9	S-8: Loose, dark gray, fine to medium SAND, some Silty Clay, little Gravel. (PP = 1.0 tsf)	4 3				
25		S-9	25.0-27.0	8	7	1 50/2"	R	S-9: Very dense, dark gray, fine to coarse SAND, little Gravel, little Silt.	3				
											28.5	SILTY CLAY (NYCBC 4c/6)	-19.5
30													

REMARKS

1 - Borehole was hand excavated to 5 feet.
2 - Brick wedged in tip of split spoon in sample S-3.
3 - Petroleum odor in samples: S-4, S-5, S-6,S-8, and S-9.
4 - Pocket Penetrometer (PP) reading in tons per square foot (tsf).

See Log Key for exploration of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

Exploration No.: SV-265

TEST BORING LOG

GZA GeoEnvironmental of New York
Engineers and Scientists

Kiewit Engineering Group, Inc.
CHPE - HVDC Segments 13, 14, and 15
Queens, NY

EXPLORATION NO.: SV-265
SHEET: 2 of 2
PROJECT NO: 41.0163205.10
REVIEWED BY: D. Patel

Logged By: M. Sisodiya
Drilling Co.: Craig Geotechnical Testing. Inc
Foreman: G. Zackman
Date Start: 12/5/2023 **Finish:** 12/5/2023

Type of Rig: Truck
Rig Model: CME 75
Drilling Method: Mud Rotary

Boring Location: See Plan
Stationing (ft.): **Offset (ft.):**
Ground Surface Elevation (ft.): 9
Final Boring Depth (ft.): 42

H. Datum: NAD 83
V. Datum: NAVD 88
Northing: 4516823
Easting: 591408

Hammer Type: Automatic Hammer
Hammer Weight (lb.): 140
Hammer Fall (in.): 30
Auger or Casing O.D./I.D Dia (in.): 4"

Sampler Type: SS
Sampler O.D. (in.): 2.0
Sampler Length (in.): 24
Rock Core Size: N/A

Groundwater Depth (ft.)

Date	Time	Water Depth	Stab. Time
12/5/2023	3:00pm	8	Estimated

Depth (ft)	Casing Blows/ Core Rate	Sample No.	Sample Depth (ft.)	Sample Pen. (in)	Sample Rec. (in)	Sample Blows (per 6 in.)	SPT Value	Sample Description and Identification (Modified Burmister Procedure)	Remark	Field Test Data	Stratum Depth (ft.)	Stratum Description	Stratum Elev. (ft.)
		S-10	30.0-32.0	24	8	2 3 2 3	5	S-10: Medium stiff, gray, Silty CLAY, some Gravel, trace Sand, shell fragments.				SILTY CLAY (NYCBC 4c/6)	
35		S-11	35.0-37.0	24	19	WOH WOH 3 2	3	S-11: Top 10": Soft, gray, Silty CLAY, root fragments. Bottom 9": Very loose, gray-brown, fine to coarse SAND, trace Gravel, trace Silt.			35.9		-26.9
40		S-12	40.0-42.0	24	10	2 3 3 2	6	S-12: Loose, gray, fine to coarse SAND, little Silt, trace Gravel.				UPPER SAND (NYCBC 6)	
								End of exploration at 42 feet.	5		42		-33.0
45													
50													
55													
60													

REMARKS

5 - Upon completion, borehole was backfilled with soil cuttings and bentonite, and surface patched with asphalt cold patch.

See Log Key for exploration of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

Exploration No.: SV-265

Thielsch
DIVISION OF THE RISE GROUP

195 Frances Avenue
Cranston RI, 02910
Phone: (401)-467-6454
Fax: (401)-467-2398
cts.thielsch.com
Let's Build a Solid Foundation

Client Information:	
GZA GeoEnvironmental	
New York, NY	
Project Manager:	Dharmil Patel
Assigned By:	Dharmil Patel
Collected By:	M. Sisodye

Project Information:	
Champlin Hudson Power Express - HVDC Area 5	
Queens to Bronx, NY	
Project Number:	41.0163206.10
Summary Page:	1 of 1
Report Date:	12.22.23

LABORATORY TESTING DATA SHEET, Report No.: 7423-M-157

Boring No.	Sample ID	Depth (ft)	Laboratory No.	Identification Tests									Proctor / CBR / Permeability Tests								Laboratory Log and Soil Description
				As Rcvd Moisture Content %	LL %	PL %	OD LL	Gravel %	Sand %	Fines %	Org. %	pH	g_d MAX (pcf) W_{opt} (%)	g_d MAX (pcf) W_{opt} (%) (Corr.)	Dry unit wt. (pcf)	Test Moisture Content %	Target Test Setup as % of Proctor	CBR @ 0.1"	CBR @ 0.2"	Permeability cm/sec	
				D2216	D4318			D6913			D2974	D4792	D1557								
SV-264	S-5	14-16	23-S-5033	22.4				10.3	73.8	15.9											Dark Brown f-m SAND, little Silt, little fine Gravel
SV-264	S-6	16-18	23-S-5034	29.1				29.1	53.7	17.2											Dark Brown f-c SAND, some fine Gravel, little Silt
SV-265	S-2	8-10	23-S-5035	6.3				54.5	40.3	5.2											Light Brown f-c GRAVEL and f-c SAND, trace Silt
SV-265	S-8	20-22	23-S-5036	43.5				11.4	55.0	33.6											Dark Grey f-m SAND, some Silt & Clay, little f-c Gravel
SV-265	S-10	30-32	23-S-5037	68.5	81	39		24.6	6.6	68.8											Grey CLAY some f-c Gravel, trace f-m Sand
SV-265	S-12	40-42	23-S-5038	25.1				1.8	83.5	14.7											Dark Grey f-m SAND, little Silt, trace fine Gravel
HDD-135-1B	S-3	10-12	23-S-5039	9.3				50.3	42.1	7.6											Dark Brown f-c GRAVEL and f-c SAND, trace Silt
HDD-135-1B	S-8	20-22	23-S-5040	14.3				40.1	49.0	10.9											Dark Grey f-c SAND and f-c GRAVEL, little Silt
HDD-135-1C	S-11	35-37	23-S-5041	14.8				27.7	60.2	12.1											Dark Grey f-c SAND, some f-c Gravel, little Silt
HDD-135-1C	S-12	40-42	23-S-5042	12.1				7.1	75.0	17.9											Brown f-c SAND, little Silt, trace fine Gravel

Date Received: **12.12.23** Reviewed By: Date Reviewed: **12.22.23**

Thielsch
DIVISION OF THE RISE GROUP

195 Frances Avenue
Cranston RI, 02910
Phone: (401)-467-6454
Fax: (401)-467-2398
cts.thielsch.com
Let's Build a Solid Foundation

Client Information:	
GZA GeoEnvironmental	
New York, NY	
Project Manager:	Dharmil Patel
Assigned By:	Dharmil Patel
Collected By:	M. Sisodye

Project Information:	
Champlin Hudson Power Express - HVDC Area 5	
Queens to Bronx, NY	
Project Number:	41.0163205.10
Summary Page:	1 of 1
Report Date:	12.22.23

LABORATORY TESTING DATA SHEET, Report No.: 7423-M-158

Material Source	Sample ID	Depth (ft)	Laboratory No.	Identification Tests						Corrosivity Tests										Laboratory Log and Soil Description
				As Rcvd Moisture Content %	LL %	PL %	Gravel %	Sand %	Fines %	Resistivity (Mohms-cm)	Chloride (mg/kg)	Sulfate (mg/kg)	Sulfide (mg/kg)	Redox Potential (mv)	pH	Electrical Resist. As Rcvd Ohm-cm @ 60°F	Electrical Resist. Saturated Ohm-cm @ 60°F	Electrical Resist. Saturated Ohm-cm @ 60°F	Electrical Resist. Saturated Ohm-cm @ 60°F	
				D2216	D4318		D6913			EPA				G200	G51	G57		G-187		
SV-264	S-1 / S-2	6-10	S-5043								48	56	ND	348.8	6.7	5090	2970	7560	4500	Corrosivity Only
SV-265	S-5 / S-6	14-18	S-5044								2680	240	ND	175.5	6.9	166	160	213	201	Corrosivity Only
										EPA										
HDD-135-1B	S-4 / S-5	12-16	S-5045							0.002	60	14.00	ND	279.0	8.34					Corrosivity Only

Sample HDD-135-1B could not be tested by ASTM Standards for pH, ORP, G57 or G187 Resistivity, the sample did not contain enough fine material for testing.

Ph, ORP, and Resistivity tested by RB on 12.20.23

Date Received: **12.12.23** Reviewed By: Date Reviewed: **12.22.23**

Particle Size Distribution Report

% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	10.3	4.0	17.4	52.4	15.9	

SIEVE SIZE OR DIAMETER	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/4"	100.0		
1/2"	94.5		
3/8"	93.7		
#4	89.7		
#10	85.7		
#20	77.8		
#40	68.3		
#60	53.8		
#100	35.4		
#200	15.9		

* (no specification provided)

Soil Description

Dark Brown f-m SAND, little Silt, little fine Gravel

Atterberg Limits

PL= NP LL= NV PI= NP

Coefficients

D_{90}= 5.0616 D_{85}= 1.8180 D_{60}= 0.3061
D_{50}= 0.2237 D_{30}= 0.1254 D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= SM AASHTO= A-2-4(0)

Remarks

Source of Sample: SV-264 Depth: 14-16'
Sample Number: S-5

Date: 12.18.23

Thielsch Engineering Inc.

Cranston, RI

Client: GZA GeoEnvironmental
Project: CHPE - HVDC Area 5
Queens to Bronx, NY
Project No: 41.0163205.00 Figure 23-S-5033

Tested By: RO Checked By: Rebecca Roth

Particle Size Distribution Report

% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	29.1	10.7	13.0	30.0	17.2	

SIEVE SIZE OR DIAMETER	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/8"	100.0		
#4	70.9		
#10	60.2		
#20	52.8		
#40	47.2		
#60	40.1		
#100	30.1		
#200	17.2		

* (no specification provided)

Soil Description

Dark Brown f-c SAND, some fine Gravel, little Silt

Atterberg Limits

PL= NP LL= NV PI= NP

Coefficients

D_{90}= 7.6256 D_{85}= 6.8466 D_{60}= 1.9650
D_{50}= 0.5876 D_{30}= 0.1490 D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= SM AASHTO= A-1-b

Remarks

Source of Sample: SV-264 Depth: 16-18'
Sample Number: S-6

Date: 12.18.23

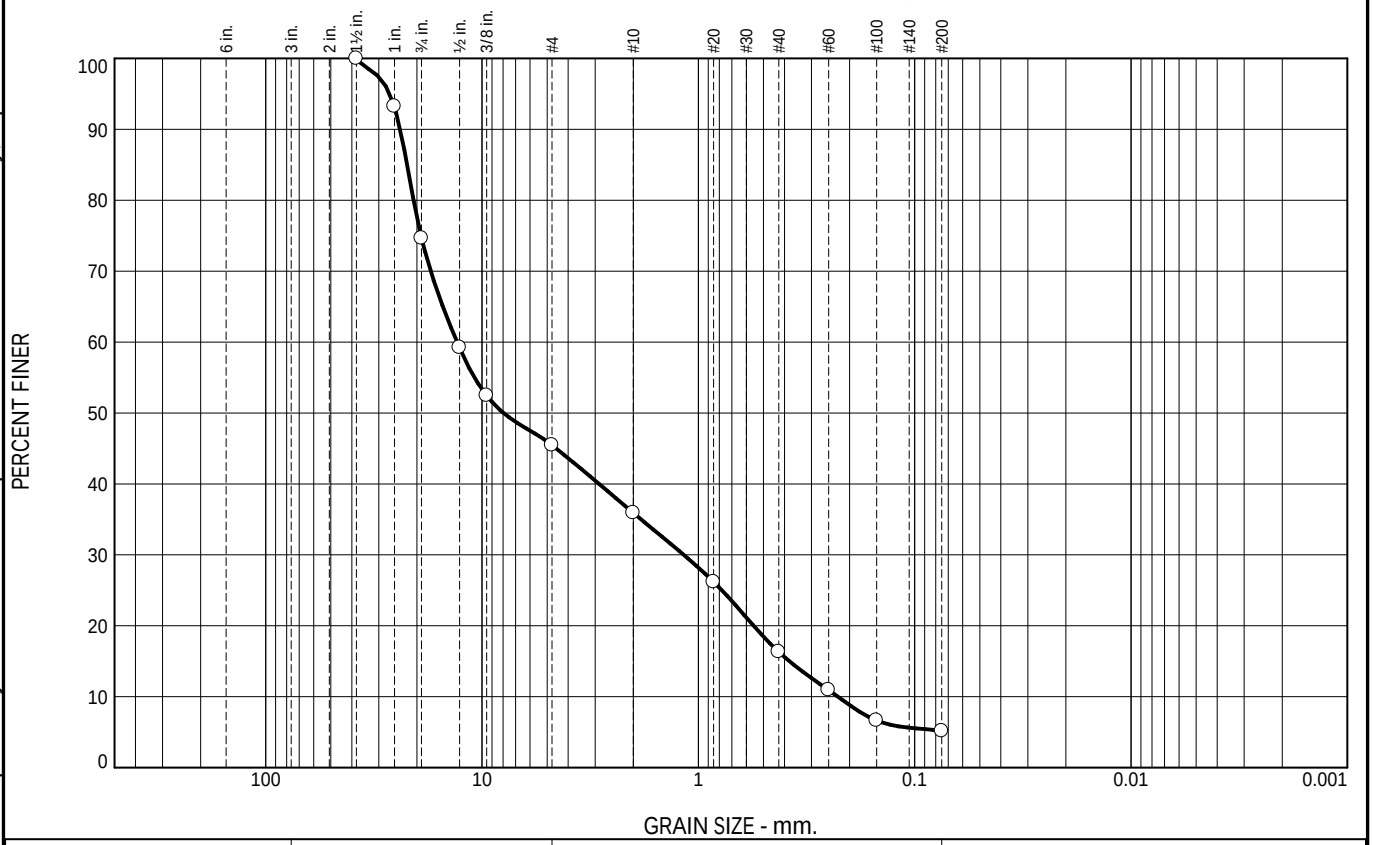
Thielsch Engineering Inc.

Cranston, RI

Client: GZA GeoEnvironmental
Project: CHPE - HVDC Area 5
Queens to Bronx, NY
Project No: 41.0163205.00 Figure 23-S-5034

Tested By: RO Checked By: Rebecca Roth

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	25.4	29.1	9.6	19.6	11.1	5.2	

SIEVE SIZE OR DIAMETER	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1 1/2"	100.0		
1"	93.2		
3/4"	74.6		
1/2"	59.2		
3/8"	52.5		
#4	45.5		
#10	35.9		
#20	26.2		
#40	16.3		
#60	10.9		
#100	6.6		
#200	5.2		

* (no specification provided)

Soil Description

Light Brown f-c GRAVEL and f-c SAND, trace Silt

Atterberg Limits

PL= NP LL= NV PI= NP

Coefficients

D_{90}= 23.8710 D_{85}= 22.2013 D_{60}= 13.0253
D_{50}= 7.9561 D_{30}= 1.1689 D_{15}= 0.3796
D_{10}= 0.2267 C_u= 57.46 C_c= 0.46

Classification

USCS= GP-GM AASHTO= A-1-a

Remarks

Source of Sample: SV-265 Depth: 8-10'
Sample Number: S-2

Date: 12.18.23

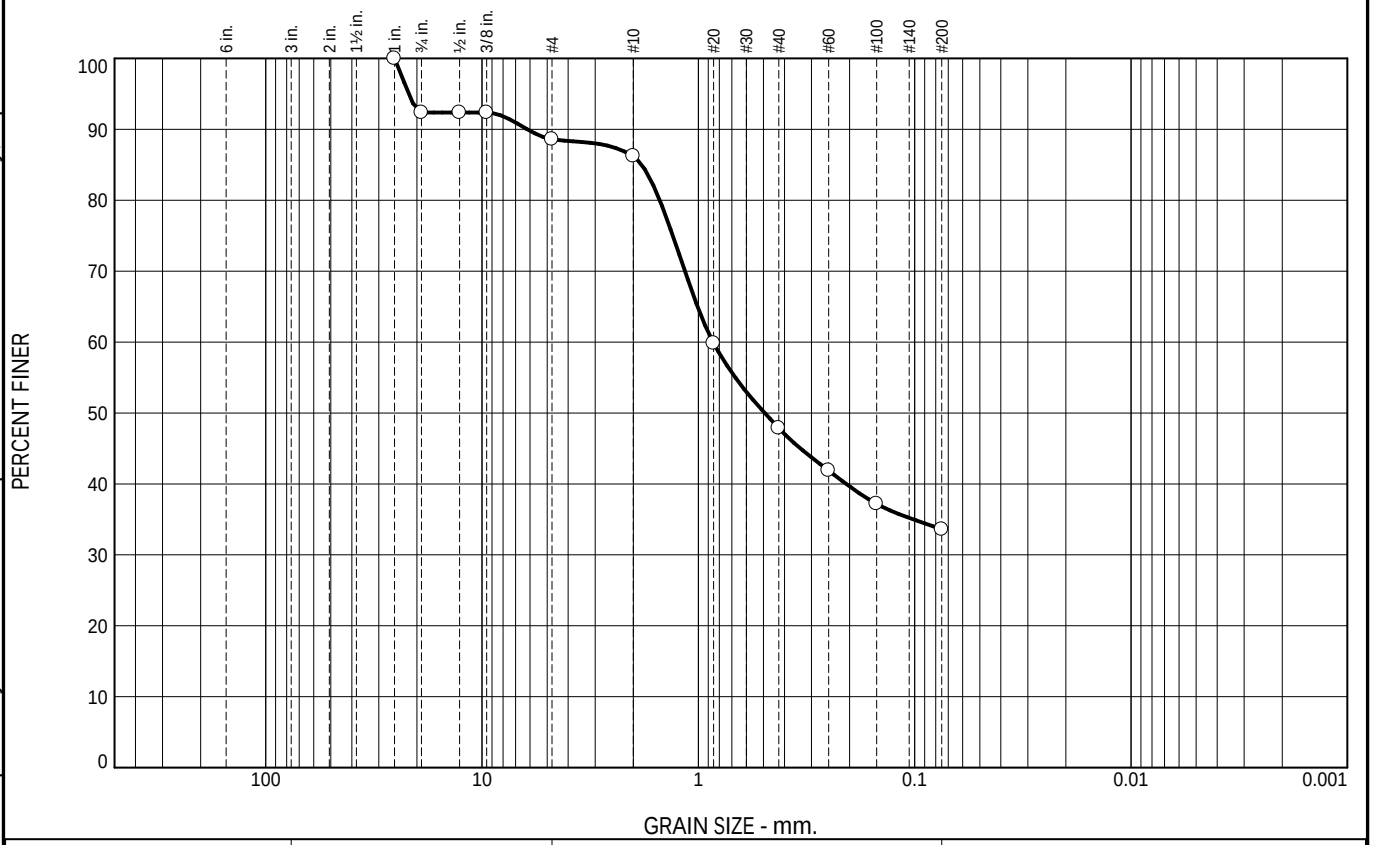
Thielsch Engineering Inc.
Cranston, RI

Client: GZA GeoEnvironmental
Project: CHPE - HVDC Area 5
Queens to Bronx, NY
Project No: 41.0163205.00

Figure 23-S-5035

Tested By: RO Checked By: Rebecca Roth

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	7.6	3.8	2.4	38.3	14.3	33.6	

SIEVE SIZE OR DIAMETER	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1"	100.0		
3/4"	92.4		
1/2"	92.4		
3/8"	92.4		
#4	88.6		
#10	86.2		
#20	59.8		
#40	47.9		
#60	41.9		
#100	37.2		
#200	33.6		

* (no specification provided)

Soil Description

Dark Grey f-m SAND, some Silt & Clay, little f-c Gravel

Atterberg Limits

PL= NP LL= NV PI= NP

Coefficients

D_{90}= 6.1660 D_{85}= 1.8245 D_{60}= 0.8556
D_{50}= 0.4932 D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= SM AASHTO= A-2-4(0)

Remarks

Sample visually classified as plastic. Sample rolled to 1/8".

Source of Sample: SV-265 Depth: 20-22'
Sample Number: S-8

Date: 12.20.23

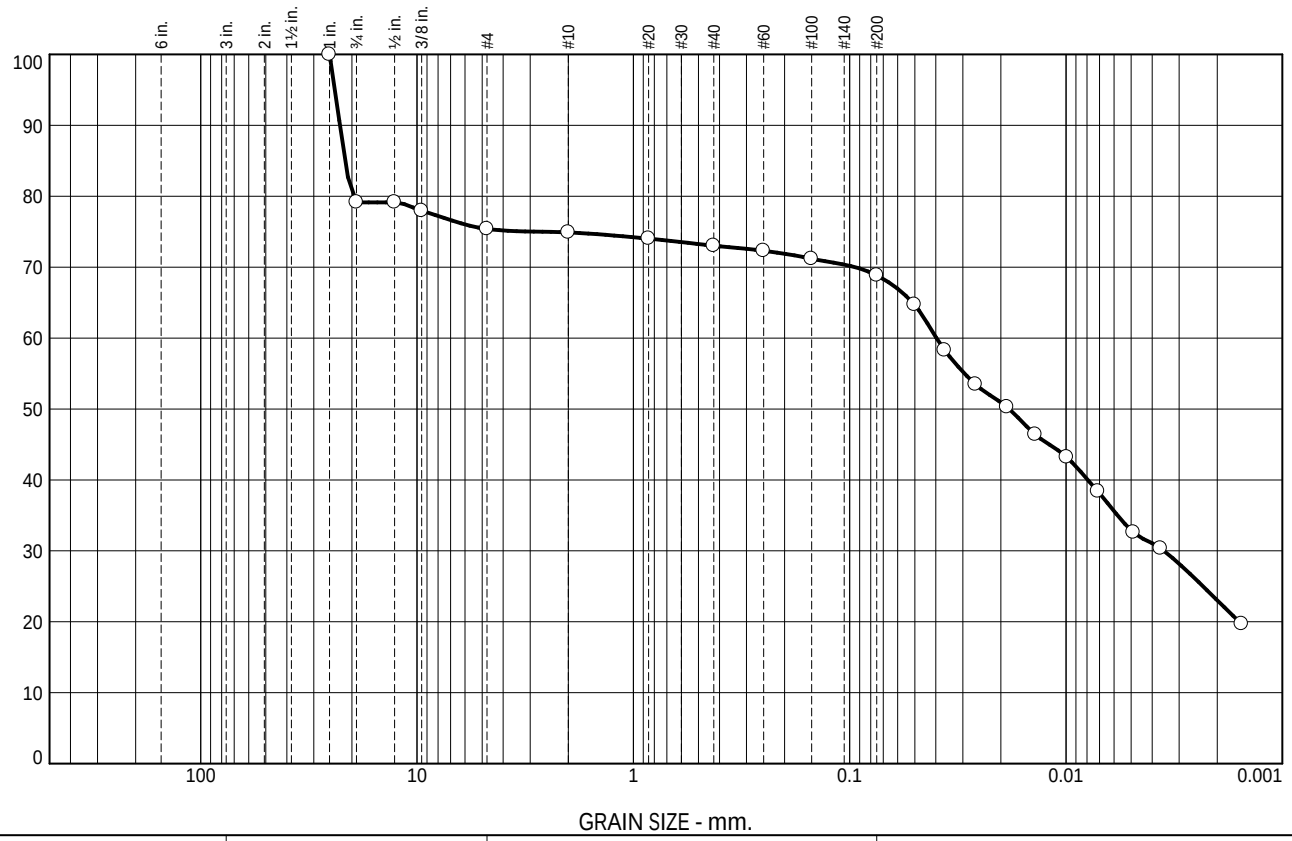
Thielsch Engineering Inc.

Cranston, RI

Client: GZA GeoEnvironmental
Project: CHPE - HVDC Area 5
Queens to Bronx, NY
Project No: 41.0163205.00 Figure 23-S-5036

Tested By: RO / JB Checked By: Rebecca Roth

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	20.9	3.7	0.5	1.9	4.2	45.8	23.0

SIEVE SIZE OR DIAMETER	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1"	100.0		
3/4"	79.1		
1/2"	79.1		
3/8"	78.0		
#4	75.4		
#10	74.9		
#20	74.0		
#40	73.0		
#60	72.3		
#100	71.2		
#200	68.8		
0.0502 mm.	64.7		
0.0364 mm.	58.3		
0.0262 mm.	53.5		
0.0187 mm.	50.3		
0.0139 mm.	46.4		
0.0099 mm.	43.2		
0.0071 mm.	38.4		
0.0049 mm.	32.6		
0.0037 mm.	30.4		
0.0015 mm.	19.7		

* (no specification provided)

Soil Description

Grey CLAY some f-c Gravel, trace f-m Sand

Atterberg Limits

PL= 39 LL= 81 PI= 42

Coefficients

D_{90}= 22.7204 D_{85}= 21.5074 D_{60}= 0.0397
D_{50}= 0.0183 D_{30}= 0.0035 D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= MH AASHTO= A-7-5(31)

Remarks

Source of Sample: SV-265 Depth: 30-32'
Sample Number: S-10

Date: 12.20.23

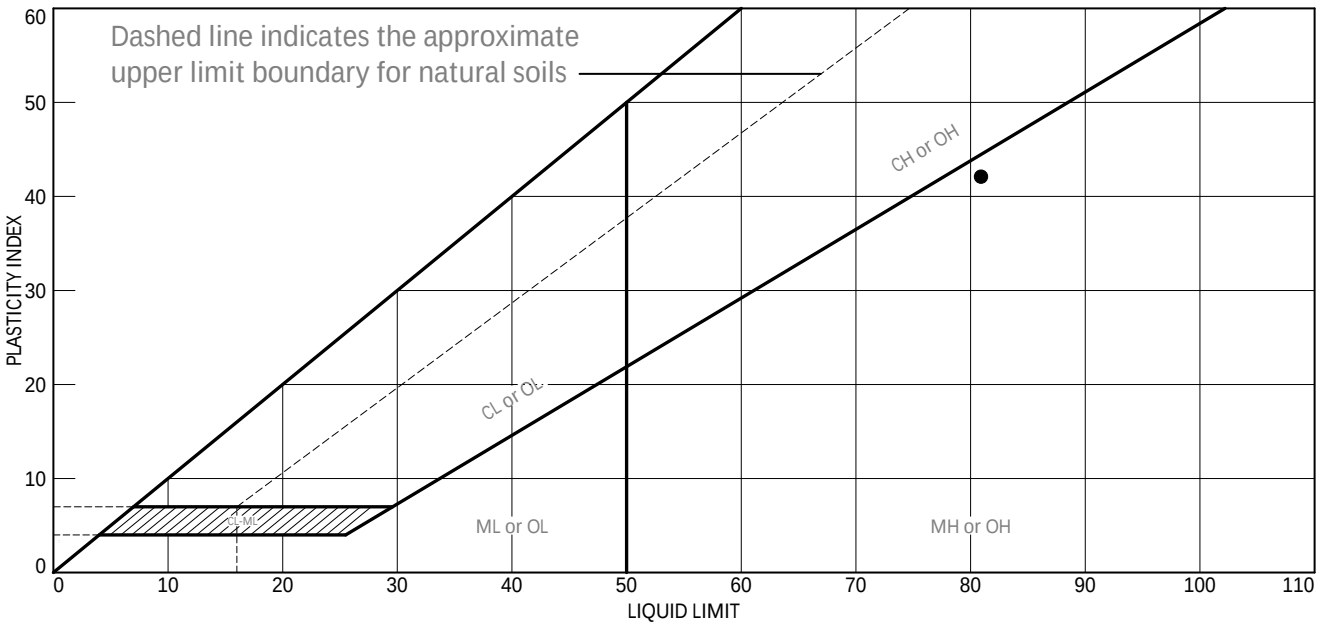
Thielsch Engineering Inc.

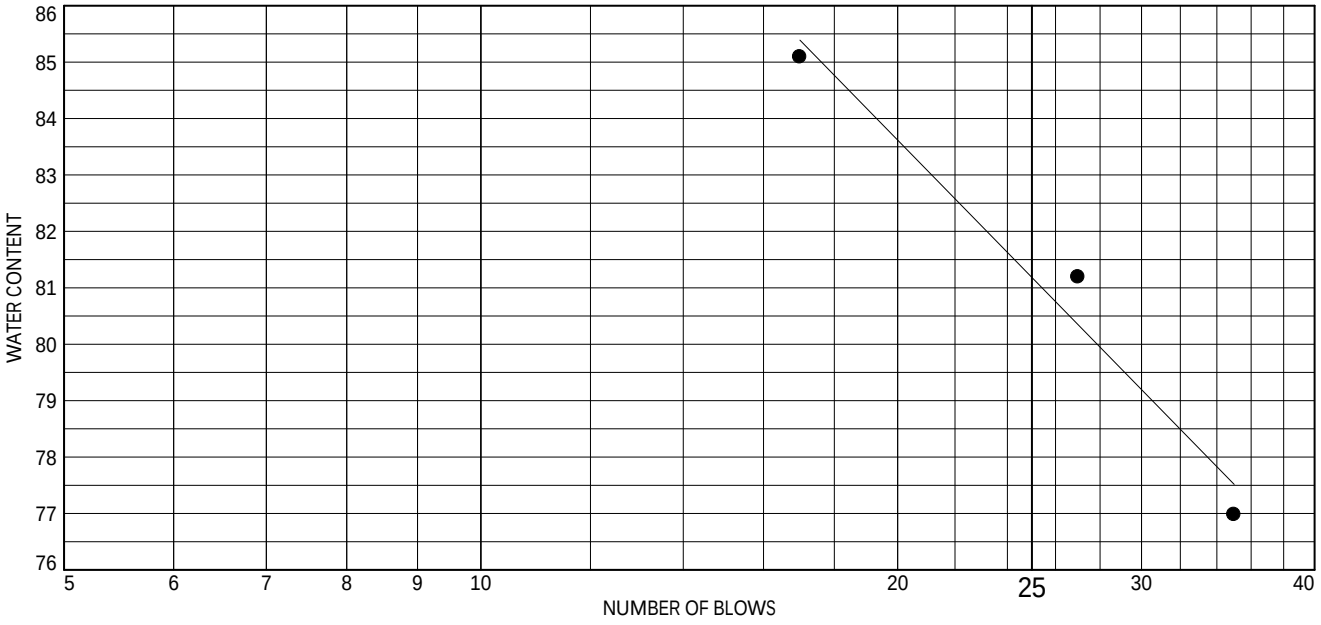
Cranston, RI

Client: GZA GeoEnvironmental
Project: CHPE - HVDC Area 5
Queens to Bronx, NY
Project No: 41.0163205.00 Figure 23-S-5037

Tested By: RB / JB Checked By: Rebecca Roth

LIQUID AND PLASTIC LIMITS TEST REPORT





	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Grey CLAY and f-c Gravel, trace f-m Sand	81	39	42	60.7	57.3	MH

Project No. 41.0163205.00 Client: GZA GeoEnvironmental

Project: CHPE - HVDC Area 5

Queens to Bronx, NY

Source of Sample: SV-265 Depth: 30-32'

Sample Number: S-10

Remarks:

Thielsch Engineering Inc.

Cranston, RI

Figure 23-L-5037

Tested By: RB Checked By: Rebecca Roth

Particle Size Distribution Report

% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	1.8	1.3	23.5	58.7	14.7	

SIEVE SIZE OR DIAMETER	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/8"	100.0		
#4	98.2		
#10	96.9		
#20	92.2		
#40	73.4		
#60	40.8		
#100	24.9		
#200	14.7		

* (no specification provided)

Source of Sample: SV-265 Depth: 40-42'
Sample Number: S-12

Date: 12.20.23

Soil Description

Dark Grey f-m SAND, little Silt, trace fine Gravel

Atterberg Limits

PL= NP LL= NV PI= NP

Coefficients

D_{90}= 0.7499 D_{85}= 0.5957 D_{60}= 0.3390
D_{50}= 0.2931 D_{30}= 0.1846 D_{15}= 0.0766
D_{10}= C_u= C_c=

Classification

USCS= SM AASHTO= A-2-4(0)

Remarks

Thielsch Engineering Inc.
Cranston, RI

Client: GZA GeoEnvironmental
Project: CHPE - HVDC Area 5
Queens to Bronx, NY
Project No: 41.0163205.00 Figure 23-S-5038

Tested By: RO / JB Checked By: Rebecca Roth

Appendix B

Calculations
BoreAid HDD Simulation Output for HDD 134A

Generated Output

WARNING: The accuracy of the data obtained by the BoreAid® system is highly dependent upon accurate data gathering, data input and proper use of the software. Vermeer is not responsible for that information. BoreAid® data is not intended to replace the need for future on-site utility locating, measuring and verification procedures, which are essential for accurate placement of new underground installations and avoidance of existing utilities.

CALL YOUR ONE-CALL SYSTEM FIRST

WARNING: Always contact your local One-Call system before the start of your digging project. The BoreAid® system is intended to be used with other utility locating methods, such as the use of the One-Call system and the exposing of existing utilities by potholing.

Locate utilities before drilling. Call 811 (U.S. only) or 1-888-258-0808 (U.S. or Canada) or local utility companies or national regulating authority.

Before you start any digging project, do not forget to call the local One-Call system in your area and any utility company that does not subscribe to the One-Call system. For areas not represented by One-Call Systems International, contact the appropriate utility companies or national regulating authority to locate and mark the underground installations. If you do not call, you may have an accident or suffer injuries; cause interruption of services; damage the environment; or experience job delays.

OSHA CFR 29 1926.651 requires that the estimated location of underground utilities be determined before beginning the excavation or underground drilling operation. When the actual excavation or bore approaches an estimated utility location, the exact location of the underground installation must be determined by a safe, acceptable and dependable method. If the utility cannot be precisely located, it must be shut off by the utility company.

Project Summary

General:	CHPE HDD 134A P8 Start Date: 07-10-2024 End Date: 09-16-2024
Project Owner:	TDI
Project Contractor:	Kiewit
Project Consultant:	CHA
Designer:	MCS CHA
Description:	FDC-0050 HDD 134A Conduit 1 10-inch DR 9

Input Summary

Start Coordinate	(0.00, 0.00, 13.19) ft
End Coordinate	(892.21, 0.00, 9.80) ft
Project Length	892.21 ft
Pipe Type	HDPE
OD Classification	IPS
Pipe OD	10.750 in
Pipe DR	9.0
Pipe Thickness	1.19 in
Rod Length	15.00 ft
Rod Diameter	3.5 in
Drill Rig Location	(0.00, 0.00, 0.00) ft

Soil Summary

Number of Layers: 4

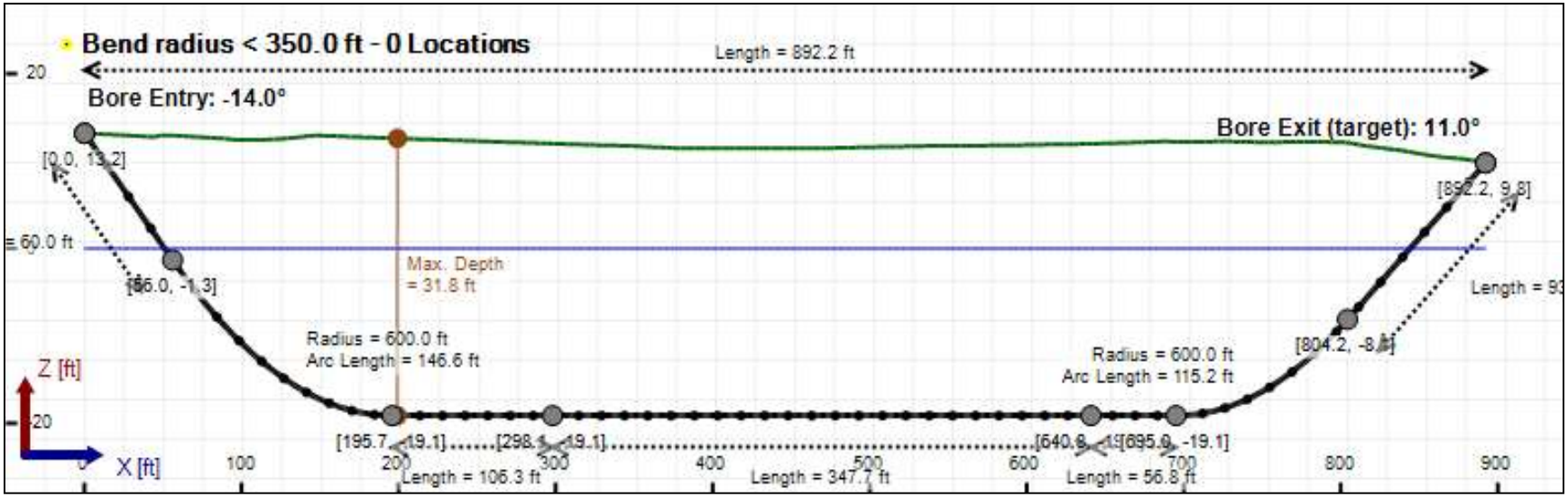
Soil Layer #1 USCS, Sand (S), SP
From Assistant
Unit Weight: 105.0000 (dry), 115.0000 (sat) [lb/ft3]
Phi: 30.00, S.M.: 200.00, Coh: 0.00 [psi]

Soil Layer #2 USCS, Clay (C), CL
From Assistant
Unit Weight: 80.0000 (dry), 110.0000 (sat) [lb/ft3]
Phi: 0.00, S.M.: 300.00, Coh: 5.60 [psi]

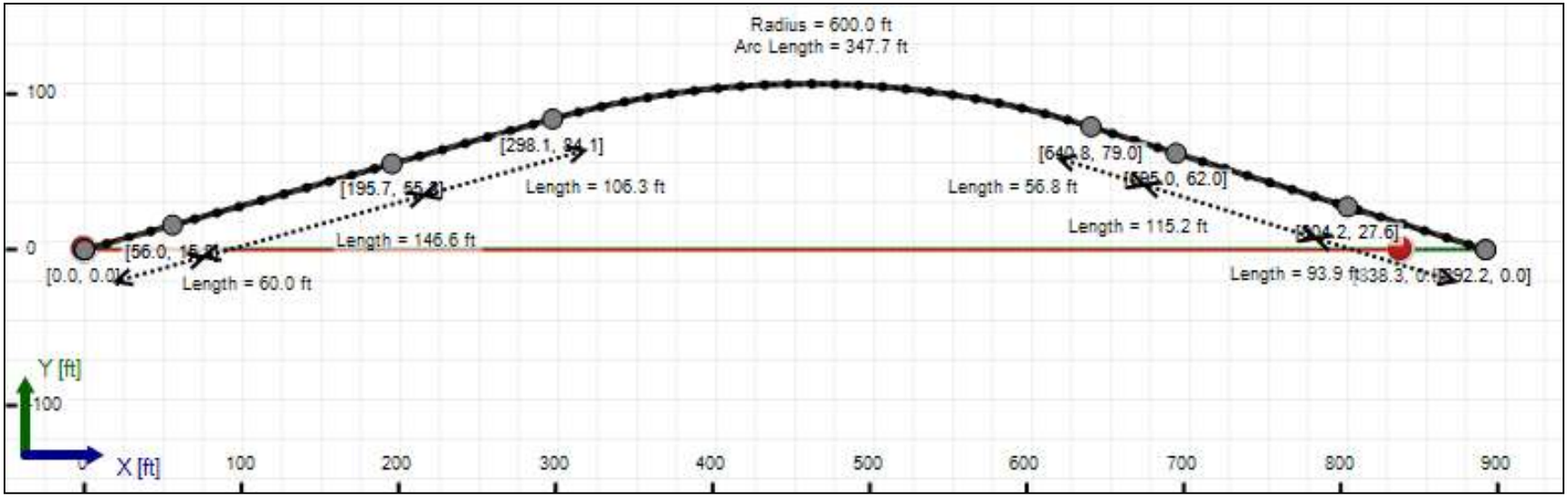
Soil Layer #3 USCS, Sand (S), SP
From Assistant
Unit Weight: 105.0000 (dry), 115.0000 (sat) [lb/ft3]
Phi: 30.00, S.M.: 200.00, Coh: 0.00 [psi]

Soil Layer #4 Rock, Geological Classification, Metamorphic Rocks
From Assistant
Unit Weight: 158.4576 (dry), 177.6384 (sat) [lb/ft3]
Phi: 35.00, S.M.: 1450.40, Coh: 4351.10 [psi]

Bore Cross-Section View



Bore Plan View



Load Verifier Input Summary:

Pipe Application: Electrical Cable
Pipe Type: HDPE
Classification: IPS
Pipe OD: 10" (10.75")
Pipe DR: 9
Pipe Length: 929.98 ft
Internal Pressure: 0 psi
Borehole Diameter: 1.34400002161662 ft
Silo Width: 1.34400002161662 ft
Surface Surcharge: 0 psi
Short Term Modulus: 57500 psi
Long Term Modulus: 28200 psi
Short Term Poisson Ratio: 0.35
Long Term Poisson Ratio: 0.45
Pipe Unit Weight: 59.30500 lb/ft3
Allowable Tensile Stress (Short Term): 1200 psi
Allowable Tensile Stress (Long Term): 1100 psi
Allowable Compressive Stress (Short Term): 1150 psi
Allowable Compressive Stress (Long Term): 1150 psi
Surface-pipe friction coefficient at entrance: 0.5
Surface-pipe friction coefficient in borehole: 0.3
Pipe-soil friction angle: 30
Slurry Unit Weight: 93.64118 lb/ft3
Hydrokinetic Pressure: 10 psi
Ballast Unit Weight: 62.42746 lb/ft3

In-service Load Summary:

Pressure [psi]	Deformed	Collapsed
Earth Pressure	3.7	16.0
Water Pressure	8.3	8.3
Surface Surcharge	0.0	0.0
Internal Pressure	0.0	0.0
Net Pressure	12.0	24.3
Deflection		
Earth Load Deflection	1.211	4.366
Buoyant Deflection	0.132	0.132
Reissner Effect	0	0
Net Deflection	1.343	4.498
Compressive Stress [psi]		
Compressive Wall Stress	54.1	109.4

Installation Load Summary:

Forces/Stresses	@Maximum Force	Absolute Maximum
Pullback Force [lb]	18418.9	18418.9
Pullback Stress [psi]	513.7	513.7
Pullback Strain	8.934E-3	8.934E-3
Bending Stress [psi]	0.0	42.9
Bending Strain	0	7.465E-4
Tensile Stress [psi]	513.7	552.3
Tensile Strain	8.934E-3	1.035E-2

Net External Pressure = 17.1 [psi]

Buoyant Deflection = 0.1

Hydrokinetic Force = 567.6 lb

In-service Analysis

	Calculated	Allowable	Factor of Safety	Check
Deflection [%]	1.343	7.5	5.6	OK
Unconstrained Collapse [psi]	21.0	124.6	5.9	OK
Compressive Wall Stress [psi]	54.1	1150.0	21.2	OK

Installation Analysis

	Calculated	Allowable	Factor of Safety	Check
Deflection [%]	0.065	7.5	115.8	OK
Unconstrained Collapse [psi]	31.0	223.8	7.2	OK
Tensile Stress [psi]	552.3	1200.0	2.2	OK

Maximum Allowable Bore Pressure Summary

Ream Number	Initial Diameter	Final Diameter	Estimated Maximum Pressure (Avg.)	Estimated Maximum Pressure (Local)
Pilot Bore	0.00 in	8.00 in	75.611 psi	78.375 psi
1	8.00 in	12.00 in	75.432 psi	78.196 psi
2	12.00 in	16.13 in	75.175 psi	77.939 psi

Note: The maximum bore pressures presented in this table are the maximum values along the length of the bore and not the maximum allowable at any point. The estimated maximum pressures should be compared to the estimated circulating pressures along the bore to determine potential locations of inadvertant returns.

Estimated Circulating Pressure Summary

Active	Shear Rate [rpm]	Shear Stress [Fann Degrees]
No	600	37
No	300	32
No	200	29
Yes	100	25
Yes	6	17
No	3	15

Flow Rate (Q): 120.00 US (liquid) gallon/min

Drill Fluid Density: 68.700 lb/ft3

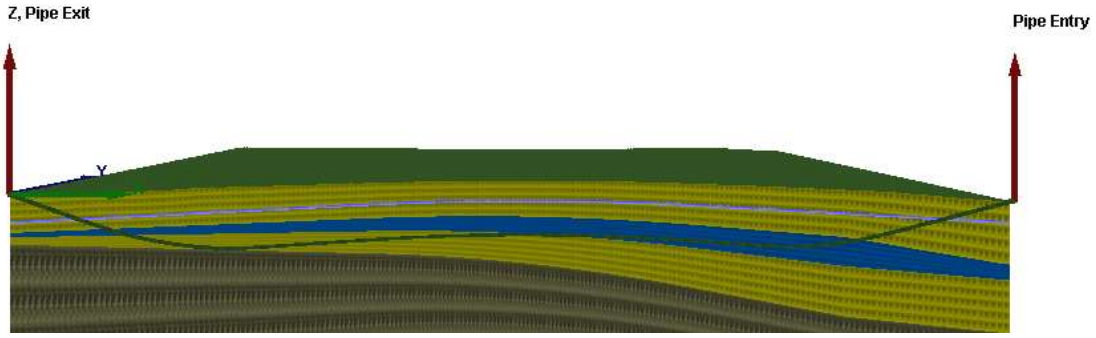
Rheological model: Power-Law

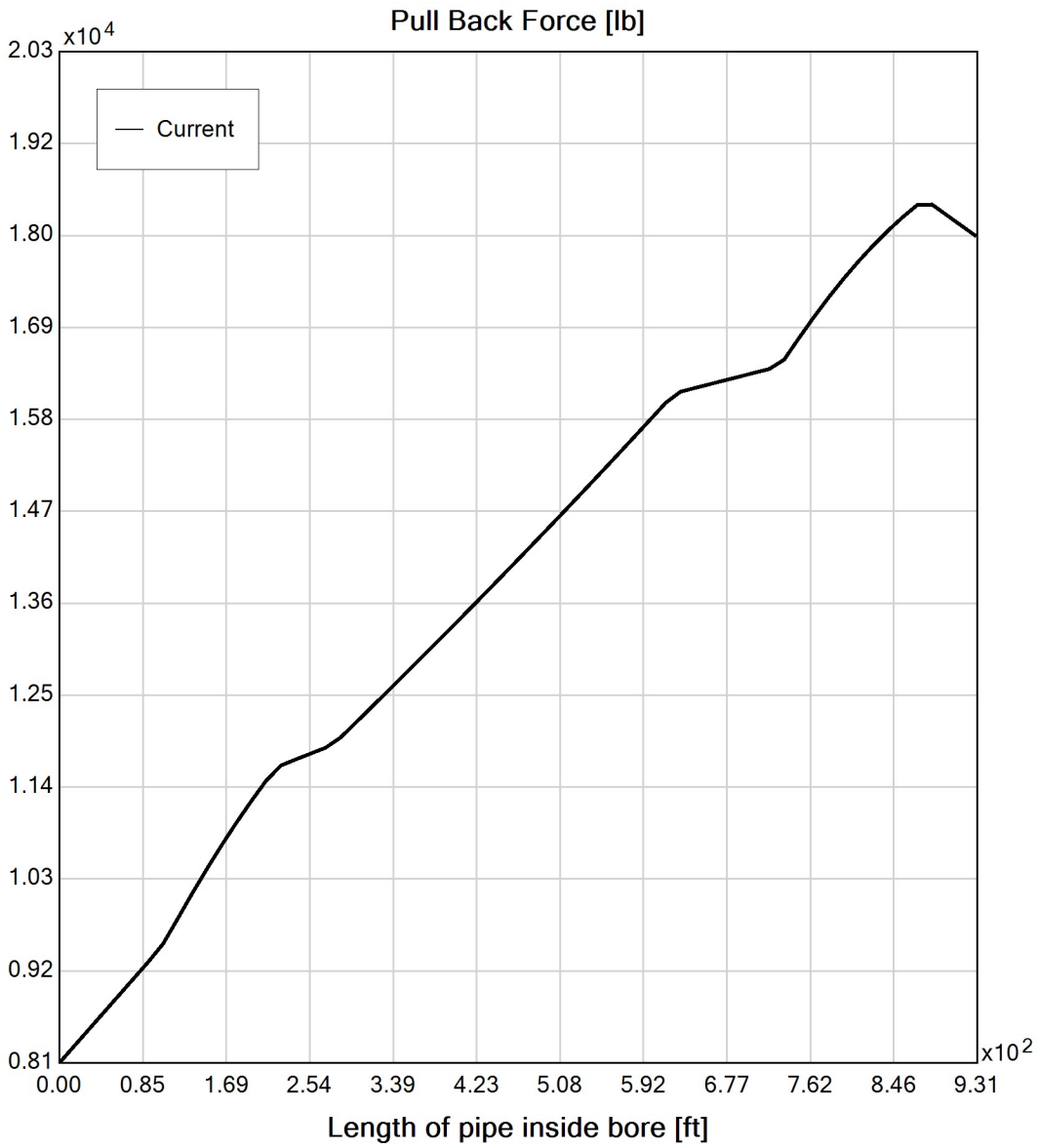
Fluid Consistency Index (K): 63.17

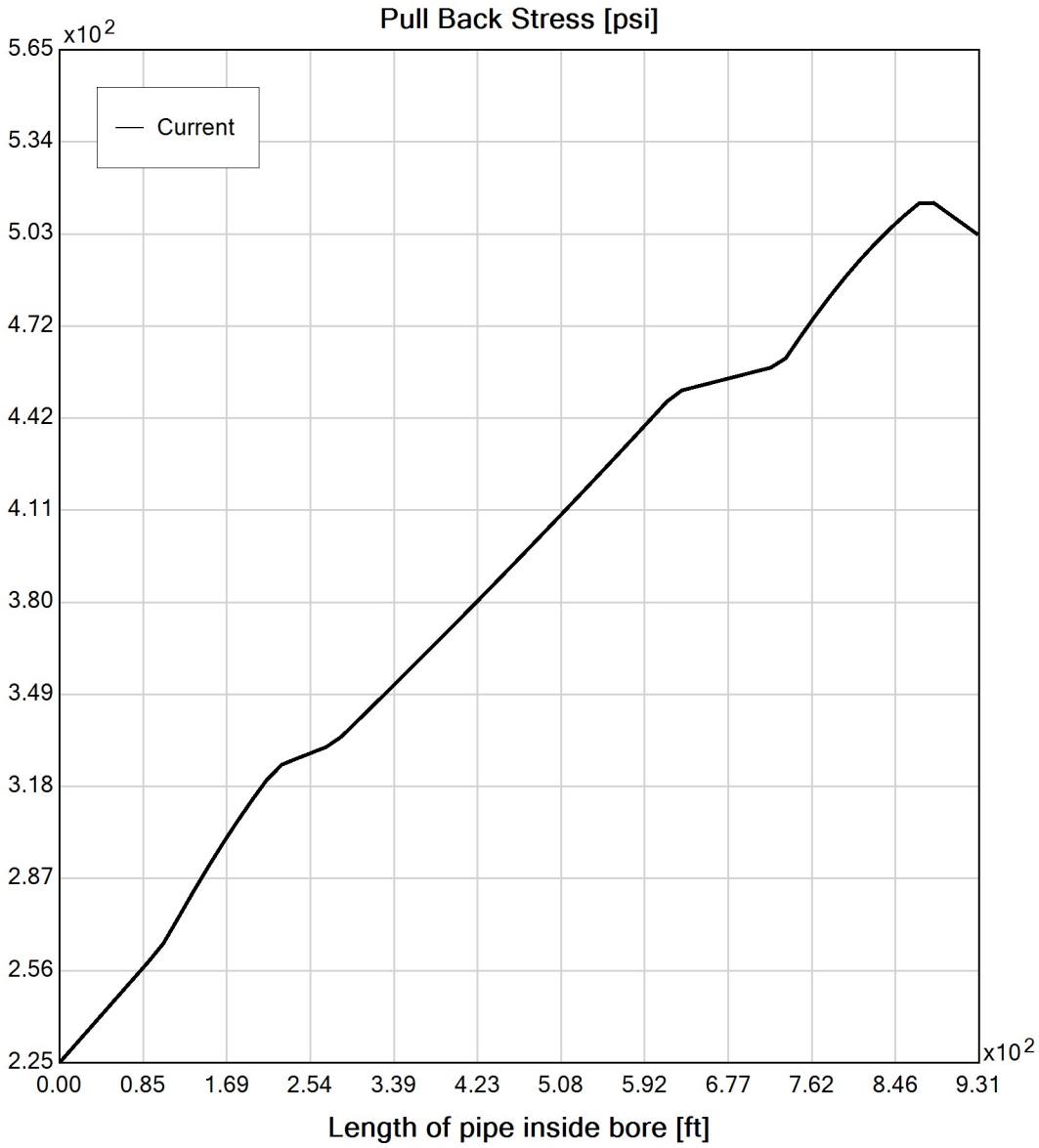
Power Law Exponent (n): 0.14

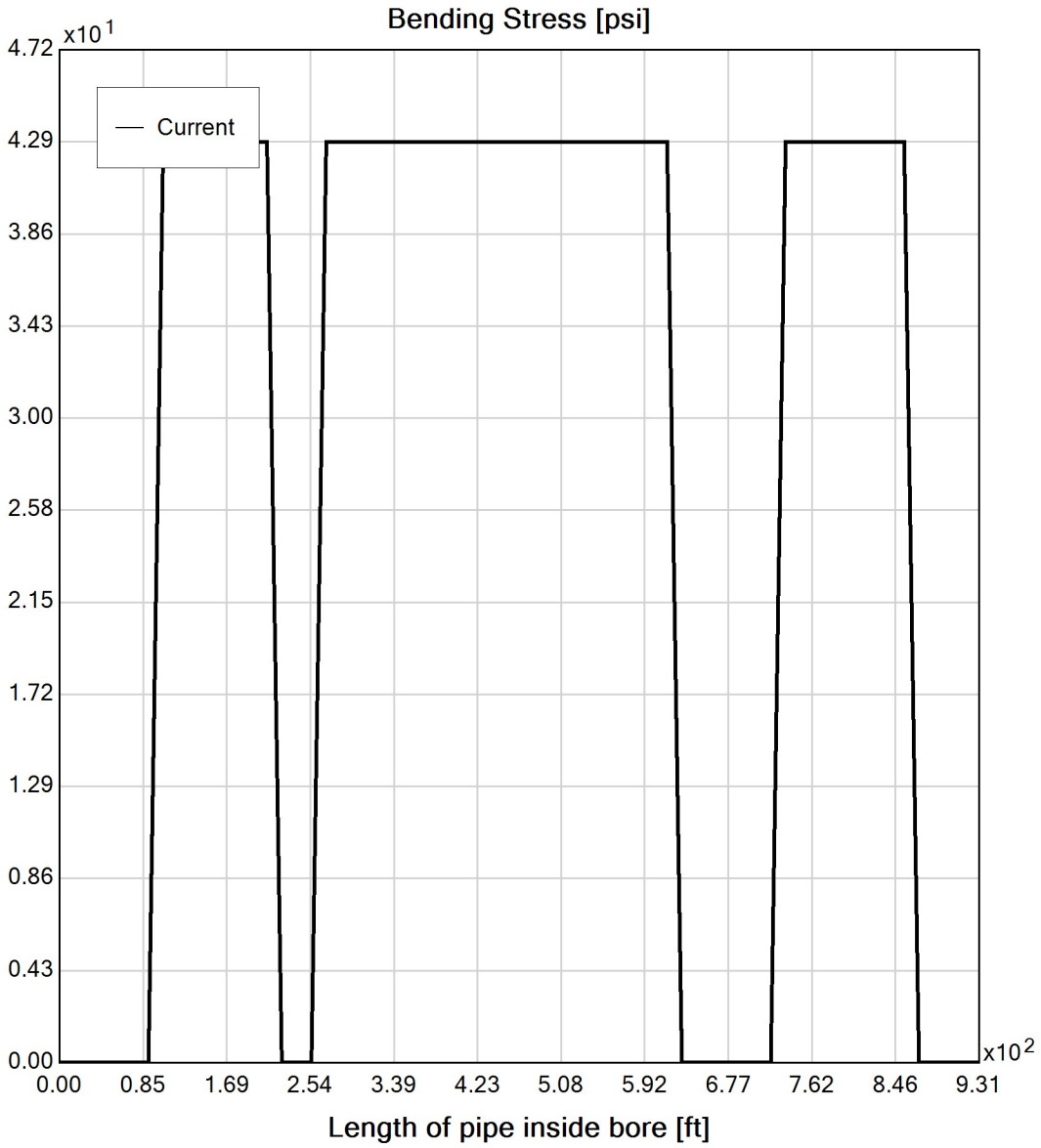
Effective Viscosity (cP): 333.0

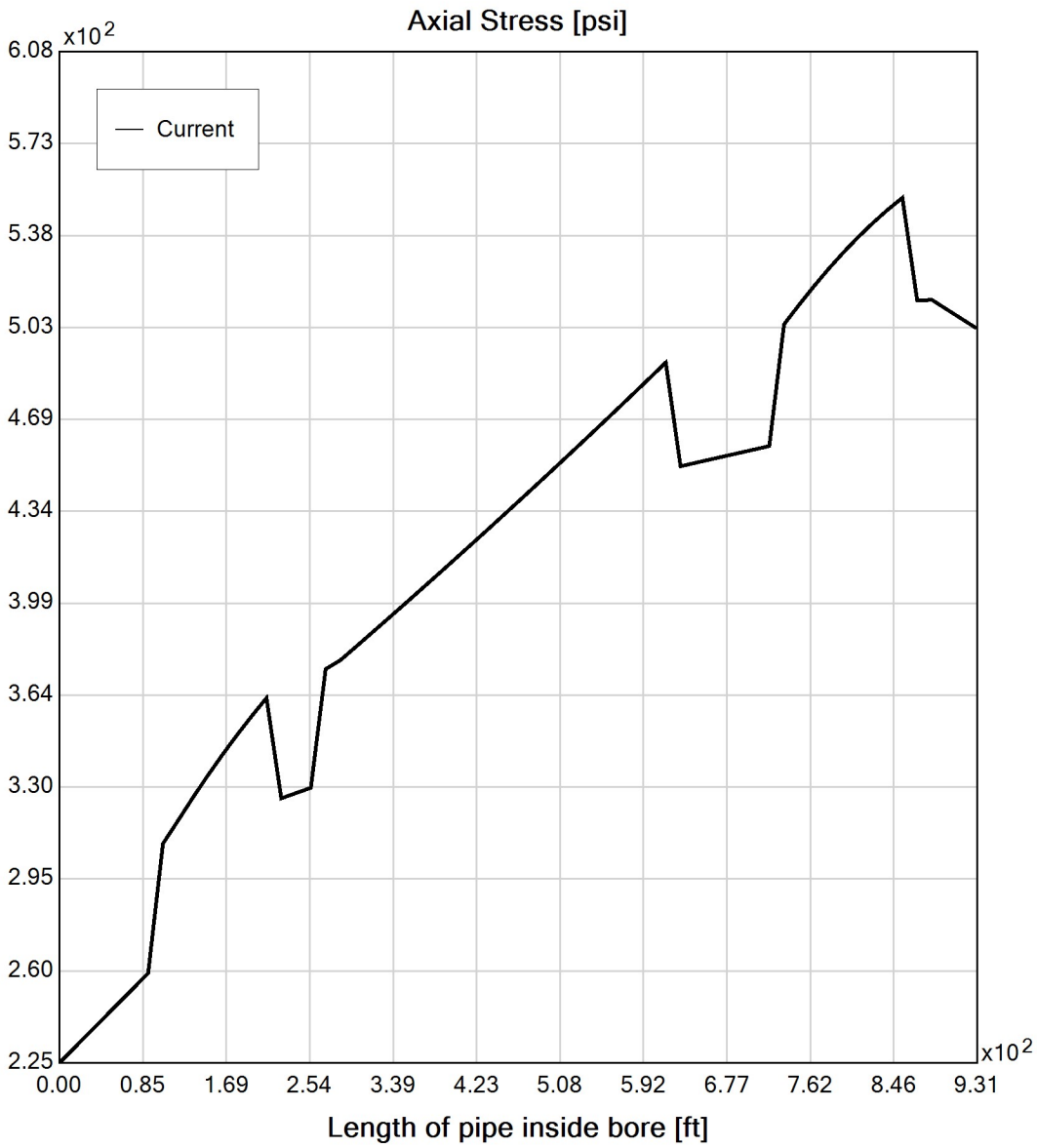
Virtual Site

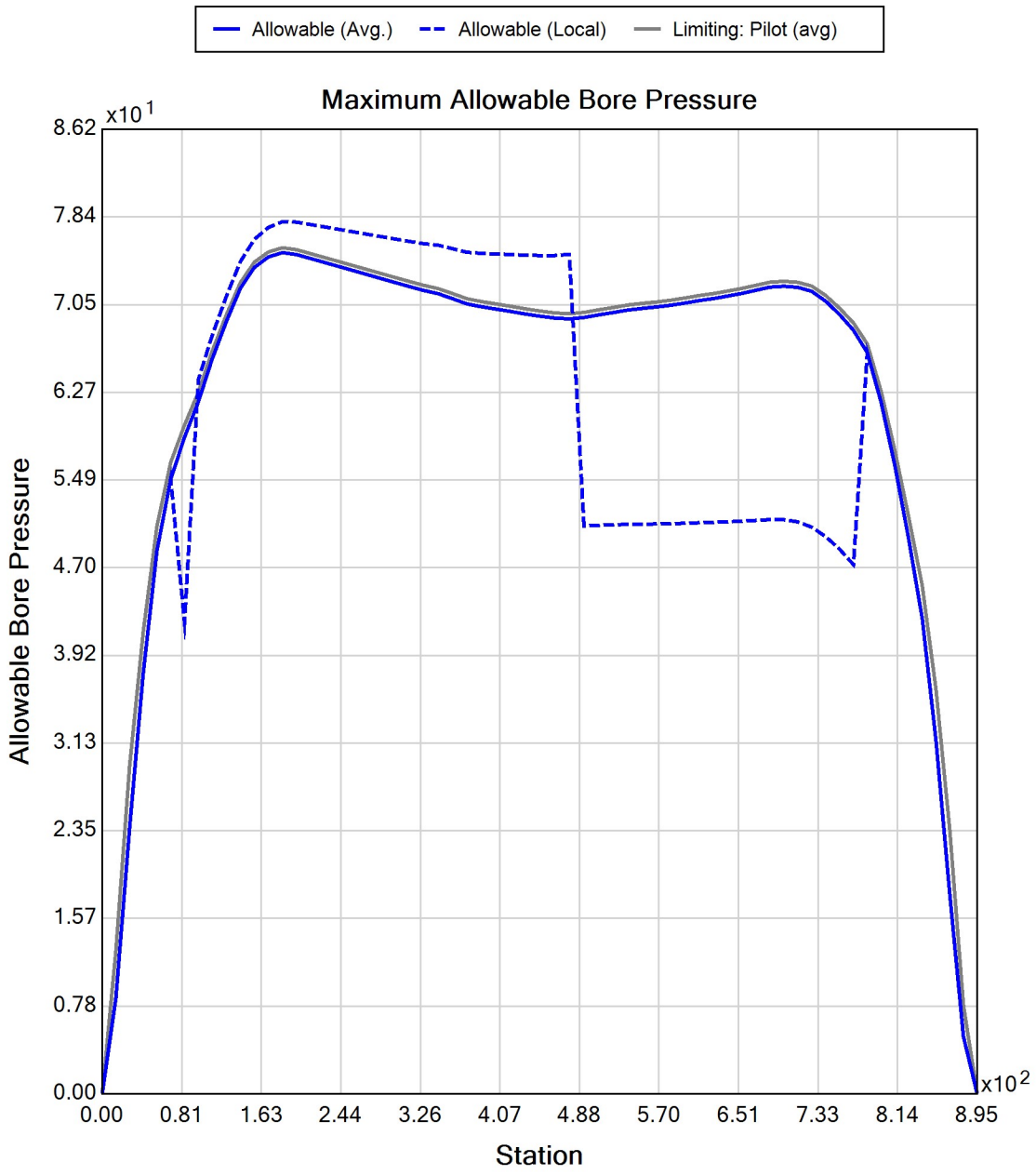


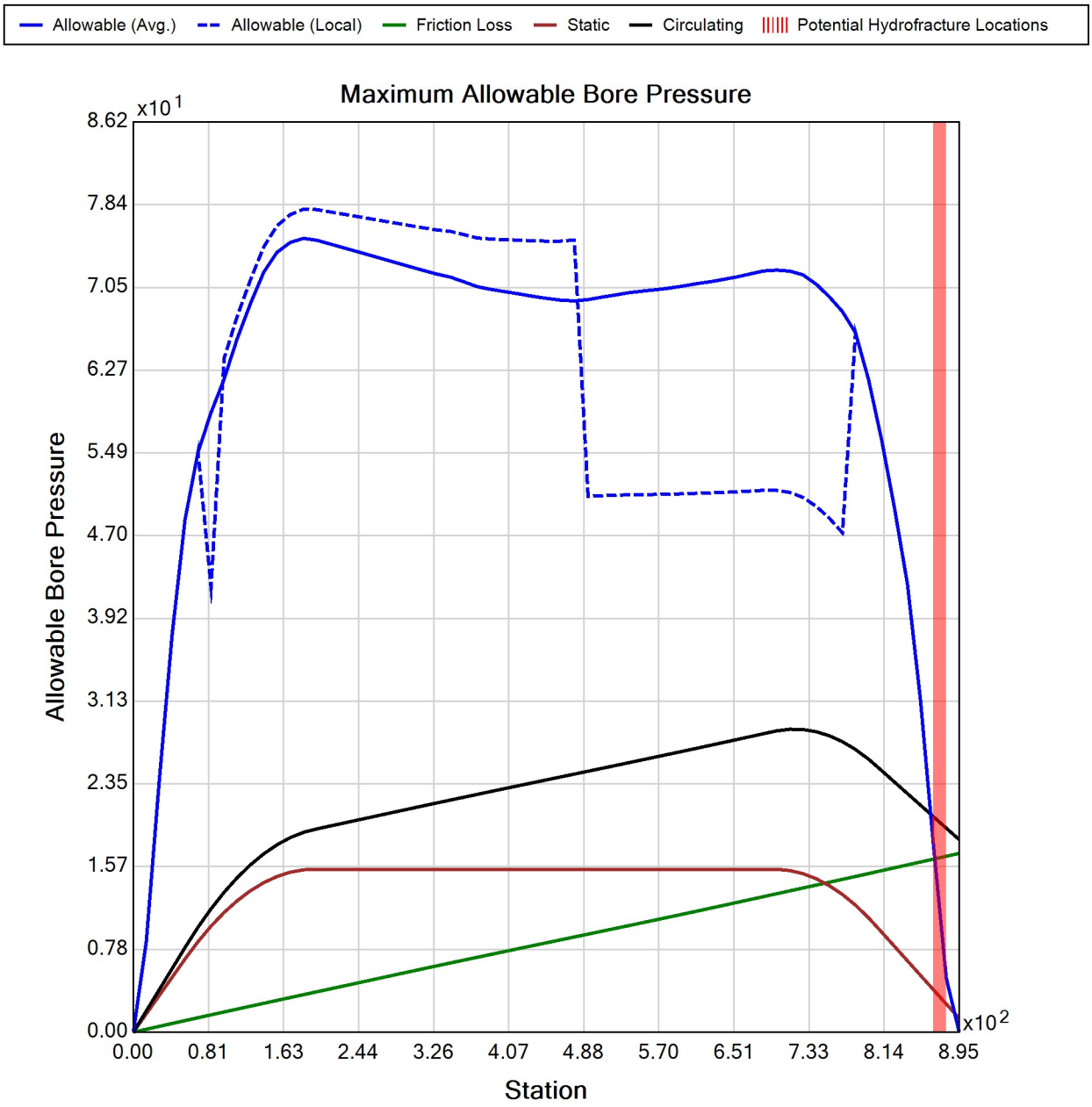












Generated Output

WARNING: The accuracy of the data obtained by the BoreAid® system is highly dependent upon accurate data gathering, data input and proper use of the software. Vermeer is not responsible for that information. BoreAid® data is not intended to replace the need for future on-site utility locating, measuring and verification procedures, which are essential for accurate placement of new underground installations and avoidance of existing utilities.

CALL YOUR ONE-CALL SYSTEM FIRST

WARNING: Always contact your local One-Call system before the start of your digging project. The BoreAid® system is intended to be used with other utility locating methods, such as the use of the One-Call system and the exposing of existing utilities by potholing.

Locate utilities before drilling. Call 811 (U.S. only) or 1-888-258-0808 (U.S. or Canada) or local utility companies or national regulating authority.

Before you start any digging project, do not forget to call the local One-Call system in your area and any utility company that does not subscribe to the One-Call system. For areas not represented by One-Call Systems International, contact the appropriate utility companies or national regulating authority to locate and mark the underground installations. If you do not call, you may have an accident or suffer injuries; cause interruption of services; damage the environment; or experience job delays.

OSHA CFR 29 1926.651 requires that the estimated location of underground utilities be determined before beginning the excavation or underground drilling operation. When the actual excavation or bore approaches an estimated utility location, the exact location of the underground installation must be determined by a safe, acceptable and dependable method. If the utility cannot be precisely located, it must be shut off by the utility company.