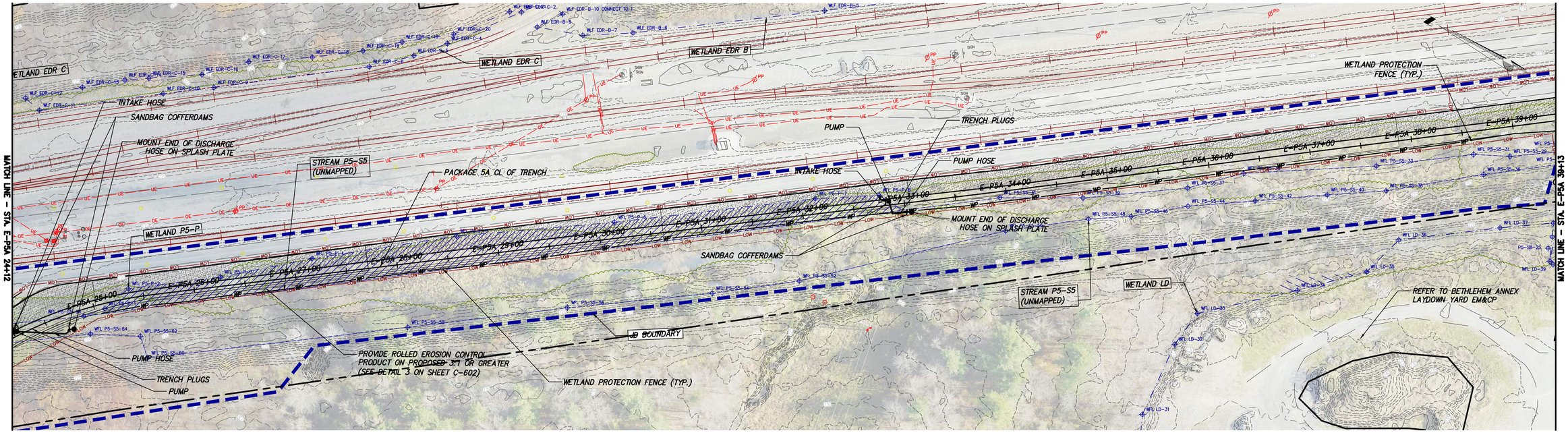
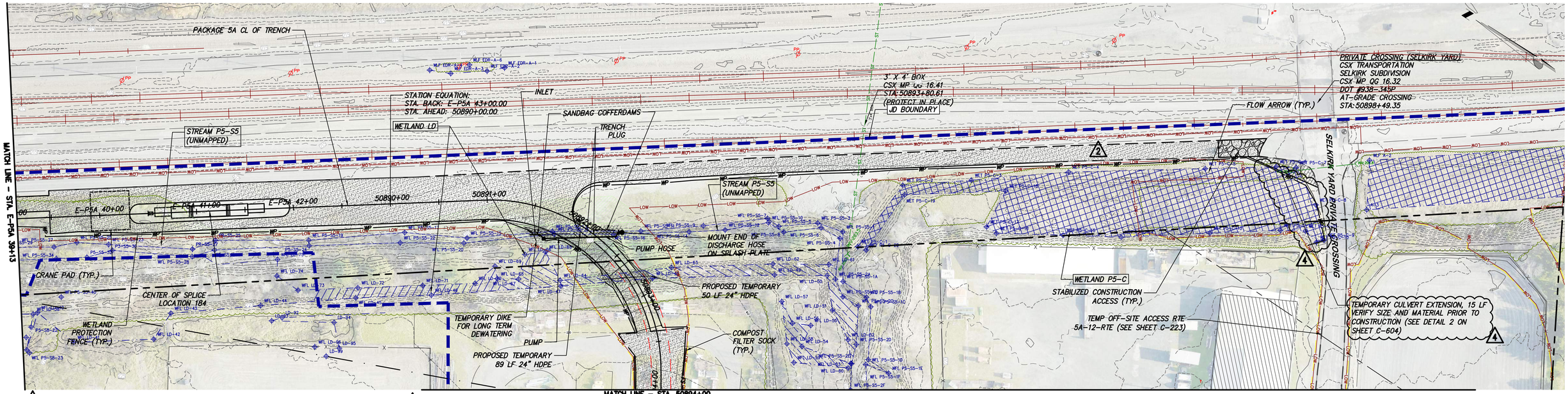


STA. 50870+00 TO STA. 50885+00 PLAN VIEW
SCALE: 1" = 50'

0 50 100
Scale in feet



STA. 50885+00 TO STA. 50894+00 PLAN VIEW
SCALE: 1" = 50'

0 50 100
Scale in feet

CHPE Champlain Hudson Power Express

PROJECT NO.: 21162 | PROJECT NO.: 120174 | ALTERED ON: 11/01/2024 | AFFIXED ON: 06/09/2023

Kiewit | Engineering and Land Surveying, P.C.

STATE OF NEW YORK · DANIT BIRBAL SINGH · 125756 · LICENSED PROFESSIONAL ENGINEER

STATE OF NEW YORK · NATHANIEL DALE HAYENGA · 103692 · LICENSED PROFESSIONAL ENGINEER

No.	DATE	SUBMITTAL / REVISION DESCRIPTION	DB	APP
4	11/01/2024	NDC-0148: REVISIONS PER BETHLEHEM COMMENTS	JR	BD
3	08/01/2024	NDC-0117: INDIAN FIELDS RD REALIGNMENT	JR	BD
2	06/12/2024	NDC-0101: HDD TRANSITION AREA RECONCILIATION	BL	BD
1	12/22/2023	NDC-0032_UPDATES PER TOWN OF BETHLEHEM	JR	BD
0	06/09/2023	ISSUED FOR CONSTRUCTION SUBMISSION	TH	NH

CHAMPLAIN HUDSON POWER EXPRESS

SEGMENT 8 (PACKAGE 5A) - CSX: ROTTERDAM - BETHLEHEM

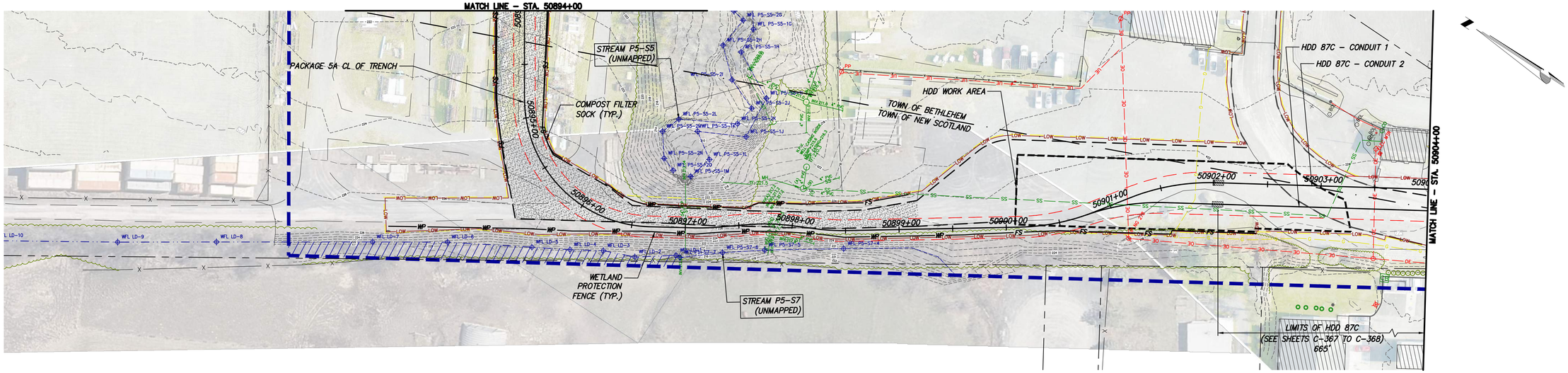
EROSION AND SEDIMENT CONTROL PLAN

STA. 50885+00 TO STA. 50894+00

DRAWN BY: SC/TH | DESIGNED BY: MK | APPROVED BY: NH | SCALE AS SHOWN | DATE: 06/09/2023

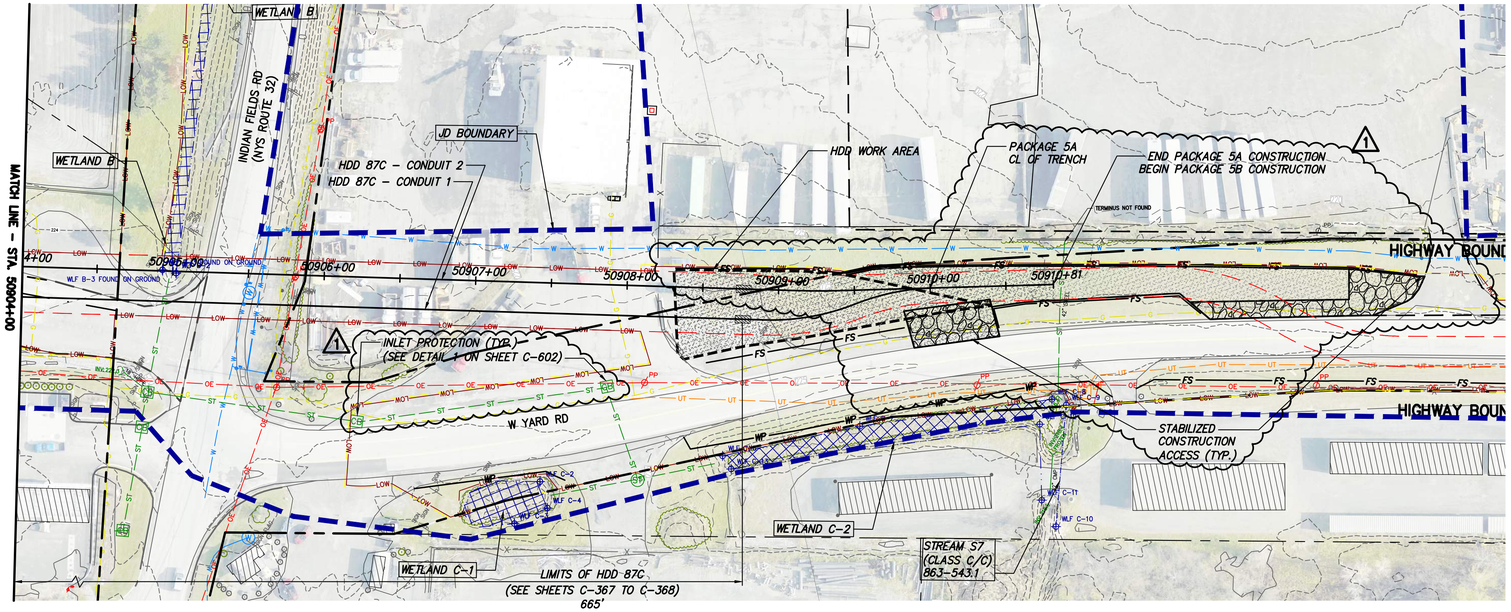
PERMIT DRAWING NO.: **N/A**

DRAWING NO.: **C-430**



STA. 50894+00 TO STA. 50904+00 PLAN VIEW
SCALE: 1" = 50'

0 50 100
Scale in feet



STA. 50904+00 TO STA. 50910+95 PLAN VIEW
SCALE: 1" = 50'

0 50 100
Scale in feet

CHPE Champlain Hudson Power Express

Kiewit

Engineering and Land Surveying, P.C.

PROJECT NO.: 21162	PROJECT NO.: 120174	ALTERED ON:	AFFIXED ON: 11/01/2024

STATE OF NEW YORK — DANIT BIRBAL SINGH — 105756 — LICENSED PROFESSIONAL ENGINEER

No.	DATE	SUBMITTAL / REVISION DESCRIPTION	DB	APP
1	11/01/2024	NDC-0148: REVISIONS PER BETHLEHEM COMMENTS	JR	BD
0	08/01/2024	NDC-0117: ISSUED FOR CONSTRUCTION SUBMISSION	JR	BD

CHAMPLAIN HUDSON POWER EXPRESS

SEGMENT 8 (PACKAGE 5A) - CSX: ROTTERDAM - BETHLEHEM

EROSION AND SEDIMENT CONTROL PLAN

STA. 50894+00 TO STA. 50910+95

DRAWN BY: JR | DESIGNED BY: BL | APPROVED BY: BD | SCALE AS SHOWN | DATE: 08/01/2024

PERMIT DRAWING NO.

N/A

DRAWING NO.

C-431

PACKAGE 5A WORK ZONE TRAFFIC CONTROL MAIN STAGES AND ACCESS ROADS

MAIN STAGE	STA. START	STA. END	ROUTE(S)	CLOSURE / DETAIL TYPE	PLAN SHEET	SPEED LIMIT	TRAFFIC COUNTS (AADT)	WORK NOTES
0.1	45485+49	45484+82	COUNTY ROAD 54 (PUTNAM ROAD)	ROAD CLOSURE WITH DETOUR	C-507C & C-507D	35	2655 (2019)	CONDUIT PULLBACK OPERATIONS (NIGHT CLOSURE)
1	50000+00	50004+60	PRINCETOWN RD.	SHOULDER CLOSURE	C-504		1158 (2019)	TRENCHING AND CONDUIT INSTALLATION
2	50004+60	50007+50	PRINCETOWN RD.	ROAD CLOSURE WITH DETOUR	C-507		1158 (2019)	HORIZONTAL DIRECTIONAL DRILL
3	50004+60	50007+50	BROOKVIEW CT.	LANE CLOSURE AT OR NEAR INTERSECTION	C-505		-	HORIZONTAL DIRECTIONAL DRILL
4	50021+50		BURDECK ST. (RTE 337)	TEMPORARY ACCESS ROAD DETAIL	C-506	35 MPH	7434 (2019)	CONSTRUCTION ACCESS
5	50041+50		KELLAR AVE.	TEMPORARY ACCESS ROAD DETAIL	C-506	35 MPH	639 (2018)	CONSTRUCTION ACCESS
6	50057+00		MOYER AVE. / S. THOMPSON ST.	TEMPORARY ACCESS ROAD DETAIL	C-506	30 MPH		CONSTRUCTION ACCESS
7	50064+00		S. THOMPSON ST.	TEMPORARY ACCESS ROAD DETAIL	C-506	30 MPH		CONSTRUCTION ACCESS
8	50084+50		DUNNSVILLE RD.	TEMPORARY ACCESS ROAD DETAIL	C-506	30 MPH	3623 (2019)	CONSTRUCTION ACCESS
9	50120+50		S. WESTCOTT RD.	TEMPORARY ACCESS ROAD DETAIL	C-506	30 MPH		CONSTRUCTION ACCESS
10	50194+50	50195+00	COUNTY LINE RD.	ROAD CLOSURE WITH DETOUR	C-508		1152 (2019)	TRENCHING AND CONDUIT INSTALLATION
11	50195+00		COUNTY LINE RD.	TEMPORARY ACCESS ROAD DETAIL	C-506	30 MPH	1152 (2019)	CONSTRUCTION ACCESS
12	50253+00		W. OLD STATE RD.	TEMPORARY ACCESS ROAD DETAIL	C-506			CONSTRUCTION ACCESS
13	50305+00		WESTERN TPKE. (RTE 20)	TEMPORARY ACCESS ROAD DETAIL	C-506			CONSTRUCTION ACCESS
14	50309+00		WESTERN TPKE. (RTE 20)	TEMPORARY ACCESS ROAD DETAIL	C-506			CONSTRUCTION ACCESS
15	50336+50		FULLER STATION RD.	TEMPORARY ACCESS ROAD DETAIL	C-506			CONSTRUCTION ACCESS
16	50385+00		FRENCHS MILL RD.	TEMPORARY ACCESS ROAD DETAIL	C-506			CONSTRUCTION ACCESS
17	50399+50	50400+50	VAN BUREN BLVD.	SHOULDER CLOSURE	C-504		3175 (2019)	TRENCHING AND CONDUIT INSTALLATION
17	50423+00		NORTHEASTEN INDUSTRIAL PARK	TEMPORARY ACCESS ROAD DETAIL	C-506			CONSTRUCTION ACCESS
18	50473+25		NORTHEASTEN INDUSTRIAL PARK	TEMPORARY ACCESS ROAD DETAIL	C-506			CONSTRUCTION ACCESS
19	50501+00	50501+50	STONE RD.	ROAD CLOSURE WITH DETOUR	C-509		1170 (2019)	TRENCHING AND CONDUIT INSTALLATION
20	50550+00		SCHOOL RD.	TEMPORARY ACCESS ROAD DETAIL	C-506			CONSTRUCTION ACCESS
21	50566+00	50579+00	FOUNDRY RD.	LANE CLOSURE FLAGGING OPERATION	C-503			TRENCHING AND CONDUIT INSTALLATION
22	50585+50		GROVE ST.	TEMPORARY ACCESS ROAD DETAIL	C-506			CONSTRUCTION ACCESS
23	50595+00	50595+50	VOORHEESVILLE AVE.	ROAD CLOSURE WITH DETOUR	C-510		2572 (2019)	TRENCHING AND CONDUIT INSTALLATION
24	50596+50		VOORHEESVILLE AVE.	TEMPORARY ACCESS ROAD DETAIL	C-506			CONSTRUCTION ACCESS
25	50616+00		MAPLE RD. (RTE 85A)	TEMPORARY ACCESS ROAD DETAIL	C-506			CONSTRUCTION ACCESS
26	50648+00		LOCUST DR.	TEMPORARY ACCESS ROAD DETAIL	C-506			CONSTRUCTION ACCESS
27	50668+00		YOUMANS RD.	TEMPORARY ACCESS ROAD DETAIL	C-506			CONSTRUCTION ACCESS
28	50693+00		NEW SCOTLAND RD. (RTE 85)	TEMPORARY ACCESS ROAD DETAIL	C-506			CONSTRUCTION ACCESS
29	50729+75	50730+50	NEW SCOTLAND SOUTH RD.	LANE CLOSURE WITH ONE WAY TRAFFIC - ADJACENT TO CSX RAILROAD	C-511		1939 (2019)	TRENCHING AND CONDUIT INSTALLATION
30	50731+25		NEW SCOTLAND SOUTH RD.	TEMPORARY ACCESS ROAD DETAIL	C-506			CONSTRUCTION ACCESS
31	50778+00	50778+75	GAME FARM RD.	ROAD CLOSURE WITH DETOUR	C-512		147 (2019)	TRENCHING AND CONDUIT INSTALLATION
32	50779+50		GAME FARM RD.	TEMPORARY ACCESS ROAD DETAIL	C-506			CONSTRUCTION ACCESS
33	50811+00		DELWARE TKPE.	TEMPORARY ACCESS ROAD DETAIL	C-506			CONSTRUCTION ACCESS
34	50832+00		WALDENMAIER RD.	TEMPORARY ACCESS ROAD DETAIL	C-506			CONSTRUCTION ACCESS
35	50838+50		UNIONVILLE FEURA BUSH RD.	TEMPORARY ACCESS ROAD DETAIL	C-506			CONSTRUCTION ACCESS
36	50898+50		FEURA BUSH RD.	TEMPORARY ACCESS ROAD DETAIL	C-506			CONSTRUCTION ACCESS
37	50909+85	50910+95	W. YARD RD.	LANE CLOSURE WITH ONE WAY TRAFFIC	C-506C* C-506D*			TRENCHING AND CONDUIT INSTALLATION
38	50910+00	50910+65	W. YARD RD.	TEMPORARY ACCESS ROAD DETAIL	C-506			CONSTRUCTION ACCESS

* *REFER TO INDICATED SHEET IN SEGMENT 9 (PACKAGE 5B)*

5 2 2 1 4 6 3

CHPE Champlain Hudson Power Express

PROJECT NO.: 21162 — Kiewit

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

ALTERED ON: 11/01/2024 — STATE OF NEW YORK, DANA BIRBAL SINGH, LICENSED PROFESSIONAL ENGINEER, 105706

AFFIXED ON: 06/09/2023 — STATE OF NEW YORK, THOMAS P. DUGGAN, 044113, LICENSED PROFESSIONAL ENGINEER

No.	DATE	SUBMITTAL / REVISION DESCRIPTION	DB	APP
6	11/01/2024	NDC-0148: REVISIONS PER BETHLEHEM COMMENTS	DM	BD
5	09/09/2024	NDC-0140: PUTNAM ROAD CLOSURE	DM	BD
4	08/01/2024	NDC-0117: INDIAN FIELDS RD REALIGNMENT	BL	BD
3	12/07/2023	NDC-0012: REVISED BORDER AND BORDER CONTENT ONLY	JR	BD
2	11/15/2023	NDC-0012: NYSDOT R1 PERM 33 COMMENTS	JR	BD
1	10/09/2023	NDC-0004: ALIGNMENT REVISIONS PER NAT. GRID COMMENT	JR	BD
0	06/09/2023	ISSUED FOR CONSTRUCTION SUBMISSION	JLB	TD

DRAWN BY: JLB | DESIGNED BY: SH | APPROVED BY: TD | SCALE AS SHOWN | DATE: 06/09/2023

CHAMPLAIN HUDSON POWER EXPRESS

SEGMENT 8 (PACKAGE 5A) - CSX: ROTTERDAM - BETHLEHEM

WORK ZONE TRAFFIC CONTROL

PERMIT DRAWING NO.: N/A

DRAWING NO.: C-502

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

Segment 9 (Package 5B):
EM&CP Appendix C Revised Sheets

Segment 9:

Sheet No.	Rev No.	Revision Description	Summary
G-001	4	NDC-0117: INDIAN FIELDS RD REALIGNMENT	Revised stations on sheet titles (C-101, C-401)
	5	NDC-0148: REVISIONS PER BETHLEHEM COMMENTS	Added C-506C and C-506D.
G-006	2	NDC-0117: INDIAN FIELDS RD REALIGNMENT	Revised start station for Package 5B alignment.
G-010	1	NDC-0117: INDIAN FIELDS RD REALIGNMENT	Revised Table 4-4 and 4-5
G-012	1	NDC-0117: INDIAN FIELDS RD REALIGNMENT	Revised Table 12-3
C-101	3	NDC-0117: INDIAN FIELDS RD REALIGNMENT	Shifted start of Package 5B further south. No change to alignment.
	4	NDC-0148: REVISIONS PER BETHLEHEM COMMENTS	Revised alignment from 51010+00 to 51012+25. Expanded limit of work and easement to allow the alignment change.
C-102	3	NDC-0117: INDIAN FIELDS RD REALIGNMENT	Switched direction of cable pull at splice vault 185.
C-401	3	NDC-0117: INDIAN FIELDS RD REALIGNMENT	Revised start station for Package 5B alignment.
	4	NDC-0148: REVISIONS PER BETHLEHEM COMMENTS	Updated alignment, limit of work, and easement as described on C-101.
C-502	2	NDC-0117: INDIAN FIELDS RD REALIGNMENT	Changed WZTC Plan Sheet reference on Main Stage 1 from C-504 to C-506A to reduce impacts to Indian Fields Rd (NYS Route 32). Updated stationing based on alignment revision and revision to the breakpoint between Package 5A and Package 5B.
	3	NDC-0148: REVISIONS PER BETHLEHEM COMMENTS	Updated table to include C-506C and C-506D.
C-506A	1	NDC-0117: INDIAN FIELDS RD REALIGNMENT	Added note and inset to address single lane closure on W. Yard Road in proximity to Indian Fields Road (NYS Route 32).
	2	NDC-0148: REVISIONS PER BETHLEHEM COMMENTS	Removed inset for work near the intersection of Indian Fields Rd and W Yard Rd. That detail is now expanded and shown on C-506C and C-506D.
C-506C	0	NDC-0148: ISSUED FOR CONSTRUCTION SUBMISSION	New sheet to show closure of eastern lane of W Yard Rd for the trenched crossing of the road and corresponding restoration.
C-506D	0	NDC-0148: ISSUED FOR CONSTRUCTION SUBMISSION	New sheet to show closure of western lane of W Yard Rd for the trenched crossing of the road and corresponding restoration.

Summary of Affected Easements:

1. LANDS N/F JAMES MASTROIANNI S.B.L. 30.15-1-13.3
2. LANDS N/F WEST YARD LLC TM# 108.00-1-11.1

SHEET LIST TABLE	
DRAWING NUMBER	SHEET TITLE
PACKAGE 5B: GENERAL SHEETS	
G-000	COVER SHEET
G-001	SHEET INDEX
G-002	GENERAL NOTES 1 OF 2
G-003	GENERAL NOTES 2 OF 2
G-004	CSX GENERAL NOTES
G-005	LEGEND AND ABBREVIATIONS
G-006	PLAN AND PROFILE KEY MAP
G-007	SPLICE, LINK BOX, AND FIBER OPTIC HANDHOLE LOCATION TABLES
G-008	SUMMARY OF DUCTBANK LIMITS WITHIN CSX ROW
G-010	EM&CP TABLES 1 OF 4
G-011	EM&CP TABLES 2 OF 4
G-012	EM&CP TABLES 3 OF 4
G-013	EM&CP TABLES 4 OF 4
G-020	RESTORATION NOTES
PACKAGE 5B: PLAN AND PROFILE SHEETS	
C-101	STA. 51009+86.89 TO STA. 51015+00.00 PLAN AND PROFILE
C-102	STA. 51015+00.00 TO STA. 51030+00.00 PLAN AND PROFILE
C-103	STA. 51030+00.00 TO STA. 51045+00.00 PLAN AND PROFILE
C-104	STA. 51045+00.00 TO STA. 51060+00.00 PLAN AND PROFILE
C-105	STA. 51060+00.00 TO STA. 51075+00.00 PLAN AND PROFILE
C-106	STA. 51075+00.00 TO STA. 51090+00.00 PLAN AND PROFILE
C-107	STA. 51090+00.00 TO STA. 51105+00.00 PLAN AND PROFILE
C-108	STA. 51105+00.00 TO STA. 51120+00.00 PLAN AND PROFILE
C-109	STA. 51120+00.00 TO STA. 51135+00.00 PLAN AND PROFILE
C-110	STA. 51135+00.00 TO STA. 51150+00.00 PLAN AND PROFILE
C-111	STA. 51150+00.00 TO STA. 51165+00.00 PLAN AND PROFILE
C-112	STA. 51165+00.00 TO STA. 51180+00.00 PLAN AND PROFILE
C-113	STA. 51180+00.00 TO STA. 51195+00.00 PLAN AND PROFILE
C-114	STA. 51195+00.00 TO STA. 51210+00.00 PLAN AND PROFILE
C-115	STA. 51210+00.00 TO STA. 51225+00.00 PLAN AND PROFILE
C-116	STA. 51225+00.00 TO STA. 51240+00.00 PLAN AND PROFILE
C-117	STA. 51240+00.00 TO STA. 51255+00.00 PLAN AND PROFILE
C-118	STA. 51255+00.00 TO STA. 51270+00.00 PLAN AND PROFILE
C-119	STA. 51270+00.00 TO STA. 51279+06.04 PLAN AND PROFILE
PACKAGE 5B: OFF-SITE ACCESS ROAD AND ROUTE PLANS	
~~C-201~~	~~TEMP OFF-SITE ACCESS ROADS (5B-01-RD)~~
~~C-202~~	~~TEMP OFF-SITE ACCESS ROADS (5B-01-RD)~~
~~C-203~~	~~TEMP OFF-SITE ACCESS ROADS (5B-01A-RD)~~
C-204	TEMP OFF-SITE ACCESS ROADS (5B-02-RD)
C-205	TEMP OFF-SITE ACCESS ROADS (5B-02-RD)
C-206	TEMP OFF-SITE ACCESS ROADS (5B-01-RTE)
C-207	TEMP OFF-SITE ACCESS ROADS (5B-01-RTE)
C-209	TEMP OFF-SITE ACCESS ROADS (5B-02-RTE) TEMP OFF-SITE ACCESS ROAD (5B-03-RD)
C-210	TEMP OFF-SITE ACCESS ROAD (5B-03-RD)
C-211	TEMP OFF-SITE ACCESS ROAD (5B-03-RD)
C-212	TEMP OFF-SITE ACCESS ROAD (5B-03-RD)
PACKAGE 5B: HDD TRENCHLESS PLANS	
C-301	PLAN AND PROFILE – HDD 87B CONDUIT 1
C-302	PLAN AND PROFILE – HDD 87B CONDUIT 1

SHEET LIST TABLE	
DRAWING NUMBER	SHEET TITLE
C-303	PLAN AND PROFILE – HDD 87B CONDUIT 2
C-304	PLAN AND PROFILE – HDD 87B CONDUIT 2
C-305	PLAN AND PROFILE – HDD 88 CONDUIT 1
C-306	PLAN AND PROFILE – HDD 88 CONDUIT 1
C-307	PLAN AND PROFILE – HDD 88 CONDUIT 2
C-308	PLAN AND PROFILE – HDD 88 CONDUIT 2
C-309	PLAN AND PROFILE – HDD 89 CONDUIT 1
C-310	PLAN AND PROFILE – HDD 89 CONDUIT 1
C-311	PLAN AND PROFILE – HDD 89 CONDUIT 1
C-312	PLAN AND PROFILE – HDD 89 CONDUIT 2
C-313	PLAN AND PROFILE – HDD 89 CONDUIT 2
C-314	PLAN AND PROFILE – HDD 89 CONDUIT 2
C-315	PLAN AND PROFILE – HDD 90 CONDUIT 1
C-316	PLAN AND PROFILE – HDD 90 CONDUIT 2
PACKAGE 5B: EROSION AND SEDIMENT CONTROL PLANS	
C-400	E&CS KEY PLAN
C-401	STA 51000+00 TO STA 51025+00
C-402	STA 51025+00 TO STA 51055+00
C-403	STA 51055+00 TO STA 51085+00
C-404	STA 51085+00 TO STA 51115+00
C-405	STA 51115+00 TO STA 51145+00
C-406	STA 51145+00 TO STA 51175+00
C-407	STA 51175+00 TO STA 51205+00
C-408	STA 51205+00 TO STA 51235+00
C-409	STA 51235+00 TO STA 51265+00
C-410	STA 51265+00 TO STA 51279+21
~~C-470~~	~~PERMANENT SPOIL AREA – EROSION AND SEDIMENT CONTROL PLAN~~
~~C-471~~	~~PERMANENT SPOIL AREA – GRADING PROFILE~~
~~C-472~~	~~PERMANENT SPOIL AREA – PROFILE VIEW~~
PACKAGE 5B: MAINTENANCE AND PROTECTION OF TRAFFIC PLANS	
C-501	WORK ZONE TRAFFIC CONTROL NOTES, LEGEND AND ABBREVIATIONS
C-502	WORK ZONE TRAFFIC CONTROL
C-503	WORK ZONE TRAFFIC CONTROL
C-504	WORK ZONE TRAFFIC CONTROL
C-505	WORK ZONE TRAFFIC CONTROL
C-506	WORK ZONE TRAFFIC CONTROL W. YARD ROAD CLOSURE
C-506A	WORK ZONE TRAFFIC CONTROL W. YARD ROAD LANE CLOSURE
C-506B	WORK ZONE TRAFFIC CONTROL W. YARD ROAD LANE CLOSURE
C-506C	WORK ZONE TRAFFIC CONTROL W. YARD ROAD LANE CLOSURE
C-506D	WORK ZONE TRAFFIC CONTROL W. YARD ROAD LANE CLOSURE
C-507	WORK ZONE TRAFFIC CONTROL SOUTH ALBANY ROAD DETOUR
PACKAGE 5B: DETAILS	
C-601	EROSION AND SEDIMENT CONTROL DETAILS
C-602	EROSION AND SEDIMENT CONTROL DETAILS
C-603	EROSION AND SEDIMENT CONTROL DETAILS
C-611	WETLAND CROSSING DETAILS
C-612	WATERBAR DETAILS
C-613	WETLAND WORKING SURFACE DETAILS
C-614	TYPICAL TEMPORARY SHORING DETAILS
C-621	TRENCHING DETAILS
C-625	CSX CROSSING DETAILS 1 OF 2

SHEET LIST TABLE	
DRAWING NUMBER	SHEET TITLE
C-626	CSX CROSSING DETAILS 2 OF 2
C-627	SECURITY GATE DETAIL
C-631	SURFACE RESTORATION DETAILS
C-632	ASPHALT PAVEMENT TRENCH CUT DETAILS
PACKAGE 5B: DETAILS–STRUCTURAL	
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-711	FRP LINK BOX HANDHOLE
S-720	REINFORCING TRAY OVER UTILITIES
S-721	REINFORCING TRAY DETAILS
S-771	FRP COMMUNICATION HANDHOLE
PACKAGE 5B: DETAILS–ELECTRICAL	
C-801	ABOVE GROUND MARKING DETAILS
C-802	TYPICAL VAULT SNAKING DETAILS
C-803	TYPICAL VAULT GROUNDING DETAILS
C-807	SPLICE VAULT AND CABLE MARKING DETAILS
C-808	TYPICAL OPEN PIT SPLICE CASING DETAILS
C-809	OPEN PIT SPLICE GROUNDING DETAILS
C-811	STEEL SUPPORT DETAILS
C-812	VAULT CONNECTION DETAILS
PACKAGE 5B: DETAILS–COMMUNICATIONS	
C-852	ENCLOSED VAULT W/ FIBER OPTICS
C-853	OPEN SPLICE W/ FIBER OPTIC HAND HOLE
C-854	FIBER OPTIC HAND HOLE DETAILS
C-855	FIBER OPTIC SPLICE DIAGRAM
C-856	FIBER OPTIC SLACK ENCLOSURE DETAIL
PACKAGE 5B: DETAILS–UTILITIES	
C-901	UTILITY TYPICAL SEPARATION DETAILS

CHPE Champlain Hudson Power Express

PROJECT NO.: 21162 | PROJECT NO.: 120174 | ALTERED ON: 11/01/2024 | AFFIXED ON: 06/09/2023

Kiewit | Engineering and Land Surveying, P.C.

STATE OF NEW YORK · DANY BIRBAL SINGH · LICENSED PROFESSIONAL ENGINEER · 125756

STATE OF NEW YORK · THOMAS A. KELLY · LICENSED PROFESSIONAL ENGINEER · 106559

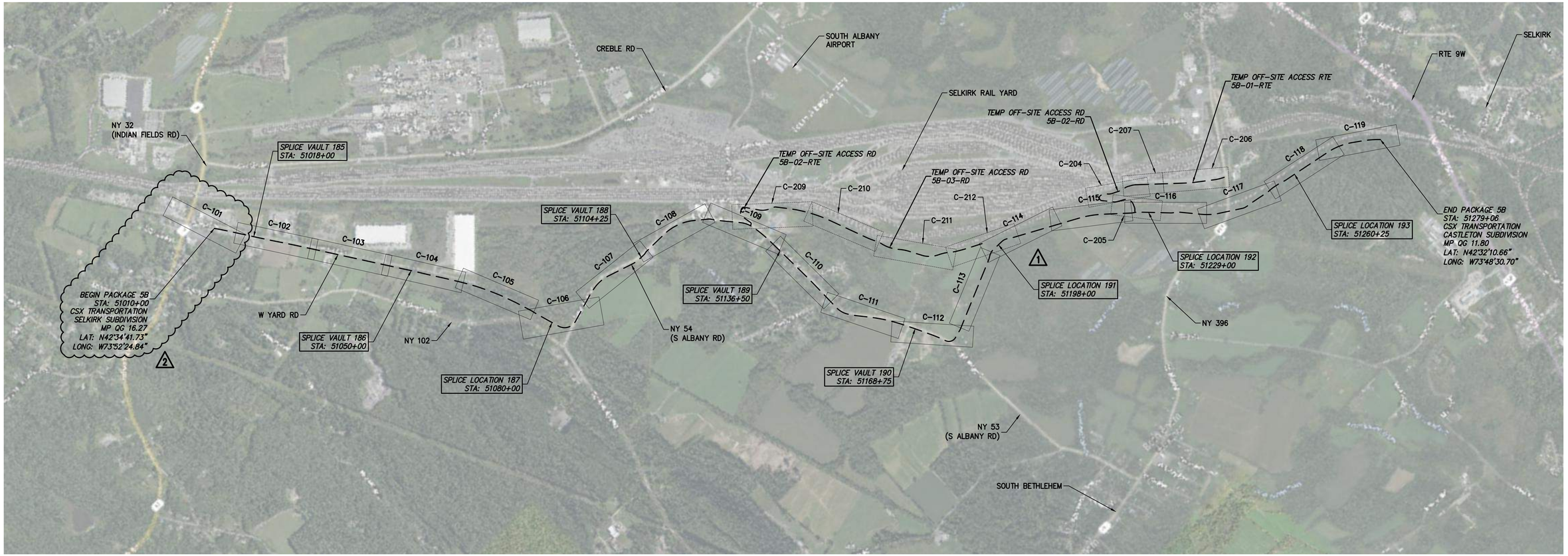
No.	DATE	SUBMITTAL / REVISION DESCRIPTION	DB	APP
5	11/01/2024	NDC-0148: REVISIONS PER BETHLEHEM COMMENTS	DM	BD
4	08/01/2024	NDC-0117: INDIAN FIELDS RD REALIGNMENT	BL	BD
3	12/08/2023	NDC-0027: NEW SELKIRK ACCESS ROAD	DM	BD
2	11/15/2023	NDC-0025: PERMANENT SPOIL DESIGN SHEETS ADDED	JR	BD
1	11/09/2023	NDC-0001, NDC-0015: BETHLEHEM RESTOR., CSX DEPTH	DM	BD
0	06/09/2023	ISSUED FOR CONSTRUCTION SUBMISSION	BV	TK

CHAMPLAIN HUDSON POWER EXPRESS
SEGMENT 9 (PACKAGE 5B) - CSX: SELKIRK RAIL YARD BYPASS
SHEET INDEX

DRAWN BY: AR | DESIGNED BY: BV | APPROVED BY: TK | SCALE AS SHOWN | DATE: 06/09/2023

PERMIT DRAWING NO.: N/A

DRAWING NO.: G-001



PLAN AND PROFILE KEY MAP

SCALE: 1" = 2000'

0 2000 4000
Scale in feet

CHPE Champlain Hudson Power Express

PROJECT NO.: 21162	PROJECT NO.: 120174	ALTERED ON: 08/01/2024	AFFIXED ON: 06/09/2023

Kiewit

Engineering and Land Surveying, P.C.

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

STATE OF NEW YORK · THOMAS A. KELLY · 106959 · LICENSED PROFESSIONAL ENGINEER

No.	DATE	SUBMITTAL / REVISION DESCRIPTION	DB	APP
2	08/01/2024	NDC-0117: INDIAN FIELDS RD REALIGNMENT	BL	BD
1	12/08/2023	NDC-0027: NEW SELKIRK ACCESS ROAD	DM	BD
0	06/09/2023	ISSUED FOR CONSTRUCTION SUBMISSION	BV	TK

CHAMPLAIN HUDSON POWER EXPRESS

SEGMENT 9 (PACKAGE 5B) - CSX: SELKIRK RAIL YARD BYPASS

PLAN AND PROFILE KEY MAP

DRAWN BY: AR | DESIGNED BY: BV | APPROVED BY: TK | SCALE AS SHOWN | DATE: 06/09/2023

PERMIT DRAWING NO.

N/A

DRAWING NO.

G-006

SEGMENT 9 – CONSTRUCTION METHODS

CHAPTER 4 –CONSTRUCTION METHODS	
TOPIC	SECTION OF EM&CP
CABLE INSTALLATION REQUIREMENTS	4.2
HORIZONTAL DIRECTIONAL DRILLING	4.3
INSTALLATION AND PERFORMANCE CONTROLS	4.3.1
BUILDINGS AND STRUCTURES WITHIN 100–FT OF HDD	4.3.2
INADVERTANT RELEASE CONTINGENCY PLAN AND DRILLING FLUID MANAGEMENT	4.3.3, APPENDIX J
ROAD CROSSING METHODS	4.3.4
TRENCHING	4.4
TRENCHING IN AGRICULTURAL LANDS	4.4.1
TRENCHING IN ROADWAYS	4.4.2
TRENCHING IN WETLANDS	4.4.3
LENGTH OF OPEN TRENCH	4.4.4
SPLICING AND JOINTING	4.4.5
DEWATERING METHODS	4.4.6
BEDDING AND BACKFILLING METHODS	4.4.7
DREDGING	NOTE APPLICABLE FOR THIS SEGMENT
CONVERTER STATION AND SUBSTATION REQUIREMENTS	NOTE APPLICABLE FOR THIS SEGMENT
RIGHT OF WAYS AND EASEMENTS	4.7
RIGHT OF WAY CLEARING	4.8 (SEE ALSO SECTION 8)
BUILDING AND STRUCTURE REMOVAL	4.9
ACCESS ROADS	4.10
DRIVEWAY ACCESS DURING CONSTRUCTION	4.10.2
ACCESS THROUGH WETLANDS OR STREAMS	4.10.3
ACCESS THROUGH AGRICULTURAL LANDS	4.10.4
DRAIN LINES AND UNDER DRAINS WITHIN AGRICULTURAL LANDS	4.10.5
SOIL MANAGEMENT PLAN	4.11 AND APPENDIX L
CULVERT REPLACEMENT	4.12

NOTE: TABLE 4 SUMMARIZES THE CONSTRUCTION METHODS AND ASSOCIATED SUBSECTIONS THAT SUMMARIZE THE MEASURES AND STANDARDS THAT WILL BE FOLLOWED WITHIN SEGMENT 9.

SEGMENT 9 – HDD INFORMATION AND ADJACENT STRUCTURES

Table 4–1 – Segment 9 HDD Locations

HDD #	Sheet	Length (feet)	Location (Approximate –see Drawings for Details)	Purpose
87.B	C–108 TO C–109	1,400	STA 51106 TO 51120+50	AVOIDANCE OF EXISTING CULVERTS
88	C–112 TO C–113	1,470	STA 51179+50 TO 51194	AVOID TERRAIN AND WATERBODY
89	C–114 TO C–116	2,370	STA 51201+50 TO 51225+50	AVOID UTILITIES
90	C–116 TO C–117	1,240	STA 51235 TO 51247+50	AVOIDANCE OF EXISTING CULVERT

TABLE 4–2 – SUMMARY OF STRUCTURES WITHIN 100 FEET OF HDD OPERATIONS

HDD #	PARCEL NUMBER	SHEET (APPROXIMATE –SEE APPENDIX C FOR DETAILS)
88	132.00–2–26	C–112 TO C–113
89	132.00–2–25.2	C–114
87B, 88, 89, 90	133.00–9–1.1	C–108 TO C–109; C–112 TO C–113; C–116 TO C–117

SEGMENT 9 – FACILITY OWNERSHIP AND EASEMENTS

TABLE 4–4 –FACILITY ROW OWNERSHIP FOR SEGMENT 9

COUNTY	TOWN	PARCEL NUMBER	PROPERTY OWNER	STATIONING START	STATIONING END	OWNER TYPE	TYPE OF EASEMENT
ALBANY	BETHLEHEM		W YARD ROAD	51010+00	50163+50	PUBLIC	PERMANENT
ALBANY	BETHLEHEM		W YARD ROAD (EAST)	51004+50	51008+00	PUBLIC	TEMPORARY CONSTRUCTION
ALBANY	BETHLEHEM	107.2–2–59	TOWN OF NEW SCOTLAND	51007+82	51009+06	PRIVATE	PERMANENT
ALBANY	BETHLEHEM	107.2–2–59	TOWN OF NEW SCOTLAND	51007+82	51009+06	PRIVATE	TEMPORARY CONSTRUCTION
ALBANY	BETHLEHEM	108.00–1–11.1	WEST YARD LLC	51008+71	51018+87	PRIVATE	TEMPORARY CONSTRUCTION (LAYDOWN AREA)
ALBANY	BETHLEHEM	107.2–2–34.10	THOMAS KEPPLER	51009+06	51009+20	PRIVATE	TEMPORARY CONSTRUCTION
ALBANY	BETHLEHEM		W YARD ROAD	51009+20	50163+50	PUBLIC	TEMPORARY CONSTRUCTION
ALBANY	BETHLEHEM	108.00–1–3.2	PETER K. FREUH	51017+66	51020+23	PRIVATE	TEMPORARY CONSTRUCTION (LAYDOWN AREA)
ALBANY	BETHLEHEM	120.00–2–29	BELL CROSSING, LLC (EAST)	51063+33	51081+93	PRIVATE	TEMPORARY CONSTRUCTION
ALBANY	BETHLEHEM	120.00–2–29	BELL CROSSING, LLC	51063+33	51081+93	PRIVATE	PERMANENT
ALBANY	BETHLEHEM	120.00–2–29	BELL CROSSING, LLC (WEST)	51063+33	51081+93	PRIVATE	TEMPORARY CONSTRUCTION
ALBANY	BETHLEHEM	120.00–2–16.1	BELL CROSSING, LLC	51070+00	51082+42	PRIVATE	TEMPORARY CONSTRUCTION
ALBANY	BETHLEHEM		SOUTH ALBANY ROAD	51085+44	51175+82	PUBLIC	PERMANENT
ALBANY	BETHLEHEM		SOUTH ALBANY ROAD (EAST)	51085+44	51175+82	PUBLIC	TEMPORARY CONSTRUCTION
ALBANY	BETHLEHEM		SOUTH ALBANY ROAD (WEST)	51085+44	51175+82	PUBLIC	TEMPORARY CONSTRUCTION
ALBANY	BETHLEHEM	120.00–3–1	DONNA ELIZABETH VANWERT & ANN MARIE COWLEY	51100+25	51102+48	PRIVATE	PERMANENT
ALBANY	BETHLEHEM	120.00–3–1	DONNA ELIZABETH VANWERT & ANN MARIE COWLEY	51100+25	51102+48	PRIVATE	TEMPORARY CONSTRUCTION
ALBANY	BETHLEHEM	120.00–3–2	C&A REAL ESTATE HOLDINGS	51102+48	51104+65	PRIVATE	PERMANENT
ALBANY	BETHLEHEM	120.00–3–2	C&A REAL ESTATE HOLDINGS	51104+00	51104+50	PRIVATE	TEMPORARY CONSTRUCTION
ALBANY	BETHLEHEM	120.00–3–3	C&A REAL ESTATE HOLDINGS	51104+64	51107+50	PRIVATE	PERMANENT
ALBANY	BETHLEHEM	120.00–3–3	C&A REAL ESTATE HOLDINGS	51104+86	51107+50	PRIVATE	TEMPORARY CONSTRUCTION
ALBANY	BETHLEHEM	133.00–9–1.1	CSX TRANSPORTATION	51107+50	51108+52	PRIVATE	PERMANENT
ALBANY	BETHLEHEM	133.00–9–1.1	CSX TRANSPORTATION	51114+99	51118+95	PRIVATE	PERMANENT
ALBANY	BETHLEHEM	12.00–7–1	NY CENTRAL LINE	51119+33	51121+45	PRIVATE	TEMPORARY CONSTRUCTION
ALBANY	BETHLEHEM	133.00–9–1.1	CSX TRANSPORTATION	51135+36	51136+20	PRIVATE	TEMPORARY CONSTRUCTION
ALBANY	BETHLEHEM	120.00–4–19	DAVID FRUEH	51166+18	51167+02	PRIVATE	TEMPORARY CONSTRUCTION (ACCESS RD)
ALBANY	BETHLEHEM	120.00–4–20	MARLYN G. STRANGE	51167+02	51167+26	PRIVATE	TEMPORARY CONSTRUCTION (ACCESS RD)
ALBANY	BETHLEHEM	120.00–3–53	ANN JASINSKI	51168+25	51169+01	PRIVATE	TEMPORARY CONSTRUCTION
ALBANY	BETHLEHEM		SOUTH ALBANY ROAD	51175+29	51176+37	PUBLIC	TEMPORARY CONSTRUCTION (ACCESS RD)
ALBANY	BETHLEHEM	120.00–4–19	DAVID FRUEH	51175+82	51176+81	PRIVATE	PERMANENT
ALBANY	BETHLEHEM	120.00–4–19	DAVID FRUEH	51175+82	51176+81	PRIVATE	TEMPORARY CONSTRUCTION
ALBANY	BETHLEHEM	132.00–2–26	CATHERINE L. BURGESS	51176+38	51179+47	PRIVATE	TEMPORARY CONSTRUCTION
ALBANY	BETHLEHEM	132.00–2–26	CATHERINE L. BURGESS	51176+81	51197+88	PRIVATE	PERMANENT
ALBANY	BETHLEHEM	132.00–2–26	CATHERINE L. BURGESS	51193+76	51198+79	PRIVATE	TEMPORARY CONSTRUCTION
ALBANY	BETHLEHEM	132.00–2–25.2	LINDA J. KASINSKI	51206+55	51207+02	PRIVATE	PERMANENT
ALBANY	BETHLEHEM	133.00–1–7.1	DONALD S.LOOSE	51247+50	51248+00	PRIVATE	TEMPORARY CONSTRUCTION (ACCESS RD)

SEGMENT 9 – ACCESS ROADS

TABLE 4–5 – SEGMENT 9 ACCESS ROADS

ACCESS ROAD NUMBER	ACCESS ROAD DESCRIPTION	SHEET	LOCATION (APPROXIMATE –SEE DRAWINGS FOR DETAILS)	SENSITIVE AREAS CROSSED (AG OR WETLANDS)
5B–02–RD	TEMPORARY	C–205 AND C–206	STA 10+00 TO 51226+00	WETLAND
5B–03–RD	TEMPORARY	C–209 TO C–212	STA 18+75.00 TO STA 64+41.00	WETLAND
5B–01–RTE	TEMPORARY	C–207 AND C–208	MEETS WITH 5B–02–RD AT STA 10.00	NONE
5B–02–RTE	TEMPORARY	C–209	STA 51128+73 TO STA 18+75.00	NONE

TABLE 4–6 SUMMARIZES THE ACCESS ROADS IN THIS PACKAGE AND THEIR ASSOCIATED IMPACTS ON ENVIRONMENTALLY SENSITIVE AREAS AND AGRICULTURAL LANDS IF APPLICABLE. SECTION 4.10 OF THE EM&CP SUMMARIZES THE PROCEDURES THAT WILL BE FOLLOWED FOR THE CONSTRUCTION OF ALL ACCESS ROADS. ALL ACCESS ROADS WILL BE TEMPORARY AND RESTORED ACCORDING TO SECTION 14.2.4 AND 14.4.1 OF THE EM&CP AS APPLICABLE.

SEGMENT 9 – CONSTRUCTION MATERIALS AND EQUIPMENT STAGING LOCATIONS AND WORK AREAS

TABLE 5–2. CONSTRUCTION MATERIALS AND EQUIPMENT STAGING LOCATIONS AND WORK AREAS

STAGING AREA/WORK AREA	SHEET	LOCATION (APPROXIMATE –SEE APPENDIX C FOR FURTHER DETAILS)
HDD 87.B ENTRY WORK AREA	C–108	STA 51110+50
HDD 87.B EXIT WORK AREA	C–109	STA 51121 TO 51122
HDD 88 ENTRY WORK AREA	C–112	STA 5176+50 TO 51179
HDD 88 EXIT WORK AREA	C–113 AND C–114	STA 51194+00 TO 51196
HDD 89 ENTRY WORK AREA	C–114	STA 51200 TO 51202
HDD 89 EXIT WORK AREA	C–116	STA 51225+50 TO 51228+50
HDD 90 ENTRY WORK AREA	C–116	STA 51233+50 TO 51235+50
HDD 90 EXIT WORK AREA	C–117	STA 51246+50 TO 51250+50

SEGMENT 9 – AGRICULTURAL LANDS

TABLE 7–1 AGRICULTURAL LANDS

AGRICULTURAL LAND DESCRIPTION	PARCEL NUMBER	SHEET	STATION (APPROXIMATE –SEE APPENDIX C FOR DETAILS)	ANTICIPATED IMPACTS TO AGRICULTURAL ACTIVITIES/LAND
AGRICULTURAL LAND #1	108.00–1–4	C–102	STA 51020+72 TO 51027+26	THE ALIGNMENT WILL BE PLACED ALONG THE SHOULDER OF THE ROAD BORDERING THE ACTIVE FIELD. THEREFORE, THE FIELD ITSELF WILL NOT BE IMPACTED BY CONSTRUCTION.
AGRICULTURAL LAND #2	108.00–1–7 108.00–1–8.2	C–103 AND C–104	STA 51034+33 TO 51058+97	THE ALIGNMENT WILL BE PLACED ALONG THE SHOULDER OF THE ROAD BORDERING THE ACTIVE FIELD. THEREFORE, THE FIELD ITSELF WILL NOT BE IMPACTED BY CONSTRUCTION.
AGRICULTURAL LAND #3	120.00–3–1	C–106 AND C–107	STA 51085+04 TO 51096+94	THE ALIGNMENT WILL BE PLACED ALONG THE SHOULDER OF THE ROAD BORDERING THE ACTIVE FIELD. THEREFORE, THE FIELD ITSELF WILL NOT BE IMPACTED BY CONSTRUCTION.
AGRICULTURAL LAND #4	120.00–3–52.1	C–111 AND C–112	STA 51156+73 TO 51165+60	THE ALIGNMENT IS ON THE OPPOSITE SIDE OF THE ROAD THAT THIS LAND BORDERS, THEREFORE IT IS AVOIDED BY DESIGN AND NO IMPACTS WILL OCCUR.
AGRICULTURAL LAND #5	120.00–3–55.3	C–112	STA 51171+06 TO 51173+19	THE ALIGNMENT IS ON THE OPPOSITE SIDE OF THE ROAD THAT THIS LAND BORDERS, THEREFORE IT IS AVOIDED BY DESIGN AND NO IMPACTS WILL OCCUR.
AGRICULTURAL LAND #6	132.00–2–26	C–112 AND C–113	STA 51177+01 TO 51183+01	MOST OF THE ACTIVE PASTURE IS AVOIDED BY HDD. THERE IS A SMALL AMOUNT OF IMPACT FROM THE TRENCH AND HDD WORK AREA ON THE EDGE OF THE PASTURE. ALL BMPS IN SECTION 7.1 AND RESTORATION IN SECTION 14.5 WILL BE FOLLOWED.
AGRICULTURAL LAND #7	120.00–4–19	C–113 AND C–114	STA 51186+68 TO 51196+17	A PORTION OF THE ACTIVE FIELD IS AVOIDED BY HDD. THE EXIT PIT IS LOCATED IN THE TREE LINE OF THE ACTIVE FIELD, THEREFORE THERE IS NO IMPACTS TO SAID FIELD.

SEGMENT 9 – TERMS AND DEFINITIONS FROM BMP DOCUMENT SECTION 5.2

TABLE 8–1. TERMS AND DEFINITIONS FROM BMP DOCUMENT SECTION 5.2

TERM	DEFINITION
CLEARING	THE CUTTING AND PHYSICAL REMOVAL, EITHER BY HAND OR MECHANICAL MEANS, OF ALL VEGETATION FROM THE WORK AREA
GRUBBING	THE MECHANICAL REMOVAL OF THE STUMP AND ROOT MASS OF FELLED WOODY VEGETATION
SLASH	SHRUBS, SAPLINGS, AND TOPS OF TREES 4 INCHES IN DIAMETER OR LESS AT THE LARGE END FOR HARDWOOD AND 6 INCHES IN DIAMETER OR LESS AT THE LARGE END FOR SOFTWOODS.
STUMPS	THE WOODY STEM AND FIBROUS ROOT MASS LEFT IN THE SOIL AFTER REMOVING THE TRUNK AT THE BUTT.
TIMBER/LOGS	TRUNKS AND LIMBS GREATER THAN 6 INCHES IN DIAMETER AT THE SMALL END, WITH A MINIMUM 8–FOOT LENGTH.

SEGMENT 9 – THREATENED AND ENDANGERED SPECIES

TABLE 9-3. RTE SPECIES IMPACT AVOIDANCE AND MINIMIZATION EFFORTS

ESA TYPE	STA. START	STA. END	BMPS	CONTRACTOR ACTIONS	ENVIRONMENTAL INSPECTOR ACTIONS	TIME OF YEAR RESTRICTION
ESA 9	51000+00	51279+06.04	(A) CONDUCT TREE CLEARING BETWEEN OCTOBER 31 AND MARCH 31. TREE CLEARING IS NOT ALLOWED BETWEEN APRIL 1 AND OCTOBER 30. (B) DURING THE PRECONSTRUCTION SURVEY, THE CONTRACTORS WOULD IDENTIFY LARGE LIVE OR DEAD TREES WITH PEELING BARK, INCLUDING LARGE SPECIMENS OF SHAGBARK HICKORY (CARYA OVATA), WITH THE POTENTIAL TO SERVE AS MATERNITY OR ROOST TREES AND THESE WOULD BE MARKED. POTENTIAL ROOST TREES IDENTIFIED WITHIN THE CONSTRUCTION LIMITS WOULD BE AVOIDED WHERE POSSIBLE DURING CONSTRUCTION ACTIVITIES.	1. TREES IDENTIFIED BY THE ENVIRONMENTAL INSPECTOR WILL BE AVOIDED WHERE POSSIBLE DURING CONSTRUCTION ACTIVITIES. 2. ALL TREE REMOVAL WILL FOLLOW TIME OF YEAR RESTRICTION.	1. IDENTIFY AND FLAG LARGE SPECIMEN TREES, LIVE OR DEAD, WITH PEELING BARK, INCLUDING SHAGBARK HICKORY (CARYA OVATA) WHICH COULD POTENTIALLY SERVE AS MATERNITY OR ROOST TREES.	TREE REMOVAL WILL BE CONDUCTED DURING THE WINTER MONTHS (OCTOBER 31–MARCH31). TREE CLEARING BETWEEN APRIL 1 – OCTOBER 30 IS PROHIBITED.
ESA 4	51000+00	51279+06.04	(A) CONDUCT TREE CLEARING BETWEEN OCTOBER 31 AND MARCH 31. TREE CLEARING IS NOT ALLOWED BETWEEN APRIL 1 AND OCTOBER 30. (B) DURING THE PRECONSTRUCTION SURVEY, THE CONTRACTORS WOULD IDENTIFY LARGE LIVE OR DEAD TREES WITH PEELING BARK, INCLUDING LARGE SPECIMENS OF SHAGBARK HICKORY (CARYA OVATA), WITH THE POTENTIAL TO SERVE AS MATERNITY OR ROOST TREES AND THESE WOULD BE MARKED. POTENTIAL ROOST TREES IDENTIFIED WITHIN THE CONSTRUCTION LIMITS WOULD BE AVOIDED WHERE POSSIBLE DURING CONSTRUCTION ACTIVITIES.	1. TREES IDENTIFIED BY THE ENVIRONMENTAL INSPECTOR WILL BE AVOIDED WHERE POSSIBLE DURING CONSTRUCTION ACTIVITIES. 2. ALL TREE REMOVAL WILL FOLLOW TIME OF YEAR RESTRICTION.	1. IDENTIFY AND FLAG LARGE SPECIMEN TREES, LIVE OR DEAD, WITH PEELING BARK, INCLUDING SHAGBARK HICKORY (CARYA OVATA) WHICH COULD POTENTIALLY SERVE AS MATERNITY OR ROOST TREES.	TREE REMOVAL WILL BE CONDUCTED DURING THE WINTER MONTHS (OCTOBER 31–MARCH31). TREE CLEARING BETWEEN APRIL 1 – OCTOBER 30 IS PROHIBITED.

SEGMENT 9 – INVASIVE SPECIES

NOTE:
SECTION 9.4 OF THE EM&CP AND APPENDIX N DESCRIBE THE INVASIVE SPECIES MANAGEMENT PLAN FOR THE PROJECT. SECTION 9.4.2 OF THE EM&CP DESCRIBE THE MEASURES TO PREVENT OR CONTROL THE TRANSPORT OF INVASIVE PLANT AND INSECT SPECIES AS WELL AS THE NECESSARY REPORTING REQUIREMENTS TO NYSDEC REGIONAL FORESTER IF THESE SPECIES ARE ENCOUNTERED. THE ENVIRONMENTAL INSPECTOR WILL ENSURE THAT MEASURES TO PREVENT AND CONTROL THE SPREAD OF INVASIVES ARE FOLLOWED AND THAT CONSTRUCTION CREWS ARE EDUCATED IN SAID MEASURES. THE ENVIRONMENTAL INSPECTOR WILL NOTIFY CREWS IF AN UPCOMING WORK AREA REQUIRES SAID MEASURES.

SEGMENT 9 – EM&CP NOISE SENSITIVE AREAS NOTE

NOTE:
1. THE NOISE RECEPTORS THAT OCCUR NEAR SEGMENT 9 AT VARIOUS POINTS INCLUDE RESIDENCES AND BUSINESSES. SECTION 10.2 OF THE EM&CP DESCRIBES THE NOISE CONTROL MEASURES THAT WILL BE EMPLOYED THROUGHOUT THIS PACKAGE.

SEGMENT 9 – EM&CP CULTURAL RESOURCES

TABLE 11-1. SEGMENT 9 CULTURAL RESOURCES

CULTURAL RESOURCE NAME	LOCATION	IMPACT	PROTECTION MEASURE
VANDERZEE–TRYON HOUSE AND BARNS (00102.000563. 18TH–CENTURY STONE FARMHOUSE AND ASSOCIATED FARM COMPLEX	SOUTHWEST SIDE OF WEST YARD ROAD, PROPERTY FRONTS ON 190 OLD QUARRY ROAD TO THE SOUTHWEST. 51039+00 TO 51059+00	NO DIRECT IMPACTS ARE ANTICIPATED, TEMPORARY EASEMENT ALONG ROAD ROW.	NO ADDITIONAL ARCHEOLOGY OR PROTECTIVE MEASURES RECOMMENDED.
398 SOUTH ALBANY ROAD, 19TH–CENTURY FARM COMPLEX	HDD 88, 51179+90 TO 51194+20 SPLICE 191 AND DEVIATION 59–2, 51196+00 TO 51198+00	BOTH HDD WORK AREAS ARE LOCATED OUTSIDE OF THE PERMITTED ROUTE. CABLE ROUTE AND PARTS OF THE SPLICE'S WORK AREAS ARE OUTSIDE THE PERMITTED ROUTE AND OUTSIDE RAILROAD ROW.	ARCHEOLOGICAL MONITORING OR TESTING FOR WORK AREAS THAT EXTEND OUTSIDE OF PERMITTED ROUTE.
398 SOUTH ALBANY ROAD, 19TH–CENTURY FARM COMPLEX	51176+00 TO 51179+00, AND 51194+00 TO 51200+60	OPEN TRENCH, HDD, AND SPLICE.	DETERMINATION OF ELIGIBILITY FOR FARM COMPLEX FURTHER CONSULTATION WITH NYSHPO.

SEGMENT 9 – NYSDOT COORDINATION

TABLE 12–2 – NYSDOT COORDINATION SUMMARY

COORDINATING PARTIES	DESCRIPTION	CURRENT STATUS
CERTIFICATE HOLDERS, DPS STAFF, NYSDOT	ALL PLANS AND WORK TO BE PERFORMED IN STATE–OWNED ROW UNDER NYSDOTS SUPERVISION AND MANAGEMENT.	ONGOING THROUGHOUT
CERTIFICATE HOLDERS, DPS STAFF, NYSDOT STAFF	CERTIFICATE HOLDERS SHALL PROVIDE DPS STAFF AND NYSDOT STAFF WITH A PRELIMINARY DESIGN MARKED TO AVOID CONFLICT WITH POTENTIAL TRANSPORTATION PROJECTS THAT NYSDOT STAFF MAY SEEK TO UNDERTAKE IN THE FUTURE AND SHALL OFFER TO CONSULT WITH NYSDOT STAFF CONCERNING ANY COMMENTS IT MAY OFFER AND SHALL USE REASONABLE EFFORTS TO ACCOMMODATE ANY NYSDOT CONCERNS.	PRIOR TO FILING ANY SEGMENT EM&CP INVOLVING ANY SUCH STATE–OWNED ROW.
CERTIFICATE HOLDERS, NYSDOT, AGENCY CROSSED BY PROJECT	CERTIFICATE HOLDERS WILL CONSULT WITH EACH TRANSPORTATION DEPARTMENT OR AGENCY HAVING JURISDICTION OVER ANY ROADS, RELATED STRUCTURES, AND COMPONENTS THAT WILL BE CROSSED BY THE FACILITY OR USED FOR DIRECT ACCESS TO THE CONSTRUCTION ZONE. IF THE ACCESS ROAD TAKES DIRECT ACCESS FROM, OR LIES WITHIN THE LIMITS OF, SUCH ROADS, THE CERTIFICATE HOLDERS WILL NOTIFY EACH RELEVANT TRANSPORTATION DEPARTMENT OR AGENCY OF THE APPROXIMATE DATE WHEN WORK WILL BEGIN.	DURING PREPARATION OF THE EM&CP AND WHEN WORK BEGINS.
CERTIFICATE HOLDERS, NYSDOT, DPS STAFF, NYSDEC	THE CERTIFICATE HOLDERS WILL PROVIDE STATUS REPORTS SUMMARIZING CONSTRUCTION AND INDICATING CONSTRUCTION ACTIVITIES AND LOCATIONS SCHEDULED FOR THE NEXT MONTH.	BI–WEEKLY.

SEGMENT 9 – ROAD AND HIGHWAY CROSSINGS AND CONSTRUCTION

TABLE 12–3: ROAD AND HIGHWAY CROSSINGS

MUNICIPALITY	JURISDICTION	ROAD CROSSING	CROSSING METHOD (HDD OR OPEN TRENCH)	SHEET	LOCATION (APPROXIMATE, SEE APPENDIX C DRAWINGS FOR DETAILS)
BETHLEHEM	ALBANY COUNTY	SOUTH ALBANY ROAD	TRENCH	C–106	STA 51085
BETHLEHEM	ALBANY COUNTY	SOUTH ALBANY ROAD	HDD 87.B	C–108 TO C–109	STA 51119
BETHLEHEM	NYSDOT	BRIDGE STREET	HDD 90	C–117	STA 51244+50

SEGMENT 9 – ROAD PARALLEL CONSTRUCTION

TABLE 12–4: ROAD PARALLEL CONSTRUCTION

PARALLEL ROAD CONSTRUCTION	JURISDICTION	SHEET	LOCATION (APPROXIMATE – SEE APPENDIX C FOR DETAILS)
WEST YARD ROAD	TOWN OF BETHLEHEM	C–101 TO C–105	STA 51010 TO 51063
SOUTH ALBANY ROAD	ALBANY COUNTY	C–106 TO C–108	STA 51085 TO 51110
SOUTH ALBANY ROAD	ALBANY COUNTY	C–109 TO C–112	STA 51121 TO STA 51175

1

SEGMENT 9 – CI COORDINATION

TABLE 13–1 – CO–LOCATED INFRASTRUCTURE CONSULTATION SUMMARY

UTILITY OWNER	UTILITY TYPE (QUANTITY)	AGREEMENT STATUS/DATE	NOTES
GATEWAY DELMAR	UNDERGROUND GAS (1)	AGREEMENT IN PLACE (10/27/22)	
LUMEN	UNDERGROUND FIBER (2)	NOT APPLICABLE	PER CI OWNER, THEY HAVE NO UTILITIES ALONG THE ROW IN THIS AREA.
NATIONAL GRID	OVERHEAD ELECTRIC DISTRIBUTION (29); OVERHEAD ELECTRIC TRANSMISSION (2)	CONSULTATION ONGOING	ONGOING CONSULTATION/INFORMATION REVIEWS RELATED TO PROPERTY RIGHTS, ELECTRICAL EFFECTS, AND DESIGN. CURRENTLY ANTICIPATE AGREEMENT IN SECOND QUARTER 2023.
TIME WARNER	OVERHEAD FIBER (2); UNDERGROUND FIBER(5); UNDERGROUND TELEPHONE (3)	AGREEMENT EXPECTED PENDING RECEIPT OF UPDATED PLAN/PROFILE THAT REFLECT CI OWNER COMMENTS/REQUIREMENTS	ANTICIPATE RECEIPT OF UPDATED PLAN/PROFILE BY 03/24/23.
VERIZON	UNDERGROUND TELEPHONE (5)	CONSULTATION ONGOING	CI OWNER HAS ACKNOWLEDGED RECEIPT OF CHPE PLANS BUT NOT YET PROVIDED ACTIONABLE FEEDBACK.

SEGMENT 9 – PARALLEL RAILROAD CONSTRUCTION

TABLE 13–3. SEGMENT 9 PARALLEL RAILROAD CONSTRUCTION

RAILROAD OWNER	SHEET	APPROXIMATE STATION LOCATION (SEE DRAWINGS FOR DETAILS)
CSX RAIL	C–116 TO C–119	STA 51234 TO 51279

A

B

CHPE Champlain Hudson Power Express

PROJECT NO.: 21162	PROJECT NO.: 120174	ALTERED ON: 08/01/2024	AFFIXED ON: 06/09/2023
Kiewit	Engineering and Land Surveying, P.C.		

FOR INFORMATION SEE THE ENVIRONMENTAL MANAGEMENT AND CONSTRUCTION PLAN NARRATIVE.

No.	DATE	SUBMITTAL / REVISION DESCRIPTION	DB	APP
1	08/01/2024	NDC-0117: INDIAN FIELDS RD REALIGNMENT	BL	BD
0	06/09/2023	ISSUED FOR CONSTRUCTION SUBMISSION	BV	TK

CHAMPLAIN HUDSON POWER EXPRESS

SEGMENT 9 (PACKAGE 5B) - CSX: SELKIRK RAIL YARD BYPASS

EM&CP TABLES 3 OF 4

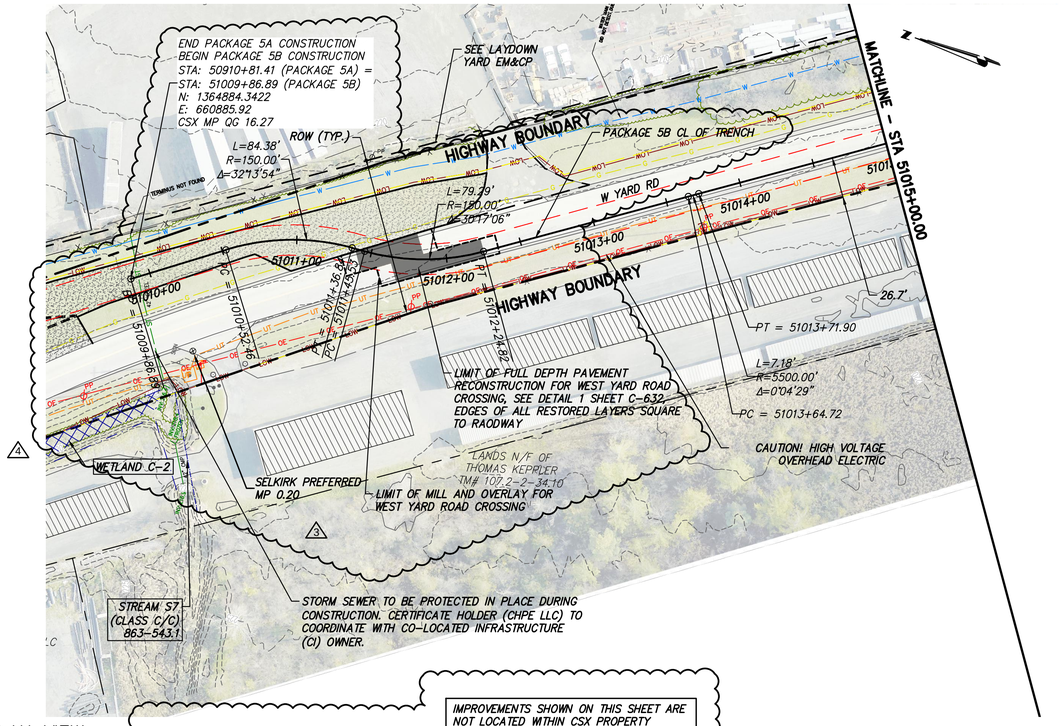
DRAWN BY: | DESIGNED BY: | APPROVED BY: | SCALE AS SHOWN | DATE: 06/09/2023

PERMIT DRAWING NO.

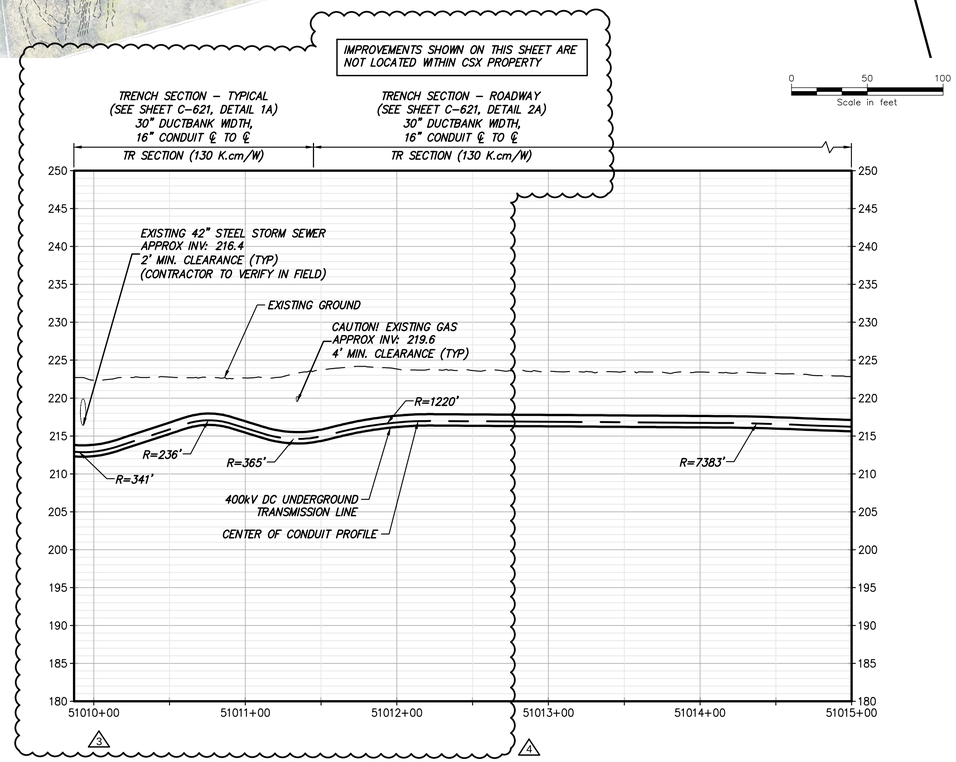
N/A

DRAWING NO.

G-012



STA. 51009+86.89 TO STA. 51015+00.00 PLAN VIEW
SCALE: 1" = 50'



STA. 51009+86.89 TO STA. 51015+00.00 PROFILE
SCALE: H: 1" = 50' V: 1" = 10'

B

CHPE Champlain Hudson Power Express

PROJECT NO.: 21162	PROJECT NO.: 120174	ALTERED ON: 11/01/2024	AFFIXED ON: 06/09/2023
Kiewit	Engineering and Land Surveying, P.C.	STATE OF NEW YORK DANY BIRBAL SIRJU 105756 LICENSED PROFESSIONAL ENGINEER	STATE OF NEW YORK THOMAS A. KELLY 106995 LICENSED PROFESSIONAL ENGINEER

No.	DATE	SUBMITTAL / REVISION DESCRIPTION	DB	APP
4	11/01/2024	NDC-0148: REVISIONS PER BETHLEHEM COMMENTS	DM	BD
3	08/01/2024	NDC-0117: INDIAN FIELDS RD REALIGNMENT	DM	BD
2	12/08/2023	NDC-0032_ESC UPDATES PER TOWN	BL	BD
1	10/09/2023	NDC-0001_UTILITY & CRANE PAD CHANGES PER TOWN COMMENTS	DM	BD
0	06/09/2023	ISSUED FOR CONSTRUCTION SUBMISSION	BV	TK

CHAMPLAIN HUDSON POWER EXPRESS

SEGMENT 9 (PACKAGE 5B) - CSX: SELKIRK RAIL YARD BYPASS

STA. 51009+86.89 TO STA. 51015+00.00

HVDC CONDUIT PLAN AND PROFILE

(AND TEMPORARY ACCESS ROAD PLAN)

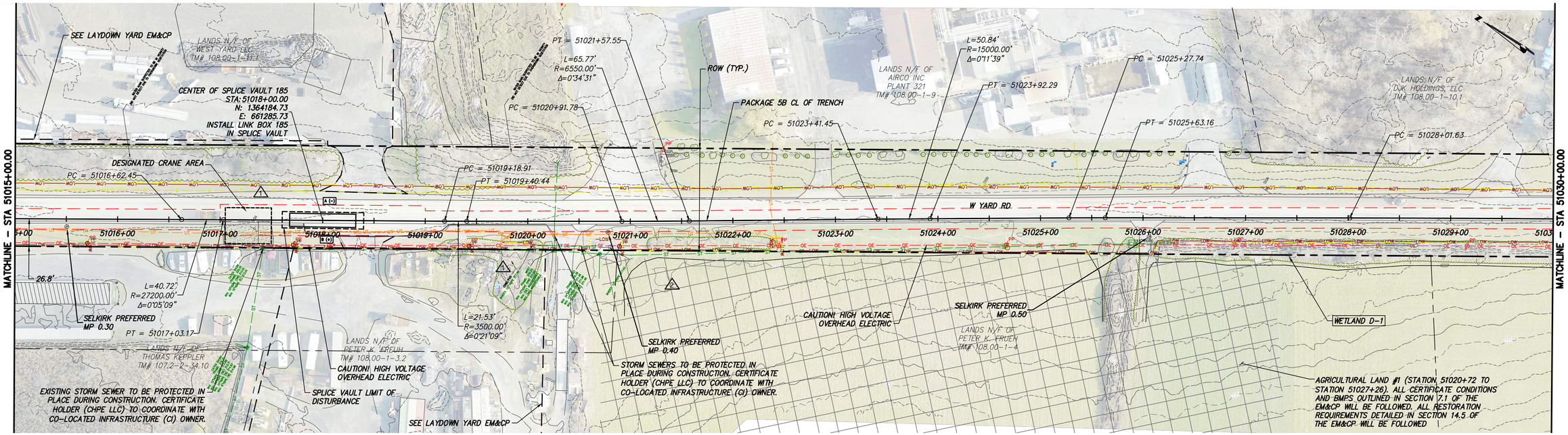
DRAWN BY: AR | DESIGNED BY: BV | APPROVED BY: TK | SCALE AS SHOWN | DATE: 06/09/2023

PERMIT DRAWING NO.

N/A

DRAWING NO.

C-101



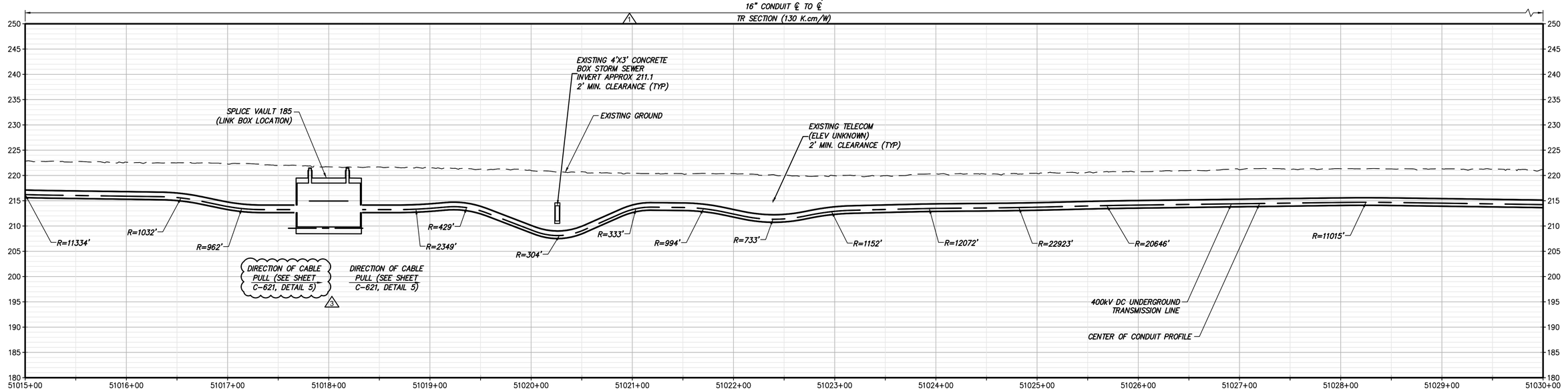
STA. 51015+00.00 TO STA. 51030+00.00 PLAN VIEW

SCALE: 1" = 50'

IMPROVEMENTS SHOWN ON THIS SHEET ARE NOT LOCATED WITHIN CSX PROPERTY

0 50 100
Scale in feet

TRENCH SECTION – ROADWAY
(SEE SHEET C-621, DETAIL 2A)
30" DUCTBANK WIDTH,
16" CONDUIT ℄ TO ℄
TR SECTION (130 K.cm/W)



STA. 51015+00.00 TO STA. 51030+00.00 PROFILE

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

Champlain Hudson Power Express

Kiewit

Engineering and Land Surveying, P.C.

PROJECT NO.: 21162 | PROJECT NO.: 120174 | ALTERED ON: 08/01/2024 | AFFIXED ON: 06/09/2023

STATE OF NEW YORK · DANIT BIRBAL SINGH · LICENSED PROFESSIONAL ENGINEER · 125756

STATE OF NEW YORK · THOMAS A. KELLY · 084559 · LICENSED PROFESSIONAL ENGINEER

No.	DATE	SUBMITTAL / REVISION DESCRIPTION	DB	APP
3	08/01/2024	NDC-0117: INDIAN FIELDS RD REALIGNMENT	DM	BD
2	12/08/2023	NDC-0032_ESC UPDATES PER TOWN	BL	BD
1	10/09/2023	NDC-0001_UTILITY & CRANE PAD CHANGES PER TOWN COMMENTS	DM	BD
0	06/09/2023	ISSUED FOR CONSTRUCTION SUBMISSION	BV	TK

DRAWN BY: AR | DESIGNED BY: BV | APPROVED BY: TK | SCALE AS SHOWN | DATE: 06/09/2023

CHAMPLAIN HUDSON POWER EXPRESS

SEGMENT 9 (PACKAGE 5B) - CSX: SELKIRK RAIL YARD BYPASS

STA. 51015+00.00 TO STA. 51030+00.00

HVDC CONDUIT PLAN AND PROFILE

(AND TEMPORARY ACCESS ROAD PLAN)

PERMIT DRAWING NO.

N/A

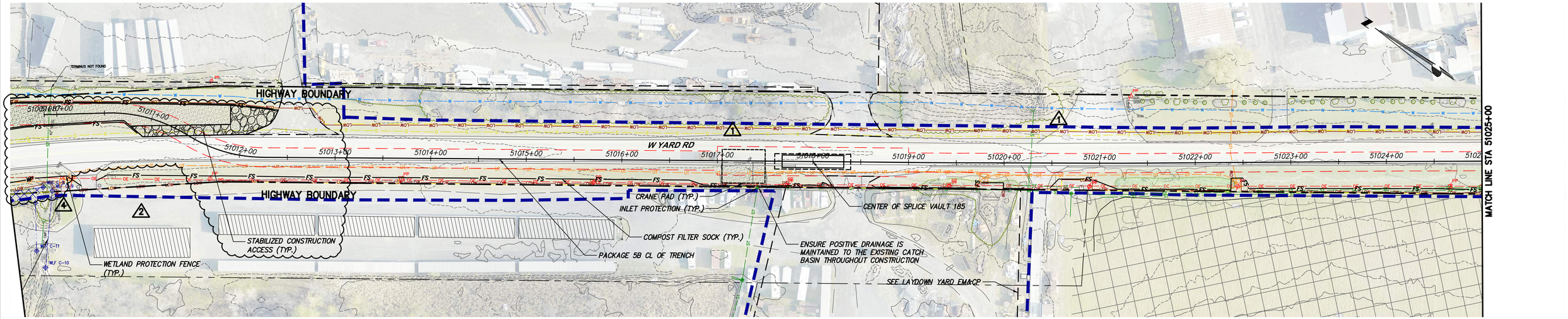
DRAWING NO.

C-102

STA. 51000+00 TO STA. 51010+00 PLAN VIEW

SCALE: 1" = 50'

0 50 100
Scale in feet



STA. 51010+00 TO STA. 51025+00 PLAN VIEW

SCALE: 1" = 50'

0 50 100
Scale in feet

CHPE Champlain Hudson Power Express

Kiewit

Engineering and Land Surveying, P.C.

PROJECT NO.: 21162

PROJECT NO.: 120174

ALTERED ON: 11/01/2024

AFFIXED ON: 06/09/2023

STATE OF NEW YORK · DANIT BIRBAL SINGH · LICENSED PROFESSIONAL ENGINEER · 125756

STATE OF NEW YORK · NATHANIEL DALE HAENER · LICENSED PROFESSIONAL ENGINEER · 103692

No.	DATE	SUBMITTAL / REVISION DESCRIPTION	DB	APP
4	11/01/2024	NDC-0148: REVISIONS PER BETHLEHEM COMMENTS	JR	BD
3	08/01/2024	NDC-0117: INDIAN FIELDS RD REALIGNMENT	JR	BD
2	12/22/2023	NDC-0032_ESC UPDATES PER TOWN	BL	BD
1	10/09/2023	NDC-0001_CRANE PAD & DRAINAGE UPDATES PER TOWN	MK/JR	BD
0	06/09/2023	ISSUED FOR CONSTRUCTION SUBMISSION	MK/TH	NH

CHAMPLAIN HUDSON POWER EXPRESS

SEGMENT 9 (PACKAGE 5B) - CSX: SELKIRK RAIL YARD BYPASS

EROSION AND SEDIMENT CONTROL PLAN

STA. 51010+00 TO STA. 51025+00

DRAWN BY: SC/TH | DESIGNED BY: MK | APPROVED BY: NH | SCALE AS SHOWN | DATE: 06/09/2023

PERMIT DRAWING NO.

N/A

DRAWING NO.

C-401

PACKAGE 5B WORK ZONE TRAFFIC CONTROL MAIN STAGES								
MAIN STAGE	STA. START	STA. END	ROUTE(S)	CLOSURE DETAIL TYPE	PLAN SHEET	SPEED LIMIT	TRAFFIC COUNTS (AADT)	WORK NOTES
1*	50909+85	50910+95	W. YARD RD.	LANE CLOSURE WITH ONE WAY TRAFFIC	C-506C C-506D			TRENCHING AND CONDUIT INSTALLATION
2*	50910+00	50910+65	W. YARD RD.	TEMPORARY ACCESS ROAD DETAIL	C-506			CONSTRUCTION ACCESS
3	51010+00	51063+00	W. YARD RD.	LANE CLOSURE WITH ONE WAY TRAFFIC	C-506A			TRENCHING, CONDUIT INSTALLATION,PAVEMENT RESTORATION
4	51012+00	51013+00	W. YARD RD.	TEMPORARY ACCESS ROAD DETAIL	C-503			COXSACKIE-HUDSON LAYDOWN YARD ACCESS
5	51018+00		W. YARD RD.	LANE CLOSURE WITH ONE WAY TRAFFIC	C-506			SPLICE BOX INSTALLATION
6	51018+25	51018+75	W. YARD RD.	TEMPORARY ACCESS ROAD DETAIL	C-503			COXSACKIE-HUDSON LAYDOWN YARD ACCESS
7	51050+00		W. YARD RD.	LANE CLOSURE WITH ONE WAY TRAFFIC	C-506B			SPLICE BOX INSTALLATION
8	51063+00	51084+25	W. YARD RD. / S. ALBANY RD. (CR 54)	TEMPORARY ACCESS ROAD DETAIL	C-505			CONSTRUCTION ACCESS
9	51084+25	51085+50	S. ALBANY RD. (CR 54)	ROAD CLOSURE WITH DETOUR	C-507	55 MPH	883 (2019)	TRENCHING AND CONDUIT INSTALLATION
10	51085+50	51104+75	S. ALBANY RD. (CR 54)	LANE CLOSURE WITH ONE WAY TRAFFIC	C-503	45 MPH	883 (2019)	TRENCHING AND CONDUIT INSTALLATION
11	51104+00		S. ALBANY RD. (CR 54)	LANE CLOSURE WITH ONE WAY TRAFFIC	C-503	45 MPH	883 (2019)	SPLICE BOX INSTALLATION
11	51105+00	51106+75	S. ALBANY RD. (CR 54)	TEMPORARY ACCESS ROAD DETAIL	C-505			CONSTRUCTION ACCESS
12	51119+25	51121+50	S. ALBANY RD. (CR 54)	TEMPORARY ACCESS ROAD DETAIL	C-505			CONSTRUCTION ACCESS
12	51121+50	51125+00	S. ALBANY RD. (CR 54)	LANE CLOSURE WITH ONE WAY TRAFFIC	C-503	35 MPH	883 (2019)	TRENCHING AND CONDUIT INSTALLATION
13	51125+00	51144+00	S. ALBANY RD. (CR 53)	LANE CLOSURE WITH ONE WAY TRAFFIC	C-503	35 MPH	883 (2019)	TRENCHING AND CONDUIT INSTALLATION
13	51136+25		S. ALBANY RD. (CR 53)	LANE CLOSURE WITH ONE WAY TRAFFIC	C-503	35 MPH	883 (2019)	SPLICE BOX INSTALLATION
14	51144+00	51144+50	ELM ST.	LANE CLOSURE WITH ONE WAY TRAFFIC	C-503			TRENCHING AND CONDUIT INSTALLATION
14	51144+50	51149+75	S. ALBANY RD. (CR 53)	ROAD CLOSURE WITH DETOUR	C-507	35 MPH	883 (2019)	TRENCHING AND CONDUIT INSTALLATION
15	51149+75	51150+25	PRIVATE DR.	LANE CLOSURE WITH ONE WAY TRAFFIC	C-503			TRENCHING AND CONDUIT INSTALLATION
15	51150+25	51175+50	S. ALBANY RD. (CR 53)	LANE CLOSURE WITH ONE WAY TRAFFIC	C-503	35 MPH	883 (2019)	TRENCHING AND CONDUIT INSTALLATION
16	51168+50		S. ALBANY RD. (CR 53)	LANE CLOSURE WITH ONE WAY TRAFFIC	C-503	35 MPH	883 (2019)	SPLICE BOX INSTALLATION
16	51167+00	51196+00	S. ALBANY RD. (CR 53)	TEMPORARY ACCESS ROAD DETAIL	C-505			CONSTRUCTION ACCESS
17	51175+50	51179+50	S. ALBANY RD. (CR 53)	TEMPORARY ACCESS ROAD DETAIL	C-505			CONSTRUCTION ACCESS
17	51226+50	51244+75	BRIDGE ST. (NY 396)	TEMPORARY ACCESS ROAD DETAIL	C-505	35 MPH	2529 (2019)	CONSTRUCTION ACCESS
18	51244+75	51279+25	BRIDGE ST. (NY 396)	TEMPORARY ACCESS ROAD DETAIL	C-505	35 MPH	2529 (2019)	CONSTRUCTION ACCESS

** PART OF PACKAGE 5A, COPIED FOR REFERENCE TO SHOW ALL W. YARD RD. WZTC IN ONE PLACE.*

1 2 3

2

1 2 3

CHPE Champlain Hudson Power Express

PROJECT NO.: 21162

Kiewit

PROJECT NO.: 120174

Engineering and Land Surveying, P.C.

ALTERED ON: 11/01/2024

AFFIXED ON: 06/09/2023

No.	DATE	SUBMITTAL / REVISION DESCRIPTION	DB	APP
3	11/01/2024	NDC-0148: REVISIONS PER BETHLEHEM COMMENTS	DM	BD
2	07/31/2024	NDC-0117: INDIAN FIELDS RD REALIGNMENT	BL	BD
1	10/09/2023	NDC-0001: REFERENCE NEW MPT DETAILS FOR BETHLEHEM	JR	BD
0	06/09/2023	ISSUED FOR CONSTRUCTION SUBMISSION	BV	TK

CHAMPLAIN HUDSON POWER EXPRESS

SEGMENT 9 (PACKAGE 5B) - CSX: SELKIRK RAIL YARD BYPASS WORK ZONE TRAFFIC CONTROL

DRAWN BY: JLB | DESIGNED BY: SH | APPROVED BY: TD | SCALE AS SHOWN | DATE: 06/09/2023

PERMIT DRAWING NO.

N/A

DRAWING NO.

C-502

NOTES:.

1. IN LOCATIONS WHERE A STANDARD BUFFER SPACE CANNOT BE PROVIDED, THE CONTRACTOR MAY USE A 22,000 LBS OR GREATER GVW PROTECTIVE VEHICLE WITH THE CORRESPONDING ROLL AHEAD DISTANCE SPECIFIED IN TABLE 011-04 OF NYSDOT STANDARD SHEET 619-011.

1 FLAGGER OPERATION, SHORT/INTERMEDIATE TERM STATIONARY, ONE LANE CLOSURE ON WEST YARD ROAD

SCALE: 1" = 30'

CHPE Champlain Hudson Power Express

PROJECT NO.: 21162 | PROJECT NO.: 120174 | ALTERED ON: | AFFIXED ON: 11/01/2024

Kiewit | Engineering and Land Surveying, P.C.

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

No.	DATE	SUBMITTAL / REVISION DESCRIPTION	DB	APP
2	11/01/2024	NDC-0148: REVISIONS PER BETHLEHEM COMMENTS	DM	BD
1	08/26/2024	NDC-0117: INDIAN FIELDS RD REALIGNMENT	DM	BD
0	10/09/2023	NDC-0001_ADDITIONAL MPT ADDED PER TOWN COMMENTS	DM	BD

CHAMPLAIN HUDSON POWER EXPRESS

SEGMENT 9 (PACKAGE 5B) - CSX: SELKIRK RAIL YARD BYPASS

WORK ZONE TRAFFIC CONTROL

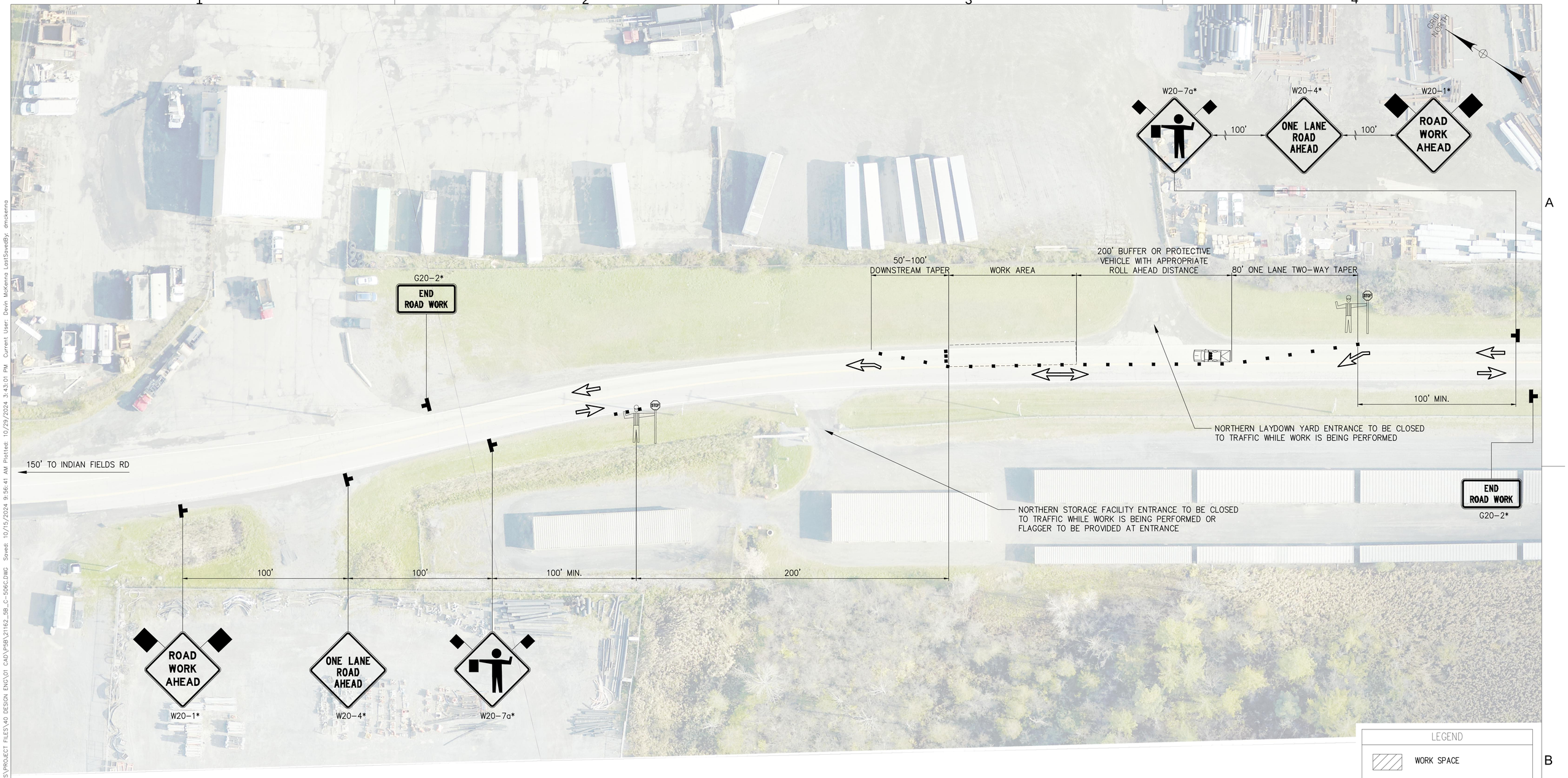
W YARD ROAD - 1 LANE CLOSURE

SHORT AND INTERMEDIATE DURATION WORK

DRAWN BY: DM | DESIGNED BY: DM | APPROVED BY: BD | SCALE AS SHOWN | DATE: 10/09/2023

PERMIT DRAWING NO.: N/A

DRAWING NO.: C-506A



LEGEND

- WORK SPACE
- DIRECTION OF TRAFFIC DETOUR
- SIGN (TEMPORARY)
- * BLACK ON ORANGE
- CHANNELIZING DEVICES
- TEMPORARY CONCRETE BARRIER

FLAGGER OPERATION, SHORT/INTERMEDIATE TERM STATIONARY, NORTH BOUND LANE CLOSURE NEAR INTERSECTION OF WEST YARD ROAD

SCALE: 1" = 30'

CHPE Champlain Hudson Power Express

PROJECT NO.: 21162	PROJECT NO.: 120174	ALTERED ON:	AFFIXED ON: 11/01/2024
Kiewit	Engineering and Land Surveying, P.C.		STATE OF NEW YORK DIMITRIOS BIRBILIS LICENSED PROFESSIONAL ENGINEER 105756

No.	DATE	SUBMITTAL / REVISION DESCRIPTION	DM	BD
0	11/01/2024	NDC-0148: ISSUED FOR CONSTRUCTION	DM	BD

CHAMPLAIN HUDSON POWER EXPRESS

SEGMENT 9 (PACKAGE 5B) - CSX: SELKIRK RAIL YARD BYPASS

WORK ZONE TRAFFIC CONTROL

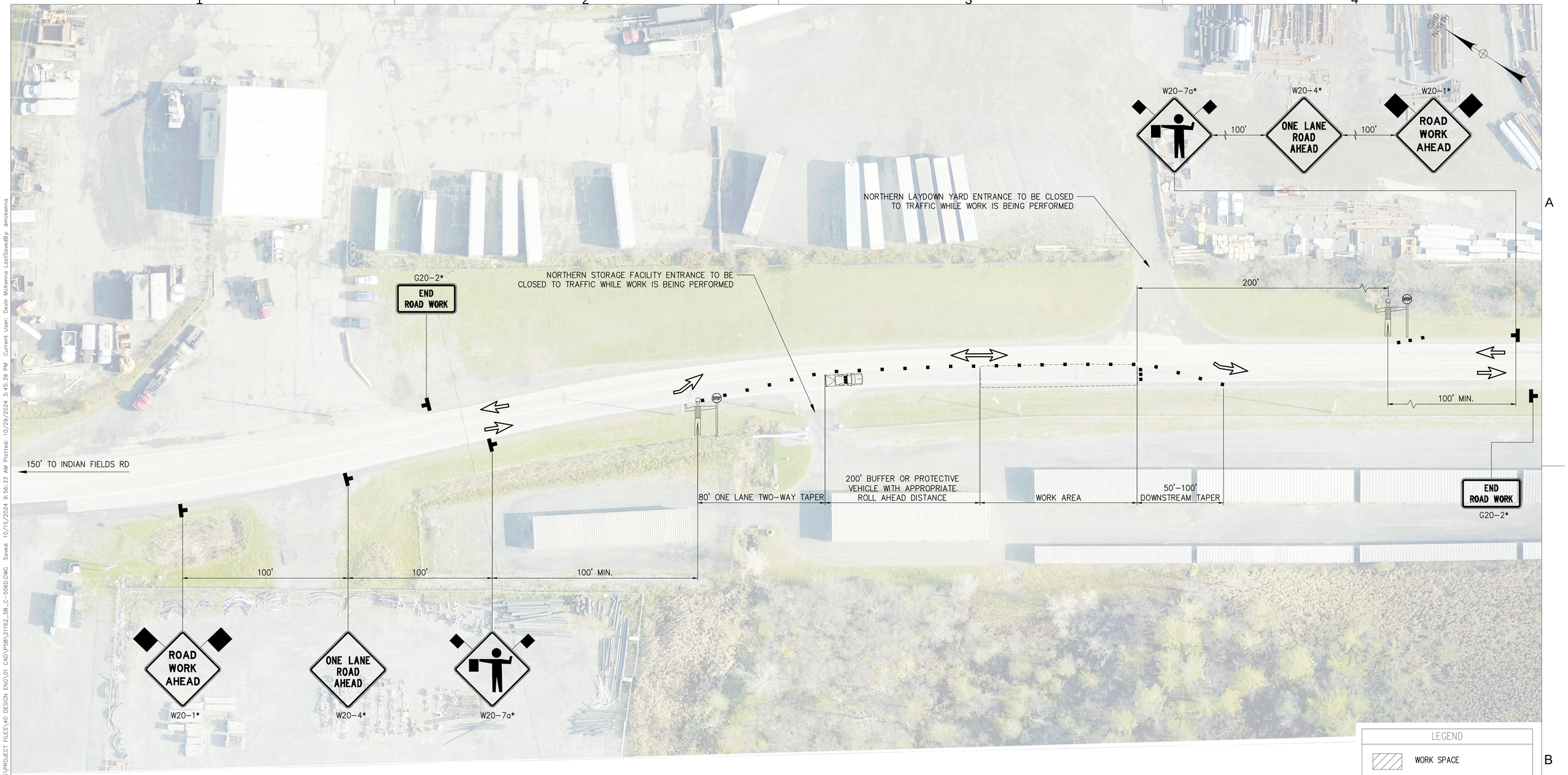
W YARD ROAD - NB LANE CLOSURE NEAR INTERSECTION

SHORT AND INTERMEDIATE DURATION WORK

DRAWN BY: DM | DESIGNED BY: DM | APPROVED BY: BD | SCALE AS SHOWN | DATE: 11/01/2024

PERMIT DRAWING NO.: N/A

DRAWING NO.: C-506C



LEGEND

- WORK SPACE
- DIRECTION OF TRAFFIC DETOUR
- SIGN (TEMPORARY)
- * BLACK ON ORANGE
- CHANNELIZING DEVICES
- TEMPORARY CONCRETE BARRIER

FLAGGER OPERATION, SHORT/INTERMEDIATE TERM STATIONARY, SOUTH BOUND LANE CLOSURE NEAR INTERSECTION OF WEST YARD ROAD

SCALE: 1" = 30'

CHPE Champlain Hudson Power Express

PROJECT NO.: 21162 | PROJECT NO.: 120174 | ALTERED ON: | AFFIXED ON: 11/01/2024

Kiewit | Engineering and Land Surveying, P.C.

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

No.	DATE	SUBMITTAL / REVISION DESCRIPTION	DB	APP
0	11/01/2024	NDC-0148: ISSUED FOR CONSTRUCTION	DM	BD

CHAMPLAIN HUDSON POWER EXPRESS

SEGMENT 9 (PACKAGE 5B) - CSX: SELKIRK RAIL YARD BYPASS

WORK ZONE TRAFFIC CONTROL

W YARD ROAD - SB LANE CLOSURE NEAR INTERSECTION

SHORT AND INTERMEDIATE DURATION WORK

DRAWN BY: DM | DESIGNED BY: DM | APPROVED BY: BD | SCALE AS SHOWN | DATE: 11/01/2024

PERMIT DRAWING NO.: N/A

DRAWING NO.: C-506D

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

Segment 8 (Package 5A):
EM&CP Appendix J HDD 87C Revision Memo

HDD Report Revision Memo for HDD Design Change

HDD #: 87C

Date: 11/1/2024

Design Change Number(s): NDC-0148

Revision Description:

NDC-0148 provides additional Geotechnical boring logs for HDD 87C. These additional Geotechnical borings were completed post IFC to provide additional soil information for the driller.

For the report sections indicated below, information and analysis regarding HDD 87C are superseded by the updates in this memo:

Design Summary Report

Section	Section Title	Refer to IFC Submittal	Revised Herein	Notes:
1.0	Introduction	X		
2.0	Project Description	X		
3.0	Background	X		
4.0	Surface Conditions	X		
5.0	Below-grade Structures	X		
6.0	**Subsurface Conditions**		**X**	**Updates for HDD 87C only**
7.0	HDD Process	X		
8.0	Design Components	X		
9.0	Construction Considerations	X		
10.0	References	X		
Apx. A	**Geotechnical Data**		**X**	**Updates for HDD 87C only**
Apx. B	**Calculations**		**X**	**Updates for HDD 87C only**

Inadvertent Release Contingency Plan

Section	Section Title	Refer to IFC Submittal	Revised Herein	Notes:
1.0	Introduction	X		
2.0	Description of the HDD Process	X		
3.0	Organization and Staffing Responsibilities	X		
4.0	Fluid Release Minimization Measures	X		
5.0	Inadvertent Release Monitoring and Notifications	X		
6.0	Inadvertent Release Response (Upload and Road Areas)	X		
7.0	Inadvertent Release Response (Wetland, railroad, and open water body areas)	X		
8.0	Drill Hole Abandonment Plan	X		
9.0	**Crossing Specific Conditions and IR Analysis**		**X**	**Updates for HDD 87C only**
Apx. A	**Annular Pressure Analysis**		**X**	**Updates for HDD 87C only**

Table of Contents

Champlain Hudson Power Express

UPDATES TO
HDD Design Summary Report
Crossings HDD 71 to HDD 87A.A
in Segment 8 – Package 5A
FOR HDD 87C

For Design Rev. #1 || Design Rev. Date: 11/1/2024

Rotterdam to Fuera Bush
Schenectady County, New York

TTR Project Number: 204-3701

Prepared for:
Transmission Developers Inc.
600 Broadway Street
Albany, NY 12207

Prepared by:
Tetra Tech Engineering and Surveying, P.C.
(A New York Professional Corporation)
115 Inverness Drive East, Suite 300
Englewood, CO 80112
(303)792-5911

November 2024

6.0 SUBSURFACE CONDITIONS

HDD #87C

Text Revised

Three Geotechnical bores (KB-HDD-87C-1, SY-1, and KB-HDD-87C-2) are located along the proposed HDD #87C alignment. After reviewing and comparing these samples, geotechnical boring KB-HDD-87C-2 was selected to be used in the BoreAid analysis as it best represented the complete soil strata for the HDD alignment and covered the full depth of the HDD profile. Consideration was taken for the other Geotechnical borings in the design of the HDD. KB-HDD-87C-2 was bored towards the south end of the drill path by Kiewit on 8/22/2024 and reached a total depth of 61.5 feet. After passing through a 5-foot-deep layer of silty sand with gravel (fill) the bore transitioned to a lean clay layer for the remainder of the bore path. The Geotechnical report for this HDD and test data is provided in Appendix A.

Based on the borings, the soil profile for the HDD #87C BoreAid analyses will be divided into three [3] layers: Silty Sand (SM), Lean Clay (CL), and Lean Clay (CL). The soil profiles used in the BoreAid analyses for this HDD are presented in Appendix B.

Appendix A

Geotechnical Boring Logs Added

Appendix A

Geotechnical Reports

Kiewit

MEMORANDUM

DATE: October 11, 2024

TO: Zachary Bauer, P.E.; Tetra Tech Rooney

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

SUBJECT: Geotechnical Data: Segment 8 – Package 5 – HDD Crossing 87C
Champlain Hudson Power Express Project
Selkirk, 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 Upstate New York. This HDD crossing is located south of Schenectady, New York. The approximate station for the start of HDD crossing Number 87C is STA 50902+00 (42.5803° N, 73.8751° W).

The geotechnical data at this HDD crossing is attached. The available data is from the previous investigation by AECOM and the recent investigation by Terracon, referenced below.

- AECOM, Geotechnical Data Report, Upland Segments, Champlain Hudson Power Express, dated May 28, 2021.
- Terracon, Champlain to Hudson HDD Crossings, Change Order 8 Borings, Selkirk, New York, dated September 17, 2024.

Contact us if you have questions or require additional information.

HDD 87C
Borings SY-1, KB-HDD-87C-1 and KB-HDD-87C-2
Segment 8 - Design Package 5

CHPE Segment 8 & 9 - Package 5
HDD Soil Boring Coordinates and Elevations

Firm	Boring	Northing (feet)	Easting (feet)	Ground Surface Elevation (feet)
TRC*	A179.6-1	1433335.8	631009.7	332.5
	A182.4-1	1420048.2	636557.9	291.5
	A187.65-1	1394856.5	644775.4	327.7
	A191.05-1	1378814.5	652321.0	274.7
	A191.82-1	1375154.9	654314.3	257.1
	A192.9-1	1370644.3	657458.6	232.8
	B177.1-1	1445275.2	626125.8	347.3
	B177.6-1	1442944.0	627003.0	346.5
	B178.01-1	1440838.2	627828.3	368.5
	B178.9-1	1436461.4	629767.4	322.1
	B180.1-1	1431140.9	631965.3	310.4
	B180.9-1	1427158.5	633611.8	307.5
	B182.9-1	1417657.6	637123.9	291.5
	B183.2-1	1415871.4	637202.5	290.2
	B184.3-1	1410133.0	637597.6	324.0
	B184.8-1	1408223.8	638230.4	323.1
	B185.6-1	1403875.9	639489.9	328.2
	B188.0-1	1392812.4	645793.4	330.9
	B188.35-1	1391616.5	646333.6	333.4
	B188.51-1	1390815.1	646697.7	340.2
	B190.0-1	1383732.6	649743.4	296.3
	B190.1-1	1383134.9	649975.5	294.6
	B190.8-1	1379726.2	651827.2	282.3
	B192.4-1	1372732.4	655878.1	239.3
	B193.5-1	1367919.2	659547.5	218.6
AECOM**	RS-2	1436092.2	629800.7	315.6
	RS-3	1418336.4	636985.0	303.2
	RS-4	1414567.4	637285.8	302.2
	RS-5	1411399.1	637471.6	319.0
	RS-7A	1391599.9	646333.6	340.5
	RS-9	1372089.8	656230.9	238.7
	SY-1	1365366.8	660565.2	224.2
	SY-7	1353089.8	670133.9	159.8
	SY-8	1353716.5	671626.7	175.0
	SY-9	1353046.4	673133.41	163.1
	SY-9A	1351940.0	674314.3	158.3
	SY-10	1350838.3	675488.6	166.0
	SCH-19	1446199.8	625927.0	333.8
	SCH-19A	1445712.1	626032.4	343.1

Notes:

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

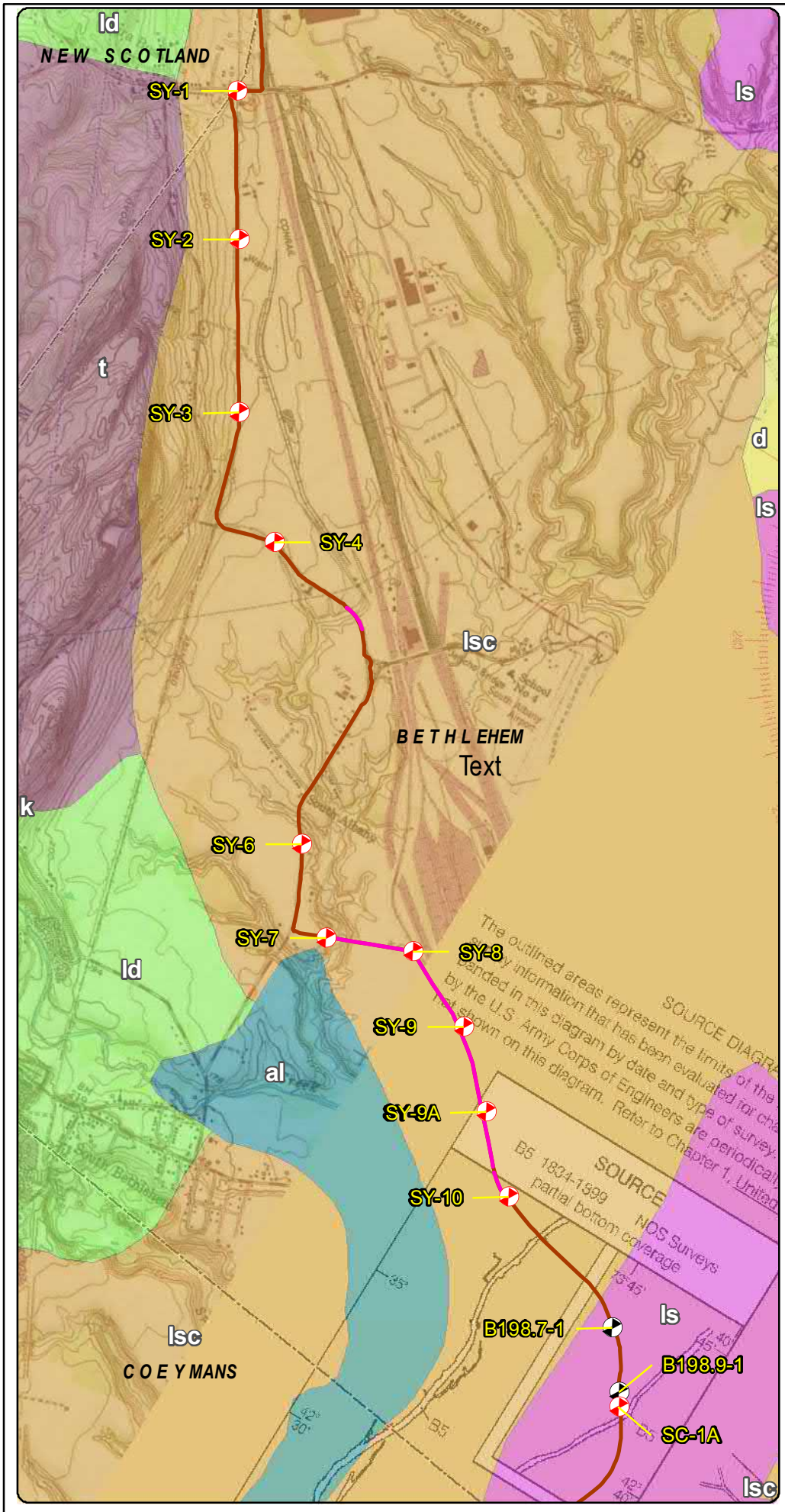
* TRC boring coordinates as shown in Table 1-6 in AECOM report (reference below). Boring elevations estimated from November 2021 topographic survey by Williams Aerial.

** AECOM boring coordinates and elevations as shown in Table 1-6 in AECOM report.

*** Kiewit boring coordinates and elevations are noted on the boring logs.

Reference:

AECOM, Geotechnical Data Report, Upland Segments: Putnam Station, Washington County, to Cementon, Green County, NY, Champlain Hudson Power Express, dated May 28, 2021.



LEGEND

- 2021 Boring Location
- Previous (2013) Boring Location
- Terrestrial Route HVDC
- Submarine Route HVDC
- Terrestrial Route HVAC
- Preliminary HDD Locations
- Preliminary Pipe Bridge Location
- Town Boundary
- County Boundary

Surficial Geology

- al - Recent alluvium
- d - Dunes
- k - Kame deposits
- ld - Lacustrine delta
- ls - Lacustrine sand
- lsc - Lacustrine silt and clay
- t - Till

0.25 0.125 0 0.25 Miles

Transmission

Champlain Hudson Power Express Project

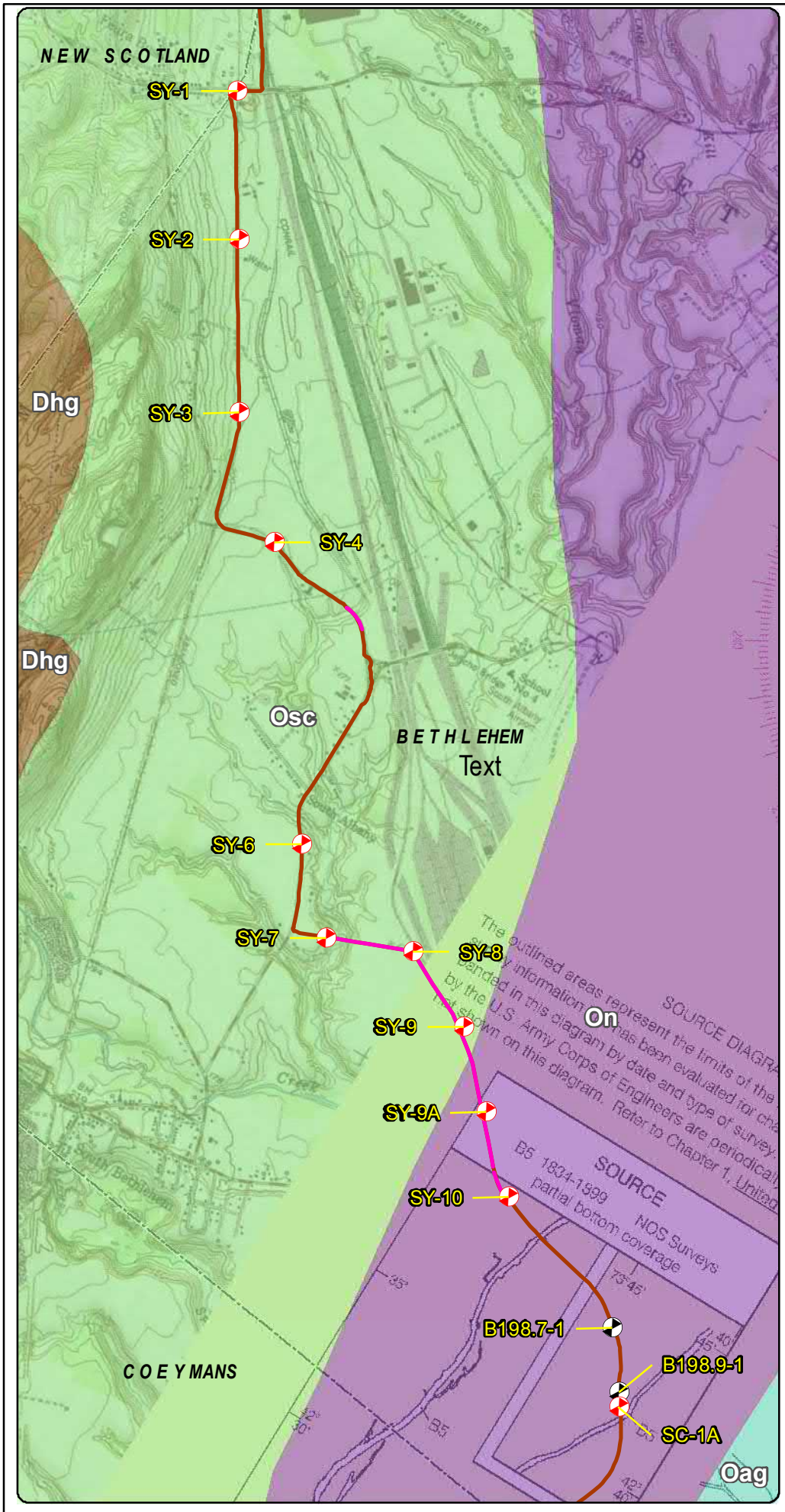
Champlain Hudson Power Express Inc.

Surficial Geology and Geotechnical Borings
Selkirk Rail Yard Bypass
Figure 3-9

Prepared on 4/30/2021
by: AECOM

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

Y:\Projects\CHPE\Route\Consensus_Alternative_Routes\MXD\Alt 5_Routes_DZ_20190\Boring_Locations\Maps_for_May_2021_Report\Selkirk_Rail_Yard_Bypass_Boring_Locations_Surficial_May_2021_Report.mxd



LEGEND

- 2021 Boring Location
- Previous (2013) Boring Location
- Terrestrial Route HVDC
- Submarine Route HVDC
- Terrestrial Route HVAC
- Preliminary HDD Locations
- Preliminary Pipe Bridge Location
- Town Boundary
- County Boundary

Bedrock Geology

- Dhg - Port Ewen Formation
- Oag - Austin Glen Formation
- On - Normanskill Shale
- Osc - Schenectady Formation

* Schenectady Formation includes: graywacke, sandstone, siltstone, shale

0.25 0.125 0 0.25 Miles

Transmission Developers Inc.

Champlain Hudson Power Express Project

Champlain Hudson Power Express Inc.

Bedrock Geology and Geotechnical Borings
Selkirk Rail Yard Bypass
Figure 4-9

Prepared on 4/30/2021
by: AECOM

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

Y:\Projects\CHPE\Route\Consensus_Alternative_Routes\MXD\Alt 5_Routes_DZ_20190\Boring_Locations\Maps_for_May_2021_Report\Selkirk_Rail_Yard_Bypass_Boring_Locations_Bedrock_May_2021_Report.mxd

BORING CONTRACTOR: ADT														SHEET 1 OF 1	
DRILLER: Matt Murtaugh														PROJECT NAME: CHPE -	
SOILS ENGINEER/GEOLOGIST: Mike Izdebski														PROJECT NO.: 60323056	
														HOLE NO.: **SY-1**	
														START DATE: 03/18/2021	
														FINISH DATE: 03/18/2021	
LOCATION: North Shoulder NYS Rt. 32 at West Yard Rd, Feura Bush NY, MP - 0.08														OFFSET: N/A	
GROUND WATER OBSERVATIONS				CASING		SAMPLER		DRILL BIT		CORE BARREL				DRILL RIG: Geoprobe 7822DT	
Not Observed			TYPE	Flush Joint Steel		California Modified		Tricone Roller Bit						BORING TYPE: SPT	
			SIZE I.D.	4"		2.5"		- -						BORING O.D.: 4.5"	
			SIZE O.D.	4.5"		3"		3 7/8"						SURFACE ELEV.:	
			HAMMER WT.	140 lbs		140 lbs								LONGITUDE:	
			HAMMER FALL	30"		30"								LATITUDE:	

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
		0'-5'				Hand Cleared					SP/GP		Gray fine to coarse SAND, some fine to coarse angular gravel, trace silt, trace organics
1.0													
2.0													
3.0											ML/GM		2.5': Gray silty clay, trace coarse sand, trace cobbles, trace fine gravel
		3'-5'	S-1										
4.0													TR-1; (3.0'-5.0')
5.0													
		5'-7'	S-2	24"	24"	8	12	12	10	16	CL		Brown SILT and CLAY
6.0													
7.0													
		7'-9'	S-3	24"	24"	14	16	14	14	20	CL		Brown silty CLAY
8.0													TR-2; (8.0'-8.5')
9.0													
		9'-11'	S-4	24"	24"	24	24	32	16	36		Silty CLAY	Gray coarse SAND and fine angular GRAVEL
10.0											CL		10.0': Brown silty CLAY
11.0													
		11'-'13'	S-5	24"	24"	18	17	16	13	21	CL		SAA
12.0													TR-3; (12.0'-12.5')
13.0													
		13'-15'	S-6	24"	24"	14	12	15	6	18	CL		SAA, some fine sand
14.0													
15.0													
		15'-17'	S-7	24"	24"	17	13	10	8	15	CL		Gray silty CLAY, little fine to medium angular gravel
16.0													16.0': Gray silty CLAY
17.0													TR-4; (16.0'-16.5')
													SY-1 terminated at 17 fbg
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: $N_{corr}=N*(2.0^2-1.375^2)/(3.0^2-2.4^2)$ in. = N*0.65.

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

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

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

EXPLORATION PLAN

Change Order 8 Borings ■ Selkirk , NY
September 17, 2024 ■ Terracon Project No. JB215256N

DIAGRAM IS FOR GENERAL LOCATION ONLY, AND IS NOT INTENDED FOR CONSTRUCTION PURPOSES

AERIAL PHOTOGRAPHY PROVIDED BY MICROSOFT BING MAPS

BORING LOG NO. KB-HDD 87C-1

PROJECT: Change Order 8 Borings

CLIENT: Kiewit Engineering (NY) Corp
Lone Tree, CO

SITE: Champlain to Hudson HDD Crossings
Selkirk, NY

LOCATION See Exploration Plan

Latitude: 42.5802° Longitude: -73.8748°

Surface Elev.: 224 (Ft.)

GRAPHIC LOG	DEPTH	ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	ATTERBERG LIMITS LL-PL-PI
		Vac Truck from 0 - 10 feet. No Samples taken.						
	10.0	214						
		LEAN CLAY (CL), brown, very soft to medium sitff	10			3-3-5 N=8		
		Grades gray	15			1-1-2 N=3		
			20			WH/18"	42.4	49-25-24
			25					

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
Soft dig to 10'
10' to 15' 4 1/4" HSA
15' to 60' Mud Rotary

Abandonment Method:

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Elevation was provided by others.

Notes:

Logged by: JO
WH = Weight of Hammer
WR = Weight of Rods

WATER LEVEL OBSERVATIONS

No free water encountered

Terracon
30 Corporate Cir Ste 201
Albany, NY

Boring Started: 08-22-2024 | Boring Completed: 08-23-2024

Drill Rig: | Driller: Caleb

Project No.: JB215256N

BORING LOG NO. KB-HDD 87C-1

PROJECT: Change Order 8 Borings

CLIENT: Kiewit Engineering (NY) Corp
Lone Tree, CO

SITE: Champlain to Hudson HDD Crossings
Selkirk, NY

LOCATION See Exploration Plan

Latitude: 42.5802° Longitude: -73.8748°

Surface Elev.: 224 (Ft.)

DEPTH ELEVATION (Ft.)

GRAPHIC LOG	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	ATTERBERG LIMITS LL-PL-PI
LEAN CLAY (CL), brown, very soft to medium sitff *(continued)*						
				WR/18"		
	30			WR/18"		
	35			WH/18" 2" Split Spoon with Ring Samplers		
	40			WR/18"	40.0	40-22-18
	45			WR/18"		
	50					

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
Soft dig to 10'
10' to 15' 4 1/4" HSA
15' to 60' Mud Rotary

Abandonment Method:

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Elevation was provided by others.

Notes:

WH = Weight of Hammer
WR = Weight of Rods

WATER LEVEL OBSERVATIONS

No free water encountered

Terracon
30 Corporate Cir Ste 201
Albany, NY

Boring Started: 08-22-2024 Boring Completed: 08-23-2024

Drill Rig: Driller: Caleb

Project No.: JB215256N

BORING LOG NO. KB-HDD 87C-1

PROJECT: Change Order 8 Borings

CLIENT: Kiewit Engineering (NY) Corp
Lone Tree, CO

SITE: Champlain to Hudson HDD Crossings
Selkirk, NY

LOCATION See Exploration Plan

Latitude: 42.5802° Longitude: -73.8748°

Surface Elev.: 224 (Ft.)

DEPTH	ELEVATION (Ft.)	GRAPHIC LOG	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	ATTERBERG LIMITS LL-PL-PI
		LEAN CLAY (CL), brown, very soft to medium sitff *(continued)*					
55					WR/18"		
60					WR/18"		
61.5	162.5				WR/18"		
		Boring Terminated at 61.5 Feet					

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
Soft dig to 10'
10' to 15' 4 1/4" HSA
15' to 60' Mud Rotary

Abandonment Method:

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Elevation was provided by others.

Notes:

WH = Weight of Hammer
WR = Weight of Rods

WATER LEVEL OBSERVATIONS

No free water encountered

Terracon
30 Corporate Cir Ste 201
Albany, NY

Boring Started: 08-22-2024 | Boring Completed: 08-23-2024

Drill Rig: | Driller: Caleb

Project No.: JB215256N

BORING LOG NO. KB-HDD 87C-2

PROJECT: Change Order 8 Borings

CLIENT: Kiewit Engineering (NY) Corp
Lone Tree, CO

SITE: Champlain to Hudson HDD Crossings
Selkirk, NY

LOCATION See Exploration Plan

Latitude: 42.5791° Longitude: -73.8743°

Surface Elev.: 226 (Ft.)

DEPTH	ELEVATION (Ft.)	Description	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	ATTERBERG LIMITS LL-PL-PI
0.0	226	**FILL - SILTY SAND WITH GRAVEL**, black						
					X	17-9-8-8 N=17		
5.0	221	**LEAN CLAY (CL)**, banded silt and clay, brown, stiff	5					
					X	2-5-5-7 N=10		
			10		X	4-4-5 N=9	27.2	39-23-16
15.0	211	**LEAN CLAY (CL)**, gray, very soft to soft	15		X	1-1-2 N=3		
			20		X	WR-WH/12		
			25					

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
0-10' 2 1/4" HSA
4" Casing set at 15'
Mud rotary 15' to 60'

Abandonment Method:

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Elevation was provided by others.

Notes:

Logged by: JO
WH = Weight of Hammer
WR = Weight of Rods

WATER LEVEL OBSERVATIONS

No free water encountered

Terracon
30 Corporate Cir Ste 201
Albany, NY

Boring Started: 08-21-2024 | Boring Completed: 08-22-2024

Drill Rig: | Driller: Caleb

Project No.: JB215256N

BORING LOG NO. KB-HDD 87C-2

PROJECT: Change Order 8 Borings

CLIENT: Kiewit Engineering (NY) Corp
Lone Tree, CO

SITE: Champlain to Hudson HDD Crossings
Selkirk, NY

LOCATION See Exploration Plan

Latitude: 42.5791° Longitude: -73.8743°

Surface Elev.: 226 (Ft.)

DEPTH | ELEVATION (Ft.)

GRAPHIC LOG	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	ATTERBERG LIMITS LL-PL-PI
LEAN CLAY (CL), gray, very soft to soft *(continued)*						
				WH/12"		
	30			WR/12"	45.4	47-23-24
	35			WR/12"		
	40			WR/24" 2" Split Spoon With ring Samplers		
	45			WH/12"	33.3	35-20-15
	50					

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
0-10' 2 1/4" HSA
4" Casing set at 15'
Mud rotary 15' to 60'

Abandonment Method:

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Elevation was provided by others.

Notes:

WH = Weight of Hammer
WR = Weight of Rods

WATER LEVEL OBSERVATIONS

No free water encountered

Terracon
30 Corporate Cir Ste 201
Albany, NY

Boring Started: 08-21-2024 | Boring Completed: 08-22-2024

Drill Rig: | Driller: Caleb

Project No.: JB215256N

BORING LOG NO. KB-HDD 87C-2

PROJECT: Change Order 8 Borings

CLIENT: Kiewit Engineering (NY) Corp
Lone Tree, CO

SITE: Champlain to Hudson HDD Crossings
Selkirk, NY

LOCATION See Exploration Plan

Latitude: 42.5791° Longitude: -73.8743°

Surface Elev.: 226 (Ft.)

DEPTH	ELEVATION (Ft.)	GRAPHIC LOG	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	ATTERBERG LIMITS LL-PL-PI
		LEAN CLAY (CL), gray, very soft to soft *(continued)*						
						WR/12"		
			55					
						WR/12"		
			60					
						WR/12"		
61.5	164.5							
		Boring Terminated at 61.5 Feet						

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
0-10' 2 1/4" HSA
4" Casing set at 15'
Mud rotary 15' to 60'

Abandonment Method:

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Elevation was provided by others.

Notes:

WH = Weight of Hammer
WR = Weight of Rods

WATER LEVEL OBSERVATIONS

No free water encountered

Terracon
30 Corporate Cir Ste 201
Albany, NY

Boring Started: 08-21-2024 Boring Completed: 08-22-2024

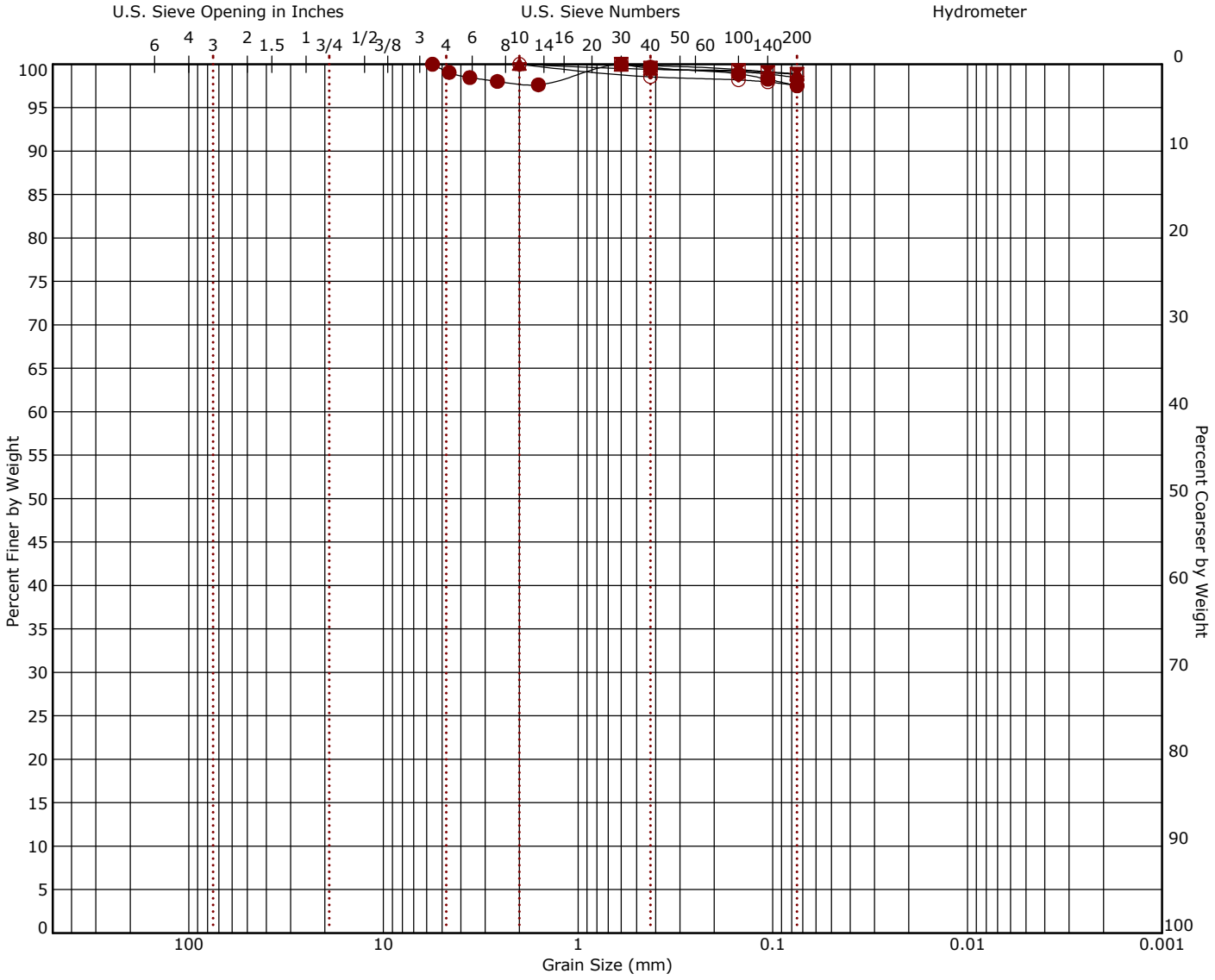
Drill Rig: Driller: Caleb

Project No.: JB215256N

30 Corporate Cir Ste 201
Albany, NY

Grain Size Distribution

ASTM D422 / ASTM C136 / AASHTO T27



Cobbles	Gravel		Sand			Silt or Clay
	coarse	fine	coarse	medium	fine	

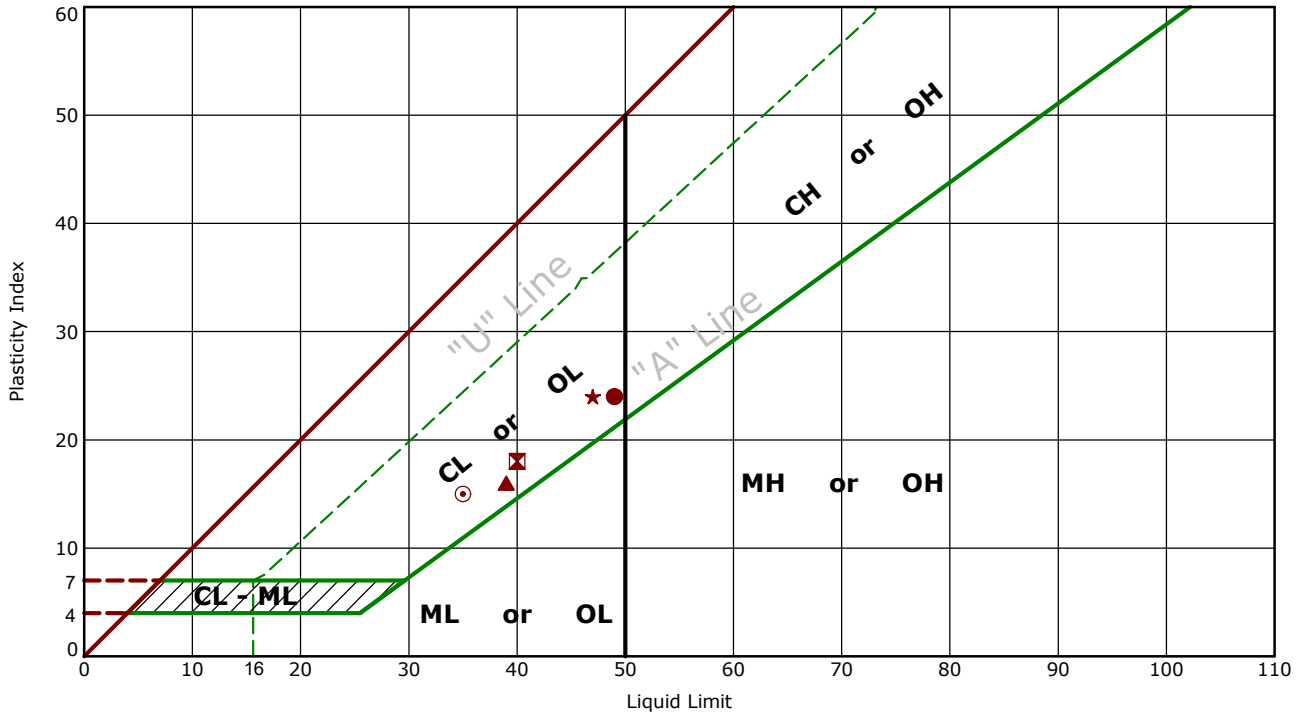
Boring ID	Depth (Ft)	Description	USCS	LL	PL	PI	Cc	Cu
KB-HDD 87C-1	20 - 21.5	LEAN CLAY	CL	49	25	24		
KB-HDD 87C-1	40 - 41.5	LEAN CLAY	CL	40	22	18		
KB-HDD 87C-2	10 - 11.5	LEAN CLAY	CL	39	23	16		
KB-HDD 87C-2	30 - 31.5	LEAN CLAY	CL	47	23	24		
KB-HDD 87C-2	45 - 46.5	LEAN CLAY	CL	35	20	15		

Boring ID	Depth (Ft)	D_{100}	D_{60}	D_{30}	D_{10}	%Cobbles	%Gravel	%Sand	%Fines	%Silt	%Clay
KB-HDD 87C-1	20 - 21.5	5.6				0.0	0.8	1.7	97.5		
KB-HDD 87C-1	40 - 41.5	0.6				0.0	0.0	1.1	98.9		
KB-HDD 87C-2	10 - 11.5	2				0.0	0.0	1.1	98.9		
KB-HDD 87C-2	30 - 31.5	2				0.0	0.0	1.6	98.4		
KB-HDD 87C-2	45 - 46.5	2				0.0	0.0	2.4	97.6		

30 Corporate Cir Ste 201
Albany, NY

Atterberg Limit Results

ASTM D4318



	Boring ID	Depth (Ft)	LL	PL	PI	Fines	USCS	Description
●	KB-HDD 87C-1	20 - 21.5	49	25	24	97.5	CL	LEAN CLAY
⊠	KB-HDD 87C-1	40 - 41.5	40	22	18	98.9	CL	LEAN CLAY
▲	KB-HDD 87C-2	10 - 11.5	39	23	16	98.9	CL	LEAN CLAY
★	KB-HDD 87C-2	30 - 31.5	47	23	24	98.4	CL	LEAN CLAY
⊙	KB-HDD 87C-2	45 - 46.5	35	20	15	97.6	CL	LEAN CLAY

Appendix B

BoreAid Calculations Revised

Appendix B

BoreAid HDD Simulation Output

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:

Kiewit - CHPE

Ref: New York

204-3701

Start Date: 07-23-2024

End Date: 11-01-2024

Designer:

Aaron Coady

Tetra Tech Rooney

115 Inverness Drive East, Suite 300

Englewood, Colorado

United States 80112

aaron.coady@tetratech.com

Description:

Segment 8 (Package 5A)
Conduit 1
HDD 87C
DWG C-367

Input Summary

Start Coordinate	(0.00, 0.00, 224.59) ft
End Coordinate	(665.00, 0.00, 225.71) ft
Project Length	665.00 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

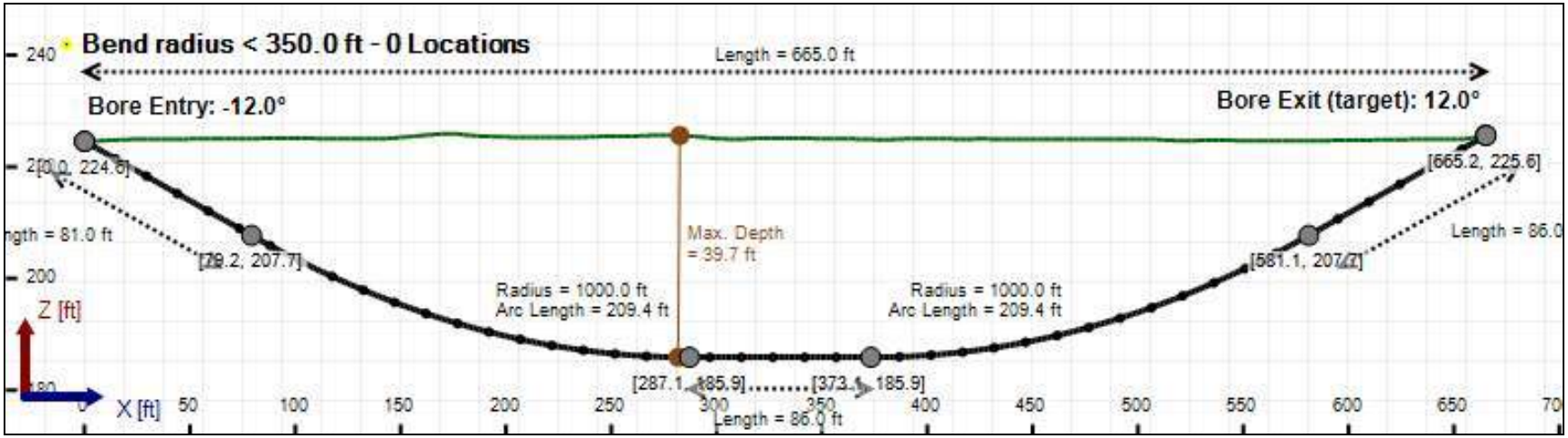
Number of Layers: 3

Soil Layer #1 USCS, Sand (S), SM
Depth: 5.00 ft
Unit Weight: 15.6618 (dry), 17.7639 (sat) [lb/US (liquid) gallon]
Phi: 30.00, S.M.: 145.00, Coh: 4.40 [psi]

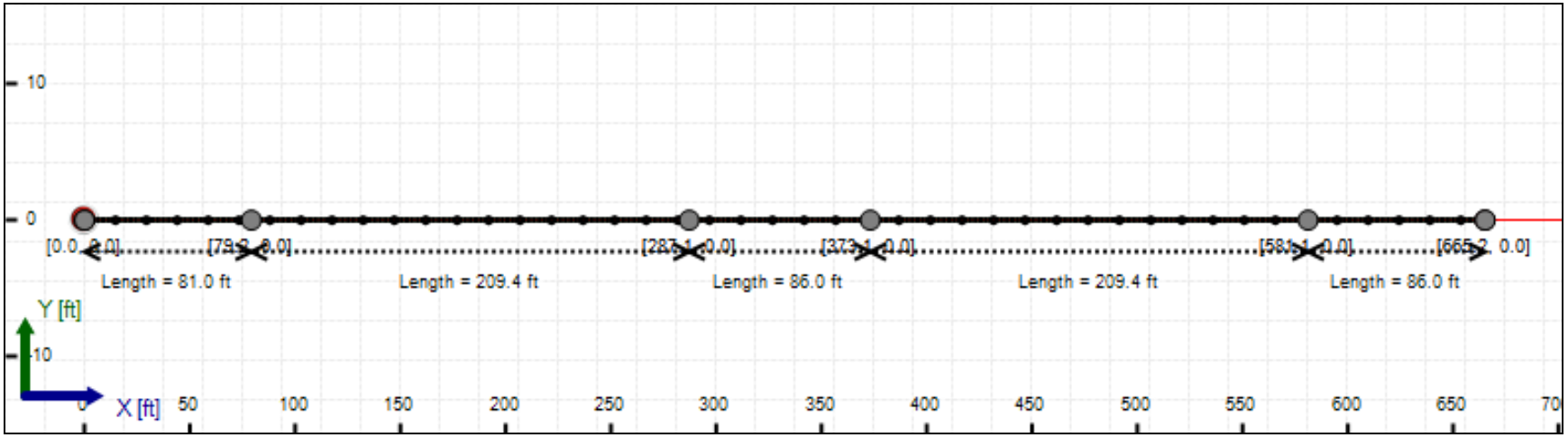
Soil Layer #2 USCS, Clay (C), CL
Depth: 10.00 ft
Unit Weight: 14.3220 (dry), 16.8861 (sat) [lb/US (liquid) gallon]
Phi: 0.00, S.M.: 400.00, Coh: 8.30 [psi]

Soil Layer #3 USCS, Clay (C), CL
Depth: 46.50 ft
Unit Weight: 14.3220 (dry), 16.8861 (sat) [lb/US (liquid) gallon]
Phi: 0.00, S.M.: 200.00, Coh: 3.10 [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: 675.00 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: 7.92790 lb/US (liquid) gallon

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: 12.51801 lb/US (liquid) gallon

Hydrokinetic Pressure: 10 psi

Ballast Unit Weight: 8.34534 lb/US (liquid) gallon

In-service Load Summary:

Pressure [psi]	Deformed	Collapsed
Earth Pressure	13.6	30.0
Water Pressure	0.0	0.0
Surface Surcharge	0.0	0.0
Internal Pressure	0.0	0.0
Net Pressure	13.6	30.0
Deflection		
Earth Load Deflection	3.698	8.168
Buoyant Deflection	0.132	0.132
Reissner Effect	0	0
Net Deflection	3.830	8.300
Compressive Stress [psi]		
Compressive Wall Stress	61.1	135.0

Installation Load Summary:

Forces/Stresses	@Maximum Force	Absolute Maximum
Pullback Force [lb]	11994.0	11994.0
Pullback Stress [psi]	334.5	334.5
Pullback Strain	5.817E-3	5.817E-3
Bending Stress [psi]	0.0	25.8
Bending Strain	0	4.479E-4
Tensile Stress [psi]	334.5	359.8
Tensile Strain	5.817E-3	6.705E-3

Net External Pressure = 21.2 [psi]

Buoyant Deflection = 0.1

Hydrokinetic Force = 567.6 lb

In-service Analysis

	Calculated	Allowable	Factor of Safety	Check
Deflection [%]	3.830	7.5	2.0	OK
Unconstrained Collapse [psi]	26.3	98.1	3.7	OK
Compressive Wall Stress [psi]	61.1	1150.0	18.8	OK

Installation Analysis

	Calculated	Allowable	Factor of Safety	Check
Deflection [%]	0.065	7.5	115.8	OK
Unconstrained Collapse [psi]	36.2	235.8	6.5	OK
Tensile Stress [psi]	359.8	1200.0	3.3	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	8.75 in	65.230 psi	50.303 psi
1	8.75 in	12.00 in	65.178 psi	49.505 psi
2	12.00 in	16.13 in	65.090 psi	48.288 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]
Yes	600	37
Yes	300	32
No	200	29
No	100	25
No	6	17
No	3	15

Flow Rate (Q): 70.00 US (liquid) gallon/min

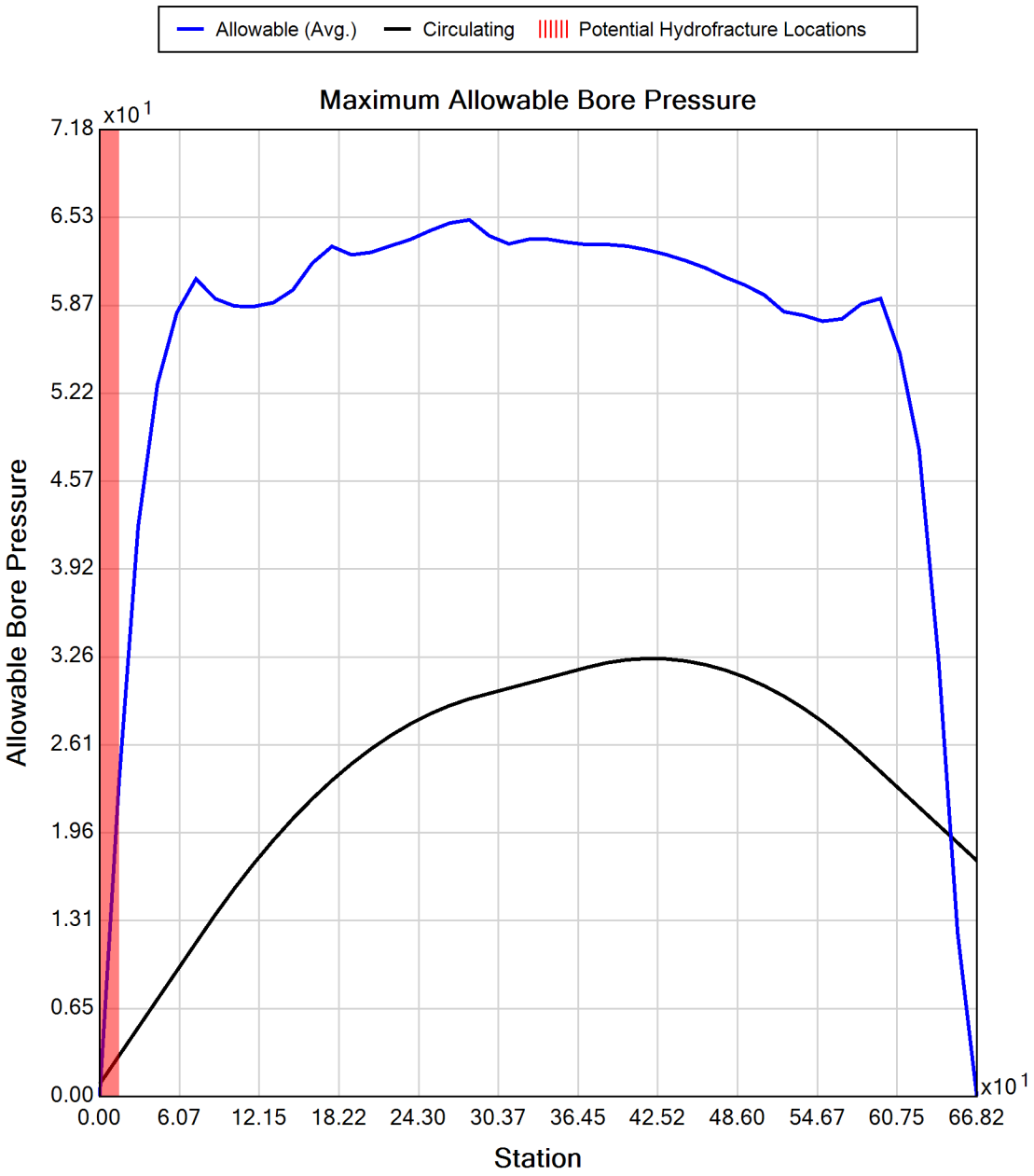
Drill Fluid Density: 10.500 lb/US (liquid) gallon

Rheological model: Bingham-Plastic

Plastic Viscosity (PV): 5.00

Yield Point (YP): 27.00

Effective Viscosity (cP): 1601.0



Generated Output

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Project Summary

General:

Kiewit - CHPE

Ref: New York

204-3701

Start Date: 07-23-2024

End Date: 11-01-2024

Designer:

Aaron Coady

Tetra Tech Rooney

115 Inverness Drive East, Suite 300

Englewood, Colorado

United States 80112

aaron.coady@tetratech.com

Description:

Segment 8 (Package 5A)
Conduit 2
HDD 87C
DWG C-368

Input Summary

Start Coordinate	(0.00, 0.00, 224.89) ft
End Coordinate	(665.00, 0.00, 224.71) ft
Project Length	665.00 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

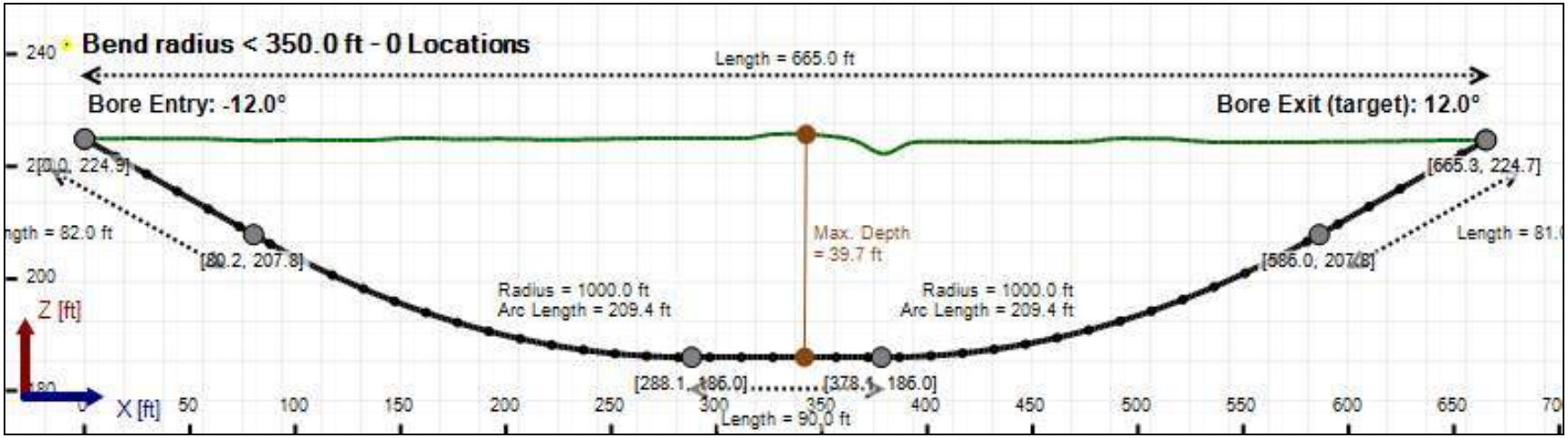
Number of Layers: 3

Soil Layer #1 USCS, Sand (S), SM
Depth: 5.00 ft
Unit Weight: 15.6618 (dry), 17.7639 (sat) [lb/US (liquid) gallon]
Phi: 30.00, S.M.: 145.00, Coh: 4.40 [psi]

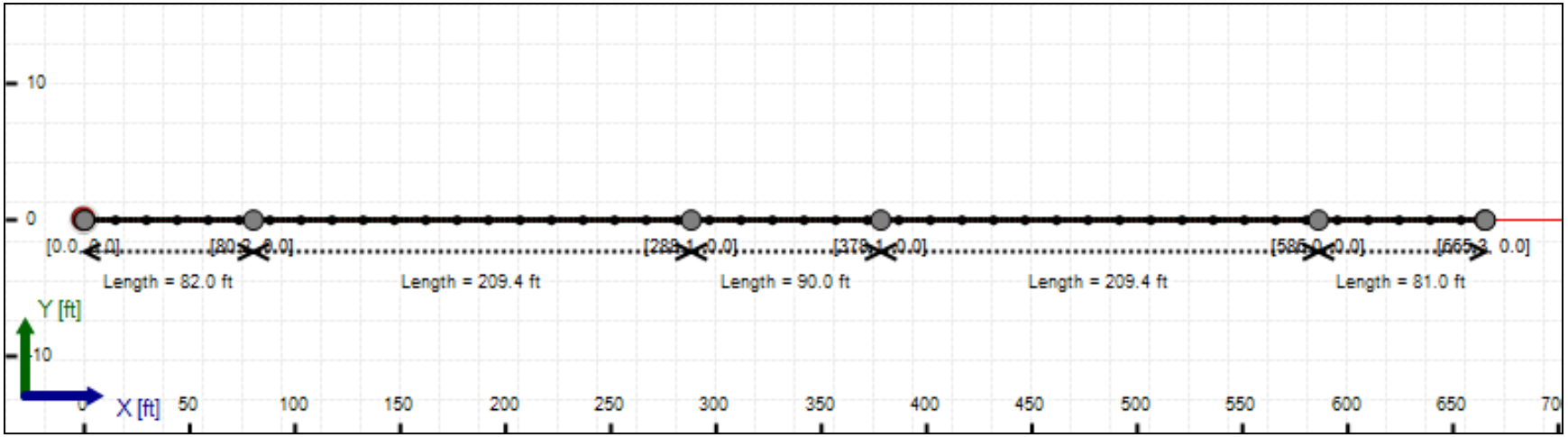
Soil Layer #2 USCS, Clay (C), CL
Depth: 10.00 ft
Unit Weight: 14.3220 (dry), 16.8861 (sat) [lb/US (liquid) gallon]
Phi: 0.00, S.M.: 400.00, Coh: 8.30 [psi]

Soil Layer #3 USCS, Clay (C), CL
Depth: 46.50 ft
Unit Weight: 14.3220 (dry), 16.8861 (sat) [lb/US (liquid) gallon]
Phi: 0.00, S.M.: 200.00, Coh: 3.10 [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: 675.00 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: 7.92790 lb/US (liquid) gallon

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: 12.51801 lb/US (liquid) gallon

Hydrokinetic Pressure: 10 psi

Ballast Unit Weight: 8.34534 lb/US (liquid) gallon

In-service Load Summary:

Pressure [psi]	Deformed	Collapsed
Earth Pressure	16.2	30.0
Water Pressure	0.0	0.0
Surface Surcharge	0.0	0.0
Internal Pressure	0.0	0.0
Net Pressure	16.2	30.0
Deflection		
Earth Load Deflection	4.418	8.162
Buoyant Deflection	0.132	0.132
Reissner Effect	0	0
Net Deflection	4.550	8.294
Compressive Stress [psi]		
Compressive Wall Stress	73.0	134.9

Installation Load Summary:

Forces/Stresses	@Maximum Force	Absolute Maximum
Pullback Force [lb]	11923.2	11923.2
Pullback Stress [psi]	332.5	332.5
Pullback Strain	5.783E-3	5.783E-3
Bending Stress [psi]	0.0	25.8
Bending Strain	0	4.479E-4
Tensile Stress [psi]	332.5	357.9
Tensile Strain	5.783E-3	6.672E-3

Net External Pressure = 20.4 [psi]

Buoyant Deflection = 0.1

Hydrokinetic Force = 567.6 lb

In-service Analysis

	Calculated	Allowable	Factor of Safety	Check
Deflection [%]	4.550	7.5	1.6	OK
Unconstrained Collapse [psi]	25.6	92.0	3.6	OK
Compressive Wall Stress [psi]	73.0	1150.0	15.8	OK

Installation Analysis

	Calculated	Allowable	Factor of Safety	Check
Deflection [%]	0.065	7.5	115.8	OK
Unconstrained Collapse [psi]	35.6	235.9	6.6	OK
Tensile Stress [psi]	357.9	1200.0	3.4	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	8.75 in	64.711 psi	48.846 psi
1	8.75 in	12.00 in	64.660 psi	47.871 psi
2	12.00 in	16.13 in	64.572 psi	46.422 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]
Yes	600	37
Yes	300	32
No	200	29
No	100	25
No	6	17
No	3	15

Flow Rate (Q): 70.00 US (liquid) gallon/min

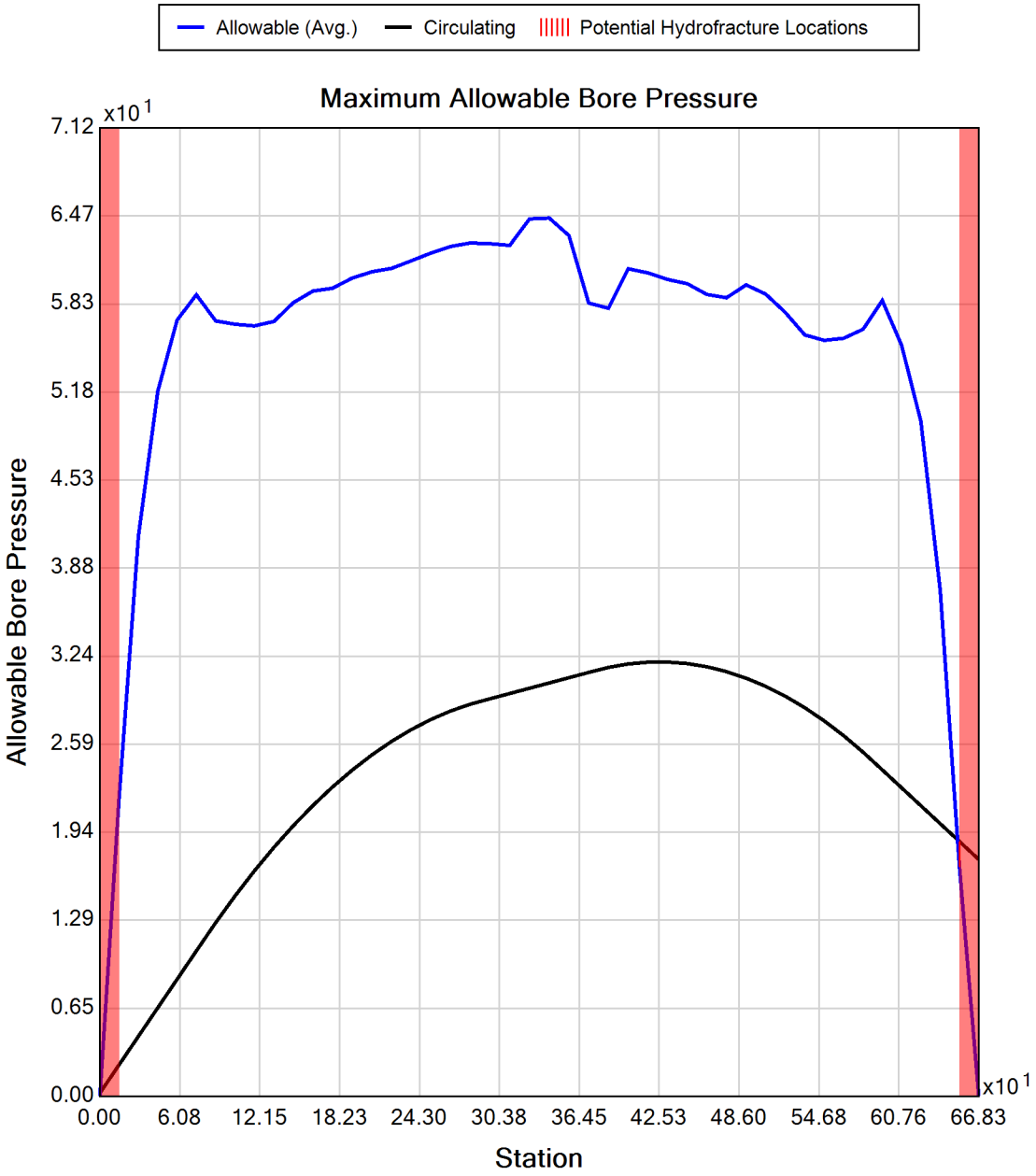
Drill Fluid Density: 10.500 lb/US (liquid) gallon

Rheological model: Bingham-Plastic

Plastic Viscosity (PV): 5.00

Yield Point (YP): 27.00

Effective Viscosity (cP): 1601.0



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General:

Kiewit - CHPE

Ref: New York

204-3701

Start Date: 07-23-2024

End Date: 11-01-2024

Designer:

Aaron Coady

Tetra Tech Rooney

115 Inverness Drive East, Suite 300

Englewood, Colorado

United States 80112

aaron.coady@tetratech.com

Description:

Segment 8 (Package 5A)
Conduit 3
HDD 87C
DWG C-368

Input Summary

Start Coordinate	(0.00, 0.00, 224.89) ft
End Coordinate	(665.00, 0.00, 224.71) ft
Project Length	665.00 ft
Pipe Type	HDPE
OD Classification	IPS
Pipe OD	3.500 in
Pipe DR	9.0
Pipe Thickness	0.39 in
Rod Length	15.00 ft
Rod Diameter	3.5 in
Drill Rig Location	(0.00, 0.00, 0.00) ft

Soil Summary

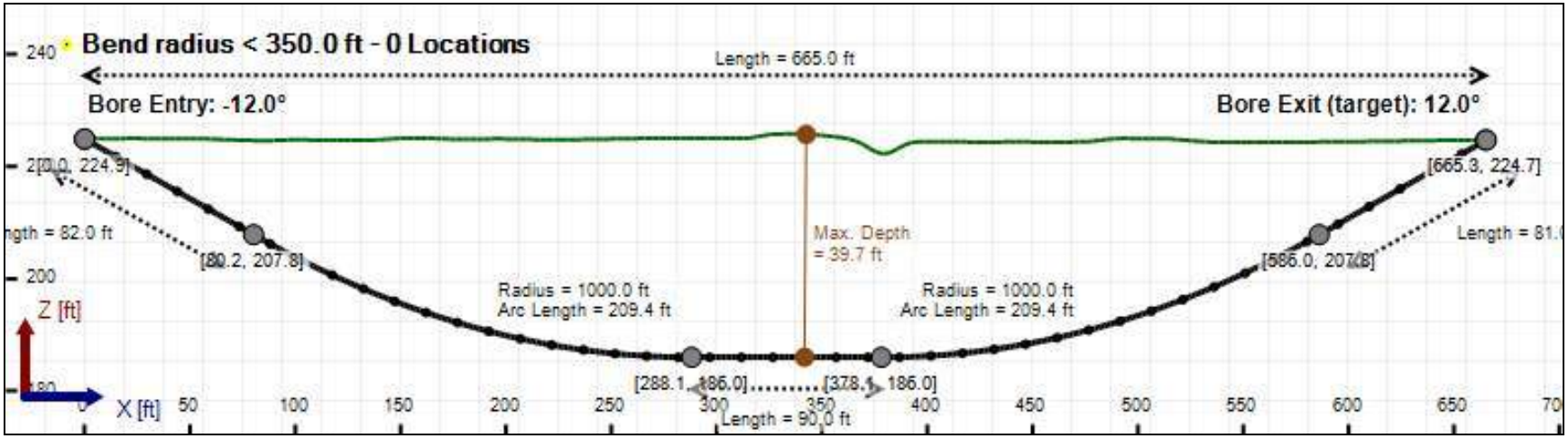
Number of Layers: 3

Soil Layer #1 USCS, Sand (S), SM
Depth: 5.00 ft
Unit Weight: 15.6618 (dry), 17.7639 (sat) [lb/US (liquid) gallon]
Phi: 30.00, S.M.: 145.00, Coh: 4.40 [psi]

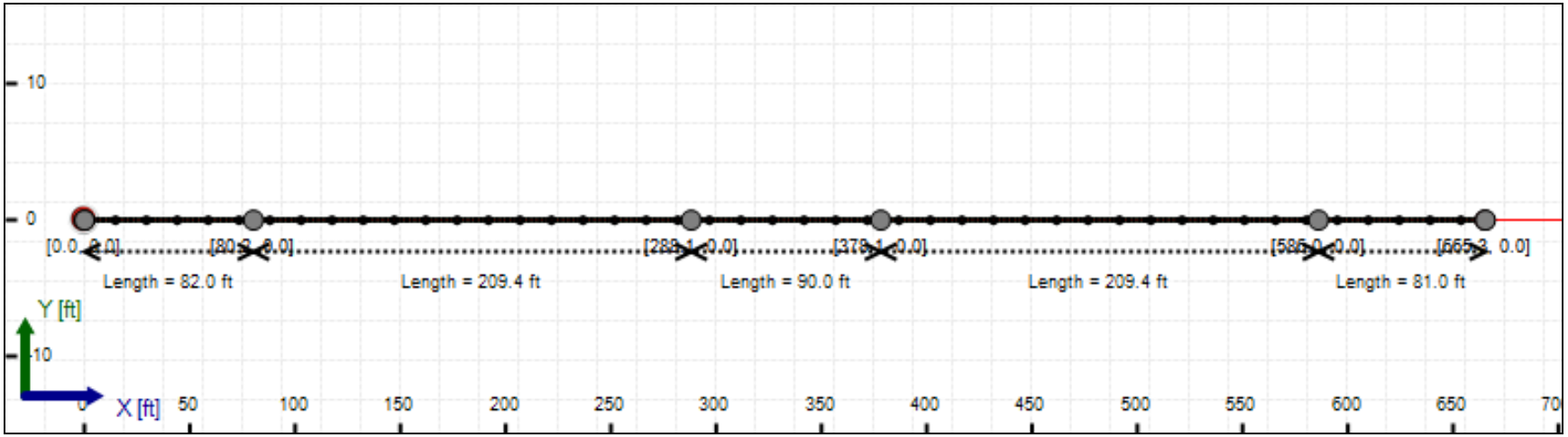
Soil Layer #2 USCS, Clay (C), CL
Depth: 10.00 ft
Unit Weight: 14.3220 (dry), 16.8861 (sat) [lb/US (liquid) gallon]
Phi: 0.00, S.M.: 400.00, Coh: 8.30 [psi]

Soil Layer #3 USCS, Clay (C), CL
Depth: 46.50 ft
Unit Weight: 14.3220 (dry), 16.8861 (sat) [lb/US (liquid) gallon]
Phi: 0.00, S.M.: 200.00, Coh: 3.10 [psi]

Bore Cross-Section View



Bore Plan View



Load Verifier Input Summary:

Pipe Application: Electrical Cable

Pipe Type: HDPE

Classification: IPS

Pipe OD: 3" (3.5")

Pipe DR: 9

Pipe Length: 675.00 ft

Internal Pressure: 0 psi

Borehole Diameter: 0.625 ft

Silo Width: 0.625 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: 7.92790 lb/US (liquid) gallon

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: 12.51801 lb/US (liquid) gallon

Hydrokinetic Pressure: 10 psi

Ballast Unit Weight: 8.34534 lb/US (liquid) gallon

In-service Load Summary:

Pressure [psi]	Deformed	Collapsed
Earth Pressure	10.0	30.0
Water Pressure	0.0	0.0
Surface Surcharge	0.0	0.0
Internal Pressure	0.0	0.0
Net Pressure	10.0	30.0
Deflection		
Earth Load Deflection	2.710	8.162
Buoyant Deflection	0.043	0.043
Reissner Effect	0	0
Net Deflection	2.753	8.205
Compressive Stress [psi]		
Compressive Wall Stress	44.8	134.9

Installation Load Summary:

Forces/Stresses	@Maximum Force	Absolute Maximum
Pullback Force [lb]	1376.5	1376.5
Pullback Stress [psi]	362.2	362.2
Pullback Strain	6.298E-3	6.298E-3
Bending Stress [psi]	0.0	8.4
Bending Strain	0	1.458E-4
Tensile Stress [psi]	362.2	370.2
Tensile Strain	6.298E-3	6.583E-3

Net External Pressure = 20.4 [psi]

Buoyant Deflection = 0.0

Hydrokinetic Force = 172.8 lb

In-service Analysis

	Calculated	Allowable	Factor of Safety	Check
Deflection [%]	2.753	7.5	2.7	OK
Unconstrained Collapse [psi]	25.6	107.9	4.2	OK
Compressive Wall Stress [psi]	44.8	1150.0	25.7	OK

Installation Analysis

	Calculated	Allowable	Factor of Safety	Check
Deflection [%]	0.021	7.5	355.7	OK
Unconstrained Collapse [psi]	35.6	236.1	6.6	OK
Tensile Stress [psi]	370.2	1200.0	3.2	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	8.75 in	64.711 psi	48.846 psi
1	8.75 in	12.00 in	64.660 psi	47.871 psi
2	12.00 in	16.13 in	64.572 psi	46.422 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]
Yes	600	37
Yes	300	32
No	200	29
No	100	25
No	6	17
No	3	15

Flow Rate (Q): 70.00 US (liquid) gallon/min

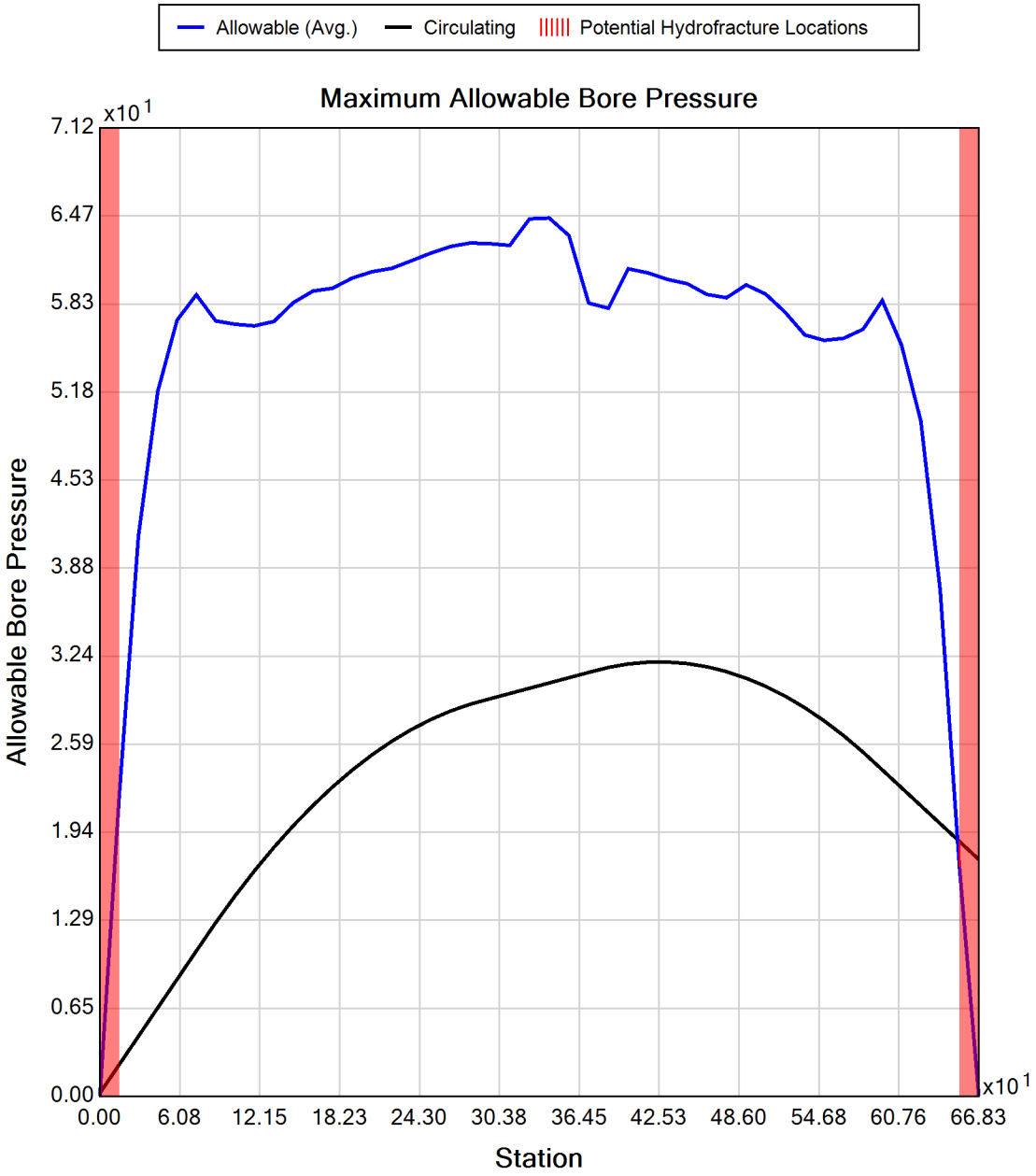
Drill Fluid Density: 10.500 lb/US (liquid) gallon

Rheological model: Bingham-Plastic

Plastic Viscosity (PV): 5.00

Yield Point (YP): 27.00

Effective Viscosity (cP): 1601.0



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Project Summary

General:	Kiewit - CHPE Ref: New York 204-3701 Start Date: 07-23-2024 End Date: 11-01-2024
Designer:	Aaron Coady Tetra Tech Rooney 115 Inverness Drive East, Suite 300 Englewood, Colorado United States 80112 aaron.coady@tetratech.com
Description:	Segment 8 (Package 5A) Conduit 2 & 3 Equivalent Pipe Bundle HDD 87C DWG C-368

Input Summary

Start Coordinate	(0.00, 0.00, 224.89) ft
End Coordinate	(665.00, 0.00, 224.71) ft
Project Length	665.00 ft
Pipe Type	HDPE
OD Classification	IPS
Pipe OD	11.305 in
Pipe DR	8.5
Pipe Thickness	1.33 in
Rod Length	15.00 ft
Rod Diameter	3.5 in
Drill Rig Location	(0.00, 0.00, 0.00) ft

Load Verifier Input Summary:

Pipe Application: Electrical Cable

Pipe Type: HDPE

Classification: IPS

Pipe OD: 11.305 in

Pipe DR: 8.5

Pipe Length: 675.00 ft

Internal Pressure: 0 psi

Borehole Diameter: 1.4129999478658 ft

Silo Width: 1.4129999478658 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: 7.92790 lb/US (liquid) gallon

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: 12.51801 lb/US (liquid) gallon

Hydrokinetic Pressure: 10 psi

Ballast Unit Weight: 8.34534 lb/US (liquid) gallon

In-service Load Summary:

Pressure [psi]	Deformed	Collapsed
Earth Pressure	16.6	30.0
Water Pressure	0.0	0.0
Surface Surcharge	0.0	0.0
Internal Pressure	0.0	0.0
Net Pressure	16.6	30.0
Deflection		
Earth Load Deflection	3.728	6.725
Buoyant Deflection	0.117	0.117
Reissner Effect	0	0
Net Deflection	3.845	6.842
Compressive Stress [psi]		
Compressive Wall Stress	70.6	127.4

Installation Load Summary:

Forces/Stresses	@Maximum Force	Absolute Maximum
Pullback Force [lb]	13054.5	13054.5
Pullback Stress [psi]	313.2	313.2
Pullback Strain	5.447E-3	5.447E-3
Bending Stress [psi]	0.0	27.1
Bending Strain	0	4.710E-4
Tensile Stress [psi]	313.2	340.2
Tensile Strain	5.447E-3	6.387E-3

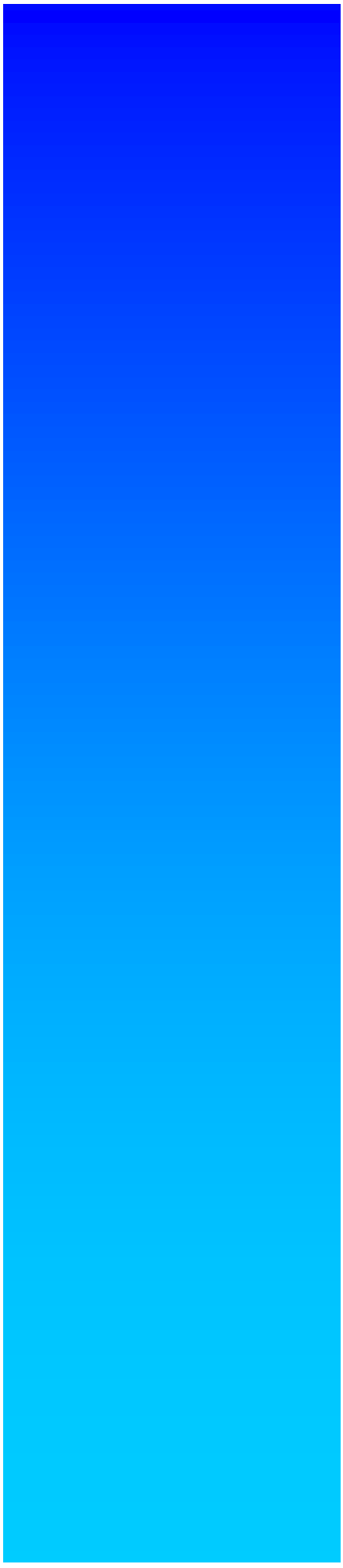
Net External Pressure = 20.4 [psi]

Buoyant Deflection = 0.1

Hydrokinetic Force = 627.2 lb

Installation Analysis

	Calculated	Allowable	Factor of Safety	Check
Deflection [%]	0.057	7.5	130.7	OK
Unconstrained Collapse [psi]	35.6	287.5	8.1	OK
Tensile Stress [psi]	340.2	1200.0	3.5	OK



Champlain Hudson Power Express

UPDATES TO
Inadvertent Release Contingency Plan for Horizontal Directional Drilling in Segment 8 - Package 5A *FOR HDD 87C*

For Design Rev. #1 || Design Rev. Date: 11/1/2024

Rotterdam to Fuera Bush
Schenectady County, New York

TTR Project Number 204-3701

Prepared for:
Transmission Developers Inc.
600 Broadway Street
Albany, NY 12207

Prepared by:
Tetra Tech Engineering and Surveying, P.C.
(A New York Professional Corporation)
115 Inverness Drive East, Suite 300
Englewood, CO 80112
(303) 792-5911

November 2024

9.0 CROSSING SPECIFIC CONDITIONS AND IR ANALYSIS

9.24 HDD CROSSING #87C

Text Revised

Subsurface conditions at HDD #87C:

Three Geotechnical bores (KB-HDD-87C-1, SY-1, and KB-HDD-87C-2) are located along the proposed HDD #87C alignment. After reviewing and comparing these samples, geotechnical boring KB-HDD-87C-2 was selected to be used in the BoreAid analysis as it best represented the complete soil strata for the HDD alignment and covered the full depth of the HDD profile. Consideration was taken for the other Geotechnical borings in the design of the HDD. KB-HDD-87C-2 was bored towards the south end of the drill path by Kiewit on 8/22/2024 and reached a total depth of 61.5 feet. After passing through a 5-foot-deep layer of silty sand with gravel (fill) the bore transitioned to a lean clay layer for the remainder of the bore path. The Geotechnical report for this HDD and test data is provided in Appendix A.

Based on the borings, the soil profile for the HDD #87C BoreAid analyses will be divided into three [3] layers: Silty Sand (SM), Lean Clay (CL), and Lean Clay (CL). The soil profiles used in the BoreAid analyses for this HDD are presented in Appendix B.

IR Risk at HDD #87C:

Preliminary analysis of the geotechnical bores, assuming typical drilling methods, indicates that the maximum allowable pressure capacity in the middle of the alignment is approximately ***65*** psi and the drill fluid pressure estimated to occur in the middle portion ranges from ***20*** to ***30*** psi. In the remaining section of the drill the maximum allowable pressure ranges from approximately ***65*** to ***20*** psi. The approximate minimum required drill fluid pressure needed to return cuttings ranges from 3 to 33 psi and the estimated operating drill fluid pressure can range from 4 to 41 psi. A sketch showing the maximum allowable pressure and the minimum required drill fluid pressure is provided in the BoreAid analyses in Appendix A.

In our opinion the conditions conducive to inadvertent releases that may exist at this site based on the ground conditions described in the boring include:

- Highly permeable soil such as cobbles and gravel in the surficial fill.
- Areas of reduced soil cover located along the alignment
- Utility pole locations.
- Existing below-grade utilities.

- Obstructions such as cobbles and boulders within the overburden soils.

It appears that there is a potential for inadvertent release at the entry and exit of the HDD (as is common). These could be controlled through the use of conductor casings, haybales, silt fences, erosion control measures and vacuum trucks.

Additional design considerations and recommended IR preventative measures include:

- Drilling an 8in or larger diameter pilot hole is recommended to reduce the required drill fluid pressures
- Requiring monitoring and controlling drilling fluid pressures with downhole sensors during pilot hole operations.
- 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.
- Increased monitoring and potential for reduced drill fluid pressures as the drill path approaches the Geotech bore locations. If a reduction in drill fluid pressures is noticed at a specific Geotech location that location can be proactively used as a strategic drill fluid containment relief well.
- If pressure is reaching the maximum allowable, the contractor can trip back as needed to clean the hole, before advancing the HDD.
- The contractor may elect to minimize drill fluid pressures as they approach the exit and/or push the drill bit over the final ***30***-feet.

Appendix A

BoreAid Calculations Revised

Appendix A

BoreAid HDD Simulation Output

Generated Output

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Designer:

Aaron Coady

Tetra Tech Rooney

115 Inverness Drive East, Suite 300

Englewood, Colorado

United States 80112

aaron.coady@tetratech.com

Description:

Segment 8 (Package 5A)
Conduit 1
HDD 87C
DWG C-367

Input Summary

Start Coordinate	(0.00, 0.00, 224.59) ft
End Coordinate	(665.00, 0.00, 225.71) ft
Project Length	665.00 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

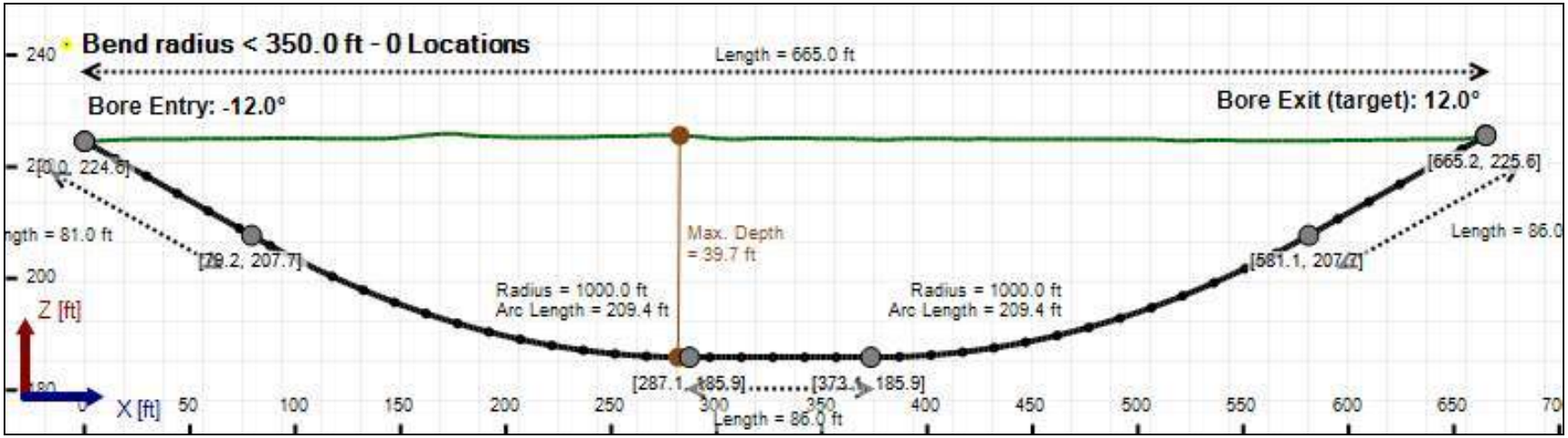
Number of Layers: 3

Soil Layer #1 USCS, Sand (S), SM
Depth: 5.00 ft
Unit Weight: 15.6618 (dry), 17.7639 (sat) [lb/US (liquid) gallon]
Phi: 30.00, S.M.: 145.00, Coh: 4.40 [psi]

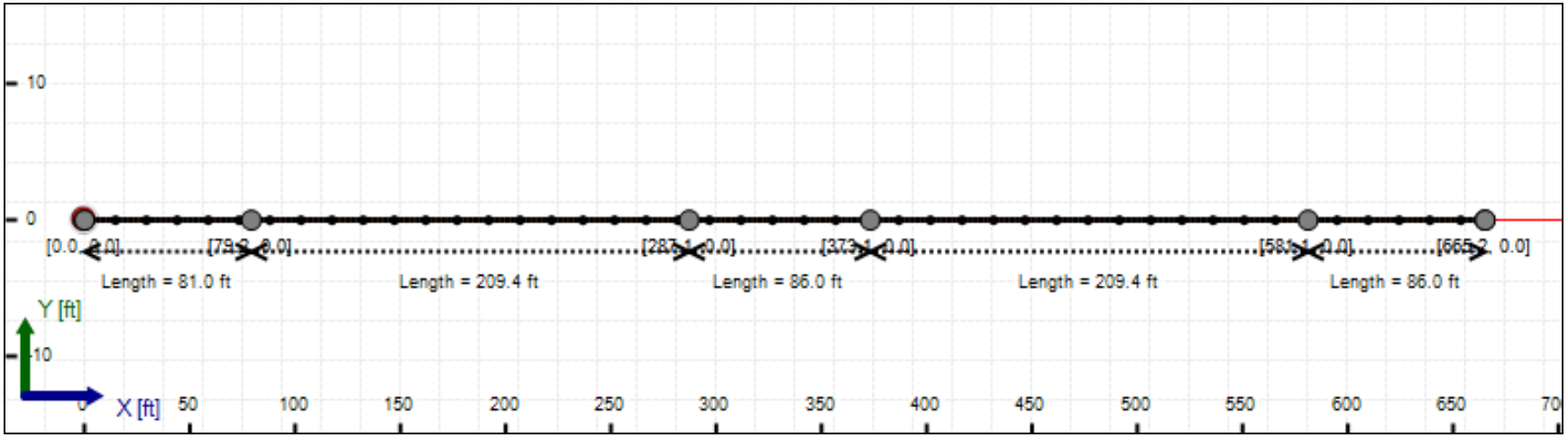
Soil Layer #2 USCS, Clay (C), CL
Depth: 10.00 ft
Unit Weight: 14.3220 (dry), 16.8861 (sat) [lb/US (liquid) gallon]
Phi: 0.00, S.M.: 400.00, Coh: 8.30 [psi]

Soil Layer #3 USCS, Clay (C), CL
Depth: 46.50 ft
Unit Weight: 14.3220 (dry), 16.8861 (sat) [lb/US (liquid) gallon]
Phi: 0.00, S.M.: 200.00, Coh: 3.10 [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: 675.00 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: 7.92790 lb/US (liquid) gallon

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: 12.51801 lb/US (liquid) gallon

Hydrokinetic Pressure: 10 psi

Ballast Unit Weight: 8.34534 lb/US (liquid) gallon

In-service Load Summary:

Pressure [psi]	Deformed	Collapsed
Earth Pressure	13.6	30.0
Water Pressure	0.0	0.0
Surface Surcharge	0.0	0.0
Internal Pressure	0.0	0.0
Net Pressure	13.6	30.0
Deflection		
Earth Load Deflection	3.698	8.168
Buoyant Deflection	0.132	0.132
Reissner Effect	0	0
Net Deflection	3.830	8.300
Compressive Stress [psi]		
Compressive Wall Stress	61.1	135.0

Installation Load Summary:

Forces/Stresses	@Maximum Force	Absolute Maximum
Pullback Force [lb]	11994.0	11994.0
Pullback Stress [psi]	334.5	334.5
Pullback Strain	5.817E-3	5.817E-3
Bending Stress [psi]	0.0	25.8
Bending Strain	0	4.479E-4
Tensile Stress [psi]	334.5	359.8
Tensile Strain	5.817E-3	6.705E-3

Net External Pressure = 21.2 [psi]

Buoyant Deflection = 0.1

Hydrokinetic Force = 567.6 lb

In-service Analysis

	Calculated	Allowable	Factor of Safety	Check
Deflection [%]	3.830	7.5	2.0	OK
Unconstrained Collapse [psi]	26.3	98.1	3.7	OK
Compressive Wall Stress [psi]	61.1	1150.0	18.8	OK

Installation Analysis

	Calculated	Allowable	Factor of Safety	Check
Deflection [%]	0.065	7.5	115.8	OK
Unconstrained Collapse [psi]	36.2	235.8	6.5	OK
Tensile Stress [psi]	359.8	1200.0	3.3	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	8.75 in	65.230 psi	50.303 psi
1	8.75 in	12.00 in	65.178 psi	49.505 psi
2	12.00 in	16.13 in	65.090 psi	48.288 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]
Yes	600	37
Yes	300	32
No	200	29
No	100	25
No	6	17
No	3	15

Flow Rate (Q): 70.00 US (liquid) gallon/min

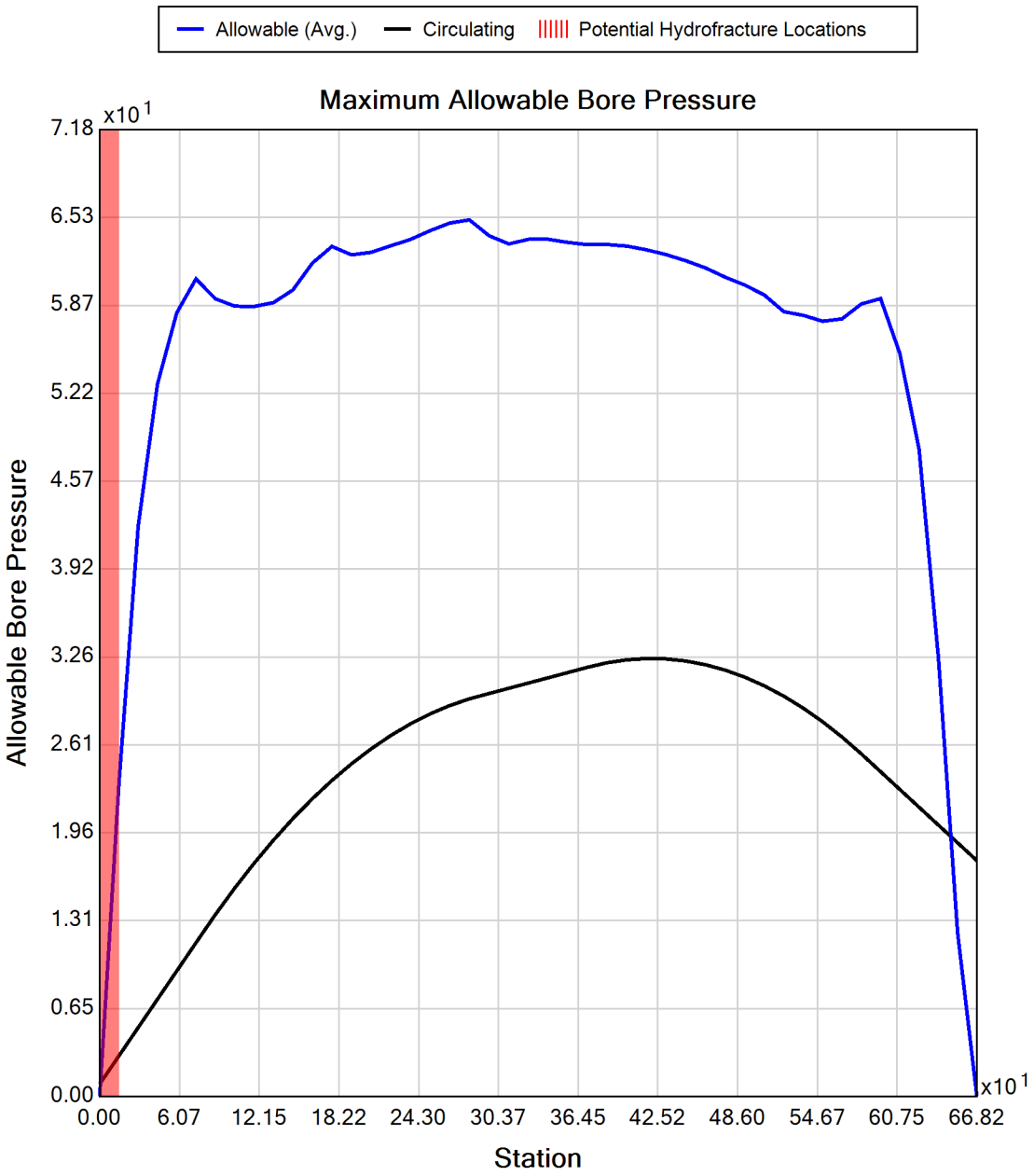
Drill Fluid Density: 10.500 lb/US (liquid) gallon

Rheological model: Bingham-Plastic

Plastic Viscosity (PV): 5.00

Yield Point (YP): 27.00

Effective Viscosity (cP): 1601.0



Generated Output

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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:

Kiewit - CHPE

Ref: New York

204-3701

Start Date: 07-23-2024

End Date: 11-01-2024

Designer:

Aaron Coady

Tetra Tech Rooney

115 Inverness Drive East, Suite 300

Englewood, Colorado

United States 80112

aaron.coady@tetratech.com

Description:

Segment 8 (Package 5A)
Conduit 2
HDD 87C
DWG C-368

Input Summary

Start Coordinate	(0.00, 0.00, 224.89) ft
End Coordinate	(665.00, 0.00, 224.71) ft
Project Length	665.00 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

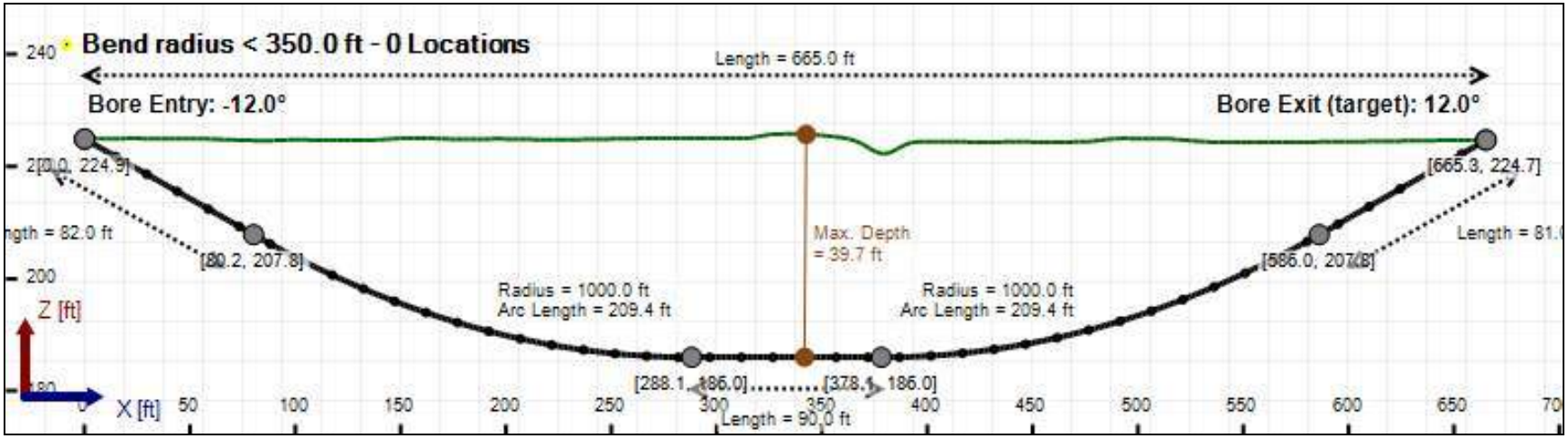
Number of Layers: 3

Soil Layer #1 USCS, Sand (S), SM
Depth: 5.00 ft
Unit Weight: 15.6618 (dry), 17.7639 (sat) [lb/US (liquid) gallon]
Phi: 30.00, S.M.: 145.00, Coh: 4.40 [psi]

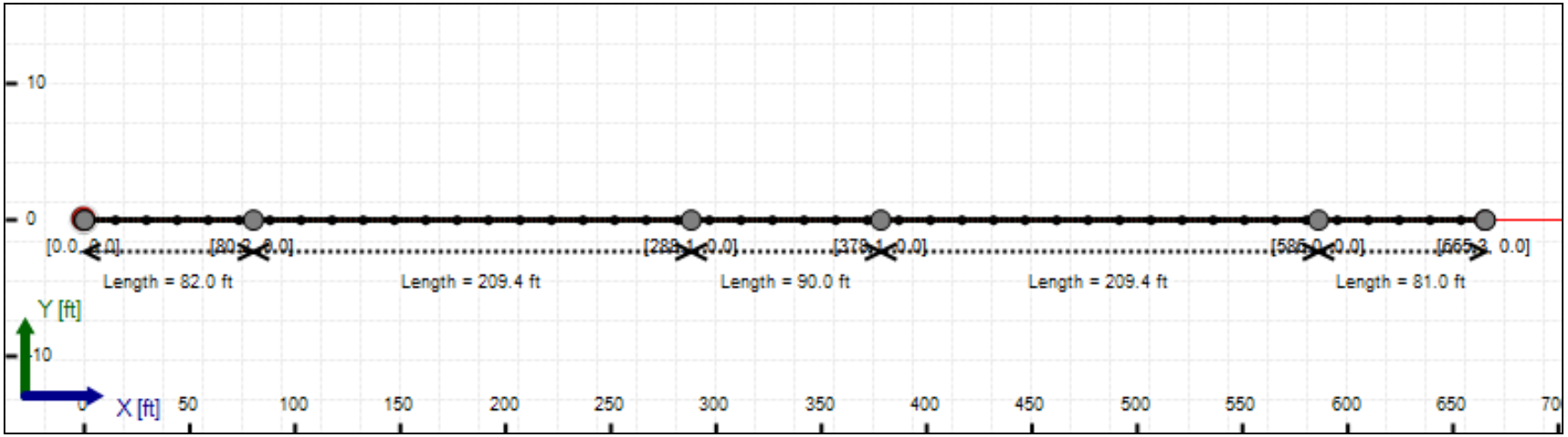
Soil Layer #2 USCS, Clay (C), CL
Depth: 10.00 ft
Unit Weight: 14.3220 (dry), 16.8861 (sat) [lb/US (liquid) gallon]
Phi: 0.00, S.M.: 400.00, Coh: 8.30 [psi]

Soil Layer #3 USCS, Clay (C), CL
Depth: 46.50 ft
Unit Weight: 14.3220 (dry), 16.8861 (sat) [lb/US (liquid) gallon]
Phi: 0.00, S.M.: 200.00, Coh: 3.10 [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: 675.00 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: 7.92790 lb/US (liquid) gallon

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: 12.51801 lb/US (liquid) gallon

Hydrokinetic Pressure: 10 psi

Ballast Unit Weight: 8.34534 lb/US (liquid) gallon

In-service Load Summary:

Pressure [psi]	Deformed	Collapsed
Earth Pressure	16.2	30.0
Water Pressure	0.0	0.0
Surface Surcharge	0.0	0.0
Internal Pressure	0.0	0.0
Net Pressure	16.2	30.0
Deflection		
Earth Load Deflection	4.418	8.162
Buoyant Deflection	0.132	0.132
Reissner Effect	0	0
Net Deflection	4.550	8.294
Compressive Stress [psi]		
Compressive Wall Stress	73.0	134.9

Installation Load Summary:

Forces/Stresses	@Maximum Force	Absolute Maximum
Pullback Force [lb]	11923.2	11923.2
Pullback Stress [psi]	332.5	332.5
Pullback Strain	5.783E-3	5.783E-3
Bending Stress [psi]	0.0	25.8
Bending Strain	0	4.479E-4
Tensile Stress [psi]	332.5	357.9
Tensile Strain	5.783E-3	6.672E-3

Net External Pressure = 20.4 [psi]

Buoyant Deflection = 0.1

Hydrokinetic Force = 567.6 lb

In-service Analysis

	Calculated	Allowable	Factor of Safety	Check
Deflection [%]	4.550	7.5	1.6	OK
Unconstrained Collapse [psi]	25.6	92.0	3.6	OK
Compressive Wall Stress [psi]	73.0	1150.0	15.8	OK

Installation Analysis

	Calculated	Allowable	Factor of Safety	Check
Deflection [%]	0.065	7.5	115.8	OK
Unconstrained Collapse [psi]	35.6	235.9	6.6	OK
Tensile Stress [psi]	357.9	1200.0	3.4	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	8.75 in	64.711 psi	48.846 psi
1	8.75 in	12.00 in	64.660 psi	47.871 psi
2	12.00 in	16.13 in	64.572 psi	46.422 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]
Yes	600	37
Yes	300	32
No	200	29
No	100	25
No	6	17
No	3	15

Flow Rate (Q): 70.00 US (liquid) gallon/min

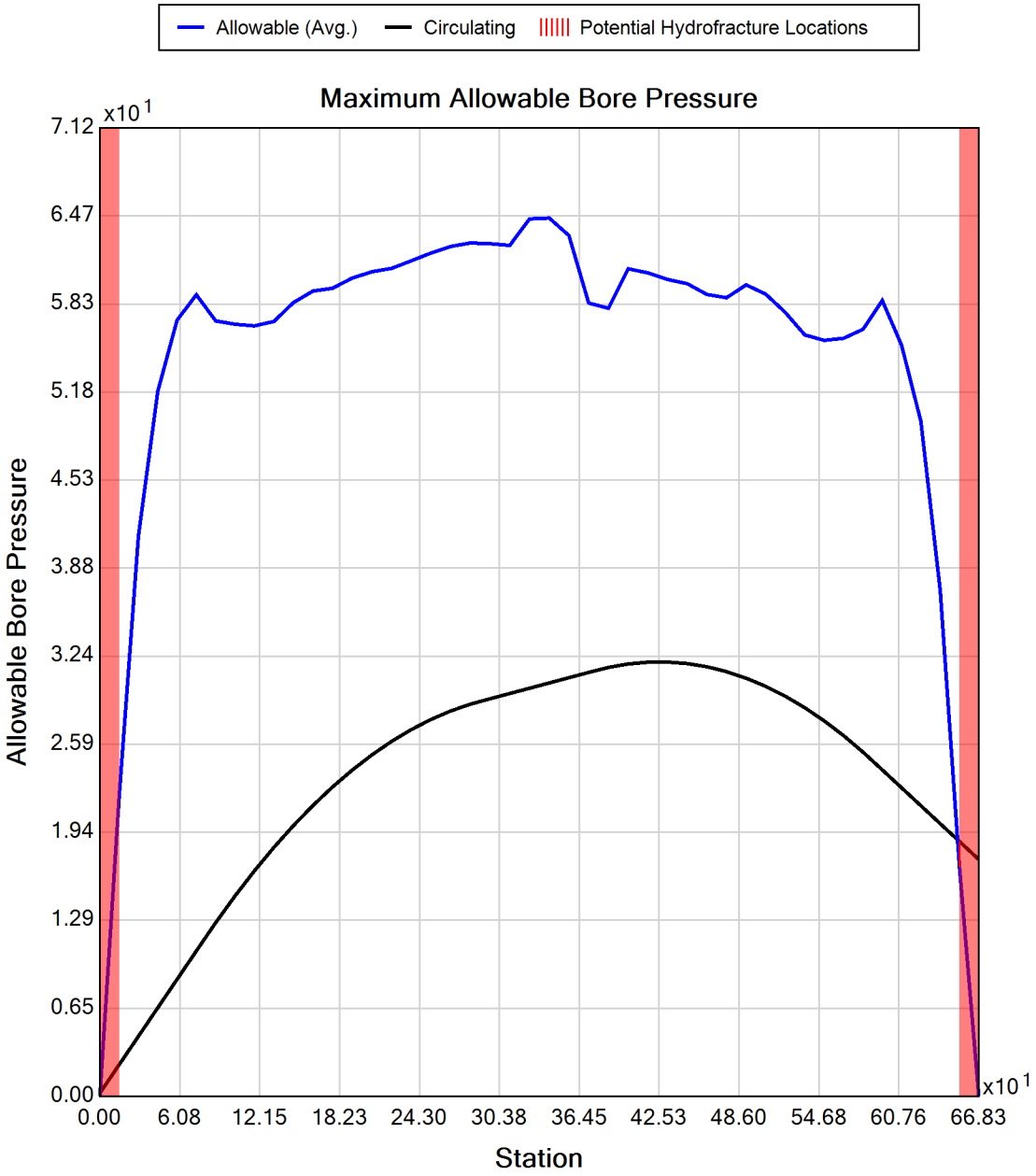
Drill Fluid Density: 10.500 lb/US (liquid) gallon

Rheological model: Bingham-Plastic

Plastic Viscosity (PV): 5.00

Yield Point (YP): 27.00

Effective Viscosity (cP): 1601.0



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Project Summary

General:

Kiewit - CHPE

Ref: New York

204-3701

Start Date: 07-23-2024

End Date: 11-01-2024

Designer:

Aaron Coady

Tetra Tech Rooney

115 Inverness Drive East, Suite 300

Englewood, Colorado

United States 80112

aaron.coady@tetratech.com

Description:

Segment 8 (Package 5A)
Conduit 3
HDD 87C
DWG C-368

Input Summary

Start Coordinate	(0.00, 0.00, 224.89) ft
End Coordinate	(665.00, 0.00, 224.71) ft
Project Length	665.00 ft
Pipe Type	HDPE
OD Classification	IPS
Pipe OD	3.500 in
Pipe DR	9.0
Pipe Thickness	0.39 in
Rod Length	15.00 ft
Rod Diameter	3.5 in
Drill Rig Location	(0.00, 0.00, 0.00) ft

Soil Summary

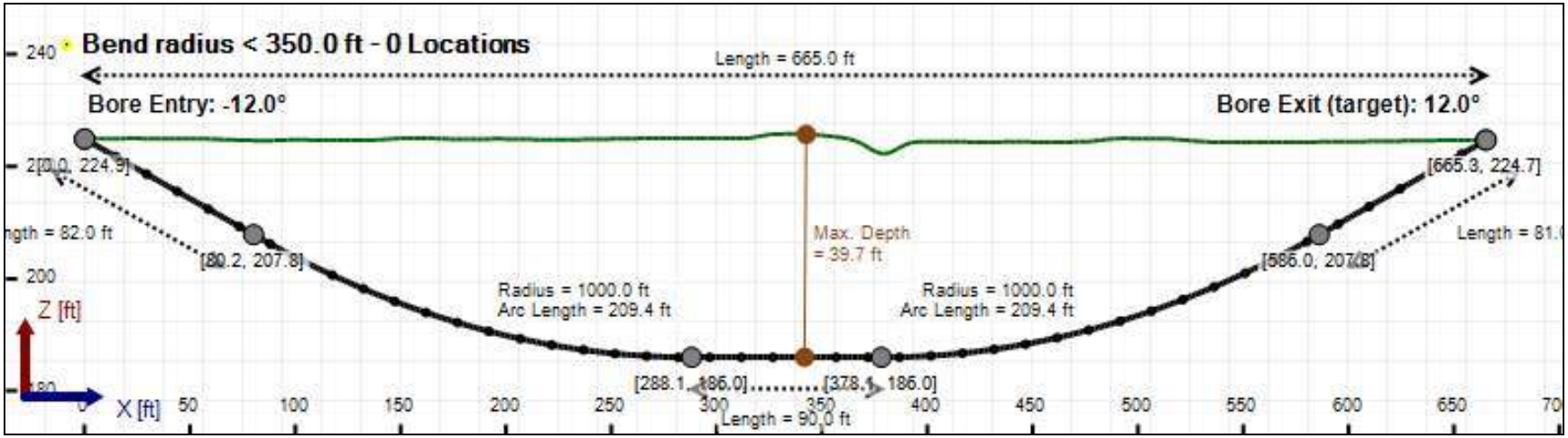
Number of Layers: 3

Soil Layer #1 USCS, Sand (S), SM
Depth: 5.00 ft
Unit Weight: 15.6618 (dry), 17.7639 (sat) [lb/US (liquid) gallon]
Phi: 30.00, S.M.: 145.00, Coh: 4.40 [psi]

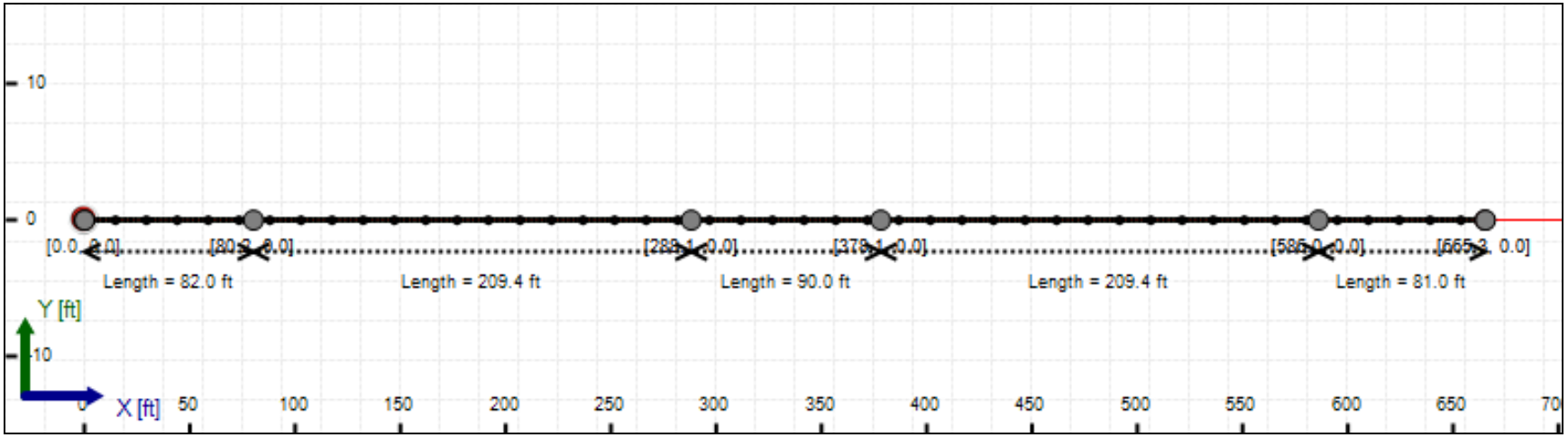
Soil Layer #2 USCS, Clay (C), CL
Depth: 10.00 ft
Unit Weight: 14.3220 (dry), 16.8861 (sat) [lb/US (liquid) gallon]
Phi: 0.00, S.M.: 400.00, Coh: 8.30 [psi]

Soil Layer #3 USCS, Clay (C), CL
Depth: 46.50 ft
Unit Weight: 14.3220 (dry), 16.8861 (sat) [lb/US (liquid) gallon]
Phi: 0.00, S.M.: 200.00, Coh: 3.10 [psi]

Bore Cross-Section View



Bore Plan View



Load Verifier Input Summary:

Pipe Application: Electrical Cable

Pipe Type: HDPE

Classification: IPS

Pipe OD: 3" (3.5")

Pipe DR: 9

Pipe Length: 675.00 ft

Internal Pressure: 0 psi

Borehole Diameter: 0.625 ft

Silo Width: 0.625 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: 7.92790 lb/US (liquid) gallon

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: 12.51801 lb/US (liquid) gallon

Hydrokinetic Pressure: 10 psi

Ballast Unit Weight: 8.34534 lb/US (liquid) gallon

In-service Load Summary:

Pressure [psi]	Deformed	Collapsed
Earth Pressure	10.0	30.0
Water Pressure	0.0	0.0
Surface Surcharge	0.0	0.0
Internal Pressure	0.0	0.0
Net Pressure	10.0	30.0
Deflection		
Earth Load Deflection	2.710	8.162
Buoyant Deflection	0.043	0.043
Reissner Effect	0	0
Net Deflection	2.753	8.205
Compressive Stress [psi]		
Compressive Wall Stress	44.8	134.9

Installation Load Summary:

Forces/Stresses	@Maximum Force	Absolute Maximum
Pullback Force [lb]	1376.5	1376.5
Pullback Stress [psi]	362.2	362.2
Pullback Strain	6.298E-3	6.298E-3
Bending Stress [psi]	0.0	8.4
Bending Strain	0	1.458E-4
Tensile Stress [psi]	362.2	370.2
Tensile Strain	6.298E-3	6.583E-3

Net External Pressure = 20.4 [psi]

Buoyant Deflection = 0.0

Hydrokinetic Force = 172.8 lb

In-service Analysis

	Calculated	Allowable	Factor of Safety	Check
Deflection [%]	2.753	7.5	2.7	OK
Unconstrained Collapse [psi]	25.6	107.9	4.2	OK
Compressive Wall Stress [psi]	44.8	1150.0	25.7	OK

Installation Analysis

	Calculated	Allowable	Factor of Safety	Check
Deflection [%]	0.021	7.5	355.7	OK
Unconstrained Collapse [psi]	35.6	236.1	6.6	OK
Tensile Stress [psi]	370.2	1200.0	3.2	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	8.75 in	64.711 psi	48.846 psi
1	8.75 in	12.00 in	64.660 psi	47.871 psi
2	12.00 in	16.13 in	64.572 psi	46.422 psi

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Estimated Circulating Pressure Summary

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

Flow Rate (Q): 70.00 US (liquid) gallon/min

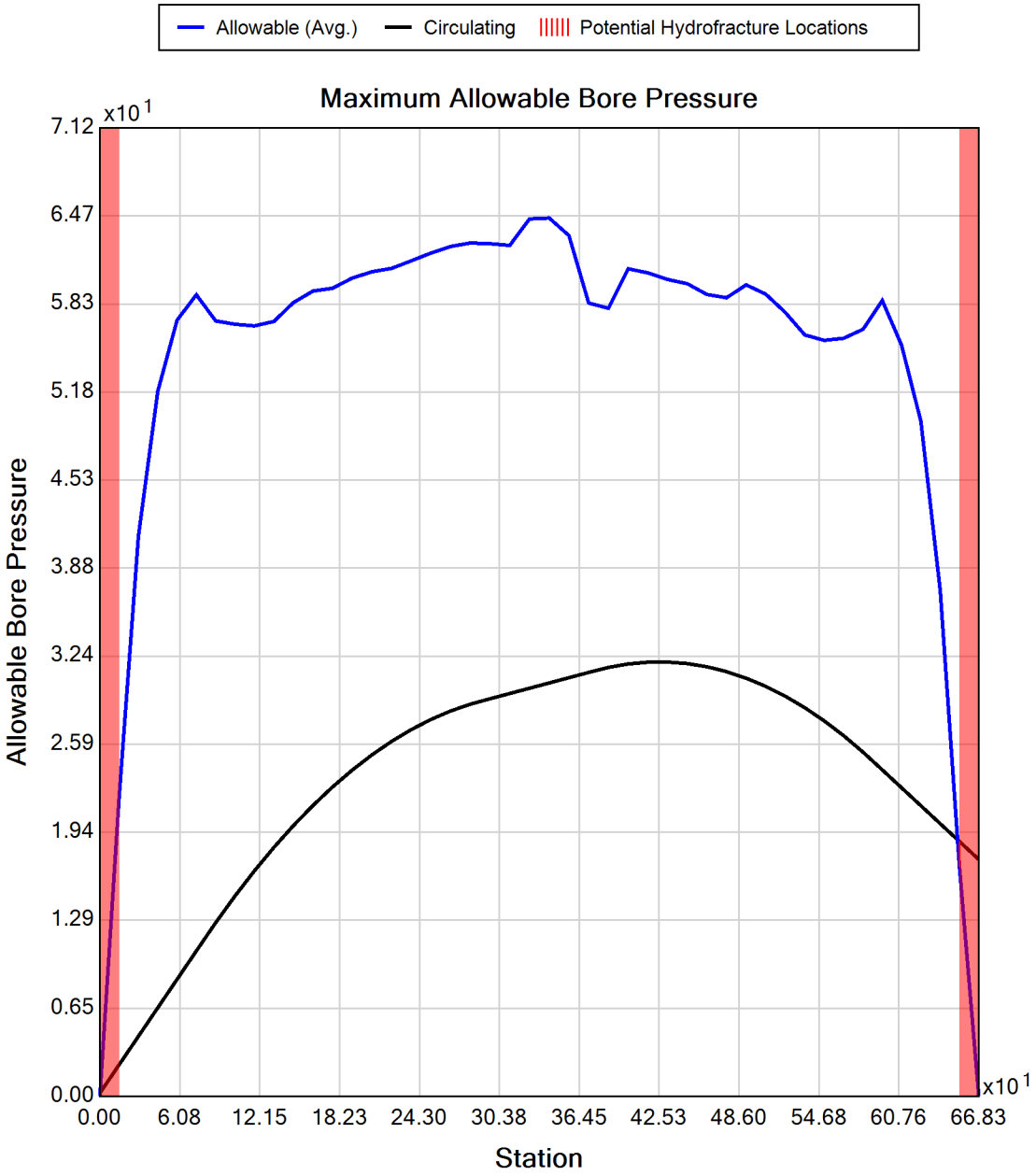
Drill Fluid Density: 10.500 lb/US (liquid) gallon

Rheological model: Bingham-Plastic

Plastic Viscosity (PV): 5.00

Yield Point (YP): 27.00

Effective Viscosity (cP): 1601.0



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Project Summary

General:	Kiewit - CHPE Ref: New York 204-3701 Start Date: 07-23-2024 End Date: 11-01-2024
Designer:	Aaron Coady Tetra Tech Rooney 115 Inverness Drive East, Suite 300 Englewood, Colorado United States 80112 aaron.coady@tetratech.com
Description:	Segment 8 (Package 5A) Conduit 2 & 3 Equivalent Pipe Bundle HDD 87C DWG C-368

Input Summary

Start Coordinate	(0.00, 0.00, 224.89) ft
End Coordinate	(665.00, 0.00, 224.71) ft
Project Length	665.00 ft
Pipe Type	HDPE
OD Classification	IPS
Pipe OD	11.305 in
Pipe DR	8.5
Pipe Thickness	1.33 in
Rod Length	15.00 ft
Rod Diameter	3.5 in
Drill Rig Location	(0.00, 0.00, 0.00) ft

Load Verifier Input Summary:

Pipe Application: Electrical Cable

Pipe Type: HDPE

Classification: IPS

Pipe OD: 11.305 in

Pipe DR: 8.5

Pipe Length: 675.00 ft

Internal Pressure: 0 psi

Borehole Diameter: 1.4129999478658 ft

Silo Width: 1.4129999478658 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: 7.92790 lb/US (liquid) gallon

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: 12.51801 lb/US (liquid) gallon

Hydrokinetic Pressure: 10 psi

Ballast Unit Weight: 8.34534 lb/US (liquid) gallon

In-service Load Summary:

Pressure [psi]	Deformed	Collapsed
Earth Pressure	16.6	30.0
Water Pressure	0.0	0.0
Surface Surcharge	0.0	0.0
Internal Pressure	0.0	0.0
Net Pressure	16.6	30.0
Deflection		
Earth Load Deflection	3.728	6.725
Buoyant Deflection	0.117	0.117
Reissner Effect	0	0
Net Deflection	3.845	6.842
Compressive Stress [psi]		
Compressive Wall Stress	70.6	127.4

Installation Load Summary:

Forces/Stresses	@Maximum Force	Absolute Maximum
Pullback Force [lb]	13054.5	13054.5
Pullback Stress [psi]	313.2	313.2
Pullback Strain	5.447E-3	5.447E-3
Bending Stress [psi]	0.0	27.1
Bending Strain	0	4.710E-4
Tensile Stress [psi]	313.2	340.2
Tensile Strain	5.447E-3	6.387E-3

Net External Pressure = 20.4 [psi]

Buoyant Deflection = 0.1

Hydrokinetic Force = 627.2 lb

Installation Analysis

	Calculated	Allowable	Factor of Safety	Check
Deflection [%]	0.057	7.5	130.7	OK
Unconstrained Collapse [psi]	35.6	287.5	8.1	OK
Tensile Stress [psi]	340.2	1200.0	3.5	OK