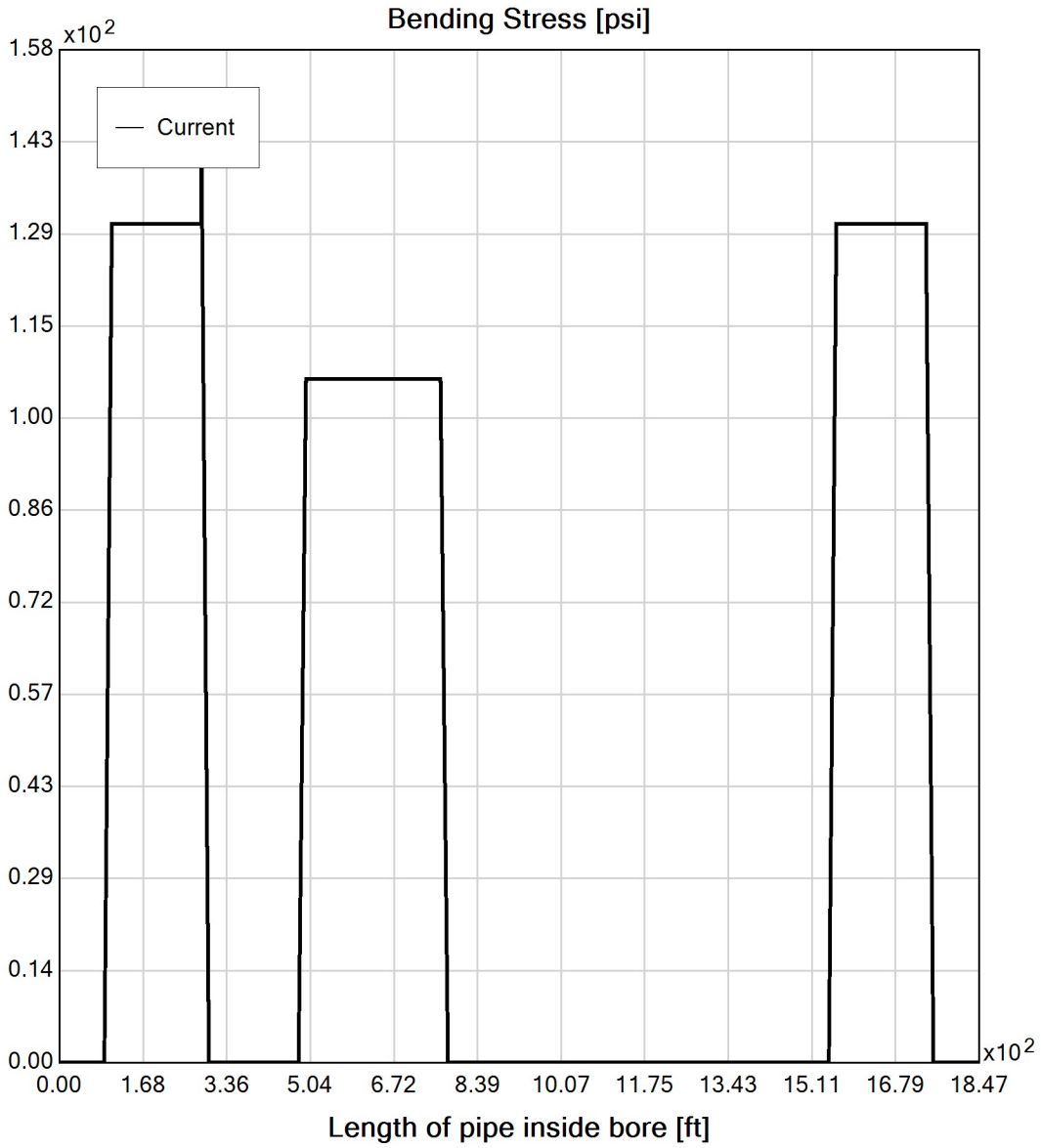

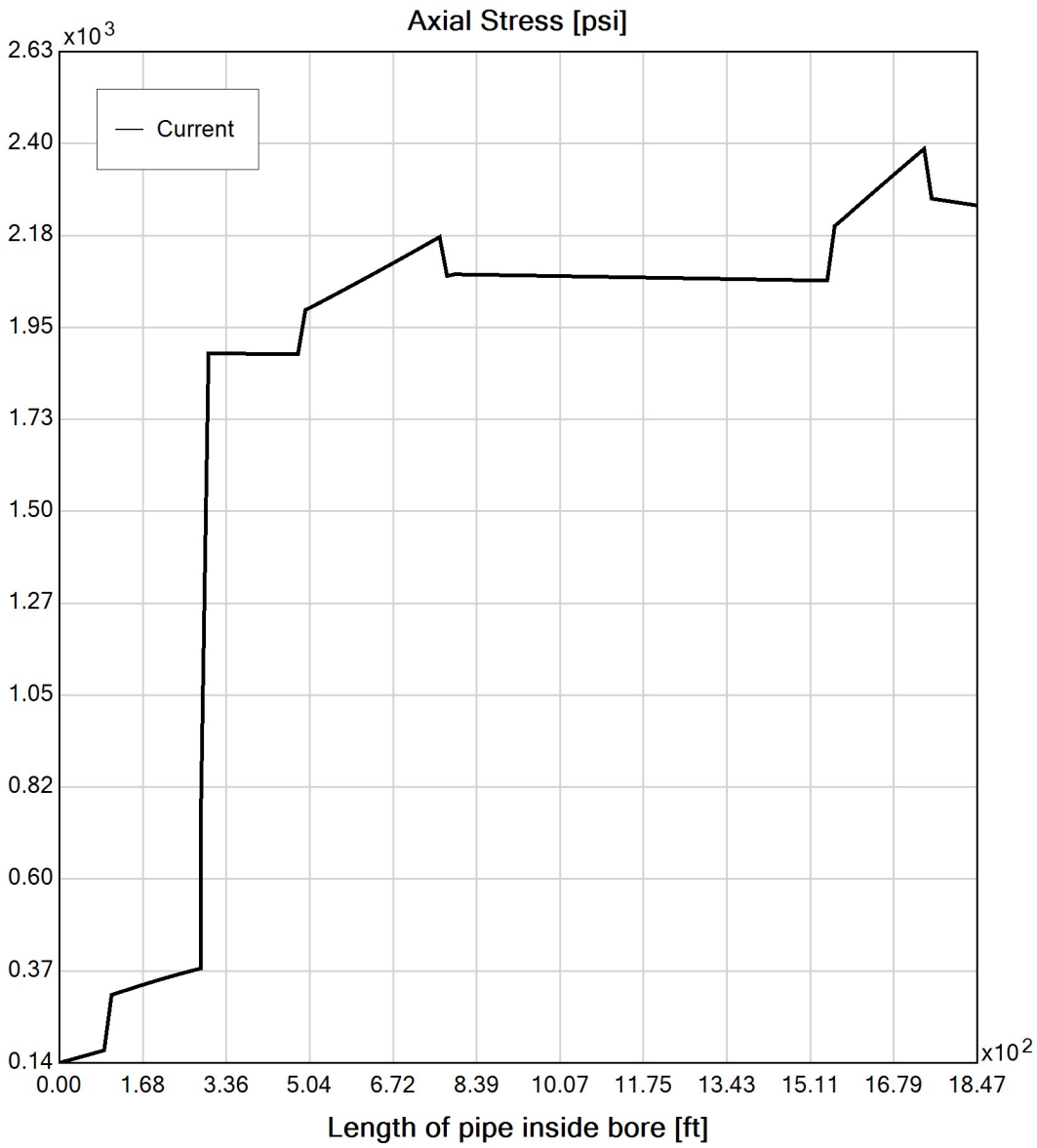

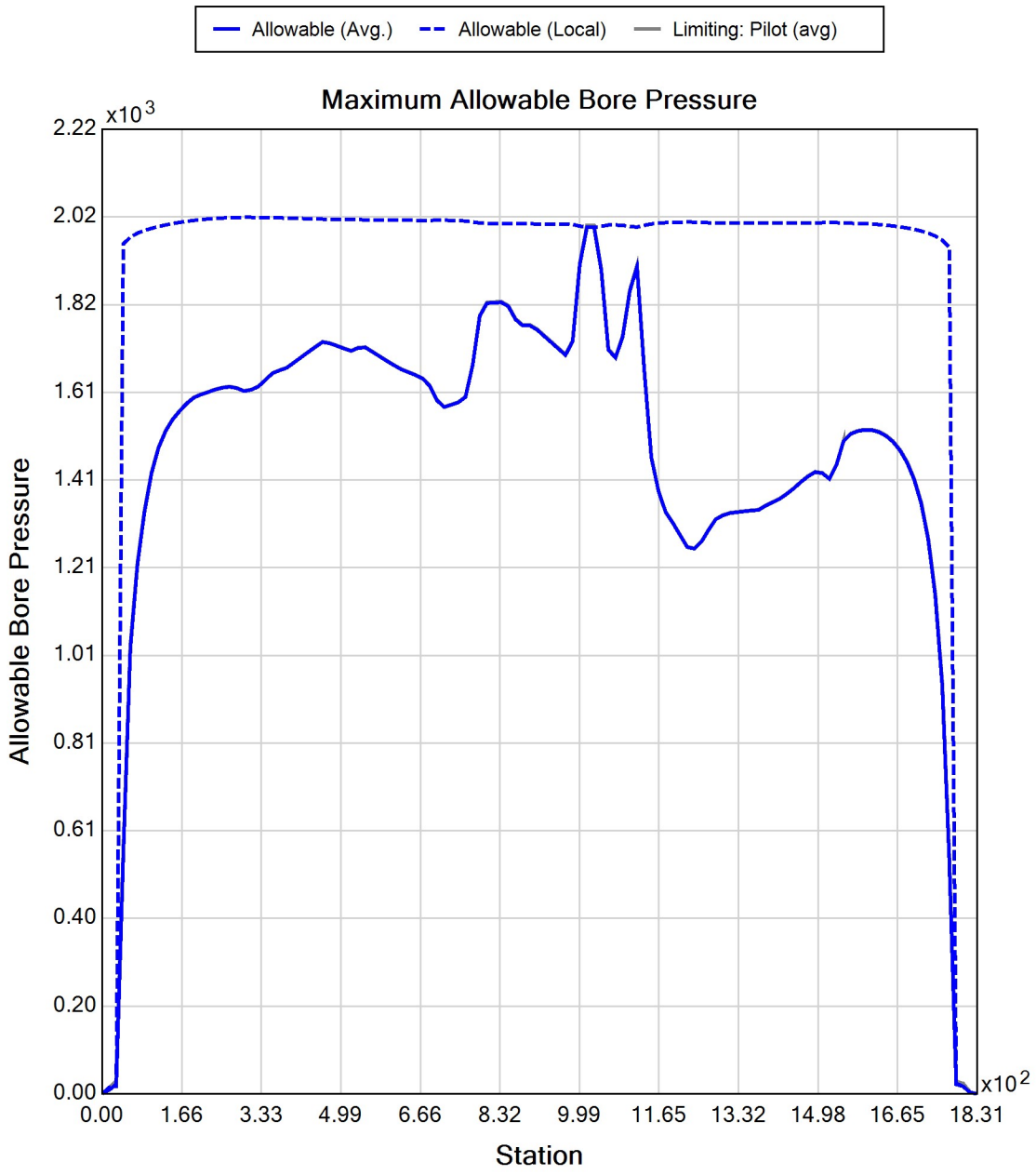

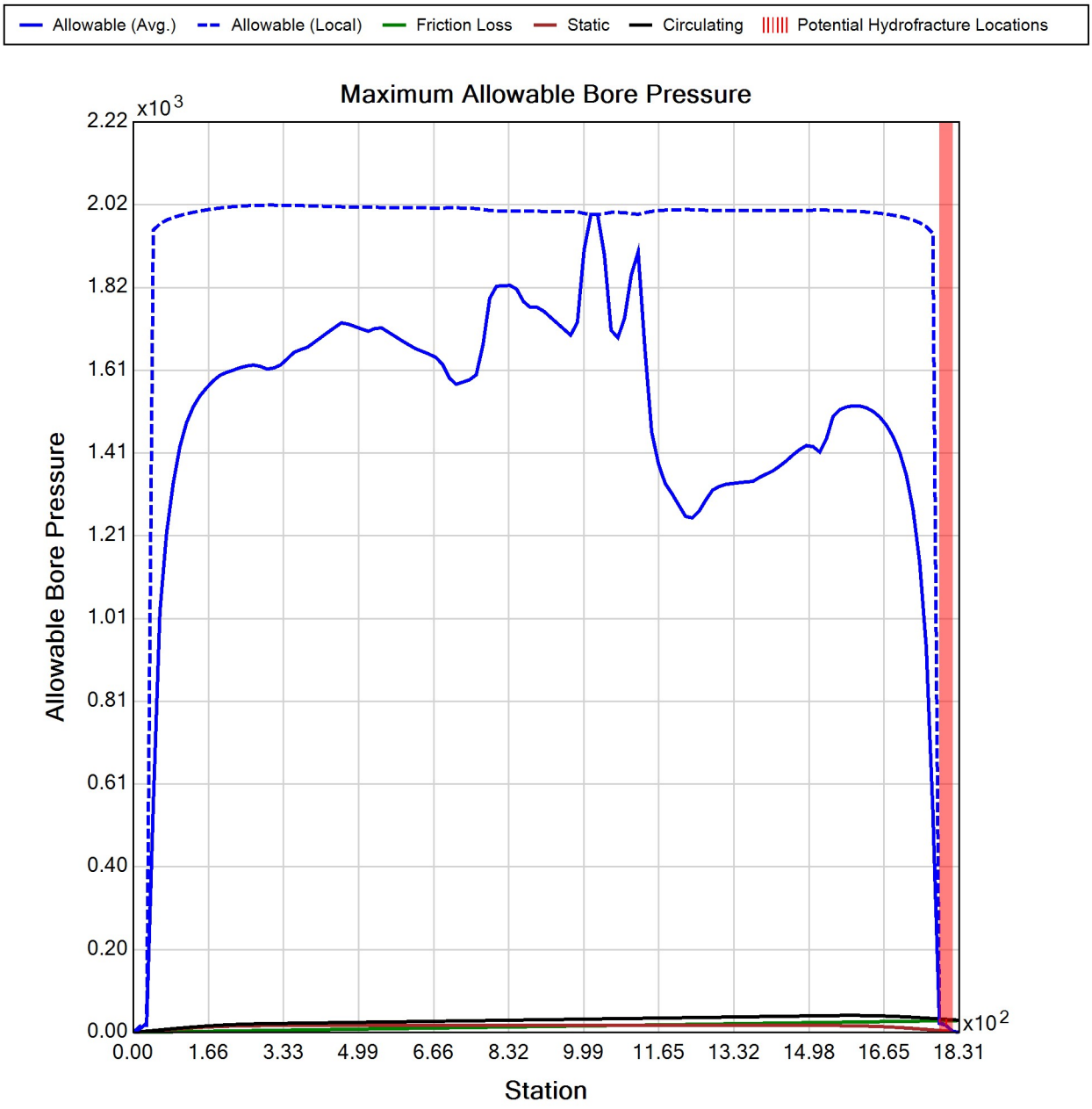

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Project Summary

General:	CHPE HDD 59A
	P4A
	Start Date: 05-16-2023
	End Date: 05-16-2023
Project Owner:	TDI
Project Contractor:	Kiewit
Project Consultant:	CHA/BCE
Designer:	MDB
	BCE
Description:	HDD 59A 3-inch DR7 HDPE Telecom Ballast Rollers C1

Input Summary

Start Coordinate	(0.00, 0.00, 264.60) ft
End Coordinate	(1826.00, 0.00, 262.20) ft
Project Length	1826.00 ft
Pipe Type	HDPE
OD Classification	IPS
Pipe OD	3.500 in
Pipe DR	7.0
Pipe Thickness	0.50 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: 3" (3.5")
Pipe DR: 7
Pipe Length: 1845.00 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: 59.30500 lb/ft3
Allowable Tensile Stress (Short Term): 1300 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: 0.1
Surface-pipe friction coefficient in borehole: 0.3
Pipe-soil friction angle: 30
Slurry Unit Weight: 93.64118 lb/ft3
Hydrokinetic Pressure: 10 psi
Ballast Unit Weight: 62.42746 lb/ft3

In-service Load Summary:

Pressure [psi]	Deformed	Collapsed
Earth Pressure	2.6	28.3
Water Pressure	14.8	14.7
Surface Surcharge	0.0	0.0
Internal Pressure	0.0	0.0
Net Pressure	17.4	43.0
Deflection		
Earth Load Deflection	0.320	3.248
Buoyant Deflection	0.020	0.020
Reissner Effect	0	0
Net Deflection	0.340	3.268
Compressive Stress [psi]		
Compressive Wall Stress	60.8	150.5

Installation Load Summary:

Forces/Stresses	@Maximum Force	Absolute Maximum
Pullback Force [lb]	6325.1	6325.1
Pullback Stress [psi]	1342.2	1342.2
Pullback Strain	2.334E-2	2.334E-2
Bending Stress [psi]	0.0	8.4
Bending Strain	0	1.455E-4
Tensile Stress [psi]	1342.2	1345.5
Tensile Strain	2.334E-2	2.353E-2

Net External Pressure = 13.4 [psi]

Buoyant Deflection = 0.0

Hydrokinetic Force = 172.8 lb

In-service Analysis

	Calculated	Allowable	Factor of Safety	Check
Deflection [%]	0.340	7.5	22.1	OK
Unconstrained Collapse [psi]	22.5	317.5	14.1	OK
Compressive Wall Stress [psi]	60.8	1150.0	18.9	OK

Installation Analysis

	Calculated	Allowable	Factor of Safety	Check
Deflection [%]	0.010	7.5	756.1	OK
Unconstrained Collapse [psi]	17.5	403.1	23.0	OK
Tensile Stress [psi]	1345.5	1300.0	1.0	OK

Generated Output

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Project Summary

General:	CHPE HDD 59A P4A Start Date: 07-31-2023 End Date: 07-31-2023
Project Owner:	TDI
Project Contractor:	Kiewit
Project Consultant:	CHA/BCE
Designer:	MDB BCE
Description:	HDD 59A 8-inch DR18 . Ballast Rollers PVC pipe C2

Input Summary

Start Coordinate	(0.00, 0.00, 264.60) ft
End Coordinate	(1826.00, 0.00, 262.00) ft
Project Length	1826.00 ft
Pipe Type	PVC
OD Classification	IPS
Pipe OD	8.625 in
Pipe DR	18.0
Pipe Thickness	0.48 in
Rod Length	15.00 ft
Rod Diameter	3.5 in
Drill Rig Location	(0.00, 0.00, 0.00) ft

Soil Summary

Number of Layers: 4

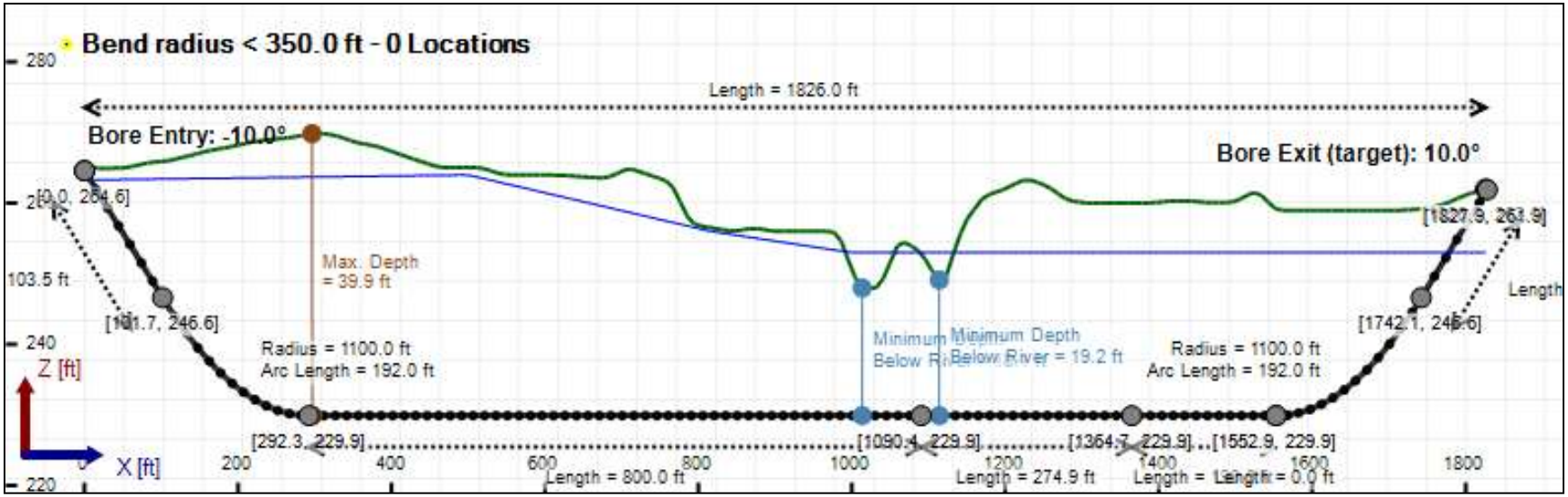
Soil Layer #1 USCS, Sand (S), SP
From Assistant
Unit Weight: 110.0000 (dry), 125.0000 (sat) [lb/ft3]
Phi: 34.00, S.M.: 500.00, Coh: 0.00 [psi]

Soil Layer #2 USCS, Clay (C), CL
From Assistant
Unit Weight: 80.0000 (dry), 110.0000 (sat) [lb/ft3]
Phi: 0.00, S.M.: 300.00, Coh: 5.10 [psi]

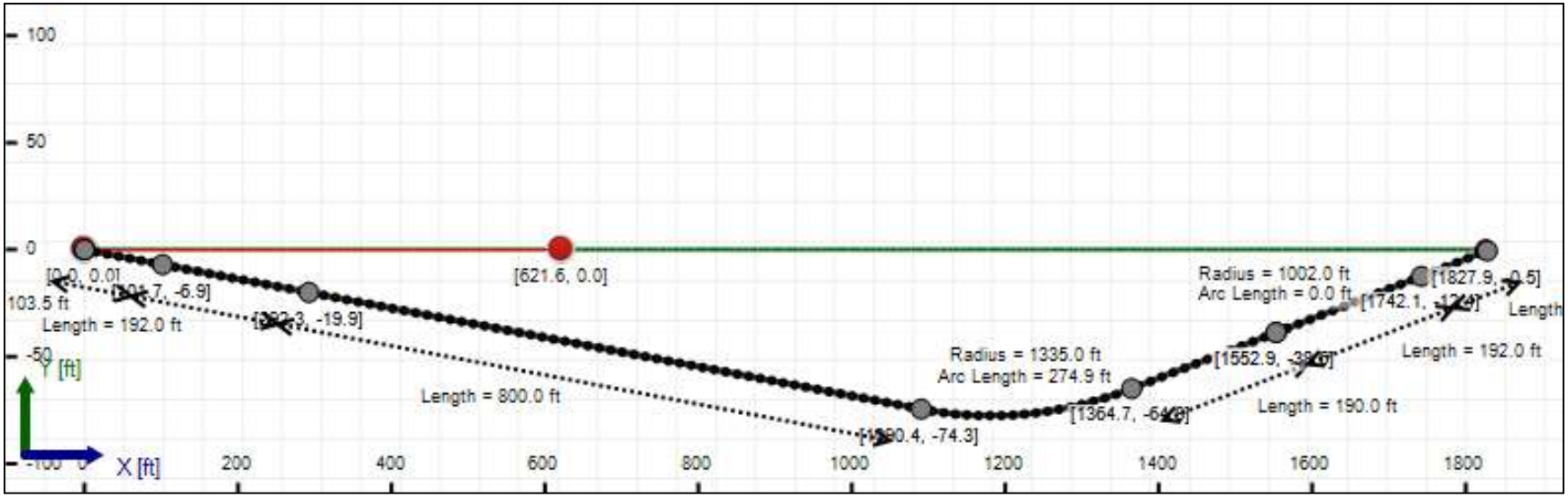
Soil Layer #3 USCS, Gravel (G), GM
From Assistant
Unit Weight: 120.0000 (dry), 140.0000 (sat) [lb/ft3]
Phi: 37.00, S.M.: 1000.00, Coh: 0.00 [psi]

Soil Layer #4 Rock, Geological Classification, Sedimentary Rocks
From Assistant
Unit Weight: 160.0000 (dry), 170.0000 (sat) [lb/ft3]
Phi: 37.00, S.M.: 2000.00, Coh: 3000.00 [psi]

Bore Cross-Section View



Bore Plan View



Load Verifier Input Summary:

Pipe Application: Electrical Cable
Pipe Type: PVC
Classification: IPS
Pipe OD: 8" (8.625")
Pipe DR: 18
Pipe Length: 1845.14 ft
Internal Pressure: 0 psi
Borehole Diameter: 1.07799990971883 ft
Silo Width: 1.07799990971883 ft
Surface Surcharge: 0 psi
Short Term Modulus: 400000 psi
Long Term Modulus: 400000 psi
Short Term Poisson Ratio: 0.38
Long Term Poisson Ratio: 0.38
Pipe Unit Weight: 87.40220 lb/ft3
Allowable Tensile Stress (Short Term): 2800 psi
Allowable Tensile Stress (Long Term): 2800 psi
Allowable Compressive Stress (Short Term): 3200 psi
Allowable Compressive Stress (Long Term): 3200 psi
Surface-pipe friction coefficient at entrance: 0.1
Surface-pipe friction coefficient in borehole: 0.3
Pipe-soil friction angle: 30
Slurry Unit Weight: 93.64118 lb/ft3
Hydrokinetic Pressure: 10 psi
Ballast Unit Weight: 62.42746 lb/ft3

In-service Load Summary:

Pressure [psi]	Deformed	Collapsed
Earth Pressure	4.5	28.3
Water Pressure	14.8	14.7
Surface Surcharge	0.0	0.0
Internal Pressure	0.0	0.0
Net Pressure	19.3	43.0
Deflection		
Earth Load Deflection	0.850	5.214
Buoyant Deflection	0.060	0.060
Reissner Effect	0	0
Net Deflection	0.909	5.274
Compressive Stress [psi]		
Compressive Wall Stress	173.5	386.6

Installation Load Summary:

Forces/Stresses	@Maximum Force	Absolute Maximum
Pullback Force [lb]	26935.3	26935.3
Pullback Stress [psi]	2196.6	2196.6
Pullback Strain	5.491E-3	5.491E-3
Bending Stress [psi]	0.0	143.5
Bending Strain	0	3.587E-4
Tensile Stress [psi]	2196.6	2319.4
Tensile Strain	5.491E-3	6.125E-3

Net External Pressure = 13.4 [psi]

Buoyant Deflection = 0.1

Hydrokinetic Force = 365.0 lb

In-service Analysis

	Calculated	Allowable	Factor of Safety	Check
Deflection [%]	0.909	7.5	8.2	OK
Unconstrained Collapse [psi]	22.6	175.4	7.8	OK
Compressive Wall Stress [psi]	173.5	3200.0	18.4	OK

Installation Analysis

	Calculated	Allowable	Factor of Safety	Check
Deflection [%]	0.060	7.5	125.5	OK
Unconstrained Collapse [psi]	17.5	143.0	8.2	OK
Tensile Stress [psi]	2319.4	2800.0	1.2	OK

Maximum Allowable Bore Pressure Summary

Ream Number	Initial Diameter	Final Diameter	Estimated Maximum Pressure (Avg.)	Estimated Maximum Pressure (Local)
Pilot Bore	0.00 in	8.00 in	1998.953 psi	2018.295 psi
1	8.00 in	12.00 in	1997.308 psi	2017.931 psi
2	12.00 in	16.13 in	1994.922 psi	2017.402 psi

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

Estimated Circulating Pressure Summary

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

Flow Rate (Q): 40.00 US (liquid) gallon/min

Drill Fluid Density: 68.700 lb/ft3

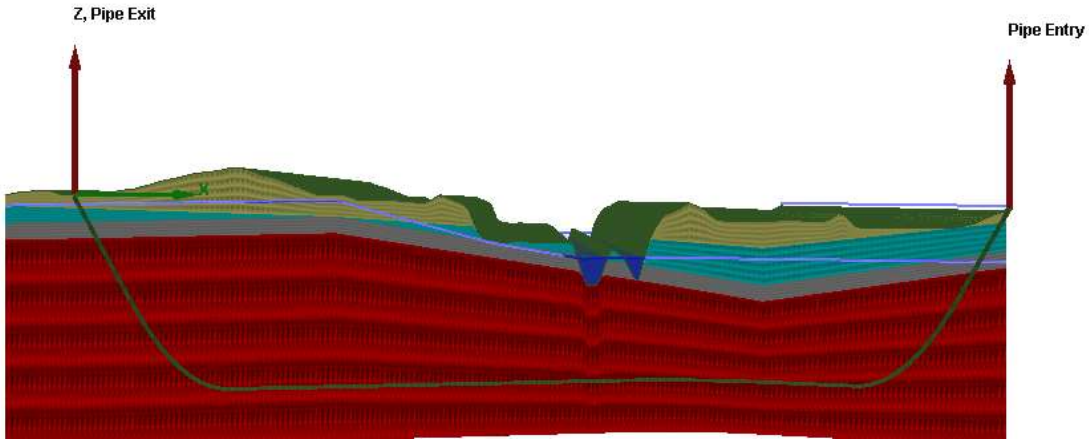
Rheological model: Power-Law

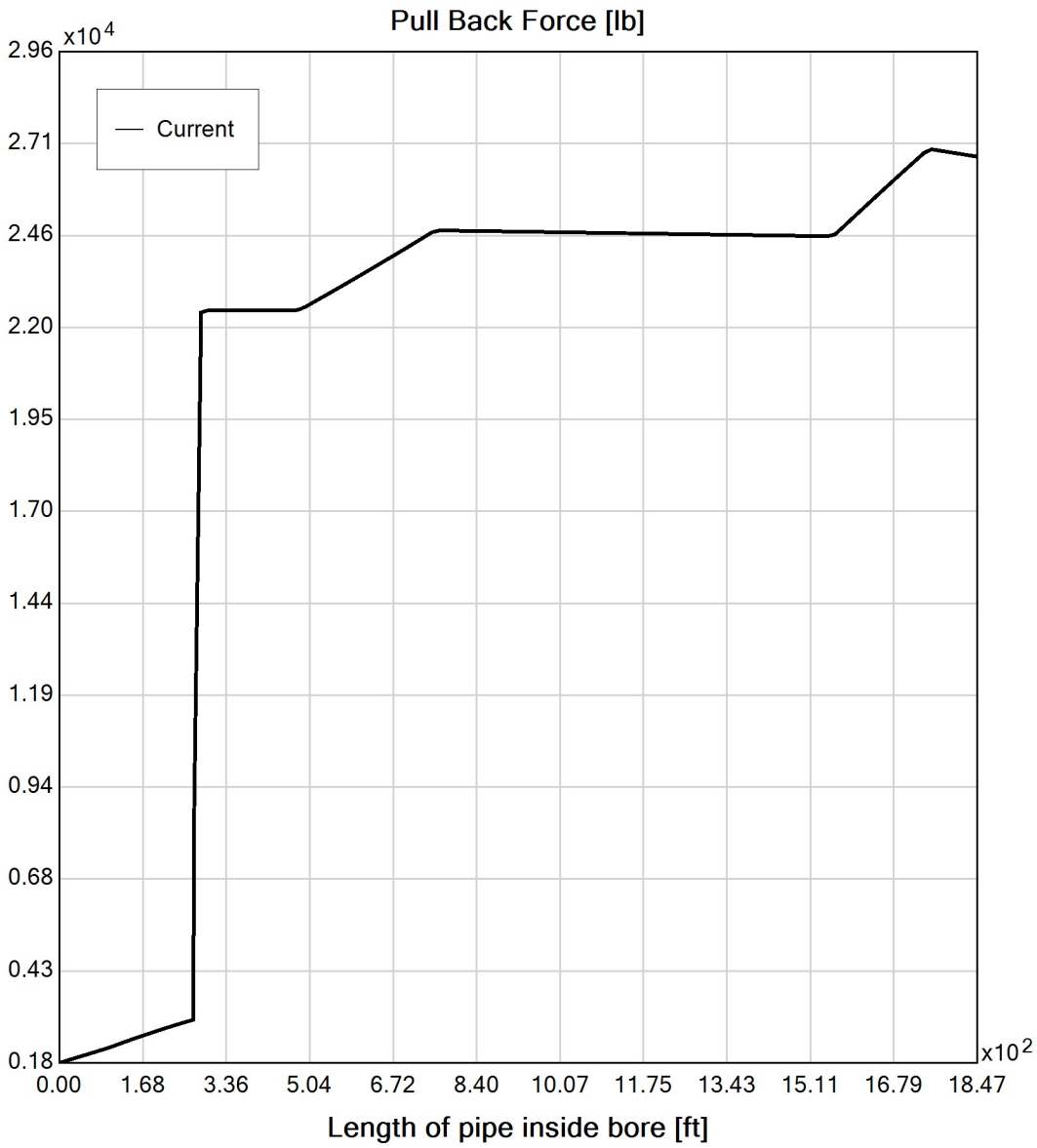
Fluid Consistency Index (K): 63.17

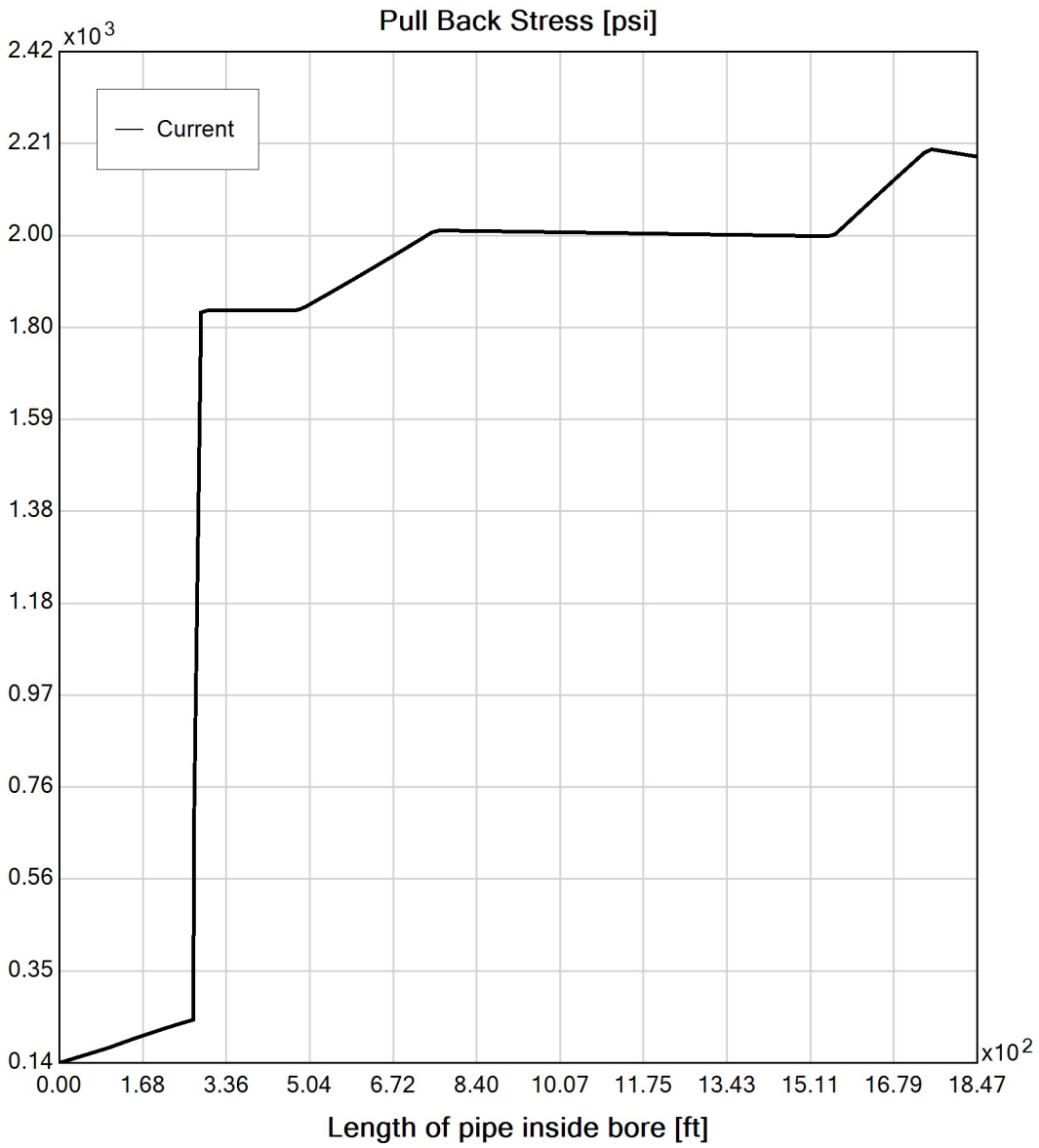
Power Law Exponent (n): 0.14

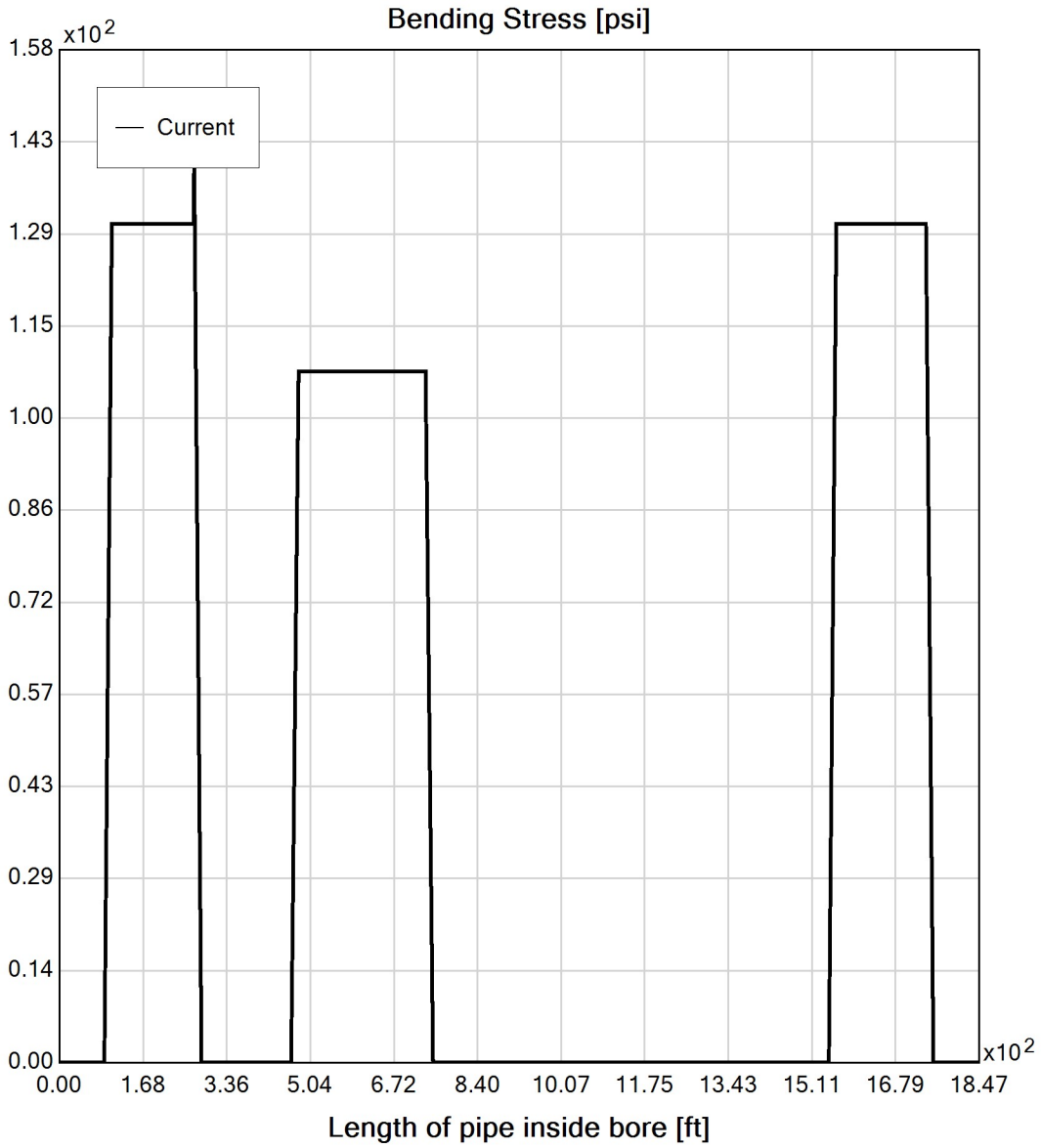
Effective Viscosity (cP): 859.3

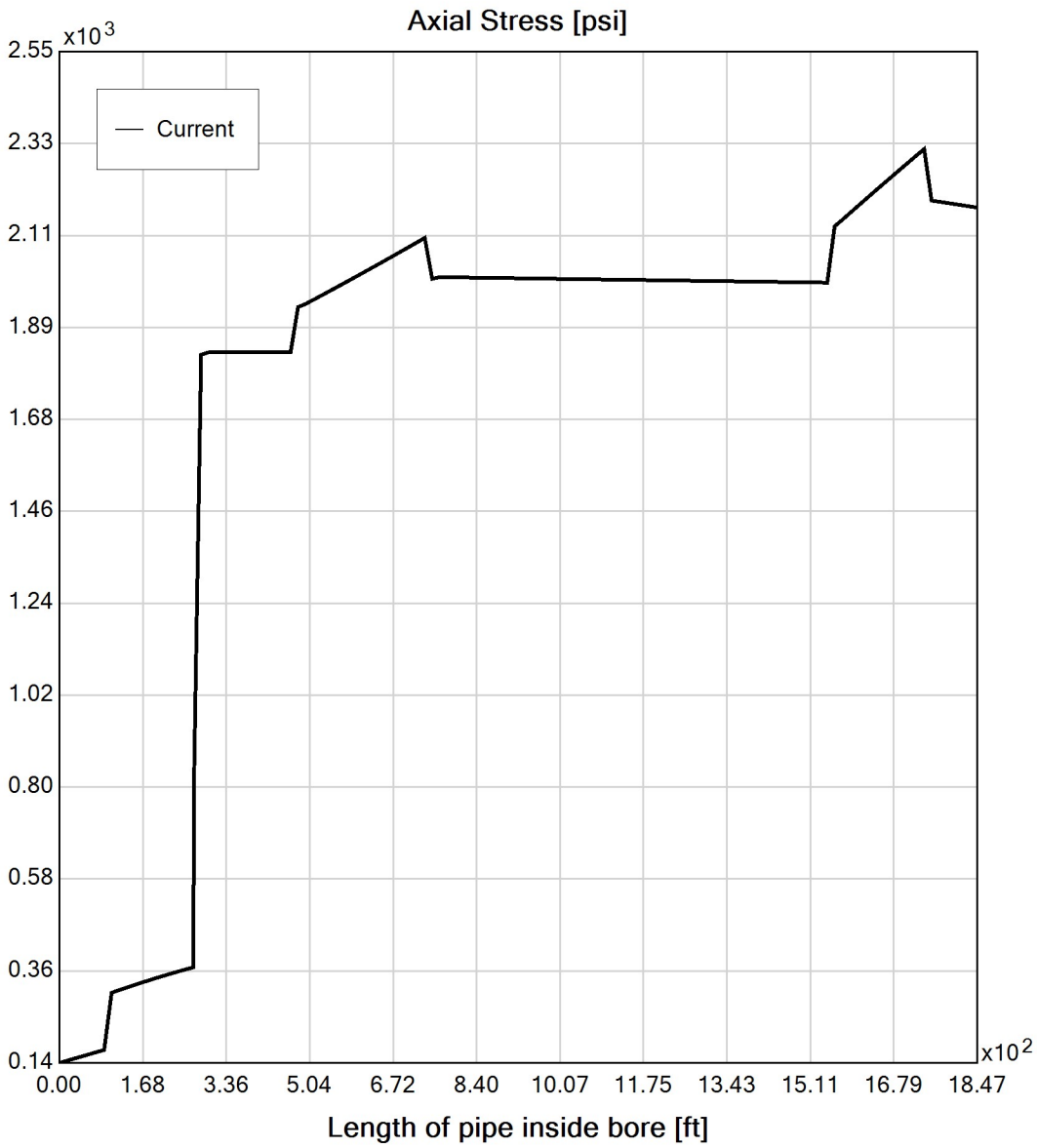
Virtual Site

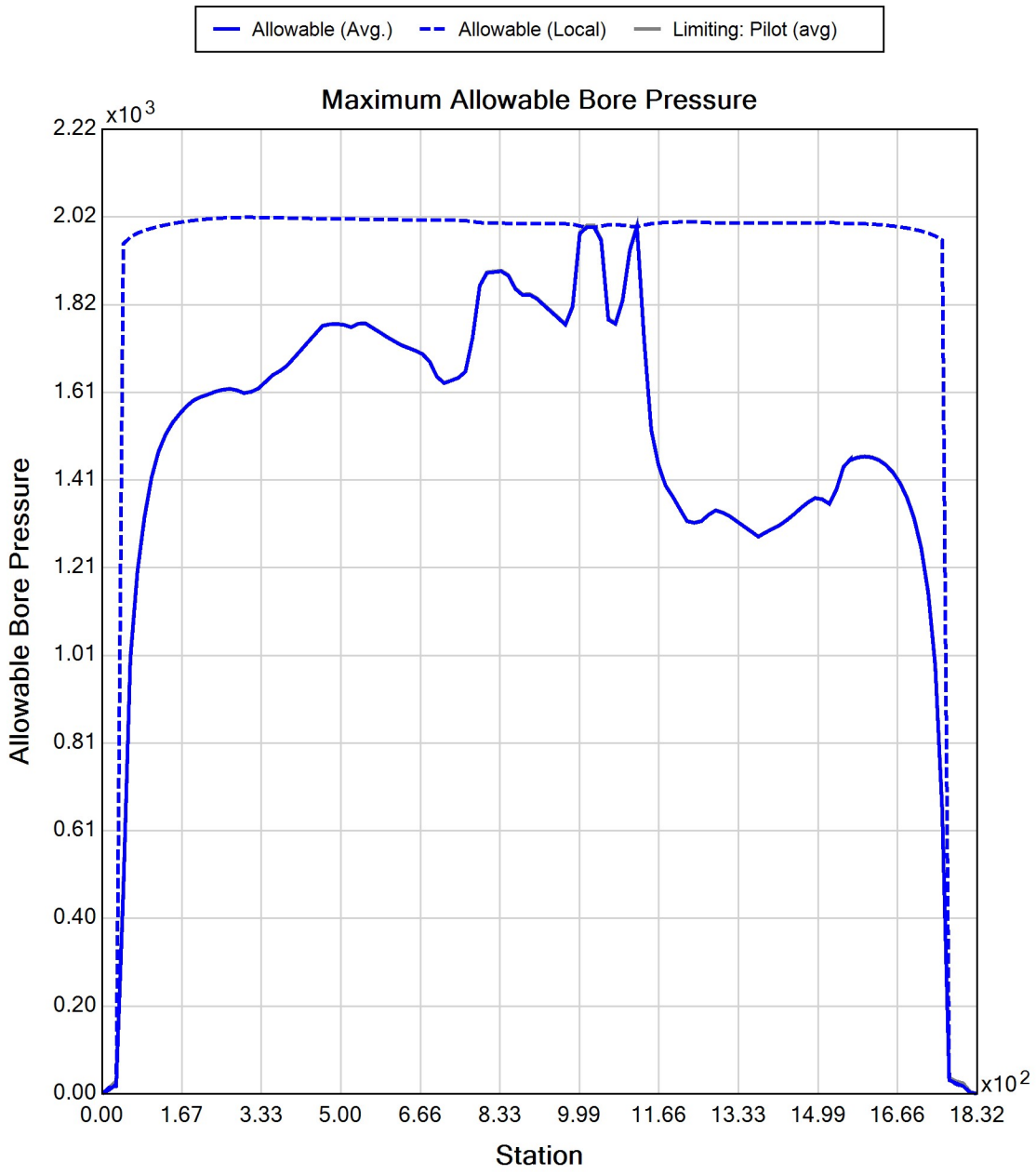


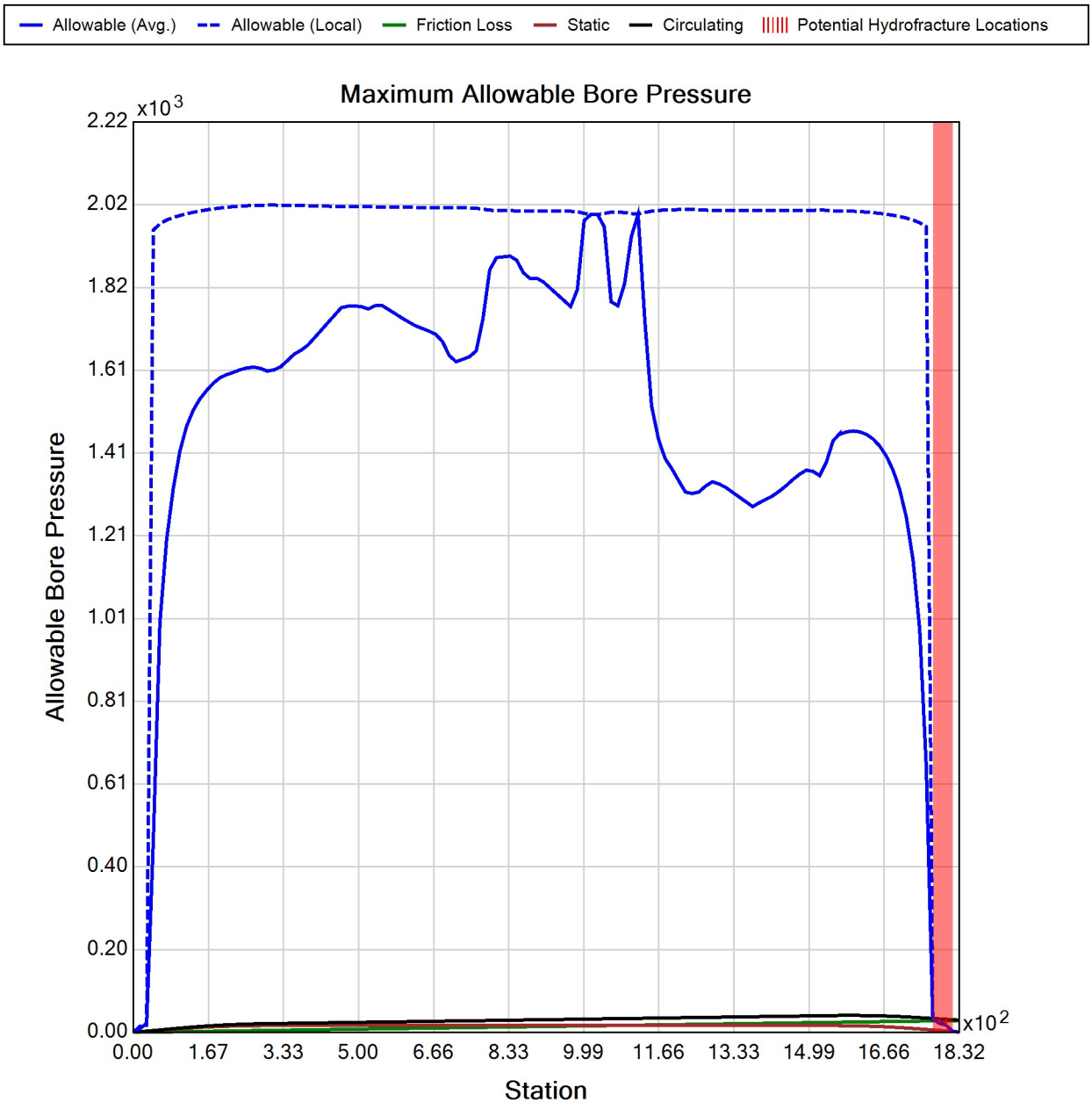












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Project Summary

General:	CHPE HDD 59A P4A Start Date: 07-31-2023 End Date: 07-31-2023
Project Owner:	TDI
Project Contractor:	Kiewit
Project Consultant:	CHA/BCE
Designer:	MDB BCE
Description:	HDD 59A 3-inch HDPE DR 7. Ballast Rollers C2

Input Summary

Start Coordinate	(0.00, 0.00, 264.60) ft
End Coordinate	(1826.00, 0.00, 262.00) ft
Project Length	1826.00 ft
Pipe Type	HDPE
OD Classification	IPS
Pipe OD	3.500 in
Pipe DR	7.0
Pipe Thickness	0.50 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: 3" (3.5")
Pipe DR: 7
Pipe Length: 1845.14 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: 59.30500 lb/ft3
Allowable Tensile Stress (Short Term): 1300 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: 0.1
Surface-pipe friction coefficient in borehole: 0.3
Pipe-soil friction angle: 30
Slurry Unit Weight: 93.64118 lb/ft3
Hydrokinetic Pressure: 10 psi
Ballast Unit Weight: 62.42746 lb/ft3

In-service Load Summary:

Pressure [psi]	Deformed	Collapsed
Earth Pressure	2.6	28.3
Water Pressure	14.8	14.7
Surface Surcharge	0.0	0.0
Internal Pressure	0.0	0.0
Net Pressure	17.4	43.0
Deflection		
Earth Load Deflection	0.320	3.252
Buoyant Deflection	0.020	0.020
Reissner Effect	0	0
Net Deflection	0.340	3.272
Compressive Stress [psi]		
Compressive Wall Stress	60.9	150.3

Installation Load Summary:

Forces/Stresses	@Maximum Force	Absolute Maximum
Pullback Force [lb]	6134.7	6134.7
Pullback Stress [psi]	1301.8	1301.8
Pullback Strain	2.264E-2	2.264E-2
Bending Stress [psi]	0.0	8.4
Bending Strain	0	1.455E-4
Tensile Stress [psi]	1301.8	1305.4
Tensile Strain	2.264E-2	2.283E-2

Net External Pressure = 13.4 [psi]

Buoyant Deflection = 0.0

Hydrokinetic Force = 172.8 lb

In-service Analysis

	Calculated	Allowable	Factor of Safety	Check
Deflection [%]	0.340	7.5	22.0	OK
Unconstrained Collapse [psi]	22.6	317.5	14.1	OK
Compressive Wall Stress [psi]	60.9	1150.0	18.9	OK

Installation Analysis

	Calculated	Allowable	Factor of Safety	Check
Deflection [%]	0.010	7.5	756.1	OK
Unconstrained Collapse [psi]	17.5	410.9	23.5	OK
Tensile Stress [psi]	1305.4	1300.0	1.0	OK

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Project Summary

General:	CHPE HDD 59B
	P4A
	Start Date: 12-10-2021
	End Date: 12-10-2021
Project Owner:	TDI
Project Contractor:	Kiewit
Project Consultant:	CHA/BCE
Designer:	AB
	CHA
Description:	HDD 59B 10-Inch DR 9 Conduit 1

Input Summary

Start Coordinate	(0.00, 0.00, 252.00) ft
End Coordinate	(830.00, 0.00, 241.00) ft
Project Length	830.00 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: 5

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

Soil Layer #2 USCS, Sand (S), SP
From Assistant
Unit Weight: 110.0000 (dry), 125.0000 (sat) [lb/ft3]
Phi: 34.00, S.M.: 500.00, Coh: 0.00 [psi]

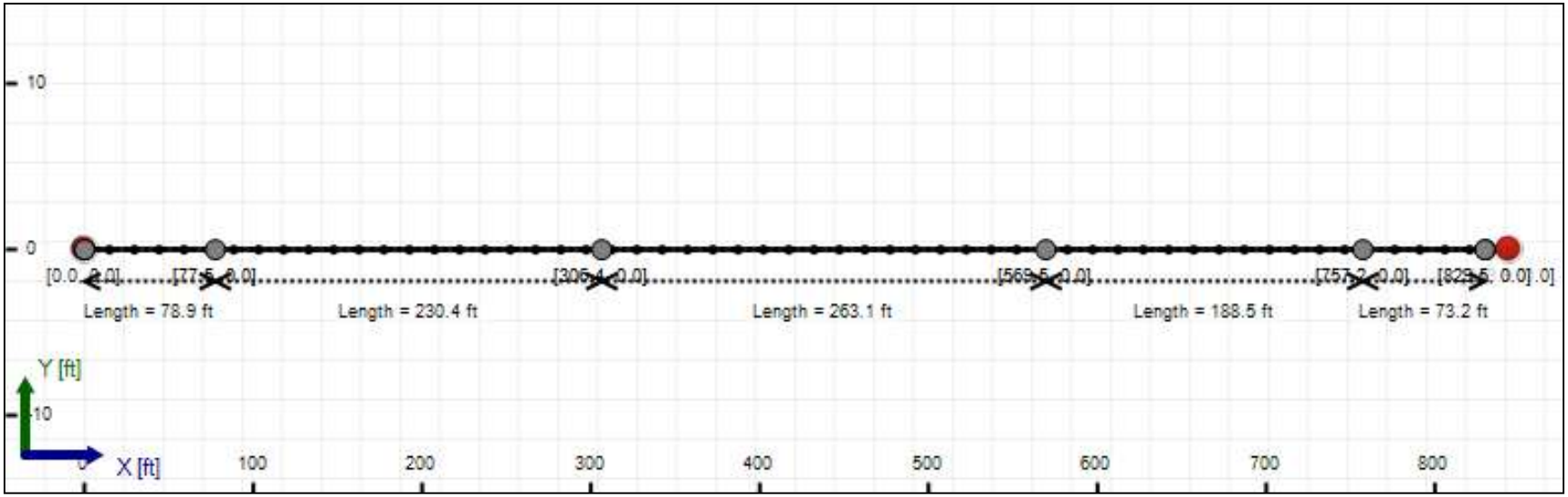
Soil Layer #3 USCS, Sand (S), SM
From Assistant
Unit Weight: 110.0000 (dry), 125.0000 (sat) [lb/ft3]
Phi: 34.00, S.M.: 500.00, Coh: 0.00 [psi]

Soil Layer #4 USCS, Gravel (G), GP
From Assistant
Unit Weight: 120.0000 (dry), 140.0000 (sat) [lb/ft3]
Phi: 37.00, S.M.: 1000.00, Coh: 0.00 [psi]

Soil Layer #5 Rock, Geological Classification, Sedimentary Rocks
From Assistant
Unit Weight: 160.0000 (dry), 170.0000 (sat) [lb/ft3]
Phi: 37.00, S.M.: 2000.00, Coh: 3000.00 [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: 840.00 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: 59.30500 lb/ft3
Allowable Tensile Stress (Short Term): 1200 psi
Allowable Tensile Stress (Long Term): 1100 psi
Allowable Compressive Stress (Short Term): 1150 psi
Allowable Compressive Stress (Long Term): 1150 psi
Surface-pipe friction coefficient at entrance: 0.5
Surface-pipe friction coefficient in borehole: 0.3
Pipe-soil friction angle: 30
Slurry Unit Weight: 93.64118 lb/ft3
Hydrokinetic Pressure: 10 psi
Ballast Unit Weight: 62.42746 lb/ft3

In-service Load Summary:

Pressure [psi]	Deformed	Collapsed
Earth Pressure	5.5	24.7
Water Pressure	10.9	10.9
Surface Surcharge	0.0	0.0
Internal Pressure	0.0	0.0
Net Pressure	16.4	35.6
Deflection		
Earth Load Deflection	1.503	6.732
Buoyant Deflection	0.132	0.132
Reissner Effect	0	0
Net Deflection	1.635	6.864
Compressive Stress [psi]		
Compressive Wall Stress	73.6	160.1

Installation Load Summary:

Forces/Stresses	@Maximum Force	Absolute Maximum
Pullback Force [lb]	13429.5	13429.5
Pullback Stress [psi]	374.5	374.5
Pullback Strain	6.514E-3	6.514E-3
Bending Stress [psi]	0.0	21.5
Bending Strain	0	3.733E-4
Tensile Stress [psi]	374.5	395.0
Tensile Strain	6.514E-3	7.244E-3

Net External Pressure = 19.3 [psi]

Buoyant Deflection = 0.1

Hydrokinetic Force = 567.6 lb

In-service Analysis

	Calculated	Allowable	Factor of Safety	Check
Deflection [%]	1.635	7.5	4.6	OK
Unconstrained Collapse [psi]	24.1	119.4	4.9	OK
Compressive Wall Stress [psi]	73.6	1150.0	15.6	OK

Installation Analysis

	Calculated	Allowable	Factor of Safety	Check
Deflection [%]	0.065	7.5	115.8	OK
Unconstrained Collapse [psi]	34.1	233.9	6.9	OK
Tensile Stress [psi]	395.0	1200.0	3.0	OK

Maximum Allowable Bore Pressure Summary

Ream Number	Initial Diameter	Final Diameter	Estimated Maximum Pressure (Avg.)	Estimated Maximum Pressure (Local)
Pilot Bore	0.00 in	8.00 in	1423.736 psi	2011.084 psi
1	8.00 in	12.00 in	1423.200 psi	2010.611 psi
2	12.00 in	16.13 in	1422.424 psi	2009.924 psi

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

Estimated Circulating Pressure Summary

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

Flow Rate (Q): 40.00 US (liquid) gallon/min

Drill Fluid Density: 68.700 lb/ft3

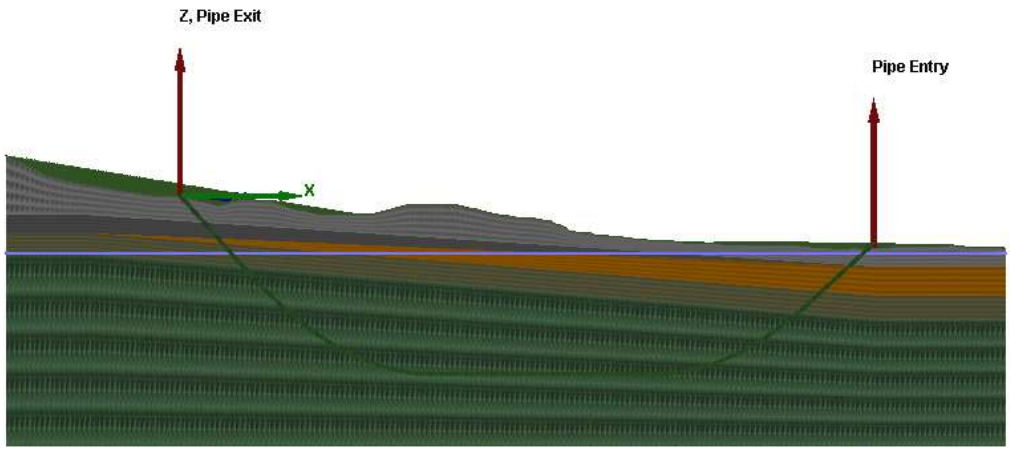
Rheological model: Bingham-Plastic

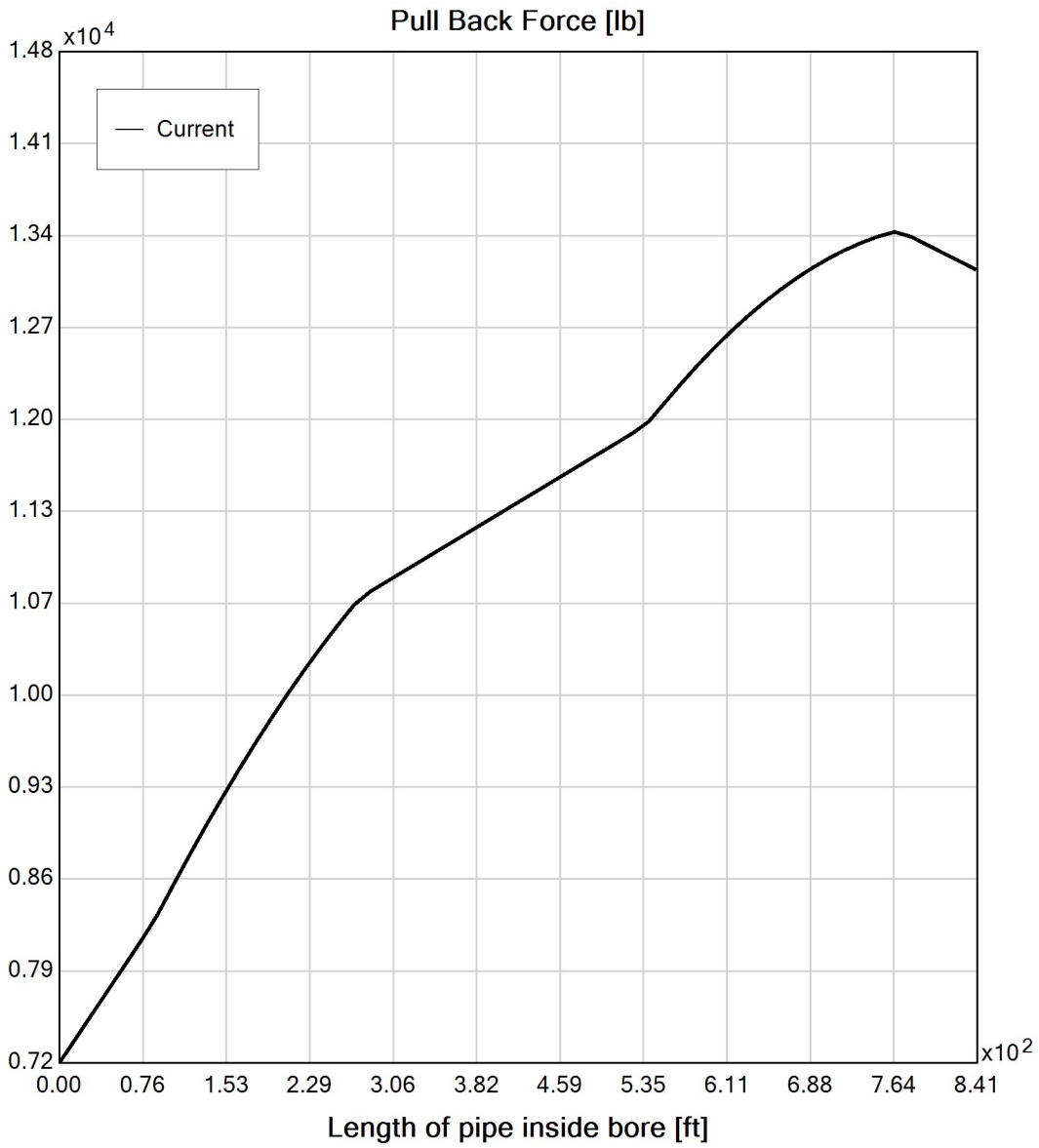
Plastic Viscosity (PV): 25.53

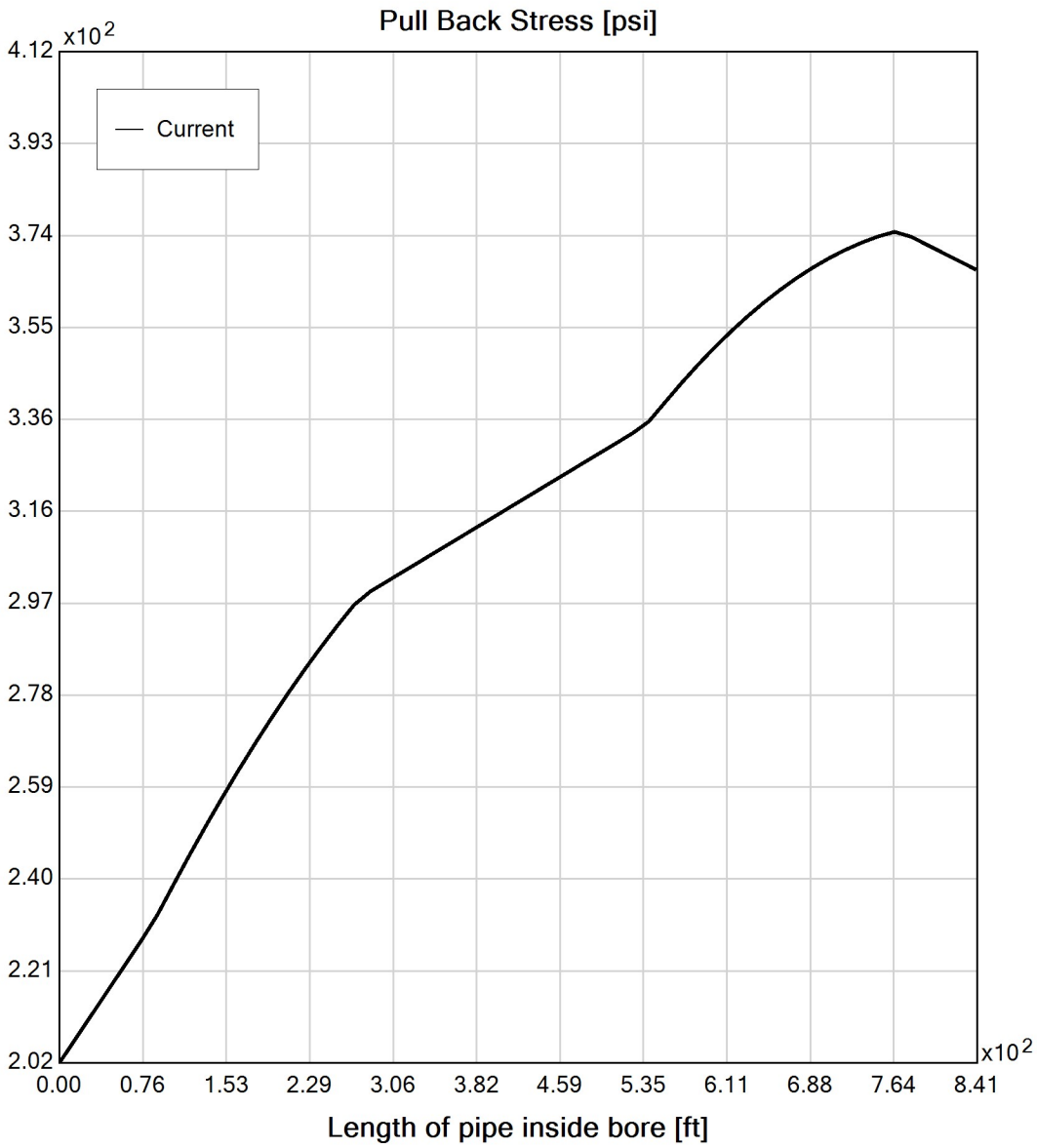
Yield Point (YP): 16.49

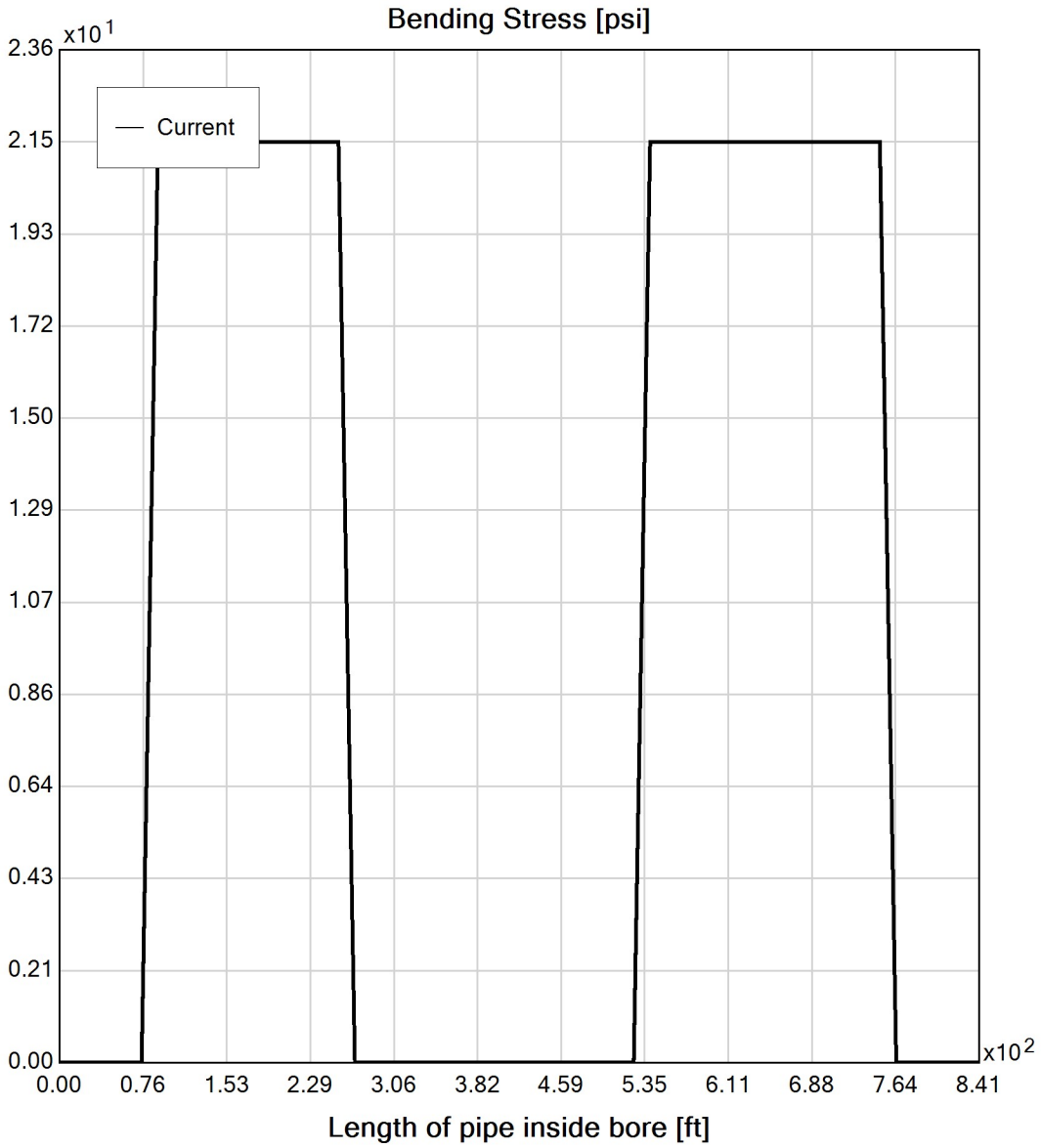
Effective Viscosity (cP): 1202.0

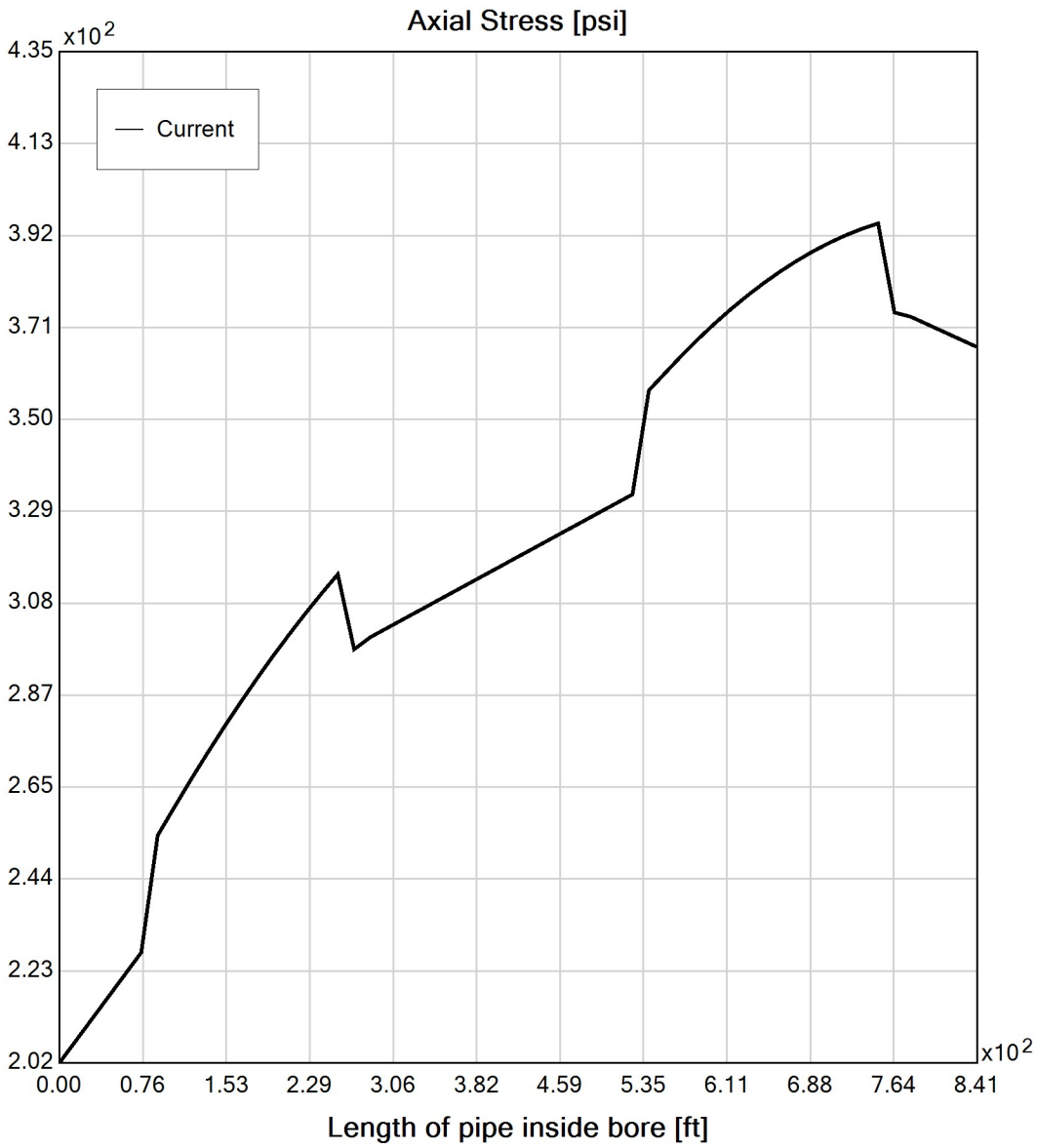
Virtual Site

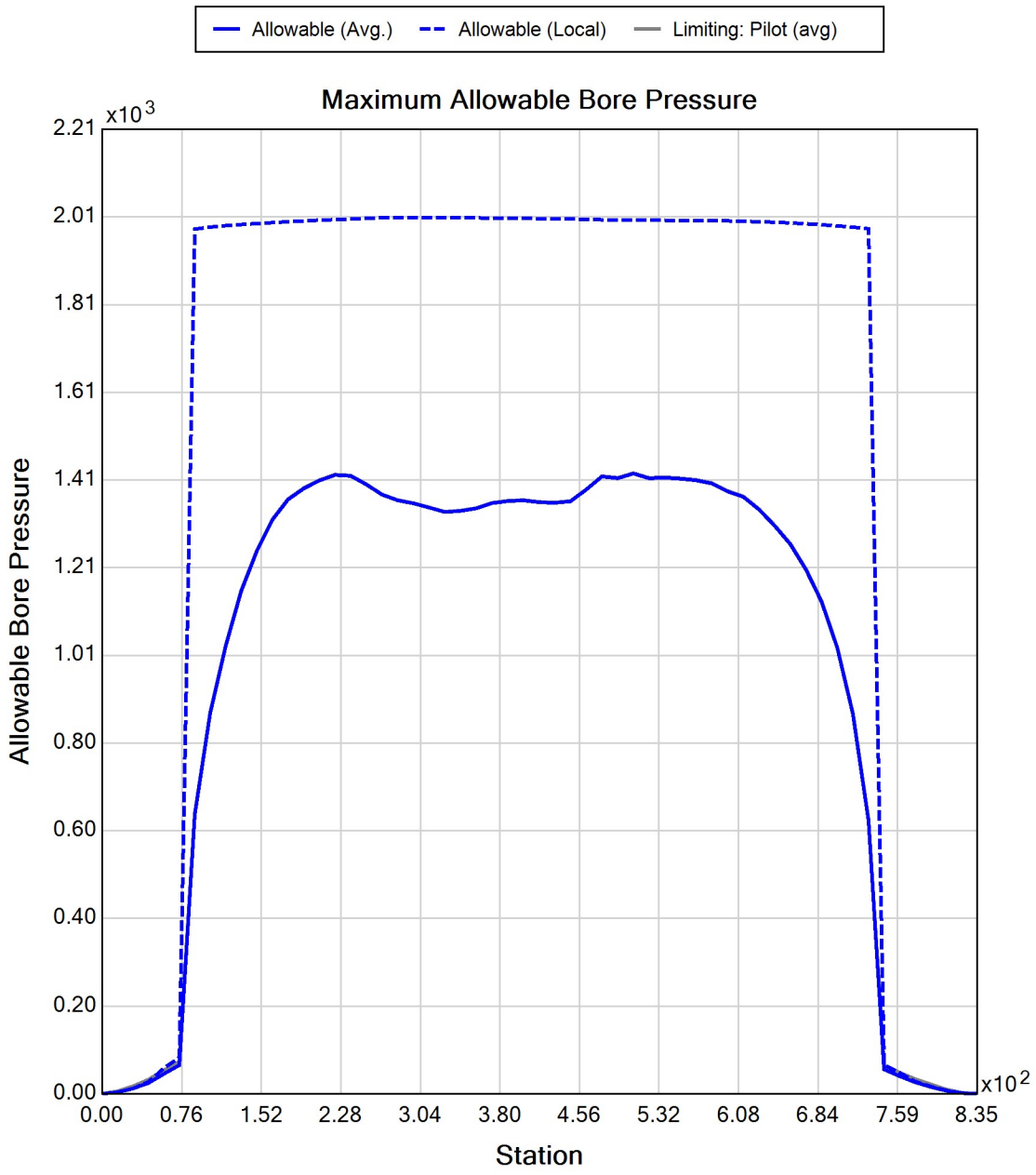


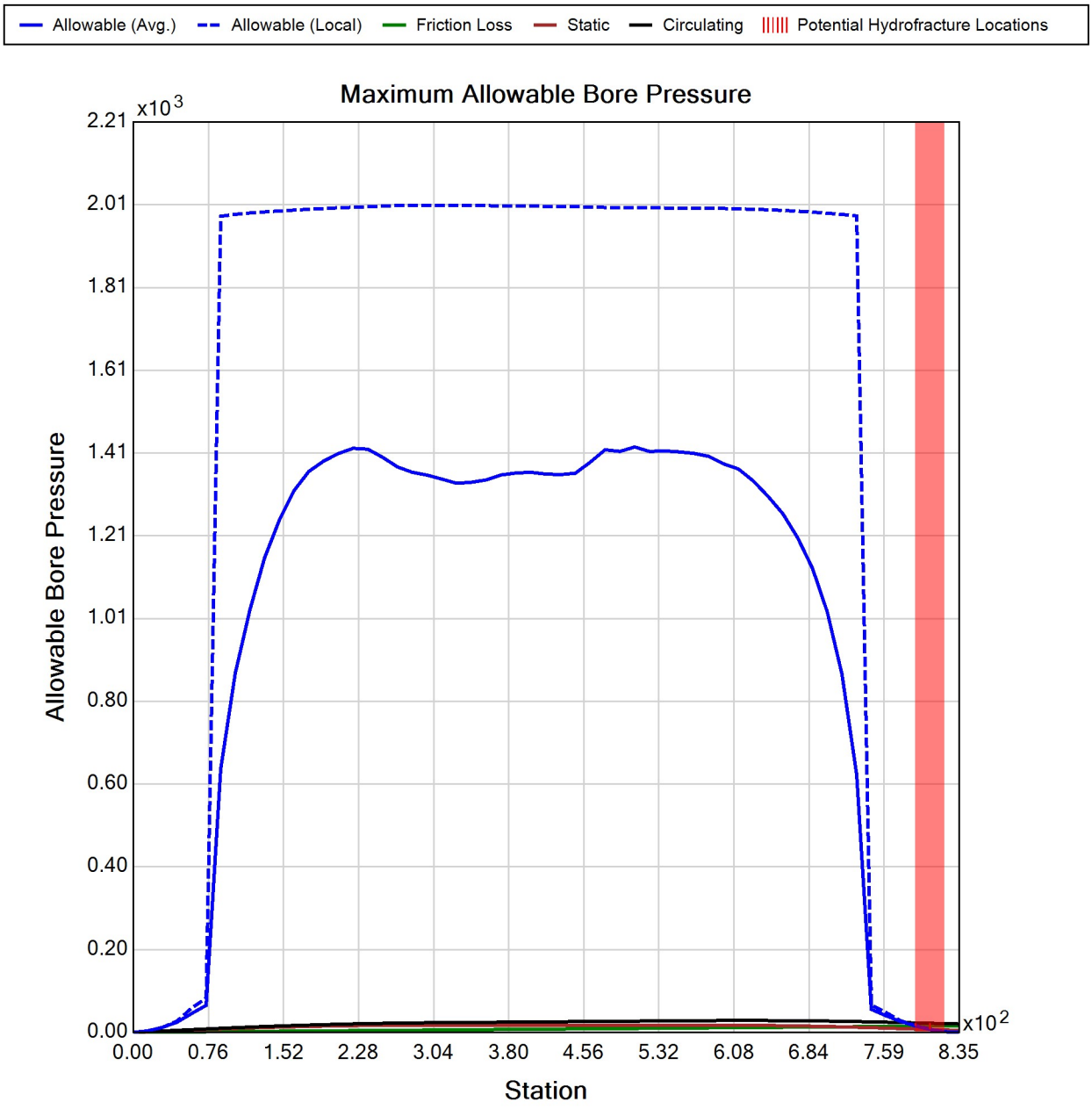












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Project Summary

General:	CHPE HDD 59B
	P4A
	Start Date: 12-10-2021
	End Date: 12-10-2021
Project Owner:	TDI
Project Contractor:	Kiewit
Project Consultant:	CHA/BCE
Designer:	AB
	CHA
Description:	HDD 59B 2-Inch DR 9 Conduit 1

Input Summary

Start Coordinate	(0.00, 0.00, 252.00) ft
End Coordinate	(830.00, 0.00, 241.00) ft
Project Length	830.00 ft
Pipe Type	HDPE
OD Classification	IPS
Pipe OD	2.375 in
Pipe DR	9.0
Pipe Thickness	0.26 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: 2" (2.375")
Pipe DR: 9
Pipe Length: 840.00 ft
Internal Pressure: 0 psi
Borehole Diameter: 0.531000018119812 ft
Silo Width: 0.531000018119812 ft
Surface Surcharge: 0 psi
Short Term Modulus: 57500 psi
Long Term Modulus: 28200 psi
Short Term Poisson Ratio: 0.35
Long Term Poisson Ratio: 0.45
Pipe Unit Weight: 59.30500 lb/ft3
Allowable Tensile Stress (Short Term): 1200 psi
Allowable Tensile Stress (Long Term): 1100 psi
Allowable Compressive Stress (Short Term): 1150 psi
Allowable Compressive Stress (Long Term): 1150 psi
Surface-pipe friction coefficient at entrance: 0.5
Surface-pipe friction coefficient in borehole: 0.3
Pipe-soil friction angle: 30
Slurry Unit Weight: 93.64118 lb/ft3
Hydrokinetic Pressure: 10 psi
Ballast Unit Weight: 62.42746 lb/ft3

In-service Load Summary:

Pressure [psi]	Deformed	Collapsed
Earth Pressure	2.2	24.7
Water Pressure	10.9	10.9
Surface Surcharge	0.0	0.0
Internal Pressure	0.0	0.0
Net Pressure	13.1	35.6
Deflection		
Earth Load Deflection	0.608	6.732
Buoyant Deflection	0.029	0.029
Reissner Effect	0	0
Net Deflection	0.637	6.761
Compressive Stress [psi]		
Compressive Wall Stress	58.8	160.1

Installation Load Summary:

Forces/Stresses	@Maximum Force	Absolute Maximum
Pullback Force [lb]	765.1	765.1
Pullback Stress [psi]	437.1	437.1
Pullback Strain	7.603E-3	7.603E-3
Bending Stress [psi]	0.0	4.7
Bending Strain	0	8.247E-5
Tensile Stress [psi]	437.1	440.9
Tensile Strain	7.603E-3	7.751E-3

Net External Pressure = 19.3 [psi]

Buoyant Deflection = 0.0

Hydrokinetic Force = 137.3 lb

In-service Analysis

	Calculated	Allowable	Factor of Safety	Check
Deflection [%]	0.637	7.5	11.8	OK
Unconstrained Collapse [psi]	24.1	130.6	5.4	OK
Compressive Wall Stress [psi]	58.8	1150.0	19.6	OK

Installation Analysis

	Calculated	Allowable	Factor of Safety	Check
Deflection [%]	0.014	7.5	524.3	OK
Unconstrained Collapse [psi]	34.1	231.9	6.8	OK
Tensile Stress [psi]	440.9	1200.0	2.7	OK

Generated Output

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Project Summary

General:	CHPE HDD 60 P4A Start Date: 06-07-2023 End Date: 06-07-2023
Project Owner:	TDI
Project Contractor:	Kiewit
Project Consultant:	CHA
Designer:	MDB BCE Amherst, MA
Description:	HDD 60 Reversed Conduit 1 10-inch DR9 ALT

Input Summary

Start Coordinate	(0.00, 0.00, 231.00) ft
End Coordinate	(1335.00, 0.00, 235.00) ft
Project Length	1335.00 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

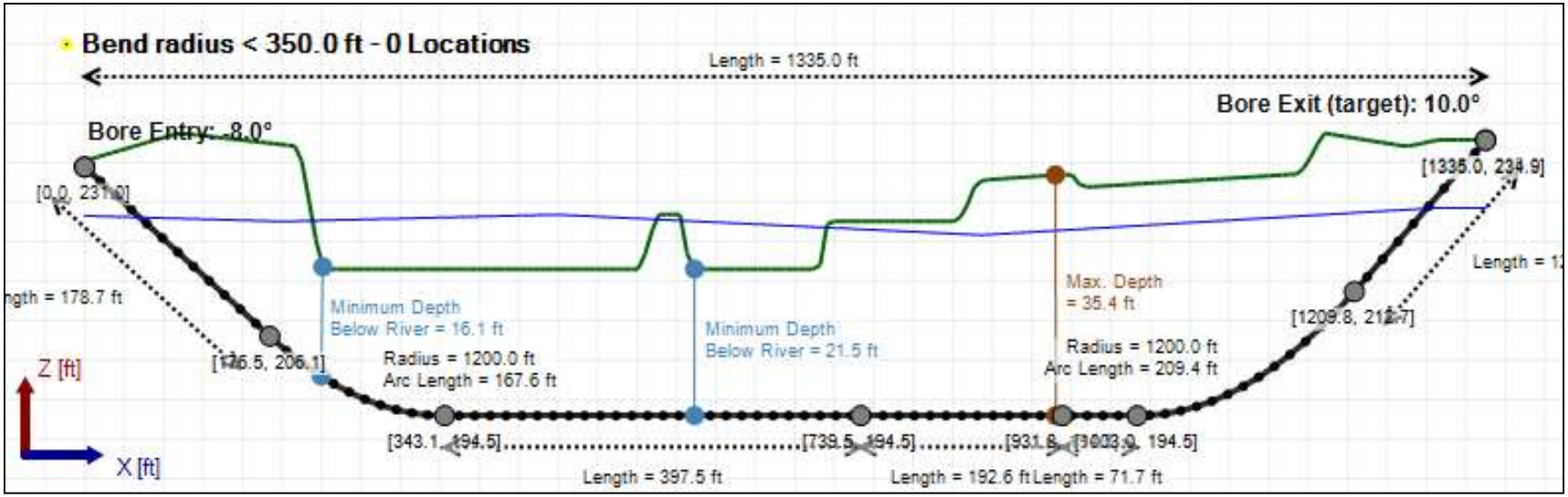
Number of Layers: 3

Soil Layer #1 USCS, Sand (S), SM
From Assistant
Unit Weight: 105.0000 (dry), 132.8832 (sat) [lb/ft3]
Phi: 30.00, S.M.: 200.00, Coh: 0.00 [psi]

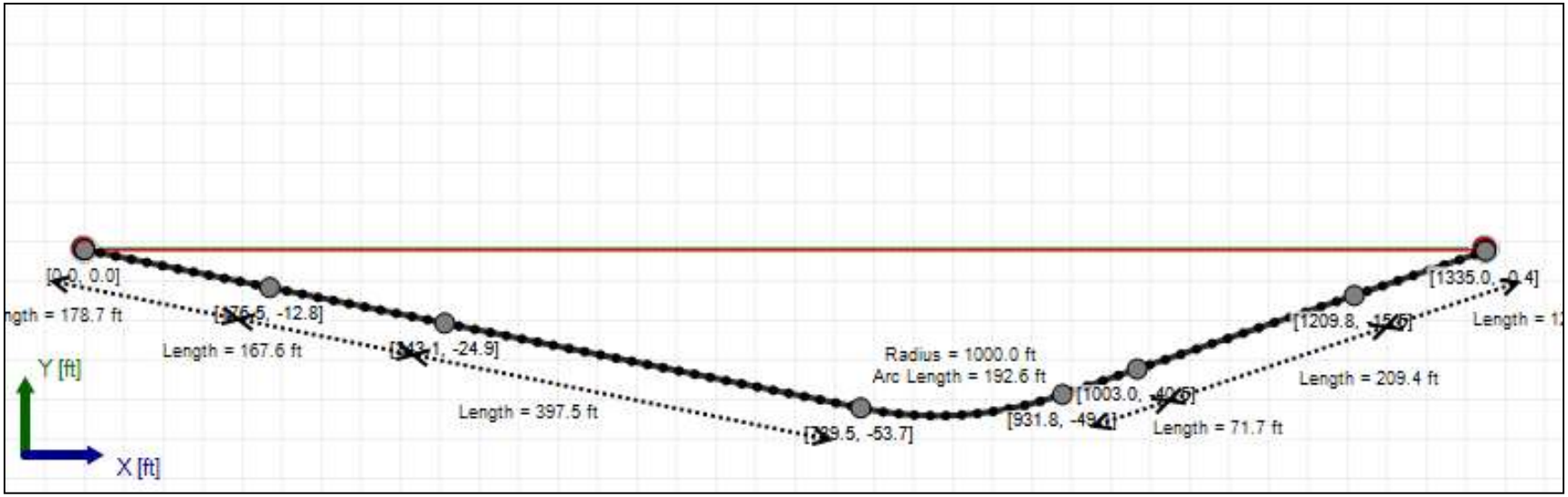
Soil Layer #2 USCS, Clay (C), CH
From Assistant
Unit Weight: 80.0000 (dry), 110.0000 (sat) [lb/ft3]
Phi: 0.00, S.M.: 300.00, Coh: 5.50 [psi]

Soil Layer #3 USCS, Sand (S), SM
From Assistant
Unit Weight: 130.0000 (dry), 140.0000 (sat) [lb/ft3]
Phi: 37.00, S.M.: 1000.00, Coh: 0.00 [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: 1350.00 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: 59.30500 lb/ft3
Allowable Tensile Stress (Short Term): 1200 psi
Allowable Tensile Stress (Long Term): 1100 psi
Allowable Compressive Stress (Short Term): 1150 psi
Allowable Compressive Stress (Long Term): 1150 psi
Surface-pipe friction coefficient at entrance: 0.5
Surface-pipe friction coefficient in borehole: 0.3
Pipe-soil friction angle: 30
Slurry Unit Weight: 93.64118 lb/ft3
Hydrokinetic Pressure: 10 psi
Ballast Unit Weight: 62.42746 lb/ft3

In-service Load Summary:

Pressure [psi]	Deformed	Collapsed
Earth Pressure	4.8	22.1
Water Pressure	12.1	11.8
Surface Surcharge	0.0	0.0
Internal Pressure	0.0	0.0
Net Pressure	16.9	33.9
Deflection		
Earth Load Deflection	1.354	6.005
Buoyant Deflection	0.132	0.132
Reissner Effect	0	0
Net Deflection	1.486	6.137
Compressive Stress [psi]		
Compressive Wall Stress	76.2	152.6

Installation Load Summary:

Forces/Stresses	@Maximum Force	Absolute Maximum
Pullback Force [lb]	22473.1	22473.1
Pullback Stress [psi]	626.7	626.7
Pullback Strain	1.090E-2	1.090E-2
Bending Stress [psi]	0.0	25.8
Bending Strain	0	4.479E-4
Tensile Stress [psi]	626.7	646.5
Tensile Strain	1.090E-2	1.162E-2

Net External Pressure = 28.0 [psi]

Buoyant Deflection = 0.1

Hydrokinetic Force = 567.6 lb

In-service Analysis

	Calculated	Allowable	Factor of Safety	Check
Deflection [%]	1.486	7.5	5.0	OK
Unconstrained Collapse [psi]	26.8	120.9	4.5	OK
Compressive Wall Stress [psi]	76.2	1150.0	15.1	OK

Installation Analysis

	Calculated	Allowable	Factor of Safety	Check
Deflection [%]	0.065	7.5	115.8	OK
Unconstrained Collapse [psi]	36.8	217.4	5.9	OK
Tensile Stress [psi]	646.5	1200.0	1.9	OK

Maximum Allowable Bore Pressure Summary

Ream Number	Initial Diameter	Final Diameter	Estimated Maximum Pressure (Avg.)	Estimated Maximum Pressure (Local)
Pilot Bore	0.00 in	8.00 in	190.031 psi	190.031 psi
1	8.00 in	12.00 in	188.810 psi	188.810 psi
2	12.00 in	16.13 in	187.092 psi	187.092 psi

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

Estimated Circulating Pressure Summary

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

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

Drill Fluid Density: 68.700 lb/ft3

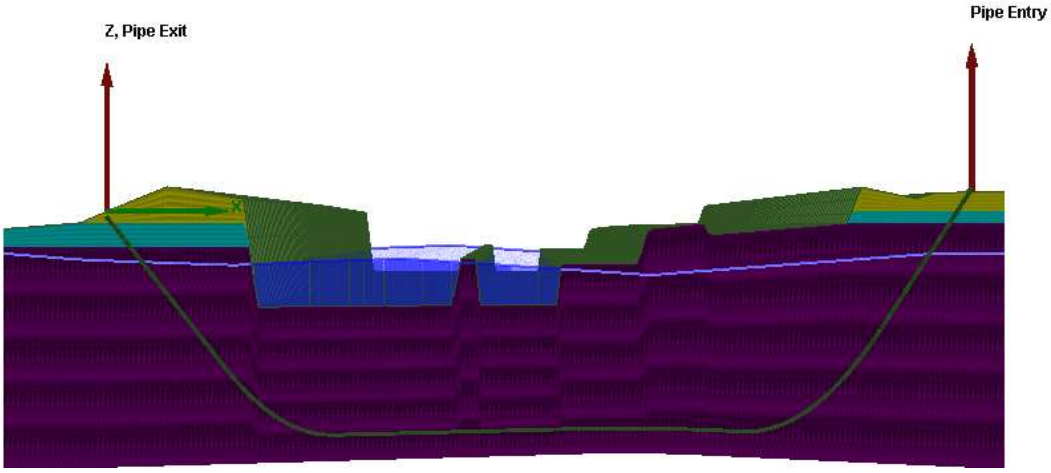
Rheological model: Bingham-Plastic

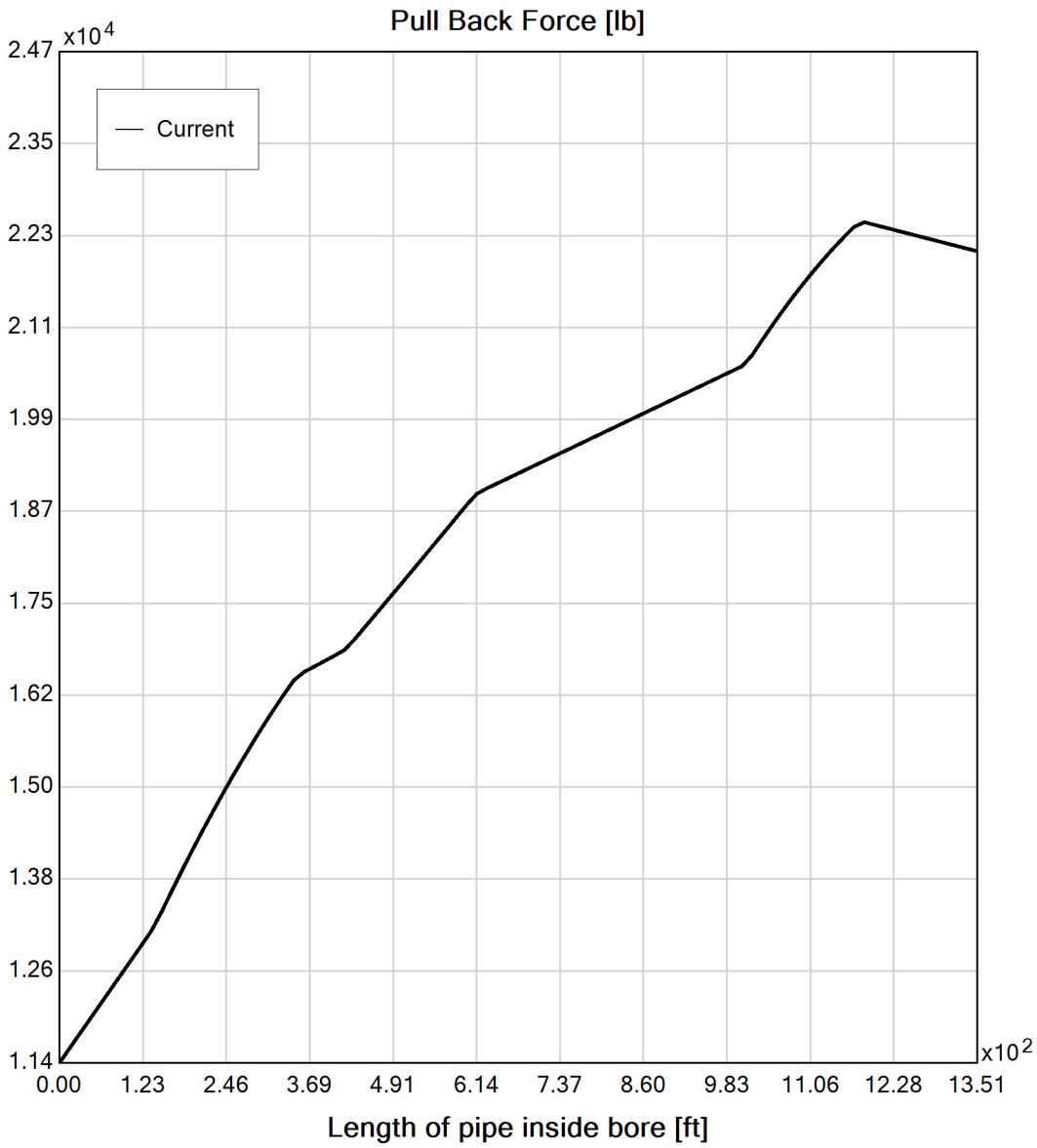
Plastic Viscosity (PV): 25.53

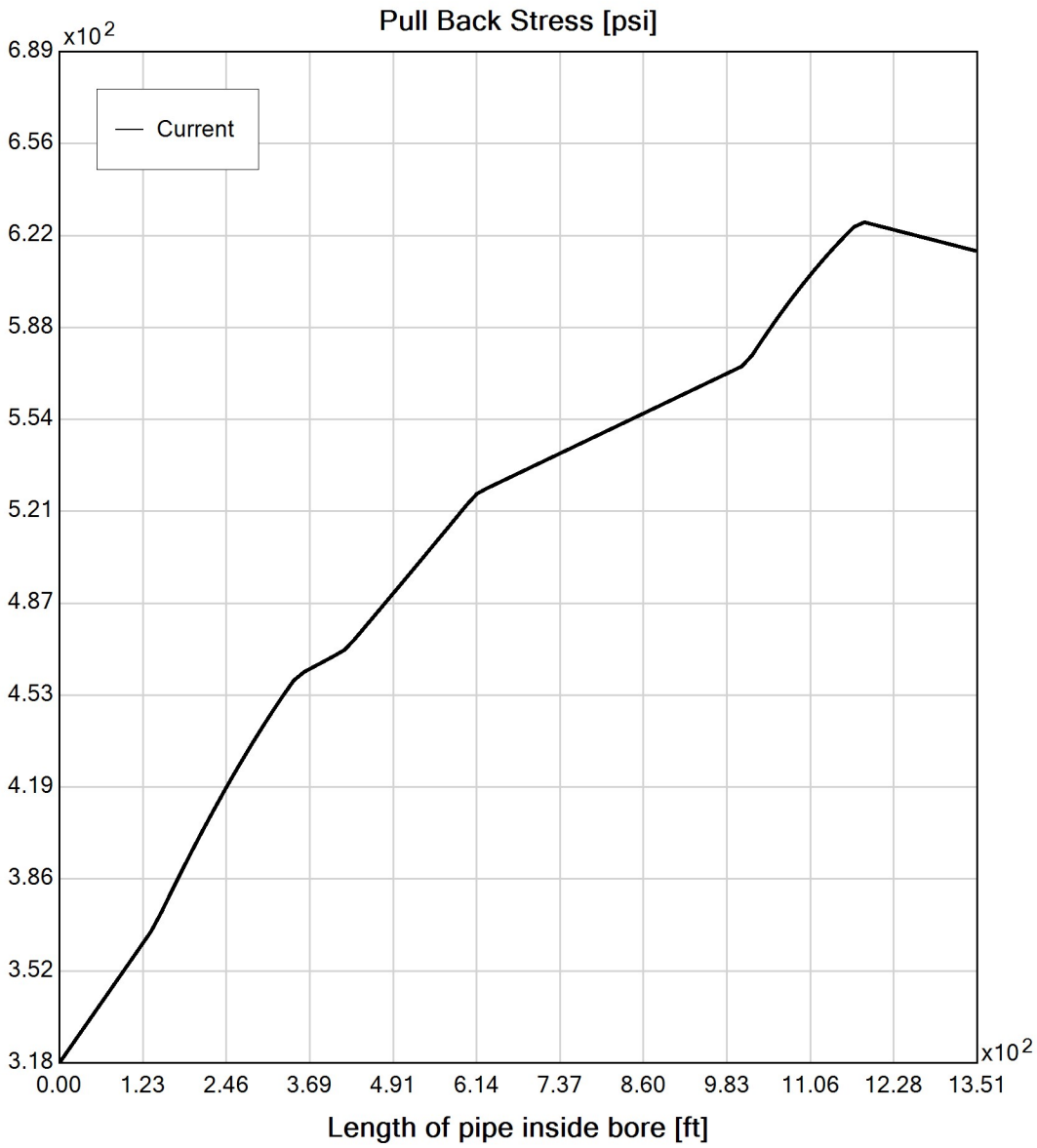
Yield Point (YP): 16.49

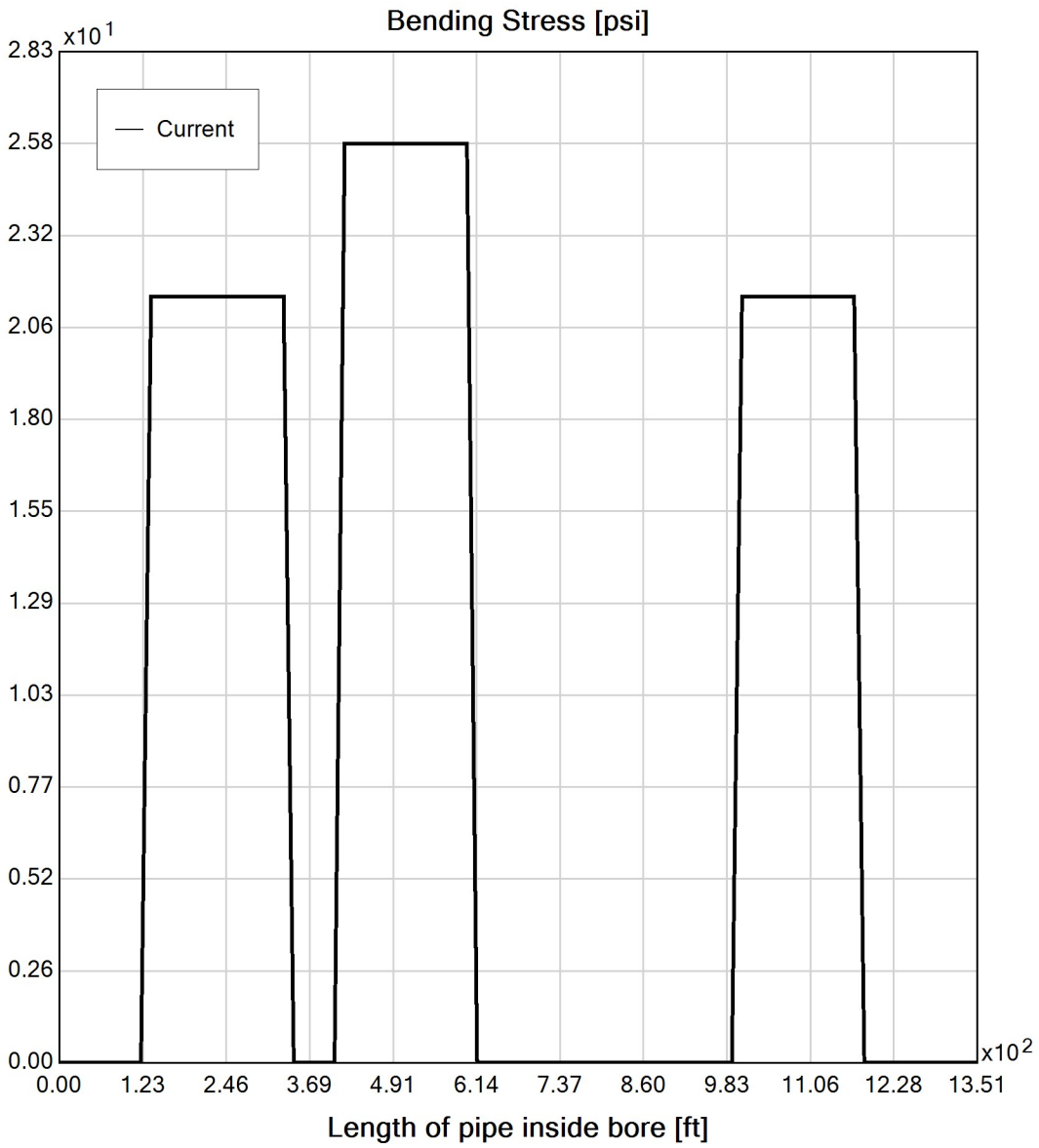
Effective Viscosity (cP): 417.7

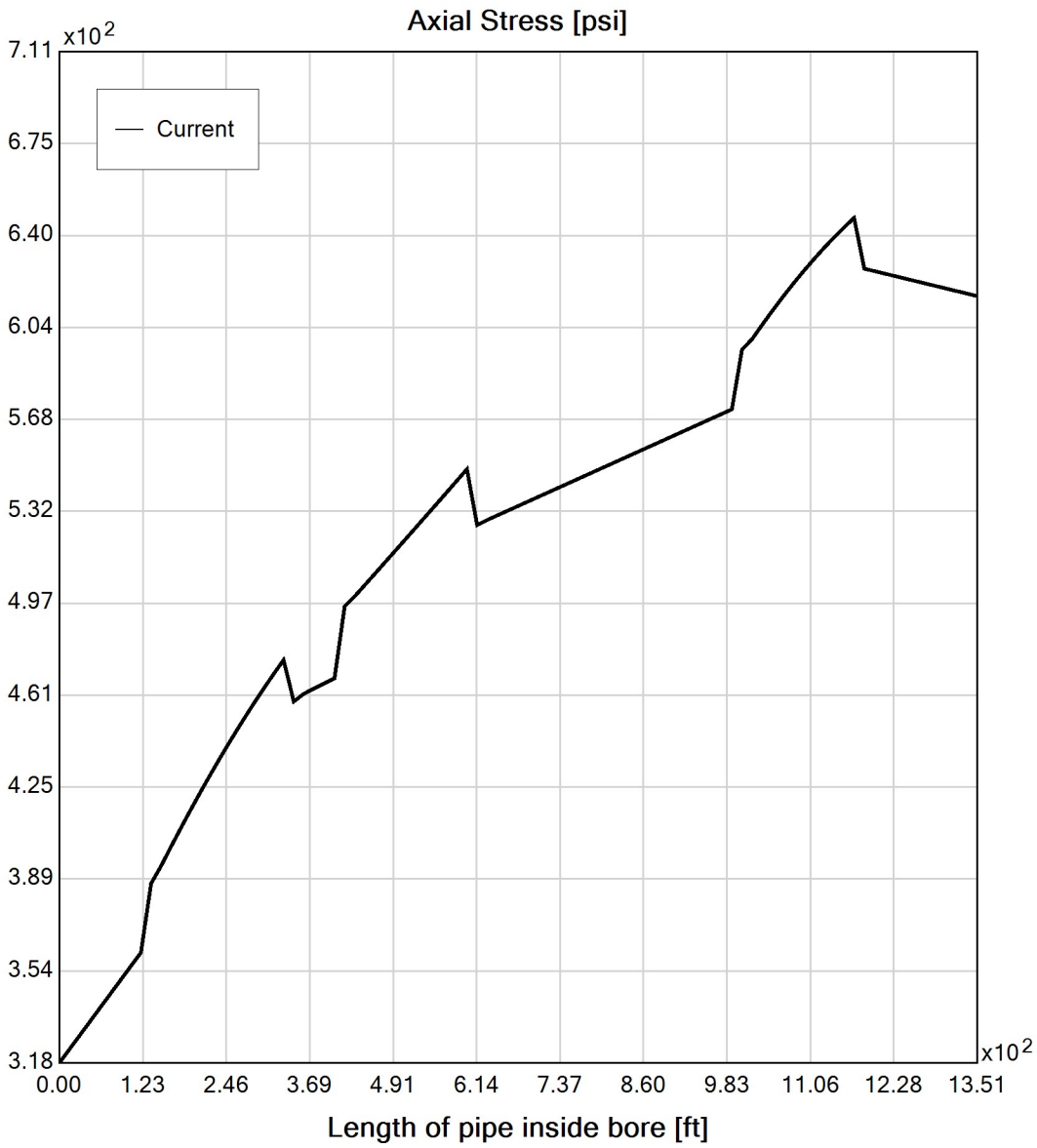
Virtual Site

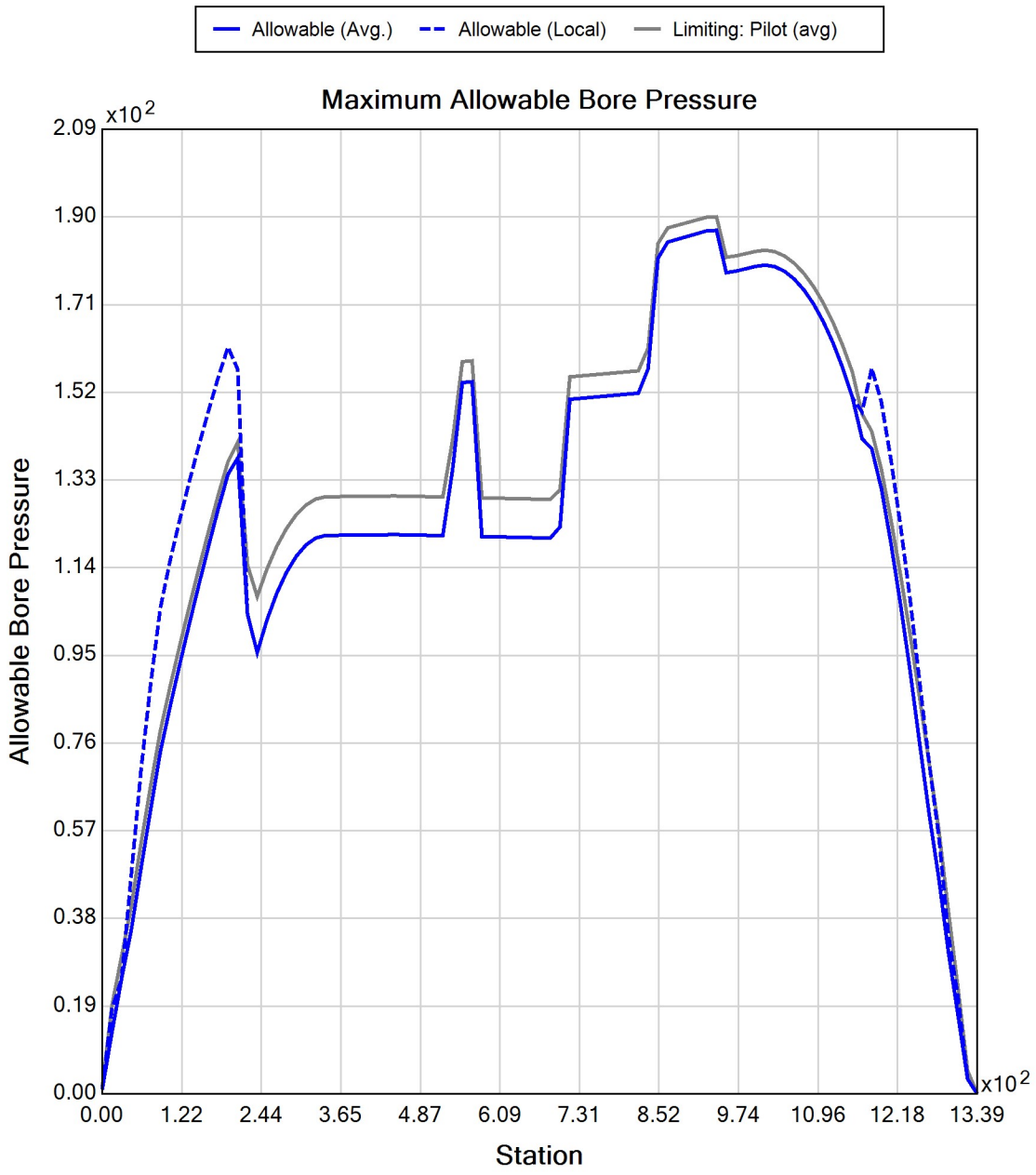


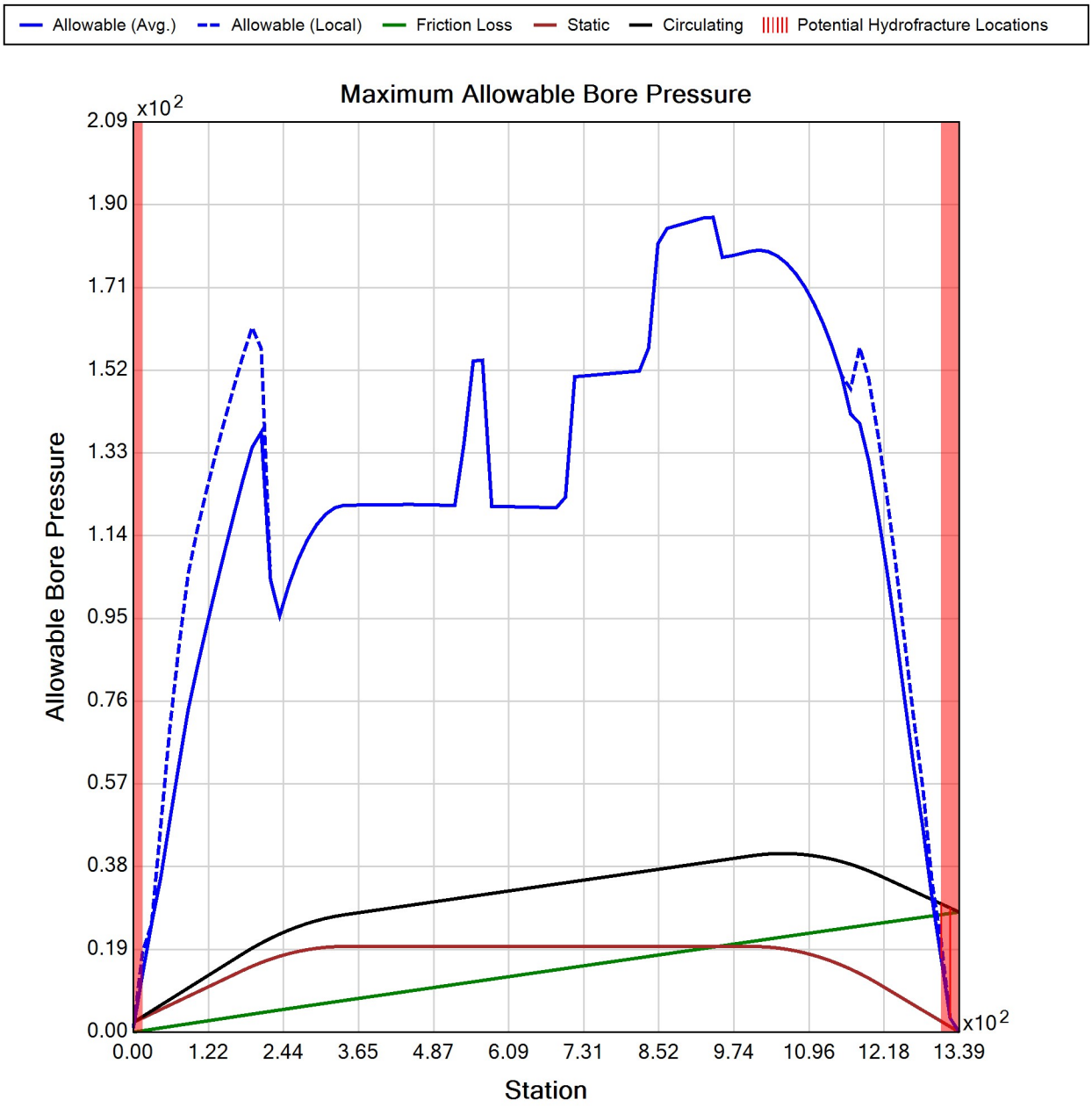












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Project Summary

General:	CHPE HDD 60 P4A Start Date: 06-07-2023 End Date: 06-07-2023
Project Owner:	TDI
Project Contractor:	Kiewit
Project Consultant:	CHA
Designer:	MDB BCE Amherst, MA
Description:	HDD 60 Reversed Conduit 1 2-inch DR9 ALT

Input Summary

Start Coordinate	(0.00, 0.00, 231.00) ft
End Coordinate	(1335.00, 0.00, 235.00) ft
Project Length	1335.00 ft
Pipe Type	HDPE
OD Classification	IPS
Pipe OD	2.375 in
Pipe DR	9.0
Pipe Thickness	0.26 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: 2" (2.375")
Pipe DR: 9
Pipe Length: 1350.00 ft
Internal Pressure: 0 psi
Borehole Diameter: 0.531000018119812 ft
Silo Width: 0.531000018119812 ft
Surface Surcharge: 0 psi
Short Term Modulus: 57500 psi
Long Term Modulus: 28200 psi
Short Term Poisson Ratio: 0.35
Long Term Poisson Ratio: 0.45
Pipe Unit Weight: 59.30500 lb/ft3
Allowable Tensile Stress (Short Term): 1200 psi
Allowable Tensile Stress (Long Term): 1100 psi
Allowable Compressive Stress (Short Term): 1150 psi
Allowable Compressive Stress (Long Term): 1150 psi
Surface-pipe friction coefficient at entrance: 0.5
Surface-pipe friction coefficient in borehole: 0.3
Pipe-soil friction angle: 30
Slurry Unit Weight: 93.64118 lb/ft3
Hydrokinetic Pressure: 10 psi
Ballast Unit Weight: 62.42746 lb/ft3

In-service Load Summary:

Pressure [psi]	Deformed	Collapsed
Earth Pressure	1.7	22.1
Water Pressure	12.8	11.8
Surface Surcharge	0.0	0.0
Internal Pressure	0.0	0.0
Net Pressure	14.5	33.9
Deflection		
Earth Load Deflection	0.600	6.005
Buoyant Deflection	0.029	0.029
Reissner Effect	0	0
Net Deflection	0.629	6.035
Compressive Stress [psi]		
Compressive Wall Stress	65.3	152.6

Installation Load Summary:

Forces/Stresses	@Maximum Force	Absolute Maximum
Pullback Force [lb]	1206.5	1206.5
Pullback Stress [psi]	689.4	689.4
Pullback Strain	1.199E-2	1.199E-2
Bending Stress [psi]	0.0	5.7
Bending Strain	0	9.896E-5
Tensile Stress [psi]	689.4	692.4
Tensile Strain	1.199E-2	1.212E-2

Net External Pressure = 28.0 [psi]

Buoyant Deflection = 0.0

Hydrokinetic Force = 137.3 lb

In-service Analysis

	Calculated	Allowable	Factor of Safety	Check
Deflection [%]	0.629	7.5	11.9	OK
Unconstrained Collapse [psi]	26.8	131.2	4.9	OK
Compressive Wall Stress [psi]	65.3	1150.0	17.6	OK

Installation Analysis

	Calculated	Allowable	Factor of Safety	Check
Deflection [%]	0.014	7.5	524.3	OK
Unconstrained Collapse [psi]	36.8	214.9	5.8	OK
Tensile Stress [psi]	692.4	1200.0	1.7	OK

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Project Summary

General:	HDD #61
	P4A
	Start Date: 12-10-2021
	End Date: 12-10-2021
Project Owner:	TDI
Project Contractor:	Kiewit
Project Consultant:	CHA/BCE
Designer:	
Description:	HDD 61 10-inch DR 9

Input Summary

Start Coordinate	(0.00, 0.00, 233.50) ft
End Coordinate	(684.50, 0.00, 233.00) ft
Project Length	684.50 ft
Pipe Type	HDPE
OD Classification	IPS
Pipe OD	10.750 in
Pipe DR	9.0
Pipe Thickness	1.19 in
Rod Length	15.00 ft
Rod Diameter	3.5 in
Drill Rig Location	(0.00, 0.00, 0.00) ft

Soil Summary

Number of Layers: 4

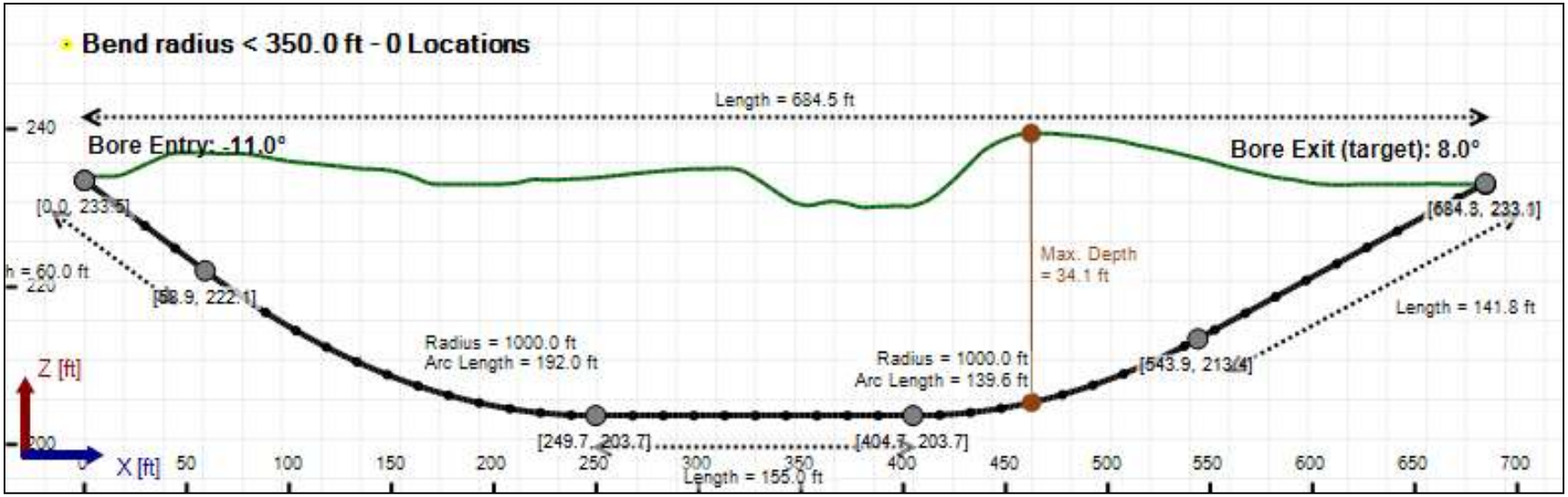
Soil Layer #1 USCS, Sand (S), SP
From Assistant
Unit Weight: 110.0000 (dry), 125.0000 (sat) [lb/ft3]
Phi: 34.00, S.M.: 145.00, Coh: 0.00 [psi]

Soil Layer #2 USCS, Sand (S), SM
From Assistant
Unit Weight: 110.0000 (dry), 125.0000 (sat) [lb/ft3]
Phi: 34.00, S.M.: 145.00, Coh: 0.00 [psi]

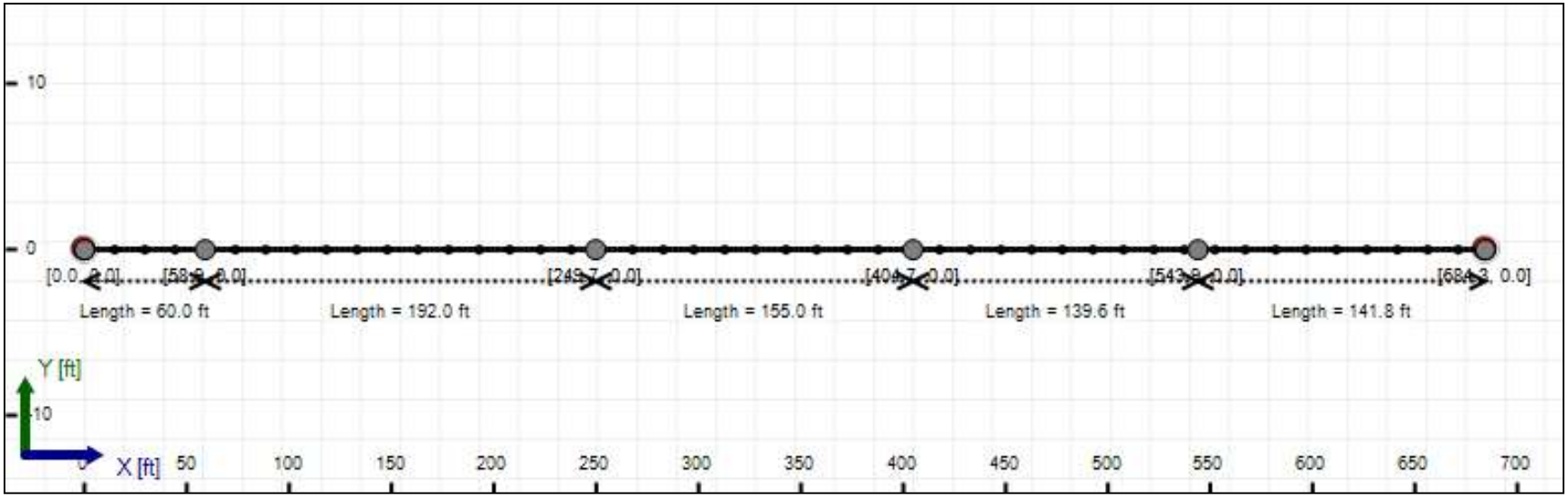
Soil Layer #3 USCS, Clay (C), CL
From Assistant
Unit Weight: 70.0000 (dry), 100.0000 (sat) [lb/ft3]
Phi: 0.00, S.M.: 145.00, Coh: 3.13 [psi]

Soil Layer #4 USCS, Sand (S), SM
From Assistant
Unit Weight: 110.0000 (dry), 125.0000 (sat) [lb/ft3]
Phi: 34.00, S.M.: 145.00, Coh: 0.00 [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: 690.00 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: 59.30500 lb/ft3
Allowable Tensile Stress (Short Term): 1200 psi
Allowable Tensile Stress (Long Term): 1100 psi
Allowable Compressive Stress (Short Term): 1150 psi
Allowable Compressive Stress (Long Term): 1150 psi
Surface-pipe friction coefficient at entrance: 0.5
Surface-pipe friction coefficient in borehole: 0.3
Pipe-soil friction angle: 30
Slurry Unit Weight: 93.64118 lb/ft3
Hydrokinetic Pressure: 10 psi
Ballast Unit Weight: 62.42746 lb/ft3

In-service Load Summary:

Pressure [psi]	Deformed	Collapsed
Earth Pressure	5.9	26.1
Water Pressure	0.0	0.0
Surface Surcharge	0.0	0.0
Internal Pressure	0.0	0.0
Net Pressure	5.9	26.1
Deflection		
Earth Load Deflection	1.597	7.097
Buoyant Deflection	0.132	0.132
Reissner Effect	0	0
Net Deflection	1.729	7.229
Compressive Stress [psi]		
Compressive Wall Stress	26.4	117.3

Installation Load Summary:

Forces/Stresses	@Maximum Force	Absolute Maximum
Pullback Force [lb]	11519.5	11519.5
Pullback Stress [psi]	321.3	321.3
Pullback Strain	5.587E-3	5.587E-3
Bending Stress [psi]	0.0	25.8
Bending Strain	0	4.479E-4
Tensile Stress [psi]	321.3	345.8
Tensile Strain	5.587E-3	6.462E-3

Net External Pressure = 17.4 [psi]

Buoyant Deflection = 0.1

Hydrokinetic Force = 567.6 lb

In-service Analysis

	Calculated	Allowable	Factor of Safety	Check
Deflection [%]	1.729	7.5	4.3	OK
Unconstrained Collapse [psi]	19.4	119.1	6.1	OK
Compressive Wall Stress [psi]	26.4	1150.0	43.6	OK

Installation Analysis

	Calculated	Allowable	Factor of Safety	Check
Deflection [%]	0.065	7.5	115.8	OK
Unconstrained Collapse [psi]	29.3	236.6	8.1	OK
Tensile Stress [psi]	345.8	1200.0	3.5	OK

Maximum Allowable Bore Pressure Summary

Ream Number	Initial Diameter	Final Diameter	Estimated Maximum Pressure (Avg.)	Estimated Maximum Pressure (Local)
Pilot Bore	0.00 in	8.00 in	92.554 psi	92.554 psi
1	8.00 in	12.00 in	92.466 psi	92.466 psi
2	12.00 in	16.13 in	92.338 psi	92.338 psi

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

Estimated Circulating Pressure Summary

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

Flow Rate (Q): 40.00 US (liquid) gallon/min

Drill Fluid Density: 68.700 lb/ft3

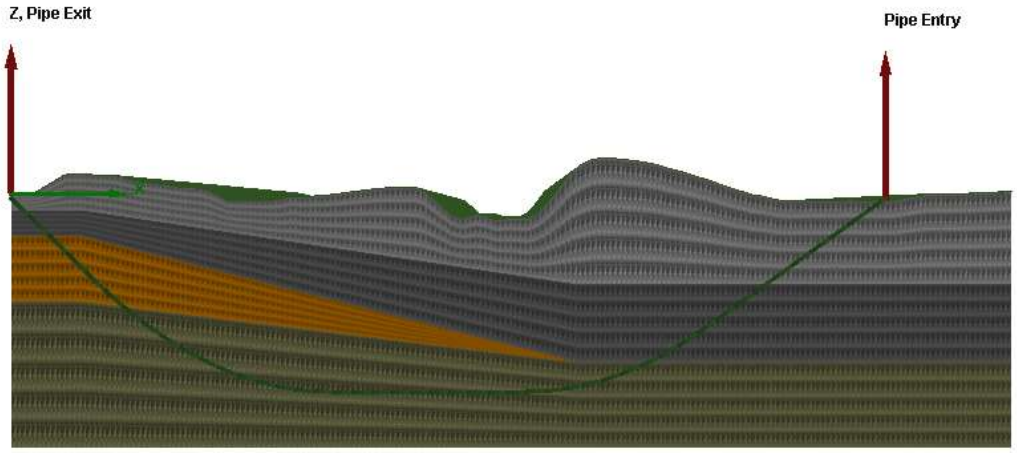
Rheological model: Bingham-Plastic

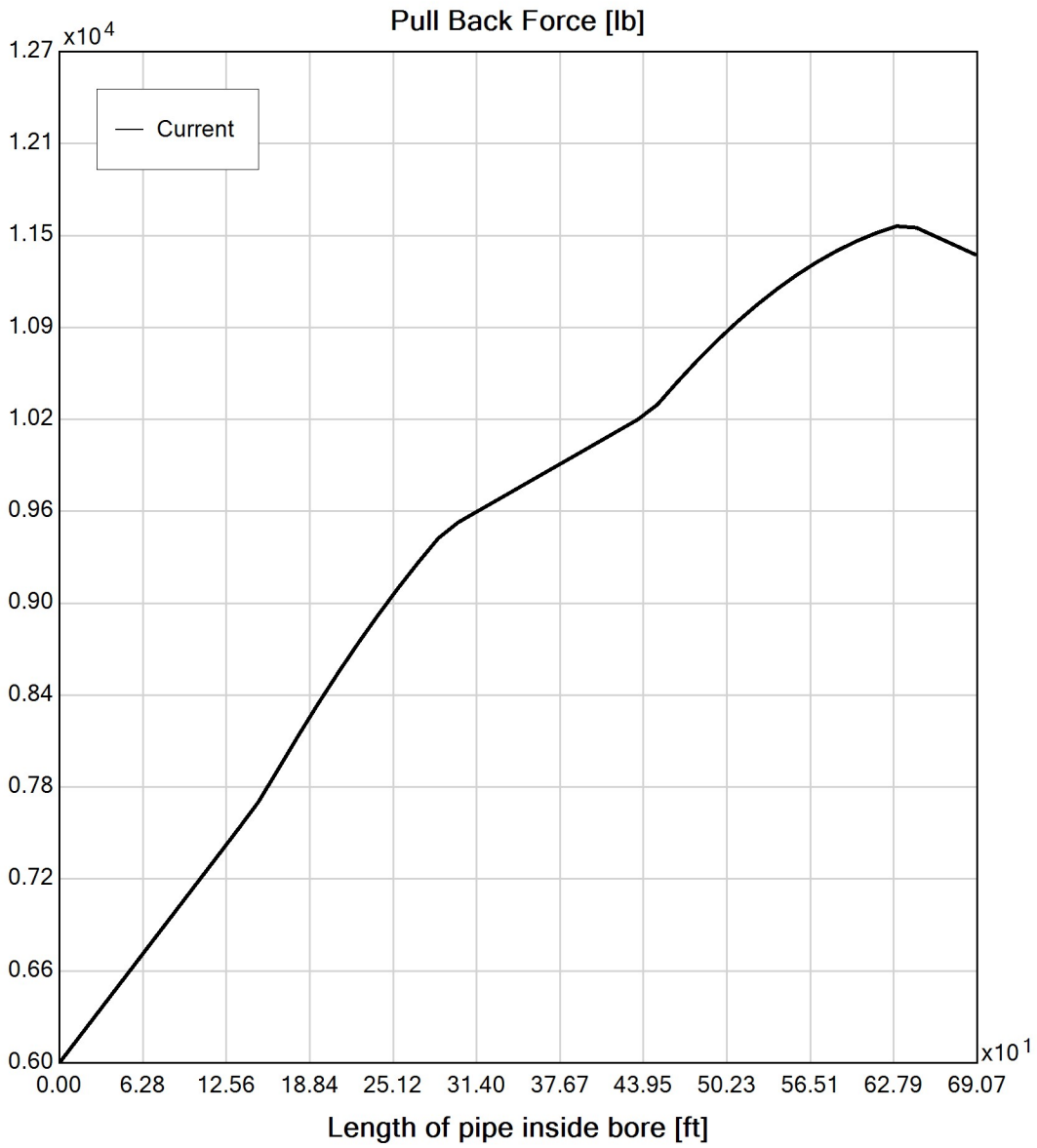
Plastic Viscosity (PV): 25.53

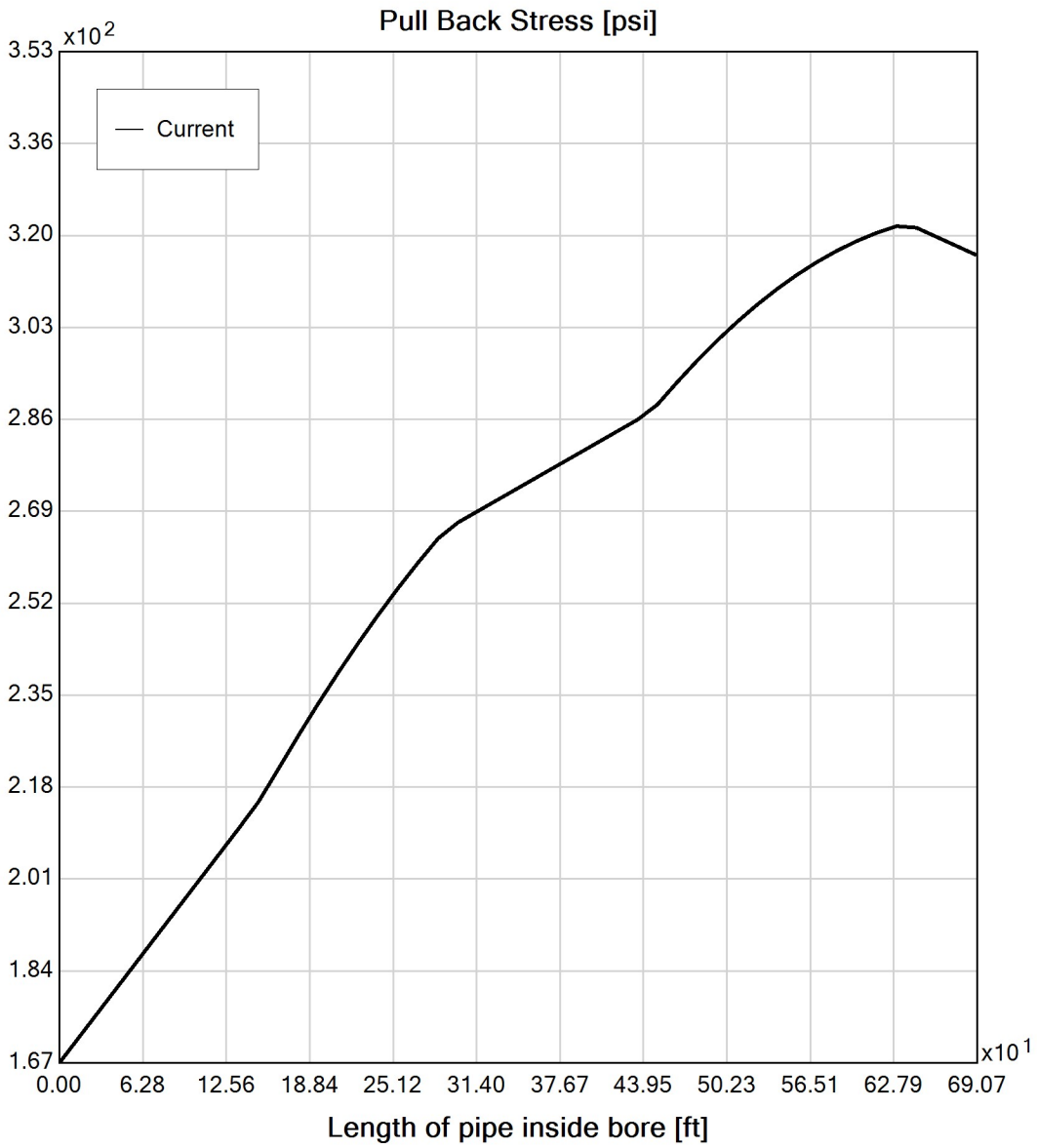
Yield Point (YP): 16.49

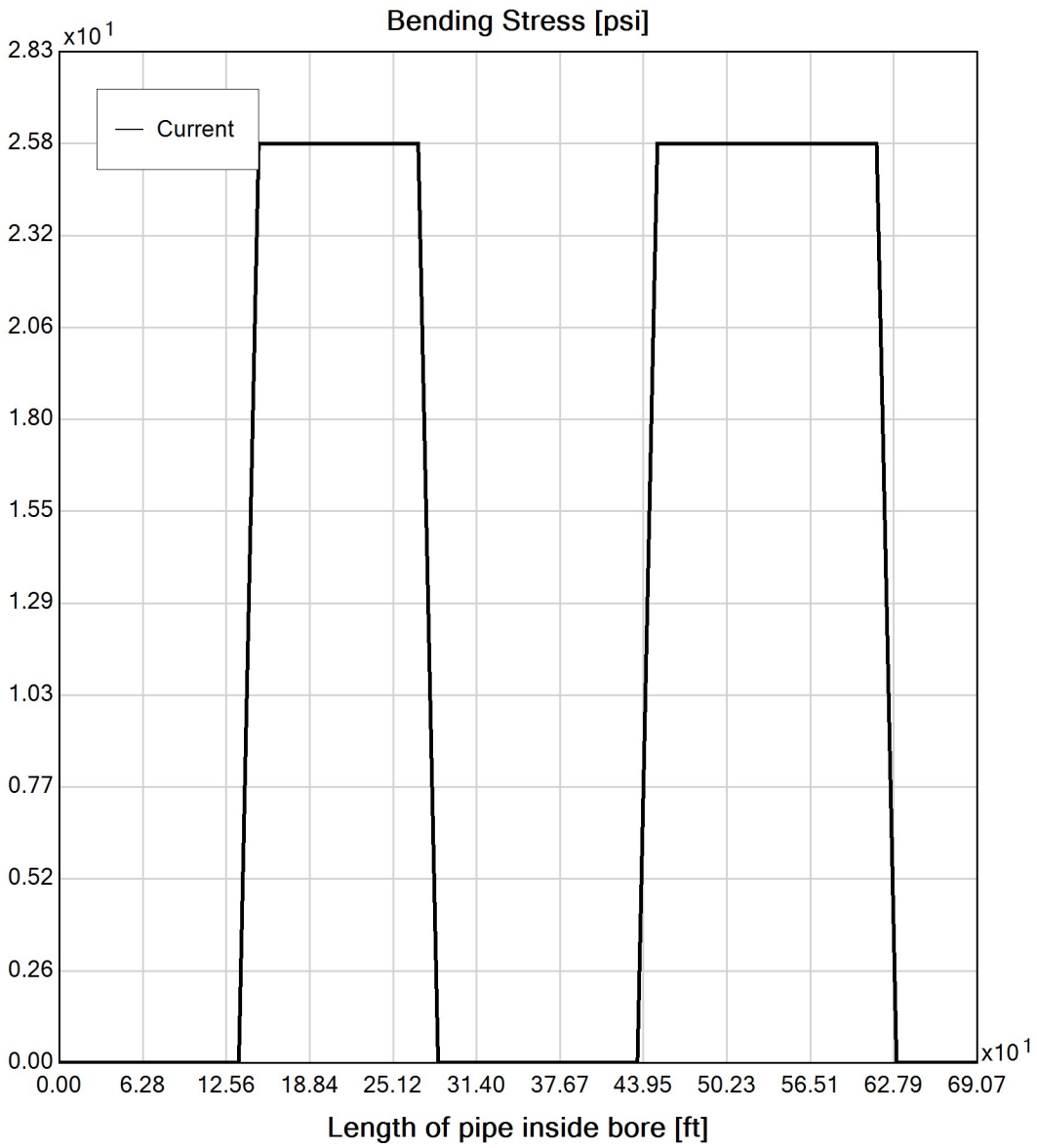
Effective Viscosity (cP): 1202.0

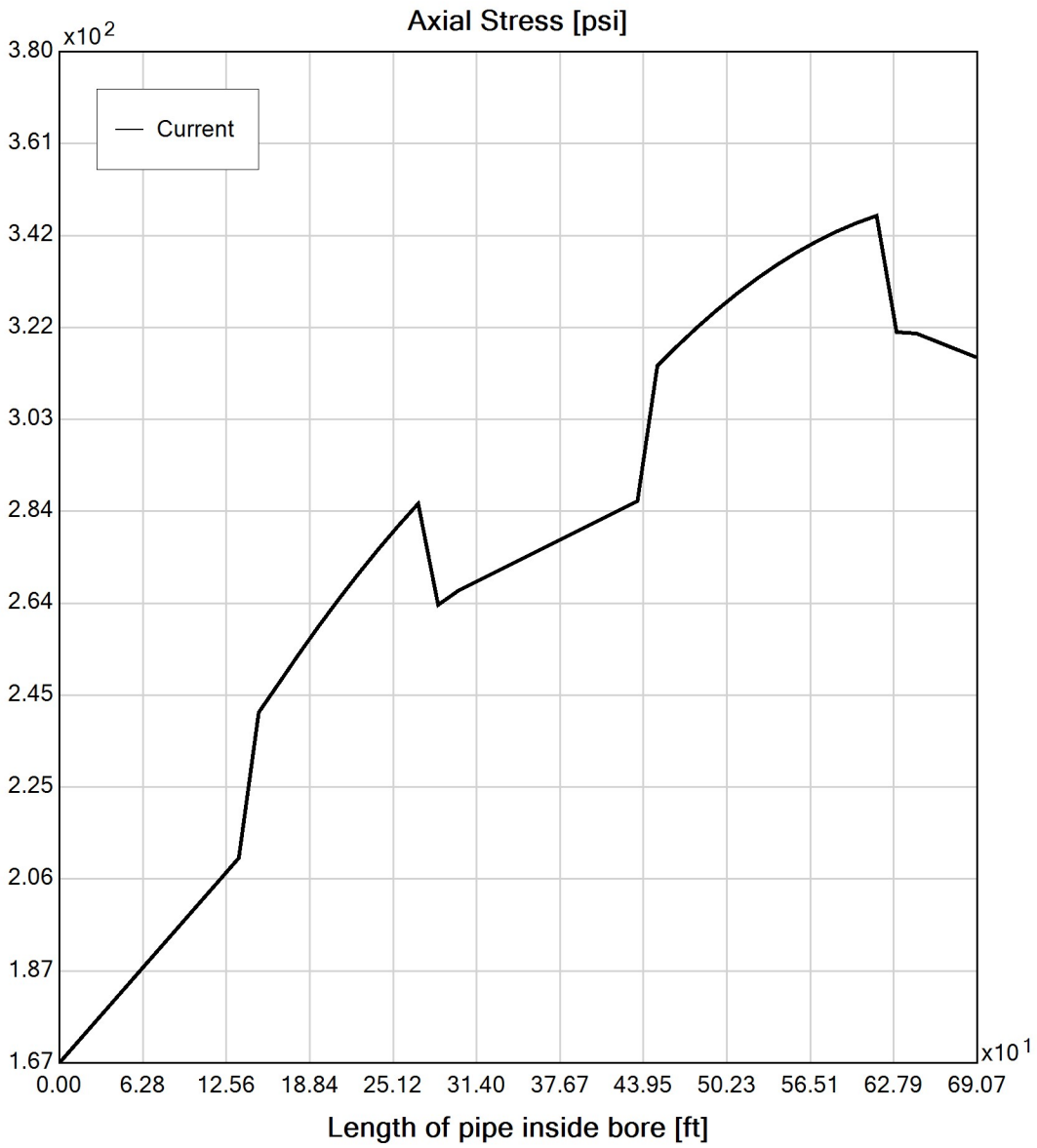
Virtual Site

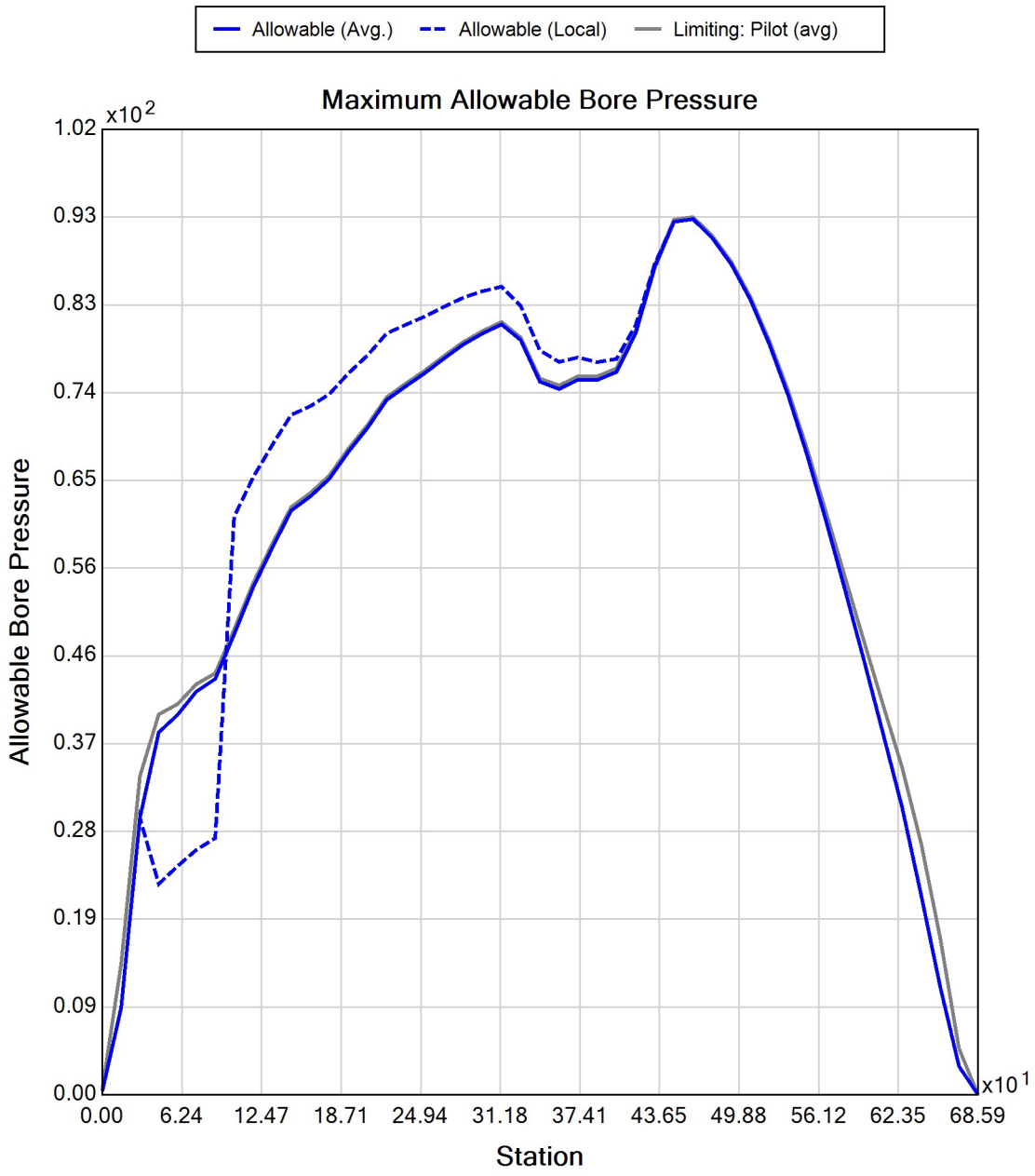


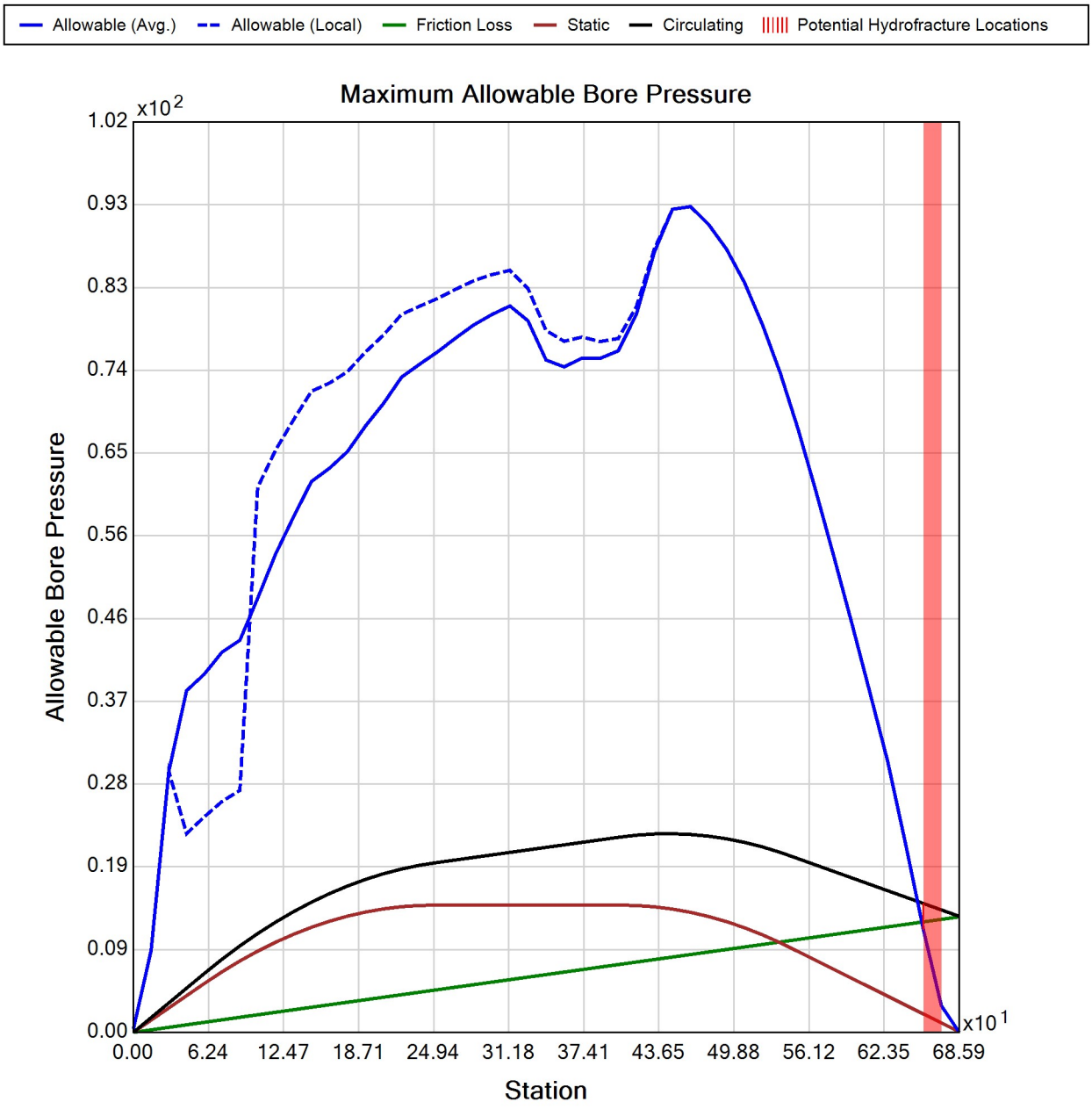












Generated Output

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

CALL YOUR ONE-CALL SYSTEM FIRST

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

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

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

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

Project Summary

General:	HDD #61
	P4A
	Start Date: 12-10-2021
	End Date: 12-10-2021
Project Owner:	TDI
Project Contractor:	Kiewit
Project Consultant:	CHA/BCE
Designer:	
Description:	HDD 61 2-inch DR 9

Input Summary

Start Coordinate	(0.00, 0.00, 233.50) ft
End Coordinate	(684.50, 0.00, 233.00) ft
Project Length	684.50 ft
Pipe Type	HDPE
OD Classification	IPS
Pipe OD	2.375 in
Pipe DR	9.0
Pipe Thickness	0.26 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: 2" (2.375")
Pipe DR: 9
Pipe Length: 690.00 ft
Internal Pressure: 0 psi
Borehole Diameter: 0.531000018119812 ft
Silo Width: 0.531000018119812 ft
Surface Surcharge: 0 psi
Short Term Modulus: 57500 psi
Long Term Modulus: 28200 psi
Short Term Poisson Ratio: 0.35
Long Term Poisson Ratio: 0.45
Pipe Unit Weight: 59.30500 lb/ft3
Allowable Tensile Stress (Short Term): 1200 psi
Allowable Tensile Stress (Long Term): 1100 psi
Allowable Compressive Stress (Short Term): 1150 psi
Allowable Compressive Stress (Long Term): 1150 psi
Surface-pipe friction coefficient at entrance: 0.5
Surface-pipe friction coefficient in borehole: 0.3
Pipe-soil friction angle: 30
Slurry Unit Weight: 93.64118 lb/ft3
Hydrokinetic Pressure: 10 psi
Ballast Unit Weight: 62.42746 lb/ft3

In-service Load Summary:

Pressure [psi]	Deformed	Collapsed
Earth Pressure	2.3	26.1
Water Pressure	0.0	0.0
Surface Surcharge	0.0	0.0
Internal Pressure	0.0	0.0
Net Pressure	2.3	26.1
Deflection		
Earth Load Deflection	0.639	7.097
Buoyant Deflection	0.029	0.029
Reissner Effect	0	0
Net Deflection	0.668	7.126
Compressive Stress [psi]		
Compressive Wall Stress	10.6	117.3

Installation Load Summary:

Forces/Stresses	@Maximum Force	Absolute Maximum
Pullback Force [lb]	671.9	671.9
Pullback Stress [psi]	383.9	383.9
Pullback Strain	6.676E-3	6.676E-3
Bending Stress [psi]	0.0	5.7
Bending Strain	0	9.896E-5
Tensile Stress [psi]	383.9	388.3
Tensile Strain	6.676E-3	6.853E-3

Net External Pressure = 17.4 [psi]

Buoyant Deflection = 0.0

Hydrokinetic Force = 137.3 lb

In-service Analysis

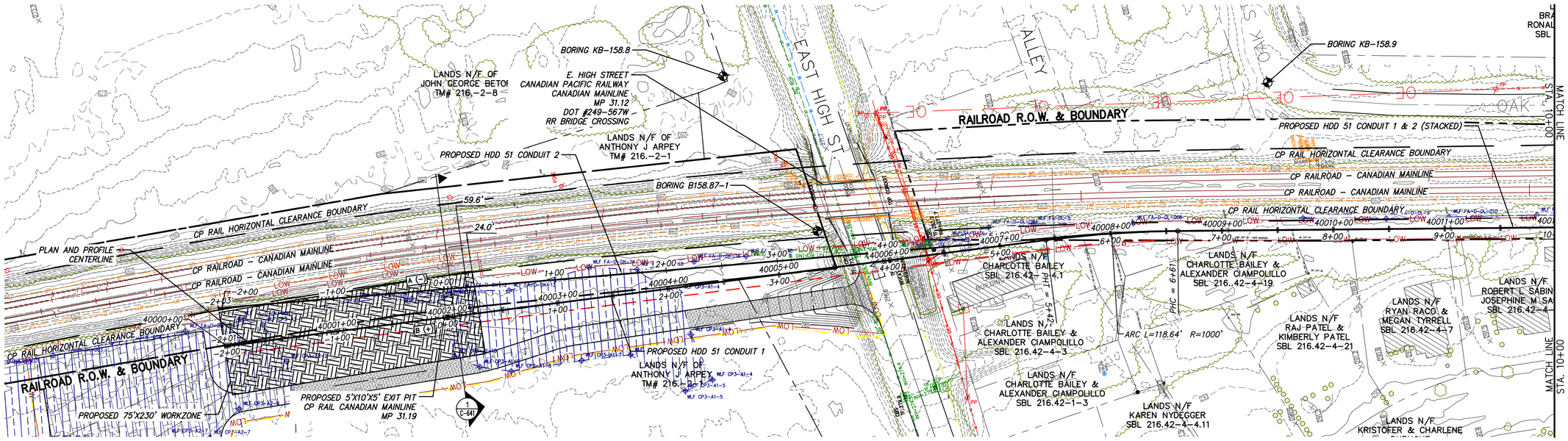
	Calculated	Allowable	Factor of Safety	Check
Deflection [%]	0.668	7.5	11.2	OK
Unconstrained Collapse [psi]	19.4	130.3	6.7	OK
Compressive Wall Stress [psi]	10.6	1150.0	108.9	OK

Installation Analysis

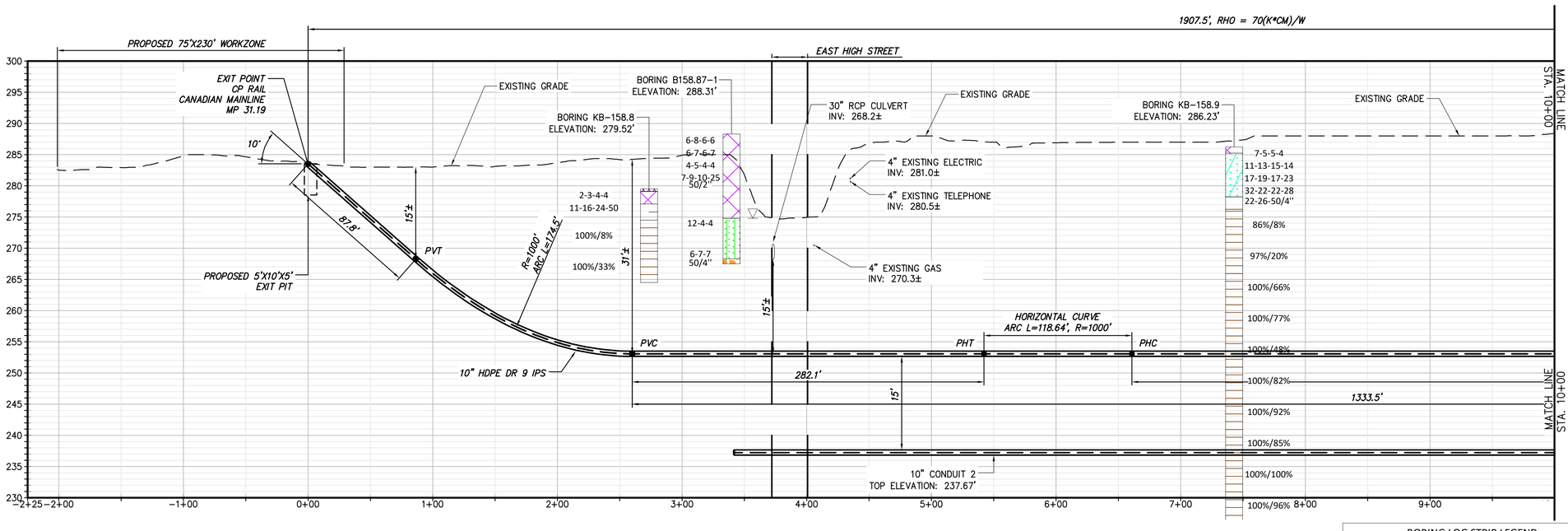
	Calculated	Allowable	Factor of Safety	Check
Deflection [%]	0.014	7.5	524.3	OK
Unconstrained Collapse [psi]	29.3	234.9	8.0	OK
Tensile Stress [psi]	388.3	1200.0	3.1	OK

Appendix B

HDD Design Drawings



PROPOSED HDD 51 PLAN VIEW
CONDUIT 1



PROPOSED HDD 51 PROFILE
CONDUIT 1

BORING LOG STRIP LEGEND

B101

Blow Counts per 6" = 10-10-10

Recovery %/RQD % = 95%/90%

11000psi =UCS

2D strip logs shown at 10x exaggeration

3D strip logs have no exaggeration

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

CHPE Champlain Hudson Power Express

Kiewit

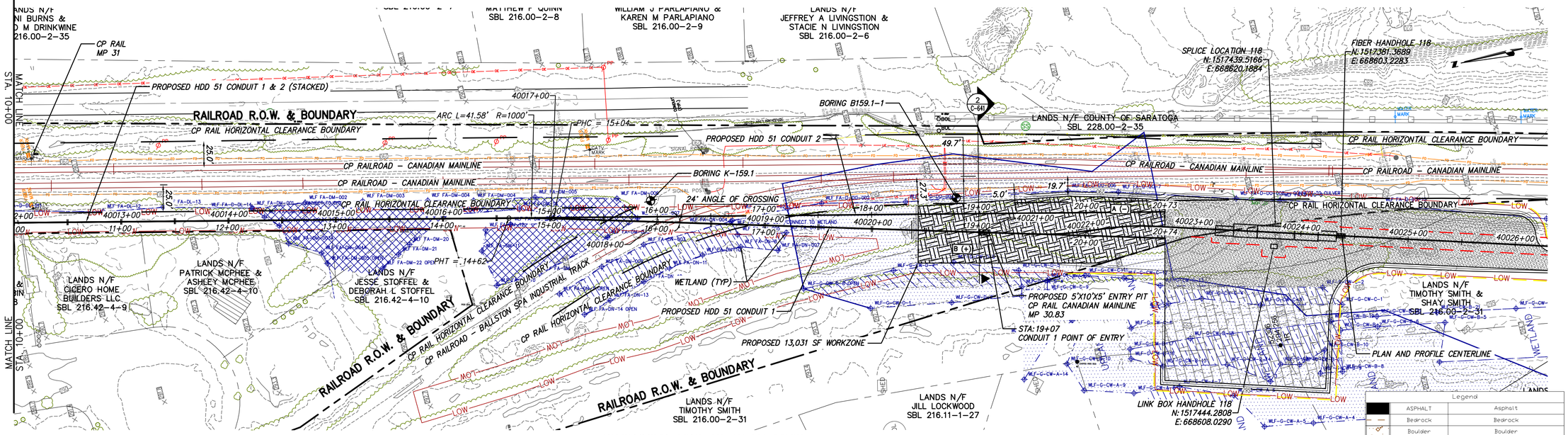
CHA
111 Winners Circle, PO Box 5269
Albany, NY 12205-0269
518.453.4500 . www.chacompanies.com

No.	DATE	SUBMITTAL / REVISION DESCRIPTION	DB	APP
0	08/03/2023	ISSUED FOR CONSTRUCTION SUBMISSION	SPB	JEO

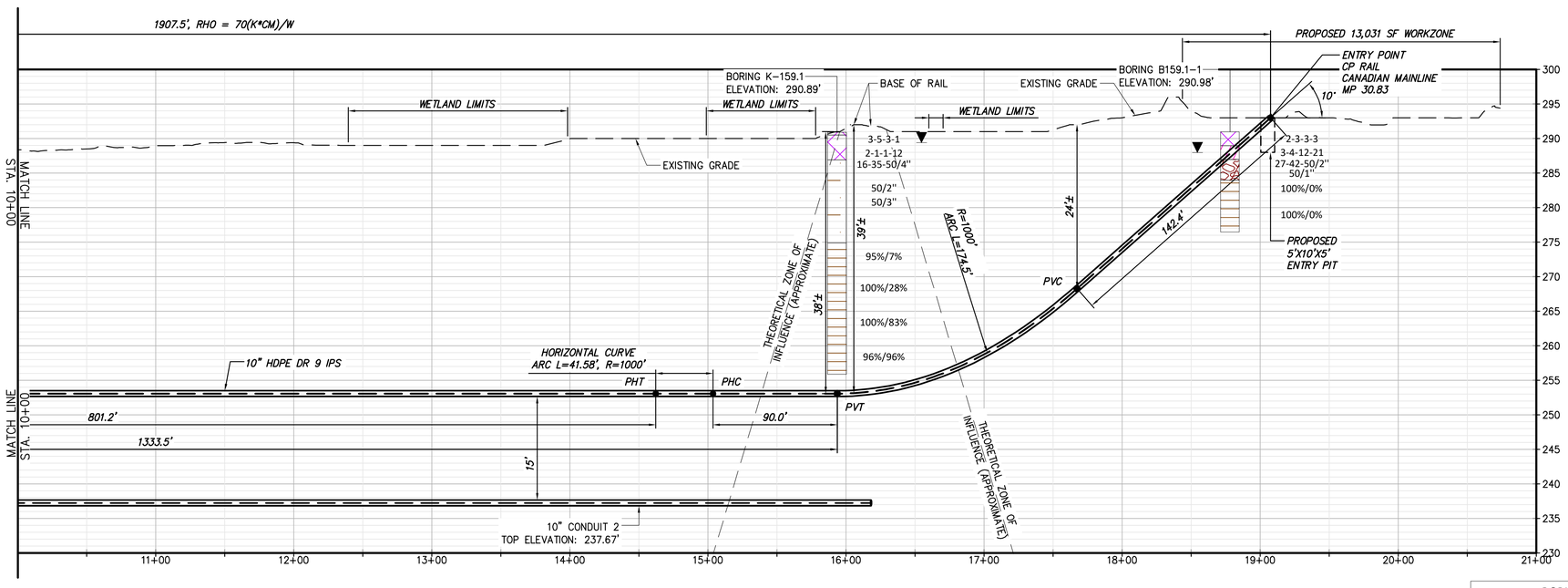
CHAMPLAIN HUDSON POWER EXPRESS
SEGMENT 6 (PACKAGE 4A) - CP: BALLSTON TO GLENVILLE
PLAN AND PROFILE - HDD 51, CONDUIT 1

KIEWIT PROJECT NO.	21162
CHA PROJECT NO.	066076
DRAWING NO.	C-301

DRAWN BY: JAS | DESIGNED BY: JAS | APPROVED BY: JEO | SCALE: AS NOTED | DATE: 8/03/2023 | REV. NO. 1 | SH.NO.



PROPOSED HDD 51 PLAN VIEW
CONDUIT 1



PROPOSED HDD 51 PROFILE
CONDUIT 1

BORING LOG STRIP LEGEND

B101

Blow Counts per 6" = 10-10-10
Recovery %/RQD % = 95%/90%
11000psi =UCS

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

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

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CHAMPLAIN HUDSON POWER EXPRESS
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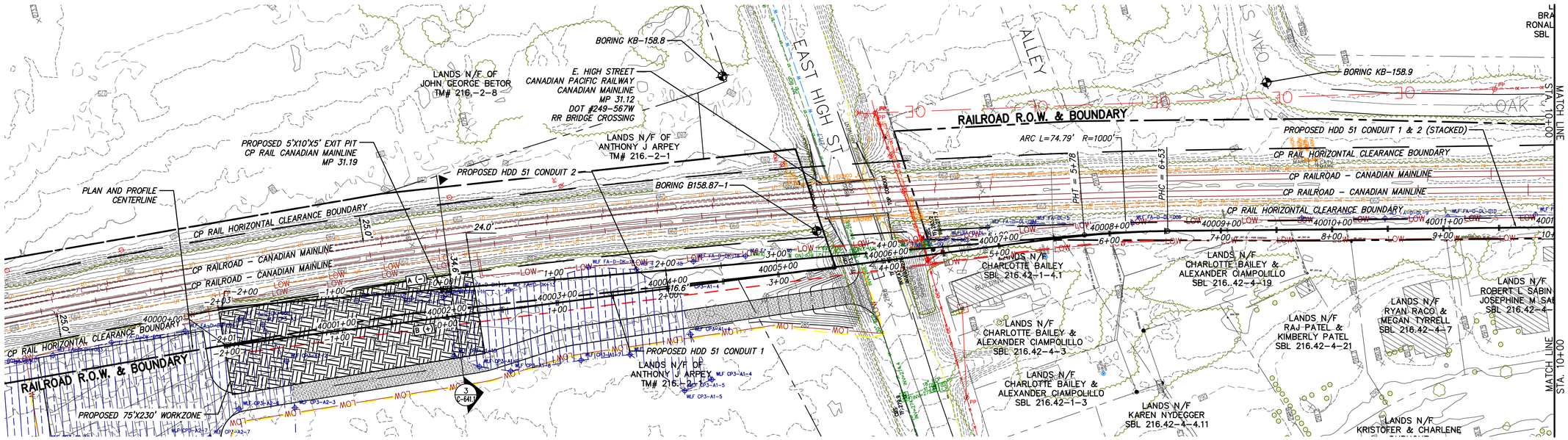
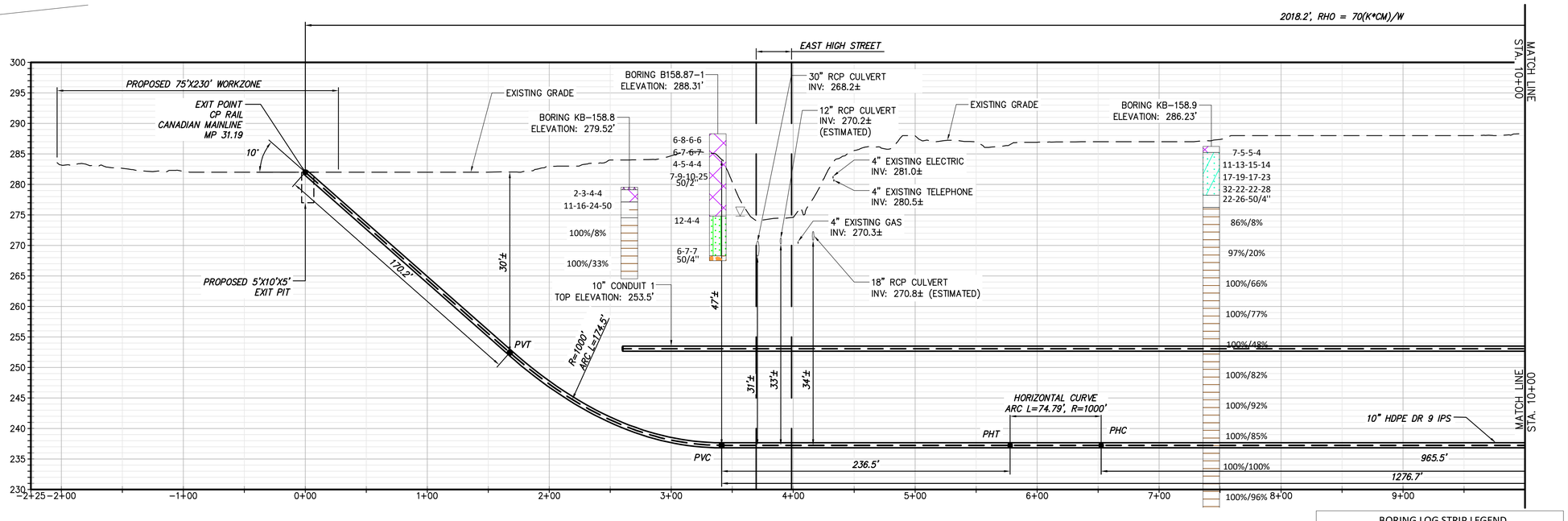
PLAN AND PROFILE - HDD 51, CONDUIT 1

KIEWIT PROJECT NO.	21162
CHA PROJECT NO.	066076
DRAWING NO.	C-301.1

DRAWN BY: JAS | DESIGNED BY: JAS | APPROVED BY: JEO | SCALE AS NOTED | DATE 8/03/2023 | REV. NO. 1 | SH.NO.

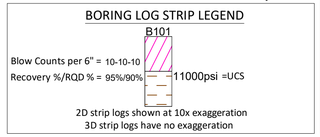


PROPOSED HDD 51 PLAN VIEW
CONDUIT 2



PROPOSED HDD 51 PROFILE
CONDUIT 2

BORING LOG STRIP LEGEND



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

CHPE Champlain Hudson Power Express

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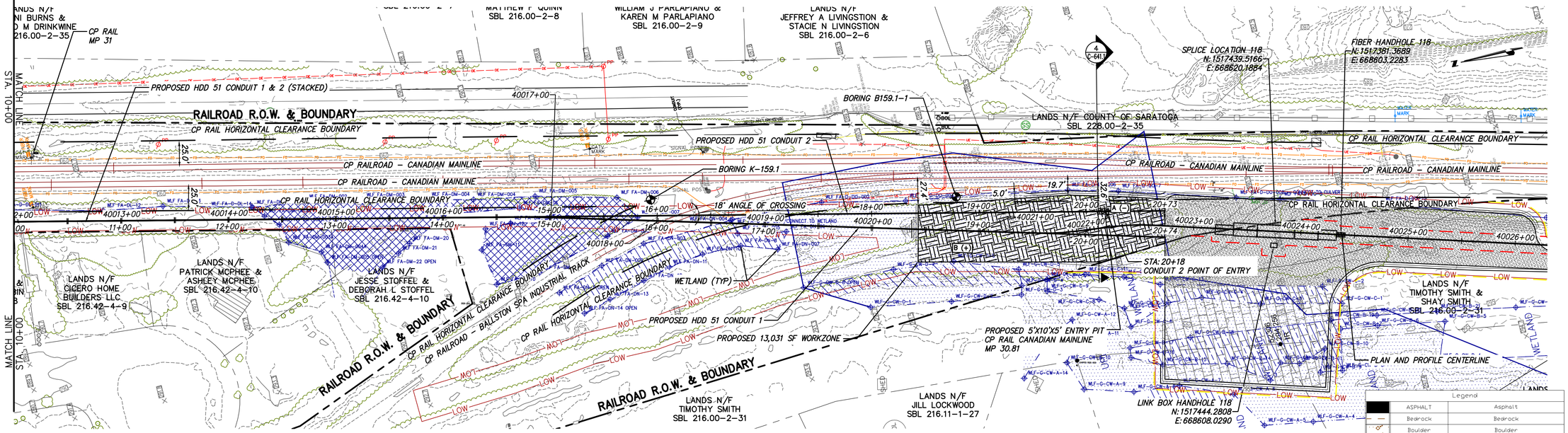
No.	DATE	SUBMITTAL / REVISION DESCRIPTION	DB	APP
0	08/03/2023	ISSUED FOR CONSTRUCTION SUBMISSION	SPB	JEO

CHAMPLAIN HUDSON POWER EXPRESS
SEGMENT 6 (PACKAGE 4A) - CP: BALLSTON TO GLENVILLE
PLAN AND PROFILE - HDD 51, CONDUIT 2

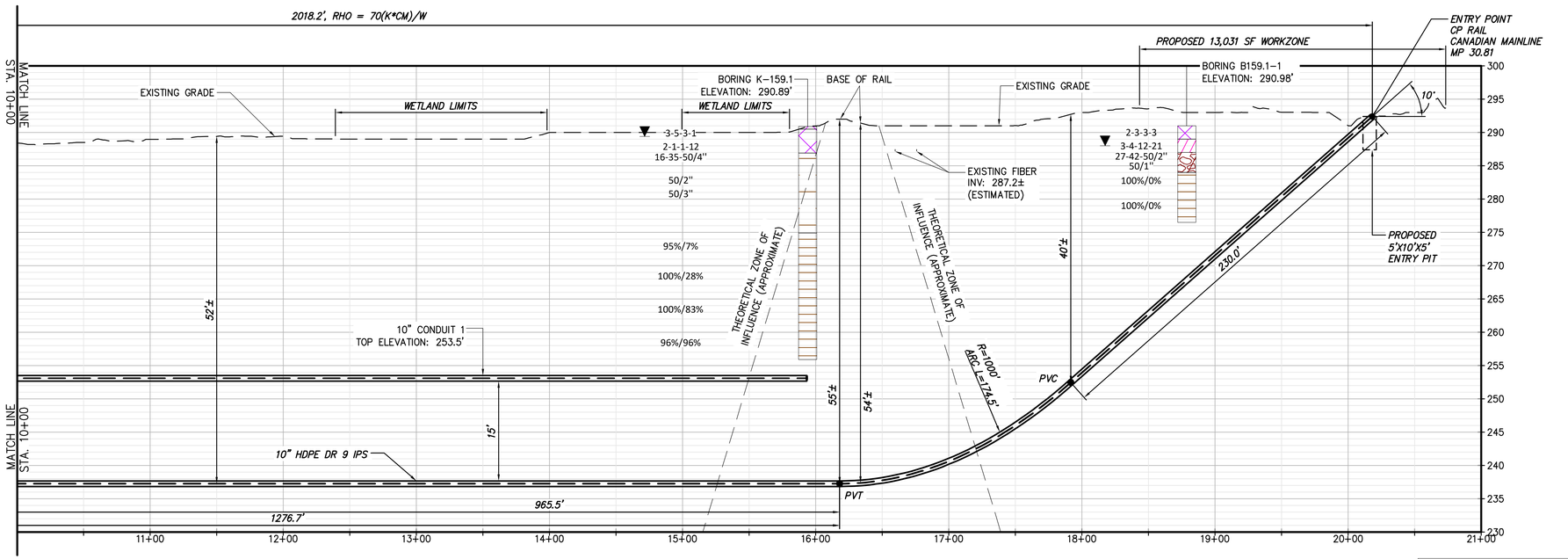
KIEWIT PROJECT NO.	21162
CHA PROJECT NO.	066076
DRAWING NO.	C-301A

DRAWN BY: JAS | DESIGNED BY: JAS | APPROVED BY: JEO | SCALE AS NOTED | DATE 8/03/2023 | REV. NO. X | SH.NO.



PROPOSED HDD 51 PLAN VIEW
CONDUIT 2

0 50 100
Scale in feet



PROPOSED HDD 51 PROFILE
CONDUIT 2

0 50 100
Scale in feet

BORING LOG STRIP LEGEND

B101

Blow Counts per 6" = 10-10-10
Recovery %/RQD % = 95%/90%
11000psi =UCS

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

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

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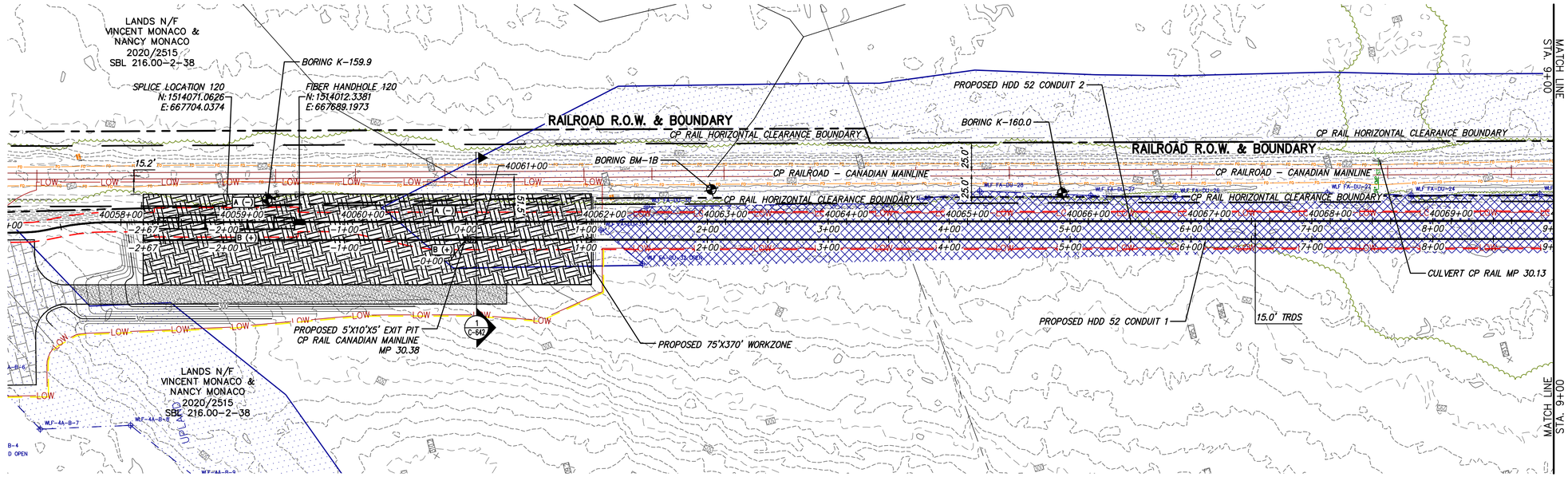
No.	DATE	SUBMITTAL / REVISION DESCRIPTION	DB	APP
0	08/03/2023	ISSUED FOR CONSTRUCTION SUBMISSION	SPB	JEO

CHAMPLAIN HUDSON POWER EXPRESS
SEGMENT 6 (PACKAGE 4A) - CP: BALLSTON TO GLENVILLE
PLAN AND PROFILE - HDD 51, CONDUIT 2

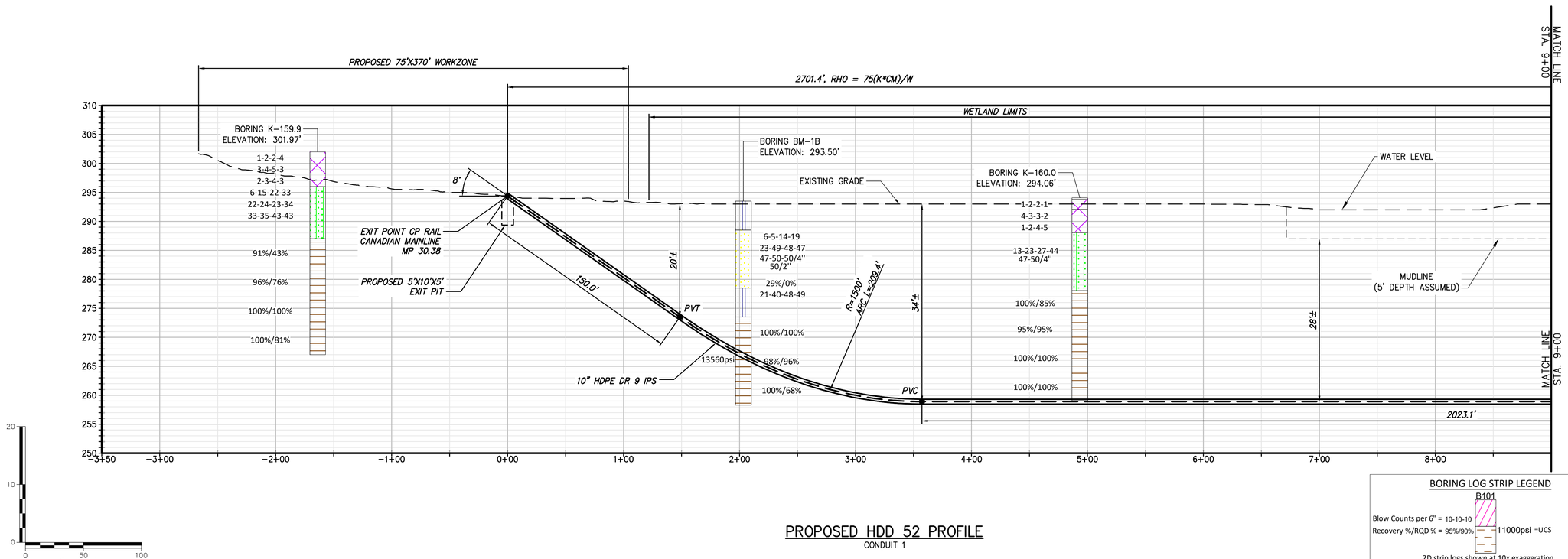
KIEWIT PROJECT NO.	21162
CHA PROJECT NO.	066076
DRAWING NO.	C-301A.1

DRAWN BY: JAS | DESIGNED BY: JAS | APPROVED BY: JEO | SCALE AS NOTED | DATE 8/03/2023 | REV. NO. X | SH.NO.



0 50 100
Scale in feet

PROPOSED HDD 52 PLAN VIEW
CONDUIT 1



0 50 100
Scale in feet

PROPOSED HDD 52 PROFILE
CONDUIT 1

BORING LOG STRIP LEGEND

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

Legend	
ASPHALT	Asphalt
Bedrock	Bedrock
Boulder	Boulder
CH	Fat CLAY
CH-MH	SILTY Fat CLAY
CL	Lean CLAY
CL-ML	SILTY CLAY
CONCRETE	Concrete
Fill	Fill
GC	CLAYEY GRAVEL
GC-GM	SILTY CLAYEY GRAVEL
GM	SILTY GRAVEL
GP	Poorly Graded GRAVEL
GP-GC	Poorly Graded Gravel with CLAY
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MH	Elastic SILT
ML	SILT
OH	ORGANIC Fat CLAY
OL	ORGANIC Lean CLAY
OL/OH	ORGANIC SOIL
PT	PEAT
Rock	Rock
Sandstone	Sandstone
SC	CLAYEY SAND
SC-SM	SILT, CLAYEY SAND
SHALE	Shale
SILTSTONE	Siltstone
SM	SILTY SAND
SP	Poorly Graded SAND
SP-SC	Poorly Graded SAND with CLAY
SP-SM	Poorly Graded SAND with SILT
SW	Well graded SAND
SW-SC	Well Graded SAND with CLAY
SW-SM	Well Graded SAND with SILT
Topsoil	Topsoil
USGS 601	Gravel or Conglomerate 1
USGS 654	Subgraywacke
USGS 670	Interbedded Sandstone and Shale
USGS 702	Quartzite
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USGS 708	Gneiss
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Void	Void
Water	Water
Weathered Rock	Undefined
Water Table	Water Table during drilling
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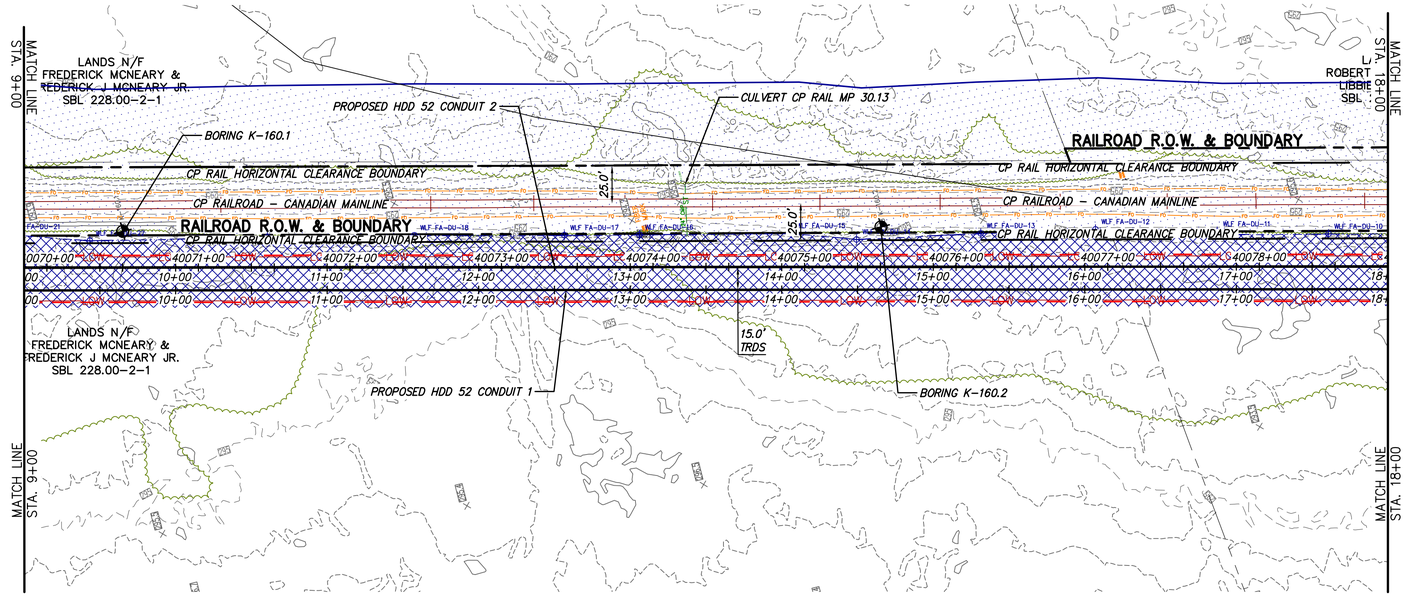
CHAMPLAIN HUDSON POWER EXPRESS
SEGMENT 6 (PACKAGE 4A) - CP: BALLSTON TO GLENVILLE
PLAN AND PROFILE - HDD 52, CONDUIT 1

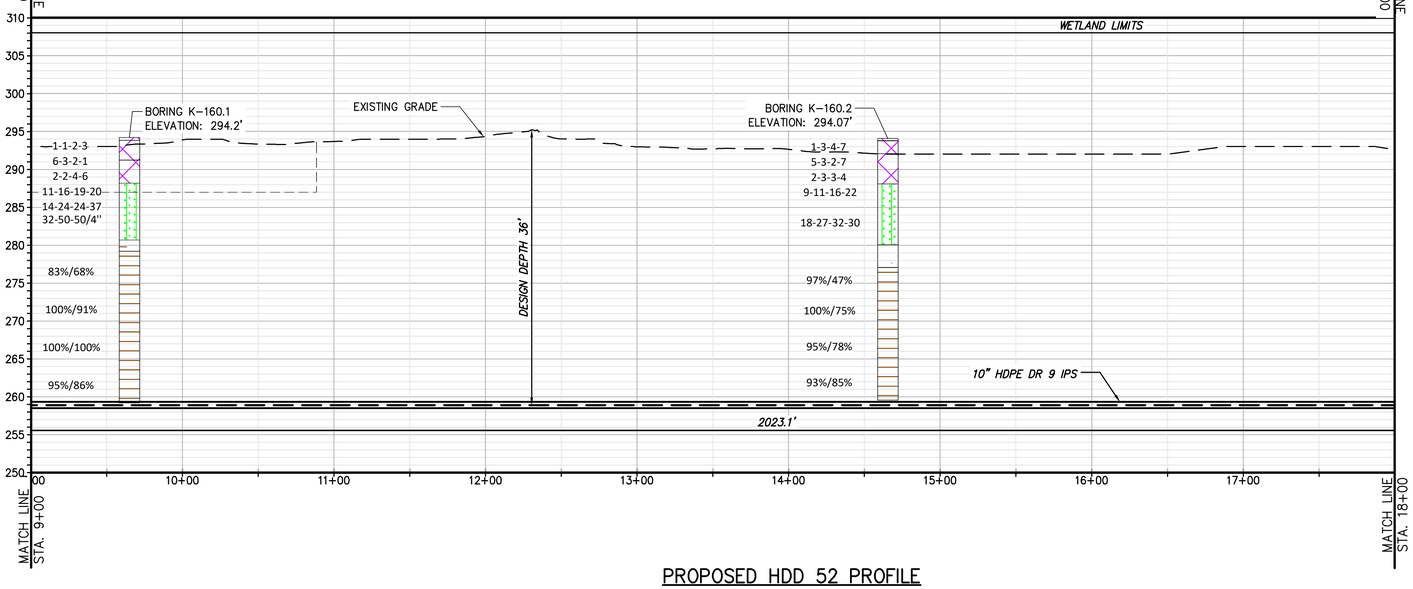
KIEWIT PROJECT NO.	21162
CHA PROJECT NO.	066076
DRAWING NO.	C-302

DRAWN BY: CJL | DESIGNED BY: CJL | APPROVED BY: JEO | SCALE AS NOTED | DATE 8/03/2023 | REV. NO. X | SH.NO.



0 50 100
Scale in feet

PROPOSED HDD 52 PLAN VIEW
CONDUIT 1



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0 50 100
Scale in feet

PROPOSED HDD 52 PROFILE
CONDUIT 1

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

Legend	
ASPHALT	Asphalt
Bedrock	Bedrock
Boulder	Boulder
CH	Fat CLAY
CH-MH	SILTY Fat CLAY
CL	Lean CLAY
CL-ML	SILTY CLAY
CONCRETE	Concrete
Fill	Fill
GC	CLAYEY GRAVEL
GC-GM	SILTY CLAYEY GRAVEL
GM	SILTY GRAVEL
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GP-GC	Poorly Graded Gravel with CLAY
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GW	Well Graded GRAVEL
GW-GC	Well Graded GRAVEL with CLAY
GW-GM	Well Graded GRAVEL with SILT
Limestone	Limestone
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ML	SILT
OH	ORGANIC Fat CLAY
OL	ORGANIC Lean CLAY
OL/OH	ORGANIC SOIL
PT	PEAT
Rock	Rock
Sandstone	Sandstone
SC	CLAYEY SAND
SC-SM	SILT, CLAYEY SAND
SHALE	Shale
SILTSTONE	Siltstone
SM	SILTY SAND
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USGS 670	Interbedded Sandstone and Shale
USGS 702	Quartzite
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USGS 708	Gneiss
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Void	Void
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Weathered Rock	Undefined
Water Table	Water Table during drilling
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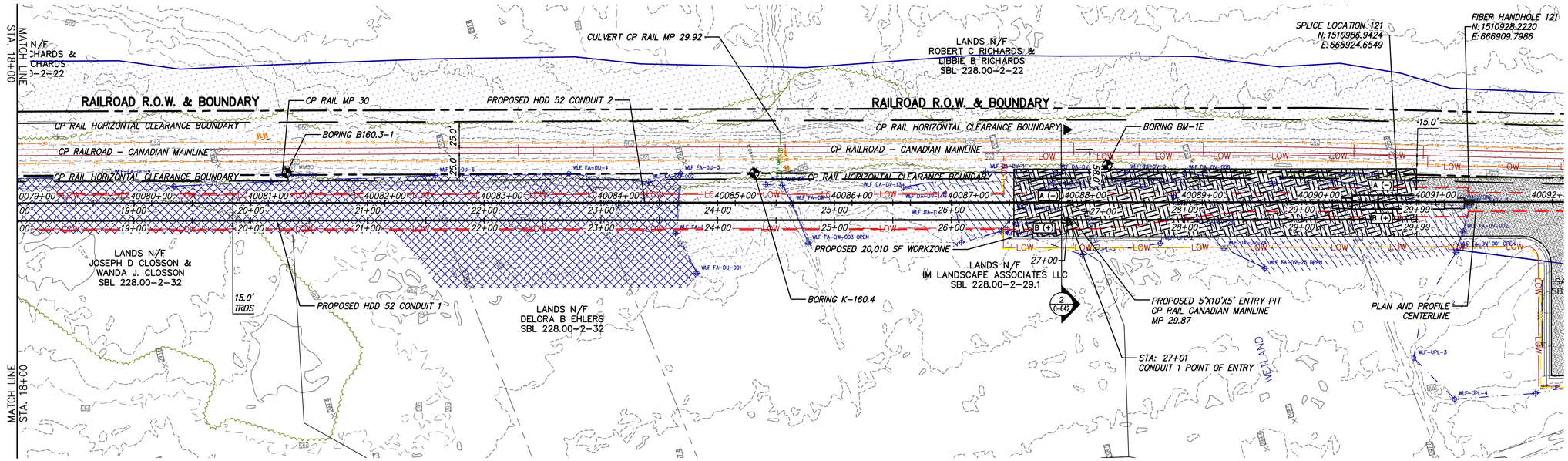
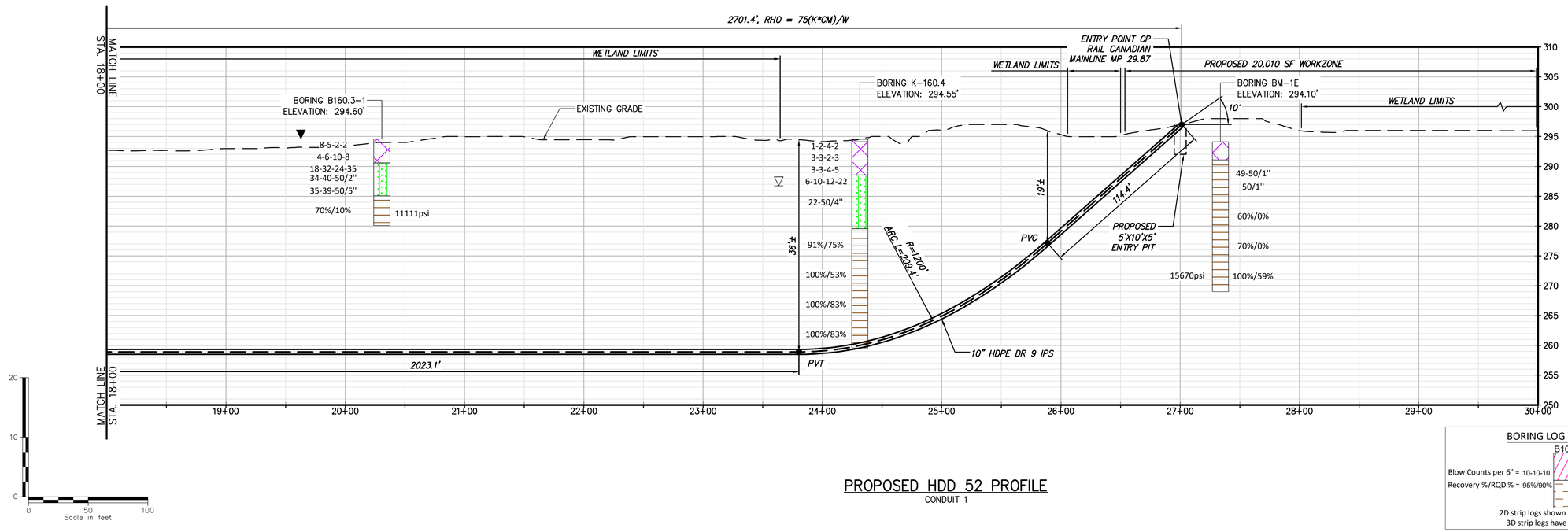
CHAMPLAIN HUDSON POWER EXPRESS
SEGMENT 6 (PACKAGE 4A) - CP: BALLSTON TO GLENVILLE
PLAN AND PROFILE - HDD 52, CONDUIT 1

KIEWIT PROJECT NO.	21162
CHA PROJECT NO.	066076
DRAWING NO.	C-302.1

DRAWN BY: CJL | DESIGNED BY: CJL | APPROVED BY: JEO | SCALE AS NOTED | DATE 8/03/2023 | REV. NO. X | SH.NO.



PROPOSED HDD 52 PLAN VIEW
CONDUIT 1



PROPOSED HDD 52 PROFILE
CONDUIT 1

BORING LOG STRIP LEGEND

B101

Blow Counts per 6" = 10-10-10
Recovery %/RQD % = 95%/90%
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2D strip logs shown at 10x exaggeration
3D strip logs have no exaggeration

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

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No.	DATE	SUBMITTAL / REVISION DESCRIPTION	DB	APP
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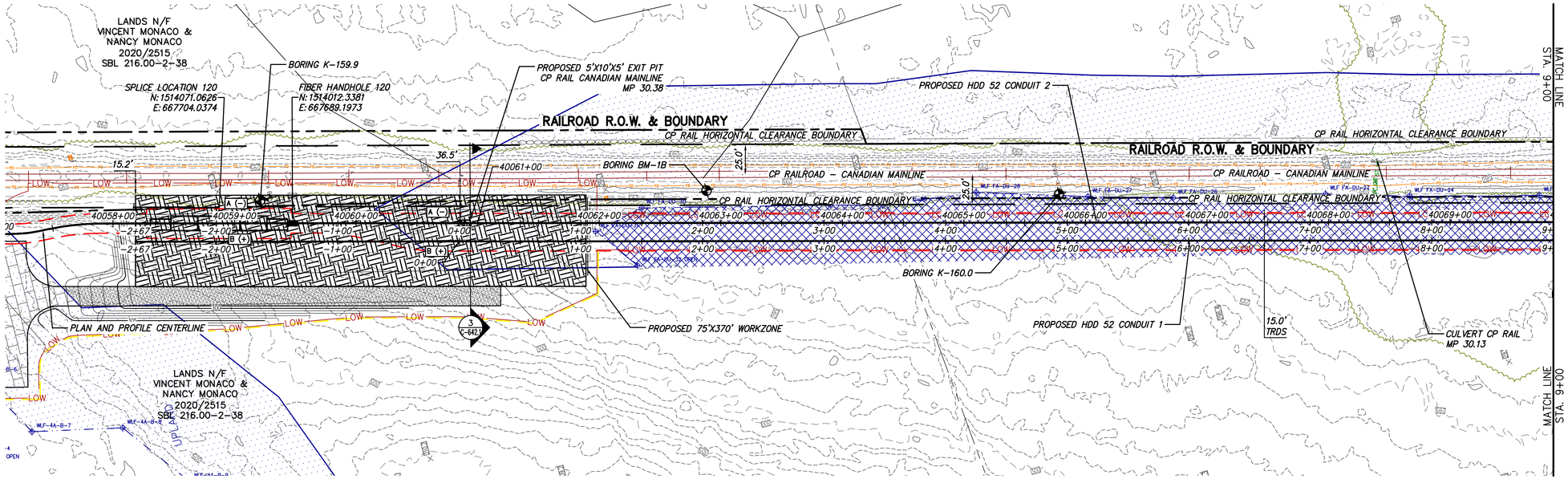
CHAMPLAIN HUDSON POWER EXPRESS
SEGMENT 6 (PACKAGE 4A) - CP: BALLSTON TO GLENVILLE
PLAN AND PROFILE - HDD 52, CONDUIT 1

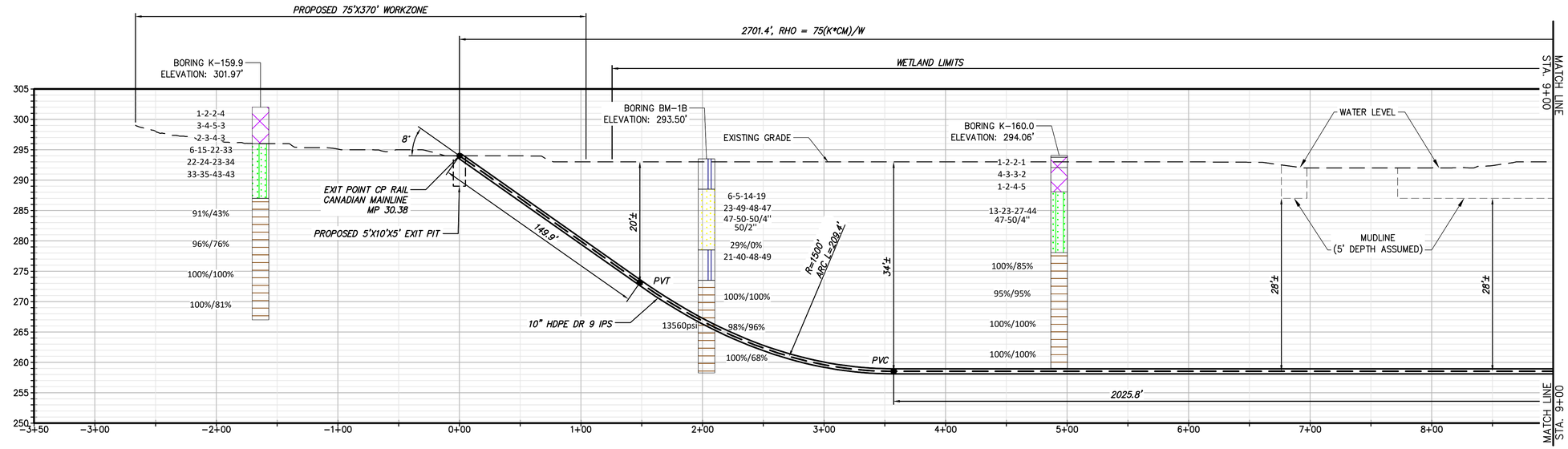
KIEWIT PROJECT NO.	21162
CHA PROJECT NO.	066076
DRAWING NO.	C-302.2

DRAWN BY: CJL | DESIGNED BY: CJL | APPROVED BY: JEO | SCALE AS NOTED | REV. NO. X | DATE 8/03/2023 | SH.NO.



0 50 100
Scale in feet

PROPOSED HDD 52 PLAN VIEW
CONDUIT 2



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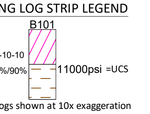
0 50 100
Scale in feet

PROPOSED HDD 52 PROFILE
CONDUIT 2

BORING LOG STRIP LEGEND



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

Legend	
ASPHALT	Asphalt
Bedrock	Bedrock
Boulder	Boulder
CH	Fat CLAY
CH-MH	SILTY Fat CLAY
CL	Lean CLAY
CL-ML	SILTY CLAY
CONCRETE	Concrete
Fill	Fill
GC	CLAYEY GRAVEL
GC-GM	SILTY CLAYEY GRAVEL
GM	SILTY GRAVEL
GP	Poorly Graded GRAVEL
GP-GC	Poorly Graded Gravel with CLAY
GP-GM	Poorly Graded GRAVEL with SILT
GW	Well Graded GRAVEL
GW-GC	Well Graded GRAVEL with CLAY
GW-GM	Well Graded GRAVEL with SILT
Limestone	Limestone
MH	Elastic SILT
ML	SILT
OH	ORGANIC Fat CLAY
OL	ORGANIC Lean CLAY
OL/OH	ORGANIC SOIL
PT	PEAT
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USGS 708	Gneiss
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USGS 718	Granite 1
Void	Void
Water	Water
Weathered Rock	Undefined
Water Table	Water Table during drilling
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No.	DATE	SUBMITTAL / REVISION DESCRIPTION	DB	APP
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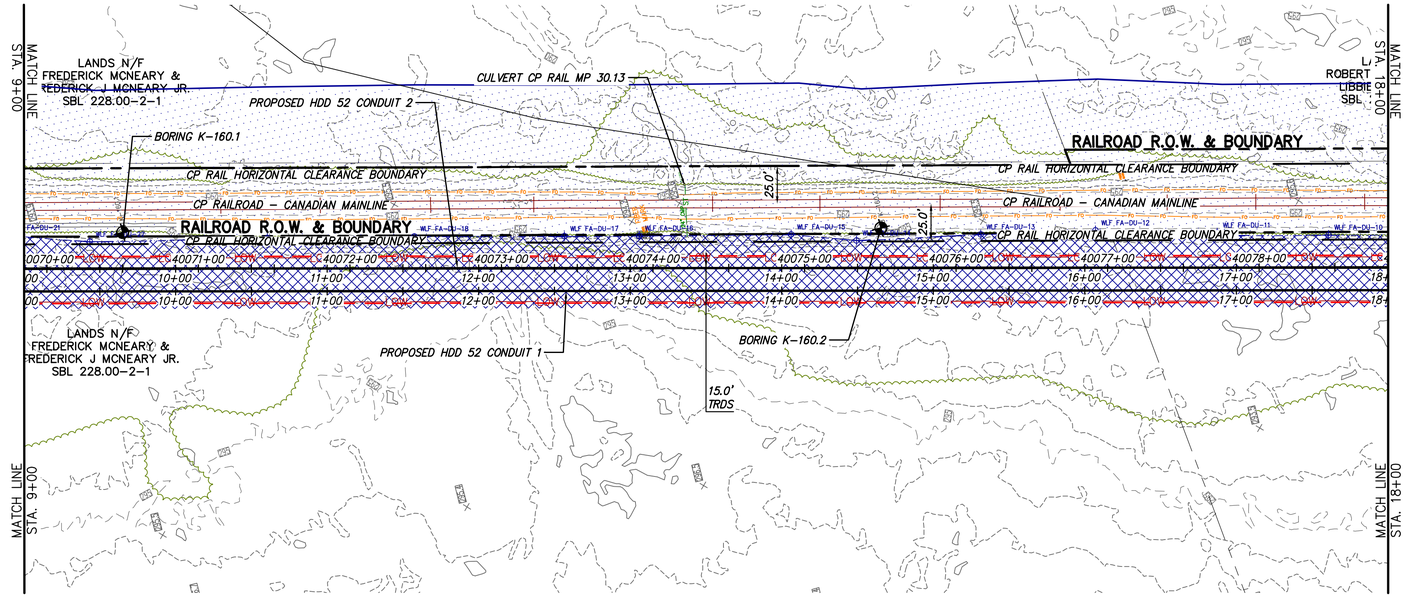
CHAMPLAIN HUDSON POWER EXPRESS
SEGMENT 6 (PACKAGE 4A) - CP: BALLSTON TO GLENVILLE
PLAN AND PROFILE - HDD 52, CONDUIT 2

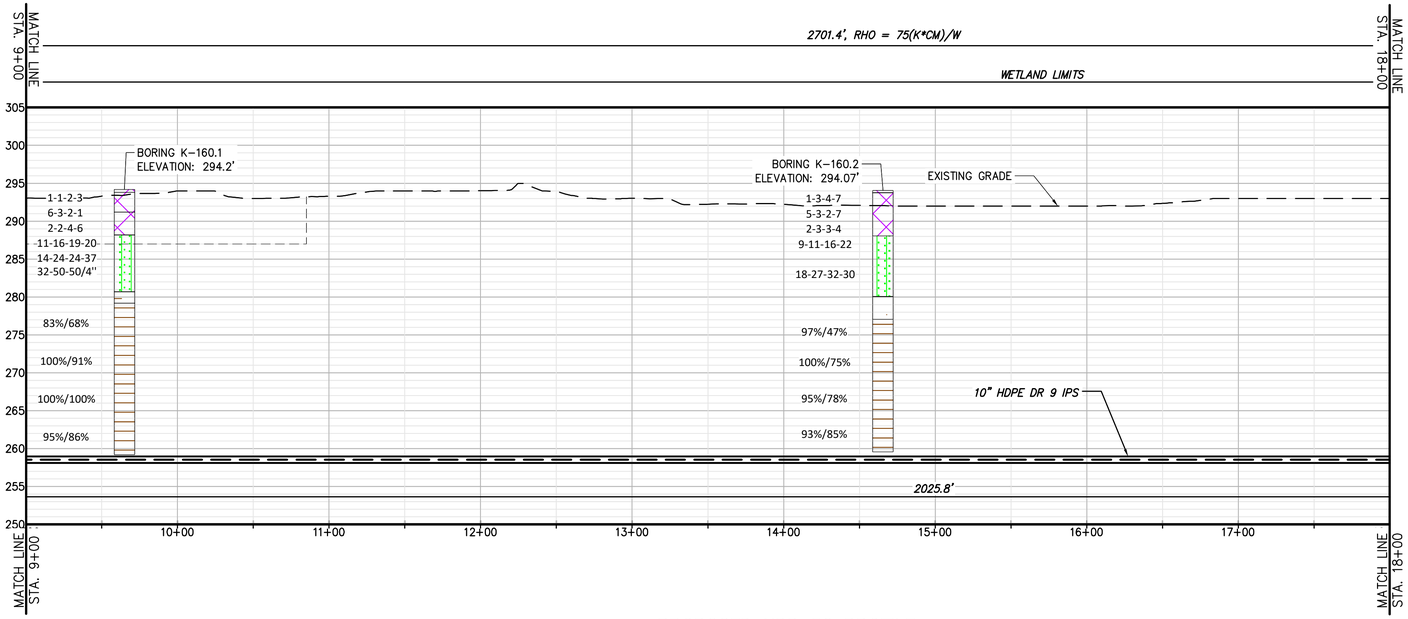
KIEWIT PROJECT NO.	21162
CHA PROJECT NO.	066076
DRAWING NO.	C-302A

DRAWN BY: CJL | DESIGNED BY: CJL | APPROVED BY: JEO | SCALE AS NOTED | REV. NO. X | DATE 8/03/2023 | SH.NO.



0 50 100
Scale in feet

PROPOSED HDD 52 PLAN VIEW
CONDUIT 2



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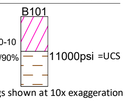
0 50 100
Scale in feet

PROPOSED HDD 52 PROFILE
CONDUIT 2

BORING LOG STRIP LEGEND



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

Legend	
ASPHALT	Asphalt
Bedrock	Bedrock
Boulder	Boulder
CH	Fat CLAY
CH-MH	SILTY Fat CLAY
CL	Lean CLAY
CL-ML	SILTY CLAY
CONCRETE	Concrete
Fill	Fill
GC	CLAYEY GRAVEL
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Water Table	Water Table during drilling
Delayed Water Table	Water Table after drilling

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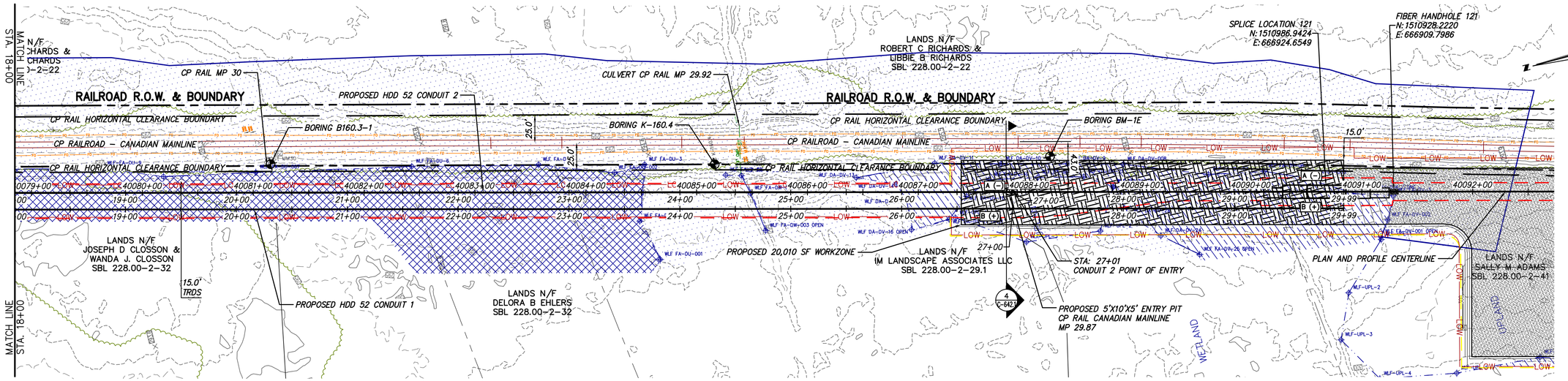
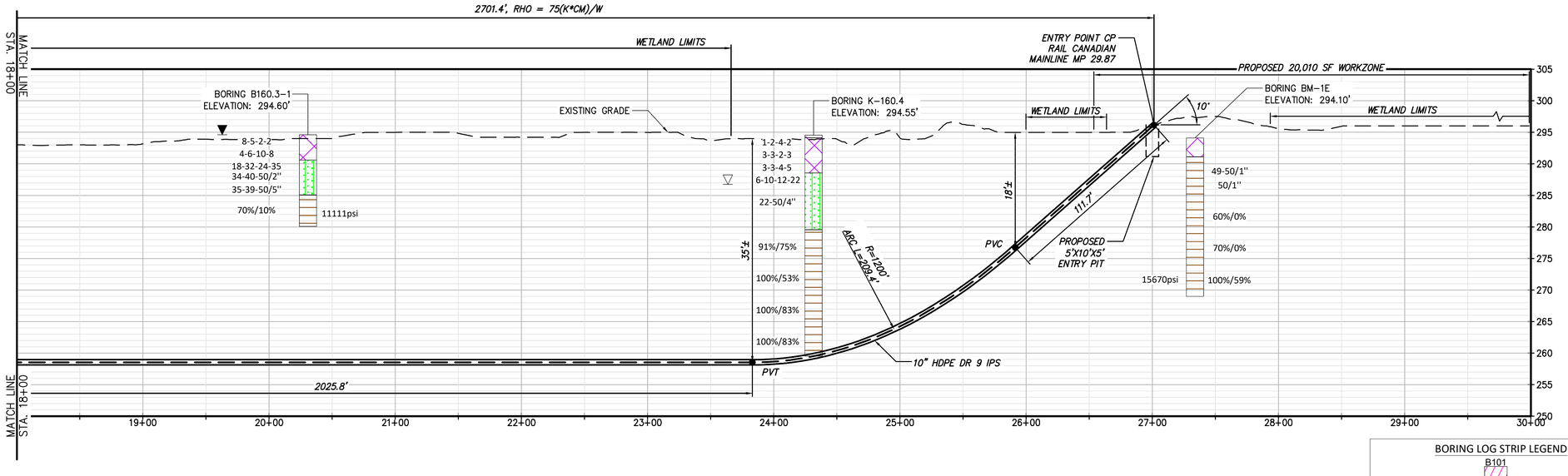
CHAMPLAIN HUDSON POWER EXPRESS
SEGMENT 6 (PACKAGE 4A) - CP: BALLSTON TO GLENVILLE
PLAN AND PROFILE - HDD 52, CONDUIT 2

KIEWIT PROJECT NO.	21162
CHA PROJECT NO.	066076
DRAWING NO.	C-302A.1

DRAWN BY: CJL | DESIGNED BY: CJL | APPROVED BY: JEO | SCALE AS NOTED | REV. NO. X | DATE 8/03/2023 | SH.NO.



PROPOSED HDD 52 PLAN VIEW
CONDUIT 2



PROPOSED HDD 52 PROFILE
CONDUIT 2

BORING LOG STRIP LEGEND

B101

Blow Counts per 6" = 10-10-10
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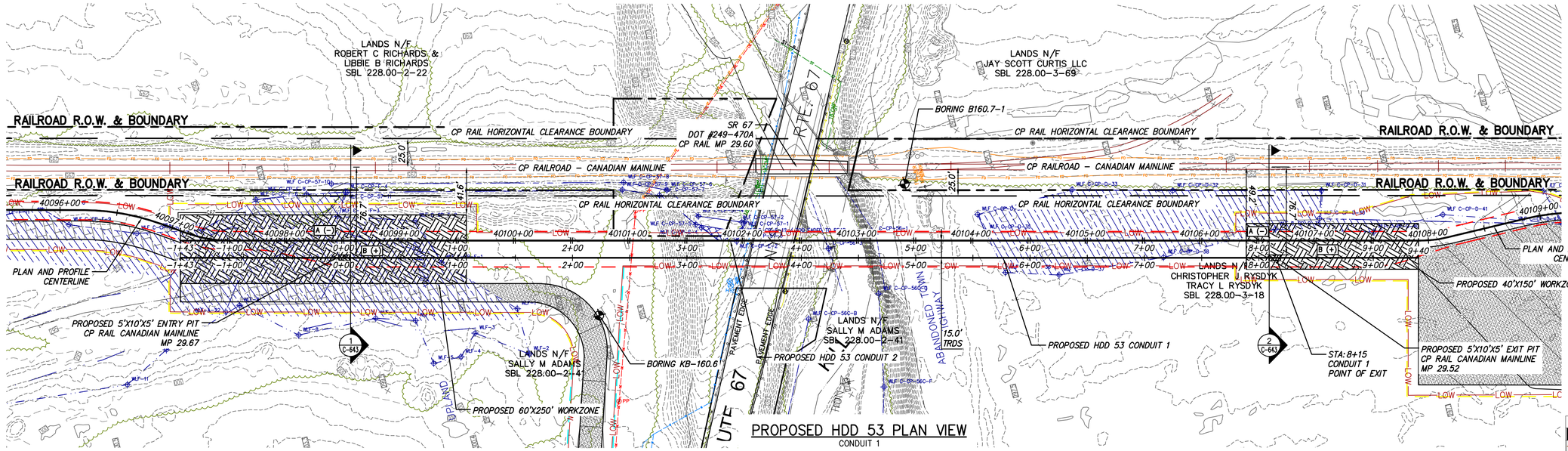
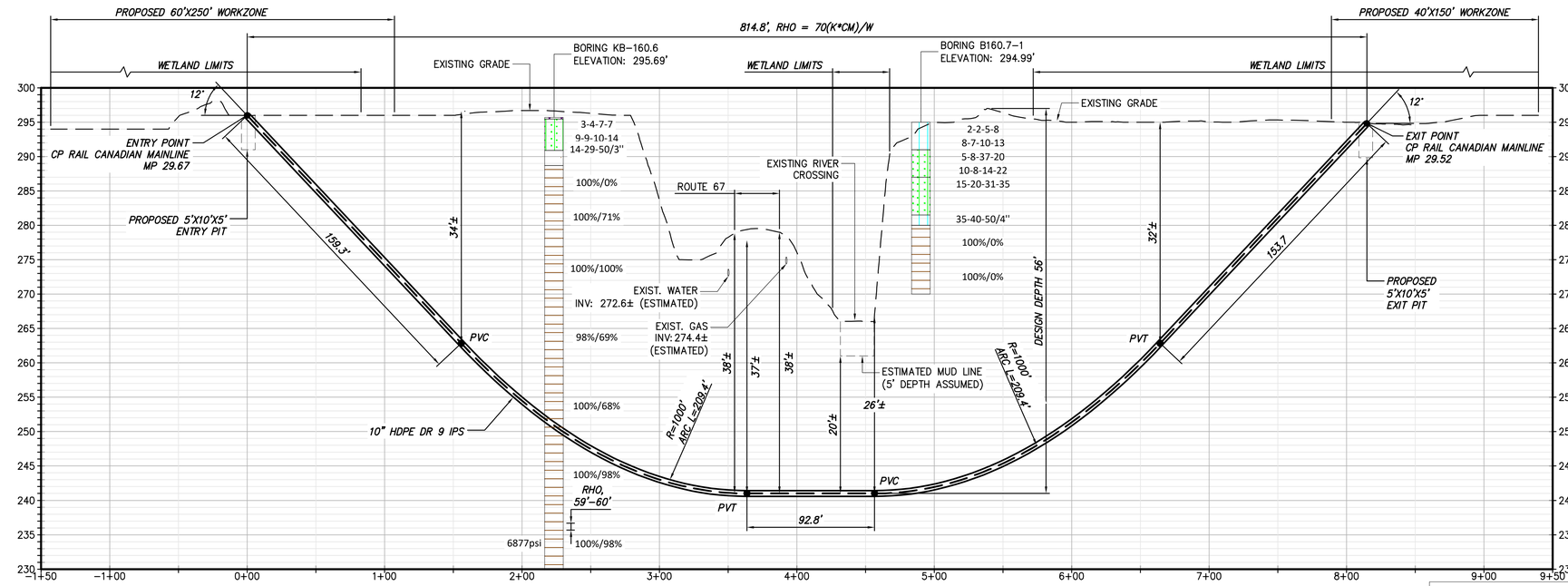
KIEWIT PROJECT NO.	21162
CHA PROJECT NO.	066076
DRAWING NO.	C-302A.2

DRAWN BY: CJL | DESIGNED BY: CJL | APPROVED BY: JEO | SCALE AS NOTED | REV. NO. X | DATE 8/03/2023 | SH.NO.





PROPOSED HDD 53 PROFILE
CONDUIT 1

BORING LOG STRIP LEGEND

B101

Blow Counts per 6" = 10-10-10

Recovery %/RQD % = 95%/90%

11000psi =UCS

2D strip logs shown at 10x exaggeration

3D strip logs have no exaggeration

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

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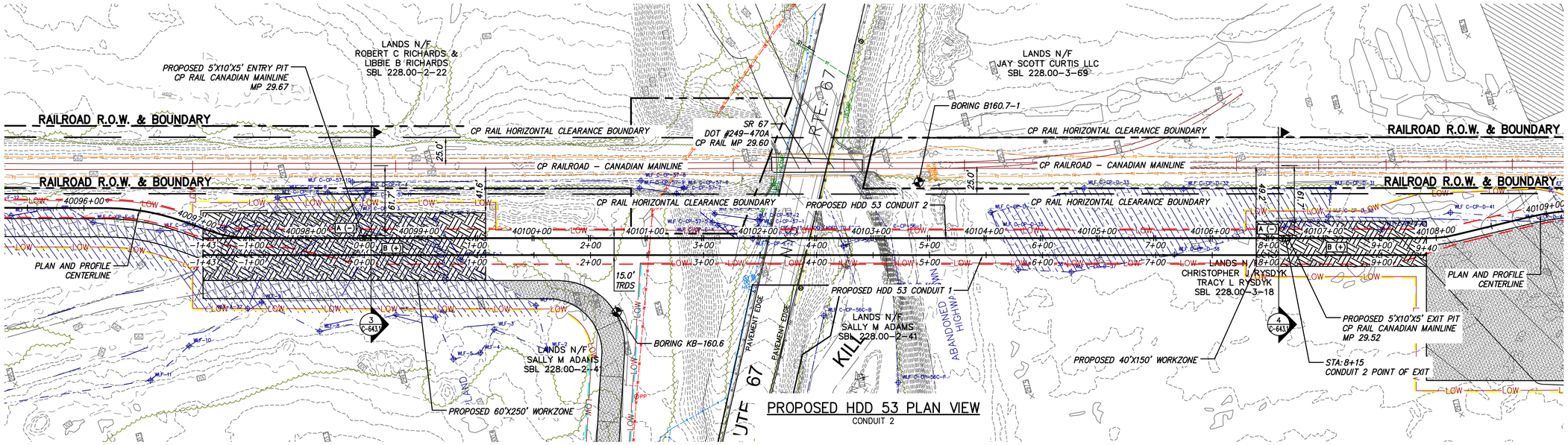
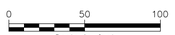
No.	DATE	SUBMITTAL / REVISION DESCRIPTION	SPB	JEO
0	08/03/2023	ISSUED FOR CONSTRUCTION SUBMISSION	DB	APP

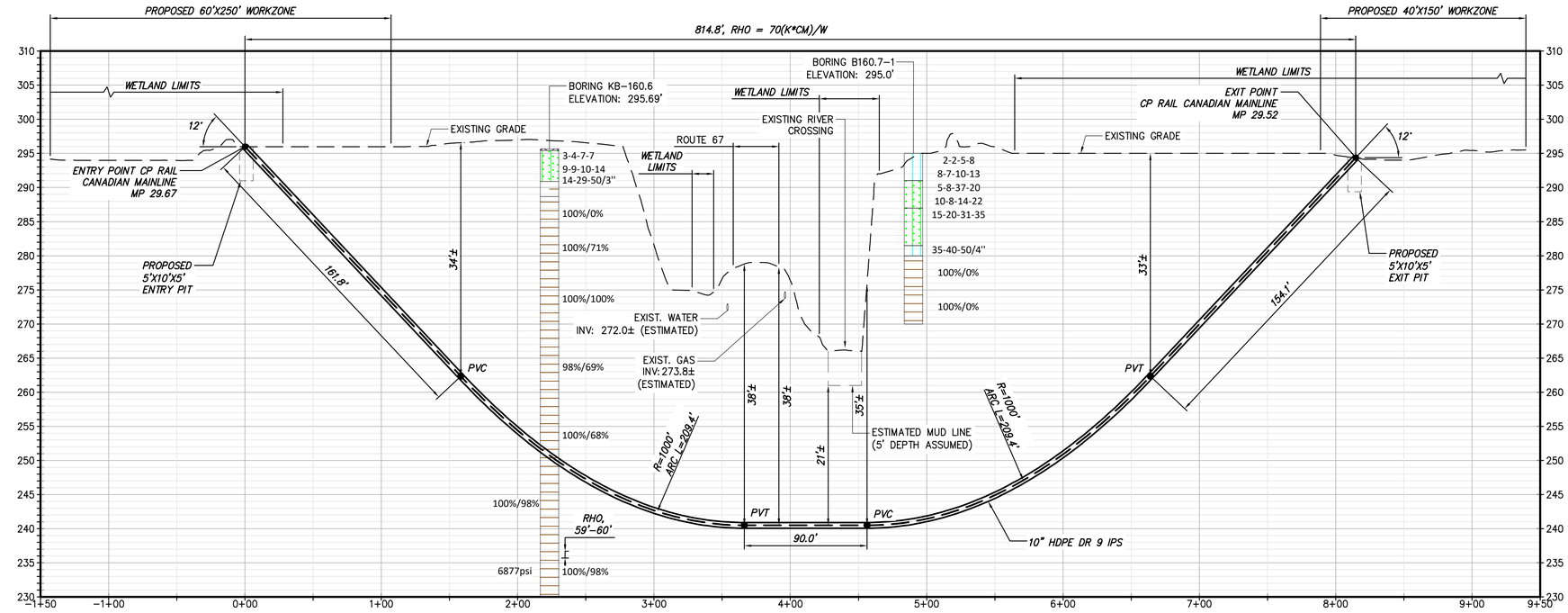
CHAMPLAIN HUDSON POWER EXPRESS
SEGMENT 6 (PACKAGE 4A) - CP: BALLSTON TO GLENVILLE
PLAN AND PROFILE - HDD 53, CONDUIT 1

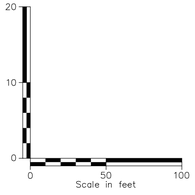
KIEWIT PROJECT NO.	21162
CHA PROJECT NO.	066076
DRAWING NO.	C-303

DRAWN BY: CKZ | DESIGNED BY: CKZ | APPROVED BY: JEO | SCALE AS NOTED | REV. NO. X | DATE 8/03/2023 | SH.NO.



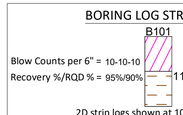






PROPOSED HDD 53 PROFILE
CONDUIT 2

BORING LOG STRIP LEGEND



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

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

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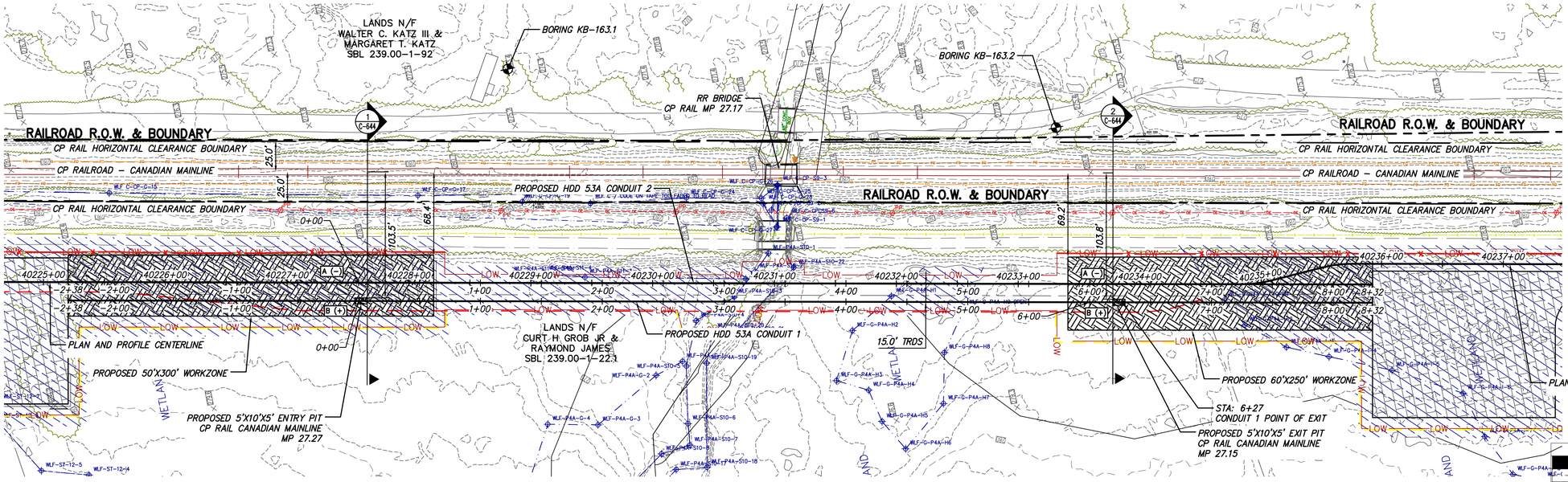
No.	DATE	SUBMITTAL / REVISION DESCRIPTION	DB	APP
0	08/03/2023	ISSUED FOR CONSTRUCTION SUBMISSION	SPB	JEO

CHAMPLAIN HUDSON POWER EXPRESS
SEGMENT 6 (PACKAGE 4A) - CP: BALLSTON TO GLENVILLE
PLAN AND PROFILE - HDD 53, CONDUIT 2

KIEWIT PROJECT NO.	21162
CHA PROJECT NO.	066076
DRAWING NO.	C-303A

DRAWN BY: CKZ | DESIGNED BY: CKZ | APPROVED BY: JEO | SCALE AS NOTED | DATE 8/03/2023 | REV. NO. X | SH.NO.



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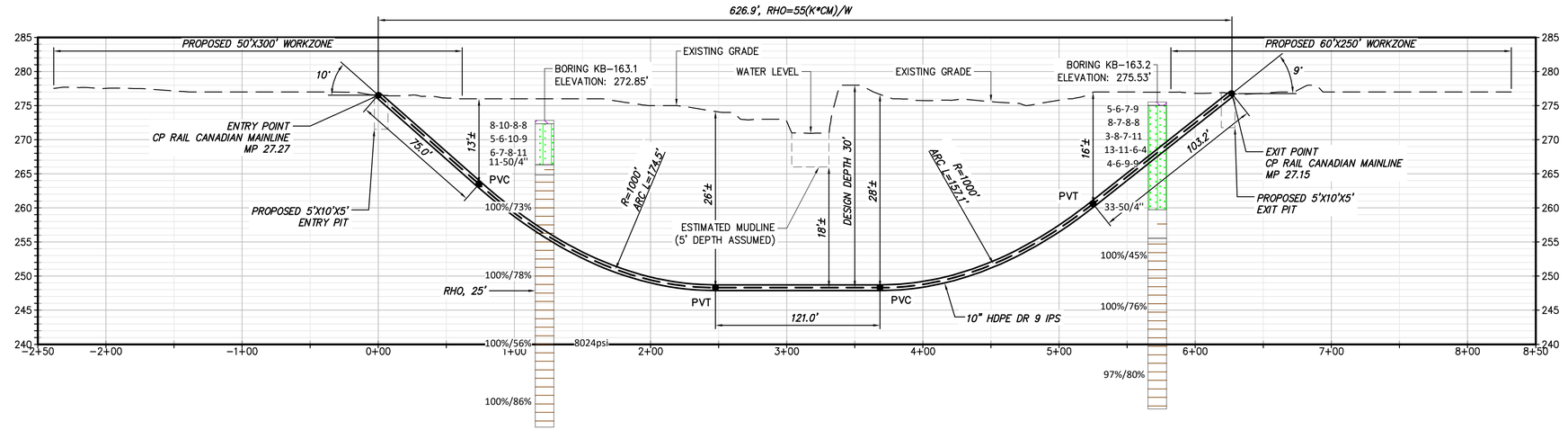
Scale in feet

PROPOSED HDD 53A PLAN VIEW
CONDUIT 1



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Scale in feet

PROPOSED HDD 53A PROFILE
CONDUIT 1

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

Legend	
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Bedrock	Bedrock
Boulder	Boulder
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CL	Lean CLAY
CL-ML	SILTY CLAY
CONCRETE	Concrete
Fill	Fill
GC	CLAYEY GRAVEL
GC-GM	SILTY CLAYEY GRAVEL
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GP	Poorly Graded GRAVEL
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GW-GC	Well Graded GRAVEL with CLAY
GW-GM	Well Graded GRAVEL with SILT
Limestone	Limestone
MH	Elastic SILT
ML	SILT
OH	ORGANIC Fat CLAY
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OL/OH	ORGANIC SOIL
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Rock	Rock
Sandstone	Sandstone
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SC-SM	SILT, CLAYEY SAND
SHALE	Shale
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USGS 670	Interbedded Sandstone and Shale
USGS 702	Quartzite
USGS 705	Schist
USGS 705	Schist
USGS 708	Gneiss
USGS 708	Gneiss
USGS 718	Granite 1
Void	Void
Water	Water
Weathered Rock	Undefined
Water Table	Water Table during drilling
Delayed Water Table	Water Table after drilling

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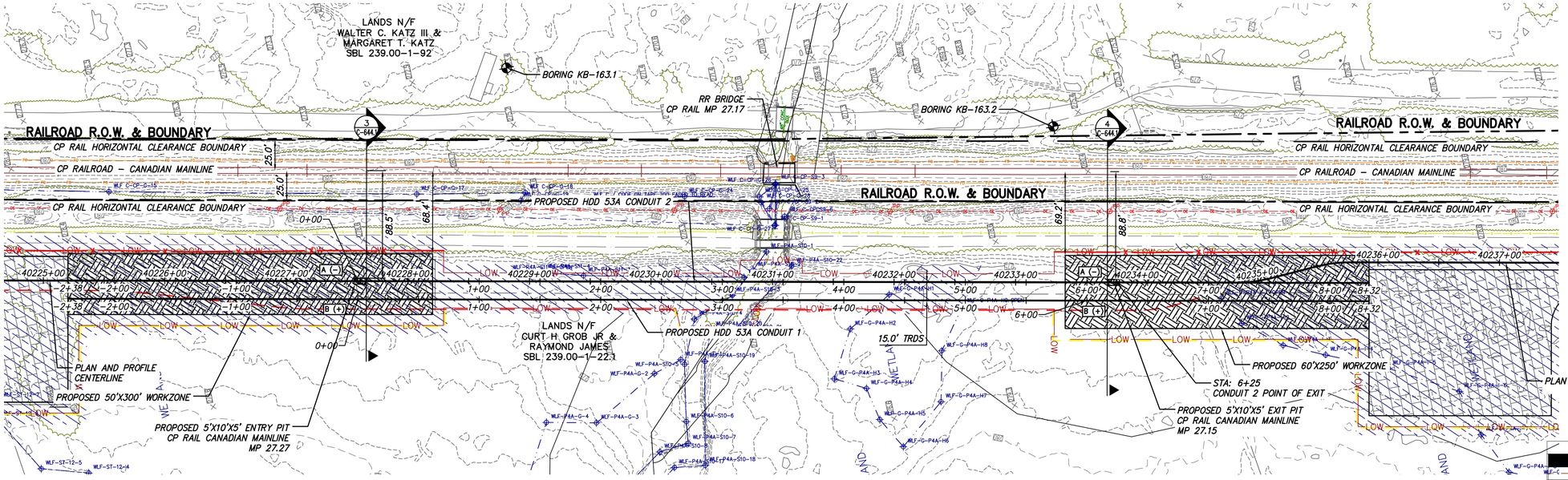
CHAMPLAIN HUDSON POWER EXPRESS
SEGMENT 6 (PACKAGE 4A) - CP: BALLSTON TO GLENVILLE
PLAN AND PROFILE - HDD 53A, CONDUIT 1

KIEWIT PROJECT NO.	21162
CHA PROJECT NO.	066076
DRAWING NO.	C-304

DRAWN BY: ES | DESIGNED BY: ES | APPROVED BY: JEO | SCALE AS NOTED | DATE 8/03/2023 | REV. NO. X | SH.NO. XXX



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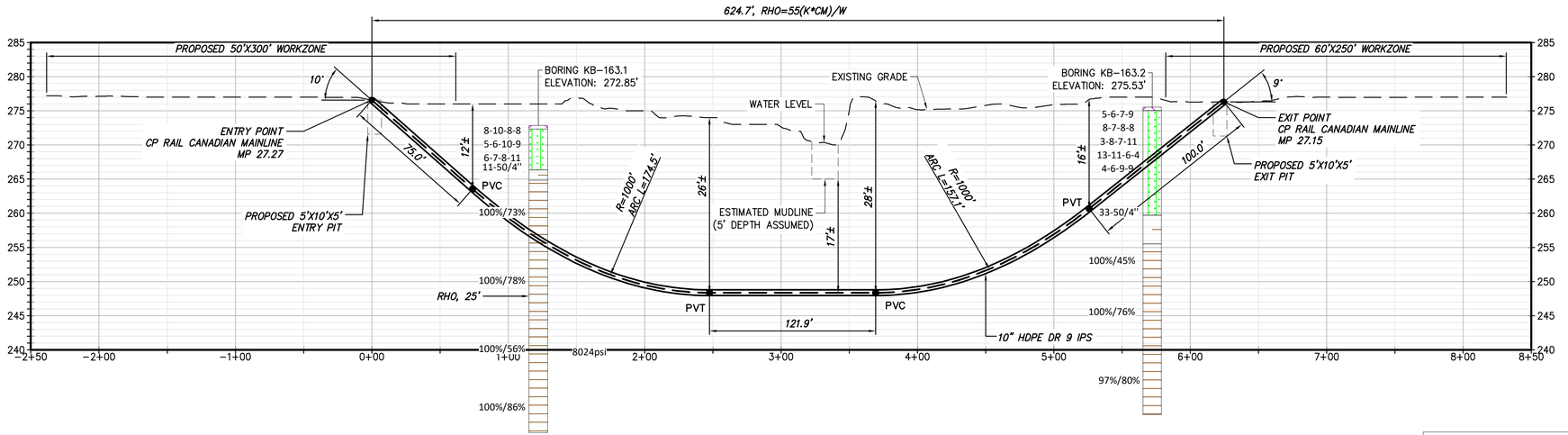
Scale in feet

PROPOSED HDD 53A PLAN VIEW
CONDUIT 2



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10
0
0 50 100
Scale in feet

PROPOSED HDD 53A PROFILE
CONDUIT 2

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

Legend	
ASPHALT	Asphalt
Bedrock	Bedrock
Boulder	Boulder
CH	Fat CLAY
CH-MH	SILTY Fat CLAY
CL	Lean CLAY
CL-ML	SILTY CLAY
CONCRETE	Concrete
Fill	Fill
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GC-GM	SILTY CLAYEY GRAVEL
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ML	SILT
OH	ORGANIC Fat CLAY
OL	ORGANIC Lean CLAY
OL/OH	ORGANIC SOIL
PT	PEAT
Rock	Rock
Sandstone	Sandstone
SC	CLAYEY SAND
SC-SM	SILT, CLAYEY SAND
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USGS 702	Quartzite
USGS 705	Schist
USGS 705	Schist
USGS 708	Gneiss
USGS 708	Gneiss
USGS 718	Granite 1
Void	Void
Water	Water
Weathered Rock	Undefined
Water Table	Water Table during drilling
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CHAMPLAIN HUDSON POWER EXPRESS
SEGMENT 6 (PACKAGE 4A) - CP: BALLSTON TO GLENVILLE
PLAN AND PROFILE - HDD 53A, CONDUIT 2

DRAWN BY: ES | DESIGNED BY: ES | APPROVED BY: JEO | SCALE AS NOTED | REV. NO. X

KIEWIT PROJECT NO. 21162
CHA PROJECT NO. 066076
DRAWING NO. **C-304A**
DATE 8/03/2023
SH.NO.

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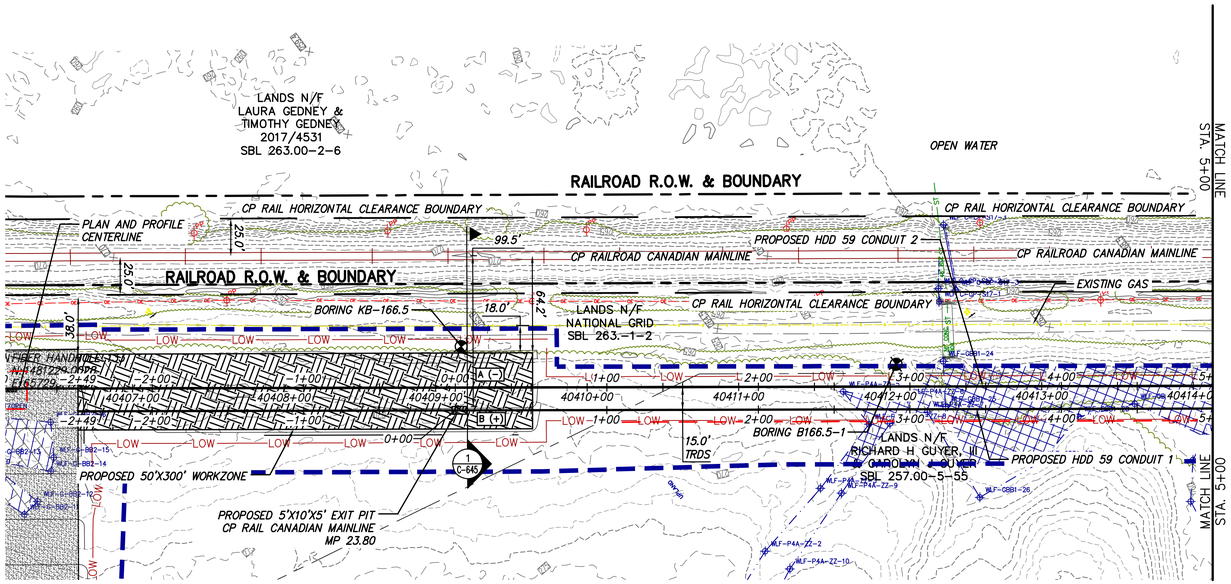

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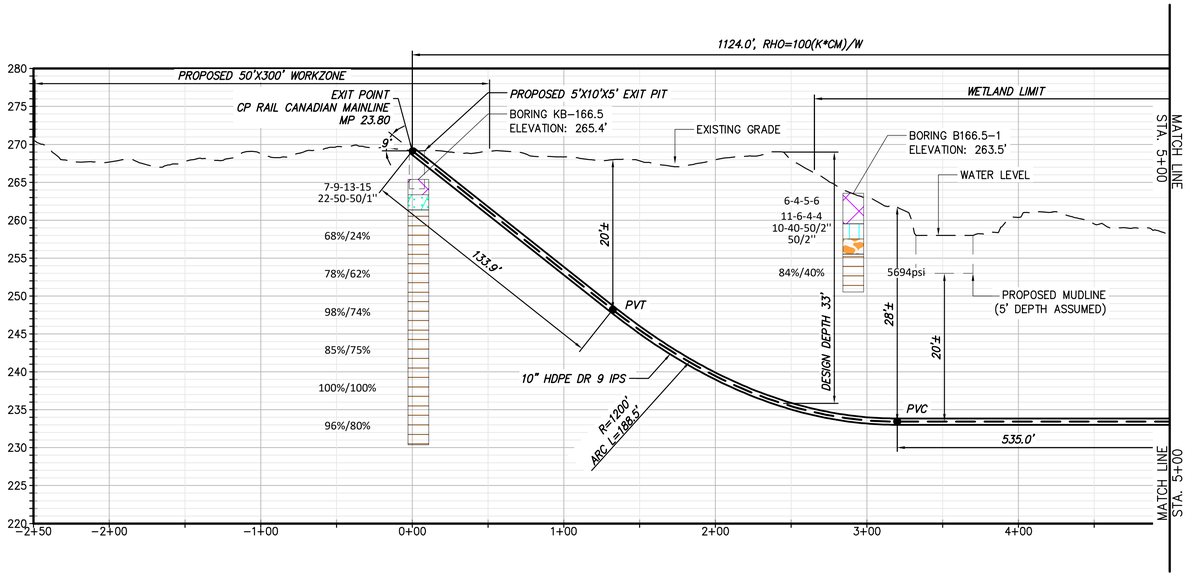
Scale in feet

PROPOSED HDD 59 PLAN VIEW
CONDUIT 1



20
10
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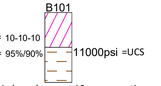
0 50 100
Scale in feet

PROPOSED HDD 59 PROFILE
CONDUIT 1

BORING LOG STRIP LEGEND



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

Legend	
ASPHALT	Asphalt
Bedrock	Bedrock
Boulder	Boulder
CH	Fat CLAY
CH-MH	SILTY Fat CLAY
CL	Lean CLAY
CL-ML	SILTY CLAY
CONCRETE	Concrete
Fill	Fill
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USGS 702	Quartzite
USGS 705	Schist
USGS 705	Schist
USGS 708	Gneiss
USGS 708	Gneiss
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Void	Void
Water	Water
Weathered Rock	Undefined
Water Table	Water Table during drilling
Delayed Water Table	Water Table after drilling

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CHAMPLAIN HUDSON POWER EXPRESS
SEGMENT 6 (PACKAGE 4A) - CP: BALLSTON TO GLENVILLE
PLAN AND PROFILE - HDD 59, CONDUIT 1

KIEWIT PROJECT NO.	21162
CHA PROJECT NO.	066076
DRAWING NO.	C-305

DRAWN BY: CJL | DESIGNED BY: CJL | APPROVED BY: JEO | SCALE AS NOTED | REV. NO. X | DATE 8/03/2023 | SH.NO.