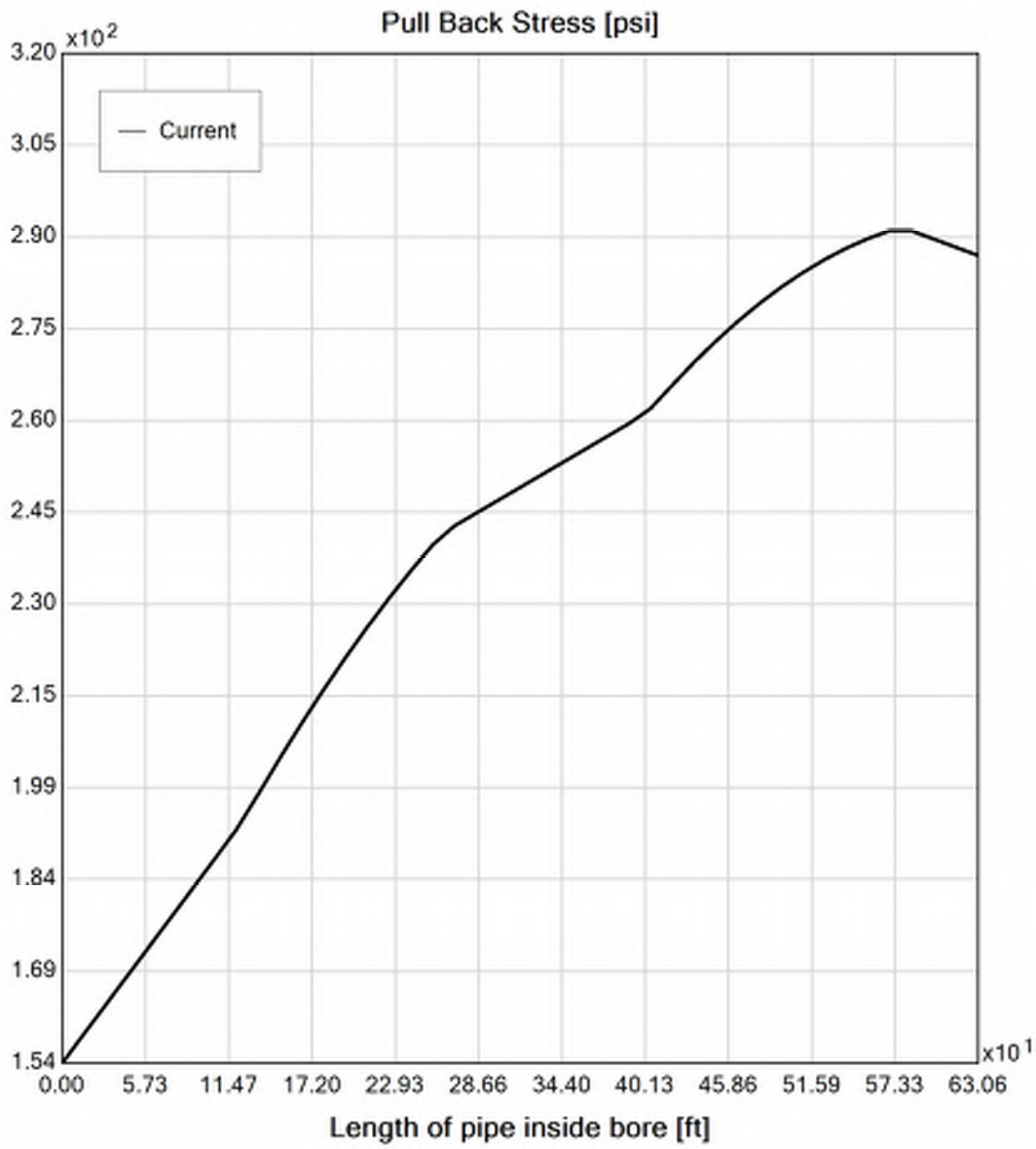
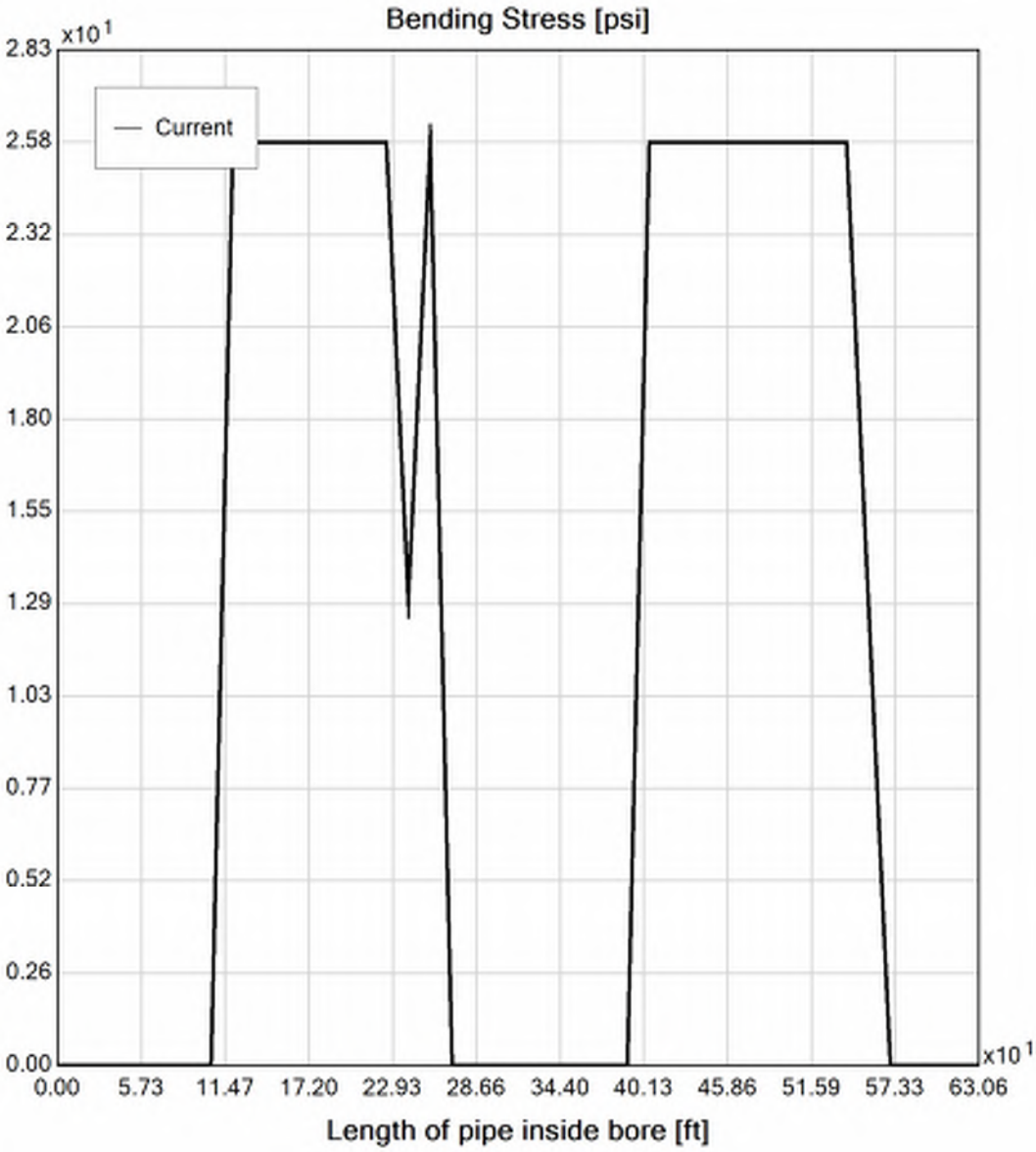


Powered by | BoreAid



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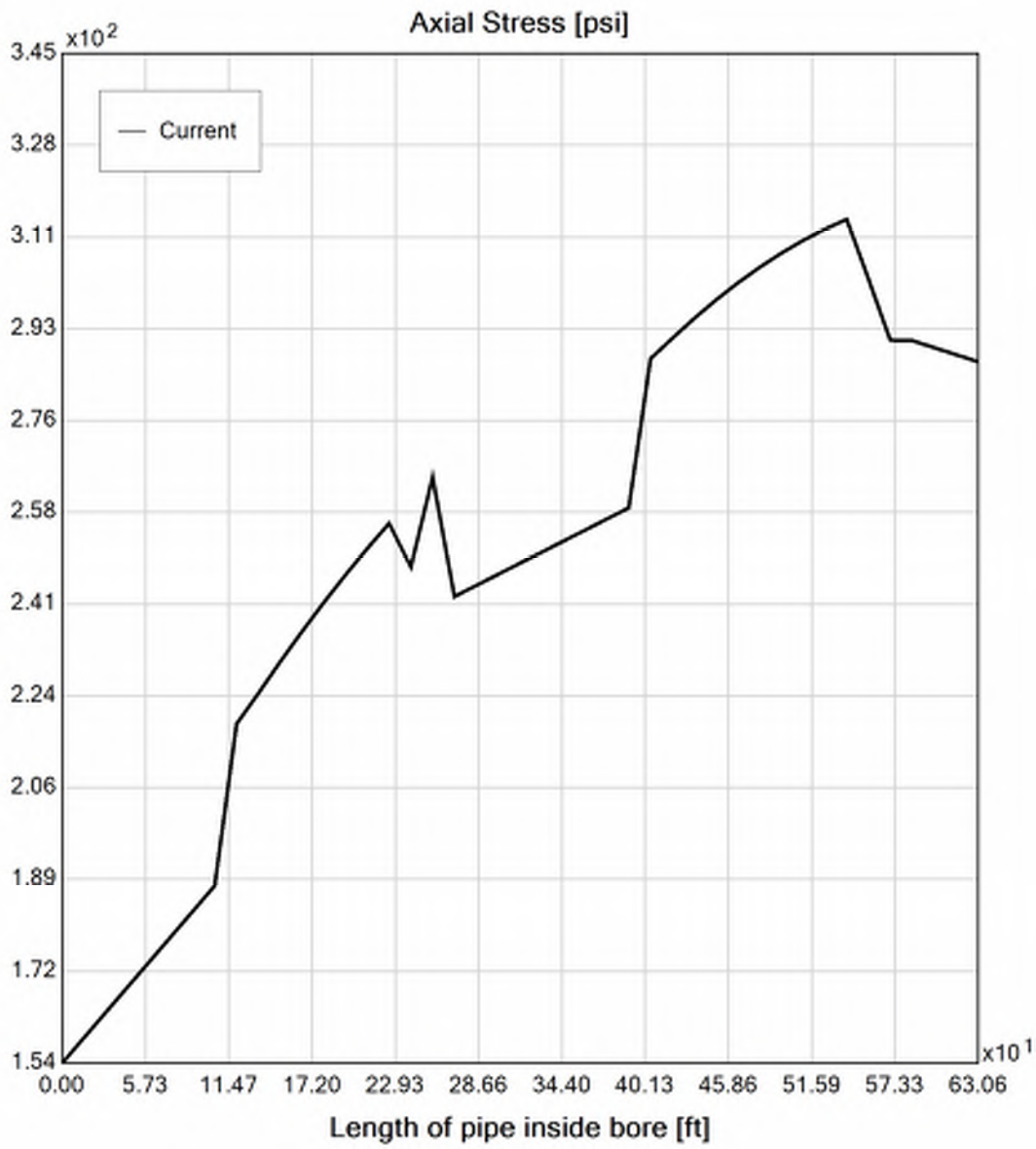

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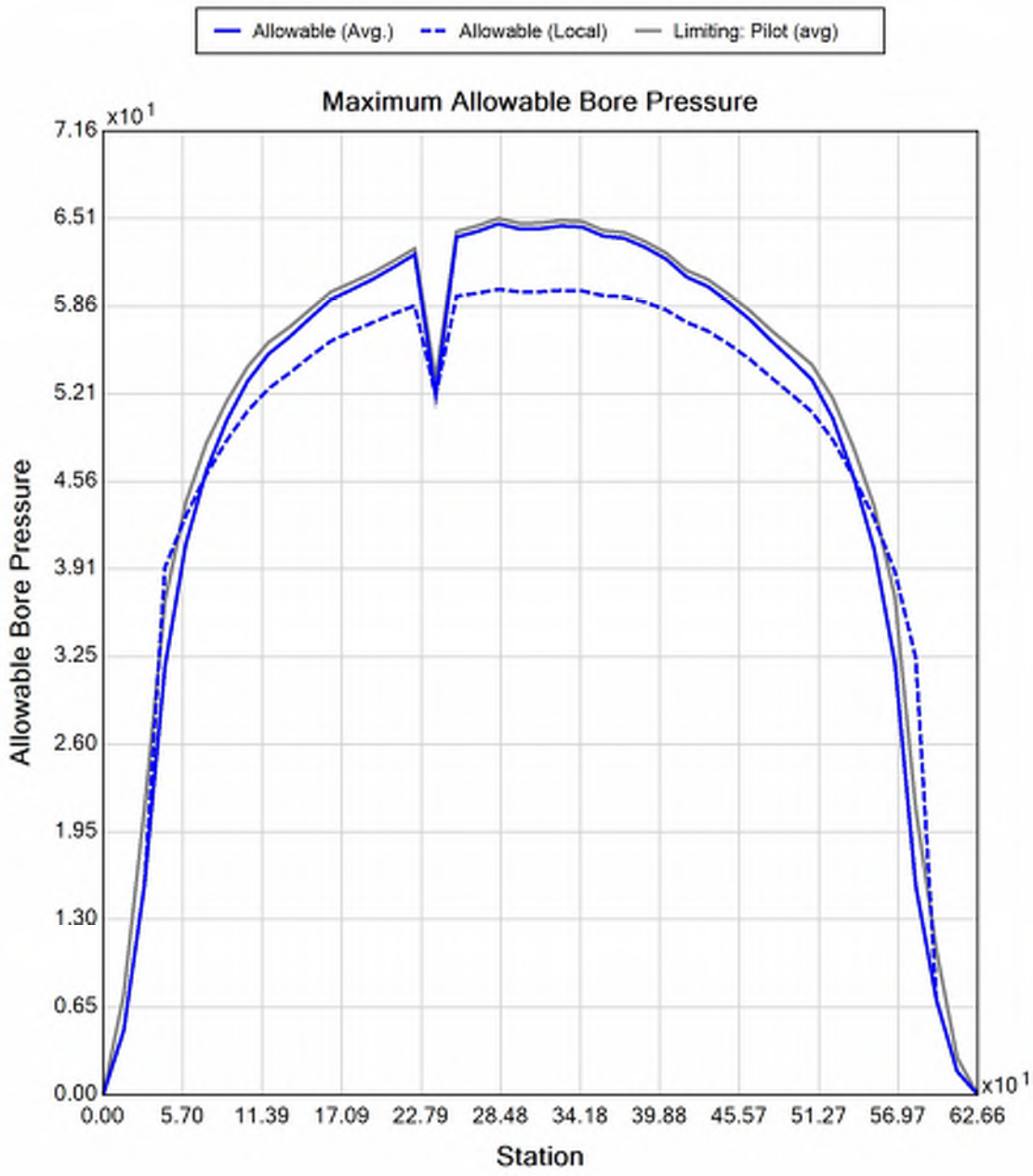

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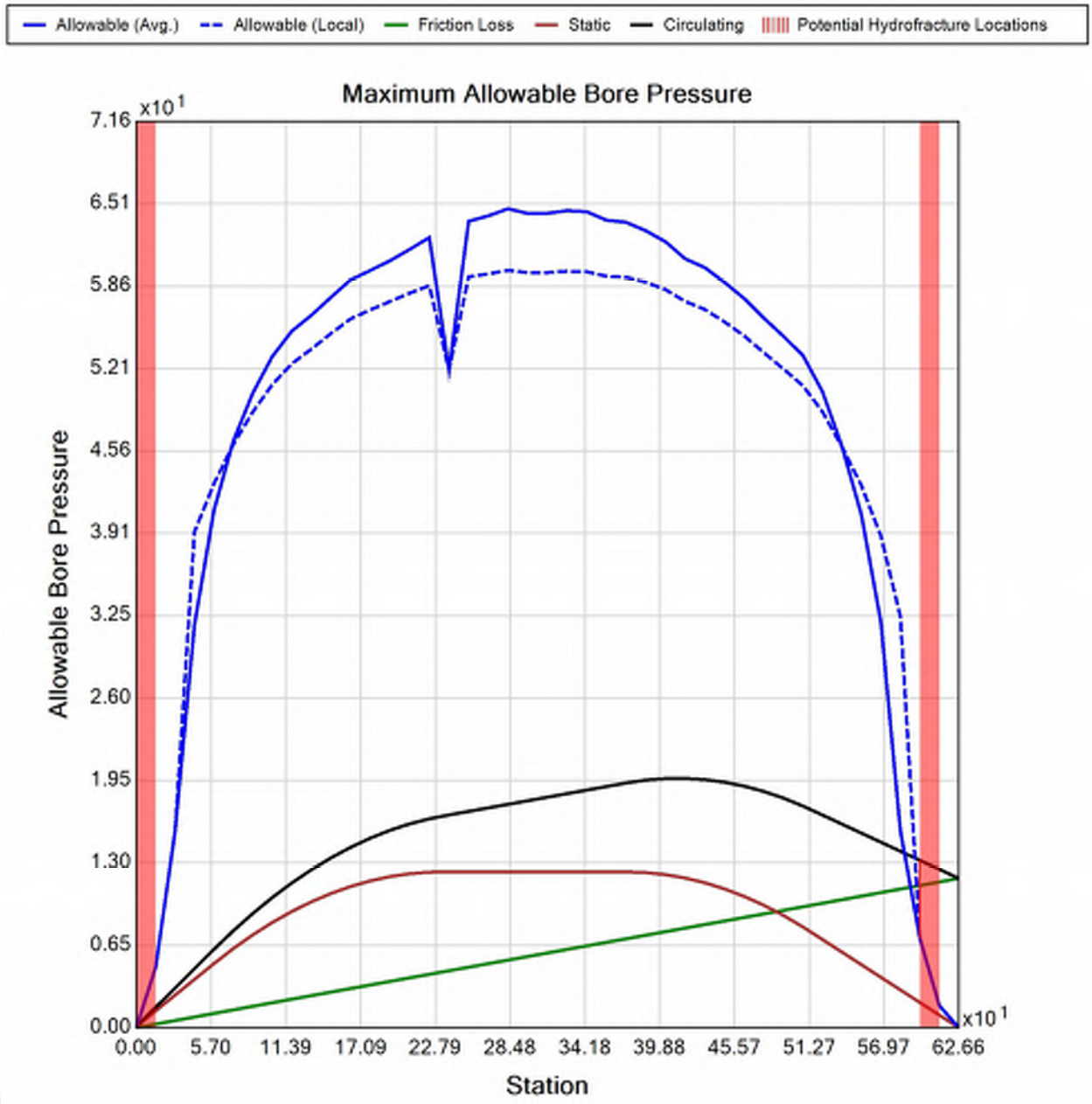

Powered by BoreAid

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.

Input Summary

Start Coordinate	(0.00, 0.00, 130.11) ft
End Coordinate	(626.20, 0.00, 129.50) ft
Project Length	626.20 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

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Load Verifier Input Summary:

Pipe Application: Electrical Cable

Pipe Type: HDPE

Classification: IPS

Pipe OD: 2" (2.375")

Pipe DR: 9

Pipe Length: 630.00 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

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In-service Load Summary:

Pressure [psi]	Deformed	Collapsed
Earth Pressure	5.9	13.0
Water Pressure	8.0	8.0
Surface Surcharge	0.0	0.0
Internal Pressure	0.0	0.0
Net Pressure	14.0	21.0
Deflection		
Earth Load Deflection	1.620	3.530
Buoyant Deflection	0.029	0.029
Reissner Effect	0	0
Net Deflection	1.649	3.559
Compressive Stress [psi]		
Compressive Wall Stress	62.9	94.4

Installation Load Summary:

Forces/Stresses	@Maximum Force	Absolute Maximum
Pullback Force [lb]	619.0	619.0
Pullback Stress [psi]	353.7	353.7
Pullback Strain	6.151E-3	6.151E-3
Bending Stress [psi]	0.0	5.7
Bending Strain	0	9.896E-5
Tensile Stress [psi]	353.7	356.5
Tensile Strain	6.151E-3	6.299E-3

Net External Pressure = 16.9 [psi]

Buoyant Deflection = 0.0

Hydrokinetic Force = 137.3 lb

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In-service Analysis

	Calculated	Allowable	Factor of Safety	Check
Deflection [%]	1.649	7.5	4.5	OK
Unconstrained Collapse [psi]	16.8	119.1	7.1	OK
Compressive Wall Stress [psi]	62.9	1150.0	18.3	OK

Installation Analysis

	Calculated	Allowable	Factor of Safety	Check
Deflection [%]	0.014	7.5	524.3	OK
Unconstrained Collapse [psi]	26.7	236.6	8.8	OK
Tensile Stress [psi]	356.5	1200.0	3.4	OK

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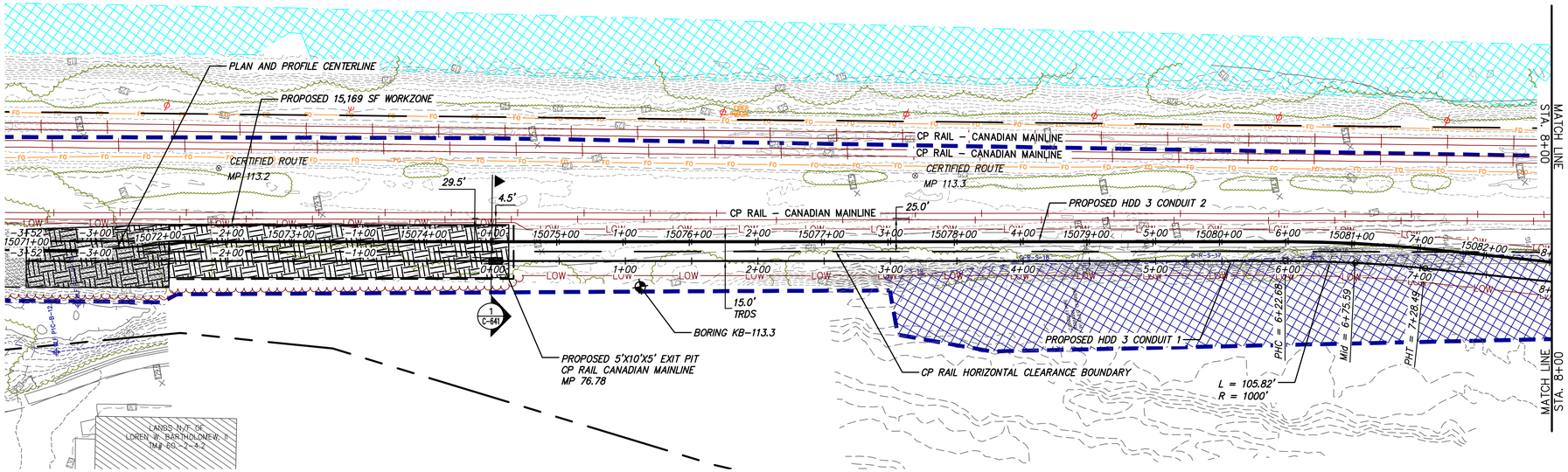
Appendix E

HDD Design Drawings



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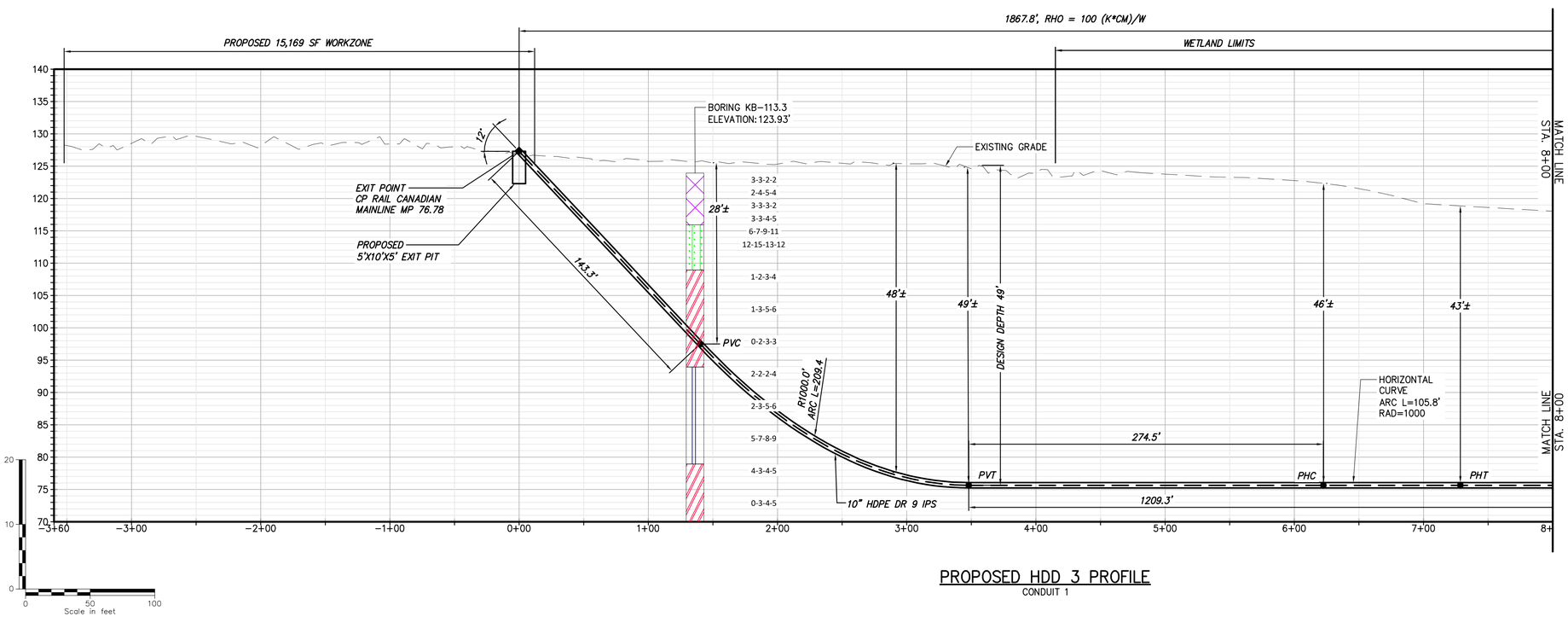
Scale in feet

PROPOSED HDD 3 PLAN VIEW
CONDUIT 1



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CONDUIT 1

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CHAMPLAIN HUDSON POWER EXPRESS
SEGMENT 3 (PACKAGE 1C) WHITEHALL TO FORT ANN
PLAN AND PROFILE - HDD 3, 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 | REV. NO. X | DATE 03/22/2023

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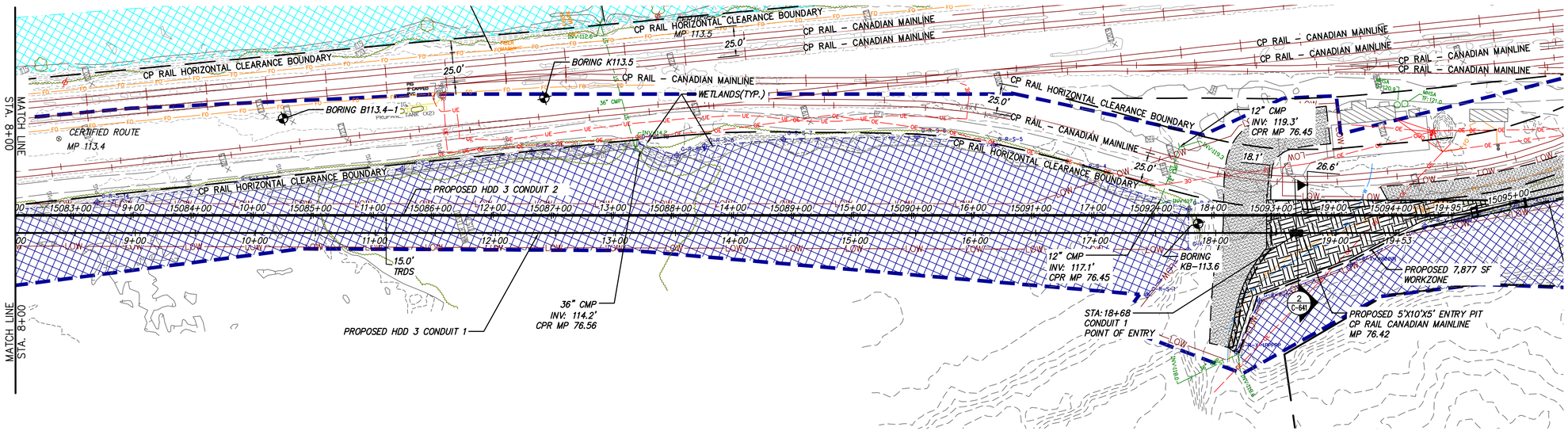

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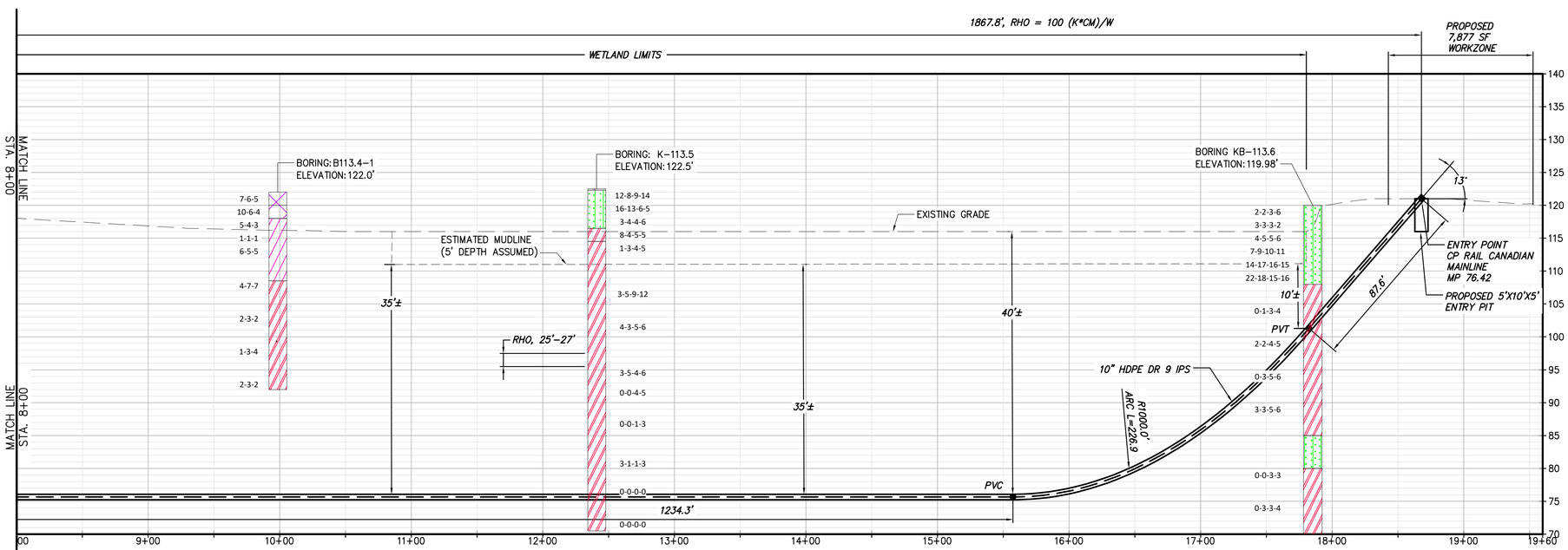
Scale in feet

PROPOSED HDD 3 PLAN VIEW

CONDUIT 1



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Scale in feet

PROPOSED HDD 3 PROFILE

CONDUIT 1

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CHAMPLAIN HUDSON POWER EXPRESS
SEGMENT 3 (PACKAGE 1C) WHITEHALL TO FORT ANN
PLAN AND PROFILE - HDD 3, 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 | REV. NO. X | DATE 03/22/2023

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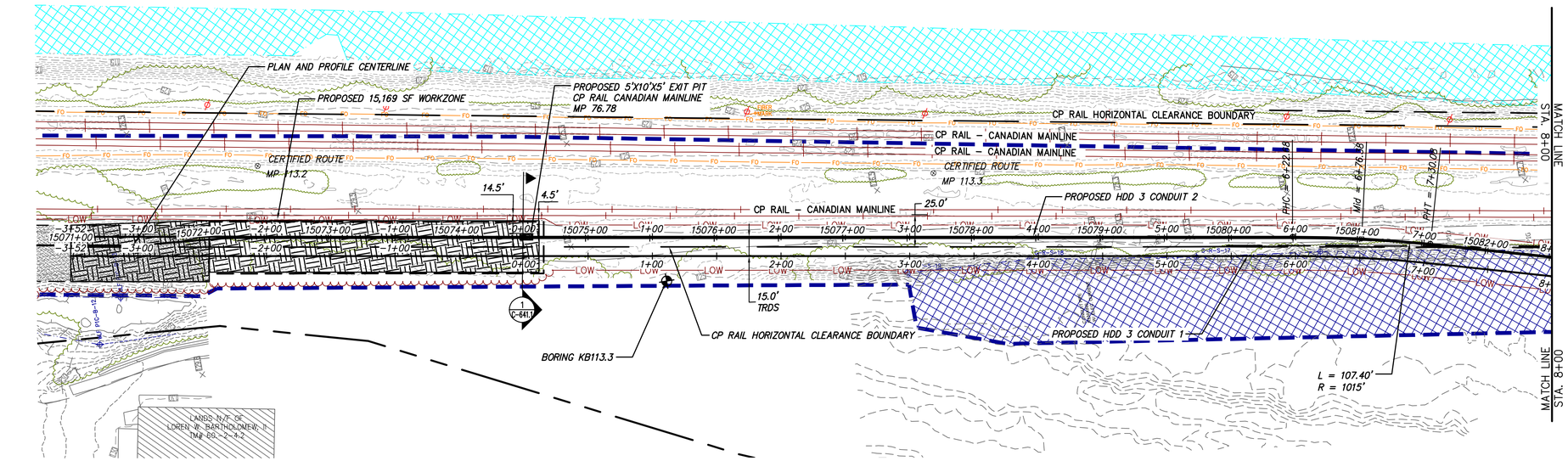

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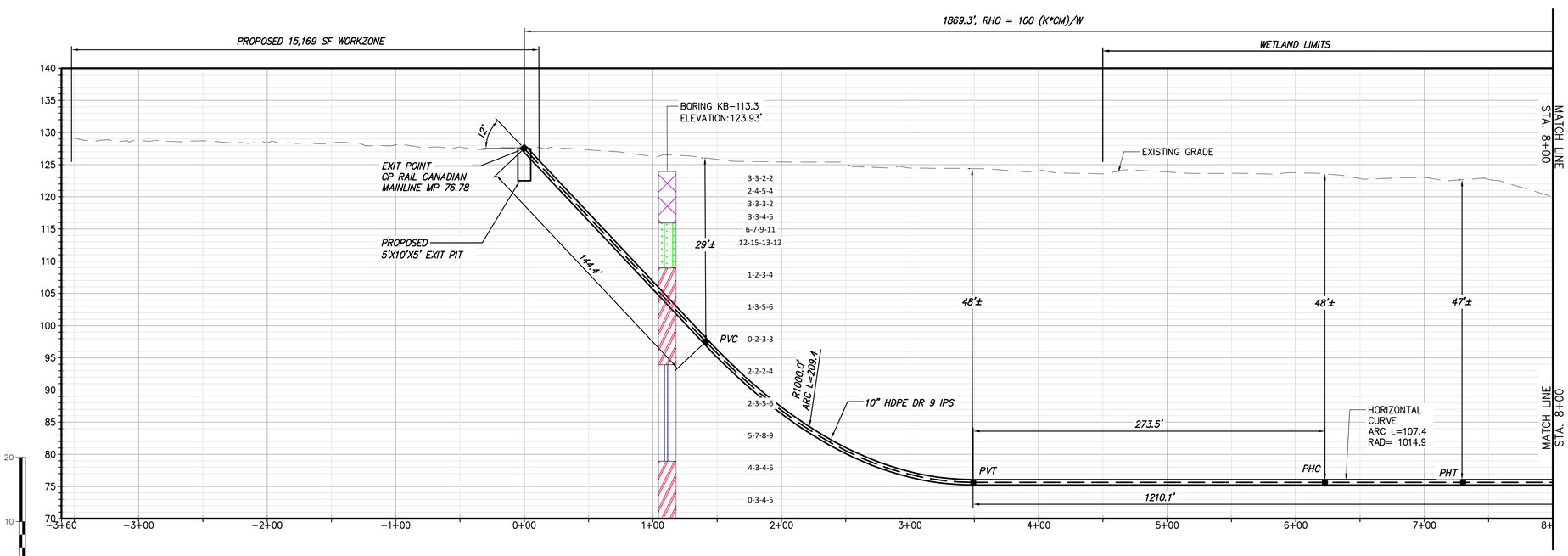
Scale in feet

PROPOSED HDD 3 PLAN VIEW
CONDUIT 2



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PROPOSED HDD 3 PROFILE
CONDUIT 2

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PLAN AND PROFILE - HDD 3, 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 | REV. NO. X | DATE 03/22/2023

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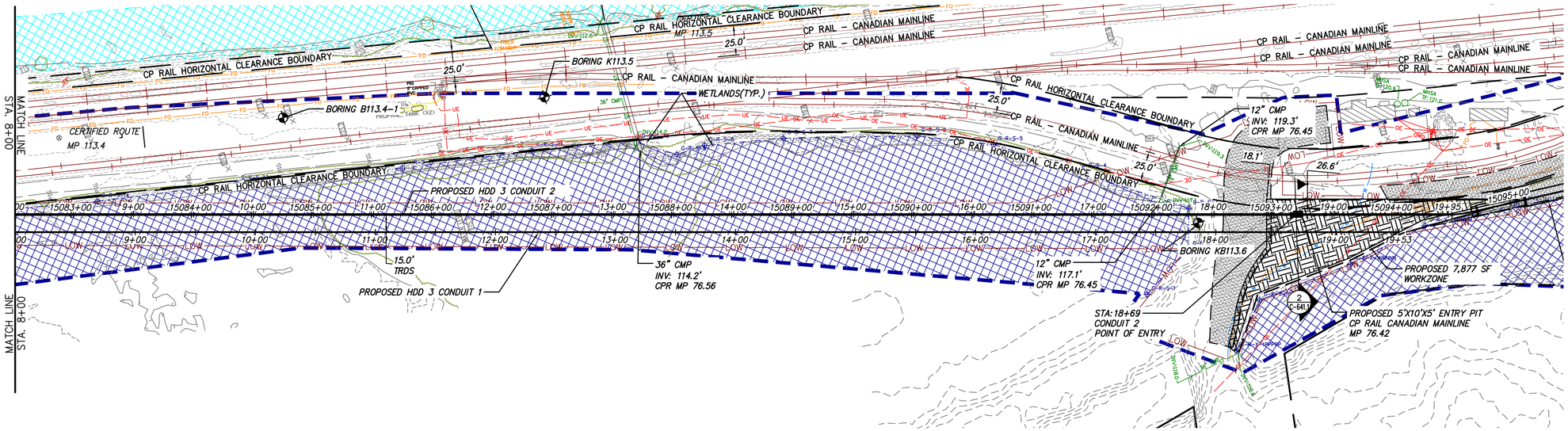

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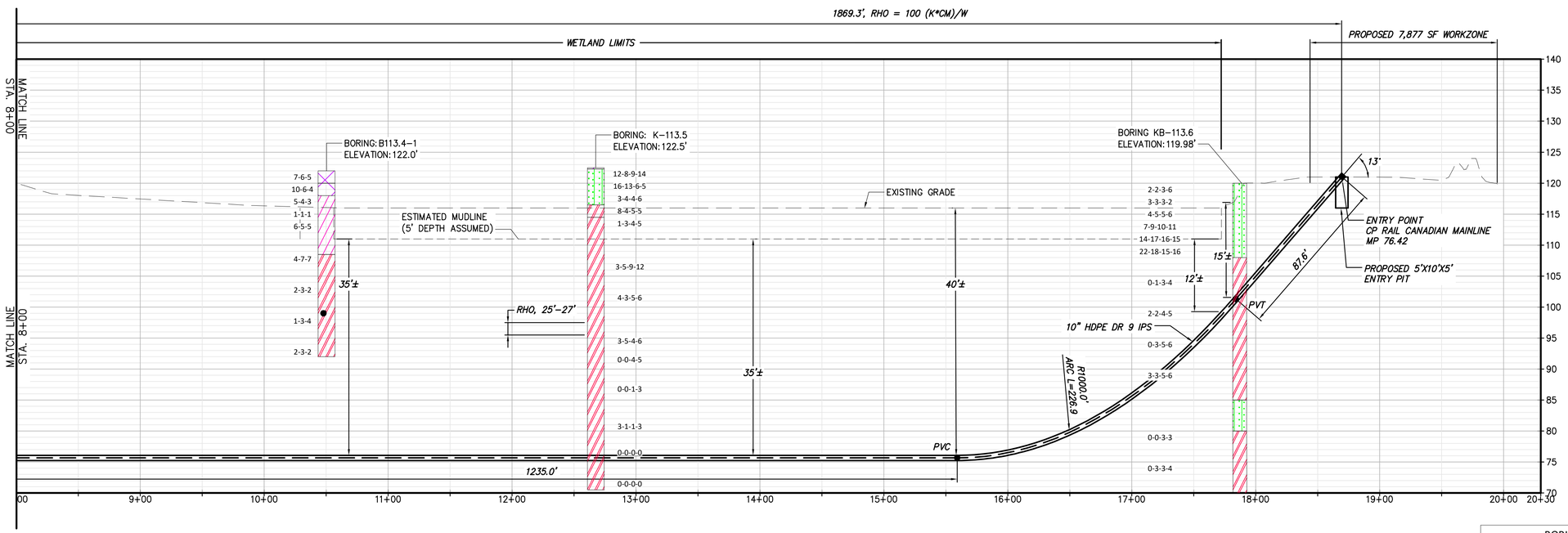
Scale in feet

PROPOSED HDD 3 PLAN VIEW

CONDUIT 2



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PROPOSED HDD 3 PROFILE

CONDUIT 2

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CHAMPLAIN HUDSON POWER EXPRESS
SEGMENT 3 (PACKAGE 1C) WHITEHALL TO FORT ANN
PLAN AND PROFILE - HDD 3, 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 | REV. NO. X | DATE 03/22/2023

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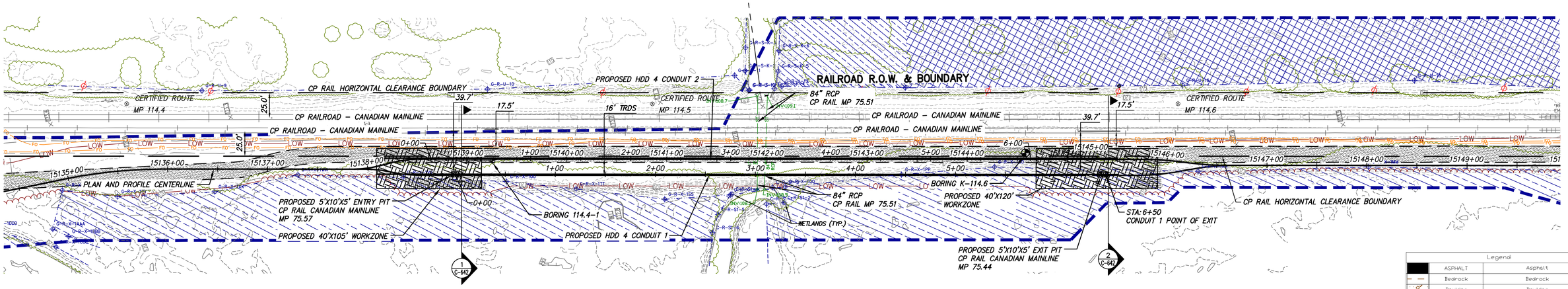
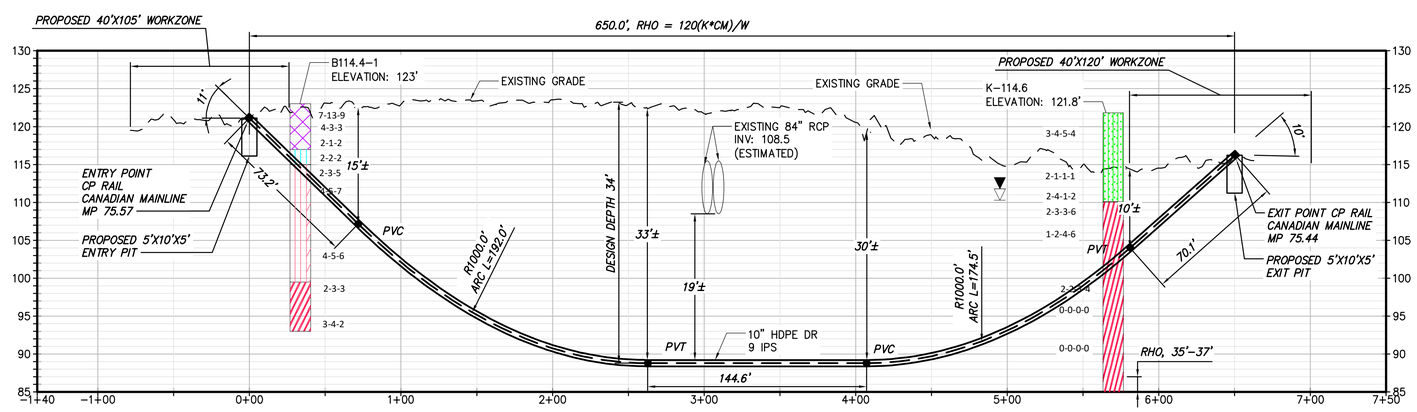


PROPOSED HDD 4 PLAN VIEW

CONDUIT 1



PROPOSED HDD 4 PROFILE

CONDUIT 1

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

CHPE Champlain Hudson Power Express

Kiewit

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

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No.	DATE	SUBMITTAL / REVISION DESCRIPTION	DB	APP
0	03/22/2023	ISSUED FOR CONSTRUCTION SUBMISSION	MCS	JEO

CHAMPLAIN HUDSON POWER EXPRESS
SEGMENT 3 (PACKAGE 1C) WHITEHALL TO FORT ANN
PLAN AND PROFILE - HDD 4, CONDUIT 1

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-302**

DATE 03/22/2023

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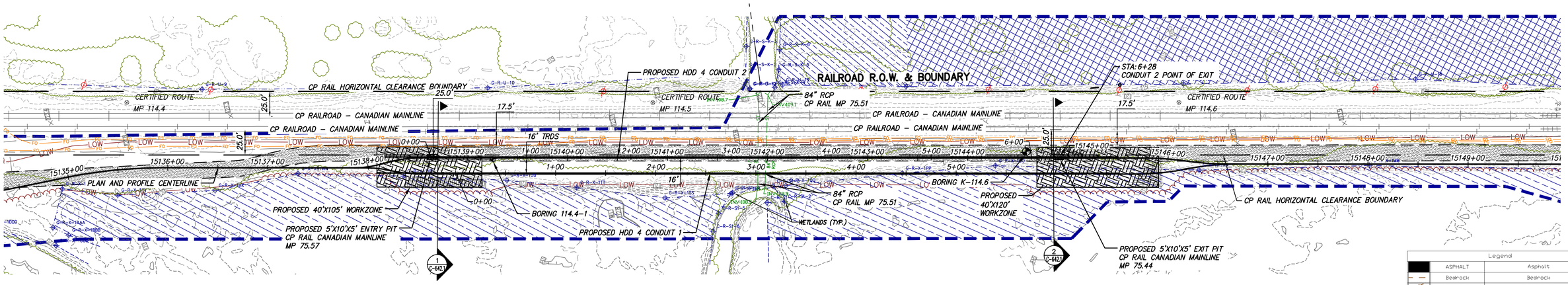
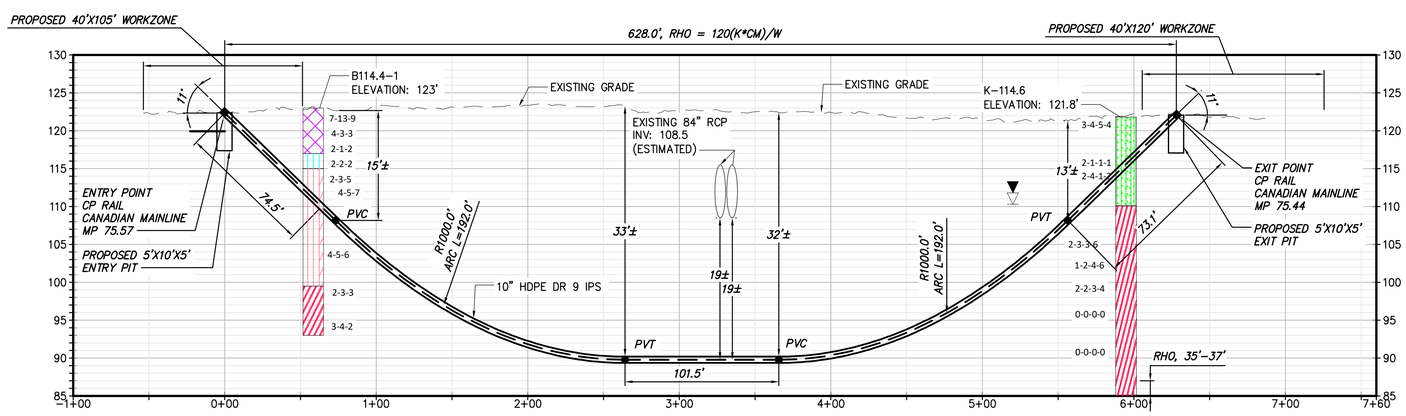


PROPOSED HDD 4 PLAN VIEW

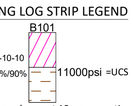
CONDUIT 2



PROPOSED HDD 4 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
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OL/OH	ORGANIC SOIL
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Water Table	Water Table during drilling
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Kiewit

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No.	DATE	SUBMITTAL / REVISION DESCRIPTION	DB	APP
0	03/22/2023	ISSUED FOR CONSTRUCTION SUBMISSION	MCS	JEO

CHAMPLAIN HUDSON POWER EXPRESS
SEGMENT 3 (PACKAGE 1C) WHITEHALL TO FORT ANN
PLAN AND PROFILE - HDD 4, 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-302A**
DATE 03/22/2023

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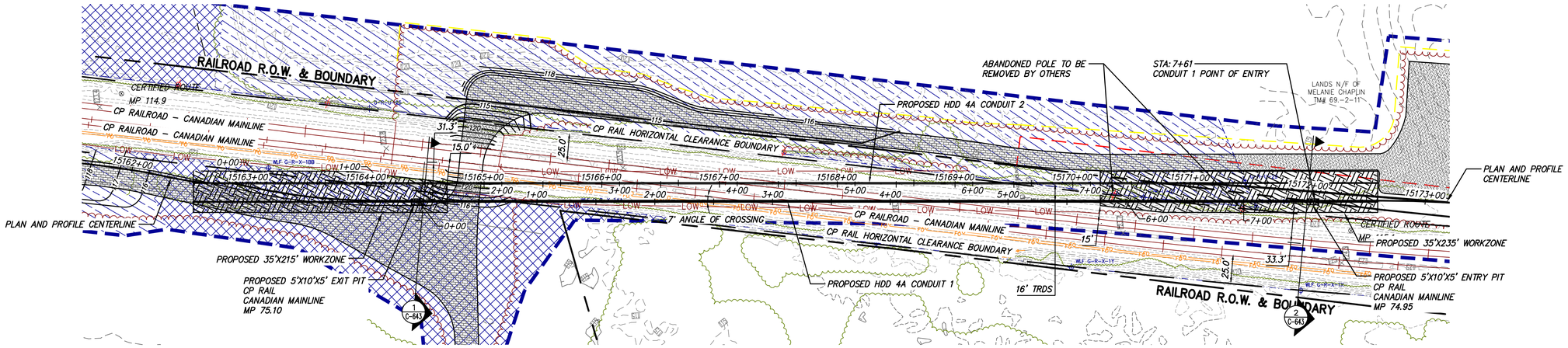

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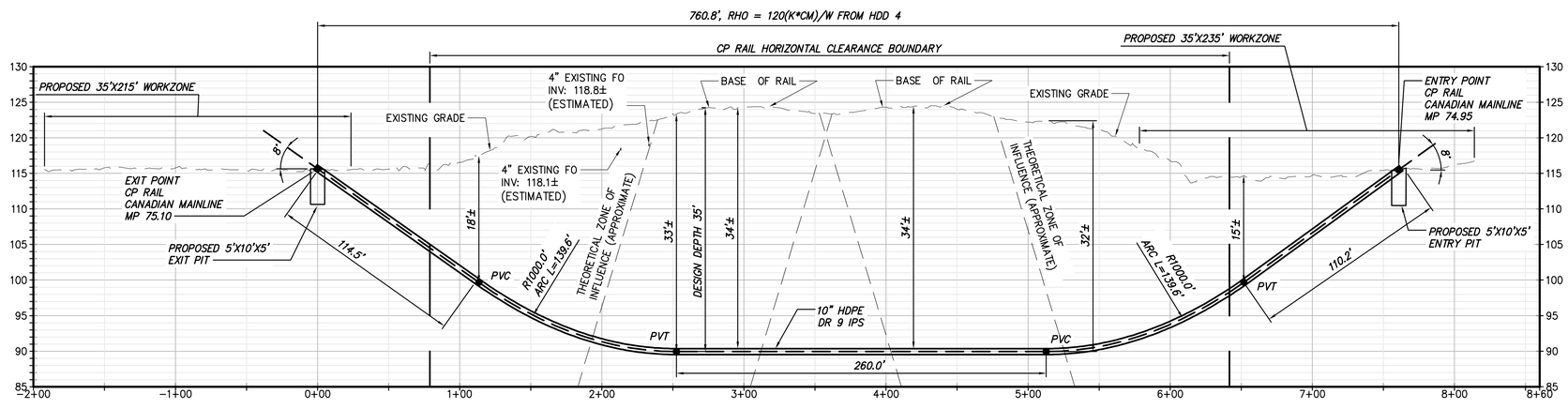
Scale in feet

PROPOSED HDD 4A PLAN VIEW

CONDUIT 1



0 50 100
Scale in feet

PROPOSED HDD 4A PROFILE

CONDUIT 1

NOTE:
1) NO SUBSURFACE INVESTIGATIONS WERE CONDUCTED AT HDD #4A. THE SOIL CONDITIONS WERE ESTIMATED BASED ON NEARBY BORINGS. IT IS RECOMMENDED THAT THE HDD SUBCONTRACTOR DRILL A TEST BORING AT THE START OF CONSTRUCTION AT THE HDD #4A SITE BEFORE STARTING THE HDD TO CONFIRM THE GROUND CONDITIONS.

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
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GC-GM	SILTY CLAYEY GRAVEL
GM	SILTY GRAVEL
GP	Poorly Graded GRAVEL
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ML	SILT
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OL/OH	ORGANIC SOIL
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Weathered Rock	Undefined
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CHPE Champlain Hudson Power Express

Kiewit

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CHAMPLAIN HUDSON POWER EXPRESS
SEGMENT 3 (PACKAGE 1C) WHITEHALL TO FORT ANN
PLAN AND PROFILE - HDD 4A, CONDUIT 1

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

DRAWN BY: ES | DESIGNED BY: ES | APPROVED BY: JEO | SCALE AS NOTED | REV. NO. X | DATE 03/22/2023

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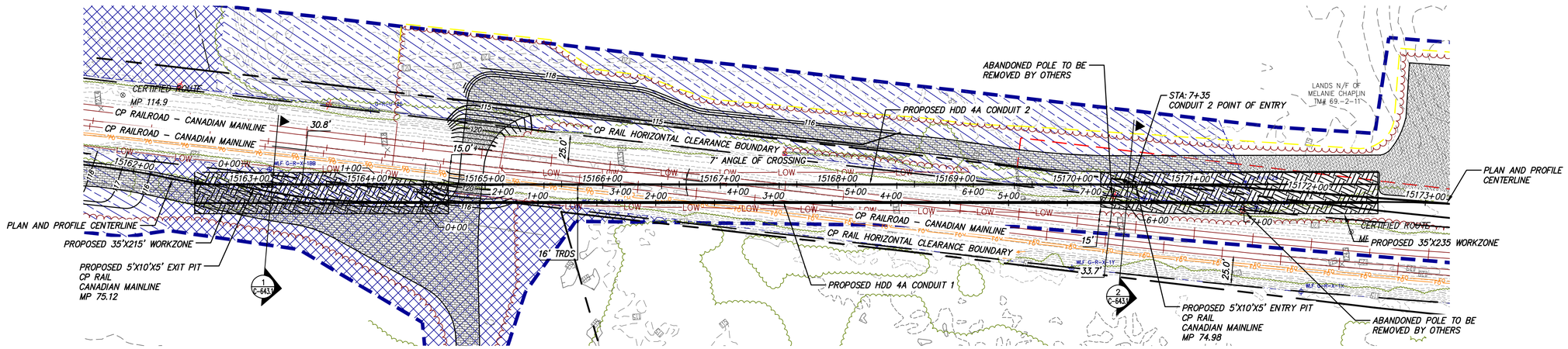

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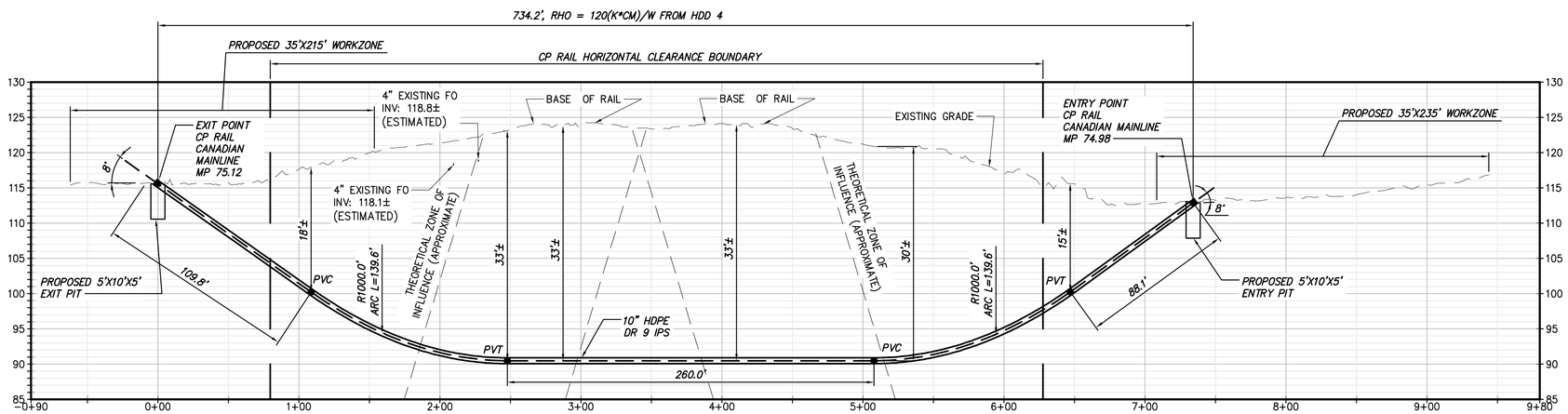
Scale in feet

PROPOSED HDD 4A PLAN VIEW

CONDUIT 2



20
10
0
0 50 100
Scale in feet

PROPOSED HDD 4A PROFILE

CONDUIT 2

NOTE:
1) NO SUBSURFACE INVESTIGATIONS WERE CONDUCTED AT HDD #4A. THE SOIL CONDITIONS WERE ESTIMATED BASED ON NEARBY BORINGS. IT IS RECOMMENDED THAT THE HDD SUBCONTRACTOR DRILL A TEST BORING AT THE START OF CONSTRUCTION AT THE HDD #4A SITE BEFORE STARTING THE HDD TO CONFIRM THE GROUND CONDITIONS.

BORING LOG STRIP LEGEND

B101

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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
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ML	SILT
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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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Void	Void
Water	Water
Weathered Rock	Undefined
Water Table	Water Table during drilling
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CHPE Champlain Hudson Power Express

Kiewit

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CHAMPLAIN HUDSON POWER EXPRESS
SEGMENT 3 (PACKAGE 1C) WHITEHALL TO FORT ANN
PLAN AND PROFILE - HDD 4A, CONDUIT 2

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

DRAWN BY: ES | DESIGNED BY: ES | APPROVED BY: JEO | SCALE AS NOTED | REV. NO. X | DATE 03/22/2023

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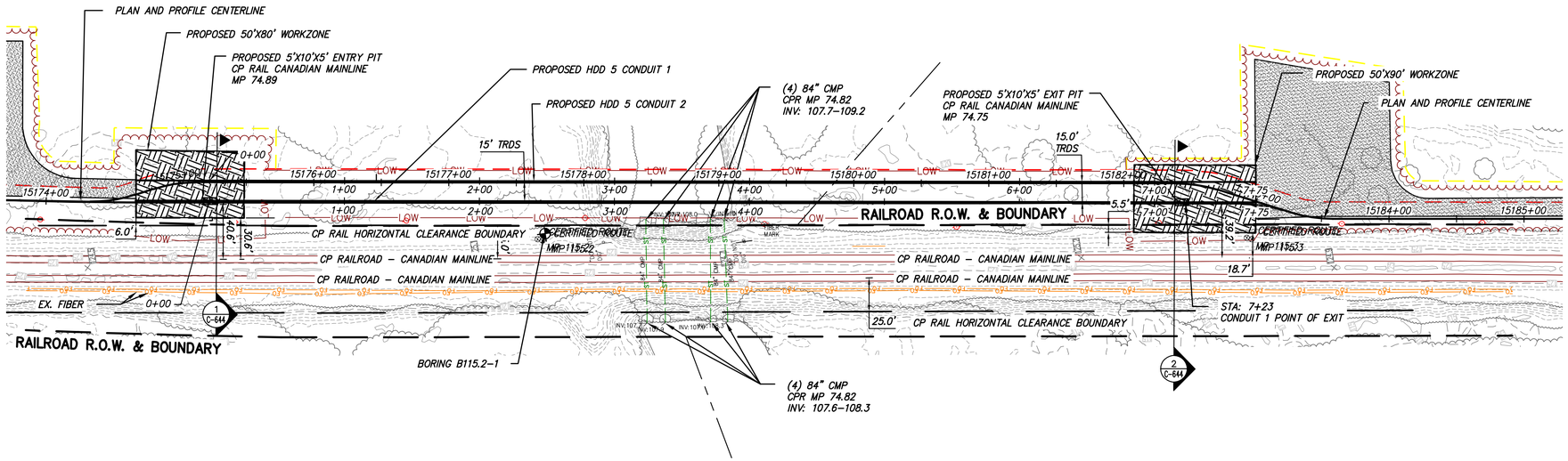

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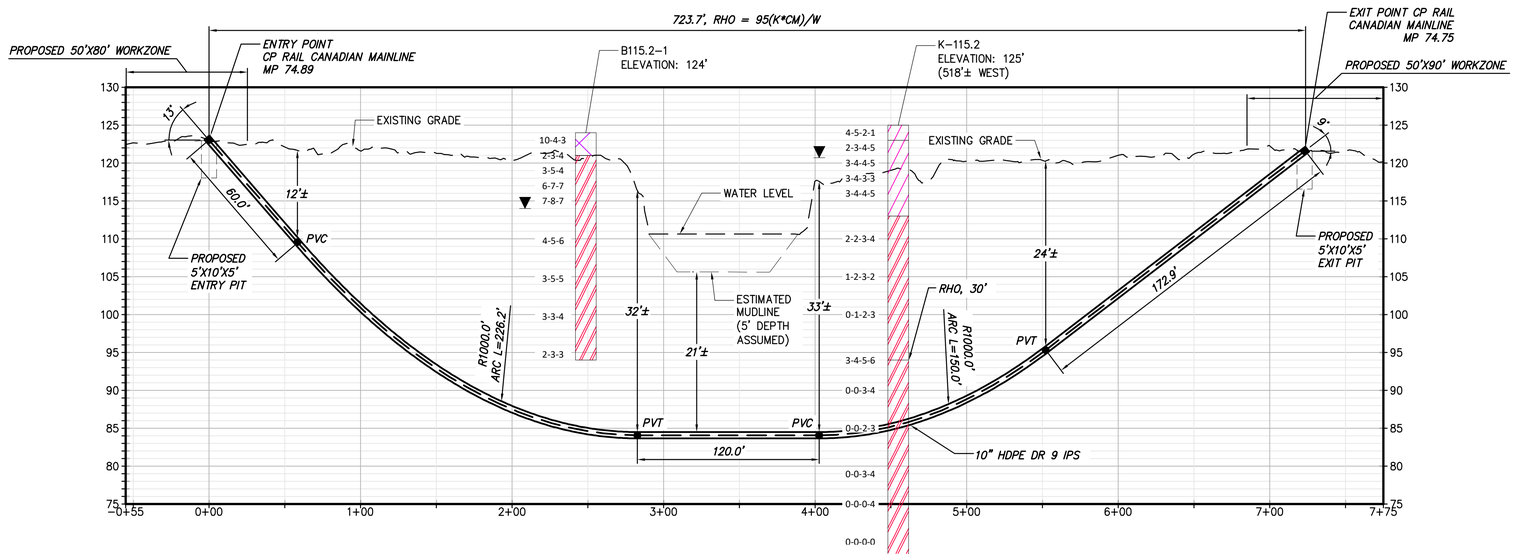
Scale in feet

PROPOSED HDD 5 PLAN VIEW

CONDUIT 1



0 50 100
Scale in feet

PROPOSED HDD 5 PROFILE

CONDUIT 1

BORING LOG STRIP LEGEND

B101

Blow Counts per 6" = 10-10-10

Recovery %/RQD % = 95%/90%

11000psi =UCS

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3D strip logs have no exaggeration

Legend

	ASPHALT	Asphalt
	Bedrock	Bedrock
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	Water	Water
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CHAMPLAIN HUDSON POWER EXPRESS
SEGMENT 3 (PACKAGE 1C) WHITEHALL TO FORT ANN
PLAN AND PROFILE - HDD 5, CONDUIT 1

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

DRAWN BY: CJL DESIGNED BY: CJL APPROVED BY: JEO
SCALE AS NOTED DATE 03/22/2023
REV. NO. X

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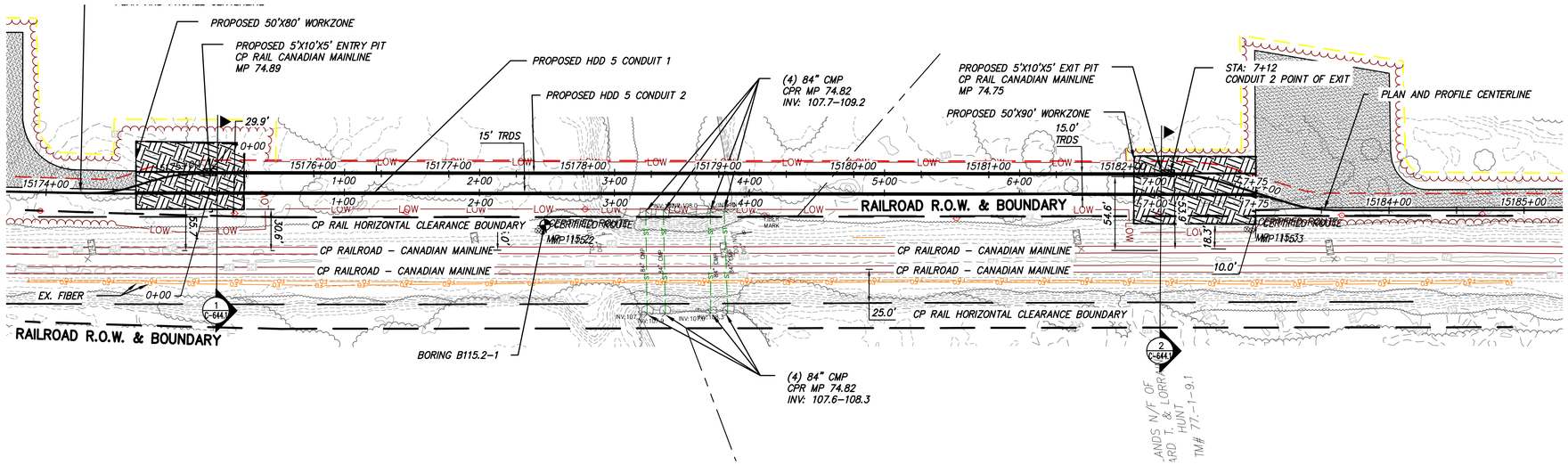

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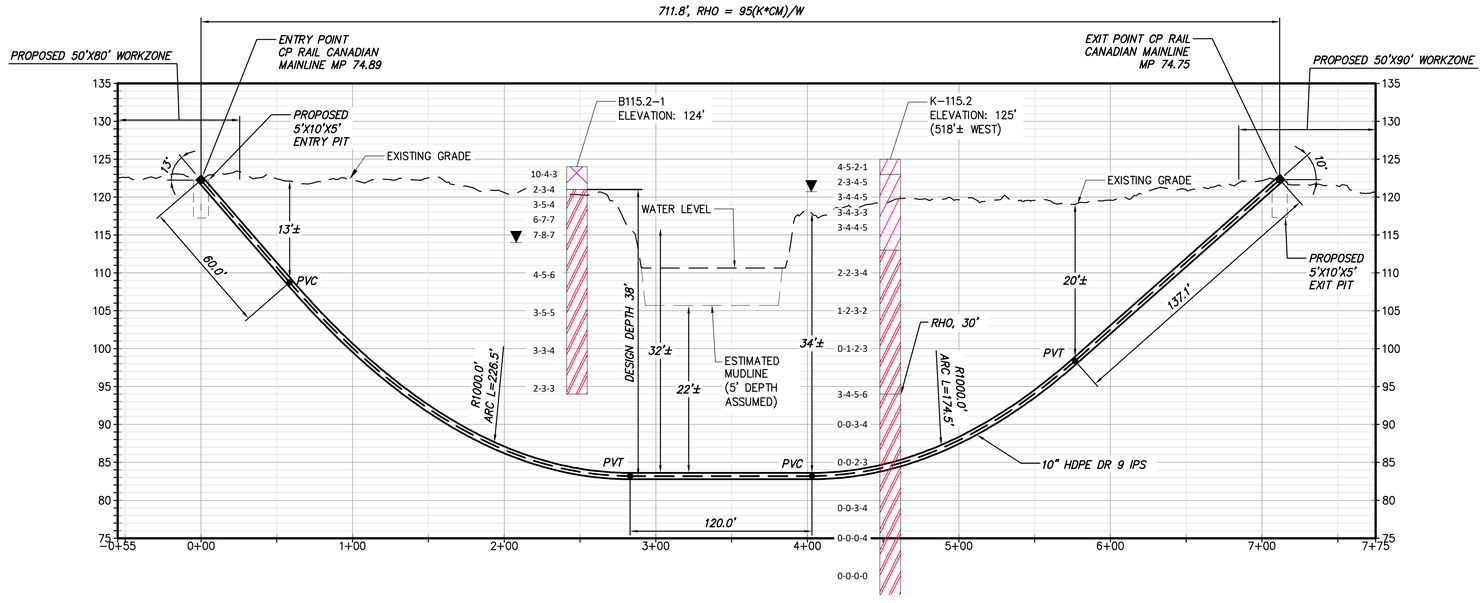
Scale in feet

PROPOSED HDD 5 PLAN VIEW

CONDUIT 2



0 50 100
Scale in feet

PROPOSED HDD 5 PROFILE

CONDUIT 2

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 I
	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 I
	Void	Void
	Water	Water
	Weathered Rock	Undefined
▼	Water Table	Water Table during drilling
▽	Delayed Water Table	Water Table after drilling

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

CHPE Champlain Hudson Power Express

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No.	DATE	SUBMITTAL / REVISION DESCRIPTION	DB	APP
0	03/22/2023	ISSUED FOR CONSTRUCTION SUBMISSION	MCS	JEO

CHAMPLAIN HUDSON POWER EXPRESS
SEGMENT 3 (PACKAGE 1C) WHITEHALL TO FORT ANN
PLAN AND PROFILE - HDD 5, CONDUIT 2

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

DRAWN BY: CJL DESIGNED BY: CJL APPROVED BY: JEO SCALE AS NOTED DATE 03/22/2023 REV. NO. X

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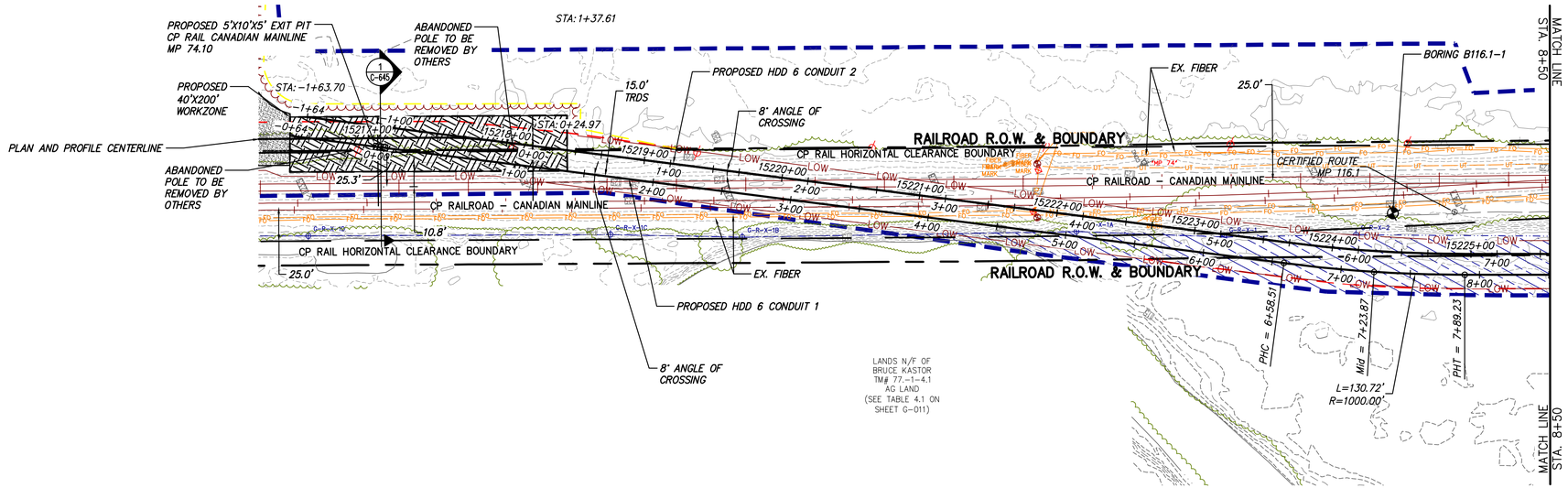
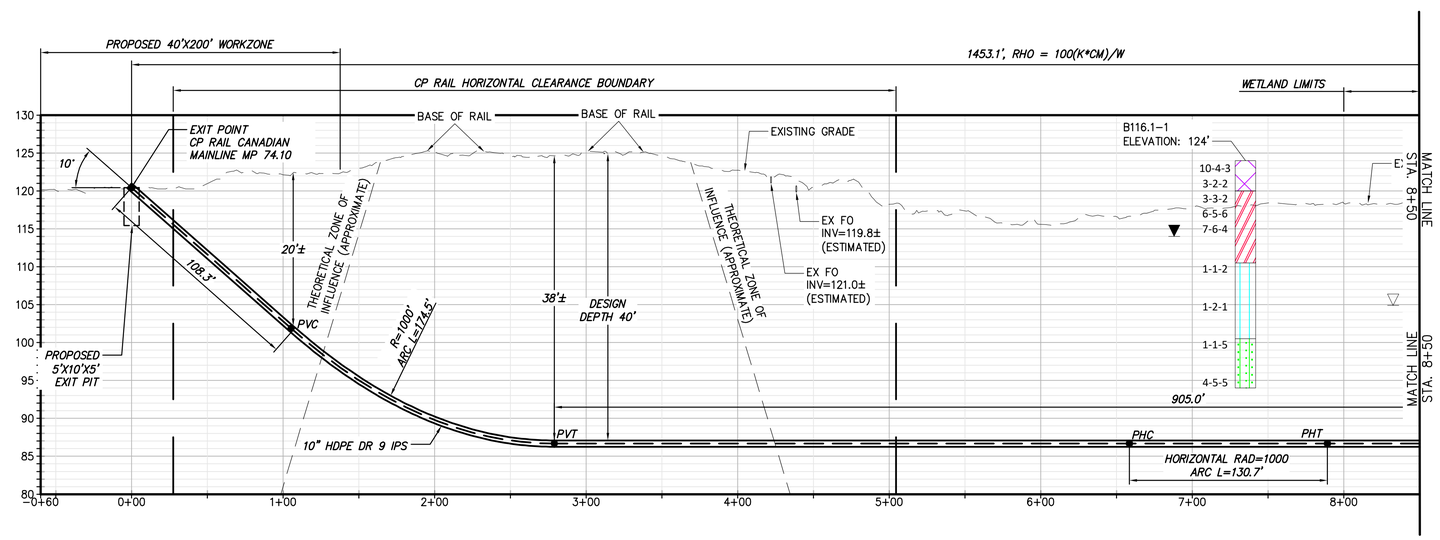


0 50 100
Scale in feet

PROPOSED HDD 6 PLAN VIEW

CONDUIT 1



0 50 100
Scale in feet

PROPOSED HDD 6 PROFILE

CONDUIT 1

NOTE:
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Legend

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	CH-MH	SILTY Fat CLAY
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	CL-ML	SILTY CLAY
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	Fill	Fill
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CHAMPLAIN HUDSON POWER EXPRESS
SEGMENT 3 (PACKAGE 1C) WHITEHALL TO FORT ANN
PLAN AND PROFILE - HDD 6, 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 03/22/2023

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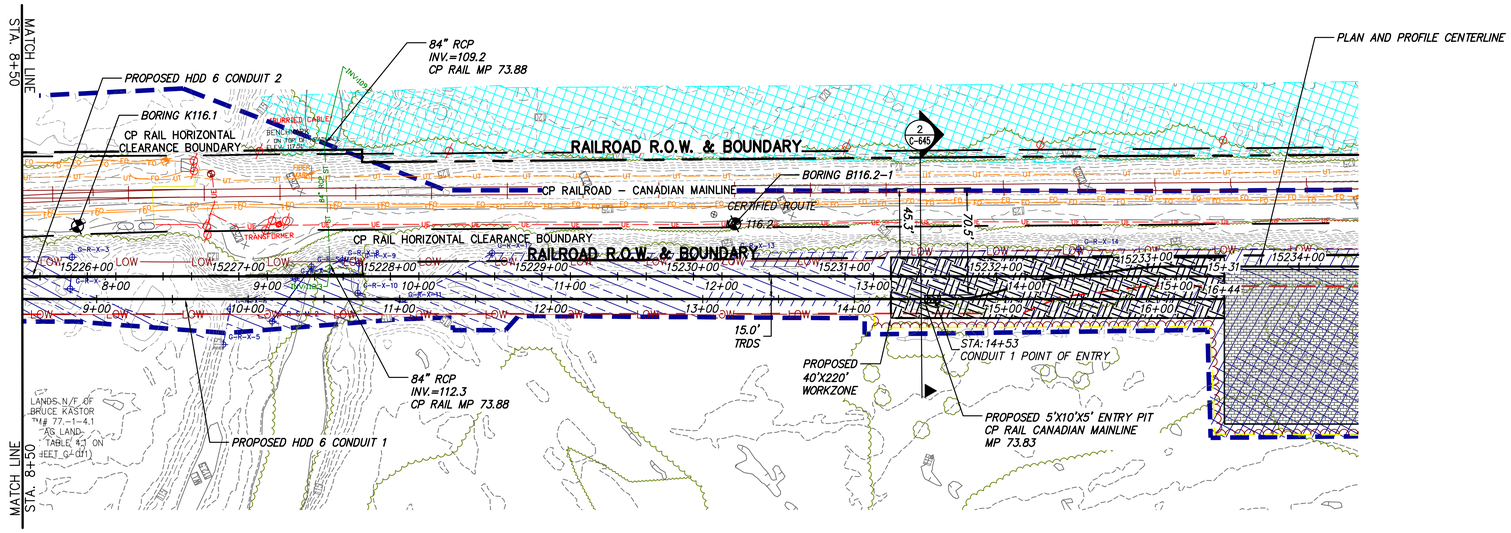
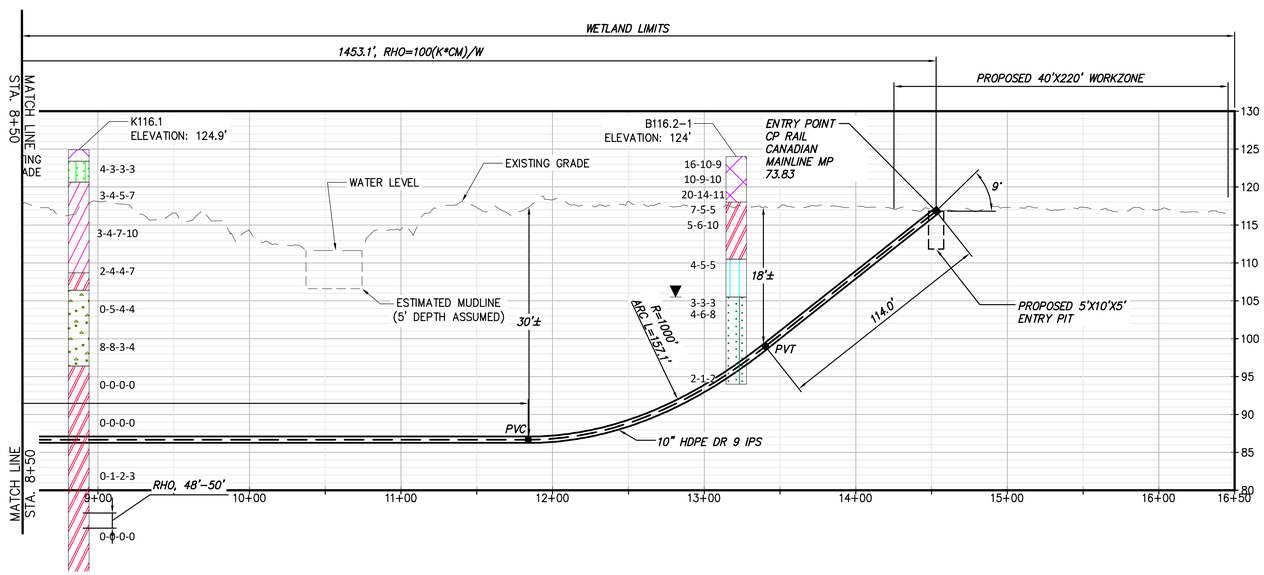


0 50 100
Scale in feet

PROPOSED HDD 6 PLAN VIEW
CONDUIT 1



PROPOSED HDD 6 PROFILE
CONDUIT 1

0 50 100
Scale in feet

NOTE:
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CHAMPLAIN HUDSON POWER EXPRESS
SEGMENT 3 (PACKAGE 1C) WHITEHALL TO FORT ANN
PLAN AND PROFILE - HDD 6, CONDUIT 1

KIEWIT PROJECT NO. 21162
CHA PROJECT NO. 066076
DRAWING NO. **C-305.1**

DRAWN BY: CJL DESIGNED BY: CJL APPROVED BY: JEO SCALE AS NOTED REV. NO. X DATE 03/22/2023

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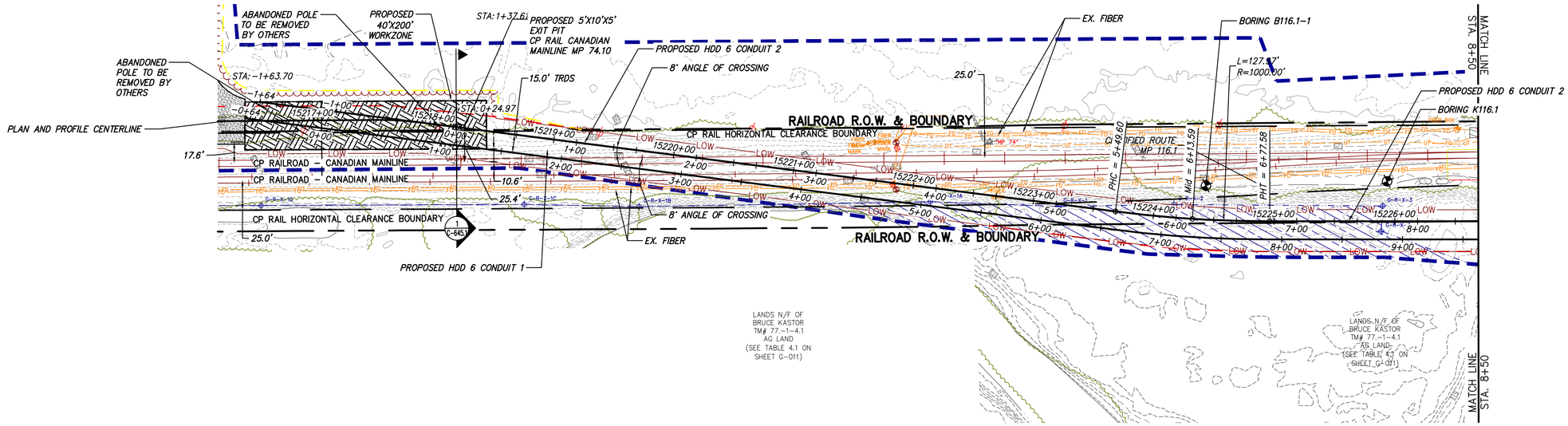
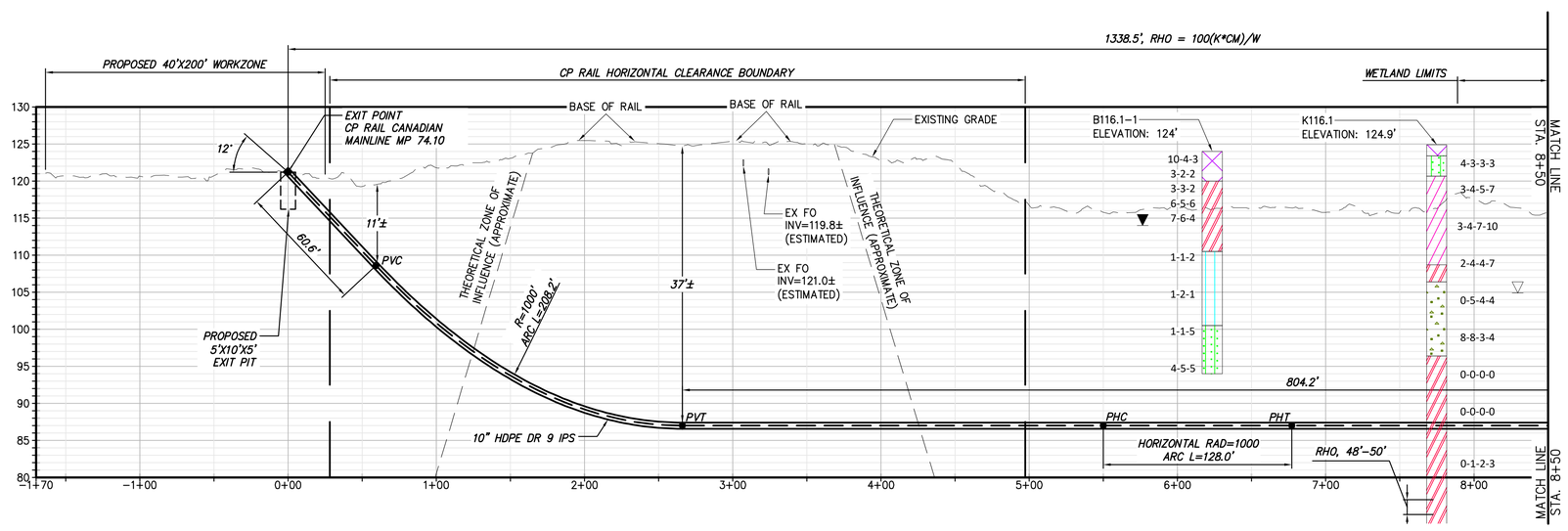


0 50 100
Scale in feet

PROPOSED HDD 6 PLAN VIEW
CONDUIT 2



PROPOSED HDD 6 PROFILE
CONDUIT 2

20
10
0
0 50 100
Scale in feet

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CHAMPLAIN HUDSON POWER EXPRESS
SEGMENT 3 (PACKAGE 1C) WHITEHALL TO FORT ANN
PLAN AND PROFILE - HDD 6, CONDUIT 2

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

DRAWN BY: CJL DESIGNED BY: CJL APPROVED BY: JEO SCALE AS NOTED REV. NO. X DATE 03/22/2023

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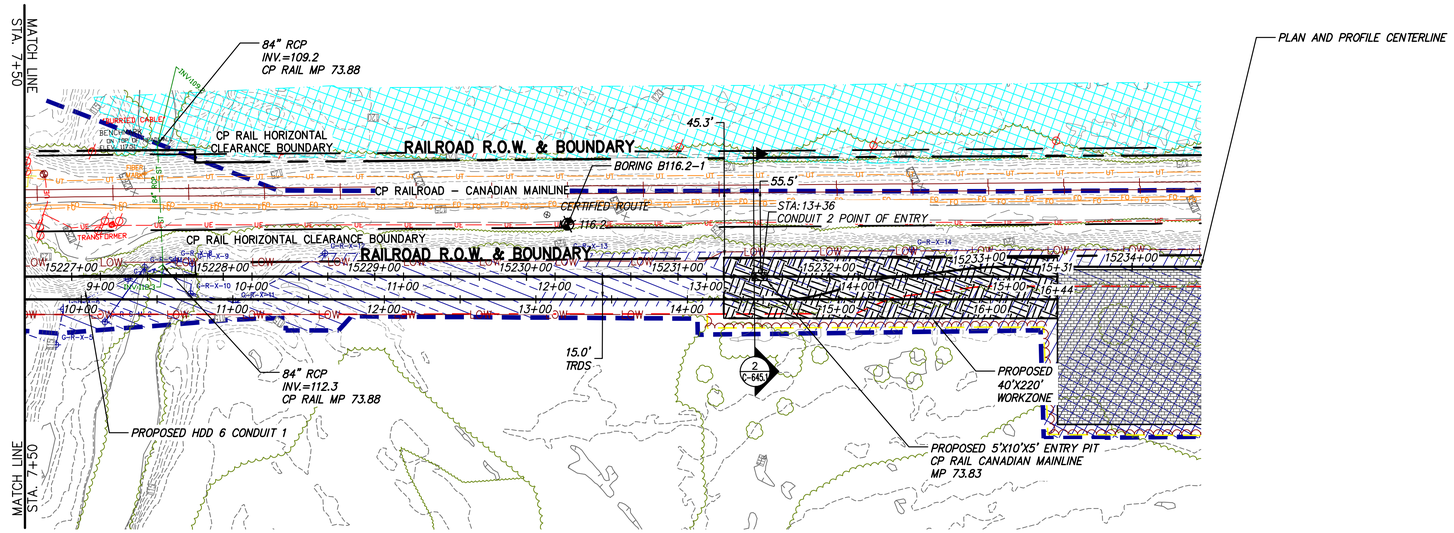

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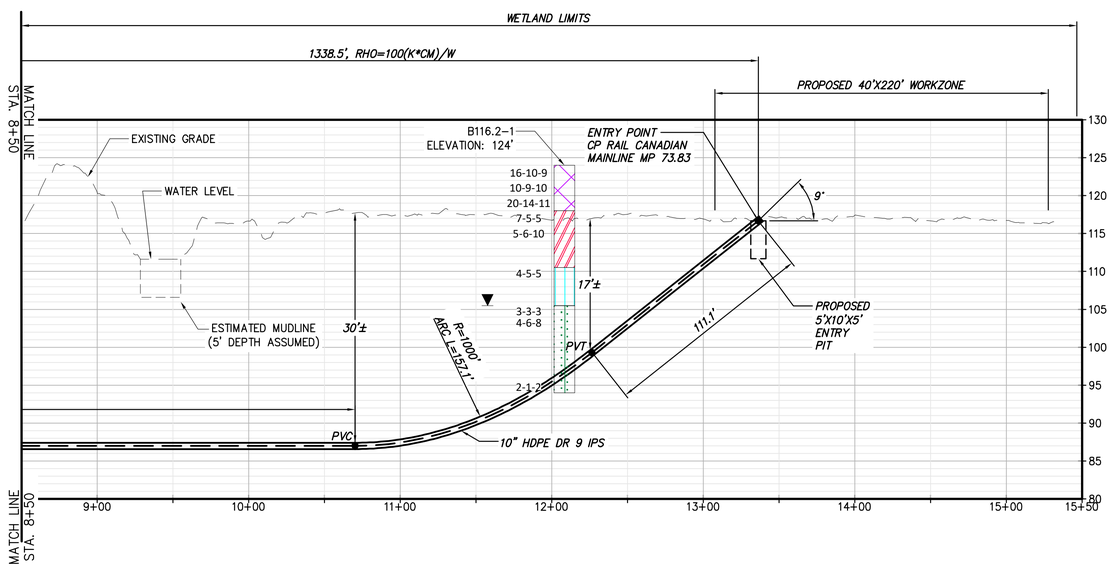
Scale in feet

PROPOSED HDD 6 PLAN VIEW

CONDUIT 2



20 10 0
0 50 100
Scale in feet

PROPOSED HDD 6 PROFILE

CONDUIT 2

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CHAMPLAIN HUDSON POWER EXPRESS
SEGMENT 3 (PACKAGE 1C) WHITEHALL TO FORT ANN
PLAN AND PROFILE - HDD 6, CONDUIT 2

KIEWIT PROJECT NO. 21162
CHA PROJECT NO. 066076
DRAWING NO. **C-305A.1**

DRAWN BY: CJL DESIGNED BY: CJL APPROVED BY: JEO
SCALE AS NOTED
REV. NO. B
DATE 03/22/2023

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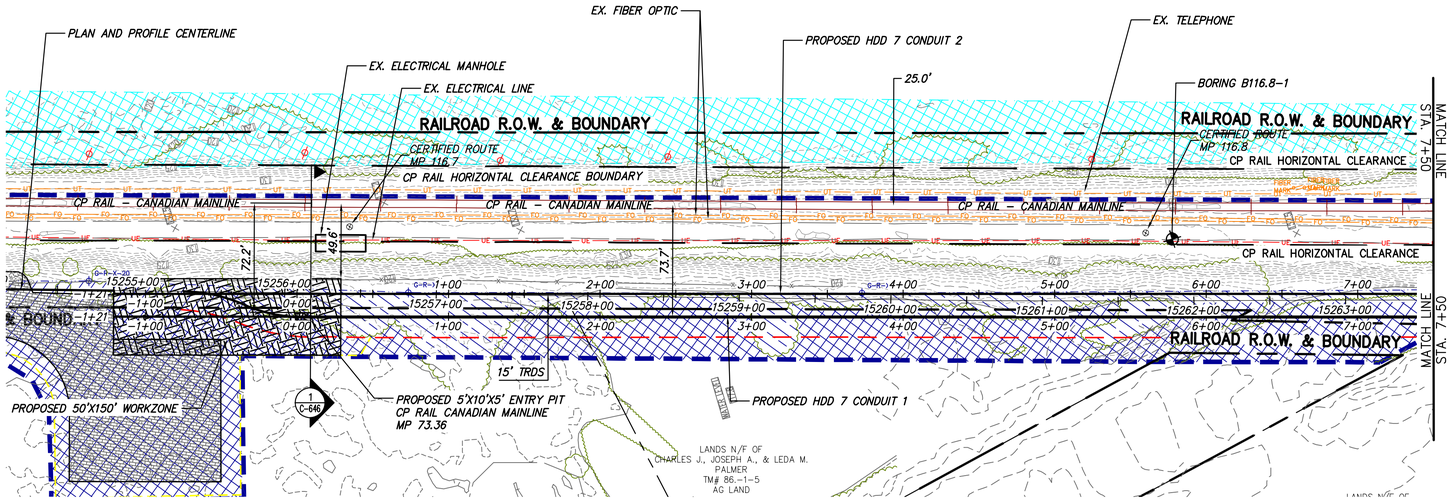
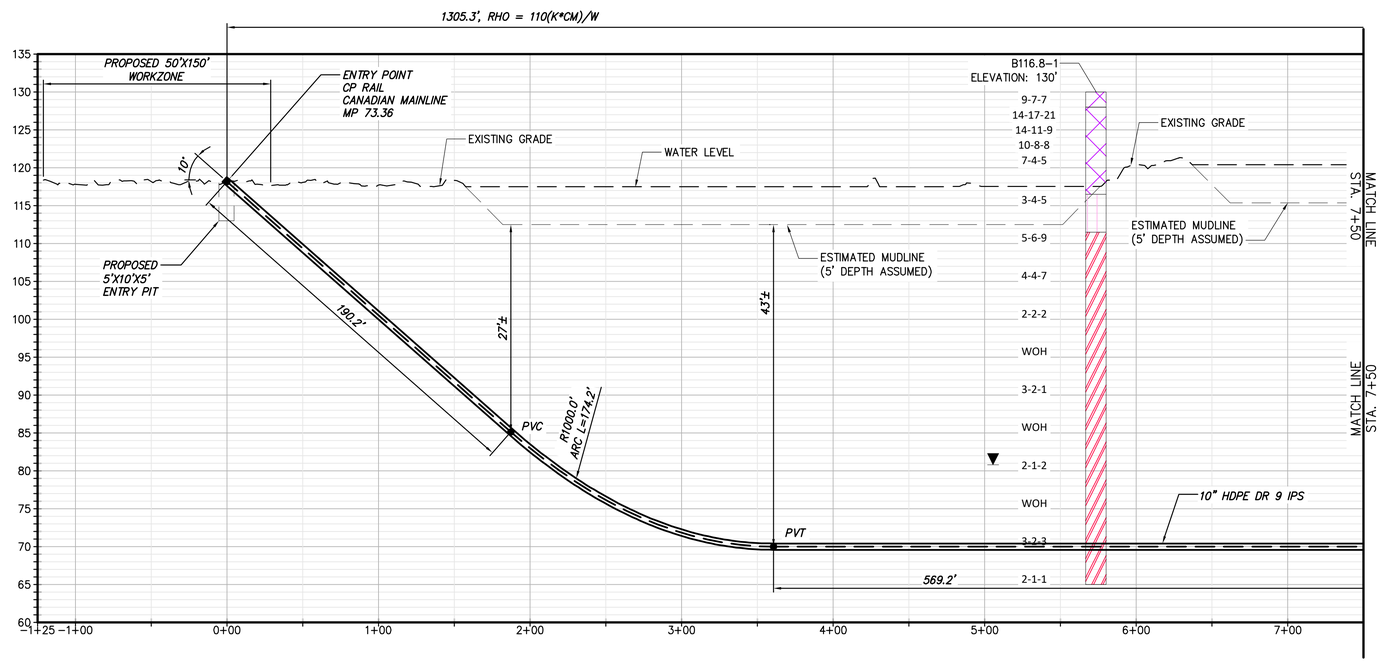


0 50 100
Scale in feet

PROPOSED HDD 7 PLAN VIEW

CONDUIT 1



PROPOSED HDD 7 PROFILE

CONDUIT 1

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
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CHPE Champlain Hudson Power Express

Kiewit

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No.	DATE	SUBMITTAL / REVISION DESCRIPTION	DB	APP
0	03/22/2023	ISSUED FOR CONSTRUCTION SUBMISSION	MCS	JEO

CHAMPLAIN HUDSON POWER EXPRESS
SEGMENT 3 (PACKAGE 1C) WHITEHALL TO FORT ANN
PLAN AND PROFILE - HDD 7, CONDUIT 1

KIEWIT PROJECT NO. 21162
CHA PROJECT NO. 066076
DRAWING NO. **C-306**

DRAWN BY: MCS DESIGNED BY: MCS APPROVED BY: JEO
SCALE AS NOTED
REV. NO. X
DATE 03/22/2023

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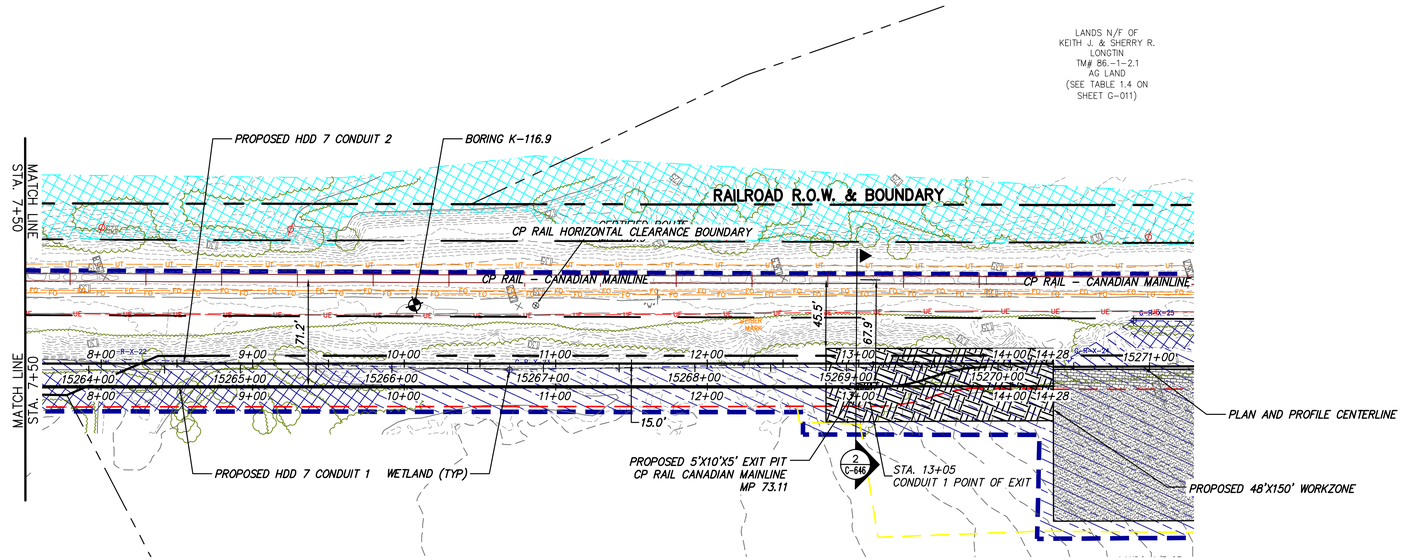
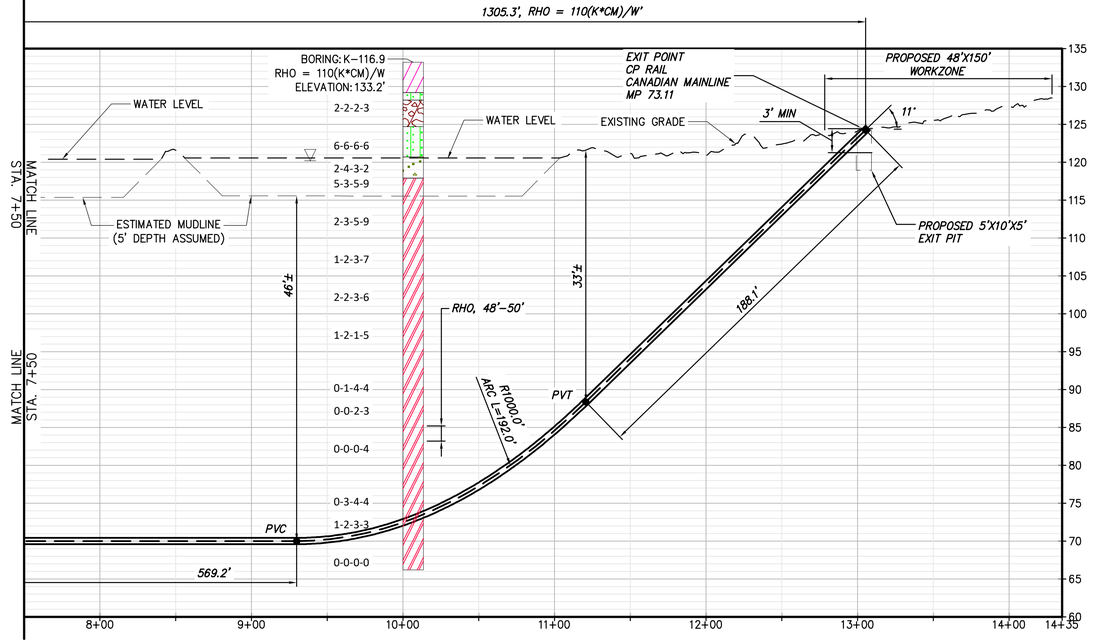


0 50 100
Scale in feet

PROPOSED HDD 7 PLAN VIEW

CONDUIT 1



PROPOSED HDD 7 PROFILE

CONDUIT 1

0 50 100
Scale in feet

20
10
0
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
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Boulder	Boulder
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CHAMPLAIN HUDSON POWER EXPRESS
SEGMENT 3 (PACKAGE 1C) WHITEHALL TO FORT ANN
PLAN AND PROFILE - HDD 7, CONDUIT 1

KIEWIT PROJECT NO. 21162
CHA PROJECT NO. 066076
DRAWING NO. **C-306.1**

DRAWN BY: MCS DESIGNED BY: MCS APPROVED BY: JEO
SCALE AS NOTED DATE 03/22/2023
REV. NO. X

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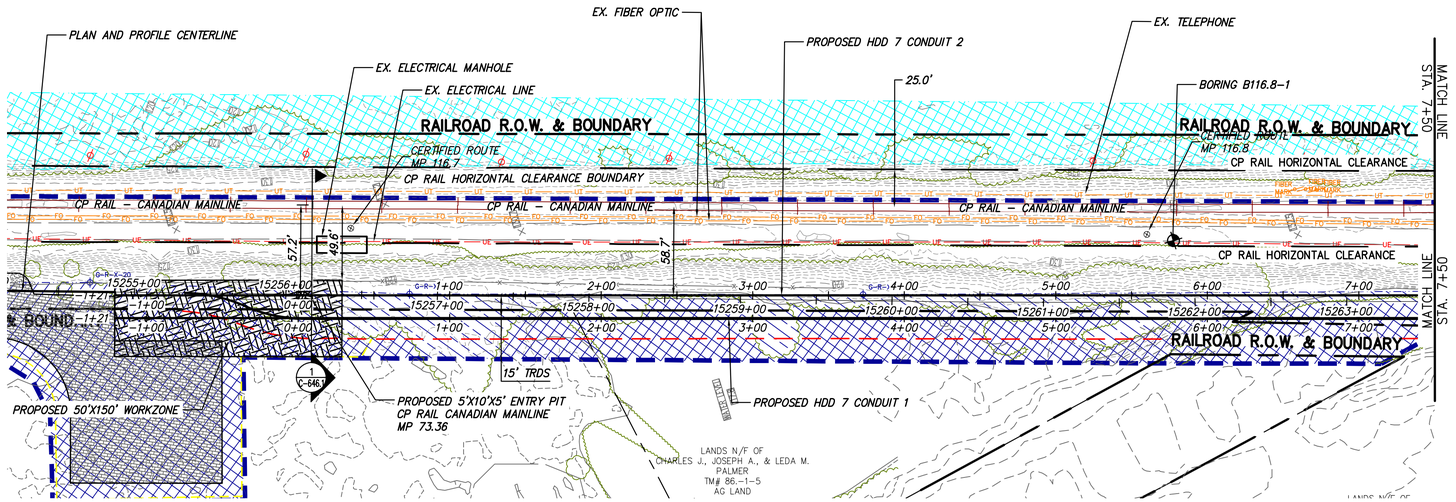
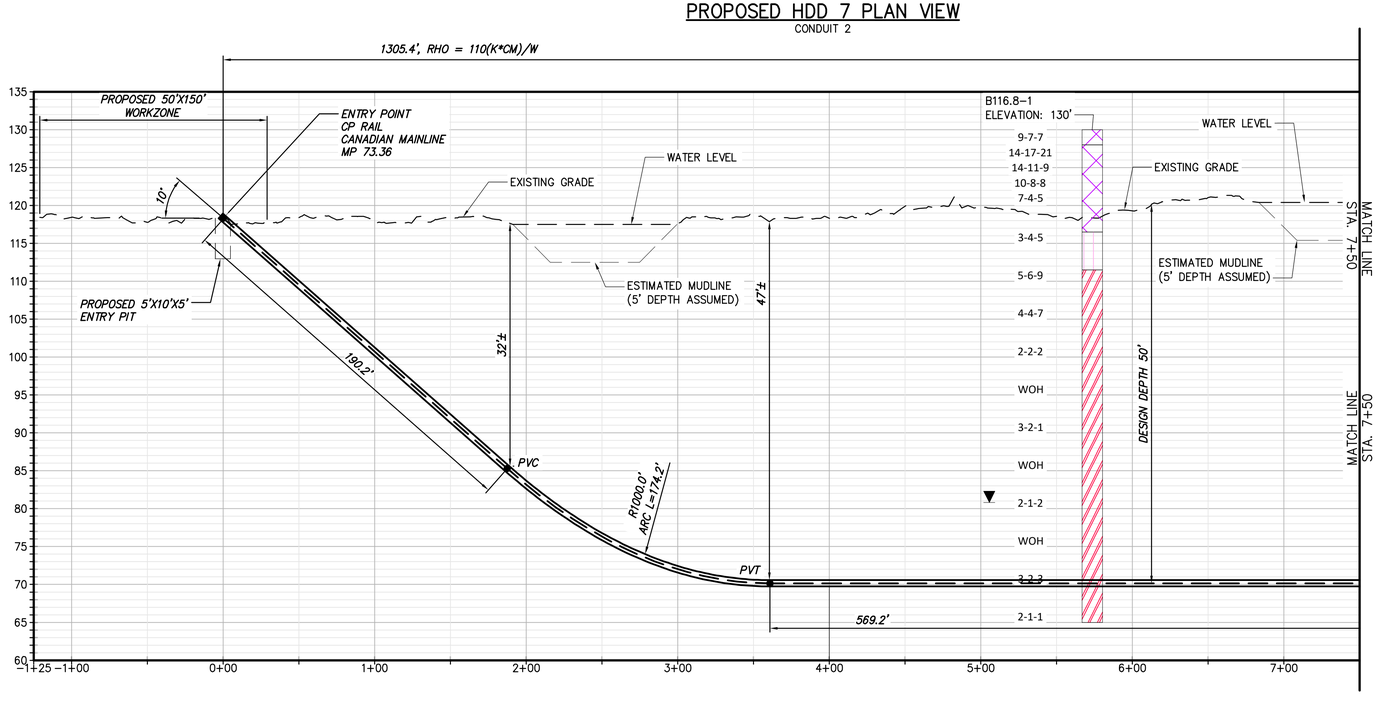


0 50 100
Scale in feet

PROPOSED HDD 7 PLAN VIEW

CONDUIT 2



PROPOSED HDD 7 PROFILE

CONDUIT 2

0 50 100
Scale in feet

20 10 0

BORING LOG STRIP LEGEND

B101

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CHAMPLAIN HUDSON POWER EXPRESS
SEGMENT 3 (PACKAGE 1C) WHITEHALL TO FORT ANN
PLAN AND PROFILE - HDD 7, CONDUIT 2

KIEWIT PROJECT NO. 21162
CHA PROJECT NO. 066076
DRAWING NO. **C-306A**

DRAWN BY: MCS DESIGNED BY: MCS APPROVED BY: JEO SCALE AS NOTED DATE 03/22/2023 REV. NO. X

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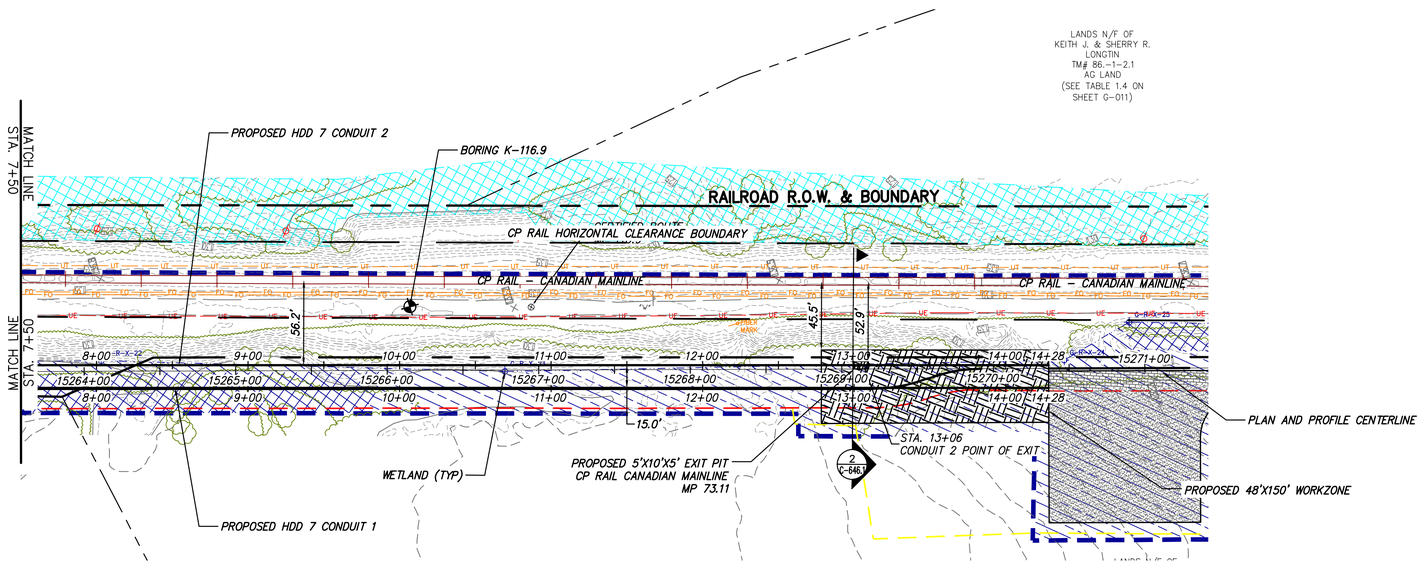
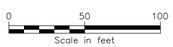
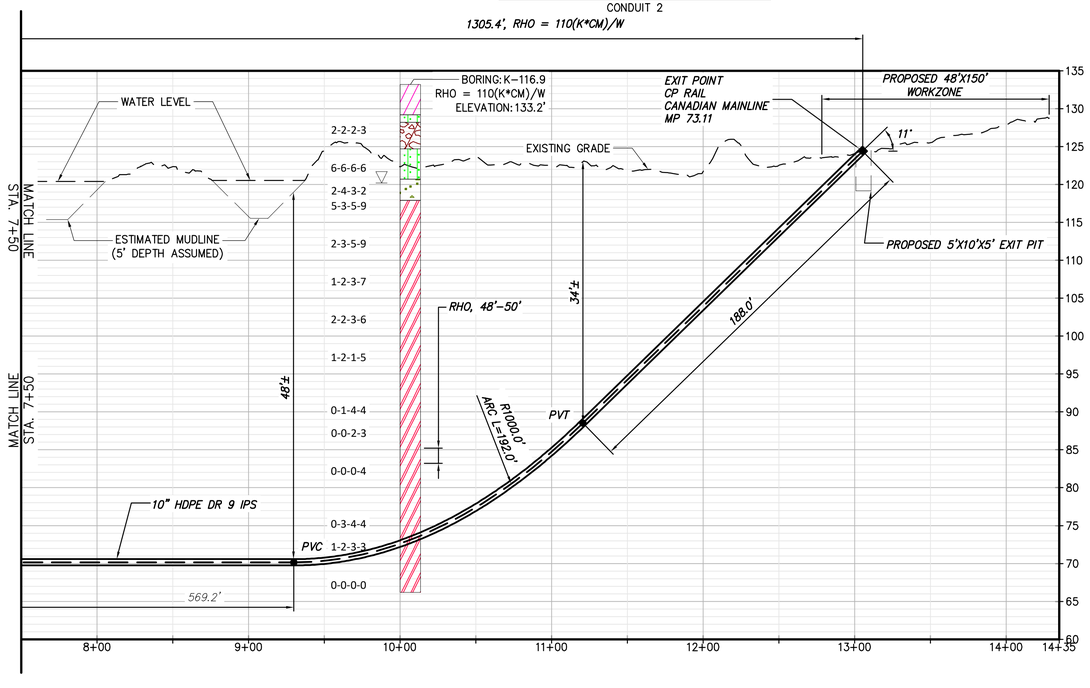




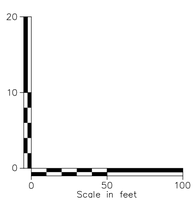
PROPOSED HDD 7 PLAN VIEW

CONDUIT 2



PROPOSED HDD 7 PROFILE

CONDUIT 2



BORING LOG STRIP LEGEND

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Bedrock	Bedrock
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CHAMPLAIN HUDSON POWER EXPRESS
SEGMENT 3 (PACKAGE 1C) WHITEHALL TO FORT ANN
PLAN AND PROFILE - HDD 7, CONDUIT 2

KIEWIT PROJECT NO. 21162
CHA PROJECT NO. 066076
DRAWING NO. **C-306A.1**

DRAWN BY: MCS | DESIGNED BY: MCS | APPROVED BY: JEO | SCALE AS NOTED | REV. NO. X | DATE 03/22/2023

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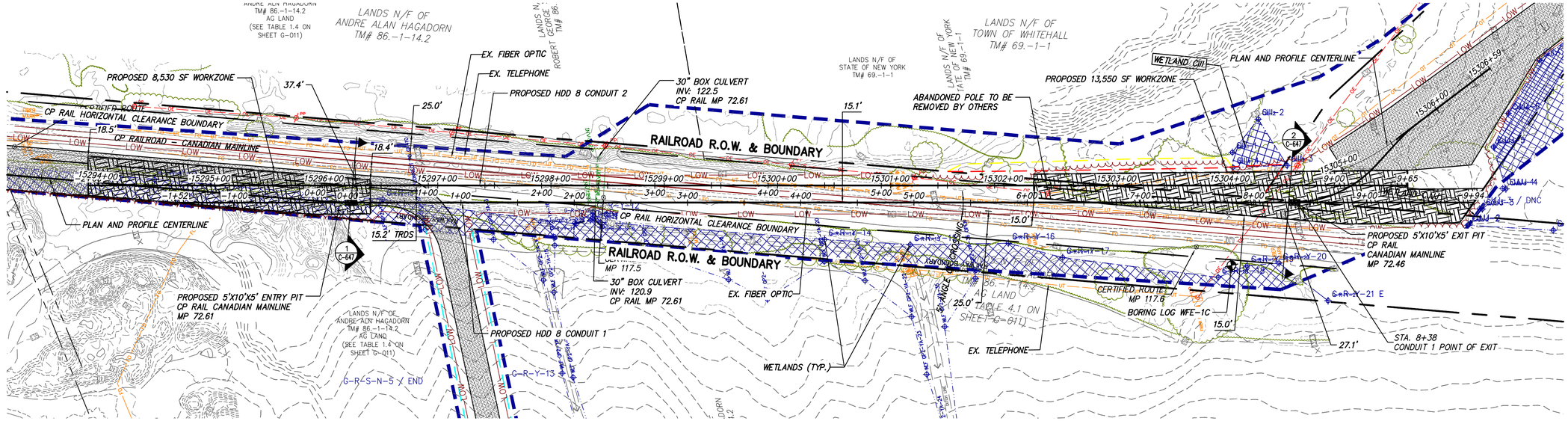
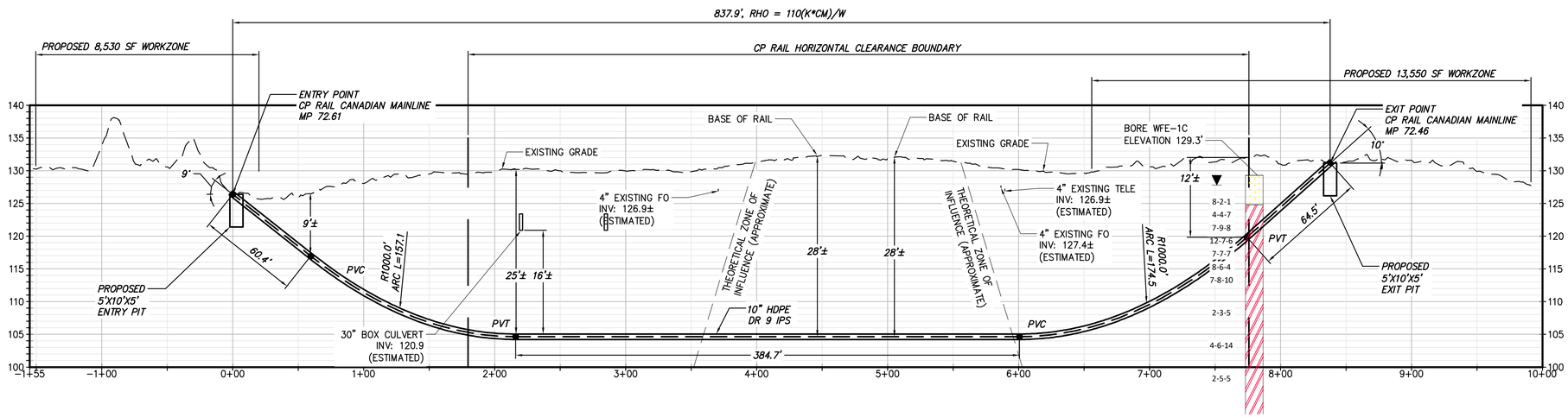


PROPOSED HDD 8 PLAN VIEW

CONDUIT 1

0 50 100
Scale in feet



PROPOSED HDD 8 PROFILE

CONDUIT 1

0 50 100
Scale in feet

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CHAMPLAIN HUDSON POWER EXPRESS
SEGMENT 3 (PACKAGE 1C) WHITEHALL TO FORT ANN
PLAN AND PROFILE - HDD 8, CONDUIT 1

KIEWIT PROJECT NO. 21162
CHA PROJECT NO. 066076
DRAWING NO. **C-307**

DRAWN BY: CKZ DESIGNED BY: CKZ APPROVED BY: JEO SCALE AS NOTED REV. NO. X DATE 03/22/2023

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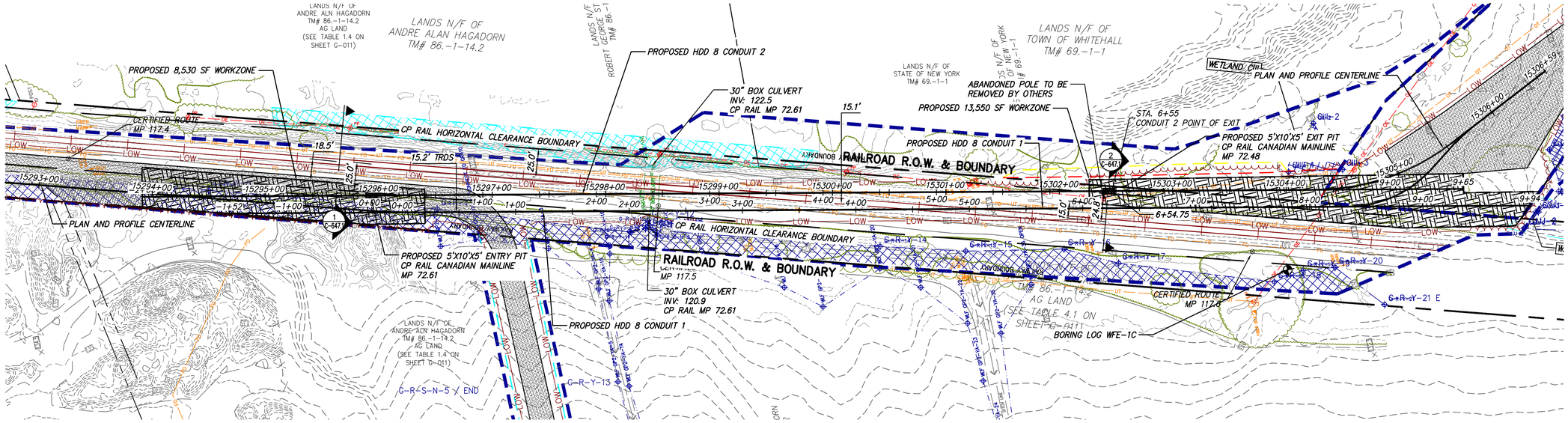
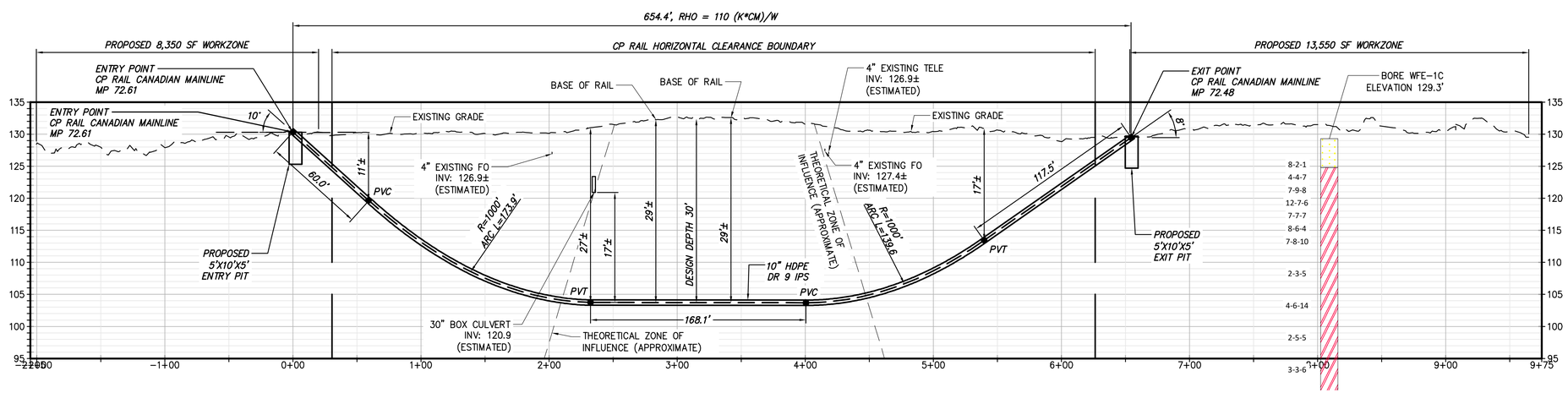


PROPOSED HDD 8 PLAN VIEW

CONDUIT 2

0 50 100
Scale in feet



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	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

Kiewit

CHA
III Winners Circle, PO Box 5269
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518.453.4500 . www.chacompanies.com

IT IS A VIOLATION OF LAW FOR ANY PERSON, UNLESS THEY ARE ACTING UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER, ARCHITECT, LANDSCAPE ARCHITECT OR LAND SURVEYOR TO ALTER AN ITEM IN ANY WAY. IF AN ITEM BEARING THE STAMP OF A LICENSED PROFESSIONAL IS ALTERED, THE ALTERING ENGINEER, ARCHITECT, LANDSCAPE ARCHITECT OR LAND SURVEYOR SHALL STAMP THE DOCUMENT AND INCLUDE THE NOTATION "ALTERED BY" FOLLOWED BY THEIR SIGNATURE, THE DATE OF SUCH ALTERATION, AND A SPECIFIC DESCRIPTION OF THE ALTERATION.

No.	DATE	SUBMITTAL / REVISION DESCRIPTION	DB	APP
0	03/22/2023	ISSUED FOR CONSTRUCTION SUBMISSION	MCS	JEO

CHAMPLAIN HUDSON POWER EXPRESS
SEGMENT 3 (PACKAGE 1C) WHITEHALL TO FORT ANN
PLAN AND PROFILE - HDD 8, CONDUIT 2

KIEWIT PROJECT NO. 21162
CHA PROJECT NO. 066076
DRAWING NO. **C-307A**

DRAWN BY: CKZ | DESIGNED BY: CKZ | APPROVED BY: JEO | SCALE AS NOTED | REV. NO. X | DATE 03/22/2023

File: V:\PROJECTS\ANY\V6\066076.000\09_DESIGN\DRAWINGS\01_SHEETS\DESIGN PACKAGE 1\DESIGN PACKAGE 1C\066076_1C_C_3074.DWG Saved: 3/15/2023 9:30:45 AM Plotted: 3/16/2023 5:20:48 PM Current User: Snyder, Morgan LastSavedBy: 6043

Appendix F

Proposed Soil Properties for CHPE Segment 3 - Package 1C HDDs

Proposed Soil Properties for CHPE Segment 3 – Package 1C HDDs

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

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