NEW YORK STATE OF OPPORTUNITY | Department of Environmental Conservation

Division of Environmental Remediation

Site Name: C&D Power Systems Tributary D-1-7 and Lagoon Remediation
Site Number: 336001
Contract Number: D012095
Location: Town of Deerpark, Orange County, New York

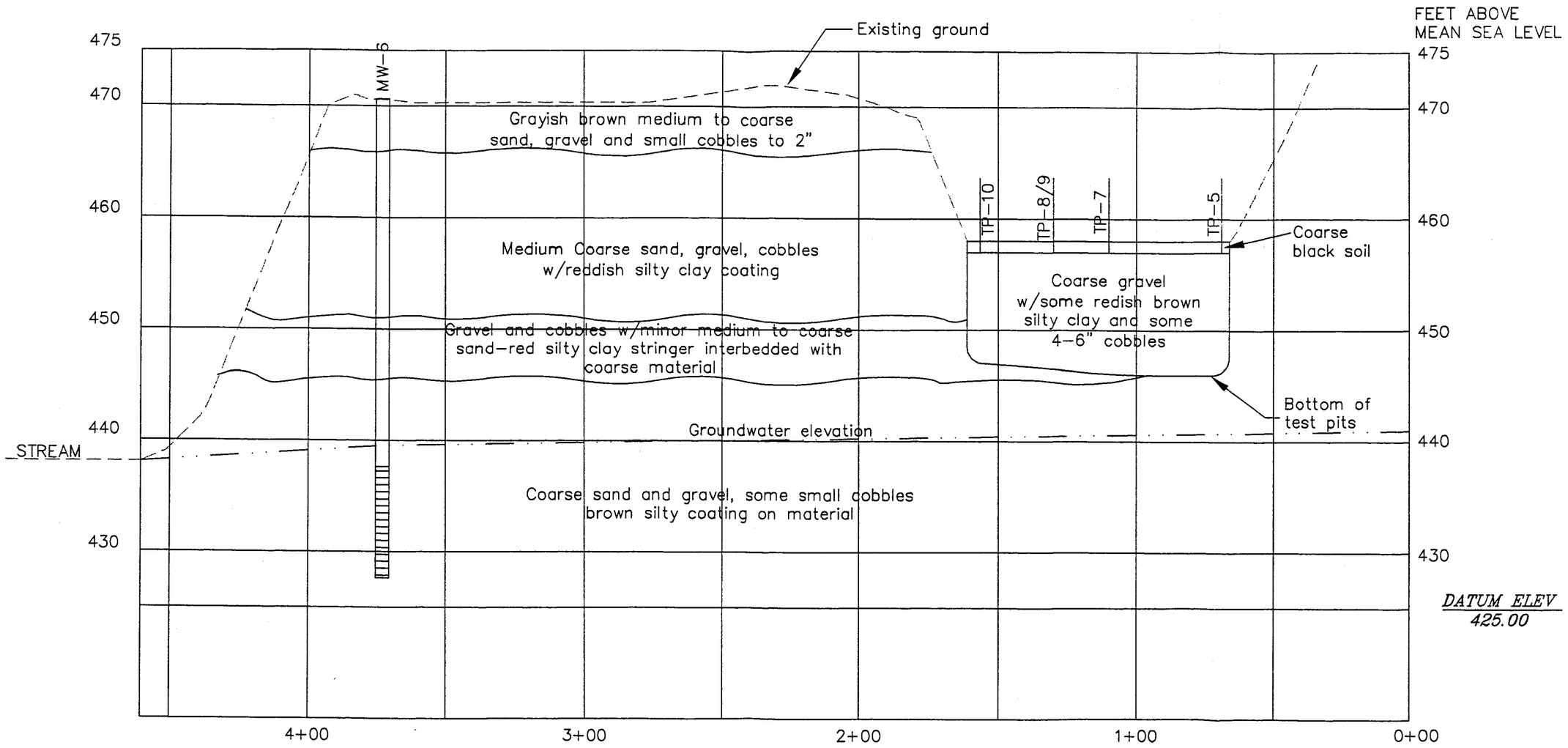
Limited Size Data Package

AECOM USA, Inc.

May 2023

New York State Department of Environmental Conservation
The Honorable Kathy Hochul, *Governor* BASIL SEGGOS, *Commissioner*

Appendix A: Select Boring Logs



10'
5'
0'
0' 20' 40'

CROSS SECTION

FIGURE 2
CROSS SECTION

DELAWARE
ENGINEERING, P.C.

28 Madison Avenue Extension
Albany, New York 12203

Phone 518-452-1290
FAX 518-452-1335

C & D TECHNOLOGIES
HUGUENOT FACILITY
NYS ROUTE 209
HUGUENOT, NEW YORK

FILENAME: REV_CDTECH.DWG

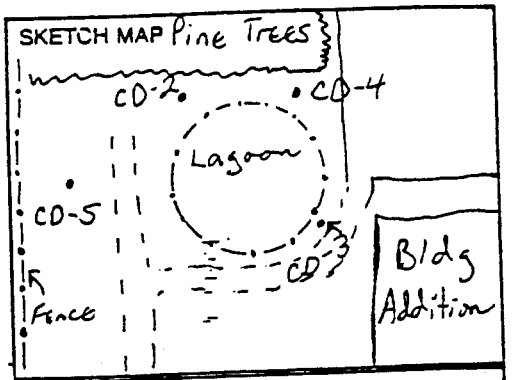
ENVIRONMENTAL RESOURCES MANAGEMENT, INC.

DRILLING LOG

PROJECT: C&D Batteries
LOCATION: Huguenot, New York
WELL NUMBER: CD-5
SURFACE ELEVATION: ____
DRILLING COMPANY: Emprie
DRILLER: D. Diedrickson
LOG BY: C. Werle

OWNER: ____
ADDRESS: ____
TOTAL DEPTH: 45 feet
WATER LEVEL: ____
DRILLING METHOD: Cable Tool
DATE DRILLED: 12-29-8
HELPER: R. Beckwith

SKETCH MAP



NOTES:

—Protective Casing

DEPTH (FEET)	GRAPHIC LOG	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE BLOWS	DESCRIPTION / SOIL CLASSIFICATION (COLOR, TEXTURE, STRUCTURES)
0					
-cont		1			Dark brown medium to coarse sand with pebbles (shale and quartz).
5		2			Dark brown coarse sand and pebbles, minor amount of medium sand, 1% - 2% interstitial silt material dense & tightly packed.
10		3			Same as above with brown silty coating on pebbles.
15		4			Gravel with minor brownish gray interstitial silty clay.
20		5			Same as above with some fine sand

ENVIRONMENTAL RESOURCES MANAGEMENT, INC.

DRILLING LOG

PROJECT: C&D Batteries
LOCATION: Huguenot
New York
WELL NUMBER: CD-5 (CONT)
SURFACE ELEVATION: _____
DRILLING COMPANY: Empire
DRILLER: D.Diedrickson
LOG BY: C. Werle

OWNER: _____
ADDRESS: _____
TOTAL DEPTH 45 feet
WATER LEVEL: _____
DRILLING METHOD: Cable Tool
DATE DRILLED: 12-29-81
HELPER: R.Beckwith

SKETCH MAP

NOTES:

DEPTH (FEET)	GRAPHIC LOG	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE BLOWS*	DESCRIPTION / SOIL CLASSIFICATION (COLOR, TEXTURE, STRUCTURES)
20					
25		6			Coarse angular pebbles and small cobbles.
30		7			Pebbles and gravel, angular to subround.
					Repeated refusal with augers.
35		8			Grayish black coarse sand and fine gravel
					pebbles grading into 3" of fine sand with tan brown plastic clay at base of sample.
40		9			Gravel and pebbles with interstitial fine sand and silt.

* A.S.T.M. D1586

ENVIRONMENTAL RESOURCES MANAGEMENT, INC.

DRILLING LOG

PROJECT: C&D Batteries
LOCATION: Huguenot
New York
WELL NUMBER: CD-5 (CONT)
SURFACE ELEVATION: _____
DRILLING COMPANY: Emprie
DRILLER: D.Diedrickson
LOG BY: C. Werle

OWNER: _____
ADDRESS: _____
TOTAL DEPTH: 45 feet
WATER LEVEL: _____
DRILLING METHOD: Cable Tool
DATE DRILLED: 12-29-81
HELPER: R.Beckwith

SKETCH MAP

NOTES:

DEPTH (FEET)	GRAPHIC LOG	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE BLOWS*	DESCRIPTION / SOIL CLASSIFICATION (COLOR, TEXTURE, STRUCTURES)
40					
45		10			Coarse sand and gravel, some pebbles 1% - 2% fine sand and silt.
-0					
-5					
-0					

* A.S.T.M. D1586

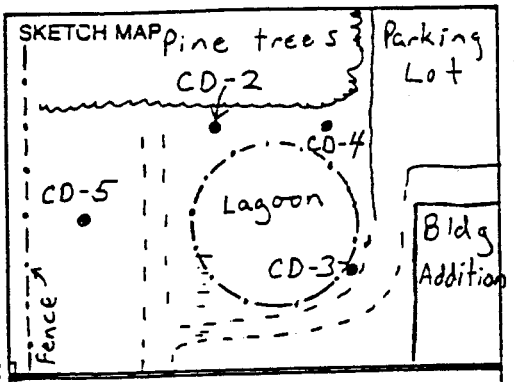
ENVIRONMENTAL RESOURCES MANAGEMENT, INC.

DRILLING LOG

PROJECT: C&D Batteries
LOCATION: Huguenot New York
WELL NUMBER: CD-2
SURFACE ELEVATION: _____
DRILLING COMPANY: Empire
DRILLER: D.Diedrickson
LOG BY: C. Werle

OWNER: _____
ADDRESS: _____
TOTAL DEPTH 40.5 feet
WATER LEVEL: _____
DRILLING METHOD: Cable Tool
DATE DRILLED: 12-30-8
HELPER: R.Beckwith

SKETCH MAP



NOTES:

DEPTH (FEET)	GRAPHIC LOG	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE BLOWS*	DESCRIPTION / SOIL CLASSIFICATION (COLOR, TEXTURE, STRUCTURES)
0		1			Dark brown fine and medium sand with pebbles.
5		2			Light tan fine to medium sand interbedded with tan silt. Individual units well sorted.
10		3			Brownish gray medium to coarse sand and gravel with subangular to subrounded shale and quartz pebbles.
15		4			Same as above.
20		5			Same as above.

* A.S.T.M. D1586

ENVIRONMENTAL RESOURCES MANAGEMENT, INC.

DRILLING LOG

PROJECT: C&D Batteries
LOCATION: Huguenot, New York
WELL NUMBER: CD-2 (CONT)
SURFACE ELEVATION: _____
DRILLING COMPANY: Empire
DRILLER: D.Diedrickson
LOG BY: C. Werle

OWNER: _____
ADDRESS: _____
TOTAL DEPTH: 40.5 feet
WATER LEVEL: _____
DRILLING METHOD: ~~Tool~~ Cable
DATE DRILLED: 12-30-81
HELPER: R.Beckwith

SKETCH MAP

NOTES:

DEPTH (FEET)	GRAPHIC LOG	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE BLOWS*	DESCRIPTION / SOIL CLASSIFICATION (COLOR, TEXTURE, STRUCTURES)
20					
25		6			Medium to coarse sand and gravel, some fine sand, no pebbles.
30		7			Medium to coarse sand and gravel, small pebbles, angular to subangular.
35		8			Same as above.
40		9			Gravel with coarse sand and pebbles, tannish brown silt as coating on material.

* A.S.T.M. D1586

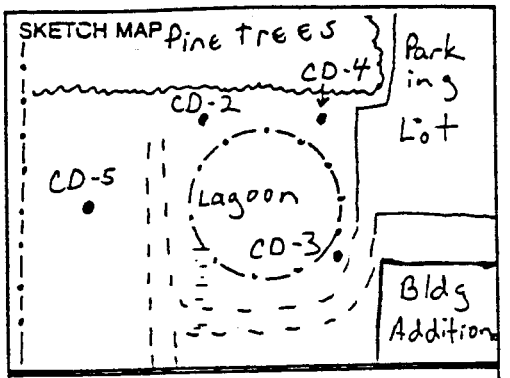
ENVIRONMENTAL RESOURCES MANAGEMENT, INC.

DRILLING LOG

PROJECT: C&D Batteries
LOCATION: Huguenot New York
WELL NUMBER: CD-3
SURFACE ELEVATION: _____
DRILLING COMPANY: Empire
DRILLER: D. Diedrickson
LOG BY: C. Werle

OWNER: _____
ADDRESS: _____
TOTAL DEPTH: 40.0 feet
WATER LEVEL: _____
DRILLING METHOD: Cable Tool
DATE DRILLED: 1-6-82
HELPER: R. Beckwith

SKETCH MAP



NOTES:

DEPTH (FEET)	GRAPHIC LOG	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE BLOWS*	DESCRIPTION / SOIL CLASSIFICATION (COLOR, TEXTURE, STRUCTURES)
0		1			Brown fine to medium sand with some silt and pebbles.
5		2			Tannish brown medium fine sand with gravel and pebbles.
10		3			Gravel with some coarse sand and small cobbles, very minor amounts of interstitial silt.
15		4			Coarse sand and gravel with pebbles and grayish brown interstitial clayey silt.
20		5			Coarse sand and gravel and pebbles, some cobbles sample very tightly packed.

* A.S.T.M. D1586

ENVIRONMENTAL RESOURCES MANAGEMENT, INC.

DRILLING LOG

PROJECT: C&D Batteries
LOCATION: Huguenot
New York
WELL NUMBER: CD-3 (CONT)
SURFACE ELEVATION: _____
DRILLING COMPANY: Emprie
DRILLER: D. Diedrickson
LOG BY: C. Werle

OWNER: _____
ADDRESS: _____
TOTAL DEPTH 40.0 feet
WATER LEVEL: _____
DRILLING METHOD: Cable Tool
DATE DRILLED: 1-6-82
HELPER: R. Beckwith

SKETCH MAP

NOTES:

DEPTH (FEET)	GRAPHIC LOG	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE BLOWS*	DESCRIPTION / SOIL CLASSIFICATION (COLOR, TEXTURE, STRUCTURES)
20					
25		6			Coarse sand, gravel, small cobbles with brownish gray silt coating, sample tightly packed.
30		7			Same as above.
35		8			Gravel and small cobbles with minor amounts of interstitial silt.
40		9			Same as above.

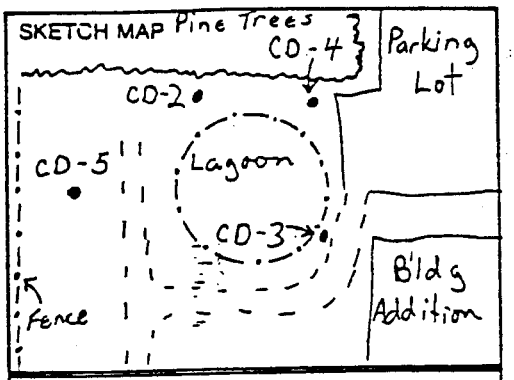
* A.S.T.M. D1586

ENVIRONMENTAL RESOURCES MANAGEMENT, INC.

DRILLING LOG

PROJECT: C&D Batteries
LOCATION: Huguenot
New York
WELL NUMBER: CD-4
SURFACE ELEVATION: _____
DRILLING COMPANY: Emprie
DRILLER: D. Diedrickson
LOG BY: C. Werle

OWNER: _____
ADDRESS: _____
TOTAL DEPTH 41.6 feet
WATER LEVEL: _____
DRILLING METHOD: Cable Tool
DATE DRILLED: 1-4-82
HELPER: R. Beckwith



NOTES:

DEPTH (FEET)	GRAPHIC LOG	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE BLOWS*	DESCRIPTION / SOIL CLASSIFICATION (COLOR, TEXTURE, STRUCTURES)
0		1			Tannish brown fine sand and silt with pebbles organic-rich soil at surface.
5		2			Tannish brown medium to fine sand with gravel.
10		3			Dark brown well sorted very fine sandy silt, material homogeneous.
15		4			Same as above.
20		5			Same as above.

* A.S.T.M. D1586

ENVIRONMENTAL RESOURCES MANAGEMENT, INC.

DRILLING LOG

PROJECT: C&D Batteries
OWNER:
LOCATION: Huguenot
New York
ADDRESS:
WELL NUMBER: CD-4 (CONT)
TOTAL DEPTH 41.6 feet
SURFACE ELEVATION:
WATER LEVEL:
DRILLING COMPANY: Emprie
DRILLING METHOD: Cable Tool
DATE DRILLED: 1-4-82
DRILLER: D. Diedrickson
HELPER: R. Beckwith
LOG BY: C. Werle

SKETCH MAP

NOTES:

DEPTH (FEET)	GRAPHIC LOG	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE BLOWS*	DESCRIPTION / SOIL CLASSIFICATION (COLOR, TEXTURE, STRUCTURES)
20					
25		6			Brown well sorted silt, as above, grading into medium to coarse sand and gravel.
30		7			Interbedded units of silt with dark gray medium to coarse sand and gravel.
35		8			Brown silty sand with infrequent pebbles.
40		9			Brown silty sand with some coarse sand and gravel.

* A.S.T.M. D1586

DRILLER'S LOGS

GENERAL INFORMATION & KEY TO SUBSURFACE LOGS

The Subsurface Logs attached to this report present the observations and mechanical data collected by the driller while at the site, supplemented by classification of the materials removed from the borings as determined through visual identification by technicians in the laboratory. It is cautioned that the materials removed from the borings represent only a fraction of the total volume of the deposits at the site and may not necessarily be representative of the subsurface conditions between adjacent borings or between the sampled intervals. The data presented on the Subsurface Logs together with the recovered samples will provide a basis for evaluating the character of the subsurface conditions relative to the proposed construction. The evaluation must consider all the recorded details and their significance relative to each other. Often analyses of standard boring data indicate the need for additional testing and sampling procedures to more accurately evaluate the subsurface conditions. Any evalutions of the contents of this report and the recovered samples must be performed by Professionals having experience in Soil Mechanics and Foundation Engineering. The information presented in the following defines some of the procedures and terms used on the Subsurface Logs to describe the conditions encountered.

---

① The figures in the Depth column defines the scale of the Subsurface Log.

② The Sample column shows, graphically, the exact depth range from which a sample was recovered. See Table I for a description of the symbols used to signify the various types of samples.

③ The Sample No. is used for identification on sample containers and/or Laboratory Test Reports.

④ Blows on Sampler – shows the results of the "Penetration Test", recording the number of blows required to drive a split spoon sampler into the soil beneath the casing. The number of blows required for each six inches penetration is recorded. The total number of blows required for the last 12 inches of penetration are summarized in the "N" column. The outside diameter of the sampler, the hammer weight and the length of drop are noted at the bottom of the Subsurface Log.

⑤ Blows on Casing – shows the number of blows required to advance the casing a distance of 12 inches. The casing size, the hammer weight and the length of drop are noted at the bottom of the Subsurface Log. If the casing is advanced by means other than driving, the method of advancement will be indicated in the Notes column or under Method of Investigation at the bottom of the Subsurface Log.

⑥ All recovered soil samples are reviewed in the laboratory by technicians. The visual descriptions are made on basis of the sample as recovered and in accordance with the Unified Classification System. Guide Lines for the terms used in descriptions are presented in Tables II and III. The description of the relative soil compactness or consistency is based upon the penetration records as defined in Table IV. The description of the soil moisture is based upon the condition of the sample as recovered. The moisture condition is described as dry, damp, moist or wet. Water used to advance the boring may have affected the in-situ moisture content of the sample. Special terms are used as required to describe materials in greater detail; several such terms are listed in Table V. When sampling gravelly soils with a standard two-inch diameter split spoon, the true percentage of gravel is often not recovered due to the relatively small sampler diameter. The presence of boulders and large gravel is sometimes, but not necessarily, detected by an evaluation of the casing and sampler blows or through the "action" of the drill rig as reported by the driller.

⑦ The description of rock shown is based upon the recovered rock core. Terms frequently used in the description are included in Table VI.

⑧ Miscellaneous observation and procedures noted by the driller are shown in this column, including water level observations. It is important to realize that the reliability of the water level observations depend upon the soil type (water does not readily stabilize in a hole through fine grained soils), and that drill water used to advance the borings may have influenced the observations The ground water level typically will fluctuate seasonally. One or more perched or trapped water levels may exist in the ground seasonally. All the available readings should be evaluated. If definite conclusions cannot be made, it is often prudent to examine the conditions more thoroughly through test pit excavations or water observation installations.

⑨ The length of core run is defined as length of penetration between retrievals of the core barrel from the bore hole, expressed in feet and tenths of feet. The core recovery expresses the length of core recovered from the core barrel per core run, in percent. The size core barrel used is also noted. The more commonly used sizes of core barrels are denoted "AX" and "NX". The "NX" core, being larger in diameter than "AX" core, often produces better recovery, and is frequently utilized where accurate information regarding the geologic conditions and engineering properties is needed. The "NX" core barrel requires the use of four inch diameter casing.

-1-70
5-1-70
OF 1

EMPIRE SOILS INVESTIGATIONS, INC.

SUBSURFACE LOG

HOLE NO 8-175
SURF ELEV 325.6
G W DEPTH See Note #1

XX

LOCATION YYY

BLOWS ON SAMPLER (0-6 / 6-12 / 12-18 / N)				BLOW ON CASING C	CROSS SECTION	SOIL OR ROCK CLASSIFICATION	NOTES
2	2	3	5	10		TOPSOIL 3"	Note #1
				15		Brown SILT, some Sand, trace clay (Moist - Loose)	G.W. at 2.0' completion
				50/.5'			G.W. at 2.2' 24 hrs. after completion
						Gray SHALE, medium hard weathered, thin bedded some fractures	Cored 2.5'-5.0', Run#1
							95 % Recovery
							AX Core

(4) (5) (6) (7) (8) (9)

plit Spoon
ample

by Tube
Sample

r or Pit
Sample

Core

TABLE II

Identification of soil type is made on basis of an estimate of particle sizes, and in the case of fine grained soils also on basis of plasticity.

Soil Type	Soil Particle Size	
Boulder	>12"	Coarse Grained (Granular)
Cobble	3" – 12"	
Gravel - Coarse	3" – 3/4"	
- Fine	3/4" – #4	
Sand - Coarse	#4 – #10	
- Medium	#10 – #40	
- Fine	#40 – #200	
Silt - Non Plastic (Granular)	<#200	Fine Grained
Clay - Plastic (Cohesive)		

TABLE III

The following terms are used in classifying soils consisting of mixtures of two or more soil types. The estimate is based on weight of total sample.

Term	Percent of Total Sample
"and"	35 – 50
"some"	20 – 35
"little"	10 – 20
"trace"	less than 10

(When sampling gravelly soils with a standard split spoon, the true percentage of gravel is often not recovered due to the relatively small sampler diameter.)

lative compactness or consistency is described in accord with the terms.

Granular Soils		Cohesive Soils	
	Blows per Foot, N	Term	Blows per Foot, N
	< 10	Very Soft	< 2
	11 – 30	Soft	3 – 5
	31 – 50	Medium	6 – 15
pact	> 51	Stiff	16 – 25
		Hard	>26

particles in the soils will often significantly influence the blows per rded during the Penetration Test.)

TABLE V

Varved -	Alternating layers, seams, and partings of soils.
Layer -	Soil deposit more than 6" thick.
Seam -	Soil deposit less than 6" thick.
Parting -	Soil deposit less than 1/8" thick.
Uniform -	All grains are of about the same diameter.

VI

Classification Terms		Meaning	
Term			
s	Soft	Scratched by fingernail	
	Medium Hard	Scratched easily by penknife	
	Hard	Scratched with difficulty by penknife	
	Very Hard	Connot be scratched by penknife	
ring	Very Weathered	Judged from the relative amounts of disintegrating iron staining, core recovery, clay seams, etc	
	Weathered		
	Sound		
ng	Laminated	Natural breaks in Rock Layers	(<1")
	Thin bedded		(1" – 4")
	Bedded		(4" – 12")
	Thick bedded		(12" – 36")
	Massive		(>36")

(Fracturing refers to natural breaks in the rock oriented at some angle to the rock layers.)

DATE
STARTED 12/21/81
FINISHED 12/22/81
SHEET 1 OF 2

EMPIRE SOILS INVESTIGATIONS, INC.

SUBSURFACE LOG

HOLE NO B-CD-1
SURF ELEV
G. W. DEPTH

PROJECT Environmental Resource Management - C & D Battery

LOCATION Port Jervis, N.Y.

DEPTH FEET	SAMPLES	SAMPLE NO	BLOWS ON SAMPLER 0/6	6/12	12/18	N	BLOW ON CASING C	SOIL OR ROCK CLASSIFICATION	NOTES
		1	15	16	23	39		Greyish Brown - fine GRAVEL and coarse-fine SAND, trace Silt, dry	Groundwater Observation Installation
					52			5.0'	2" diameter PVC screen and riser pipe. Tip at 37' screen from 37' to 27' Bentonite seal from 25' to 20'. PVC stick-up 2' above ground and covered with a threaded capped protective casing.
		2	17	23	28	51		Brown fine SAND, trace to little Silt, moist	
10		3	8	15	19	34		15.0'	
		4	9	17	22	39		Brown SILT, wet	
20		5	12	19	25	44		Brown SILT, some fine Sand, moist	
								25.0'	
		6	24	27	28	55		Brown - fine GRAVEL and coarse-fine SAND, trace Silt, moist	
30		7	7	18	20	38		35.0'	
		8	10	15	20	35		Brown coarse-fine SAND, some medium-fine Gravel, trace Silt, wet	
40									

N = No blows to drive 2 " spoon 12 " with 140 lb. pin wt falling 30 "per blow CLASSIFICATION

C = No blows to drive " casing " with lb weight falling "per blow

DATE
STARTED 12/21/81
FINISHED 12/22/81
SHEET 1 OF 2

EMPIRE SOILS INVESTIGATIONS, INC.

SUBSURFACE LOG

HOLE NO B-CD-1
SURF ELEV
G. W. DEPTH

PROJECT Environmental Resource Management- C & D Battery

LOCATION Port Jervis, N.Y.

DEPTH FEET	SAMPLES	SAMPLE NO.	BLOWS ON SAMPLER 0/6	6/12	12/18	N	BLOW ON CASING C	SOIL OR ROCK CLASSIFICATION	NOTES
								Brown c-f S, S+M-f G, +- 41.5'	
								End of Boring	
45									

N = No. blows to drive _____" spoon _____" with _____lb. pin wt. falling _____"per blow

C = No. blows to drive _____" casing _____" with _____lb. weight falling _____"per blow

CLASSIFICATION _____

DATE
STARTED 12/30/81
FINISHED 12/31/81
SHEET 1 OF 2

EMPIRE SOILS INVESTIGATIONS, INC.

SUBSURFACE LOG

HOLE NO B-CD-2
SURF ELEV
G W DEPTH

PROJECT Environmental Resource Management-C & D Battery

LOCATION Port Jefferson, NY

DEPTH	SAMPLES	SAMPLE NO	BLOWS ON SAMPLER 0/6	6/12	12/18	N	BLOW ON CASING C	SOIL OR ROCK CLASSIFICATION	NOTES
		1	3	3	5	8		Brown Topsoil, moist 2.0'	Samples 4 through 8 were wash samples.
		2	8	8	8	16		Medium Brown SILT and fine SAND 10.0'	Groundwater Observation Well 2" diameter PVC screen & riser pipe installed to 40.6'. Screen from 40.6'-30.6' Bentonite seal from 25'-22' PVC Stickup 2.5' inside Protective casing.
10		3	24	19	29	48		Brown coarse-fine SAND, some medium-fine Gravel, trace SILT	
		4						Coarse Sand (Wash sample)	
20		5						Brown coarse-fine GRAVEL, some + coarse-fine Sand, trace- silt	
		6							
30		7							
		8							
40									

N = No blows to drive 2 " spoon 12 " with 140 lb pin wt. falling 30 "per blow

C = No blows to drive _____ " casing _____ " with _____ lb weight falling _____ "per blow

CLASSIFICATION _____

DATE
STARTED 12/30/81
FINISHED 12/31/81
SHEET 2 OF 2

EMPIRE SOILS INVESTIGATIONS, INC.

SUBSURFACE LOG

HOLE NO B-CD-2
SURF ELEV
G. W. DEPTH

PROJECT Environmental Resource Management-C & D Battery

LOCATION Port Jervis, N.Y.

DEPTH FEET	SAMPLES	SAMPLE NO	BLOWS ON SAMPLER 0/6	6/12	12/18	N	BLOW ON CASING C	SOIL OR ROCK CLASSIFICATION	NOTES
								Brown c-f G, s+ c-f S, +- 41.5	
								End of Boring	

N = No blows to drive_____" spoon_____" with_____lb. pin wt. falling_____"per blow

C = No blows to drive_____" casing_____" with_____lb weight falling_____"per blow

CLASSIFICATION _____

_____

METHOD OF INVESTIGATION _____

Environmental Resources Management

Drilling Log

Project C&D Batteries Owner

Location Huguenot, NY W.O. Number

Well Number CD-6 Total Depth 42.5' Diameter 6"

Surface Elevation 470.62 Water Level: Initial 29.8' 24-hrs. 28.66'

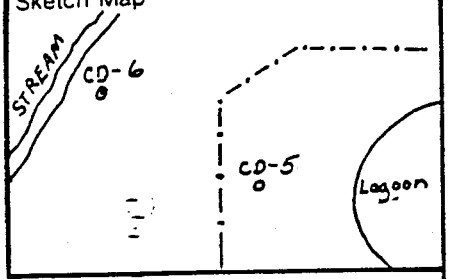
Screen: Dia. 2" Length 10' Slot Size .010

Casing: Dia. 2" Length 35' Type PVC

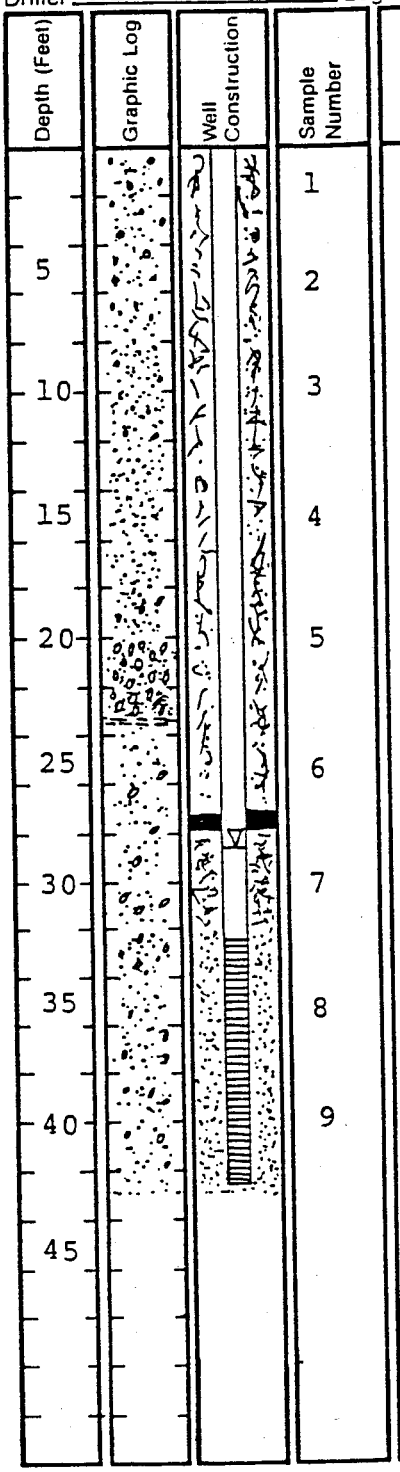
Drilling Company Empire Soils Drilling Method Holl. Stem Auger

Driller Mike Warner Log By C. Werle Date Drilled 3/1/82

Sketch Map



Notes



Sample Number	Description/Soil Classification (Color, Texture, Structures)
1	Grayish brown medium to coarse sand, gravel and small cobbles to 2"-minor fine sand and silt.
2	Coarse sand, gravel, cobbles with reddish silty clay coating.
3	Well sorted tannish brown medium to coarse sand, some pebbles - reddish silty coating.
4	Same as above.
5	Gravel and cobbles with minor medium and coarse sand - red silty clay stringer interbedded with coarse material.
6	Medium to coarse sand and gravel, some small stones, approximately 2%-3% fine sand and silt.
7	Coarse sand and gravel, some small cobbles, brown silty coating on all material; sample wet.
8	Dark tannish brown medium to coarse sand and gravel, some larger stones.
9	Same as above.

Environmental Resources Management

Drilling Log

Project C&D Batteries Owner

Location Huguenot, NY W.O. Number

Well Number CD-7 Total Depth 29' Diameter 6"

Surface Elevation 459.07 Water Level: Initial 17.0 24-hrs. 16.39

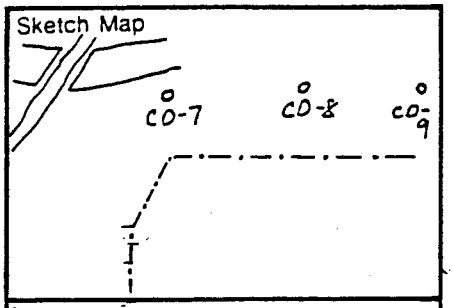
Screen: Dia. 2" Length 10' Slot Size .010

Casing: Dia. 2" Length 21' Type PVC

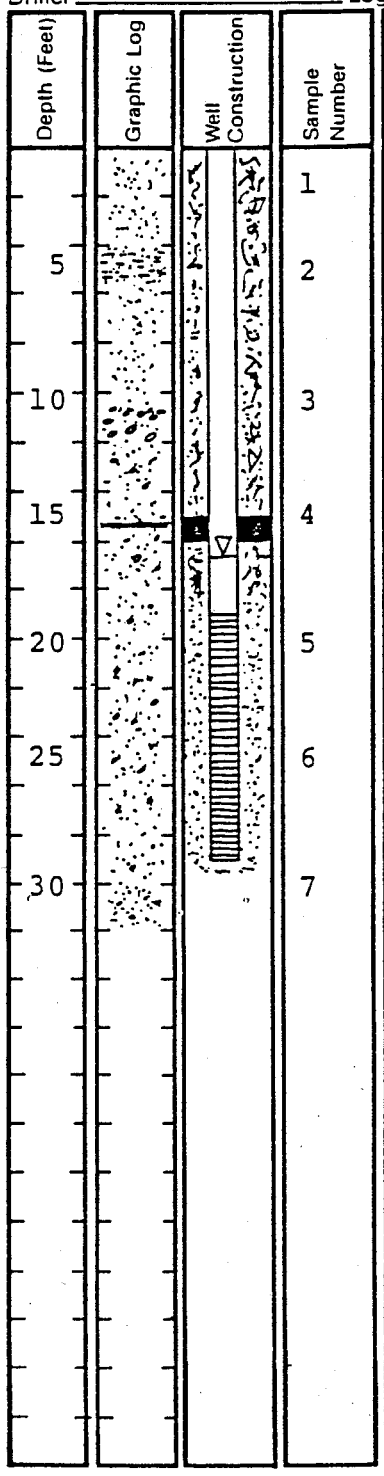
Drilling Company Empire Soils Drilling Method Holl. Stem Auger

Driller Mike Warner Log By C. Werle Date Drilled 3/3/82

Sketch Map



Notes



Sample Number	Description/Soil Classification (Color, Texture, Structures)
1	Well-sorted tannish brown very fine sand, small number of small (¼"-½") pebbles.
2	Tan brown very fine sand to coarse silt, totally homogeneous.
3	Tan very fine sand, sharp contact with coarse-horizon consisting of medium to coarse sand and gravel, some interstitial silt.
4	Coarse sand and gravel above 1" thick reddish tan clay - cohesive and plastic, below clay is brown well-sorted medium sand.
5	Medium and coarse sand, gravel, pebbles - silty coating on all material.
6	Medium to coarse sand with some gravel, grading into medium sand with minor interstitial silt.
7	Same as above.

Environmental Resources Management

Drilling Log

Project C&D Batteries Owner

Location Huguenot, NY W.O. Number

Well Number CD-8 Total Depth 33.0' Diameter 6"

Surface Elevation 460.82 Water Level: Initial 23.5' 24-hrs.

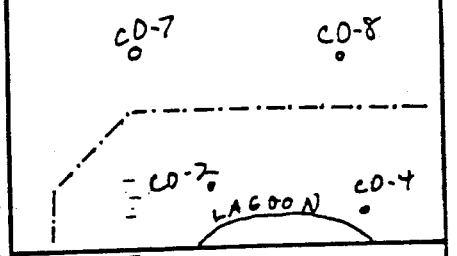
Screen: Dia. 2" Length 10' Slot Size .010

Casing: Dia. 2" Length 25' Type PVC

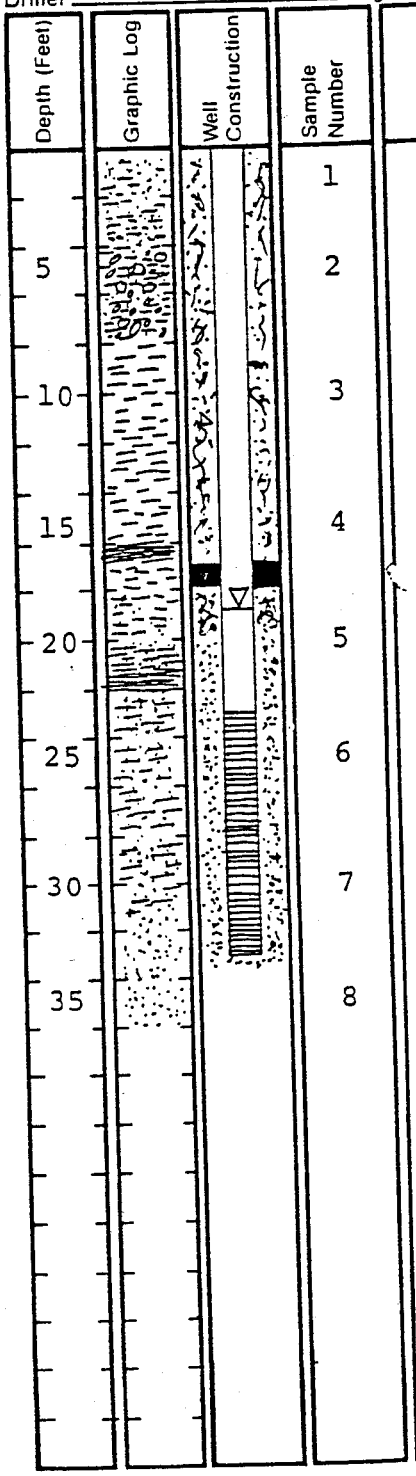
Drilling Company Empire Soils Drilling Method Holl. Stem Auger

Driller Mike Warner Log By C. Werle Date Drilled 3/4/82

Sketch Map



Notes



Sample Number	Description/Soil Classification (Color, Texture, Structures)
1	Brown, organic-rich fine sand and silt, some pebbles, minor interstitial plastic brown clay.
2	Dark brown silty, clayey matrix with gravel and pebbles-material cohesive and moderately plastic.
3	Tan, very well sorted coarse silt.
4	Tan well sorted silt, as above, grading into tan silty clay - sample damp.
5	Brownish tan medium and fine sand with interstitial silt, grading into reddish tan, plastic, cohesive silty clay.
6	Well sorted brown fine sand and silt, occasional pebbles.
7	Same as above, no pebbles.
8	Brown fine sand and silt with slight grain size variation over length of sample.

Environmental Resources Management

Drilling Log

Project C&D Batteries Owner

Location Huguenot, NY W.O. Number

Well Number CD-9 Total Depth 33.0' Diameter

Surface Elevation 462.41 Water Level: Initial 24.35' 24-hrs. 20.56'

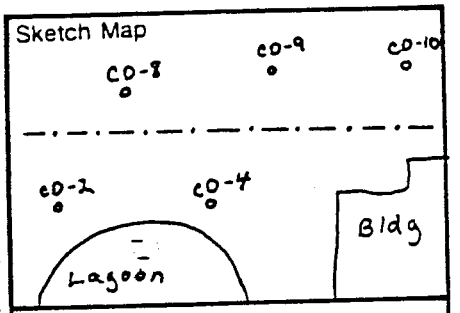
Screen: Dia. 2" Length 10' Slot Size .010

Casing: Dia. 2" Length 25' Type PVC

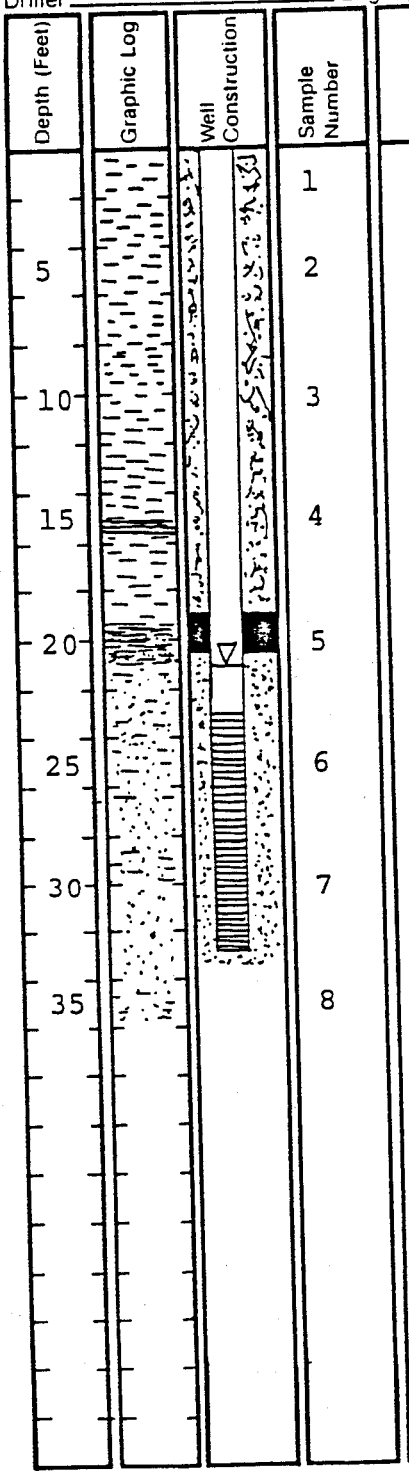
Drilling Company Empire Soils Drilling Method Holl Stem Auger

Driller Mike Warner Log By C. Werle Date Drilled 3/3/82

Sketch Map



Notes



Sample Number	Description/Soil Classification (Color, Texture, Structures)
1	Tannish brown fine sand and silt, some pebbles.
2	Dark tan, very well sorted silt, sample totally homogeneous.
3	Same as above.
4	Tan silt, as above, with interbedded laminae of lavender silty clay, sample wet.
5	Brown silty clay, sample cohesive and plastic interbedded horizons of brownish black medium sand with interstitial silt.
6	Brown fine and medium sand with interstitial silt sample somewhat cohesive.
7	Brown fine sand, percent silt in sample varies vertically.
8	Dark brown medium and fine sand with some interstitial silt.

DRILLER'S LOGS

GENERAL INFORMATION & KEY TO SUBSURFACE LOGS

The Subsurface Logs attached to this report present the observations and mechanical data collected by the driller while at the site, supplemented by classification of the materials removed from the borings as determined through visual identification by technicians in the laboratory. It is cautioned that the materials removed from the borings represent only a fraction of the total volume of the deposits at the site and may not necessarily be representative of the subsurface conditions between adjacent borings or between the sampled intervals. The data presented on the Subsurface Logs together with the recovered samples will provide a basis for evaluating the character of the subsurface conditions relative to the proposed construction. The evaluation must consider all the recorded details and their significance relative to each other. Often analyses of standard boring data indicate the need for additional testing and sampling procedures to more accurately evaluate the subsurface conditions. Any evalutions of the contents of this report and the recovered samples must be performed by Professionals having experience in Soil Mechanics and Foundation Engineering. The information presented in the following defines some of the procedures and terms used on the Subsurface Logs to describe the conditions encountered.

---

① The figures in the Depth column defines the scale of the Subsurface Log.

② The Sample column shows, graphically, the exact depth range from which a sample was recovered. See Table I for a description of the symbols used to signify the various types of samples.

③ The Sample No. is used for identification on sample containers and/or Laboratory Test Reports.

④ Blows on Sampler – shows the results of the "Penetration Test", recording the number of blows required to drive a split spoon sampler into the soil beneath the casing. The number of blows required for each six inches penetration is recorded. The total number of blows required for the last 12 inches of penetration are summarized in the "N" column. The outside diameter of the sampler, the hammer weight and the length of drop are noted at the bottom of the Subsurface Log.

⑤ Blows on Casing – shows the number of blows required to advance the casing a distance of 12 inches. The casing size, the hammer weight and the length of drop are noted at the bottom of the Subsurface Log. If the casing is advanced by means other than driving, the method of advancement will be indicated in the Notes column or under Method of Investigation at the bottom of the Subsurface Log.

⑥ All recovered soil samples are reviewed in the laboratory by technicians. The visual descriptions are made on basis of the sample as recovered and in accordance with the Unified Classification System. Guide Lines for the terms used in descriptions are presented in Tables II and III. The description of the relative soil compactness or consistency is based upon the penetration records as defined in Table IV. The description of the soil moisture is based upon the condition of the sample as recovered. The moisture condition is described as dry, damp, moist or wet. Water used to advance the boring may have affected the in-situ moisture content of the sample. Special terms are used as required to describe materials in greater detail; several such terms are listed in Table V. When sampling gravelly soils with a standard two-inch diameter split spoon, the true percentage of gravel is often not recovered due to the relatively small sampler diameter. The presence of boulders and large gravel is sometimes, but not necessarily, detected by an evaluation of the casing and sampler blows or through the "action" of the drill rig as reported by the driller.

⑦ The description of rock shown is based upon the recovered rock core. Terms frequently used in the description are included in Table VI.

⑧ Miscellaneous observation and procedures noted by the driller are shown in this column, including water level observations. It is important to realize that the reliability of the water level observations depend upon the soil type (water does not readily stabilize in a hole through fine grained soils), and that drill water used to advance the borings may have influenced the observations. The ground water level typically will fluctuate seasonally. One or more perched or trapped water levels may exist in the ground seasonally. All the available readings should be evaluated. If definite conclusions cannot be made, it is often prudent to examine the conditions more thoroughly through test pit excavations or water observation installations.

⑨ The length of core run is defined as length of penetration between retrievals of the core barrel from the bore hole, expressed in feet and tenths of feet. The core recovery expresses the length of core recovered from the core barrel per core run, in percent. The size core barrel used is also noted. The more commonly used sizes of core barrels are denoted "AX" and "NX". The "NX" core, being larger in diameter than "AX" core, often produces better recovery, and is frequently utilized where accurate information regarding the geologic conditions and engineering properties is needed.

ATE
ARTED 5-1-70
ISHED 5-1-70
HEET 1 OF 1

EMPIRE SOILS INVESTIGATIONS, INC. SUBSURFACE LOG

HOLE NO B-175
SURF. ELEV 325.6
G. W. DEPTH See Note #1

PROJECT XXX
LOCATION YYY

DEPTH-FEET	SAMPLES	SAMPLE NO	BLOWS ON SAMPLER 0/6	6/12	12/18	N	BLOW ON CASING C	CROSS SECTION	DESCRIPTION OF RECOVERED SAMPLES	REMARKS & WATER READINGS
0		1	2	2	3	5	10		TOPSOIL 3"	Note #1 G.W. at 2.0' completion
							15		Brown SILT, some Sand, trace clay (Moist - Loose)	G.W. at 2.2' 24 hrs. after completion
5							50/.5'		Gray SHALE, medium hard weathered, thin bedded some fractures	Cored 2.5'-5.0', Run #1
										95 % Recovery
										AX Core

(1) (2) (3) (4) (5) (6) (7) (8) (9)

TABLE I

- Split Spoon Sample
- Shelby Tube Sample
- Auger or Pit Sample
- Rock Core

TABLE II

Identification of soil type is made on basis of an estimate of particle sizes, and in the case of fine grained soils also on basis of plasticity.

Soil Type	Soil Particle Size	
Boulder	>12"	Coarse Grained (Granular)
Cobble	3"-12"	
Gravel - Coarse	3"-3/4"	
- Fine	3/4"-#4	
Sand - Coarse	#4-#10	
- Medium	#10-#40	
- Fine	#40-#200	
Silt - Non Plastic (Granular)	<#200	Fine Grained
Clay - Plastic (Cohesive)		

TABLE III

The following terms are used in classifying soils consisting of mixtures of two or more soil types. The estimate is based on weight of total sample.

Term	Percent of Total Sample
"and"	35-50
"some"	20-35
"little"	10-20
"trace"	less than 10

(When sampling gravelly soils with a standard split spoon, the true percentage of gravel is often not recovered due to the relatively small sampler diameter.)

TABLE IV

The relative compactness or consistency is described in accord with the following terms.

Granular Soils		Cohesive Soils	
Term	Blows per Foot, N	Term	Blows per Foot, N
Loose	< 10	Very Soft	< 2
Firm	11-30	Soft	3-5
Compact	31-50	Medium	6-15
Very Compact	> 51	Stiff	16-25
		Hard	>26

(Large particles in the soils will often significantly influence the blows per foot recorded during the Penetration Test.)

TABLE V

Varved -	Alternating layers, seams, and partings of soils.
Layer -	Soil deposit more than 6" thick.
Seam -	Soil deposit less than 6" thick.
Parting -	Soil deposit less than 1/8" thick.
Uniform -	All grains are of about the same diameter.

TABLE VI

Rock Classification Terms		Meaning	
Term			
Hardness	Soft	Scratched by fingernail	
	Medium Hard	Scratched easily by penknife	
	Hard	Scratched with difficulty by penknife	
	Very Hard	Cannot be scratched by penknife	
Weathering	Very Weathered	Judged from the relative amounts of disintegrating iron staining, core recovery, clay seams, etc	
	Weathered		
	Sound		
Bedding	Laminated	Natural breaks in Rock Layers	(<1")
	Thin bedded		(1"-4")
	Bedded		(4"-12")
	Thick bedded		(12"-36")
	Massive		(>36")

(Fracturing refers to natural breaks in the rock oriented at some angle to the rock layers.)

DATE
STARTED 3-1-82
FINISHED 3-1-82
SHEET 1 OF 2

EMPIRE SOILS INVESTIGATIONS INC

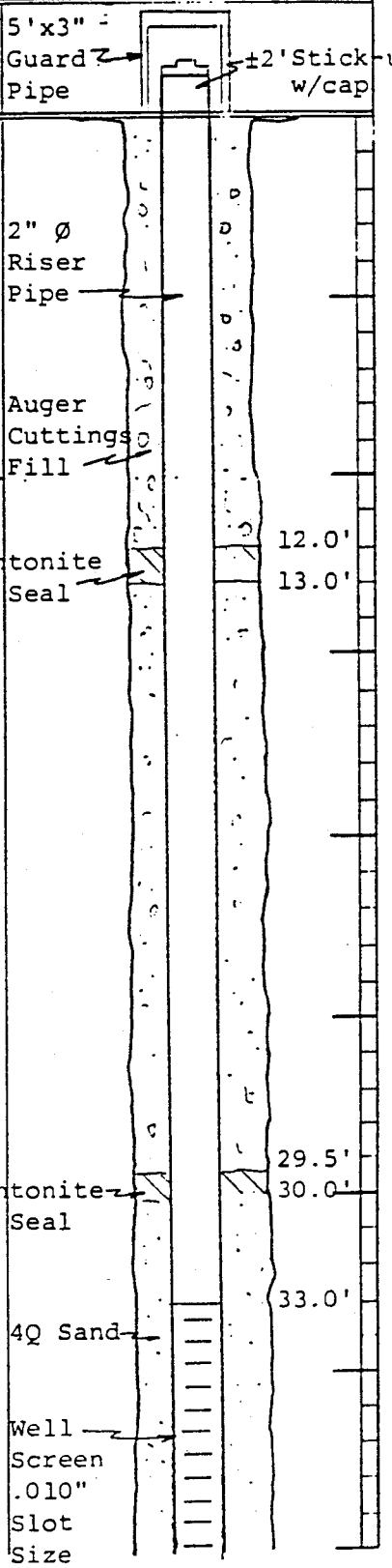
SUBSURFACE LOG

HOLE NO CD-6
SURF. ELEV
G. W. DEPTH See Note

PROJECT Observation Well Installations
C & D Battery, Inc.

LOCATION Huguenot, New York

DEPTH	SAMPLES	SAMPLE NO	BLOWS ON SAMPLER 0/6	6/12	12/18	N	BLOW ON CASING	SOIL OR ROCK CLASSIFICATION
0		1	20	42				Brown, medium-coarse SAND & GRAVEL,
			34	15		76		Some Silt, roots
								(Damp-Very Compact)
5		2	15	12				grades similar
			12	12		24		(Moist-Firm)
								10.0'
10		3	10	5				Brown, medium-fine SAND, Some fine
			6	5		11		Gravel, trace silt
								(Moist-Firm)
15		4	7	4				grades similar with trace coarse
			5	10		9		gravel, grading to Some coarse Gravel
								(moist-Loose)
20		5	3	4				Brown, coarse-medium GRAVEL
			20	20		24		(Moist-Firm)
25		6	12	16				grades similar with Some Silt
			23	36		39		(Damp-Compact)
30		7	12	17				Brown, medium-fine SAND, Some
			11	4		28		coarse Gravel
								(Wet-Firm)
35		8	7	9				Brown, medium-fine SAND & GRAVEL,
			11	7		20		Some coarse Gravel
								(Wet-Firm)
40								



N = No. blows to drive 2" spoon 12" with 140 lb. pin wt. falling 30" per blow

= No. blows to drive ____" casing ____" with ____ lb. weight falling ____" per blow

CLASSIFICATION Visual by Driller

METHOD OF INVESTIGATION 3½" I.D. Hollow Stem Auger Casing

DATE
STARTED 3-1-82
FINISHED 3-1-82
SHEET 2 OF 2

EMPIRE SOILS INVESTIGATIONS INC

SUBSURFACE LOG

HOLE NO. CD-6 cont'd
SURF. ELEV
G. W. DEPTH See Note

PROJECT Observation Well Installations
C & D Battery, Inc.

LOCATION Huguenot, New York

DEPTH	SAMPLES	SAMPLE NO	BLOWS ON SAMPLER 0/6 6/12 12/18 N	BLOWS ON CASING	SOIL OR ROCK CLASSIFICATION	NOTES
40			9 13 16 30 46		Brown coarse-medium SAND & GRAVEL (Running Sand up 1.5' into casing.) (Wet-Compact)	Plug 43.0'
					Boring Terminated @ 43.0'	
45					Note: Groundwater first encountered @ 29.8'. At completion of boring, water level @ 30.9'	

N = No. blows to drive 2 spoon 12 with 140 lb pin wt falling 30 "per blow

= No. blows to drive ____ casing ____ with ____ lb weight falling ____ "per blow

METHOD OF INVESTIGATION 3¼" I.D. Hollow Stem Auger Casing

CLASSIFICATION Visual by Driller

STARTED 3-3-82
INISHED 3-3-82
SHEET 1 OF 1

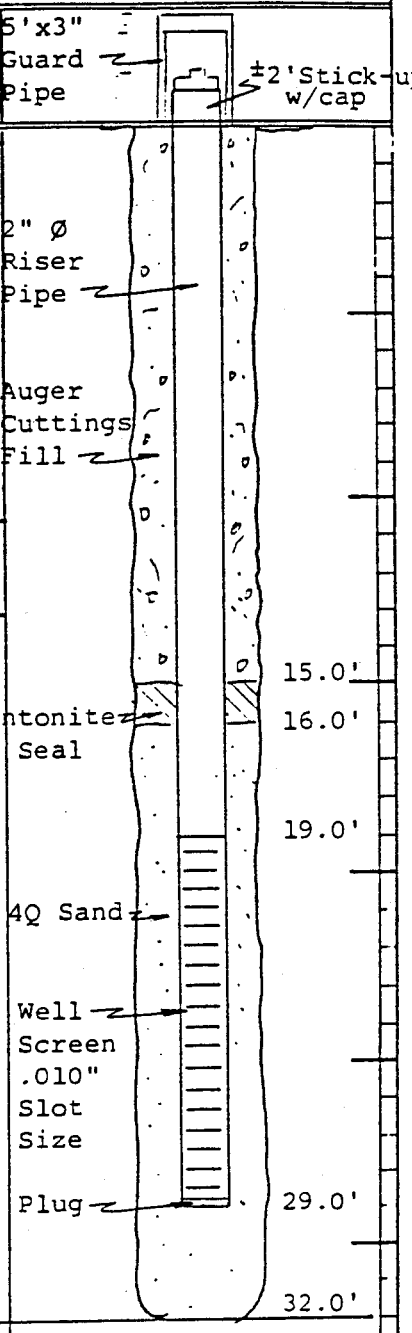
EMPIRE SOILS INVESTIGATIONS INC — SUBSURFACE LOG

HOLE NO. CD-7
SURF. ELEV.
G. W. DEPTH See Note

PROJECT Observation Well Installations
C & D Battery, Inc.

LOCATION Huguenot, New York

SAMPLES	SAMPLE NO	BLOWS ON SAMPLER 0-6	6-12	12-18	N	BLOWS ON CASING	SOIL OR ROCK CLASSIFICATION
	1	6	4				SILT, ROOTS & fine GRAVEL 0.5'
		4	3		8		Brown, SILT & fine SAND (Damp-Loose)
	2	4	5				grades similar
		4	4		9		COBBLES from 7.0'-8.0'
							10.5'
	3	4	15				Brown, coarse GRAVEL
		18	15		33		(Moist-Compact) 13.0'
							Brown, medium-fine SAND w/CLAY seam @ 15.0'-15.2'
	4	3	5				(Moist-Firm)
		6	7		11		
	5	7	12				Brown SILT & fine SAND
		14	15		26		COBBLE in tip of spoon
	6	6	13				(Wet-Firm)
		9	10		22		Brown, medium-fine SAND, Some fine Gravel-little recovery
	7	4	5				(Wet-Firm)
		7	9		12		Brown, medium-fine SAND (Wet-Firm)
							Boring Terminated @ 32.0'
							Note: Water level @ 19.5' inside 20' of casing. At completion of boring water level @ 18.0'.



N = No. blows to drive 2 " spoon 12 " with 140 lb. wt. falling 30 " per blow

No. blows to drive " casing " with lb. weight falling " per blow

METHOD OF INVESTIGATION 3¼" I.D. Hollow Stem Auger Casing

CLASSIFICATION Visual by Driller

DATE
STARTED 3-4-82
FINISHED 3-4-82
SHEET 1 OF 1

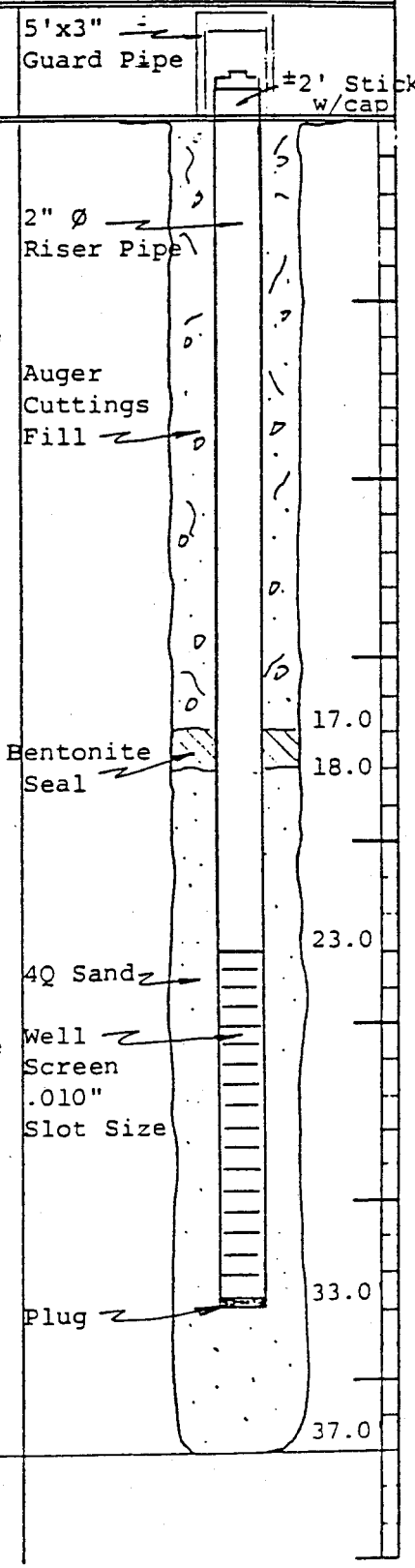
EMPIRE SOILS INVESTIGATIONS INC — SUBSURFACE LOG

HOLE NO CD-8
SURF. ELEV.
G. W. DEPTH See Note

PROJECT Observation Well Installations
C & D Battery, Inc.

LOCATION Huguenot, New York

DEPTH	SAMPLES	SAMPLE NO	BLOWS ON SAMPLER 0"/6"	6"/12"	12"/18"	N	BLOWS ON CASING	SOIL OR ROCK CLASSIFICATION
0		1	4	4				Brown, coarse-medium GRAVEL & SILT ROOTS
			6	7		10		(Damp-Firm)
5		2	6	6				Brown, coarse-medium SAND, GRAVEL & SILT (Possible Fill)
			7	21		13		(Damp-Firm)
								Note: Auger Refusal @ 6.5', Moved borehole and proceeded sampling at 10.0'
10		3	5	5				Brown, SILT & fine SAND
			4	5		9		(Damp-Loose)
15		4	3	4				grades similar with Some Clay
			5	5		9		(Wet-Loose)
20		5	2	4				Brown, SILT & fine SAND w/medium-fine SAND seams and CLAY seams
			6	7		10		(Wet-Firm)
25		6	2	4				Brown, SILT & fine SAND, trace fine gravel
			4	5		8		(Wet-Loose)
30		7	4	3				grades similar-no gravel
			5	6		8		(Wet-Loose)
35		8	3	4				grades, damp
			5	5		9		
40								Boring Terminated @ 37.0'
								Note: Water level @ 23.5' inside 30' of casing.



N = No. blows to drive 2 in. spoon 12 in. with 140 lb pin wt falling 30 in. per blow

No. blows to drive ____ in. casing ____ with ____ lb weight falling ____ in. per blow

METHOD OF INVESTIGATION 3¼" I.D. Hollow Stem Auger Casing

CLASSIFICATION Visual by Driller

DATE
STARTED 3-2-82
FINISHED 3-3-82
SHEET 1 OF 1

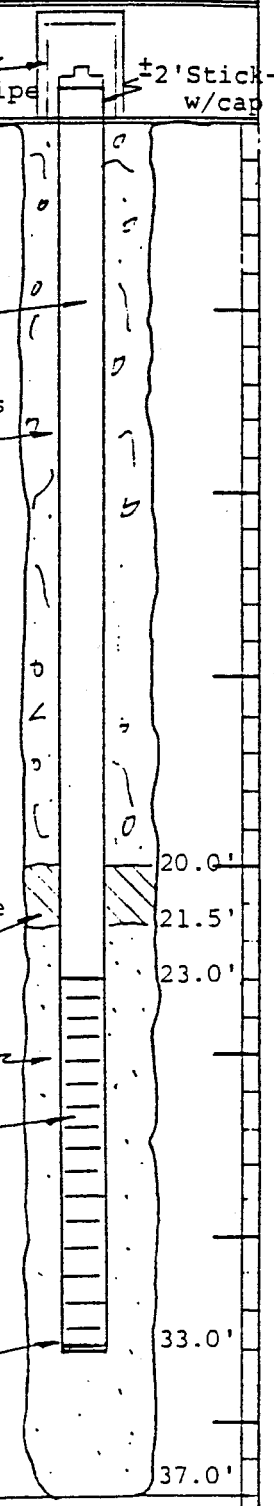
EMPIRE SOILS INVESTIGATIONS INC — SUBSURFACE LOG

HOLE NO CD-9
SURF. ELEV
G. W. DEPTH See Note

PROJECT Observation Well Installations
C & D Battery, Inc.

LOCATION Huguenot, New York

DEPTH	SAMPLES	SAMPLE NO	BLOWS ON SAMPLER 0-6"	6-12"	12-18"	N	BLOWS ON CASING	SOIL OR ROCK CLASSIFICATION
0		1	10	6				Brown, medium-fine SAND & GRAVEL, Some Silt, roots (Damp-Firm) 2.0'
			16	18		22		
								Brown, SILT & fine SAND (Damp-Firm)
5		2	5	6				
			5	5		11		
10		3	8	5				grades similar
			6	7		11		
15		4	4	5				grades similar w/CLAY seam @ 16.5' (Wet-Loose)
			4	5		9		
20		5	3	6				grades similar with medium-fine SAND seam @ 21.0'-21.2' (Wet-Firm)
			7	6		13		
25		6	1	1				Brown, medium-fine SAND (Wet-Loose)
			3	3		4		
30		7	3	2				grades similar w/trace silt & fine gravel
			3	5		5		Brown, medium-fine SAND & SILT w/ medium-fine SAND seam @ 36.5'-36.7' (Wet-Loose)
35		8	2	2				
			4	3		6		Boring Terminated @ 37.0'
40								Note: Water level @ 28.0' inside 30' of casing. At completion of boring water level @ 24.2' inside 30' of casing



N = No. blows to drive 2 in. spoon 12 in. with 140 lb pin wt falling 30 in. per blow

CLASSIFICATION Visual by Driller

No. blows to drive ___ in. casing ___ with ___ lb weight falling ___ in. per blow

METHOD OF INVESTIGATION 3¼" I.D. Hollow Stem Auger Casing

LANSING ENGINEERING, PC
7 HEMPHILL PLACE, SUITE 230, MALTA, NY 12020
TEL. (518) 899-5243 – FAX. (518) 899-5245

SUBSURFACE LOG

HOLE No.: SB-1-05

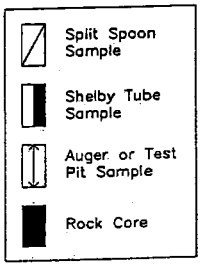
PROJECT:
Subsurface Investigation
C & D Technologies

LOCATION:
NYS Route 209
Huguenot, New York

PROJECT No.: 404.10
DATE STARTED: 2/28/05
DATE FINISHED: 2/28/05

SURFACE ELEV.: 457.3'
GW DEPTH: See Notes
REFERENCE PT.: Ground Surf.

DEPTH (ft)	SMPL. No.	BLOWS ON SAMPLER 0/6	6/12	12/18	18/24	N	REC. (ft)	SOIL CLASSIFICATION	NOTES
	S-1	12	19	21	18	40	1.0	Topsoil becomes Brown SAND & GRAVEL, little silt (Frozen - Moist)	Located in basin, north side.
	S-2	23	33	16	24	49	1.2	Brown-Gray coarse SAND & GRAVEL, little reddish brown silt (gravel portion predominantly shale fragments, poorly-sorted) (Moist)	Water level @ 11.9' in augers upon completion of S-9.
5	S-3	14	13	26	32	39	1.4	- similar	
	S-4	19	23	26	21	49	1.4	- similar ±8'	
	S-5	20	21	30	50/.3	51	0.7	Brown-Gray fine SAND & SILT w/ embedded coarser sands, gravel & shale fragments (Moist)	
10	S-6	50/.3					0.1	- similar	Very hard augering 10'-11.5' (30 min. for 18" advance - boulder?) Move 4' south, attempt #2
	S-7	50/.5					0.4	- similar ±14'	Auger refusal @ 8' on cobble Move another 4' south, attempt #3
	S-8	38	20	12	10	32	0.3	Brown GRAVEL & SAND, little silt (Saturated)	Advance samples 7-12 at attempt #3
15	S-9	8	14	12	6	26	NR	- no recovery	
	S-10	50/.3					0.1		No visual or olfactory indications of contamination were noted.
20	S-11	44	33	30	40	63	0.6	Brown GRAVEL & SAND (Saturated)	Abandoned with cement-bentonite grout mixture
	S-12	14	18	50/.4			0.5	Brown fine-coarse GRAVEL (Saturated) (GLACIAL OUTWASH)	
								End of Boring @ 23.4'	
25									
30									
35									
40									
45									
50									



N = NUMBER OF BLOWS TO DRIVE 3" SPOON 12" WITH 140 lb. HAMMER FALLING 30" PER BLOW
DRILLING CONTRACTOR: Parratt Wolff, Inc. DRILLER: Glenn Lansing
INVESTIGATION METHOD: 4 1/4" Hollow Stem Augers RIG TYPE: CME 850x

CLASSIFICATION: JH
SHEET: 1 of 1

LANSING ENGINEERING, PC
7 HEMPHILL PLACE, SUITE 230, MALTA, NY 12020
TEL. (518) 899-5243 - FAX. (518) 899-5245

SUBSURFACE LOG

HOLE No.: SB-2-05

PROJECT:
Subsurface Investigation
C & D Technologies

LOCATION:
NYS Route 209
Huguenot, New York

PROJECT No.: 404.10
DATE STARTED: 2/25/05
DATE FINISHED: 2/28/05

SURFACE ELEV.: 456.0'
GW DEPTH: See Notes
REFERENCE PT.: Ground Surf.

DEPTH (ft)	SMPL. No.	BLOWS ON SAMPLER 0/6	6/12	12/18	18/24	N	REC. (ft)	SOIL CLASSIFICATION	NOTES
	S-1	6	11	14	23	25	0.2	Topsoil (Frozen)	Located in basin, northwest side.
	S-2	26	8	10	14	18	0.8	Brown GRAVEL & fine-coarse SAND, little silt (poorly-sorted, Moist)	Water level @ 11.9' in augers upon completion of sampling.
5	S-3	10	19	15	21	34	1.2	- similar	No auger cuttings returned.
	S-4	24	29	21	16	50	1.2	- similar	No visual or olfactory indications of contamination were noted.
	S-5	17	22	24	32	46	0.9	- similar	
10	S-6	10	14	16	38	30	0.3	Brown-Gray coarse GRAVEL, some fine-coarse Sand (poorly-sorted, Moist)	Abandoned with cement-bentonite grout mixture
	S-7	50/.4					NR	- no recovery	
15	S-8	24	31	34	21	65	1.1	- similar (Wet)	
	S-9	14	18	16	24	34	0.3	- similar	
	S-10	15	30	37	49	67	0.9	Brown-Gray GRAVEL & fine-coarse SAND (Wet)	
20	S-11	39	50/.4				NR	- no recovery (GLACIAL OUTWASH)	
								End of Boring @ 20.9'	
25									
30									
35									
40									
45									
50									

Split Spoon Sample
Shelby Tube Sample
Auger or Test Pit Sample
Rock Core

N = NUMBER OF BLOWS TO DRIVE 3" SPOON 12" WITH 140 lb. HAMMER FALLING 30" PER BLOW
DRILLING CONTRACTOR: Parratt Wolff, Inc. DRILLER: Glenn Lansing
INVESTIGATION METHOD: 4 1/4" Hollow Stem Augers RIG TYPE: CME 850x

CLASSIFICATION: JH
SHEET: 1 of 1

LANSING ENGINEERING, PC
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SUBSURFACE LOG

HOLE No.: SB-3-05

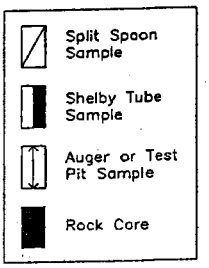
PROJECT:
Subsurface Investigation
C & D Technologies

LOCATION:
NYS Route 209
Huguenot, New York

PROJECT No.: 404.10
DATE STARTED: 2/25/05
DATE FINISHED: 2/25/05

SURFACE ELEV.: 458.3'
GW DEPTH: See Notes
REFERENCE PT.: Ground Surf.

DEPTH (ft)	SMPL. No.	BLOWS ON SAMPLER 0/6	6/12	12/18	18/24	N	REC. (ft)	SOIL CLASSIFICATION	NOTES
	S-1	10	13	12	16	25	0.7	Light Brown fine SAND & SILT (Frozen)	Located in basin, west side.
	S-2	16	29	31	32	60	1.5	Reddish-Brown coarse angular GRAVEL & SAND, little silt trace organics (Moist)	Water level @ 13.5' in augers upon completion of sampling.
5	S-3	11	23	23	41	46	1.6	- similar	
	S-4	42	60	63	33	123	1.5	Reddish-Brown GRAVEL & SAND, little silt (poorly-sorted, Moist)	
	S-5	21	50/.4				0.9	- similar (Very Moist)	
10	S-6	40	50/.1				0.1	-recovered a single piece of coarse gravel (cobble fragment?)	Driller notes occasional cobbles.
	S-7	40	36	50/.3			1.0	Brown coarse GRAVEL, some sand (Moist)	Minimal auger cuttings returned.
	S-8	50/.2					0.2	Brown-Gray GRAVEL & fine-coarse SAND, little silt	No visual or olfactory indications of contamination noted.
15	S-9	30	50/.1				0.2	- becomes wet	
	S-10	71	50/.4				0.2	- similar	Abandoned with cement-bentonite grout mixture
20	S-11	23	19	15	25	34	1.0	Brown-Gray GRAVEL & SAND, trace silt (poorly-sorted, Wet)	
	S-12	17	26	27	29	53	1.0	- similar (GLACIAL OUTWASH)	
25								End of Boring @ 24.0'	
30									
35									
40									
45									
50									



N = NUMBER OF BLOWS TO DRIVE 3" SPOON 12" WITH 140 lb. HAMMER FALLING 30" PER BLOW
DRILLING CONTRACTOR: Parratt Wolff, Inc. DRILLER: Glenn Lansing
INVESTIGATION METHOD: 4 1/4" Hollow Stem Augers RIG TYPE: CME 850x

CLASSIFICATION: JH
SHEET: 1 of 1

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SUBSURFACE LOG

HOLE No.: SB-4-05

PROJECT:
Subsurface Investigation
C & D Technologies

LOCATION:
NYS Route 209
Huguenot, New York

PROJECT No.: 404.10
DATE STARTED: 2/22/05
DATE FINISHED: 2/22/05

SURFACE ELEV.: 472.5'
GW DEPTH: See Notes
REFERENCE PT.: Ground Surf.

DEPTH (ft)	SMPL. No.	BLOWS ON SAMPLER 0/6	6/12	12/18	18/24	N	REC. (ft)	SOIL CLASSIFICATION	NOTES
	S-1	50/.4					0.4	Asphalt pavement over Brown SAND & GRAVEL (Moist)	Located on basin rim, north side.
	S-2	22	17	37	27	54	1.0	- similar, little silt	Water level @ 27.8' in augers upon completion of sampling.
5	S-3	16	27	16	9	43	0.7	- similar (Fill?)	
	S-4	8	7	5	4	12	1.1	Brown SAND & GRAVEL (Moist)	Hole grouted with bentonite-cement mix. Encountered some difficulty while doing so due to coarse nature of formation
	S-5	2	3	3	6	6	1.1	- similar	
10	S-6	2	4	4	4	8	1.0	- similar	Filled 1 drum w/ auger cuttings.
	S-7	4	6	5	7	11	0.6	- similar, trace organics (rootlets) (Moist)	
15	S-8	4	9	11	18	20	0.9	Brown SAND & GRAVEL (Moist)	No visual or olfactory indications of contamination noted.
	S-9	14	16	15	15	31	1.4	- becomes coarser (Slightly Moist)	
	S-10	14	21	24	28	45	0.4	- similar	
20	S-11	18	20	17	12	37	1.0	Brown-Gray coarse GRAVEL & SAND, trace organics (rootlets), seam shale fragments noted	
	S-12	13	22	7	18	29	0.7	- similar, shale fragments wetted with Red-Brown saturated silt	
25	S-13	13	21	16	9	37	0.4	- coarse GRAVEL (Moist)	
	S-14	12	12	12	23	24	0.3	- similar, little fine-coarse sand	
	S-15	13	13	12	8	25	0.4	- coarse GRAVEL (becomes Wet)	
30	S-16	9	15	13	17	28	0.3	- coarse GRAVEL (Wet)	
	S-17	9	13	12	21	25	0.4	- similar	
35	S-18	21	23	22	16	45	0.1	- coarse Shale fragments	
	S-19	23	28	31	26	59	1.0	- coarse GRAVEL (Wet)	
	S-20	12	16	21	38	37	0.4	- similar **(GLACIAL OUTWASH)**	
40								End of Boring @ 40.0'	
45									
50									

Split Spoon Sample
Shelby Tube Sample
Auger or Test Pit Sample
Rock Core

N = NUMBER OF BLOWS TO DRIVE 3" SPOON 12" WITH 140 lb. HAMMER FALLING 30" PER BLOW
DRILLING CONTRACTOR: Parratt Wolff, Inc. DRILLER: Glenn Lansing
INVESTIGATION METHOD: 4 1/4" Hollow Stem Augers RIG TYPE: CME 850x

CLASSIFICATION: JH
SHEET: 1 of 1

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SUBSURFACE LOG

HOLE No.: SB-5-05

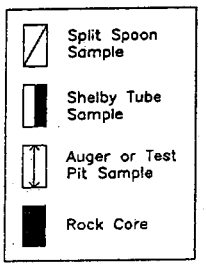
PROJECT:
Subsurface Investigation
C & D Technologies

LOCATION:
NYS Route 209
Huguenot, New York

PROJECT No.: 404.10
DATE STARTED: 2/24/05
DATE FINISHED: 2/24/05

SURFACE ELEV.: 458.2'
GW DEPTH: See Notes
REFERENCE PT.: Ground Surf.

DEPTH (ft)	SMPL. No.	BLOWS ON SAMPLER 0/6	6/12	12/18	18/24	N	REC. (ft)	SOIL CLASSIFICATION	NOTES
	S-1	3	2	6	11	8	0.4	Topsoil over Brown-Gray GRAVEL & SAND, some Silt (Gravel portion includes shale fragments; Very Moist)	Located in basin, south side.
	S-2	16	18	16	15	34	0.6	Glacial Outwash: Gray-Brown-Red coarse-fine GRAVEL, some Sand and Silt (Poorly sorted; Moist)	Water level @ 13.2' in augers upon completion of sample S-9.
5	S-3	18	28	22	23	50	0.6	- similar (Moist w/ Wet seams)	
	S-4	16	18	19	21	37	0.5	- similar (Gravel portion Wet)	
	S-5	11	13	9	8	22	0.3	- similar	
10	S-6	19	21	27	5	48	0.2	- similar (Moist-Wet)	No cuttings returned. Large hole opened up at surface. Used 12 bags cement, 2 bags bentonite, and 1 bag sand to fill.
	S-7	16	14	14	16	28	0.1	- similar (Wet)	
15	S-8	24	8	10	43	18	0.2	- similar (Wet)	Abandoned with cement-bentonite grout mixture
	S-9	7	16	18	21	34	0.3	- similar	
	S-10	50/.2					0.1	- similar w/ thin seam Red-Brown clayey SILT noted	Spoon refusal @ 18.2'
20								End of Boring @ 18.5'	Auger Refusal @ 18.5'
25									
30									
35									
40									
45									
50									



N = NUMBER OF BLOWS TO DRIVE 3" SPOON 12" WITH 140 lb. HAMMER FALLING 30" PER BLOW
DRILLING CONTRACTOR: Parratt Wolff, Inc. DRILLER: Glenn Lansing
INVESTIGATION METHOD: 4 1/4" Hollow Stem Augers RIG TYPE: CME 850x

CLASSIFICATION: JH
SHEET: 1 of 1

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SUBSURFACE LOG

HOLE No.: SB-6-05

PROJECT:
Subsurface Investigation
C & D Technologies

LOCATION:
NYS Route 209
Huguenot, New York

PROJECT No.: 404.10
DATE STARTED: 2/21/05
DATE FINISHED: 2/22/05

SURFACE ELEV.: 473.0'
GW DEPTH: See Notes
REFERENCE PT.: Ground Surf.

DEPTH (ft)	SMPL. No.	BLOWS ON SAMPLER 0/6	6/12	12/18	18/24	N	REC. (ft)	SOIL CLASSIFICATION	NOTES
	S-1	21	25	18		43	1.4	Asphalt pavement over Light Brown fine SAND, trace silt (Slightly Moist)	Located on basin rim, southeast side.
	S-2	9	11	12	13	23	0.4	- similar	Water level @ 31.2' in augers @ 0715 morning of 2/22/05.
5	S-3	6	9	15	10	24	1.4	- similar, occasional seams fine-coarse SAND, trace coarse gravel	Hole grouted with bentonite-cement mix.
	S-4	12	15	18	16	33	1.2	- similar to S-3, seam very fine sand noted	
	S-5	7	10	10	12	20	1.0	- similar	
10	S-6	12	10	11	13	21	1.8	- becomes Light Brown very fine SAND (Slightly Moist)	Filled 2 drums w/ auger cuttings.
	S-7	13	16	16	19	32	1.7	- similar	
15	S-8	11	13	14	18	27	2.0	- similar	No visual or olfactory indications of contamination noted.
	S-9	13	13	15	14	28	1.6	- similar	Abandoned with cement-bentonite grout mixture
	S-10	9	18	17	17	35	1.2	- similar	
20	S-11	12	15	17	16	32	2.0	- similar	
	S-12	12	15	14	19	29	1.2	Light Brown very fine SAND, some Silt (Moist)	
25	S-13	8	13	18	14	31	2.0	- becomes Brown SAND & GRAVEL @ 25.0' (Moist)	
	S-14	8	9	14	16	23	1.8	Interbedded seams SAND / SAND & GRAVEL (Moist-Wet)	
	S-15	14	16	7	9	23	1.0	Brown fine-medium SAND, little coarse sand (Moist-Wet)	
30	S-16	11	21	31	29	52	2.0	- becomes Brown GLACIAL OUTWASH: SAND & GRAVEL, some Silt (Wet)	
	S-17	17	19	22	29	41	2.0	- similar	
35	S-18	16	25	26	29	51	2.0	Brown SAND & GRAVEL, trace silt	
	S-19	15	12	16	26	28	2.0	Gray-Brown fine-coarse SAND, some Gravel, trace silt	
	S-20	12	19	21	31	40	2.0	- similar, occasional silty fine sand seam noted **(GLACIAL OUTWASH)**	
40								End of Boring @ 40.0'	
45									
50									

Split Spoon Sample
Shelby Tube Sample
Auger or Test Pit Sample
Rock Core

N = NUMBER OF BLOWS TO DRIVE 3" SPOON 12" WITH 140 lb. HAMMER FALLING 30" PER BLOW
DRILLING CONTRACTOR: Parratt Wolff, Inc. DRILLER: Glenn Lansing
INVESTIGATION METHOD: 4 1/4" Hollow Stem Augers RIG TYPE: CME 850x

CLASSIFICATION: JH
SHEET: 1 of 1

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SUBSURFACE LOG

HOLE No.: SB-7-05

PROJECT:
Subsurface Investigation
C & D Technologies

LOCATION:
NYS Route 209
Huguenot, New York

PROJECT No.: 404.10
DATE STARTED: 2/23/05
DATE FINISHED: 2/23/05

SURFACE ELEV.: 458.5'
GW DEPTH: See Notes
REFERENCE PT.: Ground Surf.

DEPTH (ft)	SMPL. No.	BLOWS ON SAMPLER 0/6	6/12	12/18	18/24	N	REC. (ft)	SOIL OR ROCK CLASSIFICATION	NOTES
	S-1	4	2	3	4	5	0.5	Topsoil: Dark Brown SAND & SILT (Frozen) becomes	Located in middle of basin.
	S-2	4	6	8	10	12	0.1	Brown SAND & GRAVEL, little silt (Moist)	Water level @ 13.7' in augers upon completion of sample S-8.
5	S-3	10	10	10	11	20	0.2	Brown coarse GRAVEL & SAND (Gravel portion includes shale fragments) (Moist)	Hole grouted with bentonite-cement mix. Encountered some difficulty while doing so due to coarse formation.
	S-4	9	13	10	13	23	0.5	- similar, becomes Red-Brown (Wet)	
	S-5	5	8	12	10	20	0.5	- similar, silty (Wet-Moist)	
10	S-6	6	10	9	19	19	0.1	- similar, (Moist-Wet)	No cuttings returned.
	S-7	5	14	9	6	23	0.1	- similar	
15	S-8	10	11	14	18	25	NR	- no recovery (spoon Wet)	
	S-9	14	14	18	16	32	NR	- no recovery	
	S-10	50/.4					NR	- no recovery **(GLACIAL OUTWASH)**	
20	S-11	62					0.5	Brown-Gray angular fine-coarse SAND, little silt (Brown silt seam in shoe) End of Boring @ 20.5'	Possible mild chem odor and/or thin seam dark staining noted in sample S-11.
25									
30									
35									
40									
45									
50									

Split Spoon Sample
Shelby Tube Sample
Auger or Test Pit Sample
Rock Core

N = NUMBER OF BLOWS TO DRIVE 3" SPOON 12" WITH 140 lb. HAMMER FALLING 30" PER BLOW
DRILLING CONTRACTOR: Parratt Wolff, Inc. DRILLER: Glenn Lansing
INVESTIGATION METHOD: 4 1/4" Hollow Stem Augers RIG TYPE: CME 850x

CLASSIFICATION: JH
SHEET: 1 of 1

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SUBSURFACE LOG

HOLE No.: SB-8-05

PROJECT:
Subsurface Investigation
C & D Technologies

LOCATION:
NYS Route 209
Huguenot, New York

PROJECT No.: 404.10
DATE STARTED: 2/24/05
DATE FINISHED: 2/24/05

SURFACE ELEV.: 459.8'
GW DEPTH: See Notes
REFERENCE PT.: Ground Surf.

DEPTH (ft)	SMPL. No.	BLOWS ON SAMPLER 0/6	6/12	12/18	18/24	N	REC. (ft)	SOIL CLASSIFICATION	NOTES
	S-1	5	5	6	6	11	0.4	Topsoil (Frozen)	Located in basin, east side
	S-2	5	3	3	4	6	0.3	- becomes Gravelly (Moist)	Water level @ 14.9' in augers upon completion of sample S-12.
5	S-3	7	7	8	7	15	0.3	similar (silty SAND & GRAVEL w/ organics; Moist)	
	S-4	15	17	16	18	33	NR	- no recovery	Water level @ 17.02' below top of PVC upon completion of well; 17.12' on 2/28/05.
	S-5	17	16	12	14	28	1.1	Light Brown medium SAND w/ occasional seams coarse sand (Slightly Moist)	
10	S-6	9	21	20	23	41	1.6	Light Brown fine-medium SAND, little gravel (Moist)	No cuttings returned.
	S-7	12	14	12	19	26	NR	- no recovery	
	S-8	14	12	10	28	22	2.0	- similar to sample S-6 (Moist)	2" PVC monitoring well installed upon completion of boring:
15	S-9	9	11	14	24	25	1.0	Brown medium-coarse SAND, trace gravel (Wet)	- bottom of auger hole @ 25.0'
	S-10	12	18	26	31	44	1.4	- similar, becomes fine-medium SAND, trace gravel	- 10' 0.010" well screen to 14.5'
20	S-11	20	24	48	41	72	0.8	Brown coarse GRAVEL & SAND (poorly sorted; Wet)	- riser to surface
	S-12	28	33	30	49	63	1.1	- similar	- #0 sand to 12.5'
	S-13	75/.1					0.1	- similar	- #00 sand to 12.0'
25									- bentonite chips to 9.0'
	S-14	77	45	50/.2			0.9	(GLACIAL OUTWASH)	- #00 sand to 8.5'
								End of Boring @ 26.2'	- #0 sand to 25.0'
									- grout to surface
									- top of PVC elevation at 461.76'
									- locking guard pipe installed
30									
35									
40									
45									
50									

Split Spoon Sample
Shelby Tube Sample
Auger or Test Pit Sample
Rock Core

N = NUMBER OF BLOWS TO DRIVE 3" SPOON 12" WITH 140 lb. HAMMER FALLING 30" PER BLOW

DRILLING CONTRACTOR: Parratt Wolff, Inc.
DRILLER: Glenn Lansing
INVESTIGATION METHOD: 4 1/4" Hollow Stem Augers
RIG TYPE: CME 850x

CLASSIFICATION: JH
SHEET: 1 of 1

SECTION IV

Appendix B: Pre-Design Investigation Report (AECOM 2022)

AECOM Imagine it. Delivered.

Pre-Design Investigation Report

C&D Batteries Site No. 336001
Huguenot, New York

New York State Department of Environmental Conservation

Project number: 60612108

February 11, 2022

Quality information

Prepared by	Checked by	Verified by	Approved by
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Revision History

Revision	Revision date	Details	Authorized	Name	Position

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Appendices

1. Introduction

This Pre-Design Investigation (PDI) Report has been prepared for the C&D Power Systems (C&D Batteries) site (the Site) located in the Hamlet of Huguenot, in the Town of Deerpark, Orange County, New York (**Figure 1**). This report presents the findings of the PDI.

1.1 Scope of Work

The PDI scope of work included the following:

- Geophysical investigation
- Topographic and bathymetric survey
- Groundwater sampling events
- Drum sampling
- Vault sediment sampling
- Surface soil sampling and analysis
- Advancement of soil borings and collection of subsurface soil samples for chemical and geotechnical analysis
- Advancement of sediment cores and collection of sediment samples for analysis from the Neversink River Tributary D-1-7 (the Tributary)
- Treatability study of lagoon soils

1.2 Report Organization

This PDI Report is organized into seven sections following this introduction.

- Section 2 describes the Site and presents historical ownership and operational summary information. Section 2 also provides a summary of the Site geology and hydrogeology.
- Section 3 summarizes the field activities performed during the PDI.
- Section 4 summarizes the results of the laboratory analyses for the environmental media samples during the investigation and the observed extent of environmental impacts.
- Section 5 presents the treatability study test results and recommended mix.
- Section 6 presents a summary and conclusion related to the PDI work.
- Section 7 provides a list of references cited in this report.

2. Pre-Design Investigation Study Area Description and History

2.1 Site Location and Description

The Site is zoned for commercial use with surrounding parcels used for residential and commercial uses. The site is located within the Neversink River Valley and is bordered by Route 209 to the west and by the Tributary to the east (NYSDEC, 2015). The approximately 17.3-acre parcel is currently unoccupied.

The Site (**Figure 2**) features an approximately 3-acre industrial building. A former wastewater treatment lagoon, measuring approximately 175 feet in diameter and 15 feet in depth, is located to the northeast of the site building. This lagoon formerly discharged to the Tributary that runs along the east side of the Site.

The ground surface is relatively flat with an elevation range from approximately 469 to 475 feet above mean sea level (National Geodetic Vertical Datum of 1988) over most of the Site, aside from where elevations drop-off toward the Tributary at the rear of the property. The ground water table is approximately 16 to 34 feet below ground surface (bgs) and flows to the southeast towards the Tributary (Delaware Engineering, 2001).

According to Federal Emergency Management Agency (FEMA) flood insurance mapping, dated August 3, 2009, the Site is located within the 100-year flood zone (Zone A), and a regulatory floodway (Zone AE).

2.2 Site History

The Site was owned and operated by Empire Tube Company from 1959 to 1970 and used for the manufacture of black and white picture tubes. Industrial wastewater containing hydrofluoric acid was discharged to a lagoon located 75 feet to the northeast of the site building. This lagoon measures approximately 175 feet in diameter and 15 feet in depth and is depicted on **Figure 2**. C&D Technologies, Inc. (C&D) operated at the Site from the mid-1970's until 2006 for the manufacture of lead batteries. Non-contact cooling water was discharged and accumulated in the lagoon during C&Ds operations at the Site. In 2007, the Site was sold to Star Realty Associates LLC and was later sold to the current owner, 430 US Route 209, LLC, in 2018.

Over the years, C&D has changed its name from C&D Batteries to C&D Charter Power Systems, Inc. and to C&D Technologies, Inc. Under a consent order entered on December 26, 2018, C&D resolved its liability for contamination at the C&D Power Systems site. Subsequent to this consent order, NYSDEC is directly implementing the remedy stated in the March 2015 Record of Decision.

2.3 Previous Investigations

Site investigations began in 1981 during property owner assessment of regarding plans to expand the site building over the lagoon (Delaware Engineering, 2014). Subsequent investigations were initiated by the former owner and at the request of NYSDEC. The following investigations were conducted, and regulatory documents issued between 1981 and the present and document conditions at the Site as they relate to this PCB Cleanup Plan:

- Between December 1981 and January 1982, C&D retained Environmental Resources Management, Inc. (ERM) to assess the former lagoon and determine if the former lagoon could be filled without environmental impacts in the area. Soil samples had elevated concentrations of fluoride, lead, cadmium, and zinc compared to background concentrations. Elevated fluoride concentrations were detected in soil samples collected from the bottom of the former lagoon, and fluoride was also present in groundwater downgradient of the former lagoon. One downgradient groundwater monitoring well, CD-2, had lead concentrations that exceeded NYSDEC groundwater standards (Delaware Engineering, 2014). In 1983, the Site was classified by NYSDEC as a Class 2a site.

- Between July 1988 and January 1989. Gibbs & Hill (G&H) was contracted by NYSDEC to conduct a Phase II Environmental Site Assessment (ESA). The Phase II ESA reported that there

was no evidence of the migration of contamination from the Site soils to the groundwater and downslope surface water (Gibbs & Hill, 1990).

- In July 1990, NYSDEC conducted additional groundwater monitoring and found that fluoride concentrations in groundwater were more than ten times higher than background levels. Fluoride concentrations exceeded the New York Class GA groundwater standard (1.5 mg/L). A Remedial Investigation and Feasibility Study (RI/FS) were recommended.
- In November 1991, NYSDEC notified C&D that a RI/FS would be required.
- In January 1992, NYSDEC issued a draft consent order to C&D for the performance of an RI/FS.
- In, July 1999, the consent order between NYSDEC and C&D was signed.
- In June 2000, Delaware Engineering, P.C. (Delaware Engineering) completed a Remedial Investigation (RI) Report on behalf of C&D, which identified polychlorinated biphenyl (PCB) impacts to the Site. The RI established two separate operable units for the Site. OU-1 was defined as lagoon soils and the water supply at a residential property on Swartwout Road. OU-2 is defined as groundwater, surface water, sediments, and soil near the former lagoon overflow discharge pipe. The RI report concluded that PCB impacts were primarily restricted to the top three to five feet of lagoon soils and top one foot of tributary sediments. Some lagoon soils exhibited concentrations of barium, cadmium, chromium, copper, lead, silver, and zinc above their respective NYSDEC Soil Cleanup Objectives (SCOs). Groundwater samples collected during the RI indicated that fluoride was the only constituent consistently above applicable groundwater standards. Sediments were not analyzed for PCBs in the original RI.
- In June 2006, Delaware Engineering completed an RI on behalf of C&D for OU-2. The OU-2 RI Report included a more detailed assessment of sediment and additional characterization of groundwater. PCBs were detected in three monitoring wells near the lagoon at concentrations above the NYSDEC Class GA groundwater Standard of 0.09 micrograms per liter (ug/L), but below the Toxic Substance Control Act (TSCA) decontamination standard for water of 0.5 ug/L. PCBs were detected in samples from all 14 sampling locations but were only above the 1 mg/Kg sediment cleanup guideline in only two samples. The remainder of samples were below NYSDEC aquatic life acute and chronic toxicity values.
- In June 2007, Delaware Engineering prepared a summary of additional Tributary sediment data collected in October 2006 from downgradient areas. The maximum PCB concentration detected in the downgradient area was 0.17 mg/Kg.
- In July 2008, Delaware Engineering performed a surficial soil sampling program to assess lead concentrations on the C&D property and adjacent properties, following the discovery of lead impacts on the adjacent town hall property. Surface soil and soil between cracks in paved areas were sampled and analyzed for lead and remediation of surface soils was recommended.
- Between 2008 and 2014, a FS was developed by Delaware Engineering in coordination with NYSDEC. The FS evaluated various remedial options, which were developed into the Record of Decision (ROD) in 2015.
- In March 2015, NYSDEC issued a ROD for the Site. The ROD identified a selected remedy for the Site that included excavation and in-situ stabilization of soils beneath the bottom of the lagoon, excavation of selected sediments in the tributary, and excavation of surficial soils and their stabilization in conjunction with the lagoon soils.

Other investigations conducted at the Site and surrounding areas were summarized in the RI and FS reports prepared by Delaware Engineering.

2.4 Regional Geology and Hydrogeology

The Site is located in the Valley and Ridge physiographic province which is characterized by the presence of folded Paleozoic sedimentary rocks. These sedimentary rocks include sandstone, shale, and limestone.

The Neversink Valley is part of a large trough developed over soluble limestone of Devonian Age. During post-glacial time, the Neversink River has eroded the older glacial deposits forming the existing floodplain. Remnants of the deposits remain along the sides of the valley and these coarser grained deposits underlie the Site (Delaware Engineering, 2001).

2.5 Site Geology and Hydrogeology

The Site and surrounding area are underlain by glacial sand and gravel that coarsens with depth (NYSDEC, 2015). The thickness of these glacial deposits ranges from approximately 10 to 150 feet. The estimated hydraulic conductivity of these deposits, as determined by slug testing, ranged from approximately 2.2x10-3 to 1.7x10-2 centimeters per second (cm/s) in water table wells and as much as 8.3x10-2 cm/s in deeper wells. Such values indicate a relatively high permeability, allowing groundwater to readily migrate.

The depth to groundwater at the Site ranges from approximately 16 to 34 feet bgs (Delaware Engineering, 2001) and flows to the southeast towards Tributary.

3. Investigation Activities

3.1 Lagoon Soils

Aztech Environmental Technologies (Aztech), AECOM's drilling contractor, mobilized to the site to complete the five planned Lagoon Area borings on January 26, 2020. However, cobbles were encountered during the advancement of the borings causing probe refusal and preventing collection of adequate soil sample volume. Subsequently, Aztech remobilized at the Site on February 17 and 18, 2020 with a Geoprobe 7822DT and 4.25" hollow stem augers to conduct split spoon sampling at the five (5) boring locations across the bottom of the Lagoon. Due to poor recovery in the split spoons, only one sample was collected from the bottom of the Lagoon from a depth interval of 1 to 3 ft bgs at LG-4. In addition, Aztech also advanced eight (8) borings, two feet horizontally, into the Lagoon side walls, with samples collected at one-foot intervals at locations three (3) feet above the bottom of the Lagoon. The samples were also collected two feet horizontally, into the Lagoon side walls, with samples collected at one-foot intervals at three locations five (5) feet above the bottom of the Lagoon. A total of 22 samples were analyzed from the 11 borings for PCB, lead, and cadmium by Test America Laboratories, Inc. (Test America), a NYS Environmental Laboratory Approval Program (ELAP) certified laboratory.

AECOM remobilized to the Site in September 2020 to install five borings (LG-1 through LG-5) at the floor of the lagoon. The borings were completed by Parratt-Wolff, Inc. (Parratt-Wolff) and observed by AECOM personnel. Borings were completed using a CME 550 hollow stem auger methods, with continuous split spoon sampling from a 3-inch split spoon to a depth of 25 to 30 ft bgs. Boring logs are included in **Appendix A**. Select samples were collected from each boring and analyzed for PCBs, lead, cadmium, and toxicity characteristic leaching procedure (TCLP) metals. TCLP metals were analyzed only for the samples collected from bottom two feet of each lagoon floor boring. In total, 36 PCB, lead, and cadmium, as well as 5 TCLP metal samples, were analyzed from the five borings advanced on the lagoon floor. In addition, AECOM collected three soil samples in the lagoon from just beneath the former discharge outfall locations. Samples were analyzed for PCB, lead, and cadmium by Test America.

A total of 15 borings were advanced to four feet horizontally into the side walls, with samples collected at one-foot intervals. The horizontal sidewall borings were advanced at locations 3 feet, 6 feet, and 9 feet above the bottom of the lagoon. A total of 49 samples were analyzed from the 15 borings for PCB, lead, and cadmium by Test America.

3.2 Tributary D-1-7 Sediments

Between May 18 and 22, 2020 AECOM collected sediment samples from 40 locations within the Tributary. The sediment samples were collected from intervals 0 to 6 inches, 6 to 12 inches, and 18 to 24 inches at each location and analyzed for PCBs, lead, cadmium and total organic carbon by Test America to assess current sediment concentrations in advance of performing remedial activities.

3.3 Wooded Area Soils

In January 2020, AECOM advanced five shallow borings to two feet bgs in the Wooded Area to the southeast of the Site. A total of ten soil samples were collected for PCB and lead analysis by Test America. Additional follow-up soil sampling in the Wooded Area was conducted in September 2020 and November 2020. A total of 18 surficial soil samples were collected from the top two inches of soil in the Wooded Area during these follow-up events. Samples were analyzed for PCB, lead, and cadmium by Test America.

3.4 Vault and Shed Samples

AECOM collected two samples (VS-1 and VS-2) in January 2020 from sediment that has accumulated in the catch basin located in the wooded area east of the Site and from sediment that has accumulated in an approximately 10-foot by 10-foot utility vault located south of the facility building.

During the September 2020 mobilization, AECOM collected a sample of sediment from an apparent drain hole in the floor slab of the on-site shed located adjacent to the wooded area. The hole appeared to be an approximately 6-inch diameter hole cored in the slab of the shed, not a constructed drain. A sample was collected from 0 to 6 inches below the bottom of the slab where refusal was encountered. These samples were submitted for PCB, lead, and cadmium analysis by Test America.

3.5 Drum Sampling

25 fifty-five gallon steel drums were found inside the shed structure during the site walk on July 12, 2019. Of these, four (4) drums contained sediments and one (1) drum contained a clear liquid. The remaining drums were empty. AECOM collected grab sample on January 30,2020 from four (4) drums and shipped to Test America for target compound list volatile organic compounds (TCL VOCs plus 10 tentatively identified compounds (TICs); TCL semivolatile organic compounds (SVOC) plus 20 TICs; TCL PCBs; TCL pesticides; target analyte list (TAL) inorganics; mercury, and cyanide analysis.

3.6 Groundwater Sampling

In November 2019, AECOM conducted ground water sampling from 12 monitoring wells (MW-6, MW-7, MW-8, MW-9, MW-10, MW-12, MW-13, MW-14, MW-15, MW-17, MW-17A, and MW-57). The samples from the monitoring wells were collected using low flow sampling procedures and were analyzed by Test America for TCL VOCs (using Method 8260), TCL SVOCs (using Method 8270C), TCL PCBs (using Method 8082), TCL pesticides (using Method 8081), TAL inorganics (using Method 6010B), mercury & cyanide (using Methods 7470A & 9010B, respectively), and fluoride (using Method 4500 F- Standard). In addition, the groundwater sample from MW-7 and MW-9 was analyzed for 1,4-dioxane (using Method Modified 8270 SIM), and polyfluoroalkyl substances (PFAS) (using Method Modified 537)

In January 2020, AECOM conducted groundwater sampling from six (6) monitoring wells (MW-6, MW-7, MW-9, MW-12, MW-13, and MW-14). The samples from all the wells were analyzed by Test America for 1,4-dioxane (using Method Modified 8270 SIM), and PFAS (using Method Modified 537). In addition, the groundwater sample from MW-14 was analyzed for TCL VOCs (using Method 8260), TCL SVOCs (using Method 8270C), TCL PCBs (using Method 8082), TCL pesticides (using Method 8081), TAL Inorganics (using Method 6010B), mercury & cyanide (using Methods 7470A & 9010B, respectively), and fluoride (using Method 4500 F- Standard).

3.7 Private Supply Well Sampling

In November 2019, AECOM collected grab samples from faucets connected to the private water supply wells at the Town of Deerpark Highway Department Office and the residence located at 75 Swartwout Road, Huguenot, NY. The samples (75 SWARTWOUT-RD, POT-1 and POT-2) were analyzed by Test America for PCBs (using Method 8082), TAL inorganics (using Method 6010B) and fluoride (using Method 4500 F- Standard).

In January 2020, collected grab samples from faucets connected to the private water supply wells at the Town of Deerpark Highway Department Office and the residence located at 75 Swartwout Road, Huguenot, NY. The samples (POT-1) were analyzed by Test America for TAL inorganics (using Method 6010B).

3.8 Topographic and Bathymetric Survey

The topographical survey was prepared for AECOM by Badey & Watson, Surveying & Engineering P.C. of Cold Spring, New York. The topographic data is compiled from two sources. The first source is “Topographic map and Sampling Location – C & D technologies” dated September 15, 1999 prepared by Delaware Engineering, P.C. The second source is a field survey conducted by Badey & Watson, Surveying & Engineering P.C. on January 14, 2020. Property lines are approximate and are compiled from deeds and maps of record. Additionally, the stream centerline shown is approximate and taken from 2001 New York State GIS Clearing House aerial photographs. The topographic survey is included as **Appendix B**.

3.9 Geophysical Investigation

A ground penetrating radar (GPR) survey was conducted by Enviroprobe Service, Inc. (Enviroprobe) of Mount Laurel, New Jersey. The purpose of the investigation was to detect possible underground storage tanks (USTs) or anomalies and designate underground conduits/utilities on the property. The geophysical investigation report is included as **Appendix C**.

4. Subsurface Environmental Observations and PDI Analytical Results

The analytical laboratory reports for the sampling discussed in this section is provided in electronic format as **Appendix D**.

4.1 Lagoon Soils

PCB concentrations in 28 of the 36 lagoon boring samples exceeded the Commercial and Industrial SCO and Protection of Ground Water SCO of 1.0 mg/kg. The greatest PCB concentration of 100 mg/kg was collected from LG-5 at depths of 9-11 feet below the surface of the lagoon floor. Samples analyzed for total lead and cadmium that were collected from the lagoon floor exceeded either of the SCGs, 450 mg/kg and 7.5 mg/kg respectively for lead and cadmium, in 26 of the 36 samples collected. Concentrations are depicted on **Figure 3** and analytical data is provided in **Table 1**.

Lagoon soils were additionally analyzed for metals using the TCLP from the bottom two feet of each soil boring. LG-1 and LG-2 had samples that exceeded the US EPA allowable limits for cadmium of 1.0 mg/kg; these samples had concentrations of 1.1 mg/kg and 5.7 mg/kg respectively. TCLP metal concentrations measured in lagoon soils are depicted in **Figure 3.** TCLP metal analytical data for the lagoon soils is provided in **Table 2**.

A total of 49 samples were analyzed from the sidewalls, of these, 11 samples contained PCB concentrations above 50 mg/kg, 16 samples exceeded the Industrial SCOs for PCBs of 25 mg/kg, and 25 samples exceeded the Commercial SCO of 1 mg/kg. Concentrations of PCBs in these soils ranged from non-detect below 0.12 mg/kg to 170 mg/kg. Concentrations are depicted on **Figure 3**, analytical data for the sidewall samples is provided in **Table 3**.

Of the three soil samples collected beneath the former outfalls, only OF-01 exceeded the PCB limit with a concentration of 1.7 mg/kg. PCB concentrations measured in lagoon soils are depicted in **Figure 3**. PCB, lead, and cadmium analytical data for the lagoon outfall soils is provided in **Table 4**.

4.2 Tributary D-1-7 Sediments

Tributary samples that were analyzed for PCBs exceeded the SCO concentrations limit of 1.0 mg/kg in only 2 of the 40 locations sampled. Of those two, SED-102 exceeded the limit with a PCB concentration of 1.1 mg/kg at a depth of 6-12 inches bgs while SED-106 exceeded the limit with PCB concentrations of 2.5 mg/kg and 1.3 mg/kg at depths of 0-6 inches bgs and 6-12 inches bgs, respectively. No exceedances were documented in the samples collected from the 18-24 inches interval.

Of the 40 sediment locations sampled for total metals, 18 exceeded either the SEL limit of 110 mg/kg for lead or the LEL limit of 0.6 mg/kg for cadmium. PCB concentrations measured in Tributary sediments are depicted in **Figures 4A** and **4B.** PCB and metal analytical data for the Tributary sediments is provided in **Table 5**.

4.3 Wooded Area Soils

PCB concentrations in 4 out of the 18 soil samples exceeded the SCO limit of 1.0 mg/kg. The 4 samples that exceeded the SCO limits were WAS-11, WAS-12, WAS-14, and WAS-19 with concentrations of 3.3 mg/kg, 2.7 mg/kg, 1.8 mg/kg, and 2.8 mg/kg, respectively. The total lead and cadmium samples that were

collected from the Wooded Area Soils exceeded either of the SCGs, 450 mg/kg and 7.5 mg/kg respectively for lead and cadmium, in 7 of the 36 samples collected. PCB concentrations measured in Wooded Area soils are depicted in **Figure 5.** PCB, lead, and cadmium analytical data for the Wooded Area soils is provided in **Table 6**.

4.4 Vault and Shed Samples

Of the two vault samples collected only VS-2 exceeded the PCB SCO limit of 1.0 mg/kg with a concentration of 7.9 mg/kg. The sample collected from the on-site shed was also determined to have an exceedance of PCBs with a total concentration of 3.8 mg/kg. Additionally, all three samples showed an exceedance of the total lead SCG of 450 mg/kg. The shed sample contained lead at 14,100 mg/kg, while the two vault samples contained lead at 1,690 mg/kg and 1,960 mg/kg. The Vault and Shed samples are depicted in **Figure 5** and the analytical data for these samples is provided in **Table 7.**

4.5 Drum Samples

Of the four drum samples, all four exceeded the NYSDEC Part 375-6 unrestricted use limit (30 mg/kg) for chromium with concentrations ranging from 62.4 mg/kg to 105 mg/kg, and three exceeded the limit for lead (63 mg/kg) with concentrations ranging from 485 mg/kg to 697 mg/kg. One drum sample (DRUM-5) exceeded the limit of 50 mg/kg for acetone with a concentration of 110 mg/kg. The analytical data for these samples is provided in **Tables 8a-8c**.

4.6 Monitoring Well Samples

Monitoring wells MW-9 and MW-14 did not have exceedances of the NYSDEC Groundwater Guidance of Standard Values (TOGS 1.1.1). The criteria for total Chromium of 0.05 m/L was exceeded and MW-12, MW-13 which contained concentrations of 0.178 and 0.603 mg/L, respectively. The criteria for total Iron of 0.3 mg/L was exceeded at MW-7, MW-10, MW-12, MW-13, MW-15, MW-17, and MW-17A. The criteria for dissolved Iron was only exceeded at MW-17A. The criteria for total Manganese was exceeded at MW-10, MW-17A, and MW-57; dissolved Manganese was exceeded at MW-17A. Monitoring well MW-12 exceeded the criteria for total and dissolved Nickel of 0.1 mg/K with concentrations of 0.659 mg/L and 0.647 mg/L. Criteria for both total and dissolved Sodium was exceeded at MW-7, MW-12, MW-14, and MW-57. Monitoring well locations are depicted on **Figure 6**, the analytical data for the monitoring wells is included on **Tables 9a-9g**.

4.7 Private Well Samples

The private monitoring well POT-1 exceeded the NYSDEC Groundwater Guidance or Standard Values (TOGS 1.1.1) for total and dissolved Sodium of 20 mg/L. The Sodium concentrations exceeding the limit ranged from 20.7 to 20.9 mg/L. The monitoring well 75 Swartwout Rd exceeded the total Sodium concentration limit of 20 mg/L with a concentration of 20.7. No metals exceedances were observed at POT-2. No exceedances were observed for PCBs, Cyanide, or Fluoride. The analytical data for the monitoring wells is included on **Tables 9c, 9d, and 9g**.

5. Treatability Test Results

5.1 Lagoon Soils Treatability Test Results

KEMRON Environmental Services, Inc. (KEMRON) conducted the bench-scale treatability study using two samples collected from the lagoon.

The following physical properties of the material were tested prior to treatment:

- Particle size distribution with hydrometer
- Sample classification
- Atterberg limits
- Moisture content
- pH
- Bulk density (unit weight)
- Total and SPLP RCRA metals
- PCBs

KEMRON prepared a total of 20 mixtures, 10 mixtures for each of the two samples. These mixtures were prepared using various addition rates of Type I/II Portland cement alone, and Portland combined with Ground Granulated Blast Furnace Slag (GGBFS) grade 120, Portland combined with Hydrogel Bentonite, Portland combined with EnviroBlend CS, Portland combined with GGBFS and Bentonite, and Portland combined with GGBFS and EnviroBlend CS. The mixes were cured for intervals of 1, 3, 7, 10, 14, and 28 days. KEMRON performed pH, unconfined compressive strength (UCS), and hydraulic conductivity testing on some or all of the treated samples at various cure intervals as directed by AECOM.

Based on the results of this testing, six mixtures were tested for the EPA Method 1315 (LEAF) leaching procedure at the 28-day cure period. These mixtures included:

- 0751-013 7.5% Portland Cement
- 0751-014 3% Portland Cement + 6% GGBFS
- 0751-017 7.5% Portland Cement + 2% Bentonite
- 0751-018 7.5% Portland Cement + 3% EnviroBlend CS
- 0751-019 3% Portland Cement + 6% GGBFS + 2% Bentonite
- 0751-020 3% Portland Cement + 6% GGBFS + 3% EnviroBlend CS

These samples were then tested for PCBs, Barium, Cadmium, Lead, pH, conductance, and oxygen reduction potential. Leachate results were then screened against the Class GA groundwater standard (µg/L) limits. Only two of the tested mixtures produced consistent leachate results below the screening standards. These mixtures are:

- 0751-019 3% Portland Cement + 6% GGBFS + 2% Bentonite
- 0751-020 3% Portland Cement + 6% GGBFS + 3% EnviroBlend CS

The treatability study report is included as **Appendix E**.

5.2 Tributary Sediments Treatability Test Results

Preliminary design calculations were conducted to determine the available volume within the lagoon after excavation and offsite disposal of TSCA-level Hazardous Waste soils. These calculations showed that there would not be sufficient volume available within the lagoon for the sediment soils, therefore additional

characterization data would be needed for the tributary sediments in order to determine disposal option. Three composite samples were collected on August 2, 2021. The composite samples were collected with a hand core sediment sampler pushed 12 inches into the sediment. Four sediment samples were collected for each composite sample.

The composite samples (COMP-1, COMP-2, and COMP-3) were analyzed for TCLP metals, geotechnical analyses (gradation with hydrometer, Atterberg Limits, specific gravity, total organic carbon, pH, and moisture content), and utilized for treatability testing with EnviroBlend by Premier Magnesia, LLC (EnviroBlend is a subsidiary of Premier Magnesia, LLC).

Premier Magnesia conducted the bench scale treatability study using three composite samples collected from the tributary.

The following physical properties were tested prior to treatment:

- Particle size distribution with hydrometer
- Sample classification
- Atterberg limits
- Total organic carbon
- Percent solids
- pH
- Specific gravity
- Total and SPLP RCRA metals
- PCBs
- VOCs and TCLP VOCs
- SVOCs and TCLP VOCs

Of the three samples tested, only one sample (COMP-1) failed the TCLP for lead with a level of 1,120 mg/kg. COMP-1 passed the paint filter test. The sample was amended with three dosages of EnviroBlend CS (2%, 3%, and 4%). The treated samples were tested for lead, cadmium, and paint filter to determine the required additives to be accepted for offsite disposal as non-hazardous.

A 2% dosage of Enviroblend will produce pH, TCLP cadmium, and TCLP lead results below the screening standards required for disposal.

The treatability study report is included in **Appendix E**.

6. Data Validation and Usability

10% of the sediment, soil, groundwater, and drinking water samples collected during the sampling program were validated. The Data Validation Usability Reports are included in **Appendix F**.

480-170504-1

Data from sediment samples collected May 21-22, 2021 were reported by Eurofins Test America, Buffalo as a single SDG, 480-170504-1, for which a DUSR was completed. Thirteen samples were submitted, including one MS/MSD pair, three field duplicate, 8 environmental samples. Analyses included PCBs (SW846 Method 8082A), total metals (SW846 Method 6010C), and total organic carbon (Lloyd Kahn Method). Data quality was generally acceptable.

Data quality issues requiring qualification were:

PCBs: The percent differences between the dual columns exceeded the criteria of < 25%, and results were flagged as "J". The surrogate recovery required the qualification of PCBs results for sample 102-06-12-05220 as "J+" possibly biased high.

Total Metals: The relatively percent difference (which primarily assesses variability in the sample matrix) for the field duplicates exceeded the 50% criterion for cadmium and lead. These were qualified as "J"

TOC: no qualifications necessary.

480-175717-3

Data from soil samples collected September 22-23, 2021 were reported by Eurofins Test America, Buffalo as a single SDG, 480-175717-3, for which a DUSR was completed. Fourteen samples were submitted, including two MS/MSD pairs, and 10 environmental samples. Analyses included PCBs (SW846 Method 8082A), total metals (SW846 Method 6010C). Data quality was generally acceptable.

Data quality issues requiring qualification were:

PCBs: The percent differences between standards during continuing calibrations exceeded the criteria of < 25%, and results (which were non-detect) were flagged as "UJ". The surrogate recovery required the qualification of PCBs results for samples SW2-3 and LG-5 9 as "J+" possibly biased high.

Total Metals: The MS recoveries for lead were outside of QC limits. The primary samples were qualified as "J"

480-175722-1

The data from the single drinking water sample collected on September 22, 2021 were reported by Eurofins Test America, Buffalo as a single SDG, 480-175722-1, for which a DUSR was completed. One sample was submitted. Analyses included total and dissolved metals (SW846 Method 6010C and 7470A), and fluoride (Method SM4500F C). Data quality was generally acceptable.

No data qualifications were necessary for total metals, dissolved metals and fluoride

460-197436-1

Data from groundwater samples collected November 20-21, 2021 were reported by Eurofins Test America, Buffalo as a single SDG, 460-197436-1, for which a DUSR was completed. Six samples were submitted, including one MS/MSD pair, one field blank, one field duplicate, and 2 environmental samples. Analyses included 1,4-dioxane (SW846 Method 8270D SIM), and PFAS (EPA Method 537 Modified (low level)). Data quality was generally acceptable.

Data quality issues requiring qualification were:

1,4-Dioxane: No data qualification were necessary

PFAS: The MS/DS recoveries for 6:2 FTS. The result for MW-7 was non-detect and was flagged “UJ”. Some results were reported as greater than the MDL but less than the RL, these were qualified as “J”

480-170504-1

Data from Groundwater samples collected January 28, 2022 were reported by Eurofins Test America, Buffalo as a single SDG, 480-170504-1, for which a DUSR was completed. Four samples were submitted, including one MS/MSD pair, one field duplicate, 1 environmental sample. Analyses included VOCs (SW846 Method 8260C), SVOCs (SW846 Method 8270D), pesticides (SW846 Method 8081B), PCBs (SW846 Method 8082A), total and dissolved metals (SW846 Method 6010C, and 7470A), total cyanide (SW846 Method 9012B), and fluoride (SM4500F C). Data quality was generally acceptable.

Data quality issues requiring qualification were:

VOCs: Continuing calibration required the non-detected carbon disulfide qualified as “UJ”.

SVOCs: Continuing calibration required the non-detected 4-nitrophenol qualified as “UJ”.

Pesticides: Continuing calibration required the non-detected toxaphene qualified as “UJ”. Due to detection in the blanks, the positive gamma BHC result for sample MW-14 (which was below the reporting limit) was qualified as non-detect “U”. based on the column RPD, the results for DDT and aldrin were flagged as “J”.

PCBs: Based on continuing calibration, Aroclor 1016 and 1260 (which were non-detect) were qualified as “UJ”.

Total Metals: Due to detection in blanks, detected values below the reporting limit for copper, manganese, and zinc were qualified as non-detect “U”. Due to MS/DS recoveries, results for barium and sodium were qualified “J”. the field duplicate results for barium and sodium exceeded QC limits, and so results were qualified as “J”.

Dissolved Metals: Due to detection in blanks, detected values below the reporting limit for copper, manganese, and zinc were qualified as non-detect “U”.

Total Cyanide: No data qualifications were required.

Fluoride: No data qualifications were required.

480-165715-1

Data from Soil samples collected January 28-29, 2022 were reported by Eurofins Test America, Buffalo as a single SDG, 480-165715-1, for which a DUSR was completed. Seven samples were submitted, including one MS/MSD pair, one field duplicate, 4 environmental samples. Analyses included VOCs (SW846 Method 8260C), SVOCs (SW846 Method 8270D), pesticides (SW846 Method 8081B), PCBs (SW846 Method 8082A), total and dissolved metals (SW846 Method 6010C, and 7470A), varying with the sample. Data quality was generally acceptable.

Data quality issues requiring qualification were:

VOCs: Continuing calibration required the non-detected results for dichlorodifluoromethane and trichlorofluoromethane be qualified as “UJ”. Chloroform was detected in the blank resulting in the result (which was less than the RL) being qualified as “U”.

SVOCs: Continuing calibration required the non-detected hexachlorocyclopentadiene be qualified as “UJ”.

Pesticides: Continuing calibration required the non-detected toxaphene qualified as “UJ”. Due to detection in the blanks, the positive gamma BHC result for sample VS-2 (which was below the reporting limit) was qualified as non-detect “U”. Based on the column RPD, the results for six compounds were flagged as “J”.

PCBs: Based on continuing calibration, seven Aroclors (which were non-detect) were qualified as “UJ”. The Aroclor 1254 result for sample VS-2 (0-12) 012920 exceeded the linear calibration range of the instrument. The Aroclor 1254 result for this sample was qualified as estimated “J”.

Total Metals: No data qualifications were required

7. Summary and Conclusions

Soils impacted with PCBs will be remediated by excavation of soil and proper off-site disposal and by capping with a clean soil cap and/or existing impermeable cap in accordance with 40 CFR §761.61(a)(7) and the NYSDEC regulations for inaccessible soil. In areas where PCBs are left in place beneath a clean soil cap or building, an environmental easement that prevents disturbance of the cap and requires cap inspection and maintenance will be recorded in general accordance with §761.61(a)(8).

The remediation activities are proposed in two phases as detailed below:

- Phase I Activities
    - Removal, dewatering, chemical stabilization and offsite disposal of the Tributary D-1-7 sediments to depths of 12 to 18 inches; and,
    - Restoration of the Tributary D-1-7.
- Phase II Activities
    - Excavation and off-site disposal of subsurface soils with PCB concentrations greater than 50 PPM (TSCA characteristic Hazardous Waste) within the lagoon;
    - In-situ solidification of deeper soils within the lagoon with PCB concentrations greater than 1 PPM, TCLP Lead concentrations greater than 5 PPM, or TCLP Cadmium concentrations greater than 1 PPM;
    - Excavation of soil from the wooded area and ex-situ stabilization in the lagoon; and,
    - Placement of 4 feet of clean soil cap and asphalt pavement across the lagoon area.

Details of the extents of remediation are shown on the attached **Figure 7**.

8. References

Delaware Engineering, P.C. Remedial Investigation Report, C&D Power Systems (C&D Batteries), Huguenot, New York, Site No. 336001. June 2000, revised March 2001.

Delaware Engineering, P.C. Operable Unit 2 Remedial Investigation Report, C&D Power Systems (C&D Batteries), Huguenot, New York, Site No. 336001. December 2003, revised May 2006.

Delaware Engineering, P.C. RE: C&D Site, Site No. 336001 Tributary D-1-7 Sediment Data. June 22, 2007.

Delaware Engineering, P.C. Feasibility Study Report Operable Unit-1 and Operable Unit-2, C&D Power Systems (C&D Batteries), Hamlet of Huguenot, New York, Site # 3-36-001. September 2008, revised February 2009, May 2013, June 2014, and August 2014.

NYSDEC Division of Environment Remediation. Record of Decision & Record of Decision Amendment, C&D Power Systems (C&D Batteries), State Superfund Project/RCRA Project, Deer Park, Orange County, Site No. 336001, EPA ID #NYD064337298. May 2015.

Department of State, Division of Administrative Rules. New York Codes, Rules and Regulations, Title 6 Department of Environmental Conservation. May 2020.

United States Environmental Protection Agency. Guidance on Environmental Data Verification and Data Validation. November 2002.

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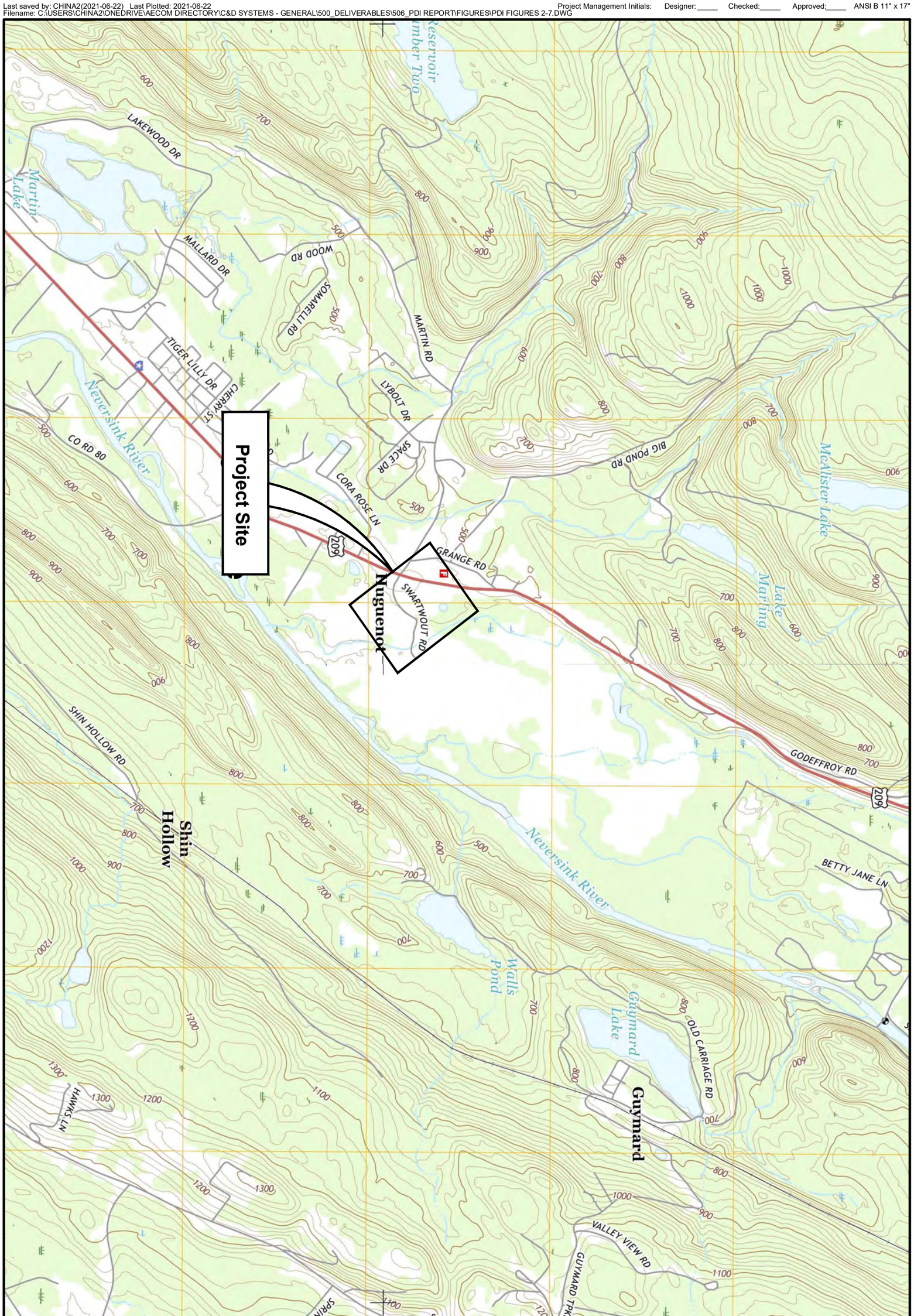

Issue Status: DRAFT

PRE-DESIGN INVESTIGATION REPORT
FORMER C&D POWER SYSTEMS
HUGUENOT, NEW YORK
Project No.: 60612108 Date: 2022-02-11

SITE LOCATION MAP

AECOM

Figure: 1

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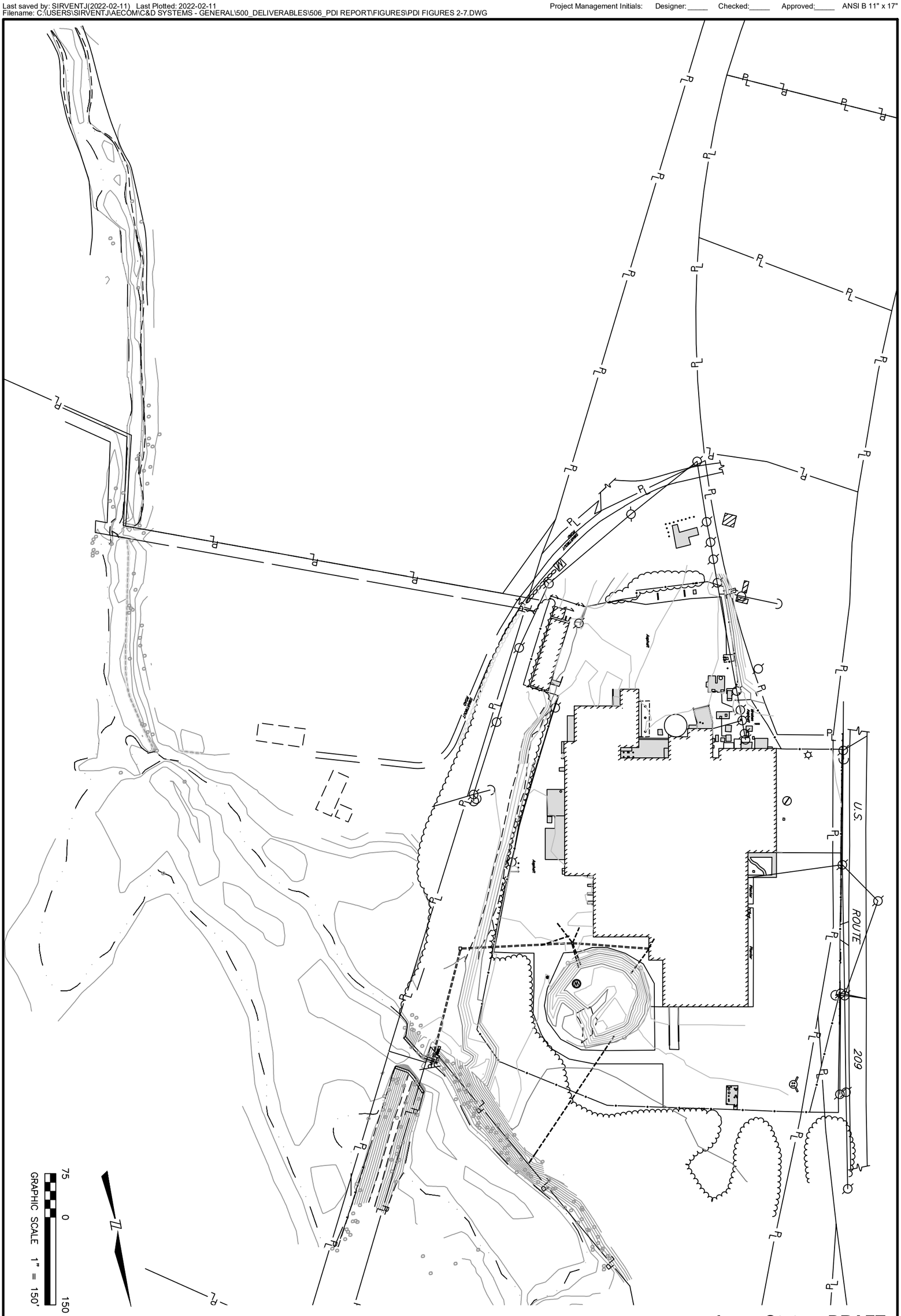

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PRE-DESIGN INVESTIGATION REPORT
FORMER C&D POWER SYSTEMS
HUGUENOT, NEW YORK
Project No.: 60612108 Date: 2022-02-11

SITE PLAN

AECOM

Figure: 2

Project Management Initials: ____ Designer: ____ Checked: ____ Approved: ____ ANSI B 11" x 17"

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Issue Status: DRAFT

AECOM

Figure: 3

LAGOON SOILS
ANALYTICAL DATA

SAMPLE	TOTAL PCBs mg/kg	SAMPLE	TOTAL PCBs mg/kg	SAMPLE	TOTAL PCBs mg/kg
SW-04-3 (0-12")	24	SW-04-6 (0-12")	ND	SW-04-9 (12-24")	0.15
SW-04-3 (12-24")	2.0	SW-04-6 (12-24")	1.3	SW-04-9 (24-36")	0.23
SW-04-3 (24-36")	0.41	SW-04-6 (24-36")	0.10	SW-04-9 (36-48")	0.19
SW-04-3 (36-48")	ND	SW-04-6 (36-48")	0.19		

SAMPLE	TOTAL PCBs mg/kg	SAMPLE	TOTAL PCBs mg/kg	SAMPLE	TOTAL PCBs mg/kg
SW-03-3 (0-12")	5.8	SW-03-6 (0-12")	0.54	SW-03-9 (0-12")	ND
SW-03-3 (12-24")	53	SW-03-6 (12-24")	0.10	SW-03-9 (12-24")	ND
SW-03-3 (24-36")	58	SW-03-6 (24-36")	ND	SW-03-9 (24-36")	0.11
		SW-03-6 (36-48")	ND	SW-03-9 (36-48")	ND

SAMPLE	TOTAL PCBs mg/kg	TCLP CADMIUM mg/kg	TCLP LEAD mg/kg
LG-03 (2-4')	7.9		
LG-03 (4-6')	3.0		
LG-03 (16-18')	9.1		
LG-03 (20-22')	4.2		
LG-03 (22-24')	7.6		
LG-03 (24-26')	2.5		
LG-03 (28-30')	ND	0.0017	ND

SAMPLE	TOTAL PCBs mg/kg
SW-4-5 (0-12")	89
SW-4-5 (12-24")	31

SAMPLE	TOTAL PCBs mg/kg
SW-4-3 (0-12")	220
SW-4-3 (12-24")	7.8

SAMPLE	TOTAL PCBs mg/kg	TCLP CADMIUM mg/kg	TCLP LEAD mg/kg
LG-02 (1-3')	51		
LG-02 (3-5')	36		
LG-02 (11-13')	21		
LG-02 (15-17')	33		
LG-02 (17-19')	8.7		
LG-02 (23-25')	33	5.7	0.66

SAMPLE	TOTAL PCBs mg/kg
SW-3-3 (0-12")	190
SW-3-3 (12-24")	110

SAMPLE	TOTAL PCBs mg/kg	TCLP CADMIUM mg/kg	TCLP LEAD mg/kg
LG-01 (2-4')	76		
LG-01 (4-6')	31		
LG-01 (6-8')	29		
LG-01 (13-15')	9.1		
LG-01 (17-19')	9.5		
LG-01 (19-21')	2.6		
LG-01 (23-25')	0.32	1.1	0.18

SAMPLE	TOTAL PCBs mg/kg	SAMPLE	TOTAL PCBs mg/kg	SAMPLE	TOTAL PCBs mg/kg
SW-02-3 (0-12")	59	SW-02-6 (0-12")	1.2	SW-02-9 (0-12")	0.21
SW-02-3 (12-24")	11	SW-02-6 (12-24")	0.87	SW-02-9 (12-24")	0.22
		SW-02-6 (24-36")	0.15	SW-02-9 (24-36")	0.34
				SW-02-9 (36-48")	0.91

SAMPLE	TOTAL PCBs mg/kg
SW-2-3 (0-12")	400
SW-2-3 (12-24")	350

SAMPLE	TOTAL PCBs mg/kg	SAMPLE	TOTAL PCBs mg/kg
SW-01-3 (0-12")	13	SW-01-6 (0-12")	0.78
SW-01-3 (12-24")	170	SW-01-6 (24-36")	1.5
SW-01-3 (24-36")	29	SW-01-9 (0-12")	0.53
SW-01-3 (36-48")	77		

SAMPLE	TOTAL PCBs mg/kg
SW-5-3 (0-12")	9.4
SW-5-3 (12-24")	2.9

SAMPLE	TOTAL PCBs mg/kg
SW-5-5 (0-12")	1.2
SW-5-5 (12-24")	0.23

SAMPLE	TOTAL PCBs mg/kg
OF-03	ND

SAMPLE	TOTAL PCBs mg/kg
SW-6-3 (0-12")	23
SW-6-3 (12-24")	2.5

SAMPLE	TOTAL PCBs mg/kg
SW-6-5 (0-12")	3.8
SW-6-5 (12-24")	1.2

SAMPLE	TOTAL PCBs mg/kg	TCLP CADMIUM mg/kg	TCLP LEAD mg/kg
LG-04 (1-3')	87		
LG-04 (3-5')	18		
LG-04 (11-13')	1.5		
LG-04 (13-15')	0.31		
LG-04 (15-17')	0.11		
LG-04 (17-19')	0.88		
LG-04 (21-23')	0.35		
LG-04 (23-25')	0.32	0.11	0.0390

SAMPLE	TOTAL PCBs mg/kg
OF-02	1.7

SAMPLE	TOTAL PCBs mg/kg
OF-01	0.50

SAMPLE	TOTAL PCBs mg/kg
SW-7-3 (0-12")	4
SW-7-3 (12-24")	0.37

SAMPLE	TOTAL PCBs mg/kg	TCLP CADMIUM mg/kg	TCLP LEAD mg/kg
LG-05 (1-3')	7.1		
LG-05 (3-5')	16		
LG-05 (5-7')	51		
LG-05 (9-11')	100		
LG-05 (19-21')	1.6		
LG-05 (21-23')	1.3		
LG-05 (23-25')	0.54	0.13	0.10

SAMPLE	TOTAL PCBs mg/kg
SW-1-3 (0-12")	280
SW-1-3 (12-24")	95

SAMPLE	TOTAL PCBs mg/kg	SAMPLE	TOTAL PCBs mg/kg	SAMPLE	TOTAL PCBs mg/kg
SW-08-3 (0-12")	46	SW-08-6 (0-12")	24	SW-08-9 (0-12")	150
SW-08-3 (12-24")	32	SW-08-6 (12-24")	64	SW-08-9 (12-24")	160
SW-08-3 (24-36")	26	SW-08-6 (24-36")	58	SW-08-9 (24-36")	64
		SW-08-6 (36-48")	27	SW-08-9 (36-48")	170

SAMPLE	TOTAL PCBs mg/kg
SW-8-3 (0-12")	14
SW-8-3 (12-24")	14

Asphalt

LEGEND

▲ SIDEWALL SAMPLING LOCATION

● BOTTOM SAMPLING LOCATION

30 0 60

GRAPHIC SCALE 1" = 60'

PRE-DESIGN INVESTIGATION REPORT
FORMER C&D POWER SYSTEMS
HUGUENOT, NEW YORK
Project No.: 60612108 Date: 2022-02-11

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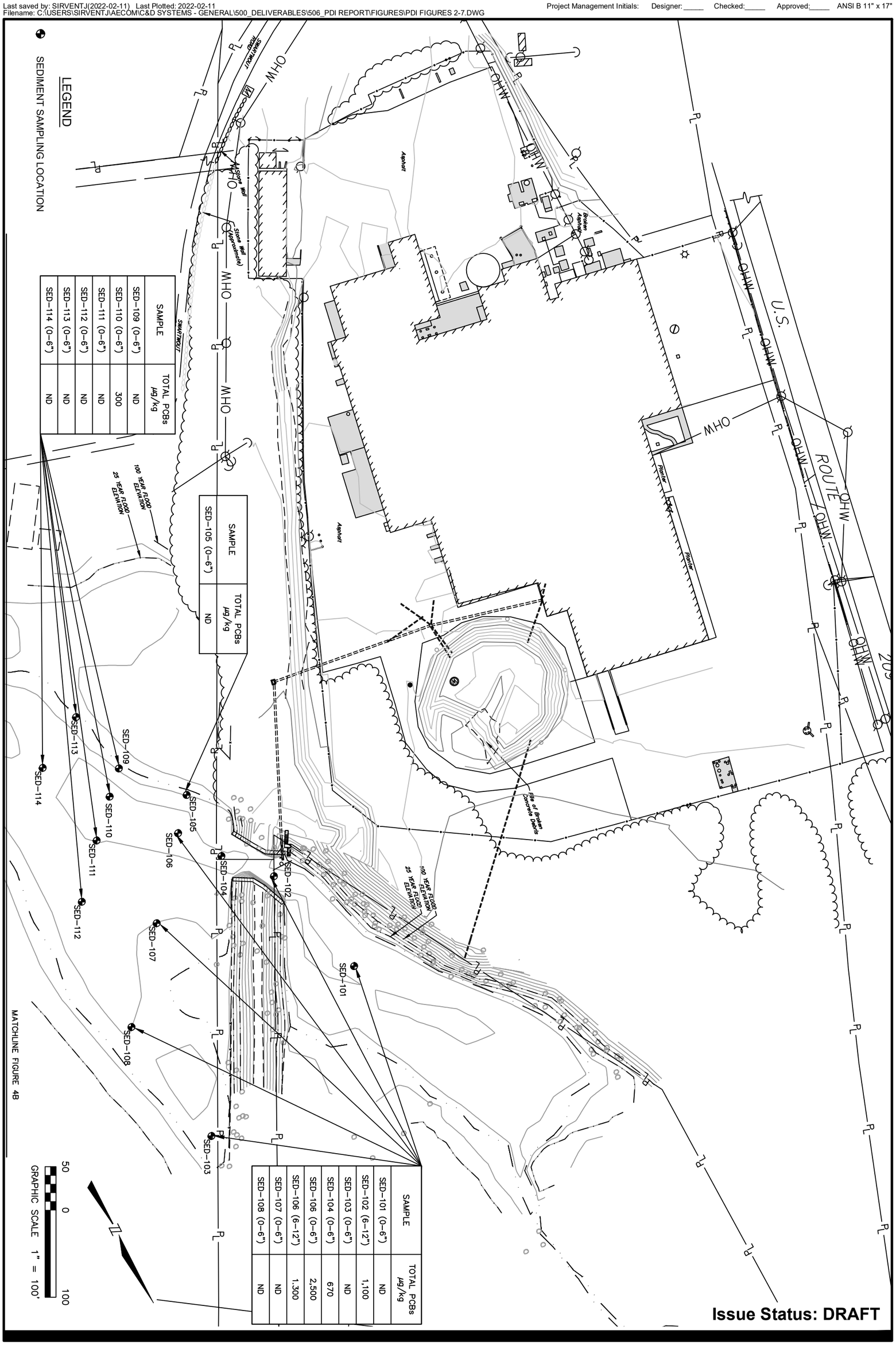

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PRE-DESIGN INVESTIGATION REPORT
FORMER C&D POWER SYSTEMS
HUGUENOT, NEW YORK
Project No.: 60612108 Date: 2022-02-11

SEDIMENT ANALYTICAL DATA
(UPPER TRIBUTARY)

AECOM

Figure: 4A

MATCHLINE FIGURE 4A

SAMPLE	TOTAL PCBs µg/kg
SED-115 (0-6")	ND
SED-116 (6-12")	910
SED-117 (0-6")	ND
SED-118 (6-12")	340
SED-119 (0-6")	ND
SED-120 (0-6")	ND
SED-121 (0-6")	ND

SAMPLE	TOTAL PCBs µg/kg
SED-128 (0-6")	ND
SED-129 (0-6")	ND
SED-130 (0-6")	ND
SED-131 (0-6")	ND
SED-132 (0-6")	ND
SED-133 (0-6")	ND
SED-134 (0-6")	ND

SAMPLE	TOTAL PCBs µg/kg
SED-122 (0-6")	ND
SED-123 (0-6")	ND
SED-124 (0-6")	270
SED-125 (0-6")	ND
SED-126 (0-6")	ND
SED-127 (0-6")	230

SAMPLE	TOTAL PCBs µg/kg
SED-135 (0-6")	ND
SED-136 (6-12")	130
SED-137 (0-6")	ND
SED-138 (0-6")	ND
SED-139 (0-6")	ND
SED-140 (0-6")	130

SED-115
SED-116
SED-117
SED-118
SED-119
SED-120
SED-121
SED-124
SED-125
SED-126
SED-122
SED-123
SED-127
SED-128
SED-129
SED-130
SED-131
SED-132
SED-133
SED-134
SED-135
SED-136
SED-137
SED-138
SED-139
SED-140

LEGEND

SEDIMENT SAMPLING LOCATION

60 0 120

GRAPHIC SCALE 1" = 120'

Issue Status: DRAFT

AECOM

Figure: 4B

SEDIMENT ANALYTICAL DATA (LOWER TRIBUTARY)

PRE-DESIGN INVESTIGATION REPORT
FORMER C&D POWER SYSTEMS
HUGUENOT, NEW YORK
Project No.: 60612108 Date: 2022-02-11

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SAMPLE	TOTAL PCBs µg/kg
VS–1 (0–12")	0.69
VS–2 (0–12")	7.9

SAMPLE	TOTAL PCBs µg/kg
SHED–01	3,800
WAS–14 (0–2")	1,800
WAS–15 (0–2")	850
WAS–16 (0–2")	ND
WAS–17 (0–2")	ND
WAS–18 (0–2")	ND
WAS–19 (0–2")	2,800

SAMPLE	TOTAL PCBs µg/kg
WAS–11 (0–2")	3,300

SAMPLE	TOTAL PCBs µg/kg
WAS–13 (0–2")	960

SAMPLE	TOTAL PCBs µg/kg
WAS–12 (0–2")	2,700
WAS–20 (0–2")	150

LEGEND

- VAULT SAMPLING LOCATION
- SURFICIAL SOIL (0-2") SAMPLING LOCATION SEPTEMBER 2020

NOTES:

1. FOR WAS-1 THROUGH WAS-5 SAMPLE LOCATIONS, THE HIGHEST PCB CONCENTRATIONS ARE PRESENTED. THE DEPTH INTERVAL WHERE THE HIGHEST CONCENTRATIONS WERE OBSERVED ARE INDICATED.

Planter
Broken Asphalt
Asphalt
File of Broken Concrete Debris
SHED–01
WAS–19
WAS–17
WAS–16
WAS–20
WAS–11
WAS–18
WAS–14
WAS–15
WAS–13
WAS–12
Stone Wall
Storm Wall (Approximate)
SWARTWOUT ROAD
100 YEAR FLOOD ELEVATION
OHW
MHO
PL

40 0 80
GRAPHIC SCALE 1" = 80'

Issue Status: DRAFT

AECOM

Figure: 5

UPLAND SITE AREA
ANALYTICAL DATA

PRE-DESIGN INVESTIGATION REPORT
FORMER C&D POWER SYSTEMS
HUGUENOT, NEW YORK
Project No.: 60612108 Date: 2022-02-11

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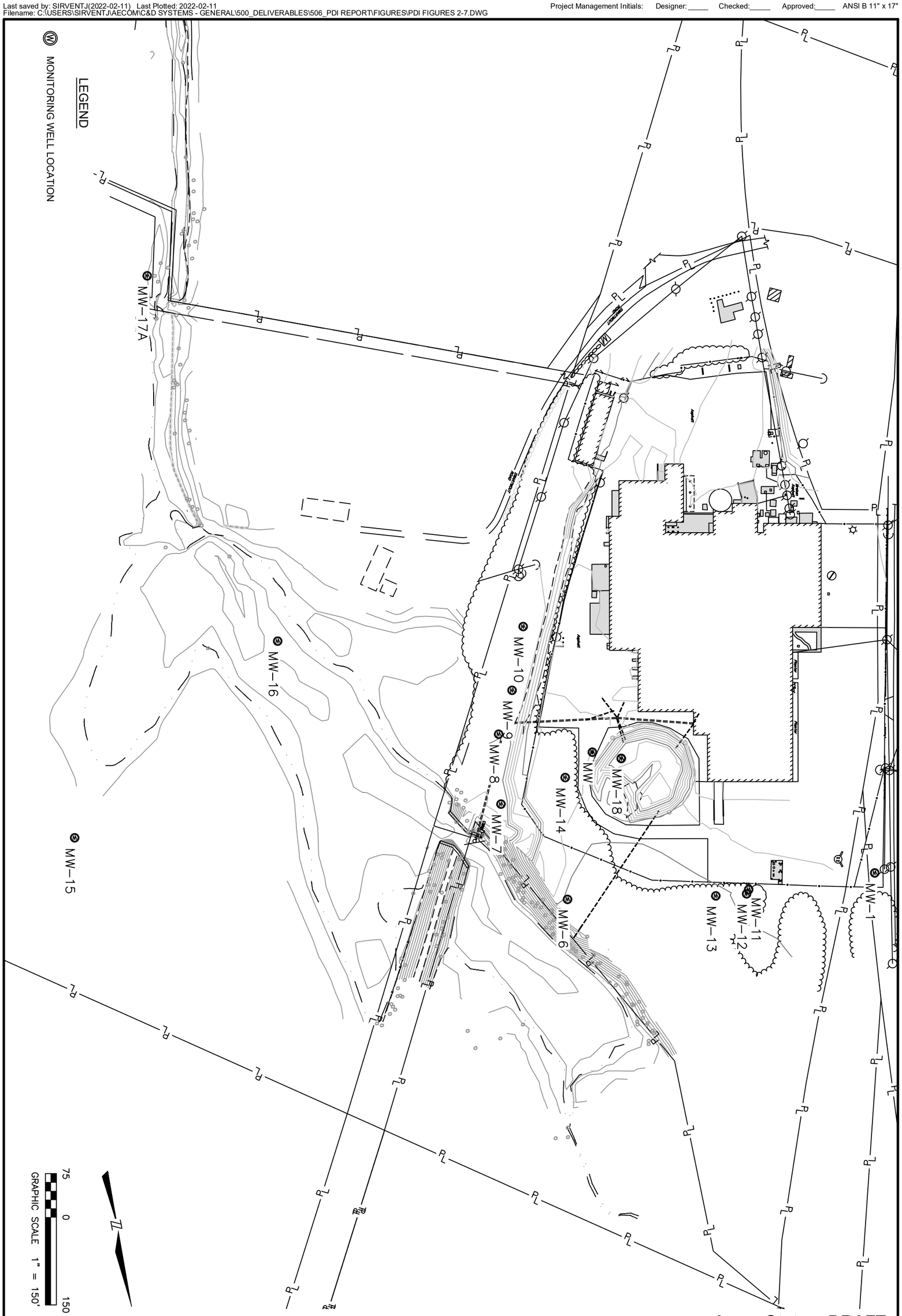
Project Management Initials: Designer:_____ Checked:_____ Approved:_____ ANSI B 11" x 17"



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PRE-DESIGN INVESTIGATION REPORT
FORMER C&D POWER SYSTEMS
HUGUENOT, NEW YORK
Project No.: 60612108 Date: 2022-02-11

MONITORING WELL LOCATIONS

AECOM

Figure: 6

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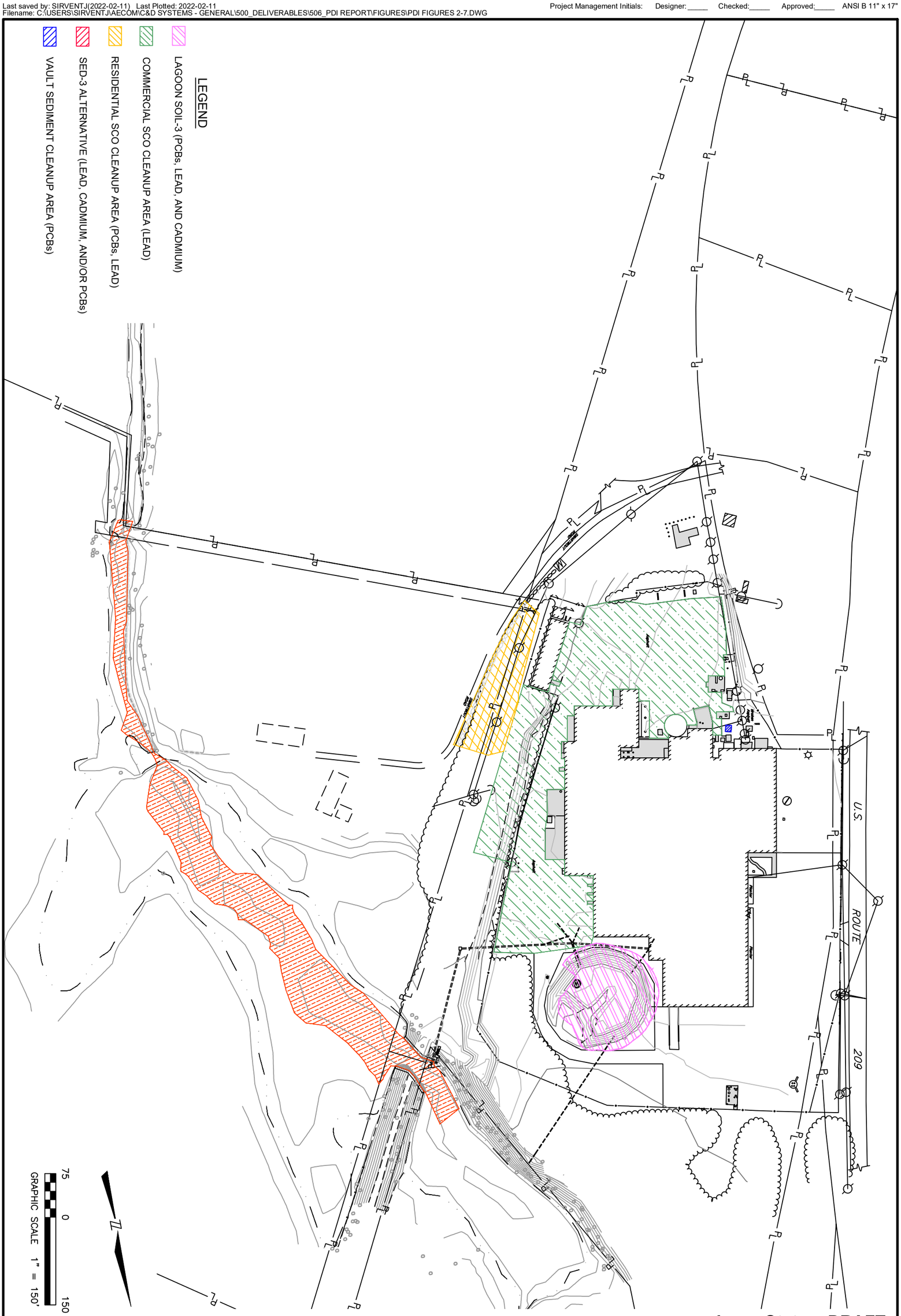
Project Management Initials: Designer:_____ Checked:_____ Approved:_____ ANSI B 11" x 17"



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PRE-DESIGN INVESTIGATION REPORT
FORMER C&D POWER SYSTEMS
HUGUENOT, NEW YORK
Project No.: 60612108 Date: 2022-02-11

REMEDIATION TARGET AREAS

AECOM

Figure: 7

Table 1
Summary of Lagoon Bottom Analytical Data
C and D Batteries Site No. 336001
Huguenot, New York

Sample ID		LG-1 2-4-20200921		LG-1 4-6-20200921		LG-1 6-8-20200921		LG-1 13-15-20200921		LG-1 17-19-20200921		LG-1 19-21-20200921		LG-1 23-25-20200921		LG-2 1-3-20200921	
Lab Sample Number	Restricted Use SCGs	480-175717-15		480-175717-16		480-175717-17		480-175717-18		480-175717-19		480-175717-20		480-175717-21		480-175717-22	
Sampling Date		09/21/2020 13:10:00		09/21/2020 13:23:00		09/21/2020 13:35:00		09/21/2020 14:25:00		09/21/2020 14:42:00		09/21/2020 14:53:00		09/21/2020 15:01:00		09/21/2020 16:55:00	
Matrix		Solid		Solid		Solid		Solid		Solid		Solid		Solid		Solid	
Dilution Factor		20		10		10		5		1		1		1		20	
Units	mg/kg	mg/Kg		mg/Kg		mg/Kg		mg/Kg		mg/Kg		mg/Kg		mg/Kg		mg/Kg	
		Low		Low		Low		Low		Low		Low		Low		Low	
GC Semivolatiles - 8082A																	
PCB-1016	1	ND	U	ND	U	ND	J F1	ND	U	ND	U	ND	U	ND	U	ND	U
PCB-1221	1	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
PCB-1232	1	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
PCB-1242	1	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
PCB-1248	1	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
PCB-1254	1	**76**		**31**		**29**		**9.1**		**9.5**		**2.6**		0.32		**51**	
PCB-1260	1	ND	U	ND	U	ND	2 F1	ND	U	ND	U	ND	U	ND	U *	ND	U *
PCB-1262	1	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
PCB-1268	1	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
Metals																	
Cadmium	7.5	**8830**	B	**1140**	B	**1610**	B	**276**	B	**379**	B	**23.4**	B	**52.5**	B	**2570**	B
Lead	450	**3350**	B	**508**	B	**582**	B	127	B	253	B	76.4	B	63.3		**1410**	

Sample ID		LG-2 3-5-20200921		LG-2 11-13-20200922		LG-2 15-17-20200922		LG-2 17-19-20200922		LG-2 23-25-20200922		LG-3 2-4-20200922		LG-3 4-6-20200922		LG-3 16-18-20200922	
Lab Sample Number	Restricted Use SCGs	480-175717-23		480-175717-24		480-175717-25		480-175717-26		480-175717-27		480-175717-44		480-175717-45		480-175717-46	
Sampling Date		09/21/2020 16:58:00		09/22/2020 09:10:00		09/22/2020 09:37:00		09/22/2020 09:40:00		09/22/2020 10:17:00		09/22/2020 10:58:00		09/22/2020 11:05:00		09/22/2020 11:50:00	
Matrix		Solid		Solid		Solid		Solid		Solid		Solid		Solid		Solid	
Dilution Factor		10		10		20		5		10		1		1		1	
Units	mg/kg	mg/Kg		mg/Kg		mg/Kg		mg/Kg		mg/Kg		mg/Kg		mg/Kg		mg/Kg	
		Low		Low		Low		Low		Low		Low		Low		Low	
GC Semivolatiles - 8082A																	
PCB-1016	1	ND	U	ND	J F1	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
PCB-1221	1	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
PCB-1232	1	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
PCB-1242	1	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
PCB-1248	1	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
PCB-1254	1	**36**		**21**		**33**		**8.7**		**33**		**7.9**		**3.0**		**9.1**	
PCB-1260	1	ND	U *	ND	F1 *	ND	U *	ND	U *	ND	U *	ND	U	ND	U	ND	U
PCB-1262	1	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
PCB-1268	1	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
Metals																	
Cadmium	7.5	**2050**	B	**261**	F2 B	**844**	B	**232**	B	**319**	B	**339**		**85.3**		**33.7**	
Lead	450	**1070**		193	F2	389		139		184		175		52.4		23.1	

B : Compound was found in the blank and sample.
F1 : MS and/or MSD recovery exceeds control limits.
F2 : MS/MSD RPD exceeds control limits
U : Indicates the analyte was analyzed for but not detected.
SCG: Part 375-6.8(b), Restricted Use Soil Cleanup Objectives for the Protection of Public Health for Commercial Use.
Red Bolded text represents exceedance of the Restricted Use SCGs.
Yellow highlighted text represents material to be removed with an exceedance of 50 mg/kg.

Table 1
Summary of Lagoon Bottom Analytical Data
C and D Batteries Site No. 336001
Huguenot, New York

Sample ID		LG-3 20-22-20200922		LG-3 22-24-20200922		LG-3 24-26-20200922		LG-3 28-30-20200922		LG-4 1-3-20200922		LG-4 3-5-20200922		LG-4 11-13-20200922		LG-4 13-15-20200922	
Lab Sample Number	Restricted Use SCGs	480-175717-47		480-175717-48		480-175717-49		480-175717-50		480-175717-56		480-175717-57		480-175717-58		480-175717-59	
Sampling Date		09/22/2020 13:28:00		09/22/2020 13:41:00		09/22/2020 13:48:00		09/22/2020 14:05:00		09/22/2020 15:02:00		09/22/2020 15:08:00		09/22/2020 15:35:00		09/22/2020 15:40:00	
Matrix		Solid		Solid		Solid		Solid		Solid		Solid		Solid		Solid	
Dilution Factor		1		1		1		1		20		10		1		1	
Units	mg/kg	mg/Kg		mg/Kg		mg/Kg		mg/Kg		mg/Kg		mg/Kg		mg/Kg		mg/Kg	
		Low		Low		Low		Low		Low		Low		Low		Low	
GC Semivolatiles - 8082A																	
PCB-1016	1	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
PCB-1221	1	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
PCB-1232	1	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
PCB-1242	1	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
PCB-1248	1	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
PCB-1254	1	4.2		7.6		2.5		ND	U	87		18		1.5		0.31	
PCB-1260	1	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
PCB-1262	1	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
PCB-1268	1	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
Metals																	
Cadmium	7.5	10.2		14.5		13.5		0.18	J	67.2		45.9		21.2		4.8	
Lead	450	12.2		14.1		11.1		7.2		231		5040		6100		65.1	

Sample ID		LG-4 15-17-20200922		LG-4 17-19-20200922		LG-4 21-23-20200922		LG-4 23-25-20200922		LG-52 11-13-20200922		LG-5 1-3-20200923		LG-5 3-5-20200923		LG-5 5-7-20200923	
Lab Sample Number	Restricted Use SCGs	480-175717-60		480-175717-61		480-175717-62		480-175717-63		480-175717-64		480-175717-72		480-175717-73		480-175717-74	
Sampling Date		09/22/2020 16:05:00		09/22/2020 16:10:00		09/22/2020 16:35:00		09/22/2020 16:50:00		09/22/2020 11:11:00		09/23/2020 09:33:00		09/23/2020 09:41:00		09/23/2020 09:50:00	
Matrix		Solid		Solid		Solid		Solid		Solid		Solid		Solid		Solid	
Dilution Factor		1		1		1		1		5		1		5		10	
Units	mg/kg	mg/Kg		mg/Kg		mg/Kg		mg/Kg		mg/Kg		mg/Kg		mg/Kg		mg/Kg	
		Low		Low		Low		Low		Low		Low		Low		Low	
GC Semivolatiles - 8082A																	
PCB-1016	1	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
PCB-1221	1	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
PCB-1232	1	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
PCB-1242	1	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
PCB-1248	1	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
PCB-1254	1	0.11	J	0.88		0.35		0.32		16		7.1		16		51	
PCB-1260	1	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
PCB-1262	1	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
PCB-1268	1	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
Metals																	
Cadmium	7.5	0.23		0.56		9.7		12.1		7.9		28.3		59.8		98.9	
Lead	450	10.9		9.3		37.4		9.9		25.3		88.8		704		1300	

B : Compound was found in the blank and sample.
F1 : MS and/or MSD recovery exceeds control limits.
F2 : MS/MSD RPD exceeds control limits
U : Indicates the analyte was analyzed for but not detected.
SCG: Part 375-6.8(b), Restricted Use Soil Cleanup Objectives for the Protection of Public Health for Commercial Use.
Red Bolded text represents exceedance of the Restricted Use SCGs.
Yellow highlighted text represents material to be removed with an exceedance of 50 mg/kg.

Table 1
Summary of Lagoon Bottom Analytical Data
C and D Batteries Site No. 336001
Huguenot, New York

Sample ID	Restricted Use SCGs	LG-5 9-11-20200923		LG-5 19-21-20200923		LG-5 21-23-20200923		LG-5 23-25-20200923	
Lab Sample Number		480-175717-75		480-175717-76		480-175717-77		480-175717-78	
Sampling Date		09/23/2020 10:00:00		09/23/2020 10:50:00		09/23/2020 11:21:00		09/23/2020 11:30:00	
Matrix		Solid		Solid		Solid		Solid	
Dilution Factor		20		1		1		1	
Units	mg/kg	mg/Kg		mg/Kg		mg/Kg		mg/Kg	
		Low		Low		Low		Low	
GC Semivolatiles - 8082A									
PCB-1016	1	ND	U	ND	U	ND	U	ND	U
PCB-1221	1	ND	U	ND	U	ND	U	ND	U
PCB-1232	1	ND	U	ND	U	ND	U	ND	U
PCB-1242	1	ND	U	ND	U	ND	U	ND	U
PCB-1248	1	ND	U	ND	U	ND	U	ND	U
PCB-1254	1	**100**		**1.6**		**1.3**		0.54	
PCB-1260	1	ND	U	ND	U	ND	U	ND	U
PCB-1262	1	ND	U	ND	U	ND	U	ND	U
PCB-1268	1	ND	U	ND	U	ND	U	ND	U
Metals									
Cadmium	7.5	**297**		**14.4**		5.4		6.8	
Lead	450	**2010**		45.8		28.3		24.7	

B : Compound was found in the blank and sample.
F1 : MS and/or MSD recovery exceeds control limits.
F2 : MS/MSD RPD exceeds control limits
U : Indicates the analyte was analyzed for but not detected.
SCG: Part 375-6.8(b), Restricted Use Soil Cleanup Objectives for the Protection of Public Health for Commercial Use.
Red Bolded text represents exceedance of the Restricted Use SCGs.
Yellow highlighted text represents material to be removed with an exceedance of 50 mg/kg.

Table 2
Summary of Lagoon Bottom TCLP Metals Analytical Data
C and D Batteries Site No. 336001
Huguenot, New York

Sample ID	US EPA Allowable Limits	LG-1 23-25-20200921		LG-2 23-25-20200922		LG-2 23-25-20200922		LG-3 28-30-20200922		LG-4 23-25-20200922		LG-5 23-25-20200923	
Lab Sample Number		480-175721-2		480-175721-4		480-175721-4		480-175721-6		480-175721-8		480-175721-10	
Sampling Date		09/21/2020 15:01:00		09/22/2020 10:17:00		09/22/2020 10:17:00		09/22/2020 14:05:00		09/22/2020 16:50:00		09/23/2020 11:30:00	
Depth		23-25		23-25		23-25		28-30		23-25		23-25	
Units	mg/L	mg/L		mg/L		mg/L		mg/L		mg/L		mg/L	
		TCLP Low		TCLP Low		TCLP Low		TCLP Low		TCLP Low		TCLP Low	
Metals													
Arsenic		ND	U	ND	U	NR		ND	U	ND	U	ND	U
Barium		6.6	^	5.7	^	NR		0.17	J ^	3.5	^	3.0	^
Cadmium	1	1.1		NR		5.7		0.0017	J	0.11		0.13	
Chromium		ND	U	0.015	J	NR		ND	U	ND	U	0.042	
Lead	5	0.18		0.66		NR		ND	U	0.039		0.10	
Selenium		ND	U	ND	U	NR		ND	U	ND	U	ND	U
Silver		ND	U	ND	U	NR		ND	U	ND	U	ND	U

^ : ICV,CCV,ICB,CCB, ISA, ISB, CRI, CRA, DLCK or MRL standard: Instrument related QC is outside acceptance limits.
J : Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.
U : Indicates the analyte was analyzed for but not detected.

Table 3
Summary of Lagoon Side Wall Analytical Data
C and D Batteries Site No. 336001
Huguenot, New York

Sample ID	Restricted Use SCGs	SW1-3 0-12-20200921		SW1-3 12-24-20200921		SW1-3 24-36-20200921		SW1-3 36-38-20200921		SW1-6 0-12-20200922		SW1-6 24-36-20200922		SW1-9 0-12-20200922		SW2-3 0-12-20200922	
Lab Sample Number		480-175717-28		480-175717-29		480-175717-30		480-175717-31		480-175717-51		480-175717-52		480-175717-53		480-175717-54	
Sampling Date		09/21/2020 15:55:00		09/21/2020 15:57:00		09/21/2020 15:59:00		09/21/2020 16:01:00		09/22/2020 10:30:00		09/22/2020 10:35:00		09/22/2020 10:47:00		09/22/2020 14:47:00	
Matrix		Solid		Solid		Solid		Solid		Solid		Solid		Solid		Solid	
Dilution Factor		5		50		10		50		1		1		1		20	
Units	mg/kg	mg/Kg		mg/Kg		mg/Kg		mg/Kg		mg/Kg		mg/Kg		mg/Kg		mg/Kg	
		Low		Low		Low		Low		Low		Low		Low		Low	
GC Semivolatiles - 8082A																	
PCB-1016	1	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
PCB-1221	1	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
PCB-1232	1	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
PCB-1242	1	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
PCB-1248	1	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
PCB-1254	1	**13**		**170**		**29**		**77**		0.78		**1.5**		0.53		**59**	
PCB-1260	1	ND	U *	ND	U *	ND	U *	ND	U *	ND	U	ND	U	ND	U	ND	U
PCB-1262	1	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
PCB-1268	1	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
Metals																	
Cadmium	7.5	**56.6**	B	**375**	B	**48.3**	B	**167**	B	**21.6**		**20.1**		**9.2**		NR	
Lead	450	195		341		167		241		177		122	F1	69.3	F1	**1160**	

Sample ID	Restricted Use SCGs	SW2-3 12-24-20200922		SW2-6 0-12-20200923		SW2-6 12-24-20200923		SW2-6 24-36-20200923		SW2-9 0-12-20200923		SW2-9 12-24-20200923		SW2-9 24-36-20200923		SW2-9 36-48-20200923	
Lab Sample Number		480-175717-55		480-175717-65		480-175717-66		480-175717-67		480-175717-68		480-175717-69		480-175717-70		480-175717-71	
Sampling Date		09/22/2020 14:56:00		09/23/2020 08:40:00		09/23/2020 08:41:00		09/23/2020 08:42:00		09/23/2020 09:23:00		09/23/2020 09:24:00		09/23/2020 09:25:00		09/23/2020 09:26:00	
Matrix		Solid		Solid		Solid		Solid		Solid		Solid		Solid		Solid	
Dilution Factor		5		1		1		1		1		1		1		1	
Units	mg/kg	mg/Kg		mg/Kg		mg/Kg		mg/Kg		mg/Kg		mg/Kg		mg/Kg		mg/Kg	
		Low		Low		Low		Low		Low		Low		Low		Low	
GC Semivolatiles - 8082A																	
PCB-1016	1	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
PCB-1221	1	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
PCB-1232	1	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
PCB-1242	1	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
PCB-1248	1	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
PCB-1254	1	**11**		**1.2**		0.87		0.15	J	0.21	J	0.22	J	0.34		0.91	
PCB-1260	1	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
PCB-1262	1	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
PCB-1268	1	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
Metals																	
Cadmium	7.5	**1040**		**359**		6.8		**9.7**		1.9		2.5		1.4		5.5	
Lead	450	NR		231		75.8		127		87.2		71.8		79.1		67.4	

B : Compound was found in the blank and sample.
F1 : MS and/or MSD recovery exceeds control limits.
U : Indicates the analyte was analyzed for but not detected.
SCG: Part 375-6.8(b), Restricted Use Soil Cleanup Objectives for the Protection of Public Health for Commercial Use.
Red Bolded text represents exceedance of the Restricted Use SCGs.
Yellow highlighted text represents material to be removed with an exceedance of 50 mg/kg.

Table 3
Summary of Lagoon Side Wall Analytical Data
C and D Batteries Site No. 336001
Huguenot, New York

Sample ID	Restricted Use SCGs	SW3-3 0-12-20200923		SW3-3 12-24-20200923		SW3-3 24-36-20200923		SW3-6 0-12-20200923		SW3-6 12-24-20200923		SW3-6 24-36-20200923		SW3-6 36-48-20200923		SW3-9 0-12-20200923	
Lab Sample Number		**480-175717-87**		**480-175717-88**		**480-175717-89**		**480-175717-83**		**480-175717-84**		**480-175717-85**		**480-175717-86**		**480-175717-79**	
Sampling Date		**09/23/2020 13:20:00**		**09/23/2020 13:21:00**		**09/23/2020 13:22:00**		**09/23/2020 13:05:00**		**09/23/2020 13:06:00**		**09/23/2020 13:07:00**		**09/23/2020 13:08:00**		**09/23/2020 12:40:00**	
Matrix		**Solid**		**Solid**		**Solid**		**Solid**		**Solid**		**Solid**		**Solid**		**Solid**	
Dilution Factor		**1**		**10**		**10**		**1**		**1**		**1**		**1**		**1**	
Units	**mg/kg**	**mg/Kg**		**mg/Kg**		**mg/Kg**		**mg/Kg**		**mg/Kg**		**mg/Kg**		**mg/Kg**		**mg/Kg**	
		Low		**Low**		**Low**		**Low**		**Low**		**Low**		**Low**		**Low**	
GC Semivolatiles - 8082A																	
PCB-1016	1	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
PCB-1221	1	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
PCB-1232	1	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
PCB-1242	1	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
PCB-1248	1	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
PCB-1254	1	**5.8**		**53**		**58**		ND	U	0.10	J	ND	U	ND	U	ND	U
PCB-1260	1	ND	U	ND	U	ND	U	0.54		ND	U	ND	U	ND	U	ND	U
PCB-1262	1	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
PCB-1268	1	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
Metals																	
Cadmium	7.5	**113**		**261**		**433**		**95.6**		**29.7**		**8.1**		ND	U	3.6	
Lead	450	285		**718**		**871**		214		17.6		10.5		3.5		44.9	

Sample ID	Restricted Use SCGs	SW3-9 12-24-20200923		SW3-9 24-36-20200923		SW3-9 36-48-20200923		SW4-3 0-12-20200921		SW4-3 12-24-20200921		SW4-3 24-36-20200921		SW4-3 36-48-20200921		SW4-6 0-12-20200921	
Lab Sample Number		**480-175717-80**		**480-175717-81**		**480-175717-82**		**480-175717-32**		**480-175717-33**		**480-175717-34**		**480-175717-35**		**480-175717-36**	
Sampling Date		**09/23/2020 12:41:00**		**09/23/2020 12:42:00**		**09/23/2020 12:43:00**		**09/21/2020 16:30:00**		**09/21/2020 16:31:00**		**09/21/2020 16:32:00**		**09/21/2020 16:33:00**		**09/21/2020 16:10:00**	
Matrix		**Solid**		**Solid**		**Solid**		**Solid**		**Solid**		**Solid**		**Solid**		**Solid**	
Dilution Factor		**1**		**1**		**1**		**10**		**1**		**1**		**1**		**1**	
Units	**mg/kg**	**mg/Kg**		**mg/Kg**		**mg/Kg**		**mg/Kg**		**mg/Kg**		**mg/Kg**		**mg/Kg**		**mg/Kg**	
		Low		**Low**		**Low**		**Low**		**Low**		**Low**		**Low**		**Low**	
GC Semivolatiles - 8082A																	
PCB-1016	1	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
PCB-1221	1	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
PCB-1232	1	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
PCB-1242	1	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
PCB-1248	1	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
PCB-1254	1	ND	U	ND	U	ND	U	**24**		**2.0**		0.41		ND	U	ND	U
PCB-1260	1	ND	U	0.11	J	ND	U	ND	U *	ND	U *	ND	U *	ND	U *	ND	U *
PCB-1262	1	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
PCB-1268	1	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
Metals																	
Cadmium	7.5	1.8		6.5		4.0		**582**	B	30.3	B	20.0	B	0.79	B	3.5	B
Lead	450	15.8		30.4		12.6		**341**		34.5		11.3		5.0		25.1	

B : Compound was found in the blank and sample.
F2 : MS/MSD RPD exceeds control limits
U : Indicates the analyte was analyzed for but not detected.
SCG: Part 375-6.8(b), Restricted Use Soil Cleanup Objectives for the Protection of Public Health for Commercial Use.
Red Bolded text represents exceedance of the Restricted Use SCGs.
Yellow highlighted text represents material to be removed with an exceedance of 50 mg/kg.

Table 3
Summary of Lagoon Side Wall Analytical Data
C and D Batteries Site No. 336001
Huguenot, New York

Sample ID		SW4-6 12-24-20200921		SW4-6 24-36-20200921		SW4-6 36-48-20200921		SW4-9 0-12-20200921		SW4-9 12-24-20200921		SW4-9 24-36-20200921		SW4-9 36-48-20200921		SW8-3 0-12-20200923	
Lab Sample Number	Restricted Use SCGs	480-175717-37		480-175717-38		480-175717-39		480-175717-40		480-175717-41		480-175717-42		480-175717-43		480-175717-98	
Sampling Date		09/21/2020 16:11:00		09/21/2020 16:12:00		09/21/2020 16:13:00		09/21/2020 16:23:00		09/21/2020 16:24:00		09/21/2020 16:25:00		09/21/2020 16:26:00		09/23/2020 14:10:00	
Matrix		Solid		Solid		Solid				Solid		Solid		Solid		Solid	
Dilution Factor		1		1		1				1		1		1		10	
Units	mg/kg	mg/Kg		mg/Kg		mg/Kg		mg/Kg		mg/Kg		mg/Kg		mg/Kg		mg/Kg	
		Low		Low		Low		Low		Low		Low		Low		Low	
GC Semivolatiles - 8082A																	
PCB-1016	1	ND	U	ND	U	ND	U	NR		ND	U	ND	U	ND	U	ND	U
PCB-1221	1	ND	U	ND	U	ND	U	NR		ND	U	ND	U	ND	U	ND	U
PCB-1232	1	ND	U	ND	U	ND	U	NR		ND	U	ND	U	ND	U	ND	U
PCB-1242	1	ND	U	ND	U	ND	U	NR		ND	U	ND	U	ND	U	ND	U
PCB-1248	1	ND	U	ND	U	ND	U	NR		ND	U	ND	U	ND	U	ND	U
PCB-1254	1	**1.3**		0.10	J	0.19	J	NR		ND	U	ND	U	ND	U	**46**	
PCB-1260	1	ND	U *	ND	U *	ND	U *	NR		0.15	J	0.23		0.19	J	ND	U
PCB-1262	1	ND	U	ND	U	ND	U	NR		ND	U	ND	U	ND	U	ND	U
PCB-1268	1	ND	U	ND	U	ND	U	NR		ND	U	ND	U	ND	U	ND	U
Metals																	
Cadmium	7.5	10.1	B	3.7	B	2.7	B	2.8	B	2.7		2.4		1.7		6.8	
Lead	450	24.8		19.9		6.3		77.0		30.6	B	30.5		78.9		**2470**	B

Sample ID		SW8-3 12-24-20200923		SW8-3 24-36-20200923		SW8-6 0-12-20200923		SW8-6 12-24-20200923		SW8-6 24-36-20200923		SW8-6 36-48-20200923		SW8-9 0-12-20200923		SW8-9 12-24-20200923	
Lab Sample Number	Restricted Use SCGs	480-175717-99		480-175717-100		480-175717-94		480-175717-95		480-175717-96		480-175717-97		480-175717-90		480-175717-91	
Sampling Date		09/23/2020 14:11:00		09/23/2020 14:12:00		09/23/2020 14:05:00		09/23/2020 14:06:00		09/23/2020 14:07:00		09/23/2020 14:08:00		09/23/2020 14:00:00		09/23/2020 14:01:00	
Matrix		Solid		Solid		Solid		Solid		Solid		Solid		Solid		Solid	
Dilution Factor		10		10		10		20		10		10		20		50	
Units	mg/kg	mg/Kg		mg/Kg		mg/Kg		mg/Kg		mg/Kg		mg/Kg		mg/Kg		mg/Kg	
		Low		Low		Low		Low		Low		Low		Low		Low	
GC Semivolatiles - 8082A																	
PCB-1016	1	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
PCB-1221	1	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
PCB-1232	1	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
PCB-1242	1	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
PCB-1248	1	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
PCB-1254	1	**32**		**26**		**24**		**64**		**58**		**27**		**150**		**160**	
PCB-1260	1	ND	U	ND	U *	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
PCB-1262	1	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
PCB-1268	1	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
Metals																	
Cadmium	7.5	1.3		4.5		2.9		2.9		3.4		1.5		3.5		4.4	
Lead	450	**1130**	B	**1380**	B	245	B	**840**	B	**1120**	B	**8920**	B	**470**		265	

B : Compound was found in the blank and sample.
F2 : MS/MSD RPD exceeds control limits
U : Indicates the analyte was analyzed for but not detected.
SCG: Part 375-6.8(b), Restricted Use Soil Cleanup Objectives for the Protection of Public Health for Commercial Use.
Red Bolded text represents exceedance of the Restricted Use SCGs.
Yellow highlighted text represents material to be removed with an exceedance of 50 mg/kg.

Table 3
Summary of Lagoon Side Wall Analytical Data
C and D Batteries Site No. 336001
Huguenot, New York

Sample ID	Restricted Use SCGs	SW8-9 24-36-20200923		SW8-9 36-48-20200923	
Lab Sample Number		480-175717-92		480-175717-93	
Sampling Date		09/23/2020 14:02:00		09/23/2020 14:03:00	
Matrix		Solid		Solid	
Dilution Factor		20		50	
Units	mg/kg	mg/Kg		mg/Kg	
		Low		Low	
GC Semivolatiles - 8082A					
PCB-1016	1	ND	U	ND	U
PCB-1221	1	ND	U	ND	U
PCB-1232	1	ND	U	ND	U
PCB-1242	1	ND	U	ND	U
PCB-1248	1	ND	U	ND	U
PCB-1254	1	**64**		**170**	
PCB-1260	1	ND	U	ND	U
PCB-1262	1	ND	U	ND	U
PCB-1268	1	ND	U	ND	U
Metals					
Cadmium	7.5	**7.9**		1.7	
Lead	450	204		237	B

B : Compound was found in the blank and sample.
F2 : MS/MSD RPD exceeds control limits
U : Indicates the analyte was analyzed for but not detected.
SCG: Part 375-6.8(b), Restricted Use Soil Cleanup Objectives for the Protection of Public Health for Commercial Use.
Red Bolded text represents exceedance of the Restricted Use SCGs.
Yellow highlighted text represents material to be removed with an exceedance of 50 mg/kg.

Table 4
Summary of Lagoon Outfall Analytical Data
C and D Batteries Site No. 336001
Huguenot, New York

Sample ID	Restricted Use SCGs	OF-01-20200921		OF-02-20200921		OF-03-20200921	
Lab Sample Number		480-175717-12		480-175717-13		480-175717-14	
Sampling Date		09/21/2020 12:55:00		09/21/2020 12:56:00		09/21/2020 13:00:00	
Matrix		Solid		Solid		Solid	
Dilution Factor		1		1		1	
Units	mg/kg	mg/Kg		mg/Kg		mg/Kg	
		Low		Low		Low	
GC Semivolatiles - 8082A							
PCB-1016	1	ND	U	ND	U	ND	U
PCB-1221	1	ND	U	ND	U	ND	U
PCB-1232	1	ND	U	ND	U	ND	U
PCB-1242	1	ND	U	ND	U	ND	U
PCB-1248	1	ND	U	ND	U	ND	U
PCB-1254	1	**1.7**		0.50		ND	U
PCB-1260	1	ND	U	ND	U	ND	U
PCB-1262	1	ND	U	ND	U	ND	U
PCB-1268	1	ND	U	ND	U	ND	U
Metals							
Cadmium	7.5	**56.9**	B	**45.7**	B	3.4	B
Lead	450	**1260**	B	**1320**	B	43.1	B

B : Compound was found in the blank and sample.
U : Indicates the analyte was analyzed for but not detected.
SCG: Part 375-6.8(b), Restricted Use Soil Cleanup Objectives for the Protection of Public Health for Commercial Use.
Red Bolded text represents exceedance of the Restricted Use SCGs.

Table 5
Summary of Sediment Analytical Data
C and D Batteries Site No. 336001
Huguenot, New York

Sample ID	Restricted Use SCGs	SED-101-00-06-052220		SED-101-06-12-052220		SED-102-00-06-052220		SED-102-06-12-052220		SED-102-18-24-052220		SED-103-00-06-052220		SED-103-06-12-052220		SED-104-00-06-052220		SED-104-06-12-052220	
Sampling Date		**05/22/2020 09:20:00**		**05/22/2020 09:25:00**		**05/22/2020 09:50:00**		**05/22/2020 09:55:00**		**05/22/2020 09:55:00**		**05/22/2020 11:20:00**		**05/22/2020 11:25:00**		**05/22/2020 10:20:00**		**05/22/2020 10:25:00**	
GC Semivolatiles - 8082A	**mg/kg**																		
PCB-1016	1	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
PCB-1221	1	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
PCB-1232	1	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
PCB-1242	1	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
PCB-1248	1	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
PCB-1254	1	ND	U	ND	U	0.61		**1.1**		0.93		ND	U	ND	U	0.67		0.61	
PCB-1260	1	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
PCB-1262	1	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
PCB-1268	1	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
Metals																			
Cadmium	7.5	0.31		0.47		**2.3**		**3.2**		**1.8**		0.25	J	0.25	J	**3.7**		**4.9**	
Lead	450	20.6		20.5	1 F2	56.2		**371**		**470**		41.4		30.9		40.8		90.0	
Wet Chemistry																			
Total Organic Carbon - mg/Kg				8670	F1	19700		9890		5590		18800		13800		20800		19900	

Sample ID	Restricted Use SCGs	SED-105-00-06-052020		SED-105-06-12-052020		SED-106-00-06-052220		SED-106-06-12-052220		SED-106-18-24-052220		SB-107-00-06-052120		SB-107-06-12-052120		SB-108-00-06-052120		SB-108-06-12-052120	
Sampling Date		**5/20/2020 10:20**		**5/20/2020 10:25**		**05/22/2020 10:50:00**		**05/22/2020 10:55:00**		**05/22/2020 10:55:00**		**05/21/2020 14:05:00**		**05/21/2020 14:10:00**		**05/21/2020 14:30:00**		**05/21/2020 14:35:00**	
GC Semivolatiles - 8082A	**mg/kg**																		
PCB-1016	1	ND	U		U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
PCB-1221	1	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
PCB-1232	1	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
PCB-1242	1	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
PCB-1248	1	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
PCB-1254	1	ND	U	ND		**2.5**		**1.3**		ND		ND	U	ND	U	ND	U	ND	U
PCB-1260	1	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
PCB-1262	1	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
PCB-1268	1	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
Metals																			
Cadmium	7.5	0.16	J	0.1	J	**11.2**		**9.3**		**1.4**		0.18	J	0.18	J	0.30	J	0.23	J
Lead	450	22.9		10		**602**		**563**		**53.4**		31.7		26.6		45.1		26.7	
Wet Chemistry																			
Total Organic Carbon - mg/Kg		9530		2010		65700		92300		NA		16400		10400		29300		12500	

J : Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.
U : Indicates the analyte was analyzed for but not detected.
F1 : MS and/or MSD recovery exceeds control limits.
F2 : MS/MSD RPD exceeds control limits
ND - Not Detected
NA - Not Analyzed
SCG: Part 375-6.8(b), Restricted Use Soil Cleanup Objectives for the Protection of Public Health for Commercial Use.
Red Bolded text represents exceedance of the Restricted Use SCGs.

PCB Concentrations exceed the SCG of 1 mg/Kg
Lead concentrations exceed the SCGs of 110 mg/Kg (i.e., SEL for lead)
Cadmium concentrations exceed the SCGs of 0.6 mg/Kg (i.e., LEL for cadmium)

Table 5
Summary of Sediment Analytical Data
C and D Batteries Site No. 336001
Huguenot, New York

Sample ID	Restricted Use SCGs	SED-109-00-06-052020		SED-109-06-12-052020		SED-110-00-06-052120		SED-110-06-12-052120		SED-111-00-06-052120		SED-111-06-12-052120		SED-112-00-06-052120		SED-112-06-12-052120		SED-113-00-06-052020	
Sampling Date		**5/20/2020 10:20**		**5/20/2020 10:25**		**05/21/2020 15:20:00**		**05/21/2020 15:25:00**		**05/21/2020 12:50:00**		**05/21/2020 12:55:00**		**05/21/2020 12:20:00**		**05/21/2020 12:25:00**		**5/20/2020 10:20**	
GC Semivolatiles - 8082A	**mg/kg**																		
PCB-1016	1	ND	U		U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
PCB-1221	1	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
PCB-1232	1	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
PCB-1242	1	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
PCB-1248	1	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
PCB-1254	1	ND	U	ND		0.30	J	0.22	J	ND	U	ND	U	ND	U	ND	U	ND	U
PCB-1260	1	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
PCB-1262	1	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
PCB-1268	1	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
Metals	7.5																		
Cadmium	450	0.21	J	0.14	J	**1.7**		**0.93**		0.27	J	0.27	J	0.28	J	0.29		0.2	J
Lead		21.3		22.1		26.7		19.1		23.8		22.6		44.6		30.0		41	
Wet Chemistry																			
Total Organic Carbon - mg/Kg		11600		18500		10700		22000		29900		48100		16300		16800		23200	

Sample ID	Restricted Use SCGs	SED-113-06-12-052020		SED-114-00-06-052120		SED-114-06-12-052120		SED-115-00-06-052020		SED-115-06-12-052020		SED-116-00-06-052120		SED-116-06-12-052120		SED-117-00-06-052220		SED-117-06-12-052220	
Sampling Date		**5/20/2020 10:25**		**05/21/2020 11:50:00**		**05/21/2020 11:55:00**		**5/20/2020 10:20**		**5/20/2020 10:25**		**05/21/2020 11:20:00**		**05/21/2020 11:25:00**		**05/22/2020 11:50:00**		**05/22/2020 11:55:00**	
GC Semivolatiles - 8082A	**mg/kg**																		
PCB-1016	1		U	ND	U	ND	U	ND	U		U	ND	U	ND	U	ND	U	ND	U
PCB-1221	1	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
PCB-1232	1	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
PCB-1242	1	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
PCB-1248	1	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
PCB-1254	1	ND		ND	U	ND	U	ND	U	ND		0.44	J	0.91	J	ND	U	ND	U
PCB-1260	1	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
PCB-1262	1	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
PCB-1268	1	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
Metals	7.5																		
Cadmium	450	0.12	J	**0.88**		0.26	J	0.18	J	0.2	J	**9.7**		**10.1**		0.22	J	0.25	J
Lead		14.2		57.3		22.0		13		41		**140**		**238**		37.0		29.4	
Wet Chemistry																			
Total Organic Carbon - mg/Kg		8550		28800		7240		15700		23200		104000		77000		19500		11700	

J : Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.
U : Indicates the analyte was analyzed for but not detected.
F1 : MS and/or MSD recovery exceeds control limits.
F2 : MS/MSD RPD exceeds control limits
ND - Not Detected
NA - Not Analyzed
SCG: Part 375-6.8(b), Restricted Use Soil Cleanup Objectives for the Protection of Public Health for Commercial Use.
Red Bolded text represents exceedance of the Restricted Use SCGs.

PCB Concentrations exceed the SCG of 1 mg/Kg
Lead concentrations exceed the SCGs of 110 mg/Kg (i.e., SEL for lead)
Cadmium concentrations exceed the SCGs of 0.6 mg/Kg (i.e., LEL for cadmium)

Table 5
Summary of Sediment Analytical Data
C and D Batteries Site No. 336001
Huguenot, New York

Sample ID	Restricted Use SCGs	SED-118-00-06-052120		SED-118-06-12-052120		SED-119-00-06-052020		SED-119-06-12-052020		SED-120-00-06-052120		SED-120-06-12-052120		SED-121-00-06-052220		SED-121-06-12-052220		SED-122-00-06-052220	
Sampling Date		**05/21/2020 10:50:00**		**05/21/2020 10:55:00**		**5/20/2020 10:20**		**5/20/2020 10:25**		**05/21/2020 10:20:00**		**05/21/2020 10:25:00**		**05/22/2020 13:20:00**		**05/22/2020 13:25:00**		**05/22/2020 14:05:00**	
GC Semivolatiles - 8082A	**mg/kg**																		
PCB-1016	1	ND	U	ND	U	ND	U		U	ND	U	ND	U	ND	U	ND	U	ND	U
PCB-1221	1	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
PCB-1232	1	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
PCB-1242	1	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
PCB-1248	1	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
PCB-1254	1	ND	U	0.34	J	ND	U	ND		ND	U	ND	U	ND	U	ND	U	ND	U
PCB-1260	1	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
PCB-1262	1	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
PCB-1268	1	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
Metals	7.5																		
Cadmium	450	7.3		3.2		0.25	J	0.15	J	0.18	J	0.19	J	0.75		0.24	J	0.23	J
Lead		134		95.9	F1	33.3		19.9		11.8		19.6		32.0		19.0		36.5	
Wet Chemistry																			
Total Organic Carbon - mg/Kg		73300		80700		6640		4690		9320		9820		9070		7920	F1	12800	

Sample ID	Restricted Use SCGs	SED-122-06-12-052220		SED-123-00-06-052220		SED-123-06-12-052220		SED-124-00-06-052020		SED-124-06-12-052020		SED-125-00-06-052120		SED-125-06-12-052120		SED-126-00-06-052220		SED-126-06-12-052220	
Sampling Date		**05/22/2020 14:10:00**		**05/22/2020 12:20:00**		**05/22/2020 12:25:00**		**5/20/2020 10:20**		**5/20/2020 10:25**		**05/21/2020 09:40:00**		**05/21/2020 09:45:00**		**05/22/2020 12:50:00**		**05/22/2020 12:55:00**	
GC Semivolatiles - 8082A	**mg/kg**																		
PCB-1016	1	ND	U	ND	U	ND	U	ND	U		U	ND	U	ND	U	ND	U	ND	U
PCB-1221	1	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
PCB-1232	1	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
PCB-1242	1	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
PCB-1248	1	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
PCB-1254	1	ND	U	ND	U	ND	U	0.27	J	0.27	J	ND	U	ND	U	ND	U	ND	U
PCB-1260	1	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
PCB-1262	1	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
PCB-1268	1	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
Metals	7.5																		
Cadmium	450	0.11	J	0.20	J	0.15	J	5.9		4		0.33		0.18	J	0.28		0.14	J
Lead		11.9		19.8		15.6		144		111		23.8		12.9		21.0		8.5	
Wet Chemistry																			
Total Organic Carbon - mg/Kg		10000		13300		5480		90300		116000		5260		11700		10800		3390	

J : Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.
U : Indicates the analyte was analyzed for but not detected.
F1 : MS and/or MSD recovery exceeds control limits.
F2 : MS/MSD RPD exceeds control limits
ND - Not Detected
NA - Not Analyzed
SCG: Part 375-6.8(b), Restricted Use Soil Cleanup Objectives for the Protection of Public Health for Commercial Use.
Red Bolded text represents exceedance of the Restricted Use SCGs.

PCB Concentrations exceed the SCG of 1 mg/Kg
Lead concentrations exceed the SCGs of 110 mg/Kg (i.e., SEL for lead)
Cadmium concentrations exceed the SCGs of 0.6 mg/Kg (i.e., LEL for cadmium)

Table 5
Summary of Sediment Analytical Data
C and D Batteries Site No. 336001
Huguenot, New York

Sample ID	Restricted Use SCGs	SED-127-00-06-051920		SED-127-06-12-051920		SED-128-00-06-051920		SED-128-06-12-051920		SED-129-00-06-051920		SED-129-06-12-051920		SED-130-00-06-051920		SED-130-06-12-051920		SED-131-00-06-051920	
Sampling Date		**05/19/2020 14:20:00**		**05/19/2020 14:25:00**		**05/19/2020 13:40:00**		**05/19/2020 13:45:00**		**05/19/2020 13:05:00**		**05/19/2020 13:10:00**		**05/19/2020 12:20:00**		**05/19/2020 12:25:00**		**05/19/2020 11:50:00**	
GC Semivolatiles - 8082A	**mg/kg**																		
PCB-1016	1	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
PCB-1221	1	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
PCB-1232	1	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
PCB-1242	1	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
PCB-1248	1	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
PCB-1254	1	0.23	J	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
PCB-1260	1	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
PCB-1262	1	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
PCB-1268	1	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
Metals	7.5																		
Cadmium	450	**3.2**		**3.6**		**2.6**		**1.7**		0.27		0.14	J	**1.7**		**2.7**		**1.9**	
Lead		79.4		71.9		25.3		32.1		32.2		9.9		34.9		49.7		44.3	
Wet Chemistry																			
Total Organic Carbon - mg/Kg		61700		26200		40800		44800		13000		4480		36100		36500		50000	

Sample ID	Restricted Use SCGs	SED-131-06-12-051920		SED-132-00-06-051920		SED-132-06-12-051920		SED-133-00-06-051920		SED-133-06-12-051920		SED-134-00-06-051920		SED-134-06-12-051920		SED-135-00-06-051920		SED-135-06-12-051920	
Sampling Date		**05/19/2020 11:55:00**		**05/19/2020 11:20:00**		05/19/2020 11:25:00		**05/19/2020 10:50:00**		**05/19/2020 10:55:00**		**05/19/2020 10:20:00**		**05/19/2020 10:25:00**		**05/19/2020 09:20:00**		**05/19/2020 09:25:00**	
GC Semivolatiles - 8082A	**mg/kg**																		
PCB-1016	1	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
PCB-1221	1	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
PCB-1232	1	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
PCB-1242	1	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
PCB-1248	1	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
PCB-1254	1	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
PCB-1260	1	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
PCB-1262	1	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
PCB-1268	1	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
Metals	7.5																		
Cadmium	450	**3.3**		0.18	J	0.14	J	0.14	J	0.090	J	**1.9**		**1.9**		**1.1**		**1.1**	
Lead		107		27.3		8.9		12.6		13.3		26.0		67.4		15.7		23.8	
Wet Chemistry																			
Total Organic Carbon - mg/Kg		41800		7040		9970		3960		3720		28600		39800		24300		7690	

J : Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.
U : Indicates the analyte was analyzed for but not detected.
F1 : MS and/or MSD recovery exceeds control limits.
F2 : MS/MSD RPD exceeds control limits
ND - Not Detected
NA - Not Analyzed
SCG: Part 375-6.8(b), Restricted Use Soil Cleanup Objectives for the Protection of Public Health for Commercial Use.
Red Bolded text represents exceedance of the Restricted Use SCGs.

PCB Concentrations exceed the SCG of 1 mg/Kg
Lead concentrations exceed the SCGs of 110 mg/Kg (i.e., SEL for lead)
Cadmium concentrations exceed the SCGs of 0.6 mg/Kg (i.e., LEL for cadmium)

Table 5
Summary of Sediment Analytical Data
C and D Batteries Site No. 336001
Huguenot, New York

Sample ID	Restricted Use SCGs	SED-136-00-06-051920		SED-136-06-12-051920		SED-137-00-06-051820		SED-137-06-12-051820		SED-138-00-06-051820		SED-138-06-12-051820		SED-139-00-06-051820		SED-139-06-12-051820		SED-140-00-06-051820	
Sampling Date		**05/19/2020 09:00:00**		**05/19/2020 09:05:00**		**05/18/2020 13:50:00**		**05/18/2020 13:55:00**		**05/18/2020 12:50:00**		**05/18/2020 12:55:00**		**05/18/2020 12:00:00**		**05/18/2020 12:05:00**		**05/18/2020 11:30:00**	
GC Semivolatiles - 8082A	**mg/kg**																		
PCB-1016	1	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
PCB-1221	1	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
PCB-1232	1	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
PCB-1242	1	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
PCB-1248	1	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
PCB-1254	1	ND	U	0.13	J	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	0.13	J
PCB-1260	1	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
PCB-1262	1	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
PCB-1268	1	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
Metals	7.5																		
Cadmium	450	**1.8**		**1.4**		**3.6**		**2.4**		0.12	J	0.10	J	**2.0**		**1.3**		**1.7**	
Lead		20.7		25.7		26.5		53.7		11.4		10.8		25.8		18.4		33.1	
Wet Chemistry																			
Total Organic Carbon - mg/Kg		9510		9040		44200		31200		12000		10000		26600		12800		13500	

Sample ID	Restricted Use SCGs	SED-140-06-12-051820	
Sampling Date		**05/18/2020 11:35:00**	
GC Semivolatiles - 8082A	**mg/kg**		
PCB-1016	1	ND	U
PCB-1221	1	ND	U
PCB-1232	1	ND	U
PCB-1242	1	ND	U
PCB-1248	1	ND	U
PCB-1254	1	ND	U
PCB-1260	1	ND	U
PCB-1262	1	ND	U
PCB-1268	1	ND	U
Metals	7.5		
Cadmium	450	**1.3**	
Lead		31.1	
Wet Chemistry			
Total Organic Carbon - mg/Kg		10500	

J : Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.
U : Indicates the analyte was analyzed for but not detected.
F1 : MS and/or MSD recovery exceeds control limits.
F2 : MS/MSD RPD exceeds control limits
ND - Not Detected
NA - Not Analyzed
SCG: Part 375-6.8(b), Restricted Use Soil Cleanup Objectives for the Protection of Public Health for Commercial Use.
Red Bolded text represents exceedance of the Restricted Use SCGs.

PCB Concentrations exceed the SCG of 1 mg/Kg
Lead concentrations exceed the SCGs of 110 mg/Kg (i.e., SEL for lead)
Cadmium concentrations exceed the SCGs of 0.6 mg/Kg (i.e., LEL for cadmium)

Table 6
Summary of Wooded Area Analytical Data
C and D Batteries Site No. 336001
Huguenot, New York

Sample ID	Restricted Use SCGs	WAS-11-20200921		WAS-12-20200921		WAS-13-20200921		WAS-14-20200921		WAS-15-20200921		WAS-16-20200921		WAS-17-20200921		WAS-18-20200921	
Lab Sample Number		480-175717-1		480-175717-2		480-175717-3		480-175717-4		480-175717-5		480-175717-6		480-175717-7		480-175717-8	
Sampling Date		09/21/2020 10:00:00		09/21/2020 10:05:00		09/21/2020 09:55:00		09/21/2020 09:45:00		09/21/2020 09:50:00		09/21/2020 10:15:00		09/21/2020 10:30:00		09/21/2020 10:20:00	
Matrix		Solid		Solid		Solid		Solid		Solid		Solid		Solid		Solid	
Dilution Factor		1		1		1		1		1		1		1		1	
Units	mg/kg	mg/Kg		mg/Kg		mg/Kg		mg/Kg		mg/Kg		mg/Kg		mg/Kg		mg/Kg	
		Low		Low		Low		Low		Low		Low		Low		Low	
GC Semivolatiles - 8082A																	
PCB-1016	1	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
PCB-1221	1	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
PCB-1232	1	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
PCB-1242	1	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
PCB-1248	1	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
PCB-1254	1	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
PCB-1260	1	**3.3**		**2.7**		0.96		**1.8**		0.85		ND	U	ND	U	ND	U
PCB-1262	1	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
PCB-1268	1	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
Metals																	
Cadmium	7.5	0.32	B	0.31	B	0.56	B	0.40	B	0.66	B	3.7	B	0.091	J B	0.051	J B
Lead	450	**6280**	B	**2810**	B	**2670**	B	**2080**	B	**2370**	B	324	B	203	B	304	B

Sample ID	Restricted Use SCGs	WAS-19-20200921		WAS-20-20200921		WAS-112-20201124		WAS-113-20201124		WAS-115-20201124		WAS-116-20201124		WAS-118-20201124		WAS-119-20201124	
Lab Sample Number		480-175717-9		480-175717-10		480-178731-2		480-178731-3		480-178731-5		480-178731-6		480-178731-8		480-178731-9	
Sampling Date		09/21/2020 10:25:00		09/21/2020 10:10:00		11/24/2020 09:30:00		11/24/2020 11:00:00		11/24/2020 10:08:00		11/24/2020 10:12:00		11/24/2020 10:18:00		11/24/2020 10:20:00	
Matrix		Solid		Solid		Solid		Solid		Solid		Solid		Solid		Solid	
Dilution Factor		1		1		1		1		1		1		1		1	
Units	mg/kg	mg/Kg		mg/Kg		mg/Kg		mg/Kg		mg/Kg		mg/Kg		mg/Kg		mg/Kg	
		Low		Low		Low		Low		Low		Low		Low		Low	
GC Semivolatiles - 8082A																	
PCB-1016	1	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
PCB-1221	1	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
PCB-1232	1	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
PCB-1242	1	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
PCB-1248	1	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
PCB-1254	1	**2.8**		ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
PCB-1260	1	ND	U	0.15	J	0.21	J	0.37		ND	U	0.37	J	ND	U	ND	U
PCB-1262	1	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
PCB-1268	1	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
Metals																	
Cadmium	7.5	ND	U	0.061	J B	0.10	J	0.087	J	1.4		0.88		0.19	J	0.23	J
Lead	450	224	B	273	B	242		315		**1290**		**697**		145	F1	127	

B : Compound was found in the blank and sample.
F1 : MS and/or MSD recovery exceeds control limits.
J : Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.
U : Indicates the analyte was analyzed for but not detected.
SCG: Part 375-6.8(b), Restricted Use Soil Cleanup Objectives for the Protection of Public Health for Commercial Use.
Red Bolded text represents exceedance of the Restricted Use SCGs.

Table 6
Summary of Wooded Area Analytical Data
C and D Batteries Site No. 336001
Huguenot, New York

Sample ID	Restricted Use SCGs	WAS-120-20201124		WAS-121-20201124	
Lab Sample Number		480-178731-10		480-178731-11	
Sampling Date		11/24/2020 10:26:00		11/24/2020 10:30:00	
Matrix		Solid		Solid	
Dilution Factor		1		1	
Units	mg/kg	mg/Kg		mg/Kg	
		Low		Low	
GC Semivolatiles - 8082A					
PCB-1016	1	ND	U	ND	U
PCB-1221	1	ND	U	ND	U
PCB-1232	1	ND	U	ND	U
PCB-1242	1	ND	U	ND	U
PCB-1248	1	ND	U	ND	U
PCB-1254	1	ND	U	ND	U
PCB-1260	1	ND	U	ND	U
PCB-1262	1	ND	U	ND	U
PCB-1268	1	ND	U	ND	U
Metals					
Cadmium	7.5	0.16	J	0.16	J
Lead	450	96.6		63.4	

B : Compound was found in the blank and sample.
F1 : MS and/or MSD recovery exceeds control limits.
J : Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.
U : Indicates the analyte was analyzed for but not detected.
SCG: Part 375-6.8(b), Restricted Use Soil Cleanup Objectives for the Protection of Public Health for Commercial Use.
Red Bolded text represents exceedance of the Restricted Use SCGs.

Table 7
Summary of Shed Floor Drain and Vault Analytical Data
C and D Batteries Site No. 336001
Huguenot, New York

Sample ID	Restricted Use SCGs	SHED-01-20200921		VS-1 (0-12) 012920		VS-2 (0-12) 012920	
Lab Sample Number		480-175717-11		480-165715-1		480-165715-1	
Sampling Date		09/21/2020 11:39:00		1/29/2020		1/29/2020	
Matrix		Solid		Solid		Solid	
Dilution Factor		1		1		1	
Units	mg/kg	mg/Kg		mg/Kg		mg/Kg	
		Low		Low		Low	
GC Semivolatiles - 8082A							
PCB-1016	1	ND	U	<0.3	U	NS	
PCB-1221	1	ND	U	<0.3	U	NS	
PCB-1232	1	ND	U	<0.3	U	NS	
PCB-1242	1	ND	U	<0.3	U	NS	
PCB-1248	1	**2.6**		<0.3	U	NS	
PCB-1254	1	**1.2**		0.69		**7.9**	J
PCB-1260	1	ND	U	<0.3	U	<0.26	U
PCB-1262	1	ND	U				
PCB-1268	1	ND	U	<0.3	U	NS	
Metals							
Cadmium	7.5	2.5	B	**49.5**		6.8	
Lead	450	**14100**	B	**1690**		**1960**	

B : Compound was found in the blank and sample.
J : Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.
U : Indicates the analyte was analyzed for but not detected.
NS : Not sampled
SCG: Part 375-6.8(b), Restricted Use Soil Cleanup Objectives for the Protection of Public Health for Commercial Use.
Red Bolded text represents exceedance of the Restricted Use SCGs.

Table 8a
Summary of Drum VOC Analytical Data
C and D Batteries Site No. 336001
Huguenot, New York

Sample ID	Unrestricted Use SCGs	DRUM-2-013020	DRUM-3-013020	DRUM-4-013020	DRUM-5-013020
Lab Sample Number		480-165835-1	480-165835-1	480-165835-1	480-165835-1
Sampling Date		1/30/2020	1/30/2020	1/30/2020	1/30/2020
Matrix		Solid	Solid	Solid	Solid
Units	mg/kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg
1,1,1-TRICHLOROETHANE (TCA)	680	< 7.4	< 7.4	< 7.5	< 8.2
1,1,2,2-TETRACHLOROETHANE	NE	< 7.4	< 7.4	< 7.5	< 8.2
1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	NE	< 7.4	< 7.4	< 7.5	< 8.2
1,1,2-TRICHLOROETHANE	NE	< 7.4	< 7.4	< 7.5	< 8.2
1,1-DICHLOROETHANE	270	< 7.4	< 7.4	< 7.5	< 8.2
1,1-DICHLOROETHENE	330	< 7.4	< 7.4	< 7.5	< 8.2
1,2,4-TRICHLOROBENZENE	NE	< 7.4	< 7.4	< 7.5	< 8.2
1,2-DIBROMO-3-CHLOROPROPANE	NE	< 7.4	< 7.4	< 7.5	< 8.2
1,2-DIBROMOETHANE (ETHYLENE DIBROMIDE)	NE	< 7.4	< 7.4	< 7.5	< 8.2
1,2-DICHLOROBENZENE	1100	< 7.4	< 7.4	< 7.5	< 8.2
1,2-DICHLOROETHANE	20	< 7.4	< 7.4	< 7.5	< 8.2
1,2-DICHLOROPROPANE	NE	< 7.4	< 7.4	< 7.5	< 8.2
1,3-DICHLOROBENZENE	2400	< 7.4	< 7.4	< 7.5	< 8.2
1,4-DICHLOROBENZENE	1800	< 7.4	< 7.4	< 7.5	< 8.2
2-HEXANONE	NE	< 37	< 37	< 38	**22**
ACETONE	50	< 37	< 37	< 38	**110**
BENZENE	60	< 7.4	< 7.4	< 7.5	< 8.2
BROMODICHLOROMETHANE	NE	< 7.4	< 7.4	< 7.5	< 8.2
BROMOFORM	NE	< 7.4	< 7.4	< 7.5	< 8.2
BROMOMETHANE	NE	< 7.4	< 7.4	< 7.5	< 8.2
CARBON DISULFIDE	NE	< 7.4	< 7.4	< 7.5	< 8.2
CARBON TETRACHLORIDE	760	< 7.4	< 7.4	< 7.5	< 8.2
CHLOROBENZENE	1100	< 7.4	< 7.4	< 7.5	< 8.2
CHLOROETHANE	NE	< 7.4	< 7.4	< 7.5	< 8.2
CHLOROFORM	370	**12**	**2.2**	**1.7**	**6.4**
CHLOROMETHANE	NE	< 7.4	< 7.4	< 7.5	< 8.2
CIS-1,2-DICHLOROETHYLENE	250	< 7.4	< 7.4	< 7.5	< 8.2
CIS-1,3-DICHLOROPROPENE	NE	< 7.4	< 7.4	< 7.5	< 8.2
CYCLOHEXANE	NE	< 7.4	< 7.4	< 7.5	< 8.2
DIBROMOCHLOROMETHANE	NE	< 7.4	< 7.4	< 7.5	< 8.2
DICHLORODIFLUOROMETHANE	NE	< 7.4	< 7.4	< 7.5	< 8.2
ETHYLBENZENE	1000	< 7.4	< 7.4	< 7.5	< 8.2
ISOPROPYLBENZENE (CUMENE)	NE	< 7.4	< 7.4	< 7.5	< 8.2
METHYL ACETATE	NE	< 37	< 37	< 38	< 41
METHYL ETHYL KETONE (2-BUTANONE)	120	< 37	< 37	< 38	**50**
METHYL ISOBUTYL KETONE (4-METHYL-2-PENTANONE)	NE	< 37	< 37	< 38	< 41
METHYLCYCLOHEXANE	NE	< 7.4	< 7.4	< 7.5	< 8.2
METHYLENE CHLORIDE	50	< 7.4	< 7.4	< 7.5	< 8.2
STYRENE	NE	< 7.4	< 7.4	< 7.5	< 8.2
TERT-BUTYL METHYL ETHER	930	< 7.4	< 7.4	< 7.5	< 8.2
TETRACHLOROETHYLENE (PCE)	1300	< 7.4	< 7.4	< 7.5	< 8.2
TOLUENE	700	< 7.4	< 7.4	< 7.5	< 8.2
TRANS-1,2-DICHLOROETHENE	190	< 7.4	< 7.4	< 7.5	< 8.2
TRANS-1,3-DICHLOROPROPENE	NE	< 7.4	< 7.4	< 7.5	< 8.2
TRICHLOROETHYLENE (TCE)	470	< 7.4	< 7.4	< 7.5	< 8.2
TRICHLOROFLUOROMETHANE	NE	< 7.4	< 7.4	< 7.5	< 8.2
VINYL CHLORIDE	20	< 7.4	< 7.4	< 7.5	< 8.2
XYLENES	260	**1.4**	< 15	< 15	**3.5**

Bold text represents values detected above reporting limit.
SCG: Part 375-6.8(b), Unrestricted Use Soil Cleanup Objectives for the Protection of Public Health for Commercial Use.
Red Bolded text represents exceedance of the Unrestricted Use SCGs.

Table 8b
Summary of Drum SVOC Analytical Data
C and D Batteries Site No. 336001
Huguenot, New York

Sample ID	Unrestricted Use SCGs	DRUM-2-013020	DRUM-3-013020	DRUM-4-013020	DRUM-5-013020
Lab Sample Number		480-165835-1	480-165835-1	480-165835-1	480-165835-1
Sampling Date		1/30/2020	1/30/2020	1/30/2020	1/30/2020
Matrix		Solid	Solid	Solid	Solid
Units	mg/kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg
1,4-DIOXANE (P-DIOXANE)	100	< 1500	< 1500	< 1500	< 160
2,4,5-TRICHLOROPHENOL	NE	< 2500	< 2500	< 2500	< 280
2,4,6-TRICHLOROPHENOL	NE	< 2500	< 2500	< 2500	< 280
2,4-DICHLOROPHENOL	NE	< 2500	< 2500	< 2500	< 280
2,4-DIMETHYLPHENOL	NE	< 2500	< 2500	< 2500	< 280
2,4-DINITROPHENOL	NE	< 25000	< 25000	< 25000	< 2700
2,4-DINITROTOLUENE	NE	< 2500	< 2500	< 2500	< 280
2,6-DINITROTOLUENE	NE	< 2500	< 2500	< 2500	< 280
2-CHLORONAPHTHALENE	NE	< 2500	< 2500	< 2500	< 280
2-CHLOROPHENOL	NE	< 4900	< 4900	< 4900	< 540
2-METHYLNAPHTHALENE	NE	< 2500	< 2500	< 2500	< 280
2-METHYLPHENOL (O-CRESOL)	330	< 2500	< 2500	< 2500	< 280
2-NITROANILINE	NE	< 4900	< 4900	< 4900	< 540
2-NITROPHENOL	NE	< 2500	< 2500	< 2500	< 280
3,3'-DICHLOROBENZIDINE	NE	< 4900	< 4900	< 4900	< 540
3-NITROANILINE	NE	< 4900	< 4900	< 4900	< 540
4,6-DINITRO-2-METHYLPHENOL	NE	< 4900	< 4900	< 4900	< 540
4-BROMOPHENYL PHENYL ETHER	NE	< 2500	< 2500	< 2500	< 280
4-CHLORO-3-METHYLPHENOL	NE	< 2500	< 2500	< 2500	< 280
4-CHLOROANILINE	NE	< 2500	< 2500	< 2500	< 280
4-CHLOROPHENYL PHENYL ETHER	NE	< 2500	< 2500	< 2500	< 280
4-METHYLPHENOL (P-CRESOL)	330	< 4900	< 4900	< 4900	< 540
4-NITROANILINE	NE	< 4900	< 4900	< 4900	< 540
4-NITROPHENOL	NE	< 4900	< 4900	< 4900	< 540
ACENAPHTHENE	20000	< 2500	< 2500	< 2500	< 280
ACENAPHTHYLENE	100000	< 2500	< 2500	< 2500	< 280
ACETOPHENONE	NE	< 2500	< 2500	< 2500	< 280
ANTHRACENE	100000	< 2500	< 2500	< 2500	< 280
ATRAZINE	NE	< 2500	< 2500	< 2500	< 280
BENZALDEHYDE	NE	< 2500	< 2500	< 2500	< 280
BENZO(A)ANTHRACENE	1000	< 2500	< 2500	< 2500	< 280
BENZO(A)PYRENE	1000	< 2500	< 2500	< 2500	< 280
BENZO(B)FLUORANTHENE	1000	< 2500	< 2500	< 2500	< 280
BENZO(G,H,I)PERYLENE	100000	< 2500	< 2500	< 2500	< 280
BENZO(K)FLUORANTHENE	800	< 2500	< 2500	< 2500	< 280
BENZYL BUTYL PHTHALATE	NE	< 2500	< 2500	< 2500	< 280
BIPHENYL (DIPHENYL)	NE	< 2500	< 2500	< 2500	< 280
BIS(2-CHLOROETHOXY) METHANE	NE	< 2500	< 2500	< 2500	< 280
BIS(2-CHLOROETHYL) ETHER (2-CHLOROETHYL ETHER)	NE	< 2500	< 2500	< 2500	< 280
BIS(2-CHLOROISOPROPYL) ETHER	NE	< 2500	< 2500	< 2500	< 280
BIS(2-ETHYLHEXYL) PHTHALATE	NE	**5700**	**4800**	**5700**	**4400**
CAPROLACTAM	NE	< 2500	< 2500	< 2500	< 280
CARBAZOLE	NE	< 2500	< 2500	< 2500	< 280
CHRYSENE	1000	< 2500	< 2500	< 2500	< 280
DIBENZ(A,H)ANTHRACENE	330	< 2500	< 2500	< 2500	< 280
DIBENZOFURAN	7000	< 2500	< 2500	< 2500	< 280
DIETHYL PHTHALATE	NE	< 2500	< 2500	< 2500	< 280
DIMETHYL PHTHALATE	NE	< 2500	< 2500	< 2500	< 280
DI-N-BUTYL PHTHALATE	NE	< 2500	< 2500	< 2500	< 280
DI-N-OCTYLPHTHALATE	NE	< 2500	< 2500	< 2500	**200**
FLUORANTHENE	100000	< 2500	< 2500	< 2500	< 280
FLUORENE	30000	< 2500	< 2500	< 2500	< 280
HEXACHLOROBENZENE	330	< 2500	< 2500	< 2500	< 280
HEXACHLOROBUTADIENE	NE	< 2500	< 2500	< 2500	< 280
HEXACHLOROCYCLOPENTADIENE	NE	< 2500	< 2500	< 2500	< 280

Table 8b
Summary of Drum SVOC Analytical Data
C and D Batteries Site No. 336001
Huguenot, New York

Sample ID	**Unrestricted Use SCGs**	**DRUM-2-013020**	**DRUM-3-013020**	**DRUM-4-013020**	**DRUM-5-013020**
Lab Sample Number		**480-165835-1**	**480-165835-1**	**480-165835-1**	**480-165835-1**
Sampling Date		**1/30/2020**	**1/30/2020**	**1/30/2020**	**1/30/2020**
Matrix		**Solid**	**Solid**	**Solid**	**Solid**
Units	**mg/kg**	**mg/Kg**	**mg/Kg**	**mg/Kg**	**mg/Kg**
HEXACHLOROETHANE	NE	< 2500	< 2500	< 2500	< 280
INDENO(1,2,3-C,D)PYRENE	500	< 2500	< 2500	< 2500	< 280
ISOPHORONE	NE	< 2500	< 2500	< 2500	< 280
NAPHTHALENE	12000	< 2500	< 2500	< 2500	< 280
NITROBENZENE	NE	< 2500	< 2500	< 2500	< 280
N-NITROSODI-N-PROPYLAMINE	NE	< 2500	< 2500	< 2500	< 280
N-NITROSODIPHENYLAMINE	NE	< 2500	< 2500	< 2500	< 280
PENTACHLOROPHENOL	800	< 4900	< 4900	< 4900	< 540
PHENANTHRENE	100000	< 2500	< 2500	< 2500	< 280
PHENOL	330	< 2500	< 2500	< 2500	< 280
PYRENE	100000	< 2500	< 2500	< 2500	< 280

Bold text represents values detected above reporting limit.
SCG: Part 375-6.8(b), Unrestricted Use Soil Cleanup Objectives for the Protection of Public Health for Commercial Use.
Red Bolded text represents exceedance of the Unrestricted Use SCGs.

Table 8c
Summary of Drum Inorganic Analytical Data
C and D Batteries Site No. 336001
Huguenot, New York

Sample ID	Unrestricted Use SCGs	DRUM-2-013020	DRUM-3-013020	DRUM-4-013020	DRUM-5-013020
Lab Sample Number		480-165835-1	480-165835-1	480-165835-1	480-165835-1
Sampling Date		1/30/2020	1/30/2020	1/30/2020	1/30/2020
Matrix		Solid	Solid	Solid	Solid
Units	mg/kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg
Metals					
ALUMINUM		**23600**	**24000**	**23500**	**37400**
ANTIMONY		**1.2**	**0.65**	**0.7**	**1.1**
ARSENIC	13	**1.3**	**2.6**	**1.8**	**4.1**
BARIUM	350	**48.2**	**50.2**	**44.8**	**60.3**
BERYLLIUM	7.2	**1.3**	**1.3**	**1.2**	**1.9**
CADMIUM	2.5	**1.2**	**1**	**1.3**	**2.1**
CALCIUM	NE	**28400**	**21400**	**28200**	**49200**
CHROMIUM, TOTAL	30	**62.4**	**65.5**	**64.9**	**105**
COBALT	NE	**7.8**	**7**	**6.9**	**10.8**
COPPER	50	**6.4**	**7.6**	**7.2**	**12**
IRON	NE	**12200**	**13100**	**12100**	**21200**
LEAD	63	**553**	**485**	**697**	**50.1**
MAGNESIUM	NE	**30800**	**27900**	**32600**	**58600**
MANGANESE	1600	**252**	**206**	**251**	**438**
MERCURY	0.18	< 0.028	< 0.029	< 0.031	< 0.033
NICKEL	30	**16**	**15.7**	**15**	**28.9**
POTASSIUM	NE	**2470**	**2500**	**2420**	**4430**
SELENIUM	3.9	< 5.6	< 5.7	< 6	< 6.5
SILVER	2	< 0.84	< 0.86	< 0.9	< 0.97
SODIUM	NE	**191**	**181**	**194**	**1300**
THALLIUM	NE	< 8.4	< 8.6	< 9	< 9.7
VANADIUM	NE	**58.8**	**57.6**	**59.5**	**86.9**
ZINC	109	**105**	**99.4**	**95.1**	**93.2**
Pesticides					
ALDRIN	5	< 130	< 120	< 120	< 2.7
ALPHA BHC (ALPHA HEXACHLOROCYCLOHEXANE)	20	< 130	< 120	< 120	< 2.7
ALPHA ENDOSULFAN	2400	< 130	< 120	< 120	< 2.7
ALPHA-CHLORDANE	94	< 130	< 120	< 120	< 2.7
BETA BHC (BETA HEXACHLOROCYCLOHEXANE)	36	< 130	< 120	< 120	< 2.7
BETA ENDOSULFAN	2400	< 130	< 120	< 120	< 2.7
BETA-CHLORDANE	NE	< 130	< 120	< 120	< 2.7
DELTA BHC (DELTA HEXACHLOROCYCLOHEXANE)	40	**26**	**25**	< 120	**0.93**
DIELDRIN	5	< 130	< 120	< 120	< 2.7
ENDOSULFAN SULFATE	2400	< 130	< 120	< 120	< 2.7
ENDRIN	14	< 130	< 120	< 120	< 2.7
ENDRIN ALDEHYDE	NE	< 130	< 120	< 120	< 2.7
ENDRIN KETONE	NE	< 130	< 120	< 120	< 2.7
GAMMA BHC (LINDANE)	100	< 130	< 120	< 120	**0.94**
HEPTACHLOR	42	< 130	< 120	< 120	< 2.7
HEPTACHLOR EPOXIDE	NE	< 130	< 120	< 120	< 2.7
METHOXYCHLOR	NE	< 130	< 120	< 120	< 2.7
P,P'-DDD	3.3	< 130	< 120	< 120	< 2.7
P,P'-DDE	3.3	< 130	< 120	< 120	< 2.7
P,P'-DDT	3.3	< 130	< 120	< 120	< 2.7
TOXAPHENE	NE	< 1300	< 1200	< 1200	< 27
Cyanide					
CYANIDE	27	< 1.5	< 1.5	< 1.4	**< 1.6**

Bold text represents values detected above reporting limit.
SCG: Part 375-6.8(b), Unrestricted Use Soil Cleanup Objectives for the Protection of Public Health for Commercial Use.
Red Bolded text represents exceedance of the Unrestricted Use SCGs.

Table 9a
Summary of Monitoring Well Analytical Data (VOCs)
C and D Batteries Site No. 336001
Huguenot, New York

		Location ID	MW-10	MW-12	MW-13	MW-14	MW-14	MW-14	MW-15	MW-17	MW-17A	MW-57	MW-6	MW-7	MW-8	MW-9
		Sample Date	11/22/2019	11/22/2019	11/22/2019	11/20/2019	1/28/2020	1/28/2020	11/21/2019	11/21/2019	11/21/2019	11/21/2019	11/22/2019	11/21/2019	11/22/2019	11/20/2019
		Sample ID	MW-10-112219	MW-12-112219	MW-13-112219	MW-14-112019	MW-14-01282020	MW-14-DUP-01282020	MW-15-112119	MW-17-112119	MW-17A-112119	MW-57-112119	MW-6-112219	MW-7-112119	MW-8-112219	MW-9-112019
		SDG	460-197390-1	460-197390-1	460-197390-1	460-197436-1	480-165717-1	480-165717-1	460-197436-1	460-197436-1	460-197436-1	460-197436-1	460-197390-1	460-197436-1	460-197390-1	460-197436-1
Analyte	CAS #	NYSDEC Groundwater Guidance or Standard Values														
1,1,1-TRICHLOROETHANE (TCA)	71-55-6	5	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
1,1,2,2-TETRACHLOROETHANE	79-34-5	5	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 UF1	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	76-13-1	5	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
1,1,2-TRICHLOROETHANE	79-00-5	1	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
1,1-DICHLOROETHANE	75-34-3	5	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
1,1-DICHLOROETHENE	75-35-4	5	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
1,2,4-TRICHLOROBENZENE	120-82-1	5	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
1,2-DIBROMO-3-CHLOROPROPANE	96-12-8	0.04	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
1,2-DIBROMOETHANE (ETHYLENE DIBROMIDE)	106-93-4	0.0006	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
1,2-DICHLOROBENZENE	95-50-1	3	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
1,2-DICHLOROETHANE	107-06-2	0.6	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
1,2-DICHLOROPROPANE	78-87-5	1	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
1,3-DICHLOROBENZENE	541-73-1	3	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
1,4-DICHLOROBENZENE	106-46-7	3	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
2-HEXANONE	591-78-6	50	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 UF1	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
ACETONE	67-64-1	50	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 10 U	< 10 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
BENZENE	71-43-2	1	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
BROMODICHLOROMETHANE	75-27-4	50	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
BROMOFORM	75-25-2	50	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
BROMOMETHANE	74-83-9	5	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 UF2	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
CARBON DISULFIDE	75-15-0	60	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	NS	NS	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
CARBON TETRACHLORIDE	56-23-5	5	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
CHLOROBENZENE	108-90-7	5	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
CHLOROETHANE	75-00-3	5	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 UF2	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
CHLOROFORM	67-66-3	7	**0.60 J**	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
CHLOROMETHANE	74-87-3	5	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 UF2	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
CIS-1,2-DICHLOROETHYLENE	156-59-2	5	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
CIS-1,3-DICHLOROPROPENE	10061-01-5	0.4	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
CYCLOHEXANE	110-82-7	NL	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
DIBROMOCHLOROMETHANE	124-48-1	50	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
DICHLORODIFLUOROMETHANE	75-71-8	5	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 UF2	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
ETHYLBENZENE	100-41-4	5	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
ISOPROPYLBENZENE (CUMENE)	98-82-8	5	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
METHYL ACETATE	79-20-9	NL	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 2.5 U	< 2.5 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
METHYL ETHYL KETONE (2-BUTANONE)	78-93-3	50	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 10 U	< 10 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
METHYL ISOBUTYL KETONE (4-METHYL-2-PENTANONE)	108-10-1	NL	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 UF1	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
METHYLCYCLOHEXANE	108-87-2	NL	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U*	< 1.0 U	< 1.0 U	< 1.0 U*	< 1.0 U*	< 1.0 U*	< 1.0 U*	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U*
METHYLENE CHLORIDE	75-09-2	5	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
STYRENE	100-42-5	5	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
TERT-BUTYL METHYL ETHER	1634-04-4	10	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
TETRACHLOROETHYLENE (PCE)	127-18-4	5	**1.8**	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	**0.42 J**	**1.4**
TOLUENE	108-88-3	5	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
TRANS-1,2-DICHLOROETHENE	156-60-5	5	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
TRANS-1,3-DICHLOROPROPENE	10061-02-6	0.4	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
TRICHLOROETHYLENE (TCE)	79-01-6	5	**0.54 J**	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	**0.37 J**	< 1.0 U	< 1.0 U	< 1.0 U	**0.50 J**
TRICHLOROFLUOROMETHANE	75-69-4	5	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 UF2	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
VINYL CHLORIDE	75-01-4	2	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 UF2	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
XYLENES	1330-20-7	5	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U

Notes:
Guidance or Standard Values - NYSDEC, Division of Water, TOGS (1.1.1) - 6 NYCRR 703.5 [NYSDEC, 1998]
All concentrations are in micrograms per liter
BOLD and yellow highlight indicates exceedances
Bold Values detected above reporting limit
J : Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.
U : Indicates the analyte was analyzed for but not detected.
F1 : MS and/or MSD recovery exceeds control limits.
F2 : MS/MSD RPD exceeds control limits
ND - Not Detected
NA - Not Analyzed
NL = Not Listed

Table 9b
Summary of Monitoring Well Analytical Data (SVOCs)
C and D Batteries Site No. 336001
Huguenot, New York

Analyte	CAS #	NYSDEC Groundwater Guidance or Standard Values	Location ID Sample Date Sample ID SDG	MW-10 11/22/2019 MW-10-112219 460-197390-1	MW-12 11/22/2019 MW-12-112219 460-197390-1	MW-13 11/22/2019 MW-13-112219 460-197390-1	MW-14 11/20/2019 MW-14-112019 460-197436-1	MW-14 1/28/2020 MW-14-01282020 480-165717-1	MW-14 1/28/2020 MW-14-DUP-01282020 480-165717-1	MW-15 11/21/2019 MW-15-112119 460-197436-1	MW-17 11/21/2019 MW-17-112119 460-197436-1	MW-17A 11/21/2019 MW-17A-112119 460-197436-1	MW-57 11/21/2019 MW-57-112119 460-197436-1	MW-6 11/22/2019 MW-6-112219 460-197390-1	MW-7 11/21/2019 MW-7-112119 460-197436-1	MW-8 11/22/2019 MW-8-112219 460-197390-1	MW-9 11/20/2019 MW-9-112019 460-197436-1
1,4-DIOXANE (P-DIOXANE)	123-91-1	NL		NS	< 0.20 U	NS	NS	NS	NS	NS	NS	NS	< 0.20 U	NS	< 0.20 U	NS	< 0.20 U
2,4,5-TRICHLOROPHENOL	95-95-4	NL		< 10 U	< 10 U	< 10 U	< 10 U	< 5.0 U	< 5.0 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U
2,4,6-TRICHLOROPHENOL	88-06-2	NL		< 10 U	< 10 U	< 10 U	< 10 U	< 5.0 U	< 5.0 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U
2,4-DICHLOROPHENOL	120-83-2	5		< 10 U	< 10 U	< 10 U	< 10 U	< 5.0 U	< 5.0 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U
2,4-DIMETHYLPHENOL	105-67-9	50		< 10 U	< 10 U	< 10 U	< 10 U	< 5.0 U	< 5.0 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 UF1	< 10 U	< 10 U
2,4-DINITROPHENOL	51-28-5	10		< 20 U*	< 20 U*	< 20 U*	< 20 U	< 10 U	< 10 U	< 20 U	< 20 U	< 20 U	< 20 U	< 20 U*	< 20 U	< 20 U*	< 20 U
2,4-DINITROTOLUENE	121-14-2	5		< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 5.0 U	< 5.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U
2,6-DINITROTOLUENE	606-20-2	5		< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 5.0 U	< 5.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U
2-CHLORONAPHTHALENE	91-58-7	10		< 10 U	< 10 U	< 10 U	< 10 U	< 5.0 U	< 5.0 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U
2-CHLOROPHENOL	95-57-8	NL		< 10 U	< 10 U	< 10 U	< 10 U	< 5.0 U	< 5.0 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U
2-METHYLNAPHTHALENE	91-57-6	NL		< 10 U	< 10 U	< 10 U	< 10 U	< 5.0 U	< 5.0 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U
2-METHYLPHENOL (O-CRESOL)	95-48-7	NL		< 10 U	< 10 U	< 10 U	< 10 U	< 5.0 U	< 5.0 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U
2-NITROANILINE	88-74-4	5		< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U
2-NITROPHENOL	88-75-5	NL		< 10 U*	< 10 U*	< 10 U*	< 10 U	< 5.0 U	< 5.0 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U*	< 10 U	< 10 U*	< 10 U
3,3'-DICHLOROBENZIDINE	91-94-1	5		< 10 U	< 10 U	< 10 U	< 10 U	< 5.0 U	< 5.0 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U
3-NITROANILINE	99-09-2	5		< 10 U	< 10 U	< 10 U	< 10 U*	< 10 U	< 10 U	< 10 U	< 10 U*	< 10 U*	< 10 U*	< 10 U	< 10 U*	< 10 U	< 10 U*
4,6-DINITRO-2-METHYLPHENOL	534-52-1	NL		< 20 U*	< 20 U*	< 20 U*	< 20 U	< 10 U	< 10 U	< 20 U	< 20 U	< 20 U	< 20 U	< 20 U*	< 20 U	< 20 U*	< 20 U
4-BROMOPHENYL PHENYL ETHER	101-55-3	NL		< 10 U	< 10 U	< 10 U	< 10 U	< 5.0 U	< 5.0 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U
4-CHLORO-3-METHYLPHENOL	59-50-7	NL		< 10 U	< 10 U	< 10 U	< 10 U	< 5.0 U	< 5.0 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U
4-CHLOROANILINE	106-47-8	5		< 10 U	< 10 U	< 10 U	< 10 U	< 5.0 U	< 5.0 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U
4-CHLOROPHENYL PHENYL ETHER	7005-72-3	NL		< 10 U	< 10 U	< 10 U	< 10 U	< 5.0 U	< 5.0 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U
4-METHYLPHENOL (P-CRESOL)	106-44-5	NL		< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U
4-NITROANILINE	100-01-6	5		< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U
4-NITROPHENOL	100-02-7	NL		< 20 U*	< 20 U*	< 20 U*	< 20 U	NS	NS	< 20 U	< 20 U	< 20 U	< 20 U	< 20 U*	< 20 U	< 20 U*	< 20 U
ACENAPHTHENE	83-32-9	20		< 10 U	< 10 U	< 10 U	< 10 U	< 5.0 U	< 5.0 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U
ACENAPHTHYLENE	208-96-8	NL		< 10 U	< 10 U	< 10 U	< 10 U	< 5.0 U	< 5.0 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U
ACETOPHENONE	98-86-2	NL		< 10 U	< 10 U	< 10 U	< 10 U	< 5.0 U	< 5.0 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U
ANTHRACENE	120-12-7	50		< 10 U	< 10 U	< 10 U	< 10 U	< 5.0 U	< 5.0 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U
ATRAZINE	1912-24-9	7.5		< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 5.0 U	< 5.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U
BENZALDEHYDE	100-52-7	NL		< 10 U	< 10 U	< 10 U	< 10 U	< 5.0 U	< 5.0 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U
BENZO(A)ANTHRACENE	56-55-3	0.002		< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 5.0 U	< 5.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
BENZO(A)PYRENE	50-32-8	NL		< 1.0 U*	< 1.0 U*	< 1.0 U*	< 1.0 U	< 5.0 U	< 5.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U*	< 1.0 U	< 1.0 U*	< 1.0 U
BENZO(B)FLUORANTHENE	205-99-2	0.002		< 2.0 U*	< 2.0 U*	< 2.0 U*	< 2.0 U*	< 5.0 U	< 5.0 U	< 2.0 U*	< 2.0 U*	< 2.0 U*	< 2.0 U*	< 2.0 U*	< 2.0 U*F1	< 2.0 U*	< 2.0 U*
BENZO(G,H,I)PERYLENE	191-24-2	NL		< 10 U	< 10 U	< 10 U	< 10 U	< 5.0 U	< 5.0 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U
BENZO(K)FLUORANTHENE	207-08-9	0.002		< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 5.0 U	< 5.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
BENZYL BUTYL PHTHALATE	85-68-7	50		< 10 U	< 10 U	< 10 U	< 10 U	< 5.0 U	< 5.0 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U
BIPHENYL (DIPHENYL)	92-52-4	5		< 10 U	< 10 U	< 10 U	< 10 U	< 5.0 U	< 5.0 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U
BIS(2-CHLOROETHOXY) METHANE	111-91-1	5		< 10 U	< 10 U	< 10 U	< 10 U	< 5.0 U	< 5.0 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U
BIS(2-CHLOROETHYL) ETHER (2-CHLOROETHYL ETHER)	111-44-4	1		< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 5.0 U	< 5.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
BIS(2-CHLOROISOPROPYL) ETHER	108-60-1	NL		< 10 U	< 10 U	< 10 U	< 10 U	< 5.0 U	< 5.0 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 UF1	< 10 U	< 10 U
BIS(2-ETHYLHEXYL) PHTHALATE	117-81-7	5		< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 5.0 U	< 5.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U
CAPROLACTAM	105-60-2	NL		< 10 U	< 10 U	**2.5 J**	< 10 U	< 5.0 U	< 5.0 U	< 10 U	**3.0 J**	< 10 U	< 10 U	< 10 U	< 10 U	**1.7 J**	< 10 U
CARBAZOLE	86-74-8	NL		< 10 U	< 10 U	< 10 U	< 10 U	< 5.0 U*	< 5.0 U*	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U
CHRYSENE	218-01-9	0.002		< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 5.0 U	< 5.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U
DIBENZ(A,H)ANTHRACENE	53-70-3	NL		< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 5.0 U	< 5.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
DIBENZOFURAN	132-64-9	NL		< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U
DIETHYL PHTHALATE	84-66-2	50		< 10 U	< 10 U	< 10 U	< 10 U	< 5.0 U	< 5.0 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U
DIMETHYL PHTHALATE	131-11-3	50		< 10 U	< 10 U	< 10 U	< 10 U	< 5.0 U	< 5.0 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U
DI-N-BUTYL PHTHALATE	84-74-2	50		< 10 U	< 10 U	< 10 U	< 10 U	< 5.0 U	< 5.0 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U
DI-N-OCTYLPHTHALATE	117-84-0	50		< 10 U*	< 10 U*	< 10 U*	< 10 U*	< 5.0 U	< 5.0 U	< 10 U*	< 10 U*	< 10 U*	< 10 U*	< 10 U*	< 10 UF1*	< 10 U*	< 10 U*
FLUORANTHENE	206-44-0	50		< 10 U	< 10 U	< 10 U	< 10 U	< 5.0 U	< 5.0 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U
FLUORENE	86-73-7	50		< 10 U	< 10 U	< 10 U	< 10 U	< 5.0 U	< 5.0 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U
HEXACHLOROBENZENE	118-74-1	0.04		< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 5.0 U	< 5.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
HEXACHLOROBUTADIENE	87-68-3	0.5		< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 5.0 U	< 5.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
HEXACHLOROCYCLOPENTADIENE	77-47-4	5		< 10 U	< 10 U	< 10 U	< 10 U	< 5.0 U	< 5.0 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U
HEXACHLOROETHANE	67-72-1	5		< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 5.0 U	< 5.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U
INDENO(1,2,3-C,D)PYRENE	193-39-5	0.002		< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 5.0 U	< 5.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U
ISOPHORONE	78-59-1	50		< 10 U	< 10 U	< 10 U	< 10 U	< 5.0 U	< 5.0 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U
NAPHTHALENE	91-20-3	10		< 10 U	< 10 U	< 10 U	< 10 U	< 5.0 U	< 5.0 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U
NITROBENZENE	98-95-3	0.4		< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 5.0 U	< 5.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
N-NITROSODI-N-PROPYLAMINE	621-64-7	NL		< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 5.0 U	< 5.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
N-NITROSODIPHENYLAMINE	86-30-6	50		< 10 U	< 10 U	< 10 U	< 10 U	< 5.0 U	< 5.0 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U
PENTACHLOROPHENOL	87-86-5	1		< 20 U	< 20 U	< 20 U	< 20 U	< 10 U	< 10 U	< 20 U	< 20 U	< 20 U	< 20 U	< 20 U	< 20 U	< 20 U	< 20 U
PHENANTHRENE	85-01-8	50		< 10 U	< 10 U	< 10 U	< 10 U	< 5.0 U	< 5.0 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U
PHENOL	108-95-2	1		< 10 U*	< 10 U*	< 10 U*	< 10 U	< 5.0 U	< 5.0 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U*	< 10 U	< 10 U*	< 10 U
PYRENE	129-00-0	50		< 10 U	< 10 U	< 10 U	< 10 U	< 5.0 U	< 5.0 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U

Notes:
Guidance or Standard Values - NYSDEC, Division of Water, TOGS (1.1.1) - 6 NYCRR 703.5 [NYSDEC, 1998]
All concentrations are in micrograms per liter
BOLD and yellow highlight indicates exceedances
Bold Values detected above reporting limit
J : Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.
U : Indicates the analyte was analyzed for but not detected.
F1 : MS and/or MSD recovery exceeds control limits.
F2 : MS/MSD RPD exceeds control limits
ND - Not Detected
NA - Not Analyzed
NL = Not Listed

Table 9c
Summary of Monitoring Well Analytical Data (Metals)
C and D Batteries Site No. 336001
Huguenot, New York

		Location ID	75-SWARTWOUT-RD	MW-10	MW-12	MW-13	MW-14	MW-14	MW-14	MW-15	MW-17	MW-17A	MW-57	MW-6	MW-7	MW-7
		Sample Date	1/29/2020	11/22/2019	11/22/2019	11/22/2019	11/20/2019	1/28/2020	1/28/2020	11/21/2019	11/21/2019	11/21/2019	11/21/2019	11/22/2019	11/21/2019	1/28/2020
		Sample ID	SWARTWOUT-RD-01292	MW-10-112219	MW-12-112219	MW-13-112219	MW-14-112019	MW-14-01282020	MW-14-DUP-01282020	MW-15-112119	MW-17-112119	MW-17A-112119	MW-57-112119	MW-6-112219	MW-7-112119	MW-7-01282020
		SDG	480-165713-1	460-197390-1	460-197390-1	460-197390-1	460-197436-1	480-165717-1	480-165717-1	460-197436-1	460-197436-1	460-197436-1	460-197436-1	460-197390-1	460-197436-1	480-165717-1
Analyte	CAS #	NYSDEC Groundwater Guidance or Standard Values														
Total Metals																
ALUMINUM	7429-90-5	NL	< 0.20 U	**0.227**	**0.0440 J**	**0.158 J**	**0.114 J**	**0.094 J**	**0.071 J**	**0.86**	**5.72**	**0.166 J**	**0.124 J**	**0.0435 J**	**0.121 J**	**0.31**
ANTIMONY	7440-36-0	0.003	< 0.020 U	< 0.0200 U	< 0.0200 U	< 0.0200 U	< 0.0200 U	< 0.020 U	< 0.020 U	< 0.0200 U	< 0.0200 U	< 0.0200 U	< 0.0200 U	< 0.0200 U	< 0.0200 U	< 0.020 U
ARSENIC	7440-38-2	0.025	< 0.015 U	< 0.0150 U	< 0.0150 U	< 0.0150 U	< 0.0150 U	< 0.015 U	< 0.015 U	< 0.0150 U	**0.0042 J**	**0.0051 J**	< 0.0150 U	< 0.0150 U	< 0.0150 U	< 0.015 U
BARIUM	7440-39-3	1	**0.13**	**0.0441 J**	**0.0186 J**	**0.0234 J**	**0.192 J**	**0.065 F1**	**0.15**	**0.183 J**	**0.152 J**	**0.0761 J**	**0.0077 J**	**0.215**	**0.0079 J**	**0.032**
BERYLLIUM	7440-41-7	0.003	< 0.0020 U	< 0.0020 U	< 0.0020 U	< 0.0020 U	< 0.0020 U	< 0.0020 U	< 0.0020 U	**0.00041 J**	**0.00032 J**	< 0.0020 U	< 0.0020 U	< 0.0020 U	< 0.0020 U	< 0.0020 U
CADMIUM	7440-43-9	0.005	< 0.0020 U	< 0.0040 U	< 0.0040 U	< 0.0040 U	< 0.0040 U	< 0.0020 U	< 0.0020 U	**0.00052 J**	< 0.0040 U	< 0.0040 U	< 0.0040 U	< 0.0040 U	< 0.0040 U	< 0.0020 U
CALCIUM	7440-70-2	NL	**30.2**	**39**	**14.3**	**6.59**	**14.2**	**11.5**	**11.6**	**18.5**	**15.2**	**16.7**	**15.5**	**9.96**	**15.1**	**12.3**
CHROMIUM, TOTAL	7440-47-3	0.05	< 0.0040 U	**0.0017 J**	**0.178**	**0.603**	< 0.0100 U	< 0.0040 U	< 0.0040 U	**0.0033 J**	**0.0082 J**	< 0.0100 U	< 0.0100 U	**0.0013 J**	< 0.0100 U	**0.0011 J**
COBALT	7440-48-4	NL	< 0.0040 U	< 0.0500 U	**0.0105 J**	< 0.0500 U	< 0.0500 U	< 0.0040 U	< 0.0040 U	< 0.0500 U	**0.0027 J**	**0.0072 J**	< 0.0500 U	< 0.0500 U	< 0.0500 U	**0.0070**
COPPER	7440-50-8	0.2	**0.0041 J**	**0.0116 J**	**0.0175 J**	**0.0132 J**	< 0.0250 U	< 0.010 U	< 0.010 U	< 0.0250 U	**0.0080 J**	< 0.0250 U	< 0.0250 U	< 0.0250 U	< 0.0250 U	< 0.010 U
IRON	7439-89-6	0.3	**0.13**	**0.453**	**0.501**	**2**	< 0.15 U	< 0.050 U	**0.055**	**4.8**	**7.91**	**6.97**	**0.0508 J**	< 0.15 U	**0.0498 J**	**0.22**
LEAD	7439-92-1	0.025	< 0.010 U	**0.0075 J**	< 0.0100 U	< 0.0100 U	< 0.0100 U	< 0.010 U	< 0.010 U	**0.0028 J**	**0.0056 J**	< 0.0100 U	< 0.0100 U	< 0.0100 U	< 0.0100 U	< 0.010 U
MAGNESIUM	7439-95-4	35	**4.1**	**7.34**	**2.88 J**	**1.26 J**	**2.6 J**	**2.1**	**2.2**	**1.15 J**	**3.54 J**	**1.03 J**	**2.81 J**	**2.12 J**	**2.79 J**	**2.4**
MANGANESE	7439-96-5	0.3	**0.045 B**	**0.832**	**0.113**	**0.0075 J**	**0.0018 J**	**0.0013 JB**	**0.050 B**	**0.227**	**0.209**	**3.05**	**0.937**	< 0.0150 U	**1**	**5.8 B**
MERCURY	7439-97-6	0.0007	NS	< 0.00020 U	< 0.00020 U	< 0.00020 U	< 0.00020 U	< 0.00020 U	< 0.00020 U	< 0.00020 U	< 0.00020 U	< 0.00020 U	< 0.00020 U	< 0.00020 U	< 0.00020 U	NS
NICKEL	7440-02-0	0.1	< 0.010 U	**0.0116 J**	**0.659**	**0.0483**	< 0.0400 U	< 0.010 U	< 0.010 U	**0.0127 J**	**0.0084 J**	**0.0043 J**	< 0.0400 U	< 0.0400 U	< 0.0400 U	**0.0019 J**
POTASSIUM	7440-09-7	NL	**0.57**	**10.1**	**1.29 J**	**0.662 J**	**2.19 J**	**2.0**	**2.1**	**0.416 J**	**4.5 J**	**0.336 J**	**2.74 J**	**1.21 J**	**2.67 J**	**2.7**
SELENIUM	7782-49-2	0.01	< 0.025 U	< 0.0200 U	< 0.0200 U	< 0.0200 U	< 0.0200 U	< 0.025 U	< 0.025 U	< 0.0200 U	< 0.0200 U	< 0.0200 U	< 0.0200 U	< 0.0200 U	< 0.0200 U	< 0.025 U
SILVER	7440-22-4	0.05	< 0.0060 U	< 0.0100 U	< 0.0100 U	< 0.0100 U	< 0.0100 U	< 0.0060 U	< 0.0060 U	< 0.0100 U	< 0.0100 U	< 0.0100 U	< 0.0100 U	< 0.0100 U	< 0.0100 U	< 0.0060 U
SODIUM	7440-23-5	20	**20.7**	**14.6**	**27**	**9.3**	**20.9**	**37.0 F1**	**18.4**	**2.72 J**	**10.2**	**13.8**	**21.1**	**16.4**	**20.4**	**19.4**
THALLIUM	7440-28-0	0.0005	< 0.020 U	< 0.0200 U	< 0.0200 U	< 0.0200 U	< 0.0200 U	< 0.020 U	< 0.020 U	< 0.0200 U	< 0.0200 U	< 0.0200 U	< 0.0200 U	< 0.0200 U	< 0.0200 U	< 0.020 U
VANADIUM	7440-62-2	NL	< 0.0050 U	< 0.0500 U	< 0.0500 U	< 0.0500 U	< 0.0500 U	< 0.0050 U	< 0.0050 U	< 0.0500 U	**0.0082 J**	< 0.0500 U	< 0.0500 U	< 0.0500 U	< 0.0500 U	< 0.0050 U
ZINC	7440-66-6	2	**0.0053 JB**	**0.0128 J**	**0.0061 J**	**0.0135 J**	< 0.0300 U	**0.0026 JB**	**0.0028 JB**	**0.0140 J**	**0.0254 J**	**0.0052 J**	< 0.0300 U	< 0.0300 U	< 0.0300 U	**0.0048 JB**
Dissolved Metals																
ALUMINUM	7429-90-5	NL	NS	**0.0370 J**	< 0.2 U	< 0.2 U	**0.0950 J**	< 0.20 U	NS	**0.293**	**0.297**	< 0.2 U	**0.0901 J**	**0.0304 J**	**0.0806 J**	NS
ANTIMONY	7440-36-0	0.003	NS	< 0.0200 U	< 0.0200 U	< 0.0200 U	**0.0043 J**	< 0.020 U	NS	< 0.0200 U	< 0.0200 U	< 0.0200 U	< 0.0200 U	< 0.0200 U	< 0.0200 U	NS
ARSENIC	7440-38-2	0.025	NS	< 0.0150 U	< 0.0150 U	< 0.0150 U	< 0.0150 U	< 0.015 U	NS	< 0.0150 U	< 0.0150 U	**0.0030 J**	< 0.0150 U	< 0.0150 U	< 0.0150 U	NS
BARIUM	7440-39-3	1	NS	**0.0361 J**	**0.0181 J**	**0.0181 J**	**0.211**	**0.063**	NS	**0.188 J**	**0.0870 J**	**0.0723 J**	< 0.2 U	**0.215**	< 0.2 U	NS
BERYLLIUM	7440-41-7	0.003	NS	< 0.0020 U	< 0.0020 U	< 0.0020 U	< 0.0020 U	< 0.0020 U	NS	**0.00036 J**	< 0.0020 U	< 0.0020 U	< 0.0020 U	< 0.0020 U	< 0.0020 U	NS
CADMIUM	7440-43-9	0.005	NS	< 0.0040 U	< 0.0040 U	< 0.0040 U	< 0.0040 U	< 0.0020 U	NS	**0.00062 J**	< 0.0040 U	< 0.0040 U	< 0.0040 U	**0.00037 J**	< 0.0040 U	NS
CALCIUM	7440-70-2	NL	NS	**47.5**	**13.8**	**7.27**	**15.3**	**11.3**	NS	**19.3**	**16.2**	**16.3**	**15.6**	**9.95**	**16**	NS
CHROMIUM, TOTAL	7440-47-3	0.05	NS	**0.0014 J**	**0.0257**	**0.0052 J**	< 0.0100 U	< 0.0040 U	NS	**0.0016 J**	< 0.0100 U	< 0.0100 U	**0.0017 J**	**0.0019 J**	< 0.0100 U	NS
COBALT	7440-48-4	NL	NS	< 0.0500 U	**0.0099 J**	< 0.0500 U	< 0.0500 U	< 0.0040 U	NS	< 0.0500 U	< 0.0500 U	**0.0071 J**	< 0.0500 U	< 0.0500 U	< 0.0500 U	NS
COPPER	7440-50-8	0.2	NS	< 0.0250 U	**0.0143 J**	< 0.0250 U	< 0.0250 U	< 0.010 U	NS	< 0.0250 U	< 0.0250 U	< 0.0250 U	< 0.0250 U	< 0.0250 U	< 0.0250 U	NS
IRON	7439-89-6	0.3	NS	< 0.15 U	< 0.15 U	< 0.15 U	< 0.15 U	< 0.050 U	NS	< 0.15 U	< 0.15 U	**0.591**	< 0.15 U	< 0.15 U	< 0.15 U	NS
LEAD	7439-92-1	0.025	NS	< 0.0100 U	< 0.0100 U	< 0.0100 U	< 0.0100 U	< 0.010 U	NS	< 0.0100 U	< 0.0100 U	< 0.0100 U	< 0.0100 U	< 0.0100 U	< 0.0100 U	NS
MAGNESIUM	7439-95-4	35	NS	**8.78**	**2.77 J**	**1.36 J**	**2.51 J**	**2.0**	NS	**1.1 J**	**2.71 J**	**0.992 J**	**2.83 J**	**2.08 J**	**2.9 J**	NS
MANGANESE	7439-96-5	0.3	NS	< 0.0150 U	**0.111**	**0.0047 J**	**0.0011 J**	**0.00042 JB**	NS	**0.185**	**0.0052 J**	**3**	< 0.0150 U	< 0.0150 U	< 0.0150 U	NS
MERCURY	7439-97-6	0.0007	NS	< 0.00020 U	< 0.00020 U	< 0.00020 U	< 0.00020 U	NS	NS	< 0.00020 U	< 0.00020 U	< 0.00020 U	< 0.00020 U	< 0.00020 U	< 0.00020 U	NS
NICKEL	7440-02-0	0.1	NS	< 0.0400 U	**0.647**	**0.0470**	< 0.0400 U	< 0.010 U	NS	**0.0127 J**	< 0.0400 U	**0.0042 J**	< 0.0400 U	< 0.0400 U	< 0.0400 U	NS
POTASSIUM	7440-09-7	NL	NS	**12.9**	**1.2 J**	**0.766 J**	**2.03 J**	**1.9**	NS	**0.351 J**	**3.59 J**	< 5 U	**2.77 J**	**1.25 J**	**2.84 J**	NS
SELENIUM	7782-49-2	0.01	NS	< 0.0200 U	< 0.0200 U	< 0.0200 U	< 0.0200 U	< 0.025 U	NS	< 0.0200 U	< 0.0200 U	< 0.0200 U	< 0.0200 U	< 0.0200 U	< 0.0200 U	NS
SILVER	7440-22-4	0.05	NS	< 0.0100 U	< 0.0100 U	< 0.0100 U	< 0.0100 U	< 0.0060 U	NS	< 0.0100 U	< 0.0100 U	< 0.0100 U	< 0.0100 U	< 0.0100 U	< 0.0100 U	NS
SODIUM	7440-23-5	20	NS	**18.4**	**26.6**	**10.9**	**20.2**	**17.5**	NS	**2.84 J**	**11.1**	**13.5**	**21.4**	**16.7**	**22**	NS
THALLIUM	7440-28-0	0.0005	NS	< 0.0200 U	< 0.0200 U	< 0.0200 U	< 0.0200 U	< 0.020 U	NS	< 0.0200 U	< 0.0200 U	< 0.0200 U	< 0.0200 U	< 0.0200 U	< 0.0200 U	NS
VANADIUM	7440-62-2	NL	NS	< 0.0500 U	< 0.0500 U	< 0.0500 U	< 0.0500 U	< 0.0050 U	NS	< 0.0500 U	< 0.0500 U	< 0.0500 U	< 0.0500 U	< 0.0500 U	< 0.0500 U	NS
ZINC	7440-66-6	2	NS	< 0.0300 U	**0.0055 J**	**0.0084 J**	< 0.0300 U	**0.0061 JB**	NS	**0.0127 J**	**0.0036 J**	**0.0056 J**	< 0.0300 U	< 0.0300 U	< 0.0300 U	NS

Notes:
Guidance or Standard Values - NYSDEC, Division of Water, TOGS (1.1.1) - 6 NYCRR 703.5 [NYSDEC, 1998]
All concentrations are in milligrams per liter
BOLD and yellow highlight indicates exceedances
Bold Values detected above reporting limit
J : Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.
U : Indicates the analyte was analyzed for but not detected.
F1 : MS and/or MSD recovery exceeds control limits.
F2 : MS/MSD RPD exceeds control limits
ND - Not Detected
NA - Not Analyzed
NL = Not Listed

Table 9c
Summary of Monitoring Well Analytical Data (Metals)
C and D Batteries Site No. 336001
Huguenot, New York

		Location ID	MW-8	MW-9	POT-1	POT-1	POT-2
		Sample Date	11/22/2019	11/20/2019	11/21/2019	2/17/2020	11/21/2019
		Sample ID	MW-8-112219	MW-9-112019	POT-1-112119	POT-1-02172020	POT-2-112119
		SDG	460-197390-1	460-197436-1	460-197436-1	480-166509-1	460-197436-1
Analyte	CAS #	NYSDEC Groundwater Guidance or Standard Values					
Total Metals							
ALUMINUM	7429-90-5	NL	**0.0503 J**	< 0.2 U	< 0.2 U	< 0.20	< 0.2 U
ANTIMONY	7440-36-0	0.003	< 0.0200 U	< 0.0200 U	< 0.0200 U	< 0.020	< 0.0200 U
ARSENIC	7440-38-2	0.025	< 0.0150 U	< 0.0150 U	< 0.0150 U	< 0.015	< 0.0150 U
BARIUM	7440-39-3	1	**0.0135 J**	**0.0122 J**	**0.149 J**	**0.14**	**0.0612 J**
BERYLLIUM	7440-41-7	0.003	< 0.0020 U	< 0.0020 U	< 0.0020 U	< 0.0020	< 0.0020 U
CADMIUM	7440-43-9	0.005	< 0.0040 U	< 0.0040 U	< 0.0040 U	< 0.0020	< 0.0040 U
CALCIUM	7440-70-2	NL	**21**	**25.4**	**32.7**	**29.1**	**32.6**
CHROMIUM, TOTAL	7440-47-3	0.05	< 0.0100 U	**0.0026 J**	< 0.0100 U	< 0.0040	< 0.0100 U
COBALT	7440-48-4	NL	< 0.0500 U	< 0.0500 U	< 0.0500 U	< 0.0040	< 0.0500 U
COPPER	7440-50-8	0.2	< 0.0250 U	< 0.0250 U	< 0.0250 U	**0.0086**	**0.0056 J**
IRON	7439-89-6	0.3	< 0.15 U	< 0.15 U	**0.171**	**0.11**	< 0.15 U
LEAD	7439-92-1	0.025	< 0.0100 U	< 0.0100 U	< 0.0100 U	< 0.010	< 0.0100 U
MAGNESIUM	7439-95-4	35	**2.99 J**	**3.28 J**	**3.99 J**	**4.0**	**4.81 J**
MANGANESE	7439-96-5	0.3	**0.0018 J**	< 0.0150 U	**0.0480**	**0.044**	**0.0022 J**
MERCURY	7439-97-6	0.0007	< 0.00020 U	< 0.00020 U	NS	< 0.00020	NS
NICKEL	7440-02-0	0.1	< 0.0400 U	< 0.0400 U	< 0.0400 U	< 0.010	< 0.0400 U
POTASSIUM	7440-09-7	NL	**2.89 J**	**5.82**	**0.547 J**	**0.55**	**0.549 J**
SELENIUM	7782-49-2	0.01	< 0.0200 U	< 0.0200 U	< 0.0200 U	< 0.025	< 0.0200 U
SILVER	7440-22-4	0.05	< 0.0100 U	< 0.0100 U	< 0.0100 U	< 0.0060	< 0.0100 U
SODIUM	7440-23-5	20	**20.7**	**14.9**	**20.9**	**20.7**	**8.8**
THALLIUM	7440-28-0	0.0005	< 0.0200 U	< 0.0200 U	< 0.0200 U	< 0.020	< 0.0200 U
VANADIUM	7440-62-2	NL	< 0.0500 U	< 0.0500 U	< 0.0500 U	< 0.0050	< 0.0500 U
ZINC	7440-66-6	2	**0.0077 J**	< 0.0300 U	< 0.0300 U	**0.024**	**0.0109 J**
Dissolved Metals							
ALUMINUM	7429-90-5	NL	**0.0472 J**	**0.0303 J**	< 0.2 U	< 0.20	< 0.2 U
ANTIMONY	7440-36-0	0.003	**0.0039 J**	< 0.0200 U	< 0.0200 U	< 0.020	< 0.0200 U
ARSENIC	7440-38-2	0.025	< 0.0150 U	< 0.0150 U	< 0.0150 U	< 0.015	< 0.0150 U
BARIUM	7440-39-3	1	**0.0124 J**	**0.0142 J**	**0.152 J**	**0.13**	**0.0609 J**
BERYLLIUM	7440-41-7	0.003	< 0.0020 U	< 0.0020 U	< 0.0020 U	< 0.0020	< 0.0020 U
CADMIUM	7440-43-9	0.005	< 0.0040 U	< 0.0040 U	< 0.0040 U	< 0.0020	< 0.0040 U
CALCIUM	7440-70-2	NL	**19**	**27.4**	**33.8**	**29.2**	**32.2**
CHROMIUM, TOTAL	7440-47-3	0.05	**0.0015 J**	**0.0042 J**	< 0.0100 U	< 0.0040	< 0.0100 U
COBALT	7440-48-4	NL	< 0.0500 U	< 0.0500 U	< 0.0500 U	< 0.0040	< 0.0500 U
COPPER	7440-50-8	0.2	< 0.0250 U	< 0.0250 U	< 0.0250 U	**0.0049**	< 0.0250 U
IRON	7439-89-6	0.3	< 0.15 U	< 0.15 U	< 0.15 U	< 0.050	< 0.15 U
LEAD	7439-92-1	0.025	< 0.0100 U	< 0.0100 U	< 0.0100 U	< 0.010	< 0.0100 U
MAGNESIUM	7439-95-4	35	**2.69 J**	**3.2 J**	**4.11 J**	**3.9**	**4.76 J**
MANGANESE	7439-96-5	0.3	**0.0018 J**	< 0.0150 U	**0.0492**	**0.045**	**0.0021 J**
MERCURY	7439-97-6	0.0007	< 0.00020 U	< 0.00020 U	NS	< 0.00020	NS
NICKEL	7440-02-0	0.1	< 0.0400 U	< 0.0400 U	< 0.0400 U	< 0.010	< 0.0400 U
POTASSIUM	7440-09-7	NL	**2.79 J**	**5.5**	**0.56 J**	**0.47**	**0.588 J**
SELENIUM	7782-49-2	0.01	< 0.0200 U	< 0.0200 U	< 0.0200 U	< 0.025	< 0.0200 U
SILVER	7440-22-4	0.05	< 0.0100 U	< 0.0100 U	< 0.0100 U	< 0.0060	< 0.0100 U
SODIUM	7440-23-5	20	**19.2**	**14.6**	**21.6**	**20.0**	**8.72**
THALLIUM	7440-28-0	0.0005	< 0.0200 U	< 0.0200 U	< 0.0200 U	< 0.020	< 0.0200 U
VANADIUM	7440-62-2	NL	< 0.0500 U	< 0.0500 U	< 0.0500 U	< 0.0050	< 0.0500 U
ZINC	7440-66-6	2	**0.0119 J**	< 0.0300 U	< 0.0300 U	**0.042**	**0.0116 J**

Notes:
Guidance or Standard Values - NYSDEC, Division of Water, TOGS (1.1.1) - 6
All concentrations are in milligrams per liter
BOLD and yellow highlight indicates exceedances
Bold Values detected above reporting limit
J : Result is less than the RL but greater than or equal to the MDL and the con
U : Indicates the analyte was analyzed for but not detected.
F1 : MS and/or MSD recovery exceeds control limits.
F2 : MS/MSD RPD exceeds control limits
ND - Not Detected
NA - Not Analyzed
NL = Not Listed

Table 9d
Summary of Monitoring Well Analytical Data (PCBs)
C and D Batteries Site No. 336001
Huguenot, New York

		Location ID	MW-10	MW-12	MW-13	MW-14	MW-14	MW-14	MW-15	MW-17	MW-17A	MW-57	MW-6	MW-7
		Sample Date	11/22/2019	11/22/2019	11/22/2019	11/20/2019	1/28/2020	1/28/2020	11/21/2019	11/21/2019	11/21/2019	11/21/2019	11/22/2019	11/21/2019
		Sample ID	MW-10-112219	MW-12-112219	MW-13-112219	MW-14-112019	MW-14-01282020	MW-14-DUP-01282020	MW-15-112119	MW-17-112119	MW-17A-112119	MW-57-112119	MW-6-112219	MW-7-112119
		SDG	460-197390-1	460-197390-1	460-197390-1	460-197436-1	480-165717-1	480-165717-1	460-197436-1	460-197436-1	460-197436-1	460-197436-1	460-197390-1	460-197436-1
Analyte	CAS #	NYSDEC Groundwater Guidance or Standard Values												
CHLOROBIPHENYL	37324-23-5	NL	< 0.40 U	< 0.40 U	< 0.40 U	< 0.40 U	< 0.50 U	< 0.50 U	< 0.40 U	< 0.40 U	< 0.40 U	< 0.40 U	< 0.40 U	< 0.40 U
PCB-1016 (AROCLOR 1016)	12674-11-2	0.09	< 0.40 U	< 0.40 U	< 0.40 U	< 0.40 U	NS	NS	< 0.40 U	< 0.40 U	< 0.40 U	< 0.40 U	< 0.40 U	< 0.40 U
PCB-1221 (AROCLOR 1221)	11104-28-2	0.09	< 0.40 U	< 0.40 U	< 0.40 U	< 0.40 U	< 0.50 U	< 0.50 U	< 0.40 U	< 0.40 U	< 0.40 U	< 0.40 U	< 0.40 U	< 0.40 U
PCB-1232 (AROCLOR 1232)	11141-16-5	0.09	< 0.40 U	< 0.40 U	< 0.40 U	< 0.40 U	< 0.50 U	< 0.50 U	< 0.40 U	< 0.40 U	< 0.40 U	< 0.40 U	< 0.40 U	< 0.40 U
PCB-1242 (AROCLOR 1242)	53469-21-9	0.09	< 0.40 U	< 0.40 U	< 0.40 U	< 0.40 U	< 0.50 U	< 0.50 U	< 0.40 U	< 0.40 U	< 0.40 U	< 0.40 U	< 0.40 U	< 0.40 U
PCB-1248 (AROCLOR 1248)	12672-29-6	0.09	< 0.40 U	< 0.40 U	< 0.40 U	< 0.40 U	< 0.50 U	< 0.50 U	< 0.40 U	< 0.40 U	< 0.40 U	< 0.40 U	< 0.40 U	< 0.40 U
PCB-1254 (AROCLOR 1254)	11097-69-1	0.09	< 0.40 U	< 0.40 U	< 0.40 U	< 0.40 U	< 0.50 U	< 0.50 U	< 0.40 U	< 0.40 U	< 0.40 U	< 0.40 U	< 0.40 U	< 0.40 U
PCB-1260 (AROCLOR 1260)	11096-82-5	0.09	< 0.40 U	< 0.40 U	< 0.40 U	< 0.40 U	NS	NS	< 0.40 U	< 0.40 U	< 0.40 U	< 0.40 U	< 0.40 U	< 0.40 U
PCB-1268 (AROCLOR 1268)	11100-14-4	0.09	< 0.40 U	< 0.40 U	< 0.40 U	< 0.40 U	< 0.50 U	< 0.50 U	< 0.40 U	< 0.40 U	< 0.40 U	< 0.40 U	< 0.40 U	< 0.40 U
TOTAL PCBS	1336-36-3	0.09	< 0.40 U	< 0.40 U	< 0.40 U	< 0.40 U	NS	NS	< 0.40 U	< 0.40 U	< 0.40 U	< 0.40 U	< 0.40 U	< 0.40 U

		Location ID	MW-8	MW-9	POT-1	POT-2
		Sample Date	11/22/2019	11/20/2019	11/21/2019	11/21/2019
		Sample ID	MW-8-112219	MW-9-112019	POT-1-112119	POT-2-112119
		SDG	460-197390-1	460-197436-1	460-197436-1	460-197436-1
Analyte	CAS #	NYSDEC Groundwater Guidance or Standard Values				
CHLOROBIPHENYL	37324-23-5	NL	< 0.40 U	< 0.40 U	< 0.40 U	< 0.40 U
PCB-1016 (AROCLOR 1016)	12674-11-2	0.09	< 0.40 U	< 0.40 U	< 0.40 U	< 0.40 U
PCB-1221 (AROCLOR 1221)	11104-28-2	0.09	< 0.40 U	< 0.40 U	< 0.40 U	< 0.40 U
PCB-1232 (AROCLOR 1232)	11141-16-5	0.09	< 0.40 U	< 0.40 U	< 0.40 U	< 0.40 U
PCB-1242 (AROCLOR 1242)	53469-21-9	0.09	< 0.40 U	< 0.40 U	< 0.40 U	< 0.40 U
PCB-1248 (AROCLOR 1248)	12672-29-6	0.09	< 0.40 U	< 0.40 U	< 0.40 U	< 0.40 U
PCB-1254 (AROCLOR 1254)	11097-69-1	0.09	< 0.40 U	< 0.40 U	< 0.40 U	< 0.40 U
PCB-1260 (AROCLOR 1260)	11096-82-5	0.09	< 0.40 U	< 0.40 U	< 0.40 U	< 0.40 U
PCB-1268 (AROCLOR 1268)	11100-14-4	0.09	< 0.40 U	< 0.40 U	< 0.40 U	< 0.40 U
TOTAL PCBS	1336-36-3	0.09	< 0.40 U	< 0.40 U	< 0.40 U	< 0.40 U

Notes:
Guidance or Standard Values - NYSDEC, Division of Water, TOGS (1.1.1) - 6 NYCRR 703.5 [NYSDEC, 1998]
All concentrations are in micrograms per liter
BOLD and yellow highlight indicates exceedances
Bold Values detected above reporting limit
J : Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.
U : Indicates the analyte was analyzed for but not detected.
F1 : MS and/or MSD recovery exceeds control limits.
F2 : MS/MSD RPD exceeds control limits
ND - Not Detected
NA - Not Analyzed
NL = Not Listed

Table 9e
Summary of Monitoring Well Analytical Data (PFAs)
C and D Batteries Site No. 336001
Huguenot, New York

		Location ID	MW-12	MW-13	MW-14	MW-14	MW-57	MW-6	MW-7	MW-7	MW-9	MW-9
		Sample Date	1/29/2020	1/29/2020	1/28/2020	1/28/2020	11/21/2019	1/29/2020	11/21/2019	1/28/2020	11/20/2019	1/28/2020
		Sample ID	MW-12-01292020	MW-13-01292020	MW-14-01282020	MW-14-DUP-01282020	MW-57-112119	MW-6-01292020	MW-7-112119	MW-7-01282020	MW-9-112019	MW-9-01282020
		SDG	480-165717-1	480-165717-1	480-165717-1	480-165717-1	460-197436-1	480-165717-1	460-197436-1	480-165717-1	460-197436-1	480-165717-1
Analyte	CAS #	NYSDEC Groundwater Guidance or Standard Values										
2-(N-methyl perfluorooctanesulfonamido) acetic acid	2355-31-9		< 17	< 17	< 17	< 17	< 18 U	< 17	< 18 U	< 18	< 18 U*	< 17
N-Ethyl-N-((heptadecafluorooctyl)sulphonyl) glycine	2991-50-6	NL	< 17	< 17	< 17	< 17	< 18 U	< 17	< 18 U	< 18	< 18 U	< 17
Perfluorobutanesulfonic acid (PFBS)	375-73-5	NL	**0.29**	**0.55**	**3.3**	**3.1**	**1.9**	**0.43**	**1.9**	**3.5**	**0.84 J**	**1.1**
Perfluorobutanoic Acid	375-22-4	NL	**1.9**	**2.4**	**8.0**	**8.0**	**5.9**	**1.4**	**6.3**	**8.8**	**5.2 B**	**5.5**
Perfluorodecane Sulfonic Acid	335-77-3	NL	< 1.7	< 1.7	< 1.7	< 1.7	< 1.8 U	< 1.7	< 1.8 U	< 1.8	< 1.8 U	< 1.7
Perfluorodecanoic acid (PFDA)	335-76-2	NL	< 1.7	**0.78**	< 1.7	< 1.7	< 1.8 U	< 1.7	< 1.8 U	< 1.8	< 1.8 U	< 1.7
Perfluorododecanoic acid (PFDoA)	307-55-1	NL	< 1.7	< 1.7	< 1.7	< 1.7	< 1.8 U	< 1.7	< 1.8 U	< 1.8	< 1.8 U	< 1.7
Perfluoroheptane Sulfonate (PFHPS)	375-92-8	NL	< 1.7	< 1.7	**0.88**	**0.96**	< 1.8 U	< 1.7	< 1.8 U	**0.70**	< 1.8 U	**0.47**
Perfluoroheptanoic Acid (PFHpA)	375-85-9	NL	**0.26**	**1.3**	**7.8**	**7.2**	**4.6**	**0.88**	**5.0**	**7.8**	**3.9**	**4.2**
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	NL	**1.6**	**0.83**	**25**	**26**	**17**	**3.6**	**16**	**24**	**10**	**11**
Perfluorohexanoic acid (PFHxA)	307-24-4	NL	**1.3**	**0.93**	**17**	**17**	**12**	**1.9**	**12**	**20**	**8.9 ***	**9.7**
Perfluorooctane Sulfonamide (FOSA)	754-91-6	NL	**1.2**	**0.65**	**0.48**	**0.55**	< 9.1 U	**0.56**	< 9.2 U	< 1.8	< 8.9 U	**0.61**
Perfluorooctanesulfonic acid (PFOS)	1763-23-1	NL	**1.7**	**5.8**	**77**	**79**	**47**	**13**	**54**	**62**	**31**	**37**
Perfluorooctanoic acid (PFOA)	335-67-1	NL	**1.1**	**1.8**	**5.0**	**4.9**	**3.4**	**1.2**	**3.5**	**5.1**	**4.9**	**5.0**
Perfluoropentanoic Acid (PFPeA)	2706-90-3	NL	**0.84**	**0.80**	**29**	**29**	**21**	**2.3**	**19**	**35**	**14**	**15**
Perfluorotetradecanoic acid (PFTA)	376-06-7	NL	< 1.7	< 1.7	< 1.7	< 1.7	< 1.8 U	< 1.7	< 1.8 U	< 1.8	< 1.8 U	< 1.7
PERFLUOROTRIDECANOIC ACID (PFTriA)	72629-94-8	NL	< 1.7	< 1.7	< 1.7	< 1.7	< 1.8 U	< 1.7	< 1.8 U	< 1.8	< 1.8 U	< 1.7
PERFLUOROUNDECANOIC ACID (PFUnA)	2058-94-8	NL	< 1.7	< 1.7	< 1.7	< 1.7	< 1.8 U	< 1.7	< 1.8 U	< 1.8	< 1.8 U	< 1.7
Perfuorononanoic acid (PFNA)	375-95-1	NL	< 1.7	**1.2**	**1.1**	**1.3**	**0.78 J**	**0.29**	**0.59 J**	**1.1**	**0.53 J**	**0.61**
Sodium 1H,1H,2H,2H-Perfluorodecane Sulfonate (8:2)	39108-34-4	NL	< 17	< 17	< 17	< 17	< 18 U	< 17	< 18 U	< 18	< 18 U	< 17
Sodium 1H,1H,2H,2H-Perfluorooctane Sulfonate (6:2)	27619-97-2	NL	< 17	< 17	< 17	< 17	< 18 U	< 17	NS	**2.2**	< 18 U	< 17

Notes:
Guidance or Standard Values - NYSDEC, Division of Water, TOGS (1.1.1) - 6 NYCRR 703.5 [NYSDEC, 1998]
All concentrations are in nanograms per liter
BOLD and yellow highlight indicates exceedances
Bold Values detected above reporting limit
J : Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.
U : Indicates the analyte was analyzed for but not detected.
F1 : MS and/or MSD recovery exceeds control limits.
F2 : MS/MSD RPD exceeds control limits
ND - Not Detected
NA - Not Analyzed
NL = Not Listed

Table 9f
Summary of Monitoring Well Analytical Data (Pesticides)
C and D Batteries Site No. 336001
Huguenot, New York

Analyte	CAS #	NYSDEC Groundwater Guidance or Standard Values	Location ID Sample Date Sample ID SDG MW-10 11/22/2019 MW-10-112219 460-197390-1	MW-12 11/22/2019 MW-12-112219 460-197390-1	MW-13 11/22/2019 MW-13-112219 460-197390-1	MW-14 11/20/2019 MW-14-112019 460-197436-1	MW-14 1/28/2020 MW-14-01282020 480-165717-1	MW-14 1/28/2020 MW-14-DUP-01282020 480-165717-1	MW-15 11/21/2019 MW-15-112119 460-197436-1	MW-17 11/21/2019 MW-17-112119 460-197436-1	MW-17A 11/21/2019 MW-17A-112119 460-197436-1	MW-57 11/21/2019 MW-57-112119 460-197436-1
ALPHA BHC (ALPHA HEXACHLOROCYCLOHEXANE)	319-84-6		< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U*	< 0.050 U	< 0.050 U	< 0.020 U*	< 0.020 U*	< 0.020 U*	< 0.020 U*
ALPHA ENDOSULFAN	959-98-8		< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U*	< 0.050 U	< 0.050 U	< 0.020 U*	< 0.020 U*	< 0.020 U*	< 0.020 U*
ALPHA-CHLORDANE	5103-71-9		< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U*	< 0.050 U	< 0.050 U	< 0.020 U*	< 0.020 U*	< 0.020 U*	< 0.020 U*
BETA BHC (BETA HEXACHLOROCYCLOHEXANE)	319-85-7		< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U*	< 0.050 U	< 0.050 U	< 0.020 U*	< 0.020 U*	< 0.020 U*	< 0.020 U*
BETA ENDOSULFAN	33213-65-9		< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U*	< 0.050 U	< 0.050 U	< 0.020 U*	< 0.020 U*	< 0.020 U*	< 0.020 U*
BETA-CHLORDANE	5103-74-2		< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U*	< 0.050 U	< 0.050 U	< 0.020 U*	< 0.020 U*	< 0.020 U*	< 0.020 U*
DELTA BHC (DELTA HEXACHLOROCYCLOHEXANE)	319-86-8		< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U*	< 0.050 U	< 0.050 U	< 0.020 U*	< 0.020 U*	< 0.020 U*	< 0.020 U*
DIELDRIN	60-57-1		< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U*	< 0.050 U	< 0.050 U	< 0.020 U*	< 0.020 U*	< 0.020 U*	< 0.020 U*
ENDOSULFAN SULFATE	1031-07-8		< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U*	< 0.050 U	< 0.050 U	< 0.020 U*	< 0.020 U*	< 0.020 U*	< 0.020 U*
ENDRIN	72-20-8		< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U*	< 0.050 U	< 0.050 U	< 0.020 U*	< 0.020 U*	< 0.020 U*	< 0.020 U*
ENDRIN ALDEHYDE	7421-93-4		< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U*	< 0.050 U	< 0.050 U	< 0.020 U*	< 0.020 U*	< 0.020 U*	< 0.020 U*
ENDRIN KETONE	53494-70-5		< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U*	< 0.050 U	< 0.050 U	< 0.020 U*	< 0.020 U*	< 0.020 U*	< 0.020 U*
GAMMA BHC (LINDANE)	58-89-9		< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U*	0.012 JB	< 0.050 U	< 0.020 U*	< 0.020 U*	< 0.020 U*	< 0.020 U*
HEPTACHLOR	76-44-8		< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U*	< 0.050 U	< 0.050 U	< 0.020 U*	< 0.020 U*	< 0.020 U*	< 0.020 U*
HEPTACHLOR EPOXIDE	1024-57-3		< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U*	< 0.050 U	< 0.050 U	< 0.020 U*	< 0.020 U*	< 0.020 U*	< 0.020 U*
METHOXYCHLOR	72-43-5		< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U*	< 0.050 U	< 0.050 U	< 0.020 U*	< 0.020 U*	< 0.020 U*	< 0.020 U*
P,P'-DDD	72-54-8		< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U*	< 0.050 U	< 0.050 U	< 0.020 U*	< 0.020 U*	< 0.020 U*	< 0.020 U*
P,P'-DDE	72-55-9		< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U*	< 0.050 U	< 0.050 U	< 0.020 U*	< 0.020 U*	< 0.020 U*	< 0.020 U*
P,P'-DDT	50-29-3		< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U*	0.019 J	< 0.050 U	< 0.020 U*	< 0.020 U*	< 0.020 U*	< 0.020 U*
TOXAPHENE	8001-35-2		< 0.50 U	< 0.50 U	< 0.50 U	< 0.50 U	NS	NS	< 0.50 U	< 0.50 U	< 0.50 U	< 0.50 U

Analyte	CAS #	NYSDEC Groundwater Guidance or Standard Values	Location ID Sample Date Sample ID SDG MW-6 11/22/2019 MW-6-112219 460-197390-1	MW-7 11/21/2019 MW-7-112119 460-197436-1	MW-8 11/22/2019 MW-8-112219 460-197390-1	MW-9 11/20/2019 MW-9-112019 460-197436-1
ALPHA BHC (ALPHA HEXACHLOROCYCLOHEXANE)	319-84-6		< 0.020 U	< 0.020 U*F1	< 0.020 U	< 0.020 U*
ALPHA ENDOSULFAN	959-98-8		< 0.020 U	< 0.020 U*F1	< 0.020 U	< 0.020 U*
ALPHA-CHLORDANE	5103-71-9		< 0.020 U	< 0.020 U*F1	< 0.020 U	< 0.020 U*
BETA BHC (BETA HEXACHLOROCYCLOHEXANE)	319-85-7		< 0.020 U	< 0.020 U*F1	< 0.020 U	< 0.020 U*
BETA ENDOSULFAN	33213-65-9		< 0.020 U	< 0.020 U*F1	< 0.020 U	< 0.020 U*
BETA-CHLORDANE	5103-74-2		< 0.020 U	< 0.020 U*F1	< 0.020 U	< 0.020 U*
DELTA BHC (DELTA HEXACHLOROCYCLOHEXANE)	319-86-8		< 0.020 U	< 0.020 U*F1	< 0.020 U	< 0.020 U*
DIELDRIN	60-57-1		< 0.020 U	< 0.020 U*F1	< 0.020 U	< 0.020 U*
ENDOSULFAN SULFATE	1031-07-8		< 0.020 U	< 0.020 U*F1	< 0.020 U	< 0.020 U*
ENDRIN	72-20-8		< 0.020 U	< 0.020 U*F1	< 0.020 U	< 0.020 U*
ENDRIN ALDEHYDE	7421-93-4		< 0.020 U	< 0.020 U*F1	< 0.020 U	< 0.020 U*
ENDRIN KETONE	53494-70-5		< 0.020 U	< 0.020 U*F1	< 0.020 U	< 0.020 U*
GAMMA BHC (LINDANE)	58-89-9		< 0.020 U	< 0.020 U*F1	< 0.020 U	< 0.020 U*
HEPTACHLOR	76-44-8		< 0.020 U	< 0.020 U*F1	< 0.020 U	< 0.020 U*
HEPTACHLOR EPOXIDE	1024-57-3		< 0.020 U	< 0.020 U*F1	< 0.020 U	< 0.020 U*
METHOXYCHLOR	72-43-5		< 0.020 U	< 0.020 U*F1	< 0.020 U	< 0.020 U*
P,P'-DDD	72-54-8		< 0.020 U	< 0.020 U*F1	< 0.020 U	< 0.020 U*
P,P'-DDE	72-55-9		< 0.020 U	< 0.020 U*F1	< 0.020 U	< 0.020 U*
P,P'-DDT	50-29-3		< 0.020 U	< 0.020 U*F1	< 0.020 U	< 0.020 U*
TOXAPHENE	8001-35-2		< 0.50 U	< 0.50 U	< 0.50 U	< 0.50 U

Notes:
Guidance or Standard Values - NYSDEC, Division of Water, TOGS (1.1.1) - 6 NYCRR 703.5 [NYSDEC, 1998]
All concentrations are in nanograms per liter
BOLD and yellow highlight indicates exceedances
Bold Values detected above reporting limit
J : Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.
U : Indicates the analyte was analyzed for but not detected.
F1 : MS and/or MSD recovery exceeds control limits.
F2 : MS/MSD RPD exceeds control limits
ND - Not Detected
NA - Not Analyzed
NL = Not Listed

Table 9g
Summary of Monitoring Well Analytical Data (Chemistry)
C and D Batteries Site No. 336001
Huguenot, New York

		Location ID	75 STUARTWOUT-RD	MW-10	MW-12	MW-13	MW-14	MW-14	MW-14	MW-15	MW-17	MW-17A	MW-57	MW-6
		Sample Date	1/29/2020	11/22/2019	11/22/2019	11/22/2019	11/20/2019	1/28/2020	1/28/2020	11/21/2019	11/21/2019	11/21/2019	11/21/2019	11/22/2019
		Sample ID	SWARTWOUT-RD-01292	MW-10-112219	MW-12-112219	MW-13-112219	MW-14-112019	MW-14-01282020	MW-14-DUP-01282020	MW-15-112119	MW-17-112119	MW-17A-112119	MW-57-112119	MW-6-112219
		SDG	480-165713-1	460-197390-1	460-197390-1	460-197390-1	460-197436-1	480-165717-1	480-165717-1	460-197436-1	460-197436-1	460-197436-1	460-197436-1	460-197390-1
Analyte	CAS #	NYSDEC Groundwater Guidance or Standard Values												
CYANIDE	57-12-5	0.2	< 0.010 U*	< 0.010 U	< 0.010 U	< 0.10 U	< 0.010 U	< 0.010 U*F1	< 0.010 U*	< 0.010 U	< 0.010 U	< 0.010 U	< 0.010 U	< 0.010 U
FLUORIDE	16984-48-8	NE	**0.24**	**4.7**	**0.11**	< 0.10 U	**2.3**	**2.4**	**2.5**	**0.14**	**1.3**	< 0.10 U	**2.1**	**0.62**

		Location ID	MW-7	MW-7	MW-8	MW-9	POT-1	POT-2
		Sample Date	11/21/2019	1/28/2020	11/22/2019	11/20/2019	11/21/2019	11/21/2019
		Sample ID	MW-7-112119	MW-7-01282020	MW-8-112219	MW-9-112019	POT-1-112119	POT-2-112119
		SDG	460-197436-1	480-165717-1	460-197390-1	460-197436-1	460-197436-1	460-197436-1
Analyte	CAS #	NYSDEC Groundwater Guidance or Standard Values						
CYANIDE	57-12-5	0.2	< 0.010 UF1	< 0.010 U*	< 0.010 U	< 0.010 U	NS	NS
FLUORIDE	16984-48-8	NE	**2.2**	NS	**2.6**	**3.3**	**0.26**	< 0.10 U

Notes:
Guidance or Standard Values - NYSDEC, Division of Water, TOGS (1.1.1) - 6 NYCRR 703.5 [NYSDEC, 1998]
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Bold Values detected above reporting limit
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U : Indicates the analyte was analyzed for but not detected.
F1 : MS and/or MSD recovery exceeds control limits.
F2 : MS/MSD RPD exceeds control limits
ND - Not Detected
NA - Not Analyzed
NL = Not Listed

Appendix A Soil Boring Logs

AECOM
30 Knightsbridge Road, Piscataway, NJ 08854
732.564.3200 office telephone

Boring ID: LG-1

Project Name: C&D Power	**Drilling Company:** Parratt Wolff	
Project Number: 60628872	**Drilling Method:** Hollow Stem Auger	**Coordinates (NJSPNAD83) x:**
Date Started Drilling: 9/21/2020	**Rig Type:** CME 550	**Coordinates (NJSPNAD83) y:**
Date Finished Drilling: 9/21/2020	**Core Size:** 3 inch	**Boring Total Depth:** 25 ft
Logged By: Jim Christopher	**Project Manager:** Amit Haryani	**Depth to Water:** 13.0 ft
Physical Location: Lagoon		**Surface Elevation:** ft NAVD88

Depth Range (ft bgs)	Recovery (ft/ft)	PID (ppm)	Moisture Content	USCS	Graphic Log	Surface Cover and Thickness:	Sample ID
1	1.5		Moist	SP-SM		fine to medium sand with fine to medium gravel, some silt, brown (7.5YR 4/2) to dark brown (7.5YR 3/2), loose, moist, no odor, no staining.	
2				NR		No Recovery	
3	1.5		Moist	SP-SM		fine to medium sand with fine to medium gravel, some silt, brown (7.5YR 4/2) to dark brown (7.5YR 3/2), loose, moist, no odor, no staining.	LG-1(2-4)_20200921
4				NR		No Recovery	
5	1.6		Moist	SP-SM		fine to medium sand with fine to medium gravel, some silt, brown (7.5YR 4/2) to dark brown (7.5YR 3/2), loose, moist, no odor, no staining. Cobble in tip of split spoon at 4.0 ft bgs.	LG-1(4-6)_20200921
6				NR		No Recovery	
7	1.2		Moist	SP-SM		fine to medium sand with fine to medium gravel, some silt, brown (7.5YR 4/2) to dark brown (7.5YR 3/2), loose, moist, no odor, no staining.	LG-1(6-8)_20200921
8				NR		No Recovery	
9	0.7		Moist	SP-SM		fine to medium sand with fine to medium gravel, some silt, brown (7.5YR 4/2) to dark brown (7.5YR 3/2), loose, moist, no odor, no staining. Greater presence of cobbles at 8.0 ft bgs.	
10				NR		No Recovery	
11	0.5		Moist	SP-SM		fine to medium sand with fine to medium gravel, some silt, brown (7.5YR 4/2) to dark brown (7.5YR 3/2), loose, moist, no odor, no staining.	
12	0.6		Moist	SP-SM		No Recovery fine to medium sand with fine to medium gravel, some silt, brown (7.5YR 4/2) to dark brown (7.5YR 3/2), loose, moist, no odor, no staining.	
13				NR		No Recovery	
14	0.7		Moist	SP-SM		fine to medium sand with fine to medium gravel, some silt, brown (7.5YR 4/2) to dark brown (7.5YR 3/2), loose, moist, no odor, no staining.	LG-1(13-15)_20200921
15				NR		No Recovery	
16	0.8		Wet	GP		coarse gravel, little fine sands, evidence of cobbles, gray (2.5Y 5/1), wet, no odor, no staining.	
17				NR		No Recovery	
18	0.6		Moist	SP-SM		coarse sand, some silt, little fine to medium sand, grayish brown (2.5Y 5/2), soft, no odor, no staiing.	LG-1(17-19)_20200921
19				NR		No Recovery	
	0.5		Wet	SP		coarse sand, little fine to medium sand and coarse gravel, dark gray (5Y 4/1), loose, wet, no odor, no staining.	LG-1(19-21)_20200921
				NR		No Recovery	

Comments:

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Boring ID: LG-1

Project Name: C&D Power	**Drilling Company:** Parratt Wolff	
Project Number: 60628872	**Drilling Method:** Hollow Stem Auger	**Coordinates (NJSPNAD83) x:**
Date Started Drilling: 9/21/2020	**Rig Type:** CME 550	**Coordinates (NJSPNAD83) y:**
Date Finished Drilling: 9/21/2020	**Core Size:** 3 inch	**Boring Total Depth:** 25 ft
Logged By: Jim Christopher	**Project Manager:** Amit Haryani	**Depth to Water:** 13.0 ft
Physical Location: Lagoon		**Surface Elevation:** ft NAVD88

Depth Range (ft bgs)	Recovery (ft/ft)	PID (ppm)	Moisture Content	USCS	Graphic Log	Surface Cover and Thickness:	Sample ID
21			Wet	SP		coarse sand, little fine to medium sand and coarse gravel, dark gray (5Y 4/1), loose, wet, no odor, no staining.	LG-1(21-23)_20200921
22	0.6			NR		No Recovery	
23			Wet	SP		coarse sand, little fine to medium sand and coarse gravel, dark gray (5Y 4/1), loose, wet, no odor, no staining.	LG-1(23-25)_20200921
24	0.7			NR		No Recovery	
25							

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Boring ID: LG-2

Project Name: C&D Power	**Drilling Company:** Parratt Wolff	
Project Number: 60628872	**Drilling Method:** Hollow Stem Auger	**Coordinates (NJSPNAD83) x:**
Date Started Drilling: 9/21/2020	**Rig Type:** CME 550	**Coordinates (NJSPNAD83) y:**
Date Finished Drilling: 9/22/2020	**Core Size:** 3 inch	**Boring Total Depth:** 25 ft
Logged By: Jim Christopher	**Project Manager:** Amit Haryani	**Depth to Water:** 17.0 ft
Physical Location: Lagoon		**Surface Elevation:** ft NAVD88

Depth Range (ft bgs)	Recovery (ft/ft)	PID (ppm)	Moisture Content	USCS	Graphic Log	Surface Cover and Thickness:	Sample ID
0	1		Dry to Moist	SP-SM		Silt, some fine to medium gravel, organic mater, dark brown (7.5YR 3/2), medium dense, dry to moist, no odor, no staining.	
1			Moist	SP-SM		Fine sand and silt, some fine to coarse gravel,evidence of cobbles, brown (7.5YR 5/2) to dark brown (7.5YR 3/2), medium loose, moist, no odor, no staining.	LG-2(1-3)_20200921
2	1.7						
3				NR		No Recovery	
3			Moist	SP-SM		Fine sand and silt, some fine to coarse gravel,evidence of cobbles, brown (7.5YR 5/2) to dark brown (7.5YR 3/2), medium loose, moist, no odor, no staining.	LG-2(3-5)_20200921
4	1.7						
5				NR		No Recovery	
5			Moist	SP-SM		Silt, little fine sands and fine to coarse gravel, dark brown (7.5YR 3/2), medium dense, moist, no odor, no staining	
6	2		Moist	SP-SM		Fine to coarse sand and silt, some fine to coarse gravel, evidence of cobbles, dark brown (7.5 YR 3/2), medium loose, moist, no odor, no staining.	
7			Moist	SP-SM		Fine to coarse sands and silt, some fine to coarse gravel with evidence of cobbles, grayish brown (2.5Y 5/2), loose, moist, no odor, no staining.	
8	1.6						
9				NR		No Recovery	
9			Moist	SP-SM		Fine to coarse sands and silt, some fine to coarse gravel with evidence of cobbles, grayish brown (2.5Y 5/2), loose, moist, no odor, no staining.	
10	2						
11							LG-2(11-13__20200922
12	1.3						
13				NR		No Recovery	
13			Moist	SP-SM		Fine to coarse sands and silt, some fine to coarse gravel with evidence of cobbles, grayish brown (2.5Y 5/2), loose, moist, no odor, no staining.	
14	0.7			NR		No Recovery	
15			Moist	SP-SM		Fine to coarse sands and silt, some fine to coarse gravel with evidence of cobbles, grayish brown (2.5Y 5/2), loose, moist, no odor, no staining.	LG-2(15-17)_20200922
16	0.7			NR		No Recovery	
17			Wet	SP-SM		Fine to coarse sands and silt, some fine to coarse gravel with evidence of cobbles, grayish brown (2.5Y 5/2), loose, wet, no odor, no staining.	LG-2(17-19)_20200922
18	0.7			NR		No Recovery	
19			Wet	SP-SM		Fine to coarse sands and silt, some fine to coarse gravel with evidence of cobbles, grayish brown (2.5Y 5/2), loose, wet, no odor, no staining.	
	0.8						

Comments: Fine sands from 21.0 and 23.0 washed out during retrieval of split spoon from borehole.

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Boring ID: LG-2

Project Name: C&D Power	**Drilling Company:** Parratt Wolff	
Project Number: 60628872	**Drilling Method:** Hollow Stem Auger	**Coordinates (NJSPNAD83) x:**
Date Started Drilling: 9/21/2020	**Rig Type:** CME 550	**Coordinates (NJSPNAD83) y:**
Date Finished Drilling: 9/22/2020	**Core Size:** 3 inch	**Boring Total Depth:** 25 ft
Logged By: Jim Christopher	**Project Manager:** Amit Haryani	**Depth to Water:** 17.0 ft
Physical Location: Lagoon		**Surface Elevation:** ft NAVD88

Depth Range (ft bgs)	Recovery (ft/ft)	PID (ppm)	Moisture Content	USCS	Graphic Log	Surface Cover and Thickness:	Sample ID
				NR		No Recovery	
21			Wet	SP-SM		Fine to coarse sands and silt, some fine to coarse gravel with evidence of cobbles, grayish brown (2.5Y 5/2), loose, wet, no odor, no staining.	
22	0.2			NR		No Recovery	
23			Wet	SP-SM		Fine to coarse sands and silt, some fine to coarse gravel with evidence of cobbles, grayish brown (2.5Y 5/2), loose, wet, no odor, no staining.	LG-2(23-25)_20200922
24	0.7			NR		No Recovery	
25							

Comments: Fine sands from 21.0 and 23.0 washed out during retrieval of split spoon from borehole.

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Boring ID: LG-3

Project Name: C&D Power	**Drilling Company:** Parratt Wolff	
Project Number: 60628872	**Drilling Method:** Hollow Stem Auger	**Coordinates (NJSPNAD83) x:**
Date Started Drilling: 9/22/2020	**Rig Type:** CME 550	**Coordinates (NJSPNAD83) y:**
Date Finished Drilling: 9/22/2020	**Core Size:** 3 inch	**Boring Total Depth:** 30 ft
Logged By: Jim Christopher	**Project Manager:** Amit Haryani	**Depth to Water:** 16.5 ft
Physical Location: Lagoon		**Surface Elevation:** ft NAVD88

Depth Range (ft bgs)	Recovery (ft/ft)	PID (ppm)	Moisture Content	USCS	Graphic Log	Surface Cover and Thickness:	Sample ID
1	0.8		Dry	SP-SM		Fine to coarse sand, some silt and fine to medium gravel, evience of cobbles, brown (7.5YR 4/2), medium loose, dry, no odor, no staining.	
2				NR		No Recovery	
3	0.8		Dry	SP-SM		Fine to coarse sand, some silt and fine to medium gravel, evience of cobbles, brown (7.5YR 4/2), medium loose, dry, no odor, no staining.	LG-3(2-4)_20200922
4				NR		No Recovery	
5	0.5		Dry	SP-SM		Fine to coarse sand, some silt and fine to medium gravel, evience of cobbles, brown (7.5YR 4/2), medium loose, dry, no odor, no staining.	LG-3(4-6)_20200922
6				NR		No Recovery	
7	0.6		Dry	SP-SM		Fine to coarse sand, some silt and fine to medium gravel, evience of cobbles, brown (7.5YR 4/2), medium loose, dry, no odor, no staining.	
8				NR		No Recovery	
9	0.4		Moist	SP-SM		Fine to coarse sand, some silt and fine to medium gravel, evience of cobbles, brown (7.5YR 4/2), medium loose, dry, no odor, no staining.	
10				NR		No Recovery	
11	0.9		Moist	SP-SM		Fine to coarse sands, some silt and gravel, evidence of cobbles, brown (7.5YR 4/2), loose, moist, no odor, no staining.	
12				NR		No Recovery	
13	0						
14							
15	0						
16							
17	0.8		Moist	SP-SM		Fine to coarse sands, some silt and gravel, evidence of cobbles, brown (7.5YR 4/2), loose, moist, no odor, no staining.	LG-3(16-18)_20200922
18				NR		No Recovery	
19	0.8		Moist	SP-SM		Fine to coarse sands, some silt and gravel, evidence of cobbles, brown (7.5YR 4/2), loose, moist, no odor, no staining.	
				NR		No Recovery	

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Boring ID: LG-3

Project Name: C&D Power	**Drilling Company:** Parratt Wolff	
Project Number: 60628872	**Drilling Method:** Hollow Stem Auger	**Coordinates (NJSPNAD83) x:**
Date Started Drilling: 9/22/2020	**Rig Type:** CME 550	**Coordinates (NJSPNAD83) y:**
Date Finished Drilling: 9/22/2020	**Core Size:** 3 inch	**Boring Total Depth:** 30 ft
Logged By: Jim Christopher	**Project Manager:** Amit Haryani	**Depth to Water:** 16.5 ft
Physical Location: Lagoon		**Surface Elevation:** ft NAVD88

Depth Range (ft bgs)	Recovery (ft/ft)	PID (ppm)	Moisture Content	USCS	Graphic Log	Surface Cover and Thickness:	Sample ID
21	2		Moist	SP-SM		Fine to coarse sands, some silt and gravel, evidence of cobbles, brown (7.5YR 4/2), loose, moist, no odor, no staining.	LG-3(20-22)_20200922
			Moist	CL		Clay lense, brown (7.5YR 4/2), soft, moist, no odor, no staining.	
22			Wet	SP-SM		Fine to medium sand, some fine to medium gravel, little stil, brown (7.5YR 4/2), medium loose, wet, no odor, no staining.	LG-3(22-24)_20200922
23	1.7						
24				NR		No Recovery	
			Wet	SP-SM		Fine to medium sand, some fine to medium gravel, little stil, brown (7.5YR 4/2), medium loose, wet, no odor, no staining.	LG-3(24-26)_20200922
25	0.9			NR		No Recovery	
26			Wet	ML		Silt, light brown (7.5YR 6/3), medium stiff, wet, no odor, no staining.	
27	1			NR		No Recovery	
28			Wet	ML		Silt, light brown (7.5YR 6/3), medium stiff, wet, no odor, no staining.	LG-3(28-30)_20200922
29	2		Wet	SP-SM		Fine to coarse sand, little fine gravel and silt, brown (7.5YR 4/2), medium loose, wet, no odot, no staining.	
30							

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Boring ID: LG-4

Project Name: C&D Power	**Drilling Company:** Parratt Wolff	
Project Number: 60628872	**Drilling Method:** Hollow Stem Auger	**Coordinates (NJSPNAD83) x:**
Date Started Drilling: 9/22/2020	**Rig Type:** CME 550	**Coordinates (NJSPNAD83) y:**
Date Finished Drilling: 9/22/2020	**Core Size:** 3 inch	**Boring Total Depth:** 25 ft
Logged By: Jim Christopher	**Project Manager:** Amit Haryani	**Depth to Water:** 17.0 ft
Physical Location: Lagoon		**Surface Elevation:** ft NAVD88

Depth Range (ft bgs)	Recovery (ft/ft)	PID (ppm)	Moisture Content	USCS	Graphic Log	Surface Cover and Thickness:	Sample ID
0	1		Dry	ML		Silt, organic matter, dark brown (7.5YR 3/2), loose, dry, slight organic odor, no staining.	
1	1.8		Dry	SP-SM		Fine sands and silt, some fine to coarse gravel, evidence of cobbles, light brown (7.5YR 6/3), loose, dry, no odor, no staining.	LG-4(1-3)_20200922
2							
3	1.2		Dry	NR		No Recovery	LG-4(3-5)_20200922
4			Dry	SP-SM		Fine sands and silt, some fine to coarse gravel, evidence of cobbles, light brown (7.5YR 6/3), loose, dry, no odor, no staining.	
5	0.9		Dry	SP-SM		No Recovery	
6				NR		Fine sands and silt, some fine to coarse gravel, evidence of cobbles, grayish-brown (2.5YR 5/2), loose, dry, no odor, no staining.	
7	0.4		Dry	SP-SM		No Recovery	
8				NR		Fine sands and silt, some fine to coarse gravel, evidence of cobbles, grayish-brown (2.5YR 5/2), loose, dry, no odor, no staining.	
9	1.2		Dry	ML		No Recovery	
10				NR		Silt, some angular cobble fragments, gray (5YR 5/1), loose, dry, no odor, no staining.	
11	1.5		Dry	ML		No Recovery	LG-4(11-13)_20200922
12			Moist	SP-SM		Silt, some angular cobble fragments, gray (5YR 5/1), loose, dry, no odor, no staining.	
13	1.4		Moist	SP		Fine to medium sand and silt, some fine to medium gravel, grayish-brown (2.5YR 5/2), medium dense, moist, no odor, no staining.	LG-4(13-15)_20200922
14						No Recovery	
15	1.8		Moist	SP-SM		Fine sand, brown (7.5YR 4/2), medium loose, moist, no odor, no staining. Pulvurized cobble fragments observed at 13.0 ft.	LG-4(15-17)_20200922
16						No Recovery	
17	1.2		Wet	SP-SM		Fine to course sand, little fine to coarse gravel, trace silt, brown (7.5YR 5/2), medium loose, moist, no odot, no staining.	LG-4(17-19)_20200922
18						No Recovery	
19	0.4		Wet	SP-SM		Fine to course sand, little fine to coarse gravel, trace silt, brown (7.5YR 5/2), medium loose, wet, no odot, no staining.	
						No Recovery	

Comments:

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Boring ID: LG-4

Project Name: C&D Power	**Drilling Company:** Parratt Wolff	
Project Number: 60628872	**Drilling Method:** Hollow Stem Auger	**Coordinates (NJSPNAD83) x:**
Date Started Drilling: 9/22/2020	**Rig Type:** CME 550	**Coordinates (NJSPNAD83) y:**
Date Finished Drilling: 9/22/2020	**Core Size:** 3 inch	**Boring Total Depth:** 25 ft
Logged By: Jim Christopher	**Project Manager:** Amit Haryani	**Depth to Water:** 17.0 ft
Physical Location: Lagoon		**Surface Elevation:** ft NAVD88

Depth Range (ft bgs)	Recovery (ft/ft)	PID (ppm)	Moisture Content	USCS	Graphic Log	Surface Cover and Thickness:	Sample ID
21			Wet	SP-SM		Fine to course sand, little fine to coarse gravel, trace silt, brown (7.5YR 5/2), medium loose, wet, no odot, no staining.	LG-4(21-23)_20200922
22	0.8					No Recovery	
23			Wet	SP-SM		Fine to course sand, little fine to coarse gravel, trace silt, brown (7.5YR 5/2), medium loose, wet, no odot, no staining.	LG-4(23-25)_20200922
24	1					No Recovery	
25							

Comments:

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Boring ID: LG-5

Project Name: C&D Power	**Drilling Company:** Parratt Wolff	
Project Number: 60628872	**Drilling Method:** Hollow Stem Auger	**Coordinates (NJSPNAD83) x:**
Date Started Drilling: 9/23/2020	**Rig Type:** CME 550	**Coordinates (NJSPNAD83) y:**
Date Finished Drilling: 9/23/2020	**Core Size:** 3 inch	**Boring Total Depth:** 25 ft
Logged By: Jim Christopher	**Project Manager:** Amit Haryani	**Depth to Water:** 13.0 ft
Physical Location: Lagoon		**Surface Elevation:** ft NAVD88

Depth Range (ft bgs)	Recovery (ft/ft)	PID (ppm)	Moisture Content	USCS	Graphic Log	Surface Cover and Thickness:	Sample ID
0	0.7		Moist	TOPSOIL		Topsoil with vegetation (grass), little fine gravel, dark brown (7.5YR 3/2), medium dense, moist, no odor, no staining.	
			Moist	SP-SM		Fine to medium sand and silt, some fine to coarse gravel, evidence of cobbles, brown (7.5YR 4/2) to dark brown (7.5YR 3/2), medium loose, moist, no odor, no staining.	
1				NR		No Recovery	
	1		Moist	SP-SM		Fine to medium sand and silt, some fine to coarse gravel, evidence of cobbles, brown (7.5YR 4/2) to dark brown (7.5YR 3/2), medium loose, moist, no odor, no staining.	LG-5(1-3)_20200923
2				NR		No Recovery	
3			Moist	SP-SM		Fine to medium sand and silt, some fine to coarse gravel, evidence of cobbles, brown (7.5YR 4/2) to dark brown (7.5YR 3/2), medium loose, moist, no odor, no staining.	LG-5(3-5)_20200923
	0.9			NR		No Recovery	
4							
5			Moist	SP-SM		Fine to medium sand and silt, some fine to coarse gravel, evidence of cobbles, brown (7.5YR 4/2) to dark brown (7.5YR 3/2), medium loose, moist, no odor, no staining.	LG-5(5-7)_20200923
6	1.2			NR		No Recovery	
7			Moist	SP-SM		Fine to medium sand and silt, some fine to coarse gravel, evidence of cobbles, brown (7.5YR 4/2) to dark brown (7.5YR 3/2), medium loose, moist, no odor, no staining.	
8	1.1			NR		No Recovery	
9			Moist	SP-SM		Fine to medium sand and silt, some fine to coarse gravel, evidence of cobbles, brown (7.5YR 4/2) to dark brown (7.5YR 3/2), medium loose, moist, no odor, no staining.	LG-5(9-11)_20200923
10	0.7			NR		No Recovery	
11			Moist	SP-SM		Fine to medium sand and silt, some fine to coarse gravel, evidence of cobbles, brown (7.5YR 4/2) to dark brown (7.5YR 3/2), medium loose, moist, no odor, no staining.	
12	0.5			NR		No Recovery	
13			Wet	SP-SM		Fine to medium sand and silt, some fine to coarse gravel, evidence of cobbles, brown (7.5YR 4/2) to dark brown (7.5YR 3/2), medium loose, wet, no odor, no staining.	
14	0.3			NR		No Recovery	
15			Wet	SP-SM		Fine to medium sand and silt, some fine to coarse gravel, evidence of cobbles, brown (7.5YR 4/2) to dark brown (7.5YR 3/2), medium loose, wet, no odor, no staining.	
16	0.2			NR		No Recovery	
17							
18	0						
19			Wet	SP-SM		Fine to medium sand and silt, some fine to coarse gravel, evidence of cobbles, brown (7.5YR 4/2) to dark brown (7.5YR 3/2), medium loose, wet, no odor, no staining.	LG-5(19-21)_20200923
	0.3			NR			

Comments: Fine sands from 15.0-17.0 ft and 19.0-21.0 bgs washed out during retrieval of split spoons from borehole.

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Boring ID: LG-5

Project Name: C&D Power	**Drilling Company:** Parratt Wolff	
Project Number: 60628872	**Drilling Method:** Hollow Stem Auger	**Coordinates (NJSPNAD83) x:**
Date Started Drilling: 9/23/2020	**Rig Type:** CME 550	**Coordinates (NJSPNAD83) y:**
Date Finished Drilling: 9/23/2020	**Core Size:** 3 inch	**Boring Total Depth:** 25 ft
Logged By: Jim Christopher	**Project Manager:** Amit Haryani	**Depth to Water:** 13.0 ft
Physical Location: Lagoon		**Surface Elevation:** ft NAVD88

Depth Range (ft bgs)	Recovery (ft/ft)	PID (ppm)	Moisture Content	USCS	Graphic Log	Surface Cover and Thickness:	Sample ID
						No Recovery	
21			Wet	SP-SM		Fine sand, little medium sands, trace silts, grayish-brown (2.5Y 5/2), medium loose, wet, no odor, no staining.	LG-5(21-23)_20200923
22	2						
				ML		Silt, brown (7.5YR 4/2), medium stiff, wet, no odor, no staining.	
23			Wet	SP-SM		Fine to coarse sand, little fine gravel and silt, brown (7.5YR 4/2), medium loose, wet, no odor, no staining.	LG-5(23-25)_20200923
24	1.8						
25				NR		No Recovery	

Comments: Fine sands from 15.0-17.0 ft and 19.0-21.0 bgs washed out during retrieval of split spoons from borehole.

Appendix B Topographic Survey

GEOGRAPHIC INDEX 41–25–07.1 –74–37–44.6

T.M. : 38–1–35

On XX–XX–XX Closed by XXX Drawn by NTK Spell checked by NTK Checked by SRM Layout: SHEET1 W.O. No. 25037 Drawing Name: L525037___R01_V17

LEGEND

○ B2	BOLLARD
—350—	CONTOUR LINE
CMP	CORRUGATED METAL PIPE
	FIRE HYDRANT
	GUY
	LAMP
	MAIL BOX
	POLE
PVC	POLYVINYL CHLORIDE PIPE
	POST
	SIGN (SMALL)
362.8	SPOT ELEVATION
TC215.7 *BC215.9 *TW217.7 *BW215.9	TOP & BOTTOM OF CURB TOP & BOTTOM OF WALL
✱	WATER VALVE

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7. *The area, meridian, distances and coordinate values shown hereon refer to the New York Coordinate System, East Zone (NAD 83), expressed in feet. The distances shown on this map are grid distances. They have been scaled by a grid factor (scale factor x sea level factor) of 0.999988398. To obtain ground distances divide the distances on this map by the grid factor. To obtain ground area divide the area on this map by the square of the grid factor.*
8. *The vertical datum hereon is North American Vertical Datum of 1988 (NAVD 1988).*
9. *The center line of stream shown hereon is approximate and taken from 2001 New York State GIS Clearing House aerial photographs.*
10. *The topographic data shown hereon was compiled from two sources. The first source is that certain map entitled "Topographic Map and Sampling Locations – C & D Technologies... dated September 15, 1999 prepared by Delaware Engineering, P.C. The second source is an actual field survey conducted by Badey & Watson, Surveying & Engineering P.C. on January 14, 2020.*

SHEET 1 OF 2
TOPOGRAPHIC SURVEY
PREPARED FOR

AECOM

SITUATE IN THE

TOWN OF DEERPARK
ORANGE COUNTY
NEW YORK

SCALE 1 in. = 50 ft. *JANUARY 14, 2020*

GRAPHIC SCALE

50 0 25 50 100 200
(IN FEET)
1 inch = 50 ft.

We hereby certify that the survey shown hereon was completed by us on January 14, 2020 that this map was completed on January 15, 2020.

BADEY & WATSON
Surveying & Engineering, P.C.

by
NEW YORK STATE LICENSED LAND SURVEYOR
LICENSE No. 49789

FILE No. 19–162

GEOGRAPHIC INDEX 41–25–07.1 –74–37–44.6

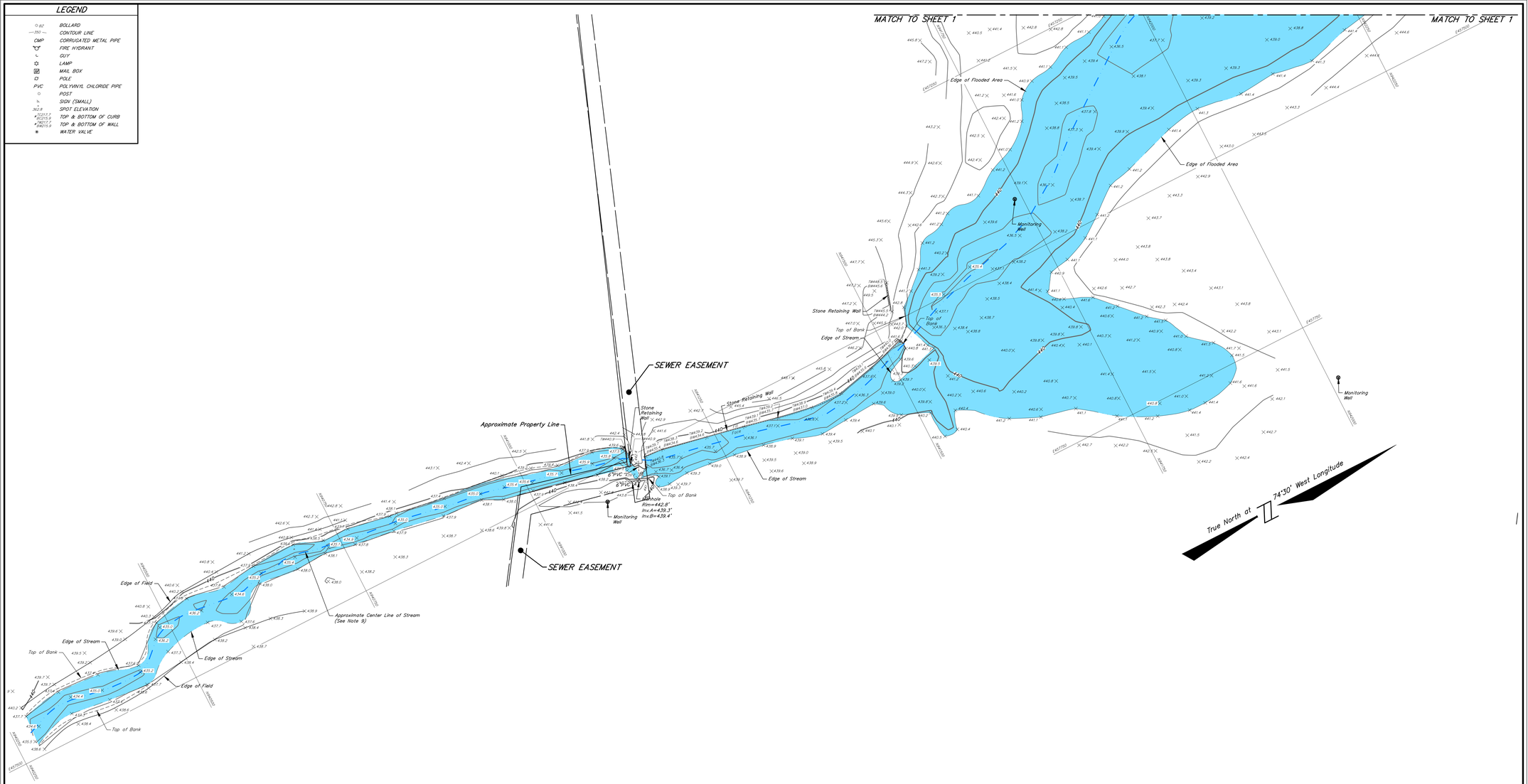
T.M. : 39–1–35

On XX–XX–XX Closed by XXX

Drawing Name: L520317__R01_V17 Layout: SHEET2 W.O. No. 25037 Checked by SRM Spell checked by NTK Drawn by NTK

LEGEND

○ B2	BOLLARD
—350—	CONTOUR LINE
CMP	CORRUGATED METAL PIPE
	FIRE HYDRANT
	GUY
	LAMP
	MAIL BOX
	POLE
PVC	POLYVINYL CHLORIDE PIPE
	POST
	SIGN (SMALL)
362.8	SPOT ELEVATION
TC215.7 *BC215.9 TW217.7 *BW215.9	TOP & BOTTOM OF CURB TOP & BOTTOM OF WALL
	WATER VALVE



This map was prepared for the exclusive use of and is certified only to:

AECOM

BADEY & WATSON
Surveying & Engineering, P.C.

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SHEET 2 OF 2
TOPOGRAPHIC SURVEY
PREPARED FOR
AECOM
SITUATE IN THE
TOWN OF DEERPARK
ORANGE COUNTY
NEW YORK

SCALE 1 in. = 50 ft. JANUARY 14, 2020

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50 0 25 50 100 200

(IN FEET)
1 inch = 50 ft.

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BADEY & WATSON
Surveying & Engineering, P.C.

by
NEW YORK STATE LICENSED LAND SURVEYOR
LICENSE No. 49789

FILE No. 19–162

Appendix C Geophysical Investigation Report

GEOPHYSICAL INVESTIGATION REPORT

PERFORMED AT:

430 US-209
Huguenot, NY 12746

PREPARED FOR:

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AECOM (NY)
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Toll Free: (800) 596-7472

May 18, 19, & 20 2020

1.0 INTRODUCTION

Enviroprobe Service, Inc. (Enviroprobe) is an environmental investigation services firm which provides monitoring well installation (HSA), Geoprobe (DPT) drilling services and Environmental & Engineering Geophysics (EEG) services to the environmental consulting and engineering community.

Enviroprobe conducted a subsurface geophysical investigation at the subject property within client-specified areas of concern. Due to conditions and objectives, the investigation utilized a GSSI UtilityScan cart-mounted ground penetrating radar (GPR) unit with a 350 MHz antenna, a Fisher TW-6 metallic locator, a Radiodetection multi-frequency transmitter, and a Radiodetection receiver.

Ground penetrating radar (commonly called GPR) is a geophysical method that has been developed over the past thirty years for shallow, high-resolution, subsurface investigations of the earth. GPR uses high frequency pulsed electromagnetic waves (generally 10 MHz to 2,000 MHz) to acquire subsurface information. An EM wave is propagated downward into the ground by a transmitting antenna. Where abrupt changes in electrical properties occur in the subsurface, a portion of the energy is reflected back to the surface. This reflected wave is detected by a receiver antenna and transmitted to a control unit for real time processing and display. The penetration depth of the GPR unit varies from several inches to tens of feet according to site-specific conditions. The penetration depth decreases with increased soil conductivity. The penetration depth is the greatest in ice, dry sands, and fine gravels. Clayey, highly saline or saturated soils, areas covered by concrete, foundry slag, or other highly conductive materials greatly reduce GPR penetration. GPR is a method that is commonly used for environmental, engineering, archaeological, and other shallow investigations.

The Fisher TW-6 metallic locator is designed to find pipes, cables and other metallic objects such as underground storage tanks (USTs). The TW-6 transmitter generates an electromagnetic field that induces electrical currents in the subsurface. These currents produce a secondary electromagnetic field that is measured by the TW-6 receiver. One surveyor can carry both the transmitter and receiver together to search for underground metallic objects, although the TW-6 response can also be affected by the electrical properties of non-metallic materials in the subsurface.

The Radiodetection (RD) transmitter and receiver are commonly used for pipe and cable locating. The multi-frequency transmitter can be directly connected, clamped, or used to induce a signal in a target line while the multi-frequency receiver is used to measure the signal from energized lines.

2.0 SCOPE OF WORK

On May 18, 19, & 20 2020, a geophysical technician from Enviroprobe Service Inc. was mobilized to the subject property to perform a geophysical investigation. The

purpose of the investigation was to detect possible USTs/anomalies and designate underground conduits/utilities in the client selected exterior portions of the subject property. The ground surface of the survey area consisted of concrete, asphalt, and natural soil surfaces.

3.0 SURVEY RESULTS

The utility survey was conducted using a cart-mounted GPR unit and a RD unit. The RD unit was used to trace common utilities from sources in and around the survey area. The RD receiver was also used in the passive mode to search for live underground electrical power cables and other utilities emitting 60Hz electromagnetic signals. When possible, the location of utilities was confirmed with the GPR. The GPR survey was also performed in a grid pattern in at least two orthogonal directions to search for evident and non-evident underground utilities. Linear anomalies consistent with underground utilities were designated on site with spray paint using the following colors: red – electric, yellow – gas, green – sanitary sewer & storm drainage, blue – water, orange – communications, pink – unknown utility (See Figures Below).

The GPR and TW-6 were used in a grid pattern over all client specified areas of the site. Based on the results of the GPR and TW-6 surveys, two metallic anomalies, one approximately 5'x13' consistent with a UST, were detected on site.

(Figure 1)

(Figure 2)

(Figure 3)

(Figure 4)

4.0 LIMITATIONS

On-site limitations included overgrown vegetation, uneven terrain, fencing, reinforced concrete, room to maneuver GPR, and no access to the building.

Due to surface conditions and subsurface content, the GPR penetration depth was estimated at about 5 feet in the majority of the survey area.

Due to the dielectric properties of the subsurface, plastic polymer and fiberglass utilities may not have been detected.

The underground utility survey was conducted in compliance with the industry standard of care guidelines found in ASCE 38-02 (Level B).

5.0 WARRANTIES

The field observations and measurements reported herein are considered sufficient in detail and scope for this project. Enviroprobe Service, Inc. warrants that the findings

and conclusions contained herein have been promulgated in accordance with generally accepted environmental engineering methods. There is a possibility that conditions may exist which could not be identified within the scope of this project and were not apparent during the site activities performed for this project.

Enviroprobe represents that the services were performed in a manner consistent with that level of care and skill ordinarily exercised by environmental consultants under similar circumstances. No other representations to Client, express or implied, and no warranty or guarantee is included or intended in this agreement, or in any report, document, or otherwise.

Enviroprobe Service, Inc. believes that the information provided in this report is reliable. However, Enviroprobe cannot warrant or guarantee that the information provided by others is complete or accurate. No other warranties or guarantees are implied or expressed.

GPR data is subject to signal anomalies and operator interpretation. The GPR data is intended to provide the locations of areas of concern requiring additional investigation or the approximate location of underground structures and utilities. Great care must be utilized when excavating and/or drilling around underground structures and utilities since GPR data can only be used for estimation purposes and GPR data is subject to misinterpretation. Enviroprobe can not guarantee that utilities, post-tension cables, and/or rebar will not be incurred during drilling, cutting, coring, or excavating activities.

This report was prepared pursuant to the contract Enviroprobe has with the Client. That contractual relationship included an exchange of information about the property that was unique and between Enviroprobe and its client and serves as the basis upon which this report was prepared. Because of the importance of the communication between Enviroprobe and its client, reliance or any use of this report by anyone other than the Client, for whom it was prepared, is prohibited and therefore not foreseeable to Enviroprobe.

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Appendix D Analytical Lab Reports (Electronic Format Only)

Appendix E Treatability Test Results

C&D SYSTEMS SOLIDIFICATION STUDY
TREATABILITY STUDY FINAL REPORT

April 23, 2021

Prepared for:

AECOM

Prepared by:

KEMRON ENVIRONMENTAL SERVICES

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Reviewed By:

Tomecia Bradley
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Acronyms

ASTM	American Society of Testing and Materials
˚C	Degrees Celsius
cm/sec	Centimeters per second
DI	De-ionized
EPA	U.S. Environmental Protection Agency
KEMRON	KEMRON Environmental Services
psi	Pounds per square inch
UCS	Unconfined Compressive Strength

1.0 INTRODUCTION

KEMRON Environmental Services, Inc. (KEMRON) has developed the C&D Systems Solidification Bench-Scale Treatability Study Final Report to summarize the results of testing performed on materials from the site, and to present the protocols used in testing of the site materials. All testing performed during the study was conducted in accordance with the Cost Proposal 19-ATG-4116 Revision 1 developed by KEMRON and information provided by AECOM. All treatability testing was conducted at KEMRON's facilities located in Atlanta, Georgia, and analytical testing was conducted by a laboratory directly subcontracted by AECOM.

The bench-scale testing was performed in a phased approach and included untreated material characterization, mixture design testing and subsequent physical and chemical testing. Note that all analytical testing was performed by a subcontract laboratory selected by AECOM. The results of analytical testing have not been provided to KEMRON for incorporation into this final report.

The primary objective of the bench-scale study was to evaluate the effectiveness of different reagent admixtures at improving of physical properties including UCS and permeability of the site materials while reducing the leachability of Constituents of Concern (COCs). The following discussions summarize the various treatment alternatives and methods.

2.0 MATERIAL RECIEPT, HOMOGENIZATION, AND CHARACTERIZATION

On October 8, 2020, KEMRON received two (2) soil materials from the site labeled LG-4, and LG-5. Immediately following the receipt of the site materials, KEMRON logged the materials into a sample tracking database and placed them in a 4-degree-Celsius (°C) walk-in cooler for storage. Prior to testing, KEMRON individually homogenized each of the chilled composite materials separately by placing the contents from the appropriate shipping containers into a pre-cleaned plastic mixing pan and gently blending by hand using a stainless-steel spoon until visually homogenous. During homogenization any solid particles measuring greater than 0.5 inches in diameter were removed to facilitate bench-scale treatment and adhere to particle-size limits outlined in certain ASTM and EPA test methods. KEMRON performed homogenization activities on the chilled samples to minimize any physical or chemical changes to the soil materials, primarily the volatilization of any organic constituents.

To characterize each the physical properties of each site material, KEMRON performed the following testing on aliquots of each untreated material:

PARAMETER	METHOD
Particle Size Distribution with Hydrometer	ASTM D422
Sample Classification	ASTM D2487
Atterberg Limits	ASTM D4317
Moisture Content	ASTM D2216
Material pH	EPA Method 9045
Bulk Density (unit weight)	ASTM D7263

A summary of the results of the physical properties testing conducted by KEMRON are provided in **Table 1**, and physical properties data sheets for the untreated materials are included in **Appendix A**.

Review of the data presented in **Table 1** indicates that the two site soils were similar in particle size distribution with sample LG-5 exhibiting a slightly higher gravel content and a slightly lower sand content. Both site soils were classified as "SM" soils and the LG-4 soil was described as a Very Dusky Red Silty Sand, and the LG-5 soil was described as a Very Dusky Red Silty Sand with Gravel. The material pH of the LG-4 soil was 9.05 standard units (s.u.) while the LG-5 soil had a pH value of 8.03 s.u. Both site soils were dry exhibiting moisture contents below 10% and had remolded densities of approximately 112 and 113 pounds per cubic foot (pcf). The Atterberg limits testing for both soils indicated that the Plastic Limit (PL) was higher than the Liquid Limit (LL) which is reported as zero (0) or Non-Plastic (NP). The Atterberg limits testing is highly subjective and depends highly on the personnel performing the testing. Typically, with soils containing such high sand content a LL and PL are not indicated.

Note that bulk density testing was performed in accordance using ASTM D7263, where an aliquot of the appropriate site soil was placed into a cylindrical mold measuring 2 inches in diameter by 4 inches in height. The soil in the mold is tamped using minimal energy to remove any air voids present in the sample. Additional aliquots of soil are introduced into the mold and tamped until the mold is full. The weight and volume of the soil in the mold are then used to calculate the density of the sample. This method of density measurement is utilized when an actual in-situ soil density is not available and may not reflect actual site soil densities. KEMRON believes that this density testing procedure is more applicable for estimating the potential in-situ soil density at the site because it utilizes testing the soil at the existing soil moisture content.

In addition to physical characterization testing performed on the untreated site soils, KEMRON submitted aliquots of the untreated soils to AECOM's subcontract analytical laboratory for Total and SPLP RCRA metals and PCBs.

AECOM
C-D SYSTEMS SOLIDIFICATION STUDY
KEMRON PROJECT No. SH0751

TABLE 1

Untreated Material Characterization

Testing Parameter	Test Method	Unit	Untreated Material	
			LG-4	LG-5
Particle Size Distribution	ASTM D422			
Gravel (<1/2")		%	13.4	20.8
Sand		%	74.4	65.9
Silt		%	4.9	6.1
Clay		%	7.3	7.2
Sample Description (1)	ASTM D2487		Very Dusky Red Silty Sand	Very Dusky Red Silty Sand with Gravel
Sample Classification (2)	ASTM D2487		SM	SM
Atterberg Limits	ASTM D4318			
LL			10.0	12.0
PL			17.0	16.0
PI			NP	NP
Moisture Content	ASTM D2216			
Average ASTM Moisture Content		%	6.80	8.03
Average Percent Solids		%	93.63	92.57
Material pH	EPA Method 9045		9.05	8.54
Bulk Density	ASTM D2937			
Average Bulk Unit Weight		pcf	112.2	113.2

Notes:
(1) Sample color determined by the Munsell Soil Color Charts.
(2) Sample classification based on the Unified Classification System.
Sample description and classification is based on visual classification where Atterberg limits were not performed
LL = Liquid Limit
PL = Plastic Limit
PI = Plastic Index
%= Percent
pcf = pounds per cubic foot

3.0 MIXTURE DESIGN TESTING

In order to understand the physical effects that various reagents and reagent addition rates have on the site soils, KEMRON prepared several small mixtures using each of the site soils combined with Type I/II Portland cement alone and Portland cement combined with EnviroBlend CS. Mixtures utilized Portland cement addition rates of 7.5 and 15% alone and combined with a 4% EnviroBlend CS addition rate. KEMRON has extensive experience performing treatability studies using EnviroBlend products, and often sees reduced strength gains when EnviroBlend is combined with Portland cement versus Portland cement alone. Results of these experimental mixtures indicated that all the mixtures exceeded a pocket penetrometer testing limit of 4.5 tons pers square foot (TSF) after only one (1) day of curing. These results were used to select the mixture designs to be used in the study.

KEMRON prepared ten (10) batch mixtures for each of the two (2) site soils, a total of twenty mixtures. These mixtures were prepared using various addition rates of Type I/II Portland cement alone, and Portland combined with Ground Granulated Blast Furnace Slag (GGBFS) grade 120, Portland combined with Hydrogel Bentonite, Portland combined with EnviroBlend CS, Portland combined with GGBFS and Bentonite, and Portland combined with GGBFS and EnviroBlend CS. All the reagents or reagent combinations were introduced into the untreated soil as a slurry where the reagents were blended with potable tap water at a 1:1 reagent to water ratio (listed as a 100% water addition based on the weight of the reagents used in the mixture). These mixtures were utilized to evaluate the potential strength gains via Unconfined Compressive Strength (UCS) testing, as well as determining the material pH and hydraulic conductivity of the treated materials.

The mixture designs prepared during this screening phase of the study are presented in **Table 2**. Note that this table presents the specific mixture identification number assigned to each mixture, the type of untreated material treated in the specific mixture, the reagent or reagent combination utilized as well as the corresponding addition rates, and the amount of water added to the reagent combination prior to blending with the untreated soil. For all the mixtures the reagents were blended dry then slurried with the water and mixed with the untreated site soil.

The reagent additions were calculated on a by-weight basis according to the quantity of untreated material utilized. The water used in each mixture was based on the total weight of the reagent or reagents utilized in the mixture. For example, in a mixture with a 3.0 percent (%) Portland cement and a 100% water addition, for every 100g of untreated material, 3.0g of Portland cement and 100.0g of water was used. Mixture development sheets for the initial design mixtures are found in **Appendix B**.

All mixtures were prepared using a Hobart-type kitchen mixer with a paddle-type mixing arm. Mixtures were developed by preparing the appropriate reagents. An aliquot of the appropriate untreated material was placed into the mixing chamber. The reagent slurry was then added to the untreated material while mixing. Each mixture was blended for a period of approximately 60 to 90 seconds at a rate of approximately 60 revolutions per minute (rpm). Treatment utilizing this mixer is intended to simulate potential full-scale remediation options, to the extent possible on the bench-scale. This approach is routinely utilized to simulate a wide range of potential full-scale remediation approaches, including both in-situ and ex-situ applications.

Immediately following the preparation of each mixture design, the treated materials were placed into cylindrical plastic molds for curing. Note that during the preparation of the curing molds air voids were removed from the treated soil by tapping the mold on a firm surface. At curing

intervals of 1, 3, 7, 10, and 14 days, KEMRON evaluated the potential setting properties of each mixture through pocket penetrometer testing. The results of penetrometer testing are presented in **Table 2**. Review of the results of pocket penetrometer testing presented in **Table 2** shows that all the mixtures showed a significant penetrometer strength gain after only one day of curing and achieved a penetrometer value exceeding the instrument limit of 4.5 tons per square foot after seven (7) days of curing.

At various cure intervals KEMRON performed material pH, Unconfined Compressive Strength (UCS), and Hydraulic Conductivity testing on some or all the treated samples. Note that the specific samples and cure times for testing were determined by AECOM. The results of these tests are also summarized in **Table 2**. Review of the material pH testing results indicates that materials evaluated exhibited pH values ranging from 12.78 to almost 14.0 s.u.

As outlined in the cost proposal UCS testing was scheduled for all the treated mixtures at cure times of 7, 14, and 28 days. Complete data sheets are included in **Appendix C**. Based on instructions from AECOM personnel not all the mixtures were subjected to UCS testing at all three of the curing intervals. Review of the results of the mixtures prepared using the Untreated LG-4 site material shows that the UCS strengths exhibited very good correlation between pozzolanic addition rates and strength. For example, the mixtures prepared with Type I/II Portland cement at addition rates of 3.0, 5.0, and 7.5% achieved 7-day UCS strengths of 44.9, 181.9, and 323.1 pounds per square inch (psi) respectively. This trend was also shown in the mixtures using the PC/GGBFS blends. The mixtures including either Hydrogel Bentonite or EnviroBlend exhibited lower UCS values than the same mixtures without the bentonite or EnviroBlend. KEMRON's experience with both additives have shown that lower strengths are very common with mixtures using these additives. Additional observations show that all the mixtures exhibited an increase in curing with longer cure times. Note that several mixtures had lower strength values at the 14-day cure time than the 7-day cure time but rebounded to higher strengths at the 28-day cure.

Review of the results of UCS testing performed on the mixtures prepared using the LG-5 site material shows very similar strength gain trends. The strengths of the 28-day cured LG-5 treatments were also considerably high for soil-cement ISS materials.

Based on the results of UCS testing AECOM selected twelve (12) of the treated soils for hydraulic conductivity (HC) testing at the 28-day cure time. The results of hydraulic conductivity testing are also presented in Table 2. Complete data sheets are included in **Appendix C**. Review of the HC data in table 2 shows that all candidate mixtures had K values in the 10^{-8} centimeters per second (cm/sec) range, except for mixture 0751-004, which had a K value of $1.5x10^{-7}$ cm/sec.

AECOM
C&D SYSTEMS SOLIDIFICATION STUDY
KEMRON PROJECT No. SH0751

TABLE 2

Initial Mixture Design Testing
Mixture Design, Pocket Penetrometer, Volumetric Expansion, Unconfined Compressive Strength and Hydraulic Conductivity

KEMRON Sample Number	Untreated Material Type	Reagent Type	Reagent Addition % by Wet Soil wt.	Water Addition % by Reagent wt.	Pocket Penetrometer (TSF)					Cure Day	pH	Unconfined Compressive Strength ASTM D2166				Hydraulic Conductivity ASTM D5084			
					1 Day	3 Day	7 Day	10 Day	14 Day			Moisture Content (%)	Bulk Density (lb/ft^3)	Dry Density (lb/ft^3)	UCS (lb/in^2)	Moisture Content (%)	Bulk Density (lb/ft^3)	Dry Density (lb/ft^3)	K (cm/sec)
0751-001	LG-4	Type I/II PC	3.0	100.0	3.0	4.5	>4.5	>4.5	>4.5	7		7.15	115.9	108.1	44.9				
										14		8.10	125.0	115.7	43.8				
										28									
0751-002	LG-4	Type I/II PC	5.0	100.0	4.0	>4.5	>4.5	>4.5	>4.5	7		4.37	140.5	134.6	181.9				
										14		9.81	140.9	128.4	163.4				
										28									
0751-003	LG-4	Type I/II PC	7.5	100.0	4.5	>4.5	>4.5	>4.5	>4.5	7		10.42	139.8	126.6	323.1				
										14	13.08	11.58	137.9	123.6	385.7				
										28	12.78	11.08	138.1	124.3	358.3	11.1	134	121.0	1.2×10^{-8}
0751-004	LG-4	Type I/II PC/ GGBFS 120	3 / 6	100.0	3.25	4.5	>4.5	>4.5	>4.5	7		11.55	136.1	122.0	544.4				
										14	13.07	12.92	137.4	121.7	690.7				
										28	12.79	12.23	135.4	120.6	979.3	11.1	132	118.7	1.5×10^{-7}
0751-005	LG-4	Type I/II PC/ GGBFS 120	3 / 9	100.0	3.25	4.5	>4.5	>4.5	>4.5	7		15.19	134.2	116.5	632.3				
										14	12.95	15.83	135.4	116.9	760.4				
										28									
0751-006	LG-4	Type I/II PC/ GGBFS 120	5 / 9	100.0	4.5	>4.5	>4.5	>4.5	>4.5	7		15.46	132.8	115.0	648.6				
										14	13.09	15.95	131.6	113.5	551.8				
										28									
0751-007	LG-4	Type I/II PC/ Hydrogel Bentonite	7.5 / 2	100.0	4.5	>4.5	>4.5	>4.5	>4.5	7		12.97	134.8	119.3	202.8				
										14	13.31	11.83	137.5	122.9	182.7				
										28	13.30	13.90	133.5	117.2	475.7	11.2	134	120.0	7.7×10^{-8}
0751-008	LG-4	Type I/II PC/ Enviroblend	7.5 / 3	100.0	4.5	>4.5	>4.5	>4.5	>4.5	7		13.15	132.7	117.3	305.0				
										14	13.50	12.94	134.1	118.7	168.5				
										28	13.55	12.78	134.8	119.5	313.7	12.2	131	116.6	1.3×10^{-8}
0751-009	LG-4	Type I/II PC / GGBFS 120 / Hydrogel Bentonite	3 / 6 / 1	100.0	3.5	>4.5	>4.5	>4.5	>4.5	7		12.36	134.8	120.0	456.1				
										14	13.30	12.39	137.8	122.6	432.0				
										28	13.36	11.43	138.3	124.1	518.9	11.1	132	118.5	6.9×10^{-8}
0751-010	LG-4	Type I/II PC / GGBFS 120 / Enviroblend	3 / 6 / 3	100.0	3.5	>4.5	>4.5	>4.5	>4.5	7		14.18	133.7	117.1	422.5				
										14	13.06	13.53	131.6	115.9	399.6				
										28	13.34	14.04	133.5	117.1	537.4	11.8	131	117.1	6.4×10^{-8}
0751-011	LG-5	Type I/II PC	3.0	100.0	2.75	4.0	>4.5	>4.5	>4.5	7		8.83	137.3	126.2	110.9				
										14	13.35	8.73	138.1	127.0	128.5				
										28									
0751-012	LG-5	Type I/II PC	5.0	100.0	3.5	4.5	>4.5	>4.5	>4.5	7		9.73	142.7	130.0	225.5				
										14	13.30	11.85	139.5	124.7	348.6				
										28									
0751-013	LG-5	Type I/II PC	7.5	100.0	4.5	>4.5	>4.5	>4.5	>4.5	7		12.32	139.9	124.6	376.6				
										14	13.44	12.68	139.2	123.5	533.9				
										28	13.62					11.9	132	117.9	3.8×10^{-8}
0751-014	LG-5	Type I/II PC/ GGBFS 120	3 / 6	100.0	3.0	4.5	>4.5	>4.5	>4.5	7		12.57	135.8	120.7	300.5				
										14	13.12	13.48	137.4	121.1	369.8				
										28	13.41					12.1	132	117.9	2.6×10^{-8}
0751-015	LG-5	Type I/II PC/ GGBFS 120	3 / 9	100.0	3.0	4.5	>4.5	>4.5	>4.5	7		16.55	132.9	114.0	583.8				
										14	13.06	17.23	132.6	113.1	364.9				
										28									
0751-016	LG-5	Type I/II PC/ GGBFS 120	5 / 9	100.0	4.25	>4.5	>4.5	>4.5	>4.5	7		15.88	131.3	113.3	414.1				
										14	13.07	16.89	131.3	112.3	406.1				
										28									
0751-017	LG-5	Type I/II PC/ Hydrogel Bentonite	7.5 / 2	100.0	4.5	>4.5	>4.5	>4.5	>4.5	7		15.65	131.8	114.0	144.9				
										14	13.53	16.69	133.8	114.7	199.3				
										28	13.53					11.5	134	119.9	1.8×10^{-8}
0751-018	LG-5	Type I/II PC/ Enviroblend	7.5 / 3	100.0	4.5	>4.5	>4.5	>4.5	>4.5	7		15.31	132.6	115.0	237.5				
										14	13.57	15.63	134.2	116.1	200.3				
										28	13.95					11.6	132	117.9	1.9×10^{-8}
0751-019	LG-5	Type I/II PC / GGBFS 120 / Hydrogel Bentonite	3 / 6 / 1	100.0	3.25	4.5	>4.5	>4.5	>4.5	7		11.46	140.0	125.6	569.7				
										14	13.26	12.13	134.4	119.8	515.5				
										28	13.68					11.7	131	117.5	2.3×10^{-8}
0751-020	LG-5	Type I/II PC / GGBFS 120 / Enviroblend	3 / 6 / 3	100.0	3.25	4.5	>4.5	>4.5	>4.5	7		15.45	132.1	114.4	231.3				
										14	13.26	16.12	132.8	114.3	265.0				
										28	13.59					11.3	131	117.9	2.8×10^{-8}

Notes:

GGBFS = Ground Granulated Blast Furnace Slag
% = Percent
lb/ft3 = pounds per cubic foot
lb/in2 = pounds per square inch
TSF = tons per square foot
Wt= Weight

Based on the results of pH, UCS and Hydraulic Conductivity testing, AECOM selected three (3) candidate mixtures for testing utilizing the EPA Method 1315 (LEAF) leaching procedure at the 28-day cure period including:

- 0751-014 3% Portland Cement + 6% GGBFS
- 0751-017 7.5% Portland Cement + 2% Bentonite
- 0751-020 3% Portland Cement + 6% GGBFS + 3% EnviroBlend CS

The 1315 LEAF method is designed to provide the mass transfer rates (release rates) of organic and inorganic analytes contained in a monolithic material, under diffusion-controlled release conditions, as a function of leaching time. Observed diffusivity and tortuosity may be estimated through analysis of the resulting leaching test data. KEMRON submitted the candidate mixtures to AECOM's subcontract analytical laboratory for EPA Method 1315 (LEAF) testing. The analytical results for each mixture are included in **Tables 3 through 5**. Several analytes were detected throughout the LEAF testing procedure. The results of the LEAF test should be utilized to determine the overall transfer rates of the specific COCs to determine the effectiveness of the specific treatment formulation.

AECOM
C-D SYSTEMS SOLIDIFICATION STUDY
KEMRON PROJECT No. SH0751

TABLE 3

LEAF Method 1315 Analytical Results - 0751-014
PCB, Metals and General Chemistry

Sample ID	PCB sum	Barium	Cadmium	Lead	pH	Specific Conductance	Oxygen Reduction Potential
	8082A	6020	6020	6020	Direct Measure	Direct Measure	Direct Measure
	µg/L	µg/L	µg/L	µg/L	S.U.	mS/cm	mV
0751-014 (2 hour) (T01)	0.0001	277	0.0001	29.7	10.20	0.0336	469
0751-014 (24 hour) (T02)	0.08	688	0.0001	38	11.10	0.202	117
0751-014 (48 hour) (T03)	0.068	365	0.0001	15.8	10.70	0.109	118
0751-014 (7 day) (T04)	0.16	953	0.23	61.3	11.40	0.476	87
0751-014 (14 day) (T05)	0.14	808	0.0001	49.2	11.40	0.481	60
0751-014 (28 day) (T06)	0.14	989	0.0001	66.1	11.50	0.609	42
0751-014 (42 day) (T07)	0.18	860	1.1	55.5	11.50	0.572	115
0751-014 (49 day) (T08)	0.18	383	0.0001	17.4	11.30	0.353	120
0751-014 (63 day) (T09)	0.22	494	0.0001	28.2	11.40	0.458	161

Notes:
µg/L = milligram per Liter
S.U. = Standard Units
mS/cm = milliSiemens per centimter
mV = millivolts

AECOM
C-D SYSTEMS SOLIDIFICATION STUDY
KEMRON PROJECT No. SH0751

TABLE 4

LEAF Method 1315 Analytical Results - 0751-017
PCB, Metals and General Chemistry

Sample ID	PCB sum	Barium	Cadmium	Lead	pH	Specific Conductance	Oxygen Reduction Potential
	8082A	6020	6020	6020	Direct Measure	Direct Measure	Direct Measure
	µg/L	µg/L	µg/L	µg/L	S.U.	mS/cm	mV
0751-017 (2 hour) (T01)	0.0001	52.5	0.0001	0.64	10.40	0.0481	253
0751-017 (24 hour) (T02)	0.0001	125	0.0001	1.7	11.00	0.182	123
0751-017 (48 hour) (T03)	0.027	86.3	0.0001	0.86	10.70	0.111	122
0751-017 (7 day) (T04)	0.093	168	0.0001	3.5	11.30	0.337	106
0751-017 (14 day) (T05)	0.084	144	0.0001	3.1	11.30	0.386	65
0751-017 (28 day) (T06)	0.11	163	0.0001	4.2	11.40	0.474	58
0751-017 (42 day) (T07)	0.13	153	0.45	4.2	11.30	0.438	108
0751-017 (49 day) (T08)	0.13	87.6	0.0001	1.3	11.20	0.289	115
0751-017 (63 day) (T09)	0.16	109	0.0001	3	11.30	0.364	157

Notes:
µg/L = milligram per Liter
S.U. = Standard Units
mS/cm = milliSiemens per centimter
mV = millivolts

AECOM
C-D SYSTEMS SOLIDIFICATION STUDY
KEMRON PROJECT No. SH0751

TABLE 5

LEAF Method 1315 Analytical Results - 0751-020
PCB, Metals and General Chemistry

Sample ID	PCB sum	Barium	Cadmium	Lead	pH	Specific Conductance	Oxygen Reduction Potential
	8082A	6020	6020	6020	Direct Measure	Direct Measure	Direct Measure
	µg/L	µg/L	µg/L	µg/L	S.U.	mS/cm	mV
0751-020 (2 hour) (T01)	0.0001	15.9	0.0001	1.2	10.40	0.0437	197
0751-020 (24 hour) (T02)	0.025	115	0.0001	2.7	11.30	0.346	110
0751-020 (48 hour) (T03)	0.016	77.2	0.0001	1.7	10.90	0.161	111
0751-020 (7 day) (T04)	0.042	151	0.0001	6.5	11.50	0.565	85
0751-020 (14 day) (T05)	0.028	130	0.0001	5.3	11.40	0.489	60
0751-020 (28 day) (T06)	0.036	152	0.0001	7.3	11.60	0.659	52
0751-020 (42 day) (T07)	0.0001	138	0.0001	6.5	11.50	0.601	90
0751-020 (49 day) (T08)	0.051	79.3	0.0001	2.3	11.30	0.386	86
0751-020 (63 day) (T09)	0.06	97.9	0.0001	4.5	11.40	0.49	142

Notes:
µg/L = milligram per Liter
S.U. = Standard Units
mS/cm = milliSiemens per centimter
mV = millivolts

4.0 CONCLUSIONS

KEMRON evaluated a variety of solidification/stabilization treatments under the direction and guidance of AECOM, which are potentially capable of improving the physical properties of the study materials and reducing leachability of contaminants of concern. The treatments utilized various combinations of Type I Portland Cement (PC), Ground Granulated Blast Furnace Slag (GGBFS) Grade 120, Hydrogel Bentonite and EnviroBlend CS.

Untreated material characterization testing indicated that the two site soils were similar in particle size distribution with sample LG-5 exhibiting a slightly higher gravel content and a slightly lower sand content. Untreated material characterization testing also indicated that the material pH of the LG-4 soil was 9.05 standard units (s.u.) while the LG-5 soil had a pH value of 8.03 s.u.

KEMRON prepared 10 ISS mixtures for each of the untreated materials using mixture formulations approved by AECOM. Based on the results of testing performed on the treated ISS mixtures, AECOM selected three candidate treatments for leachability evaluations using the EPA LEAF leaching method.

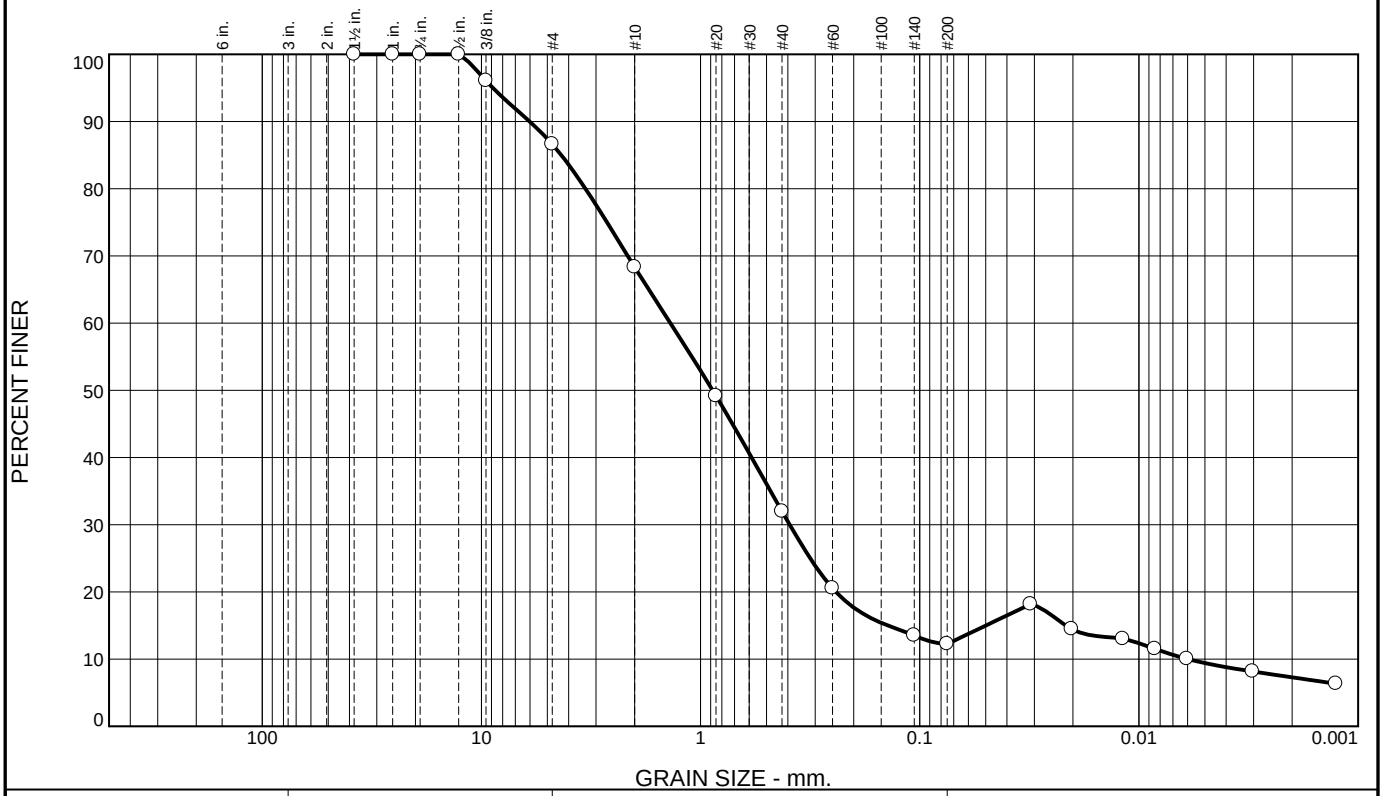
The selection of a full-scale treatment application should take into consideration both the physical and chemical performance of the candidate mixtures. Data indicates that all three of the candidate treatments exhibited significantly high 28-day UCS strength for typical solidification/stabilization applications as well as reduced hydraulic conductivity values. The results of LEAF testing should be fully evaluated to determine the most advantageous mixture design for full-scale application.

This report should be reviewed in its entirety including all attachments prior to making decisions concerning a remedial approach. This study is intended to suggest what will occur in the field but does not guarantee the same results.

If you have any questions concerning the data provided in this report, please do not hesitate to contact us at 404-601-6927.

Appendix A: Untreated Material Physical Properties Characterization Data Sheets

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	13.4	18.3	36.3	19.8	4.9	7.3

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1.5	100.0		
1.0	100.0		
0.75	100.0		
0.5	100.0		
0.375	96.1		
#4	86.6		
#10	68.3		
#20	49.2		
#40	32.0		
#60	20.5		
#140	13.5		
#200	12.2		
0.0312 mm.	18.2		
0.0203 mm.	14.5		
0.0118 mm.	13.0		
0.0085 mm.	11.5		
0.0060 mm.	10.0		
0.0030 mm.	8.2		
0.0013 mm.	6.3		

* (no specification provided)

Soil Description

Very Dusky Red silty sand

Atterberg Limits

PL= 17 LL= 10 PI= NP

Coefficients

D_{90}= 6.0247 D_{85}= 4.3212 D_{60}= 1.3740
D_{50}= 0.8812 D_{30}= 0.3921 D_{15}= 0.0215
D_{10}= 0.0060 C_u= 230.34 C_c= 18.76

Classification

USCS= SM AASHTO= A-1-b

Remarks

Sample Number: LG-4

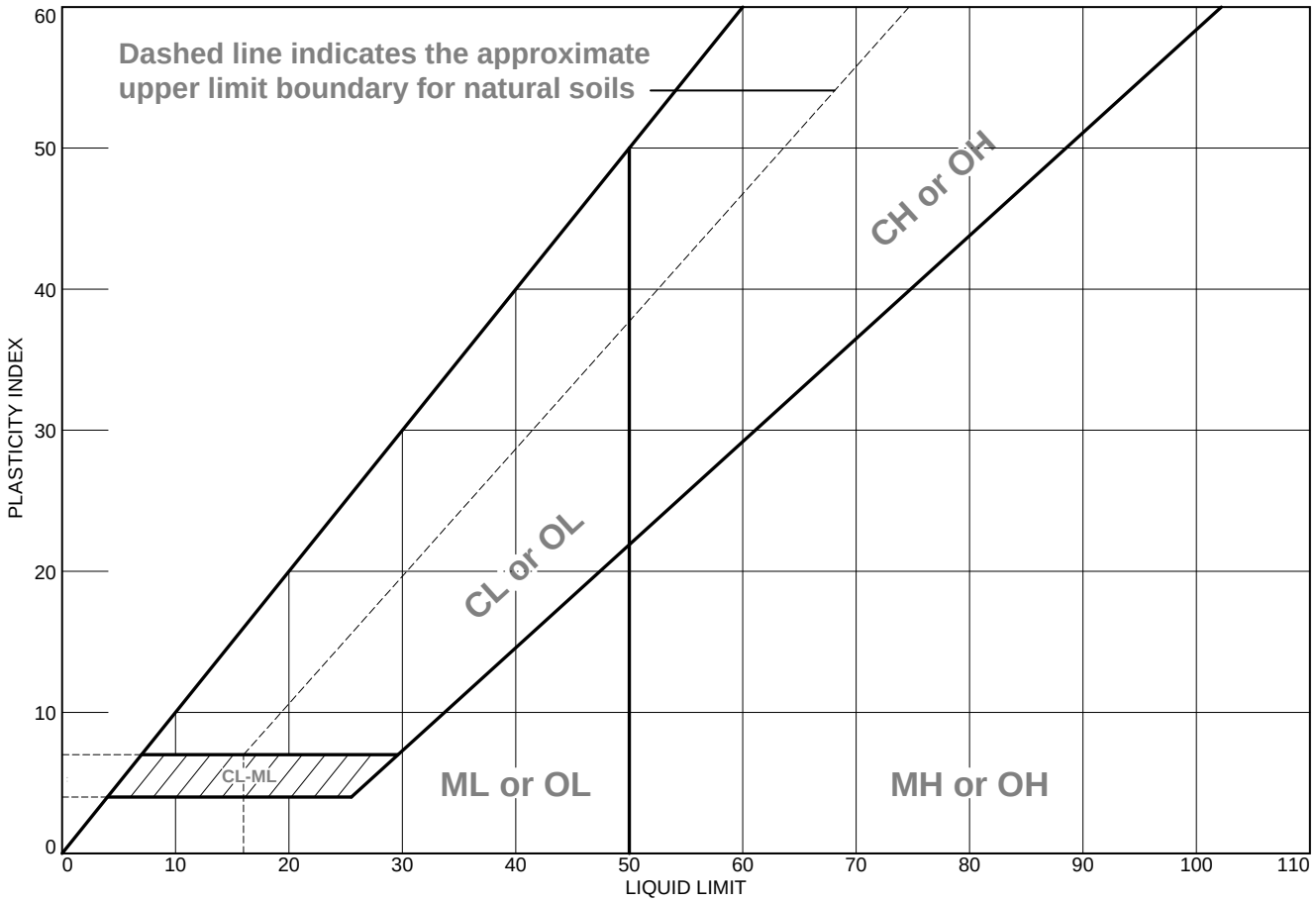
Date: 10/12/20

KEMRON Environmental Services Inc.
Atlanta, Georgia

Client: AECOM
Project: C-D Systems Solidification Study
Project No: SH0751 **Figure** E243

Tested By: JBA **Checked By:** TNB

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Very Dusky Red silty sand	10	17	NP	32.0	12.2	SM

Project No. SH0751 **Client:** AECOM

Project: C-D Systems Solidification Study

●**Sample Number:** LG-4

Remarks:

KEMRON Environmental Services Inc.

Atlanta, Georgia

Figure E243

Tested By: JBA **Checked By:** TNB

MOISTURE CONTENT DETERMINATION

REPORT FORM
ASTM D 2216

PROJECT:	C-D Systems Solidification
PROJECT No.:	SH0751
SAMPLE No.:	LG-4
TESTING DATE:	10/09/20
TESTED BY:	JBA
TRACKING CODE:	E243

MOISTURE CONTENT (Dry & Wet Basis)						
1. MOISTURE TIN NO.	A		B		C	
2. WT MOISTURE TIN (tare weight)	1.2722	g	1.2762	g	1.2747	g
3. WT WET SOIL + TARE	23.2187	g	27.4465	g	29.0647	g
4. WT DRY SOIL + TARE	21.7936	g	25.8772	g	27.2247	g
5. WT WATER, Ww	1.4251	g	1.5693	g	1.8400	g
6. WT DRY SOIL, Ws	20.5214	g	24.6010	g	25.9500	g
7. ASTM MOISTURE CONTENT	6.94	%	6.38	%	7.09	%
8. PERCENT SOLIDS	93.51	%	94.00	%	93.38	%
9. AVERAGE ASTM MOISTURE CONTENT	6.80	%				
10. AVERAGE PERCENT SOLIDS	93.63	%				

MATERIAL pH

EPA METHOD 9045
DATA SHEET

PROJECT:	C-D Systems Solidification Study
PROJECT No.:	SH0751
TESTING DATE:	10/9/2020
TESTED BY:	JBA
TRACKING CODE:	E243

KEMRON SAMPLE No.		MATERIAL pH
1	LG-4 A	9.40
2	LG-4 B	8.93
3	LG-4 C	8.83
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
	AVERAGE:	9.05

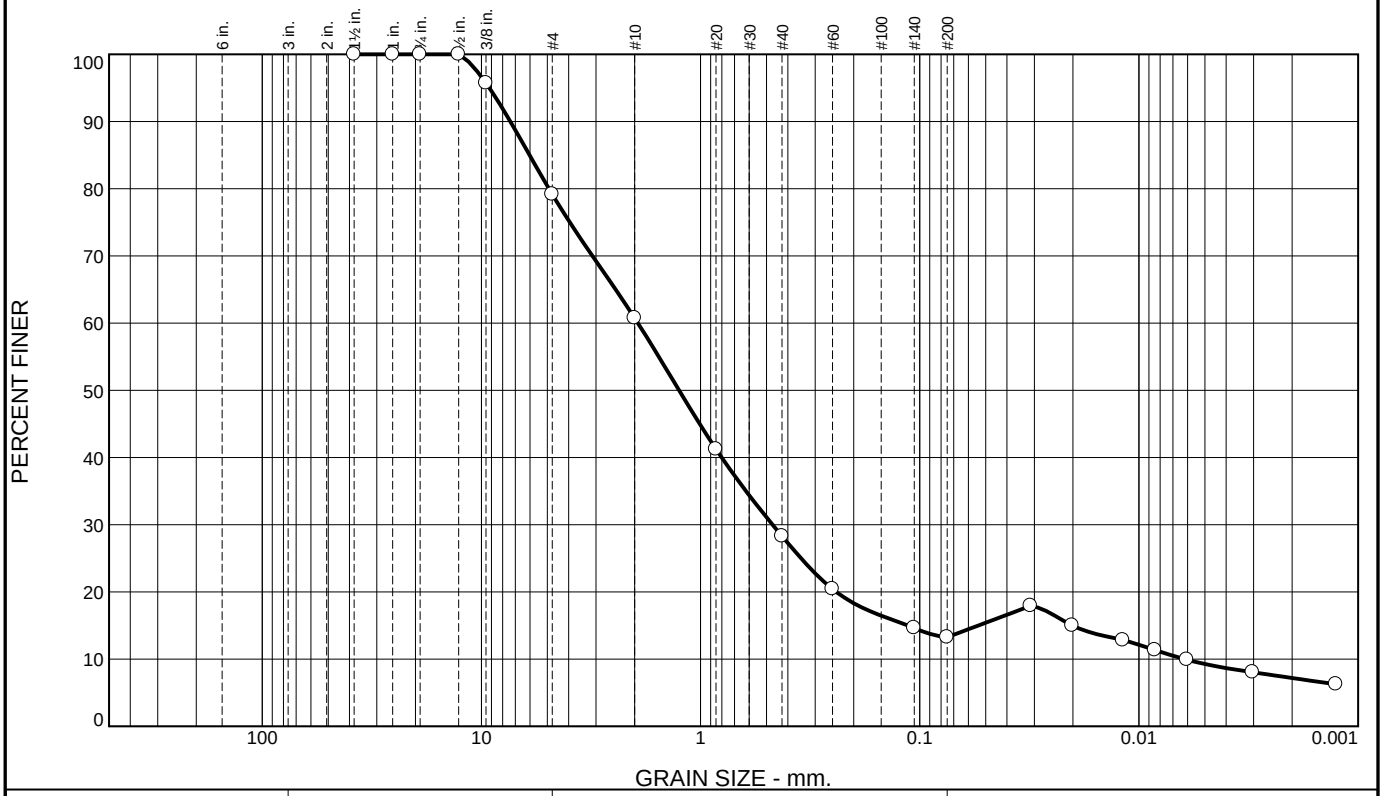
UNIT WEIGHT DETERMINATION

DATA SHEET
ASTM D7263

PROJECT:	C-D Systems Solidification Study
PROJECT No.:	SH0751
SAMPLE No.:	LG-4
TESTING DATE:	10/16/20
TESTED BY:	JBA
TRACKING CODE:	E243

UNIT WEIGHT (DENSITY)						
1. SAMPLE NO.	A		B		C	
2. WT OF MOLD (tare weight)	18.15	g	18.14	g	18.15	g
3. WT OF MOLD + SOIL	382.59	g	393.68	g	388.38	g
4. WT OF WET SOIL, W	364.44	g	375.54	g	370.23	g
5. DIAMETER OF SPECIMEN, D	2.00	in	2.00	in	2.00	in
6. HEIGHT OF SPECIMEN, H	4.00	in	4.00	in	4.00	in
7. VOLUME OF SPECIMEN	12.57	in^3	12.57	in^3	12.57	in^3
8. BULK UNIT WEIGHT	110.5	pcf	113.8	pcf	112.2	pcf
9. BULK SPECIFIC GRAVITY	1.8		1.8		1.8	
10. AVERAGE BULK UNIT WEIGHT	112.2	pcf				
11. AVERAGE BULK SPECIFIC GRAVITY	1.8					

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	20.8	18.4	32.5	15.0	6.1	7.2

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1.5	100.0		
1.0	100.0		
0.75	100.0		
0.5	100.0		
0.375	95.7		
#4	79.2		
#10	60.8		
#20	41.2		
#40	28.3		
#60	20.4		
#140	14.6		
#200	13.3		
0.0312 mm.	17.9		
0.0202 mm.	15.0		
0.0118 mm.	12.8		
0.0085 mm.	11.4		
0.0060 mm.	9.9		
0.0030 mm.	8.1		
0.0013 mm.	6.3		

* (no specification provided)

Soil Description

Very Dusky Red silty sand with gravel

Atterberg Limits

PL= 16 LL= 12 PI= NP

Coefficients

D_{90}= 7.3826 D_{85}= 6.0300 D_{60}= 1.9324
D_{50}= 1.2533 D_{30}= 0.4694 D_{15}= 0.0201
D_{10}= 0.0062 C_u= 312.11 C_c= 18.42

Classification

USCS= SM AASHTO= A-1-b

Remarks

Sample Number: LG-5

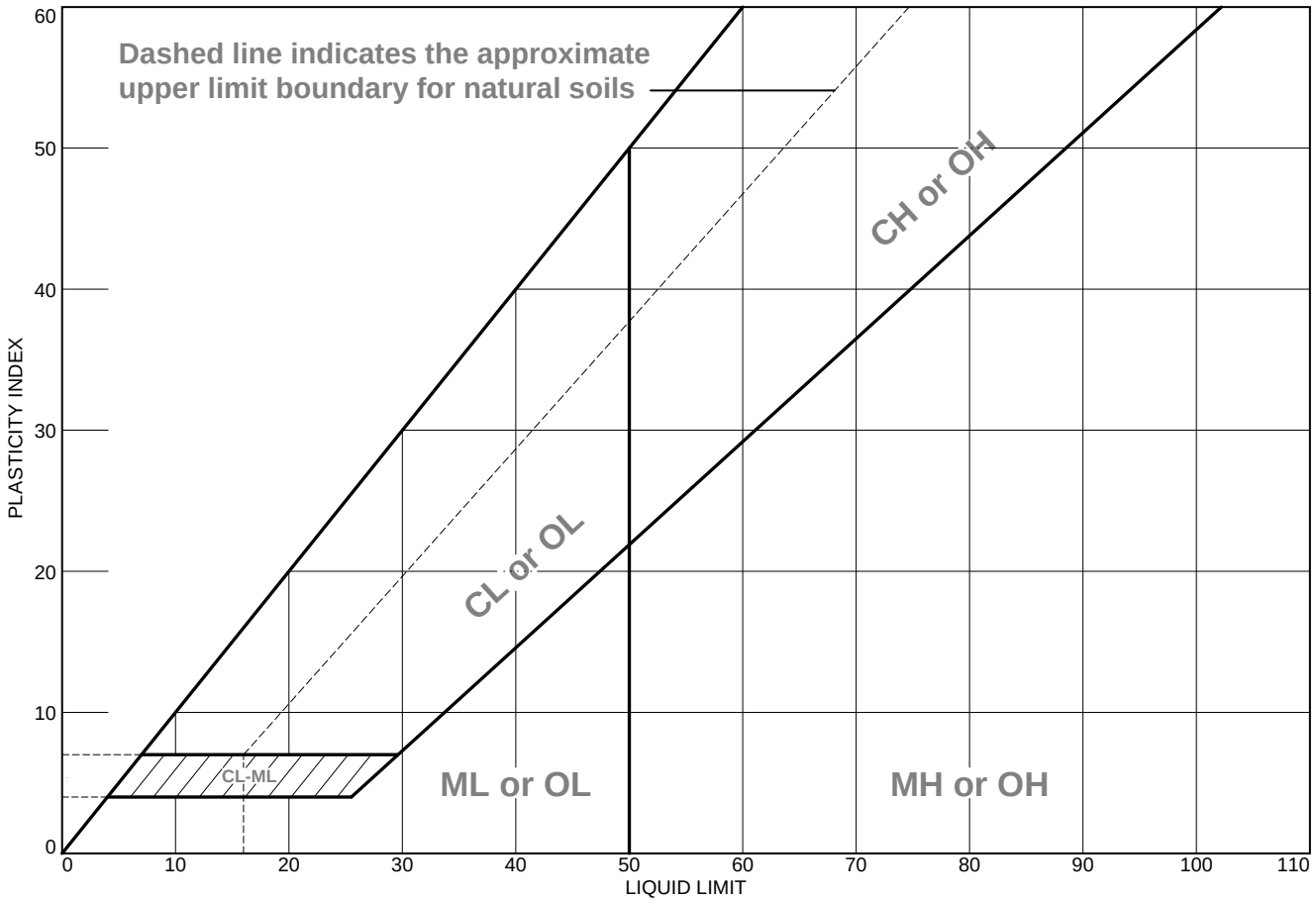
Date: 10/12/20

KEMRON Environmental Services Inc.
Atlanta, Georgia

Client: AECOM
Project: C-D Systems Solidification Study
Project No: SH0751 **Figure** E244

Tested By: JBA **Checked By:** TNB

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Very Dusky Red silty sand with gravel	12	16	NP	28.3	13.3	SM

Project No. SH0751 **Client:** AECOM

Project: C-D Systems Solidification Study

●**Sample Number:** LG-5

Remarks:

KEMRON Environmental Services Inc.

Atlanta, Georgia

Figure E244

Tested By: JBA **Checked By:** TNB

MOISTURE CONTENT DETERMINATION

REPORT FORM
ASTM D 2216

PROJECT:	C-D Systems Solidification
PROJECT No.:	SH0751
SAMPLE No.:	LG-5
TESTING DATE:	10/09/20
TESTED BY:	JBA
TRACKING CODE:	E244

MOISTURE CONTENT (Dry & Wet Basis)					
1. MOISTURE TIN NO.	A		B	C	
2. WT MOISTURE TIN (tare weight)	1.2772	g	1.2677 g	1.2747	g
3. WT WET SOIL + TARE	34.9033	g	30.2779 g	28.5903	g
4. WT DRY SOIL + TARE	32.4770	g	28.1101 g	26.5105	g
5. WT WATER, Ww	2.4263	g	2.1678 g	2.0798	g
6. WT DRY SOIL, Ws	31.1998	g	26.8424 g	25.2358	g
7. ASTM MOISTURE CONTENT	7.78	%	8.08 %	8.24	%
8. PERCENT SOLIDS	92.78	%	92.53 %	92.39	%
9. AVERAGE ASTM MOISTURE CONTENT	8.03	%			
10. AVERAGE PERCENT SOLIDS	92.57	%			

MATERIAL pH

EPA METHOD 9045
DATA SHEET

PROJECT:	C-D Systems Solidification Study
PROJECT No.:	SH0751
TESTING DATE:	10/9/2020
TESTED BY:	JBA
TRACKING CODE:	E244

KEMRON SAMPLE No.		MATERIAL pH
1	LG-5 A	8.70
2	LG-5 B	8.55
3	LG-5 C	8.37
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
	AVERAGE:	8.54

UNIT WEIGHT DETERMINATION

DATA SHEET
ASTM D7263

PROJECT:	C-D Systems Solidification Study
PROJECT No.:	SH0751
SAMPLE No.:	LG-5
TESTING DATE:	10/16/20
TESTED BY:	JBA
TRACKING CODE:	E244

UNIT WEIGHT (DENSITY)			
1. SAMPLE NO.	A	B	C
2. WT OF MOLD (tare weight)	18.15 g	18.14 g	18.14 g
3. WT OF MOLD + SOIL	389.48 g	393.77 g	391.24 g
4. WT OF WET SOIL, W	371.33 g	375.63 g	373.10 g
5. DIAMETER OF SPECIMEN, D	2.00 in	2.00 in	2.00 in
6. HEIGHT OF SPECIMEN, H	4.00 in	4.00 in	4.00 in
7. VOLUME OF SPECIMEN	12.57 in^3	12.57 in^3	12.57 in^3
8. BULK UNIT WEIGHT	112.6 pcf	113.9 pcf	113.1 pcf
9. BULK SPECIFIC GRAVITY	1.8	1.8	1.8
10. AVERAGE BULK UNIT WEIGHT	113.2 pcf		
11. AVERAGE BULK SPECIFIC GRAVITY	1.8		

Appendix B:
Initial Design Mixture Development Sheets

MIX DEVELOPMENT DATA SHEET

PROJECT:	C-D Systems Solidification Study	MIX No.	
PROJECT No.:	SH0751		0751-001
MIXING DATE:	23-Nov-20	MIXED BY:	JBA

UNTREATED MATERIAL TYPE		LG-4
WEIGHT OF UNTREATED MATERIAL		1,600 g
REAGENT TYPE AND LOT NUMBER	ADDITION RATE	WEIGHT
Type I/II Portland Cement #1139	3.00 %	48.0 g
	%	0.0 g
	%	0.0 g
	%	0.0 g
	%	0.0 g
Water Addition	100 %	48.0 g

OBSERVATIONS / NOTES

PP (1,3 7, 10, 14)

UCS (7, 14, 28)

PENETROMETER ANALYSES					
CURE TIME (Days)	1	3	7	10	14
PENETROMETER (tons/ft^2)	3.0	4.5	>4.5	>4.5	>4.5

MIX DEVELOPMENT DATA SHEET

PROJECT:	C-D Systems Solidification Study	MIX No.	
PROJECT No.:	SH0751		0751-002
MIXING DATE:	23-Nov-20	MIXED BY:	JBA

UNTREATED MATERIAL TYPE		LG-4
WEIGHT OF UNTREATED MATERIAL		1,600 g
REAGENT TYPE AND LOT NUMBER	ADDITION RATE	WEIGHT
Type I/II Portland Cement #1139	5.00 %	80.0 g
	%	0.0 g
	%	0.0 g
	%	0.0 g
	%	0.0 g
Water Addition	100 %	80.0 g

OBSERVATIONS / NOTES

PP (1,3 7, 10, 14)

UCS (7, 14, 28)

PENETROMETER ANALYSES

CURE TIME (Days)	1	3	7	10	14
PENETROMETER (tons/ft^2)	4.0	>4.5	>4.5	>4.5	>4.5

MIX DEVELOPMENT DATA SHEET

PROJECT:	C-D Systems Solidification Study	MIX No.	
PROJECT No.:	SH0751		0751-003
MIXING DATE:	23-Nov-20	MIXED BY:	JBA

UNTREATED MATERIAL TYPE		LG-4
WEIGHT OF UNTREATED MATERIAL		1,900 g
REAGENT TYPE AND LOT NUMBER	ADDITION RATE	WEIGHT
Type I/II Portland Cement #1139	7.50 %	142.5 g
	%	0.0 g
	%	0.0 g
	%	0.0 g
	%	0.0 g
Water Addition	100 %	142.5 g

OBSERVATIONS / NOTES

PP (1,3 7, 10, 14)

UCS (7, 14, 28)

PENETROMETER ANALYSES

CURE TIME (Days)	1	3	7	10	14
PENETROMETER (tons/ft^2)	4.5	>4.5	>4.5	>4.5	>4.5

MIX DEVELOPMENT DATA SHEET

PROJECT:	C-D Systems Solidification Study	MIX No.	
PROJECT No.:	SH0751		0751-004
MIXING DATE:	23-Nov-20	MIXED BY:	JBA

UNTREATED MATERIAL TYPE		LG-4
WEIGHT OF UNTREATED MATERIAL		**1,600 g**
REAGENT TYPE AND LOT NUMBER	ADDITION RATE	WEIGHT
Type I/II Portland Cement #1139	3.00 %	48.0 g
GGBFS 120 #1138	6.00 %	96.0 g
	%	0.0 g
	%	0.0 g
	%	0.0 g
Water Addition	100 %	144.0 g

OBSERVATIONS / NOTES

PP (1,3 7, 10, 14)

UCS (7, 14, 28)

PENETROMETER ANALYSES

CURE TIME (Days)	1	3	7	10	14
PENETROMETER (tons/ft^2)	3.25	4.5	>4.5	>4.5	>4.5

MIX DEVELOPMENT DATA SHEET

PROJECT:	C-D Systems Solidification Study	MIX No.	
PROJECT No.:	SH0751		0751-005
MIXING DATE:	23-Nov-20	MIXED BY:	JBA

UNTREATED MATERIAL TYPE		LG-4
WEIGHT OF UNTREATED MATERIAL		**1,900 g**
REAGENT TYPE AND LOT NUMBER	ADDITION RATE	WEIGHT
Type I/II Portland Cement #1139	3.00 %	57.0 g
GGBFS 120 #1138	9.00 %	171.0 g
	%	0.0 g
	%	0.0 g
	%	0.0 g
Water Addition	100 %	228.0 g

OBSERVATIONS / NOTES

PP (1,3 7, 10, 14)

UCS (7, 14, 28)

PENETROMETER ANALYSES

CURE TIME (Days)	1	3	7	10	14
PENETROMETER (tons/ft^2)	3.25	4.5	>4.5	>4.5	>4.5

MIX DEVELOPMENT DATA SHEET

PROJECT:	C-D Systems Solidification Study	MIX No.	
PROJECT No.:	SH0751		0751-006
MIXING DATE:	23-Nov-20	MIXED BY:	JBA

UNTREATED MATERIAL TYPE		LG-4
WEIGHT OF UNTREATED MATERIAL		**1,900 g**
REAGENT TYPE AND LOT NUMBER	ADDITION RATE	WEIGHT
Type I/II Portland Cement #1139	5.00 %	95.0 g
GGBFS 120 #1138	9.00 %	171.0 g
	%	0.0 g
	%	0.0 g
	%	0.0 g
Water Addition	100 %	266.0 g

OBSERVATIONS / NOTES

PP (1,3 7, 10, 14)
VE
UCS (7, 14, 28)

PENETROMETER ANALYSES

CURE TIME (Days)	1	3	7	10	14
PENETROMETER (tons/ft^2)	4.5	>4.5	>4.5	>4.5	>4.5

MIX DEVELOPMENT DATA SHEET

PROJECT:	C-D Systems Solidification Study	MIX No.	
PROJECT No.:	SH0751		0751-007
MIXING DATE:	23-Nov-20	MIXED BY:	JBA

UNTREATED MATERIAL TYPE		LG-4
WEIGHT OF UNTREATED MATERIAL		**1,900 g**
REAGENT TYPE AND LOT NUMBER	ADDITION RATE	WEIGHT
Type I/II Portland Cement #1139	7.50 %	142.5 g
Bentonite #1140	2.00 %	38.0 g
	%	0.0 g
	%	0.0 g
	%	0.0 g
Water Addition	100 %	180.5 g

OBSERVATIONS / NOTES

PP (1,3 7, 10, 14)

UCS (7, 14, 28)

PENETROMETER ANALYSES

CURE TIME (Days)	1	3	7	10	14
PENETROMETER (tons/ft^2)	4.5	>4.5	>4.5	>4.5	>4.5

MIX DEVELOPMENT DATA SHEET

PROJECT:	C-D Systems Solidification Study	MIX No.	
PROJECT No.:	SH0751		0751-008
MIXING DATE:	23-Nov-20	MIXED BY:	JBA

UNTREATED MATERIAL TYPE		LG-4
WEIGHT OF UNTREATED MATERIAL		1,900 g
REAGENT TYPE AND LOT NUMBER	ADDITION RATE	WEIGHT
Type I/II Portland Cement #1138	7.50 %	142.5 g
Enviroblend #1146	3.00 %	57.0 g
	%	0.0 g
	%	0.0 g
	%	0.0 g
Water Addition	100 %	199.5 g

OBSERVATIONS / NOTES

PP (1,3 7, 10, 14)

UCS (7, 14, 28)

PENETROMETER ANALYSES

CURE TIME (Days)	1	3	7	10	14
PENETROMETER (tons/ft^2)	4.5	>4.5	>4.5	>4.5	>4.5

MIX DEVELOPMENT DATA SHEET

PROJECT:	C-D Systems Solidification Study	MIX No.	
PROJECT No.:	SH0751		0751-009
MIXING DATE:	23-Nov-20	MIXED BY:	JBA

UNTREATED MATERIAL TYPE			LG-4
WEIGHT OF UNTREATED MATERIAL			1,900 g
REAGENT TYPE AND LOT NUMBER		ADDITION RATE	WEIGHT
Type I/II Portland Cement	#1138	3.00 %	57.0 g
GGBFS 120	#1139	6.00 %	114.0 g
Bentonite	#1140	1.00 %	19.0 g
		%	0.0 g
		%	0.0 g
Water Addition		100 %	171.0 g

OBSERVATIONS / NOTES

PP (1,3 7, 10, 14)

UCS (7, 14, 28)

PENETROMETER ANALYSES

CURE TIME (Days)	1	3	7	10	14
PENETROMETER (tons/ft^2)	3.5	>4.5	>4.5	>4.5	>4.5

MIX DEVELOPMENT DATA SHEET

PROJECT:	C-D Systems Solidification Study	MIX No.	
PROJECT No.:	SH0751		0751-010
MIXING DATE:	23-Nov-20	MIXED BY:	JBA

UNTREATED MATERIAL TYPE			LG-4
WEIGHT OF UNTREATED MATERIAL			1,900 g
REAGENT TYPE AND LOT NUMBER		ADDITION RATE	WEIGHT
Type I/II Portland Cement	#1138	3.00 %	57.0 g
GGBFS 120	#1139	6.00 %	114.0 g
Enviroblend	#1146	3.00 %	57.0 g
		%	0.0 g
		%	0.0 g
Water Addition		100 %	171.0 g

OBSERVATIONS / NOTES

PP (1,3 7, 10, 14)

UCS (7, 14, 28)

PENETROMETER ANALYSES

CURE TIME (Days)	1	3	7	10	14
PENETROMETER (tons/ft^2)	3.5	>4.5	>4.5	>4.5	>4.5

MIX DEVELOPMENT DATA SHEET

PROJECT:	C-D Systems Solidification Study	MIX No.	
PROJECT No.:	SH0751		0751-011
MIXING DATE:	23-Nov-20	MIXED BY:	JBA

UNTREATED MATERIAL TYPE		LG-5
WEIGHT OF UNTREATED MATERIAL		1,900 g
REAGENT TYPE AND LOT NUMBER	ADDITION RATE	WEIGHT
Type I/II Portland Cement #1138	3.00 %	57.0 g
	%	0.0 g
	%	0.0 g
	%	0.0 g
	%	0.0 g
Water Addition	100 %	57.0 g

OBSERVATIONS / NOTES

PP (1,3 7, 10, 14)

UCS (7, 14, 28)

PENETROMETER ANALYSES

CURE TIME (Days)	1	3	7	10	14
PENETROMETER (tons/ft^2)	2.75	4.0	>4.5	>4.5	>4.5

MIX DEVELOPMENT DATA SHEET

PROJECT:	C-D Systems Solidification Study	MIX No.	
PROJECT No.:	SH0751		0751-012
MIXING DATE:	23-Nov-20	MIXED BY:	JBA

UNTREATED MATERIAL TYPE		LG-5
WEIGHT OF UNTREATED MATERIAL		1,600 g
REAGENT TYPE AND LOT NUMBER	ADDITION RATE	WEIGHT
Type I/II Portland Cement #1138	5.00 %	80.0 g
	%	0.0 g
	%	0.0 g
	%	0.0 g
	%	0.0 g
Water Addition	100 %	80.0 g

OBSERVATIONS / NOTES

PP (1,3 7, 10, 14)

UCS (7, 14, 28)

PENETROMETER ANALYSES

CURE TIME (Days)	1	3	7	10	14
PENETROMETER (tons/ft^2)	3.5	4.5	>4.5	>4.5	>4.5

MIX DEVELOPMENT DATA SHEET

PROJECT:	C-D Systems Solidification Study	MIX No.	
PROJECT No.:	SH0751		0751-013
MIXING DATE:	23-Nov-20	MIXED BY:	JBA

UNTREATED MATERIAL TYPE		LG-5
WEIGHT OF UNTREATED MATERIAL		**1,900 g**
REAGENT TYPE AND LOT NUMBER	ADDITION RATE	WEIGHT
Type I/II Portland Cement #1139	7.50 %	142.5 g
	%	0.0 g
	%	0.0 g
	%	0.0 g
	%	0.0 g
Water Addition	100 %	142.5 g

OBSERVATIONS / NOTES

PP (1,3 7, 10, 14)

UCS (7, 14, 28)

PENETROMETER ANALYSES

CURE TIME (Days)	1	3	7	10	14
PENETROMETER (tons/ft^2)	4.5	>4.5	>4.5	>4.5	>4.5

MIX DEVELOPMENT DATA SHEET

PROJECT:	C-D Systems Solidification Study	MIX No.	
PROJECT No.:	SH0751		0751-014
MIXING DATE:	23-Nov-20	MIXED BY:	JBA

UNTREATED MATERIAL TYPE		LG-5
WEIGHT OF UNTREATED MATERIAL		1,900 g
REAGENT TYPE AND LOT NUMBER	ADDITION RATE	WEIGHT
Type I/II Portland Cement #1139	3.00 %	57.0 g
GGBFS 120 #1138	6.00 %	114.0 g
	%	0.0 g
	%	0.0 g
	%	0.0 g
Water Addition	100 %	171.0 g

OBSERVATIONS / NOTES

PP (1,3 7, 10, 14)

UCS (7, 14, 28)

PENETROMETER ANALYSES

CURE TIME (Days)	1	3	7	10	14
PENETROMETER (tons/ft^2)	3.0	4.5	>4.5	>4.5	>4.5

MIX DEVELOPMENT DATA SHEET

PROJECT:	C-D Systems Solidification Study	MIX No.	
PROJECT No.:	SH0751		0751-015
MIXING DATE:	23-Nov-20	MIXED BY:	JBA

UNTREATED MATERIAL TYPE		LG-5
WEIGHT OF UNTREATED MATERIAL		1,900 g
REAGENT TYPE AND LOT NUMBER	ADDITION RATE	WEIGHT
Type I/II Portland Cement #1139	3.00 %	57.0 g
GGBFS 120 #1138	9.00 %	171.0 g
	%	0.0 g
	%	0.0 g
	%	0.0 g
Water Addition	100 %	228.0 g

OBSERVATIONS / NOTES

PP (1,3 7, 10, 14)

UCS (7, 14, 28)

PENETROMETER ANALYSES

CURE TIME (Days)	1	3	7	10	14
PENETROMETER (tons/ft^2)	3.0	4.5	>4.5	>4.5	>4.5

MIX DEVELOPMENT DATA SHEET

PROJECT:	C-D Systems Solidification Study	MIX No.	
PROJECT No.:	SH0751		0751-016
MIXING DATE:	23-Nov-20	MIXED BY:	JBA

UNTREATED MATERIAL TYPE		LG-5
WEIGHT OF UNTREATED MATERIAL		1,900 g
REAGENT TYPE AND LOT NUMBER	ADDITION RATE	WEIGHT
Type I/II Portland Cement #1139	5.00 %	95.0 g
GGBFS 120 #1138	9.00 %	171.0 g
	%	0.0 g
	%	0.0 g
	%	0.0 g
Water Addition	100 %	266.0 g

OBSERVATIONS / NOTES

PP (1,3 7, 10, 14)

UCS (7, 14, 28)

PENETROMETER ANALYSES

CURE TIME (Days)	1	3	7	10	14
PENETROMETER (tons/ft^2)	4.25	>4.5	>4.5	>4.5	>4.5

MIX DEVELOPMENT DATA SHEET

PROJECT:	C-D Systems Solidification Study	MIX No.	
PROJECT No.:	SH0751		0751-017
MIXING DATE:	23-Nov-20	MIXED BY:	JBA

UNTREATED MATERIAL TYPE		LG-5
WEIGHT OF UNTREATED MATERIAL		**1,900 g**
REAGENT TYPE AND LOT NUMBER	ADDITION RATE	WEIGHT
Type I/II Portland Cement #1139	7.50 %	142.5 g
Bentonite #1140	2.00 %	38.0 g
	%	0.0 g
	%	0.0 g
	%	0.0 g
Water Addition	100 %	180.5 g

OBSERVATIONS / NOTES

PP (1,3 7, 10, 14)

UCS (7, 14, 28)

PENETROMETER ANALYSES

CURE TIME (Days)	1	3	7	10	14
PENETROMETER (tons/ft^2)	4.5	>4.5	>4.5	>4.5	>4.5

MIX DEVELOPMENT DATA SHEET

PROJECT:	C-D Systems Solidification Study	MIX No.	
PROJECT No.:	SH0751		0751-018
MIXING DATE:	23-Nov-20	MIXED BY:	JBA

UNTREATED MATERIAL TYPE		LG-5
WEIGHT OF UNTREATED MATERIAL		1,900 g
REAGENT TYPE AND LOT NUMBER	ADDITION RATE	WEIGHT
Type I/II Portland Cement #1139	7.50 %	142.5 g
Enviroblend #1146	3.00 %	57.0 g
	%	0.0 g
	%	0.0 g
	%	0.0 g
Water Addition	100 %	199.5 g

OBSERVATIONS / NOTES

PP (1,3 7, 10, 14)

UCS (7, 14, 28)

PENETROMETER ANALYSES					
CURE TIME (Days)	1	3	7	10	14
PENETROMETER (tons/ft^2)	4.5	>4.5	>4.5	>4.5	>4.5

MIX DEVELOPMENT DATA SHEET

PROJECT:	C-D Systems Solidification Study	MIX No.	
PROJECT No.:	SH0751		0751-019
MIXING DATE:	23-Nov-20	MIXED BY:	JBA

UNTREATED MATERIAL TYPE		LG-5
WEIGHT OF UNTREATED MATERIAL		1,900 g
REAGENT TYPE AND LOT NUMBER	ADDITION RATE	WEIGHT
Type I/II Portland Cement #1139	3.00 %	57.0 g
GGBFS 120 #1138	6.00 %	114.0 g
Bentonite #1140	1.00 %	19.0 g
	%	0.0 g
	%	0.0 g
Water Addition	100 %	190.0 g

OBSERVATIONS / NOTES

PP (1,3 7, 10, 14)

UCS (7, 14, 28)

PENETROMETER ANALYSES

CURE TIME (Days)	1	3	7	10	14
PENETROMETER (tons/ft^2)	3.25	4.5	>4.5	>4.5	>4.5

MIX DEVELOPMENT DATA SHEET

PROJECT:	C-D Systems Solidification Study	MIX No.	
PROJECT No.:	SH0751		0751-020
MIXING DATE:	23-Nov-20	MIXED BY:	JBA

UNTREATED MATERIAL TYPE			LG-5
WEIGHT OF UNTREATED MATERIAL			1,900 g
REAGENT TYPE AND LOT NUMBER		ADDITION RATE	WEIGHT
Type I/II Portland Cement	#1139	3.00 %	57.0 g
GGBFS 120	#1138	6.00 %	114.0 g
Enviroblend	#1146	3.00 %	57.0 g
		%	0.0 g
		%	0.0 g
Water Addition		100 %	228.0 g

OBSERVATIONS / NOTES

PP (1,3 7, 10, 14)

UCS (7, 14, 28)

PENETROMETER ANALYSES

CURE TIME (Days)	1	3	7	10	14
PENETROMETER (tons/ft^2)	3.25	4.5	>4.5	>4.5	>4.5

Appendix C:
Initial Mixture Design Physical Properties Characterization Data Sheets

7 Day

UNCONFINED COMPRESSION TEST

ASTM D 2166

PROJECT:	C-D Systems Solidification Study		
PROJECT No.:	SH0751		
SAMPLE No.:	0751-001 (7 Day)		
TESTING DATE:	30-Nov-20	LOADING RATE:	0.0400 in./min
TESTED BY:	JBA	TRACKING CODE:	E295

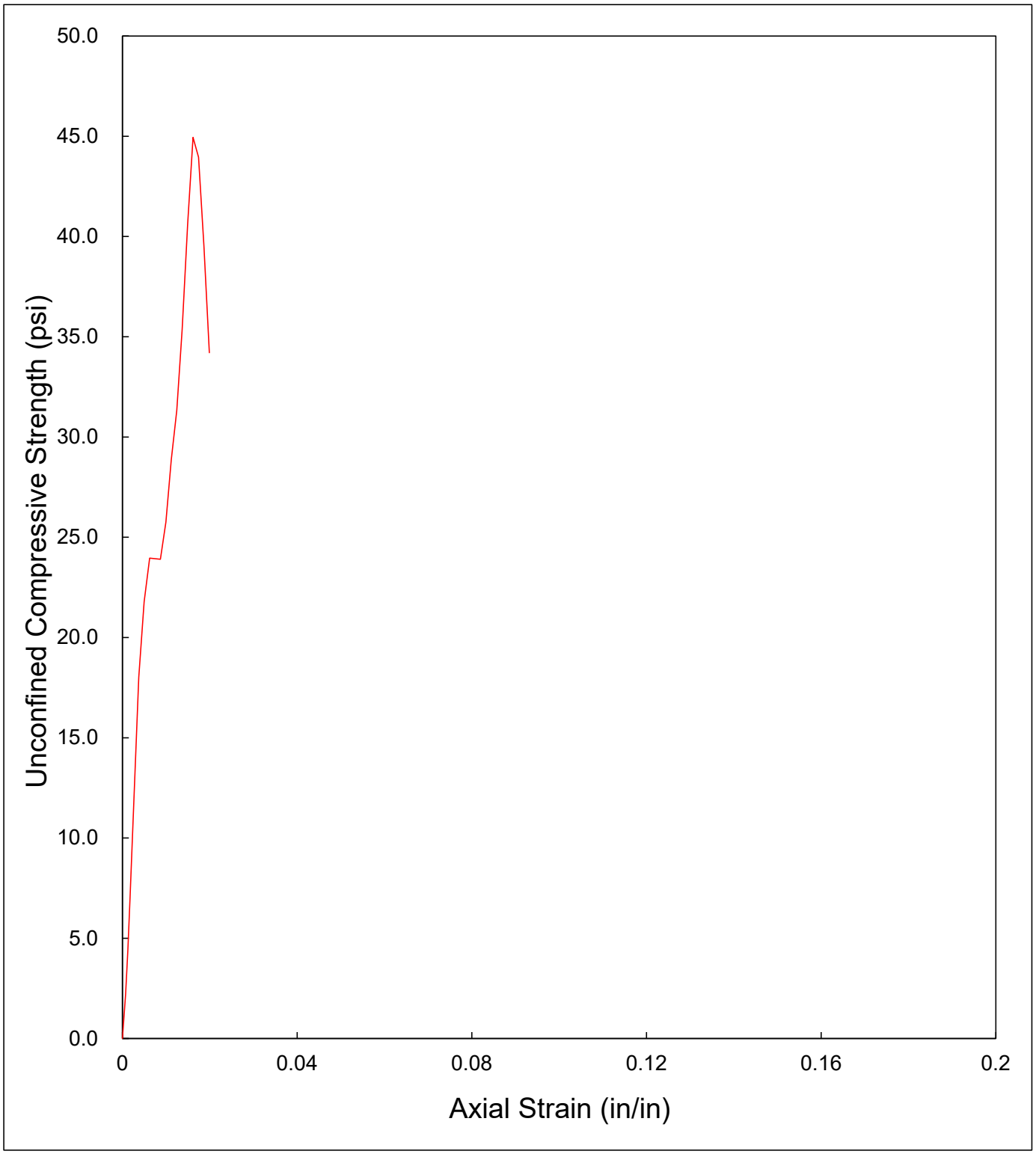
MOISTURE CONTENT (Dry Basis)		
1. MOISTURE TIN NO.		
2. WT MOISTURE TIN (tare weight)	215.72	g
3. WT WET SOIL + TARE	358.02	g
4. WT DRY SOIL + TARE	348.52	g
5. WT WATER, Ww	9.50	g
6. WT DRY SOIL, Ws	132.80	g
7. MOISTURE CONTENT, W	**7.15**	**%**

SOIL SPECIMEN DIMENSIONS				
	DIAMETER		***LENGTH***	
No. 1	2.01	in.	4.05	in.
No. 2	2.01	in.	4.02	in.
No. 3	1.99	in.	3.99	in.
Average	**2.00**	**in.**	**4.02**	**in.**

SPECIMEN CONDITIONS		
Initial Specimen WT, Wo	***385.30***	***g***
Initial Area, Ao	3.15	in²
Initial Volume, Vo	12.67	in³
Initial Bulk Unit Weight,	115.9	lb/ft³
Initial Dry Unit Weight	108.1	lb/ft³
15 % Strain (0.15 Lo)	0.60	in.
UCS	44.9	lb/in²

COMPRESSIVE LOAD (lbs.)	DIAL GAGE READING (in.)	SPECIMEN DEFORMATION (in.)	CORRECTED AREA (in²)	AXIAL STRAIN (in/in)	UNCONFINED COMPRESSIVE STRENGTH (lb/in²)
0	0.000	0.000	3.152	0.0000	0.0
7	0.003	0.003	3.154	0.0007	2.2
14	0.005	0.005	3.156	0.0012	4.4
22	0.007	0.007	3.158	0.0017	7.0
35	0.010	0.010	3.160	0.0025	11.1
57	0.015	0.015	3.164	0.0037	18.0
69	0.020	0.020	3.168	0.0050	21.8
76	0.025	0.025	3.172	0.0062	24.0
76	0.030	0.030	3.176	0.0075	23.9
76	0.035	0.035	3.180	0.0087	23.9
82	0.040	0.040	3.184	0.0100	25.8
92	0.045	0.045	3.188	0.0112	28.9
100	0.050	0.050	3.192	0.0124	31.3
113	0.055	0.055	3.196	0.0137	35.4
130	0.060	0.060	3.200	0.0149	40.6
144	0.065	0.065	3.204	0.0162	44.9
141	0.070	0.070	3.208	0.0174	44.0
127	0.075	0.075	3.212	0.0187	39.5
110	0.080	0.080	3.216	0.0199	34.2

UNCONFINED COMPRESSION TESTING
Sample No. 0751-001 (7 Day)



UNCONFINED COMPRESSION TEST

ASTM D 2166
SUMMARY OF RESULTS

PROJECT:	C-D Systems Solidification Study		
PROJECT No.:	SH0751		
SAMPLE No.:	0751-001 (7 Day)		
TESTING DATE:	30-Nov-20	LOADING RATE:	0.0400 in./min
TESTED BY:	JBA	TRACKING CODE:	E295

TESTING PARAMETER AND RESULTS		
MOISTURE CONTENT	7.2	**%**
BULK UNIT WEIGHT	115.9	lb/ft³
DRY UNIT WEIGHT	108.1	lb/ft³
UCS *	44.9	lb/in²

* UCS - UNCONFINED COMPRESSIVE STRENGTH

UNCONFINED COMPRESSION TEST

ASTM D 2166

PROJECT:	C-D Systems Solidification Study		
PROJECT No.:	SH0751		
SAMPLE No.:	0751-002 (7 Day)		
TESTING DATE:	30-Nov-20	LOADING RATE:	0.0400 in./min
TESTED BY:	JBA	TRACKING CODE:	E296

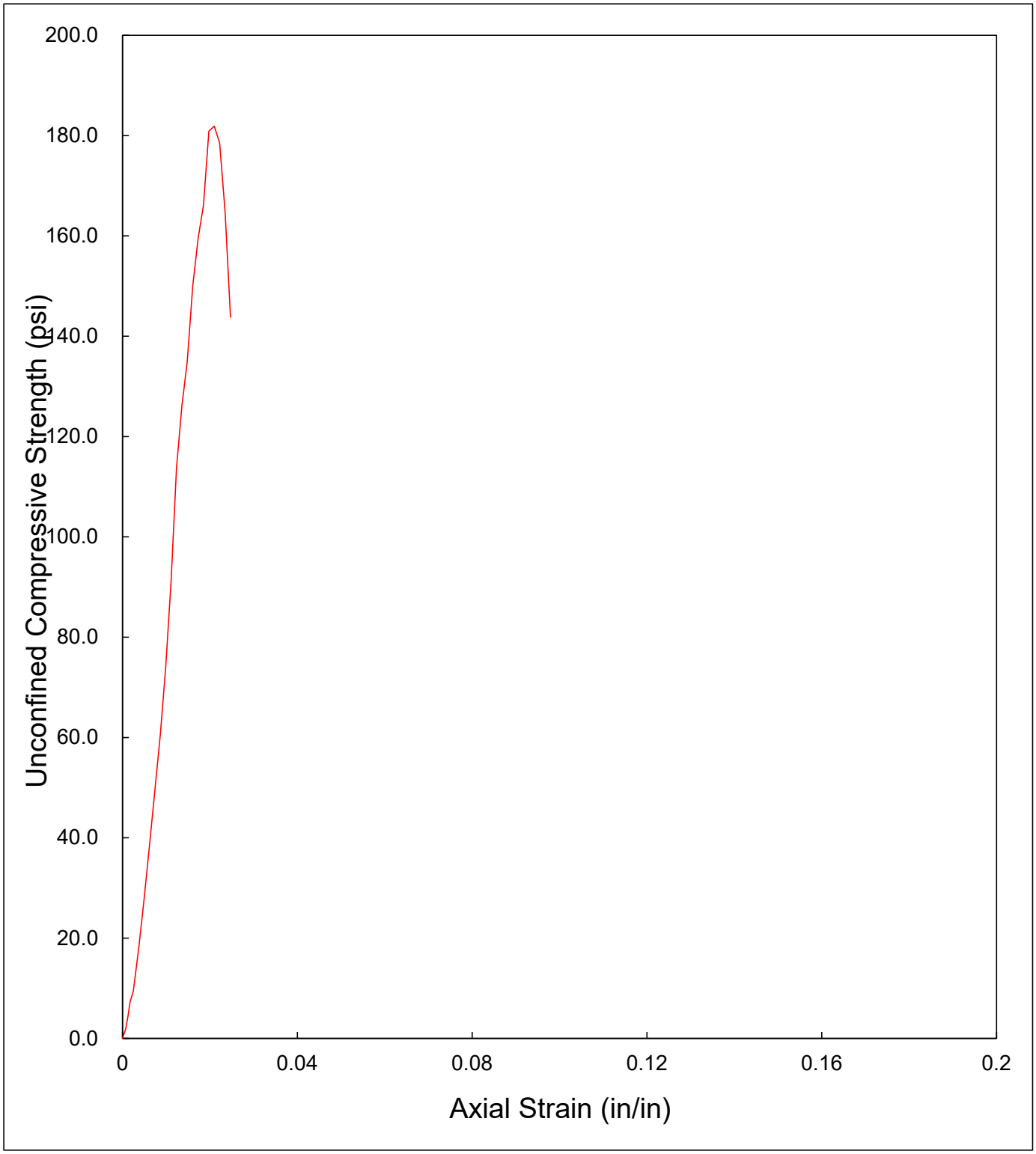
MOISTURE CONTENT (Dry Basis)		
1. MOISTURE TIN NO.		
2. WT MOISTURE TIN (tare weight)	213.57	g
3. WT WET SOIL + TARE	324.10	g
4. WT DRY SOIL + TARE	319.47	g
5. WT WATER, Ww	4.63	g
6. WT DRY SOIL, Ws	105.90	g
7. MOISTURE CONTENT, W	**4.37**	**%**

SOIL SPECIMEN DIMENSIONS				
	DIAMETER		***LENGTH***	
No. 1	2.02	in.	4.05	in.
No. 2	2.00	in.	4.10	in.
No. 3	1.99	in.	4.00	in.
Average	**2.00**	**in.**	**4.05**	**in.**

SPECIMEN CONDITIONS		
Initial Specimen WT, Wo	***470.78***	***g***
Initial Area, Ao	3.15	in²
Initial Volume, Vo	12.77	in³
Initial Bulk Unit Weight,	140.5	lb/ft³
Initial Dry Unit Weight	134.6	lb/ft³
15 % Strain (0.15 Lo)	0.61	in.
UCS	181.9	lb/in²

COMPRESSIVE LOAD (lbs.)	DIAL GAGE READING (in.)	SPECIMEN DEFORMATION (in.)	CORRECTED AREA (in²)	AXIAL STRAIN (in/in)	UNCONFINED COMPRESSIVE STRENGTH (lb/in²)
0	0.000	0.000	3.154	0.0000	0.0
6	0.003	0.003	3.157	0.0007	1.9
14	0.005	0.005	3.158	0.0012	4.4
23	0.007	0.007	3.160	0.0017	7.3
30	0.010	0.010	3.162	0.0025	9.5
57	0.015	0.015	3.166	0.0037	18.0
88	0.020	0.020	3.170	0.0049	27.8
122	0.025	0.025	3.174	0.0062	38.4
157	0.030	0.030	3.178	0.0074	49.4
193	0.035	0.035	3.182	0.0086	60.7
236	0.040	0.040	3.186	0.0099	74.1
291	0.045	0.045	3.190	0.0111	91.2
363	0.050	0.050	3.194	0.0124	113.7
403	0.055	0.055	3.198	0.0136	126.0
432	0.060	0.060	3.202	0.0148	134.9
481	0.065	0.065	3.206	0.0161	150.0
512	0.070	0.070	3.210	0.0173	159.5
534	0.075	0.075	3.214	0.0185	166.2
582	0.080	0.080	3.218	0.0198	180.9
586	0.085	0.085	3.222	0.0210	181.9
576	0.090	0.090	3.226	0.0222	178.6
532	0.095	0.095	3.230	0.0235	164.7
465	0.100	0.100	3.234	0.0247	143.8

UNCONFINED COMPRESSION TESTING
Sample No. 0751-002 (7 Day)



UNCONFINED COMPRESSION TEST

ASTM D 2166
SUMMARY OF RESULTS

PROJECT:	C-D Systems Solidification Study		
PROJECT No.:	SH0751		
SAMPLE No.:	0751-002 (7 Day)		
TESTING DATE:	30-Nov-20	LOADING RATE:	0.0400 in./min
TESTED BY:	JBA	TRACKING CODE:	E296

TESTING PARAMETER AND RESULTS		
MOISTURE CONTENT	4.4	**%**
BULK UNIT WEIGHT	140.5	lb/ft³
DRY UNIT WEIGHT	134.6	lb/ft³
UCS *	181.9	lb/in²

* UCS - UNCONFINED COMPRESSIVE STRENGTH

UNCONFINED COMPRESSION TEST

ASTM D 2166

PROJECT:	C-D Systems Solidification Study		
PROJECT No.:	SH0751		
SAMPLE No.:	0751-003 (7 Day)		
TESTING DATE:	30-Nov-20	LOADING RATE:	0.0400 in./min
TESTED BY:	JBA	TRACKING CODE:	E297

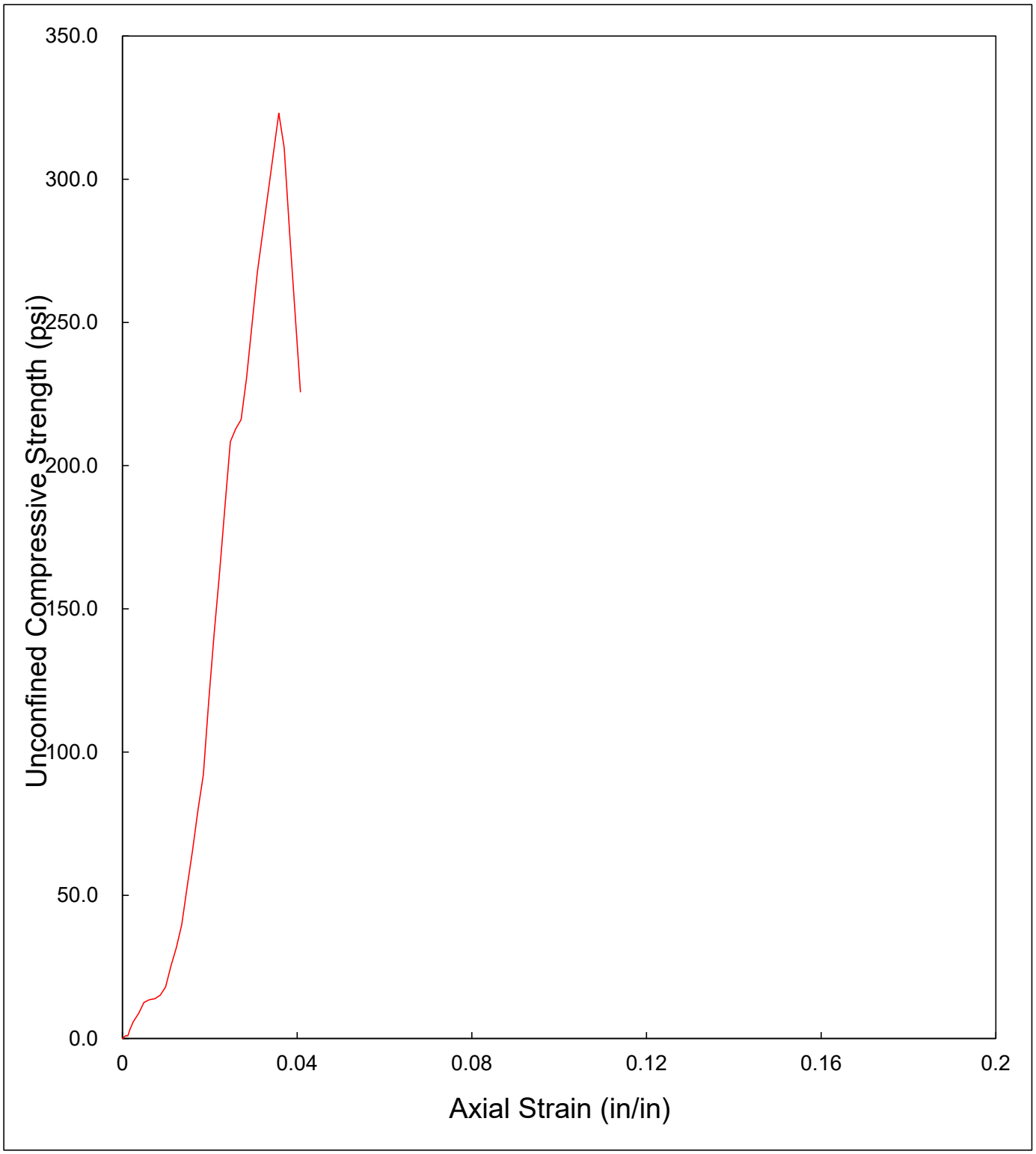
MOISTURE CONTENT (Dry Basis)		
1. MOISTURE TIN NO.		
2. WT MOISTURE TIN (tare weight)	218.90	g
3. WT WET SOIL + TARE	331.72	g
4. WT DRY SOIL + TARE	321.07	g
5. WT WATER, Ww	10.65	g
6. WT DRY SOIL, Ws	102.17	g
7. MOISTURE CONTENT, W	**10.42**	**%**

SOIL SPECIMEN DIMENSIONS				
	DIAMETER		***LENGTH***	
No. 1	1.98	in.	4.08	in.
No. 2	1.98	in.	4.11	in.
No. 3	1.98	in.	3.96	in.
Average	**1.98**	**in.**	**4.05**	**in.**

SPECIMEN CONDITIONS		
Initial Specimen WT, Wo	***457.45***	***g***
Initial Area, Ao	3.08	in²
Initial Volume, Vo	12.47	in³
Initial Bulk Unit Weight,	139.8	lb/ft³
Initial Dry Unit Weight	126.6	lb/ft³
15 % Strain (0.15 Lo)	0.61	in.
UCS	323.1	lb/in²

COMPRESSIVE LOAD (lbs.)	DIAL GAGE READING (in.)	SPECIMEN DEFORMATION (in.)	CORRECTED AREA (in²)	AXIAL STRAIN (in/in)	UNCONFINED COMPRESSIVE STRENGTH (lb/in²)
0	0.000	0.000	3.080	0.0000	0.0
3	0.003	0.003	3.082	0.0007	1.0
3	0.005	0.005	3.084	0.0012	1.0
10	0.007	0.007	3.085	0.0017	3.2
18	0.010	0.010	3.088	0.0025	5.8
27	0.015	0.015	3.092	0.0037	8.7
39	0.020	0.020	3.095	0.0049	12.6
42	0.025	0.025	3.099	0.0062	13.6
43	0.030	0.030	3.103	0.0074	13.9
47	0.035	0.035	3.107	0.0086	15.1
56	0.040	0.040	3.111	0.0099	18.0
79	0.045	0.045	3.115	0.0111	25.4
99	0.050	0.050	3.119	0.0124	31.7
124	0.055	0.055	3.123	0.0136	39.7
165	0.060	0.060	3.126	0.0148	52.8
206	0.065	0.065	3.130	0.0161	65.8
250	0.070	0.070	3.134	0.0173	79.8
289	0.075	0.075	3.138	0.0185	92.1
370	0.080	0.080	3.142	0.0198	117.8
444	0.085	0.085	3.146	0.0210	141.1
511	0.090	0.090	3.150	0.0222	162.2
586	0.095	0.095	3.154	0.0235	185.8
658	0.100	0.100	3.158	0.0247	208.4
673	0.105	0.105	3.162	0.0259	212.8
684	0.110	0.110	3.166	0.0272	216.0
730	0.115	0.115	3.170	0.0284	230.3
850	0.125	0.125	3.178	0.0309	267.4
1032	0.145	0.145	3.195	0.0358	323.1
995	0.150	0.150	3.199	0.0371	311.1
900	0.155	0.155	3.203	0.0383	281.0
725	0.165	0.165	3.211	0.0408	225.8

UNCONFINED COMPRESSION TESTING
Sample No. 0751-003 (7 Day)



UNCONFINED COMPRESSION TEST

ASTM D 2166
SUMMARY OF RESULTS

PROJECT:	C-D Systems Solidification Study		
PROJECT No.:	SH0751		
SAMPLE No.:	0751-003 (7 Day)		
TESTING DATE:	30-Nov-20	LOADING RATE:	0.0400 in./min
TESTED BY:	JBA	TRACKING CODE:	E297

TESTING PARAMETER AND RESULTS		
MOISTURE CONTENT	10.4	**%**
BULK UNIT WEIGHT	139.8	lb/ft³
DRY UNIT WEIGHT	126.6	lb/ft³
UCS *	323.1	lb/in²

* UCS - UNCONFINED COMPRESSIVE STRENGTH

UNCONFINED COMPRESSION TEST

ASTM D 2166

PROJECT:	C-D Systems Solidification Study		
PROJECT No.:	SH0751		
SAMPLE No.:	0751-004 (7 Day)		
TESTING DATE:	30-Nov-20	LOADING RATE:	0.0400 in./min
TESTED BY:	JBA	TRACKING CODE:	E298

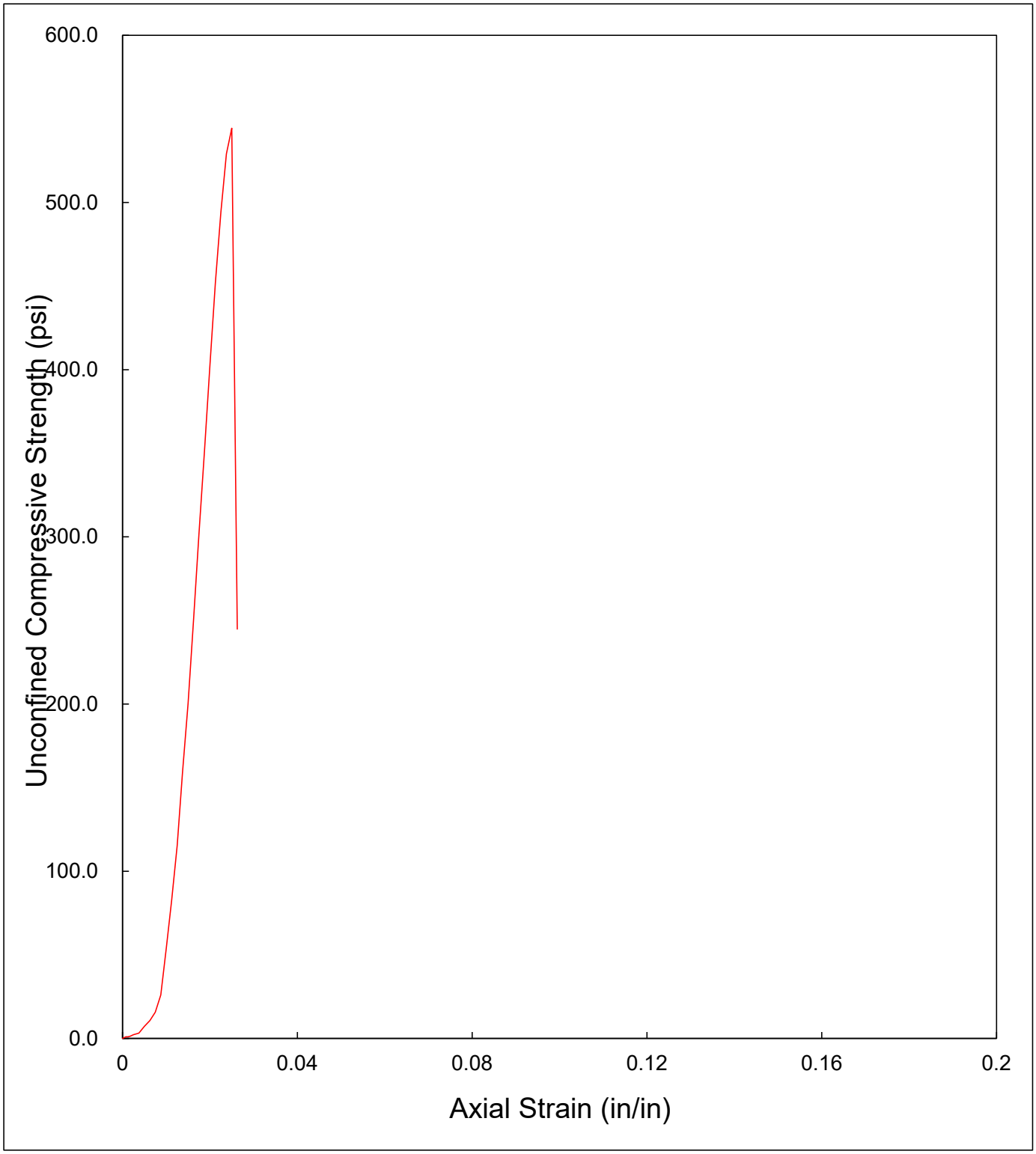
MOISTURE CONTENT (Dry Basis)		
1. MOISTURE TIN NO.		
2. WT MOISTURE TIN (tare weight)	211.89	g
3. WT WET SOIL + TARE	403.22	g
4. WT DRY SOIL + TARE	383.41	g
5. WT WATER, Ww	19.81	g
6. WT DRY SOIL, Ws	171.52	g
7. MOISTURE CONTENT, W	**11.55**	**%**

SOIL SPECIMEN DIMENSIONS				
	DIAMETER		***LENGTH***	
No. 1	2.02	in.	4.00	in.
No. 2	2.01	in.	4.03	in.
No. 3	1.99	in.	3.97	in.
Average	**2.01**	**in.**	**4.00**	**in.**

SPECIMEN CONDITIONS		
Initial Specimen WT, Wo	***452.18***	***g***
Initial Area, Ao	3.17	in²
Initial Volume, Vo	12.66	in³
Initial Bulk Unit Weight,	136.1	lb/ft³
Initial Dry Unit Weight	122.0	lb/ft³
15 % Strain (0.15 Lo)	0.60	in.
UCS	544.4	lb/in²

COMPRESSIVE LOAD (lbs.)	DIAL GAGE READING (in.)	SPECIMEN DEFORMATION (in.)	CORRECTED AREA (in²)	AXIAL STRAIN (in/in)	UNCONFINED COMPRESSIVE STRENGTH (lb/in²)
0	0.000	0.000	3.166	0.0000	0.0
3	0.003	0.003	3.169	0.0008	0.9
3	0.005	0.005	3.170	0.0013	0.9
4	0.007	0.007	3.172	0.0018	1.3
7	0.010	0.010	3.174	0.0025	2.2
10	0.015	0.015	3.178	0.0038	3.1
23	0.020	0.020	3.182	0.0050	7.2
34	0.025	0.025	3.186	0.0063	10.7
50	0.030	0.030	3.190	0.0075	15.7
83	0.035	0.035	3.194	0.0088	26.0
173	0.040	0.040	3.198	0.0100	54.1
265	0.045	0.045	3.202	0.0113	82.8
370	0.050	0.050	3.206	0.0125	115.4
512	0.055	0.055	3.210	0.0138	159.5
644	0.060	0.060	3.214	0.0150	200.3
807	0.065	0.065	3.219	0.0163	250.7
973	0.070	0.070	3.223	0.0175	301.9
1134	0.075	0.075	3.227	0.0188	351.4
1303	0.080	0.080	3.231	0.0200	403.3
1462	0.085	0.085	3.235	0.0213	451.9
1601	0.090	0.090	3.239	0.0225	494.3
1716	0.095	0.095	3.243	0.0238	529.1
1768	0.100	0.100	3.247	0.0250	544.4
796	0.105	0.105	3.252	0.0263	244.8

UNCONFINED COMPRESSION TESTING
Sample No. 0751-004 (7 Day)



UNCONFINED COMPRESSION TEST

ASTM D 2166
SUMMARY OF RESULTS

PROJECT:	C-D Systems Solidification Study		
PROJECT No.:	SH0751		
SAMPLE No.:	0751-004 (7 Day)		
TESTING DATE:	30-Nov-20	LOADING RATE:	0.0400 in./min
TESTED BY:	JBA	TRACKING CODE:	E298

TESTING PARAMETER AND RESULTS		
MOISTURE CONTENT	11.5	**%**
BULK UNIT WEIGHT	136.1	lb/ft³
DRY UNIT WEIGHT	122.0	lb/ft³
UCS *	544.4	lb/in²

* UCS - UNCONFINED COMPRESSIVE STRENGTH

UNCONFINED COMPRESSION TEST

ASTM D 2166

PROJECT:	C-D Systems Solidification Study		
PROJECT No.:	SH0751		
SAMPLE No.:	0751-005 (7 Day)		
TESTING DATE:	30-Nov-20	LOADING RATE:	0.0400 in./min
TESTED BY:	JBA	TRACKING CODE:	E299

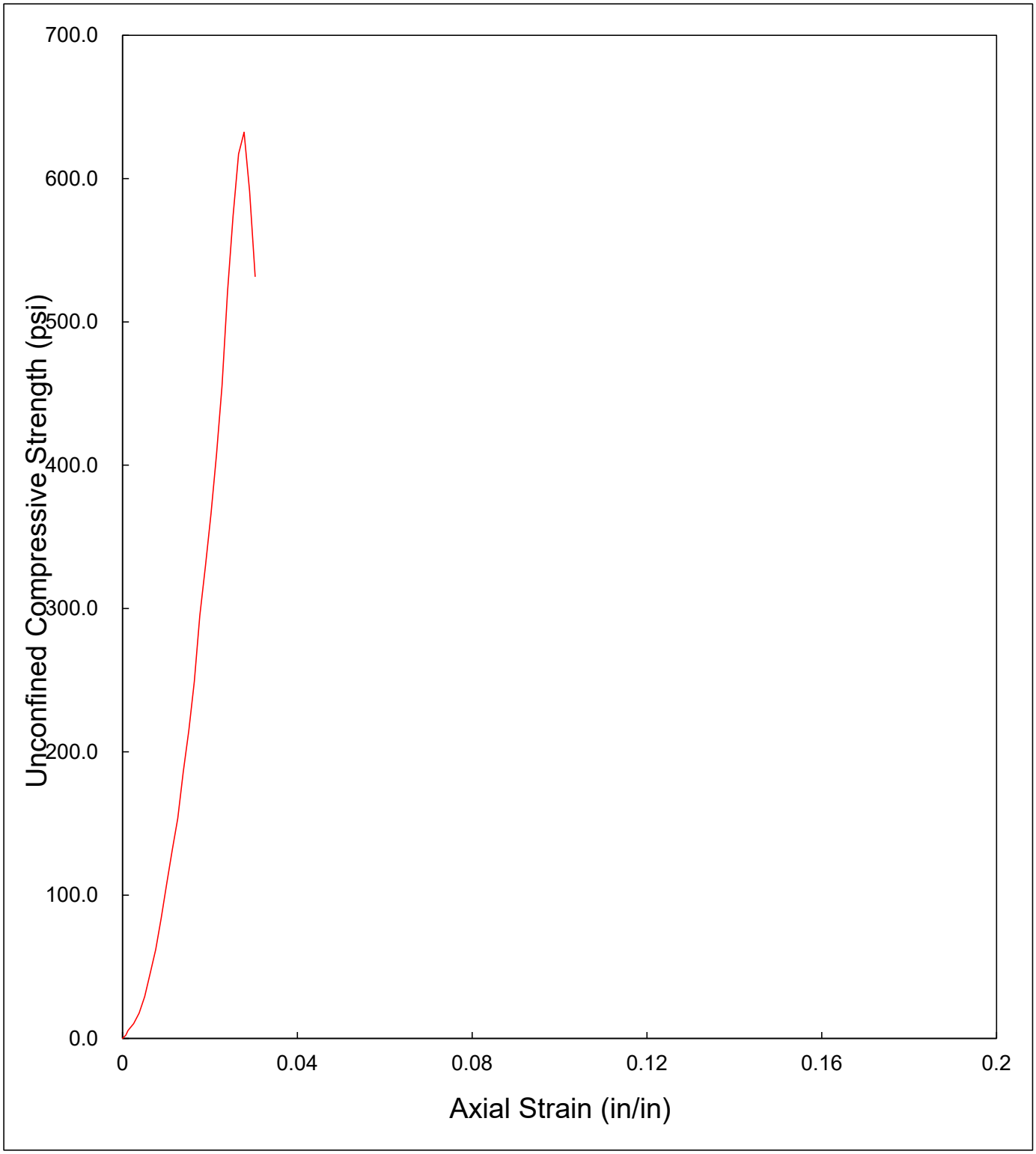
MOISTURE CONTENT (Dry Basis)		
1. MOISTURE TIN NO.		
2. WT MOISTURE TIN (tare weight)	212.88	g
3. WT WET SOIL + TARE	311.08	g
4. WT DRY SOIL + TARE	298.13	g
5. WT WATER, Ww	12.95	g
6. WT DRY SOIL, Ws	85.25	g
7. MOISTURE CONTENT, W	**15.19**	**%**

SOIL SPECIMEN DIMENSIONS				
	DIAMETER		***LENGTH***	
No. 1	1.99	in.	3.93	in.
No. 2	1.99	in.	4.01	in.
No. 3	1.99	in.	3.92	in.
Average	**1.99**	**in.**	**3.95**	**in.**

SPECIMEN CONDITIONS		
Initial Specimen WT, Wo	***432.47***	***g***
Initial Area, Ao	3.11	in²
Initial Volume, Vo	12.28	in³
Initial Bulk Unit Weight,	134.2	lb/ft³
Initial Dry Unit Weight	116.5	lb/ft³
15 % Strain (0.15 Lo)	0.59	in.
UCS	632.3	lb/in²

COMPRESSIVE LOAD (lbs.)	DIAL GAGE READING (in.)	SPECIMEN DEFORMATION (in.)	CORRECTED AREA (in²)	AXIAL STRAIN (in/in)	UNCONFINED COMPRESSIVE STRENGTH (lb/in²)
0	0.000	0.000	3.106	0.0000	0.0
7	0.003	0.003	3.108	0.0008	2.3
17	0.005	0.005	3.110	0.0013	5.5
23	0.007	0.007	3.111	0.0018	7.4
32	0.010	0.010	3.113	0.0025	10.3
55	0.015	0.015	3.117	0.0038	17.6
91	0.020	0.020	3.121	0.0051	29.2
142	0.025	0.025	3.125	0.0063	45.4
194	0.030	0.030	3.129	0.0076	62.0
263	0.035	0.035	3.133	0.0089	83.9
339	0.040	0.040	3.137	0.0101	108.1
413	0.045	0.045	3.141	0.0114	131.5
483	0.050	0.050	3.145	0.0126	153.6
586	0.055	0.055	3.149	0.0139	186.1
677	0.060	0.060	3.153	0.0152	214.7
786	0.065	0.065	3.157	0.0164	248.9
933	0.070	0.070	3.162	0.0177	295.1
1044	0.075	0.075	3.166	0.0190	329.8
1160	0.080	0.080	3.170	0.0202	366.0
1293	0.085	0.085	3.174	0.0215	407.4
1447	0.090	0.090	3.178	0.0228	455.3
1658	0.095	0.095	3.182	0.0240	521.1
1828	0.100	0.100	3.186	0.0253	573.7
1969	0.105	0.105	3.190	0.0266	617.2
2020	0.110	0.110	3.194	0.0278	632.3
1891	0.115	0.115	3.199	0.0291	591.2
1703	0.120	0.120	3.203	0.0304	531.7

UNCONFINED COMPRESSION TESTING
Sample No. 0751-005 (7 Day)



UNCONFINED COMPRESSION TEST

ASTM D 2166
SUMMARY OF RESULTS

PROJECT:	C-D Systems Solidification Study		
PROJECT No.:	SH0751		
SAMPLE No.:	0751-005 (7 Day)		
TESTING DATE:	30-Nov-20	LOADING RATE:	0.0400 in./min
TESTED BY:	JBA	TRACKING CODE:	E299

TESTING PARAMETER AND RESULTS		
MOISTURE CONTENT	15.2	**%**
BULK UNIT WEIGHT	134.2	lb/ft³
DRY UNIT WEIGHT	116.5	lb/ft³
UCS *	632.3	lb/in²

* UCS - UNCONFINED COMPRESSIVE STRENGTH

UNCONFINED COMPRESSION TEST

ASTM D 2166

PROJECT:	C-D Systems Solidification Study		
PROJECT No.:	SH0751		
SAMPLE No.:	0751-006 (7 Day)		
TESTING DATE:	30-Nov-20	LOADING RATE:	0.0400 in./min
TESTED BY:	JBA	TRACKING CODE:	E300

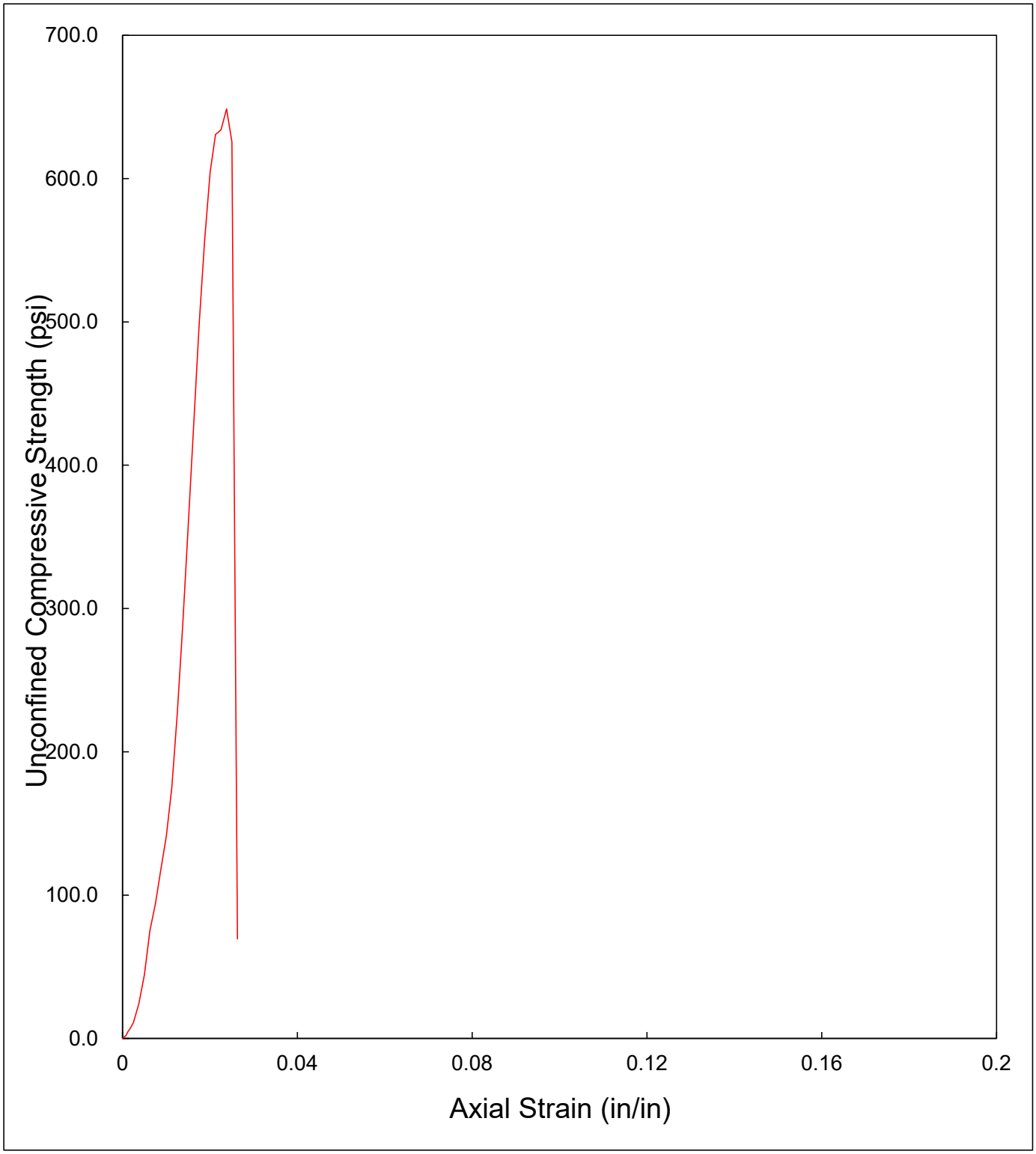
MOISTURE CONTENT (Dry Basis)		
1. MOISTURE TIN NO.		
2. WT MOISTURE TIN (tare weight)	213.29	g
3. WT WET SOIL + TARE	394.51	g
4. WT DRY SOIL + TARE	370.25	g
5. WT WATER, Ww	24.26	g
6. WT DRY SOIL, Ws	156.96	g
7. MOISTURE CONTENT, W	**15.46**	**%**

SOIL SPECIMEN DIMENSIONS				
	DIAMETER		*LENGTH*	
No. 1	2.00	in.	3.99	in.
No. 2	1.99	in.	4.00	in.
No. 3	1.99	in.	3.98	in.
Average	**1.99**	**in.**	**3.99**	**in.**

SPECIMEN CONDITIONS		
Initial Specimen WT, Wo	***433.90***	***g***
Initial Area, Ao	3.12	in²
Initial Volume, Vo	12.45	in³
Initial Bulk Unit Weight,	132.8	lb/ft³
Initial Dry Unit Weight	115.0	lb/ft³
15 % Strain (0.15 Lo)	0.60	in.
UCS	648.6	lb/in²

COMPRESSIVE LOAD (lbs.)	DIAL GAGE READING (in.)	SPECIMEN DEFORMATION (in.)	CORRECTED AREA (in²)	AXIAL STRAIN (in/in)	UNCONFINED COMPRESSIVE STRENGTH (lb/in²)
0	0.000	0.000	3.117	0.0000	0.0
6	0.003	0.003	3.119	0.0008	1.9
15	0.005	0.005	3.121	0.0013	4.8
22	0.007	0.007	3.123	0.0018	7.0
35	0.010	0.010	3.125	0.0025	11.2
76	0.015	0.015	3.129	0.0038	24.3
139	0.020	0.020	3.133	0.0050	44.4
236	0.025	0.025	3.137	0.0063	75.2
295	0.030	0.030	3.141	0.0075	93.9
370	0.035	0.035	3.145	0.0088	117.7
444	0.040	0.040	3.149	0.0100	141.0
552	0.045	0.045	3.153	0.0113	175.1
713	0.050	0.050	3.157	0.0125	225.9
911	0.055	0.055	3.161	0.0138	288.2
1132	0.060	0.060	3.165	0.0150	357.7
1353	0.065	0.065	3.169	0.0163	427.0
1579	0.070	0.070	3.173	0.0175	497.7
1769	0.075	0.075	3.177	0.0188	556.9
1923	0.080	0.080	3.181	0.0200	604.6
2009	0.085	0.085	3.185	0.0213	630.8
2022	0.090	0.090	3.189	0.0225	634.1
2071	0.095	0.095	3.193	0.0238	648.6
2000	0.100	0.100	3.197	0.0250	625.6
222	0.105	0.105	3.201	0.0263	69.3

UNCONFINED COMPRESSION TESTING
Sample No. 0751-006 (7 Day)



UNCONFINED COMPRESSION TEST

ASTM D 2166
SUMMARY OF RESULTS

PROJECT:	C-D Systems Solidification Study		
PROJECT No.:	SH0751		
SAMPLE No.:	0751-006 (7 Day)		
TESTING DATE:	30-Nov-20	LOADING RATE:	0.0400 in./min
TESTED BY:	JBA	TRACKING CODE:	E300

TESTING PARAMETER AND RESULTS		
MOISTURE CONTENT	15.5	**%**
BULK UNIT WEIGHT	132.8	lb/ft³
DRY UNIT WEIGHT	115.0	lb/ft³
UCS *	648.6	lb/in²

* UCS - UNCONFINED COMPRESSIVE STRENGTH

UNCONFINED COMPRESSION TEST

ASTM D 2166

PROJECT:	C-D Systems Solidification Study		
PROJECT No.:	SH0751		
SAMPLE No.:	0751-007 (7 Day)		
TESTING DATE:	30-Nov-20	LOADING RATE:	0.0400 in./min
TESTED BY:	JBA	TRACKING CODE:	E301

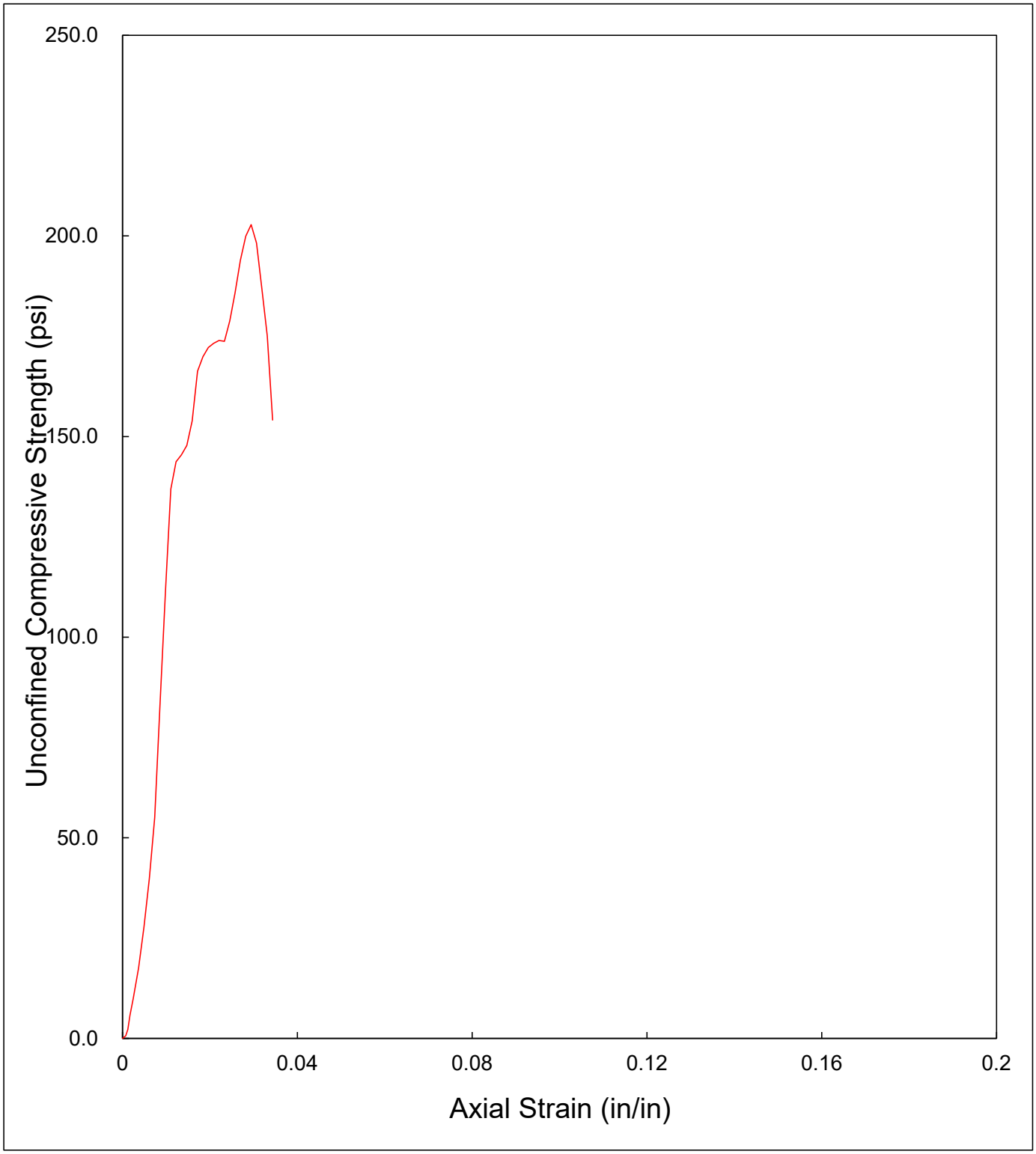
MOISTURE CONTENT (Dry Basis)		
1. MOISTURE TIN NO.		
2. WT MOISTURE TIN (tare weight)	220.27	g
3. WT WET SOIL + TARE	356.02	g
4. WT DRY SOIL + TARE	340.43	g
5. WT WATER, Ww	15.59	g
6. WT DRY SOIL, Ws	120.16	g
7. MOISTURE CONTENT, W	**12.97**	**%**

SOIL SPECIMEN DIMENSIONS				
	DIAMETER		***LENGTH***	
No. 1	2.00	in.	4.08	in.
No. 2	1.99	in.	4.07	in.
No. 3	1.99	in.	4.09	in.
Average	**1.99**	**in.**	**4.08**	**in.**

SPECIMEN CONDITIONS		
Initial Specimen WT, Wo	***449.89***	***g***
Initial Area, Ao	3.12	in²
Initial Volume, Vo	12.72	in³
Initial Bulk Unit Weight,	134.8	lb/ft³
Initial Dry Unit Weight	119.3	lb/ft³
15 % Strain (0.15 Lo)	0.61	in.
UCS	202.8	lb/in²

COMPRESSIVE LOAD (lbs.)	DIAL GAGE READING (in.)	SPECIMEN DEFORMATION (in.)	CORRECTED AREA (in²)	AXIAL STRAIN (in/in)	UNCONFINED COMPRESSIVE STRENGTH (lb/in²)
0	0.000	0.000	3.120	0.0000	0.0
2	0.003	0.003	3.122	0.0007	0.6
7	0.005	0.005	3.124	0.0012	2.2
18	0.007	0.007	3.126	0.0017	5.8
31	0.010	0.010	3.128	0.0025	9.9
55	0.015	0.015	3.132	0.0037	17.6
87	0.020	0.020	3.136	0.0049	27.7
125	0.025	0.025	3.139	0.0061	39.8
173	0.030	0.030	3.143	0.0074	55.0
263	0.035	0.035	3.147	0.0086	83.6
351	0.040	0.040	3.151	0.0098	111.4
432	0.045	0.045	3.155	0.0110	136.9
454	0.050	0.050	3.159	0.0123	143.7
460	0.055	0.055	3.163	0.0135	145.4
468	0.060	0.060	3.167	0.0147	147.8
488	0.065	0.065	3.171	0.0159	153.9
528	0.070	0.070	3.175	0.0172	166.3
540	0.075	0.075	3.179	0.0184	169.9
548	0.080	0.080	3.183	0.0196	172.2
552	0.085	0.085	3.187	0.0209	173.2
555	0.090	0.090	3.191	0.0221	173.9
555	0.095	0.095	3.195	0.0233	173.7
572	0.100	0.100	3.199	0.0245	178.8
595	0.105	0.105	3.203	0.0258	185.8
622	0.110	0.110	3.207	0.0270	194.0
642	0.115	0.115	3.211	0.0282	200.0
652	0.120	0.120	3.215	0.0294	202.8
638	0.125	0.125	3.219	0.0307	198.2
602	0.130	0.130	3.223	0.0319	186.8
565	0.135	0.135	3.227	0.0331	175.1
498	0.140	0.140	3.231	0.0343	154.1

UNCONFINED COMPRESSION TESTING
Sample No. 0751-007 (7 Day)



UNCONFINED COMPRESSION TEST

ASTM D 2166
SUMMARY OF RESULTS

PROJECT:	C-D Systems Solidification Study		
PROJECT No.:	SH0751		
SAMPLE No.:	0751-007 (7 Day)		
TESTING DATE:	30-Nov-20	LOADING RATE:	0.0400 in./min
TESTED BY:	JBA	TRACKING CODE:	E301

TESTING PARAMETER AND RESULTS		
MOISTURE CONTENT	13.0	**%**
BULK UNIT WEIGHT	134.8	lb/ft³
DRY UNIT WEIGHT	119.3	lb/ft³
UCS *	202.8	lb/in²

* UCS - UNCONFINED COMPRESSIVE STRENGTH

UNCONFINED COMPRESSION TEST

ASTM D 2166

PROJECT:	C-D Systems Solidification Study		
PROJECT No.:	SH0751		
SAMPLE No.:	0751-008 (7 Day)		
TESTING DATE:	30-Nov-20	LOADING RATE:	0.0400 in./min
TESTED BY:	JBA	TRACKING CODE:	E302

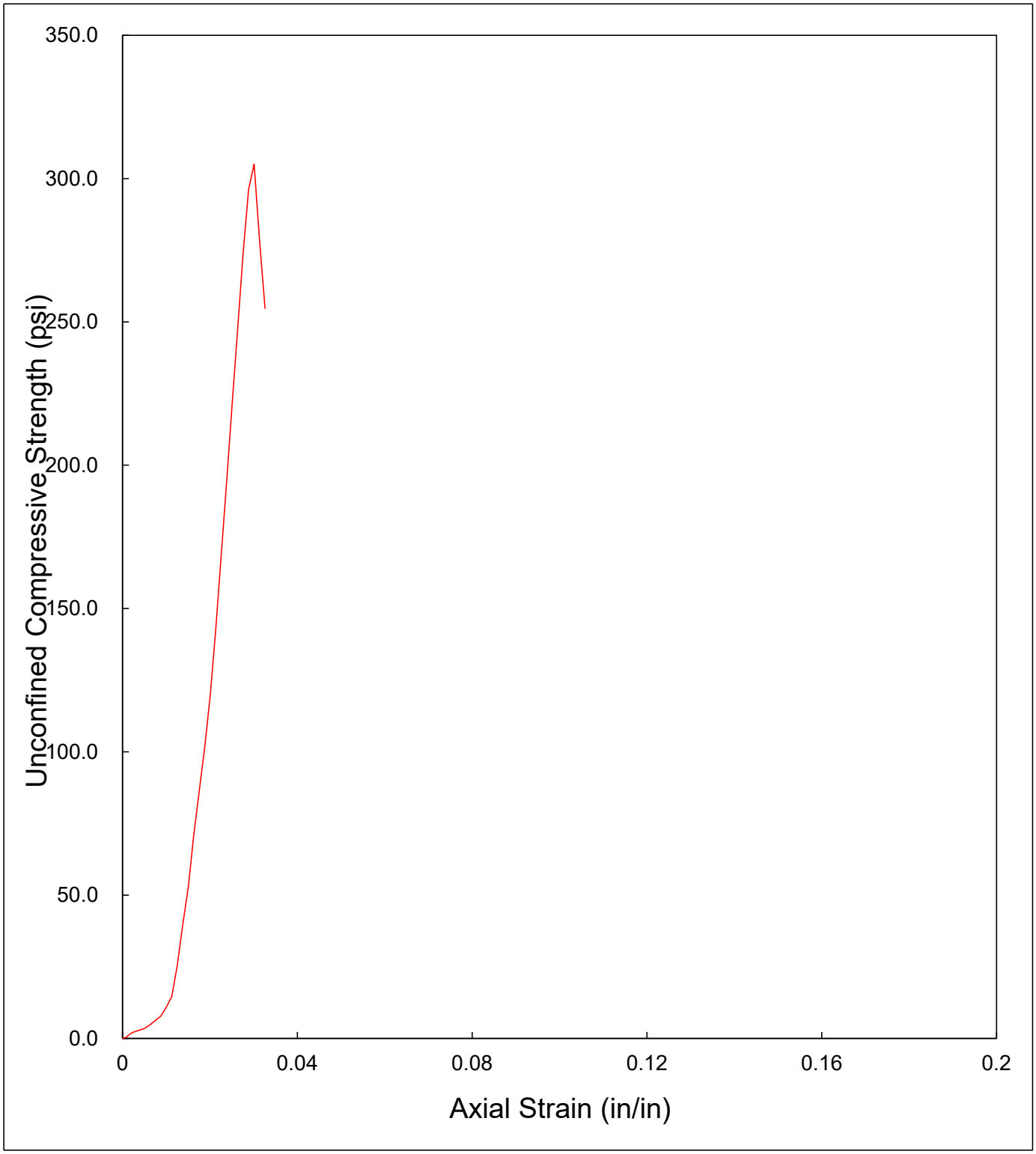
MOISTURE CONTENT (Dry Basis)		
1. MOISTURE TIN NO.		
2. WT MOISTURE TIN (tare weight)	221.25	g
3. WT WET SOIL + TARE	369.62	g
4. WT DRY SOIL + TARE	352.38	g
5. WT WATER, Ww	17.24	g
6. WT DRY SOIL, Ws	131.13	g
7. MOISTURE CONTENT, W	**13.15**	**%**

SOIL SPECIMEN DIMENSIONS				
	DIAMETER		***LENGTH***	
No. 1	2.02	in.	3.97	in.
No. 2	2.01	in.	4.01	in.
No. 3	1.99	in.	3.99	in.
Average	**2.01**	**in.**	**3.99**	**in.**

SPECIMEN CONDITIONS		
Initial Specimen WT, Wo	***439.30***	***g***
Initial Area, Ao	3.16	in²
Initial Volume, Vo	12.61	in³
Initial Bulk Unit Weight,	132.7	lb/ft³
Initial Dry Unit Weight	117.3	lb/ft³
15 % Strain (0.15 Lo)	0.60	in.
UCS	305.0	lb/in²

COMPRESSIVE LOAD (lbs.)	DIAL GAGE READING (in.)	SPECIMEN DEFORMATION (in.)	CORRECTED AREA (in²)	AXIAL STRAIN (in/in)	UNCONFINED COMPRESSIVE STRENGTH (lb/in²)
0	0.000	0.000	3.164	0.0000	0.0
1	0.003	0.003	3.166	0.0008	0.3
3	0.005	0.005	3.168	0.0013	0.9
5	0.007	0.007	3.169	0.0018	1.6
7	0.010	0.010	3.172	0.0025	2.2
9	0.015	0.015	3.176	0.0038	2.8
11	0.020	0.020	3.180	0.0050	3.5
15	0.025	0.025	3.184	0.0063	4.7
20	0.030	0.030	3.188	0.0075	6.3
25	0.035	0.035	3.192	0.0088	7.8
35	0.040	0.040	3.196	0.0100	11.0
47	0.045	0.045	3.200	0.0113	14.7
82	0.050	0.050	3.204	0.0125	25.6
128	0.055	0.055	3.208	0.0138	39.9
170	0.060	0.060	3.212	0.0151	52.9
228	0.065	0.065	3.216	0.0163	70.9
278	0.070	0.070	3.220	0.0176	86.3
328	0.075	0.075	3.224	0.0188	101.7
387	0.080	0.080	3.228	0.0201	119.9
460	0.085	0.085	3.233	0.0213	142.3
545	0.090	0.090	3.237	0.0226	168.4
630	0.095	0.095	3.241	0.0238	194.4
719	0.100	0.100	3.245	0.0251	221.6
803	0.105	0.105	3.249	0.0263	247.1
891	0.110	0.110	3.253	0.0276	273.9
965	0.115	0.115	3.258	0.0289	296.2
995	0.120	0.120	3.262	0.0301	305.0
908	0.125	0.125	3.266	0.0314	278.0
833	0.130	0.130	3.270	0.0326	254.7

UNCONFINED COMPRESSION TESTING
Sample No. 0751-008 (7 Day)



UNCONFINED COMPRESSION TEST

ASTM D 2166
SUMMARY OF RESULTS

PROJECT:	C-D Systems Solidification Study		
PROJECT No.:	SH0751		
SAMPLE No.:	0751-008 (7 Day)		
TESTING DATE:	30-Nov-20	LOADING RATE:	0.0400 in./min
TESTED BY:	JBA	TRACKING CODE:	E302

TESTING PARAMETER AND RESULTS		
MOISTURE CONTENT	13.1	**%**
BULK UNIT WEIGHT	132.7	lb/ft³
DRY UNIT WEIGHT	117.3	lb/ft³
UCS *	305.0	lb/in²

* UCS - UNCONFINED COMPRESSIVE STRENGTH

UNCONFINED COMPRESSION TEST

ASTM D 2166

PROJECT:	C-D Systems Solidification Study		
PROJECT No.:	SH0751		
SAMPLE No.:	0751-009 (7 Day)		
TESTING DATE:	30-Nov-20	LOADING RATE:	0.0400 in./min
TESTED BY:	JBA	TRACKING CODE:	E303

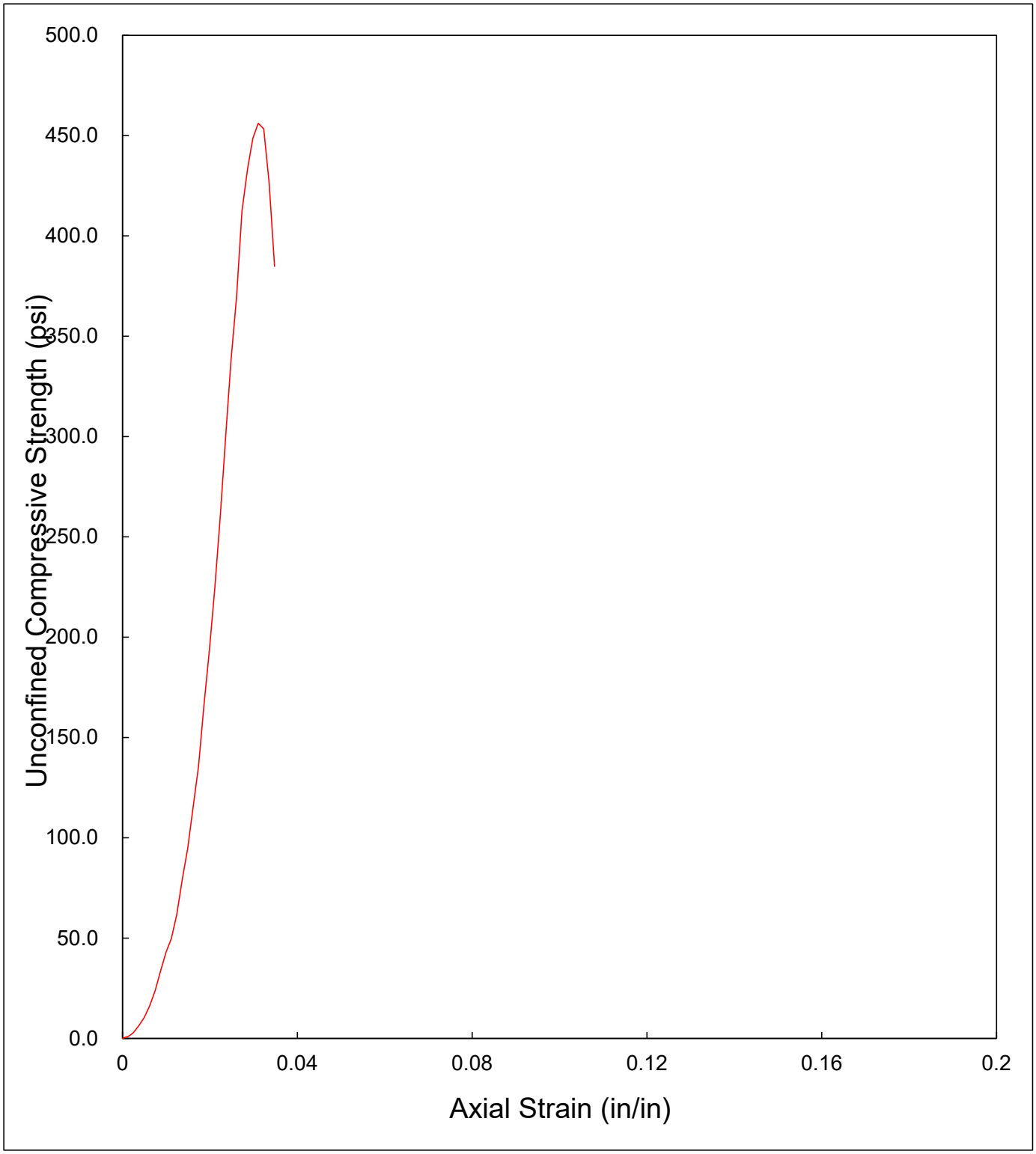
MOISTURE CONTENT (Dry Basis)		
1. MOISTURE TIN NO.		
2. WT MOISTURE TIN (tare weight)	217.06	g
3. WT WET SOIL + TARE	325.16	g
4. WT DRY SOIL + TARE	313.27	g
5. WT WATER, Ww	11.89	g
6. WT DRY SOIL, Ws	96.21	g
7. MOISTURE CONTENT, W	**12.36**	**%**

SOIL SPECIMEN DIMENSIONS				
	DIAMETER		***LENGTH***	
No. 1	2.00	in.	4.01	in.
No. 2	1.99	in.	4.05	in.
No. 3	2.00	in.	4.01	in.
Average	**2.00**	**in.**	**4.02**	**in.**

SPECIMEN CONDITIONS		
Initial Specimen WT, Wo	***446.40***	***g***
Initial Area, Ao	3.14	in²
Initial Volume, Vo	12.62	in³
Initial Bulk Unit Weight,	134.8	lb/ft³
Initial Dry Unit Weight	120.0	lb/ft³
15 % Strain (0.15 Lo)	0.60	in.
UCS	456.1	lb/in²

COMPRESSIVE LOAD (lbs.)	DIAL GAGE READING (in.)	SPECIMEN DEFORMATION (in.)	CORRECTED AREA (in²)	AXIAL STRAIN (in/in)	UNCONFINED COMPRESSIVE STRENGTH (lb/in²)
0	0.000	0.000	3.135	0.0000	0.0
2	0.003	0.003	3.138	0.0007	0.6
3	0.005	0.005	3.139	0.0012	1.0
5	0.007	0.007	3.141	0.0017	1.6
9	0.010	0.010	3.143	0.0025	2.9
20	0.015	0.015	3.147	0.0037	6.4
33	0.020	0.020	3.151	0.0050	10.5
51	0.025	0.025	3.155	0.0062	16.2
75	0.030	0.030	3.159	0.0075	23.7
106	0.035	0.035	3.163	0.0087	33.5
136	0.040	0.040	3.167	0.0099	42.9
158	0.045	0.045	3.171	0.0112	49.8
196	0.050	0.050	3.175	0.0124	61.7
252	0.055	0.055	3.179	0.0137	79.3
301	0.060	0.060	3.183	0.0149	94.6
368	0.065	0.065	3.187	0.0162	115.5
433	0.070	0.070	3.191	0.0174	135.7
530	0.075	0.075	3.195	0.0186	165.9
620	0.080	0.080	3.199	0.0199	193.8
719	0.085	0.085	3.203	0.0211	224.5
836	0.090	0.090	3.207	0.0224	260.7
964	0.095	0.095	3.211	0.0236	300.2
1088	0.100	0.100	3.215	0.0249	338.4
1190	0.105	0.105	3.219	0.0261	369.6
1329	0.110	0.110	3.223	0.0273	412.3
1398	0.115	0.115	3.228	0.0286	433.1
1450	0.120	0.120	3.232	0.0298	448.7
1476	0.125	0.125	3.236	0.0311	456.1
1469	0.130	0.130	3.240	0.0323	453.4
1384	0.135	0.135	3.244	0.0336	426.6
1250	0.140	0.140	3.248	0.0348	384.8

UNCONFINED COMPRESSION TESTING
Sample No. 0751-009 (7 Day)



UNCONFINED COMPRESSION TEST

ASTM D 2166
SUMMARY OF RESULTS

PROJECT:	C-D Systems Solidification Study		
PROJECT No.:	SH0751		
SAMPLE No.:	0751-009 (7 Day)		
TESTING DATE:	30-Nov-20	LOADING RATE:	0.0400 in./min
TESTED BY:	JBA	TRACKING CODE:	E303

TESTING PARAMETER AND RESULTS		
MOISTURE CONTENT	12.4	**%**
BULK UNIT WEIGHT	134.8	lb/ft³
DRY UNIT WEIGHT	120.0	lb/ft³
UCS *	456.1	lb/in²

* UCS - UNCONFINED COMPRESSIVE STRENGTH

UNCONFINED COMPRESSION TEST

ASTM D 2166

PROJECT:	C-D Systems Solidification Study		
PROJECT No.:	SH0751		
SAMPLE No.:	0751-010 (7 Day)		
TESTING DATE:	1-Dec-20	LOADING RATE:	0.0400 in./min
TESTED BY:	JBA	TRACKING CODE:	E304

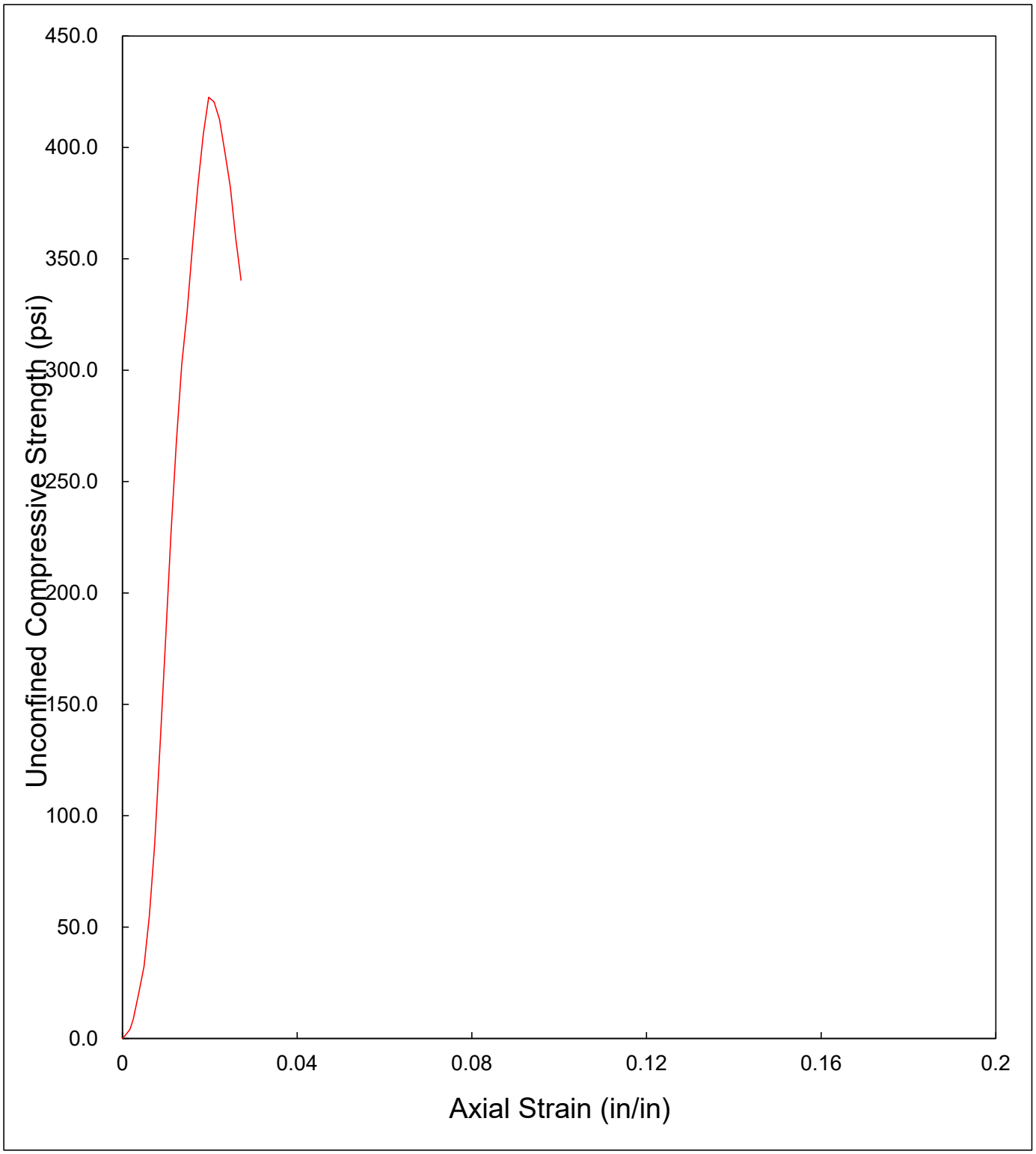
MOISTURE CONTENT (Dry Basis)		
1. MOISTURE TIN NO.		
2. WT MOISTURE TIN (tare weight)	216.03	g
3. WT WET SOIL + TARE	312.99	g
4. WT DRY SOIL + TARE	300.95	g
5. WT WATER, Ww	12.04	g
6. WT DRY SOIL, Ws	84.92	g
7. MOISTURE CONTENT, W	**14.18**	**%**

SOIL SPECIMEN DIMENSIONS				
	DIAMETER		***LENGTH***	
No. 1	1.99	in.	4.03	in.
No. 2	2.00	in.	4.05	in.
No. 3	1.99	in.	4.06	in.
Average	**1.99**	**in.**	**4.05**	**in.**

SPECIMEN CONDITIONS		
Initial Specimen WT, Wo	***443.11***	***g***
Initial Area, Ao	3.12	in²
Initial Volume, Vo	12.63	in³
Initial Bulk Unit Weight,	133.7	lb/ft³
Initial Dry Unit Weight	117.1	lb/ft³
15 % Strain (0.15 Lo)	0.61	in.
UCS	422.5	lb/in²

COMPRESSIVE LOAD (lbs.)	DIAL GAGE READING (in.)	SPECIMEN DEFORMATION (in.)	CORRECTED AREA (in²)	AXIAL STRAIN (in/in)	UNCONFINED COMPRESSIVE STRENGTH (lb/in²)
0	0.000	0.000	3.118	0.0000	0.0
5	0.003	0.003	3.120	0.0007	1.6
9	0.005	0.005	3.122	0.0012	2.9
13	0.007	0.007	3.123	0.0017	4.2
27	0.010	0.010	3.126	0.0025	8.6
63	0.015	0.015	3.130	0.0037	20.1
101	0.020	0.020	3.134	0.0049	32.2
173	0.025	0.025	3.137	0.0062	55.1
275	0.030	0.030	3.141	0.0074	87.5
415	0.035	0.035	3.145	0.0086	131.9
564	0.040	0.040	3.149	0.0099	179.1
715	0.045	0.045	3.153	0.0111	226.8
845	0.050	0.050	3.157	0.0123	267.7
956	0.055	0.055	3.161	0.0136	302.4
1032	0.060	0.060	3.165	0.0148	326.1
1127	0.065	0.065	3.169	0.0161	355.6
1216	0.070	0.070	3.173	0.0173	383.2
1290	0.075	0.075	3.177	0.0185	406.1
1344	0.080	0.080	3.181	0.0198	422.5
1339	0.085	0.085	3.185	0.0210	420.4
1316	0.090	0.090	3.189	0.0222	412.7
1271	0.095	0.095	3.193	0.0235	398.1
1222	0.100	0.100	3.197	0.0247	382.2
1150	0.105	0.105	3.201	0.0259	359.3
1091	0.110	0.110	3.205	0.0272	340.4

UNCONFINED COMPRESSION TESTING
Sample No. 0751-010 (7 Day)



UNCONFINED COMPRESSION TEST

ASTM D 2166
SUMMARY OF RESULTS

PROJECT:	C-D Systems Solidification Study		
PROJECT No.:	SH0751		
SAMPLE No.:	0751-010 (7 Day)		
TESTING DATE:	1-Dec-20	LOADING RATE:	0.0400 in./min
TESTED BY:	JBA	TRACKING CODE:	E304

TESTING PARAMETER AND RESULTS		
MOISTURE CONTENT	14.2	**%**
BULK UNIT WEIGHT	133.7	lb/ft³
DRY UNIT WEIGHT	117.1	lb/ft³
UCS *	422.5	lb/in²

* UCS - UNCONFINED COMPRESSIVE STRENGTH

UNCONFINED COMPRESSION TEST

ASTM D 2166

PROJECT:	C-D Systems Solidification Study		
PROJECT No.:	SH0751		
SAMPLE No.:	0751-011 (7 Day)		
TESTING DATE:	1-Dec-20	LOADING RATE:	0.0400 in./min
TESTED BY:	JBA	TRACKING CODE:	E305

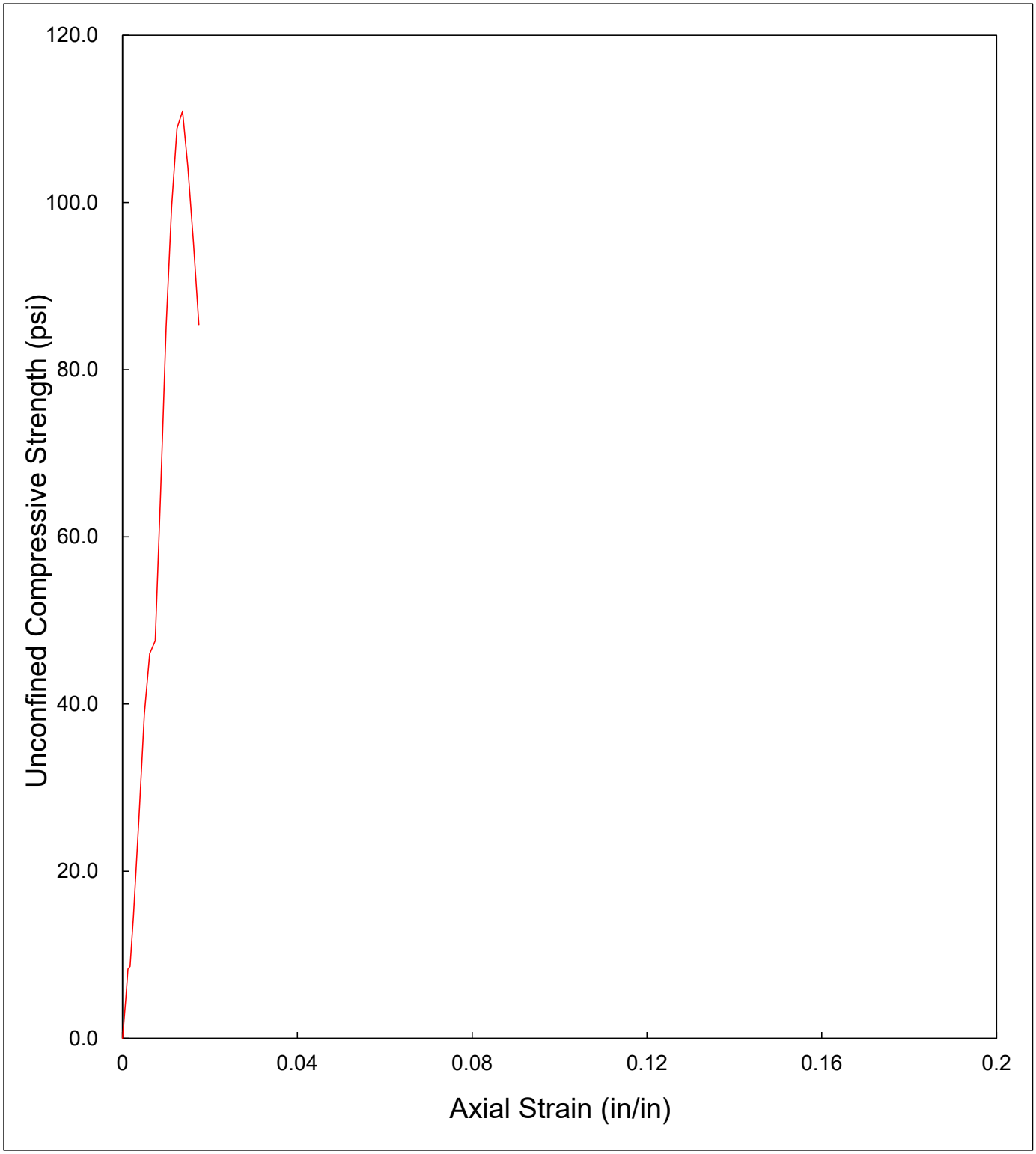
MOISTURE CONTENT (Dry Basis)		
1. MOISTURE TIN NO.		
2. WT MOISTURE TIN (tare weight)	225.09	g
3. WT WET SOIL + TARE	326.20	g
4. WT DRY SOIL + TARE	318.00	g
5. WT WATER, Ww	8.20	g
6. WT DRY SOIL, Ws	92.91	g
7. MOISTURE CONTENT, W	**8.83**	**%**

SOIL SPECIMEN DIMENSIONS				
	DIAMETER		***LENGTH***	
No. 1	2.00	in.	4.08	in.
No. 2	2.00	in.	3.95	in.
No. 3	1.99	in.	3.98	in.
Average	**2.00**	**in.**	**4.01**	**in.**

SPECIMEN CONDITIONS		
Initial Specimen WT, Wo	***451.85***	***g***
Initial Area, Ao	3.13	in²
Initial Volume, Vo	12.53	in³
Initial Bulk Unit Weight,	137.3	lb/ft³
Initial Dry Unit Weight	126.2	lb/ft³
15 % Strain (0.15 Lo)	0.60	in.
UCS	110.9	lb/in²

COMPRESSIVE LOAD (lbs.)	DIAL GAGE READING (in.)	SPECIMEN DEFORMATION (in.)	CORRECTED AREA (in²)	AXIAL STRAIN (in/in)	UNCONFINED COMPRESSIVE STRENGTH (lb/in²)
	0.000	0.000	3.130	0.0000	0.0
15	0.003	0.003	3.132	0.0007	4.8
26	0.005	0.005	3.133	0.0012	8.3
27	0.007	0.007	3.135	0.0017	8.6
46	0.010	0.010	3.137	0.0025	14.7
82	0.015	0.015	3.141	0.0037	26.1
122	0.020	0.020	3.145	0.0050	38.8
145	0.025	0.025	3.149	0.0062	46.0
150	0.030	0.030	3.153	0.0075	47.6
206	0.035	0.035	3.157	0.0087	65.2
269	0.040	0.040	3.161	0.0100	85.1
315	0.045	0.045	3.165	0.0112	99.5
345	0.050	0.050	3.169	0.0125	108.9
352	0.055	0.055	3.173	0.0137	110.9
331	0.060	0.060	3.177	0.0150	104.2
303	0.065	0.065	3.181	0.0162	95.2
272	0.070	0.070	3.185	0.0175	85.4

UNCONFINED COMPRESSION TESTING
Sample No. 0751-011 (7 Day)



UNCONFINED COMPRESSION TEST

ASTM D 2166
SUMMARY OF RESULTS

PROJECT:	C-D Systems Solidification Study		
PROJECT No.:	SH0751		
SAMPLE No.:	0751-011 (7 Day)		
TESTING DATE:	1-Dec-20	LOADING RATE:	0.0400 in./min
TESTED BY:	JBA	TRACKING CODE:	E305

TESTING PARAMETER AND RESULTS		
MOISTURE CONTENT	8.8	**%**
BULK UNIT WEIGHT	137.3	lb/ft³
DRY UNIT WEIGHT	126.2	lb/ft³
UCS *	110.9	lb/in²

* UCS - UNCONFINED COMPRESSIVE STRENGTH

UNCONFINED COMPRESSION TEST

ASTM D 2166

PROJECT:	C-D Systems Solidification Study		
PROJECT No.:	SH0751		
SAMPLE No.:	0751-012 (7 Day)		
TESTING DATE:	1-Dec-20	LOADING RATE:	0.0400 in./min
TESTED BY:	JBA	TRACKING CODE:	E306

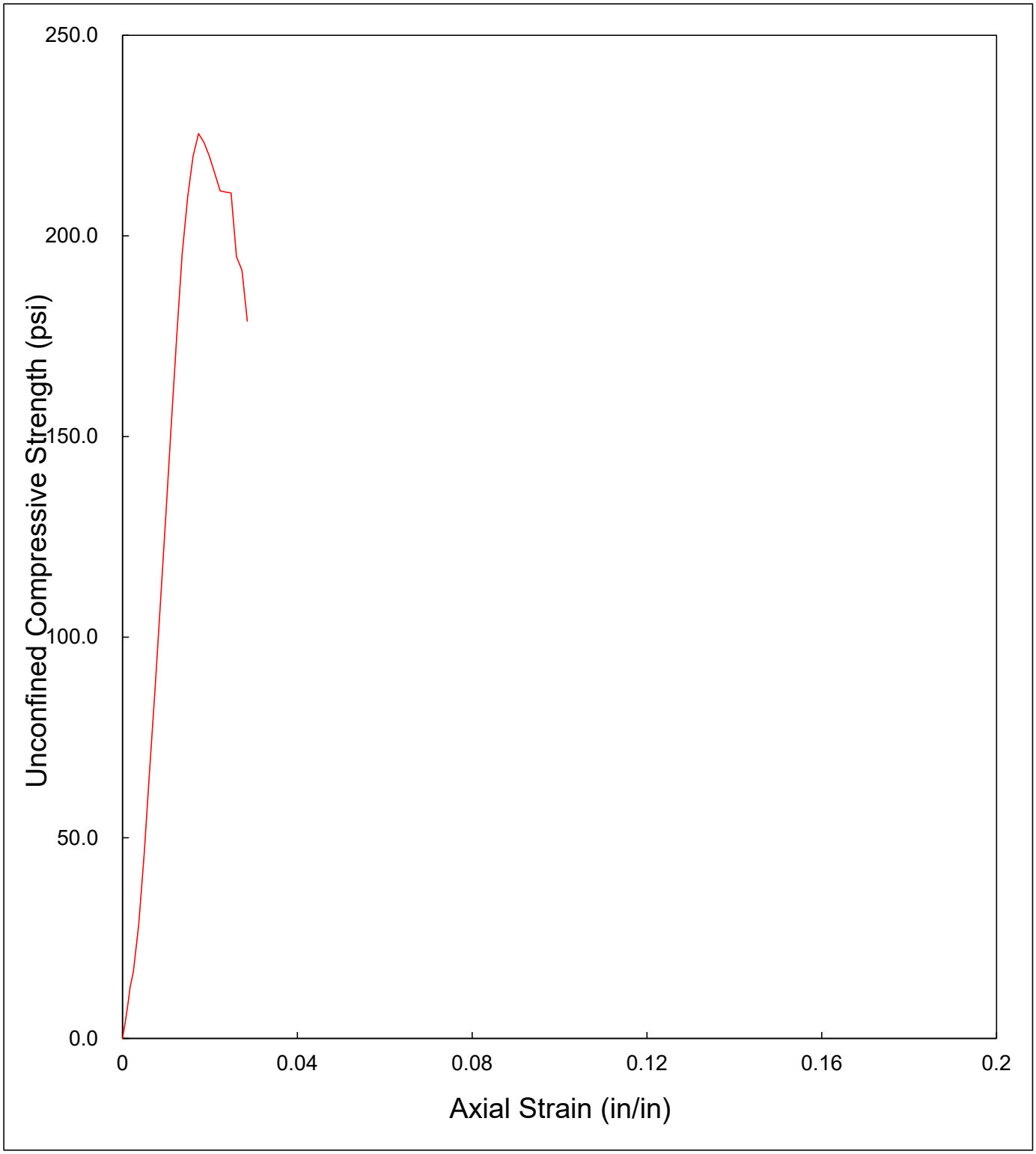
MOISTURE CONTENT (Dry Basis)		
1. MOISTURE TIN NO.		
2. WT MOISTURE TIN (tare weight)	216.85	g
3. WT WET SOIL + TARE	333.77	g
4. WT DRY SOIL + TARE	323.40	g
5. WT WATER, Ww	10.37	g
6. WT DRY SOIL, Ws	106.55	g
7. MOISTURE CONTENT, W	**9.73**	**%**

SOIL SPECIMEN DIMENSIONS				
	DIAMETER		***LENGTH***	
No. 1	2.00	in.	4.07	in.
No. 2	1.99	in.	4.02	in.
No. 3	1.99	in.	3.99	in.
Average	**1.99**	**in.**	**4.03**	**in.**

SPECIMEN CONDITIONS		
Initial Specimen WT, Wo	***471.17***	***g***
Initial Area, Ao	3.12	in²
Initial Volume, Vo	12.58	in³
Initial Bulk Unit Weight,	142.7	lb/ft³
Initial Dry Unit Weight	130.0	lb/ft³
15 % Strain (0.15 Lo)	0.60	in.
UCS	225.5	lb/in²

COMPRESSIVE LOAD (lbs.)	DIAL GAGE READING (in.)	SPECIMEN DEFORMATION (in.)	CORRECTED AREA (in²)	AXIAL STRAIN (in/in)	UNCONFINED COMPRESSIVE STRENGTH (lb/in²)
0	0.000	0.000	3.124	0.0000	0.0
15	0.003	0.003	3.127	0.0007	4.8
27	0.005	0.005	3.128	0.0012	8.6
40	0.007	0.007	3.130	0.0017	12.8
52	0.010	0.010	3.132	0.0025	16.6
89	0.015	0.015	3.136	0.0037	28.4
145	0.020	0.020	3.140	0.0050	46.2
210	0.025	0.025	3.144	0.0062	66.8
275	0.030	0.030	3.148	0.0075	87.4
343	0.035	0.035	3.152	0.0087	108.8
412	0.040	0.040	3.156	0.0099	130.6
485	0.045	0.045	3.160	0.0112	153.5
554	0.050	0.050	3.164	0.0124	175.1
619	0.055	0.055	3.168	0.0137	195.4
665	0.060	0.060	3.172	0.0149	209.7
698	0.065	0.065	3.176	0.0161	219.8
717	0.070	0.070	3.180	0.0174	225.5
711	0.075	0.075	3.184	0.0186	223.3
701	0.080	0.080	3.188	0.0199	219.9
688	0.085	0.085	3.192	0.0211	215.6
675	0.090	0.090	3.196	0.0224	211.2
675	0.095	0.095	3.200	0.0236	210.9
675	0.100	0.100	3.204	0.0248	210.7
625	0.105	0.105	3.208	0.0261	194.8
615	0.110	0.110	3.212	0.0273	191.5
575	0.115	0.115	3.216	0.0286	178.8

UNCONFINED COMPRESSION TESTING
Sample No. 0751-012 (7 Day)



UNCONFINED COMPRESSION TEST

ASTM D 2166
SUMMARY OF RESULTS

PROJECT:	C-D Systems Solidification Study		
PROJECT No.:	SH0751		
SAMPLE No.:	0751-012 (7 Day)		
TESTING DATE:	1-Dec-20	LOADING RATE:	0.0400 in./min
TESTED BY:	JBA	TRACKING CODE:	E306

TESTING PARAMETER AND RESULTS		
MOISTURE CONTENT	9.7	**%**
BULK UNIT WEIGHT	142.7	lb/ft³
DRY UNIT WEIGHT	130.0	lb/ft³
UCS *	225.5	lb/in²

* UCS - UNCONFINED COMPRESSIVE STRENGTH

UNCONFINED COMPRESSION TEST

ASTM D 2166

PROJECT:	C-D Systems Solidification Study		
PROJECT No.:	SH0751		
SAMPLE No.:	0751-013 (7 Day)		
TESTING DATE:	1-Dec-20	LOADING RATE:	0.0400 in./min
TESTED BY:	JBA	TRACKING CODE:	E307

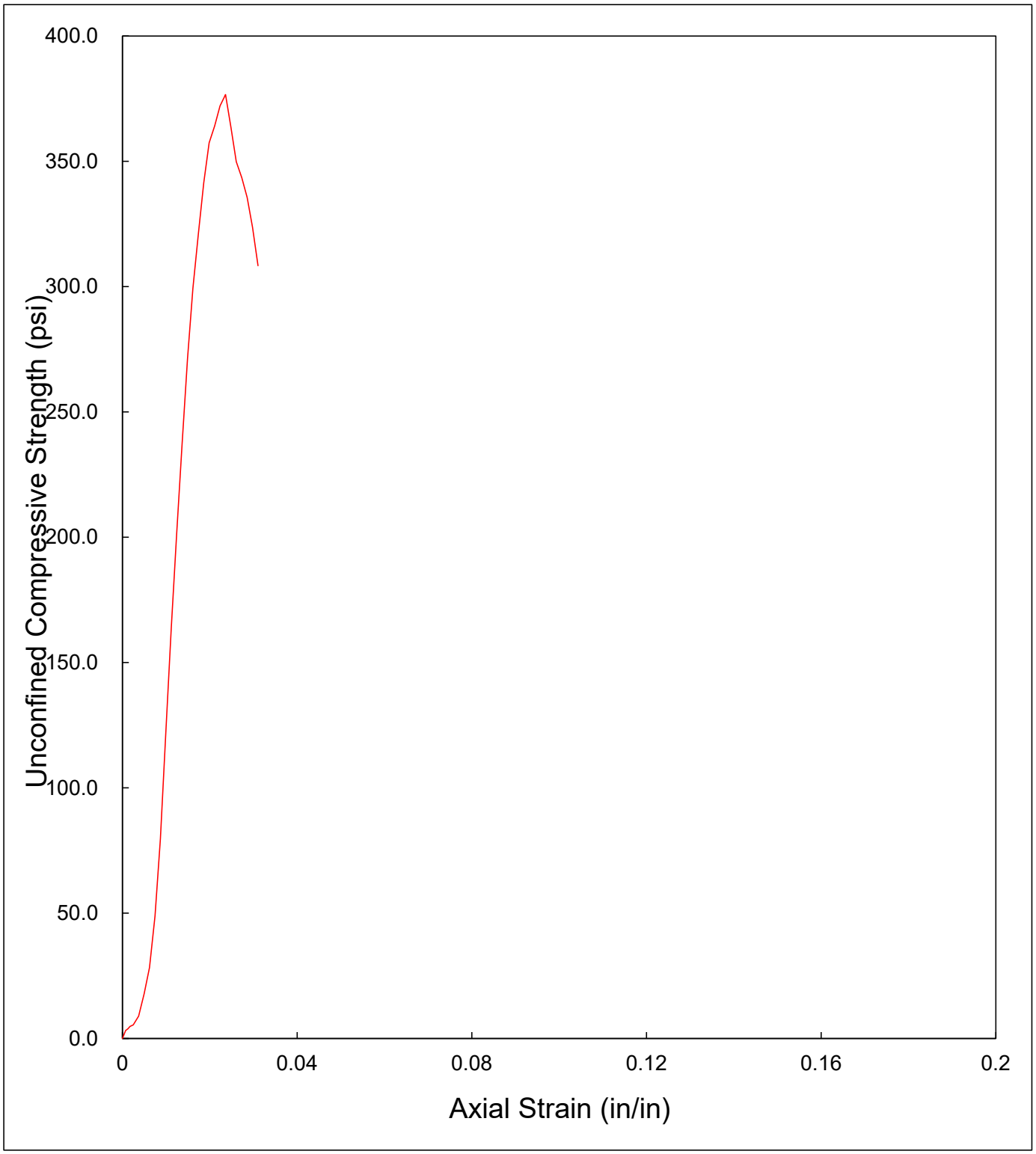
MOISTURE CONTENT (Dry Basis)		
1. MOISTURE TIN NO.		
2. WT MOISTURE TIN (tare weight)	217.43	g
3. WT WET SOIL + TARE	322.26	g
4. WT DRY SOIL + TARE	310.76	g
5. WT WATER, Ww	11.50	g
6. WT DRY SOIL, Ws	93.33	g
7. MOISTURE CONTENT, W	**12.32**	**%**

SOIL SPECIMEN DIMENSIONS				
	DIAMETER		***LENGTH***	
No. 1	2.00	in.	4.03	in.
No. 2	2.00	in.	4.04	in.
No. 3	1.99	in.	4.01	in.
Average	**2.00**	**in.**	**4.03**	**in.**

SPECIMEN CONDITIONS		
Initial Specimen WT, Wo	***462.34***	***g***
Initial Area, Ao	3.13	in²
Initial Volume, Vo	12.59	in³
Initial Bulk Unit Weight,	139.9	lb/ft³
Initial Dry Unit Weight	124.6	lb/ft³
15 % Strain (0.15 Lo)	0.60	in.
UCS	376.6	lb/in²

COMPRESSIVE LOAD (lbs.)	DIAL GAGE READING (in.)	SPECIMEN DEFORMATION (in.)	CORRECTED AREA (in²)	AXIAL STRAIN (in/in)	UNCONFINED COMPRESSIVE STRENGTH (lb/in²)
0	0.000	0.000	3.126	0.0000	0.0
10	0.003	0.003	3.129	0.0007	3.2
12	0.005	0.005	3.130	0.0012	3.8
15	0.007	0.007	3.132	0.0017	4.8
17	0.010	0.010	3.134	0.0025	5.4
28	0.015	0.015	3.138	0.0037	8.9
56	0.020	0.020	3.142	0.0050	17.8
89	0.025	0.025	3.146	0.0062	28.3
154	0.030	0.030	3.150	0.0075	48.9
251	0.035	0.035	3.154	0.0087	79.6
384	0.040	0.040	3.158	0.0099	121.6
518	0.045	0.045	3.162	0.0112	163.8
637	0.050	0.050	3.166	0.0124	201.2
753	0.055	0.055	3.170	0.0137	237.6
861	0.060	0.060	3.174	0.0149	271.3
951	0.065	0.065	3.178	0.0161	299.3
1022	0.070	0.070	3.182	0.0174	321.2
1088	0.075	0.075	3.186	0.0186	341.5
1140	0.080	0.080	3.190	0.0199	357.4
1163	0.085	0.085	3.194	0.0211	364.1
1190	0.090	0.090	3.198	0.0224	372.1
1206	0.095	0.095	3.202	0.0236	376.6
1166	0.100	0.100	3.206	0.0248	363.7
1123	0.105	0.105	3.210	0.0261	349.8
1104	0.110	0.110	3.214	0.0273	343.5
1080	0.115	0.115	3.218	0.0286	335.6
1043	0.120	0.120	3.222	0.0298	323.7
995	0.125	0.125	3.227	0.0310	308.4

UNCONFINED COMPRESSION TESTING
Sample No. 0751-013 (7 Day)



UNCONFINED COMPRESSION TEST

ASTM D 2166
SUMMARY OF RESULTS

PROJECT:	C-D Systems Solidification Study		
PROJECT No.:	SH0751		
SAMPLE No.:	0751-013 (7 Day)		
TESTING DATE:	1-Dec-20	LOADING RATE:	0.0400 in./min
TESTED BY:	JBA	TRACKING CODE:	E307

TESTING PARAMETER AND RESULTS		
MOISTURE CONTENT	12.3	**%**
BULK UNIT WEIGHT	139.9	lb/ft³
DRY UNIT WEIGHT	124.6	lb/ft³
UCS *	376.6	lb/in²

* UCS - UNCONFINED COMPRESSIVE STRENGTH

UNCONFINED COMPRESSION TEST

ASTM D 2166

PROJECT:	C-D Systems Solidification Study		
PROJECT No.:	SH0751		
SAMPLE No.:	0751-014 (7 Day)		
TESTING DATE:	1-Dec-20	LOADING RATE:	0.0400 in./min
TESTED BY:	JBA	TRACKING CODE:	E308

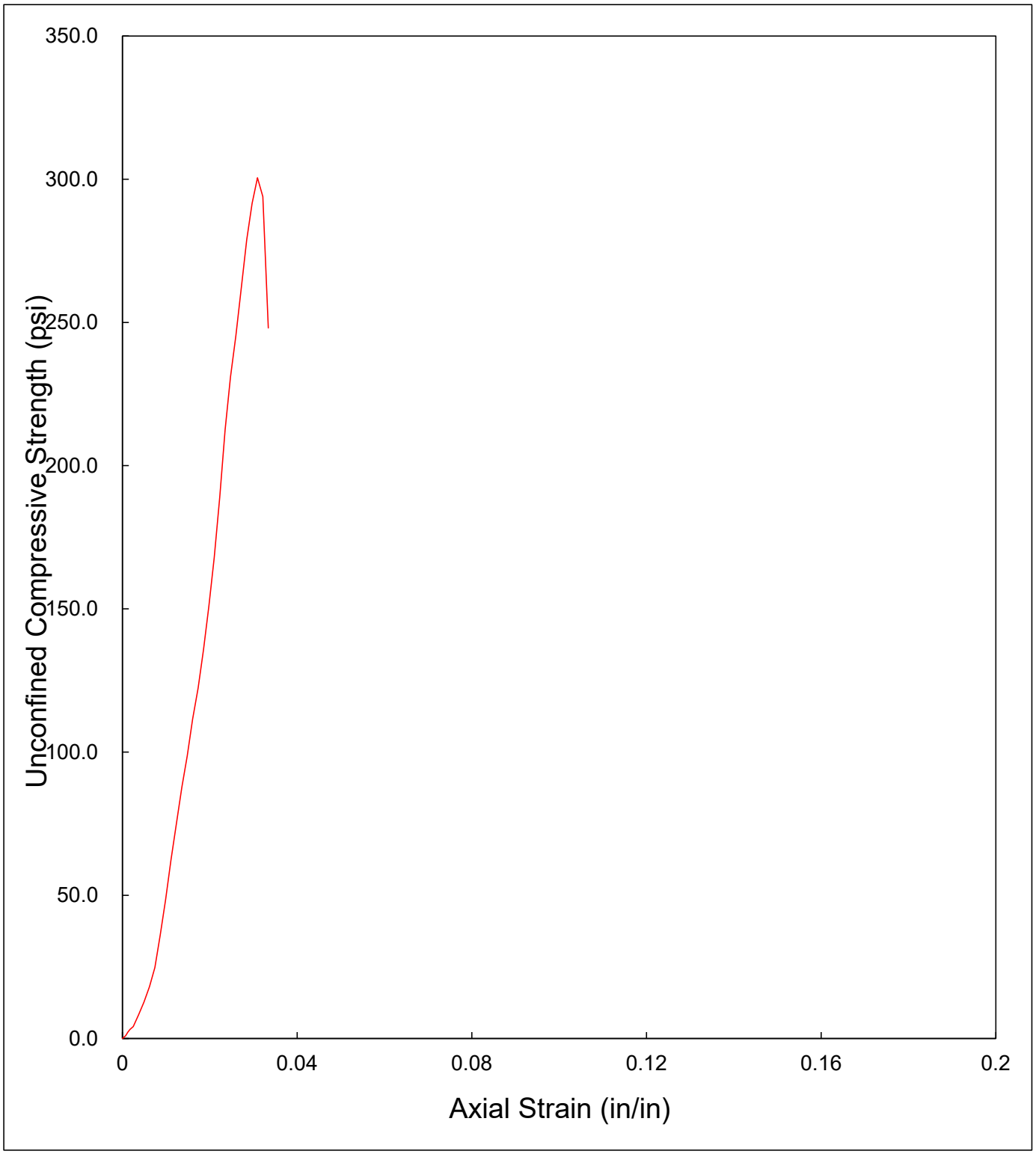
MOISTURE CONTENT (Dry Basis)		
1. MOISTURE TIN NO.		
2. WT MOISTURE TIN (tare weight)	218.11	g
3. WT WET SOIL + TARE	307.40	g
4. WT DRY SOIL + TARE	297.43	g
5. WT WATER, Ww	9.97	g
6. WT DRY SOIL, Ws	79.32	g
7. MOISTURE CONTENT, W	**12.57**	**%**

SOIL SPECIMEN DIMENSIONS				
	DIAMETER		***LENGTH***	
No. 1	2.00	in.	4.08	in.
No. 2	1.99	in.	4.00	in.
No. 3	1.99	in.	4.04	in.
Average	**1.99**	**in.**	**4.04**	**in.**

SPECIMEN CONDITIONS		
Initial Specimen WT, Wo	***450.36***	***g***
Initial Area, Ao	3.12	in²
Initial Volume, Vo	12.63	in³
Initial Bulk Unit Weight,	135.8	lb/ft³
Initial Dry Unit Weight	120.7	lb/ft³
15 % Strain (0.15 Lo)	0.61	in.
UCS	300.5	lb/in²

COMPRESSIVE LOAD (lbs.)	DIAL GAGE READING (in.)	SPECIMEN DEFORMATION (in.)	CORRECTED AREA (in²)	AXIAL STRAIN (in/in)	UNCONFINED COMPRESSIVE STRENGTH (lb/in²)
0	0.000	0.000	3.125	0.0000	0.0
3	0.003	0.003	3.127	0.0007	1.0
7	0.005	0.005	3.129	0.0012	2.2
10	0.007	0.007	3.130	0.0017	3.2
13	0.010	0.010	3.133	0.0025	4.1
26	0.015	0.015	3.137	0.0037	8.3
40	0.020	0.020	3.140	0.0049	12.7
57	0.025	0.025	3.144	0.0062	18.1
78	0.030	0.030	3.148	0.0074	24.8
114	0.035	0.035	3.152	0.0087	36.2
153	0.040	0.040	3.156	0.0099	48.5
197	0.045	0.045	3.160	0.0111	62.3
238	0.050	0.050	3.164	0.0124	75.2
278	0.055	0.055	3.168	0.0136	87.8
313	0.060	0.060	3.172	0.0148	98.7
354	0.065	0.065	3.176	0.0161	111.5
389	0.070	0.070	3.180	0.0173	122.3
432	0.075	0.075	3.184	0.0186	135.7
481	0.080	0.080	3.188	0.0198	150.9
536	0.085	0.085	3.192	0.0210	167.9
604	0.090	0.090	3.196	0.0223	189.0
680	0.095	0.095	3.200	0.0235	212.5
740	0.100	0.100	3.204	0.0247	231.0
787	0.105	0.105	3.208	0.0260	245.3
841	0.110	0.110	3.212	0.0272	261.8
897	0.115	0.115	3.216	0.0285	278.9
939	0.120	0.120	3.220	0.0297	291.6
969	0.125	0.125	3.225	0.0309	300.5
949	0.130	0.130	3.229	0.0322	293.9
802	0.135	0.135	3.233	0.0334	248.1

UNCONFINED COMPRESSION TESTING
Sample No. 0751-014 (7 Day)



UNCONFINED COMPRESSION TEST

ASTM D 2166
SUMMARY OF RESULTS

PROJECT:	C-D Systems Solidification Study		
PROJECT No.:	SH0751		
SAMPLE No.:	0751-014 (7 Day)		
TESTING DATE:	1-Dec-20	LOADING RATE:	0.0400 in./min
TESTED BY:	JBA	TRACKING CODE:	E308

TESTING PARAMETER AND RESULTS		
MOISTURE CONTENT	12.6	**%**
BULK UNIT WEIGHT	135.8	lb/ft³
DRY UNIT WEIGHT	120.7	lb/ft³
UCS *	300.5	lb/in²

* UCS - UNCONFINED COMPRESSIVE STRENGTH

UNCONFINED COMPRESSION TEST

ASTM D 2166

PROJECT:	C-D Systems Solidification Study		
PROJECT No.:	SH0751		
SAMPLE No.:	0751-015 (7 Day)		
TESTING DATE:	1-Dec-20	LOADING RATE:	0.0400 in./min
TESTED BY:	JBA	TRACKING CODE:	E309

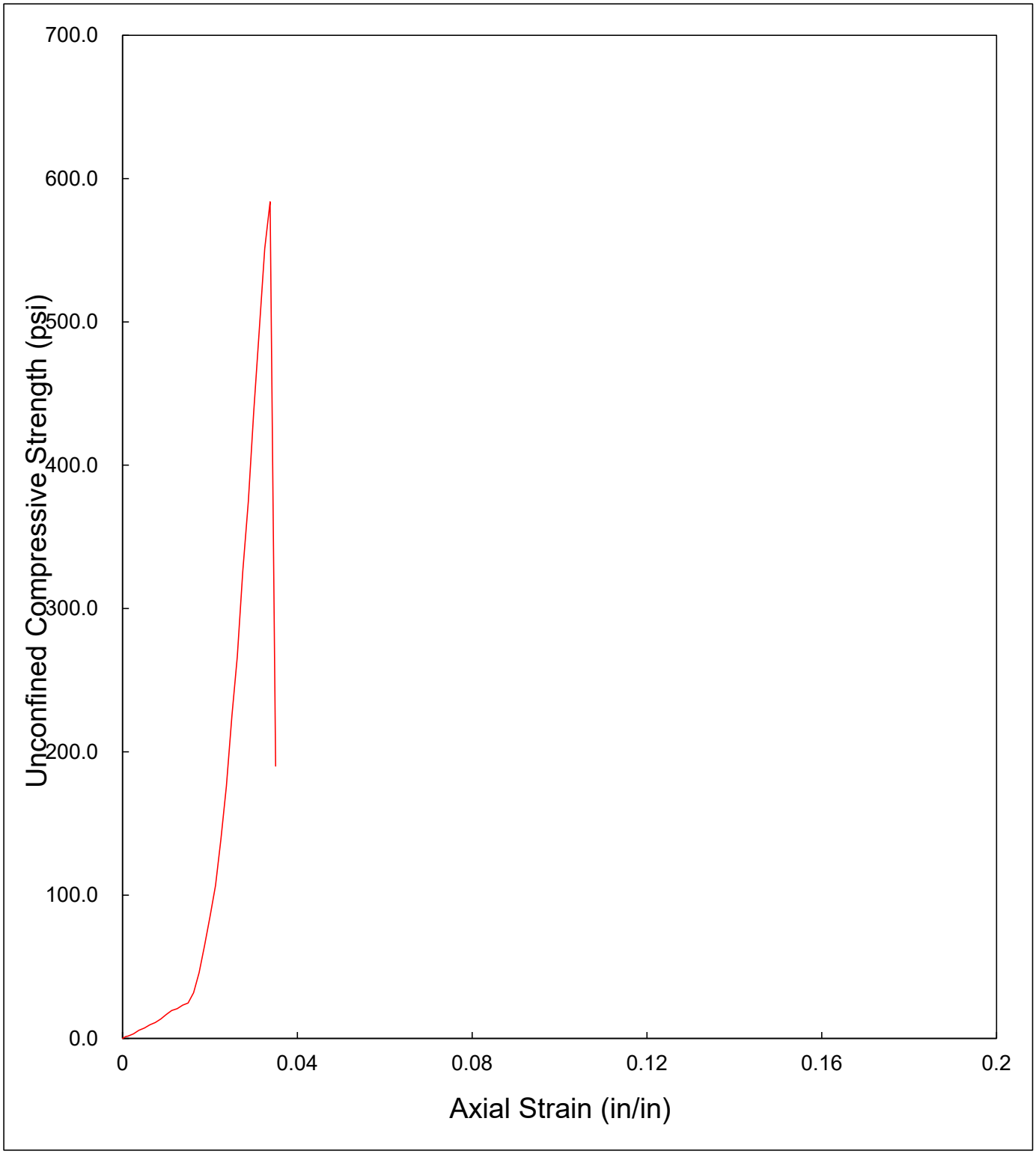
MOISTURE CONTENT (Dry Basis)		
1. MOISTURE TIN NO.		
2. WT MOISTURE TIN (tare weight)	223.39	g
3. WT WET SOIL + TARE	354.36	g
4. WT DRY SOIL + TARE	335.76	g
5. WT WATER, Ww	18.60	g
6. WT DRY SOIL, Ws	112.37	g
7. MOISTURE CONTENT, W	**16.55**	**%**

SOIL SPECIMEN DIMENSIONS				
	DIAMETER		***LENGTH***	
No. 1	2.01	in.	3.98	in.
No. 2	2.00	in.	3.96	in.
No. 3	1.99	in.	4.05	in.
Average	**2.00**	**in.**	**4.00**	**in.**

SPECIMEN CONDITIONS		
Initial Specimen WT, Wo	***438.85***	***g***
Initial Area, Ao	3.15	in²
Initial Volume, Vo	12.58	in³
Initial Bulk Unit Weight,	132.9	lb/ft³
Initial Dry Unit Weight	114.0	lb/ft³
15 % Strain (0.15 Lo)	0.60	in.
UCS	583.8	lb/in²

COMPRESSIVE LOAD (lbs.)	DIAL GAGE READING (in.)	SPECIMEN DEFORMATION (in.)	CORRECTED AREA (in²)	AXIAL STRAIN (in/in)	UNCONFINED COMPRESSIVE STRENGTH (lb/in²)
0	0.000	0.000	3.148	0.0000	0.0
4	0.003	0.003	3.150	0.0008	1.3
5	0.005	0.005	3.152	0.0013	1.6
7	0.007	0.007	3.153	0.0018	2.2
10	0.010	0.010	3.156	0.0025	3.2
18	0.015	0.015	3.160	0.0038	5.7
23	0.020	0.020	3.164	0.0050	7.3
30	0.025	0.025	3.168	0.0063	9.5
35	0.030	0.030	3.172	0.0075	11.0
43	0.035	0.035	3.176	0.0088	13.5
53	0.040	0.040	3.180	0.0100	16.7
62	0.045	0.045	3.184	0.0113	19.5
66	0.050	0.050	3.188	0.0125	20.7
74	0.055	0.055	3.192	0.0138	23.2
79	0.060	0.060	3.196	0.0150	24.7
102	0.065	0.065	3.200	0.0163	31.9
147	0.070	0.070	3.204	0.0175	45.9
207	0.075	0.075	3.208	0.0188	64.5
273	0.080	0.080	3.212	0.0200	85.0
343	0.085	0.085	3.216	0.0213	106.6
447	0.090	0.090	3.220	0.0225	138.8
568	0.095	0.095	3.225	0.0238	176.1
727	0.100	0.100	3.229	0.0250	225.2
861	0.105	0.105	3.233	0.0263	266.3
1056	0.110	0.110	3.237	0.0275	326.2
1214	0.115	0.115	3.241	0.0288	374.6
1418	0.120	0.120	3.245	0.0300	436.9
1604	0.125	0.125	3.250	0.0313	493.6
1793	0.130	0.130	3.254	0.0325	551.1
1902	0.135	0.135	3.258	0.0338	583.8
620	0.140	0.140	3.262	0.0350	190.1

UNCONFINED COMPRESSION TESTING
Sample No. 0751-015 (7 Day)



UNCONFINED COMPRESSION TEST

ASTM D 2166
SUMMARY OF RESULTS

PROJECT:	C-D Systems Solidification Study		
PROJECT No.:	SH0751		
SAMPLE No.:	0751-015 (7 Day)		
TESTING DATE:	1-Dec-20	LOADING RATE:	0.0400 in./min
TESTED BY:	JBA	TRACKING CODE:	E309

TESTING PARAMETER AND RESULTS		
MOISTURE CONTENT	16.6	**%**
BULK UNIT WEIGHT	132.9	lb/ft³
DRY UNIT WEIGHT	114.0	lb/ft³
UCS *	583.8	lb/in²

* UCS - UNCONFINED COMPRESSIVE STRENGTH

UNCONFINED COMPRESSION TEST

ASTM D 2166

PROJECT:	C-D Systems Solidification Study		
PROJECT No.:	SH0751		
SAMPLE No.:	0751-016 (7 Day)		
TESTING DATE:	1-Dec-20	LOADING RATE:	0.0400 in./min
TESTED BY:	JBA	TRACKING CODE:	E310

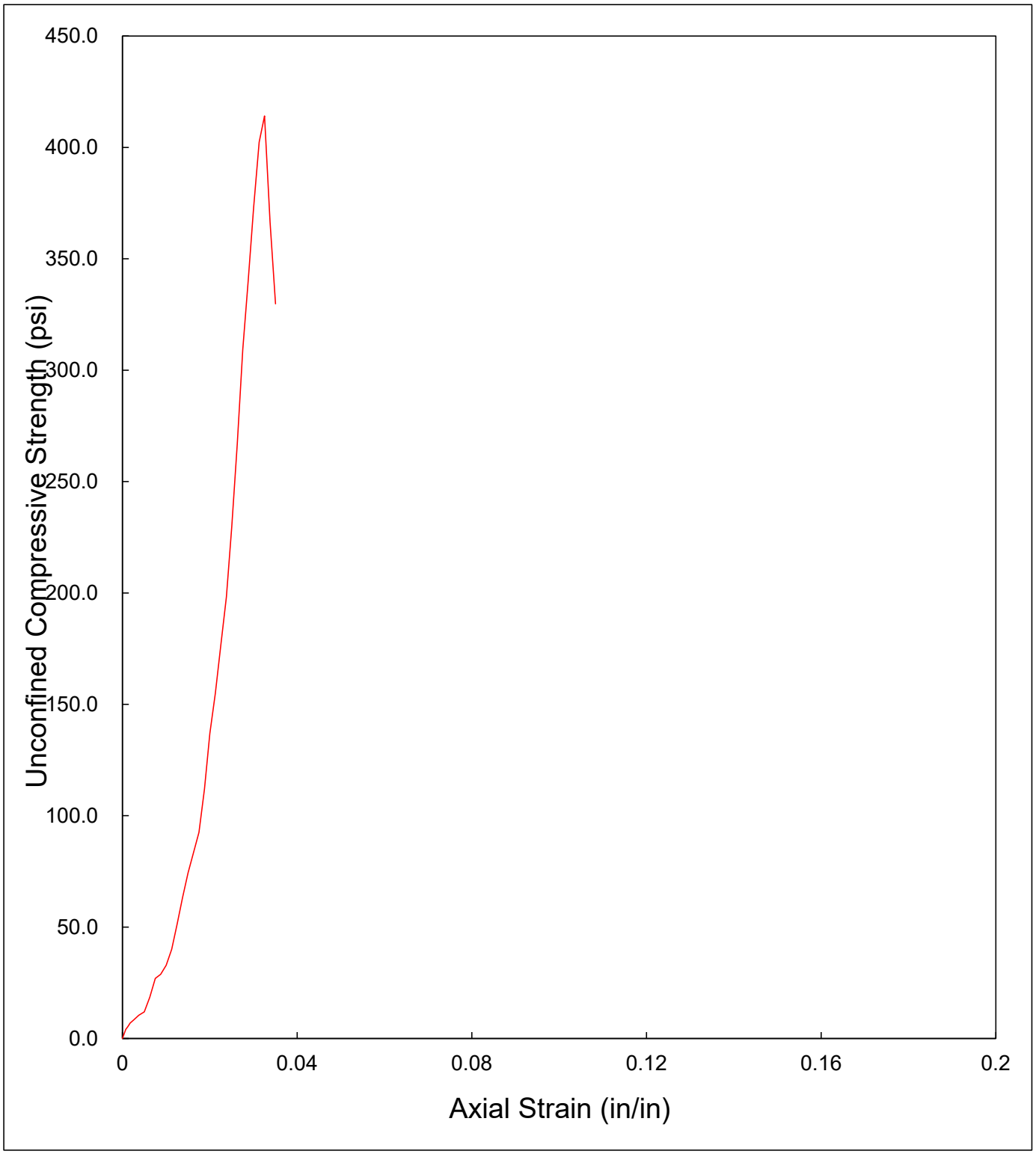
MOISTURE CONTENT (Dry Basis)		
1. MOISTURE TIN NO.		
2. WT MOISTURE TIN (tare weight)	212.46	g
3. WT WET SOIL + TARE	375.51	g
4. WT DRY SOIL + TARE	353.17	g
5. WT WATER, Ww	22.34	g
6. WT DRY SOIL, Ws	140.71	g
7. MOISTURE CONTENT, W	**15.88**	**%**

SOIL SPECIMEN DIMENSIONS				
	DIAMETER		***LENGTH***	
No. 1	2.02	in.	3.96	in.
No. 2	2.01	in.	4.04	in.
No. 3	2.00	in.	3.98	in.
Average	**2.01**	**in.**	**3.99**	**in.**

SPECIMEN CONDITIONS		
Initial Specimen WT, Wo	***435.25***	***g***
Initial Area, Ao	3.16	in²
Initial Volume, Vo	12.63	in³
Initial Bulk Unit Weight,	131.3	lb/ft³
Initial Dry Unit Weight	113.3	lb/ft³
15 % Strain (0.15 Lo)	0.60	in.
UCS	414.1	lb/in²

COMPRESSIVE LOAD (lbs.)	DIAL GAGE READING (in.)	SPECIMEN DEFORMATION (in.)	CORRECTED AREA (in²)	AXIAL STRAIN (in/in)	UNCONFINED COMPRESSIVE STRENGTH (lb/in²)
0	0.000	0.000	3.163	0.0000	0.0
13	0.003	0.003	3.165	0.0008	4.1
17	0.005	0.005	3.167	0.0013	5.4
22	0.007	0.007	3.169	0.0018	6.9
26	0.010	0.010	3.171	0.0025	8.2
33	0.015	0.015	3.175	0.0038	10.4
38	0.020	0.020	3.179	0.0050	12.0
59	0.025	0.025	3.183	0.0063	18.5
86	0.030	0.030	3.187	0.0075	27.0
92	0.035	0.035	3.191	0.0088	28.8
105	0.040	0.040	3.195	0.0100	32.9
128	0.045	0.045	3.199	0.0113	40.0
164	0.050	0.050	3.203	0.0125	51.2
203	0.055	0.055	3.207	0.0138	63.3
239	0.060	0.060	3.211	0.0150	74.4
268	0.065	0.065	3.215	0.0163	83.3
298	0.070	0.070	3.220	0.0175	92.6
361	0.075	0.075	3.224	0.0188	112.0
442	0.080	0.080	3.228	0.0200	136.9
501	0.085	0.085	3.232	0.0213	155.0
572	0.090	0.090	3.236	0.0225	176.8
642	0.095	0.095	3.240	0.0238	198.1
745	0.100	0.100	3.244	0.0250	229.6
867	0.105	0.105	3.249	0.0263	266.9
1006	0.110	0.110	3.253	0.0275	309.3
1107	0.115	0.115	3.257	0.0288	339.9
1217	0.120	0.120	3.261	0.0300	373.2
1314	0.125	0.125	3.265	0.0313	402.4
1354	0.130	0.130	3.270	0.0326	414.1
1200	0.135	0.135	3.274	0.0338	366.6
1081	0.140	0.140	3.278	0.0351	329.8

UNCONFINED COMPRESSION TESTING
Sample No. 0751-016 (7 Day)



UNCONFINED COMPRESSION TEST

ASTM D 2166
SUMMARY OF RESULTS

PROJECT:	C-D Systems Solidification Study		
PROJECT No.:	SH0751		
SAMPLE No.:	0751-016 (7 Day)		
TESTING DATE:	1-Dec-20	LOADING RATE:	0.0400 in./min
TESTED BY:	JBA	TRACKING CODE:	E310

TESTING PARAMETER AND RESULTS		
MOISTURE CONTENT	15.9	**%**
BULK UNIT WEIGHT	131.3	lb/ft³
DRY UNIT WEIGHT	113.3	lb/ft³
UCS *	414.1	lb/in²

* UCS - UNCONFINED COMPRESSIVE STRENGTH

UNCONFINED COMPRESSION TEST

ASTM D 2166

PROJECT:	C-D Systems Solidification Study		
PROJECT No.:	SH0751		
SAMPLE No.:	0751-017 (7 Day)		
TESTING DATE:	1-Dec-20	LOADING RATE:	0.0400 in./min
TESTED BY:	JBA	TRACKING CODE:	E311

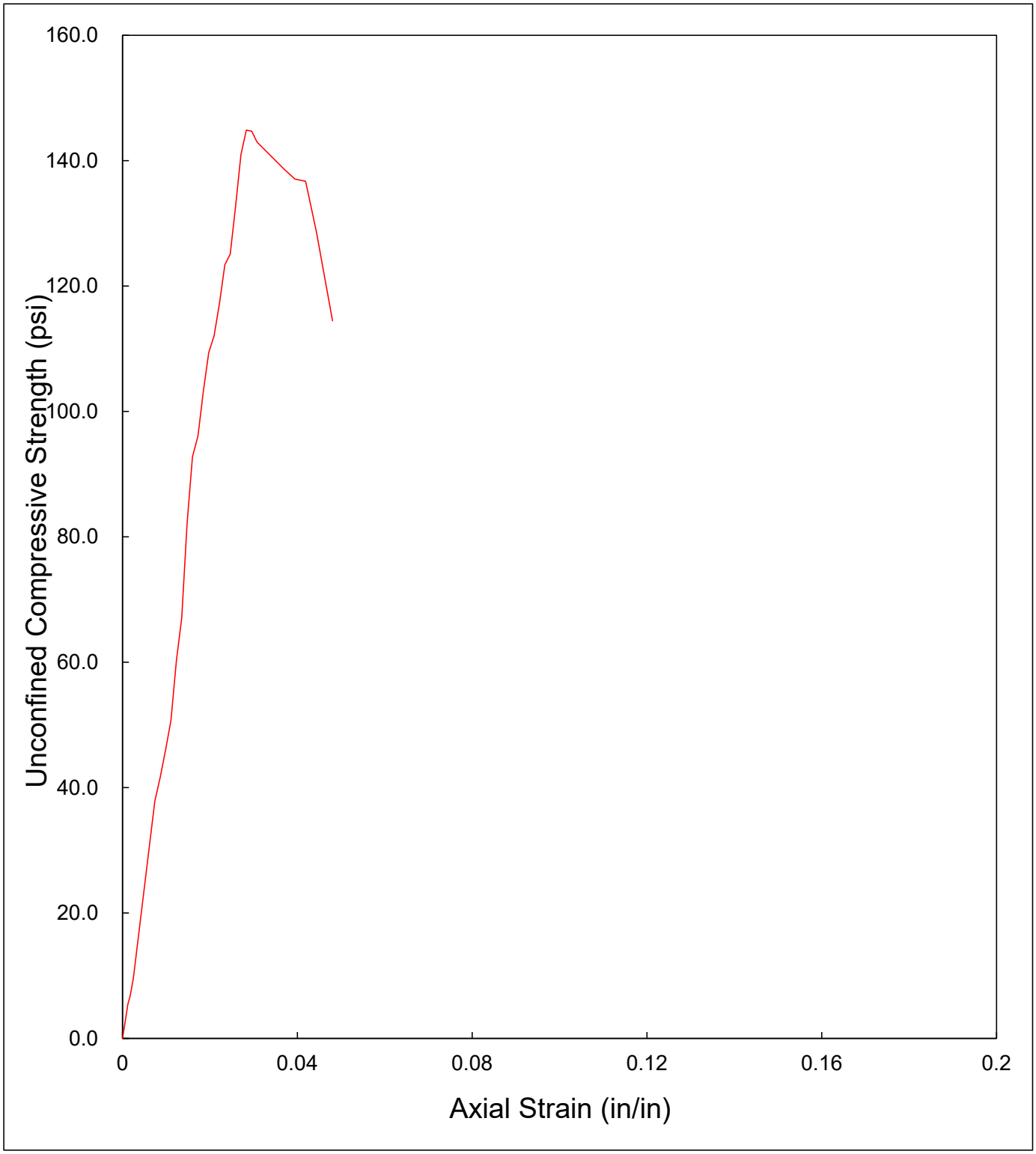
MOISTURE CONTENT (Dry Basis)		
1. MOISTURE TIN NO.		
2. WT MOISTURE TIN (tare weight)	224.84	g
3. WT WET SOIL + TARE	371.86	g
4. WT DRY SOIL + TARE	351.97	g
5. WT WATER, Ww	19.89	g
6. WT DRY SOIL, Ws	127.13	g
7. MOISTURE CONTENT, W	**15.65**	**%**

SOIL SPECIMEN DIMENSIONS				
	DIAMETER		***LENGTH***	
No. 1	2.00	in.	4.10	in.
No. 2	1.99	in.	3.95	in.
No. 3	1.99	in.	4.12	in.
Average	**1.99**	**in.**	**4.06**	**in.**

SPECIMEN CONDITIONS		
Initial Specimen WT, Wo	***437.95***	***g***
Initial Area, Ao	3.12	in²
Initial Volume, Vo	12.65	in³
Initial Bulk Unit Weight,	131.8	lb/ft³
Initial Dry Unit Weight	114.0	lb/ft³
15 % Strain (0.15 Lo)	0.61	in.
UCS	144.9	lb/in²

COMPRESSIVE LOAD (lbs.)	DIAL GAGE READING (in.)	SPECIMEN DEFORMATION (in.)	CORRECTED AREA (in²)	AXIAL STRAIN (in/in)	UNCONFINED COMPRESSIVE STRENGTH (lb/in²)
0	0.000	0.000	3.119	0.0000	0.0
10	0.003	0.003	3.121	0.0007	3.2
17	0.005	0.005	3.122	0.0012	5.4
21	0.007	0.007	3.124	0.0017	6.7
30	0.010	0.010	3.126	0.0025	9.6
119	0.030	0.030	3.142	0.0074	37.9
131	0.035	0.035	3.146	0.0086	41.6
145	0.040	0.040	3.150	0.0099	46.0
160	0.045	0.045	3.154	0.0111	50.7
190	0.050	0.050	3.158	0.0123	60.2
212	0.055	0.055	3.161	0.0136	67.1
260	0.060	0.060	3.165	0.0148	82.1
294	0.065	0.065	3.169	0.0160	92.8
305	0.070	0.070	3.173	0.0173	96.1
328	0.075	0.075	3.177	0.0185	103.2
348	0.080	0.080	3.181	0.0197	109.4
357	0.085	0.085	3.185	0.0209	112.1
374	0.090	0.090	3.189	0.0222	117.3
394	0.095	0.095	3.193	0.0234	123.4
400	0.100	0.100	3.197	0.0246	125.1
425	0.105	0.105	3.201	0.0259	132.8
452	0.110	0.110	3.205	0.0271	141.0
465	0.115	0.115	3.210	0.0283	144.9
465	0.120	0.120	3.214	0.0296	144.7
460	0.125	0.125	3.218	0.0308	143.0
449	0.150	0.150	3.238	0.0370	138.7
445	0.160	0.160	3.247	0.0394	137.1
445	0.170	0.170	3.255	0.0419	136.7
420	0.180	0.180	3.263	0.0444	128.7
375	0.195	0.195	3.276	0.0481	114.5

UNCONFINED COMPRESSION TESTING
Sample No. 0751-017 (7 Day)



UNCONFINED COMPRESSION TEST

ASTM D 2166
SUMMARY OF RESULTS

PROJECT:	C-D Systems Solidification Study		
PROJECT No.:	SH0751		
SAMPLE No.:	0751-017 (7 Day)		
TESTING DATE:	1-Dec-20	LOADING RATE:	0.0400 in./min
TESTED BY:	JBA	TRACKING CODE:	E311

TESTING PARAMETER AND RESULTS		
MOISTURE CONTENT	15.6	**%**
BULK UNIT WEIGHT	131.8	lb/ft³
DRY UNIT WEIGHT	114.0	lb/ft³
UCS *	144.9	lb/in²

* UCS - UNCONFINED COMPRESSIVE STRENGTH

UNCONFINED COMPRESSION TEST

ASTM D 2166

PROJECT:	C-D Systems Solidification Study		
PROJECT No.:	SH0751		
SAMPLE No.:	0751-018 (7 Day)		
TESTING DATE:	1-Dec-20	LOADING RATE:	0.0400 in./min
TESTED BY:	JBA	TRACKING CODE:	E312

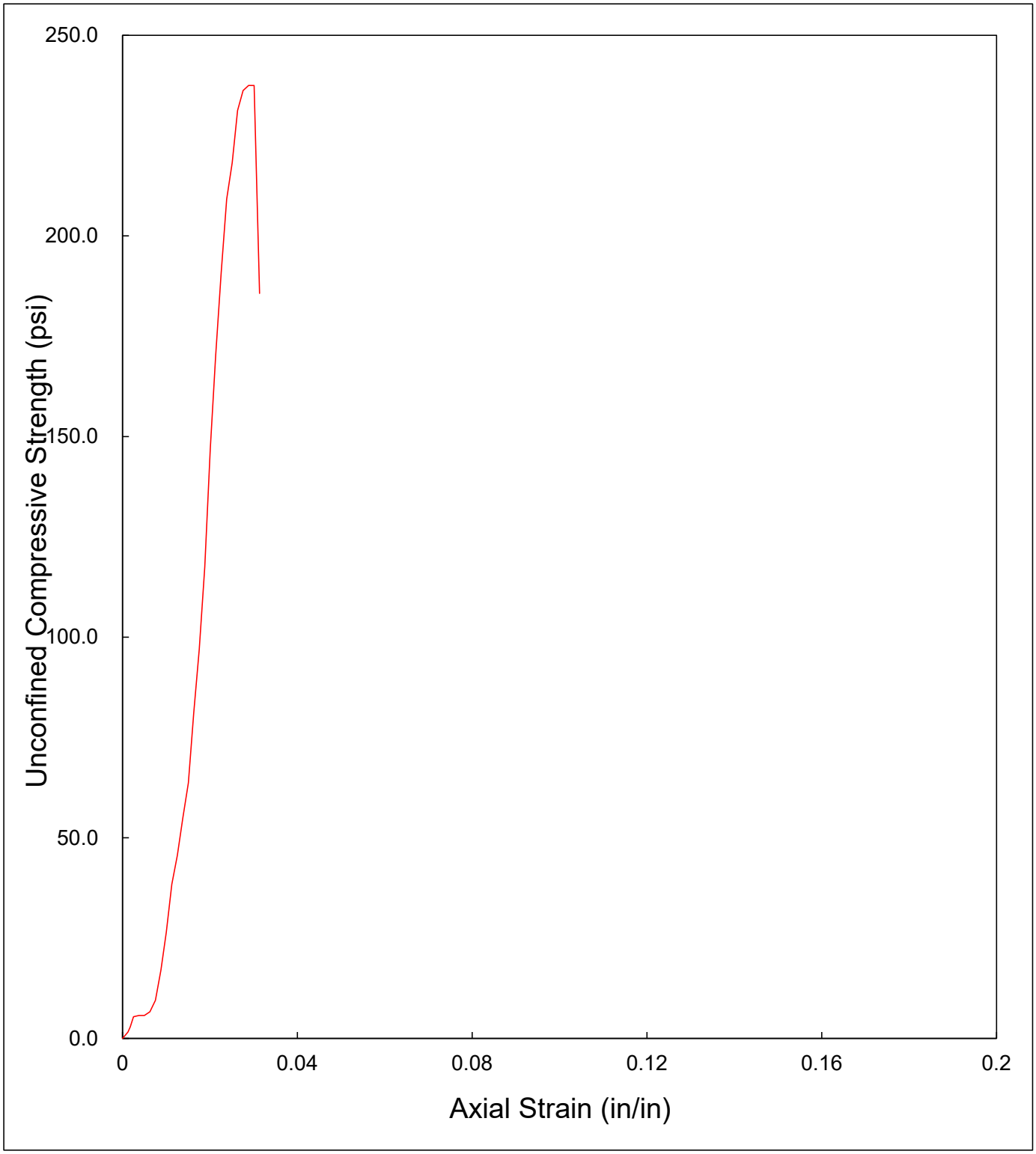
MOISTURE CONTENT (Dry Basis)		
1. MOISTURE TIN NO.		
2. WT MOISTURE TIN (tare weight)	222.74	g
3. WT WET SOIL + TARE	334.89	g
4. WT DRY SOIL + TARE	320.00	g
5. WT WATER, Ww	14.89	g
6. WT DRY SOIL, Ws	97.26	g
7. MOISTURE CONTENT, W	**15.31**	**%**

SOIL SPECIMEN DIMENSIONS				
	DIAMETER		***LENGTH***	
No. 1	2.01	in.	4.02	in.
No. 2	2.00	in.	3.99	in.
No. 3	2.00	in.	3.95	in.
Average	**2.00**	**in.**	**3.99**	**in.**

SPECIMEN CONDITIONS		
Initial Specimen WT, Wo	***435.81***	***g***
Initial Area, Ao	3.14	in²
Initial Volume, Vo	12.52	in³
Initial Bulk Unit Weight,	132.6	lb/ft³
Initial Dry Unit Weight	115.0	lb/ft³
15 % Strain (0.15 Lo)	0.60	in.
UCS	237.5	lb/in²

COMPRESSIVE LOAD (lbs.)	DIAL GAGE READING (in.)	SPECIMEN DEFORMATION (in.)	CORRECTED AREA (in²)	AXIAL STRAIN (in/in)	UNCONFINED COMPRESSIVE STRENGTH (lb/in²)
0	0.000	0.000	3.141	0.0000	0.0
3	0.003	0.003	3.143	0.0008	1.0
5	0.005	0.005	3.144	0.0013	1.6
9	0.007	0.007	3.146	0.0018	2.9
17	0.010	0.010	3.148	0.0025	5.4
18	0.015	0.015	3.152	0.0038	5.7
18	0.020	0.020	3.156	0.0050	5.7
21	0.025	0.025	3.160	0.0063	6.6
30	0.030	0.030	3.164	0.0075	9.5
54	0.035	0.035	3.168	0.0088	17.0
84	0.040	0.040	3.172	0.0100	26.5
122	0.045	0.045	3.176	0.0113	38.4
145	0.050	0.050	3.180	0.0125	45.6
175	0.055	0.055	3.184	0.0138	55.0
203	0.060	0.060	3.189	0.0151	63.7
259	0.065	0.065	3.193	0.0163	81.1
310	0.070	0.070	3.197	0.0176	97.0
376	0.075	0.075	3.201	0.0188	117.5
471	0.080	0.080	3.205	0.0201	147.0
546	0.085	0.085	3.209	0.0213	170.1
613	0.090	0.090	3.213	0.0226	190.8
673	0.095	0.095	3.217	0.0238	209.2
703	0.100	0.100	3.221	0.0251	218.2
746	0.105	0.105	3.226	0.0263	231.3
763	0.110	0.110	3.230	0.0276	236.2
768	0.115	0.115	3.234	0.0289	237.5
769	0.120	0.120	3.238	0.0301	237.5
602	0.125	0.125	3.242	0.0314	185.7

UNCONFINED COMPRESSION TESTING
Sample No. 0751-018 (7 Day)



UNCONFINED COMPRESSION TEST

ASTM D 2166
SUMMARY OF RESULTS

PROJECT:	C-D Systems Solidification Study		
PROJECT No.:	SH0751		
SAMPLE No.:	0751-018 (7 Day)		
TESTING DATE:	1-Dec-20	LOADING RATE:	0.0400 in./min
TESTED BY:	JBA	TRACKING CODE:	E312

TESTING PARAMETER AND RESULTS		
MOISTURE CONTENT	15.3	**%**
BULK UNIT WEIGHT	132.6	lb/ft³
DRY UNIT WEIGHT	115.0	lb/ft³
UCS *	237.5	lb/in²

* UCS - UNCONFINED COMPRESSIVE STRENGTH

UNCONFINED COMPRESSION TEST

ASTM D 2166

PROJECT:	C-D Systems Solidification Study		
PROJECT No.:	SH0751		
SAMPLE No.:	0751-019 (7 Day)		
TESTING DATE:	1-Dec-20	LOADING RATE:	0.0400 in./min
TESTED BY:	JBA	TRACKING CODE:	E313

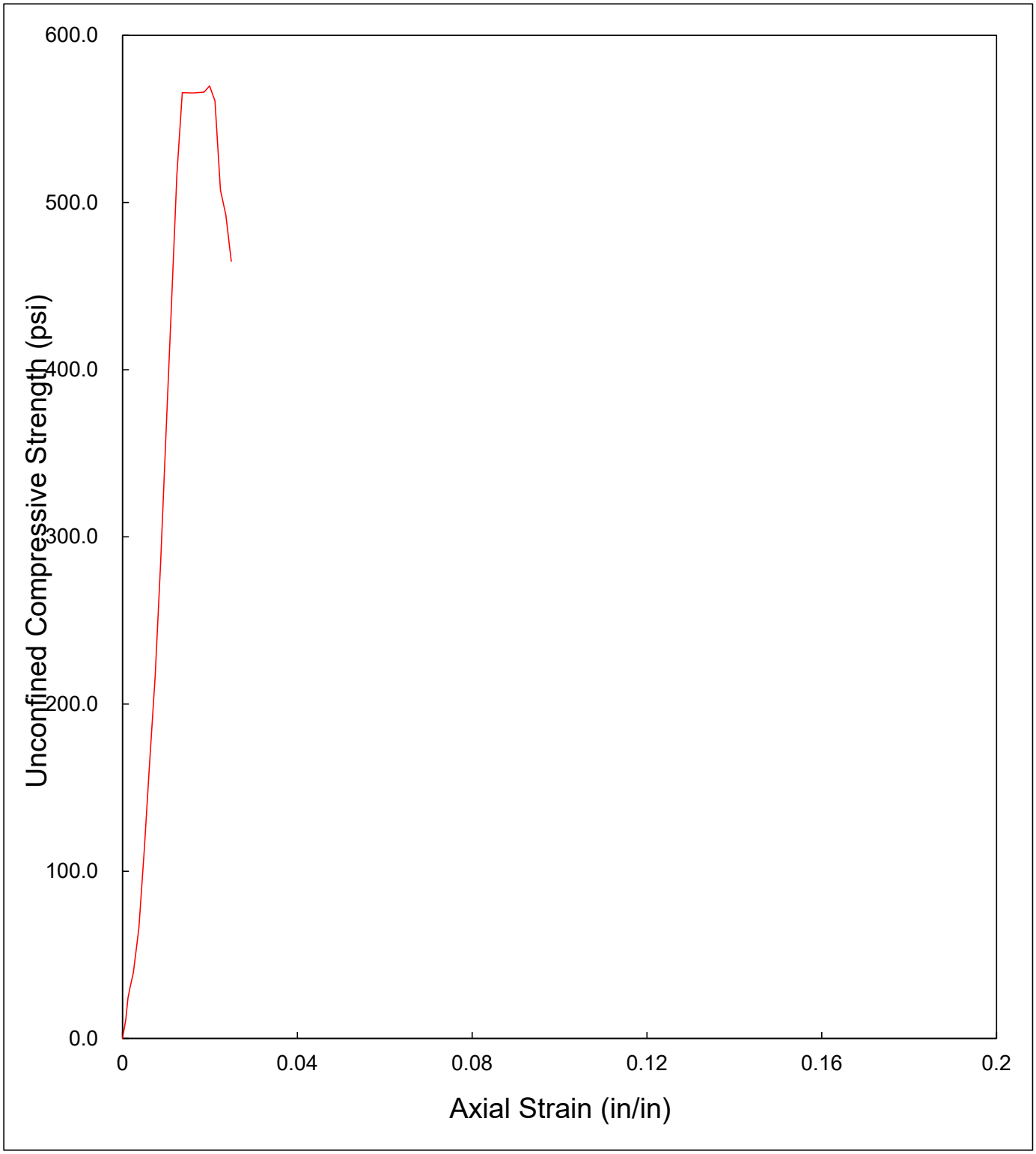
MOISTURE CONTENT (Dry Basis)		
1. MOISTURE TIN NO.		
2. WT MOISTURE TIN (tare weight)	221.73	g
3. WT WET SOIL + TARE	366.92	g
4. WT DRY SOIL + TARE	351.99	g
5. WT WATER, Ww	14.93	g
6. WT DRY SOIL, Ws	130.26	g
7. MOISTURE CONTENT, W	**11.46**	**%**

SOIL SPECIMEN DIMENSIONS				
	DIAMETER		***LENGTH***	
No. 1	1.99	in.	4.02	in.
No. 2	1.99	in.	4.04	in.
No. 3	1.99	in.	4.00	in.
Average	**1.99**	**in.**	**4.02**	**in.**

SPECIMEN CONDITIONS		
Initial Specimen WT, Wo	***457.69***	***g***
Initial Area, Ao	3.10	in²
Initial Volume, Vo	12.45	in³
Initial Bulk Unit Weight,	140.0	lb/ft³
Initial Dry Unit Weight	125.6	lb/ft³
15 % Strain (0.15 Lo)	0.60	in.
UCS	569.7	lb/in²

COMPRESSIVE LOAD (lbs.)	DIAL GAGE READING (in.)	SPECIMEN DEFORMATION (in.)	CORRECTED AREA (in²)	AXIAL STRAIN (in/in)	UNCONFINED COMPRESSIVE STRENGTH (lb/in²)
0	0.000	0.000	3.098	0.0000	0.0
34	0.003	0.003	3.101	0.0007	11.0
75	0.005	0.005	3.102	0.0012	24.2
95	0.007	0.007	3.104	0.0017	30.6
122	0.010	0.010	3.106	0.0025	39.3
205	0.015	0.015	3.110	0.0037	65.9
350	0.020	0.020	3.114	0.0050	112.4
518	0.025	0.025	3.118	0.0062	166.1
675	0.030	0.030	3.122	0.0075	216.2
890	0.035	0.035	3.126	0.0087	284.8
1133	0.040	0.040	3.129	0.0100	362.0
1372	0.045	0.045	3.133	0.0112	437.9
1622	0.050	0.050	3.137	0.0124	517.0
1777	0.055	0.055	3.141	0.0137	565.7
1779	0.060	0.060	3.145	0.0149	565.6
1781	0.065	0.065	3.149	0.0162	565.5
1784	0.070	0.070	3.153	0.0174	565.8
1787	0.075	0.075	3.157	0.0187	566.0
1801	0.080	0.080	3.161	0.0199	569.7
1775	0.085	0.085	3.165	0.0212	560.8
1608	0.090	0.090	3.169	0.0224	507.4
1563	0.095	0.095	3.173	0.0236	492.5
1477	0.100	0.100	3.177	0.0249	464.9

UNCONFINED COMPRESSION TESTING
Sample No. 0751-019 (7 Day)



UNCONFINED COMPRESSION TEST

ASTM D 2166
SUMMARY OF RESULTS

PROJECT:	C-D Systems Solidification Study		
PROJECT No.:	SH0751		
SAMPLE No.:	0751-019 (7 Day)		
TESTING DATE:	1-Dec-20	LOADING RATE:	0.0400 in./min
TESTED BY:	JBA	TRACKING CODE:	E313

TESTING PARAMETER AND RESULTS		
MOISTURE CONTENT	11.5	**%**
BULK UNIT WEIGHT	140.0	lb/ft³
DRY UNIT WEIGHT	125.6	lb/ft³
UCS *	569.7	lb/in²

* UCS - UNCONFINED COMPRESSIVE STRENGTH

UNCONFINED COMPRESSION TEST

ASTM D 2166

PROJECT:	C-D Systems Solidification Study		
PROJECT No.:	SH0751		
SAMPLE No.:	0751-020 (7 Day)		
TESTING DATE:	1-Dec-20	LOADING RATE:	0.0400 in./min
TESTED BY:	JBA	TRACKING CODE:	E314

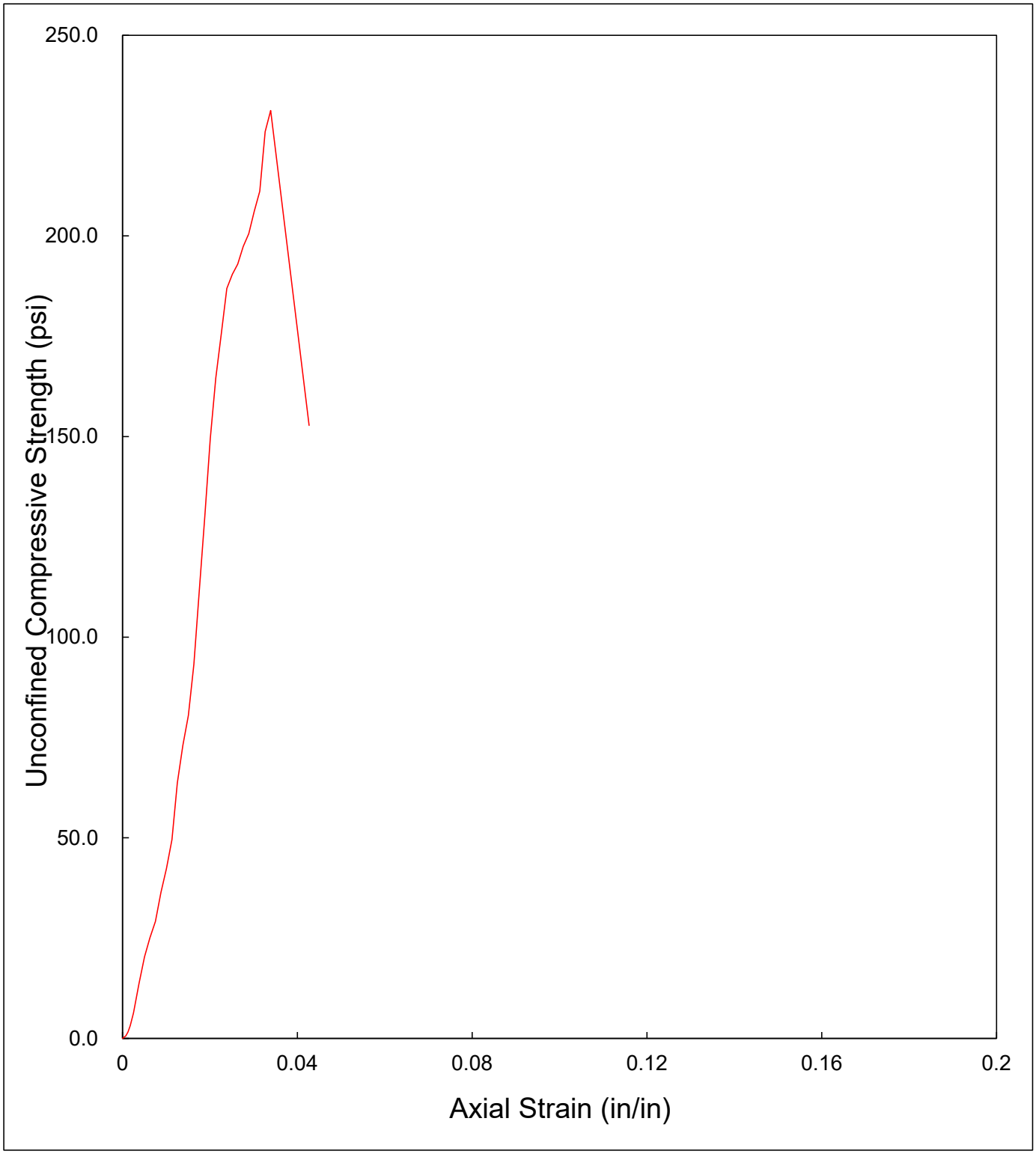
MOISTURE CONTENT (Dry Basis)		
1. MOISTURE TIN NO.		
2. WT MOISTURE TIN (tare weight)	216.43	g
3. WT WET SOIL + TARE	381.47	g
4. WT DRY SOIL + TARE	359.38	g
5. WT WATER, Ww	22.09	g
6. WT DRY SOIL, Ws	142.95	g
7. MOISTURE CONTENT, W	**15.45**	**%**

SOIL SPECIMEN DIMENSIONS				
	DIAMETER		***LENGTH***	
No. 1	2.01	in.	4.04	in.
No. 2	2.00	in.	3.90	in.
No. 3	1.99	in.	4.00	in.
Average	**2.00**	**in.**	**3.98**	**in.**

SPECIMEN CONDITIONS		
Initial Specimen WT, Wo	***432.66***	***g***
Initial Area, Ao	3.13	in²
Initial Volume, Vo	12.48	in³
Initial Bulk Unit Weight,	132.1	lb/ft³
Initial Dry Unit Weight	114.4	lb/ft³
15 % Strain (0.15 Lo)	0.60	in.
UCS	231.3	lb/in²

COMPRESSIVE LOAD (lbs.)	DIAL GAGE READING (in.)	SPECIMEN DEFORMATION (in.)	CORRECTED AREA (in²)	AXIAL STRAIN (in/in)	UNCONFINED COMPRESSIVE STRENGTH (lb/in²)
0	0.000	0.000	3.133	0.0000	0.0
2	0.003	0.003	3.136	0.0008	0.6
5	0.005	0.005	3.137	0.0013	1.6
10	0.007	0.007	3.139	0.0018	3.2
20	0.010	0.010	3.141	0.0025	6.4
43	0.015	0.015	3.145	0.0038	13.7
64	0.020	0.020	3.149	0.0050	20.3
79	0.025	0.025	3.153	0.0063	25.1
92	0.030	0.030	3.157	0.0075	29.1
115	0.035	0.035	3.161	0.0088	36.4
134	0.040	0.040	3.165	0.0100	42.3
157	0.045	0.045	3.169	0.0113	49.5
202	0.050	0.050	3.173	0.0126	63.7
232	0.055	0.055	3.177	0.0138	73.0
256	0.060	0.060	3.181	0.0151	80.5
297	0.065	0.065	3.185	0.0163	93.2
357	0.070	0.070	3.189	0.0176	111.9
415	0.075	0.075	3.193	0.0188	130.0
478	0.080	0.080	3.197	0.0201	149.5
527	0.085	0.085	3.202	0.0213	164.6
563	0.090	0.090	3.206	0.0226	175.6
600	0.095	0.095	3.210	0.0239	186.9
612	0.100	0.100	3.214	0.0251	190.4
621	0.105	0.105	3.218	0.0264	193.0
636	0.110	0.110	3.222	0.0276	197.4
647	0.115	0.115	3.226	0.0289	200.5
666	0.120	0.120	3.231	0.0301	206.2
683	0.125	0.125	3.235	0.0314	211.1
732	0.130	0.130	3.239	0.0326	226.0
750	0.135	0.135	3.243	0.0339	231.3
500	0.170	0.170	3.273	0.0427	152.8

UNCONFINED COMPRESSION TESTING
Sample No. 0751-020 (7 Day)



UNCONFINED COMPRESSION TEST

ASTM D 2166
SUMMARY OF RESULTS

PROJECT:	C-D Systems Solidification Study		
PROJECT No.:	SH0751		
SAMPLE No.:	0751-020 (7 Day)		
TESTING DATE:	1-Dec-20	LOADING RATE:	0.0400 in./min
TESTED BY:	JBA	TRACKING CODE:	E314

TESTING PARAMETER AND RESULTS		
MOISTURE CONTENT	15.5	**%**
BULK UNIT WEIGHT	132.1	lb/ft³
DRY UNIT WEIGHT	114.4	lb/ft³
UCS *	231.3	lb/in²

* UCS - UNCONFINED COMPRESSIVE STRENGTH

14 Day

MATERIAL pH

EPA METHOD 9045
DATA SHEET

PROJECT:	C-D Systems Solidification Study
PROJECT No.:	SH0751
TESTING DATE:	17-Dec-20
TESTED BY:	JBA/BLM
TRACKING CODE:	E315

	KEMRON SAMPLE No.	MATERIAL pH
1	0751-001 A	11.96
2	0751-001 B	12.46
3	0751-001 C	12.69
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
	AVERAGE:	12.37

UNCONFINED COMPRESSION TEST

ASTM D 2166

PROJECT:	C-D Systems Solidification Study		
PROJECT No.:	SH0751		
SAMPLE No.:	0751-001 (14 Day)		
TESTING DATE:	7-Dec-20	LOADING RATE:	0.0400 in./min
TESTED BY:	JBA	TRACKING CODE:	E315

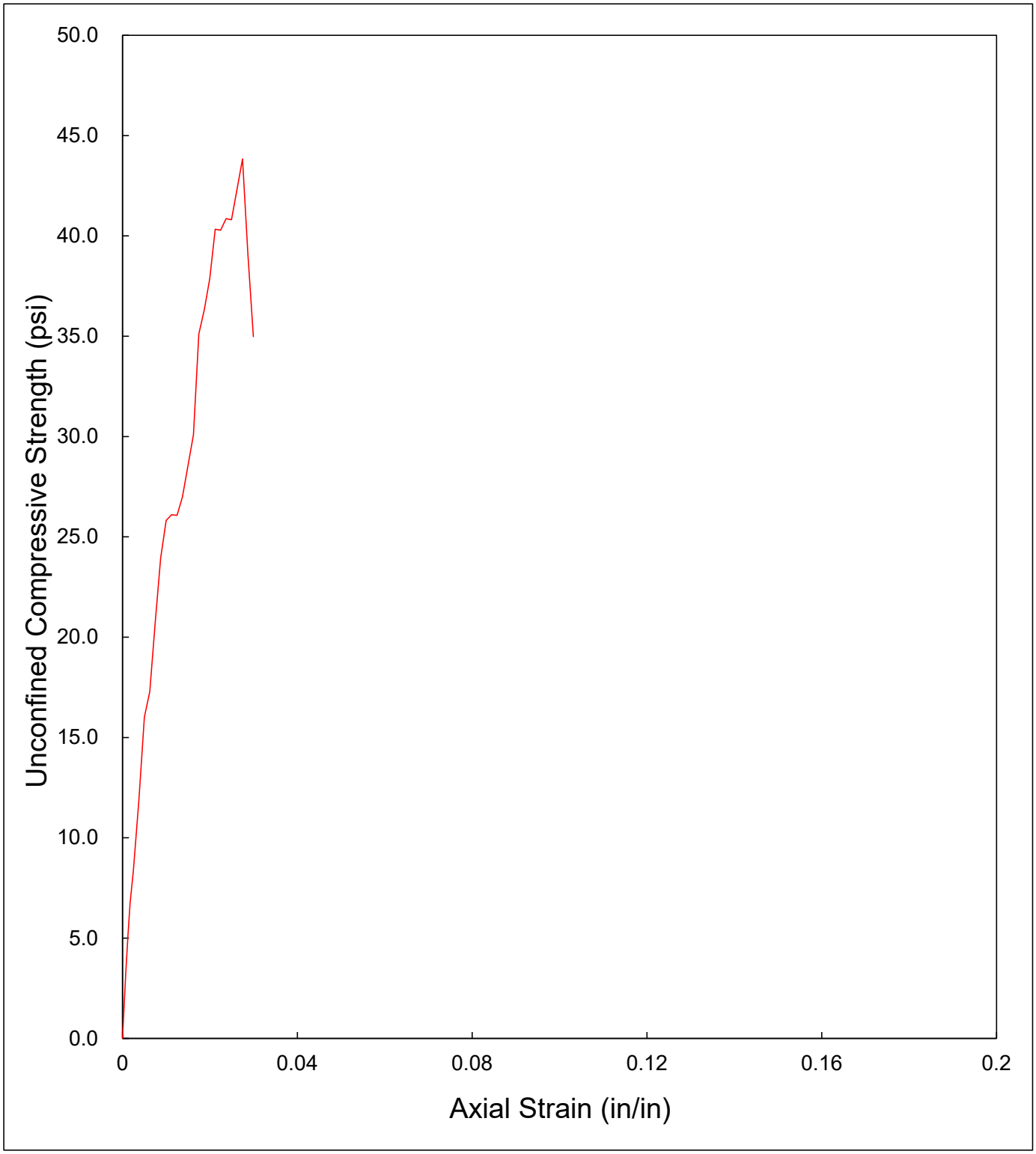
MOISTURE CONTENT (Dry Basis)		
1. MOISTURE TIN NO.		
2. WT MOISTURE TIN (tare weight)	214.66	g
3. WT WET SOIL + TARE	300.32	g
4. WT DRY SOIL + TARE	293.90	g
5. WT WATER, Ww	6.42	g
6. WT DRY SOIL, Ws	79.24	g
7. MOISTURE CONTENT, W	**8.10**	**%**

SOIL SPECIMEN DIMENSIONS				
	DIAMETER		***LENGTH***	
No. 1	1.99	in.	4.01	in.
No. 2	1.99	in.	4.03	in.
No. 3	1.99	in.	3.98	in.
Average	**1.99**	**in.**	**4.01**	**in.**

SPECIMEN CONDITIONS		
Initial Specimen WT, Wo	***408.65***	***g***
Initial Area, Ao	3.11	in²
Initial Volume, Vo	12.45	in³
Initial Bulk Unit Weight,	125.0	lb/ft³
Initial Dry Unit Weight	115.7	lb/ft³
15 % Strain (0.15 Lo)	0.60	in.
UCS	43.8	lb/in²

COMPRESSIVE LOAD (lbs.)	DIAL GAGE READING (in.)	SPECIMEN DEFORMATION (in.)	CORRECTED AREA (in²)	AXIAL STRAIN (in/in)	UNCONFINED COMPRESSIVE STRENGTH (lb/in²)
0	0.000	0.000	3.106	0.0000	0.0
10	0.003	0.003	3.108	0.0007	3.2
16	0.005	0.005	3.110	0.0012	5.1
21	0.007	0.007	3.112	0.0017	6.7
26	0.010	0.010	3.114	0.0025	8.3
37	0.015	0.015	3.118	0.0037	11.9
50	0.020	0.020	3.122	0.0050	16.0
54	0.025	0.025	3.126	0.0062	17.3
65	0.030	0.030	3.130	0.0075	20.8
75	0.035	0.035	3.133	0.0087	23.9
81	0.040	0.040	3.137	0.0100	25.8
82	0.045	0.045	3.141	0.0112	26.1
82	0.050	0.050	3.145	0.0125	26.1
85	0.055	0.055	3.149	0.0137	27.0
90	0.060	0.060	3.153	0.0150	28.5
95	0.065	0.065	3.157	0.0162	30.1
111	0.070	0.070	3.161	0.0175	35.1
115	0.075	0.075	3.165	0.0187	36.3
120	0.080	0.080	3.169	0.0200	37.9
128	0.085	0.085	3.173	0.0212	40.3
128	0.090	0.090	3.177	0.0225	40.3
130	0.095	0.095	3.181	0.0237	40.9
130	0.100	0.100	3.186	0.0250	40.8
135	0.105	0.105	3.190	0.0262	42.3
140	0.110	0.110	3.194	0.0274	43.8
125	0.115	0.115	3.198	0.0287	39.1
112	0.120	0.120	3.202	0.0299	35.0

UNCONFINED COMPRESSION TESTING
Sample No. 0751-001 (14 Day)



UNCONFINED COMPRESSION TEST

ASTM D 2166
SUMMARY OF RESULTS

PROJECT:	C-D Systems Solidification Study		
PROJECT No.:	SH0751		
SAMPLE No.:	0751-001 (14 Day)		
TESTING DATE:	7-Dec-20	LOADING RATE:	0.0400 in./min
TESTED BY:	JBA	TRACKING CODE:	E315

TESTING PARAMETER AND RESULTS		
MOISTURE CONTENT	8.1	**%**
BULK UNIT WEIGHT	125.0	lb/ft³
DRY UNIT WEIGHT	115.7	lb/ft³
UCS *	43.8	lb/in²

* UCS - UNCONFINED COMPRESSIVE STRENGTH

MATERIAL pH

EPA METHOD 9045
DATA SHEET

PROJECT:	C-D Systems Solidification Study
PROJECT No.:	SH0751
TESTING DATE:	17-Dec-20
TESTED BY:	JBA/BLM
TRACKING CODE:	E316

	KEMRON SAMPLE No.	MATERIAL pH
1	0751-002 A	12.81
2	0751-002 B	12.42
3	0751-002 C	13.06
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
	AVERAGE:	12.76

UNCONFINED COMPRESSION TEST

ASTM D 2166

PROJECT:	C-D Systems Solidification Study		
PROJECT No.:	SH0751		
SAMPLE No.:	0751-002 (14 Day)		
TESTING DATE:	7-Dec-20	LOADING RATE:	0.0400 in./min
TESTED BY:	JBA	TRACKING CODE:	E316

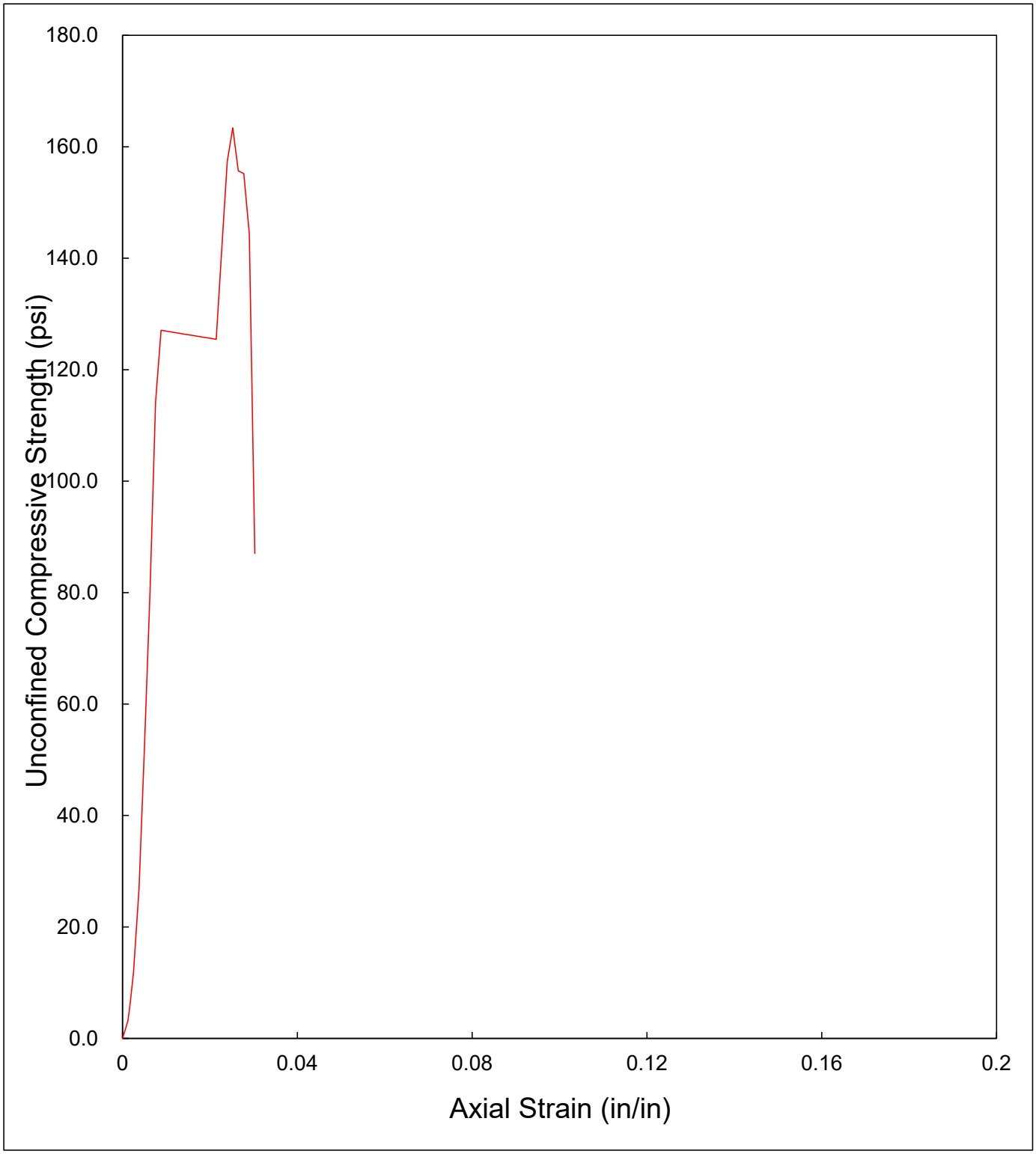
MOISTURE CONTENT (Dry Basis)		
1. MOISTURE TIN NO.		
2. WT MOISTURE TIN (tare weight)	221.43	g
3. WT WET SOIL + TARE	326.18	g
4. WT DRY SOIL + TARE	316.82	g
5. WT WATER, Ww	9.36	g
6. WT DRY SOIL, Ws	95.39	g
7. MOISTURE CONTENT, W	**9.81**	**%**

SOIL SPECIMEN DIMENSIONS				
	DIAMETER		***LENGTH***	
No. 1	2.00	in.	3.96	in.
No. 2	1.99	in.	3.96	in.
No. 3	1.99	in.	3.98	in.
Average	**1.99**	**in.**	**3.96**	**in.**

SPECIMEN CONDITIONS		
Initial Specimen WT, Wo	***457.63***	***g***
Initial Area, Ao	3.12	in²
Initial Volume, Vo	12.37	in³
Initial Bulk Unit Weight,	140.9	lb/ft³
Initial Dry Unit Weight	128.4	lb/ft³
15 % Strain (0.15 Lo)	0.59	in.
UCS	163.4	lb/in²

COMPRESSIVE LOAD (lbs.)	DIAL GAGE READING (in.)	SPECIMEN DEFORMATION (in.)	CORRECTED AREA (in²)	AXIAL STRAIN (in/in)	UNCONFINED COMPRESSIVE STRENGTH (lb/in²)
0	0.000	0.000	3.120	0.0000	0.0
6	0.003	0.003	3.123	0.0008	1.9
10	0.005	0.005	3.124	0.0013	3.2
20	0.007	0.007	3.126	0.0018	6.4
37	0.010	0.010	3.128	0.0025	11.8
84	0.015	0.015	3.132	0.0038	26.8
165	0.020	0.020	3.136	0.0050	52.6
252	0.025	0.025	3.140	0.0063	80.3
359	0.030	0.030	3.144	0.0076	114.2
400	0.035	0.035	3.148	0.0088	127.1
400	0.040	0.040	3.152	0.0101	126.9
400	0.045	0.045	3.156	0.0114	126.7
400	0.050	0.050	3.160	0.0126	126.6
400	0.055	0.055	3.164	0.0139	126.4
400	0.060	0.060	3.168	0.0151	126.3
400	0.065	0.065	3.172	0.0164	126.1
400	0.070	0.070	3.176	0.0177	125.9
400	0.075	0.075	3.180	0.0189	125.8
400	0.080	0.080	3.184	0.0202	125.6
400	0.085	0.085	3.189	0.0214	125.4
452	0.090	0.090	3.193	0.0227	141.6
503	0.095	0.095	3.197	0.0240	157.3
523	0.100	0.100	3.201	0.0252	163.4
499	0.105	0.105	3.205	0.0265	155.7
498	0.110	0.110	3.209	0.0277	155.2
464	0.115	0.115	3.213	0.0290	144.4
280	0.120	0.120	3.218	0.0303	87.0

UNCONFINED COMPRESSION TESTING
Sample No. 0751-002 (14 Day)



UNCONFINED COMPRESSION TEST

ASTM D 2166
SUMMARY OF RESULTS

PROJECT:	C-D Systems Solidification Study		
PROJECT No.:	SH0751		
SAMPLE No.:	0751-002 (14 Day)		
TESTING DATE:	7-Dec-20	LOADING RATE:	0.0400 in./min
TESTED BY:	JBA	TRACKING CODE:	E316

TESTING PARAMETER AND RESULTS		
MOISTURE CONTENT	9.8	**%**
BULK UNIT WEIGHT	140.9	lb/ft³
DRY UNIT WEIGHT	128.4	lb/ft³
UCS *	163.4	lb/in²

* UCS - UNCONFINED COMPRESSIVE STRENGTH

MATERIAL pH

EPA METHOD 9045
DATA SHEET

PROJECT:	C-D Systems Solidification Study
PROJECT No.:	SH0751
TESTING DATE:	17-Dec-20
TESTED BY:	JBA/BLM
TRACKING CODE:	E317

	KEMRON SAMPLE No.	MATERIAL pH
1	0751-003 A	12.86
2	0751-003 B	13.13
3	0751-003 C	13.25
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
	AVERAGE:	13.08

UNCONFINED COMPRESSION TEST

ASTM D 2166

PROJECT:	C-D Systems Solidification Study		
PROJECT No.:	SH0751		
SAMPLE No.:	0751-003 (14 Day)		
TESTING DATE:	7-Dec-20	LOADING RATE:	0.0400 in./min
TESTED BY:	JBA	TRACKING CODE:	E317

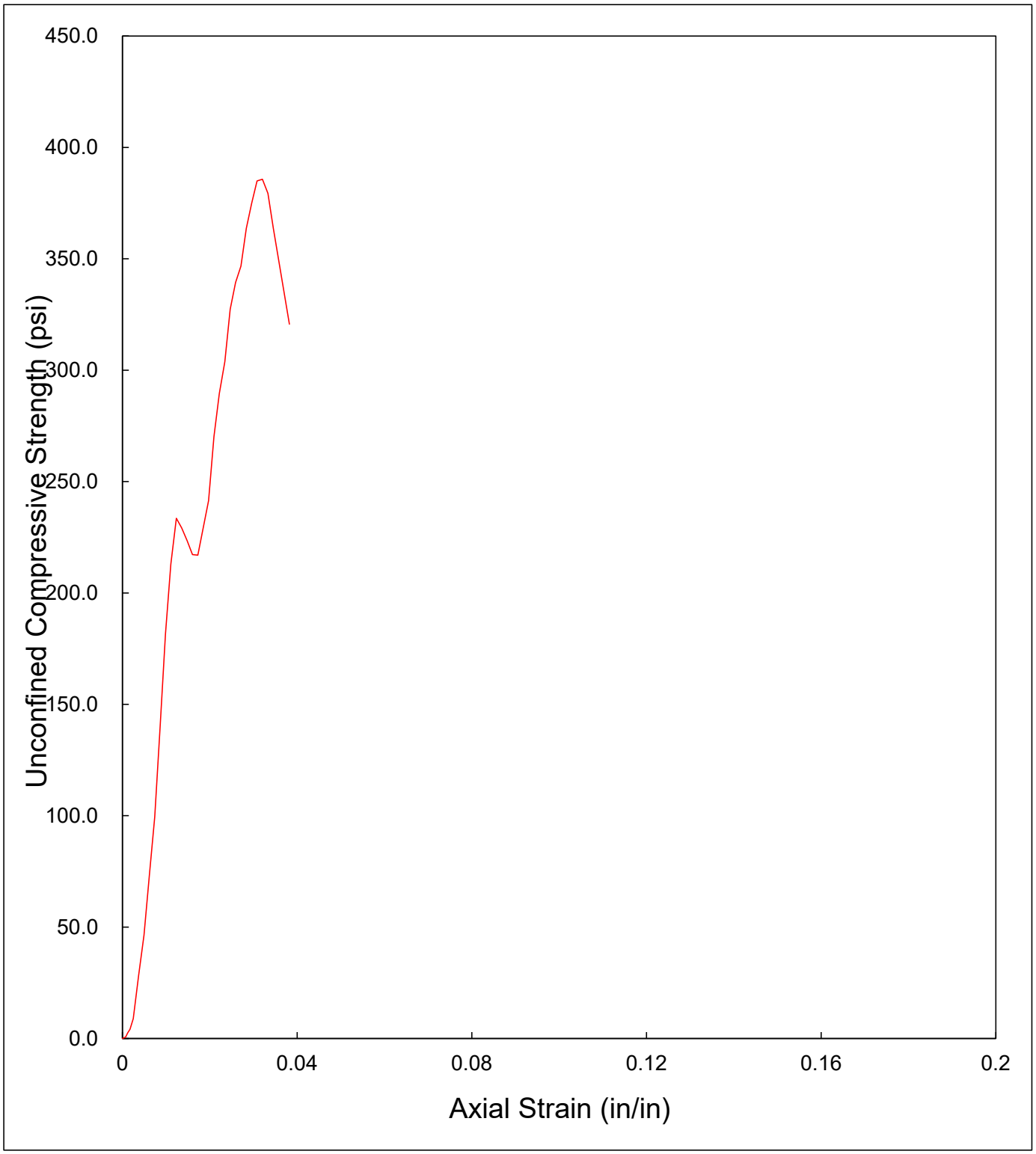
MOISTURE CONTENT (Dry Basis)		
1. MOISTURE TIN NO.		
2. WT MOISTURE TIN (tare weight)	216.95	g
3. WT WET SOIL + TARE	338.88	g
4. WT DRY SOIL + TARE	326.23	g
5. WT WATER, Ww	12.65	g
6. WT DRY SOIL, Ws	109.28	g
7. MOISTURE CONTENT, W	**11.58**	**%**

SOIL SPECIMEN DIMENSIONS				
	DIAMETER		***LENGTH***	
No. 1	2.01	in.	4.07	in.
No. 2	2.00	in.	4.06	in.
No. 3	1.99	in.	4.04	in.
Average	**2.00**	**in.**	**4.05**	**in.**

SPECIMEN CONDITIONS		
Initial Specimen WT, Wo	***459.84***	***g***
Initial Area, Ao	3.13	in²
Initial Volume, Vo	12.71	in³
Initial Bulk Unit Weight,	137.9	lb/ft³
Initial Dry Unit Weight	123.6	lb/ft³
15 % Strain (0.15 Lo)	0.61	in.
UCS	385.7	lb/in²

COMPRESSIVE LOAD (lbs.)	DIAL GAGE READING (in.)	SPECIMEN DEFORMATION (in.)	CORRECTED AREA (in²)	AXIAL STRAIN (in/in)	UNCONFINED COMPRESSIVE STRENGTH (lb/in²)
0	0.000	0.000	3.134	0.0000	0.0
2	0.003	0.003	3.137	0.0007	0.6
8	0.005	0.005	3.138	0.0012	2.5
13	0.007	0.007	3.140	0.0017	4.1
28	0.010	0.010	3.142	0.0025	8.9
89	0.015	0.015	3.146	0.0037	28.3
146	0.020	0.020	3.150	0.0049	46.4
231	0.025	0.025	3.154	0.0062	73.2
314	0.030	0.030	3.158	0.0074	99.4
442	0.035	0.035	3.162	0.0086	139.8
575	0.040	0.040	3.166	0.0099	181.6
675	0.045	0.045	3.169	0.0111	213.0
741	0.050	0.050	3.173	0.0123	233.5
728	0.055	0.055	3.177	0.0136	229.1
711	0.060	0.060	3.181	0.0148	223.5
692	0.065	0.065	3.185	0.0160	217.2
692	0.070	0.070	3.189	0.0173	217.0
772	0.080	0.080	3.197	0.0197	241.4
865	0.085	0.085	3.201	0.0210	270.2
928	0.090	0.090	3.205	0.0222	289.5
975	0.095	0.095	3.209	0.0234	303.8
1052	0.100	0.100	3.214	0.0247	327.4
1092	0.105	0.105	3.218	0.0259	339.4
1117	0.110	0.110	3.222	0.0271	346.7
1173	0.115	0.115	3.226	0.0284	363.6
1211	0.120	0.120	3.230	0.0296	374.9
1245	0.125	0.125	3.234	0.0308	385.0
1249	0.130	0.130	3.238	0.0321	385.7
1230	0.135	0.135	3.242	0.0333	379.4
1181	0.140	0.140	3.246	0.0345	363.8
1045	0.155	0.155	3.259	0.0382	320.7

UNCONFINED COMPRESSION TESTING
Sample No. 0751-003 (14 Day)



UNCONFINED COMPRESSION TEST

ASTM D 2166
SUMMARY OF RESULTS

PROJECT:	C-D Systems Solidification Study		
PROJECT No.:	SH0751		
SAMPLE No.:	0751-003 (14 Day)		
TESTING DATE:	7-Dec-20	LOADING RATE:	0.0400 in./min
TESTED BY:	JBA	TRACKING CODE:	E317

TESTING PARAMETER AND RESULTS		
MOISTURE CONTENT	11.6	**%**
BULK UNIT WEIGHT	137.9	lb/ft³
DRY UNIT WEIGHT	123.6	lb/ft³
UCS *	385.7	lb/in²

* UCS - UNCONFINED COMPRESSIVE STRENGTH

MATERIAL pH

EPA METHOD 9045
DATA SHEET

PROJECT:	C-D Systems Solidification Study
PROJECT No.:	SH0751
TESTING DATE:	17-Dec-20
TESTED BY:	JBA/BLM
TRACKING CODE:	E318

	KEMRON SAMPLE No.	MATERIAL pH
1	0751-004 A	13.43
2	0751-004 B	12.93
3	0751-004 C	12.85
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
	AVERAGE:	13.07

UNCONFINED COMPRESSION TEST

ASTM D 2166

PROJECT:	C-D Systems Solidification Study		
PROJECT No.:	SH0751		
SAMPLE No.:	0751-004 (14 Day)		
TESTING DATE:	7-Dec-20	LOADING RATE:	0.0400 in./min
TESTED BY:	JBA	TRACKING CODE:	E318

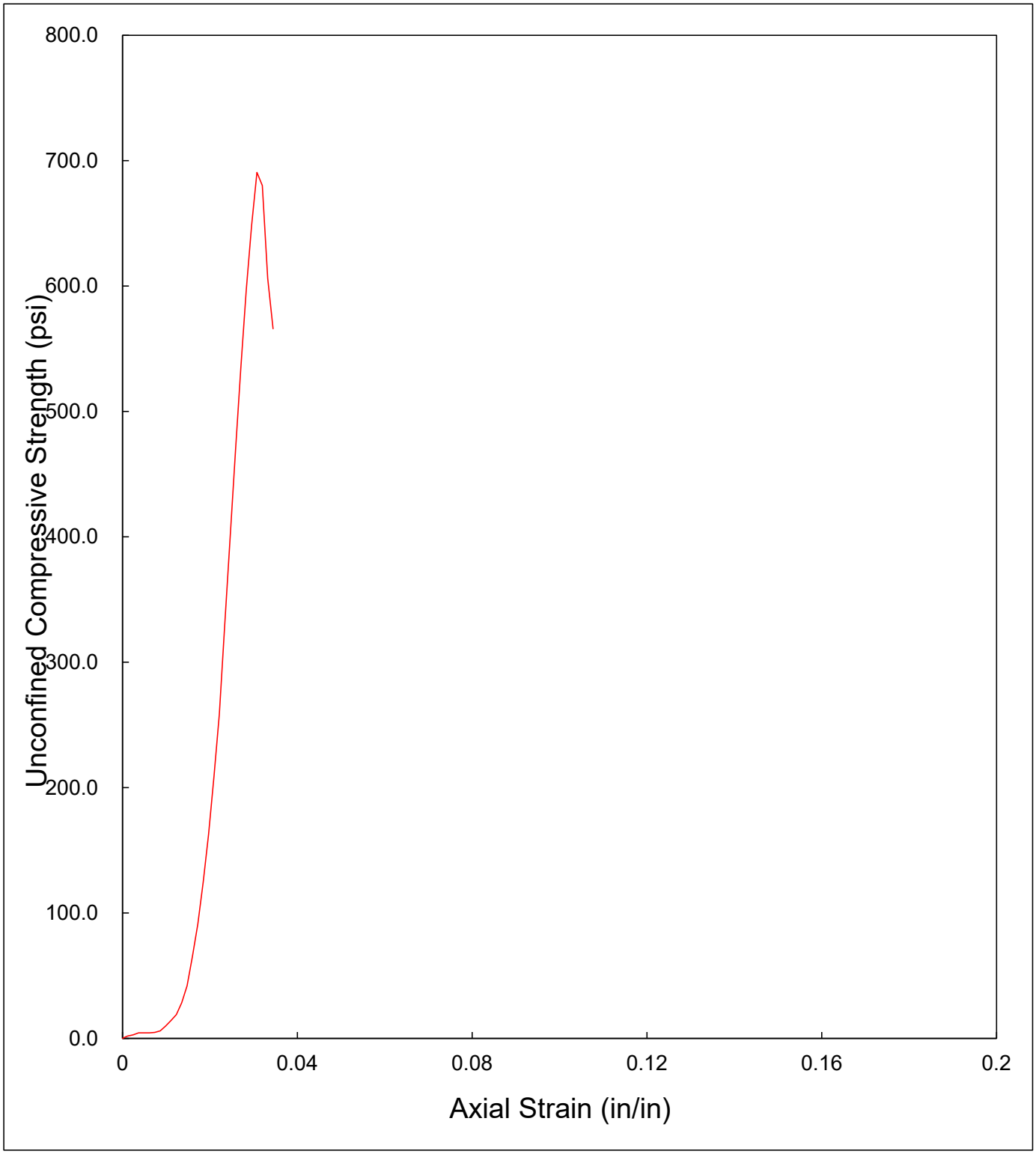
MOISTURE CONTENT (Dry Basis)		
1. MOISTURE TIN NO.		
2. WT MOISTURE TIN (tare weight)	225.47	g
3. WT WET SOIL + TARE	330.43	g
4. WT DRY SOIL + TARE	318.42	g
5. WT WATER, Ww	12.01	g
6. WT DRY SOIL, Ws	92.95	g
7. MOISTURE CONTENT, W	**12.92**	**%**

SOIL SPECIMEN DIMENSIONS				
	DIAMETER		***LENGTH***	
No. 1	2.00	in.	4.06	in.
No. 2	1.99	in.	4.08	in.
No. 3	1.99	in.	4.05	in.
Average	**1.99**	**in.**	**4.06**	**in.**

SPECIMEN CONDITIONS		
Initial Specimen WT, Wo	***457.90***	***g***
Initial Area, Ao	3.12	in²
Initial Volume, Vo	12.70	in³
Initial Bulk Unit Weight,	137.4	lb/ft³
Initial Dry Unit Weight	121.7	lb/ft³
15 % Strain (0.15 Lo)	0.61	in.
UCS	690.7	lb/in²

COMPRESSIVE LOAD (lbs.)	DIAL GAGE READING (in.)	SPECIMEN DEFORMATION (in.)	CORRECTED AREA (in²)	AXIAL STRAIN (in/in)	UNCONFINED COMPRESSIVE STRENGTH (lb/in²)
0	0.000	0.000	3.124	0.0000	0.0
4	0.003	0.003	3.126	0.0007	1.3
6	0.005	0.005	3.128	0.0012	1.9
7	0.007	0.007	3.129	0.0017	2.2
9	0.010	0.010	3.132	0.0025	2.9
14	0.015	0.015	3.135	0.0037	4.5
14	0.020	0.020	3.139	0.0049	4.5
14	0.025	0.025	3.143	0.0062	4.5
15	0.030	0.030	3.147	0.0074	4.8
19	0.035	0.035	3.151	0.0086	6.0
31	0.040	0.040	3.155	0.0098	9.8
45	0.045	0.045	3.159	0.0111	14.2
60	0.050	0.050	3.163	0.0123	19.0
90	0.055	0.055	3.167	0.0135	28.4
133	0.060	0.060	3.171	0.0148	41.9
208	0.065	0.065	3.175	0.0160	65.5
290	0.070	0.070	3.179	0.0172	91.2
397	0.075	0.075	3.183	0.0185	124.7
519	0.080	0.080	3.187	0.0197	162.9
666	0.085	0.085	3.191	0.0209	208.7
826	0.090	0.090	3.195	0.0221	258.6
1054	0.095	0.095	3.199	0.0234	329.5
1277	0.100	0.100	3.203	0.0246	398.7
1501	0.105	0.105	3.207	0.0258	468.1
1717	0.110	0.110	3.211	0.0271	534.8
1917	0.115	0.115	3.215	0.0283	596.3
2086	0.120	0.120	3.219	0.0295	648.1
2226	0.125	0.125	3.223	0.0308	690.7
2195	0.130	0.130	3.227	0.0320	680.2
1959	0.135	0.135	3.231	0.0332	606.3
1831	0.140	0.140	3.235	0.0344	566.0

UNCONFINED COMPRESSION TESTING
Sample No. 0751-004 (14 Day)



UNCONFINED COMPRESSION TEST

ASTM D 2166
SUMMARY OF RESULTS

PROJECT:	C-D Systems Solidification Study		
PROJECT No.:	SH0751		
SAMPLE No.:	0751-004 (14 Day)		
TESTING DATE:	7-Dec-20	LOADING RATE:	0.0400 in./min
TESTED BY:	JBA	TRACKING CODE:	E318

TESTING PARAMETER AND RESULTS		
MOISTURE CONTENT	12.9	**%**
BULK UNIT WEIGHT	137.4	lb/ft³
DRY UNIT WEIGHT	121.7	lb/ft³
UCS *	690.7	lb/in²

* UCS - UNCONFINED COMPRESSIVE STRENGTH

MATERIAL pH

EPA METHOD 9045
DATA SHEET

PROJECT:	C-D Systems Solidification Study
PROJECT No.:	SH0751
TESTING DATE:	17-Dec-20
TESTED BY:	JBA/BLM
TRACKING CODE:	E319

	KEMRON SAMPLE No.	MATERIAL pH
1	0751-005 A	12.97
2	0751-005 B	13.12
3	0751-005 C	12.75
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
	AVERAGE:	12.95

UNCONFINED COMPRESSION TEST

ASTM D 2166

PROJECT:	C-D Systems Solidification Study		
PROJECT No.:	SH0751		
SAMPLE No.:	0751-005 (14 Day)		
TESTING DATE:	7-Dec-20	LOADING RATE:	0.0400 in./min
TESTED BY:	JBA	TRACKING CODE:	E319

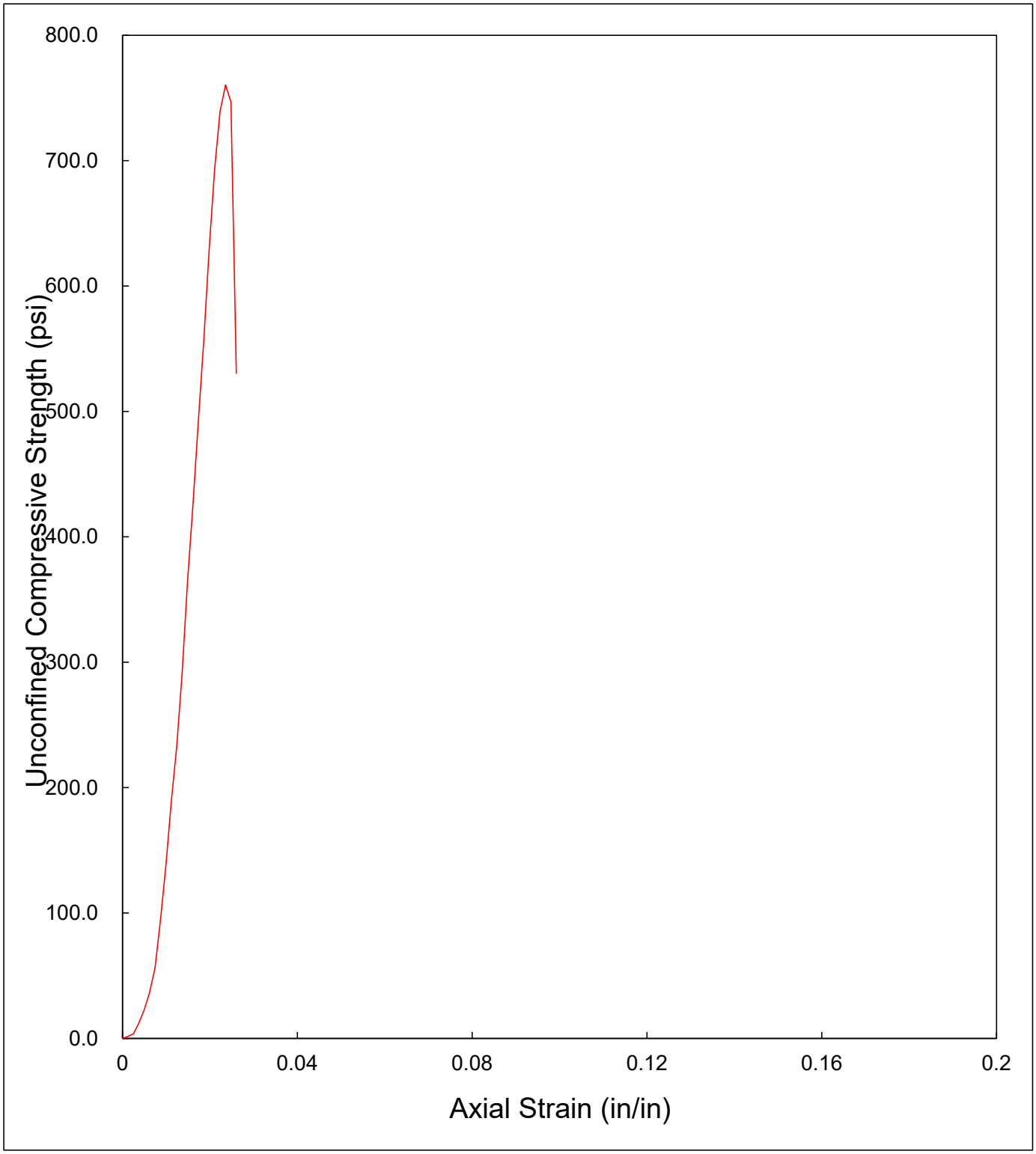
MOISTURE CONTENT (Dry Basis)		
1. MOISTURE TIN NO.		
2. WT MOISTURE TIN (tare weight)	219.92	g
3. WT WET SOIL + TARE	366.32	g
4. WT DRY SOIL + TARE	346.31	g
5. WT WATER, Ww	20.01	g
6. WT DRY SOIL, Ws	126.39	g
7. MOISTURE CONTENT, W	**15.83**	**%**

SOIL SPECIMEN DIMENSIONS				
	DIAMETER		***LENGTH***	
No. 1	2.00	in.	4.06	in.
No. 2	2.00	in.	4.02	in.
No. 3	1.99	in.	4.02	in.
Average	**2.00**	**in.**	**4.03**	**in.**

SPECIMEN CONDITIONS		
Initial Specimen WT, Wo	***448.86***	***g***
Initial Area, Ao	3.13	in²
Initial Volume, Vo	12.63	in³
Initial Bulk Unit Weight,	135.4	lb/ft³
Initial Dry Unit Weight	116.9	lb/ft³
15 % Strain (0.15 Lo)	0.60	in.
UCS	760.4	lb/in²

COMPRESSIVE LOAD (lbs.)	DIAL GAGE READING (in.)	SPECIMEN DEFORMATION (in.)	CORRECTED AREA (in²)	AXIAL STRAIN (in/in)	UNCONFINED COMPRESSIVE STRENGTH (lb/in²)
0	0.000	0.000	3.133	0.0000	0.0
3	0.003	0.003	3.136	0.0007	1.0
5	0.005	0.005	3.137	0.0012	1.6
8	0.007	0.007	3.139	0.0017	2.5
11	0.010	0.010	3.141	0.0025	3.5
38	0.015	0.015	3.145	0.0037	12.1
72	0.020	0.020	3.149	0.0050	22.9
116	0.025	0.025	3.153	0.0062	36.8
177	0.030	0.030	3.157	0.0074	56.1
299	0.035	0.035	3.161	0.0087	94.6
436	0.040	0.040	3.165	0.0099	137.8
597	0.045	0.045	3.169	0.0112	188.4
740	0.050	0.050	3.173	0.0124	233.2
926	0.055	0.055	3.177	0.0136	291.5
1159	0.060	0.060	3.181	0.0149	364.4
1358	0.065	0.065	3.185	0.0161	426.4
1572	0.070	0.070	3.189	0.0174	493.0
1777	0.075	0.075	3.193	0.0186	556.6
2017	0.080	0.080	3.197	0.0198	631.0
2220	0.085	0.085	3.201	0.0211	693.6
2369	0.090	0.090	3.205	0.0223	739.2
2440	0.095	0.095	3.209	0.0236	760.4
2400	0.100	0.100	3.213	0.0248	747.0
1706	0.105	0.105	3.217	0.0260	530.3

UNCONFINED COMPRESSION TESTING
Sample No. 0751-005 (14 Day)



UNCONFINED COMPRESSION TEST

ASTM D 2166
SUMMARY OF RESULTS

PROJECT:	C-D Systems Solidification Study		
PROJECT No.:	SH0751		
SAMPLE No.:	0751-005 (14 Day)		
TESTING DATE:	7-Dec-20	LOADING RATE:	0.0400 in./min
TESTED BY:	JBA	TRACKING CODE:	E319

TESTING PARAMETER AND RESULTS		
MOISTURE CONTENT	15.8	**%**
BULK UNIT WEIGHT	135.4	lb/ft³
DRY UNIT WEIGHT	116.9	lb/ft³
UCS *	760.4	lb/in²

* UCS - UNCONFINED COMPRESSIVE STRENGTH

MATERIAL pH

EPA METHOD 9045
DATA SHEET

PROJECT:	C-D Systems Solidification Study
PROJECT No.:	SH0751
TESTING DATE:	17-Dec-20
TESTED BY:	JBA/BLM
TRACKING CODE:	E320

	KEMRON SAMPLE No.	MATERIAL pH
1	0751-006 A	13.10
2	0751-006 B	12.91
3	0751-006 C	13.25
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
	AVERAGE:	13.09

UNCONFINED COMPRESSION TEST

ASTM D 2166

PROJECT:	C-D Systems Solidification Study		
PROJECT No.:	SH0751		
SAMPLE No.:	0751-006 (14 Day)		
TESTING DATE:	7-Dec-20	LOADING RATE:	0.0400 in./min
TESTED BY:	JBA	TRACKING CODE:	E320

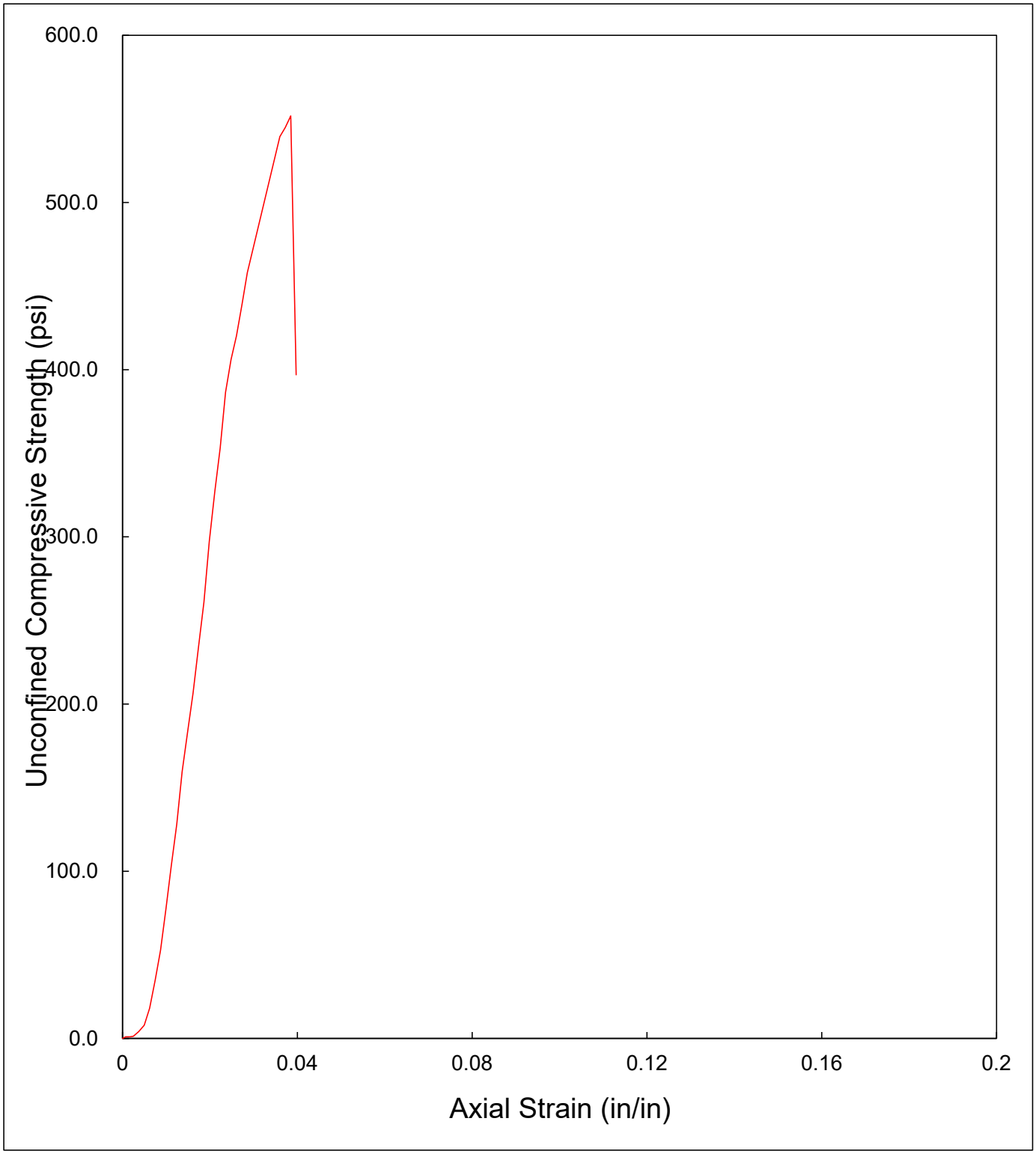
MOISTURE CONTENT (Dry Basis)		
1. MOISTURE TIN NO.		
2. WT MOISTURE TIN (tare weight)	219.19	g
3. WT WET SOIL + TARE	400.81	g
4. WT DRY SOIL + TARE	375.83	g
5. WT WATER, Ww	24.98	g
6. WT DRY SOIL, Ws	156.64	g
7. MOISTURE CONTENT, W	**15.95**	**%**

SOIL SPECIMEN DIMENSIONS				
	DIAMETER		***LENGTH***	
No. 1	2.00	in.	4.09	in.
No. 2	2.00	in.	4.02	in.
No. 3	2.00	in.	3.97	in.
Average	**2.00**	**in.**	**4.03**	**in.**

SPECIMEN CONDITIONS		
Initial Specimen WT, Wo	***437.67***	***g***
Initial Area, Ao	3.15	in²
Initial Volume, Vo	12.67	in³
Initial Bulk Unit Weight,	131.6	lb/ft³
Initial Dry Unit Weight	113.5	lb/ft³
15 % Strain (0.15 Lo)	0.60	in.
UCS	551.8	lb/in²

COMPRESSIVE LOAD (lbs.)	DIAL GAGE READING (in.)	SPECIMEN DEFORMATION (in.)	CORRECTED AREA (in²)	AXIAL STRAIN (in/in)	UNCONFINED COMPRESSIVE STRENGTH (lb/in²)
0	0.000	0.000	3.145	0.0000	0.0
3	0.003	0.003	3.148	0.0007	1.0
3	0.005	0.005	3.149	0.0012	1.0
3	0.007	0.007	3.151	0.0017	1.0
4	0.010	0.010	3.153	0.0025	1.3
13	0.015	0.015	3.157	0.0037	4.1
25	0.020	0.020	3.161	0.0050	7.9
57	0.025	0.025	3.165	0.0062	18.0
110	0.030	0.030	3.169	0.0074	34.7
167	0.035	0.035	3.173	0.0087	52.6
245	0.040	0.040	3.177	0.0099	77.1
330	0.045	0.045	3.181	0.0112	103.7
408	0.050	0.050	3.185	0.0124	128.1
509	0.055	0.055	3.189	0.0137	159.6
586	0.060	0.060	3.193	0.0149	183.5
660	0.065	0.065	3.197	0.0161	206.5
750	0.070	0.070	3.201	0.0174	234.3
836	0.075	0.075	3.205	0.0186	260.8
954	0.080	0.080	3.209	0.0199	297.3
1051	0.085	0.085	3.213	0.0211	327.1
1136	0.090	0.090	3.217	0.0223	353.1
1245	0.095	0.095	3.221	0.0236	386.5
1310	0.100	0.100	3.225	0.0248	406.2
1357	0.105	0.105	3.229	0.0261	420.2
1419	0.110	0.110	3.234	0.0273	438.8
1483	0.115	0.115	3.238	0.0286	458.0
1760	0.145	0.145	3.263	0.0360	539.4
1780	0.150	0.150	3.267	0.0372	544.9
1805	0.155	0.155	3.271	0.0385	551.8
1300	0.160	0.160	3.275	0.0397	396.9

UNCONFINED COMPRESSION TESTING
Sample No. 0751-006 (14 Day)



UNCONFINED COMPRESSION TEST

ASTM D 2166
SUMMARY OF RESULTS

PROJECT:	C-D Systems Solidification Study		
PROJECT No.:	SH0751		
SAMPLE No.:	0751-006 (14 Day)		
TESTING DATE:	7-Dec-20	LOADING RATE:	0.0400 in./min
TESTED BY:	JBA	TRACKING CODE:	E320

TESTING PARAMETER AND RESULTS		
MOISTURE CONTENT	15.9	**%**
BULK UNIT WEIGHT	131.6	lb/ft³
DRY UNIT WEIGHT	113.5	lb/ft³
UCS *	551.8	lb/in²

* UCS - UNCONFINED COMPRESSIVE STRENGTH

MATERIAL pH

EPA METHOD 9045
DATA SHEET

PROJECT:	C-D Systems Solidification Study
PROJECT No.:	SH0751
TESTING DATE:	17-Dec-20
TESTED BY:	JBA/BLM
TRACKING CODE:	E321

	KEMRON SAMPLE No.	MATERIAL pH
1	0751-007 A	13.28
2	0751-007 B	13.30
3	0751-007 C	13.36
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
	AVERAGE:	13.31

UNCONFINED COMPRESSION TEST

ASTM D 2166

PROJECT:	C-D Systems Solidification Study		
PROJECT No.:	SH0751		
SAMPLE No.:	0751-007 (14 Day)		
TESTING DATE:	7-Dec-20	LOADING RATE:	0.0400 in./min
TESTED BY:	JBA	TRACKING CODE:	E321

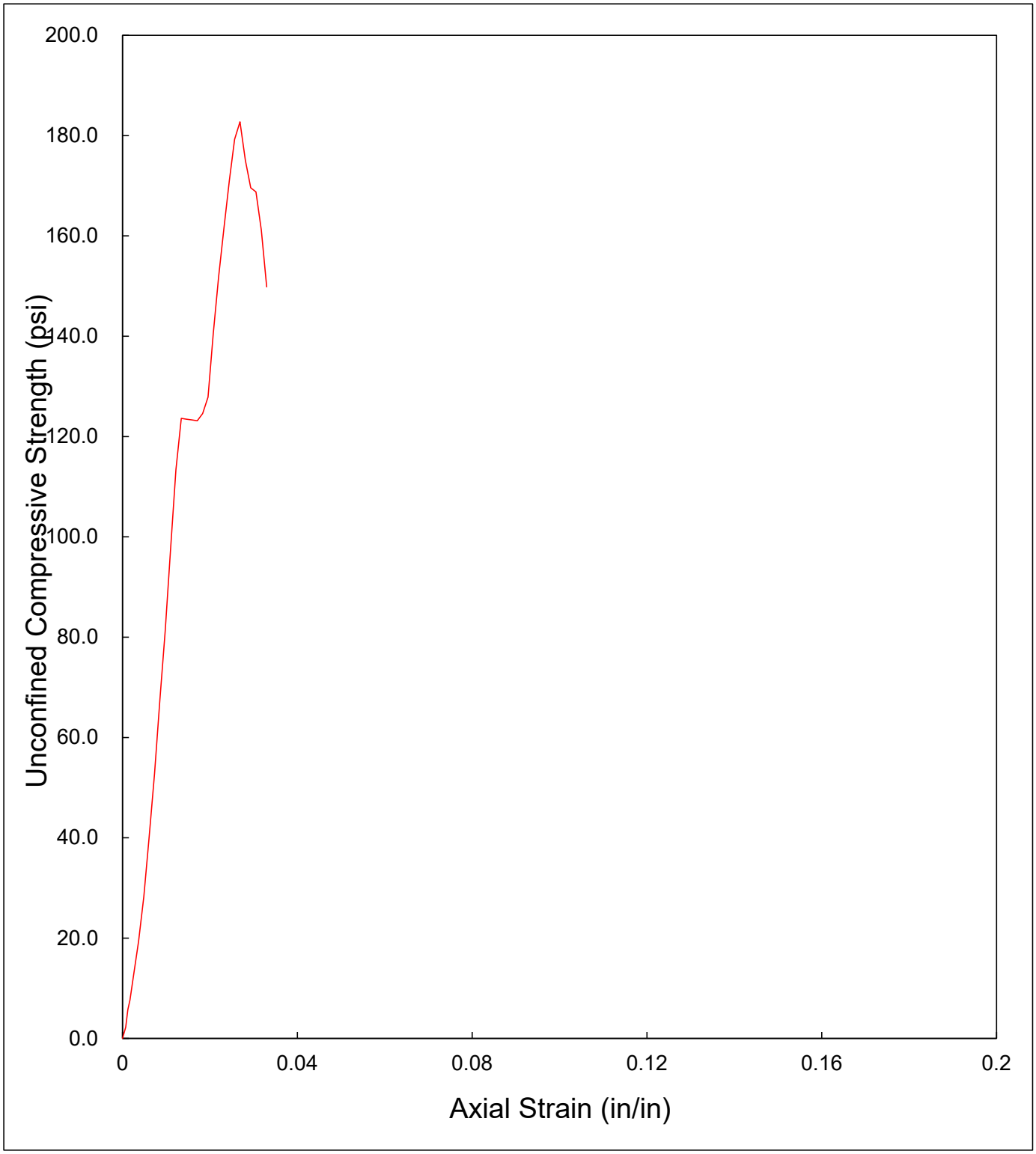
MOISTURE CONTENT (Dry Basis)		
1. MOISTURE TIN NO.		
2. WT MOISTURE TIN (tare weight)	225.93	g
3. WT WET SOIL + TARE	338.06	g
4. WT DRY SOIL + TARE	326.20	g
5. WT WATER, Ww	11.86	g
6. WT DRY SOIL, Ws	100.27	g
7. MOISTURE CONTENT, W	**11.83**	**%**

SOIL SPECIMEN DIMENSIONS				
	DIAMETER		***LENGTH***	
No. 1	2.00	in.	4.06	in.
No. 2	2.00	in.	4.11	in.
No. 3	1.99	in.	4.11	in.
Average	**2.00**	**in.**	**4.09**	**in.**

SPECIMEN CONDITIONS		
Initial Specimen WT, Wo	***463.20***	***g***
Initial Area, Ao	3.14	in²
Initial Volume, Vo	12.83	in³
Initial Bulk Unit Weight,	137.5	lb/ft³
Initial Dry Unit Weight	122.9	lb/ft³
15 % Strain (0.15 Lo)	0.61	in.
UCS	182.7	lb/in²

COMPRESSIVE LOAD (lbs.)	DIAL GAGE READING (in.)	SPECIMEN DEFORMATION (in.)	CORRECTED AREA (in²)	AXIAL STRAIN (in/in)	UNCONFINED COMPRESSIVE STRENGTH (lb/in²)
0	0.000	0.000	3.136	0.0000	0.0
7	0.003	0.003	3.139	0.0007	2.2
18	0.005	0.005	3.140	0.0012	5.7
24	0.007	0.007	3.142	0.0017	7.6
38	0.010	0.010	3.144	0.0024	12.1
61	0.015	0.015	3.148	0.0037	19.4
89	0.020	0.020	3.152	0.0049	28.2
127	0.025	0.025	3.156	0.0061	40.2
167	0.030	0.030	3.160	0.0073	52.9
214	0.035	0.035	3.163	0.0086	67.6
257	0.040	0.040	3.167	0.0098	81.1
309	0.045	0.045	3.171	0.0110	97.4
360	0.050	0.050	3.175	0.0122	113.4
393	0.055	0.055	3.179	0.0134	123.6
393	0.060	0.060	3.183	0.0147	123.5
393	0.065	0.065	3.187	0.0159	123.3
393	0.070	0.070	3.191	0.0171	123.2
398	0.075	0.075	3.195	0.0183	124.6
409	0.080	0.080	3.199	0.0196	127.9
450	0.085	0.085	3.203	0.0208	140.5
487	0.090	0.090	3.207	0.0220	151.9
519	0.095	0.095	3.211	0.0232	161.6
550	0.100	0.100	3.215	0.0244	171.1
577	0.105	0.105	3.219	0.0257	179.3
589	0.110	0.110	3.223	0.0269	182.7
565	0.115	0.115	3.227	0.0281	175.1
548	0.120	0.120	3.231	0.0293	169.6
546	0.125	0.125	3.235	0.0305	168.8
522	0.130	0.130	3.239	0.0318	161.1
486	0.135	0.135	3.243	0.0330	149.8

UNCONFINED COMPRESSION TESTING
Sample No. 0751-007 (14 Day)



UNCONFINED COMPRESSION TEST

ASTM D 2166
SUMMARY OF RESULTS

PROJECT:	C-D Systems Solidification Study		
PROJECT No.:	SH0751		
SAMPLE No.:	0751-007 (14 Day)		
TESTING DATE:	7-Dec-20	LOADING RATE:	0.0400 in./min
TESTED BY:	JBA	TRACKING CODE:	E321

TESTING PARAMETER AND RESULTS		
MOISTURE CONTENT	11.8	**%**
BULK UNIT WEIGHT	137.5	lb/ft³
DRY UNIT WEIGHT	122.9	lb/ft³
UCS *	182.7	lb/in²

* UCS - UNCONFINED COMPRESSIVE STRENGTH

MATERIAL pH

EPA METHOD 9045
DATA SHEET

PROJECT:	C-D Systems Solidification Study
PROJECT No.:	SH0751
TESTING DATE:	17-Dec-20
TESTED BY:	JBA/BLM
TRACKING CODE:	E322

	KEMRON SAMPLE No.	MATERIAL pH
1	0751-008 A	13.66
2	0751-008 B	13.37
3	0751-008 C	13.48
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
	AVERAGE:	13.50

UNCONFINED COMPRESSION TEST

ASTM D 2166

PROJECT:	C-D Systems Solidification Study		
PROJECT No.:	SH0751		
SAMPLE No.:	0751-008 (14 Day)		
TESTING DATE:	7-Dec-20	LOADING RATE:	0.0400 in./min
TESTED BY:	JBA	TRACKING CODE:	E322

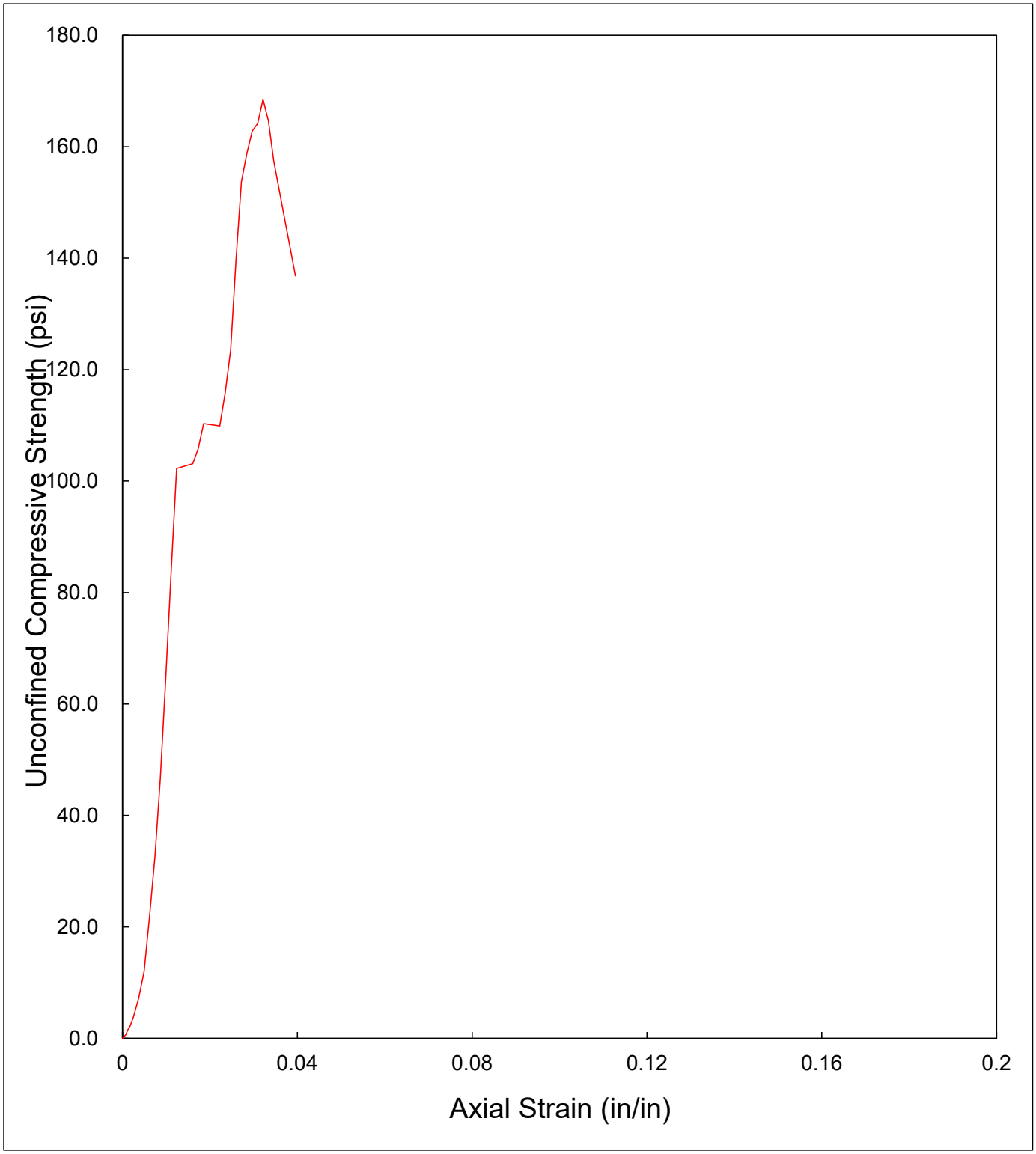
MOISTURE CONTENT (Dry Basis)		
1. MOISTURE TIN NO.		
2. WT MOISTURE TIN (tare weight)	228.89	g
3. WT WET SOIL + TARE	325.06	g
4. WT DRY SOIL + TARE	314.04	g
5. WT WATER, Ww	11.02	g
6. WT DRY SOIL, Ws	85.15	g
7. MOISTURE CONTENT, W	**12.94**	**%**

SOIL SPECIMEN DIMENSIONS				
	DIAMETER		***LENGTH***	
No. 1	2.01	in.	4.03	in.
No. 2	2.01	in.	4.00	in.
No. 3	1.99	in.	4.10	in.
Average	**2.01**	**in.**	**4.04**	**in.**

SPECIMEN CONDITIONS		
Initial Specimen WT, Wo	***449.35***	***g***
Initial Area, Ao	3.16	in²
Initial Volume, Vo	12.77	in³
Initial Bulk Unit Weight,	134.1	lb/ft³
Initial Dry Unit Weight	118.7	lb/ft³
15 % Strain (0.15 Lo)	0.61	in.
UCS	168.5	lb/in²

COMPRESSIVE LOAD (lbs.)	DIAL GAGE READING (in.)	SPECIMEN DEFORMATION (in.)	CORRECTED AREA (in²)	AXIAL STRAIN (in/in)	UNCONFINED COMPRESSIVE STRENGTH (lb/in²)
0	0.000	0.000	3.158	0.0000	0.0
2	0.003	0.003	3.161	0.0007	0.6
5	0.005	0.005	3.162	0.0012	1.6
7	0.007	0.007	3.164	0.0017	2.2
12	0.010	0.010	3.166	0.0025	3.8
23	0.015	0.015	3.170	0.0037	7.3
38	0.020	0.020	3.174	0.0049	12.0
69	0.025	0.025	3.178	0.0062	21.7
104	0.030	0.030	3.182	0.0074	32.7
149	0.035	0.035	3.186	0.0087	46.8
206	0.040	0.040	3.190	0.0099	64.6
267	0.045	0.045	3.194	0.0111	83.6
327	0.050	0.050	3.198	0.0124	102.3
331	0.065	0.065	3.210	0.0161	103.1
340	0.070	0.070	3.214	0.0173	105.8
355	0.075	0.075	3.218	0.0186	110.3
355	0.080	0.080	3.222	0.0198	110.2
355	0.085	0.085	3.226	0.0210	110.0
355	0.090	0.090	3.230	0.0223	109.9
375	0.095	0.095	3.234	0.0235	115.9
400	0.100	0.100	3.238	0.0247	123.5
453	0.105	0.105	3.243	0.0260	139.7
499	0.110	0.110	3.247	0.0272	153.7
516	0.115	0.115	3.251	0.0284	158.7
530	0.120	0.120	3.255	0.0297	162.8
535	0.125	0.125	3.259	0.0309	164.2
550	0.130	0.130	3.263	0.0322	168.5
538	0.135	0.135	3.267	0.0334	164.7
515	0.140	0.140	3.272	0.0346	157.4
450	0.160	0.160	3.289	0.0396	136.8

UNCONFINED COMPRESSION TESTING
Sample No. 0751-008 (14 Day)



UNCONFINED COMPRESSION TEST

ASTM D 2166
SUMMARY OF RESULTS

PROJECT:	C-D Systems Solidification Study		
PROJECT No.:	SH0751		
SAMPLE No.:	0751-008 (14 Day)		
TESTING DATE:	7-Dec-20	LOADING RATE:	0.0400 in./min
TESTED BY:	JBA	TRACKING CODE:	E322

TESTING PARAMETER AND RESULTS		
MOISTURE CONTENT	12.9	**%**
BULK UNIT WEIGHT	134.1	lb/ft³
DRY UNIT WEIGHT	118.7	lb/ft³
UCS *	168.5	lb/in²

* UCS - UNCONFINED COMPRESSIVE STRENGTH

MATERIAL pH

EPA METHOD 9045
DATA SHEET

PROJECT:	C-D Systems Solidification Study
PROJECT No.:	SH0751
TESTING DATE:	17-Dec-20
TESTED BY:	JBA/BLM
TRACKING CODE:	E323

	KEMRON SAMPLE No.	MATERIAL pH
1	0751-009 A	13.32
2	0751-009 B	13.37
3	0751-009 C	13.20
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
	AVERAGE:	13.30

UNCONFINED COMPRESSION TEST

ASTM D 2166

PROJECT:	C-D Systems Solidification Study		
PROJECT No.:	SH0751		
SAMPLE No.:	0751-009 (14 Day)		
TESTING DATE:	7-Dec-20	LOADING RATE:	0.0400 in./min
TESTED BY:	JBA	TRACKING CODE:	E323

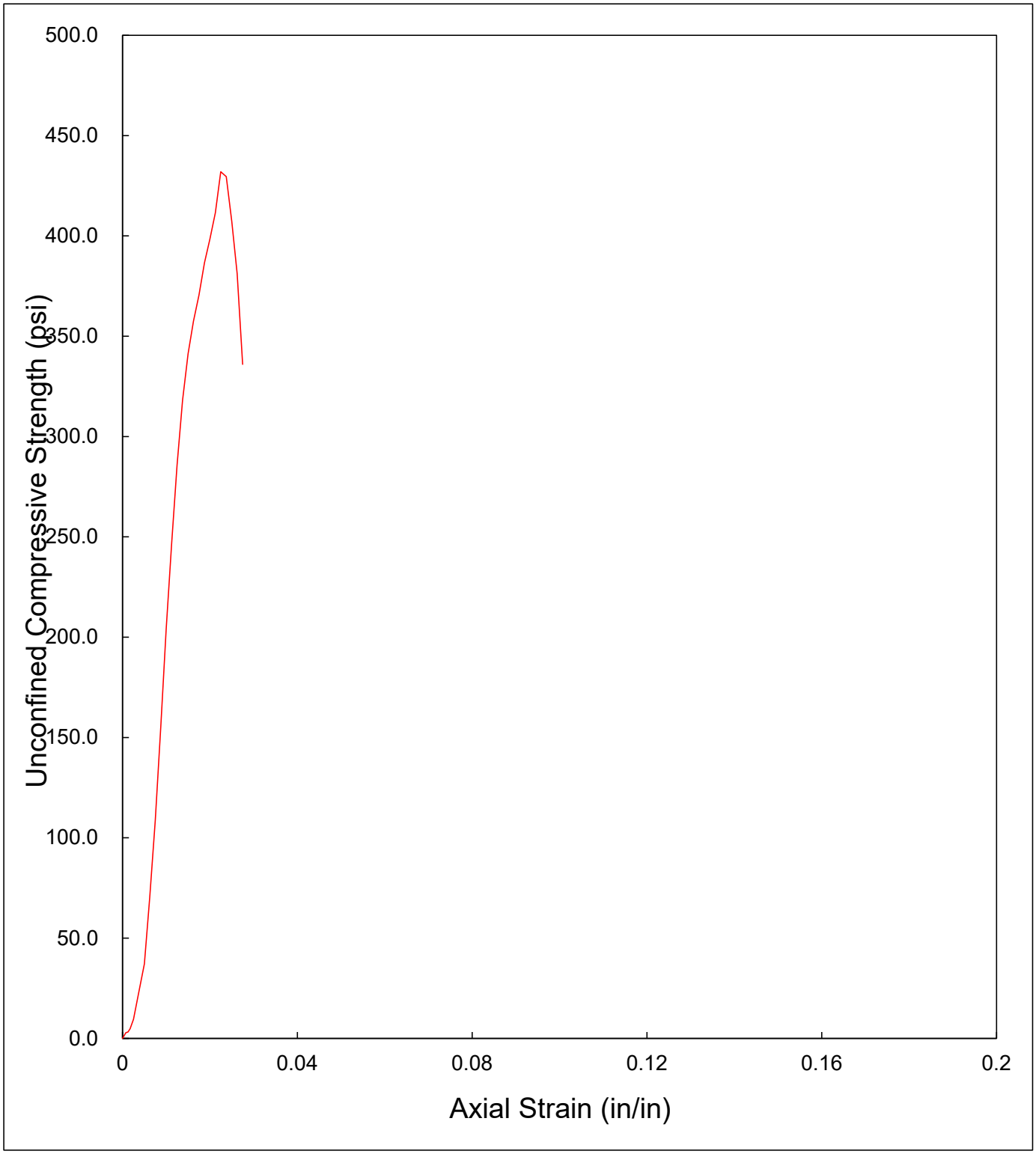
MOISTURE CONTENT (Dry Basis)		
1. MOISTURE TIN NO.		
2. WT MOISTURE TIN (tare weight)	215.72	g
3. WT WET SOIL + TARE	347.58	g
4. WT DRY SOIL + TARE	333.04	g
5. WT WATER, Ww	14.54	g
6. WT DRY SOIL, Ws	117.32	g
7. MOISTURE CONTENT, W	**12.39**	**%**

SOIL SPECIMEN DIMENSIONS				
	DIAMETER		*LENGTH*	
No. 1	2.00	in.	4.03	in.
No. 2	2.00	in.	3.97	in.
No. 3	1.99	in.	4.01	in.
Average	**2.00**	**in.**	**4.00**	**in.**

SPECIMEN CONDITIONS		
Initial Specimen WT, Wo	***453.41***	***g***
Initial Area, Ao	3.13	in²
Initial Volume, Vo	12.53	in³
Initial Bulk Unit Weight,	137.8	lb/ft³
Initial Dry Unit Weight	122.6	lb/ft³
15 % Strain (0.15 Lo)	0.60	in.
UCS	432.0	lb/in²

COMPRESSIVE LOAD (lbs.)	DIAL GAGE READING (in.)	SPECIMEN DEFORMATION (in.)	CORRECTED AREA (in²)	AXIAL STRAIN (in/in)	UNCONFINED COMPRESSIVE STRENGTH (lb/in²)
0	0.000	0.000	3.132	0.0000	0.0
9	0.003	0.003	3.134	0.0007	2.9
10	0.005	0.005	3.136	0.0012	3.2
15	0.007	0.007	3.137	0.0017	4.8
30	0.010	0.010	3.139	0.0025	9.6
73	0.015	0.015	3.143	0.0037	23.2
117	0.020	0.020	3.147	0.0050	37.2
222	0.025	0.025	3.151	0.0062	70.4
343	0.030	0.030	3.155	0.0075	108.7
491	0.035	0.035	3.159	0.0087	155.4
645	0.040	0.040	3.163	0.0100	203.9
782	0.045	0.045	3.167	0.0112	246.9
906	0.050	0.050	3.171	0.0125	285.7
1010	0.055	0.055	3.175	0.0137	318.1
1085	0.060	0.060	3.179	0.0150	341.3
1138	0.065	0.065	3.183	0.0162	357.5
1181	0.070	0.070	3.187	0.0175	370.5
1234	0.075	0.075	3.191	0.0187	386.7
1273	0.080	0.080	3.196	0.0200	398.4
1317	0.085	0.085	3.200	0.0212	411.6
1384	0.090	0.090	3.204	0.0225	432.0
1378	0.095	0.095	3.208	0.0237	429.6
1308	0.100	0.100	3.212	0.0250	407.2
1226	0.105	0.105	3.216	0.0262	381.2
1082	0.110	0.110	3.220	0.0275	336.0

UNCONFINED COMPRESSION TESTING
Sample No. 0751-009 (14 Day)



UNCONFINED COMPRESSION TEST

ASTM D 2166
SUMMARY OF RESULTS

PROJECT:	C-D Systems Solidification Study		
PROJECT No.:	SH0751		
SAMPLE No.:	0751-009 (14 Day)		
TESTING DATE:	7-Dec-20	LOADING RATE:	0.0400 in./min
TESTED BY:	JBA	TRACKING CODE:	E323

TESTING PARAMETER AND RESULTS		
MOISTURE CONTENT	12.4	**%**
BULK UNIT WEIGHT	137.8	lb/ft³
DRY UNIT WEIGHT	122.6	lb/ft³
UCS *	432.0	lb/in²

* UCS - UNCONFINED COMPRESSIVE STRENGTH

MATERIAL pH

EPA METHOD 9045
DATA SHEET

PROJECT:	C-D Systems Solidification Study
PROJECT No.:	SH0751
TESTING DATE:	17-Dec-20
TESTED BY:	JBA/BLM
TRACKING CODE:	E324

	KEMRON SAMPLE No.	MATERIAL pH
1	0751-010 A	13.10
2	0751-010 B	13.05
3	0751-010 C	13.02
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
	AVERAGE:	13.06

UNCONFINED COMPRESSION TEST

ASTM D 2166

PROJECT:	C-D Systems Solidification Study		
PROJECT No.:	SH0751		
SAMPLE No.:	0751-010 (14 Day)		
TESTING DATE:	8-Dec-20	LOADING RATE:	0.0400 in./min
TESTED BY:	JBA	TRACKING CODE:	E324

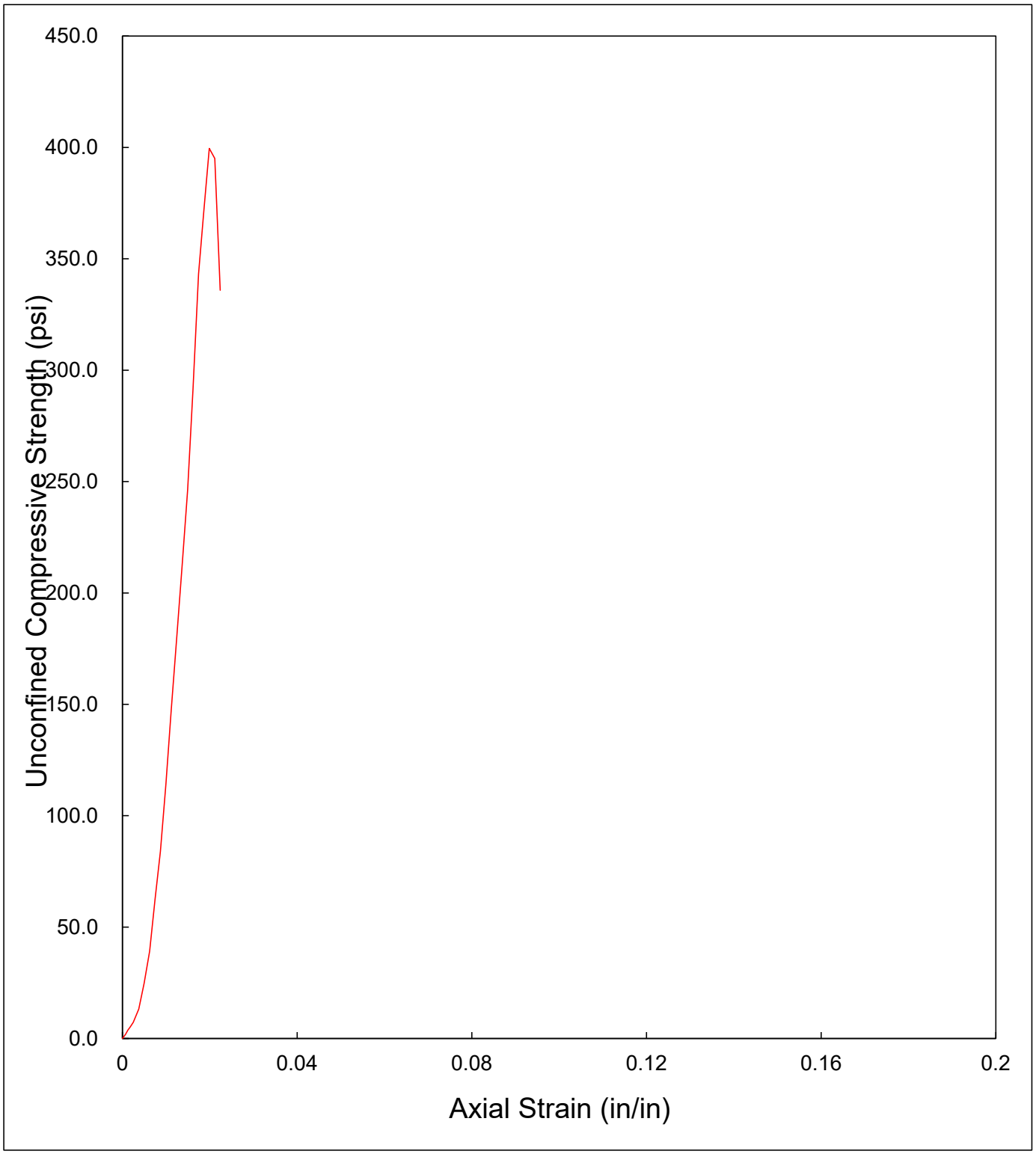
MOISTURE CONTENT (Dry Basis)		
1. MOISTURE TIN NO.		
2. WT MOISTURE TIN (tare weight)	214.67	g
3. WT WET SOIL + TARE	397.78	g
4. WT DRY SOIL + TARE	375.96	g
5. WT WATER, Ww	21.82	g
6. WT DRY SOIL, Ws	161.29	g
7. MOISTURE CONTENT, W	**13.53**	**%**

SOIL SPECIMEN DIMENSIONS				
	DIAMETER		***LENGTH***	
No. 1	2.02	in.	3.99	in.
No. 2	2.01	in.	4.05	in.
No. 3	2.00	in.	4.02	in.
Average	**2.01**	**in.**	**4.02**	**in.**

SPECIMEN CONDITIONS		
Initial Specimen WT, Wo	***439.63***	***g***
Initial Area, Ao	3.17	in²
Initial Volume, Vo	12.73	in³
Initial Bulk Unit Weight,	131.6	lb/ft³
Initial Dry Unit Weight	115.9	lb/ft³
15 % Strain (0.15 Lo)	0.60	in.
UCS	399.6	lb/in²

COMPRESSIVE LOAD (lbs.)	DIAL GAGE READING (in.)	SPECIMEN DEFORMATION (in.)	CORRECTED AREA (in²)	AXIAL STRAIN (in/in)	UNCONFINED COMPRESSIVE STRENGTH (lb/in²)
0	0.000	0.000	3.167	0.0000	0.0
6	0.003	0.003	3.169	0.0007	1.9
12	0.005	0.005	3.171	0.0012	3.8
16	0.007	0.007	3.172	0.0017	5.0
23	0.010	0.010	3.175	0.0025	7.2
42	0.015	0.015	3.179	0.0037	13.2
79	0.020	0.020	3.183	0.0050	24.8
125	0.025	0.025	3.187	0.0062	39.2
199	0.030	0.030	3.191	0.0075	62.4
268	0.035	0.035	3.195	0.0087	83.9
365	0.040	0.040	3.199	0.0100	114.1
473	0.045	0.045	3.203	0.0112	147.7
578	0.050	0.050	3.207	0.0124	180.2
682	0.055	0.055	3.211	0.0137	212.4
792	0.060	0.060	3.215	0.0149	246.4
939	0.065	0.065	3.219	0.0162	291.7
1106	0.070	0.070	3.223	0.0174	343.2
1200	0.075	0.075	3.227	0.0187	371.9
1291	0.080	0.080	3.231	0.0199	399.6
1278	0.085	0.085	3.235	0.0211	395.0
1088	0.090	0.090	3.239	0.0224	335.9

UNCONFINED COMPRESSION TESTING
Sample No. 0751-010 (14 Day)



UNCONFINED COMPRESSION TEST

ASTM D 2166
SUMMARY OF RESULTS

PROJECT:	C-D Systems Solidification Study		
PROJECT No.:	SH0751		
SAMPLE No.:	0751-010 (14 Day)		
TESTING DATE:	8-Dec-20	LOADING RATE:	0.0400 in./min
TESTED BY:	JBA	TRACKING CODE:	E324

TESTING PARAMETER AND RESULTS		
MOISTURE CONTENT	13.5	**%**
BULK UNIT WEIGHT	131.6	lb/ft³
DRY UNIT WEIGHT	115.9	lb/ft³
UCS *	399.6	lb/in²

* UCS - UNCONFINED COMPRESSIVE STRENGTH

MATERIAL pH

EPA METHOD 9045
DATA SHEET

PROJECT:	C-D Systems Solidification Study
PROJECT No.:	SH0751
TESTING DATE:	17-Dec-20
TESTED BY:	JBA/BLM
TRACKING CODE:	E325

	KEMRON SAMPLE No.	MATERIAL pH
1	0751-011 A	13.37
2	0751-011 B	13.12
3	0751-011 C	13.57
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
	AVERAGE:	13.35

UNCONFINED COMPRESSION TEST

ASTM D 2166

PROJECT:	C-D Systems Solidification Study		
PROJECT No.:	SH0751		
SAMPLE No.:	0751-011 (14 Day)		
TESTING DATE:	8-Dec-20	LOADING RATE:	0.0400 in./min
TESTED BY:	JBA	TRACKING CODE:	E325

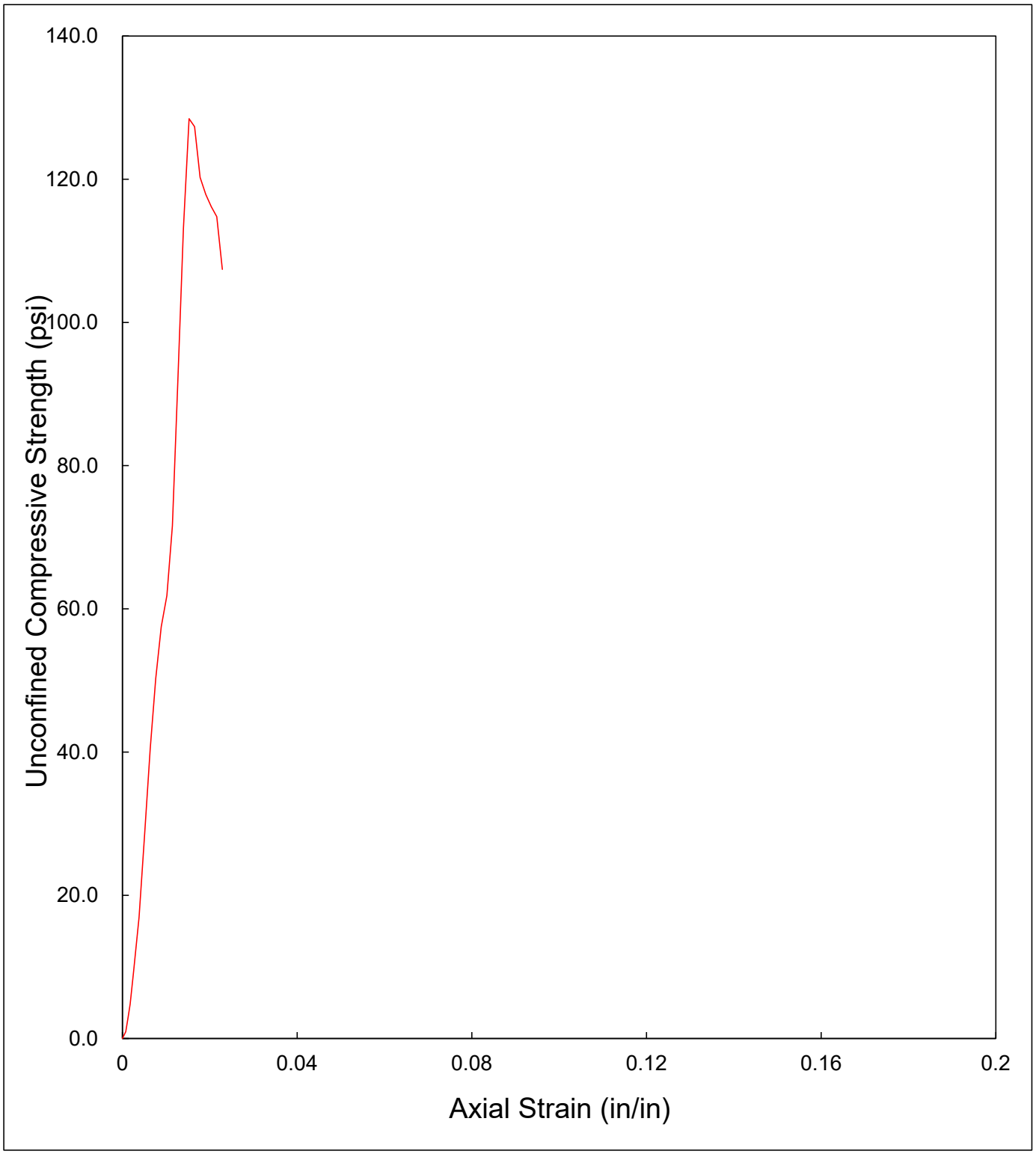
MOISTURE CONTENT (Dry Basis)		
1. MOISTURE TIN NO.		
2. WT MOISTURE TIN (tare weight)	223.40	g
3. WT WET SOIL + TARE	334.29	g
4. WT DRY SOIL + TARE	325.39	g
5. WT WATER, Ww	8.90	g
6. WT DRY SOIL, Ws	101.99	g
7. MOISTURE CONTENT, W	**8.73**	**%**

SOIL SPECIMEN DIMENSIONS				
	DIAMETER		***LENGTH***	
No. 1	2.00	in.	3.82	in.
No. 2	1.99	in.	4.01	in.
No. 3	1.99	in.	3.97	in.
Average	**1.99**	**in.**	**3.93**	**in.**

SPECIMEN CONDITIONS		
Initial Specimen WT, Wo	***444.95***	***g***
Initial Area, Ao	3.12	in²
Initial Volume, Vo	12.27	in³
Initial Bulk Unit Weight,	138.1	lb/ft³
Initial Dry Unit Weight	127.0	lb/ft³
15 % Strain (0.15 Lo)	0.59	in.
UCS	128.5	lb/in²

COMPRESSIVE LOAD (lbs.)	DIAL GAGE READING (in.)	SPECIMEN DEFORMATION (in.)	CORRECTED AREA (in²)	AXIAL STRAIN (in/in)	UNCONFINED COMPRESSIVE STRENGTH (lb/in²)
0	0.000	0.000	3.120	0.0000	0.0
3	0.003	0.003	3.123	0.0008	1.0
9	0.005	0.005	3.124	0.0013	2.9
15	0.007	0.007	3.126	0.0018	4.8
29	0.010	0.010	3.128	0.0025	9.3
53	0.015	0.015	3.132	0.0038	16.9
89	0.020	0.020	3.136	0.0051	28.4
127	0.025	0.025	3.140	0.0064	40.4
158	0.030	0.030	3.144	0.0076	50.3
181	0.035	0.035	3.148	0.0089	57.5
195	0.040	0.040	3.152	0.0102	61.9
226	0.045	0.045	3.156	0.0114	71.6
291	0.050	0.050	3.160	0.0127	92.1
358	0.055	0.055	3.164	0.0140	113.1
407	0.060	0.060	3.168	0.0153	128.5
404	0.065	0.065	3.173	0.0165	127.3
382	0.070	0.070	3.177	0.0178	120.3
375	0.075	0.075	3.181	0.0191	117.9
370	0.080	0.080	3.185	0.0203	116.2
366	0.085	0.085	3.189	0.0216	114.8
343	0.090	0.090	3.193	0.0229	107.4

UNCONFINED COMPRESSION TESTING
Sample No. 0751-011 (14 Day)



UNCONFINED COMPRESSION TEST

ASTM D 2166
SUMMARY OF RESULTS

PROJECT:	C-D Systems Solidification Study		
PROJECT No.:	SH0751		
SAMPLE No.:	0751-011 (14 Day)		
TESTING DATE:	8-Dec-20	LOADING RATE:	0.0400 in./min
TESTED BY:	JBA	TRACKING CODE:	E325

TESTING PARAMETER AND RESULTS		
MOISTURE CONTENT	8.7	**%**
BULK UNIT WEIGHT	138.1	lb/ft³
DRY UNIT WEIGHT	127.0	lb/ft³
UCS *	128.5	lb/in²

* UCS - UNCONFINED COMPRESSIVE STRENGTH

MATERIAL pH

EPA METHOD 9045
DATA SHEET

PROJECT:	C-D Systems Solidification Study
PROJECT No.:	SH0751
TESTING DATE:	17-Dec-20
TESTED BY:	JBA/BLM
TRACKING CODE:	E326

KEMRON SAMPLE No.		MATERIAL pH
1	0751-012 A	13.14
2	0751-012 B	13.34
3	0751-012 C	13.42
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
	AVERAGE:	13.30

UNCONFINED COMPRESSION TEST

ASTM D 2166

PROJECT:	C-D Systems Solidification Study		
PROJECT No.:	SH0751		
SAMPLE No.:	0751-012 (14 Day)		
TESTING DATE:	8-Dec-20	LOADING RATE:	0.0400 in./min
TESTED BY:	JBA	TRACKING CODE:	E326

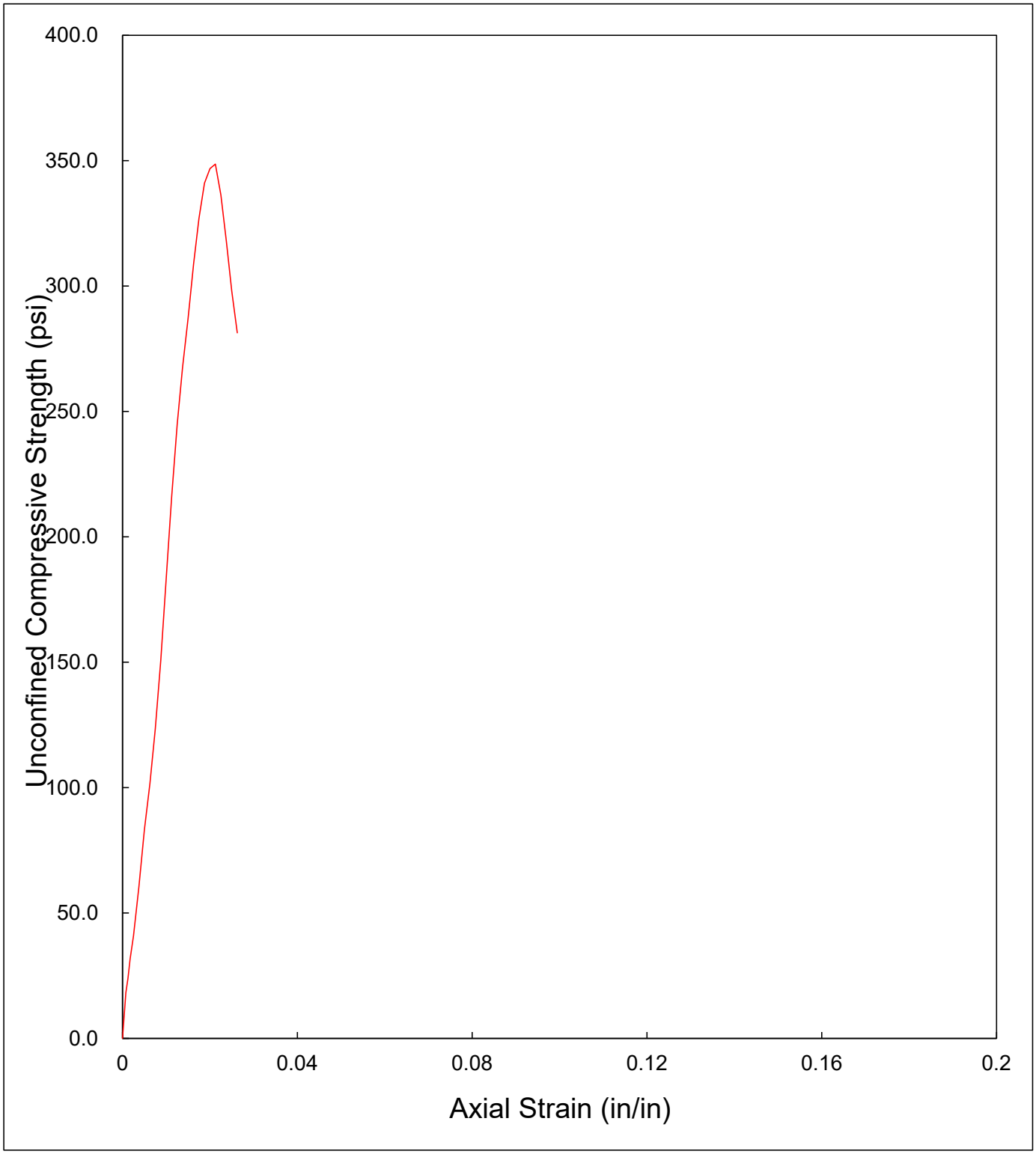
MOISTURE CONTENT (Dry Basis)		
1. MOISTURE TIN NO.		
2. WT MOISTURE TIN (tare weight)	219.76	g
3. WT WET SOIL + TARE	361.77	g
4. WT DRY SOIL + TARE	346.72	g
5. WT WATER, Ww	15.05	g
6. WT DRY SOIL, Ws	126.96	g
7. MOISTURE CONTENT, W	**11.85**	**%**

SOIL SPECIMEN DIMENSIONS				
	DIAMETER		***LENGTH***	
No. 1	2.00	in.	3.99	in.
No. 2	1.99	in.	4.03	in.
No. 3	1.99	in.	3.97	in.
Average	**1.99**	**in.**	**4.00**	**in.**

SPECIMEN CONDITIONS		
Initial Specimen WT, Wo	***456.91***	***g***
Initial Area, Ao	3.12	in²
Initial Volume, Vo	12.48	in³
Initial Bulk Unit Weight,	139.5	lb/ft³
Initial Dry Unit Weight	124.7	lb/ft³
15 % Strain (0.15 Lo)	0.60	in.
UCS	348.6	lb/in²

COMPRESSIVE LOAD (lbs.)	DIAL GAGE READING (in.)	SPECIMEN DEFORMATION (in.)	CORRECTED AREA (in²)	AXIAL STRAIN (in/in)	UNCONFINED COMPRESSIVE STRENGTH (lb/in²)
0	0.000	0.000	3.122	0.0000	0.0
57	0.003	0.003	3.124	0.0008	18.2
75	0.005	0.005	3.126	0.0013	24.0
99	0.007	0.007	3.127	0.0018	31.7
128	0.010	0.010	3.130	0.0025	40.9
189	0.015	0.015	3.133	0.0038	60.3
261	0.020	0.020	3.137	0.0050	83.2
319	0.025	0.025	3.141	0.0063	101.5
388	0.030	0.030	3.145	0.0075	123.4
475	0.035	0.035	3.149	0.0088	150.8
580	0.040	0.040	3.153	0.0100	183.9
682	0.045	0.045	3.157	0.0113	216.0
774	0.050	0.050	3.161	0.0125	244.8
847	0.055	0.055	3.165	0.0138	267.6
910	0.060	0.060	3.169	0.0150	287.1
980	0.065	0.065	3.173	0.0163	308.8
1039	0.070	0.070	3.177	0.0175	327.0
1085	0.075	0.075	3.181	0.0188	341.0
1105	0.080	0.080	3.185	0.0200	346.9
1112	0.085	0.085	3.190	0.0213	348.6
1074	0.090	0.090	3.194	0.0225	336.3
1016	0.095	0.095	3.198	0.0238	317.7
954	0.100	0.100	3.202	0.0250	298.0
902	0.105	0.105	3.206	0.0263	281.4

UNCONFINED COMPRESSION TESTING
Sample No. 0751-012 (14 Day)



UNCONFINED COMPRESSION TEST

ASTM D 2166
SUMMARY OF RESULTS

PROJECT:	C-D Systems Solidification Study		
PROJECT No.:	SH0751		
SAMPLE No.:	0751-012 (14 Day)		
TESTING DATE:	8-Dec-20	LOADING RATE:	0.0400 in./min
TESTED BY:	JBA	TRACKING CODE:	E326

TESTING PARAMETER AND RESULTS		
MOISTURE CONTENT	11.9	**%**
BULK UNIT WEIGHT	139.5	lb/ft³
DRY UNIT WEIGHT	124.7	lb/ft³
UCS *	348.6	lb/in²

* UCS - UNCONFINED COMPRESSIVE STRENGTH

MATERIAL pH

EPA METHOD 9045
DATA SHEET

PROJECT:	C-D Systems Solidification Study
PROJECT No.:	SH0751
TESTING DATE:	17-Dec-20
TESTED BY:	JBA/BLM
TRACKING CODE:	E327

	KEMRON SAMPLE No.	MATERIAL pH
1	0751-013 A	13.37
2	0751-013 B	13.44
3	0751-013 C	13.50
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
	AVERAGE:	13.44

UNCONFINED COMPRESSION TEST

ASTM D 2166

PROJECT:	C-D Systems Solidification Study		
PROJECT No.:	SH0751		
SAMPLE No.:	0751-013 (14 Day)		
TESTING DATE:	8-Dec-20	LOADING RATE:	0.0400 in./min
TESTED BY:	JBA	TRACKING CODE:	E327

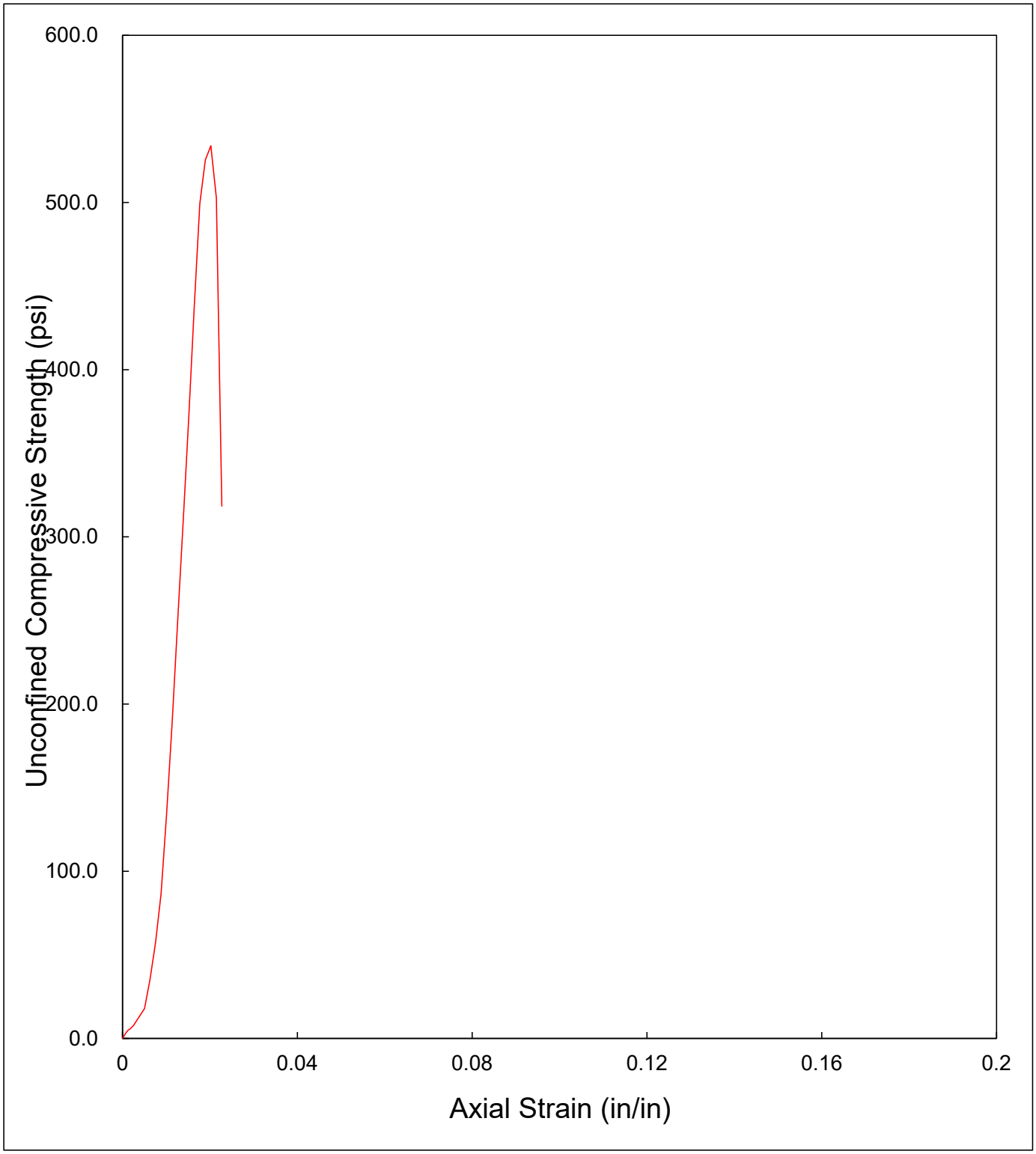
MOISTURE CONTENT (Dry Basis)		
1. MOISTURE TIN NO.		
2. WT MOISTURE TIN (tare weight)	227.11	g
3. WT WET SOIL + TARE	437.35	g
4. WT DRY SOIL + TARE	413.69	g
5. WT WATER, Ww	23.66	g
6. WT DRY SOIL, Ws	186.58	g
7. MOISTURE CONTENT, W	**12.68**	**%**

SOIL SPECIMEN DIMENSIONS				
	DIAMETER		***LENGTH***	
No. 1	2.00	in.	3.95	in.
No. 2	1.99	in.	3.97	in.
No. 3	1.99	in.	3.96	in.
Average	**1.99**	**in.**	**3.96**	**in.**

SPECIMEN CONDITIONS		
Initial Specimen WT, Wo	***450.77***	***g***
Initial Area, Ao	3.12	in²
Initial Volume, Vo	12.34	in³
Initial Bulk Unit Weight,	139.2	lb/ft³
Initial Dry Unit Weight	123.5	lb/ft³
15 % Strain (0.15 Lo)	0.59	in.
UCS	533.9	lb/in²

COMPRESSIVE LOAD (lbs.)	DIAL GAGE READING (in.)	SPECIMEN DEFORMATION (in.)	CORRECTED AREA (in²)	AXIAL STRAIN (in/in)	UNCONFINED COMPRESSIVE STRENGTH (lb/in²)
0	0.000	0.000	3.116	0.0000	0.0
10	0.003	0.003	3.118	0.0008	3.2
15	0.005	0.005	3.120	0.0013	4.8
18	0.007	0.007	3.122	0.0018	5.8
24	0.010	0.010	3.124	0.0025	7.7
40	0.015	0.015	3.128	0.0038	12.8
56	0.020	0.020	3.132	0.0051	17.9
111	0.025	0.025	3.136	0.0063	35.4
180	0.030	0.030	3.140	0.0076	57.3
272	0.035	0.035	3.144	0.0088	86.5
422	0.040	0.040	3.148	0.0101	134.1
598	0.045	0.045	3.152	0.0114	189.7
791	0.050	0.050	3.156	0.0126	250.6
980	0.055	0.055	3.160	0.0139	310.1
1176	0.060	0.060	3.164	0.0152	371.7
1388	0.065	0.065	3.168	0.0164	438.1
1584	0.070	0.070	3.172	0.0177	499.4
1669	0.075	0.075	3.176	0.0189	525.5
1698	0.080	0.080	3.180	0.0202	533.9
1601	0.085	0.085	3.184	0.0215	502.8
1015	0.090	0.090	3.188	0.0227	318.3

UNCONFINED COMPRESSION TESTING
Sample No. 0751-013 (14 Day)



UNCONFINED COMPRESSION TEST

ASTM D 2166
SUMMARY OF RESULTS

PROJECT:	C-D Systems Solidification Study		
PROJECT No.:	SH0751		
SAMPLE No.:	0751-013 (14 Day)		
TESTING DATE:	8-Dec-20	LOADING RATE:	0.0400 in./min
TESTED BY:	JBA	TRACKING CODE:	E327

TESTING PARAMETER AND RESULTS		
MOISTURE CONTENT	12.7	**%**
BULK UNIT WEIGHT	139.2	lb/ft³
DRY UNIT WEIGHT	123.5	lb/ft³
UCS *	533.9	lb/in²

* UCS - UNCONFINED COMPRESSIVE STRENGTH

MATERIAL pH

EPA METHOD 9045
DATA SHEET

PROJECT:	C-D Systems Solidification Study
PROJECT No.:	SH0751
TESTING DATE:	17-Dec-20
TESTED BY:	JBA/BLM
TRACKING CODE:	E328

	KEMRON SAMPLE No.	MATERIAL pH
1	0751-014 A	13.15
2	0751-014 B	13.02
3	0751-014 C	13.20
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
	AVERAGE:	13.12

UNCONFINED COMPRESSION TEST

ASTM D 2166

PROJECT:	C-D Systems Solidification Study		
PROJECT No.:	SH0751		
SAMPLE No.:	0751-014 (14 Day)		
TESTING DATE:	8-Dec-20	LOADING RATE:	0.0400 in./min
TESTED BY:	JBA	TRACKING CODE:	E328

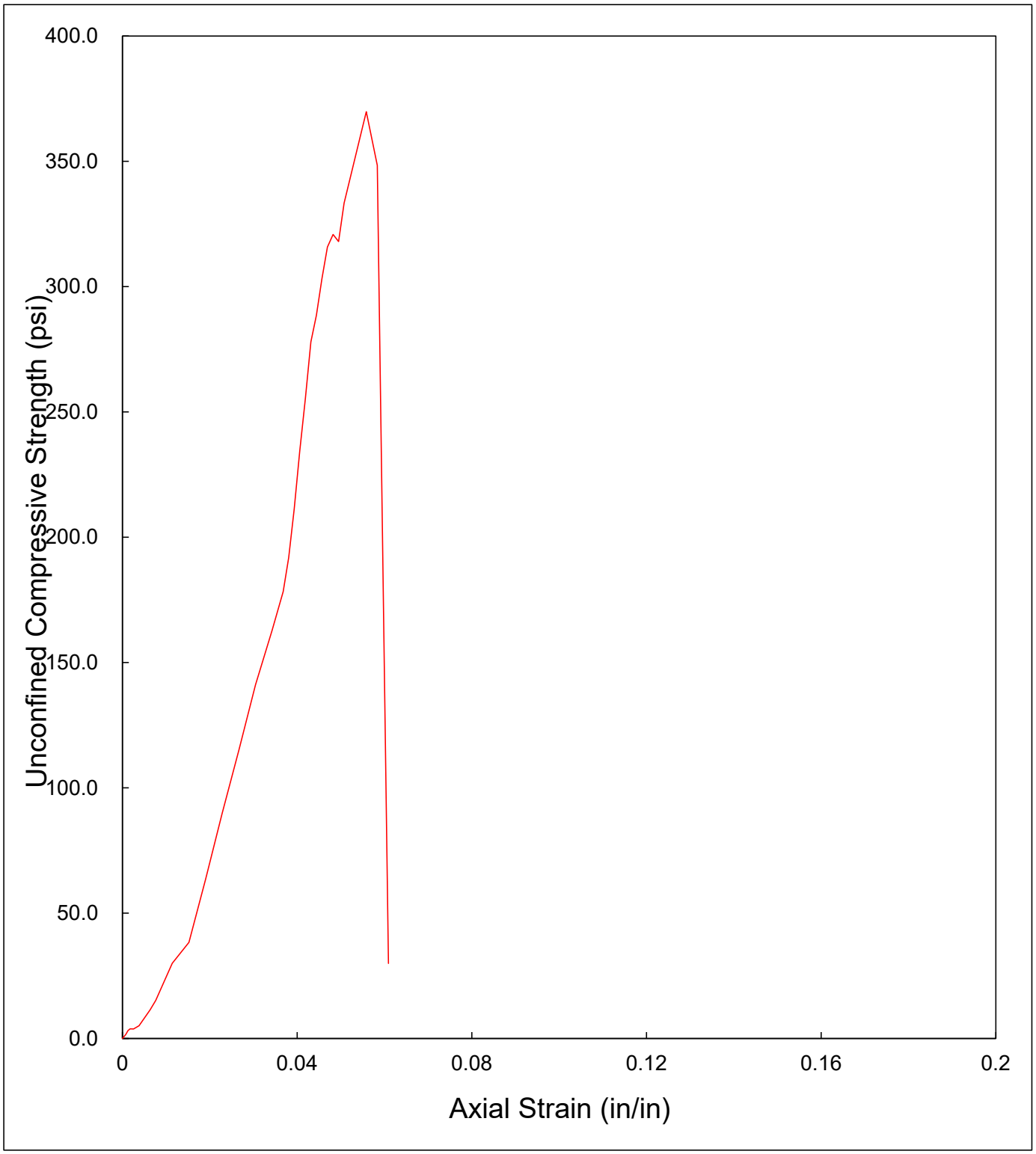
MOISTURE CONTENT (Dry Basis)		
1. MOISTURE TIN NO.		
2. WT MOISTURE TIN (tare weight)	217.70	g
3. WT WET SOIL + TARE	367.21	g
4. WT DRY SOIL + TARE	349.45	g
5. WT WATER, Ww	17.76	g
6. WT DRY SOIL, Ws	131.75	g
7. MOISTURE CONTENT, W	**13.48**	**%**

SOIL SPECIMEN DIMENSIONS				
	DIAMETER		***LENGTH***	
No. 1	2.00	in.	3.88	in.
No. 2	2.00	in.	3.89	in.
No. 3	1.99	in.	4.05	in.
Average	**2.00**	**in.**	**3.94**	**in.**

SPECIMEN CONDITIONS		
Initial Specimen WT, Wo	***445.25***	***g***
Initial Area, Ao	3.13	in²
Initial Volume, Vo	12.34	in³
Initial Bulk Unit Weight,	137.4	lb/ft³
Initial Dry Unit Weight	121.1	lb/ft³
15 % Strain (0.15 Lo)	0.59	in.
UCS	369.8	lb/in²

COMPRESSIVE LOAD (lbs.)	DIAL GAGE READING (in.)	SPECIMEN DEFORMATION (in.)	CORRECTED AREA (in²)	AXIAL STRAIN (in/in)	UNCONFINED COMPRESSIVE STRENGTH (lb/in²)
0	0.000	0.000	3.133	0.0000	0.0
5	0.003	0.003	3.135	0.0008	1.6
10	0.005	0.005	3.137	0.0013	3.2
12	0.007	0.007	3.138	0.0018	3.8
12	0.010	0.010	3.141	0.0025	3.8
16	0.015	0.015	3.145	0.0038	5.1
26	0.020	0.020	3.149	0.0051	8.3
36	0.025	0.025	3.153	0.0063	11.4
48	0.030	0.030	3.157	0.0076	15.2
95	0.045	0.045	3.169	0.0114	30.0
122	0.060	0.060	3.181	0.0152	38.4
203	0.075	0.075	3.193	0.0190	63.6
288	0.090	0.090	3.206	0.0228	89.8
370	0.105	0.105	3.218	0.0267	115.0
456	0.120	0.120	3.231	0.0305	141.1
528	0.135	0.135	3.244	0.0343	162.8
580	0.145	0.145	3.252	0.0368	178.3
625	0.150	0.150	3.257	0.0381	191.9
689	0.155	0.155	3.261	0.0393	211.3
765	0.160	0.160	3.265	0.0406	234.3
835	0.165	0.165	3.270	0.0419	255.4
910	0.170	0.170	3.274	0.0431	278.0
946	0.175	0.175	3.278	0.0444	288.6
995	0.180	0.180	3.283	0.0457	303.1
1038	0.185	0.185	3.287	0.0470	315.8
1056	0.190	0.190	3.291	0.0482	320.8
1048	0.195	0.195	3.296	0.0495	318.0
1100	0.200	0.200	3.300	0.0508	333.3
1227	0.220	0.220	3.318	0.0558	369.8
1159	0.230	0.230	3.327	0.0584	348.4
100	0.240	0.240	3.336	0.0609	30.0

UNCONFINED COMPRESSION TESTING
Sample No. 0751-014 (14 Day)



UNCONFINED COMPRESSION TEST

ASTM D 2166
SUMMARY OF RESULTS

PROJECT:	C-D Systems Solidification Study		
PROJECT No.:	SH0751		
SAMPLE No.:	0751-014 (14 Day)		
TESTING DATE:	8-Dec-20	LOADING RATE:	0.0400 in./min
TESTED BY:	JBA	TRACKING CODE:	E328

TESTING PARAMETER AND RESULTS		
MOISTURE CONTENT	13.5	**%**
BULK UNIT WEIGHT	137.4	lb/ft³
DRY UNIT WEIGHT	121.1	lb/ft³
UCS *	369.8	lb/in²

* UCS - UNCONFINED COMPRESSIVE STRENGTH

MATERIAL pH

EPA METHOD 9045
DATA SHEET

PROJECT:	C-D Systems Solidification Study
PROJECT No.:	SH0751
TESTING DATE:	17-Dec-20
TESTED BY:	JBA/BLM
TRACKING CODE:	E329

	KEMRON SAMPLE No.	MATERIAL pH
1	0751-015 A	13.01
2	0751-015 B	13.12
3	0751-015 C	13.06
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
	AVERAGE:	13.06

UNCONFINED COMPRESSION TEST

ASTM D 2166

PROJECT:	C-D Systems Solidification Study		
PROJECT No.:	SH0751		
SAMPLE No.:	0751-015 (14 Day)		
TESTING DATE:	8-Dec-20	LOADING RATE:	0.0400 in./min
TESTED BY:	JBA	TRACKING CODE:	E329

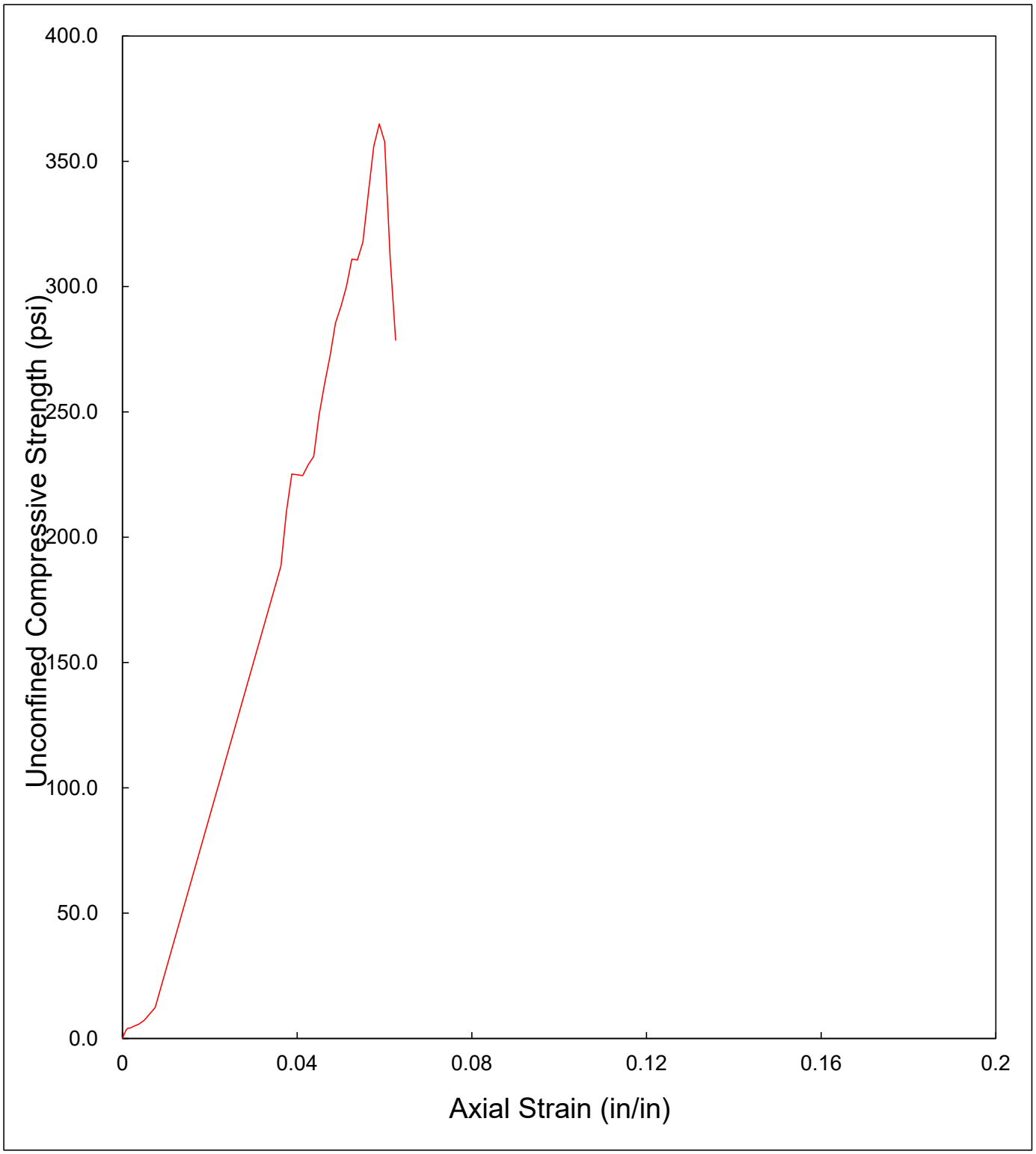
MOISTURE CONTENT (Dry Basis)		
1. MOISTURE TIN NO.		
2. WT MOISTURE TIN (tare weight)	217.45	g
3. WT WET SOIL + TARE	325.78	g
4. WT DRY SOIL + TARE	309.86	g
5. WT WATER, Ww	15.92	g
6. WT DRY SOIL, Ws	92.41	g
7. MOISTURE CONTENT, W	**17.23**	**%**

SOIL SPECIMEN DIMENSIONS				
	DIAMETER		***LENGTH***	
No. 1	2.00	in.	4.08	in.
No. 2	1.99	in.	4.02	in.
No. 3	1.99	in.	3.89	in.
Average	**2.00**	**in.**	**4.00**	**in.**

SPECIMEN CONDITIONS		
Initial Specimen WT, Wo	***435.08***	***g***
Initial Area, Ao	3.13	in²
Initial Volume, Vo	12.50	in³
Initial Bulk Unit Weight,	132.6	lb/ft³
Initial Dry Unit Weight	113.1	lb/ft³
15 % Strain (0.15 Lo)	0.60	in.
UCS	364.9	lb/in²

COMPRESSIVE LOAD (lbs.)	DIAL GAGE READING (in.)	SPECIMEN DEFORMATION (in.)	CORRECTED AREA (in²)	AXIAL STRAIN (in/in)	UNCONFINED COMPRESSIVE STRENGTH (lb/in²)
0	0.000	0.000	3.129	0.0000	0.0
10	0.003	0.003	3.131	0.0008	3.2
13	0.005	0.005	3.132	0.0013	4.2
13	0.007	0.007	3.134	0.0018	4.1
15	0.010	0.010	3.136	0.0025	4.8
18	0.015	0.015	3.140	0.0038	5.7
23	0.020	0.020	3.144	0.0050	7.3
31	0.025	0.025	3.148	0.0063	9.8
39	0.030	0.030	3.152	0.0075	12.4
612	0.145	0.145	3.246	0.0363	188.5
682	0.150	0.150	3.251	0.0375	209.8
733	0.155	0.155	3.255	0.0388	225.2
733	0.160	0.160	3.259	0.0400	224.9
733	0.165	0.165	3.263	0.0413	224.6
748	0.170	0.170	3.268	0.0425	228.9
760	0.175	0.175	3.272	0.0438	232.3
815	0.180	0.180	3.276	0.0450	248.8
857	0.185	0.185	3.280	0.0463	261.2
895	0.190	0.190	3.285	0.0475	272.5
939	0.195	0.195	3.289	0.0488	285.5
962	0.200	0.200	3.293	0.0501	292.1
990	0.205	0.205	3.298	0.0513	300.2
1027	0.210	0.210	3.302	0.0526	311.0
1027	0.215	0.215	3.306	0.0538	310.6
1052	0.220	0.220	3.311	0.0551	317.7
1117	0.225	0.225	3.315	0.0563	336.9
1182	0.230	0.230	3.320	0.0576	356.1
1213	0.235	0.235	3.324	0.0588	364.9
1191	0.240	0.240	3.328	0.0601	357.8
1038	0.245	0.245	3.333	0.0613	311.4
930	0.250	0.250	3.337	0.0626	278.7

UNCONFINED COMPRESSION TESTING
Sample No. 0751-015 (14 Day)



UNCONFINED COMPRESSION TEST

ASTM D 2166
SUMMARY OF RESULTS

PROJECT:	C-D Systems Solidification Study		
PROJECT No.:	SH0751		
SAMPLE No.:	0751-015 (14 Day)		
TESTING DATE:	8-Dec-20	LOADING RATE:	0.0400 in./min
TESTED BY:	JBA	TRACKING CODE:	E329

TESTING PARAMETER AND RESULTS		
MOISTURE CONTENT	17.2	**%**
BULK UNIT WEIGHT	132.6	lb/ft³
DRY UNIT WEIGHT	113.1	lb/ft³
UCS *	364.9	lb/in²

* UCS - UNCONFINED COMPRESSIVE STRENGTH

MATERIAL pH

EPA METHOD 9045
DATA SHEET

PROJECT:	C-D Systems Solidification Study
PROJECT No.:	SH0751
TESTING DATE:	17-Dec-20
TESTED BY:	JBA/BLM
TRACKING CODE:	E330

	KEMRON SAMPLE No.	MATERIAL pH
1	0751-016 A	13.20
2	0751-016 B	13.08
3	0751-016 C	12.93
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
	AVERAGE:	13.07

UNCONFINED COMPRESSION TEST

ASTM D 2166

PROJECT:	C-D Systems Solidification Study		
PROJECT No.:	SH0751		
SAMPLE No.:	0751-016 (14 Day)		
TESTING DATE:	8-Dec-20	LOADING RATE:	0.0400 in./min
TESTED BY:	JBA	TRACKING CODE:	E330

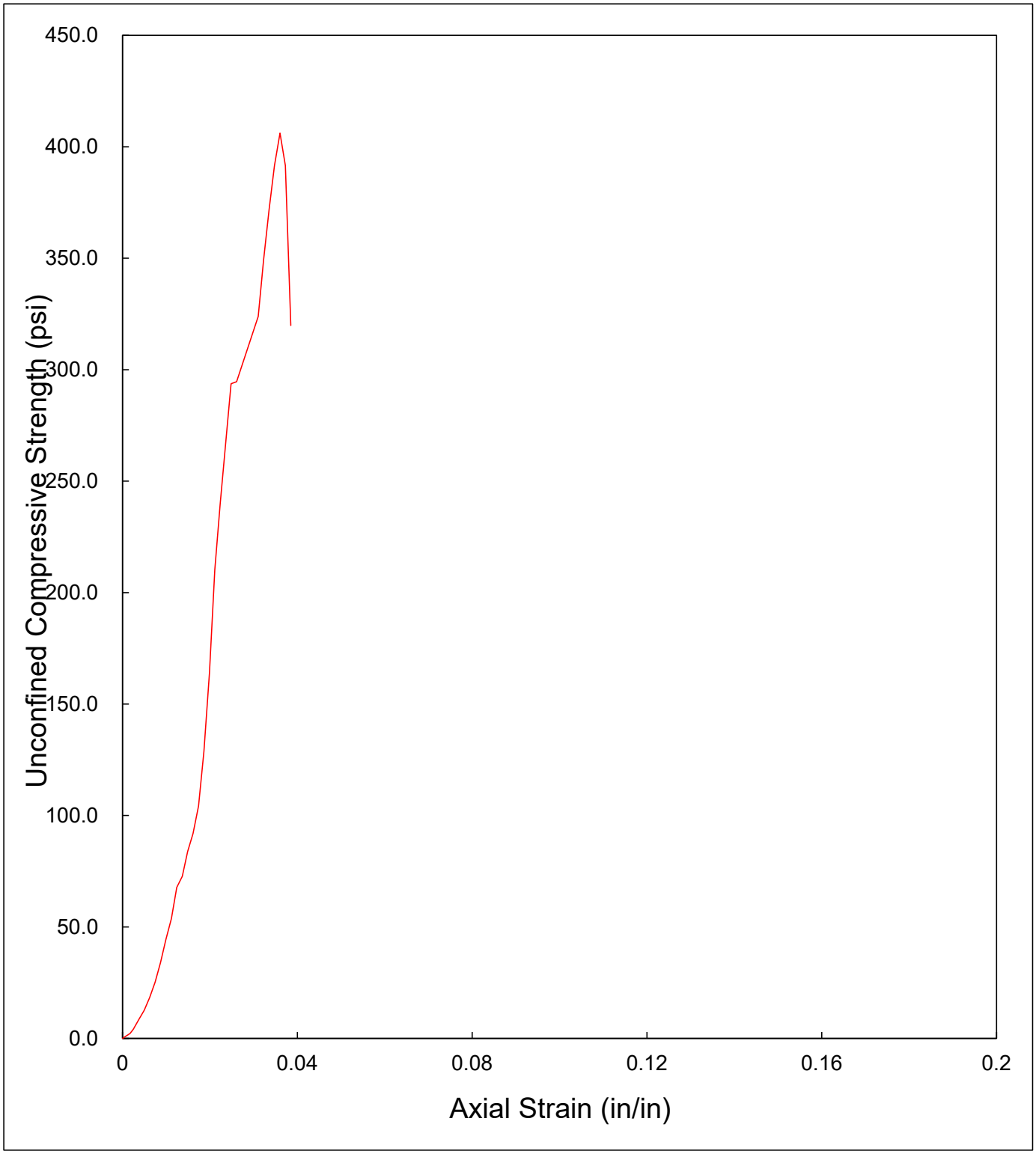
MOISTURE CONTENT (Dry Basis)		
1. MOISTURE TIN NO.		
2. WT MOISTURE TIN (tare weight)	241.57	g
3. WT WET SOIL + TARE	382.33	g
4. WT DRY SOIL + TARE	361.99	g
5. WT WATER, Ww	20.34	g
6. WT DRY SOIL, Ws	120.42	g
7. MOISTURE CONTENT, W	**16.89**	**%**

SOIL SPECIMEN DIMENSIONS				
	DIAMETER		***LENGTH***	
No. 1	2.01	in.	4.05	in.
No. 2	2.00	in.	3.98	in.
No. 3	1.99	in.	4.05	in.
Average	**2.00**	**in.**	**4.03**	**in.**

SPECIMEN CONDITIONS		
Initial Specimen WT, Wo	***436.61***	***g***
Initial Area, Ao	3.15	in²
Initial Volume, Vo	12.67	in³
Initial Bulk Unit Weight,	131.3	lb/ft³
Initial Dry Unit Weight	112.3	lb/ft³
15 % Strain (0.15 Lo)	0.60	in.
UCS	406.1	lb/in²

COMPRESSIVE LOAD (lbs.)	DIAL GAGE READING (in.)	SPECIMEN DEFORMATION (in.)	CORRECTED AREA (in²)	AXIAL STRAIN (in/in)	UNCONFINED COMPRESSIVE STRENGTH (lb/in²)
0	0.000	0.000	3.147	0.0000	0.0
3	0.003	0.003	3.150	0.0007	1.0
5	0.005	0.005	3.151	0.0012	1.6
7	0.007	0.007	3.153	0.0017	2.2
13	0.010	0.010	3.155	0.0025	4.1
27	0.015	0.015	3.159	0.0037	8.5
40	0.020	0.020	3.163	0.0050	12.6
58	0.025	0.025	3.167	0.0062	18.3
80	0.030	0.030	3.171	0.0075	25.2
108	0.035	0.035	3.175	0.0087	34.0
141	0.040	0.040	3.179	0.0099	44.4
171	0.045	0.045	3.183	0.0112	53.7
216	0.050	0.050	3.187	0.0124	67.8
232	0.055	0.055	3.191	0.0137	72.7
268	0.060	0.060	3.195	0.0149	83.9
294	0.065	0.065	3.199	0.0161	91.9
334	0.070	0.070	3.203	0.0174	104.3
413	0.075	0.075	3.207	0.0186	128.8
526	0.080	0.080	3.211	0.0199	163.8
676	0.085	0.085	3.215	0.0211	210.2
772	0.090	0.090	3.219	0.0224	239.8
861	0.095	0.095	3.223	0.0236	267.1
948	0.100	0.100	3.228	0.0248	293.7
952	0.105	0.105	3.232	0.0261	294.6
1052	0.125	0.125	3.248	0.0311	323.9
1136	0.130	0.130	3.252	0.0323	349.3
1211	0.135	0.135	3.257	0.0335	371.9
1277	0.140	0.140	3.261	0.0348	391.6
1326	0.145	0.145	3.265	0.0360	406.1
1280	0.150	0.150	3.269	0.0373	391.5
1047	0.155	0.155	3.273	0.0385	319.9

UNCONFINED COMPRESSION TESTING
Sample No. 0751-016 (14 Day)



UNCONFINED COMPRESSION TEST

ASTM D 2166
SUMMARY OF RESULTS

PROJECT:	C-D Systems Solidification Study		
PROJECT No.:	SH0751		
SAMPLE No.:	0751-016 (14 Day)		
TESTING DATE:	8-Dec-20	LOADING RATE:	0.0400 in./min
TESTED BY:	JBA	TRACKING CODE:	E330

TESTING PARAMETER AND RESULTS		
MOISTURE CONTENT	16.9	**%**
BULK UNIT WEIGHT	131.3	lb/ft³
DRY UNIT WEIGHT	112.3	lb/ft³
UCS *	406.1	lb/in²

* UCS - UNCONFINED COMPRESSIVE STRENGTH

MATERIAL pH

EPA METHOD 9045
DATA SHEET

PROJECT:	C-D Systems Solidification Study
PROJECT No.:	SH0751
TESTING DATE:	17-Dec-20
TESTED BY:	JBA/BLM
TRACKING CODE:	E331

KEMRON SAMPLE No.		MATERIAL pH
1	0751-017 A	13.49
2	0751-017 B	13.55
3	0751-017 C	13.55
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
	AVERAGE:	13.53

UNCONFINED COMPRESSION TEST

ASTM D 2166

PROJECT:	C-D Systems Solidification Study		
PROJECT No.:	SH0751		
SAMPLE No.:	0751-017 (14 Day)		
TESTING DATE:	8-Dec-20	LOADING RATE:	0.0400 in./min
TESTED BY:	JBA	TRACKING CODE:	E331

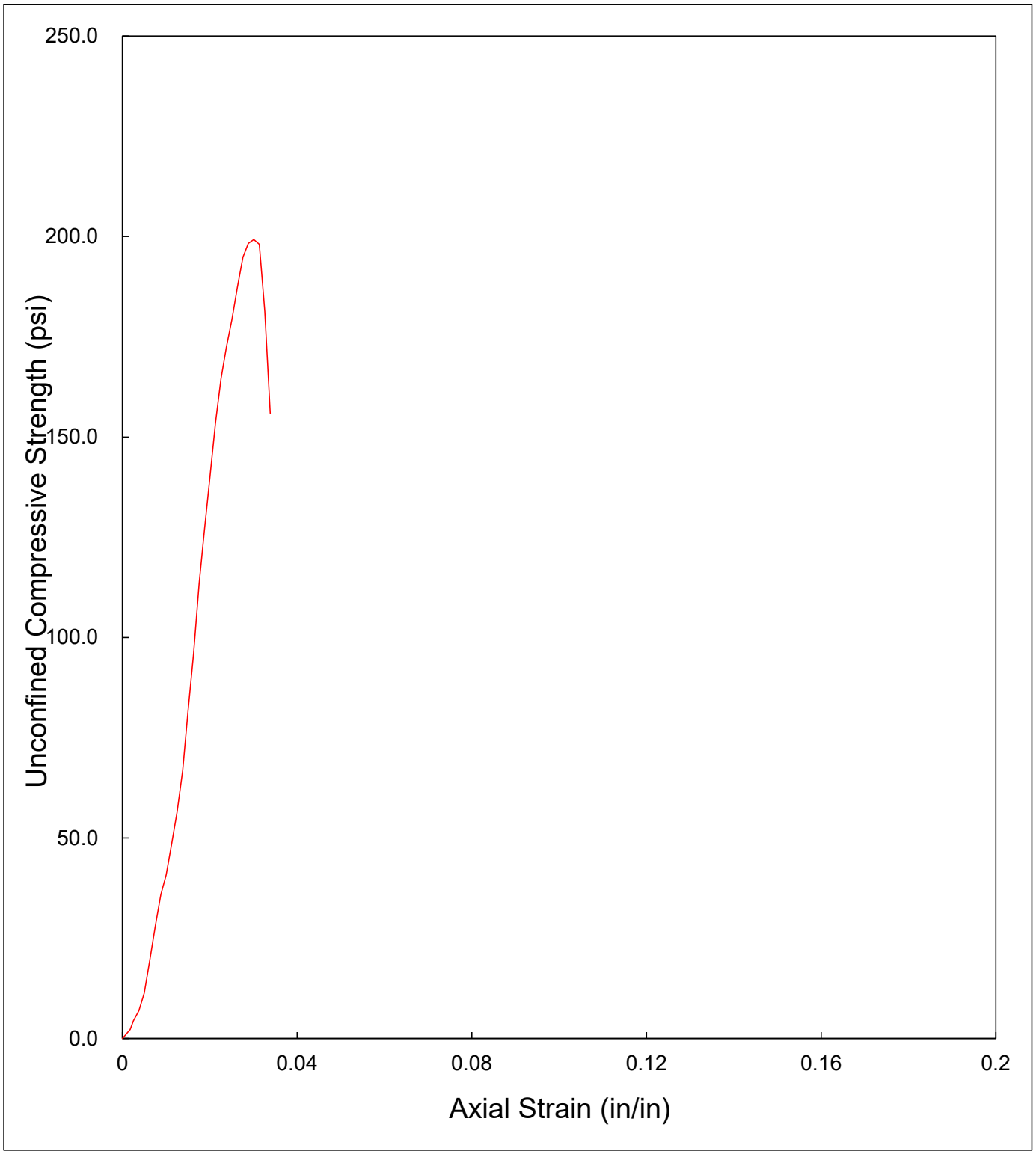
MOISTURE CONTENT (Dry Basis)		
1. MOISTURE TIN NO.		
2. WT MOISTURE TIN (tare weight)	223.85	g
3. WT WET SOIL + TARE	377.14	g
4. WT DRY SOIL + TARE	355.21	g
5. WT WATER, Ww	21.93	g
6. WT DRY SOIL, Ws	131.36	g
7. MOISTURE CONTENT, W	**16.69**	**%**

SOIL SPECIMEN DIMENSIONS				
	DIAMETER		***LENGTH***	
No. 1	2.01	in.	4.04	in.
No. 2	2.01	in.	3.96	in.
No. 3	2.00	in.	3.97	in.
Average	**2.00**	**in.**	**3.99**	**in.**

SPECIMEN CONDITIONS		
Initial Specimen WT, Wo	***441.89***	***g***
Initial Area, Ao	3.15	in²
Initial Volume, Vo	12.58	in³
Initial Bulk Unit Weight,	133.8	lb/ft³
Initial Dry Unit Weight	114.7	lb/ft³
15 % Strain (0.15 Lo)	0.60	in.
UCS	199.3	lb/in²

COMPRESSIVE LOAD (lbs.)	DIAL GAGE READING (in.)	SPECIMEN DEFORMATION (in.)	CORRECTED AREA (in²)	AXIAL STRAIN (in/in)	UNCONFINED COMPRESSIVE STRENGTH (lb/in²)
0	0.000	0.000	3.154	0.0000	0.0
3	0.003	0.003	3.157	0.0008	1.0
5	0.005	0.005	3.158	0.0013	1.6
7	0.007	0.007	3.160	0.0018	2.2
14	0.010	0.010	3.162	0.0025	4.4
22	0.015	0.015	3.166	0.0038	6.9
36	0.020	0.020	3.170	0.0050	11.4
62	0.025	0.025	3.174	0.0063	19.5
89	0.030	0.030	3.178	0.0075	28.0
114	0.035	0.035	3.182	0.0088	35.8
130	0.040	0.040	3.186	0.0100	40.8
155	0.045	0.045	3.190	0.0113	48.6
181	0.050	0.050	3.194	0.0125	56.7
214	0.055	0.055	3.198	0.0138	66.9
262	0.060	0.060	3.202	0.0150	81.8
308	0.065	0.065	3.206	0.0163	96.1
364	0.070	0.070	3.211	0.0176	113.4
408	0.075	0.075	3.215	0.0188	126.9
451	0.080	0.080	3.219	0.0201	140.1
495	0.085	0.085	3.223	0.0213	153.6
531	0.090	0.090	3.227	0.0226	164.5
557	0.095	0.095	3.231	0.0238	172.4
580	0.100	0.100	3.235	0.0251	179.3
607	0.105	0.105	3.239	0.0263	187.4
632	0.110	0.110	3.244	0.0276	194.8
644	0.115	0.115	3.248	0.0288	198.3
648	0.120	0.120	3.252	0.0301	199.3
645	0.125	0.125	3.256	0.0313	198.1
591	0.130	0.130	3.260	0.0326	181.3
509	0.135	0.135	3.265	0.0338	155.9

UNCONFINED COMPRESSION TESTING
Sample No. 0751-017 (14 Day)



UNCONFINED COMPRESSION TEST

ASTM D 2166
SUMMARY OF RESULTS

PROJECT:	C-D Systems Solidification Study		
PROJECT No.:	SH0751		
SAMPLE No.:	0751-017 (14 Day)		
TESTING DATE:	8-Dec-20	LOADING RATE:	0.0400 in./min
TESTED BY:	JBA	TRACKING CODE:	E331

TESTING PARAMETER AND RESULTS		
MOISTURE CONTENT	16.7	**%**
BULK UNIT WEIGHT	133.8	lb/ft³
DRY UNIT WEIGHT	114.7	lb/ft³
UCS *	199.3	lb/in²

* UCS - UNCONFINED COMPRESSIVE STRENGTH

MATERIAL pH

EPA METHOD 9045
DATA SHEET

PROJECT:	C-D Systems Solidification Study
PROJECT No.:	SH0751
TESTING DATE:	17-Dec-20
TESTED BY:	JBA/BLM
TRACKING CODE:	E332

KEMRON SAMPLE No.		MATERIAL pH
1	0751-018 A	13.56
2	0751-018 B	13.58
3	0751-018 C	13.58
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
	AVERAGE:	13.57

UNCONFINED COMPRESSION TEST

ASTM D 2166

PROJECT:	C-D Systems Solidification Study		
PROJECT No.:	SH0751		
SAMPLE No.:	0751-018 (14 Day)		
TESTING DATE:	8-Dec-20	LOADING RATE:	0.0400 in./min
TESTED BY:	JBA	TRACKING CODE:	E332

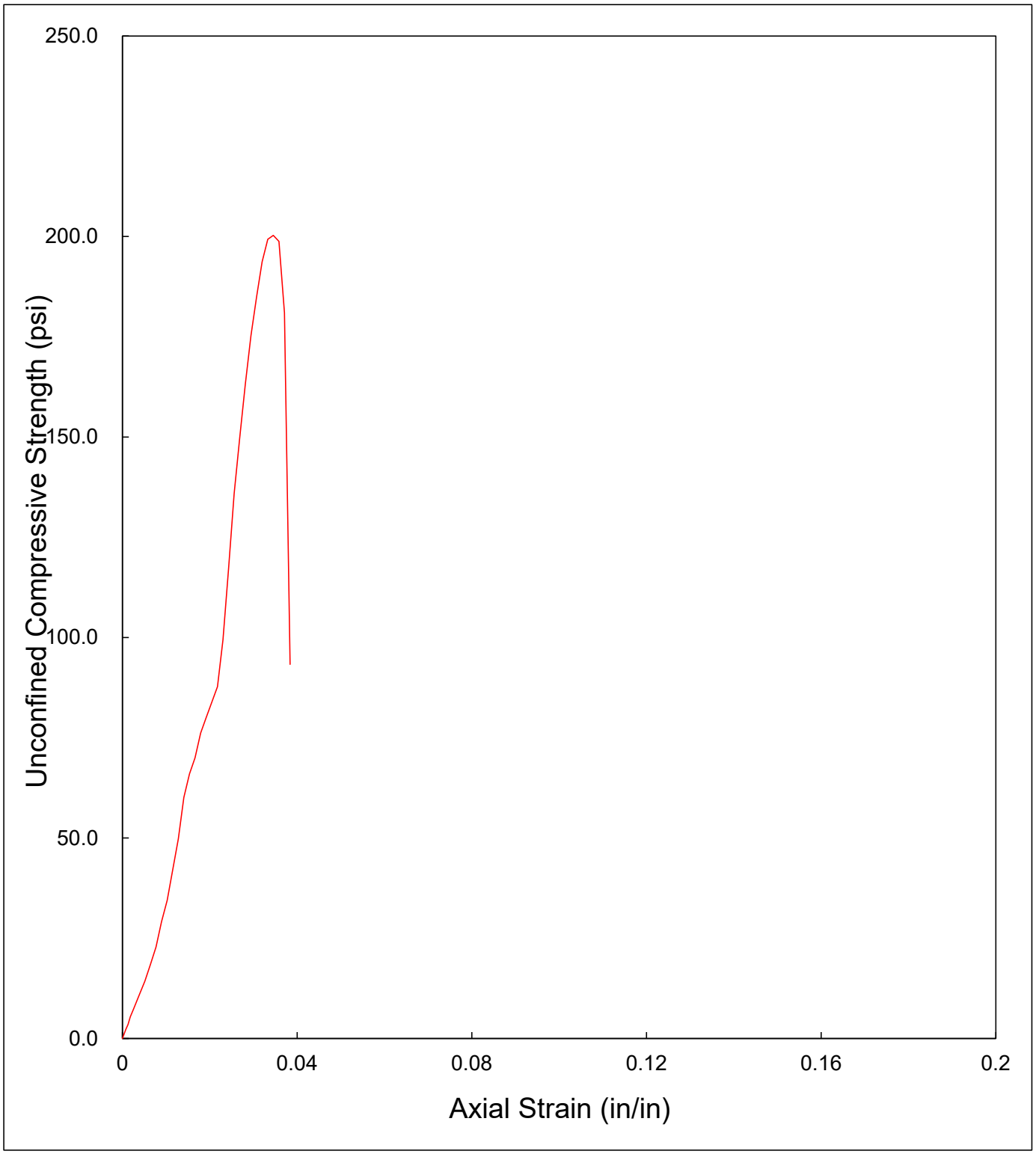
MOISTURE CONTENT (Dry Basis)		
1. MOISTURE TIN NO.		
2. WT MOISTURE TIN (tare weight)	223.95	g
3. WT WET SOIL + TARE	412.99	g
4. WT DRY SOIL + TARE	387.43	g
5. WT WATER, Ww	25.56	g
6. WT DRY SOIL, Ws	163.48	g
7. MOISTURE CONTENT, W	**15.63**	**%**

SOIL SPECIMEN DIMENSIONS				
	DIAMETER		***LENGTH***	
No. 1	2.00	in.	3.97	in.
No. 2	2.00	in.	3.89	in.
No. 3	1.99	in.	3.86	in.
Average	**2.00**	**in.**	**3.91**	**in.**

SPECIMEN CONDITIONS		
Initial Specimen WT, Wo	***431.33***	***g***
Initial Area, Ao	3.13	in²
Initial Volume, Vo	12.24	in³
Initial Bulk Unit Weight,	134.2	lb/ft³
Initial Dry Unit Weight	116.1	lb/ft³
15 % Strain (0.15 Lo)	0.59	in.
UCS	200.3	lb/in²

COMPRESSIVE LOAD (lbs.)	DIAL GAGE READING (in.)	SPECIMEN DEFORMATION (in.)	CORRECTED AREA (in²)	AXIAL STRAIN (in/in)	UNCONFINED COMPRESSIVE STRENGTH (lb/in²)
0	0.000	0.000	3.133	0.0000	0.0
7	0.003	0.003	3.136	0.0008	2.2
11	0.005	0.005	3.137	0.0013	3.5
17	0.007	0.007	3.139	0.0018	5.4
23	0.010	0.010	3.141	0.0026	7.3
34	0.015	0.015	3.145	0.0038	10.8
45	0.020	0.020	3.149	0.0051	14.3
58	0.025	0.025	3.153	0.0064	18.4
72	0.030	0.030	3.157	0.0077	22.8
92	0.035	0.035	3.162	0.0090	29.1
109	0.040	0.040	3.166	0.0102	34.4
158	0.050	0.050	3.174	0.0128	49.8
191	0.055	0.055	3.178	0.0141	60.1
210	0.060	0.060	3.182	0.0154	66.0
223	0.065	0.065	3.186	0.0166	70.0
243	0.070	0.070	3.190	0.0179	76.2
256	0.075	0.075	3.195	0.0192	80.1
281	0.085	0.085	3.203	0.0218	87.7
319	0.090	0.090	3.207	0.0230	99.5
377	0.095	0.095	3.211	0.0243	117.4
437	0.100	0.100	3.216	0.0256	135.9
483	0.105	0.105	3.220	0.0269	150.0
526	0.110	0.110	3.224	0.0282	163.2
566	0.115	0.115	3.228	0.0294	175.3
598	0.120	0.120	3.233	0.0307	185.0
627	0.125	0.125	3.237	0.0320	193.7
646	0.130	0.130	3.241	0.0333	199.3
650	0.135	0.135	3.245	0.0346	200.3
646	0.140	0.140	3.250	0.0358	198.8
589	0.145	0.145	3.254	0.0371	181.0
304	0.150	0.150	3.258	0.0384	93.3

UNCONFINED COMPRESSION TESTING
Sample No. 0751-018 (14 Day)



UNCONFINED COMPRESSION TEST

ASTM D 2166
SUMMARY OF RESULTS

PROJECT:	C-D Systems Solidification Study		
PROJECT No.:	SH0751		
SAMPLE No.:	0751-018 (14 Day)		
TESTING DATE:	8-Dec-20	LOADING RATE:	0.0400 in./min
TESTED BY:	JBA	TRACKING CODE:	E332

TESTING PARAMETER AND RESULTS		
MOISTURE CONTENT	15.6	**%**
BULK UNIT WEIGHT	134.2	lb/ft³
DRY UNIT WEIGHT	116.1	lb/ft³
UCS *	200.3	lb/in²

* UCS - UNCONFINED COMPRESSIVE STRENGTH

MATERIAL pH

EPA METHOD 9045
DATA SHEET

PROJECT:	C-D Systems Solidification Study
PROJECT No.:	SH0751
TESTING DATE:	17-Dec-20
TESTED BY:	JBA/BLM
TRACKING CODE:	E333

	KEMRON SAMPLE No.	MATERIAL pH
1	0751-019 A	13.22
2	0751-019 B	13.33
3	0751-019 C	13.23
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
	AVERAGE:	13.26

UNCONFINED COMPRESSION TEST

ASTM D 2166

PROJECT:	C-D Systems Solidification Study		
PROJECT No.:	SH0751		
SAMPLE No.:	0751-019 (14 Day)		
TESTING DATE:	8-Dec-20	LOADING RATE:	0.0400 in./min
TESTED BY:	JBA	TRACKING CODE:	E333

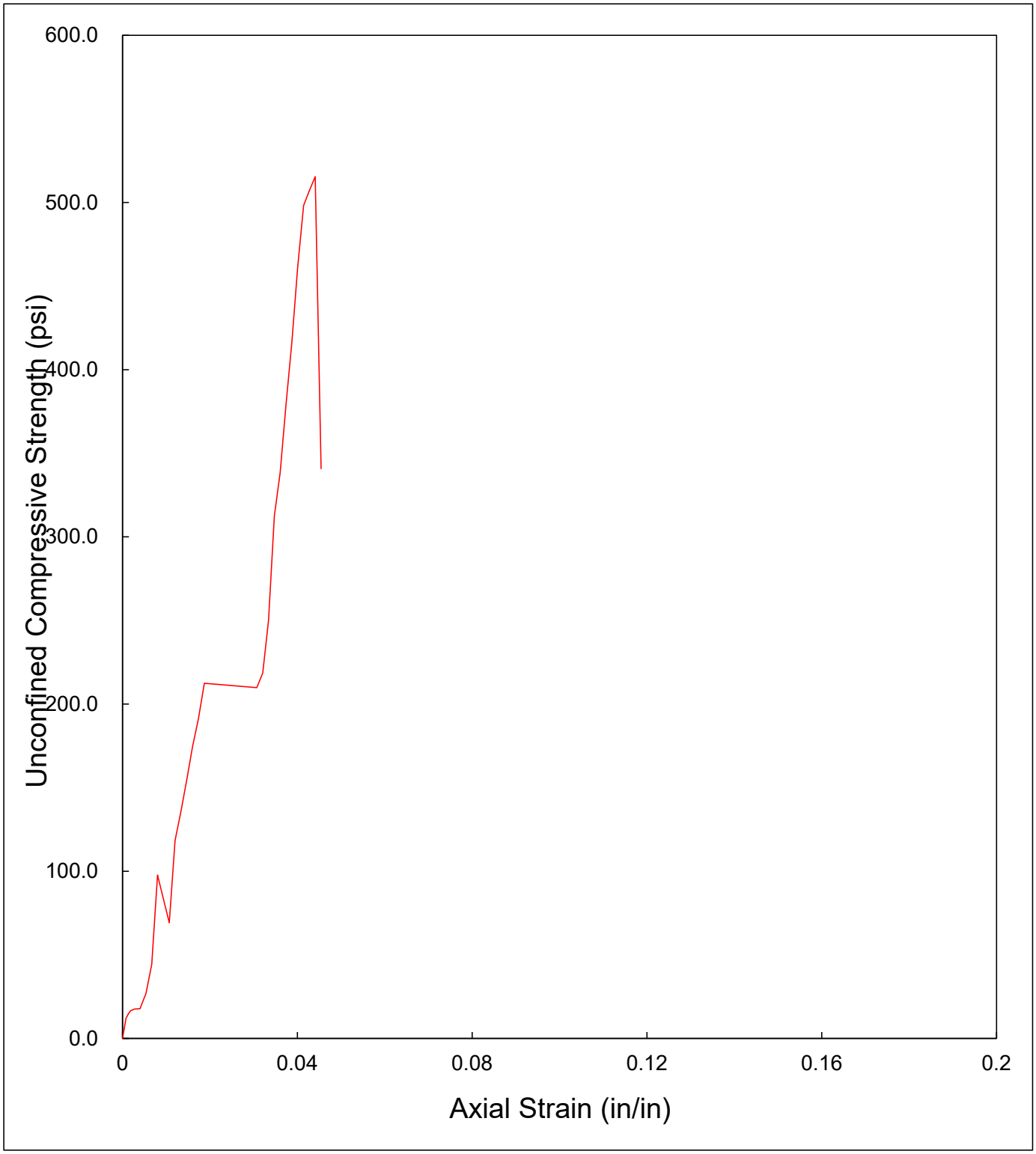
MOISTURE CONTENT (Dry Basis)		
1. MOISTURE TIN NO.		
2. WT MOISTURE TIN (tare weight)	219.88	g
3. WT WET SOIL + TARE	338.11	g
4. WT DRY SOIL + TARE	325.32	g
5. WT WATER, Ww	12.79	g
6. WT DRY SOIL, Ws	105.44	g
7. MOISTURE CONTENT, W	**12.13**	**%**

SOIL SPECIMEN DIMENSIONS				
	DIAMETER		***LENGTH***	
No. 1	2.03	in.	3.78	in.
No. 2	2.01	in.	3.74	in.
No. 3	2.00	in.	3.71	in.
Average	**2.01**	**in.**	**3.74**	**in.**

SPECIMEN CONDITIONS		
Initial Specimen WT, Wo	***420.63***	***g***
Initial Area, Ao	3.19	in²
Initial Volume, Vo	11.93	in³
Initial Bulk Unit Weight,	134.4	lb/ft³
Initial Dry Unit Weight	119.8	lb/ft³
15 % Strain (0.15 Lo)	0.56	in.
UCS	515.5	lb/in²

COMPRESSIVE LOAD (lbs.)	DIAL GAGE READING (in.)	SPECIMEN DEFORMATION (in.)	CORRECTED AREA (in²)	AXIAL STRAIN (in/in)	UNCONFINED COMPRESSIVE STRENGTH (lb/in²)
0	0.000	0.000	3.188	0.0000	0.0
38	0.003	0.003	3.190	0.0008	11.9
47	0.005	0.005	3.192	0.0013	14.7
53	0.007	0.007	3.194	0.0019	16.6
56	0.010	0.010	3.196	0.0027	17.5
57	0.015	0.015	3.201	0.0040	17.8
86	0.020	0.020	3.205	0.0053	26.8
142	0.025	0.025	3.209	0.0067	44.2
314	0.030	0.030	3.214	0.0080	97.7
223	0.040	0.040	3.222	0.0107	69.2
382	0.045	0.045	3.227	0.0120	118.4
438	0.050	0.050	3.231	0.0134	135.6
501	0.055	0.055	3.235	0.0147	154.8
566	0.060	0.060	3.240	0.0160	174.7
620	0.065	0.065	3.244	0.0174	191.1
690	0.070	0.070	3.249	0.0187	212.4
690	0.115	0.115	3.289	0.0307	209.8
720	0.120	0.120	3.293	0.0321	218.6
825	0.125	0.125	3.298	0.0334	250.1
1032	0.130	0.130	3.303	0.0347	312.5
1119	0.135	0.135	3.307	0.0361	338.4
1257	0.140	0.140	3.312	0.0374	379.6
1381	0.145	0.145	3.316	0.0388	416.4
1532	0.150	0.150	3.321	0.0401	461.3
1657	0.155	0.155	3.326	0.0414	498.3
1689	0.160	0.160	3.330	0.0428	507.2
1719	0.165	0.165	3.335	0.0441	515.5
1138	0.170	0.170	3.340	0.0454	340.8

UNCONFINED COMPRESSION TESTING
Sample No. 0751-019 (14 Day)



UNCONFINED COMPRESSION TEST

ASTM D 2166
SUMMARY OF RESULTS

PROJECT:	C-D Systems Solidification Study		
PROJECT No.:	SH0751		
SAMPLE No.:	0751-019 (14 Day)		
TESTING DATE:	8-Dec-20	LOADING RATE:	0.0400 in./min
TESTED BY:	JBA	TRACKING CODE:	E333

TESTING PARAMETER AND RESULTS		
MOISTURE CONTENT	12.1	**%**
BULK UNIT WEIGHT	134.4	lb/ft³
DRY UNIT WEIGHT	119.8	lb/ft³
UCS *	515.5	lb/in²

* UCS - UNCONFINED COMPRESSIVE STRENGTH

MATERIAL pH

EPA METHOD 9045
DATA SHEET

PROJECT:	C-D Systems Solidification Study
PROJECT No.:	SH0751
TESTING DATE:	17-Dec-20
TESTED BY:	JBA/BLM
TRACKING CODE:	E334

	KEMRON SAMPLE No.	MATERIAL pH
1	0751-020 A	13.35
2	0751-020 B	13.30
3	0751-020 C	13.13
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
	AVERAGE:	13.26

UNCONFINED COMPRESSION TEST

ASTM D 2166

PROJECT:	C-D Systems Solidification Study		
PROJECT No.:	SH0751		
SAMPLE No.:	0751-020 (14 Day)		
TESTING DATE:	8-Dec-20	LOADING RATE:	0.0400 in./min
TESTED BY:	JBA	TRACKING CODE:	E334

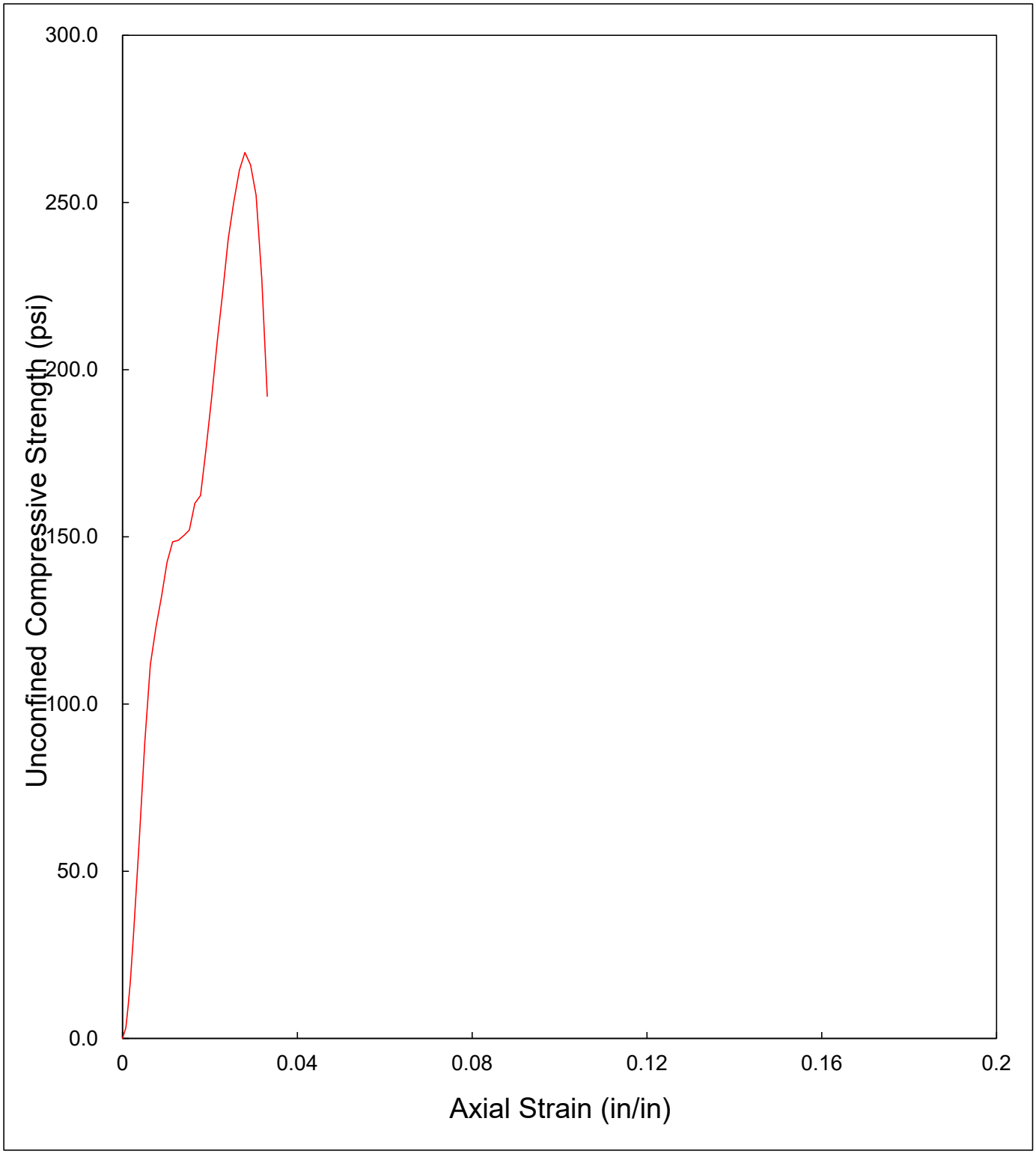
MOISTURE CONTENT (Dry Basis)		
1. MOISTURE TIN NO.		
2. WT MOISTURE TIN (tare weight)	222.69	g
3. WT WET SOIL + TARE	329.32	g
4. WT DRY SOIL + TARE	314.52	g
5. WT WATER, Ww	14.80	g
6. WT DRY SOIL, Ws	91.83	g
7. MOISTURE CONTENT, W	**16.12**	**%**

SOIL SPECIMEN DIMENSIONS				
	DIAMETER		***LENGTH***	
No. 1	2.00	in.	3.92	in.
No. 2	1.99	in.	3.92	in.
No. 3	1.99	in.	3.94	in.
Average	**1.99**	**in.**	**3.93**	**in.**

SPECIMEN CONDITIONS		
Initial Specimen WT, Wo	***427.02***	***g***
Initial Area, Ao	3.12	in²
Initial Volume, Vo	12.25	in³
Initial Bulk Unit Weight,	132.8	lb/ft³
Initial Dry Unit Weight	114.3	lb/ft³
15 % Strain (0.15 Lo)	0.59	in.
UCS	265.0	lb/in²

COMPRESSIVE LOAD (lbs.)	DIAL GAGE READING (in.)	SPECIMEN DEFORMATION (in.)	CORRECTED AREA (in²)	AXIAL STRAIN (in/in)	UNCONFINED COMPRESSIVE STRENGTH (lb/in²)
0	0.000	0.000	3.122	0.0000	0.0
10	0.003	0.003	3.124	0.0008	3.2
30	0.005	0.005	3.126	0.0013	9.6
52	0.007	0.007	3.127	0.0018	16.6
99	0.010	0.010	3.130	0.0025	31.6
184	0.015	0.015	3.134	0.0038	58.7
278	0.020	0.020	3.138	0.0051	88.6
351	0.025	0.025	3.142	0.0064	111.7
387	0.030	0.030	3.146	0.0076	123.0
416	0.035	0.035	3.150	0.0089	132.1
449	0.040	0.040	3.154	0.0102	142.4
469	0.045	0.045	3.158	0.0115	148.5
471	0.050	0.050	3.162	0.0127	149.0
476	0.055	0.055	3.166	0.0140	150.3
482	0.060	0.060	3.170	0.0153	152.0
508	0.065	0.065	3.174	0.0166	160.0
516	0.070	0.070	3.178	0.0178	162.3
561	0.075	0.075	3.183	0.0191	176.3
610	0.080	0.080	3.187	0.0204	191.4
665	0.085	0.085	3.191	0.0217	208.4
713	0.090	0.090	3.195	0.0229	223.2
765	0.095	0.095	3.199	0.0242	239.1
802	0.100	0.100	3.203	0.0255	250.4
833	0.105	0.105	3.208	0.0268	259.7
851	0.110	0.110	3.212	0.0280	265.0
840	0.115	0.115	3.216	0.0293	261.2
812	0.120	0.120	3.220	0.0306	252.2
733	0.125	0.125	3.224	0.0318	227.3
620	0.130	0.130	3.229	0.0331	192.0

UNCONFINED COMPRESSION TESTING
Sample No. 0751-020 (14 Day)



UNCONFINED COMPRESSION TEST

ASTM D 2166
SUMMARY OF RESULTS

PROJECT:	C-D Systems Solidification Study		
PROJECT No.:	SH0751		
SAMPLE No.:	0751-020 (14 Day)		
TESTING DATE:	8-Dec-20	LOADING RATE:	0.0400 in./min
TESTED BY:	JBA	TRACKING CODE:	E334

TESTING PARAMETER AND RESULTS		
MOISTURE CONTENT	16.1	**%**
BULK UNIT WEIGHT	132.8	lb/ft³
DRY UNIT WEIGHT	114.3	lb/ft³
UCS *	265.0	lb/in²

* UCS - UNCONFINED COMPRESSIVE STRENGTH

28 Day

UNCONFINED COMPRESSION TEST

ASTM D 2166

PROJECT:	C-D Systems Solidification Study		
PROJECT No.:	SH0751		
SAMPLE No.:	0751-001 (28 Day)		
TESTING DATE:	21-Dec-20	LOADING RATE:	0.0400 in./min
TESTED BY:	JBA/BLM	TRACKING CODE:	E344

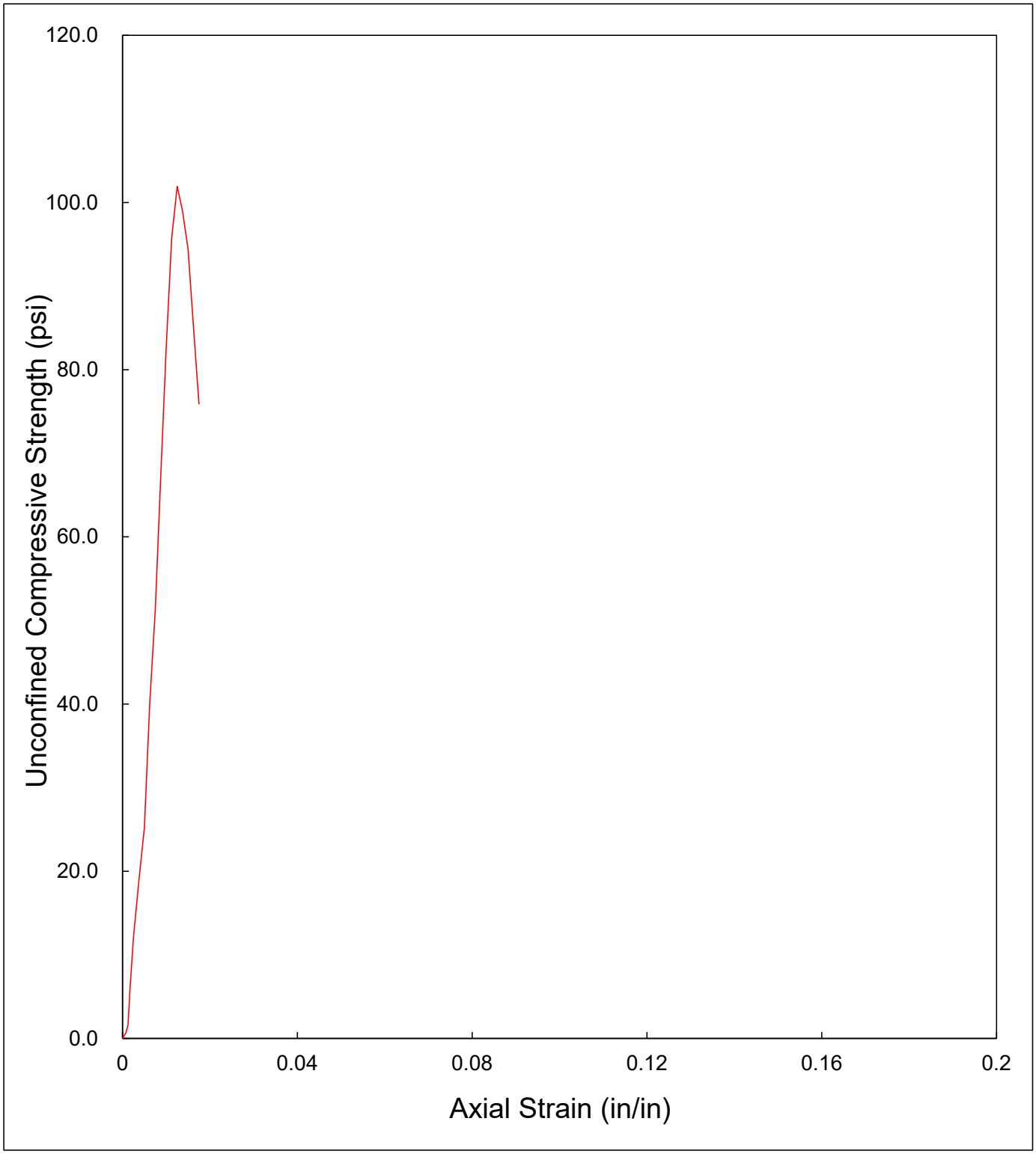
MOISTURE CONTENT (Dry Basis)		
1. MOISTURE TIN NO.		
2. WT MOISTURE TIN (tare weight)	225.09	g
3. WT WET SOIL + TARE	329.49	g
4. WT DRY SOIL + TARE	322.12	g
5. WT WATER, Ww	7.37	g
6. WT DRY SOIL, Ws	97.03	g
7. MOISTURE CONTENT, W	**7.60**	**%**

SOIL SPECIMEN DIMENSIONS				
	DIAMETER		*LENGTH*	
No. 1	2.00	in.	3.95	in.
No. 2	1.99	in.	4.02	in.
No. 3	1.99	in.	4.03	in.
Average	**1.99**	**in.**	**4.00**	**in.**

SPECIMEN CONDITIONS		
Initial Specimen WT, Wo	***427.24***	***g***
Initial Area, Ao	3.12	in²
Initial Volume, Vo	12.48	in³
Initial Bulk Unit Weight,	130.4	lb/ft³
Initial Dry Unit Weight	121.2	lb/ft³
15 % Strain (0.15 Lo)	0.60	in.
UCS	101.9	lb/in²

COMPRESSIVE LOAD (lbs.)	DIAL GAGE READING (in.)	SPECIMEN DEFORMATION (in.)	CORRECTED AREA (in²)	AXIAL STRAIN (in/in)	UNCONFINED COMPRESSIVE STRENGTH (lb/in²)
0	0.000	0.000	3.120	0.0000	0.0
2	0.003	0.003	3.122	0.0007	0.6
5	0.005	0.005	3.124	0.0012	1.6
19	0.007	0.007	3.125	0.0017	6.1
38	0.010	0.010	3.127	0.0025	12.2
59	0.015	0.015	3.131	0.0037	18.8
79	0.020	0.020	3.135	0.0050	25.2
126	0.025	0.025	3.139	0.0062	40.1
161	0.030	0.030	3.143	0.0075	51.2
212	0.035	0.035	3.147	0.0087	67.4
260	0.040	0.040	3.151	0.0100	82.5
302	0.045	0.045	3.155	0.0112	95.7
322	0.050	0.050	3.159	0.0125	101.9
313	0.055	0.055	3.163	0.0137	99.0
299	0.060	0.060	3.167	0.0150	94.4
270	0.065	0.065	3.171	0.0162	85.1
241	0.070	0.070	3.175	0.0175	75.9

UNCONFINED COMPRESSION TESTING
Sample No. 0751-001 (28 Day)



UNCONFINED COMPRESSION TEST

ASTM D 2166
SUMMARY OF RESULTS

PROJECT:	C-D Systems Solidification Study		
PROJECT No.:	SH0751		
SAMPLE No.:	0751-001 (28 Day)		
TESTING DATE:	21-Dec-20	LOADING RATE:	0.0400 in./min
TESTED BY:	JBA/BLM	TRACKING CODE:	E344

TESTING PARAMETER AND RESULTS		
MOISTURE CONTENT	7.6	**%**
BULK UNIT WEIGHT	130.4	lb/ft³
DRY UNIT WEIGHT	121.2	lb/ft³
UCS *	101.9	lb/in²

* UCS - UNCONFINED COMPRESSIVE STRENGTH

UNCONFINED COMPRESSION TEST

ASTM D 2166

PROJECT:	C-D Systems Solidification Study		
PROJECT No.:	SH0751		
SAMPLE No.:	0751-002 (28 Day)		
TESTING DATE:	21-Dec-20	LOADING RATE:	0.0400 in./min
TESTED BY:	JBA/BLM	TRACKING CODE:	E345

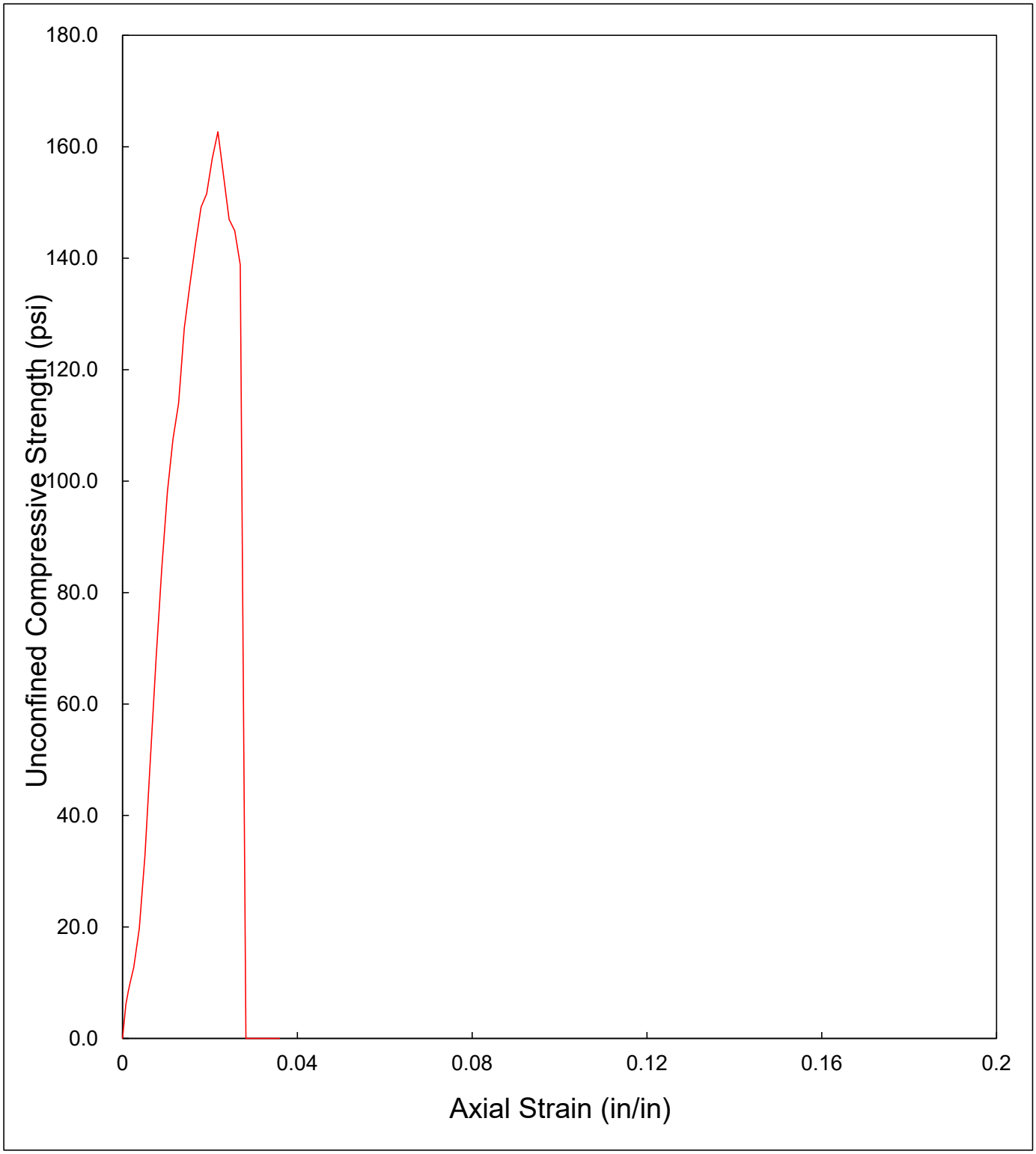
MOISTURE CONTENT (Dry Basis)		
1. MOISTURE TIN NO.		
2. WT MOISTURE TIN (tare weight)	216.02	g
3. WT WET SOIL + TARE	318.47	g
4. WT DRY SOIL + TARE	309.65	g
5. WT WATER, Ww	8.82	g
6. WT DRY SOIL, Ws	93.63	g
7. MOISTURE CONTENT, W	**9.42**	**%**

SOIL SPECIMEN DIMENSIONS				
	DIAMETER		*LENGTH*	
No. 1	2.00	in.	3.92	in.
No. 2	2.00	in.	3.85	in.
No. 3	1.99	in.	3.91	in.
Average	**2.00**	**in.**	**3.89**	**in.**

SPECIMEN CONDITIONS		
Initial Specimen WT, Wo	***445.69***	***g***
Initial Area, Ao	3.13	in²
Initial Volume, Vo	12.18	in³
Initial Bulk Unit Weight,	139.4	lb/ft³
Initial Dry Unit Weight	127.4	lb/ft³
15 % Strain (0.15 Lo)	0.58	in.
UCS	162.7	lb/in²

COMPRESSIVE LOAD (lbs.)	DIAL GAGE READING (in.)	SPECIMEN DEFORMATION (in.)	CORRECTED AREA (in²)	AXIAL STRAIN (in/in)	UNCONFINED COMPRESSIVE STRENGTH (lb/in²)
0	0.000	0.000	3.126	0.0000	0.0
19	0.003	0.003	3.129	0.0008	6.1
26	0.005	0.005	3.130	0.0013	8.3
32	0.007	0.007	3.132	0.0018	10.2
40	0.010	0.010	3.134	0.0026	12.8
62	0.015	0.015	3.139	0.0039	19.8
103	0.020	0.020	3.143	0.0051	32.8
160	0.025	0.025	3.147	0.0064	50.8
215	0.030	0.030	3.151	0.0077	68.2
266	0.035	0.035	3.155	0.0090	84.3
310	0.040	0.040	3.159	0.0103	98.1
340	0.045	0.045	3.163	0.0116	107.5
361	0.050	0.050	3.167	0.0128	114.0
404	0.055	0.055	3.171	0.0141	127.4
429	0.060	0.060	3.175	0.0154	135.1
453	0.065	0.065	3.179	0.0167	142.5
475	0.070	0.070	3.184	0.0180	149.2
483	0.075	0.075	3.188	0.0193	151.5
504	0.080	0.080	3.192	0.0205	157.9
520	0.085	0.085	3.196	0.0218	162.7
496	0.090	0.090	3.200	0.0231	155.0
471	0.095	0.095	3.205	0.0244	147.0
465	0.100	0.100	3.209	0.0257	144.9
446	0.105	0.105	3.213	0.0270	138.8
	0.110	0.110	3.217	0.0282	0.0
	0.115	0.115	3.222	0.0295	0.0
	0.120	0.120	3.226	0.0308	0.0
	0.125	0.125	3.230	0.0321	0.0
	0.130	0.130	3.234	0.0334	0.0
	0.135	0.135	3.239	0.0347	0.0
	0.140	0.140	3.243	0.0359	0.0

UNCONFINED COMPRESSION TESTING
Sample No. 0751-002 (28 Day)



UNCONFINED COMPRESSION TEST

ASTM D 2166
SUMMARY OF RESULTS

PROJECT:	C-D Systems Solidification Study		
PROJECT No.:	SH0751		
SAMPLE No.:	0751-002 (28 Day)		
TESTING DATE:	21-Dec-20	LOADING RATE:	0.0400 in./min
TESTED BY:	JBA/BLM	TRACKING CODE:	E345

TESTING PARAMETER AND RESULTS		
MOISTURE CONTENT	9.4	**%**
BULK UNIT WEIGHT	139.4	lb/ft³
DRY UNIT WEIGHT	127.4	lb/ft³
UCS *	162.7	lb/in²

* UCS - UNCONFINED COMPRESSIVE STRENGTH

MATERIAL pH

EPA METHOD 9045
DATA SHEET

PROJECT:	C-D Systems Solidification Study
PROJECT No.:	SH0751
TESTING DATE:	22-Dec-20
TESTED BY:	JBA/BLM
TRACKING CODE:	E346

	KEMRON SAMPLE No.	MATERIAL pH
1	0751-003 (28 Day) A	12.58
2	0751-003 (28 Day) B	12.80
3	0751-003 (28 Day) C	12.96
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
	AVERAGE:	12.78

UNCONFINED COMPRESSION TEST

ASTM D 2166

PROJECT:	C-D Systems Solidification Study		
PROJECT No.:	SH0751		
SAMPLE No.:	0751-003 (28 Day)		
TESTING DATE:	21-Dec-20	LOADING RATE:	0.0400 in./min
TESTED BY:	JBA/BLM	TRACKING CODE:	E346

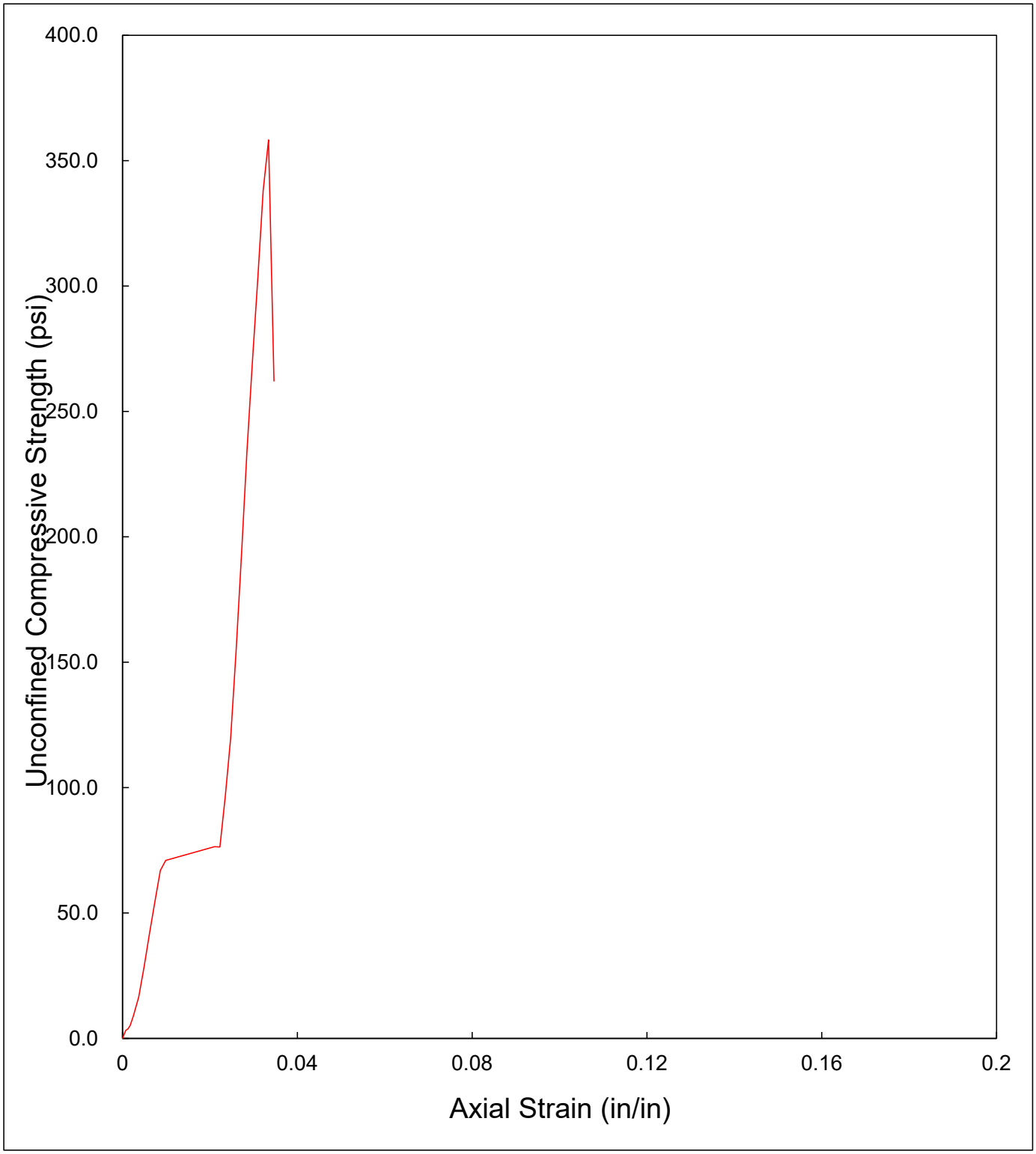
MOISTURE CONTENT (Dry Basis)		
1. MOISTURE TIN NO.		
2. WT MOISTURE TIN (tare weight)	217.44	g
3. WT WET SOIL + TARE	328.05	g
4. WT DRY SOIL + TARE	317.02	g
5. WT WATER, Ww	11.03	g
6. WT DRY SOIL, Ws	99.58	g
7. MOISTURE CONTENT, W	**11.08**	**%**

SOIL SPECIMEN DIMENSIONS				
	DIAMETER		*LENGTH*	
No. 1	2.01	in.	4.02	in.
No. 2	2.00	in.	4.03	in.
No. 3	1.99	in.	4.07	in.
Average	**2.00**	**in.**	**4.04**	**in.**

SPECIMEN CONDITIONS		
Initial Specimen WT, Wo	***459.35***	***g***
Initial Area, Ao	3.14	in²
Initial Volume, Vo	12.67	in³
Initial Bulk Unit Weight,	138.1	lb/ft³
Initial Dry Unit Weight	124.3	lb/ft³
15 % Strain (0.15 Lo)	0.61	in.
UCS	358.3	lb/in²

COMPRESSIVE LOAD (lbs.)	DIAL GAGE READING (in.)	SPECIMEN DEFORMATION (in.)	CORRECTED AREA (in²)	AXIAL STRAIN (in/in)	UNCONFINED COMPRESSIVE STRENGTH (lb/in²)
0	0.000	0.000	3.137	0.0000	0.0
10	0.003	0.003	3.140	0.0007	3.2
12	0.005	0.005	3.141	0.0012	3.8
16	0.007	0.007	3.143	0.0017	5.1
28	0.010	0.010	3.145	0.0025	8.9
52	0.015	0.015	3.149	0.0037	16.5
90	0.020	0.020	3.153	0.0050	28.5
133	0.025	0.025	3.157	0.0062	42.1
173	0.030	0.030	3.161	0.0074	54.7
212	0.035	0.035	3.165	0.0087	67.0
225	0.040	0.040	3.169	0.0099	71.0
245	0.085	0.085	3.205	0.0210	76.4
245	0.090	0.090	3.209	0.0223	76.4
310	0.095	0.095	3.213	0.0235	96.5
385	0.100	0.100	3.217	0.0248	119.7
499	0.105	0.105	3.221	0.0260	154.9
623	0.110	0.110	3.225	0.0272	193.2
755	0.115	0.115	3.229	0.0285	233.8
870	0.120	0.120	3.233	0.0297	269.1
981	0.125	0.125	3.238	0.0309	303.0
1096	0.130	0.130	3.242	0.0322	338.1
1163	0.135	0.135	3.246	0.0334	358.3
852	0.140	0.140	3.250	0.0347	262.2

UNCONFINED COMPRESSION TESTING
Sample No. 0751-003 (28 Day)



UNCONFINED COMPRESSION TEST

ASTM D 2166
SUMMARY OF RESULTS

PROJECT:	C-D Systems Solidification Study		
PROJECT No.:	SH0751		
SAMPLE No.:	0751-003 (28 Day)		
TESTING DATE:	21-Dec-20	LOADING RATE:	0.0400 in./min
TESTED BY:	JBA/BLM	TRACKING CODE:	E346

TESTING PARAMETER AND RESULTS		
MOISTURE CONTENT	11.1	**%**
BULK UNIT WEIGHT	138.1	lb/ft³
DRY UNIT WEIGHT	124.3	lb/ft³
UCS *	358.3	lb/in²

* UCS - UNCONFINED COMPRESSIVE STRENGTH

Client:	Kemron Environmental Services		
Project Name:	C-D Systems Solidification Study		
Project Location:	---		
GTX #:	312983		
Start Date:	12/28/2020	Tested By:	jm
End Date:	12/30/2020	Checked By:	mcm
Boring	---	Test #: K1	
Sample #:	0751-003 (28 Day)		
Depth:	---		
Visual Description:	Moist, grayish brown solidified soil		

Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter by ASTM D5084 Increasing Tailwater

Sample Type:	Core	Permeant Fluid:	de-aired tap water
Orientation:	Vertical	Cell #:	K6

Sample Preparation: Core weighed and dimensioned, then placed in permeameter at the "as-received" moisture content.

Parameter	Initial	Final
Height, in	2.28	2.28
Diameter, in	2.00	2.00
Area, in^2	3.14	3.14
Volume, in^3	7.2	7.2
Mass, g	253	256
Bulk Density, pcf	134	136
Moisture Content, %	11.1	12.4
Dry Density, pcf	121.0	121.0
Degree of Saturation, %	---	100

B COEFFICIENT DETERMINATION

Cell Pressure, psi:	90	Pressure Increment, psi:	9.6
Sample Pressure, psi:	80	B Coefficient:	0.96

FLOW DATA

Date	Trial #	Pressure, psi		Head readings			Elapsed Time, sec	Gradient	Permeability K, cm/sec	Temp, °C	R_t	Permeability K @ 20 °C, cm/sec
		Cell	Sample	H_1	H_2	H_1-H_2						
12/29	2	90	80	178.4	178.1	0.3	3000	30.8	1.3E-08	21	0.976	1.3E-08
12/29	3	90	80	178.1	177.7	0.4	4500	30.7	1.2E-08	21	0.976	1.1E-08
12/29	4	90	80	177.7	177.0	0.7	7380	30.7	1.2E-08	21	0.976	1.2E-08
12/29	5	90	80	177.0	176.6	0.4	4800	30.6	1.1E-08	21	0.976	1.1E-08

PERMEABILITY AT 20° C: 1.2 x 10^{-8} cm/sec (@ 10 psi effective stress)

MATERIAL pH

EPA METHOD 9045
DATA SHEET

PROJECT:	C-D Systems Solidification Study
PROJECT No.:	SH0751
TESTING DATE:	22-Dec-20
TESTED BY:	JBA/BLM
TRACKING CODE:	E347

	KEMRON SAMPLE No.	MATERIAL pH
1	0751-004 (28 Day) A	12.60
2	0751-004 (28 Day) B	12.84
3	0751-004 (28 Day) C	12.94
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
	AVERAGE:	12.79

UNCONFINED COMPRESSION TEST

ASTM D 2166

PROJECT:	C-D Systems Solidification Study		
PROJECT No.:	SH0751		
SAMPLE No.:	0751-004 (28 Day)		
TESTING DATE:	28-Dec-20	LOADING RATE:	0.0400 in./min
TESTED BY:	JBA/BLM	TRACKING CODE:	E347

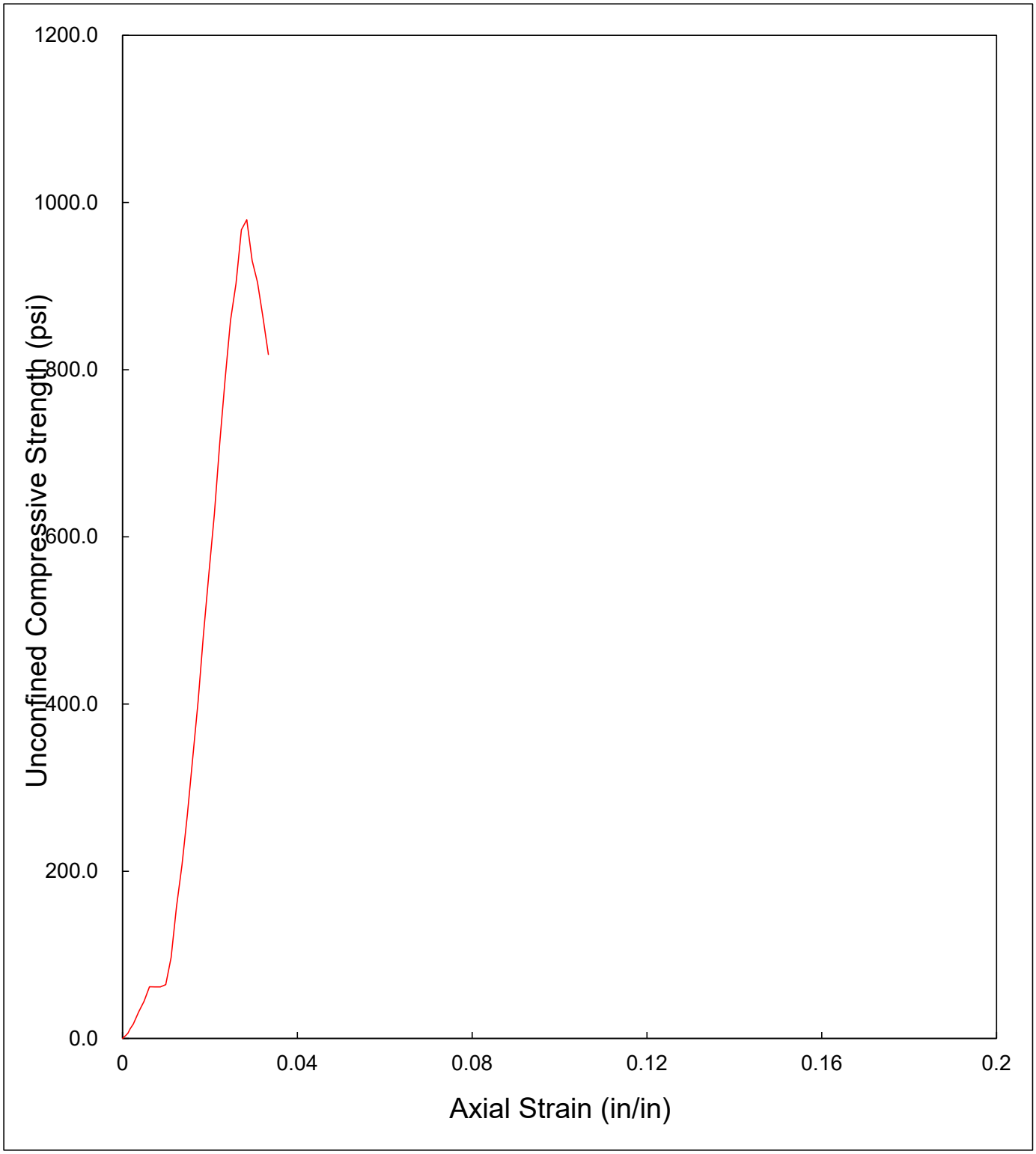
MOISTURE CONTENT (Dry Basis)		
1. MOISTURE TIN NO.		
2. WT MOISTURE TIN (tare weight)	218.79	g
3. WT WET SOIL + TARE	323.43	g
4. WT DRY SOIL + TARE	312.03	g
5. WT WATER, Ww	11.40	g
6. WT DRY SOIL, Ws	93.24	g
7. MOISTURE CONTENT, W	**12.23**	**%**

SOIL SPECIMEN DIMENSIONS				
	DIAMETER		***LENGTH***	
No. 1	2.02	in.	4.06	in.
No. 2	2.01	in.	4.07	in.
No. 3	1.99	in.	4.01	in.
Average	**2.00**	**in.**	**4.04**	**in.**

SPECIMEN CONDITIONS		
Initial Specimen WT, Wo	***453.65***	***g***
Initial Area, Ao	3.16	in²
Initial Volume, Vo	12.77	in³
Initial Bulk Unit Weight,	135.4	lb/ft³
Initial Dry Unit Weight	120.6	lb/ft³
15 % Strain (0.15 Lo)	0.61	in.
UCS	979.3	lb/in²

COMPRESSIVE LOAD (lbs.)	DIAL GAGE READING (in.)	SPECIMEN DEFORMATION (in.)	CORRECTED AREA (in²)	AXIAL STRAIN (in/in)	UNCONFINED COMPRESSIVE STRENGTH (lb/in²)
0	0.000	0.000	3.157	0.0000	0.0
11	0.003	0.003	3.159	0.0007	3.5
20	0.005	0.005	3.161	0.0012	6.3
36	0.007	0.007	3.162	0.0017	11.4
55	0.010	0.010	3.165	0.0025	17.4
101	0.015	0.015	3.169	0.0037	31.9
141	0.020	0.020	3.172	0.0049	44.4
196	0.025	0.025	3.176	0.0062	61.7
196	0.030	0.030	3.180	0.0074	61.6
196	0.035	0.035	3.184	0.0087	61.6
205	0.040	0.040	3.188	0.0099	64.3
309	0.045	0.045	3.192	0.0111	96.8
503	0.050	0.050	3.196	0.0124	157.4
664	0.055	0.055	3.200	0.0136	207.5
858	0.060	0.060	3.204	0.0148	267.8
1077	0.065	0.065	3.208	0.0161	335.7
1296	0.070	0.070	3.212	0.0173	403.4
1556	0.075	0.075	3.216	0.0185	483.8
1796	0.080	0.080	3.220	0.0198	557.7
2023	0.085	0.085	3.225	0.0210	627.4
2300	0.090	0.090	3.229	0.0223	712.4
2550	0.095	0.095	3.233	0.0235	788.8
2780	0.100	0.100	3.237	0.0247	858.9
2927	0.105	0.105	3.241	0.0260	903.1
3139	0.110	0.110	3.245	0.0272	967.3
3182	0.115	0.115	3.249	0.0284	979.3
3027	0.120	0.120	3.253	0.0297	930.4
2946	0.125	0.125	3.257	0.0309	904.4
2812	0.130	0.130	3.262	0.0321	862.1
2672	0.135	0.135	3.266	0.0334	818.2

UNCONFINED COMPRESSION TESTING
Sample No. 0751-004 (28 Day)



UNCONFINED COMPRESSION TEST

ASTM D 2166
SUMMARY OF RESULTS

PROJECT:	C-D Systems Solidification Study		
PROJECT No.:	SH0751		
SAMPLE No.:	0751-004 (28 Day)		
TESTING DATE:	28-Dec-20	LOADING RATE:	0.0400 in./min
TESTED BY:	JBA/BLM	TRACKING CODE:	E347

TESTING PARAMETER AND RESULTS		
MOISTURE CONTENT	12.2	**%**
BULK UNIT WEIGHT	135.4	lb/ft³
DRY UNIT WEIGHT	120.6	lb/ft³
UCS *	979.3	lb/in²

* UCS - UNCONFINED COMPRESSIVE STRENGTH

Client:	Kemron Environmental Services		
Project Name:	C-D Systems Solidification Study		
Project Location:	---		
GTX #:	312983		
Start Date:	12/28/2020	Tested By:	jm
End Date:	12/30/2020	Checked By:	mcm
Boring	---	Test #:	K3
Sample #:	0751-004 (28 Day)		
Depth:	---		
Visual Description:	Moist, grayish brown solidified soil		

Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter by ASTM D5084 Increasing Tailwater

Sample Type:	Core	Permeant Fluid:	de-aired tap water
Orientation:	Vertical	Cell #:	K2

Sample Preparation: Core weighed and dimensioned, then placed in permeameter at the "as-received" moisture content.

Parameter	Initial	Final
Height, in	2.02	2.02
Diameter, in	2.00	2.00
Area, in^2	3.14	3.14
Volume, in^3	6.3	6.3
Mass, g	220	224
Bulk Density, pcf	132	134
Moisture Content, %	11.1	12.9
Dry Density, pcf	118.7	118.7
Degree of Saturation, %	---	96

B COEFFICIENT DETERMINATION

Cell Pressure, psi:	90	Pressure Increment, psi:	9.6
Sample Pressure, psi:	80	B Coefficient:	0.96

FLOW DATA

Date	Trial #	Pressure, psi		Head readings			Elapsed Time,	Gradient	Permeability K,	Temp,		Permeability K @ 20 °C,
		Cell	Sample	H_1	H_2	H_1-H_2	sec		cm/sec	°C	R_t	cm/sec
12/29	3	90	80	182.7	181.6	1.1	720	35.6	1.7E-07	21	0.976	1.7E-07
12/29	4	90	80	181.6	177.9	3.7	2640	35.4	1.6E-07	21	0.976	1.6E-07
12/29	5	90	80	177.9	172.0	5.9	4680	34.7	1.5E-07	21	0.976	1.4E-07
12/29	6	90	80	172.0	163.8	8.2	7440	33.5	1.4E-07	21	0.976	1.3E-07

PERMEABILITY AT 20° C: 1.5 x 10^{-7} cm/sec (@ 10 psi effective stress)

UNCONFINED COMPRESSION TEST

ASTM D 2166

PROJECT:	C-D Systems Solidification Study		
PROJECT No.:	SH0751		
SAMPLE No.:	0751-005 (28 Day)		
TESTING DATE:	21-Dec-20	LOADING RATE:	0.0400 in./min
TESTED BY:	JBA/BLM	TRACKING CODE:	E348

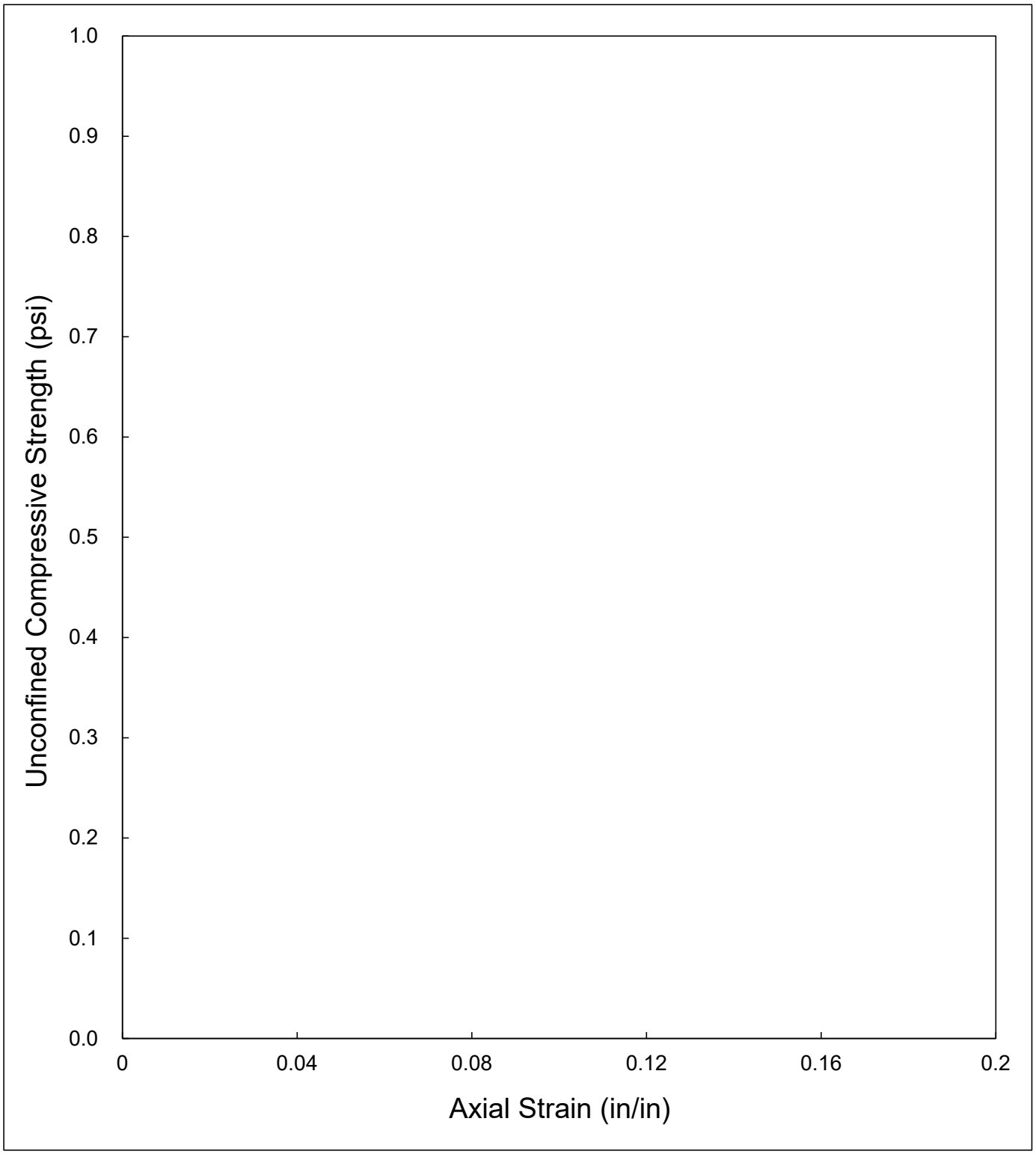
MOISTURE CONTENT (Dry Basis)		
1. MOISTURE TIN NO.		
2. WT MOISTURE TIN (tare weight)		g
3. WT WET SOIL + TARE		g
4. WT DRY SOIL + TARE		g
5. WT WATER, Ww	0.00	g
6. WT DRY SOIL, Ws	0.00	g
7. MOISTURE CONTENT, W	**#DIV/0!**	**%**

SOIL SPECIMEN DIMENSIONS		
	DIAMETER	***LENGTH***
No. 1	in.	in.
No. 2	in.	in.
No. 3	in.	in.
Average	**0.00 in.**	**0.00 in.**

SPECIMEN CONDITIONS		
Initial Specimen WT, Wo	***g***	
Initial Area, Ao	0.00	in²
Initial Volume, Vo	0.00	in³
Initial Bulk Unit Weight,	#DIV/0!	lb/ft³
Initial Dry Unit Weight	#DIV/0!	lb/ft³
15 % Strain (0.15 Lo)	0.00	in.
UCS	#DIV/0!	lb/in²

COMPRESSIVE LOAD (lbs.)	DIAL GAGE READING (in.)	SPECIMEN DEFORMATION (in.)	CORRECTED AREA (in²)	AXIAL STRAIN (in/in)	UNCONFINED COMPRESSIVE STRENGTH (lb/in²)
	0.000	0.000	#DIV/0!	#DIV/0!	#DIV/0!
	0.003	0.003	#DIV/0!	#DIV/0!	#DIV/0!
	0.005	0.005	#DIV/0!	#DIV/0!	#DIV/0!
	0.007	0.007	#DIV/0!	#DIV/0!	#DIV/0!
	0.010	0.010	#DIV/0!	#DIV/0!	#DIV/0!
	0.015	0.015	#DIV/0!	#DIV/0!	#DIV/0!
	0.020	0.020	#DIV/0!	#DIV/0!	#DIV/0!
	0.025	0.025	#DIV/0!	#DIV/0!	#DIV/0!
	0.030	0.030	#DIV/0!	#DIV/0!	#DIV/0!
	0.035	0.035	#DIV/0!	#DIV/0!	#DIV/0!
	0.040	0.040	#DIV/0!	#DIV/0!	#DIV/0!
	0.045	0.045	#DIV/0!	#DIV/0!	#DIV/0!
	0.050	0.050	#DIV/0!	#DIV/0!	#DIV/0!
	0.055	0.055	#DIV/0!	#DIV/0!	#DIV/0!
	0.060	0.060	#DIV/0!	#DIV/0!	#DIV/0!
	0.065	0.065	#DIV/0!	#DIV/0!	#DIV/0!
	0.070	0.070	#DIV/0!	#DIV/0!	#DIV/0!
	0.075	0.075	#DIV/0!	#DIV/0!	#DIV/0!
	0.080	0.080	#DIV/0!	#DIV/0!	#DIV/0!
	0.085	0.085	#DIV/0!	#DIV/0!	#DIV/0!
	0.090	0.090	#DIV/0!	#DIV/0!	#DIV/0!
	0.095	0.095	#DIV/0!	#DIV/0!	#DIV/0!
	0.100	0.100	#DIV/0!	#DIV/0!	#DIV/0!
	0.105	0.105	#DIV/0!	#DIV/0!	#DIV/0!
	0.110	0.110	#DIV/0!	#DIV/0!	#DIV/0!
	0.115	0.115	#DIV/0!	#DIV/0!	#DIV/0!
	0.120	0.120	#DIV/0!	#DIV/0!	#DIV/0!
	0.125	0.125	#DIV/0!	#DIV/0!	#DIV/0!
	0.130	0.130	#DIV/0!	#DIV/0!	#DIV/0!
	0.135	0.135	#DIV/0!	#DIV/0!	#DIV/0!
	0.140	0.140	#DIV/0!	#DIV/0!	#DIV/0!

UNCONFINED COMPRESSION TESTING
Sample No. 0751-005 (28 Day)



UNCONFINED COMPRESSION TEST

ASTM D 2166
SUMMARY OF RESULTS

PROJECT:	C-D Systems Solidification Study		
PROJECT No.:	SH0751		
SAMPLE No.:	0751-005 (28 Day)		
TESTING DATE:	21-Dec-20	LOADING RATE:	0.0400 in./min
TESTED BY:	JBA/BLM	TRACKING CODE:	E348

TESTING PARAMETER AND RESULTS		
MOISTURE CONTENT	#DIV/0!	**%**
BULK UNIT WEIGHT	#DIV/0!	lb/ft³
DRY UNIT WEIGHT	#DIV/0!	lb/ft³
UCS *	#DIV/0!	lb/in²

* UCS - UNCONFINED COMPRESSIVE STRENGTH

UNCONFINED COMPRESSION TEST

ASTM D 2166

PROJECT:	C-D Systems Solidification Study		
PROJECT No.:	SH0751		
SAMPLE No.:	0751-006 (28 Day)		
TESTING DATE:	21-Dec-20	LOADING RATE:	0.0400 in./min
TESTED BY:	JBA/BLM	TRACKING CODE:	E349

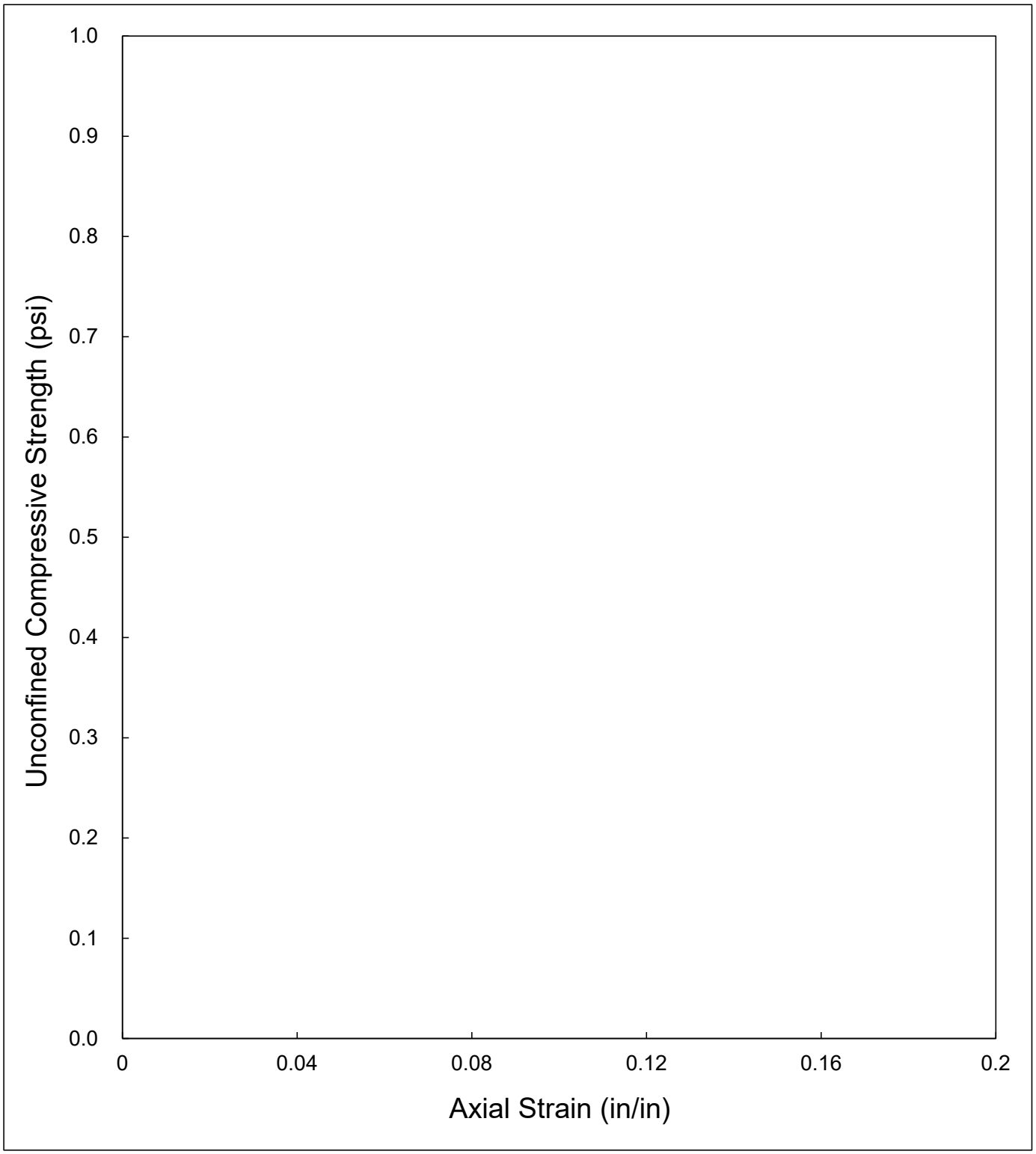
MOISTURE CONTENT (Dry Basis)		
1. MOISTURE TIN NO.		
2. WT MOISTURE TIN (tare weight)		g
3. WT WET SOIL + TARE		g
4. WT DRY SOIL + TARE		g
5. WT WATER, Ww	0.00	g
6. WT DRY SOIL, Ws	0.00	g
7. MOISTURE CONTENT, W	**#DIV/0!**	**%**

SOIL SPECIMEN DIMENSIONS		
	DIAMETER	***LENGTH***
No. 1	in.	in.
No. 2	in.	in.
No. 3	in.	in.
Average	**0.00 in.**	**0.00 in.**

SPECIMEN CONDITIONS		
Initial Specimen WT, Wo	***g***	
Initial Area, Ao	0.00	in²
Initial Volume, Vo	0.00	in³
Initial Bulk Unit Weight,	#DIV/0!	lb/ft³
Initial Dry Unit Weight	#DIV/0!	lb/ft³
15 % Strain (0.15 Lo)	0.00	in.
UCS	#DIV/0!	lb/in²

COMPRESSIVE LOAD (lbs.)	DIAL GAGE READING (in.)	SPECIMEN DEFORMATION (in.)	CORRECTED AREA (in²)	AXIAL STRAIN (in/in)	UNCONFINED COMPRESSIVE STRENGTH (lb/in²)
	0.000	0.000	#DIV/0!	#DIV/0!	#DIV/0!
	0.003	0.003	#DIV/0!	#DIV/0!	#DIV/0!
	0.005	0.005	#DIV/0!	#DIV/0!	#DIV/0!
	0.007	0.007	#DIV/0!	#DIV/0!	#DIV/0!
	0.010	0.010	#DIV/0!	#DIV/0!	#DIV/0!
	0.015	0.015	#DIV/0!	#DIV/0!	#DIV/0!
	0.020	0.020	#DIV/0!	#DIV/0!	#DIV/0!
	0.025	0.025	#DIV/0!	#DIV/0!	#DIV/0!
	0.030	0.030	#DIV/0!	#DIV/0!	#DIV/0!
	0.035	0.035	#DIV/0!	#DIV/0!	#DIV/0!
	0.040	0.040	#DIV/0!	#DIV/0!	#DIV/0!
	0.045	0.045	#DIV/0!	#DIV/0!	#DIV/0!
	0.050	0.050	#DIV/0!	#DIV/0!	#DIV/0!
	0.055	0.055	#DIV/0!	#DIV/0!	#DIV/0!
	0.060	0.060	#DIV/0!	#DIV/0!	#DIV/0!
	0.065	0.065	#DIV/0!	#DIV/0!	#DIV/0!
	0.070	0.070	#DIV/0!	#DIV/0!	#DIV/0!
	0.075	0.075	#DIV/0!	#DIV/0!	#DIV/0!
	0.080	0.080	#DIV/0!	#DIV/0!	#DIV/0!
	0.085	0.085	#DIV/0!	#DIV/0!	#DIV/0!
	0.090	0.090	#DIV/0!	#DIV/0!	#DIV/0!
	0.095	0.095	#DIV/0!	#DIV/0!	#DIV/0!
	0.100	0.100	#DIV/0!	#DIV/0!	#DIV/0!
	0.105	0.105	#DIV/0!	#DIV/0!	#DIV/0!
	0.110	0.110	#DIV/0!	#DIV/0!	#DIV/0!
	0.115	0.115	#DIV/0!	#DIV/0!	#DIV/0!
	0.120	0.120	#DIV/0!	#DIV/0!	#DIV/0!
	0.125	0.125	#DIV/0!	#DIV/0!	#DIV/0!
	0.130	0.130	#DIV/0!	#DIV/0!	#DIV/0!
	0.135	0.135	#DIV/0!	#DIV/0!	#DIV/0!
	0.140	0.140	#DIV/0!	#DIV/0!	#DIV/0!

UNCONFINED COMPRESSION TESTING
Sample No. 0751-006 (28 Day)



UNCONFINED COMPRESSION TEST

ASTM D 2166
SUMMARY OF RESULTS

PROJECT:	C-D Systems Solidification Study		
PROJECT No.:	SH0751		
SAMPLE No.:	0751-006 (28 Day)		
TESTING DATE:	21-Dec-20	LOADING RATE:	0.0400 in./min
TESTED BY:	JBA/BLM	TRACKING CODE:	E349

TESTING PARAMETER AND RESULTS		
MOISTURE CONTENT	#DIV/0!	**%**
BULK UNIT WEIGHT	#DIV/0!	lb/ft³
DRY UNIT WEIGHT	#DIV/0!	lb/ft³
UCS *	#DIV/0!	lb/in²

* UCS - UNCONFINED COMPRESSIVE STRENGTH

MATERIAL pH

EPA METHOD 9045
DATA SHEET

PROJECT:	C-D Systems Solidification Study
PROJECT No.:	SH0751
TESTING DATE:	22-Dec-20
TESTED BY:	JBA/BLM
TRACKING CODE:	E350

	KEMRON SAMPLE No.	MATERIAL pH
1	0751-007 (28 Day) A	13.21
2	0751-007 (28 Day) B	13.29
3	0751-007 (28 Day) C	13.41
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
	AVERAGE:	13.30

UNCONFINED COMPRESSION TEST

ASTM D 2166

PROJECT:	C-D Systems Solidification Study		
PROJECT No.:	SH0751		
SAMPLE No.:	0751-007 (28 Day)		
TESTING DATE:	28-Dec-20	LOADING RATE:	0.0400 in./min
TESTED BY:	JBA/BLM	TRACKING CODE:	E350

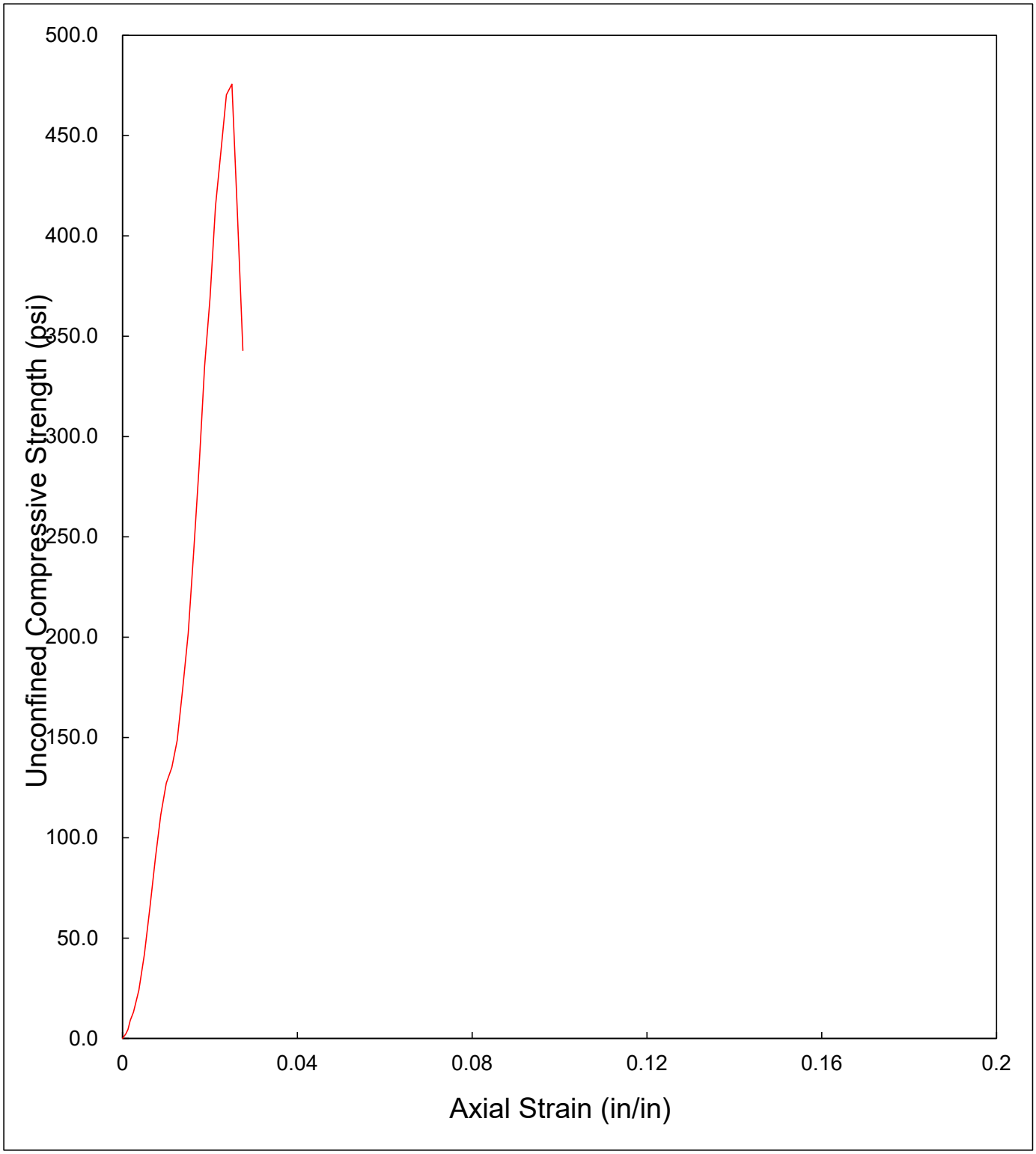
MOISTURE CONTENT (Dry Basis)		
1. MOISTURE TIN NO.		
2. WT MOISTURE TIN (tare weight)	221.38	g
3. WT WET SOIL + TARE	429.22	g
4. WT DRY SOIL + TARE	403.85	g
5. WT WATER, Ww	25.37	g
6. WT DRY SOIL, Ws	182.47	g
7. MOISTURE CONTENT, W	**13.90**	**%**

SOIL SPECIMEN DIMENSIONS				
	DIAMETER		***LENGTH***	
No. 1	1.98	in.	4.03	in.
No. 2	2.00	in.	3.97	in.
No. 3	1.99	in.	3.99	in.
Average	**1.99**	**in.**	**3.99**	**in.**

SPECIMEN CONDITIONS		
Initial Specimen WT, Wo	***435.43***	***g***
Initial Area, Ao	3.11	in²
Initial Volume, Vo	12.43	in³
Initial Bulk Unit Weight,	133.5	lb/ft³
Initial Dry Unit Weight	117.2	lb/ft³
15 % Strain (0.15 Lo)	0.60	in.
UCS	475.7	lb/in²

COMPRESSIVE LOAD (lbs.)	DIAL GAGE READING (in.)	SPECIMEN DEFORMATION (in.)	CORRECTED AREA (in²)	AXIAL STRAIN (in/in)	UNCONFINED COMPRESSIVE STRENGTH (lb/in²)
0	0.000	0.000	3.111	0.0000	0.0
7	0.003	0.003	3.114	0.0008	2.2
14	0.005	0.005	3.115	0.0013	4.5
28	0.007	0.007	3.117	0.0018	9.0
41	0.010	0.010	3.119	0.0025	13.1
75	0.015	0.015	3.123	0.0038	24.0
131	0.020	0.020	3.127	0.0050	41.9
204	0.025	0.025	3.131	0.0063	65.2
282	0.030	0.030	3.135	0.0075	90.0
350	0.035	0.035	3.139	0.0088	111.5
400	0.040	0.040	3.143	0.0100	127.3
425	0.045	0.045	3.147	0.0113	135.1
468	0.050	0.050	3.151	0.0125	148.5
550	0.055	0.055	3.155	0.0138	174.3
638	0.060	0.060	3.159	0.0150	202.0
765	0.065	0.065	3.163	0.0163	241.9
903	0.070	0.070	3.167	0.0175	285.1
1063	0.075	0.075	3.171	0.0188	335.2
1171	0.080	0.080	3.175	0.0200	368.8
1319	0.085	0.085	3.179	0.0213	414.9
1409	0.090	0.090	3.183	0.0225	442.7
1499	0.095	0.095	3.187	0.0238	470.3
1518	0.100	0.100	3.191	0.0250	475.7
1313	0.105	0.105	3.195	0.0263	410.9
1097	0.110	0.110	3.199	0.0275	342.9

UNCONFINED COMPRESSION TESTING
Sample No. 0751-007 (28 Day)



UNCONFINED COMPRESSION TEST

ASTM D 2166
SUMMARY OF RESULTS

PROJECT:	C-D Systems Solidification Study		
PROJECT No.:	SH0751		
SAMPLE No.:	0751-007 (28 Day)		
TESTING DATE:	28-Dec-20	LOADING RATE:	0.0400 in./min
TESTED BY:	JBA/BLM	TRACKING CODE:	E350

TESTING PARAMETER AND RESULTS		
MOISTURE CONTENT	13.9	**%**
BULK UNIT WEIGHT	133.5	lb/ft³
DRY UNIT WEIGHT	117.2	lb/ft³
UCS *	475.7	lb/in²

* UCS - UNCONFINED COMPRESSIVE STRENGTH

Client:	Kemron Environmental Services		
Project Name:	C-D Systems Solidification Study		
Project Location:	---		
GTX #:	312983		
Start Date:	12/28/2020	Tested By:	jm
End Date:	12/30/2020	Checked By:	mcm
Boring	---	Test #:	K2
Sample #:	0751-007 (28 Day)		
Depth:	---		
Visual Description:	Moist, grayish brown solidified soil		

Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter by ASTM D5084 Increasing Tailwater

Sample Type:	Core	Permeant Fluid:	de-aired tap water
Orientation:	Vertical	Cell #:	P3

Sample Preparation: Core weighed and dimensioned, then placed in permeameter at the "as-received" moisture content.

Parameter	Initial	Final
Height, in	2.11	2.11
Diameter, in	2.00	2.00
Area, in^2	3.14	3.14
Volume, in^3	6.6	6.6
Mass, g	233	236
Bulk Density, pcf	134	135
Moisture Content, %	11.2	12.6
Dry Density, pcf	120.0	120.0
Degree of Saturation, %	---	98

B COEFFICIENT DETERMINATION

Cell Pressure, psi:	90	Pressure Increment, psi:	9.6
Sample Pressure, psi:	80	B Coefficient:	0.96

FLOW DATA

Date	Trial #	Pressure, psi		Head readings			Elapsed Time,	Gradient	Permeability K,	Temp,		Permeability K @ 20 °C,
		Cell	Sample	H_1	H_2	H_1-H_2	sec		cm/sec	°C	R_t	cm/sec
12/29	3	90	80	180.7	180.2	0.5	780	33.7	7.6E-08	21	0.976	7.5E-08
12/29	4	90	80	180.2	177.8	2.4	3600	33.6	8.0E-08	21	0.976	7.8E-08
12/29	5	90	80	177.8	175.1	2.7	4200	33.2	7.8E-08	21	0.976	7.6E-08
12/29	6	90	80	175.1	170.2	4.9	7500	32.7	8.1E-08	21	0.976	7.9E-08

PERMEABILITY AT 20° C: 7.7 x 10^{-8} cm/sec (@ 10 psi effective stress)

MATERIAL pH

EPA METHOD 9045
DATA SHEET

PROJECT:	C-D Systems Solidification Study
PROJECT No.:	SH0751
TESTING DATE:	22-Dec-20
TESTED BY:	JBA/BLM
TRACKING CODE:	E351

	KEMRON SAMPLE No.	MATERIAL pH
1	0751-008 (28 Day) A	13.47
2	0751-008 (28 Day) B	13.55
3	0751-008 (28 Day) C	13.63
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
	AVERAGE:	13.55

UNCONFINED COMPRESSION TEST

ASTM D 2166

PROJECT:	C-D Systems Solidification Study		
PROJECT No.:	SH0751		
SAMPLE No.:	0751-008 (28 Day)		
TESTING DATE:	28-Dec-20	LOADING RATE:	0.0400 in./min
TESTED BY:	JBA/BLM	TRACKING CODE:	E351

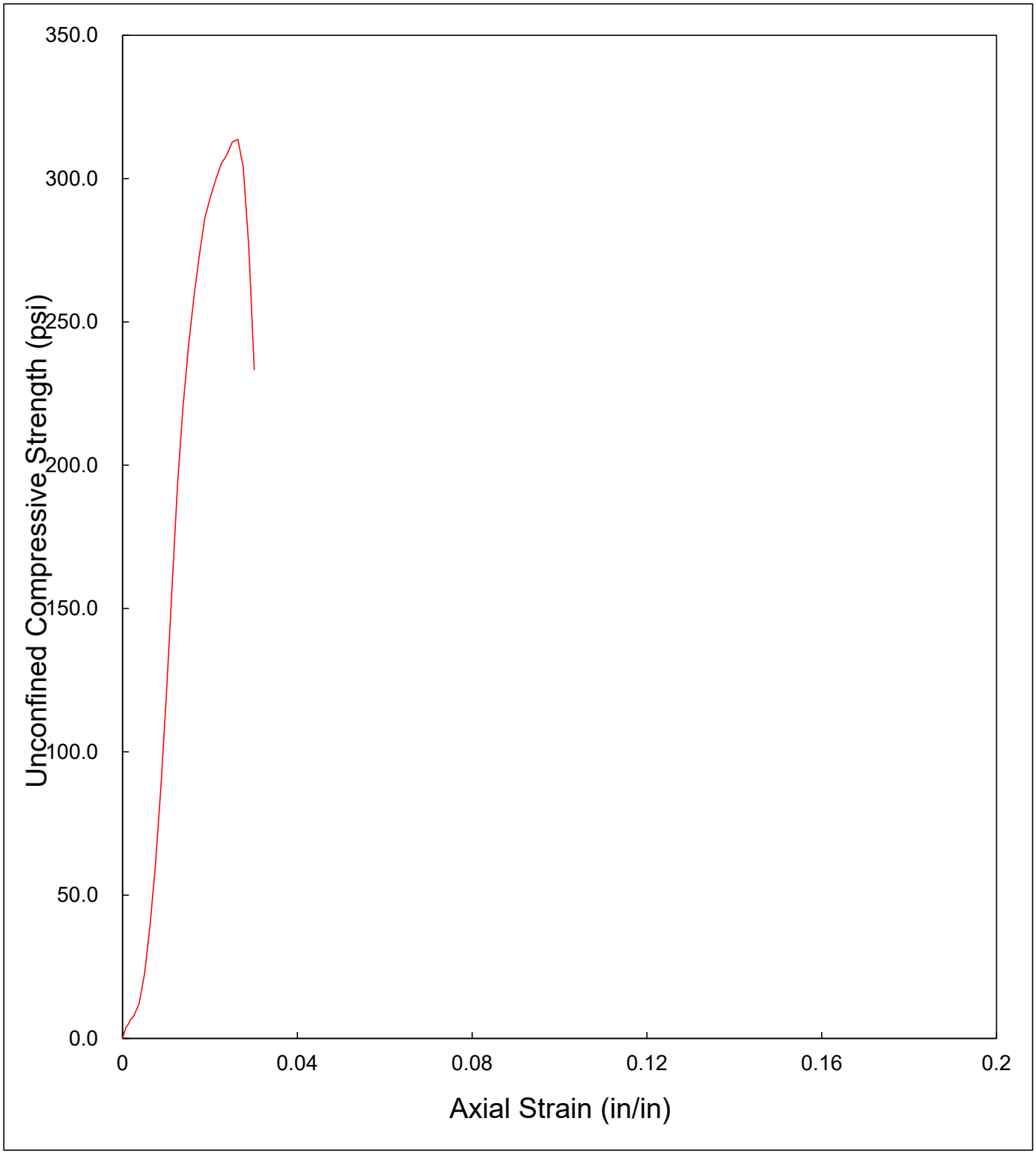
MOISTURE CONTENT (Dry Basis)		
1. MOISTURE TIN NO.		
2. WT MOISTURE TIN (tare weight)	219.91	g
3. WT WET SOIL + TARE	333.72	g
4. WT DRY SOIL + TARE	320.82	g
5. WT WATER, Ww	12.90	g
6. WT DRY SOIL, Ws	100.91	g
7. MOISTURE CONTENT, W	**12.78**	**%**

SOIL SPECIMEN DIMENSIONS				
	DIAMETER		***LENGTH***	
No. 1	2.01	in.	3.99	in.
No. 2	2.00	in.	3.98	in.
No. 3	1.99	in.	3.98	in.
Average	**2.00**	**in.**	**3.98**	**in.**

SPECIMEN CONDITIONS		
Initial Specimen WT, Wo	***441.93***	***g***
Initial Area, Ao	3.14	in²
Initial Volume, Vo	12.49	in³
Initial Bulk Unit Weight,	134.8	lb/ft³
Initial Dry Unit Weight	119.5	lb/ft³
15 % Strain (0.15 Lo)	0.60	in.
UCS	313.7	lb/in²

COMPRESSIVE LOAD (lbs.)	DIAL GAGE READING (in.)	SPECIMEN DEFORMATION (in.)	CORRECTED AREA (in²)	AXIAL STRAIN (in/in)	UNCONFINED COMPRESSIVE STRENGTH (lb/in²)
0	0.000	0.000	3.138	0.0000	0.0
12	0.003	0.003	3.140	0.0008	3.8
15	0.005	0.005	3.142	0.0013	4.8
20	0.007	0.007	3.143	0.0018	6.4
24	0.010	0.010	3.146	0.0025	7.6
38	0.015	0.015	3.150	0.0038	12.1
71	0.020	0.020	3.154	0.0050	22.5
123	0.025	0.025	3.158	0.0063	39.0
191	0.030	0.030	3.162	0.0075	60.4
278	0.035	0.035	3.166	0.0088	87.8
381	0.040	0.040	3.170	0.0101	120.2
497	0.045	0.045	3.174	0.0113	156.6
613	0.050	0.050	3.178	0.0126	192.9
699	0.055	0.055	3.182	0.0138	219.7
768	0.060	0.060	3.186	0.0151	241.1
825	0.065	0.065	3.190	0.0163	258.6
873	0.070	0.070	3.194	0.0176	273.3
916	0.075	0.075	3.198	0.0188	286.4
940	0.080	0.080	3.202	0.0201	293.5
961	0.085	0.085	3.206	0.0214	299.7
980	0.090	0.090	3.211	0.0226	305.2
991	0.095	0.095	3.215	0.0239	308.3
1007	0.100	0.100	3.219	0.0251	312.8
1011	0.105	0.105	3.223	0.0264	313.7
981	0.110	0.110	3.227	0.0276	304.0
893	0.115	0.115	3.231	0.0289	276.4
755	0.120	0.120	3.235	0.0302	233.4

UNCONFINED COMPRESSION TESTING
Sample No. 0751-008 (28 Day)



UNCONFINED COMPRESSION TEST

ASTM D 2166
SUMMARY OF RESULTS

PROJECT:	C-D Systems Solidification Study		
PROJECT No.:	SH0751		
SAMPLE No.:	0751-008 (28 Day)		
TESTING DATE:	28-Dec-20	LOADING RATE:	0.0400 in./min
TESTED BY:	JBA/BLM	TRACKING CODE:	E351

TESTING PARAMETER AND RESULTS		
MOISTURE CONTENT	12.8	**%**
BULK UNIT WEIGHT	134.8	lb/ft³
DRY UNIT WEIGHT	119.5	lb/ft³
UCS *	313.7	lb/in²

* UCS - UNCONFINED COMPRESSIVE STRENGTH

Client:	Kemron Environmental Services		
Project Name:	C-D Systems Solidification Study		
Project Location:	---		
GTX #:	312983		
Start Date:	12/29/2020	Tested By:	jm
End Date:	12/31/2020	Checked By:	mcm
Boring	---	Test #:	K4
Sample #:	0751-008 (28 Day)		
Depth:	---		
Visual Description:	Moist, grayish brown solidified soil		

Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter by ASTM D5084 Increasing Tailwater

Sample Type:	Core	Permeant Fluid:	de-aired tap water
Orientation:	Vertical	Cell #:	K12

Sample Preparation: Core weighed and dimensioned, then placed in permeameter at the "as-received" moisture content.

Parameter	Initial	Final
Height, in	2.03	2.03
Diameter, in	2.00	2.00
Area, in^2	3.14	3.14
Volume, in^3	6.4	6.4
Mass, g	220	223
Bulk Density, pcf	131	133
Moisture Content, %	12.2	14.2
Dry Density, pcf	116.6	116.6
Degree of Saturation, %	---	99

B COEFFICIENT DETERMINATION

Cell Pressure, psi:	90	Pressure Increment, psi:	9.6
Sample Pressure, psi:	80	B Coefficient:	0.96

FLOW DATA

Date	Trial #	Pressure, psi		Head readings			Elapsed Time,	Gradient	Permeability K,	Temp,		Permeability K @ 20 °C,
		Cell	Sample	H_1	H_2	H_1-H_2	sec		cm/sec	°C	R_t	cm/sec
12/30	3	90	80	175.6	175.2	0.4	3240	34.0	1.5E-08	21	0.976	1.4E-08
12/30	4	90	80	175.2	174.8	0.4	3600	34.0	1.3E-08	21	0.976	1.3E-08
12/30	5	90	80	174.8	174.4	0.4	3900	33.9	1.2E-08	21	0.976	1.2E-08
12/30	6	90	80	174.4	173.7	0.7	6900	33.8	1.2E-08	21	0.976	1.2E-08

PERMEABILITY AT 20° C: 1.3 x 10^{-8} cm/sec (@ 10 psi effective stress)

MATERIAL pH

EPA METHOD 9045
DATA SHEET

PROJECT:	C-D Systems Solidification Study
PROJECT No.:	SH0751
TESTING DATE:	22-Dec-20
TESTED BY:	JBA/BLM
TRACKING CODE:	E352

	KEMRON SAMPLE No.	MATERIAL pH
1	0751-009 (28 Day) A	13.42
2	0751-009 (28 Day) B	13.39
3	0751-009 (28 Day) C	13.26
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
	AVERAGE:	13.36

UNCONFINED COMPRESSION TEST

ASTM D 2166

PROJECT:	C-D Systems Solidification Study		
PROJECT No.:	SH0751		
SAMPLE No.:	0751-009 (28 Day)		
TESTING DATE:	28-Dec-20	LOADING RATE:	0.0400 in./min
TESTED BY:	JBA/BLM	TRACKING CODE:	E352

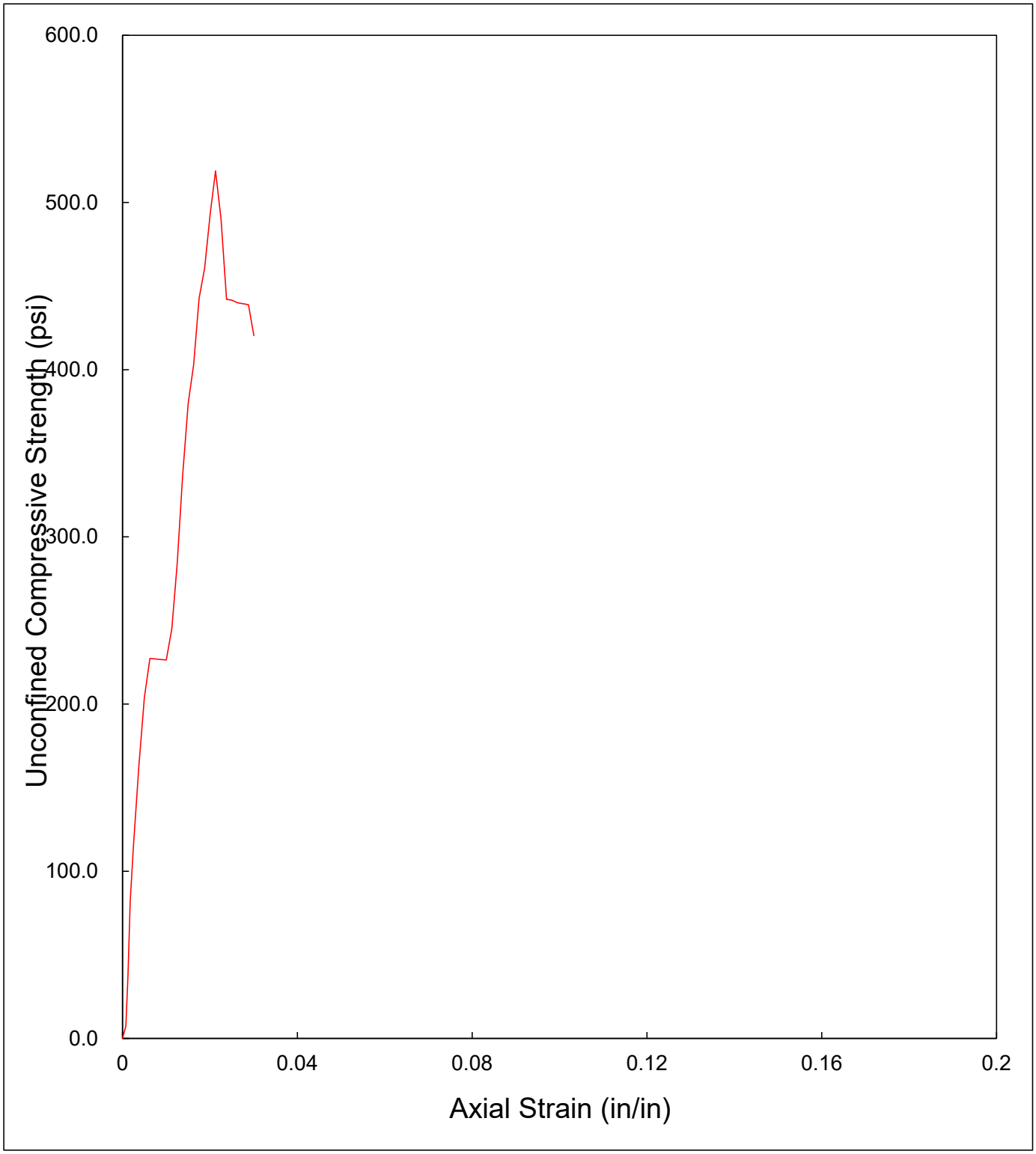
MOISTURE CONTENT (Dry Basis)		
1. MOISTURE TIN NO.		
2. WT MOISTURE TIN (tare weight)	214.67	g
3. WT WET SOIL + TARE	354.84	g
4. WT DRY SOIL + TARE	340.46	g
5. WT WATER, Ww	14.38	g
6. WT DRY SOIL, Ws	125.79	g
7. MOISTURE CONTENT, W	**11.43**	**%**

SOIL SPECIMEN DIMENSIONS				
	DIAMETER		***LENGTH***	
No. 1	2.00	in.	3.96	in.
No. 2	2.00	in.	4.02	in.
No. 3	1.99	in.	4.00	in.
Average	**2.00**	**in.**	**3.99**	**in.**

SPECIMEN CONDITIONS		
Initial Specimen WT, Wo	***453.93***	***g***
Initial Area, Ao	3.13	in²
Initial Volume, Vo	12.50	in³
Initial Bulk Unit Weight,	138.3	lb/ft³
Initial Dry Unit Weight	124.1	lb/ft³
15 % Strain (0.15 Lo)	0.60	in.
UCS	518.9	lb/in²

COMPRESSIVE LOAD (lbs.)	DIAL GAGE READING (in.)	SPECIMEN DEFORMATION (in.)	CORRECTED AREA (in²)	AXIAL STRAIN (in/in)	UNCONFINED COMPRESSIVE STRENGTH (lb/in²)
0	0.000	0.000	3.131	0.0000	0.0
23	0.003	0.003	3.133	0.0008	7.3
118	0.005	0.005	3.135	0.0013	37.6
259	0.007	0.007	3.137	0.0018	82.6
363	0.010	0.010	3.139	0.0025	115.6
512	0.015	0.015	3.143	0.0038	162.9
642	0.020	0.020	3.147	0.0050	204.0
716	0.025	0.025	3.151	0.0063	227.2
716	0.030	0.030	3.155	0.0075	227.0
716	0.035	0.035	3.159	0.0088	226.7
716	0.040	0.040	3.163	0.0100	226.4
776	0.045	0.045	3.167	0.0113	245.0
900	0.050	0.050	3.171	0.0125	283.8
1071	0.055	0.055	3.175	0.0138	337.3
1208	0.060	0.060	3.179	0.0150	380.0
1282	0.065	0.065	3.183	0.0163	402.8
1411	0.070	0.070	3.187	0.0175	442.7
1470	0.075	0.075	3.191	0.0188	460.7
1575	0.080	0.080	3.195	0.0200	492.9
1660	0.085	0.085	3.199	0.0213	518.9
1570	0.090	0.090	3.203	0.0225	490.1
1418	0.095	0.095	3.207	0.0238	442.1
1418	0.100	0.100	3.212	0.0250	441.5
1415	0.105	0.105	3.216	0.0263	440.0
1415	0.110	0.110	3.220	0.0276	439.5
1415	0.115	0.115	3.224	0.0288	438.9
1357	0.120	0.120	3.228	0.0301	420.4

UNCONFINED COMPRESSION TESTING
Sample No. 0751-009 (28 Day)



UNCONFINED COMPRESSION TEST

ASTM D 2166
SUMMARY OF RESULTS

PROJECT:	C-D Systems Solidification Study		
PROJECT No.:	SH0751		
SAMPLE No.:	0751-009 (28 Day)		
TESTING DATE:	28-Dec-20	LOADING RATE:	0.0400 in./min
TESTED BY:	JBA/BLM	TRACKING CODE:	E352

TESTING PARAMETER AND RESULTS		
MOISTURE CONTENT	11.4	**%**
BULK UNIT WEIGHT	138.3	lb/ft³
DRY UNIT WEIGHT	124.1	lb/ft³
UCS *	518.9	lb/in²

* UCS - UNCONFINED COMPRESSIVE STRENGTH

Client:	Kemron Environmental Services		
Project Name:	C-D Systems Solidification Study		
Project Location:	---		
GTX #:	312983		
Start Date:	12/29/2020	Tested By:	jm
End Date:	12/31/2020	Checked By:	mcm
Boring	---	Test #:	K5
Sample #:	0751-009 (28 Day)		
Depth:	---		
Visual Description:	Moist, grayish brown solidified soil		

Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter by ASTM D5084 Increasing Tailwater

Sample Type:	Core	Permeant Fluid:	de-aired tap water
Orientation:	Vertical	Cell #:	P1

Sample Preparation: Core weighed and dimensioned, then placed in permeameter at the "as-received" moisture content.

Parameter	Initial	Final
Height, in	2.11	2.11
Diameter, in	2.00	2.00
Area, in^2	3.14	3.14
Volume, in^3	6.6	6.6
Mass, g	230	234
Bulk Density, pcf	132	134
Moisture Content, %	11.1	13.2
Dry Density, pcf	118.5	118.5
Degree of Saturation, %	---	98

B COEFFICIENT DETERMINATION

Cell Pressure, psi:	90	Pressure Increment, psi:	9.6
Sample Pressure, psi:	80	B Coefficient:	0.96

FLOW DATA

Date	Trial #	Pressure, psi		Head readings			Elapsed Time,	Gradient	Permeability K,	Temp,		Permeability K @ 20 °C,
		Cell	Sample	H_1	H_2	H_1-H_2	sec		cm/sec	°C	R_t	cm/sec
12/30	2	90	80	173.0	171.0	2.0	3600	32.3	6.9E-08	21	0.976	6.8E-08
12/30	3	90	80	171.0	170.0	1.0	1800	31.9	7.0E-08	21	0.976	6.8E-08
12/30	4	90	80	170.0	166.0	4.0	7200	31.7	7.1E-08	21	0.976	6.9E-08
12/30	5	90	80	167.0	163.0	4.0	7200	31.2	7.3E-08	21	0.976	7.1E-08

PERMEABILITY AT 20° C: 6.9 x 10^{-8} cm/sec (@ 10 psi effective stress)

MATERIAL pH

EPA METHOD 9045
DATA SHEET

PROJECT:	C-D Systems Solidification Study
PROJECT No.:	SH0751
TESTING DATE:	22-Dec-20
TESTED BY:	JBA/BLM
TRACKING CODE:	E353

	KEMRON SAMPLE No.	MATERIAL pH
1	0751-010 (28 Day) A	13.39
2	0751-010 (28 Day) B	13.30
3	0751-010 (28 Day) C	13.34
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
	AVERAGE:	13.34

UNCONFINED COMPRESSION TEST

ASTM D 2166

PROJECT:	C-D Systems Solidification Study		
PROJECT No.:	SH0751		
SAMPLE No.:	0751-010 (28 Day)		
TESTING DATE:	21-Dec-20	LOADING RATE:	0.0400 in./min
TESTED BY:	JBA/BLM	TRACKING CODE:	E353

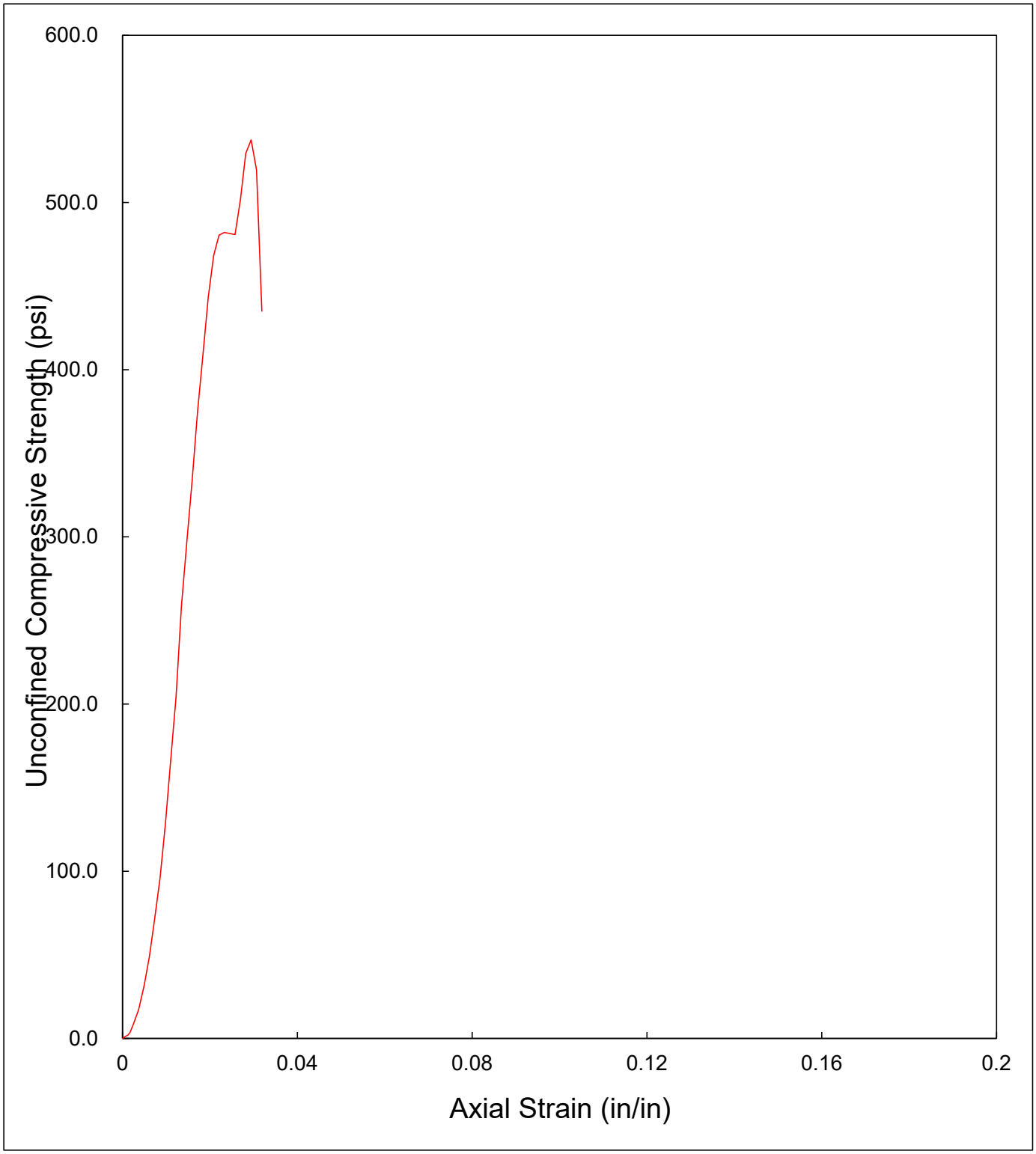
MOISTURE CONTENT (Dry Basis)		
1. MOISTURE TIN NO.		
2. WT MOISTURE TIN (tare weight)	212.91	g
3. WT WET SOIL + TARE	339.28	g
4. WT DRY SOIL + TARE	323.72	g
5. WT WATER, Ww	15.56	g
6. WT DRY SOIL, Ws	110.81	g
7. MOISTURE CONTENT, W	**14.04**	**%**

SOIL SPECIMEN DIMENSIONS				
	DIAMETER		*LENGTH*	
No. 1	2.00	in.	4.08	in.
No. 2	2.00	in.	4.06	in.
No. 3	1.99	in.	4.09	in.
Average	**2.00**	**in.**	**4.08**	**in.**

SPECIMEN CONDITIONS		
Initial Specimen WT, Wo	***448.70***	***g***
Initial Area, Ao	3.14	in²
Initial Volume, Vo	12.81	in³
Initial Bulk Unit Weight,	133.5	lb/ft³
Initial Dry Unit Weight	117.1	lb/ft³
15 % Strain (0.15 Lo)	0.61	in.
UCS	537.4	lb/in²

COMPRESSIVE LOAD (lbs.)	DIAL GAGE READING (in.)	SPECIMEN DEFORMATION (in.)	CORRECTED AREA (in²)	AXIAL STRAIN (in/in)	UNCONFINED COMPRESSIVE STRENGTH (lb/in²)
0	0.000	0.000	3.141	0.0000	0.0
4	0.003	0.003	3.143	0.0007	1.3
6	0.005	0.005	3.144	0.0012	1.9
11	0.007	0.007	3.146	0.0017	3.5
26	0.010	0.010	3.148	0.0025	8.3
54	0.015	0.015	3.152	0.0037	17.1
98	0.020	0.020	3.156	0.0049	31.1
154	0.025	0.025	3.160	0.0061	48.7
227	0.030	0.030	3.164	0.0074	71.7
304	0.035	0.035	3.168	0.0086	96.0
408	0.040	0.040	3.172	0.0098	128.6
528	0.045	0.045	3.176	0.0110	166.3
650	0.050	0.050	3.180	0.0123	204.4
823	0.055	0.055	3.183	0.0135	258.5
946	0.060	0.060	3.187	0.0147	296.8
1066	0.065	0.065	3.191	0.0159	334.0
1198	0.070	0.070	3.195	0.0172	374.9
1308	0.075	0.075	3.199	0.0184	408.8
1421	0.080	0.080	3.203	0.0196	443.6
1502	0.085	0.085	3.207	0.0208	468.3
1543	0.090	0.090	3.211	0.0221	480.5
1550	0.095	0.095	3.215	0.0233	482.0
1550	0.100	0.100	3.220	0.0245	481.4
1550	0.105	0.105	3.224	0.0258	480.8
1619	0.110	0.110	3.228	0.0270	501.6
1711	0.115	0.115	3.232	0.0282	529.4
1739	0.120	0.120	3.236	0.0294	537.4
1683	0.125	0.125	3.240	0.0307	519.5
1411	0.130	0.130	3.244	0.0319	435.0

UNCONFINED COMPRESSION TESTING
Sample No. 0751-010 (28 Day)



UNCONFINED COMPRESSION TEST

ASTM D 2166
SUMMARY OF RESULTS

PROJECT:	C-D Systems Solidification Study		
PROJECT No.:	SH0751		
SAMPLE No.:	0751-010 (28 Day)		
TESTING DATE:	21-Dec-20	LOADING RATE:	0.0400 in./min
TESTED BY:	JBA/BLM	TRACKING CODE:	E353

TESTING PARAMETER AND RESULTS		
MOISTURE CONTENT	14.0	**%**
BULK UNIT WEIGHT	133.5	lb/ft³
DRY UNIT WEIGHT	117.1	lb/ft³
UCS *	537.4	lb/in²

* UCS - UNCONFINED COMPRESSIVE STRENGTH

Client:	Kemron Environmental Services		
Project Name:	C-D Systems Solidification Study		
Project Location:	---		
GTX #:	312983		
Start Date:	12/29/2020	Tested By:	jm
End Date:	12/31/2020	Checked By:	mcm
Boring	---	Test #:	K6
Sample #:	0751-010 (28 Day)		
Depth:	---		
Visual Description:	Moist, grayish brown solidified soil		

Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter by ASTM D5084 Increasing Tailwater

Sample Type:	Core	Permeant Fluid:	de-aired tap water
Orientation:	Vertical	Cell #:	K6

Sample Preparation: Core weighed and dimensioned, then placed in permeameter at the "as-received" moisture content.

Parameter	Initial	Final
Height, in	2.01	2.01
Diameter, in	2.00	2.00
Area, in^2	3.14	3.14
Volume, in^3	6.3	6.3
Mass, g	217	221
Bulk Density, pcf	131	133
Moisture Content, %	11.8	13.4
Dry Density, pcf	117.1	117.1
Degree of Saturation, %	---	95

B COEFFICIENT DETERMINATION

Cell Pressure, psi:	90	Pressure Increment, psi:	9.6
Sample Pressure, psi:	80	B Coefficient:	0.96

FLOW DATA

Date	Trial #	Pressure, psi		Head readings			Elapsed Time,	Gradient	Permeability K,	Temp,		Permeability K @ 20 °C,
		Cell	Sample	H_1	H_2	H_1-H_2	sec		cm/sec	°C	R_t	cm/sec
12/30	4	90	80	178.8	178.2	0.6	1020	35.0	6.7E-08	21	0.976	6.6E-08
12/30	5	90	80	178.2	176.8	1.4	2340	34.9	6.9E-08	21	0.976	6.7E-08
12/30	6	90	80	176.8	174.7	2.1	3780	34.6	6.5E-08	21	0.976	6.3E-08
12/30	7	90	80	174.7	171.3	3.4	6600	34.2	6.1E-08	21	0.976	6.0E-08

PERMEABILITY AT 20° C: 6.4 x 10^{-8} cm/sec (@ 10 psi effective stress)

UNCONFINED COMPRESSION TEST

ASTM D 2166

PROJECT:	C-D Systems Solidification Study		
PROJECT No.:	SH0751		
SAMPLE No.:	0751-011 (28 Day)		
TESTING DATE:	22-Dec-20	LOADING RATE:	0.0400 in./min
TESTED BY:	JBA/BLM	TRACKING CODE:	E354

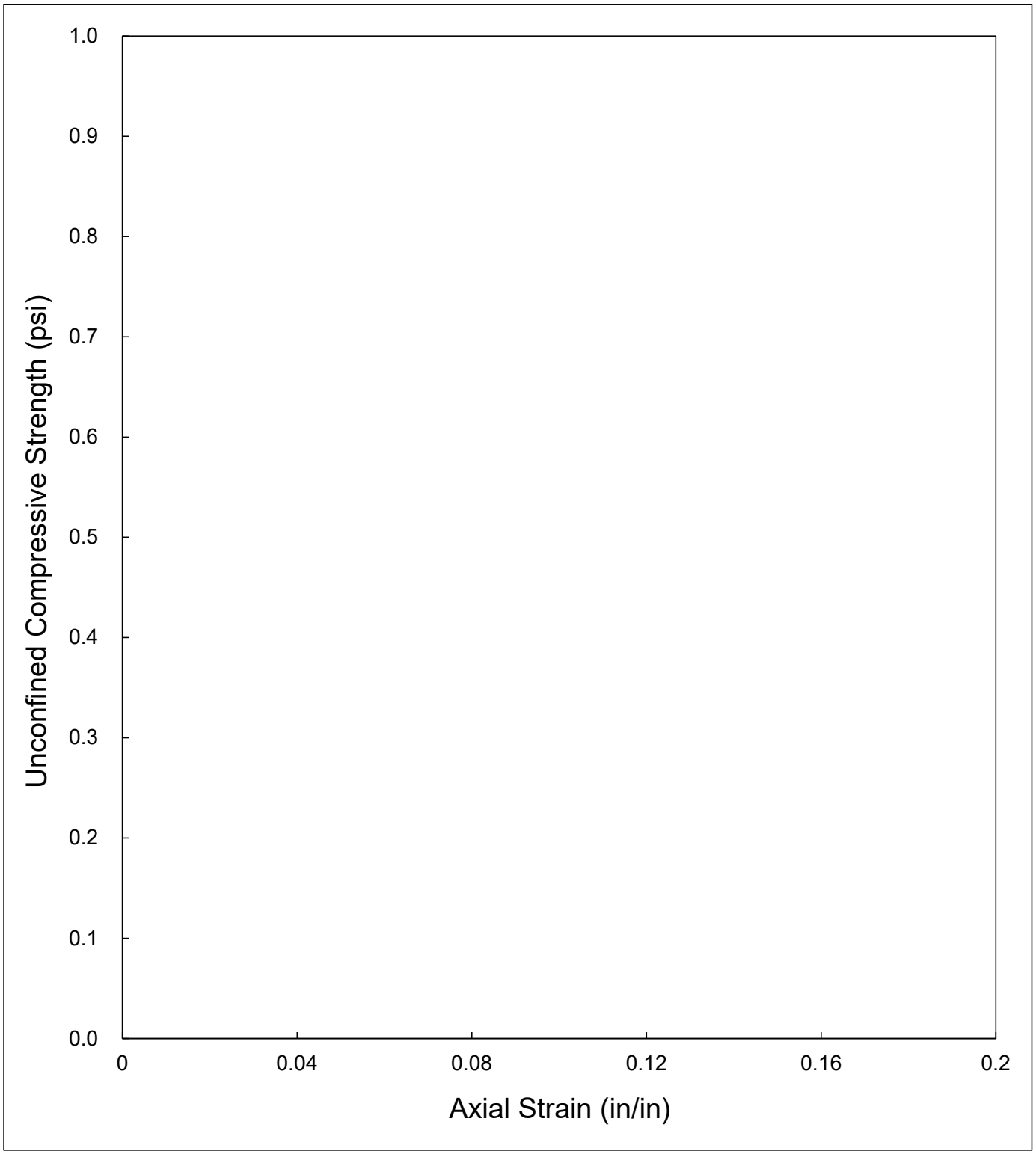
MOISTURE CONTENT (Dry Basis)		
1. MOISTURE TIN NO.		
2. WT MOISTURE TIN (tare weight)		g
3. WT WET SOIL + TARE		g
4. WT DRY SOIL + TARE		g
5. WT WATER, Ww	0.00	g
6. WT DRY SOIL, Ws	0.00	g
7. MOISTURE CONTENT, W	**#DIV/0!**	**%**

SOIL SPECIMEN DIMENSIONS		
	DIAMETER	***LENGTH***
No. 1	in.	in.
No. 2	in.	in.
No. 3	in.	in.
Average	**0.00 in.**	**0.00 in.**

SPECIMEN CONDITIONS		
Initial Specimen WT, Wo	***g***	
Initial Area, Ao	0.00	in²
Initial Volume, Vo	0.00	in³
Initial Bulk Unit Weight,	#DIV/0!	lb/ft³
Initial Dry Unit Weight	#DIV/0!	lb/ft³
15 % Strain (0.15 Lo)	0.00	in.
UCS	#DIV/0!	lb/in²

COMPRESSIVE LOAD (lbs.)	DIAL GAGE READING (in.)	SPECIMEN DEFORMATION (in.)	CORRECTED AREA (in²)	AXIAL STRAIN (in/in)	UNCONFINED COMPRESSIVE STRENGTH (lb/in²)
	0.000	0.000	#DIV/0!	#DIV/0!	#DIV/0!
	0.003	0.003	#DIV/0!	#DIV/0!	#DIV/0!
	0.005	0.005	#DIV/0!	#DIV/0!	#DIV/0!
	0.007	0.007	#DIV/0!	#DIV/0!	#DIV/0!
	0.010	0.010	#DIV/0!	#DIV/0!	#DIV/0!
	0.015	0.015	#DIV/0!	#DIV/0!	#DIV/0!
	0.020	0.020	#DIV/0!	#DIV/0!	#DIV/0!
	0.025	0.025	#DIV/0!	#DIV/0!	#DIV/0!
	0.030	0.030	#DIV/0!	#DIV/0!	#DIV/0!
	0.035	0.035	#DIV/0!	#DIV/0!	#DIV/0!
	0.040	0.040	#DIV/0!	#DIV/0!	#DIV/0!
	0.045	0.045	#DIV/0!	#DIV/0!	#DIV/0!
	0.050	0.050	#DIV/0!	#DIV/0!	#DIV/0!
	0.055	0.055	#DIV/0!	#DIV/0!	#DIV/0!
	0.060	0.060	#DIV/0!	#DIV/0!	#DIV/0!
	0.065	0.065	#DIV/0!	#DIV/0!	#DIV/0!
	0.070	0.070	#DIV/0!	#DIV/0!	#DIV/0!
	0.075	0.075	#DIV/0!	#DIV/0!	#DIV/0!
	0.080	0.080	#DIV/0!	#DIV/0!	#DIV/0!
	0.085	0.085	#DIV/0!	#DIV/0!	#DIV/0!
	0.090	0.090	#DIV/0!	#DIV/0!	#DIV/0!
	0.095	0.095	#DIV/0!	#DIV/0!	#DIV/0!
	0.100	0.100	#DIV/0!	#DIV/0!	#DIV/0!
	0.105	0.105	#DIV/0!	#DIV/0!	#DIV/0!
	0.110	0.110	#DIV/0!	#DIV/0!	#DIV/0!
	0.115	0.115	#DIV/0!	#DIV/0!	#DIV/0!
	0.120	0.120	#DIV/0!	#DIV/0!	#DIV/0!
	0.125	0.125	#DIV/0!	#DIV/0!	#DIV/0!
	0.130	0.130	#DIV/0!	#DIV/0!	#DIV/0!
	0.135	0.135	#DIV/0!	#DIV/0!	#DIV/0!
	0.140	0.140	#DIV/0!	#DIV/0!	#DIV/0!

UNCONFINED COMPRESSION TESTING
Sample No. 0751-011 (28 Day)



UNCONFINED COMPRESSION TEST

ASTM D 2166
SUMMARY OF RESULTS

PROJECT:	C-D Systems Solidification Study		
PROJECT No.:	SH0751		
SAMPLE No.:	0751-011 (28 Day)		
TESTING DATE:	22-Dec-20	LOADING RATE:	0.0400 in./min
TESTED BY:	JBA/BLM	TRACKING CODE:	E354

TESTING PARAMETER AND RESULTS		
MOISTURE CONTENT	#DIV/0!	**%**
BULK UNIT WEIGHT	#DIV/0!	lb/ft³
DRY UNIT WEIGHT	#DIV/0!	lb/ft³
UCS *	#DIV/0!	lb/in²

* UCS - UNCONFINED COMPRESSIVE STRENGTH

UNCONFINED COMPRESSION TEST

ASTM D 2166

PROJECT:	C-D Systems Solidification Study		
PROJECT No.:	SH0751		
SAMPLE No.:	0751-012 (28 Day)		
TESTING DATE:	22-Dec-20	LOADING RATE:	0.0400 in./min
TESTED BY:	JBA/BLM	TRACKING CODE:	E355

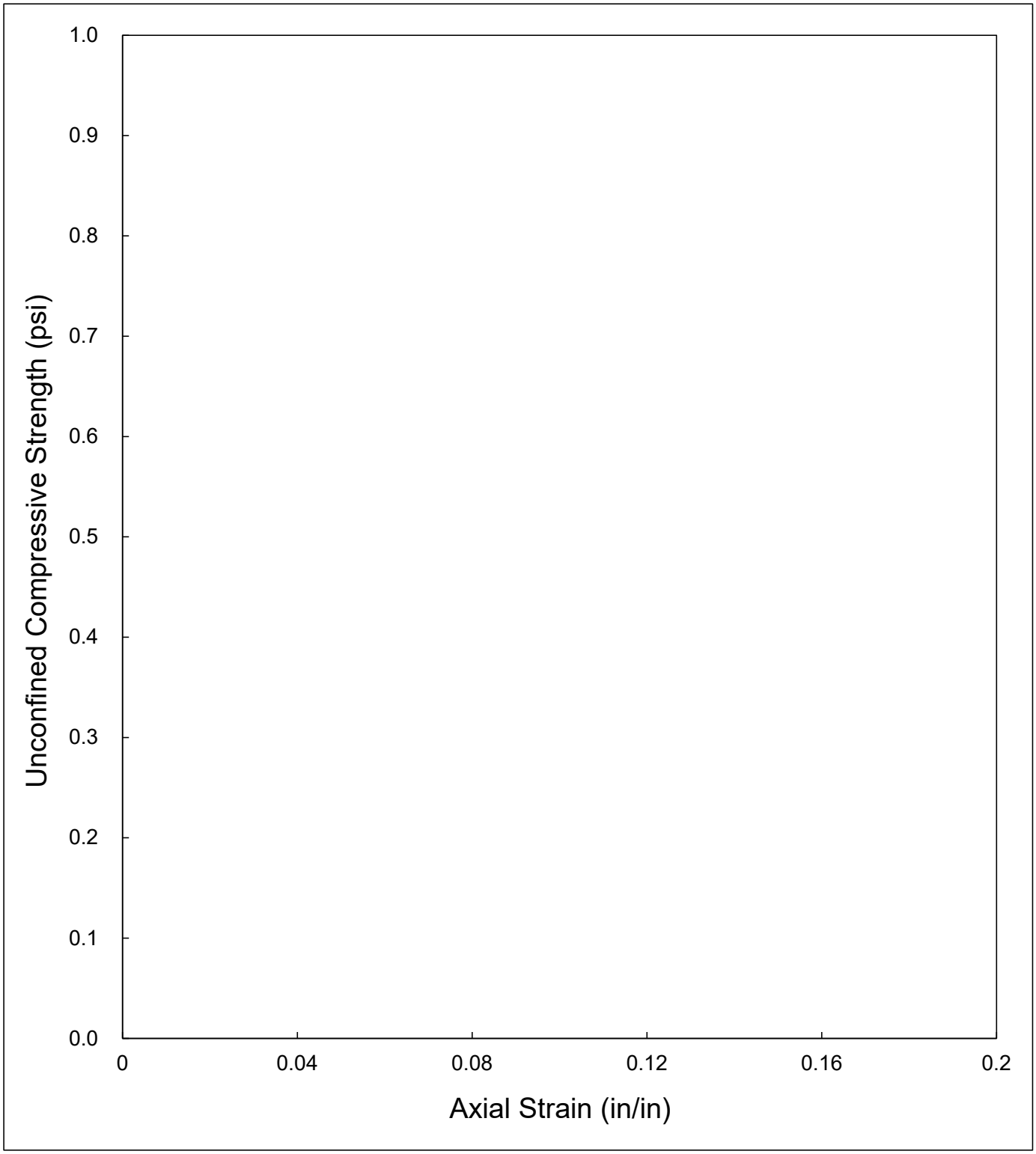
MOISTURE CONTENT (Dry Basis)		
1. MOISTURE TIN NO.		
2. WT MOISTURE TIN (tare weight)		g
3. WT WET SOIL + TARE		g
4. WT DRY SOIL + TARE		g
5. WT WATER, Ww	0.00	g
6. WT DRY SOIL, Ws	0.00	g
7. MOISTURE CONTENT, W	**#DIV/0!**	**%**

SOIL SPECIMEN DIMENSIONS		
	DIAMETER	***LENGTH***
No. 1	in.	in.
No. 2	in.	in.
No. 3	in.	in.
Average	**0.00 in.**	**0.00 in.**

SPECIMEN CONDITIONS		
Initial Specimen WT, Wo	***g***	
Initial Area, Ao	0.00	in²
Initial Volume, Vo	0.00	in³
Initial Bulk Unit Weight,	#DIV/0!	lb/ft³
Initial Dry Unit Weight	#DIV/0!	lb/ft³
15 % Strain (0.15 Lo)	0.00	in.
UCS	#DIV/0!	lb/in²

COMPRESSIVE LOAD (lbs.)	DIAL GAGE READING (in.)	SPECIMEN DEFORMATION (in.)	CORRECTED AREA (in²)	AXIAL STRAIN (in/in)	UNCONFINED COMPRESSIVE STRENGTH (lb/in²)
	0.000	0.000	#DIV/0!	#DIV/0!	#DIV/0!
	0.003	0.003	#DIV/0!	#DIV/0!	#DIV/0!
	0.005	0.005	#DIV/0!	#DIV/0!	#DIV/0!
	0.007	0.007	#DIV/0!	#DIV/0!	#DIV/0!
	0.010	0.010	#DIV/0!	#DIV/0!	#DIV/0!
	0.015	0.015	#DIV/0!	#DIV/0!	#DIV/0!
	0.020	0.020	#DIV/0!	#DIV/0!	#DIV/0!
	0.025	0.025	#DIV/0!	#DIV/0!	#DIV/0!
	0.030	0.030	#DIV/0!	#DIV/0!	#DIV/0!
	0.035	0.035	#DIV/0!	#DIV/0!	#DIV/0!
	0.040	0.040	#DIV/0!	#DIV/0!	#DIV/0!
	0.045	0.045	#DIV/0!	#DIV/0!	#DIV/0!
	0.050	0.050	#DIV/0!	#DIV/0!	#DIV/0!
	0.055	0.055	#DIV/0!	#DIV/0!	#DIV/0!
	0.060	0.060	#DIV/0!	#DIV/0!	#DIV/0!
	0.065	0.065	#DIV/0!	#DIV/0!	#DIV/0!
	0.070	0.070	#DIV/0!	#DIV/0!	#DIV/0!
	0.075	0.075	#DIV/0!	#DIV/0!	#DIV/0!
	0.080	0.080	#DIV/0!	#DIV/0!	#DIV/0!
	0.085	0.085	#DIV/0!	#DIV/0!	#DIV/0!
	0.090	0.090	#DIV/0!	#DIV/0!	#DIV/0!
	0.095	0.095	#DIV/0!	#DIV/0!	#DIV/0!
	0.100	0.100	#DIV/0!	#DIV/0!	#DIV/0!
	0.105	0.105	#DIV/0!	#DIV/0!	#DIV/0!
	0.110	0.110	#DIV/0!	#DIV/0!	#DIV/0!
	0.115	0.115	#DIV/0!	#DIV/0!	#DIV/0!
	0.120	0.120	#DIV/0!	#DIV/0!	#DIV/0!
	0.125	0.125	#DIV/0!	#DIV/0!	#DIV/0!
	0.130	0.130	#DIV/0!	#DIV/0!	#DIV/0!
	0.135	0.135	#DIV/0!	#DIV/0!	#DIV/0!
	0.140	0.140	#DIV/0!	#DIV/0!	#DIV/0!

UNCONFINED COMPRESSION TESTING
Sample No. 0751-012 (28 Day)



UNCONFINED COMPRESSION TEST

ASTM D 2166
SUMMARY OF RESULTS

PROJECT:	C-D Systems Solidification Study		
PROJECT No.:	SH0751		
SAMPLE No.:	0751-012 (28 Day)		
TESTING DATE:	22-Dec-20	LOADING RATE:	0.0400 in./min
TESTED BY:	JBA/BLM	TRACKING CODE:	E355

TESTING PARAMETER AND RESULTS		
MOISTURE CONTENT	#DIV/0!	**%**
BULK UNIT WEIGHT	#DIV/0!	lb/ft³
DRY UNIT WEIGHT	#DIV/0!	lb/ft³
UCS *	#DIV/0!	lb/in²

* UCS - UNCONFINED COMPRESSIVE STRENGTH

MATERIAL pH

EPA METHOD 9045
DATA SHEET

PROJECT:	C-D Systems Solidification Study
PROJECT No.:	SH0751
TESTING DATE:	22-Dec-20
TESTED BY:	JBA/BLM
TRACKING CODE:	E356

	KEMRON SAMPLE No.	MATERIAL pH
1	0751-013 (28 Day) A	13.49
2	0751-013 (28 Day) B	13.69
3	0751-013 (28 Day) C	13.68
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
	AVERAGE:	13.62

UNCONFINED COMPRESSION TEST

ASTM D 2166

PROJECT:	C-D Systems Solidification Study		
PROJECT No.:	SH0751		
SAMPLE No.:	0751-013 (28 Day)		
TESTING DATE:	22-Dec-20	LOADING RATE:	0.0400 in./min
TESTED BY:	JBA/BLM	TRACKING CODE:	E356

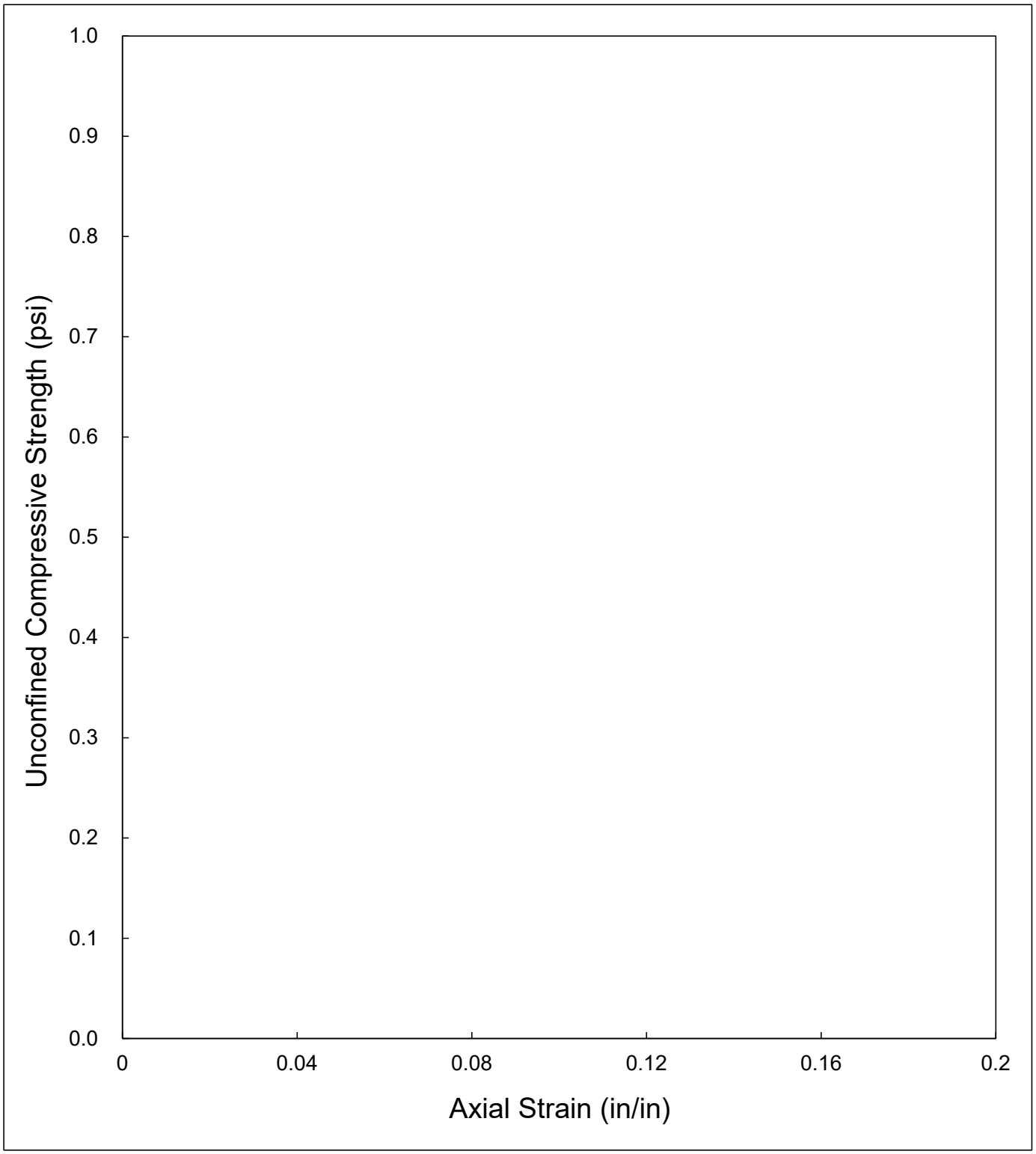
MOISTURE CONTENT (Dry Basis)		
1. MOISTURE TIN NO.		
2. WT MOISTURE TIN (tare weight)		g
3. WT WET SOIL + TARE		g
4. WT DRY SOIL + TARE		g
5. WT WATER, Ww	0.00	g
6. WT DRY SOIL, Ws	0.00	g
7. MOISTURE CONTENT, W	**#DIV/0!**	**%**

SOIL SPECIMEN DIMENSIONS		
	DIAMETER	***LENGTH***
No. 1	in.	in.
No. 2	in.	in.
No. 3	in.	in.
Average	**0.00 in.**	**0.00 in.**

SPECIMEN CONDITIONS		
Initial Specimen WT, Wo	***g***	
Initial Area, Ao	0.00	in²
Initial Volume, Vo	0.00	in³
Initial Bulk Unit Weight,	#DIV/0!	lb/ft³
Initial Dry Unit Weight	#DIV/0!	lb/ft³
15 % Strain (0.15 Lo)	0.00	in.
UCS	#DIV/0!	lb/in²

COMPRESSIVE LOAD (lbs.)	DIAL GAGE READING (in.)	SPECIMEN DEFORMATION (in.)	CORRECTED AREA (in²)	AXIAL STRAIN (in/in)	UNCONFINED COMPRESSIVE STRENGTH (lb/in²)
	0.000	0.000	#DIV/0!	#DIV/0!	#DIV/0!
	0.003	0.003	#DIV/0!	#DIV/0!	#DIV/0!
	0.005	0.005	#DIV/0!	#DIV/0!	#DIV/0!
	0.007	0.007	#DIV/0!	#DIV/0!	#DIV/0!
	0.010	0.010	#DIV/0!	#DIV/0!	#DIV/0!
	0.015	0.015	#DIV/0!	#DIV/0!	#DIV/0!
	0.020	0.020	#DIV/0!	#DIV/0!	#DIV/0!
	0.025	0.025	#DIV/0!	#DIV/0!	#DIV/0!
	0.030	0.030	#DIV/0!	#DIV/0!	#DIV/0!
	0.035	0.035	#DIV/0!	#DIV/0!	#DIV/0!
	0.040	0.040	#DIV/0!	#DIV/0!	#DIV/0!
	0.045	0.045	#DIV/0!	#DIV/0!	#DIV/0!
	0.050	0.050	#DIV/0!	#DIV/0!	#DIV/0!
	0.055	0.055	#DIV/0!	#DIV/0!	#DIV/0!
	0.060	0.060	#DIV/0!	#DIV/0!	#DIV/0!
	0.065	0.065	#DIV/0!	#DIV/0!	#DIV/0!
	0.070	0.070	#DIV/0!	#DIV/0!	#DIV/0!
	0.075	0.075	#DIV/0!	#DIV/0!	#DIV/0!
	0.080	0.080	#DIV/0!	#DIV/0!	#DIV/0!
	0.085	0.085	#DIV/0!	#DIV/0!	#DIV/0!
	0.090	0.090	#DIV/0!	#DIV/0!	#DIV/0!
	0.095	0.095	#DIV/0!	#DIV/0!	#DIV/0!
	0.100	0.100	#DIV/0!	#DIV/0!	#DIV/0!
	0.105	0.105	#DIV/0!	#DIV/0!	#DIV/0!
	0.110	0.110	#DIV/0!	#DIV/0!	#DIV/0!
	0.115	0.115	#DIV/0!	#DIV/0!	#DIV/0!
	0.120	0.120	#DIV/0!	#DIV/0!	#DIV/0!
	0.125	0.125	#DIV/0!	#DIV/0!	#DIV/0!
	0.130	0.130	#DIV/0!	#DIV/0!	#DIV/0!
	0.135	0.135	#DIV/0!	#DIV/0!	#DIV/0!
	0.140	0.140	#DIV/0!	#DIV/0!	#DIV/0!

UNCONFINED COMPRESSION TESTING
Sample No. 0751-013 (28 Day)



UNCONFINED COMPRESSION TEST

ASTM D 2166
SUMMARY OF RESULTS

PROJECT:	C-D Systems Solidification Study		
PROJECT No.:	SH0751		
SAMPLE No.:	0751-013 (28 Day)		
TESTING DATE:	22-Dec-20	LOADING RATE:	0.0400 in./min
TESTED BY:	JBA/BLM	TRACKING CODE:	E356

TESTING PARAMETER AND RESULTS		
MOISTURE CONTENT	#DIV/0!	**%**
BULK UNIT WEIGHT	#DIV/0!	lb/ft³
DRY UNIT WEIGHT	#DIV/0!	lb/ft³
UCS *	#DIV/0!	lb/in²

* UCS - UNCONFINED COMPRESSIVE STRENGTH

Client:	Kemron Environmental Services		
Project Name:	C-D Systems Solidification Study		
Project Location:	---		
GTX #:	312983		
Start Date:	12/31/2020	Tested By:	jm
End Date:	1/4/2021	Checked By:	mcm
Boring	---	Test #:	K7
Sample #:	0751-013 (28 Day)		
Depth:	---		
Visual Description:	Moist, grayish brown solidified soil		

Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter by ASTM D5084 Increasing Tailwater

Sample Type:	Core	Permeant Fluid:	de-aired tap water
Orientation:	Vertical	Cell #:	K9

Sample Preparation: Core weighed and dimensioned, then placed in permeameter at the "as-received" moisture content.

Parameter	Initial	Final
Height, in	2.39	2.39
Diameter, in	2.00	2.00
Area, in^2	3.14	3.14
Volume, in^3	7.5	7.5
Mass, g	261	264
Bulk Density, pcf	132	134
Moisture Content, %	11.9	13.3
Dry Density, pcf	117.9	117.9
Degree of Saturation, %	---	97

B COEFFICIENT DETERMINATION

Cell Pressure, psi:	90	Pressure Increment, psi:	9.6
Sample Pressure, psi:	80	B Coefficient:	0.96

FLOW DATA

Date	Trial #	Pressure, psi		Head readings			Elapsed Time,	Gradient	Permeability K,	Temp,		Permeability K @ 20 °C,
		Cell	Sample	H_1	H_2	H_1-H_2	sec		cm/sec	°C	R_t	cm/sec
12/30	3	90	80	183.3	183.0	0.3	1020	30.2	3.9E-08	21	0.976	3.8E-08
12/30	4	90	80	183.0	182.5	0.5	1800	30.2	3.7E-08	21	0.976	3.6E-08
12/30	5	90	80	182.5	182.1	0.4	1380	30.1	3.9E-08	21	0.976	3.8E-08
12/30	6	90	80	182.1	181.4	0.7	2400	30.0	3.9E-08	21	0.976	3.8E-08

PERMEABILITY AT 20° C: 3.8 x 10^{-8} cm/sec (@ 10 psi effective stress)

MATERIAL pH

EPA METHOD 9045
DATA SHEET

PROJECT:	C-D Systems Solidification Study
PROJECT No.:	SH0751
TESTING DATE:	22-Dec-20
TESTED BY:	JBA/BLM
TRACKING CODE:	E357

	KEMRON SAMPLE No.	MATERIAL pH
1	0751-014 (28 Day) A	13.45
2	0751-014 (28 Day) B	13.34
3	0751-014 (28 Day) C	13.43
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
	AVERAGE:	13.41

UNCONFINED COMPRESSION TEST

ASTM D 2166

PROJECT:	C-D Systems Solidification Study		
PROJECT No.:	SH0751		
SAMPLE No.:	0751-014 (28 Day)		
TESTING DATE:	22-Dec-20	LOADING RATE:	0.0400 in./min
TESTED BY:	JBA/BLM	TRACKING CODE:	E357

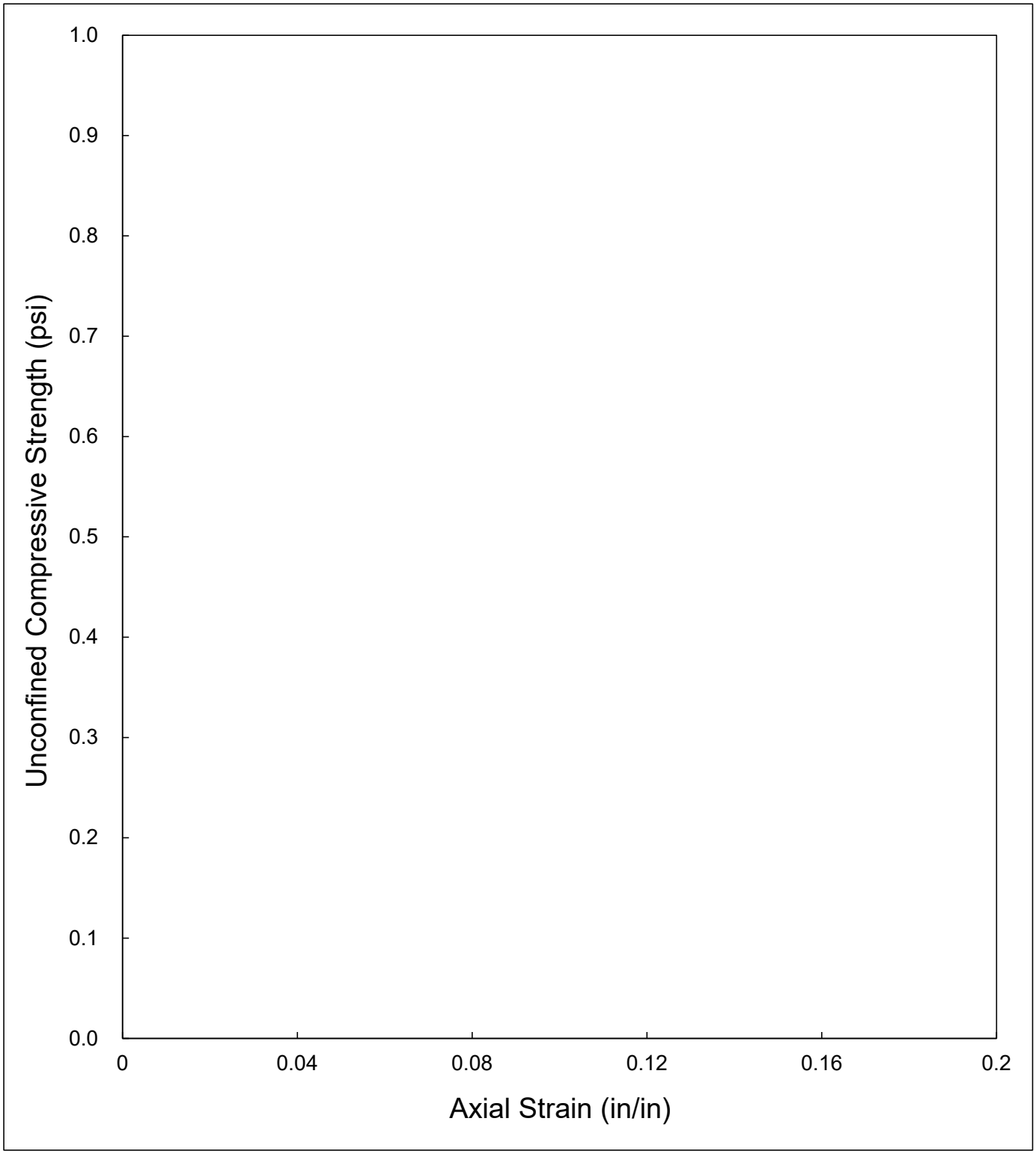
MOISTURE CONTENT (Dry Basis)		
1. MOISTURE TIN NO.		
2. WT MOISTURE TIN (tare weight)		g
3. WT WET SOIL + TARE		g
4. WT DRY SOIL + TARE		g
5. WT WATER, Ww	0.00	g
6. WT DRY SOIL, Ws	0.00	g
7. MOISTURE CONTENT, W	**#DIV/0!**	**%**

SOIL SPECIMEN DIMENSIONS		
	DIAMETER	***LENGTH***
No. 1	in.	in.
No. 2	in.	in.
No. 3	in.	in.
Average	**0.00 in.**	**0.00 in.**

SPECIMEN CONDITIONS		
Initial Specimen WT, Wo	***g***	
Initial Area, Ao	0.00	in²
Initial Volume, Vo	0.00	in³
Initial Bulk Unit Weight,	#DIV/0!	lb/ft³
Initial Dry Unit Weight	#DIV/0!	lb/ft³
15 % Strain (0.15 Lo)	0.00	in.
UCS	#DIV/0!	lb/in²

COMPRESSIVE LOAD (lbs.)	DIAL GAGE READING (in.)	SPECIMEN DEFORMATION (in.)	CORRECTED AREA (in²)	AXIAL STRAIN (in/in)	UNCONFINED COMPRESSIVE STRENGTH (lb/in²)
	0.000	0.000	#DIV/0!	#DIV/0!	#DIV/0!
	0.003	0.003	#DIV/0!	#DIV/0!	#DIV/0!
	0.005	0.005	#DIV/0!	#DIV/0!	#DIV/0!
	0.007	0.007	#DIV/0!	#DIV/0!	#DIV/0!
	0.010	0.010	#DIV/0!	#DIV/0!	#DIV/0!
	0.015	0.015	#DIV/0!	#DIV/0!	#DIV/0!
	0.020	0.020	#DIV/0!	#DIV/0!	#DIV/0!
	0.025	0.025	#DIV/0!	#DIV/0!	#DIV/0!
	0.030	0.030	#DIV/0!	#DIV/0!	#DIV/0!
	0.035	0.035	#DIV/0!	#DIV/0!	#DIV/0!
	0.040	0.040	#DIV/0!	#DIV/0!	#DIV/0!
	0.045	0.045	#DIV/0!	#DIV/0!	#DIV/0!
	0.050	0.050	#DIV/0!	#DIV/0!	#DIV/0!
	0.055	0.055	#DIV/0!	#DIV/0!	#DIV/0!
	0.060	0.060	#DIV/0!	#DIV/0!	#DIV/0!
	0.065	0.065	#DIV/0!	#DIV/0!	#DIV/0!
	0.070	0.070	#DIV/0!	#DIV/0!	#DIV/0!
	0.075	0.075	#DIV/0!	#DIV/0!	#DIV/0!
	0.080	0.080	#DIV/0!	#DIV/0!	#DIV/0!
	0.085	0.085	#DIV/0!	#DIV/0!	#DIV/0!
	0.090	0.090	#DIV/0!	#DIV/0!	#DIV/0!
	0.095	0.095	#DIV/0!	#DIV/0!	#DIV/0!
	0.100	0.100	#DIV/0!	#DIV/0!	#DIV/0!
	0.105	0.105	#DIV/0!	#DIV/0!	#DIV/0!
	0.110	0.110	#DIV/0!	#DIV/0!	#DIV/0!
	0.115	0.115	#DIV/0!	#DIV/0!	#DIV/0!
	0.120	0.120	#DIV/0!	#DIV/0!	#DIV/0!
	0.125	0.125	#DIV/0!	#DIV/0!	#DIV/0!
	0.130	0.130	#DIV/0!	#DIV/0!	#DIV/0!
	0.135	0.135	#DIV/0!	#DIV/0!	#DIV/0!
	0.140	0.140	#DIV/0!	#DIV/0!	#DIV/0!

UNCONFINED COMPRESSION TESTING
Sample No. 0751-014 (28 Day)



UNCONFINED COMPRESSION TEST

ASTM D 2166
SUMMARY OF RESULTS

PROJECT:	C-D Systems Solidification Study		
PROJECT No.:	SH0751		
SAMPLE No.:	0751-014 (28 Day)		
TESTING DATE:	22-Dec-20	LOADING RATE:	0.0400 in./min
TESTED BY:	JBA/BLM	TRACKING CODE:	E357

TESTING PARAMETER AND RESULTS		
MOISTURE CONTENT	#DIV/0!	**%**
BULK UNIT WEIGHT	#DIV/0!	lb/ft³
DRY UNIT WEIGHT	#DIV/0!	lb/ft³
UCS *	#DIV/0!	lb/in²

* UCS - UNCONFINED COMPRESSIVE STRENGTH

Client:	Kemron Environmental Services		
Project Name:	C-D Systems Solidification Study		
Project Location:	---		
GTX #:	312983		
Start Date:	12/31/2020	Tested By:	jm
End Date:	1/4/2021	Checked By:	mcm
Boring	---	Test #:	K8
Sample #:	0751-014 (28 Day)		
Depth:	---		
Visual Description:	Moist, grayish brown solidified soil		

Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter by ASTM D5084 Increasing Tailwater

Sample Type:	Core	Permeant Fluid:	de-aired tap water
Orientation:	Vertical	Cell #:	P12

Sample Preparation: Core weighed and dimensioned, then placed in permeameter at the "as-received" moisture content.

Parameter	Initial	Final
Height, in	1.99	1.99
Diameter, in	2.00	2.00
Area, in^2	3.14	3.14
Volume, in^3	6.3	6.3
Mass, g	217	220
Bulk Density, pcf	132	134
Moisture Content, %	12.1	13.4
Dry Density, pcf	117.9	117.9
Degree of Saturation, %	---	98

B COEFFICIENT DETERMINATION

Cell Pressure, psi:	90	Pressure Increment, psi:	9.6
Sample Pressure, psi:	80	B Coefficient:	0.96

FLOW DATA

Date	Trial #	Pressure, psi		Head readings			Elapsed Time,	Gradient	Permeability K,	Temp,		Permeability K @ 20 °C,
		Cell	Sample	H_1	H_2	H_1-H_2	sec		cm/sec	°C	R_t	cm/sec
12/30	2	90	80	190.0	189.0	1.0	3600	37.6	2.9E-08	21	0.976	2.8E-08
12/30	3	90	80	189.0	188.3	0.7	3000	37.4	2.5E-08	21	0.976	2.4E-08
12/30	4	90	80	188.3	187.7	0.6	2700	37.3	2.4E-08	21	0.976	2.3E-08
12/30	5	90	80	187.7	186.9	0.8	3000	37.1	2.9E-08	21	0.976	2.8E-08

PERMEABILITY AT 20° C: 2.6 x 10^{-8} cm/sec (@ 10 psi effective stress)

UNCONFINED COMPRESSION TEST

ASTM D 2166

PROJECT:	C-D Systems Solidification Study		
PROJECT No.:	SH0751		
SAMPLE No.:	0751-015 (28 Day)		
TESTING DATE:	22-Dec-20	LOADING RATE:	0.0400 in./min
TESTED BY:	JBA/BLM	TRACKING CODE:	E358

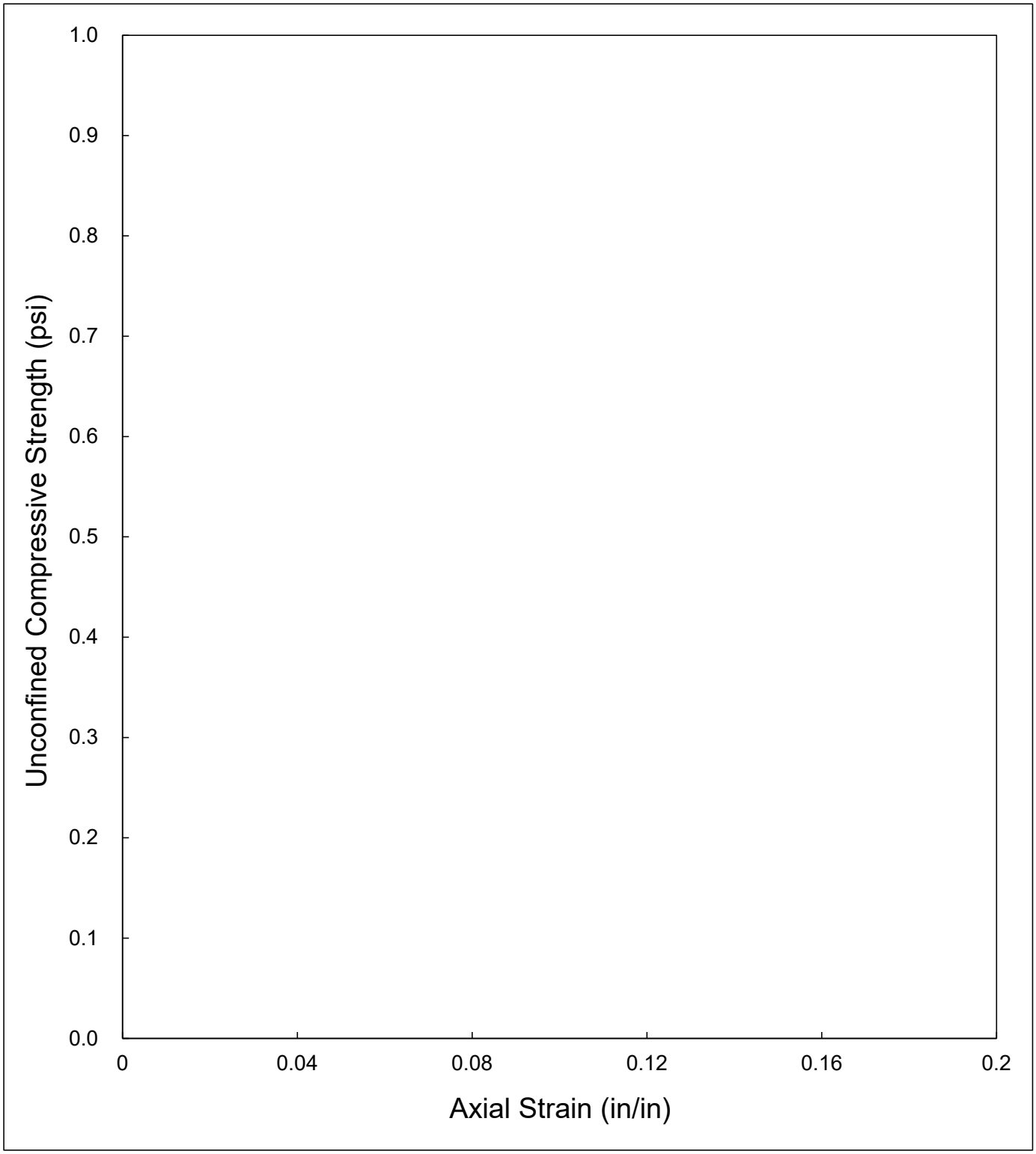
MOISTURE CONTENT (Dry Basis)		
1. MOISTURE TIN NO.		
2. WT MOISTURE TIN (tare weight)		g
3. WT WET SOIL + TARE		g
4. WT DRY SOIL + TARE		g
5. WT WATER, Ww	0.00	g
6. WT DRY SOIL, Ws	0.00	g
7. MOISTURE CONTENT, W	**#DIV/0!**	**%**

SOIL SPECIMEN DIMENSIONS		
	DIAMETER	***LENGTH***
No. 1	in.	in.
No. 2	in.	in.
No. 3	in.	in.
Average	**0.00 in.**	**0.00 in.**

SPECIMEN CONDITIONS		
Initial Specimen WT, Wo	***g***	
Initial Area, Ao	0.00	in²
Initial Volume, Vo	0.00	in³
Initial Bulk Unit Weight,	#DIV/0!	lb/ft³
Initial Dry Unit Weight	#DIV/0!	lb/ft³
15 % Strain (0.15 Lo)	0.00	in.
UCS	#DIV/0!	lb/in²

COMPRESSIVE LOAD (lbs.)	DIAL GAGE READING (in.)	SPECIMEN DEFORMATION (in.)	CORRECTED AREA (in²)	AXIAL STRAIN (in/in)	UNCONFINED COMPRESSIVE STRENGTH (lb/in²)
	0.000	0.000	#DIV/0!	#DIV/0!	#DIV/0!
	0.003	0.003	#DIV/0!	#DIV/0!	#DIV/0!
	0.005	0.005	#DIV/0!	#DIV/0!	#DIV/0!
	0.007	0.007	#DIV/0!	#DIV/0!	#DIV/0!
	0.010	0.010	#DIV/0!	#DIV/0!	#DIV/0!
	0.015	0.015	#DIV/0!	#DIV/0!	#DIV/0!
	0.020	0.020	#DIV/0!	#DIV/0!	#DIV/0!
	0.025	0.025	#DIV/0!	#DIV/0!	#DIV/0!
	0.030	0.030	#DIV/0!	#DIV/0!	#DIV/0!
	0.035	0.035	#DIV/0!	#DIV/0!	#DIV/0!
	0.040	0.040	#DIV/0!	#DIV/0!	#DIV/0!
	0.045	0.045	#DIV/0!	#DIV/0!	#DIV/0!
	0.050	0.050	#DIV/0!	#DIV/0!	#DIV/0!
	0.055	0.055	#DIV/0!	#DIV/0!	#DIV/0!
	0.060	0.060	#DIV/0!	#DIV/0!	#DIV/0!
	0.065	0.065	#DIV/0!	#DIV/0!	#DIV/0!
	0.070	0.070	#DIV/0!	#DIV/0!	#DIV/0!
	0.075	0.075	#DIV/0!	#DIV/0!	#DIV/0!
	0.080	0.080	#DIV/0!	#DIV/0!	#DIV/0!
	0.085	0.085	#DIV/0!	#DIV/0!	#DIV/0!
	0.090	0.090	#DIV/0!	#DIV/0!	#DIV/0!
	0.095	0.095	#DIV/0!	#DIV/0!	#DIV/0!
	0.100	0.100	#DIV/0!	#DIV/0!	#DIV/0!
	0.105	0.105	#DIV/0!	#DIV/0!	#DIV/0!
	0.110	0.110	#DIV/0!	#DIV/0!	#DIV/0!
	0.115	0.115	#DIV/0!	#DIV/0!	#DIV/0!
	0.120	0.120	#DIV/0!	#DIV/0!	#DIV/0!
	0.125	0.125	#DIV/0!	#DIV/0!	#DIV/0!
	0.130	0.130	#DIV/0!	#DIV/0!	#DIV/0!
	0.135	0.135	#DIV/0!	#DIV/0!	#DIV/0!
	0.140	0.140	#DIV/0!	#DIV/0!	#DIV/0!

UNCONFINED COMPRESSION TESTING
Sample No. 0751-015 (28 Day)



UNCONFINED COMPRESSION TEST

ASTM D 2166
SUMMARY OF RESULTS

PROJECT:	C-D Systems Solidification Study		
PROJECT No.:	SH0751		
SAMPLE No.:	0751-015 (28 Day)		
TESTING DATE:	22-Dec-20	LOADING RATE:	0.0400 in./min
TESTED BY:	JBA/BLM	TRACKING CODE:	E358

TESTING PARAMETER AND RESULTS		
MOISTURE CONTENT	#DIV/0!	**%**
BULK UNIT WEIGHT	#DIV/0!	lb/ft³
DRY UNIT WEIGHT	#DIV/0!	lb/ft³
UCS *	#DIV/0!	lb/in²

* UCS - UNCONFINED COMPRESSIVE STRENGTH

UNCONFINED COMPRESSION TEST

ASTM D 2166

PROJECT:	C-D Systems Solidification Study		
PROJECT No.:	SH0751		
SAMPLE No.:	0751-016 (28 Day)		
TESTING DATE:	22-Dec-20	LOADING RATE:	0.0400 in./min
TESTED BY:	JBA/BLM	TRACKING CODE:	E359

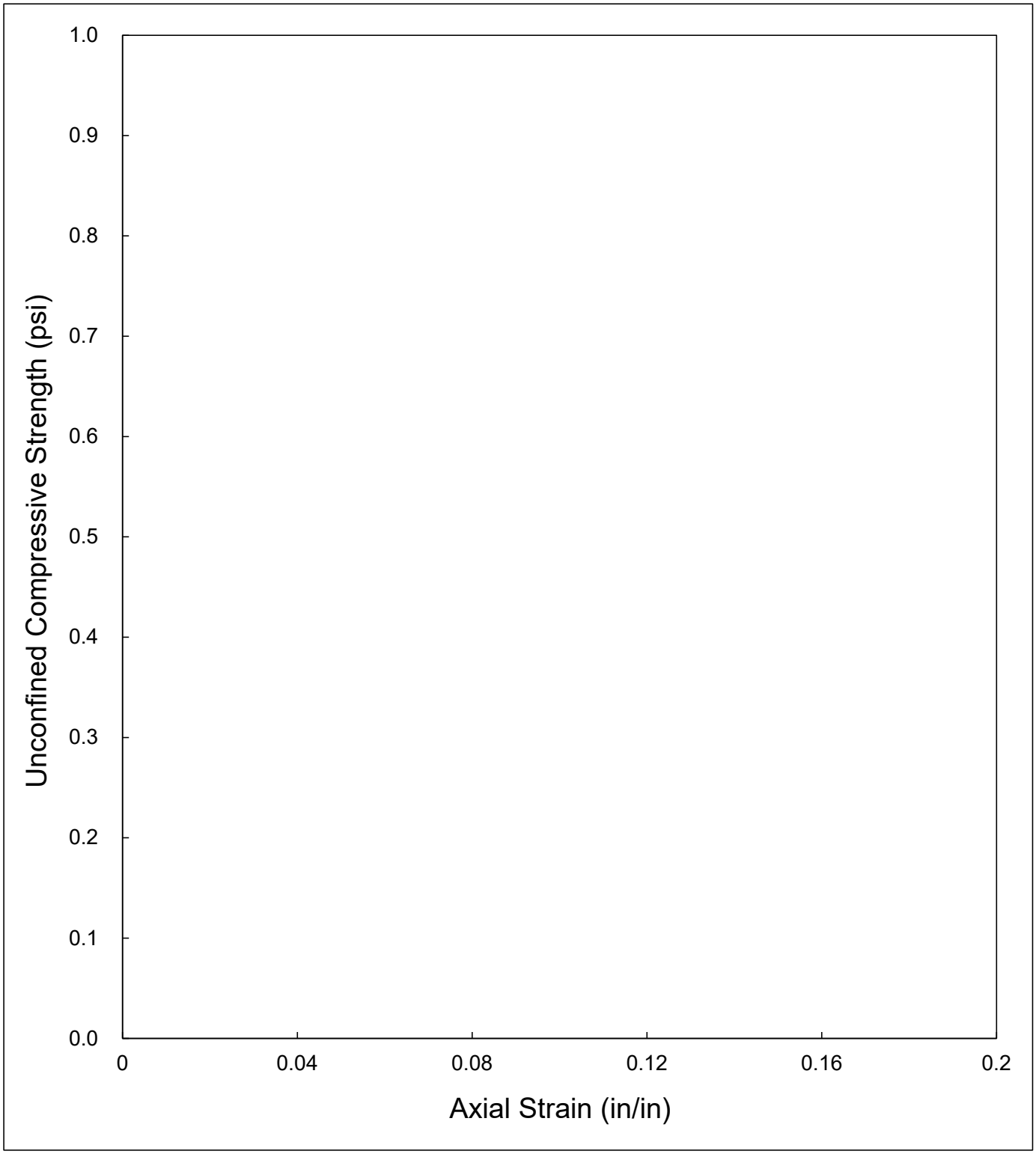
MOISTURE CONTENT (Dry Basis)		
1. MOISTURE TIN NO.		
2. WT MOISTURE TIN (tare weight)		g
3. WT WET SOIL + TARE		g
4. WT DRY SOIL + TARE		g
5. WT WATER, Ww	0.00	g
6. WT DRY SOIL, Ws	0.00	g
7. MOISTURE CONTENT, W	**#DIV/0!**	**%**

SOIL SPECIMEN DIMENSIONS		
	DIAMETER	***LENGTH***
No. 1	in.	in.
No. 2	in.	in.
No. 3	in.	in.
Average	**0.00 in.**	**0.00 in.**

SPECIMEN CONDITIONS		
Initial Specimen WT, Wo	***g***	
Initial Area, Ao	0.00	in²
Initial Volume, Vo	0.00	in³
Initial Bulk Unit Weight,	#DIV/0!	lb/ft³
Initial Dry Unit Weight	#DIV/0!	lb/ft³
15 % Strain (0.15 Lo)	0.00	in.
UCS	#DIV/0!	lb/in²

COMPRESSIVE LOAD (lbs.)	DIAL GAGE READING (in.)	SPECIMEN DEFORMATION (in.)	CORRECTED AREA (in²)	AXIAL STRAIN (in/in)	UNCONFINED COMPRESSIVE STRENGTH (lb/in²)
	0.000	0.000	#DIV/0!	#DIV/0!	#DIV/0!
	0.003	0.003	#DIV/0!	#DIV/0!	#DIV/0!
	0.005	0.005	#DIV/0!	#DIV/0!	#DIV/0!
	0.007	0.007	#DIV/0!	#DIV/0!	#DIV/0!
	0.010	0.010	#DIV/0!	#DIV/0!	#DIV/0!
	0.015	0.015	#DIV/0!	#DIV/0!	#DIV/0!
	0.020	0.020	#DIV/0!	#DIV/0!	#DIV/0!
	0.025	0.025	#DIV/0!	#DIV/0!	#DIV/0!
	0.030	0.030	#DIV/0!	#DIV/0!	#DIV/0!
	0.035	0.035	#DIV/0!	#DIV/0!	#DIV/0!
	0.040	0.040	#DIV/0!	#DIV/0!	#DIV/0!
	0.045	0.045	#DIV/0!	#DIV/0!	#DIV/0!
	0.050	0.050	#DIV/0!	#DIV/0!	#DIV/0!
	0.055	0.055	#DIV/0!	#DIV/0!	#DIV/0!
	0.060	0.060	#DIV/0!	#DIV/0!	#DIV/0!
	0.065	0.065	#DIV/0!	#DIV/0!	#DIV/0!
	0.070	0.070	#DIV/0!	#DIV/0!	#DIV/0!
	0.075	0.075	#DIV/0!	#DIV/0!	#DIV/0!
	0.080	0.080	#DIV/0!	#DIV/0!	#DIV/0!
	0.085	0.085	#DIV/0!	#DIV/0!	#DIV/0!
	0.090	0.090	#DIV/0!	#DIV/0!	#DIV/0!
	0.095	0.095	#DIV/0!	#DIV/0!	#DIV/0!
	0.100	0.100	#DIV/0!	#DIV/0!	#DIV/0!
	0.105	0.105	#DIV/0!	#DIV/0!	#DIV/0!
	0.110	0.110	#DIV/0!	#DIV/0!	#DIV/0!
	0.115	0.115	#DIV/0!	#DIV/0!	#DIV/0!
	0.120	0.120	#DIV/0!	#DIV/0!	#DIV/0!
	0.125	0.125	#DIV/0!	#DIV/0!	#DIV/0!
	0.130	0.130	#DIV/0!	#DIV/0!	#DIV/0!
	0.135	0.135	#DIV/0!	#DIV/0!	#DIV/0!
	0.140	0.140	#DIV/0!	#DIV/0!	#DIV/0!

UNCONFINED COMPRESSION TESTING
Sample No. 0751-016 (28 Day)



UNCONFINED COMPRESSION TEST

ASTM D 2166
SUMMARY OF RESULTS

PROJECT:	C-D Systems Solidification Study		
PROJECT No.:	SH0751		
SAMPLE No.:	0751-016 (28 Day)		
TESTING DATE:	22-Dec-20	LOADING RATE:	0.0400 in./min
TESTED BY:	JBA/BLM	TRACKING CODE:	E359

TESTING PARAMETER AND RESULTS		
MOISTURE CONTENT	#DIV/0!	**%**
BULK UNIT WEIGHT	#DIV/0!	lb/ft³
DRY UNIT WEIGHT	#DIV/0!	lb/ft³
UCS *	#DIV/0!	lb/in²

* UCS - UNCONFINED COMPRESSIVE STRENGTH

MATERIAL pH

EPA METHOD 9045
DATA SHEET

PROJECT:	C-D Systems Solidification Study
PROJECT No.:	SH0751
TESTING DATE:	22-Dec-20
TESTED BY:	JBA/BLM
TRACKING CODE:	E360

	KEMRON SAMPLE No.	MATERIAL pH
1	0751-017 (28 Day) A	13.69
2	0751-017 (28 Day) B	13.07
3	0751-017 (28 Day) C	13.82
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
	AVERAGE:	13.53

UNCONFINED COMPRESSION TEST

ASTM D 2166

PROJECT:	C-D Systems Solidification Study		
PROJECT No.:	SH0751		
SAMPLE No.:	0751-017 (28 Day)		
TESTING DATE:	22-Dec-20	LOADING RATE:	0.0400 in./min
TESTED BY:	JBA/BLM	TRACKING CODE:	E360

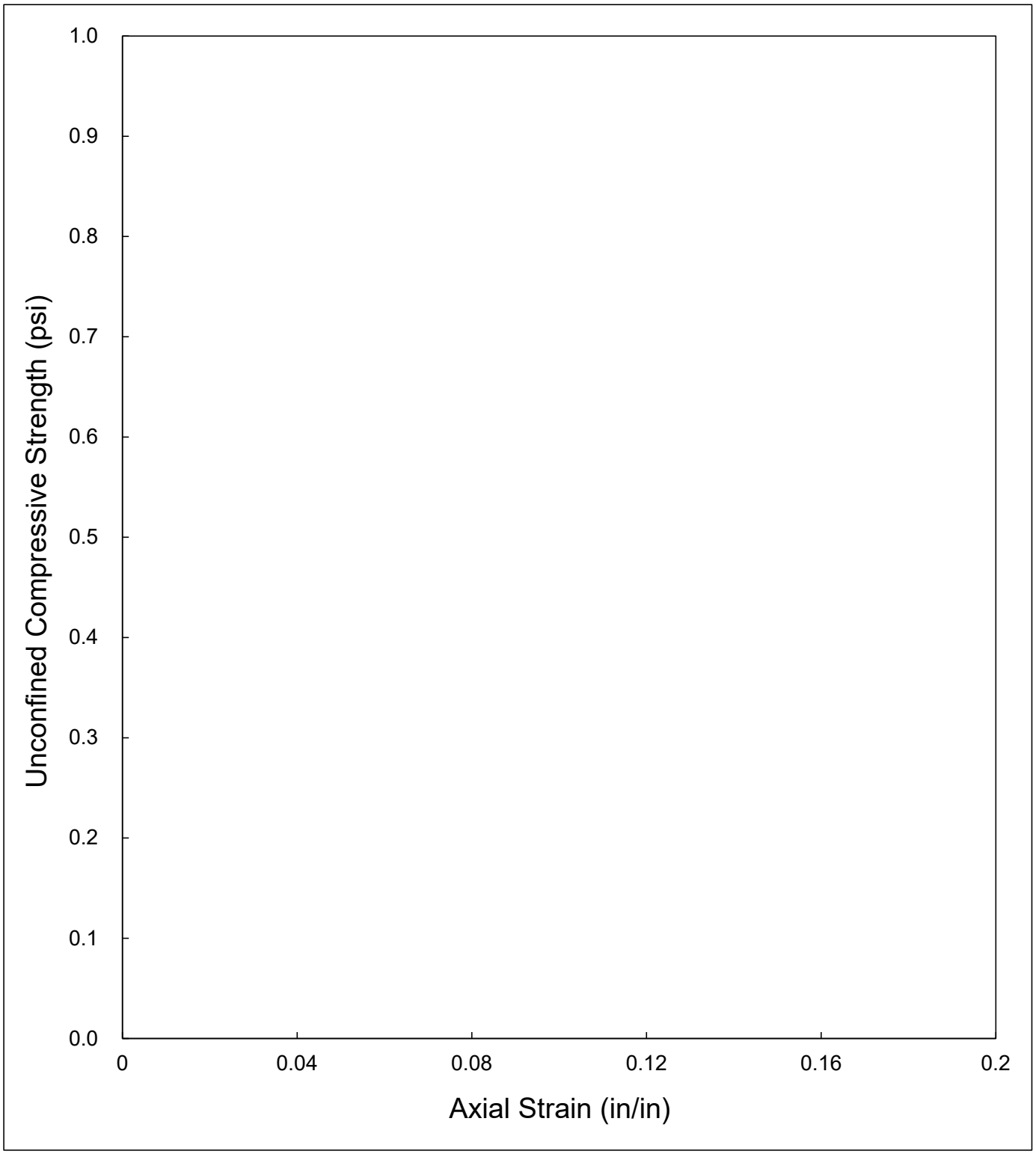
MOISTURE CONTENT (Dry Basis)		
1. MOISTURE TIN NO.		
2. WT MOISTURE TIN (tare weight)		g
3. WT WET SOIL + TARE		g
4. WT DRY SOIL + TARE		g
5. WT WATER, Ww	0.00	g
6. WT DRY SOIL, Ws	0.00	g
7. MOISTURE CONTENT, W	**#DIV/0!**	**%**

SOIL SPECIMEN DIMENSIONS		
	DIAMETER	***LENGTH***
No. 1	in.	in.
No. 2	in.	in.
No. 3	in.	in.
Average	**0.00 in.**	**0.00 in.**

SPECIMEN CONDITIONS		
Initial Specimen WT, Wo	***g***	
Initial Area, Ao	0.00	in²
Initial Volume, Vo	0.00	in³
Initial Bulk Unit Weight,	#DIV/0!	lb/ft³
Initial Dry Unit Weight	#DIV/0!	lb/ft³
15 % Strain (0.15 Lo)	0.00	in.
UCS	#DIV/0!	lb/in²

COMPRESSIVE LOAD (lbs.)	DIAL GAGE READING (in.)	SPECIMEN DEFORMATION (in.)	CORRECTED AREA (in²)	AXIAL STRAIN (in/in)	UNCONFINED COMPRESSIVE STRENGTH (lb/in²)
	0.000	0.000	#DIV/0!	#DIV/0!	#DIV/0!
	0.003	0.003	#DIV/0!	#DIV/0!	#DIV/0!
	0.005	0.005	#DIV/0!	#DIV/0!	#DIV/0!
	0.007	0.007	#DIV/0!	#DIV/0!	#DIV/0!
	0.010	0.010	#DIV/0!	#DIV/0!	#DIV/0!
	0.015	0.015	#DIV/0!	#DIV/0!	#DIV/0!
	0.020	0.020	#DIV/0!	#DIV/0!	#DIV/0!
	0.025	0.025	#DIV/0!	#DIV/0!	#DIV/0!
	0.030	0.030	#DIV/0!	#DIV/0!	#DIV/0!
	0.035	0.035	#DIV/0!	#DIV/0!	#DIV/0!
	0.040	0.040	#DIV/0!	#DIV/0!	#DIV/0!
	0.045	0.045	#DIV/0!	#DIV/0!	#DIV/0!
	0.050	0.050	#DIV/0!	#DIV/0!	#DIV/0!
	0.055	0.055	#DIV/0!	#DIV/0!	#DIV/0!
	0.060	0.060	#DIV/0!	#DIV/0!	#DIV/0!
	0.065	0.065	#DIV/0!	#DIV/0!	#DIV/0!
	0.070	0.070	#DIV/0!	#DIV/0!	#DIV/0!
	0.075	0.075	#DIV/0!	#DIV/0!	#DIV/0!
	0.080	0.080	#DIV/0!	#DIV/0!	#DIV/0!
	0.085	0.085	#DIV/0!	#DIV/0!	#DIV/0!
	0.090	0.090	#DIV/0!	#DIV/0!	#DIV/0!
	0.095	0.095	#DIV/0!	#DIV/0!	#DIV/0!
	0.100	0.100	#DIV/0!	#DIV/0!	#DIV/0!
	0.105	0.105	#DIV/0!	#DIV/0!	#DIV/0!
	0.110	0.110	#DIV/0!	#DIV/0!	#DIV/0!
	0.115	0.115	#DIV/0!	#DIV/0!	#DIV/0!
	0.120	0.120	#DIV/0!	#DIV/0!	#DIV/0!
	0.125	0.125	#DIV/0!	#DIV/0!	#DIV/0!
	0.130	0.130	#DIV/0!	#DIV/0!	#DIV/0!
	0.135	0.135	#DIV/0!	#DIV/0!	#DIV/0!
	0.140	0.140	#DIV/0!	#DIV/0!	#DIV/0!

UNCONFINED COMPRESSION TESTING
Sample No. 0751-017 (28 Day)



UNCONFINED COMPRESSION TEST

ASTM D 2166
SUMMARY OF RESULTS

PROJECT:	C-D Systems Solidification Study		
PROJECT No.:	SH0751		
SAMPLE No.:	0751-017 (28 Day)		
TESTING DATE:	22-Dec-20	LOADING RATE:	0.0400 in./min
TESTED BY:	JBA/BLM	TRACKING CODE:	E360

TESTING PARAMETER AND RESULTS		
MOISTURE CONTENT	#DIV/0!	**%**
BULK UNIT WEIGHT	#DIV/0!	lb/ft³
DRY UNIT WEIGHT	#DIV/0!	lb/ft³
UCS *	#DIV/0!	lb/in²

* UCS - UNCONFINED COMPRESSIVE STRENGTH

Client:	Kemron Environmental Services		
Project Name:	C-D Systems Solidification Study		
Project Location:	---		
GTX #:	312983		
Start Date:	12/31/2020	Tested By:	jm
End Date:	1/4/2021	Checked By:	mcm
Boring	---	Test #:	K9
Sample #:	0751-017 (28 Day)		
Depth:	---		
Visual Description:	Moist, grayish brown solidified soil		

Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter by ASTM D5084 Increasing Tailwater

Sample Type:	Core	Permeant Fluid:	de-aired tap water
Orientation:	Vertical	Cell #:	K5

Sample Preparation: Core weighed and dimensioned, then placed in permeameter at the "as-received" moisture content.

Parameter	Initial	Final
Height, in	2.07	2.07
Diameter, in	2.00	2.00
Area, in^2	3.14	3.14
Volume, in^3	6.5	6.5
Mass, g	229	232
Bulk Density, pcf	134	135
Moisture Content, %	11.5	12.9
Dry Density, pcf	119.9	119.9
Degree of Saturation, %	---	100

B COEFFICIENT DETERMINATION

Cell Pressure, psi:	90	Pressure Increment, psi:	9.6
Sample Pressure, psi:	80	B Coefficient:	0.96

FLOW DATA

Date	Trial #	Pressure, psi		Head readings			Elapsed Time,	Gradient	Permeability K,	Temp,		Permeability K @ 20 °C,
		Cell	Sample	H_1	H_2	H_1-H_2	sec		cm/sec	°C	R_t	cm/sec
12/30	4	90	80	175.6	175.2	0.4	3000	33.4	1.6E-08	21	0.976	1.6E-08
12/30	5	90	80	175.1	174.3	0.8	5400	33.3	1.8E-08	21	0.976	1.7E-08
12/30	6	90	80	174.3	173.4	0.9	5700	33.1	1.9E-08	21	0.976	1.9E-08
12/30	7	90	80	173.4	172.2	1.2	7800	33.0	1.9E-08	21	0.976	1.8E-08

PERMEABILITY AT 20° C: 1.8 x 10^{-8} cm/sec (@ 10 psi effective stress)

MATERIAL pH

EPA METHOD 9045
DATA SHEET

PROJECT:	C-D Systems Solidification Study
PROJECT No.:	SH0751
TESTING DATE:	22-Dec-20
TESTED BY:	JBA/BLM
TRACKING CODE:	E361

	KEMRON SAMPLE No.	MATERIAL pH
1	0751-018 (28 Day) A	13.87
2	0751-018 (28 Day) B	14.06
3	0751-018 (28 Day) C	13.91
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
	AVERAGE:	13.95

UNCONFINED COMPRESSION TEST

ASTM D 2166

PROJECT:	C-D Systems Solidification Study		
PROJECT No.:	SH0751		
SAMPLE No.:	0751-018 (28 Day)		
TESTING DATE:	22-Dec-20	LOADING RATE:	0.0400 in./min
TESTED BY:	JBA/BLM	TRACKING CODE:	E361

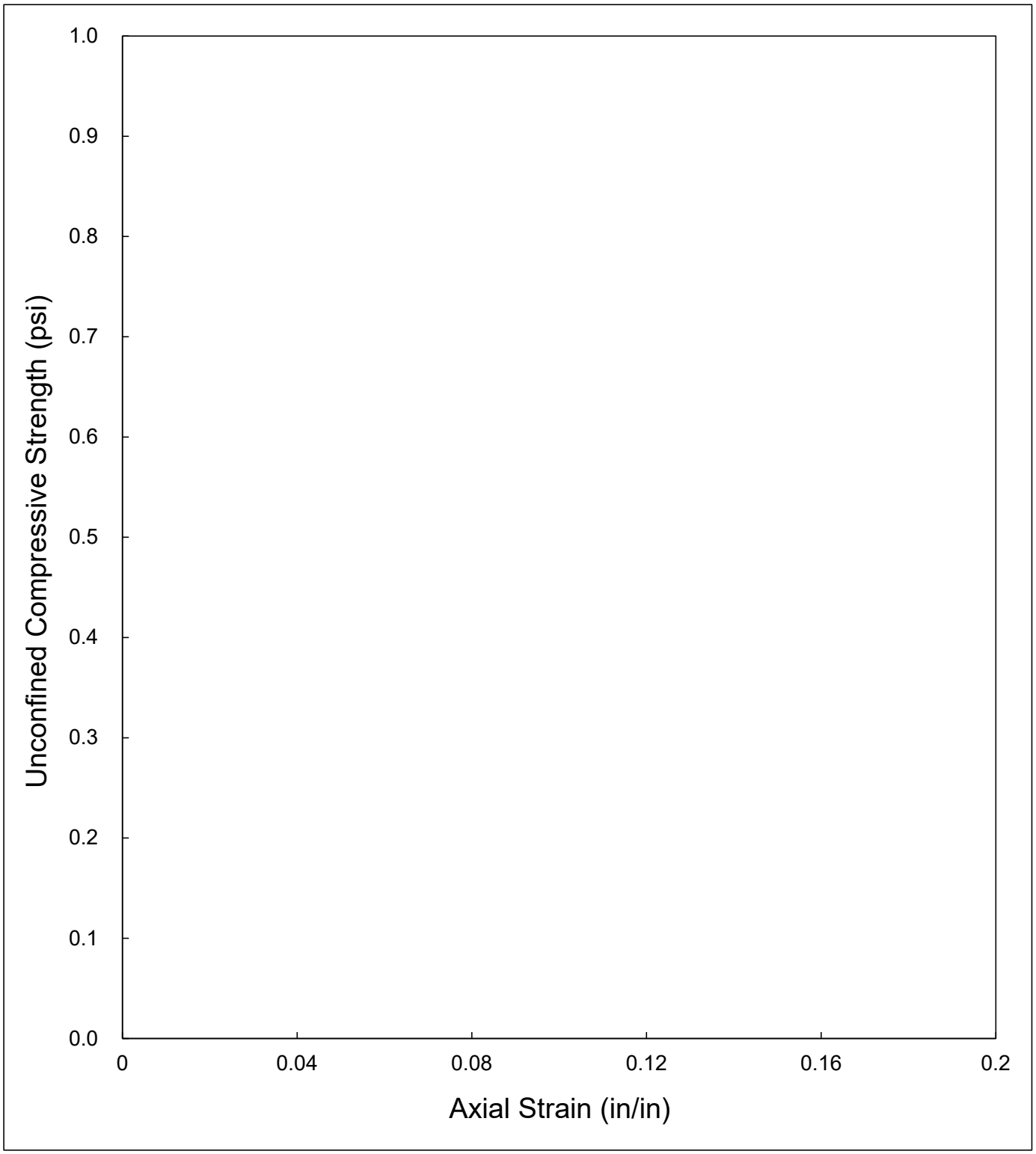
MOISTURE CONTENT (Dry Basis)		
1. MOISTURE TIN NO.		
2. WT MOISTURE TIN (tare weight)		g
3. WT WET SOIL + TARE		g
4. WT DRY SOIL + TARE		g
5. WT WATER, Ww	0.00	g
6. WT DRY SOIL, Ws	0.00	g
7. MOISTURE CONTENT, W	**#DIV/0!**	**%**

SOIL SPECIMEN DIMENSIONS		
	DIAMETER	***LENGTH***
No. 1	in.	in.
No. 2	in.	in.
No. 3	in.	in.
Average	**0.00 in.**	**0.00 in.**

SPECIMEN CONDITIONS		
Initial Specimen WT, Wo	***g***	
Initial Area, Ao	0.00	in²
Initial Volume, Vo	0.00	in³
Initial Bulk Unit Weight,	#DIV/0!	lb/ft³
Initial Dry Unit Weight	#DIV/0!	lb/ft³
15 % Strain (0.15 Lo)	0.00	in.
UCS	#DIV/0!	lb/in²

COMPRESSIVE LOAD (lbs.)	DIAL GAGE READING (in.)	SPECIMEN DEFORMATION (in.)	CORRECTED AREA (in²)	AXIAL STRAIN (in/in)	UNCONFINED COMPRESSIVE STRENGTH (lb/in²)
	0.000	0.000	#DIV/0!	#DIV/0!	#DIV/0!
	0.003	0.003	#DIV/0!	#DIV/0!	#DIV/0!
	0.005	0.005	#DIV/0!	#DIV/0!	#DIV/0!
	0.007	0.007	#DIV/0!	#DIV/0!	#DIV/0!
	0.010	0.010	#DIV/0!	#DIV/0!	#DIV/0!
	0.015	0.015	#DIV/0!	#DIV/0!	#DIV/0!
	0.020	0.020	#DIV/0!	#DIV/0!	#DIV/0!
	0.025	0.025	#DIV/0!	#DIV/0!	#DIV/0!
	0.030	0.030	#DIV/0!	#DIV/0!	#DIV/0!
	0.035	0.035	#DIV/0!	#DIV/0!	#DIV/0!
	0.040	0.040	#DIV/0!	#DIV/0!	#DIV/0!
	0.045	0.045	#DIV/0!	#DIV/0!	#DIV/0!
	0.050	0.050	#DIV/0!	#DIV/0!	#DIV/0!
	0.055	0.055	#DIV/0!	#DIV/0!	#DIV/0!
	0.060	0.060	#DIV/0!	#DIV/0!	#DIV/0!
	0.065	0.065	#DIV/0!	#DIV/0!	#DIV/0!
	0.070	0.070	#DIV/0!	#DIV/0!	#DIV/0!
	0.075	0.075	#DIV/0!	#DIV/0!	#DIV/0!
	0.080	0.080	#DIV/0!	#DIV/0!	#DIV/0!
	0.085	0.085	#DIV/0!	#DIV/0!	#DIV/0!
	0.090	0.090	#DIV/0!	#DIV/0!	#DIV/0!
	0.095	0.095	#DIV/0!	#DIV/0!	#DIV/0!
	0.100	0.100	#DIV/0!	#DIV/0!	#DIV/0!
	0.105	0.105	#DIV/0!	#DIV/0!	#DIV/0!
	0.110	0.110	#DIV/0!	#DIV/0!	#DIV/0!
	0.115	0.115	#DIV/0!	#DIV/0!	#DIV/0!
	0.120	0.120	#DIV/0!	#DIV/0!	#DIV/0!
	0.125	0.125	#DIV/0!	#DIV/0!	#DIV/0!
	0.130	0.130	#DIV/0!	#DIV/0!	#DIV/0!
	0.135	0.135	#DIV/0!	#DIV/0!	#DIV/0!
	0.140	0.140	#DIV/0!	#DIV/0!	#DIV/0!

UNCONFINED COMPRESSION TESTING
Sample No. 0751-018 (28 Day)



UNCONFINED COMPRESSION TEST

ASTM D 2166
SUMMARY OF RESULTS

PROJECT:	C-D Systems Solidification Study		
PROJECT No.:	SH0751		
SAMPLE No.:	0751-018 (28 Day)		
TESTING DATE:	22-Dec-20	LOADING RATE:	0.0400 in./min
TESTED BY:	JBA/BLM	TRACKING CODE:	E361

TESTING PARAMETER AND RESULTS		
MOISTURE CONTENT	#DIV/0!	**%**
BULK UNIT WEIGHT	#DIV/0!	lb/ft³
DRY UNIT WEIGHT	#DIV/0!	lb/ft³
UCS *	#DIV/0!	lb/in²

* UCS - UNCONFINED COMPRESSIVE STRENGTH

Client:	Kemron Environmental Services		
Project Name:	C-D Systems Solidification Study		
Project Location:	---		
GTX #:	312983		
Start Date:	1/4/2021	Tested By:	jm
End Date:	1/5/2021	Checked By:	mcm
Boring	---	Test #:	K10
Sample #:	0751-018 (28 Day)		
Depth:	---		
Visual Description:	Moist, grayish brown solidified soil		

Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter by ASTM D5084 Increasing Tailwater

Sample Type:	Core	Permeant Fluid:	de-aired tap water
Orientation:	Vertical	Cell #:	P3

Sample Preparation: Core weighed and dimensioned, then placed in permeameter at the "as-received" moisture content.

Parameter	Initial	Final
Height, in	2.20	2.20
Diameter, in	2.00	2.00
Area, in^2	3.14	3.14
Volume, in^3	6.9	6.9
Mass, g	239	243
Bulk Density, pcf	132	133
Moisture Content, %	11.6	13.1
Dry Density, pcf	117.9	117.9
Degree of Saturation, %	---	96

B COEFFICIENT DETERMINATION

Cell Pressure, psi:	90	Pressure Increment, psi:	9.6
Sample Pressure, psi:	80	B Coefficient:	0.96

FLOW DATA

Date	Trial #	Pressure, psi		Head readings			Elapsed Time, sec	Gradient	Permeability K, cm/sec	Temp, °C	R_t	Permeability K @ 20 °C, cm/sec
		Cell	Sample	H_1	H_2	H_1-H_2						
1/4	2	90	80	181.1	180.6	0.5	3000	32.4	2.1E-08	21	0.976	2.0E-08
1/4	3	90	80	180.6	180.2	0.4	2700	32.3	1.8E-08	21	0.976	1.8E-08
1/4	4	90	80	180.2	179.3	0.9	5700	32.2	2.0E-08	21	0.976	1.9E-08
1/4	5	90	80	179.3	178.2	1.1	7800	32.1	1.8E-08	21	0.976	1.7E-08

PERMEABILITY AT 20° C: 1.9 x 10^{-8} cm/sec (@ 10 psi effective stress)

MATERIAL pH

EPA METHOD 9045
DATA SHEET

PROJECT:	C-D Systems Solidification Study
PROJECT No.:	SH0751
TESTING DATE:	22-Dec-20
TESTED BY:	JBA/BLM
TRACKING CODE:	E362

	KEMRON SAMPLE No.	MATERIAL pH
1	0751-019 (28 Day) A	13.78
2	0751-019 (28 Day) B	13.57
3	0751-019 (28 Day) C	13.70
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
	AVERAGE:	13.68

UNCONFINED COMPRESSION TEST

ASTM D 2166

PROJECT:	C-D Systems Solidification Study		
PROJECT No.:	SH0751		
SAMPLE No.:	0751-019 (28 Day)		
TESTING DATE:	22-Dec-20	LOADING RATE:	0.0400 in./min
TESTED BY:	JBA/BLM	TRACKING CODE:	E362

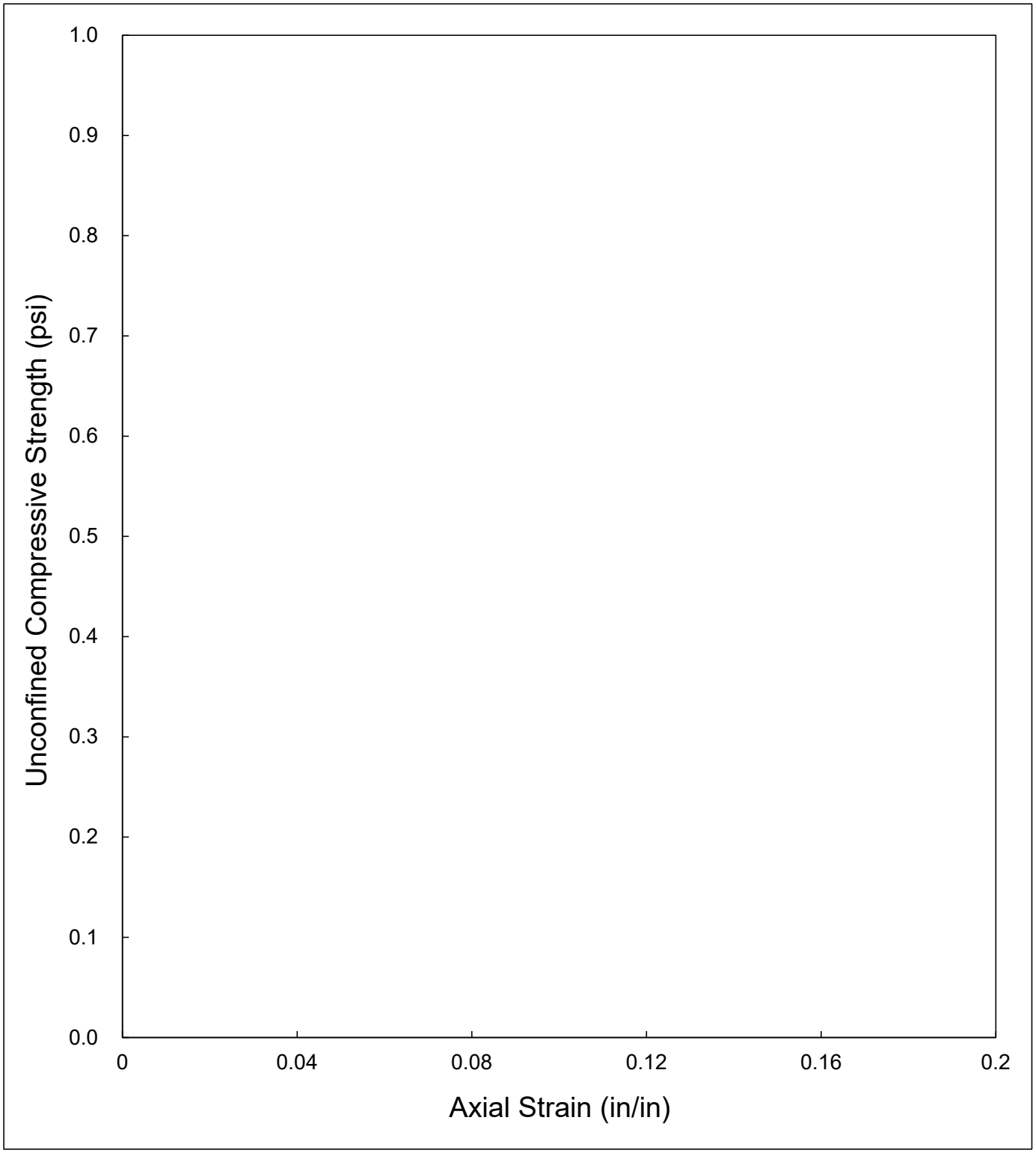
MOISTURE CONTENT (Dry Basis)		
1. MOISTURE TIN NO.		
2. WT MOISTURE TIN (tare weight)		g
3. WT WET SOIL + TARE		g
4. WT DRY SOIL + TARE		g
5. WT WATER, Ww	0.00	g
6. WT DRY SOIL, Ws	0.00	g
7. MOISTURE CONTENT, W	**#DIV/0!**	**%**

SOIL SPECIMEN DIMENSIONS		
	DIAMETER	***LENGTH***
No. 1	in.	in.
No. 2	in.	in.
No. 3	in.	in.
Average	**0.00 in.**	**0.00 in.**

SPECIMEN CONDITIONS		
Initial Specimen WT, Wo	***g***	
Initial Area, Ao	0.00	in²
Initial Volume, Vo	0.00	in³
Initial Bulk Unit Weight,	#DIV/0!	lb/ft³
Initial Dry Unit Weight	#DIV/0!	lb/ft³
15 % Strain (0.15 Lo)	0.00	in.
UCS	#DIV/0!	lb/in²

COMPRESSIVE LOAD (lbs.)	DIAL GAGE READING (in.)	SPECIMEN DEFORMATION (in.)	CORRECTED AREA (in²)	AXIAL STRAIN (in/in)	UNCONFINED COMPRESSIVE STRENGTH (lb/in²)
	0.000	0.000	#DIV/0!	#DIV/0!	#DIV/0!
	0.003	0.003	#DIV/0!	#DIV/0!	#DIV/0!
	0.005	0.005	#DIV/0!	#DIV/0!	#DIV/0!
	0.007	0.007	#DIV/0!	#DIV/0!	#DIV/0!
	0.010	0.010	#DIV/0!	#DIV/0!	#DIV/0!
	0.015	0.015	#DIV/0!	#DIV/0!	#DIV/0!
	0.020	0.020	#DIV/0!	#DIV/0!	#DIV/0!
	0.025	0.025	#DIV/0!	#DIV/0!	#DIV/0!
	0.030	0.030	#DIV/0!	#DIV/0!	#DIV/0!
	0.035	0.035	#DIV/0!	#DIV/0!	#DIV/0!
	0.040	0.040	#DIV/0!	#DIV/0!	#DIV/0!
	0.045	0.045	#DIV/0!	#DIV/0!	#DIV/0!
	0.050	0.050	#DIV/0!	#DIV/0!	#DIV/0!
	0.055	0.055	#DIV/0!	#DIV/0!	#DIV/0!
	0.060	0.060	#DIV/0!	#DIV/0!	#DIV/0!
	0.065	0.065	#DIV/0!	#DIV/0!	#DIV/0!
	0.070	0.070	#DIV/0!	#DIV/0!	#DIV/0!
	0.075	0.075	#DIV/0!	#DIV/0!	#DIV/0!
	0.080	0.080	#DIV/0!	#DIV/0!	#DIV/0!
	0.085	0.085	#DIV/0!	#DIV/0!	#DIV/0!
	0.090	0.090	#DIV/0!	#DIV/0!	#DIV/0!
	0.095	0.095	#DIV/0!	#DIV/0!	#DIV/0!
	0.100	0.100	#DIV/0!	#DIV/0!	#DIV/0!
	0.105	0.105	#DIV/0!	#DIV/0!	#DIV/0!
	0.110	0.110	#DIV/0!	#DIV/0!	#DIV/0!
	0.115	0.115	#DIV/0!	#DIV/0!	#DIV/0!
	0.120	0.120	#DIV/0!	#DIV/0!	#DIV/0!
	0.125	0.125	#DIV/0!	#DIV/0!	#DIV/0!
	0.130	0.130	#DIV/0!	#DIV/0!	#DIV/0!
	0.135	0.135	#DIV/0!	#DIV/0!	#DIV/0!
	0.140	0.140	#DIV/0!	#DIV/0!	#DIV/0!

UNCONFINED COMPRESSION TESTING
Sample No. 0751-019 (28 Day)



UNCONFINED COMPRESSION TEST

ASTM D 2166
SUMMARY OF RESULTS

PROJECT:	C-D Systems Solidification Study		
PROJECT No.:	SH0751		
SAMPLE No.:	0751-019 (28 Day)		
TESTING DATE:	22-Dec-20	LOADING RATE:	0.0400 in./min
TESTED BY:	JBA/BLM	TRACKING CODE:	E362

TESTING PARAMETER AND RESULTS		
MOISTURE CONTENT	#DIV/0!	**%**
BULK UNIT WEIGHT	#DIV/0!	lb/ft³
DRY UNIT WEIGHT	#DIV/0!	lb/ft³
UCS *	#DIV/0!	lb/in²

* UCS - UNCONFINED COMPRESSIVE STRENGTH

Client:	Kemron Environmental Services		
Project Name:	C-D Systems Solidification Study		
Project Location:	---		
GTX #:	312983		
Start Date:	1/4/2021	Tested By:	jm
End Date:	1/5/2021	Checked By:	mcm
Boring	---	Test #:	K11
Sample #:	0751-019 (28 Day)		
Depth:	---		
Visual Description:	Moist, grayish brown solidified soil		

Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter by ASTM D5084 Increasing Tailwater

Sample Type:	Core	Permeant Fluid:	de-aired tap water
Orientation:	Vertical	Cell #:	K4

Sample Preparation: Core weighed and dimensioned, then placed in permeameter at the "as-received" moisture content.

Parameter	Initial	Final
Height, in	2.11	2.11
Diameter, in	2.00	2.00
Area, in^2	3.14	3.14
Volume, in^3	6.6	6.6
Mass, g	229	232
Bulk Density, pcf	131	133
Moisture Content, %	11.7	13.3
Dry Density, pcf	117.5	117.5
Degree of Saturation, %	---	96

B COEFFICIENT DETERMINATION

Cell Pressure, psi:	90	Pressure Increment, psi:	9.6
Sample Pressure, psi:	80	B Coefficient:	0.96

FLOW DATA

Date	Trial #	Pressure, psi		Head readings			Elapsed Time, sec	Gradient	Permeability K, cm/sec	Temp, °C	R_t	Permeability K @ 20 °C, cm/sec
		Cell	Sample	H_1	H_2	H_1-H_2						
1/4	3	90	80	188.2	187.6	0.6	2700	35.1	2.5E-08	21	0.976	2.5E-08
1/4	4	90	80	187.6	187.1	0.5	2400	35.0	2.4E-08	21	0.976	2.3E-08
1/4	5	90	80	187.1	186.5	0.6	3000	34.9	2.3E-08	21	0.976	2.2E-08
1/4	6	90	80	186.5	185.8	0.7	3600	34.8	2.2E-08	21	0.976	2.2E-08

PERMEABILITY AT 20° C: 2.3 x 10^{-8} cm/sec (@ 10 psi effective stress)

MATERIAL pH

EPA METHOD 9045
DATA SHEET

PROJECT:	C-D Systems Solidification Study
PROJECT No.:	SH0751
TESTING DATE:	22-Dec-20
TESTED BY:	JBA/BLM
TRACKING CODE:	E363

	KEMRON SAMPLE No.	MATERIAL pH
1	0751-020 (28 Day) A	13.61
2	0751-020 (28 Day) B	13.54
3	0751-020 (28 Day) C	13.61
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
	AVERAGE:	13.59

UNCONFINED COMPRESSION TEST

ASTM D 2166

PROJECT:	C-D Systems Solidification Study		
PROJECT No.:	SH0751		
SAMPLE No.:	0751-020 (28 Day)		
TESTING DATE:	22-Dec-20	LOADING RATE:	0.0400 in./min
TESTED BY:	JBA/BLM	TRACKING CODE:	E363

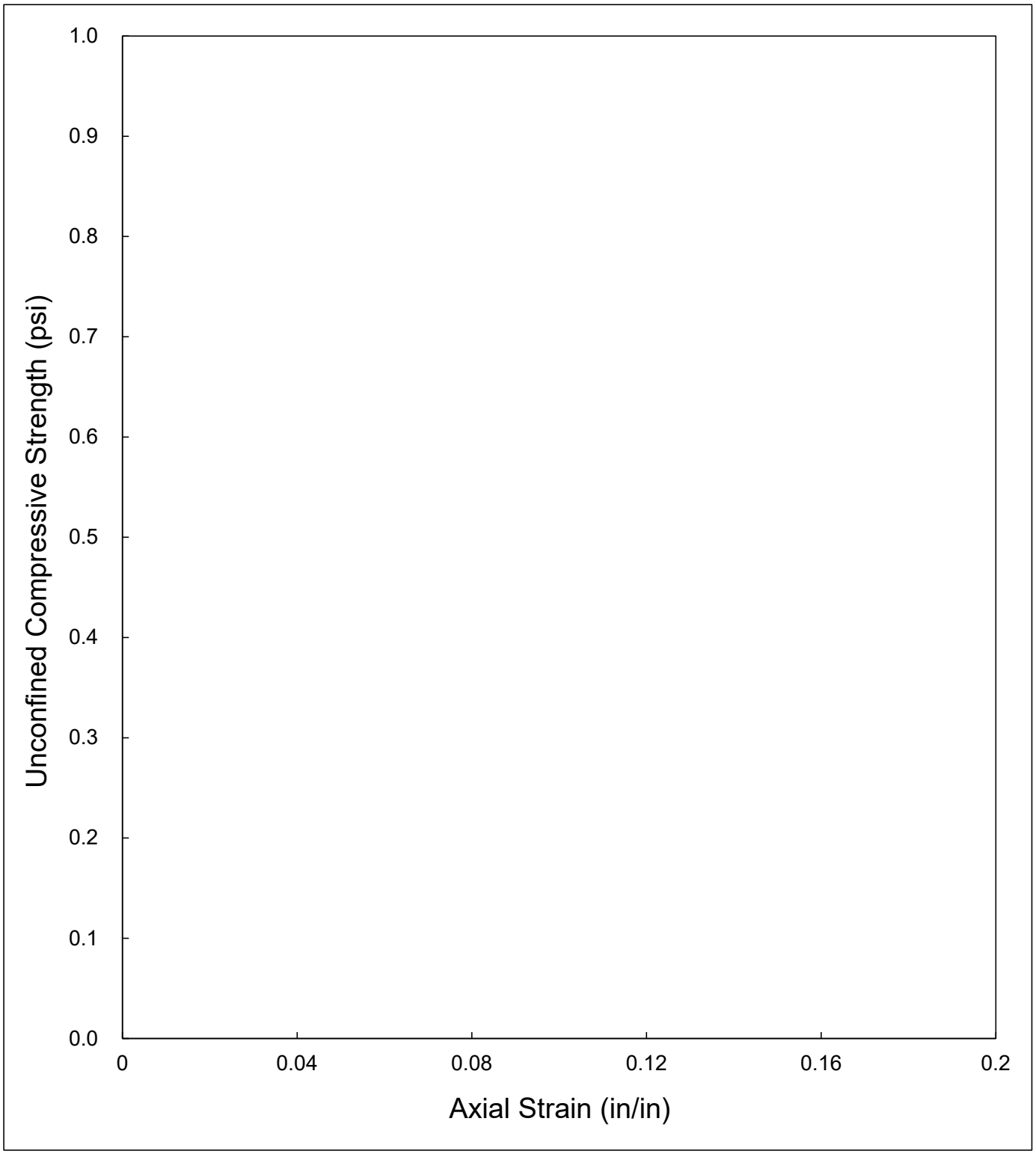
MOISTURE CONTENT (Dry Basis)		
1. MOISTURE TIN NO.		
2. WT MOISTURE TIN (tare weight)		g
3. WT WET SOIL + TARE		g
4. WT DRY SOIL + TARE		g
5. WT WATER, Ww	0.00	g
6. WT DRY SOIL, Ws	0.00	g
7. MOISTURE CONTENT, W	**#DIV/0!**	**%**

SOIL SPECIMEN DIMENSIONS		
	DIAMETER	***LENGTH***
No. 1	in.	in.
No. 2	in.	in.
No. 3	in.	in.
Average	**0.00 in.**	**0.00 in.**

SPECIMEN CONDITIONS		
Initial Specimen WT, Wo	***g***	
Initial Area, Ao	0.00	in²
Initial Volume, Vo	0.00	in³
Initial Bulk Unit Weight,	#DIV/0!	lb/ft³
Initial Dry Unit Weight	#DIV/0!	lb/ft³
15 % Strain (0.15 Lo)	0.00	in.
UCS	#DIV/0!	lb/in²

COMPRESSIVE LOAD (lbs.)	DIAL GAGE READING (in.)	SPECIMEN DEFORMATION (in.)	CORRECTED AREA (in²)	AXIAL STRAIN (in/in)	UNCONFINED COMPRESSIVE STRENGTH (lb/in²)
	0.000	0.000	#DIV/0!	#DIV/0!	#DIV/0!
	0.003	0.003	#DIV/0!	#DIV/0!	#DIV/0!
	0.005	0.005	#DIV/0!	#DIV/0!	#DIV/0!
	0.007	0.007	#DIV/0!	#DIV/0!	#DIV/0!
	0.010	0.010	#DIV/0!	#DIV/0!	#DIV/0!
	0.015	0.015	#DIV/0!	#DIV/0!	#DIV/0!
	0.020	0.020	#DIV/0!	#DIV/0!	#DIV/0!
	0.025	0.025	#DIV/0!	#DIV/0!	#DIV/0!
	0.030	0.030	#DIV/0!	#DIV/0!	#DIV/0!
	0.035	0.035	#DIV/0!	#DIV/0!	#DIV/0!
	0.040	0.040	#DIV/0!	#DIV/0!	#DIV/0!
	0.045	0.045	#DIV/0!	#DIV/0!	#DIV/0!
	0.050	0.050	#DIV/0!	#DIV/0!	#DIV/0!
	0.055	0.055	#DIV/0!	#DIV/0!	#DIV/0!
	0.060	0.060	#DIV/0!	#DIV/0!	#DIV/0!
	0.065	0.065	#DIV/0!	#DIV/0!	#DIV/0!
	0.070	0.070	#DIV/0!	#DIV/0!	#DIV/0!
	0.075	0.075	#DIV/0!	#DIV/0!	#DIV/0!
	0.080	0.080	#DIV/0!	#DIV/0!	#DIV/0!
	0.085	0.085	#DIV/0!	#DIV/0!	#DIV/0!
	0.090	0.090	#DIV/0!	#DIV/0!	#DIV/0!
	0.095	0.095	#DIV/0!	#DIV/0!	#DIV/0!
	0.100	0.100	#DIV/0!	#DIV/0!	#DIV/0!
	0.105	0.105	#DIV/0!	#DIV/0!	#DIV/0!
	0.110	0.110	#DIV/0!	#DIV/0!	#DIV/0!
	0.115	0.115	#DIV/0!	#DIV/0!	#DIV/0!
	0.120	0.120	#DIV/0!	#DIV/0!	#DIV/0!
	0.125	0.125	#DIV/0!	#DIV/0!	#DIV/0!
	0.130	0.130	#DIV/0!	#DIV/0!	#DIV/0!
	0.135	0.135	#DIV/0!	#DIV/0!	#DIV/0!
	0.140	0.140	#DIV/0!	#DIV/0!	#DIV/0!

UNCONFINED COMPRESSION TESTING
Sample No. 0751-020 (28 Day)



UNCONFINED COMPRESSION TEST

ASTM D 2166
SUMMARY OF RESULTS

PROJECT:	C-D Systems Solidification Study		
PROJECT No.:	SH0751		
SAMPLE No.:	0751-020 (28 Day)		
TESTING DATE:	22-Dec-20	LOADING RATE:	0.0400 in./min
TESTED BY:	JBA/BLM	TRACKING CODE:	E363

TESTING PARAMETER AND RESULTS		
MOISTURE CONTENT	#DIV/0!	**%**
BULK UNIT WEIGHT	#DIV/0!	lb/ft³
DRY UNIT WEIGHT	#DIV/0!	lb/ft³
UCS *	#DIV/0!	lb/in²

* UCS - UNCONFINED COMPRESSIVE STRENGTH

Client:	Kemron Environmental Services		
Project Name:	C-D Systems Solidification Study		
Project Location:	---		
GTX #:	312983		
Start Date:	1/4/2021	Tested By:	jm
End Date:	1/5/2021	Checked By:	mcm
Boring	---	Test #:	K12
Sample #:	0751-020 (28 Day)		
Depth:	---		
Visual Description:	Moist, grayish brown solidified soil		

Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter by ASTM D5084 Increasing Tailwater

Sample Type:	Core	Permeant Fluid:	de-aired tap water
Orientation:	Vertical	Cell #:	P12

Sample Preparation: Core weighed and dimensioned, then placed in permeameter at the "as-received" moisture content.

Parameter	Initial	Final
Height, in	1.94	1.94
Diameter, in	2.00	2.00
Area, in^2	3.14	3.14
Volume, in^3	6.1	6.1
Mass, g	210	214
Bulk Density, pcf	131	133
Moisture Content, %	11.3	13.0
Dry Density, pcf	117.9	117.9
Degree of Saturation, %	---	95

B COEFFICIENT DETERMINATION

Cell Pressure, psi:	90	Pressure Increment, psi:	9.6
Sample Pressure, psi:	80	B Coefficient:	0.96

FLOW DATA

Date	Trial #	Pressure, psi		Head readings			Elapsed Time,	Gradient	Permeability K,	Temp,		Permeability K @ 20 °C,
		Cell	Sample	H_1	H_2	H_1-H_2	sec		cm/sec	°C	R_t	cm/sec
1/4	2	90	80	165.2	164.8	0.4	1800	33.5	2.8E-08	21	0.976	2.7E-08
1/4	3	90	80	164.8	164.2	0.6	2400	33.4	3.0E-08	21	0.976	2.9E-08
1/4	4	90	80	164.2	163.6	0.6	2400	33.3	3.0E-08	21	0.976	2.9E-08
1/4	5	90	80	163.6	162.9	0.7	3300	33.2	2.6E-08	21	0.976	2.5E-08

PERMEABILITY AT 20° C: 2.8 x 10^{-8} cm/sec (@ 10 psi effective stress)

1204 Springdale Street
Mount Horeb, WI 53572
(608) 437-7413

December 21, 2021

Ms. Charis Gehret
Premier Magnesia, LLC
1275 Drummers Ln
Wayne, PA 19373

Subject: AECOM – C&D Power.

Ms. Gehret:

Ursus Remediation Testing & Technologies, LLC (Ursus) is pleased to provide Premier Magnesia LLC, (Premier) this report for treatability testing of sediment from the AECOM - C&D site.

OBJECTIVE

The objective of the study was to evaluate the effectiveness of EnviroBlend® to stabilize cadmium and lead, and pass Paint Filter for disposal in a non-hazardous waste landfill.

BACKGROUND

Three sediment sample were received for the study on August 20, 2021. A description of the samples and comments are shown in Table 1.

Table 1.
Samples Received for Treatability Testing

Sample Name	Sample Date	Matrix	Comments
Comp-1	8/16/2021	Sediment	Untreated Material
Comp-2	8/16/2021	Sediment	Untreated Material
Comp-3	8/16/2021	Sediment	Untreated Material

MATERIAL & METHODOLOGY

TCLP metal testing was performed using screening methodologies. The TCLP screening methodology employed uses the same guidelines as prescribed by EPA Method SW-846

1311, except the amount of sample is scaled down to one-tenth the prescribed sample weight and extraction solution volume. Paint Filter testing was analyzed by EPA Method SW-846 9095B

Screening results are not intended for regulatory compliance.

RESULTS

Total metals of concern are shown in Table 2.

Table 2.
Total Metals

Total Results (mg/kg, dry wt.)			
Sample Name	**Cadmium**	**Lead**	**Percent Solids**
Comp-1	15.9	1,120	63%
Comp-2	<8.08	35.4	46%
Comp-3	<5.71	39.6	67%

Ursus performed the TCLP test to determine if the sediment exceeded the hazardous waste criterion. The sediment was tested untreated and treated with EnviroBlend® CS at 2%, 3% and 4% by weight. Untreated and treated sediment was also tested by the Paint Filter test. Untreated and treated results were compared to the TCLP Hazardous Waste Criterion.

The untreated Comp-2 and Comp-3 samples did not exceed TCLP limits for the metals of concern. Comp-2 did however fail the Paint Filter test (Table 3). No further testing was performed on samples Comp-2 and Comp-3.

Untreated Comp-1 did exceed the TCLP limit for lead (Table 3). A 2% dosage of EnviroBlend® CS lowered the lead concentration below TCLP Hazardous Waste Criterion of 5 mg/L. EnviroBlend® CS dosages of 3% and 4% further lowered cadmium and lead below their respective detection limit. Untreated Comp-1 passed Paint Filter as did the EnviroBlend® CS treated samples.

Table 3.
TCLP Metals and Paint Filter.

Sample Name	Dosage		Screening Leaching Results				
	Chemical	Percentage	Solution	Final pH	Cadmium mg/L	Lead mg/L	Paint Filter
TCLP Limit	-	-	-	-	*1*	*5*	*Pass/Fail*
Comp-1	Untreated	-	TCLP 1	5.05	0.13	5.70	Pass
	EnviroBlend® CS	2%	TCLP 1	6.20	0.086	1.28	Pass
		3%	TCLP 1	9.21	<0.024	<0.067	Pass
		4%	TCLP 1	9.93	<0.024	<0.067	Pass
Comp-2	Untreated	-	TCLP 1	5.07	<0.024	0.16	Fail
Comp-3	Untreated	-	TCLP 1	5.05	<0.024	<0.067	Pass

Sincerely,

Andrew Wenzel
Principal

Appendix F Data Usability Summary Reports

VALIDATA
Chemical Services, Inc.
2159 Wynnton Pointe, Duluth, GA 30097
(770) 232-0130
(770) 232-5082 (Fax)
www.datavalidator.com

DATA USABILITY SUMMARY REPORT

COMPANY:	AECOM Technical Services Northeast, Inc.
PROJECT NAME:	C&D Power Systems #336001
CONTRACTED LAB:	Eurofins Test America, Buffalo
QA/QC LEVEL:	DUSR
ANALYTICAL METHOD(S):	SW846 and EPA Methods
VALIDATION GUIDELINES:	*USEPA Region II data validation SOPs (VOA HW-24 Rev.4, SVOC HW-22 Rev.5, PEST-HW-44, Rev 1.1, PCB HW-37a Rev. 0, METALS_SOP_HW3a-ICP-AES Rev 1.1 and HW3c-Hg-CN, Rev. 1), USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review,* **2008**; *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review,***2010**; NYDEC *Guidelines for Sampling and Analysis of PFAS,* January 2020, Professional Judgment
SAMPLE MATRIX:	Water
TYPES OF ANALYSES:	Volatile Organic Compounds (VOC) Semivolatile Organic Compounds (SVOC), Pesticides (Pest), Polychlorinated Hydrocarbons (PCBs), Total Metals, Dissolved Metals, Total Mercury, Total Cyanide, Fluoride
DATA REVIEWER(S):	Amy L. Hogan
SDG NUMBER:	480-165713-1
SAMPLING DATE(S):	January 28, 2020

SAMPLES:

Client Sample ID	Laboratory ID	VOC	SVOC
MW-14-01282020	480-165713-1	X	X
MW-14-DUP-01282020	480-165713-6	X	X
MW-14-01282020MS	480-165713-1MS	X	X
MW-14-01282020MSD	480-165713-1MSD	X	X

Client Sample ID	Laboratory ID	PEST	PCB
MW-14-01282020	480-165713-1	X	X
MW-14-DUP-01282020	480-165713-6	X	X
MW-14-01282020MS	480-165713-1MS	X	X
MW-14-01282020MSD	480-165713-1MSD	X	X

Client Sample ID	Laboratory ID	T. MET.	D. MET.
MW-14-01282020	480-165713-1	X	X
MW-14-DUP-01282020	480-165713-6	X	
MW-14-01282020MS	480-165713-1MS	X	X
MW-14-01282020MSD	480-165713-1MSD	X	X

Client Sample ID	Laboratory ID	MERCURY	CYANIDE
MW-14-01282020	480-165713-1	X	X
MW-14-DUP-01282020	480-165713-6	X	X
MW-14-01282020MS	480-165713-1MS	X	X
MW-14-01282020MSD	480-165713-1MSD	X	X

Client Sample ID	Laboratory ID	FLUORIDE
MW-14-01282020	480-165713-1	X
MW-14-DUP-01282020	480-165713-6	X
MW-14-01282020MS	480-165713-1MS	X
MW-14-01282020MSD	480-165713-1MSD	X

Suffix Codes: DL= DILUTION, MS = MATRIX SPIKE,
MSD = MATRIX SPIKE DUPLICATE, RE = REANALYSIS

Qualifier	Definition
U	The analyte was not detected and was reported as less than the LOD or as defined by the customer. The LOD has been adjusted for any dilution or concentration of the sample.
J	The reported result was an estimated value with an unknown bias.
J+	The result was an estimated quantity, but the result may be biased high.
J-	The result was an estimated quantity, but the result may be biased low.
N	The analysis indicates the presence of an analyte for which there was presumptive evidence to make a "tentative identification."
NJ	The analyte has been “tentatively identified” or “presumptively” as present and the associated numerical value was the estimated concentration in the sample.
UJ	The analyte was not detected and was reported as less than the LOD or as defined by the customer. However, the associated numerical value is approximate.
X	The sample results (including non-detects) were affected by serious deficiencies in the ability to analyze the sample and to meet published method and project quality control criteria. The presence or absence of the analyte cannot be substantiated by the data provided. Acceptance or rejection of the data should be decided by the project team (which should include a project chemist), but exclusion of the data is recommended.

DATA USABILITY SUMMARY

Eurofins Test America, Buffalo – 480-175713-1

VOLATILE ORGANICS

SUMMARY

I.) General:

The analyses for Volatile Organics were performed per SW846 Method 8260C.

II.) Overall Assessment of Data:

All laboratory data were acceptable with qualifications.

II.) Holding Times:

All Holding Time criteria were met. No data qualification was necessary.

IV.) GC/MS Tuning:

All GC/MS Tuning criteria were met. No data qualification was necessary.

V.) Calibration:

Initial Calibration:

All Initial Calibration criteria were met. No data qualification was necessary.

Initial Calibration Verification:

All Initial Calibration Verification criteria were met. No data qualification was necessary.

Continuing Calibration:

The Percent Difference (%D) for the standards run on 2/2/20 at 21:16 on instrument HP5973N was -23.36% for carbon disulfide, which exceeded the 20% QC limit. The non-detect carbon disulfide results for both samples were qualified as estimated (UJ).

It was noted by the validator that the lab did not analyze a closing calibration standard. Since the samples were all analyzed within the 12-hour analytical clock of the submitted calibration and citing professional judgment, the validator determined that data qualification based on the closing calibration standard absence was not necessary.

VI.) Blanks:

Method Blanks:

There were no detections in the method blanks for this SDG. No data qualification was necessary.

Equipment Blanks:

There were no detections in the equipment blank submitted in association with this SDG. No data qualification was necessary.

Field Blanks:

There was no field blank submitted in association with this SDG. No data qualification was necessary.

Trip Blank:

There were no detections in the trip blank submitted in association with this SDG. No data qualification was necessary.

VII.) Surrogate Recoveries:

All Surrogate Recovery criteria were met. No data qualification was necessary.

VIII.) Laboratory Control Samples (LCS):

One LCS was analyzed by the laboratory for this SDG. All criteria were met. No data qualification was necessary.

IX.) Matrix Spike / Matrix Spike Duplicate (MS / MSD):

MS / MSD analyses were performed using SDG sample MW-14-01282020. The following Percent Recoveries (%Rs) all exceeded the laboratory QC limits:

Compound	MS, %R	MSD, %R
4-methyl-2-pentanone	137%	134%
2-hexanone	140%	133%
1,1,2,2-tetrachloroethane	124%	

In addition to the high %Rs, the Relative Percent Differences (RPDs) exceeded the laboratory QC limit for the following compounds:

chloromethane	48%
bromomethane	49%

vinyl chloride	52%
chloroethane	48%
trichlorofluoromethane	51%
dichlorodifluoromethane	42%

Data qualification based on MS / MSD criteria alone was not required, so no data qualification was necessary for the other listed compounds.

X.) Field Duplicates:

One set of field duplicate samples (MW-14-01282020 / MW-14-DUP-01282020) was identified as part of this SDG. There were no calculable results for this fraction of the SDG. No data qualification was necessary.

XI.) TCL Compound Identification:

All TCL Compound Identification criteria were met. No data qualification was necessary.

XII.) Internal Standards Performance (ISTD):

All ISTD area count criteria were met. No data qualification was necessary.

XIII.) Compound Quantitation and Reported Contract Required Quantitation Limits (CRQL):

All CRQL criteria were met. No data qualification was necessary.

SEMIVOLATILE ORGANICS

SUMMARY

I.) General:

The analyses for Semivolatile Organics were performed per SW846 Method 8270D.

II.) Overall Assessment of Data:

All laboratory data were acceptable with qualifications.

II.) Holding Times:

All Holding Time criteria were met. No data qualification was necessary.

IV.) GC/MS Tuning:

All GC/MS Tuning criteria were met. No data qualification was necessary.

V.) Calibration:

Initial Calibration:

All Initial Calibration criteria were met. No data qualification was necessary.

Initial Calibration Verification:

All Initial Calibration Verification criteria were met. No data qualification was necessary.

Continuing Calibration:

The Percent Difference (%D) for the standards run on 2/4/20 at 12:23 on instrument HP5974 was 23.0% for 4-nitrophenol, which exceeded the 20% QC limit. The non-detect results for 4-nitrophenol for both samples were qualified as estimated (UJ).

VI.) Blanks:

Method Blanks:

There were no detections in the associated method blank. No data qualification was necessary.

Equipment Blanks:

There were no detections in the equipment blank submitted in association with this SDG. No data qualification was necessary.

Field Blanks:

There was no field blank submitted in association with this SDG. No data qualification was necessary.

VII.) Surrogate Recoveries:

The Percent Recovery (%R) for 2,4,6-tribromophenol was 128% for the LCS, which exceeded the QC limits. Since the listed sample is a laboratory QC sample, no data qualification was necessary.

VIII.) Laboratory Control Samples (LCS):

One LCS was analyzed by the laboratory for this SDG. The Percent Recovery (%R) for carbazole (124%) exceeded the laboratory QC limits. Data qualification based on LCS criteria alone was not required. No data qualification was necessary.

IX.) Matrix Spike / Matrix Spike Duplicate (MS / MSD):

MS / MSD analyses were performed using SDG sample MW-14-01282020. All criteria were met.

No data qualification was necessary.

X.) Field Duplicates:

One set of field duplicate samples (MW-14-01282020 / MW-14-DUP-01282020) was identified as part of this SDG. There were no calculable results. No data qualification was necessary.

XI.) TCL Compound Identification:

All TCL Compound Identification criteria were met. No data qualification was necessary.

XII.) Internal Standards Performance (ISTD):

All ISTD area count criteria were met. No data qualification was necessary.

XIII.) Compound Quantitation and Reported Contract Required Quantitation Limits (CRQL):

All CRQL criteria were met. No data qualification was necessary.

PESTICIDES

SUMMARY

I.) General:

The analyses for Pesticides were performed per SW846 Method 8081B.

II.) Overall Assessment of Data:

All laboratory data were acceptable with qualifications.

II.) Holding Times:

All Holding Time criteria were met. No data qualification was necessary.

IV.) Instrument Performance:

All Instrument Performance criteria were met. No data qualification was necessary.

V.) Calibration:

Initial Calibration:

All Initial Calibration criteria were met. No data qualification was necessary.

Continuing Calibration:

The Percent Differences (%Ds) for the standards run on 2/4/20 at 09:20 on column II of instrument HP6890-25 exceeded the 20% QC limit for the following compounds:

Toxaphene (#2)	-20.2%
Toxaphene (#4)	-20.4%
Toxaphene (#5)	-25.6%

The non-detect Toxaphene results for both samples were qualified as estimated (UJ).

A review of the run log indicates that the CCV was not analyzed after every 10 samples as recommended by the guidance and that a closing CCV was also not analyzed. It was noted that the lab did analyze a CCV every 20 samples as recommended by the method. Since the samples were all analyzed within the 12-hour analytical clock of the submitted calibration and citing professional judgment, the validator determined that data qualification based on the closing calibration standard absence was not necessary.

VI.) Blanks:

Method Blanks:

Delta BHC (0.0209 ug/L), gamma BHC (0.0111 ug/L) and methoxychlor (0.02020 ug/L) were detected in the associated method blank. Since the blank results were below the RL, the positive gamma BHC result for sample MW-14-01282020, which was less than the RL, was qualified as undetected (U) with the result being raised to the RL. Since the results for the other compounds were non-detect for the samples, no further data qualification was necessary.

Equipment Blanks:

Delta BHC (0.017 ug/L) and gamma BHC (0.011 ug/L) were detected in the associated method blank. Since the blank results were below the RL, the positive gamma BHC result for sample MW-14-01282020, which was less than the RL, was qualified as undetected (U) with the result being raised to the RL. Since the results for the other compound were non-detect for the samples, no further data qualification was necessary.

Field Blanks:

There was no field blank submitted in association with this SDG. No data qualification was necessary.

VII.) Surrogate Recoveries:

All Surrogate Recovery criteria were met. No data qualification was necessary.

VIII.) Laboratory Control Samples (LCS):

One LCS was analyzed by the laboratory for this SDG. All criteria were met. No data qualification was necessary.

IX.) Matrix Spike / Matrix Spike Duplicate (MS / MSD):

MS / MSD analyses were performed using SDG sample MW-14-01282020. All criteria were met. No data qualification was necessary.

X.) Field Duplicates:

One set of field duplicate samples (MW-14-01282020 / MW-14-DUP-01282020) was identified as part of this SDG. The absolute difference for aldrin was less than the RL, so no data qualification was necessary.

XI.) TCL Compound Identification:

The Column Relative Percent Difference (RPD) exceeded the 25% QC limit for the following samples and compounds:

MW-14-01282020	4,4'-DDT	25.5%
MW-14-DUP-01282020	aldrin	28.7%

The results for these compounds in the listed samples were qualified as estimated (J).

XII.) Internal Standards Performance (ISTD):

All ISTD area count criteria were met. No data qualification was necessary.

XIII.) Compound Quantitation and Reported Contract Required Quantitation Limits (CRQL):

All CRQL criteria were met. No data qualification was necessary.

POLYCHLORINATED BIPHENYLS (PCB)

SUMMARY

I.) General:

The analyses for Polychlorinated Biphenyls (PCB) were performed per SW846 Method 8082A.

II.) Overall Assessment of Data:

All laboratory data were acceptable with qualifications.

II.) Holding Times:

All Holding Time criteria were met. No data qualification was necessary.

IV.) Instrument Performance:

All Instrument Performance criteria were met. No data qualification was necessary.

V.) Calibration:

Initial Calibration:

All Initial Calibration criteria were met. No data qualification was necessary.

Continuing Calibration:

The Percent Differences (%Ds) for the standards run on 2/5/20 at 19:15 on instrument HP6890-7 exceeded the 25% opening CCV QC limit for the following compounds:

Compound	Col. I, %R	Col. II, %D
Aroclor 1016 (3)	30.2%	
Aroclor 1016 (4)	30.2%	
Aroclor 1260 (2)		45.9%
Aroclor 1260 (4)		41.0%
Aroclor 1260 (5)		41.2%

The results for Aroclor 1016 and Aroclor 1260 for the SDG samples, which were all non-detects, were qualified as estimated (UJ).

The Percent Differences (%Ds) for the standards run on 2/5/20 at 23:48 on instrument HP6890-7 exceeded the 50% closing CCV QC limit for the following compounds:

Compound	Col. I, %R	Col. II, %D
Aroclor 1016 (2)		64.0%
Aroclor 1016 (3)	74.1%	60.1%
Aroclor 1016 (4)		53.0%
Aroclor 1260 (1)	51.2%	77.1%
Aroclor 1260 (2)		99.1%
Aroclor 1260 (3)	50.3%	72.0%
Aroclor 1260 (4)	69.2%	89.2%
Aroclor 1260 (5)		94.9%

The results for Aroclor 1016 and Aroclor 1260 for the SDG samples, which were all non-detects, were qualified as estimated (UJ).

A review of the run log indicates that the CCV was not analyzed after every 10 samples as recommended by the guidance and that a closing CCV was also not analyzed. It was noted that

the lab did analyze a CCV every 20 samples as recommended by the method. Since the samples were all analyzed within the 12-hour analytical clock of the submitted calibration and citing professional judgment, the validator determined that data qualification based on the closing calibration standard absence was not necessary.

VI.) Blanks:

Method Blanks:

There were no detections in the associated method blank. No data qualification was necessary.

Equipment Blanks:

There were no detections in the equipment blank submitted in association with this SDG. No data qualification was necessary.

Field Blanks:

There was no field blank submitted in association with this SDG. No data qualification was necessary.

VII.) Surrogate Recoveries:

All Surrogate Recovery criteria were met. No data qualification was necessary.

VIII.) Laboratory Control Samples (LCS):

One LCS was analyzed by the laboratory for this SDG. All criteria were met. No data qualification was necessary.

IX.) Matrix Spike / Matrix Spike Duplicate (MS / MSD):

MS / MSD analyses were performed using SDG sample MW-14-01282020. All criteria were met. No data qualification was necessary.

X.) Field Duplicates:

One set of field duplicate samples (MW-14-01282020 / MW-14-DUP-01282020) was identified as part of this SDG. There were no calculable results. No data qualification was necessary.

XI.) TCL Compound Identification:

All TCL Compound Identification criteria were met. No data qualification was necessary.

XII.) Internal Standards Performance (ISTD):

All ISTD area count criteria were met. No data qualification was necessary.

XIII.) Compound Quantitation and Reported Contract Required Quantitation Limits (CRQL):

All CRQL criteria were met. No data qualification was necessary.

TOTAL METALS

SUMMARY

I.) General:

The analyses for Total Metals were performed per SW846 Method 6010C.

II.) Overall Assessment of Data:

All laboratory data were acceptable with qualifications.

III.) Holding Times:

All Holding Time criteria were met. No data qualification was necessary.

IV.) Calibration:

All Initial and Continuing Calibration criteria were met. No data qualification was necessary.

V.) CRDL standards:

All CRDL standards criteria were met. No data qualification was required.

VI.) Blanks:

Calibration Blanks:

Iron (0.0435 mg/L, 0.0193 mg/L, 0.0204 mg/L) was detected in the associated calibration blanks. Since the blank results were less than the RL and the positive iron results for the samples were greater than the RL, no data qualification was necessary.

Preparation Blanks:

Manganese (0.000850 mg/L) and zinc (0.00165 mg/L) were detected in the associated method blank. Since the blank results were less than the RL, the positive results for these analytes in the samples, which were less than the RL, were qualified as undetected (U) with the result being raised to the RL.

Equipment Blanks:

Copper (0.0021 mg/L), manganese (0.0083 mg/L) and zinc (0.0018 mg/L) were detected in the associated equipment blank submitted with this SDG. Since the blank results were less than the RL, the positive results for these analytes in the samples, which were less than the RL, were qualified as undetected (U) with the result being raised to the RL.

Field Blank:

There was no field blank submitted in association with this SDG. No data qualification was necessary.

VII.) Interference Check Sample (ICS) Results:

All ICS criteria were met. No data qualification was necessary.

VIII.) Matrix Spike / Matrix Spike Duplicates (MS / MSD):

MS / MSD analyses were performed using SDG sample MW-14-01282020. The Percent Recoveries (%Rs) for barium (150%, 149) and sodium (-87%, -87%) were outside the QC limits. All post spike criteria were met. The positive barium and sodium results for both samples were qualified as estimated (J).

IX.) Laboratory Control Samples (LCS):

All LCS Recovery criteria were met. No data qualification was necessary.

X.) Serial Dilution Analysis:

Serial Dilution Analysis was performed using SDG sample MW-14-01282020. All criteria were met. No data qualification was necessary.

XI.) Field Duplicates:

One set of field duplicate samples (MW-14-01282020 / MW-14-DUP-01282020) was identified for this SDG. The calculable Relative Percent Differences (RPDs) for the first set were:

barium	79%
calcium	0.9%
magnesium	4.6%
potassium	4.9%
sodium	67%

The RPDs for barium and sodium exceeded the 20% QC limit for aqueous samples, so the results for these analytes in the two samples were qualified as estimated (J). The absolute difference for manganese was greater than the RL, so the manganese results for the two samples were qualified as estimated (J) and (UJ). The absolute differences for aluminum and zinc were less than the RL,

so no data qualification was necessary for these analytes.

XII.) Compound Quantitation and Reported Contract Required Quantitation Limits (CRQL):

All CRQL criteria were met. No data qualification was necessary.

DISSOLVED METALS

SUMMARY

I.) General:

The analyses for Dissolved Metals were performed per SW846 Method 6010C.

II.) Overall Assessment of Data:

All laboratory data were acceptable with qualifications.

III.) Holding Times:

All Holding Time criteria were met. No data qualification was necessary.

IV.) Calibration:

All Initial and Continuing Calibration criteria were met. No data qualification was necessary.

V.) CRDL standards:

All CRDL standards criteria were met. No data qualification was required.

VI.) Blanks:

Calibration Blanks:

Copper (0.00169 mg/L) and iron (0.0281 mg/L, 0.0344 mg/L, 0.0223 mg/L) was detected in the associated calibration blanks. Since the copper and iron results for the sample were both non-detect, no data qualification was necessary.

Preparation Blanks:

Iron (0.0460 mg/L), manganese (0.000890 mg/L) and zinc (0.002065 mg/L) were detected in the associated method blank. Since the blank results were less than the RL, the positive manganese and zinc results for the sample, which were less than the RL, were qualified as undetected (U) with the result being raised to the RL.

Equipment Blanks:

The associated equipment blank submitted with this SDG was not analyzed for dissolved metals. No data qualification was necessary.

Field Blank:

There was no field blank submitted in association with this SDG. No data qualification was necessary.

VII.) Interference Check Sample (ICS) Results:

All ICS criteria were met. No data qualification was necessary.

VIII.) Matrix Spike / Matrix Spike Duplicates (MS / MSD):

MS / MSD analyses were performed using SDG sample MW-14-01282020. All criteria were met. No data qualification was necessary.

IX.) Laboratory Control Samples (LCS):

All LCS Recovery criteria were met. No data qualification was necessary.

X.) Serial Dilution Analysis:

Serial Dilution Analysis was performed using SDG sample MW-14-01282020. All criteria were met. No data qualification was necessary.

XI.) Field Duplicates:

There were no field duplicate samples identified for this fraction of the SDG. No data qualification was necessary.

XII.) Compound Quantitation and Reported Contract Required Quantitation Limits (CRQL):

All CRQL criteria were met. No data qualification was necessary.

TOTAL MERCURY

SUMMARY

I.) General:

The analyses for Total Mercury were performed per SW846 Method 7470A.

II.) Overall Assessment of Data:

All laboratory data were acceptable without qualifications.

III.) Holding Times:

All Holding Time criteria were met. No data qualification was necessary.

IV.) Calibration:

All Initial and Continuing Calibration criteria were met. No data qualification was necessary.

V.) CRDL standards:

All CRDL standards criteria were met. No data qualification was required.

VI.) Blanks:

Calibration Blanks:

There were no detections in the associated calibration blanks. No data qualification was necessary.

Preparation Blanks:

There was no detection in the associated preparation blanks. No data qualification was necessary.

Equipment Blanks:

There was detection in the equipment blank submitted in associated with this SDG. No data qualification was necessary.

Field Blank:

There was no field blank submitted in association with this SDG. No data qualification was necessary.

VII.) Matrix Spike / Matrix Spike Duplicates (MS / MSD):

MS / MSD analyses were performed using SDG sample MW-14-01282020. All criteria were met. No data qualification was necessary.

VIII.) Laboratory Control Samples (LCS):

All LCS Recovery criteria were met. No data qualification was necessary.

IX.) Serial Dilution Analysis:

Serial Dilution Analysis was performed using SDG sample MW-14-012820. All criteria were met. No data qualification was necessary.

X.) Field Duplicates:

One set of field duplicate samples (MW-14-01282020 / MW-14-DUP-01282020) was identified for this fraction of the SDG. There was no calculable result. No data qualification was necessary.

XI.) Compound Quantitation and Reported Contract Required Quantitation Limits (CRQL):

All CRQL criteria were met. No data qualification was necessary.

TOTAL CYANIDE

SUMMARY

I.) General:

The analyses for Total Cyanide were performed per SW846 Method 9012B.

II.) Overall Assessment of Data:

All laboratory data were acceptable without qualifications.

III.) Holding Times:

All Holding Time criteria were met. No data qualification was necessary.

IV.) Calibration:

All Initial and Continuing Calibration criteria were met. No data qualification was necessary.

V.) Blanks:

Calibration Blanks:

There were no detections in the associated calibration blanks. No data qualification was necessary.

Preparation Blanks:

There were no detections in the associated preparation blanks. No data qualification was necessary.

Equipment Blanks:

There was no equipment blank submitted in associated with this SDG. No data qualification was necessary.

Field Blank:

There was no field blank submitted in association with this SDG. No data qualification was necessary.

VI.) Matrix Spike / Matrix Spike Duplicates (MS / MSD):

MS / MSD analyses were performed using SDG sample MW-14-01282020. The Percent Recoveries (%Rs) were 117% for both samples, which exceeded the QC limits. Since the parent sample was non-detect, no data qualification was necessary.

VII.) Laboratory Control Samples (LCS):

An LCS / LCSD set was analyzed for this fraction of the SDG. The Percent Recovery (%R) was 113% for the LCSD, which exceeded the QC limits. Taken in conjunction with the MS/MSD results, the recovery indicates the potential for a high bias. Since the sample results for cyanide were both non-detect, no data qualification was necessary.

VIII.) Field Duplicates:

One set of field duplicate samples (MW-14-01282020 / MW-14-DUP-01282020) was identified for this fraction of the SDG. There was no calculable result. No data qualification was necessary.

IX.) Compound Quantitation and Reported Contract Required Quantitation Limits (CRQL):

All CRQL criteria were met. No data qualification was necessary.

FLUORIDE

SUMMARY

I.) General:

The analyses for Fluoride were performed per EPA Method SM4500F C.

II.) Overall Assessment of Data:

All laboratory data were acceptable without qualifications.

III.) Holding Times:

All Holding Time criteria were met. No data qualification was necessary.

IV.) Calibration:

All Initial and Continuing Calibration criteria were met. No data qualification was necessary.

V.) Blanks:

Calibration Blanks:

There were no detections in the associated calibration blanks. No data qualification was necessary.

Preparation Blanks:

There were no detections in the associated preparation blanks. No data qualification was necessary.

Equipment Blanks:

There was no equipment blank submitted in associated with this SDG. No data qualification was necessary.

Field Blank:

There was no field blank submitted in association with this SDG. No data qualification was necessary.

VI.) Matrix Spike / Matrix Spike Duplicates (MS / MSD):

MS / MSD analyses were performed using SDG sample MW-14-01282020. All criteria were met. No data qualification was necessary.

VII.) Laboratory Control Samples (LCS):

One LCS was analyzed for this fraction of the SDG. All criteria were met. No data qualification was necessary.

VIII.) Field Duplicates:

One set of field duplicate samples (MW-14-01282020 / MW-14-DUP-01282020) was identified for this fraction of the SDG. The calculable Relative Percent Difference (RPD) was 4.1%, which was within the QC limits. No data qualification was necessary.

IX.) Compound Quantitation and Reported Contract Required Quantitation Limits (CRQL):

All CRQL criteria were met. No data qualification was necessary.

Attachment A

Sample Result Forms (FORM Is) Corrected for Validation Qualifiers

FORM I
GC/MS VOA ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins TestAmerica, Buffalo Job No.: 480-165713-1

SDG No.:

Client Sample ID: MW-14-01282020 Lab Sample ID: 480-165713-1

Matrix: Water Lab File ID: N1207.D

Analysis Method: 8260C Date Collected: 01/28/2020 10:55

Sample wt/vol: 5(mL) Date Analyzed: 02/03/2020 02:32

Soil Aliquot Vol: Dilution Factor: 1

Soil Extract Vol.: GC Column: ZB-624 (20) ID: 0.18(mm)

% Moisture: Level: (low/med) Low

Analysis Batch No.: 515875 Units: ug/L

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
74-87-3	Chloromethane	ND	F2	1.0	0.35
74-83-9	Bromomethane	ND	F2	1.0	0.69
75-01-4	Vinyl chloride	ND	F2	1.0	0.90
75-00-3	Chloroethane	ND	F2	1.0	0.32
75-09-2	Methylene Chloride	ND		1.0	0.44
67-64-1	Acetone	ND		10	3.0
75-15-0	Carbon disulfide	ND	UJ	1.0	0.19
75-69-4	Trichlorofluoromethane	ND	F2	1.0	0.88
75-35-4	1,1-Dichloroethene	ND		1.0	0.29
75-34-3	1,1-Dichloroethane	ND		1.0	0.38
156-60-5	trans-1,2-Dichloroethene	ND		1.0	0.90
156-59-2	cis-1,2-Dichloroethene	ND		1.0	0.81
67-66-3	Chloroform	ND		1.0	0.34
107-06-2	1,2-Dichloroethane	ND		1.0	0.21
78-93-3	2-Butanone (MEK)	ND		10	1.3
71-55-6	1,1,1-Trichloroethane	ND		1.0	0.82
56-23-5	Carbon tetrachloride	ND		1.0	0.27
75-27-4	Dichlorobromomethane	ND		1.0	0.39
78-87-5	1,2-Dichloropropane	ND		1.0	0.72
10061-01-5	cis-1,3-Dichloropropene	ND		1.0	0.36
79-01-6	Trichloroethene	ND		1.0	0.46
124-48-1	Chlorodibromomethane	ND		1.0	0.32
79-00-5	1,1,2-Trichloroethane	ND		1.0	0.23
71-43-2	Benzene	ND		1.0	0.41
10061-02-6	trans-1,3-Dichloropropene	ND		1.0	0.37
75-25-2	Bromoform	ND		1.0	0.26
108-10-1	4-Methyl-2-pentanone (MIBK)	ND	F1	5.0	2.1
591-78-6	2-Hexanone	ND	F1	5.0	1.2
127-18-4	Tetrachloroethene	ND		1.0	0.36
79-34-5	1,1,2,2-Tetrachloroethane	ND	F1	1.0	0.21
108-88-3	Toluene	ND		1.0	0.51
108-90-7	Chlorobenzene	ND		1.0	0.75
100-41-4	Ethylbenzene	ND		1.0	0.74
100-42-5	Styrene	ND		1.0	0.73
1330-20-7	Xylenes, Total	ND		2.0	0.66

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FORM I
GC/MS VOA ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins TestAmerica, Buffalo Job No.: 480-165713-1

SDG No.:

Client Sample ID: MW-14-01282020 Lab Sample ID: 480-165713-1

Matrix: Water Lab File ID: N1207.D

Analysis Method: 8260C Date Collected: 01/28/2020 10:55

Sample wt/vol: 5(mL) Date Analyzed: 02/03/2020 02:32

Soil Aliquot Vol: Dilution Factor: 1

Soil Extract Vol.: GC Column: ZB-624 (20) ID: 0.18(mm)

% Moisture: Level: (low/med) Low

Analysis Batch No.: 515875 Units: ug/L

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	ND		1.0	0.31
1634-04-4	Methyl tert-butyl ether	ND		1.0	0.16
110-82-7	Cyclohexane	ND		1.0	0.18
106-93-4	Ethylene Dibromide	ND		1.0	0.73
541-73-1	1,3-Dichlorobenzene	ND		1.0	0.78
106-46-7	1,4-Dichlorobenzene	ND		1.0	0.84
95-50-1	1,2-Dichlorobenzene	ND		1.0	0.79
75-71-8	Dichlorodifluoromethane	ND	F2	1.0	0.68
120-82-1	1,2,4-Trichlorobenzene	ND		1.0	0.41
96-12-8	1,2-Dibromo-3-Chloropropane	ND		1.0	0.39
98-82-8	Isopropylbenzene	ND		1.0	0.79
79-20-9	Methyl acetate	ND		2.5	1.3
108-87-2	Methylcyclohexane	ND		1.0	0.16

CAS NO.	SURROGATE	%REC	Q	LIMITS
17060-07-0	1,2-Dichloroethane-d4 (Surr)	100		77-120
2037-26-5	Toluene-d8 (Surr)	103		80-120
460-00-4	4-Bromofluorobenzene (Surr)	98		73-120
1868-53-7	Dibromofluoromethane (Surr)	95		75-123

FORM I
GC/MS VOA ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins TestAmerica, Buffalo Job No.: 480-165713-1

SDG No.:

Client Sample ID: MW-14-DUP-01282020 Lab Sample ID: 480-165713-6

Matrix: Water Lab File ID: N1210.D

Analysis Method: 8260C Date Collected: 01/28/2020 11:10

Sample wt/vol: 5(mL) Date Analyzed: 02/03/2020 03:45

Soil Aliquot Vol: Dilution Factor: 1

Soil Extract Vol.: GC Column: ZB-624 (20) ID: 0.18(mm)

% Moisture: Level: (low/med) Low

Analysis Batch No.: 515875 Units: ug/L

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
74-87-3	Chloromethane	ND		1.0	0.35
74-83-9	Bromomethane	ND		1.0	0.69
75-01-4	Vinyl chloride	ND		1.0	0.90
75-00-3	Chloroethane	ND		1.0	0.32
75-09-2	Methylene Chloride	ND		1.0	0.44
67-64-1	Acetone	ND		10	3.0
75-15-0	Carbon disulfide	ND	UJ	1.0	0.19
75-69-4	Trichlorofluoromethane	ND		1.0	0.88
75-35-4	1,1-Dichloroethene	ND		1.0	0.29
75-34-3	1,1-Dichloroethane	ND		1.0	0.38
156-60-5	trans-1,2-Dichloroethene	ND		1.0	0.90
156-59-2	cis-1,2-Dichloroethene	ND		1.0	0.81
67-66-3	Chloroform	ND		1.0	0.34
107-06-2	1,2-Dichloroethane	ND		1.0	0.21
78-93-3	2-Butanone (MEK)	ND		10	1.3
71-55-6	1,1,1-Trichloroethane	ND		1.0	0.82
56-23-5	Carbon tetrachloride	ND		1.0	0.27
75-27-4	Dichlorobromomethane	ND		1.0	0.39
78-87-5	1,2-Dichloropropane	ND		1.0	0.72
10061-01-5	cis-1,3-Dichloropropene	ND		1.0	0.36
79-01-6	Trichloroethene	ND		1.0	0.46
124-48-1	Chlorodibromomethane	ND		1.0	0.32
79-00-5	1,1,2-Trichloroethane	ND		1.0	0.23
71-43-2	Benzene	ND		1.0	0.41
10061-02-6	trans-1,3-Dichloropropene	ND		1.0	0.37
75-25-2	Bromoform	ND		1.0	0.26
108-10-1	4-Methyl-2-pentanone (MIBK)	ND		5.0	2.1
591-78-6	2-Hexanone	ND		5.0	1.2
127-18-4	Tetrachloroethene	ND		1.0	0.36
79-34-5	1,1,2,2-Tetrachloroethane	ND		1.0	0.21
108-88-3	Toluene	ND		1.0	0.51
108-90-7	Chlorobenzene	ND		1.0	0.75
100-41-4	Ethylbenzene	ND		1.0	0.74
100-42-5	Styrene	ND		1.0	0.73
1330-20-7	Xylenes, Total	ND		2.0	0.66

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FORM I
GC/MS VOA ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins TestAmerica, Buffalo Job No.: 480-165713-1

SDG No.:

Client Sample ID: MW-14-DUP-01282020 Lab Sample ID: 480-165713-6

Matrix: Water Lab File ID: N1210.D

Analysis Method: 8260C Date Collected: 01/28/2020 11:10

Sample wt/vol: 5(mL) Date Analyzed: 02/03/2020 03:45

Soil Aliquot Vol: Dilution Factor: 1

Soil Extract Vol.: GC Column: ZB-624 (20) ID: 0.18(mm)

% Moisture: Level: (low/med) Low

Analysis Batch No.: 515875 Units: ug/L

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	ND		1.0	0.31
1634-04-4	Methyl tert-butyl ether	ND		1.0	0.16
110-82-7	Cyclohexane	ND		1.0	0.18
106-93-4	Ethylene Dibromide	ND		1.0	0.73
541-73-1	1,3-Dichlorobenzene	ND		1.0	0.78
106-46-7	1,4-Dichlorobenzene	ND		1.0	0.84
95-50-1	1,2-Dichlorobenzene	ND		1.0	0.79
75-71-8	Dichlorodifluoromethane	ND		1.0	0.68
120-82-1	1,2,4-Trichlorobenzene	ND		1.0	0.41
96-12-8	1,2-Dibromo-3-Chloropropane	ND		1.0	0.39
98-82-8	Isopropylbenzene	ND		1.0	0.79
79-20-9	Methyl acetate	ND		2.5	1.3
108-87-2	Methylcyclohexane	ND		1.0	0.16

CAS NO.	SURROGATE	%REC	Q	LIMITS
17060-07-0	1,2-Dichloroethane-d4 (Surr)	102		77-120
2037-26-5	Toluene-d8 (Surr)	99		80-120
460-00-4	4-Bromofluorobenzene (Surr)	99		73-120
1868-53-7	Dibromofluoromethane (Surr)	97		75-123

FORM I
GC/MS SEMI VOA ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins TestAmerica, Buffalo Job No.: 480-165713-1

SDG No.:

Client Sample ID: MW-14-01282020 Lab Sample ID: 480-165713-1

Matrix: Water Lab File ID: Y02814496.D

Analysis Method: 8270D Date Collected: 01/28/2020 10:55

Extract. Method: 3510C Date Extracted: 02/03/2020 15:23

Sample wt/vol: 250(mL) Date Analyzed: 02/04/2020 16:14

Con. Extract Vol.: 1(mL) Dilution Factor: 1

Injection Volume: 2(uL) Level: (low/med) Low

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 516107 Units: ug/L

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
108-95-2	Phenol	ND		5.0	0.39
95-57-8	2-Chlorophenol	ND		5.0	0.53
95-48-7	2-Methylphenol	ND		5.0	0.40
106-44-5	4-Methylphenol	ND		10	0.36
88-75-5	2-Nitrophenol	ND		5.0	0.48
105-67-9	2,4-Dimethylphenol	ND		5.0	0.50
120-83-2	2,4-Dichlorophenol	ND		5.0	0.51
59-50-7	4-Chloro-3-methylphenol	ND		5.0	0.45
88-06-2	2,4,6-Trichlorophenol	ND		5.0	0.61
95-95-4	2,4,5-Trichlorophenol	ND		5.0	0.48
121-14-2	2,4-Dinitrotoluene	ND		5.0	0.45
100-02-7	4-Nitrophenol	ND	UJ	10	1.5
534-52-1	4,6-Dinitro-2-methylphenol	ND		10	2.2
87-86-5	Pentachlorophenol	ND		10	2.2
111-44-4	Bis(2-chloroethyl)ether	ND		5.0	0.40
621-64-7	N-Nitrosodi-n-propylamine	ND		5.0	0.54
67-72-1	Hexachloroethane	ND		5.0	0.59
98-95-3	Nitrobenzene	ND		5.0	0.29
78-59-1	Isophorone	ND		5.0	0.43
91-20-3	Naphthalene	ND		5.0	0.76
106-47-8	4-Chloroaniline	ND		5.0	0.59
87-68-3	Hexachlorobutadiene	ND		5.0	0.68
91-57-6	2-Methylnaphthalene	ND		5.0	0.60
77-47-4	Hexachlorocyclopentadiene	ND		5.0	0.59
91-58-7	2-Chloronaphthalene	ND		5.0	0.46
88-74-4	2-Nitroaniline	ND		10	0.42
131-11-3	Dimethyl phthalate	ND		5.0	0.36
208-96-8	Acenaphthylene	ND		5.0	0.38
606-20-2	2,6-Dinitrotoluene	ND		5.0	0.40
99-09-2	3-Nitroaniline	ND		10	0.48
83-32-9	Acenaphthene	ND		5.0	0.41
132-64-9	Dibenzofuran	ND		10	0.51
51-28-5	2,4-Dinitrophenol	ND		10	2.2
84-66-2	Diethyl phthalate	ND		5.0	0.22

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FORM I
GC/MS SEMI VOA ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins TestAmerica, Buffalo | Job No.: 480-165713-1

SDG No.:

Client Sample ID: MW-14-01282020 | Lab Sample ID: 480-165713-1

Matrix: Water | Lab File ID: Y02814496.D

Analysis Method: 8270D | Date Collected: 01/28/2020 10:55

Extract. Method: 3510C | Date Extracted: 02/03/2020 15:23

Sample wt/vol: 250(mL) | Date Analyzed: 02/04/2020 16:14

Con. Extract Vol.: 1(mL) | Dilution Factor: 1

Injection Volume: 2(uL) | Level: (low/med) Low

% Moisture: | GPC Cleanup:(Y/N) N

Analysis Batch No.: 516107 | Units: ug/L

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
7005-72-3	4-Chlorophenyl phenyl ether	ND		5.0	0.35
86-73-7	Fluorene	ND		5.0	0.36
100-01-6	4-Nitroaniline	ND		10	0.25
86-30-6	N-Nitrosodiphenylamine	ND		5.0	0.51
101-55-3	4-Bromophenyl phenyl ether	ND		5.0	0.45
118-74-1	Hexachlorobenzene	ND		5.0	0.51
85-01-8	Phenanthrene	ND		5.0	0.44
120-12-7	Anthracene	ND		5.0	0.28
86-74-8	Carbazole	ND	*	5.0	0.30
84-74-2	Di-n-butyl phthalate	ND		5.0	0.31
206-44-0	Fluoranthene	ND		5.0	0.40
129-00-0	Pyrene	ND		5.0	0.34
85-68-7	Butyl benzyl phthalate	ND		5.0	1.0
56-55-3	Benzo[a]anthracene	ND		5.0	0.36
218-01-9	Chrysene	ND		5.0	0.33
117-81-7	Bis(2-ethylhexyl) phthalate	ND		5.0	2.2
117-84-0	Di-n-octyl phthalate	ND		5.0	0.47
205-99-2	Benzo[b]fluoranthene	ND		5.0	0.34
207-08-9	Benzo[k]fluoranthene	ND		5.0	0.73
50-32-8	Benzo[a]pyrene	ND		5.0	0.47
193-39-5	Indeno[1,2,3-cd]pyrene	ND		5.0	0.47
53-70-3	Dibenz(a,h)anthracene	ND		5.0	0.42
191-24-2	Benzo[g,h,i]perylene	ND		5.0	0.35
92-52-4	1,1'-Biphenyl	ND		5.0	0.65
98-86-2	Acetophenone	ND		5.0	0.54
100-52-7	Benzaldehyde	ND		5.0	0.27
105-60-2	Caprolactam	ND		5.0	2.2
1912-24-9	Atrazine	ND		5.0	0.46
108-60-1	2,2'-oxybis[1-chloropropane]	ND		5.0	0.52
91-94-1	3,3'-Dichlorobenzidine	ND		5.0	0.40
111-91-1	Bis(2-chloroethoxy)methane	ND		5.0	0.35

FORM I
GC/MS SEMI VOA ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins TestAmerica, Buffalo Job No.: 480-165713-1

SDG No.:

Client Sample ID: MW-14-01282020 Lab Sample ID: 480-165713-1

Matrix: Water Lab File ID: Y02814496.D

Analysis Method: 8270D Date Collected: 01/28/2020 10:55

Extract. Method: 3510C Date Extracted: 02/03/2020 15:23

Sample wt/vol: 250(mL) Date Analyzed: 02/04/2020 16:14

Con. Extract Vol.: 1(mL) Dilution Factor: 1

Injection Volume: 2(uL) Level: (low/med) Low

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 516107 Units: ug/L

CAS NO.	SURROGATE	%REC	Q	LIMITS
4165-60-0	Nitrobenzene-d5 (Surr)	78		46-120
4165-62-2	Phenol-d5 (Surr)	37		22-120
118-79-6	2,4,6-Tribromophenol (Surr)	84		41-120
367-12-4	2-Fluorophenol (Surr)	50		35-120
321-60-8	2-Fluorobiphenyl	74		48-120
1718-51-0	p-Terphenyl-d14 (Surr)	95		60-148

FORM I
GC/MS SEMI VOA ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins TestAmerica, Buffalo Job No.: 480-165713-1

SDG No.:

Client Sample ID: MW-14-DUP-01282020 Lab Sample ID: 480-165713-6

Matrix: Water Lab File ID: Y02814510.D

Analysis Method: 8270D Date Collected: 01/28/2020 11:10

Extract. Method: 3510C Date Extracted: 02/03/2020 15:23

Sample wt/vol: 250(mL) Date Analyzed: 02/04/2020 22:58

Con. Extract Vol.: 1(mL) Dilution Factor: 1

Injection Volume: 2(uL) Level: (low/med) Low

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 516107 Units: ug/L

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
108-95-2	Phenol	ND		5.0	0.39
95-57-8	2-Chlorophenol	ND		5.0	0.53
95-48-7	2-Methylphenol	ND		5.0	0.40
106-44-5	4-Methylphenol	ND		10	0.36
88-75-5	2-Nitrophenol	ND		5.0	0.48
105-67-9	2,4-Dimethylphenol	ND		5.0	0.50
120-83-2	2,4-Dichlorophenol	ND		5.0	0.51
59-50-7	4-Chloro-3-methylphenol	ND		5.0	0.45
88-06-2	2,4,6-Trichlorophenol	ND		5.0	0.61
95-95-4	2,4,5-Trichlorophenol	ND		5.0	0.48
121-14-2	2,4-Dinitrotoluene	ND		5.0	0.45
100-02-7	4-Nitrophenol	ND	UJ	10	1.5
534-52-1	4,6-Dinitro-2-methylphenol	ND		10	2.2
87-86-5	Pentachlorophenol	ND		10	2.2
111-44-4	Bis(2-chloroethyl)ether	ND		5.0	0.40
621-64-7	N-Nitrosodi-n-propylamine	ND		5.0	0.54
67-72-1	Hexachloroethane	ND		5.0	0.59
98-95-3	Nitrobenzene	ND		5.0	0.29
78-59-1	Isophorone	ND		5.0	0.43
91-20-3	Naphthalene	ND		5.0	0.76
106-47-8	4-Chloroaniline	ND		5.0	0.59
87-68-3	Hexachlorobutadiene	ND		5.0	0.68
91-57-6	2-Methylnaphthalene	ND		5.0	0.60
77-47-4	Hexachlorocyclopentadiene	ND		5.0	0.59
91-58-7	2-Chloronaphthalene	ND		5.0	0.46
88-74-4	2-Nitroaniline	ND		10	0.42
131-11-3	Dimethyl phthalate	ND		5.0	0.36
208-96-8	Acenaphthylene	ND		5.0	0.38
606-20-2	2,6-Dinitrotoluene	ND		5.0	0.40
99-09-2	3-Nitroaniline	ND		10	0.48
83-32-9	Acenaphthene	ND		5.0	0.41
132-64-9	Dibenzofuran	ND		10	0.51
51-28-5	2,4-Dinitrophenol	ND		10	2.2
84-66-2	Diethyl phthalate	ND		5.0	0.22

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FORM I
GC/MS SEMI VOA ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins TestAmerica, Buffalo Job No.: 480-165713-1

SDG No.:

Client Sample ID: MW-14-DUP-01282020 Lab Sample ID: 480-165713-6

Matrix: Water Lab File ID: Y02814510.D

Analysis Method: 8270D Date Collected: 01/28/2020 11:10

Extract. Method: 3510C Date Extracted: 02/03/2020 15:23

Sample wt/vol: 250(mL) Date Analyzed: 02/04/2020 22:58

Con. Extract Vol.: 1(mL) Dilution Factor: 1

Injection Volume: 2(uL) Level: (low/med) Low

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 516107 Units: ug/L

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
7005-72-3	4-Chlorophenyl phenyl ether	ND		5.0	0.35
86-73-7	Fluorene	ND		5.0	0.36
100-01-6	4-Nitroaniline	ND		10	0.25
86-30-6	N-Nitrosodiphenylamine	ND		5.0	0.51
101-55-3	4-Bromophenyl phenyl ether	ND		5.0	0.45
118-74-1	Hexachlorobenzene	ND		5.0	0.51
85-01-8	Phenanthrene	ND		5.0	0.44
120-12-7	Anthracene	ND		5.0	0.28
86-74-8	Carbazole	ND	*	5.0	0.30
84-74-2	Di-n-butyl phthalate	ND		5.0	0.31
206-44-0	Fluoranthene	ND		5.0	0.40
129-00-0	Pyrene	ND		5.0	0.34
85-68-7	Butyl benzyl phthalate	ND		5.0	1.0
56-55-3	Benzo[a]anthracene	ND		5.0	0.36
218-01-9	Chrysene	ND		5.0	0.33
117-81-7	Bis(2-ethylhexyl) phthalate	ND		5.0	2.2
117-84-0	Di-n-octyl phthalate	ND		5.0	0.47
205-99-2	Benzo[b]fluoranthene	ND		5.0	0.34
207-08-9	Benzo[k]fluoranthene	ND		5.0	0.73
50-32-8	Benzo[a]pyrene	ND		5.0	0.47
193-39-5	Indeno[1,2,3-cd]pyrene	ND		5.0	0.47
53-70-3	Dibenz(a,h)anthracene	ND		5.0	0.42
191-24-2	Benzo[g,h,i]perylene	ND		5.0	0.35
92-52-4	1,1'-Biphenyl	ND		5.0	0.65
98-86-2	Acetophenone	ND		5.0	0.54
100-52-7	Benzaldehyde	ND		5.0	0.27
105-60-2	Caprolactam	ND		5.0	2.2
1912-24-9	Atrazine	ND		5.0	0.46
108-60-1	2,2'-oxybis[1-chloropropane]	ND		5.0	0.52
91-94-1	3,3'-Dichlorobenzidine	ND		5.0	0.40
111-91-1	Bis(2-chloroethoxy)methane	ND		5.0	0.35

FORM I
GC/MS SEMI VOA ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins TestAmerica, Buffalo Job No.: 480-165713-1

SDG No.:

Client Sample ID: MW-14-DUP-01282020 Lab Sample ID: 480-165713-6

Matrix: Water Lab File ID: Y02814510.D

Analysis Method: 8270D Date Collected: 01/28/2020 11:10

Extract. Method: 3510C Date Extracted: 02/03/2020 15:23

Sample wt/vol: 250(mL) Date Analyzed: 02/04/2020 22:58

Con. Extract Vol.: 1(mL) Dilution Factor: 1

Injection Volume: 2(uL) Level: (low/med) Low

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 516107 Units: ug/L

CAS NO.	SURROGATE	%REC	Q	LIMITS
4165-60-0	Nitrobenzene-d5 (Surr)	89		46-120
4165-62-2	Phenol-d5 (Surr)	42		22-120
118-79-6	2,4,6-Tribromophenol (Surr)	88		41-120
367-12-4	2-Fluorophenol (Surr)	53		35-120
321-60-8	2-Fluorobiphenyl	90		48-120
1718-51-0	p-Terphenyl-d14 (Surr)	100		60-148

FORM I
PESTICIDES ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins TestAmerica, Buffalo Job No.: 480-165713-1

SDG No.:

Client Sample ID: MW-14-01282020 Lab Sample ID: 480-165713-1

Matrix: Water Lab File ID: 25_30-283.D

Analysis Method: 8081B Date Collected: 01/28/2020 10:55

Extraction Method: 3510C Date Extracted: 02/03/2020 07:23

Sample wt/vol: 250(mL) Date Analyzed: 02/04/2020 12:17

Con. Extract Vol.: 2(mL) Dilution Factor: 1

Injection Volume: 1(uL) GC Column: RTX-CLPI ID: 0.53(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 516035 Units: ug/L

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
72-54-8	4,4'-DDD	ND		0.050	0.0092
72-55-9	4,4'-DDE	ND		0.050	0.012
50-29-3	4,4'-DDT	0.019	J J	0.050	0.011
309-00-2	Aldrin	0.018	J	0.050	0.0081
319-84-6	alpha-BHC	ND		0.050	0.0077
5103-71-9	cis-Chlordane	ND		0.050	0.015
319-85-7	beta-BHC	ND		0.050	0.025
319-86-8	delta-BHC	ND		0.050	0.010
60-57-1	Dieldrin	ND		0.050	0.0098
959-98-8	Endosulfan I	ND		0.050	0.011
33213-65-9	Endosulfan II	ND		0.050	0.012
1031-07-8	Endosulfan sulfate	ND		0.050	0.016
72-20-8	Endrin	ND		0.050	0.014
7421-93-4	Endrin aldehyde	ND		0.050	0.016
53494-70-5	Endrin ketone	ND		0.050	0.012
58-89-9	gamma-BHC (Lindane)	0.050 ~~0.012~~	~~J B~~ U	0.050	0.0080
5103-74-2	trans-Chlordane	ND		0.050	0.011
76-44-8	Heptachlor	ND		0.050	0.0085
1024-57-3	Heptachlor epoxide	ND		0.050	0.0074
72-43-5	Methoxychlor	ND		0.050	0.014
8001-35-2	Toxaphene	ND	UJ	0.50	0.12

CAS NO.	SURROGATE	%REC	Q	LIMITS
2051-24-3	DCB Decachlorobiphenyl	55		20-120
877-09-8	Tetrachloro-m-xylene	90		44-120

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FORM I
PESTICIDES ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins TestAmerica, Buffalo Job No.: 480-165713-1

SDG No.:

Client Sample ID: MW-14-DUP-01282020 Lab Sample ID: 480-165713-6

Matrix: Water Lab File ID: 25_30-297.D

Analysis Method: 8081B Date Collected: 01/28/2020 11:10

Extraction Method: 3510C Date Extracted: 02/03/2020 07:23

Sample wt/vol: 250(mL) Date Analyzed: 02/04/2020 16:52

Con. Extract Vol.: 2(mL) Dilution Factor: 1

Injection Volume: 1(uL) GC Column: RTX-CLPI ID: 0.53(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 516035 Units: ug/L

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
72-54-8	4,4'-DDD	ND		0.050	0.0092
72-55-9	4,4'-DDE	ND		0.050	0.012
50-29-3	4,4'-DDT	ND		0.050	0.011
309-00-2	Aldrin	0.020	J J	0.050	0.0081
319-84-6	alpha-BHC	ND		0.050	0.0077
5103-71-9	cis-Chlordane	ND		0.050	0.015
319-85-7	beta-BHC	ND		0.050	0.025
319-86-8	delta-BHC	ND		0.050	0.010
60-57-1	Dieldrin	ND		0.050	0.0098
959-98-8	Endosulfan I	ND		0.050	0.011
33213-65-9	Endosulfan II	ND		0.050	0.012
1031-07-8	Endosulfan sulfate	ND		0.050	0.016
72-20-8	Endrin	ND		0.050	0.014
7421-93-4	Endrin aldehyde	ND		0.050	0.016
53494-70-5	Endrin ketone	ND		0.050	0.012
58-89-9	gamma-BHC (Lindane)	ND		0.050	0.0080
5103-74-2	trans-Chlordane	ND		0.050	0.011
76-44-8	Heptachlor	ND		0.050	0.0085
1024-57-3	Heptachlor epoxide	ND		0.050	0.0074
72-43-5	Methoxychlor	ND		0.050	0.014
8001-35-2	Toxaphene	ND	UJ	0.50	0.12

CAS NO.	SURROGATE	%REC	Q	LIMITS
2051-24-3	DCB Decachlorobiphenyl	60		20-120
877-09-8	Tetrachloro-m-xylene	82		44-120

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FORM I
PCBS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins TestAmerica, Buffalo Job No.: 480-165713-1

SDG No.:

Client Sample ID: MW-14-01282020 Lab Sample ID: 480-165713-1

Matrix: Water Lab File ID: 7_65-181.D

Analysis Method: 8082A Date Collected: 01/28/2020 10:55

Extraction Method: 3510C Date Extracted: 02/04/2020 15:21

Sample wt/vol: 250(mL) Date Analyzed: 02/05/2020 21:19

Con. Extract Vol.: 2(mL) Dilution Factor: 1

Injection Volume: 1(uL) GC Column: ZB-5 ID: 0.53(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 516322 Units: ug/L

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
12674-11-2	PCB-1016	ND	UJ	0.50	0.18
11104-28-2	PCB-1221	ND		0.50	0.18
11141-16-5	PCB-1232	ND		0.50	0.18
53469-21-9	PCB-1242	ND		0.50	0.18
12672-29-6	PCB-1248	ND		0.50	0.18
11097-69-1	PCB-1254	ND		0.50	0.25
11096-82-5	PCB-1260	ND	UJ	0.50	0.25
37324-23-5	PCB-1262	ND		0.50	0.25
11100-14-4	PCB-1268	ND		0.50	0.25

CAS NO.	SURROGATE	%REC	Q	LIMITS
877-09-8	Tetrachloro-m-xylene	74		39-121
2051-24-3	DCB Decachlorobiphenyl	47		19-120

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FORM I
PCBS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins TestAmerica, Buffalo Job No.: 480-165713-1

SDG No.:

Client Sample ID: MW-14-DUP-01282020 Lab Sample ID: 480-165713-6

Matrix: Water Lab File ID: 7_65-188.D

Analysis Method: 8082A Date Collected: 01/28/2020 11:10

Extraction Method: 3510C Date Extracted: 02/04/2020 15:21

Sample wt/vol: 250(mL) Date Analyzed: 02/05/2020 22:46

Con. Extract Vol.: 2(mL) Dilution Factor: 1

Injection Volume: 1(uL) GC Column: ZB-5 ID: 0.53(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 516322 Units: ug/L

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
12674-11-2	PCB-1016	ND	UJ	0.50	0.18
11104-28-2	PCB-1221	ND		0.50	0.18
11141-16-5	PCB-1232	ND		0.50	0.18
53469-21-9	PCB-1242	ND		0.50	0.18
12672-29-6	PCB-1248	ND		0.50	0.18
11097-69-1	PCB-1254	ND		0.50	0.25
11096-82-5	PCB-1260	ND	UJ	0.50	0.25
37324-23-5	PCB-1262	ND		0.50	0.25
11100-14-4	PCB-1268	ND		0.50	0.25

CAS NO.	SURROGATE	%REC	Q	LIMITS
877-09-8	Tetrachloro-m-xylene	91		39-121
2051-24-3	DCB Decachlorobiphenyl	64		19-120

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1A-IN
INORGANIC ANALYSIS DATA SHEET
METALS

Client Sample ID: MW-14-01282020 Lab Sample ID: 480-165713-1

Lab Name: Eurofins TestAmerica, Buffalo Job No.: 480-165713-1

SDG ID.:

Matrix: Water Date Sampled: 01/28/2020 10:55

Reporting Basis: WET Date Received: 01/30/2020 09:30

CAS No.	Analyte	Result	RL	MDL	Units	C	Q	DIL	Method
7429-90-5	Aluminum	0.094	0.20	0.060	mg/L	J		1	6010C
7440-36-0	Antimony	ND	0.020	0.0068	mg/L			1	6010C
7440-38-2	Arsenic	ND	0.015	0.0056	mg/L			1	6010C
7440-39-3	Barium	0.065	0.0020	0.00070	mg/L	J	F1	1	6010C
7440-41-7	Beryllium	ND	0.0020	0.00030	mg/L			1	6010C
7440-43-9	Cadmium	ND	0.0020	0.00050	mg/L			1	6010C
7440-70-2	Calcium	11.5	0.50	0.10	mg/L			1	6010C
7440-47-3	Chromium	ND	0.0040	0.0010	mg/L			1	6010C
7440-48-4	Cobalt	ND	0.0040	0.00063	mg/L			1	6010C
7440-50-8	Copper	ND	0.010	0.0016	mg/L			1	6010C
7439-89-6	Iron	ND	0.050	0.019	mg/L			1	6010C
7439-92-1	Lead	ND	0.010	0.0030	mg/L			1	6010C
7439-95-4	Magnesium	2.1	0.20	0.043	mg/L			1	6010C
7439-96-5	Manganese	0.0030 ~~0.0013~~	0.0030	0.00040	mg/L	~~J~~ UJ	B	1	6010C
7440-02-0	Nickel	ND	0.010	0.0013	mg/L			1	6010C
7440-09-7	Potassium	2.0	0.50	0.10	mg/L			1	6010C
7782-49-2	Selenium	ND	0.025	0.0087	mg/L			1	6010C
7440-22-4	Silver	ND	0.0060	0.0017	mg/L			1	6010C
7440-23-5	Sodium	37.0	1.0	0.32	mg/L	J	F1	1	6010C
7440-28-0	Thallium	ND	0.020	0.010	mg/L			1	6010C
7440-62-2	Vanadium	ND	0.0050	0.0015	mg/L			1	6010C
7440-66-6	Zinc	0.010 ~~0.0026~~	0.010	0.0015	mg/L	~~J~~ U	B	1	6010C
7439-97-6	Mercury	ND	0.00020	0.00012	mg/L			1	7470A

1A-IN
INORGANIC ANALYSIS DATA SHEET
METALS - DISSOLVED

Client Sample ID: MW-14-01282020 | Lab Sample ID: 480-165713-1

Lab Name: Eurofins TestAmerica, Buffalo | Job No.: 480-165713-1

SDG ID.:

Matrix: Water | Date Sampled: 01/28/2020 10:55

Reporting Basis: WET | Date Received: 01/30/2020 09:30

CAS No.	Analyte	Result	RL	MDL	Units	C	Q	DIL	Method
7429-90-5	Aluminum	ND	0.20	0.060	mg/L			1	6010C
7440-36-0	Antimony	ND	0.020	0.0068	mg/L			1	6010C
7440-38-2	Arsenic	ND	0.015	0.0056	mg/L			1	6010C
7440-39-3	Barium	0.063	0.0020	0.00070	mg/L			1	6010C
7440-41-7	Beryllium	ND	0.0020	0.00030	mg/L			1	6010C
7440-43-9	Cadmium	ND	0.0020	0.00050	mg/L			1	6010C
7440-70-2	Calcium	11.3	0.50	0.10	mg/L			1	6010C
7440-47-3	Chromium	ND	0.0040	0.0010	mg/L			1	6010C
7440-48-4	Cobalt	ND	0.0040	0.00063	mg/L			1	6010C
7440-50-8	Copper	ND	0.010	0.0016	mg/L			1	6010C
7439-89-6	Iron	ND	0.050	0.019	mg/L			1	6010C
7439-92-1	Lead	ND	0.010	0.0030	mg/L			1	6010C
7439-95-4	Magnesium	2.0	0.20	0.043	mg/L			1	6010C
7439-96-5	Manganese	0.0030 ~~0.00042~~	0.0030	0.00040	mg/L	~~J~~ U	B	1	6010C
7440-02-0	Nickel	ND	0.010	0.0013	mg/L			1	6010C
7440-09-7	Potassium	1.9	0.50	0.10	mg/L			1	6010C
7782-49-2	Selenium	ND	0.025	0.0087	mg/L			1	6010C
7440-22-4	Silver	ND	0.0060	0.0017	mg/L			1	6010C
7440-23-5	Sodium	17.5	1.0	0.32	mg/L			1	6010C
7440-28-0	Thallium	ND	0.020	0.010	mg/L			1	6010C
7440-62-2	Vanadium	ND	0.0050	0.0015	mg/L			1	6010C
7440-66-6	Zinc	0.010 ~~0.0061~~	0.010	0.0015	mg/L	~~J~~ U	B	1	6010C

ALH 11/4/2020

1A-IN
INORGANIC ANALYSIS DATA SHEET
METALS

Client Sample ID: MW-14-DUP-01282020 Lab Sample ID: 480-165713-6

Lab Name: Eurofins TestAmerica, Buffalo Job No.: 480-165713-1

SDG ID.:

Matrix: Water Date Sampled: 01/28/2020 11:10

Reporting Basis: WET Date Received: 01/30/2020 09:30

CAS No.	Analyte	Result	RL	MDL	Units	C	Q	DIL	Method
7429-90-5	Aluminum	0.071	0.20	0.060	mg/L	J		1	6010C
7440-36-0	Antimony	ND	0.020	0.0068	mg/L			1	6010C
7440-38-2	Arsenic	ND	0.015	0.0056	mg/L			1	6010C
7440-39-3	Barium	0.15	0.0020	0.00070	mg/L	J		1	6010C
7440-41-7	Beryllium	ND	0.0020	0.00030	mg/L			1	6010C
7440-43-9	Cadmium	ND	0.0020	0.00050	mg/L			1	6010C
7440-70-2	Calcium	11.6	0.50	0.10	mg/L			1	6010C
7440-47-3	Chromium	ND	0.0040	0.0010	mg/L			1	6010C
7440-48-4	Cobalt	ND	0.0040	0.00063	mg/L			1	6010C
7440-50-8	Copper	ND	0.010	0.0016	mg/L			1	6010C
7439-89-6	Iron	0.055	0.050	0.019	mg/L			1	6010C
7439-92-1	Lead	ND	0.010	0.0030	mg/L			1	6010C
7439-95-4	Magnesium	2.2	0.20	0.043	mg/L			1	6010C
7439-96-5	Manganese	0.050	0.0030	0.00040	mg/L	J	B	1	6010C
7440-02-0	Nickel	ND	0.010	0.0013	mg/L			1	6010C
7440-09-7	Potassium	2.1	0.50	0.10	mg/L			1	6010C
7782-49-2	Selenium	ND	0.025	0.0087	mg/L			1	6010C
7440-22-4	Silver	ND	0.0060	0.0017	mg/L			1	6010C
7440-23-5	Sodium	18.4	1.0	0.32	mg/L	J		1	6010C
7440-28-0	Thallium	ND	0.020	0.010	mg/L			1	6010C
7440-62-2	Vanadium	ND	0.0050	0.0015	mg/L			1	6010C
7440-66-6	Zinc	0.010 ~~0.0028~~	0.010	0.0015	mg/L	~~J~~ U	B	1	6010C
7439-97-6	Mercury	ND	0.00020	0.00012	mg/L			1	7470A

1B-IN
INORGANIC ANALYSIS DATA SHEET
GENERAL CHEMISTRY

Client Sample ID: MW-14-01282020 Lab Sample ID: 480-165713-1

Lab Name: Eurofins TestAmerica, Buffalo Job No.: 480-165713-1

SDG ID.:

Matrix: Water Date Sampled: 01/28/2020 10:55

Reporting Basis: WET Date Received: 01/30/2020 09:30

CAS No.	Analyte	Result	RL	MDL	Units	C	Q	DIL	Method
57-12-5	Cyanide, Total	ND	0.010	0.0050	mg/L		* F1	1	9012B
16984-48-8	Fluoride	2.4	0.20	0.034	mg/L			2	SM 4500 F C

1B-IN
INORGANIC ANALYSIS DATA SHEET
GENERAL CHEMISTRY

Client Sample ID: MW-14-DUP-01282020 Lab Sample ID: 480-165713-6

Lab Name: Eurofins TestAmerica, Buffalo Job No.: 480-165713-1

SDG ID.:

Matrix: Water Date Sampled: 01/28/2020 11:10

Reporting Basis: WET Date Received: 01/30/2020 09:30

CAS No.	Analyte	Result	RL	MDL	Units	C	Q	DIL	Method
57-12-5	Cyanide, Total	ND	0.010	0.0050	mg/L		*	1	9012B
16984-48-8	Fluoride	2.5	0.20	0.034	mg/L			2	SM 4500 F C

VALIDATA
Chemical Services, Inc.
2159 Wynnton Pointe, Duluth, GA 30097
(770) 232-0130
(770) 232-5082 (Fax)
www.datavalidator.com

DATA USABILITY SUMMARY REPORT

COMPANY:	AECOM Technical Services Northeast, Inc.
PROJECT NAME:	C&D Power Systems #336001
CONTRACTED LAB:	Eurofins Test America, Buffalo
QA/QC LEVEL:	DUSR
ANALYTICAL METHOD(S):	SW846 and EPA Methods
VALIDATION GUIDELINES:	*USEPA Region II data validation SOPs (VOA HW-24 Rev.4, SVOC HW-22 Rev.5, PEST-HW-44, Rev 1.1, PCB HW-37a Rev. 0, METALS_SOP_HW3a-ICP-AES Rev 1.1 and HW3c-Hg-CN, Rev. 1), USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review,* **2008**; *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review,***2010**; NYDEC *Guidelines for Sampling and Analysis of PFAS,* January 2020, Professional Judgment
SAMPLE MATRIX:	Solid
TYPES OF ANALYSES:	Volatile Organic Compounds (VOC) Semivolatile Organic Compounds (SVOC), Pesticides (Pest), Polychlorinated Hydrocarbons (PCBs), Total Metals, Total Mercury
DATA REVIEWER(S):	Amy L. Hogan
SDG NUMBER:	480-165715-1
SAMPLING DATE(S):	January 28-29, 2020

SAMPLES:

Client Sample ID	Laboratory ID	VOC	SVOC
VS-2 (0-12) 012920	480-165715-12	X	X

Client Sample ID	Laboratory ID	PEST	PCB
Was-1 (0-12) 012820	480-165715-1		X
Was-1 (12-24) 012820	480-165715-2		X
Was-2 (0-12) 012820	480-165715-3		X
VS-2 (0-12) 012920	480-165715-12	X	X
Was-1 (0-12) 012820MS	480-165715-1MS		X
Was-1 (0-12) 012820MSD	480-165715-1MSD		X

Client Sample ID	Laboratory ID	T. MET.	MERCURY
VS-2 (0-12) 012920	480-165715-12	X	X

Suffix Codes: DL= DILUTION, MS = MATRIX SPIKE,
MSD = MATRIX SPIKE DUPLICATE, RE = REANALYSIS

Qualifier	Definition
U	The analyte was not detected and was reported as less than the LOD or as defined by the customer. The LOD has been adjusted for any dilution or concentration of the sample.
J	The reported result was an estimated value with an unknown bias.
J+	The result was an estimated quantity, but the result may be biased high.
J-	The result was an estimated quantity, but the result may be biased low.
N	The analysis indicates the presence of an analyte for which there was presumptive evidence to make a "tentative identification."
NJ	The analyte has been “tentatively identified” or “presumptively” as present and the associated numerical value was the estimated concentration in the sample.
UJ	The analyte was not detected and was reported as less than the LOD or as defined by the customer. However, the associated numerical value is approximate.
X	The sample results (including non-detects) were affected by serious deficiencies in the ability to analyze the sample and to meet published method and project quality control criteria. The presence or absence of the analyte cannot be substantiated by the data provided. Acceptance or rejection of the data should be decided by the project team (which should include a project chemist), but exclusion of the data is recommended.

DATA USABILITY SUMMARY

Eurofins Test America, Buffalo – 480-165715-1

VOLATILE ORGANICS

SUMMARY

I.) General:

The analyses for Volatile Organics were performed per SW846 Method 8260C.

II.) Overall Assessment of Data:

All laboratory data were acceptable with qualifications.

II.) Holding Times:

All Holding Time criteria were met. No data qualification was necessary.

IV.) GC/MS Tuning:

All GC/MS Tuning criteria were met. No data qualification was necessary.

V.) Calibration:

Initial Calibration:

All Initial Calibration criteria were met. No data qualification was necessary.

Initial Calibration Verification:

All Initial Calibration Verification criteria were met. No data qualification was necessary.

Continuing Calibration:

The Percent Differences (%Ds) for the standards run on 1/30/20 at 09:19 on instrument HP5973F were 24.4% for dichlorodifluoromethane and 25.4% for trichlorofluoromethane, which exceeded the 20% QC limit. The non-detect results for these compounds in the sample were qualified as estimated (UJ).

It was noted by the validator that the lab did not analyze a closing calibration standard. Since the samples were all analyzed within the 12-hour analytical clock of the submitted calibration and citing professional judgment, the validator determined that data qualification based on the closing

calibration standard absence was not necessary.

VI.) Blanks:

Method Blanks:

Chloroform (0.684 ug/kg) was detected in the associated method blank. Since the blank result was less than the RL, the positive chloroform result for the sample, which was less than the RL, was qualified as undetected (U) with the result being raised to the RL.

Equipment Blanks:

There was no equipment blank submitted in association with this SDG. No data qualification was necessary.

Field Blanks:

There was no field blank submitted in association with this SDG. No data qualification was necessary.

Trip Blank:

There was no trip blank submitted in association with this SDG. No data qualification was necessary.

VII.) Surrogate Recoveries:

All Surrogate Recovery criteria were met. No data qualification was necessary.

VIII.) Laboratory Control Samples (LCS):

One LCS was analyzed by the laboratory for this SDG. All criteria were met. No data qualification was necessary.

IX.) Matrix Spike / Matrix Spike Duplicate (MS / MSD):

MS / MSD analyses data were not submitted for this fraction of the SDG. Data qualification based on the absence of MS / MSD data was not required. No data qualification was necessary.

X.) Field Duplicates:

There were no field duplicate samples identified as part of this SDG. No data qualification was necessary.

XI.) TCL Compound Identification:

All TCL Compound Identification criteria were met. No data qualification was necessary.

XII.) Internal Standards Performance (ISTD):

All ISTD area count criteria were met. No data qualification was necessary.

XIII.) Compound Quantitation and Reported Contract Required Quantitation Limits (CRQL):

All CRQL criteria were met. No data qualification was necessary.

SEMIVOLATILE ORGANICS

SUMMARY

I.) General:

The analyses for Semivolatile Organics were performed per SW846 Method 8270D.

II.) Overall Assessment of Data:

All laboratory data were acceptable with qualifications.

II.) Holding Times:

All Holding Time criteria were met. No data qualification was necessary.

IV.) GC/MS Tuning:

All GC/MS Tuning criteria were met. No data qualification was necessary.

V.) Calibration:

Initial Calibration:

All Initial Calibration criteria were met. No data qualification was necessary.

Initial Calibration Verification:

All Initial Calibration Verification criteria were met. No data qualification was necessary.

Continuing Calibration:

The Percent Difference (%D) for the standards run on 2/3/20 at 15:12 on instrument HP5973 was 20.7% for hexachlorocyclopentadiene, which exceeded the 20% QC limit. The non-detect result for hexachlorocyclopentadiene for the sample was qualified as estimated (UJ).

VI.) Blanks:

Method Blanks:

There were no detections in the associated method blank. No data qualification was necessary.

Equipment Blanks:

There was no equipment blank submitted in association with this SDG. No data qualification was necessary.

Field Blanks:

There was no field blank submitted in association with this SDG. No data qualification was necessary.

VII.) Surrogate Recoveries:

The Percent Recoveries (%Rs) for 2,4,6-tribromophenol (171%) and nitrobenzene-d5 (48%) for sample VS-2 (0-12) 012920 were outside the QC limits. Since only one %R was outside the QC limits for either the acid or base-neutral portion of the sample, no data qualification was necessary.

VIII.) Laboratory Control Samples (LCS):

One LCS was analyzed by the laboratory for this SDG. All criteria were met. No data qualification was necessary.

IX.) Matrix Spike / Matrix Spike Duplicate (MS / MSD):

MS / MSD analyses data were not submitted for this fraction of the SDG. Data qualification based on the absence of MS / MSD data was not required. No data qualification was necessary.

X.) Field Duplicates:

There were no field duplicate samples identified as part of this SDG. No data qualification was necessary.

XI.) TCL Compound Identification:

All TCL Compound Identification criteria were met. No data qualification was necessary.

XII.) Internal Standards Performance (ISTD):

All ISTD area count criteria were met. No data qualification was necessary.

XIII.) Compound Quantitation and Reported Contract Required Quantitation Limits (CRQL):

All CRQL criteria were met. No data qualification was necessary.

PESTICIDES

SUMMARY

I.) General:

The analyses for Pesticides were performed per SW846 Method 8081B.

II.) Overall Assessment of Data:

All laboratory data were acceptable with qualifications.

II.) Holding Times:

All Holding Time criteria were met. No data qualification was necessary.

IV.) Instrument Performance:

All Instrument Performance criteria were met. No data qualification was necessary.

V.) Calibration:

Initial Calibration:

All Initial Calibration criteria were met. No data qualification was necessary.

Continuing Calibration:

The Percent Differences (%Ds) for the standards run on 2/5/20 at 09:02 on column II of instrument HP6890-25 exceeded the 20% QC limit for the following compounds:

Toxaphene (#3)	-21.3%
Toxaphene (#4)	-23.3%
Toxaphene (#5)	-29.4%

The non-detect Toxaphene result for the sample was qualified as estimated (UJ).

A review of the run log indicates that the CCV was not analyzed after every 10 samples as recommended by the guidance and that a closing CCV was also not analyzed. It was noted that the lab did analyze a CCV every 20 samples as recommended by the method. Since the samples were all analyzed within the 12-hour analytical clock of the submitted calibration and citing professional judgment, the validator determined that data qualification based on the closing

calibration standard absence was not necessary.

VI.) Blanks:

Method Blanks:

Beta BHC (1.16 ug/kg), delta BHC (1.21 ug/kg), gamma BHC (0.596 ug/kg) and endrin ketone (1.15 ug/kg) were detected in the associated method blank. Since the blank results were below the RL, the positive beta BHC, delta BHC and gamma BHC result for the sample, which were less than the RL, were qualified as undetected (U) with the result being raised to the RL. Since the sample result for endrin ketone was greater than the RL, no further data qualification was necessary.

Equipment Blanks:

There was no equipment blank submitted in association with this SDG. No data qualification was necessary.

Field Blanks:

There was no field blank submitted in association with this SDG. No data qualification was necessary.

VII.) Surrogate Recoveries:

The Surrogates were diluted out of the SDG sample. No data qualification was necessary.

VIII.) Laboratory Control Samples (LCS):

One LCS was analyzed by the laboratory for this SDG. All criteria were met. No data qualification was necessary.

IX.) Matrix Spike / Matrix Spike Duplicate (MS / MSD):

MS / MSD analyses were performed using the other SDG sample. A total of 15 Percent Recoveries (%Rs) were outside the QC limits. Since the parent sample was not part of the validation for this SDG, no data qualification was necessary.

X.) Field Duplicates:

There were no field duplicate samples identified as part of this SDG. No data qualification was necessary.

XI.) TCL Compound Identification:

The Column Relative Percent Difference (RPD) exceeded the 25% QC limit for the following samples and compounds:

VS-2 (0-12) 012920	heptachlor epoxide	148.7%
	dieldrin	105.3%
	endrin	33.0%
	endosulfan II	160.9%
	endrin aldehyde	103.7%
	endrin ketone	101.8%

The results for these compounds in the sample were qualified as estimated (J).

XII.) Internal Standards Performance (ISTD):

All ISTD area count criteria were met. No data qualification was necessary.

XIII.) Compound Quantitation and Reported Contract Required Quantitation Limits (CRQL):

All CRQL criteria were met. No data qualification was necessary.

POLYCHLORINATED BIPHENYLS (PCB)

SUMMARY

I.) General:

The analyses for Polychlorinated Biphenyls (PCB) were performed per SW846 Method 8082A.

II.) Overall Assessment of Data:

All laboratory data were acceptable with qualifications.

II.) Holding Times:

All Holding Time criteria were met. No data qualification was necessary.

IV.) Instrument Performance:

All Instrument Performance criteria were met. No data qualification was necessary.

V.) Calibration:

Initial Calibration:

All Initial Calibration criteria were met. No data qualification was necessary.

Continuing Calibration:

The Percent Differences (%Ds) for the standards runs on 2/3/20 at on instrument HP6890-7 exceeded the 25% opening CCV QC limit for the following compounds:

Compound	Col. I, %R	Col. II, %D
Aroclor 1016 (2)		26.4%
Aroclor 1016 (3)	30.6%	
Aroclor 1221 (1)		29.1%
Aroclor 1221 (2)		35.1%
Aroclor 1221 (3)		29.9%
Aroclor 1221 (4)		32.6%
Aroclor 1232 (1)	43.8%	51.0%
Aroclor 1232 (2)	46.9%	67.3%
Aroclor 1232 (3)	50.9%	60.0%
Aroclor 1232 (4)	44.6%	77.9%
Aroclor 1232 (5)	62.9%	63.9%
Aroclor 1262 (1)	38.0%	64.2%
Aroclor 1262 (2)	33.9%	101.5%
Aroclor 1262 (3)	46.3%	103.4%
Aroclor 1262 (4)	25.8%	64.4%
Aroclor 1262 (5)	26.1%	44.3%
Aroclor 1242 (1)		37.0%
Aroclor 1242 (2)		49.3%
Aroclor 1242 (3)	43.9%	40.3%
Aroclor 1242 (4)		41.9%
Aroclor 1242 (5)	32.7%	27.0%
Aroclor 1268 (1)		35.6%
Aroclor 1268 (4)		25.9%
Aroclor 1248 (1)	30.1%	54.0%
Aroclor 1248 (2)		73.1%
Aroclor 1248 (3)	25.3%	37.8%
Aroclor 1248 (4)		69.8%
Aroclor 1248 (5)	36.6%	67.4%

The results for Aroclors 1016, 1221, 1232, 1242, 1248, 1262 and 1268 for the SDG samples, which were all non-detects, were qualified as estimated (UJ).

A review of the run log indicates that the CCV was not analyzed after every 10 samples as recommended by the guidance and that a closing CCV was also not analyzed. It was noted that the lab did analyze a CCV every 20 samples as recommended by the method. Since the samples were all analyzed within the 12-hour analytical clock of the submitted calibration and citing professional judgment, the validator determined that data qualification based on the closing calibration standard absence was not necessary.

VI.) Blanks:

Method Blanks:

There were no detections in the associated method blank. No data qualification was necessary.

Equipment Blanks:

There was no equipment blank submitted in association with this SDG. No data qualification was necessary.

Field Blanks:

There was no field blank submitted in association with this SDG. No data qualification was necessary.

VII.) Surrogate Recoveries:

All Surrogate Recovery criteria were met. No data qualification was necessary.

VIII.) Laboratory Control Samples (LCS):

One LCS was analyzed by the laboratory for this SDG. All criteria were met. No data qualification was necessary.

IX.) Matrix Spike / Matrix Spike Duplicate (MS / MSD):

MS / MSD analyses were performed using SDG sample Was-1 (0-12) 012820. All criteria were met. No data qualification was necessary.

X.) Field Duplicates:

There were no field duplicate samples identified as part of this SDG. No data qualification was necessary.

XI.) TCL Compound Identification:

All TCL Compound Identification criteria were met. No data qualification was necessary.

XII.) Internal Standards Performance (ISTD):

All ISTD area count criteria were met. No data qualification was necessary.

XIII.) Compound Quantitation and Reported Contract Required Quantitation Limits (CRQL):

The Aroclor 1254 result for sample VS-2 (0-12) 012920 exceeded the linear calibration range of the instrument. The Aroclor 1254 result for this sample was qualified as estimated (J).

TOTAL METALS

SUMMARY

I.) General:

The analyses for Total Metals were performed per SW846 Method 6010C.

II.) Overall Assessment of Data:

All laboratory data were acceptable without qualifications.

III.) Holding Times:

All Holding Time criteria were met. No data qualification was necessary.

IV.) Calibration:

All Initial and Continuing Calibration criteria were met. No data qualification was necessary.

V.) CRDL standards:

The Percent Recovery (%R) for total potassium (142%) for a CRDL standard exceeded the QC limits. Since the associated sample result was greater than the RL, no data qualification was required.

VI.) Blanks:

Calibration Blanks:

Iron (0.324 mg/L, 0.0240 mg/L, 0.0231 mg/L) and potassium (0.163 mg/L), 0.120 mg/L) were detected in the associated calibration blanks. Since the blank results were less than the RL and the positive iron and potassium result for the sample were greater than the RL, no data qualification was necessary.

Preparation Blanks:

Calcium (4.28 mg/kg) and manganese (0.0594 mg/kg) were detected in the associated method blank. Since the blank results were less than the RL and the sample results for these analytes were greater than the RL, no data qualification was necessary.

Equipment Blanks:

There was no equipment blank submitted in association with this SDG. No data qualification was necessary.

Field Blank:

There was no field blank submitted in association with this SDG. No data qualification was necessary.

VII.) Interference Check Sample (ICS) Results:

All ICS criteria were met. No data qualification was necessary.

VIII.) Matrix Spike / Matrix Spike Duplicates (MS / MSD):

MS / MSD analyses data were not submitted for this fraction of the SDG. Data qualification based on the absence of MS / MSD data was not required. No data qualification was necessary.

IX.) Laboratory Control Samples (LCS):

All LCS Recovery criteria were met. No data qualification was necessary.

X.) Serial Dilution Analysis:

Serial Dilution Analysis data was not required for this SDG. No data qualification was necessary.

XI.) Field Duplicates:

There were no field duplicate samples identified for this SDG. No data qualification was necessary.

XII.) Compound Quantitation and Reported Contract Required Quantitation Limits (CRQL):

All CRQL criteria were met. No data qualification was necessary.

TOTAL MERCURY

SUMMARY

I.) General:

The analyses for Total Mercury were performed per SW846 Method 7470A.

II.) Overall Assessment of Data:

All laboratory data were acceptable without qualifications.

III.) Holding Times:

All Holding Time criteria were met. No data qualification was necessary.

IV.) Calibration:

All Initial and Continuing Calibration criteria were met. No data qualification was necessary.

V.) CRDL standards:

All CRDL standards criteria were met. No data qualification was required.

VI.) Blanks:

Calibration Blanks:

There were no detections in the associated calibration blanks. No data qualification was necessary.

Preparation Blanks:

There was no detection in the associated preparation blanks. No data qualification was necessary.

Equipment Blanks:

There was no equipment blank submitted in associated with this SDG. No data qualification was necessary.

Field Blank:

There was no field blank submitted in association with this SDG. No data qualification was necessary.

VII.) Matrix Spike / Matrix Spike Duplicates (MS / MSD):

MS / MSD analyses data was not submitted for this fraction of the SDG. Data qualification based on the absence of MS / MSD data was not required. No data qualification was necessary.

VIII.) Laboratory Control Samples (LCS):

All LCS Recovery criteria were met. No data qualification was necessary.

IX.) Serial Dilution Analysis:

Serial Dilution Analysis data was not required for this fraction of the SDG. No data qualification was necessary.

X.) Field Duplicates:

There were no field duplicate samples identified for this fraction of the SDG. No data

qualification was necessary.

XI.) Compound Quantitation and Reported Contract Required Quantitation Limits (CRQL):

All CRQL criteria were met. No data qualification was necessary.

Attachment A

Sample Result Forms (FORM Is) Corrected for Validation Qualifiers

FORM I
GC/MS VOA ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins TestAmerica, Buffalo Job No.: 480-165715-1

SDG No.:

Client Sample ID: VS-2 (0-12) 012920 Lab Sample ID: 480-165715-12

Matrix: Solid Lab File ID: F5394.D

Analysis Method: 8260C Date Collected: 01/29/2020 08:55

Sample wt/vol: 5.06(g) Date Analyzed: 01/30/2020 17:13

Soil Aliquot Vol: Dilution Factor: 1

Soil Extract Vol.: GC Column: ZB-624 (30) VOA ID: 0.25(mm)

% Moisture: 25.7 Level: (low/med) Low

Analysis Batch No.: 515513 Units: ug/Kg

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
71-55-6	1,1,1-Trichloroethane	ND	vs	6.7	0.48
79-34-5	1,1,2,2-Tetrachloroethane	ND	vs	6.7	1.1
79-00-5	1,1,2-Trichloroethane	ND	vs	6.7	0.86
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	ND	vs	6.7	1.5
75-34-3	1,1-Dichloroethane	ND	vs	6.7	0.81
75-35-4	1,1-Dichloroethene	ND	vs	6.7	0.81
120-82-1	1,2,4-Trichlorobenzene	ND	vs	6.7	0.40
96-12-8	1,2-Dibromo-3-Chloropropane	ND	vs	6.7	3.3
95-50-1	1,2-Dichlorobenzene	ND	vs	6.7	0.52
107-06-2	1,2-Dichloroethane	ND	vs	6.7	0.33
78-87-5	1,2-Dichloropropane	ND	vs	6.7	3.3
541-73-1	1,3-Dichlorobenzene	ND	vs	6.7	0.34
106-46-7	1,4-Dichlorobenzene	ND	vs	6.7	0.93
78-93-3	2-Butanone (MEK)	ND	vs	33	2.4
591-78-6	2-Hexanone	ND	vs	33	3.3
108-10-1	4-Methyl-2-pentanone (MIBK)	ND	vs	33	2.2
67-64-1	Acetone	ND	vs	33	5.6
71-43-2	Benzene	ND	vs	6.7	0.33
75-27-4	Bromodichloromethane	ND	vs	6.7	0.89
75-25-2	Bromoform	ND	vs	6.7	3.3
74-83-9	Bromomethane	ND	vs	6.7	0.60
75-15-0	Carbon disulfide	ND	vs	6.7	3.3
56-23-5	Carbon tetrachloride	ND	vs	6.7	0.64
108-90-7	Chlorobenzene	ND	vs	6.7	0.88
124-48-1	Dibromochloromethane	ND	vs	6.7	0.85
75-00-3	Chloroethane	ND	vs	6.7	1.5
67-66-3	Chloroform	6.7 ~~0.59~~ ~~J B~~	U vs	6.7	0.41
74-87-3	Chloromethane	ND	vs	6.7	0.40
156-59-2	cis-1,2-Dichloroethene	ND	vs	6.7	0.85
10061-01-5	cis-1,3-Dichloropropene	ND	vs	6.7	0.96
110-82-7	Cyclohexane	ND	vs	6.7	0.93
75-71-8	Dichlorodifluoromethane	ND	vs UJ	6.7	0.55
100-41-4	Ethylbenzene	ND	vs	6.7	0.46
106-93-4	1,2-Dibromoethane	ND	vs	6.7	0.85
98-82-8	Isopropylbenzene	ND	vs	6.7	1.0

ALH 11/4/2020

FORM I
GC/MS VOA ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins TestAmerica, Buffalo Job No.: 480-165715-1

SDG No.:

Client Sample ID: VS-2 (0-12) 012920 Lab Sample ID: 480-165715-12

Matrix: Solid Lab File ID: F5394.D

Analysis Method: 8260C Date Collected: 01/29/2020 08:55

Sample wt/vol: 5.06(g) Date Analyzed: 01/30/2020 17:13

Soil Aliquot Vol: Dilution Factor: 1

Soil Extract Vol.: GC Column: ZB-624 (30) VOA ID: 0.25(mm)

% Moisture: 25.7 Level: (low/med) Low

Analysis Batch No.: 515513 Units: ug/Kg

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
79-20-9	Methyl acetate	ND	vs	33	4.0
1634-04-4	Methyl tert-butyl ether	ND	vs	6.7	0.65
108-87-2	Methylcyclohexane	ND	vs	6.7	1.0
75-09-2	Methylene Chloride	ND	vs	6.7	3.1
100-42-5	Styrene	ND	vs	6.7	0.33
127-18-4	Tetrachloroethene	ND	vs	6.7	0.89
108-88-3	Toluene	ND	vs	6.7	0.50
156-60-5	trans-1,2-Dichloroethene	ND	vs	6.7	0.69
10061-02-6	trans-1,3-Dichloropropene	ND	vs	6.7	2.9
79-01-6	Trichloroethene	ND	vs	6.7	1.5
75-69-4	Trichlorofluoromethane	ND	vs UJ	6.7	0.63
75-01-4	Vinyl chloride	ND	vs	6.7	0.81
1330-20-7	Xylenes, Total	ND	vs	13	1.1

CAS NO.	SURROGATE	%REC	Q	LIMITS
2037-26-5	Toluene-d8 (Surr)	96		71-125
17060-07-0	1,2-Dichloroethane-d4 (Surr)	104		64-126
460-00-4	4-Bromofluorobenzene (Surr)	98		72-126
1868-53-7	Dibromofluoromethane (Surr)	105		60-140

ALH 11/4/2020

FORM I
GC/MS SEMI VOA ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins TestAmerica, Buffalo | Job No.: 480-165715-1

SDG No.:

Client Sample ID: VS-2 (0-12) 012920 | Lab Sample ID: 480-165715-12

Matrix: Solid | Lab File ID: V3143368.D

Analysis Method: 8270D | Date Collected: 01/29/2020 08:55

Extract. Method: 3550C | Date Extracted: 01/31/2020 14:48

Sample wt/vol: 30.32(g) | Date Analyzed: 02/03/2020 21:05

Con. Extract Vol.: 10(mL) | Dilution Factor: 5

Injection Volume: 1(uL) | Level: (low/med) Low

% Moisture: 25.7 | GPC Cleanup:(Y/N) N

Analysis Batch No.: 515974 | Units: ug/Kg

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
92-52-4	Biphenyl	ND		11000	1700
108-60-1	bis (2-chloroisopropyl) ether	ND		11000	2300
95-95-4	2,4,5-Trichlorophenol	ND		11000	3100
88-06-2	2,4,6-Trichlorophenol	ND		11000	2300
120-83-2	2,4-Dichlorophenol	ND		11000	1200
105-67-9	2,4-Dimethylphenol	ND		11000	2700
51-28-5	2,4-Dinitrophenol	ND		110000	52000
121-14-2	2,4-Dinitrotoluene	ND		11000	2300
606-20-2	2,6-Dinitrotoluene	ND		11000	1300
91-58-7	2-Chloronaphthalene	ND		11000	1900
123-91-1	1,4-Dioxane	ND		6700	3700
95-57-8	2-Chlorophenol	ND		22000	2100
95-48-7	2-Methylphenol	ND		11000	1300
91-57-6	2-Methylnaphthalene	ND		11000	2300
88-74-4	2-Nitroaniline	ND		22000	1700
88-75-5	2-Nitrophenol	ND		11000	3200
91-94-1	3,3'-Dichlorobenzidine	ND		22000	13000
99-09-2	3-Nitroaniline	ND		22000	3100
534-52-1	4,6-Dinitro-2-methylphenol	ND		22000	11000
101-55-3	4-Bromophenyl phenyl ether	ND		11000	1600
59-50-7	4-Chloro-3-methylphenol	ND		11000	2800
106-47-8	4-Chloroaniline	ND		11000	2800
7005-72-3	4-Chlorophenyl phenyl ether	ND		11000	1400
106-44-5	4-Methylphenol	ND		22000	1300
100-01-6	4-Nitroaniline	ND		22000	5900
100-02-7	4-Nitrophenol	ND		22000	7900
83-32-9	Acenaphthene	ND		11000	1700
208-96-8	Acenaphthylene	ND		11000	1500
98-86-2	Acetophenone	ND		11000	1500
120-12-7	Anthracene	ND		11000	2800
1912-24-9	Atrazine	ND		11000	3900
100-52-7	Benzaldehyde	ND		11000	9000
56-55-3	Benzo[a]anthracene	2400	J	11000	1100
50-32-8	Benzo[a]pyrene	2800	J	11000	1700

FORM I
GC/MS SEMI VOA ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins TestAmerica, Buffalo Job No.: 480-165715-1

SDG No.:

Client Sample ID: VS-2 (0-12) 012920 Lab Sample ID: 480-165715-12

Matrix: Solid Lab File ID: V3143368.D

Analysis Method: 8270D Date Collected: 01/29/2020 08:55

Extract. Method: 3550C Date Extracted: 01/31/2020 14:48

Sample wt/vol: 30.32(g) Date Analyzed: 02/03/2020 21:05

Con. Extract Vol.: 10(mL) Dilution Factor: 5

Injection Volume: 1(uL) Level: (low/med) Low

% Moisture: 25.7 GPC Cleanup:(Y/N) N

Analysis Batch No.: 515974 Units: ug/Kg

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
205-99-2	Benzo[b]fluoranthene	3000	J	11000	1800
191-24-2	Benzo[g,h,i]perylene	2700	J	11000	1200
207-08-9	Benzo[k]fluoranthene	ND		11000	1500
111-91-1	Bis(2-chloroethoxy)methane	ND		11000	2400
111-44-4	Bis(2-chloroethyl)ether	ND		11000	1500
117-81-7	Bis(2-ethylhexyl) phthalate	ND		11000	3900
85-68-7	Butyl benzyl phthalate	ND		11000	1900
105-60-2	Caprolactam	ND		11000	3400
86-74-8	Carbazole	ND		11000	1300
218-01-9	Chrysene	ND		11000	2500
53-70-3	Dibenz(a,h)anthracene	ND		11000	2000
84-74-2	Di-n-butyl phthalate	ND		11000	1900
117-84-0	Di-n-octyl phthalate	ND		11000	1300
132-64-9	Dibenzofuran	ND		11000	1300
84-66-2	Diethyl phthalate	ND		11000	1500
131-11-3	Dimethyl phthalate	ND		11000	1300
206-44-0	Fluoranthene	3600	J	11000	1200
86-73-7	Fluorene	ND		11000	1300
118-74-1	Hexachlorobenzene	ND		11000	1500
87-68-3	Hexachlorobutadiene	ND		11000	1700
77-47-4	Hexachlorocyclopentadiene	ND	UJ	11000	1500
67-72-1	Hexachloroethane	ND		11000	1500
193-39-5	Indeno[1,2,3-cd]pyrene	2100	J	11000	1400
78-59-1	Isophorone	ND		11000	2400
621-64-7	N-Nitrosodi-n-propylamine	ND		11000	1900
86-30-6	N-Nitrosodiphenylamine	ND		11000	9200
91-20-3	Naphthalene	ND		11000	1500
98-95-3	Nitrobenzene	ND		11000	1300
87-86-5	Pentachlorophenol	ND		22000	11000
85-01-8	Phenanthrene	ND		11000	1700
108-95-2	Phenol	ND		11000	1700
129-00-0	Pyrene	3100	J	11000	1300

ALH 11/4/2020

FORM I
GC/MS SEMI VOA ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins TestAmerica, Buffalo Job No.: 480-165715-1

SDG No.:

Client Sample ID: VS-2 (0-12) 012920 Lab Sample ID: 480-165715-12

Matrix: Solid Lab File ID: V3143368.D

Analysis Method: 8270D Date Collected: 01/29/2020 08:55

Extract. Method: 3550C Date Extracted: 01/31/2020 14:48

Sample wt/vol: 30.32(g) Date Analyzed: 02/03/2020 21:05

Con. Extract Vol.: 10(mL) Dilution Factor: 5

Injection Volume: 1(uL) Level: (low/med) Low

% Moisture: 25.7 GPC Cleanup:(Y/N) N

Analysis Batch No.: 515974 Units: ug/Kg

CAS NO.	SURROGATE	%REC	Q	LIMITS
4165-60-0	Nitrobenzene-d5 (Surr)	48	X	53-120
4165-62-2	Phenol-d5 (Surr)	60		54-120
1718-51-0	p-Terphenyl-d14 (Surr)	99		79-130
118-79-6	2,4,6-Tribromophenol (Surr)	171	X	54-120
321-60-8	2-Fluorobiphenyl	83		60-120
367-12-4	2-Fluorophenol (Surr)	103		52-120

FORM I
PESTICIDES ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins TestAmerica, Buffalo Job No.: 480-165715-1

SDG No.:

Client Sample ID: VS-2 (0-12) 012920 Lab Sample ID: 480-165715-12

Matrix: Solid Lab File ID: 25_30-324.D

Analysis Method: 8081B Date Collected: 01/29/2020 08:55

Extraction Method: 3550C Date Extracted: 02/04/2020 14:38

Sample wt/vol: 30.66(g) Date Analyzed: 02/05/2020 14:36

Con. Extract Vol.: 10(mL) Dilution Factor: 50

Injection Volume: 1(uL) GC Column: RTX-CLPI ID: 0.53(mm)

% Moisture: 25.7 GPC Cleanup:(Y/N) N

Analysis Batch No.: 516235 Units: ug/Kg

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
72-54-8	4,4'-DDD	ND		110	21
72-55-9	4,4'-DDE	190		110	23
50-29-3	4,4'-DDT	ND		110	26
309-00-2	Aldrin	ND		110	27
319-84-6	alpha-BHC	ND		110	20
5103-71-9	cis-Chlordane	ND		110	55
319-85-7	beta-BHC	110 ~~37~~	~~J B~~ U	110	20
319-86-8	delta-BHC	110 ~~26~~	~~J B~~ U	110	20
60-57-1	Dieldrin	390	J	110	26
959-98-8	Endosulfan I	ND		110	21
33213-65-9	Endosulfan II	87	~~J~~ J	110	20
1031-07-8	Endosulfan sulfate	ND		110	20
72-20-8	Endrin	750	J	110	22
7421-93-4	Endrin aldehyde	59	~~J~~ J	110	28
53494-70-5	Endrin ketone	160	~~B~~ J	110	27
58-89-9	gamma-BHC (Lindane)	110 ~~31~~	~~J B~~ U	110	20
5103-74-2	trans-Chlordane	ND		110	35
76-44-8	Heptachlor	ND		110	24
1024-57-3	Heptachlor epoxide	43	~~J~~ J	110	28
72-43-5	Methoxychlor	150		110	22
8001-35-2	Toxaphene	ND	UJ	1100	640

CAS NO.	SURROGATE	%REC	Q	LIMITS
2051-24-3	DCB Decachlorobiphenyl	0	X	45-120
877-09-8	Tetrachloro-m-xylene	0	X	30-124

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FORM I
PCBS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins TestAmerica, Buffalo Job No.: 480-165715-1

SDG No.:

Client Sample ID: Was-1 (0-12) 012820 Lab Sample ID: 480-165715-1

Matrix: Solid Lab File ID: 7_65-093.D

Analysis Method: 8082A Date Collected: 01/28/2020 13:40

Extraction Method: 3550C Date Extracted: 01/30/2020 15:25

Sample wt/vol: 2.18(g) Date Analyzed: 02/03/2020 15:22

Con. Extract Vol.: 10(mL) Dilution Factor: 1

Injection Volume: 1(uL) GC Column: ZB-5 ID: 0.53(mm)

% Moisture: 10.4 GPC Cleanup:(Y/N) N

Analysis Batch No.: 515960 Units: mg/Kg

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
12674-11-2	PCB-1016	ND	UJ	0.26	0.050
11104-28-2	PCB-1221	ND	UJ	0.26	0.050
11141-16-5	PCB-1232	ND	UJ	0.26	0.050
53469-21-9	PCB-1242	ND	UJ	0.26	0.050
12672-29-6	PCB-1248	ND	UJ	0.26	0.050
11097-69-1	PCB-1254	ND		0.26	0.12
11096-82-5	PCB-1260	ND		0.26	0.12
37324-23-5	PCB-1262	ND	UJ	0.26	0.12
11100-14-4	PCB-1268	ND	UJ	0.26	0.12

CAS NO.	SURROGATE	%REC	Q	LIMITS
877-09-8	Tetrachloro-m-xylene	105		60-154
2051-24-3	DCB Decachlorobiphenyl	113		65-174

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FORM I
PCBS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins TestAmerica, Buffalo Job No.: 480-165715-1

SDG No.:

Client Sample ID: Was-1 (12-24) 012820 Lab Sample ID: 480-165715-2

Matrix: Solid Lab File ID: 7_65-094.D

Analysis Method: 8082A Date Collected: 01/28/2020 13:45

Extraction Method: 3550C Date Extracted: 01/30/2020 15:25

Sample wt/vol: 2.30(g) Date Analyzed: 02/03/2020 15:35

Con. Extract Vol.: 10(mL) Dilution Factor: 1

Injection Volume: 1(uL) GC Column: ZB-5 ID: 0.53(mm)

% Moisture: 9.6 GPC Cleanup:(Y/N) N

Analysis Batch No.: 515960 Units: mg/Kg

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
12674-11-2	PCB-1016	ND	UJ	0.24	0.047
11104-28-2	PCB-1221	ND	UJ	0.24	0.047
11141-16-5	PCB-1232	ND	UJ	0.24	0.047
53469-21-9	PCB-1242	ND	UJ	0.24	0.047
12672-29-6	PCB-1248	ND	UJ	0.24	0.047
11097-69-1	PCB-1254	ND		0.24	0.11
11096-82-5	PCB-1260	ND		0.24	0.11
37324-23-5	PCB-1262	ND	UJ	0.24	0.11
11100-14-4	PCB-1268	ND	UJ	0.24	0.11

CAS NO.	SURROGATE	%REC	Q	LIMITS
877-09-8	Tetrachloro-m-xylene	108		60-154
2051-24-3	DCB Decachlorobiphenyl	119		65-174

FORM I
PCBS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins TestAmerica, Buffalo Job No.: 480-165715-1

SDG No.:

Client Sample ID: Was-2 (0-12) 012820 Lab Sample ID: 480-165715-3

Matrix: Solid Lab File ID: 7_65-095.D

Analysis Method: 8082A Date Collected: 01/28/2020 13:30

Extraction Method: 3550C Date Extracted: 01/30/2020 15:25

Sample wt/vol: 2.01(g) Date Analyzed: 02/03/2020 15:47

Con. Extract Vol.: 10(mL) Dilution Factor: 1

Injection Volume: 1(uL) GC Column: ZB-5 ID: 0.53(mm)

% Moisture: 14.7 GPC Cleanup:(Y/N) N

Analysis Batch No.: 515960 Units: mg/Kg

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
12674-11-2	PCB-1016	ND	UJ	0.29	0.057
11104-28-2	PCB-1221	ND	UJ	0.29	0.057
11141-16-5	PCB-1232	ND	UJ	0.29	0.057
53469-21-9	PCB-1242	ND	UJ	0.29	0.057
12672-29-6	PCB-1248	ND	UJ	0.29	0.057
11097-69-1	PCB-1254	ND		0.29	0.14
11096-82-5	PCB-1260	0.30		0.29	0.14
37324-23-5	PCB-1262	ND	UJ	0.29	0.14
11100-14-4	PCB-1268	ND	UJ	0.29	0.14

CAS NO.	SURROGATE	%REC	Q	LIMITS
877-09-8	Tetrachloro-m-xylene	104		60-154
2051-24-3	DCB Decachlorobiphenyl	114		65-174

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FORM I
PCBS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins TestAmerica, Buffalo Job No.: 480-165715-1

SDG No.:

Client Sample ID: VS-2 (0-12) 012920 Lab Sample ID: 480-165715-12

Matrix: Solid Lab File ID: 7_65-104.D

Analysis Method: 8082A Date Collected: 01/29/2020 08:55

Extraction Method: 3550C Date Extracted: 01/30/2020 15:25

Sample wt/vol: 2.62(g) Date Analyzed: 02/03/2020 17:39

Con. Extract Vol.: 10(mL) Dilution Factor: 1

Injection Volume: 1(uL) GC Column: ZB-5 ID: 0.53(mm)

% Moisture: 25.7 GPC Cleanup:(Y/N) N

Analysis Batch No.: 515960 Units: mg/Kg

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
12674-11-2	PCB-1016	ND	UJ	0.26	0.050
11104-28-2	PCB-1221	ND	UJ	0.26	0.050
11141-16-5	PCB-1232	ND	UJ	0.26	0.050
53469-21-9	PCB-1242	ND	UJ	0.26	0.050
12672-29-6	PCB-1248	ND	UJ	0.26	0.050
11097-69-1	PCB-1254	7.9	E J	0.26	0.12
11096-82-5	PCB-1260	ND		0.26	0.12
37324-23-5	PCB-1262	ND	UJ	0.26	0.12
11100-14-4	PCB-1268	ND	UJ	0.26	0.12

CAS NO.	SURROGATE	%REC	Q	LIMITS
877-09-8	Tetrachloro-m-xylene	81		60-154
2051-24-3	DCB Decachlorobiphenyl	76		65-174

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1A-IN
INORGANIC ANALYSIS DATA SHEET
METALS

Client Sample ID: Was-1 (0-12) 012820 Lab Sample ID: 480-165715-1

Lab Name: Eurofins TestAmerica, Buffalo Job No.: 480-165715-1

SDG ID.:

Matrix: Solid Date Sampled: 01/28/2020 13:40

Reporting Basis: DRY Date Received: 01/30/2020 09:30

% Solids: 89.6

CAS No.	Analyte	Result	RL	MDL	Units	C	Q	DIL	Method
7440-43-9	Cadmium	ND	0.22	0.033	mg/Kg			1	6010C
7439-92-1	Lead	103	1.1	0.26	mg/Kg			1	6010C

1A-IN
INORGANIC ANALYSIS DATA SHEET
METALS

Client Sample ID: Was-1 (12-24) 012820 Lab Sample ID: 480-165715-2

Lab Name: Eurofins TestAmerica, Buffalo Job No.: 480-165715-1

SDG ID.:

Matrix: Solid Date Sampled: 01/28/2020 13:45

Reporting Basis: DRY Date Received: 01/30/2020 09:30

% Solids: 90.4

CAS No.	Analyte	Result	RL	MDL	Units	C	Q	DIL	Method
7440-43-9	Cadmium	ND	0.21	0.032	mg/Kg			1	6010C
7439-92-1	Lead	110	1.1	0.25	mg/Kg			1	6010C

1A-IN
INORGANIC ANALYSIS DATA SHEET
METALS

Client Sample ID: Was-2 (0-12) 012820 Lab Sample ID: 480-165715-3

Lab Name: Eurofins TestAmerica, Buffalo Job No.: 480-165715-1

SDG ID.:

Matrix: Solid Date Sampled: 01/28/2020 13:30

Reporting Basis: DRY Date Received: 01/30/2020 09:30

% Solids: 85.3

CAS No.	Analyte	Result	RL	MDL	Units	C	Q	DIL	Method
7440-43-9	Cadmium	0.16	0.23	0.035	mg/Kg	J		1	6010C
7439-92-1	Lead	148	1.2	0.28	mg/Kg			1	6010C

1A-IN
INORGANIC ANALYSIS DATA SHEET
METALS

Client Sample ID: VS-2 (0-12) 012920 Lab Sample ID: 480-165715-12

Lab Name: Eurofins TestAmerica, Buffalo Job No.: 480-165715-1

SDG ID.:

Matrix: Solid Date Sampled: 01/29/2020 08:55

Reporting Basis: DRY Date Received: 01/30/2020 09:30

% Solids: 74.3

CAS No.	Analyte	Result	RL	MDL	Units	C	Q	DIL	Method
7429-90-5	Aluminum	7770	12.5	5.5	mg/Kg			1	6010C
7440-36-0	Antimony	20.1	93.9	2.5	mg/Kg	J		5	6010C
7440-38-2	Arsenic	13.2	12.5	2.5	mg/Kg			5	6010C
7440-39-3	Barium	59.1	0.63	0.14	mg/Kg			1	6010C
7440-41-7	Beryllium	0.55	0.25	0.035	mg/Kg			1	6010C
7440-43-9	Cadmium	6.8	0.25	0.038	mg/Kg			1	6010C
7440-70-2	Calcium	4460	62.6	4.1	mg/Kg		B	1	6010C
7440-47-3	Chromium	125	3.1	1.3	mg/Kg			5	6010C
7440-48-4	Cobalt	31.0	0.63	0.063	mg/Kg			1	6010C
7440-50-8	Copper	739	1.3	0.26	mg/Kg			1	6010C
7439-89-6	Iron	226000	62.6	21.9	mg/Kg			5	6010C
7439-92-1	Lead	1960	6.3	1.5	mg/Kg			5	6010C
7439-95-4	Magnesium	1740	25.0	1.2	mg/Kg			1	6010C
7439-96-5	Manganese	964	1.3	0.20	mg/Kg		B	5	6010C
7440-02-0	Nickel	95.5	31.3	1.4	mg/Kg			5	6010C
7440-09-7	Potassium	1090	37.6	25.0	mg/Kg		^	1	6010C
7782-49-2	Selenium	ND	25.0	2.5	mg/Kg			5	6010C
7440-22-4	Silver	ND	0.75	0.25	mg/Kg			1	6010C
7440-23-5	Sodium	75.5	175	16.3	mg/Kg	J		1	6010C
7440-28-0	Thallium	ND	7.5	0.38	mg/Kg			1	6010C
7440-62-2	Vanadium	12.5	3.1	0.69	mg/Kg			5	6010C
7440-66-6	Zinc	490	2.5	0.80	mg/Kg			1	6010C
7439-97-6	Mercury	1.8	0.026	0.010	mg/Kg			1	7471B

VALIDATA
Chemical Services, Inc.
2159 Wynnton Pointe, Duluth, GA 30097
(770) 232-0130
(770) 232-5082 (Fax)
www.datavalidator.com

DATA USABILITY SUMMARY REPORT

COMPANY:	AECOM Technical Services Northeast, Inc.
PROJECT NAME:	C&D Power Systems #336001
CONTRACTED LAB:	Eurofins Test America, Buffalo
QA/QC LEVEL:	DUSR
ANALYTICAL METHOD(S):	SW846 and EPA Methods
VALIDATION GUIDELINES:	*USEPA Region II data validation SOPs (VOA HW-24 Rev.4, SVOC HW-22 Rev.5, PEST-HW-44, Rev 1.1, PCB HW-37a Rev. 0, METALS_SOP_HW3a-ICP-AES Rev 1.1 and HW3c-Hg-CN, Rev. 1), USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review,* **2008**; *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review,***2010**; NYDEC *Guidelines for Sampling and Analysis of PFAS,* January 2020, Professional Judgment
SAMPLE MATRIX:	Solid
TYPES OF ANALYSES:	Polychlorinated Hydrocarbons (PCBs), Total Metals, Total Organic Carbon (TOC)
DATA REVIEWER(S):	Amy L. Hogan
SDG NUMBER:	480-170504-1
SAMPLING DATE(S):	May 21-22, 2020

SAMPLES:

Client Sample ID	Laboratory ID	PCB	T.Metals
SED-110-00-06-052120	480-170504-1	X	X
SED-101-00-06-052220	480-170504-4	X	X
SED-102-06-12-052220	480-170504-8	X	X
SED-106-00-06-052220	480-170504-13	X	X
SED-106-06-12-052220	480-170504-14	X	X
SED-123-00-06-052220	480-170504-22	X	X
SED-126-00-06-052220	480-170504-25	X	X
SED-121-06-12-052220	480-170504-29	X	X
DUPE-1-052220	480-170504-34	X	X
DUPE-2-052220	480-170504-35	X	X
DUPE-3-052220	480-170504-36	X	X
SED-121-06-12-052220MS	480-170504-29MS	X	X
SED-121-06-12-052220MSD	480-170504-29MSD	X	X

Client Sample ID	Laboratory ID	TOC
SED-110-00-06-052120	480-170504-1	X
SED-101-00-06-052220	480-170504-4	X
SED-102-06-12-052220	480-170504-8	X
SED-106-00-06-052220	480-170504-13	X
SED-106-06-12-052220	480-170504-14	X
SED-123-00-06-052220	480-170504-22	X
SED-126-00-06-052220	480-170504-25	X
SED-121-06-12-052220	480-170504-29	X
DUPE-1-052220	480-170504-34	X
DUPE-2-052220	480-170504-35	X
DUPE-3-052220	480-170504-36	X
SED-121-06-12-052220MS	480-170504-29MS	X
SED-121-06-12-052220MSD	480-170504-29MSD	X

Suffix Codes: DL= DILUTION, MS = MATRIX SPIKE,
MSD = MATRIX SPIKE DUPLICATE, RE = REANALYSIS

Qualifier	Definition
U	The analyte was not detected and was reported as less than the LOD or as defined by the customer. The LOD has been adjusted for any dilution or concentration of the sample.
J	The reported result was an estimated value with an unknown bias.
J+	The result was an estimated quantity, but the result may be biased high.
J-	The result was an estimated quantity, but the result may be biased low.
N	The analysis indicates the presence of an analyte for which there was presumptive evidence to make a "tentative identification."
NJ	The analyte has been “tentatively identified” or “presumptively” as present and the associated numerical value was the estimated concentration in the sample.
UJ	The analyte was not detected and was reported as less than the LOD or as defined by the customer. However, the associated numerical value is approximate.
X	The sample results (including non-detects) were affected by serious deficiencies in the ability to analyze the sample and to meet published method and project quality control criteria. The presence or absence of the analyte cannot be substantiated by the data provided. Acceptance or rejection of the data should be decided by the project team (which should include a project chemist), but exclusion of the data is recommended.

DATA USABILITY SUMMARY

Eurofins Test America, Buffalo – 480-170504-1

POLYCHLORINATED BIPHENYLS (PCB)

SUMMARY

I.) General:

The analyses for Polychlorinated Biphenyls (PCB) were performed per SW846 Method 8082A.

II.) Overall Assessment of Data:

All laboratory data were acceptable with qualifications.

II.) Holding Times:

All Holding Time criteria were met. No data qualification was necessary.

IV.) Instrument Performance:

All Instrument Performance criteria were met. No data qualification was necessary.

V.) Calibration:

Initial Calibration:

All Initial Calibration criteria were met. No data qualification was necessary.

Continuing Calibration:

The Percent Differences (%Ds) for the standards runs on 6/3/20 on instrument HP6890-6 exceeded the 25% opening CCV QC limit for the following compounds:

Compound	Col. I, %R	Col. II, %D
Aroclor 1248 (4)		-27.4%
Aroclor 1260 (4)	26.0%	
Aroclor 1260 (5)	29.3%	
Aroclor 1262 (2)		-21.6%
Aroclor 1262 (3)		-22.7%
Aroclor 1262 (4)		-21.1%
Aroclor 1268 (1)		-22.3%
DCB		23.9%

The results for these Aroclors for associated samples SED-121-06-12-052220, DUPE-1-052220, DUPE-2-052220 and DUPE-3-052220 were qualified as estimated (J) and (UJ).

The Percent Differences (%Ds) for the standards runs on 6/4/20 on instrument HP6890-6 exceeded the 25% opening CCV QC limit for the following compounds:

Compound	Col. I, %R	Col. II, %D
Aroclor 1016 (3)	21.1%	
Aroclor 1016 (4)	20.5%	
Aroclor 1232 (5)	-20.1%	
Aroclor 1248 (4)	-28.8%	
Aroclor 1254 (2)	-21.9%	
Aroclor 1260 (4)	26.5%	
Aroclor 1260 (5)	29.5%	
Aroclor 1262 (2)		-20.5%
Aroclor 1262 (3)		-21.1%
Aroclor 1262 (4)		-21.4%
Aroclor 1268 (1)	-21.6%	
DCB	24.9%	32.4%

The results for these Aroclors in associated sample SED-106-06-12-052220 were qualified as estimated (J) and (UJ).

The Percent Differences (%Ds) for the standards runs on 6/2/20 at 12:17 and 18:54 on instrument HP6890-7 exceeded the 25% opening CCV QC limit for the following compounds:

Compound	Col. I, %R	Col. II, %D
Aroclor 1016 (1)		58.0%
Aroclor 1016 (2)	46.4%	44.1%
Aroclor 1016 (3)	35.0%	61.0%
Aroclor 1016 (4)	32.0%	45.7%
Aroclor 1016 (5)		21.1%
Aroclor 1221 (3)	24.7%	
Aroclor 1260 (1)	38.6%	55.1%
Aroclor 1260 (2)	37.9%	56.6%
Aroclor 1260 (3)	29.0%	57.1%
Aroclor 1260 (4)	38.0%	54.5%
Aroclor 1260 (5)	38.4%	54.5%
TCMX	39.3%	52.6%
DCB		39.8%

The results for these Aroclors in associated samples SED-110-00-06-052120, SED-101-00-06-052220, SED-102-06-12-052220, SED-106-00-06-052220, SED-123-00-06-052220 and SED-126-00-06-052220 were qualified as estimated (J) and (UJ).

The Percent Differences (%Ds) for the standards runs on 6/3/20 at 00:44 on instrument HP6890-7 exceeded the 25% opening CCV QC limit for the following compounds:

Compound	Col. I, %R	Col. II, %D
Aroclor 1016 (1)		55.4%
Aroclor 1016 (2)	48.9%	40.9%
Aroclor 1016 (3)	32.7%	56.4%
Aroclor 1016 (4)	29.7%	41.5%
Aroclor 1260 (1)	33.4%	52.0%
Aroclor 1260 (2)	32.4%	52.4%
Aroclor 1260 (3)	24.4%	52.2%
Aroclor 1260 (4)	32.8%	49.5%
Aroclor 1260 (5)	32.3%	49.2%
TCMX	36.5%	51.6%
DCB		33.8%

The results for these Aroclors in associated samples SED-110-00-06-052120, SED-101-00-06-052220, SED-102-06-12-052220, SED-106-00-06-052220, SED-123-00-06-052220 and SED-126-00-06-052220 were qualified as estimated (J) and (UJ).

A review of the run log indicates that the CCV was not analyzed after every 10 samples as recommended by the guidance and that a closing CCV was also not analyzed. It was noted that the lab did analyze a CCV every 20 samples as recommended by the method. Since the samples were all analyzed within the 12-hour analytical clock of the submitted calibration and citing professional judgment, the validator determined that data qualification based on the closing calibration standard absence was not necessary.

VI.) Blanks:

Method Blanks:

There were no detections in the associated method blank. No data qualification was necessary.

Equipment Blanks:

There was no equipment blank submitted in association with this SDG. No data qualification was necessary.

Field Blanks:

There was no field blank submitted in association with this SDG. No data qualification was necessary.

VII.) Surrogate Recoveries:

The Percent Recoveries (%Rs) for TCMX for samples SED-102-06-12-05220 (159%) and SED-126-00-06-052220 (179%, 182%) exceeded the QC limits. The positive results for sample SED-

102-06-12-05220 were qualified as estimated biased high (J+). Since the results for the other sample were all non-detect, no data qualification was necessary.

It was also noted that the surrogate recoveries were high for one of the method blanks. Since there were no detections in the method blank, no data qualification was necessary.

VIII.) Laboratory Control Samples (LCS):

Three LCS were analyzed by the laboratory for this SDG. All criteria were met. No data qualification was necessary.

IX.) Matrix Spike / Matrix Spike Duplicate (MS / MSD):

MS / MSD analyses were performed using SDG samples SED-101-06-12-05220 (not validated) and SED-121-06-12-05220. All criteria were met. No data qualification was necessary.

X.) Field Duplicates:

Three sets of field duplicate samples (SED-102-06-12-05220 / DUPE-1-052220, SED-123-00-06-05220 / DUPE-2-05220 and SED-126-00-06-05220 / DUPE-3-05220) was identified as part of this SDG. The only calculable Relative Percent Difference (RPD) was 77% for Aroclor 1254. Data qualification based on field duplicate criteria was not required.

XI.) TCL Compound Identification:

All TCL Compound Identification criteria were met. No data qualification was necessary.

XII.) Internal Standards Performance (ISTD):

All ISTD area count criteria were met. No data qualification was necessary.

XIII.) Compound Quantitation and Reported Contract Required Quantitation Limits (CRQL):

All CRQL criteria were met. No data qualification was necessary.

TOTAL METALS

SUMMARY

I.) General:

The analyses for Total Metals were performed per SW846 Method 6010C.

II.) Overall Assessment of Data:

All laboratory data were acceptable without qualifications.

III.) Holding Times:

All Holding Time criteria were met. No data qualification was necessary.

IV.) Calibration:

All Initial and Continuing Calibration criteria were met. No data qualification was necessary.

V.) CRDL standards:

All CRDL criteria were met. No data qualification was necessary.

VI.) Blanks:

Calibration Blanks:

There were no detections in the associated calibration blanks. No data qualification was necessary.

Preparation Blanks:

There were no detections in the associated preparation blanks. No data qualification was necessary.

Equipment Blanks:

There was no equipment blank submitted in association with this SDG. No data qualification was necessary.

Field Blank:

There was no field blank submitted in association with this SDG. No data qualification was necessary.

VII.) Interference Check Sample (ICS) Results:

All ICS criteria were met. No data qualification was necessary.

VIII.) Matrix Spike / Matrix Spike Duplicates (MS / MSD):

MS / MSD analyses were performed using SDG samples SED-101-06-12-05220 and SED-121-06-12-05220. The Percent Recovery (%R) for lead (341%) and the Relative Percent Difference (RPD) for lead (93%) for SED-101-06-12-052220 exceeded the QC limits. Since the parent sample was not chosen for data validation, no data qualification was necessary. All criteria were met for sample SED-121-06-12-05220. No data qualification was necessary.

IX.) Laboratory Control Samples (LCS):

All LCS Recovery criteria were met. No data qualification was necessary.

X.) Serial Dilution Analysis:

Serial Dilution Analysis was performed using sample SED-101-06-12-05220. All criteria were met. No data qualification was necessary.

XI.) Field Duplicates:

Three sets of field duplicate samples (SED-102-06-12-05220 / DUPE-1-052220, SED-123-00-06-05220 / DUPE-2-05220 and SED-126-00-06-05220 / DUPE-3-05220) was identified as part of this SDG. The calculable Relative Percent Differences (RPD) were cadmium (98%) and lead (140%) for the first set, cadmium (30%) and lead (36%) for the second set and cadmium (13%) and lead (2.8%) for the third set. The RPs for cadmium and lead for the first set exceeded the 50%Q C limit for soils, so the results for these analytes in the first set were qualified as estimated (J).

XII.) Compound Quantitation and Reported Contract Required Quantitation Limits (CRQL):

All CRQL criteria were met. No data qualification was necessary.

TOTAL ORGANIC CARBON (TOC)

SUMMARY

I.) General:

The analyses for Total Organic Carbon (TOC) were performed per Lloyd Kahn Method.

II.) Overall Assessment of Data:

All laboratory data were acceptable with qualifications.

III.) Holding Times:

All Holding Time criteria were met. No data qualification was necessary.

IV.) Calibration:

All Initial and Continuing Calibration criteria were met. No data qualification was necessary.

V.) Blanks:

Calibration Blanks:

There were no detections in the associated calibration blanks. No data qualification was necessary.

Preparation Blanks:

There was no detection in the associated preparation blanks. No data qualification was necessary.

Equipment Blanks:

There was no equipment blank submitted in associated with this SDG. No data qualification was necessary.

Field Blank:

There was no field blank submitted in association with this SDG. No data qualification was necessary.

VI.) Matrix Spike / Matrix Spike Duplicates (MS / MSD):

MS / MSD analyses were performed using SDG samples SED-101-06-12-05220 and SED-121-06-12-05220. The Percent Recoveries (%Rs) for SED-101-06-12-05220MSD (69%) and SED-121-06-12-05220MS (73%) were below the QC limits. The positive result for parent sample SED-121-06-12-05220 was qualified as estimated (J). Since the parent sample SED-101-06-12-05220 was not chosen for data validation, no data qualification was necessary.

VII.) Laboratory Control Samples (LCS):

All LCS Recovery criteria were met. No data qualification was necessary.

VIII.) Field Duplicates:

Three sets of field duplicate samples (SED-102-06-12-05220 / DUPE-1-052220, SED-123-00-06-05220 / DUPE-2-05220 and SED-126-00-06-05220 / DUPE-3-05220) was identified as part of this SDG. The calculable Relative Percent Differences (RPD) were 6.0% for the first set, 18% for the second set and 31% for the third set, which were all within the QC limit for soil samples. No data qualification was necessary.

XI.) Compound Quantitation and Reported Contract Required Quantitation Limits (CRQL):

All CRQL criteria were met. No data qualification was necessary.

Attachment A

Sample Result Forms (FORM Is) Corrected for Validation Qualifiers

FORM I
PCBS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins TestAmerica, Buffalo Job No.: 480-170504-1

SDG No.:

Client Sample ID: SED-110-00-06-052120 Lab Sample ID: 480-170504-1

Matrix: Solid Lab File ID: 7_68-270.D

Analysis Method: 8082A Date Collected: 05/21/2020 15:20

Extraction Method: 3550C Date Extracted: 06/01/2020 15:53

Sample wt/vol: 2.30(g) Date Analyzed: 06/02/2020 21:17

Con. Extract Vol.: 10(mL) Dilution Factor: 1

Injection Volume: 1(uL) GC Column: ZB-5 ID: 0.53(mm)

% Moisture: 51.6 GPC Cleanup:(Y/N) N

Analysis Batch No.: 534394 Units: mg/Kg

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
12674-11-2	PCB-1016	ND	UJ	0.45	0.088
11104-28-2	PCB-1221	ND	UJ	0.45	0.088
11141-16-5	PCB-1232	ND		0.45	0.088
53469-21-9	PCB-1242	ND		0.45	0.088
12672-29-6	PCB-1248	ND		0.45	0.088
11097-69-1	PCB-1254	0.30	J	0.45	0.21
11096-82-5	PCB-1260	ND	UJ	0.45	0.21
37324-23-5	PCB-1262	ND		0.45	0.21
11100-14-4	PCB-1268	ND		0.45	0.21

CAS NO.	SURROGATE	%REC	Q	LIMITS
877-09-8	Tetrachloro-m-xylene	144		60-154
2051-24-3	DCB Decachlorobiphenyl	96		65-174

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FORM I
PCBS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins TestAmerica, Buffalo Job No.: 480-170504-1

SDG No.:

Client Sample ID: SED-101-00-06-052220 Lab Sample ID: 480-170504-4

Matrix: Solid Lab File ID: 7_68-272.D

Analysis Method: 8082A Date Collected: 05/22/2020 09:20

Extraction Method: 3550C Date Extracted: 06/01/2020 15:53

Sample wt/vol: 2.30(g) Date Analyzed: 06/02/2020 21:49

Con. Extract Vol.: 10(mL) Dilution Factor: 1

Injection Volume: 1(uL) GC Column: ZB-5 ID: 0.53(mm)

% Moisture: 38.8 GPC Cleanup:(Y/N) N

Analysis Batch No.: 534394 Units: mg/Kg

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
12674-11-2	PCB-1016	ND	UJ	0.36	0.070
11104-28-2	PCB-1221	ND	UJ	0.36	0.070
11141-16-5	PCB-1232	ND		0.36	0.070
53469-21-9	PCB-1242	ND		0.36	0.070
12672-29-6	PCB-1248	ND		0.36	0.070
11097-69-1	PCB-1254	ND		0.36	0.17
11096-82-5	PCB-1260	ND	UJ	0.36	0.17
37324-23-5	PCB-1262	ND		0.36	0.17
11100-14-4	PCB-1268	ND		0.36	0.17

CAS NO.	SURROGATE	%REC	Q	LIMITS
877-09-8	Tetrachloro-m-xylene	149		60-154
2051-24-3	DCB Decachlorobiphenyl	102		65-174

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FORM I
PCBS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins TestAmerica, Buffalo Job No.: 480-170504-1

SDG No.:

Client Sample ID: SED-102-06-12-052220 Lab Sample ID: 480-170504-8

Matrix: Solid Lab File ID: 7_68-274.D

Analysis Method: 8082A Date Collected: 05/22/2020 09:55

Extraction Method: 3550C Date Extracted: 06/01/2020 15:53

Sample wt/vol: 2.87(g) Date Analyzed: 06/02/2020 22:21

Con. Extract Vol.: 10(mL) Dilution Factor: 1

Injection Volume: 1(uL) GC Column: ZB-5 ID: 0.53(mm)

% Moisture: 24.8 GPC Cleanup:(Y/N) N

Analysis Batch No.: 534394 Units: mg/Kg

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
12674-11-2	PCB-1016	ND	UJ	0.23	0.045
11104-28-2	PCB-1221	ND	UJ	0.23	0.045
11141-16-5	PCB-1232	ND		0.23	0.045
53469-21-9	PCB-1242	ND		0.23	0.045
12672-29-6	PCB-1248	ND		0.23	0.045
11097-69-1	PCB-1254	1.1	J+	0.23	0.11
11096-82-5	PCB-1260	ND	UJ	0.23	0.11
37324-23-5	PCB-1262	ND		0.23	0.11
11100-14-4	PCB-1268	ND		0.23	0.11

CAS NO.	SURROGATE	%REC	Q	LIMITS
877-09-8	Tetrachloro-m-xylene	153		60-154
2051-24-3	DCB Decachlorobiphenyl	112		65-174

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FORM I
PCBS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins TestAmerica, Buffalo Job No.: 480-170504-1

SDG No.:

Client Sample ID: SED-106-00-06-052220 Lab Sample ID: 480-170504-13

Matrix: Solid Lab File ID: 7_68-277.D

Analysis Method: 8082A Date Collected: 05/22/2020 10:50

Extraction Method: 3550C Date Extracted: 06/01/2020 15:53

Sample wt/vol: 2.04(g) Date Analyzed: 06/02/2020 23:08

Con. Extract Vol.: 10(mL) Dilution Factor: 1

Injection Volume: 1(uL) GC Column: ZB-5 ID: 0.53(mm)

% Moisture: 77.5 GPC Cleanup:(Y/N) N

Analysis Batch No.: 534394 Units: mg/Kg

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
12674-11-2	PCB-1016	ND	UJ	1.1	0.21
11104-28-2	PCB-1221	ND	UJ	1.1	0.21
11141-16-5	PCB-1232	ND		1.1	0.21
53469-21-9	PCB-1242	ND		1.1	0.21
12672-29-6	PCB-1248	ND		1.1	0.21
11097-69-1	PCB-1254	2.5		1.1	0.51
11096-82-5	PCB-1260	ND	UJ	1.1	0.51
37324-23-5	PCB-1262	ND		1.1	0.51
11100-14-4	PCB-1268	ND		1.1	0.51

CAS NO.	SURROGATE	%REC	Q	LIMITS
877-09-8	Tetrachloro-m-xylene	140		60-154
2051-24-3	DCB Decachlorobiphenyl	90		65-174

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FORM I
PCBS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins TestAmerica, Buffalo Job No.: 480-170504-1

SDG No.:

Client Sample ID: SED-106-06-12-052220 Lab Sample ID: 480-170504-14

Matrix: Solid Lab File ID: 6_057-095.D

Analysis Method: 8082A Date Collected: 05/22/2020 10:55

Extraction Method: 3550C Date Extracted: 06/04/2020 07:25

Sample wt/vol: 2.15(g) Date Analyzed: 06/05/2020 00:58

Con. Extract Vol.: 10(mL) Dilution Factor: 1

Injection Volume: 1(uL) GC Column: ZB-35 ID: 0.53(mm)

% Moisture: 75.0 GPC Cleanup:(Y/N) N

Analysis Batch No.: 534813 Units: mg/Kg

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
12674-11-2	PCB-1016	ND	UJ	0.93	0.18
11104-28-2	PCB-1221	ND		0.93	0.18
11141-16-5	PCB-1232	ND	UJ	0.93	0.18
53469-21-9	PCB-1242	ND		0.93	0.18
12672-29-6	PCB-1248	ND	UJ	0.93	0.18
11097-69-1	PCB-1254	1.3	J	0.93	0.44
11096-82-5	PCB-1260	ND	UJ	0.93	0.44
37324-23-5	PCB-1262	ND	UJ	0.93	0.44
11100-14-4	PCB-1268	ND	UJ	0.93	0.44

CAS NO.	SURROGATE	%REC	Q	LIMITS
877-09-8	Tetrachloro-m-xylene	74		60-154
2051-24-3	DCB Decachlorobiphenyl	92		65-174

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FORM I
PCBS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins TestAmerica, Buffalo Job No.: 480-170504-1

SDG No.:

Client Sample ID: SED-123-00-06-052220 Lab Sample ID: 480-170504-22

Matrix: Solid Lab File ID: 7_68-282.D

Analysis Method: 8082A Date Collected: 05/22/2020 12:20

Extraction Method: 3550C Date Extracted: 06/01/2020 15:53

Sample wt/vol: 2.31(g) Date Analyzed: 06/03/2020 00:28

Con. Extract Vol.: 10(mL) Dilution Factor: 1

Injection Volume: 1(uL) GC Column: ZB-5 ID: 0.53(mm)

% Moisture: 29.4 GPC Cleanup:(Y/N) N

Analysis Batch No.: 534394 Units: mg/Kg

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
12674-11-2	PCB-1016	ND	UJ	0.31	0.060
11104-28-2	PCB-1221	ND	UJ	0.31	0.060
11141-16-5	PCB-1232	ND		0.31	0.060
53469-21-9	PCB-1242	ND		0.31	0.060
12672-29-6	PCB-1248	ND		0.31	0.060
11097-69-1	PCB-1254	ND		0.31	0.14
11096-82-5	PCB-1260	ND	UJ	0.31	0.14
37324-23-5	PCB-1262	ND		0.31	0.14
11100-14-4	PCB-1268	ND		0.31	0.14

CAS NO.	SURROGATE	%REC	Q	LIMITS
877-09-8	Tetrachloro-m-xylene	104		60-154
2051-24-3	DCB Decachlorobiphenyl	79		65-174

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FORM I
PCBS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins TestAmerica, Buffalo Job No.: 480-170504-1

SDG No.:

Client Sample ID: SED-126-00-06-052220 Lab Sample ID: 480-170504-25

Matrix: Solid Lab File ID: 7_68-286.D

Analysis Method: 8082A Date Collected: 05/22/2020 12:50

Extraction Method: 3550C Date Extracted: 06/01/2020 15:53

Sample wt/vol: 2.83(g) Date Analyzed: 06/03/2020 01:32

Con. Extract Vol.: 10(mL) Dilution Factor: 1

Injection Volume: 1(uL) GC Column: ZB-5 ID: 0.53(mm)

% Moisture: 31.1 GPC Cleanup:(Y/N) N

Analysis Batch No.: 534394 Units: mg/Kg

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
12674-11-2	PCB-1016	ND	UJ	0.26	0.050
11104-28-2	PCB-1221	ND	UJ	0.26	0.050
11141-16-5	PCB-1232	ND		0.26	0.050
53469-21-9	PCB-1242	ND		0.26	0.050
12672-29-6	PCB-1248	ND		0.26	0.050
11097-69-1	PCB-1254	ND		0.26	0.12
11096-82-5	PCB-1260	ND	UJ	0.26	0.12
37324-23-5	PCB-1262	ND		0.26	0.12
11100-14-4	PCB-1268	ND		0.26	0.12

CAS NO.	SURROGATE	%REC	Q	LIMITS
877-09-8	Tetrachloro-m-xylene	179	X	60-154
2051-24-3	DCB Decachlorobiphenyl	130		65-174

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FORM I
PCBS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins TestAmerica, Buffalo Job No.: 480-170504-1

SDG No.:

Client Sample ID: SED-121-06-12-052220 Lab Sample ID: 480-170504-29

Matrix: Solid Lab File ID: 6_057-034.D

Analysis Method: 8082A Date Collected: 05/22/2020 13:25

Extraction Method: 3550C Date Extracted: 06/02/2020 08:43

Sample wt/vol: 2.42(g) Date Analyzed: 06/03/2020 19:25

Con. Extract Vol.: 10(mL) Dilution Factor: 1

Injection Volume: 1(uL) GC Column: ZB-35 ID: 0.53(mm)

% Moisture: 24.3 GPC Cleanup:(Y/N) N

Analysis Batch No.: 534607 Units: mg/Kg

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
12674-11-2	PCB-1016	ND		0.27	0.053
11104-28-2	PCB-1221	ND		0.27	0.053
11141-16-5	PCB-1232	ND		0.27	0.053
53469-21-9	PCB-1242	ND		0.27	0.053
12672-29-6	PCB-1248	ND	UJ	0.27	0.053
11097-69-1	PCB-1254	ND		0.27	0.13
11096-82-5	PCB-1260	ND	UJ	0.27	0.13
37324-23-5	PCB-1262	ND	UJ	0.27	0.13
11100-14-4	PCB-1268	ND	UJ	0.27	0.13

CAS NO.	SURROGATE	%REC	Q	LIMITS
877-09-8	Tetrachloro-m-xylene	102		60-154
2051-24-3	DCB Decachlorobiphenyl	134		65-174

ALH 7/16/21

FORM I
PCBS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins TestAmerica, Buffalo Job No.: 480-170504-1

SDG No.:

Client Sample ID: DUPE-1-052220 Lab Sample ID: 480-170504-34

Matrix: Solid Lab File ID: 6_057-037.D

Analysis Method: 8082A Date Collected: 05/22/2020 00:00

Extraction Method: 3550C Date Extracted: 06/02/2020 08:43

Sample wt/vol: 2.34(g) Date Analyzed: 06/03/2020 20:04

Con. Extract Vol.: 10(mL) Dilution Factor: 1

Injection Volume: 1(uL) GC Column: ZB-35 ID: 0.53(mm)

% Moisture: 9.7 GPC Cleanup:(Y/N) N

Analysis Batch No.: 534607 Units: mg/Kg

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
12674-11-2	PCB-1016	ND		0.24	0.046
11104-28-2	PCB-1221	ND		0.24	0.046
11141-16-5	PCB-1232	ND		0.24	0.046
53469-21-9	PCB-1242	ND		0.24	0.046
12672-29-6	PCB-1248	ND	UJ	0.24	0.046
11097-69-1	PCB-1254	0.49		0.24	0.11
11096-82-5	PCB-1260	ND	UJ	0.24	0.11
37324-23-5	PCB-1262	ND	UJ	0.24	0.11
11100-14-4	PCB-1268	ND	UJ	0.24	0.11

CAS NO.	SURROGATE	%REC	Q	LIMITS
877-09-8	Tetrachloro-m-xylene	111		60-154
2051-24-3	DCB Decachlorobiphenyl	138		65-174

ALH 7/16/21

FORM I
PCBS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins TestAmerica, Buffalo Job No.: 480-170504-1

SDG No.:

Client Sample ID: DUPE-2-052220 Lab Sample ID: 480-170504-35

Matrix: Solid Lab File ID: 6_057-038.D

Analysis Method: 8082A Date Collected: 05/22/2020 00:00

Extraction Method: 3550C Date Extracted: 06/02/2020 08:43

Sample wt/vol: 2.33(g) Date Analyzed: 06/03/2020 20:16

Con. Extract Vol.: 10(mL) Dilution Factor: 1

Injection Volume: 1(uL) GC Column: ZB-35 ID: 0.53(mm)

% Moisture: 31.8 GPC Cleanup:(Y/N) N

Analysis Batch No.: 534607 Units: mg/Kg

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
12674-11-2	PCB-1016	ND		0.31	0.062
11104-28-2	PCB-1221	ND		0.31	0.062
11141-16-5	PCB-1232	ND		0.31	0.062
53469-21-9	PCB-1242	ND		0.31	0.062
12672-29-6	PCB-1248	ND	UJ	0.31	0.062
11097-69-1	PCB-1254	ND		0.31	0.15
11096-82-5	PCB-1260	ND	UJ	0.31	0.15
37324-23-5	PCB-1262	ND	UJ	0.31	0.15
11100-14-4	PCB-1268	ND	UJ	0.31	0.15

CAS NO.	SURROGATE	%REC	Q	LIMITS
877-09-8	Tetrachloro-m-xylene	93		60-154
2051-24-3	DCB Decachlorobiphenyl	119		65-174

ALH 7/16/21

FORM I
PCBS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins TestAmerica, Buffalo Job No.: 480-170504-1

SDG No.:

Client Sample ID: DUPE-3-052220 Lab Sample ID: 480-170504-36

Matrix: Solid Lab File ID: 6_057-039.D

Analysis Method: 8082A Date Collected: 05/22/2020 00:00

Extraction Method: 3550C Date Extracted: 06/02/2020 08:43

Sample wt/vol: 2.56(g) Date Analyzed: 06/03/2020 20:29

Con. Extract Vol.: 10(mL) Dilution Factor: 1

Injection Volume: 1(uL) GC Column: ZB-35 ID: 0.53(mm)

% Moisture: 32.2 GPC Cleanup:(Y/N) N

Analysis Batch No.: 534607 Units: mg/Kg

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
12674-11-2	PCB-1016	ND		0.29	0.056
11104-28-2	PCB-1221	ND		0.29	0.056
11141-16-5	PCB-1232	ND		0.29	0.056
53469-21-9	PCB-1242	ND		0.29	0.056
12672-29-6	PCB-1248	ND	UJ	0.29	0.056
11097-69-1	PCB-1254	ND		0.29	0.13
11096-82-5	PCB-1260	ND	UJ	0.29	0.13
37324-23-5	PCB-1262	ND	UJ	0.29	0.13
11100-14-4	PCB-1268	ND	UJ	0.29	0.13

CAS NO.	SURROGATE	%REC	Q	LIMITS
877-09-8	Tetrachloro-m-xylene	101		60-154
2051-24-3	DCB Decachlorobiphenyl	141		65-174

ALH 7/16/21

1A-IN
INORGANIC ANALYSIS DATA SHEET
METALS

Client Sample ID: SED-110-00-06-052120 Lab Sample ID: 480-170504-1

Lab Name: Eurofins TestAmerica, Buffalo Job No.: 480-170504-1

SDG ID.:

Matrix: Solid Date Sampled: 05/21/2020 15:20

Reporting Basis: DRY Date Received: 05/28/2020 10:15

% Solids: 48.4

CAS No.	Analyte	Result	RL	MDL	Units	C	Q	DIL	Method
7440-43-9	Cadmium	1.7	0.39	0.059	mg/Kg			1	6010C
7439-92-1	Lead	26.7	2.0	0.47	mg/Kg			1	6010C

1A-IN
INORGANIC ANALYSIS DATA SHEET
METALS

Client Sample ID: SED-101-00-06-052220 Lab Sample ID: 480-170504-4

Lab Name: Eurofins TestAmerica, Buffalo Job No.: 480-170504-1

SDG ID.:

Matrix: Solid Date Sampled: 05/22/2020 09:20

Reporting Basis: DRY Date Received: 05/28/2020 10:15

% Solids: 61.2

CAS No.	Analyte	Result	RL	MDL	Units	C	Q	DIL	Method
7440-43-9	Cadmium	0.31	0.31	0.046	mg/Kg			1	6010C
7439-92-1	Lead	20.6	1.5	0.37	mg/Kg			1	6010C

1A-IN
INORGANIC ANALYSIS DATA SHEET
METALS

Client Sample ID: SED-102-06-12-052220 Lab Sample ID: 480-170504-8

Lab Name: Eurofins TestAmerica, Buffalo Job No.: 480-170504-1

SDG ID.:

Matrix: Solid Date Sampled: 05/22/2020 09:55

Reporting Basis: DRY Date Received: 05/28/2020 10:15

% Solids: 75.2

CAS No.	Analyte	Result	RL	MDL	Units	C	Q	DIL	Method
7440-43-9	Cadmium	3.2	0.26	0.039	mg/Kg			1	6010C
7439-92-1	Lead	371	1.3	0.31	mg/Kg			1	6010C

1A-IN
INORGANIC ANALYSIS DATA SHEET
METALS

Client Sample ID: SED-106-00-06-052220 Lab Sample ID: 480-170504-13

Lab Name: Eurofins TestAmerica, Buffalo Job No.: 480-170504-1

SDG ID.:

Matrix: Solid Date Sampled: 05/22/2020 10:50

Reporting Basis: DRY Date Received: 05/28/2020 10:15

% Solids: 22.5

CAS No.	Analyte	Result	RL	MDL	Units	C	Q	DIL	Method
7440-43-9	Cadmium	11.2	0.90	0.13	mg/Kg			1	6010C
7439-92-1	Lead	602	4.5	1.1	mg/Kg			1	6010C

1A-IN
INORGANIC ANALYSIS DATA SHEET
METALS

Client Sample ID: SED-106-06-12-052220 Lab Sample ID: 480-170504-14

Lab Name: Eurofins TestAmerica, Buffalo Job No.: 480-170504-1

SDG ID.:

Matrix: Solid Date Sampled: 05/22/2020 10:55

Reporting Basis: DRY Date Received: 05/28/2020 10:15

% Solids: 25.0

CAS No.	Analyte	Result	RL	MDL	Units	C	Q	DIL	Method
7440-43-9	Cadmium	9.3	0.79	0.12	mg/Kg			1	6010C
7439-92-1	Lead	563	3.9	0.94	mg/Kg			1	6010C

1A-IN
INORGANIC ANALYSIS DATA SHEET
METALS

Client Sample ID: SED-123-00-06-052220 Lab Sample ID: 480-170504-22

Lab Name: Eurofins TestAmerica, Buffalo Job No.: 480-170504-1

SDG ID.:

Matrix: Solid Date Sampled: 05/22/2020 12:20

Reporting Basis: DRY Date Received: 05/28/2020 10:15

% Solids: 70.6

CAS No.	Analyte	Result	RL	MDL	Units	C	Q	DIL	Method
7440-43-9	Cadmium	0.20	0.28	0.042	mg/Kg	J		1	6010C
7439-92-1	Lead	19.8	1.4	0.34	mg/Kg			1	6010C

1A-IN
INORGANIC ANALYSIS DATA SHEET
METALS

Client Sample ID: SED-126-00-06-052220 Lab Sample ID: 480-170504-25

Lab Name: Eurofins TestAmerica, Buffalo Job No.: 480-170504-1

SDG ID.:

Matrix: Solid Date Sampled: 05/22/2020 12:50

Reporting Basis: DRY Date Received: 05/28/2020 10:15

% Solids: 68.9

CAS No.	Analyte	Result	RL	MDL	Units	C	Q	DIL	Method
7440-43-9	Cadmium	0.28	0.28	0.042	mg/Kg			1	6010C
7439-92-1	Lead	21.0	1.4	0.33	mg/Kg			1	6010C

1A-IN
INORGANIC ANALYSIS DATA SHEET
METALS

Client Sample ID: SED-121-06-12-052220 Lab Sample ID: 480-170504-29

Lab Name: Eurofins TestAmerica, Buffalo Job No.: 480-170504-1

SDG ID.:

Matrix: Solid Date Sampled: 05/22/2020 13:25

Reporting Basis: DRY Date Received: 05/28/2020 10:15

% Solids: 75.7

CAS No.	Analyte	Result	RL	MDL	Units	C	Q	DIL	Method
7440-43-9	Cadmium	0.24	0.27	0.040	mg/Kg	J		1	6010C
7439-92-1	Lead	19.0	1.3	0.32	mg/Kg			1	6010C

1A-IN
INORGANIC ANALYSIS DATA SHEET
METALS

Client Sample ID: DUPE-1-052220 Lab Sample ID: 480-170504-34

Lab Name: Eurofins TestAmerica, Buffalo Job No.: 480-170504-1

SDG ID.:

Matrix: Solid Date Sampled: 05/22/2020 00:00

Reporting Basis: DRY Date Received: 05/28/2020 10:15

% Solids: 90.3

CAS No.	Analyte	Result	RL	MDL	Units	C	Q	DIL	Method
7440-43-9	Cadmium	1.1	0.22	0.033	mg/Kg			1	6010C
7439-92-1	Lead	64.3	1.1	0.26	mg/Kg			1	6010C

1A-IN
INORGANIC ANALYSIS DATA SHEET
METALS

Client Sample ID: DUPE-2-052220 Lab Sample ID: 480-170504-35

Lab Name: Eurofins TestAmerica, Buffalo Job No.: 480-170504-1

SDG ID.:

Matrix: Solid Date Sampled: 05/22/2020 00:00

Reporting Basis: DRY Date Received: 05/28/2020 10:15

% Solids: 68.2

CAS No.	Analyte	Result	RL	MDL	Units	C	Q	DIL	Method
7440-43-9	Cadmium	0.27	0.29	0.044	mg/Kg	J		1	6010C
7439-92-1	Lead	28.6	1.5	0.35	mg/Kg			1	6010C

1A-IN
INORGANIC ANALYSIS DATA SHEET
METALS

Client Sample ID: DUPE-3-052220 Lab Sample ID: 480-170504-36

Lab Name: Eurofins TestAmerica, Buffalo Job No.: 480-170504-1

SDG ID.:

Matrix: Solid Date Sampled: 05/22/2020 00:00

Reporting Basis: DRY Date Received: 05/28/2020 10:15

% Solids: 67.8

CAS No.	Analyte	Result	RL	MDL	Units	C	Q	DIL	Method
7440-43-9	Cadmium	0.32	0.29	0.043	mg/Kg			1	6010C
7439-92-1	Lead	21.6	1.4	0.35	mg/Kg			1	6010C

1B-IN
INORGANIC ANALYSIS DATA SHEET
GENERAL CHEMISTRY

Client Sample ID: SED-110-00-06-052120 Lab Sample ID: 480-170504-1

Lab Name: Eurofins TestAmerica, Burlington Job No.: 480-170504-1

SDG ID.:

Matrix: Solid Date Sampled: 05/21/2020 15:20

Reporting Basis: WET Date Received: 05/28/2020 10:15

CAS No.	Analyte	Result	RL	MDL	Units	C	Q	DIL	Method
7440-44-0	Total Organic Carbon	10700	1000	684	mg/Kg			1	Lloyd Kahn

1B-IN
INORGANIC ANALYSIS DATA SHEET
GENERAL CHEMISTRY

Client Sample ID: SED-101-00-06-052220 Lab Sample ID: 480-170504-4

Lab Name: Eurofins TestAmerica, Burlington Job No.: 480-170504-1

SDG ID.:

Matrix: Solid Date Sampled: 05/22/2020 09:20

Reporting Basis: WET Date Received: 05/28/2020 10:15

CAS No.	Analyte	Result	RL	MDL	Units	C	Q	DIL	Method
7440-44-0	Total Organic Carbon	11300	1000	684	mg/Kg			1	Lloyd Kahn

1B-IN
INORGANIC ANALYSIS DATA SHEET
GENERAL CHEMISTRY

Client Sample ID: SED-102-06-12-052220 Lab Sample ID: 480-170504-8

Lab Name: Eurofins TestAmerica, Burlington Job No.: 480-170504-1

SDG ID.:

Matrix: Solid Date Sampled: 05/22/2020 09:55

Reporting Basis: WET Date Received: 05/28/2020 10:15

CAS No.	Analyte	Result	RL	MDL	Units	C	Q	DIL	Method
7440-44-0	Total Organic Carbon	9890	1000	684	mg/Kg			1	Lloyd Kahn

1B-IN
INORGANIC ANALYSIS DATA SHEET
GENERAL CHEMISTRY

Client Sample ID: SED-106-00-06-052220 Lab Sample ID: 480-170504-13

Lab Name: Eurofins TestAmerica, Burlington Job No.: 480-170504-1

SDG ID.:

Matrix: Solid Date Sampled: 05/22/2020 10:50

Reporting Basis: WET Date Received: 05/28/2020 10:15

CAS No.	Analyte	Result	RL	MDL	Units	C	Q	DIL	Method
7440-44-0	Total Organic Carbon	65700	1000	684	mg/Kg			1	Lloyd Kahn

1B-IN
INORGANIC ANALYSIS DATA SHEET
GENERAL CHEMISTRY

Client Sample ID: SED-106-06-12-052220 Lab Sample ID: 480-170504-14

Lab Name: Eurofins TestAmerica, Burlington Job No.: 480-170504-1

SDG ID.:

Matrix: Solid Date Sampled: 05/22/2020 10:55

Reporting Basis: WET Date Received: 05/28/2020 10:15

CAS No.	Analyte	Result	RL	MDL	Units	C	Q	DIL	Method
7440-44-0	Total Organic Carbon	92300	1000	684	mg/Kg			1	Lloyd Kahn

1B-IN
INORGANIC ANALYSIS DATA SHEET
GENERAL CHEMISTRY

Client Sample ID: SED-123-00-06-052220 Lab Sample ID: 480-170504-22

Lab Name: Eurofins TestAmerica, Burlington Job No.: 480-170504-1

SDG ID.:

Matrix: Solid Date Sampled: 05/22/2020 12:20

Reporting Basis: WET Date Received: 05/28/2020 10:15

CAS No.	Analyte	Result	RL	MDL	Units	C	Q	DIL	Method
7440-44-0	Total Organic Carbon	13300	1000	684	mg/Kg			1	Lloyd Kahn

1B-IN
INORGANIC ANALYSIS DATA SHEET
GENERAL CHEMISTRY

Client Sample ID: SED-126-00-06-052220 Lab Sample ID: 480-170504-25

Lab Name: Eurofins TestAmerica, Burlington Job No.: 480-170504-1

SDG ID.:

Matrix: Solid Date Sampled: 05/22/2020 12:50

Reporting Basis: WET Date Received: 05/28/2020 10:15

CAS No.	Analyte	Result	RL	MDL	Units	C	Q	DIL	Method
7440-44-0	Total Organic Carbon	10800	1000	684	mg/Kg			1	Lloyd Kahn

1B-IN
INORGANIC ANALYSIS DATA SHEET
GENERAL CHEMISTRY

Client Sample ID: SED-121-06-12-052220 Lab Sample ID: 480-170504-29

Lab Name: Eurofins TestAmerica, Burlington Job No.: 480-170504-1

SDG ID.:

Matrix: Solid Date Sampled: 05/22/2020 13:25

Reporting Basis: WET Date Received: 05/28/2020 10:15

CAS No.	Analyte	Result	RL	MDL	Units	C	Q	DIL	Method
7440-44-0	Total Organic Carbon	7920	J 1000	684	mg/Kg		F1	1	Lloyd Kahn

ALH 7/16/21

1B-IN
INORGANIC ANALYSIS DATA SHEET
GENERAL CHEMISTRY

Client Sample ID: DUPE-1-052220 Lab Sample ID: 480-170504-34

Lab Name: Eurofins TestAmerica, Burlington Job No.: 480-170504-1

SDG ID.:

Matrix: Solid Date Sampled: 05/22/2020 00:00

Reporting Basis: WET Date Received: 05/28/2020 10:15

CAS No.	Analyte	Result	RL	MDL	Units	C	Q	DIL	Method
7440-44-0	Total Organic Carbon	10500	1000	684	mg/Kg			1	Lloyd Kahn

1B-IN
INORGANIC ANALYSIS DATA SHEET
GENERAL CHEMISTRY

Client Sample ID: DUPE-2-052220 Lab Sample ID: 480-170504-35

Lab Name: Eurofins TestAmerica, Burlington Job No.: 480-170504-1

SDG ID.:

Matrix: Solid Date Sampled: 05/22/2020 00:00

Reporting Basis: WET Date Received: 05/28/2020 10:15

CAS No.	Analyte	Result	RL	MDL	Units	C	Q	DIL	Method
7440-44-0	Total Organic Carbon	15900	1000	684	mg/Kg			1	Lloyd Kahn

1B-IN
INORGANIC ANALYSIS DATA SHEET
GENERAL CHEMISTRY

Client Sample ID: DUPE-3-052220 Lab Sample ID: 480-170504-36

Lab Name: Eurofins TestAmerica, Burlington Job No.: 480-170504-1

SDG ID.:

Matrix: Solid Date Sampled: 05/22/2020 00:00

Reporting Basis: WET Date Received: 05/28/2020 10:15

CAS No.	Analyte	Result	RL	MDL	Units	C	Q	DIL	Method
7440-44-0	Total Organic Carbon	7920	1000	684	mg/Kg			1	Lloyd Kahn

VALIDATA
Chemical Services, Inc.
2159 Wynnton Pointe, Duluth, GA 30097
(770) 232-0130
(770) 232-5082 (Fax)
www.datavalidator.com

DATA USABILITY SUMMARY REPORT

COMPANY:	AECOM Technical Services Northeast, Inc.
PROJECT NAME:	C&D Power Systems #336001
CONTRACTED LAB:	Eurofins Test America, Buffalo
QA/QC LEVEL:	DUSR
ANALYTICAL METHOD(S):	SW846 and EPA Methods
VALIDATION GUIDELINES:	*USEPA Region II data validation SOPs (VOA HW-24 Rev.4, SVOC HW-22 Rev.5, PEST-HW-44, Rev 1.1, PCB HW-37a Rev. 0, METALS_SOP_HW3a-ICP-AES Rev 1.1 and HW3c-Hg-CN, Rev. 1), USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review,* **2008**; *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review,***2010**; NYDEC *Guidelines for Sampling and Analysis of PFAS,* January 2020, Professional Judgment
SAMPLE MATRIX:	Solid
TYPES OF ANALYSES:	Polychlorinated Hydrocarbons (PCBs), Total Metals
DATA REVIEWER(S):	Amy L. Hogan
SDG NUMBER:	480-175717-3
SAMPLING DATE(S):	September 22-23, 2020

SAMPLES:

Client Sample ID	Laboratory ID	PCB	T.Metals
SW1-6 24-36-20200922	480-175717-52	X	X
SW1-9 0-12-20200922	480-175717-53	X	X
SW2-3 12-24-20200922	480-175717-55	X	X
LG-4 13-15 20200922	480-175717-59	X	X
LG-4 23-25 20200922	480-175717-63	X	X
LG-52 11-13-20200922	480-175717-64	X	X
SW2-9 0-12-20200923	480-175717-68	X	X
SW2-9 24-36-20200923	480-175717-70	X	X
LG-5 1-3 20200923	480-175717-72	X	X
LG-5 9-11-20200923	480-175717-75	X	X
SW1-6 24-36-20200922MS	480-175717-52MS		X
SW1-6 24-36-20200922MSD	480-175717-52MSD		X

Client Sample ID	Laboratory ID	PCB	T.Metals
SW1-9 0-12-20200922MS	480-175717-53MS		X
SW1-9 0-12-20200922MSD	480-175717-53MSD		X

Suffix Codes: DL= DILUTION, MS = MATRIX SPIKE,
MSD = MATRIX SPIKE DUPLICATE, RE = REANALYSIS

Qualifier	Definition
U	The analyte was not detected and was reported as less than the LOD or as defined by the customer. The LOD has been adjusted for any dilution or concentration of the sample.
J	The reported result was an estimated value with an unknown bias.
J+	The result was an estimated quantity, but the result may be biased high.
J-	The result was an estimated quantity, but the result may be biased low.
N	The analysis indicates the presence of an analyte for which there was presumptive evidence to make a "tentative identification."
NJ	The analyte has been “tentatively identified” or “presumptively” as present and the associated numerical value was the estimated concentration in the sample.
UJ	The analyte was not detected and was reported as less than the LOD or as defined by the customer. However, the associated numerical value is approximate.
X	The sample results (including non-detects) were affected by serious deficiencies in the ability to analyze the sample and to meet published method and project quality control criteria. The presence or absence of the analyte cannot be substantiated by the data provided. Acceptance or rejection of the data should be decided by the project team (which should include a project chemist), but exclusion of the data is recommended.

DATA USABILITY SUMMARY

Eurofins Test America, Buffalo – 480-175717-3

POLYCHLORINATED BIPHENYLS (PCB)

SUMMARY

I.) General:

The analyses for Polychlorinated Biphenyls (PCB) were performed per SW846 Method 8082A.

II.) Overall Assessment of Data:

All laboratory data were acceptable with qualifications.

II.) Holding Times:

All Holding Time criteria were met. No data qualification was necessary.

IV.) Instrument Performance:

All Instrument Performance criteria were met. No data qualification was necessary.

V.) Calibration:

Initial Calibration:

All Initial Calibration criteria were met. No data qualification was necessary.

Continuing Calibration:

The Percent Differences (%Ds) for the standards runs on 10/19/20 at 16:01 through 16:39 on instrument HP6890-6 exceeded the 25% opening CCV QC limit for the following compounds:

Compound	Col. I, %R	Col. II, %D
Aroclor 1016 (1)	-20.9%	
Aroclor 1016 (2)	-20.5%	
Aroclor 1221 (1)	31.0%	
Aroclor 1260 (4)	-29.3%	
Aroclor 1260 (5)	-21.4%	
Aroclor 1268 (3)	-47.1%	
Aroclor 1268 (4)	-40.5%	
DCB		-36.2%

The results for these Aroclors for associated samples LG-4 23-25-20200922, LG-52 11-13-20200922, SW2-9 0-12-20200923M SW5-9 24-36 20200923, LG-5 1-3-20200923 and LG-5 9-11-20200923, which were all non-detect, were qualified as estimated (UJ).

The Percent Differences (%Ds) for the standards runs on 10-19/20 at 21:23 on instrument HP6890-6 exceeded the 25% opening CCV QC limit for the following compounds:

Compound	Col. I, %R	Col. II, %D
Aroclor 1260 (4)	-23.7%	
DCB		-27.4%

The results for Aroclor 1260 in associated samples LG-4 23-25-20200922, LG-52 11-13-20200922, SW2-9 0-12-20200923M SW5-9 24-36 20200923, LG-5 1-3-20200923 and LG-5 9-11-20200923, which were all non-detect, were qualified as estimated (UJ).

The Percent Differences (%Ds) for the standards runs on 10/16/20 at 11:20 through 11:36 on instrument HP6890-7 exceeded the 25% opening CCV QC limit for the following compounds:

Compound	Col. I, %R	Col. II, %D
Aroclor 1232 (1)	-20.8%	
Aroclor 1242 (3)	-23.6%	
Aroclor 1242 (4)	-25.5%	
Aroclor 1262 (3)	-24.6%	
Aroclor 1268 (1)	-21.3%	
Aroclor 1268 (2)	-20.3%	

The results for these Aroclors in associated samples SW1-6 24-36-20200922, SW1-9 0-12-20200922 and LG-4 13-15-20200922, which were all non-detect, were qualified as estimated (UJ).

The Percent Differences (%Ds) for the standards runs on 10/16/20 at 17:42 on instrument HP6890-7 exceeded the 25% opening CCV QC limit for the following compounds:

Compound	Col. I, %R	Col. II, %D
Aroclor 1016 (1)		24.5%
Aroclor 1016 (2)		29.1%
Aroclor 1260 (1)	24.1%	37.5%
Aroclor 1260 (2)	21.0%	38.2%
Aroclor 1260 (3)		36.7%
Aroclor 1260 (4)		40.0%
Aroclor 1260 (5)	22.9%	38.3%
DCB		39.1%

The results for these Aroclors in associated samples SW1-6 24-36-20200922, SW1-9 0-12-20200922 and LG-4 13-15-20200922, which were all non-detect, were qualified as estimated (UJ).

The Percent Difference (%D) for the standards run on 10/18/20 at 21:05 on instrument HP6890-7 was -20.1% for Aroclor 1221 (1) on column I, which exceeded the QC limit. The non-detect result for this Aroclor for associated sample SW2-3 12-24-20200922 was qualified as estimated (UJ).

A review of the run log indicates that the CCV was not analyzed after every 10 samples as recommended by the guidance and that a closing CCV was also not analyzed. It was noted that the lab did analyze a CCV every 20 samples as recommended by the method. Since the samples were all analyzed within the 12-hour analytical clock of the submitted calibration and citing professional judgment, the validator determined that data qualification based on the closing calibration standard absence was not necessary.

VI.) Blanks:

Method Blanks:

There were no detections in the associated method blank. No data qualification was necessary.

Equipment Blanks:

There was no equipment blank submitted in association with this SDG. No data qualification was necessary.

Field Blanks:

There was no field blank submitted in association with this SDG. No data qualification was necessary.

VII.) Surrogate Recoveries:

The Percent Recoveries (%Rs) for DCB for samples SW2-3 12-24-20200922 (184%) and LG-5 9-11-20200923 (207%) exceeded the QC limits. The positive results for these samples were qualified as estimated biased high (J+).

VIII.) Laboratory Control Samples (LCS):

Two LCS were analyzed by the laboratory for this SDG. All criteria were met. No data qualification was necessary.

IX.) Matrix Spike / Matrix Spike Duplicate (MS / MSD):

MS / MSD analyses were performed using SDG sample LG-4 15-17-20200922 (not validated). All criteria were met. No data qualification was necessary.

X.) Field Duplicates:

There were no field duplicates identified for this SDG. No data qualification was necessary.

XI.) TCL Compound Identification:

All TCL Compound Identification criteria were met. No data qualification was necessary.

XII.) Internal Standards Performance (ISTD):

All ISTD area count criteria were met. No data qualification was necessary.

XIII.) Compound Quantitation and Reported Contract Required Quantitation Limits (CRQL):

All CRQL criteria were met. No data qualification was necessary.

TOTAL METALS

SUMMARY

I.) General:

The analyses for Total Metals were performed per SW846 Method 6010C.

II.) Overall Assessment of Data:

All laboratory data were acceptable with qualifications.

III.) Holding Times:

All Holding Time criteria were met. No data qualification was necessary.

IV.) Calibration:

All Initial and Continuing Calibration criteria were met. No data qualification was necessary.

V.) CRDL standards:

All CRDL criteria were met. No data qualification was necessary.

VI.) Blanks:

Calibration Blanks:

There were no detections in the associated calibration blanks. No data qualification was necessary.

Preparation Blanks:

There were no detections in the associated preparation blanks. No data qualification was necessary.

Equipment Blanks:

There was no equipment blank submitted in association with this SDG. No data qualification was necessary.

Field Blank:

There was no field blank submitted in association with this SDG. No data qualification was necessary.

VII.) Interference Check Sample (ICS) Results:

All ICS criteria were met. No data qualification was necessary.

VIII.) Matrix Spike / Matrix Spike Duplicates (MS / MSD):

MS / MSD analyses were performed using SDG samples SW1-6 24-36-20200922 and SW1-9 0-12 20200922. The Percent Recoveries (%Rs) for lead at -52% for SW1-6 24-36 20200922 and lead at 142% and 143% for SW1-9 0-12 20200922 were outside the QC limits. The positive lead results for both parent samples were qualified as estimated (J).

IX.) Laboratory Control Samples (LCS):

All LCS Recovery criteria were met. No data qualification was necessary.

X.) Serial Dilution Analysis:

Serial Dilution Analysis was performed using SDG samples SW1-6 24-36-20200922 and SW1-9 0-12 20200922. All criteria were met. No data qualification was necessary.

XI.) Field Duplicates:

There were no field duplicate samples identified as part of this SDG. No data qualification was necessary.

XII.) Compound Quantitation and Reported Contract Required Quantitation Limits (CRQL):

All CRQL criteria were met. No data qualification was necessary.

Attachment A

Sample Result Forms (FORM Is) Corrected for Validation Qualifiers

FORM I
PCBS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins TestAmerica, Buffalo Job No.: 480-175717-3

SDG No.:

Client Sample ID: SW1-6 24-36-20200922 Lab Sample ID: 480-175717-52

Matrix: Solid Lab File ID: 7_79-288.D

Analysis Method: 8082A Date Collected: 09/22/2020 10:35

Extraction Method: 3550C Date Extracted: 10/06/2020 15:09

Sample wt/vol: 2.48(g) Date Analyzed: 10/16/2020 20:52

Con. Extract Vol.: 10(mL) Dilution Factor: 1

Injection Volume: 1(uL) GC Column: ZB-5 ID: 0.53(mm)

% Moisture: 5.4 GPC Cleanup:(Y/N) N

Analysis Batch No.: 554253 Units: mg/Kg

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
12674-11-2	PCB-1016	ND	UJ	0.21	0.042
11104-28-2	PCB-1221	ND		0.21	0.042
11141-16-5	PCB-1232	ND	UJ	0.21	0.042
53469-21-9	PCB-1242	ND	UJ	0.21	0.042
12672-29-6	PCB-1248	ND		0.21	0.042
11097-69-1	PCB-1254	1.5		0.21	0.10
11096-82-5	PCB-1260	ND	UJ	0.21	0.10
37324-23-5	PCB-1262	ND	UJ	0.21	0.10
11100-14-4	PCB-1268	ND	UJ	0.21	0.10

CAS NO.	SURROGATE	%REC	Q	LIMITS
877-09-8	Tetrachloro-m-xylene	142		60-154
2051-24-3	DCB Decachlorobiphenyl	124		65-174

ALH 7/13/21

FORM I
PCBS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins TestAmerica, Buffalo Job No.: 480-175717-3

SDG No.:

Client Sample ID: SW1-9 0-12-20200922 Lab Sample ID: 480-175717-53

Matrix: Solid Lab File ID: 7_79-289.D

Analysis Method: 8082A Date Collected: 09/22/2020 10:47

Extraction Method: 3550C Date Extracted: 10/06/2020 15:09

Sample wt/vol: 2.21(g) Date Analyzed: 10/16/2020 21:08

Con. Extract Vol.: 10(mL) Dilution Factor: 1

Injection Volume: 1(uL) GC Column: ZB-5 ID: 0.53(mm)

% Moisture: 3.5 GPC Cleanup:(Y/N) N

Analysis Batch No.: 554253 Units: mg/Kg

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
12674-11-2	PCB-1016	ND	UJ	0.23	0.046
11104-28-2	PCB-1221	ND		0.23	0.046
11141-16-5	PCB-1232	ND	UJ	0.23	0.046
53469-21-9	PCB-1242	ND	UJ	0.23	0.046
12672-29-6	PCB-1248	ND		0.23	0.046
11097-69-1	PCB-1254	0.53		0.23	0.11
11096-82-5	PCB-1260	ND	UJ	0.23	0.11
37324-23-5	PCB-1262	ND	UJ	0.23	0.11
11100-14-4	PCB-1268	ND	UJ	0.23	0.11

CAS NO.	SURROGATE	%REC	Q	LIMITS
877-09-8	Tetrachloro-m-xylene	140		60-154
2051-24-3	DCB Decachlorobiphenyl	115		65-174

ALH 7/13/21

FORM I
PCBS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins TestAmerica, Buffalo Job No.: 480-175717-3

SDG No.:

Client Sample ID: SW2-3 12-24-20200922 Lab Sample ID: 480-175717-55

Matrix: Solid Lab File ID: 7_79-317.D

Analysis Method: 8082A Date Collected: 09/22/2020 14:56

Extraction Method: 3550C Date Extracted: 10/06/2020 15:09

Sample wt/vol: 2.77(g) Date Analyzed: 10/19/2020 00:31

Con. Extract Vol.: 10(mL) Dilution Factor: 5

Injection Volume: 1(uL) GC Column: ZB-5 ID: 0.53(mm)

% Moisture: 3.6 GPC Cleanup:(Y/N) N

Analysis Batch No.: 554521 Units: mg/Kg

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
12674-11-2	PCB-1016	ND		0.94	0.18
11104-28-2	PCB-1221	ND		0.94	0.18
11141-16-5	PCB-1232	ND		0.94	0.18
53469-21-9	PCB-1242	ND		0.94	0.18
12672-29-6	PCB-1248	ND		0.94	0.18
11097-69-1	PCB-1254	11	J+	0.94	0.44
11096-82-5	PCB-1260	ND		0.94	0.44
37324-23-5	PCB-1262	ND		0.94	0.44
11100-14-4	PCB-1268	ND		0.94	0.44

CAS NO.	SURROGATE	%REC	Q	LIMITS
877-09-8	Tetrachloro-m-xylene	113		60-154
2051-24-3	DCB Decachlorobiphenyl	119		65-174

ALH 7/13/21

FORM I
PCBS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins TestAmerica, Buffalo Job No.: 480-175717-3

SDG No.:

Client Sample ID: LG-4 13-15-20200922 Lab Sample ID: 480-175717-59

Matrix: Solid Lab File ID: 7_79-295.D

Analysis Method: 8082A Date Collected: 09/22/2020 15:40

Extraction Method: 3550C Date Extracted: 10/06/2020 15:09

Sample wt/vol: 2.97(g) Date Analyzed: 10/16/2020 22:44

Con. Extract Vol.: 10(mL) Dilution Factor: 1

Injection Volume: 1(uL) GC Column: ZB-5 ID: 0.53(mm)

% Moisture: 12.8 GPC Cleanup:(Y/N) N

Analysis Batch No.: 554253 Units: mg/Kg

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
12674-11-2	PCB-1016	ND	UJ	0.19	0.038
11104-28-2	PCB-1221	ND		0.19	0.038
11141-16-5	PCB-1232	ND	UJ	0.19	0.038
53469-21-9	PCB-1242	ND	UJ	0.19	0.038
12672-29-6	PCB-1248	ND		0.19	0.038
11097-69-1	PCB-1254	0.31		0.19	0.090
11096-82-5	PCB-1260	ND	UJ	0.19	0.090
37324-23-5	PCB-1262	ND	UJ	0.19	0.090
11100-14-4	PCB-1268	ND	UJ	0.19	0.090

CAS NO.	SURROGATE	%REC	Q	LIMITS
877-09-8	Tetrachloro-m-xylene	104		60-154
2051-24-3	DCB Decachlorobiphenyl	89		65-174

ALH 7/13/21

FORM I
PCBS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins TestAmerica, Buffalo Job No.: 480-175717-3

SDG No.:

Client Sample ID: LG-4 23-25-20200922 Lab Sample ID: 480-175717-63

Matrix: Solid Lab File ID: 6_072-270.D

Analysis Method: 8082A Date Collected: 09/22/2020 16:50

Extraction Method: 3550C Date Extracted: 10/06/2020 15:14

Sample wt/vol: 2.08(g) Date Analyzed: 10/19/2020 18:54

Con. Extract Vol.: 10(mL) Dilution Factor: 1

Injection Volume: 1(uL) GC Column: ZB-35 ID: 0.53(mm)

% Moisture: 10.6 GPC Cleanup:(Y/N) N

Analysis Batch No.: 554652 Units: mg/Kg

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
12674-11-2	PCB-1016	ND	UJ	0.27	0.053
11104-28-2	PCB-1221	ND	UJ	0.27	0.053
11141-16-5	PCB-1232	ND		0.27	0.053
53469-21-9	PCB-1242	ND		0.27	0.053
12672-29-6	PCB-1248	ND		0.27	0.053
11097-69-1	PCB-1254	0.32		0.27	0.13
11096-82-5	PCB-1260	ND	UJ	0.27	0.13
37324-23-5	PCB-1262	ND		0.27	0.13
11100-14-4	PCB-1268	ND	UJ	0.27	0.13

CAS NO.	SURROGATE	%REC	Q	LIMITS
877-09-8	Tetrachloro-m-xylene	83		60-154
2051-24-3	DCB Decachlorobiphenyl	86		65-174

ALH 7/13/21

FORM I
PCBS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins TestAmerica, Buffalo Job No.: 480-175717-3

SDG No.:

Client Sample ID: LG-52 11-13-20200922 Lab Sample ID: 480-175717-64

Matrix: Solid Lab File ID: 6_072-298.D

Analysis Method: 8082A Date Collected: 09/22/2020 11:11

Extraction Method: 3550C Date Extracted: 10/06/2020 15:14

Sample wt/vol: 2.45(g) Date Analyzed: 10/20/2020 00:40

Con. Extract Vol.: 10(mL) Dilution Factor: 5

Injection Volume: 1(uL) GC Column: ZB-35 ID: 0.53(mm)

% Moisture: 8.4 GPC Cleanup:(Y/N) N

Analysis Batch No.: 554652 Units: mg/Kg

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
12674-11-2	PCB-1016	ND	UJ	1.1	0.22
11104-28-2	PCB-1221	ND	UJ	1.1	0.22
11141-16-5	PCB-1232	ND		1.1	0.22
53469-21-9	PCB-1242	ND		1.1	0.22
12672-29-6	PCB-1248	ND		1.1	0.22
11097-69-1	PCB-1254	16		1.1	0.52
11096-82-5	PCB-1260	ND	UJ	1.1	0.52
37324-23-5	PCB-1262	ND		1.1	0.52
11100-14-4	PCB-1268	ND	UJ	1.1	0.52

CAS NO.	SURROGATE	%REC	Q	LIMITS
877-09-8	Tetrachloro-m-xylene	105		60-154
2051-24-3	DCB Decachlorobiphenyl	168		65-174

ALH 7/13/21

FORM I
PCBS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins TestAmerica, Buffalo | Job No.: 480-175717-3

SDG No.:

Client Sample ID: SW2-9 0-12-20200923 | Lab Sample ID: 480-175717-68

Matrix: Solid | Lab File ID: 6_072-275.D

Analysis Method: 8082A | Date Collected: 09/23/2020 09:23

Extraction Method: 3550C | Date Extracted: 10/06/2020 15:14

Sample wt/vol: 2.19(g) | Date Analyzed: 10/19/2020 19:56

Con. Extract Vol.: 10(mL) | Dilution Factor: 1

Injection Volume: 1(uL) | GC Column: ZB-35 ID: 0.53(mm)

% Moisture: 3.7 | GPC Cleanup:(Y/N) N

Analysis Batch No.: 554652 | Units: mg/Kg

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
12674-11-2	PCB-1016	ND	UJ	0.24	0.046
11104-28-2	PCB-1221	ND	UJ	0.24	0.046
11141-16-5	PCB-1232	ND		0.24	0.046
53469-21-9	PCB-1242	ND		0.24	0.046
12672-29-6	PCB-1248	ND		0.24	0.046
11097-69-1	PCB-1254	0.21	J	0.24	0.11
11096-82-5	PCB-1260	ND	UJ	0.24	0.11
37324-23-5	PCB-1262	ND		0.24	0.11
11100-14-4	PCB-1268	ND	UJ	0.24	0.11

CAS NO.	SURROGATE	%REC	Q	LIMITS
877-09-8	Tetrachloro-m-xylene	80		60-154
2051-24-3	DCB Decachlorobiphenyl	75		65-174

ALH 7/13/21

FORM I
PCBS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins TestAmerica, Buffalo Job No.: 480-175717-3

SDG No.:

Client Sample ID: SW2-9 24-36-20200923 Lab Sample ID: 480-175717-70

Matrix: Solid Lab File ID: 6_072-277.D

Analysis Method: 8082A Date Collected: 09/23/2020 09:25

Extraction Method: 3550C Date Extracted: 10/06/2020 15:14

Sample wt/vol: 2.15(g) Date Analyzed: 10/19/2020 20:21

Con. Extract Vol.: 10(mL) Dilution Factor: 1

Injection Volume: 1(uL) GC Column: ZB-35 ID: 0.53(mm)

% Moisture: 3.2 GPC Cleanup:(Y/N) N

Analysis Batch No.: 554652 Units: mg/Kg

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
12674-11-2	PCB-1016	ND	UJ	0.24	0.047
11104-28-2	PCB-1221	ND	UJ	0.24	0.047
11141-16-5	PCB-1232	ND		0.24	0.047
53469-21-9	PCB-1242	ND		0.24	0.047
12672-29-6	PCB-1248	ND		0.24	0.047
11097-69-1	PCB-1254	0.34		0.24	0.11
11096-82-5	PCB-1260	ND	UJ	0.24	0.11
37324-23-5	PCB-1262	ND		0.24	0.11
11100-14-4	PCB-1268	ND	UJ	0.24	0.11

CAS NO.	SURROGATE	%REC	Q	LIMITS
877-09-8	Tetrachloro-m-xylene	84		60-154
2051-24-3	DCB Decachlorobiphenyl	77		65-174

ALH 7/13/21

FORM I
PCBS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins TestAmerica, Buffalo Job No.: 480-175717-3

SDG No.:

Client Sample ID: LG-5 1-3-20200923 Lab Sample ID: 480-175717-72

Matrix: Solid Lab File ID: 6_072-279.D

Analysis Method: 8082A Date Collected: 09/23/2020 09:33

Extraction Method: 3550C Date Extracted: 10/06/2020 15:14

Sample wt/vol: 2.52(g) Date Analyzed: 10/19/2020 20:46

Con. Extract Vol.: 10(mL) Dilution Factor: 1

Injection Volume: 1(uL) GC Column: ZB-35 ID: 0.53(mm)

% Moisture: 4.4 GPC Cleanup:(Y/N) N

Analysis Batch No.: 554652 Units: mg/Kg

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
12674-11-2	PCB-1016	ND	UJ	0.21	0.041
11104-28-2	PCB-1221	ND	UJ	0.21	0.041
11141-16-5	PCB-1232	ND		0.21	0.041
53469-21-9	PCB-1242	ND		0.21	0.041
12672-29-6	PCB-1248	ND		0.21	0.041
11097-69-1	PCB-1254	7.1		0.21	0.097
11096-82-5	PCB-1260	ND	UJ	0.21	0.097
37324-23-5	PCB-1262	ND		0.21	0.097
11100-14-4	PCB-1268	ND	UJ	0.21	0.097

CAS NO.	SURROGATE	%REC	Q	LIMITS
877-09-8	Tetrachloro-m-xylene	88		60-154
2051-24-3	DCB Decachlorobiphenyl	81		65-174

ALH 7/13/21

FORM I
PCBS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins TestAmerica, Buffalo Job No.: 480-175717-3

SDG No.:

Client Sample ID: LG-5 9-11-20200923 Lab Sample ID: 480-175717-75

Matrix: Solid Lab File ID: 6_072-301.D

Analysis Method: 8082A Date Collected: 09/23/2020 10:00

Extraction Method: 3550C Date Extracted: 10/06/2020 15:14

Sample wt/vol: 2.57(g) Date Analyzed: 10/20/2020 01:17

Con. Extract Vol.: 10(mL) Dilution Factor: 20

Injection Volume: 1(uL) GC Column: ZB-35 ID: 0.53(mm)

% Moisture: 14.6 GPC Cleanup:(Y/N) N

Analysis Batch No.: 554652 Units: mg/Kg

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
12674-11-2	PCB-1016	ND	UJ	4.6	0.89
11104-28-2	PCB-1221	ND	UJ	4.6	0.89
11141-16-5	PCB-1232	ND		4.6	0.89
53469-21-9	PCB-1242	ND		4.6	0.89
12672-29-6	PCB-1248	ND		4.6	0.89
11097-69-1	PCB-1254	100	J+	4.6	2.1
11096-82-5	PCB-1260	ND	UJ	4.6	2.1
37324-23-5	PCB-1262	ND		4.6	2.1
11100-14-4	PCB-1268	ND	UJ	4.6	2.1

CAS NO.	SURROGATE	%REC	Q	LIMITS
877-09-8	Tetrachloro-m-xylene	145		60-154
2051-24-3	DCB Decachlorobiphenyl	141		65-174

ALH 7/13/21

1A-IN
INORGANIC ANALYSIS DATA SHEET
METALS

Client Sample ID: SW1-6 24-36-20200922 Lab Sample ID: 480-175717-52

Lab Name: Eurofins TestAmerica, Buffalo Job No.: 480-175717-3

SDG ID.:

Matrix: Solid Date Sampled: 09/22/2020 10:35

Reporting Basis: DRY Date Received: 09/29/2020 10:30

% Solids: 94.6

CAS No.	Analyte	Result	RL	MDL	Units	C	Q	DIL	Method
7440-43-9	Cadmium	20.1	0.21	0.032	mg/Kg			1	6010C
7439-92-1	Lead	122	1.1	0.25	mg/Kg	J	F1	1	6010C

ALH 7/13/21

1A-IN
INORGANIC ANALYSIS DATA SHEET
METALS

Client Sample ID: SW1-9 0-12-20200922 Lab Sample ID: 480-175717-53

Lab Name: Eurofins TestAmerica, Buffalo Job No.: 480-175717-3

SDG ID.:

Matrix: Solid Date Sampled: 09/22/2020 10:47

Reporting Basis: DRY Date Received: 09/29/2020 10:30

% Solids: 96.5

CAS No.	Analyte	Result	RL	MDL	Units	C	Q	DIL	Method
7440-43-9	Cadmium	9.2	0.21	0.031	mg/Kg			1	6010C
7439-92-1	Lead	69.3	1.0	0.25	mg/Kg	J	F1	1	6010C

ALH 7/13/21

1A-IN
INORGANIC ANALYSIS DATA SHEET
METALS

Client Sample ID: SW2-3 12-24-20200922 Lab Sample ID: 480-175717-55

Lab Name: Eurofins TestAmerica, Buffalo Job No.: 480-175717-3

SDG ID.:

Matrix: Solid Date Sampled: 09/22/2020 14:56

Reporting Basis: DRY Date Received: 09/29/2020 10:30

% Solids: 96.4

CAS No.	Analyte	Result	RL	MDL	Units	C	Q	DIL	Method
7440-43-9	Cadmium	67.2	0.21	0.032	mg/Kg			1	6010C
7439-92-1	Lead	231	1.1	0.25	mg/Kg			1	6010C

1A-IN
INORGANIC ANALYSIS DATA SHEET
METALS

Client Sample ID: LG-4 13-15-20200922 Lab Sample ID: 480-175717-59

Lab Name: Eurofins TestAmerica, Buffalo Job No.: 480-175717-3

SDG ID.:

Matrix: Solid Date Sampled: 09/22/2020 15:40

Reporting Basis: DRY Date Received: 09/29/2020 10:30

% Solids: 87.2

CAS No.	Analyte	Result	RL	MDL	Units	C	Q	DIL	Method
7440-43-9	Cadmium	0.23	0.22	0.034	mg/Kg			1	6010C
7439-92-1	Lead	10.9	1.1	0.27	mg/Kg			1	6010C

1A-IN
INORGANIC ANALYSIS DATA SHEET
METALS

Client Sample ID: LG-4 23-25-20200922 Lab Sample ID: 480-175717-63

Lab Name: Eurofins TestAmerica, Buffalo Job No.: 480-175717-3

SDG ID.:

Matrix: Solid Date Sampled: 09/22/2020 16:50

Reporting Basis: DRY Date Received: 09/29/2020 10:30

% Solids: 89.4

CAS No.	Analyte	Result	RL	MDL	Units	C	Q	DIL	Method
7440-43-9	Cadmium	7.9	0.22	0.033	mg/Kg			1	6010C
7439-92-1	Lead	25.3	1.1	0.26	mg/Kg			1	6010C

1A-IN
INORGANIC ANALYSIS DATA SHEET
METALS

Client Sample ID: LG-52 11-13-20200922 Lab Sample ID: 480-175717-64

Lab Name: Eurofins TestAmerica, Buffalo Job No.: 480-175717-3

SDG ID.:

Matrix: Solid Date Sampled: 09/22/2020 11:11

Reporting Basis: DRY Date Received: 09/29/2020 10:30

% Solids: 91.6

CAS No.	Analyte	Result	RL	MDL	Units	C	Q	DIL	Method
7440-43-9	Cadmium	359	0.21	0.032	mg/Kg			1	6010C
7439-92-1	Lead	231	1.1	0.26	mg/Kg			1	6010C

1A-IN
INORGANIC ANALYSIS DATA SHEET
METALS

Client Sample ID: SW2-9 0-12-20200923 Lab Sample ID: 480-175717-68

Lab Name: Eurofins TestAmerica, Buffalo Job No.: 480-175717-3

SDG ID.:

Matrix: Solid Date Sampled: 09/23/2020 09:23

Reporting Basis: DRY Date Received: 09/29/2020 10:30

% Solids: 96.3

CAS No.	Analyte	Result	RL	MDL	Units	C	Q	DIL	Method
7440-43-9	Cadmium	2.5	0.21	0.031	mg/Kg			1	6010C
7439-92-1	Lead	71.8	1.0	0.25	mg/Kg			1	6010C

1A-IN
INORGANIC ANALYSIS DATA SHEET
METALS

Client Sample ID: SW2-9 24-36-20200923 Lab Sample ID: 480-175717-70

Lab Name: Eurofins TestAmerica, Buffalo Job No.: 480-175717-3

SDG ID.:

Matrix: Solid Date Sampled: 09/23/2020 09:25

Reporting Basis: DRY Date Received: 09/29/2020 10:30

% Solids: 96.8

CAS No.	Analyte	Result	RL	MDL	Units	C	Q	DIL	Method
7440-43-9	Cadmium	5.5	0.20	0.031	mg/Kg			1	6010C
7439-92-1	Lead	67.4	1.0	0.24	mg/Kg			1	6010C

1A-IN
INORGANIC ANALYSIS DATA SHEET
METALS

Client Sample ID: LG-5 1-3-20200923 Lab Sample ID: 480-175717-72

Lab Name: Eurofins TestAmerica, Buffalo Job No.: 480-175717-3

SDG ID.:

Matrix: Solid Date Sampled: 09/23/2020 09:33

Reporting Basis: DRY Date Received: 09/29/2020 10:30

% Solids: 95.6

CAS No.	Analyte	Result	RL	MDL	Units	C	Q	DIL	Method
7440-43-9	Cadmium	59.8	0.21	0.032	mg/Kg			1	6010C
7439-92-1	Lead	704	1.1	0.25	mg/Kg			1	6010C

1A-IN
INORGANIC ANALYSIS DATA SHEET
METALS

Client Sample ID: LG-5 9-11-20200923 Lab Sample ID: 480-175717-75

Lab Name: Eurofins TestAmerica, Buffalo Job No.: 480-175717-3

SDG ID.:

Matrix: Solid Date Sampled: 09/23/2020 10:00

Reporting Basis: DRY Date Received: 09/29/2020 10:30

% Solids: 85.4

CAS No.	Analyte	Result	RL	MDL	Units	C	Q	DIL	Method
7440-43-9	Cadmium	407	0.23	0.034	mg/Kg			1	6010C
7439-92-1	Lead	3690	1.1	0.27	mg/Kg			1	6010C

VALIDATA
Chemical Services, Inc.
2159 Wynnton Pointe, Duluth, GA 30097
(770) 232-0130
(770) 232-5082 (Fax)
www.datavalidator.com

DATA USABILITY SUMMARY REPORT

COMPANY:	AECOM Technical Services Northeast, Inc.
PROJECT NAME:	C&D Power Systems #336001
CONTRACTED LAB:	Eurofins Test America, Buffalo
QA/QC LEVEL:	DUSR
ANALYTICAL METHOD(S):	SW846 and EPA Methods
VALIDATION GUIDELINES:	*USEPA Region II data validation SOPs (VOA HW-24 Rev.4, SVOC HW-22 Rev.5, PEST-HW-44, Rev 1.1, PCB HW-37a Rev. 0, METALS_SOP_HW3a-ICP-AES Rev 1.1 and HW3c-Hg-CN, Rev. 1), USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review,* **2008**; *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review,***2010**; NYDEC *Guidelines for Sampling and Analysis of PFAS,* January 2020, Professional Judgment
SAMPLE MATRIX:	Water
TYPES OF ANALYSES:	Total Metals, Dissolved Metals, Fluoride
DATA REVIEWER(S):	Amy L. Hogan
SDG NUMBER:	480-175722-1
SAMPLING DATE(S):	September 22, 2020

SAMPLES:

Client Sample ID	Laboratory ID	T.Metals	D.Metals
BP-RR-20200922	480-175722-1	X	X

Client Sample ID	Laboratory ID	Fluoride
BP-RR-20200922	480-175722-1	X

* - Total and Dissolved Metals include 22 analytes by method 6010 and mercury by method 7470A
Suffix Codes: DL= DILUTION, MS = MATRIX SPIKE,
MSD = MATRIX SPIKE DUPLICATE, RE = REANALYSIS

Qualifier	Definition
U	The analyte was not detected and was reported as less than the LOD or as defined by the customer. The LOD has been adjusted for any dilution or concentration of the sample.
J	The reported result was an estimated value with an unknown bias.
J+	The result was an estimated quantity, but the result may be biased high.
J-	The result was an estimated quantity, but the result may be biased low.
N	The analysis indicates the presence of an analyte for which there was presumptive evidence to make a "tentative identification."
NJ	The analyte has been “tentatively identified” or “presumptively” as present and the associated numerical value was the estimated concentration in the sample.
UJ	The analyte was not detected and was reported as less than the LOD or as defined by the customer. However, the associated numerical value is approximate.
X	The sample results (including non-detects) were affected by serious deficiencies in the ability to analyze the sample and to meet published method and project quality control criteria. The presence or absence of the analyte cannot be substantiated by the data provided. Acceptance or rejection of the data should be decided by the project team (which should include a project chemist), but exclusion of the data is recommended.

DATA USABILITY SUMMARY

Eurofins Test America, Buffalo – 480-175722-1

TOTAL METALS

SUMMARY

I.) General:

The analyses for Total Metals were performed per SW846 Method 6010C and 7470A.

II.) Overall Assessment of Data:

All laboratory data were acceptable without qualifications.

III.) Holding Times:

All Holding Time criteria were met. No data qualification was necessary.

IV.) Calibration:

All Initial and Continuing Calibration criteria were met. No data qualification was necessary.

V.) CRDL standards:

All CRDL criteria were met. No data qualification was necessary.

VI.) Blanks:

Calibration Blanks:

There were no detections in the associated calibration blanks. No data qualification was necessary.

Preparation Blanks:

Manganese (0.00105 mg/L) was detected in method blank MB 480-551801/1-A. Since the blank result was less than the RL and the sample result was greater than the RL, no data qualification was necessary.

Equipment Blanks:

There was no equipment blank submitted in association with this SDG. No data qualification was

necessary.

Field Blank:

There was no field blank submitted in association with this SDG. No data qualification was necessary.

VII.) Interference Check Sample (ICS) Results:

All ICS criteria were met. No data qualification was necessary.

VIII.) Matrix Spike / Matrix Spike Duplicates (MS / MSD):

MS / MSD analyses were performed using SDG sample BP-ST-20200922 for mercury only. All criteria were met. No data qualification was necessary.

IX.) Laboratory Control Samples (LCS):

All LCS Recovery criteria were met. No data qualification was necessary.

X.) Serial Dilution Analysis:

Serial Dilution Analysis was performed using SDG samples BP-ST-20200922 for mercury only. All criteria were met. No data qualification was necessary.

XI.) Field Duplicates:

There were no field duplicate samples identified as part of this SDG. No data qualification was necessary.

XII.) Compound Quantitation and Reported Contract Required Quantitation Limits (CRQL):

All CRQL criteria were met. No data qualification was necessary.

DISSOLVED METALS

SUMMARY

I.) General:

The analyses for Dissolved Metals were performed per SW846 Method 6010C and 7470A.

II.) Overall Assessment of Data:

All laboratory data were acceptable without qualifications.

III.) Holding Times:

All Holding Time criteria were met. No data qualification was necessary.

IV.) Calibration:

All Initial and Continuing Calibration criteria were met. No data qualification was necessary.

V.) CRDL standards:

All CRDL criteria were met. No data qualification was necessary.

VI.) Blanks:

Calibration Blanks:

Zinc (0.00590 mg/L, 0.00624 mg/L) were detected in associated CCB for this SDG. Since the blank results were less than the RL and the zinc result for the sample was greater than the RL, no data qualification was necessary.

Preparation Blanks:

Potassium (0.116 mg/L) and zinc (0.00263 mg/L) were detected in method blank MB 480-552048/1-A. Since the blank results were less than the RL and the sample results were greater than the RL, no data qualification was necessary.

Equipment Blanks:

There was no equipment blank submitted in association with this SDG. No data qualification was necessary.

Field Blank:

There was no field blank submitted in association with this SDG. No data qualification was necessary.

VII.) Interference Check Sample (ICS) Results:

All ICS criteria were met. No data qualification was necessary.

VIII.) Matrix Spike / Matrix Spike Duplicates (MS / MSD):

MS / MSD analyses were performed using SDG sample BP-ST-20200922 for mercury only. All criteria were met. No data qualification was necessary.

IX.) Laboratory Control Samples (LCS):

All LCS Recovery criteria were met. No data qualification was necessary.

X.) Serial Dilution Analysis:

Serial Dilution Analysis was performed using SDG samples BP-ST-20200922 for mercury only. All criteria were met. No data qualification was necessary.

XI.) Field Duplicates:

There were no field duplicate samples identified as part of this SDG. No data qualification was necessary.

XII.) Compound Quantitation and Reported Contract Required Quantitation Limits (CRQL):

All CRQL criteria were met. No data qualification was necessary.

FLUORIDE

SUMMARY

I.) General:

The analyses for Fluoride were performed per Method SM4500F C.

II.) Overall Assessment of Data:

All laboratory data were acceptable without qualifications.

III.) Holding Times:

All Holding Time criteria were met. No data qualification was necessary.

IV.) Calibration:

All Initial and Continuing Calibration criteria were met. No data qualification was necessary.

V.) Blanks:

Calibration Blanks:

There were no detections in the associated calibration blanks. No data qualification was necessary.

Preparation Blanks:

There was no detection in the associated preparation blank. No data qualification was necessary.

Equipment Blanks:

There was no equipment blank submitted in association with this SDG. No data qualification was necessary.

Field Blank:

There was no field blank submitted in association with this SDG. No data qualification was necessary.

VI.) Matrix Spike / Matrix Spike Duplicates (MS / MSD):

MS / MSD analyses were performed using SDG sample BP-ST-20200922. All criteria were met. No data qualification was necessary.

VII.) Laboratory Control Samples (LCS):

All LCS Recovery criteria were met. No data qualification was necessary.

VIII.) Field Duplicates:

There were no field duplicate samples identified as part of this SDG. No data qualification was necessary.

IX.) Compound Quantitation and Reported Contract Required Quantitation Limits (CRQL):

All CRQL criteria were met. No data qualification was necessary.

Attachment A

Sample Result Forms (FORM Is) Corrected for Validation Qualifiers

1A-IN
INORGANIC ANALYSIS DATA SHEET
METALS

Client Sample ID: BP-RR-20200922 Lab Sample ID: 480-175722-1

Lab Name: Eurofins TestAmerica, Buffalo Job No.: 480-175722-1

SDG ID.:

Matrix: Water Date Sampled: 09/22/2020 08:45

Reporting Basis: WET Date Received: 09/25/2020 10:30

CAS No.	Analyte	Result	RL	MDL	Units	C	Q	DIL	Method
7429-90-5	Aluminum	ND	0.20	0.060	mg/L			1	6010C
7440-36-0	Antimony	ND	0.020	0.0068	mg/L			1	6010C
7440-38-2	Arsenic	ND	0.015	0.0056	mg/L			1	6010C
7440-39-3	Barium	0.39	0.0020	0.00070	mg/L		^	1	6010C
7440-41-7	Beryllium	ND	0.0020	0.00030	mg/L			1	6010C
7440-43-9	Cadmium	ND	0.0020	0.00050	mg/L			1	6010C
7440-70-2	Calcium	113	0.50	0.10	mg/L			1	6010C
7440-47-3	Chromium	ND	0.0040	0.0010	mg/L			1	6010C
7440-48-4	Cobalt	ND	0.0040	0.00063	mg/L			1	6010C
7440-50-8	Copper	0.030	0.010	0.0016	mg/L			1	6010C
7439-89-6	Iron	0.039	0.050	0.019	mg/L	J		1	6010C
7439-92-1	Lead	ND	0.010	0.0030	mg/L			1	6010C
7439-95-4	Magnesium	15.1	0.20	0.043	mg/L			1	6010C
7439-96-5	Manganese	0.096	0.0030	0.00040	mg/L		B	1	6010C
7440-02-0	Nickel	ND	0.010	0.0013	mg/L			1	6010C
7440-09-7	Potassium	0.67	0.50	0.10	mg/L			1	6010C
7782-49-2	Selenium	ND	0.025	0.0087	mg/L			1	6010C
7440-22-4	Silver	ND	0.0060	0.0017	mg/L			1	6010C
7440-23-5	Sodium	59.6	1.0	0.32	mg/L			1	6010C
7440-28-0	Thallium	ND	0.020	0.010	mg/L			1	6010C
7440-62-2	Vanadium	ND	0.0050	0.0015	mg/L			1	6010C
7440-66-6	Zinc	0.018	0.010	0.0015	mg/L			1	6010C
7439-97-6	Mercury	ND	0.00020	0.00012	mg/L			1	7470A

1A-IN
INORGANIC ANALYSIS DATA SHEET
METALS - DISSOLVED

Client Sample ID: BP-RR-20200922 Lab Sample ID: 480-175722-1

Lab Name: Eurofins TestAmerica, Buffalo Job No.: 480-175722-1

SDG ID.:

Matrix: Water Date Sampled: 09/22/2020 08:45

Reporting Basis: WET Date Received: 09/25/2020 10:30

CAS No.	Analyte	Result	RL	MDL	Units	C	Q	DIL	Method
7429-90-5	Aluminum	ND	0.20	0.060	mg/L			1	6010C
7440-36-0	Antimony	ND	0.020	0.0068	mg/L			1	6010C
7440-38-2	Arsenic	ND	0.015	0.0056	mg/L			1	6010C
7440-39-3	Barium	0.35	0.0020	0.00070	mg/L		^	1	6010C
7440-41-7	Beryllium	ND	0.0020	0.00030	mg/L			1	6010C
7440-43-9	Cadmium	ND	0.0020	0.00050	mg/L			1	6010C
7440-70-2	Calcium	105	0.50	0.10	mg/L			1	6010C
7440-47-3	Chromium	ND	0.0040	0.0010	mg/L			1	6010C
7440-48-4	Cobalt	ND	0.0040	0.00063	mg/L			1	6010C
7440-50-8	Copper	0.020	0.010	0.0016	mg/L			1	6010C
7439-89-6	Iron	ND	0.050	0.019	mg/L			1	6010C
7439-92-1	Lead	0.0032	0.010	0.0030	mg/L	J		1	6010C
7439-95-4	Magnesium	14.4	0.20	0.043	mg/L			1	6010C
7439-96-5	Manganese	0.089	0.0030	0.00040	mg/L			1	6010C
7440-02-0	Nickel	ND	0.010	0.0013	mg/L			1	6010C
7440-09-7	Potassium	0.66	0.50	0.10	mg/L		B	1	6010C
7782-49-2	Selenium	ND	0.025	0.0087	mg/L			1	6010C
7440-22-4	Silver	ND	0.0060	0.0017	mg/L			1	6010C
7440-23-5	Sodium	53.8	1.0	0.32	mg/L			1	6010C
7440-28-0	Thallium	ND	0.020	0.010	mg/L			1	6010C
7440-62-2	Vanadium	ND	0.0050	0.0015	mg/L			1	6010C
7440-66-6	Zinc	0.020	0.010	0.0015	mg/L		B	1	6010C
7439-97-6	Mercury	ND	0.00020	0.00012	mg/L			1	7470A

1B-IN
INORGANIC ANALYSIS DATA SHEET
GENERAL CHEMISTRY

Client Sample ID: BP-RR-20200922 Lab Sample ID: 480-175722-1

Lab Name: Eurofins TestAmerica, Buffalo Job No.: 480-175722-1

SDG ID.:

Matrix: Water Date Sampled: 09/22/2020 08:45

Reporting Basis: WET Date Received: 09/25/2020 10:30

CAS No.	Analyte	Result	RL	MDL	Units	C	Q	DIL	Method
16984-48-8	Fluoride	0.15	0.10	0.017	mg/L			1	SM 4500 F C

VALIDATA
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2159 Wynnton Pointe, Duluth, GA 30097
(770) 232-0130
(770) 232-5082 (Fax)
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DATA USABILITY SUMMARY REPORT

COMPANY:	AECOM Technical Services Northeast, Inc.
PROJECT NAME:	C&D Power Systems #336001
CONTRACTED LAB:	Eurofins Test America, Burlington
QA/QC LEVEL:	DUSR
ANALYTICAL METHOD(S):	SW 846 Methods and EPA Method 537 Modified
VALIDATION GUIDELINES:	*USEPA Region II data validation SOPs (VOA HW-24 Rev.4, SVOC HW-22 Rev.5, PEST-HW-44, Rev 1.1, PCB HW-37a Rev. 0, METALS_SOP_HW3a-ICP-AES Rev 1.1 and HW3c-Hg-CN, Rev. 1), USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review,* **2008**; *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review,***2010**; NYDEC *Guidelines for Sampling and Analysis of PFAS,* January 2020, Professional Judgment
SAMPLE MATRIX:	Water
TYPES OF ANALYSES:	1,4-dioxane, Per and Polyfluoroalkyl Substances (PFAS)
DATA REVIEWER(S):	Amy L. Hogan &Thomas B Granat
SDG NUMBER:	460-197436-1
SAMPLING DATE(S):	November 20-21, 2019

SAMPLES:

Client Sample ID	Laboratory ID	1,4-dioxane	PFAS
MW-9-112019	460-197436-2	X	X
FB-112019	460-197436-3	X	X
MW-7-112119	460-197436-4	X	X
MW-7-112119MS	460-197436-4MS	X	X
MW-7-112119MSD	460-197436-4MSD	X	X
MW-57-112119	460-197436-5	X	X

Suffix Codes: DL= DILUTION, MS = MATRIX SPIKE,
MSD = MATRIX SPIKE DUPLICATE, RE = REANALYSIS

Qualifier	Definition
U	The analyte was not detected and was reported as less than the LOD or as defined by the customer. The LOD has been adjusted for any dilution or concentration of the sample.
J	The reported result was an estimated value with an unknown bias.
J+	The result was an estimated quantity, but the result may be biased high.
J-	The result was an estimated quantity, but the result may be biased low.
N	The analysis indicates the presence of an analyte for which there was presumptive evidence to make a "tentative identification."
NJ	The analyte has been “tentatively identified” or “presumptively” as present and the associated numerical value was the estimated concentration in the sample.
UJ	The analyte was not detected and was reported as less than the LOD or as defined by the customer. However, the associated numerical value is approximate.
X	The sample results (including non-detects) were affected by serious deficiencies in the ability to analyze the sample and to meet published method and project quality control criteria. The presence or absence of the analyte cannot be substantiated by the data provided. Acceptance or rejection of the data should be decided by the project team (which should include a project chemist), but exclusion of the data is recommended.

DATA USABILITY SUMMARY REPORT

Eurofins Test America, Burlington – 460-197436-1

1,4-DIOXANE

SUMMARY

I.) General:

The analyses for 1,4-dioxane were performed per SW846 Method 8270D SIM.

II.) Overall Assessment of Data:

All laboratory data were acceptable without qualifications.

II.) Holding Times:

All Holding Time criteria were met. No data qualification was necessary.

IV.) GC/MS Tuning:

All GC/MS Tuning criteria were met. No data qualification was necessary.

V.) Calibration:

Initial Calibration:

All Initial Calibration criteria were met. No data qualification was necessary.

Initial Calibration Verification:

All Initial Calibration Verification criteria were met. No data qualification was necessary.

Continuing Calibration:

All Continuing Calibration criteria were met. No data qualification was necessary.

VI.) Blanks:

Method Blanks:

There were no detections in the associated method blank. No data qualification was necessary.

Equipment Blanks:

There was no equipment blank submitted in association with this SDG. No data qualification was necessary.

Field Blanks:

There was no detection in associated field blank FB-112019. No data qualification was necessary.

VII.) Surrogate Recoveries:

All Surrogate Recovery criteria were met. No data qualification was necessary.

VIII.) Laboratory Control Samples (LCS):

One LCS was analyzed by the laboratory for this SDG. All criteria were met. No data qualification was necessary.

IX.) Matrix Spike / Matrix Spike Duplicate (MS / MSD):

MS / MSD analyses were performed using sample MW-7-112119. All criteria were met. No data qualification was necessary.

X.) Field Duplicates:

One set of field duplicate samples (MW-7-112119 / MW-57-112119) was identified as part of this SDG. There was no calculable result. No data qualification was necessary.

XI.) TCL Compound Identification:

All TCL Compound Identification criteria were met. No data qualification was necessary.

XII.) Internal Standards Performance (ISTD):

All ISTD area count criteria were met. No data qualification was necessary.

XIII.) Compound Quantitation and Reported Contract Required Quantitation Limits (CRQL):

All CRQL criteria were met. No data qualification was necessary.

PERFLOROALKYL SUBSTANCES (PFAS)

SUMMARY

I.) General:

The analyses for Perfluoroalkyl Substances were performed by Liquid Chromatography Tandem Mass Spectrometry (LC/MS/MS) per EPA Method 537 Modified (low level).

II.) Overall Assessment of Data:

All laboratory data were acceptable with qualifications.

MAJOR ISSUES

There were no major problems for this fraction of the SDG.

MINOR ISSUES

I.) Laboratory Data Package:

The required documentation was present and complete. The laboratory presented a complete and accurate case narrative in the data package. The data package contains results for all samples and method types listed on the COC.

II.) Sample Receipt, Preservation, and Holding Times:

The samples were received intact with proper COC documentation and signatures. The samples were received within the method temperature requirements. The samples were extracted and analyzed within the method hold times.

III.) Initial Calibration (ICAL) and Initial Calibration Verification (ICV):

All Initial Calibration and Initial Calibration Verification criteria were met. No data qualification was necessary.

IV.) Continuing Calibration (CCV):

The low level continuing calibration verification (CCVL) associated with batch 200-150476 recovered above the upper control limit for PFTeDA. The samples associated with this CCV were non-detects for the affected analyte; therefore, no data qualification was necessary.

V.) Blanks:

Instrument Blank (IB):

All Instrument Blanks were acceptable. No data qualification was necessary.

Method Blank (MB):

Method Blank results were evaluated based on project guidelines in the following table:

Blank Result	Sample Result	Qualification
Any detection	< Reporting Limit	Qualify as ND at reporting limit
Any detection	>Reporting Limit and >10x the blank result	No qualification
>Reporting Limit	>Reporting limit and <10x blank result	J+ biased high

The following analyte was detected below the RL in MB 200-150343/1-A:

Analyte	Analysis Batch	Prep Batch	Result	RL	MDL
PFBA	150466	150343	1.02	2.0	1.0

The associated field sample result was acceptable compared to the blank result. No data qualification was necessary.

Field Blank (FB):

There were no detections in FB-112019. No data qualification was necessary.

Equipment Blank (EB):

There were no equipment blanks identified in this SDG. No data qualification was necessary.

VI.) Matrix Spike / Matrix Spike Duplicate (MS / MSD):

MS / MSD analysis was performed on SDG sample MW-7-112119. The matrix spike / matrix spike duplicate (MS/MSD) recoveries for preparation batch 200-150363 and analytical batch 200-150476 were outside control limits for 6:2 FTS. The 6:2 FTS results for sample MW-7-112119 was qualified as estimated (UJ). All other MS/MSD criteria were met. No further data qualification was necessary.

VII.) Laboratory Control Samples (LCS / LCSD):

All LCS/LCSD Recovery criteria were met. All LCS/LCSD RPDs were ≤ 30%. No data qualification was necessary.

VIII.) Field Duplicates:

One FD sample was identified for this fraction of the SDG. Below are the calculated RPDs (Relative Percent Differences) for the detected analyte results (> 2x RL) used to evaluate the field sampling and laboratory precision for the sample matrix.

Parent Sample	Duplicate Sample	Analyte	RPD
MW-7-112119	MW-57-112119	PFBA	6.6
		PFPeA	10.0
		PFHxA	0.0
		PFHpA	8.3
		PFHxS	6.1

Parent Sample	Duplicate Sample	Analyte	RPD
		PFOS	13.9

The RPDs were within the ≤ 30% QC limit for water. No data qualification was necessary.

IX.) Internal Standards Performance (ISTD):

All sample ISTD recoveries (%R) were acceptable. No data qualification was necessary.

X.) Ion Transitions:

All sample ratios of quantifier ion response to qualifier ion response were acceptable. No data qualification was necessary.

XI.) Reporting limits (RLs):

All Reporting Limits were acceptable. No data qualification was necessary.

Several sample results were greater than the MDL but less than the RL and were qualified as estimated (J) by the laboratory. These qualifiers were confirmed by the validator.

XII.) Instrument Performance criteria:

All Instrument Performance criteria were met. No data qualification was necessary.

XIII.) Sample and QC Calculation Verification:

All Sample and QC Calculation Verification criteria were met. No discrepancies were noted.

Attachment A

Sample Result Forms (FORM Is) Corrected for Validation Qualifiers

FORM I
GC/MS SEMI VOA ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins TestAmerica, Edison Job No.: 460-197436-1

SDG No.:

Client Sample ID: MW-9-112019 Lab Sample ID: 460-197436-2

Matrix: Water Lab File ID: C5277.D

Analysis Method: 8270D SIM ID Date Collected: 11/20/2019 16:15

Extract. Method: 3510C Date Extracted: 11/27/2019 09:51

Sample wt/vol: 250(mL) Date Analyzed: 11/28/2019 04:39

Con. Extract Vol.: 2(mL) Dilution Factor: 1

Injection Volume: 5(uL) Level: (low/med) Low

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 658903 Units: ug/L

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
123-91-1	1,4-Dioxane	ND		0.20	0.016

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
17647-74-4	1,4-Dioxane-d8	33		10-150

FORM I
GC/MS SEMI VOA ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins TestAmerica, Edison Job No.: 460-197436-1

SDG No.:

Client Sample ID: FB-112019 Lab Sample ID: 460-197436-3

Matrix: Water Lab File ID: C5278.D

Analysis Method: 8270D SIM ID Date Collected: 11/20/2019 15:00

Extract. Method: 3510C Date Extracted: 11/27/2019 09:51

Sample wt/vol: 250(mL) Date Analyzed: 11/28/2019 04:58

Con. Extract Vol.: 2(mL) Dilution Factor: 1

Injection Volume: 5(uL) Level: (low/med) Low

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 658903 Units: ug/L

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
123-91-1	1,4-Dioxane	ND		0.20	0.016

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
17647-74-4	1,4-Dioxane-d8	36		10-150

FORM I
GC/MS SEMI VOA ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins TestAmerica, Edison Job No.: 460-197436-1

SDG No.:

Client Sample ID: MW-7-112119 Lab Sample ID: 460-197436-4

Matrix: Water Lab File ID: C5274.D

Analysis Method: 8270D SIM ID Date Collected: 11/21/2019 09:05

Extract. Method: 3510C Date Extracted: 11/27/2019 09:51

Sample wt/vol: 250(mL) Date Analyzed: 11/28/2019 03:40

Con. Extract Vol.: 2(mL) Dilution Factor: 1

Injection Volume: 5(uL) Level: (low/med) Low

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 658903 Units: ug/L

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
123-91-1	1,4-Dioxane	ND		0.20	0.016

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
17647-74-4	1,4-Dioxane-d8	69		10-150

FORM I
GC/MS SEMI VOA ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins TestAmerica, Edison Job No.: 460-197436-1

SDG No.:

Client Sample ID: MW-57-112119 Lab Sample ID: 460-197436-5

Matrix: Water Lab File ID: C5279.D

Analysis Method: 8270D SIM ID Date Collected: 11/21/2019 00:00

Extract. Method: 3510C Date Extracted: 11/27/2019 09:51

Sample wt/vol: 250(mL) Date Analyzed: 11/28/2019 05:18

Con. Extract Vol.: 2(mL) Dilution Factor: 1

Injection Volume: 5(uL) Level: (low/med) Low

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 658903 Units: ug/L

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
123-91-1	1,4-Dioxane	ND		0.20	0.016

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
17647-74-4	1,4-Dioxane-d8	63		10-150

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins TestAmerica, Burlington Job No.: 460-197436-1

SDG No.:

Client Sample ID: MW-9-112019 Lab Sample ID: 460-197436-2

Matrix: Water Lab File ID: SC120719B028.d

Analysis Method: 537 (modified) Date Collected: 11/20/2019 16:15

Extraction Method: 3535 Date Extracted: 12/03/2019 15:31

Sample wt/vol: 279.8(mL) Date Analyzed: 12/08/2019 00:25

Con. Extract Vol.: 10(mL) Dilution Factor: 1

Injection Volume: 20(uL) GC Column: C-18 ID: 4.6(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 150466 Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q Val	RL	MDL
375-22-4	Perfluorobutanoic acid (PFBA)	5.2	B	1.8	0.89
2706-90-3	Perfluoropentanoic acid (PFPeA)	14		1.8	0.56
307-24-4	Perfluorohexanoic acid (PFHxA)	8.9	*	1.8	0.68
375-85-9	Perfluoroheptanoic acid (PFHpA)	3.9		1.8	0.81
335-67-1	Perfluorooctanoic acid (PFOA)	4.9		1.8	0.72
375-95-1	Perfluorononanoic acid (PFNA)	0.53	J J	1.8	0.24
335-76-2	Perfluorodecanoic acid (PFDA)	ND		1.8	0.69
2058-94-8	Perfluoroundecanoic acid (PFUnA)	ND		1.8	0.70
307-55-1	Perfluorododecanoic acid (PFDoA)	ND		1.8	0.53
72629-94-8	Perfluorotridecanoic acid (PFTriA)	ND		1.8	0.54
376-06-7	Perfluorotetradecanoic acid (PFTeA)	ND		1.8	0.82
375-73-5	Perfluorobutanesulfonic acid (PFBS)	0.84	J J	1.8	0.44
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	10		1.8	0.71
375-92-8	Perfluoroheptanesulfonic Acid (PFHpS)	ND		1.8	0.85
335-77-3	Perfluorodecanesulfonic acid (PFDS)	ND		1.8	0.80
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	31		1.8	0.55
754-91-6	Perfluorooctanesulfonamide (FOSA)	ND		8.9	8.9
2355-31-9	N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND	*	18	1.5
2991-50-6	N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		18	1.3
27619-97-2	6:2 FTS	ND		18	4.9
39108-34-4	8:2 FTS	ND		18	2.6

TBG 10/13/2020

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins TestAmerica, Burlington Job No.: 460-197436-1

SDG No.:

Client Sample ID: FB-112019 Lab Sample ID: 460-197436-3

Matrix: Water Lab File ID: SC120719B029.d

Analysis Method: 537 (modified) Date Collected: 11/20/2019 15:00

Extraction Method: 3535 Date Extracted: 12/03/2019 15:31

Sample wt/vol: 303.7(mL) Date Analyzed: 12/08/2019 00:34

Con. Extract Vol.: 10(mL) Dilution Factor: 1

Injection Volume: 20(uL) GC Column: C-18 ID: 4.6(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 150466 Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
375-22-4	Perfluorobutanoic acid (PFBA)	ND		1.6	0.82
2706-90-3	Perfluoropentanoic acid (PFPeA)	ND		1.6	0.52
307-24-4	Perfluorohexanoic acid (PFHxA)	ND	*	1.6	0.63
375-85-9	Perfluoroheptanoic acid (PFHpA)	ND		1.6	0.75
335-67-1	Perfluorooctanoic acid (PFOA)	ND		1.6	0.67
375-95-1	Perfluorononanoic acid (PFNA)	ND		1.6	0.22
335-76-2	Perfluorodecanoic acid (PFDA)	ND		1.6	0.63
2058-94-8	Perfluoroundecanoic acid (PFUnA)	ND		1.6	0.64
307-55-1	Perfluorododecanoic acid (PFDoA)	ND		1.6	0.49
72629-94-8	Perfluorotridecanoic acid (PFTriA)	ND		1.6	0.49
376-06-7	Perfluorotetradecanoic acid (PFTeA)	ND		1.6	0.76
375-73-5	Perfluorobutanesulfonic acid (PFBS)	ND		1.6	0.40
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	ND		1.6	0.66
375-92-8	Perfluoroheptanesulfonic Acid (PFHpS)	ND		1.6	0.78
335-77-3	Perfluorodecanesulfonic acid (PFDS)	ND		1.6	0.74
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	ND		1.6	0.50
754-91-6	Perfluorooctanesulfonamide (FOSA)	ND		8.2	8.2
2355-31-9	N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND	*	16	1.4
2991-50-6	N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		16	1.2
27619-97-2	6:2 FTS	ND		16	4.5
39108-34-4	8:2 FTS	ND		16	2.4

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins TestAmerica, Burlington Job No.: 460-197436-1

SDG No.:

Client Sample ID: MW-7-112119 Lab Sample ID: 460-197436-4

Matrix: Water Lab File ID: SC120819A025.d

Analysis Method: 537 (modified) Date Collected: 11/21/2019 09:05

Extraction Method: 3535 Date Extracted: 12/04/2019 15:50

Sample wt/vol: 272.7(mL) Date Analyzed: 12/08/2019 18:11

Con. Extract Vol.: 10(mL) Dilution Factor: 1

Injection Volume: 20(uL) GC Column: C-18 ID: 4.6(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 150476 Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q Val	RL	MDL
375-22-4	Perfluorobutanoic acid (PFBA)	6.3		1.8	0.92
2706-90-3	Perfluoropentanoic acid (PFPeA)	19		1.8	0.58
307-24-4	Perfluorohexanoic acid (PFHxA)	12		1.8	0.70
375-85-9	Perfluoroheptanoic acid (PFHpA)	5.0		1.8	0.83
335-67-1	Perfluorooctanoic acid (PFOA)	3.5		1.8	0.74
375-95-1	Perfluorononanoic acid (PFNA)	0.59	J J	1.8	0.25
335-76-2	Perfluorodecanoic acid (PFDA)	ND		1.8	0.71
2058-94-8	Perfluoroundecanoic acid (PFUnA)	ND		1.8	0.72
307-55-1	Perfluorododecanoic acid (PFDoA)	ND		1.8	0.54
72629-94-8	Perfluorotridecanoic acid (PFTriA)	ND		1.8	0.55
376-06-7	Perfluorotetradecanoic acid (PFTeA)	ND		1.8	0.84
375-73-5	Perfluorobutanesulfonic acid (PFBS)	1.9		1.8	0.45
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	16		1.8	0.73
375-92-8	Perfluoroheptanesulfonic Acid (PFHpS)	ND		1.8	0.87
335-77-3	Perfluorodecanesulfonic acid (PFDS)	ND		1.8	0.83
754-91-6	Perfluorooctanesulfonamide (FOSA)	ND		9.2	9.2
2355-31-9	N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		18	1.6
2991-50-6	N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		18	1.4
39108-34-4	8:2 FTS	ND		18	2.7

TBG 10/13/2020

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins TestAmerica, Burlington Job No.: 460-197436-1

SDG No.:

Client Sample ID: MW-7-112119 Lab Sample ID: 460-197436-4

Matrix: Water Lab File ID: SC121219D005.d

Analysis Method: 537 (modified) Date Collected: 11/21/2019 09:05

Extraction Method: 3535 Date Extracted: 12/04/2019 15:50

Sample wt/vol: 272.7(mL) Date Analyzed: 12/13/2019 00:02

Con. Extract Vol.: 10(mL) Dilution Factor: 1

Injection Volume: 20(uL) GC Column: C-18 ID: 4.6(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 150683 Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q Val	RL	MDL
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	54		1.8	0.56
27619-97-2	6:2 FTS	ND	F1 UJ	18	5.0

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL00991	13C4 PFOS	83		50-150
STL02279	M2-6:2 FTS	89		25-150

TBG 10/13/2020

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins TestAmerica, Burlington Job No.: 460-197436-1

SDG No.:

Client Sample ID: MW-57-112119 Lab Sample ID: 460-197436-5

Matrix: Water Lab File ID: SC120819A028.d

Analysis Method: 537 (modified) Date Collected: 11/21/2019 00:00

Extraction Method: 3535 Date Extracted: 12/04/2019 15:50

Sample wt/vol: 275.1(mL) Date Analyzed: 12/08/2019 18:35

Con. Extract Vol.: 10(mL) Dilution Factor: 1

Injection Volume: 20(uL) GC Column: C-18 ID: 4.6(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 150476 Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q Val	RL	MDL
375-22-4	Perfluorobutanoic acid (PFBA)	5.9		1.8	0.91
2706-90-3	Perfluoropentanoic acid (PFPeA)	21		1.8	0.57
307-24-4	Perfluorohexanoic acid (PFHxA)	12		1.8	0.69
375-85-9	Perfluoroheptanoic acid (PFHpA)	4.6		1.8	0.83
335-67-1	Perfluorooctanoic acid (PFOA)	3.4		1.8	0.74
375-95-1	Perfluorononanoic acid (PFNA)	0.78	J J	1.8	0.25
335-76-2	Perfluorodecanoic acid (PFDA)	ND		1.8	0.70
2058-94-8	Perfluoroundecanoic acid (PFUnA)	ND		1.8	0.71
307-55-1	Perfluorododecanoic acid (PFDoA)	ND		1.8	0.54
72629-94-8	Perfluorotridecanoic acid (PFTriA)	ND		1.8	0.55
376-06-7	Perfluorotetradecanoic acid (PFTeA)	ND		1.8	0.84
375-73-5	Perfluorobutanesulfonic acid (PFBS)	1.9		1.8	0.45
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	17		1.8	0.73
375-92-8	Perfluoroheptanesulfonic Acid (PFHpS)	ND		1.8	0.86
335-77-3	Perfluorodecanesulfonic acid (PFDS)	ND		1.8	0.82
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	47		1.8	0.55
754-91-6	Perfluorooctanesulfonamide (FOSA)	ND		9.1	9.1
2355-31-9	N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		18	1.5
2991-50-6	N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		18	1.4
27619-97-2	6:2 FTS	ND		18	5.0
39108-34-4	8:2 FTS	ND		18	2.6

TBG 10/13/2020

SECTION IV

Appendix C: Phase 1B Archaeological Subsurface Testing Survey for the C&D Power Systems Site Sediment Removal Project (AECOM 2022)

AECOM

Phase IB Archaeological Subsurface Testing Survey for the C&D Power Systems Site Sediment Removal Project

Hamlet of Huguenot, Town of Deerpark, Orange County, NY

New York State Department of Environmental Conservation

NYSDEC Site No. 336001

Project number: 60628872

December 2021
Revised September 2022

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Prepared by	Checked by	Verified by	Approved by

Revision History

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Prepared for:

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OPRHP MANAGEMENT SUMMARY

SHPO Project Review Number: **20PR06690**

Involved State and Federal Agencies (DEC, USACE, FHWA, etc.): **NYSDEC, USACE**

Phase of Survey: **Phase IB**

Location: **Hamlet of Huguenot, Town of Deerpark, Orange County**

Minor Civil Division: **Town of Deerpark**

County: **Orange County**

Survey Area Dimensions: July 2021: **High sensitivity area = 94,092 square ft; Moderate sensitivity area = 26,000 square ft. October 2021: Moderate sensitivity area = 56.636 square ft**

Number of Acres Surveyed: **4.06 total acres** (July 2021 2.76 ac; Oct 2021 1.3 ac)

USGS 7.5 Minute Quadrangle Map: **Port Jervis North & Otisville NY**

Archaeological Survey Overview:

Number & Interval of Shovel Test Pits (STPs): **141 STPS excavated: 61 STPs excavated along transects at 15-meter (50 ft) intervals; 80 radial STPs excavated at 1-meter (3 ft) and 3-meter (10 ft) intervals around positive STPs.**

Number & Size of Units: N/A

Width of Plowed Strips: N/A

Surface Survey Transect Interval: N/A

Results of Archaeological Survey:

Number & Name of Precontact Sites Identified: **Five areas of archaeological sensitivity associated with previously identified multi-component site MRE-TRC-8 (07501.000148)**

Number & Name of Historic Sites Identified: **Historic artifact scatter representative of 19th century farmstead remains associated with multi-component site MRE-TRC-8 (07501.000148)**

Number & Name of Sites Recommended for Phase II/Avoidance: **All five areas of sensitivity associated with MRE-TRC-8 (07501.000148) are recommended for avoidance. A Site Avoidance and Protection Plan has been developed.**

Results of Architectural Survey: N/A

Report Author(s): **Nancy A. Stehling, MS, RPA; Jeremy Koch, Ph.D., RPA**

Date of Report: **December 2021; revised September 2022**

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Management Summary

The New York State Department of Environmental Conservation, Division of Environmental Remediation (NYSDEC-DER) is planning to remediate the C&D Power Systems (C&D) Site (NYSDEC Site No. 336001), EPA ID #NYD064337298, in the Hamlet of Huguenot, Town of Deerpark, Orange County, NY in compliance with Record of Decision (NYSDEC, March, 2015). The site is located within the Neversink River Valley and is bordered by U.S. Route 209 to the west and by Tributary D-1-7 to the Neversink River to the east. The project is concerned with the excavation and removal of contaminated sediments from the streambed of Tributary D-1-7 of the Neversink River. Sensitive archaeological areas, although not identified within the site proper, are identified in areas needed to access to the work area. NYSDEC DER is supportive of avoidance and protection measures detailed within this report, as no intrusive work (ground breaking) is necessary in the areas of sensitivity. United States Army Corp of Engineers (USACE), under its Section 106 responsibility, will include consultation with Indian Nations, as part of the Joint Application Permit process.

On October 23, 2020, AECOM, on behalf of NYSDEC DER, submitted a consultation initiation package to the New York State Historic Preservation Office (SHPO) describing the project and requested SHPO's recommendations on next steps in the Section 106 compliance process. SHPO replied on November 9, 2020 and recommended that a Phase IA/IB archaeological survey be conducted, in lieu of a memorandum documenting extensive prior subsurface disturbance to the project site (Perazio 2020). The Phase IA documentary survey report was completed in January 2021. The results of the Phase IA assessment concluded that the Project Area possessed archaeological sensitivity for prehistoric (precontact) and historic resources and recommended that a Phase IB subsurface presence/absence testing survey be conducted. On January 21, 2021, SHPO concurred with the Phase IA recommendation for a Phase IB survey.

The Phase IB scope of work for a shovel test pit (STP) survey was prepared in consultation with SHPO and NYSDEC DER and conducted during July 2021. The STP survey consisted of manual testing on a 15-meter (50-foot) pre-plotted grid. A total of 45 STPs were pre-plotted along seven transects labeled Transect A through Transect G. Due to field conditions at the time of the Phase IB survey, five of the 45 pre-plotted STPs were not excavated. Of the 40 STPs excavated, eight were positive for cultural material. Each positive STP location was further investigated through the excavation of eight radial STPs, for a total of 64. Therefore, the total number of STPs excavated during the Phase IB survey is 104. Thirty-four of the 64 radial STPs were also positive for cultural material.

A total of 116 artifacts were recovered during the Phase IB survey from 42 of the 104 STPs excavated. Of this total, 101 were precontact artifacts, and 15 were historic artifacts. The precontact artifact assemblage includes fire cracked rock (FCR) (*n*=6), debitage (*n*=93), a manuport (*n*=1), and a unifacial stone tool (*n*=1). All artifacts were recovered from Ap and A horizon contexts. No precontact features such as hearths, storage pits or earth ovens for cooking were identified during the Phase IB STP survey. The 15 historic artifacts recovered represent a scatter of historic material likely related to 19th through 20th-century occupation of the area.

Subsequently, based on the guidance received during the phone conversation between Ms. Jessica Schreyer (Scientist Archaeology, SHPO) and Mr. Benjamin Rung, NYSDEC on October 13, 2021, a Supplemental Phase 1B STP survey was undertaken of the areas located to the west of the proposed sediment handling area on October 27 and 28, 2021. The STP survey consisted of manual testing on a 15-meter (50-foot) pre-plotted grid. A total of 21 STPs were pre-plotted along six transects labeled Transect H through Transect M. Of the 21 STPs excavated, two were positive for cultural material. Each positive STP location was further investigated through the excavation of eight radial STPs, for a total of 16. Therefore, the total number of STPs excavated during the Supplemental Phase IB STP survey was 37. Five of the 16 radial STPs were also positive for cultural material.

A total of 14 artifacts were recovered during the Supplemental Phase IB survey from seven of the 37 STPs excavated. Of this total, 12 were precontact artifacts, and 2 were historic artifacts. The precontact artifact assemblage includes fire cracked rock (FCR) (*n*=1), debitage (*n*=10), and a partial projectile point tool (*n*=1). All artifacts were recovered from Ap plow zone contexts. No precontact features such as hearths, storage pits or earth ovens for cooking were identified during the Phase IB STP survey. The 2 historic artifacts recovered represent a scatter of historic material likely related to 19th through 20th-century occupation of the area.

It is noted that no temporally or culturally diagnostic precontact artifacts such as dateable projectile points and pottery were recovered in any of the positive STPs during either of the Phase 1B STP surveys. In other words, it was not possible to assign dates or tribal affiliations to the precontact artifacts recovered. In addition, no precontact features such as hearths, storage pits or earth ovens for cooking were identified during either of the Phase IB STP surveys. However, fire-cracked

rocks of quartzite and sandstone indicate the potential for hot-rock cooking (i.e., earth ovens) or heating facilities (i.e., hearths) in the area, although no such features were identified in the field.

The Phase IB artifact analysis has indicated that there are five areas of precontact archaeological sensitivity within the C&D Power Systems Site Sediment Removal Project Survey Area. The five areas of archaeological sensitivity were delineated based on the positive STPs, with a 25-foot buffer surrounding each. These areas are shown on Figures 4-1a and 4-1b. The five areas of sensitivity are summarized below, and each description includes the engineering controls proposed as the Avoidance and Protection Plan for that area of sensitivity.

- **Area 1:** located in the northern portion of the Survey Area, and focused on positive STP F 8 on the west bank of the tributary, north of the agricultural fields. The extent of this area is delineated by documentation of no temporally or culturally diagnostic precontact artifacts at STP F 9 to the south, STP F7 to the north and the APE boundaries to the east and west of the location. STP F 8 is located within the route of the proposed Access Road. The Avoidance and Protection Plan proposed for this area includes the placement of temporary construction mats over the entire delineated boundary of Area 1. The temporary construction matting would consist of interlocking, high-strength DURA BASE® composite material mats or equivalent that are designed for use in environmentally sensitive areas and specifically to avoid ground disturbance and compaction impacts.

- **Area 2:** located in the southeastern portion of the Survey Area, and includes positive STPs B 3, B 4, C 3, and D 2. Each of the initial positive STPs are within 15 meters (50 feet) of each other along the transect grid. Subsequent to the completion of the Phase 1B sampling in July 2021, the sensitive area including positive STPs B 3, B 4, and C 3 is now excluded from the APE/Project Area. AECOM has relocated the Sediment Staging, Mixing and Drying Area, the Water Treatment System Containment Area, and portion of Access Road further west to areas that do not possess sensitivity. The extent of this area is delineated by documentation of no temporally or culturally diagnostic precontact artifacts at STP C 5 , STP C 4 and the APE boundary to the east, STP C 2 and STP B 2 to the north, STP B 3+10W and STP A11 to the west and the APE boundaries to the south of the location. The Avoidance and Protection Plan proposed for this area includes installation of a chain link fence around the boundary of Area 2 as delineated by negative STPs above. Positive STP D 2 is in the eastern portion of Area 2, along the adjacent proposed Access Road. The Avoidance and Protection Plan proposed for this area includes the placement of temporary construction mats over the entire width of the proposed Access Road, running northward as a continuation of the temporary construction matting across Positive STPs D 4 and D 5 (Area 3). The temporary construction matting would consist of interlocking, high-strength DURA BASE® composite material mats or equivalent that are designed for use in environmentally sensitive areas and specifically to avoid ground disturbance and compaction impacts.

- **Area 3:** located in the southeastern portion of the Survey Area, closest to the southern terminus of the sediment removal zone, and includes positive STPs D 4 and D 5. Positive STP D 4 , STP D 5, and their radials are located in the proposed Access Road along the western bank of Tributary D-1-7, and the proposed route of diversion pipe in the Stream Diversion Corridor. The extent of this area is delineated by documentation of no temporally or culturally diagnostic precontact artifacts at STP D 6 to the south, STP D 1 to the north and the APE boundaries to the east and west of the location. The Avoidance and Protection Plan proposed for this area includes the placement of temporary construction mats over the entire delineated boundary of Area 3. The temporary construction matting would consist of interlocking, high-strength DURA BASE® composite material mats or equivalent that are designed for use in environmentally sensitive areas and specifically to avoid ground disturbance and compaction impacts.

- **Area 4:** located in the southwestern portion of the supplemental Survey Area, and focused on positive STP J 5, west of the proposed Water Treatment System Containment Area. Radial STPs were excavated and three were positive for precontact cultural material. The extent of this area is delineated by documentation of no temporally or culturally diagnostic precontact artifacts at STP J 5+3S to the south, STP J 5+3E to the east, STP J 5+3N to the north, and STP J 5+3W to the west. The Avoidance and Protection Plan proposed for this area includes installation of a chain link fence around the entire delineated boundary of Area 4.

- **Area 5:** located in the northwestern portion of the supplemental Survey Area, and focused on positive STP J 2, west of the proposed Sediment Staging, Mixing and Drying Area. Radial STPs were excavated and two were positive for precontact cultural material. The extent of this area is delineated by documentation of no temporally or culturally diagnostic precontact artifacts at STP J 2+3S to the south, STP J 2+3E to the east, STP J 2+3N to

the north, and STP I 2 to the west. The Avoidance and Protection Plan proposed for this area includes a combination of the installation of a chain link fence and placement of temporary construction mats over a portion of the delineated boundary of Area 5. The temporary construction matting would consist of interlocking, high-strength DURA BASE® composite material mats or equivalent that are designed for use in environmentally sensitive areas and specifically to avoid ground disturbance and compaction impacts.

The number of precontact artifacts recovered during the Phase IB presence/absence survey suggests the presence of a nearby precontact archaeological site. Given the proximity of previously identified precontact site MRE-TRC-8 (07501.000148), it is probable that the precontact artifacts encountered during the Phase IB survey are associated with that site. Site MRE-TRC-8 (07501.000148) was first encountered and identified in 2016 as a multi-component site, having both precontact and historic components. The prehistoric component of the site consists of a lithic scatter concentrated in the southern portion of the site area. According to the mapping provided in the TRC report, this southern portion is in proximity to Sensitivity Areas 2 and 3 as identified along Transects B, C, and D through the 2021 Phase IB survey.

Site MRE-TRC-8 (07501.000148) was recommended as potentially eligible for listing in the National Register by TRC in 2016. A site avoidance plan was recommended by TRC.

Although sensitive areas have been identified, none of these areas are subject to intrusive (ground breaking) work. In accordance with Section 106 guidelines, NYSDEC is supportive of projection and avoidance measures to preserve areas that could be the subject for future research by others. NYSDEC-DER is not in the position to support further research under NYS Superfund Program; however, we understand that concurrence is needed under the provisions of Section 106, including consultation with Indian Nations. The USACE will incorporate consultation with Indian Nations as part of its Section 106 responsibility. For consideration, a protection and avoidance plan is detailed in this document to support moving forward without a Phase II Investigation.

The Avoidance and Protection Plan proposed by AECOM on behalf of the NYSDEC includes a combination of installing chain link fence to avoid archaeologically sensitive areas and the placement of temporary construction mats over the areas within the proposed work corridor as a protective measure. The temporary construction matting would consist of interlocking, high-strength DURA BASE® composite material mats or equivalent that are designed for use in environmentally sensitive areas. More specifically, the mats are intended to prevent ground disturbance and compaction impacts. All vehicle traffic at the project site would be accessed over the temporary construction matting using low-pressure, rubber tire vehicles. An excavator would be utilized to install the temporary construction mats and would use an installation method by which the mats are installed ahead of the excavator to ensure that the excavator is always on top of the mats. The temporary construction matting will be removed manually from ground surface once the site work is complete.

1. Introduction

The New York State Department of Environmental Conservation, Division of Environmental Remediation (NYSDEC DER) is planning to remediate the C&D Power Systems (C&D) Site (NYSDEC Site No. 336001) in the Hamlet of Huguenot, Town of Deerpark, Orange County, New York (Figure 1-1). The site is located within the Neversink River Valley and is bordered by U.S. Route 209 to the west and by Tributary D-1-7 to the Neversink River to the east. The project will include the excavation and off-site disposal of PCB impacted sediments from the streambed of Tributary D-1-7, a tributary to the Neversink River. The archaeological study area is located upland of the sediment removal area and is the primary access point to the stream. NYSDEC is under an access agreement with the County for use of this property to support the project.

1.1 Location and Description of Project Area

The C&D site is located within the Neversink River Valley, approximately four miles northeast of Port Jervis. The project location includes a small stream corridor bordered by lawns, agricultural fields and other natural areas.

The main site features include an approximately three-acre industrial building, constructed c.1958, formerly used for the manufacturing of lead batteries and is currently unoccupied, as well as a 175-foot-diameter lagoon, located approximately 75-feet northeast of the former industrial building. This lagoon formerly discharged to Tributary D-1-7 that runs along the east side of the Site. Tributary D-1-7 flows south to where it joins the Neversink River approximately 0.5-miles south of the C&D site. The C&D buildings and lagoon area are immediately surrounded by parking lots and paved roads.

The former C&D site industrial buildings are located on a bluff that is some 30-40 feet in elevation higher than Tributary D-1-7. The ground surface is relatively horizontal with an elevation that ranges from approximately 469 to 475 feet above mean sea level (National Geodetic Vertical Datum of 1988) over most of the site, aside from where elevations drop-off toward Tributary D-1-7 at the rear (east) of the property. South of the C&D facility the land is generally flat and dominated by agricultural fields. The headwaters of Tributary D-1-7 consist largely of an underground stream that emanates from the base of the bluff in the northwestern portion of the Project Area. Also, small rivulets in the northeast portion of the Project Area contribute minor amounts of hydrology. Several hundred feet northeast of the Project Area, beaver damming activity has also altered the hydrology.

In the Project Area, Tributary D-1-7 passes through an opening in an abandoned railroad embankment that once supported a bridge that crossed the stream for the Port Jervis Monticello & New York Railroad (reorganized in 1875), later the New York, Ontario & Western Railroad (Figure 1-2a). Tributary D-1-7 flows through two additional crossings in the Project Area: Swartwout Road and the Southern Crossing. Both crossings were used to allow agricultural machinery to cross the tributary. The Swartwout Road location still serves as a viable crossing and appears to be recently used. The Southern Crossing is located along a sewer easement, near a manhole noted on project mapping, and is no longer in condition to support machinery (Figure 1-2b).

The crossings are generally made of stone with 12-inch-diameter culvert pipes underneath to permit the flow of the tributary under the crossings. Within the last several years, the piping at both crossings have become fouled, and the crossings now act as weirs, impounding the water upstream. Review of aerial photographs show that Tributary D-1-7 north of Swartwout Road was generally approximately 20-feet-wide and likely less than 1-foot in depth, and today the ponded area is over 175-feet-wide. The ponded areas vary in depth, up to three-feet-deep in spots.

1.2 Regulatory Framework

The cultural resources component of this project is being conducted in compliance with the guidelines established in Section 106 of the National Historic Preservation Act of 1966, as amended (NHPA), the New York State Environmental Quality Review Act (SEQRA), and Section 14.09 of the New York State Historic Preservation Act (NYSHPA).

NYSDEC DER is submitting permit applications to obtain authorization to perform dredging within the streambed of Tributary D-1-7. It is anticipated that this work will be authorized using the United States Army Corps of Engineers (USACE) Nationwide Permit 38 (NWP 38) for Cleanup of Hazardous and Toxic Waste, and a joint application to the USACE and NYSDEC will be submitted to obtain authorization for the project. Section 106 consultation falls under the purview of the USACE permit authorization. USACE will incorporate consultation with Indian Nations as part of its Section 106 responsibility.

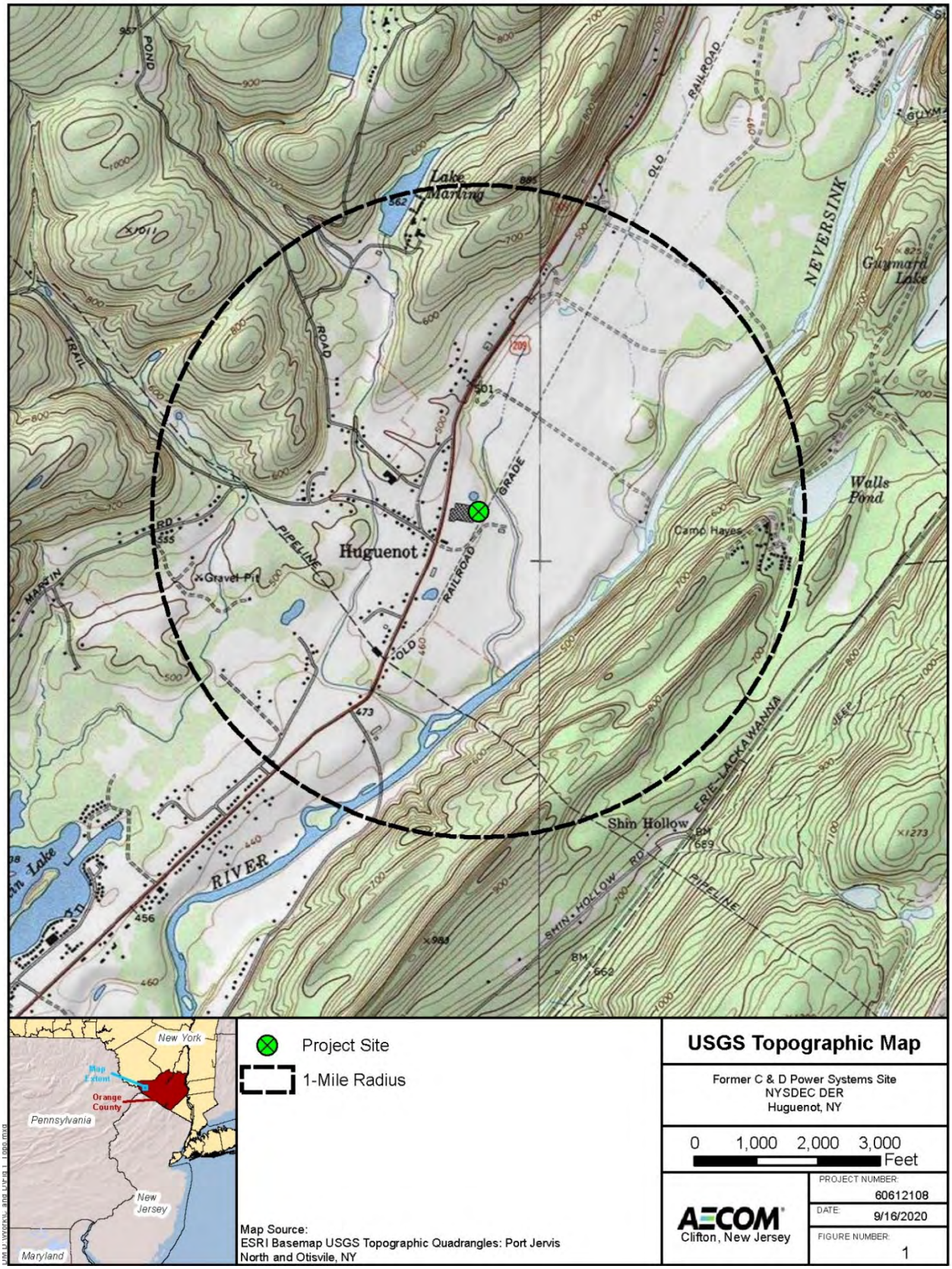

Figure 1-1: C&D Project Site Location and 1-Mile Radius

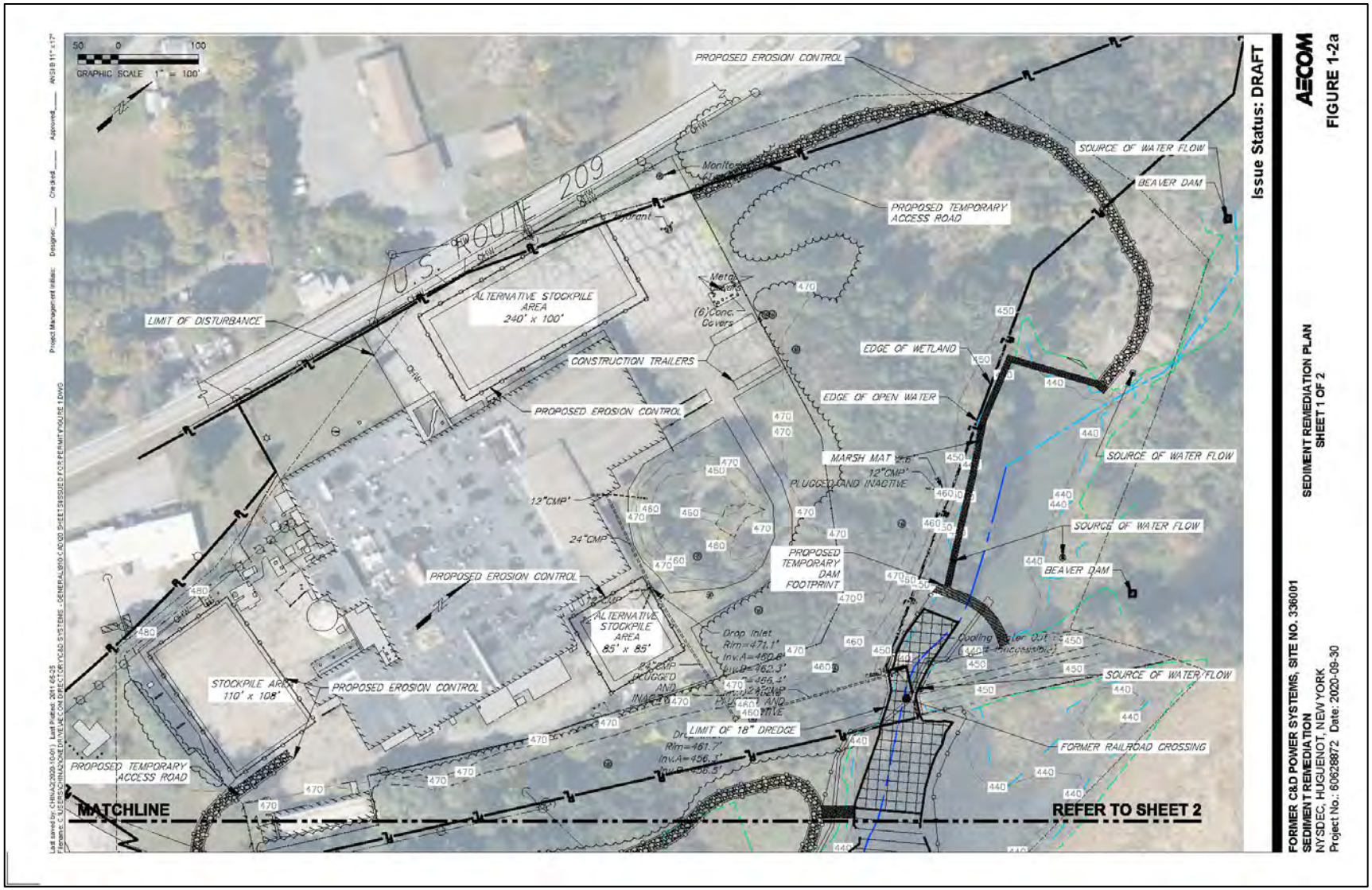

Figure 1-2a: Sediment Remediation Plan North

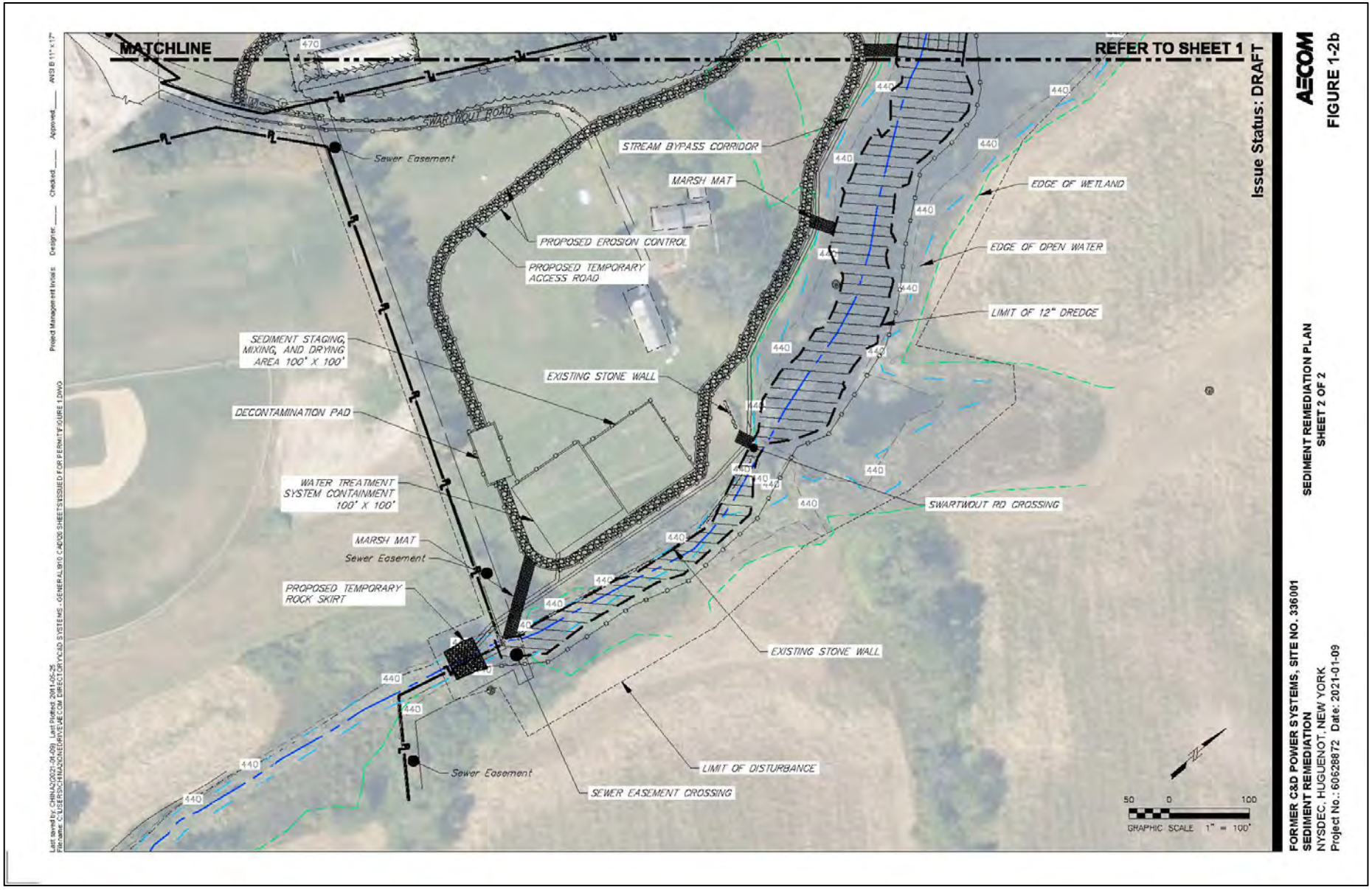

Figure 1-2b: Sediment Remediation Plan South

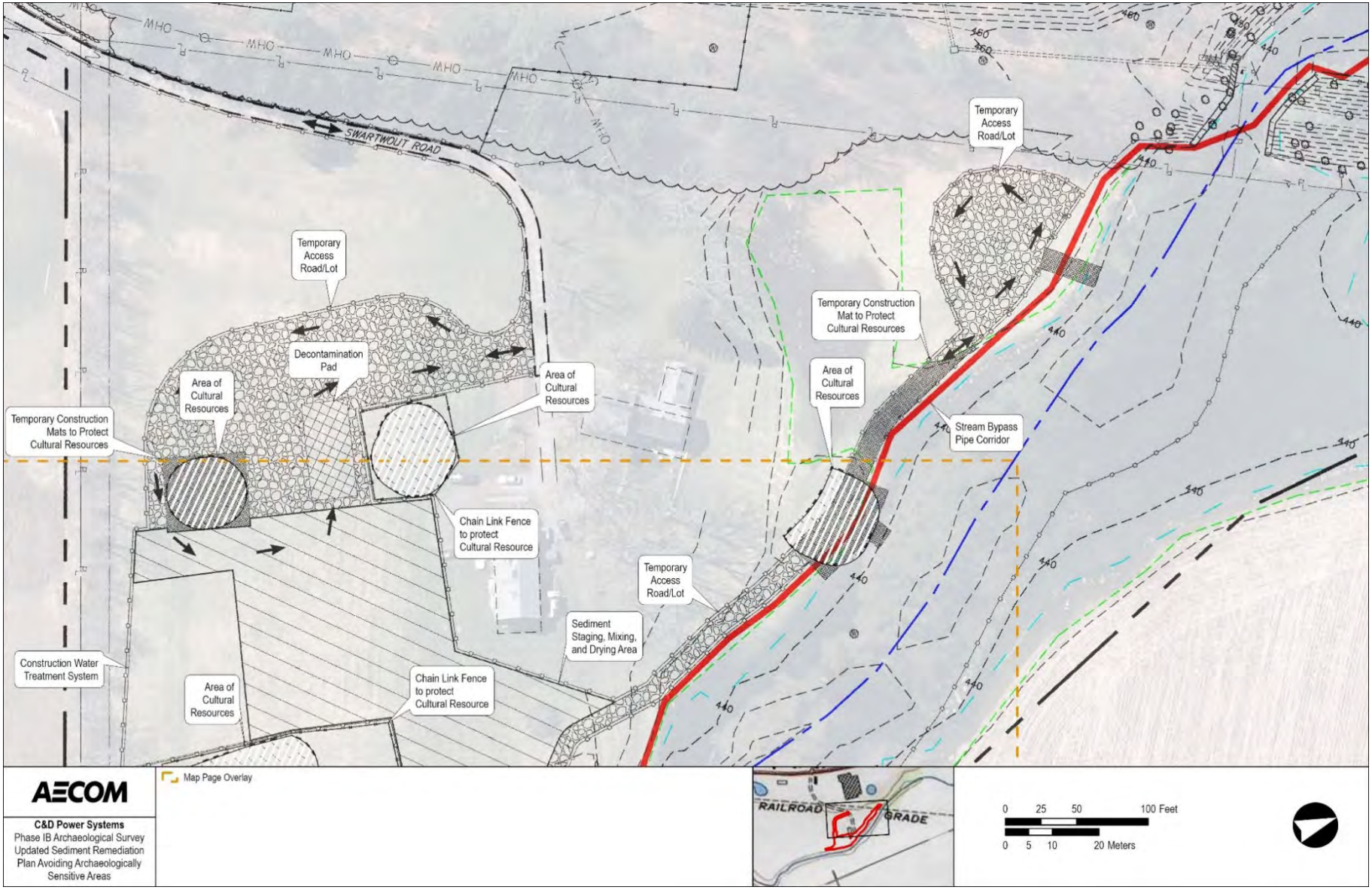

Figure 1-2c: Updated Sediment Remediation Plan Northwest

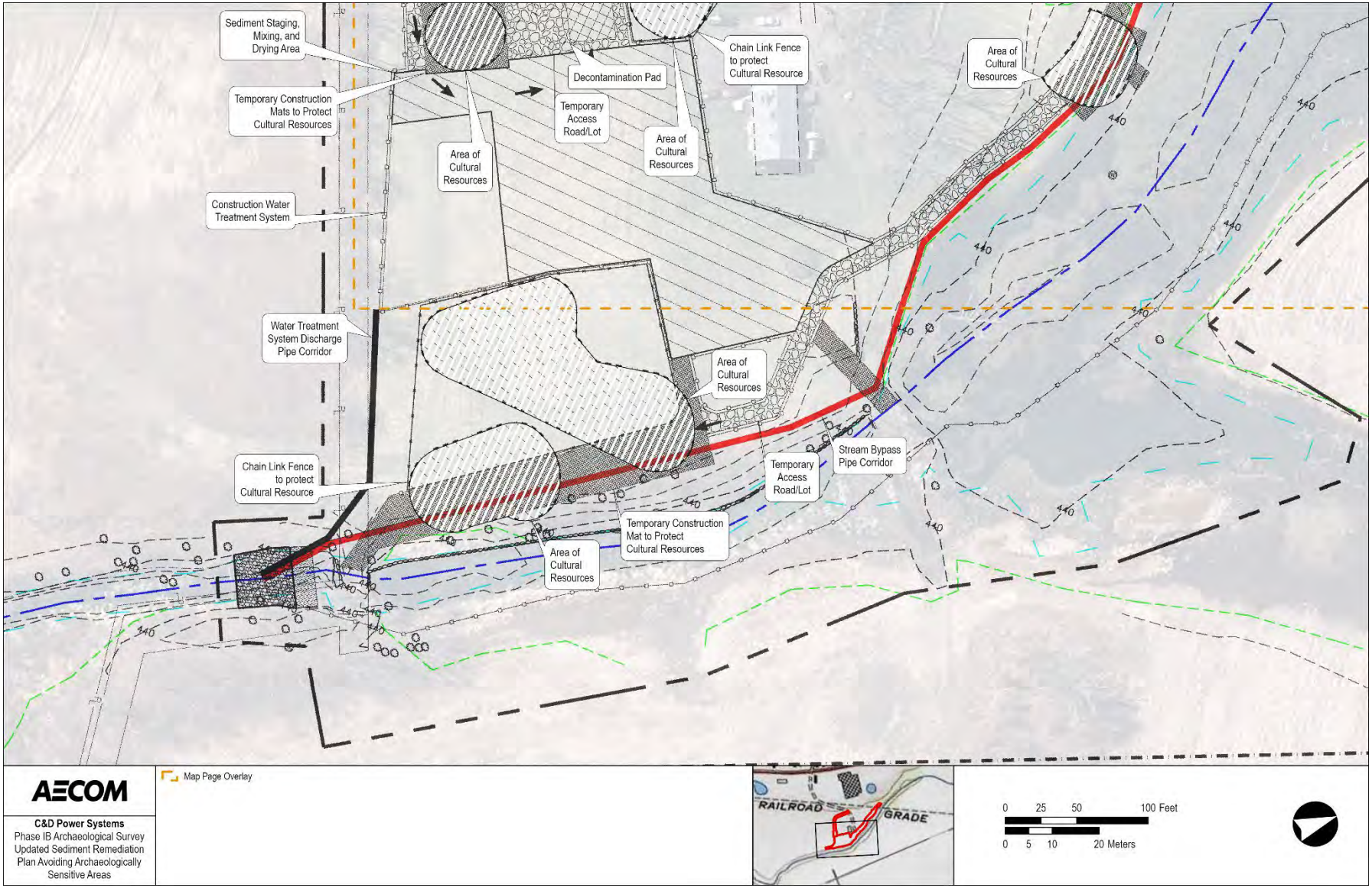

Figure 1-2d: Updated Sediment Remediation Plan Southeast

1.3 Project Consultation History

On October 23, 2020, AECOM, on behalf of NYSDEC DER, submitted a consultation initiation package to the New York State Historic Preservation Office (SHPO) describing the project and requested SHPO's recommendations on next steps in the Section 106 compliance process. SHPO replied on November 9, 2020 and recommended that a Phase IA/IB archaeological survey be conducted, in lieu of a memorandum documenting extensive prior subsurface disturbance to the project site (Perazio 2020). The Phase IA documentary survey report was completed in January 2021 to assess the archaeological sensitivity of the C&D sediment removal Project Area, and to determine if a Phase IB subsurface testing survey was warranted.

The results of the Phase IA assessment concluded that the Project Area possessed archaeological sensitivity for precontact and historic resources, and recommended that a Phase IB subsurface presence/absence testing survey be conducted. The Phase IA report included a proposed Phase IB survey scope of work as an attachment when it was submitted to SHPO for review. On January 21, 2021, SHPO concurred with the Phase IA recommendation for a Phase IB survey. The one comment on the attached Phase IB scope of work was to note that in the event of positive shovel test pits (STPs), the subsequent radial STPs should be placed at 1 meter and 3 meters in each cardinal direction from the positive STP (Perazio 2021). The scope of work was subsequently revised through consultation with SHPO and a 50-foot grid interval was proposed for the Survey Area. SHPO concurred with the revised scope of work on April 13, 2021. All project correspondence with SHPO is included in Appendix C.

On October 15, 2021, Mr. Benjamin Rung, NYSDEC participated in a phone consultation meeting with Ms. Jessica Schreyer (Scientist Archaeology, SHPO) to share the findings of the Phase 1B STP Survey and scope of work for the Supplemental Phase 1B Survey, During the phone conversation, SHPO approved additional STPs on a 50-foot grid interval in the areas to the west of the proposed Sediment Staging, Mixing and Drying Area and the Water Treatment System Containment Area.

The Phase IB report was submitted to SHPO for review on June 28, 2022. Bradley Russell, Archaeological Reviewer at SHPO, responded in a letter dated July 20, 2022 (Appendix C). The letter requested that a Management Summary Form be prepared as well as additional edits to the body of the text.

This revised Phase IB survey report presents the results of the C&D Power Systems Site Sediment Removal Project STP surveys conducted during July 2021 and October 2021.This revision addresses the following comments received from SHPO in their response letter dated July 20, 2022:

- A Management Summary Form has been added to the report in compliance with the 2005 Phase I Archaeological Report Format Requirements.
- The report has identified the five areas of sensitivity defined by the Phase IB testing as part of previously identified Precontact Site MRE-TRC-8; USN 07105,000148, first identified by TRC in 2016.
- The USN information will be updated in CRIS using the supplied token when the revised report is uploaded for SHPO review.
- AECOM will submit the revised report in PDF format.

Although a Phase II archaeological investigation was requested by SHPO, NYSDEC asserts that protective and avoidance measures will be suitable to protect the resources identified by the Phase IB subsurface testing survey. NYSDEC respectfully requests the Agency to evaluate the revisions to this report before making a final determination on the need for a Phase II archaeological investigation.

USACE, under their Section 106 consultation responsibility, will consult with Tribal Nation representatives regarding the need for a Phase II archaeological investigation.

1.4 Archaeological Area of Potential Effect (APE)

Archaeological resources are concerned with direct effects caused by subsurface disturbances to previously undisturbed soils or minimally disturbed soils associated with the execution of project actions. The Archaeological APE includes two

components: the horizontal APE, which is the footprint of proposed ground disturbance; and the vertical APE, which is considered as the depth to which the proposed ground disturbance is anticipated to extend.

The C&D Project Phase IA study Archaeological APE included all areas within the Project Area limits that would be subject to subsurface disturbance because of the actions required to complete the proposed sediment removal project. All project action components were described and discussed in the Phase IA study. All components of the initial and updated sediment remediation plan are depicted on Figures 1-2a through 1-2d.

The Phase IB Survey Area was determined through consultation with SHPO and the NYSDEC DER. Not every project action described and discussed in the Phase IA report was considered to have the potential for impacting potential archaeological resources. The project actions that are components of the Survey Area, and thereby comprise the Phase IB Archaeological APE, are discussed individually below in Section 1.5.

1.5 Phase IB Survey Area Project Actions

The current project is concerned solely with the removal of contaminated sediments from the streambed of Tributary D-1-7. Multiple project actions are required to carry out and complete the sediment removal project. Most of these actions require some form of construction, and many involve potential ground disturbance. The footprints of those actions that will create subsurface disturbance and could directly impact potential archaeological resources collectively comprise the Phase IB Survey Area, or Phase IB Archaeological APE. As stated above, the Phase IB Survey Area was determined through consultation with SHPO and the NYSDEC DER. The project components that comprise the Survey Area are discussed individually below.

1.5.1 Sediment Excavation

Dredging of sediments will be accomplished by mechanical methods, utilizing heavy equipment. Access for heavy equipment to the streambed will likely be from the north, in the vicinity of the proposed temporary dam north of the abandoned railroad embankment. On the west bank of Tributary D-1-7 below the abandoned railroad embankment crossing, there is a large flat parcel of land on which the major sections of Access Roads, sediment stockpile areas, sediment staging, mixing and drying area, water treatment system containment area, and vehicular contamination pad will be constructed (Figures 1-2a through 1-2d).

1.5.2 Access Roads

Access Roads will be constructed to move heavy machinery into position to excavate the contaminated sediments from the streambed, and to haul truckloads of excavated sediments across the site areas for initial processing and stockpiling. The roads will be at least 12-feet-wide, with a maximum width of 25-feet. Typical equipment will include 70,000-pound excavators (2-3), 20,000 to 30,000-pound off road haul trucks (2-4), a 25,000 to 35,000-pound front end loader, and a 25,000 to 35,000-pound bulldozer.

The proposed temporary Access Road locations are depicted on Figures 1-2a through 1-2d.

The section of proposed Access Road along the top of the west bank of Tributary D-1-7 is considered to possess high potential for archaeological resources, and was included in the Phase IB Survey Area. The section of Access Road that turns west and then continues north to Swartwout Road is considered to possess moderate potential for archaeological resources, and was also included in the July 2021 Phase IB Survey Area (Figures 1-3a and 1-3b).

1.5.3 Temporary Construction Mats – Protection of Sensitive Areas

Temporary Construction Mats will be installed in the areas of archaeological sensitivity that cannot be protected via fencing to facilitate the movement of heavy machinery in concert with the proposed Access Roads. The temporary construction matting would consist of interlocking, high-strength DURA BASE® composite material mats or equivalent that are designed for use in environmentally sensitive areas and specifically to avoid ground disturbance and compaction impacts. All vehicle traffic at the work site would be accessed over the temporary construction matting using low-pressure, rubber tire vehicles. An excavator would be utilized to install the temporary construction mats and would use an installation method by which the mats are installed ahead of the excavator to ensure that the excavator is always on top of the mats. The temporary construction matting will be removed manually from ground surface once site work is complete. The temporary construction mats will also facilitate access for construction equipment between the sediment dredging area in the streambed and the temporary Access Road to allow for the dredge material to be transferred to trucks and brought to the Sediment Staging,

Mixing, and Drying Area located in the upland area on the west side of the stream. The temporary construction mat locations are depicted on Figures 1-2c and 1-2d.

The Temporary Construction Mats will bridge the area between the west bank of the stream and the temporary Access Road, which also includes the proposed corridor of the diversion pipe (Figures 1-2c and 1-2d). Temporary Construction Mats will be placed above the diversion pipe, and it will be protected. Typically, pipe crossings are accomplished by "bridging" over the pipe by stacking multiple mats to provide a space under the bridge that is equal in height to the pipe. The Temporary Construction Mat locations on the west bank of Tributary D-1-7 possess high archaeological sensitivity, and were included in the July 2021 Phase IB Survey Area (Figures 1-3a and 1-3b).

1.5.4 Stream Diversion

Excavation of the stream will require diverting the flow into a temporary pipeline to transport water downstream past the remediation area. The diversion pipe would measure approximately 1,250 feet in length, with an assumed diameter of 24 inches. Figures 1-2c and 1-2d depict this stream bypass corridor. Upstream of the former rail line, the temporary dam would be placed to collect the water and divert it into the pipe.

From the tributary crossing at the abandoned railroad embankment southward, the pipe will be laid on the ground along the west bank of Tributary D-1-7. It is likely that the pipe will be staked to prevent horizontal movement. At the southern end of the pipe, a Rock Skirt will be constructed where the diverted water reenters the tributary to prevent erosion (Figure 1-2d). The route of the diversion pipe from the abandoned railroad embankment southward along the west bank of Tributary D-1-7 to the Rock Skirt possesses high archaeological potential, and was included in the July 2021 Phase IB Survey Area (Figures 1-3a and 1-3b).

1.5.5 Temporary Dam

The Temporary Dam will be installed north of the abandoned railroad embankment and sediment removal zone to divert the stream and impounded water into the diversion pipe (Figure 1-2c).

This is proposed as a Temporary Dam, and the materials for the dam will be determined by the contractor. No sheet piles will be installed, and the materials will be removed upon completion of construction. It is anticipated that little to no ground disturbance will occur at the location, as it is likely that the dam will be anchored by simple gravity. The temporary dam location was not included in the Phase IB Survey Area.

1.5.6 Sediment Staging, Mixing, and Drying Area

A Sediment Staging, Mixing, and Drying area measuring 100-feet by 100-feet was proposed adjacent to the Access Road in the upland area west of Tributary D-1-7 (Figure 1-2b). Upon completion of the Phase 1B Survey in July 2021, this location (Figure 1-3b) was deemed to possess high archaeological potential. Subsequently, this area was excluded from the APE as part of the Avoidance and Protection Plan. The Avoidance and Protection Plan includes relocating the sediment storage, mixing and drying to areas further west of the former proposed location. The updated locations are depicted on Figures 1-3c and 1-3d. The new location was tested during the October 2021 STP survey.

1.5.7 Water Treatment System Containment Area

There will be onsite dewatering and treatment of construction water. A proposed Water Treatment System Containment Area measuring 100-feet by 100-feet will be constructed adjacent to the Access Road in the upland area west of Tributary D-1-7. This area will be located to the south and adjacent to the Sediment Staging, Mixing, and Drying Area (Figure 1-3b). Upon completion of the Phase 1B Survey in July 2021, this location (Figure 1-3b) was deemed to possess high archaeological potential, and is excluded from the APE as part of the Avoidance and Protection Plan. The Avoidance and Protection Plan includes relocating the water treatment system further west of the former proposed location. The updated location is depicted on Figures 1-3c and 1-3d. The new location was tested during the October 2021 STP survey.

1.5.8 Decontamination Pad

Decontamination of on-site heavy equipment will be performed as necessary prior to the equipment leaving the project site to minimize the potential spreading of contamination. All decontamination of equipment will occur within a designated decontamination zone. The Decontamination Pad is depicted on Figure 1-2b, and measures approximately 80-feet by 40-feet. The proposed pad straddles the Access Road leaving the Water Treatment System Containment area to the east. An associated sump will be installed within the pad. The existing subgrade will be grubbed and sloped to the area sump. This

location possesses moderate archaeological potential, and was included in the July 2021 Phase IB Survey Area (Figure 1-3b).

The location has been updated and is depicted on Figures 1-3c and 1-3d. The new location was tested during the October 2021 STP survey.

1.5.9 Stream Crossings

It is anticipated that the two stream crossings (Swartwout Road and the Southern Crossing) will be removed prior to sediment removal activities (Figure 1-2b).

Areas along the west bank of the Tributary D-1-7 leading up to the crossings possess high archaeological potential and were included in the Phase IB Survey Area (Figure 1-3b). However, the crossings themselves do not possess archaeological potential due to extensive prior subsurface disturbance.

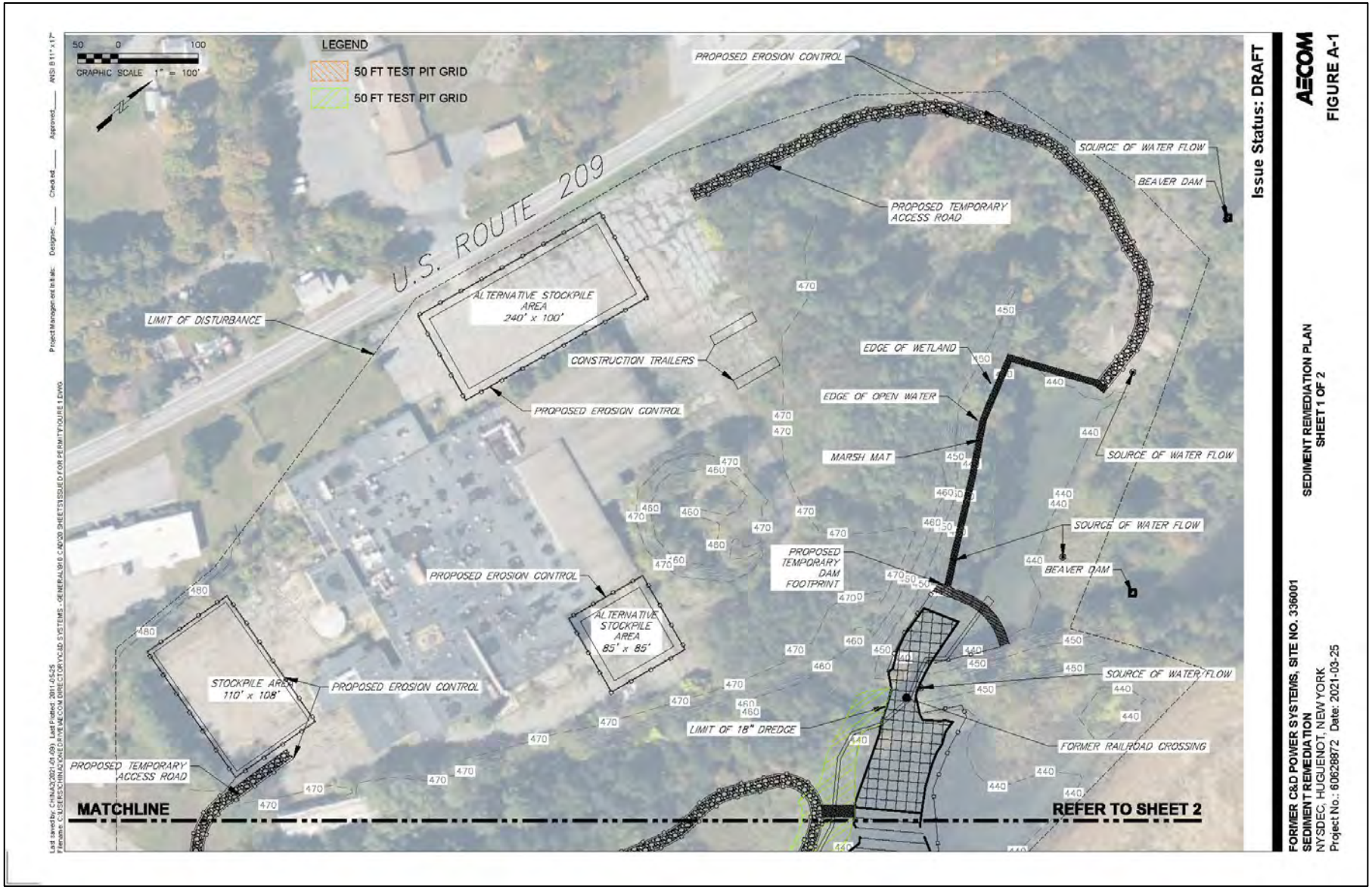

Figure 1-3a: Initial Phase IB Survey Area July 2021

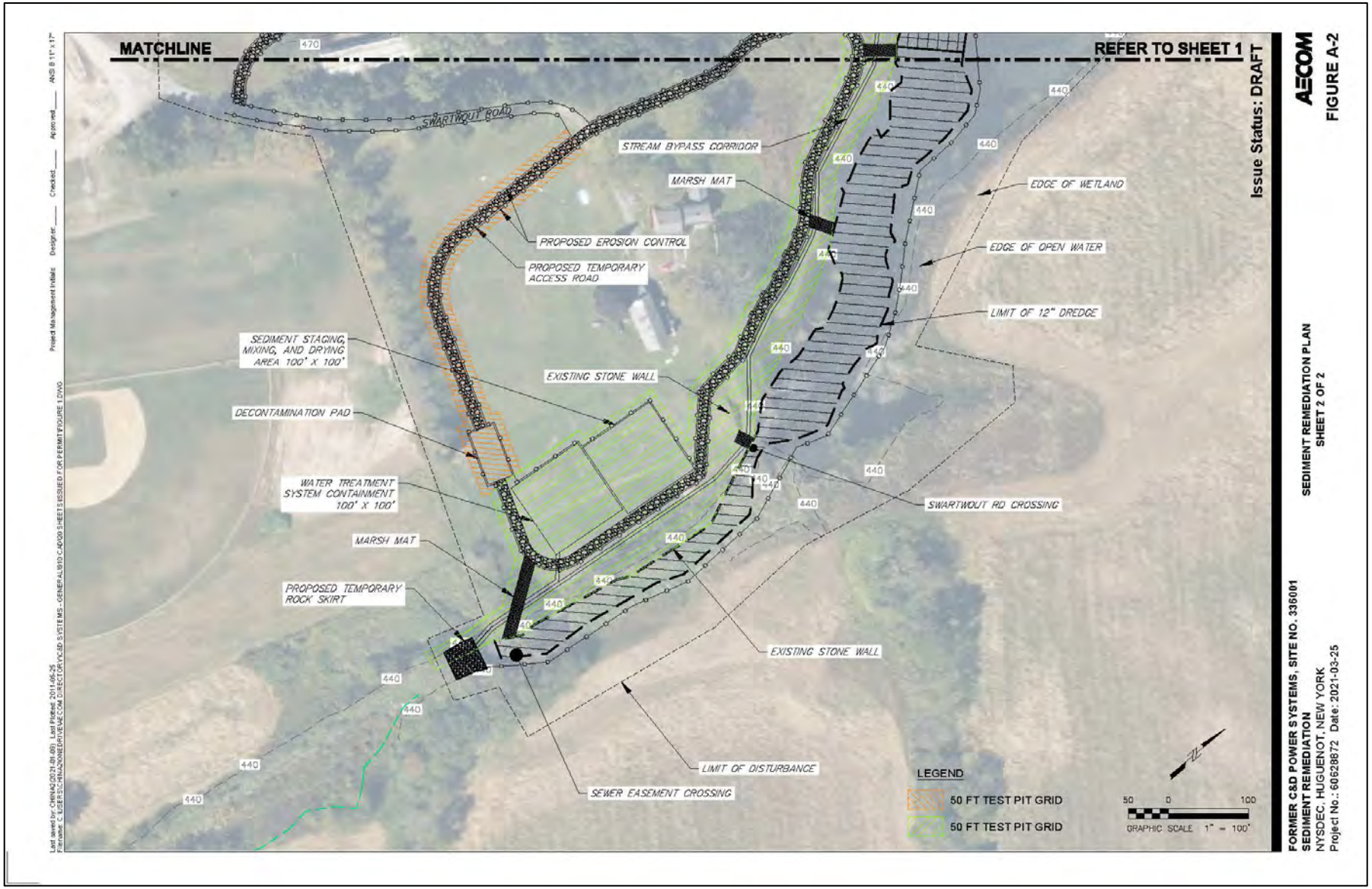

Figure 1-3b: Initial Phase IB Survey Area July 2021

Figure 1-3c: Updated Phase IB Survey Areas

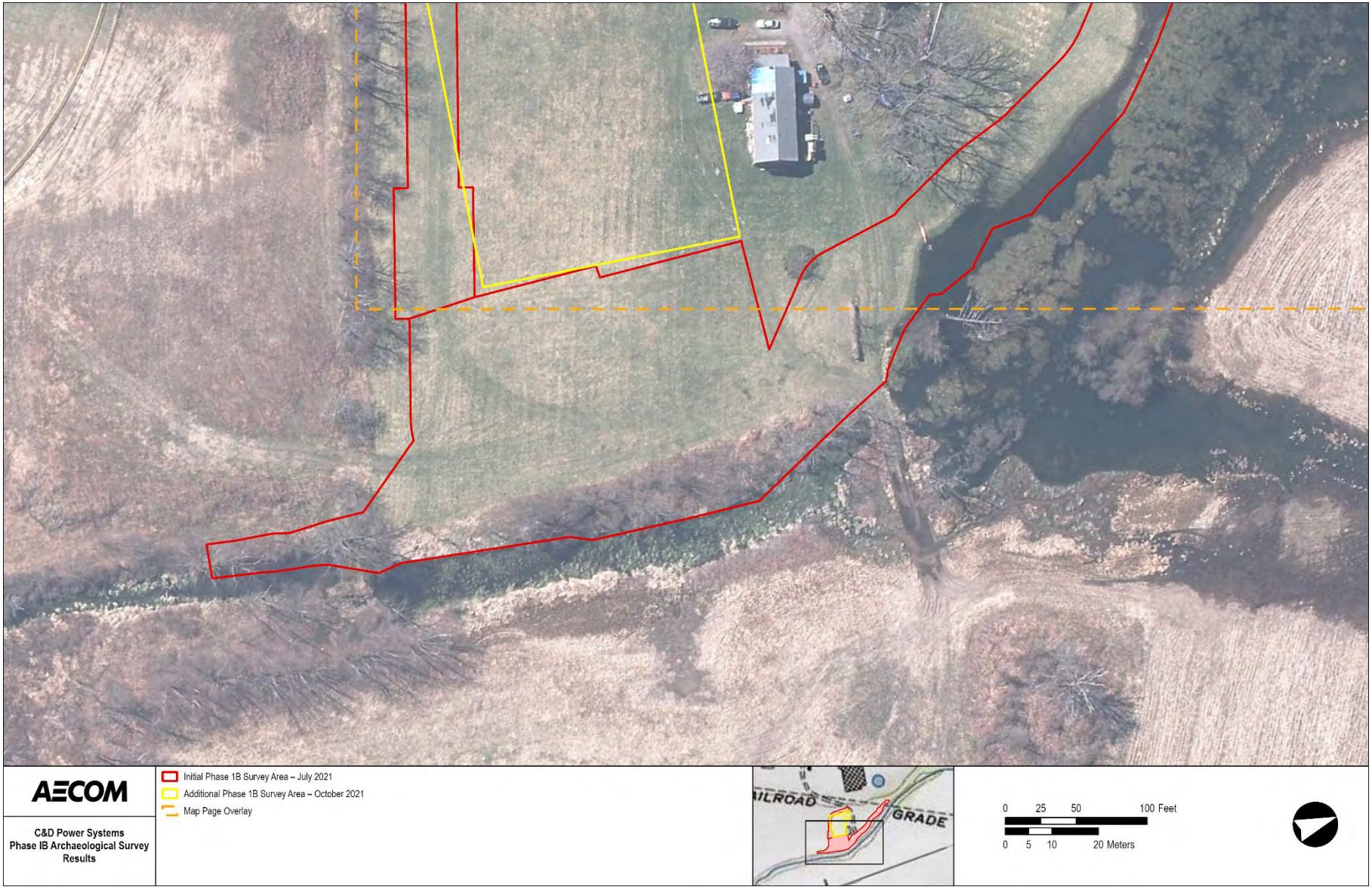

Figure 1-3d: Updated Phase IB Survey Areas

1.6 Phase IB Survey Area

Figures 1-3a through 1-3d depict the areas of high and moderate archaeological sensitivity that were tested during the July 2021 and October 2021 Phase IB surveys. These areas were developed through consultation with the SHPO and NYSDEC DER.

1.6.1 High Sensitivity

The area hatched in green along the sediment removal zone on the west side of Tributary D-1-7 includes the crossing of the abandoned railroad embankment; the longest section of proposed Access Road; the proposed locations of Marsh Mats (Temporary Construction Mats); the proposed location of the Stream Diversion Pipe; the Sediment Staging, Mixing and Drying Area; the Water Treatment System Containment Area; the Swartwout Road crossing of Tributary D-1-7; the Southern Crossing of Tributary D-1-7; and the Rock Skirt at the southern end of the sediment removal zone. These locations were tested during July 2021. The green hatched area covers approximately 94,092 square feet.

1.6.2 Moderate Sensitivity

The area hatched in orange on Figures 1-3a and 1-3b shows areas of moderate sensitivity across the proposed work area covering approximately 26,000 square feet. “Moderate” sensitivity is designated to areas before the Phase 1B investigation was completed. There are several archaeological consideration factors involved in determining the level of sensitivity for a given area. This was determined through the research completed for the Phase IA Documentary Survey for the project as discussed in Section 2.3. Such factors include elevation, drainage, distance to a potable source of water, evidence of nearby archaeological sites, slope, and noted past disturbances (such as cutting and filling and grading). The moderate designation remains intact in the absence of subsurface testing.

The section of Access Road that turns west from the area of high sensitivity near the proposed Water Treatment System Containment Area location near the southern end of the sediment removal zone, and then continues north to Swartwout Road is considered to possess moderate potential for archaeological resources.

.Any proposed work within this proposed section of Access Road will include placement of a protective crushed stone overlaying geotextile fabric; no subsurface disturbance to the existing ground surface is anticipated, thereby eliminating impacts to potential archaeological resources. In addition, vehicular traffic consisting of empty trucks and/or partially loaded trucks is anticipated across this area for a short duration of construction period.

2. Survey Methodology

2.1 Introduction

The primary goal of the C&D Power Systems Site Sediment Removal Project Phase IB subsurface testing surveys was to determine the location and distribution of potentially National Register-eligible archaeological resources in the APE. Subsurface testing was conducted in those areas identified through the Phase IA research to possess prehistoric and/or historic archaeological sensitivity that may be impacted by construction activities associated with the project.

Phase IB field investigation verifies site locations suggested by the Phase IA research, and locates previously unknown sites. Detailed evaluation of identified resources is not carried out at this level investigation, but the precise locations of identified resources with respect to the proposed Project Area must be clearly established.

2.2 Prehistoric and Historic Overview

The Archaeological APE was researched in the SHPO's Cultural Resource Information System (CRIS) website in compliance with Section 106 of NHPA, SEQRA, and Section 14.09 of the NYSHPA. The search area for both prehistoric and historic archaeological resources surrounding the Project Area was a 1-mile-radius.

CRIS indicated that 24 previously identified prehistoric and historic archaeological sites, field scatters and isolated finds were located within the 1-mile search area. The entire C&D sediment removal Project Area lies within a large NYS Museum Site polygon (#4379; #6116) that covers a large portion of the Neversink River Valley.

Preliminary research conducted through CRIS indicated that eight previous Phase I archaeological surveys had been conducted within the 1-mile search radius surrounding the C&D sediment removal Project Area. The reports were downloaded from the CRIS website for review and reference.

Of particular relevance to the C&D Sediment Removal Project Section 106 archaeological compliance studies is the 2016 Phase IA/IB survey report by TRC Environmental Corp., entitled Phase IA/IB Archaeological Survey of The Eastern System Upgrade Project Orange, Sullivan, And Delaware Counties, New York prepared for the Millennium Pipeline Company, LLC. A portion of the Millennium Pipeline APE is included within the current C&D project boundary. A linear portion of the 2016 upgrade project corridor was located east of the C&D main building and west of the Tributary D-1-7 crossing of the abandoned railroad embankment.

This overlapping area was tested during the 2016 survey, and resulted in the identification of a previously unknown site (MRE-TRC-8, 07105.000148). This multicomponent site contains the foundation remains of a 19th-century bank barn and a prehistoric lithic scatter of unknown temporal and cultural affiliation. The site is located on the Neversink River floodplain, just west of Tributary D-1-7. The site was identified during the TRC survey based on the recovery of precontact and historic artifacts from 17 positive STPs and the presence of a stone retaining wall. A low-density scatter of historic artifacts extends south of the stone wall. The prehistoric component of the site consists of a lithic scatter concentrated in the southern portion of the site area. According to the 2016 TRC report, there appeared to be an artificially graded area to the south of this site location.

The barn is a former outbuilding associated with an early-19th-century farmstead located on Swartwout Road, which was established by the family of the same name. The property appears on both the 1859 French, Wood and Beers Map of Orange and Rockland Counties, and the 1875 Beers County Atlas of Orange, New York, as owned by P.P. Swartwout. The 1903 Lathrop Atlas of Orange County, New York indicates the same property was owned by Isaac Ayers. The Swartwout farmhouse is still standing, and currently occupied by the caretaker of the municipal grounds to the south. During the 2016 survey, the tenant was interviewed by the TRC team, and confirmed the presence of a former barn in the site location.

This site was recommended National Register-eligible by TRC. This site location does fall within the approximate project limit boundary for the C&D Power Systems Sediment Removal Project and is noted on Figure 1-2b as "existing stone wall".

2.3 Archaeological Potential

The C&D sediment removal Project Area limits include formerly cultivated fields to the south and east of the C&D facility. These fields have been determined to possess moderate or high prehistoric and historic archaeological potential. This

conclusion is based on the results of the Phase IA assessment, as well as prior archaeological survey results, and are summarized by the following factors:

- Adjacent to a Tributary D-1-7 of the Neversink River
- Most of APE exhibits moderate slope
- Most of APE located on well drained soils
- There are numerous previously identified prehistoric sites within a one-mile radius
- Soil units present are capable of cultivation of crops, hay, pasture
- Project Area lies within a documented historic 19th century farmstead
- There are several previously identified historic sites within a one-mile radius
- Minimal prior subsurface disturbance (plowing)

Given the high potential for encountering archaeological resources that might prove to be eligible for inclusion in the National Register of Historic Places (National Register), a Phase IB subsurface testing survey was recommended.

2.4 Phase IB Methodology

The Phase IB survey methodology includes the following:

- Conduct an intensive walkover of proposed ground disturbance areas that possess archaeological sensitivity as identified during the Phase IA survey.
- Conduct a subsurface shovel testing survey in undisturbed or minimally disturbed archaeologically sensitive locations to determine the presence or absence of archaeological resources within the APE.
- Conduct laboratory processing, cataloguing, and analysis of all artifacts recovered during the Phase IB subsurface testing survey.
- Complete NYS Prehistoric and/or Historic Site Forms for archaeological resources identified during the Phase IB survey that may be eligible for listing in the National Register.
- Prepare draft and final Phase IB Survey reports.

2.5 Field Methods

Subsurface testing was conducted through two systematic STP surveys during July 2021 and October 2021. The STPs were excavated along linear transects at an interval of 50 feet, where feasible. The transects and STP locations were pre-plotted prior to the initiation of each fieldwork effort to facilitate location in the field. Transect lengths varied, and the number of STPs along each transect varied as well (Figure 2-1). Not all the pre-plotted STPs were excavated due to existing field conditions at the time of the survey.

Figure 2-1: Pre-Plotted STPs in Phase IB Survey Areas

Testing was not conducted in areas of documented prior subsurface disturbance, standing water, or slopes greater than 20 percent. The STPs measured approximately 1 foot in diameter, and were excavated to sterile soils when possible.

All field information, such as opening and closing depths, soil descriptions, Munsell color chart identifications, and notes were manually recorded on pre-printed provenience sheets and in field notebooks. All excavated soils were screened through 0.25-inch hardware cloth to ensure artifact recovery. All recovered artifacts were placed in re-sealable polyethylene bags labeled with all relevant provenience information, using a permanent, waterproof pen.

When precontact and/or historic artifacts were encountered in an isolated shovel test, arrays of additional STPs were excavated at 1 meter and 3 meters (3 feet and 10 feet) from the original STP in the four cardinal directions. The purpose of the additional STP arrays was to define the boundaries of the encountered resource. Soil profiles were recorded and Field Specimen Numbers (FS #s) were assigned to the cultural material encountered in each positive STP.

The locations of all transects and excavated STPs were recorded using a hand-held GPS unit, depicted on project mapping, and included in the survey report figures.

2.6 Laboratory Methods

All recovered artifacts and samples taken have been cleaned and/or processed, catalogued, and analyzed in the AECOM in-house archaeological laboratory in compliance with the guidelines established by the Department of the Interior for the proper curation of Federally owned and administered archaeological collections (36 CFR 79 and 66), and New York Archaeological Council's (NYAC) Standards for Cultural Resources Investigations and the Curation of Archaeological Collections in New York State (1994), adopted by the SHPO in 2004.

The resulting artifact assemblage and all secondary information such as field notes, photographs, and sketches are temporarily stored at AECOM's Burlington, New Jersey Laboratory at 437 High Street, Burlington, NJ 08016, until an acceptable facility for curation of the project materials is decided through consultation with NYSDEC DER and SHPO.

3. Results of Survey

Phase 1B STP surveys were conducted in July 2021 and October 2021. During the July 2021 Phase 1B STP survey, a total of 45 STPs were pre-plotted along seven transects labeled Transect A through Transect G, and depicted on Figure 2-1. Due to field conditions at the time of the Phase IB survey, five of the 45 pre-plotted STPs were not excavated. Of the 40 STPs excavated, eight were positive for cultural material. Each positive STP location was further investigated through the excavation of eight radial STPs, for a total of 64. Therefore, the total number of STPs excavated during the July 2021 Phase IB survey was 104. Thirty four of the 64 radial STPs were also positive for cultural material. No temporally or culturally diagnostic artifacts were recovered in any of the positive STPs. No features or portions of features were encountered during the survey.

During the October 2021 Supplemental Phase 1B STP survey, a total of 21 STPs were pre-plotted along six transects labeled Transect H through Transect M. Of the 21 STPs excavated, two were positive for cultural material. Each positive STP location was further investigated through the excavation of eight radial STPs, for a total of 16. Therefore, the total number of STPs excavated during the Supplemental Phase IB STP survey was 37. Five of the 16 radial STPs were also positive for cultural material. No temporally or culturally diagnostic artifacts were recovered in any of the positive STPs. No features or portions of features were encountered during the survey.

3.1 Introduction

The Phase IB subsurface testing survey of the C & D Power Systems Site in Huguenot, New York began on July 19th, 2021 and was completed on July 23, 2021. A supplemental Phase IB STP survey was conducted on October 27 and 28, 2021. The STP surveys consisted of manual testing on a 15-meter (50-foot) pre-plotted grid (Figure 2-1). The STPs were excavated in compliance with the guidelines of the SHPO which requires that the STPs be excavated at a minimum of 30 centimeters (cm), or 1 foot in diameter, with all excavated soils to be screened through 0.25-inch hardware cloth to allow for the recovery and identification of any cultural material present. In addition, the guidelines state that STPs are to be excavated to a depth of 1 meter (3 feet) below ground surface, or until culturally sterile, non-artifact bearing soils are reached. During the C & D Power Systems Phase IB surveys, once culturally sterile soils were identified, all STPs were excavated an additional 10 cm (4 inches) in depth to confirm that culturally sterile soil had been reached.

The SHPO guidelines also require that an array of STPs be excavated in the four cardinal directions around each STP that yielded cultural material or, in other words, represented positive hits. The SHPO guidelines recommend the first such array be excavated at 1 meter (3 feet) around the positive STP, and the second array be excavated at 3 meters (10 feet) around the positive STP. This strategy was employed for all positive STPs during the Phase IB survey.

All field information, such as opening and closing depths, soil descriptions, Munsell color chart identifications, and notes were manually recorded on provenience sheets and in field notebooks. All measurements were recorded in centimeters, consistent with standard operating procedures for archaeological survey in New York State. All excavated soils were screened through 0.25-inch hardware cloth to ensure artifact recovery. All recovered artifacts were placed in re-sealable polyethylene bags labeled with all relevant provenience information, using a permanent, waterproof pen.

A Field Specimen (FS) log was generated to record all cultural material recovered from the STPs. The FS log indicated the positive STP, and included the depths in centimeters below the ground surface, the horizon in which the materials were found, a brief description of the cultural material recovered, and the total count of all artifacts collected.

3.2 Field Results

3.2.1 STP Transects

The 50-foot (15-meter) grid across the Archaeological APE consisted of seven transects labeled Transect A through Transect G during the July 2021 Phase 1B STP survey and six transects labeled Transect I through Transect M during the October 2021 Supplemental Phase 1B STP survey. The lengths of the seven transects varied across the Archaeological APE; therefore, the number of pre-plotted STPs along each transect varied as well (Figure 2-1). Each transect was excavated and recorded separately.

Figures 3-1a through 3-1d depict all 141 STPs (i.e., 104 STPs and 37 STPs excavated during the July 2021 and October 20201 survey, respectively) excavated on aerial photo base maps, and identify whether the STP tested positive or negative. Positive STPs are further defined as yielding cultural material as follows: Prehistoric (Precontact); Historic; or Prehistoric and Historic.

Figures 3-2a through 3-2d depict the results of all 141 STPs excavated on base maps with the sediment remediation construction plan as an overlay to demonstrate the measures taken as part of the Avoidance and Protection Plan.

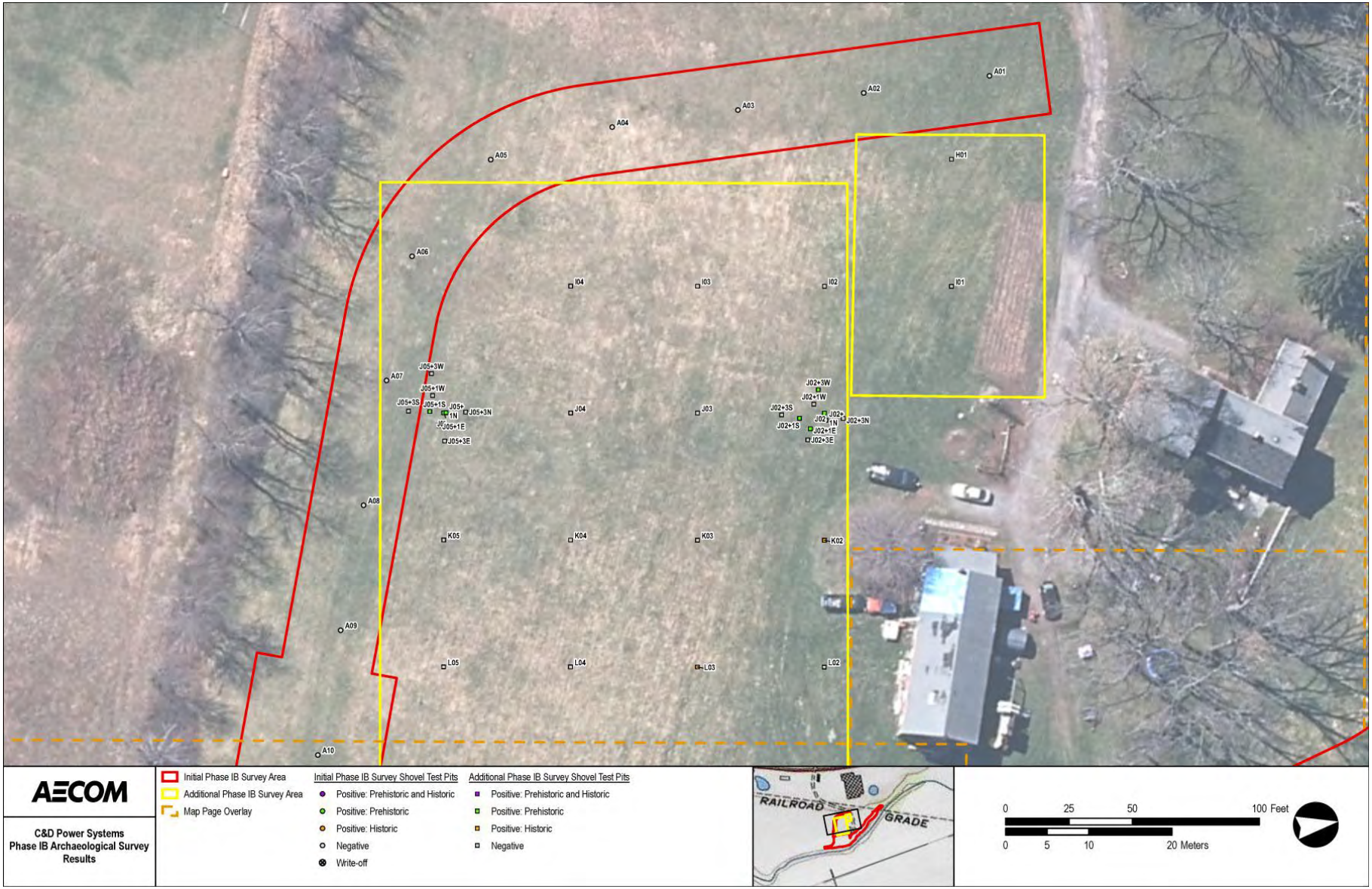

Figure 3-1a: Phase IB Survey Results West

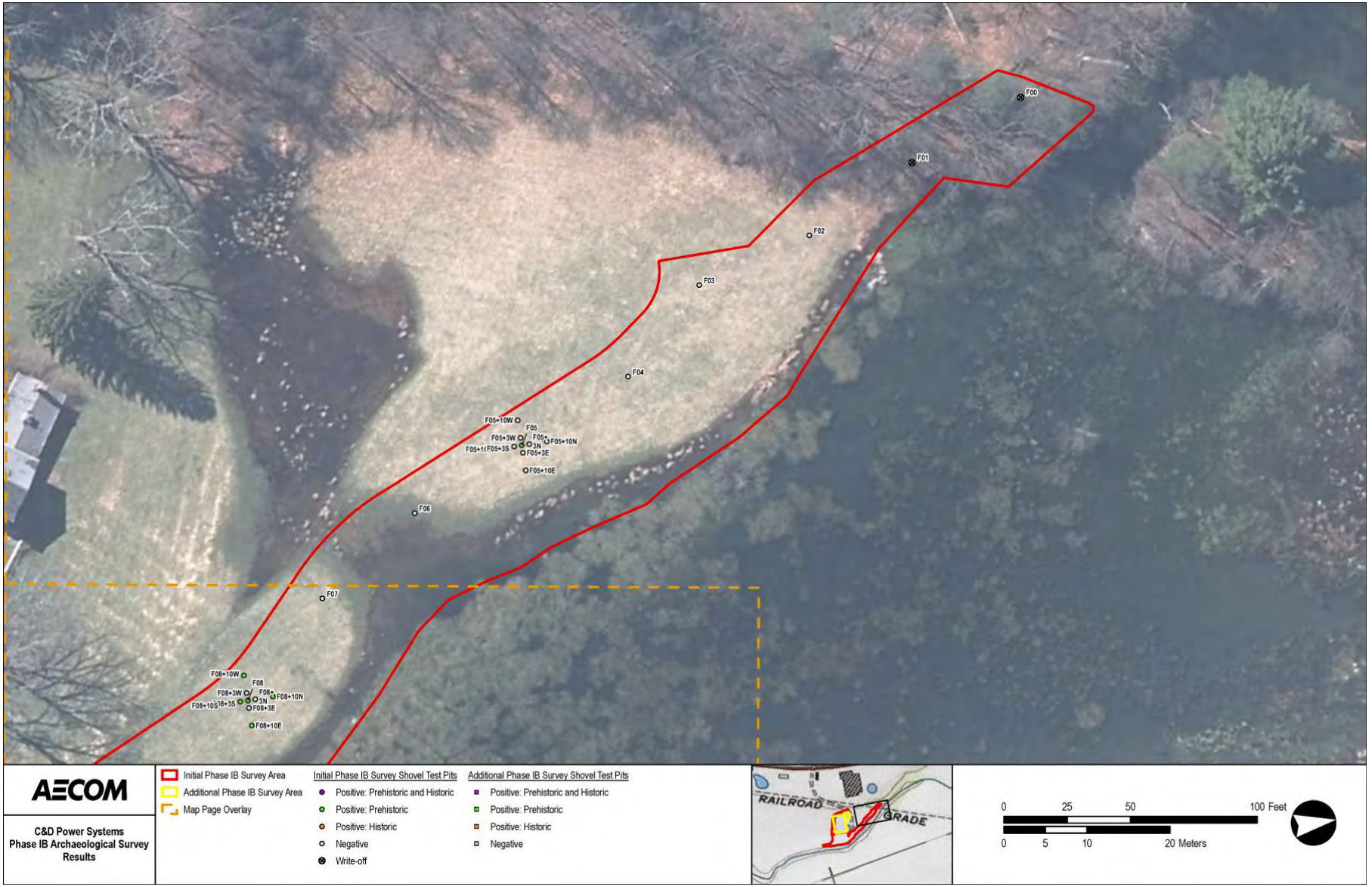

Figure 3-1b: Phase IB Survey Results North

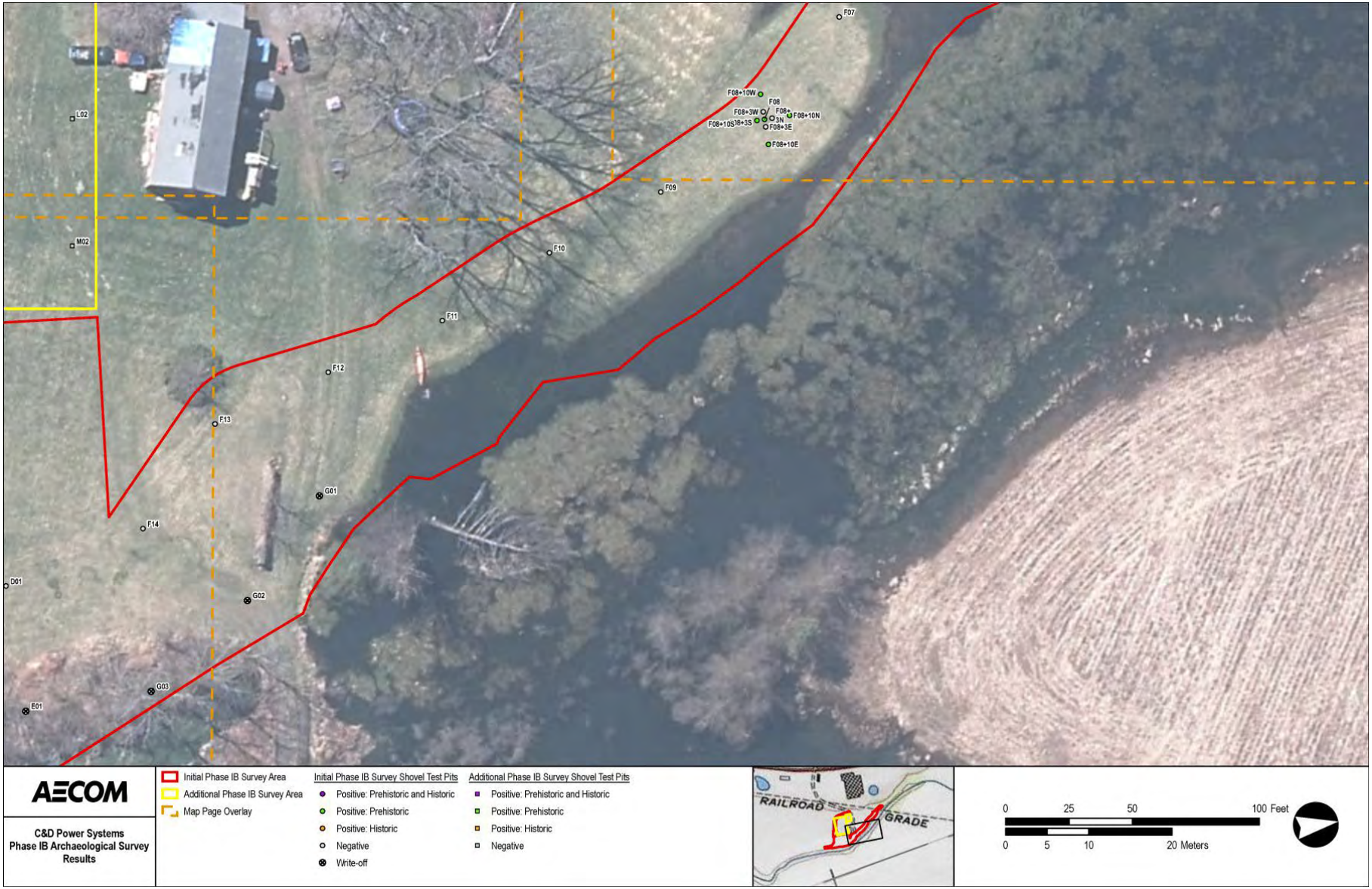

Figure 3-1c: Phase IB Survey Results Northeast

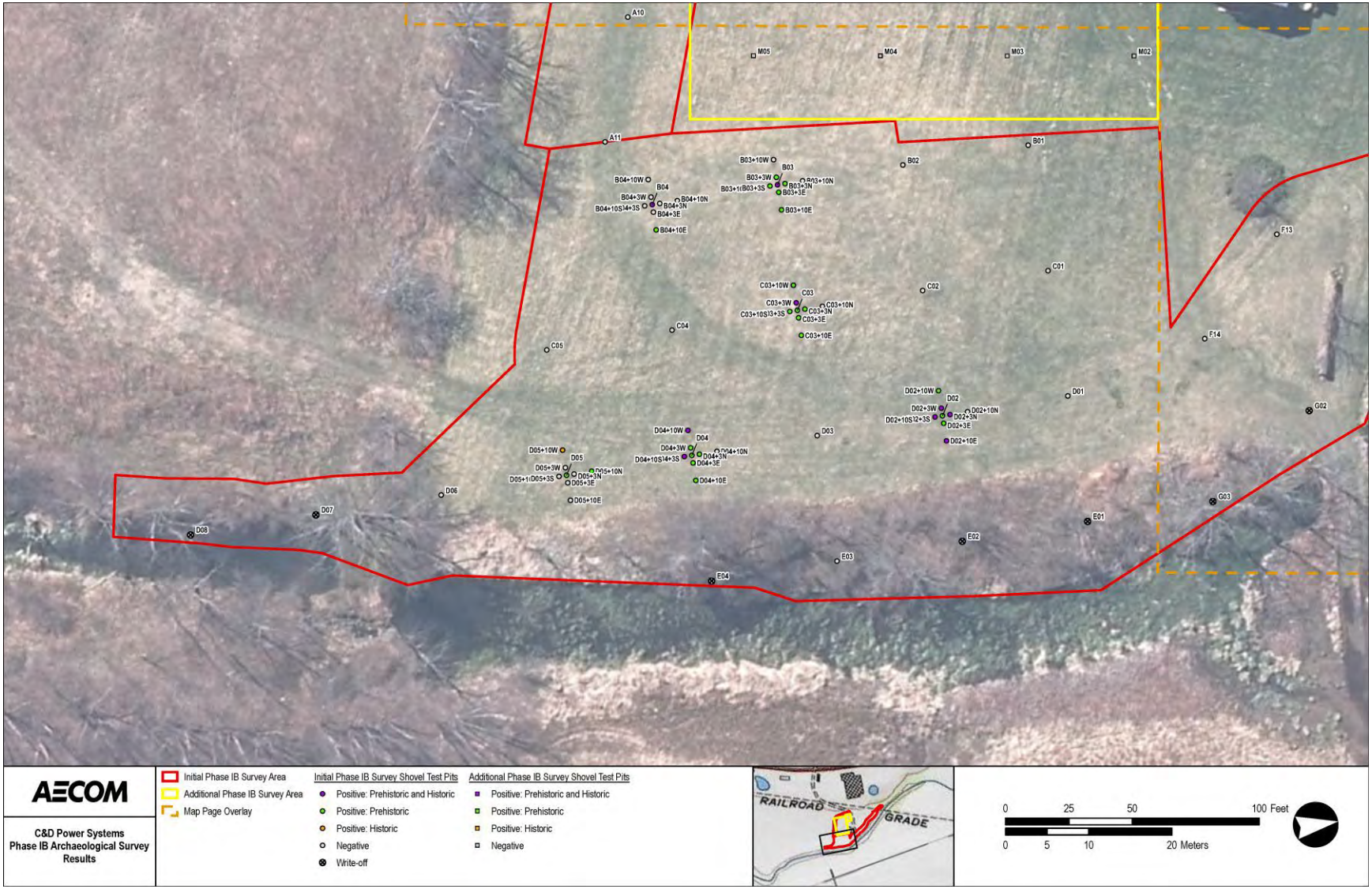

Figure 3-1d: Phase IB Survey Results Southeast

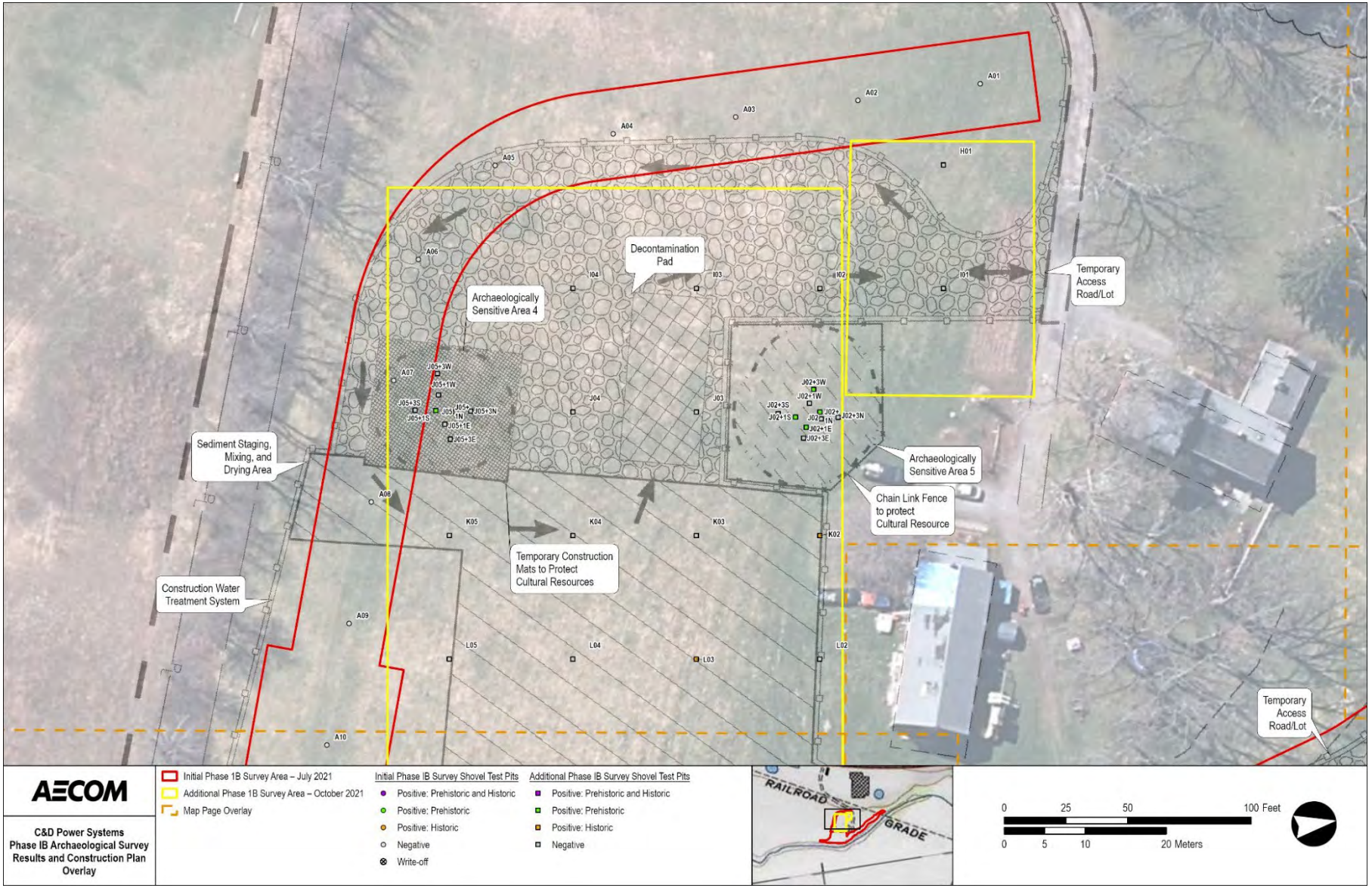

Figure 3-2a: Phase IB Survey Results and Construction Plan West

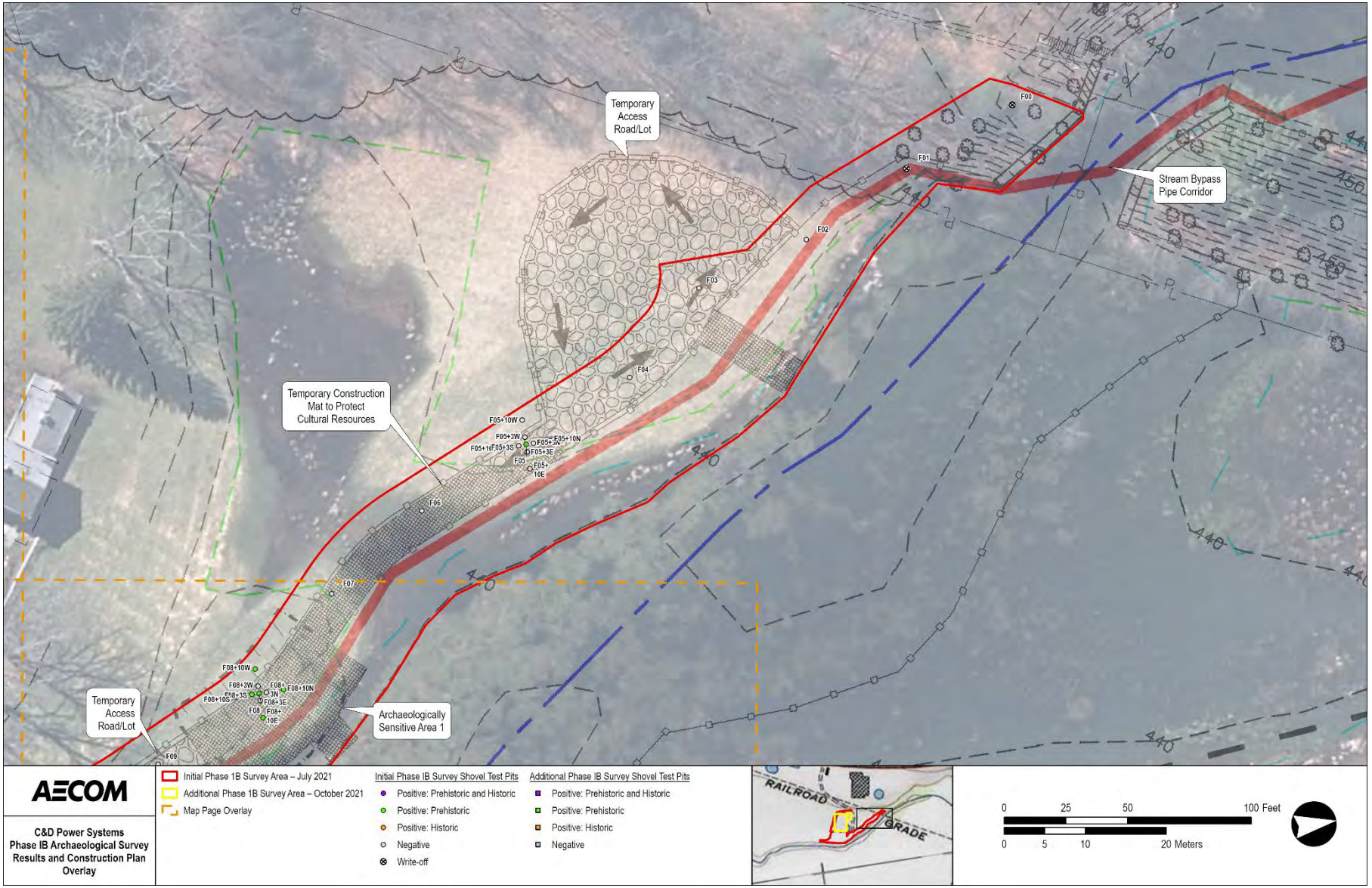

Figure 3-2b: Phase IB Survey Results and Construction Plan North

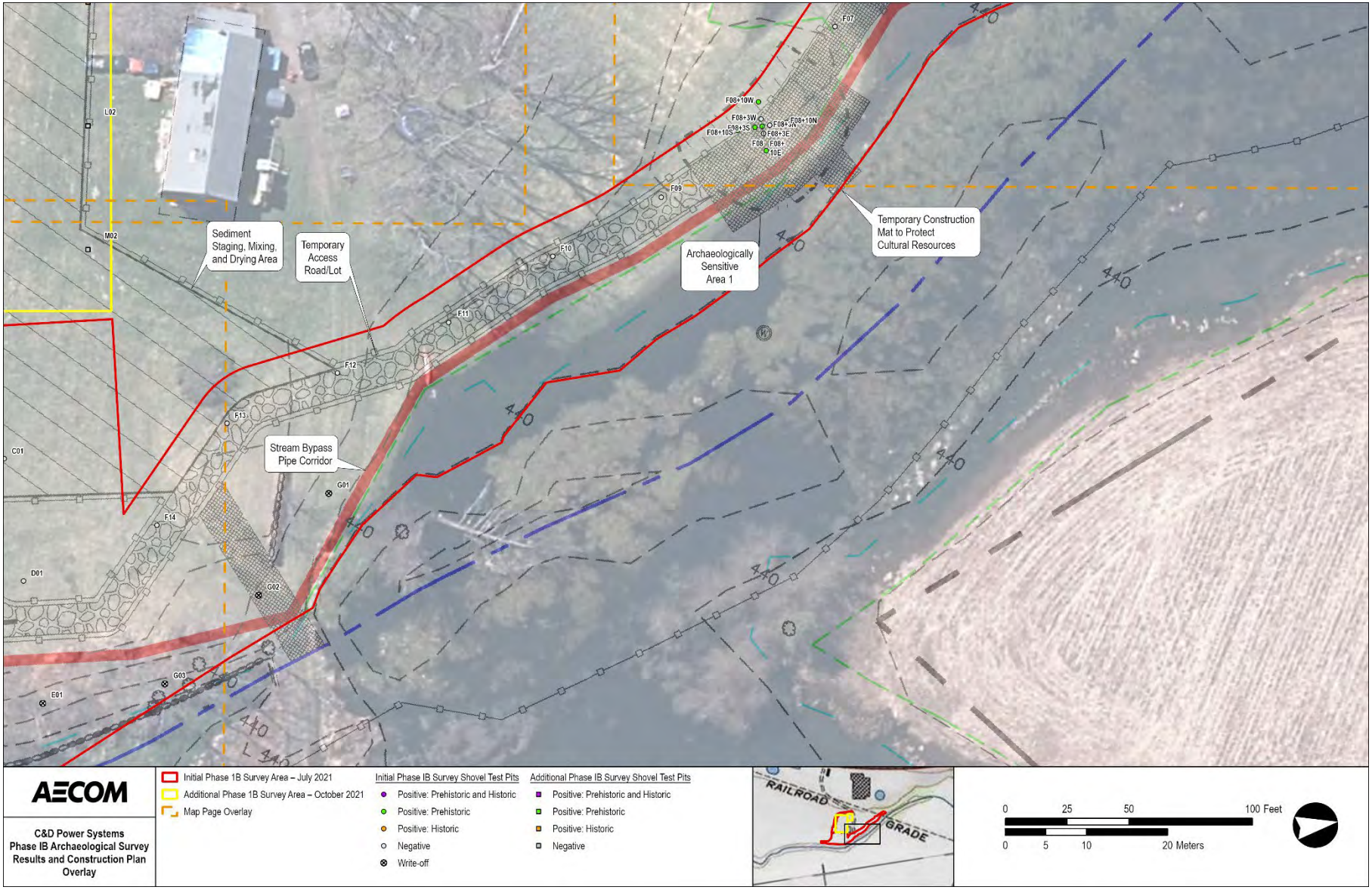

Figure 3-2c: Phase IB Survey Results and Construction Plan Northeast

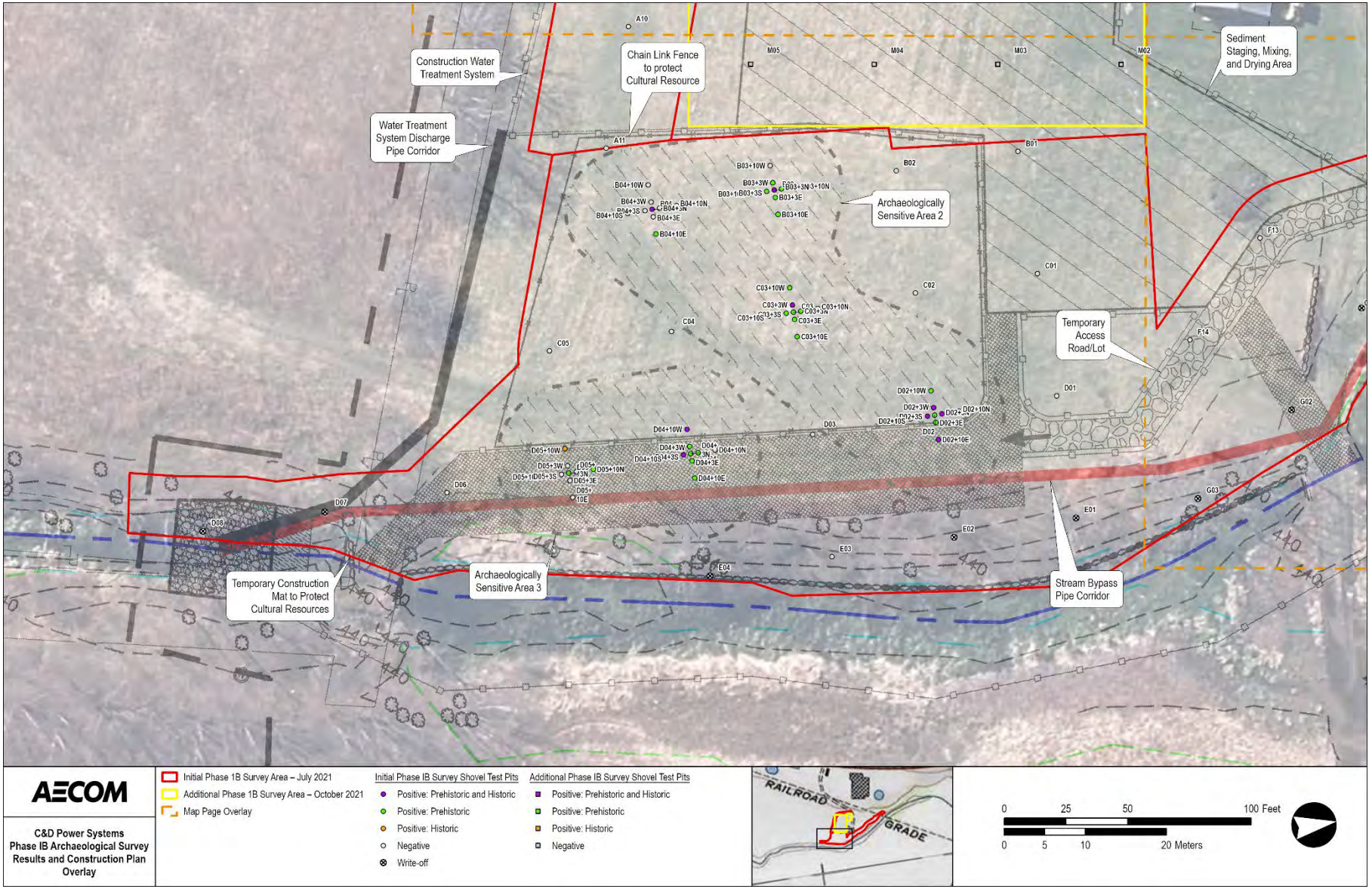

Figure 3-2d: Phase IB Survey Results and Construction Plan Southeast

3.2.1.1 Transect A

Transect A was a tangential segment of the Archaeological APE oriented along the route of the Proposed Temporary Access Road that begins at the proposed Decontamination Station and runs westward, then turns northward and connects to Swartwout Road (Figure 1-3a and 1-3b). Eleven STPs had been pre-plotted onto the project map (Figure 2-1). Topographically, the transect was in a lowland area that may have been cut down, leveled, and/or graded at some point. The adjacent upland plateau on the east has a substantial/abrupt steep slope along its east side which suggests that at some point the landform had been modified. The transitions between the soil horizons encountered in the STP profiles appeared moderately level, or horizontally oriented, suggesting that this portion of the Project Area land had been modified or tilled (plowed).

Depths of the Ap, or plow zone, ranged from 18 cm below ground surface to 31 cm below ground surface. The plow zone soil, Stratum 1, was of sandy loam texture with a well-formed and sorted structure. The underlying B horizon subsoil, Stratum 2, ranged from 28 cm to 31 cm below the ground surface. The soil was of silty clay texture with a well-drained and well-formed structure. No cultural material was recovered from the 11 STPs excavated along Transect A. Construction of the proposed Decontamination Pad and Access Road to Swartwout Road will not impact any potential archaeological resources.

3.2.1.2 Transect B

Transect B was located along the western edge of the centrally located upland plateau. Four STPs had been pre-plotted onto the project map (Figure 2-1). The transect was located in the area of the Archaeological APE proposed for construction of the Sediment Staging, Mixing, and Drying Area and the Water Treatment System Containment Area (Figure 1-3b).

STPs B 1 and B 2 were both negative for cultural material, and were excavated to depths of 37 cm and 38 cm below ground surface, respectively. The soils were the same as those identified along Transect A, a well-sorted sandy loam plow zone (Stratum 1) over a well-formed and well-drained culturally sterile subsoil (Stratum 2). STPs B 3 and B 4 were both positive tests (Table 3-1). STP B 3 was located on the southern sloping edge of the upland landform. One chert flake was recovered between 0 cm and 39 cm below ground surface in Stratum 1, the plow zone. No cultural material was recovered from Stratum 2, the underlying B horizon. STP B 4 was located at the base of the plateau, 15 meters (50 feet) south of STP B 3. Three chert flakes and 1 iron nail were recovered between 0 cm and 27 cm below ground surface in Stratum 1, the plow zone. The underlying Stratum 2, or B horizon, was culturally sterile.

Table 3-1: Transect B Positive STPs

STP	Stratum	Depths in cm	Horizon	Munsell	Soil Texture	Artifacts Recovered
B 3	I	0-39	Ap	10yr 4/3	Sandy Loam	1 Chert Flake
	II	39-49	B	7.5yr 4/6	Sandy Silty Clay	No Cultural Material
B 4	I	0-27	Ap	10yr 4/3	Sandy Loam	3 Chert Flakes, 1 Nail
	II	27-37	B	7.5yr 4/6	Sandy Silty Clay	No Cultural Material

No temporally or culturally diagnostic artifacts were recovered in the positive STPs along Transect B. No features or portions of features were encountered in any of the STPs.

3.2.1.3 Transect C

Transect C was located 15 meters (50 feet) to the east of Transect B. Transect C consisted of five pre-plotted STPs (Figure 2-1). The identified soils were consistent with those identified along Transect B. Stratum 1, the plow zone, was a well-sorted sandy loam averaging in depth from 19 cm below ground surface to roughly 32 cm below ground surface. Stratum 2, the B horizon subsoil, was culturally sterile and consisted of a well-formed sandy silty clay, also consistent with the identified soils in the STPs along Transect B.

STPs C 1 and C 2 were negative for cultural material. STP C 3 was positive with one fire cracked rock (FCR) cobble, five chert flakes, and one possible stone hand tool recovered between ground surface and 26 cm in depth (Table 3-2). This soil

layer was identified as the plow zone and designated as Stratum 1. The Stratum 2 B horizon was culturally sterile. The remaining two STPs along Transect C, STP C 4 and STP C 5, were negative for cultural material.

Table 3-2: Transect C Positive STPs

STP	Stratum	Depths in cm	Horizon	Munsell	Soil Texture	Artifacts Recovered
C 3	I	0-26	Ap	10yr 4/3	Sandy Loam	1FCR, 5 Chert Flakes, 1 Possible Stone Hand Tool
	II	26-36	B	7.5yr 4/6	Sandy Silty Clay	No Cultural Material

No temporally or culturally diagnostic artifacts were recovered in the positive STPs along Transect C. No features or portions of features were encountered in any of the STPs.

3.2.1.4 Transect D

Transect D was located 15 meters (50 feet) to the east of Transect C. Six STPs were pre-plotted on the project map (Figure 2-1). The depth of the plow zone, or Stratum 1, ranged from 19 cm at D 6 to 35 cm at D 4, moving south along Transect D. The texture and structure of the encountered soils were consistent with the soil profiles along Transects B and C. The Stratum 1 plow zone was a well-sorted sandy loam, and the Stratum 2 subsoil was a well-developed silty clay. There was a slight increase in the percentage of naturally occurring small cobbles and pebbles noted moving south along Transect D.

Of the six STPs excavated along Transect D, STP D 1 was negative, STP D 2 was positive, STP D 3 was negative, STPs D 4 and D 5 were positive, and STP D 6 was negative (Table 3-3). The first positive STP was D 2, which was located towards the northern portion of the upland plateau. Stratum 1, the plow zone, yielded one FCR cobble and four chert flakes. The artifacts were recovered between 0 cm below ground surface and 20 cm below ground surface. No cultural material was found in the Stratum 2, B horizon subsoil. It is noted that no cultural material was recovered from STP D 1 or STP D 3, the adjacent tests along Transect D. STP D 4 was located 30 meters (100 feet) to the south of STP D 2 on the southern edge of the upland plateau. The Stratum 1 plow zone, which ranged in depth from 0 cm below ground surface to 35 cm below ground surface, yielded 1 chert flake. The underlying Stratum 2 B horizon subsoil was culturally sterile from 35 cm below ground surface to 45 cm below ground surface. STP D 5 was located at the base of the southern slope of the upland landform, 15 meters (50 feet) to the south of STP D 4. The Stratum 1 plow zone, which extended in depth from 0 cm below ground surface to 28 cm below ground surface, yielded two chert flakes and one FCR cobble. The underlying Stratum 2 subsoil was culturally sterile to 38 cm below ground surface.

Table 3-3: Transect D Positive STPs

STP	Stratum	Depths in cm	Horizon	Munsell	Soil Texture	Artifacts Recovered
D 2	I	0-20	Ap	10yr 4/3	Sandy Loam	4 Chert Flakes, 1 FCR
	II	20-40	B	5yr 3/3	Silty Clay	No Cultural Material
D 4	I	0-35	Ap	10yr 4/3	Sandy Loam	1 Chert Flake
	II	35-45	B	5yr 3/3	Silty Clay	No Cultural Material
D 5	I	0-28	Ap	10yr 4/3	Sandy Loam	2 Chert Flakes, 1 FCR
	II	28-38	B	5yr 3/3	Silty Clay	No Cultural Material

No temporally or culturally diagnostic artifacts were recovered in the positive STPs along Transect D. No features or portions of features were encountered in any of the STPs

3.2.1.5 Transect E

Transect E was pre-plotted along the westernmost edge of the upland plateau along the southern portion of the Project Area, adjacent to the west bank of Tributary D-1-7. Transect E consisted of three pre-plotted STP locations (Figure 2-1). However, STPs E 2 and E 3 were not excavated, as they were located on a slope greater than 15 percent leading down to the tributary. STP E 1 was excavated. The test consisted of a horizon of fill, and the underlying plow zone soil had been disturbed and appeared mixed with the subsoil, possibly as a result of maintenance activities of the tributary channel over time. Underlying the disturbed fill horizon, designated as Stratum 1, was the culturally sterile B horizon subsoil, within which large, rounded river cobbles were noted. No cultural material was found in either the disturbed fill or the subsoil.

3.2.1.6 Transect F

Transect F ran parallel the northeastern extension of the Tributary D-1-7. The transect began on the northern edge of the upland landform and gradually sloped into a periodically damp lowland. Fourteen STPs were pre-plotted along Transect F (Figure 2-1). The transition between the A horizon the B horizon soils seen in the STPs was a gradient, rather than a clear break indicating that the area through which Transect F traversed was not formally tilled or plowed. Profiles generally consisted of a dark brown, well-sorted and well-developed A horizon (Stratum 1) with a silty loam texture overlying a slightly more clayey reddish-brown B horizon subsoil that exhibited a moderate amount of reoxidation (Stratum 2). The A horizon ranged from 10 cm below ground surface at the shallowest, particularly around the lowest elevations, to 45 cm below ground surface.

Of the 14 STPs pre-plotted along Transect F, 13 were excavated. STP F 1, the northernmost location, was not excavated as it was located on a slope of approximately 20 percent. All tests except for STP F 5 and STP F 8 were negative (Table 3-4). STPs F 2 through F 4, F 6 and F 7, and F 9 through F 14 were negative, and exhibited the above described soil profiles. STP F 5 was the first positive test on Transect F. The test was located in the middle of the transect in the lowland area closest to Tributary D-1-7. The noted soil profile was an A horizon (Stratum 1), 0 cm below ground surface to 30 cm below ground surface overlying a B horizon subsoil (Stratum 2), 30 cm below ground surface to 40 cm below ground surface. Within the Stratum 1 A horizon, one chert flake was recovered. The Stratum 2 B horizon was culturally sterile. STP F 8 was the second positive STP along Transect F. The Stratum 1 A horizon, which extended in depth from 0 cm below ground surface to 30 cm below ground surface, yielded three chert flakes. The underlying Stratum 2 B horizon subsoil was culturally sterile.

Table 3-4: Transect F Positive STPs

STP	Stratum	Depths in cm	Horizon	Munsell	Soil Texture	Artifacts Recovered
F 5	I	0-30	A	10yr 3/3	Silty Loam	1 Chert Flake
	II	30-40	B	5yr 3/3	Silty Clay	No Cultural Material
F 8	I	0-30	A	10yr 3/3	Silty Loam	3 Chert Flakes
	II	30-40	B	7.5yr 4/6	Silty Clay	No Cultural Material

No temporally or culturally diagnostic artifacts were recovered in the positive STPs along Transect F. No features or portions of features were encountered in any of the STPs.

3.2.1.7 Transect G

Transect G was located along the west bank of Tributary D-1-7, near the Swartwout Road Crossing. Two STPs had been pre-plotted (Figure 2-1). This portion of the Project Area included a section of historic stone wall that likely represented part of a barn, no longer standing. Its presence had been reported in prior survey reports and was noted on the current project mapping (Figure 1-2b). The Transect G STP area was apparently impacted when contractors replaced the culvert connecting the northern portion of the tributary to the southern portion during recent drainage improvement efforts. The area where the two Transect G STPs were plotted was also located atop a gravel drive. The two STPs were not excavated due to existing field conditions and prior disturbance.

3.2.1.8 Transect H

Transect H was located along the westernmost edge of the supplemental Survey Area, to the west of the proposed Water Treatment System Containment Area. Transect H consisted of one pre-plotted STP location (Figure 2-1). The test consisted of a sandy loam plow zone, or Ap stratum, 32 cm in depth, underlain by a sandy clay loam, culturally sterile B Horizon

subsoil. The B Horizon was sampled to a depth of 52 cm below ground surface. No cultural material was recovered from STP H 1.

3.2.1.9 Transect I

Transect I was located along the westernmost edge of the supplemental Survey Area, to the west of the proposed Water Treatment System Containment Area. Transect I consisted of four pre-plotted STP locations (Figure 2-1). The STP profiles exhibited a sandy loam Ap stratum ranging in depth from 27 cm to 36 cm below ground surface. The Ap stratum was underlain by a sandy clay loam, culturally sterile B Horizon subsoil. The B Horizon was sampled to depths ranging from 50 cm to 55 cm below ground surface. No cultural material was recovered from the four Transect I STPs.

3.2.1.10 Transect J

Transect J was located along the central portion of the supplemental Survey Area, to the west of the proposed Water Treatment System Containment Area. Four STPs were pre-plotted along Transect J (Figure 2-1). The STP profiles exhibited a sandy loam Ap stratum ranging in depth from 25 cm to 28 cm below ground surface. The Ap stratum was underlain by a sandy clay loam, culturally sterile B Horizon subsoil. The B Horizon was sampled to depths ranging from 41 cm to 50 cm below ground surface.

STP J 2 and STP J 5 were positive for precontact cultural material. The artifacts were recovered from the Ap stratum, or plow zone in both STPs. STP J 2 yielded two black chert bifacial thinning flakes and one sandstone FCR. STP J 5 yielded two black chert bifacial thinning flakes (Table 3-5).

Table 3-5: Transect J Positive STPs

STP	Stratum	Depths in cm	Horizon	Munsell	Soil Texture	Artifacts Recovered
J 2	I	0-25	Ap	10yr 4/3	Sandy Loam	2 Chert Flakes, 1 FCR
	II	25-45	B	10yr 5/6	Sandy Clay Loam	No Cultural Material
J 5	I	0-26	Ap	10yr 4/3	Sandy Loam	2 Chert Flakes
	II	26-48	B	10yr 5/6	Sandy Clay Loam	No Cultural Material

3.2.1.11 Transect K

Transect K was located along the central portion of the supplemental Survey Area, to the west of the proposed Water Treatment System Containment Area. Transect K consisted of four pre-plotted STP locations (Figure 2-1). The STP profiles exhibited a sandy loam Ap stratum ranging in depth from 17 cm to 28 cm below ground surface. The Ap stratum was underlain by a sandy clay loam, culturally sterile B Horizon subsoil. The B Horizon was sampled to depths ranging from 30 cm to 45 cm below ground surface. One historic artifact was recovered from the AP stratum plow zone in STP K 2. This artifact is a small unidentified metal bell, probably an animal bell. No precontact cultural material was recovered from the four Transect K STPs.

3.2.1.12 Transect L

Transect L was located along the central portion of the supplemental Survey Area, to the west of the proposed Water Treatment System Containment Area. Transect L consisted of four pre-plotted STP locations (Figure 2-1). The STP profiles exhibited a sandy loam AP stratum ranging in depth from 20 to 26 cm below ground surface. The AP stratum was underlain by a sandy clay loam, culturally sterile B Horizon subsoil. The B Horizon was sampled to depths ranging from 35 to 40 cm below ground surface. One historic artifact was recovered from the AP stratum plow zone in STP L 3. This artifact is a white ball clay smoking pipe pipestem fragment. This artifact has not been discretely dated, but likely represents historic field scatter resulting from 19th century occupation of the project area. No precontact cultural material was recovered from the four STPs along Transect L.

3.2.1.13 Transect M

Transect M was located along the easternmost edge of the supplemental Survey Area, to the west of the proposed Water Treatment System Containment Area. Transect M consisted of four pre-plotted STP locations (Figure 2-1). All STPs

exhibited a sandy loam Ap stratum plow zone, ranging in depth from 10 cm to 39 cm below ground surface. The Ap stratum was underlain by a sandy clay loam B Horizon subsoil in STPs M 4 and M 5, and was sampled to depths of 40 cm and 50 cm, respectively. STP M 4 was inundated at 40 cm below ground surface. STP M 3 was inundated at 10 cm into the Ap stratum, and was terminated. The Ap stratum in STP M 2 was directly underlain by a fill level, which extended to a depth of 34 cm below ground surface. Underlying the fill level was the sandy clay loam B Horizon subsoil, which was sampled to a depth of 55 cm below ground surface. No cultural material was recovered from the Ap stratum, the fill level, or the B Horizon subsoil.

3.2.2 Radial STPs

Of the 40 STPs excavated along Transects A through G during the July 2021 STP survey, eight were positive for cultural material. Therefore, two radial arrays in the four cardinal directions, one at 1 meter (3 feet) and the second at 3 meters (10 feet), were excavated around each positive STP. A total of 64 radial STPs were excavated. Thirty-four of the 64 radials were also positive for cultural material. No temporally or culturally diagnostic artifacts were recovered in any of the positive STPs. No features or portions of features were encountered in the radial STPs. The following discussion of the radial STP results is organized by positive STP. The positive tests included in order are STPs B 3 and B 4, STP C 3, STPs D 2, D 4 and D 5 and STPs F 5 and F 8.

Of the 21 STPs excavated along Transects H through M during the supplemental October 2021 STP survey, two were positive for precontact cultural material. The positive tests are STPs J 2 and J 5. Therefore, two arrays in the four cardinal directions, one at 1 meter (3 feet) and the second at 3 meters (10 feet), were excavated around each positive STP. A total of 16 radial STPs were excavated. Five of the radial STPs were positive for precontact cultural material. . No temporally or culturally diagnostic artifacts were recovered in any of the positive STPs. No features or portions of features were encountered in the radial STPs.

3.2.2.1 STP B 3

Six positive radials were identified of the eight radials excavated around STP B 3 (Table 3-6). All cultural material was recovered from the plow zone. No cultural material (NCM) was recovered from the B horizon. No temporally diagnostic artifacts were recovered; no cultural affiliations were identified. No features or portions of features were encountered.

Table 3-6: STP B 3 – Positive Radial STPs

Radial STP	Stratum	Depths in cm	Horizon	Artifacts
+ 3ft North	I	0-26	Ap	1 Chert Flake
	II	26-36	B	NCM
+ 10ft South	I	0-26	Ap	1 Chert Flake
	II	26-36	B	NCM
+ 3ft South	I	0-25	Ap	1 Chert Flake
	II	25-35	B	NCM
+ 10ft East	I	0-27	Ap	6 Chert Flakes
	II	27-37	B	NCM
+ 3ft East	I	0-26	Ap	1 Chert Flake
	II	26-36	B	NCM
+ 3ft West	I	0-23	Ap	1 Chert Flake
	II	23-33	B	NCM

3.2.2.2 STP B 4

Two positive radials were identified of the eight radials excavated around STP B 4 (Table 3-7). All cultural material was recovered from the plow zone. No cultural material (NCM) was recovered from the B horizon. No temporally diagnostic artifacts were recovered; no cultural affiliations were identified. No features or portions of features were encountered.

Table 3-7: STP B 4 – Positive Radial STPs

Radial STP	Stratum	Depths in cm	Horizon	Artifacts
+ 10ft South	I	0-26	Ap	2 chert flakes, 1 bolt
	II	26-36	B	NCM
+ 10ft East	I	0-27	Ap	1 chert flake
	II	27-37	B	NCM

3.2.2.3 STP C 3

Seven positive radials were identified of the eight radials excavated around STP C 3 (Table 3-8). The only negative radial was 3 meters north (STP C 4+10N). All cultural material was recovered from the plow zone. No cultural material (NCM) was recovered from the B horizon. No temporally diagnostic artifacts were recovered; no cultural affiliations were identified. No features or portions of features were encountered.

Table 3-8: STP C 3 – Positive Radial STPs

Radial STP	Stratum	Depths in cm	Horizon	Artifacts
+ 3ft North	I	0-30	Ap	1 Chert Flake
	II	30-40	B	NCM
+ 10ft South	I	0-27	Ap	2 Chert Flakes
	II	27-37	B	NCM
+ 3ft South	I	0-29	Ap	2 Chert Flakes
	II	29-39	B	NCM
+ 10ft East	I	0-28	Ap	1 Chert Flake
	II	28-38	B	NCM
+ 3ft East	I	0-33	Ap	4 Chert Flakes
	II	33-43	B	NCM
+ 10ft West	I	0-27	Ap	1 Chert Flake
	II	27-37	B	NCM
+ 3ft West	I	0-34	Ap	5 Chert Flakes
	II	34-44	B	NCM

3.2.2.4 STP D 2

Seven positive radials were identified of the eight radials excavated around STP D 2 (Table 3-9). The only negative radial was 3 meters north (STP D 2+10N). All cultural material was recovered from the plow zone. No cultural material (NCM) was recovered from the B horizon. No temporally diagnostic artifacts were recovered; no cultural affiliations were identified. No features or portions of features were encountered.

STP D 2 was the northernmost positive STP on the upland landform. The original shovel test was isolated from the surrounding positive tests by 30 meters (100 feet) to the south (Figure 2-1).

Table 3-9: STP D 2 – Positive Radial STPs

Radial STP	Stratum	Depths in cm	Horizon	Artifacts
+ 3ft North	I	0-30	Ap	4 Chert Flakes, 1 nail, 1 redware fragment
	II	30-40	B	NCM
+10ft South	I	0-23	Ap	3 Chert Flakes
	II	23-33	B	NCM
+ 3ft South	I	0-27	Ap	1 Chert Flake
	II	27-37	B	NCM
+ 10ft East	I	0-22	Ap	3 Chert Flakes, 2 nails
	II	22-32	B	NCM
+ 3ft East	I	0-27	Ap	3 Chert Flakes
	II	27-37	B	NCM
+ 10ft West	I	0-26	Ap	5 Chert Flakes
	II	26-36	B	NCM
+ 3ft West	I	0-23	Ap	5 Chert Flakes, 2 nail fragments
	II	23-32	B	

3.2.2.5 STP D 4

Six positive radials were identified of the eight radials excavated around STP D 4 (Table 3-10). All cultural material was recovered from the plow zone. No cultural material (NCM) was recovered from the B horizon. No temporally diagnostic artifacts were recovered; no cultural affiliations were identified. No features or portions of features were encountered.

Table 3-10: STP D 4 – Positive Radial STPs

Radial STP	Stratum	Depths in cm	Horizon	Artifacts
+ 3ft North	I	0-45	Ap	2 Chert Flakes
	II	45-55	B	NCM
+ 3ft South	I	0-35	Ap	2 Chert Flakes, 1 flat glass fragment
	II	35-45	B	NCM
+ 10ft East	I	0-34	Ap	1 Chert Flake
	II	34-44	B	NCM
+ 3ft East	I	0-34	Ap	1 Chert Flake

	II	34-44	B	NCM
+ 10ft West	I	0-44	Ap	1 Chert Flake, 1 glass sherd
	II	44-54	B	NCM
+ 3ft West	I	0-41	Ap	3 Chert Flakes
	II	41-51	B	NCM

3.2.2.6 STP D 5

Two positive radials were identified of the eight radials excavated around STP D 5 (Table 3-11). One radial yielded one precontact chert flake; and the second positive radial yielded one historic white ball clay smoking pipestem fragment. The historic clay pipestem was collected as representative of the historic occupation of the area. STP D 5 was located at the base of the slope from the upland plateau, and it is very possible that the one chert flake recovered from radial STP D 5 +10ft N washed down from the upland.

The cultural material was recovered from the plow zone. No cultural material (NCM) was recovered from the B horizon. No features or portions of features were encountered.

Table 3-11: STP D 5 – Positive Radial STPs

Radial STP	Stratum	Depths in cm	Horizon	Artifacts
+ 10ft North	I	0-30	Ap	1 Chert Flake
	II	30-40	B	NCM
+ 10ft West	I	0-26	Ap	1 Clay Pipestem
	II	26-36	B	NCM

3.2.2.7 STP F 5

No positive radials were identified among the eight radials excavated around STP F 5.

3.2.2.8 STP F 8

Five positive radials were identified of the eight radials excavated around STP F 8 (Table 3-12). All cultural material was recovered from the A horizon. No cultural material (NCM) was recovered from the B horizon. No temporally diagnostic artifacts were recovered; no cultural affiliations were identified. No features or portions of features were encountered.

Table 3-12: STP F 8 – Positive Radial STPs

Radial STP	Stratum	Depths in cm	Horizon	Artifacts
+ 10ft North	I	0-32	A	3 Chert Flakes
	II	32-42	B	NCM
+10ft South	I	0-27	A	3 Chert Flakes
	II	27-37	B	NCM
+ 3ft South	I	0-37	A	1 Chert Flake
	II	37-47	B	NCM
+ 10ft East	I	0-29	A	1 Chert Flake
	II	29-39	B	NCM

+ 10ft West	I	0-31	A	1 Chert Flake
	II	31-41	B	NCM

3.2.2.9 STP J 2

Three positive radials were identified of the eight radials excavated around STP J 2 (Table 3-13). One radial yielded one precontact chert flake; the second positive radial yielded four precontact chert flakes; and third radial yielded a partial argillite projectile point. This artifact is not dated.

All cultural material was recovered from the plow zone. No cultural material was recovered from the B horizon subsoil. No features or portions of features were encountered.

Table 3-13: STP J 2 – Positive Radial STPs

Radial STP	Stratum	Depths in cm	Horizon	Artifacts
+ 3ft South	I	0-25	Ap	1 Argillite partial Projectile Point
	II	25-40	B	NCM
+ 3ft East	I	0-24	Ap	4 Chert Flakes
	II	24-40	B	NCM
+ 10ft West	I	0-25	Ap	1 Chert Flake
	II	25-40	B	NCM

3.2.2.10 STP J 5

Two positive radials were identified of the eight radials excavated around STP J 5 (Table 3-14). Both the radials yielded one precontact chert flake.

The cultural material was recovered from the plow zone. No cultural material (NCM) was recovered from the B horizon. No features or portions of features were encountered.

Table 3-14: STP J 5 – Positive Radial STPs

Radial STP	Stratum	Depths in cm	Horizon	Artifacts
+ 3ft North	I	0-23	Ap	1 Chert Flake
	II	23-38	B	NCM
+ 3ft South	I	0-28	Ap	1 Chert Flake
	II	28-40	B	NCM

3.3 Laboratory Results

A total of 116 artifacts were recovered from 42 STPs excavated during the July 2021 Phase IB survey. Of this total, 101 were precontact artifacts and 15 were historic artifacts. The supplemental Phase IB survey conducted in October 2021 yielded a total of 14 artifacts from seven STPs. Of this total, 12 were precontact artifacts and two were historic artifacts.

3.3.1 Precontact Artifact Analysis

Artifacts recovered from the C&D Power Systems Site Sediment Removal Project were transported to the AECOM archaeological laboratory in Burlington, New Jersey for washing, cataloguing, identification, and analysis. Positive STP proveniences were assigned field specimen numbers (FS#s) during the fieldwork phase, and these numbers were carried over into the laboratory tasks. All artifacts were given successive entry numbers within the FS #s during cataloguing.

3.3.1.1 Precontact Artifact Categories

Precontact artifacts were analyzed and cataloged based on the following database categories: group, subgroup, class, material type, and object type. Groups include: debitage, cores, fire-cracked rock, storage/cooking, and tools. These groups were further divided into applicable subgroups: biface, uniface, core, cobble, and ground stone. Precontact database classes include ceramic, lithic, glass, metal, fauna, and flora. Object types were determined based on artifact morphology and potential function. Metric and non-metric attributes were recorded during analysis based on object type assignation. All recovered artifacts were counted and weighed. Weight was recorded to the nearest 0.1 gram (g) using a calibrated digital scale. The information from laboratory analyses was entered into a Microsoft Access database designed to facilitate the generation of artifact tables.

Artifact Groups:

Debitage

Lithic debitage, the detritus from the manufacture of stone tools, was analyzed using a typological approach in order to better understand the types of lithic reduction activities occurring on site (Andrefsky 2005:114, Odell 2003:121-122). Complete flakes and platform remnant bearing flakes (Magne and Pokotylo 1981) were assessed using attributes such as striking platform type, flake morphology, termination type, dorsal flake scar count, and the presence or absence of cortex. Based on these characteristics, debitage was classified into the following technological types: decortication flakes, early reduction flakes, bifacial thinning flakes, trimming (i.e., pressure) flakes, blade flakes, and bipolar flakes (Andrefsky 2005; Shott 1994). Nondiagnostic flake types include indeterminate flakes, flake fragments, and shatter.

Debitage attributes recorded for this analysis include weight, flake condition (i.e., whole or fragmentary), lithic raw material, cortex type, cortex cover (%), thermal alteration, and size class. Cortex was classified as block, cobble, or absent. Blocky cortex consists of weathered rind and other coarse surfaces that are typically found on lithic material recovered from primary outcrops. Cobble cortex describes the smooth, rounded surface found on natural river cobbles. Thermal alteration of debitage was recorded as reddened, potlidded, crazed, or absent. Debitage size was determined using a series of circles with graduated diameters. Size classes begin at 1-5 millimeter (mm) and increase in 5 mm increments. This provides a general and relative characterization of debitage sizes rather than an exact measurement of length and width.

Tools and Cores

Flake tools are classified based on morphology, metric attributes, and non-metric attributes (Andrefsky 2005; Odell 2003). Metric attributes include maximum length, maximum width, maximum thickness, and weight. Non-metric attributes include condition, lithic raw material, cortex type, cortex cover, and thermal alteration. Based on these attributes and tool morphology, unifacial flake tools were classified into the following types: denticulates, end scrapers, gravers, side scrapers, spokeshaves, utilized flakes, and retouched flakes.

Bifaces are classified based on morphology, metric attributes, and non-metric attributes (Andrefsky 2005; Callahan 2000; Odell 2003). Metric attributes include maximum length, maximum width, maximum thickness, and weight. Non-metric attributes include condition, lithic raw material, cortex type, cortex cover, thermal alteration, and reduction stage. Based on these attributes and artifact morphology, bifaces were grouped into the following types: early stage bifaces, middle stage bifaces, late stage bifaces, drills, projectile points, and other bifaces.

Projectile points (i.e., hafted bifaces) are classified using regional typologies outlined by Ritchie (1971) and discussed in Justice (1987). Metric attributes recorded include weight, maximum thickness, maximum length, and maximum width. Non-metric attributes include raw material, cortex type, cortex cover, thermal alteration, and haft shape. Diagnostic features evident from the haft and blade elements were used to determine the nature and ages of the various point types recovered from controlled excavations

Cores are classified based on morphology and the orientation of flake removals (Andrefsky 2005; Odell 2003). Metric attributes recorded include maximum length, maximum width, maximum thickness, and weight. Non-metric attributes include condition, lithic raw material, cortex type, cortex cover, and thermal alteration. Cores are classified into the following types: bifacial cores, bipolar cores, multidirectional cores, unidirectional cores, and tested cobbles.

Cobble and ground stone tools were classified based on morphology and implied function. The type of modification, degree of use, and kinetics of the tool were examined macroscopically. Metric attributes recorded include weight, maximum

thickness, maximum length, and maximum width. Non-metric attributes recorded include lithic raw material, cortex type, cortex cover, and evidence of thermal alteration.

Fire Cracked Rock

Fire-cracked rock (FCR) includes lithic material that displayed cracks, fractures, and reddening caused by thermal alteration. Fire-cracked rocks are the byproducts of lithic materials being heated in hearths, earth-ovens, and boiling containers (Black and Thoms 2014). Fire-cracked rock were identified based on thermal reddening and sharp angular fractures. These materials were sorted by lithic raw material type, counted, and weighed.

3.3.1.2 Precontact Analysis Results

A total of 113 precontact lithic artifacts were recovered during field investigations for the C&D Power Systems Site Sediment Removal Project (Table 3-15). The precontact artifact assemblage includes FCR (*n*=7), debitage (*n*=103), a partial projectile point (n=1), a manuport (*n*=1), and a unifacial stone tool (*n*=1). All artifacts were recovered from Ap and A horizon contexts. No precontact features such as hearths, storage pits or earth ovens for cooking were identified during the Phase IB STP survey.

Table 3-15: Precontact Artifact Totals

H/P	Group	Class	Count
Precontact	FCR	Lithic	7
Precontact	Debitage	Lithic	103
Precontact	Tool	Lithic	2
Precontact	Unmodified	Lithic	1

Precontact artifact concentrations were most prominent in STP B3+10ft E (*n*=6), STP C3 (*n*=7), STP C3+3ft W (*n*=5), STP D2 (*n*=5), STP D2+3ft W (*n*=5), and STP D2+10ft W (*n*=5) (Table 2). Artifact concentrations were predominantly comprised of flakes and flake fragments. STP C3+3ft W included the only flake tool recovered from the site. STP J 2+3 ft South yielded the only projectile point (partial) recovered. Fire-cracked rocks were most common in STP F8+10ft S (*n*=2) and recovered in smaller amounts from STP B4, STP C3, STP D2, and STP D5.

Table 3-16: Precontact Artifact Totals by STP

STP #	H/P	Group	Count
B 3	Precontact	Debitage	1
B 3+10ft E	Precontact	Debitage	6
B 3+10ft S	Precontact	Debitage	1
B 3+3ft E	Precontact	Debitage	1
B 3+3ft N	Precontact	Debitage	2
B 3+3ft S	Precontact	Debitage	1
B 3+3ft W	Precontact	Debitage	1
B 4	Precontact	FCR	1
B 4	Precontact	Debitage	2
B 4+10ft E	Precontact	Debitage	1

B 4+10ft S	Precontact	Debitage	2
C 3	Precontact	FCR	1
C 3	Precontact	Debitage	5
C 3	Precontact	Unmodified	1
C 3+10ft E	Precontact	Debitage	1
C 3+10ft S	Precontact	Debitage	2
C 3+10ft W	Precontact	Debitage	1
C 3+3ft E	Precontact	Debitage	4
C 3+3ft N	Precontact	Debitage	1
C 3+3ft S	Precontact	Debitage	2
C 3+3ft W	Precontact	Debitage	4
C 3+3ft W	Precontact	Tool	1
D 2	Precontact	FCR	1
D 2	Precontact	Debitage	4
D 2+10ft E	Precontact	Debitage	3
D 2+10ft S	Precontact	Debitage	3
D 2+10ft W	Precontact	Debitage	5
D 2+3ft E	Precontact	Debitage	3
D 2+3ft N	Precontact	Debitage	4
D 2+3ft S	Precontact	Debitage	1
D 2+3ft W	Precontact	Debitage	5
D 4	Precontact	Debitage	1
D 4+10ft E	Precontact	Debitage	1
D 4+10ft W	Precontact	Debitage	1
D 4+3ft E	Precontact	Debitage	1
D 4+3ft N	Precontact	Debitage	2
D 4+3ft S	Precontact	Debitage	2
D 4+3ft W	Precontact	Debitage	3
D 5	Precontact	FCR	1
D 5	Precontact	Debitage	2
D 5+10ft N	Precontact	Debitage	1

F 5	Precontact	Debitage	3
F 8	Precontact	Debitage	3
F 8+10ft E	Precontact	Debitage	1
F 8+10ft N	Precontact	Debitage	3
F 8+10ft S	Precontact	FCR	2
F 8+10ft S	Precontact	Debitage	1
F 8+10ft W	Precontact	Debitage	1
F 8+3ft S	Precontact	Debitage	1
J 2	Precontact	FCR	1
J 2	Precontact	Debitage	2
J 2+3 ft S	Precontact	Tool	1
J 2+3 ft E	Precontact	Debitage	4
J 2+10 ft W	Precontact	Debitage	1
J 5	Precontact	Debitage	2
J 5+3 ft N	Precontact	Debitage	1
J 5+3 ft S	Precontact	Debitage	1

A total of four lithic raw material types were identified in the flaked stone assemblage including chalcedony (*n*=6), chert (*n*=87), argillite (n=1), and sandstone (*n*=1) (Table 3-17). Lithic debitage analysis identified bifacial thinning flakes (*n*=34), trimming flakes (*n*=10), bipolar reduction flakes (*n*=1), decortication flakes (*n*=2), early reduction flakes (*n*=5), indeterminate flakes (*n*=4), and flake fragments (*n*=47).

Bifacial thinning and trimming flakes represent the majority of technologically diagnostic debitage and include chalcedony (*n*=2) and chert (*n*=44) raw materials. The prevalence of these flake types indicates that late stage reduction of bifaces was a primary knapping activity occurring on site.

Decortication and early reduction flakes were comprised of chert (*n*=5) and sandstone (*n*=1) raw materials. Chert and sandstone flakes derived from early stage reduction activities exhibited cobble cortex indicating a local source. A single chert bipolar flake recovered from radial STP D 4+3ft West provides evidence that bipolar lithic reduction was practiced on site to some extent.

Flaked stone tools in the artifact assemblage include a single chert utilized flake recovered from radial STP C 3+3ft West. The unifacial stone tool exhibited evidence of utilization along its left lateral margin and measured 24 mm long, 27.5 mm wide, 4 mm thick, and weighed 2.1 g. One partial argillite projectile point was recovered from radial STP J 2+3 ft North. This partial point was broken on the distal and proximal ends, and exhibited a random flake pattern on both the dorsal and ventral faces. It measures 45 mm in length, 20.6 mm in width, and 6.2 mm in thickness, and is composed of gray/green argillite.

Fire-cracked rock was limited to quartzite (*n*=2) and sandstone (*n*=5) lithic raw material types. River-rounded cobble cortex present on FCR indicates that they were procured from a local secondary source. A single sandstone cobble manuport was also recovered. In archaeology, a manuport is a natural object which has been moved from its original context by human agency but otherwise remains unmodified.

Table 3-17: Precontact Artifact Totals by Object and Material Types

Object	Group	Chalcedony	Argillite	Chert	Quartzite	Sandstone	Total
Bifacial Thinning Flake	Debitage	1		33			33
Trimming Flake	Debitage	1		9			10
Bipolar Reduction Flake	Debitage			1			1
Decortication Flake	Debitage			1		1	2
Early Reduction Flake	Debitage			5			5
Indeterminate Flake	Debitage	1		3			4
Flake Fragment	Debitage	3		44			47
Projectile Point	Tool		1				1
Utilized Flake	Tool			1			1
Cobble	Unmodified					1	1
FCR	FCR				2	5	7
Total		**6**		**87**	**2**	**6**	**113**

3.3.1.3 Discussion and Conclusions

Phase IB field investigations for the C&D Power Systems Site Sediment Removal Project produced a precontact artifact assemblage comprised of lithic debitage, FCR, a partial projectile point, and a utilized flake tool. Debitage analysis indicates that concentrations of flaked stone were primarily associated with late stage lithic reduction activities. Small amounts bipolar lithic reduction debris and early stage reduction flakes were also recovered. Bipolar reduction debris suggests reworking/sharpening of existing or broken tools, and early stage reduction evidence suggests attempts at making new tools from flakes taken off a cortex. Cobble cortex present on chert debitage suggests that some lithic raw material was locally available and/or recently procured. Fire-cracked rocks of quartzite and sandstone indicate the potential for hot-rock cooking (i.e., earth ovens) or heating facilities (i.e., hearths) in the area, although no such features were identified in the field.

The C&D Power Systems Site precontact deposits were not assigned any chronological or cultural affiliations as diagnostic projectile points and pottery were absent from the assemblage.

3.3.2 Historic Artifact Analysis

The 15 historic artifacts were recovered from 10 STPs within the Survey Area during the July 2021 survey. These STPs were located along Transects B, C, and D, and all material was recovered from the plow zone. Most historic artifacts were recovered from seven STPs (including radial STPs) along Transect D. As detailed in Table 3-15, Artifact Groups include Architectural, Electrical, Household, Personal, and Indeterminate. Two historic artifacts were recovered from two STPs during the October 2021 survey. A metal animal bell was identified from STP K 2, and one white ball clay smoking pipe pipestem fragment was recovered from STP L 3.

Identified objects include cut nail fragments (*n*=2), complete wire nail (*n*=1), probable wire nail fragments (*n*=4), rusted, unidentified nail fragments (*n*=2), window glass fragments (*n*=2), modern bottle glass fragment (*n*=1), electrical wire housing portion (*n*=1), redware ceramic sherd (*n*=1), metal animal bell (*n*=1), and white ball clay smoking pipe pipestem fragment (*n*=2). All historic artifacts except for the pipestem fragment were recovered from the plow zone in association with precontact artifacts during the July 2021 survey.

It is not possible to assign discrete dates to these artifacts. The date ranges for the identified cut nail and wire nail fragments are too broad to be of utility. Although iron nails and nail fragments are common on practically all historic sites, it is a difficult class of artifact to date with any certainty. This is particularly true in the case of cut nails, or hand wrought nails, where the state of preservation must be such that the head and shaft are relatively intact. For the C&D Power Systems assemblage, it is not possible due to breakage and corrosion.

The electrical housing and modern bottle glass fragment represent modern 20th through 21st century debris. The window glass fragments identified do not possess any attributes to assist in dating. Historic ceramics are usually the most reliable dating indicators on historic sites. However, the one redware sherd identified in the assemblage does not possess any diagnostic attributes to assist in dating.

The one pipestem fragment from the July 2021 survey exhibited a bore diameter of 5/64th inch, which may be interpreted as dating from 1710-1750, based on the work of J. C. Harrington and Lewis Binford, and others, and noted in Ivor Noel Hume's reference standard, *A Guide To Artifacts of Colonial America.* However, the bracketed date ranges for pipestem bore diameters were developed by applying a regression formula based on the analysis of thousands of stem fragments. The lone pipestem from this assemblage is far too small a sample to be statistically valid.

Table 3-18: Historic Artifacts by STP

STP	LEVEL	CT.	GROUP	CLASS	MATERIAL	OBJECT	COLOR	NOTES
B4	1	1	Architectural	Metal	Iron	Nail fragment	Rusted	Cut nail
B4+10ft S	1	1	Electrical	Metal	Iron	Fragment		Wire Housing w/wire
C3+3ft W	1	1	Architectural	Glass	Common glass	Window glass fragment	Aqua	Flat fragment
D2+10ft E	1	2	Architectural	Metal	Iron	Nail Fragments	Rusted	Probable wire nail
D2+3ft N	1	1	Household	Ceramic	Coarse earthenware	Body sherd	Brown	Lead glazed
D2+3ft N	1	1	Architectural	Metal	Iron	Nail Fragment		Cut nail
D2+3ft S	1	2	Architectural	Metal	Iron	Nail, complete		Wire
D2+3ft S	1	2	Architectural	Metal	Iron	Nail fragment	Rusted	Unident. type
D2+3ft W	1	2	Architectural	Metal	Iron	Nail fragments	Rusted	Probable wire nail
D4+10ft W	1	1	Household	Glass	Common glass	Curved bodysherd	Green	Probable beverage bottle
D4+3ft S	1	1	Architectural	Glass	Non-lead glass	Window glass fragment	Colorless	Flat fragment
D5+10ft W	1	1	Personal	Ceramic	Refined earthenware	Smoking Pipe	White ball clay	5/64-inch bore

						Pipestem fragment		
K 2	1	1	Not Determined	Metal	White Metal	Bell		Animal Bell
L 3	1	1	Personal	Ceramic	Refined earthenware	Smoking Pipe Pipestem Fragment	White ball clay	

In summary, the historic artifacts identified in the C&D Power Systems assemblage represent a scatter of material over a broad portion of the Survey Area. These artifacts are most likely representative of the nearby historic 19th century Swartwout farmstead.

4. Conclusions

4.1 Summary of Results

The Phase IB subsurface testing survey of the C & D Power Systems Site in Huguenot, New York consisted of manual testing on a 15-meter (50-foot) pre-plotted grid (Figure 2-1). The 15-meter (50-foot) grid across the Survey Area of the Archaeological APE consisted of seven transects labeled Transect A through Transect G during the July 2021 Phase 1B STP survey and six transects labeled Transect I through Transect M during the October 2021 Supplemental Phase 1B STP survey. The lengths of the transects varied across the Survey Area; therefore, the number of pre-plotted STPs along each transect varied as well (Figure 2-1).

During the July 2021 Phase IB STP survey, a total of 45 STPs were pre-plotted along the seven transects. Due to field conditions at the time of the Phase IB survey, five of the 45 STPs were not excavated. Of the 40 STPs excavated, eight were positive for cultural material. Therefore, two radial arrays in the four cardinal directions, one at 1 meter (3 feet) and the second at 3 meters (10 feet), were excavated around each positive STP, in compliance with SHPO guidelines. A total of 64 radial STPs were excavated. Thirty four of the 64 radials were also positive for cultural material. The total number of STPs excavated during the July 2021 Phase IB STP survey is 104.

During the October 2021 Supplemental Phase 1B STP survey, a total of 21 STPs were pre-plotted along six transects labeled Transect H through Transect M. Of the 21 STPs excavated, two were positive for cultural material. Each positive STP location was further investigated through the excavation of eight radial STPs, for a total of 16. Therefore, the total number of STPs excavated during the Supplemental Phase IB STP survey is 37. Five of the 16 radial STPs were also positive for cultural material. No temporally or culturally diagnostic artifacts were recovered in any of the positive STPs. No features or portions of features were encountered during the survey. The results of the STP survey are depicted on Figures 3-1a through 3-1d, indicating which were negative for cultural material and which were positive for precontact artifacts, historic artifacts, or both precontact and historic artifacts. Figures 3-2a through 3-2d depict the STP results with the proposed components of the sediment removal plan as an overlay.

No cultural material was recovered from the 11 pre-plotted STPs along Transect A (Figure 2-1), which included the footprint of the proposed Decontamination Pad and the proposed Access Road leading from the Decontamination Pad to Swartwout Road (Figure 3-2b). This portion of the Survey Area has no archaeological sensitivity.

The majority of the positive STPs (along Transects B, C, and D) are located along the southern end spanning approximately 45-meters (150-feet) east to west from Transect D to Transect B, and 60-meters (200-feet) north to south along Transect D. All artifacts were recovered from the plow zone along Transects B, C, D, and J.

No cultural material was recovered from the one STP excavated along Transect E (STP E 3). Three STPs were pre-plotted (Figure 2-1), but two (STPs E 1 and E 2) were found to be located on a slope of approximately 20 percent and were not excavated.

Positive STPs F 5 and F 8 were located in the lowland area in the northern portion of the Survey Area. Both positive STPs lie within the route of the proposed Access Road that runs along the Tributary D-1-7 within the northern extent of the APE (Figure 3-2a). No positive radials were associated with positive STP F 5. Five of eight radial STPs associated with positive STP F 8 were also positive for cultural material.

Transect G included two pre-plotted STP locations (Figure 2-1). These STPs were not excavated due to the amount of prior disturbance noted in the field.

Transect H consisted of one pre-plotted STP location (Figure 2-1). No cultural material was recovered from STP H 1.

Transect I include four pre-plotted STP locations (Figure 2-1). No cultural material was recovered from the four Transect I STPs.

Positive STPs J 2 and J5 are located in the northwestern and southwestern portion of the supplemental Survey Area, respectively, west of the proposed Water Treatment System Containment Area. Three and two radial STPs associated with positive STP J 2 and J5, respectively, were also positive for cultural material.

4.2 Artifact Analysis Results

Phase IB field investigations for the C&D Power Systems Site Sediment Removal Project produced a precontact artifact assemblage comprised of lithic debitage, FCR, a partial projectile point tool, and a utilized flake tool. One hundred and thirteen precontact artifacts were identified and analyzed.

Debitage analysis indicates that concentrations of flaked stone were primarily associated with late stage lithic reduction activities. Small amounts bipolar lithic reduction debris and early stage reduction flakes were also recovered. Bipolar reduction debris suggests reworking/sharpening of existing or broken tools and early stage reduction evidence suggests attempts at making new tools from flakes taken off a cortex. Cobble cortex present on chert debitage suggests that some lithic raw material was locally available and/or recently procured.

It is noted that no temporally or culturally diagnostic precontact artifacts such as complete projectile points or pottery sherds were recovered in any of the positive STPs. In other words, it was not possible to assign dates or tribal affiliations to the precontact artifacts recovered. In addition, no precontact features such as hearths, storage pits or earth ovens for cooking were identified during the Phase IB STP survey. However, fire-cracked rocks of quartzite and sandstone indicate the potential for hot-rock cooking (i.e., earth ovens) or heating facilities (i.e., hearths) in the area, although no such features were identified in the field.

The 17 historic artifacts recovered represent a scatter of cultural material over 10 STPs.

4.3 Areas of Archaeological Sensitivity

The Phase IB artifact analysis has indicated that there are five areas of archaeological sensitivity within the C&D Power Systems Site Sediment Removal Project Survey Area. The areas were identified based on the analysis of the artifacts recovered from the STP survey. Ten of the 61 STPs excavated along the 13 transects were positive for cultural material. Radial STPs were excavated around each positive STP, and 39 of the 80 radial STPs excavated were also positive for cultural material (Figures 3-1a and 3-1b). The results of the survey were also plotted with the sediment remediation plan as an overlay to depict which project components could impact potential archaeological resources (Figures 3-2a through 3-2d).

The five areas of archaeological sensitivity were delineated based on the positive STPs, with a 25-foot buffer surrounding each. The areas are shown on Figures 4-1a and 4-1b. The five areas of sensitivity are summarized as follows:

- **Area 1:** located in the northern portion of the Survey Area, and focused on positive STP F 8 on the west bank of the tributary, north of the agricultural fields. The extent of this area is delineated by documentation of no temporally or culturally diagnostic precontact artifacts at STP F 9 to the south, STP F7 to the north and the APE boundaries to the east and west of the location. STP F 8 is located within the route of the proposed Access Road.

- **Area 2:** located in the southeastern portion of the Survey Area, and includes positive STPs B 3, B 4, C 3, and D 2. All artifacts were recovered from the plow zone in Area 2. Each of the initial positive STPs are within 15 meters (50 feet) of each other along the transect grid. Subsequent to the completion of the Phase 1B sampling in July 2021, this area is now excluded from APE. The extent of this sensitive area is delineated by documentation of no temporally or culturally diagnostic precontact artifacts at STP C 5 , STP C 4 and APE boundary to the east, STP C 2 and STP B 2 to the north, STP B 3+10W and STP A11 to the west and the APE boundaries to the south of the location.

- **Area 3:** located in the southeastern portion of the Survey Area, closest to the southern terminus of the sediment removal zone, and includes positive STPs D 4 and D 5. Positive STP D 4 , STP D 5, and their radials are located in the proposed Access Road along the western bank of Tributary D-1-7, and the proposed route of diversion pipe in the Stream Diversion Corridor. The extent of this area is delineated by documentation of no temporally or culturally diagnostic precontact artifacts at STP D 6 to the south, STP D 1 to the north and the APE boundaries to the east and west of the location.

- **Area 4:** located in the southwestern portion of the supplemental Survey Area, and focused on positive STP J 5, west of the proposed Water Treatment System Containment Area. Radial STPs were excavated and three were positive for precontact cultural material. The extent of this area is delineated by documentation of no temporally

or culturally diagnostic precontact artifacts at STP J 5+3S to the south, STP J 5+3E to the east, STP J 5+3N to the north, and STP J 5+3W to the west.

- **Area 5:** located in the northwestern portion of the supplemental Survey Area, and focused on positive STP J 2, west of the proposed Sediment Staging, Mixing and Drying Area. Radial STPs were excavated and two were positive for precontact cultural material. The extent of this area is delineated by documentation of no temporally or culturally diagnostic precontact artifacts at STP J 2+3S to the south, STP J 2+3E to the east, STP J 2+3N to the north, and STP I 2 to the west.

4.4 Summary of Results

The areas of archaeological sensitivity identified by the Phase IB survey indicate precontact activity over much of the project area. Given the proximity of previously identified precontact site MRE-TRC-8 (07501.000148), it is probable that the precontact artifacts encountered during the Phase IB survey are associated with that site. Site MRE-TRC-8 (07501.000148) was first encountered and identified in 2016 as a multi-component site, having both precontact and historic components. The prehistoric component of the site consists of a lithic scatter concentrated in the southern portion of the site area. According to the mapping provided in the TRC report, this southern portion is in proximity to Sensitivity Areas 2 and 3 as identified along Transects B, C, and D through the 2021 Phase IB survey.

The artifact assemblages recovered from the 2016 TRC survey and the 2021 AECOM survey are similar in content. In total, 16 precontact artifacts, 15 historic artifacts, and one coal fragment were recovered from site MRE-TRC-8 (07501.000148). The 2016 precontact artifact sample consists of seven flake fragments, five pieces of angular shatter, three biface reduction flakes, and one biface thinning flake. Raw material types represented in the sample include chert (n=6), rhyolite (n=6) jasper (n=3), and chalcedony (n=1). The 2021 precontact artifact assemblage includes a total of four lithic raw material types that were identified in the flaked stone assemblage including chalcedony (*n*=6), chert (*n*=87), argillite (n=1), and sandstone (*n*=1). Lithic debitage analysis identified bifacial thinning flakes (*n*=34), trimming flakes (*n*=10), bipolar reduction flakes (*n*=1), decortication flakes (*n*=2), early reduction flakes (*n*=5), indeterminate flakes (*n*=4), and flake fragments (*n*=47). No cultural affiliation or date range was possible to determine for the precontact component, as no temporally or culturally diagnostic artifacts or features were recovered during the 2016 or the 2021 surveys.

The 2016 historic artifact sample consists of Architectural class (five window glass, three wire nails, one piece of wire, one iron bolt, and one iron spike), Domestic class (one brown container glass shard, one redware sherd, and one whiteware sherd), and Personal class (one metal button) artifacts. A total of 15 historic artifacts were recovered from 10 STPs within the Survey Area during the July 2021 survey. These STPs were located along Transects B, C, and D, and all material was recovered from the plow zone. Identified objects include cut nail fragments (*n*=2), complete wire nail (*n*=1), probable wire nail fragments (*n*=4), rusted, unidentified nail fragments (*n*=2), window glass fragments (*n*=2), modern bottle glass fragment (*n*=1), electrical wire housing portion (*n*=1), redware ceramic sherd (*n*=1), metal animal bell (*n*=1), and white ball clay smoking pipe pipestem fragment (*n*=2). All historic artifacts except for the pipestem fragment were recovered from the plow zone in association with precontact artifacts during the 2021 survey.

Site MRE-TRC-8 (07501.000148) was recommended as potentially eligible for listing in the National Register by TRC in 2016. A site avoidance plan was recommended by TRC.

AECOM has developed a Site Avoidance and Protection Plan, which includes a combination of relocating construction support elements from sensitive to non-sensitive areas, fencing off areas of sensitivity, and temporary construction matting atop areas of sensitivity that cannot be avoided.

The Site Avoidance and Protection Plan is discussed in detail in Section 5 Recommendations.

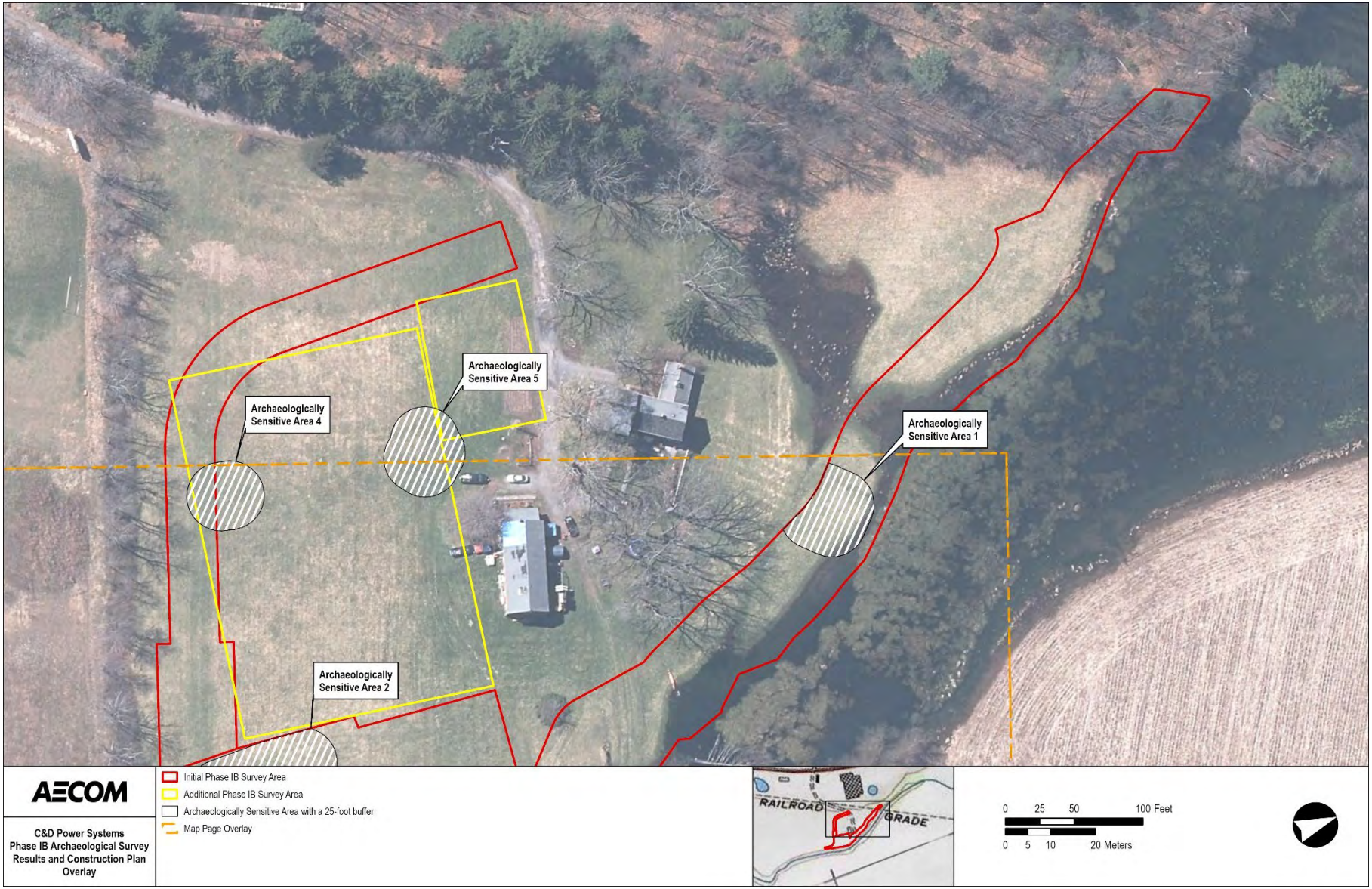

Figure 4-1a: Archaeologically Sensitive Areas 1, 4 and 5

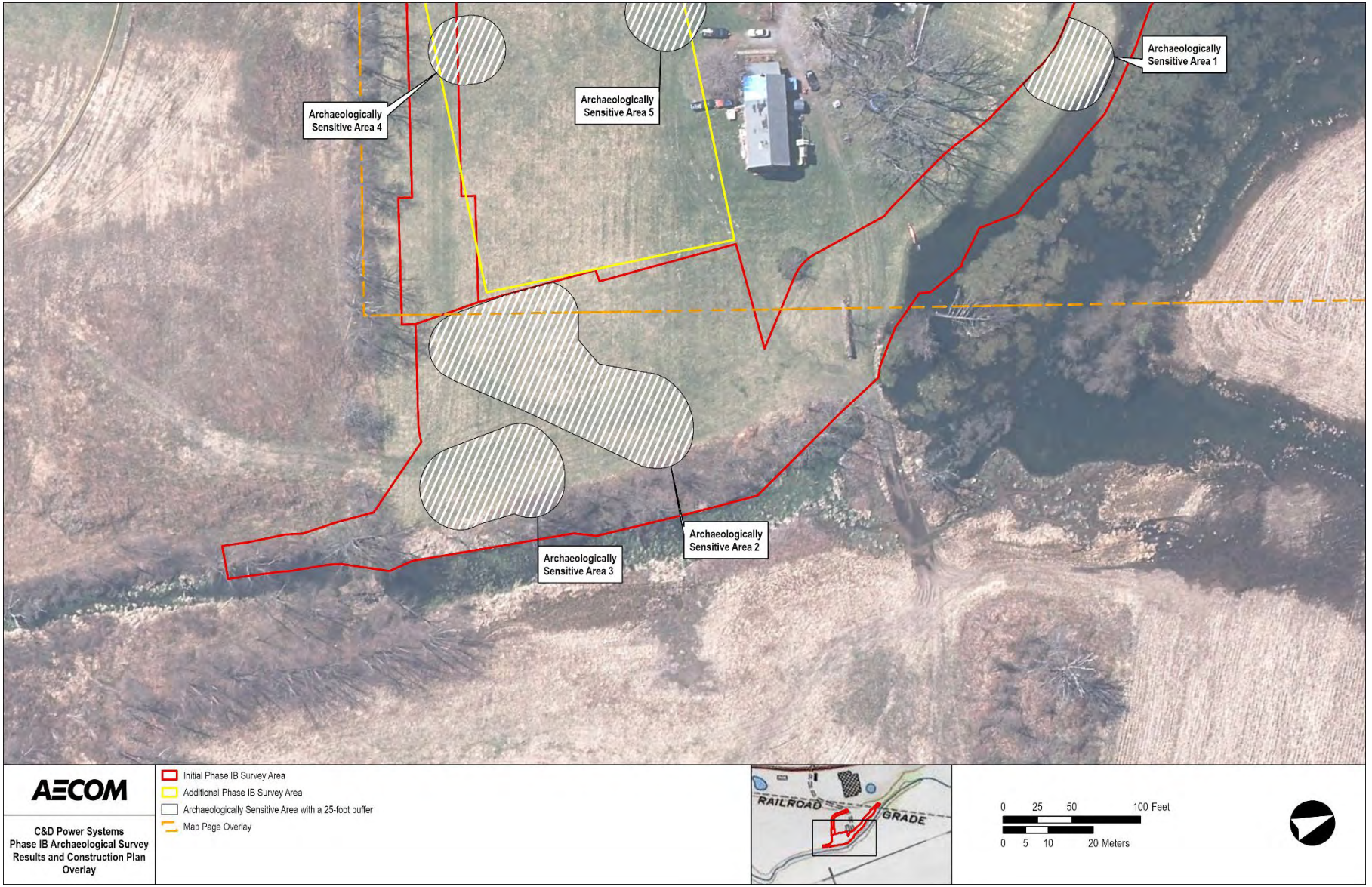

Figure 4-1b: Archaeologically Sensitive Areas 2 and 3

5. Recommendations

It has been established that the areas of sensitivity identified during the 2021 Phase IB survey are probably portions of previously identified Site MRE-TRC-8 (07501.000148). This site has been recommended as potentially eligible for listing in the National Register due to its research potential. Although potentially eligible, NYSDEC DER is not in the position to support further research under NYS Superfund Programs and thus supports an avoidance and protection plan should future research opportunities become available through coordination with SHPO.

Section 106 compliance process guidelines for the protection of archaeological resources include measures to protect archaeological resources in place. AECOM is proposing to relocate the Sediment Staging, Mixing and Drying Area, the Water Treatment System Containment Area, and portions of Access Roads to areas that do not possess sensitivity. In addition, a Site Avoidance and Protection Plan has been developed to preserve the integrity of potential archaeological deposits, including areas where relocation of project activity areas is not feasible.

5.1 Avoidance and Protection Plan for Sensitivity Area 1

The Avoidance and Protection Plan proposed for this area includes the placement of temporary construction mats over the entire delineated boundary of Sensitivity Area 1 (Figure 5-1a). The temporary construction matting would consist of interlocking, high-strength DURA BASE® composite material mats or equivalent that are designed for use in environmentally sensitive areas and, more specifically, to avoid ground disturbance and compaction impacts. All vehicle traffic at the project site would be accessed over the temporary construction matting using low-pressure, rubber tire vehicles. An excavator would be utilized to install the mats and would use an installation method by which the mats are installed ahead of the excavator to ensure that the excavator is always on top of the mats. The construction matting will be removed manually from ground surface once work is complete. A typical cross-section of the temporary construction mat is shown on Figure 5-1b. Technical data and specifications for DURA BASE® composite material mats are included in Attachment 1.

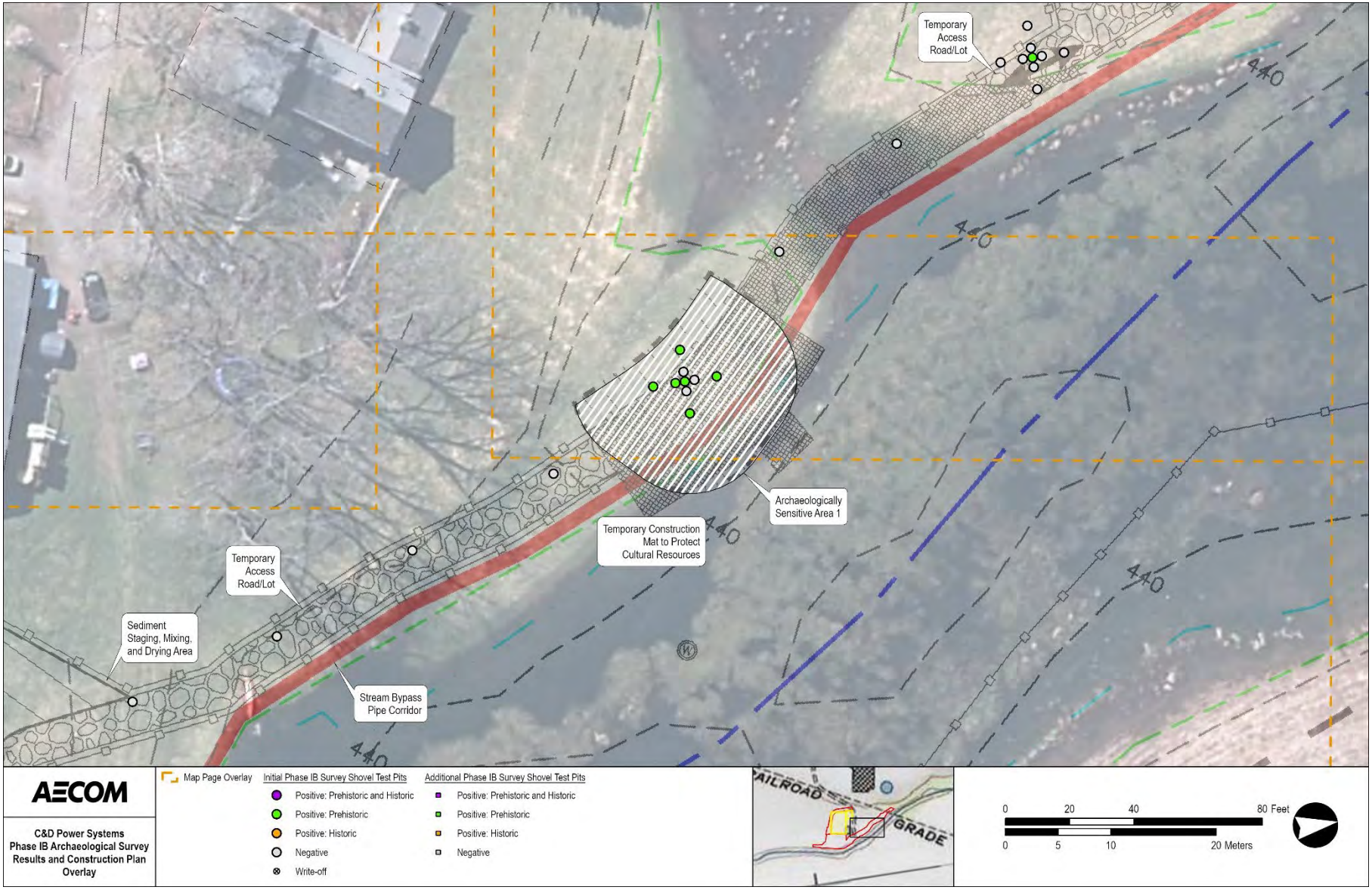

Figure 5-1a: Sensitivity Area 1 Survey Results and Avoidance Plan

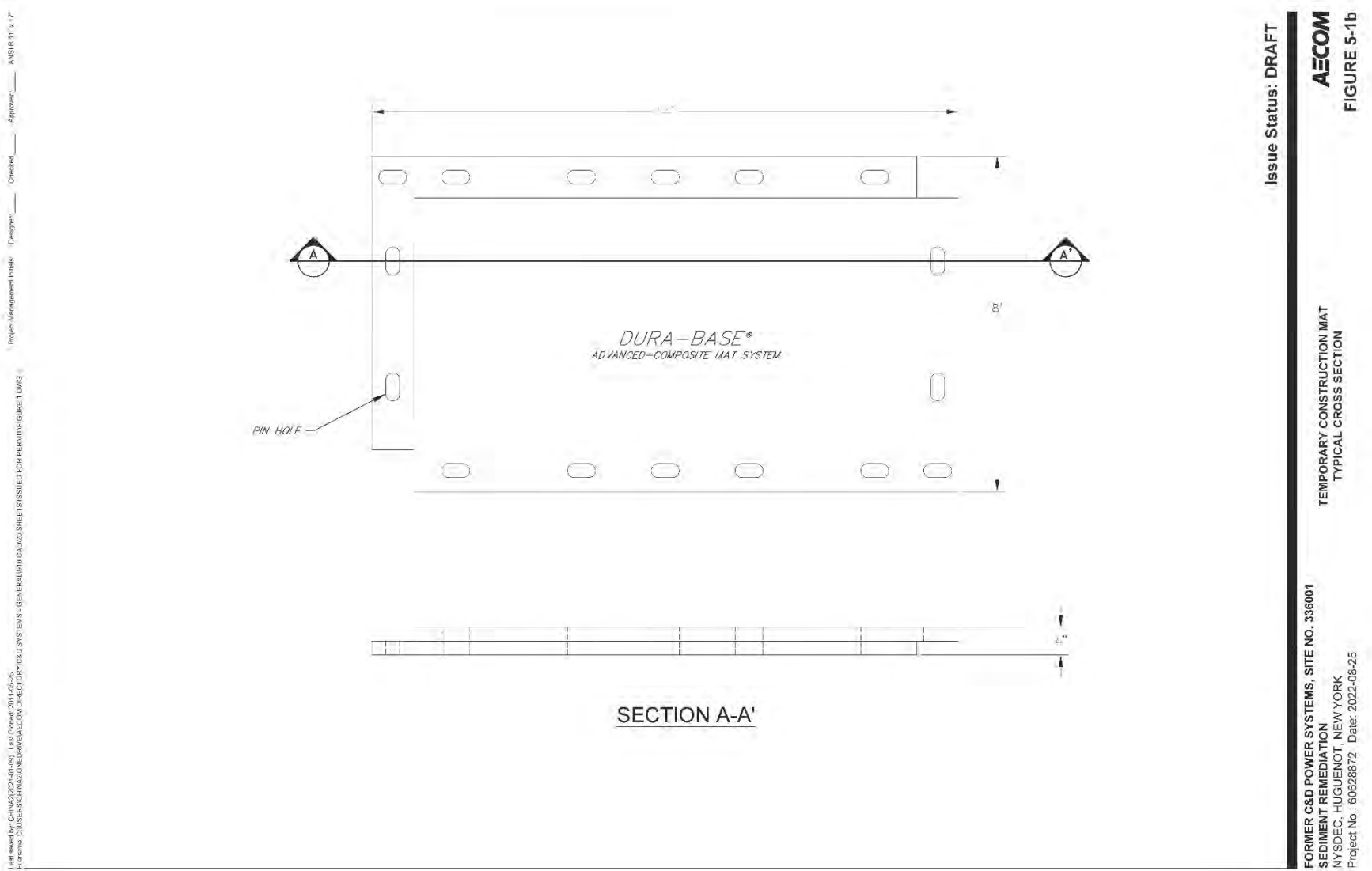

Figure 5-1b: Temporary Construction Mat Typical Cross Section

5.2 Avoidance and Protection Plan for Sensitivity Area 2

The avoidance and Protection Plan for Sensitivity Area 2 consists of a combination of engineering controls (Figure 5-2a). The Avoidance and Protection Plan proposed for this area includes installation of a chain link fence around the portion of Sensitivity Area 2 as described in Chapter 4. A typical cross-section of the chain link fence is shown on Figure 5-2b. In addition, AECOM has relocated the Sediment Staging, Mixing and Drying Area, the Water Treatment System Containment Area, and portion of Access Road further west to areas that do not possess sensitivity. The entire width of the proposed Access Road along the west bank of Tributary D-1-7, at the eastern boundary of Sensitivity Area 2, will be protected by temporary construction matting (Figure 5-1b) continuing northward from the temporary construction matting protecting Sensitivity Area 3. The temporary construction matting would consist of interlocking, high-strength DURA BASE® composite material mats or equivalent that are designed for use in environmentally sensitive areas and specifically to avoid ground disturbance and compaction impacts. Any vehicle traffic work site would be accessed over the construction matting using low-pressure, rubber tire vehicles. An excavator would be required to install the mats and would use an installation method by which the mats are installed ahead of the excavator and thus the excavator is always on top of the mats. The construction matting will be removed manually from ground surface once work is complete.

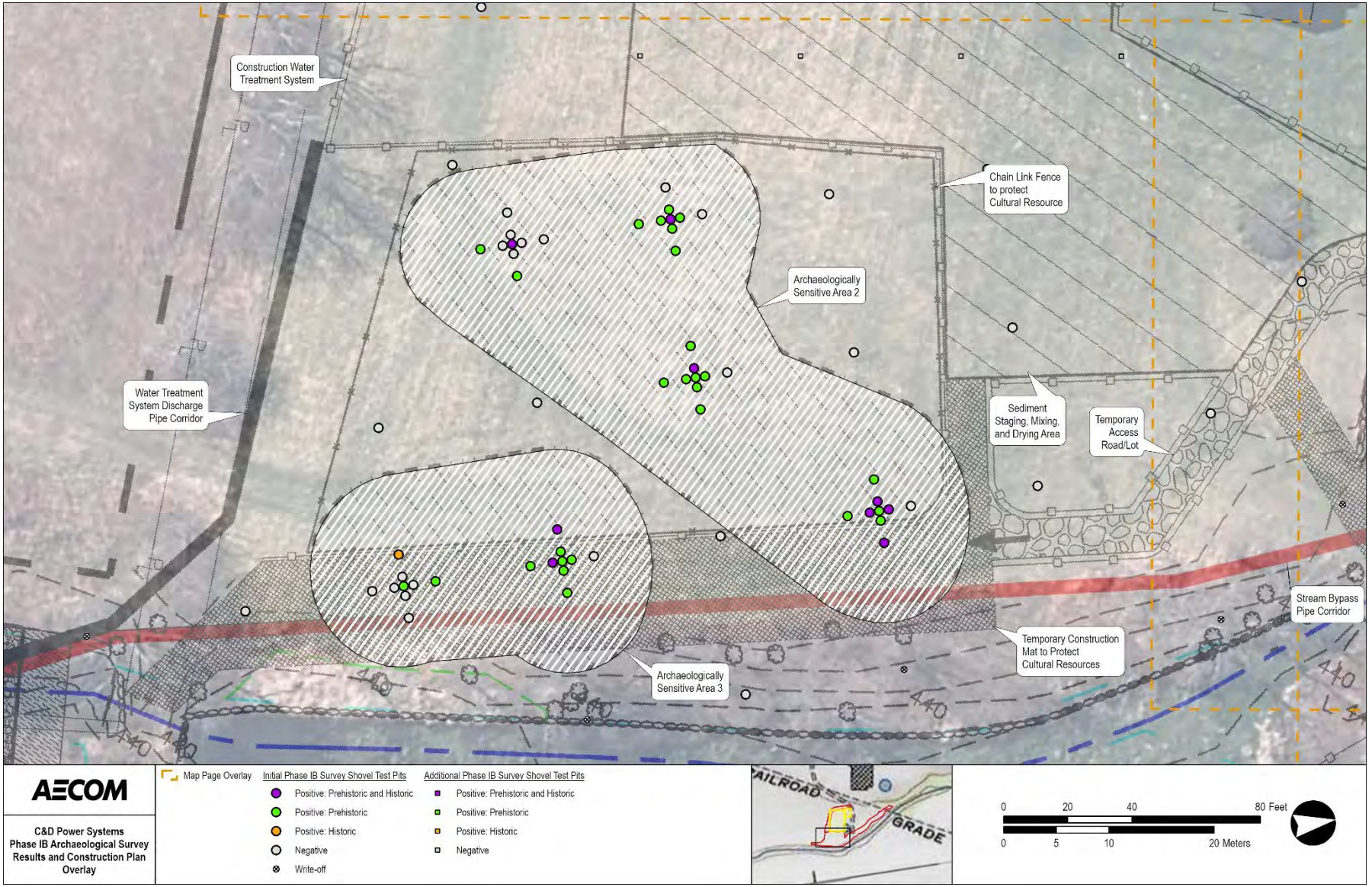

Figure 5-2a: Sensitivity Area 2 Survey Results and Avoidance Plan

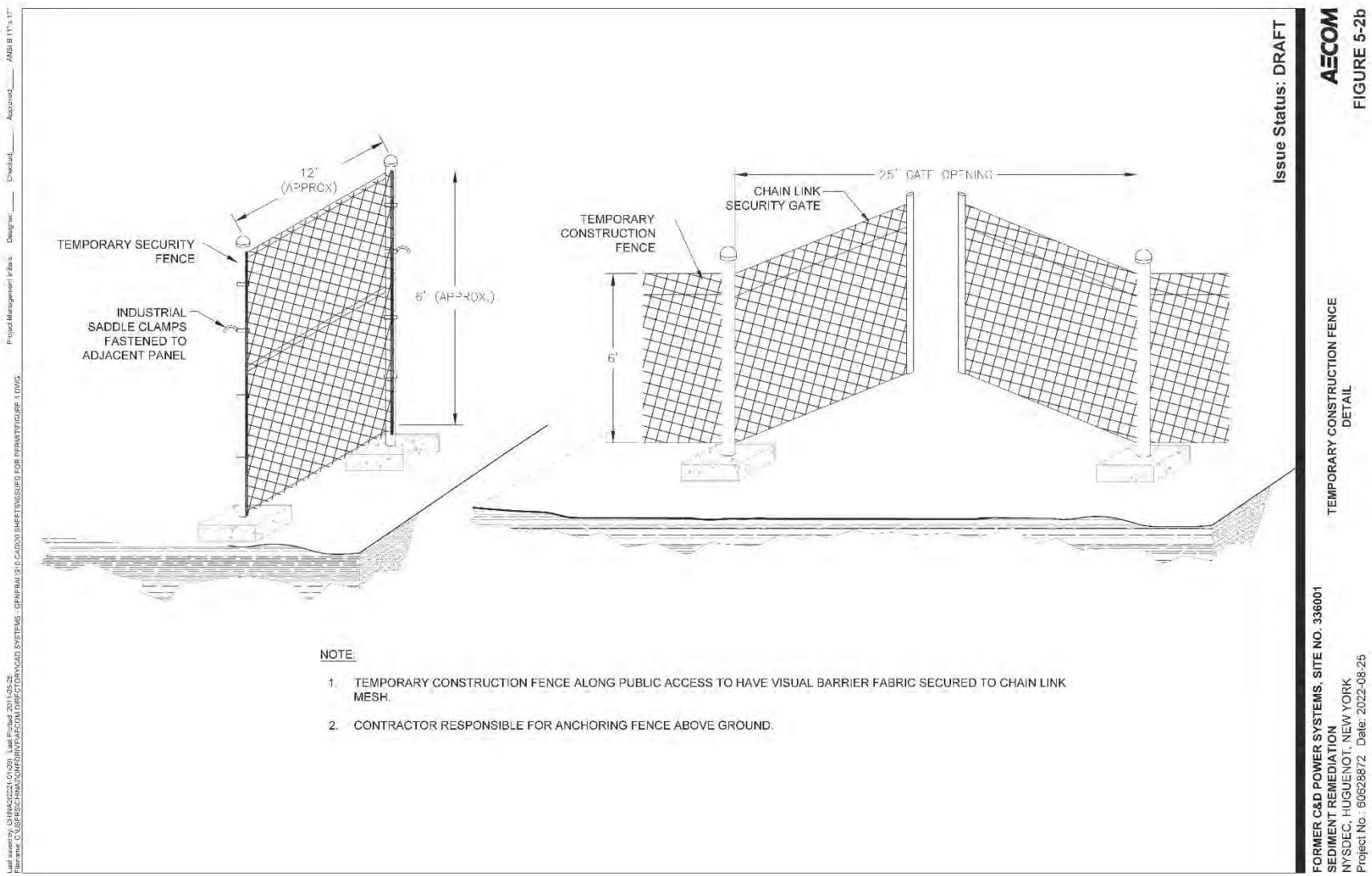

Figure 5-2b: Temporary Construction Fence Detail

5.3 Avoidance and Protection Plan for Sensitivity Area 3

The Avoidance and Protection Plan proposed for this area includes the placement of temporary construction mats over the entire delineated boundary of Area 3 (Figure 5-3). The temporary construction matting would consist of interlocking, high-strength DURA BASE® composite material mats or equivalent that are designed for use in environmentally sensitive areas and specifically to avoid ground disturbance and compaction impacts. Any vehicle traffic work site would be accessed over the construction matting using low-pressure, rubber tire vehicles. An excavator would be required to install the mats and would use an installation method by which the mats are installed ahead of the excavator and thus the excavator is always on top of the mats. The construction matting will be removed manually from ground surface once work is complete. Typical cross-section of the mat is presented in Figure 5-1b.

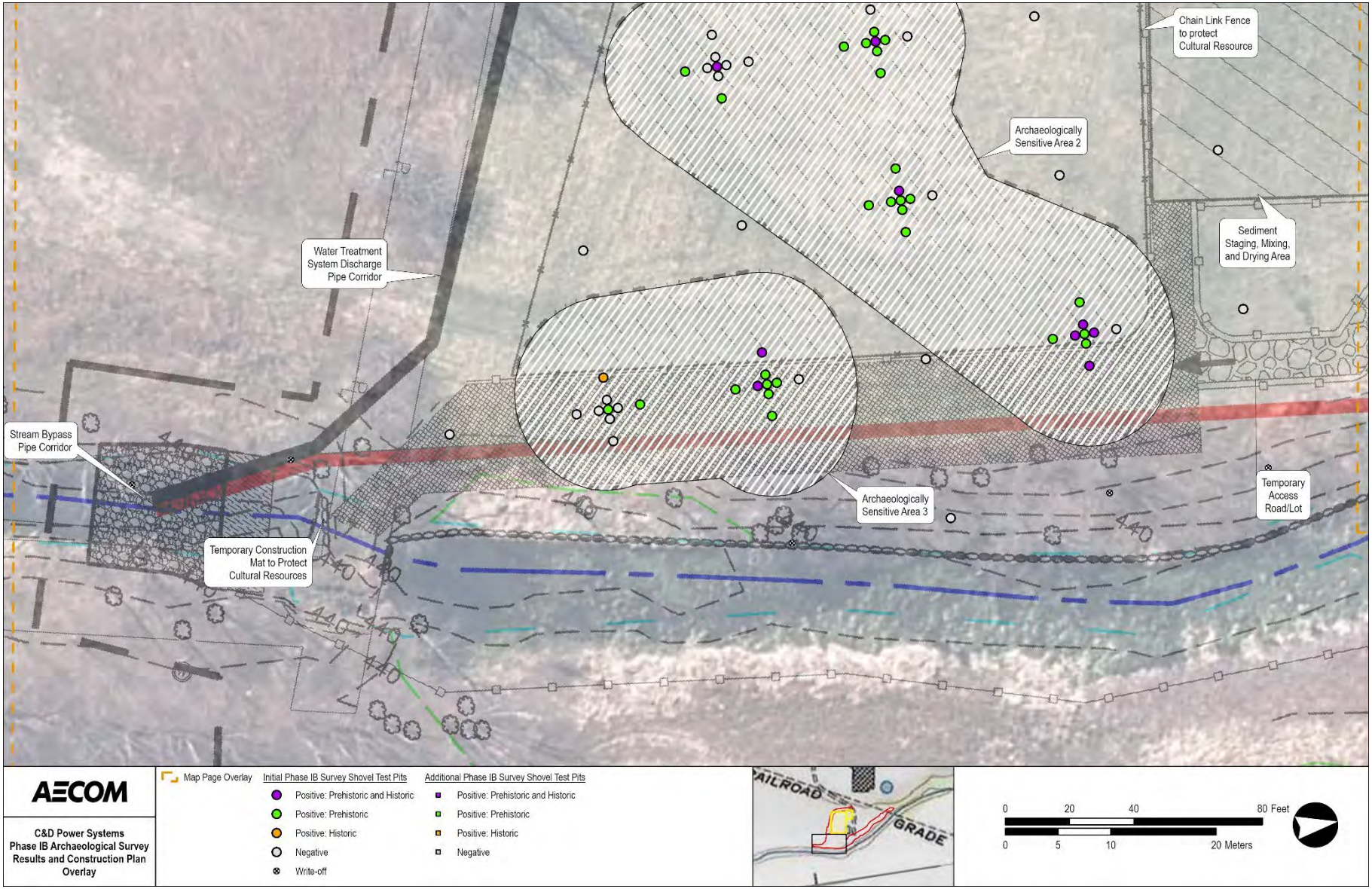

Figure 5-3: Sensitivity Area 3 Survey Results and Avoidance Plan

5.4 Avoidance and Protection Plan for Sensitivity Area 4

The Avoidance and Protection Plan proposed for this area includes installation of a chain link fence around the entire delineated boundary of Area 4 (Figure 5-4). Typical cross-section of the fence is shown on Figure 5-2b.

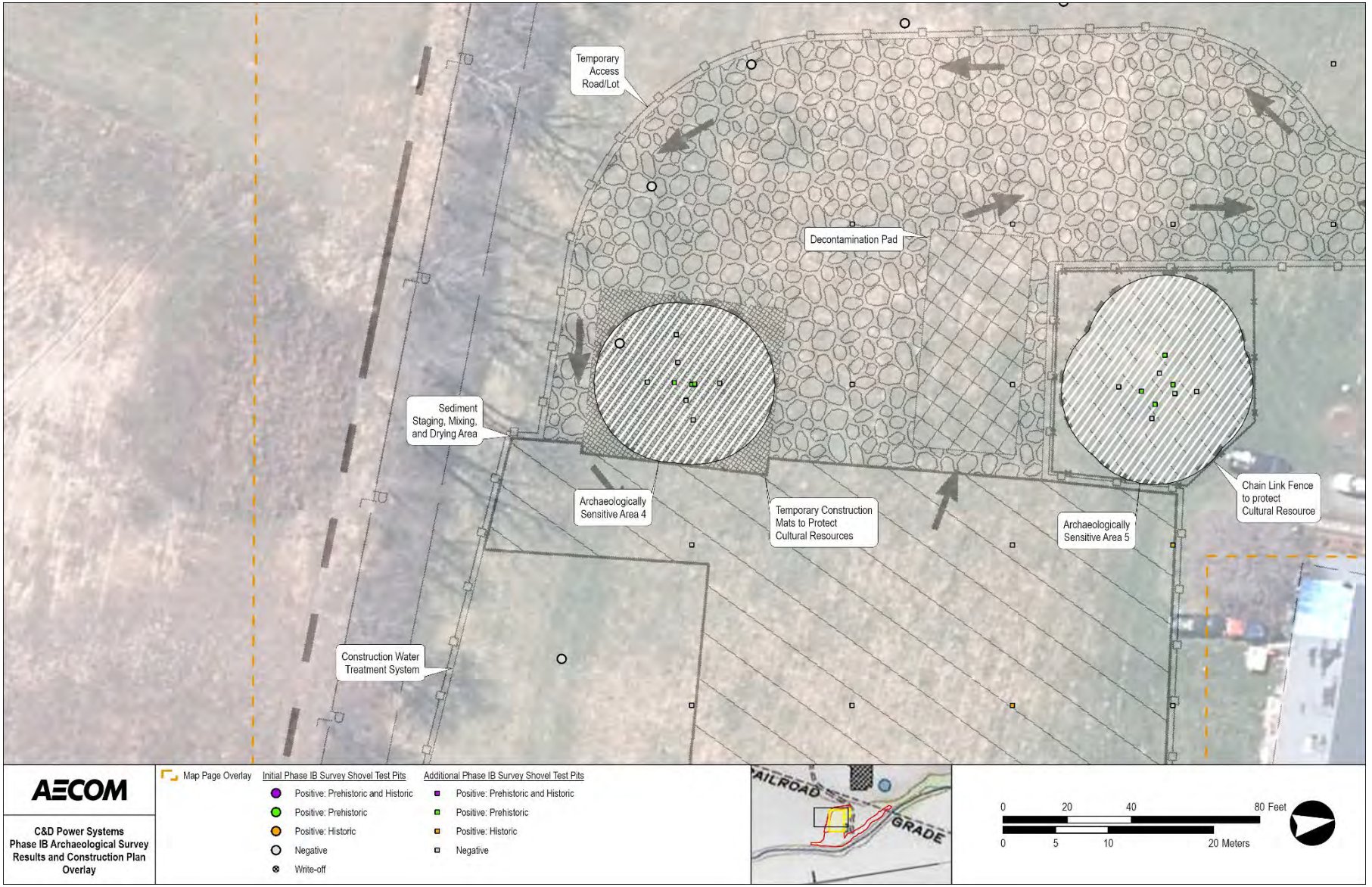

Figure 5-4: Sensitivity Area 4 Survey Results and Avoidance Plan

5.5 Avoidance and Protection Plan for Sensitivity Area 5

The Avoidance and Protection Plan proposed for this area includes a combination of installation of a chain link fence and placement of temporary construction mats over a portion of the delineated boundary of Area 5 (Figure 5-5). The temporary construction matting would consist of interlocking, high-strength DURA BASE® composite material mats or equivalent that are designed for use in environmentally sensitive areas and specifically to avoid ground disturbance and compaction impacts. Any vehicle traffic work site would be accessed over the construction matting using low-pressure, rubber tire vehicles. An excavator would be required to install the mats and would use an installation method by which the mats are installed ahead of the excavator and thus the excavator is always on top of the mats. The construction matting will be removed manually from ground surface once work is complete. Typical cross-sections of the mat and chain link fence are shown on Figure 5-1b and Figure 5-2b, respectively.

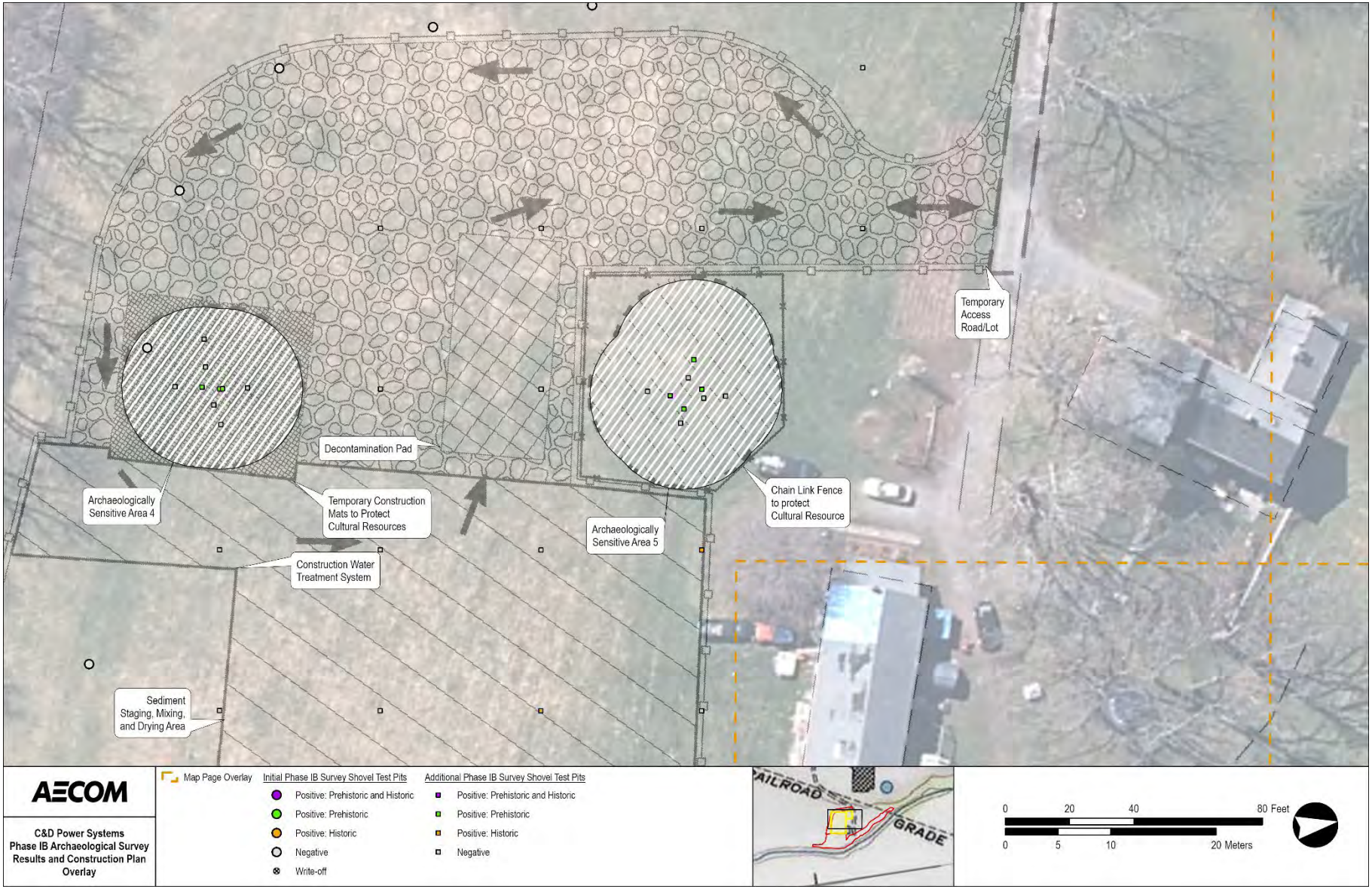

Figure 5-5: Sensitivity Area 5 Survey Results and Avoidance Plan

6. References

6.1 Books and Survey Reports

Adams, Arthur G.
1996 *The Hudson Through the Years.* Third Edition. Fordham University Press, NY.

Andrefsky, William Jr.
2005 *Lithics: Macroscopic Approaches to Analysis*. Cambridge Manuals in Archaeology. Cambridge University Press. Cambridge, United Kingdom

Black, Stephen L. and Alston V. Thoms
2014 Hunter-Gatherer Earth Ovens in the Archaeological Record: Fundamental Concepts. *American Antiquity* 79(2):203-226.

Callahan, Errett
2000 *The Basics of Biface Knapping in the Eastern Fluted Point Tradition: A Manual for Flintknappers and Lithic Analysts, 4th edition*. Piltdown Productions, Lynchburg.

Cammisa, Alfred G., MA with Alexander Padilla (CAD)
2020 Phase I Archaeological Investigation for the proposed Rivendale subdivision at 515 Neversink Drive Huguenot, Town of Deer Park, Orange County, New York. Prepared for: John D. Fuller, P.E., P.C. Prepared by: TRACKER Archaeology, Inc. April 2020.

2019 *Phase I Archaeological Investigation for the proposed subdivision at 463 NYS RT 209 Huguenot, Town of Deer Park, Orange County, New York*. Prepared for: Makai Real Estate, LLC, Brooklyn, New York Arden Consulting Engineers, PLLC, Monroe, New York. Prepared by: TRACKER Archaeology, Inc. October 2019.

2016 *Phase I Archaeological Investigation for the proposed Paragon subdivision Huguenot, Town of Deer Park, Orange County, New York.* Prepared for: John D. Fuller, P.E. Prepared by: TRACKER Archaeology, Inc. July 2016.

Diamond, Joseph E.
2016 *Phase I Cultural Resource Investigation, Neversink Berm Removal, Town of Deer Park, Orange County, NY.* Prepared for: The Nature Conservancy and Milone and MacBroom. Prepared by: Joseph E. Diamond, Ph.D. July 25, 2016.

Hudson, Jonathan
2001 *Phase I Archaeological Survey Proposed Wireless Telecommunications Site "Deerpark" 410 NYS Route 209, Huguenot, Town of Deerpark, NY.* Prepared for: JNS Towers, LLC. Prepared by: Jonathan Hudson, IVI Telecom Services, Inc.

Justice, Noel D.
1987 *Stone Age Spear and Arrow Points of the Midcontinental and Eastern United States: A Modern Survey and Reference*. Bloomington, Indiana: Indiana University Press.

Magne, Martin and David Pokotylo
1981 A Pilot Study in the Bifacial Lithic Reduction Sequences. *Lithic Technology* 10:34-47.

New York Archaeological Council
1994 *Standards for Cultural Resource Investigations and the Curation of Archaeological Collections in New York State.* Adopted by the NYS Office of Parks, Recreation and Historic Preservation in 2004.

Noel Hume, Ivor
1976 *A Guide to Artifacts of Colonial America*. Hawthorne Books, New York.

Oberon, Stephen J.
2010 *Phase I Cultural Resource Survey, Site Assessment and Site Identification Phases, Huguenot Farms Big Pond Road Mine Site, Town of Deerpark, Orange County, NY.* Prepared for: Spectra Environmental Group, Inc. Prepared by: Stephen J. Oberon, Columbia Heritage, Ltd.

Odell, George H.
2003 *Lithic Analysis*. Manuals in Archaeological Method, Theory, and Technique. Springer Science + Business Media, LLC. New York, NY.

Olsson, Karl S.
1981 *Soil Survey of Orange County, New York.* US Department of Agriculture in cooperation with Cornell University Agricultural Experiment Station.

Parker, Arthur C.
1922 The Archaeological History of New York. *NYS Museum Bulletin 235-238.* Albany, NY.

Ritchie, William A
1971 *A Typology and Nomenclature for New York Projectile Points*. New York State Museum and Science Service Bulletin 384. Albany.

Ruttenber, E.M. and L.H. Clarke
1881 *History of Orange County, New York.* Everts & Peck, Philadelphia, PA.

Sanders, Michael J.
2007 Phase I Cultural Resource Survey, Neversink Preserve Wetland Restoration, Route 209, Town of Deer Park, Orange County, New York. Prepared for: The Upper Susquehanna Coalition and The Nature Conservancy. Prepared by: Michael J. Sanders, Taconic Research. July 2007.

Schindler, Bill and Jeremy W. Koch
2012 Flakes Giving You Lip? Let Them Speak: An Examination of the Relationship Between Percussor Type and Lipped Platforms. *Archaeology of Eastern North America* 40:99-106.

Shott, Michael J.
1994 Size and Form in the Analysis of Flake Debris: Review and Recent Approaches. *Journal of Archaeological Method and Theory* 1(1):69-110.

TRC Environmental Corp.
2016 *Phase IA/IB Archaeological Survey of The Eastern System Upgrade Project Orange, Sullivan, And Delaware Counties, New York.* Prepared for: Millennium Pipeline Company, LLC. Prepared by: Marianne Ballantyne, M.A., Patrick Walters, B.A., Timothy R. Sara, M.A., Robert Wall, Ph.D., and Heather Schramm, B.A. July 2016.

6.2 Maps

Beers, F.W.
1875 *County Atlas of Orange County, New York, Plate 20 Deer Park.* Andreas Baskin & Burr, Chicago, IL.

Lathrop, J.M.
1903 *Atlas of Orange County, New York.* A.H. Mueller & Company, Philadelphia, PA.

Sidney, J.C.
1859 *Map of Orange County from Actual Surveys.* Newell S. Brown, Newburgh, NY.

USGS
1969 *Port Jervis* 7.5-minute series
1969 *Otisville* 7.5-minute series

6.3 Online Resources

http://www.nrcs.usda.gov

http://www.orangecounty.gov.com

https://townofdeerparkny.gov/

7. List of Preparers

AECOM
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Gabrielle Perry, BA, GIS Specialist. Over 4 years of experience in archaeological excavations, geomorphological surveys, and laboratory analyses across the Mid-Atlantic region and New England**.** Primary duties include producing and analyzing geospatial data for above and below-ground cultural resource investigations as well as conducting geomorphological surveys. Temple University, 2017, BA, Anthropology.

Thanks to **Jordan Smith,** Field Supervisor, **John Stanzeski**, Field Supervisor, and **Christopher DiMaiolo,** Field Technician, for their work on the Phase IB survey tasks.

Appendix A – Field Records

APPENDIX A

Field Records:

Appendix A-1 Location Record

Table A1 - Phase IB Location Record

STP	Association	Date Excavated	Depth (cm)	Termination Reason	Cultural Material	FS Log #	Notes
Transect A							
A 11	Proposed access road	07/20/21	43.0	sterile	NCM		
A 10	Proposed access road	07/20/21	30.0	sterile	NCM		
A 9	Proposed access road	07/20/21	41.0	sterile	NCM		
A 8	Proposed access road	07/20/21	36.0	sterile	NCM		
A 7	Proposed access road	07/20/21	40.0	sterile	NCM		
A 6	Proposed access road	07/20/21	38.0	sterile	NCM		
A 5	Proposed access road	07/20/21	37.0	sterile	NCM		
A 4	Proposed access road	07/20/21	28.0	sterile	NCM		
A 3	Proposed access road	07/20/21	30.0	sterile	NCM		
A 2	Proposed access road	07/20/21	28.0	sterile	NCM		
A 1	Proposed access road	07/20/21	32.0	sterile	NCM		
Transect B							
B 1	Eastern edge of upland	07/21/21	37.0	sterile	NCM		
B 2	Eastern edge of upland	07/21/21	38.0	sterile	NCM		
B 3	Eastern edge of upland	07/21/21	49.0	sterile	Precontact	8	1 chert flake in plow zone (0-39 cm)
B 3 10N	Radial STP	07/22/21	30.0	sterile	NCM		
B 3 3N	Radial STP	07/22/21	36.0	sterile	Precontact	33	1 chert flake in plow zone (0-26 cm)
B 3 10S	Radial STP	07/22/21	36.0	sterile	Precontact	31	1 chert flake in plow zone (0-26 cm)
B 3 3S	Radial STP	07/22/21	35.0	sterile	Precontact	32	1 chert flake in plow zone (0-25 cm)
B3 10E	Radial STP	07/22/21	37.0	sterile	Precontact	36	6 chert flakes in plow zone (0-27 cm)
B 3 3E	Radial STP	07/22/21	36.0	sterile	Precontact	35	1 chert flake in plow zone (0-26 cm)
B 3 10W	Radial STP	07/22/21	40.0	sterile	NCM		
B 3 3W	Radial STP	07/22/21	33.0	sterile	Precontact	34	1 chert flake in plow zone (0-23 cm)
B 4	Eastern edge of upland	07/21/21	37.0	sterile	Precontact	9	3 chert flakes in plow zone (0-27 cm)
B 4 10N	Radial STP	07/22/21	26.0	sterile	NCM		
B 4 3N	Radial STP	07/22/21	26.0	sterile	NCM		
B 4 10S	Radial STP	07/22/21	36.0	sterile	Precontact	30	2 chert flakes, 1 iron bolt in plow zone (0-26 cm)
B 4 3S	Radial STP	07/22/21	27.0	sterile	NCM		
B 4 10W	Radial STP	07/22/21	23.0	sterile	NCM		
B 4 3W	Radial STP	07/22/21	28.0	sterile	NCM		
B4 10E	Radial STP	07/22/21	37.0	sterile	Precontact	29	1 chert flake in plow zone (0-27 cm)
B 4 3E	Radial STP	07/22/21	30.0	sterile	NCM		
Transect C							
C 5	50 feet east of Transect B in upland	07/21/21	30.0	sterile	NCM		
C 4	50 feet east of Transect B in upland	07/21/21	41.0	sterile	NCM		
C 3	50 feet east of Transect B in upland	07/21/21	36.0	sterile	Precontact	10	5 chert flakes, possible stone tool in plow zone (0-26 cm)

Table A1 - Phase IB Location Record

STP	Association	Date Excavated	Depth (cm)	Termination Reason	Cultural Material	FS Log #	Notes
C 3 10N	Radial STP	07/23/21	40.0	sterile	NCM		
C 3 3N	Radial STP	07/23/21	40.0	sterile	Precontact	37	1 chert flake in plow zone (0-30 cm)
C 3 10S	Radial STP	07/23/21	37.0	sterile	Precontact	38	2 chert flakes in plow zone (0-27 cm)
C 3 3S	Radial STP	07/23/21	39.0	sterile	Precontact	39	2 chert flakes in plow zone (0-29 cm)
C 3 10E	Radial STP	07/23/21	38.0	sterile	Precontact	40	1 chert flake in plow zone (0-28 cm)
C 3 3E	Radial STP	07/23/21	43.0	sterile	Precontact	41	4 chert flakes in plow zone (0-33 cm)
C 3 10W	Radial STP	07/23/21	37.0	sterile	Precontact	42	1 chert flake in plow zone
C 3 3W	Radial STP	07/23/21	44.0	sterile	Precontact	43	5 chert flakes in plow zone (0-34 cm)
C 2	50 feet east of Transect B in upland	07/21/21	32.0	sterile	NCM		
C 1	50 feet east of Transect B in upland	07/21/21	29.0	sterile	NCM		
			Transect D				
D 1	50 ft east of Trans C, E edge upland	07/21/21	43.0	sterile	NCM		
D 2	50 ft east of Trans C, E edge upland	07/21/21	30.0	sterile	Precontact	11	4 chert flakes, 1 fire cracked rock in plow zone (0-20 m)
D 2 10N	Radial STP	07/21/21	38.0	sterile	NCM		
D 2 3N	Radial STP	07/21/21	40.0	sterile	Precontact	16	cm)
D 2 10S	Radial STP	07/21/21	33.0	sterile	Precontact	15	3 chert flakes in plow zone (0-23 cm)
D 2 3S	Radial STP	07/21/21	37.0	sterile	Precontact	14	1 chert flake, 3 nails in plow zone (0-27 cm)
D 2 10W	Radial STP	07/21/21	36.0	sterile	Precontact	17	5 chert flakes in plow zone (0-26 cm)
D 2 3W	Radial STP	07/21/21	33.0	sterile	Precontact	18	5 chert flakes, 2 nail frags in plow zone (0-23 cm)
D 2 10E	Radial STP	07/21/21	32.0	sterile	Precontact	19	3 chert flakes, 2 nail frags in plow zone (0-22 cm)
D 2 3E	Radial STP	07/21/21	37.0	sterile	Precontact	20	3 chert flakes in plow zone (0-27 cm)
D 3	50 ft east of Trans C, E edge upland	07/21/21	40.0	sterile	NCM		
D 4	50 ft east of Trans C, E edge upland	07/21/21	45.0	sterile	Precontact	12	1 chert flake in plow zone (0-35 cm)
D 4 10N	Radial STP	07/22/21	34.0	sterile	NCM		
D 4 3N	Radial STP	07/22/21	55.0	sterile	Precontact	22	2 chert flakes in A Horizon (0-45 cm)
D 4 10S	Radial STP	07/22/21	46.0	sterile	NCM		
D 4 3S	Radial STP	07/22/21	45.0	sterile	Precontact	21	2 chert flakes, 1 flat glass sherd in plow zone (0-35 cm)
D 4 10E	Radial STP	07/22/21	44.0	sterile	Precontact	23	1 chert flake in plow zone (0-34 cm)
D 4 3E	Radial STP	07/22/21	44.0	sterile	Precontact	24	1 chert flake in plow zone (0-34 cm)
D 4 10W	Radial STP NOT D 4 10N Fix FS Log	07/22/21	54.0	sterile	Precontact	25	1 chert flake, 1 glass sherd in plow zone (0-44 cm)
D 4 3W	Radial STP	07/22/21	51.0	sterile	NCM	26	
D 5	50 ft east of Trans C, E edge upland	07/21/21	38.0	sterile	Precontact	13	2 chert flakes, 1 fire cracked rock in plow zone (0-28 cm)
D 5 10S	Radial STP	07/22/21	40.0	sterile	NCM		
D 5 3S	Radial STP	07/22/21	40.0	sterile	NCM		
D 5 10N	Radial STP	07/22/21	40.0	sterile	Precontact	27	1 chert flake in plow zone (0-30 cm)
D 5 3N	Radial STP	07/22/21	34.0	sterile	NCM		
D 5 10E	Radial STP	07/22/21	33.0	sterile	NCM		
D 5 3E	Radial STP	07/22/21	36.0	sterile	NCM		
D 5 10W	Radial STP	07/22/21	39.0	sterile	Historic	28	1 white clay pipestem fragment in plow zone (0-26 cm)

Table A1 - Phase IB Location Record

STP	Association	Date Excavated	Depth (cm)	Termination Reason	Cultural Material	FS Log #	Notes
D 5 3W	Radial STP	07/22/21	39.0	sterile	NCM		
D 6	50 ft east of Trans C, E edge upland	07/21/21	29.0	sterile	NCM		
			Transect E				
E 1	W bank of tributary, S of Swartwout Rd	07/21/21					Not excavated due to excessive slope
E 2	W bank of tributary, S of Swartwout Rd	07/21/21					Not excavated due to excessive slope
E 3	W bank of tributary, S of Swartwout Rd	07/21/21	30.0	sterile	NCM		Fill from 0-20 cm; no A Horizon or plow zone
			Transect F				
F 14	W bank tributary, S of RR embankment	07/19/21	52.0	sterile	NCM		
F 13	W bank tributary, S of RR embankment	07/19/21	56.0	sterile	NCM		Fill from 0-12 cm
F 12	W bank tributary, S of RR embankment	07/19/21	20.0	sterile	NCM		Gravel from driveway
F 11	W bank tributary, S of RR embankment	07/19/21	55.0	sterile	NCM		
F 10	W bank tributary, S of RR embankment	07/19/21	55.0	sterile	NCM		
F 9	W bank tributary, S of RR embankment	07/19/21	40.0	sterile	NCM		
F 8	W bank tributary, S of RR embankment	07/19/21	40.0	sterile	Precontact	1	3 chert flakes in A Horizon (0-30 cm)
F 8 10N	Radial STP	07/20/21	42.0	sterile	Precontact	3	3 chert flakes in A Horizon (0-32 cm)
F 8 3N	Radial STP	07/20/21	41.0	sterile	NCM		
F 8 10E	Radial STP	07/20/21	39.0	sterile	Precontact	5	1 chert flake in A Horizon
F 8 3E	Radial STP	07/20/21	39.0	sterile	NCM		
F 8 10W	Radial STP	07/20/21	41.0	sterile	Precontact	4	1 chert flake in A Horizon
F 8 3W	Radial STP	07/20/21	41.0	sterile	NCM		
F 8 10S	Radial STP	07/20/21	37.0	sterile	Precontact	6	3 chert flakes in A Horizon
F 8 3S	Radial STP	07/20/21	47.0	sterile	Precontact	7	1 chert flake in A Horizon
F 7	W bank tributary, S of RR embankment	07/19/21	35.0	sterile	NCM		
F 6	W bank tributary, S of RR embankment	07/19/21	23.0	sterile	NCM		Lower marshy area
F 5	W bank tributary, S of RR embankment	07/19/21	40.0	sterile	Precontact	2	1 chert flake in A Horizon
F 5 10N	Radial STP	07/19/21	40.0	sterile	NCM		Not plowed
F 5 3N	Radial STP	07/19/21	45.0	sterile	NCM		
F 5 10E	Radial STP	07/19/21	35.0	sterile	NCM		
F 5 3E	Radial STP	07/19/21	39.0	sterile	NCM		
F 5 10S	Radial STP	07/19/21	40.0	sterile	NCM		Offset
F 5 3S	Radial STP	07/19/21	40.0	sterile	NCM		
F 5 10W	Radial STP	07/19/21	35.0	sterile	NCM		
F 5 3W	Radial STP	07/19/21	40.0	sterile	NCM		
F 4	W bank tributary, S of RR embankment	07/19/21	38.0	sterile	NCM		
F 3	W bank tributary, S of RR embankment	07/19/21	20.0	water	NCM		Water infiltration at 20 cm
F 2	W bank tributary, S of RR embankment	07/19/21	32.0	sterile	NCM		
F 1	W bank tributary, S of RR embankment	07/19/21					Not excavated due to excessive slope

Table A1 - Phase IB Location Record

STP	Association	Date Excavated	Depth (cm)	Termination Reason	Cultural Material	FS Log #	Notes
Transect G							
G 1	Swartwout Rd tributary crossing area	07/20/21					Not excavated: in gravel turn around; culvert disturbance
G 2	Swartwout Rd tributary crossing area	07/20/21					Not excavated: former historic barn stone wall

APPENDIX A

Field Records:

Appendix A-2 Excavation Record

Table A2 Phase IB Excavation Record

STP	Level	Name	Depth (cm)	Soil Description	Munsell Color	Munsell Hue/Chroma	Inclusions/Notes	Artifacts
					TRANSECT A			
A 11	1	Ap	33	Sandy loam	Brown	10 YR 4/5		NCM
A 11	2	B	43	Silty clay	Reddish brown	5 YR 3/3		NCM
A 10	1	Ap	20	Sandy loam	Brown	10 YR 4/3		NCM
A 10	2	B	30	Silty clay	Reddish brown	5 YR 3/3		NCM
A 9	1	Ap	31	Sandy loam	Brown	10 YR 4/3		NCM
A 9	2	B	41	Silty clay	Reddish brown	5 YR 3/3		NCM
A 8	1	Ap	26	Sandy loam	Brown	10 YR 4/3		NCM
A 8	2	B	36	Silty clay	Reddish brown	5 YR 3/3		NCM
A 7	1	Ap	30	Sandy loam	Brown	10 YR 4/3		NCM
A 7	2	B	40	Silty clay	Reddish brown	5 YR 3/3		NCM
A 6	1	Ap	28	Sandy loam	Brown	10 YR 4/3		NCM
A 6	2	B	38	Silty clay	Reddish brown	5 YR 3/3		NCM
A 5	1	Ap	27	Sandy loam	Brown	10 YR 4/3		NCM
A 5	2	B	37	Silty clay	Reddish brown	5 YR 3/3		NCM
A 4	1	Ap	18	Sandy loam	Brown	10 YR 4/3		NCM
A 4	2	B	28	Silty clay	Reddish brown	5 YR 3/3		NCM
A 3	1	Ap	20	Sandy loam	Brown	10 YR 4/3		NCM
A 3	2	B	30	Silty clay	Reddish brown	5 YR 3/3		NCM
A 2	1	Ap	18	Sandy loam	Brown	10 YR 4/3		NCM
A 2	2	B	28	Silty clay	Reddish brown	5 YR 3/3		NCM
A 1	1	Fill	22	Fill/sandy loam	Dark brown	10 YR 3/3	10% sm cobbles; 5% lg gravels	NCM
A 1	2	B	32	Silty clay	Reddish brown	5 YR 3/3		NCM
					TRANSECT B			
B 1	1	Ap	27	Sandy loam	Brown	10 YR 4/3		NCM
B 1	2	B	37	Silty clay	Reddish brown	5 YR 3/3		NCM
B 2	1	Ap	28	Sandy loam	Brown	10 YR 4/3		NCM
B 2	2	B	38	Silty clay	Reddish brown	5 YR 3/3		NCM
B 3	1	Ap	39	Sandy loam	Brown	10 YR 4/3		Precontact
B 3	2	B	49	Sandy silty clay	Strong brown	7.5 YR 4/6	soil shows evidence of redox	NCM
B 3 10N	1	Ap	20	Sandy loam	Brown	10 YR 4/3		NCM
B 3 10N	2	B	30	Silty clay	Reddish brown	5 YR 3/3		NCM
B 3 3N	1	Ap	26	Sandy loam	Brown	10 YR 4/3		Precontact
B 3 3N	2	B	36	Silty clay	Reddish brown	5 YR 3/3		NCM
B 3 10S	1	Ap	26	Sandy loam	Brown	10 YR 4/3		Precontact
B 3 10S	2	B	36	Silty clay	Reddish brown	5 YR 3/3		NCM
B 3 3S	1	Ap	25	Sandy loam	Brown	10 YR 4/3		Precontact
B 3 3S	2	B	35	Silty clay	Reddish brown	5 YR 3/3		NCM
B 3 10E	1	Ap	27	Sandy loam	Brown	10 YR 4/3		Precontact
B 3 10E	2	B	37	Silty clay	Reddish brown	5 YR 3/3		NCM
B 3 3E	1	Ap	26	Sandy loam	Brown	10 YR 4/3		Precontact
B 3 3E	2	B	36	Silty clay	Reddish brown	5 YR 3/3		NCM

Table A2 Phase IB Excavation Record

STP	Level	Name	Depth (cm)	Soil Description	Munsell Color	Munsell Hue/Chroma	Inclusions/Notes	Artifacts
B 3 10W	1	Ap	30	Sandy loam	Brown	10 YR 4/3		NCM
B 3 10W	2	B	40	Silty clay	Reddish brown	5 YR 3/3		NCM
B 3 3W	1	Ap	23	Sandy loam	Brown	10 YR 4/3		Precontact
B 3 3W	2	B	33	Silty clay	Reddish brown	5 YR 3/3		NCM
B 4	1	Ap	27	Sandy loam	Brown	10 YR 4/3		Precontact; Historic
B 4	2	B	37	Sandy silty clay	Strong brown	7.5 YR 4/6		NCM
B 4 10N	1	Ap	16	Sandy loam	Brown	10 YR 4/3		NCM
B 4 10N	2	B	26	Silty clay	Reddish brown	5 YR 3/3		NCM
B 4 3N	1	Ap	16	Sandy loam	Brown	10 YR 4/3		NCM
B 4 3N	2	B	26	Silty clay	Reddish brown	5 YR 3/3		NCM
B 4 10S	1	Ap	26	Sandy loam	Brown	10 YR 4/3		Precontact; Historic
B 4 10S	2	B	36	Silty clay	Reddish brown	5 YR 3/3		NCM
B 4 3S	1	Ap	17	Sandy loam	Brown	10 YR 4/3		NCM
B 4 3S	2	B	27	Silty clay	Reddish brown	5 YR 3/3		NCM
B 4 10W	1	Ap	13	Sandy loam	Brown	10 YR 4/3		NCM
B 4 10W	2	B	23	Silty clay	Reddish brown	5 YR 3/3		NCM
B 4 3W	1	Ap	18	Sandy loam	Brown	10 YR 4/3		NCM
B 4 3W	2	B	28	Silty clay	Reddish brown	5 YR 3/3		NCM
B 4 10E	1	Ap	27	Sandy loam	Brown	10 YR 4/3		Precontact
B 4 10E	2	B	37	Silty clay	Reddish brown	5 YR 3/3		NCM
B 4 3E	1	Ap	20	Sandy loam	Brown	10 YR 4/3		NCM
B 4 3E	2	B	30	Silty clay	Reddish brown	5 YR 3/3		NCM
					TRANSECT C			
C 5	1	Ap	20	Sandy loam	Brown	10 YR 4/3		NCM
C 5	2	B	30	Silty sand	Strong brown	7.5 YR 4/6		NCM
C 4	1	Ap	31	Sandy loam	Brown	10 YR 4/3		NCM
C 4	2	B	41	Silty sand	Strong brown	7.5 YR 4/6		NCM
C 3	1	Ap	26	Sandy loam	Brown	10 YR 4/3		Precontact
C 3	2	B	36	Silty sandy clay	Reddish brown	5 YR 3/3		NCM
C 3 10N	1	Ap	30	Sandy loam	Dk yellow brown	10 YR 3/4		NCM
C 3 10N	2	B	40	Silty clay	Reddish brown	5 YR 3/3		NCM
C 3 3N	1	Ap	30	Sandy loam	Dk yellow brown	10 YR 3/4		Precontact
C 3 3N	2	B	40	Silty clay	Reddish brown	5 YR 3/3		NCM
C 3 10S	1	Ap	27	Sandy loam	Dk yellow brown	10 YR 3/4		Precontact
C 3 10S	2	B	37	Silty clay	Reddish brown	5 YR 3/3		NCM
C 3 3S	1	Ap	29	Sandy loam	Dk yellow brown	10 YR 3/4		Precontact
C 3 3S	2	B	39	Silty clay	Reddish brown	5 YR 3/3		NCM
C 3 10E	1	Ap	28	Sandy loam	Dk yellow brown	10 YR 3/4		Precontact
C 3 10E	2	B	38	Silty clay	Reddish brown	5 YR 3/3		NCM
C 3 3E	1	Ap	33	Sandy loam	Dk yellow brown	10 YR 3/4		Precontact
C 3 3E	2	B	43	Silty clay	Reddish brown	5 YR 3/3		NCM
C 3 10W	1	Ap	27	Sandy loam	Dk yellow brown	10 YR 3/4		Precontact
C 3 10W	2	B	37	Silty clay	Reddish brown	5 YR 3/3		NCM

Table A2 Phase IB Excavation Record

STP	Level	Name	Depth (cm)	Soil Description	Munsell Color	Munsell Hue/Chroma	Inclusions/Notes	Artifacts
C 3 3W	1	Ap	34	Sandy loam	Dk yellow brown	10 YR 3/4		Precontact
C 3 3W	2	B	44	Silty clay	Reddish brown	5 YR 3/3		NCM
C 2	1	Ap	22	Sandy loam	Brown	10 YR 4/3		NCM
C 2	2	B	32	Silty sandy clay	Reddish brown	5 YR 3/3		NCM
C 1	1	Ap	19	Sandy loam	Brown	10 YR 4/3		NCM
C 1	2	B	29	Silty sandy clay	Reddish brown	5 YR 3/3		NCM
					TRANSECT D			
D 1	1	Ap	33	Sandy loam	Brown	10 YR 4/3		NCM
D 1	2	B	43	Silty clay	Reddish brown	5 YR 3/3		NCM
D 2	1	Ap	20	Sandy loam	Brown	10 YR 4/3		NCM
D 2	2	B	30	Silty clay	Reddish brown	5 YR 3/3		NCM
D 2 10N	1	Ap	28	Sandy loam	Brown	10 YR 4/3		NCM
D 2 10N	2	B	38	Silty clay	Reddish brown	5 YR 3/3		NCM
D 2 3N	1	Ap	30	Sandy loam	Brown	10 YR 4/3		Precontact; Historic
D 2 3N	2	B	40	Silty clay	Reddish brown	5 YR 3/3		NCM
D 2 10S	1	Ap	23	Sandy loam	Brown	10 YR 4/3		Precontact
D 2 10S	2	B	33	Silty clay	Reddish brown	5 YR 3/3		NCM
D 2 3S	1	Ap	27	Sandy loam	Brown	10 YR 4/3		Precontact
D 2 3S	2	B	37	Silty clay	Reddish brown	5 YR 3/3		NCM
D 2 10W	1	Ap	26	Sandy loam	Brown	10 YR 4/3		Precontact
D 2 10W	2	B	36	Silty clay	Reddish brown	5 YR 3/3		NCM
D 2 3W	1	Ap	23	Sandy loam	Brown	10 YR 4/3		Precontact; Historic
D 2 3W	2	B	33	Silty clay	Reddish brown	5 YR 3/3		NCM
D 2 10E	1	Ap	22	Sandy loam	Brown	10 YR 4/3		Prehistoric; Historic
D 2 10E	2	B	32	Silty clay	Reddish brown	5 YR 3/3		NCM
D 2 3E	1	Ap	27	Sandy loam	Brown	10 YR 4/3		Prehistoric; Historic
D 2 3E	2	B	37	Silty clay	Reddish brown	5 YR 3/3		NCM
D 3	1	Ap	30	Sandy loam	Brown	10 YR 4/3		NCM
D 3	2	B	40	Silty clay	Reddish brown	5 YR 3/3		NCM
D 4	1	Ap	35	Sandy loam	Brown	10 YR 4/3		Precontact
D 4	2	B	45	Silty clay	Reddish brown	5 YR 3/3		NCM
D 4 10N	1	Ap	24	Sandy loam	Dk yellow brown	10 YR 3/4		NCM
D 4 10N	2	B	34	Silty clay	Strong brown	7.5 YR 4/6		NCM
D 4 3N	1	A	45	Sandy loam	Dk yellow brown	10 YR 3/4		Precontact
D 4 3N	2	B	55	Silty clay	Strong brown	7.5 YR 4/6		NCM
D 4 10S	1	A	36	Sandy loam	Dk yellow brown	10 YR 3/4		NCM
D 4 10S	2	B	46	Silty clay	Strong brown	7.5 YR 4/6		NCM
D 4 3S	1	Ap	35	Sandy loam	Dk yellow brown	10 YR 4/6		Precontact; Historic
D 4 3S	2	B	45	Silty clay	Strong brown	7.5 YR 4/6		NCM
D 4 10E	1	Ap	34	Sandy loam	Dk yellow brown	10 YR 3/4		Precontact
D 4 10E	2	B	44	Silty clay	Strong brown	7.5 YR 4/6		NCM
D 4 3E	1	Ap	34	Sandy loam	Dk yellow brown	10 YR 3/4		Precontact
D 4 3E	2	B	44	Silty clay	Strong brown	7.5 YR 4/6		NCM

Table A2 Phase IB Excavation Record

STP	Level	Name	Depth (cm)	Soil Description	Munsell Color	Munsell Hue/Chroma	Inclusions/Notes	Artifacts
D 4 10W	1	Ap	44	Sandy loam	Dk yellow brown	10 YR 3/4		Precontact; Historic
D 4 10W	2	B	54	Silty clay	Strong brown	7.5 YR 4/6		NCM
D 4 3W	1	Ap	41	Sandy loam	Dk yellow brown	10 YR 3/4		NCM
D 4 3W	2	B	51	Silty clay	Strong brown	7.5 YR 4/6		NCM
D 5	1	Ap	28	Sandy loam	Brown	10 YR 4/3		Precontact
D 5	2	B	38	Silty clay	Reddish brown	5 YR 3/3		NCM
D 5 10S	1	Ap	30	Sandy loam	Dk yellow brown	10 YR 3/4		NCM
D 5 10S	2	B	40	Silty clay	Strong brown	7.5 YR 4/6		NCM
D 5 3S	1	Ap	30	Sandy loam	Dk yellow brown	10 YR 3/4		NCM
D 5 3S	2	B	40	Silty clay	Strong brown	7.5 YR 4/6		NCM
D 5 10N	1	Ap	30	Sandy loam	Dk yellow brown	10 YR 3/4		Precontact
D 5 10N	2	B	40	Silty clay	Strong brown	7.5 YR 4/6		NCM
D 5 3N	1	Ap	24	Sandy loam	Dk yellow brown	10 YR 3/4		NCM
D 5 3N	2	B	34	Silty clay	Strong brown	7.5 YR 4/6		NCM
D 5 10E	1	Ap	23	Sandy loam	Dk yellow brown	10 YR 3/4		NCM
D 5 10E	2	B	33	Silty clay	Strong brown	7.5 YR 4/6		NCM
D 5 3E	1	Ap	26	Sandy loam	Dk yellow brown	10 YR 3/4		NCM
D 5 3E	2	B	36	Silty clay	Strong brown	7.5 YR 4/6		NCM
D 5 10W	1	Ap	26	Sandy loam	Dk yellow brown	10 YR 3/4		Historic
D 5 10W	2	B	39	Silty clay	Strong brown	7.5 YR 4/6		NCM
D 5 3W	1	Ap	29	Sandy loam	Dk yellow brown	10 YR 3/4		NCM
D 5 3W	2	B	39	Silty clay	Strong brown	7.5 YR 4/6		NCM
D 6	1	Ap	19	Sandy loam	Brown	10 YR 4/3		NCM
D 6	2	B	29	Silty clay	Reddish brown	5 YR 3/3	sm to med cobbles at interface	NCM
					TRANSECT E			
E 1				Not excavated			Excessive slope	
E 2				Not excavated			Excessive slope	
E 3	1	Fill	20	Sandy loam	Very dark brown	10 YR 3/2	Mottled w/ 7.5 YR 3/3 dk brown	NCM
E 3	2	B	30	Silty clay	Dark brown	7.5 YR 3/3	10% large rounded cobbles	NCM
					TRANSECT F			
F 14	1	Ap	42	Sandy loam	Yellowish brown	10 YR 4/4	inside historic barn footprint	NCM
F 14	2	BC	52	Silty sandy loam	Strong brown	7.5 YR 4/6	increase in silt redox	NCM
F 13	1	Fill	12	Sandy loam	Dark brown	10 YR 3/3		NCM
F 13	2	Ap	50	Sandy loam	Yellowish brown	10 YR 4/4		NCM
F 13	3	BC	56	Silty sandy loam	Strong brown	7.5 YR 4/6	increase in silt redox	NCM
F 12	1	Ap	20	Sandy loam	Dark brown	10 YR 3/3	over gravel from driveway	NCM
F 11	1	A	45	Silty loam	Dark brown	10 YR 3/3		NCM
F 11	2	B	55	Silty clay	Reddish brown	5 YR 3/3	redox noted, mica fragments	NCM
F 10	1	A	45	Silty loam	Dark brown	10 YR 3/3		NCM
F 10	2	B	55	Silty clay	Reddish brown	5 YR 3/3		NCM
F 9	1	A	30	Silty loam	Dark brown	10 YR 3/3		NCM

Table A2 Phase IB Excavation Record

STP	Level	Name	Depth (cm)	Soil Description	Munsell Color	Munsell Hue/Chroma	Inclusions/Notes	Artifacts
F 9	2	B	40	Silty clay	Reddish brown	5 YR 3/3		NCM
F 8	1	A	30	Silty loam	Dark brown	10 YR 3/3		Precontact
F 8	2	B	40	Silty clay	Reddish brown	5 YR 3/3		NCM
F 8 10N	1	A	32	Silty loam	Dark brown	10 YR 3/3		Precontact
F 8 10N	2	B	42	Silty clay	Reddish brown	5 YR 3/3		NCM
F 8 3N	1	A	31	Silty loam	Dark brown	10 YR 3/3		NCM
F 8 3N	2	B	41	Silty clay	Reddish brown	5 YR 3/3		NCM
F 8 10E	1	A	29	Silty loam	Dark brown	10 YR 3/3		Precontact
F 8 10E	2	B	39	Silty clay	Reddish brown	5 YR 3/3		NCM
F 8 3E	1	A	29	Silty loam	Dark brown	10 YR 3/3		NCM
F 8 3E	2	B	39	Silty clay	Reddish brown	5 YR 3/3		NCM
F 8 10W	1	A	31	Silty loam	Dark brown	10 YR 3/3		Precontact
F 8 10W	2	B	41	Silty clay	Reddish brown	5 YR 3/3		NCM
F 8 3W	1	A	31	Silty loam	Dark brown	10 YR 3/3		NCM
F 8 3W	2	B	41	Silty clay	Reddish brown	5 YR 3/3		NCM
F 8 10S	1	A	27	Silty loam	Dark brown	10 YR 3/3		Precontact
F 8 10S	2	B	37	Silty clay	Reddish brown	5 YR 3/3		NCM
F 8 3S	1	A	37	Silty loam	Dark brown	10 YR 3/3		Precontact
F 8 3S	2	B	47	Silty clay	Reddish brown	5 YR 3/3		NCM
F 7	1	A	25	Silty loam	Dark brown	10 YR 3/3		NCM
F 7	2	B	35	Silty clay	Reddish brown	5 YR 3/3		NCM
F 6	1	A	13	Silty loam	Dark brown	10 YR 3/3	lower marshy area of transect	NCM
F 6	2	B	23	Silty clay	Reddish brown	5 YR 3/3	heavy redox noted	NCM
F 5	1	A	30	Silty loam	Dark brown	10 YR 3/3		Precontact
F 5	2	B	40	Silty clay	Reddish brown	5 YR 3/3		NCM
F 5 10N	1	A	30	Silty loam	Dark brown	10 YR 3/3		NCM
F 5 10N	2	B	40	Silty clay	Reddish brown	5 YR 3/3		NCM
F 5 3N	1	A	35	Silty loam	Dark brown	10 YR 3/3		NCM
F 5 3N	2	B	45	Silty clay	Reddish brown	5 YR 3/3		NCM
F 5 10E	1	A	25	Silty loam	Dark brown	10 YR 3/3		NCM
F 5 10E	2	B	35	Silty clay	Reddish brown	5 YR 3/3		NCM
F 5 3E	1	A	29	Silty loam	Dark brown	10 YR 3/3		NCM
F 5 3E	2	B	39	Silty clay	Reddish brown	5 YR 3/3		NCM
F 5 10S	1	A	30	Silty loam	Dark brown	10 YR 3/3	offset from transect line	NCM
F 5 10S	2	B	40	Silty clay	Reddish brown	5 YR 3/3		NCM
F 5 3S	1	A	30	Silty loam	Dark brown	10 YR 3/3		NCM
F 5 3S	2	B	40	Silty clay	Reddish brown	5 YR 3/3		NCM
F 5 10W	1	A	25	Silty loam	Dark brown	10 YR 3/3		NCM
F 5 10W	2	B	35	Silty clay	Reddish brown	5 YR 3/3		NCM
F 5 3W	1	A	30	Silty loam	Dark brown	10 YR 3/3		NCM
F 5 3W	2	B	40	Silty clay	Reddish brown	5 YR 3/3		NCM
F 4	1	A	28	Silty loam	Dark brown	10 YR 3/3		NCM
F 4	2	B	38	Silty clay	Reddish brown	5 YR 3/3		NCM

Table A2 Phase IB Excavation Record

STP	Level	Name	Depth (cm)	Soil Description	Munsell Color	Munsell Hue/Chroma	Inclusions/Notes	Artifacts
F 3	1	A	10	Silty loam	Dark brown	10 YR 3/3	wet	NCM
F 3	2	B	20	Silty clay	Reddish brown	5 YR 3/3	wet	NCM
F 2	1	A	22	Silty loam	Dark brown	10 YR 3/3	dry	NCM
F 2	2	B	32	Silty clay	Reddish brown	5 YR 3/3	dry	NCM
F1				Not excavated			Excessive slope	
					TRANSECT G			
G 1				Not excavated			gravel; culvert disturbance	
G 2				Not excavated			historic barn stone wall	

Appendix B – Artifact Catalogues

APPENDIX B

Artifact Catalogues:

Appendix B-1 Prehistoric Artifacts by STP Number

APPENDIX B-1: PREHISTORIC ARTIFACT CATALOGUE

In Order by STP

FS #	STP	LEVEL	SOIL HORIZON	DEPTH (cm)	COUNT	HISTORIC/ PREHISTORIC	GROUP	CLASS	MATERIAL	OBJECT	COLOR	NOTES
8	B3	1	Ap	39	1	Prehistoric	Debitage	Lithic	Chert	Bifacial thinning flake, proximal	Gray/Red	Heat reddened
36	B3+10ft E	1	Ap	27	3	Prehistoric	Debitage	Lithic	Chert	Bifacial thinning flake complete	Red	Heat reddened
36	B3+10ft E	1	Ap	27	3	Prehistoric	Debitage	Lithic	Chert	Flake fragment	Red	Heat reddened
31	B3+10ft S	1	Ap	26	1	Prehistoric	Debitage	Lithic	Chert	Decortication flake, complete	Gray/Red	Heat reddened
35	B3+3ft E	1	Ap	26	1	Prehistoric	Debitage	Lithic	Chert	Early reduction flake, complete	Red	Heat reddened
33	B3+3ft N	1	Ap	26	2	Prehistoric	Debitage	Lithic	Chert	Flake fragment	Red	Heat reddened
32	B3+3ft S	1	Ap	25	1	Prehistoric	Debitage	Lithic	Chert	Trimming Flake, Complete	Gray	
34	B3+3ft W	1	Ap	23	1	Prehistoric	Debitage	Lithic	Chert	Flake fragment	Gray	
9	B4	1	Ap	27	1	Prehistoric	Debitage	Lithic	Chert	Bifacial thinning flake complete	Black	
9	B4	1	Ap	27	1	Prehistoric	Debitage	Lithic	Chert	Flake fragment	Gray	
9	B4	1	Ap	27	1	Prehistoric	Cracked rock	Lithic	Sandstone	FCR	Tan/Red	Fire cracked rock
29	B4+10ft E	1	Ap	27	1	Prehistoric	Debitage	Lithic	Chert	Bifacial thinning flake complete	Gray	
30	B4+10ft S	1	Ap	26	2	Prehistoric	Debitage	Lithic	Chert	Flake fragment	Gray, dark	
10	C3	1	Ap	26	4	Prehistoric	Debitage	Lithic	Chert	Bifacial thinning flake	Gray, dark	

FS #	STP	LEVEL	SOIL HORIZON	DEPTH (cm)	COUNT	HISTORIC/ PREHISTORIC	GROUP	CLASS	MATERIAL	OBJECT	COLOR	NOTES
										complete		
10	C3	1	Ap	26	1	Prehistoric	Debitage	Lithic	Chert	Trimming flake, complete	Gray, dark	
10	C3	1	Ap	26	1	Prehistoric	Cracked rock	Lithic	Sandstone	FCR	Tan/Red	Fire cracked rock
10	C3	1	Ap	26	1	Prehistoric	Unmodified	Lithic	Sandstone	Cobble	Gray	Not worked
40	C3+10ft E	1	Ap	28	1	Prehistoric	Debitage	Lithic	Chalcedony	Bifacial thinning flake complete	Gray, light	Proximal
38	C3+10ft S	1	Ap	27	1	Prehistoric	Debitage	Lithic	Chert	Early reduction flake, complete	Black	
38	C3+10ft S	1	Ap	27	1	Prehistoric	Debitage	Lithic	Chert	Bifacial thinning flake complete	Black	
42	C3+10ft W	1	Ap	27	1	Prehistoric	Debitage	Lithic	Chert	Flake fragment	Black	
41	C3+3ft E	1	Ap	33	2	Prehistoric	Debitage	Lithic	Chert	Flake fragment	Gray, dark	
41	C3+3ft E	1	Ap	33	2	Prehistoric	Debitage	Lithic	Chert	Flake fragment	Gray/Red	Heat reddened
37	C3+3ft N	1	Ap	30	1	Prehistoric	Debitage	Lithic	Chert	Trimming flake, complete	Gray, dark	
39	C3+3ft S	1	Ap	39	1	Prehistoric	Debitage	Lithic	Chert	Flake Fragment	Red	Heat reddened
39	C3+3ft S	1	Ap	39	1	Prehistoric	Debitage	Lithic	Chalcedony	Trimming flake, complete	Gray	
43	C3+3ft W	1	Ap	34	1	Prehistoric	Debitage	Lithic	Chert	Bifacial thinning flake complete	Gray	
43	C3+3ft W	1	Ap	34	1	Prehistoric	Debitage	Lithic	Chert	Flake fragment	Gray	
43	C3+3ft W	1	Ap	34	1	Prehistoric	Debitage	Lithic	Chert	Indeterminate Flake, Complete	Black	

FS #	STP	LEVEL	SOIL HORIZON	DEPTH (cm)	COUNT	HISTORIC/ PREHISTORIC	GROUP	CLASS	MATERIAL	OBJECT	COLOR	NOTES
43	C3+3ft W	1	Ap	34	1	Prehistoric	Debitage	Lithic	Chert	Flake fragment	Black	
43	C3+3ft W	1	Ap	34	1	Prehistoric	Debitage	Lithic	Chert	Flake fragment	Red	Heat reddened
11	D2	1	Ap	20	1	Prehistoric	Debitage	Lithic	Chert	Trimming flake, complete	Gray, dark	
11	D2	1	Ap	20	1	Prehistoric	Debitage	Lithic	Chert	Bifacial thinning flake, complete	Gray, dark	
11	D2	1	Ap	20	1	Prehistoric	Debitage	Lithic	Chert	Bifacial thinning flake, complete	Tan/Red	Heat reddened
11	D2	1	Ap	20	1	Prehistoric	Debitage	Lithic	Chert	Flake fragment	Gray	
11	D2	1	Ap	20	1	Prehistoric	Cracked Rock	Lithic	Quartzite	FCR	Tan/Red	Fire cracked rock
19	D2+10ft E	1	Ap	22	2	Prehistoric	Debitage	Lithic	Chert	Trimming flake, complete	Gray, dark	
19	D2+10ft E	1	Ap	22	1	Prehistoric	Debitage	Lithic	Chert	Flake fragment	Gray. dark	
15	D2+10ft S	1	Ap	23	2	Prehistoric	Debitage	Lithic	Chert	Bifacial thinning flake	Gray	
15	D2+10ft S	1	Ap	23	1	Prehistoric	Debitage	Lithic	Chalcedony	Flake fragment	Gray, light	
17	D2+10ft W	1	Ap	26	2	Prehistoric	Debitage	Lithic	Chert	Trimming flake, complete	Black	
17	D2+3ft W	1	Ap	26	2	Prehistoric	Debitage	Lithic	Chert	Bifacial thinning flake	Gray, dark	
17	D2+3ft W	1	Ap	26	1	Prehistoric	Debitage	Lithic	Chert	Flake fragment	Black	
20	D2+3ft E	1	Ap	27	3	Prehistoric	Debitage	Lithic	Chert	Flake fragment	Gray, dark	
16	D2+3ft N	1	Ap	30	1	Prehistoric	Debitage	Lithic	Chert	Bifacial	Black	

FS #	STP	LEVEL	SOIL HORIZON	DEPTH (cm)	COUNT	HISTORIC/ PREHISTORIC	GROUP	CLASS	MATERIAL	OBJECT	COLOR	NOTES
										thinning flake		
16	D2+3ft N	1	Ap	30	1	Prehistoric	Debitage	Lithic	Chalcedony	Flake fragment	Gray	
16	D2+3ft N	1	Ap	30	1	Prehistoric	Debitage	Lithic	Chert	Flake fragment	Gray	
16	D2+3ft N	1	Ap	30	1	Prehistoric	Debitage	Lithic	Chert	Flake fragment	Black	
14	D2+3ft S	1	Ap	27	1	Prehistoric	Debitage	Lithic	Chert	Trimming flake, complete	Gray, Dark	
18	D2+3ft W	1	Ap	23	1	Prehistoric	Debitage	Lithic	Sandstone	Decortication flake, complete	Tan	Cortex: cobble
18	D2+3ft W	1	Ap	23	2	Prehistoric	Debitage	Lithic	Chert	Flake fragment	Black	
18	D2+3ft W	1	Ap	23	2	Prehistoric	Debitage	Lithic	Chert	Flake fragment	Gray	
12	D4	1	Ap	35	1	Prehistoric	Debitage	Lithic	Chert	Bifacial thinning flake, complete	Black	
23	D4+10ft E	1	A	34	1	Prehistoric	Debitage	Lithic	Chert	Flake fragment	Gray	
25	D4+10ft W	1	Ap	44	1	Prehistoric	Debitage	Lithic	Chert	Bifacial thinning flake, complete	Black	
24	D4+3ft E	1	A	34	1	Prehistoric	Debitage	Lithic	Chert	Flake fragment	Gray	
22	D4+3ft N	1	A	45	1	Prehistoric	Debitage	Lithic	Chert	Flake fragment	Red	Heat reddened
22	D4+3ft N	1	A	45	1	Prehistoric	Debitage	Lithic	Chert	Indeterminate flake, complete	Gray	
21	D4+3ft S	1	Ap	35	1	Prehistoric	Debitage	Lithic	Chert	Bifacial thinning flake, complete	Gray	
21	D4+3ft S	1	Ap	35	1	Prehistoric	Debitage	Lithic	Chert	Flake fragment	Black	

FS #	STP	LEVEL	SOIL HORIZON	DEPTH (cm)	COUNT	HISTORIC/ PREHISTORIC	GROUP	CLASS	MATERIAL	OBJECT	COLOR	NOTES
26	D4+3ft W	1	Ap	41	1	Prehistoric	Debitage	Lithic	Chert	Flake Fragment	Gray, dark	
26	D4+3ft W	1	Ap	41	1	Prehistoric	Debitage	Lithic	Chert	Early Reduction flake, Complete	Brown/ gray	
26	D4+3ft W	1	Ap	41	1	Prehistoric	Debitage	Lithic	Chert	Early Reduction flake, Complete	Black	
13	D5	1	Ap	28	1	Prehistoric	Debitage	Lithic	Chert	Flake fragment	Gray/Red	Heat reddened
13	D5	1	Ap	28	1	Prehistoric	Debitage	Lithic	Chert	Flake fragment	Gray/Red	Potlidded
13	D5	1	Ap	28	1	Prehistoric	Cracked Rock	Lithic	Quartzite	FCR	Tan	Fire cracked rock
27	D5+10ft N	1	Ap	30	1	Prehistoric	Debitage	Lithic	Chert	Early Reduction flake, Complete	Gray/ brown	
2	F5	1	A	30	1	Prehistoric	Debitage	Lithic	Chert	Bifacial thinning flake complete	Gray	
2	F5	1	A	30	2	Prehistoric	Debitage	Lithic	Chert	Flake fragment	Gray	
1	F8	1	A	30	1	Prehistoric	Debitage	Lithic	Chert	Bifacial thinning flake complete	Black	
1	F8	1	A	30	1	Prehistoric	Debitage	Lithic	Chert	Flake fragment	Gray/Red	Heat reddened
1	F8	1	A	30	1	Prehistoric	Debitage	Lithic	Chalcedony	Indeterminate flake, complete	Gray	
5	F8+10ft E	1	A	29	1	Prehistoric	Debitage	Lithic	Chert	Indeterminate flake, complete	Gray	
3	F8+10ft N	1	A	32	1	Prehistoric	Debitage	Lithic	Chert	Early reduction flake, complete	Gray, light	

FS #	STP	LEVEL	SOIL HORIZON	DEPTH (cm)	COUNT	HISTORIC/ PREHISTORIC	GROUP	CLASS	MATERIAL	OBJECT	COLOR	NOTES
3	F8+10ft N	1	A	32	1	Prehistoric	Debitage	Lithic	Chalcedony	Flake fragment	Gray	
3	F8+10ft N	1	A	32	1	Prehistoric	Debitage	Lithic	Chert	Bifacial thinning flake complete	Gray, light	
6	F8+10ft S	1	A	27	1	Prehistoric	Debitage	Lithic	Chert	Bifacial thinning flake complete	Gray	
6	F8+10ft S	1	A	27	1	Prehistoric	Cracked Rock	Lithic	Sandstone	FCR	Gray	Fire cracked rock
6	F8+10ft S	1	A	27	1	Prehistoric	Cracked Rock	Lithic	Sandstone	FCR	Gray/Red	Fire cracked rock
4	F8+10ft W	1	A	31	1	Prehistoric	Debitage	Lithic	Chert	Flake fragment	Gray, dark	
7	F8+3ft S	1	A	37	1	Prehistoric	Debitage	Lithic	Chert	Bifacial thinning flake complete	Black	

APPENDIX B

Artifact Catalogues:

Appendix B-2 Historic Artifacts by STP Number

APPENDIX B-2: HISTORIC ARTIFACT CATALOGUE

In Order by STP

FS #	STP	LEVEL	SOIL HORIZON	DEPTH (cm)	COUNT	HISTORIC/ PREHISTORIC	GROUP	CLASS	MATERIAL	OBJECT	COLOR	NOTES
9	B4	1	Ap	27	1	Historic	Architectural	Metal	Iron	Nail fragment	Rusted	Cut nail
30	B4+10ft S	1	Ap	26	1	Historic	Electrical	Metal	Iron	Fragment		Wire Housing w/wire
43	C3+3ft W	1	Ap	34	1	Historic	Architectural	Glass	Common glass	Window glass fragment	Aqua	
19	D2+10ft E	1	Ap	22	2	Historic	Architectural	Metal	Iron	Nail Fragments	Rusted	Probable wire nail
16	D2+3ft N	1	Ap	30	1	Historic	Household	Ceramic	Coarse earthenware	Body sherd	Brown	Lead glazed
16	D2+3ft N	1	Ap	30	1	Historic	Architectural	Metal	Iron	Nail Fragment		Cut nail
14	D2+3ft S	1	Ap	27	2	Historic	Architectural	Metal	Iron	Nail, complete		Wire
14	D2+3ft S	1	Ap	27	2	Historic	Architectural	Metal	Iron	Nail fragment	Rusted	Unident. type
18	D2+3ft W	1	Ap	23	2	Historic	Architectural	Metal	Iron	Nail fragments	Rusted	Probable wire nail
25	D4+10ft W	1	Ap	44	1	Historic	Household	Glass	Common glass	Curved bodysherd	Green	Probable beverage bottle
21	D4+3ft S	1	Ap	35	1	Historic	Architectural	Glass	Non-lead glass	Window glass fragment	Colorless	
28	D5+10ft W	1	Ap	26	1	Historic	Personal	Ceramic	Refined earthenware	Smoking pipe pipestem fragment	White ball clay	5/64-inch bore
46	K 2	1	Ap	26	1	Historic	Indeterminate	Metal	White Metal	Bell		Probable animal bell
47	L 3	1	Ap	26	1	Historic	Personal	Ceramic	Refined earthenware	Smoking Pipe pipestem fragment	White ball clay	

APPENDIX B

Artifact Catalogues:

Appendix B-3 Complete Artifact Catalogue by FS Number

Appendix B-3: Prehistoric and Historic Artifact Catalogue In Order of Field Specimen Number

FS.Entry	Provenience	Artifact Count	Group	Material	Object	Color	Ware/ Technology/ Species	Comments	Weight (grams)	Cortex Type	Cortex percent
1.1	STP F8 Strat I A	1	Prehistoric, Debitage	Lithic, Chert	Bifacial Thinning Flake, Complete	Black			1.67	Absent	0 %
1.2	STP F8 Strat I A	1	Prehistoric, Debitage	Lithic, Chert	Flake Fragment,	Gray/Red			0.14	Absent	0 %
1.3	STP F8 Strat I A	1	Prehistoric, Debitage	Lithic, Chalcedony	Indeterminate Flake, Complete	Gray			1.30	Absent	0 %
2.1	STP F5 Strat I A	1	Prehistoric, Debitage	Lithic, Chert	Bifacial Thinning Flake, Complete	Gray			0.24	Absent	0 %
2.2	STP F5 Strat I A	2	Prehistoric, Debitage	Lithic, Chert	Flake Fragment,	Gray			3.90	Absent	0 %
3.1	STP F8+10ft N Strat I A	1	Prehistoric, Debitage	Lithic, Chert	Early Reduction Flake, Complete	Gray, Light			3.00	Absent	0 %
3.2	STP F8+10ft N Strat I A	1	Prehistoric, Debitage	Lithic, Chert	Bifacial Thinning Flake, Complete	Gray, Light			0.53	Absent	0 %
3.3	STP F8+10ft N Strat I A	1	Prehistoric, Debitage	Lithic, Chalcedony	Flake Fragment,	Gray			0.12	Absent	0 %
4.1	STP F8+10ft W Strat I A	1	Prehistoric, Debitage	Lithic, Chert	Flake Fragment,	Gray, Dark			0.80	Absent	0 %
5.1	STP F8+10ft E Strat I A	1	Prehistoric, Debitage	Lithic, Chert	Indeterminate Flake, Complete	Gray			0.22	Absent	0 %
6.1	STP F8+10ft S Strat I A	1	Prehistoric, Cracked Rock	Lithic, Sandstone	FCR,	Gray/Red			21.50		
6.2	STP F8+10ft S Strat I A	1	Prehistoric, Cracked Rock	Lithic, Sandstone	FCR,	Gray			10.60		
6.3	STP F8+10ft S Strat I A	1	Prehistoric, Debitage	Lithic, Chert	Bifacial Thinning Flake, Complete	Gray			0.70	Absent	0 %
7.1	STP F8+3ft S Strat I A	1	Prehistoric, Debitage	Lithic, Chert	Bifacial Thinning Flake, Complete	Black			0.90	Absent	0 %
8.1	STP B3 Strat I Ap	1	Prehistoric, Debitage	Lithic, Chert	Bifacial Thinning Flake, Proximal	Gray/Red			0.66	Absent	0 %
9.1	STP B4 Strat I Ap	1	Historic, Architectural	Metal, Iron	Nail, Fragment		Cut	Rusted cut nail fragment.	5.10		
9.2	STP B4 Strat I Ap	1	Prehistoric, Cracked Rock	Lithic, Sandstone	FCR,	Tan/Red			6.80		
9.3	STP B4 Strat I Ap	1	Prehistoric, Debitage	Lithic, Chert	Bifacial Thinning Flake, Complete	Black			1.20	Absent	0 %
9.4	STP B4 Strat I Ap	1	Prehistoric, Debitage	Lithic, Chert	Flake Fragment,	Gray			0.60	Absent	0 %
10.1	STP C3 Strat I Ap	1	Prehistoric, Unmodifieds	Lithic, Sandstone	Cobble, Complete	Gray		Small coble without any modification or reddening.	121.80		

FS.Entry	Provenience	Artifact Count	Group	Material	Object	Color	Ware/ Technology/ Species	Comments	Weight (grams)	Cortex Type	Cortex percent
10.2	STP C3 Strat I Ap	1	Prehistoric, Cracked Rock	Lithic, Sandstone	FCR,	Tan/Red			59.40		
10.3	STP C3 Strat I Ap	4	Prehistoric, Debitage	Lithic, Chert	Bifacial Thinning Flake, Complete	Gray, Dark			1.44	Absent	0 %
10.4	STP C3 Strat I Ap	1	Prehistoric, Debitage	Lithic, Chert	Trimming Flake, Complete	Gray, Dark			0.18	Absent	0 %
11.1	STP D2 Strat I Ap	1	Prehistoric, Cracked Rock	Lithic, Quartzite	FCR,	Tan/Red			127.80		
11.2	STP D2 Strat I Ap	1	Prehistoric, Debitage	Lithic, Chert	Bifacial Thinning Flake, Complete	Gray, Dark			0.50	Absent	0 %
11.3	STP D2 Strat I Ap	1	Prehistoric, Debitage	Lithic, Chert	Trimming Flake, Complete	Gray, Dark			0.06	Absent	0 %
11.4	STP D2 Strat I Ap	1	Prehistoric, Debitage	Lithic, Chert	Flake Fragment,	Gray			0.25	Absent	0 %
11.5	STP D2 Strat I Ap	1	Prehistoric, Debitage	Lithic, Chert	Bifacial Thinning Flake, Complete	Tan/Red			0.46	Absent	0 %
12.1	STP D4 Strat I Ap	1	Prehistoric, Debitage	Lithic, Chert	Bifacial Thinning Flake, Complete	Black			0.45	Absent	0 %
13.1	STP D5 Strat I Ap	1	Prehistoric, Cracked Rock	Lithic, Quartzite	FCR,	Tan			72.30		
13.2	STP D5 Strat I Ap	1	Prehistoric, Debitage	Lithic, Chert	Flake Fragment,	Gray/Red			0.19	Absent	0 %
13.3	STP D5 Strat I Ap	1	Prehistoric, Debitage	Lithic, Chert	Flake Fragment,	Gray/Red			0.12	Absent	0 %
14.1	STP D2+3ft S Strat I Ap	2	Historic, Architectural	Metal, Iron	Nail, Fragment		Indeterminate	Rusted nail fragments.	4.80		
14.2	STP D2+3ft S Strat I Ap	1	Historic, Architectural	Metal, Iron	Nail, Complete		Wire	Rusted wire nail.	5.10		
14.3	STP D2+3ft S Strat I Ap	1	Prehistoric, Debitage	Lithic, Chert	Trimming Flake, Complete	Gray, Dark			0.08	Absent	0 %
15.1	STP D2+10ft S Strat I Ap	1	Prehistoric, Debitage	Lithic, Chalcedony	Flake Fragment,	Gray, Light			0.38	Absent	0 %
15.1	STP D2+10ft S Strat I Ap	2	Prehistoric, Debitage	Lithic, Chert	Bifacial Thinning Flake, Complete	Gray			0.41	Absent	0 %
16.1	STP D2+3ft N Strat I Ap	1	Historic, Architectural	Metal, Iron	Nail, Fragment		Cut	Heavily rusted cut nail fragment.	6.70		
16.2	STP D2+3ft N Strat I Ap	1	Historic, Household	Ceramic, Coarse Earthenware	Indeterminate, Body Sherd		Redware	Brown glaze on interior. Interior spalled.	0.20		
16.3	STP D2+3ft N Strat I Ap	1	Prehistoric, Debitage	Lithic, Chert	Bifacial Thinning Flake, Complete	Black			0.30	Absent	0 %

FS.Entry	Provenience	Artifact Count	Group	Material	Object	Color	Ware/ Technology/ Species	Comments	Weight (grams)	Cortex Type	Cortex percent
16.4	STP D2+3ft N Strat I Ap	1	Prehistoric, Debitage	Lithic, Chert	Flake Fragment,	Black			0.30	Absent	0 %
16.5	STP D2+3ft N Strat I Ap	1	Prehistoric, Debitage	Lithic, Chert	Flake Fragment,	Gray			0.30	Absent	0 %
16.6	STP D2+3ft N Strat I Ap	1	Prehistoric, Debitage	Lithic, Chalcedony	Flake Fragment,	Gray			0.22	Absent	0 %
17.1	STP D2+10ft W Strat I Ap	2	Prehistoric, Debitage	Lithic, Chert	Trimming Flake, Complete	Black			0.10	Absent	0 %
17.2	STP D2+10ft W Strat I Ap	2	Prehistoric, Debitage	Lithic, Chert	Bifacial Thinning Flake, Complete	Gray, Dark			0.40	Absent	0 %
17.3	STP D2+10ft W Strat I Ap	1	Prehistoric, Debitage	Lithic, Chert	Flake Fragment,	Black			0.20	Absent	0 %
18.1	STP D2+3ft W Strat I Ap	2	Historic, Architectural	Metal, Iron	Nail, Fragment		Indeterminate	Two rusted nail fragments. Most likely wire nails.	2.00		
18.2	STP D2+3ft W Strat I Ap	1	Prehistoric, Debitage	Lithic, Sandstone	Decortication Flake, Complete	Tan			0.70	Cobble	100 %
18.3	STP D2+3ft W Strat I Ap	2	Prehistoric, Debitage	Lithic, Chert	Flake Fragment,	Black			0.50	Absent	0 %
18.4	STP D2+3ft W Strat I Ap	2	Prehistoric, Debitage	Lithic, Chert	Flake Fragment,	Gray			1.80	Absent	0 %
19.1	STP D2+10ft E Strat I Ap	2	Historic, Architectural	Metal, Iron	Nail, Fragment		Indeterminate	Heavily rusted nails. Most likely wire nails.	6.20		
19.2	STP D2+10ft E Strat I Ap	2	Prehistoric, Debitage	Lithic, Chert	Trimming Flake, Complete	Gray, Dark			0.30	Absent	0 %
19.3	STP D2+10ft E Strat I Ap	1	Prehistoric, Debitage	Lithic, Chert	Flake Fragment,	Gray, Dark			0.10	Absent	0 %
20.1	STP D2+3ft E Strat I Ap	3	Prehistoric, Debitage	Lithic, Chert	Flake Fragment,	Gray, Dark			1.30	Absent	0 %
21.1	STP D4+3ft S Strat I Ap	1	Historic, Architectural	Glass, Non-Lead Glass	Window Glass, Fragment	Colorless			1.20		
21.2	STP D4+3ft S Strat I Ap	1	Prehistoric, Debitage	Lithic, Chert	Bifacial Thinning Flake, Complete	Gray			0.18	Absent	0 %
21.3	STP D4+3ft S Strat I Ap	1	Prehistoric, Debitage	Lithic, Chert	Flake Fragment,	Black			0.11	Absent	0 %
22.1	STP D4+3ft N Strat I Ap	1	Prehistoric, Debitage	Lithic, Chert	Flake Fragment,	Red			2.70	Absent	0 %
22.2	STP D4+3ft N Strat I Ap	1	Prehistoric, Debitage	Lithic, Chert	Indeterminate Flake, Complete	Gray			0.66	Absent	0 %
23.1	STP D4+10ft E Strat I Ap	1	Prehistoric, Debitage	Lithic, Chert	Flake Fragment,	Gray			0.20	Absent	0 %

FS.Entry	Provenience	Artifact Count	Group	Material	Object	Color	Ware/ Technology/ Species	Comments	Weight (grams)	Cortex Type	Cortex percent
24.1	STP D4+3ft E Strat I Ap	1	Prehistoric, Debitage	Lithic, Chert	Flake Fragment,	Gray			1.44	Absent	0 %
25.1	STP D4+10ft W Strat I Ap	1	Historic, Household	Glass, Common Glass	Indeterminate, Body Sherd	Green	Indeterminate	Curved fragment of (7-up) green bottle glass. Probably a bottle/container.	3.70		
25.2	STP D4+10ft W Strat I Ap	1	Prehistoric, Debitage	Lithic, Chert	Bifacial Thinning Flake, Complete	Black			0.43	Absent	0 %
26.1	STP D4+3ft W Strat I Ap	1	Prehistoric, Debitage	Lithic, Chert	Bipolar Reduction Flake, Complete	Brown/Gray			6.20	Absent	0 %
26.2	STP D4+3ft W Strat I Ap	1	Prehistoric, Debitage	Lithic, Chert	Early Reduction Flake, Complete	Black			0.47	Absent	0 %
26.3	STP D4+3ft W Strat I Ap	1	Prehistoric, Debitage	Lithic, Chert	Flake Fragment,	Gray, Dark			1.24	Absent	0 %
27.1	STP D5+10ft N Strat I Ap	1	Prehistoric, Debitage	Lithic, Chert	Early Reduction Flake, Complete	Gray/Brown			0.89	Absent	0 %
28.1	STP D5+10ft W Strat I Ap	1	Historic, Personal	Ceramic, Refined Earthenware	Smoking Pipe, Stem		White Ball Clay		3.90		
29.1	STP B4+10ft E Strat I Ap	1	Prehistoric, Debitage	Lithic, Chert	Bifacial Thinning Flake, Complete	Gray			0.82	Absent	0 %
30.1	STP B4+10ft S Strat I Ap	1	Historic, Electrical	Metal, Iron	Indeterminate, Fragment		Indeterminate	Metal wire housing fragment w/ wire inside.	37.90		
30.2	STP B4+10ft S Strat I Ap	2	Prehistoric, Debitage	Lithic, Chert	Flake Fragment,	Gray, Dark			0.52	Absent	0 %
31.1	STP B3+10ft S Strat I Ap	1	Prehistoric, Debitage	Lithic, Chert	Decortication Flake, Complete	Gray/Red			2.58	Cobble	100 %
32.1	STP B3+3ft S Strat I Ap	1	Prehistoric, Debitage	Lithic, Chert	Trimming Flake, Complete	Gray			0.22		
33.1	STP B3+3ft N Strat I Ap	2	Prehistoric, Debitage	Lithic, Chert	Flake Fragment,	Red		Flakes re-fit.	0.35	Absent	0 %
34.1	STP B3+3ft W Strat I Ap	1	Prehistoric, Debitage	Lithic, Chert	Flake Fragment,	Gray			0.66	Absent	0 %
35.1	STP B3+3ft E Strat I Ap	1	Prehistoric, Debitage	Lithic, Chert	Early Reduction Flake, Complete	Red			5.20	Absent	0 %
36.1	STP B3+10ft E Strat I Ap	3	Prehistoric, Debitage	Lithic, Chert	Bifacial Thinning Flake, Complete	Red			1.09	Absent	0 %
36.2	STP B3+10ft E Strat I Ap	3	Prehistoric, Debitage	Lithic, Chert	Flake Fragment,	Red			0.54	Absent	0 %
37.1	STP C3+3ft N Strat I Ap	1	Prehistoric, Debitage	Lithic, Chert	Trimming Flake, Complete	Gray, Dark			0.09	Absent	0 %

FS.Entry	Provenience	Artifact Count	Group	Material	Object	Color	Ware/ Technology/ Species	Comments	Weight (grams)	Cortex Type	Cortex percent
38.1	STP C3+10ft S Strat I Ap	1	Prehistoric, Debitage	Lithic, Chert	Early Reduction Flake, Complete	Black			0.90	Absent	0 %
38.2	STP C3+10ft S Strat I Ap	1	Prehistoric, Debitage	Lithic, Chert	Bifacial Thinning Flake, Complete	Black			0.40	Absent	0 %
39.1	STP C3+3ft S Strat I Ap	1	Prehistoric, Debitage	Lithic, Chert	Flake Fragment,	Red			0.14	Absent	0 %
39.2	STP C3+3ft S Strat I Ap	1	Prehistoric, Debitage	Lithic, Chalcedony	Trimming Flake, Complete	Gray			0.09	Absent	0 %
40.1	STP C3+10ft E Strat I Ap	1	Prehistoric, Debitage	Lithic, Chalcedony	Bifacial Thinning Flake, Proximal	Gray, Light			0.10	Absent	0 %
41.1	STP C3+3ft E Strat I Ap	2	Prehistoric, Debitage	Lithic, Chert	Flake Fragment,	Gray, Dark			0.50	Absent	0 %
41.2	STP C3+3ft E Strat I Ap	2	Prehistoric, Debitage	Lithic, Chert	Flake Fragment,	Gray/Red			4.10	Absent	0 %
42.1	STP C3+10ft W Strat I Ap	1	Prehistoric, Debitage	Lithic, Chert	Flake Fragment,	Black			0.30	Absent	0 %
43.1	STP C3+3ft W Strat I Ap	1	Historic, Architectural	Glass, Common Glass	Window Glass, Fragment	Aqua			0.19		
43.2	STP C3+3ft W Strat I Ap	1	Prehistoric, Debitage	Lithic, Chert	Bifacial Thinning Flake, Complete	Gray			0.80	Absent	0 %
43.3	STP C3+3ft W Strat I Ap	1	Prehistoric, Debitage	Lithic, Chert	Flake Fragment,	Gray			0.26	Absent	0 %
43.4	STP C3+3ft W Strat I Ap	1	Prehistoric, Debitage	Lithic, Chert	Indeterminate Flake, Complete	Black			0.80	Absent	0 %
43.5	STP C3+3ft W Strat I Ap	1	Prehistoric, Debitage	Lithic, Chert	Flake Fragment,	Black			0.20	Absent	0 %
43.6	STP C3+3ft W Strat I Ap	1	Prehistoric, Tool	Lithic, Chert	Utilized Flake, Distal	Red		Distal flake fragment exhibiting utilization along left lateral margin.	2.10	Absent	0 %

Appendix C – Correspondence

APPENDIX C

Correspondence

Close

View and/or Address a Response

Project 20PR06690: C&D Power Systems (C&D Batteries) Sediment Remediation DEC Site No. 336001 (JQQBL18I84UT)

View Project

Please accept the following information below as the consolidated response from NYS SHPO for the above referenced submission.

Review Responses

Reviewer	Review Type	Response
Chelsea Towers	Survey and Evaluation	In order for SHPO to complete our evaluation of the historic significance of all buildings/structures/districts within or adjacent to your project area, we need further information. Please review the specific information request(s) below and click the Process button to respond to each request.
Philip Perazio	Archaeology	In order for SHPO to complete our evaluation of the Archaeological sensitivity of your project, we need further information. Please review the specific information request(s) below and click the Process button to respond to each request.

Information Requests

Process	Status	Reviewer	Review Type	Request Type	Request Entity	Request Item	Request Description
☐	Information Requested	Chelsea Towers	Survey and Evaluation	Request a New Attachment, Photo, or Survey for this Consultation Project		Attachment	We have not previously evaluated this building. Please provide exterior photos of all major elevations of the C&D Power Systems Main Building. All photos can be combined into a single PDF for submission in CRIS. Contact Chelsea Towers at chelsea.towers@parks.ny.gov with any questions. Thank you.
☐	Information Requested	Philip Perazio	Archaeology	Request a New Attachment, Photo, or Survey for this Consultation Project		Archaeology Survey	We are requesting either a Phase I archaeological survey or evidence of prior disturbance (see attached letter). If you are submitting a Phase I survey report, please upload via the survey wizard using the enclosed survey link/token (green cog/wheel process button). If you are submitting evidence of prior disturbance, please upload as a regular attachment.

Attachments

Attachment	Reviewer	Review Type	Type	Name	Description
☐	Philip Perazio	Archaeology	Document	20PR06690 Submission 1 response archaeology	Request for either a Phase I archaeological survey or evidence of prior disturbance.

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NEW YORK STATE OF OPPORTUNITY. Parks, Recreation and Historic Preservation

ANDREW M. CUOMO
Governor

ERIK KULLESEID
Commissioner

ARCHAEOLOGY COMMENTS

Phase IA/IB Archaeological Survey Recommendation
Project: C&D Power Systems (C&D Batteries) Sediment Remediation DEC Site No. 336001
PR#: 20PR06690
Date: 9 November 2020

Your project is in an archaeologically sensitive location. Therefore, the State Historic Preservation Office/Office of Parks, Recreation and Historic Preservation (SHPO/OPRHP) recommends a Phase IA/IB archaeological survey for components of the project that will involve ground disturbance, unless substantial prior ground disturbance can be documented. A Phase IA/IB survey is designed to determine the presence or absence of archaeological sites or other cultural resources in the project's Area of Potential Effects (APE).

If you consider the entire project area to be disturbed, documentation of the disturbance will need to be reviewed by SHPO/OPRHP. Examples of disturbance include mining activities and multiple episodes of building construction and demolition. Documentation of ground disturbance typically consists of soil bore logs, photos, or previous project plans. Agricultural activity is not considered to be substantial ground disturbance.

Please note that in areas with alluvial soils or fill archaeological deposits may exist below the depth of superficial disturbances such as pavement or even deeper disturbances, depending on the thickness of the alluvium or fill. Evaluation of the possible impact of prior disturbance on archaeological sites must consider the depth of potentially culture-bearing deposits and the depth of planned disturbance by the proposed project.

Our office does not conduct archaeological surveys. A 36 CFR 61 qualified archaeologist should be retained to conduct the Phase IA/IB survey.

Please also be aware that a Section 233 permit from the New York State Education Department (SED) may be necessary before archaeological fieldwork is conducted on State-owned land. If any portion of the project includes the lands of New York State, you should contact the SED before initiating survey activities. The SED contact is Christina Rieth and she can be reached at christina.rieth@nysed.gov. Section 233 permits are not required for projects on private land.

If you have any questions concerning archaeology, please contact Philip Perazio at philip.perazio@parks.ny.gov.

Please note that comments regarding architectural resources are being provided separately.

NEW YORK STATE OF OPPORTUNITY. Parks, Recreation, and Historic Preservation

ANDREW M. CUOMO
Governor

ERIK KULLESEID
Commissioner

January 26, 2021

Nancy Stehling
Senior Archaeologist
AECOM
125 Broad Street
15th Floor
New York, NY 10004

Re: USACE
C&D Power Systems (C&D Batteries) Sediment Remediation DEC Site No. 336001
Town of Deerpark, Orange County, NY
20PR06690

Dear Nancy Stehling:

Thank you for requesting the comments of the New York State Historic Preservation Office (SHPO). We have reviewed the submitted materials in accordance with Section 106 of the National Historic Preservation Act of 1966. These comments are those of the SHPO and relate only to Historic/Cultural resources.

SHPO has reviewed *Phase IA Archaeological Documentary Study for the C&D Power Systems Site Sediment Removal Project, Hamlet of Huguenot, Town of Deerpark, Orange County, NY* (AECOM, 20 January 2021) [21SR00037]. We concur with the recommendation that a Phase IB investigation of this project's APE should be conducted.

We have also reviewed the proposed Phase IB scope of work "Phase IB Archaeological Survey Scope of Work for the C&D Power Systems Site Sediment Removal Project." We have one comment. In accordance with our 2005 Phase I guidelines, supplemental tests surrounding isolated finds should be placed in cardinal directions, spaced at one and three meters from the original test.

If you have any questions, please don't hesitate to contact me.

Sincerely,

Philip A. Perazio, Historic Preservation Program Analyst - Archaeology Unit
Phone: 518-268-2175
e-mail: philip.perazio@parks.ny.gov via e-mail only

cc: Robert Forstner and Amit Haryani, AECOM; Brian Orzel, USACE
Benjamin Rung and Justin Starr, DEC

NEW YORK STATE OF OPPORTUNITY. Parks, Recreation, and Historic Preservation

ANDREW M. CUOMO
Governor

ERIK KULLESEID
Commissioner

April 13, 2021

Nancy Stehling
Senior Archaeologist
AECOM
125 Broad Street
15th Floor
New York, NY 10004

Re: USACE
C&D Power Systems (C&D Batteries) Sediment Remediation DEC Site No. 336001
Town of Deerpark, Orange County, NY
20PR06690

Dear Nancy Stehling:

Thank you for requesting the comments of the New York State Historic Preservation Office (SHPO). We have reviewed the submitted materials in accordance with Section 106 of the National Historic Preservation Act of 1966. These comments are those of the SHPO and relate only to Historic/Cultural resources.

SHPO has reviewed the revised Phase IB scope of work "Phase IB Archaeological Survey Scope of Work for the C&D Power Systems Site Sediment Removal Project." We concur with the revised SOW.

If you have any questions, please don't hesitate to contact me.

Sincerely,

Philip A. Perazio, Historic Preservation Program Analyst - Archaeology Unit
Phone: 518-268-2175
e-mail: philip.perazio@parks.ny.gov via e-mail only

cc: Robert Forstner and Amit Haryani, AECOM; Brian Orzel, USACE
Benjamin Rung and Justin Starr, DEC

Stehling, Nancy

From: Towers, Chelsea (PARKS) <Chelsea.Towers@parks.ny.gov>
Sent: Friday, January 29, 2021 3:51 PM
To: Stehling, Nancy
Subject: [EXTERNAL] RE: 20PR06690.002 - Photographs of C&D Power Systems Submitted Per 11-9-2020 Request in Response

Hi Nancy –

Yes, I have signed off on the above ground resources and have no other concerns. This will be formally communicated through the Effect Finding letter issued at the close of the project review.

Have a nice weekend!

Chelsea Towers
Historic Preservation Program Analyst

New York State Parks, Recreation & Historic Preservation
Peebles Island State Park, P.O. Box 189, Waterford, N.Y. 12188-0189
518.268.2129 | Chelsea.Towers@parks.ny.gov
https://parks.ny.gov/shpo

From: Stehling, Nancy <Nancy.Stehling@aecom.com>
Sent: Friday, January 29, 2021 1:02 PM
To: Towers, Chelsea (PARKS) <Chelsea.Towers@parks.ny.gov>
Subject: 20PR06690.002 - Photographs of C&D Power Systems Submitted Per 11-9-2020 Request in Response

ATTENTION: This email came from an external source. Do not open attachments or click on links from unknown senders or unexpected emails.

Hello Chelsea,

AECOM submitted an initial consultation package to SHPO on 10-23-2020 for the C&D Power Systems Site Sediment Removal Project for NYSDEC.
The consultation package was assigned 20PR06690.001.

On 11-09-2020, SHPO responded in a consolidated response to request a Phase I archaeological survey and additional documentation for above ground resources in the form of photographs of the C&D building.

Your communication was as follows:
"*We have not previously evaluated this building. Please provide exterior photos of all major elevations of the C&D Power Systems Main Building. All photos can be combined into a single PDF for submission in CRIS. Contact Chelsea Towers at chelsea.towers@parks.ny.gov with any questions. Thank you.*"

On 11-19-2020, AECOM uploaded a photo package to CRIS in response to SHPO's request. This submission was assigned 20PR06690.002, and CRIS notified AECOM that the submission was accepted on 11-23-2020.

There has been no response from SHPO on submission 20PR06690.002 since 11-23-2020.

On 1-20-2021 AECOM uploaded the Phase IA report and proposed Phase IB scope of work for the project. This submission was assigned 20PR06690.003 and was accepted on 1-21-2021.

I am emailing you to confirm that SHPO has no additional concerns regarding above ground resources, as submission 20PR06690.002 was sufficient.

Thank you,
-Nancy

Nancy A. Stehling, RPA
Project Manager
Senior Archaeologist
Environment
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nancy.stehling@aecom.com

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NEW YORK STATE OF OPPORTUNITY. Parks, Recreation, and Historic Preservation

KATHY HOCHUL
Governor

ERIK KULLESEID
Commissioner

July 20, 2022

Nancy Stehling
Senior Archaeologist
AECOM
125 Broad Street
15th Floor
New York, NY 10004

Re: USACE
C&D Power Systems (C&D Batteries) Sediment Remediation DEC Site No. 336001
Town of Deerpark, Orange County, NY
20PR06690

Dear Nancy Stehling:

Thank you for requesting the comments of the New York State Historic Preservation Office (SHPO). We have reviewed the submitted materials in accordance with Section 106 of the National Historic Preservation Act of 1966. These comments are those of the SHPO and relate only to Historic/Cultural resources. They do not include other environmental impacts to New York State Parkland that may be involved in or near your project. Such impacts must be considered as part of the environmental review of the project pursuant to the National Environmental Policy Act and/or the State Environmental Quality Review Act (New York State Environmental Conservation Law Article 8).

We have received the recently submitted report entitled *Phase IB Archaeological Subsurface Testing Survey for the C & D Power Systems Site Sediment Removal Project, Hamlet of Huguenot, Town of Deerpark, Orange County, New York*. In order to complete our project review, we are requesting that the report be revised and resubmitted to account for several issues that are described below.

First, the report does not conform to the 2005 Phase I Archaeological Report Format Requirements (See attached). Specifically, it lacks the required Management Summary described in Appendix A of the attached guidelines.

Second, the report fails to identify an archaeological site that the documented deposits can be associated with. It is the opinion of SHPO that the various "areas of archaeological sensitivity" described in the report are part of the previously recorded MRE-TRC-8 Precontact site (USN 07105.000148) originally identified by TRC Environmental Corp. in 2016. The site was discussed at length in your Phase IA report. However, it is not identified in the Phase IB report which simply states "The number of precontact artifacts recovered during the Phase IB survey suggests the presence of a nearby precontact archaeological site." Please revise your report to reflect this site association and update the site record in the CRIS system to reflect your new data. A link/token will be provided with this response allowing you to update the USN record.

Based on the distribution of artifacts reported from your Phase IB investigation, it appears that the MRE-TRC-8 Precontact site extends across most, if not all, of the current study area. Therefore, we are unlikely to concur with any recommendation that does not involve total site avoidance or a Phase II investigation to firmly establish the site boundaries and provide information regarding its eligibility for inclusion on the National Register of Historic Places. It should be noted that the original 2016 TRC report already recommended that site should be considered eligible, an argument strengthened by your Phase IB results.

Finally, we require that reports be submitted as PDF documents, which facilitates our sharing information with the federally recognized tribal nations. Please submit the revised report in PDF format.

If further correspondence is required regarding this project, please refer to the SHPO Project Review (PR) number noted above. If you have any questions, please contact me via email.

Sincerely,

Brad Russell

Bradley W. Russell, Ph.D.
Historic Preservation Specialist - Archaeology
bradley.russell@parks.ny.gov

via e-mail only

Attachment

ATTACHMENT

DURA BASE Performance Data

DURA-BASE®
ADVANCED-COMPOSITE MAT SYSTEM™

SPECIFICATION AND PERFORMANCE DATA

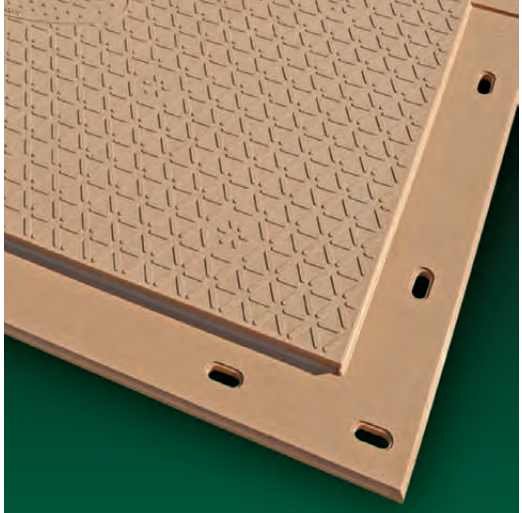
DURA-BASE Advanced-Composite Mat System provides a set of products for temporary roads and temporary job sites. The System includes the DURA-BASE mat, the turning mat and the half mat. The DURA-BASE mat is the primary working product for heavy duty matting needs. The turning mat provides a 10 degree change of direction in a single lane temporary road. The half mat complements the regular mat and provides increase coverage and flexibility in job site layouts.

Strength

DURA-BASE is a load spreading product and is designed to function in conjunction with a supporting sub grade. Full scale laboratory testing has demonstrated mat tolerance to extreme deflection while maintaining high load bearing capacity in pure bending. Pure compressive crush load capacity of the mat structures is approximately 600 psi (40kg/cm^2) when supported by an unyielding surface.

Environmental Performance

DURA-BASE mats are made from high-density polyethylene (HDPE) and are 100% recyclable through our mat recycling program. From this program, Newpark is taking a proactive approach to reduce the overall HDPE carbon footprint. DURA-BASE mats are non-absorbent which prevents environmental risk from cross-contamination threats, including invasive species. This allows for complete decontamination at the end of the project which wood products cannot claim. Wood mats retain contaminants and cannot be effectively cleaned – only effective method of completely removing the risk of cross-contamination is burning or burying them. Our manufacturing process allows for 100% utilization of the plastic. Remaining scrap material is reintroduced into the process.



DURA-BASE mats can be used on a wide variety of projects, including, but not limited to:

- Upstream Oil & Gas
- Pipeline
- Downstream
- Utilities
- Construction
- Heavy Haul
- Events
- Military
- Any project requiring safe temporary roads or job sites

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Hot Weather Performance

DURA-BASE Mats are deployed worldwide, including places that experience extreme hot wet jungle and hot dry desert conditions. HDPE plastic melts at around 121°C (250°F), therefore any exposure to temperatures near or above this level is strongly discouraged. Typical long term operating conditions should not exceed 66°C (150°F). Our DURA-BASE mats can withstand intermittent temperatures of 82°C (180°F) without issue. Damage of mats can occur with long exposure of temperatures above 82°C (180°F).

Cold Weather Performance

DURA-BASE mats have been successfully used in environments where temperatures of minus 34.4°C (minus 30°F) were observed for an extended period of time. In an effort to characterize the mats low temperature performance, our team explored ASTM D746-07 Brittleness Temperature of Plastics and Elastomers by Impact. The results from an independent laboratory indicate that the ASTM D 746-07 Brittleness Temperature for our mats is below minus 90°C (minus 135°F). In our environmental chamber at our world class R&D facility, we have exposed our mats to minus 51.11°C (minus 60°F).

Traffic

Traffic tests on differing soil conditions have shown DURA-BASE to be suitable for an average expected life in excess of 15 years when properly used and maintained. Fatigue tests have shown no appreciable damage at 60,000 cycles [6 inch (15 cm) deflection of 8 foot (2.5 m) span].

Static Dissipation

Plastics, left untreated, exhibit poor electrical conductivity. This condition, when present in mat material, can lead to a buildup of static charge on the plastic or personnel and result in arcing (mild shock). DURA-BASE Composite Mats contain an additive that combines with the plastic and increases the conductivity, rapidly dissipating any charge and reducing the potential for static buildup. Tests have shown the mat surface conductivity to be approximately 10e8 Ohms. The upper limit for a dissipative material is 10e10 Ohms. Field tests have shown the dissipative properties of the composite mat to be equal to those of wooden mats.

DURA-BASE General Specifications

	DURA-BASE Mat	DURA-BASE Turning Mat™	DURA-BASE Half Mat™
Overall Dimensions	8' x 14' x 4"	7' x 14' x 4"	8' x 7' 6" x 4"
	2.44 m x 4.27 m x 10.2 cm	2.13 m x 4.27 m x 10.2 cm	2.44 m x 2.29 m x 10.2 cm
Surface Dimensions	7' x 13'	58 sqft	7' x 6' 6"
	2.13 m x 3.96 m	5.38 sqm	2.13 m x 1.98 m
Weight / Mat	1000 lbs (454 kg)*	750 lbs (340 kg)*	550 lbs (249 kg)*
Material	Custom HDPE	Custom HDPE	Custom HDPE
Coefficient of Friction	0.6**	0.6**	0.6**

*All measurements and weights are nominal. **For wet neoprene rubber on mat surface.

All tests were performed by third party laboratories or in Newpark's facilities or are values from the broad literature on polymers. The information provided above is representative of the materials of construction, manufacturing processes and performance of the DURA-BASE mat, including the test results noted. Newpark makes no representations or warranties with regard any marketing or promotional materials, including, without limitation, the information and data provided herein, which is subject to change at any time without notice. The representations and warranties provided by Newpark in connection with the sale or rental of DURA-BASE products are contained exclusively in our Terms and Conditions and Installation & Handling manual.

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SECTION IV

Appendix D:Record of Decision and Record of Decision Amendment (NYSDEC 2015)

RECORD OF DECISION &
RECORD OF DECISION AMENDMENT

C&D Power Systems (C&D Batteries)
State Superfund Project/RCRA Project
Deer Park, Orange County
Site No. 336001
EPA ID #NYD064337298
March 2015

Prepared by
Division of Environmental Remediation
New York State Department of Environmental Conservation

DECLARATION STATEMENT - RECORD OF DECISION & RECORD OF DECISION AMENDMENT

C&D Power Systems (C&D Batteries)
State Superfund Project/RCRA Project
Deer Park, Orange County
Site No. 336001
EPA ID #NYD064337298
March 2015

Statement of Purpose and Basis

This Record of Decision and Record of Decision Amendment presents the remedy for the C&D Power Systems (C&D Batteries) site, a Class 2 inactive hazardous waste disposal site. The remedial program was chosen in accordance with the New York State Environmental Conservation Law and Title 6 of the Official Compilation of Codes, Rules and Regulations of the State of New York (6 NYCRR) Part 373 (RCRA) and 375 (State Superfund), and is not inconsistent with the National Oil and Hazardous Substances Pollution Contingency Plan of March 8, 1990 (40CFR300), as amended. This is a Toxic Substance Control Act (TSCA) risk based cleanup in accordance with 40 CFR 761.

This decision is based on the Administrative Record of the New York State Department of Environmental Conservation (the Department) for the C&D Power Systems (C&D Batteries) site and the public's input to the proposed remedy and proposed record of decision amendment presented by the Department. A listing of the documents included as a part of the Administrative Record is included in Appendix B of the ROD.

Description of Selected Remedy

This remedy addresses both operable unit (OU) 01 and OU 02 and replaces the March 2002 Record of Decision (ROD) issued for OU 01. Upon issuance of the Record of Decision, OU 01 and OU 02 will be combined into a single operable unit.

The elements of the selected remedy are as follows:

1. Remedial Design

A remedial design program will be implemented to provide the details necessary for the construction, operation, maintenance, and monitoring of the remedial program. Re-sampling of the groundwater to confirm past sampling data and re-evaluation of the wells in the area will be conducted as part of the remedial design program. Green remediation principles and techniques will be implemented to the extent feasible in the design, implementation, and site management of the remedy as per DER-31. The major green remediation components are as follows:

- Considering the environmental impacts of treatment technologies and remedy stewardship over the long term;
- Reducing direct and indirect greenhouse gas and other emissions;
- Increasing energy efficiency and minimizing use of non-renewable energy;
- Conserving and efficiently managing resources and materials;
- Reducing waste, increasing recycling and increasing reuse of materials which would otherwise be considered a waste;
- Maximizing habitat value and creating habitat when possible;
- Fostering Green and healthy communities and working landscapes with balanced ecological, economic and social goals; and
- Integrating the remedy with the end use where possible and encouraging green and sustainable re-development.

2. Excavation

Lagoon: Excavation and off-site disposal of contaminated lagoon soils to a depth of 4 to 6 feet below the lagoon floor (19 to 21 feet below surrounding grade (bsg)). It is estimated that approximately 1,600 cubic yards of contaminated lagoon soil will be excavated and transported to an off-site TSCA and/or RCRA-permitted disposal facility for treatment and/or disposal. The excavation of lagoon soils to a depth up to six feet (21 feet bsg) will address all PCB concentrations that exceed 50 parts per million (ppm). All soils that contain PCB concentrations above 50 parts per million (ppm) will be disposed off-site as hazardous waste. Excavated soils that contain PCB concentrations above 1,000 parts per million (ppm) will be transported to an approved facility for incineration. Excavated soils that contain PCB concentrations above 500 ppm and below 1,000 ppm that are also a characteristic hazardous waste for metals toxicity will be stabilized on-site and transported to an approved facility for disposal.

On-site Soil: All on-site soils and sub-pavement soils containing lead concentrations greater than the Part 375 commercial SCO of 1,000 ppm will be excavated and stabilized for use as backfill in the lagoon as described in remedy element 4. The areas of on-site excavation are shown on Figure 2. It is estimated that approximately 600 cubic yards of soil and 2,500 cubic yards of sub-pavement soil will be excavated.

Off-site Soil: All areas of off-site soil containing lead concentrations greater than Part 375 residential SCO of 400 ppm will be excavated and stabilized for use as backfill in the lagoon as described in remedy element 4. It is estimated that approximately 325 cubic yards of off-site soil will be excavated from the area shown on Figure 2.

Clean fill meeting the requirements of 6 NYCRR Part 375-6.7(d) for commercial use on-site and residential use off-site will be brought in to complete the backfilling of the excavations, lagoon and establish the designed grades at the site to accommodate installation of the cover system described in remedy element 5. Off-site areas will be restored to pre-existing grades.

3. In-Situ Solidification

In-situ solidification (ISS) will be implemented for the on-site lagoon, as indicated on Figure 2. The treatment zone will extend from the bottom of the excavation as described in remedy element 2 (approximately 19 to 21 feet bsg) to the groundwater table, at approximately 28 feet bsg and from the groundwater table to approximately 35 feet bsg in an area where the cadmium toxicity characteristic leaching procedure (TCLP) regulatory limit is exceeded. ISS is a process that binds the soil particles in place creating a low permeability mass. The contaminated soil will be mixed in place together with solidifying agents (typically Portland cement) or other binding agents using an excavator or augers. The soil and binding agents are mixed to produce a solidified mass resulting in a low permeability monolith. The resulting solid matrix reduces or eliminates mobility of contamination and reduces or eliminates the matrix as a source of groundwater contamination.

4. Ex-Situ Stabilization; On-site disposal

Ex-situ stabilization will be implemented to treat the lead contaminated soil excavated from on- and off-site as described in remedy element 2. Ex-situ stabilization is a process that mixes agents with contaminated soil to chemically modify the material to allow it to meet remedial goals, allowing it to be placed back on-site. Under this process the excavated contaminated soil (approximately 3,425 cubic yards) will be mixed in a temporary mixing facility (i.e., pug mill, mixer, etc.) with stabilizing agents (i.e., Enviroblend or an equivalent product) to address lead contamination. The treated soil will then be used as backfill in the lagoon and covered with a site cover to prevent direct exposure.

5. Site Cover

A site cover will be required to allow for commercial use of the site. The site will be restored to existing grade and the cover will consist of either structures such as buildings, pavement, sidewalks comprising any site development or a soil cover in areas where the upper one foot of exposed surface soil will exceed the applicable soil cleanup objectives (SCOs). Where the soil cover is required it will be a minimum of one foot of soil meeting the soil cleanup objectives (SCOs) for cover material as set forth in 6 NYCRR Part 375-6.7(d) for commercial use. The soil cover will be placed over a demarcation layer, with the upper six inches of the soil of sufficient quality to maintain a vegetation layer. Where the soil cover is required over the on-site ISS treatment area, it will consist of a minimum of four feet of soil meeting the SCOs for commercial use. For areas where solidified material underlies the cover, the solidified material itself will serve as the demarcation layer due to the nature of the material.

6. Sediment Removal

Contaminated stream sediment will be removed from tributary D-1-7 to a depth of 12 inches along approximately 1,132 linear feet of stream bed as shown on Figure 2. Approximately, 2,270 cubic yards of sediment will be removed. The removal of sediment to a depth of 12 inches would achieve SCGs for protection of the environment and would be expected to meet residential SCOs. The sediment will be place in the lagoon above the stabilized soils, below the cover system.

The stream will be excavated by diverting or pumping the stream around the contaminated area. Excavated sediments will be replaced with an appropriate substrate and the area restored to pre-excavation contours. Disturbed stream, stream bank and adjacent area vegetation will be re-established by planting and seeding. The restoration of the riverbed will meet the substantive requirements of 6 NYCRR Part 608 Use and Protection of Waters.

Prior to sediment removal, an assessment of the biota and plant communities in the area, including an assessment of the presence of mussels in the disturbed areas will be performed. If mussels are found in the remediation areas or adjacent areas, measures will be taken to limit the deleterious effects of the remedial action.

Following sediment removal, monitoring of restoration success with replacement of failed vegetation and post-removal monitoring of contaminants will be performed.

7. Institutional Controls

Imposition of an institutional control in the form of an environmental easement for the controlled property that:

a. requires the remedial party or site owner to complete and submit to the Department a periodic certification of institutional and engineering controls in accordance with Part 375-1.8(h)(3);

b. allows the use and development of the controlled property for commercial and industrial uses as defined by Part 375-1.8(g), although land use is subject to local zoning laws;

c. restricts the use of groundwater as a source of potable or process water, without necessary water quality treatment as determined by the NYSDOH or County DOH; and

d. requires compliance with the Department approved Site Management Plan.

8. Site Management Plan

A Site Management Plan is required, which includes the following:

a. An Institutional and Engineering Control Plan that identifies all use restrictions and engineering controls for the site and details the steps and media-specific requirements necessary to ensure the following institutional and/or engineering controls remain in place and effective:

Institutional Controls: The Environmental Easement discussed in element 7.

Engineering Controls: The solidified mass and site cover discussed in elements 2 and 4.

This plan includes, but may not be limited to:

• an Excavation Plan which details the provisions for management of future excavations in areas of remaining contamination;

• descriptions of the provisions of the environmental easement including any land use and/or groundwater use restrictions;

• a provision for further delineation of the nature and extent of contamination under the building when the building is demolished and for removal or treatment of any identified source area located under the building if and when the building is demolished;

• a provision for implementing actions recommended to address well contamination if identified;

• provisions for the management and inspection of the identified engineering controls;

• maintaining site access controls and Department notification; and

• the steps necessary for the periodic reviews and certification of the institutional and/or engineering controls.

b. A Monitoring Plan to assess the performance and effectiveness of the remedy. The plan includes, but may not be limited to:

• monitoring of groundwater to assess the performance and effectiveness of the remedy;

• monitoring for site-related groundwater contamination for any off-site private wells, as may be required; and

• a schedule of monitoring and frequency of submittals to the Department.

New York State Department of Health Acceptance

The New York State Department of Health (NYSDOH) concurs that the remedy for this site is protective of human health.

Declaration

The selected remedy is protective of human health and the environment, complies with State and Federal requirements that are legally applicable or relevant and appropriate to the remedial action to the extent practicable, and is cost effective. This remedy utilizes permanent solutions and alternative treatment or resource recovery technologies, to the maximum extent practicable, and satisfies the preference for remedies that reduce toxicity, mobility, or volume as a principal element.

March 26, 2015
Date

Robert W. Schick, P.E., Director
Division of Environmental Remediation

RECORD OF DECISION &
RECORD OF DECISION AMENDMENT

C&D Power Systems (C&D Batteries)
Deer Park, Orange County
Site No. 336001
EPA ID#NYD064337298
March 2015

SECTION 1: SUMMARY AND PURPOSE OF THE RECORD OF DECISION AND RECORD OF DECISION AMENDMENT

The New York State Department of Environmental Conservation (the Department), in consultation with the New York State Department of Health (NYSDOH), has selected a remedy for the above referenced site. The disposal of hazardous wastes at the site has resulted in threats to public health and the environment that would be addressed by the remedy. The disposal or release of hazardous wastes at this site, as more fully described in this document, has contaminated various environmental media. The remedy is intended to attain the remedial action objectives identified for this site for the protection of public health and the environment. This Record of Decision (ROD) and ROD Amendment identifies the selected remedy, summarizes the other alternatives considered, and discusses the reasons for selecting the remedy.

The New York State Inactive Hazardous Waste Disposal Site Remedial Program (also known as the State Superfund Program) is an enforcement program, the mission of which is to identify and characterize suspected inactive hazardous waste disposal sites and to investigate and remediate those sites found to pose a significant threat to public health and environment. The New York State Hazardous Waste Management Program (also known as the RCRA Program) requires corrective action for releases of hazardous waste and hazardous constituents to the environment. The Toxic Substance Control Act (TSCA) governs the management of polychlorinated biphenyls (PCB) containing materials in the United States. This facility is subject to these three programs.

The Department has issued this document in accordance with the requirements of New York State Environmental Conservation Law and Title 6 of the Official Compilation of Codes, Rules and Regulations of the State of New York; (6 NYCRR) Parts 373 (RCRA) and 375 (State Superfund). This is a TSCA risk based cleanup in accordance with 40 CFR 761. This document serves as the Statement of Basis (SB) for the Corrective Action (CA). This document is a summary of the information that can be found in the site-related reports and documents in the document repository identified below.

On March 27, 2002, The New York State Department of Environmental Conservation (Department) signed a Record of Decision (ROD) which selected a remedy to clean up the C&D Power Systems Site Operable Unit (OU) Number 01, the unsaturated lagoon soils, The ROD

outlined a set of remedial actions for the site that included excavation and disposal of the top six to eight feet (21 feet to 23 feet below surrounding grade (bsg)) of the contaminated lagoon soil and ex-situ stabilization of the remaining contaminated unsaturated lagoon soil. Following the issuance of the ROD, investigations for OU 02 were completed. OU 02 consists of the saturated zone beneath the lagoon, tributary sediment, surface water, on- and off-site groundwater, and on- and off-site surface soil and sub-paved surface soils.

The remedial investigation for OU 02 identified constructability issues associated with the driving of sheet pile due to the site's geology and the need to combine OU 01 and OU 02 remedies due to the presence of contamination in saturated lagoon soils (i.e., below the groundwater table).

SECTION 2: CITIZEN PARTICIPATION

The Department seeks input from the community on all remedies. A public comment period was held, during which the public was encouraged to submit comment on the proposed remedy and proposed ROD amendment. All comments on the remedy received during the comment period were considered by the Department in selecting a remedy for the site. Site-related reports and documents were made available for review by the public at the following document repositories:

Port Jervis Library
138 Pike Street
Port Jervis, NY 12771
Phone: (845) 856-7313

Deerpark Town Hall
420 Rt. 209
Huguenot, NY 12746
Phone: (845) 856-5705

NYSDEC Region 3 Office
21 South Putt Corners Road
New Paltz, NY 12561
Phone: (845) 256-3018
Please call for an appointment

A public meeting was also conducted. At the meeting, the findings of the remedial investigation (RI) and the feasibility study (FS) were presented along with a summary of the proposed remedy and ROD amendment. After the presentation, a question-and-answer period was held, during which verbal or written comments were accepted on the proposed remedy and ROD amendment.

Comments on the remedy received during the comment period are summarized and addressed in the Responsiveness Summary section of the ROD and ROD Amendment.

Receive Site Citizen Participation Information By Email

Please note that the Department's Division of Environmental Remediation (DER) is "going

paperless" relative to citizen participation information. The ultimate goal is to distribute citizen participation information about contaminated sites electronically by way of county email listservs. Information will be distributed for all sites that are being investigated and cleaned up in a particular county under the State Superfund Program, Environmental Restoration Program, Brownfield Cleanup Program, Voluntary Cleanup Program, and Resource Conservation and Recovery Act Program. We encourage the public to sign up for one or more county listservs at http://www.dec.ny.gov/chemical/61092.html

SECTION 3: SITE DESCRIPTION AND HISTORY

3.1: Operable Units

Operable Units (OU) 01 and 02 are the subject of this document

OU 01 consists of the unsaturated lagoon soils. OU 02 consists of the balance of the site and off-site media. Specifically, OU 02 includes the saturated zone beneath the lagoon, off-site sediment, off-site surface water, on- and off-site groundwater, and on- and off-site soil.

The amended remedy described in this document supersedes the Record of Decision (ROD) previously issued for OU 01. Upon issuance of the amended OU 01 and OU 02 Records of Decision, OU 01 and OU 02 will be combined into a single operable unit.

A site location map is attached as Figure 1.

3.2: Site Details

Location: The C and D Power Systems site is located in the Hamlet of Huguenot in the Town of Deerpark, Orange County. The site is located approximately four miles northeast of the City of Port Jervis.

Site Features: The main site features include a large industrial building formerly used for the manufacturing of batteries, which is currently unoccupied, and an approximately 175-foot diameter wastewater treatment lagoon located 75 feet northeast of the plant building. The depth of the lagoon is approximately 15 feet. The site drops off rapidly to the northeast. Tributary D-1-7 to the Neversink River is located to the east/northeast and is currently accessible. The aquatic habitat of Tributary D-1-7 is consistent with the aquatic habitat preferred by the dwarf wedge mussel, a federal and New York State endangered species, known to inhabit the Neversink River.

Current Zoning and Land Use: The site is currently inactive, and is zoned for commercial use. Manufacturing operations at the site ceased in 2006. The site is in the Neversink River Valley and is bordered on the west by Route 209 and on the east by tributary D-1-7 to the Neversink River. The surrounding parcels are currently used for a combination of residential and commercial uses.

Past Use of the Site: From 1959 to approximately 1970, the facility was owned and operated by the Empire Tube Company (ETC), a manufacturer of black and white picture tubes. Hydrofluoric acid was used in the manufacturing process to remove carbon and potassium silicate from the

inside of the tubes. During this period, industrial wastewater was discharged to a lagoon adjacent to the northeastern corner of the plant building. C&D Technologies Incorporated operated at the facility manufacturing industrial lead batteries from the mid-1970s to 2006. From the mid-1970s until approximately 1982, C&D discharged non-contact cooling water into the lagoon.

The facility was formerly permitted to operate as a treatment, storage and/or disposal (TSDF) facility under the Resource Conservation and Recovery Act (RCRA) hazardous waste management program. The site has been included in the USEPA's tracking system under GPRA (Government Performance and Results Act) for corrective action. The RCRA Corrective Action Program requires investigation and cleanup of releases of hazardous wastes and hazardous constituents that pose an unacceptable risk at RCRA hazardous waste treatment, storage and disposal facilities. This site has not yet met indicators to show compliance with RCRA Corrective Action.

Operable Units: The site was divided into two operable units. An operable unit represents a portion of a remedial program for a site that for technical or administrative reasons can be addressed separately to investigate, eliminate or mitigate a release, threat of release or exposure pathway resulting from the site contamination.

Operable unit (OU) 01 consists of the unsaturated lagoon soils. OU 02 consists of the saturated zone beneath the lagoon, off-site tributary sediment, surface water, on- and off-site groundwater, on- and off-site soil.

The Record of Decision (ROD) for OU 01 was issued in March 2002. Because the selected remedy for OU 01 included removal of the unsaturated lagoon soils, ex-situ stabilization of the soils with disposal back into the lagoon, it was necessary to complete the investigation and remedy selection for OU 02 prior to implementing the OU 01 remedy.

Site Geology and Hydrogeology: The site and surrounding area is underlain by glacially deposited sand and gravel that gets coarser with depth. The irregular thickness of the deposit ranges from less than 10 feet to approximately 150 feet. Depth to groundwater is approximately 30 feet below ground surface. Groundwater flows southeast towards the unnamed tributary to the Neversink River which lies east of the site.

SECTION 4: LAND USE AND PHYSICAL SETTING

The Department may consider the current, intended, and reasonably anticipated future land use of the site and its surroundings when evaluating a remedy for soil remediation. For this site, alternatives (or an alternative) that restrict(s) the use of the site to commercial use (which allows for industrial use) as described in Part 375-1.8(g) were/was evaluated in addition to an alternative which would allow for unrestricted use of the site.

A comparison of the results of the RI to the appropriate standards, criteria and guidance values (SCGs) for the identified land use and the unrestricted use SCGs for the site contaminants is included in the Tables for the media being evaluated in Exhibit A.

SECTION 5: ENFORCEMENT STATUS

Potentially Responsible Parties (PRPs) are those who may be legally liable for contamination at a site. This may include past or present owners and operators, waste generators, and haulers.

The PRPs for the site, documented to date, include:

C&D Technologies Inc.

The Department and C and D Technologies Inc. entered into a Consent Order on July 19, 1999. The Order obligates the responsible parties to implement a remedial investigation (RI)/feasibility study (FS)-only remedial program. After the remedy is determined, the Department will approach the PRPs to enter another consent order with the Department to implement the remedy.

SECTION 6: SITE CONTAMINATION

6.1: Summary of the Remedial Investigation

A Remedial Investigation (RI) has been conducted. The purpose of the RI was to define the nature and extent of any contamination resulting from previous activities at the site. The field activities and findings of the investigation are described in the RI Report.

The following general activities are conducted during an RI:

- Research of historical information,
- Geophysical survey to determine the lateral extent of wastes,
- Test pits, soil borings, and monitoring well installations,
- Sampling of waste, surface and subsurface soils, groundwater, and soil vapor,
- Sampling of surface water and sediment,
- Ecological and Human Health Exposure Assessments.

The analytical data collected on this site includes data for:

- groundwater
- surface water
- soil
- sediment

6.1.1: Standards, Criteria, and Guidance (SCGs)

The remedy must conform to promulgated standards and criteria that are directly applicable or that

are relevant and appropriate. The selection of a remedy must also take into consideration guidance, as appropriate. Standards, Criteria and Guidance are hereafter called SCGs.

To determine whether the contaminants identified in various media are present at levels of concern, the data from the RI were compared to media-specific SCGs. The Department has developed SCGs for groundwater, surface water, sediments, and soil. The NYSDOH has developed SCGs for drinking water and soil vapor intrusion. The tables found in Exhibit A list the applicable SCGs in the footnotes. For a full listing of all SCGs see: http://www.dec.ny.gov/regulations/61794.html

6.1.2: RI Results

The data have identified contaminants of concern. A "contaminant of concern" is a hazardous waste that is sufficiently present in frequency and concentration in the environment to require evaluation for remedial action. Not all contaminants identified on the property are contaminants of concern. The nature and extent of contamination and environmental media requiring action are summarized in Exhibit A. Additionally, the RI Report contains a full discussion of the data. The contaminants of concern identified for this Operable Unit at this site is/are:

barium
cadmium
fluoride
lead
PCB-aroclor 1254

As illustrated in Exhibit A, the contaminants of concern exceed the applicable SCGs for:

- groundwater
- soil
- sediment

6.2: Interim Remedial Measures

An interim remedial measure (IRM) is conducted at a site when a source of contamination or exposure pathway can be effectively addressed before issuance of the Record of Decision.

There were no IRMs performed at this site during the RI.

In 1998, the facility completed closure, in accordance with USEPA RCRA requirements, of a 90,000 gallon settling tank and a 6,800 gallon neutralization tank. The following closure activities took place in October 2006:

- Power washing and removal of equipment;
- Power washing of building walls and floors;
- Decontamination of building roof equipment;
- Cleanup of the interior offices, the maintenance room and outside area; and
- Segregation and removal off-site of non-hazardous and hazardous materials and wastes.

6.3: Summary of Environmental Assessment

This section summarizes the assessment of existing and potential future environmental impacts presented by the site. Environmental impacts may include existing and potential future exposure pathways to fish and wildlife receptors, wetlands, groundwater resources, and surface water.

The Fish and Wildlife Resources Impact Analysis (FWRIA) for OU 02, which is included in the RI report, presents a detailed discussion of the existing and potential impacts from the site to fish and wildlife receptors.

Nature and Extent of Contamination:

The goal of a remedial investigation is to determine the nature and extent of contamination. Therefore, the investigation included sampling and analysis for the full target compound list/target analyte list. No volatile organic compounds or semi-volatile organic compounds were detected above applicable standards. Metals and polychlorinated biphenyls were detected above applicable standards and identified as the contaminants of concern for this site.

For OU 01: Unsaturated Lagoon Soils

The primary contaminants of concern for OU 01 include barium, cadmium, fluoride, polychlorinated biphenyls (PCBs) and lead.

Lagoon Soil – PCBs were detected in the top foot of lagoon soils up to 1,100 parts per million (ppm) (unrestricted use SCO of 0.1 ppm; commercial use SCO of 1 ppm).

The following metals were detected throughout the unsaturated lagoon soils, to a depth of 27 feet below surrounding grade (bsg): cadmium up to 46,000 ppm (unrestricted use SCO of 2.5 ppm; commercial use SCO of 9.3 ppm), lead up to 13,000 ppm (unrestricted use SCO of 63 ppm; commercial use SCO of 1,000 ppm) and barium up 7,710 ppm (unrestricted use SCO of 350 ppm; commercial use SCO of 400 ppm).

Fluoride was consistently detected in the unsaturated lagoon soils at concentrations up to 327 ppm, above background levels (less than 10.42 ppm).

For OU 02: Saturated zone beneath lagoon, tributary sediment, surface water, on- and off-site groundwater, on- and off-site soil.

The primary contaminants of concern for OU 02 include cadmium, fluoride, PCBs and lead.

Lagoon Soil Below Groundwater - Cadmium was detected up to 402 ppm (unrestricted use SCO of 2.5 ppm; commercial use SCO of 9.3 ppm) and barium was detected up to 1,370 ppm (unrestricted use SCO of 350 ppm; commercial use SCO of 400 ppm) in saturated lagoon soil. Cadmium concentrations were detected up to 1.94 ppm above the Toxicity Characteristic Leaching Procedure (TCLP) regulatory limit (1 ppm) in the saturated lagoon soil to a depth of 35 feet bsg. Exceedances of the TCLP regulatory limit for cadmium were limited to two areas of the lagoon

(northeast and southwest portion). All other areas of the lagoon exhibited barium, cadmium and lead concentrations below the respective TCLP regulatory limits in the saturated lagoon soil.

Soil Outside Lagoon– Surface soils and soil currently covered with pavement on-site, located east and south of the main building, are contaminated with lead up to 58,600 ppm above the unrestricted (63 ppm) and commercial (1,000 ppm) SCOs to a depth of approximately one foot. Off-site surface soils located southeast of the main building, are contaminated with lead up to 2,040 ppm above the unrestricted (63 ppm) and residential (400 ppm) SCOs to a depth of approximately one foot.

Groundwater – Groundwater both on- and off-site has been impacted by fluoride. The highest concentrations of fluoride in groundwater have been detected in the vicinity of the former lagoon. On-site, fluoride was detected in groundwater up to 10,400 parts per billion (ppb), above the standard of 1,500 ppb. Off-site impacts are limited; however, fluoride was detected up to 2,120 ppb, above the standard of 1,500 ppb, in one off-site groundwater monitoring well. Fluoride was not detected above the standard of 1,500 ppb in the off-site groundwater monitoring well located approximately 1,200 feet downgradient of the lagoon center. This off-site groundwater monitoring well is located downgradient of the off-site well where fluoride was detected above the standard. Samples collected from the Harriet Space Park ladies restroom and from the Town of Deerpark Town Hall, which are both located south of the lagoon, also did not contain fluoride concentrations above the standard of 1,500 ppb. Fluoride was detected in exceedance of the drinking water standard in one off-site residential well in 2000, but subsequent samples found no contamination in exceedance of the standard.

Sediments - Off-site tributary sediments also have been impacted by lead, cadmium and PCBs in excess of the NYSDEC sediment quality criteria. Lead was detected up to 400 ppm above the lowest effects level (LEL) (31 ppm) and severe effects level (SEL) (110 ppm). Lead concentrations above the SEL are primarily limited to the top six inches of sediment. Cadmium was detected up to 3.7 ppm above the LEL (0.6 ppm). Cadmium concentrations above the LEL are limited to the top six inches of sediment. PCBs were detected up to 1.470 ppm in the top twelve inches of sediment above the human health bioaccumulation sediment criteria value (0.000018 ppm) and wildlife bioaccumulation sediment criteria value (0.0315 ppm).

Surface Water – Surface water has not been impacted by site-related contamination. All concentrations of site-related contamination identified (lead (10.4 ppb); barium (16.7 ppb); and fluoride (360 ppb)) were below their NYSDEC water quality standards ((50 ppb); (1,000 ppb); and (1,500 ppb), respectively).

6.4: Summary of Human Exposure Pathways

This human exposure assessment identifies ways in which people may be exposed to site-related contaminants. Chemicals can enter the body through three major pathways (breathing, touching or swallowing). This is referred to as *exposure*.

The former lagoon is fenced to restrict access, but the rest of the site is unrestricted. Persons who enter the site could contact contaminants in the soil by walking on the soil, digging, or otherwise disturbing the soil. Contaminated groundwater at the site is not used for drinking water; however,

private drinking water wells are in use near the site. It is unknown if these wells are affected by the site related contamination in groundwater. People may come in contact with contaminants present in the shallow tributary sediments while entering or exiting the tributary during recreational activities.

SECTION 7: SUMMARY OF ORIGINAL REMEDY AND ROD AMENDMENT

7.1.1: Original Remedy for OU 01

In the March 2002 ROD for OU 01 the NYSDEC selected partial excavation and ex-situ stabilization. The components of the original remedy were as follows:

- A remedial design program, including bench scale and pilot study programs, to provide the details necessary for the construction, operation and maintenance, and monitoring of the remedial program;

- Excavation of lagoon soil to a depth of six to eight feet (21 to 23 feet bsg), and transportation to an off-site TSCA/RCRA disposal facility for treatment and disposal. Excavation of remaining unsaturated lagoon soil to a depth of 14 feet (29 feet bsg) or groundwater table, whichever is encountered first, and on-site stabilization. Placement of several feet of clean fill in the lagoon excavation to provide a buffer from the fluctuations in the groundwater. Replacement of stabilized soils back into the lagoon excavation, backfill with clean fill to the existing grade of the surrounding areas, and installation of a geomembrane liner/asphalt cover.

- Semi-annual sampling of on-site monitoring wells to be conducted as part of a long-term monitoring program to monitor the effectiveness of the on-site stabilization;

- Institutional controls in the form of deed restrictions to be recorded in the chain of title of the property to restrict the future use of the former lagoon area to industrial use only, mandate the maintenance of the cap, and require notification to the NYSDEC when excavation of the capped area is planned; and

- Annual certification by the property owner that the site is in compliance with the institutional controls outlined in this ROD.

7.1.2: Elements of the OU 01 Remedy Already Performed

No elements of the OU 01 remedy have been performed to date. Because the selected remedy included removal of the unsaturated lagoon soils, ex-situ stabilization of the soils with disposal back into the lagoon, it was necessary to complete the investigation and remedy selection for the saturated lagoon soils (OU 02) prior to implementing the OU 01 remedy.

7.1.3: New Information

Since the issuance of the FS and ROD, new information about the site has been obtained. It was determined during the OU 02 remedial investigation that the feasibility of installing the sheet piling system, required to stabilize the adjacent building foundation and allow excavation of the unsaturated lagoon soils, would need to be installed to a substantially greater depth due to the loose nature of the on-site soil.

In addition, cadmium contamination, which failed the toxicity characteristic leaching procedure (TCLP), was also found in an area of the saturated zone of the lagoon to a depth of 35 feet bsg. The TCLP failure means the contamination is a characteristic hazardous waste, which would require a much deeper excavation and associated sheet pile support to address this material in accordance with the original remedy.

7.1.4: Selected Change to the Original Remedy

Based on the new information identified above and the identified need to coordinate the remedies for both operable units of the site as it relates to the lagoon area, the original remedy for the unsaturated lagoon soil will no longer be implemented. The OU 01 ROD Amendment will be combined with the OU 02 remedy and the selected remedy will encompass all lagoon soil. This ROD presents the evaluation and identification of a combined OU 01 and 02 selected remedy in the sections to follow.

7.2: Summary of the Remediation Objectives

The objectives for the remedial program have been established through the remedy selection process stated in 6 NYCRR Part 375. The goal for the remedial program is to restore the site to pre-disposal conditions to the extent feasible. At a minimum, the remedy shall eliminate or mitigate all significant threats to public health and the environment presented by the contamination identified at the site through the proper application of scientific and engineering principles.

The remedial action objectives for this site are:

Groundwater

RAOs for Public Health Protection

- Prevent ingestion of groundwater with contaminant levels exceeding drinking water standards.

RAOs for Environmental Protection

- Restore ground water aquifer to pre-disposal/pre-release conditions, to the extent practicable.
- Remove the source of ground or surface water contamination.

Soil

RAOs for Public Health Protection

- Prevent ingestion/direct contact with contaminated soil.

RAOs for Environmental Protection

- Prevent migration of contaminants that would result in groundwater or surface water contamination.

Sediment

RAOs for Public Health Protection

- Prevent direct contact with contaminated sediments.

RAOs for Environmental Protection

- Prevent impacts to biota from ingestion/direct contact with sediments causing toxicity or impacts from bioaccumulation through the marine or aquatic food chain.

7.3: SUMMARY OF THE SELECTED OU 01 and 02 REMEDY

To be selected the remedy must be protective of human health and the environment, be cost-effective, comply with other statutory requirements, and utilize permanent solutions, alternative technologies or resource recovery technologies to the maximum extent practicable. The remedy must also attain the remedial action objectives identified for the site, which are presented in Section 7.2. Potential remedial alternatives for the Site were identified, screened and evaluated in the feasibility study (FS) report.

A summary of the remedial alternatives that were considered for this site is presented in Exhibit B. Cost information is presented in the form of present worth, which represents the amount of money invested in the current year that would be sufficient to cover all present and future costs associated with the alternative. This enables the costs of remedial alternatives to be compared on a common basis. As a convention, a time frame of 30 years is used to evaluate present worth costs for alternatives with an indefinite duration. This does not imply that operation, maintenance, or monitoring would cease after 30 years if remediation goals are not achieved. A summary of the Remedial Alternatives Costs is included as Exhibit C.

The basis for the Department's remedy is set forth at Exhibit D.

The selected remedy addresses both OU 01 and OU 02 and replaces the March 2002 Record of Decision (ROD) issued for OU 01. Upon issuance of the Record of Decision, OU 01 and OU 02 will be combined into a single operable unit.

The selected remedy is referred to as the excavation and solidification with private well sampling, sediment removal and long-term monitoring remedy.

The estimated present worth cost to implement the remedy is $5,998,000. The cost to construct the remedy is estimated to be $5,375,000 and the estimated average annual cost is $40,000.

The elements of the selected remedy are as follows:

1. Remedial Design

A remedial design program will be implemented to provide the details necessary for the construction, operation, maintenance, and monitoring of the remedial program. Re-sampling of the groundwater to confirm past sampling data and re-evaluation of the wells in the area will be conducted as part of the remedial design program. Green remediation principles and techniques will be implemented to the extent feasible in the design, implementation, and site management of the remedy as per DER-31. The major green remediation components are as follows:

- Considering the environmental impacts of treatment technologies and remedy stewardship over the long term;
- Reducing direct and indirect greenhouse gas and other emissions;
- Increasing energy efficiency and minimizing use of non-renewable energy;
- Conserving and efficiently managing resources and materials;
- Reducing waste, increasing recycling and increasing reuse of materials which would otherwise be considered a waste;
- Maximizing habitat value and creating habitat when possible;
- Fostering Green and healthy communities and working landscapes with balanced ecological, economic and social goals; and
- Integrating the remedy with the end use where possible and encouraging green and sustainable re-development.

2. Excavation

Lagoon: Excavation and off-site disposal of contaminated lagoon soils to a depth of 4 to 6 feet below the lagoon floor (19 to 21 feet below surrounding grade (bsg)). It is estimated that approximately 1,600 cubic yards of contaminated lagoon soil will be excavated and transported to an off-site TSCA and/or RCRA-permitted disposal facility for treatment and/or disposal. The excavation of lagoon soils to a depth up to six feet (21 feet bsg) will address all PCB concentrations that exceed 50 parts per million (ppm). All soils that contain PCB concentrations above 50 parts per million (ppm) will be disposed off-site as hazardous waste. Excavated soils that contain PCB concentrations above 1,000 parts per million (ppm) will be transported to an approved facility for incineration. Excavated soils that contain PCB concentrations above 500 ppm and below 1,000 ppm that are also a characteristic hazardous waste for metals toxicity will be stabilized on-site and transported to an approved facility for disposal.

On-site Soil: All on-site soils and sub-pavement soils containing lead concentrations greater than the Part 375 commercial SCO of 1,000 ppm will be excavated and stabilized for use as backfill in the lagoon as described in remedy element 4. The areas of on-site excavation are shown on Figure 2. It is estimated that approximately 600 cubic yards of soil and 2,500 cubic yards of sub-pavement soil will be excavated.

Off-site Soil: All areas of off-site soil containing lead concentrations greater than Part 375 residential SCO of 400 ppm will be excavated and stabilized for use as backfill in the lagoon as described in remedy element 4. It is estimated that approximately 325 cubic yards of off-site soil will be excavated from the area shown on Figure 2.

Clean fill meeting the requirements of 6 NYCRR Part 375-6.7(d) for commercial use on-site and residential use off-site will be brought in to complete the backfilling of the excavations, lagoon and establish the designed grades at the site to accommodate installation of the cover system described in remedy element 5. Off-site areas will be restored to pre-existing grades.

3. In-Situ Solidification

In-situ solidification (ISS) will be implemented for the on-site lagoon, as indicated on Figure 2. The treatment zone will extend from the bottom of the excavation as described in remedy element 2 (approximately 19 to 21 feet bsg) to the groundwater table, at approximately 28 feet bsg and from the groundwater table to approximately 35 feet bsg in an area where the cadmium toxicity characteristic leaching procedure (TCLP) regulatory limit is exceeded. ISS is a process that binds the soil particles in place creating a low permeability mass. The contaminated soil will be mixed in place together with solidifying agents (typically Portland cement) or other binding agents using an excavator or augers. The soil and binding agents are mixed to produce a solidified mass resulting in a low permeability monolith. The resulting solid matrix reduces or eliminates mobility of contamination and reduces or eliminates the matrix as a source of groundwater contamination.

4. Ex-Situ Stabilization; On-site disposal

Ex-situ stabilization will be implemented to treat the lead contaminated soil excavated from on- and off-site as described in remedy element 2. Ex-situ stabilization is a process that mixes agents with contaminated soil to chemically modify the material to allow it to meet remedial goals, allowing it to be placed back on-site. Under this process the excavated contaminated soil (approximately 3,425 cubic yards) will be mixed in a temporary mixing facility (i.e., pug mill, mixer, etc.) with stabilizing agents (i.e., Enviroblend or an equivalent product) to address lead contamination. The treated soil will then be used as backfill in the lagoon and covered with a site cover to prevent direct exposure.

5. Site Cover

A site cover will be required to allow for commercial use of the site. The site will be restored to existing grade and the cover will consist of either structures such as buildings, pavement, sidewalks comprising any site development or a soil cover in areas where the upper one foot of exposed surface soil will exceed the applicable soil cleanup objectives (SCOs). Where the soil cover is required it will be a minimum of one foot of soil meeting the soil cleanup objectives (SCOs) for cover material as set forth in 6 NYCRR Part 375-6.7(d) for commercial use. The soil cover will be placed over a demarcation layer, with the upper six inches of the soil of sufficient quality to maintain a vegetation layer. Where the soil cover is required over the on-site ISS treatment area, it will consist of a minimum of four feet of soil meeting the SCOs for commercial use. For areas where solidified material underlies the cover, the solidified material itself will serve as the demarcation layer due to the nature of the material.

6. Sediment Removal

Contaminated stream sediment will be removed from tributary D-1-7 to a depth of 12 inches along approximately 1,132 linear feet of stream bed as shown on Figure 2. Approximately, 2,270 cubic yards of sediment will be removed. The removal of sediment to a depth of 12 inches would achieve SCGs for protection of the environment and would be expected to meet residential SCOs. The sediment will be place in the lagoon above the stabilized soils, below the cover system.

The stream will be excavated by diverting or pumping the stream around the contaminated area. Excavated sediments will be replaced with an appropriate substrate and the area restored to pre-excavation contours. Disturbed stream, stream bank and adjacent area vegetation will be re-established by planting and seeding. The restoration of the riverbed will meet the substantive requirements of 6 NYCRR Part 608 Use and Protection of Waters.

Prior to sediment removal, an assessment of the biota and plant communities in the area, including an assessment of the presence of mussels in the disturbed areas will be performed. If mussels are found in the remediation areas or adjacent areas, measures will be taken to limit the deleterious effects of the remedial action.

Following sediment removal, monitoring of restoration success with replacement of failed vegetation and post-removal monitoring of contaminants will be performed.

7. Institutional Controls

Imposition of an institutional control in the form of an environmental easement for the controlled property that:

a. requires the remedial party or site owner to complete and submit to the Department a periodic certification of institutional and engineering controls in accordance with Part 375-1.8(h)(3);

b. allows the use and development of the controlled property for commercial and industrial uses as defined by Part 375-1.8(g), although land use is subject to local zoning laws;

c. restricts the use of groundwater as a source of potable or process water, without necessary water quality treatment as determined by the NYSDOH or County DOH; and

d. requires compliance with the Department approved Site Management Plan.

8. Site Management Plan

A Site Management Plan is required, which includes the following:

a. An Institutional and Engineering Control Plan that identifies all use restrictions and engineering controls for the site and details the steps and media-specific requirements necessary to ensure the following institutional and/or engineering controls remain in place and effective:

Institutional Controls: The Environmental Easement discussed in element 7.

Engineering Controls: The solidified mass and site cover discussed in elements 2 and 4.

This plan includes, but may not be limited to:

• an Excavation Plan which details the provisions for management of future excavations in areas of remaining contamination;

• descriptions of the provisions of the environmental easement including any land use and/or groundwater use restrictions;

• a provision for further delineation of the nature and extent of contamination under the building when the building is demolished and for removal or treatment of any identified source area located under the building if and when the building is demolished;

• a provision for implementing actions recommended to address well contamination if identified;

• provisions for the management and inspection of the identified engineering controls;

• maintaining site access controls and Department notification; and

• the steps necessary for the periodic reviews and certification of the institutional and/or engineering controls.

b. A Monitoring Plan to assess the performance and effectiveness of the remedy. The plan includes, but may not be limited to:

• monitoring of groundwater to assess the performance and effectiveness of the remedy;

• monitoring for site-related groundwater contamination for any off-site private wells, as may be required; and

• a schedule of monitoring and frequency of submittals to the Department.

Exhibit A

Nature and Extent of Contamination

This section describes the findings of the Remedial Investigation for all environmental media that were evaluated. As described in Section 6.1, samples were collected from various environmental media to characterize the nature and extent of contamination. Samples were initially analyzed for full target compound list/target analyte list. Based on historic use and contaminants detected, sampling was then reduced to contaminants of concern.

For each medium, a table summarizes the findings of the investigation. The tables present the range of contamination found at the site in the media and compares the data with the applicable SCGs for the site. The contaminants are arranged into two categories; polychlorinated biphenyls (PCBs), and inorganics (metals). For comparison purposes, the SCGs are provided for each medium that allows for unrestricted use. For soil, if applicable, the Restricted Use SCGs identified in Section 6.1.1 are also presented.

Groundwater

Groundwater samples were collected from overburden monitoring wells. The samples were collected to assess groundwater conditions on- and off-site. The results indicate that contamination in overburden groundwater at the site exceed the SCGs for inorganics and PCBs. Contaminant levels in downgradient groundwater samples exceed the SCGs for fluoride; however, the downgradient impact is limited in extent. The only known downgradient private well in the vicinity of the site was found to be impacted with fluoride, however subsequent samples of this well found no contamination above the drinking water standards.

Table 1 - Groundwater

Detected Constituents		Concentration Range Detected (ppb)[a]	SCG[b] (ppb)	Frequency Exceeding SCG
Inorganics	Fluoride	ND – 10,900	1,500	24 of 40
	Barium	ND – 1,420	1,000	1 of 42
	Cadmium	ND – 42.2	5	2 of 44
	Lead	ND – 29.4	25	1 of 40
PCBs	Aroclor 1254	ND – 0.31	0.09	6 of 50

a - ppb: parts per billion, which is equivalent to micrograms per liter, ug/L, in water.
b- SCG: Standard Criteria or Guidance - Ambient Water Quality Standards and Guidance Values (TOGs 1.1.1), 6 NYCRR Part 703, Surface water and Groundwater Quality Standards, and Part 5 of the New York State Sanitary Code (10 NYCRR Part 5).

The primary groundwater contaminant is fluoride associated with former manufacturing operations at the site. As noted on Figure 3, the primary groundwater contamination is associated with the former lagoon located northeast of the plant building.

Based on the findings of the RI, the past disposal of hazardous waste has resulted in the contamination of groundwater. The site contaminant that is considered to be the primary contaminant of concern which will drive the remediation of groundwater to be addressed by the remedy selection process is: fluoride.

Soil

During the RI, soil samples were collected from the former lagoon surface (15 feet below surrounding grade (bsg)) and at various depths above and within the groundwater table. The groundwater table is located approximately 14 feet below the lagoon soil surface (29 feet bsg). Samples were also collected from on- and off-site surface soil and soil currently covered with pavement. The results indicate that lagoon soil exceeds the commercial and groundwater protection soil cleanup objectives (SCOs) for metals (i.e. lead, cadmium, and barium) and PCBs (Aroclor 1254) and surface soil and soil currently covered with pavement east and south of the main buildings are contaminated with lead above the residential and commercial SCOs. Fluoride, present in saturated lagoon soil, is likely the source of the groundwater contamination plume. However, there is no SCO for fluoride in soil.

Table 2 – Lagoon Soil

Detected Constituents	Concentration Range Detected (ppm)[a]	Unrestricted SCG[b] (ppm)	Frequency Exceeding Unrestricted SCG	Restricted Use SCG[c] (ppm)	Frequency Exceeding Restricted SCG
Inorganics					
Lead	ND – 13,000	63	54/87	450[d]	32/87
Cadmium	ND – 46,000	2.5	47/56	7.5[d]	40/56
Barium	18.5 – 7,710	350	63/81	400	60/81
Fluoride	ND - 327	N/A[e]	N/A	N/A	N/A
Pesticides/PCBs					
Aroclor 1254	ND – 1,100	0.1	31/37	1	31/37

a - ppm: parts per million, which is equivalent to milligrams per kilogram, mg/kg, in soil;
b - SCG: Part 375-6.8(a), Unrestricted Soil Cleanup Objectives.
c - SCG: Part 375-6.8(b), Restricted Use Soil Cleanup Objectives for the Protection of Public Health for Commercial Use, unless otherwise noted.
d - SCG: Part 375-6.8(b), Restricted Use Soil Cleanup Objectives for the Protection of Groundwater.
e – SCG is not available

Table 3 – Surface and Sub-Pavement Soil

Detected Constituents	Concentration Range Detected (ppm)[a]	Residential Use SCG[b] (ppm)	Frequency Exceeding Residential Use SCG	Commercial Use SCG[c] (ppm)	Frequency Exceeding Restricted SCG
Inorganics					
Lead	14.3 – 58,600	400	56/109	450[d]	54/109

a - ppm: parts per million, which is equivalent to milligrams per kilogram, mg/kg, in soil;
b - SCG: Part 375-6.8(b), Restricted Use Soil Cleanup Objectives for the Protection of Public Health for Residential Use.
c - SCG: Part 375-6.8(b), Restricted Use Soil Cleanup Objectives for the Protection of Public Health for Commercial Use, unless otherwise noted.
d - SCG: Part 375-6.8(b), Restricted Use Soil Cleanup Objectives for the Protection of Groundwater.

The primary soil contaminants are PCBs and metals including lead, fluoride, cadmium and barium associated with the past discharge of industrial wastewater into the lagoon at the site as noted on Figures 4 through 7.

Surface soil and sub-paved surface soil east and south of the main buildings were found to be contaminated with lead above the Protection of Public Health SCO for a residential and commercial property, respectively as shown on Figure 8. The lead contamination is from historical manufacturing operations at the site.

Based on the findings of the Remedial Investigation, the past disposal of hazardous waste has resulted in the contamination of soil. The site contaminants identified in soil which are considered to be the primary contaminants of concern, to be addressed by the remedy selection process are, PCBs, lead, fluoride, cadmium and barium.

Surface Water

Surface water samples were collected from tributary D-1-7 of the Neversink River during the RI. Six surface water samples were collected at locations upstream, adjacent and downstream of the site. PCBs and cadmium were not detected in any of the six surface water samples. Lead, barium and fluoride were detected in the surface water samples. However, all concentrations of lead, barium and fluoride detected in the surface water samples were below their NYSDEC water quality standards.

Table 4 – Surface Water

Detected Constituents	Concentration Range Detected (ppb)[a]	SCG[b] (ppb)	Frequency Exceeding SCG
Inorganics			
Barium	8.2 – 16.7	1,000	0/6
Lead	ND – 10.4	50	0/6
Fluoride	ND - 360	1,500	0/6

a - ppb: parts per billion, which is equivalent to micrograms per liter, ug/L, in water.
b - SCG: Ambient Water Quality Standards and Guidance Values (TOGS 1.1.1) and 6 NYCRR Part 703: Surface Water and Groundwater Quality Standards.

No site-related surface water contamination of concern was identified during the RI. Therefore, no remedial alternatives need to be evaluated for surface water.

Sediments

Sediment samples were collected during the RI at locations upstream, adjacent and downstream of the site along tributary D-1-7 of the Neversink River and from the flood plain adjacent to the main channel of the tributary. The samples were collected to assess the potential impacts to stream sediments from the site and were collected from 0-6 inches and 6-12 inches below the stream bed. The results indicate that sediment in the tributary of the Neversink River exceed the Department's SCGs for sediments for cadmium, lead and PCBs.

Table 5 - Sediment

Detected Constituents	Concentration Range Detected (ppm)[a]	SCG[b] (ppm)	Frequency Exceeding SCG
Inorganics			
Barium	15.6 – 137	NA	
Fluoride	ND – 53.9	NA	
Cadmium	ND – 3.7	LEL[c] – 0.6	12/48
		SEL[c] – 9	0/48
Lead	ND - 400	LEL[c] - 31	24/52
		SEL[c] - 110	7/52
PCBs			
Total PCBs	ND – 1.470	0.0000258[d]	30/48
		88.898[e]	0/48
		0.6215[f]	2/48
		0.04508[g]	23/48

a - ppm: parts per million, which is equivalent to milligrams per kilogram, mg/kg, in sediment;
b - SCG: The Department's Technical Guidance for Screening Contaminated Sediments.
c- LEL = Lowest Effects Level and SEL = Severe Effects Level. A sediment is considered contaminated if either of these criteria is exceeded. If the SEL criteria are exceeded, the sediment is severely impacted. If only the LEL is impacted, the impact is considered moderate.
d – Value is based on Human Health Bioaccumulation
e - Value is based on Benthic Aquatic Life Acute Toxicity
f - Value is based on Benthic Aquatic Life Chronic Toxicity
g - Value is based on Wildlife Bioaccumulation

The primary sediment contaminants are lead and PCBs, and to a lesser degree cadmium, associated with the historical discharge of industrial wastewater into the lagoon at the site. As noted on Figure 9, the primary sediment contamination is found between sediment sample locations SED-9 and SED-14.

Based on the findings of the Remedial Investigation, the disposal of hazardous waste has resulted in the contamination of sediment. The site contaminants that are considered to be the primary contaminants of concern which will drive the remediation of sediment to be addressed by the remedy selection process are, lead, cadmium and PCBs.

Exhibit B

Description of Remedial Alternatives

The following alternatives were considered based on the remedial action objectives (see Section 6.5) to address the contaminated media identified at the site as described in Exhibit A. The lagoon soil remedial action alternatives include the OU 01 portion of the lagoon soil.

Lagoon Soil Remedial Action Alternatives

Alternative LS-1: No Action

The No Action Alternative is evaluated as a procedural requirement and as a basis for comparison. This alternative leaves the site in its present condition and does not provide any additional protection to public health and the environment.

Alternative LS-2: Restoration to Pre-Disposal or Unrestricted Conditions

This alternative achieves all of the SCGs discussed in Section 6.1.1 and Exhibit A and soil meets the unrestricted soil clean objectives listed in Part 375-6.8 (a). This alternative includes: excavation and off-site disposal of all soil contamination above the unrestricted soil cleanup objectives. The total quantity of soil to be excavated and sent off-site for treatment or disposal is estimated to be 9,800 cubic yards. When excavation is complete, the excavated area of the lagoon would be backfilled to original grade using clean imported fill. Vegetated areas would receive a six inch layer of topsoil.

This alternative removes all contamination above unrestricted SCOs therefore no institutional controls would be necessary and no annual cost would be incurred.

Capital Cost:.....*$7,730,000*

Alternative LS-3: Excavation (Top 6 to 8 ft.), Disposal, Stabilization, Geomembrane Liner/Asphalt Cap, Institutional Controls, and Long-Term Monitoring

This alternative includes the excavation and off-site disposal of the top 6 to 8 feet of the lagoon soils to a Toxic Substances and Control Act/Resource Conservation Recovery Act (TSCA/RCRA) permitted facility. The total quantity of soil to be excavated and disposed off-site is estimated to be 2,320 cubic yards.

The remaining lagoon soils will be excavated to a depth of 28 feet below surrounding grade (bsg) or groundwater, whichever is encountered first, and stabilized on-site with trisodium phosphate to transform the metal constituents into insoluble metal phosphate compounds. Several feet of clean fill will be placed in the lagoon excavation to provide a buffer between the groundwater table and the treated soil that will be subsequently placed back into the lagoon. The excavated area will be backfilled with clean fill to the existing grade of the surrounding area and a geomembrane liner/asphalt cap will be installed over the area to prevent precipitation infiltration.

This alternative includes institutional controls, in the form of an environmental easement and a site management plan, necessary to protect public health and the environment from any contamination identified at the site.

Present Worth: *$3,606,000*
Capital Cost: *$3,384,000*
Annual Costs: *$14,000*

Alternative LS-4: Excavation and Disposal (Top 4 to 6 feet), Ex-Situ Stabilization of Unsaturated and Saturated Soils, Geomembrane/Asphalt Cap and Institutional Controls

This alternative includes the excavation and off-site disposal of the top 4 to 6 feet of the lagoon soils to a TSCA/RCRA permitted facility. The total quantity of soil to be excavated and disposed off-site is estimated to be 1,600 cubic yards.

The remaining impacted soil in the unsaturated zone will be excavated to a depth of 28 feet bsg or groundwater, whichever is encountered first, and stabilized on-site. In addition, soil below this level in areas where cadmium concentrations fail the TCLP test, currently estimated to be 35 feet bsg, will be excavated and stabilized on-site. The impacted lagoon soils will be stabilized on-site with trisodium phosphate or Portland cement to transform the metal constituents into insoluble metal phosphate compounds. Several feet of clean fill will be placed in the lagoon excavation to provide a buffer between the groundwater table and the treated soil that will be subsequently be placed back into the lagoon above the saturated zone. The excavated area will be backfilled with clean fill to the existing grade of the surrounding area and a geomembrane liner/asphalt cap will be installed over the area to prevent precipitation infiltration.

This alternative includes institutional controls, in the form of an environmental easement and a site management plan, necessary to protect public health and the environment from any contamination identified at the site.

Present Worth: *$3,801,000*
Capital Cost: *$3,579,000*
Annual Costs: *$14,000*

Alternative LS-5: Excavation and Disposal (Top 4 to 6 feet), In-Situ Solidification, Site Cover, Institutional Controls, and Long-Term Monitoring

This alternative includes the excavation and off-site disposal of the top 4 to 6 feet of the lagoon soils to a TSCA/RCRA permitted facility. The total quantity of soil to be excavated and disposed off-site is estimated to be 1,600 cubic yards.

The remaining impacted soils in the unsaturated zone (approximately 28 feet bsg) will be solidified in place using shallow mixing technology. In addition, solidification of soil below this level in areas where cadmium concentrations fail the TCLP test, currently estimated to be 35 feet bsg. Tri-sodium phosphate and/or Portland cement will be used to transform the metal constituents into insoluble metal phosphate compounds. The excavated area will be backfilled with clean fill to the existing grade of the surrounding area and an asphalt cap will be installed over the area to prevent precipitation infiltration.

This alternative includes institutional controls, in the form of an environmental easement and a site management plan, necessary to protect public health and the environment from any contamination identified at the site.

Present Worth: *$2,761,000*
Capital Cost: *$2,539,000*

Annual Costs: *$14,000*

Surface Soil Remedial Action Alternative

Alternative SS-1: No Action

The No Action Alternative is evaluated as a procedural requirement and as a basis for comparison. This alternative leaves the site in its present condition and does not provide any additional protection to public health and the environment.

Alternative SS-2: Restoration to Pre-Disposal or Unrestricted Conditions

This alternative achieves all of the SCGs discussed in Section 6.1.1 and Exhibit A and soil meets the unrestricted soil clean objectives listed in Part 375-6.8 (a). This alternative includes: excavation and off-site disposal of all surface soil and sub-pavement soil contamination above the unrestricted soil cleanup objectives. The total quantity of soil to be excavated and sent off-site for disposal is estimated to be 10,530 cubic yards. When excavation is complete, excavation areas would be backfilled to original grade using clean imported fill. Vegetated areas would receive a six inch layer of topsoil.

This alternative removes all contamination above unrestricted SCOs therefore no institutional controls would be necessary and no annual cost would be incurred.

Capital Cost: *$7,252,000*

Alternative SS-3: Excavation, Ex-Situ Stabilization and On-Site Disposal

This alternative includes the excavation of impacted on- and off-site surface soils and sub-pavement soils, ex-situ stabilization and placement of the stabilized soils in the lagoon as backfill beneath the cover system.

It is estimated that approximately 325 cubic yards of soil with concentrations above the residential SCO and 600 cubic yards of surface soil and 2,500 cubic yards of sub-pavement soil above the commercial SCO would be excavated. When excavation is complete, excavation areas outside the pavement area will be backfilled to original grade using clean imported fill. Vegetated areas will receive a six inch layer of topsoil. Excavation areas within the pavement area will be re-paved. Asphalt paving removed during excavation will be disposed off-site or reused on-site as backfill in the lagoon below the cover system.

The excavated contaminated soil will be mixed with tri-sodium phosphate or an equivalent product to create insoluble metal phosphate compounds. The treated soil will then be used as backfill in the lagoon and covered with a cover system.

Present Worth: *$1,206,000*
Capital Cost: *$1,206,000*
Annual Costs: *$0*

Sediment Remedial Action Alternatives

Alternative SED-1: No Action

The No Action Alternative is evaluated as a procedural requirement and as a basis for comparison. This alternative leaves the site in its present condition and does not provide any additional protection to public health and the environment.

Alternative SED-2: Restoration to Pre-Disposal or Unrestricted Conditions

This alternative achieves all of the SCGs discussed in Section 6.1.1 and Exhibit A. This alternative includes: removal and off-site disposal of contaminated sediment from Tributary D-1-7 with metal concentrations above the LEL and PCB concentrations above 1 mg/kg.

Removal of sediments will be conducted using conventional earth moving equipment. A cofferdam would be constructed upstream of the sediment removal areas and the stream flow pumped or diverted around the excavation areas. The total quantity of sediment to be removed and sent off-site for disposal is estimated to be 4,230 cubic yards.

The dredged areas will be backfilled to restore original bathymetry. The restoration of the riverbed will meet the substantive requirements of 6 NYCRR Part 608 Use and Protection of Waters.

This alternative removes all contamination above unrestricted SCOs therefore no institutional controls will be necessary and no annual cost will be incurred.

Capital Cost:.....$3,751,000

Alternative SED-3: Excavation/Dredging of Targeted Lead and PCB Impacted Sediment

This alternative includes the excavation of all stream bed sediments between sediment sample locations SED-9 and SED-14 to a depth of 12 inches in Tributary D-1-7. It is estimated that 64% of sediment with lead concentrations above the severe effects level (SEL), 63% of sediment with cadmium concentrations above the lower effects level (LEL) and all sediment where PCB concentrations exceed 1 mg/kg will be removed from the stream.

The total quantity of sediment to be removed is estimated to be 2,270 cubic yards. The sediment will be placed in the lagoon above the stabilized soils, below the cover system.

Removal of sediments will be conducted using conventional earth moving equipment. A cofferdam will be constructed upstream of the sediment removal areas and the stream will be dredged by diverting or pumping the stream around the contaminated area. Excavated sediments will be replaced with an appropriate substrate and the area restored to pre-excavation contours. Disturbed stream, stream bank and adjacent area vegetation will be re-established by planting and seeding. The restoration of the riverbed will meet the substantive requirements of 6 NYCRR Part 608 Use and Protection of Waters.

Prior to sediment removal an assessment of the biota and plant communities in the area, especially an assessment of potential mussels in removal areas will be performed. If mussels are found in the remediation areas or adjacent areas, measures will be taken to limit the deleterious effects of the remedial action.

Following sediment removal, monitoring of restoration success with replacement of failed vegetation and post-removal monitoring of contaminants will be performed.

Present Worth: *$1,707,000*
Capital Cost: *$1,630,000*
Annual Costs: *$5,000*

Alternative SED-4: Excavation/Removal of all Impacted Sediment and On-Site Disposal

This alternative includes the excavation of all sediments where the sediment metal concentrations are above the LEL and where PCB concentrations are above 1 mg/kg to a depth of 12 inches in Tributary D-1-7 and placement of the sediment in the lagoon as backfill.

Removal of sediments will be conducted using conventional earth moving equipment. A cofferdam would be constructed upstream of the sediment removal areas and the stream flow pumped or diverted around the excavation areas. The total quantity of sediment to be removed is estimated to be 4,230 cubic yards. The sediment will be placed in the lagoon above the stabilized soils, below the cover system.

The dredged areas will be backfilled to restore original bathymetry. The restoration of the riverbed will meet the substantive requirements of 6 NYCRR Part 608 Use and Protection of Waters.

Prior to sediment removal an assessment of the biota and plant communities in the area, especially an assessment of potential mussels in removal areas will be performed. If mussels are found in the remediation areas or adjacent areas, measures will be taken to limit the deleterious effects of the remedial action.

Following sediment removal, monitoring of restoration success with replacement of failed vegetation and post-removal monitoring of contaminants will be performed.

Present Worth: *$2,751,000*
Capital Cost: *$2,674,000*
Annual Costs: *$5,000*

Alternative SED-5: Excavation/Removal of Highest Lead and PCB Impacted Sediments

This alternative includes the excavation of sediment to a depth of 12 inches where PCB concentrations are above 1 mg/kg and where the highest lead concentrations were detected in Tributary D-1-7. It is estimated that 33% of the sediment with lead concentrations above the SEL and approximately 32% of sediment with cadmium concentrations above the LEL will be removed from the stream.

The total quantity of sediment to be excavated is estimated to be 813 cubic yards of sediment. The sediment will be placed in the lagoon above the stabilized soils, below the cover system.

The excavated sediment will be placed in the lagoon as backfill above the stabilized soils, below the cover system. Removal of sediments will be conducted using conventional earth moving equipment. A cofferdam will be

constructed upstream of the sediment removal areas and the stream will be dredged by diverting or pumping the stream around the contaminated area.

Excavated sediments will be replaced with an appropriate substrate and the area restored to pre-excavation contours. The dredged areas will be backfilled to the pre-existing contours using appropriate materials and the disturbed areas of the stream bank and adjacent area vegetation will be re-established. The restoration of the riverbed will meet the substantive requirements of 6 NYCRR Part 608 Use and Protection of Waters.

Prior to sediment removal an assessment of the biota and plant communities in the area, especially an assessment of potential mussels in removal areas will be performed. If mussels are found in the remediation areas or adjacent areas, measures will be taken to limit the deleterious effects of the remedial action.

Following sediment removal, monitoring of restoration success with replacement of failed vegetation and post-removal monitoring of contaminants will be performed.

Present Worth: *$1,253,000*
Capital Cost: *$1,176,000*
Annual Costs: *$5,000*

Groundwater Remedial Action Alternatives

Alternative GW-1: No Action

The No Action Alternative is evaluated as a procedural requirement and as a basis for comparison. This alternative leaves the site in its present condition and does not provide any additional protection to public health and the environment.

Alternative GW-2 Groundwater Control, Treatment and Long-Term Monitoring

This alternative includes groundwater treatment and long-term monitoring. Groundwater will be collected downgradient of the lagoon and will be treated with activated alumina for fluoride, and if necessary with precipitation for lead and cadmium and activated carbon for PCBs. The treated water will be discharged to Tributary D-1-7. The treatment system configuration will be determined during design.

A long-term groundwater monitoring program for all on-site and off-site monitoring wells will be established. Monitoring wells will be sampled semi-annually for fluoride, barium, cadmium, lead and PCBs.

Present Worth: *$4,999,000*
Capital Cost: *$1,049,000*
Annual Costs: *$257,000*

Alternative GW-3: Private Well Re-Sampling and Long-Term Monitoring

This alternative includes a re-evaluation of the potential for off-site private well supplies to be impacted by site-related contamination in groundwater, including a provision for implementing actions recommended to address exposures.

A long-term groundwater monitoring program for all on-site and off-site groundwater monitoring wells and the off-site potable well where levels previously exceeded the drinking water standard for fluoride will be established. Monitoring wells will be sampled semi-annually for fluoride, barium, cadmium, lead and PCBs.

Present Worth: *$324,000*
Capital Cost: *$0*
Annual Costs: *$21,000*

Exhibit C
Remedial Alternative Costs

Remedial Alternative	Capital Cost ($)	Annual Costs ($)	Total Present Worth ($)
Lagoon Soil Alternatives			
LS-1: No Action	0	0	0
LS-2: Restoration to Pre-Disposal or Unrestricted Conditions	$7,730,000	0	$7,730,000
LS-3: Excavation (Top 6 to 8 feet), Disposal, Stabilization, Geomembrane Liner/Asphalt Cap, Institutional Controls, and Long-Term Monitoring	$3,384,000	$14,000	$3,606,000
LS-4: Excavation and Disposal (Top 4 to 6 feet), Ex-Situ Stabilization Unsaturated and Saturated Soils, Geomembrane/ Asphalt Cap, and Institutional Controls	$3,579,000	$14,000	$3,801,000
LS-5: Excavation and Disposal (Top 4 to 6 feet), In-Situ Solidification, Site Cover, Institutional Controls, and Long-Term Monitoring	$2,539,000	$14,000	$2,761,000
Surface Soil Alternatives			
SS-1: No Action	0	0	0
SS-2: Restoration to Pre-Disposal or Unrestricted Conditions	$7,252,000	0	$7,252,000
SS-3: Excavation, Ex-Situ Stabilization and On-Site Disposal	$1,206,000	0	$1,206,000
Sediment Alternatives			
SED-1: No Action	0	0	0
SED-2: Restoration to Pre-Disposal or Unrestricted Conditions	$3,751,000	0	$3,751,000
SED-3: Excavation/Dredging of Targeted Lead and PCB Impacted Sediment	$1,630,000	$5,000	$1,707,000
SED-4: Excavation/Removal of all Impacted Sediment and On-Site	$2,674,000	$5,000	$2,751,000

Remedial Alternative	Capital Cost ($)	Annual Costs ($)	Total Present Worth ($)
Disposal			
SED-5: Excavation/Removal of Highest Lead and PCB Impacted Sediments	$ 1,176,000	$5,000	$1,253,000
Groundwater Alternatives			
GW-1: No Action	0	0	0
GW-2: Groundwater Control, Treatment and Long-Term Monitoring	$1,049,000	$257,000	$4,999,000
GW-3: Private Well Re-Sampling and Long-Term Monitoring	0	$21,000	$324,000
Proposed Remedy - Alternatives			
LS-5, SS-3, SED-3 and GW-3: Excavation and Solidification with Private Well Sampling and Long-Term Monitoring	$5,375,000	$40,000	$5,998,000

Exhibit D

SUMMARY OF THE SELECTED REMEDY

The Department has selected a combination of Alternatives LS-5 "Excavation and Disposal (Top 4 to 6 feet), In-Situ Solidification, Site Cover, Institutional Controls", SS-3 "Excavation, Ex-Situ Stabilization and On-Site Disposal", SED-3 "Excavation/Dredging of Targeted Lead and PCB Impacted Sediment", and GW-3 "Private Well Re-Sampling and Long-Term Monitoring" as the remedy for this site. Alternatives LS-5, SS-3, SED-3 and GW-3 will achieve the remediation goals for the site by removing or solidifying contaminants of concern (COCs) in the on-site lagoon, removing surface soils on- and off-site exceeding commercial and residential SCOs, respectively, removing impacted sediments, and eliminating the source of fluoride concentrations in groundwater above the New York State Department of Health (NYSDOH) drinking water standard. IC/ECs will also be established to protect human health and the environment from remaining contamination. The elements of this remedy are described in Section 7. The selected remedy is depicted in Figure 2.

Basis for Selection

The selected remedy is based on the results of the RI and the evaluation of alternatives. The criteria to which potential remedial alternatives are compared are defined in 6 NYCRR Part 375. A detailed discussion of the evaluation criteria and comparative analysis is included in the FS report.

The first two evaluation criteria are termed "threshold criteria" and must be satisfied in order for an alternative to be considered for selection.

1. Protection of Human Health and the Environment. This criterion is an overall evaluation of each alternative's ability to protect public health and the environment.

Alternatives LS-1, SS-1, SED-1 and GW-1 (No Action) do not provide any additional protection to public health and the environment and will not be evaluated further. Alternatives LS-2, SS-2, and SED-2 by removing all soil and sediments contaminated above the "unrestricted" soil cleanup objectives, meet the threshold criteria and provide the highest level of protection for human health and the environment. Alternatives LS-3, LS-4, LS-5, SS-3, SED-3, SED-4, and SED-5 also comply with this criterion but to a lesser degree or with lower certainty as some contamination will remain.

The selected remedy Alternative LS-5 will satisfy this criterion by removing and disposing off-site impacted lagoon soils to a depth of 4 to 6 feet and solidifying the remaining impacted lagoon soils. All soils that contain PCB concentrations above 50 parts per million (ppm) will be removed and disposed off-site. Alternative SS-3 will satisfy this criterion by removing on-and off-site impacted surface soil and sub-pavement soils and stabilizing this material for use as backfill in the lagoon. Removing surface soils will eliminate the potential for exposure to the public. Engineering (i.e., site cover) and institutional controls (i.e., environmental easement) will further limit exposure. By removing/solidifying these materials, the source of contamination to the groundwater will also be addressed.

Alternative GW-2 provides a high degree of protection for human health and the environment through groundwater treatment and long-term monitoring. Alternative GW-3 will provide a level of protection to public health and the environment through private well sampling and long-term monitoring.

Alternative SED-3 will satisfy this criterion by removing impacted sediment.

2. Compliance with New York State Standards, Criteria, and Guidance (SCGs). Compliance with SCGs addresses whether a remedy will meet environmental laws, regulations, and other standards and criteria. In addition, this criterion includes the consideration of guidance which the Department has determined to be applicable on a case-specific basis.

Lagoon soil alternative LS-2, surface soil alternative SS-2 and sediment alternative SED-2 comply with SCGs without the use of engineering and institutional controls.

Lagoon soil alternatives LS-4 and LS-5 and surface soil alternative SS-3 comply with SCGs. They address impacted lagoon soil, surface soil and sub-pavement soil and comply with the restricted use soil cleanup objectives at the surface through construction of a cover system. They also create the conditions necessary to restore groundwater quality to the extent practicable.

Sediment alternatives SED-3 and SED-4 and groundwater alternative GW-2 also comply with SCGs to the extent practicable. Lagoon soil alternative LS-3, sediment alternative SED-5 and groundwater alternative GW-3 comply with this criterion but to a lesser degree or lower certainty. Because lagoon soil alternatives LS-2, LS-3, LS-4, and LS-5, surface soil alternatives SS-2 and SS-3, sediment alternatives SED-2, SED-3, SED-4, and SED-5, and groundwater alternatives GW-2 and GW-3 satisfy the threshold criteria, the remaining criteria are particularly important in selecting a final remedy for the site.

The next six "primary balancing criteria" are used to compare the positive and negative aspects of each of the remedial strategies.

3. Long-term Effectiveness and Permanence. This criterion evaluates the long-term effectiveness of the remedial alternatives after implementation. If wastes or treated residuals remain on-site after the selected remedy has been implemented, the following items are evaluated: 1) the magnitude of the remaining risks, 2) the adequacy of the engineering and/or institutional controls intended to limit the risk, and 3) the reliability of these controls.

Long-term effectiveness is best accomplished by those alternatives involving excavation of the contaminated soils/sediment. Lagoon soil alternatives LS-2, LS-4 and LS-5 provide the most long-term effectiveness by eliminating or minimizing long-term residual risks since the majority of impacted soils will be either permanently removed and transported off site for disposal or permanently stabilized/solidified and rendered immobile. The potential for direct contact will be decreased. Remaining impacts from alternatives LS-4 and LS-5 will be addressed by institutional controls. Alternative LS-3 provides a lesser degree of long-term effectiveness.

Surface soil alternative SS-2 provides a high degree of long-term effectiveness by the removal and off-site disposal of surface soil and sub-pavement soil with concentrations above unrestricted SCOs. Surface soil alternative SS-3 will also provide a high degree of long-term effectiveness by eliminating or minimizing long-term residual risks since all on-site soils and sub-pavement soils with concentrations above the commercial SCOs and all off-site surface soils with concentrations above the residential SCOs will be permanently removed and stabilized on-site, rendering these soils immobile. The stabilized soils will be used as backfill in the lagoon below the cover system and addressed by institutional controls.

Sediment alternatives SED-2, SED-3, SED-4 and SED-5 call for the removal of the majority of the impacted materials in the stream. Alternative SED-2 and SED-4 provide the most long-term effectiveness as they remove all sediments with cadmium and lead concentrations above the NYSDEC LEL and PCBs above 1 mg/kg from the stream. However, alternatives SED-2 and SED-4 have a significantly larger impact on the existing aquatic habitat

than either alternative SED-3 or SED-5. Alternative SED-5 has the lowest long-term effectiveness as it removes the least amount of the sediments with lead concentrations above the SEL.

Groundwater alternative GW-2 provides a high degree of long-term effectiveness by eliminating the continued off-site movement of groundwater with fluoride concentrations above the groundwater standards. Alternative GW-3 consists of private well sampling to re-evaluate the potential impact to off-site private well supplies and the site management plan (SMP) will include a provision for implementing actions recommended to address any exposures which may be identified. Long-term monitoring to evaluate groundwater quality is included in GW-2 and GW-3.

4. Reduction of Toxicity, Mobility or Volume. Preference is given to alternatives that permanently and significantly reduce the toxicity, mobility or volume of the wastes at the site.

Alternatives which remove contaminated materials offer the highest degree of mobility, toxicity, and volume reduction. Alternatives LS-2, SS-2 and SED-2 reduce the on-site mobility and volume of contaminants by transferring all soil and sediments contaminated above the "unrestricted" soil cleanup objectives to an approved off-site location. However, depending on the disposal facility, the volume of the material will not be reduced. Alternative LS-3, which calls for the off-site treatment and disposal of the top six to eight feet of soils, and stabilization of soils at eight to fourteen feet depth, will effectively reduce the mobility of the contaminated material. Alternatives LS-4 and LS-5, which call for the complete removal of the upper four to six feet of soils, and stabilization of the remaining soils in the unsaturated zone and seven feet of soils in the saturated zone over 20% of the lagoon, effectively reduce the mobility of the contaminated material.

Alternatives SED-3, SED-4 and SED-5 reduce the mobility of contamination in the stream by removing contaminated sediments and placing them in the lagoon above the solidified lagoon material and beneath a cap. The total amount of sediments to be removed for alternatives SED-3, SED-4 and SED-5 is approximately 2,270 cubic yards, 4, 231 cubic yards, and 813 cubic yards, respectively. The toxicity and volume of sediment contaminants is not directly reduced by these alternatives via treatment or recycling. However, the toxicity of the sediment to aquatic life in the stream is reduced by the removal of the sediments from the stream.

Alternative GW-2, which involves groundwater control and treatment, will reduce the volume of fluoride leaving the site. Toxicity of the fluoride will not be affected. Alternative GW-3 will not reduce the toxicity, mobility or volume of contaminants but will include provisions in the SMP to address any impact from the site to private wells that may be identified.

Alternative SS-3, which calls for stabilization of on- and off-site surface and sub-pavement soils with concentrations above the commercial and residential SCGs and placement of these soils in the lagoon as backfill above the water table and below the site cap, will effectively reduce the mobility of contaminated surface soils.

5. Short-term Impacts and Effectiveness. The potential short-term adverse impacts of the remedial action upon the community, the workers, and the environment during the construction and/or implementation are evaluated. The length of time needed to achieve the remedial objectives is also estimated and compared against the other alternatives.

Alternatives LS-2, LS-3, LS-4, LS-5, SS-2 and SS-3 all have short-term impacts which could easily be controlled. Alternatives LS-2 and SS-2 will have the most significant short-term impacts due to the intrusive activities involved with the excavation and handling of impacted soil. The time needed to achieve the remediation goals is the shortest for alternative LS-5 and longest for alternative LS-2.

Sediment alternatives SED-2, SED-3, SED-4 and SED-5 all have short-term impacts to wildlife receptors due to the disruption of the stream bed and short-term impacts to the surrounding area due to the excavation, handling, and transportation of sediments. Sediment alternative SED-5 will have the least impact to wildlife receptors compared to SED-3 and SED-4 due to the limited area of excavation. The disturbed area of the stream bank and adjacent area vegetation will be re-established. Maximizing habitat value and creating habitat are green remediation concepts encouraged by the Department's DER-31.

Groundwater alternatives GW-2 and GW-3 do not have any short-term impacts.

6. Implementability. The technical and administrative feasibility of implementing each alternative are evaluated. Technical feasibility includes the difficulties associated with the construction of the remedy and the ability to monitor its effectiveness. For administrative feasibility, the availability of the necessary personnel and materials is evaluated along with potential difficulties in obtaining specific operating approvals, access for construction, institutional controls, and so forth.

All alternatives, with the exception of alternatives LS-2, SS-2 and SED-2; Restoration to Unrestricted conditions, will require institutional controls. Institutional controls are easily implementable, but require coordination with C&D Technologies, Inc., the current property owner to file an environmental easement on the site.

Alternatives LS-5 and SS-3 are favorable in that they are readily implementable. Alternatives LS-2, LS-3 and LS-4 pose concerns with the implementation of the excavations. Special excavation procedures (sheet pile installation) will be required for excavating soil in the area of the lagoons to stabilize the adjacent building foundation and the excavation. There will also be greater truck staging and traffic.

Alternatives SED-3, SED-4 and SED-5 can be implemented using readily available materials, equipment and construction practices. The sediment removal will most likely be completed in stages due to the length of the excavation areas.

Alternative GW-3 utilizes common and readily available technology and services that are easily implemented. Alternative GW-2 requires the design of the ground water extraction system and implementability is dependent on sub-surface hydrogeology.

7. Cost-Effectiveness. Capital costs and annual operation, maintenance, and monitoring costs are estimated for each alternative and compared on a present worth basis. Although cost-effectiveness is the last balancing criterion evaluated, where two or more alternatives have met the requirements of the other criteria, it can be used as the basis for the final decision.

The costs of the alternatives vary significantly. The least expensive lagoon alternative is alternative LS-5 because it does not require a sheet piling system. With the large volume of soil to be handled and the extensive sheet piling system required, alternatives LS-2, LS-3 and LS-4 have the highest present worth of the alternatives. Alternative LS-2 will only marginally increase in protectiveness over alternative LS-5, but results in approximately $5 million more in cost.

Alternative SED-3 is considered more cost effective than alternative SED-4. Although alternative SED-5 has a lower present worth it removes very little material relative to alternatives SED-3 and SED-4.

Alternative GW-3 will only require low periodic groundwater monitoring costs and potential costs associated

with any actions recommended to address exposures. Alternative GW-2 is the most costly groundwater alternative, an additional $4.5 million more than Alternative GW-3.

8. Land Use. When cleanup to pre-disposal conditions is determined to be infeasible, the Department may consider the current, intended, and reasonable anticipated future land use of the site and its surroundings in the selection of the soil remedy.

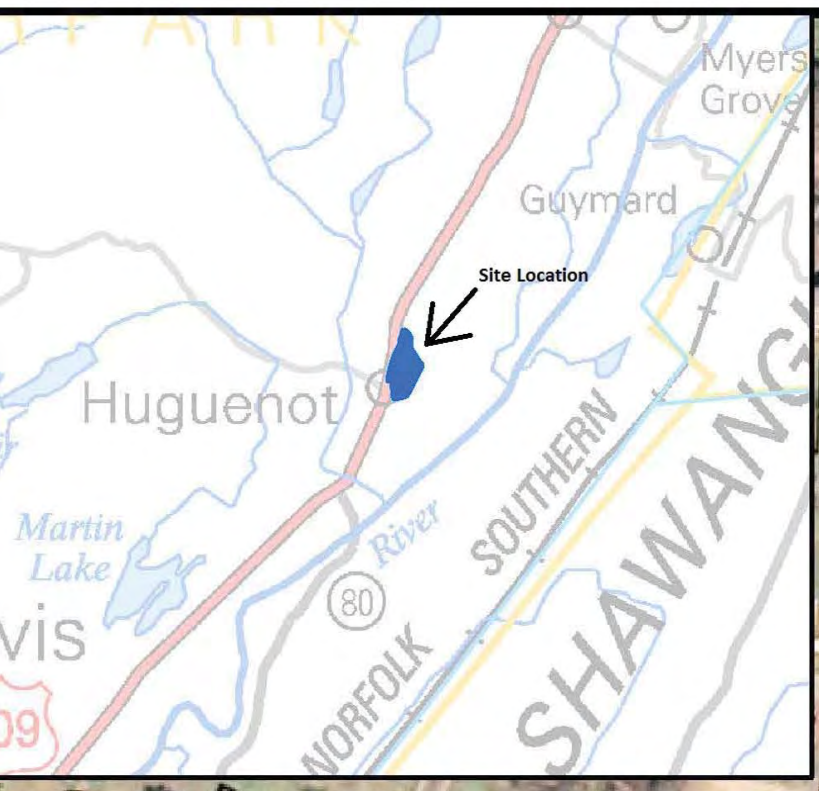
The anticipated future use of the site is commercial. Alternatives LS-3, LS-4, LS-5 and SS-3 will be less desirable because at least some contaminated soil remains on the property whereas alternatives LS-2 and SS-2 remove the contaminated soil permanently. However, the remaining contamination with alternatives LS-3, LS-4, LS-5 and SS-3 could be readily controlled with implementation of a site management plan. With alternatives LS-2 and SS-2 restrictions on the site use will not be necessary.

Sediment alternatives SED-2, SED-3, SED-4 and SED-5 achieve SCGs for protection of the environment and will be expected to meet residential SCOs.

The final criterion, Community Acceptance, is considered a "modifying criterion" and is taken into account after evaluating those above. It is evaluated after public comments on the Proposed Remedial Action Plan have been received.

9. Community Acceptance. Concerns of the community regarding the investigation, the evaluation of alternatives, and the PRAP were evaluated. A responsiveness summary was prepared that describes public comments received and the manner in which the Department addressed the concerns raised.

Alternatives LS-5, SS-3, SED-3 and GW-3 were selected because, as described above, they satisfy the threshold criteria and provide the best balance of the balancing criterion.



336001
C&D Power Systems (C&D Batteries)

N

4080 160 240 320

Feet

Figure 1
Site Location
C&D Power Systems
Site #336001

FIGURE 2
C&D Power Systems Site (336001)
Proposed Remediation Areas

N
W E
S

MW-12
MW-13
MW-6
MW-14
MW-7
MW-8
MW-9
MW-10
MW-17
MW-17A

Site Boundary

Legend

- Long Term Ground Water Monitoring Locations
- Lagoon Soil-3
- Residential SCO Cleanup Area
- Commercial SCO Cleanup Area
- SED-1 Alternative

Lagoon Soil Alternative Soil- 3: Excavation with off-site disposal and on-site In-situ solidification/stabilization.

Sediment Alternative SED-1: Removal of all stream bed sediment between sediment sample locations SED-9 and SED-14 and placement in lagoon.

Surface Soil Alternative: Ex-situ stabilization and placement of the soils in the lagoon. On-site soils cleanup to commercial use soil cleanup objective. Off-site soils cleanup to residential use soil cleanup objective.

Ground Water Alternative GW-3 Long-Term Monitoring: Semi-annual collection of ground water samples from ten ground water monitoring wells and the Orange County rental property well.

100 50 0 100 Feet

Proposed Locations of Existing Monitoring Wells to be Included in Long-Term Monitoring Ground Water Monitoring Program Are Approximate

LEGEND

- = SEDIMENT SAMPLE SED 1 THRU SED 4
- = TEST PIT
- = MONITORING WELL
- = FIRE HYDRANT
- = FENCE POST
- = CHAIN LINK FENCE
- = 1ST FLOOR ELEVATION
- = EDGE OF PAVEMENT
- = TREE LINE
- = CONTOUR LINE
- = INDEX CONTOUR LINE
- = ELEVATION
- = SOIL SAMPLE

OU - 2 RI SAMPLING LOCATIONS

- NEW MONITORING WELL LOCATION
- SW-1 THROUGH SW-6
- SED-5 THROUGH SED-10
- SSCMP – SURFICIAL SOIL SAMPLE AT 12" CMP

NOTES:

Datum : Based on ground elevation of MW-1
Contour Interval = 1'

NA = Indicates Not Analyzed

All Results in ug / L

Values in Bold Exceed Ground water Standard.

July 31, 2001: Values in ( ) is field filtered or dissolved value.

July 31, 2001: Value / Value represents sample results from Water Sample obtained with bailer / Sample result from Micro-Purging procedure.

GROUNDWATER MONITORING WELL ID: MW-15

Compound	Aug. 27, 2003	March 30, 2005
Barium	80.6	132
Cadmium	<0.6	<0.3
Lead	<2.1	<2.9
Fluoride	120	<100
PCB s	0.078	<0.065

GROUNDWATER MONITORING WELL ID: MW-8

Compound	Sept. 9,1999	Jan. 13, 2000	March 27, 2000	July 31, 2001	Aug. 27, 2003	March 31, 2005
Barium	26.7	NA	NA	21.6 (14.2)	15.2	12.56
Cadmium	NA	<5.0		<0.2 (<0.2)	<0.6	<0.3
Lead	17.5	NA		<2.8	<2.1	4.8
Lead (dissolved)	<3.0	NA		<2.8	NA	NA
Fluoride	**5,350**	NA		**6,300**	**6,560**	**5,320**
Fluoride (dissolved)	**5,120**	NA		NA	NA	NA
PCB s	NA	<1.0	<0.05	<0.065	<0.065	<0.065

GROUNDWATER MONITORING WELL ID: MW-7

Compound	Sept. 9,1999	Jan. 13, 2000	March 27, 2000	July 31, 2001	Aug. 27, 2003	March 31, 2005
Barium	17.9	NA	NA	855 / 35.4	25.1	9.2
Cadmium	1.0 U	<5.0		**5.6** / 0.47	<0.6	0.67
Lead	15.4	NA		<2.8 / <2.8	<2.1	<2.9
Lead (dissolved)	<3.0	NA		NA	NA	NA
Fluoride	**10,900**	NA		**8,700 / 8,600**	**7,870**	**6,440**
Fluoride (dissolved)	**10,800**	NA		NA	NA	NA
PCB s	<1.0	<1.1	0.067	**0.31 / 0.14**	<0.065	<0.065

GROUNDWATER MONITORING WELL ID: MW-6

Compound (ug/L)	Sept. 9,1999	Jan. 13, 2000	March 27, 2000	July 31, 2001	Aug 26, 2003	March 31, 2005
Barium	13.0	NA	NA	39.1 / 22.8	7.8	131
Cadmium	<1.0	<5.0		0.4 / <0.2	<0.6	0.35
Lead	**29.4**	NA		3 / < 2.8	< 2.1	6.8
Lead (dissolved)	<3.0	NA		NA	NA	NA
Fluoride	319	NA		1,100 / 580	140	**2,360**
Fluoride (dissolved)	264	NA		NA	NA	NA
PCB s	<1.0	<1.0	**0.24**	**0.23** / 0.051 J	<0.065	0.24

GROUNDWATER MONITORING WELL ID: MW-16

Compound	Aug. 27, 2003	March 30, 2005
Barium	16.1	42.7
Cadmium	<0.6	<0.3
Lead	<2.1	6.3
Fluoride	<100	<100
PCB s	0.035	<0.065

GROUNDWATER MONITORING WELL ID: MW-17A

Compound	Aug. 27, 2003	March 30, 2005
Barium	72.5	49
Cadmium	<0.6	<0.3
Lead	<2.1	<2.9
Fluoride	<100	<100
PCB s	0.032	<0.065

GROUNDWATER MONITORING WELL ID: MW-13

Compound	Sept. 9,1999	Jan. 13, 2000	March 27, 2000	July 31, 2001	Aug. 26, 2003	March 30, 2005
Barium	24.7	NA	NA	13.7	20.3	11.8
Cadmium	NA	<5.0		<0.2	<0.6	<0.3
Lead	5.2	NA		< 2.8	< 2.1	< 2.9
Lead (dissolved)	<2.0	NA		NA	NA	NA
Fluoride	642	NA		220	<100	<100
Fluoride (dissolved)	636	NA		NA	NA	NA
PCB s	NA	<1.4	<0.05	<0.065	<0.065	<0.065

GROUNDWATER MONITORING WELL ID: MW-12

Compound	Sept. 9,1999	Jan. 13, 2000	March 27, 2000	July 31, 2001	Aug 26, 2003
Barium	56.8	NA	NA	9.5	16.4
Cadmium	NA	<5.0		<0.2	<0.6
Lead	17.7	NA		< 2.8	< 2.1
Lead (dissolved)	6.8	NA		NA	NA
Fluoride	521	NA		310	290
Fluoride (dissolved)	501	NA		NA	NA
PCB s	NA	<1.0	<0.05	0.041J	<0.065

GROUNDWATER MONITORING WELL ID: MW-12

Compound	April 1, 2005
Barium	17.7
Cadmium	<0.3
Lead	< 2.9
Lead (dissolved)	NA
Fluoride	170
Fluoride (dissolved)	NA
PCB s	<0.065

GROUNDWATER MONITORING WELL ID: MW-9

Compound	Sept. 9,1999	Jan. 13, 2000	March 27, 2000	July 31, 2001	Aug. 27, 2003	March 31, 2005
Barium	28.5	NA	NA	34.1 (16.6)	18.7	18.5
Cadmium	NA	<5.0		<0.2 (<0.2)	<0.6	<0.3
Lead	20.5	NA		4.7	<2.1	<2.9
Lead (dissolved)	<3.0	NA		<2.8	NA	NA
Fluoride	**6,490**	NA		**6,200**	**6,520**	**5,180**
Fluoride (dissolved)	**6,390**	NA		NA	NA	NA
PCB s	NA	<1.0	<0.05	<0.065	<0.065	<0.065

GROUNDWATER MONITORING WELL ID: MW-10

Compound	Sept. 9,1999	Jan. 13, 2000	March 27, 2000	Aug. 27, 2003	March 31, 2005
Barium	124	NA	NA	48.5	28.2
Cadmium	NA	<5.0		<0.6	<0.3
Lead	13.1	NA		<2.1	<2.9
Lead (dissolved)	3.0 U	NA		NA	NA
Fluoride	**3,340**	NA		**5,530**	**6,160**
Fluoride (dissolved)	**3,320**	NA		NA	NA
PCB s	NA	1.0	<0.05	<0.065	<0.065

GROUNDWATER MONITORING WELL ID: MW-17

Compound	Aug. 27, 2003	March 30, 2005
Barium	31.8	110
Cadmium	<0.6	<0.3
Lead	<2.1	<2.9
Fluoride	**1,800**	**2,120**
PCB s	0.063	<0.065

GROUNDWATER MONITORING WELL ID: MW-14

Compound	July 31, 2001	Aug. 26, 2003	April 1, 2005
Barium	117 / <13.7	26.4	27.3
Cadmium	0.99 / <0.2	<0.6	<0.3
Lead	18.5 / <2.8	<2.1	<2.9
Fluoride	**4,100 / 4,300**	**6,540**	**6,590**
PCB s	**0.25 / 0.15**	0.088	0.2

GROUNDWATER MONITORING WELL ID: MW-18

Compound	March 31, 2005
Barium	**1,420**
Cadmium	**42.2**
Lead	<2.9
Fluoride	**10,400**
PCB s	<0.065

GROUNDWATER MONITORING WELL ID: MW-11

Compound	March 27, 2000
PCB s	<0.05

Compound	NYSDEC Ground water Standard (ug/L)
Barium	1,000
Cadmium	5
Lead	25
Fluoride	1,500
PCB s	0.09

SITE PLAN

0' 60'

GRAPHIC SCALE

DATE: 07-18-06
DRAWN BY: KJ
SCALE: AS SHOWN
REVIEWED BY: EF

REVISIONS

NO.	DATE	DESCRIPTION

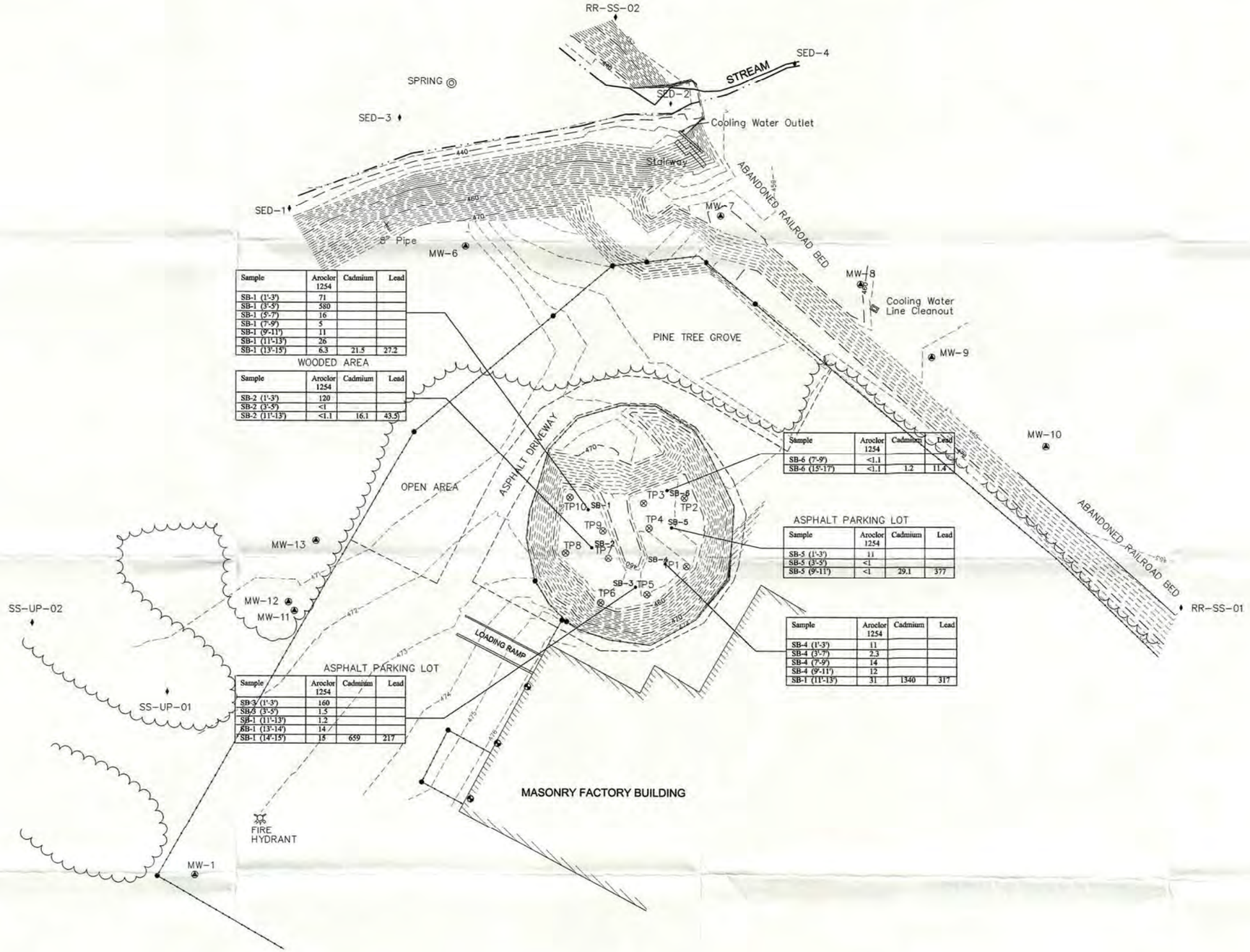
DELAWARE ENGINEERING, P.C.
ALBANY
28 Madison Avenue Extension - Albany, NY 12203
Phone: (518) 452-1200 - Fax: (518) 452-1335
CHICOUTAI

OU - 2 RI
C & D TECHNOLOGIES
NYS ROUTE 209
HUGUENOT, NEW YORK

Figure 3
GROUNDWATER SAMPLING DATA

SHEET:

H:\Drawings\CD_TECH\03-2005 GROUNDWATER_SAMPLING.dwg 7/18/2006 2:50:24 PM EST



Sample	Aroclor 1254	Cadmium	Lead
SB-1 (1'-3')	71		
SB-1 (3'-5')	580		
SB-1 (5'-7')	16		
SB-1 (7'-9')	5		
SB-1 (9'-11')	11		
SB-1 (11'-13')	26		
SB-1 (13'-15')	6.3	21.5	27.2

WOODED AREA

Sample	Aroclor 1254	Cadmium	Lead
SB-2 (1'-3')	120		
SB-2 (3'-5')	<1		
SB-2 (11'-13')	<1.1	16.1	43.5

Sample	Aroclor 1254	Cadmium	Lead
SB-6 (7'-9')	<1.1		
SB-6 (13'-17')	<1.1	1.2	11.4

ASPHALT PARKING LOT

Sample	Aroclor 1254	Cadmium	Lead
SB-5 (1'-3')	11		
SB-5 (3'-5')	<1		
SB-5 (9'-11')	<1	29.1	377

Sample	Aroclor 1254	Cadmium	Lead
SB-4 (1'-3')	11		
SB-4 (3'-7')	2.3		
SB-4 (7'-9')	14		
SB-4 (9'-11')	12		
SB-1 (11'-13')	31	1340	317

ASPHALT PARKING LOT

Sample	Aroclor 1254	Cadmium	Lead
SB-3 (1'-3')	160		
SB-3 (3'-5')	1.5		
SB-1 (11'-13')	1.2		
SB-1 (13'-14')	14		
SB-1 (14'-15')	15	659	217

LEGEND

- ♦ = SOIL SAMPLE
- ⊗ = TEST PIT
- ▲ = MONITORING WELL
- = FIRE HYDRANT
- = FENCE POST
- = CHAIN LINK FENCE
- = 1ST FLOOR ELEVATION
- = EDGE OF PAVEMENT
- = TREE LINE
- = CONTOUR LINE
- = INDEX CONTOUR LINE
- 465 = ELEVATION

NOTES:

Datum : Based on ground elevation of MW-1
Contour Interval = 1'

All values in mg / kg.

GRAPHIC SCALE

40 0 20 40 80 160

(IN FEET)
1 inch = 40 ft.

Figure 4

SUMMARY SOIL BORING DATA

SITE AT
C & D TECHNOLOGIES
NYS ROUTE 209
HUGUENOT, NEW YORK

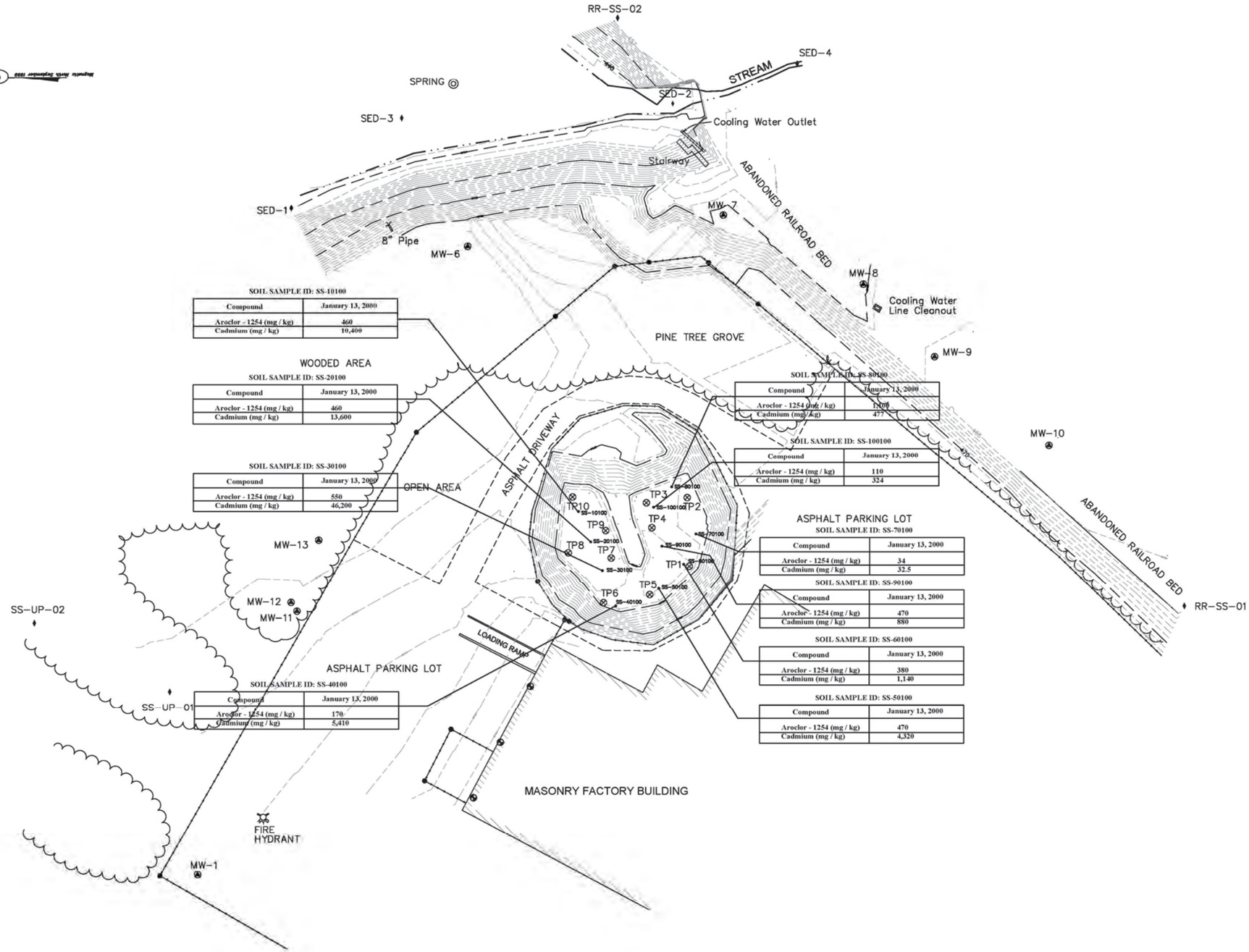
DELAWARE ENGINEERING, P.C.
28 Madison Avenue Extension
Albany, New York 12203
Phone 518-452-1290
FAX 518-452-1335

SCALE	AS SHOWN
DATE	MAY 22, 2000
DRAWN BY	KJ
CHECKED BY	
APPROVED BY	E.F.
FILENAME	Soil Boring Data
PROJECT NO.	
REVISED	

DRAWING NUMBER No. 4

SHEET NUMBER 1 OF 1

FILENAME: SOIL_BORING_DATA.DWG



LEGEND

- = SOIL SAMPLE
- = TEST PIT
- = MONITORING WELL
- = FIRE HYDRANT
- = FENCE POST
- = CHAIN LINK FENCE
- = 1ST FLOOR ELEVATION
- = EDGE OF PAVEMENT
- = TREE LINE
- = CONTOUR LINE
- = INDEX CONTOUR LINE
- 465 = ELEVATION

NOTES:

Datum : Based on ground elevation of MW-1
Contour Interval = 1'

Compound	Commercial Use SCO
PCB	1.0 mg / kg
Cadmium	9.3 mg / kg

GRAPHIC SCALE

40 0 20 40 80 160

(IN FEET)
1 inch = 40 ft.

Figure 5

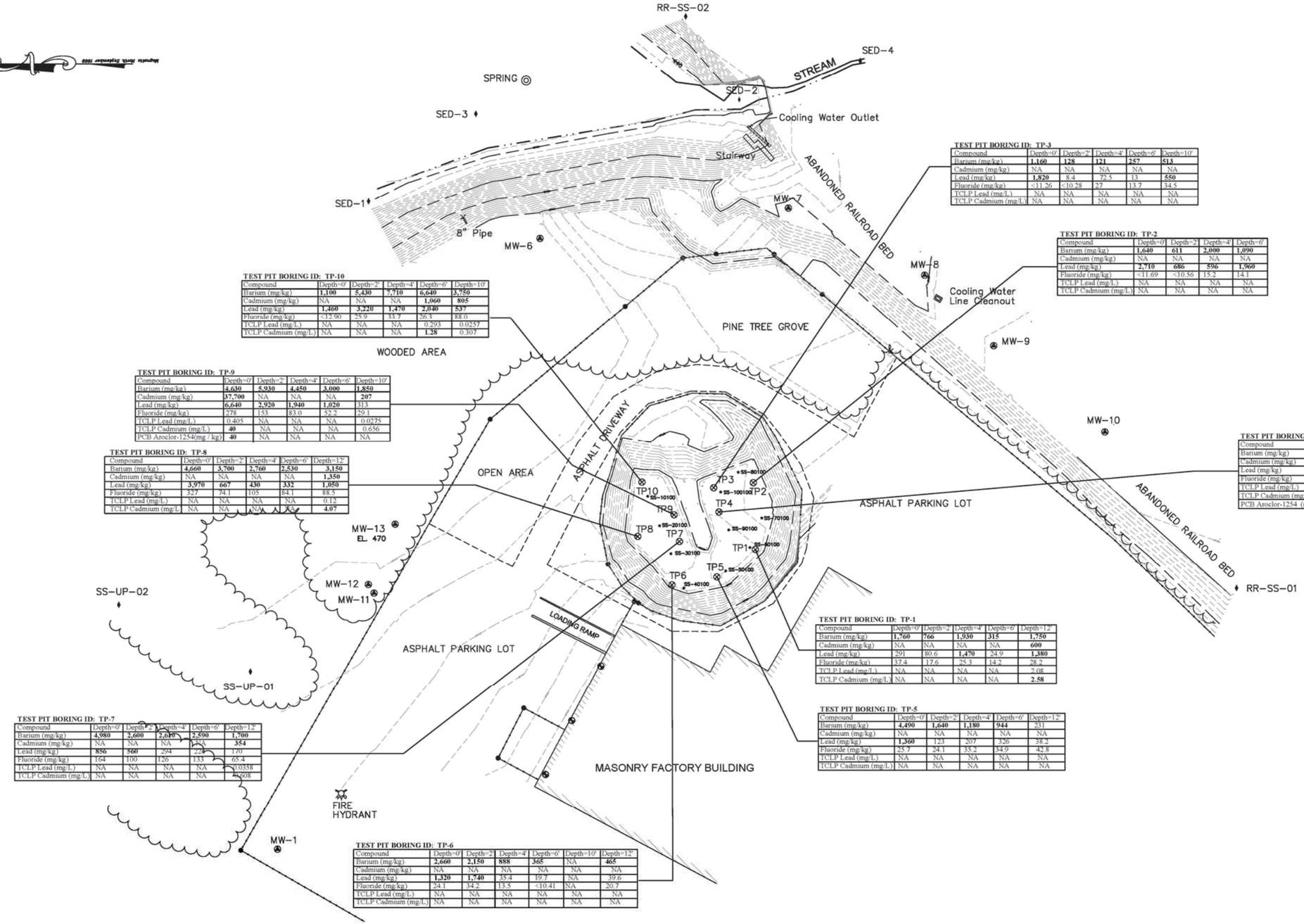
PCB & CADMIUM SURFACE SOIL SAMPLING DATA SUMMARY

SITE AT
C & D TECHNOLOGIES
NYS ROUTE 209
HUGUENOT, NEW YORK

DELAWARE ENGINEERING, P.C.
28 Madison Avenue Extension
Albany, New York 12203
Phone 518-452-1290
FAX 518-452-1335

SCALE	AS SHOWN
DATE	MAY 22, 2000
DRAWN BY	KJ
CHECKED BY	
APPROVED BY	EF
FILENAME	PCB_1.DWG
PROJECT NO.	
REVISED	

DRAWING NUMBER No. 3
SHEET NUMBER 1 OF 1



TEST PIT BORING ID: TP-10

Compound	Depth=0'	Depth=2'	Depth=4'	Depth=6'	Depth=10'
Barium (mg/kg)	**1,100**	**5,430**	**7,710**	**6,640**	**3,750**
Cadmium (mg/kg)	NA	NA	NA	**1,060**	**805**
Lead (mg/kg)	**1,460**	**3,220**	**1,470**	**2,040**	**537**
Fluoride (mg/kg)	<12.90	25.9	33.7	26.3	88.0
TCLP Lead (mg/L)	NA	NA	NA	0.293	0.0257
TCLP Cadmium (mg/L)	NA	NA	NA	**1.28**	0.307

TEST PIT BORING ID: TP-9

Compound	Depth=0'	Depth=2'	Depth=4'	Depth=6'	Depth=10'
Barium (mg/kg)	**4,630**	**5,930**	**4,450**	**3,000**	**1,850**
Cadmium (mg/kg)	**37,700**	NA	NA	NA	**207**
Lead (mg/kg)	**6,640**	**2,920**	**1,940**	**1,020**	313
Fluoride (mg/kg)	278	153	83.0	52.2	29.1
TCLP Lead (mg/L)	0.405	NA	NA	NA	0.0275
TCLP Cadmium (mg/L)	**40**	NA	NA	NA	0.656
PCB Aroclor-1254(mg / kg)	**40**	NA	NA	NA	NA

TEST PIT BORING ID: TP-8

Compound	Depth=0'	Depth=2'	Depth=4'	Depth=6'	Depth=12'
Barium (mg/kg)	**4,660**	**3,700**	**2,760**	**2,530**	**3,150**
Cadmium (mg/kg)	NA	NA	NA	NA	**1,350**
Lead (mg/kg)	**3,970**	**667**	**430**	**332**	**1,050**
Fluoride (mg/kg)	327	74.1	105	84.1	88.5
TCLP Lead (mg/L)	NA	NA	NA	NA	0.12
TCLP Cadmium (mg/L)	NA	NA	NA	NA	**4.07**

TEST PIT BORING ID: TP-3

Compound	Depth=0'	Depth=2'	Depth=4'	Depth=6'	Depth=10'
Barium (mg/kg)	**1,160**	**128**	**121**	**257**	**513**
Cadmium (mg/kg)	NA	NA	NA	NA	NA
Lead (mg/kg)	**1,820**	8.4	72.5	13	**550**
Fluoride (mg/kg)	<11.26	<10.28	27	13.7	34.5
TCLP Lead (mg/L)	NA	NA	NA	NA	NA
TCLP Cadmium (mg/L)	NA	NA	NA	NA	NA

TEST PIT BORING ID: TP-2

Compound	Depth=0'	Depth=2'	Depth=4'	Depth=6'
Barium (mg/kg)	**1,640**	**611**	**2,000**	**1,090**
Cadmium (mg/kg)	NA	NA	NA	NA
Lead (mg/kg)	**2,710**	**686**	**596**	**1,960**
Fluoride (mg/kg)	<11.69	<10.56	15.2	14.1
TCLP Lead (mg/L)	NA	NA	NA	NA
TCLP Cadmium (mg/L)	NA	NA	NA	NA

TEST PIT BORING ID: TP-4

Compound	Depth=0'	Depth=2'	Depth=4'	Depth=6'	Depth=10'
Barium (mg/kg)	**4,670**	**1,060**	**1,100**	**701**	**2,280**
Cadmium (mg/kg)	NA	NA	NA	NA	**1,260**
Lead (mg/kg)	**1,950**	**9,350**	**7,190**	**13,000**	**6,830**
Fluoride (mg/kg)	<15.45	<11.98	22.1	24.2	31.5
TCLP Lead (mg/L)	NA	NA	NA	NA	**5.46**
TCLP Cadmium (mg/L)	NA	NA	NA	NA	**3.76**
PCB Aroclor-1254 (mg/kg)	NA	NA	NA	NA	6.5

TEST PIT BORING ID: TP-1

Compound	Depth=0'	Depth=2'	Depth=4'	Depth=6'	Depth=12'
Barium (mg/kg)	**1,760**	**766**	**1,930**	**315**	**1,750**
Cadmium (mg/kg)	NA	NA	NA	NA	**600**
Lead (mg/kg)	291	80.6	**1,470**	24.9	**1,380**
Fluoride (mg/kg)	37.4	17.6	25.3	14.2	28.2
TCLP Lead (mg/L)	NA	NA	NA	NA	2.08
TCLP Cadmium (mg/L)	NA	NA	NA	NA	**2.58**

TEST PIT BORING ID: TP-5

Compound	Depth=0'	Depth=2'	Depth=4'	Depth=6'	Depth=12'
Barium (mg/kg)	**4,490**	**1,640**	**1,180**	**944**	231
Cadmium (mg/kg)	NA	NA	NA	NA	NA
Lead (mg/kg)	**1,360**	123	207	326	38.2
Fluoride (mg/kg)	25.7	24.1	35.2	34.9	42.8
TCLP Lead (mg/L)	NA	NA	NA	NA	NA
TCLP Cadmium (mg/L)	NA	NA	NA	NA	NA

TEST PIT BORING ID: TP-7

Compound	Depth=0'	Depth=2'	Depth=4'	Depth=6'	Depth=12'
Barium (mg/kg)	**4,980**	**2,600**	**2,620**	**2,590**	**1,700**
Cadmium (mg/kg)	NA	NA	NA	NA	**354**
Lead (mg/kg)	**856**	**560**	294	228	170
Fluoride (mg/kg)	164	100	126	133	65.4
TCLP Lead (mg/L)	NA	NA	NA	NA	0.0358
TCLP Cadmium (mg/L)	NA	NA	NA	NA	0.608

TEST PIT BORING ID: TP-6

Compound	Depth=0'	Depth=2'	Depth=4'	Depth=6'	Depth=10'	Depth=12'
Barium (mg/kg)	**2,660**	**2,150**	**888**	**365**	NA	**465**
Cadmium (mg/kg)	NA	NA	NA	NA	NA	NA
Lead (mg/kg)	**1,320**	**1,740**	35.4	19.7	NA	39.6
Fluoride (mg/kg)	24.1	34.2	13.5	<10.41	NA	20.7
TCLP Lead (mg/L)	NA	NA	NA	NA	NA	NA
TCLP Cadmium (mg/L)	NA	NA	NA	NA	NA	NA

GRAPHIC SCALE

40 0 20 40 80 160

(IN FEET)
1 inch = 40 ft.

LEGEND

- = SOIL SAMPLE
- = TEST PIT
- = MONITORING WELL
- = FIRE HYDRANT
- = FENCE POST
- = CHAIN LINK FENCE
- = 1ST FLOOR ELEVATION
- = EDGE OF PAVEMENT
- = TREE LINE
- = CONTOUR LINE
- = INDEX CONTOUR LINE
- 465 = ELEVATION

NOTES:

Datum : Based on ground elevation of MW-1
Contour Interval = 1'

NA : Indicates Not Analyzed

Values in Bold Exceed R.S.C.O.

Lead Values in Bold Exceed both Site Background and Typical Metropolitan and Suburban Concentrations.

Compound	PART 375 Commercial Use SCO
Barium (mg/kg)	400
Cadmium (mg/kg)	9.3
Lead (mg/kg)	1,000
Fluoride (mg/kg)	NA
TCLP Lead (mg/L)	5
TCLP Cadmium (mg/L)	1
PCB (mg / kg)	1

Figure 6

TEST PIT SAMPLING DATA SUMMARY

SITE AT
C & D TECHNOLOGIES
NYS ROUTE 209
HUGUENOT, NEW YORK

DELAWARE ENGINEERING, P.C.
28 Madison Avenue Extension
Albany, New York 12203
Phone 518-452-1290
FAX 518-452-1335

SCALE	AS SHOWN
DATE	MAY 22, 2000
DRAWN BY	KJ
CHECKED BY	
APPROVED BY	EF
FILENAME	PCB_1.DWG
PROJECT NO.	
REVISED	

DRAWING NUMBER No. 2 SHEET NUMBER 1 OF 1

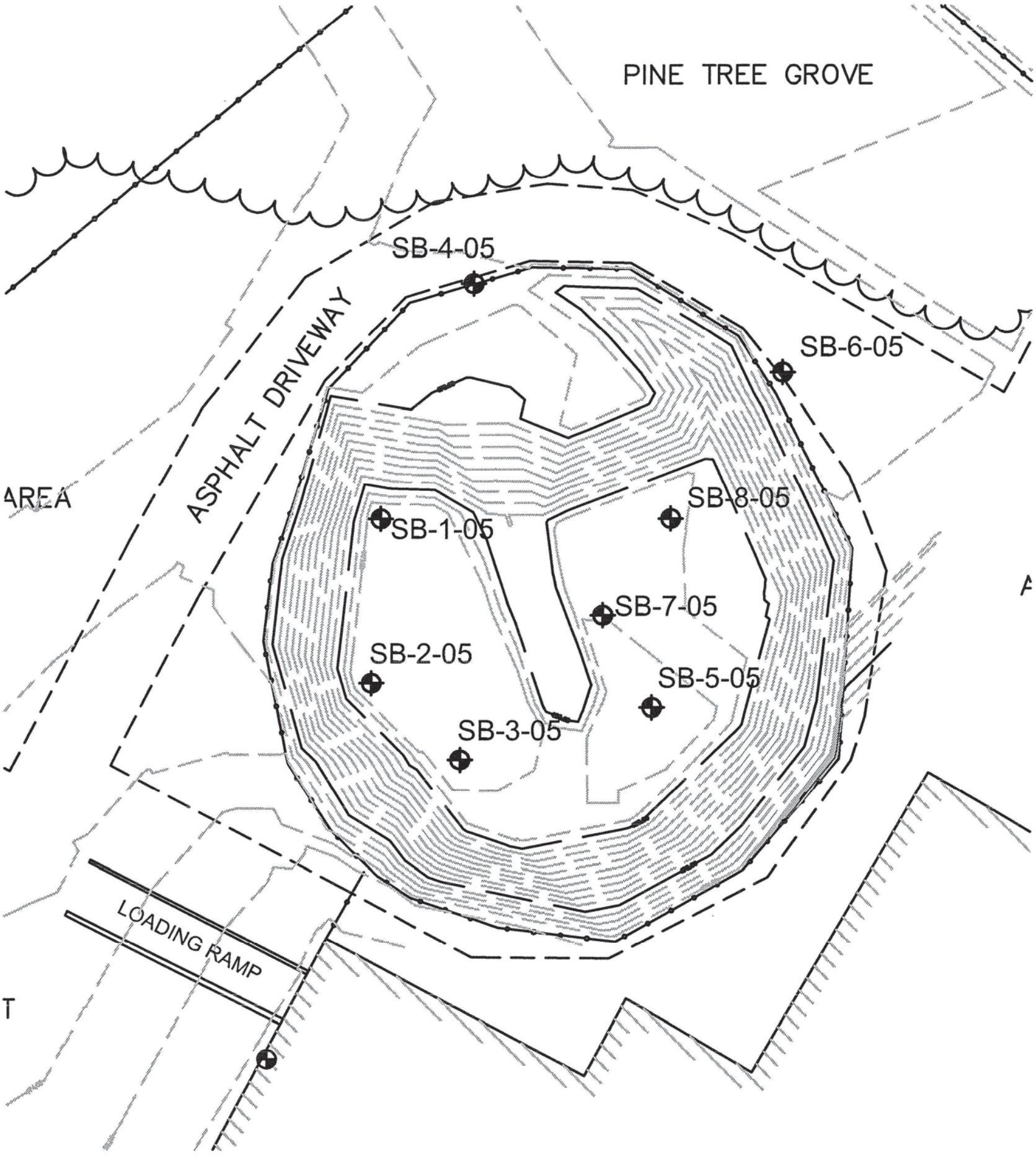


Figure 7

LAGOON SATURATED ZONE BORING LOCATIONS

C & D TECHNOLOGIES, INC.
HUGUENOT, NEW YORK

DATE: 11/11/04
DRAWN BY: KJ
SCALE: AS SHOWN
REVIEWED BY: EF
DATE REVISED: 01/05/05

DELAWARE ENGINEERING,
CIVIL AND ENVIRONMENTAL ENGINEERING
ALBANY:
28 Madison Avenue Extension - Albany
Phone: (518) 452-1290 - Fax: (518) 452
ONEONTA:
8-12 Dietz Street, Suite 303 - Oneonta,
Phone: (607) 432-8073 - Fax: (607) 43

Drawings Archive\CD_TECH\FIG_8_LAGOONSATUR_ZONE

Figure 8
C&D Former Huguenot, NY Facility
Pavement Soil and Soil Sample Lead Data

N
W E
S

SS-38 225
SS-39 88.2
PS-21 88.1
PS-20 139
SS-40 14.3
PS-22 29.4
PS-18 97.2
SS-41 494
SS-44 94.3
SS-37 342
PS-23 224
PS-19 82.3
SS-42 67.9
SS-43 375
PS-24 115
SS-45 302
PS-25 70.9
SS-46 74.3
SS-36 121
SS-47 222
PS-17 catch basin 2,100
SS-1 138
SS-2 46.2
PS-16 1,620
PS-26 112
PS-42 425
SS-3 401
SS-4 183
SS-35 7.10
PS-15 3,400
PS-14 8,910
PS-27 5,950
PS-3 5,880
SS-5 222
SS-6 659
SS-34 34.7
PS-4 2,220
SS-7 5,120
SS-8 2,120
PS-1 13,200
PS-2 8,370
PS-5 58,600
PS-6 5,830
PS-7 4,070
PS-28 7,600
SS-9 1,780
SS-10 751
PS-38 2,710
PS-9 1,700
PS-35 256
SS-33 33.7
SS-32 101
PS-30 11,200
PS-29 40,200
PS-41 22,900
SS-11 1,680
SS-12 523
PS-31 2,240
SS-13 190
SS-14 2,040
SS-31 69.1
SS-30 133
PS-32 599
PS-40 7,350
PS-37 11,400
SS-29 130
SS-28 101
PS-33 9,520
PS-39 27,200
SS-27 130
SS-26 111
PS-34 3,820
SS-15 536
SS-16 128
PS-11 1,690
SS-23 654
SS-22 1,700
SS-25 145
SS-17 104
SS-24 177
SS-21 947
SS-20 135
SS-18 99.4
SS-19 149

75 37.5 0 75 Feet

SS: Soil Sample Outside Fenced Area 0-2"

PS: Pavement Soil Sample Inside Fenced Area 0-2"

Note: Soil Samples 34, 35, 36, 42, 43 45, 46, 47 collected inside fenced area.

Results expressed in mg/Kg

C&D Power Systems Site
Site No. 336001
Tributary D-1-7 Sedmiment Data

N

Figure 9

Legend

- Sediment Sample Locations
- Lead > Lowest Effect Level
- Cadmium and Lead > Lowest Effect Level

Values in red exceed the Metals Severe Effect Level Criteria or the PCB aquatic life chronic toxicity criteria

Prepared by Delaware Engineering, P.C. April 2007
Sources NYS Digital Ortho Imagery 2004

100 50 0 100 Feet

APPENDIX A

Responsiveness Summary

RESPONSIVENESS SUMMARY

C&D Power Systems (C&D Batteries)
State Superfund Project/RCRA Project
Deerpark, Orange County, New York
Site No. 336001
EPA ID #NYD064337298

The Proposed Remedial Action Plan (PRAP) for the C&D Power Systems (C&D Batteries) site was prepared by the New York State Department of Environmental Conservation (the Department) in consultation with the New York State Department of Health (NYSDOH) and was issued to the document repositories on February 11, 2015. The PRAP outlined the remedial measure proposed for the contaminated soil, sediment, and groundwater at the C&D Batteries site.

The release of the PRAP was announced by sending a notice to the public contact list, informing the public of the opportunity to comment on the proposed remedy.

A public meeting was held on February 26, 2015, which included a presentation of the remedial investigation, feasibility study (RI/FS) for the C&D Batteries site as well as a discussion of the proposed remedy. The meeting provided an opportunity for citizens to discuss their concerns, ask questions and comment on the proposed remedy. These comments have become part of the Administrative Record for this site. The public comment period for the PRAP ended on March 18, 2015.

This responsiveness summary responds to all questions and comments raised during the public comment period. The following are the comments received, with the Department's responses:

COMMENT 1: Will children be able to play on the site once remediation is complete?

RESPONSE 1: Part of the remedy is to construct a site cover to allow for commercial use of the property. The site cover will consist of either structures such as buildings, pavement, sidewalks comprising any site development or a minimum of one foot of soil meeting the soil cleanup objectives (SCOs) for cover material as set forth in 6 NYCRR Part 375-6.7(d) for commercial use. Commercial use allows for passive recreational uses such as walking, cycling, golf and green park space, which would be acceptable at the site following the construction of the site cover.

COMMENT 2: Are sediments going into the lagoon untreated?

RESPONSE 2: Although tributary D-1-7 sediment exceeds the Department sediment quality criteria, the concentrations are below the commercial use and protection of groundwater soil cleanup objectives (SCOs). Therefore, the sediment can be used as backfill in the lagoon. The sediment will be placed above the stabilized soils and below the cover system. Some treatment to change the physical properties of the sediment may be necessary for transport and stability prior to placement in the lagoon.

COMMENT 3: What is the allowable end use?

RESPONSE 3: The cleanup at the property allows for commercial or industrial use. However, actual use is subject to local zoning.

COMMENT 4: How long will monitoring be performed on the site?

RESPONSE 4: Monitoring will continue on the site until the Department and NYSDOH have determined that the remedy has achieved the remedial action objectives for the site, in this case groundwater standards. For the purpose of cost estimation, it is assumed that monitoring will continue for 30 years.

COMMENT 5: Is there money available to perform the remedial work?

RESPONSE 5: The remedial program is currently being conducted by the Potentially Responsible Party (PRP) under an Order on Consent. After the Record of Decision (ROD) is issued, the PRP will be given an opportunity to enter into an Order on Consent for implementation of the design, construction and long-term management of the remedy. If the PRP does not enter into an Order on Consent with the Department, then the Department will implement the remedy under the State Superfund. The Department would then refer the site to the New York State Attorney General to recover the costs expended for the remedy from the PRP.

COMMENT 6: Can water be used on the site?

RESPONSE 6: Groundwater cannot be used on the site as a source of potable or process water, without necessary water quality treatment as determined by the NYSDOH or County DOH.

COMMENT 7: Are you just adding cement to the lagoon soil? How does this work?

RESPONSE 7: The contaminated lagoon soil will be mixed in place with solidifying agents (typically Portland cement) or other binding agents using an excavator or augers. The soil and binding agents are mixed to encapsulate and chemically bind the contaminated soil in a low permeability matrix. The resulting solid matrix reduces or eliminates the mobility of the contaminants and reduces or eliminates the matrix as a source of groundwater contamination.

COMMENT 8: What is the timeline for the work to be performed?

RESPONSE 8: Once the ROD is issued, the Department will approach the PRP for this site, to enter into an Order on Consent for implementation of the design and construction of the remedy. Once the Order is signed, the design phase will begin, which is estimated to take between 6 months to a year. The construction following the design of the remedy is expected to take 6 months.

COMMENT 9: A representative from C&D Technologies, Inc. stated that Avnet, Inc. is responsible for 87% of the costs for the site based on an agreement between C&D Technologies, Inc. and Avnet, Inc.

RESPONSE 9: The comment is noted.

Mr. Alfred Fusco submitted a letter dated March 2, 2015, which included the following comments:

COMMENT 10: As discussed at the public meeting, the town of Deerpark has a contaminated well only a few feet from the property which rendered the Town Hall water unpotable. Funding was requested to cap this well and either drill another well or run water from the Senior Center well and install iron removal equipment and a disinfection system. Test results will be forwarded to the Department when available.

RESPONSE 10: The Department was unaware of the contaminated Town Hall potable well until recently, first being informed of the issue when speaking with the Town of Deerpark supervisor at the public meeting. If it is determined, based on review of analytical data, that the contamination is related to the C&D Batteries site, then the treatment required for the Town Hall potable well will be included as a component of the site remedy. As part of the selected remedy, wells in the area will be re-evaluated and any site-related contamination that is identified will be addressed.

Mr. Frank Demuth submitted an email (dated March 12, 2015) which included the following comments:

COMMENT 11: A request was made for the proposals for remediation at the site and for any information and results regarding recent groundwater testing.

RESPONSE 11: A copy of the proposed remedial action plan (PRAP) was sent to Mr. Demuth. Previous groundwater sampling indicated fluoride was the only contaminant of concern detected in groundwater. The town hall and the Swartout residence groundwater supplies were sampled and found not to be contaminated. As part of the selected remedy, wells in the area will be re-evaluated and any site-related contamination that is identified will be addressed.

Administrative Record

C&D Power Systems (C&D Batteries) Site
State Superfund Project/RCRA Project
Deerpark, Orange County, New York
Site No. 336001
EPA ID #NYD064337298

1. Proposed Remedial Action Plan for the C&D Power Systems (C&D Batteries) site, dated February 2015, prepared by the Department.

2. Order on Consent, Index No. W3-0726-97-11, between the Department and C&D Technologies, Inc., executed on July 19, 1999.

3. "Remedial Investigation/Feasibility Study Work Plan", April 1999, prepared by Earth Tech.

4. "Remedial Investigation Report", March 2001, prepared by Delaware Engineering.

5. "Feasibility Study Report", March 2001, prepared by Delaware Engineering.

6. Proposed Remedial Action Plan for the C&D Power Systems (C&D Batteries) Operable Unit No. 1, dated February 2002, prepared by the Department.

7. Record of Decision, C&D Power Systems (C&D Batteries) Operable Unit No. 1, dated March 2002, prepared by the Department.

8. "Operable Unit 2 Remedial Investigation Report", May 2006, prepared by Delaware Engineering.

9. "Final Facility Decommissioning and Closure Plan Report", March 2007, prepared by C&D Technologies, Inc.

10. "Tributary D-1-7 Sediment Data Report", June 2007, prepared by Delaware Engineering.

11. "Soil and Pavement Soil Sample Lead Results Report", September 2008, prepared by Delaware Engineering.

12. "Soil and Pavement Soil Sample Lead Results Report", October 2009, prepared by Delaware Engineering.

13. "Feasibility Study Report", August 2014, prepared by Delaware Engineering.

14. Letter dated March, 2, 2015 from Alfred Fusco.

15. Email dated March 12, 2015 from Frank Demuth.

Appendix E Nationwide Permit 38

Supporting Documentation

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

Division of Environmental Remediation, Office of the Director
625 Broadway, 12th Floor, Albany, New York 12233-7011
P: (518) 402-9706 | F: (518) 402-9020
www.dec.ny.gov

Transmitted Via Email Only

March 25, 2022

Ariel Iglesias - Director
Land, Chemicals and Redevelopment Division
United State Environmental Protection Agency
290 Broadway, 256h Floor
New York, NY 10007-1866
Iglesias.Ariel@epa.gov

Subject: **USEPA Region 2 PCB Program**
Acceptance of Conditions
PCB Risk-Based Disposal Approval under 40 CFR §761.61(c)
C&D Power Systems (C&D Batteries) Site # 336001
Huguenot, New York

Dear Ariel Iglesias,

The New York State Department of Environmental Conservation (DEC) is in receipt of the above referenced approval from the United States Environmental Protection Agency. We have reviewed the conditions of the approval, and in accordance with Condition 1 of the approval, this letter is being provided to notify you that DEC accepts the approval conditions and will perform the PCB cleanup in accordance with the approval and the notification referenced therein.

If you have any questions, comments, or concerns you may contact the DEC project manager, Justin Starr, by phone at 518-402-9662 or by email at justin.starr@dec.ny.gov.

Sincerely,

Susan L. Edwards

Susan Edwards, P.E.
Acting Division Director
Division of Environmental Remediation

ec: A. Tamuno - alali.tamuno@dec.ny.gov
J. Brown – janet.brown@dec.ny.gov
M. Cruden - michael.cruden@dec.ny.gov
A. Omorogbe - amen.omorogbe@dec.ny.gov
J. Starr – justin.starr@dec.ny.gov
B. Rung - benjamin.rung@dec.ny.gov
A. Haryani - Amit.Haryani@aecom.com
P. Haskell - patrick.haskell@aecom.com
A. Park – Park.Andy@epa.gov
W. Palomino - Palomino.Wilfredo@epa.gov
D2

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 2
290 BROADWAY
NEW YORK, NY 10007-1866

March 31, 2023

Lisa A. Gorton, P.E.
Project Manager
Division of Environmental Remediation
New York State Department of Environmental Conservation
625 Broadway, 12th Floor
Albany, New York 12233-7011
Lisa.Gorton@dec.ny.gov

Re: Modification to EPA's PCB Risk-Based Cleanup and Disposal Approval
C&D Power Systems (C&D Batteries) Site, Huguenot, New York

Dear Ms. Gorton:

This is in response to a letter dated February 23, 2023 submitted by AECOM, on behalf of the New York State Department of Environmental Conservation or NYSDEC (the Letter), requesting a modification to the Polychlorinated Biphenyl (PCB) Risk-Based Cleanup and Disposal Approval issued by the Environmental Protection Agency Region 2 (EPA) for the C&D Power Systems Site on March 23, 2022 (Approval). The Letter requests that Area 1 of the sediment excavation plan in Tributary D-1-7 (the Tributary) to the Neversink River (see Figure 1 of the February 23 letter) be omitted from the sediment excavation plan due to the technical challenges for implementing the Area 1 cleanup and potential adverse impact to the wetlands. EPA has reviewed the request and has concluded that the request is acceptable.

Remediation design activities performed subsequent to issuance of the Approval identified technical challenges to implementing remediation of Area 1, the upstream area near the railroad bridge, as AECOM and NYSDEC determined it is difficult to access the area with the necessary equipment. Due to the presence of the railroad abutment, placement of a coffer dam on the upstream side could not be accomplished. There is no adjacent access pathway and creating a new pathway would require construction of a roadway through the wetland buffering the Tributary, which would impact a large extent of ecological habitat.

Furthermore, in efforts to assess the protectiveness of the requested modification, a surface weighted-average concentration (SWAC) analysis of PCB concentrations for pre- and post-remediation in a northern section of the Study Area, called Reach 1, and the entire Study Area were performed. PCB SWACs for Reach 1 without and with excavation are 0.457 microgram per kilogram (mg/kg as known as part per million (ppm)) and 0.317 mg/kg, respectively. SWACs of PCBs for the entire Study Area for pre- and post-excavation are 0.308 mg/kg, 0.206 mg/kg (including Area 1 sediment excavation) and 0.223 mg/kg (excluding Area 1 sediment excavation), respectively. All SWACs are below the PCB remediation standard of 1 mg/kg. No significant changes in the PCB SWACs for Reach 1 and the entire Study Area without and with the Area 1 sediment excavation are noted.

In summary, EPA has concluded that NYSDEC's request to modify the work required to be performed under the Approval (as more fully described in the C&D Power Systems Risk Based Plan (RBP) dated

July 13, 2021 referenced therein) to exclude from the remedial excavation footprint a small, difficult-to-access portion of the river (or tributary) located at the bank of the site is acceptable. This conclusion is based on review of the potential impacts to the wetlands buffering the tributary, which would occur due to the physical requirements to implement excavation in the approved remediation footprint, and an analysis of residual PCB concentrations following remediation.

Please note that nothing in this letter is to be interpreted as modifying any other aspect of the Approval. The remainder of the contaminated area is to be managed and remediated in accordance with the Approval.

Should you have any questions or want to discuss this matter further, please free to contact Wilfredo Palomino, of my staff, at (212) 637-4179.

Sincerely,

Adolph Everett, Chief
Land and Redevelopment Programs Branch

cc: Benjamin Rung, NYSDEC, Benjamin.Rung@dec.ny.gov
Patrick Haskell, AECOM, Patrick.Haskell@aecom.com
Amit Haryani, AECOM, Amit.Haryani@aecom.com
430 US RTE 209 LLC C/O Berel Krug, berel@lbhrealestate.com

U.S. Environmental Protection Agency
Region 2

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In the Matter of

C&D Power Systems (C&D Batteries) Site
Huguenot, New York

Approval for Risk-Based Cleanup and Disposal of Polychlorinated Biphenyl Remediation Waste

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This document is the United States Environmental Protection Agency, Region 2's ("EPA Region 2") response to and approval of the request for a risk-based disposal of polychlorinated biphenyl ("PCB") remediation waste (as defined at 40 C.F.R. § 761.3) ("Approval"). The disposal approval request was submitted to EPA Region 2 by AECOM, the consultant for the New York State Department of Environmental Conservation (hereafter referred as "NYSDEC"), in the form of a Risk Based Cleanup and Disposal Plan ("Plan") dated July 13, 2021. The Plan addresses the remediation of PCB-contamination located at the C&D Power Systems (C&D Batteries) Site in Huguenot, New York ("Site"). The Site is currently owned by 430 US Route 209, LLC (hereinafter "the Owner").

The completed application that EPA Region 2 considered in determining whether to approve NYSDEC's request consists of the Plan submitted by AECOM dated July 13, 2021 ("Application").

EPA Region 2 reviewed NYSDEC's Application to determine whether the remedial actions proposed in the Application would be protective of human health and the environment, and technically feasible and appropriate. EPA Region 2 has also reviewed NYSDEC's Application to ensure that safeguards, including long-term maintenance and monitoring commitments, associated with the remediation of the Site will be in place.

Based on the information provided in the Application, EPA Region 2 has determined that implementation of the remedial actions proposed in the Application to address the presence of residual PCBs at the Site will not pose an unreasonable risk of injury to health or the environment.

EPA hereby issues this Approval to NYSDEC and to the Owner for the risk-based disposal of PCB remediation waste at the Site, subject to the terms and conditions specified herein. EPA's authority to issue Approvals derives from the federal regulations for PCBs promulgated pursuant to the Toxic Substances Control Act ("TSCA"), 15 U.S.C. §§ 2601 - 2697 et seq. as amended and set forth in Part 761 of Title 40 of the Code of Federal Regulations (40 C.F.R. Part 761). In EPA Region 2, the authority to issue Approvals under 40 C.F.R. § 761.61(c)(2) has been delegated to the Director of the Land, Chemicals & Redevelopment Division ("LCRD"). This Approval also constitutes an order issued under the authority of Section 6 of TSCA, 15 U.S.C. § 2605.

1. Effective Date

This Approval shall become effective on the date the Director of LCRD, EPA Region 2, receives written notification from both NYSDEC and the Owner, signed by an authorized representative of each, of their respective acceptance of, and intention to comply with, the terms and conditions of this

Approval. This Approval may be withdrawn if EPA Region 2 does not receive, within forty-five (45) calendar days of the date of this Approval, written notification from both NYSDEC and the Owner of each's acceptance of, and intention to comply with, the terms and conditions of this Approval.

2. Description of the Site and the Extent of PCB Contamination

The Site is 17+ acres in area and is located immediately southwest of Tributary D-1-7 of the Neversink River (the "Tributary") at 430 US Route 209, Huguenot, Orange County, New York, 12746. One three-acre single-story structure is located on the Site, and the Site is currently vacant. The Site was owned by Empire Tube Company between 1959 and 1970 and used for the manufacture of black and white television picture tubes. In or about 1970, C&D Technologies Inc. ("C&D") became the owner and operator of the Site and used it for the manufacture of lead acid batteries until ceasing operation in 2006. In 2007, the Site was sold to Star Realty Associates LLC and was later sold to the Owner in 2018.

The Site has been the subject of a series of environmental investigations, most of which were performed by C&D between 1981 and 2008. C&D completed a Feasibility Study between 2008 and 2014. In March 2002, NYSDEC issued a Record of Decision ("ROD") for Operable Unit ("OU")-1 of the Site. In March 2015, NYSDEC issued a ROD and ROD Amendment for the Site for OU-1 and OU-2 (combining OU-1 and OU-2 into a single OU and replacing the original ROD for OU-1 of the Site dated March 2002). NYSDEC is currently performing investigation and remediation of the Site under the New York State Superfund Program.

The results of the investigations indicate the presence of PCBs in soil within the footprint of a former 15-foot deep waste lagoon and in sediments of the Tributary to which the lagoon previously discharged. PCBs have been detected in lagoon soils at concentrations up to 1,100 milligrams per kilogram (mg/kg, also referred to as parts per million or ppm). PCBs have been detected in Tributary sediments at concentrations between 0.031 and 1.47 mg/kg and in off-Site soils at concentrations between 0.15 to 3.3 mg/kg.

PCBs have previously been found in on-Site groundwater at concentrations below 0.5 parts per billion, but the most recent sampling of the 11 on-Site monitoring wells (in 2019) did not detect concentrations of PCBs.

3. Work to be Performed

NYSDEC shall perform the work and shall comply with all the conditions in this Approval and complete and/or implement the work as described in the Application. The Owner shall also be responsible for the tasks specified below in the Approval, including but not limited to Sections 7-10. and Section 13. All work required by this Approval must be conducted in accordance with the federal PCB regulations including but not limited to the regulatory provisions regarding on-Site storage of remediation waste, off-Site transport and disposal, and decontamination of equipment utilized in remediation. Specifically, the following work shall be completed:

1) excavation of PCB-contaminated soil to 50 mg/kg from the lagoon, with off-Site disposal of the excavated soil;

2) post-excavation sampling in the lagoon, as described in the Application, to verify that PCBs at concentrations greater than 50 mg/kg have been removed;

3) in-situ stabilization of soil containing less than 50 mg/kg below the lagoon at depths of up to 35 feet below the lagoon surface grade;

4) up to approximately 940 cubic yards of sediment and floodplain soils containing PCB concentrations greater than 1 mg/kg will either be removed and disposed in accordance with 40 C.F.R. § 761.61(a)(5)(i)(B)(2)(ii) or stabilized and consolidated in the bottom of the lagoon;

5) filling the lagoon to one foot below grade and placement of clean fill and asphalt pavement cover to serve as a cap ("Cap");

6) implementation of a Site Management Plan ("SMP"), prepared in accordance with Section 6 below as it pertains to PCB contamination present on the Site, for long-term (no less than 30 years) maintenance and monitoring of the Cap to ensure effective isolation and containment of the PCBs remaining on the Site;

7) the recording of a deed notice, in the form of a Declaration of Covenants, Restrictions and Environmental Easement, to restrict the Site to commercial or industrial use and specify the institutional controls, specifically the ongoing monitoring and maintenance of the Cap (The Owner's responsibility with respect to this is described below in Sections 7-9); and

8) any other remedial actions, if deemed necessary, to prevent migration of or unacceptable exposures to PCB contamination at the Site.

To the extent that NYSDEC hires any sub-contractor, independent agent or other third party to perform said work, NYSDEC shall be responsible to ensure that any such sub-contractor, independent agent or other third party performs said work in accordance with the terms and conditions of the Application and this Approval.

Nothing herein shall preclude additional work measures from being implemented, provided that any such measure is not inconsistent with nor violates any express provision in this Approval or any provision of 40 C.F.R. Part 761.

4. Reporting Requirements

The following reports shall be made:

Work Schedule. Within thirty (30) calendar days after this Approval becomes effective, NYSDEC shall submit to EPA Region 2 a reasonably detailed schedule for performance of the remedial work

identified in Section 3 [1– 5].

Work Status Report. After the effective date of this Approval, NYSDEC shall provide EPA Region 2 with a written report, every three (3) months, of the status of the relevant remedial actions performed in accordance with Section 3 of this Approval (Work to be Performed) and any other remedial actions, if deemed necessary, under this Approval.

Remedial Action Report. Within sixty (60) calendar days of completing the work specified in Section 3[1-5, 8] of this Approval, NYSDEC shall submit to EPA Region 2 for review and approval a Remedial Action Report ("RAR") in accordance with Section 5 below.

Deed Notice. Within seven (7) calendar days of recording the *Declaration of Covenants, Restrictions and Environmental Easement* identified in Section 3[7] above and further described in Section 9 below, the Owner shall submit proof of recording to EPA Region 2 in accordance with Section 9.

Annual Report. Beginning July first following the completion of the work identified in Section 3 and continuing every July thereafter, NYSDEC shall submit to EPA Region 2, no later than July 31, an annual written report covering the previous annual reporting period (July 1 through June 30) (the "Annual Report"). (See also Section 6.)

The Annual Report shall include the information collected during implementation of the long-term maintenance and monitoring performed pursuant to Sections 3 and 6 of this Approval.

5. Remedial Action Report

Within sixty (60) calendar days of completing the work specified in Section 3[1-5] of this Approval, NYSDEC shall submit to the Region a RAR that includes the following:

1) a detailed description of the specific activities performed to address the PCB contamination present on the Site;

2) a tabular summary (with supporting laboratory documentation) of the results of all sampling conducted in connection with the remedial work and corresponding figures;

3) documentation of off-Site disposal, including certificates of disposal or similar certifications issued by the disposal facility, of any PCB remediation waste that is removed from the Site;

4) "as-built" figures depicting conditions at the Site after the remedial work has been completed; and,

5) a certification, signed by a professional engineer licensed by the State of New York and on behalf of NYSDEC, verifying that all engineering components directed by this Approval have been completed in accordance with this Approval.

A supplemental RAR shall be submitted within sixty (60) calendar days of completing any other

remedial action as identified under Section 3[8] of this Approval and shall include the information specified above.

6. Inspection, Monitoring, Maintenance, and Related Obligations

No Site Management Plan (SMP) was prepared as part of the risk-based PCB cleanup and disposal application. Within thirty (30) calendar days of the completion of the remedial work identified in Sections 3 [1-5], NYSDEC shall submit a comprehensive SMP to EPA Region 2. EPA Region 2 shall review and approve the PCB-specific items that are detailed within the SMP. Within thirty (30) calendar days from EPA Region 2's approval of the SMP, NYSDEC shall commence implementation of the SMP.

Annual inspections and reporting are to be required as part of the SMP. The Cap shall be maintained to prevent access to or release of contaminated material. NYSDEC shall perform at least annual visual inspections of the Cap to document its integrity and effectiveness and shall timely perform any necessary activities to maintain the Cap. NYSDEC shall prepare written reports of all inspections performed and maintenance activities completed and shall submit to EPA Region 2 as part of the Annual Report required by Section 4, above, a copy of all such Cap inspection and maintenance reports, as well as any other information pertaining to maintenance of the Cap.

If NYSDEC identifies a breach in the Cap, NYSDEC shall notify EPA Region 2 in writing within fourteen (14) calendar days of discovery. The notification shall include the anticipated corrective measures and a schedule for implementation.

Any proposed revisions or modifications to the SMP pertaining to PCB-specific items that are detailed within the SMP will be provided to EPA Region 2 for review and approval under this Approval.

7. Financial Assurance

NYSDEC will be responsible for the work to be performed at the Site including approximately 30 years of operation and maintenance. As such, neither NYSDEC nor the Owner need make a showing of financial assurance unless required under Section 10.

In the event that the Owner sells or leases any portion of the Site or the Site in its entirety, then the Owner shall ensure that the sales contract or lease shall include the provisions set forth in this Section and shall advise the buyer or lessee that it may be required to comply with the terms and conditions specified in this Section and Section 10, below. Upon EPA's notification of the need to comply, such buyer or lessee shall demonstrate that it has in place financial assurance sufficient for the costs of operation and maintenance as will be described in the SMP and the Declaration of Covenants, Restrictions and Environmental Easement by choosing among the financial assurance mechanisms set forth in 40 C.F.R. § 761.65(g) (referencing provisions of Subpart H of 40 C.F.R. Part 264). Following such notification, no later than March 1st of each year following the year of acquisition of its interest in the Site, such buyer or lessee shall submit an annual certification to EPA Region 2 that the selected financial assurance mechanism(s) covered the prior calendar year and that the buyer/lessee has and will

maintain such coverage for the current year. Beginning five years from the effective date of the acquisition of its interest in the Site and repeating every five years thereafter, the buyer or lessee shall demonstrate to EPA Region 2 that the financial assurance mechanism(s) is/are sufficient to cover any reasonably contemplated costs of a future cleanup.

If the Owner sells or leases any portion of the Site or the Site in its entirety, but satisfactory demonstration of financial assurance has not been provided by the buyer or lessee to EPA, NYSDEC shall remain liable for funding all obligations required by this Approval as if such sale or leasing arrangement had not taken place.

8. Records

As long as PCB remediation waste above 1 ppm remains on the Site, subject to Paragraph 10 regarding the transfer of all responsibility to comply with the terms and conditions of the Approval, NYSDEC shall maintain the following records at 625 Broadway, Albany, NY 12233 and shall make them available to EPA upon request[1]:

1) the final construction drawings and any other construction-related documents pertaining to the Cap;

2) all records and information related to characterization, analysis,[2] sampling, shipping and disposal of PCB-contaminated material at the Site; and,

3) all records and information related to the long-term monitoring including monitoring of the Cap.

The Owner (or any new owner/lessee pursuant to Section 10) shall confirm and certify that these records are maintained at NYSDECs central office location at 625 Broadway, Albany, NY 12233. Such certification shall be provided to EPA with the notification pursuant to Section 1, above. In the event that the three conditions listed below in Section 10 of this Approval are met and the Approval is reissued to and accepted by a new owner or lessee, NYSDEC will, unless otherwise approved by EPA, transfer custody of the documents required to be preserved pursuant to 40 C.F.R. Part 761, and to the extent not inconsistent with applicable TSCA statutory or regulatory requirements, NYSDEC will then be released from any further record-keeping obligations, mandated by this Approval.

9. Declaration of Covenants, Restrictions and Environmental Easement and Certification to EPA

Within sixty (60) calendar days of completion of the work specified in Section 3-1 through 3-5 and the approval of the Site Management Plan under 3-6 and Section 6 of this Approval, the Owner shall in

[1] Public access to these documents is also available at: https://www.dec.ny.gov/data/DecDocs/336001/

[2] NYSDEC shall use an appropriately sensitive and selective testing method from the latest update of the document entitled: "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," also known as SW-846, or validated equivalent, or as otherwise specified in this Approval.

consultation with NYSDEC do both of the following:

1) Prepare and record a Declaration of Covenants, Restrictions and Environmental Easement with the County Clerk's Office, Orange County, New York in accordance with 40 C.F.R. § 761.61(a)(8) and applicable New York State law. The Declaration of Covenants, Restrictions and Environmental Easement shall, at a minimum, include a description of the extent of PCB contamination found at the Site; a description of the work performed under this Approval; the restrictions on use included in Section 11 of this Approval and any additional limitations; a description of the inspection, maintenance, and reporting requirements associated with the final approved SMP; and a copy of this Approval, appended as an attachment.

2) Submit to EPA Region 2 (see the addressee in Section 15) proof of recording of the Declaration of Covenants, Restrictions and Environmental Easement for the Site, complete with book and page number or instrument number, specified in subparagraph (1) of this Section.

10. Sale or Lease of the Site

The Owner shall not sell or lease any portion of the Site (or the Site in its entirety) unless it notifies EPA Region 2 and NYSDEC (the notification to NYSDEC to be in accordance with applicable state law and regulations), in writing, no less than thirty (30) calendar days prior to such sale or lease. This notification shall include the name, mailing and email address and telephone number of the proposed new owner(s) or lessee(s) and contact information for any person representing them. The Owner must ensure that any sale or lease agreement explicitly provides that NYSDEC has continued access to the Site to perform its obligations under the Approval, and that EPA has access to the Site for inspection and/or monitoring activity. Furthermore, any sale or lease agreement must state that the owner or lessee's use of the property will be subject to the terms and conditions of the recorded Declaration of Covenants, Restrictions and Environmental Easement.

In the event that the Owner sells or leases any portion of the Site (or the Site in its entirety), NYSDEC and the Owner shall continue to be bound by all the terms and conditions of this Approval, and be responsible to ensure the timely and satisfactory completion of all work required thereunder, unless and until the following three conditions occur:

1) the new owner or lessee requests, in writing, that EPA Region 2 reissue this Approval to the new owner or lessee, transferring all responsibility to comply with the terms and conditions of this Approval to the new owner or lessee, and the new owner or lessee indicates how it intends to comply with the financial assurance and other requirements of this Approval;

2) EPA Region 2 reissues this Approval to the new owner or lessee, transferring all responsibility to comply with the terms and conditions of this Approval to the new owner or lessee; and,

3) the new owner or lessee provides written notification to EPA Region 2 of its acceptance of and intention to comply with the terms and conditions of the reissued Approval.

EPA Region 2 may withdraw the reissued Approval if EPA does not receive written notification from the new owner or lessee of its acceptance of, and intention to comply with, the terms and conditions of the reissued or as modified Approval within forty-five (45) calendar days of the date of the reissued or as modified Approval. Where EPA Region 2 has withdrawn the reissued or as modified Approval, this Approval, as originally issued to NYSDEC and the Owner, will remain in effect and the Owner shall provide EPA Region 2, in writing, documentation that NYSDEC and EPA will continue to be afforded access to the Site, as necessary, to fulfill any and all obligations included in this Approval.

In the event that the three conditions listed above are met and the Approval is reissued to and accepted by a new owner or lessee, NYSDEC will transfer custody of the documents required to be preserved pursuant to 40 C.F.R. Part 761, and to the extent not inconsistent with applicable TSCA statutory or regulatory requirements, NYSDEC will then be released from any further obligations, except as otherwise set out in Section 7 (Financial Assurance), above, mandated by this Approval.

11. Restrictions on Use

As long as PCB remediation waste above 1 ppm is present on the Site, the Owner or any successor in interest may not use any area of the Site for purposes other than commercial or industrial use as set forth in the Application and in accordance with any additional limitations recorded in the Declaration of Covenants, Restrictions and Environmental Easement, unless otherwise approved in writing by EPA Region 2.

12. Modifications and Changes in Use

Any proposed modification to any of the terms or conditions of this Approval, whether expressly stated herein or incorporated by reference, must receive prior written approval from the Director of LCRD, EPA Region 2. NYSDEC or the Owner (whichever party is seeking the modification) shall notify EPA Region 2 in writing of any such proposed modification at least sixty (60) calendar days prior to the anticipated date for implementation of the modification unless EPA agrees in writing to shorten the prior notice period. No action shall be taken to implement any such modification unless EPA Region 2 has approved the modification in writing. In determining whether to approve the modification, EPA Region 2 may request additional information or seek input from the parties.

At least sixty (60) calendar days before any work that requires modification of the Cap identified in Section 3[5], above, the party seeking the modification shall submit to EPA Region 2, for approval, a work plan that describes in detail the specific activities including, but not limited to:

- the reason for the modification
- how the Cap is to be modified
- installation of stormwater controls
- any off-Site disposal of materials that are either contaminated or potentially contaminated with PCBs

- any necessary proposed revisions to the SMP to address the modification (any proposed revisions or modifications to the SMP shall be made in accordance with Section 6, above).

If a proposed modification to the terms and conditions of the Approval involves a change in the use of the Site that has the potential to affect the Cap or to result in other unacceptable changes, EPA Region 2 may not approve the proposed modification. If EPA determines that the change in use of the Site may pose an unreasonable risk to human health or to the environment, or if EPA Region 2 does not receive the information from the seeker of the modification that EPA requires to assess and/or make a determination regarding such potential risk, then EPA Region 2 may deny the proposed modification; revoke, suspend and/or modify this Approval; or take other action as appropriate.

The Owner shall prepare and record any amendment to the Declaration of Covenants, Restrictions and Environmental Easement and/or this Approval, resulting from any approved modification(s), within sixty (60) days of such changes(s).

13. EPA Region 2 Authority for Entry and Inspection and NYSDEC Access to Site

By accepting this Approval (as provided in Section 1 above), NYSDEC and the Owner consent to EPA Region 2's and NYSDEC's authorized representatives entering the Site at reasonable times, upon notice to NYSDEC to coordinate such access, for any purpose authorized by Section 11 of TSCA, 15 U.S.C. § 2610, including but not limited to the following purposes:

1) to inspect the Site to assess compliance with this Approval and/or the federal PCB regulations; and

2) to collect samples to assess compliance with this Approval and/or the federal PCB regulations. NYSDEC will be given the opportunity to split samples collected by EPA Region 2 representatives, provided this does not compromise EPA Region 2's sampling activities or the samples which EPA Region 2 collects.

By accepting the Approval, the Owner also grants NYSDEC access to the Site to perform the tasks set out in this Approval.

Any refusal to allow any of the above actions may result in the suspension and/or revocation of this Approval.

14. Confidential Business Information

Information supplied to EPA is presumptively available to the public under the Freedom of Information Act, 5 U.S.C. § 552, and the regulations at 40 C.F.R. Part 2. As provided in Section 14(c) of TSCA, 15 U.S.C. § 2613(c), NYSDEC and its contractors may claim information provided to EPA Region 2 to be Confidential Business Information ("CBI") provided it complies with the substantive criteria in 40 C.F.R. § 2.208. Information designated as CBI will be disclosed by EPA Region 2 only to the extent, and by means of the procedures, set forth in 40 C.F.R. Part 2.

Factors that EPA Region 2 considers in determining whether a claim of CBI is valid, and in the evaluation of a claim, are set out in TSCA § 14(c) and at 40 C.F.R. § 2.204(e)(4). These factors include but are not limited to the following:

1) NYSDEC's contractor has taken measures to protect the confidentiality of the information, and it intends to continue to take such measures;

2) the information is not, and has not been, reasonably obtainable without NYSDEC's contractor's consent by other persons (other than governmental bodies) by use of legitimate means (other than discovery based on showing of special need in a judicial or quasi-judicial proceeding);

3) the information is not publicly available elsewhere; and,

4) disclosure of the information would cause substantial harm to NYSDEC's contractor's competitive position.

The information requested under this Approval concerns the proper handling of PCB remediation waste and is not expected to involve CBI. However, if that information is claimed to be CBI by NYSDEC or its contractor, it must be clearly identified as such on the documents submitted and the claims to confidentiality must be certified and substantiated at the time of submittal. Additional information on TSCA CBI, including certification and substantiation templates, can be found at https://www.epa.gov/tsca-cbi.

15. Addresses for Correspondence

1) EPA Addresses:
   (a) All non-CBI correspondence to be submitted to EPA Region 2 shall be sent via electronic mail to:

Andrew Park, Chief
Corrective Action Section
Land and Redevelopment Programs Branch
United States Environmental Protection Agency, Region 2,
290 Broadway
New York, New York 10007-1866
park.andy@epa.gov

   (b) All CBI information with cover letter designating it as such that is to be submitted to EPA Region 2 shall be placed in a sealed envelope marked 'CONTAINS TSCA CBI TO BE OPENED BY ADDRESSEE ONLY' and that envelope shall be placed inside a regular mailing envelope addressed as below. DO NOT indicate on the outer envelope that it contains CBI or that the addressee is the Document Control Officer. The records should be submitted to:

Chief, Land and Redevelopment Programs Branch
United States Environmental Protection Agency, Region 2
290 Broadway
New York, New York 10007-1866

2) NYSDEC Address. All correspondence to NYSDEC shall be submitted to the following representatives:

Justin Starr
New York State Department of Environmental Conservation
Division of Environmental Remediation
625 Broadway, 12th Floor
Albany, NY 12233-7012
justin.starr@dec.ny.gov

and

Benjamin Rung
New York State Department of Environmental Conservation
Division of Environmental Remediation
625 Broadway, 12th Floor
Albany, NY 12233-7012
Benjamin.rung@dec.ny.gov

3) The Owner Address. All correspondence to 430 US Route 209, LLC shall be submitted to the following address:

430 US RTE 209 LLC
C/O Berel Krug
501 Chestnut Ridge Rd Ste. 310
Chestnut Ridge NY 10977
berel@lbhrealestate.com

4) The EPA, NYSDEC, and the Owner may designate additional or different addressees for communication upon advance written notice to the other parties.

16. Conclusion

Based on the information included in the Application, EPA Region 2 finds that the PCB disposal authorized by this Approval and the use of the Site as set forth in the Application does not present an unreasonable risk to human health or the environment. Acceptable concentrations of PCB remediation waste remaining on-Site under this Approval are based on a Site-specific risk determination pursuant to TSCA and are not applicable to any other site. Notwithstanding any other provision of this

Approval, this Approval may be reviewed, revoked, suspended and/or modified at any time before or after NYSDEC's and the Owner's acceptance thereof if EPA Region 2 determines that implementation of this Approval may present an unreasonable risk to human health or the environment. Nothing in this Approval is intended or is to be construed as prejudicing, waiving or negating any authority or sanction available to EPA (or the United States on behalf of EPA) under Section 6 of TSCA, 15 U.S.C. § 2605, any other section of TSCA, and 40 C.F.R. Part 761, and/or under other applicable law or regulation, nor is anything in this Approval intended or is to be construed as barring or precluding EPA (and/or the United States on behalf of EPA) from commencing and maintaining an enforcement action under Sections 16 and 17 of TSCA, 15 U.S.C. §§ 2615 and 2616, respectively, for any relief authorized thereunder, with regard to or concerning the Site.

This Approval, issued pursuant to 40 C.F.R. § 761.61(c), is based upon NYSDEC, including its consultant, having provided EPA Region 2 with a complete and truthful disclosure of all material facts related to the Site in its Application. The misrepresentation or omission by NYSDEC of any material fact in its Application or in any document associated with or supporting this Approval may result in EPA Region 2's revocation, suspension and/or modification of this Approval, and such other legal or equitable remedy, either civil or criminal, that EPA (or the United States on behalf of EPA) is authorized to pursue under applicable law.

The acceptance by each party -- NYSDEC and the Owner -- of this Approval pursuant to Section 1 above constitutes both parties' agreement that they shall comply with the following:

1) all terms and conditions of this Approval; and,

2) all applicable provisions of federal, state and local law pertaining to the PCB remediation waste present in or beneath the Site. This Approval only specifies the applicable requirements under TSCA and does not cite to or make any determination regarding the requirements that may be applicable under other federal, state or local law. TSCA disposal requirements do not supersede other, more stringent, applicable federal, state or local laws. Any failure by both parties to comply with any condition or term of this Approval shall constitute a violation of the Approval, which has been issued pursuant to 40 C.F.R. § 761.61(c). Any such violation is made unlawful by Section 15(1)(C) of TSCA, 15 U.S.C. § 2614(1)(C), and may result in EPA Region 2's revocation, suspension and/or modification of this Approval and/or its pursuit of such other legal or equitable remedy that EPA Region 2 (or the United States on behalf of EPA) may choose to pursue under applicable law.

March 23, 2022

Ariel Iglesias, Director
Land, Chemicals & Redevelopment Division
United States Environmental Protection Agency, Region 2

Date

Attachments

AECOM
125 Broad Street
New York, NY 10004
212.377.8734 tel

March 21, 2023

Brian A. Orzel
Project Manager, Civil Engineer
NY District US Army Corps of Engineers
Regulatory Branch
26 Federal Plaza, Room 16-406
New York, New York 10278-0090

Re: REVISED Permit Application 20PR06690 by Default for Remedial Activities for the C&D Power Systems NYSDEC Site No. 336001

Dear Mr. Orzel:

AECOM, on behalf of the New York State Department of Environmental Conservation – Division of Remediation (NYSDEC – DER) has prepared the attached REVISED permit application for the proposed remedial activities for the C&D Power Systems Site (NYSDEC Site No. 336001) in Huguenot, New York. The C&D Power Systems Site manufactured picture tubes and lead batteries up until the 1980s. During the site's operations, contaminated effluent was discharged to Tributary D-1-7, a classified trout stream that is a tributary to the Neversink River. This project was initially permitted USACE by default under PN-LRB Final Regional Conditions on January 7, 2021; and NYSDEC 401 WQC No. 3-3328-00040/00032. This correspondence serves to re-affirm the project complies with the 2022 Nationwide Permit No.38 conditions. Supplemental documentation is provided to address comments that have been received through State Historical Preservation Office (SHPO) Section 106 consultation, including an Indian Nation consultation.

The cleanup of the contaminated sediments would require some temporary disturbance to Wetlands and Waters of the United States by excavating contaminated sediments. The remediation activities were authorized in a March 2015 Record of Decision entitled *C&D Power Systems (C&D Batteries), State Superfund Project/RCRA Project, Deer Park, Orange County. Site No. 336001. EPA ID #NYD064337298. March 2015*. The attached package reflects changes to the excavation area and upland work areas versus the previously permitted work.

The modifications proposed in this package include:

- Incorporation of findings of Phase IB Site Investigation, and implementation of Site Avoidance and Protection Plan has been developed to preserve the integrity of potential archaeological deposits; and
- A revised proposed work zone layout, including information on revised access roads, upland staging area and excavation of lagoon; and
- Adjustments to depth of excavation, including reduction in excavation footprint area, and increasing depth to 18-inches in some areas (in response to additional testing showing deeper contamination); and
- Detailed information on post-construction restoration.

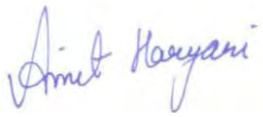
The permit application contains unbound copies of the following materials:

- Cover Letter;
- Joint Permit Application Form [*Provided for affirmation of NYSDEC Permit No. 3-3328-00040/00032 conditions*];
- Project Drawings[1];
- Supplemental Information Packet, with a summary of assessment of existing and predicted environmental conditions, including
  - Wetland Delineation Report
  - Affirmation of the 2022 wetland jurisdictional boundary;
  - Visual Stream Assessment;
  - Structural Archaeological Assessment Form;
  - Revised Phase 1B Archaeological Report supporting Section 106 – Indian Nation Consult;
  - Copies of Previously Issued Permits
  - Restoration Plan – Nontidal Wetland/Waterways
- Pre-Construction Notice (Eng. Form 6082) w/ Drawings;
- Environmental Questionnaire; and
- Copy of Record of Decision for NYSDEC Site No. 336001, EPA ID #NYD064337298.

This revised application is being submitted due to revision of the project design and expiry of the original permits.

Should you have any questions, please do not hesitate to contact me at 212.377.8701 or amit.haryani@aecom.com.

Sincerely,



Amit Haryani
AECOM
125 Broad Street
New York, NY 10004

Cc: Mr. Christopher Lang (NYSDEC, Region 3), A. Martin, R. Forstner (AECOM), Lisa Gorton (NYSDEC).

---

[1] Drawings have been modified from October 19, 2020 submission as follows: revision of legend; refined hashing indicating specific zones (i.e., areas of particular excavation, restoration, etc.); definition of staging area and water treatment system; revision of excavation footprint, addition of cultural resource protection areas; marking of areas of upland excavation and remediation (including lagoon); increased areas of seeding; reduction of number of drawings used to represent the site during each phase; and removal of planting detail drawings [not required for permit drawings].

NEW YORK STATE | Department of Environmental Conservation | Office of General Services | Department of State

US Army Corps of Engineers

JOINT APPLICATION FORM

For Permits for activities activities affecting streams, waterways, waterbodies, wetlands, coastal areas, sources of water, and endangered and threatened species.

You must separately apply for and obtain Permits from each involved agency before starting work. Please read all instructions.

1. **Applications To:**

>NYS Department of Environmental Conservation ☑ Check here to confirm you sent this form to NYSDEC.

Check all permits that apply:

- ☑ Stream Disturbance
- ☑ Excavation and Fill in Navigable Waters
- ☐ Docks, Moorings or Platforms
- ☐ Dams and Impoundment Structures
- ☑ 401 Water Quality Certification*
- ☐ Freshwater Wetlands
- ☐ Tidal Wetlands
- ☐ Wild, Scenic and Recreational Rivers
- ☐ Coastal Erosion Management
- ☐ Water Withdrawal
- ☐ Long Island Well
- ☐ Incidental Take of Endangered / Threatened Species

* See Instructions (page 3)

>US Army Corps of Engineers ☑ Check here to confirm you sent this form to USACE.

Check all permits that apply: ☑ Section 404 Clean Water Act ☐ Section 10 Rivers and Harbors Act

Is the project Federally funded? Yes ☑ No

If yes, name of Federal Agency:

General Permit Type(s), if known: NWP #38 Haz & Toxic Waste

Preconstruction Notification: ☑ Yes No

>NYS Office of General Services ☐ Check here to confirm you sent this form to NYSOGS.

Check all permits that apply:

- ☐ State Owned Lands Under Water
- ☐ Utility Easement (pipelines, conduits, cables, etc.)
- ☐ Docks, Moorings or Platforms

>NYS Department of State ☐ Check here to confirm you sent this form to NYSDOS.

Check if this applies: ☐ Coastal Consistency Concurrence

2. **Name of Applicant**

New York State Dept. of Environmental Conservation

Taxpayer ID (if applicant is NOT an individual): N/A

Mailing Address: Division of Environmental Remediation, 625 Broadway, 12th Floor

Post Office / City: Albany

State: NY

Zip: 12233

Telephone: 518.949.5091

Email: lisa.gorton@dec.ny.gov

Applicant Must be (check all that apply): ☑ Owner ☑ Operator ☐ Lessee

3. **Name of Property Owner (if different than Applicant)**

Mailing Address

Post Office / City

State

Zip

Telephone

Email

For Agency Use Only	Agency Application Number:

4. **Name of Contact / Agent**

Amit Haryani

Mailing Address	Post Office / City	State	Zip
AECOM; 125 Broad St, 15th Fl.	New York	NY	10004

Telephone 212.377.8701 Email amit.haryani@aecom.com

5. **Project / Facility Name**

Former C&D Power Systems Site #336001

Property Tax Map Section / Block / Lot Number: 38 / 1 / Lots 35, 2, 3.1, 8, 36, 104.3

Project Street Address, if applicable	Post Office / City	State	Zip
430 U.S. Route 209	Huguenot	NY	12746

Provide directions and distances to roads, intersections, bridges and bodies of water

East of U.S. Route 209, and north of Swartwout Road

✔ Town	Village	City	County	Stream/Waterbody Name
Deerpark			Orange	Unnamed Tributary to Neversink River

Project Location Coordinates: Enter Latitude and Longitude in degrees, minutes, seconds:

Latitude: 41 ° 25 ' 07 " Longitude: 74 ° 37 ' 45 "

6. **Project Description:** Provide the following information about your project. Continue each response and provide any additional information on other pages. **Attach plans on separate pages.**

a. Purpose of the proposed project:

Remediate existing contamination in sediments and soils that are the result of the release of harmful substances while the site was used for the production of black and white picture tubes and lead batteries from 1959 - 2006. The work is to be authorized under Nationwide Permit 38 and being completed by the NYSDEC under the New York State Superfund Program. See Attached Supplemental Information Packet (SIP) for more information.

b. Description of current site conditions:

The site consists of a mostly flat topography, with a few steep adjacent forested hillsides, and is dominated by wetland areas, maintained lawn, agricultural field, and some forested areas. A minor tributary to the Neversink River has become impounded due to a failed downstream culvert. The stream is the subject of the permit application, as contaminated sediments must be removed. See Attached SIP for more information.

c. Proposed site changes:

The site changes consists of the following: culvert improvement at one tributary crossing that has failed and is causing the impounding of water upstream, the excavation of contaminated sediments from the unnamed tributary as per the ROD, and the restoration of riverbed grade with clean fill, and restoration planting and seed. See Attached SIP for more information.

d. Type of structures and fill materials to be installed, and quantity of materials to be used (e.g., square feet of coverage, cubic yards of fill material, structures below ordinary/mean high water, etc.):

The placement of 2,280 CY of clean fill in the excavated areas in the tributary shown on attached Permit Drawings C-04.1 through C-04.5. The fill material will consist of clean sand, gravel, and cobble and will be obtained from a suitable upland source. See attached SIP for more information.

e. Area of excavation or dredging, volume of material to be removed, location of dredged material placement:

Removal of approximately 2,280 CY of sediment, within footprint shown in attached Permit Drawings. The sediment will be stabilized and disposed off-site at an approved permitted facility. See attached SIP for more information.

f. Is tree cutting or clearing proposed? ✔ Yes If Yes, explain below. No

Timing of the proposed cutting or clearing (month/year): March-April 2023

Number of trees to be cut: 5 Acreage of trees to be cleared: 0.01

g. Work methods and type of equipment to be used:

1. Temporary diversion of water around work areas and treatment of construction contact water
2. Excavation of impacted sediments to a dewatering and handling area for prep and off-site disposal. Expected equipment: 70,000lb excavator (2-3); 20,000-30,000lb off road haul truck (2-4); 25,000-35,000lb front end loader; 25,000-35,000lb bulldozer. A 51,000-80,000lb long-haul truck will be used to transport sediments off-site. See SIP for more information.

h. Describe the planned sequence of activities:

Culvert improvements. Construct onsite haul/access roads, stockpile pads, construction water treatment plant. Install water bypass system, including check dams to divert flow. Excavate impacted sediments, transfer to stockpile pad for dewatering/amending and then load onto long-haul trucks for off-site disposal. Backfill/restoration of dewatered areas. Removal of temporary bypass, haul roads & stockpile pads. Restoration of wetland and upland areas with planting and seeding. Monitoring of restoration. See SIP for more information.

i. Pollution control methods and other actions proposed to mitigate environmental impacts:

Excavation of impacted sediments will occur between temporary check dams in the tributary. Dewatering of active excavations will be pumped to a temporary permitted (SPDES-equivalent) water treatment plant for treatment prior to discharge. Contractor will prepare a Storm Water Pollution Prevention Plan (or equivalent) under separate cover prior to mobilization. See SIP for more information.

j. Erosion and silt control methods that will be used to prevent water quality impacts:

Prior to the performance of any earthwork at the site, an approved sedimentation and erosion control system (straw bales or wattles and silt fence) will be installed around the proposed limits of disturbance. SWPPP documentation that meets the substantive requirements of NYSDEC SPDES GP 02-01 will be prepared. Turbidity curtains (if needed) will be installed to NYS Standard& Specifications for Erosion and Sediment Control.

k. Alternatives considered to avoid regulated areas. If no feasible alternatives exist, explain how the project will minimize impacts:

Regulated areas have been avoided to the greatest extent practicable and were considered in the design of the support areas such as; temporary access roadways were re-designed to avoid wetland disturbance outside of the remedial boundary and the support staging areas are located within the upland site boundary to avoid and protect cultural resources.

l. Proposed use: ☐ Private ☑ Public ☐ Commercial

m. Proposed Start Date: April 2023 Estimated Completion Date: April 2025

n. Has work begun on project? Yes If Yes, explain below. ☑ No

Work will be procured under NYS Superfund Program as a state-lead construction project.

o. Will project occupy Federal, State, or Municipal Land? ☑ Yes If Yes, explain below. ☐ No

Portions of the Project Area in the tributary, outside of the limits of the C&D Power Systems site proper, are owned by Orange County, with access agreements in place with the NYSDEC.

p. List any previous DEC, USACE, OGS or DOS Permit / Application numbers for activities at this location:

Joint application was previously submitted to USACE and NYSDEC on October 19, 2020. Permit approvals and public notice are attached:
NYSDEC 401 Water Quality Certification No. 3-3328-00040/00031, 00032, 00303; effective 8/26/2021;
USACE did not provide a written determination within 45 days of submission of PCN, the Project was therefore permitted to proceed on 1/7/21.

q. Will this project require additional Federal, State, or Local authorizations, including zoning changes?

☑ Yes If Yes, list below. ☐ No

NYS permit conditions have been satisfied under the 401 Water Quality Certification Permit No. 03- 3328-00040-00032.
The site is located within an Indian Nation Area of Interest. Archeological investigations identify the presence of potential cultural resources within the proposed area of the access road construction. Avoidance and protection measures will require consult with the State Historical Preservation Office including Indian Nation Consult under the provision of Section 106.

7. **Signatures.**

Applicant and Owner (If different) must sign the application. If the applicant is the landowner, the **landowner attestation form** can be used as an electronic signature as an alternative to the signature below, if necessary. Append additional pages of this Signature section if there are multiple Applicants, Owners or Contact/Agents.

I hereby affirm that information provided on this form and all attachments submitted herewith is true to the best of my knowledge and belief.

Permission to Inspect - I hereby consent to Agency inspection of the project site and adjacent property areas. Agency staff may enter the property without notice between 7:00 am and 7:00 pm, Monday - Friday. Inspection may occur without the owner, applicant or agent present. If the property is posted with "keep out" signs or fenced with an unlocked gate, Agency staff may still enter the property. Agency staff may take measurements, analyze site physical characteristics, take soil and vegetation samples, sketch and photograph the site. I understand that failure to give this consent may result in denial of the permit(s) sought by this application.

False statements made herein are punishable as a Class A misdemeanor pursuant to Section 210.45 of the NYS Penal Law. Further, the applicant accepts full responsibility for all damage, direct or indirect, of whatever nature, and by whomever suffered, arising out of the project described herein and agrees to indemnify and save harmless the State from suits, actions, damages and costs of every name and description resulting from said project. In addition, Federal Law, 18 U.S.C., Section 1001 provides for a fine of not more than $10,000 or imprisonment for not more than 5 years, or both where an applicant knowingly and willingly falsifies, conceals, or covers up a material fact; or knowingly makes or uses a false, fictitious or fraudulent statement.

Signature of Applicant | Date

Lisa A. Gorton | March 9, 2023

Applicant Must be (check all that apply): ☑ Owner ☑ Operator ☐ Lessee

Printed Name: Lisa Gorton / NYSDEC | Title: Project Manager

Signature of Owner (if different than Applicant) | Date

Printed Name | Title

Signature of Contact / Agent | Date

Amit Haryani | March 13, 2023

Printed Name: Amit Haryani / AECOM | Title: Project Manager

For Agency Use Only **DETERMINATION OF NO PERMIT REQUIRED**

Agency Application Number

(Agency Name) has determined that No Permit is required from this Agency for the project described in this application.

Agency Representative:

Printed Name | Title

Signature | Date

Last saved by: JACOB.GASE(2020-10-12) Last Plotted: 2011-05-25 Project Management Initials: Designer: JTS Checked: AC Approved: RF ANSI B 8.5" x 11"
Filename: C:\USERS\JACOB.GASE\AECOM DIRECTORY\C&D SYSTEMS - GENERAL\910 CAD\20 SHEETS\ISSUED FOR PERMIT\8.5X11\G-01-03 TITLE SHEET, VICINITY MAP, AND SITE LOCATION.DWG

FORMER C&D POWER SYSTEMS SEDIMENT REMEDIATION

SHEET #	FIGURE #	SHEET TITLE	SHEET #	FIGURE #	SHEET TITLE
1	G-01	TITLE SHEET	21	C-04.1	RESTORATION PLAN (1 OF 7)
2	G-02	VICINITY MAP	22	C-04.2	RESTORATION PLAN (2 OF 7)
3	G-03	SITE MAP	23	C-04.3	RESTORATION PLAN (3 OF 7)
4	G-04.1	LEGEND AND GENERAL NOTES (1 OF 2)	24	C-04.4	RESTORATION PLAN (4 OF 7)
5	G-04.2	LEGEND AND GENERAL NOTES (2 OF 2)	25	C-04.5	RESTORATION PLAN (5 OF 7)
6	C-01.1	EXISTING CONDITIONS (1 OF 5)	26	C-04.6	RESTORATION PLAN (6 OF 7)
7	C-01.2	EXISTING CONDITIONS (2 OF 5)	27	C-04.7	RESTORATION PLAN (7 OF 7)
8	C-01.3	EXISTING CONDITIONS (3 OF 5)	28	X-01.1	EXISTING CROSS SECTIONS (1 OF 2)
9	C-01.4	EXISTING CONDITIONS (4 OF 5)	29	X-01.2	EXISTING CROSS SECTIONS (2 OF 2)
10	C-01.5	EXISTING CONDITIONS (5 OF 5)	30	X-01.3	EXISTING CROSS SECTIONS (3 OF 4)
11	C-02.1	SITE PREPARATION AND EROSION CONTROL (1 OF 5)	31	X-01.4	EXISTING CROSS SECTIONS (4 OF 4)
12	C-02.2	SITE PREPARATION AND EROSION CONTROL (2 OF 5)	32	X-02.1	DURING CONSTRUCTION CROSS SECTIONS (1 OF 4)
13	C-02.3	SITE PREPARATION AND EROSION CONTROL (3 OF 5)	33	X-02.2	DURING CONSTRUCTION CROSS SECTIONS (2 OF 4)
14	C-02.4	SITE PREPARATION AND EROSION CONTROL (4 OF 5)	34	X-02.3	DURING CONSTRUCTION CROSS SECTIONS (3 OF 4)
15	C-02.5	SITE PREPARATION AND EROSION CONTROL (5 OF 5)	35	X-02.2	DURING CONSTRUCTION CROSS SECTIONS (4 OF 4)
16	C-03.1	EXCAVATION PLAN (1 OF 3)	36	X-03.1	FUTURE CONDITIONS CROSS SECTIONS (1 OF 4)
17	C-03.2	EXCAVATION PLAN (2 OF 3)	37	X-03.2	FUTURE CONDITIONS CROSS SECTIONS (2 OF 4)
18	C-03.3	EXCAVATION PLAN (3 OF 3)	38	X-03.1	FUTURE CONDITIONS CROSS SECTIONS (3 OF 4)
19	C-03.4	EXCAVATION PLAN (4 OF 5)	39	X-03.2	FUTURE CONDITIONS CROSS SECTIONS (4 OF 4)
20	C-03.5	EXCAVATION PLAN (5 OF 5)	40	X-04	TAILWATER DAM CROSS SECTION

SITE IS LOCATED AT 41°25'07" N 74°37'45" W

Issue Status: DRAFT

FORMER C&D POWER SYSTEMS, SITE NO. 336001 **TITLE SHEET**
SEDIMENT REMEDIATION **SHEET 1 OF 40**
TRIBUTARY D-1-7 TO NEVERSINK RIVER, HUGUENOT, NEW YORK
APPLICANT: NYSDEC. USACE PRE-APPLICATION # NAN-2021-01201-EMI

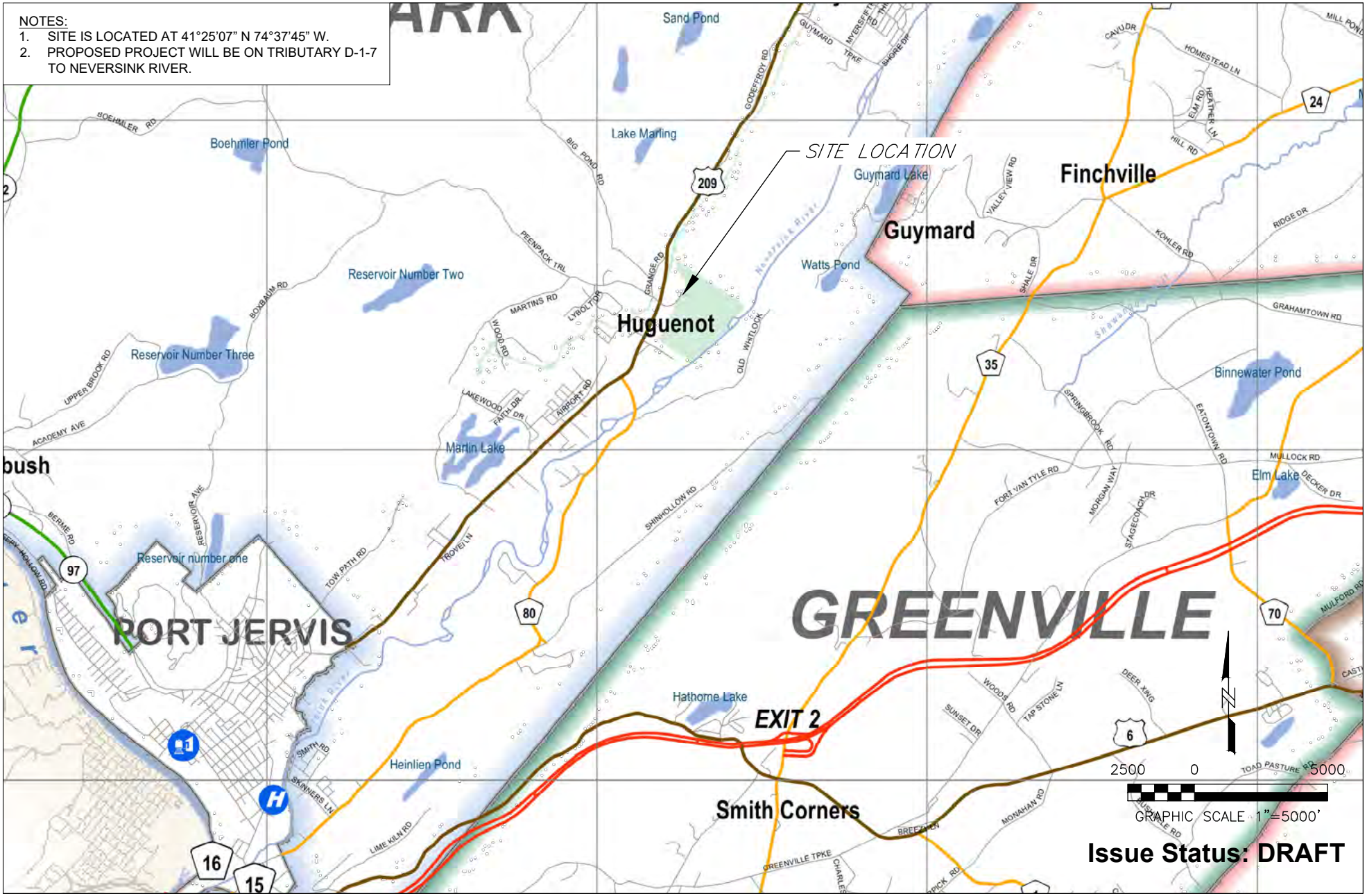
Date: 2023-02-10

AECOM

Figure: G-01

Last saved by: JACOB.GASE(2020-10-12) Last Plotted: 2011-05-25 Project Management Initials: Designer: JTS Checked: AC Approved: RF ANSI B 8.5" x 11"
Filename: C:\USERS\JACOB.GASE\AECOM DIRECTORY\C&D SYSTEMS - GENERAL\910 CAD\20 SHEETS\ISSUED FOR PERMIT\8.5X11\G-01-03 TITLE SHEET, VICINITY MAP, AND SITE LOCATION.DWG

NOTES:
1. SITE IS LOCATED AT 41°25'07" N 74°37'45" W.
2. PROPOSED PROJECT WILL BE ON TRIBUTARY D-1-7 TO NEVERSINK RIVER.



FORMER C&D POWER SYSTEMS, SITE NO. 336001
SEDIMENT REMEDIATION
TRIBUTARY D-1-7 TO NEVERSINK RIVER, HUGUENOT, NEW YORK
APPLICANT: NYSDEC. USACE PRE-APPLICATION # NAN-2021-01201-EMI

VICINITY MAP
SHEET 2 OF 40

Date: 2023-02-10

AECOM

Figure: G-02

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FORMER C&D POWER SYSTEMS, SITE NO. 336001
SEDIMENT REMEDIATION
TRIBUTARY D-1-7 TO NEVERSINK RIVER, HUGUENOT, NEW YORK
APPLICANT: NYSDEC. USACE PRE-APPLICATION # NAN-2021-01201-EMI

VICINITY AND SITE MAP
SHEET 3 OF 40

Date: 2023-02-10

AECOM

Figure: G-03

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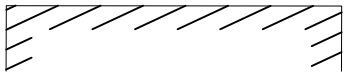
Filename: C:\USERS\JACOB.GASE\AECOM DIRECTORY\C&D SYSTEMS - GENERAL\910 CAD\20 SHEETS\ISSUED FOR PERMIT\8.5X11\G-04 LEGEND AND NOTES.DWG
Project Management Initials: Designer: JTS Checked: AC Approved: RF ANSI B 8.5" x 11"

LEGEND



EXISTING STRUCTURE

LIMIT OF WORK

FENCE

OVERHEAD WIRES

UTILITY DRAINAGE

EDGE OF PAVEMENT

EDGE OF CONCRETE

CONCRETE CURB

STONE

SEWER EASEMENT

EXISTING TREELINE

PROPERTY LINE

EDGE OF ROADWAY

APPROXIMATE EDGE OF ROADWAY

APPROXIMATE BUILDING LOCATION

EROSION/SEDIMENT CONTROL

ACCESS ROAD

TEMPORARY CONSTRUCTION MAT

DREDGING MINOR ELEVATION CONTOUR (1 FT)

DREDGING MAJOR ELEVATION CONTOUR (5 FT)

STREAM CENTERLINE

STREAM BYPASS PIPE

LIMIT OF 12" DREDGING

LIMIT OF 18" DREDGING

EDGE OF OPEN WATER

WETLAND BOUNDARY

APPROXIMATE STREAM CENTERLINE

Issue Status: DRAFT

FORMER C&D POWER SYSTEMS, SITE NO. 336001
SEDIMENT REMEDIATION
TRIBUTARY D-1-7 TO NEVERSINK RIVER, HUGUENOT, NEW YORK
APPLICANT: NYSDEC. USACE PRE-APPLICATION # NAN-2021-01201-EMI

LEGEND AND NOTES
SHEET 4 OF 40

Date: 2023-02-10

AECOM

Figure: G-04.1

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Filename: C:\USERS\JACOB.GASE\AECOM DIRECTORY\C&D SYSTEMS - GENERAL\910 CAD\20 SHEETS\ISSUED FOR PERMIT\8.5X11\G-04 LEGEND AND NOTES.DWG

LEGEND

- TREE
- INLET
- GUY WIRE
- POLE
- LIGHT POLE
- MONITORING WELL
- STORMWATER INLETS
- FLAGPOLE
- SIGN
- BOLLARD
- HYDRANT
- SOURCE OF WATER FLOW
- BEAVER DAM
- LAGOON EXCAVATION AREA
- ASPHALT AREA EXCAVATION
- RESTRICTED USE SCO EXCAVATION
- UNRESTRICTED USE SCO EXCAVATION
- SHED SUMP/VAULT CLEANOUT
- LAGOON AREA ASPHALT PAVEMENT RESTORATION
- ASPHALT PAVEMENT RESTORATION
- RESTRICTED USE SCO RESTORATION
- UNRESTRICTED USE SCO RESTORATION
- INFILTRATION SWALE
- TEMPORARY FILL WITHIN THE WETLANDS
- TEMPORARY FILL WITHIN THE WATER
- EXCAVATION AND PERMANENT FILL WITHIN WATER

GENERAL NOTES:

1. SURVEY INFORMATION PROVIDED IN NEW YORK STATE PLANE COORDINATE SYSTEM, EAST ZONE (NAD83). ELEVATIONS ARE PROVIDED IN NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88).
2. SURVEY PROVIDED BY BADEY & WATSON, SURVEYING & ENGINEERING P.C. IS A OBTAINED FROM TWO SOURCES. THE FIRST SOURCE "TOPOGRAPHIC MAP AND SAMPLING LOCATIONS - C & D TECHNOLOGIES DATED SEPTEMBER 15, 1999 PREPARED BY DELAWARE ENGINEERING, P.C. THE SECOND SOURCE IS AN ACTUAL FIELD SURVEY CONDUCTED BY BADEY & WATSON, SURVEYING & ENGINEERING P.C. ON JANUARY 14, 2020.
3. THE CENTERLINE OF THE STREAM IS APPROXIMATE AND TAKEN FROM THE 2001 NEW YORK STATE GIS CLEARING HOUSE AERIAL PHOTOGRAPHS BY BADEY & WATSON, SURVEYING & ENGINEERING P.C.
4. APPROXIMATE ROADWAY AND BUILDING LOCATIONS OBTAINED FROM 2020 MICROSOFT IMAGERY.
5. WETLAND BOUNDARY, STREAM BOUNDARY, AND TREE SURVEY CONDUCTED BY AECOM ON MAY 24, 2020.

Issue Status: DRAFT

FORMER C&D POWER SYSTEMS, SITE NO. 336001
SEDIMENT REMEDIATION
TRIBUTARY D-1-7 TO NEVERSINK RIVER, HUGUENOT, NEW YORK
APPLICANT: NYSDEC. USACE PRE-APPLICATION # NAN-2021-01201-EMI

LEGEND AND NOTES
SHEET 5 OF 40

Date: 2023-02-10

AECOM

Figure: G-04.2

Last saved by: CHINA2(2020-09-30) Last Plotted: 2011-05-25 Project Management Initials: Designer: JTS Checked: AC Approved: RF ANSI B 8.5" x 11"
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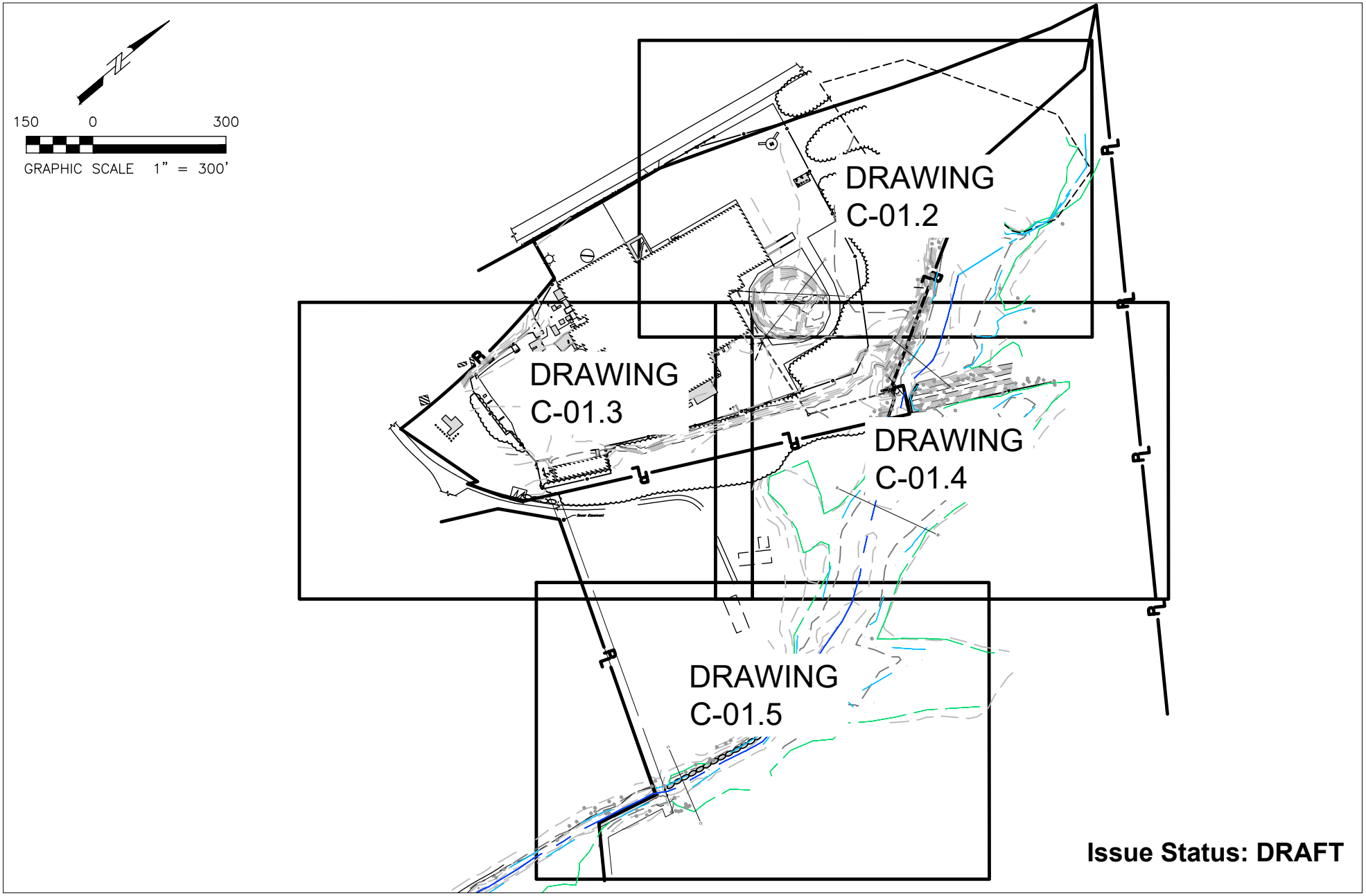

FORMER C&D POWER SYSTEMS, SITE NO. 336001
SEDIMENT REMEDIATION
TRIBUTARY D-1-7 TO NEVERSINK RIVER, HUGUENOT, NEW YORK
APPLICANT: NYSDEC. USACE PRE-APPLICATION # NAN-2021-01201-EMI

EXISTING CONDITIONS
SHEET 6 OF 40

Date: 2023-02-10

AECOM

Figure: C-01.1

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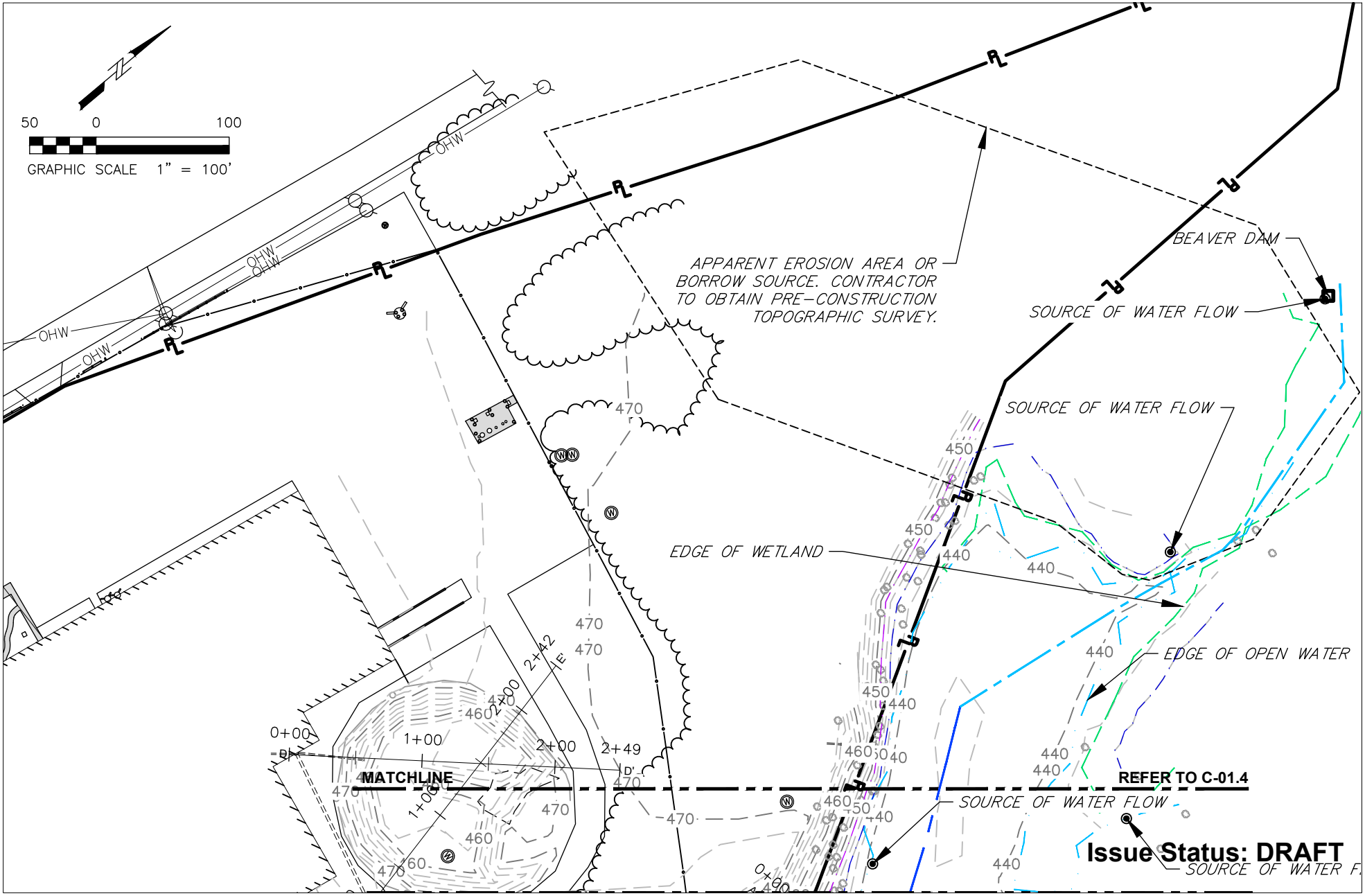

FORMER C&D POWER SYSTEMS, SITE NO. 336001
SEDIMENT REMEDIATION
TRIBUTARY D-1-7 TO NEVERSINK RIVER, HUGUENOT, NEW YORK
APPLICANT: NYSDEC. USACE PRE-APPLICATION # NAN-2021-01201-EMI

EXISTING CONDITIONS
SHEET 7 OF 40

Date: 2023-02-10

AECOM

Figure: C-01.2

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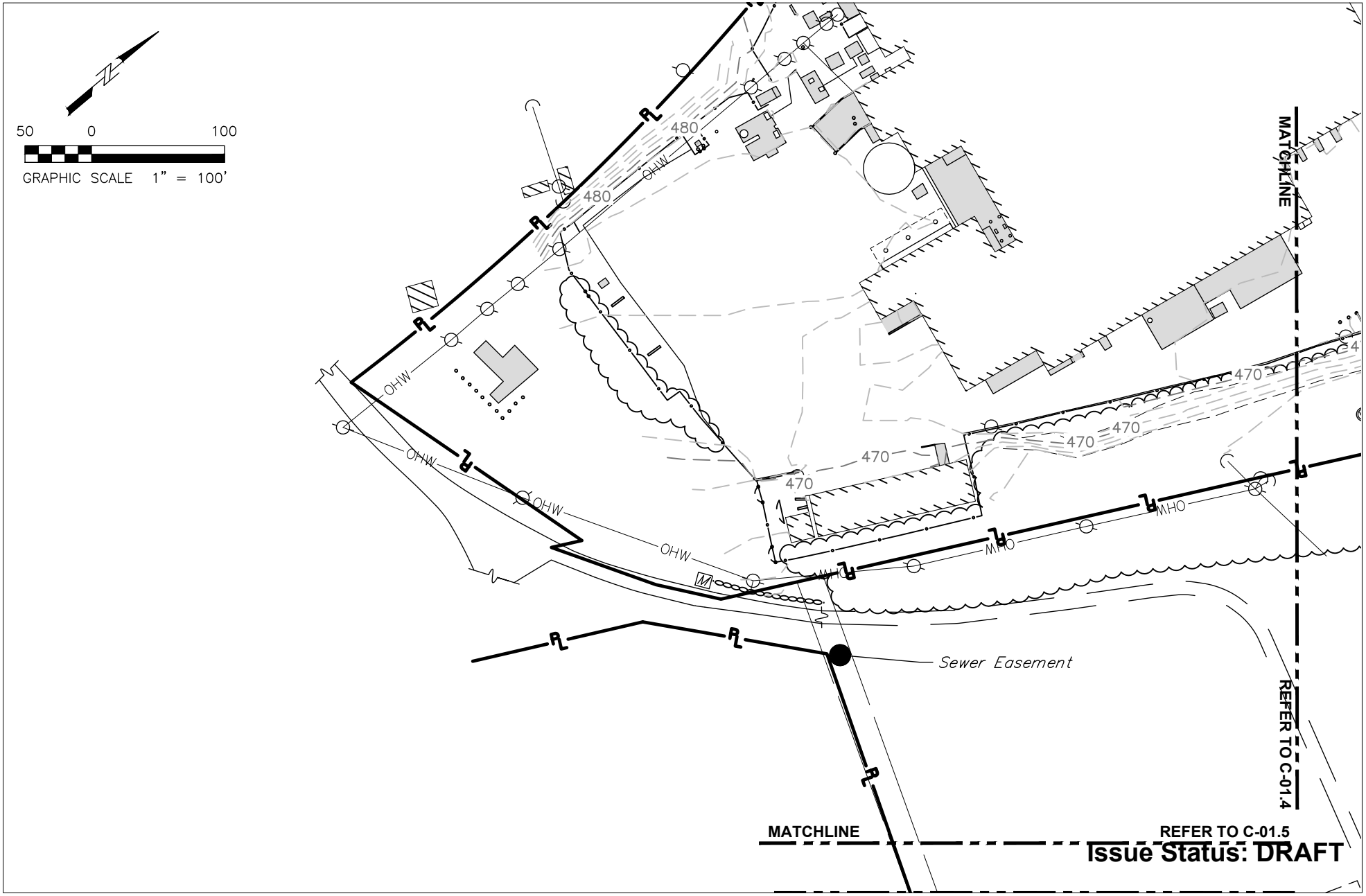

FORMER C&D POWER SYSTEMS, SITE NO. 336001
SEDIMENT REMEDIATION
TRIBUTARY D-1-7 TO NEVERSINK RIVER, HUGUENOT, NEW YORK
APPLICANT: NYSDEC. USACE PRE-APPLICATION # NAN-2021-01201-EMI

EXISTING CONDITIONS
SHEET 8 OF 40

Date: 2023-02-10

AECOM

Figure: C-01.3

Last saved by: CHINA2(2020-09-30) Last Plotted: 2011-05-25 Project Management Initials: Designer: JTS Checked: AC Approved: RF ANSI B 8.5" x 11"
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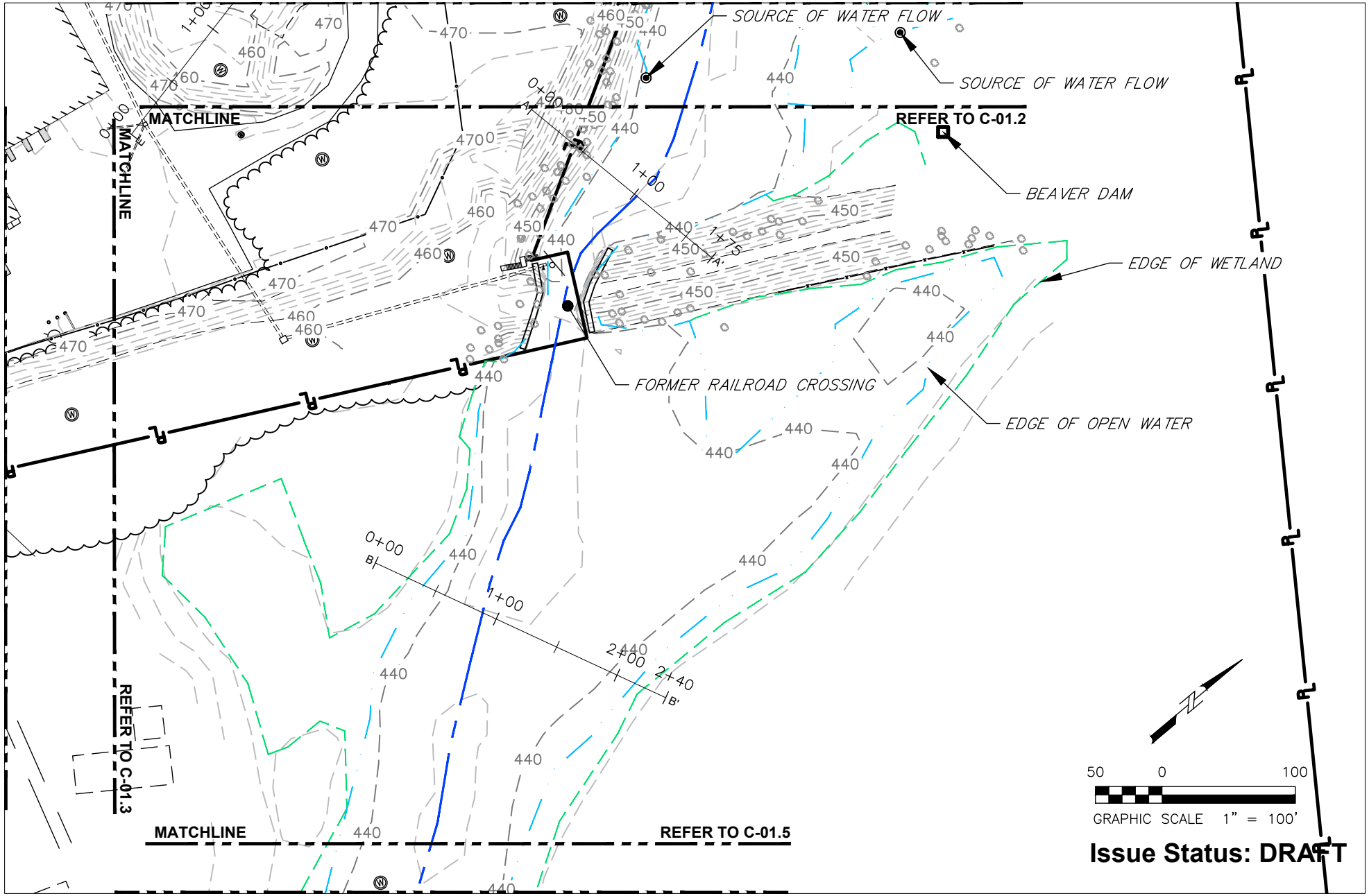

FORMER C&D POWER SYSTEMS, SITE NO. 336001
SEDIMENT REMEDIATION
TRIBUTARY D-1-7 TO NEVERSINK RIVER, HUGUENOT, NEW YORK
APPLICANT: NYSDEC. USACE PRE-APPLICATION # NAN-2021-01201-EMI

EXISTING CONDITIONS
SHEET 9 OF 40

Date: 2023-02-10

AECOM

Figure: C-01.4

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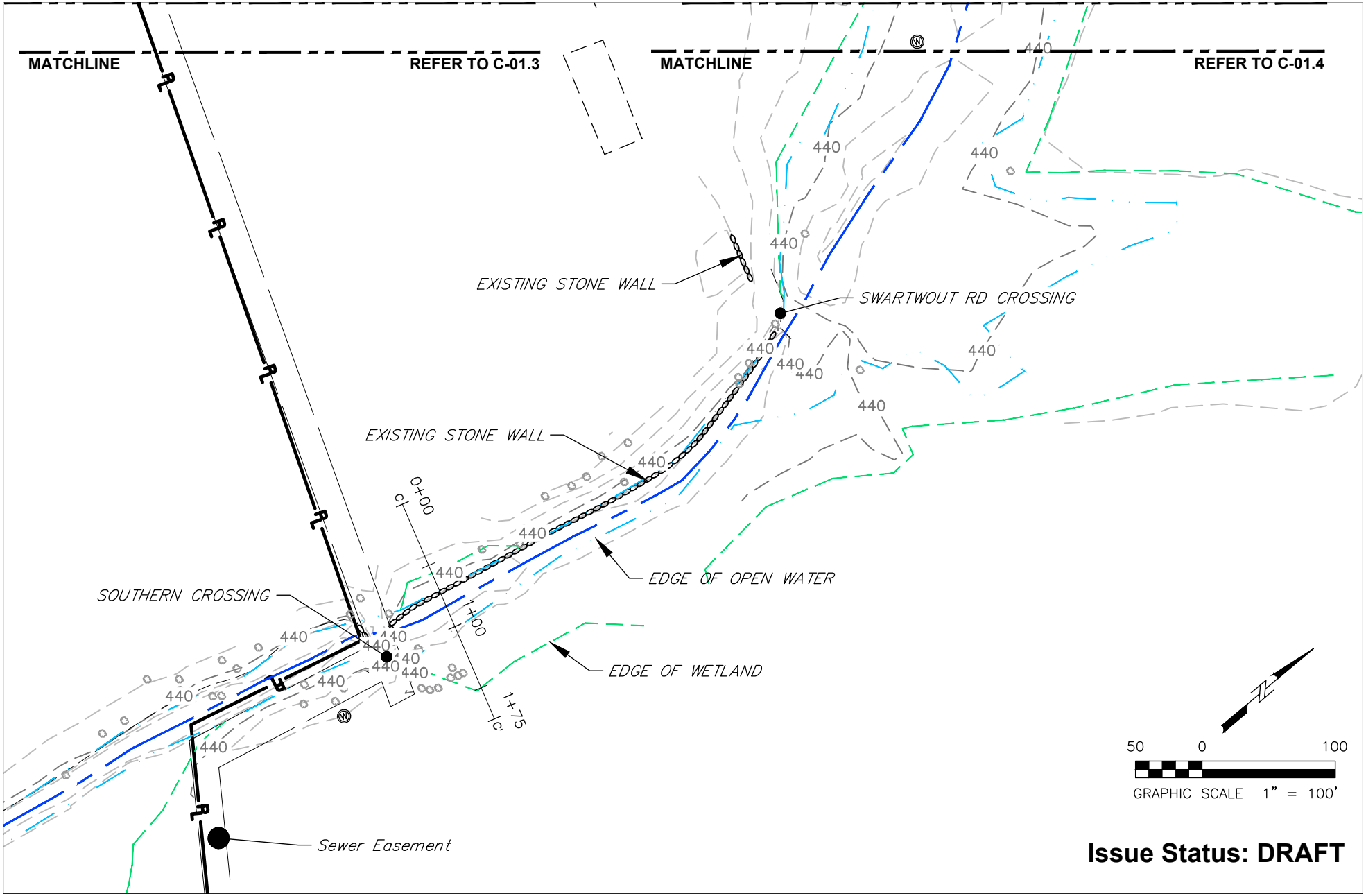

FORMER C&D POWER SYSTEMS, SITE NO. 336001
SEDIMENT REMEDIATION
TRIBUTARY D-1-7 TO NEVERSINK RIVER, HUGUENOT, NEW YORK
APPLICANT: NYSDEC. USACE PRE-APPLICATION # NAN-2021-01201-EMI

EXISTING CONDITIONS
SHEET 10 OF 40

Date: 2023-02-10

AECOM

Figure: C-01.5

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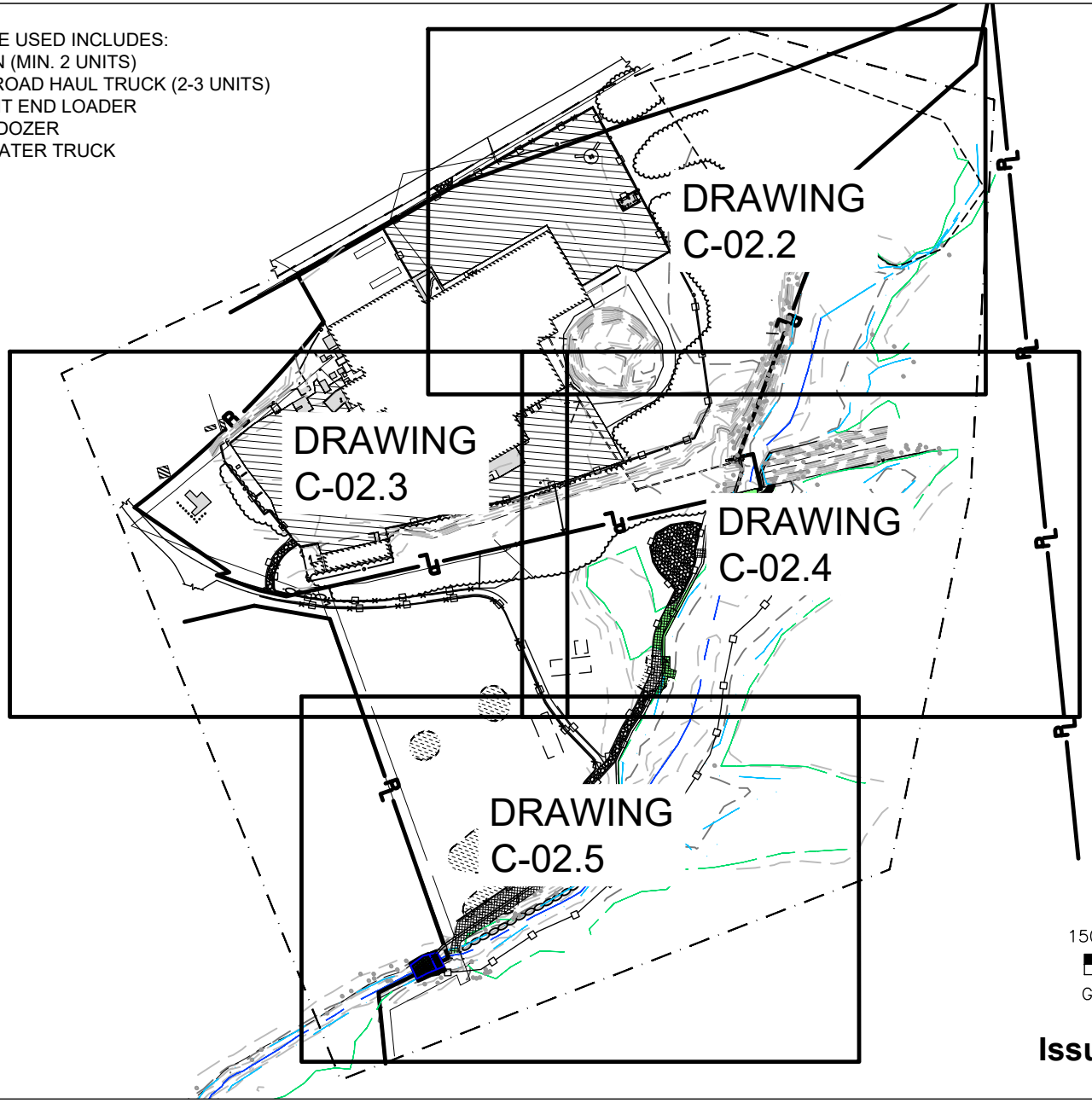
NOTES:

1. TYPICAL EQUIPMENT TO BE USED INCLUDES:
   - 1.1. 70,000 LB EXCAVATION (MIN. 2 UNITS)
   - 1.2. 20,000-30,000 LB OFF ROAD HAUL TRUCK (2-3 UNITS)
   - 1.3. 25,000-35,000 LB FRONT END LOADER
   - 1.4. 25,000-35,000 LB BULLDOZER
   - 1.5. 2,000-4,000 GALLON WATER TRUCK



Issue Status: DRAFT

FORMER C&D POWER SYSTEMS, SITE NO. 336001 **SITE PREPARATION AND EROSION CONTROL**
SEDIMENT REMEDIATION **SHEET 11 OF 40**
TRIBUTARY D-1-7 TO NEVERSINK RIVER, HUGUENOT, NEW YORK
APPLICANT: NYSDEC. USACE PRE-APPLICATION # NAN-2021-01201-EMI Date: 2023-02-10

AECOM

Figure: C-02.1

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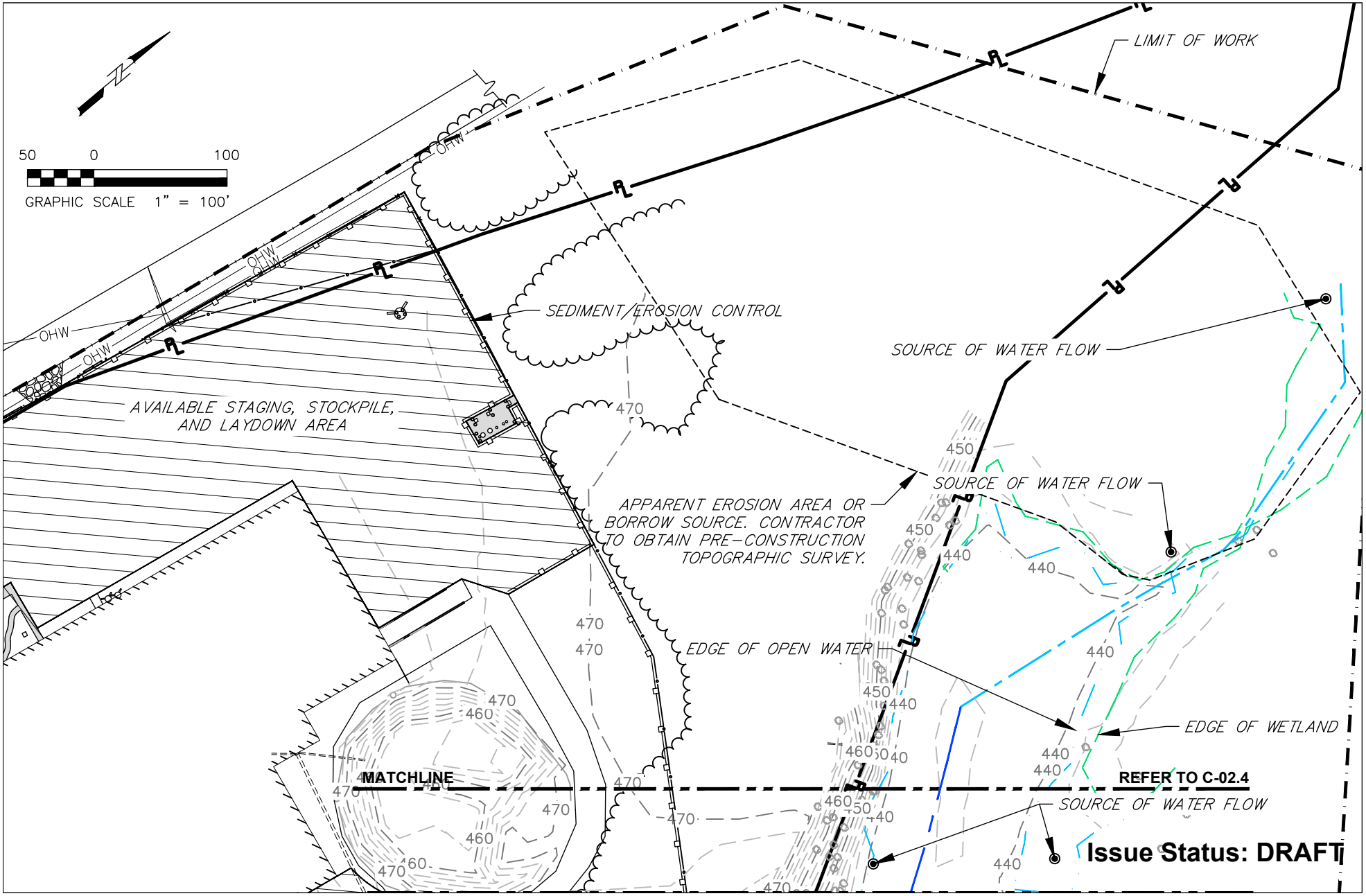

FORMER C&D POWER SYSTEMS, SITE NO. 336001 **SITE PREPARATION AND EROSION CONTROL**
SEDIMENT REMEDIATION **SHEET 12 OF 40**
TRIBUTARY D-1-7 TO NEVERSINK RIVER, HUGUENOT, NEW YORK
APPLICANT: NYSDEC. USACE PRE-APPLICATION # NAN-2021-01201-EMI Date: 2023-02-10

AECOM

Figure: C-02.2

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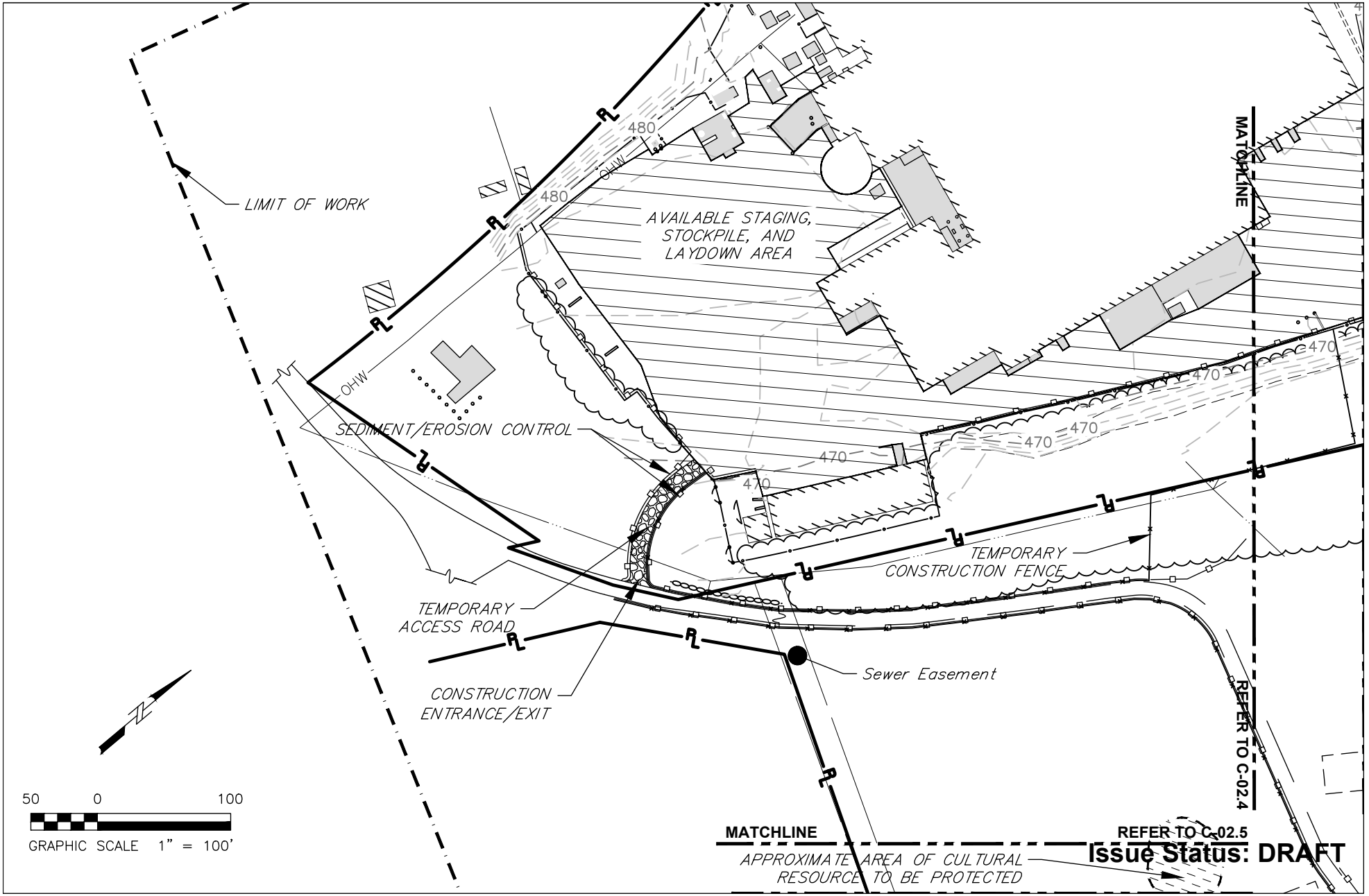

FORMER C&D POWER SYSTEMS, SITE NO. 336001 **SITE PREPARATION AND EROSION CONTROL**
SEDIMENT REMEDIATION **SHEET 13 OF 40**
TRIBUTARY D-1-7 TO NEVERSINK RIVER, HUGUENOT, NEW YORK
APPLICANT: NYSDEC. USACE PRE-APPLICATION # NAN-2021-01201-EMI Date: 2023-02-10

AECOM

Figure: C-02.3

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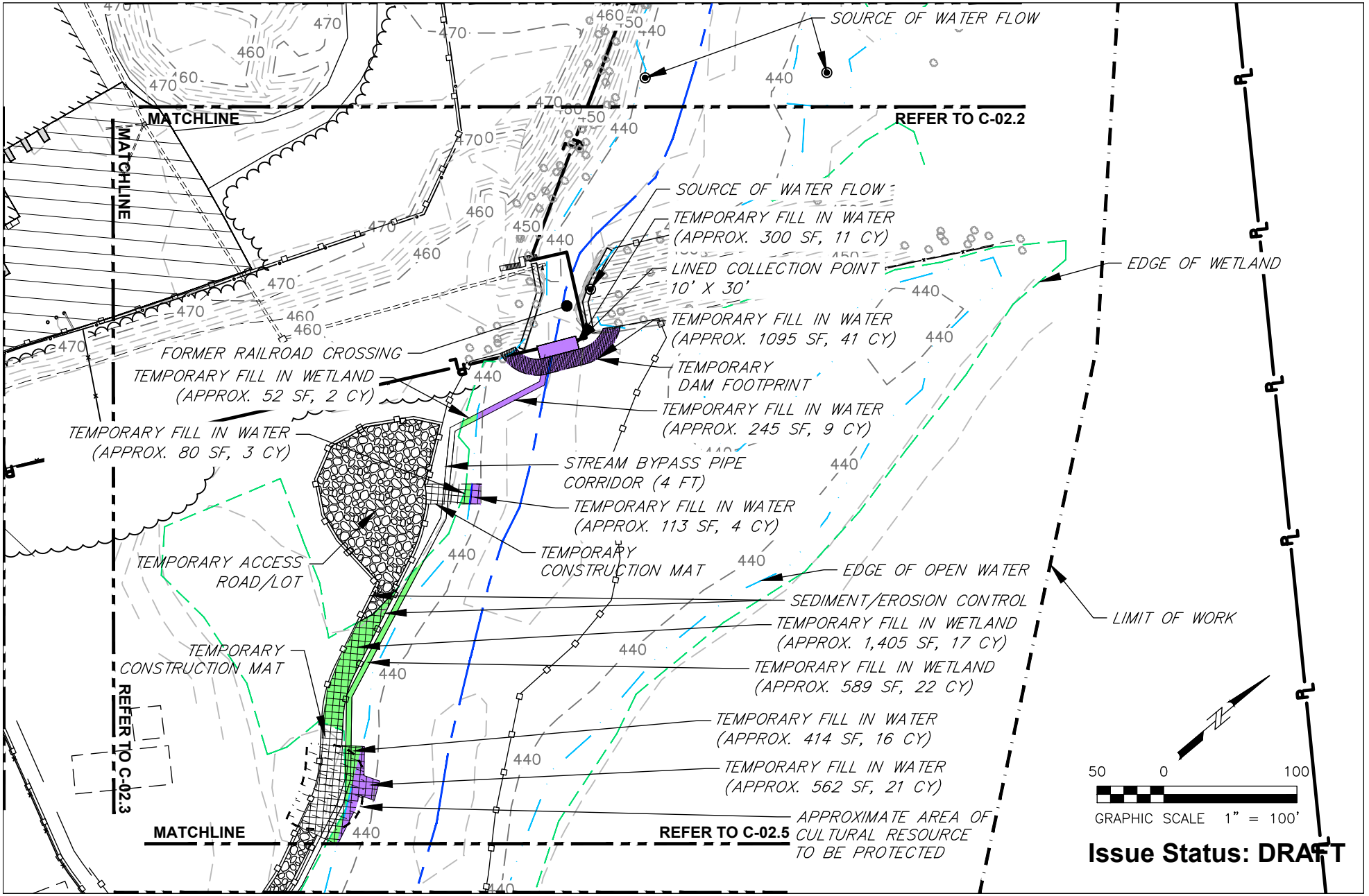

FORMER C&D POWER SYSTEMS, SITE NO. 336001 **SITE PREPARATION AND EROSION CONTROL**
SEDIMENT REMEDIATION **SHEET 14 OF 40**
TRIBUTARY D-1-7 TO NEVERSINK RIVER, HUGUENOT, NEW YORK
APPLICANT: NYSDEC. USACE PRE-APPLICATION # NAN-2021-01201-EMI Date: 2023-02-10

AECOM

Figure: C-02.4

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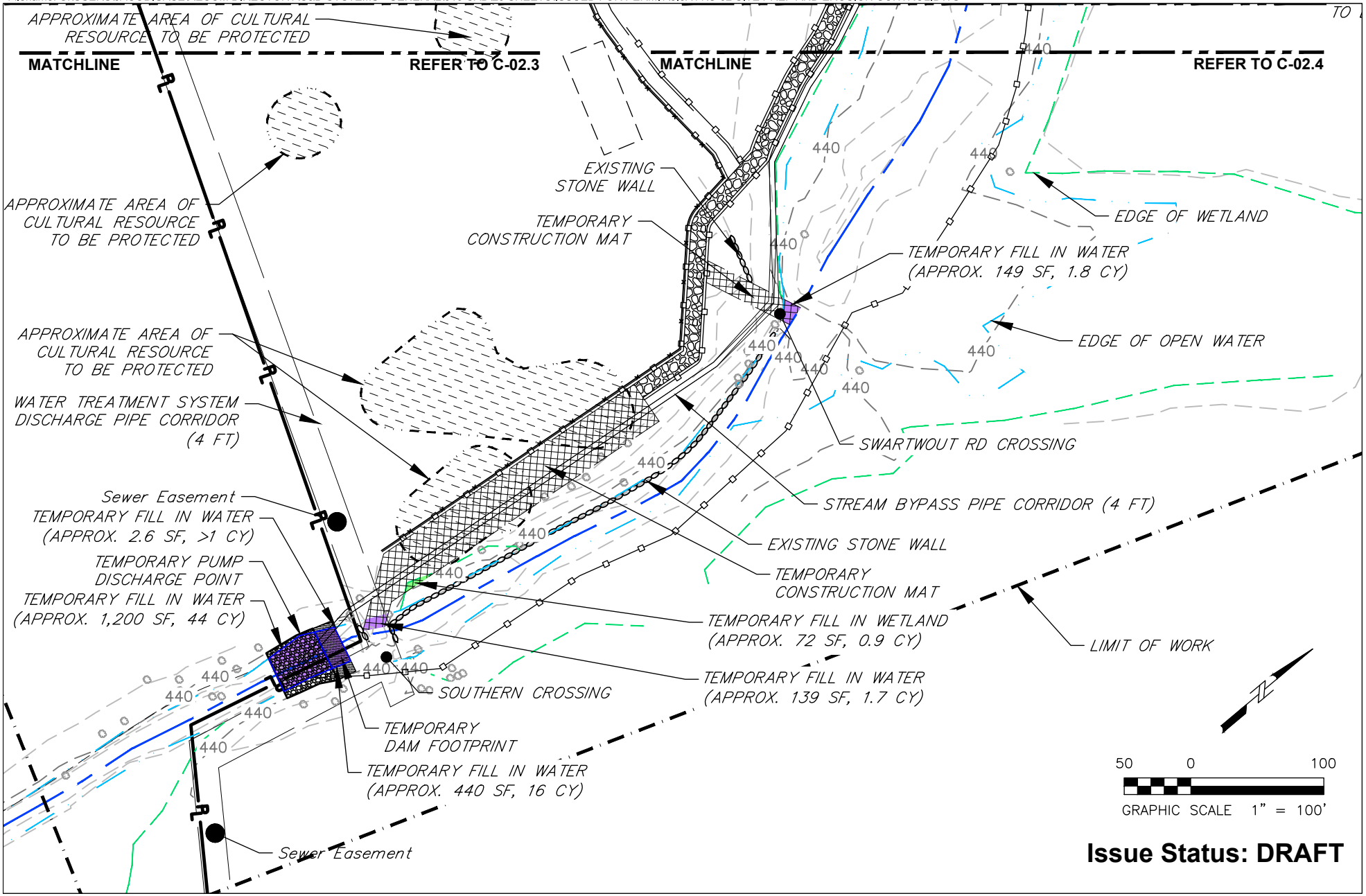


FORMER C&D POWER SYSTEMS, SITE NO. 336001 **SITE PREPARATION AND EROSION CONTROL**
SEDIMENT REMEDIATION **SHEET 15 OF 40**
TRIBUTARY D-1-7 TO NEVERSINK RIVER, HUGUENOT, NEW YORK
APPLICANT: NYSDEC. USACE PRE-APPLICATION # NAN-2021-01201-EMI Date: 2023-02-10

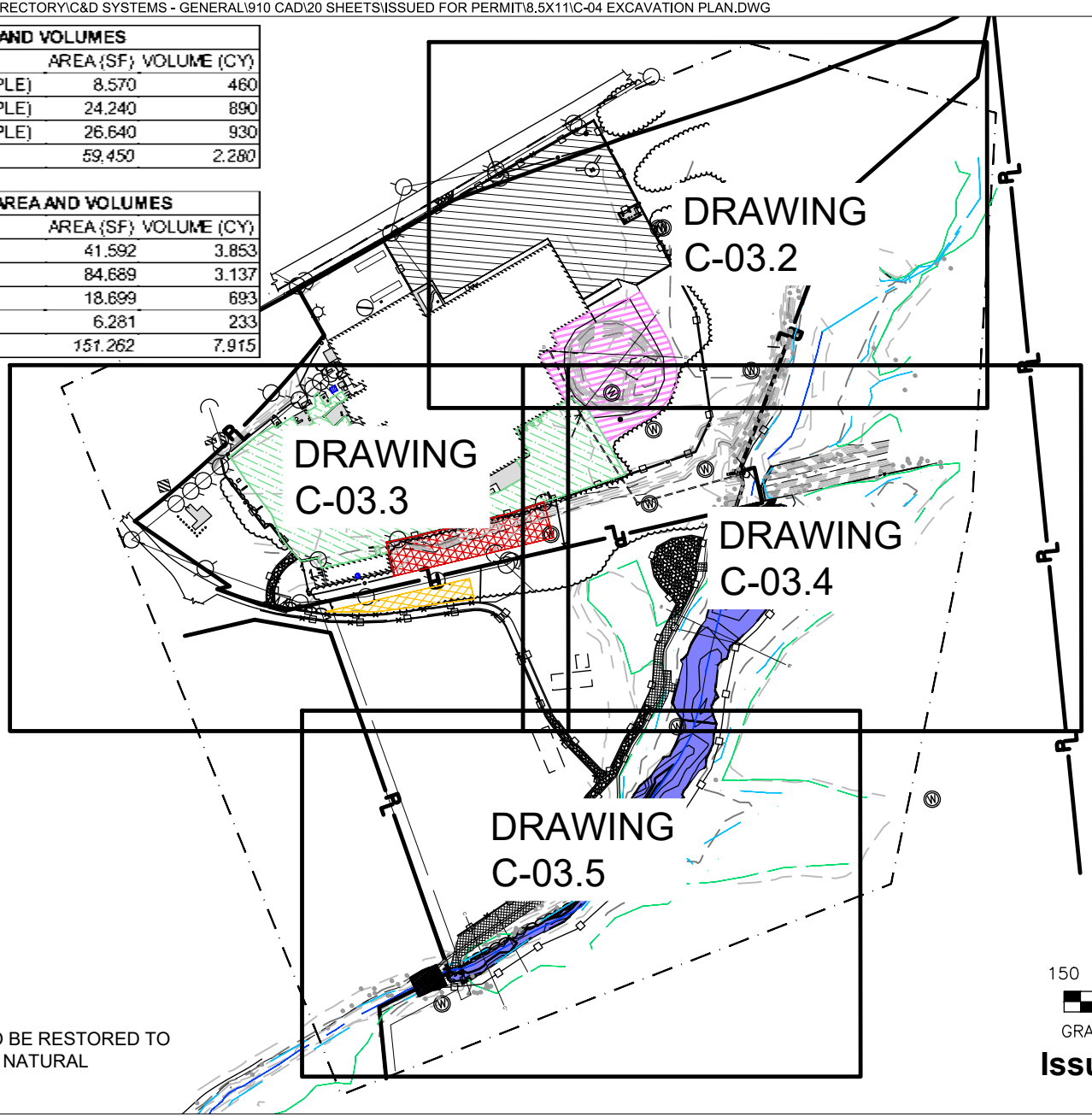
AECOM

Figure: C-02.5

Last saved by: JACOB.GASE(2020-10-13) Last Plotted: 2011-05-25 Project Management Initials: Designer: JTS Checked: AC Approved: RF ANSI B 8.5" x 11"
Filename: C:\USERS\JACOB.GASE\AECOM DIRECTORY\C&D SYSTEMS - GENERAL\910 CAD\20 SHEETS\ISSUED FOR PERMIT\8.5X11\C-04 EXCAVATION PLAN.DWG

DREDGING AREA AND VOLUMES		
	AREA (SF)	VOLUME (CY)
18 INCH DREDGING (COMP 1 SAMPLE)	8,570	460
12 INCH DREDGING (COMP 2 SAMPLE)	24,240	890
12 INCH DREDGING (COMP 3 SAMPLE)	26,640	930
TOTAL	*59,450*	*2,280*

UPLAND EXCAVATION AREA AND VOLUMES		
	AREA (SF)	VOLUME (CY)
LAGOON	41,592	3,853
ASPHALT AREA	84,689	3,137
RESTRICTED USE SCO	18,699	693
UNRESTRICTED USE SCO	6,281	233
TOTAL	*151,262*	*7,915*



NOTE:
1. EXCAVATION AREAS TO BE RESTORED TO ORIGINAL GRADE WITH NATURAL MATERIALS

150 0 300
GRAPHIC SCALE 1" = 300'

Issue Status: DRAFT

FORMER C&D POWER SYSTEMS, SITE NO. 336001
SEDIMENT REMEDIATION
TRIBUTARY D-1-7 TO NEVERSINK RIVER, HUGUENOT, NEW YORK
APPLICANT: NYSDEC. USACE PRE-APPLICATION # NAN-2021-01201-EMI

EXCAVATION PLAN
SHEET 16 OF 40

Date: 2023-03-02

AECOM

Figure: C-03.1

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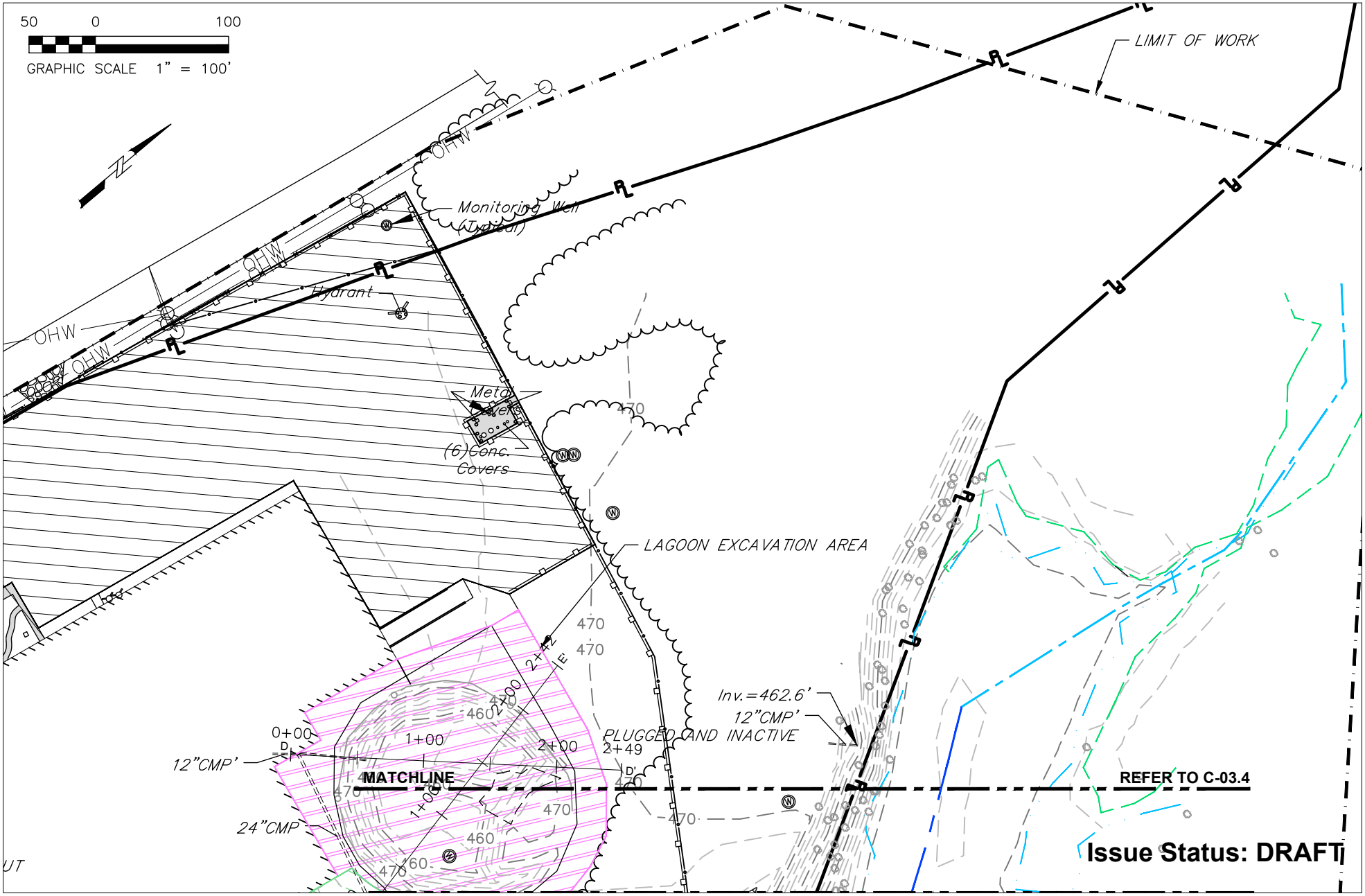

FORMER C&D POWER SYSTEMS, SITE NO. 336001
SEDIMENT REMEDIATION
TRIBUTARY D-1-7 TO NEVERSINK RIVER, HUGUENOT, NEW YORK
APPLICANT: NYSDEC. USACE PRE-APPLICATION # NAN-2021-01201-EMI

EXCAVATION PLAN
SHEET 17 OF 40

Date: 2023-02-10

AECOM

Figure: C-03.2

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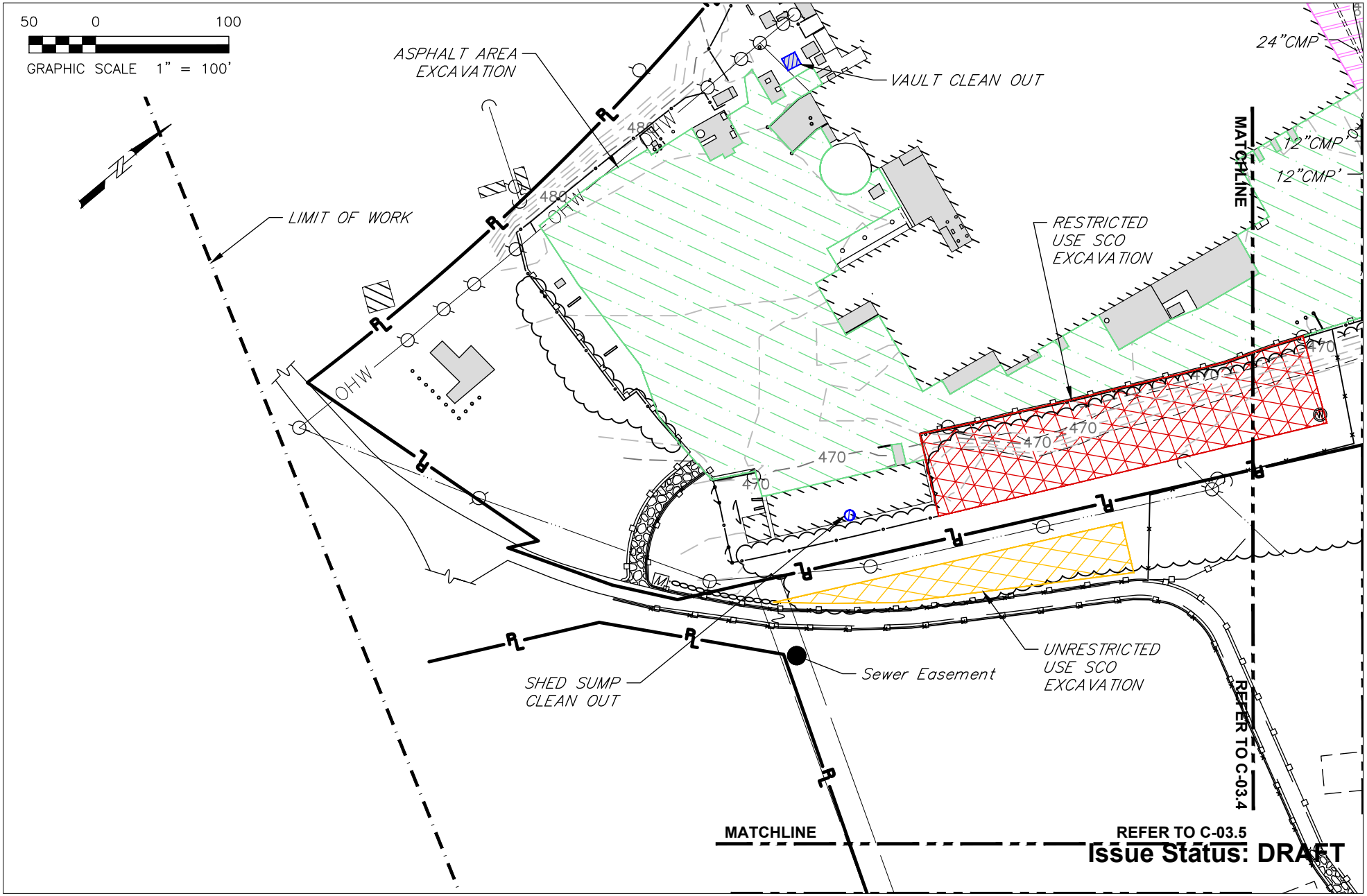

FORMER C&D POWER SYSTEMS, SITE NO. 336001
SEDIMENT REMEDIATION
TRIBUTARY D-1-7 TO NEVERSINK RIVER, HUGUENOT, NEW YORK
APPLICANT: NYSDEC. USACE PRE-APPLICATION # NAN-2021-01201-EMI

EXCAVATION PLAN
SHEET 18 OF 40

Date: 2023-02-10

AECOM

Figure: C-03.3

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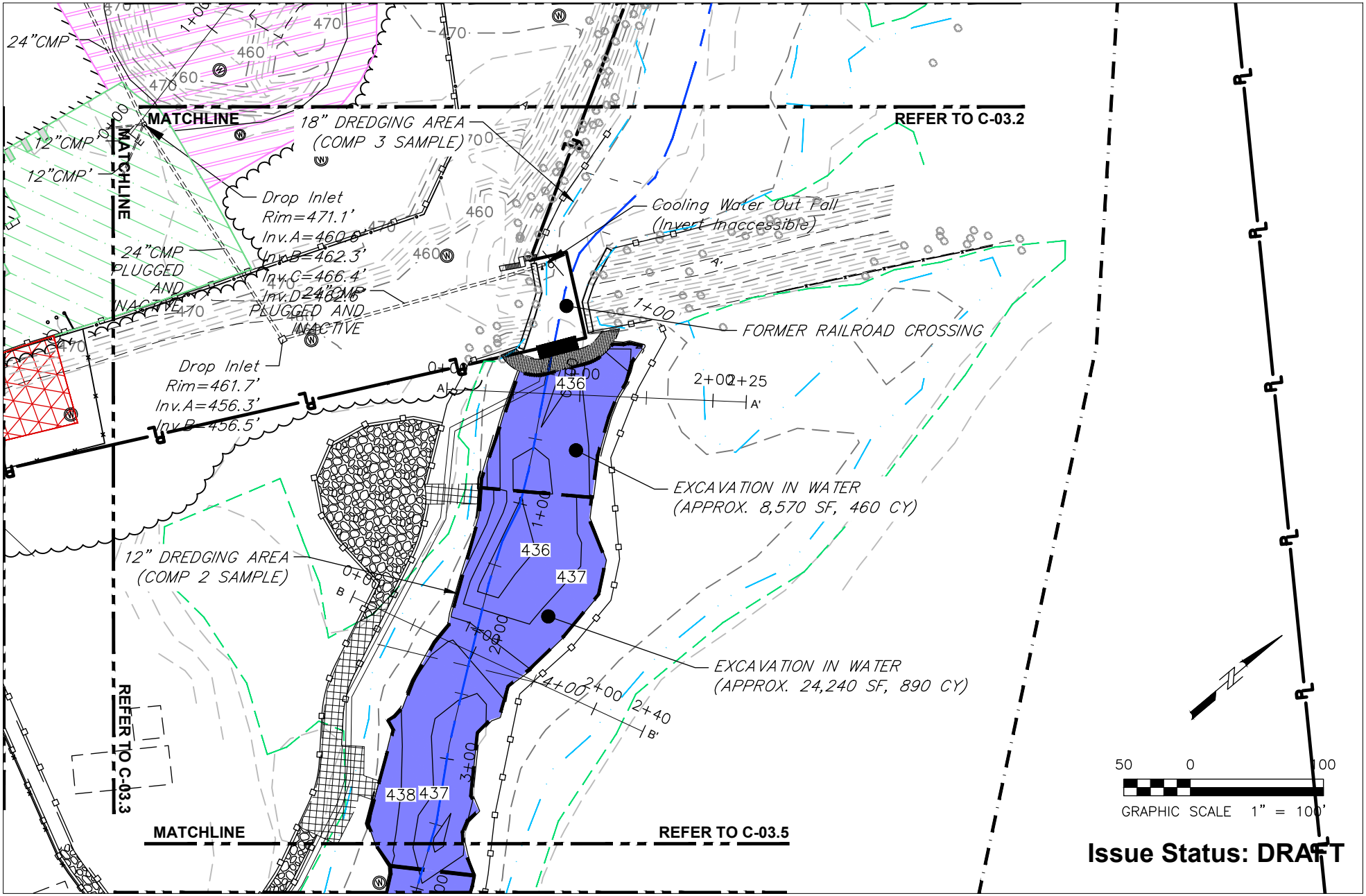

FORMER C&D POWER SYSTEMS, SITE NO. 336001
SEDIMENT REMEDIATION
TRIBUTARY D-1-7 TO NEVERSINK RIVER, HUGUENOT, NEW YORK
APPLICANT: NYSDEC. USACE PRE-APPLICATION # NAN-2021-01201-EMI

EXCAVATION PLAN
SHEET 19 OF 40

Date: 2023-03-02

AECOM

Figure: C-03.4

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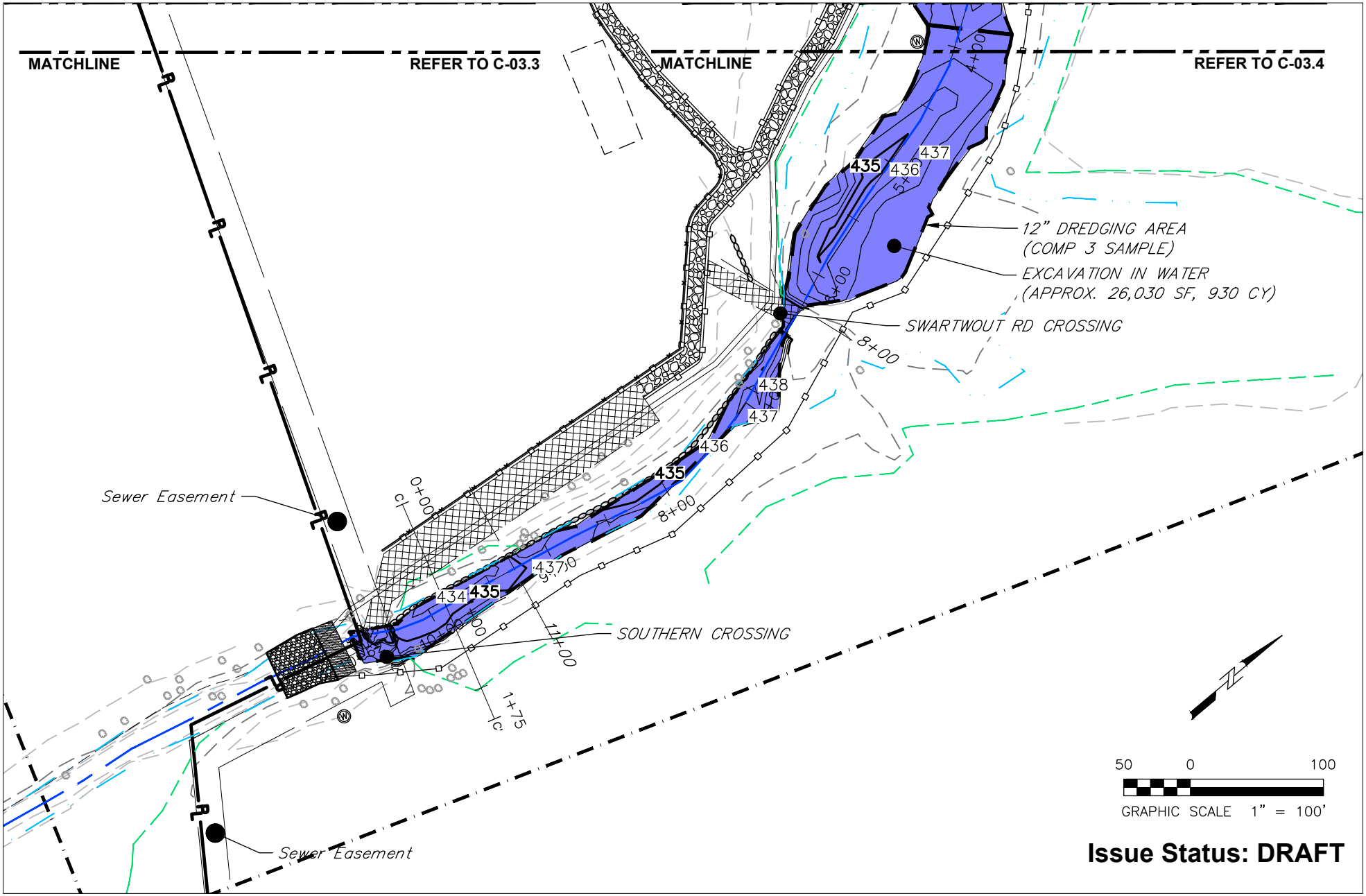

FORMER C&D POWER SYSTEMS, SITE NO. 336001
SEDIMENT REMEDIATION
TRIBUTARY D-1-7 TO NEVERSINK RIVER, HUGUENOT, NEW YORK
APPLICANT: NYSDEC. USACE PRE-APPLICATION # NAN-2021-01201-EMI

EXCAVATION PLAN
SHEET 20 OF 40

Date: 2023-03-02

AECOM

Figure: C-03.5

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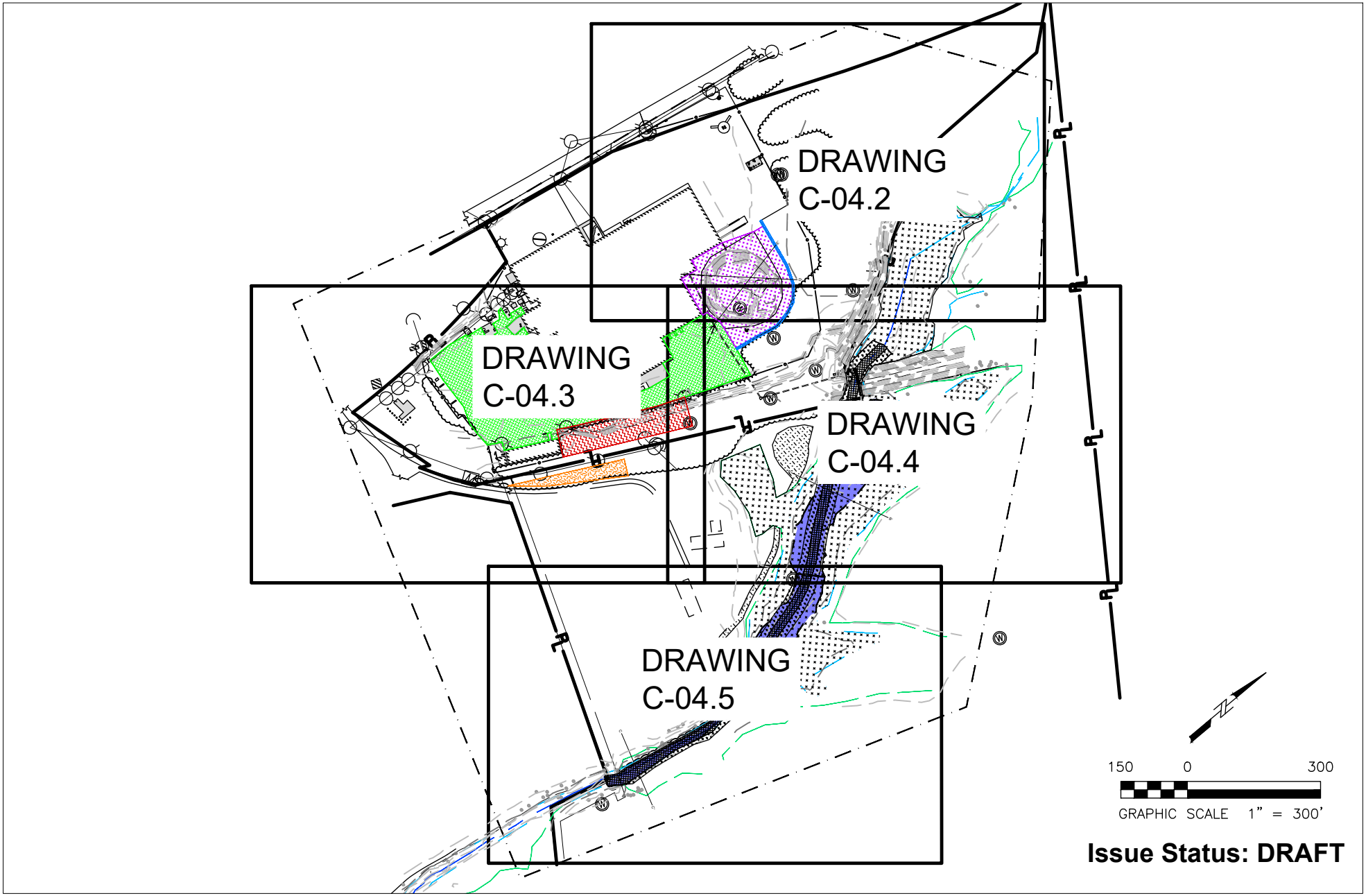

FORMER C&D POWER SYSTEMS, SITE NO. 336001
SEDIMENT REMEDIATION
TRIBUTARY D-1-7 TO NEVERSINK RIVER, HUGUENOT, NEW YORK
APPLICANT: NYSDEC. USACE PRE-APPLICATION # NAN-2021-01201-EMI

RESTORATION PLAN
SHEET 21 OF 40

Date: 2023-02-10

AECOM

Figure: C-04.1

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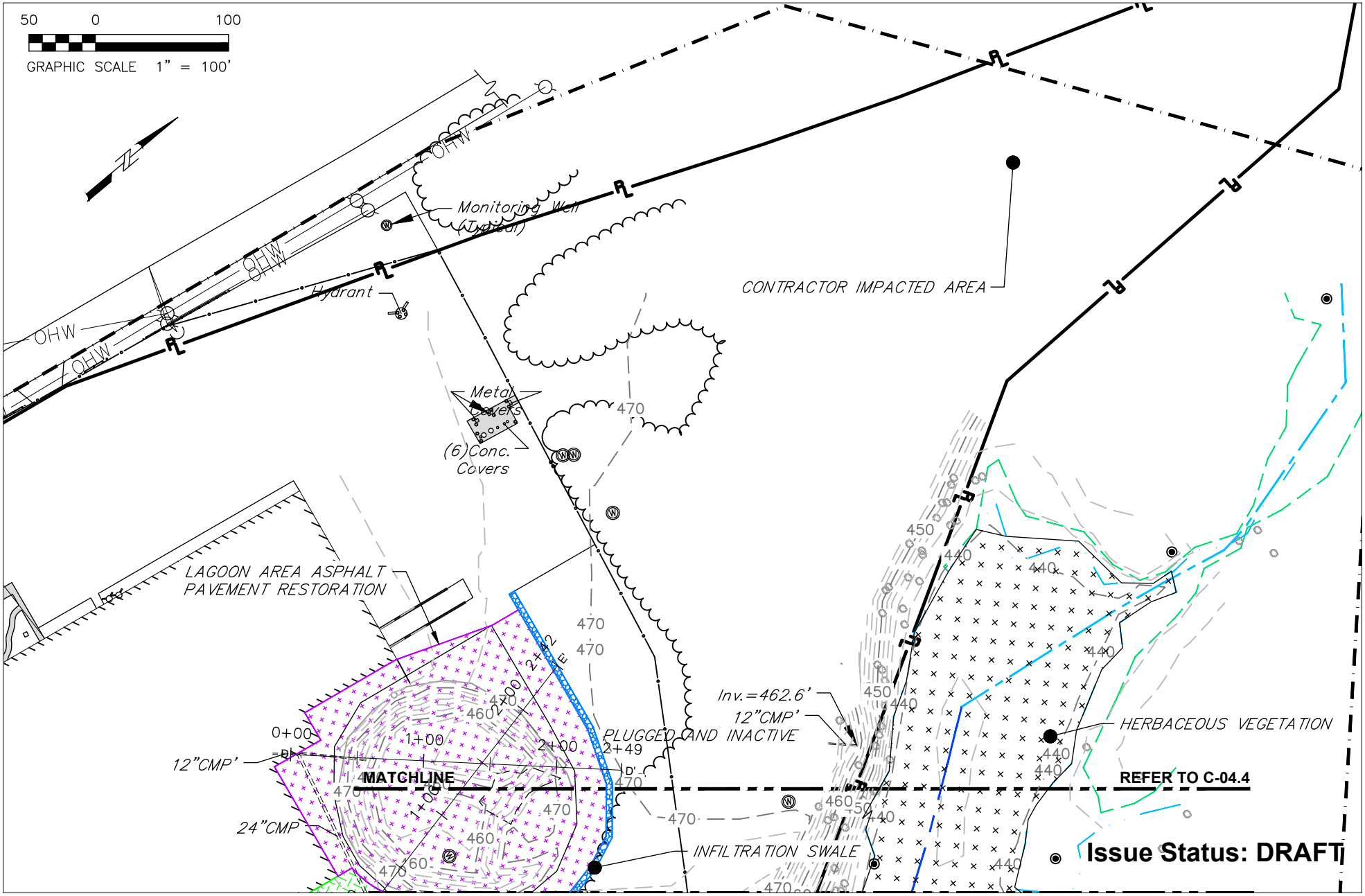

FORMER C&D POWER SYSTEMS, SITE NO. 336001
SEDIMENT REMEDIATION
TRIBUTARY D-1-7 TO NEVERSINK RIVER, HUGUENOT, NEW YORK
APPLICANT: NYSDEC. USACE PRE-APPLICATION # NAN-2021-01201-EMI

RESTORATION PLAN
SHEET 22 OF 40

Date: 2023-02-10

AECOM

Figure: C-04.2

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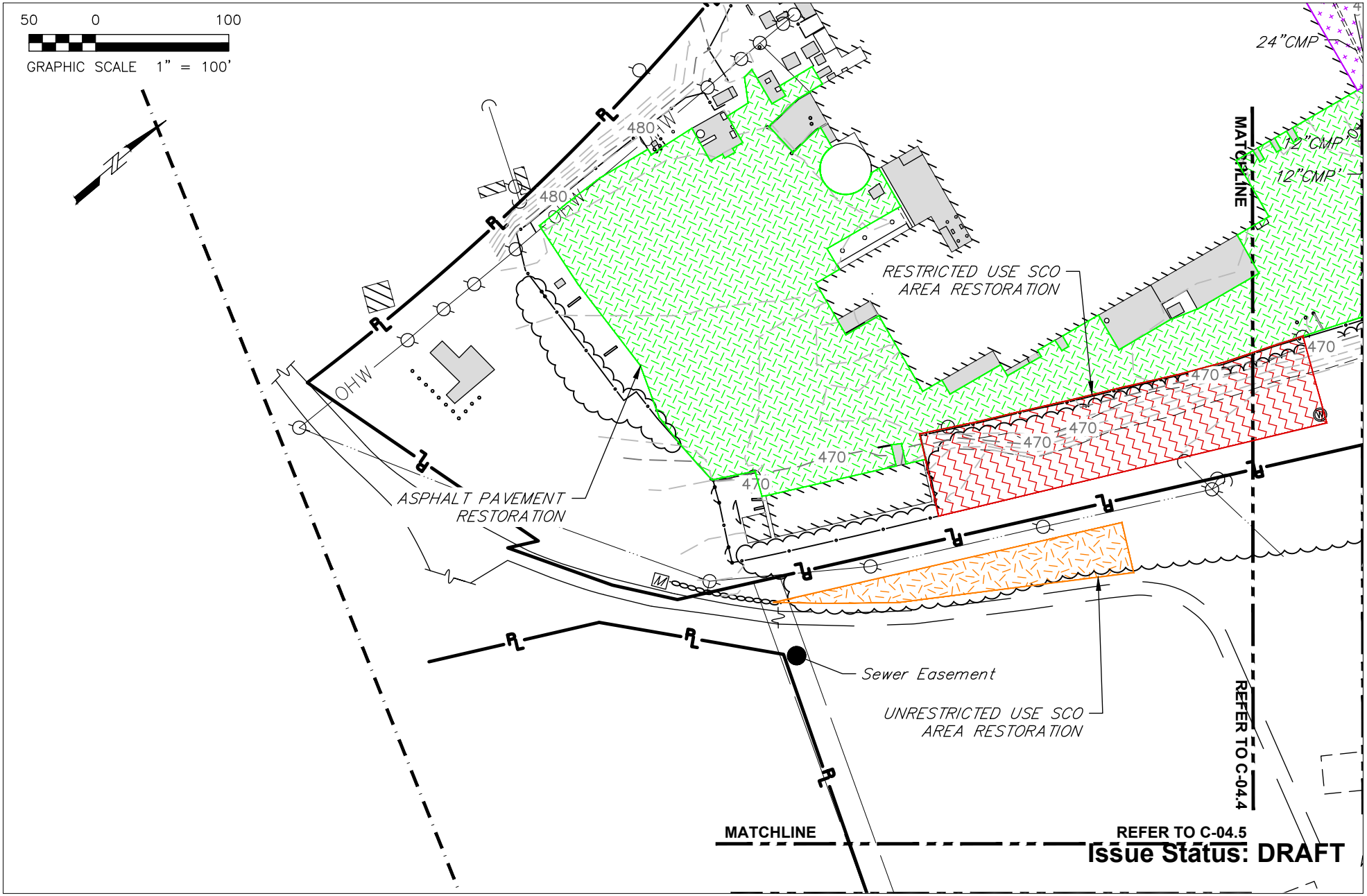

FORMER C&D POWER SYSTEMS, SITE NO. 336001
SEDIMENT REMEDIATION
TRIBUTARY D-1-7 TO NEVERSINK RIVER, HUGUENOT, NEW YORK
APPLICANT: NYSDEC. USACE PRE-APPLICATION # NAN-2021-01201-EMI

RESTORATION PLAN
SHEET 23 OF 40

Date: 2023-02-10

AECOM

Figure: C-04.2

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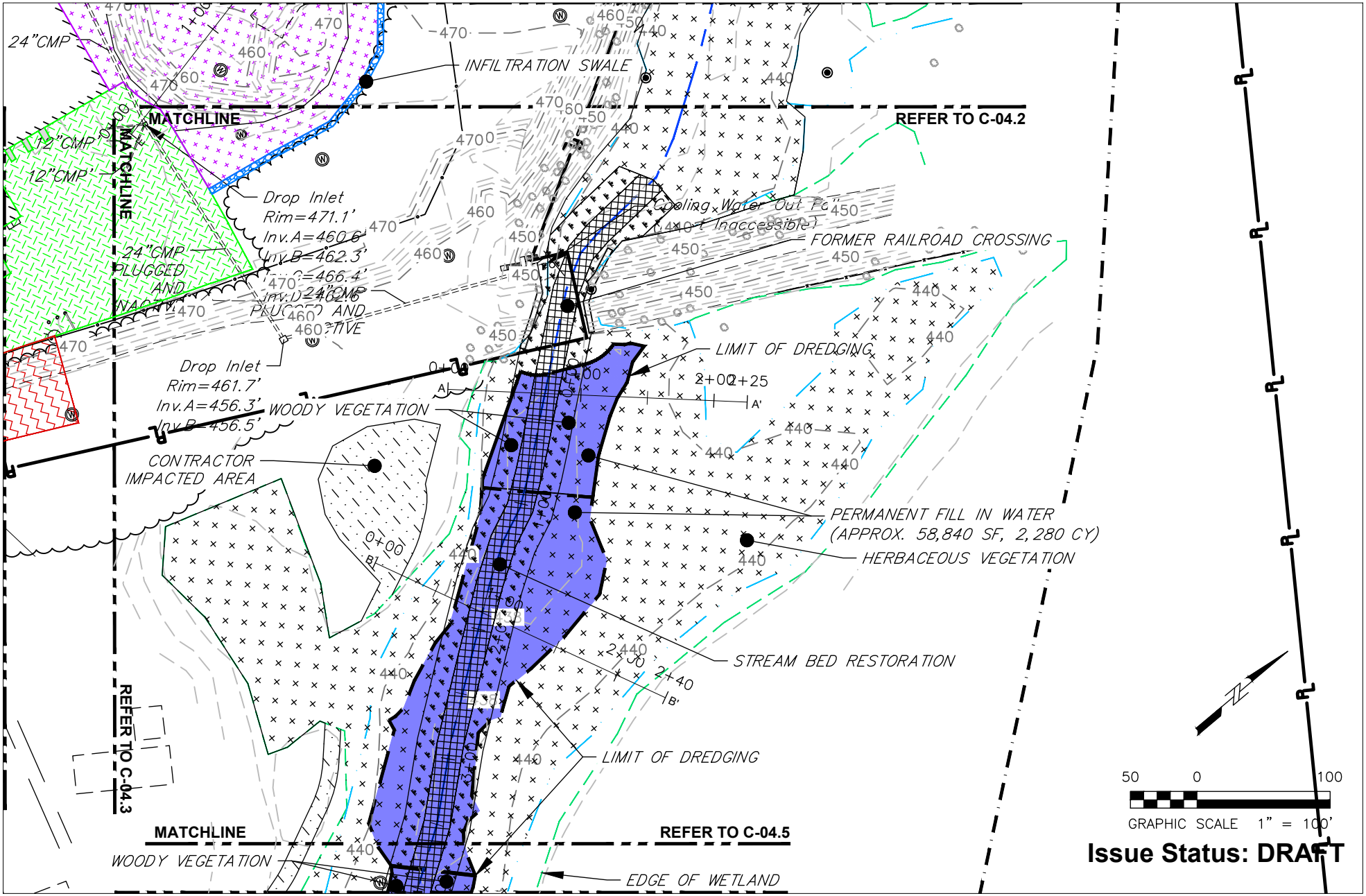

FORMER C&D POWER SYSTEMS, SITE NO. 336001
SEDIMENT REMEDIATION
TRIBUTARY D-1-7 TO NEVERSINK RIVER, HUGUENOT, NEW YORK
APPLICANT: NYSDEC. USACE PRE-APPLICATION # NAN-2021-01201-EMI

RESTORATION PLAN
SHEET 24 OF 40

Date: 2023-03-02

AECOM

Figure: C-04.4

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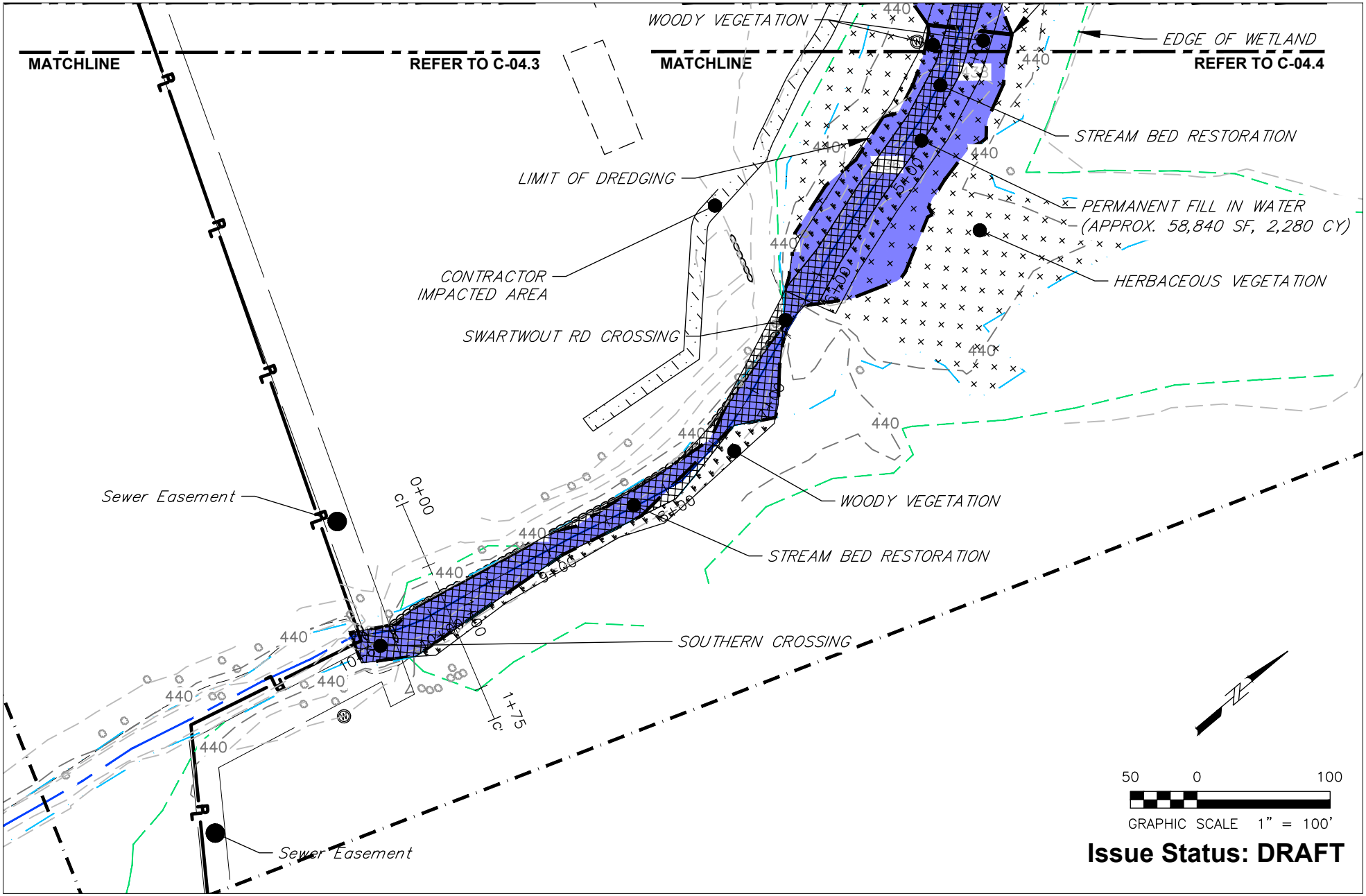

FORMER C&D POWER SYSTEMS, SITE NO. 336001
SEDIMENT REMEDIATION
TRIBUTARY D-1-7 TO NEVERSINK RIVER, HUGUENOT, NEW YORK
APPLICANT: NYSDEC. USACE PRE-APPLICATION # NAN-2021-01201-EMI

RESTORATION PLAN
SHEET 25 OF 40

Date: 2023-03-02

AECOM

Figure: C-04.5

NOTES:

STREAM BED RESTORATION

1. AFTER EXCAVATION OF CONTAMINATED SEDIMENTS, CHANNEL WILL BE FILLED WITH SAND AND ROCK OBTAINED FROM A CLEAN SOURCE.

WOODY VEGETATION

1. THE ELEVATIONS OF ALL DREDGED AREAS WILL BE REPLACED TO EXISTING GRADE WITH TOPSOIL.
2. ALL PLANTINGS (TABLE 1) WILL BE PERFORMED UNDER THE SUPERVISION OF THE ENGINEER.
3. EACH PLANTING WILL HAVE A NORMAL HABIT OF GROWTH WITH WELL-DEVELOPED BRANCH SYSTEMS AND VIGOROUS ROOT SYSTEMS.
4. ALL PLANTINGS WILL BE SOUND, HEALTHY, AND VIGOROUS PLANTS; FREE FROM VISIBLE DEFECTS, DISFIGURATION, INJURY, RECOGNIZABLE DISEASE OF ANY KIND, INSECT EGGS, BORERS, AND ANY INFESTATION.
5. EXCAVATION OF PLANTING HOLES MAY BE ACCOMPLISHED BY HAND OR ROTARY AUGER.
6. PLANTING HOLES WILL BE 1.5 TO 2.0 TIMES THE DIAMETER OF THE ROOT BALL AND NO MORE THAN 1.0 TIMES THE DEPTH OF THE ROOT BALL.
7. TREES WILL BE SET PLUMB IN THE PLANTING HOLE AND STAKED TO GROW IN AN UPRIGHT POSITION.
8. THE TOP OF THE ROOT BALL WILL BE SET AT APPROXIMATELY TWO INCHES (2") ABOVE GRADE IN THE POORLY DRAINED SOIL.
9. ALL PLANT STOCK WILL BE INSTALLED BY HAND.
10. ANY AND ALL WRAPPING SHALL BE REMOVED FROM ROOT BALL PRIOR TO INSTALLATION.
11. PLANTING HOLES WILL BE BACKFILLED WITH NATIVE SOIL MATERIAL, APPROPRIATE AMENDMENTS, AND LIGHTLY TAMPED. IN ACCORDANCE WITH SPECIFIC SECTION 32 93 01 - PLANTS
12. EXCESS SOIL MATERIAL FROM PLANTING HOLES WILL BE USED TO FORM A TWO TO THREE INCH (2" - 3") HIGH SAUCER AROUND THE PERIMETER OF THE PLANTING HOLE.
13. ANY EXCESS SOIL WILL BE DISPOSED OF PROPERLY.
14. A THREE-INCH (3") LAYER OF WOOD CHIPS OR AGED HARDWOOD BARK MULCH WILL BE APPLIED OVER THE PLANTED TREES AND DISTURBED SOIL AREA. THE MULCH WILL BE FREE FROM ANY OBJECTIONABLE OR FOREIGN MATERIALS. ALL PLANTED TREES WILL BE STAKED AS NECESSARY AND DIRECTED BY THE ENGINEER.
15. ALL TREES WILL BE THOROUGHLY WATERED WITHIN 24 HOURS FOLLOWING PLANTING.
16. EACH TREE WILL BE WRAPPED WITH A VENTILATED, CORRUGATED PLASTIC TREE GUARD WHICH WILL PROTECT AGAINST RODENT AND DEER DAMAGE.
17. ALL WOODY PLANTING STOCK SHOULD BE INOCULATED WITH MYCORRHIZAE AS SPECIFIED; AND IN ACCORDANCE WITH BEST FORESTRY MANAGEMENT PRACTICES, AS SOLELY DETERMINED BY THE ENGINEER. ALL PLANTING STOCK WILL BE INDIVIDUALLY FERTILIZED DURING INSTALLATION WITH OSMOCOTE® 3:4:3 SLOW RELEASE FERTILIZER OR EQUIVALENT.

HERBACEOUS VEGETATION AND CONTRACTOR IMPACTED AREA

1. THE ELEVATIONS OF ALL DREDGED AREAS WILL BE RESTORED TO EXISTING GRADE WITH TOPSOIL.
2. SEEDING WILL OCCUR USING A LOW PRESSURE TRUE AX OR SIMILAR DEVICE.
3. AFTER SEEDING, THE AREA WILL BE COVERED IN STRAW AND A TACKIFYING AGENT APPLIED.
4. IN AREAS WHERE TREES ARE TO BE PLANTED, THE TREES WOULD BE PLANTED FIRST AND SEEDING TO OCCUR AFTER TREE PLANTING IS COMPLETED.
5. HYDROSEEDING WILL NOT BE ALLOWED.
6. AREAS ABOVE ELEVATION 440' SHALL BE SEEDED WITH RIPARIAN BUFFER MIX (61,945 SF). AREAS BELOW ELEVATION 440' SHALL BE SEEDED WITH FACW MEADOW MIX (131,530 SF).

Issue Status: DRAFT

FORMER C&D POWER SYSTEMS, SITE NO. 336001 **RESTORATION PLAN**
SEDIMENT REMEDIATION **SHEET 26 OF 40**
TRIBUTARY D-1-7 TO NEVERSINK RIVER, HUGUENOT, NEW YORK
APPLICANT: NYSDEC. USACE PRE-APPLICATION # NAN-2021-01201-EMI

Date: 2023-02-10

AECOM

Figure: C-04.6

TABLE 1 PLANTING QUANTITIES

Wetland Tree	Scientific Name	Size, spacing and notes	Number Planted
Red Maple	*Acer rubrum*	2-3" B&B, 12-15 Feet on Center	30
River Birch	*Betula nigra*	2-3" B&B, 10-12' Height, 12 Feet on Center	47
Pin Oak	*Quercus palustris*	2-3" B&B, 12-15 Feet on Center	20
Sycamore	*Platanus occidentalis*	3" B&B, 18 Feet on Center	70
Winterberry	*Ilex Verticullata*	#3, 8 Feet on Center	285
Black haw viburnum	*Viburnum prunifolium*	#3, 8 Feet on Center	250
Spicebush	*Lindera benzoin*	#3, 8 Feet on Center	250
Seed Mix		**Rate (lbs/acre)**	**Quantity (lbs)**
Riparian Buffer Mix (ENRMX-178) [Modified]		20	34
FACW Meadow Mix (ERXMX – 122) or equivalent		20	52

Issue Status: DRAFT

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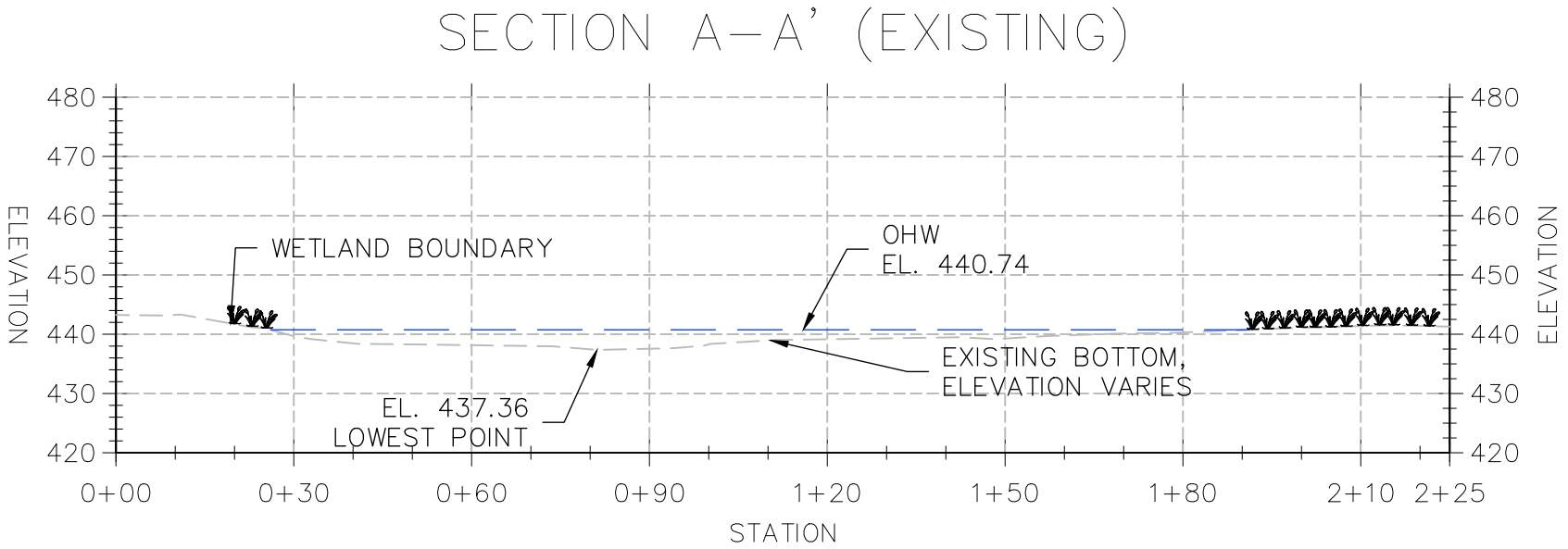
NOTES:
1. ELEVATIONS ARE IN NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88).



10 0 20
GRAPHIC SCALE 1" = 20'

Issue Status: DRAFT

FORMER C&D POWER SYSTEMS, SITE NO. 336001 **EXISTING CROSS SECTIONS**
SEDIMENT REMEDIATION **SHEET 28 OF 40**
TRIBUTARY D-1-7 TO NEVERSINK RIVER, HUGUENOT, NEW YORK
APPLICANT: NYSDEC. USACE PRE-APPLICATION # NAN-2021-01201-EMI

Date: 2023-02-10

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Figure: X-01.1

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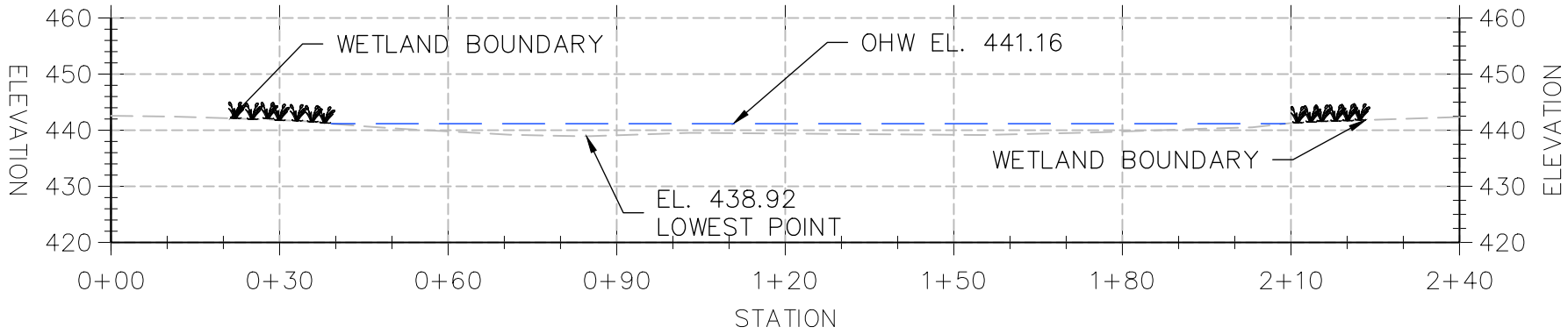
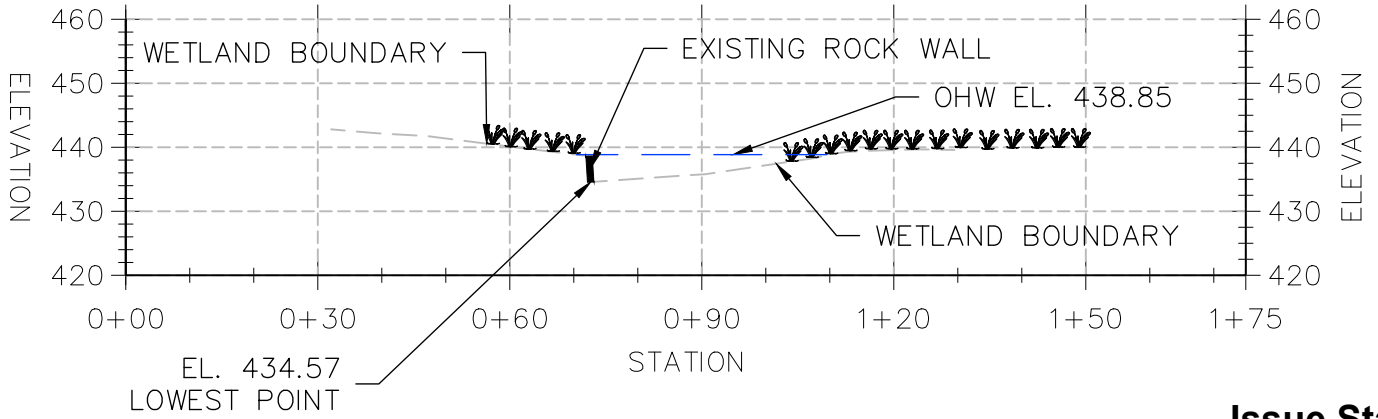
NOTES:
1. ELEVATIONS ARE IN NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88).

SECTION B–B' (EXISTING)



SECTION C–C' (EXISTING)



15 0 30
GRAPHIC SCALE 1" = 30'

Issue Status: DRAFT

FORMER C&D POWER SYSTEMS, SITE NO. 336001
SEDIMENT REMEDIATION
TRIBUTARY D-1-7 TO NEVERSINK RIVER, HUGUENOT, NEW YORK
APPLICANT: NYSDEC. USACE PRE-APPLICATION # NAN-2021-01201-EMI

EXISTING CROSS SECTIONS
SHEET 29 OF 40

Date: 2023-02-10

AECOM

Figure: X-01.2

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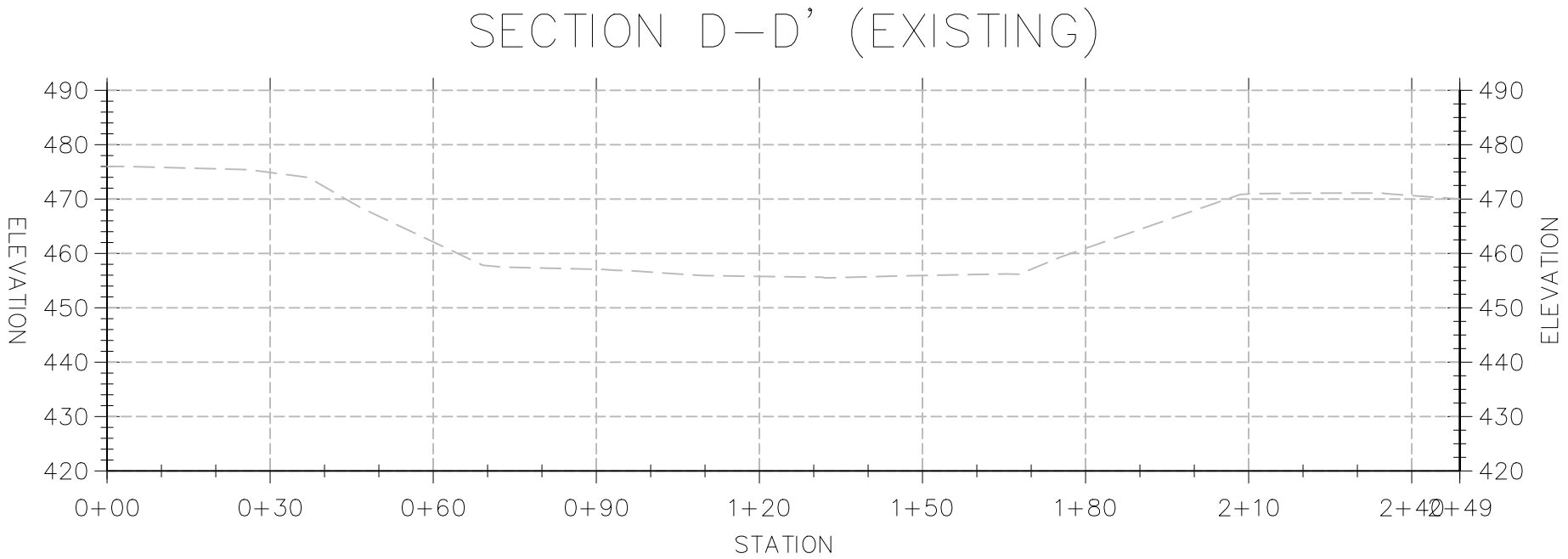
NOTES:
1. ELEVATIONS ARE IN NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88).



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GRAPHIC SCALE 1" = 30'

Issue Status: DRAFT

FORMER C&D POWER SYSTEMS, SITE NO. 336001 **EXISTING CROSS SECTIONS**
SEDIMENT REMEDIATION **SHEET 30 OF 40**
TRIBUTARY D-1-7 TO NEVERSINK RIVER, HUGUENOT, NEW YORK
APPLICANT: NYSDEC. USACE PRE-APPLICATION # NAN-2021-01201-EMI

Date: 2023-02-10

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Figure: X-01.3

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NOTES:
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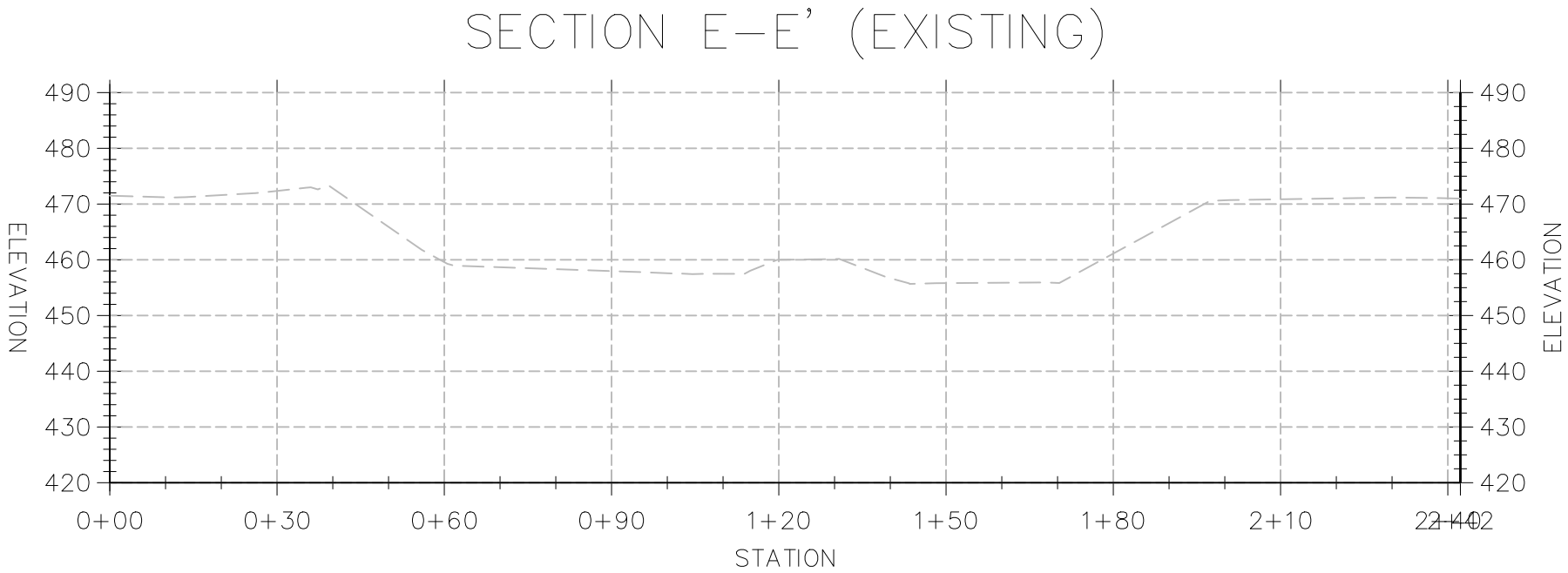

15 0 30
GRAPHIC SCALE 1" = 30'

Issue Status: DRAFT

FORMER C&D POWER SYSTEMS, SITE NO. 336001 **EXISTING CROSS SECTIONS**
SEDIMENT REMEDIATION **SHEET 31 OF 40**
TRIBUTARY D-1-7 TO NEVERSINK RIVER, HUGUENOT, NEW YORK
APPLICANT: NYSDEC. USACE PRE-APPLICATION # NAN-2021-01201-EMI

Date: 2023-02-10

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Figure: X-01.4

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NOTES:
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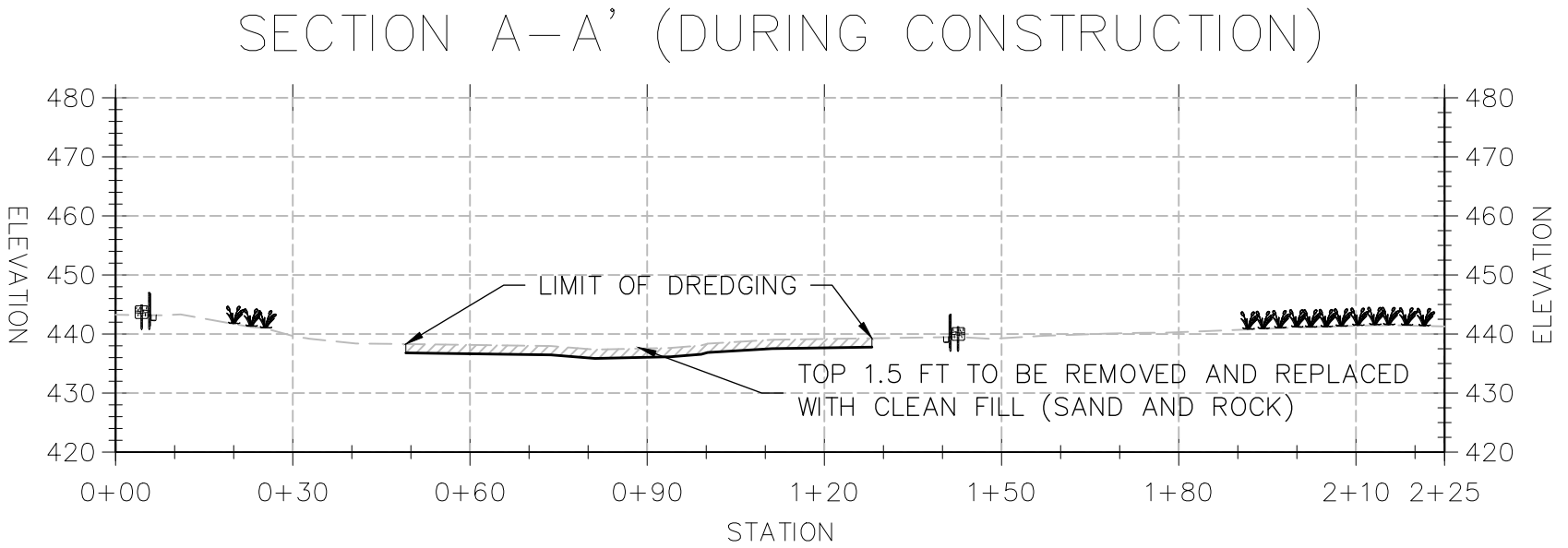

10 0 20
GRAPHIC SCALE 1" = 20'

Issue Status: DRAFT

FORMER C&D POWER SYSTEMS, SITE NO. 336001 **DURING CONSTRUCTION CROSS SECTIONS**
SEDIMENT REMEDIATION **SHEET 32 OF 40**
TRIBUTARY D-1-7 TO NEVERSINK RIVER, HUGUENOT, NEW YORK
APPLICANT: NYSDEC. USACE PRE-APPLICATION # NAN-2021-01201-EMI

Date: 2023-02-10

AECOM

Figure: X-02.1

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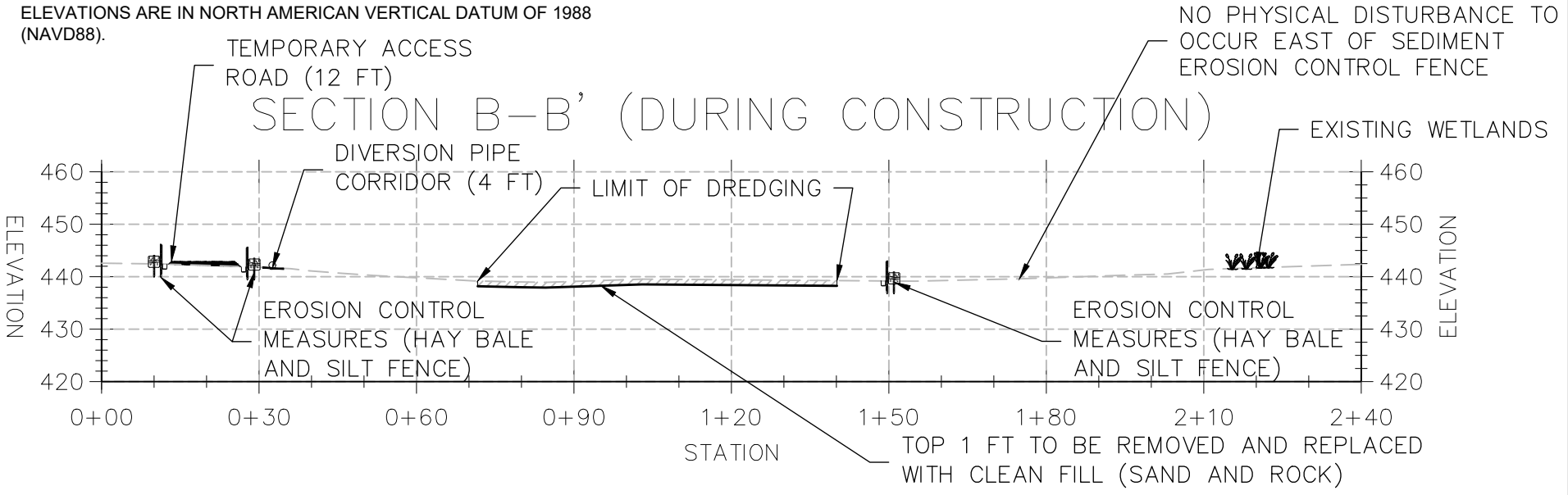
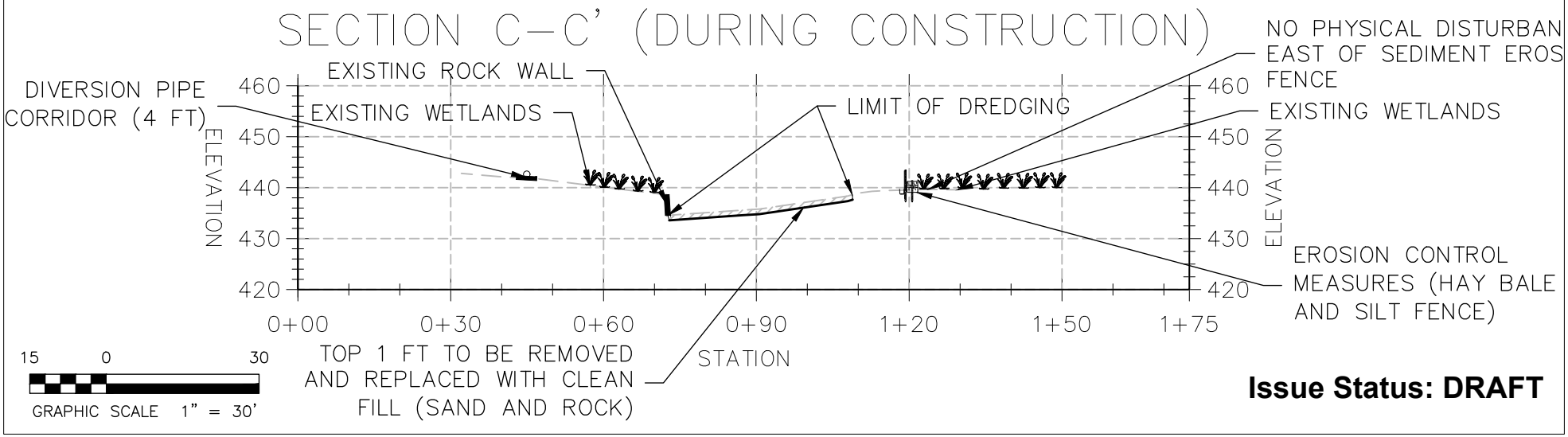
NOTES:
1. ELEVATIONS ARE IN NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88).





Issue Status: DRAFT

FORMER C&D POWER SYSTEMS, SITE NO. 336001 **DURING CONSTRUCTION CROSS SECTIONS**
SEDIMENT REMEDIATION **SHEET 33 OF 40**
TRIBUTARY D-1-7 TO NEVERSINK RIVER, HUGUENOT, NEW YORK
APPLICANT: NYSDEC. USACE PRE-APPLICATION # NAN-2021-01201-EMI

Date: 2023-02-10

AECOM

Figure: X-02.2

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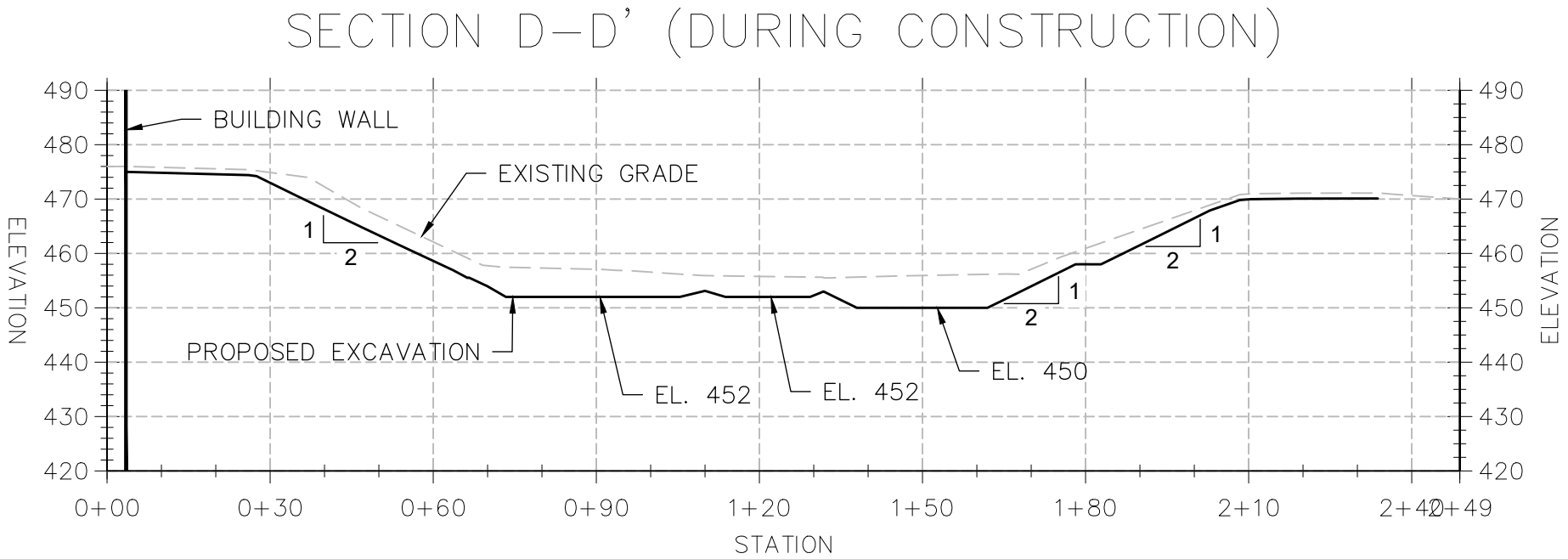

15 0 30
GRAPHIC SCALE 1" = 30'

Issue Status: DRAFT

FORMER C&D POWER SYSTEMS, SITE NO. 336001 **DURING CONSTRUCTION CROSS SECTIONS**
SEDIMENT REMEDIATION **SHEET 34 OF 40**
TRIBUTARY D-1-7 TO NEVERSINK RIVER, HUGUENOT, NEW YORK
APPLICANT: NYSDEC. USACE PRE-APPLICATION # NAN-2021-01201-EMI

Date: 2023-02-10

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Figure: X-02.3

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NOTES:
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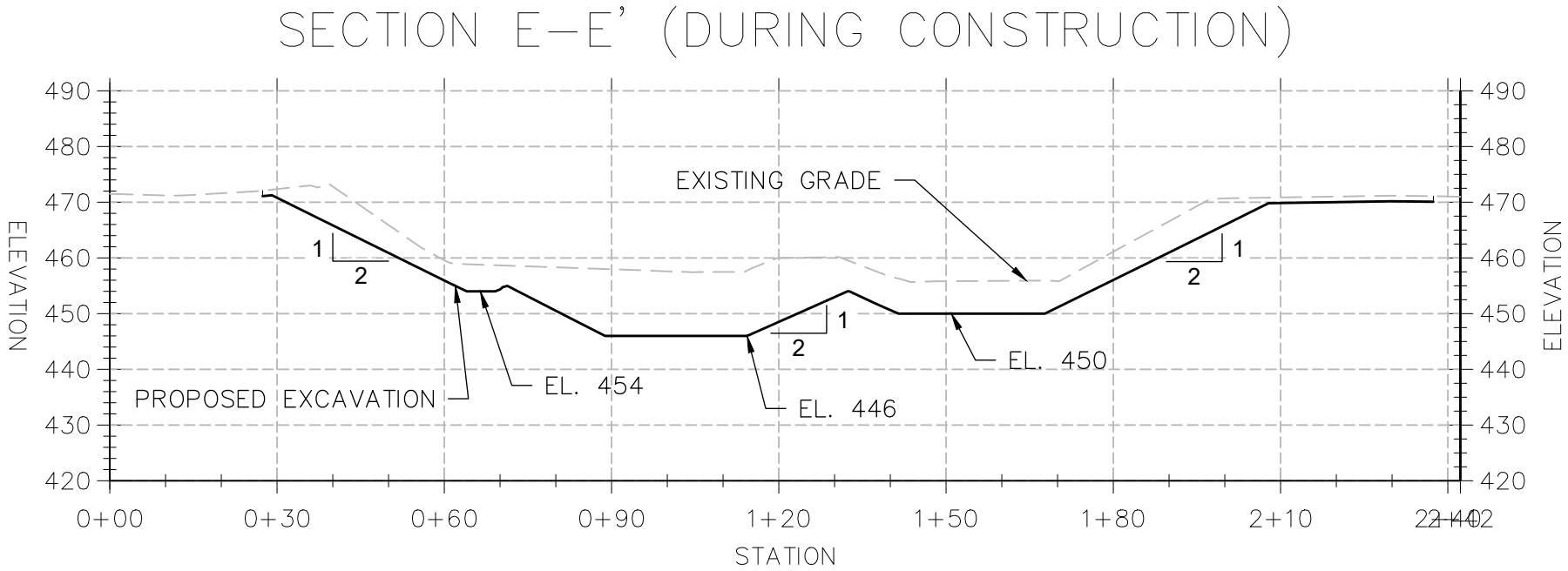

15 0 30
GRAPHIC SCALE 1" = 30'

Issue Status: DRAFT

FORMER C&D POWER SYSTEMS, SITE NO. 336001 **DURING CONSTRUCTION CROSS SECTIONS**
SEDIMENT REMEDIATION **SHEET 35 OF 40**
TRIBUTARY D-1-7 TO NEVERSINK RIVER, HUGUENOT, NEW YORK
APPLICANT: NYSDEC. USACE PRE-APPLICATION # NAN-2021-01201-EMI

Date: 2023-02-10

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Figure: X-02.4

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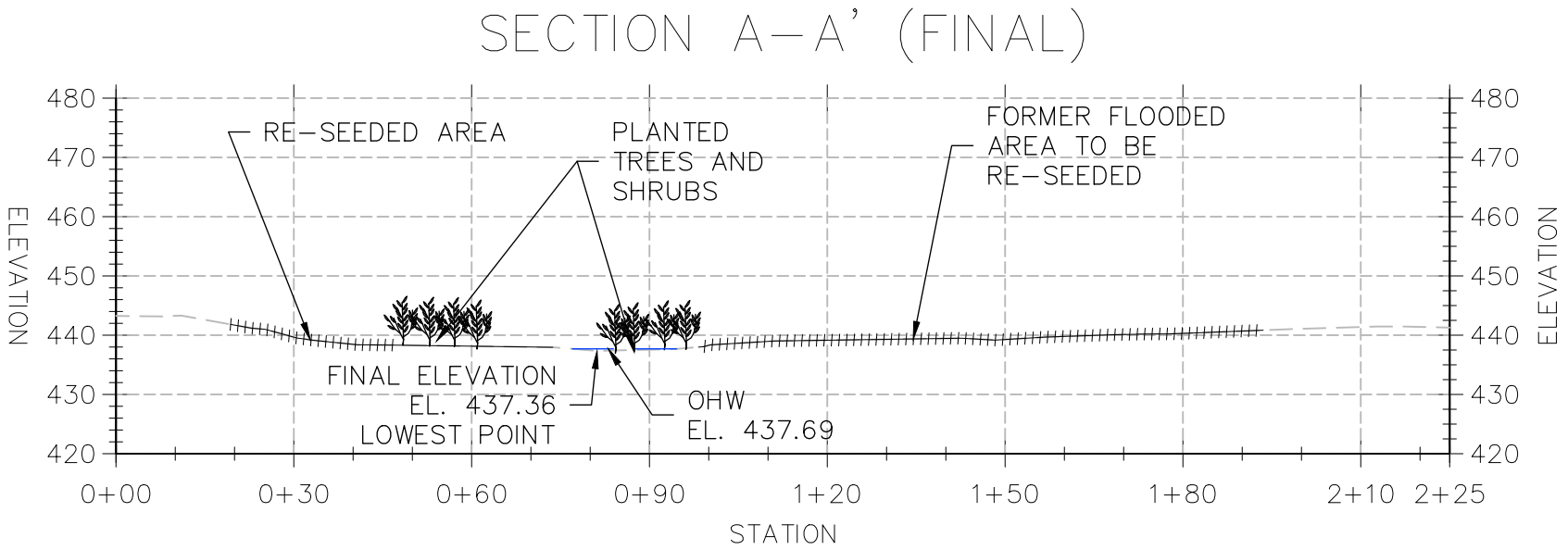
NOTES:
1. ELEVATIONS ARE IN NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88).



10 0 20
GRAPHIC SCALE 1" = 20'

Issue Status: DRAFT

FORMER C&D POWER SYSTEMS, SITE NO. 336001 **FUTURE CONDITION CROSS SECTIONS**
SEDIMENT REMEDIATION **SHEET 36 OF 40**
TRIBUTARY D-1-7 TO NEVERSINK RIVER, HUGUENOT, NEW YORK
APPLICANT: NYSDEC. USACE PRE-APPLICATION # NAN-2021-01201-EMI

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Figure: X-03.1

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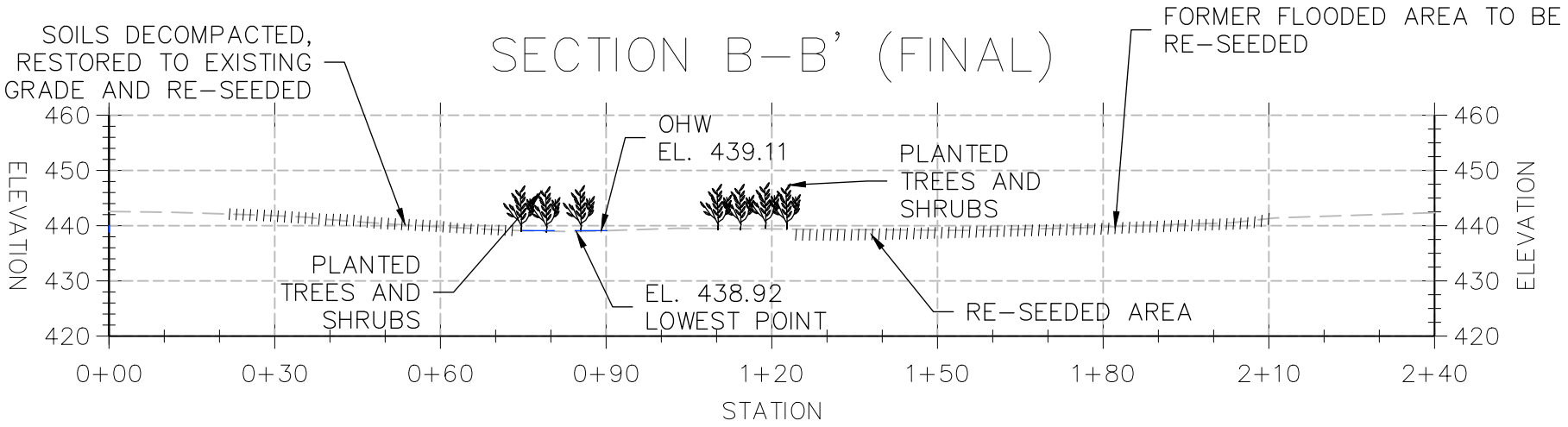

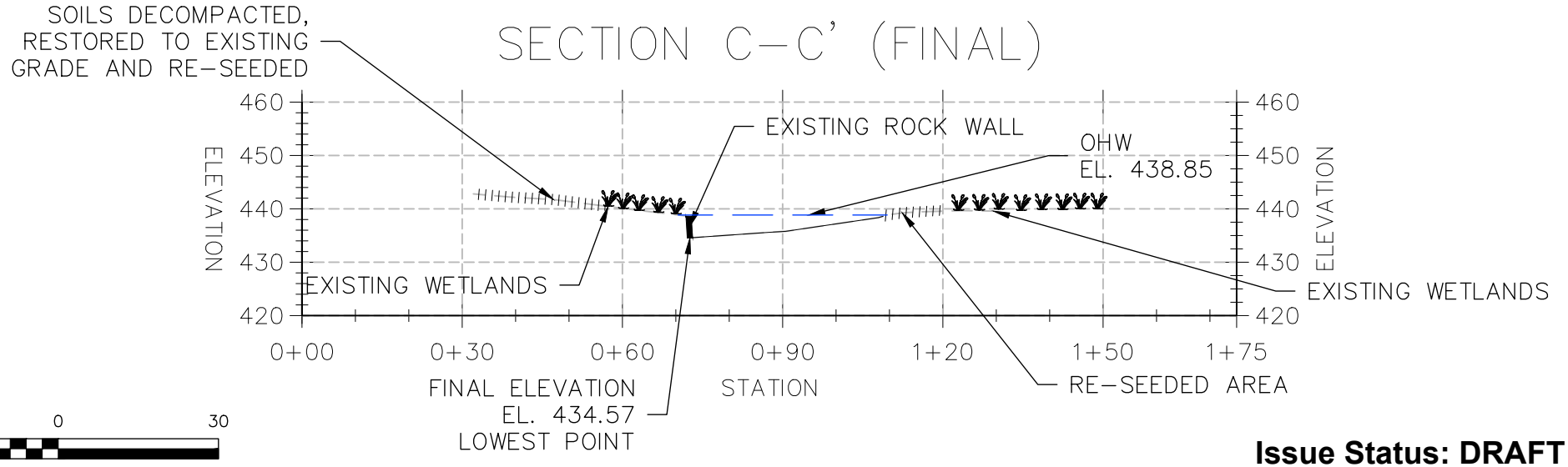

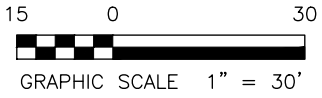

Issue Status: DRAFT

FORMER C&D POWER SYSTEMS, SITE NO. 336001 **FUTURE CONDITION CROSS SECTIONS**
SEDIMENT REMEDIATION **SHEET 37 OF 40**
TRIBUTARY D-1-7 TO NEVERSINK RIVER, HUGUENOT, NEW YORK
APPLICANT: NYSDEC. USACE PRE-APPLICATION # NAN-2021-01201-EMI

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Figure: X-03.2

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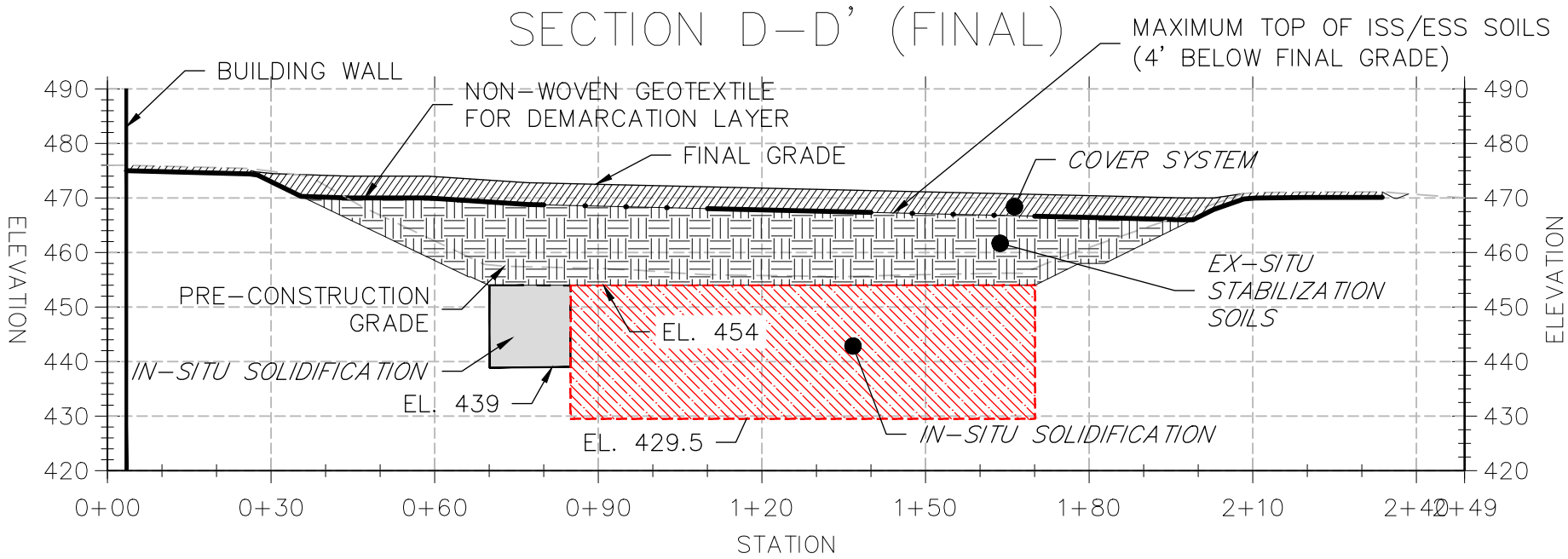

15 0 30
GRAPHIC SCALE 1" = 30'

Issue Status: DRAFT

FORMER C&D POWER SYSTEMS, SITE NO. 336001 **FUTURE CONDITION CROSS SECTIONS**
SEDIMENT REMEDIATION **SHEET 38 OF 40**
TRIBUTARY D-1-7 TO NEVERSINK RIVER, HUGUENOT, NEW YORK
APPLICANT: NYSDEC. USACE PRE-APPLICATION # NAN-2021-01201-EMI

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Figure: X-03.3

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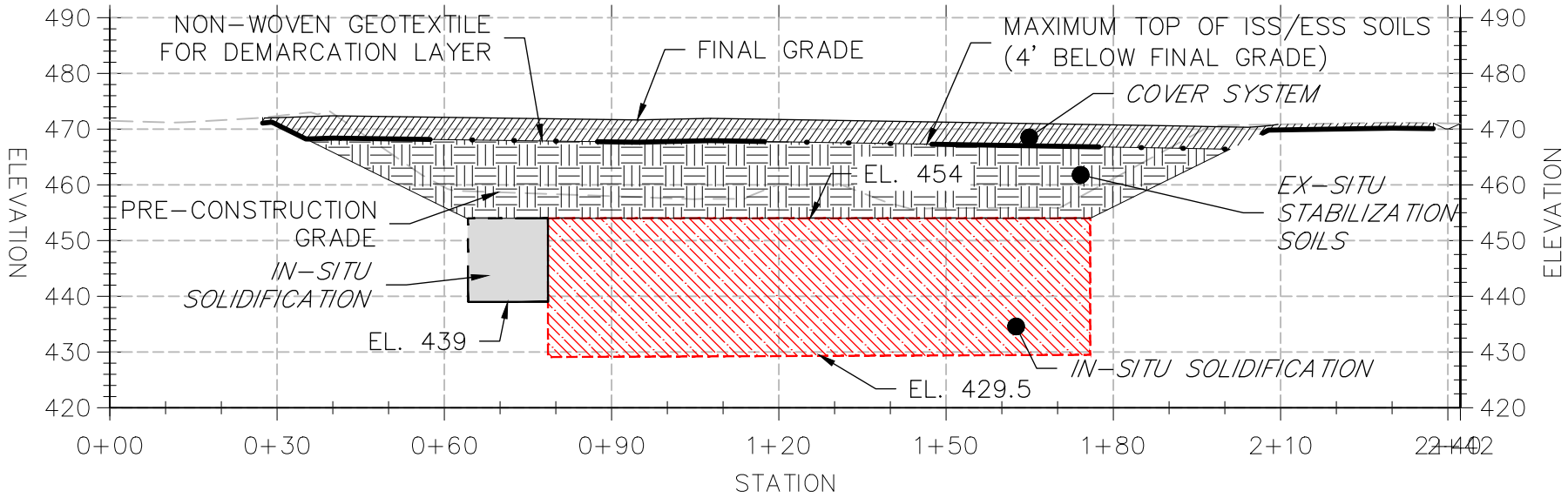
NOTES:
1. ELEVATIONS ARE IN NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88).

SECTION E–E' (FINAL)



15 0 30
GRAPHIC SCALE 1" = 30'

Issue Status: DRAFT

FORMER C&D POWER SYSTEMS, SITE NO. 336001 **FUTURE CONDITION CROSS SECTIONS**
SEDIMENT REMEDIATION **SHEET 39 OF 40**
TRIBUTARY D-1-7 TO NEVERSINK RIVER, HUGUENOT, NEW YORK
APPLICANT: NYSDEC. USACE PRE-APPLICATION # NAN-2021-01201-EMI

Date: 2023-02-10

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Figure: X-03.4

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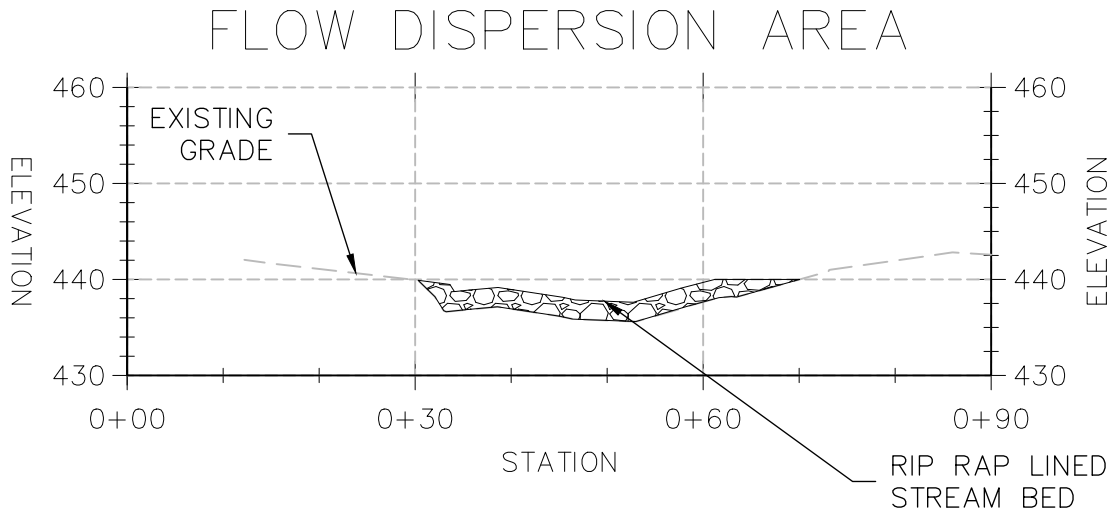
NOTES:

1. CONTRACTOR TO SUBMIT HEADWATER AND TAILWATER DAM MATERIAL SIZING AND EQUIPMENT SCHEDULE FOR APPROVAL BY THE ENGINEER.
2. TYPICAL MATERIAL TO BE USED INCLUDES:
   - 2.1. HDPE PIPES PLACED ON GRAVEL BED
   - 2.2. COFFERDAM TO BE CONSTRUCTED WITH SUPERSACKS, TURBIDITY CONTROL LINER, AND PVC LINER OR SIMILAR AS APPROVED BY ENGINEER.
3. ALL MATERIAL TO BE REMOVED UPON COMPLETION.



10 0 20

GRAPHIC SCALE 1" = 20'

Issue Status: DRAFT

FORMER C&D POWER SYSTEMS, SITE NO. 336001
SEDIMENT REMEDIATION
TRIBUTARY D-1-7 TO NEVERSINK RIVER, HUGUENOT, NEW YORK
APPLICANT: NYSDEC. USACE PRE-APPLICATION # NAN-2021-01201-EMI

TAILWATER DAM
SHEET 40 OF 40

Date: 2023-02-10

AECOM

Figure: X-04

Supplemental Information Packet

C&D Power Systems, Site No. 336001
Joint Permit Application
Huguenot, NY

New York State Department of Environmental Conservation –
Division of Environmental Remediation

USACE Pre-Application # NAN-2021-01201-EMI

Prepared for New York State Department of Environmental Conservation
AECOM Project number: 60628872

13 March 2023

Quality information

Prepared by	Checked by	Verified by	Approved by
John Rollino	Andrew Martin	Robert Forstner	Amit Haryani
Environmental Lead	Senior Scientist	Lead Verifier	Project Manager

Revision History

Revision	Revision date	Details	Authorized	Name	Position
V1.0	19-Oct-2020	Submission	19-Oct-2020	Amit Haryani	Project Manager
V1.1	26-Oct-2022	Revised Internal Draft			
V1.2	3-Mar-2023	Internal Draft			
V2.0	13-Mar-2023	Revised Submission	03-Mar-2023	Amit Haryani	Project Manager

Prepared for:

New York State Department of Environmental Conservation – Department of Remediation
625 Broadway, 12th Floor
Albany, NY 12233

Prepared by:

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125 Broad St, 15th Fl.
New York, NY 10004

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Figures

Tables

Appendices

This document provides supplemental information to support the joint permit application (JPA) to the US Army Corps of Engineers (USACE) and the New York State Department of Environmental Conservation (NYSDEC) for the remediation activities for the C&D Power Systems Site (Project) (NYSDEC Site No. 336001) in Huguenot, Orange County, New York (NY). It is anticipated that this work will be authorized using the United States Army Corps of Engineers (USACE) Nationwide Permit (NWP) #38 (NWP38) for Cleanup of Hazardous and Toxic Waste. The supplemental information to the JPA includes associated forms, relevant agency correspondence, and technical reports.

A previous application for remediation of this site was submitted by NYSDEC on October 19, 2020. Permits issued in response to this initial submission are attached to this packet as Appendix H, including NYSDEC Water Quality Certification No. 3-3328-00040/00032, and approval by 2017 USACE Nationwide Permit Conditions. Design has changed from the original submission, necessitating a resubmission.

1 Introduction

The New York State Department of Environmental Conservation's Division of Environmental Remediation (NYSDEC DER) is planning to remediate the C&D Power Systems (C&D) Site (NYSDEC Site No. 336001) in Huguenot, Orange County, NY (see **Figure 1**). AECOM has been hired as the environmental design consultant that is responsible for developing the plans, specifications and permit applications for the proposed project.

All site photos referenced in text are included in Appendix A – Site Photos.

1.1 C&D Facility and Setting

From 1959 to approximately 1970, the facility was owned and operated by the Empire Tube Company (ETC), a manufacturer of black and white picture tubes. Hydrofluoric acid was used in the manufacturing process to remove carbon and potassium silicate from the inside of the tubes. During this period, industrial wastewater was discharged to a man-made discharge treatment pit, hereafter referred to as the waste lagoon[1] adjacent to the northeastern corner of the plant building. C&D Technologies Incorporated operated at the facility manufacturing industrial lead batteries from the mid-1970s to 2006. From the mid- 1970s until approximately 1982, C&D discharged non-contact cooling water into the waste lagoon.

The main site features include an existing large industrial building formerly used for the manufacturing of lead batteries that is currently unoccupied, as well as a 175-feet (ft) diameter

[1] The waste lagoon is dry. Any former conveyance from the facility to the stream was plugged many years ago. During the wetland delineation in Spring 2020 the waste lagoon was investigated and determined to not have hydric soils, wetland hydrology, and/or a dominance of hydric vegetation. The habitat of the waste lagoon is therefore not considered in detail in this document.

waste lagoon, located approximately 75 ft northeast of the former industrial building. The existing C&D buildings and waste lagoon area are immediately surrounded by parking lots and paved roads.

Approximately 200 ft east and south of the waste lagoon there is a steep cliff slope some 35 feet in height. At the toe of the slope there are the waters of Tributary D-1-7 (the tributary). The streambed of the tributary was impacted by historic releases from the plant, and a 1,142-linear foot (LF) long segment of the tributary adjacent to the plant is considered part of the site and targeted for remediation via mechanical removal of contaminated sediments.

The tributary was historically a shallow body of water that flowed in a stream bed approximately 20 ft in width. Review of historical aerial photographs showed that the water within the bed was generally a few feet in width with a likely depth less than one foot. Swartwout Road (Photo 1), a stream crossing within the site, had a 12-inch-wide culvert to convey the tributary under the road. Several years ago, the culvert failed and caused water to impound upstream; moreover, another crossing, colloquially called the Southern Crossing, located approximately 300 ft south of Swartwout Road, also failed, further compounding the upstream impounding. As of Fall 2022, the waters associated with the tributary have a width of over 175 ft in some locations. The impounded waters are flooding former agricultural fields, maintained lawns, and in some instances formerly vegetated wetlands.

Work within the riverbed is planned to be carried out under a USACE Nationwide Permit #38 for Cleanup of Hazardous and Toxic Waste (NWP38). Remedial excavation activities in the waste lagoon will begin on a schedule not related to permitting.

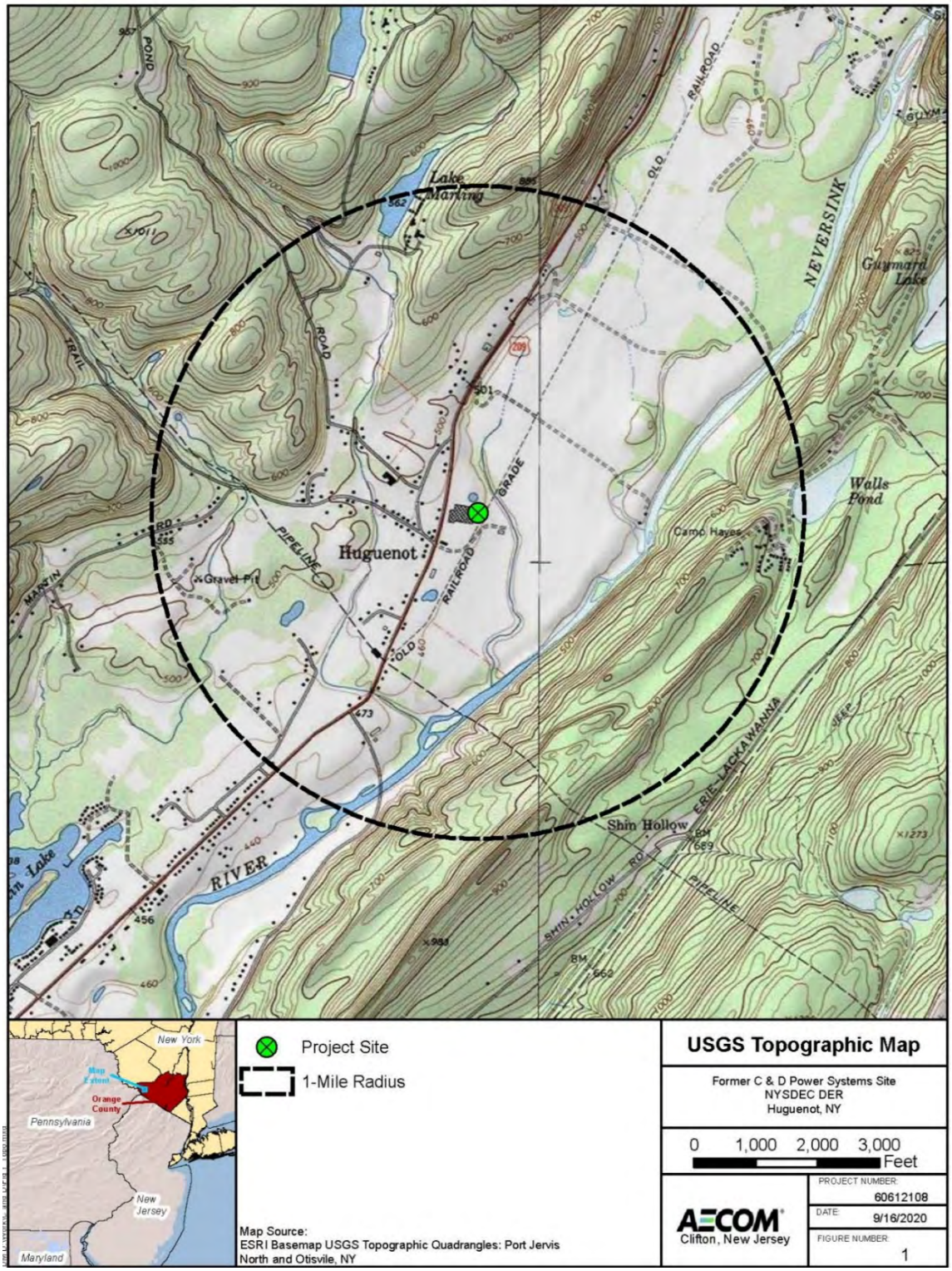

Figure 1 Project Area

1.2 Remedial Action and Record of Decision

The facility was formerly permitted to operate as a treatment, storage and/or disposal (TSDF) facility under the Resource Conservation and Recovery Act (RCRA) hazardous waste management program. The Site has been included in the USEPA's tracking system under the Government Performance and Results Act (GPRA) for corrective action. The RCRA Corrective Action Program requires investigation and cleanup of releases of hazardous wastes and hazardous constituents that pose an unacceptable risk at RCRA hazardous waste treatment, storage and disposal facilities. This site has not yet met indicators to show compliance with RCRA Corrective Action requirements. The contaminants of concern are barium, cadmium, fluoride, lead, and polychlorinated biphenyl (PCB) Aroclor 1254.

In March 2015, NYSDEC signed a Record of Decision (ROD), *C&D Power Systems (C&D Batteries) State Superfund Project/RCRA Project Deer Park, Orange County Site No. 336001 EPA ID #NYD064337298* which selected a remedy for C&D Power Systems Site Operable Unit (OU) Number 01, the unsaturated waste lagoon soils. The ROD outlined a set of remedial actions for the site that included excavation and disposal of the contaminated sediments in the tributary and the top six to eight ft (21 ft to 23 ft below surrounding grade [bsg]) of the contaminated waste lagoon soil and ex-situ stabilization of the remaining contaminated unsaturated waste lagoon soil. It should be noted that the waste lagoon area does not hydrologically connect to the tributary and does not have hydric soils, wetland hydrology, or a dominance of wetland vegetation. Remedial excavation activities in the waste lagoon will begin on a schedule not related to the NWP38 permitting.

1.3 Regulated Activities

NYSDEC DER is submitting permit applications to obtain authorization to excavate within the streambed of the tributary. Contaminated stream sediment will be removed from the tributary to a depth of 12 to18 inches along approximately 1,132 linear ft of stream bed as shown on **Figure 2**. Approximately, 2,280 cubic yards (CY) of sediment will be removed[2] and replaced by clean 1:1:1 mix of sand:gravel:cobble materials. The removal of sediment to a depth of 12 to 18 inches would achieve Soil Cleanup Goals (SCGs) for protection of the environment and would be expected to meet residential Soil Cleanup Objectives (SCOs). The excavated sediment will be stabilized and direct loaded into trucks for off-site disposal at an approved permitted facility.

[2] The ROD initially identified 2,175 cu yds to be removed; however, follow up sampling conducted in 2020 determined that removal of up to 18 inches depth was needed in some areas to remove contamination, and an estimated 2,280 cu yds will be removed. While the excavation area is similar to that of the ROD, the deeper excavation of sediments accounts for the increased volume.

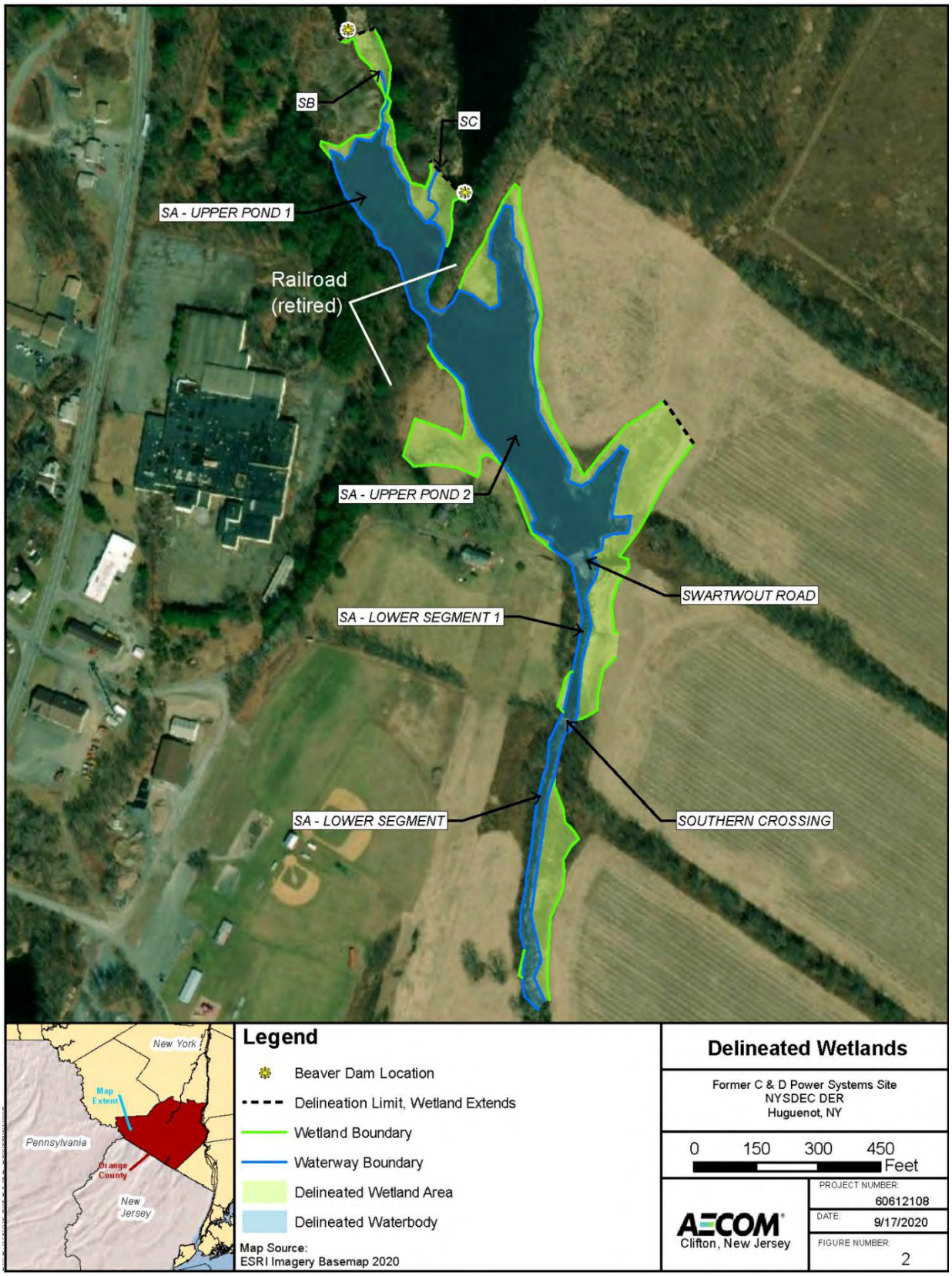

Figure 2 Delineated Wetlands

2 Project Construction Activities

The activities subject to NWP authorization are detailed in Subsections 2.1 to 2.2. Please refer to Permit Drawings for relevant details. Please refer to Permit Drawings for location of work and further details. Tree removal is anticipated to be limited to an incidental clearing of 0 to 5 smaller trees in a margin areas between mown turf and the tributary on the west side of the tributary, as required for access for excavation. Tree removal will be minimized and trees and steam bank habitat will be protected to the maximum extent possible while still achieving Project goals.

2.1 Culvert Improvement [Spring 2023]

In an attempt to return Tributary D-1-7 to previous water levels, the failed Southern Crossing was removed and the collapsed culvert at the Swartwout Road crossing was replaced in May 2021 by a contractor retained by NYSDEC. Based on the field observations made by AECOM on September 16, 2022, during the wetlands condition verification site visit (detailed in Appendix F), the upstream side of the replacement culvert at Swartwout Road crossing was found to be covered in mud and woody debris, having either collapsed or become clogged. Water flow through the culvert was observed to be minimal and conditions upstream of the culvert were identical to those seen in 2020, with the width of the tributary upstream of this culvert in excess of 175 ft.

In Spring of 2023 (i.e., ahead of the commencement of construction activities), a contractor will remove/replace the culvert at the Swartwout Road crossing. The effective replacement of the culvert function would allow the currently-impounded areas to drain prior to the anticipated construction in Summer 2023.

The current Swartwout Road crossing will be removed with conventional excavation equipment, means and methods. The NYSDEC will utilize a Call-Out Contractor to remove the deteriorated/partially blocked culvert structures. The selected Contractor will select their own means and methods for managing the bypass of flow around each structure and management of sediment in conformance with the NY State Standards and Specification for Erosion and Sediment Control, “The Blue Book”, which shall be subject to NYSDEC Division of Environmental Remediation review and approval prior to mobilization.

Removal/replacement of the deteriorated/partially blocked culvert structures will provide a stream channel equivalent to that currently present downstream of each structure, such that stream flow capacity shall be restored and any artificially impounded water will be allowed to recede. It is anticipated that this will restore conditions in the Project Area to historic dry and stable conditions allowing construction equipment to approach the remediation areas with minimal stabilization and dewatering beyond by-pass pumping of the stream around the work area.

2.2 Excavation of Contamined Sediments [Summer – Fall 2023]

An estimated 2,280 cubic yards of contaminated sediments will be excavated from the channel of Tributary D-1-7. Excavation would be over an area of 58,840 square feet (SF) and a stream length of 1,062 LF. Excavation of sediments would be accomplished by mechanical methods. On the west bank of the tributary there is a large flat area on which a gravel haul road (with turnaround loop) would be constructed (see attached Permit Drawings for the proposed construction footprint and general layout).

Excavation would be conducted with a temporary bypass to be installed to divert stream flow around the work area as described below. There will be onsite dewatering and treatment of construction water in upland areas. After the target area is sufficiently dewatered, the impacted sediments will be excavated, stabilized ex-situ, and disposed off-site at an approved permitted facility. Typical equipment will include 70,000-lb excavators (2-3 machines), 20,000 to 30,000-lb off-road haul trucks (2-4 trucks), a 25,000 to 35,000-lb front end loader, and a 25,000 to 35,000-lb bulldozer. Additionally, 51,000 to 80,000-lb long-haul trucks would be used to transport sediments off site. In between the excavation area and haul road, temporary construction mats will be placed to support the construction vehicles. Prior to leaving the site, all vehicles will travel on an installed gravel haul road, to the decontamination pad, and then on to the paved roads of Orange County.

This work will be sequenced as follows:

1. Construct onsite haul and access roads.
2. Construct stockpile pads and construction water treatment plant in upland areas.
3. Install bypass pump system and dewater sediment removal area.
4. Removal of contaminated sediments: excavate impacted sediments, transfer to stockpile pad for dewatering/amending, direct load in trucks for off-site disposal at an approved permitted facility.
5. Backfill and restore dewatered areas.
6. Removal of bypass pump system.
7. Remove temporary haul roads and stockpile pads and restoration of upland areas.

It is envisioned that access and staging would result in temporary impacts to 4,170 SF of existing waterbody (streambed to be exposed due to culvert improvements detailed in Section 2.1 – Culvert Improvement) and 2,620 SF of existing wetland habitat (per delineation conducted in 2020, detailed in Section 4.2 and shown in attached Permit Drawings). It should be noted that all of the Waters of the United States and associated wetlands that will be temporarily impacted by haul and access roads were likely created in the last few years by impounded waters from the failed culvert under Swartwout Road. All disturbed areas will be restored as detailed on the attached drawings and discussed in Section 6.

Excavation of the stream will require diverting the flow into a temporary pipeline to transport water downstream past the remediation area. The diversion pipe would measure approximately 1,200 feet in length, with an assumed diameter of 24 inches. At the narrows formed by the historical filling related to the former rail line, a temporary dam would be placed to collect the water and divert it into the pipe. The dam would be placed within the footprint of the waters of the pond, which is expected to be at a much lower ordinary high water (OHW) level at the time the diversion is installed following the earlier removal of the road crossings causing the impoundment. The temporary dam will be placed to avoid impacting any vegetated wetlands. The pipe would convey water to a point sufficiently downstream of the work area so as to allow for discharge without backwater returning into the downstream end of the remediation area.

Excavated sediments will be passively dewatered on-site. Dewatering effluent from active excavations will be pumped to a temporarily permitted (State Pollutant Discharge Elimination System (SPDES)-equivalent) water treatment plant for treatment prior to discharge. The decant fluids from passive dewatering will be directed to an approximately 18,000-gallon weir tank for initial settlement, then through a temporary system consisting of bag filtration and, if needed (determined via influent and effluent sampling of the treatment system by the contractor prior to the initiation of discharge of treated water to Tributary D-1-7), granular activated carbon and cartridge filters. Ultimately, the treated effluent will flow to an approximately 21,000-gallon frac tank to equalize flow and provide a limited volume of storage prior to discharge to the receiving stream. Contractor will prepare and submit a Storm Water Pollution Prevention Plan (SWPPP) (or equivalent) documentation that meets the substantive requirements of NYSDEC SPDES GP 02-01 prior to mobilization.

After excavation is finished, the stream bed will be restored with 2,280 CY of a 1:1:1 mixture of clean sand:gravel:cobble fill obtained from an approved natural deposit, modified only for removal of fines and large particles. In addition, approximately 0.6 acres of woody vegetation trees will be planted along the stream bank, and approximately 6.1 acres of the formerly flooded areas will be reseeded with a wetland and/or riparian seed mix. These restoration activities are described in greater detail in Section 6.

Table 1 identifies volumes of excavation for the proposed remedial activities located in regulated areas:

Table 1 Quantities of Excavation within Regulated Areas

Item	Volume (CY)	Area (SF)
Impacts		
Total Excavation Volume	2,280	58,840
Total Permanent Fill (replacement of excavated stream bed materials with clean fill) in Open Waters of the United States	2,280	58,840
Total Permanent Fill (replacement of excavated stream bed materials with clean fill) in Freshwater Wetlands	0	0
Total Temporary Fill (placement of haul roads, piping, dams, laydown areas in Waters of the United States	154	4,170

Total Temporary Fill (placement of haul roads, piping, dams, laydown areas in Freshwater Wetlands	97	2,620
Restoration		
Streambed Restoration	-	25,865
Planting: Woody Vegetation Buffer Zone (planting & seeding)	-	25,445
Seeding to Establish Herbaceous Vegetation Upland of Woody Vegetation Buffer Zone	-	170,942

As stated previously, the waste lagoon work is located entirely in upland areas and, on its own, does not require permitting pursuant to NWP38. However, the scope of the waste lagoon work is described herein and in the project permitting documents for purposes of depicting the full scope of remedial work planned to occur.

This waste lagoon remediation located in upland areas will be sequenced as follows:

1. Clearing and grubbing necessary to complete the work.
2. Approximately 3,300 CY of soil containing 50 mg/kg PCBs or greater is expected to be excavated and direct loaded into trucks for off-site disposal at an approved facility.
3. Surficial soils containing lead from landscaped and paved areas of the Site will be consolidated and stabilized with the waste lagoon soils
4. Approximately 630 CY of soil with PCB concentrations between 1 and 50 mg/kg from wooded areas is expected to be removed, stabilized and consolidated in the bottom of the waste lagoon prior to capping.
5. Less than 1 CY of sediment containing between 1 and 10 mg/kg PCBs is expected to be removed, stabilized and consolidated in the bottom of the waste lagoon as part of the vault and Shed floor cleanout activities.
6. PCB-impacted material with PCB concentrations below 50 mg/kg excavated from the Site and placed in the bottom of the waste lagoon will be consolidated with shallow lead-impacted soil from above and stabilized in-situ along with soil beneath the waste lagoon to a depth of 35 feet bgs.
7. Following completion of excavation and ISS in the waste lagoon, a clean soil and asphalt pavement cap will be placed in the waste lagoon.

3 Alternatives

The required work is location-specific. As such, alternative sites were not considered.

Layout of work at the site has been revised to avoid high value and regulated areas to the greatest extent practicable, e.g., temporary access roadways were re-designed to avoid wetland disturbance outside of the remedial boundary, and the support staging areas have been located within the upland site boundary and have been moved to avoid and protect cultural resources.

4 Environmental Setting

The project location is a small stream corridor bordered by lawns, agricultural fields, and other natural areas. The C&D facility itself is owned by a private entity, while the entirety of lands downstream along the tributary throughout the work area are owned by Orange County. Immediately adjacent property owners are limited to municipal facilities (e.g., police station, etc., ball fields, etc.).

4.1 Cultural Resources

Sensitive archaeological areas, although not identified within the site proper, are identified in areas needed to access to the work area. NYSDEC DER is supportive of avoidance and protection measures detailed within this report, as no intrusive work (groundbreaking) in necessary in the areas of sensitivity. USACE, under its Section 106 responsibility, will include consultation with Indian Nations, as part of the Joint Application Permit process.

All cultural resource reports and agency responses referenced in this section are attached to this packet in Appendix G.

On October 23, 2020, AECOM, on behalf of NYSDEC DER, submitted a consultation initiation package to the New York State Historic Preservation Office (SHPO) describing the project and requested SHPO's recommendations on next steps in the Section 106 compliance process. SHPO replied on November 9, 2020 and recommended that a Phase IA/IB archaeological survey be conducted, in lieu of a memorandum documenting extensive prior subsurface disturbance to the project site (Perazio 2020). The Phase IA documentary survey report was completed in January 2021. The results of the Phase IA assessment concluded that the Project Area possessed archaeological sensitivity for prehistoric (precontact) and historic resources and recommended that a Phase IB subsurface presence/absence testing survey be conducted. On January 21, 2021, SHPO concurred with the Phase IA recommendation for a Phase IB survey.

The Phase IB scope of work for a shovel test pit (STP) survey was prepared in consultation with SHPO and NYSDEC DER and conducted during July 2021. The STP survey consisted of manual testing on a 15-meter (50-foot) pre-plotted grid. A total of 45 STPs were pre-plotted along seven

transects labeled Transect A through Transect G. Due to field conditions at the time of the Phase IB survey, five of the 45 pre-plotted STPs were not excavated. Of the 40 STPs excavated, eight were positive for cultural material. Each positive STP location was further investigated through the excavation of eight radial STPs, for a total of 64. Therefore, the total number of STPs excavated during the Phase IB survey is 104. Thirty-four of the 64 radial STPs were also positive for cultural material.

A total of 116 artifacts were recovered during the Phase IB survey from 42 of the 104 STPs excavated. Of this total, 101 were precontact artifacts, and 15 were historic artifacts. The precontact artifact assemblage includes fire cracked rock (FCR) (n=6), debitage (n=93), a manuport (n=1), and a unifacial stone tool (n=1). All artifacts were recovered from Ap and A horizon contexts. No precontact features such as hearths, storage pits or earth ovens for cooking were identified during the Phase IB STP survey. The 15 historic artifacts recovered represent a scatter of historic material likely related to 19th through 20th-century occupation of the area.

Subsequently, based on the guidance received during the phone conversation between Ms. Jessica Schreyer (Scientist Archaeology, SHPO) and Mr. Benjamin Rung, NYSDEC on October 13, 2021, a Supplemental Phase IB STP survey was undertaken of the areas located to the west of the proposed sediment handling area on October 27 and 28, 2021. The STP survey consisted of manual testing on a 15-meter (50-foot) pre-plotted grid. A total of 21 STPs were pre-plotted along six transects labeled Transect H through Transect M. Of the 21 STPs excavated, two were positive for cultural material. Each positive STP location was further investigated through the excavation of eight radial STPs, for a total of 16. Therefore, the total number of STPs excavated during the Supplemental Phase IB STP survey was 37. Five of the 16 radial STPs were also positive for cultural material.

A total of 14 artifacts were recovered during the Supplemental Phase IB survey from seven of the 37 STPs excavated. Of this total, 12 were precontact artifacts, and 2 were historic artifacts. The precontact artifact assemblage includes FCR (n=1), debitage (n=10), and a partial projectile point tool (n=1). All artifacts were recovered from Ap plow zone contexts. No precontact features such as hearths, storage pits or earth ovens for cooking were identified during the Phase IB STP survey. The 2 historic artifacts recovered represent a scatter of historic material likely related to 19th through 20th-century occupation of the area.

It is noted that no temporally or culturally diagnostic precontact artifacts such as dateable projectile points and pottery were recovered in any of the positive STPs during either of the Phase 1B STP surveys. In other words, it was not possible to assign dates or tribal affiliations to the precontact artifacts recovered. In addition, no precontact features such as hearths, storage pits or earth ovens for cooking were identified during either of the Phase IB STP surveys. However, FCR of quartzite and sandstone indicate the potential for hot-rock cooking (i.e., earth ovens) or heating facilities (i.e., hearths) in the area, although no such features were identified in the field.

The Phase IB artifact analysis has indicated that there are five areas of precontact archaeological sensitivity within the C&D Power Systems Site Sediment Removal Project Survey Area. The five areas of archaeological sensitivity were delineated based on the positive STPs, with a 25-foot buffer surrounding each. These areas are shown on Figures 4-1a and 4-1b of the Phase 1B Report (Appendix G). The five areas of sensitivity are summarized below, and each description includes the engineering controls proposed as the Avoidance and Protection Plan for that area of sensitivity.

- Area 1: located in the northern portion of the Survey Area and focused on positive STP F 8 on the west bank of the tributary, north of the agricultural fields. The extent of this area is delineated by documentation of no temporally or culturally diagnostic precontact artifacts at STP F 9 to the south, STP F7 to the north and the APE boundaries to the east and west of the location. STP F 8 is located within the route of the proposed Access Road. The Avoidance and Protection Plan proposed for this area includes the placement of temporary construction mats over the entire delineated boundary of Area 1. The temporary construction matting would consist of interlocking, high-strength DURA BASE® composite material mats or equivalent that are designed for use in environmentally sensitive areas and specifically to avoid ground disturbance and compaction impacts.
- Area 2: located in the southeastern portion of the Survey Area, and includes positive STPs B 3, B 4, C 3, and D 2. Each of the initial positive STPs are within 15 meters (50 feet) of each other along the transect grid. Subsequent to the completion of the Phase 1B sampling in July 2021, the sensitive area including positive STPs B 3, B 4, and C 3 is now excluded from the APE/Project Area. AECOM has relocated the Sediment Staging, Mixing and Drying Area, the Water Treatment System Containment Area, and portion of Access Road further west to areas that do not possess sensitivity. The extent of this area is delineated by documentation of no temporally or culturally diagnostic precontact artifacts at STP C 5, STP C 4 and the APE boundary to the east, STP C 2 and STP B 2 to the north, STP B 3+10W and STP A11 to the west and the APE boundaries to the south of the location. The Avoidance and Protection Plan proposed for this area includes installation of a chain link fence around the boundary of Area 2 as delineated by negative STPs above. Positive STP D 2 is in the eastern portion of Area 2, along the adjacent proposed Access Road. The Avoidance and Protection Plan proposed for this area includes the placement of temporary construction mats over the entire width of the proposed Access Road, running northward as a continuation of the temporary construction matting across Positive STPs D 4 and D 5 (Area 3). The temporary construction matting would consist of interlocking, high-strength DURA BASE® composite material mats or equivalent that are designed for use in environmentally sensitive areas and specifically to avoid ground disturbance and compaction impacts.
- Area 3: located in the southeastern portion of the Survey Area, closest to the southern terminus of the sediment removal zone and includes positive STPs D 4 and D 5. Positive STP D 4 , STP D 5, and their radials are located in the proposed Access Road along the western bank of Tributary D-1-7, and the proposed route of diversion pipe in the Stream Diversion Corridor.

The extent of this area is delineated by documentation of no temporally or culturally diagnostic precontact artifacts at STP D 6 to the south, STP D 1 to the north and the APE boundaries to the east and west of the location. The Avoidance and Protection Plan proposed for this area includes the placement of temporary construction mats over the entire delineated boundary of Area 3. The temporary construction matting would consist of interlocking, high-strength DURA BASE® composite material mats or equivalent that are designed for use in environmentally sensitive areas and specifically to avoid ground disturbance and compaction impacts.

- Area 4: located in the southwestern portion of the supplemental Survey Area, and focused on positive STP J 5, west of the proposed Water Treatment System Containment Area. Radial STPs were excavated and three were positive for precontact cultural material. The extent of this area is delineated by documentation of no temporally or culturally diagnostic precontact artifacts at STP J 5+3S to the south, STP J 5+3E to the east, STP J 5+3N to the north, and STP J 5+3W to the west. The Avoidance and Protection Plan proposed for this area includes installation of a chain link fence around the entire delineated boundary of Area 4.
- Area 5: located in the northwestern portion of the supplemental Survey Area, and focused on positive STP J 2, west of the proposed Sediment Staging, Mixing and Drying Area. Radial STPs were excavated and two were positive for precontact cultural material. The extent of this area is delineated by documentation of no temporally or culturally diagnostic precontact artifacts at STP J 2+3S to the south, STP J 2+3E to the east, STP J 2+3N to the north, and STP I 2 to the west. The Avoidance and Protection Plan proposed for this area includes a combination of the installation of a chain link fence and placement of temporary construction mats over a portion of the delineated boundary of Area 5. The temporary construction matting would consist of interlocking, high-strength DURA BASE® composite material mats or equivalent that are designed for use in environmentally sensitive areas and specifically to avoid ground disturbance and compaction impacts.

The number of precontact artifacts recovered during the Phase IB presence/absence survey suggests the presence of a nearby precontact archaeological site. Given the proximity of previously identified precontact site MRE-TRC-8 (07501.000148), it is probable that the precontact artifacts encountered during the Phase IB survey are associated with that site. Site MRE-TRC-8 (07501.000148) was first encountered and identified in 2016 as a multi-component site, having both precontact and historic components. The prehistoric component of the site consists of a lithic scatter concentrated in the southern portion of the site area. According to the mapping provided in the 2016 Phase IA/IB survey report by TRC Environmental Corp., entitled Phase IA/IB Archaeological Survey of The Eastern System Upgrade Project Orange, Sullivan, And Delaware Counties, New York prepared for the Millennium Pipeline Company, LLC, this southern portion is in proximity to Sensitivity Areas 2 and 3 as identified along Transects B, C, and D through the 2021 Phase IB survey.

Site MRE-TRC-8 (07501.000148) was recommended as potentially eligible for listing in the National Register by TRC in 2016. A site avoidance plan was recommended by TRC. Similar to AECOM's proposed Avoidance and Protection Plan, TRC's proposed plan consisted of covering the entire site area with DURA BASE® construction matting prior to the start of construction.

Although sensitive areas have been identified, none of these areas are subject to intrusive (groundbreaking) work. In accordance with Section 106 guidelines, NYSDEC is supportive of projection and avoidance measures to preserve areas that could be the subject for future research by others. NYSDEC-DER is not in the position to support further research under NYS Superfund Program; however, we understand that concurrence is needed under the provisions of Section 106, including consultation with Indian Nations. The USACE will incorporate consultation with Indian Nations as part of its Section 106 responsibility. For consideration, a protection and avoidance plan is detailed in this document to support moving forward without a Phase 2 Investigation.

The Avoidance and Protection Plan proposed by AECOM on behalf of the NYSDEC includes a combination of installing chain link fence to avoid archaeologically sensitive areas and the placement of temporary construction mats over the areas within the proposed work corridor as a protective measure. The temporary construction matting would consist of interlocking, high-strength DURA BASE® composite material mats or equivalent that are designed for use in environmentally sensitive areas. More specifically, the mats are intended to prevent ground disturbance and compaction impacts. All vehicle traffic at the project site would be accessed over the temporary construction matting using low-pressure, rubber tire vehicles. An excavator would be utilized to install the temporary construction mats and would use an installation method by which the mats are installed ahead of the excavator to ensure that the excavator is always on top of the mats. The temporary construction matting will be removed manually from ground surface once the site work is complete.

The Revised Phase IB Archaeological Subsurface Testing Survey Report was submitted on September 26, 2022 and is currently under review by SHPO. The Revised Phase IB presents the results of the C&D Power Systems Site Sediment Removal Project STP surveys conducted during July 2021 and October 2021. This revision addresses the comments received from SHPO in their response letter dated July 20, 2022 on the Draft Phase IB Report.

Although the proposed work will occur in a site that recommended as potentially eligible for the National Register due to its research potential, NYSDEC DER is not in the position to support further research under NYS Superfund Programs and thus supports an avoidance and protection plan should future research opportunities become available through coordination with SHPO.

Section 106 compliance process guidelines for the protection of archaeological resources include measures to protect archaeological resources in place. The design has already been revised to relocate the Sediment Staging, Mixing and Drying Area, the Water Treatment System Containment Area, and portions of access roads to areas that do not possess sensitivity. In addition,

a Site Avoidance and Protection Plan has been developed to preserve the integrity of potential archaeological deposits, including areas where relocation of project activity areas is not feasible.

4.2 Wetlands and Watercourses

Reports on Wetland Delineation and Stream Visual Assessment are attached as PIP – Appendix B, and PIP – Appendix C. A Wetland Condition Memo, confirming the wetland condition in Fall 2022, is attached as PIP – Appendix F.

The Site is underlain by glacially deposited sand and gravel, with depth to groundwater averaging around 30 ft below ground surface. Surface soils tend to consist of sandy silt to silty sand in wetland areas, while upland areas also tend to exhibit sandy characteristics. There was a noted presence of silty loams in the northeastern section of the Site. A Remedial Investigation performed in 2002 indicated that the following contaminants were found to exceed SCOs in groundwater, soils and sediments:

- Barium
- Cadmium
- Fluoride
- Lead
- PCB Aroclor 1254

The former C&D site industrial buildings are located on a bluff that is some 30-40 ft in elevation higher than Tributary D-1-7 (the tributary). South of the C&D facility the land is generally flat and dominated with agricultural fields. The tributary flows south to where it joins the Neversink River approximately 0.5 miles south of the site. The headwaters of the tributary consist largely of an underground stream that emanates from the base of the bluff in the northwestern portion of the Project Area. Also, small rivulets in the northeast portion of the Project Area contribute minor amounts of hydrology. Several hundred feet northeast of the Project Area, beaver damming activities have also altered the hydrology.

In the Project Area, the tributary passes through an opening in an abandoned rail line and through two crossings: Swartwout Road and the Southern Crossing. Both of these latter crossings were used to allow agricultural machinery to cross the tributary; the Swartwout Road crossing is still in use. The crossings are generally made of stone with piping to permit the flow of the tributary underneath the crossings. Within the last several years, the piping and conveyances have become fouled, and these crossings are now acting as weirs impounding the water upstream (Photos 1 and 2). The ponded areas vary in depth, up to 3 ft deep in spots. There is also evidence to suggest that water levels fluctuate based on rain events, evapotranspiration, and other anthropogenic activities (agriculture) disturbing the edges of the waterbody. Review of 2006 and 2016 aerial photos show that the bed of tributary north of Swartwout Road was formerly 10-to-20 ft wide and less than 1 ft

in depth. Today, the ponded areas are over 175 ft wide (Photos 3 and 4). The tributary is a mapped trout stream, though the ponded areas (wide shallow water) would not serve as suitable trout habitat.

Wetlands along the edge of the ponded areas are generally small pockets of fringe wetlands that are newly forming. Evidence suggests some wetlands become compromised due fluctuating water levels (the waters are backing up into maintained grass lawns [Photo 5]), mowing and agricultural practices (Photo 6).

A wetland delineation was conducted in late May and early June of 2020. The delineation investigation, summarized in the Wetland Delineation Report (Appendix B) found that much of the wetlands south of the rail line are newly formed and/or influenced by the impounded waters. As these wetlands have common characteristics, they have been grouped together as 'Wetland A.'

Wetlands north of the rail line have been mapped by the National Wetland Inventory and have in place for a considerable amount of time. They are believed to be influenced by the hydrology of lacustrine waterbody upstream of the site, created by a beaver dam. As these wetlands have common characteristics, they have been grouped together as 'Wetland B.' Review of some aerial photos suggests that the impounded waters has reduced vegetated wetland coverage.

Four segments within the tributary were analyzed:

- Upper Pond 1 – tributary north of the abandoned rail line (Photo 7);
- Upper Pond 2 – tributary between the rail line and Swartwout Rd (Photo 8);
- Lower Segment 1 – impounded area between Swartwout Road and the Southern crossing (Photo 9); and
- Lower Segment 2 – waterbody below the Southern Crossing (Photo 10).

The Stream Visual Assessment Protocol (SVAP) review determined that Upper Pond 1, Upper Pond 2 and Lower Segment 1 all scored very poorly, as they are subject to contamination and currently have few characteristics of a trout stream (Appendix C). The Lower Segment scored much higher. The Lower Segment would not be impacted by downstream impediments.

An additional site inspection, detailed in Appendix F was conducted on September 16, 2022, to assess the conditions following the replacement of a culvert on Swartwout Road that had previously been collapsed. The inspection revealed that water levels, and the limits of wetlands and other habitat types throughout the Project vicinity did not noticeably differ from those recorded during the prior field studies and the culvert had either collapsed or become clogged on the upstream side. As such, the findings of wetland delineations (Appendix B) and stream assessment (Appendix C) are considered reflective of current hydrology in the Project Area at the time of this application.

4.3 Significant Natural Communities

The New York Natural Heritage Program (NYNHP) was consulted for information on New York State-list resources in the vicinity of the Project Area. Per a November 18, 2022, response letter (attached as Appendix D), NYNHP identified four natural communities considered significant from a statewide perspective, occurring within one mile of the site:

- Floodplain Forest
- Hemlock Northern Hardwood Forest
- Chestnut Oak Forest
- Red Cedar Rocky Summit

4.3.1 Floodplain Forest

Floodplain forests are wooded habitat subject to regular flooding from adjacent rivers. Floodplain forest is documented in the vicinity of the site. The habitat is noted by NYSNHP as being in risk of impact from invasion of Japanese knotweed (*Reynoutria japonica*). The habitat type occurs statewide, but is at a small fraction of historical levels, and is often extremely compromised, due to development (NYNHP, 2023a). No impacts to habitats of Floodplain Forests are anticipated, as Project work will not impact wooded habitats other than incidental tree removal from upland margin habitats for access. Additionally, post-construction restoration (Appendix I) will include planting and seeding to establish new Floodplain Forest habitat, increasing this habitat in the Project Area. Restoration will also include invasive control during establishment, which will control spread of Japanese knotweed.

4.3.2 Hemlock-Northern Hardwood Forest)

The Hemlock-Northern Hardwood Forest is a habitat listed as Vulnerable within New York State. Acreage of these hemlock-northern hardwood forests have been declining moderately within New York due to logging, agriculture, and development, as well as potential losses due to the hemlock woolly adelgid (*Adelges tsugae*). In larger hemlock forests, the biggest threat is any activity that causes forest fragmentation which restrict the movement of species and seeds throughout the forest (NYNHP, 2023b). No impacts to habitats of Hemlock-Northern Hardwood Forests are anticipated as no Project work will impact wooded habitats.

4.3.3 Chestnut Oak Forest

The Chestnut Oak Forest is classified as Secure within New York State and is not state or federally protected. Total acreage of Chestnut Oak Forest habitats have likely declined slightly in recent decades due to fire suppression, logging, fragmentation, and land development but have likely increased more recently due to reforestation (NYNHP, 2023c). No impacts to habitats of Hemlock-Northern Hardwood Forests are anticipated as no Project work will impact wooded habitats.

4.3.4 Red Cedar Rock Summit

Red Cedar Rocky Summit habitat is considered Vulnerable but not currently imperiled in New York State. These habitats can be found statewide, but particularly in upstate New York (NYNHP,

2023d). The community is currently declining substantially from historic numbers and nearly all documented occurrences are impacted by invasive plants and threatened by fire suppression (NYNHP, 2023d). Impacts to Red Cedar Rocky Summit habitat near the project site are not anticipated as all project work will be confined to lowland habitats, and will not impact wooded habitats.

4.4 Protected Species

Review of the United States Fish and Wildlife Service's (USFWS) Information, Planning, and Consultation System (IPaC System) website indicated there are six endangered, threatened, or candidate species within Orange County, New York. These species include:

- Indiana Bat (*Myotis sodalist*, Endangered),
- Northern Long-eared Bat (*Myotis septentrionalis*, Threatened),
- Small Whorled Pogonia (*Isotria medeoloides*, Threatened),
- Bog Turtle (*Clemmys muhlenbergii,* Threatened), and
- Dwarf Wedgemussel (*Alasmidonta heterodon*, Endangered).
- Monarch Butterfly (*Danaus plexippus*, Candidate)

In addition to the federally-listed species, the New York Natural Heritage Program (NYNHP) was consulted for information on New York State protected species within the Project Area. Per a November 18, 2020, response from the NYNHP, there are four threatened or endangered species, and two rare species, within proximity of the site (letter attached as Appendix D). These species include:

- Bald eagle (*Haliaeetus leucocephalus*, NY State Threatened Species),
- Dwarf wedgemussel (*Alasmidonta heterodon*, Federally Listed Endangered Species),
- Brook floater (*Alasmidonta varicosa*, NY State Threatened Species), and
- Timber rattlesnake (*Crotalus horridus*, NY State Threatened Species), which has been documented approximately 0.75 miles from the Site.
- Alewife floater (*Anodonta implicata*, unlisted, Critically Imperiled in NYS)
- Inlands barrens buckmoth (*Hemileuca maia maia,* Special Concern, Critically Imperiled in NYS)

4.4.1 Plants (Small Whorled Pogonia)

During August 2020, a team of AECOM scientists, including a trained botanist, traversed the site and did not find the small whorled pogonia. The pogonia is an upland forested species. The habitats that would be affected by the proposed work are entirely flooded ponded riverine streambed and emergent wetlands, maintained lawns, and marginal grass and shrub areas. These habitats would

not support the small whorled pogonia. No impacts to small whorled pogonia are anticipated from the remediation activities.

4.4.2 Mammals (Indiana Bat and Northern Long-eared Bat)

No known hibernacula, maternity roost trees, and/or critical habitat for either bat species were identified on site. It is anticipated that there would be no or limited tree removal on site, as most of the disturbances would occur in maintained lawns, marginal grassland, riverine emergent wetland, and/or ponded waters. Tree removal will be limited to a very small number (anticipated to be 0 to 5) of smaller trees on the margin between mowed grass and the tributary bank that required for access to Lower Segment & Lower Segment 1. These trees will be small and as part of a thin marginal habitat between mown turfgrass and the tributary These trees are not preferred for roosting by Indiana bat, which prefer large dead trees with loose bark (Schroder *et al.*, 2017), or the Northern Long-eared bat, which prefers cavities in dead or declining trees in denser forested areas (Owen et al. 2002) .

4.4.3 Terrestrial Invertebrates (Monarch Butterfly and Inlands Barrens Buckmoth)

The inland barrens buckmoth is found among scrub oaks or on dry ridgetops with scrub oak or potentially other shrubby oak species, utilizing the habitat for feeding and egg laying (NYNHP, 2023d). Cherry and willow trees may also be a food resource. As Project activities will have no impact on the forested habitats in the vicinity, no impacts are anticipated to the inland barrens buckmoth. Moreover, additional wetland and riparian areas will be enhanced with tree plantings post-construction which will create a new Floodplain Forest habitat, potentially enhancing habitat for the buckmoth.

Monarch butterfly utilize meadows and grasslands for feeding, and lay eggs on milkweed (*Asclepias* spp.) plants. (USDA, 2023) Construction will require clearing of vegetation in unmowed grassy areas and emergent wetlands, which is potential feeding and egg-laying habitat for the monarch butterfly. This habitat type is common in the vicinity of the Project Area, and the Project is expected to temporarily remove an infinitesimally small portion of habitat versus what is available. Areas that are disturbed will be restored and enhanced by seeding. The Project will therefore have a negligible impact on population dynamics.

4.4.4 Benthic Invertebrates (Dwarf Wedgemussel, Brook Floater, Alewife Floater)

In order to determine whether there is a presence of the any protected mussel species or associated habitat, a survey was performed by Biodiversity, Inc on April 22, 2020 (Report attached as Appendix E). As recorded in the mussel survey report, approximately 1,100 meters (3,600 ft) of Tributary D-1-7 to the Neversink River was surveyed for both the presence of any mussel species or potential habitat which might support those species. No specimens of any mussel species were found during survey, live or dead.

The stream lacks suitable habitat for any of the listed mussel species. While some of the northern impoundments may provide some habitat for the eastern floater (*Pyganodon cataracta*, Not Listed), no evidence of this species was found during the survey. All three protected species are

known to occur in the Neversink River, downstream of the Project Area, in deeper river habitats that the species are known to occur. As such, proper precautions and best management practices will be enacted prevent downstream sedimentation or transport of harmful contaminants.

As protected mussel species were not recorded on site, the site is unsuitable habitat for mussel species, and turbidity controls will be in place prior to the start of work; no impacts to dwarf wedgemussel, brook floater, or alewife floater are anticipated from the remediation activities.

4.4.5 Reptiles (Bog Turtle and Timber Rattlesnake)

4.4.5.1 Bog Turtle

The NYNHP has no records of the bog turtle occurring within one mile of the site. However, as the species is listed in Orange County by the USFWS, a Phase 1 bog turtle assessment was conducted by a team of two AECOM scientists on August 1, 2020, to assess habitat suitability at the site. The scientists noted that suitable bog turtle habitat was not found in wetlands that fringed the Tributary south of Swartwout Road. These wetlands are narrow emergent wetlands within the upper banks of the stream's floodplain. Also, the western bank is lined with a stone rock wall. Species such as purple loosestrife and reed canary grass were dominant. No springs, seeps, rivulets, or other evidence of subsurface flow were observed in this area.

The wetlands north of Swartwout Road are associated with a larger ponded wetland complex with slower flow with two limited backwater areas supporting soft mucky substrate, both located adjacent to the rail line in the extreme eastern portions of the delineated wetlands. These wetlands are subject to fluctuating levels of hydrology (often flooded in the spring) and are and have been influenced by agricultural practices. However, no evidence of subsurface flow or rivulets were identified at these locations; thus. making them unsuitable bog turtle habitats. This area would not be physically impacted by any remediation activity. Moreover, these wetlands were not mapped on NWI mapping and likely have been altered with the recent impoundments of water upstream of the Swartwout Road.

The only area identified as potentially suitable bog turtle habitat was an emergent wetland directly north of the rail line, east of the Project Area. The observed substrate was soft and rivulets were present in this wetland. Tussock sedge, common arrowhead, wool grass, reed canary grass, and arrowwood were some species noted within this area. This wetland was mapped by the NWI mapper and review of historical aerial photos shows evidence of wetlands for decades. Remedial activities would not impact these vegetated wetlands. All remedial activity north of the railroad embankment will be limited to the footprint of the waste lagoon, in upland areas approximately 150 ft to the west of the tributary and associated wetlands, and at an elevation approximately 30 ft above wetland and waterbody habitat. Waterward of the vegetated wetland boundary, temporary fencing will be installed to serve as a visual cue for onsite personnel not to directly or indirectly disturb this vegetated wetland area.

Finally, upon cessation of remedial activities the stream bed will be restored. Within the areas that will be drained as a result of removing the impoundments, native facultative species will be

planted; thus, the removal of the temporary ponded water and wetland restoration activities will likely increase potential bog turtle habitat in the future.

4.4.5.2 Timber Rattlesnake

Timber rattlesnakes are known to inhabit mountainous or hilly forests, featuring rocky outcroppings or ledges, and foraging areas also consist of the surrounding forested areas. In addition, in communicating with NYSDEC, AECOM was informed that U.S. Route 209 forms the boundary of the timber rattlesnake habitat, which separates the Site from the species' known habitat. The remediation activities will not disturb any known Timber Rattlesnake habitat. During construction, placards identifying the timber rattlesnake will be erected on site. The placards will identify a photo of the snake, avoidance procedures and the appropriate NYSDEC personnel to call if sighted.

4.4.6 Birds (Bald Eagle)

Bald eagles are protected by The Bald and Golden Eagle Protection Act and are listed as a threatened species by New York State. Correspondence from the New York Natural Heritage Program, dated July 20, 2020, indicated that there is a known Bald Eagle nest in the Project Area; moreover, during an August 14 conference call with the NYSDEC, AECOM was informed the nest is located approximately 0.4 miles east of the site, along the Neversink River. As the species is protected and regulated, actions subject to federal and state permit must demonstrate compliance and not affect the eagles.

The Project Area is separated from the nest by several lines of mature trees and agricultural fields. These lines of trees serve as field boundaries. Machinery used in farming operations likely comes within 0.1 mile of the eagles' nest. During the onsite sampling activities in 2020, no sighting of the species was noted in the remediation areas. In addition, the D-1-7 tributary in the Project Area does not support large populations of fish or other prey species preferred by Bald Eagles.

According to the NYSDEC Conservation Plan for Bald Eagles, it is recommended that new construction not occur within ¼ mile of known nesting sites, and if possible, it should occur outside of the breeding season (January 1 through September 30). The 9-month breeding period adopted by the NYSDEC guidance was created with statewide Bald Eagle populations in mind; local populations may vary in the span and timing of their breeding season.

Eagles response to human activity often correlates to their familiarity with humans and their actions. Eagles located in remote settings are likely to be less tolerant to human perturbations than eagles that have some familiarity to human activities. It is anticipated that the eagles nesting 0.4 miles from the site have some familiarity with anthropogenic activities and sounds. The C&D site is located adjacent to a major national-network roadway and is in close proximity to a fire station. Sirens associated with these facilities may exceed 100 dB for short durations. Also, machinery used in farming operations likely comes within 0.1 mile of the eagles' nest. There is also an access road and structures located along the Neversink River in close proximity to the nest.

The proposed remedial activities would utilize the following equipment: 70,000-lb excavator (2-3); 20,000-30,000 lb off road haul truck (2-4); 25,000-35,000 lb front end loader; 25,000-35,000 lb bulldozer. In addition, two, 6-inch trash pumps would run continuously. Although this equipment would not operate at the same time continuously, the worst-case when these pieces of equipment operate at the same time may produce sounds (unmuffled) approaching 95 dB on site.

Analysis

Review of the National Bald Eagle Management Guidelines identifies requirements regarding temporary impacts. The Guidelines indicates that activities such as alteration of shorelines and wetlands, water impoundment and/or construction of roads should occur at least 330 feet (0.06 miles) away if the activities are visible from the nest or 660 ft (0.12 miles), if not visible from the nest. As mentioned previously, the project is 0.4 miles (2,110 ft) from any recorded nest, and therefore meets both criteria.

The Guidelines also mention that blasting or other extremely loud noises must not occur within 0.5 miles of an active nest. The remediation activities will not require producing extremely loud noise (e.g., sounds over 100 dB, etc.). The equipment used on site would be fitted with standard industrial-grade mufflers on exhausts, which would realize an approximate 15 dB reduction in noise at the source. Moreover, based on a distance of 0.4 miles, the noise would further reduce by another 43 dB through transmission loss. Thus, at 0.4 miles, the noise would be approximately 50 dB, which is at a similar level for an ambient daytime condition for a rural setting. Brown, et. al., 1999 in a study testing eagles response to jet aircraft, identified that nesting eagles had minimal no response to sounds of 80db. As the sound levels increased the eagles would often respond and fly away, especially with sounds over 100 dB.

When construction is not taking place (at night, weekends) the only noise producing pieces of equipment will be water pumps associated with the stream diversion, which would produce sounds approximately 10-20 decibels above ambient at the Project Area. This noise would dissipate to ambient in the distance between the project site and the eagle nest.

The Project, and noise disturbance will be reduced to the extent most practicable. It is anticipated that the project will not disturb any individuals or known habitat which supports Bald Eagles.

5 Anticipated Environmental Impacts

The project would not result in any traffic or socioeconomic disruptions, as the project activities would occur in a remote location generally free from traffic. Although there will be a temporary increase in noise from construction machinery during the day, there would be no anticipated adverse impacts to listed species or sensitive receptors. On U.S. Route 209 adjacent to the Project Area there are a police station and fire station, which periodically produce noise above the ambient

due to the use of sirens. As stated previously, these developments are all much higher in elevation and are screened from the Project Area by vegetation and the former C&D site.

The remedial and restoration activities would have the following permanent effects on the site:

1. remove contaminants from a known trout stream,
2. result in approximately of 1,000 additional ft of streambed to become accessible to coldwater fisheries, and
3. return the water level in Tributary D-1-7 to levels prior to collapse of the Swartwout Road culvert, returning land in Upper River currently flooded due to man-made impoundment to herbaceous wetland habitat, maintained lawns, and agricultural fields.

6 Restoration Plan

A detailed description of restoration is included in Appendix I – Restoration Plan – Nontidal Wetland/Waterways. Restoration drawings are provided in the Permit Drawings (Figure # C-04.1 to C-04.8).

6.1 Stream Restoration

After the excavation of contaminated sediments has concluded, the stream bed sediments will be replaced with a clean 1:1:1 mix of sand:gravel:cobble materials. Following the removal of all equipment and temporary material, the stream bed surface will be graded to match the preconstruction grade throughout the Project Area. Upon completion of excavation, backfill, and grading, barriers used to divert the river flow will be removed, and stream flow will resume along the existing path. Areas below the OHW will not receive any further restoration. It is anticipated that stream communities will recolonize the newly-flushed streambed from adjacent habitats.

6.2 Wetland Restoration

A riparian buffer will be installed throughout the Project Area in order to stabilize the riverbank and prevent erosion. Once the stream flow has reached final state, the site will be assessed by an expert to adjust final seeding and planting areas appropriate for the final environmental conditions.

After machinery and materials have been removed, areas compacted by work will be decompacted to 12-inches below grade and raked out. Any differences to surrounding grade will be ameliorated with addition of additional fill to match existing. A Woody Vegetation buffer zone measuring approximately 20 ft in width out from the edge of open water will be marked out on both right and left banks of the tributary. This area will be planted with trees and shrubs as shown in the attached Permit Drawings. Plantings will consist of 2.5 to 3-inch caliper trees planted 18 ft on-center, and shrubs planted 6 ft on-center. The proposed planting palette is shown in Table 2.

Table 2 Planting Palette for Wetland Restoration

Common Name	Scientific Name	Size/Type	Spacing	Number
Red maple	*Acer rubrum*	2-3” caliper B&B	12 ft o.c.	30
River birch	*Betula nigra*	2-3” caliper B&B	12 ft o.c.	47
Pin oak	*Quercus palustris*	2-3” caliper B&B	12-15 ft o.c.	20
American sycamore	*Platanus occidentalis*	3” caliper B&B	18 ft o.c.	70
Winterberry	*Ilex verticullata*	3 gallon container	8 ft o.c.	285
Black haw viburnum	*Viburnum prunifolium*	3 gallon container	8 ft o.c.	250
Spicebush	*Lindera benzoin*	3 gallon container	8 ft o.c.	250

Plantings should be evenly distributed throughout the Woody Vegetation buffer zone and planted per details in the Permit Drawings. Species distribution should be equal throughout the buffer.

The Woody Vegetation buffer zone would also be seeded with either

- Riparian Buffer Mix (ENRMX-178) [Elevations below 440 ft], or
- FACW Meadow Mix (ERXMX-122) [Elevations above 440 ft].

Seeding would be done via broadcast method, at a rate of 20 lbs of seed per acre, with a cover crop applied simultaneously at a rate of 30 lbs per acre (typically perennial rye or oats) to stabilize soil. After application of seed, straw mulch or equivalent will be installed on top of the soil. Ideal species compositions of each mix are given in Appendix I.

Seeding will extend upland from the limit of the Woody Vegetation buffer zone, to cover all areas

- within 20 ft of the Woody Vegetation buffer zone,
- any formerly flooded surface exposed by the lowering of the OWH, and
- any wetland habitat that has been disturbed by construction activity.

Seeding applied on slopes greater than 3:1 [horizontal:vertical] will be subject to erosion control material during establishment, following best management practices.

6.3 Upland Restoration

After paving of areas associated with the waste lagoon, upland disturbance is anticipated to be limited to the following:

1. Installation and removal of stabilizing materials (crushed stone and construction mats) for access from Swartwout Road;
2. Installation and removal of silt fence and other stormwater controls; and
3. Incidental damage.

Impacted upland habitats are expected to be limited to turfgrass or grassy margin areas. No impacts to tree canopy are anticipated.

Crushed stone materials installed in the pre-construction footprint of Swartwout Road will be left in place. Stabilizing materials outside of this existing roadbed will be removed, and soil beneath will be decompacted to at least 12 inches of depth. After decompaction, any perceptible change from pre-construction grade, or change in soil quality, versus adjacent, will be corrected with topsoil matching existing and possible amendments. All areas will be raked and then seeded with either a commercial turfgrass (in areas that will be regularly mowed) or native meadow grass mix (in areas that will not be mowed) seed mix. Seed will be applied via broadcast method at the manufacturer's recommended rate, along with a cover crop applied simultaneously at a rate of 30 lbs per acre (typically perennial rye or oats) to stabilize soil. After application of seed, straw mulch or equivalent will be installed on top of the soil.

6.4 Maintenace of Restoration

All planting and seeding will be maintained for a period of two years after installation. During this time, the establishment and vitality of the installed vegetation will be kept to the standards

described in Section 6.4.1. During this period, the NYSDEC will monitor the condition of installed vegetation to ensure that performance standards are being met. It is expected that the contractor will apply water and soil amendments as needed and replace any dead plantings.

6.4.1 Standards of Restoration

The performance standards required in order to determine the success of the restoration will include:

1. The riparian buffer must be restored throughout the Project Area;
2. The stream channel grade or alignment (after the culvert replacement detailed in Section 2.1 – Culvert Improvement) must not be noticeably impacted from restoration activities;
3. No more than 15 percent of the surface area coverage from the Ordinary Highwater Mark to the outer edge of the established riparian buffer shall be bare ground; and
4. The cross-sectional area of the mitigation (post-construction and remediation) stream channel must not be less than the stream channel after the culvert replacement detailed in Section 2.1 – Culvert Improvement and not larger than 25 percent from the permit plan set.

The success criteria for the proposed wetland mitigation site will include:

- 85 percent wetland vegetation coverage of the wetland mitigation site (planted and naturally regenerated/recruited stems);
- 85 percent planted vegetation survival;
- The appearance of positive vitality indicators for planted species, such as increasing size and caliper, and healthy foliage;
- No more than 10 percent areal cover of invasive species within the wetland mitigation site; and
- The site exhibits evidence of wetland hydrology indicators.

6.4.2 Post-Construction Monitoring

After the onsite restoration activities are complete, as-built design plans will be submitted to NYSDEC and USACE within 120 days of completion and a monitoring program will be implemented for the project. The permittee is proposing a 5-year monitoring program for installed vegetation, in accordance with the guidance provided in RGL No. 08-03 (USACE, 2008). Further detail is included in Appendix I.

6.4.3 Long Term Management Responsibilities

Long-term management and maintenance of the restoration site will be assured through the Site Management Plan for the restoration area. If ownership of the restoration area should be transferred, all appropriate monitoring and protective mechanisms (which will have been recorded)

will remain in effect and will remain with the site into perpetuity. Further detail is included in Appendix I.

6.4.4 Adaptive Management Plan

The permittee recognizes that restoration may require significant modification or additional measures in order to be viable, due to changes in surrounding land use, change in hydrology of the Project Area, invasion by a noxious weed species, or other unforeseen incident. Therefore, the permittee proposes an adaptive management and monitoring plan for use at this site. In accordance with Final Mitigation Rule 332.7(c)(4), the performance standards outlined in this report can be revised through the adaptive management procedure to consider appropriate measures implemented to address deficiencies. Further detail is included in Appendix I.

6.4.5 Financial Assurance

Based on the anticipation of the site being placed on the inactive hazardous waste site registry as a Class 4 Site (requiring continued management) under the State Superfund Program, financial assurance will not be required.

7 Mitigation Credit Accounting

The Limit of Disturbance for the remediation of the contaminated soils via removal and replacement was developed based on the extent of contamination and therefore could not be altered to avoid and minimize impacts to wetlands and waterways to the greatest extent practical while still meeting the project needs. The remediation project would not be possible without temporarily impacting waters of the United States, including regulated wetlands.

The 2,620 SF of nontidal wetlands temporarily impacted by creation of access roads required for the remediation will also be restored (as described in Section 6.2) after work has concluded. As summarized in **Table 3** below, there will be no net loss of wetlands/waterways as a result of this project.

In order to meet a “minimal cumulative impact” goal of nontidal wetland and waterway mitigation, the 1,142 LF of stream impacted by the remediation will be mitigated in place by the restoration of the channel to pre-construction grade (as described in Section 6.1, in areas indicated in the attached Permit Drawings, and as quantified in **Table 4**) after contaminants are removed.

In addition to restoration of the habitat disturbed, non-impacted habitat above the post-construction OHW will be enhanced by planting and seeding as described in Section 6.2. This will include both habitats exposed by the lower OHW and areas within 40 ft of the OHW. This enhanced area is measured in **Table 3** and **Table 4**.

Table 3 Quantities of Freshwater Wetland Impacts, Restoration, and Enhancement Proposed

Habitat	Habitat Type	Size	Permanent Impact	Temporary Impact		Restoration Proposed	Enhancement Proposed
				Excavation	Compaction		
Wetland A	Emergent Shrub/Scrub	136,168 SF	0 SF	0 SF	2,620 SF	2,620 SF	25,550 SF
Wetland B	Stream Fringe	25,831 SF	0 SF	0 SF	0 SF	0 SF	1,150 SF
Total Wetland Impact			**0 SF**	**0 SF**	**2,620 SF**	**2,620 SF**	**26,700 SF**

Table 4 Quantities of Waterbody Impacts, Restoration, and Enhancement Proposed

Habitat	Habitat Type	Size	Permanent Impact	Temporary Impact		Restoration Proposed	Enhancement Proposed
				Excavation	Compaction		
Stream	Perennial Stream	2304 LF	0 LF	1,062 LF	1,142 LF	1,679 LF	138,250 SF
Upper Pond 1			*0 LF*	*0 LF*	*0 LF*	*504 LF*	*49,610 SF*
Upper Pond 2			*0 LF*	*635 LF*	*660 LF*	*693 LF*	*87,700 SF*
Lower Segment 1			*0 LF*	*407 LF*	*407 LF*	*407 LF*	*940 SF*
Lower Segment			*0 LF*	*20 LF*	*75 LF*	*75 LF*	*0 SF*
Stream B	Rivulet	131 LF	0 LF	0 LF	0 LF	0 LF	*0 SF*
Stream C	Rivulet	162 LF	0 LF	0 LF	0 LF	0 LF	*0 SF*
Total Waterbody Impact			**0 LF**	**1,062 LF**	**1,142 LF**	**1,679 LF**	**138,250 SF**

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8 References

New York State Natural Heritage Program (NYNHP). 2023a. Floodplain Forest. https://guides.nynhp.org/floodplain-forest/ Accessed February 20, 2023.

NYNHP. 2023b. Online Conservation Guide for Hemlock-northern hardwood forest. Available from: https://guides.nynhp.org/hemlock-northern-hardwood-forest/ Accessed February 27, 2023.

NYNHP. 2023c. Online Conservation Guide for Chestnut oak forest. Available from: https://guides.nynhp.org/chestnut-oak-forest/ Accessed February 27, 2023.

NYNHP. 2023d. Online Conservation Guide for Red cedar rocky summit. Available from: https://guides.nynhp.org/red-cedar-rocky-summit/. Accessed February 27, 2023.

Owen, S. et al. 2002. Roost Tre Selection by Maternal Colonies of Northern Long-eared Myotis in an Intensively Managed Forest. USDA Forest Service Northern Research Station General Technical Report NE-292. 10p.

Schroder, E., D. Ekanayake, and S. romano. 2017. Indiana bat maternity roost habitat preference within Midwestern United States upland Oak-Hickory (*Quercus-Carya*) forests. Forest Ecology and Management 404:65-74.

United States Department of Agriculture (USDA). 2023. Monarch Butterfly Habitat Needs. https://www.fs.usda.gov/wildflowers/pollinators/Monarch_Butterfly/habitat/index.shtml Accessed February 20, 2023.

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Appendix A

Site Photos

Photo 1 Looking east at the Swartwout Road Crossing. Note how water is overtopping the crossing. Date: August 17, 2020.

Photo 2 Southern crossing, looking east. Date: August 17, 2020.

Photo 3 2007 Aerial Photo

Photo 4 2016 Aerial Photo

Photo 5 Example of ponded water backing into maintained lawns. Date: Spring 2020.

Photo 6 Upper Pond. Date: Spring 2020.

Photo 7 Upper Pond 2. Date: Spring 2020.

Photo 8 Lower Segment 1. Date: Spring 2020.

Photo 9 Lower Segment (downstream of Project Area). Date: Spring 2020.

Appendix B

Wetland Delineation Report

FORMER C&D POWER SYSTEMS, SITE NO. 336001

SEDIMENT REMEDIATION NYSDEC, HUGUENOT, NEW YORK Project No.: 60628872

Wetland Delineation Report

September, 2020

AECOM
125 Broad Street, Suite 1500
New York, NY 10004

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1. Introduction

The New York State Department of Environmental Conservation's Division of Environmental Remediation (NYSDEC DER) is planning to remediate the former C&D Power Systems Site (NYSDEC Site No. 336001) in Huguenot, NY (see Figure B1). AECOM has been hired as the environmental design consultant that is responsible for developing the plans, specifications and permit applications for the proposed project. The main site features include a large industrial building formerly used for the manufacturing of lead batteries and is currently unoccupied, as well as a 175-feet diameter wastewater treatment pit, often referred to as the lagoon[1], located approximately 75 feet northeast of the former industrial building. The C&D buildings and lagoon area are immediately surrounded by parking lots and paved roads.

Approximately 200 feet east and south of the lagoon there is a steep cliff slope some 35 feet in height. At the toe of the slope there are the waters of Tributary D-1-7(the tributary). The streambed of the tributary was impacted by releases[2] from the plant, and a 1,132-long segment of the stream adjacent to the plant is part of the Site for purposes of this remedial project.

South of the C&D Site the site is generally flat and dominated with agricultural fields. In the Project Area, the Tributary D-1-7 flows through an opening in an abandoned rail line and under two crossings: Swartwout Road and the Southern Crossing (Photo 1 & 2). Both of these crossings were/are used to allow agricultural machinery to cross the tributary to access agricultural fields to the east and north of the tributary. The Swartwout Road still serves as a viable crossing and appears to be recently used. The Southern Crossing is no longer in condition to support machinery. The crossings are generally made of stone with a 12" culvert pipe underneath to permit the flow of the tributary under the crossings. Within the last several years, the piping have become fouled, and the crossings are now acting as weirs, impounding the water upstream. Review of aerial photo shows that the Tributary north of Swartwout Road was generally approximately 20 feet wide, today the ponded areas is over 175 feet wide (Photos 3 and 4).

This report summarizes the wetland delineation survey conducted in June 2020 within areas of potential disturbance along tributary D-1-7, to approximately 1,500 feet downstream of the site.

2. Wetland Delineation Overview

The United States (U.S.) Army Corps of Engineers (Corps) regulates "waters of the U.S.", pursuant to Section 404 of the Clean Water Act (CWA) (33 U.S.C. 1344) (Federal Register, 1980) (hereinafter referred to as Section 404). The term "waters of the U.S." includes navigable lakes, rivers, streams, tributaries to navigable waters, all waters which are subject to the ebb and flow of the tide, and interstate waters and their tributaries. Waters of the U.S. also include wetlands adjacent to any of the above and all other waters of the U.S. not identified above, such as isolated wetlands and lakes, intermittent streams, and other waters, the destruction of which could affect interstate or foreign commerce (Federal Register 1982).

[1] The lagoon is dry and does not contain hydric vegetation, wetland hydrology and a dominance of hydric vegetation.
[2] Any former conveyance from the facility to the stream was plugged many years ago.

The interpretation of waters that affect interstate commerce is broad. It extends to the following: waters that are presently used, have been used in the past, or may be susceptible for use by interstate or foreign travelers for recreation; waters from which fish or shellfish are or could be taken and sold in interstate commerce or foreign commerce; waters that are or could be used by industries in interstate commerce; and waters that are or could be used by migratory birds or waterfowl. While the determination of wetlands is the focus of this report, it must be emphasized that waters in general are subject to regulation, since in all likelihood such waters would be considered "waters of the U.S."

The Corps (Federal Register 1982) and the U.S. Environmental Protection Agency (Federal Register 1980) jointly define wetlands as: "Those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions."

From this definition of wetlands, the Corps developed a three-parameter method to evaluate areas of land for the existence of wetlands, based on the presence of hydrophytic vegetation, hydric soils, and wetland hydrology. Generally, an area must exhibit allheal three three parameters in order to be considered a jurisdictional wetland. A detailed field sampling methodology was developed based on the following definitions of the three parameters:

- Hydrophytic Vegetation - The sum total of macrophytic plant life that occurs in areas where the frequency and duration of inundation or soil saturation produce permanently or periodically saturated soils of sufficient duration to exert a controlling influence on the plant species present.

- Hydric Soil - A soil that is saturated, flooded, or ponded long enough during the growing season to develop anaerobic conditions that favor the growth and regeneration of hydrophytic vegetation.

- Wetland Hydrology - Encompasses all hydrologic characteristics of areas that are periodically inundated or have soils saturated to the surface at some time during the growing season. Areas with evident characteristics of wetland hydrology are those where the presence of water has an overriding influence on characteristics of vegetation and soils due to anaerobic and reducing conditions, respectively.

  A detailed description of these three parameters is provided in the following sections.

  A. Hydrophytic Vegetation

  Hydrophytic vegetation is adapted to life in permanently or periodically inundated or saturated soils. There are five main plant indicator status categories, based on the plant species' frequency of occurrence in wetlands:

  - Obligate wetland plants (OBL) occur almost always (estimated probability >99 percent) in wetlands under natural conditions, but may also occur rarely (estimated probability <1 percent) in nonwetland areas;

  - Facultative wetland plants (FACW) usually occur in wetlands (estimated probability >67-99 percent), but occasionally are found in nonwetlands (estimated probability 1-33 percent);

- Facultative plants (FAC) are equally likely to occur in wetlands or nonwetlands (estimated probability 33-67 percent);

- Facultative upland plants (FACU) usually occur in nonwetlands (estimated probability >67-99 percent), but occasionally are found in wetlands (estimated probability 1-<33 percent); and

- Upland plants (UPL) occur rarely (estimated probability <1 percent) in wetlands, but occur almost always (estimated probability >99 percent) in nonwetlands.

An area is considered to have hydrophytic vegetation when, under normal circumstances, more than 50 percent of the dominant species are OBL, FACW, or FAC species. Additional indicators of wetland vegetation include:

- Observation of plant species growing in areas of prolonged inundation and/or soil saturation;
- Morphological adaptations;
- Information from technical literature;
- Physiological adaptations; and
- Reproductive adaptations.

B. Hydric Soils

Indicators of hydric soils can be placed into two categories: 1) soil series and phases on the national and state hydric soils lists; and 2) field indicators of hydric soils. In addition, direct evidence can be used such as the observation of ponding, flooding and saturation, taking into account factors such as the time of year and likely duration. Direct evidence may be the only indication in newly developing soils or in areas of recent change. The U.S. Department of Agriculture (USDA), Soil Conservation Service (SCS), in conjunction with the National Technical Committee for Hydric Soils has developed national and state lists of hydric soils (NTCHS, 1991).

The presence of any one of the following field identifiable factors may indicate that hydric soils are present:

- **Organic Soils** contain a high amount of organic matter and water content;

- **Histic Epipedon** is a layer of a mineral hydric soil between 8 to 16 inches in depth at or near the surface that is saturated for 30 consecutive days or more in most years and contains a minimum of 20 percent of organic matter when no clay is present or a minimum of 30 percent of organic matter when 60 percent or greater clay is present;

- **Sulfidic materials** in mineral soils emit an odor of rotten eggs. The odor is produced by the presence of hydrogen sulfide. These odors are present in permanently saturated soils with sulfidic material only a few inches from the soil surface. Sulfides are produced only in a reducing environment;

- **Aquic or peraquic moisture regimes** in soils that are almost completely free of dissolved oxygen due to the presence and/or saturation of groundwater at the soil surface, i.e., soils of tidal marshes and soils of closed, landlocked depressions that are fed by permanent streams;

- **Reducing soil conditions** (e.g. black anoxic soil) occur when soils have been saturated for long or very long durations of time;

- **Gleyed, low chroma or low chroma mottled soils** refer to the coloration of hydric soils. The colors of various soil components are often the most diagnostic indicator of soils. Gleyed, or gray-colored, soils develop when anaerobic conditions result in pronounced chemical reduction of iron, manganese, and other elements, thereby producing a gray soil colors. Mottled means "marked with spots of contrasting color." Soils that have brightly colored mottles and a low matrix chroma are indicative of a fluctuating water table;

- **Iron and/or manganese concretions** less than 0.07 inches (2 mm) in diameter occurring within 3 inches (7.5 cm) of the surface are evidence that the soil is saturated for long periods near the surface; and

- **Coarse textured soils with**:
  a) High organic matter content in the surface horizon,
  b) Dark vertical streaking of subsurface horizons by organic matter; and/or
  c) Wet spodosols.

C. Hydrology

Areas with evident characteristics of wetland hydrology are those where the presence of water has an overriding influence on characteristics of vegetation and soils due to the anaerobic and reducing conditions caused by consistent inundation. Generally speaking, areas that are seasonally inundated and/or saturated to the surface for more than 12.5 percent of the growing season are classified as wetlands. Areas saturated to the surface between 5 percent and 12 percent of the growing season are sometimes wetlands and sometimes uplands. Areas saturated to the surface for less than 5 percent of the growing season are non-wetlands. The length of time an area is wet for the hydrology criterion is based on consecutive days during the growing season.

The hydrology parameter may be quite evident (i.e., overbank flooding), or it can be difficult to observe. In contrast to the vegetation and soil parameters, the hydrology parameter has much more spatial and temporal variation, making the determination of wetland boundaries generally impracticable based on the hydrology parameter alone. Hydrologic indicators are useful in confirming that a site with hydrophytic vegetation and hydric soils still exhibits hydrological conditions typically associated with such vegetation and soils.

Hydrologic indicators associated with wetlands can be based on recorded data and/or field data. Recorded data can be obtained from tide gauges, stream gauges, flood predictions, historical data (i.e., aerial photographs and soil surveys), and piezometers. Field data include the following characteristics:

- Visual observation of inundation;
- Visual observation of soil saturation;
- Water marks;
- Drift lines;
- Sediment deposits;
- Surface scouring; and,

- Wetland drainage patterns.

3. Survey Methods

Qualified scientists conducted a wetland delineation survey in late May and June 2020. A review of existing mapping and available resources was conducted prior to execution of the field surveys.

A. Resource Information Review

Prior to conducting the field activities, qualified biologists conducted a review of the following material to prepare for the wetland assessments in the field:

- United States Geological Survey (USGS) 7.5-minute Topographic Quadrangle Maps (Figure B1);
- USDA Natural Resources Conservation Service's Web Soil Survey Website (Figure B2); and
- U.S. Fish & Wildlife Service (USFWS) National Wetlands Inventory (NWI) Map (Figure B3)

B. Field Survey

Scientists delineated wetlands within the Project Area. The wetland delineation methodologies outlined in the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Northcentral and Northeast, Version 2.0 (Regional Supplement)* (USACE 2012), were used to identify and delineate wetlands. Information for each documentation plot has been recorded on Field Data Sheets (Appendix B). Additionally, water features including perennial, intermittent, or ephemeral streams and ponds, which potentially are regulated State open waters, were identified as such and also documented on Field Data Sheets (Appendix B).

The specific methods used for characterizing and evaluating vegetation, hydrology, and soils are provided in the following sections:

1. Hydrophytic Vegetation

Species abundance in both upland and wetland communities was visually estimated by percent cover within each vegetation stratum. Dominant trees/vines, shrubs/saplings, and herbaceous plants were recorded within sample plots of 30-foot, 15-foot, and 5-foot radius, respectively. Plant species were identified using botanical references for the region. The hydrophytic indicator status of each species was identified using "The National Wetland Plant List" (USDA, 2017a). Indicators of hydrophytic vegetation are satisfied if the results of the rapid assessment include all species rated as OBL or FACW (Indicator 1), the dominance test is greater than 50 percent (Indicator 2), or the prevalence index is less than or equal to 3.0 (Indicator 3). The wetland classification system developed by Cowardin et al. (1979) was utilized to classify delineated wetland vegetated community cover type as palustrine forested (PFO), palustrine scrub-shrub (PSS), palustrine emergent (PEM), or palustrine open water (POW).

2. Hydric Soils

For each observation plot, the soil profile was characterized to determine the presence or absence of hydric soil indicators. Soil borings were taken with a hand-held auger to depths of 18 inches to observe the soil profile and evaluate redoximorphic features, if present. Information collected for each soil profile included (for each soil horizon observed) horizon depth, texture, color, and the presence or absence of redoximorphic features. Colors of the soil matrix and redoximorphic features were identified using Munsell® colors (Munsell Color, 2000). All hydric soil determinations were based on criteria established in the USDA, NRCS Field Indicators of Hydric Soils (USDA, 2017b).

3. Hydrology

Indicators of wetland hydrology were evaluated by determining the presence of primary indictors, noting whether the soil at the surface was inundated or contained free water or saturation within the upper 12 inches of the soil profile. If primary indicators were not observed, the presence of secondary indicators was investigated. If two or more secondary indicators were observed, the area was determined to contain wetland hydrology. Additionally, the presence of any saturation and/or standing water encountered within the soil profile was noted.

4. Results and Discussion

A. Resource Information Review

1. Topography

The areas investigated for wetlands is relatively flat with little variation in elevation and gentle slopes (Figure B1). The only slopes of note are the edges of the floodplain and artificial slopes created by a steep slope in the northwestern portion investigated area (former C&D site), and slopes associated with a defunct railline.

2. Geology and Soils

USDA Natural Resources Conservation Service's Soil Survey Website (https://websoilsurvey.sc.egov.usda.gov/) identified six soil types in the project area (Figure B2). The identified soils are the following:

- Ba – Barbour fine sandy loam (not hydric);
- Be – Basher fine sandy loam (not hydric);
- OtB – Otisville gravelly sandy loam, 0 to 8 percent slopes;
- OtC – Otisville gravelly sandy loam, 8 to 15 percent slopes;
- W – Water; and
- Wd – Wayland soils complex, non-calcareous substratum, 0 to 3 percent slopes, frequently flooded (Hydric soil).

3. Hydrology

The site receives hydrologic input from several sources including direct precipitation, an underground stream in the northwest portion of the site, and several small rivulets in the north eastern portion of the site. These rivulets emanate from beaver dams constructed immediately up stream.

B. Field Survey

During field investigations, scientists delineated wetlands and waterbodies within the Project Area. The attached Photographs (Appendix A), Field Data Sheets (Appendix B), and Delineated Wetlands and Waterbodies maps (Figure B3 & B4) depict detailed information of the wetlands and waterbodies identified during the survey. Vegetation identified during the delineation is presented in Table B1.

Table B1 – Vegetative Species Identified on Site

Strata	Common Name	Scientific Name	Indicator
H	Vernal water-starwort	*Callitriche palustris*	OBL
H	Reed canary grass	*Phalaris arundinacea*	FACW
H	Purple loosestrife	*Lythrium salicaria*	FACW
H	Soybean	*Glysine max*	NI
H	Mouseear cress	*Aradopsis thaliana*	NI
H	Cyperus sedge	*Cyperus sp.*	NI
H	Soft rush	*Juncus effusus*	FACW
H	Common blue violet	*Viola sororia*	FAC
H	Chickweed	*Stellaria media*	FACU
H	Hairy bittercress	*Cardine hirsuta*	NI
H	Broadleaf cattail	*Typha latifolia*	OBL
H	Unknown sedge	*Carex sp*	NI
H	Thistle sp.	*Cirsium arvense.*	FACU
H	Corn speedwell	*Veronica arvensis*	FACU
H	Southern water-plantain	*Alisma subcordatum*	OBL

Strata	Common Name	Scientific Name	Indicator
H	Common horsetail	*Equestrium arvense*	FACU
H	Carolina horsenettle	*Solanium carolensis*	FAC
H	Jewelweed	*Impatiens capensis*	FACW
H	Fox sedge	*Carex vulpinoidea*	OBL
H	Broadleaf arrowhead	*Sagitarria latifolia*	OBL
H	Pennsylvania bitter cress	*Cardamine pensylvanica*	NI
H	Hairy bittercress	*Cardimine hirsuta*	FACU
H	Marsh fern	*Thelpturus palustris*	FACU
H	Bedstraw	*Galium sp.*	FACU
H	Sensitive fern	*Onoclea sensibilis*	FACW
H	Lady's fern	*Athyrium filix-femina*	FAC
S	American elder	*Sambucus canandensis*	FACW
S	Arrowwood viburnum	*Viburnum dentatum*	FACW
S	Nannyberry	*Viburnum lentago*	FAC
S	Meadowsweet	*Spirea alba*	FACW
S	Silky dogwood	*Cornus ammonium*	FACW
S	Steeplebush	*Spirea tomentosa*	FACW
S	Grey alder	*Alnus incana*	FACW
S	Morrow's honeysuckle	*Lonicera morrowii*	FACU
S	Downy serviceberry	*Amelanchier arborea*	FACU
S	Chokeberry	*Prunus virginiana*	FACU
S/T	Green ash	*Fraxinus pennsylvanica*	FACW
S/T	Red oak	*Quercus rubra*	FACU
V	Allegheny blackberry	*Rubus allegheniensis*	FACU
V	Swamp dewberry	*Rubus hispidus*	FACW
V	Black raspberry	*Rubus occidentalis*	NI
V	Poison ivy	*Toxicodendron radicans*	FAC
V	Virginia creeper	*Parthenocissus quinquefolia*	FACU
T	Eastern white pine	*Pinus strobus*	FACU
T	Red maple	*Acer rubrum*	FAC
S/T	Black cherry	*Prunus serotina*	FACU

Notes: Strata: V – vine, H – herbaceous, S – shrub/scrub, T – Tree, V – vine
Indicator: NI – No information

1. Delineated Waterbodies

All waterbodies delineated for this project (Figure B3) are associated with Tributary D-1-7. Waterbody SA is the main stem of the tributary and is broken up into four distinct segments:

- Upper Pond 1 – waterbody of the abandoned rail line;
- Upper Pond 2 – Impounded waterbody between the rail line and Swatwout Road;

- Lower Segment 1 – Impounded area between Swartwout Road and the southern crossing (Photo 5); and
- Lower Segment – waterbody below the southern crossing. (Photo 6)

Additionally, segments SB and SC – are very small rivulets that flow past Beaver dams north of the abandoned rail line and confluence with Upper Pond 1.

Table 2 – Waterbodies Associated with the Green Brook Flood Control Project

Waterbody Name/ID	Flag Numbers		Township / County	Type[b]	Surface Water Quality Classification	Stream Attributes[C]			Comments
	Bank 1 or Centerline[a]	Bank 2				Bank Height (ft)	Stream Width (ft)	Water Depth (in)	
Lower Segment	201-217	112-123	Orange County	P	C(t)	3-3	25	0-18	Outside of project area.
Lower Segment 1	101-127	213-195		P	C(t)	0-2	30	0-20	Associated with Wetland A
Upper Pond 2	001-019	61-102		P	C(t)	2-4	175	0-48	Associated with Wetland A
Upper Pond 1	020-039	040-060		P	C(t)	2-30	150	0-24	Associated with Wetland B
WB-SB	SB001-008	NA		P	C(t)	2-4	2	0-6	Associated with Wetland B
WB-SC	SC001-017	NA		P	C(t)	2-4	2	0-6	Associated with Wetland B

NA = not applicable
a: For watercourses B and C less than 2 feet wide, only the centerline of the stream was flagged.
b: P = perennial; I = intermittent; E = ephemeral; POW = palustrine open water
c: Stream attributes are based on field surveys and are approximate.

2. Delineated Wetlands

Small fringe wetland polygons were identified within the Study Area (Figure B3 and B4). These polygons were grouped into two separate wetlands: A and B. Wetland A is comprised of six wetland polygons located south of the abandoned rail line. These wetlands consist of narrow strip of emergent or scrub/shrub vegetation along the edges of the open waters of waterbody (Photo B7). Much of the area of these wetlands are influenced by widely fluctuating water conditions, as a result of the impoundments, and are mildly disturbed and are newly formed within the last five years.

Wetland B is associated with rivulets and have also been influenced by the presence of upstream beaver dams. These wetlands are comprised of the fringes of a much larger wetland complex east of the site. Review of NWI mapping (Figure B3) shows that Wetland B has been in existence for a considerable period of time when the ponded area was not present.

Within Figure B3, NWI Mapping, there is a circular feature immediately adjacent to the C&D building that measures approximately 150 in diameter. Per the NWI mapping this feature is mapped as PEM1Cx. The circular feature is the old waste lagoon associated with the C&D site. The lagoon feature was investigated and determined to have no hydric soils, signs of hydrology, or dominance of hydric vegetation. The lagoon has no hydrologic connection to the tributary.

Interestingly, Figure B3 depicts much less waters and wetlands and waters on site than currently occurs. Figure B3 identifies a thin stream corridor that corresponds to the course of tributary and emergent and forested wetlands adjacent to the east of the ponded area north of the railroad. This discrepancy in wetland presence and ponded water is attributable to the failure of the piping under the Swartwout Road and Southern Crossing resulting in the impoundment of water upstream.

5. Qualifications of Preparers

John Rollino MS, MA, BA, has over 20 years of experience performing hundreds of wetland delineations and ecological investigations. Mr. Rollino has performed wetland delineations and investigations throughout the state of New Jersey, along the east coast of the U.S., in the Caribbean, and in the South Pacific Islands. He has conducted wetland delineations in a variety of habitats and locations, including rare habitats, Superfund Sites, contaminated and disturbed sites, and others considered “atypical conditions.” Mr. Rollino is a Certified Wetland Delineator in the state of Minnesota and is an ISA Certified Arborist. Mr. Rollino also routinely prepares habitat restoration and wetland mitigation plans.

6. References

Cowardin, L.M., V. Carter, F.C. Golet, and E.T. La Roe. 1979. Classification of Wetlands and Deepwater Habitats of the United States. FWS/OBS-79/31, U.S. Fish and Wildlife Service, Office of Biological Services, Washington, D.C.

Federal Register. 1980. "40 CFR Part 230: Section 404(b)(1) Guidelines for Specification of Disposal Sites for Dredged of Fill Material, "Vol 45, No. 249, pp. 85352-85353, US Government Printing Office, Washington D.C.

Federal Register. 1982. "Title 33: Navigation and Navigable Waters: Chapter II, Regulatory Programs of the Corps of Engineers, "Vol 47, No. 138, P. 31810, US Government Printing Office, Washington, D.C.

Munsell Colors. 2000. Munsell Soil Color Charts. Gretag/Macbeth. Baltimore, Maryland.

National Technical Committee for Hydric Soils (NTCHS). 1991. Hydric Soils of the United States, (3rd edition). Misc. Publ. No. 1491. USDA. Soil Conservation Service. Washington, D.C.

U.S. Army Corps of Engineers (USACE). 2012. Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Eastern Mountains and Piedmont Region Version 2.0, ed. J.F. Berkowitz, J.S. Wakeley, R.W. Lichvar, and C.V. Noble. ERDC/EL TR-12-9. Vicksburg, MS: U.S. Army Engineer Research and Development Center.

U.S. Department of Agriculture (USDA). 2017a. United State Department of Agriculture Natural Resource Conservation Service. Plant Data Base (http://plants.usda.gov/).

USDA. 2017b. United State Department of Agriculture Natural Resource Conservation Service. Field Indicators of Hydric Soils in the United States. A Guide for Identifying and Delineating Hydric Soils, Version 8.1, 2017.

FIGURES

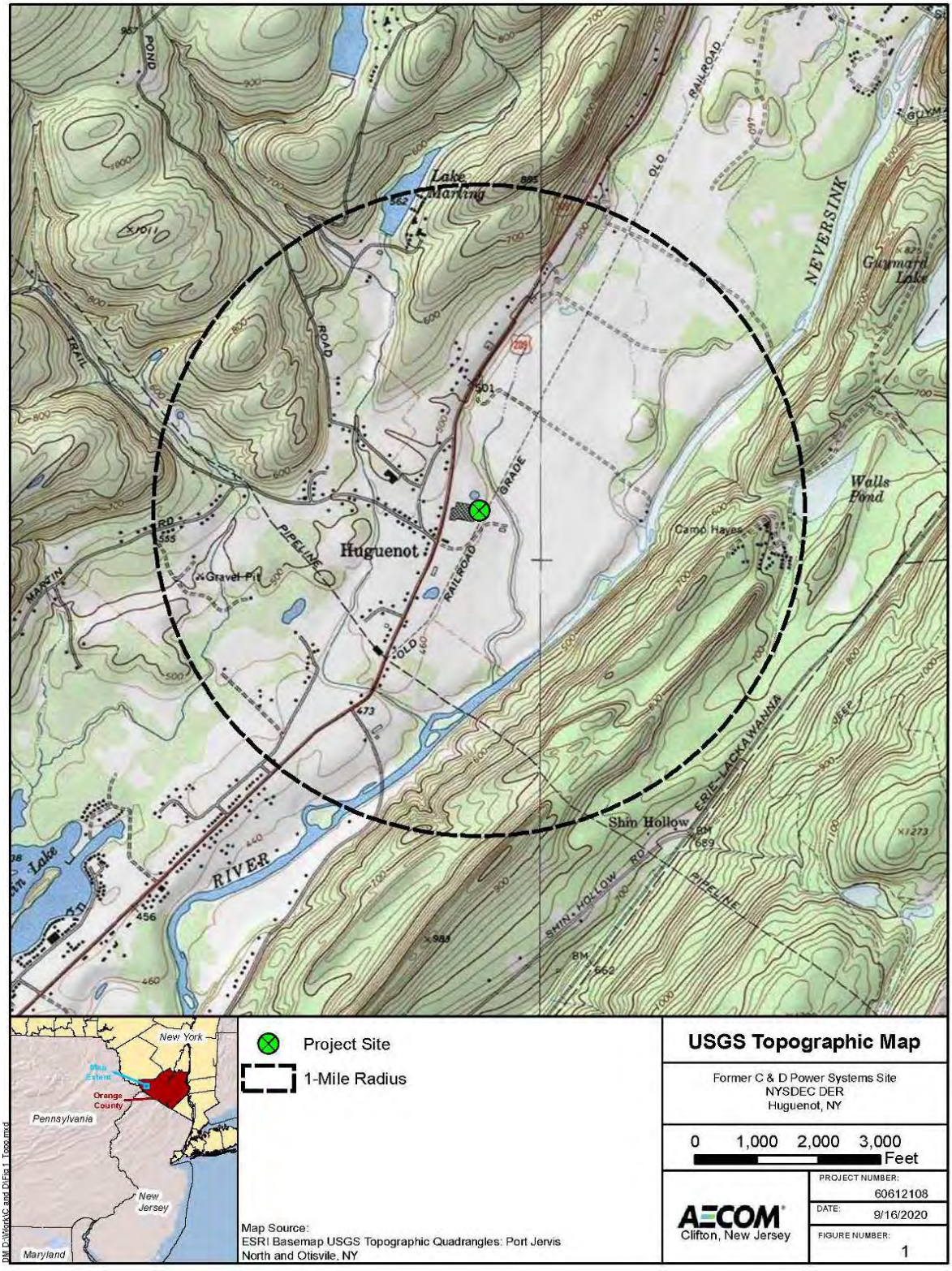

Figure B1 USGS Map

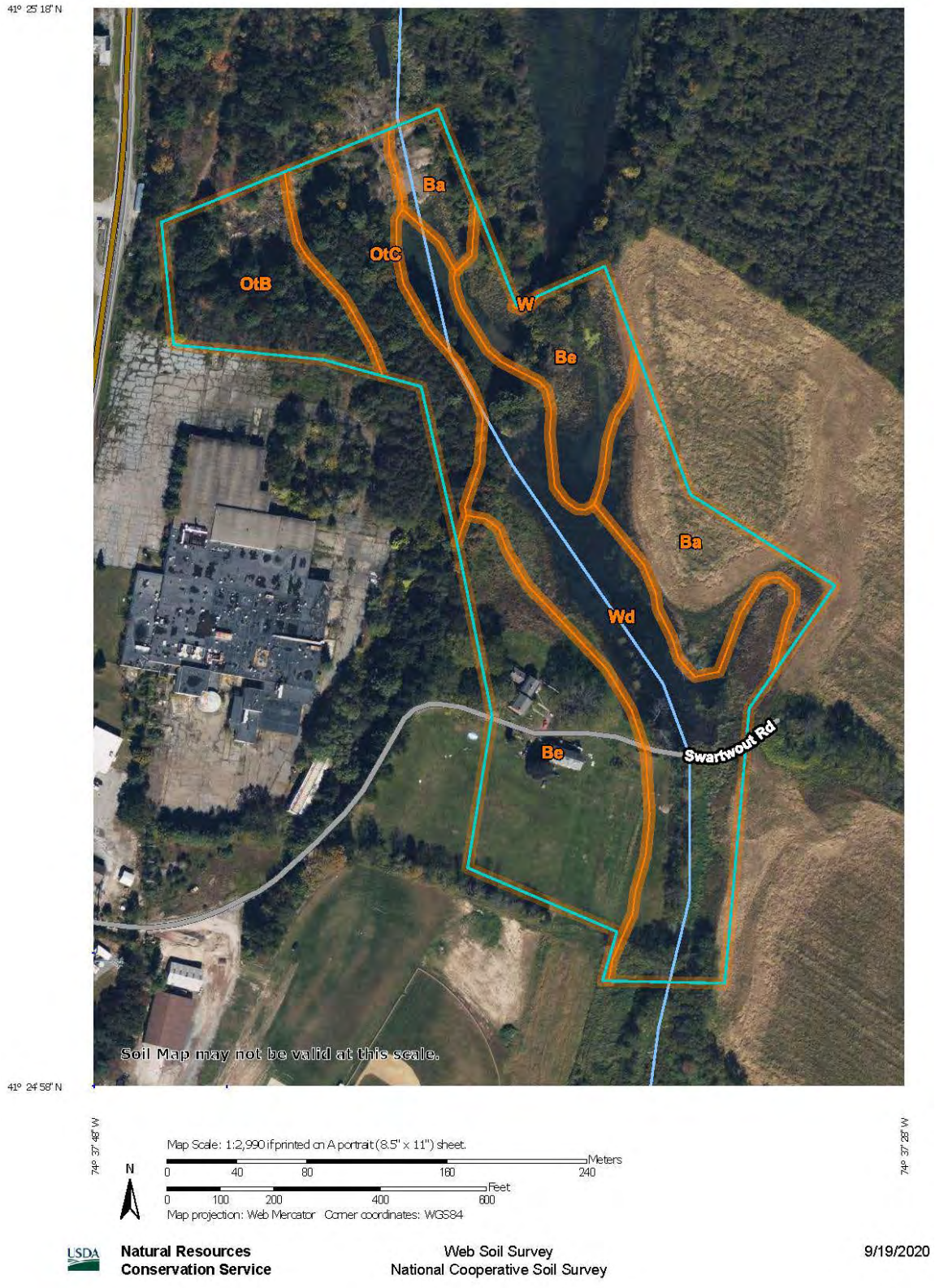

Figure B2 Soil Survey

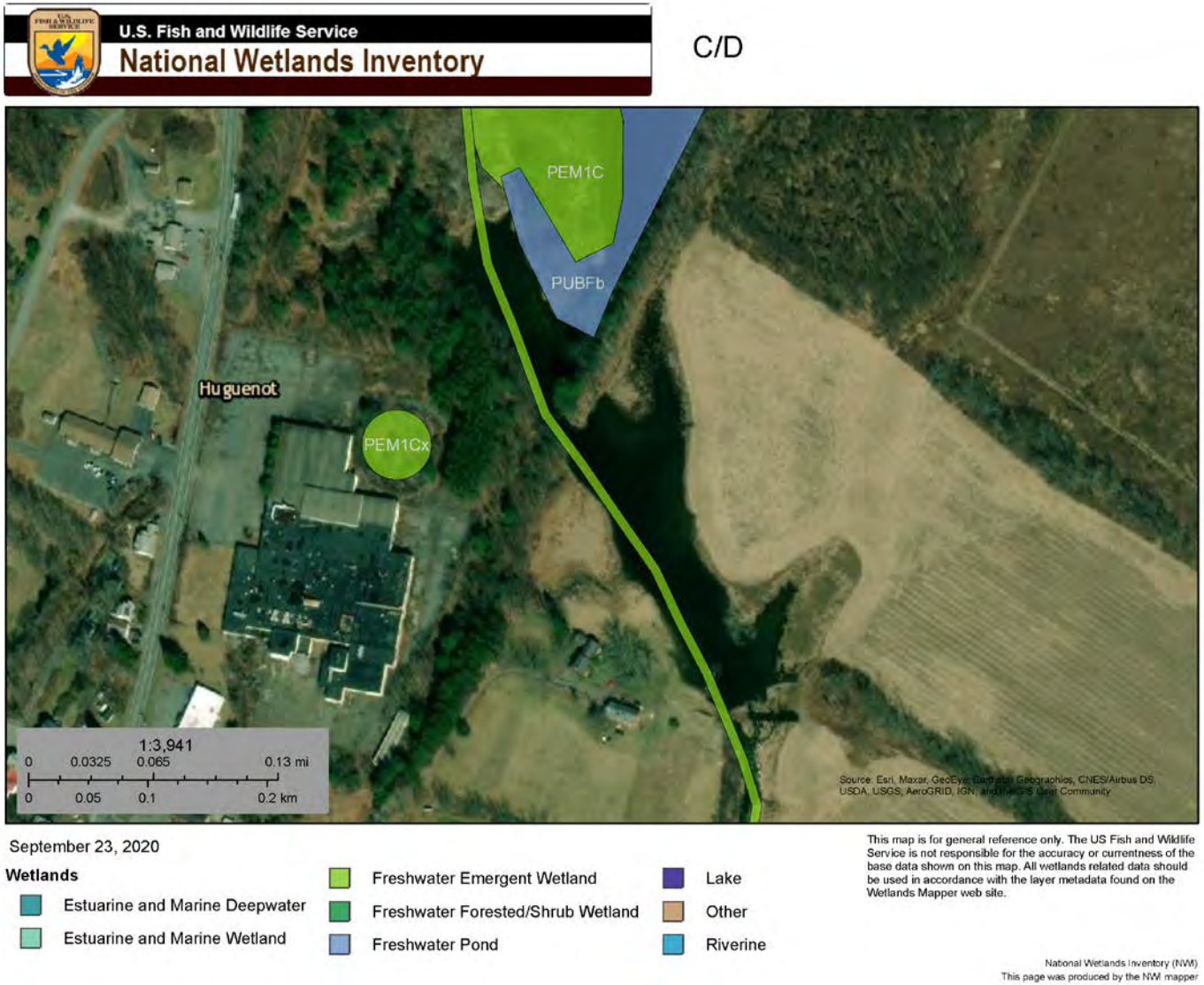

Figure B3 NWI Mapping of the Project Area

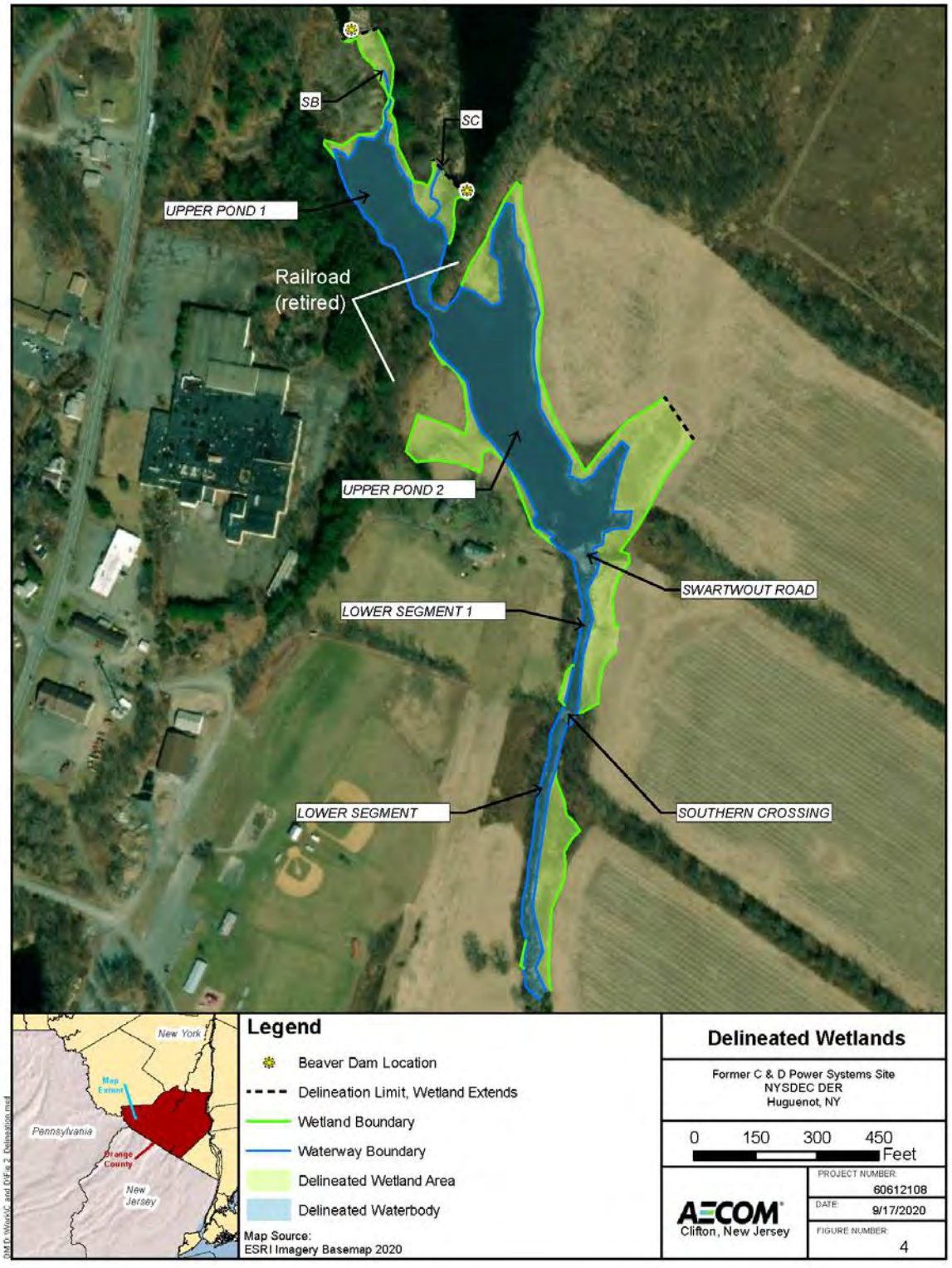

Figure B4 - Delineated Waters of the United States and Wetlands

Figure B5 - Delineation Flags

APPENDIX B.1

Photographs

Photo B1 Looking east at the Swartwout Road Crossing. Note how the water is overtopping the crossing.

Photo B2 Southern Crossing. View from west shore, looking east.

Photo B3 1998 Aerial Photo [Site Circled]

Photo B4 2016 Aerial Photo [Site Circled]

Photo B5 Typical impounded waters between Swartwout Road and Southern Crossing (Lower Segment 1). Note agricultural fields in close proximity to the banks.

Photo B6 View of Lower Segment downstream of the project area. Note vegetated banks and small pockets of wetland vegetation

Photo B7 View of Wetland A along waters edge where impounded water is backing up into a maintained lawn (Upper Pond 2)

Photo B8 – Looking south at Upper Pond 1.

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APPENDIX B.2

Field Data Sheets

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region 5/21/20

Project/Site: C&D Power – Site No 336001 City/County: Highland, NY – Orange Sampling Date: [redacted]
Applicant/Owner: C&D Power State: NY Sampling Point: WA-Wet 1
Investigator(s): JA/SG Section, Township, Range: stream corridor above sewer
Landform (hillslope, terrace, etc.): stream edge Local relief (concave, convex, none): concave Slope (%): 5
Subregion (LRR or MLRA): Lat: 41°25'03.23 N Long: 74°37'33.16 Datum: Lat/Long
Soil Map Unit Name: Wayland soils, non-calcareous (WdL) NWI classification: PEM
Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No No (If no, explain in Remarks.)
Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? No Are "Normal Circumstances" present? Yes X No ____
Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? No (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X No	**Is the Sampled Area within a Wetland?**	**Yes X No**
Hydric Soil Present?	Yes X No	If yes, optional Wetland Site ID:	WA
Wetland Hydrology Present?	Yes X No		

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required: check all that apply)

- ___ Surface Water (A1)
- X High Water Table (A2)
- X Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- X Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- X Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- X Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- X Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- X FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ____ No X Depth (inches):
Water Table Present? Yes X No ____ Depth (inches): 16"
Saturation Present? (includes capillary fringe) Yes X No ____ Depth (inches): 23"

Wetland Hydrology Present? Yes X No

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

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VEGETATION – Use scientific names of plants.

Sampling Point: WA-Wet1

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1. None			
2.			
3.			
4.			
5.			
6.			
7.			
	0 = Total Cover		
Sapling/Shrub Stratum (Plot size: 15')			
1. None			
2.			
3.			
4.			
5.			
6.			
7.			
	0 = Total Cover		
Herb Stratum (Plot size: 5' radius)			
1. Callitriche palustris	5%	N	OBL
2. Phalaris arundinacea	70%	Y	FACW
3. Lythrum salicaria	5	N	OBL
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	80 = Total Cover		
Woody Vine Stratum (Plot size:)			
1. None			
2.			
3.			
4.			
	0 = Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	10	x 1 =	10
FACW species	70	x 2 =	140
FAC species		x 3 =	
FACU species		x 4 =	
UPL species		x 5 =	
Column Totals:	80 (A)		150 (B)

Prevalence Index = B/A = 1.875

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes X No

Remarks: (Include photo numbers here or on a separate sheet.)

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WETLAND DETERMINATION DATA FORM -- Northcentral and Northeast Region

Project/Site: C&D Site #336001 City/County: Huguenot / Orange Sampling Date: 5/24/20
Applicant/Owner: C&D Power State: NY Sampling Point: WA-Upland 1
Investigator(s): JA / SG Section, Township, Range: stream corridor above sewer x-ing
Landform (hillslope, terrace, etc.): Ag Field Local relief (concave, convex, none): concave Slope (%): 3
Subregion (LRR or MLRA): Lat: 41°25' 03.58" N Long: 74° 37' 32.57" Datum: '94
Soil Map Unit Name: Barbour Fine sandy loam NWI classification: UPL
Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)
Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? No Are "Normal Circumstances" present? Yes X No ____
Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes ____ No X	**Is the Sampled Area within a Wetland?** Yes ____ No X
Hydric Soil Present? Yes ____ No X	
Wetland Hydrology Present? Yes ____ No X	If yes, optional Wetland Site ID: ____

Remarks: (Explain alternative procedures here or in a separate report.)
Not a lot of live vegetation.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ____ No X Depth (inches):
Water Table Present? Yes ____ No X Depth (inches):
Saturation Present? (includes capillary fringe) Yes ____ No X Depth (inches):

Wetland Hydrology Present? Yes ____ No X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Ag Field

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SOIL Sampling Point: WA-1-wet

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-3"	10YR3/3		[redacted]				silty sand	
3"-23"	10YR3/3		10YR3/6	5	RM	M	silty sand	
23"-24"	10YR4/2							

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- X Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) **(LRR R, MLRA 149B)**
- ___ Polyvalue Below Surface (S8) **(LRR R, MLRA 149B)**
- ___ Thin Dark Surface (S9) **(LRR R, MLRA 149B)**
- ___ Loamy Mucky Mineral (F1) **(LRR K, L)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **(LRR K, L, MLRA 149B)**
- ___ Coast Prairie Redox (A16) **(LRR K, L, R)**
- ___ 5 cm Mucky Peat or Peat (S3) **(LRR K, L, R)**
- ___ Dark Surface (S7) **(LRR K, L, M)**
- ___ Polyvalue Below Surface (S8) **(LRR K, L)**
- ___ Thin Dark Surface (S9) **(LRR K, L)**
- ___ Iron-Manganese Masses (F12) **(LRR K, L, R)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 149B)**
- ___ Mesic Spodic (TA6) **(MLRA 144A, 145, 149B)**
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: None

Depth (inches): ___

Hydric Soil Present? Yes X No ___

Remarks:

Early in season. Not all vegetation visible

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VEGETATION – Use scientific names of plants. Sampling Point: WK-UPL1

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1. None			
2.			
3.			
4.			
5.			
6.			
7.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size: 15')			
1. None			
2.			
3.			
4.			
5.			
6.			
7.			
	= Total Cover		
Herb Stratum (Plot size: 5')			
1. Arabadopsis thaliana	5	N	NI
2. Glycine max - soybean	70%	Y	NI
3. Typha latifolia	1%	N	OBL
4. Cyperus sp.	<1%	N	NA
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	77 = Total Cover		
Woody Vine Stratum (Plot size: 30')			
1. None			
2.			
3.			
4.			
	0 = Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	1	x 1 =	1
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	0	x 4 =	0
UPL species	75	x 5 =	375
Column Totals:	76 (A)		376 (B)

Prevalence Index = B/A = 4.95

Hydrophytic Vegetation Indicators:

__ 1 - Rapid Test for Hydrophytic Vegetation
__ 2 - Dominance Test is >50%
__ 3 - Prevalence Index is ≤3.0[1]
__ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
__ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes ____ No X

Remarks: (Include photo numbers here or on a separate sheet.)

As field

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WETLAND DETERMINATION DATA FORM -- Northcentral and Northeast Region

Project/Site: C&D Site # 336001 City/County: Huguenot / Orange Sampling Date: 5/24/20
Applicant/Owner: C&D Power State: NY Sampling Point: WA-Upland 1
Investigator(s): JA / SG Section, Township, Range: stream corridor above sewer x-ing
Landform (hillslope, terrace, etc.): Ag Field Local relief (concave, convex, none): concave Slope (%): 5
Subregion (LRR or MLRA): Lat: 41° 25' 03.58 N Long: 74° 37' 32.57" Datum: '94
Soil Map Unit Name: Barbour fine sandy loam NWI classification: UPL
Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)
Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? No Are "Normal Circumstances" present? Yes X No ____
Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____ No X	**Is the Sampled Area within a Wetland?** Yes ____ No X
Hydric Soil Present?	Yes ____ No X	
Wetland Hydrology Present?	Yes ____ No X	If yes, optional Wetland Site ID: ____

Remarks: (Explain alternative procedures here or in a separate report.)
Not a lot of live vegetation.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____ No X	Depth (inches):
Water Table Present?	Yes ____ No X	Depth (inches):
Saturation Present? (includes capillary fringe)	Yes ____ No X	Depth (inches):

Wetland Hydrology Present? Yes ____ No X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Ag Field

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WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: C&D Site # 336001 City/County: Hayward / Orange Sampling Date: 5/24/20
Applicant/Owner: C&D State: NY Sampling Point: WC-Wet 2
Investigator(s): JA / SG Section, Township, Range: stream corridor below sewer x-ing
Landform (hillslope, terrace, etc.): stream corridor Local relief (concave, convex, none): Convex Slope (%): 5%
Subregion (LRR or MLRA): Lat: 41°24'57.27" Long: 74°37'34.71" Datum: '94
Soil Map Unit Name: Wayland soils, non-calcareous NWI classification: PSS
Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)
Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? No Are "Normal Circumstances" present? Yes X No ____
Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? No (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No	**Is the Sampled Area within a Wetland?** Yes X No
Hydric Soil Present?	Yes X	No	If yes, optional Wetland Site ID: WC
Wetland Hydrology Present?	Yes X	No	

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- X High Water Table (A2)
- X Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- X Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- X Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- X Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- X Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- X FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches):
Water Table Present?	Yes X	No ____	Depth (inches): 22"
Saturation Present? (includes capillary fringe)	Yes X	No ____	Depth (inches): 18"

Wetland Hydrology Present? Yes X No

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

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SOIL Sampling Point: WA-UPL 1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-18"	10YR4/4	0					sandy silt	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) **(LRR R, MLRA 149B)**
- ___ Polyvalue Below Surface (S8) **(LRR R, MLRA 149B)**
- ___ Thin Dark Surface (S9) **(LRR R, MLRA 149B)**
- ___ Loamy Mucky Mineral (F1) **(LRR K, L)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **(LRR K, L, MLRA 149B)**
- ___ Coast Prairie Redox (A16) **(LRR K, L, R)**
- ___ 5 cm Mucky Peat or Peat (S3) **(LRR K, L, R)**
- ___ Dark Surface (S7) **(LRR K, L, M)**
- ___ Polyvalue Below Surface (S8) **(LRR K, L)**
- ___ Thin Dark Surface (S9) **(LRR K, L)**
- ___ Iron-Manganese Masses (F12) **(LRR K, L, R)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 149B)**
- ___ Mesic Spodic (TA6) **(MLRA 144A, 145, 149B)**
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:_____

Depth (inches):_____

Hydric Soil Present? Yes _____ No X

Remarks:

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VEGETATION – Use scientific names of plants. Sampling Point: WC-WET 2

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1. None			
2.			
3.			
4.			
5.			
6.			
7.			
	0	= Total Cover	
Sapling/Shrub Stratum (Plot size: 15')			
1. Sambucus canadensis	5	FACW	N
2. Viburnum dentatum	5	FACW	N
3. Spiraea alba	10	FACW	N
4. Cornus amomum	5	FACW	N
5.			
6.			
7.			
	25	= Total Cover	
Herb Stratum (Plot size: 5')			
1. Phalaris arundinacea	60	Y	FACW
2. Impatiens capensis	10	N	FACW
3. Lythrum salicaria	1	N	OBL
4. Galium sp. (Bedstraw)	1	N	NI
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	72	= Total Cover	
Woody Vine Stratum (Plot size: 30')			
1. Rubus allegheniensis	5	N	FACU
2.			
3.			
4.			
	5	= Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	1	x 1 =	1
FACW species	95	x 2 =	190
FAC species	0	x 3 =	0
FACU species	5	x 4 =	20
UPL species	1	x 5 =	5
Column Totals:	102 (A)		216 (B)

Prevalence Index = B/A = 2.12

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- ___ 2 - Dominance Test is >50%
- ___ 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes X No

Remarks: (Include photo numbers here or on a separate sheet.)

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SOIL

Sampling Point: WC-West 2

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-18	10YR4/2		7.5YR5/6	10	RM	M	silty sand	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- X Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) (**LRR R, MLRA 149B**)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Dark Surface (S7) (**LRR K, L, M**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:_____

Depth (inches):_____

Hydric Soil Present? Yes X No ____

Remarks:

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WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: C&D # 336001 City/County: Huguenot / Orange Sampling Date: 5/24/20
Applicant/Owner: C&D Power Systems State: NY Sampling Point: WC-UPL-2
Investigator(s): JA/SG Section, Township, Range: lower area of stream
Landform (hillslope, terrace, etc.): Ag Field Local relief (concave, convex, none): concave Slope (%): 5
Subregion (LRR or MLRA): Lat: 41° 24' 56.93" Long: 74° 37' 34.24" Datum: 1994
Soil Map Unit Name: Barbour fine sandy loam NWI classification: UPL
Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)
Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? N Are "Normal Circumstances" present? Yes Y No ____
Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? N (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____ No X	**Is the Sampled Area within a Wetland?** Yes ____ No X
Hydric Soil Present?	Yes ____ No X	
Wetland Hydrology Present?	Yes ____ No X	If yes, optional Wetland Site ID: ____

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____ No X	Depth (inches):
Water Table Present?	Yes ____ No X	Depth (inches):
Saturation Present? (includes capillary fringe)	Yes ____ No X	Depth (inches):

Wetland Hydrology Present? Yes ____ No X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Ag Field

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VEGETATION – Use scientific names of plants. Sampling Point: WC-UPL Plot 2

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1. None			
2.			
3.			
4.			
5.			
6.			
7.			
	0 = Total Cover		
Sapling/Shrub Stratum (Plot size: 15')			
1. None			
2.			
3.			
4.			
5.			
6.			
7.			
	0 = Total Cover		
Herb Stratum (Plot size: 5' radius)			
1. Glycine max (soybean	90	Y	NI
2. Juncus effusus	1	N	FACW
3. Cardimine hirsuta	1	N	NI
4. Veronica arvensis	<1	N	FACU
5. Lythrum salicaria	<1	N	OBL
6. Arabidopsis thaliana	1	N	NI
7. Viola sororia	<1	N	FAC
8. Stellaria media	<1	N	FACU
9.			
10.			
11.			
12.			
	97 = Total Cover		
Woody Vine Stratum (Plot size: 30')			
1. None			
2.			
3.			
4.			
	0 = Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 0 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	1	x 1 =	1
FACW species	1	x 2 =	2
FAC species	1	x 3 =	3
FACU species	2	x 4 =	6
UPL species	92	x 5 =	460
Column Totals:	97 (A)		472 (B)

Prevalence Index = B/A = 4.87

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation
___ 2 - Dominance Test is >50%
___ 3 - Prevalence Index is ≤3.0[1]
___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes ___ No X

Remarks: (Include photo numbers here or on a separate sheet.)

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SOIL Sampling Point: WC-UPL 2

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-3	10YR4/4	100						
3-18	10YR4/4	90	10YR4/6	10	RM	M	silty sand	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) **(LRR R, MLRA 149B)**
- ___ Polyvalue Below Surface (S8) **(LRR R, MLRA 149B)**
- ___ Thin Dark Surface (S9) **(LRR R, MLRA 149B)**
- ___ Loamy Mucky Mineral (F1) **(LRR K, L)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **(LRR K, L, MLRA 149B)**
- ___ Coast Prairie Redox (A16) **(LRR K, L, R)**
- ___ 5 cm Mucky Peat or Peat (S3) **(LRR K, L, R)**
- ___ Dark Surface (S7) **(LRR K, L, M)**
- ___ Polyvalue Below Surface (S8) **(LRR K, L)**
- ___ Thin Dark Surface (S9) **(LRR K, L)**
- ___ Iron-Manganese Masses (F12) **(LRR K, L, R)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 149B)**
- ___ Mesic Spodic (TA6) **(MLRA 144A, 145, 149B)**
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:_____

Depth (inches):_____

Hydric Soil Present? Yes _____ No X

Remarks:

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WETLAND DETERMINATION DATA FORM -- Northcentral and Northeast Region

Project/Site: C&D #336001 City/County: Huguenot / Orange Sampling Date: 3-24-20
Applicant/Owner: C&D State: NY Sampling Point: WA-Plot 3 wet
Investigator(s): JA/SG Section, Township, Range: lower ponded area
Landform (hillslope, terrace, etc.): stream corridor Local relief (concave, convex, none): _____ Slope (%): 2
Subregion (LRR or MLRA): _____ Lat: 41°25' 08.62" Long: 74°37' 31.82" Datum: 1994
Soil Map Unit Name: Wayland soils, non-calcerous NWI classification: PEM
Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)
Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? No Are "Normal Circumstances" present? Yes X No _____
Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? No (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS -- Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X No	**Is the Sampled Area within a Wetland?**	**Yes X No**
Hydric Soil Present?	Yes X No	If yes, optional Wetland Site ID:	WA
Wetland Hydrology Present?	Yes X No		

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- X High Water Table (A2)
- X Saturation (A3)
- X Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- X Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- X Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- X Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- X Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- X FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches):
Water Table Present? Yes X No 5" Depth (inches):
Saturation Present? (includes capillary fringe) Yes X No ___ Depth (inches): surface - 0"

Wetland Hydrology Present? Yes X No

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

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VEGETATION – Use scientific names of plants.

Sampling Point: WA Wet Plot 3

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	0 = Total Cover		
Sapling/Shrub Stratum (Plot size: 15')			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	0 = Total Cover		
Herb Stratum (Plot size: 5')			
1. Phalaris arundinacea	20	Y	FACW
2. Typha latifolia	40	Y	OBL
3. Juncus effusus	10	N	FACW
4. Lythrum salicaria	2	N	OBL
5. Carex sp.	10	N	NA
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	72 = Total Cover		
Woody Vine Stratum (Plot size: 30')			
1.			
2.			
3.			
4.			
	0 = Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	42	x 1 =	42
FACW species	30	x 2 =	60
FAC species	0	x 3 =	0
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	72 (A)		102 (B)

Prevalence Index = B/A = 1.42

Hydrophytic Vegetation Indicators:

__ 1 - Rapid Test for Hydrophytic Vegetation
__ 2 - Dominance Test is >50%
__ 3 - Prevalence Index is ≤3.0[1]
__ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
__ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes X No

Remarks: (Include photo numbers here or on a separate sheet.)

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SOIL

Sampling Point: WA-Wet Plot 3

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-18"	10YR5/2		7.5YR4/6	15%	RM	M	silty sand	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- X Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) **(LRR R, MLRA 149B)**
- ___ Polyvalue Below Surface (S8) **(LRR R, MLRA 149B)**
- ___ Thin Dark Surface (S9) **(LRR R, MLRA 149B)**
- ___ Loamy Mucky Mineral (F1) **(LRR K, L)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **(LRR K, L, MLRA 149B)**
- ___ Coast Prairie Redox (A16) **(LRR K, L, R)**
- ___ 5 cm Mucky Peat or Peat (S3) **(LRR K, L, R)**
- ___ Dark Surface (S7) **(LRR K, L, M)**
- ___ Polyvalue Below Surface (S8) **(LRR K, L)**
- ___ Thin Dark Surface (S9) **(LRR K, L)**
- ___ Iron-Manganese Masses (F12) **(LRR K, L, R)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 149B)**
- ___ Mesic Spodic (TA6) **(MLRA 144A, 145, 149B)**
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:_____

Depth (inches):_____

Hydric Soil Present? Yes X No _____

Remarks:

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WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: C&D site # 336001 City/County: Huguenot, Orange Sampling Date: 5/24/20
Applicant/Owner: C&D Power Systems State: NY Sampling Point: WA-UPL Plot 3
Investigator(s): JA/SG Section, Township, Range: Ag Field, lower pond
Landform (hillslope, terrace, etc.): Ag Field Local relief (concave, convex, none): Slope Slope (%): 5
Subregion (LRR or MLRA): Lat: 41°25' 08.81 Long: 74° 37' 32.10" Datum: WGS
Soil Map Unit Name: Barbour fine sandy loam NWI classification: Upland
Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No X (If no, explain in Remarks.)
Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? No Are "Normal Circumstances" present? Yes X No ____
Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? No (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No X	**Is the Sampled Area within a Wetland?** Yes ____ No X
Hydric Soil Present?	Yes ____	No X	
Wetland Hydrology Present?	Yes ____	No X	If yes, optional Wetland Site ID: ____

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches):
Water Table Present?	Yes ____	No X	Depth (inches):
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches):

Wetland Hydrology Present? Yes ____ No X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

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SOIL Sampling Point: WA-UPL 3

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-18"	10YR3/3	100		0				

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) **(LRR R, MLRA 149B)**
- ___ Polyvalue Below Surface (S8) **(LRR R, MLRA 149B)**
- ___ Thin Dark Surface (S9) **(LRR R, MLRA 149B)**
- ___ Loamy Mucky Mineral (F1) **(LRR K, L)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **(LRR K, L, MLRA 149B)**
- ___ Coast Prairie Redox (A16) **(LRR K, L, R)**
- ___ 5 cm Mucky Peat or Peat (S3) **(LRR K, L, R)**
- ___ Dark Surface (S7) **(LRR K, L, M)**
- ___ Polyvalue Below Surface (S8) **(LRR K, L)**
- ___ Thin Dark Surface (S9) **(LRR K, L)**
- ___ Iron-Manganese Masses (F12) **(LRR K, L, R)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 149B)**
- ___ Mesic Spodic (TA6) **(MLRA 144A, 145, 149B)**
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:_____

Depth (inches):_____

Hydric Soil Present? Yes _____ No X

Remarks:

US Army Corps of Engineers Northcentral and Northeast Region – Version 2.0

VEGETATION – Use scientific names of plants.

Sampling Point: WA-UPL 3

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	0 = Total Cover		
Sapling/Shrub Stratum (Plot size: 15')			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	0 = Total Cover		
Herb Stratum (Plot size: 5')			
1. Glicene max	85	Y	NI
2. Cardamine hirsuta	10	N	NI
3. Cirsium arvense	2	N	FACU
4. Solanum carolinienses	1	N	FACU
5. Equisetum arvense	1	N	FAC
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	99 = Total Cover		
Woody Vine Stratum (Plot size: 30')			
1.			
2.			
3.			
4.			
	0 = Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 0 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	1	x 3 =	3
FACU species	3	x 4 =	12
UPL species	95	x 5 =	475
Column Totals:	99 (A)		490 (B)

Prevalence Index = B/A = 4.95

Hydrophytic Vegetation Indicators:

__ 1 - Rapid Test for Hydrophytic Vegetation
__ 2 - Dominance Test is >50%
__ 3 - Prevalence Index is ≤3.0[1]
__ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
__ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes _____ No X

Remarks: (Include photo numbers here or on a separate sheet.)

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Northcentral and Northeast Region – Version 2.0

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: C&D Site # 336001 City/County: Hugenot / Orange Sampling Date: 5/24/20
Applicant/Owner: C&D State: NY Sampling Point: WB-wet 4
Investigator(s): JA/SG Section, Township, Range: north pond wetland
Landform (hillslope, terrace, etc.): stream corridor Local relief (concave, convex, none): concave Slope (%): 2
Subregion (LRR or MLRA): Lat: 41° 25' 14.95" Long: 74° 37' 39.75" Datum: 1
Soil Map Unit Name: Barbour fine sandy loam NWI classification: PEM/PSS
Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)
Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? N Are "Normal Circumstances" present? Yes X No ____
Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? N (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes X No Hydric Soil Present? Yes X No Wetland Hydrology Present? Yes X No	**Is the Sampled Area within a Wetland?** Yes X No If yes, optional Wetland Site ID: WB

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- X Surface Water (A1)
- X High Water Table (A2)
- X Saturation (A3)
- X Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- X Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- X Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- X Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- X Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- X Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- X FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes X No ~~X~~ Depth (inches): 1"
Water Table Present? Yes X No ~~X~~ Depth (inches): 1"
Saturation Present? (includes capillary fringe) Yes X No ____ Depth (inches): 0"

Wetland Hydrology Present? Yes X No

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

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VEGETATION – Use scientific names of plants. Sampling Point: WS Wet 4

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	0 = Total Cover		
Sapling/Shrub Stratum (Plot size: 15')			
1. Viburnum dentatum	10	N	FACW
2. Spiraea tomentosa	5	N	FACW
3. Alnus incana	2	N	FACW
4. Lonicera morrowii	5	N	FACU
5. Cornus amomum	2	N	FACW
6. ~~Carex vulpinoidea~~			
7.			
	24 = Total Cover		
Herb Stratum (Plot size: 5')			
1. Typha latifolia	1	N	FACW
2. Phalaris arundinacea	80	Y	FACW
3. Sagittaria latifolia	1	N	OBL
4. Lythrum salicaria	1	N	OBL
5. Alisma subcordata	1	N	NI
6. Impatiens capensis	1	N	OBL
7. Carex Sp.	1	N	NA
8. Cardamine pennsylvanica	<1	N	NI
9. Thelypteris palustris	<1	N	FACU
10. Carex vulpinoidea	<1	N	OBL
11.			
12.			
	89 = Total Cover		
Woody Vine Stratum (Plot size: 30')			
1.			
2.			
3.			
4.			
	0 = Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	4	x 1 =	4
FACW species	100	x 2 =	208
FAC species	0	x 3 =	0
FACU species	2	x 4 =	8
UPL species	2	x 5 =	10
Column Totals:	108 (A)		222 (B)

Prevalence Index = B/A = 2.06

Hydrophytic Vegetation Indicators:

__ 1 - Rapid Test for Hydrophytic Vegetation
__ 2 - Dominance Test is >50%
__ 3 - Prevalence Index is ≤3.0[1]
__ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
__ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes X No

Remarks: (Include photo numbers here or on a separate sheet.)

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SOIL Sampling Point: WB-WC4

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-18"	10YR 3/2		None		RM	M	silty clay	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) **(LRR R, MLRA 149B)**
- ___ Polyvalue Below Surface (S8) **(LRR R, MLRA 149B)**
- ___ Thin Dark Surface (S9) **(LRR R, MLRA 149B)**
- ___ Loamy Mucky Mineral (F1) **(LRR K, L)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **(LRR K, L, MLRA 149B)**
- ___ Coast Prairie Redox (A16) **(LRR K, L, R)**
- ___ 5 cm Mucky Peat or Peat (S3) **(LRR K, L, R)**
- ___ Dark Surface (S7) **(LRR K, L, M)**
- ___ Polyvalue Below Surface (S8) **(LRR K, L)**
- ___ Thin Dark Surface (S9) **(LRR K, L)**
- ___ Iron-Manganese Masses (F12) **(LRR K, L, R)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 149B)**
- ___ Mesic Spodic (TA6) **(MLRA 144A, 145, 149B)**
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (TF12)
- X Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:_____

Depth (inches):_____

Hydric Soil Present? Yes X No ____

Remarks:
Oxidized Rhizospheres.

US Army Corps of Engineers — Northcentral and Northeast Region – Version 2.0

WETLAND DETERMINATION DATA FORM -- Northcentral and Northeast Region

Project/Site: C&D site # 336001 City/County: Hugenot / Orange Sampling Date: 5/24/20

Applicant/Owner: C&D Power Systems State: NY Sampling Point: WB-UPL 4

Investigator(s): JA / SG Section, Township, Range: north of pond

Landform (hillslope, terrace, etc.): [redacted] slope Local relief (concave, convex, none): slope Slope (%): 5

Subregion (LRR or MLRA): Lat: 41° 25' 15.01" Long: 74° 37' 39.28" Datum: '94

Soil Map Unit Name: Barbour fine sandy loam NWI classification: Upland

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? No Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? No (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____ No X	**Is the Sampled Area within a Wetland?** Yes ____ No X
Hydric Soil Present?	Yes ____ No X	
Wetland Hydrology Present?	Yes ____ No X	If yes, optional Wetland Site ID: ____

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____ No X	Depth (inches):
Water Table Present?	Yes ____ No X	Depth (inches):
Saturation Present? (includes capillary fringe)	Yes ____ No X	Depth (inches):

Wetland Hydrology Present? Yes ____ No X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

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VEGETATION – Use scientific names of plants. Sampling Point: WB-VP4

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1. Pinus strobus	50	Y	FACU
2. Acer rubrum	10	N	FAC
3. Prunus serotina	10	N	FACU
4.			
5.			
6.			
7.			
	70	= Total Cover	

Sapling/Shrub Stratum (Plot size:)			
1. Viburnum dentatum	25	Y	FACW
2. Prunus serotina	5	N	FACU
3. Amelanchier arborea	1	N	FACU
4. Cornus amomum	1	N	FACW
5. Fraxinus ~~[illegible]~~ pennsylvanica	1	N	FACW
6. Prunus virginiana	1	N	FACU
7. Quercus rubra	<1	N	FACU
Viburnum lentago	<1	36	= Total Cover

Herb Stratum (Plot size:)			
1. Onoclea sensibilis	5	N	FACW
2. Athyrium filix-femina (lady's fern)	5	N	NI
3. ~~[illegible]~~			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	10	= Total Cover	

Woody Vine Stratum (Plot size:)			
1. Toxicodendron radicans	5	N	FAC
2. Rubus hispidus	1	N	FACW
3. Parthenocissus quinquefolia	2	N	FACW
4. Rubus accidentalus	1	N	NI
	9	= Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	33	x 2 =	66
FAC species	15	x 3 =	45
FACU species	70	x 4 =	280
UPL species	6	x 5 =	30
Column Totals:	124 (A)		421 (B)

Prevalence Index = B/A = 3.40

Hydrophytic Vegetation Indicators:

__ 1 - Rapid Test for Hydrophytic Vegetation
__ 2 - Dominance Test is >50%
__ 3 - Prevalence Index is ≤3.0[1]
__ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
__ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes ____ No X

Remarks: (Include photo numbers here or on a separate sheet.)

US Army Corps of Engineers — Northcentral and Northeast Region – Version 2.0

SOIL Sampling Point: WB-UPL4

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-3"	7.5YR3/3						silt loam	w/organics
3-6	7.5YR3/3						silt loam	
6"-18"	10YR4/6						sandy loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) **(LRR R, MLRA 149B)**
- ___ Polyvalue Below Surface (S8) **(LRR R, MLRA 149B)**
- ___ Thin Dark Surface (S9) **(LRR R, MLRA 149B)**
- ___ Loamy Mucky Mineral (F1) **(LRR K, L)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **(LRR K, L, MLRA 149B)**
- ___ Coast Prairie Redox (A16) **(LRR K, L, R)**
- ___ 5 cm Mucky Peat or Peat (S3) **(LRR K, L, R)**
- ___ Dark Surface (S7) **(LRR K, L, M)**
- ___ Polyvalue Below Surface (S8) **(LRR K, L)**
- ___ Thin Dark Surface (S9) **(LRR K, L)**
- ___ Iron-Manganese Masses (F12) **(LRR K, L, R)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 149B)**
- ___ Mesic Spodic (TA6) **(MLRA 144A, 145, 149B)**
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:_____

Depth (inches):_____

Hydric Soil Present? Yes _____ No X

Remarks:

US Army Corps of Engineers Northcentral and Northeast Region – Version 2.0

Appendix C

Stream Visual Assessment Protocol

Stream Visual Assessment Protocol

Introduction

The New York State Department of Environmental Conservation's Division of Environmental Remediation (NYSDEC DER) is planning to remediate the C&D Power Systems Site (NYSDEC Site No. 336001) in Huguenot, NY (see Figure 1 of the Supplemental Information Packet). AECOM has been hired as the environmental design consultant that is responsible for developing the plans, specifications and permit applications for the proposed project. The main site features include a large industrial building formerly used for the manufacturing of lead batteries and is currently unoccupied, as well as a 175-foot diameter wastewater treatment lagoon located approximately 75 feet northeast of the former industrial building. The site then drops off steeply to the northeast, where Tributary D-1-7 (the tributary) is located.

South of the C&D site the land is generally flat and dominated with agricultural fields. In the project area, the tributary D-1-7 flows through an opening in an abandoned rail line and under two crossings: Swartwout Road and the Southern Crossing. Both of these crossings were/are used to allow agricultural machinery to cross the tributary. Currently the Swartwout Road crossing serves as a viable crossing. The crossings are generally made of stone with piping underneath to permit the flow of the tributary under the crossings. Within the last several years, the piping and conveyances have become fouled, and are now acting as weirs impounding the water upstream. Review of aerial photo shows that the Tributary north of Swartwout Road was generally approximately 20 feet wide; today, the ponded areas is over 175 feet wide.

In order to quantify potential upgrades to the stream due to the planned dredging and removal and/or repair of the Swartwout and Southern crossings, AECOM performed a Stream Visual Assessment Protocol (SVAP) review (NRCS, 2009).

Assessment Procedures

The Natural Resource Conservation Service (NRCS) SVAP was utilized to assess hydrologic and morphologic stream conditions in Tributary D-1-7. SVAP is a qualitative field reconnaissance technique that assesses channel and floodplain conditions, riparian areas, water quality and aquatic habitat. It was developed to work as an assessment for existing physical conditions within a project site; it may not detect factors affecting the location from the watershed or stream reaches outside of the project limits.

Following the SVAP guidelines, up to 15 assessment elements such as channel, bank stability, riparian zone conditions, and in-stream fish cover are recorded, as applicable. A brief description of the element used are as follows:

- **Channel Condition** – The shape of a stream channel changes constantly, imperceptibly, or dramatically, depending on the condition of the stream corridor (channel, riparian area, and flood plain) and how it transports water and materials. Channel condition is a description of the geomorphic stage of the channel as it adjusts its shape relative to its flood plain.

- **Hydrologic alteration** – Description and rationale for assessing hydrologic alteration Hydrologic alteration is the degree to which hydrology and streamflow conditions differ from natural, unregulated flow patterns.

- **Bank condition** – Stable streambanks are essential components of functional physical habitat and unimpaired biological community A healthy riparian corridor with a well-vegetated flood plain contributes to bank stability.

- **Riparian area quantity and quality** – Ecological processes that occur in the stream corridor are linked to those in uplands via intact riparian areas and flood plains, if present. Well-established and connected riparian areas perform critical functions for maintaining healthy, resilient stream ecosystems

- **Canopy Cover** – In forested riparian areas, shading of the stream is important because it helps maintain cool water temperatures and limits algal growth. Cool water has a greater oxygen holding capacity than warm water.

- **Water Appearance** The water appearance assessment element compares turbidity, color, and other visual characteristics of the water with those of a reference stream. Nutrients are necessary for stream food webs by promoting algal and aquatic plant growth, which provide habitat and food for aquatic organisms. However, an excessive amount of algal and plant growth is detrimental to stream ecosystems.

- **Manure or human waste presence** – Manure and human waste increase nutrients and biochemical oxygen demand in streams, which alter food webs and nutrient cycles of stream/riparian ecosystems Pools Regardless of the stream channel type, pools are important resting, hiding, and feeding habitat for fish.

- **Pools –** Streams with a mix of shallow and deep pools offer diverse habitat for different species of fish and other aquatic species

- **Barriers to aquatic species movement** – Passage barriers are typically categorized by characteristics such as water velocity, water depth, and barrier height in relation to the passage requirements of a given species and/or life stage.

- **Fish habitat complexity** – The dynamic features of stream corridors create diverse habitat types and conditions for fish and other aquatic species. Quality fish habitat is a mosaic of different types of habitats created by various combinations of water quality and quantity, water depth, velocity, wood, boulders, riparian vegetation, and the species that inhabit stream corridors

- **Aquatic invertebrate habitat –** In a healthy stream, substrates are varied, free of sediment, abundant, and in place long enough to allow colonization by invertebrates.

- **Aquatic invertebrate community –** This important element reflects the ability of the stream to support aquatic invertebrates such as crayfish, mussels, dragonflies, and caddisflies. However, successful assessments require knowledge of the life cycles of some aquatic insects and other macroinvertebrates and the ability to identify them. For this reason, this is an optional element.

Each element is scored from 1 to 10, where 1 indicates the feature is most degraded or is in unstable condition and 10 indicates that the feature is in the most natural or stable condition. The overall assessment score is created by adding up the scored value for each element and dividing that by the number of the categories assessed. Any overall assessment score below six is determined to be poor and any score over nine is excellent. This numerical score can be used as a general determination of the overall quality of the stream condition.

Results – Tributary D-1-7 Existing Conditions

The tributary due to the presence of the rail line, and crossing, the tributary was assessed in four segments:

- Upper Pond 1 – waterbody of the abandoned rail line;
- Upper Pond 2 impounded waterbody between the rail line and Swatwout Road;
- Lower Segment 1, impounded area between Swartwout Road and the southern crossing; and
- Lower Segment, waterbody below the southern crossing.

Photos C1, C2, C3, and C4 depict the Upper Pond 1, Upper Pond 2, Lower Segment 1, and Lower Segment, respectively.

The Rankings of the stream are as follows:

Summary of Stream Evaluation using SVAP for Streams Sampled Once

Tributary Segment	Upper Pond 1	Upper Pond 2	Lower Segment 1	Lower Segment
Substrate	Mud over sand/gravel	Mud over sand/gravel	Mud over sand/gravel	Sand/gravel
Sampling Date	May/June, 2020	May/June, 2020	May/June, 2020	May/June, 2020
Channel Condition	2	2	1	7
Channel Alteration	3	3	2	6
Bank Condition	6	6	5	8
Riparian Area	7	6	8	9
Canopy Cover	2	0	4	6
Water Appearance	8	8	8	9
Nutrient Enrichment	7	6	7	9
Manure and Human Waste	9	9	9	9
Pools	0	0	0	5
Barriers to Movement	1	1	0	7
Fish Habitat Complexity	2	2	1	5

Tributary Segment	Upper Pond 1	Upper Pond 2	Lower Segment 1	Lower Segment
Substrate	Mud over sand/gravel	Mud over sand/gravel	Mud over sand/gravel	Sand/gravel
Sampling Date	May/June, 2020	May/June, 2020	May/June, 2020	May/June, 2020
Riffle embeddedness	0	0	0	4
Total Score	47	43	45	84
Weighted Score	3.9	3.6	3.8	7.0
Rank	Poor	Poor	Poor	Fair

After the remedial actions ae complete the stream bed will be reconstructed, and facultative plantings will be placed along the back and within the riparian areas. The restoration would result in Upper Pond 1, Upper Pond 2, and Lower Segment 1 being returned to their former condition of several years ago, prior to the unexpected impounding of water.

References

Natural Resource Conservation Service. 2009. National Biology Handbook Subpart B— Conservation Planning. Part 614 Stream Visual Assessment. Protocol Version 2, United States Department of Agriculture. December 2009.

PHOTOGRAPHS

Photo C1 Upper Pond

Photo C2 Upper Pond 2

Photo C3 Lower Segment 1

Photo C4 Lower Segment (downstream of dredge area)

Appendix D

New York Natural Heritage Program Consultation

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

Division of Fish and Wildlife, New York Natural Heritage Program
625 Broadway, Fifth Floor, Albany, NY 12233-4757
P: (518) 402-8935 | F: (518) 402-8925
www.dec.ny.gov

November 8, 2022

Andrew Martin
AECOM
125 Broad St
New York, NY 10004

Re: Remedial actions for the C&D Power Systems Site, Huguenot (NYSDEC Site No. 336001)
County: Orange Town/City: Deerpark

Dear Andrew Martin:

In response to your recent request, we have reviewed the New York Natural Heritage Program database with respect to the above project.

Enclosed is a report of rare or state-listed animals and plants, and significant natural communities that our database indicates occur at or within one mile of the project site.

For most sites, comprehensive field surveys have not been conducted; the enclosed report only includes records from our database. We cannot provide a definitive statement as to the presence or absence of all rare or state-listed species or significant natural communities. Depending on the nature of the project and the conditions at the project site, further information from on-site surveys or other sources may be required to fully assess impacts on biological resources.

The presence of the plants and animals identified in the enclosed report may result in this project requiring additional review or permit conditions. For further guidance, and for information regarding other permits that may be required under state law for regulated areas or activities (e.g., regulated wetlands), please contact the NYS DEC Region 3 Office, Division of Environmental Permits, at dep.r3@dec.ny.gov.

Sincerely,

Heidi Krahling
Environmental Review Specialist
New York Natural Heritage Program

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The following state-listed animals have been documented in the vicinity of the project site.

The following list includes animals that are listed by NYS as Endangered, Threatened, or Special Concern; and/or that are federally listed.

For more information, including any permit considerations for the project, please contact the NYSDEC Region 3 Office, Division of Environmental Permits, at dep.r3@dec.ny.gov, (845) 256-3054.

The following species have been documented at or adjacent to the project site.

COMMON NAME	*SCIENTIFIC NAME*	*NY STATE LISTING*	*FEDERAL LISTING*	
Birds				
Bald Eagle *Breeding and Nonbreeding*	*Haliaeetus leucocephalus*	Threatened		14996 5298
Freshwater Mussels				
Brook Floater	*Alasmidonta varicosa*	Threatened		6255
Dwarf Wedgemussel	*Alasmidonta heterodon*	Endangered	Endangered	7381

The following species has been documented within 0.75 mile of the project site. Individual animals may travel 1.5 miles from documented locations.

COMMON NAME	*SCIENTIFIC NAME*	*NY STATE LISTING*	*FEDERAL LISTING*	
Reptiles				
Timber Rattlesnake	*Crotalus horridus*	Threatened		15053

This report only includes records from the NY Natural Heritage database.

Information about many of the listed animals in New York, including habitat, biology, identification, conservation, and management, are available online in Natural Heritage's Conservation Guides at www.guides.nynhp.org, and from NYSDEC at www.dec.ny.gov/animals/7494.html.

The following rare plants, rare animals, and significant natural communities have been documented at your project site, or in its vicinity.

We recommend that potential impacts of the proposed project on these species or communities be addressed as part of any environmental assessment or review conducted as part of the planning, permitting and approval process, such as reviews conducted under SEQR. Field surveys of the project site may be necessary to determine the status of a species at the site, particularly for sites that are currently undeveloped and may contain suitable habitat. Final requirements of the project to avoid, minimize, or mitigate potential impacts are determined by the lead permitting agency or the government body approving the project.

The following animals, while not listed by New York State as Endangered or Threatened, are of conservation concern to the state, and are considered rare by the New York Natural Heritage Program.

COMMON NAME	*SCIENTIFIC NAME*	*NY STATE LISTING*	*HERITAGE CONSERVATION STATUS*
Freshwater Mussels			
Alewife Floater	*Utterbackiana implicata*	Unlisted	Critically Imperiled in NYS

Documented adjacent to the project site. 1997-07-05: The Neversink River is approximately 100 feet wide and generally 1 to 4 feet deep. A few slow, sand-bottomed pools may reach approximately 6.5 feet. The substrate is stony substrate with sand and gravel interspersed. There are boulders in some stretches. 8437

Moths			
Inland Barrens Buckmoth	*Hemileuca maia maia*	Special Concern	Critically Imperiled in NYS

Documented within 1/2 mile south of the project site. 2004-05-25: The larva was found on a narrow strip of cedar glade and grassy patches along a narrow limestone/shale ridge southeast of the Neversink River. 7515

The following significant natural communities are considered significant from a statewide perspective by the NY Natural Heritage Program. They are either occurrences of a community type that is rare in the state, or a high quality example of a more common community type. By meeting specific, documented criteria, the NY Natural Heritage Program considers these community occurrences to have high ecological and conservation value.

COMMON NAME	*HERITAGE CONSERVATION STATUS*
Wetland/Aquatic Communities	
Floodplain Forest	High Quality Occurrence of Rare Community Type

Documented at the project site. This is a moderate-sized floodplain forest occurring in many patches along the Neversink and Basherkill Rivers in good condition, but with an immediate threat of continued Japanese knotweed invasion. The community is located at the edge of the large, high-quality Shawangunk Ridge greater landscape and along the Neversink and Basherkill River corridors. 114

COMMON NAME *HERITAGE CONSERVATION STATUS*

Upland/Terrestrial Communities

Hemlock-Northern Hardwood Forest High Quality Occurrence of Uncommon Community Type

Documented along the eastern shore of the Neversink River, within 100 yards of the project site. This is a large forest dispersed among many patches. Some patches are in very good condition within an excellent landscape context, but others are in moderate condition at the edge of the natural landscape with agriculture and development nearby. The condition is also degraded by hemlock woolly adelgid. 9759

Chestnut Oak Forest High Quality Occurrence

Documented within 1/4 mile east of the project site 2007: This is a very large, diverse matrix-forming chestnut oak forest in good to excellent condition within an excellent landscape context. It has a high diversity of physiognomy and species with very low cover of exotic species. 9519

Red Cedar Rocky Summit High Quality Occurrence of Uncommon Community Type

Documented within 1/2 mile south of the project site. This is a small occurrence in excellent condition with intact ecological processes within a very large, high quality landscape. 9106

This report only includes records from the NY Natural Heritage database. For most sites, comprehensive field surveys have not been conducted, and we cannot provide a definitive statement as to the presence or absence of all rare or state-listed species. Depending on the nature of the project and the conditions at the project site, further information from on-site surveys or other sources may be required to fully assess impacts on biological resources.

If any rare plants or animals are documented during site visits, we request that information on the observations be provided to the New York Natural Heritage Program so that we may update our database.

Information about many of the rare animals and plants in New York, including habitat, biology, identification, conservation, and management, are available online in Natural Heritage's Conservation Guides at www.guides.nynhp.org.

Information about many of the natural community types in New York, including identification, dominant and characteristic vegetation, distribution, conservation, and management, is available online in Natural Heritage's Conservation Guides at www.guides.nynhp.org. For descriptions of all community types, go to www.nynhp.org/ecological-communities/ for Ecological Communities of New York State.

Appendix E

Freshwater Mussel Survey and Habitat Assessment Report

FINAL REPORT

Freshwater Mussel Survey and Habitat Assessment in Tributary D-1-7 at the C & D Power Systems Site (Huguenot, New York)

prepared for

AECOM, Inc.
125 Broad Street, New York, NY 10004

prepared by

Biodrawversity LLC
206 Pratt Corner Road
Leverett, MA 01054

May 4, 2020

Tributary D-1-7 downstream from the C & D Power Systems site in Huguenot, New York, showing typical instream and riparian habitat.

INTRODUCTION

Biodrawversity LLC conducted a freshwater mussel survey and habitat assessment in a small tributary (denoted D-1-7) of the Neversink River in Huguenot, New York (Orange County). The stream flows adjacent to, and downstream from, the C & D Power Systems site where remediation of legacy contaminants is being planned. The New York State Department of Environmental Conservation (NYSDEC) requested a freshwater mussel survey for the proposed project. There were no records of state-listed or common mussel species from this stream, but the stream flows into the Neversink River where three state-listed or uncommon mussel species are known to occur: dwarf wedgemussel (*Alasmidonta heterodon*), brook floater (*Alasmidonta varicosa*), and alewife floater (*Anodonta implicata*). In lieu of a rigorous mussel sampling protocol, we proposed a 1-day survey and habitat assessment to determine if the stream provided suitable mussel habitat and supported native mussels, because small streams such as these often do not support mussels. Ethan Nedeau conducted the fieldwork; Ethan is recognized as a freshwater mussel expert in the region by the NYSDEC and U.S. Fish and Wildlife Service.

SURVEY DATE & CONDITIONS

Fieldwork was conducted on April 22, 2020. Weather included sunny skies, moderate to strong west winds, and cool temperatures. Water temperature was in the low 50s, and water clarity was high. USGS streamgage data for April 22 indicate that discharge was near or slightly above average in streams in southeastern New York, but had been below average throughout late winter and early spring. The stream's very small size and shallow depth made it easy to survey, except for the two deeper ponds/swamps near the upper end of the study area.

METHODS

A ~1,100 meter reach was assessed (Figure E1). Stream habitat was photographed and described, focusing on habitat parameters most important to mussels: water depth, substrate, flow velocity, and the presence and density of aquatic vegetation and

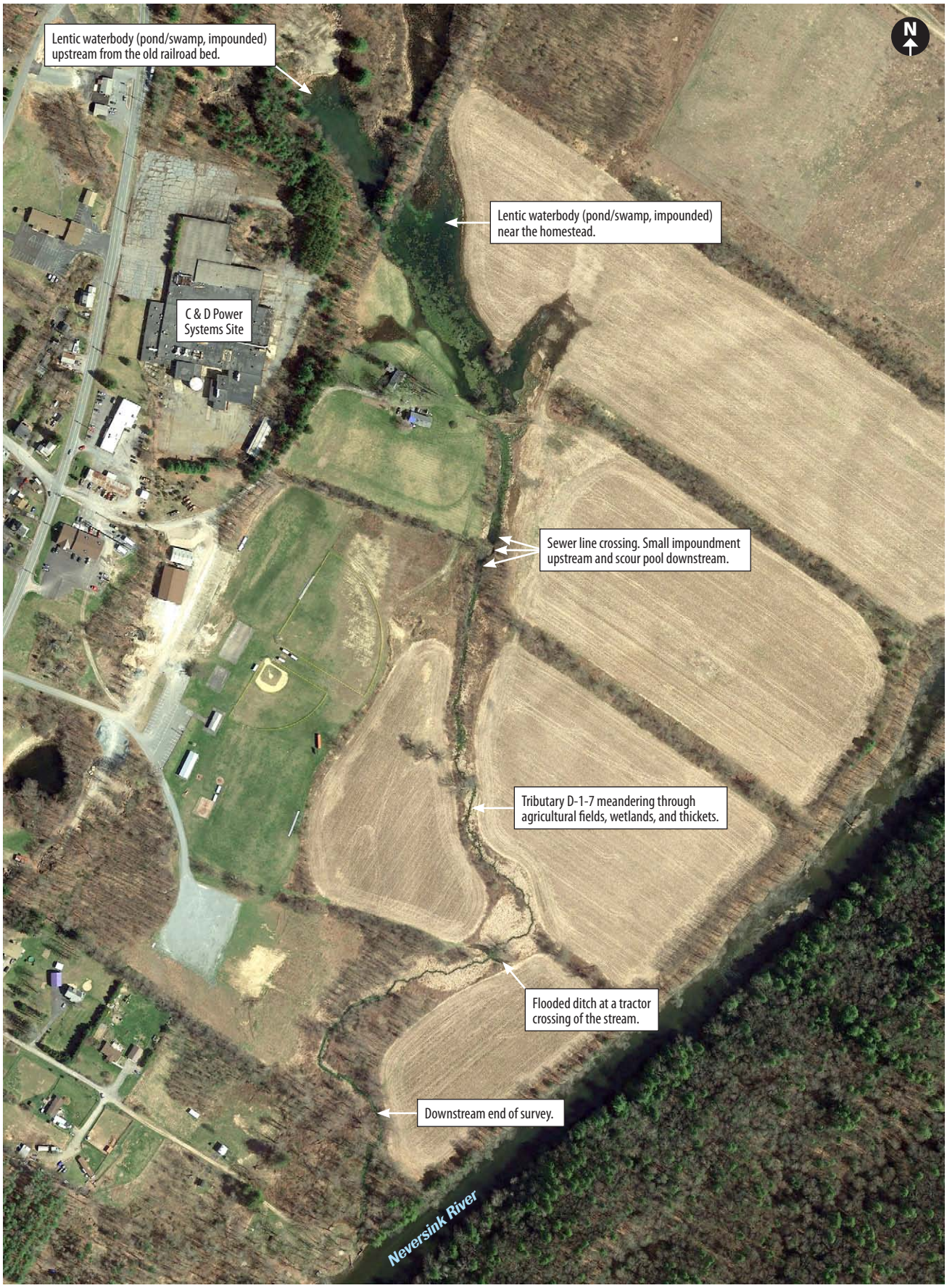


Figure E1. Mussel survey and habitat assessment area in Tributary D-1-7 near the C & D Power Systems site in Huguenot, New York.

Small pond/swamp (impoundment) at the upper end of the study area, near the stormwater discharge point.

Flooded ditch (foreground) and stream flowing past a tree near the agricultural fields toward the downstream end of the survey area.

Eroded and unstable channel near the sewer line crossing.

Narrow wetland-dominated channel near downstream end of the survey area.

other forms of instream cover. Brief surveys, conducted by wading with a clear bottom bucket, were completed along the entire reach, particularly in areas that appear most suitable for freshwater mussels. Stream banks were searched for mussel middens. If mussels had been found, the species and approximate densities would have been recorded, and specimens would have been photographed.

RESULTS AND DISCUSSION

Mussels: No live or dead mussels of any species were found, either in the water or along the streambanks.

Habitat: The stream does not contain suitable habitat for dwarf wedgemussel, brook floater, or alewife floater. Even at comparatively high April flows (compared to seasonal low flow periods), this is a very small stream with a narrow and shallow channel, usually less than 2-3 meters wide and <0.5 meters deep. The stream flows through a fairly expansive herbaceous (grass and sedge) and shrubby floodplain wetland, bounded by shrub thickets and agricultural fields on both sides. In many areas, the stream lacks a clear channel and thalweg, and instead its flows are dispersed over a broad complex of hummocks, woody debris, and accumulations of detritus. Substrate is primarily deep and unstable silt/muck, sand, detritus, and coarse woody debris. Disturbing these sediments, by walking or wading, usually releases bubbles indicating decomposition of organic matter. In these types of stream/wetland habitats, mussels are usually scarce or absent due to several related parameters: shallow depth, unstable and poor substrates, low dissolved oxygen during times of excessive macrophyte growth and decomposition, warm temperatures, desiccation if the channel dries up significantly during low-flow periods, and a low density and diversity of

fish (which may serve as hosts for juvenile mussels) that can tolerate these conditions.

The two ponds/swamps at the upper end both contain deep water and more permanent aquatic habitats that could support native mussels. However, there are few mussel species that could tolerate the poor substrate conditions and high primary productivity (and associated low dissolved oxygen) in these waterbodies. Neither dwarf wedgemussel nor brook floater could survive in these types of habitats. Alewife floater does exist in both lotic and lentic habitats, but rarely ever in such small ponds and only if there is a strong run of its host fish species: alewife or American shad. Neither of these two fish species would be able to exist in this tributary or reach these two small impoundments. The only species that might occur in these two small ponds is the eastern floater, *Pyganodon cataracta*, a very tolerant species that often thrives in small eutrophic waterbodies such as farm ponds and small impoundments.

Conclusion: None of the three state-listed mussel species, or any live or dead mussels of any mussel species, were found during the survey. The stream lacks mussel habitat altogether, primarily due to its very small size and the influence of adjacent wetlands. The impoundments at the upper end of the might only contain low densities of the highly tolerant eastern floater. Contaminant remediation in this area will have no effect on dwarf wedgemussel, brook floater, or alewife floater. However, all three of these species are known to occur in the Neversink River, and any work within and along this tributary should be carefully planned to ensure that contaminants or excessive sediments are not released to the Neversink River.

Small pond/swamp (impoundment) at the upper end of the study area.

Larger pond/swamp (impoundment) near the homestead.

Tributary (marked by strip of greener vegetation) upstream from the sewer line crossing.

Lower end of the tributary where it flows through agricultural lands, thickets, and wetlands.

Appendix F

Memo Summarizing Wetland Condition on September 15, 2022

AECOM
125 Broad St
NYC, NY 10004
www.aecom.com

212 377 8410 tel
212 377 8400 fax

September 28, 2022

Lisa Gorton
New York State Department of Environmental Conservation
625 Broadway
Albany, NY 12233

Dear Lisa,

Re: C&D Power Systems Site No. 336001 – Hydrology and Wetlands Check – Sept 16, 2022.

This letter is a summary of observations made at the C& D Power site in Huguenot, NY, during a site visit on Sept 16, 2022. AECOM visited the site with information that the culvert on Swartwout Road, which had previously been collapsed, had been replaced. AECOM expected that the restoration of water flow through the culvert would result in lowered water levels throughout much of the Project site, which could potentially alter both the wetland limits and the types of habitats present at the site.

Site Condition:
Upon arrival onsite, AECOM observed water levels similar to those observed during field assessments in 2020, and limits of wetlands and other habitat types throughout the Project vicinity did not noticeably differ from those recorded in 2020. Water had backed up upstream of the culvert and was instead flowing over the roadway, reaching what is assumed to be the original streambed further downstream of the culvert, again in a manner similar to that seen in 2020.

Culvert Condition:
Upon closer inspection, the upstream side of the culvert on Swartwout Road was found to be covered in mud and woody debris, having either collapsed or become clogged. Water flow through the culvert was observed to be minimal. A trickling sound could be heard within the culvert, but water surfaces on both sides indicated negligible water flow through the culvert.

There was no evidence of beaver activity. There was no appreciable evidence that the fill over the culvert had been disturbed – fill was not of a different color or type, nor had a different grade from adjacent roadway areas. AECOM staff did not attempt to clear the culvert.

Photos of both the culvert and the observed conditions of the Project Site are included on the following pages. All photos were taken on Friday, Sept 16, 2022.

If you require anything further, please contact me at 646.345.6442 or Andrew.Martin2@aecom.com.

Yours,

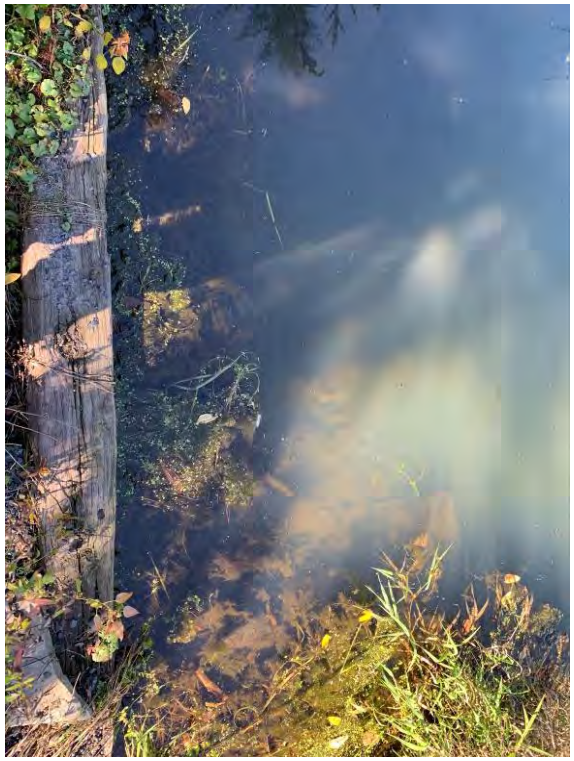
Andrew Martin
Senior Scientist

cc: B. Rung (NYSDEC), A. Haryani, J. Rollino (AECOM).

View of field upstream of culvert. [view north from culvert mouth] Over a foot of standing water covers an area similar to that observed in field visits in August 2020.

Water level approximately 100 ft upstream of culvert. [view looking north]

Water level in the area upstream of the abandoned railway bridge [view looking southeast].



Upstream mouth of Swartwout Road culvert. Dense woody debris and mud covered the culvert opening. Culvert showed no evidence of recent disturbance – fill over culvert was not appreciably different from adjacent roadway.

Downstream opening of Swartwout Road culvert. Minimal water flow was evident.

Water flow over Swartwout Road. Water was approximately 2-inches in depth over roadway [view East from culvert location].

Appendix G

Cultural Resources Documents and Records of Correspondence

Documents Included

NEW YORK STATE OF OPPORTUNITY. Department of Environmental Conservation

STRUCTURAL ARCHAEOLOGICAL ASSESSMENT FORM (SAAF)
Supplement to the Joint Application Form

PART 1 – APPLICANT COMPLETES

APPLICANT INFORMATION

1. Applicant Name: NYSDEC, Division of Environmental Remediation

2. Applicant Address: 625 Broadway, 12th Floor, Albany, NY 12233

PROJECT INFORMATION

3. Project/Facility Name: C&D Power Systems (C&D Batteries), State Superfund Site No. 336001, EPA ID NYD064337298

4. Project/Facility Location: Hamlet of Huguenot, Town of Deerpark, Orange County, New York

5. Is the proposed project adjacent to, or does it contain a building or structure listed in the State or National Register of Historic Places? ☐ Yes ☐ No

6. Are there any buildings or structures 50 years old or older adjacent to or within the proposed project area? ☐ Yes ☐ No

If the answer to question 5 and /or 6 is yes, provide the following information for each building and structure (use attachments if necessary):

a. Name of structure:

b. Location:

c. Type of structure (ex. house, outbuilding, barn, bridge, dam, ruins):

d. Approximate age or date of construction:

7. Might the proposed project have any impact (physical/visual) upon any buildings or structures listed in the State or National Register of Historic Places or 50 years old or older? ☐ Yes ☐ No

If yes, describe briefly (use attachments if necessary):

APPLICANT SECTION CONTINUES ON REVERSE SIDE

8. Provide photographs of every building and structure that may be impacted by the project as described in number 7, on the opposite side of this page. The following standards are recommended:

- Minimum of 2 photographs
- Photographs must be 3.5" x 5" in size or larger
- Photos must be clear and focused
- Digital photographs must be printed on photo paper and be produced at a printer setting of a minimum of 600 dpi
- Clearly label photos so it is obvious what is being illustrated; key photos to map or plan, if possible
- Photo 1: show both the entire front and side of the structure in a single shot from as close to the building as possible. Be sure the structure is not partially or fully blocked by trees or other obstructions
- Photo 2: show relationship of building or structure to roadway or surroundings

9. Has the land within the proposed project area been previously disturbed or altered (excavated, landscaped, filled, utilities installed)? ■ Yes ☐ No

If yes, describe briefly, including depth of disturbance (use attachments if necessary):

Disturbed upland west of stream: C&D building and all assoc. utilities; 15-ft deep lagoon; historic canal bed; historic RR embankment. Two blocked stream crossings below RR have impounded water and created wetlands on east side of stream at lower elevation.

10. Approximate percentage of proposed project area with slopes:

- 0-10% 95 %
- 10-15% 5 %
- 15% or greater ____%

11. Approximate percentage of proposed project site with the following drainage characteristics:

- Well drained 10 %
- Moderately well drained 20 %
- Poorly drained 70 %

Prepared By (Print or type name): Nancy A. Stehling, RPA

Signature: Nancy A. Stehling Date: Oct 12, 2022

RESET PART 1

PART 2 – DEPARTMENT OF ENVIRONMENTAL CONSERVATION (DEC) COMPLETES

APPLICANT/PROJECT INFORMATION

1.Applicant Name: NYSDEC, Division of Environmental Remediation

2. Project/Facility Name: C&D Power Systems (C&D Batteries), EPA ID NYD064337298, NY Superfund

3. DEC Number: 336001

BUILDINGS AND STRUCTURES

4. Might the proposed project have any impact (physical/visual) upon any buildings or structures listed in the State or National Register of Historic Places or 50 years old or older? ☐ Yes ☐ No

If yes, DEC must consult with the Office of Parks, Recreation and Historic Preservation (OPRHP). DEC must request a determination of eligibility for the State Register of Historic Places and/or comments regarding project impact. Include information supplied by the applicant in response to questions 5, 6, 7 and 8 of **Part 1** of this form.

ARCHAEOLOGICAL SITES

5. Does the proposed project area coincide with a circle, square or stippled area on OPRHP's Statewide Archaeological Inventory Map? ■ Yes ☐ No

6. Is the proposed project area outside of a circle or square, but one for which information has been provided (ex: documented reports of known sites) that suggests the area is archaeologically sensitive? ■ Yes ☐ No

If yes, what is the nature and source of information?

CRIS indicates numerous previously identified sites and surveys within 1-mile-radius.

7. Is the proposed project area apparently undisturbed? ☐ Yes ☐ No

8. Will the proposed action include a physical disturbance of the project area? ■ Yes ☐ No

9. Is the slope in the area characteristically less than 15% (unless on limestone/flint escarpments)? ■ Yes ☐ No

DEC SECTION CONTINUES ON REVERSE SIDE

10. Is the proposed project area characteristically moderately well or well drained? ☐ Yes ☐ No

If the answers to 5, 7-10 are yes, an archeological survey should be performed by the applicant. Provide the applicant with a copy of or the link to the *State Historic Preservation Office Phase 1 Archaeological Report Format Requirements (08/05)*.

If the answer to 5 is no, but answers to 6-10 are yes, DEC must consult with OPRHP before requiring that the applicant perform an archaeological survey.

RESULTS OF EVALUATION

☐ SHPA-1 No buildings, structures or archaeological sites identified at the project location.

☐ SHPA-2 Buildings, structures or archaeological sites identified, but no impacts will occur, no survey required. No further cultural resources review required.

☐ Consultation by DEC with OPRHP required. ☐ Structures ☐ Archaeology

☐ Archaeological survey required.

Prepared by: Date:

RESET PART 2

AECOM
125 Broad Street
New York, NY 10004
212.991.2100 tel

September 26, 2022

Bradley W Russell, Ph.D.
Historic Preservation Specialist – Archaeology
New York Office of Parks, Recreation and Historic Preservation
PO Box 189
Waterford, NY 12188-0189

Subject: Phase 1B Archaeological Subsurface Testing Survey
C&D Power Systems Site No. 336001 Remediation
Huguenot, NY

Dear Mr. Russell,

AECOM, on behalf of the New York State Department of Environmental Conservation – Division of Remediation (NYSDEC – DER) has prepared the revised Phase 1B Archaeological Subsurface Testing Survey Report for the proposed remedial activities for the C&D Power Systems Site (NYSDEC Site No. 336001) in Huguenot, New York.

The revised Phase IB Archaeological Subsurface Testing Survey Report presents the results of the C&D Power Systems Site Sediment Removal Project STP surveys conducted during July 2021 and October 2021. This revision addresses the following comments received from SHPO in their response letter dated July 20, 2022:

- A Management Summary Form has been added to the report in compliance with the 2005 Phase I Archaeological Report Format Requirements.
- The report has identified the five areas of sensitivity defined by the Phase IB testing as part of previously identified Precontact Site MRE-TRC-8; USN 07105,000148, first identified by TRC in 2016.
- The USN information will be updated in CRIS using the supplied token when the revised report is uploaded for New York State Historic Preservation Office (SHPO) review.

In addition, the report presents in detail, the protective and avoidance measures that are suitable to protect the resources identified by the Phase IB subsurface testing survey..

Please let me know if you require additional information regarding this request. Should you have any questions, please do not hesitate to contact me at amit.haryani@aecom.com or 732.762.4275.

Sincerely,

Amit Haryani

Amit Haryani, P.E.
AECOM
125 Broad Street
New York, NY 10004

cc: NYCDEC-DER, N. Stehling, J. Rollino (AECOM)

AECOM

Phase IB Archaeological Subsurface Testing Survey for the C&D Power Systems Site Sediment Removal Project

Hamlet of Huguenot, Town of Deerpark, Orange County, NY

New York State Department of Environmental Conservation

NYSDEC Site No. 336001

Project number: 60628872

December 2021
Revised September 2022

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Quality information

Prepared by	Checked by	Verified by	Approved by

Revision History

Revision	Revision date	Details	Authorized	Name	Position

Distribution List

# Hard Copies	PDF Required	Association / Company Name

Prepared for:

NYSDEC Site No. 336001

Prepared by:

AECOM
125 Broad Street
New York, NY 10004
aecom.com

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OPRHP MANAGEMENT SUMMARY

SHPO Project Review Number: **20PR06690**

Involved State and Federal Agencies (DEC, USACE, FHWA, etc.): **NYSDEC, USACE**

Phase of Survey: **Phase IB**

Location: **Hamlet of Huguenot, Town of Deerpark, Orange County**

Minor Civil Division: **Town of Deerpark**

County: **Orange County**

Survey Area Dimensions: July 2021: **High sensitivity area = 94,092 square ft; Moderate sensitivity area = 26,000 square ft. October 2021: Moderate sensitivity area = 56.636 square ft**

Number of Acres Surveyed: **4.06 total acres** (July 2021 2.76 ac; Oct 2021 1.3 ac)

USGS 7.5 Minute Quadrangle Map: **Port Jervis North & Otisville NY**

Archaeological Survey Overview:

Number & Interval of Shovel Test Pits (STPs): **141 STPS excavated: 61 STPs excavated along transects at 15-meter (50 ft) intervals; 80 radial STPs excavated at 1-meter (3 ft) and 3-meter (10 ft) intervals around positive STPs.**

Number & Size of Units: N/A

Width of Plowed Strips: N/A

Surface Survey Transect Interval: N/A

Results of Archaeological Survey:

Number & Name of Precontact Sites Identified: **Five areas of archaeological sensitivity associated with previously identified multi-component site MRE-TRC-8 (07501.000148)**

Number & Name of Historic Sites Identified: **Historic artifact scatter representative of 19th century farmstead remains associated with multi-component site MRE-TRC-8 (07501.000148)**

Number & Name of Sites Recommended for Phase II/Avoidance: **All five areas of sensitivity associated with MRE-TRC-8 (07501.000148) are recommended for avoidance. A Site Avoidance and Protection Plan has been developed.**

Results of Architectural Survey: N/A

Report Author(s): **Nancy A. Stehling, MS, RPA; Jeremy Koch, Ph.D., RPA**

Date of Report: **December 2021; revised September 2022**

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Figures

Tables

Appendices

Attachment

Management Summary

The New York State Department of Environmental Conservation, Division of Environmental Remediation (NYSDEC-DER) is planning to remediate the C&D Power Systems (C&D) Site (NYSDEC Site No. 336001), EPA ID #NYD064337298, in the Hamlet of Huguenot, Town of Deerpark, Orange County, NY in compliance with Record of Decision (NYSDEC, March, 2015). The site is located within the Neversink River Valley and is bordered by U.S. Route 209 to the west and by Tributary D-1-7 to the Neversink River to the east. The project is concerned with the excavation and removal of contaminated sediments from the streambed of Tributary D-1-7 of the Neversink River. Sensitive archaeological areas, although not identified within the site proper, are identified in areas needed to access to the work area. NYSDEC DER is supportive of avoidance and protection measures detailed within this report, as no intrusive work (ground breaking) is necessary in the areas of sensitivity. United States Army Corp of Engineers (USACE), under its Section 106 responsibility, will include consultation with Indian Nations, as part of the Joint Application Permit process.

On October 23, 2020, AECOM, on behalf of NYSDEC DER, submitted a consultation initiation package to the New York State Historic Preservation Office (SHPO) describing the project and requested SHPO's recommendations on next steps in the Section 106 compliance process. SHPO replied on November 9, 2020 and recommended that a Phase IA/IB archaeological survey be conducted, in lieu of a memorandum documenting extensive prior subsurface disturbance to the project site (Perazio 2020). The Phase IA documentary survey report was completed in January 2021. The results of the Phase IA assessment concluded that the Project Area possessed archaeological sensitivity for prehistoric (precontact) and historic resources and recommended that a Phase IB subsurface presence/absence testing survey be conducted. On January 21, 2021, SHPO concurred with the Phase IA recommendation for a Phase IB survey.

The Phase IB scope of work for a shovel test pit (STP) survey was prepared in consultation with SHPO and NYSDEC DER and conducted during July 2021. The STP survey consisted of manual testing on a 15-meter (50-foot) pre-plotted grid. A total of 45 STPs were pre-plotted along seven transects labeled Transect A through Transect G. Due to field conditions at the time of the Phase IB survey, five of the 45 pre-plotted STPs were not excavated. Of the 40 STPs excavated, eight were positive for cultural material. Each positive STP location was further investigated through the excavation of eight radial STPs, for a total of 64. Therefore, the total number of STPs excavated during the Phase IB survey is 104. Thirty-four of the 64 radial STPs were also positive for cultural material.

A total of 116 artifacts were recovered during the Phase IB survey from 42 of the 104 STPs excavated. Of this total, 101 were precontact artifacts, and 15 were historic artifacts. The precontact artifact assemblage includes fire cracked rock (FCR) (*n*=6), debitage (*n*=93), a manuport (*n*=1), and a unifacial stone tool (*n*=1). All artifacts were recovered from Ap and A horizon contexts. No precontact features such as hearths, storage pits or earth ovens for cooking were identified during the Phase IB STP survey. The 15 historic artifacts recovered represent a scatter of historic material likely related to 19th through 20th-century occupation of the area.

Subsequently, based on the guidance received during the phone conversation between Ms. Jessica Schreyer (Scientist Archaeology, SHPO) and Mr. Benjamin Rung, NYSDEC on October 13, 2021, a Supplemental Phase 1B STP survey was undertaken of the areas located to the west of the proposed sediment handling area on October 27 and 28, 2021. The STP survey consisted of manual testing on a 15-meter (50-foot) pre-plotted grid. A total of 21 STPs were pre-plotted along six transects labeled Transect H through Transect M. Of the 21 STPs excavated, two were positive for cultural material. Each positive STP location was further investigated through the excavation of eight radial STPs, for a total of 16. Therefore, the total number of STPs excavated during the Supplemental Phase IB STP survey was 37. Five of the 16 radial STPs were also positive for cultural material.

A total of 14 artifacts were recovered during the Supplemental Phase IB survey from seven of the 37 STPs excavated. Of this total, 12 were precontact artifacts, and 2 were historic artifacts. The precontact artifact assemblage includes fire cracked rock (FCR) (*n*=1), debitage (*n*=10), and a partial projectile point tool (*n*=1). All artifacts were recovered from Ap plow zone contexts. No precontact features such as hearths, storage pits or earth ovens for cooking were identified during the Phase IB STP survey. The 2 historic artifacts recovered represent a scatter of historic material likely related to 19th through 20th-century occupation of the area.

It is noted that no temporally or culturally diagnostic precontact artifacts such as dateable projectile points and pottery were recovered in any of the positive STPs during either of the Phase 1B STP surveys. In other words, it was not possible to assign dates or tribal affiliations to the precontact artifacts recovered. In addition, no precontact features such as hearths, storage pits or earth ovens for cooking were identified during either of the Phase IB STP surveys. However, fire-cracked

rocks of quartzite and sandstone indicate the potential for hot-rock cooking (i.e., earth ovens) or heating facilities (i.e., hearths) in the area, although no such features were identified in the field.

The Phase IB artifact analysis has indicated that there are five areas of precontact archaeological sensitivity within the C&D Power Systems Site Sediment Removal Project Survey Area. The five areas of archaeological sensitivity were delineated based on the positive STPs, with a 25-foot buffer surrounding each. These areas are shown on Figures 4-1a and 4-1b. The five areas of sensitivity are summarized below, and each description includes the engineering controls proposed as the Avoidance and Protection Plan for that area of sensitivity.

- **Area 1:** located in the northern portion of the Survey Area, and focused on positive STP F 8 on the west bank of the tributary, north of the agricultural fields. The extent of this area is delineated by documentation of no temporally or culturally diagnostic precontact artifacts at STP F 9 to the south, STP F7 to the north and the APE boundaries to the east and west of the location. STP F 8 is located within the route of the proposed Access Road. The Avoidance and Protection Plan proposed for this area includes the placement of temporary construction mats over the entire delineated boundary of Area 1. The temporary construction matting would consist of interlocking, high-strength DURA BASE® composite material mats or equivalent that are designed for use in environmentally sensitive areas and specifically to avoid ground disturbance and compaction impacts.

- **Area 2:** located in the southeastern portion of the Survey Area, and includes positive STPs B 3, B 4, C 3, and D 2. Each of the initial positive STPs are within 15 meters (50 feet) of each other along the transect grid. Subsequent to the completion of the Phase 1B sampling in July 2021, the sensitive area including positive STPs B 3, B 4, and C 3 is now excluded from the APE/Project Area. AECOM has relocated the Sediment Staging, Mixing and Drying Area, the Water Treatment System Containment Area, and portion of Access Road further west to areas that do not possess sensitivity. The extent of this area is delineated by documentation of no temporally or culturally diagnostic precontact artifacts at STP C 5 , STP C 4 and the APE boundary to the east, STP C 2 and STP B 2 to the north, STP B 3+10W and STP A11 to the west and the APE boundaries to the south of the location. The Avoidance and Protection Plan proposed for this area includes installation of a chain link fence around the boundary of Area 2 as delineated by negative STPs above. Positive STP D 2 is in the eastern portion of Area 2, along the adjacent proposed Access Road. The Avoidance and Protection Plan proposed for this area includes the placement of temporary construction mats over the entire width of the proposed Access Road, running northward as a continuation of the temporary construction matting across Positive STPs D 4 and D 5 (Area 3). The temporary construction matting would consist of interlocking, high-strength DURA BASE® composite material mats or equivalent that are designed for use in environmentally sensitive areas and specifically to avoid ground disturbance and compaction impacts.

- **Area 3:** located in the southeastern portion of the Survey Area, closest to the southern terminus of the sediment removal zone, and includes positive STPs D 4 and D 5. Positive STP D 4 , STP D 5, and their radials are located in the proposed Access Road along the western bank of Tributary D-1-7, and the proposed route of diversion pipe in the Stream Diversion Corridor. The extent of this area is delineated by documentation of no temporally or culturally diagnostic precontact artifacts at STP D 6 to the south, STP D 1 to the north and the APE boundaries to the east and west of the location. The Avoidance and Protection Plan proposed for this area includes the placement of temporary construction mats over the entire delineated boundary of Area 3. The temporary construction matting would consist of interlocking, high-strength DURA BASE® composite material mats or equivalent that are designed for use in environmentally sensitive areas and specifically to avoid ground disturbance and compaction impacts.

- **Area 4:** located in the southwestern portion of the supplemental Survey Area, and focused on positive STP J 5, west of the proposed Water Treatment System Containment Area. Radial STPs were excavated and three were positive for precontact cultural material. The extent of this area is delineated by documentation of no temporally or culturally diagnostic precontact artifacts at STP J 5+3S to the south, STP J 5+3E to the east, STP J 5+3N to the north, and STP J 5+3W to the west. The Avoidance and Protection Plan proposed for this area includes installation of a chain link fence around the entire delineated boundary of Area 4.

- **Area 5:** located in the northwestern portion of the supplemental Survey Area, and focused on positive STP J 2, west of the proposed Sediment Staging, Mixing and Drying Area. Radial STPs were excavated and two were positive for precontact cultural material. The extent of this area is delineated by documentation of no temporally or culturally diagnostic precontact artifacts at STP J 2+3S to the south, STP J 2+3E to the east, STP J 2+3N to

the north, and STP I 2 to the west. The Avoidance and Protection Plan proposed for this area includes a combination of the installation of a chain link fence and placement of temporary construction mats over a portion of the delineated boundary of Area 5. The temporary construction matting would consist of interlocking, high-strength DURA BASE® composite material mats or equivalent that are designed for use in environmentally sensitive areas and specifically to avoid ground disturbance and compaction impacts.

The number of precontact artifacts recovered during the Phase IB presence/absence survey suggests the presence of a nearby precontact archaeological site. Given the proximity of previously identified precontact site MRE-TRC-8 (07501.000148), it is probable that the precontact artifacts encountered during the Phase IB survey are associated with that site. Site MRE-TRC-8 (07501.000148) was first encountered and identified in 2016 as a multi-component site, having both precontact and historic components. The prehistoric component of the site consists of a lithic scatter concentrated in the southern portion of the site area. According to the mapping provided in the TRC report, this southern portion is in proximity to Sensitivity Areas 2 and 3 as identified along Transects B, C, and D through the 2021 Phase IB survey.

Site MRE-TRC-8 (07501.000148) was recommended as potentially eligible for listing in the National Register by TRC in 2016. A site avoidance plan was recommended by TRC.

Although sensitive areas have been identified, none of these areas are subject to intrusive (ground breaking) work. In accordance with Section 106 guidelines, NYSDEC is supportive of projection and avoidance measures to preserve areas that could be the subject for future research by others. NYSDEC-DER is not in the position to support further research under NYS Superfund Program; however, we understand that concurrence is needed under the provisions of Section 106, including consultation with Indian Nations. The USACE will incorporate consultation with Indian Nations as part of its Section 106 responsibility. For consideration, a protection and avoidance plan is detailed in this document to support moving forward without a Phase II Investigation.

The Avoidance and Protection Plan proposed by AECOM on behalf of the NYSDEC includes a combination of installing chain link fence to avoid archaeologically sensitive areas and the placement of temporary construction mats over the areas within the proposed work corridor as a protective measure. The temporary construction matting would consist of interlocking, high-strength DURA BASE® composite material mats or equivalent that are designed for use in environmentally sensitive areas. More specifically, the mats are intended to prevent ground disturbance and compaction impacts. All vehicle traffic at the project site would be accessed over the temporary construction matting using low-pressure, rubber tire vehicles. An excavator would be utilized to install the temporary construction mats and would use an installation method by which the mats are installed ahead of the excavator to ensure that the excavator is always on top of the mats. The temporary construction matting will be removed manually from ground surface once the site work is complete.

1. Introduction

The New York State Department of Environmental Conservation, Division of Environmental Remediation (NYSDEC DER) is planning to remediate the C&D Power Systems (C&D) Site (NYSDEC Site No. 336001) in the Hamlet of Huguenot, Town of Deerpark, Orange County, New York (Figure 1-1). The site is located within the Neversink River Valley and is bordered by U.S. Route 209 to the west and by Tributary D-1-7 to the Neversink River to the east. The project will include the excavation and off-site disposal of PCB impacted sediments from the streambed of Tributary D-1-7, a tributary to the Neversink River. The archaeological study area is located upland of the sediment removal area and is the primary access point to the stream. NYSDEC is under an access agreement with the County for use of this property to support the project.

1.1 Location and Description of Project Area

The C&D site is located within the Neversink River Valley, approximately four miles northeast of Port Jervis. The project location includes a small stream corridor bordered by lawns, agricultural fields and other natural areas.

The main site features include an approximately three-acre industrial building, constructed c.1958, formerly used for the manufacturing of lead batteries and is currently unoccupied, as well as a 175-foot-diameter lagoon, located approximately 75-feet northeast of the former industrial building. This lagoon formerly discharged to Tributary D-1-7 that runs along the east side of the Site. Tributary D-1-7 flows south to where it joins the Neversink River approximately 0.5-miles south of the C&D site. The C&D buildings and lagoon area are immediately surrounded by parking lots and paved roads.

The former C&D site industrial buildings are located on a bluff that is some 30-40 feet in elevation higher than Tributary D-1-7. The ground surface is relatively horizontal with an elevation that ranges from approximately 469 to 475 feet above mean sea level (National Geodetic Vertical Datum of 1988) over most of the site, aside from where elevations drop-off toward Tributary D-1-7 at the rear (east) of the property. South of the C&D facility the land is generally flat and dominated by agricultural fields. The headwaters of Tributary D-1-7 consist largely of an underground stream that emanates from the base of the bluff in the northwestern portion of the Project Area. Also, small rivulets in the northeast portion of the Project Area contribute minor amounts of hydrology. Several hundred feet northeast of the Project Area, beaver damming activity has also altered the hydrology.

In the Project Area, Tributary D-1-7 passes through an opening in an abandoned railroad embankment that once supported a bridge that crossed the stream for the Port Jervis Monticello & New York Railroad (reorganized in 1875), later the New York, Ontario & Western Railroad (Figure 1-2a). Tributary D-1-7 flows through two additional crossings in the Project Area: Swartwout Road and the Southern Crossing. Both crossings were used to allow agricultural machinery to cross the tributary. The Swartwout Road location still serves as a viable crossing and appears to be recently used. The Southern Crossing is located along a sewer easement, near a manhole noted on project mapping, and is no longer in condition to support machinery (Figure 1-2b).

The crossings are generally made of stone with 12-inch-diameter culvert pipes underneath to permit the flow of the tributary under the crossings. Within the last several years, the piping at both crossings have become fouled, and the crossings now act as weirs, impounding the water upstream. Review of aerial photographs show that Tributary D-1-7 north of Swartwout Road was generally approximately 20-feet-wide and likely less than 1-foot in depth, and today the ponded area is over 175-feet-wide. The ponded areas vary in depth, up to three-feet-deep in spots.

1.2 Regulatory Framework

The cultural resources component of this project is being conducted in compliance with the guidelines established in Section 106 of the National Historic Preservation Act of 1966, as amended (NHPA), the New York State Environmental Quality Review Act (SEQRA), and Section 14.09 of the New York State Historic Preservation Act (NYSHPA).

NYSDEC DER is submitting permit applications to obtain authorization to perform dredging within the streambed of Tributary D-1-7. It is anticipated that this work will be authorized using the United States Army Corps of Engineers (USACE) Nationwide Permit 38 (NWP 38) for Cleanup of Hazardous and Toxic Waste, and a joint application to the USACE and NYSDEC will be submitted to obtain authorization for the project. Section 106 consultation falls under the purview of the USACE permit authorization. USACE will incorporate consultation with Indian Nations as part of its Section 106 responsibility.

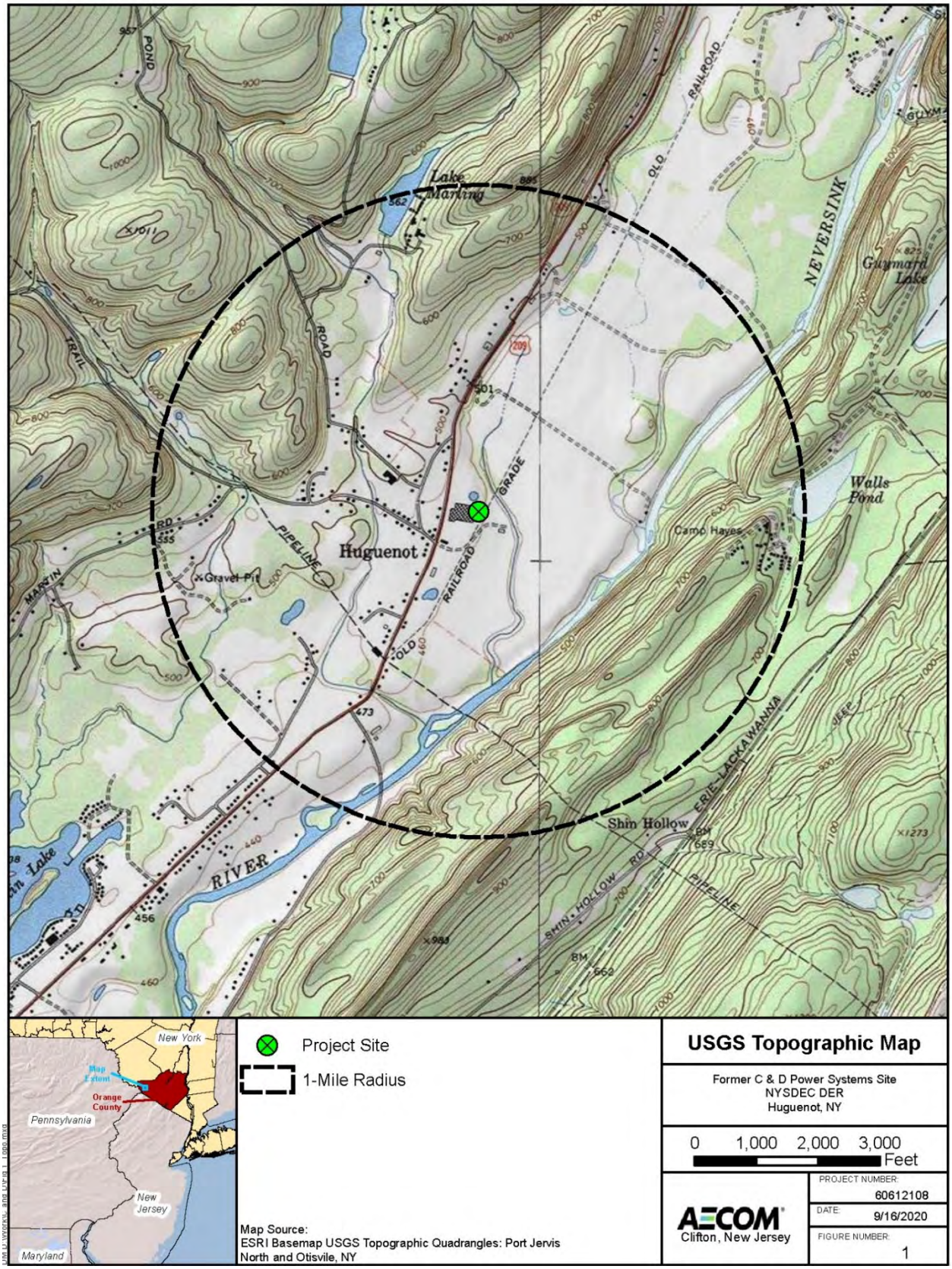

Figure 1-1: C&D Project Site Location and 1-Mile Radius

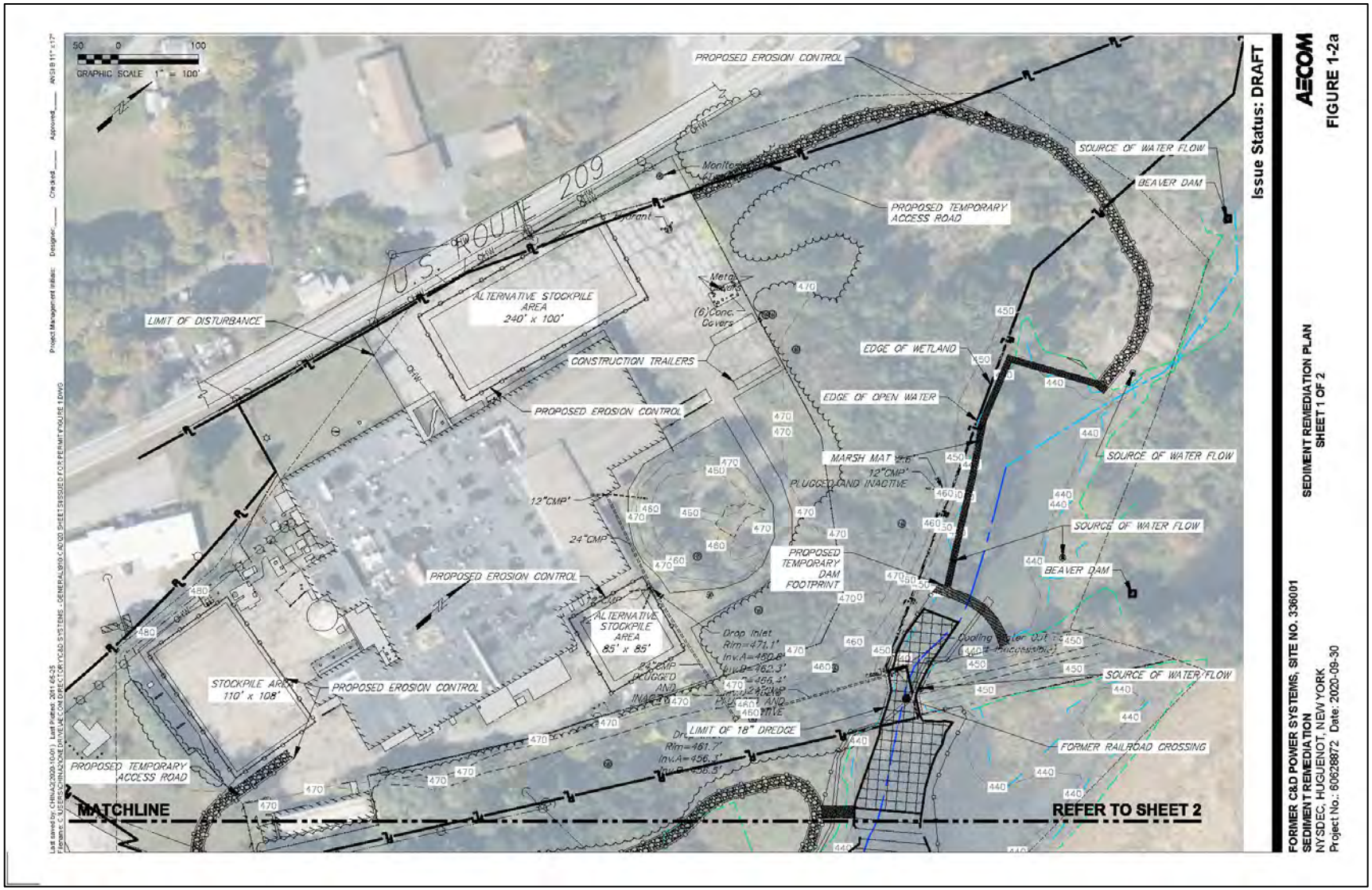

Figure 1-2a: Sediment Remediation Plan North

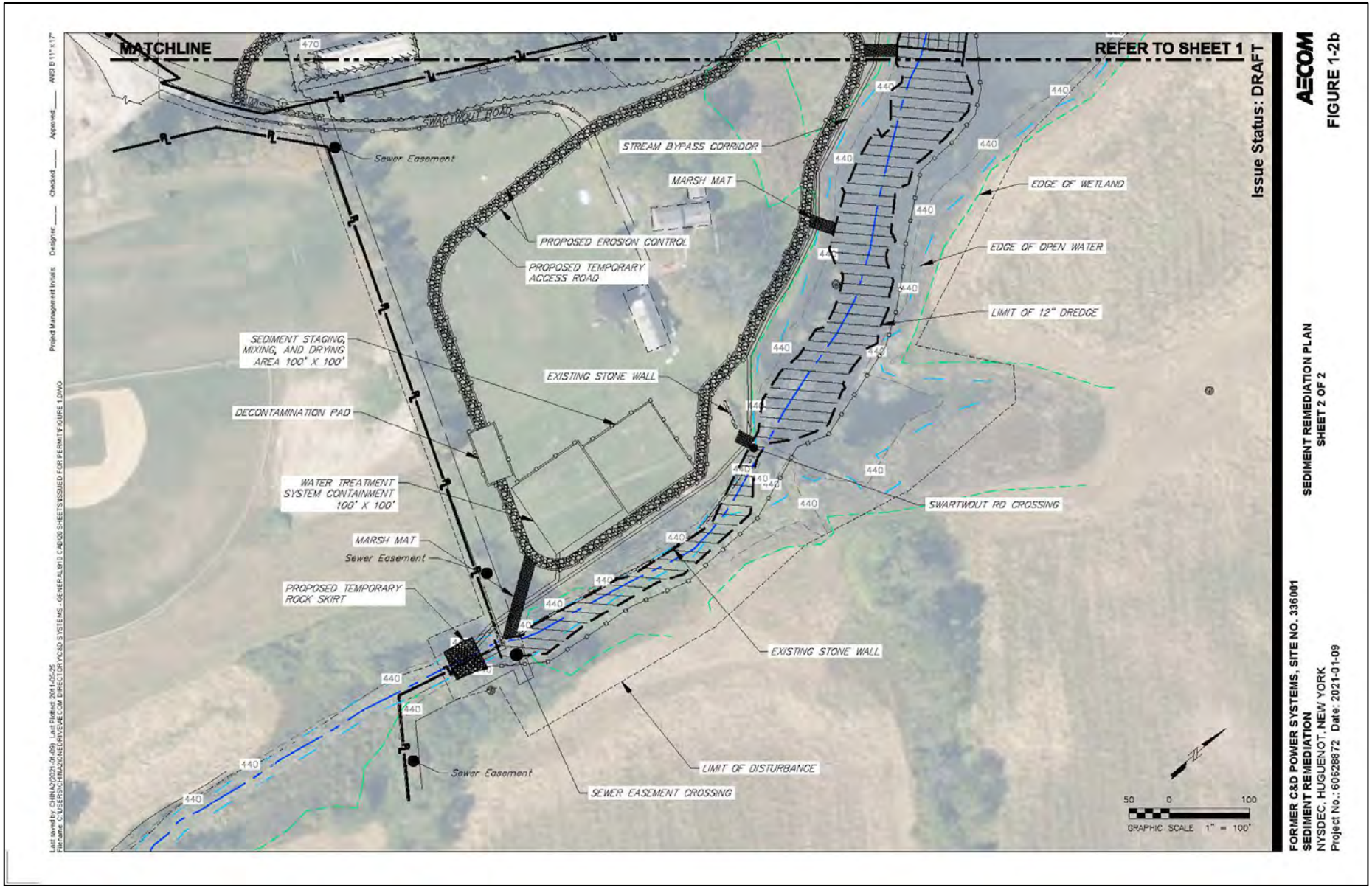

Figure 1-2b: Sediment Remediation Plan South

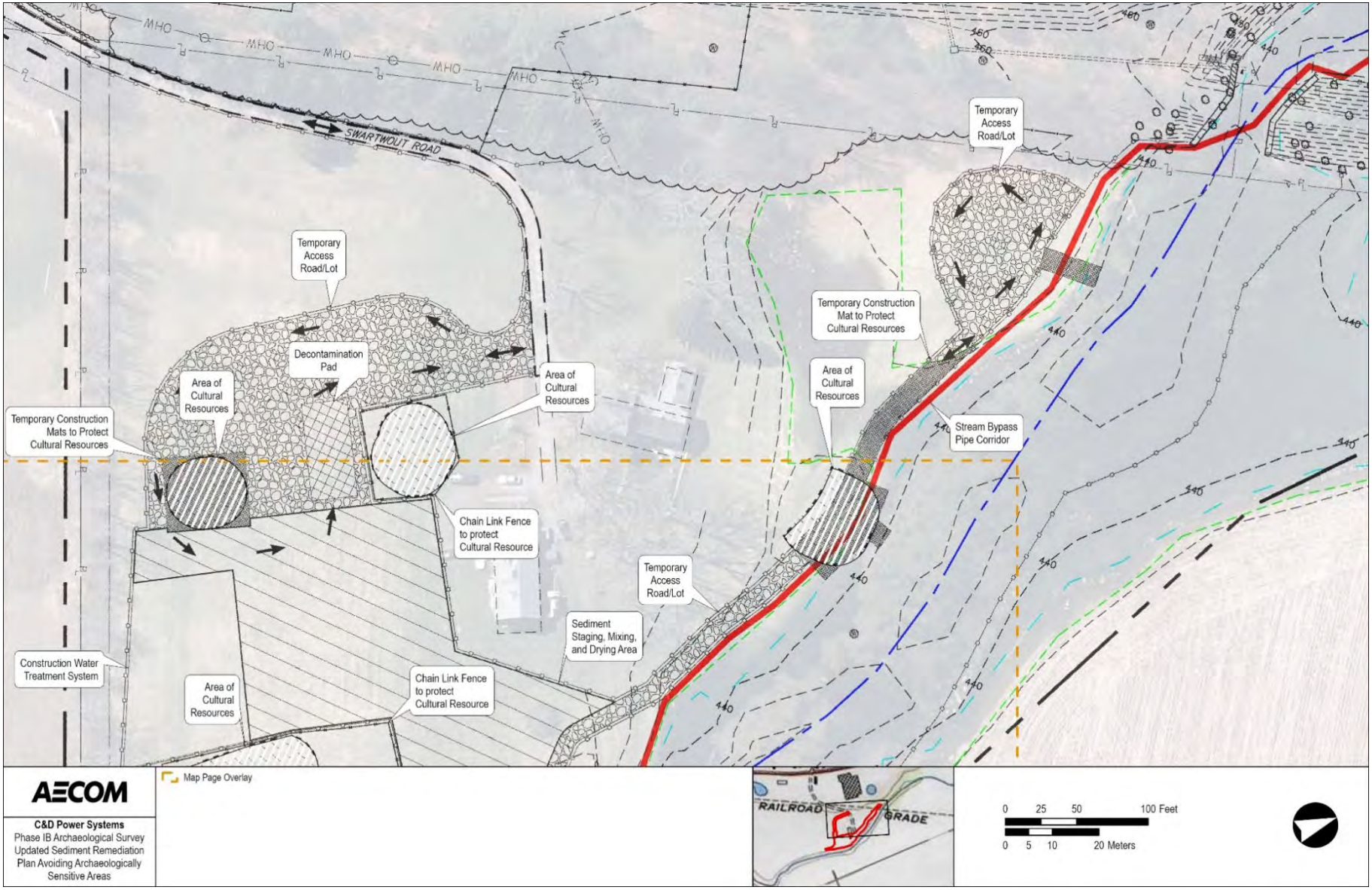

Figure 1-2c: Updated Sediment Remediation Plan Northwest

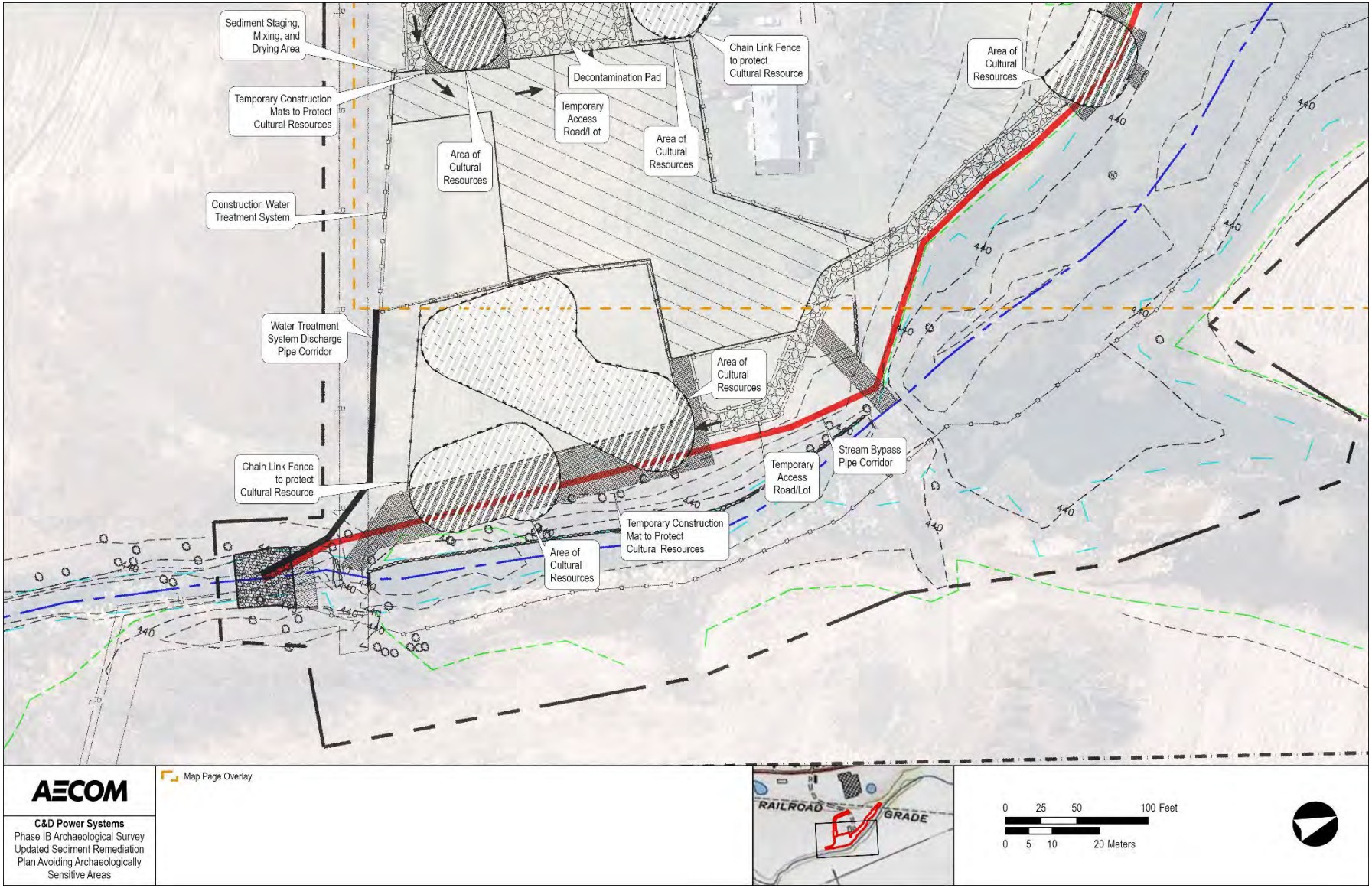

Figure 1-2d: Updated Sediment Remediation Plan Southeast

1.3 Project Consultation History

On October 23, 2020, AECOM, on behalf of NYSDEC DER, submitted a consultation initiation package to the New York State Historic Preservation Office (SHPO) describing the project and requested SHPO's recommendations on next steps in the Section 106 compliance process. SHPO replied on November 9, 2020 and recommended that a Phase IA/IB archaeological survey be conducted, in lieu of a memorandum documenting extensive prior subsurface disturbance to the project site (Perazio 2020). The Phase IA documentary survey report was completed in January 2021 to assess the archaeological sensitivity of the C&D sediment removal Project Area, and to determine if a Phase IB subsurface testing survey was warranted.

The results of the Phase IA assessment concluded that the Project Area possessed archaeological sensitivity for precontact and historic resources, and recommended that a Phase IB subsurface presence/absence testing survey be conducted. The Phase IA report included a proposed Phase IB survey scope of work as an attachment when it was submitted to SHPO for review. On January 21, 2021, SHPO concurred with the Phase IA recommendation for a Phase IB survey. The one comment on the attached Phase IB scope of work was to note that in the event of positive shovel test pits (STPs), the subsequent radial STPs should be placed at 1 meter and 3 meters in each cardinal direction from the positive STP (Perazio 2021). The scope of work was subsequently revised through consultation with SHPO and a 50-foot grid interval was proposed for the Survey Area. SHPO concurred with the revised scope of work on April 13, 2021. All project correspondence with SHPO is included in Appendix C.

On October 15, 2021, Mr. Benjamin Rung, NYSDEC participated in a phone consultation meeting with Ms. Jessica Schreyer (Scientist Archaeology, SHPO) to share the findings of the Phase 1B STP Survey and scope of work for the Supplemental Phase 1B Survey, During the phone conversation, SHPO approved additional STPs on a 50-foot grid interval in the areas to the west of the proposed Sediment Staging, Mixing and Drying Area and the Water Treatment System Containment Area.

The Phase IB report was submitted to SHPO for review on June 28, 2022. Bradley Russell, Archaeological Reviewer at SHPO, responded in a letter dated July 20, 2022 (Appendix C). The letter requested that a Management Summary Form be prepared as well as additional edits to the body of the text.

This revised Phase IB survey report presents the results of the C&D Power Systems Site Sediment Removal Project STP surveys conducted during July 2021 and October 2021.This revision addresses the following comments received from SHPO in their response letter dated July 20, 2022:

- A Management Summary Form has been added to the report in compliance with the 2005 Phase I Archaeological Report Format Requirements.
- The report has identified the five areas of sensitivity defined by the Phase IB testing as part of previously identified Precontact Site MRE-TRC-8; USN 07105,000148, first identified by TRC in 2016.
- The USN information will be updated in CRIS using the supplied token when the revised report is uploaded for SHPO review.
- AECOM will submit the revised report in PDF format.

Although a Phase II archaeological investigation was requested by SHPO, NYSDEC asserts that protective and avoidance measures will be suitable to protect the resources identified by the Phase IB subsurface testing survey. NYSDEC respectfully requests the Agency to evaluate the revisions to this report before making a final determination on the need for a Phase II archaeological investigation.

USACE, under their Section 106 consultation responsibility, will consult with Tribal Nation representatives regarding the need for a Phase II archaeological investigation.

1.4 Archaeological Area of Potential Effect (APE)

Archaeological resources are concerned with direct effects caused by subsurface disturbances to previously undisturbed soils or minimally disturbed soils associated with the execution of project actions. The Archaeological APE includes two

components: the horizontal APE, which is the footprint of proposed ground disturbance; and the vertical APE, which is considered as the depth to which the proposed ground disturbance is anticipated to extend.

The C&D Project Phase IA study Archaeological APE included all areas within the Project Area limits that would be subject to subsurface disturbance because of the actions required to complete the proposed sediment removal project. All project action components were described and discussed in the Phase IA study. All components of the initial and updated sediment remediation plan are depicted on Figures 1-2a through 1-2d.

The Phase IB Survey Area was determined through consultation with SHPO and the NYSDEC DER. Not every project action described and discussed in the Phase IA report was considered to have the potential for impacting potential archaeological resources. The project actions that are components of the Survey Area, and thereby comprise the Phase IB Archaeological APE, are discussed individually below in Section 1.5.

1.5 Phase IB Survey Area Project Actions

The current project is concerned solely with the removal of contaminated sediments from the streambed of Tributary D-1-7. Multiple project actions are required to carry out and complete the sediment removal project. Most of these actions require some form of construction, and many involve potential ground disturbance. The footprints of those actions that will create subsurface disturbance and could directly impact potential archaeological resources collectively comprise the Phase IB Survey Area, or Phase IB Archaeological APE. As stated above, the Phase IB Survey Area was determined through consultation with SHPO and the NYSDEC DER. The project components that comprise the Survey Area are discussed individually below.

1.5.1 Sediment Excavation

Dredging of sediments will be accomplished by mechanical methods, utilizing heavy equipment. Access for heavy equipment to the streambed will likely be from the north, in the vicinity of the proposed temporary dam north of the abandoned railroad embankment. On the west bank of Tributary D-1-7 below the abandoned railroad embankment crossing, there is a large flat parcel of land on which the major sections of Access Roads, sediment stockpile areas, sediment staging, mixing and drying area, water treatment system containment area, and vehicular contamination pad will be constructed (Figures 1-2a through 1-2d).

1.5.2 Access Roads

Access Roads will be constructed to move heavy machinery into position to excavate the contaminated sediments from the streambed, and to haul truckloads of excavated sediments across the site areas for initial processing and stockpiling. The roads will be at least 12-feet-wide, with a maximum width of 25-feet. Typical equipment will include 70,000-pound excavators (2-3), 20,000 to 30,000-pound off road haul trucks (2-4), a 25,000 to 35,000-pound front end loader, and a 25,000 to 35,000-pound bulldozer.

The proposed temporary Access Road locations are depicted on Figures 1-2a through 1-2d.

The section of proposed Access Road along the top of the west bank of Tributary D-1-7 is considered to possess high potential for archaeological resources, and was included in the Phase IB Survey Area. The section of Access Road that turns west and then continues north to Swartwout Road is considered to possess moderate potential for archaeological resources, and was also included in the July 2021 Phase IB Survey Area (Figures 1-3a and 1-3b).

1.5.3 Temporary Construction Mats – Protection of Sensitive Areas

Temporary Construction Mats will be installed in the areas of archaeological sensitivity that cannot be protected via fencing to facilitate the movement of heavy machinery in concert with the proposed Access Roads. The temporary construction matting would consist of interlocking, high-strength DURA BASE® composite material mats or equivalent that are designed for use in environmentally sensitive areas and specifically to avoid ground disturbance and compaction impacts. All vehicle traffic at the work site would be accessed over the temporary construction matting using low-pressure, rubber tire vehicles. An excavator would be utilized to install the temporary construction mats and would use an installation method by which the mats are installed ahead of the excavator to ensure that the excavator is always on top of the mats. The temporary construction matting will be removed manually from ground surface once site work is complete. The temporary construction mats will also facilitate access for construction equipment between the sediment dredging area in the streambed and the temporary Access Road to allow for the dredge material to be transferred to trucks and brought to the Sediment Staging,

Mixing, and Drying Area located in the upland area on the west side of the stream. The temporary construction mat locations are depicted on Figures 1-2c and 1-2d.

The Temporary Construction Mats will bridge the area between the west bank of the stream and the temporary Access Road, which also includes the proposed corridor of the diversion pipe (Figures 1-2c and 1-2d). Temporary Construction Mats will be placed above the diversion pipe, and it will be protected. Typically, pipe crossings are accomplished by "bridging" over the pipe by stacking multiple mats to provide a space under the bridge that is equal in height to the pipe. The Temporary Construction Mat locations on the west bank of Tributary D-1-7 possess high archaeological sensitivity, and were included in the July 2021 Phase IB Survey Area (Figures 1-3a and 1-3b).

1.5.4 Stream Diversion

Excavation of the stream will require diverting the flow into a temporary pipeline to transport water downstream past the remediation area. The diversion pipe would measure approximately 1,250 feet in length, with an assumed diameter of 24 inches. Figures 1-2c and 1-2d depict this stream bypass corridor. Upstream of the former rail line, the temporary dam would be placed to collect the water and divert it into the pipe.

From the tributary crossing at the abandoned railroad embankment southward, the pipe will be laid on the ground along the west bank of Tributary D-1-7. It is likely that the pipe will be staked to prevent horizontal movement. At the southern end of the pipe, a Rock Skirt will be constructed where the diverted water reenters the tributary to prevent erosion (Figure 1-2d). The route of the diversion pipe from the abandoned railroad embankment southward along the west bank of Tributary D-1-7 to the Rock Skirt possesses high archaeological potential, and was included in the July 2021 Phase IB Survey Area (Figures 1-3a and 1-3b).

1.5.5 Temporary Dam

The Temporary Dam will be installed north of the abandoned railroad embankment and sediment removal zone to divert the stream and impounded water into the diversion pipe (Figure 1-2c).

This is proposed as a Temporary Dam, and the materials for the dam will be determined by the contractor. No sheet piles will be installed, and the materials will be removed upon completion of construction. It is anticipated that little to no ground disturbance will occur at the location, as it is likely that the dam will be anchored by simple gravity. The temporary dam location was not included in the Phase IB Survey Area.

1.5.6 Sediment Staging, Mixing, and Drying Area

A Sediment Staging, Mixing, and Drying area measuring 100-feet by 100-feet was proposed adjacent to the Access Road in the upland area west of Tributary D-1-7 (Figure 1-2b). Upon completion of the Phase 1B Survey in July 2021, this location (Figure 1-3b) was deemed to possess high archaeological potential. Subsequently, this area was excluded from the APE as part of the Avoidance and Protection Plan. The Avoidance and Protection Plan includes relocating the sediment storage, mixing and drying to areas further west of the former proposed location. The updated locations are depicted on Figures 1-3c and 1-3d. The new location was tested during the October 2021 STP survey.

1.5.7 Water Treatment System Containment Area

There will be onsite dewatering and treatment of construction water. A proposed Water Treatment System Containment Area measuring 100-feet by 100-feet will be constructed adjacent to the Access Road in the upland area west of Tributary D-1-7. This area will be located to the south and adjacent to the Sediment Staging, Mixing, and Drying Area (Figure 1-3b). Upon completion of the Phase 1B Survey in July 2021, this location (Figure 1-3b) was deemed to possess high archaeological potential, and is excluded from the APE as part of the Avoidance and Protection Plan. The Avoidance and Protection Plan includes relocating the water treatment system further west of the former proposed location. The updated location is depicted on Figures 1-3c and 1-3d. The new location was tested during the October 2021 STP survey.

1.5.8 Decontamination Pad

Decontamination of on-site heavy equipment will be performed as necessary prior to the equipment leaving the project site to minimize the potential spreading of contamination. All decontamination of equipment will occur within a designated decontamination zone. The Decontamination Pad is depicted on Figure 1-2b, and measures approximately 80-feet by 40-feet. The proposed pad straddles the Access Road leaving the Water Treatment System Containment area to the east. An associated sump will be installed within the pad. The existing subgrade will be grubbed and sloped to the area sump. This

location possesses moderate archaeological potential, and was included in the July 2021 Phase IB Survey Area (Figure 1-3b).

The location has been updated and is depicted on Figures 1-3c and 1-3d. The new location was tested during the October 2021 STP survey.

1.5.9 Stream Crossings

It is anticipated that the two stream crossings (Swartwout Road and the Southern Crossing) will be removed prior to sediment removal activities (Figure 1-2b).

Areas along the west bank of the Tributary D-1-7 leading up to the crossings possess high archaeological potential and were included in the Phase IB Survey Area (Figure 1-3b). However, the crossings themselves do not possess archaeological potential due to extensive prior subsurface disturbance.

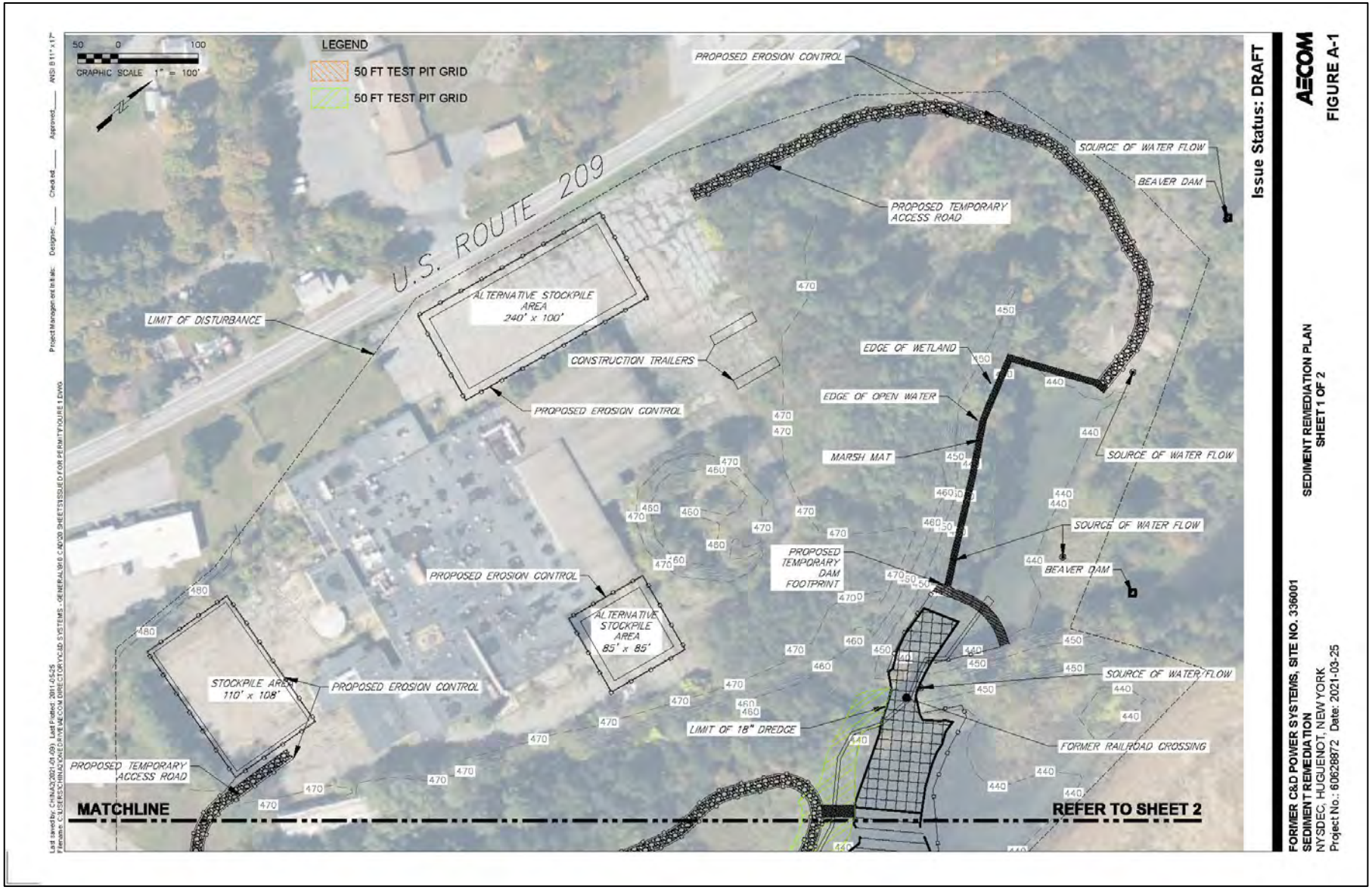

Figure 1-3a: Initial Phase IB Survey Area July 2021

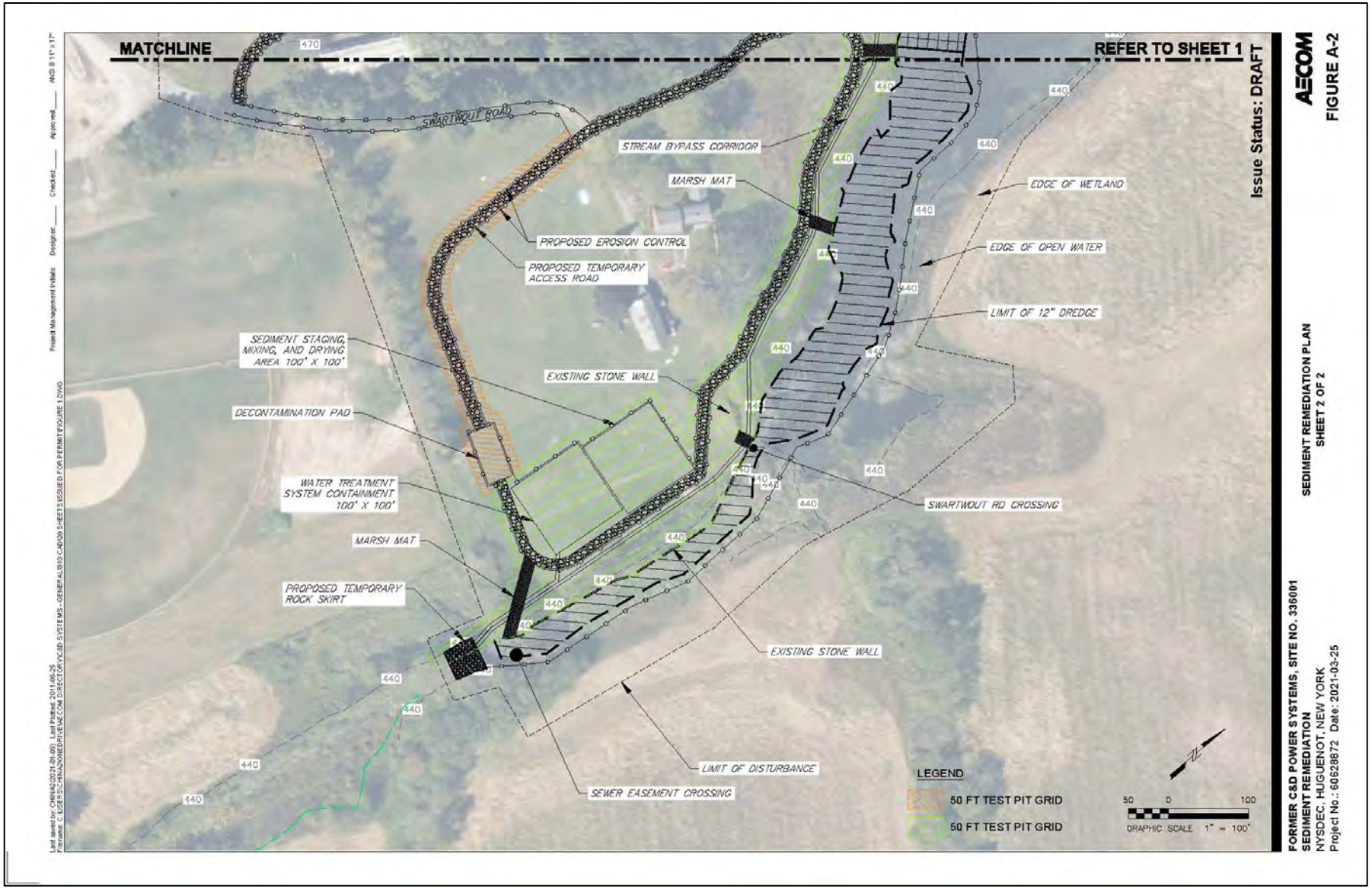

Figure 1-3b: Initial Phase IB Survey Area July 2021

Figure 1-3c: Updated Phase IB Survey Areas

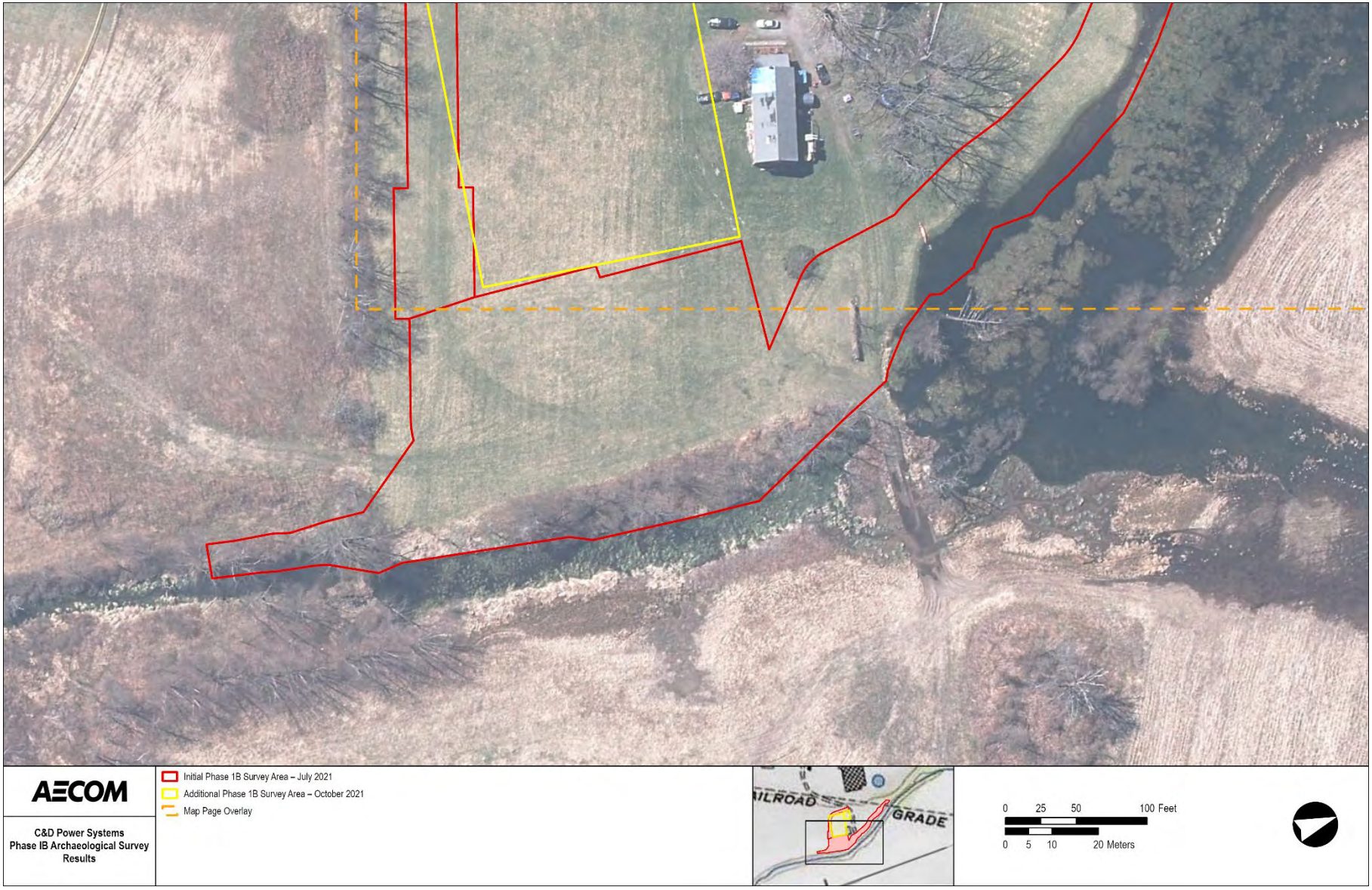

Figure 1-3d: Updated Phase IB Survey Areas

1.6 Phase IB Survey Area

Figures 1-3a through 1-3d depict the areas of high and moderate archaeological sensitivity that were tested during the July 2021 and October 2021 Phase IB surveys. These areas were developed through consultation with the SHPO and NYSDEC DER.

1.6.1 High Sensitivity

The area hatched in green along the sediment removal zone on the west side of Tributary D-1-7 includes the crossing of the abandoned railroad embankment; the longest section of proposed Access Road; the proposed locations of Marsh Mats (Temporary Construction Mats); the proposed location of the Stream Diversion Pipe; the Sediment Staging, Mixing and Drying Area; the Water Treatment System Containment Area; the Swartwout Road crossing of Tributary D-1-7; the Southern Crossing of Tributary D-1-7; and the Rock Skirt at the southern end of the sediment removal zone. These locations were tested during July 2021. The green hatched area covers approximately 94,092 square feet.

1.6.2 Moderate Sensitivity

The area hatched in orange on Figures 1-3a and 1-3b shows areas of moderate sensitivity across the proposed work area covering approximately 26,000 square feet. “Moderate” sensitivity is designated to areas before the Phase 1B investigation was completed. There are several archaeological consideration factors involved in determining the level of sensitivity for a given area. This was determined through the research completed for the Phase IA Documentary Survey for the project as discussed in Section 2.3. Such factors include elevation, drainage, distance to a potable source of water, evidence of nearby archaeological sites, slope, and noted past disturbances (such as cutting and filling and grading). The moderate designation remains intact in the absence of subsurface testing.

The section of Access Road that turns west from the area of high sensitivity near the proposed Water Treatment System Containment Area location near the southern end of the sediment removal zone, and then continues north to Swartwout Road is considered to possess moderate potential for archaeological resources.

.Any proposed work within this proposed section of Access Road will include placement of a protective crushed stone overlaying geotextile fabric; no subsurface disturbance to the existing ground surface is anticipated, thereby eliminating impacts to potential archaeological resources. In addition, vehicular traffic consisting of empty trucks and/or partially loaded trucks is anticipated across this area for a short duration of construction period.

2. Survey Methodology

2.1 Introduction

The primary goal of the C&D Power Systems Site Sediment Removal Project Phase IB subsurface testing surveys was to determine the location and distribution of potentially National Register-eligible archaeological resources in the APE. Subsurface testing was conducted in those areas identified through the Phase IA research to possess prehistoric and/or historic archaeological sensitivity that may be impacted by construction activities associated with the project.

Phase IB field investigation verifies site locations suggested by the Phase IA research, and locates previously unknown sites. Detailed evaluation of identified resources is not carried out at this level investigation, but the precise locations of identified resources with respect to the proposed Project Area must be clearly established.

2.2 Prehistoric and Historic Overview

The Archaeological APE was researched in the SHPO's Cultural Resource Information System (CRIS) website in compliance with Section 106 of NHPA, SEQRA, and Section 14.09 of the NYSHPA. The search area for both prehistoric and historic archaeological resources surrounding the Project Area was a 1-mile-radius.

CRIS indicated that 24 previously identified prehistoric and historic archaeological sites, field scatters and isolated finds were located within the 1-mile search area. The entire C&D sediment removal Project Area lies within a large NYS Museum Site polygon (#4379; #6116) that covers a large portion of the Neversink River Valley.

Preliminary research conducted through CRIS indicated that eight previous Phase I archaeological surveys had been conducted within the 1-mile search radius surrounding the C&D sediment removal Project Area. The reports were downloaded from the CRIS website for review and reference.

Of particular relevance to the C&D Sediment Removal Project Section 106 archaeological compliance studies is the 2016 Phase IA/IB survey report by TRC Environmental Corp., entitled Phase IA/IB Archaeological Survey of The Eastern System Upgrade Project Orange, Sullivan, And Delaware Counties, New York prepared for the Millennium Pipeline Company, LLC. A portion of the Millennium Pipeline APE is included within the current C&D project boundary. A linear portion of the 2016 upgrade project corridor was located east of the C&D main building and west of the Tributary D-1-7 crossing of the abandoned railroad embankment.

This overlapping area was tested during the 2016 survey, and resulted in the identification of a previously unknown site (MRE-TRC-8, 07105.000148). This multicomponent site contains the foundation remains of a 19th-century bank barn and a prehistoric lithic scatter of unknown temporal and cultural affiliation. The site is located on the Neversink River floodplain, just west of Tributary D-1-7. The site was identified during the TRC survey based on the recovery of precontact and historic artifacts from 17 positive STPs and the presence of a stone retaining wall. A low-density scatter of historic artifacts extends south of the stone wall. The prehistoric component of the site consists of a lithic scatter concentrated in the southern portion of the site area. According to the 2016 TRC report, there appeared to be an artificially graded area to the south of this site location.

The barn is a former outbuilding associated with an early-19th-century farmstead located on Swartwout Road, which was established by the family of the same name. The property appears on both the 1859 French, Wood and Beers Map of Orange and Rockland Counties, and the 1875 Beers County Atlas of Orange, New York, as owned by P.P. Swartwout. The 1903 Lathrop Atlas of Orange County, New York indicates the same property was owned by Isaac Ayers. The Swartwout farmhouse is still standing, and currently occupied by the caretaker of the municipal grounds to the south. During the 2016 survey, the tenant was interviewed by the TRC team, and confirmed the presence of a former barn in the site location.

This site was recommended National Register-eligible by TRC. This site location does fall within the approximate project limit boundary for the C&D Power Systems Sediment Removal Project and is noted on Figure 1-2b as "existing stone wall".

2.3 Archaeological Potential

The C&D sediment removal Project Area limits include formerly cultivated fields to the south and east of the C&D facility. These fields have been determined to possess moderate or high prehistoric and historic archaeological potential. This

conclusion is based on the results of the Phase IA assessment, as well as prior archaeological survey results, and are summarized by the following factors:

- Adjacent to a Tributary D-1-7 of the Neversink River
- Most of APE exhibits moderate slope
- Most of APE located on well drained soils
- There are numerous previously identified prehistoric sites within a one-mile radius
- Soil units present are capable of cultivation of crops, hay, pasture
- Project Area lies within a documented historic 19th century farmstead
- There are several previously identified historic sites within a one-mile radius
- Minimal prior subsurface disturbance (plowing)

Given the high potential for encountering archaeological resources that might prove to be eligible for inclusion in the National Register of Historic Places (National Register), a Phase IB subsurface testing survey was recommended.

2.4 Phase IB Methodology

The Phase IB survey methodology includes the following:

- Conduct an intensive walkover of proposed ground disturbance areas that possess archaeological sensitivity as identified during the Phase IA survey.
- Conduct a subsurface shovel testing survey in undisturbed or minimally disturbed archaeologically sensitive locations to determine the presence or absence of archaeological resources within the APE.
- Conduct laboratory processing, cataloguing, and analysis of all artifacts recovered during the Phase IB subsurface testing survey.
- Complete NYS Prehistoric and/or Historic Site Forms for archaeological resources identified during the Phase IB survey that may be eligible for listing in the National Register.
- Prepare draft and final Phase IB Survey reports.

2.5 Field Methods

Subsurface testing was conducted through two systematic STP surveys during July 2021 and October 2021. The STPs were excavated along linear transects at an interval of 50 feet, where feasible. The transects and STP locations were pre-plotted prior to the initiation of each fieldwork effort to facilitate location in the field. Transect lengths varied, and the number of STPs along each transect varied as well (Figure 2-1). Not all the pre-plotted STPs were excavated due to existing field conditions at the time of the survey.

Figure 2-1: Pre-Plotted STPs in Phase IB Survey Areas

Testing was not conducted in areas of documented prior subsurface disturbance, standing water, or slopes greater than 20 percent. The STPs measured approximately 1 foot in diameter, and were excavated to sterile soils when possible.

All field information, such as opening and closing depths, soil descriptions, Munsell color chart identifications, and notes were manually recorded on pre-printed provenience sheets and in field notebooks. All excavated soils were screened through 0.25-inch hardware cloth to ensure artifact recovery. All recovered artifacts were placed in re-sealable polyethylene bags labeled with all relevant provenience information, using a permanent, waterproof pen.

When precontact and/or historic artifacts were encountered in an isolated shovel test, arrays of additional STPs were excavated at 1 meter and 3 meters (3 feet and 10 feet) from the original STP in the four cardinal directions. The purpose of the additional STP arrays was to define the boundaries of the encountered resource. Soil profiles were recorded and Field Specimen Numbers (FS #s) were assigned to the cultural material encountered in each positive STP.

The locations of all transects and excavated STPs were recorded using a hand-held GPS unit, depicted on project mapping, and included in the survey report figures.

2.6 Laboratory Methods

All recovered artifacts and samples taken have been cleaned and/or processed, catalogued, and analyzed in the AECOM in-house archaeological laboratory in compliance with the guidelines established by the Department of the Interior for the proper curation of Federally owned and administered archaeological collections (36 CFR 79 and 66), and New York Archaeological Council's (NYAC) Standards for Cultural Resources Investigations and the Curation of Archaeological Collections in New York State (1994), adopted by the SHPO in 2004.

The resulting artifact assemblage and all secondary information such as field notes, photographs, and sketches are temporarily stored at AECOM's Burlington, New Jersey Laboratory at 437 High Street, Burlington, NJ 08016, until an acceptable facility for curation of the project materials is decided through consultation with NYSDEC DER and SHPO.

3. Results of Survey

Phase 1B STP surveys were conducted in July 2021 and October 2021. During the July 2021 Phase 1B STP survey, a total of 45 STPs were pre-plotted along seven transects labeled Transect A through Transect G, and depicted on Figure 2-1. Due to field conditions at the time of the Phase IB survey, five of the 45 pre-plotted STPs were not excavated. Of the 40 STPs excavated, eight were positive for cultural material. Each positive STP location was further investigated through the excavation of eight radial STPs, for a total of 64. Therefore, the total number of STPs excavated during the July 2021 Phase IB survey was 104. Thirty four of the 64 radial STPs were also positive for cultural material. No temporally or culturally diagnostic artifacts were recovered in any of the positive STPs. No features or portions of features were encountered during the survey.

During the October 2021 Supplemental Phase 1B STP survey, a total of 21 STPs were pre-plotted along six transects labeled Transect H through Transect M. Of the 21 STPs excavated, two were positive for cultural material. Each positive STP location was further investigated through the excavation of eight radial STPs, for a total of 16. Therefore, the total number of STPs excavated during the Supplemental Phase IB STP survey was 37. Five of the 16 radial STPs were also positive for cultural material. No temporally or culturally diagnostic artifacts were recovered in any of the positive STPs. No features or portions of features were encountered during the survey.

3.1 Introduction

The Phase IB subsurface testing survey of the C & D Power Systems Site in Huguenot, New York began on July 19th, 2021 and was completed on July 23, 2021. A supplemental Phase IB STP survey was conducted on October 27 and 28, 2021. The STP surveys consisted of manual testing on a 15-meter (50-foot) pre-plotted grid (Figure 2-1). The STPs were excavated in compliance with the guidelines of the SHPO which requires that the STPs be excavated at a minimum of 30 centimeters (cm), or 1 foot in diameter, with all excavated soils to be screened through 0.25-inch hardware cloth to allow for the recovery and identification of any cultural material present. In addition, the guidelines state that STPs are to be excavated to a depth of 1 meter (3 feet) below ground surface, or until culturally sterile, non-artifact bearing soils are reached. During the C & D Power Systems Phase IB surveys, once culturally sterile soils were identified, all STPs were excavated an additional 10 cm (4 inches) in depth to confirm that culturally sterile soil had been reached.

The SHPO guidelines also require that an array of STPs be excavated in the four cardinal directions around each STP that yielded cultural material or, in other words, represented positive hits. The SHPO guidelines recommend the first such array be excavated at 1 meter (3 feet) around the positive STP, and the second array be excavated at 3 meters (10 feet) around the positive STP. This strategy was employed for all positive STPs during the Phase IB survey.

All field information, such as opening and closing depths, soil descriptions, Munsell color chart identifications, and notes were manually recorded on provenience sheets and in field notebooks. All measurements were recorded in centimeters, consistent with standard operating procedures for archaeological survey in New York State. All excavated soils were screened through 0.25-inch hardware cloth to ensure artifact recovery. All recovered artifacts were placed in re-sealable polyethylene bags labeled with all relevant provenience information, using a permanent, waterproof pen.

A Field Specimen (FS) log was generated to record all cultural material recovered from the STPs. The FS log indicated the positive STP, and included the depths in centimeters below the ground surface, the horizon in which the materials were found, a brief description of the cultural material recovered, and the total count of all artifacts collected.

3.2 Field Results

3.2.1 STP Transects

The 50-foot (15-meter) grid across the Archaeological APE consisted of seven transects labeled Transect A through Transect G during the July 2021 Phase 1B STP survey and six transects labeled Transect I through Transect M during the October 2021 Supplemental Phase 1B STP survey. The lengths of the seven transects varied across the Archaeological APE; therefore, the number of pre-plotted STPs along each transect varied as well (Figure 2-1). Each transect was excavated and recorded separately.

Figures 3-1a through 3-1d depict all 141 STPs (i.e., 104 STPs and 37 STPs excavated during the July 2021 and October 20201 survey, respectively) excavated on aerial photo base maps, and identify whether the STP tested positive or negative. Positive STPs are further defined as yielding cultural material as follows: Prehistoric (Precontact); Historic; or Prehistoric and Historic.

Figures 3-2a through 3-2d depict the results of all 141 STPs excavated on base maps with the sediment remediation construction plan as an overlay to demonstrate the measures taken as part of the Avoidance and Protection Plan.

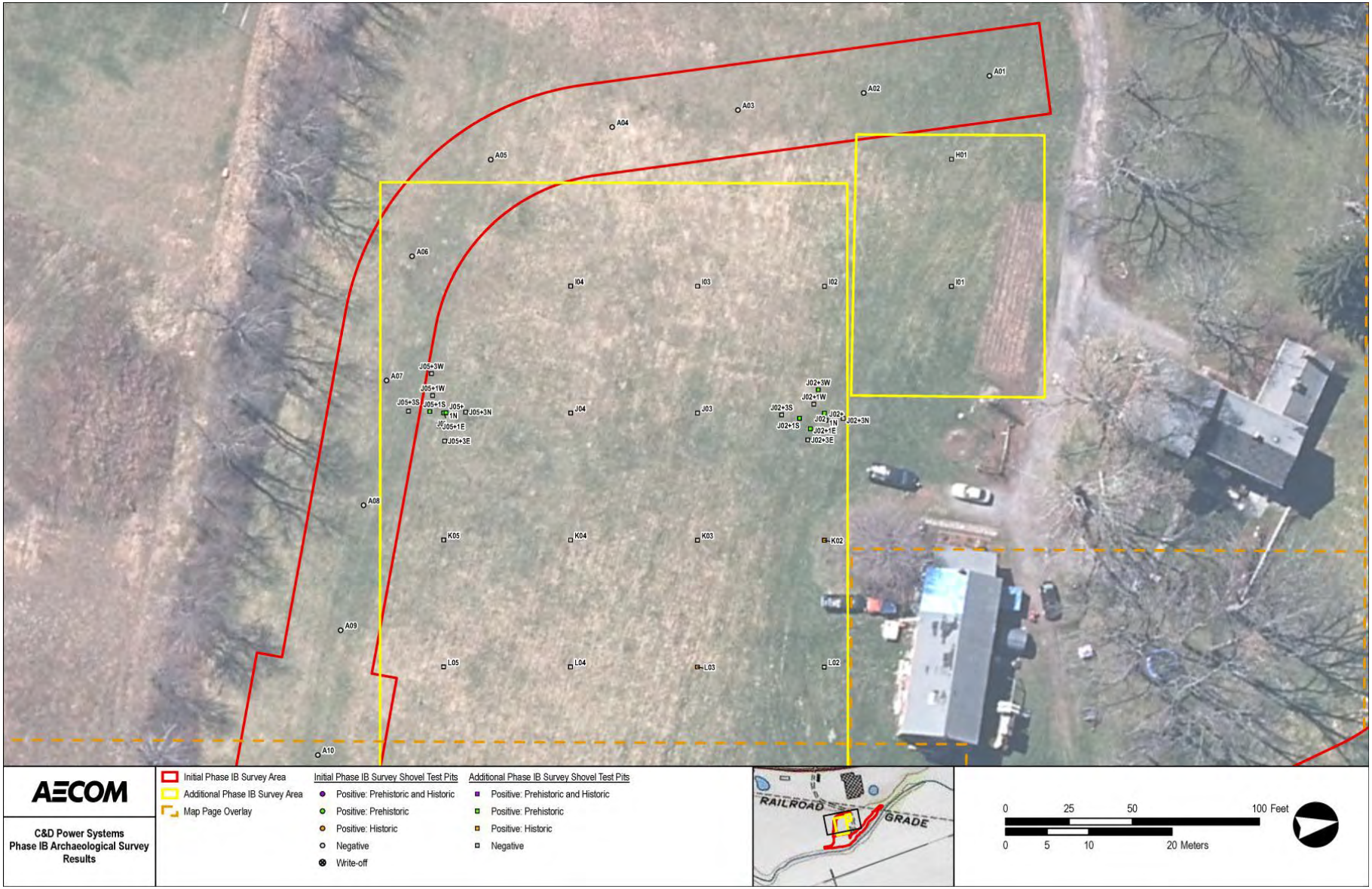

Figure 3-1a: Phase IB Survey Results West

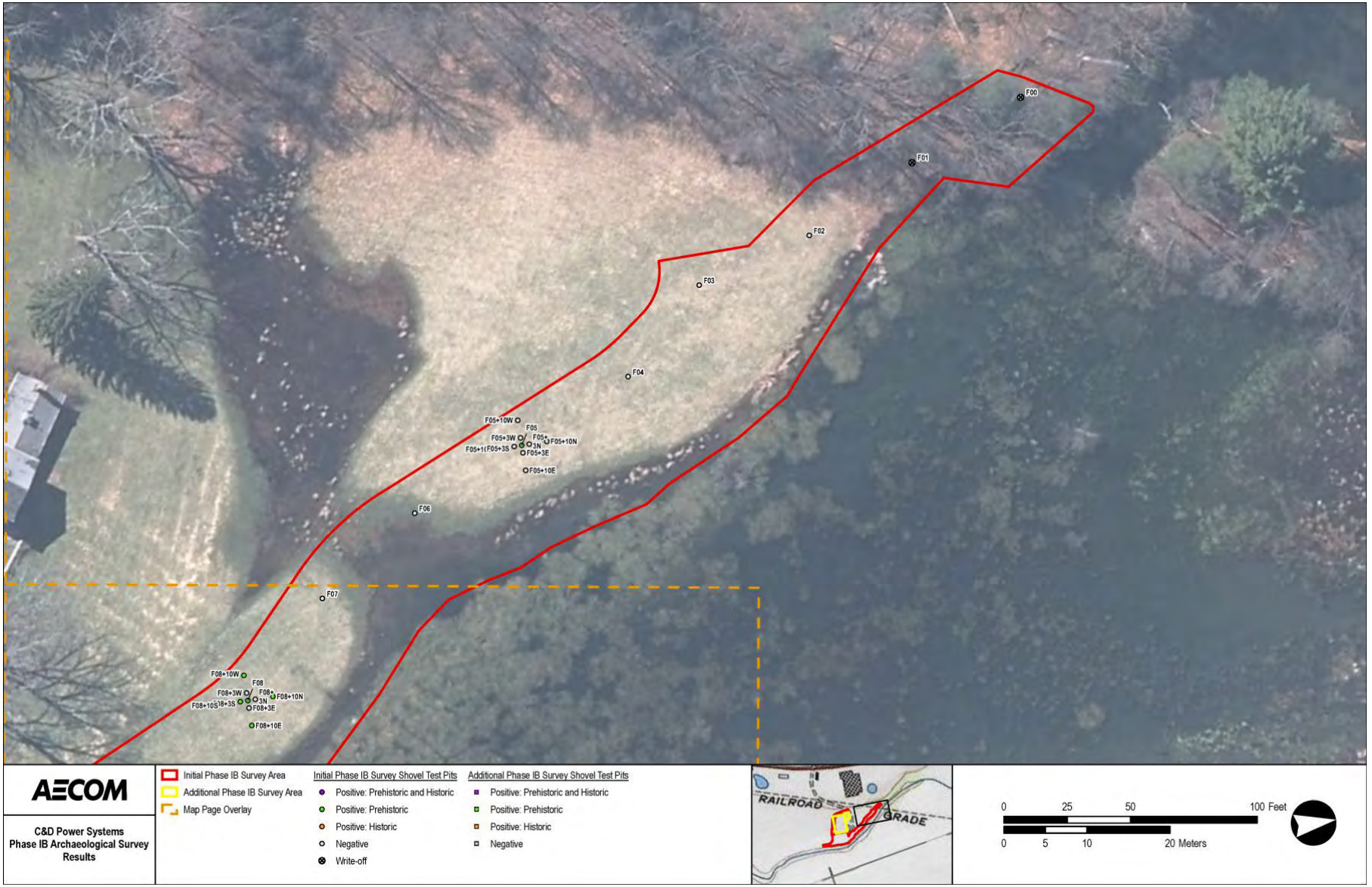

Figure 3-1b: Phase IB Survey Results North

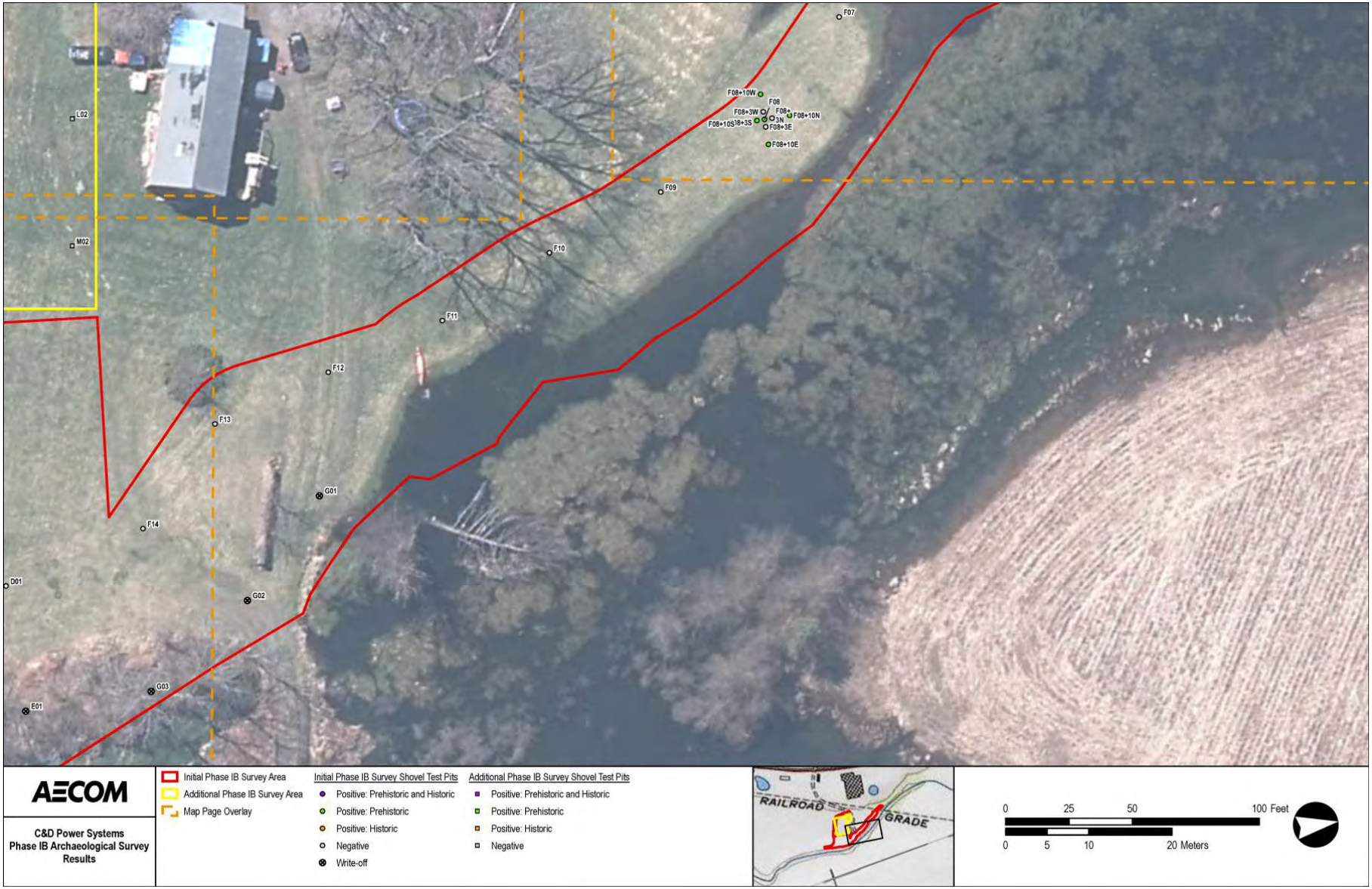

Figure 3-1c: Phase IB Survey Results Northeast

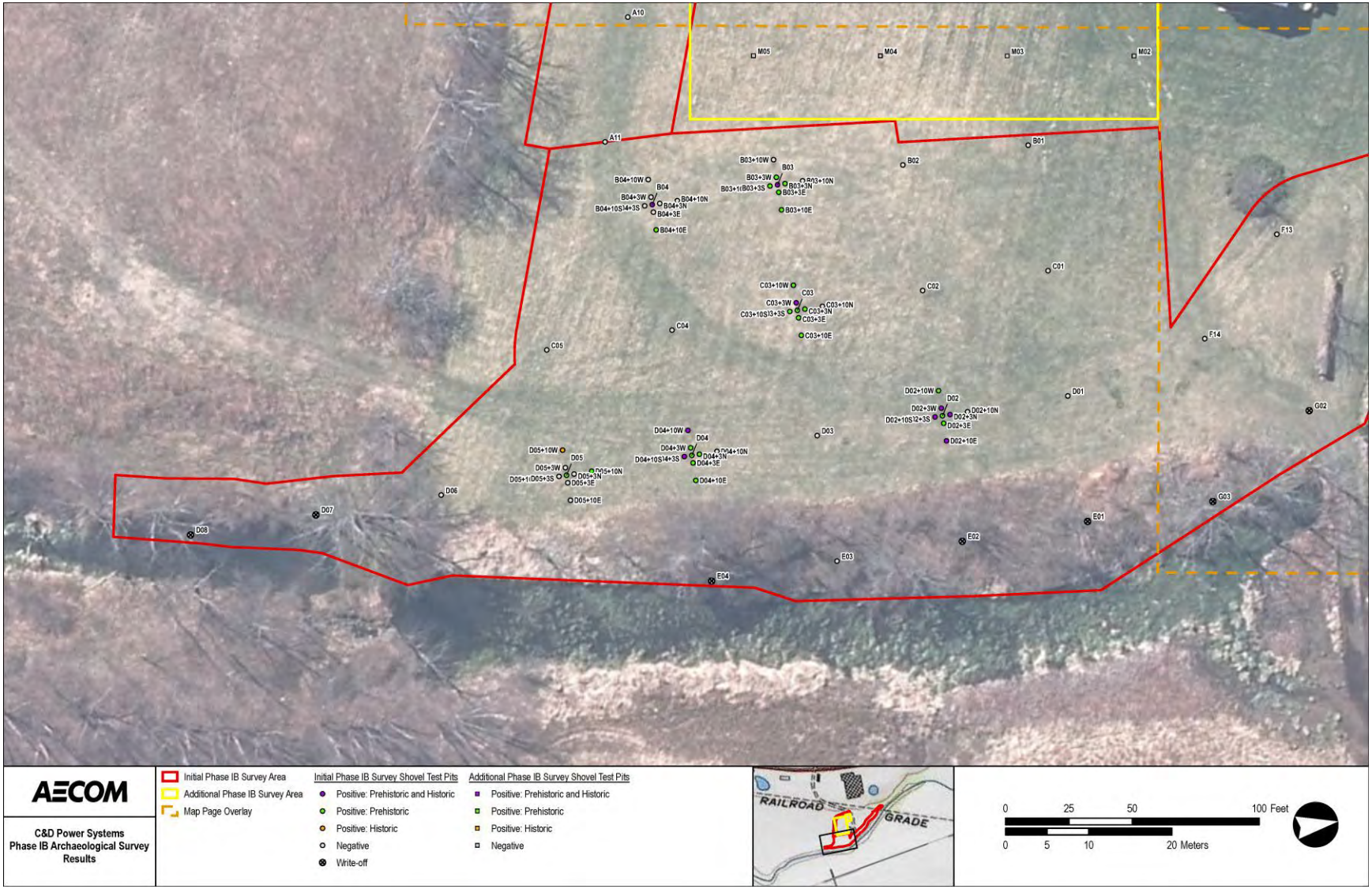

Figure 3-1d: Phase IB Survey Results Southeast

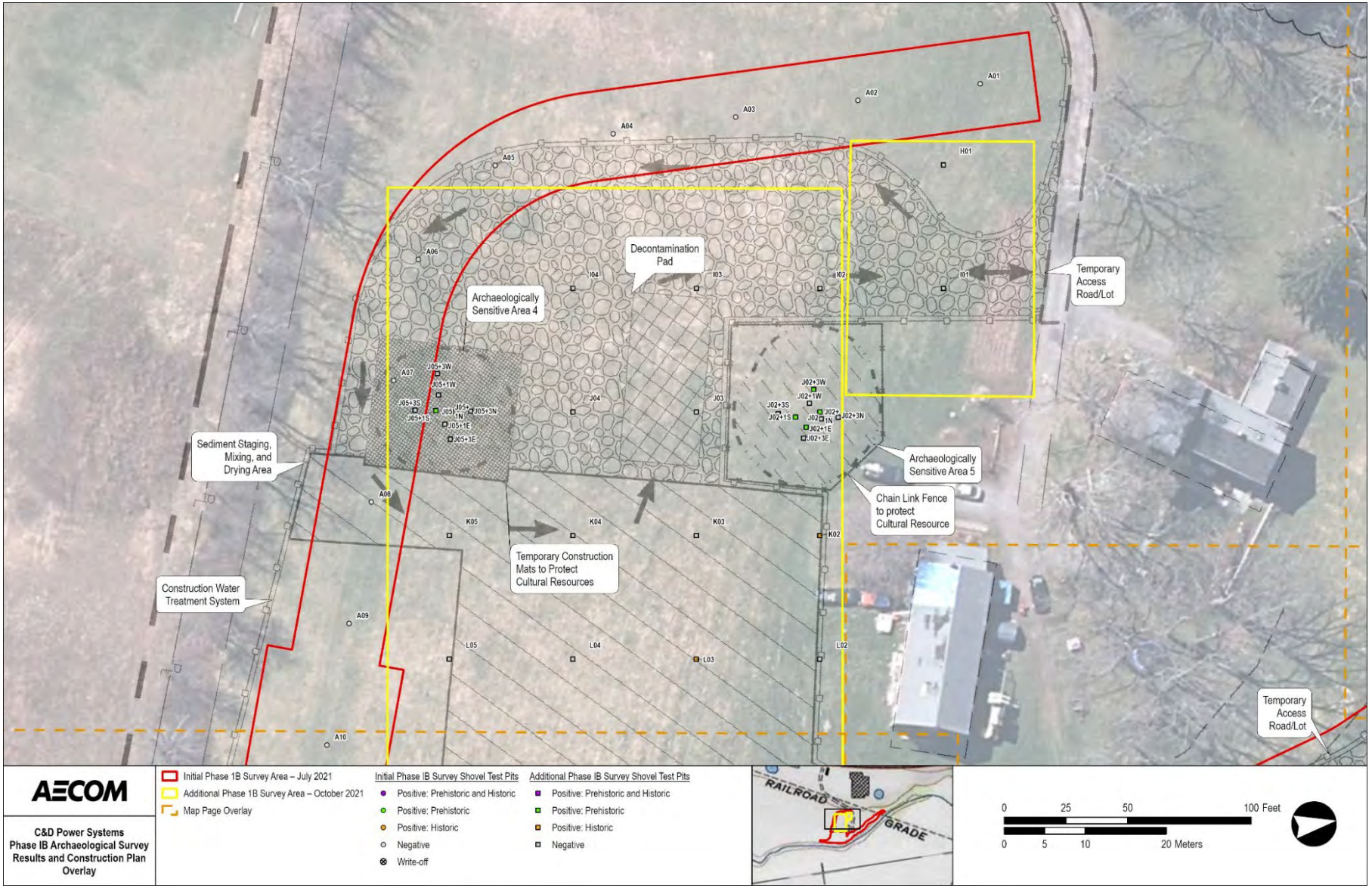

Figure 3-2a: Phase IB Survey Results and Construction Plan West

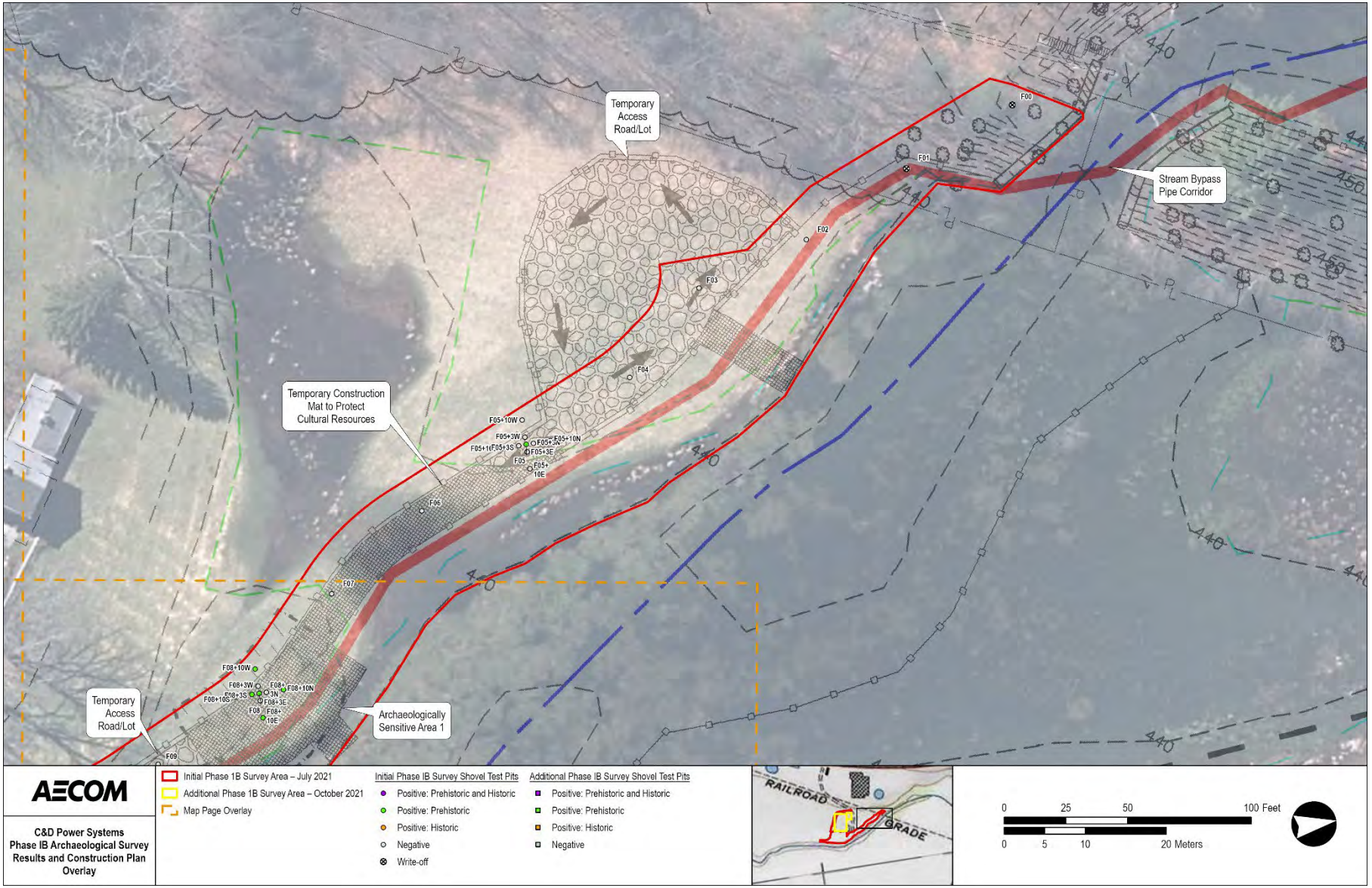

Figure 3-2b: Phase IB Survey Results and Construction Plan North

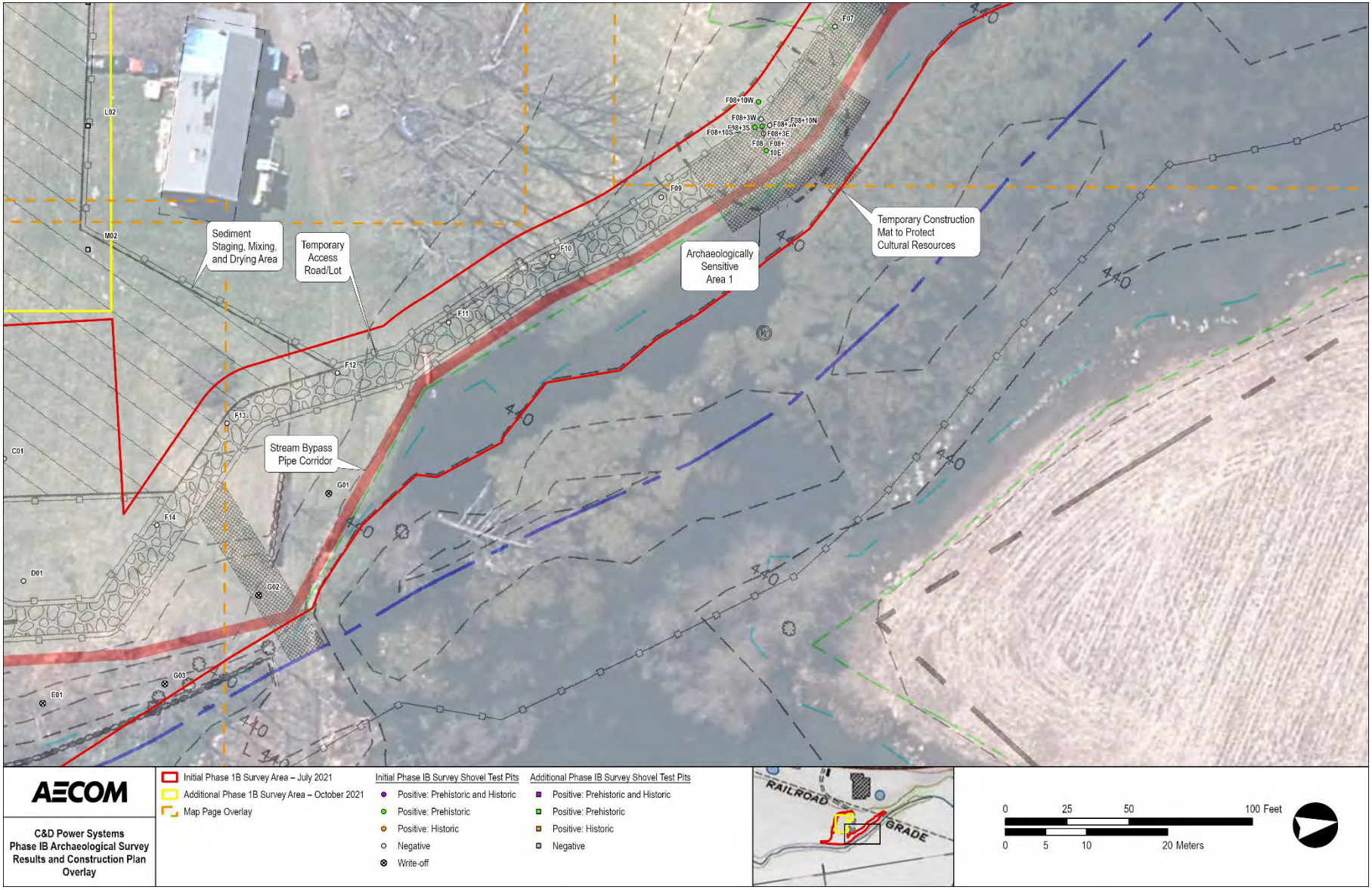

Figure 3-2c: Phase IB Survey Results and Construction Plan Northeast

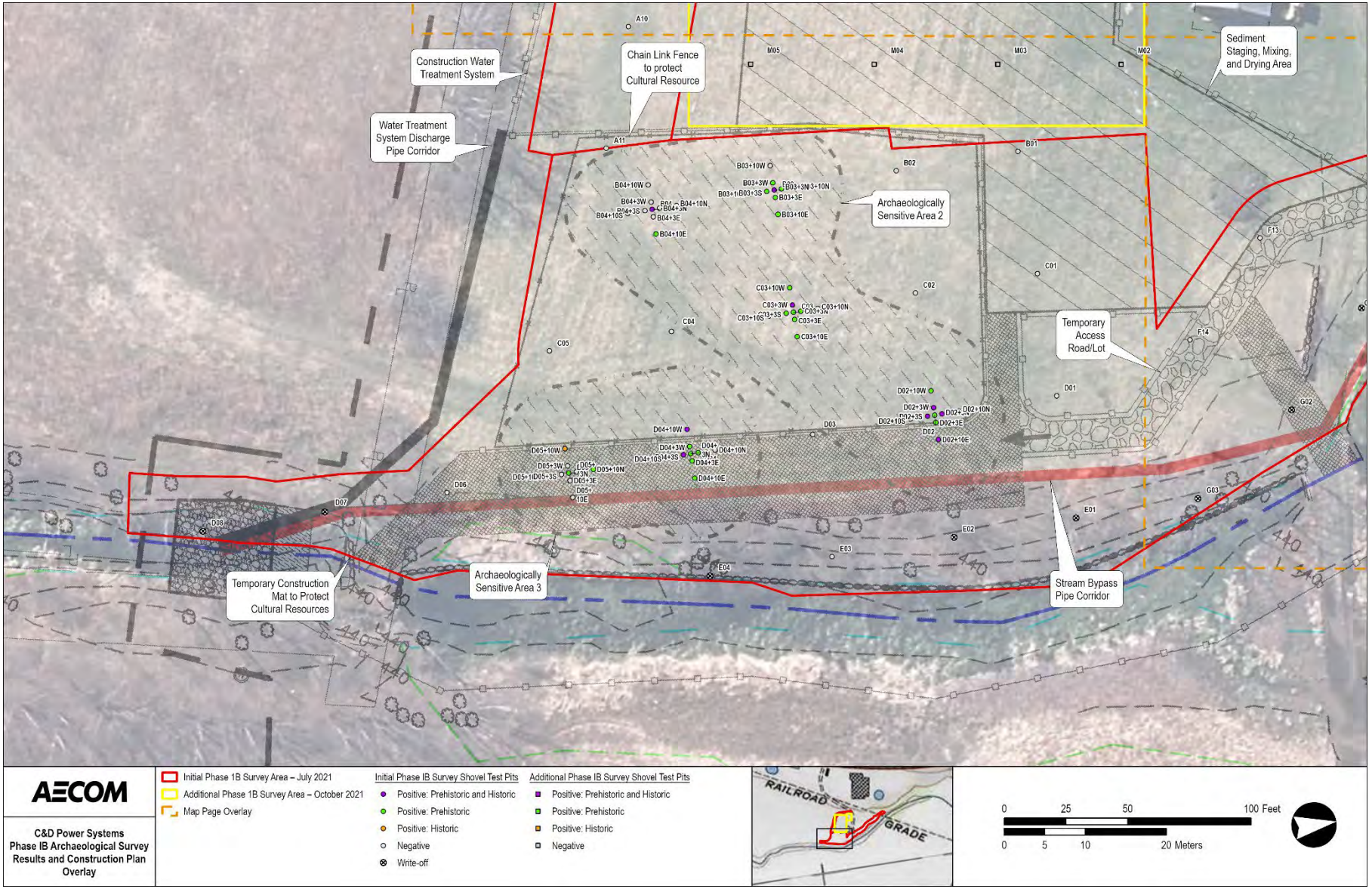

Figure 3-2d: Phase IB Survey Results and Construction Plan Southeast

3.2.1.1 Transect A

Transect A was a tangential segment of the Archaeological APE oriented along the route of the Proposed Temporary Access Road that begins at the proposed Decontamination Station and runs westward, then turns northward and connects to Swartwout Road (Figure 1-3a and 1-3b). Eleven STPs had been pre-plotted onto the project map (Figure 2-1). Topographically, the transect was in a lowland area that may have been cut down, leveled, and/or graded at some point. The adjacent upland plateau on the east has a substantial/abrupt steep slope along its east side which suggests that at some point the landform had been modified. The transitions between the soil horizons encountered in the STP profiles appeared moderately level, or horizontally oriented, suggesting that this portion of the Project Area land had been modified or tilled (plowed).

Depths of the Ap, or plow zone, ranged from 18 cm below ground surface to 31 cm below ground surface. The plow zone soil, Stratum 1, was of sandy loam texture with a well-formed and sorted structure. The underlying B horizon subsoil, Stratum 2, ranged from 28 cm to 31 cm below the ground surface. The soil was of silty clay texture with a well-drained and well-formed structure. No cultural material was recovered from the 11 STPs excavated along Transect A. Construction of the proposed Decontamination Pad and Access Road to Swartwout Road will not impact any potential archaeological resources.

3.2.1.2 Transect B

Transect B was located along the western edge of the centrally located upland plateau. Four STPs had been pre-plotted onto the project map (Figure 2-1). The transect was located in the area of the Archaeological APE proposed for construction of the Sediment Staging, Mixing, and Drying Area and the Water Treatment System Containment Area (Figure 1-3b).

STPs B 1 and B 2 were both negative for cultural material, and were excavated to depths of 37 cm and 38 cm below ground surface, respectively. The soils were the same as those identified along Transect A, a well-sorted sandy loam plow zone (Stratum 1) over a well-formed and well-drained culturally sterile subsoil (Stratum 2). STPs B 3 and B 4 were both positive tests (Table 3-1). STP B 3 was located on the southern sloping edge of the upland landform. One chert flake was recovered between 0 cm and 39 cm below ground surface in Stratum 1, the plow zone. No cultural material was recovered from Stratum 2, the underlying B horizon. STP B 4 was located at the base of the plateau, 15 meters (50 feet) south of STP B 3. Three chert flakes and 1 iron nail were recovered between 0 cm and 27 cm below ground surface in Stratum 1, the plow zone. The underlying Stratum 2, or B horizon, was culturally sterile.

Table 3-1: Transect B Positive STPs

STP	Stratum	Depths in cm	Horizon	Munsell	Soil Texture	Artifacts Recovered
B 3	I	0-39	Ap	10yr 4/3	Sandy Loam	1 Chert Flake
	II	39-49	B	7.5yr 4/6	Sandy Silty Clay	No Cultural Material
B 4	I	0-27	Ap	10yr 4/3	Sandy Loam	3 Chert Flakes, 1 Nail
	II	27-37	B	7.5yr 4/6	Sandy Silty Clay	No Cultural Material

No temporally or culturally diagnostic artifacts were recovered in the positive STPs along Transect B. No features or portions of features were encountered in any of the STPs.

3.2.1.3 Transect C

Transect C was located 15 meters (50 feet) to the east of Transect B. Transect C consisted of five pre-plotted STPs (Figure 2-1). The identified soils were consistent with those identified along Transect B. Stratum 1, the plow zone, was a well-sorted sandy loam averaging in depth from 19 cm below ground surface to roughly 32 cm below ground surface. Stratum 2, the B horizon subsoil, was culturally sterile and consisted of a well-formed sandy silty clay, also consistent with the identified soils in the STPs along Transect B.

STPs C 1 and C 2 were negative for cultural material. STP C 3 was positive with one fire cracked rock (FCR) cobble, five chert flakes, and one possible stone hand tool recovered between ground surface and 26 cm in depth (Table 3-2). This soil

layer was identified as the plow zone and designated as Stratum 1. The Stratum 2 B horizon was culturally sterile. The remaining two STPs along Transect C, STP C 4 and STP C 5, were negative for cultural material.

Table 3-2: Transect C Positive STPs

STP	Stratum	Depths in cm	Horizon	Munsell	Soil Texture	Artifacts Recovered
C 3	I	0-26	Ap	10yr 4/3	Sandy Loam	1FCR, 5 Chert Flakes, 1 Possible Stone Hand Tool
	II	26-36	B	7.5yr 4/6	Sandy Silty Clay	No Cultural Material

No temporally or culturally diagnostic artifacts were recovered in the positive STPs along Transect C. No features or portions of features were encountered in any of the STPs.

3.2.1.4 Transect D

Transect D was located 15 meters (50 feet) to the east of Transect C. Six STPs were pre-plotted on the project map (Figure 2-1). The depth of the plow zone, or Stratum 1, ranged from 19 cm at D 6 to 35 cm at D 4, moving south along Transect D. The texture and structure of the encountered soils were consistent with the soil profiles along Transects B and C. The Stratum 1 plow zone was a well-sorted sandy loam, and the Stratum 2 subsoil was a well-developed silty clay. There was a slight increase in the percentage of naturally occurring small cobbles and pebbles noted moving south along Transect D.

Of the six STPs excavated along Transect D, STP D 1 was negative, STP D 2 was positive, STP D 3 was negative, STPs D 4 and D 5 were positive, and STP D 6 was negative (Table 3-3). The first positive STP was D 2, which was located towards the northern portion of the upland plateau. Stratum 1, the plow zone, yielded one FCR cobble and four chert flakes. The artifacts were recovered between 0 cm below ground surface and 20 cm below ground surface. No cultural material was found in the Stratum 2, B horizon subsoil. It is noted that no cultural material was recovered from STP D 1 or STP D 3, the adjacent tests along Transect D. STP D 4 was located 30 meters (100 feet) to the south of STP D 2 on the southern edge of the upland plateau. The Stratum 1 plow zone, which ranged in depth from 0 cm below ground surface to 35 cm below ground surface, yielded 1 chert flake. The underlying Stratum 2 B horizon subsoil was culturally sterile from 35 cm below ground surface to 45 cm below ground surface. STP D 5 was located at the base of the southern slope of the upland landform, 15 meters (50 feet) to the south of STP D 4. The Stratum 1 plow zone, which extended in depth from 0 cm below ground surface to 28 cm below ground surface, yielded two chert flakes and one FCR cobble. The underlying Stratum 2 subsoil was culturally sterile to 38 cm below ground surface.

Table 3-3: Transect D Positive STPs

STP	Stratum	Depths in cm	Horizon	Munsell	Soil Texture	Artifacts Recovered
D 2	I	0-20	Ap	10yr 4/3	Sandy Loam	4 Chert Flakes, 1 FCR
	II	20-40	B	5yr 3/3	Silty Clay	No Cultural Material
D 4	I	0-35	Ap	10yr 4/3	Sandy Loam	1 Chert Flake
	II	35-45	B	5yr 3/3	Silty Clay	No Cultural Material
D 5	I	0-28	Ap	10yr 4/3	Sandy Loam	2 Chert Flakes, 1 FCR
	II	28-38	B	5yr 3/3	Silty Clay	No Cultural Material

No temporally or culturally diagnostic artifacts were recovered in the positive STPs along Transect D. No features or portions of features were encountered in any of the STPs

3.2.1.5 Transect E

Transect E was pre-plotted along the westernmost edge of the upland plateau along the southern portion of the Project Area, adjacent to the west bank of Tributary D-1-7. Transect E consisted of three pre-plotted STP locations (Figure 2-1). However, STPs E 2 and E 3 were not excavated, as they were located on a slope greater than 15 percent leading down to the tributary. STP E 1 was excavated. The test consisted of a horizon of fill, and the underlying plow zone soil had been disturbed and appeared mixed with the subsoil, possibly as a result of maintenance activities of the tributary channel over time. Underlying the disturbed fill horizon, designated as Stratum 1, was the culturally sterile B horizon subsoil, within which large, rounded river cobbles were noted. No cultural material was found in either the disturbed fill or the subsoil.

3.2.1.6 Transect F

Transect F ran parallel the northeastern extension of the Tributary D-1-7. The transect began on the northern edge of the upland landform and gradually sloped into a periodically damp lowland. Fourteen STPs were pre-plotted along Transect F (Figure 2-1). The transition between the A horizon the B horizon soils seen in the STPs was a gradient, rather than a clear break indicating that the area through which Transect F traversed was not formally tilled or plowed. Profiles generally consisted of a dark brown, well-sorted and well-developed A horizon (Stratum 1) with a silty loam texture overlying a slightly more clayey reddish-brown B horizon subsoil that exhibited a moderate amount of reoxidation (Stratum 2). The A horizon ranged from 10 cm below ground surface at the shallowest, particularly around the lowest elevations, to 45 cm below ground surface.

Of the 14 STPs pre-plotted along Transect F, 13 were excavated. STP F 1, the northernmost location, was not excavated as it was located on a slope of approximately 20 percent. All tests except for STP F 5 and STP F 8 were negative (Table 3-4). STPs F 2 through F 4, F 6 and F 7, and F 9 through F 14 were negative, and exhibited the above described soil profiles. STP F 5 was the first positive test on Transect F. The test was located in the middle of the transect in the lowland area closest to Tributary D-1-7. The noted soil profile was an A horizon (Stratum 1), 0 cm below ground surface to 30 cm below ground surface overlying a B horizon subsoil (Stratum 2), 30 cm below ground surface to 40 cm below ground surface. Within the Stratum 1 A horizon, one chert flake was recovered. The Stratum 2 B horizon was culturally sterile. STP F 8 was the second positive STP along Transect F. The Stratum 1 A horizon, which extended in depth from 0 cm below ground surface to 30 cm below ground surface, yielded three chert flakes. The underlying Stratum 2 B horizon subsoil was culturally sterile.

Table 3-4: Transect F Positive STPs

STP	Stratum	Depths in cm	Horizon	Munsell	Soil Texture	Artifacts Recovered
F 5	I	0-30	A	10yr 3/3	Silty Loam	1 Chert Flake
	II	30-40	B	5yr 3/3	Silty Clay	No Cultural Material
F 8	I	0-30	A	10yr 3/3	Silty Loam	3 Chert Flakes
	II	30-40	B	7.5yr 4/6	Silty Clay	No Cultural Material

No temporally or culturally diagnostic artifacts were recovered in the positive STPs along Transect F. No features or portions of features were encountered in any of the STPs.

3.2.1.7 Transect G

Transect G was located along the west bank of Tributary D-1-7, near the Swartwout Road Crossing. Two STPs had been pre-plotted (Figure 2-1). This portion of the Project Area included a section of historic stone wall that likely represented part of a barn, no longer standing. Its presence had been reported in prior survey reports and was noted on the current project mapping (Figure 1-2b). The Transect G STP area was apparently impacted when contractors replaced the culvert connecting the northern portion of the tributary to the southern portion during recent drainage improvement efforts. The area where the two Transect G STPs were plotted was also located atop a gravel drive. The two STPs were not excavated due to existing field conditions and prior disturbance.

3.2.1.8 Transect H

Transect H was located along the westernmost edge of the supplemental Survey Area, to the west of the proposed Water Treatment System Containment Area. Transect H consisted of one pre-plotted STP location (Figure 2-1). The test consisted of a sandy loam plow zone, or Ap stratum, 32 cm in depth, underlain by a sandy clay loam, culturally sterile B Horizon

subsoil. The B Horizon was sampled to a depth of 52 cm below ground surface. No cultural material was recovered from STP H 1.

3.2.1.9 Transect I

Transect I was located along the westernmost edge of the supplemental Survey Area, to the west of the proposed Water Treatment System Containment Area. Transect I consisted of four pre-plotted STP locations (Figure 2-1). The STP profiles exhibited a sandy loam Ap stratum ranging in depth from 27 cm to 36 cm below ground surface. The Ap stratum was underlain by a sandy clay loam, culturally sterile B Horizon subsoil. The B Horizon was sampled to depths ranging from 50 cm to 55 cm below ground surface. No cultural material was recovered from the four Transect I STPs.

3.2.1.10 Transect J

Transect J was located along the central portion of the supplemental Survey Area, to the west of the proposed Water Treatment System Containment Area. Four STPs were pre-plotted along Transect J (Figure 2-1). The STP profiles exhibited a sandy loam Ap stratum ranging in depth from 25 cm to 28 cm below ground surface. The Ap stratum was underlain by a sandy clay loam, culturally sterile B Horizon subsoil. The B Horizon was sampled to depths ranging from 41 cm to 50 cm below ground surface.

STP J 2 and STP J 5 were positive for precontact cultural material. The artifacts were recovered from the Ap stratum, or plow zone in both STPs. STP J 2 yielded two black chert bifacial thinning flakes and one sandstone FCR. STP J 5 yielded two black chert bifacial thinning flakes (Table 3-5).

Table 3-5: Transect J Positive STPs

STP	Stratum	Depths in cm	Horizon	Munsell	Soil Texture	Artifacts Recovered
J 2	I	0-25	Ap	10yr 4/3	Sandy Loam	2 Chert Flakes, 1 FCR
	II	25-45	B	10yr 5/6	Sandy Clay Loam	No Cultural Material
J 5	I	0-26	Ap	10yr 4/3	Sandy Loam	2 Chert Flakes
	II	26-48	B	10yr 5/6	Sandy Clay Loam	No Cultural Material

3.2.1.11 Transect K

Transect K was located along the central portion of the supplemental Survey Area, to the west of the proposed Water Treatment System Containment Area. Transect K consisted of four pre-plotted STP locations (Figure 2-1). The STP profiles exhibited a sandy loam Ap stratum ranging in depth from 17 cm to 28 cm below ground surface. The Ap stratum was underlain by a sandy clay loam, culturally sterile B Horizon subsoil. The B Horizon was sampled to depths ranging from 30 cm to 45 cm below ground surface. One historic artifact was recovered from the AP stratum plow zone in STP K 2. This artifact is a small unidentified metal bell, probably an animal bell. No precontact cultural material was recovered from the four Transect K STPs.

3.2.1.12 Transect L

Transect L was located along the central portion of the supplemental Survey Area, to the west of the proposed Water Treatment System Containment Area. Transect L consisted of four pre-plotted STP locations (Figure 2-1). The STP profiles exhibited a sandy loam AP stratum ranging in depth from 20 to 26 cm below ground surface. The AP stratum was underlain by a sandy clay loam, culturally sterile B Horizon subsoil. The B Horizon was sampled to depths ranging from 35 to 40 cm below ground surface. One historic artifact was recovered from the AP stratum plow zone in STP L 3. This artifact is a white ball clay smoking pipe pipestem fragment. This artifact has not been discretely dated, but likely represents historic field scatter resulting from 19th century occupation of the project area. No precontact cultural material was recovered from the four STPs along Transect L.

3.2.1.13 Transect M

Transect M was located along the easternmost edge of the supplemental Survey Area, to the west of the proposed Water Treatment System Containment Area. Transect M consisted of four pre-plotted STP locations (Figure 2-1). All STPs

exhibited a sandy loam Ap stratum plow zone, ranging in depth from 10 cm to 39 cm below ground surface. The Ap stratum was underlain by a sandy clay loam B Horizon subsoil in STPs M 4 and M 5, and was sampled to depths of 40 cm and 50 cm, respectively. STP M 4 was inundated at 40 cm below ground surface. STP M 3 was inundated at 10 cm into the Ap stratum, and was terminated. The Ap stratum in STP M 2 was directly underlain by a fill level, which extended to a depth of 34 cm below ground surface. Underlying the fill level was the sandy clay loam B Horizon subsoil, which was sampled to a depth of 55 cm below ground surface. No cultural material was recovered from the Ap stratum, the fill level, or the B Horizon subsoil.

3.2.2 Radial STPs

Of the 40 STPs excavated along Transects A through G during the July 2021 STP survey, eight were positive for cultural material. Therefore, two radial arrays in the four cardinal directions, one at 1 meter (3 feet) and the second at 3 meters (10 feet), were excavated around each positive STP. A total of 64 radial STPs were excavated. Thirty-four of the 64 radials were also positive for cultural material. No temporally or culturally diagnostic artifacts were recovered in any of the positive STPs. No features or portions of features were encountered in the radial STPs. The following discussion of the radial STP results is organized by positive STP. The positive tests included in order are STPs B 3 and B 4, STP C 3, STPs D 2, D 4 and D 5 and STPs F 5 and F 8.

Of the 21 STPs excavated along Transects H through M during the supplemental October 2021 STP survey, two were positive for precontact cultural material. The positive tests are STPs J 2 and J 5. Therefore, two arrays in the four cardinal directions, one at 1 meter (3 feet) and the second at 3 meters (10 feet), were excavated around each positive STP. A total of 16 radial STPs were excavated. Five of the radial STPs were positive for precontact cultural material. . No temporally or culturally diagnostic artifacts were recovered in any of the positive STPs. No features or portions of features were encountered in the radial STPs.

3.2.2.1 STP B 3

Six positive radials were identified of the eight radials excavated around STP B 3 (Table 3-6). All cultural material was recovered from the plow zone. No cultural material (NCM) was recovered from the B horizon. No temporally diagnostic artifacts were recovered; no cultural affiliations were identified. No features or portions of features were encountered.

Table 3-6: STP B 3 – Positive Radial STPs

Radial STP	Stratum	Depths in cm	Horizon	Artifacts
+ 3ft North	I	0-26	Ap	1 Chert Flake
	II	26-36	B	NCM
+ 10ft South	I	0-26	Ap	1 Chert Flake
	II	26-36	B	NCM
+ 3ft South	I	0-25	Ap	1 Chert Flake
	II	25-35	B	NCM
+ 10ft East	I	0-27	Ap	6 Chert Flakes
	II	27-37	B	NCM
+ 3ft East	I	0-26	Ap	1 Chert Flake
	II	26-36	B	NCM
+ 3ft West	I	0-23	Ap	1 Chert Flake
	II	23-33	B	NCM

3.2.2.2 STP B 4

Two positive radials were identified of the eight radials excavated around STP B 4 (Table 3-7). All cultural material was recovered from the plow zone. No cultural material (NCM) was recovered from the B horizon. No temporally diagnostic artifacts were recovered; no cultural affiliations were identified. No features or portions of features were encountered.

Table 3-7: STP B 4 – Positive Radial STPs

Radial STP	Stratum	Depths in cm	Horizon	Artifacts
+ 10ft South	I	0-26	Ap	2 chert flakes, 1 bolt
	II	26-36	B	NCM
+ 10ft East	I	0-27	Ap	1 chert flake
	II	27-37	B	NCM

3.2.2.3 STP C 3

Seven positive radials were identified of the eight radials excavated around STP C 3 (Table 3-8). The only negative radial was 3 meters north (STP C 4+10N). All cultural material was recovered from the plow zone. No cultural material (NCM) was recovered from the B horizon. No temporally diagnostic artifacts were recovered; no cultural affiliations were identified. No features or portions of features were encountered.

Table 3-8: STP C 3 – Positive Radial STPs

Radial STP	Stratum	Depths in cm	Horizon	Artifacts
+ 3ft North	I	0-30	Ap	1 Chert Flake
	II	30-40	B	NCM
+ 10ft South	I	0-27	Ap	2 Chert Flakes
	II	27-37	B	NCM
+ 3ft South	I	0-29	Ap	2 Chert Flakes
	II	29-39	B	NCM
+ 10ft East	I	0-28	Ap	1 Chert Flake
	II	28-38	B	NCM
+ 3ft East	I	0-33	Ap	4 Chert Flakes
	II	33-43	B	NCM
+ 10ft West	I	0-27	Ap	1 Chert Flake
	II	27-37	B	NCM
+ 3ft West	I	0-34	Ap	5 Chert Flakes
	II	34-44	B	NCM

3.2.2.4 STP D 2

Seven positive radials were identified of the eight radials excavated around STP D 2 (Table 3-9). The only negative radial was 3 meters north (STP D 2+10N). All cultural material was recovered from the plow zone. No cultural material (NCM) was recovered from the B horizon. No temporally diagnostic artifacts were recovered; no cultural affiliations were identified. No features or portions of features were encountered.

STP D 2 was the northernmost positive STP on the upland landform. The original shovel test was isolated from the surrounding positive tests by 30 meters (100 feet) to the south (Figure 2-1).

Table 3-9: STP D 2 – Positive Radial STPs

Radial STP	Stratum	Depths in cm	Horizon	Artifacts
+ 3ft North	I	0-30	Ap	4 Chert Flakes, 1 nail, 1 redware fragment
	II	30-40	B	NCM
+10ft South	I	0-23	Ap	3 Chert Flakes
	II	23-33	B	NCM
+ 3ft South	I	0-27	Ap	1 Chert Flake
	II	27-37	B	NCM
+ 10ft East	I	0-22	Ap	3 Chert Flakes, 2 nails
	II	22-32	B	NCM
+ 3ft East	I	0-27	Ap	3 Chert Flakes
	II	27-37	B	NCM
+ 10ft West	I	0-26	Ap	5 Chert Flakes
	II	26-36	B	NCM
+ 3ft West	I	0-23	Ap	5 Chert Flakes, 2 nail fragments
	II	23-32	B	

3.2.2.5 STP D 4

Six positive radials were identified of the eight radials excavated around STP D 4 (Table 3-10). All cultural material was recovered from the plow zone. No cultural material (NCM) was recovered from the B horizon. No temporally diagnostic artifacts were recovered; no cultural affiliations were identified. No features or portions of features were encountered.

Table 3-10: STP D 4 – Positive Radial STPs

Radial STP	Stratum	Depths in cm	Horizon	Artifacts
+ 3ft North	I	0-45	Ap	2 Chert Flakes
	II	45-55	B	NCM
+ 3ft South	I	0-35	Ap	2 Chert Flakes, 1 flat glass fragment
	II	35-45	B	NCM
+ 10ft East	I	0-34	Ap	1 Chert Flake
	II	34-44	B	NCM
+ 3ft East	I	0-34	Ap	1 Chert Flake

	II	34-44	B	NCM
+ 10ft West	I	0-44	Ap	1 Chert Flake, 1 glass sherd
	II	44-54	B	NCM
+ 3ft West	I	0-41	Ap	3 Chert Flakes
	II	41-51	B	NCM

3.2.2.6 STP D 5

Two positive radials were identified of the eight radials excavated around STP D 5 (Table 3-11). One radial yielded one precontact chert flake; and the second positive radial yielded one historic white ball clay smoking pipestem fragment. The historic clay pipestem was collected as representative of the historic occupation of the area. STP D 5 was located at the base of the slope from the upland plateau, and it is very possible that the one chert flake recovered from radial STP D 5 +10ft N washed down from the upland.

The cultural material was recovered from the plow zone. No cultural material (NCM) was recovered from the B horizon. No features or portions of features were encountered.

Table 3-11: STP D 5 – Positive Radial STPs

Radial STP	Stratum	Depths in cm	Horizon	Artifacts
+ 10ft North	I	0-30	Ap	1 Chert Flake
	II	30-40	B	NCM
+ 10ft West	I	0-26	Ap	1 Clay Pipestem
	II	26-36	B	NCM

3.2.2.7 STP F 5

No positive radials were identified among the eight radials excavated around STP F 5.

3.2.2.8 STP F 8

Five positive radials were identified of the eight radials excavated around STP F 8 (Table 3-12). All cultural material was recovered from the A horizon. No cultural material (NCM) was recovered from the B horizon. No temporally diagnostic artifacts were recovered; no cultural affiliations were identified. No features or portions of features were encountered.

Table 3-12: STP F 8 – Positive Radial STPs

Radial STP	Stratum	Depths in cm	Horizon	Artifacts
+ 10ft North	I	0-32	A	3 Chert Flakes
	II	32-42	B	NCM
+10ft South	I	0-27	A	3 Chert Flakes
	II	27-37	B	NCM
+ 3ft South	I	0-37	A	1 Chert Flake
	II	37-47	B	NCM
+ 10ft East	I	0-29	A	1 Chert Flake
	II	29-39	B	NCM

+ 10ft West	I	0-31	A	1 Chert Flake
	II	31-41	B	NCM

3.2.2.9 STP J 2

Three positive radials were identified of the eight radials excavated around STP J 2 (Table 3-13). One radial yielded one precontact chert flake; the second positive radial yielded four precontact chert flakes; and third radial yielded a partial argillite projectile point. This artifact is not dated.

All cultural material was recovered from the plow zone. No cultural material was recovered from the B horizon subsoil. No features or portions of features were encountered.

Table 3-13: STP J 2 – Positive Radial STPs

Radial STP	Stratum	Depths in cm	Horizon	Artifacts
+ 3ft South	I	0-25	Ap	1 Argillite partial Projectile Point
	II	25-40	B	NCM
+ 3ft East	I	0-24	Ap	4 Chert Flakes
	II	24-40	B	NCM
+ 10ft West	I	0-25	Ap	1 Chert Flake
	II	25-40	B	NCM

3.2.2.10 STP J 5

Two positive radials were identified of the eight radials excavated around STP J 5 (Table 3-14). Both the radials yielded one precontact chert flake.

The cultural material was recovered from the plow zone. No cultural material (NCM) was recovered from the B horizon. No features or portions of features were encountered.

Table 3-14: STP J 5 – Positive Radial STPs

Radial STP	Stratum	Depths in cm	Horizon	Artifacts
+ 3ft North	I	0-23	Ap	1 Chert Flake
	II	23-38	B	NCM
+ 3ft South	I	0-28	Ap	1 Chert Flake
	II	28-40	B	NCM

3.3 Laboratory Results

A total of 116 artifacts were recovered from 42 STPs excavated during the July 2021 Phase IB survey. Of this total, 101 were precontact artifacts and 15 were historic artifacts. The supplemental Phase IB survey conducted in October 2021 yielded a total of 14 artifacts from seven STPs. Of this total, 12 were precontact artifacts and two were historic artifacts.

3.3.1 Precontact Artifact Analysis

Artifacts recovered from the C&D Power Systems Site Sediment Removal Project were transported to the AECOM archaeological laboratory in Burlington, New Jersey for washing, cataloguing, identification, and analysis. Positive STP proveniences were assigned field specimen numbers (FS#s) during the fieldwork phase, and these numbers were carried over into the laboratory tasks. All artifacts were given successive entry numbers within the FS #s during cataloguing.

3.3.1.1 Precontact Artifact Categories

Precontact artifacts were analyzed and cataloged based on the following database categories: group, subgroup, class, material type, and object type. Groups include: debitage, cores, fire-cracked rock, storage/cooking, and tools. These groups were further divided into applicable subgroups: biface, uniface, core, cobble, and ground stone. Precontact database classes include ceramic, lithic, glass, metal, fauna, and flora. Object types were determined based on artifact morphology and potential function. Metric and non-metric attributes were recorded during analysis based on object type assignation. All recovered artifacts were counted and weighed. Weight was recorded to the nearest 0.1 gram (g) using a calibrated digital scale. The information from laboratory analyses was entered into a Microsoft Access database designed to facilitate the generation of artifact tables.

Artifact Groups:

Debitage

Lithic debitage, the detritus from the manufacture of stone tools, was analyzed using a typological approach in order to better understand the types of lithic reduction activities occurring on site (Andrefsky 2005:114, Odell 2003:121-122). Complete flakes and platform remnant bearing flakes (Magne and Pokotylo 1981) were assessed using attributes such as striking platform type, flake morphology, termination type, dorsal flake scar count, and the presence or absence of cortex. Based on these characteristics, debitage was classified into the following technological types: decortication flakes, early reduction flakes, bifacial thinning flakes, trimming (i.e., pressure) flakes, blade flakes, and bipolar flakes (Andrefsky 2005; Shott 1994). Nondiagnostic flake types include indeterminate flakes, flake fragments, and shatter.

Debitage attributes recorded for this analysis include weight, flake condition (i.e., whole or fragmentary), lithic raw material, cortex type, cortex cover (%), thermal alteration, and size class. Cortex was classified as block, cobble, or absent. Blocky cortex consists of weathered rind and other coarse surfaces that are typically found on lithic material recovered from primary outcrops. Cobble cortex describes the smooth, rounded surface found on natural river cobbles. Thermal alteration of debitage was recorded as reddened, potlidded, crazed, or absent. Debitage size was determined using a series of circles with graduated diameters. Size classes begin at 1-5 millimeter (mm) and increase in 5 mm increments. This provides a general and relative characterization of debitage sizes rather than an exact measurement of length and width.

Tools and Cores

Flake tools are classified based on morphology, metric attributes, and non-metric attributes (Andrefsky 2005; Odell 2003). Metric attributes include maximum length, maximum width, maximum thickness, and weight. Non-metric attributes include condition, lithic raw material, cortex type, cortex cover, and thermal alteration. Based on these attributes and tool morphology, unifacial flake tools were classified into the following types: denticulates, end scrapers, gravers, side scrapers, spokeshaves, utilized flakes, and retouched flakes.

Bifaces are classified based on morphology, metric attributes, and non-metric attributes (Andrefsky 2005; Callahan 2000; Odell 2003). Metric attributes include maximum length, maximum width, maximum thickness, and weight. Non-metric attributes include condition, lithic raw material, cortex type, cortex cover, thermal alteration, and reduction stage. Based on these attributes and artifact morphology, bifaces were grouped into the following types: early stage bifaces, middle stage bifaces, late stage bifaces, drills, projectile points, and other bifaces.

Projectile points (i.e., hafted bifaces) are classified using regional typologies outlined by Ritchie (1971) and discussed in Justice (1987). Metric attributes recorded include weight, maximum thickness, maximum length, and maximum width. Non-metric attributes include raw material, cortex type, cortex cover, thermal alteration, and haft shape. Diagnostic features evident from the haft and blade elements were used to determine the nature and ages of the various point types recovered from controlled excavations

Cores are classified based on morphology and the orientation of flake removals (Andrefsky 2005; Odell 2003). Metric attributes recorded include maximum length, maximum width, maximum thickness, and weight. Non-metric attributes include condition, lithic raw material, cortex type, cortex cover, and thermal alteration. Cores are classified into the following types: bifacial cores, bipolar cores, multidirectional cores, unidirectional cores, and tested cobbles.

Cobble and ground stone tools were classified based on morphology and implied function. The type of modification, degree of use, and kinetics of the tool were examined macroscopically. Metric attributes recorded include weight, maximum

thickness, maximum length, and maximum width. Non-metric attributes recorded include lithic raw material, cortex type, cortex cover, and evidence of thermal alteration.

Fire Cracked Rock

Fire-cracked rock (FCR) includes lithic material that displayed cracks, fractures, and reddening caused by thermal alteration. Fire-cracked rocks are the byproducts of lithic materials being heated in hearths, earth-ovens, and boiling containers (Black and Thoms 2014). Fire-cracked rock were identified based on thermal reddening and sharp angular fractures. These materials were sorted by lithic raw material type, counted, and weighed.

3.3.1.2 Precontact Analysis Results

A total of 113 precontact lithic artifacts were recovered during field investigations for the C&D Power Systems Site Sediment Removal Project (Table 3-15). The precontact artifact assemblage includes FCR (*n*=7), debitage (*n*=103), a partial projectile point (n=1), a manuport (*n*=1), and a unifacial stone tool (*n*=1). All artifacts were recovered from Ap and A horizon contexts. No precontact features such as hearths, storage pits or earth ovens for cooking were identified during the Phase IB STP survey.

Table 3-15: Precontact Artifact Totals

H/P	Group	Class	Count
Precontact	FCR	Lithic	7
Precontact	Debitage	Lithic	103
Precontact	Tool	Lithic	2
Precontact	Unmodified	Lithic	1

Precontact artifact concentrations were most prominent in STP B3+10ft E (*n*=6), STP C3 (*n*=7), STP C3+3ft W (*n*=5), STP D2 (*n*=5), STP D2+3ft W (*n*=5), and STP D2+10ft W (*n*=5) (Table 2). Artifact concentrations were predominantly comprised of flakes and flake fragments. STP C3+3ft W included the only flake tool recovered from the site. STP J 2+3 ft South yielded the only projectile point (partial) recovered. Fire-cracked rocks were most common in STP F8+10ft S (*n*=2) and recovered in smaller amounts from STP B4, STP C3, STP D2, and STP D5.

Table 3-16: Precontact Artifact Totals by STP

STP #	H/P	Group	Count
B 3	Precontact	Debitage	1
B 3+10ft E	Precontact	Debitage	6
B 3+10ft S	Precontact	Debitage	1
B 3+3ft E	Precontact	Debitage	1
B 3+3ft N	Precontact	Debitage	2
B 3+3ft S	Precontact	Debitage	1
B 3+3ft W	Precontact	Debitage	1
B 4	Precontact	FCR	1
B 4	Precontact	Debitage	2
B 4+10ft E	Precontact	Debitage	1

B 4+10ft S	Precontact	Debitage	2
C 3	Precontact	FCR	1
C 3	Precontact	Debitage	5
C 3	Precontact	Unmodified	1
C 3+10ft E	Precontact	Debitage	1
C 3+10ft S	Precontact	Debitage	2
C 3+10ft W	Precontact	Debitage	1
C 3+3ft E	Precontact	Debitage	4
C 3+3ft N	Precontact	Debitage	1
C 3+3ft S	Precontact	Debitage	2
C 3+3ft W	Precontact	Debitage	4
C 3+3ft W	Precontact	Tool	1
D 2	Precontact	FCR	1
D 2	Precontact	Debitage	4
D 2+10ft E	Precontact	Debitage	3
D 2+10ft S	Precontact	Debitage	3
D 2+10ft W	Precontact	Debitage	5
D 2+3ft E	Precontact	Debitage	3
D 2+3ft N	Precontact	Debitage	4
D 2+3ft S	Precontact	Debitage	1
D 2+3ft W	Precontact	Debitage	5
D 4	Precontact	Debitage	1
D 4+10ft E	Precontact	Debitage	1
D 4+10ft W	Precontact	Debitage	1
D 4+3ft E	Precontact	Debitage	1
D 4+3ft N	Precontact	Debitage	2
D 4+3ft S	Precontact	Debitage	2
D 4+3ft W	Precontact	Debitage	3
D 5	Precontact	FCR	1
D 5	Precontact	Debitage	2
D 5+10ft N	Precontact	Debitage	1

F 5	Precontact	Debitage	3
F 8	Precontact	Debitage	3
F 8+10ft E	Precontact	Debitage	1
F 8+10ft N	Precontact	Debitage	3
F 8+10ft S	Precontact	FCR	2
F 8+10ft S	Precontact	Debitage	1
F 8+10ft W	Precontact	Debitage	1
F 8+3ft S	Precontact	Debitage	1
J 2	Precontact	FCR	1
J 2	Precontact	Debitage	2
J 2+3 ft S	Precontact	Tool	1
J 2+3 ft E	Precontact	Debitage	4
J 2+10 ft W	Precontact	Debitage	1
J 5	Precontact	Debitage	2
J 5+3 ft N	Precontact	Debitage	1
J 5+3 ft S	Precontact	Debitage	1

A total of four lithic raw material types were identified in the flaked stone assemblage including chalcedony (*n*=6), chert (*n*=87), argillite (n=1), and sandstone (*n*=1) (Table 3-17). Lithic debitage analysis identified bifacial thinning flakes (*n*=34), trimming flakes (*n*=10), bipolar reduction flakes (*n*=1), decortication flakes (*n*=2), early reduction flakes (*n*=5), indeterminate flakes (*n*=4), and flake fragments (*n*=47).

Bifacial thinning and trimming flakes represent the majority of technologically diagnostic debitage and include chalcedony (*n*=2) and chert (*n*=44) raw materials. The prevalence of these flake types indicates that late stage reduction of bifaces was a primary knapping activity occurring on site.

Decortication and early reduction flakes were comprised of chert (*n*=5) and sandstone (*n*=1) raw materials. Chert and sandstone flakes derived from early stage reduction activities exhibited cobble cortex indicating a local source. A single chert bipolar flake recovered from radial STP D 4+3ft West provides evidence that bipolar lithic reduction was practiced on site to some extent.

Flaked stone tools in the artifact assemblage include a single chert utilized flake recovered from radial STP C 3+3ft West. The unifacial stone tool exhibited evidence of utilization along its left lateral margin and measured 24 mm long, 27.5 mm wide, 4 mm thick, and weighed 2.1 g. One partial argillite projectile point was recovered from radial STP J 2+3 ft North. This partial point was broken on the distal and proximal ends, and exhibited a random flake pattern on both the dorsal and ventral faces. It measures 45 mm in length, 20.6 mm in width, and 6.2 mm in thickness, and is composed of gray/green argillite.

Fire-cracked rock was limited to quartzite (*n*=2) and sandstone (*n*=5) lithic raw material types. River-rounded cobble cortex present on FCR indicates that they were procured from a local secondary source. A single sandstone cobble manuport was also recovered. In archaeology, a manuport is a natural object which has been moved from its original context by human agency but otherwise remains unmodified.

Table 3-17: Precontact Artifact Totals by Object and Material Types

Object	Group	Chalcedony	Argillite	Chert	Quartzite	Sandstone	Total
Bifacial Thinning Flake	Debitage	1		33			33
Trimming Flake	Debitage	1		9			10
Bipolar Reduction Flake	Debitage			1			1
Decortication Flake	Debitage			1		1	2
Early Reduction Flake	Debitage			5			5
Indeterminate Flake	Debitage	1		3			4
Flake Fragment	Debitage	3		44			47
Projectile Point	Tool		1				1
Utilized Flake	Tool			1			1
Cobble	Unmodified					1	1
FCR	FCR				2	5	7
Total		**6**		**87**	**2**	**6**	**113**

3.3.1.3 Discussion and Conclusions

Phase IB field investigations for the C&D Power Systems Site Sediment Removal Project produced a precontact artifact assemblage comprised of lithic debitage, FCR, a partial projectile point, and a utilized flake tool. Debitage analysis indicates that concentrations of flaked stone were primarily associated with late stage lithic reduction activities. Small amounts bipolar lithic reduction debris and early stage reduction flakes were also recovered. Bipolar reduction debris suggests reworking/sharpening of existing or broken tools, and early stage reduction evidence suggests attempts at making new tools from flakes taken off a cortex. Cobble cortex present on chert debitage suggests that some lithic raw material was locally available and/or recently procured. Fire-cracked rocks of quartzite and sandstone indicate the potential for hot-rock cooking (i.e., earth ovens) or heating facilities (i.e., hearths) in the area, although no such features were identified in the field.

The C&D Power Systems Site precontact deposits were not assigned any chronological or cultural affiliations as diagnostic projectile points and pottery were absent from the assemblage.

3.3.2 Historic Artifact Analysis

The 15 historic artifacts were recovered from 10 STPs within the Survey Area during the July 2021 survey. These STPs were located along Transects B, C, and D, and all material was recovered from the plow zone. Most historic artifacts were recovered from seven STPs (including radial STPs) along Transect D. As detailed in Table 3-15, Artifact Groups include Architectural, Electrical, Household, Personal, and Indeterminate. Two historic artifacts were recovered from two STPs during the October 2021 survey. A metal animal bell was identified from STP K 2, and one white ball clay smoking pipe pipestem fragment was recovered from STP L 3.

Identified objects include cut nail fragments (*n*=2), complete wire nail (*n*=1), probable wire nail fragments (*n*=4), rusted, unidentified nail fragments (*n*=2), window glass fragments (*n*=2), modern bottle glass fragment (*n*=1), electrical wire housing portion (*n*=1), redware ceramic sherd (*n*=1), metal animal bell (*n*=1), and white ball clay smoking pipe pipestem fragment (*n*=2). All historic artifacts except for the pipestem fragment were recovered from the plow zone in association with precontact artifacts during the July 2021 survey.

It is not possible to assign discrete dates to these artifacts. The date ranges for the identified cut nail and wire nail fragments are too broad to be of utility. Although iron nails and nail fragments are common on practically all historic sites, it is a difficult class of artifact to date with any certainty. This is particularly true in the case of cut nails, or hand wrought nails, where the state of preservation must be such that the head and shaft are relatively intact. For the C&D Power Systems assemblage, it is not possible due to breakage and corrosion.

The electrical housing and modern bottle glass fragment represent modern 20th through 21st century debris. The window glass fragments identified do not possess any attributes to assist in dating. Historic ceramics are usually the most reliable dating indicators on historic sites. However, the one redware sherd identified in the assemblage does not possess any diagnostic attributes to assist in dating.

The one pipestem fragment from the July 2021 survey exhibited a bore diameter of 5/64th inch, which may be interpreted as dating from 1710-1750, based on the work of J. C. Harrington and Lewis Binford, and others, and noted in Ivor Noel Hume's reference standard, *A Guide To Artifacts of Colonial America.* However, the bracketed date ranges for pipestem bore diameters were developed by applying a regression formula based on the analysis of thousands of stem fragments. The lone pipestem from this assemblage is far too small a sample to be statistically valid.

Table 3-18: Historic Artifacts by STP

STP	LEVEL	CT.	GROUP	CLASS	MATERIAL	OBJECT	COLOR	NOTES
B4	1	1	Architectural	Metal	Iron	Nail fragment	Rusted	Cut nail
B4+10ft S	1	1	Electrical	Metal	Iron	Fragment		Wire Housing w/wire
C3+3ft W	1	1	Architectural	Glass	Common glass	Window glass fragment	Aqua	Flat fragment
D2+10ft E	1	2	Architectural	Metal	Iron	Nail Fragments	Rusted	Probable wire nail
D2+3ft N	1	1	Household	Ceramic	Coarse earthenware	Body sherd	Brown	Lead glazed
D2+3ft N	1	1	Architectural	Metal	Iron	Nail Fragment		Cut nail
D2+3ft S	1	2	Architectural	Metal	Iron	Nail, complete		Wire
D2+3ft S	1	2	Architectural	Metal	Iron	Nail fragment	Rusted	Unident. type
D2+3ft W	1	2	Architectural	Metal	Iron	Nail fragments	Rusted	Probable wire nail
D4+10ft W	1	1	Household	Glass	Common glass	Curved bodysherd	Green	Probable beverage bottle
D4+3ft S	1	1	Architectural	Glass	Non-lead glass	Window glass fragment	Colorless	Flat fragment
D5+10ft W	1	1	Personal	Ceramic	Refined earthenware	Smoking Pipe	White ball clay	5/64-inch bore

						Pipestem fragment		
K 2	1	1	Not Determined	Metal	White Metal	Bell		Animal Bell
L 3	1	1	Personal	Ceramic	Refined earthenware	Smoking Pipe Pipestem Fragment	White ball clay	

In summary, the historic artifacts identified in the C&D Power Systems assemblage represent a scatter of material over a broad portion of the Survey Area. These artifacts are most likely representative of the nearby historic 19th century Swartwout farmstead.

4. Conclusions

4.1 Summary of Results

The Phase IB subsurface testing survey of the C & D Power Systems Site in Huguenot, New York consisted of manual testing on a 15-meter (50-foot) pre-plotted grid (Figure 2-1). The 15-meter (50-foot) grid across the Survey Area of the Archaeological APE consisted of seven transects labeled Transect A through Transect G during the July 2021 Phase 1B STP survey and six transects labeled Transect I through Transect M during the October 2021 Supplemental Phase 1B STP survey. The lengths of the transects varied across the Survey Area; therefore, the number of pre-plotted STPs along each transect varied as well (Figure 2-1).

During the July 2021 Phase IB STP survey, a total of 45 STPs were pre-plotted along the seven transects. Due to field conditions at the time of the Phase IB survey, five of the 45 STPs were not excavated. Of the 40 STPs excavated, eight were positive for cultural material. Therefore, two radial arrays in the four cardinal directions, one at 1 meter (3 feet) and the second at 3 meters (10 feet), were excavated around each positive STP, in compliance with SHPO guidelines. A total of 64 radial STPs were excavated. Thirty four of the 64 radials were also positive for cultural material. The total number of STPs excavated during the July 2021 Phase IB STP survey is 104.

During the October 2021 Supplemental Phase 1B STP survey, a total of 21 STPs were pre-plotted along six transects labeled Transect H through Transect M. Of the 21 STPs excavated, two were positive for cultural material. Each positive STP location was further investigated through the excavation of eight radial STPs, for a total of 16. Therefore, the total number of STPs excavated during the Supplemental Phase IB STP survey is 37. Five of the 16 radial STPs were also positive for cultural material. No temporally or culturally diagnostic artifacts were recovered in any of the positive STPs. No features or portions of features were encountered during the survey. The results of the STP survey are depicted on Figures 3-1a through 3-1d, indicating which were negative for cultural material and which were positive for precontact artifacts, historic artifacts, or both precontact and historic artifacts. Figures 3-2a through 3-2d depict the STP results with the proposed components of the sediment removal plan as an overlay.

No cultural material was recovered from the 11 pre-plotted STPs along Transect A (Figure 2-1), which included the footprint of the proposed Decontamination Pad and the proposed Access Road leading from the Decontamination Pad to Swartwout Road (Figure 3-2b). This portion of the Survey Area has no archaeological sensitivity.

The majority of the positive STPs (along Transects B, C, and D) are located along the southern end spanning approximately 45-meters (150-feet) east to west from Transect D to Transect B, and 60-meters (200-feet) north to south along Transect D. All artifacts were recovered from the plow zone along Transects B, C, D, and J.

No cultural material was recovered from the one STP excavated along Transect E (STP E 3). Three STPs were pre-plotted (Figure 2-1), but two (STPs E 1 and E 2) were found to be located on a slope of approximately 20 percent and were not excavated.

Positive STPs F 5 and F 8 were located in the lowland area in the northern portion of the Survey Area. Both positive STPs lie within the route of the proposed Access Road that runs along the Tributary D-1-7 within the northern extent of the APE (Figure 3-2a). No positive radials were associated with positive STP F 5. Five of eight radial STPs associated with positive STP F 8 were also positive for cultural material.

Transect G included two pre-plotted STP locations (Figure 2-1). These STPs were not excavated due to the amount of prior disturbance noted in the field.

Transect H consisted of one pre-plotted STP location (Figure 2-1). No cultural material was recovered from STP H 1.

Transect I include four pre-plotted STP locations (Figure 2-1). No cultural material was recovered from the four Transect I STPs.

Positive STPs J 2 and J5 are located in the northwestern and southwestern portion of the supplemental Survey Area, respectively, west of the proposed Water Treatment System Containment Area. Three and two radial STPs associated with positive STP J 2 and J5, respectively, were also positive for cultural material.

4.2 Artifact Analysis Results

Phase IB field investigations for the C&D Power Systems Site Sediment Removal Project produced a precontact artifact assemblage comprised of lithic debitage, FCR, a partial projectile point tool, and a utilized flake tool. One hundred and thirteen precontact artifacts were identified and analyzed.

Debitage analysis indicates that concentrations of flaked stone were primarily associated with late stage lithic reduction activities. Small amounts bipolar lithic reduction debris and early stage reduction flakes were also recovered. Bipolar reduction debris suggests reworking/sharpening of existing or broken tools and early stage reduction evidence suggests attempts at making new tools from flakes taken off a cortex. Cobble cortex present on chert debitage suggests that some lithic raw material was locally available and/or recently procured.

It is noted that no temporally or culturally diagnostic precontact artifacts such as complete projectile points or pottery sherds were recovered in any of the positive STPs. In other words, it was not possible to assign dates or tribal affiliations to the precontact artifacts recovered. In addition, no precontact features such as hearths, storage pits or earth ovens for cooking were identified during the Phase IB STP survey. However, fire-cracked rocks of quartzite and sandstone indicate the potential for hot-rock cooking (i.e., earth ovens) or heating facilities (i.e., hearths) in the area, although no such features were identified in the field.

The 17 historic artifacts recovered represent a scatter of cultural material over 10 STPs.

4.3 Areas of Archaeological Sensitivity

The Phase IB artifact analysis has indicated that there are five areas of archaeological sensitivity within the C&D Power Systems Site Sediment Removal Project Survey Area. The areas were identified based on the analysis of the artifacts recovered from the STP survey. Ten of the 61 STPs excavated along the 13 transects were positive for cultural material. Radial STPs were excavated around each positive STP, and 39 of the 80 radial STPs excavated were also positive for cultural material (Figures 3-1a and 3-1b). The results of the survey were also plotted with the sediment remediation plan as an overlay to depict which project components could impact potential archaeological resources (Figures 3-2a through 3-2d).

The five areas of archaeological sensitivity were delineated based on the positive STPs, with a 25-foot buffer surrounding each. The areas are shown on Figures 4-1a and 4-1b. The five areas of sensitivity are summarized as follows:

- **Area 1:** located in the northern portion of the Survey Area, and focused on positive STP F 8 on the west bank of the tributary, north of the agricultural fields. The extent of this area is delineated by documentation of no temporally or culturally diagnostic precontact artifacts at STP F 9 to the south, STP F7 to the north and the APE boundaries to the east and west of the location. STP F 8 is located within the route of the proposed Access Road.

- **Area 2:** located in the southeastern portion of the Survey Area, and includes positive STPs B 3, B 4, C 3, and D 2. All artifacts were recovered from the plow zone in Area 2. Each of the initial positive STPs are within 15 meters (50 feet) of each other along the transect grid. Subsequent to the completion of the Phase 1B sampling in July 2021, this area is now excluded from APE. The extent of this sensitive area is delineated by documentation of no temporally or culturally diagnostic precontact artifacts at STP C 5 , STP C 4 and APE boundary to the east, STP C 2 and STP B 2 to the north, STP B 3+10W and STP A11 to the west and the APE boundaries to the south of the location.

- **Area 3:** located in the southeastern portion of the Survey Area, closest to the southern terminus of the sediment removal zone, and includes positive STPs D 4 and D 5. Positive STP D 4 , STP D 5, and their radials are located in the proposed Access Road along the western bank of Tributary D-1-7, and the proposed route of diversion pipe in the Stream Diversion Corridor. The extent of this area is delineated by documentation of no temporally or culturally diagnostic precontact artifacts at STP D 6 to the south, STP D 1 to the north and the APE boundaries to the east and west of the location.

- **Area 4:** located in the southwestern portion of the supplemental Survey Area, and focused on positive STP J 5, west of the proposed Water Treatment System Containment Area. Radial STPs were excavated and three were positive for precontact cultural material. The extent of this area is delineated by documentation of no temporally

or culturally diagnostic precontact artifacts at STP J 5+3S to the south, STP J 5+3E to the east, STP J 5+3N to the north, and STP J 5+3W to the west.

- **Area 5:** located in the northwestern portion of the supplemental Survey Area, and focused on positive STP J 2, west of the proposed Sediment Staging, Mixing and Drying Area. Radial STPs were excavated and two were positive for precontact cultural material. The extent of this area is delineated by documentation of no temporally or culturally diagnostic precontact artifacts at STP J 2+3S to the south, STP J 2+3E to the east, STP J 2+3N to the north, and STP I 2 to the west.

4.4 Summary of Results

The areas of archaeological sensitivity identified by the Phase IB survey indicate precontact activity over much of the project area. Given the proximity of previously identified precontact site MRE-TRC-8 (07501.000148), it is probable that the precontact artifacts encountered during the Phase IB survey are associated with that site. Site MRE-TRC-8 (07501.000148) was first encountered and identified in 2016 as a multi-component site, having both precontact and historic components. The prehistoric component of the site consists of a lithic scatter concentrated in the southern portion of the site area. According to the mapping provided in the TRC report, this southern portion is in proximity to Sensitivity Areas 2 and 3 as identified along Transects B, C, and D through the 2021 Phase IB survey.

The artifact assemblages recovered from the 2016 TRC survey and the 2021 AECOM survey are similar in content. In total, 16 precontact artifacts, 15 historic artifacts, and one coal fragment were recovered from site MRE-TRC-8 (07501.000148). The 2016 precontact artifact sample consists of seven flake fragments, five pieces of angular shatter, three biface reduction flakes, and one biface thinning flake. Raw material types represented in the sample include chert (n=6), rhyolite (n=6) jasper (n=3), and chalcedony (n=1). The 2021 precontact artifact assemblage includes a total of four lithic raw material types that were identified in the flaked stone assemblage including chalcedony (*n*=6), chert (*n*=87), argillite (n=1), and sandstone (*n*=1). Lithic debitage analysis identified bifacial thinning flakes (*n*=34), trimming flakes (*n*=10), bipolar reduction flakes (*n*=1), decortication flakes (*n*=2), early reduction flakes (*n*=5), indeterminate flakes (*n*=4), and flake fragments (*n*=47). No cultural affiliation or date range was possible to determine for the precontact component, as no temporally or culturally diagnostic artifacts or features were recovered during the 2016 or the 2021 surveys.

The 2016 historic artifact sample consists of Architectural class (five window glass, three wire nails, one piece of wire, one iron bolt, and one iron spike), Domestic class (one brown container glass shard, one redware sherd, and one whiteware sherd), and Personal class (one metal button) artifacts. A total of 15 historic artifacts were recovered from 10 STPs within the Survey Area during the July 2021 survey. These STPs were located along Transects B, C, and D, and all material was recovered from the plow zone. Identified objects include cut nail fragments (*n*=2), complete wire nail (*n*=1), probable wire nail fragments (*n*=4), rusted, unidentified nail fragments (*n*=2), window glass fragments (*n*=2), modern bottle glass fragment (*n*=1), electrical wire housing portion (*n*=1), redware ceramic sherd (*n*=1), metal animal bell (*n*=1), and white ball clay smoking pipe pipestem fragment (*n*=2). All historic artifacts except for the pipestem fragment were recovered from the plow zone in association with precontact artifacts during the 2021 survey.

Site MRE-TRC-8 (07501.000148) was recommended as potentially eligible for listing in the National Register by TRC in 2016. A site avoidance plan was recommended by TRC.

AECOM has developed a Site Avoidance and Protection Plan, which includes a combination of relocating construction support elements from sensitive to non-sensitive areas, fencing off areas of sensitivity, and temporary construction matting atop areas of sensitivity that cannot be avoided.

The Site Avoidance and Protection Plan is discussed in detail in Section 5 Recommendations.

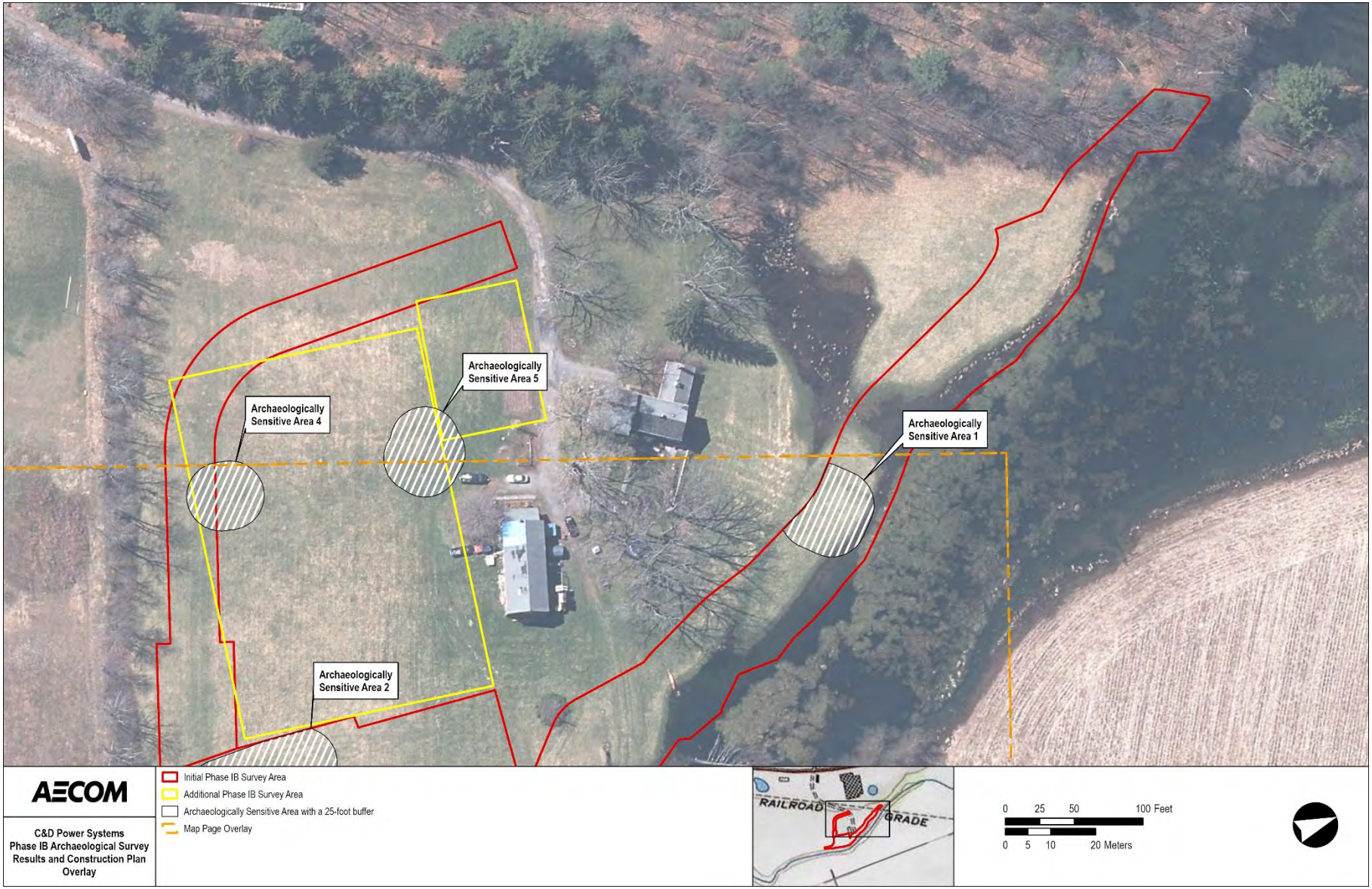

Figure 4-1a: Archaeologically Sensitive Areas 1, 4 and 5

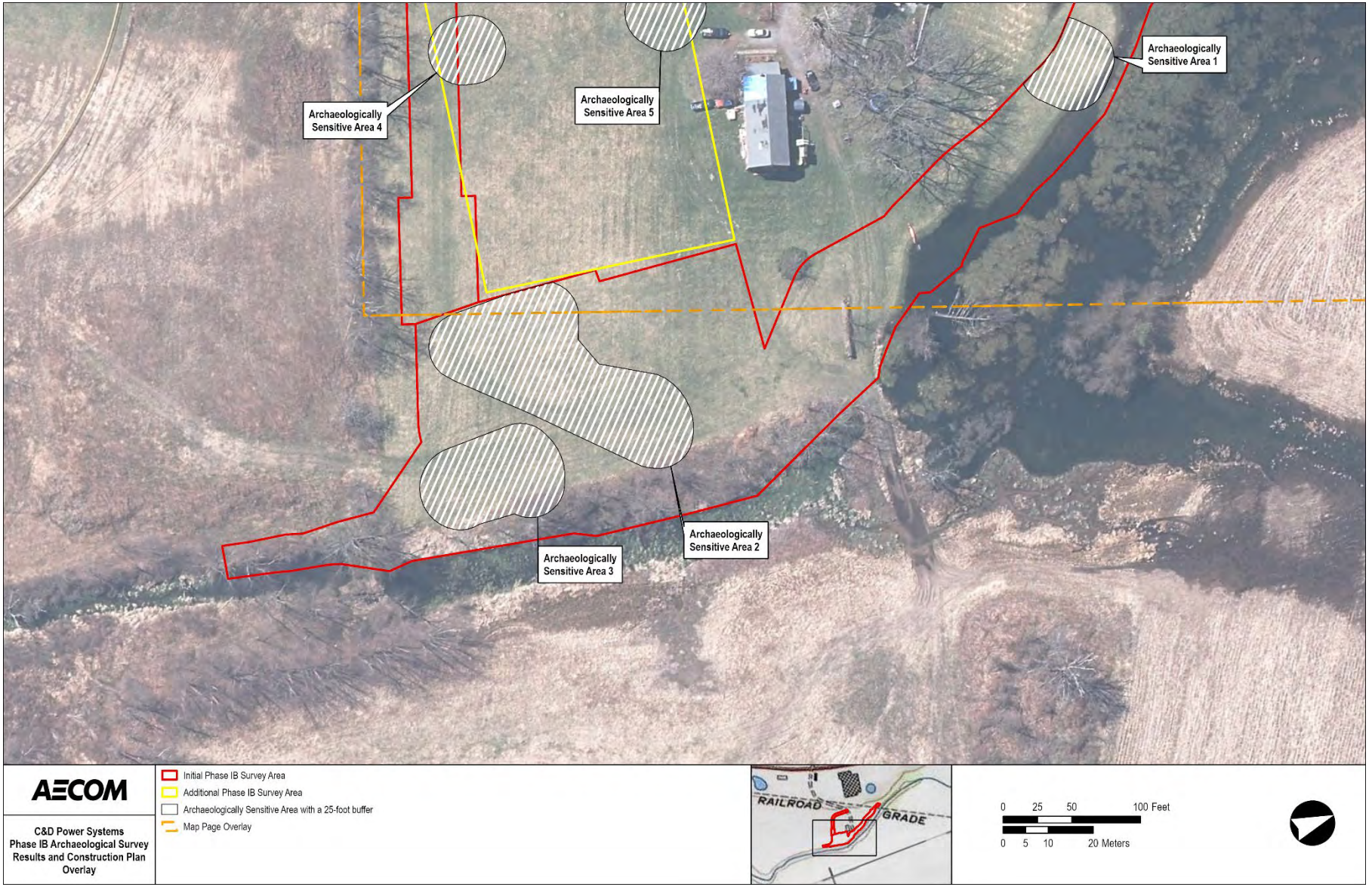

Figure 4-1b: Archaeologically Sensitive Areas 2 and 3

5. Recommendations

It has been established that the areas of sensitivity identified during the 2021 Phase IB survey are probably portions of previously identified Site MRE-TRC-8 (07501.000148). This site has been recommended as potentially eligible for listing in the National Register due to its research potential. Although potentially eligible, NYSDEC DER is not in the position to support further research under NYS Superfund Programs and thus supports an avoidance and protection plan should future research opportunities become available through coordination with SHPO.

Section 106 compliance process guidelines for the protection of archaeological resources include measures to protect archaeological resources in place. AECOM is proposing to relocate the Sediment Staging, Mixing and Drying Area, the Water Treatment System Containment Area, and portions of Access Roads to areas that do not possess sensitivity. In addition, a Site Avoidance and Protection Plan has been developed to preserve the integrity of potential archaeological deposits, including areas where relocation of project activity areas is not feasible.

5.1 Avoidance and Protection Plan for Sensitivity Area 1

The Avoidance and Protection Plan proposed for this area includes the placement of temporary construction mats over the entire delineated boundary of Sensitivity Area 1 (Figure 5-1a). The temporary construction matting would consist of interlocking, high-strength DURA BASE® composite material mats or equivalent that are designed for use in environmentally sensitive areas and, more specifically, to avoid ground disturbance and compaction impacts. All vehicle traffic at the project site would be accessed over the temporary construction matting using low-pressure, rubber tire vehicles. An excavator would be utilized to install the mats and would use an installation method by which the mats are installed ahead of the excavator to ensure that the excavator is always on top of the mats. The construction matting will be removed manually from ground surface once work is complete. A typical cross-section of the temporary construction mat is shown on Figure 5-1b. Technical data and specifications for DURA BASE® composite material mats are included in Attachment 1.

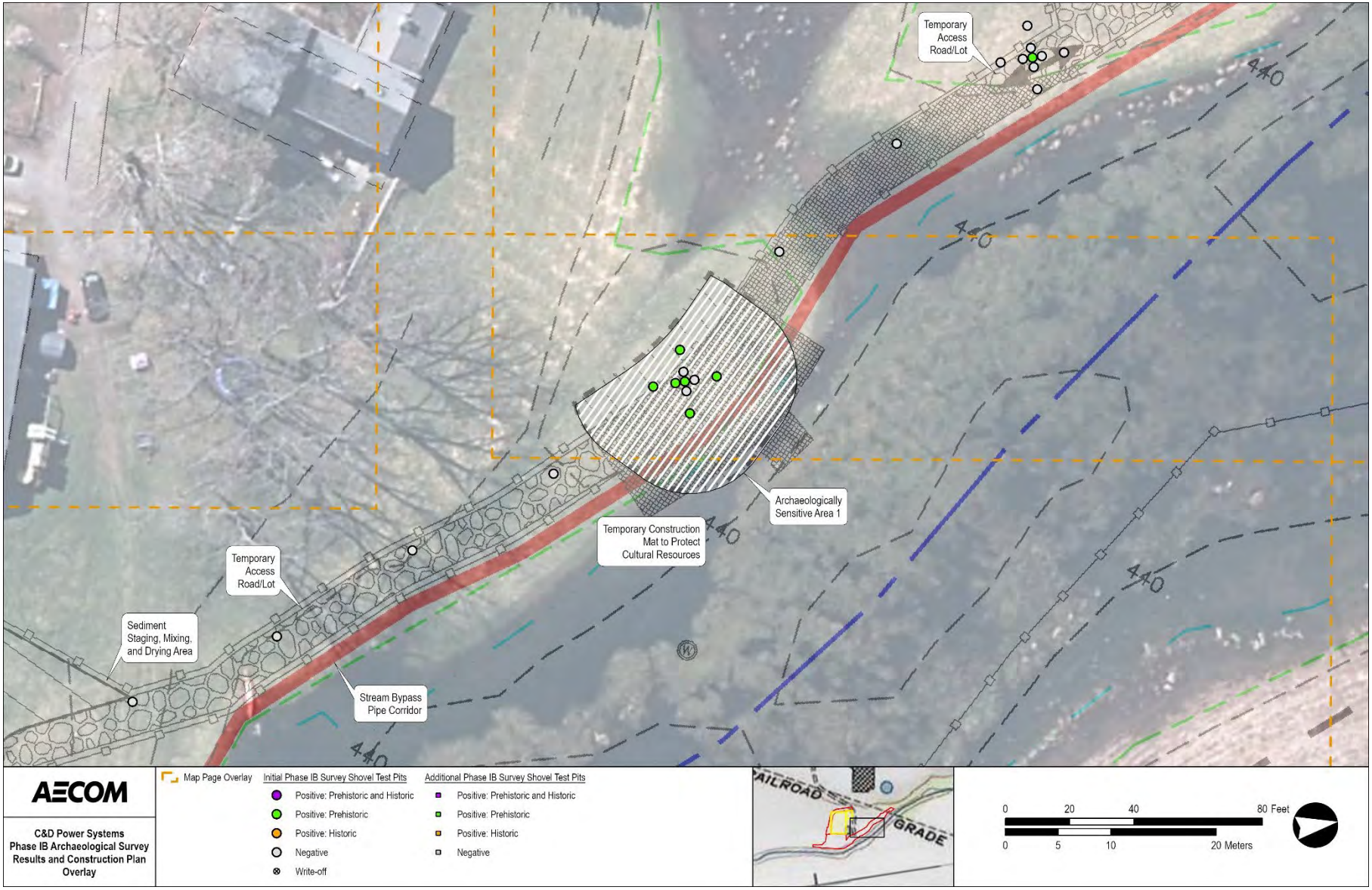

Figure 5-1a: Sensitivity Area 1 Survey Results and Avoidance Plan

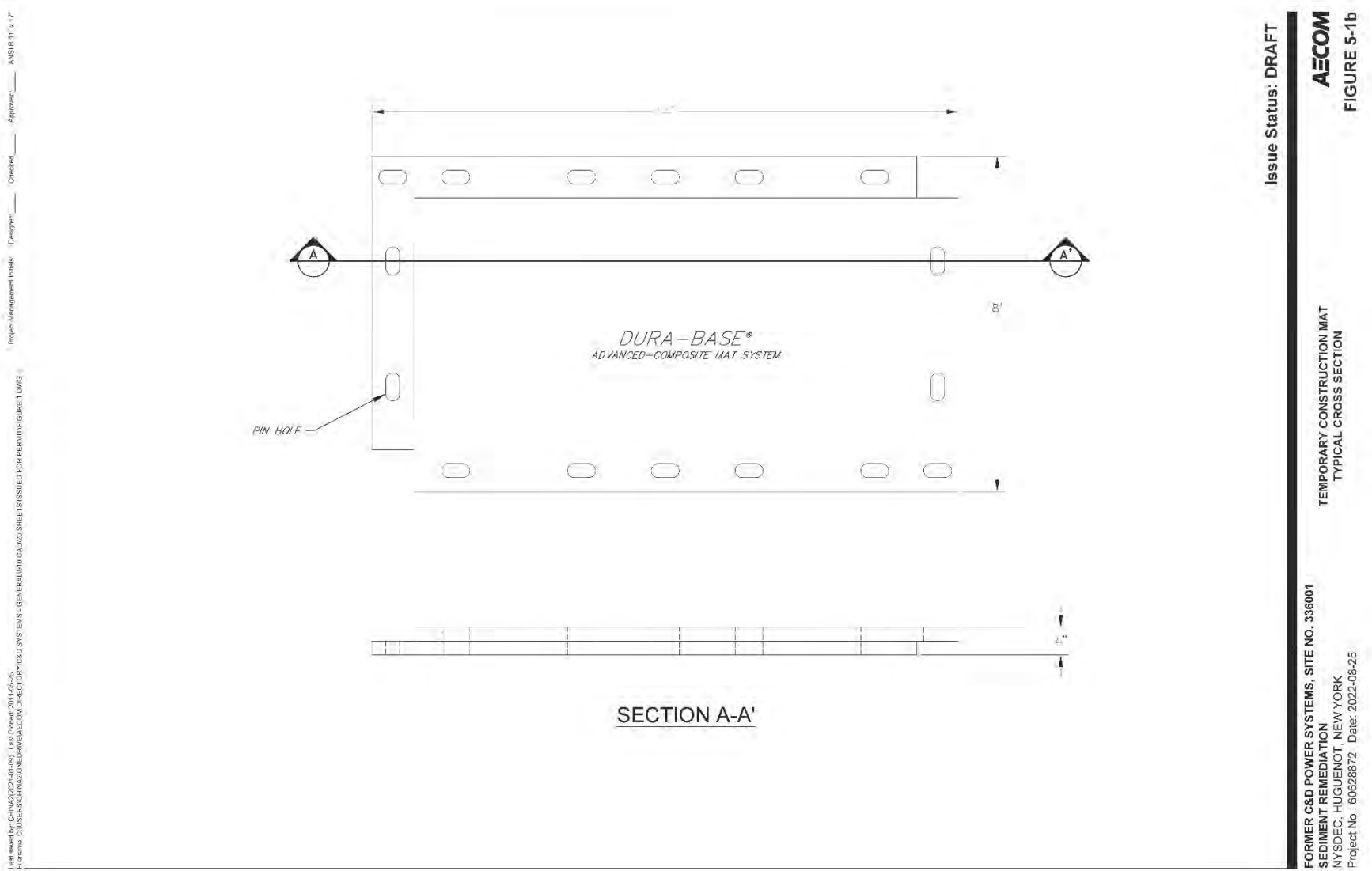

Figure 5-1b: Temporary Construction Mat Typical Cross Section

5.2 Avoidance and Protection Plan for Sensitivity Area 2

The avoidance and Protection Plan for Sensitivity Area 2 consists of a combination of engineering controls (Figure 5-2a). The Avoidance and Protection Plan proposed for this area includes installation of a chain link fence around the portion of Sensitivity Area 2 as described in Chapter 4. A typical cross-section of the chain link fence is shown on Figure 5-2b. In addition, AECOM has relocated the Sediment Staging, Mixing and Drying Area, the Water Treatment System Containment Area, and portion of Access Road further west to areas that do not possess sensitivity. The entire width of the proposed Access Road along the west bank of Tributary D-1-7, at the eastern boundary of Sensitivity Area 2, will be protected by temporary construction matting (Figure 5-1b) continuing northward from the temporary construction matting protecting Sensitivity Area 3. The temporary construction matting would consist of interlocking, high-strength DURA BASE® composite material mats or equivalent that are designed for use in environmentally sensitive areas and specifically to avoid ground disturbance and compaction impacts. Any vehicle traffic work site would be accessed over the construction matting using low-pressure, rubber tire vehicles. An excavator would be required to install the mats and would use an installation method by which the mats are installed ahead of the excavator and thus the excavator is always on top of the mats. The construction matting will be removed manually from ground surface once work is complete.

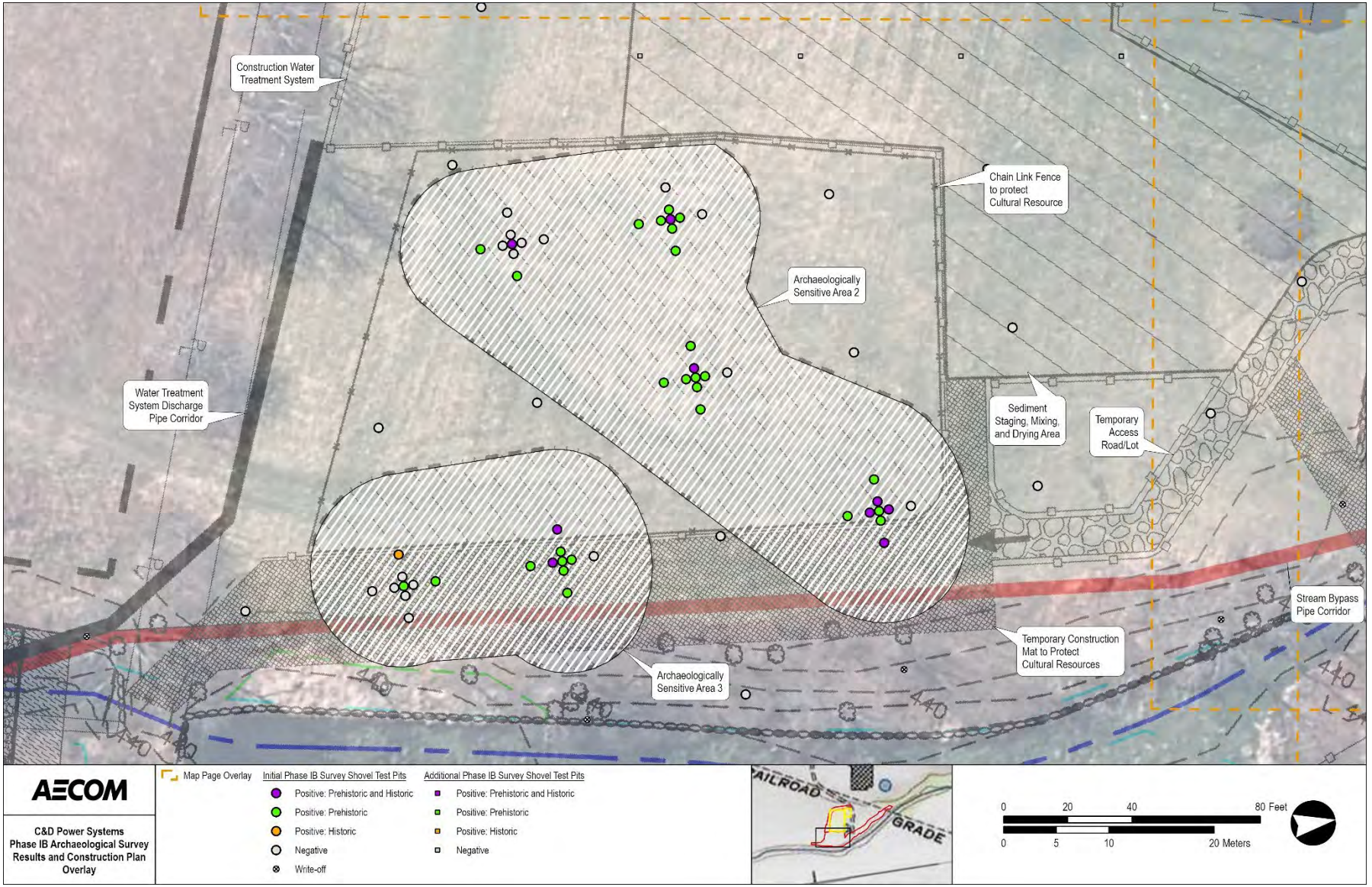

Figure 5-2a: Sensitivity Area 2 Survey Results and Avoidance Plan

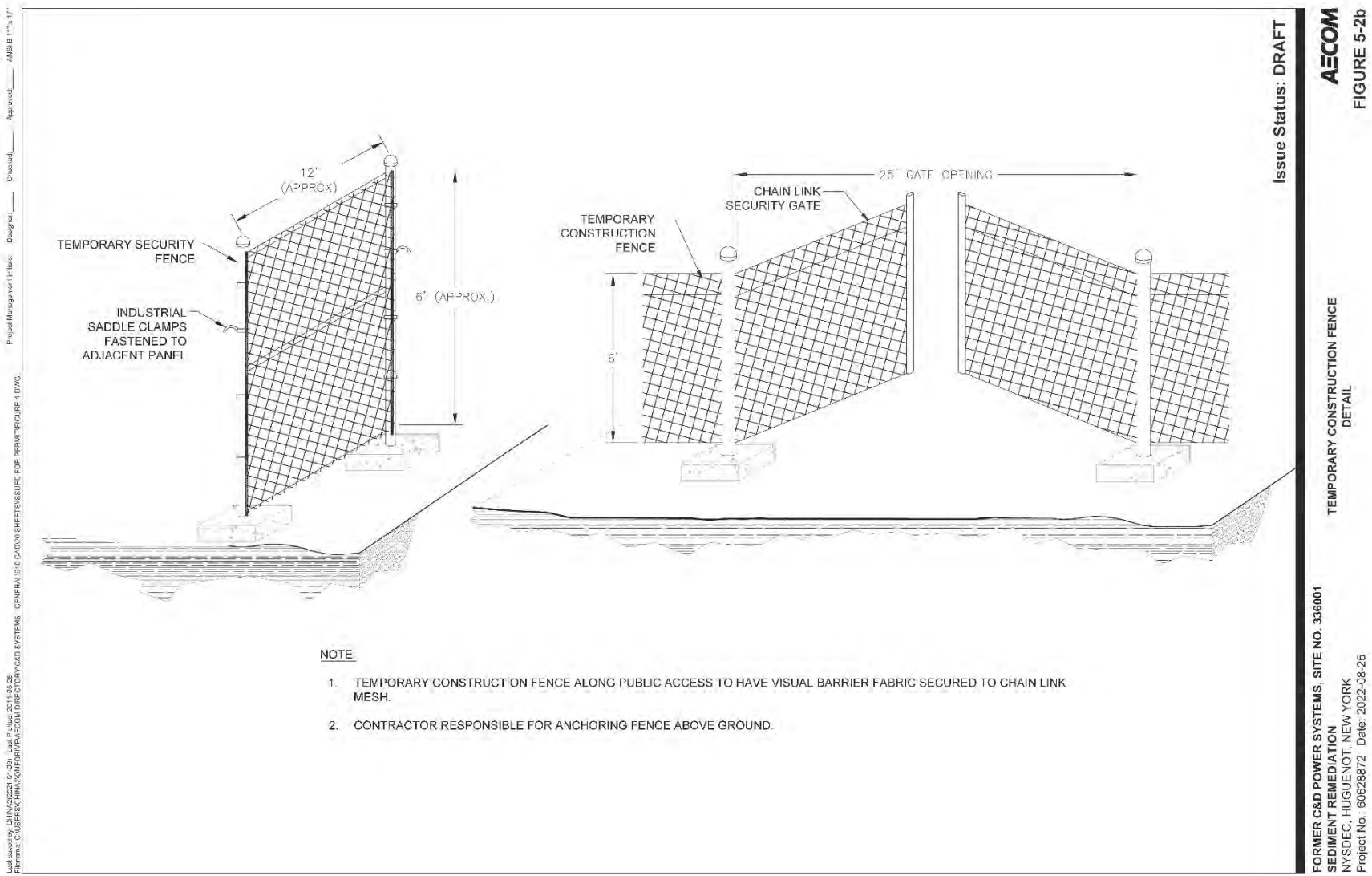

Figure 5-2b: Temporary Construction Fence Detail

5.3 Avoidance and Protection Plan for Sensitivity Area 3

The Avoidance and Protection Plan proposed for this area includes the placement of temporary construction mats over the entire delineated boundary of Area 3 (Figure 5-3). The temporary construction matting would consist of interlocking, high-strength DURA BASE® composite material mats or equivalent that are designed for use in environmentally sensitive areas and specifically to avoid ground disturbance and compaction impacts. Any vehicle traffic work site would be accessed over the construction matting using low-pressure, rubber tire vehicles. An excavator would be required to install the mats and would use an installation method by which the mats are installed ahead of the excavator and thus the excavator is always on top of the mats. The construction matting will be removed manually from ground surface once work is complete. Typical cross-section of the mat is presented in Figure 5-1b.

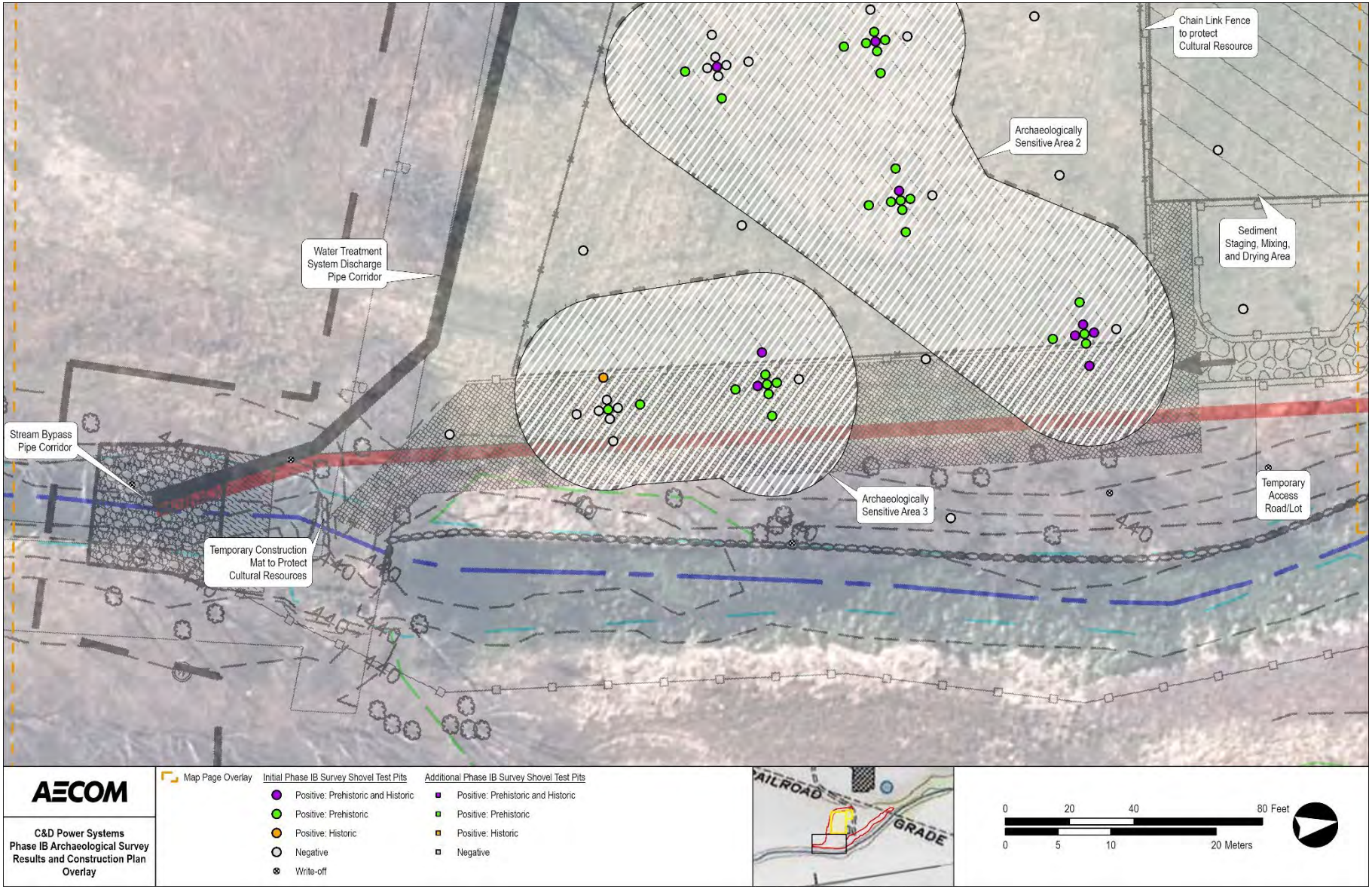

Figure 5-3: Sensitivity Area 3 Survey Results and Avoidance Plan

5.4 Avoidance and Protection Plan for Sensitivity Area 4

The Avoidance and Protection Plan proposed for this area includes installation of a chain link fence around the entire delineated boundary of Area 4 (Figure 5-4). Typical cross-section of the fence is shown on Figure 5-2b.

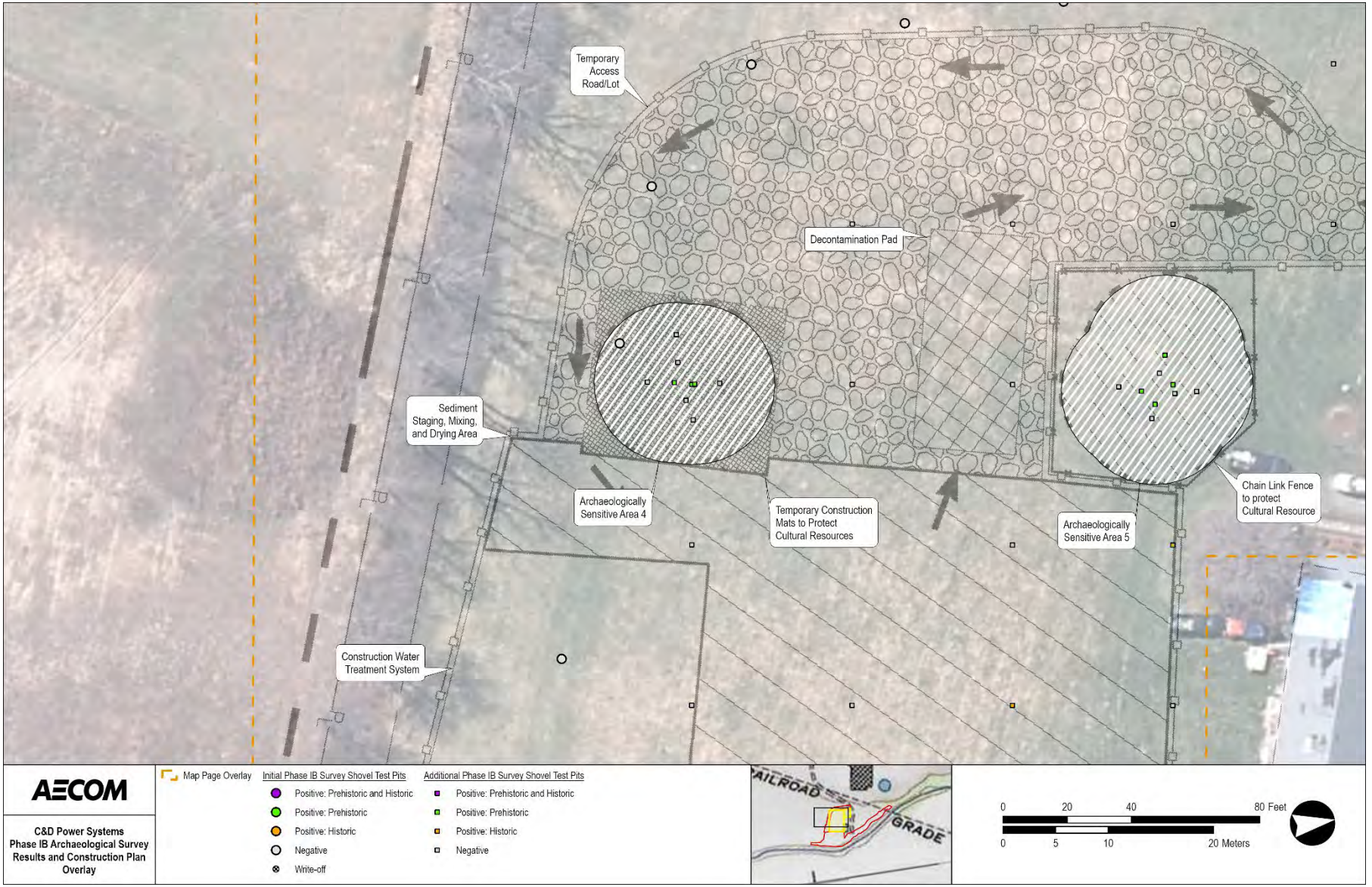

Figure 5-4: Sensitivity Area 4 Survey Results and Avoidance Plan

5.5 Avoidance and Protection Plan for Sensitivity Area 5

The Avoidance and Protection Plan proposed for this area includes a combination of installation of a chain link fence and placement of temporary construction mats over a portion of the delineated boundary of Area 5 (Figure 5-5). The temporary construction matting would consist of interlocking, high-strength DURA BASE® composite material mats or equivalent that are designed for use in environmentally sensitive areas and specifically to avoid ground disturbance and compaction impacts. Any vehicle traffic work site would be accessed over the construction matting using low-pressure, rubber tire vehicles. An excavator would be required to install the mats and would use an installation method by which the mats are installed ahead of the excavator and thus the excavator is always on top of the mats. The construction matting will be removed manually from ground surface once work is complete. Typical cross-sections of the mat and chain link fence are shown on Figure 5-1b and Figure 5-2b, respectively.

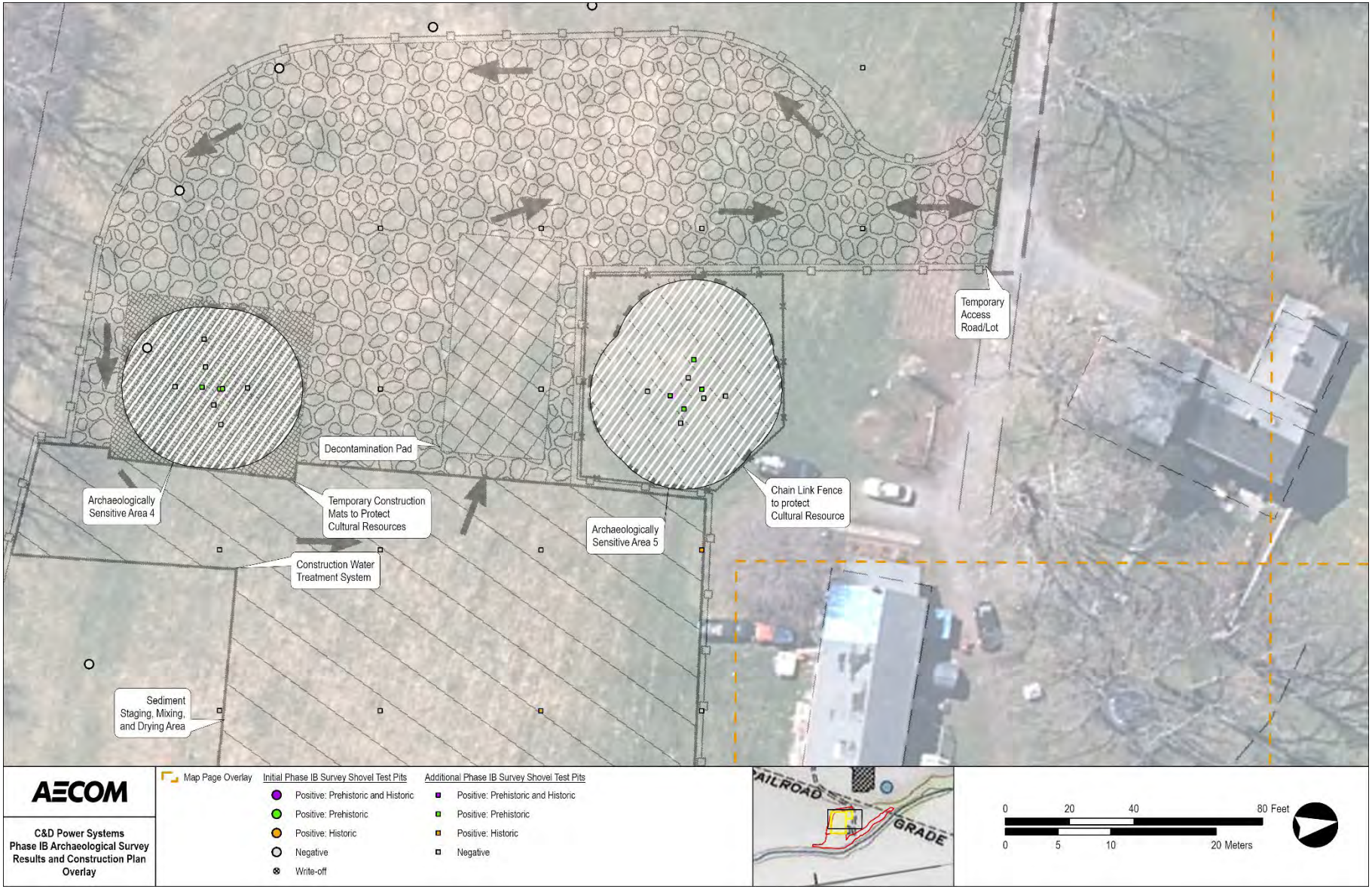

Figure 5-5: Sensitivity Area 5 Survey Results and Avoidance Plan

6. References

6.1 Books and Survey Reports

Adams, Arthur G.
1996 *The Hudson Through the Years.* Third Edition. Fordham University Press, NY.

Andrefsky, William Jr.
2005 *Lithics: Macroscopic Approaches to Analysis*. Cambridge Manuals in Archaeology. Cambridge University Press. Cambridge, United Kingdom

Black, Stephen L. and Alston V. Thoms
2014 Hunter-Gatherer Earth Ovens in the Archaeological Record: Fundamental Concepts. *American Antiquity* 79(2):203-226.

Callahan, Errett
2000 *The Basics of Biface Knapping in the Eastern Fluted Point Tradition: A Manual for Flintknappers and Lithic Analysts, 4th edition*. Piltdown Productions, Lynchburg.

Cammisa, Alfred G., MA with Alexander Padilla (CAD)
2020 Phase I Archaeological Investigation for the proposed Rivendale subdivision at 515 Neversink Drive Huguenot, Town of Deer Park, Orange County, New York. Prepared for: John D. Fuller, P.E., P.C. Prepared by: TRACKER Archaeology, Inc. April 2020.

2019 *Phase I Archaeological Investigation for the proposed subdivision at 463 NYS RT 209 Huguenot, Town of Deer Park, Orange County, New York*. Prepared for: Makai Real Estate, LLC, Brooklyn, New York Arden Consulting Engineers, PLLC, Monroe, New York. Prepared by: TRACKER Archaeology, Inc. October 2019.

2016 *Phase I Archaeological Investigation for the proposed Paragon subdivision Huguenot, Town of Deer Park, Orange County, New York.* Prepared for: John D. Fuller, P.E. Prepared by: TRACKER Archaeology, Inc. July 2016.

Diamond, Joseph E.
2016 *Phase I Cultural Resource Investigation, Neversink Berm Removal, Town of Deer Park, Orange County, NY.* Prepared for: The Nature Conservancy and Milone and MacBroom. Prepared by: Joseph E. Diamond, Ph.D. July 25, 2016.

Hudson, Jonathan
2001 *Phase I Archaeological Survey Proposed Wireless Telecommunications Site "Deerpark" 410 NYS Route 209, Huguenot, Town of Deerpark, NY.* Prepared for: JNS Towers, LLC. Prepared by: Jonathan Hudson, IVI Telecom Services, Inc.

Justice, Noel D.
1987 *Stone Age Spear and Arrow Points of the Midcontinental and Eastern United States: A Modern Survey and Reference*. Bloomington, Indiana: Indiana University Press.

Magne, Martin and David Pokotylo
1981 A Pilot Study in the Bifacial Lithic Reduction Sequences. *Lithic Technology* 10:34-47.

New York Archaeological Council
1994 *Standards for Cultural Resource Investigations and the Curation of Archaeological Collections in New York State.* Adopted by the NYS Office of Parks, Recreation and Historic Preservation in 2004.

Noel Hume, Ivor
1976 *A Guide to Artifacts of Colonial America*. Hawthorne Books, New York.

Oberon, Stephen J.
2010 *Phase I Cultural Resource Survey, Site Assessment and Site Identification Phases, Huguenot Farms Big Pond Road Mine Site, Town of Deerpark, Orange County, NY.* Prepared for: Spectra Environmental Group, Inc. Prepared by: Stephen J. Oberon, Columbia Heritage, Ltd.

Odell, George H.
2003 *Lithic Analysis*. Manuals in Archaeological Method, Theory, and Technique. Springer Science + Business Media, LLC. New York, NY.

Olsson, Karl S.
1981 *Soil Survey of Orange County, New York.* US Department of Agriculture in cooperation with Cornell University Agricultural Experiment Station.

Parker, Arthur C.
1922 The Archaeological History of New York. *NYS Museum Bulletin 235-238.* Albany, NY.

Ritchie, William A
1971 *A Typology and Nomenclature for New York Projectile Points*. New York State Museum and Science Service Bulletin 384. Albany.

Ruttenber, E.M. and L.H. Clarke
1881 *History of Orange County, New York.* Everts & Peck, Philadelphia, PA.

Sanders, Michael J.
2007 Phase I Cultural Resource Survey, Neversink Preserve Wetland Restoration, Route 209, Town of Deer Park, Orange County, New York. Prepared for: The Upper Susquehanna Coalition and The Nature Conservancy. Prepared by: Michael J. Sanders, Taconic Research. July 2007.

Schindler, Bill and Jeremy W. Koch
2012 Flakes Giving You Lip? Let Them Speak: An Examination of the Relationship Between Percussor Type and Lipped Platforms. *Archaeology of Eastern North America* 40:99-106.

Shott, Michael J.
1994 Size and Form in the Analysis of Flake Debris: Review and Recent Approaches. *Journal of Archaeological Method and Theory* 1(1):69-110.

TRC Environmental Corp.
2016 *Phase IA/IB Archaeological Survey of The Eastern System Upgrade Project Orange, Sullivan, And Delaware Counties, New York.* Prepared for: Millennium Pipeline Company, LLC. Prepared by: Marianne Ballantyne, M.A., Patrick Walters, B.A., Timothy R. Sara, M.A., Robert Wall, Ph.D., and Heather Schramm, B.A. July 2016.

6.2 Maps

Beers, F.W.
1875 *County Atlas of Orange County, New York, Plate 20 Deer Park.* Andreas Baskin & Burr, Chicago, IL.

Lathrop, J.M.
1903 *Atlas of Orange County, New York.* A.H. Mueller & Company, Philadelphia, PA.

Sidney, J.C.
1859 *Map of Orange County from Actual Surveys.* Newell S. Brown, Newburgh, NY.

USGS
1969 *Port Jervis* 7.5-minute series
1969 *Otisville* 7.5-minute series

6.3 Online Resources

http://www.nrcs.usda.gov

http://www.orangecounty.gov.com

https://townofdeerparkny.gov/

7. List of Preparers

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Gabrielle Perry, BA, GIS Specialist. Over 4 years of experience in archaeological excavations, geomorphological surveys, and laboratory analyses across the Mid-Atlantic region and New England**.** Primary duties include producing and analyzing geospatial data for above and below-ground cultural resource investigations as well as conducting geomorphological surveys. Temple University, 2017, BA, Anthropology.

Thanks to **Jordan Smith,** Field Supervisor, **John Stanzeski**, Field Supervisor, and **Christopher DiMaiolo,** Field Technician, for their work on the Phase IB survey tasks.

Appendix A – Field Records

APPENDIX A

Field Records:

Appendix A-1 Location Record

Table A1 - Phase IB Location Record

STP	Association	Date Excavated	Depth (cm)	Termination Reason	Cultural Material	FS Log #	Notes
Transect A							
A 11	Proposed access road	07/20/21	43.0	sterile	NCM		
A 10	Proposed access road	07/20/21	30.0	sterile	NCM		
A 9	Proposed access road	07/20/21	41.0	sterile	NCM		
A 8	Proposed access road	07/20/21	36.0	sterile	NCM		
A 7	Proposed access road	07/20/21	40.0	sterile	NCM		
A 6	Proposed access road	07/20/21	38.0	sterile	NCM		
A 5	Proposed access road	07/20/21	37.0	sterile	NCM		
A 4	Proposed access road	07/20/21	28.0	sterile	NCM		
A 3	Proposed access road	07/20/21	30.0	sterile	NCM		
A 2	Proposed access road	07/20/21	28.0	sterile	NCM		
A 1	Proposed access road	07/20/21	32.0	sterile	NCM		
Transect B							
B 1	Eastern edge of upland	07/21/21	37.0	sterile	NCM		
B 2	Eastern edge of upland	07/21/21	38.0	sterile	NCM		
B 3	Eastern edge of upland	07/21/21	49.0	sterile	Precontact	8	1 chert flake in plow zone (0-39 cm)
B 3 10N	Radial STP	07/22/21	30.0	sterile	NCM		
B 3 3N	Radial STP	07/22/21	36.0	sterile	Precontact	33	1 chert flake in plow zone (0-26 cm)
B 3 10S	Radial STP	07/22/21	36.0	sterile	Precontact	31	1 chert flake in plow zone (0-26 cm)
B 3 3S	Radial STP	07/22/21	35.0	sterile	Precontact	32	1 chert flake in plow zone (0-25 cm)
B3 10E	Radial STP	07/22/21	37.0	sterile	Precontact	36	6 chert flakes in plow zone (0-27 cm)
B 3 3E	Radial STP	07/22/21	36.0	sterile	Precontact	35	1 chert flake in plow zone (0-26 cm)
B 3 10W	Radial STP	07/22/21	40.0	sterile	NCM		
B 3 3W	Radial STP	07/22/21	33.0	sterile	Precontact	34	1 chert flake in plow zone (0-23 cm)
B 4	Eastern edge of upland	07/21/21	37.0	sterile	Precontact	9	3 chert flakes in plow zone (0-27 cm)
B 4 10N	Radial STP	07/22/21	26.0	sterile	NCM		
B 4 3N	Radial STP	07/22/21	26.0	sterile	NCM		
B 4 10S	Radial STP	07/22/21	36.0	sterile	Precontact	30	2 chert flakes, 1 iron bolt in plow zone (0-26 cm)
B 4 3S	Radial STP	07/22/21	27.0	sterile	NCM		
B 4 10W	Radial STP	07/22/21	23.0	sterile	NCM		
B 4 3W	Radial STP	07/22/21	28.0	sterile	NCM		
B4 10E	Radial STP	07/22/21	37.0	sterile	Precontact	29	1 chert flake in plow zone (0-27 cm)
B 4 3E	Radial STP	07/22/21	30.0	sterile	NCM		
Transect C							
C 5	50 feet east of Transect B in upland	07/21/21	30.0	sterile	NCM		
C 4	50 feet east of Transect B in upland	07/21/21	41.0	sterile	NCM		
C 3	50 feet east of Transect B in upland	07/21/21	36.0	sterile	Precontact	10	5 chert flakes, possible stone tool in plow zone (0-26 cm)

Table A1 - Phase IB Location Record

STP	Association	Date Excavated	Depth (cm)	Termination Reason	Cultural Material	FS Log #	Notes
C 3 10N	Radial STP	07/23/21	40.0	sterile	NCM		
C 3 3N	Radial STP	07/23/21	40.0	sterile	Precontact	37	1 chert flake in plow zone (0-30 cm)
C 3 10S	Radial STP	07/23/21	37.0	sterile	Precontact	38	2 chert flakes in plow zone (0-27 cm)
C 3 3S	Radial STP	07/23/21	39.0	sterile	Precontact	39	2 chert flakes in plow zone (0-29 cm)
C 3 10E	Radial STP	07/23/21	38.0	sterile	Precontact	40	1 chert flake in plow zone (0-28 cm)
C 3 3E	Radial STP	07/23/21	43.0	sterile	Precontact	41	4 chert flakes in plow zone (0-33 cm)
C 3 10W	Radial STP	07/23/21	37.0	sterile	Precontact	42	1 chert flake in plow zone
C 3 3W	Radial STP	07/23/21	44.0	sterile	Precontact	43	5 chert flakes in plow zone (0-34 cm)
C 2	50 feet east of Transect B in upland	07/21/21	32.0	sterile	NCM		
C 1	50 feet east of Transect B in upland	07/21/21	29.0	sterile	NCM		
			Transect D				
D 1	50 ft east of Trans C, E edge upland	07/21/21	43.0	sterile	NCM		
D 2	50 ft east of Trans C, E edge upland	07/21/21	30.0	sterile	Precontact	11	4 chert flakes, 1 fire cracked rock in plow zone (0-20 m)
D 2 10N	Radial STP	07/21/21	38.0	sterile	NCM		
D 2 3N	Radial STP	07/21/21	40.0	sterile	Precontact	16	cm)
D 2 10S	Radial STP	07/21/21	33.0	sterile	Precontact	15	3 chert flakes in plow zone (0-23 cm)
D 2 3S	Radial STP	07/21/21	37.0	sterile	Precontact	14	1 chert flake, 3 nails in plow zone (0-27 cm)
D 2 10W	Radial STP	07/21/21	36.0	sterile	Precontact	17	5 chert flakes in plow zone (0-26 cm)
D 2 3W	Radial STP	07/21/21	33.0	sterile	Precontact	18	5 chert flakes, 2 nail frags in plow zone (0-23 cm)
D 2 10E	Radial STP	07/21/21	32.0	sterile	Precontact	19	3 chert flakes, 2 nail frags in plow zone (0-22 cm)
D 2 3E	Radial STP	07/21/21	37.0	sterile	Precontact	20	3 chert flakes in plow zone (0-27 cm)
D 3	50 ft east of Trans C, E edge upland	07/21/21	40.0	sterile	NCM		
D 4	50 ft east of Trans C, E edge upland	07/21/21	45.0	sterile	Precontact	12	1 chert flake in plow zone (0-35 cm)
D 4 10N	Radial STP	07/22/21	34.0	sterile	NCM		
D 4 3N	Radial STP	07/22/21	55.0	sterile	Precontact	22	2 chert flakes in A Horizon (0-45 cm)
D 4 10S	Radial STP	07/22/21	46.0	sterile	NCM		
D 4 3S	Radial STP	07/22/21	45.0	sterile	Precontact	21	2 chert flakes, 1 flat glass sherd in plow zone (0-35 cm)
D 4 10E	Radial STP	07/22/21	44.0	sterile	Precontact	23	1 chert flake in plow zone (0-34 cm)
D 4 3E	Radial STP	07/22/21	44.0	sterile	Precontact	24	1 chert flake in plow zone (0-34 cm)
D 4 10W	Radial STP NOT D 4 10N Fix FS Log	07/22/21	54.0	sterile	Precontact	25	1 chert flake, 1 glass sherd in plow zone (0-44 cm)
D 4 3W	Radial STP	07/22/21	51.0	sterile	NCM	26	
D 5	50 ft east of Trans C, E edge upland	07/21/21	38.0	sterile	Precontact	13	2 chert flakes, 1 fire cracked rock in plow zone (0-28 cm)
D 5 10S	Radial STP	07/22/21	40.0	sterile	NCM		
D 5 3S	Radial STP	07/22/21	40.0	sterile	NCM		
D 5 10N	Radial STP	07/22/21	40.0	sterile	Precontact	27	1 chert flake in plow zone (0-30 cm)
D 5 3N	Radial STP	07/22/21	34.0	sterile	NCM		
D 5 10E	Radial STP	07/22/21	33.0	sterile	NCM		
D 5 3E	Radial STP	07/22/21	36.0	sterile	NCM		
D 5 10W	Radial STP	07/22/21	39.0	sterile	Historic	28	1 white clay pipestem fragment in plow zone (0-26 cm)

Table A1 - Phase IB Location Record

STP	Association	Date Excavated	Depth (cm)	Termination Reason	Cultural Material	FS Log #	Notes
D 5 3W	Radial STP	07/22/21	39.0	sterile	NCM		
D 6	50 ft east of Trans C, E edge upland	07/21/21	29.0	sterile	NCM		
			Transect E				
E 1	W bank of tributary, S of Swartwout Rd	07/21/21					Not excavated due to excessive slope
E 2	W bank of tributary, S of Swartwout Rd	07/21/21					Not excavated due to excessive slope
E 3	W bank of tributary, S of Swartwout Rd	07/21/21	30.0	sterile	NCM		Fill from 0-20 cm; no A Horizon or plow zone
			Transect F				
F 14	W bank tributary, S of RR embankment	07/19/21	52.0	sterile	NCM		
F 13	W bank tributary, S of RR embankment	07/19/21	56.0	sterile	NCM		Fill from 0-12 cm
F 12	W bank tributary, S of RR embankment	07/19/21	20.0	sterile	NCM		Gravel from driveway
F 11	W bank tributary, S of RR embankment	07/19/21	55.0	sterile	NCM		
F 10	W bank tributary, S of RR embankment	07/19/21	55.0	sterile	NCM		
F 9	W bank tributary, S of RR embankment	07/19/21	40.0	sterile	NCM		
F 8	W bank tributary, S of RR embankment	07/19/21	40.0	sterile	Precontact	1	3 chert flakes in A Horizon (0-30 cm)
F 8 10N	Radial STP	07/20/21	42.0	sterile	Precontact	3	3 chert flakes in A Horizon (0-32 cm)
F 8 3N	Radial STP	07/20/21	41.0	sterile	NCM		
F 8 10E	Radial STP	07/20/21	39.0	sterile	Precontact	5	1 chert flake in A Horizon
F 8 3E	Radial STP	07/20/21	39.0	sterile	NCM		
F 8 10W	Radial STP	07/20/21	41.0	sterile	Precontact	4	1 chert flake in A Horizon
F 8 3W	Radial STP	07/20/21	41.0	sterile	NCM		
F 8 10S	Radial STP	07/20/21	37.0	sterile	Precontact	6	3 chert flakes in A Horizon
F 8 3S	Radial STP	07/20/21	47.0	sterile	Precontact	7	1 chert flake in A Horizon
F 7	W bank tributary, S of RR embankment	07/19/21	35.0	sterile	NCM		
F 6	W bank tributary, S of RR embankment	07/19/21	23.0	sterile	NCM		Lower marshy area
F 5	W bank tributary, S of RR embankment	07/19/21	40.0	sterile	Precontact	2	1 chert flake in A Horizon
F 5 10N	Radial STP	07/19/21	40.0	sterile	NCM		Not plowed
F 5 3N	Radial STP	07/19/21	45.0	sterile	NCM		
F 5 10E	Radial STP	07/19/21	35.0	sterile	NCM		
F 5 3E	Radial STP	07/19/21	39.0	sterile	NCM		
F 5 10S	Radial STP	07/19/21	40.0	sterile	NCM		Offset
F 5 3S	Radial STP	07/19/21	40.0	sterile	NCM		
F 5 10W	Radial STP	07/19/21	35.0	sterile	NCM		
F 5 3W	Radial STP	07/19/21	40.0	sterile	NCM		
F 4	W bank tributary, S of RR embankment	07/19/21	38.0	sterile	NCM		
F 3	W bank tributary, S of RR embankment	07/19/21	20.0	water	NCM		Water infiltration at 20 cm
F 2	W bank tributary, S of RR embankment	07/19/21	32.0	sterile	NCM		
F 1	W bank tributary, S of RR embankment	07/19/21					Not excavated due to excessive slope

Table A1 - Phase IB Location Record

STP	Association	Date Excavated	Depth (cm)	Termination Reason	Cultural Material	FS Log #	Notes
Transect G							
G 1	Swartwout Rd tributary crossing area	07/20/21					Not excavated: in gravel turn around; culvert disturbance
G 2	Swartwout Rd tributary crossing area	07/20/21					Not excavated: former historic barn stone wall

APPENDIX A

Field Records:

Appendix A-2 Excavation Record

Table A2 Phase IB Excavation Record

STP	Level	Name	Depth (cm)	Soil Description	Munsell Color	Munsell Hue/Chroma	Inclusions/Notes	Artifacts
					TRANSECT A			
A 11	1	Ap	33	Sandy loam	Brown	10 YR 4/5		NCM
A 11	2	B	43	Silty clay	Reddish brown	5 YR 3/3		NCM
A 10	1	Ap	20	Sandy loam	Brown	10 YR 4/3		NCM
A 10	2	B	30	Silty clay	Reddish brown	5 YR 3/3		NCM
A 9	1	Ap	31	Sandy loam	Brown	10 YR 4/3		NCM
A 9	2	B	41	Silty clay	Reddish brown	5 YR 3/3		NCM
A 8	1	Ap	26	Sandy loam	Brown	10 YR 4/3		NCM
A 8	2	B	36	Silty clay	Reddish brown	5 YR 3/3		NCM
A 7	1	Ap	30	Sandy loam	Brown	10 YR 4/3		NCM
A 7	2	B	40	Silty clay	Reddish brown	5 YR 3/3		NCM
A 6	1	Ap	28	Sandy loam	Brown	10 YR 4/3		NCM
A 6	2	B	38	Silty clay	Reddish brown	5 YR 3/3		NCM
A 5	1	Ap	27	Sandy loam	Brown	10 YR 4/3		NCM
A 5	2	B	37	Silty clay	Reddish brown	5 YR 3/3		NCM
A 4	1	Ap	18	Sandy loam	Brown	10 YR 4/3		NCM
A 4	2	B	28	Silty clay	Reddish brown	5 YR 3/3		NCM
A 3	1	Ap	20	Sandy loam	Brown	10 YR 4/3		NCM
A 3	2	B	30	Silty clay	Reddish brown	5 YR 3/3		NCM
A 2	1	Ap	18	Sandy loam	Brown	10 YR 4/3		NCM
A 2	2	B	28	Silty clay	Reddish brown	5 YR 3/3		NCM
A 1	1	Fill	22	Fill/sandy loam	Dark brown	10 YR 3/3	10% sm cobbles; 5% lg gravels	NCM
A 1	2	B	32	Silty clay	Reddish brown	5 YR 3/3		NCM
					TRANSECT B			
B 1	1	Ap	27	Sandy loam	Brown	10 YR 4/3		NCM
B 1	2	B	37	Silty clay	Reddish brown	5 YR 3/3		NCM
B 2	1	Ap	28	Sandy loam	Brown	10 YR 4/3		NCM
B 2	2	B	38	Silty clay	Reddish brown	5 YR 3/3		NCM
B 3	1	Ap	39	Sandy loam	Brown	10 YR 4/3		Precontact
B 3	2	B	49	Sandy silty clay	Strong brown	7.5 YR 4/6	soil shows evidence of redox	NCM
B 3 10N	1	Ap	20	Sandy loam	Brown	10 YR 4/3		NCM
B 3 10N	2	B	30	Silty clay	Reddish brown	5 YR 3/3		NCM
B 3 3N	1	Ap	26	Sandy loam	Brown	10 YR 4/3		Precontact
B 3 3N	2	B	36	Silty clay	Reddish brown	5 YR 3/3		NCM
B 3 10S	1	Ap	26	Sandy loam	Brown	10 YR 4/3		Precontact
B 3 10S	2	B	36	Silty clay	Reddish brown	5 YR 3/3		NCM
B 3 3S	1	Ap	25	Sandy loam	Brown	10 YR 4/3		Precontact
B 3 3S	2	B	35	Silty clay	Reddish brown	5 YR 3/3		NCM
B 3 10E	1	Ap	27	Sandy loam	Brown	10 YR 4/3		Precontact
B 3 10E	2	B	37	Silty clay	Reddish brown	5 YR 3/3		NCM
B 3 3E	1	Ap	26	Sandy loam	Brown	10 YR 4/3		Precontact
B 3 3E	2	B	36	Silty clay	Reddish brown	5 YR 3/3		NCM

Table A2 Phase IB Excavation Record

STP	Level	Name	Depth (cm)	Soil Description	Munsell Color	Munsell Hue/Chroma	Inclusions/Notes	Artifacts
B 3 10W	1	Ap	30	Sandy loam	Brown	10 YR 4/3		NCM
B 3 10W	2	B	40	Silty clay	Reddish brown	5 YR 3/3		NCM
B 3 3W	1	Ap	23	Sandy loam	Brown	10 YR 4/3		Precontact
B 3 3W	2	B	33	Silty clay	Reddish brown	5 YR 3/3		NCM
B 4	1	Ap	27	Sandy loam	Brown	10 YR 4/3		Precontact; Historic
B 4	2	B	37	Sandy silty clay	Strong brown	7.5 YR 4/6		NCM
B 4 10N	1	Ap	16	Sandy loam	Brown	10 YR 4/3		NCM
B 4 10N	2	B	26	Silty clay	Reddish brown	5 YR 3/3		NCM
B 4 3N	1	Ap	16	Sandy loam	Brown	10 YR 4/3		NCM
B 4 3N	2	B	26	Silty clay	Reddish brown	5 YR 3/3		NCM
B 4 10S	1	Ap	26	Sandy loam	Brown	10 YR 4/3		Precontact; Historic
B 4 10S	2	B	36	Silty clay	Reddish brown	5 YR 3/3		NCM
B 4 3S	1	Ap	17	Sandy loam	Brown	10 YR 4/3		NCM
B 4 3S	2	B	27	Silty clay	Reddish brown	5 YR 3/3		NCM
B 4 10W	1	Ap	13	Sandy loam	Brown	10 YR 4/3		NCM
B 4 10W	2	B	23	Silty clay	Reddish brown	5 YR 3/3		NCM
B 4 3W	1	Ap	18	Sandy loam	Brown	10 YR 4/3		NCM
B 4 3W	2	B	28	Silty clay	Reddish brown	5 YR 3/3		NCM
B 4 10E	1	Ap	27	Sandy loam	Brown	10 YR 4/3		Precontact
B 4 10E	2	B	37	Silty clay	Reddish brown	5 YR 3/3		NCM
B 4 3E	1	Ap	20	Sandy loam	Brown	10 YR 4/3		NCM
B 4 3E	2	B	30	Silty clay	Reddish brown	5 YR 3/3		NCM
					TRANSECT C			
C 5	1	Ap	20	Sandy loam	Brown	10 YR 4/3		NCM
C 5	2	B	30	Silty sand	Strong brown	7.5 YR 4/6		NCM
C 4	1	Ap	31	Sandy loam	Brown	10 YR 4/3		NCM
C 4	2	B	41	Silty sand	Strong brown	7.5 YR 4/6		NCM
C 3	1	Ap	26	Sandy loam	Brown	10 YR 4/3		Precontact
C 3	2	B	36	Silty sandy clay	Reddish brown	5 YR 3/3		NCM
C 3 10N	1	Ap	30	Sandy loam	Dk yellow brown	10 YR 3/4		NCM
C 3 10N	2	B	40	Silty clay	Reddish brown	5 YR 3/3		NCM
C 3 3N	1	Ap	30	Sandy loam	Dk yellow brown	10 YR 3/4		Precontact
C 3 3N	2	B	40	Silty clay	Reddish brown	5 YR 3/3		NCM
C 3 10S	1	Ap	27	Sandy loam	Dk yellow brown	10 YR 3/4		Precontact
C 3 10S	2	B	37	Silty clay	Reddish brown	5 YR 3/3		NCM
C 3 3S	1	Ap	29	Sandy loam	Dk yellow brown	10 YR 3/4		Precontact
C 3 3S	2	B	39	Silty clay	Reddish brown	5 YR 3/3		NCM
C 3 10E	1	Ap	28	Sandy loam	Dk yellow brown	10 YR 3/4		Precontact
C 3 10E	2	B	38	Silty clay	Reddish brown	5 YR 3/3		NCM
C 3 3E	1	Ap	33	Sandy loam	Dk yellow brown	10 YR 3/4		Precontact
C 3 3E	2	B	43	Silty clay	Reddish brown	5 YR 3/3		NCM
C 3 10W	1	Ap	27	Sandy loam	Dk yellow brown	10 YR 3/4		Precontact
C 3 10W	2	B	37	Silty clay	Reddish brown	5 YR 3/3		NCM

Table A2 Phase IB Excavation Record

STP	Level	Name	Depth (cm)	Soil Description	Munsell Color	Munsell Hue/Chroma	Inclusions/Notes	Artifacts
C 3 3W	1	Ap	34	Sandy loam	Dk yellow brown	10 YR 3/4		Precontact
C 3 3W	2	B	44	Silty clay	Reddish brown	5 YR 3/3		NCM
C 2	1	Ap	22	Sandy loam	Brown	10 YR 4/3		NCM
C 2	2	B	32	Silty sandy clay	Reddish brown	5 YR 3/3		NCM
C 1	1	Ap	19	Sandy loam	Brown	10 YR 4/3		NCM
C 1	2	B	29	Silty sandy clay	Reddish brown	5 YR 3/3		NCM
					TRANSECT D			
D 1	1	Ap	33	Sandy loam	Brown	10 YR 4/3		NCM
D 1	2	B	43	Silty clay	Reddish brown	5 YR 3/3		NCM
D 2	1	Ap	20	Sandy loam	Brown	10 YR 4/3		NCM
D 2	2	B	30	Silty clay	Reddish brown	5 YR 3/3		NCM
D 2 10N	1	Ap	28	Sandy loam	Brown	10 YR 4/3		NCM
D 2 10N	2	B	38	Silty clay	Reddish brown	5 YR 3/3		NCM
D 2 3N	1	Ap	30	Sandy loam	Brown	10 YR 4/3		Precontact; Historic
D 2 3N	2	B	40	Silty clay	Reddish brown	5 YR 3/3		NCM
D 2 10S	1	Ap	23	Sandy loam	Brown	10 YR 4/3		Precontact
D 2 10S	2	B	33	Silty clay	Reddish brown	5 YR 3/3		NCM
D 2 3S	1	Ap	27	Sandy loam	Brown	10 YR 4/3		Precontact
D 2 3S	2	B	37	Silty clay	Reddish brown	5 YR 3/3		NCM
D 2 10W	1	Ap	26	Sandy loam	Brown	10 YR 4/3		Precontact
D 2 10W	2	B	36	Silty clay	Reddish brown	5 YR 3/3		NCM
D 2 3W	1	Ap	23	Sandy loam	Brown	10 YR 4/3		Precontact; Historic
D 2 3W	2	B	33	Silty clay	Reddish brown	5 YR 3/3		NCM
D 2 10E	1	Ap	22	Sandy loam	Brown	10 YR 4/3		Prehistoric; Historic
D 2 10E	2	B	32	Silty clay	Reddish brown	5 YR 3/3		NCM
D 2 3E	1	Ap	27	Sandy loam	Brown	10 YR 4/3		Prehistoric; Historic
D 2 3E	2	B	37	Silty clay	Reddish brown	5 YR 3/3		NCM
D 3	1	Ap	30	Sandy loam	Brown	10 YR 4/3		NCM
D 3	2	B	40	Silty clay	Reddish brown	5 YR 3/3		NCM
D 4	1	Ap	35	Sandy loam	Brown	10 YR 4/3		Precontact
D 4	2	B	45	Silty clay	Reddish brown	5 YR 3/3		NCM
D 4 10N	1	Ap	24	Sandy loam	Dk yellow brown	10 YR 3/4		NCM
D 4 10N	2	B	34	Silty clay	Strong brown	7.5 YR 4/6		NCM
D 4 3N	1	A	45	Sandy loam	Dk yellow brown	10 YR 3/4		Precontact
D 4 3N	2	B	55	Silty clay	Strong brown	7.5 YR 4/6		NCM
D 4 10S	1	A	36	Sandy loam	Dk yellow brown	10 YR 3/4		NCM
D 4 10S	2	B	46	Silty clay	Strong brown	7.5 YR 4/6		NCM
D 4 3S	1	Ap	35	Sandy loam	Dk yellow brown	10 YR 4/6		Precontact; Historic
D 4 3S	2	B	45	Silty clay	Strong brown	7.5 YR 4/6		NCM
D 4 10E	1	Ap	34	Sandy loam	Dk yellow brown	10 YR 3/4		Precontact
D 4 10E	2	B	44	Silty clay	Strong brown	7.5 YR 4/6		NCM
D 4 3E	1	Ap	34	Sandy loam	Dk yellow brown	10 YR 3/4		Precontact
D 4 3E	2	B	44	Silty clay	Strong brown	7.5 YR 4/6		NCM

Table A2 Phase IB Excavation Record

STP	Level	Name	Depth (cm)	Soil Description	Munsell Color	Munsell Hue/Chroma	Inclusions/Notes	Artifacts
D 4 10W	1	Ap	44	Sandy loam	Dk yellow brown	10 YR 3/4		Precontact; Historic
D 4 10W	2	B	54	Silty clay	Strong brown	7.5 YR 4/6		NCM
D 4 3W	1	Ap	41	Sandy loam	Dk yellow brown	10 YR 3/4		NCM
D 4 3W	2	B	51	Silty clay	Strong brown	7.5 YR 4/6		NCM
D 5	1	Ap	28	Sandy loam	Brown	10 YR 4/3		Precontact
D 5	2	B	38	Silty clay	Reddish brown	5 YR 3/3		NCM
D 5 10S	1	Ap	30	Sandy loam	Dk yellow brown	10 YR 3/4		NCM
D 5 10S	2	B	40	Silty clay	Strong brown	7.5 YR 4/6		NCM
D 5 3S	1	Ap	30	Sandy loam	Dk yellow brown	10 YR 3/4		NCM
D 5 3S	2	B	40	Silty clay	Strong brown	7.5 YR 4/6		NCM
D 5 10N	1	Ap	30	Sandy loam	Dk yellow brown	10 YR 3/4		Precontact
D 5 10N	2	B	40	Silty clay	Strong brown	7.5 YR 4/6		NCM
D 5 3N	1	Ap	24	Sandy loam	Dk yellow brown	10 YR 3/4		NCM
D 5 3N	2	B	34	Silty clay	Strong brown	7.5 YR 4/6		NCM
D 5 10E	1	Ap	23	Sandy loam	Dk yellow brown	10 YR 3/4		NCM
D 5 10E	2	B	33	Silty clay	Strong brown	7.5 YR 4/6		NCM
D 5 3E	1	Ap	26	Sandy loam	Dk yellow brown	10 YR 3/4		NCM
D 5 3E	2	B	36	Silty clay	Strong brown	7.5 YR 4/6		NCM
D 5 10W	1	Ap	26	Sandy loam	Dk yellow brown	10 YR 3/4		Historic
D 5 10W	2	B	39	Silty clay	Strong brown	7.5 YR 4/6		NCM
D 5 3W	1	Ap	29	Sandy loam	Dk yellow brown	10 YR 3/4		NCM
D 5 3W	2	B	39	Silty clay	Strong brown	7.5 YR 4/6		NCM
D 6	1	Ap	19	Sandy loam	Brown	10 YR 4/3		NCM
D 6	2	B	29	Silty clay	Reddish brown	5 YR 3/3	sm to med cobbles at interface	NCM
					TRANSECT E			
E 1				Not excavated			Excessive slope	
E 2				Not excavated			Excessive slope	
E 3	1	Fill	20	Sandy loam	Very dark brown	10 YR 3/2	Mottled w/ 7.5 YR 3/3 dk brown	NCM
E 3	2	B	30	Silty clay	Dark brown	7.5 YR 3/3	10% large rounded cobbles	NCM
					TRANSECT F			
F 14	1	Ap	42	Sandy loam	Yellowish brown	10 YR 4/4	inside historic barn footprint	NCM
F 14	2	BC	52	Silty sandy loam	Strong brown	7.5 YR 4/6	increase in silt redox	NCM
F 13	1	Fill	12	Sandy loam	Dark brown	10 YR 3/3		NCM
F 13	2	Ap	50	Sandy loam	Yellowish brown	10 YR 4/4		NCM
F 13	3	BC	56	Silty sandy loam	Strong brown	7.5 YR 4/6	increase in silt redox	NCM
F 12	1	Ap	20	Sandy loam	Dark brown	10 YR 3/3	over gravel from driveway	NCM
F 11	1	A	45	Silty loam	Dark brown	10 YR 3/3		NCM
F 11	2	B	55	Silty clay	Reddish brown	5 YR 3/3	redox noted, mica fragments	NCM
F 10	1	A	45	Silty loam	Dark brown	10 YR 3/3		NCM
F 10	2	B	55	Silty clay	Reddish brown	5 YR 3/3		NCM
F 9	1	A	30	Silty loam	Dark brown	10 YR 3/3		NCM

Table A2 Phase IB Excavation Record

STP	Level	Name	Depth (cm)	Soil Description	Munsell Color	Munsell Hue/Chroma	Inclusions/Notes	Artifacts
F 9	2	B	40	Silty clay	Reddish brown	5 YR 3/3		NCM
F 8	1	A	30	Silty loam	Dark brown	10 YR 3/3		Precontact
F 8	2	B	40	Silty clay	Reddish brown	5 YR 3/3		NCM
F 8 10N	1	A	32	Silty loam	Dark brown	10 YR 3/3		Precontact
F 8 10N	2	B	42	Silty clay	Reddish brown	5 YR 3/3		NCM
F 8 3N	1	A	31	Silty loam	Dark brown	10 YR 3/3		NCM
F 8 3N	2	B	41	Silty clay	Reddish brown	5 YR 3/3		NCM
F 8 10E	1	A	29	Silty loam	Dark brown	10 YR 3/3		Precontact
F 8 10E	2	B	39	Silty clay	Reddish brown	5 YR 3/3		NCM
F 8 3E	1	A	29	Silty loam	Dark brown	10 YR 3/3		NCM
F 8 3E	2	B	39	Silty clay	Reddish brown	5 YR 3/3		NCM
F 8 10W	1	A	31	Silty loam	Dark brown	10 YR 3/3		Precontact
F 8 10W	2	B	41	Silty clay	Reddish brown	5 YR 3/3		NCM
F 8 3W	1	A	31	Silty loam	Dark brown	10 YR 3/3		NCM
F 8 3W	2	B	41	Silty clay	Reddish brown	5 YR 3/3		NCM
F 8 10S	1	A	27	Silty loam	Dark brown	10 YR 3/3		Precontact
F 8 10S	2	B	37	Silty clay	Reddish brown	5 YR 3/3		NCM
F 8 3S	1	A	37	Silty loam	Dark brown	10 YR 3/3		Precontact
F 8 3S	2	B	47	Silty clay	Reddish brown	5 YR 3/3		NCM
F 7	1	A	25	Silty loam	Dark brown	10 YR 3/3		NCM
F 7	2	B	35	Silty clay	Reddish brown	5 YR 3/3		NCM
F 6	1	A	13	Silty loam	Dark brown	10 YR 3/3	lower marshy area of transect	NCM
F 6	2	B	23	Silty clay	Reddish brown	5 YR 3/3	heavy redox noted	NCM
F 5	1	A	30	Silty loam	Dark brown	10 YR 3/3		Precontact
F 5	2	B	40	Silty clay	Reddish brown	5 YR 3/3		NCM
F 5 10N	1	A	30	Silty loam	Dark brown	10 YR 3/3		NCM
F 5 10N	2	B	40	Silty clay	Reddish brown	5 YR 3/3		NCM
F 5 3N	1	A	35	Silty loam	Dark brown	10 YR 3/3		NCM
F 5 3N	2	B	45	Silty clay	Reddish brown	5 YR 3/3		NCM
F 5 10E	1	A	25	Silty loam	Dark brown	10 YR 3/3		NCM
F 5 10E	2	B	35	Silty clay	Reddish brown	5 YR 3/3		NCM
F 5 3E	1	A	29	Silty loam	Dark brown	10 YR 3/3		NCM
F 5 3E	2	B	39	Silty clay	Reddish brown	5 YR 3/3		NCM
F 5 10S	1	A	30	Silty loam	Dark brown	10 YR 3/3	offset from transect line	NCM
F 5 10S	2	B	40	Silty clay	Reddish brown	5 YR 3/3		NCM
F 5 3S	1	A	30	Silty loam	Dark brown	10 YR 3/3		NCM
F 5 3S	2	B	40	Silty clay	Reddish brown	5 YR 3/3		NCM
F 5 10W	1	A	25	Silty loam	Dark brown	10 YR 3/3		NCM
F 5 10W	2	B	35	Silty clay	Reddish brown	5 YR 3/3		NCM
F 5 3W	1	A	30	Silty loam	Dark brown	10 YR 3/3		NCM
F 5 3W	2	B	40	Silty clay	Reddish brown	5 YR 3/3		NCM
F 4	1	A	28	Silty loam	Dark brown	10 YR 3/3		NCM
F 4	2	B	38	Silty clay	Reddish brown	5 YR 3/3		NCM

Table A2 Phase IB Excavation Record

STP	Level	Name	Depth (cm)	Soil Description	Munsell Color	Munsell Hue/Chroma	Inclusions/Notes	Artifacts
F 3	1	A	10	Silty loam	Dark brown	10 YR 3/3	wet	NCM
F 3	2	B	20	Silty clay	Reddish brown	5 YR 3/3	wet	NCM
F 2	1	A	22	Silty loam	Dark brown	10 YR 3/3	dry	NCM
F 2	2	B	32	Silty clay	Reddish brown	5 YR 3/3	dry	NCM
F1				Not excavated			Excessive slope	
					TRANSECT G			
G 1				Not excavated			gravel; culvert disturbance	
G 2				Not excavated			historic barn stone wall	

Appendix B – Artifact Catalogues

APPENDIX B

Artifact Catalogues:

Appendix B-1 Prehistoric Artifacts by STP Number

APPENDIX B-1: PREHISTORIC ARTIFACT CATALOGUE

In Order by STP

FS #	STP	LEVEL	SOIL HORIZON	DEPTH (cm)	COUNT	HISTORIC/ PREHISTORIC	GROUP	CLASS	MATERIAL	OBJECT	COLOR	NOTES
8	B3	1	Ap	39	1	Prehistoric	Debitage	Lithic	Chert	Bifacial thinning flake, proximal	Gray/Red	Heat reddened
36	B3+10ft E	1	Ap	27	3	Prehistoric	Debitage	Lithic	Chert	Bifacial thinning flake complete	Red	Heat reddened
36	B3+10ft E	1	Ap	27	3	Prehistoric	Debitage	Lithic	Chert	Flake fragment	Red	Heat reddened
31	B3+10ft S	1	Ap	26	1	Prehistoric	Debitage	Lithic	Chert	Decortication flake, complete	Gray/Red	Heat reddened
35	B3+3ft E	1	Ap	26	1	Prehistoric	Debitage	Lithic	Chert	Early reduction flake, complete	Red	Heat reddened
33	B3+3ft N	1	Ap	26	2	Prehistoric	Debitage	Lithic	Chert	Flake fragment	Red	Heat reddened
32	B3+3ft S	1	Ap	25	1	Prehistoric	Debitage	Lithic	Chert	Trimming Flake, Complete	Gray	
34	B3+3ft W	1	Ap	23	1	Prehistoric	Debitage	Lithic	Chert	Flake fragment	Gray	
9	B4	1	Ap	27	1	Prehistoric	Debitage	Lithic	Chert	Bifacial thinning flake complete	Black	
9	B4	1	Ap	27	1	Prehistoric	Debitage	Lithic	Chert	Flake fragment	Gray	
9	B4	1	Ap	27	1	Prehistoric	Cracked rock	Lithic	Sandstone	FCR	Tan/Red	Fire cracked rock
29	B4+10ft E	1	Ap	27	1	Prehistoric	Debitage	Lithic	Chert	Bifacial thinning flake complete	Gray	
30	B4+10ft S	1	Ap	26	2	Prehistoric	Debitage	Lithic	Chert	Flake fragment	Gray, dark	
10	C3	1	Ap	26	4	Prehistoric	Debitage	Lithic	Chert	Bifacial thinning flake	Gray, dark	

FS #	STP	LEVEL	SOIL HORIZON	DEPTH (cm)	COUNT	HISTORIC/ PREHISTORIC	GROUP	CLASS	MATERIAL	OBJECT	COLOR	NOTES
										complete		
10	C3	1	Ap	26	1	Prehistoric	Debitage	Lithic	Chert	Trimming flake, complete	Gray, dark	
10	C3	1	Ap	26	1	Prehistoric	Cracked rock	Lithic	Sandstone	FCR	Tan/Red	Fire cracked rock
10	C3	1	Ap	26	1	Prehistoric	Unmodified	Lithic	Sandstone	Cobble	Gray	Not worked
40	C3+10ft E	1	Ap	28	1	Prehistoric	Debitage	Lithic	Chalcedony	Bifacial thinning flake complete	Gray, light	Proximal
38	C3+10ft S	1	Ap	27	1	Prehistoric	Debitage	Lithic	Chert	Early reduction flake, complete	Black	
38	C3+10ft S	1	Ap	27	1	Prehistoric	Debitage	Lithic	Chert	Bifacial thinning flake complete	Black	
42	C3+10ft W	1	Ap	27	1	Prehistoric	Debitage	Lithic	Chert	Flake fragment	Black	
41	C3+3ft E	1	Ap	33	2	Prehistoric	Debitage	Lithic	Chert	Flake fragment	Gray, dark	
41	C3+3ft E	1	Ap	33	2	Prehistoric	Debitage	Lithic	Chert	Flake fragment	Gray/Red	Heat reddened
37	C3+3ft N	1	Ap	30	1	Prehistoric	Debitage	Lithic	Chert	Trimming flake, complete	Gray, dark	
39	C3+3ft S	1	Ap	39	1	Prehistoric	Debitage	Lithic	Chert	Flake Fragment	Red	Heat reddened
39	C3+3ft S	1	Ap	39	1	Prehistoric	Debitage	Lithic	Chalcedony	Trimming flake, complete	Gray	
43	C3+3ft W	1	Ap	34	1	Prehistoric	Debitage	Lithic	Chert	Bifacial thinning flake complete	Gray	
43	C3+3ft W	1	Ap	34	1	Prehistoric	Debitage	Lithic	Chert	Flake fragment	Gray	
43	C3+3ft W	1	Ap	34	1	Prehistoric	Debitage	Lithic	Chert	Indeterminate Flake, Complete	Black	

FS #	STP	LEVEL	SOIL HORIZON	DEPTH (cm)	COUNT	HISTORIC/ PREHISTORIC	GROUP	CLASS	MATERIAL	OBJECT	COLOR	NOTES
43	C3+3ft W	1	Ap	34	1	Prehistoric	Debitage	Lithic	Chert	Flake fragment	Black	
43	C3+3ft W	1	Ap	34	1	Prehistoric	Debitage	Lithic	Chert	Flake fragment	Red	Heat reddened
11	D2	1	Ap	20	1	Prehistoric	Debitage	Lithic	Chert	Trimming flake, complete	Gray, dark	
11	D2	1	Ap	20	1	Prehistoric	Debitage	Lithic	Chert	Bifacial thinning flake, complete	Gray, dark	
11	D2	1	Ap	20	1	Prehistoric	Debitage	Lithic	Chert	Bifacial thinning flake, complete	Tan/Red	Heat reddened
11	D2	1	Ap	20	1	Prehistoric	Debitage	Lithic	Chert	Flake fragment	Gray	
11	D2	1	Ap	20	1	Prehistoric	Cracked Rock	Lithic	Quartzite	FCR	Tan/Red	Fire cracked rock
19	D2+10ft E	1	Ap	22	2	Prehistoric	Debitage	Lithic	Chert	Trimming flake, complete	Gray, dark	
19	D2+10ft E	1	Ap	22	1	Prehistoric	Debitage	Lithic	Chert	Flake fragment	Gray. dark	
15	D2+10ft S	1	Ap	23	2	Prehistoric	Debitage	Lithic	Chert	Bifacial thinning flake	Gray	
15	D2+10ft S	1	Ap	23	1	Prehistoric	Debitage	Lithic	Chalcedony	Flake fragment	Gray, light	
17	D2+10ft W	1	Ap	26	2	Prehistoric	Debitage	Lithic	Chert	Trimming flake, complete	Black	
17	D2+3ft W	1	Ap	26	2	Prehistoric	Debitage	Lithic	Chert	Bifacial thinning flake	Gray, dark	
17	D2+3ft W	1	Ap	26	1	Prehistoric	Debitage	Lithic	Chert	Flake fragment	Black	
20	D2+3ft E	1	Ap	27	3	Prehistoric	Debitage	Lithic	Chert	Flake fragment	Gray, dark	
16	D2+3ft N	1	Ap	30	1	Prehistoric	Debitage	Lithic	Chert	Bifacial	Black	

FS #	STP	LEVEL	SOIL HORIZON	DEPTH (cm)	COUNT	HISTORIC/ PREHISTORIC	GROUP	CLASS	MATERIAL	OBJECT	COLOR	NOTES
										thinning flake		
16	D2+3ft N	1	Ap	30	1	Prehistoric	Debitage	Lithic	Chalcedony	Flake fragment	Gray	
16	D2+3ft N	1	Ap	30	1	Prehistoric	Debitage	Lithic	Chert	Flake fragment	Gray	
16	D2+3ft N	1	Ap	30	1	Prehistoric	Debitage	Lithic	Chert	Flake fragment	Black	
14	D2+3ft S	1	Ap	27	1	Prehistoric	Debitage	Lithic	Chert	Trimming flake, complete	Gray, Dark	
18	D2+3ft W	1	Ap	23	1	Prehistoric	Debitage	Lithic	Sandstone	Decortication flake, complete	Tan	Cortex: cobble
18	D2+3ft W	1	Ap	23	2	Prehistoric	Debitage	Lithic	Chert	Flake fragment	Black	
18	D2+3ft W	1	Ap	23	2	Prehistoric	Debitage	Lithic	Chert	Flake fragment	Gray	
12	D4	1	Ap	35	1	Prehistoric	Debitage	Lithic	Chert	Bifacial thinning flake, complete	Black	
23	D4+10ft E	1	A	34	1	Prehistoric	Debitage	Lithic	Chert	Flake fragment	Gray	
25	D4+10ft W	1	Ap	44	1	Prehistoric	Debitage	Lithic	Chert	Bifacial thinning flake, complete	Black	
24	D4+3ft E	1	A	34	1	Prehistoric	Debitage	Lithic	Chert	Flake fragment	Gray	
22	D4+3ft N	1	A	45	1	Prehistoric	Debitage	Lithic	Chert	Flake fragment	Red	Heat reddened
22	D4+3ft N	1	A	45	1	Prehistoric	Debitage	Lithic	Chert	Indeterminate flake, complete	Gray	
21	D4+3ft S	1	Ap	35	1	Prehistoric	Debitage	Lithic	Chert	Bifacial thinning flake, complete	Gray	
21	D4+3ft S	1	Ap	35	1	Prehistoric	Debitage	Lithic	Chert	Flake fragment	Black	

FS #	STP	LEVEL	SOIL HORIZON	DEPTH (cm)	COUNT	HISTORIC/ PREHISTORIC	GROUP	CLASS	MATERIAL	OBJECT	COLOR	NOTES
26	D4+3ft W	1	Ap	41	1	Prehistoric	Debitage	Lithic	Chert	Flake Fragment	Gray, dark	
26	D4+3ft W	1	Ap	41	1	Prehistoric	Debitage	Lithic	Chert	Early Reduction flake, Complete	Brown/ gray	
26	D4+3ft W	1	Ap	41	1	Prehistoric	Debitage	Lithic	Chert	Early Reduction flake, Complete	Black	
13	D5	1	Ap	28	1	Prehistoric	Debitage	Lithic	Chert	Flake fragment	Gray/Red	Heat reddened
13	D5	1	Ap	28	1	Prehistoric	Debitage	Lithic	Chert	Flake fragment	Gray/Red	Potlidded
13	D5	1	Ap	28	1	Prehistoric	Cracked Rock	Lithic	Quartzite	FCR	Tan	Fire cracked rock
27	D5+10ft N	1	Ap	30	1	Prehistoric	Debitage	Lithic	Chert	Early Reduction flake, Complete	Gray/ brown	
2	F5	1	A	30	1	Prehistoric	Debitage	Lithic	Chert	Bifacial thinning flake complete	Gray	
2	F5	1	A	30	2	Prehistoric	Debitage	Lithic	Chert	Flake fragment	Gray	
1	F8	1	A	30	1	Prehistoric	Debitage	Lithic	Chert	Bifacial thinning flake complete	Black	
1	F8	1	A	30	1	Prehistoric	Debitage	Lithic	Chert	Flake fragment	Gray/Red	Heat reddened
1	F8	1	A	30	1	Prehistoric	Debitage	Lithic	Chalcedony	Indeterminate flake, complete	Gray	
5	F8+10ft E	1	A	29	1	Prehistoric	Debitage	Lithic	Chert	Indeterminate flake, complete	Gray	
3	F8+10ft N	1	A	32	1	Prehistoric	Debitage	Lithic	Chert	Early reduction flake, complete	Gray, light	

FS #	STP	LEVEL	SOIL HORIZON	DEPTH (cm)	COUNT	HISTORIC/ PREHISTORIC	GROUP	CLASS	MATERIAL	OBJECT	COLOR	NOTES
3	F8+10ft N	1	A	32	1	Prehistoric	Debitage	Lithic	Chalcedony	Flake fragment	Gray	
3	F8+10ft N	1	A	32	1	Prehistoric	Debitage	Lithic	Chert	Bifacial thinning flake complete	Gray, light	
6	F8+10ft S	1	A	27	1	Prehistoric	Debitage	Lithic	Chert	Bifacial thinning flake complete	Gray	
6	F8+10ft S	1	A	27	1	Prehistoric	Cracked Rock	Lithic	Sandstone	FCR	Gray	Fire cracked rock
6	F8+10ft S	1	A	27	1	Prehistoric	Cracked Rock	Lithic	Sandstone	FCR	Gray/Red	Fire cracked rock
4	F8+10ft W	1	A	31	1	Prehistoric	Debitage	Lithic	Chert	Flake fragment	Gray, dark	
7	F8+3ft S	1	A	37	1	Prehistoric	Debitage	Lithic	Chert	Bifacial thinning flake complete	Black	

APPENDIX B

Artifact Catalogues:

Appendix B-2 Historic Artifacts by STP Number

APPENDIX B-2: HISTORIC ARTIFACT CATALOGUE

In Order by STP

FS #	STP	LEVEL	SOIL HORIZON	DEPTH (cm)	COUNT	HISTORIC/ PREHISTORIC	GROUP	CLASS	MATERIAL	OBJECT	COLOR	NOTES
9	B4	1	Ap	27	1	Historic	Architectural	Metal	Iron	Nail fragment	Rusted	Cut nail
30	B4+10ft S	1	Ap	26	1	Historic	Electrical	Metal	Iron	Fragment		Wire Housing w/wire
43	C3+3ft W	1	Ap	34	1	Historic	Architectural	Glass	Common glass	Window glass fragment	Aqua	
19	D2+10ft E	1	Ap	22	2	Historic	Architectural	Metal	Iron	Nail Fragments	Rusted	Probable wire nail
16	D2+3ft N	1	Ap	30	1	Historic	Household	Ceramic	Coarse earthenware	Body sherd	Brown	Lead glazed
16	D2+3ft N	1	Ap	30	1	Historic	Architectural	Metal	Iron	Nail Fragment		Cut nail
14	D2+3ft S	1	Ap	27	2	Historic	Architectural	Metal	Iron	Nail, complete		Wire
14	D2+3ft S	1	Ap	27	2	Historic	Architectural	Metal	Iron	Nail fragment	Rusted	Unident. type
18	D2+3ft W	1	Ap	23	2	Historic	Architectural	Metal	Iron	Nail fragments	Rusted	Probable wire nail
25	D4+10ft W	1	Ap	44	1	Historic	Household	Glass	Common glass	Curved bodysherd	Green	Probable beverage bottle
21	D4+3ft S	1	Ap	35	1	Historic	Architectural	Glass	Non-lead glass	Window glass fragment	Colorless	
28	D5+10ft W	1	Ap	26	1	Historic	Personal	Ceramic	Refined earthenware	Smoking pipe pipestem fragment	White ball clay	5/64-inch bore
46	K 2	1	Ap	26	1	Historic	Indeterminate	Metal	White Metal	Bell		Probable animal bell
47	L 3	1	Ap	26	1	Historic	Personal	Ceramic	Refined earthenware	Smoking Pipe pipestem fragment	White ball clay	

APPENDIX B

Artifact Catalogues:

Appendix B-3 Complete Artifact Catalogue by FS Number

Appendix B-3: Prehistoric and Historic Artifact Catalogue In Order of Field Specimen Number

FS.Entry	Provenience	Artifact Count	Group	Material	Object	Color	Ware/ Technology/ Species	Comments	Weight (grams)	Cortex Type	Cortex percent
1.1	STP F8 Strat I A	1	Prehistoric, Debitage	Lithic, Chert	Bifacial Thinning Flake, Complete	Black			1.67	Absent	0 %
1.2	STP F8 Strat I A	1	Prehistoric, Debitage	Lithic, Chert	Flake Fragment,	Gray/Red			0.14	Absent	0 %
1.3	STP F8 Strat I A	1	Prehistoric, Debitage	Lithic, Chalcedony	Indeterminate Flake, Complete	Gray			1.30	Absent	0 %
2.1	STP F5 Strat I A	1	Prehistoric, Debitage	Lithic, Chert	Bifacial Thinning Flake, Complete	Gray			0.24	Absent	0 %
2.2	STP F5 Strat I A	2	Prehistoric, Debitage	Lithic, Chert	Flake Fragment,	Gray			3.90	Absent	0 %
3.1	STP F8+10ft N Strat I A	1	Prehistoric, Debitage	Lithic, Chert	Early Reduction Flake, Complete	Gray, Light			3.00	Absent	0 %
3.2	STP F8+10ft N Strat I A	1	Prehistoric, Debitage	Lithic, Chert	Bifacial Thinning Flake, Complete	Gray, Light			0.53	Absent	0 %
3.3	STP F8+10ft N Strat I A	1	Prehistoric, Debitage	Lithic, Chalcedony	Flake Fragment,	Gray			0.12	Absent	0 %
4.1	STP F8+10ft W Strat I A	1	Prehistoric, Debitage	Lithic, Chert	Flake Fragment,	Gray, Dark			0.80	Absent	0 %
5.1	STP F8+10ft E Strat I A	1	Prehistoric, Debitage	Lithic, Chert	Indeterminate Flake, Complete	Gray			0.22	Absent	0 %
6.1	STP F8+10ft S Strat I A	1	Prehistoric, Cracked Rock	Lithic, Sandstone	FCR,	Gray/Red			21.50		
6.2	STP F8+10ft S Strat I A	1	Prehistoric, Cracked Rock	Lithic, Sandstone	FCR,	Gray			10.60		
6.3	STP F8+10ft S Strat I A	1	Prehistoric, Debitage	Lithic, Chert	Bifacial Thinning Flake, Complete	Gray			0.70	Absent	0 %
7.1	STP F8+3ft S Strat I A	1	Prehistoric, Debitage	Lithic, Chert	Bifacial Thinning Flake, Complete	Black			0.90	Absent	0 %
8.1	STP B3 Strat I Ap	1	Prehistoric, Debitage	Lithic, Chert	Bifacial Thinning Flake, Proximal	Gray/Red			0.66	Absent	0 %
9.1	STP B4 Strat I Ap	1	Historic, Architectural	Metal, Iron	Nail, Fragment		Cut	Rusted cut nail fragment.	5.10		
9.2	STP B4 Strat I Ap	1	Prehistoric, Cracked Rock	Lithic, Sandstone	FCR,	Tan/Red			6.80		
9.3	STP B4 Strat I Ap	1	Prehistoric, Debitage	Lithic, Chert	Bifacial Thinning Flake, Complete	Black			1.20	Absent	0 %
9.4	STP B4 Strat I Ap	1	Prehistoric, Debitage	Lithic, Chert	Flake Fragment,	Gray			0.60	Absent	0 %
10.1	STP C3 Strat I Ap	1	Prehistoric, Unmodifieds	Lithic, Sandstone	Cobble, Complete	Gray		Small coble without any modification or reddening.	121.80		

FS.Entry	Provenience	Artifact Count	Group	Material	Object	Color	Ware/ Technology/ Species	Comments	Weight (grams)	Cortex Type	Cortex percent
10.2	STP C3 Strat I Ap	1	Prehistoric, Cracked Rock	Lithic, Sandstone	FCR,	Tan/Red			59.40		
10.3	STP C3 Strat I Ap	4	Prehistoric, Debitage	Lithic, Chert	Bifacial Thinning Flake, Complete	Gray, Dark			1.44	Absent	0 %
10.4	STP C3 Strat I Ap	1	Prehistoric, Debitage	Lithic, Chert	Trimming Flake, Complete	Gray, Dark			0.18	Absent	0 %
11.1	STP D2 Strat I Ap	1	Prehistoric, Cracked Rock	Lithic, Quartzite	FCR,	Tan/Red			127.80		
11.2	STP D2 Strat I Ap	1	Prehistoric, Debitage	Lithic, Chert	Bifacial Thinning Flake, Complete	Gray, Dark			0.50	Absent	0 %
11.3	STP D2 Strat I Ap	1	Prehistoric, Debitage	Lithic, Chert	Trimming Flake, Complete	Gray, Dark			0.06	Absent	0 %
11.4	STP D2 Strat I Ap	1	Prehistoric, Debitage	Lithic, Chert	Flake Fragment,	Gray			0.25	Absent	0 %
11.5	STP D2 Strat I Ap	1	Prehistoric, Debitage	Lithic, Chert	Bifacial Thinning Flake, Complete	Tan/Red			0.46	Absent	0 %
12.1	STP D4 Strat I Ap	1	Prehistoric, Debitage	Lithic, Chert	Bifacial Thinning Flake, Complete	Black			0.45	Absent	0 %
13.1	STP D5 Strat I Ap	1	Prehistoric, Cracked Rock	Lithic, Quartzite	FCR,	Tan			72.30		
13.2	STP D5 Strat I Ap	1	Prehistoric, Debitage	Lithic, Chert	Flake Fragment,	Gray/Red			0.19	Absent	0 %
13.3	STP D5 Strat I Ap	1	Prehistoric, Debitage	Lithic, Chert	Flake Fragment,	Gray/Red			0.12	Absent	0 %
14.1	STP D2+3ft S Strat I Ap	2	Historic, Architectural	Metal, Iron	Nail, Fragment		Indeterminate	Rusted nail fragments.	4.80		
14.2	STP D2+3ft S Strat I Ap	1	Historic, Architectural	Metal, Iron	Nail, Complete		Wire	Rusted wire nail.	5.10		
14.3	STP D2+3ft S Strat I Ap	1	Prehistoric, Debitage	Lithic, Chert	Trimming Flake, Complete	Gray, Dark			0.08	Absent	0 %
15.1	STP D2+10ft S Strat I Ap	1	Prehistoric, Debitage	Lithic, Chalcedony	Flake Fragment,	Gray, Light			0.38	Absent	0 %
15.1	STP D2+10ft S Strat I Ap	2	Prehistoric, Debitage	Lithic, Chert	Bifacial Thinning Flake, Complete	Gray			0.41	Absent	0 %
16.1	STP D2+3ft N Strat I Ap	1	Historic, Architectural	Metal, Iron	Nail, Fragment		Cut	Heavily rusted cut nail fragment.	6.70		
16.2	STP D2+3ft N Strat I Ap	1	Historic, Household	Ceramic, Coarse Earthenware	Indeterminate, Body Sherd		Redware	Brown glaze on interior. Interior spalled.	0.20		
16.3	STP D2+3ft N Strat I Ap	1	Prehistoric, Debitage	Lithic, Chert	Bifacial Thinning Flake, Complete	Black			0.30	Absent	0 %

FS.Entry	Provenience	Artifact Count	Group	Material	Object	Color	Ware/ Technology/ Species	Comments	Weight (grams)	Cortex Type	Cortex percent
16.4	STP D2+3ft N Strat I Ap	1	Prehistoric, Debitage	Lithic, Chert	Flake Fragment,	Black			0.30	Absent	0 %
16.5	STP D2+3ft N Strat I Ap	1	Prehistoric, Debitage	Lithic, Chert	Flake Fragment,	Gray			0.30	Absent	0 %
16.6	STP D2+3ft N Strat I Ap	1	Prehistoric, Debitage	Lithic, Chalcedony	Flake Fragment,	Gray			0.22	Absent	0 %
17.1	STP D2+10ft W Strat I Ap	2	Prehistoric, Debitage	Lithic, Chert	Trimming Flake, Complete	Black			0.10	Absent	0 %
17.2	STP D2+10ft W Strat I Ap	2	Prehistoric, Debitage	Lithic, Chert	Bifacial Thinning Flake, Complete	Gray, Dark			0.40	Absent	0 %
17.3	STP D2+10ft W Strat I Ap	1	Prehistoric, Debitage	Lithic, Chert	Flake Fragment,	Black			0.20	Absent	0 %
18.1	STP D2+3ft W Strat I Ap	2	Historic, Architectural	Metal, Iron	Nail, Fragment		Indeterminate	Two rusted nail fragments. Most likely wire nails.	2.00		
18.2	STP D2+3ft W Strat I Ap	1	Prehistoric, Debitage	Lithic, Sandstone	Decortication Flake, Complete	Tan			0.70	Cobble	100 %
18.3	STP D2+3ft W Strat I Ap	2	Prehistoric, Debitage	Lithic, Chert	Flake Fragment,	Black			0.50	Absent	0 %
18.4	STP D2+3ft W Strat I Ap	2	Prehistoric, Debitage	Lithic, Chert	Flake Fragment,	Gray			1.80	Absent	0 %
19.1	STP D2+10ft E Strat I Ap	2	Historic, Architectural	Metal, Iron	Nail, Fragment		Indeterminate	Heavily rusted nails. Most likely wire nails.	6.20		
19.2	STP D2+10ft E Strat I Ap	2	Prehistoric, Debitage	Lithic, Chert	Trimming Flake, Complete	Gray, Dark			0.30	Absent	0 %
19.3	STP D2+10ft E Strat I Ap	1	Prehistoric, Debitage	Lithic, Chert	Flake Fragment,	Gray, Dark			0.10	Absent	0 %
20.1	STP D2+3ft E Strat I Ap	3	Prehistoric, Debitage	Lithic, Chert	Flake Fragment,	Gray, Dark			1.30	Absent	0 %
21.1	STP D4+3ft S Strat I Ap	1	Historic, Architectural	Glass, Non-Lead Glass	Window Glass, Fragment	Colorless			1.20		
21.2	STP D4+3ft S Strat I Ap	1	Prehistoric, Debitage	Lithic, Chert	Bifacial Thinning Flake, Complete	Gray			0.18	Absent	0 %
21.3	STP D4+3ft S Strat I Ap	1	Prehistoric, Debitage	Lithic, Chert	Flake Fragment,	Black			0.11	Absent	0 %
22.1	STP D4+3ft N Strat I Ap	1	Prehistoric, Debitage	Lithic, Chert	Flake Fragment,	Red			2.70	Absent	0 %
22.2	STP D4+3ft N Strat I Ap	1	Prehistoric, Debitage	Lithic, Chert	Indeterminate Flake, Complete	Gray			0.66	Absent	0 %
23.1	STP D4+10ft E Strat I Ap	1	Prehistoric, Debitage	Lithic, Chert	Flake Fragment,	Gray			0.20	Absent	0 %

FS.Entry	Provenience	Artifact Count	Group	Material	Object	Color	Ware/ Technology/ Species	Comments	Weight (grams)	Cortex Type	Cortex percent
24.1	STP D4+3ft E Strat I Ap	1	Prehistoric, Debitage	Lithic, Chert	Flake Fragment,	Gray			1.44	Absent	0 %
25.1	STP D4+10ft W Strat I Ap	1	Historic, Household	Glass, Common Glass	Indeterminate, Body Sherd	Green	Indeterminate	Curved fragment of (7-up) green bottle glass. Probably a bottle/container.	3.70		
25.2	STP D4+10ft W Strat I Ap	1	Prehistoric, Debitage	Lithic, Chert	Bifacial Thinning Flake, Complete	Black			0.43	Absent	0 %
26.1	STP D4+3ft W Strat I Ap	1	Prehistoric, Debitage	Lithic, Chert	Bipolar Reduction Flake, Complete	Brown/Gray			6.20	Absent	0 %
26.2	STP D4+3ft W Strat I Ap	1	Prehistoric, Debitage	Lithic, Chert	Early Reduction Flake, Complete	Black			0.47	Absent	0 %
26.3	STP D4+3ft W Strat I Ap	1	Prehistoric, Debitage	Lithic, Chert	Flake Fragment,	Gray, Dark			1.24	Absent	0 %
27.1	STP D5+10ft N Strat I Ap	1	Prehistoric, Debitage	Lithic, Chert	Early Reduction Flake, Complete	Gray/Brown			0.89	Absent	0 %
28.1	STP D5+10ft W Strat I Ap	1	Historic, Personal	Ceramic, Refined Earthenware	Smoking Pipe, Stem		White Ball Clay		3.90		
29.1	STP B4+10ft E Strat I Ap	1	Prehistoric, Debitage	Lithic, Chert	Bifacial Thinning Flake, Complete	Gray			0.82	Absent	0 %
30.1	STP B4+10ft S Strat I Ap	1	Historic, Electrical	Metal, Iron	Indeterminate, Fragment		Indeterminate	Metal wire housing fragment w/ wire inside.	37.90		
30.2	STP B4+10ft S Strat I Ap	2	Prehistoric, Debitage	Lithic, Chert	Flake Fragment,	Gray, Dark			0.52	Absent	0 %
31.1	STP B3+10ft S Strat I Ap	1	Prehistoric, Debitage	Lithic, Chert	Decortication Flake, Complete	Gray/Red			2.58	Cobble	100 %
32.1	STP B3+3ft S Strat I Ap	1	Prehistoric, Debitage	Lithic, Chert	Trimming Flake, Complete	Gray			0.22		
33.1	STP B3+3ft N Strat I Ap	2	Prehistoric, Debitage	Lithic, Chert	Flake Fragment,	Red		Flakes re-fit.	0.35	Absent	0 %
34.1	STP B3+3ft W Strat I Ap	1	Prehistoric, Debitage	Lithic, Chert	Flake Fragment,	Gray			0.66	Absent	0 %
35.1	STP B3+3ft E Strat I Ap	1	Prehistoric, Debitage	Lithic, Chert	Early Reduction Flake, Complete	Red			5.20	Absent	0 %
36.1	STP B3+10ft E Strat I Ap	3	Prehistoric, Debitage	Lithic, Chert	Bifacial Thinning Flake, Complete	Red			1.09	Absent	0 %
36.2	STP B3+10ft E Strat I Ap	3	Prehistoric, Debitage	Lithic, Chert	Flake Fragment,	Red			0.54	Absent	0 %
37.1	STP C3+3ft N Strat I Ap	1	Prehistoric, Debitage	Lithic, Chert	Trimming Flake, Complete	Gray, Dark			0.09	Absent	0 %

FS.Entry	Provenience	Artifact Count	Group	Material	Object	Color	Ware/ Technology/ Species	Comments	Weight (grams)	Cortex Type	Cortex percent
38.1	STP C3+10ft S Strat I Ap	1	Prehistoric, Debitage	Lithic, Chert	Early Reduction Flake, Complete	Black			0.90	Absent	0 %
38.2	STP C3+10ft S Strat I Ap	1	Prehistoric, Debitage	Lithic, Chert	Bifacial Thinning Flake, Complete	Black			0.40	Absent	0 %
39.1	STP C3+3ft S Strat I Ap	1	Prehistoric, Debitage	Lithic, Chert	Flake Fragment,	Red			0.14	Absent	0 %
39.2	STP C3+3ft S Strat I Ap	1	Prehistoric, Debitage	Lithic, Chalcedony	Trimming Flake, Complete	Gray			0.09	Absent	0 %
40.1	STP C3+10ft E Strat I Ap	1	Prehistoric, Debitage	Lithic, Chalcedony	Bifacial Thinning Flake, Proximal	Gray, Light			0.10	Absent	0 %
41.1	STP C3+3ft E Strat I Ap	2	Prehistoric, Debitage	Lithic, Chert	Flake Fragment,	Gray, Dark			0.50	Absent	0 %
41.2	STP C3+3ft E Strat I Ap	2	Prehistoric, Debitage	Lithic, Chert	Flake Fragment,	Gray/Red			4.10	Absent	0 %
42.1	STP C3+10ft W Strat I Ap	1	Prehistoric, Debitage	Lithic, Chert	Flake Fragment,	Black			0.30	Absent	0 %
43.1	STP C3+3ft W Strat I Ap	1	Historic, Architectural	Glass, Common Glass	Window Glass, Fragment	Aqua			0.19		
43.2	STP C3+3ft W Strat I Ap	1	Prehistoric, Debitage	Lithic, Chert	Bifacial Thinning Flake, Complete	Gray			0.80	Absent	0 %
43.3	STP C3+3ft W Strat I Ap	1	Prehistoric, Debitage	Lithic, Chert	Flake Fragment,	Gray			0.26	Absent	0 %
43.4	STP C3+3ft W Strat I Ap	1	Prehistoric, Debitage	Lithic, Chert	Indeterminate Flake, Complete	Black			0.80	Absent	0 %
43.5	STP C3+3ft W Strat I Ap	1	Prehistoric, Debitage	Lithic, Chert	Flake Fragment,	Black			0.20	Absent	0 %
43.6	STP C3+3ft W Strat I Ap	1	Prehistoric, Tool	Lithic, Chert	Utilized Flake, Distal	Red		Distal flake fragment exhibiting utilization along left lateral margin.	2.10	Absent	0 %

Appendix C – Correspondence

APPENDIX C

Correspondence

Close

View and/or Address a Response

Project 20PR06690: C&D Power Systems (C&D Batteries) Sediment Remediation DEC Site No. 336001 (JQQBL18I84UT)

View Project

Please accept the following information below as the consolidated response from NYS SHPO for the above referenced submission.

Review Responses

Reviewer	Review Type	Response
Chelsea Towers	Survey and Evaluation	In order for SHPO to complete our evaluation of the historic significance of all buildings/structures/districts within or adjacent to your project area, we need further information. Please review the specific information request(s) below and click the Process button to respond to each request.
Philip Perazio	Archaeology	In order for SHPO to complete our evaluation of the Archaeological sensitivity of your project, we need further information. Please review the specific information request(s) below and click the Process button to respond to each request.

Information Requests

Process	Status	Reviewer	Review Type	Request Type	Request Entity	Request Item	Request Description
☐	Information Requested	Chelsea Towers	Survey and Evaluation	Request a New Attachment, Photo, or Survey for this Consultation Project		Attachment	We have not previously evaluated this building. Please provide exterior photos of all major elevations of the C&D Power Systems Main Building. All photos can be combined into a single PDF for submission in CRIS. Contact Chelsea Towers at chelsea.towers@parks.ny.gov with any questions. Thank you.
☐	Information Requested	Philip Perazio	Archaeology	Request a New Attachment, Photo, or Survey for this Consultation Project		Archaeology Survey	We are requesting either a Phase I archaeological survey or evidence of prior disturbance (see attached letter). If you are submitting a Phase I survey report, please upload via the survey wizard using the enclosed survey link/token (green cog/wheel process button). If you are submitting evidence of prior disturbance, please upload as a regular attachment.

Attachments

Attachment	Reviewer	Review Type	Type	Name	Description
☐	Philip Perazio	Archaeology	Document	20PR06690 Submission 1 response archaeology	Request for either a Phase I archaeological survey or evidence of prior disturbance.

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NEW YORK STATE OF OPPORTUNITY. Parks, Recreation and Historic Preservation

ANDREW M. CUOMO
Governor

ERIK KULLESEID
Commissioner

ARCHAEOLOGY COMMENTS

Phase IA/IB Archaeological Survey Recommendation
Project: C&D Power Systems (C&D Batteries) Sediment Remediation DEC Site No. 336001
PR#: 20PR06690
Date: 9 November 2020

Your project is in an archaeologically sensitive location. Therefore, the State Historic Preservation Office/Office of Parks, Recreation and Historic Preservation (SHPO/OPRHP) recommends a Phase IA/IB archaeological survey for components of the project that will involve ground disturbance, unless substantial prior ground disturbance can be documented. A Phase IA/IB survey is designed to determine the presence or absence of archaeological sites or other cultural resources in the project's Area of Potential Effects (APE).

If you consider the entire project area to be disturbed, documentation of the disturbance will need to be reviewed by SHPO/OPRHP. Examples of disturbance include mining activities and multiple episodes of building construction and demolition. Documentation of ground disturbance typically consists of soil bore logs, photos, or previous project plans. Agricultural activity is not considered to be substantial ground disturbance.

Please note that in areas with alluvial soils or fill archaeological deposits may exist below the depth of superficial disturbances such as pavement or even deeper disturbances, depending on the thickness of the alluvium or fill. Evaluation of the possible impact of prior disturbance on archaeological sites must consider the depth of potentially culture-bearing deposits and the depth of planned disturbance by the proposed project.

Our office does not conduct archaeological surveys. A 36 CFR 61 qualified archaeologist should be retained to conduct the Phase IA/IB survey.

Please also be aware that a Section 233 permit from the New York State Education Department (SED) may be necessary before archaeological fieldwork is conducted on State-owned land. If any portion of the project includes the lands of New York State, you should contact the SED before initiating survey activities. The SED contact is Christina Rieth and she can be reached at christina.rieth@nysed.gov. Section 233 permits are not required for projects on private land.

If you have any questions concerning archaeology, please contact Philip Perazio at philip.perazio@parks.ny.gov.

Please note that comments regarding architectural resources are being provided separately.

NEW YORK STATE OF OPPORTUNITY. Parks, Recreation, and Historic Preservation

ANDREW M. CUOMO
Governor

ERIK KULLESEID
Commissioner

January 26, 2021

Nancy Stehling
Senior Archaeologist
AECOM
125 Broad Street
15th Floor
New York, NY 10004

Re: USACE
C&D Power Systems (C&D Batteries) Sediment Remediation DEC Site No. 336001
Town of Deerpark, Orange County, NY
20PR06690

Dear Nancy Stehling:

Thank you for requesting the comments of the New York State Historic Preservation Office (SHPO). We have reviewed the submitted materials in accordance with Section 106 of the National Historic Preservation Act of 1966. These comments are those of the SHPO and relate only to Historic/Cultural resources.

SHPO has reviewed *Phase IA Archaeological Documentary Study for the C&D Power Systems Site Sediment Removal Project, Hamlet of Huguenot, Town of Deerpark, Orange County, NY* (AECOM, 20 January 2021) [21SR00037]. We concur with the recommendation that a Phase IB investigation of this project's APE should be conducted.

We have also reviewed the proposed Phase IB scope of work "Phase IB Archaeological Survey Scope of Work for the C&D Power Systems Site Sediment Removal Project." We have one comment. In accordance with our 2005 Phase I guidelines, supplemental tests surrounding isolated finds should be placed in cardinal directions, spaced at one and three meters from the original test.

If you have any questions, please don't hesitate to contact me.

Sincerely,

Philip A. Perazio, Historic Preservation Program Analyst - Archaeology Unit
Phone: 518-268-2175
e-mail: philip.perazio@parks.ny.gov via e-mail only

cc: Robert Forstner and Amit Haryani, AECOM; Brian Orzel, USACE
Benjamin Rung and Justin Starr, DEC

NEW YORK STATE OF OPPORTUNITY. Parks, Recreation, and Historic Preservation

ANDREW M. CUOMO
Governor

ERIK KULLESEID
Commissioner

April 13, 2021

Nancy Stehling
Senior Archaeologist
AECOM
125 Broad Street
15th Floor
New York, NY 10004

Re: USACE
C&D Power Systems (C&D Batteries) Sediment Remediation DEC Site No. 336001
Town of Deerpark, Orange County, NY
20PR06690

Dear Nancy Stehling:

Thank you for requesting the comments of the New York State Historic Preservation Office (SHPO). We have reviewed the submitted materials in accordance with Section 106 of the National Historic Preservation Act of 1966. These comments are those of the SHPO and relate only to Historic/Cultural resources.

SHPO has reviewed the revised Phase IB scope of work "Phase IB Archaeological Survey Scope of Work for the C&D Power Systems Site Sediment Removal Project." We concur with the revised SOW.

If you have any questions, please don't hesitate to contact me.

Sincerely,

Philip A. Perazio, Historic Preservation Program Analyst - Archaeology Unit
Phone: 518-268-2175
e-mail: philip.perazio@parks.ny.gov via e-mail only

cc: Robert Forstner and Amit Haryani, AECOM; Brian Orzel, USACE
Benjamin Rung and Justin Starr, DEC

Stehling, Nancy

From: Towers, Chelsea (PARKS) <Chelsea.Towers@parks.ny.gov>
Sent: Friday, January 29, 2021 3:51 PM
To: Stehling, Nancy
Subject: [EXTERNAL] RE: 20PR06690.002 - Photographs of C&D Power Systems Submitted Per 11-9-2020 Request in Response

Hi Nancy –

Yes, I have signed off on the above ground resources and have no other concerns. This will be formally communicated through the Effect Finding letter issued at the close of the project review.

Have a nice weekend!

Chelsea Towers
Historic Preservation Program Analyst

New York State Parks, Recreation & Historic Preservation
Peebles Island State Park, P.O. Box 189, Waterford, N.Y. 12188-0189
518.268.2129 | Chelsea.Towers@parks.ny.gov
https://parks.ny.gov/shpo

From: Stehling, Nancy <Nancy.Stehling@aecom.com>
Sent: Friday, January 29, 2021 1:02 PM
To: Towers, Chelsea (PARKS) <Chelsea.Towers@parks.ny.gov>
Subject: 20PR06690.002 - Photographs of C&D Power Systems Submitted Per 11-9-2020 Request in Response

ATTENTION: This email came from an external source. Do not open attachments or click on links from unknown senders or unexpected emails.

Hello Chelsea,

AECOM submitted an initial consultation package to SHPO on 10-23-2020 for the C&D Power Systems Site Sediment Removal Project for NYSDEC.
The consultation package was assigned 20PR06690.001.

On 11-09-2020, SHPO responded in a consolidated response to request a Phase I archaeological survey and additional documentation for above ground resources in the form of photographs of the C&D building.

Your communication was as follows:
"*We have not previously evaluated this building. Please provide exterior photos of all major elevations of the C&D Power Systems Main Building. All photos can be combined into a single PDF for submission in CRIS. Contact Chelsea Towers at chelsea.towers@parks.ny.gov with any questions. Thank you.*"

On 11-19-2020, AECOM uploaded a photo package to CRIS in response to SHPO's request. This submission was assigned 20PR06690.002, and CRIS notified AECOM that the submission was accepted on 11-23-2020.

There has been no response from SHPO on submission 20PR06690.002 since 11-23-2020.

On 1-20-2021 AECOM uploaded the Phase IA report and proposed Phase IB scope of work for the project. This submission was assigned 20PR06690.003 and was accepted on 1-21-2021.

I am emailing you to confirm that SHPO has no additional concerns regarding above ground resources, as submission 20PR06690.002 was sufficient.

Thank you,
-Nancy

Nancy A. Stehling, RPA
Project Manager
Senior Archaeologist
Environment
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NEW YORK STATE OF OPPORTUNITY. Parks, Recreation, and Historic Preservation

KATHY HOCHUL
Governor

ERIK KULLESEID
Commissioner

July 20, 2022

Nancy Stehling
Senior Archaeologist
AECOM
125 Broad Street
15th Floor
New York, NY 10004

Re: USACE
C&D Power Systems (C&D Batteries) Sediment Remediation DEC Site No. 336001
Town of Deerpark, Orange County, NY
20PR06690

Dear Nancy Stehling:

Thank you for requesting the comments of the New York State Historic Preservation Office (SHPO). We have reviewed the submitted materials in accordance with Section 106 of the National Historic Preservation Act of 1966. These comments are those of the SHPO and relate only to Historic/Cultural resources. They do not include other environmental impacts to New York State Parkland that may be involved in or near your project. Such impacts must be considered as part of the environmental review of the project pursuant to the National Environmental Policy Act and/or the State Environmental Quality Review Act (New York State Environmental Conservation Law Article 8).

We have received the recently submitted report entitled *Phase IB Archaeological Subsurface Testing Survey for the C & D Power Systems Site Sediment Removal Project, Hamlet of Huguenot, Town of Deerpark, Orange County, New York*. In order to complete our project review, we are requesting that the report be revised and resubmitted to account for several issues that are described below.

First, the report does not conform to the 2005 Phase I Archaeological Report Format Requirements (See attached). Specifically, it lacks the required Management Summary described in Appendix A of the attached guidelines.

Second, the report fails to identify an archaeological site that the documented deposits can be associated with. It is the opinion of SHPO that the various "areas of archaeological sensitivity" described in the report are part of the previously recorded MRE-TRC-8 Precontact site (USN 07105.000148) originally identified by TRC Environmental Corp. in 2016. The site was discussed at length in your Phase IA report. However, it is not identified in the Phase IB report which simply states "The number of precontact artifacts recovered during the Phase IB survey suggests the presence of a nearby precontact archaeological site." Please revise your report to reflect this site association and update the site record in the CRIS system to reflect your new data. A link/token will be provided with this response allowing you to update the USN record.

Based on the distribution of artifacts reported from your Phase IB investigation, it appears that the MRE-TRC-8 Precontact site extends across most, if not all, of the current study area. Therefore, we are unlikely to concur with any recommendation that does not involve total site avoidance or a Phase II investigation to firmly establish the site boundaries and provide information regarding its eligibility for inclusion on the National Register of Historic Places. It should be noted that the original 2016 TRC report already recommended that site should be considered eligible, an argument strengthened by your Phase IB results.

Finally, we require that reports be submitted as PDF documents, which facilitates our sharing information with the federally recognized tribal nations. Please submit the revised report in PDF format.

If further correspondence is required regarding this project, please refer to the SHPO Project Review (PR) number noted above. If you have any questions, please contact me via email.

Sincerely,

Brad Russell

Bradley W. Russell, Ph.D.
Historic Preservation Specialist - Archaeology
bradley.russell@parks.ny.gov

via e-mail only

Attachment

ATTACHMENT

DURA BASE Performance Data

DURA-BASE®
ADVANCED-COMPOSITE MAT SYSTEM™

SPECIFICATION AND PERFORMANCE DATA

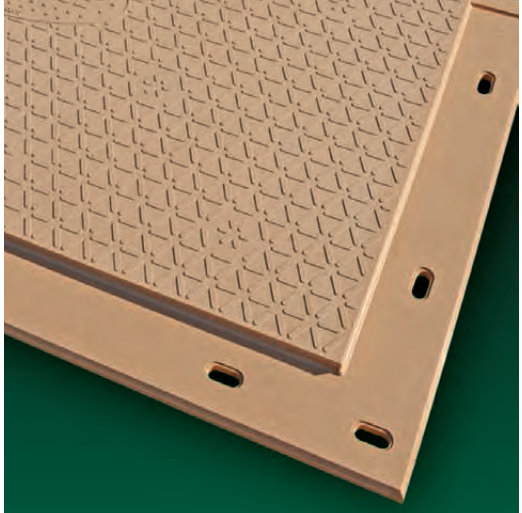
DURA-BASE Advanced-Composite Mat System provides a set of products for temporary roads and temporary job sites. The System includes the DURA-BASE mat, the turning mat and the half mat. The DURA-BASE mat is the primary working product for heavy duty matting needs. The turning mat provides a 10 degree change of direction in a single lane temporary road. The half mat complements the regular mat and provides increase coverage and flexibility in job site layouts.

Strength

DURA-BASE is a load spreading product and is designed to function in conjunction with a supporting sub grade. Full scale laboratory testing has demonstrated mat tolerance to extreme deflection while maintaining high load bearing capacity in pure bending. Pure compressive crush load capacity of the mat structures is approximately 600 psi (40kg/cm^2) when supported by an unyielding surface.

Environmental Performance

DURA-BASE mats are made from high-density polyethylene (HDPE) and are 100% recyclable through our mat recycling program. From this program, Newpark is taking a proactive approach to reduce the overall HDPE carbon footprint. DURA-BASE mats are non-absorbent which prevents environmental risk from cross-contamination threats, including invasive species. This allows for complete decontamination at the end of the project which wood products cannot claim. Wood mats retain contaminants and cannot be effectively cleaned – only effective method of completely removing the risk of cross-contamination is burning or burying them. Our manufacturing process allows for 100% utilization of the plastic. Remaining scrap material is reintroduced into the process.



DURA-BASE mats can be used on a wide variety of projects, including, but not limited to:

- Upstream Oil & Gas
- Pipeline
- Downstream
- Utilities
- Construction
- Heavy Haul
- Events
- Military
- Any project requiring safe temporary roads or job sites

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Hot Weather Performance

DURA-BASE Mats are deployed worldwide, including places that experience extreme hot wet jungle and hot dry desert conditions. HDPE plastic melts at around 121°C (250°F), therefore any exposure to temperatures near or above this level is strongly discouraged. Typical long term operating conditions should not exceed 66°C (150°F). Our DURA-BASE mats can withstand intermittent temperatures of 82°C (180°F) without issue. Damage of mats can occur with long exposure of temperatures above 82°C (180°F).

Cold Weather Performance

DURA-BASE mats have been successfully used in environments where temperatures of minus 34.4°C (minus 30°F) were observed for an extended period of time. In an effort to characterize the mats low temperature performance, our team explored ASTM D746-07 Brittleness Temperature of Plastics and Elastomers by Impact. The results from an independent laboratory indicate that the ASTM D 746-07 Brittleness Temperature for our mats is below minus 90°C (minus 135°F). In our environmental chamber at our world class R&D facility, we have exposed our mats to minus 51.11°C (minus 60°F).

Traffic

Traffic tests on differing soil conditions have shown DURA-BASE to be suitable for an average expected life in excess of 15 years when properly used and maintained. Fatigue tests have shown no appreciable damage at 60,000 cycles [6 inch (15 cm) deflection of 8 foot (2.5 m) span].

Static Dissipation

Plastics, left untreated, exhibit poor electrical conductivity. This condition, when present in mat material, can lead to a buildup of static charge on the plastic or personnel and result in arcing (mild shock). DURA-BASE Composite Mats contain an additive that combines with the plastic and increases the conductivity, rapidly dissipating any charge and reducing the potential for static buildup. Tests have shown the mat surface conductivity to be approximately 10e8 Ohms. The upper limit for a dissipative material is 10e10 Ohms. Field tests have shown the dissipative properties of the composite mat to be equal to those of wooden mats.

DURA-BASE General Specifications

	DURA-BASE Mat	DURA-BASE Turning Mat™	DURA-BASE Half Mat™
Overall Dimensions	8' x 14' x 4"	7' x 14' x 4"	8' x 7' 6" x 4"
	2.44 m x 4.27 m x 10.2 cm	2.13 m x 4.27 m x 10.2 cm	2.44 m x 2.29 m x 10.2 cm
Surface Dimensions	7' x 13'	58 sqft	7' x 6' 6"
	2.13 m x 3.96 m	5.38 sqm	2.13 m x 1.98 m
Weight / Mat	1000 lbs (454 kg)*	750 lbs (340 kg)*	550 lbs (249 kg)*
Material	Custom HDPE	Custom HDPE	Custom HDPE
Coefficient of Friction	0.6**	0.6**	0.6**

*All measurements and weights are nominal. **For wet neoprene rubber on mat surface.

All tests were performed by third party laboratories or in Newpark's facilities or are values from the broad literature on polymers. The information provided above is representative of the materials of construction, manufacturing processes and performance of the DURA-BASE mat, including the test results noted. Newpark makes no representations or warranties with regard any marketing or promotional materials, including, without limitation, the information and data provided herein, which is subject to change at any time without notice. The representations and warranties provided by Newpark in connection with the sale or rental of DURA-BASE products are contained exclusively in our Terms and Conditions and Installation & Handling manual.

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The Global Leader in Temporary Road and Jobsite Construction Technology

aecom.com

From:	New York State Parks CRIS Application
To:	Stehling, Nancy
Cc:	Justin.Starr@dec.ny.gov; benjamin.rung@dec.ny.gov; Brian.A.Orzel@usace.army.mil; Haryani, Amit; Forstner, Rob; Charles.Vandrei@dec.ny.gov; david.witt@dec.ny.gov; Josalyn.ferguson@dec.ny.gov
Subject:	NY SHPO: Requested Submission 3IU9WJPU6HLV Received for Consultation Project 20PR06690
Date:	Monday, September 26, 2022 3:24:32 PM

This Message Is From an External Sender
This message came from outside your organization. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Report Suspicious

Requested Submission Received

The New York State Historic Preservation Office (SHPO) has received the following requested submission.

> **Requested Submission Token:** 3IU9WJPU6HLV
>
> **Project Number:** 20PR06690
>
> **Project Type:** Consultation
>
> **Project Name:** C&D Power Systems (C&D Batteries) Sediment Remediation DEC Site No. 336001
>
> **Consolidated Response Token:** JKUW66X46H8K
>
> **Previous Submission Number:** 20PR06690.005
>
> **Open Request:** Revised Phase IB archaeological survey report requested - Please see attached letter for more details
>
> ***The request description above is for reference only. It is not a new request.***

New York State Historic Preservation Office
Peebles Island State Park, P.O. Box 189, Waterford, NY 12188-0189
518-237-8643 | https://parks.ny.gov/shpo
CRIS: https://cris.parks.ny.gov

Are you registered to vote? Register to vote online today. Moved recently? Update your information with the NYS Board of Elections. Not sure if you're registered to vote? Search your voter registration status.

Who sent this email?

This email is a notification from the New York State Cultural Resource Information System (CRIS). CRIS is an online service administered by the New York State Division for Historic Preservation, also known as the New York State Historic Preservation Office (SHPO), which is a division of New York State Parks, Recreation & Historic Preservation.

This message pertains to a submission for a consultation project. Please see SHPO's Environmental Review web page for more information about the consultation process.

Why did I receive this email?

The contact list for the project or the requested submission includes your email address.

What do I need to do?

You do not need to take any action at this time. The submission is now in SHPO's processing queue.

What will happen next?

If SHPO accepts your submission, you will receive a "Requested Submission Accepted" email notification, the submission will receive a new submission number, and the submission's contents will be added to the project. SHPO will then review the submission.

If SHPO needs more information to process your submission, you will receive a "Requested Submission Found Insufficient" email with the reviewer's comments. You may then revise the submission and resend it to SHPO.

What else can I do?

Please see the following help topics for more information about managing requested submissions and projects in CRIS:

- Process an Information Request
- How do I check the review status of my project?
- How long does SHPO take to review projects?
- Submit New Information for an Existing Project

Where can I get help?

Please visit the CRIS Online Help System: https://cris.parks.ny.gov/CRISHelp

If you still have questions about CRIS, please contact CRIS Help at CRISHelp@parks.ny.gov.

For any other questions, please call SHPO at 518-237-8643.

Appendix H

Permits Issued for Application of October 19, 2020

PERMIT
Under the Environmental Conservation Law (ECL)

Permittee and Facility Information

Permit Issued To:
NYS Dept of Environmental Conservation

625 BROADWAY
ALBANY, NY 12233

Facility:
STAR REALTY ASSOCIATES HUGUENOT FACILITY
430 US RTE 209
HUGUENOT, NY 12746

Facility Location: in DEERPARK in ORANGE COUNTY
Facility Principal Reference Point: NYTM-E: 530.991 NYTM-N: 4585.334
Latitude: 41°25'08.3" Longitude: 74°37'44.9"
Authorized Activity: This permit authorizes disturbance to an unnamed tributary of the Neversink River [DEC Waters Index No. D-1-7, Class C(T)] associated with the removal of contaminated sediments as part of a State Superfund Program remedial project for the C&D Power Systems (C&D Batteries) Site (Remedial Site ID 336001).

Permit Authorizations

Water Quality Certification - Under Section 401 - Clean Water Act
Permit ID 3-3328-00040/00031
New Permit Effective Date: 8/26/2021 Expiration Date: 12/31/2026
Stream Disturbance - Under Article 15, Title 5
Permit ID 3-3328-00040/00032
New Permit Effective Date: 8/26/2021 Expiration Date: 12/31/2026
Excavation & Fill in Navigable Waters - Under Article 15, Title 5
Permit ID 3-3328-00040/00033
New Permit Effective Date: 8/26/2021 Expiration Date: 12/31/2026

NYSDEC Approval

By acceptance of this permit, the permittee agrees that the permit is contingent upon strict compliance with the ECL, all applicable regulations, and all conditions included as part of this permit.

Permit Administrator: CHRISTOPHER LANG, Deputy Regional Permit Administrator
Address: NYSDEC Region 3 Headquarters
21 S Putt Corners Rd
New Paltz, NY 12561

Authorized Signature: _____ Date 08 / 26 / 2021

Distribution List

Mike Fraatz, DEC Bureau of Ecosystem Health
John Rollino, AECOM
Brian Orzel, US Army Corps of Engineers
Eric Ruscher, Orange County
Town of Deerpark

Permit Components

NATURAL RESOURCE PERMIT CONDITIONS

WATER QUALITY CERTIFICATION SPECIFIC CONDITION

GENERAL CONDITIONS, APPLY TO ALL AUTHORIZED PERMITS

NOTIFICATION OF OTHER PERMITTEE OBLIGATIONS

NATURAL RESOURCE PERMIT CONDITIONS - Apply to the Following Permits: WATER QUALITY CERTIFICATION; STREAM DISTURBANCE; EXCAVATION & FILL IN NAVIGABLE WATERS

1. **Conformance With Plans** All activities authorized by this permit must be in strict conformance with the approved plans submitted by the applicant or applicant's agent as part of the permit application. Such approved plans were prepared by the applicant or applicant's agent, as cited in Natural Resource Permit Condition 2.

2. **Conformance with Plans - Addenda** In addition to plans referenced in the Condition titled "Conformance with Plans," the activities authorized by this permit must be in strict conformance with the following approved plans and/or submissions made as part of the permit application:

    a. Drawings prepared by AECOM, entitled "Former C&D Power Systems, Site No. 336001 Sediment Remediation", sheets C-02.1, C-02.10, C-03.1, C-03.4, C-03.5, C-04.6, X-05, and D-01.5, received by DEC March 31, 2021;

    b. Drawing sheets C-02.9 and G-04, prepared by AECOM, received by DEC May 14, 2021;

    c. "Responses to Comments" narrative, received by DEC March 31, 2021.

3. **Notification of Pre-Construction Meeting** Prior to commencement of any work, the permittee must notify Michael Fraatz of the Bureau of Ecosystem Health via email (michael.fraatz@dec.ny.gov) a minimum of 5 business days prior to scheduling an on-site preconstruction meeting with the permittee and/or contractors.

4. **Notice of Intent to Commence Work** The permittee must notify Mike Fraatz of the DEC Bureau of Ecosystem Health via email (michael.fraatz@dec.ny.gov) no less than 48 hours prior to the commencement of work.

5. **Post Permit Sign** The permit sign enclosed with this permit shall be posted in a conspicuous location on the worksite and adequately protected from the weather.

6. **Install Erosion Controls Prior to Work** No site preparation work shall be undertaken until all required erosion control measures have been installed.

7. **Work During Low Flows** All work shall be performed during low flow conditions.

8. **Install Cofferdam** Prior to commencing the project, a temporary cofferdam made of clean gravel, sandbags and/or plastic liners shall be installed to isolate the work area from the rest of the stream. The cofferdam shall be entirely removed immediately upon completion of work.

9. **Use of Timber Matting** Disturbance to wetlands, streams and other waterbodies by construction equipment shall be minimized through the use of timber mats and low ground weight construction.

10. **Removal of Timber Mats** Timber mats shall be removed in all work areas as soon as construction has been completed and such areas shall be immediately seeded and mulched as appropriate.

11. **No Turbidity from Dewatering** No turbid water resulting from dewatering operations shall be discharged directly to or allowed to enter the wetland. Such water shall be pumped to settling basins or to an upland vegetated area prior to any discharge to any surface waters or wetlands. All other necessary measures shall be implemented to prevent any visible increase in turbidity or sedimentation downstream of the work site.

12. **Environmental Monitor and Reports** An environmental monitor is required to be on site during all in-stream work. Reports which include photographs and a narrative of project progress must be submitted via email to Mike Fraatz of the DEC Bureau of Ecosystem Health (michael.fraatz@dec.ny.gov) once per week during the course of construction.

13. **Maintain Water Flow During Work** During periods of work activity, sufficient flow of water shall be maintained at all times to sustain aquatic life downstream.

14. **Precautions Against Contamination of Waters** All necessary precautions shall be taken to preclude contamination of any wetland or waterway by suspended solids, sediments, fuels, solvents, lubricants, epoxy coatings, paints, concrete, leachate or any other environmentally deleterious materials associated with the project.

15. **Return Stranded Fish** Any fish remaining in the dewatered area shall be returned to the stream, lake or wetland.

16. **Storage of Materials** Excavated materials and or fill materials shall be stockpiled more than 100 feet landward of the wetland or water body and shall be contained by straw bales or silt fencing to prevent erosion.

17. **Seed, Mulch Disturbed Soils** All areas of soil disturbance resulting from this project (above the mean high water line) shall be seeded with an appropriate perennial grass seed and mulched with straw within one week of final grading.

18. **Prior Approval of Changes** If the permittee desires to make any minor changes to the scope of work shown in the approved plans referenced in Natural Resource Permit Condition 1, the permittee shall submit a request via email to Mike Fraatz of the DEC Bureau of Ecosystem Health (michael.fraatz@dec.ny.gov) to make such proposed changes. The proposed changes shall not be implemented unless authorized in writing by the Department. Issuance of such approval without modification of the permit is at the Department's discretion.

19. **No Interference With Navigation** There shall be no unreasonable interference with navigation by the work herein authorized.

WATER QUALITY CERTIFICATION SPECIFIC CONDITIONS

1. **Water Quality Certification** The authorized project, as conditioned pursuant to the Certificate, complies with Section 301, 302, 303, 306, and 307 of the Federal Water Pollution Control Act, as amended and as implemented by the limitations, standards, and criteria of state statutory and regulatory requirements set forth in 6 NYCRR Section 608.9(a). The authorized project, as conditioned, will also comply with applicable New York State water quality standards, including but not limited to effluent limitations, best usages and thermal discharge criteria, as applicable, as set forth in 6 NYCRR Parts 701, 702, 703, and 704.

GENERAL CONDITIONS - Apply to ALL Authorized Permits:

1. **Facility Inspection by The Department** The permitted site or facility, including relevant records, is subject to inspection at reasonable hours and intervals by an authorized representative of the Department of Environmental Conservation (the Department) to determine whether the permittee is complying with this permit and the ECL. Such representative may order the work suspended pursuant to ECL 71- 0301 and SAPA 401(3).

The permittee shall provide a person to accompany the Department's representative during an inspection to the permit area when requested by the Department.

A copy of this permit, including all referenced maps, drawings and special conditions, must be available for inspection by the Department at all times at the project site or facility. Failure to produce a copy of the permit upon request by a Department representative is a violation of this permit.

2. **Relationship of this Permit to Other Department Orders and Determinations** Unless expressly provided for by the Department, issuance of this permit does not modify, supersede or rescind any order or determination previously issued by the Department or any of the terms, conditions or requirements contained in such order or determination.

3. **Applications For Permit Renewals, Modifications or Transfers** The permittee must submit a separate written application to the Department for permit renewal, modification or transfer of this permit. Such application must include any forms or supplemental information the Department requires. Any renewal, modification or transfer granted by the Department must be in writing. Submission of applications for permit renewal, modification or transfer are to be submitted to:

Regional Permit Administrator
NYSDEC Region 3 Headquarters
21 S Putt Corners Rd
New Paltz, NY12561

4. **Submission of Renewal Application** The permittee must submit a renewal application at least 30 days before permit expiration for the following permit authorizations: Excavation & Fill in Navigable Waters, Stream Disturbance, Water Quality Certification.

5. **Permit Modifications, Suspensions and Revocations by the Department** The Department reserves the right to exercise all available authority to modify, suspend or revoke this permit. The grounds for modification, suspension or revocation include:

a. materially false or inaccurate statements in the permit application or supporting papers;

b. failure by the permittee to comply with any terms or conditions of the permit;

c. exceeding the scope of the project as described in the permit application;

d. newly discovered material information or a material change in environmental conditions, relevant technology or applicable law or regulations since the issuance of the existing permit;

e. noncompliance with previously issued permit conditions, orders of the commissioner, any provisions of the Environmental Conservation Law or regulations of the Department related to the permitted activity.

6. **Permit Transfer** Permits are transferrable unless specifically prohibited by statute, regulation or another permit condition. Applications for permit transfer should be submitted prior to actual transfer of ownership.

NOTIFICATION OF OTHER PERMITTEE OBLIGATIONS

Item A: Permittee Accepts Legal Responsibility and Agrees to Indemnification
The permittee, excepting state or federal agencies, expressly agrees to indemnify and hold harmless the Department of Environmental Conservation of the State of New York, its representatives, employees, and agents ("DEC") for all claims, suits, actions, and damages, to the extent attributable to the permittee's acts or omissions in connection with the permittee's undertaking of activities in connection with, or operation and maintenance of, the facility or facilities authorized by the permit whether in compliance or not in compliance with the terms and conditions of the permit. This indemnification does not extend to any claims, suits, actions, or damages to the extent attributable to DEC's own negligent or

intentional acts or omissions, or to any claims, suits, or actions naming the DEC and arising under Article 78 of the New York Civil Practice Laws and Rules or any citizen suit or civil rights provision under federal or state laws.

Item B: Permittee's Contractors to Comply with Permit
The permittee is responsible for informing its independent contractors, employees, agents and assigns of their responsibility to comply with this permit, including all special conditions while acting as the permittee's agent with respect to the permitted activities, and such persons shall be subject to the same sanctions for violations of the Environmental Conservation Law as those prescribed for the permittee.

Item C: Permittee Responsible for Obtaining Other Required Permits
The permittee is responsible for obtaining any other permits, approvals, lands, easements and rights-of-way that may be required to carry out the activities that are authorized by this permit.

Item D: No Right to Trespass or Interfere with Riparian Rights
This permit does not convey to the permittee any right to trespass upon the lands or interfere with the riparian rights of others in order to perform the permitted work nor does it authorize the impairment of any rights, title, or interest in real or personal property held or vested in a person not a party to the permit.

Item E: SEQR Type II Action Under the State Environmental Quality Review Act (SEQR), this project has been determined to be a Type II Action and therefore is not subject to further procedures under this law.

New York State

Department of Environmental Conservation

NOTICE

The Department of Environmental Conservation (DEC) has issued permit(s) pursuant to the Environmental Conservation Law for work being conducted at this site. For further information regarding the nature and extent of work approved and any Department condition on it, contact the DEC at 845-256-3054. Please refer to the permit number shown when contacting the DEC.

Permittee: NYSDEC

Permit No. 3-3328-00040/00032

Effective Date: August 26, 2021

Expiration Date: December 31, 2026

❑ **Applicable if checked. No instream work allowed between October 1 & April 30**

NOTE: This notice is NOT a permit.

From:	Orzel, Brian A CIV USARMY CENAN (USA)
To:	Rollino, John
Cc:	Haryani, Amit; Forstner, Rob
Subject:	[EXTERNAL] RE: Permit Application for Remedial Activities for the C&D Power Systems. Site No. 336001 Remedial Design
Date:	Thursday, January 07, 2021 4:54:46 PM
Attachments:	NWP Regulations FR 06JAN17.pdf PN-LRB NAN Final Regional Conditions WQC CZM for NY (dated 21-MAR-2017).pdf

John,
We received the pre-construction notification for the above referenced project on November 2, 2020.
Due to my excessive work load, I was unable to provide a written determination within 45 days of its submission.
In accordance with the current nationwide general permit regulations (Federal Register dated January 6, 2017, pages 1860 to 2008), if the Corps of Engineers district does not respond to a pre-construction notification within 45 days of receipt, then the applicant may proceed with the project as proposed.
That means that the applicant must perform the work as proposed in the pre-construction notification, including any proposed mitigation. Any substantive changes to the project would require the applicant to submit a new notification to this office.
If you have any questions, let me know.
Brian

From: Rollino, John <John.Rollino@aecom.com>
Sent: Thursday, January 7, 2021 2:31 PM
To: Orzel, Brian A CIV USARMY CENAN (USA) <Brian.A.Orzel@usace.army.mil>
Cc: Haryani, Amit <Amit.Haryani@aecom.com>; Forstner, Robert <Robert.Forstner@aecom.com>
Subject: [Non-DoD Source] RE: Permit Application for Remedial Activities for the C&D Power Systems. Site No. 336001 Remedial Design
Mr. Orzel,
Good morning. I just want to follow up on the review of Permit Application for Remedial Activities for the C&D Power Systems. Site No. 336001 Remedial Design.
Should you have any questions, please do not hesitate to ask.
Cheers,
John Rollino,
Section Manager – Natural Resources and Environmental Permitting Dept. (NY Metro - IAP)
United States (East) Lead for Natural Resources Management, AECOM Technical Practice Group (TPG)
ESA Certified Ecologist; Certified Wetland Delineator (Minnesota # 1233); ISA-Certified Arborist (Worldwide)
AECOM Environment.
125 Broad Street,
15th Floor. New York, NY 10004.
212-377-8734

From: Rollino, John
Sent: Tuesday, December 01, 2020 12:12 PM
To: 'Orzel, Brian A CIV USARMY CENAN (USA)' <Brian.A.Orzel@usace.army.mil>
Cc: Haryani, Amit <Amit.Haryani@aecom.com>; Forstner, Robert <Robert.Forstner@aecom.com>
Subject: RE: Permit Application for Remedial Activities for the C&D Power Systems. Site No. 336001 Remedial Design

Mr. Orzel,

Good morning. I just want to follow up on the review of Permit Application for Remedial Activities for the C&D Power Systems. Site No. 336001 Remedial Design.

Should you have any questions, please do not hesitate to ask.

Cheers,

John Rollino,
Section Manager – Natural Resources and Environmental Permitting Dept. (NY Metro - IAP)
United States (East) Lead for Natural Resources Management, AECOM Technical Practice Group (TPG)
ESA Certified Ecologist; Certified Wetland Delineator (Minnesota # 1233); ISA-Certified Arborist (Worldwide)
AECOM Environment.
125 Broad Street,
15th Floor. New York, NY 10004.
212-377-8734

From: Rollino, John
Sent: Wednesday, November 11, 2020 11:08 AM
To: 'Orzel, Brian A CIV USARMY CENAN (USA)' <Brian.A.Orzel@usace.army.mil>
Cc: Haryani, Amit <Amit.Haryani@aecom.com>; Forstner, Robert <Robert.Forstner@aecom.com>
Subject: RE: Permit Application for Remedial Activities for the C&D Power Systems. Site No. 336001 Remedial Design

Mr. Orzel,

Good morning. I just wanted to reach out to confirm you received our permit application package.

Also, should you have any questions, please do not hesitate to ask.

Cheers,

John Rollino,
Section Manager – Natural Resources and Environmental Permitting Dept. (NY Metro - IAP)
ESA Certified Ecologist; Certified Wetland Delineator (Minnesota # 1233); ISA-Certified Arborist (Worldwide)
TPG Leader – Arboriculture & Urban Habitats and Forestry – AECOM Technical Practice Group (TPG)
AECOM Environment
125 Broad Street, 15th Floor
New York, NY 10004
212-377-8734

New York State Department of Environmental Conservation
Division of Environmental Permits
NYSDEC Region 3 Headquarters
21 S Putt Corners Rd
New Paltz, NY 12561
(845) 256-3054

May 28, 2021

NYS Dept of Environmental Conservation
625 BROADWAY
ALBANY, NY 12233

Re: DEC ID # 3-3328-00040/00032
STAR REALTY ASSOCIATES HUGUENOT FACILITY

Dear Applicant :

Please be advised that your application for a DEC permit(s) is complete and a technical review has commenced. Notice and the opportunity for public comment is required for this application. Enclosed is a Notice of Complete Application for your project. Please have the Notice published in the newspaper identified below once during the week of 5/31/2021 on any day Monday through Friday.

The official newspaper of the Town (City) of DEERPARK.
Contact the Town (City) Clerk's office to confirm the official newspaper.

On the Notice of Complete Application, that information presented between the horizontal lines, on the enclosed page(s) should be published. Do not print this letter or the information contained below the second horizontal line. Please request the newspaper publisher to provide you with a Proof of Publication for the Notice. Upon receipt of the Proof of Publication promptly forward it to this office. You must provide the Proof of Publication before a final decision can be rendered on your application. You are responsible for paying the cost of publishing the Notice in the newspaper.

Notification of this complete application is also being provided by this Department in the NYSDEC Environmental Notice Bulletin.

This notification does not signify approval of your application for permit. Additional information may be requested from you at a future date, if deemed necessary to reach a decision on your application. Your project is classified major under the Uniform Procedures Act. Accordingly, a decision is due within 90 days of the date of this notice unless a public hearing is held, which may extend this time frame. If a public hearing is necessary, you will be notified.

If you have any questions please contact me at the above address or phone number above.

Sincerely,

CHRISTOPHER LANG
Division of Environmental Permits

THIS IS NOT A PERMIT

New York State Department of Environmental Conservation
Notice of Complete Application

Date: 05/28/2021

Applicant: NYS Dept of Environmental Conservation
625 BROADWAY
ALBANY, NY 12233

Facility: STAR REALTY ASSOCIATES HUGUENOT FACILITY
430 US RTE 209
HUGUENOT, NY 12746

Application ID: 3-3328-00040/00032

Permits(s) Applied for: 1 - Article 15 Title 5 Excavation & Fill in Navigable Waters
1 - Section 401 - Clean Water Act Water Quality Certification
1 - Article 15 Title 5 Stream Disturbance

Project is located: in DEERPARK in ORANGE COUNTY

Project Description:
The applicant proposes disturbance to an unnamed tributary of the Neversink River [DEC Waters Index No. D-1-7, Class C(T)] associated with the removal of contaminated sediments as part of a State Superfund Program remedial project for the C&D Power Systems (C&D Batteries) Site (Remedial Site ID 336001). The proposal involves dredging of approximately 2,755 cubic yards of contaminated sediments, subsequent restoration of the stream channel/floodplain areas, as well as rehabilitation and removal of existing stream crossings in the project area.

Availability of Application Documents:
Filed application documents, and Department draft permits where applicable, are available for inspection during normal business hours at the address of the contact person. To ensure timely service at the time of inspection, it is recommended that an appointment be made with the contact person.

State Environmental Quality Review (SEQR) Determination
Project is not subject to SEQR because it is a Type II action.

SEQR Lead Agency None Designated

State Historic Preservation Act (SHPA) Determination
The proposed activity is not subject to review in accordance with SHPA. The application type is exempt and/or the project involves the continuation of an existing operational activity.

Availability For Public Comment

Comments on this project must be submitted in writing to the Contact Person no later than 06/17/2021 or 15 days after the publication date of this notice, whichever is later.

Contact Person

CHRISTOPHER LANG
NYSDEC
21 S Putt Corners Rd
New Paltz, NY 12561
(845) 256-3096

CC List for Complete Notice

Mike Fraatz, DEC Bureau of Ecosystem Health
John Rollino, AECOM
Brian Orzel, US Army Corps of Engineers
Eric Ruscher, Orange County
Town of Deerpark Supervisor
ENB

TIMES HERALD-RECORD

90 Crystal Run Road, Ste 310
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TIMES HERALD-RECORD

90 Crystal Run Road, Ste 310, Middletown, NY 10941

State of New York:
County of Orange: ss:

Tricia Crowe

Being duly sworn deposes and says that the Local Media Group, Inc. is organized under the last of the State of New York and is, at all the times hereinafter mentioned, was the printer and publisher of the Times Herald-Record, a daily newspaper distributed in the Orange, Ulster, Rockland, Dutchess, Pike, PA, Delaware and Sullivan , Counties, published in the English language in the City of Middletown, County of Orange, State of New York, that deponent is the

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of said The Times Herald-Record acquainted with the facts hereinafter stated, and duly authorized by said Corporation to make this affidavit; that the

Public Notice

a true printed copy of which is attached, has been duly and regularly published in the manner require by law in said The Times Herald-Record in each o its issues published upon each of the following dates, to with: In its issues of:

06/04/2021

Signature of Representative:
Tricia Crowe

Sworn to before me this 8 Day of June 2021

Notary Public, Orange County

ELIZABETH MARTHA RAPALO
Notary Public - State of New York
No. 01RA6344907
Qualified in Orange County
My Commission Expires 07/11/2024

New York State Department of Environmental Conservation
Notice of Complete Application

Date: 05/28/2021

Applicant: NYS Dept of Environmental Conservation
625 BROADWAY
ALBANY, NY 12233

Facility: STAR REALTY ASSOCIATES HUGUENOT FACILITY
430 US RTE 209
HUGUENOT, NY 12746

Application ID: 3-3328-00040/00032

Permits(s) Applied for: 1 - Article 15 Title 5 Excavation & Fill in Navigable Waters
1 - Section 401 - Clean Water Act Water Quality Certification
1 - Article 15 Title 5 Stream Disturbance

Project is located: in DEERPARK in ORANGE COUNTY

Project Description:
The applicant proposes disturbance to an unnamed tributary of the Neversink River [DEC Waters Index No. D- 1-7, Class C(T)] associated with the removal of contaminated sediments as part of a State Superfund Program remedial project for the C&D Power Systems (C&D Batteries) Site (Remedial Site ID 336001). The proposal involves dredging of approximately 2,755 cubic yards of contaminated sediments, subsequent restoration of the stream channel/floodplain areas, as well as rehabilitation and removal of existing stream crossings in the project area.

Availability of Application Documents:
Filed application documents, and Department draft permits where applicable, are available for inspection during normal business hours at the address of the contact person. To ensure timely service at the time of inspection, it is recommended that an appointment be made with the contact person.

State Environmental Quality Review (SEQR) Determination
Project is not subject to SEQR because it is a Type II action.

SEQR Lead Agency None Designated

State Historic Preservation Act (SHPA) Determination
The proposed activity is not subject to review in accordance with SHPA. The application type is exempt and/or the project involves the continuation of an existing operational activity.

Availability For Public Comment
Comments on this project must be submitted in writing to the Contact Person no later than 06/17/2021 or 15 days after the publication date of this notice, whichever is later.

Contact Person
CHRISTOPHER LANG
NYSDEC
21 S Putt Corners Rd
New Paltz, NY 12561
(845) 256-3096

0001002777

Appendix I

Restoration Plan – Nontidal Wetland/Waterways

Restoration Plan
Nontidal Wetland/Waterways

C&D Power Systems, Site No. 336001
Joint Permit Application
Huguenot, NY

New York State Department of Environmental Conservation –
Division of Environmental Remediation

USACE Pre-Application # NAN-2021-01201-EMI

Prepared for New York State Department of Environmental Conservation
AECOM Project number: 60628872

13 March 2023

Quality Information

Prepared by	Checked by	Verified by	Approved by
John Rollino	Andrew Martin	Robert Forstner	Amit Haryani
Permitting Lead	Senior Scientist	Lead Verifier	Project Manager

Revision History

Revision	Revision date	Details	Authorized	Name	Position
V0.1	14-Feb-23	Internal Draft			
V0.2	3-Mar-23	Internal Draft			
V1.0	13-Mar-23	Submission	13-Mar-23	Amit Haryani	Project Manager

Prepared for:

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Albany, NY 12233

Prepared by:

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Figures

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This report provides information on planned site restoration after the completion of remediation activity proposed to the C&D Power Systems Site (Project) (NYSDEC Site No. 336001) in Huguenot, Orange County, New York (NY).

This document is intended as an appendix to the Permit Information Packet (PIP) dated October 27, 2022, submitted in support of a Joint Permit Application (JPA) submitted jointly to the US Army Corps of Engineers (USACE) and the New York State Department of Environmental Conservation (NYSDEC) for permits required for the remediation activities.

Remediation will consist of the clearing of a blocked culvert, removal of contaminated sediments, and related activities. A full description of remediation is given in Section 2 of the documents. Restoration will include backfill of the excavated footprint, removal of temporary materials, grading of all disturbed areas, and seeding and replanting of disturbed riparian areas. A full description of restoration is given in Sections 6, with additional information given in Sections 7 to 13.

All citations to photos in this document refer to those in PIP Appendix A – Site Photos.

1 Introduction

The New York State Department of Environmental Conservation's Division of Environmental Remediation (NYSDEC DER) is planning to remediate the C&D Power Systems (C&D) Site (NYSDEC Site No. 336001) in Huguenot, Orange County, NY (see **Figure 1**). AECOM has been hired as the environmental design consultant that is responsible for developing the plans, specifications and permit applications for the proposed project.

The Project Need and history is detailed in the PIP – Section 1.

The remedial action prescribed for the site that includes excavation and disposal of contaminated sediments in the Tributary D-1-7 (hereafter, referred to as the tributary) and the top six to eight feet (ft) (21 ft to 23 ft below surrounding grade [bsg]) of the contaminated waste lagoon soil and ex-situ stabilization of the remaining contaminated unsaturated waste lagoon soil.

It should be noted that the waste lagoon area does not hydrologically connect to the tributary, does not have any indicators of wetland properties, is currently an extremely compromised habitat, and will be paved after remediation. As such, it is not considered in detail in this document, which will focus on restoration of natural areas.

Work within the riverbed is planned to be carried out under a USACE Nationwide Permit #38 for Cleanup of Hazardous and Toxic Waste (NWP38). Remedial excavation activities in the waste lagoon will begin on a schedule not related to permitting.

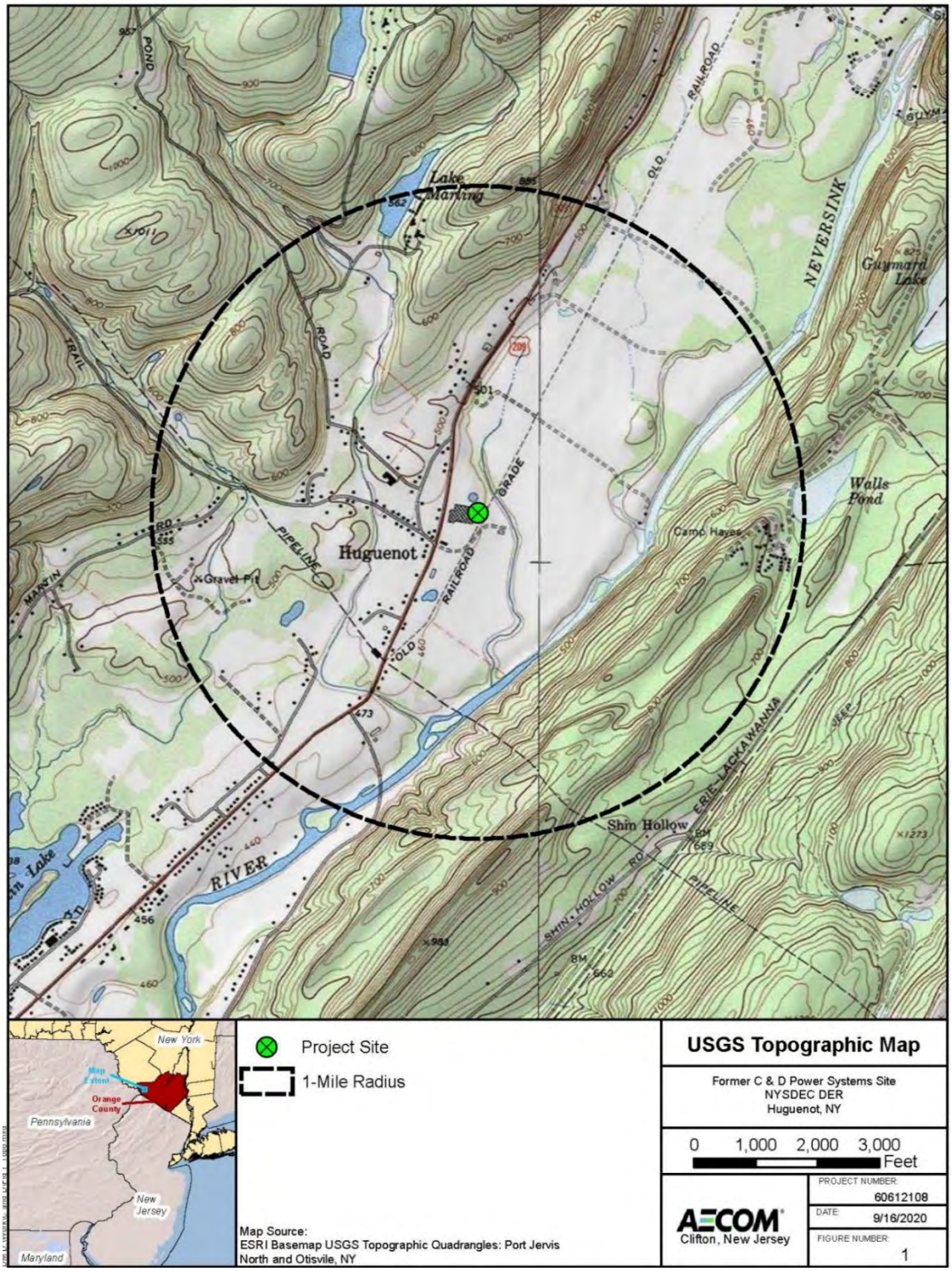

Figure 1 Project Area

1.1 C&D Facility and Setting

The main site features include an existing large industrial building formerly used for the manufacturing of lead batteries that is currently unoccupied, as well as a 175-ft diameter wastewater treatment pit, often referred to as "the waste lagoon," located approximately 75 ft northeast of the former industrial building. The existing C&D buildings and waste lagoon area are immediately surrounded by parking lots and paved roads.

Approximately 200 ft east and south of the waste lagoon there is a steep cliff slope some 35 ft in height. At the toe of the slope there are the waters of the tributary. The streambed of the tributary was impacted by historic releases from the plant; a 1,062-linear foot (LF) long segment of the tributary adjacent to the plant is considered part of the site and targeted for remediation via mechanical removal of contaminated sediments.

The tributary was historically a shallow body of water that flowed in a stream bed approximately 20 ft in width. Review of historical aerial photographs showed that the water within the bed was generally a few feet in width with a likely depth less than one foot. Swartwout Road (Photo 1), a stream crossing within the site, had a 12-inch-wide culvert to convey the tributary under the road. Several years ago, the culvert failed and caused water to impound upstream; moreover, another crossing, colloquially called the Southern Crossing, located approximately 300 ft south of Swartwout Road, also failed, further compounding the upstream impounding. As of Fall 2022, the waters associated with the tributary have a width of over 175 ft in some locations. The impounded waters are flooding former agricultural fields, maintained lawns, and in some instances formerly vegetated wetlands.

1.2 Remedial Action and Record of Decision

The facility was formerly permitted to operate as a treatment, storage and/or disposal (TSDF) facility under the Resource Conservation and Recovery Act (RCRA) hazardous waste management program. The Site has been included in the USEPA's tracking system under the Government Performance and Results Act (GPRA) for corrective action. The RCRA Corrective Action Program requires investigation and cleanup of releases of hazardous wastes and hazardous constituents that pose an unacceptable risk at RCRA hazardous waste treatment, storage and disposal facilities. This site has not yet met indicators to show compliance with RCRA Corrective Action requirements. The contaminants of concern are barium, cadmium, fluoride, lead, and polychlorinated biphenyl (PCB) Aroclor 1254.

In March 2015, NYSDEC signed a Record of Decision (ROD), *C&D Power Systems (C&D Batteries) State Superfund Project/RCRA Project Deer Park, Orange County Site No. 336001 EPA ID #NYD064337298*, which selected a remedy for C&D Power Systems Site Operable Unit (OU) Number 01, the unsaturated waste lagoon soils.

1.3 Regulated Activities

NYSDEC DER is submitting permit applications to obtain authorization to perform excavation within the streambed of the tributary. Contaminated stream sediment will be removed from the tributary to a depth of 12 -18 inches along approximately 1,062 LF of stream bed as shown on the Permit Drawings and **Figure 2**. Approximately, 2,280 cubic yards (CY) of sediment will be removed[1] and replaced by a clean 1:1:1 mix of sand:gravel:cobble materials. The removal of sediment to a depth of 12 inches to 18 inches would achieve Soil Cleanup Goals (SCGs) for protection of the environment and would be expected to meet residential Soil Cleanup Objectives (SCOs). The excavated sediment will be stabilized and direct loaded into trucks for off-site disposal at an approved permitted facility.

[1] The ROD initially identified 2,175 cu yds to be removed; however, follow up sampling conducted in 2020 determined that removal of up to 18 inches depth was needed in some areas to remove contamination, and an estimated 2,280 CY will be removed. While the excavation area is similar to that of the ROD, the deeper excavation of sediments accounts for the increased volume.

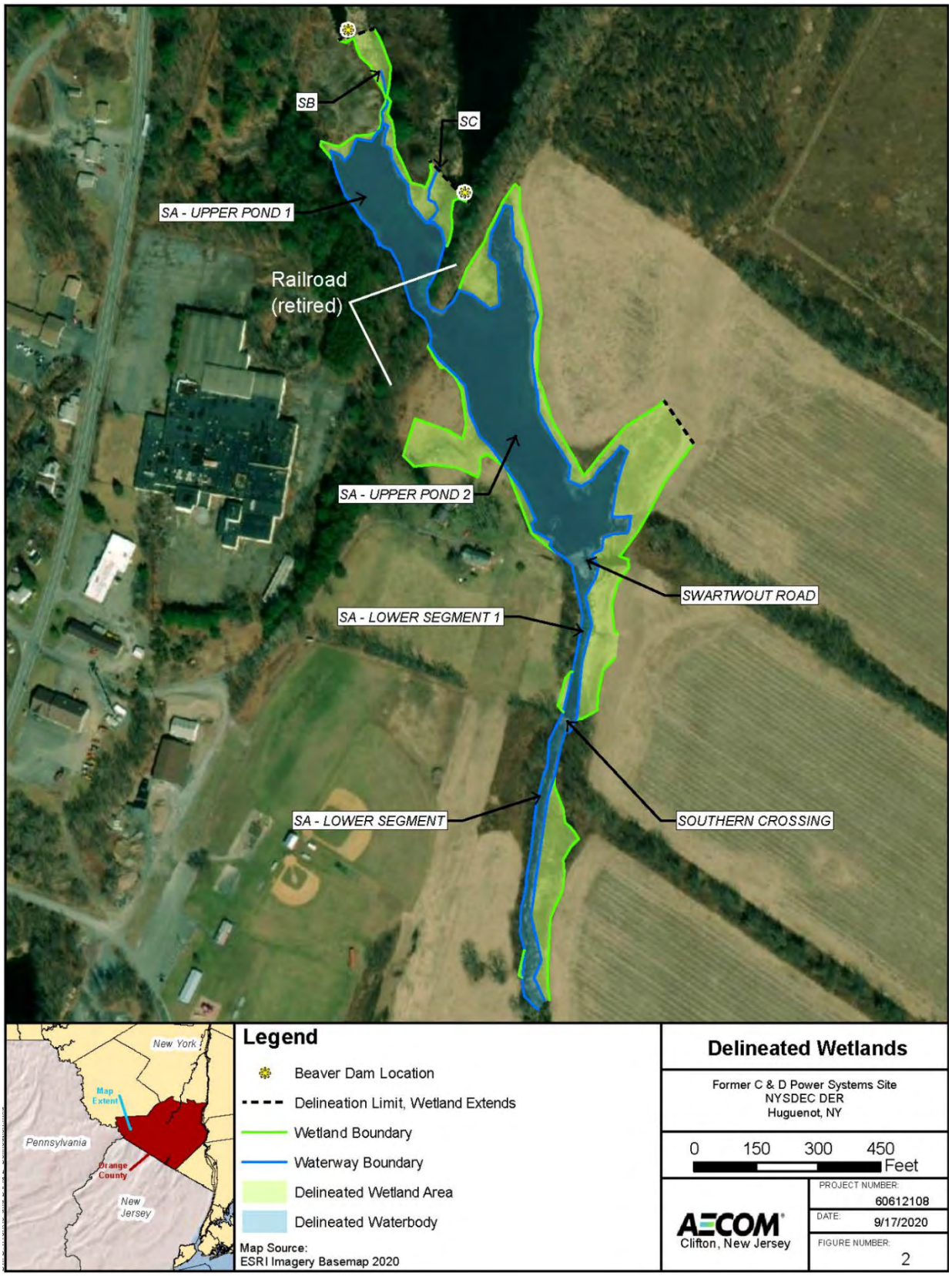

Figure 2 Delineated Wetlands

2 Project Construction Activities

The activities subject to NWP authorization are detailed in Subsections 2.1 to 2.3. Please refer to Permit Drawings for location of work and further details. Tree removal is anticipated to be limited to an incidental clearing of 0 to 5 smaller trees in a margin areas between mown turf and the tributary on the west side of the tributary, as required for access for excavation. Tree removal will be minimized and trees and steam bank habitat will be protected to the maximum extent possible while still achieving Project goals.

2.1 Culvert Improvement [Spring 2023]

In an attempt to return Tributary D-1-7 to previous water levels, the failed Southern Crossing was removed and the collapsed culvert at the Swartwout Road crossing was replaced in May 2021 by a contractor retained by NYSDEC. Based on the field observations made by AECOM on September 16, 2022, during the wetlands condition verification site visit (detailed in PIP – Appendix F), the upstream side of the replacement culvert at Swartwout Road crossing was found to be covered in mud and woody debris, having either collapsed or become clogged. Water flow through the culvert was observed to be minimal and conditions upstream of the culvert were identical to those seen in 2020, with the width of the tributary upstream of this culvert in excess of 175 ft.

In the Spring 2023 (i.e., ahead of the commencement of construction activities), a contractor will remove/replace the culvert at the Swartwout Road crossing. The effective replacement of the culvert function would allow the currently-impounded areas to drain prior to the anticipated construction in Summer 2023.

The current Swartwout Road crossing will be removed with conventional excavation equipment, means and methods. The NYSDEC will utilize a Call-Out Contractor to remove the deteriorated/partially blocked culvert structures. The selected Contractor will select their own means and methods for managing the bypass of flow around each structure and management of sediment in conformance with the NY State Standards and Specification for Erosion and Sediment Control, “The Blue Book”, which shall be subject to NYSDEC Division of Environmental Remediation review and approval prior to mobilization.

Removal/replacement of the deteriorated/partially blocked culvert structures will provide a stream channel equivalent to that currently present downstream of each structure, such that stream flow capacity shall be restored and any artificially impounded water will be allowed to recede. It is anticipated that this will restore conditions in the Project Area to historic dry and stable conditions allowing construction equipment to approach the remediation areas with minimal stabilization and dewatering beyond by-pass pumping of the stream around the work area.

2.2 Excavation of Contamined Sediments [Summer – Fall 2023]

An estimated 2,280 cubic yards of contaminated sediments will be excavation from the channel of Tributary D-1-7. Excavation would be over an area of 58,840 square feet (SF) and a stream length

of 1,062 LF. Excavation of sediments would be accomplished by mechanical methods. On the west bank of the tributary there is a large flat parcel of land on which a gravel haul road (with turnaround loop) would be constructed (see attached Permit Drawings for the proposed construction footprint and general layout).

Excavation would be conducted in the dry, with a temporary bypass to be installed to divert stream flow around the work area as described below. There will be onsite dewatering and treatment of construction water in upland areas. After the target area is sufficiently dewatered, the impacted sediments will be excavated, stabilized ex-situ, and disposed off-site at an approved permitted facility. Typical equipment will include 70,000-lb excavators (2-3 machines), 20,000 to 30,000-lb off-road haul trucks (2-4 trucks), a 25,000 to 35,000-lb front end loader, and a 25,000 to 35,000-lb bulldozer. Additionally, 51,000 to 80,000-lb long-haul trucks would be used to transport sediments off site. In between the excavation area and haul road, temporary construction mats will be placed to support the construction vehicles. Prior to leaving the site all vehicles will travel on an installed gravel haul road, to the decontamination pad, and then on to the paved roads of Orange County.

This work will be sequenced as follows:

1. Construct onsite haul and access roads.
2. Construct stockpile pads and construction water treatment plant in upland areas.
3. Install bypass pump system and dewater sediment removal area.
4. Removal of contaminated sediments: excavate impacted sediments, transfer to stockpile pad for dewatering/amending, direct load in trucks for off-site disposal at an approved permitted facility.
5. Backfill and restore dewatered areas.
6. Removal of bypass pump system.
7. Remove temporary haul roads and stockpile pads and restoration of upland areas.

It is envisioned that access and staging would result in temporary impacts to 4,170 SF of existing waterbody (streambed to be exposed due to culvert improvements detailed in Section 2.1 – Culvert Improvement) and 2,620 SF of existing wetland habitat. It should be noted that all of the Waters of the United States and adjacent wetlands that will be temporarily impacted by haul and access roads were likely created in the last few years by impounded waters from the failed culvert under Swartwout Road. All disturbed areas will be restored as detailed on the attached drawings and discussed in Section 6 – Restoration Plan.

Excavation of the stream will require diverting the flow into a temporary pipeline to transport water downstream past the remediation area. The diversion pipe would measure approximately 1,200 ft in length, with an assumed diameter of 24 inches. At the narrows formed by the historical filling related to the former rail line, a temporary dam would be placed to collect the water and

divert it into the pipe. The dam would be placed within the footprint of the waters of the pond, which is expected to be at a much lower ordinary high water (OHW) level at the time the diversion is installed following the earlier removal of the road crossings causing the impoundment. The temporary dam in the pond will be placed to avoid impacting any vegetated wetlands. The pipe would convey water to a point sufficiently downstream of the work area so as to allow for discharge without backwater returning into the downstream end of the remediation area.

Excavated sediments will be passively dewatered on-site. Dewatering effluent from active excavations will be pumped to a temporarily permitted (State Pollutant Discharge Elimination System (SPDES)-equivalent) water treatment plant for treatment prior to discharge. The decant fluids from passive dewatering will be directed to an approximately 18,000-gallon weir tank for initial settlement, then through a temporary system consisting of bag filtration and, if needed (determined via influent and effluent sampling of the treatment system by the contractor prior to the initiation of discharge of treated water to Tributary D-1-7), granular activated carbon and cartridge filters. Ultimately, the treated effluent will flow to an approximately 21,000-gallon frac tank to equalize flow and provide a limited volume of storage prior to discharge to the receiving stream. Contractor will prepare and submit a Storm Water Pollution Prevention Plan (SWPPP) (or equivalent) under separate cover prior to mobilization.

After excavation is finished, the stream bed will be restored with 2,280 CY of a 1:1:1 mixture of clean sand:gravel:cobble fill obtained from an approved natural deposit, modified only for removal of fines and large particles. In addition, approximately 0.6 acres of woody vegetation trees will be planted along the stream bank, and approximately 6.1 acres of the formerly flooded areas will be reseeded with a wetland and/or riparian seed mix. These restoration activities are described in greater detail in Section 6 – Restoration Plan.

Table 1 identifies volumes of excavation for the proposed remedial activities located in regulated areas.

Table 1 Quantities of Excavation with Regulated Areas

Item*	Volume (CY)	Area (SF)
Impacts		
Total Excavation Volume	2,280	58,840
Total Permanent Fill (replacement of excavated stream bed materials with clean fill) in Open Waters of the United States	2,280	58,840
Total Permanent Fill (replacement of excavated stream bed materials with clean fill) in Freshwater Wetlands	0	0
Total Temporary Fill (placement of haul roads, piping, dams, laydown areas in Waters of the United States	154	4,170
Total Temporary Fill (placement of haul roads, piping, dams, laydown areas in Freshwater Wetlands	97	2,620
Restoration		
Streambed Restoration	-	25,865
Planting: Woody Vegetation Buffer Zone (planting & seeding)	-	25,445

Seeding to Establish Herbaceous Vegetation Upland of Woody Vegetation Buffer Zone	-	170,942

**-Each estimate of wetlands and Waters of the United States reflect pre-construction conditions.*

As stated previously, the waste lagoon work is located entirely in upland areas and, on its own, does not require permitting pursuant to NWP38. However, the scope of the waste lagoon work is described herein and in the project permitting documents for purposes of depicting the full scope of remedial work planned to occur.

This waste lagoon remediation located in upland areas will be sequenced as follows:

1. Clearing and grubbing necessary to complete the work.
2. Approximately 3,300 CY of soil containing 50 mg/kg PCBs or greater is expected to be excavated and direct loaded into trucks for off-site disposal at an approved facility.
3. Surficial soils containing lead from landscaped and paved areas of the Site will be consolidated and stabilized with the waste lagoon soils
4. Approximately 630 CY of soil with PCB concentrations between 1 and 50 mg/kg from wooded areas is expected to be removed, stabilized and consolidated in the bottom of the waste lagoon prior to capping.
5. Less than 1 CY of sediment containing between 1 and 10 mg/kg PCBs is expected to be removed, stabilized and consolidated in the bottom of the waste lagoon as part of the vault and Shed floor cleanout activities.
6. PCB-impacted material with PCB concentrations below 50 mg/kg excavated from the Site and placed in the bottom of the waste lagoon will be consolidated with shallow lead-impacted soil from above and stabilized in-situ along with soil beneath the waste lagoon to a depth of 35 ft bgs.
7. Following completion of excavation and ISS in the waste lagoon, a clean soil and asphalt pavement cap will be placed in the waste lagoon.

3 Alternatives

The required work is location-specific. As such, alternative sites were not considered.

Layout of work at the site has been revised to avoid high value and regulated areas to the greatest extent practicable, e.g., temporary access roadways were re-designed to avoid wetland disturbance outside of the remedial boundary, and the support staging areas have been located within the upland site boundary and have been moved to avoid and protect cultural resources.

4 Environmental Setting

The project location is a small stream corridor bordered by lawns, agricultural fields, and other natural areas. The C&D facility itself is owned by a private entity, while the entirety of lands downstream along the tributary throughout the work area are owned by Orange County. Immediately adjacent property owners are limited to municipal facilities (e.g., police station, ball fields, etc.).

4.1 Cultural Resources

Sensitive archaeological areas, although not identified within the site proper, are identified in areas needed to access to the work area. NYSDEC DER is supportive of avoidance and protection measures detailed within this report, as no intrusive work (groundbreaking) in necessary in the areas of sensitivity. USACE, under its Section 106 responsibility, will include consultation with Indian Nations, as part of the Joint Application Permit process.

All cultural resource reports and agency responses referenced in this section are attached to this packet in Appendix G.

On October 23, 2020, AECOM, on behalf of NYSDEC DER, submitted a consultation initiation package to the New York State Historic Preservation Office (SHPO) describing the project and requested SHPO's recommendations on next steps in the Section 106 compliance process. SHPO replied on November 9, 2020 and recommended that a Phase IA/IB archaeological survey be conducted, in lieu of a memorandum documenting extensive prior subsurface disturbance to the project site (Perazio 2020). The Phase IA documentary survey report was completed in January 2021. The results of the Phase IA assessment concluded that the Project Area possessed archaeological sensitivity for prehistoric (precontact) and historic resources and recommended that a Phase IB subsurface presence/absence testing survey be conducted. On January 21, 2021, SHPO concurred with the Phase IA recommendation for a Phase IB survey.

The Phase IB scope of work for a shovel test pit (STP) survey was prepared in consultation with SHPO and NYSDEC DER and conducted during July 2021. The STP survey consisted of manual testing on a 15-meter (50-foot) pre-plotted grid. A total of 45 STPs were pre-plotted along seven transects labeled Transect A through Transect G. Due to field conditions at the time of the Phase

IB survey, five of the 45 pre-plotted STPs were not excavated. Of the 40 STPs excavated, eight were positive for cultural material. Each positive STP location was further investigated through the excavation of eight radial STPs, for a total of 64. Therefore, the total number of STPs excavated during the Phase IB survey is 104. Thirty-four of the 64 radial STPs were also positive for cultural material.

A total of 116 artifacts were recovered during the Phase IB survey from 42 of the 104 STPs excavated. Of this total, 101 were precontact artifacts, and 15 were historic artifacts. The precontact artifact assemblage includes fire cracked rock (FCR) (n=6), debitage (n=93), a manuport (n=1), and a unifacial stone tool (n=1). All artifacts were recovered from Ap and A horizon contexts. No precontact features such as hearths, storage pits or earth ovens for cooking were identified during the Phase IB STP survey. The 15 historic artifacts recovered represent a scatter of historic material likely related to 19th through 20th-century occupation of the area.

Subsequently, based on the guidance received during the phone conversation between Ms. Jessica Schreyer (Scientist Archaeology, SHPO) and Mr. Benjamin Rung, NYSDEC on October 13, 2021, a Supplemental Phase IB STP survey was undertaken of the areas located to the west of the proposed sediment handling area on October 27 and 28, 2021. The STP survey consisted of manual testing on a 15-meter (50-foot) pre-plotted grid. A total of 21 STPs were pre-plotted along six transects labeled Transect H through Transect M. Of the 21 STPs excavated, two were positive for cultural material. Each positive STP location was further investigated through the excavation of eight radial STPs, for a total of 16. Therefore, the total number of STPs excavated during the Supplemental Phase IB STP survey was 37. Five of the 16 radial STPs were also positive for cultural material.

A total of 14 artifacts were recovered during the Supplemental Phase IB survey from seven of the 37 STPs excavated. Of this total, 12 were precontact artifacts, and 2 were historic artifacts. The precontact artifact assemblage includes FCR (n=1), debitage (n=10), and a partial projectile point tool (n=1). All artifacts were recovered from Ap plow zone contexts. No precontact features such as hearths, storage pits or earth ovens for cooking were identified during the Phase IB STP survey. The 2 historic artifacts recovered represent a scatter of historic material likely related to 19th through 20th-century occupation of the area.

It is noted that no temporally or culturally diagnostic precontact artifacts such as dateable projectile points and pottery were recovered in any of the positive STPs during either of the Phase 1B STP surveys. In other words, it was not possible to assign dates or tribal affiliations to the precontact artifacts recovered. In addition, no precontact features such as hearths, storage pits or earth ovens for cooking were identified during either of the Phase IB STP surveys. However, FCR of quartzite and sandstone indicate the potential for hot-rock cooking (i.e., earth ovens) or heating facilities (i.e., hearths) in the area, although no such features were identified in the field.

The Phase IB artifact analysis has indicated that there are five areas of precontact archaeological sensitivity within the C&D Power Systems Site Sediment Removal Project Survey Area. The five

areas of archaeological sensitivity were delineated based on the positive STPs, with a 25-foot buffer surrounding each. These areas are shown on Figures 4-1a and 4-1b of the Phase 1B Report (Appendix G). The five areas of sensitivity are summarized below, and each description includes the engineering controls proposed as the Avoidance and Protection Plan for that area of sensitivity.

- Area 1: located in the northern portion of the Survey Area and focused on positive STP F 8 on the west bank of the tributary, north of the agricultural fields. The extent of this area is delineated by documentation of no temporally or culturally diagnostic precontact artifacts at STP F 9 to the south, STP F7 to the north and the APE boundaries to the east and west of the location. STP F 8 is located within the route of the proposed Access Road. The Avoidance and Protection Plan proposed for this area includes the placement of temporary construction mats over the entire delineated boundary of Area 1. The temporary construction matting would consist of interlocking, high-strength DURA BASE® composite material mats or equivalent that are designed for use in environmentally sensitive areas and specifically to avoid ground disturbance and compaction impacts.
- Area 2: located in the southeastern portion of the Survey Area, and includes positive STPs B 3, B 4, C 3, and D 2. Each of the initial positive STPs are within 15 meters (50 ft) of each other along the transect grid. Subsequent to the completion of the Phase 1B sampling in July 2021, the sensitive area including positive STPs B 3, B 4, and C 3 is now excluded from the APE/Project Area. AECOM has relocated the Sediment Staging, Mixing and Drying Area, the Water Treatment System Containment Area, and portion of Access Road further west to areas that do not possess sensitivity. The extent of this area is delineated by documentation of no temporally or culturally diagnostic precontact artifacts at STP C 5, STP C 4 and the APE boundary to the east, STP C 2 and STP B 2 to the north, STP B 3+10W and STP A11 to the west and the APE boundaries to the south of the location. The Avoidance and Protection Plan proposed for this area includes installation of a chain link fence around the boundary of Area 2 as delineated by negative STPs above. Positive STP D 2 is in the eastern portion of Area 2, along the adjacent proposed Access Road. The Avoidance and Protection Plan proposed for this area includes the placement of temporary construction mats over the entire width of the proposed Access Road, running northward as a continuation of the temporary construction matting across Positive STPs D 4 and D 5 (Area 3). The temporary construction matting would consist of interlocking, high-strength DURA BASE® composite material mats or equivalent that are designed for use in environmentally sensitive areas and specifically to avoid ground disturbance and compaction impacts.
- Area 3: located in the southeastern portion of the Survey Area, closest to the southern terminus of the sediment removal zone and includes positive STPs D 4 and D 5. Positive STP D 4 , STP D 5, and their radials are located in the proposed Access Road along the western bank of Tributary D-1-7, and the proposed route of diversion pipe in the Stream Diversion Corridor. The extent of this area is delineated by documentation of no temporally or culturally diagnostic precontact artifacts at STP D 6 to the south, STP D 1 to the north and the APE boundaries to

the east and west of the location. The Avoidance and Protection Plan proposed for this area includes the placement of temporary construction mats over the entire delineated boundary of Area 3. The temporary construction matting would consist of interlocking, high-strength DURA BASE® composite material mats or equivalent that are designed for use in environmentally sensitive areas and specifically to avoid ground disturbance and compaction impacts.

- Area 4: located in the southwestern portion of the supplemental Survey Area, and focused on positive STP J 5, west of the proposed Water Treatment System Containment Area. Radial STPs were excavated and three were positive for precontact cultural material. The extent of this area is delineated by documentation of no temporally or culturally diagnostic precontact artifacts at STP J 5+3S to the south, STP J 5+3E to the east, STP J 5+3N to the north, and STP J 5+3W to the west. The Avoidance and Protection Plan proposed for this area includes installation of a chain link fence around the entire delineated boundary of Area 4.
- Area 5: located in the northwestern portion of the supplemental Survey Area, and focused on positive STP J 2, west of the proposed Sediment Staging, Mixing and Drying Area. Radial STPs were excavated and two were positive for precontact cultural material. The extent of this area is delineated by documentation of no temporally or culturally diagnostic precontact artifacts at STP J 2+3S to the south, STP J 2+3E to the east, STP J 2+3N to the north, and STP I 2 to the west. The Avoidance and Protection Plan proposed for this area includes a combination of the installation of a chain link fence and placement of temporary construction mats over a portion of the delineated boundary of Area 5. The temporary construction matting would consist of interlocking, high-strength DURA BASE® composite material mats or equivalent that are designed for use in environmentally sensitive areas and specifically to avoid ground disturbance and compaction impacts.

The number of precontact artifacts recovered during the Phase IB presence/absence survey suggests the presence of a nearby precontact archaeological site. Given the proximity of previously identified precontact site MRE-TRC-8 (07501.000148), it is probable that the precontact artifacts encountered during the Phase IB survey are associated with that site. Site MRE-TRC-8 (07501.000148) was first encountered and identified in 2016 as a multi-component site, having both precontact and historic components. The prehistoric component of the site consists of a lithic scatter concentrated in the southern portion of the site area. According to the mapping provided in the 2016 Phase IA/IB survey report by TRC Environmental Corp., entitled Phase IA/IB Archaeological Survey of The Eastern System Upgrade Project Orange, Sullivan, And Delaware Counties, New York prepared for the Millennium Pipeline Company, LLC, this southern portion is in proximity to Sensitivity Areas 2 and 3 as identified along Transects B, C, and D through the 2021 Phase IB survey.

Site MRE-TRC-8 (07501.000148) was recommended as potentially eligible for listing in the National Register by TRC in 2016. A site avoidance plan was recommended by TRC. Similar to

AECOM's proposed Avoidance and Protection Plan, TRC's proposed plan consisted of covering the entire site area with DURA BASE® construction matting prior to the start of construction.

Although sensitive areas have been identified, none of these areas are subject to intrusive (groundbreaking) work. In accordance with Section 106 guidelines, NYSDEC is supportive of projection and avoidance measures to preserve areas that could be the subject for future research by others. NYSDEC-DER is not in the position to support further research under NYS Superfund Program; however, we understand that concurrence is needed under the provisions of Section 106, including consultation with Indian Nations. The USACE will incorporate consultation with Indian Nations as part of its Section 106 responsibility. For consideration, a protection and avoidance plan is detailed in this document to support moving forward without a Phase 2 Investigation.

The Avoidance and Protection Plan proposed by AECOM on behalf of the NYSDEC includes a combination of installing chain link fence to avoid archaeologically sensitive areas and the placement of temporary construction mats over the areas within the proposed work corridor as a protective measure. The temporary construction matting would consist of interlocking, high-strength DURA BASE® composite material mats or equivalent that are designed for use in environmentally sensitive areas. More specifically, the mats are intended to prevent ground disturbance and compaction impacts. All vehicle traffic at the project site would be accessed over the temporary construction matting using low-pressure, rubber tire vehicles. An excavator would be utilized to install the temporary construction mats and would use an installation method by which the mats are installed ahead of the excavator to ensure that the excavator is always on top of the mats. The temporary construction matting will be removed manually from ground surface once the site work is complete.

The Revised Phase IB Archaeological Subsurface Testing Survey Report was submitted on September 26, 2022 and is currently under review by SHPO. The Revised Phase IB presents the results of the C&D Power Systems Site Sediment Removal Project STP surveys conducted during July 2021 and October 2021. This revision addresses the comments received from SHPO in their response letter dated July 20, 2022 on the Draft Phase IB Report.

Although the proposed work will occur in a site that recommended as potentially eligible for the National Register due to its research potential, NYSDEC DER is not in the position to support further research under NYS Superfund Programs and thus supports an avoidance and protection plan should future research opportunities become available through coordination with SHPO.

Section 106 compliance process guidelines for the protection of archaeological resources include measures to protect archaeological resources in place. The design has already been revised to relocate the Sediment Staging, Mixing and Drying Area, the Water Treatment System Containment Area, and portions of access roads to areas that do not possess sensitivity. In addition, a Site Avoidance and Protection Plan has been developed to preserve the integrity of potential archaeological deposits, including areas where relocation of project activity areas is not feasible.

4.2 Wetlands and Watercourses

Reports on Wetland Delineation and Stream Visual Assessment are attached as PIP – Appendix B, and PIP – Appendix C. A Wetland Condition Memo, confirming the wetland condition in Fall 2022, is attached as PIP – Appendix F.

The Site is underlain by glacially deposited sand and gravel, with depth to groundwater averaging around 30 ft below ground surface. Surface soils tend to consist of sandy silt to silty sand in wetland areas, while upland areas also tend to exhibit sandy characteristics. There was a noted presence of silty loams in the northeastern section of the Site. A Remedial Investigation performed in 2002 indicated that the following contaminants were found to exceed SCOs in groundwater, soils and sediments:

- Barium
- Cadmium
- Fluoride
- Lead
- PCB Aroclor 1254

The former C&D site industrial buildings are located on a bluff that is some 30-40 ft in elevation higher than Tributary D-1-7 (the tributary). South of the C&D facility the land is generally flat and dominated with agricultural fields. The tributary flows south to where it joins the Neversink River approximately 0.5 miles south of the site. The headwaters of the tributary consist largely of an underground stream that emanates from the base of the bluff in the northwestern portion of the Project Area. Also, small rivulets in the northeast portion of the Project Area contribute minor amounts of hydrology. Several hundred feet northeast of the Project Area, beaver damming activities have also altered the hydrology.

In the Project Area, the tributary passes through an opening in an abandoned rail line and through two crossings: Swartwout Road and the Southern Crossing. Both of these latter crossings were used to allow agricultural machinery to cross the tributary; the Swartwout Road crossing is still in use. The crossings are generally made of stone with piping to permit the flow of the tributary underneath the crossings. Within the last several years, the piping and conveyances have become fouled, and these crossings are now acting as weirs impounding the water upstream (Photos 1 and 2). The ponded areas vary in depth, up to 3 ft deep in spots. There is also evidence to suggest that water levels fluctuate based on rain events, evapotranspiration, and other anthropogenic activities (agriculture) disturbing the edges of the waterbody. Review of 2006 and 2016 aerial photos show that the bed of tributary north of Swartwout Road was formerly 10-to-20 ft wide and less than 1 ft in depth. Today, the ponded areas are over 175 ft wide (Photos 3 and 4). The tributary is a mapped trout stream, though the ponded areas (wide shallow water) would not serve as suitable trout habitat.

Wetlands along the edge of the ponded areas are generally small pockets of fringe wetlands that are newly forming. Evidence suggests some wetlands become compromised due fluctuating water

levels (the waters are backing up into maintained grass lawns [Photo 5]), mowing and agricultural practices (Photo 6).

A wetland delineation was conducted in late May and early June of 2020. The delineation investigation, summarized in the Wetland Delineation Report (PIP – Appendix B), found that much of the wetlands south of the rail line are newly formed and/or influenced by the impounded waters. As these wetlands have common characteristics, they have been grouped together as 'Wetland A.'

Wetlands north of the rail line have been mapped by the National Wetland Inventory and have been in place for a considerable amount of time. They are believed to be influenced by the hydrology of lacustrine waterbody upstream of the site, created by a beaver dam. As these wetlands have common characteristics, they have been grouped together as 'Wetland B.' Review of some aerial photos suggests that the impounded waters have reduced vegetated wetland coverage.

Four segments within the tributary were analyzed:

- Upper Pond 1 – tributary north of the abandoned rail line (Photo 7);
- Upper Pond 2 – tributary between the rail line and Swartwout Rd (Photo 8);
- Lower Segment 1 – impounded area between Swartwout Road and the Southern crossing (Photo 9); and
- Lower Segment 2 – waterbody below the Southern Crossing (Photo 10).

The Stream Visual Assessment Protocol (SVAP) review determined that Upper Pond 1, Upper Pond 2 and Lower Segment 1 all scored very poorly, as they are subject to contamination and currently have few characteristics of a trout stream (PIP – Appendix C). The Lower Segment scored much higher. The Lower Segment would not be impacted by downstream impediments.

An additional site inspection, detailed in PIP – Appendix F was conducted on September 16, 2022, to assess the conditions following the replacement of a culvert on Swartwout Road that had previously been collapsed. The inspection revealed that water levels, and the limits of wetlands and other habitat types throughout the Project vicinity did not noticeably differ from those recorded during the prior field studies and the culvert had either collapsed or become clogged on the upstream side. As such, the findings of wetland delineations (PIP – Appendix B) and stream assessment (PIP – Appendix C) are considered reflective of current hydrology in the Project Area at the time of this application.

4.3 Significant Natural Communities

The New York Natural Heritage Program (NYNHP) was consulted for information on New York State-list resources in the vicinity of the Project Area. Per a November 18, 2022, response letter (attached as Appendix D), NYNHP identified four natural communities considered significant from a statewide perspective, occurring within one mile of the site:

- Floodplain Forest

- Hemlock Northern Hardwood Forest
- Chestnut Oak Forest
- Red Cedar Rocky Summit

4.3.1 Floodplain Forest

Floodplain forests are wooded habitat subject to regular flooding from adjacent rivers. Floodplain forest is documented in the vicinity of the site. The habitat is noted by NYSNHP as being in risk of impact from invasion of Japanese knotweed (*Reynoutria japonica*). The habitat type occurs statewide, but is at a small fraction of historical levels, and is often extremely compromised, due to development (NYNHP, 2023a). No impacts to habitats of Floodplain Forests are anticipated, as Project work will not impact wooded habitats other than incidental tree removal from upland margin habitats for access. Additionally, post-construction restoration (Appendix I) will include planting and seeding to establish new Floodplain Forest habitat, increasing this habitat in the Project Area. Restoration will also include invasive control during establishment, which will control spread of Japanese knotweed.

4.3.2 Hemlock-Northern Hardwood Forest)

The Hemlock-Northern Hardwood Forest is a habitat listed as Vulnerable within New York State. Acreage of these hemlock-northern hardwood forests have been declining moderately within New York due to logging, agriculture, and development, as well as potential losses due to the hemlock woolly adelgid (*Adelges tsugae*). In larger hemlock forests, the biggest threat is any activity that causes forest fragmentation which restrict the movement of species and seeds throughout the forest (NYNHP, 2023b). No impacts to habitats of Hemlock-Northern Hardwood Forests are anticipated as no Project work will impact wooded habitats.

4.3.3 Chestnut Oak Forest

The Chestnut Oak Forest is classified as Secure within New York State and is not state or federally protected. Total acreage of Chestnut Oak Forest habitats have likely declined slightly in recent decades due to fire suppression, logging, fragmentation, and land development but have likely increased more recently due to reforestation (NYNHP, 2023c). No impacts to habitats of Hemlock-Northern Hardwood Forests are anticipated as no Project work will impact wooded habitats.

4.3.4 Red Cedar Rock Summit

Red Cedar Rocky Summit habitat is considered Vulnerable but not currently imperiled in New York State. These habitats can be found statewide, but particularly in upstate New York (NYNHP, 2023d). The community is currently declining substantially from historic numbers and nearly all documented occurrences are impacted by invasive plants and threatened by fire suppression (NYNHP, 2023d). Impacts to Red Cedar Rocky Summit habitat near the project site are not anticipated as all project work will be confined to lowland habitats, and will not impact wooded habitats.

4.4 Protected Species

Review of the United States Fish and Wildlife Service's (USFWS) Information, Planning, and Consultation System (IpaC System) website indicated there are six endangered, threatened, or candidate species within Orange County, New York. These species include:

- Indiana Bat (*Myotis sodalist*, Endangered),
- Northern Long-eared Bat (*Myotis septentrionalis*, Threatened),
- Small Whorled Pogonia (*Isotria medeoloides*, Threatened),
- Bog Turtle (*Clemmys muhlenbergii,* Threatened), and
- Dwarf Wedgemussel (*Alasmidonta heterodon*, Endangered).
- Monarch Butterfly (*Danaus plexippus*, Candidate)

In addition to the federally-listed species, the New York Natural Heritage Program (NYNHP) was consulted for information on New York State protected species within the Project Area. Per a November 18, 2020, response from the NYNHP, there are four threatened or endangered species, and two rare species, within proximity of the site (letter attached as Appendix D). These species include:

- Bald eagle (*Haliaeetus leucocephalus*, NY State Threatened Species),
- Dwarf wedgemussel (*Alasmidonta heterodon*, Federally Listed Endangered Species),
- Brook floater (*Alasmidonta varicosa*, NY State Threatened Species), and
- Timber rattlesnake (*Crotalus horridus*, NY State Threatened Species), which has been documented approximately 0.75 miles from the Site.
- Alewife floater (*Anodonta implicata*, unlisted, Critically Imperiled in NYS)
- Inlands barrens buckmoth (*Hemileuca maia maia,* Special Concern, Critically Imperiled in NYS)

4.4.1 Plants (Small Whorled Pogonia)

During August 2020, a team of AECOM scientists, including a trained botanist, traversed the site and did not find the small whorled pogonia. The pogonia is an upland forested species. The habitats that would be affected by the proposed work are entirely flooded ponded riverine streambed and emergent wetlands, maintained lawns, and marginal grass and shrub areas. These habitats would not support the small whorled pogonia. No impacts to small whorled pogonia are anticipated from the remediation activities.

4.4.2 Mammals (Indiana Bat and Northern Long-eared Bat)

No known hibernacula, maternity roost trees, and/or critical habitat for either bat species were identified on site. It is anticipated that there would be no or limited tree removal on site, as most of the disturbances would occur in maintained lawns, marginal grassland, riverine emergent

wetland, and/or ponded waters. Tree removal will be limited to a very small number (anticipated to be 0 to 5) of smaller trees on the margin between mowed grass and the tributary bank that required for access to Lower Segment & Lower Segment 1. These trees will be small and as part of a thin marginal habitat between mown turfgrass and the tributary These trees are not preferred for roosting by Indiana bat, which prefer large dead trees with loose bark (Schroder *et al.*, 2017), or the Northern Long-eared bat, which prefers cavities in dead or declining trees in denser forested areas (Owen et al. 2002) .

4.4.3 Terrestrial Invertebrates (Monarch Butterfly and Inlands Barrens Buckmoth)

The inland barrens buckmoth is found among scrub oaks or on dry ridgetops with scrub oak or potentially other shrubby oak species, utilizing the habitat for feeding and egg laying (NYNHP, 2023d). Cherry and willow trees may also be a food resource. As Project activities will have no impact on the forested habitats in the vicinity, no impacts are anticipated to the inland barrens buckmoth. Moreover, additional wetland and riparian areas will be enhanced with tree plantings post-construction which will create a new Floodplain Forest habitat, potentially enhancing habitat for the buckmoth.

Monarch butterfly utilize meadows and grasslands for feeding, and lay eggs on milkweed (*Asclepias* spp.) plants. (USDA, 2023) Construction will require clearing of vegetation in unmowed grassy areas and emergent wetlands, which is potential feeding and egg-laying habitat for the monarch butterfly. This habitat type is common in the vicinity of the Project Area, and the Project is expected to temporarily remove an infinitesimally small portion of habitat versus what is available. Areas that are disturbed will be restored and enhanced by seeding. The Project will therefore have a negligible impact on population dynamics.

4.4.4 Benthic Invertebrates (Dwarf Wedgemussel, Brook Floater, Alewife Floater)

In order to determine whether there is a presence of the any protected mussel species or associated habitat, a survey was performed by Biodiversity, Inc on April 22, 2020 (Report attached as Appendix E). As recorded in the mussel survey report, approximately 1,100 meters (3,600 ft) of Tributary D-1-7 to the Neversink River was surveyed for both the presence of any mussel species or potential habitat which might support those species. No specimens of any mussel species were found during survey, live or dead.

The stream lacks suitable habitat for any of the listed mussel species. While some of the northern impoundments may provide some habitat for the eastern floater (*Pyganodon cataracta*, Not Listed), no evidence of this species was found during the survey. All three protected species are known to occur in the Neversink River, downstream of the Project Area, in deeper river habitats that the species are known to occur. As such, proper precautions and best management practices will be enacted prevent downstream sedimentation or transport of harmful contaminants.

As protected mussel species were not recorded on site, the site is unsuitable habitat for mussel species, and turbidity controls will be in place prior to the start of work; no impacts to dwarf wedgemussel, brook floater, or alewife floater are anticipated from the remediation activities.

4.4.5 Reptiles (Bog Turtle and Timber Rattlesnake)

4.4.5.1 Bog Turtle

The NYNHP has no records of the bog turtle occurring within one mile of the site. However, as the species is listed in Orange County by the USFWS, a Phase 1 bog turtle assessment was conducted by a team of two AECOM scientists on August 1, 2020, to assess habitat suitability at the site. The scientists noted that suitable bog turtle habitat was not found in wetlands that fringed the Tributary south of Swartwout Road. These wetlands are narrow emergent wetlands within the upper banks of the stream's floodplain. Also, the western bank is lined with a stone rock wall. Species such as purple loosestrife and reed canary grass were dominant. No springs, seeps, rivulets, or other evidence of subsurface flow were observed in this area.

The wetlands north of Swartwout Road are associated with a larger ponded wetland complex with slower flow with two limited backwater areas supporting soft mucky substrate, both located adjacent to the rail line in the extreme eastern portions of the delineated wetlands. These wetlands are subject to fluctuating levels of hydrology (often flooded in the spring) and are and have been influenced by agricultural practices. However, no evidence of subsurface flow or rivulets were identified at these locations; thus. making them unsuitable bog turtle habitats. This area would not be physically impacted by any remediation activity. Moreover, these wetlands were not mapped on NWI mapping and likely have been altered with the recent impoundments of water upstream of the Swartwout Road.

The only area identified as potentially suitable bog turtle habitat was an emergent wetland directly north of the rail line, east of the Project Area. The observed substrate was soft and rivulets were present in this wetland. Tussock sedge, common arrowhead, wool grass, reed canary grass, and arrowwood were some species noted within this area. This wetland was mapped by the NWI mapper and review of historical aerial photos shows evidence of wetlands for decades. Remedial activities would not impact these vegetated wetlands. All remedial activity north of the railroad embankment will be limited to the footprint of the waste lagoon, in upland areas approximately 150 ft to the west of the tributary and associated wetlands, and at an elevation approximately 30 ft above wetland and waterbody habitat. Waterward of the vegetated wetland boundary, temporary fencing will be installed to serve as a visual cue for onsite personnel not to directly or indirectly disturb this vegetated wetland area.

Finally, upon cessation of remedial activities the stream bed will be restored. Within the areas that will be drained as a result of removing the impoundments, native facultative species will be planted; thus, the removal of the temporary ponded water and wetland restoration activities will likely increase potential bog turtle habitat in the future.

4.4.5.2 Timber Rattlesnake

Timber rattlesnakes are known to inhabit mountainous or hilly forests, featuring rocky outcroppings or ledges, and foraging areas also consist of the surrounding forested areas. In addition, in communicating with NYSDEC, AECOM was informed that U.S. Route 209 forms the

boundary of the timber rattlesnake habitat, which separates the Site from the species' known habitat. The remediation activities will not disturb any known Timber Rattlesnake habitat. During construction, placards identifying the timber rattlesnake will be erected on site. The placards will identify a photo of the snake, avoidance procedures and the appropriate NYSDEC personnel to call if sighted.

4.4.6 Birds (Bald Eagle)

Bald eagles are protected by The Bald and Golden Eagle Protection Act and are listed as a threatened species by New York State. Correspondence from the New York Natural Heritage Program, dated July 20, 2020, indicated that there is a known Bald Eagle nest in the Project Area; moreover, during an August 14 conference call with the NYSDEC, AECOM was informed the nest is located approximately 0.4 miles east of the site, along the Neversink River. As the species is protected and regulated, actions subject to federal and state permit must demonstrate compliance and not affect the eagles.

The Project Area is separated from the nest by several lines of mature trees and agricultural fields. These lines of trees serve as field boundaries. Machinery used in farming operations likely comes within 0.1 mile of the eagles' nest. During the onsite sampling activities in 2020, no sighting of the species was noted in the remediation areas. In addition, the D-1-7 tributary in the Project Area does not support large populations of fish or other prey species preferred by Bald Eagles.

According to the NYSDEC Conservation Plan for Bald Eagles, it is recommended that new construction not occur within ¼ mile of known nesting sites, and if possible, it should occur outside of the breeding season (January 1 through September 30). The 9-month breeding period adopted by the NYSDEC guidance was created with statewide Bald Eagle populations in mind; local populations may vary in the span and timing of their breeding season.

Eagles response to human activity often correlates to their familiarity with humans and their actions. Eagles located in remote settings are likely to be less tolerant to human perturbations than eagles that have some familiarity to human activities. It is anticipated that the eagles nesting 0.4 miles from the site have some familiarity with anthropogenic activities and sounds. The C&D site is located adjacent to a major national-network roadway and is in close proximity to a fire station. Sirens associated with these facilities may exceed 100 dB for short durations. Also, machinery used in farming operations likely comes within 0.1 mile of the eagles' nest. There is also an access road and structures located along the Neversink River in close proximity to the nest.

The proposed remedial activities would utilize the following equipment: 70,000-lb excavator (2-3); 20,000-30,000 lb off road haul truck (2-4); 25,000-35,000 lb front end loader; 25,000-35,000 lb bulldozer. In addition, two 6-inch trash pumps would run continuously. Although all equipment would not operate at the same time continuously, the worst-case when these pieces of equipment operate at the same time may produce sounds (unmuffled) approaching 95 dB on site.

Analysis

Review of the National Bald Eagle Management Guidelines identifies requirements regarding temporary impacts. The Guidelines indicates that activities such as alteration of shorelines and wetlands, water impoundment and/or construction of roads should occur at least 330 ft (0.06 miles) away if the activities are visible from the nest or 660 ft (0.12 miles), if not visible from the nest. As mentioned previously, the project is 0.4 miles (2,110 ft) from the nest, and therefore meets both criteria.

The Guidelines also mention that blasting or other extremely loud noises must not occur within 0.5 miles of an active nest. The remediation activities will not require producing extremely loud noise (e.g., sounds over 100 dB, etc.). The equipment used on site would be fitted with standard industrial-grade mufflers on exhausts, which would realize an approximate 15 dB reduction in noise at the source. Moreover, based on a distance of 0.4 miles, the noise would further reduce by another 43 dB through transmission loss. Thus, at 0.4 miles, the noise would be approximately 50 dB, which is at a similar level for an ambient daytime condition for a rural setting. Brown, et. al., 1999 in a study testing eagles response to jet aircraft, identified that nesting eagles had minimal no response to sounds of 80db. As the sound levels increased the eagles would often respond and fly away, especially with sounds over 100 dB.

When construction is not taking place (at night, weekends) the only noise producing pieces of equipment will be water pumps associated with the stream diversion, which would produce sounds approximately 10-20 decibels above ambient at the project site. This noise would dissipate to ambient in the distance between the project site and the eagle nest.

The project, and noise disturbance will be reduced to the extent most practicable. It is anticipated that the project will not disturb any individuals or known habitat which supports Bald Eagles.

5 Anticipated Environmental Impacts

The project would not result in any traffic or socioeconomic disruptions, as the project activities would occur in a remote location generally free from traffic. Although there will be a temporary increase in noise from construction machinery during the day, there would be no anticipated adverse impacts to listed species or sensitive receptors. On U.S. Route 209 adjacent to the Project Area there are a police station and fire station, which periodically produce noise above the ambient due to the use of sirens. As stated previously, these developments are all much higher in elevation and are screened from the Project Area by vegetation and the former C&D site.

The remedial and restoration activities would have the following permanent effects on the site:

1. remove contaminants from a known trout stream,
2. result in approximately of 1,000 additional ft of streambed to become accessible to coldwater fisheries, and

3. return the water level in Tributary D-1-7 to levels prior to collapse of the Swartwout Road culvert, returning land in Upper River currently flooded due to man-made impoundment to herbaceous wetland habitat, maintained lawns, and agricultural fields.

6 Restoration Plan

A riparian buffer will be installed throughout the Project Area in order to stabilize the riverbank and prevent erosion. Restoration drawings are provided in the Permit Drawings (Figure # C-04.1 to C-04.8). After the excavation of contaminated sediments has concluded, the stream bed sediments will be replaced with a clean 1:1:1 mix of sand:gravel:cobble materials. The surface will be graded to match the preconstruction grade throughout. Upon completion of excavation, backfill, and grading, barriers used to divert the river flow will be removed, and stream flow will resume along the existing path.

Restoration is divided into methods for stream, wetland, and upland habitat, each detailed in the following subsections. The restoration drawings and calculated footprints reflect the anticipated waterbody footprint. Post-construction wetland habitats are conservatively assumed to extend from the anticipated post-construction OHW to the current extent of wetland limits.

At the conclusion of culvert improvements (detailed in Section 2.1 – Culvert Improvements), the water level of Tributary D-1-7 is expected to revert to levels prior to collapse of the Swartwout Road culvert, resulting in a significant drop of water level in the Upper Basin, and a slight increase in the level of the Lower Segment than currently measured. Once the stream flow has reached final state, the site will be assessed by an expert to adjust final seeding and planting areas appropriate for the final environmental conditions.

It is expected that maintenance of the site and installed vegetation will be the responsibility of the contractor during construction and during the specified maintenance period.

6.1 Stream Restoration

As soon as is feasible upon removal of contaminated sediments, the footprint of excavation will be backfilled with a clean 1:1:1 sand:gravel:cobble fill material using machinery already in use for excavation. The backfilled material will be graded to match existing elevations.

After backfill and grading operations have been completed, machines and materials (including material used for access roads) will be removed from the pre-construction stream and wetland footprint. Areas compacted by work will be decompacted to 12-inches below grade and raked out. Any differences to surrounding grade will be ameliorated with addition of additional fill to match existing. After completion of removal of all material and decompaction, the bypass pump system will be removed and the stream area will be allowed to be flushed with stream water. Stream water will be given ample time to fill the streambed. As water flushes the streambed, the flow of water will be observed to ensure uninterrupted passage of water through the channel identical to that seen after culvert replacement detailed in Section 2.1 – Culvert Improvement.

Areas below the OHW will not receive any further restoration. It is anticipated that stream communities will recolonize the newly-flushed streambed from adjacent habitats.

6.2 Wetland Restoration

After completion of the steam restoration described in Section 6.1 – Stream Restoration, water levels will be verified prior to installation of planting and seeding. If the footprint of the water has changed noticeably, wetland planting and seeding areas will be modified appropriately.

After machinery and materials have been removed, areas compacted by work will be decompacted to 12-inches below grade and raked out. Any differences to surrounding grade will be ameliorated with addition of additional fill to match existing. A Woody Vegetation buffer zone measuring approximately 20 ft in width out from the edge of open water will be marked out on both right and left banks of the tributary. This area will be planted with trees and shrubs as shown in the attached Permit Drawings. Plantings will consist of 2.5 to 3-inch caliper trees planted 18 ft on-center, and shrubs planted 6 ft on-center. The proposed planting palette is shown in **Table 2**.

Table 2 Planting Palette for Wetland Restoration

Common Name	Scientific Name	Size/Type	Spacing	Number
Red maple	*Acer rubrum*	2-3" caliper B&B	12 ft o.c.	30
River birch	*Betula nigra*	2-3" caliper B&B	12 ft o.c.	47
Pin oak	*Quercus palustris*	2-3" caliper B&B	12-15 ft o.c.	20
American sycamore	*Platanus occidentalis*	3" caliper B&B	18 ft o.c.	70
Winterberry	*Ilex verticullata*	3 gallon container	8 ft o.c.	285
Black haw viburnum	*Viburnum prunifolium*	3 gallon container	8 ft o.c.	250
Spicebush	*Lindera benzoin*	3 gallon container	8 ft o.c.	250

Plantings should be evenly distributed throughout the Woody Vegetation buffer zone and planted per details in the Permit Drawings. Species distribution should be equal throughout the buffer.

The Woody Vegetation buffer zone would also be seeded with either

- Riparian Buffer Mix (ENRMX-178) [Elevations below 440 ft], or
- FACW Meadow Mix (ERXMX-122) [Elevations above 440 ft].

Seeding would be done via broadcast method, at a rate of 20 lbs of seed per acre, with a cover crop applied simultaneously at a rate of 30 lbs per acre (typically perennial rye or oats) to stabilize soil. After application of seed, straw mulch or equivalent will be installed on top of the soil. Ideal species compositions of each mix are given in **Table 3**.

Table 3 Species Mix for Wetland Restoration Seeding

Scientific Name	Common Name	% by No. Seeds	% Germination
Riparian Buffer Mix (ENRMX-178)			
Elymus virginicus,	Virginia Wildrye	20	90
Panicum clandestinum	Deertongue	20	90
Andropogon gerardii, 'Niagara'	Big Bluestem, 'Niagara'	18	90
Sorghastrum nutans	Indiangrass	18	90

Panicum virgatum, 'Shelter'	Switchgrass, 'Shelter'	10	90
Rudbeckia hirta	Blackeyed Susan	3	90
Verbena hastata	Blue Vervain	3	90
Asclepias incarnata	Swamp Milkweed	2.5	90
Aster novae-angliae	New England Aster	2	90
Zizia aurea	Golden Alexanders	1.5	90
Solidago rugosa	Wrinkleleaf Goldenrod	0.8	90
Monarda fistulosa	Wild Bergamot	0.5	90
Eupatorium perfoliatum	Boneset	0.3	90
Helenium autumnale	Common Sneezeweed	0.3	90
Aster prenanthoides	Zigzag Aster	0.1	90
FACW Meadow Mix (ERXMX-122)			
Carex vulpinoidea	Fox Sedge	23	90
Carex lurida	Lurid Sedge	22	90
Elymus virginicus	Virginia Wild Rye	20	90
Carex scoparia	Blunt Broom Sedge	14	90
Juncus effusus	Soft Rush	3	90
Verbena hastata	Blue Vervain	3	90
Asclepias incarnata	Swamp Milkweed	2	90
Carex intumescens	Star Sedge	2	90
Zizia aurea	Golden Alexanders	2	90
Aster movae-angliae	New England Aster	1	90
Juncus tenuis	Path Rush	1	90
Verbena urticifolia	White vervain	1	90
Solidago rugosa	Wrinkleleaf goldenrod	0.7	90
Aster lanceolatus	Lance-leaved aster	0.5	90
Aster puniceus	Purplestem aster	0.5	90
Bidens cernua	Nodding bur marigold	0.5	90
Carex crinite	Fringed sedge	0.5	90
Lobelia siphilitica	Great blue lobelia	0.5	90
Mimulus ringens	Square stemmed monkeyflower	0.5	90
Carex stipata	Awl sedge	0.4	90
Eupatorium perfoliatum	Boneset	0.4	90
Helenium autumnale	Common sneezeweed	0.3	90
Lycopus americanus	American water horehound	0.3	90
Scirpus atrovirens	Green bulrush	0.3	90
Scirpus cyperinus	Woolgrass	0.3	90
Alisma subcordatum	Mud plantain	0.1	90

Seeding will extend upland from the limit of the Woody Vegetation buffer zone, to cover all areas

- within 20 ft of the Woody Vegetation buffer zone,
- any formerly flooded surface exposed by the lowering of the OWH, and
- any wetland habitat that has been disturbed by construction activity.

Seeding applied on slopes greater than 3:1 [horizontal:vertical] will be subject to erosion control material during establishment, following best management practices.

Planting and seeding species were selected based on a combination of surviving adjacent vegetation, appropriateness for region and site-specific conditions, contribution of habitat for local wildlife, and overall ecosystem services. Substitutions for all listed species may be considered at the discretion of NYSDEC.

All planting and seeding will be maintained by the contractor for a period of two years after installation. During this time, the contractor will be responsible for the establishment and vitality of the installed vegetation to the standards described in Section 8 – Performance Standards. During this period, the NYSDEC will monitor the condition of installed vegetation to ensure that performance standards are being met. It is expected that the contractor will apply water and soil amendments as needed and replace any dead plantings.

6.3 Upland Restoration

After paving of areas associated with the waste lagoon, upland disturbance is anticipated to be limited to the following:

1. Installation and removal of stabilizing materials (crushed stone and construction mats) for access from Swartwout Road;
2. Installation and removal of silt fence and other stormwater controls; and
3. Incidental damage.

Impacted upland habitats are expected to be limited to turfgrass or grassy margin areas. No impacts to tree canopy are anticipated.

Crushed stone materials installed in the pre-construction footprint of Swartwout Road will be left in place. Stabilizing materials outside of this existing roadbed will be removed, and soil beneath will be decompacted to at least 12 inches of depth. After decompaction, any perceptible change from pre-construction grade, or change in soil quality, versus adjacent, will be corrected with topsoil matching existing and possible amendments. All areas will be raked and then seeded with either a commercial turfgrass (in areas that will be regularly mowed) or native meadow grass mix (in areas that will not be mowed) seed mix. Seed will be applied via broadcast method at the manufacturer's recommended rate, along with a cover crop applied simultaneously at a rate of 30 lbs per acre (typically perennial rye or oats) to stabilize soil. After application of seed, straw mulch or equivalent will be installed on top of the soil.

All seeding will be maintained by the contractor for a period of two years after installation. During this time, the contractor will be responsible for the establishment and vitality of the installed vegetation to the standards described in Section 8 – Performance Standards. During this period, the NYSDEC will monitor the condition of installed vegetation to ensure that performance standards are being met. It is expected that the contractor will apply water and soil amendments as needed and overseed areas as required to meet performance standards.

7 Site Protection

Upon completion of restoration, the site will be maintained by NYSDEC. It is expected that significant activity in the vicinity of the Project Area will not occur unless otherwise approved by both USACE and NYSDEC. Therefore, it is expected the mitigation areas will be protected in the future to against detrimental activity. Exceptions to this protection include the removal of invasive plant species or other significant corrective action deemed necessary to the success of the restoration or the integrity of the site.

Plantings will be protected during the contracted maintenance period from herbivore browsing using methods proposed by the contractor. Due to remote location, infrequent foot traffic, and adjacent private residence, it is not expected that fencing or other materials will be installed to deter the public from entering the site after plantings and seed have been installed and all workers have demobilized; however, the contractor may elect to install temporary protection to prevent damage.

8 Performance Standards

Compensatory mitigation plans are required to provide written performance standards for assessing whether mitigation is achieving planned goals. The performance standards will become part of the permits as special conditions and be used for performance monitoring. Project performance evaluations will be performed by USACE, as specified in the permits or special conditions, based upon monitoring reports. Adaptive management activities may be required to adjust to unforeseen or changing circumstances, and responsible parties may be required to adjust mitigation projects or rectify deficiencies. The project performance evaluations will be used to determine whether the environmental benefits or "credit(s)" for the entire project equal or exceed the environmental impact(s) or "debit(s)" of authorized activities. Performance standards for compensatory mitigation sites will be based on quantitative or qualitative characteristics that can be practicably measured. The performance standards will be indicators that demonstrate that the mitigation is developing or has developed into the desired habitat.

The performance standards required in order to determine the success of the restoration will include:

1. The riparian buffer must be restored throughout the Project Area;
2. The stream channel grade or alignment (after the culvert replacement detailed in Section 2.1 – Culvert Improvement) must not be noticeably impacted from restoration activities;
3. No more than 15 percent of the surface area coverage from the Ordinary Highwater Mark to the outer edge of the established riparian buffer shall be bare ground; and

4. The cross-sectional area of the mitigation (post-construction and remediation) stream channel must not be less than the stream channel after the culvert replacement detailed in Section 2.1 – Culvert Improvement and not larger than 25 percent from the permit plan set.

The success criteria for the proposed wetland mitigation site will include:

- 85 percent wetland vegetation coverage of the wetland mitigation site (planted and naturally regenerated/recruited stems);
- 85 percent planted vegetation survival;
- The appearance of positive vitality indicators for planted species, such as increasing size and caliper, and healthy foliage;
- No more than 10 percent areal cover of invasive species within the wetland mitigation site; and
- The site exhibits evidence of wetland hydrology indicators.

9 Post-Construction Monitoring

The following monitoring plan is proposed for the implementation of the restoration work detailed in Section 6 – Restoration Plan.

After the onsite restoration activities are complete, as-built design plans will be submitted to NYSDEC and USACE within 120 days of completion and a monitoring program will be implemented for the project. The permittee is proposing a 5-year monitoring program for installed vegetation, in accordance with the guidance provided in RGL No. 08-03 (USACE, 2008). The mitigation monitoring plan will include field collection of data for reporting, including the following:

- The growth and vitality of the planted vegetation;
- Current site conditions via fixed photographic points and visual observations;
- The species composition and percent coverage of planted and recruited desirable plant species;
- Presence of any nuisance, invasive, and/or non-native plant species;
- Evidence of wildlife utilization; and
- Descriptions of hydrology indicators observed and hydric soils development.

The monitoring procedure will include a baseline monitoring event (Year 0) and establishment of control plots, conducted immediately following the completion of the mitigation site construction activities and included in the submittal of the as-built design plans. Following the completion of the baseline monitoring event, a 5-year monitoring schedule will be implemented. Year 1 of the

monitoring effort will be conducted during the fall of the same year of completion of the mitigation planting, unless the plantings are completed after July 1st. If the wetland mitigation areas are not completed prior to July 1st, the first-year monitoring event will be performed during the following year. Each monitoring event will be followed by an annual monitoring report which will be submitted prior to December 31st of the same year.

Annual monitoring and sampling events will be performed between May and September of each year in order to appropriately measure vegetation. The success criteria for the monitoring program will include, at a minimum, the survivorship and establishment of the planted vegetation, as measured through survivorship counts, observations of vitality, and density measurements, and the existence of wetland hydrology for the created wetlands.

If success criteria have been satisfied at the completion of the 5-year monitoring program, a request for release from monitoring will be made to USACE and NYSDEC. Additional monitoring or supplementary planting may be required as a special condition of the issued permits or after reviewing the success of the mitigation sites during the initial monitoring period. If at any time the compensatory mitigation project cannot be maintained in accordance with the approved restoration plan, it is the responsibility of the permittee (NYSDEC) to notify USACE.

10 Long Term Management Responsibilities

Long-term management and maintenance of the restoration site will be assured through the Site Management Plan for the restoration area. If ownership of the restoration area should be transferred, all appropriate monitoring and protective mechanisms (which will have been recorded) will remain in effect and will remain with the site into perpetuity.

Appropriate measures to address deficiencies identified during monitoring will be developed by USACE in consultation with the permittee (NYSDEC). These appropriate measures will be part of the plan discussed in Section 11 – Adaptive Management Plan, and will ensure that the modification of the mitigation project provides ecological resource functions comparable to the objectives of this restoration plan. Extended monitoring of the restoration site, for a period longer than proposed in Section 7 – Post-Construction Monitoring, may be required by USACE. Additional monitoring may be required as a special condition of the issued permits or after reviewing the success of the restoration site during the initial monitoring period.

11 Adaptive Management Plan

The permittee recognizes that restoration may require significant modification or additional measures in order to be viable, due to changes in surrounding land use, change in hydrology of the Project Area, invasion by a noxious weed species, or other unforeseen incident. Therefore, the permittee proposes an adaptive management and monitoring plan for use at this site.

In accordance with Final Mitigation Rule 332.7(c)(4), the performance standards outlined in this report can be revised through the adaptive management procedure to consider appropriate measures implemented to address deficiencies. The performance standards may also be modified to reflect changes in management strategies and objectives so long as the modifications lead to ecological benefits comparable to or superior to the approved compensatory mitigation project. For example, if a planted species shows particularly low survival compared to other species, an alternative species can be proposed to replace dead individuals. Adaptive management procedure can be implemented under any circumstances in which the function of the impacted wetlands and streams are not being performed by the mitigation project and secondary impacts are not being prevented.

If monitoring or other information identifies a deficiency in the restoration plan at any time during or following construction of the project, the USACE and NYSDEC must be notified within a month of the discovery of the deficiency through a formal report or other documentation, identifying the deficiencies to be addressed. If it is found that the deficiencies have impaired or will significantly impair the function of restoration, then the participating parties will consult to produce appropriate measures in coordination with the permittee. USACE and NYSDEC have final approval over the measure implemented to address the mitigation project deficiencies. The proposal of appropriate measures should take place within eight weeks following the agency decision that the deficiencies need to be addressed, and the final course of action decided on within four weeks following the presentation of appropriate measures. During the four weeks following the presentation of appropriate measures, the consulting stakeholders will participate in a review and revision process until measures are approved by USACE and NYSDEC. Corrective action will be taken as soon as possible following the adaptive management decision, within the constraints of growing seasons, the special conditions of the permit, and weather conditions.

12 Financial Assurance

Based on the anticipation of the site being placed on the inactive hazardous waste site registry as a Class 4 Site (requiring continued management) under the State Superfund Program, financial assurance will not be required.

13 Mitigation Credit Accounting

The Limit of Disturbance for the remediation of the contaminated soils via removal and replacement was developed based on the extent of contamination and therefore could not be altered to avoid and minimize impacts to wetlands and waterways to the greatest extent practical while still meeting the project needs. The remediation project would not be possible without temporarily impacting waters of the United States, including regulated wetlands.

The 2,620 SF of nontidal wetlands temporarily impacted by creation of access roads required for the remediation will also be restored (as described in Section 6.2 – Wetland Restoration) after work has concluded. As summarized in **Table 4** below, there will be no net loss of wetlands/waterways as a result of this project.

In order to meet a "minimal cumulative impact" goal of nontidal wetland and waterway mitigation, the 1,142 LF of stream impacted by the remediation will be mitigated in place by the restoration of the channel to pre-construction grade (as described in Section 6.1 – Stream Restoration, in areas indicated in the attached design drawings, and as quantified in **Table 5**) after contaminants are removed.

In addition to restoration of the habitat disturbed, non-impacted habitat above the post-construction OHW will be enhanced by planting and seeding as described in Section 6.2 – Wetland Restoration. This will include both habitats exposed by the lower OHW and areas within 40 ft of the OHW. This enhanced area is measured in **Table 4** and **Table 5**.

Table 4 Quantities of Freshwater Wetland Impacts, Restoration, and Enhancement Proposed

Habitat	Habitat Type	Size	Permanent Impact	Temporary Impact		Restoration Proposed	Enhancement Proposed
				Excavation	Compaction		
Wetland A	Emergent Shrub/Scrub	136,168 SF	0 SF	0 SF	2,620 SF	2,620 SF	25,550 SF
Wetland B	Stream Fringe	25,831 SF	0 SF	0 SF	0 SF	0 SF	1,150 SF
Total Wetland Impact			**0 SF**	**0 SF**	**2,620 SF**	**2,620 SF**	**26,700 SF**

Table 5 Quantities of Waterbody Impacts, Restoration, and Enhancement Proposed

Habitat	Habitat Type	Size	Permanent Impact	Temporary Impact		Restoration Proposed	Enhancement Proposed
				Excavation	Compaction		
Stream	Perennial Stream	2304 LF	0 LF	1,062 LF	1,142 LF	1,679 LF	138,250 SF
Upper Pond 1			*0 LF*	*0 LF*	*0 LF*	*504 LF*	*49,610 SF*
Upper Pond 2			*0 LF*	*635 LF*	*660 LF*	*693 LF*	*87,700 SF*
Lower Segment 1			*0 LF*	*407 LF*	*407 LF*	*407 LF*	*940 SF*
Lower Segment			*0 LF*	*20 LF*	*75 LF*	*75 LF*	*0 SF*
Stream B	Rivulet	131 LF	0 LF	0 LF	0 LF	0 LF	*0 SF*
Stream C	Rivulet	162 LF	0 LF	0 LF	0 LF	0 LF	*0 SF*
Total Waterbody Impact			**0 LF**	**1,062 LF**	**1,142 LF**	**1,679 LF**	**138,250 SF**

14 References

New York State Natural Heritage Program (NYNHP). 2023a. Floodplain Forest. https://guides.nynhp.org/floodplain-forest/ Accessed February 20, 2023.

NYNHP. 2023b. Online Conservation Guide for Hemlock-northern hardwood forest. Available from: https://guides.nynhp.org/hemlock-northern-hardwood-forest/ Accessed February 27, 2023.

NYNHP. 2023c. Online Conservation Guide for Chestnut oak forest. Available from: https://guides.nynhp.org/chestnut-oak-forest/ Accessed February 27, 2023.

NYNHP. 2023d. Online Conservation Guide for Red cedar rocky summit. Available from: https://guides.nynhp.org/red-cedar-rocky-summit/. Accessed February 27, 2023.

Owen, S. et al. 2002. Roost Tre Selection by Maternal Colonies of Northern Long-eared Myotis in an Intensively Managed Forest. USDA Forest Service Northern Research Station General Technical Report NE-292. 10p.

Perazio, P. 2020. Email dated November 9, 2020, to AECOM, in response to CRIS request for Project 20PR06690: C&D Power Systems (C&D Batteries) Sediment Remediation DEC Site No. 336001 (JQQBL18I84UT).

Schroder, E., D. Ekanayake, and S. romano. 2017. Indiana bat maternity roost habitat preference within Midwestern United States upland Oak-Hickory (*Quercus-Carya*) forests. Forest Ecology and Management 404:65-74.

United States Department of Agriculture (USDA). 2023. Monarch Butterfly Habitat Needs. https://www.fs.usda.gov/wildflowers/pollinators/Monarch_Butterfly/habitat/index.shtml Accessed February 20, 2023.

U.S. Army Corps of Engineers (USACE). 2008. Minimum Monitoring Requirements for Compensatory Mitigation Projects Involving the Restoration, Establishment, and/or Enhancement of Aquatic Resources. Regulatory Guidance Letter No. 08-03.

USACE and Environmental Protection Agency (EPA). 2008. Compensatory Mitigation for Losses of Aquatic Resources. Code of Federal Regulations (33 CFR Part 332). April.

U.S. Army Corps of Engineers (USACE)

NATIONWIDE PERMIT PRE-CONSTRUCTION NOTIFICATION (PCN)

33 CFR 330. The proponent agency is CECW-CO-R.

Form Approved - OMB No. 0710-0003 Expires: 02-28-2022

DATA REQUIRED BY THE PRIVACY ACT OF 1974

Authority	Rivers and Harbors Act, Section 10, 33 USC 403; Clean Water Act, Section 404, 33 USC 1344; Regulatory Program of the Corps of Engineers (Corps); Final Rule 33 CFR 320-332.
Principal Purpose	Information provided on this form will be used in evaluating the nationwide permit pre-construction notification.
Routine Uses	This information may be shared with the Department of Justice and other federal, state, and local government agencies, and the public and may be made available as part of the agency coordination process.
Disclosure	Submission of requested information is voluntary, however, if information is not provided the permit application cannot be evaluated nor can a permit be issued.

The public reporting burden for this collection of information, 0710-0003, is estimated to average 11 hours per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding the burden estimate or burden reduction suggestions to the Department of Defense, Washington Headquarters Services, at whs.mc-alex.esd.mbx.dd-dod-information-collections@mail.mil. Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to any penalty for failing to comply with a collection of information if it does not display a currently valid OMB control number.

PLEASE DO NOT RETURN YOUR RESPONSE TO THE ABOVE EMAIL.

One set of original drawings or good reproducible copies which show the location and character of the proposed activity must be attached to this application (*see sample drawings and/or instructions*) and be submitted to the district engineer having jurisdiction over the location of the proposed activity. An application that is not completed in full will be returned.

(ITEMS 1 THRU 4 TO BE FILLED BY THE CORPS)

1. APPLICATION NO.	2. FIELD OFFICE CODE	3. DATE RECEIVED	4. DATE APPLICATION COMPLETE

(ITEMS BELOW TO BE FILLED BY APPLICANT)

5. APPLICANT'S NAME	8. AUTHORIZED AGENT'S NAME AND TITLE (*agent is not required*)
First - Lisa Middle - Last - Groton	First - Amit Middle - Last - Haryani
Company - NYSDEC Div. of Environmental Remediation	Company - AECOM
Company Title - Engineer/Project Manager	E-mail Address - amit.haryani@aecom.com
E-mail Address - lisa.gorton@dec.ny.gov	
6. APPLICANT'S ADDRESS	**9. AGENT'S ADDRESS**
Address- 625 Broadway	Address- 125 Broad St
City - Albany State - NY Zip - 12233 Country - USA	City - NY State - NY Zip - 10004 Country - USA
7. APPLICANT'S PHONE NOs. with AREA CODE	**10. AGENT'S PHONE NOs. with AREA CODE**
a. Residence b. Business c. Fax d. Mobile	a. Residence b. Business c. Fax d. Mobile
518.949.5091	212.377.8701

STATEMENT OF AUTHORIZATION

11. I hereby authorize, Amit Haryani to act in my behalf as my agent in the processing of this nationwide permit pre-construction notification and to furnish, upon request, supplemental information in support of this nationwide permit pre-construction notification.

Lisa A. Gorton — SIGNATURE OF APPLICANT

3-13-2023 — DATE

NAME, LOCATION, AND DESCRIPTION OF PROJECT OR ACTIVITY

12. PROJECT NAME or TITLE (*see instructions*)

Former C&D Power Systems Site #336001

NAME, LOCATION, AND DESCRIPTION OF PROJECT OR ACTIVITY

13. NAME OF WATERBODY, IF KNOWN (*if applicable*)
Unnamed Tributary to Neversink River

14. PROPOSED ACTIVITY STREET ADDRESS (*if applicable*)
430 US Rt 209

15. LOCATION OF PROPOSED ACTIVITY (*see instructions*)

Latitude	°N	Longitude	°W
41 25' 7"		74 37'45"	

City: Hugenot

State: NY

Zip: 12746

16. OTHER LOCATION DESCRIPTIONS, IF KNOWN (*see instructions*)

State Tax Parcel ID
Block 1 / Lots 35, 2, 3.1, 8, 36, 104.3

Municipality
Deerpark

Section
38

Township

Range

17. DIRECTIONS TO THE SITE
Located on south side of Rt 209 in the hamlet of Huguenot, within the town of Deerpark, NY. From Rt 209, turn east on Swartmout Road and continue approximately 600 ft, to the end of the functional road. The site extends upstream and downstream from the culvert under Swartmout Road.

18. IDENTIFY THE SPECIFIC NATIONWIDE PERMIT(S) YOU PROPOSE TO USE
NWP 38 - Clean Up of Hazardous & Toxic Waste

19. DESCRIPTION OF PROPOSED NATIONWIDE PERMIT ACTIVITY (*see instructions*)
In accordance with a signed Record of Decision (ROD) - Site No 336001 and EPA number NYD064337298, the NYSDEC will dredge approximately 2,280 cubic yards of contaminated sediment from an unnamed tributary. The sediments will be stabilized and disposed of in a upland location. The grade of the dredged stream bed will be restored with clean fill to existing grade. The adjacent riparian areas would be restored with planting and seeding. No permanent net fill will be realized by this project.

20. DESCRIPTION OF PROPOSED MITIGATION MEASURES (*see instructions*)
Excavation will utilize marsh mats, and sediment and erosion control devices, decontamination pads for vehicles. Post-construction restoration includes restoring existing grade with clean fill and planting and seeding of riparian areas.

21. PURPOSE OF NATIONWIDE PERMIT ACTIVITY (*Describe the reason or purpose of the project, see instructions*)
To comply with the ROD and remove contaminated sediments.

22. QUANTITY OF WETLANDS, STREAMS, OR OTHER TYPES OF WATERS DIRECTLY AFFECTED BY PROPOSED NATIONWIDE PERMIT ACTIVITY (*see instructions*)

Acres	Linear Feet	Cubic Yards Dredged or Discharged
1.43	1,142	2,215

Each PCN must include a delineation of wetlands, other special aquatic sites, and other waters, such as lakes and ponds, and perennial, intermittent, and ephemeral streams, on the project site.

23. List any other NWP(s), regional general permit(s), or individual permit(s) used or intended to be used to authorize any part of the proposed project or any related activity. (*see instructions*)
N/A

24. If the proposed activity will result in the loss of greater than 1/10-acre of wetlands and requires pre-construction notification, explain how the compensatory mitigation requirement in paragraph (c) of general condition 23 will be satisfied, or explain why the adverse environmental effects are no more than minimal and why compensatory mitigation should not be required for the proposed activity.

No loss of wetlands will occur associated with the Project.

Areas of Waters of the United States and associated freshwater wetlands would be temporarily impacted by the proposed remediation, but will be restored to its pre-construction grade, and disturbed wetlands and riparian floodplains would be planted and seeded, resulting in restoration with a net ecological uplift.

25. Is any portion of the nationwide permit activity already complete? ☐ Yes ☒ No If Yes, describe the completed work:

26. List the name(s) of any species listed as endangered or threatened under the Endangered Species Act that might be affected by the proposed NWP activity or utilize the designated critical habitat that might be affected by the proposed NWP activity. (*see instructions*)

Indiana bat, northern long-eared bat, bog turtle, timber rattlesnake. See attached Supplemental Information Packet for analysis of potential effect.

27. List any historic properties that have the potential to be affected by the proposed NWP activity or include a vicinity map indicating the location of the historic property or properties. (*see instructions*)

Site MRE-TRC-8 (07501.000148) may be impacted. A Site Avoidance and Protection Plan has been developed to preserve the integrity of potential archaeological deposits.

28. For a proposed NWP activity that will occur in a component of the National Wild and Scenic River System, or in a river officially designated by Congress as a "study river" for possible inclusion in the system while the river is in an official study status, identify the Wild and Scenic River or the "study river":

N/A

29. If the proposed NWP activity also requires permission from the Corps pursuant to 33 U.S.C. 408 because it will alter or temporarily or permanently occupy or use a U.S. Army Corps of Engineers federally authorized civil works project, have you submitted a written request for section 408 permission from the Corps district having jurisdiction over that project? ☐ Yes ☒ No

If "yes", please provide the date your request was submitted to the Corps district: N/A

30. If the terms of the NWP(s) you want to use require additional information to be included in the PCN, please include that information in this space or provide it on an additional sheet of paper marked Block 30. (*see instructions*)

See attached drawing set showing all work.

31. Pre-construction notification is hereby made for one or more nationwide permit(s) to authorize the work described in this notification. I certify that the information in this pre-construction notification is complete and accurate. I further certify that I possess the authority to undertake the work described herein or am acting as the duly authorized agent of the applicant.

Lisa A. Gorton	3-10-2023	Amit Kanyani	13-Mar-2023
SIGNATURE OF APPLICANT	DATE	SIGNATURE OF AGENT	DATE

The pre-construction notification must be signed by the person who desires to undertake the proposed activity (applicant) and, if the statement in Block 11 has been filled out and signed, the authorized agent.

18 U.S.C. Section 1001 provides that: Whoever, in any manner within the jurisdiction of any department or agency of the United States knowingly and willfully falsifies, conceals, or covers up any trick, scheme, or disguises a material fact or makes any false, fictitious or fraudulent statements or representations or makes or uses any false writing or document knowing same to contain any false, fictitious or fraudulent statements or entry, shall be fined not more than $10,000 or imprisoned not more than five years or both.

Instructions for Preparing a

Department of the Army

Nationwide Permit (NWP) Pre - Construction Notification (PCN)

Blocks 1 through 4. To be completed by the Corps of Engineers.

Block 5. Applicant's Name. Enter the name and the e - mail address of the responsible party or parties. If the responsible party is an agency, company, corporation, or other organization, indicate the name of the organization and responsible officer and title. If more than one party is associated with the preconstruction notification, please attach a sheet of paper with the necessary information marked Block 5.

Block 6. Address of Applicant. Please provide the full address of the party or parties responsible for the PCN. If more space is needed, attach an extra sheet of paper marked Block 6.

Block 7. Applicant's Telephone Number(s). Please provide the telephone number where you can usually be reached during normal business hours.

Blocks 8 through 11. To be completed, if you choose to have an agent.

Block 8. Authorized Agent's Name and Title. Indicate name of individual or agency, designated by you, to represent you in this process. An agent can be an attorney, builder, contractor, engineer, consultant, or any other person or organization. Note: An agent is not required.

Blocks 9 and 10. Agent's Address and Telephone Number. Please provide the complete mailing address of the agent, along with the telephone number where he / she can be reached during normal business hours.

Block 11. Statement of Authorization. To be completed by the applicant, if an agent is to be employed.

Block 12. Proposed Nationwide Permit Activity Name or Title. Please provide a name identifying the proposed NWP activity, e.g., Windward Marina, Rolling Hills Subdivision, or Smith Commercial Center.

Block 13. Name of Waterbody. Please provide the name (if it has a name) of any stream, lake, marsh, or other waterway to be directly impacted by the NWP activity. If it is a minor (no name) stream, identify the waterbody the minor stream enters.

Block 14. Proposed Activity Street Address. If the proposed NWP activity is located at a site having a street address (not a box number), please enter it in Block 14.

Block 15. Location of Proposed Activity. Enter the latitude and longitude of where the proposed NWP activity is located. Indicate whether the project location provided is the center of the project or whether the project location is provided as the latitude and longitude for each of the "corners" of the project area requiring evaluation. If there are multiple sites, please list the latitude and longitude of each site (center or corners) on a separate sheet of paper and mark as Block 15.

Block 16. Other Location Descriptions. If available, provide the Tax Parcel Identification number of the site, Section, Township, and Range of the site (if known), and / or local Municipality where the site is located.

Block 17. Directions to the Site. Provide directions to the site from a known location or landmark. Include highway and street numbers as well as names. Also provide distances from known locations and any other information that would assist in locating the site. You may also provide a description of the location of the proposed NWP activity, such as lot numbers, tract numbers, or you may choose to locate the proposed NWP activity site from a known point (such as the right descending bank of Smith Creek, one mile downstream from the Highway 14 bridge). If a large river or stream, include the river mile of the proposed NWP activity site if known. If there are multiple locations, please indicate directions to each location on a separate sheet of paper and mark as Block 17.

Block 18. Identify the Specific Nationwide Permit(s) You Propose to Use. List the number(s) of the Nationwide Permit(s) you want to use to authorize the proposed activity (e.g., NWP 29).

Block 19. Description of the Proposed Nationwide Permit Activity. Describe the proposed NWP activity, including the direct and indirect adverse environmental effects the activity would cause. The description of the proposed activity should be sufficiently detailed to allow the district engineer to determine that the adverse environmental effects of the activity will be no more than minimal. Identify the materials to be used in construction, as well as the methods by which the work is to be done.

Provide sketches when necessary to show that the proposed NWP activity complies with the terms of the applicable NWP(s). Sketches usually clarify the activity and result in a quicker decision. Sketches should contain sufficient detail to provide an illustrative description of the proposed NWP activity (e.g.,a conceptual plan), but do not need to be detailed engineering plans.

The written descriptions and illustrations are an important part of the application. Please describe, in detail, what you wish to do. If more space is needed, attach an extra sheet of paper marked Block 19.

Block 20. Description of Proposed Mitigation Measures. Describe any proposed mitigation measures intended to reduce the adverse environmental effects caused by the proposed NWP activity. The description of any proposed mitigation measures should be sufficiently detailed to allow the district engineer to determine that the adverse environmental effects of the activity will be no more than minimal and to determine the need for compensatory mitigation or additional mitigation measures.

Block 21. Purpose of Nationwide Permit Activity. Describe the purpose and need for the proposed NWP activity. What will it be used for and why? Also include a brief description of any related activities associated with the proposed project. Provide the approximate dates you plan to begin and complete all work.

Block 22. Quantity of Wetlands, Streams, or Other Types of Waters Directly Affected by the Proposed Nationwide Permit Activity. For discharges of dredged or fill material into waters of the United States, provide the amount of wetlands, streams, or other types of waters filled, flooded, excavated, or drained by the proposed NWP activity. For structures or work in navigable waters of the United States subject to Section 10 of the Rivers and Harbors Act of 1899, provide the amount of navigable waters filled, dredged, or occupied by one or more structures (e.g., aids to navigation, mooring buoys) by the proposed NWP activity.

For multiple NWPs, or for separate and distant crossings of waters of the United States authorized by NWPs 12 or 14, attach an extra sheet of paper marked Block 21 to provide the quantities of wetlands, streams, or other types of waters filled, flooded, excavated, or drained (or dredged or occupied by structures, if in waters subject to Section 10 of the Rivers and Harbors Act of 1899) for each NWP. For NWPs 12 and 14, include the amount of wetlands, streams, or other types of waters filled, flooded, excavated, or drained for each separate and distant crossing of waters or wetlands. If more space is needed, attach an extra sheet of paper marked Block 22.

Block 23. Identify Any Other Nationwide Permit(s), Regional General Permit(s), or Individual Permit(s) Used to Authorize Any Part of Proposed Activity or Any Related Activity. List any other NWP(s), regional general permit(s), or individual permit(s) used or intended to be used to authorize any part of the proposed project or any related activity. For linear projects, list other separate and distant crossings of waters and wetlands authorized by NWPs 12 or 14 that do not require PCNs. If more space is needed, attach an extra sheet of paper marked Block 23.

Block 24. Compensatory Mitigation Statement for Losses of Greater Than 1/10 - Acre of Wetlands When Pre - Construction Notification is Required. Paragraph (c) of NWP general condition 23 requires compensatory mitigation at a minimum one - for - one replacement ratio will be required for all wetland losses that exceed 1/10 - acre and require pre - construction notification, unless the district engineer determines in writing that either some other form of mitigation is more environmentally appropriate or the adverse environmental effects of the proposed NWP activity are no more than minimal without compensatory mitigation, and provides an activity - specific waiver of this requirement. Describe the proposed compensatory mitigation for wetland losses greater than 1/10 acre, or provide an explanation of why the district engineer should not require wetland compensatory mitigation for the proposed NWP activity. If more space is needed, attach an extra sheet of paper marked Block 24.

Block 25. Is Any Portion of the Nationwide Permit Activity Already Complete? Describe any work that has already been completed for the NWP activity.

Block 26. List the Name(s) of Any Species Listed As Endangered or Threatened under the Endangered Species Act that Might be Affected by the Nationwide Permit Activity. If you are not a federal agency, and if any listed species or designated critical habitat might be affected or is in the vicinity of the proposed NWP activity, or if the proposed NWP activity is located in designated critical habitat, list the name(s) of those endangered or threatened species that might be affected by the proposed NWP activity or utilize the designated critical habitat that might be affected by the proposed NWP activity. If you are a Federal agency, and the proposed NWP activity requires a PCN, you must provide documentation demonstrating compliance with Section 7 of the Endangered Species Act.

Block 27. List Any Historic Properties that Have the Potential to be Affected by the Nationwide Permit Activity. If you are not a Federal agency, and if any historic properties have the potential to be affected by the proposed NWP activity, list the name(s) of those historic properties that have the potential to be affected by the proposed NWP activity. If you are a Federal agency, and the proposed NWP activity requires a PCN, you must provide documentation demonstrating compliance with Section 106 of the National Historic Preservation Act.

Block 28. List the Wild and Scenic River or Congressionally Designated Study River if the Nationwide Permit Activity Would Occur in such a River. If the proposed NWP activity will occur in a river in the National Wild and Scenic River System or in a river officially designated by Congress as a "study river" under the Wild and Scenic Rivers Act, provide the name of the river. For a list of Wild and Scenic Rivers and study rivers, please visit http://www.rivers.gov/.

Block 29. Nationwide Permit Activities that also Require Permission from the Corps Under 33 U.S.C. 408. If the proposed NWP activity also requires permission from the Corps under 33 U.S.C. 408 because it will temporarily or permanently alter, occupy, or use a Corps federal authorized civil works project, indicate whether you have submitted a written request for section 408 permission from the Corps district having jurisdiction over that project.

Block 30. Other Information Required For Nationwide Permit Pre - Construction Notifications. The terms of some of the Nationwide Permits include additional information requirements for preconstruction notifications:

* NWP 3, Maintenance –information regarding the original design capacities and configurations of the outfalls, intakes, small impoundments, and canals.
* NWP 31, Maintenance of Existing Flood Control Facilities –a description of the maintenance baseline and the dredged material disposal site.
* NWP 33, Temporary Construction, Access, and Dewatering –a restoration plan showing how all temporary fills and structures will be removed and the area restored to pre - project conditions.
* NWP 44, Mining Activities –if reclamation is required by other statutes, then a copy of the final reclamation plan must be submitted with the pre - construction notification.
* NWP 45, Repair of Uplands Damaged by Discrete Events –documentation, such as a recent topographic survey or photographs, to justify the extent of the proposed restoration.
* NWP 48, Commercial Shellfish Aquaculture Activities –(1) a map showing the boundaries of the project area, with latitude and longitude coordinates for each corner of the project area; (2) the name(s) of the species that will be cultivated during the period this NWP is in effect; (3) whether canopy predator nets will be used; (4) whether suspended cultivation techniques will be used; and (5) general water depths in the project area (a detailed survey is not required).
* NWP 49, Coal Remining Activities –a document describing how the overall mining plan will result in a net increase in aquatic resource functions must be submitted to the district engineer and receive written authorization prior to commencing the activity.
* NWP 50, Underground Coal Mining Activities –if reclamation is required by other statutes, then a copy of the reclamation plan must be submitted with the pre - construction notification.

If more space is needed, attach an extra sheet of paper marked Block 30.

Block 31. Signature of Applicant or Agent. The PCN must be signed by the person proposing to undertake the NWP activity, and if applicable, the authorized party (agent) that prepared the PCN. The signature of the person proposing to undertake the NWP activity shall be an affirmation that the party submitting the PCN possesses the requisite property rights to undertake the NWP activity (including compliance with special conditions, mitigation, etc.).

DELINEATION OF WETLANDS, OTHER SPECIAL AQUATIC SITES, AND OTHER WATERS

Each PCN must include a delineation of wetlands, other special aquatic sites, and other waters, such as lakes and ponds, and perennial, intermittent, and ephemeral streams, on the project site. Wetland delineations must be prepared in accordance with the current wetland delineation manual and regional supplement published by the Corps. The permittee may ask the Corps to delineate the special aquatic sites and other waters on the project site, but there may be a delay if the Corps does the delineation, especially if the project site is large or contains many wetlands, other special aquatic sites, and other waters. The 45 day PCN review period will not start until the delineation is submitted or has been completed by the Corps.

DRAWINGS AND ILLUSTRATIONS

General Information.

Three types of illustrations are needed to properly depict the work to be undertaken. These illustrations or drawings are identified as a Vicinity Map, a Plan View or a Typical Cross - Section Map. Identify each illustration with a figure or attachment number. For linear projects (e.g. roads, subsurface utility lines, etc.) gradient drawings should also be included. Please submit one original, or good quality copy, of all drawings on 8½x11 inch plain white paper (electronic media may be substituted). Use the fewest number of sheets necessary for your drawings or illustrations. Each illustration should identify the project, the applicant, and the type of illustration (vicinity map, plan view, or cross - section). While illustrations need not be professional (many small, private project illustrations are prepared by hand), they should be clear, accurate, and contain all necessary information.

ADDITIONAL INFORMATION AND REQUIREMENTS

For proposed NWP activities that involve discharges into waters of the United States, water quality certification from the State, Tribe, or EPA must be obtained or waived (see NWP general condition 25). Some States, Tribes, or EPA have issued water quality certification for one or more NWPs. Please check the appropriate Corps district web site to see if water quality certification has already been issued for the NWP(s) you wish to use. For proposed NWP activities in coastal states, state Coastal Zone Management Act consistency concurrence must be obtained, or a presumption of concurrence must occur (see NWP general condition 26). Some States have issued Coastal Zone Management Act consistency concurrences for one or more NWPs. Please check the appropriate Corps district web site to see if Coastal Zone Management Act consistency concurrence has already been issued for the NWP(s) you wish to use.

ENVIRONMENTAL QUESTIONNAIRE

This is intended to supplement ENG Form 4345, Application for Department of the Army Permit, or the Joint Application for Permit used in the State of New York. Please provide complete answers to all questions below which are relevant to your project. Any answers may be continued on separate sheet(s) of paper to be attached to this form.

PRIVACY ACT STATEMENT

The purpose of this form is to provide the Corps of Engineers with basic information regarding your project. This information will be used to facilitate evaluation of your permit application and for public dissemination as required by regulation. Failure to provide complete information may result in your application being declared incomplete for processing, thereby delaying processing of your application.

GENERAL--APPLICABLE TO ALL PROJECTS

1. Explain the need for, and purpose of, the proposed work.

The proposed project consists of the implementation of remedial actions to remove historic contamination resulting from the industrial processes at the C&D Power Systems facility adjacent to an unnamed tributary to the Neversink River, Orange County, NY. The facility was in operation from 1959 until 2006, and during its lifespan, contaminants from the facility's processes were discharged to the unnamed tributary. The remedial actions include dredging and upland disposal of contaminated sediments and restoration of the stream bed and riparian areas currently flooded due to the failure of piping at downstream crossings.

Remediation of the contamination and removal of the manmade crossings will result in the improvement of the natural character of the site and improve the quality of surrounding and downstream environments. See attached Supplemental Information Packet for more information.

2. Provide the names and addresses of property owners adjacent to your work site (if not shown on the application form or project drawings).

A list of property owners within adjacent to the site are attached to this Questionnaire as Appendix 1.

3. Photographs of the project site should be submitted. For projects in tidal areas, photographs of the waterway vicinity should be taken at low tide. Using a separate copy of your plan view, indicate the location and direction of each photograph as well as the date and time at which the photograph was taken.

Provide a sufficient number of photographs so as to provide a clear understanding of conditions on and proximate to your project site.

Photographs are included in Appendix A of the attached Supplemental Information Packet.

4. Provide a copy of any environmental impact statement, or any other environmental report which was prepared for your project.

Environmental impacts to natural resources are identified and addressed in the Supplemental Information Packet.

5. Provide a thorough discussion of alternatives to your proposal. This discussion should include, but not necessarily be limited to, the "no action" alternative and alternative(s) resulting in less disturbance to waters of the United States. For filling projects in waters of the United States, including wetlands, your alternatives discussion should demonstrate that there are no practicable alternatives to your proposed filling and that your project meets with current mitigation policy (i.e. avoidance, minimization and compensation).

The proposed work is to carry out remedial activities as identified in the March 2015 Record of Decision entitled *C&D Power Systems (C&D Batteries), State Superfund Project/RCRA Project, Deer Park, Orange County. Site No. 336001. EPA ID #NYD064337298. March 2015.* Failure to perform the activities would violate the requirements of the Record of Decision, and leave contaminated sediments in place. There are no practicable alternatives to the proposed work because removal of the impacted sediment is necessary to remove contamination from the environment.

2. You can apply for a ten-year permit for maintenance dredging. If you wish to apply for a ten-year permit, please provide the number of additional dredging events during the ten-year life of the permit and the amount of material to be removed during future events.

There is no need for a ten-year permit for maintenance dredging.

3. Indicate of your drawings the dewatering area (if applicable) and disposal site for the dredged material (except landfill sites). Submit a sufficient number of photographs of the dewatering and disposal sites as applicable so as to provide a clear indication of existing conditions. For ten-year maintenance dredging permits, indicate the dewatering/disposal sites for future dredging events, if known.

Photographs of the project site are included in Appendix A of the Supplemental Information Packet.

4. Describe the method of dredging (i.e. clamshell, dragline, etc.) and the expected duration of dredging.

Dredging of sediments would be accomplished by mechanical methods. Excavation would be conducted in the "dry", with a temporary bypass to be installed to divert stream flow around the work area. There would be onsite dewatering of soils in upland areas on site, and treatment of water used during the dredging following a SPDES-equivalent water treatment plan. After the sediments removed from the target area are sufficiently dewatered, they will be transferred to a stockpile handling area for treatment preparation and eventual disposal offsite at an appropriate facility. Typical equipment will include 70,000-lb excavators (2-3), 20,000 to 30,000-lb off road haul trucks (2-4), a 25,000 to 35,000-lb front end loader, and a 25,000 to 35,000-lb bulldozer. Additionally, 51,000 to 80,000 lb long-haul trucks would be used to transport sediments off site.

The proposed work would take approximately two months.

5. Indicate the physical nature of the material to be dredged (i.e. sand, silt, clay, etc.) and provide estimated percentages of the various constituents if available. For beach nourishment projects, grain size analysis data is required.

It is anticipated the dredged material would consist of sand and gravel with minor amounts of silt that have accumulated in the last several years.

6. Describe the method of dredged material containment (i.e. hay bales, embankment, bulkhead, etc.) and whether return flow from the dewatering/disposal site would reenter any waterway. Also indicate if there would be any barge overflow.

The primary water flow of the tributary would be diverted around the work area. Dewatering effluent of active excavations would be pumped to a temporary permitted (SPDES-permit equivalent) water treatment plant for treatment prior to discharge. The Contractor will prepare a Storm Water Pollution Prevention Plan (or equivalent) under separate cover prior to mobilization.

The selected contractor would be responsible to ensure the dredged material removal and disposal would be handled in accordance with all regulations.

MOORING FACILITIES

N/A

Answer the following if your project includes the construction or rehabilitation of recreational mooring facilities.

1. It is generally recommended that any fixed piers and walk ramps be limited to four feet in width, and that floats be limited to eight feet in width and rest at least two feet above the waterway bottom at mean low water. Terminal floats at private, noncommercial facilities should be limited to 20 feet in length. If you do not believe your proposal can meet with these recommendations, please provide the reason(s).
N/A

2. Using your plan view, show to scale the location(s), position(s) and size(s) (including length, beam and draft) of vessel(s) to be moored at the proposed facility, including those of transient vessel(s) if known.
N/A

3. For commercial mooring sites such as marinas, indicate the capacity of the facility and indicate on the plan view the location(s) of any proposed fueling and/or sewage pumpout facilities. If pumpout facilities are not planned, please discuss the rationale below and indicate the distance to the nearest available pumpout station.
N/A

4. Indicate on your plan view the distance to adjacent marine structures, if any are proximate and show the locations and dimensions of such structures.
N/A

5. Discuss the need for wave protection at the proposed facility. Please be advised that if a permit is issued, you would be required to recognize that the mooring facility may be subject to wave action from wakes of passing vessels, whose operations would not be required to be modified. Issuance of a permit would not relieve you of ensuring the integrity of the authorized structure(s) and the United States would not be held responsible for damages to the structure(s) and vessel(s) moored thereto from wakes from passing vessels.
N/A

BULKHEADING/BANK STABILIZATION/FILLING ACTIVITIES

Answer the following if your project includes construction of bulkheading (also retaining walls and seawalls) with backfill, filling of waters/wetlands, or any other bank stabilization fills such as riprap, revetments, gabions, etc.

1. Indicate the total volume of fill (including backfill behind a structure such as a bulkhead) as well as the volume of fill to be placed into waters of the United States. The amount of fill in waters of the United States can be determined by calculating the amount of fill to be placed below the plane of spring high tide in tidal areas and below ordinary high water in non-tidal areas.

The project would result in no net fill of Waters of the United States and adjacent wetlands. The table below identifies temporary and permanent impacts to waters and wetlands. All temporarily impacted areas would be restored.

Item	Volume (CY)	Area (SF)
Total Dredge Volume	2,280	58,840
Total Permanent Fill (replacement of dredged stream bed materials with clean fill) in Open Waters of the United States	2,280	58,840
Total Permanent Fill (replacement of dredged stream bed materials with clean fill) in Freshwater Wetlands	0	0
Total Temporary Fill (placement of haul roads, piping, dams, laydown areas in Waters of the United States	154	4,170
Total Temporary Fill (placement of haul roads, piping, dams, laydown areas in Freshwater Wetlands	97	2,620

2. Indicate the source(s) and type(s) of fill material.

After excavation is finished, the stream bed will be restored with a 1:1:1 mixture of clean sand:gravel:cobble fill obtained from an approved natural deposit, modified only for removal of fines and large particles. Because the work is being conducted pursuant to the New York State Superfund Program, all imported fill will be required to meet chemical and physical property screening and sampling as required by relevant program regulations at 6 NYCRR Part 375 and as detailed in NYSDEC's Division of Environmental Remediation Technical Guidance for Site Investigation and Remediation (DER-10).

3. Indicate the method of fill placement (i.e. by hand, bulldozer, crane, etc.). Would any temporary fills be required in waterways or wetlands to provide access for construction equipment? If so, please indicate the area of such waters and/or wetlands to be filled, and show on the plan and sectional views.

Fill material will be delivered to the site by truck and placed into the restoration area by backhoes and loaders. The same temporary haul roads installed adjacent to the tributary to support the dredging would be used for placement of backfill. Installed sediment and erosion control devices (hay bales, silt fences, etc.) installed for the excavation phase will be maintained through the backfill phase. All dredged materials will be disposed of in a suitable upland facility.

The foregoing requests basic information on the most common types of projects requiring Department of the Army permits. It is intended to obviate or reduce the need for requesting additional information; however, additional information may be requested above and beyond what is requested in this form.

Please feel free to add any additional information regarding your project which you believe may facilitate our review.

N/A

Appendix 1 - Property Owners Adjacent to Project Site

Section-Block-l	Owner	Street Address
38-1-2	COUNTY OF ORANGE,	440 US RTE 209
38-1-3.1	COUNTY OF ORANGE,	433 US RTE 209
38-1-3.2	NATURE CONSERVANCY INC,	34 US RTE 209
38-1-4.11	NATURE CONSERVANCY INC,	476 US RTE 209
38-1-8	COUNTY OF ORANGE,	75 SWARTOUT RD
38-1-34.3	TOWN OF DEERPARK,	416 US RTE 209
38-1-35	430 ROUTE 209 LLC,	430 US RTE 209
38-1-36	TOWN OF DEERPARK TOWN HALL,	420 US RTE 209
38-1-37	CONKLIN, CHARLES E	3 PEENPACK TRL
38-1-39	MCKEAN, JOHN	407 US RTE 209
38-1-98.2	WANDERER, PAUL T	448 US RTE 209
38-1-104.1	TOWN OF DEERPARK,	410 US RTE 209
38-1-104.3	COUNTY OF ORANGE,	75 SWARTOUT RD
38-2-2.12	MGONDAL HOLDINGS LLC,	437 US RTE 209
38-2-2.22	RIORDAN, JOSEPH K	439 US RTE 209
38-2-3.2	MGONDAL HOLDINGS LLC,	435 US RTE 209
38-2-5.2	HUGUENOT FIRE COMPANY INC,	431 US RTE 209
38-2-7	COUNTY OF ORANGE,	427 US RTE 209
38-2-8.1	MURIQI, NAIM	423 US RTE 209
38-2-8.2	GRILLO DOMENICO S,	419 US RTE 209
38-2-9	BENSLEY, RONNY GENE	10 PEENPACK TRL
38-2-10.1	BENSLEY, GARY DIANE	8 PEENPACK TRL
38-2-10.2	MANDEL, SCOTT	6 PEENPACK TRL
38-2-11	HESS, CHARLES	2 PEENPACK TRL