

HISTORY OF CONSTRUCTION

40 CFR 257.73(c)

Ash Pond

Kammer Site

Moundsville, West Virginia

February 2026

Prepared for: Franklin Realty

Prepared by: American Electric Power Service Corporation

1 Riverside Plaza

Columbus, OH 43215



Kammer Ash Pond

History of Construction

PREPARED BY Dan Murphy Digitally signed by Dan Murphy
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Date: 2026.02.03 09:32:54 -
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Date: 2026.02.03 09:35:09 -05'00' DATE _____

Blake Arthur, P.E.

APPROVED BY David Anthony Miller DATE 02.02.2026

David A. Miller, P.E.
Director – Ash Management Services



I certify to the best of my knowledge, information, and belief the information contained in this report meets the requirements of 40 CFR § 257.73(c).

Table of CONTENTS

1.0 OBJECTIVE.....	4
2.0 DESCRIPTION OF CCR THE IMPOUNDMENT.....	4
3.0 SUMMARY OF OWNERSHIP 275.73(c)(1)(i).....	4
4.0 LOCATION OF THE CCR UNIT 275.73 (c)(1)(ii).....	5
5.0 STATEMENT OF PURPOSE 275.73 (c)(1)(iii).....	5
6.0 NAME AND SIZE OF WATERSHED THE CCR UNIT IS LOCATED 275.73 (c)(1)(iv).....	5
7.0 DESCRIPTION OF THE FOUNDATION AND ABUTMENT MATERIALS 275.73(c)(1)(v).....	6
8.0 DESCRIPTION OF EACH CONSTRUCTED ZONE OR STAGE OF THE CCR UNIT 275.73 (c)(1)(vi).....	7
9.0 ENGINEERING STRUCTURES AND APPURTENANCES, 275.73 (c)(1)(vii).....	7
10.0 SUMMARY OF POOL SURFACE ELEVATIONS, AND MAXIMUM DEPTH OF CCR, 275.73 (c)(1)(vii).....	7
11.0 FEATURES THAT COULD ADVERSELY AFFECT OPERATION DUE TO MALFUNCTION OR MIS-OPERATION (275.73 (c)(1)(vii)).....	8
12.0 DESCRIPTION OF THE TYPE, PURPOSE AND LOCATION OF EXISTING INSTRUMENTATION 275.73 (c)(1)(viii).....	8
13.0 AREA – CAPACITY CURVES FOR THE CCR UNIT 275.73 (c)(1)(ix).....	8
14.0 275.73 (c)(1)(x) DESCRIPTION OF EACH SPILLWAY AND DIVERSION.....	9
15.0 SUMMARY CONSTRUCTION SPECIFICATIONS AND PROVISIONS FOR SURVEILLANCE, MAINTENANCE AND REPAIR 275.73 (c)(1)(xi).....	10
16.0 RECORD OR KNOWLEDGE OF STRUCTURAL INSTABILITY 275.73 (c)(1)(xii).....	10

Attachments

- Attachment A – Location Map
- Attachment B – Geotechnical Information
- Attachment C – Design Drawings

1.0 OBJECTIVE

The “Hazardous and Solid Waste Management System: Disposal of Coal Combustion Residuals From Electric Utilities; Legacy CCR Surface Impoundments”, 89 Fed. Reg. 38950 (May 8, 2024) (amending 40 C.F.R. §257) requires owners and operators of facilities with a legacy coal combustion residual (CCR) surface impoundment to prepare a history of construction document for each legacy CCR surface impoundment at the facility.

The Ash Pond at the Kammer Site is subjected to this rule.

2.0 DESCRIPTION OF CCR THE IMPOUNDMENT

The Former Kammer Site is located at 7897 Energy Road, Moundsville West Virginia. The latitude/longitude of the facility is: 39°50'25"N / 80°49'22" W. The Ash Pond is approximately 20 acres. The Kammer Power Plant was placed in service in 1958 and subsequently retired in May of 2015.

The Ash Pond is located near the Ohio River on the south side of the plant property. The Ash Pond is created by dikes on three sides of the impoundment. The Ash Pond abuts a 345 kV substation on the northern side. The exterior slopes are generally 2 horizontal: 1 vertical or flatter while the interior slopes are generally 1.75 horizontal on 1 vertical or flatter. The crest of the dike is at elevation 640 ft-msl and the bottom of the pond is noted as elevation 612.5 ft-msl on record drawings. Original grades varied across the Ash Pond site between 625 and 638 ft-msl.

In its current configuration, the Ash Pond is separated into a northern portion and a southern portion by a splitter dike for controlling flow and to create a working surface for excavation equipment. The splitter dike has a concrete flume at the eastern end of the dike which allows water to pass to the southern portion of the pond.

The discharge structure is a pipe and riser type structure located at the southern end of the Ash Pond. The riser structure is made of reinforced concrete and sloped to match the interior slope of the dike. The outlet pipe is a 36” concrete pipe that outlets 10 feet below the navigational pool of Hanibal Lock and Dam. The pond water surface elevation is controlled by stop logs that are inserted into groove on the riser structure. The main inflow into the Ash Pond would have come from the north when the plant was operational.

3.0 SUMMARY OF OWNERSHIP 275.73(c)(1)(i)

[The name and address of the person(s) owning or operating the CCR unit: the name associated with the CCR unit: and the identification number of the CCR unit if one has been assigned by the state.]

The name associated with the CCR unit is Ash Pond. Franklin Realty, Wheeling Power Company, and Kentucky Power Company are owners of the Ash Pond at the Kammer Site.

Franklin Realty
Attn: Gary Spitznogle
1 Riverside Plaza
Columbus, OH 43215
Phone: 614-716-1774
Email: aepccrhelp@aep.com

The Ash Pond site has been assigned to NPDES permit number WV0005304.

4.0 LOCATION OF THE CCR UNIT 275.73 (c)(1)(ii)

[The location of the CCR unit identified on the most recent U.S. Geological Survey (USGS) 7 ½ minute or 15 minute topographic quadrangle map, or a topographic map of equivalent scale if a USGS map is not available.]

A location map is included in Attachment A.

5.0 STATEMENT OF PURPOSE 275.73 (c)(1)(iii)

[A statement of the purpose for which the CCR unit is being used.]

When the Kammer Plant was operational, the Ash Pond was a surface impoundment for settling and storing coal ash.

6.0 NAME AND SIZE OF WATERSHED THE CCR UNIT IS LOCATED 275.73

(c)(1)(iv)

[The name and size in acres of the watershed within which the CCR unit is located.]

The watershed for the Kammer Ash Pond is approximately 211 acres. The drainage area extends north and east of the pond and encompasses mountainside runoff from the eastern side of West Virginia State Highway 2 through a network of stormwater structures and channels.

The Ash Pond is located within the Region 5 - Ohio Region Watershed and is part of the subgroup Hydrologic Unit Code = 050301061208 Big Run- Ohio River watershed area.

7.0 DESCRIPTION OF THE FOUNDATION AND ABUTMENT MATERIALS

275.73(c)(1)(v)

[A description of the physical and engineering properties of the foundation and abutment

Attachment B includes a geotechnical information from a 2025 subsurface exploration program conducted by Civil & Environmental Consultants, Inc. The findings of that subsurface exploration program are summarized in this section.

The subsurface explorations generally encountered about 2 to 8 inches of topsoil atop existing fill soils. The previously placed fill was present in each boring to a depth of about 8.5 and 23.5 feet below ground surface (bgs). The fill is comprised of lean clay, sandy lean clay, gravelly lean clay, silt, sandy silt, clayey sand, well-graded sand, poorly-graded sand, well-graded gravel, and poorly-graded gravel. The consistency of the cohesive fill soils is generally described as stiff to very stiff with Hand Penetrometer readings ranging from about 1.0 to 2.5 tons per square foot (tsf) with an average of about 1.5 tsf and SPT-N values generally ranging from about 4 to 15 blows per foot (bpf) with an average of about 9 bpf.

The alluvial deposits underlying fill soils is separated into two distinct layers defined as upper and lower alluvium.

The upper alluvium generally consists of weaker cohesive soils down to elevations ranging between 605 and 590 ft amsl. The upper alluvium is comprised of lean clay, sandy lean clay, sandy silt, sandy silty clay, fat clay, clayey gravel, silty sand, well-graded sand, and poorly-graded sand. The consistency of the upper alluvium deposit is generally described as very soft to stiff with Hand Penetrometer reading ranging from about 0.25 to 1.5 tsf with an average of about 0.75 tsf and SPT- N values generally ranging from 0 (weight of hammer) to about 5 bpf, with an average of about 2 bpf.

The lower alluvium was generally medium dense granular soils that extend to the bedrock surface at elevations around 570 ft amsl. The lower alluvium was generally granular and comprised of sand, well-graded sand, poorly-graded sand, and poorly-graded gravel. The granular alluvial deposits were generally described as medium dense to dense with corresponding SPT-N values ranging from 11 to 40 bpf with an average of 21 bpf.

8.0 DESCRIPTION OF EACH CONSTRUCTED ZONE OR STAGE OF THE CCR UNIT 275.73 (c)(1)(vi)

[A statement of the type, size, range, and physical and engineering properties of the materials used in constructing each zone or stage of the CCR unit; and the approximate dates of construction of each successive stage of construction of the CCR unit.]

The perimeter dike was constructed in a single stage around 1958. The embankment was constructed with natural soils borrowed from inside the pond area. A forebay was constructed on the western sides of the Kammer 345 kV substation area around 1972. Divider dikes were constructed in the ash pond around 1994 to create smaller treatment ponds. In 2003, a riprap revetment was constructed along the exterior toe of the dike. In 2007, additional divider dikes were constructed within the ash pond.

9.0 ENGINEERING STRUCTURES AND APPURTENANCES, 275.73 (c)(1)(vii)

[At a scale that details engineering structures and appurtenances relevant to the design, construction, operation, and maintenance of the CCR unit, detailed dimensional drawings of the CCR unit, including a plan view and cross sections of the length and width of the CCR unit, showing all zones, foundation improvements, drainage provisions, spillways, diversion ditches, outlets, instrument locations, and slope protection...]

AEP performed an extensive review to locate historical files, drawings, and other information for the Kammer Ash Pond. All readily available drawings are included in Attachment C.

10.0 SUMMARY OF POOL SURFACE ELEVATIONS, AND MAXIMUM DEPTH OF CCR, 275.73 (c)(1)(vii)

[...in addition to the normal operating pool surface elevation and the maximum pool elevation following peak discharge from the inflow design flood, the expected maximum depth of CCR within the CCR surface impoundment.]

Table 1 describes the normal pool elevations and maximum pool elevations and the maximum depth of CCR within the impoundment.

The maximum depth of CCR is based on original design drawings and localized depth of water soundings performed near the spillway structure.

Table 1	Kammer Ash Pond
Normal Pool Elevation	630.3 ft-msl
Maximum Pool Elevation following peak discharge from inflow design flood (24-hour, 1,000-year event)	Appx. 634 ft-msl
Expected Maximum depth of CCR within impoundment	11 feet

11.0 FEATURES THAT COULD ADVERSELY AFFECT OPERATION DUE TO MALFUNCTION OR MIS-OPERATION (275.73 (c)(1)(vii))

[...and any identifiable natural or manmade features that could adversely affect operations of the CCR unit due to malfunction or mis-operation]

There are no known features such as pipes underneath the ash pond that could adversely affect operation due to malfunction or mis-operation.

12.0 DESCRIPTION OF THE TYPE, PURPOSE, AND LOCATION OF EXISTING INSTRUMENTATION 275.73 (c)(1)(viii)

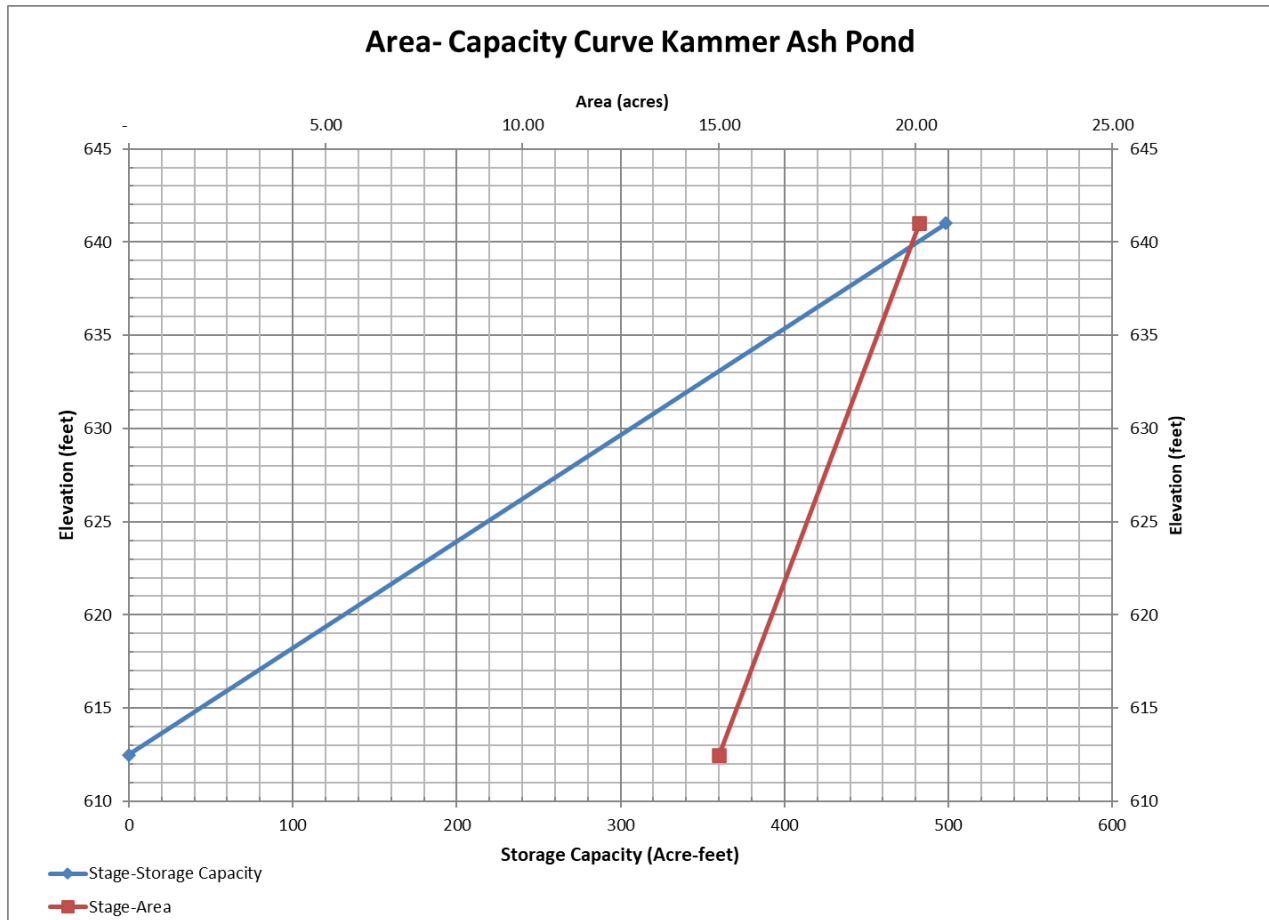
[A description of the type, purpose, and location of existing instrumentation.]

The Kammer Ash Pond does not have any instrumentation.

13.0 AREA – CAPACITY CURVES FOR THE CCR UNIT 275.73 (c)(1)(ix)

[Area-capacity curves for the CCR unit.]

The area-capacity curve is based on drawing KMP-12-3004-22 and should be considered approximate.



14.0 275.73 (c)(1)(x) DESCRIPTION OF EACH SPILLWAY AND DIVERSION

[A description of each spillway and diversion design features and capacities and calculations used in their determination.]

There is one spillway at the Kammer Ash Pond. It is a sloped pipe and riser located on the south end of the pond. The sloped drainage shaft is made of reinforced concrete and has a three-sided, 35-foot-long weir wall to function as a skimmer and to control the pool. The weir is at elevation 631.6 ft amsl and has three windows cut lower the normal pool elevation to 630.3 ft amsl. Water flows over the weir discharges into the bottom of the drainage shaft. The outlet pipe at the bottom of the sloped drainage shaft is a 36-inch-diameter reinforced concrete pipe. The outlet of the 36-inch-diameter reinforced concrete pipe is at elevation 613 ft-msl, approximately 10 feet under the navigational pool established by Hannibal Lock and Dam in 1975.

The spillways discharge rating table is presented in Table 2. The rating curve was prepared by Civil and Environmental Consultants, Inc using HydroCAD.

Table 2: Discharge Rating Table for Kammer Ash Pond	
Elevation (feet)	Discharge (cfs)
630	0
631	17
632	116
633	217
634	283
635	360
636	442
637	528
638	615
639	703
640	791

15.0 SUMMARY CONSTRUCTION SPECIFICATIONS AND PROVISIONS FOR SURVEILLANCE, MAINTENANCE AND REPAIR 275.73 (c)(1)(xi)

[The construction specifications and provisions for surveillance, maintenance, and repair of the CCR unit.]

There are no readily available portions of the original construction specifications.

As required by the CCR rules the Auxiliary Ash Pond Complex is inspected at least every 7 days by a qualified person. Also, as a requirement of the CCR rules the impoundment is inspected annually by a qualified professional engineer.

If repairs are found to be necessary during any inspection they will be completed as soon as feasible.

16.0 RECORD OR KNOWLEDGE OF STRUCTURAL INSTABILITY 275.73 (c)(1)(xii)

[Any record or knowledge of the structural instability of the CCR unit.]

To date there has been no known record of knowledge of the structural instability of the CCR unit.

ATTACHMENT A

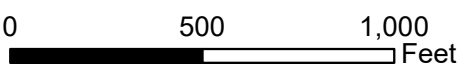
LOCATION MAP



Legend

 Legacy CCR Surface Impoundment

Attachment A
Kammer Ash Pond Site Map
Drawn by: Dan Murphy
Date: January 12, 2026



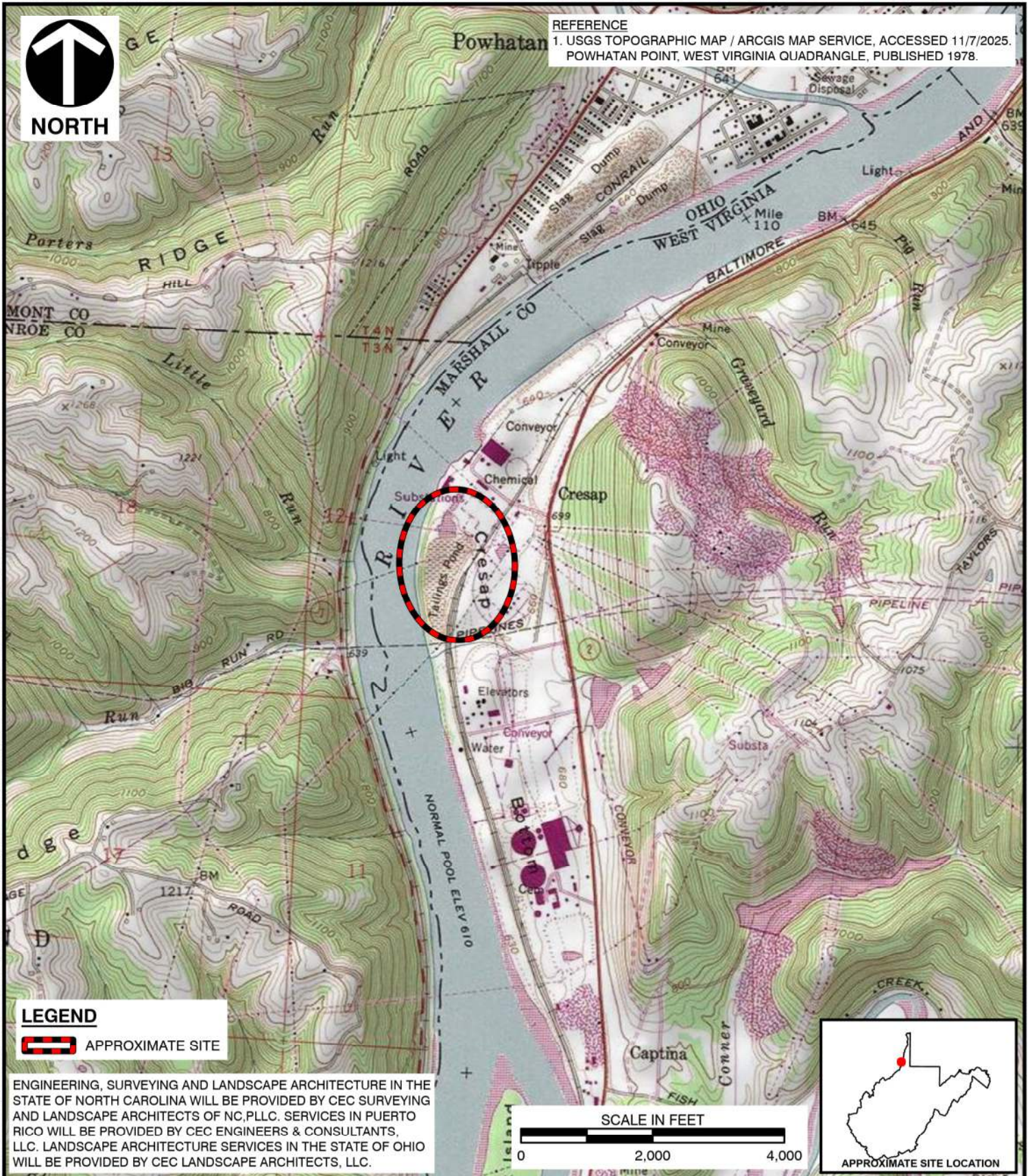
ATTACHMENT B

Geotechnical Information



REFERENCE

1. USGS TOPOGRAPHIC MAP / ARCGIS MAP SERVICE, ACCESSED 11/7/2025.
POWHATAN POINT, WEST VIRGINIA QUADRANGLE, PUBLISHED 1978.



LEGEND

 APPROXIMATE SITE

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SCALE IN FEET
0 2,000 4,000



APPROXIMATE SITE LOCATION



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AMERICAN ELECTRIC POWER
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MOUNDSVILLE, WEST VIRGINIA

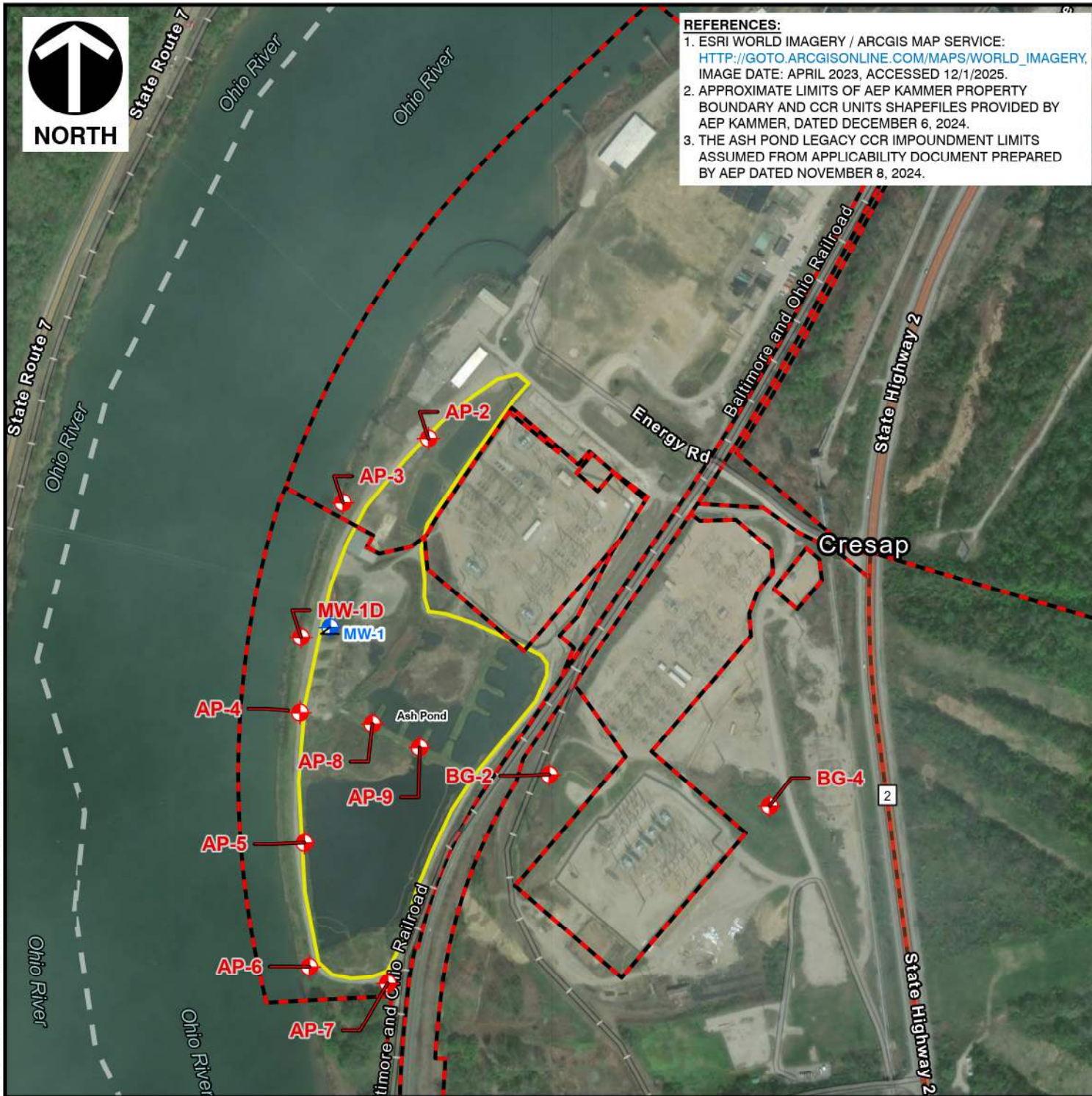
SITE LOCATION MAP

DRAWN BY:	SDS	CHECKED BY:	JBG	APPROVED BY:	APA*	FIGURE NO:	1
DATE:	11/7/2025	SCALE:	1"=2,000'	PROJECT NO:	345-817-0004		

*Hand Signature on file

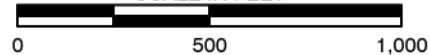
**REFERENCES:**

1. ESRI WORLD IMAGERY / ARCGIS MAP SERVICE:
[HTTP://GOTO.ARCGISONLINE.COM/MAPS/WORLD_IMAGERY](http://GOTO.ARCGISONLINE.COM/MAPS/WORLD_IMAGERY),
IMAGE DATE: APRIL 2023, ACCESSED 12/1/2025.
2. APPROXIMATE LIMITS OF AEP KAMMER PROPERTY
BOUNDARY AND CCR UNITS SHAPEFILES PROVIDED BY
AEP KAMMER, DATED DECEMBER 6, 2024.
3. THE ASH POND LEGACY CCR IMPOUNDMENT LIMITS
ASSUMED FROM APPLICABILITY DOCUMENT PREPARED
BY AEP DATED NOVEMBER 8, 2024.

**LEGEND**

- APPROXIMATE LIMITS OF AEP KAMMER PROPERTY BOUNDARY
- ASH POND LEGACY CCR IMPOUNDMENT
- EXISTING MONITORING WELL LOCATION
- GEOTECHNICAL BORING AND MONITORING WELL LOCATION (SHALLOW & DEEP)

SCALE IN FEET



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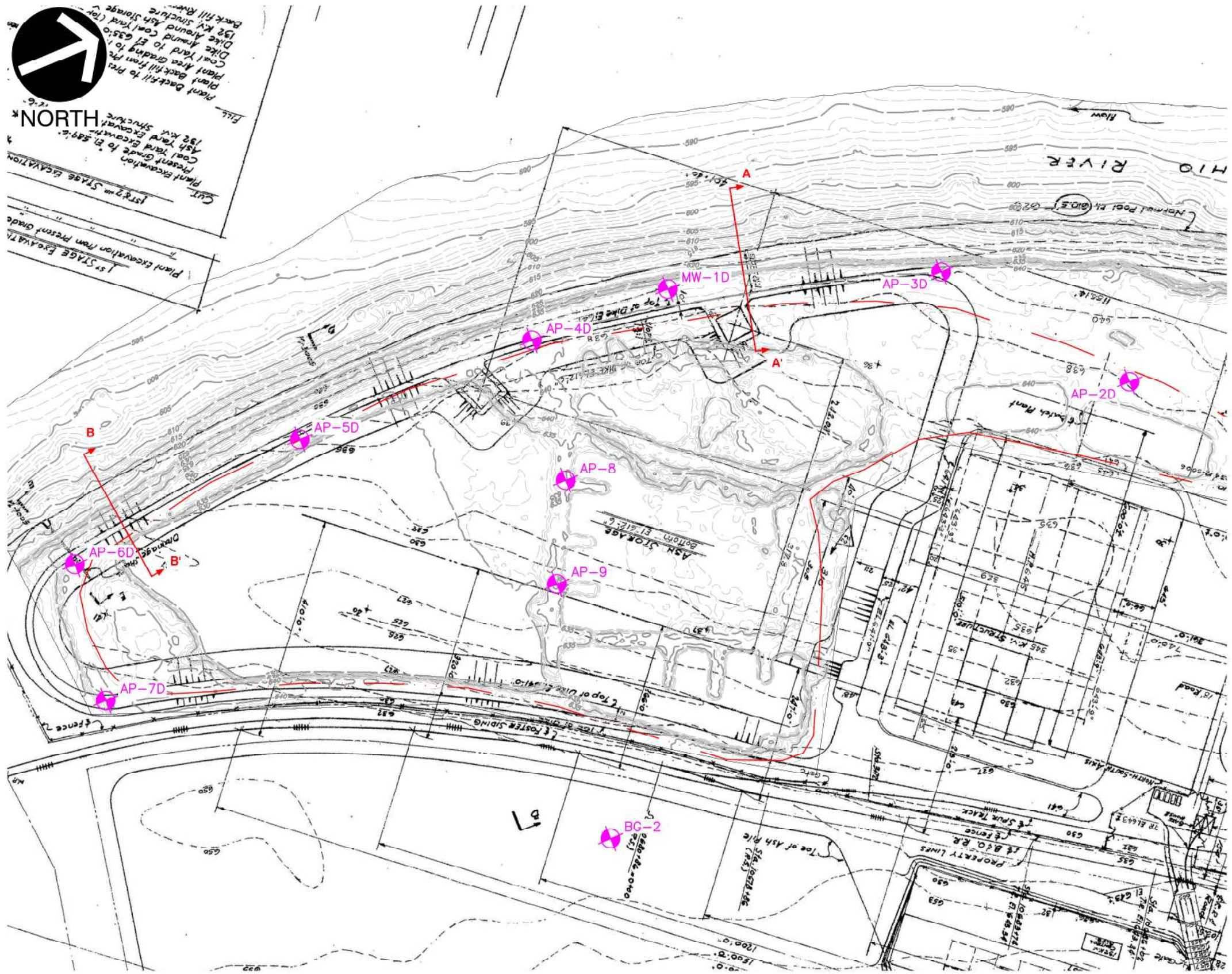
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SITE AND VICINITY AERIAL MAP

DRAWN BY:	SDS	CHECKED BY:	JBG	APPROVED BY:	APA*	FIGURE NO:
DATE:	12/1/2025	SCALE:	1"=500'	PROJECT NO:	345-817-0004	2

*Hand Signature on file

\\svr-fs-cin\projects\340-000\345-817\--CADD\DWG\GTD1\345817-GTD1-Boring Location Plan.dwg[ATTACHMENT 1 - BORING LOCATION PLAN] LS(12/1/2025 2:04 PM) - LP: 12/1/2025 2:04 PM



LEGEND

- AP-1D SOIL BORING LOCATION AND NUMBER
- 630 - 1966 EXISTING CONTOUR
- 630 - 2025 INDEX (MAJOR) EXISTING CONTOUR
- 630 - 2025 INTERMEDIATE (MINOR) EXISTING CONTOUR
- A A' CROSS SECTION LOCATION
- ASSUMED LIMITS OF ASH POND LEGACY CCR IMPOUNDMENT

REFERENCES

1. TOPOGRAPHIC INFORMATION FROM SURVEY BY CIVIL & ENVIRONMENTAL CONSULTANTS DATED AUGUST 2025.
2. HISTORICAL TOPOGRAPHY AND LAYOUT SHOWN FROM DRAWING TITLED "EXCAVATION PLAN" BY OHIO POWER COMPANY, DATED MARCH 16, 1966.
3. THE ASH POND LEGACY CCR IMPOUNDMENT LIMITS ASSUMED FROM APPLICABILITY DOCUMENT PREPARED BY AEP DATED NOVEMBER 8, 2024.

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AMERICAN ELECTRIC POWER
INITIAL SAFETY FACTOR ASSESSMENT
AEP KAMMER PLANT
MOUNDSVILLE, WEST VIRGINIA

BORING LOCATION PLAN

DRAWN BY: LRY CHECKED BY: JO APPROVED BY: APA
DATE: OCTOBER 2025 DWG SCALE: 1"=200' PROJECT NO: 345-817-0004



Civil & Environmental Consultants, Inc.
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Cincinnati, Ohio 45242

SUBSURFACE DIAGRAM
Cross Section A-A'
Figure 4

LEGEND

Water Level At Time of Drilling

Water Level At End of Drilling

Water Level After Drilling

Borehole Number

N Value
Recovery-
(RQD)

Pocket Pen. (tsf)

Topsoil

Existing Fill

CCR

Sandy Silt

Silty Sand

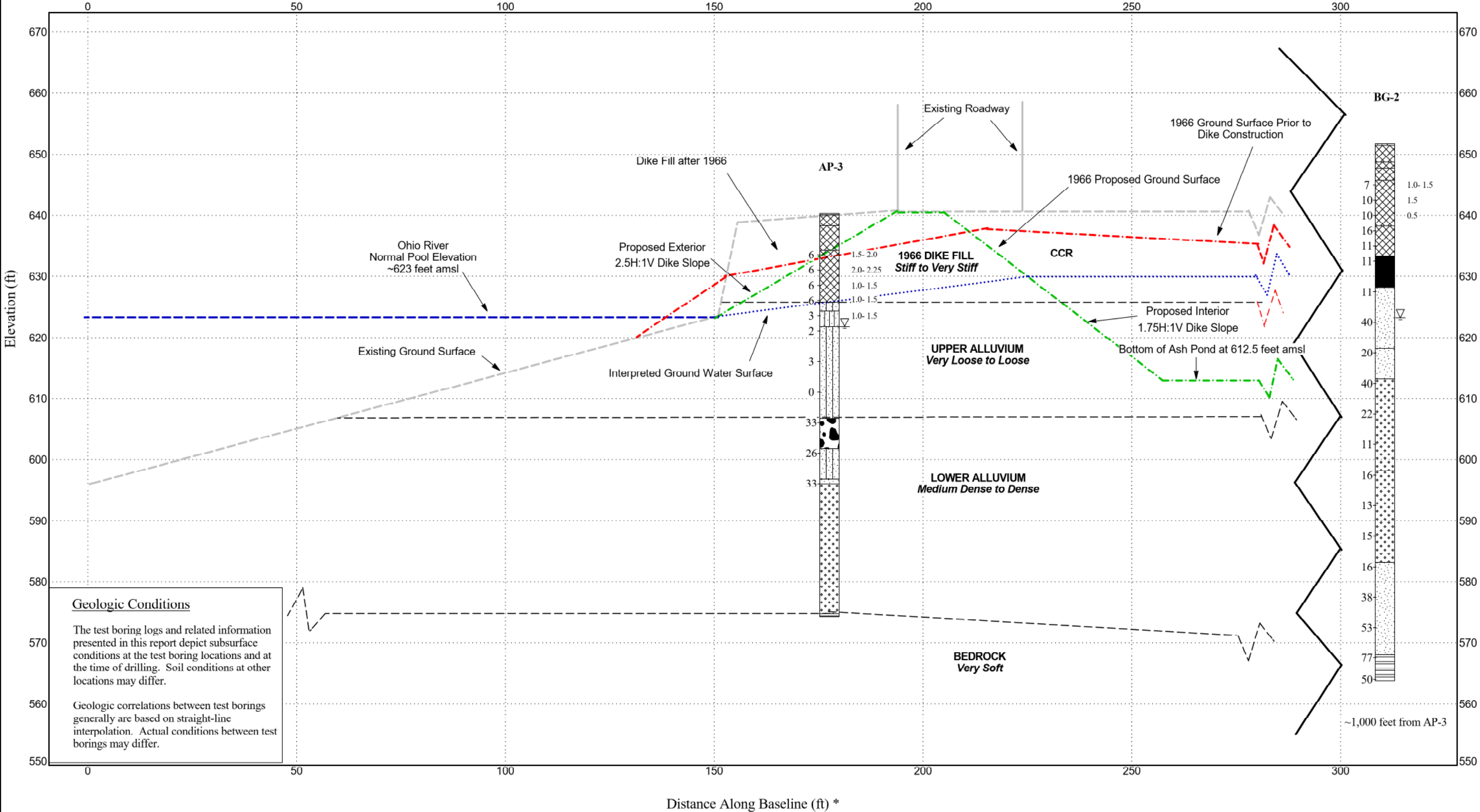
Poorly-Graded Sand

Well-Graded Sand

Well-Graded Gravel

Shale

CLIENT American Electric Power
PROJECT NAME Kammer-Initial Safety Factor Assessment
PROJECT NUMBER 345-817-0004
PROJECT LOCATION Moundsville, West Virginia





Civil & Environmental Consultants, Inc.
10300 Alliance Road, Suite 300
Cincinnati, Ohio 45242

SUBSURFACE DIAGRAM
Cross Section B-B'
Figure 5

LEGEND

Borehole Number

N Value
Recovery
(RQD)

Pocket Pen. (tsf)

Water Level At Time of Drilling

Water Level At End of Drilling

Water Level After Drilling

Topsoil

Existing Fill

CCR

Sandy Lean Clay

Lean Clay

Fat Clay

Silty Sand

Poorly-Graded Sand

Poorly-Graded Sand with Silt

Well-Graded Sand

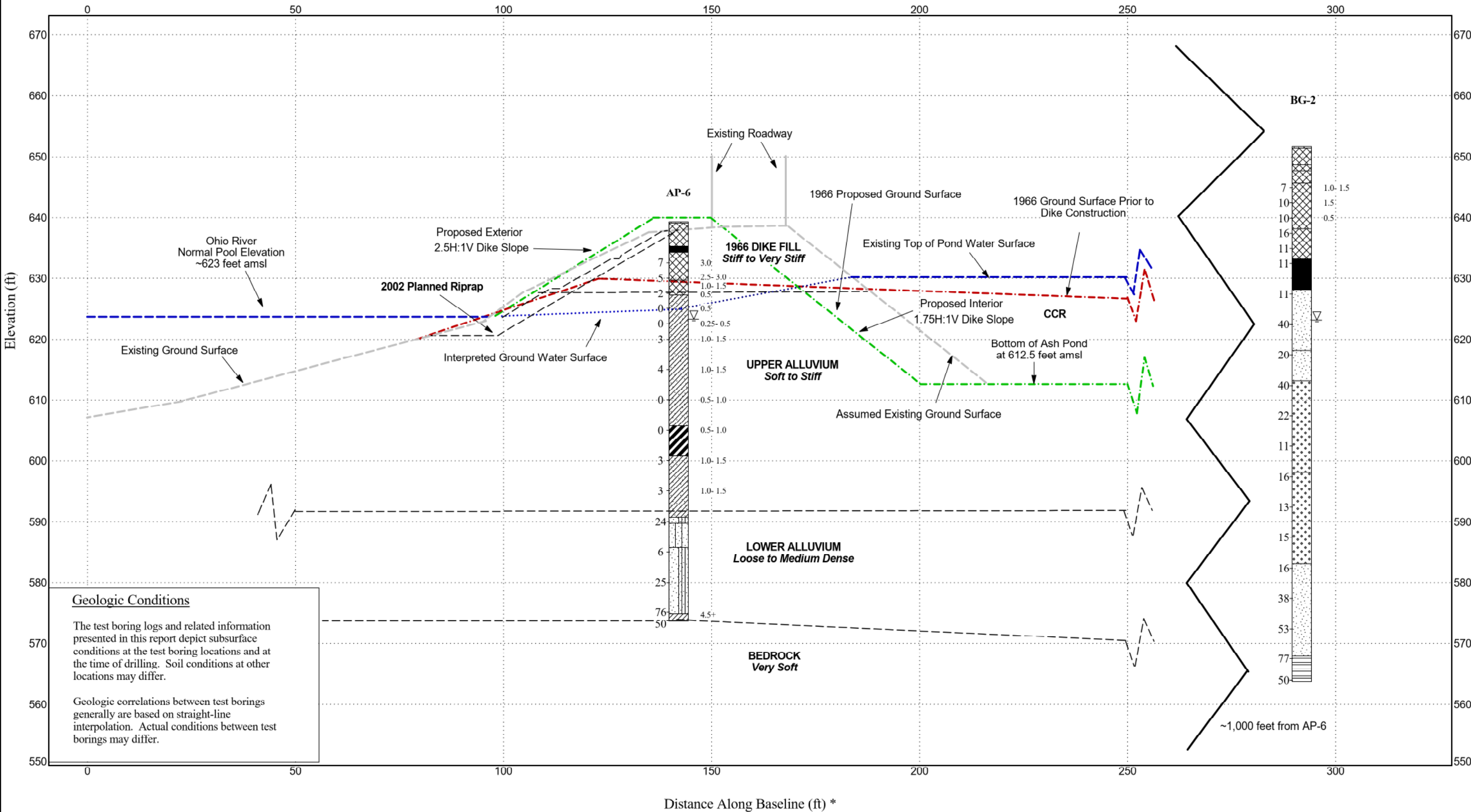
Shale

CLIENT American Electric Power

PROJECT NAME Kammer-Initial Safety Factor Assessment

PROJECT NUMBER 345-817-0004

PROJECT LOCATION Moundsville, West Virginia



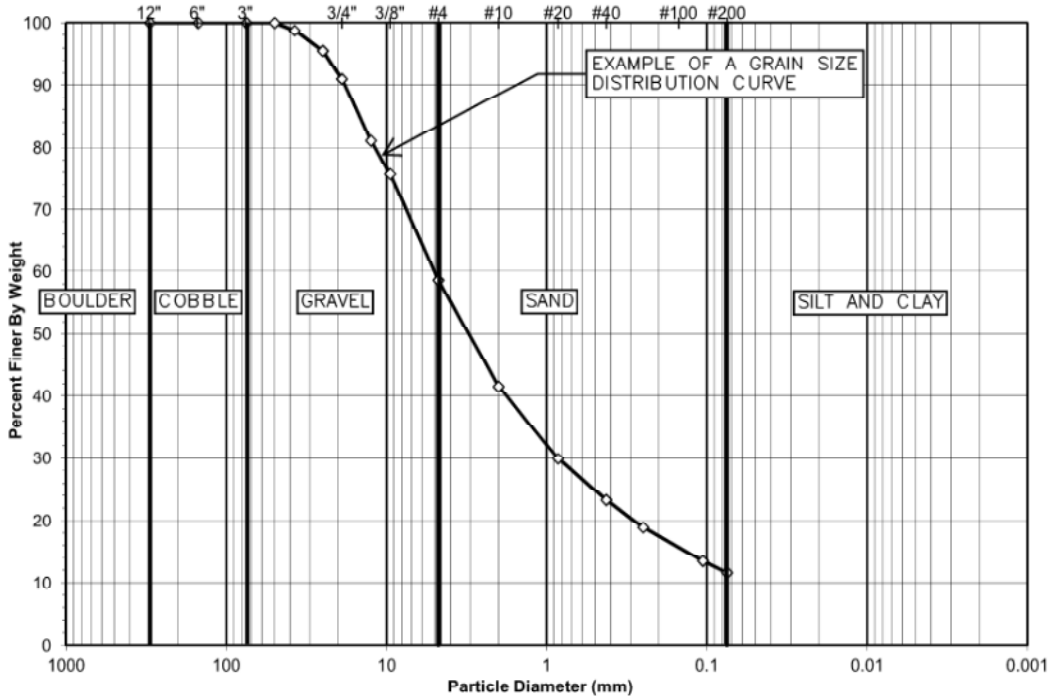
TABLES

Table 1: Summary of Laboratory Test Results																												
Test Boring	Sample Type	Sample Depth (ft bgs)	Geologic Origin	USCS Description	USCS Group Symbol	Atterberg Limits			Effective Stress (Peak)		Total Stress		Total Stress (R Envelope)		Standard Proctor		One Pt Wet Density (pcf)	One Pt Dry Density (pcf)	One Pt Moisture (%)	ODOT Curve	ODOT Maximum Dry Density (pcf)	ODOT Optimum Moisture (%)	Percent Compaction (%)	Difference from Optimum Moisture (%)	In-place Moisture Content (%)	In-place Wet Denisty (pcf)	In-place Dry Density (pcf)	Percent fines (%)
						LL (%)	PL (%)	PI (%)	Friction Angle	Cohesion	Friction Angle	Cohesion	Friction Angle	Cohesion	Optimum Moisture Content (%)	Maximum Dry Density (pcf)												
									(degrees)	(psi)	(degrees)	(psi)	(degrees)	(psi)														
AP-2	SS	13.5-15	ALL	Sandy Silty Clay w/ Gravel	CL-ML	23	16	7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	14.2	-	-	64.1	
AP-3	SS	18.5-20	ALL	Silty Sand	SM	NP	NP	NP	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	19.6	-	-	40.5	
AP-4	SS	13.5-15	ALL	Sandy Lean Clay	CL	29	18	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	17.7	-	-	63.1	
AP-5	ST	3-5	FILL	Lean Clay with Sand	CL	33	19	14	34.3	0.4	-	-	23.0	0.7	-	-	113.1	88.0	28.5	V	89.9	27.4	103%	-6.1	21.3	118.9	92.9	81.9
AP-5	BS	6-8	FILL	Sandy Lean Clay	CL	44	21	23	-	-	-	-	-	-	15.6	108.5	-	-	-	-	-	-	-	+4.5	20.1	-	-	79.1
AP-5	ST	13-15	ALL	Clayey Sand	SC	22	14	8	33.7	0.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	18.4	125.3	105.8	42.3
AP-5	ST	20-22	ALL	Sandy Lean Clay	CL	39	18	21	-	-	0.0	3.6	-	-	-	-	-	-	-	-	-	-	-	-	18.1	135.4	114.5	59.7
AP-5	ST	23-25	ALL	Sandy Lean Clay	CL	35	18	17	29.0	0.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	21.0	124.0	102.5	53.2
AP-5	SS	33.5-34.5	ALL	Silty Sand	SM	NP	NP	NP	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	22.3	-	-	23.3
AP-6	SS	33.5-35	ALL	Fat Clay	CH	60	26	34	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	47.2	-	-	88.9
AP-7	ST	3-5	FILL	Sandy Lean Clay	CL	29	17	12	-	-	0.0	12.4	-	-	-	-	129.0	109.6	17.7	M	112.0	15.8	99%	+2.1	17.9	130.2	110.9	66.5
AP-7	ST	8-10	FILL	Clayey Sand	SC	31	16	15	32.9	0.6	-	-	12.7	2.2	-	-	-	-	-	-	-	-	-	-	21.7	125.1	101.6	47.8
AP-7	SI	11-13	FILL	Sandy Lean Clay	CL	33	15	18	33.1	0.9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	21.5	119.5	98.3	56.7
AP-7	BS	11-13	FILL	Sandy Lean Clay	CL	27	17	10	-	-	-	-	-	-	13.6	113.9	-	-	-	-	-	-	86%	+5.0	18.6	-	-	59.4
AP-7	ST	14-16	ALL	Sandy Lean Clay	CL	35	17	18	-	-	0.0	6.2	-	-	-	-	-	-	-	-	-	-	-	-	20.2	129.3	106.2	57.1
AP-7	ST	18-20	ALL	Sandy Lean Clay	CL	34	16	18	31.6	0.8	-	-	15.2	3.0	-	-	-	-	-	-	-	-	-	-	23.4	130.9	106.8	57.6
MW-10	SS	8.5-10	FILL	Well Graded Gravel w/ Silt & Sand	GW-GM	NP	NP	NP	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3.6	-	-	8.0
Maximum						60	26	34	34.3	0.9	0.0	12.4	23.0	3.0	15.6	113.9	129.0	109.6	28.5		112.0	27.4	103%	+5.0	47.2	135.4	114.5	88.9
Minimum						22	14	7	29.0	0.4	0	3.6	12.7	0.7	13.6	108.5	113.1	88.0	17.7		89.9	15.8	86%	-6.1	3.6	118.9	92.9	8.0
Average						34	18	16	32.4	0.6	0.0	7.4	17.0	2.0	14.6	111.2	121.1	98.8	23.1		101.0	21.6	96%	+1.4	20.4	126.5	104.4	55.8

Rock Types

Rock Name	Characteristics	Symbol
Claystone	Clay sized particles that are consolidated, lacking fissility.	
Coal	Black and shiny, can break into cubes or conchoidally.	
Conglomerate	Gravel sized grains and larger held together by finer material, called a breccia if clasts are angular.	
Limestone	Effervescences w/ diluted HCl, can be composed of clay up to gravel particles (fossils).	
Sandstone	Primarily sand sized particles modified w/ the descriptor fine, medium, or coarse.	
Shale	Clay sized particles, shale has fissility which is a horizontal sheet-like or laminated feature.	
Siltstone	Composed of silt, normally breaks as irregular chunks.	

Grain Size Distribution Curve



Glossary

Alluvial Soil or Alluvium: Soil deposited by water in a river, stream, floodplain, or delta.

Bedrock: Materials underlying soil or other unconsolidated surficial materials in which refusal is consistently encountered on lithified, undisturbed, natural bedrock.

Colluvial Soil or Colluvium: Incoherent soil on or at the base of a slope deposited by gravity or slope movement.

Fill: Soil derived from natural soil, rock, or processed materials that was placed by artificial methods, such as construction, waste disposal, or dumping.

Glacial Outwash: Soil, typically sand and gravel, deposited by glacial streams or meltwater in a preexisting valley or over a plain.

Glacial Till: Soil deposited by and underneath a glacier, generally consisting of a heterogeneous, unstratified mixture of clay, sand, gravel, and boulders.

N-Value: The blow count representation of the penetration resistance of the soil determined by the Standard Penetration Test (SPT). It is the sum of the number of blows required to drive the sampler the second and third 6-inch increments (sample depth interval of 6 to 18 inches) and is recorded in blows per foot (bpf). The N-value is considered to be an indication of the relative density of coarse-grained soils (sand and gravel) or consistency of fine-grained soils (silt and clay).

Pocket Pen (PP): Field penetration test performed using a hand-held penetrometer that estimates unconfined compressive strength of cohesive soil in tons per square foot (tsf).

Recovery %: Total length of rock core or soil sample retrieved divided by the total length of the core run or sample interval, expressed as a percentage.

Refusal: The depth at which greater than 50 SPT hammer blows are required to drive the sampling spoon 6 inches or less.

Residual Soil or Residuum: Soil derived from the physical or chemical weathering of the underlying parent bedrock, generally with N-values less than 30 and 50 bpf in cohesive and cohesionless materials, respectively.

Rock Quality Designation (RQD): The sum of the length of intact rock core pieces longer than 4 inches (excluding mechanical breaks) divided by the total length of the core run, expressed as a percentage.

Shelby Tube: A 2" to 3" diameter, thin walled sampling tube that is pushed into the soil to obtain a relatively undisturbed soil sample for geotechnical laboratory tests.

Split Spoon Sampler: A soil sampling tube which is driven, retrieved, and split-open lengthwise for removal and visual inspection, and testing of the soil obtained.

Standard Penetration Test (SPT) ASTM D1586 : Field penetration test consisting of driving a 2-inch outside diameter split-spoon sampler 18 inches using a 140-pound hammer free falling a distance of 30 inches. The number of blows required to advance the spoon through successive 6-inch increments is recorded to determine the N-value.

Weathered Rock: Materials derived from lithified, undisturbed, natural bedrock which are able to be sampled with a split-spoon. Cohesive and cohesionless materials generally have N-values greater than 30 and 50 bpf, respectively.

Rock Quality Descriptions

Weathering

Completely Weathered: All rock material is decomposed and/or disintegrated. The original rock structure may still be intact.

Highly Weathered: More than half of the rock material is decomposed. Fresh rock is present only as a discontinuous framework or as corestones.

Moderately Weathered: Less than half of the rock material is decomposed. Fresh rock is present at a discontinuous framework or as corestones.

Slightly Weathered: Discoloration or staining indicates weathering of rock material on discontinuity surfaces. Rock may be discolored and softened.

Fresh: No visible signs of rock material weathering.

RQD

Descriptor	%
Very Poor	<25
Poor	25-50
Fair	50-75
Good	75-90
Excellent	>90

Brokenness

Descriptor	Fracture Spacing (in & ft)
Very Broken	<1 (<0.08)
Broken	1-3 (0.08-0.25)
Moderately Broken	3-6 (0.25-0.5)
Slightly Broken	>6 (>0.5)

Rock Hardness

Descriptor	Field Criterion	Relative Unconfined Compressive Strength
Very Hard	Difficult to break w/ Hammer	> 30,000 psi
Hard	Hand-held sample breaks w/ Hammer	8,000 to 30,000 psi
Medium Hard	Cannot scrape surface w/ knife	2,000 to 8,000 psi
Soft	Cutting or scraping w/ knife difficult	500 to 2,000 psi
Very Soft	Can be cut w/ knife	< 500 psi

UNIFIED SOIL CLASSIFICATION AND SYMBOL CHART

COARSE-GRAINED SOILS (more than 50% of material is larger than No. 200 sieve size.)		
GRAVELS More than 50% of coarse fraction larger than No. 4 sieve size	Clean Gravels (Less than 5% fines)	
		GW Well-graded gravels, gravel-sand mixtures, little or no fines
		GP Poorly-graded gravels, gravel-sand mixtures, little or no fines
	Gravels with fines (More than 12% fines)	
		GM Silty gravels, gravel-sand-silt mixtures
		GC Clayey gravels, gravel-sand-clay mixtures
SANDS 50% or more of coarse fraction smaller than No. 4 sieve size	Clean Sands (Less than 5% fines)	
		SW Well-graded sands, gravelly sands, little or no fines
		SP Poorly graded sands, gravelly sands, little or no fines
	Sands with fines (More than 12% fines)	
		SM Silty sands, sand-silt mixtures
		SC Clayey sands, sand-clay mixtures

FINE-GRAINED SOILS (50% or more of material is smaller than No. 200 sieve size.)		
SILTS AND CLAYS Liquid limit less than 50%		ML Inorganic silts and very fine sands, rock flour, silty of clayey fine sands or clayey silts with slight plasticity
		CL Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays
		OL Organic silts and organic silty clays of low plasticity
SILTS AND CLAYS Liquid limit 50% or greater		MH Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts
		CH Inorganic clays of high plasticity, fat clays
		OH Organic clays of medium to high plasticity, organic silts
HIGHLY ORGANIC SOILS		PT Peat and other highly organic soils

LABORATORY CLASSIFICATION CRITERIA

$$C_u = \frac{D_{60}}{D_{10}} \text{ greater than } 4; C_c = \frac{D_{30}}{D_{10} \times D_{60}} \text{ between } 1 \text{ and } 3$$

GP Not meeting all gradation requirements for GW

GM Atterberg limits below "A" line or P.I. less than 4
GC Atterberg limits above "A" line with P.I. greater than 7
Above "A" line with P.I. between 4 and 7 are borderline cases requiring use of dual symbols

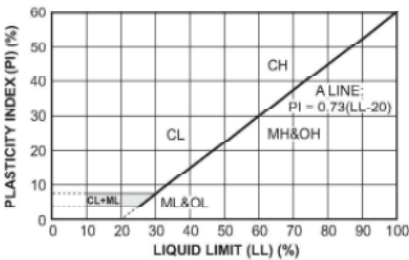
$$C_u = \frac{D_{60}}{D_{10}} \text{ greater than } 4; C_c = \frac{D_{30}}{D_{10} \times D_{60}} \text{ between } 1 \text{ and } 3$$

SP Not meeting all gradation requirements for GW

SM Atterberg limits below "A" line or P.I. less than 4
SC Atterberg limits above "A" line with P.I. greater than 7
Limits plotting in shaded zone with P.I. between 4 and 7 are borderline cases requiring use of dual symbols.

Determine percentages of sand and gravel from grain-size curve. Depending on percentage of fines (fraction smaller than No. 200 sieve size), coarse-grained soils are classified as follows:
Less than 5 percent GW, GP, SW, SP
More than 12 percent GM, GC, SM, SC
5 to 12 percent Borderline cases requiring dual symbols

PLASTICITY CHART



N-Value Rating

Fine-Grained Soils (Silt and Clay)

Consistency	Blows/ft	PP (tsf)
Very Soft	0-2	<0.25
Soft	3-4	0.25-0.5
Medium Stiff	5-8	0.5-1
Stiff	9-15	1-2
Very Stiff	16-32	2-4
Hard	>32	>4

Coarse-Grained Soils (Sand and Gravel)

Relative Density	Blows/ft
Very Loose	0-4
Loose	5-10
Medium Dense	11-30
Dense	31-50
Very Dense	>50

Unconsolidated Material

Term	Grain Size in mm (in)	Approximate Example Size
Clay and Silt	<.075	can't see grains to barely visible
Fine Sand	0.075 – 0.4	table salt to sugar
Med. Sand	0.4-2.0 (~1/16)	openings in a window screen
Coarse Sand	2.0 - 4.75 (~1/16 – 1/8)	sidewalk salt
Gravel	4.75 – 75 (~1/8 – 3)	pea to tennis ball
Cobble	75 – 300 (3 – 12)	tennis ball to basketball
Boulder	>300 (>12)	larger than a basketball

Other Features – Used to describe other identifiable, pertinent features (e.g., angularity of coarse-grained soils, organics, construction debris, etc.)

Term

Term	%
Trace	< 5
Few	5-15
Some	15-45

Moisture Content

Dry: Sample is dusty or obviously dry.
Moist: Anything that does not fit the definition of dry or wet.
Wet: Sample contains free water.



Civil & Environmental Consultants, Inc.

Definitions of Standard Terms and Symbols



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BORING NUMBER AP-2

PAGE 1 OF 2

CLIENT American Electric Power

PROJECT NAME Kammer-Initial Safety Factor Assessment

CEC PROJECT NUMBER 345-817-0004

PROJECT LOCATION Moundsville, West Virginia

DATE STARTED 5/14/25

COMPLETED 7/31/25

GROUND ELEVATION 641.6 ft

HOLE SIZE 10 inches

DRILLING CONTRACTOR RockWater Drilling, Inc.

GROUND WATER LEVELS:

DRILLING METHOD 4.25" I.D. Hollow Stem Augers; Automatic Hammer

AT TIME OF DRILLING 18.5 ft / Elev 623.1 ft

LOGGED BY JO

CHECKED BY JBG

AT END OF DRILLING Refer to Note 3

LOCATION N 492207.4, E 1597319.2

AFTER DRILLING Refer to Note 3

ELEVATION (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN (tsf)	▲ SPT N VALUE ▲			
								20	40	60	80
								PL	MC	LL	
								20	40	60	80
								□ FINES CONTENT (%) □			
								20	40	60	80
641.6		TOPSOIL (3 inches)	0.0								
641.3		Dark Brown, Sandy Lean Clay, CL, Moist (FILL) <i>Noted geotextile fabric at 3" bgs.</i>		GB 1							
639.6		Brown, Clayey Gravel, GC, Moist (FILL)		GB 2							
638.6		Brown, Poorly Graded Gravel, GP, Moist (FILL)		GB 3							
637.6		Brown, Poorly Graded Sand, SP, Moist (FILL) <i>Noted intermixed bottom ash.</i>	5.0	GB 4							
636.6		Brown, Poorly Graded Sand, SP, Moist (BOTTOM ASH)		GB 5							
635.6		Brown and Gray, Silt, ML, Moist, Medium Stiff (FILL) <i>Noted intermixed fly ash.</i>		SS 1	78	3-5-7 (12)	0.5-1.0				
634.3		Brown and Black, Poorly-Graded Sand, SP, Moist (FILL) <i>Noted intermixed bottom ash.</i>									
633.1		Brown, Lean Clay with Sand, CL, Moist, Very Stiff (FILL)	10.0	SS 2	100	1-2-4 (6)	2.0-2.5				
				SS 3	100	1-2-3 (5)	2.0-3.0				
628.1		Brown, SANDY SILTY CLAY WITH GRAVEL, CL-ML, Moist becoming Wet, Medium Stiff Becoming Soft to Very Soft (ALLUVIUM)	15.0	SS 4	100	1-1-2 (3)	0.5				
				SS 5	100	1-1-2 (3)	0.25-0.5				
			20.0	SS 6	100	1-WH-1 (1)	0.25				
				SS 7	100	WH-1-WH (1)	<0.25				
613.1		Brown, Silty Sand with Gravel, SM, Wet, Loose (ALLUVIUM)	30.0	SS 8	78	1-3-5 (8)					
608.1		Brown, Well-Graded Sand with Silt and Gravel, SW-SM, Wet, Medium Dense Becoming Dense (ALLUVIUM)	35.0	SS 9	39	9-8-10 (18)					

(Continued Next Page)

CEC CUSTOM LOG 345-817-0004 INITIAL SAFETY FACTOR ASSESSMENT.GPJ GOOD TEMPLATE.GDT 11/5/25



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BORING NUMBER AP-2

PAGE 2 OF 2

CLIENT American Electric Power

PROJECT NAME Kammer-Initial Safety Factor Assessment

CEC PROJECT NUMBER 345-817-0004

PROJECT LOCATION Moundsville, West Virginia

ELEVATION (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN (tsf)	▲ SPT N VALUE ▲			
								20	40	60	80
								PL	MC	LL	
								20	40	60	80
								□ FINES CONTENT (%) □			
								20	40	60	80
		Brown, Well-Graded Sand with Silt and Gravel, SW-SM, Wet, Medium Dense Becoming Dense (ALLUVIUM) (continued)	35.0								
			40.0	SS 10	39	11-15-19 (34)					
598.1		Brown, Poorly-Graded Sand, SP, Wet, Medium Dense (ALLUVIUM)	45.0	SS 11	100	4-6-16 (22)					
593.1		Brown, Well-Graded Sand with Gravel, SW, Wet, Medium Dense (ALLUVIUM)	50.0	SS 12	100	10-10-6 (16)					
			55.0	SS 13	78	6-5-8 (13)					
583.1		Brown, Well-Graded Gravel with Sand, GW, Wet, Medium Dense (ALLUVIUM)	60.0	SS 14	50	10-15-10 (25)					
			65.0	SS 15	67	10-15-7 (22)					
574.6		Gray, Shale with Interbedded Limestone, Completely Weathered, Very Broken, Very Soft		SS 16	25	50/4"					
574.3		Bottom of hole at 67.3 feet.									
Notes: 1) Vacuum extraction methods were performed to a depth of 6 feet prior to the auger boring, to identify whether shallow underground utilities were present. The auger boring with standard penetration tests began at a depth of 6 feet. 2) Auger refusal was encountered at a depth of about 67' bgs. 3) Deep well installed in borehole and shallow well installed in offset borehole. Refer to well logs.											

CEC CUSTOM LOG 345-817-0004 INITIAL SAFETY FACTOR ASSESSMENT.GPJ GOOD TEMPLATE.GDT 11/5/25



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Cincinnati, Ohio 45242

BORING NUMBER AP-3

PAGE 1 OF 2

CLIENT American Electric Power

PROJECT NAME Kammer-Initial Safety Factor Assessment

CEC PROJECT NUMBER 345-817-0004

PROJECT LOCATION Moundsville, West Virginia

DATE STARTED 5/14/25

COMPLETED 7/30/25

GROUND ELEVATION 640.3 ft

HOLE SIZE 10 inches

DRILLING CONTRACTOR RockWater Drilling, Inc.

GROUND WATER LEVELS:

DRILLING METHOD 4.25" I.D. Hollow Stem Augers; Automatic Hammer

▽ AT TIME OF DRILLING 18.5 ft / Elev 621.8 ft

LOGGED BY JO

CHECKED BY JBG

AT END OF DRILLING Refer to Note 3

LOCATION N 491966.5, E 1597006.1

AFTER DRILLING Refer to Note 3

CEC CUSTOM LOG 345-817-0004 INITIAL SAFETY FACTOR ASSESSMENT.GPJ GOOD TEMPLATE.GDT 11/5/25

ELEVATION (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN (tsf)	▲ SPT N VALUE ▲			
								20	40	60	80
								PL	MC	LL	
								20	40	60	80
								□ FINES CONTENT (%) □			
								20	40	60	80
640.3		TOPSOIL (2 inches)	0.0								
640.1		Dark Brown, Sandy Lean Clay, CL, Moist (FILL)		GB 1							
638.3		Brown, Clayey Sand, SC, Moist (FILL)		GB 2							
				GB 3							
				GB 4							
634.3	Brown, Lean Clay with Sand, CL, Moist, Stiff to Very Stiff (FILL)	5.0	GB 5								
			SS 1								
		10.0	SS 2	100	2-2-4 (6)		2.0-2.25				
625.8		Brown, Silty Sand, SM, Moist, Loose to Very Loose (ALLUVIUM)	15.0	SS 4	100	2-3-3 (6)		1.0-1.5			
624.3		Brown, Sandy Silt, ML, Moist, Stiff (ALLUVIUM)		SS 5	100	WH-1-2 (3)		1.0-1.5			
621.8		Brown, SILTY SAND, SM, Wet, Very Loose (ALLUVIUM)	20.0	SS 6	100	WH-1-1 (2)					
</											

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BORING NUMBER AP-3

PAGE 2 OF 2

CLIENT American Electric Power

PROJECT NAME Kammer-Initial Safety Factor Assessment

CEC PROJECT NUMBER 345-817-0004

PROJECT LOCATION Moundsville, West Virginia

ELEVATION (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN (tsf)	▲ SPT N VALUE ▲			
								20	40	60	80
								PL	MC	LL	
								20	40	60	80
								□ FINES CONTENT (%) □			
								20	40	60	80
		Brown, Well-Graded Gravel with Sand, GW, Wet, Dense (ALLUVIUM) (continued)	35.0								
601.8		Brown, Silty Sand, SM, Wet, Medium Dense (ALLUVIUM)	40.0	SS 10	100	10-12-14 (26)					
596.8		Brown, Poorly-Graded Sand, SP, Wet, Dense (ALLUVIUM)	45.0	SS 11	100	30-22-11 (33)					
596.0		Brown, Well-Graded Sand with Gravel, SW, Wet, Dense	45.0								
			50.0								
			55.0	SONIC 1	67						
			60.0								
			65.0								
574.8		Gray, Shale with Interbedded Limestone, Completely Weathered, Very Broken, Very Soft									
575.3		Bottom of hole at 65.0 feet.									
Notes: 1) Vacuum extraction methods were performed to a depth of 6 feet prior to the auger boring, to identify whether shallow underground utilities were present. The auger boring with standard penetration tests began at a depth of 6 feet. 2) About 23 feet of heave was observed in the augers at a depth of 45 feet. Sampling was resumed utilizing sonic drilling from a depth of 45 feet to the termination depth. 3) Deep well installed in borehole and shallow well installed in offset borehole. Refer to well logs.											



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BORING NUMBER AP-4

PAGE 1 OF 2

CLIENT American Electric Power

PROJECT NAME Kammer-Initial Safety Factor Assessment

CEC PROJECT NUMBER 345-817-0004

PROJECT LOCATION Moundsville, West Virginia

DATE STARTED 5/14/25

COMPLETED 6/17/25

GROUND ELEVATION 639.3 ft

HOLE SIZE 8 inches

DRILLING CONTRACTOR RockWater Drilling, Inc.

GROUND WATER LEVELS:

DRILLING METHOD 4.25" I.D. Hollow Stem Augers; Automatic Hammer

▽ AT TIME OF DRILLING 18.5 ft / Elev 620.8 ft

LOGGED BY JO

CHECKED BY JBG

AT END OF DRILLING Refer to Note 3

LOCATION N 491233.1, E 1596841.4

AFTER DRILLING Refer to Note 3

CEC CUSTOM LOG 345-817-0004 INITIAL SAFETY FACTOR ASSESSMENT.GPJ GOOD TEMPLATE.GDT 11/5/25

ELEVATION (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN (tsf)	▲ SPT N VALUE ▲			
								20	40	60	80
								PL	MC	LL	
								20	40	60	80
								□ FINES CONTENT (%) □			
								20	40	60	80
639.3		GRAVEL BASE (8 inches)	0.0								
638.6		Brown, Poorly Graded Gravel, GP, Moist, Loose (FILL) <i>Noted cobbles.</i>		GB 1							
637.3		Dark Gray, Lean Clay with Sand, CL, Moist, Hard becoming Stiff (FILL)		GB 2			4.5+				
				GB 3			4.5+				
			5.0	GB 4			1.0-				
				GB 5			1.5				
633.3		Gray and Brown, Lean Clay with Sand, CL, Moist, Stiff to Very Stiff (FILL)		SS 1	56	4-5-7 (12)	1.0-				
				SS 2	100	2-4-4 (8)	2.5-				
			10.0	SS 3	100	2-3-4 (7)	3.0				
				SS 4	100	1-2-3 (5)	1.5-				
625.8		Brown, SANDY LEAN CLAY, CL, Moist, Stiff (ALLUVIUM)	15.0	SS 5	100	WH-WH-WH (0)	2.0				
623.3		Brown, Silty Clay, CL-ML, Wet, Medium Stiff to Stiff (ALLUVIUM)		SS 6	100	WH-WH-1 (1)	0.75-				
620.8	▽	Brown, Sandy Lean Clay, CL, Wet, Medium Stiff Becoming Very Soft (ALLUVIUM)	20.0	SS 7	100	WH-WH-WH (0)	1.5				
				SS 8	0	1-WH-WH (0)	0.5-				
			25.0	SS 9	100	13-14-19 (33)	0.25-				
							0.5				
605.8		Brown, Poorly-Graded Sand, SP, Wet, Medium Dense becoming Very Dense (ALLUVIUM)	35.0								

(Continued Next Page)



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BORING NUMBER AP-4

PAGE 2 OF 2

CLIENT American Electric Power

PROJECT NAME Kammer-Initial Safety Factor Assessment

CEC PROJECT NUMBER 345-817-0004

PROJECT LOCATION Moundsville, West Virginia

ELEVATION (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN (tsf)	▲ SPT N VALUE ▲							
								20	40	60	80				
								PL	MC	LL					
								20	40	60	80				
								□ FINES CONTENT (%) □							
								20	40	60	80				
		Brown, Poorly-Graded Sand, SP, Wet, Medium Dense becoming Very Dense (ALLUVIUM) (continued)	35.0												
			40.0		SS 10	100	3-11-18 (29)								
			45.0		SS 11	61	2-5-7 (12)								
			50.0		SS 12	100	5-10-8 (18)								
			55.0		SS 13	100	3-5-8 (13)								
			60.0		SS 14	100	3-8-9 (17)								
					SS 15	100	50/5"								
575.4		Bottom of hole at 63.9 feet.													
		Notes: 1) Vacuum extraction methods were performed to a depth of 6 feet prior to the auger boring, to identify whether shallow underground utilities were present. The auger boring with standard penetration tests began at a depth of 6 feet. 2) Auger refusal was encountered at a depth of about 65' bgs. 3) Deep well installed in borehole and shallow well installed in offset borehole. Refer to well logs.													

CLIENT American Electric Power

PROJECT NAME Kammer-Initial Safety Factor Assessment

CEC PROJECT NUMBER 345-817-0004

PROJECT LOCATION Moundsville, West Virginia

DATE STARTED 5/14/25 **COMPLETED** 7/23/25

GROUND ELEVATION 639.1 ft **HOLE SIZE** 10 inches

DRILLING CONTRACTOR RockWater Drilling, Inc.

GROUND WATER LEVELS:

DRILLING METHOD 4.25" I.D. Hollow Stem Augers; Automatic Hammer

▽ AT TIME OF DRILLING 18.5 ft / Elev 620.6 ft

LOGGED BY JO

CHECKED BY JBG

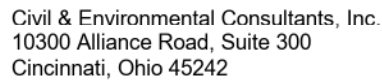
AT END OF DRILLING Refer to Note 6

LOCATION N 490776.1, E 1596848.7

AFTER DRILLING Refer to Note 6

ELEVATION (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN (tsf)	▲ SPT N VALUE ▲								
								PLMCLL								
								20	40	60	80					
								□ FINES CONTENT (%) □								
								20406080								
639.1		GRAVEL BASE (5 inches)	0.0													
638.7		Brown, LEAN CLAY WITH SAND, CL, Moist, Stiff (FILL)														
				GB 1				1.0-1.5								
				GB 2				1.0-1.5								
				GB 3				1.0-1.5								
			GB 4				1.0-1.5									
			5.0		GB 5			1.0-1.5								
633.1		Brown, SANDY LEAN CLAY, CL, Moist, Stiff (FILL)			SS 1	78	1-3-3 (6)	1.5-1.75								
630.6		Brown, Sandy Silt, ML, Stiff Becoming Medium Stiff (ALLUVIUM)	ST 2		SS 2	100	1-2-4 (6)	1.5-2.0								
					SS 3	50	WH-WH-3 (3)	0.5-1.0								
626.1		Brown, CLAYEY SAND, SC, Moist, Loose to Very Loose (ALLUVIUM)	ST 3		SS 4	100	WH-1-1 (2)									
		<table><tr><td>c'</td><td>φ'</td></tr><tr><td>(psi)</td><td>(degrees)</td></tr><tr><td>0.4</td><td>33.7</td></tr></table>	c'	φ'	(psi)	(degrees)	0.4	33.7			SS 5	100	1-WH-1 (1)			
c'		φ'														
(psi)	(degrees)															
0.4	33.7															
620.6		Brown, SANDY LEAN CLAY, CL, Wet, Very Soft (ALLUVIUM)			SS 6	100	WH-WH-WH (0)	<0.25								
		<table><tr><td>c</td><td>φ</td></tr><tr><td>(psi)</td><td>(degrees)</td></tr><tr><td>3.6</td><td>0.0</td></tr></table>	c	φ	(psi)	(degrees)	3.6	0.0	ST 4							
c		φ														
(psi)	(degrees)															
3.6	0.0															
	<table><tr><td>c'</td><td>φ'</td></tr><tr><td>(psi)</td><td>(degrees)</td></tr><tr><td>0.6</td><td>29.0</td></tr></table>	c'	φ'	(psi)	(degrees)	0.6	29.0	ST 5		SS 7	100	WH-WH-1 (1)	<0.25			
c'	φ'															
(psi)	(degrees)															
0.6	29.0															

(Continued Next Page)



PAGE 2 OF 3

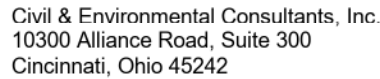
PROJECT NAME Kammer-Initial Safety Factor Assessment

PROJECT LOCATION Moundsville, West Virginia

ELEVATION (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN (tsf)	▲ SPT N VALUE ▲			
								20	40	60	80
								PL	MC	LL	
								□ FINES CONTENT (%) □			
			20	40	60	80					
		Brown, SANDY LEAN CLAY, CL, Wet, Very Soft (ALLUVIUM) <i>(continued)</i>	25.0								

(Continued Next Page)

DEC CUSTOM LOG 345-817-0004 INITIAL SAFETY FACTOR ASSESSMENT.GPJ GOOD TEMPLATE.GDT 11/5/25



PROJECT NAME Kammer-Initial Safety Factor Assessment

PROJECT LOCATION Moundsville, West Virginia

ELEVATION (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN (tsf)	▲ SPT N VALUE ▲			
								20 40 60 80			
								PL	MC	LL	
								20 40 60 80			
								□ FINES CONTENT (%) □			
								20 40 60 80			
585.6		Brown, Well-Graded Sand with Gravel, SW, Wet, Medium Dense (ALLUVIUM) <i>(continued)</i>	55.0	SS 13	100	19-22-5 (27)		▲			
580.6		Brown, Poorly-Graded Sand, SP, Wet, Dense to Very Dense (ALLUVIUM)	60.0	SS 14	100	5-9-35 (44)		▲			



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BORING NUMBER AP-6

PAGE 1 OF 2

CLIENT American Electric Power

PROJECT NAME Kammer-Initial Safety Factor Assessment

CEC PROJECT NUMBER 345-817-0004

PROJECT LOCATION Moundsville, West Virginia

DATE STARTED 5/14/25

COMPLETED 7/22/25

GROUND ELEVATION 639.3 ft

HOLE SIZE 10 inches

DRILLING CONTRACTOR RockWater Drilling, Inc.

GROUND WATER LEVELS:

DRILLING METHOD 4.25" I.D. Hollow Stem Augers; Automatic Hammer

▽ AT TIME OF DRILLING 16.0 ft / Elev 623.3 ft

LOGGED BY JO

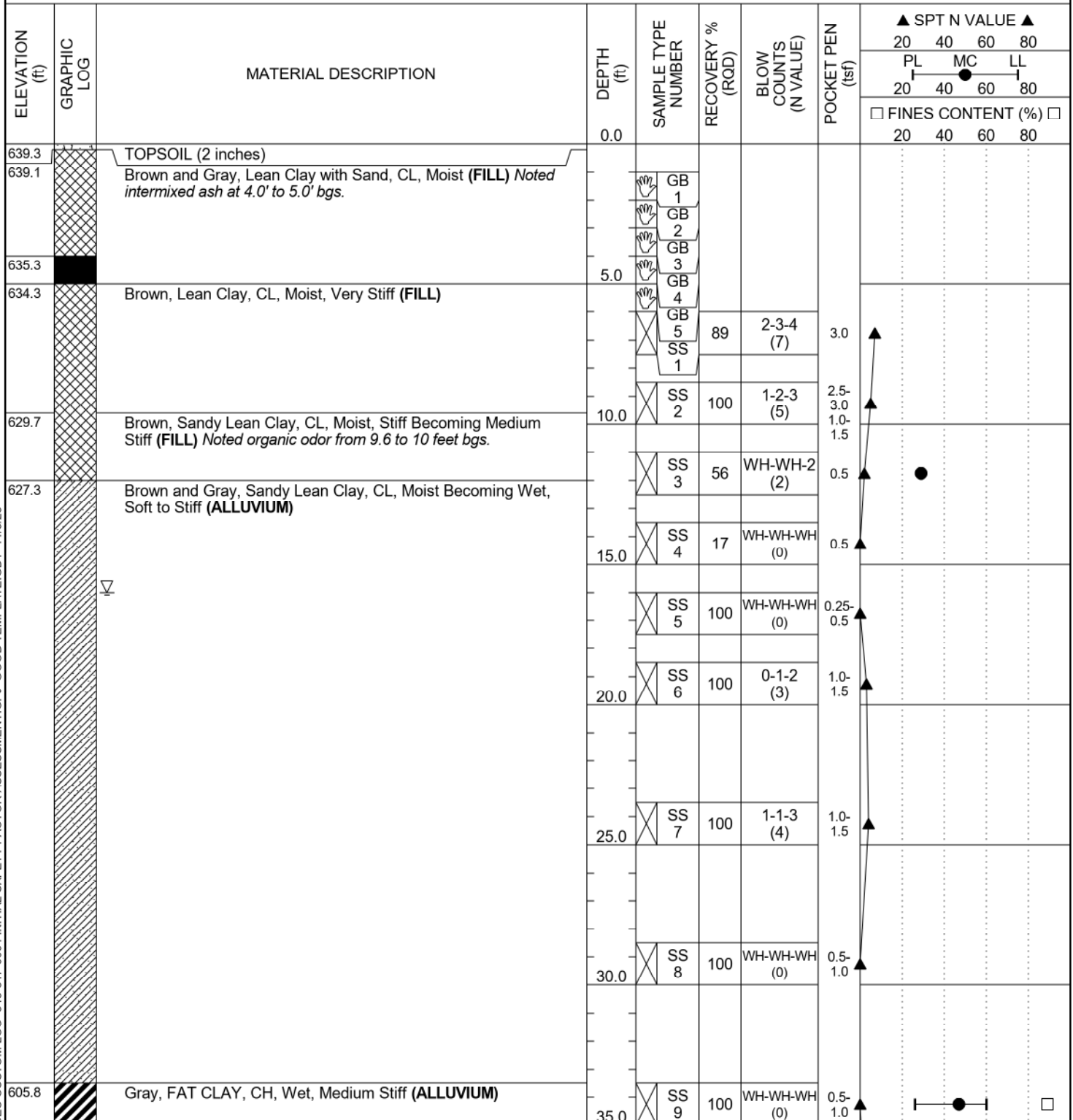
CHECKED BY JBG

AT END OF DRILLING Refer to Note 3

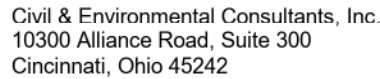
LOCATION N 490313.1, E 1596904.6

AFTER DRILLING Refer to Note 3

CEC CUSTOM LOG 345-817-0004 INITIAL SAFETY FACTOR ASSESSMENT.GPJ GOOD TEMPLATE.GDT 11/5/25



(Continued Next Page)





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BORING NUMBER AP-7

PAGE 1 OF 3

CLIENT American Electric Power

PROJECT NAME Kammer-Initial Safety Factor Assessment

CEC PROJECT NUMBER 345-817-0004

PROJECT LOCATION Moundsville, West Virginia

DATE STARTED 5/14/25

COMPLETED 7/15/25

GROUND ELEVATION 640.0 ft

HOLE SIZE 10 inches

DRILLING CONTRACTOR RockWater Drilling, Inc.

GROUND WATER LEVELS:

DRILLING METHOD 4.25" I.D. Hollow Stem Augers; Automatic Hammer

AT TIME OF DRILLING 18.5 ft / Elev 621.5 ft

LOGGED BY JO

CHECKED BY JBG

AT END OF DRILLING Refer to Note 6

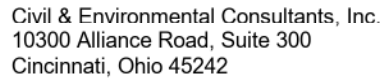
LOCATION N 490271.8, E 1597154.5

AFTER DRILLING Refer to Note 6

CEC CUSTOM LOG 345-817-0004 INITIAL SAFETY FACTOR ASSESSMENT.GPJ GOOD TEMPLATE.GDT 11/5/25

ELEVATION (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN (tsf)	▲ SPT N VALUE ▲			
								20	40	60	80
640.0		TOPSOIL (2 inches)	0.0								
639.8		Brown and Gray, SANDY LEAN CLAY, CL, Moist, Very Stiff Becoming Medium Stiff (FILL)		GB 1			1.5-2.0				
				GB 2							
				GB 3			1.0-1.5				
				GB 4			1.0-1.5				
				GB 5			1.0-1.5				
				SS 1	89	5-5-8 (13)	3.5				
632.0		Brown, CLAYEY SAND, SC, Wet, Loose (FILL)		SS 2	100	2-2-4 (6)					
				SS 2							
629.0		Brown, SANDY LEAN CLAY, CL, Moist, Medium Stiff (FILL)		SS 3	72	WH-1-3 (4)	0.5-0.75				
				SS 3							
626.5		Brown to Gray, SANDY LEAN CLAY, CL, Moist, Very Soft to Medium Stiff (ALLUVIUM)		SS 4	100	WH-WH-WH (0)	0.25-0.5				
				SS 4							
				SS 5	100	WH-WH-WH (0)	<0.25				
				SS 5							
				SS 6	100	WH-WH-WH (0)	<0.25				
				SS 6							
				SS 7	100	WH-WH-WH (0)	<0.25				
				SS 7							

(Continued Next Page)





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BORING NUMBER AP-8

PAGE 1 OF 1

CLIENT American Electric Power

PROJECT NAME Kammer-Initial Safety Factor Assessment

CEC PROJECT NUMBER 345-817-0004

PROJECT LOCATION Moundsville, West Virginia

DATE STARTED 6/12/25

COMPLETED 6/12/25

GROUND ELEVATION 634.5 ft

HOLE SIZE 8 inches

DRILLING CONTRACTOR RockWater Drilling, Inc.

GROUND WATER LEVELS:

DRILLING METHOD 4.25" I.D. Hollow Stem Augers; Automatic Hammer

AT TIME OF DRILLING 8.5 ft / Elev 626.0 ft

LOGGED BY JO

CHECKED BY JBG

AT END OF DRILLING Backfilled With Grout Upon Completion

LOCATION N 491193.9, E 1597099.3

AFTER DRILLING Backfilled With Grout Upon Completion

CEC CUSTOM LOG 345-817-0004 INITIAL SAFETY FACTOR ASSESSMENT.GPJ GOOD TEMPLATE.GDT 11/5/25

ELEVATION (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN (tsf)	▲ SPT N VALUE ▲			
								20	40	60	80
634.5		TOPSOIL (2 inches)	0.0								
634.3		Brown and Dark Gray, Lean Clay with Sand, CL, Moist, Hard Becoming Medium Stiff (FILL)		SS 1	78	5-7-8 (15)	4.5+				
			5.0	SS 2	72	3-2-2 (4)	1.5- 2.0				
				SS 3	17	WH-1-1 (2)	0.5- 1.0				
626.0		Black, Silty Sand, SM, Wet, Very Loose (BOTTOM ASH)	10.0	SS 4	11	WH-WH-WH (0)					
				SS 5	100	WH-WH-WH (0)	<0.25				
			15.0	SS 6	17	WH-1-WH (1)					
618.2		Brown, Sandy Silt, ML, Moist becoming Wet, Very Stiff Becoming Very Soft (ALLUVIUM) <i>Noted brown sand seam at 19-19.3'.</i>		SS 7	78	1-2-5 (7)	3.0				
			20.0	SS 8	100	2-WH-WH (0)	<0.25 0.25				
				SS 9	100	WH-WH-WH (0)	<0.25				
			25.0	SS 10	100	WH-WH-2 (2)	<0.25				
				SS 11	61	WH-WH-WH (0)	<0.25				
			30.0	SS 12	100	WH-2-1 (3)	<0.25				
				SS 13	100	WH-1-1 (2)	<0.25				
601.0		Brown, Silty Sand with Gravel, SM, Wet, Very Dense (ALLUVIUM)	35.0	SS 14	100	21-34-28 (62)					

599.5

Bottom of hole at 35.0 feet.



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BORING NUMBER AP-9

PAGE 1 OF 1

CLIENT American Electric Power

PROJECT NAME Kammer-Initial Safety Factor Assessment

CEC PROJECT NUMBER 345-817-0004

PROJECT LOCATION Moundsville, West Virginia

DATE STARTED 6/11/25

COMPLETED 6/11/25

GROUND ELEVATION 634.8 ft

HOLE SIZE 8 inches

DRILLING CONTRACTOR RockWater Drilling, Inc.

GROUND WATER LEVELS:

DRILLING METHOD 4.25" I.D. Hollow Stem Augers; Automatic Hammer

AT TIME OF DRILLING 6.5 ft / Elev 628.3 ft

LOGGED BY JO

CHECKED BY JBG

AT END OF DRILLING Backfilled With Grout Upon Completion

LOCATION N 491108.4, E 1597267.2

AFTER DRILLING Backfilled With Grout Upon Completion

ELEVATION (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN (tsf)	▲ SPT N VALUE ▲			
								20	40	60	80
								PL	MC	LL	
								20	40	60	80
								□ FINES CONTENT (%) □			
								20	40	60	80
634.8		TOPSOIL (2 inches)	0.0								
634.6		Brown and Gray, Lean Clay with Sand, CL, Moist, Hard becoming Medium Stiff (FILL)			SS 1	78	11-11-12 (23)	4.5			
					SS 2	33	2-3-1 (4)	1.5-2.0			
					SS 3	100	1-1-WH (1)	0.5-1.0			
628.3		Black, Silt, ML, Wet, Very Soft (FLYASH)			SS 4	0	WH-WH-WH (0)	1.0			
					SS 5	6	WH-WH-WH (0)				
					SS 6	100	WH-WH-WH (0)	<0.25			
					SS 7	100	1-2-5 (7)	<0.25			
					SS 8	100	WH-3-5 (8)	1.5-2.0			
618.3	Brown, Sandy Silt, ML, Moist, Stiff to Very Stiff (ALLUVIUM)			SS 9	100	2-3-5 (8)	2.0-2.5				
612.3		Bottom of hole at 22.5 feet.									



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BORING NUMBER MW-1D

PAGE 1 OF 2

CLIENT American Electric Power

PROJECT NAME Kammer-Initial Safety Factor Assessment

CEC PROJECT NUMBER 345-817-0004

PROJECT LOCATION Moundsville, West Virginia

DATE STARTED 5/14/25

COMPLETED 7/25/25

GROUND ELEVATION 637.7 ft

HOLE SIZE 10 inches

DRILLING CONTRACTOR RockWater Drilling, Inc.

GROUND WATER LEVELS:

DRILLING METHOD 4.25" I.D. Hollow Stem Augers; Automatic Hammer

▽ AT TIME OF DRILLING 16.0 ft / Elev 621.7 ft

LOGGED BY JO

CHECKED BY JBG

AT END OF DRILLING Refer to Note 2

LOCATION N 491496.2, E 1596848.2

AFTER DRILLING Refer to Note 2

CEC CUSTOM LOG 345-817-0004 INITIAL SAFETY FACTOR ASSESSMENT.GPJ GOOD TEMPLATE.GDT 11/5/25

ELEVATION (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN (tsf)	▲ SPT N VALUE ▲			
								20	40	60	80
								PL	MC	LL	
								20	40	60	80
								□ FINES CONTENT (%) □			
								20	40	60	80
637.7		TOPSOIL (3 inches)	0.0								
637.4		Brown, Poorly Graded Gravel, GP, Moist (FILL)		GB 1							
635.7		Brown, Clayey Sand, SC, Moist (FILL)		GB 2							
634.7		Brown, Clayey Gravel, GC, Moist (FILL)		GB 3							
			5.0	GB 4							
				GB 5							
631.7		Brown, WELL GRADED GRAVEL WITH SILT AND SAND, GW-GM, Moist, Loose to Medium Dense (FILL)		SS 1	22	5-6-4 (10)					
			10.0	SS 2	56	5-4-5 (9)					
				SS 3	72	5-6-6 (12)					
624.2		Brown, Sandy Lean Clay, CL, Moist, Stiff (ALLUVIUM)	15.0	SS 4	89	5-3-3 (6)	1.0-1.5				
621.7		Gray, Sandy Silt, ML, Wet, Soft (ALLUVIUM)		SS 5	89	3-1-WH (1)	0.25-0.5				
619.2		Brown, Lean Clay, CL, Moist, Very Stiff (ALLUVIUM)	20.0	SS 6	100	1-3-4 (7)	2.0-2.5				
614.2		Brown, Sandy Silt, ML, Wet, Very Soft (ALLUVIUM)	25.0	SS 7	100	1-3-3 (6)	<0.25				
609.2		Brown, Poorly-Graded Sand with Silt, SP-SM, Wet, Loose (ALLUVIUM)	30.0	SS 8	100	WH-1-4 (5)					
			35.0								

(Continued Next Page)



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BORING NUMBER MW-1D

PAGE 2 OF 2

CLIENT American Electric Power

PROJECT NAME Kammer-Initial Safety Factor Assessment

CEC PROJECT NUMBER 345-817-0004

PROJECT LOCATION Moundsville, West Virginia

ELEVATION (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN (tsf)	▲ SPT N VALUE ▲			
								20	40	60	80
								PL	MC	LL	
								20	40	60	80
								□ FINES CONTENT (%) □			
								20	40	60	80
		Brown, Poorly-Graded Sand with Silt, SP-SM, Wet, Loose (ALLUVIUM) <i>(continued)</i>	35.0								
599.2		Brown, Well-Graded Sand with Gravel, SW, Wet, Medium Dense (ALLUVIUM)	40.0	X SS 9	28	16-15-10 (25)					
			45.0	X SS 10	33	8-8-8 (16)					
			50.0	X SS 11	50	7-7-7 (14)					
			55.0	X SS 12	22	7-15-12 (27)					
579.2		Brown, Poorly-Graded Sand, SP, Wet, Very Dense (ALLUVIUM)	60.0	X SS 13	72	8-23-33 (56)					
574.7 574.6		Gray, Shale with Interbedded Limestone, Completely Weathered, Very Broken, Very Soft Bottom of hole at 63.1 feet.		SS 14	50	50/1"					
Notes: 1) About 5 feet of heave was observed in the augers at a depth of 33.5 feet. The heaved material was flushed from the augers using water. SPT sampling was resumed at a depth of 38.5 feet. 2) Deep well installed in borehole and shallow well installed in offset borehole. Refer to well logs.											



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BORING NUMBER BG-2

PAGE 1 OF 3

CLIENT American Electric Power

PROJECT NAME Kammer-Initial Safety Factor Assessment

CEC PROJECT NUMBER 345-817-0004

PROJECT LOCATION Moundsville, West Virginia

DATE STARTED 5/15/25

COMPLETED 6/19/25

GROUND ELEVATION 652.4 ft

HOLE SIZE 8 inches

DRILLING CONTRACTOR RockWater Drilling, Inc.

GROUND WATER LEVELS:

DRILLING METHOD 4.25" I.D. Hollow Stem Augers; Automatic Hammer

▽ AT TIME OF DRILLING 28.5 ft / Elev 623.9 ft

LOGGED BY JO

CHECKED BY JBG

AT END OF DRILLING Refer to Note 5

LOCATION N 491024.4, E 1597731.1

AFTER DRILLING Refer to Note 5

CEC CUSTOM LOG 345-817-0004 INITIAL SAFETY FACTOR ASSESSMENT.GPJ GOOD TEMPLATE.GDT 11/5/25

ELEVATION (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN (tsf)	▲ SPT N VALUE ▲			
								20	40	60	80
								PL	MC	LL	
								20	40	60	80
								□ FINES CONTENT (%) □			
								20	40	60	80
652.4		TOPSOIL (4 inches)	0.0								
652.1		Brown, Clayey Gravel with Sand, GC, Moist (FILL)		GB 1							
				GB 2							
649.4		Brown, Sandy Silt, ML, Moist (FILL)		GB 3							
648.4		Brown, Clayey Gravel, GC, Moist (FILL)	5.0	GB 4							
				GB 5							
646.4		Brown, Sandy Silt, ML, Moist, Stiff Becoming Medium Stiff (FILL)		SS 1	100	2-3-4 (7)	1.0-1.5				
			10.0	SS 2	94	2-4-6 (10)	1.5				
				SS 3	83	1-4-6 (10)	0.5				
638.9		Brown, Well-Graded Gravel with Sand, GW, Moist, Medium Dense (FILL) <i>Noted fly ash.</i>	15.0	SS 4	33	4-8-8 (16)					
				SS 5	6	2-7-4 (11)					
633.9		Brown and Black, Silty Sand, SM, Moist, Stiff (FILL) <i>Noted intermixed bottom ash.</i>	20.0	SS 6	28	3-5-6 (11)					
628.9		Brown and Gray, Poorly-Graded Sand with Gravel, SP, Moist Becoming Wet, Medium Dense to Dense (ALLUVIUM)	25.0	SS 7	72	5-6-5 (11)					
			30.0	SS 8	78	7-18-22 (40)					
618.9		Brown and Gray, Poorly-Graded Sand, SP, Wet, Medium Dense (ALLUVIUM)	35.0	SS 9	94	2-7-13 (20)					

(Continued Next Page)



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BORING NUMBER BG-2

PAGE 2 OF 3

CLIENT American Electric Power

PROJECT NAME Kammer-Initial Safety Factor Assessment

CEC PROJECT NUMBER 345-817-0004

PROJECT LOCATION Moundsville, West Virginia

ELEVATION (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN (tsf)	▲ SPT N VALUE ▲			
								20	40	60	80
								PL	MC	LL	
								20	40	60	80
								□ FINES CONTENT (%) □			
								20	40	60	80
		Brown and Gray, Poorly-Graded Sand, SP, Wet, Medium Dense (ALLUVIUM) (continued)	35.0								
613.9		Brown, Well-Graded Sand with Gravel, SW, Wet, Dense Becoming Medium Dense (ALLUVIUM)	40.0	SS 10	22	12-21-19 (40)					
			45.0	SS 11	22	5-10-12 (22)					
			50.0	SS 12	50	3-4-7 (11)					
598.9		Brown, Well-Graded Sand, SW, Wet, Medium Dense (ALLUVIUM)	55.0	SS 13	78	6-5-11 (16)					
			60.0	SS 14	50	4-5-8 (13)					
			65.0	SS 15	100	8-7-8 (15)					
583.9		Brown, Poorly-Graded Sand, SP, Wet, Medium Dense Becoming Very Dense (ALLUVIUM)	70.0	SS 16	78	6-7-9 (16)					
			75.0	SS 17	100	6-11-27 (38)					

CEC CUSTOM LOG 345-817-0004 INITIAL SAFETY FACTOR ASSESSMENT.GPJ GOOD TEMPLATE.GDT 11/5/25

(Continued Next Page)



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BORING NUMBER BG-2

PAGE 3 OF 3

CLIENT American Electric Power

PROJECT NAME Kammer-Initial Safety Factor Assessment

CEC PROJECT NUMBER 345-817-0004

PROJECT LOCATION Moundsville, West Virginia

ELEVATION (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN (tsf)	▲ SPT N VALUE ▲			
								20	40	60	80
								PL	MC	LL	
			75.0					20	40	60	80
								□ FINES CONTENT (%) □			
								20	40	60	80
		Brown, Poorly-Graded Sand, SP, Wet, Medium Dense Becoming Very Dense (ALLUVIUM) (<i>continued</i>)									
			80.0	SS 18	100	16-36-17 (53)					
568.7		Gray, Shale with Interbedded Limestone, Completely Weathered, Very Broken, Very Soft	85.0	SS 19	103	23-27- 50/4"					
564.5		Bottom of hole at 87.9 feet.		SS 20	104	50/5"					
		Notes: 1) Vacuum extraction methods were performed to a depth of 6 feet prior to the auger boring, to identify whether shallow underground utilities were present. The auger boring with standard penetration tests began at a depth of 6 feet. 2) About 10 feet of heave on 1st attempt and 14 feet of heave on 2nd attempt was observed in the augers at a depth of 38.5 feet. The heaved material was flushed from the augers using water. SPT sampling was resumed at a depth of 38.5 feet. 3) Auger refusal was encountered at a depth of about 87.5' bgs. 4) Bulk sample collected from 6 to 8 feet bgs. 5) Deep well installed in borehole and shallow well installed in offset borehole. Refer to well logs.									



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BORING NUMBER BG-4

PAGE 1 OF 2

CLIENT American Electric Power

PROJECT NAME Kammer-Initial Safety Factor Assessment

CEC PROJECT NUMBER 345-817-0004

PROJECT LOCATION Moundsville, West Virginia

DATE STARTED 5/15/25

COMPLETED 7/10/25

GROUND ELEVATION 667.0 ft

HOLE SIZE 10 inches

DRILLING CONTRACTOR RockWater Drilling, Inc.

GROUND WATER LEVELS:

DRILLING METHOD 4.25" I.D. Hollow Stem Augers; Automatic Hammer

▽ AT TIME OF DRILLING 16.0 ft / Elev 651.0 ft

LOGGED BY JO

CHECKED BY JBG

AT END OF DRILLING Refer to Note 3

LOCATION N 490913.4, E 1598535.7

AFTER DRILLING Refer to Note 3

CEC CUSTOM LOG 345-817-0004 INITIAL SAFETY FACTOR ASSESSMENT.GPJ GOOD TEMPLATE.GDT 11/5/25

ELEVATION (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN (tsf)	▲ SPT N VALUE ▲			
								20	40	60	80
								PL	MC	LL	
								20	40	60	80
								□ FINES CONTENT (%) □			
								20	40	60	80
667.0		TOPSOIL (5 inches)	0.0								
666.6		Brown, Clayey Gravel with Sand, GC, Moist (FILL)		GB 1							
				GB 2							
664.0		Brown and Gray, Gravelly Lean Clay, CL, Moist (FILL)		GB 3							
			5.0	GB 4							
				GB 5							
661.0		Brown and Gray, Gravelly Lean Clay with Sand, CL, Moist, Very Stiff (FILL) <i>Noted few coal fragments from 8.5 to 12.5 feet below ground surface.</i>		SS 1	50	3-4-5 (9)	2.5				
			10.0	SS 2	78	2-9-12 (21)	2.0				
656.0		Brown, Lean Clay with Sand, CL, Moist, Very Stiff (FILL)		SS 3	100	5-8-7 (15)	2.5-3.5				
653.5		Brown, Well-Graded Sand with Clay, SW-SC, Moist, Medium Dense (FILL)	15.0	SS 4	56	5-6-5 (11)					
651.0	▽	Brown, Well-Graded Sand with Clay, SW-SC, Wet, Loose becoming Very Loose (ALLUVIUM)		SS 5	67	1-2-3 (5)					
			20.0	SS 6	56	WH-WH-1 (1)					
			25.0	SS 7	50	WH-WH-1 (1)					
638.5		Brown, Clayey Gravel with Sand, GC, Wet, Loose (ALLUVIUM)	30.0	SS 8	67	1-3-6 (9)					
633.5		Brown, Poorly-Graded Sand with Gravel, SP, Wet, Loose (ALLUVIUM)	35.0	SS 9	72	5-4-5 (9)					

(Continued Next Page)



Civil & Environmental Consultants, Inc.
10300 Alliance Road, Suite 300
Cincinnati, Ohio 45242

BORING NUMBER BG-4

PAGE 2 OF 2

CLIENT American Electric Power

PROJECT NAME Kammer-Initial Safety Factor Assessment

CEC PROJECT NUMBER 345-817-0004

PROJECT LOCATION Moundsville, West Virginia

ELEVATION (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN (tsf)	▲ SPT N VALUE ▲			
								20	40	60	80
								PL	MC	LL	
								20	40	60	80
								□ FINES CONTENT (%) □			
								20	40	60	80
		Brown, Poorly-Graded Sand with Gravel, SP, Wet, Loose (ALLUVIUM) <i>(continued)</i>	35.0								
628.5		Brown, Poorly-Graded Sand with Clay and Gravel, SP-SC, Wet, Medium Dense (ALLUVIUM)	40.0	X SS 10	89	6-8-9 (17)					
623.5		Brown, Sandy Silt, ML, Wet, Very Stiff (ALLUVIUM)	45.0	X SS 11	100	4-7-7 (14)	2.0				
618.5		Gray, Shale with Interbedded Limestone, Completely Weathered to Highly Weathered, Very Broken, Very Soft	50.0	X SS 12	100	12-14-16 (30)	2.0-3.5				
				X SS 13	82	18-37-50/5"					
612.1		Bottom of hole at 54.9 feet.									
		Notes: 1) Vacuum extraction methods were performed to a depth of 6 feet prior to the auger boring, to identify whether shallow underground utilities were present. The auger boring with standard penetration tests began at a depth of 6 feet. 2) Noted geotextile fabric at 9 inches below ground surface. 3) Deep well installed in offset borehole. Refer to well logs.									

APPENDIX III

LABORATORY TEST RESULTS

LABORATORY DETERMINATION OF WATER (MOISTURE) CONTENT OF SOIL AND ROCK
ASTM D2216-19

Client CIVIL & Environmental Consultants, Inc. (CEC)
Client Project 345-817.0004 AEP Kammer Plant
Project No. 25-04143

Lab Sample No.	Boring	Depth	Sample	Tare Number	Tare Weight + Wet Soil gm	Tare Weight + Dry Soil gm	Tare Weight gm	Water Content		~Maximum Particle Tested	Any + Sizes Omitted?	Weight Omitted grams	Material Types (quantity)	Could Minimum Mass be met	Method A or B
								Method B %	Method A %						
25-04143-12	AP-2	6.0' - 7.0'	SS-1A	916	298.61	275	97.47	13.3	13	-3/8	Yes	14.75	2	Yes	A
25-04143-13	AP-2	8.5' - 10.0'	SS-2	219	410.34	372.33	178.8	19.6	20	-3/8	No	-	2	Yes	A
25-04143-14	AP-2	11.0'-12.5'	SS-3	817	311.42	276.43	101.45	20.0	20	-3/8	No	-	1	Yes	A
25-04143-16	AP-2	18.5'-20.0'	SS-4	516	592.07	514.49	101.71	18.8	19	-3/8	Yes	17.7	2	Yes	A
25-04143-17	AP-2	23.5'-25.0'	SS-7	736	447.04	406.32	179.9	18.0	18	-3/8	No	-	2	Yes	A
25-04143-18	AP-3	6.0'-7.5'	SS-1	3004	417.12	385.48	182.3	15.6	16	-3/8	No	-	2	Yes	A
25-04143-19	AP-3	8.5'-10.0'	SS-2	829	343.46	306.35	101.51	18.1	18	-3/8	No	-	1	Yes	A
25-04143-20	AP-3	11.0'-12.5'	SS-3	739	397.4	367.77	180.8	15.8	16	-3/8	No	-	2	Yes	A
25-04143-21	AP-3	16.0'-18.5'	SS-5	964	322.74	287.3	102.95	19.2	19	-3/8	No	-	1	Yes	A
25-04143-23	AP-3	28.5'-30.0'	SS-8	507	469.08	410.6	102.56	19.0	19	-3/8	No	-	2	Yes	A
25-04143-24	AP-4	6.0'-7.5'	SS-1	971	231.58	213.9	97.82	15.2	15	-3/8	No	-	1	Yes	A
25-04143-25	AP-4	11.0'-12.5'	SS-3	911	335.82	315.68	187.5	15.7	16	-3/8	No	-	2	Yes	A
25-04143-27	AP-4	16.0'-17.5'	SS-5	320	419.11	381.33	189.7	19.7	20	-3/8	No	-	2	Yes	A
25-04143-28	AP-4	18.5'-20.0'	SS-6	234	416.79	374.68	179.83	21.6	22	-3/8	No	-	2	Yes	A
25-04143-29	AP-4	23.5'-25.0'	SS-7	750	394.9	355.8	183.2	22.7	23	-3/8	No	-	2	Yes	A
25-04143-30	AP-5	6.0'-7.5'	SS-1	500	278.24	249.17	104.94	20.2	20	-3/8	No	-	2	Yes	A
25-04143-32	AP-6	11.0' 12.5'	SS-3	740	377.04	334.83	187	28.6	29	-3/8	No	-	2	Yes	A
25-04143-34	AP-8	3.5'-5.0'	SS-2	907	337.56	318.72	185.68	14.2	14	-3/8	Yes	31.08	3	Yes	A
25-04143-35	AP-8	6.0'-7.5'	SS-3	316	299.93	283.84	187.74	16.7	17	-3/8	Yes	9.25	2	Yes	A
25-04143-37	MW-10	13.5'-15.0'	SS-4	1009	322.1	316.58	194.1	4.5	5	-3/4	Yes	32.49	2	No	A
25-04143-38	MW-10	18.5'-20.0'	SS-6	203	427.85	389.94	176.76	17.8	18	-3/8	No	-	1	Yes	A
25-04143-39	MW-10	23.5'-25.0'	SS-7	2076	447.28	398.97	150.98	19.5	19	-3/8	No	-	2	Yes	A

Performed By: RH

Input Validation: MA

Reviewed By: BS

Date Tested: 9/9/2025

Note: Both Methods A & B are presented for instances where additional significant digits are required for other calculations.

PARTICLE-SIZE ANALYSIS OF SOILS - ASTM D422-63(2007)

Client	Civil & Environmental Consultants, Inc. (CEC)	Boring	AP-2
Client Project	345-817.0004 AEP Kammer Plant	Depth	13.5'-15.0'
Project No.	25-04143	Sample	SS-6
		Lab Sample	25-04143 -15

Sample Color: BROWN

USCS Group Name: SANDY SILTY CLAY WITH GRAVEL

Dry Prep: R58-11(2018)¹

USCS Group Symbol: CL-ML

USDA: LOAM

AASHTO: A-4 (2)

MECHANICAL SIEVE									
Total Sample			Sieve Size	Nominal Opening, mm	Dry Wt, gm	Split Normalized		Project Specifications	
Tare No.	2015		3"	75	0	% Retained	% Finer		
Tare + WS., gm	239.18		2-1/2"	63	0	0.0%	100.0%		
Tare + DS., gm	228.19		2"	50	0	0.0%	100.0%		
Tare, gm	151.00		1-1/2"	37.5	0	0.0%	100.0%		
Total sample WC	14.2%		1"	25	0	0.0%	100.0%		
Total Sample Dry Wt, gm (-3")	77		3/4"	19	0	0.0%	100.0%		
Hygroscopic WC (-#10)			1/2"	12.5	2.99	3.9%	96.1%		
Tare No.	202		3/8"	9.5	4.07	5.3%	90.9%		
Tare + WS., gm	20.29		No. 4	4.75	5.17	6.7%	84.2%		
Tare + DS., gm	20.18		No. 10	2	3.29	4.3%	79.9%		
Tare, gm	16.69		No. 20	0.85	0.14	0.2%	79.7%		
Hygroscopic WC	3.15%		No. 40	0.425	0.51	0.8%	78.9%		
			No. 60	0.25	0.49	0.7%	78.2%		
-#10 Hydro/Sieve air dry wt.	54.20		No. 140	0.106	5.31	7.8%	70.4%		
Wt. of + #200 Sample, gm	10.73		No. 200	0.075	4.28	6.3%	64.1%		
HYDROMETER (-#10)									
Split Air Dry Wt	55.91						Specific Gravity	2.7	
Hygroscopic WC	3.15%							Assumed	
Corrected Dry wt	54.2	#10 Dispersed 1min in Hamilton Beach Mixer					a Factor	0.9889	
Elapsed Time (min.)	R Measured	Temp °C	Composite Correction	R Corrected	K Factor	Percent Finer (%)	Particle Diameter (mm)	Adjusted % Finer (%)	
2	24.0	23.5	4.7	19.3	0.0129	35.2	0.0320	28.1%	
5	20.0	23.5	4.7	15.3	0.0129	27.9	0.0208	22.3%	
15	19.0	23.6	4.7	14.3	0.0129	26.1	0.0121	20.8%	
30	17.0	23.7	4.6	12.4	0.0129	22.6	0.0086	18.1%	
60	15.0	23.8	4.6	10.4	0.0129	19.0	0.0062	15.2%	
250	13.5	23.9	4.6	8.9	0.0129	16.2	0.0030	13.0%	
1440	11.0	23.9	4.6	6.4	0.0129	11.7	0.0013	9.3%	
USCS SOIL CLASSIFICATION				USDA CLASSIFICATION					
Corrected For 100% Passing a 3" Sieve				Particle Size (mm)	Percent Finer (%)	Percent of Each Component (Material) (%)		Corrected Percent of -2.0 mm Material for USDA	
% Gravel (-3" & + #4)	15.8	Silt=49.6% Clay=14.5%							
Coarse=0; Fine=15.8		D60, mm	NA	100	100	Gravel	20.1	0	
% Sand (-#4 & + #200)		D30, mm	NA						
Coarse=4.3; Medium=1; Fine=14.9		D10, mm	NA						
% Fines (-#200)		Cc	NA						
% Plus #200 (-3")		Cu	NA	2	79.9				
USCS Description									
SANDY SILTY CLAY WITH GRAVEL									
USCS Group Symbol		Atterberg Limits Group Symbol							
CL-ML		CL-ML - SILTY CLAY		0.05	47.0	Sand	32.9	41.2	
Auxiliary Information		Wt Ret, gm	% Retained						% Finer
12" Sieve - 300 mm		0	0.0	100.0	0.002	11.2	Silt	35.8	44.8
6" Sieve - 150 mm		0	0.0	100.0					
3" Sieve - 75 mm		0	0.0	100.0					
USDA Classification									
LOAM									

Performed By: RH

Input Validation: MA

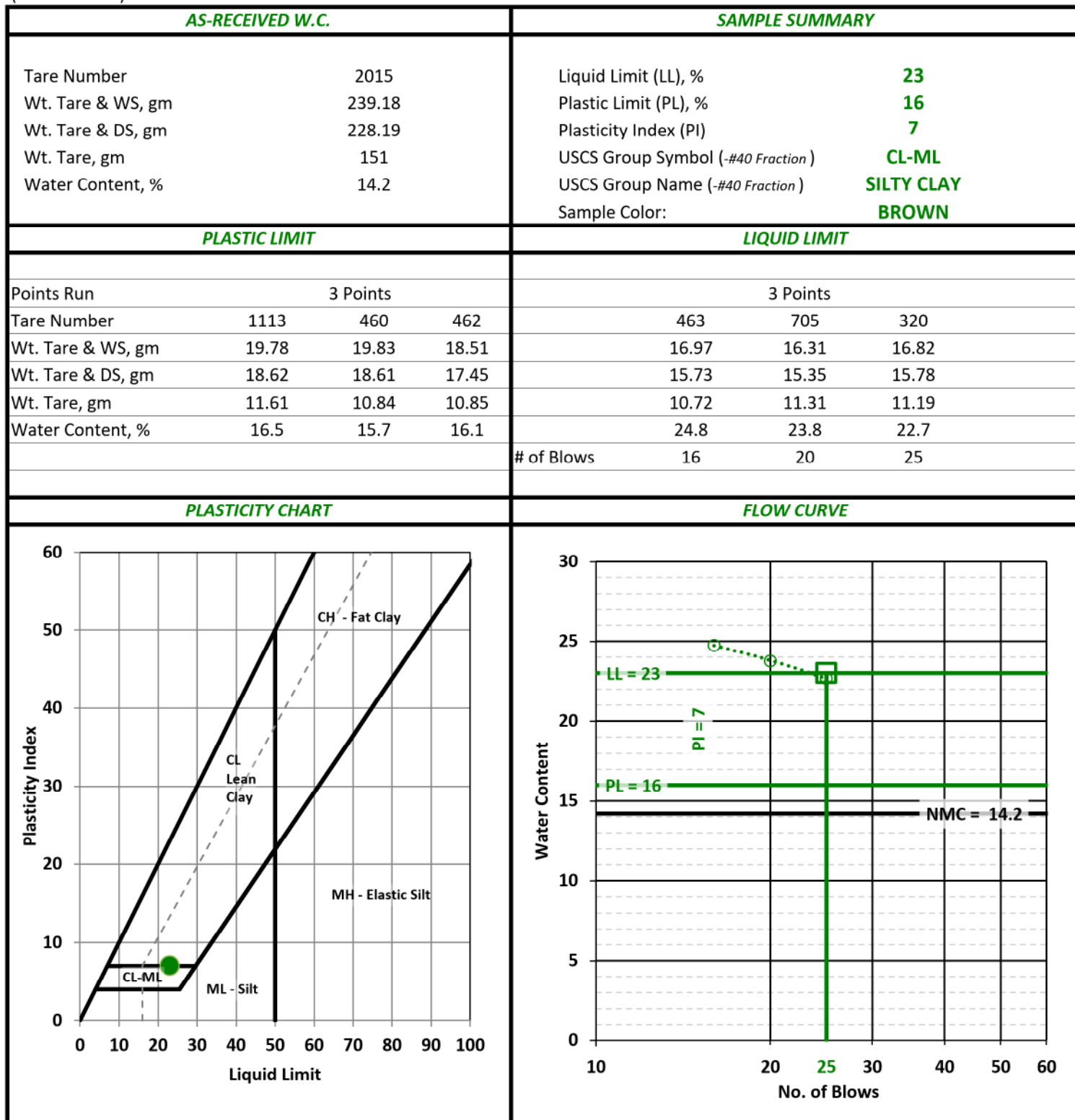
Reviewed By: BS

Date Tested: 9/8/2025

LIQUID LIMIT, PLASTIC LIMIT, AND PLASTICITY INDEX OF SOILS
ASTM D4318-17e1

Client	Civil & Environmental Consultants, Inc. (CEC)	Boring	AP-2
Client Project	345-817.0004 AEP Kammer Plant	Depth	13.5'-15.0'
Project No.	25-04143	Sample	SS-6
		Lab Sample	25-04143 -15

Soil Description: BROWN SILTY CLAY
 (-#40 Fraction)



Performed By: RH

Input Validation: MA

Reviewed By: BS

Date Tested: 9/8/2025

PARTICLE-SIZE ANALYSIS OF SOILS - ASTM D422-63(2007)

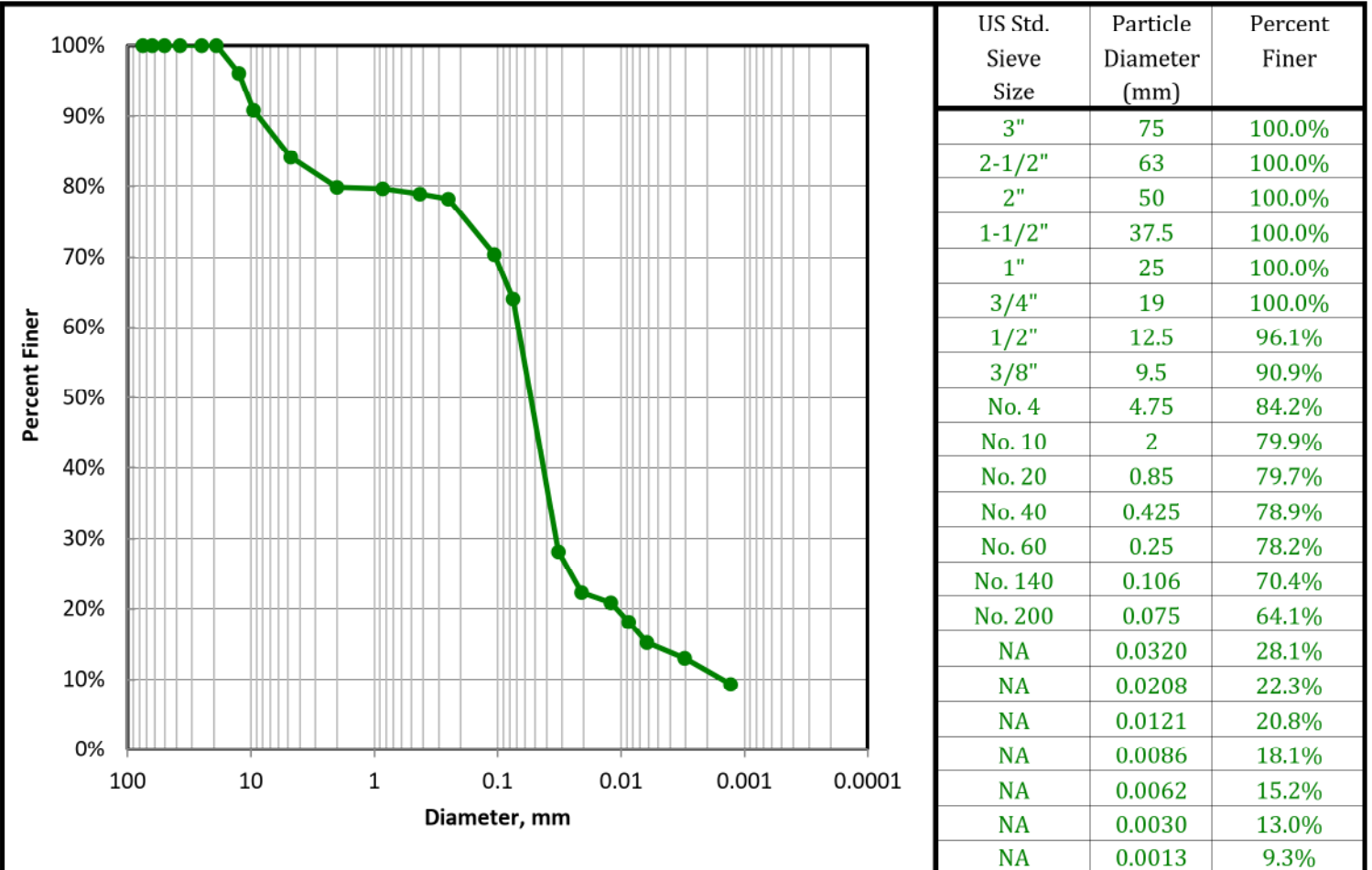
Client	Civil & Environmental Consultants, Inc. (CEC)	Boring	AP-2
Client Project	345-817.0004 AEP Kammer Plant	Depth	13.5'-15.0'
Project No.	25-04143	Sample	SS-6
		Lab Sample	25-04143 -15

Sample Color: **BROWN**

USCS Group Name: **SANDY SILTY CLAY WITH GRAVEL**

USCS Group Symbol: **CL-ML** USDA: **LOAM**

AASHTO: **A-4 (2)**



USCS SOIL CLASSIFICATION				USDA CLASSIFICATION				
Corrected For 100% Passing a 3" Sieve				Particle Size (mm)	Percent Finer (%)	Percent of Each Component (Material) (%)		Corrected Percent of -2.0 mm Material for USDA
% Gravel (-3" & + #4)	15.8	Silt=49.6% Clay=14.5%						
Coarse=0; Fine=15.8		D60, mm	NA			Gravel	20.1	0
% Sand (-#4 & + #200)	20.1	D30, mm	NA					
Coarse=4.3; Medium=1; Fine=14.9		D10, mm	NA					
% Fines (-#200)	64.1	Cc	NA					
% Plus #200 (-3")	35.9	Cu	NA	100	100			
USCS Description				2	79.9			
SANDY SILTY CLAY WITH GRAVEL								
USCS Group Symbol		Atterberg Limits Group Symbol		0.05	47.0			
CL-ML		CL-ML - SILTY CLAY						
Auxiliary Information		Wt Ret, gm	% Retained	% Finer	0.002	11.2		
12" Sieve - 300 mm	0	0.0	100.0	USDA Classification LOAM				
6" Sieve - 150 mm	0	0.0	100.0					
3" Sieve - 75 mm	0	0.0	100.0					

USDA CLASSIFICATION CHART

Client	Civil & Environmental Consultants, Inc. (CEC)	Boring	AP-2
Client Project	345-817.0004 AEP Kammer Plant	Depth	13.5'-15.0'
Project No.	25-04143	Sample	SS-6
		Lab Sample	25-04143 -15

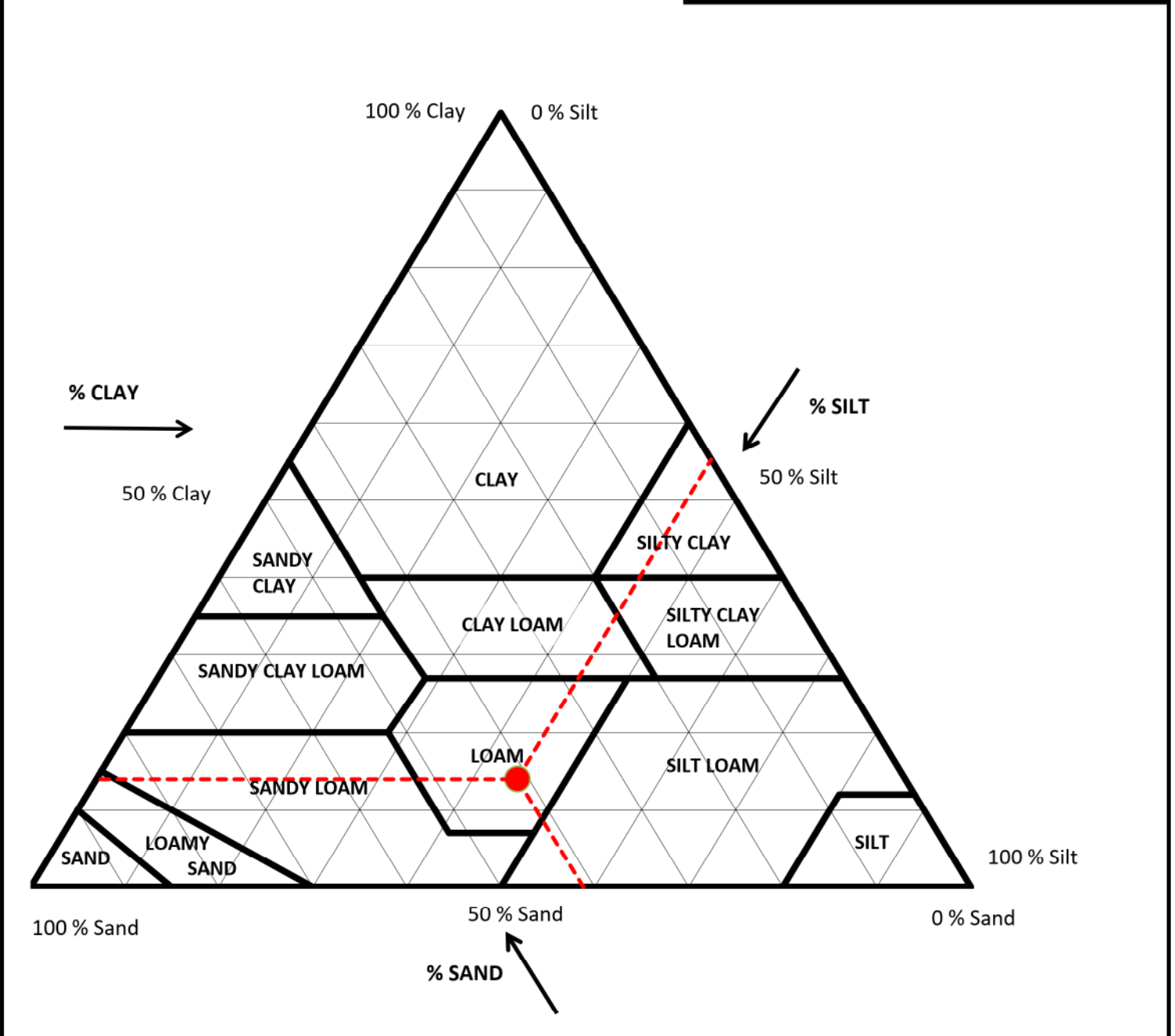
Sample Color: **BROWN**

USCS Group Name: **SANDY SILTY CLAY WITH GRAVEL**

USCS Group Symbol: **CL-ML** USDA: **LOAM**

AASHTO: **A-4 (2)**

Corrected for 0% gravel		Sand Subsizes Corrected Percentages	
Percent Gravel, %	0.0	Very Coarse Sand; 2-1	0.2
Percent Sand, %	41.2	Coarse Sand; 1-0.5	0.8
Percent Silt, %	44.8	Medium Sand; 0.5-0.25	1.1
Percent Clay, %	14.0	Fine Sand; 0.25-0.1	11.1
		Very Fine Sand; 0.1-0.05	28.0
		Total	41.2



PARTICLE-SIZE ANALYSIS OF SOILS - ASTM D422-63(2007)

Client	Civil & Environmental Consultants, Inc. (CEC)	Boring	AP-3
Client Project	345-817.0004 AEP Kammer Plant	Depth	18.5'-20.0'
Project No.	25-04143	Sample	SS-6
		Lab Sample	25-04143 -22

Sample Color: **BROWN**
 USCS Group Name: **SILTY SAND**
 USCS Group Symbol: **SM**

USDA: **SANDY LOAM** AASHTO: **A-4 (0)**

Dry Prep: R58-11(2018)¹

MECHANICAL SIEVE								
Total Sample		Sieve Size	Nominal Opening, mm	Dry Wt, gm	Split Normalized		Project Specifications	
					% Retained	% Finer		
Tare No.	2062	3"	75	0	0.0%	100.0%		
Tare + WS., gm	461.03	2-1/2"	63	0	0.0%	100.0%		
Tare + DS., gm	410.76	2"	50	0	0.0%	100.0%		
Tare, gm	154.20	1-1/2"	37.5	0	0.0%	100.0%		
Total sample WC	19.6%	1"	25	0	0.0%	100.0%		
Total Sample Dry Wt, gm (-3")	257	3/4"	19	0	0.0%	100.0%		
Hygroscopic WC (-#10)		1/2"	12.5	0	0.0%	100.0%		
Tare No.	208	3/8"	9.5	0	0.0%	100.0%		
Tare + WS., gm	36.06	No. 4	4.75	0	0.0%	100.0%		
Tare + DS., gm	35.92	No. 10	2	0.07	0.0%	100.0%		
Tare, gm	16.79	No. 20	0.85	0.16	0.2%	99.7%		
Hygroscopic WC	0.73%	No. 40	0.425	1.07	1.5%	98.2%		
		No. 60	0.25	3.57	5.1%	93.2%		
-#10 Hydro/Sieve air dry wt.	70.47	No. 140	0.106	31.40	44.5%	48.6%		
Wt. of +#200 Sample, gm	41.90	No. 200	0.075	5.70	8.1%	40.5%		
HYDROMETER (-#10)								
Split Air Dry Wt	70.99						Specific Gravity	2.7
Hygroscopic WC	0.73%							Assumed
Corrected Dry wt	70.5	-#10 Dispersed 1min in Hamilton Beach Mixer					a Factor	0.9889
Elapsed Time (min.)	R Measured	Temp °C	Composite Correction	R Corrected	K Factor	Percent Finer (%)	Particle Diameter (mm)	Adjusted % Finer (%)
2	25.0	23.6	4.7	20.3	0.0129	28.5	0.0318	28.5%
5	21.0	23.6	4.7	16.3	0.0129	22.9	0.0206	22.9%
15	19.5	23.6	4.7	14.8	0.0129	20.8	0.0120	20.8%
30	18.0	23.7	4.6	13.4	0.0129	18.8	0.0086	18.8%
60	17.0	23.8	4.6	12.4	0.0129	17.4	0.0061	17.4%
250	14.0	23.9	4.6	9.4	0.0129	13.2	0.0030	13.2%
1440	12.0	23.9	4.6	7.4	0.0129	10.4	0.0013	10.4%
USCS SOIL CLASSIFICATION				USDA CLASSIFICATION				
Corrected For 100% Passing a 3" Sieve				Particle Size (mm)	Percent Finer (%)	Percent of Each Component (Material) (%)		Corrected Percent of -2.0 mm Material for USDA
% Gravel (-3" & +#4)	0.0	Silt=24.3% Clay=16.2%						
Coarse=0; Fine=0		D60, mm	NA					
% Sand (-#4 & +#200)	59.5	D30, mm	NA					
Coarse=0; Medium=1.7; Fine=57.7		D10, mm	NA					
% Fines (-#200)	40.5	Cc	NA	100	100	Gravel	0.0	0
% Plus #200 (-3")	59.5	Cu	NA	2	100.0	Sand	65.1	65.1
USCS Description				0.05	34.8	Silt	23.0	23.0
SILTY SAND				0.002	11.8	Clay	11.8	11.8
USCS Group Symbol	Atterberg Limits Group Symbol			USDA Classification				
SM	NP - NON PLASTIC			SANDY LOAM				
Auxiliary Information	Wt Ret, gm	% Retained	% Finer					
12" Sieve - 300 mm	0	0.0	100.0					
6" Sieve - 150 mm	0	0.0	100.0					
3" Sieve - 75 mm	0	0.0	100.0					

Performed By: RH Input Validation: MA Reviewed By: BS Date Tested: 9/8/2025

LIQUID LIMIT, PLASTIC LIMIT, AND PLASTICITY INDEX OF SOILS

ASTM D4318-17e1

Client	Civil & Environmental Consultants, Inc. (CEC)	Boring	AP-3
Client Project	345-817.0004 AEP Kammer Plant	Depth	18.5'-20.0'
Project No.	25-04143	Sample	SS-6
		Lab Sample	25-04143 -22

Soil Description: BROWN NON PLASTIC MATERIAL
(-#40 Fraction)

AS-RECEIVED W.C.		SAMPLE SUMMARY	
Tare Number	2062	Liquid Limit (LL), %	NA
Wt. Tare & WS, gm	461.03	Plastic Limit (PL), %	NA
Wt. Tare & DS, gm	410.76	Plasticity Index (PI)	NA
Wt. Tare, gm	154.2	USCS Group Symbol (-#40 Fraction)	NP
Water Content, %	19.6	USCS Group Name (-#40 Fraction)	NON PLASTIC
		Sample Color:	BROWN
PLASTIC LIMIT		LIQUID LIMIT	
Points Run	0 Non-Plastic	0 Non-Plastic	
Tare Number			
Wt. Tare & WS, gm			
Wt. Tare & DS, gm			
Wt. Tare, gm			
Water Content, %			
		# of Blows	
PLASTICITY CHART		FLOW CURVE	

Performed By: RH

Input Validation:MA

Reviewed By: BS

Date Tested: 9/8/2025

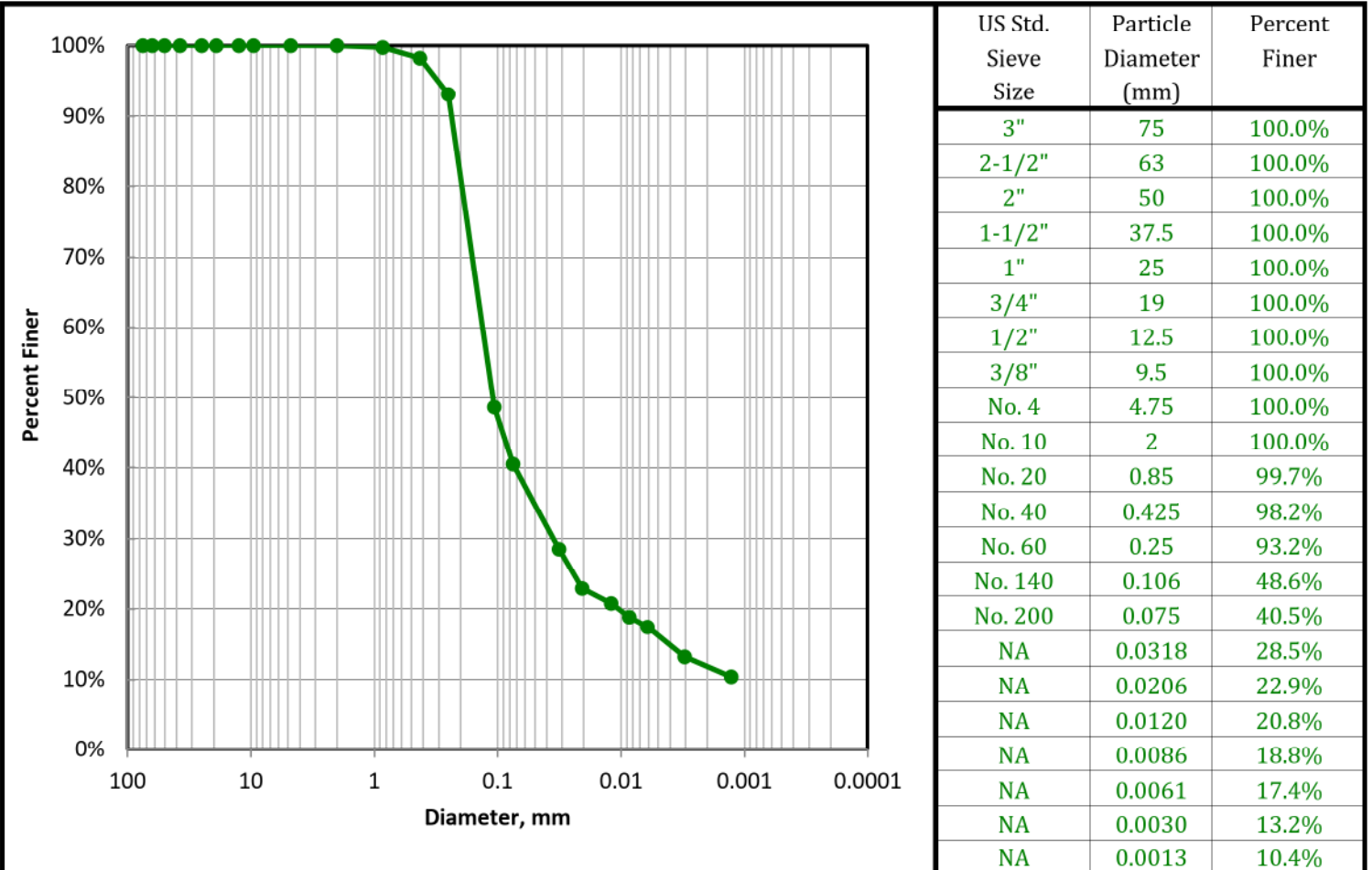
PARTICLE-SIZE ANALYSIS OF SOILS - ASTM D422-63(2007)

Client	Civil & Environmental Consultants, Inc. (CEC)	Boring	AP-3
Client Project	345-817.0004 AEP Kammer Plant	Depth	18.5'-20.0'
Project No.	25-04143	Sample	SS-6
		Lab Sample	25-04143 -22

Sample Color: **BROWN**
 USCS Group Name: **SILTY SAND**
 USCS Group Symbol: **SM**

USDA: **SANDY LOAM**

AASHTO: **A-4 (0)**



USCS SOIL CLASSIFICATION				USDA CLASSIFICATION					
Corrected For 100% Passing a 3" Sieve				Particle Size (mm)	Percent Finer (%)	Percent of Each Component (Material) (%)		Corrected Percent of -2.0 mm Material for USDA	
% Gravel (-3" & + #4)	0.0	Silt=24.3% Clay=16.2%							
Coarse=0; Fine=0		D60, mm	NA						
% Sand (-#4 & + #200)	59.5	D30, mm	NA						
Coarse=0; Medium=1.7; Fine=57.7		D10, mm	NA						
% Fines (-#200)	40.5	Cc	NA	100	100				
% Plus #200 (-3")	59.5	Cu	NA	2	100.0	Gravel	0.0	0	
USCS Description				0.05	34.8	Sand	65.1	65.1	
SILTY SAND				0.002	11.8	Silt	23.0	23.0	
USCS Group Symbol		Atterberg Limits Group Symbol							
SM		NP - NON PLASTIC							
Auxiliary Information		Wt Ret, gm	% Retained	% Finer					
12" Sieve - 300 mm		0	0.0	100.0					
6" Sieve - 150 mm		0	0.0	100.0					
3" Sieve - 75 mm		0	0.0	100.0					
					USDA Classification				
					SANDY LOAM				

USDA CLASSIFICATION CHART

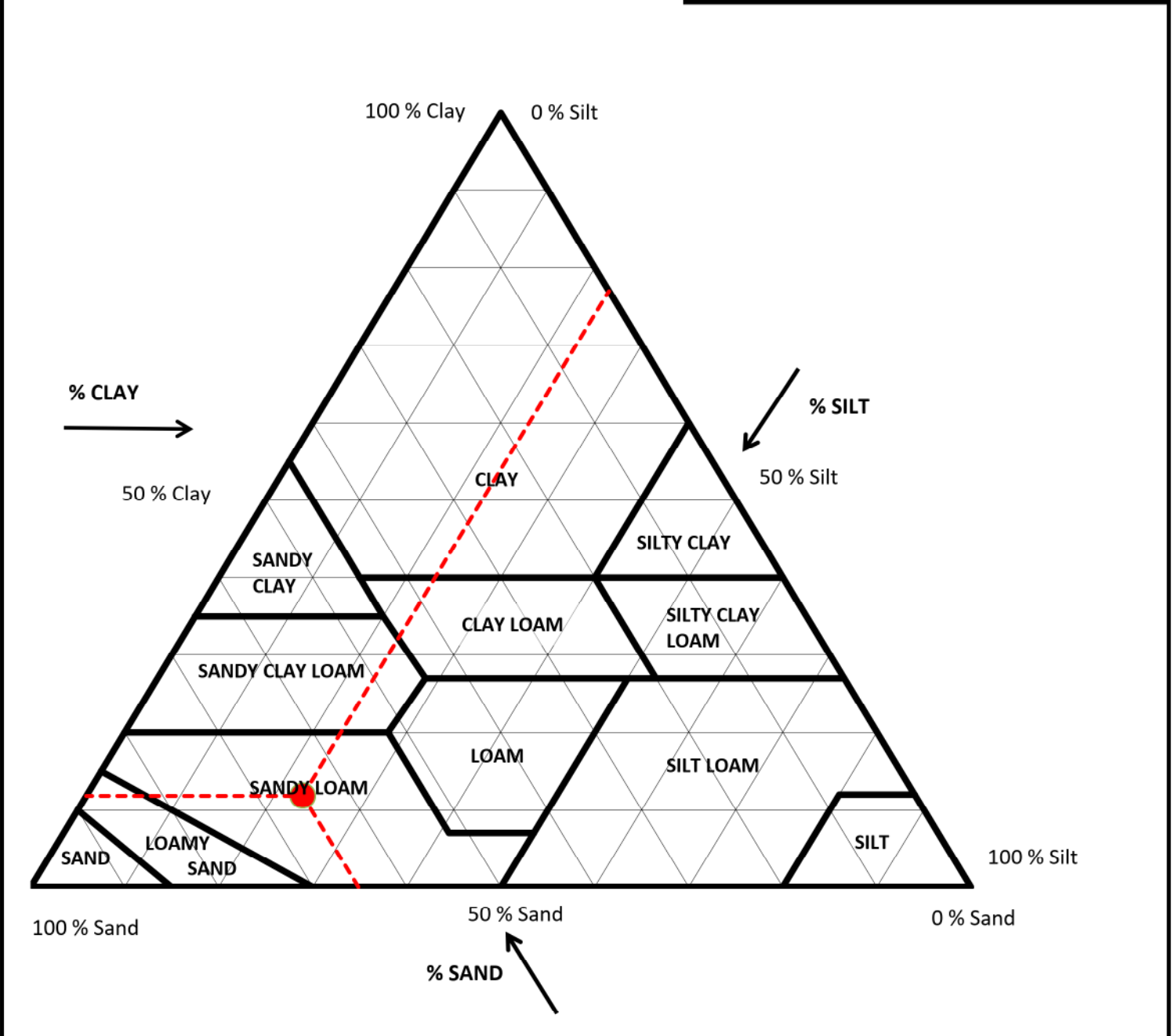
Client	Civil & Environmental Consultants, Inc. (CEC)	Boring	AP-3
Client Project	345-817.0004 AEP Kammer Plant	Depth	18.5'-20.0'
Project No.	25-04143	Sample	SS-6
		Lab Sample	25-04143 -22

Sample Color: **BROWN**
 USCS Group Name: **SILTY SAND**
 USCS Group Symbol: **SM**

USDA: **SANDY LOAM**

AASHTO: **A-4 (0)**

Corrected for 0% gravel		Sand Subsizes	
Percent Gravel, %	0.0	Corrected Percentages	
Percent Sand, %	65.1	Very Coarse Sand; 2-1	0.2
Percent Silt, %	23.0	Coarse Sand; 1-0.5	1.2
Percent Clay, %	11.8	Medium Sand; 0.5-0.25	5.4
		Fine Sand; 0.25-0.1	45.9
		Very Fine Sand; 0.1-0.05	12.4
		Total	65.1



PARTICLE-SIZE ANALYSIS OF SOILS - ASTM D422-63(2007)

Client	Civil & Environmental Consultants, Inc. (CEC)	Boring	AP-4
Client Project	345-817.0004 AEP Kammer Plant	Depth	13.5'-15.0'
Project No.	25-04143	Sample	SS-4
		Lab Sample	25-04143 26

Sample Color: BROWN
USCS Group Name: SANDY LEAN CLAY
USCS Group Symbol: CL

USDA: LOAM

AASHTO: A-6 (5)

Dry Prep: R58-11(2018)¹

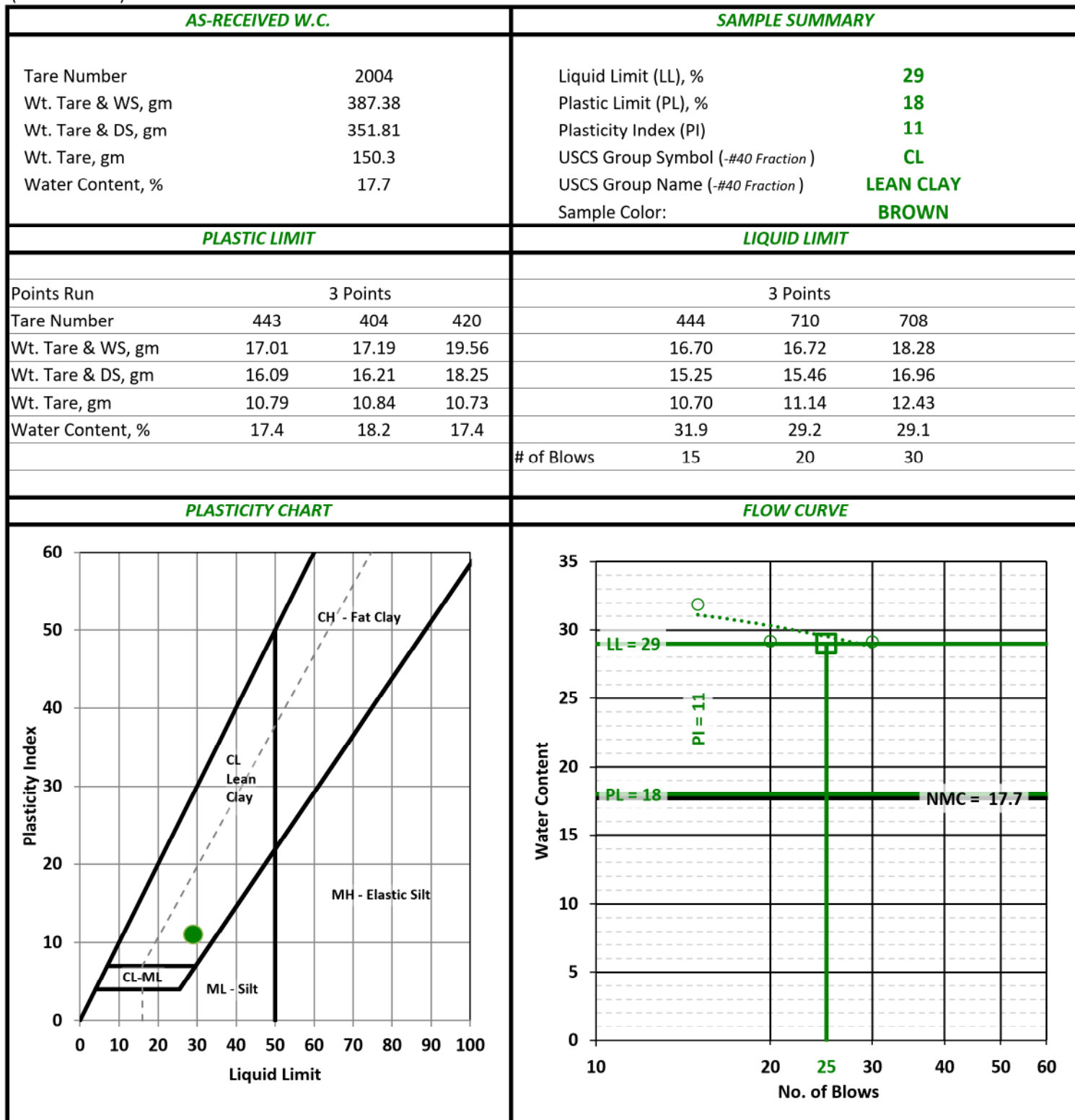
MECHANICAL SIEVE								
Total Sample		Sieve Size	Nominal Opening, mm	Dry Wt, gm	Split Normalized		Project Specifications	
Tare No.	2004	3"	75	0	% Retained	% Finer		
Tare + WS., gm	387.38	2-1/2"	63	0	0.0%	100.0%		
Tare + DS., gm	351.81	2"	50	0	0.0%	100.0%		
Tare, gm	150.30	1-1/2"	37.5	0	0.0%	100.0%		
Total sample WC	17.7%	1"	25	0	0.0%	100.0%		
Total Sample Dry Wt, gm (-3")	202	3/4"	19	0	0.0%	100.0%		
Hygroscopic WC (-#10)		1/2"	12.5	0	0.0%	100.0%		
Tare No.	218	3/8"	9.5	0	0.0%	100.0%		
Tare + WS., gm	44.42	No. 4	4.75	0	0.0%	100.0%		
Tare + DS., gm	44.26	No. 10	2	0.07	0.0%	100.0%		
Tare, gm	16.82	No. 20	0.85	0.02	0.0%	99.9%		
Hygroscopic WC	0.58%	No. 40	0.425	0.09	0.1%	99.8%		
		No. 60	0.25	0.42	0.5%	99.3%		
-#10 Hydro/Sieve air dry wt.	80.88	No. 140	0.106	21.58	26.7%	72.6%		
Wt. of +#200 Sample, gm	29.83	No. 200	0.075	7.72	9.5%	63.1%		
HYDROMETER (-#10)								
Split Air Dry Wt	81.35						Specific Gravity	2.7
Hygroscopic WC	0.58%							Assumed
Corrected Dry wt	80.9	-#10 Dispersed 1min in Hamilton Beach Mixer					a Factor	0.9889
Elapsed Time (min.)	R Measured	Temp °C	Composite Correction	R Corrected	K Factor	Percent Finer (%)	Particle Diameter (mm)	Adjusted % Finer (%)
2	36.0	23.6	4.7	31.3	0.0129	38.3	0.0293	38.3%
5	32.0	23.7	4.6	27.4	0.0129	33.5	0.0191	33.5%
15	27.0	23.7	4.6	22.4	0.0129	27.4	0.0114	27.4%
30	26.0	23.7	4.6	21.4	0.0129	26.2	0.0081	26.2%
60	23.0	23.8	4.6	18.4	0.0129	22.5	0.0059	22.5%
250	19.0	23.8	4.6	14.4	0.0129	17.6	0.0029	17.6%
1440	17.0	20.0	5.7	11.3	0.0135	13.8	0.0013	13.8%
USCS SOIL CLASSIFICATION				USDA CLASSIFICATION				
Corrected For 100% Passing a 3" Sieve				Particle Size (mm)	Percent Finer (%)	Percent of Each Component (Material) (%)		Corrected Percent of -2.0 mm Material for USDA
% Gravel (-3" & +#4)	0.0	Silt=41.7% Clay=21.4%						
Coarse=0; Fine=0		D60, mm	NA	100	100	Gravel	0.0	0
% Sand (-#4 & +#200)		D30, mm	NA					
Coarse=0; Medium=0.1; Fine=36.7		D10, mm	NA					
% Fines (-#200)		Cc	NA					
% Plus #200 (-3")		Cu	NA	2	100.0	Sand	47.6	47.6
USCS Description								
SANDY LEAN CLAY								
USCS Group Symbol		Atterberg Limits Group Symbol						
CL		CL - LEAN CLAY		0.05	52.4	Silt	36.6	36.6
Auxiliary Information		Wt Ret, gm	% Retained					
12" Sieve - 300 mm		0	0.0	100.0	USDA Classification	LOAM		
6" Sieve - 150 mm		0	0.0	100.0				
3" Sieve - 75 mm		0	0.0	100.0				

Performed By: RH Input Validation: MA Reviewed By: BS Date Tested: 9/8/2025

LIQUID LIMIT, PLASTIC LIMIT, AND PLASTICITY INDEX OF SOILS
ASTM D4318-17e1

Client	Civil & Environmental Consultants, Inc. (CEC)	Boring	AP-4
Client Project	345-817.0004 AEP Kammer Plant	Depth	13.5'-15.0'
Project No.	25-04143	Sample	SS-4
		Lab Sample	25-04143 26

Soil Description: BROWN LEAN CLAY
 (-#40 Fraction)



Performed By: RH

Input Validation: MA

Reviewed By: BS

Date Tested: 9/8/2025

PARTICLE-SIZE ANALYSIS OF SOILS - ASTM D422-63(2007)

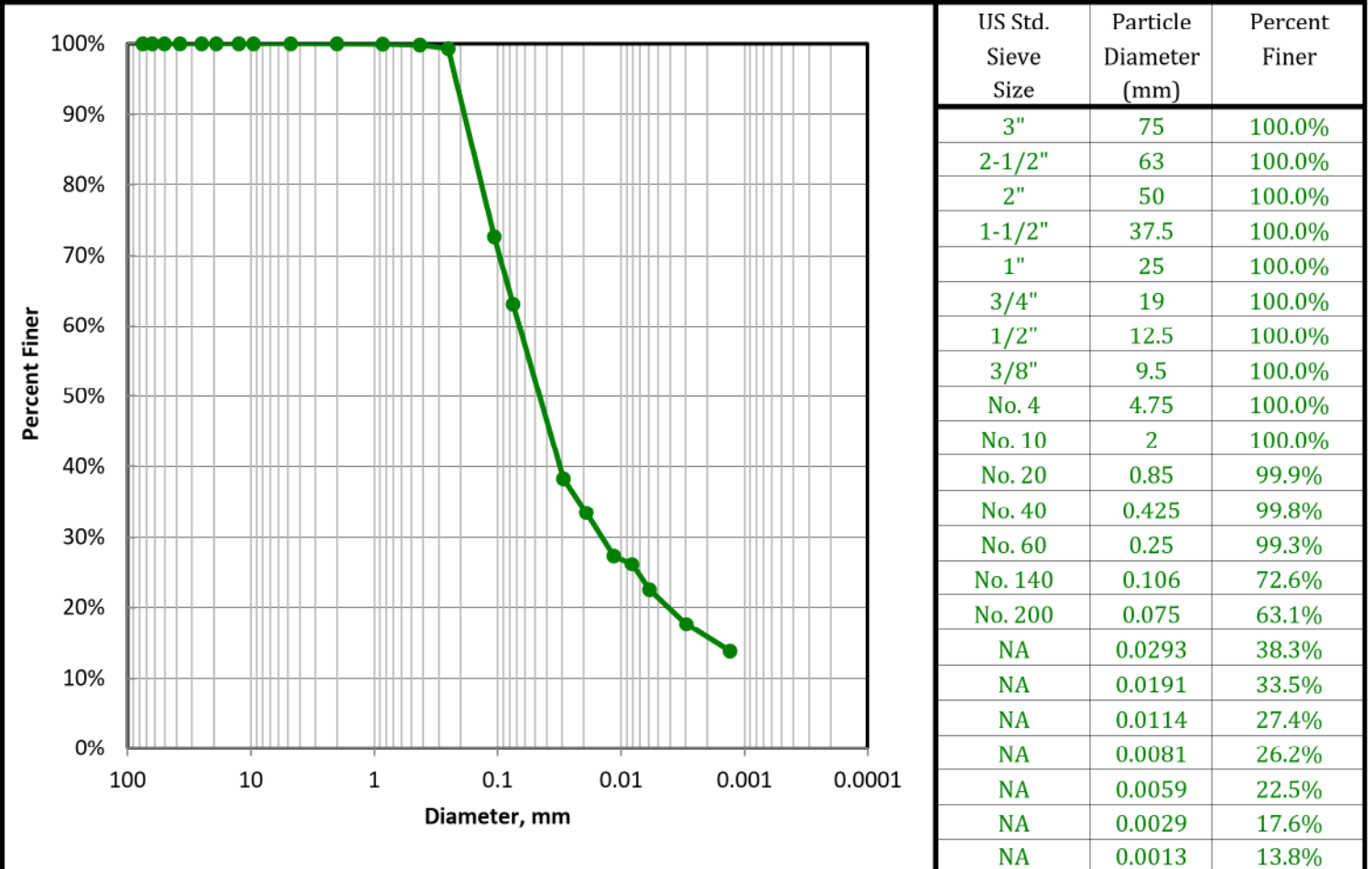
Client	Civil & Environmental Consultants, Inc. (CEC)	Boring	AP-4
Client Project	345-817.0004 AEP Kammer Plant	Depth	13.5'-15.0'
Project No.	25-04143	Sample	SS-4
		Lab Sample	25-04143 26

Sample Color: **BROWN**

USCS Group Name: **SANDY LEAN CLAY**

USCS Group Symbol: **CL** USDA: **LOAM**

AASHTO: **A-6 (5)**



USCS SOIL CLASSIFICATION				USDA CLASSIFICATION					
Corrected For 100% Passing a 3" Sieve				Particle Size (mm)	Percent Finer (%)	Percent of Each Component (Material) (%)		Corrected Percent of -2.0 mm Material for USDA	
% Gravel (-3" & + #4)	0.0	Silt=41.7% Clay=21.4%							
Coarse=0; Fine=0		D60, mm	NA						
% Sand (-#4 & + #200)	36.9	D30, mm NA							
Coarse=0; Medium=0.1; Fine=36.7		D10, mm	NA						
% Fines (-#200)	63.1	Cc NA		100	100				
% Plus #200 (-3")	36.9	Cu NA		2	100.0	Gravel	0.0	0	
USCS Description				0.05	52.4	Sand	47.6	47.6	
SANDY LEAN CLAY				0.002	15.8	Silt	36.6	36.6	
USCS Group Symbol		Atterberg Limits Group Symbol				Clay	15.8	15.8	
CL		CL - LEAN CLAY		USDA Classification					
Auxiliary Information		Wt Ret, gm	% Retained	% Finer	LOAM				
12" Sieve - 300 mm	0	0.0	100.0						
6" Sieve - 150 mm	0	0.0	100.0						
3" Sieve - 75 mm	0	0.0	100.0						

USDA CLASSIFICATION CHART

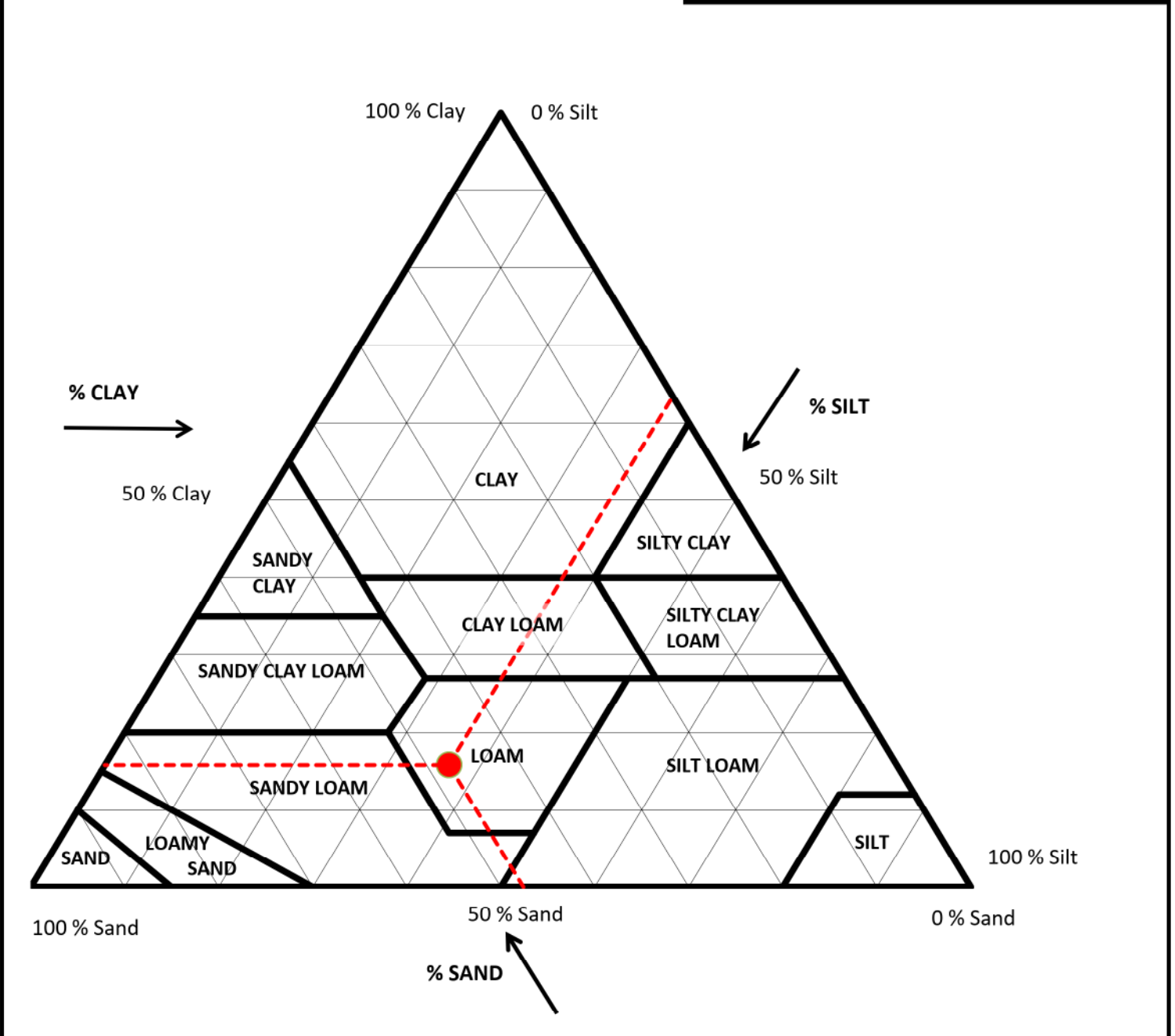
Client	Civil & Environmental Consultants, Inc. (CEC)	Boring	AP-4
Client Project	345-817.0004 AEP Kammer Plant	Depth	13.5'-15.0'
Project No.	25-04143	Sample	SS-4
		Lab Sample	25-04143 26

Sample Color: **BROWN**
 USCS Group Name: **SANDY LEAN CLAY**
 USCS Group Symbol: **CL**

USDA: **LOAM**

AASHTO: **A-6 (5)**

Corrected for 0% gravel	Sand Subsizes Corrected Percentages
Percent Gravel, % 0.0	Very Coarse Sand; 2-1 0.0
Percent Sand, % 47.6	Coarse Sand; 1-0.5 0.1
Percent Silt, % 36.6	Medium Sand; 0.5-0.25 0.5
Percent Clay, % 15.8	Fine Sand; 0.25-0.1 28.3
	Very Fine Sand; 0.1-0.05 18.7
	Total 47.6



PARTICLE-SIZE ANALYSIS OF SOILS - ASTM D422-63(2007)

Client	Civil & Environmental Consultants, Inc. (CEC)	Boring	AP-5
Client Project	345-817.0004 AEP Kammer Plant	Depth	3.0'-5.0'
Project No.	25-04143	Sample	ST-1
		Lab Sample	25-04143 -01

Sample Color: **BROWN**
 USCS Group Name: **LEAN CLAY WITH SAND**
 USCS Group Symbol: **CL**

USDA: **LOAM** AASHTO: **A-6 (10)**

Dry Prep: R58-11(2018)¹

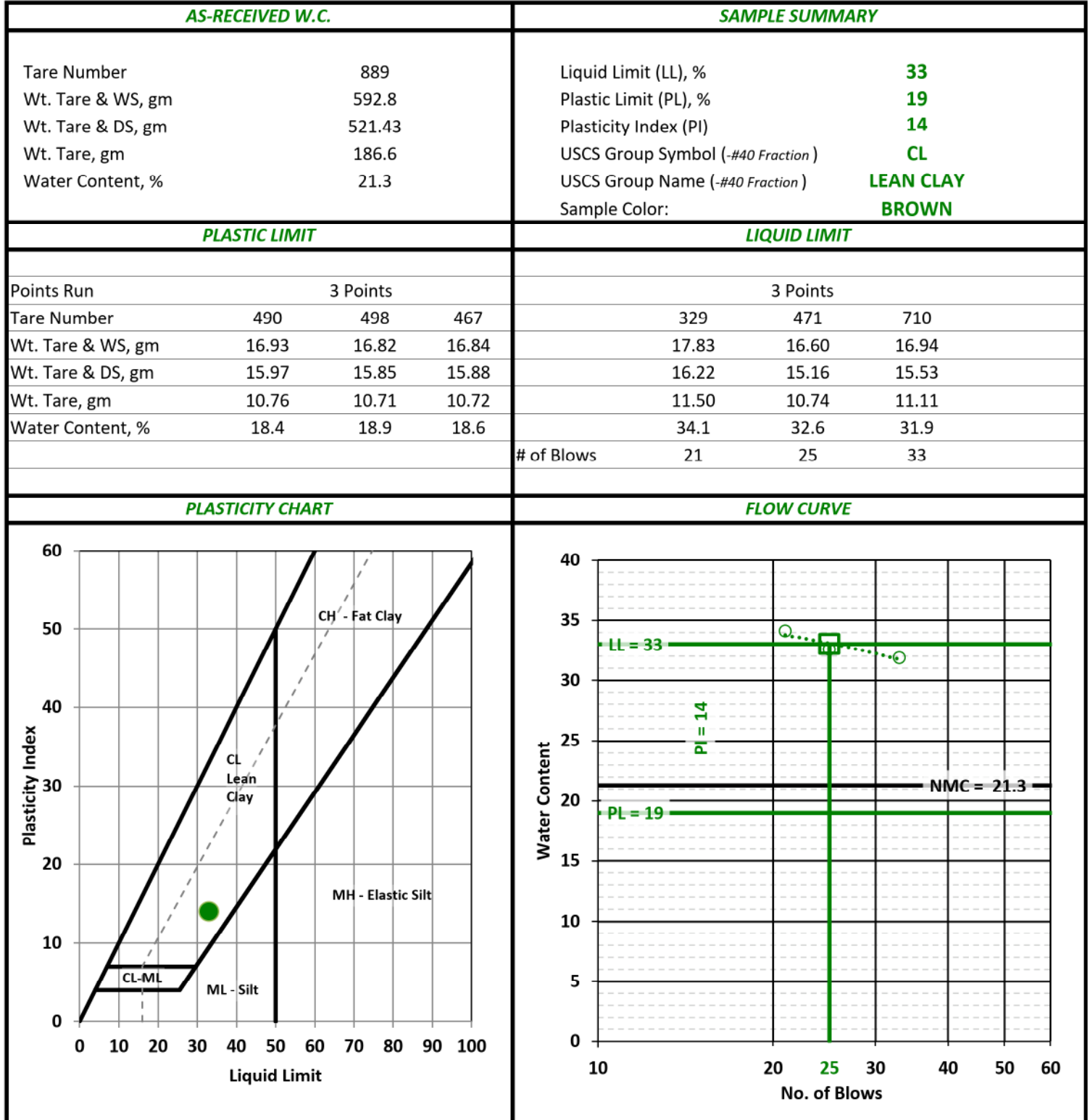
MECHANICAL SIEVE								
Total Sample			Sieve Size	Nominal Opening, mm	Dry Wt, gm	Split Normalized		Project Specifications
Tare No.	889		3"	75	0	% Retained	% Finer	
Tare + WS., gm	592.80		2-1/2"	63	0	0.0%	100.0%	
Tare + DS., gm	521.43		2"	50	0	0.0%	100.0%	
Tare, gm	186.60		1-1/2"	37.5	0	0.0%	100.0%	
Total sample WC	21.3%		1"	25	0	0.0%	100.0%	
Total Sample Dry Wt, gm (-3")	335		3/4"	19	0	0.0%	100.0%	
Hygroscopic WC (-#10)			1/2"	12.5	0	0.0%	100.0%	
Tare No.	336		3/8"	9.5	4.32	1.3%	98.7%	
Tare + WS., gm	41.39		No. 4	4.75	3.29	1.0%	97.7%	
Tare + DS., gm	41.24		No. 10	2	3.52	1.1%	96.7%	
Tare, gm	11.15		No. 20	0.85	0.95	1.3%	95.4%	
Hygroscopic WC	0.50%		No. 40	0.425	0.29	0.4%	95.0%	
			No. 60	0.25	0.03	0.0%	95.0%	
-#10 Hydro/Sieve air dry wt.	72.45		No. 140	0.106	5.49	7.3%	87.7%	
Wt. of +#200 Sample, gm	11.05		No. 200	0.075	4.29	5.7%	81.9%	
HYDROMETER (-#10)								
Split Air Dry Wt	72.81						Specific Gravity	2.7
Hygroscopic WC	0.50%							Assumed
Corrected Dry wt	72.4	#10 Dispersed 1min in Hamilton Beach Mixer					a Factor	0.9889
Elapsed Time (min.)	R Measured	Temp *C	Composite Correction	R Corrected	K Factor	Percent Finer (%)	Particle Diameter (mm)	Adjusted % Finer (%)
2	46.0	23.6	4.7	41.3	0.0129	56.4	0.0269	54.5%
5	40.0	23.6	4.7	35.3	0.0129	48.2	0.0179	46.6%
15	36.5	23.6	4.7	31.8	0.0129	43.4	0.0107	42.0%
30	32.0	23.6	4.7	27.3	0.0129	37.3	0.0078	36.0%
60	30.0	23.6	4.7	25.3	0.0129	34.5	0.0056	33.4%
250	24.5	23.8	4.6	19.9	0.0129	27.2	0.0028	26.3%
1440	20.0	23.8	4.6	15.4	0.0129	21.0	0.0012	20.3%
USCS SOIL CLASSIFICATION				USDA CLASSIFICATION				
Corrected For 100% Passing a 3" Sieve				Particle Size (mm)	Percent Finer (%)	Percent of Each Component (Material) (%)		Corrected Percent of -2.0 mm Material for USDA
% Gravel (-3" & +#4)	2.3	Silt=49.7% Clay=32.2%						
Coarse=0; Fine=2.3		D60, mm	NA			Gravel	3.3	0
% Sand (-#4 & +#200)		D30, mm	NA					
Coarse=1.1; Medium=1.7; Fine=13.1		D10, mm	NA					
% Fines (-#200)		Cc	NA					
% Plus #200 (-3")		Cu	NA	100	100			
USCS Description				2	96.7			
LEAN CLAY WITH SAND						Sand	25.6	26.5
USCS Group Symbol		Atterberg Limits Group Symbol		0.05	71.1			
CL		CL - LEAN CLAY				Silt	47.3	48.9
Auxiliary Information		Wt Ret, gm	% Retained	% Finer	0.002	23.8		
12" Sieve - 300 mm		0	0.0	100.0	USDA Classification LOAM			
6" Sieve - 150 mm		0	0.0	100.0				
3" Sieve - 75 mm		0	0.0	100.0				

Performed By: RH Input Validation: MA Reviewed By: BLS Date Tested: 9/8/2025

LIQUID LIMIT, PLASTIC LIMIT, AND PLASTICITY INDEX OF SOILS
ASTM D4318-17e1

Client	Civil & Environmental Consultants, Inc. (CEC)	Boring	AP-5
Client Project	345-817.0004 AEP Kammer Plant	Depth	3.0'-5.0'
Project No.	25-04143	Sample	ST-1
		Lab Sample	25-04143 -01

Soil Description: BROWN LEAN CLAY
 (-#40 Fraction)



Performed By: RH

Input Validation: MA

Reviewed By: BS

Date Tested: 9/8/2025

PARTICLE-SIZE ANALYSIS OF SOILS - ASTM D422-63(2007)

Client	Civil & Environmental Consultants, Inc. (CEC)	Boring	AP-5
Client Project	345-817.0004 AEP Kammer Plant	Depth	3.0'-5.0'
Project No.	25-04143	Sample	ST-1
		Lab Sample	25-04143 -01

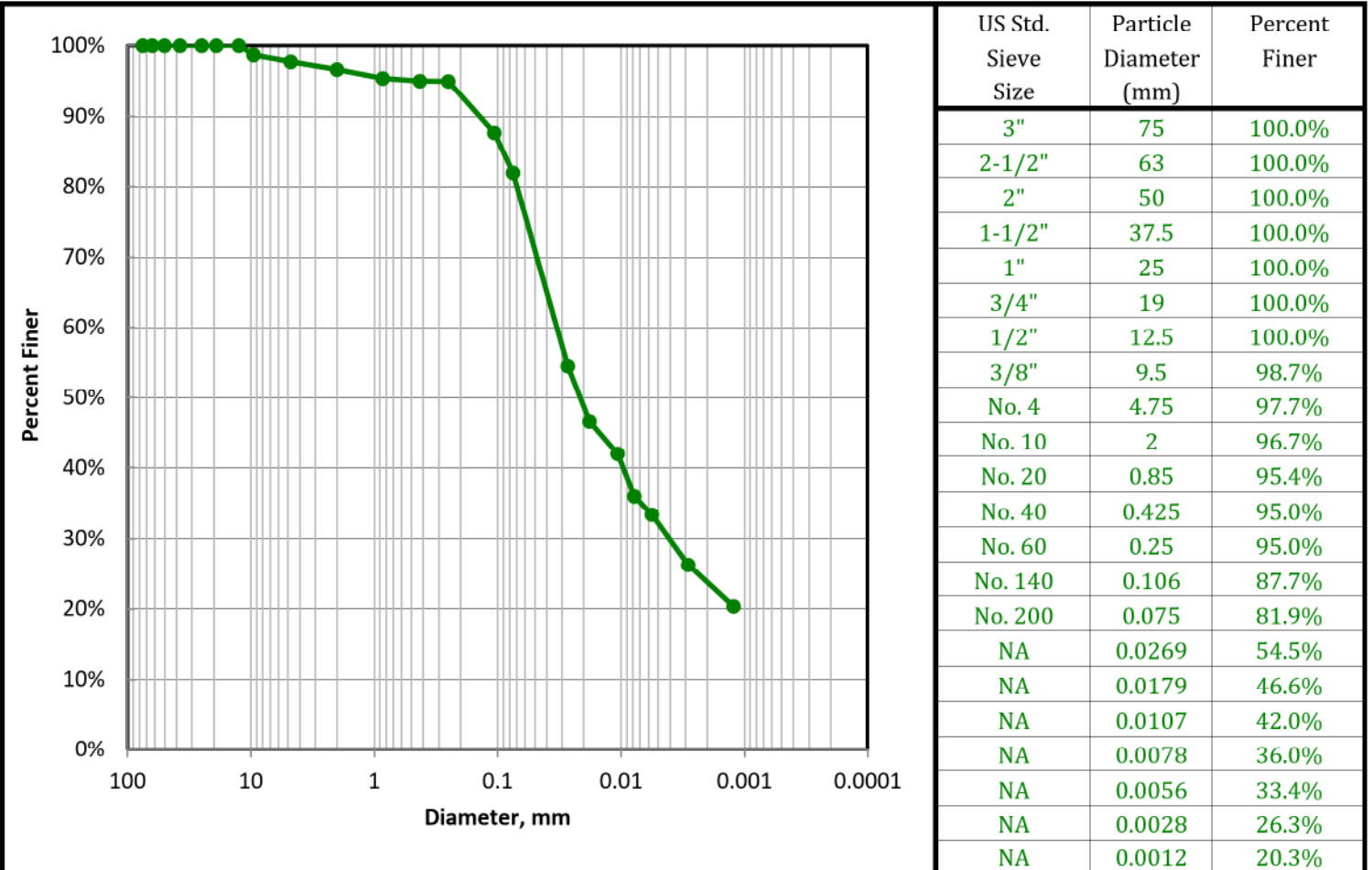
Sample Color: **BROWN**

USCS Group Name: **LEAN CLAY WITH SAND**

USCS Group Symbol: **CL**

USDA: **LOAM**

AASHTO: **A-6 (10)**



USCS SOIL CLASSIFICATION				USDA CLASSIFICATION					
Corrected For 100% Passing a 3" Sieve				Particle Size (mm)	Percent Finer (%)	Percent of Each Component (Material) (%)		Corrected Percent of -2.0 mm Material for USDA	
% Gravel (-3" & + #4)	2.3	Silt=49.7% Clay=32.2%							
Coarse=0; Fine=2.3		D60, mm	NA						
% Sand (-#4 & + #200)	15.8	D30, mm	NA						
Coarse=1.1; Medium=1.7; Fine=13.1		D10, mm	NA						
% Fines (-#200)	81.9	Cc	NA	100	100				
% Plus #200 (-3")	18.1	Cu	NA	2	96.7	Gravel	3.3	0	
USCS Description				0.05	71.1	Sand	25.6	26.5	
LEAN CLAY WITH SAND				0.002	23.8	Silt	47.3	48.9	
						Clay	23.8	24.6	
USCS Group Symbol		Atterberg Limits Group Symbol		USDA Classification LOAM					
CL		CL - LEAN CLAY							
Auxiliary Information		Wt Ret, gm	% Retained						% Finer
12" Sieve - 300 mm		0	0.0						100.0
6" Sieve - 150 mm		0	0.0						100.0
3" Sieve - 75 mm		0	0.0	100.0					

USDA CLASSIFICATION CHART

Client
Client Project
Project No.

Civil & Environmental Consultants, Inc. (CEC)
345-817.0004 AEP Kammer Plant
25-04143

Boring AP-5
Depth 3.0'-5.0'
Sample ST-1
Lab Sample 25-04143 -01

Sample Color: **BROWN**
USCS Group Name: **LEAN CLAY WITH SAND**
USCS Group Symbol: **CL**

USDA: **LOAM**

AASHTO: **A-6 (10)**

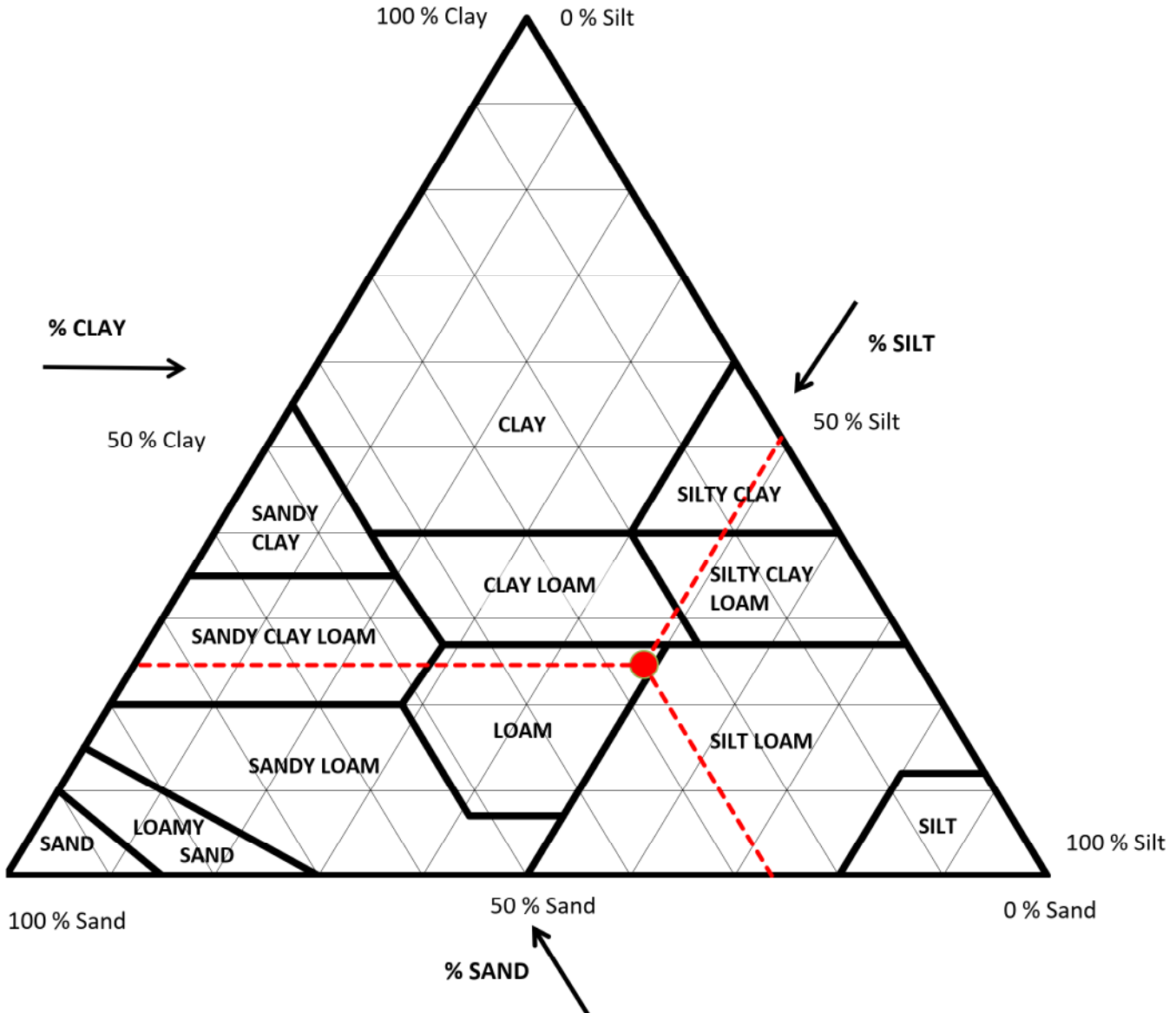
Corrected for 0% gravel

Percent Gravel, %	0.0
Percent Sand, %	26.5
Percent Silt, %	48.9
Percent Clay, %	24.6

Sand Subsizes

Corrected Percentages

Very Coarse Sand; 2-1	1.1
Coarse Sand; 1-0.5	0.6
Medium Sand; 0.5-0.25	0.1
Fine Sand; 0.25-0.1	8.6
Very Fine Sand; 0.1-0.05	16.1
Total	26.5



Consolidated-Undrained Triaxial Compression

Client: Civil & Environmental Consultants, Inc.
 Project: 345-817.0004
 Sample: AP-5 (3' - 5') ST-1

TRI Log #: 25-04143.1
 Test Method: ASTM D4767

Specimens				
Identification	1	2	3	4
Depth/Elev. (ft)	-	-	-	-
Eff. Consol. Stress (psi)	5.0	20.0	40.0	-
Initial Specimen Properties				
Avg. Diameter (in)	2.82	2.83	2.79	-
Avg. Height (in)	5.99	5.88	6.03	-
Avg. Water Content (%)	27.9	29.1	27.4	-
Bulk Density (pcf)	118.9	117.8	129.0	-
Dry Density (pcf)	92.9	91.3	101.2	-
Specific Gravity (Assumed)	2.75			
Saturation (%)	90.7	90.9	108.5	-
Void Ratio, n	0.85	0.88	0.69	-
B-Value, End of Saturation	0.93	0.94	0.93	-

Test Setup	
Specimen Condition	Undisturbed / Intact
Specimen Preparation	Trimmed
Mounting Method	Wet
Consolidation	Isotropic

Post-Consolidation / Pre-Shear				
Void Ratio	0.85	0.84	0.64	-

Shear / Post-Shear				
Rate of Strain (%/hr)	1.00	1.00	1.00	-
Avg. Water Content (%)	27.3	27.7	27.4	-

At Failure								
Failure Criterion: Peak Principal Stress	Difference, $(\sigma_1' - \sigma_3')_{\max}$				Ratio, $(\sigma_1' / \sigma_3')_{\max}$			
Axial Strain at Failure (%), $\epsilon_{a,f}$	15.0	15.0	15.0	-	7.0	7.5	8.0	-
Minor Effective Stress (psi), $\sigma_3'_f$	4.2	8.7	22.1	-	3.1	7.7	18.0	-
Principal Stress Difference (psi), $(\sigma_1 - \sigma_3)_f$	10.6	24.1	55.1	-	9.0	21.9	47.7	-
Pore Water Pressure, Δu_f (psi)	0.8	11.3	18.0	-	1.9	12.3	22.0	-
Major Effective Stress (psi), $\sigma_1'_f$	14.8	32.8	77.2	-	12.1	29.6	65.6	-
Secant Friction Angle (degrees)	34.0	35.5	33.7	-	36.0	36.0	34.7	-
Effective Friction Angle (degrees)	33.4				34.3			
Effective Cohesion (psi)	0.4				0.4			

Note: The presented M-C parameters are based on a linear regression in modified stress space, across all assigned effective consolidation stresses. This fit does not purported to capture typical curvature of envelopes that may, in particular, be observed across broader range in effective stresses. Please note that the stresses associated with peak principal stress ratio and peak principal stress difference are presented in tabular form on the first page of the report. There are alternate interpretations to these two failure criterion including but not limited to strain compatibility and post-peak.

Jeffrey A. Kuhn, Ph.D., P.E., 09/02/2025
 Analysis & Quality Review/Date

Consolidated-Undrained Triaxial Compression

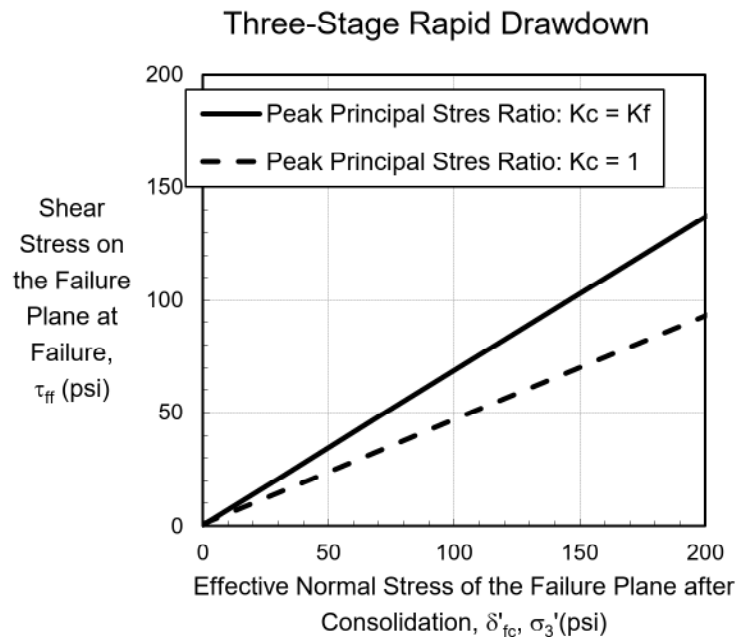
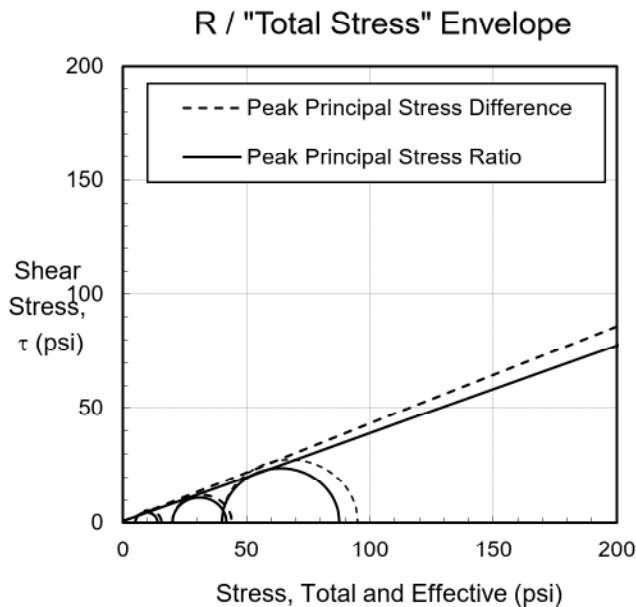
Client: Civil & Environmental Consultants, Inc.
 Project: 345-817.0004
 Sample: AP-5 (3' - 5') ST-1

TRI Log #: 25-04143.1
 Test Method: ASTM D4767

R / "Total Stress" Envelope			
Failure Criterion: Peak Principal Stress		Difference, $(\sigma_1' - \sigma_3')_{\max}$	Ratio, $(\sigma_1' / \sigma_3')_{\max}$
Friction Angle (deg)	ϕ_R	23.0	21.0
Cohesion (psi)	c_R	0.7	0.7

Kc = Kf Envelope, Effective Stress Envelope (Duncan et al. 1990)			
Failure Criterion: Peak Principal Stress		Difference, $(\sigma_1' - \sigma_3')_{\max}$	Ratio, $(\sigma_1' / \sigma_3')_{\max}$
Effective Friction Angle (deg)	ϕ'	33.4	34.3
Effective Cohesion (psi)	c'	0.4	0.4

Kc = 1 (τ_{ff} vs σ'_{fc}) Envelope, Total Stress Envelope (Duncan et al. 1990)			
Failure Criterion: Peak Principal Stress		Difference, $(\sigma_1' - \sigma_3')_{\max}$	Ratio, $(\sigma_1' / \sigma_3')_{\max}$
Friction Angle (deg)	$d_{Kc=1}$	28.2	24.7
Cohesion (psi)	$\Psi_{Kc=1}$	0.9	0.8

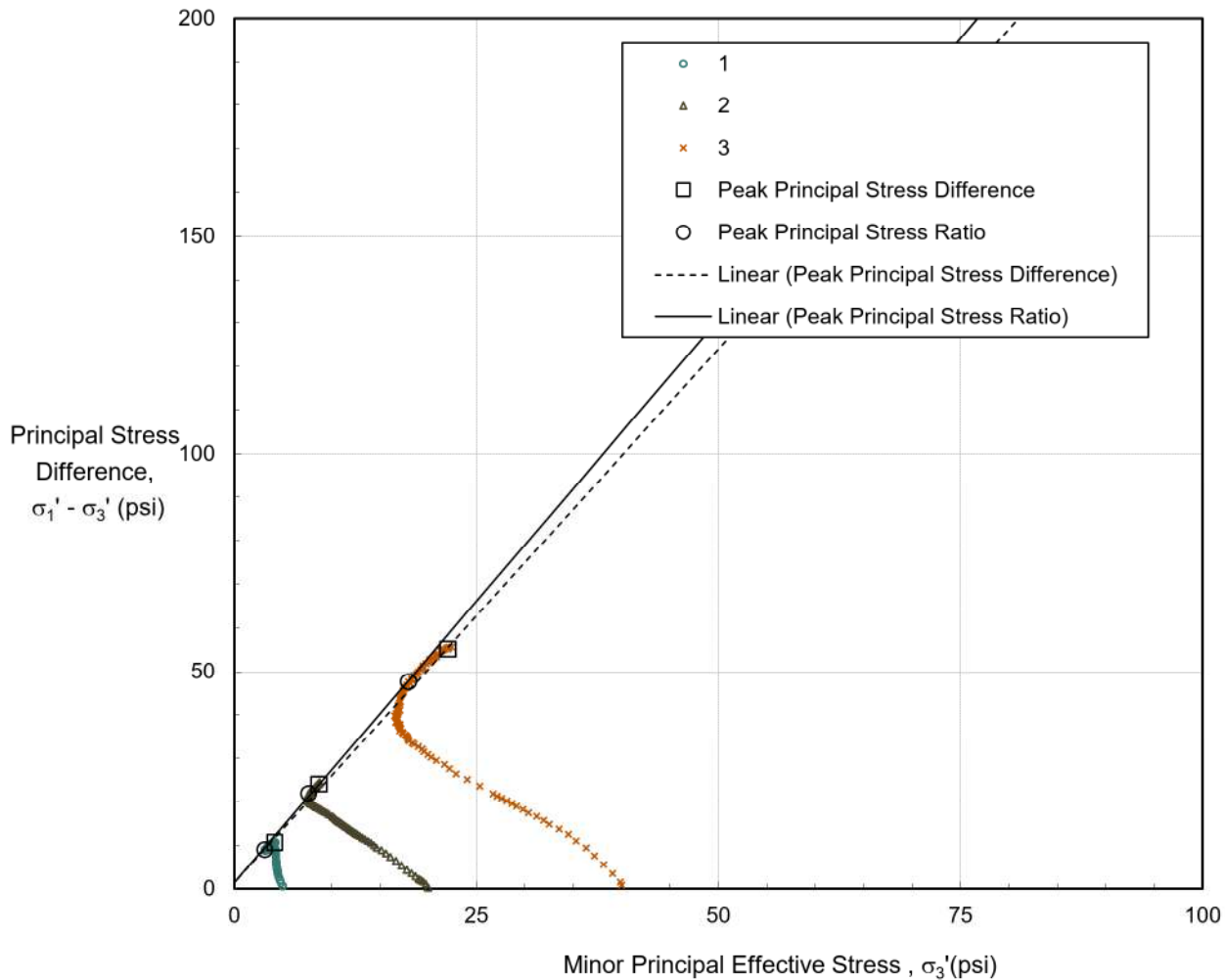


Consolidated-Undrained Triaxial Compression

Client: Civil & Environmental Consultants, Inc.
 Project: 345-817.0004
 Sample: AP-5 (3' - 5') ST-1

TRI Log #: 25-04143.1
 Test Method: ASTM D4767

Modified Mohr-Coulomb



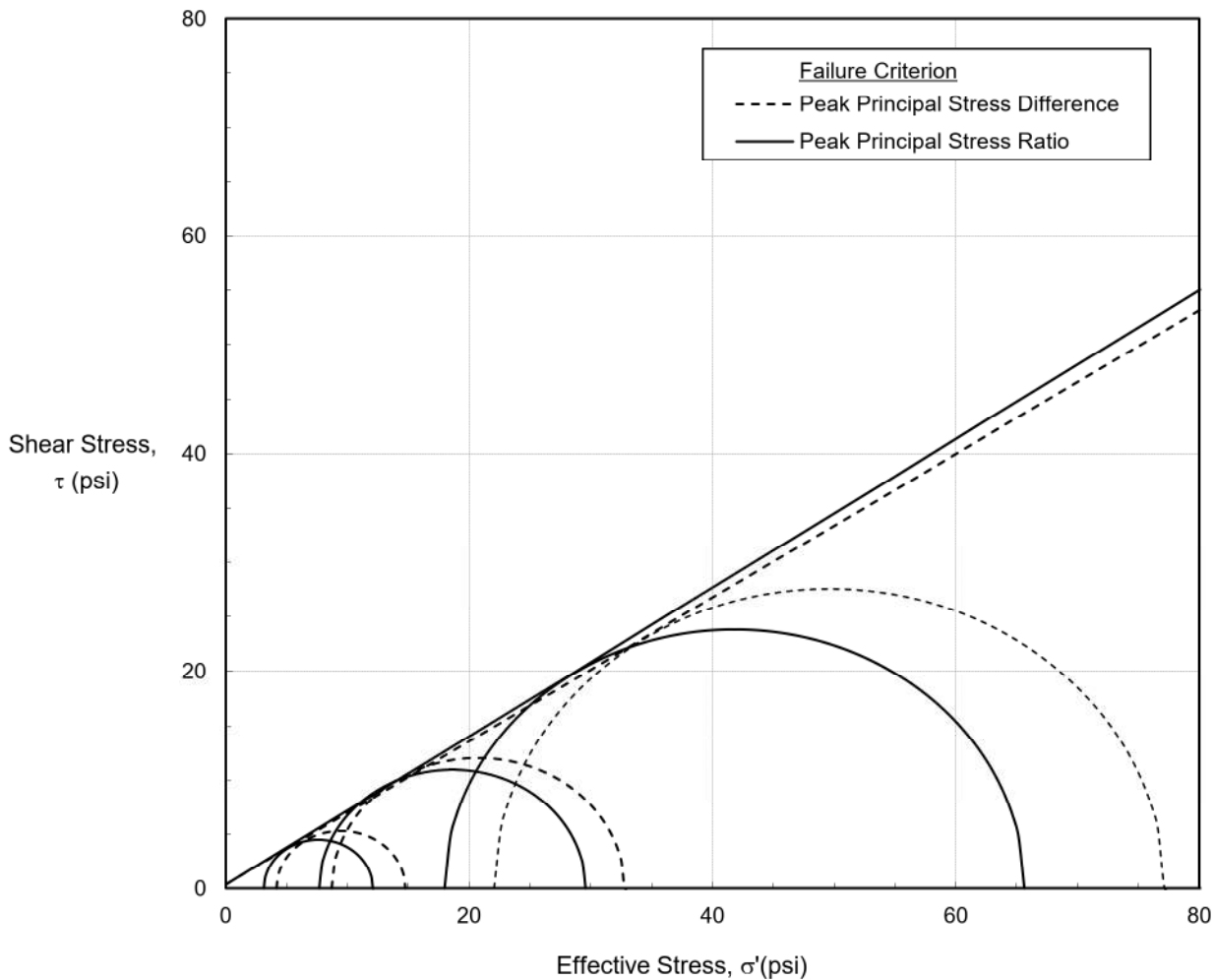
Failure Criterion: Peak Principal Stress	Difference, $(\sigma_1' - \sigma_3')_{max}$	Ratio, $(\sigma_1' / \sigma_3')_{max}$
Effective Friction Angle (deg)	33.4	34.3
Effective Cohesion (psi)	0.4	0.4

Consolidated-Undrained Triaxial Compression

Client: Civil & Environmental Consultants, Inc.
Project: 345-817.0004
Sample: AP-5 (3' - 5') ST-1

TRI Log #: 25-04143.1
Test Method: ASTM D4767

Mohr-Coulomb



Failure Criterion: Peak Principal Stress	Difference, $(\sigma_1' - \sigma_3')_{\max}$	Ratio, $(\sigma_1' / \sigma_3')_{\max}$
Effective Friction Angle (deg)	33.4	34.3
Effective Cohesion (psi)	0.4	0.4

Consolidated-Undrained Triaxial Compression

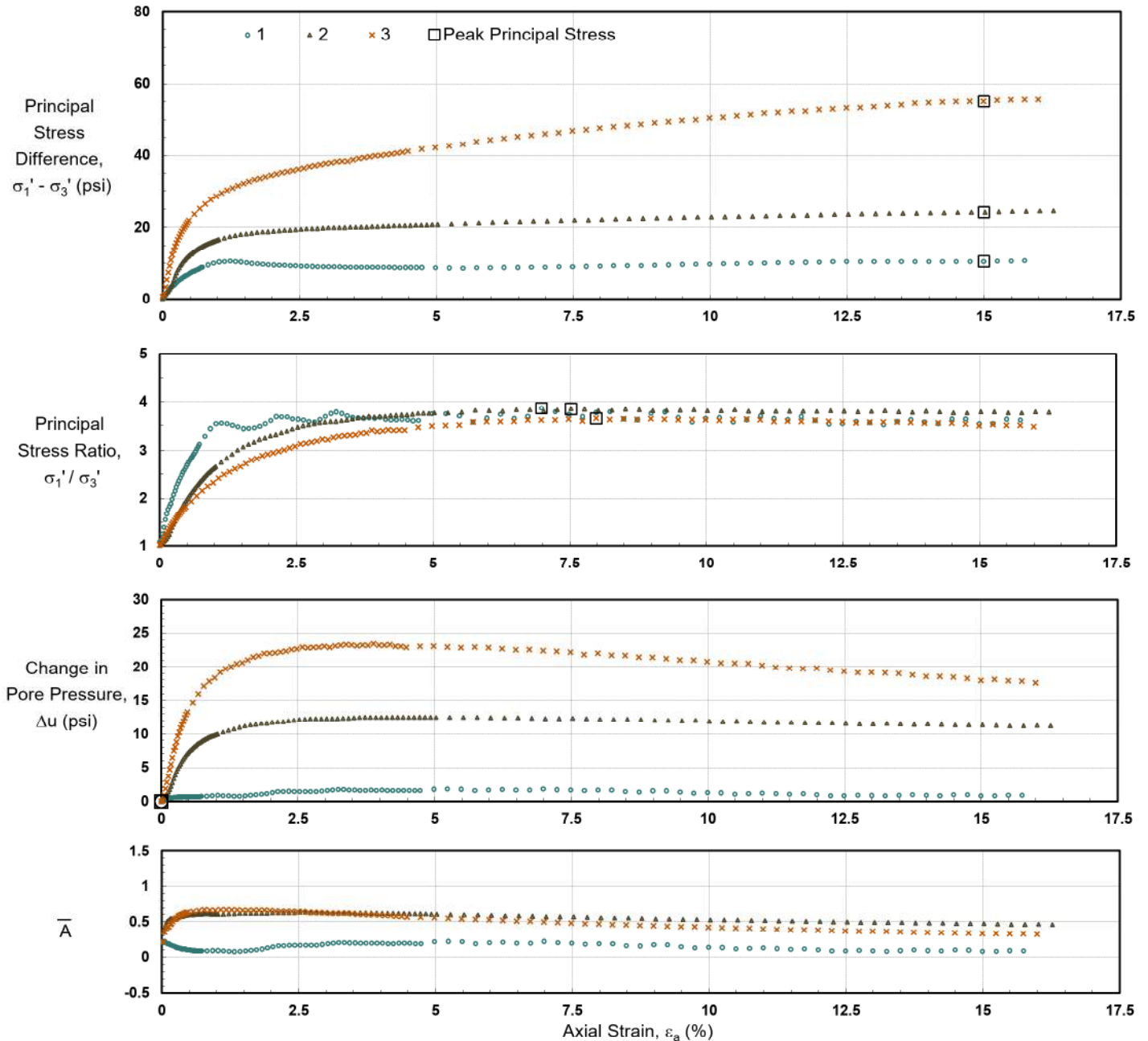
Client: Civil & Environmental Consultants, Inc.

Project: 345-817.0004

Sample: AP-5 (3' - 5') ST-1

TRI Log #: 25-04143.1

Test Method: ASTM D4767



Consolidated-Undrained Triaxial Compression

Client: Civil & Environmental Consultants, Inc.

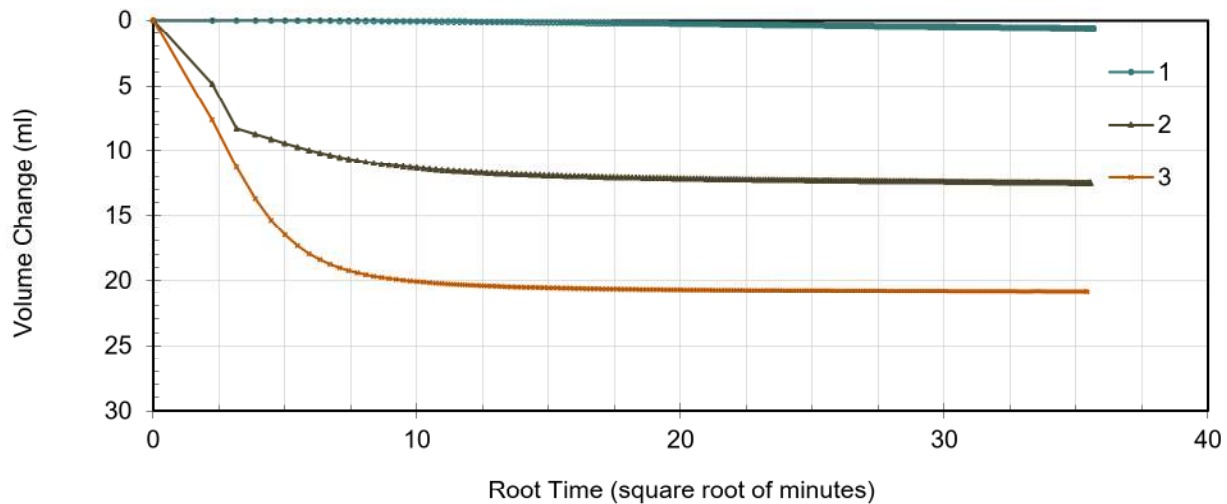
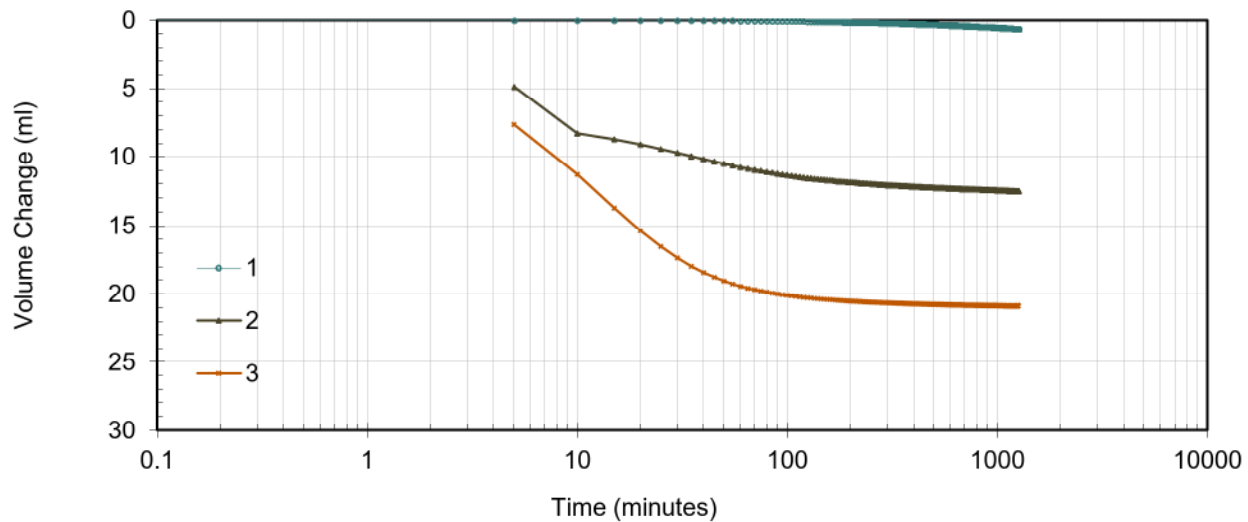
Project: 345-817.0004

Sample: AP-5 (3' - 5') ST-1

TRI Log #: 25-04143.1

Test Method: ASTM D4767

Consolidation

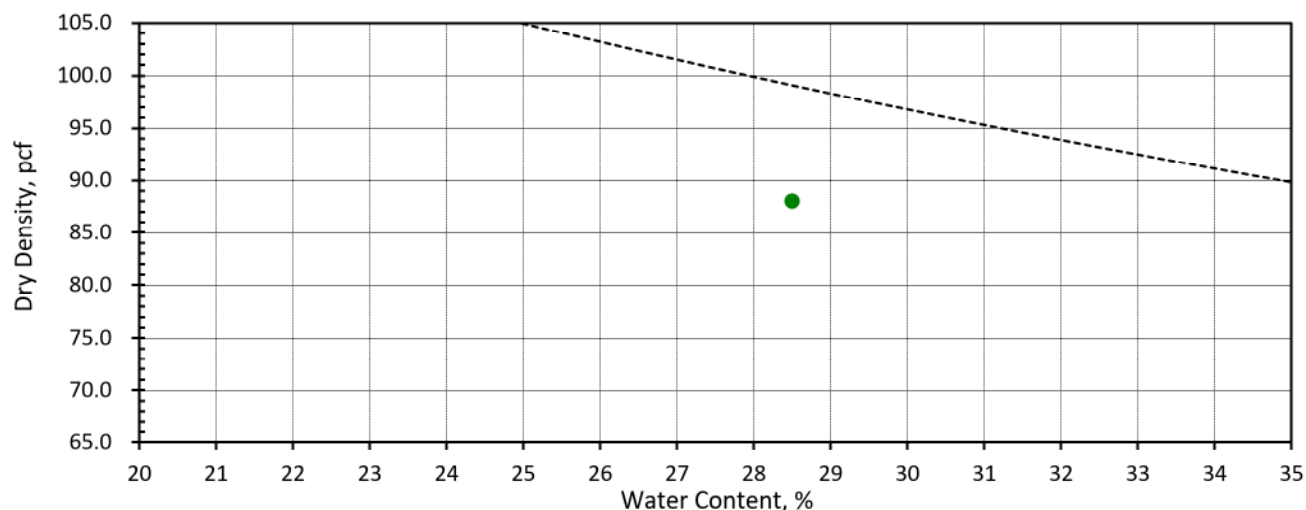


LABORATORY COMPACTION CHARACTERISTICS OF SOIL

Client	Civil & Environmental Consultants, Inc. Boring	AP-5
Client Project	345-817.0004 AEP Kammer Plant	Depth 3.0' - 5.0'
Project No.	25-04143	Sample ST-1
	Lab Sample No.	25-04143-01
Visual Description:	BROWN LEAN CLAY WITH SAND	

WET DENSITY					TEST PARAMETERS	
Mold ID	G				Test Method	ASTM D1557
Compaction Point #	1				Compaction Energy	Modified
Wt. Mold & WS, gm.	6059.2				Test Procedure	B
Wt. Mold, gm.	4357				Mold Diameter, in	4
Wt. WS, gm.	1702				Compacted Layers	5
Mold Volume, cc	939				Blows Per Layer	25
Wet Density, gm./cc	1.81				Rammer Weight / Fall	10 lbs / 18 in.
Wet Density, pcf	113.1				Size of Material Used	-3/8" Sieve
					Use: <5% Retained on 3/8"	
WATER CONTENT					OVERSIZE PARTICLE CORRECTION	
					No Corrections Needed	
Tare Number	563					
Wt. Tare & WS, gm.	469					
Wt. Tare & DS, gm.	408.23				Percent of Oversize Rock (+3/8" Sieve) = <5% (Based on As-received Screening & Soaking)	
Wt. Tare, gm.	195					
Water Content, %	28.5				W.C. of Finer Material, % (-3/8" Sieve) = NA	
DRY DENSITY vs. WATER CONTENT					SAMPLE SUMMARY	
LABORATORY TEST VALUES						
Water Content, %	28.5				Lab 1 Pt Water Content, %	28.5
Dry Density, pcf	88.0				Lab 1 pt Dry Density, pcf	88.0

Note: Maximum Density and Optimum Water Content reported from estimated best fit smooth curve!



Note: Compacted using manual hammer.

Input Validation: JSJ

Reviewed By: BLS

Date Tested: 09/02/25

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PARTICLE-SIZE ANALYSIS OF SOILS - ASTM D422-63(2007)

Client	Civil & Environmental Consultants, Inc. (CEC)	Boring	AP-5
Client Project	345-817.0004 AEP Kammer Plant	Depth	6.0'-8.0'
Project No.	25-04143	Sample	BS-1
		Lab Sample	25-04143 -10

Sample Color: BROWN

USCS Group Name: SANDY LEAN CLAY

USCS Group Symbol: CL

USDA: LOAM

AASHTO: A-7-6 (18)

Dry Prep: R58-11(2018)¹

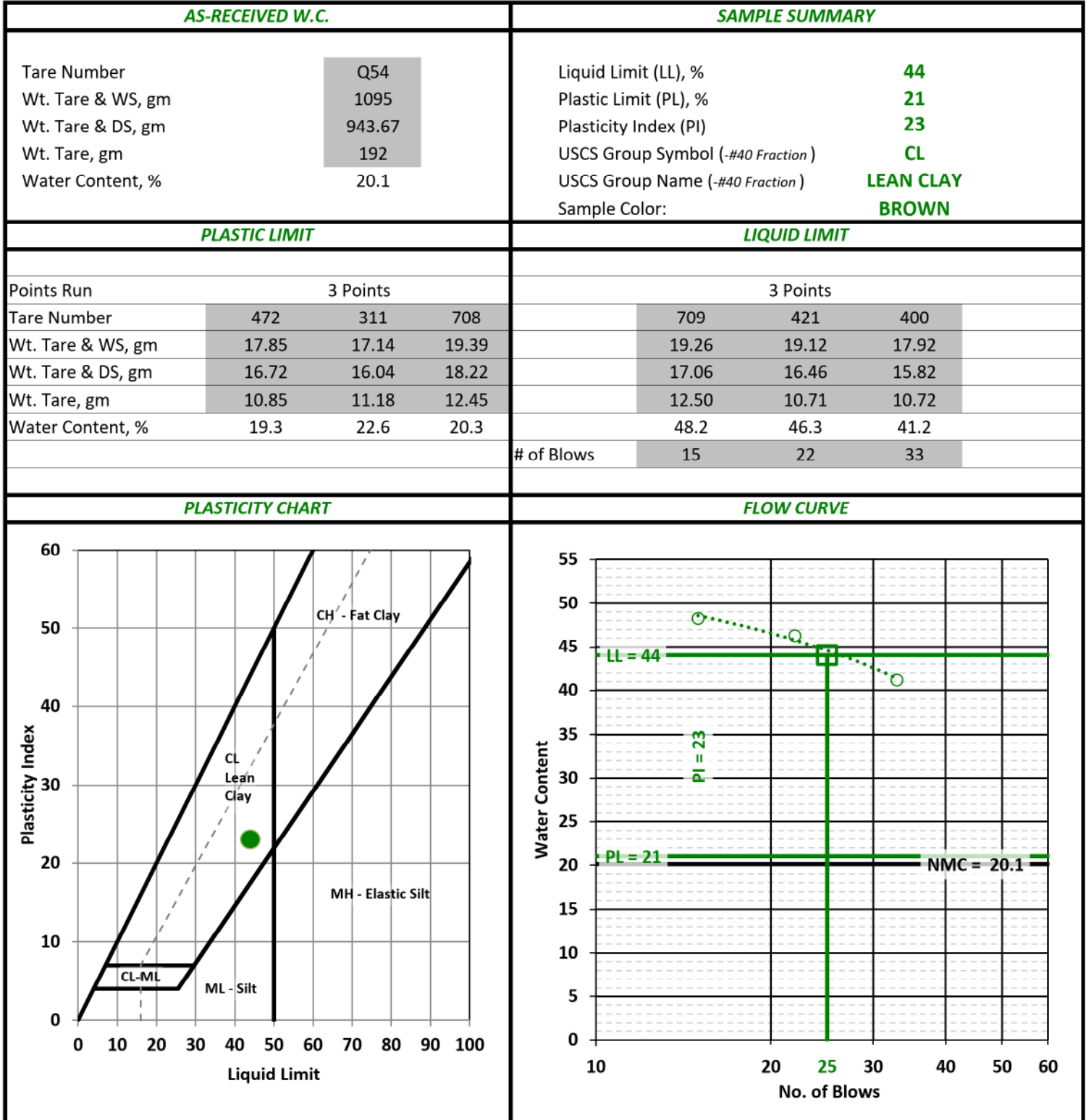
MECHANICAL SIEVE													
Total Sample			Sieve Size	Nominal Opening, mm	Dry Wt, gm	Split Normalized		Project Specifications					
Tare No.	Q54		3"	75	0	% Retained	% Finer						
Tare + WS., gm	1095.00		2-1/2"	63	0	0.0%	100.0%						
Tare + DS., gm	943.67		2"	50	0	0.0%	100.0%						
Tare, gm	192.00		1-1/2"	37.5	0	0.0%	100.0%						
Total sample WC	20.1%		1"	25	0	0.0%	100.0%						
Total Sample Dry Wt, gm (-3")			3/4"	19	0	0.0%	100.0%						
			1/2"	12.5	0	0.0%	100.0%						
Hygroscopic WC (-#10)			3/8"	9.5	0	0.0%	100.0%						
Tare No.	803		No. 4	4.75	2.33	0.3%	99.7%						
Tare + WS., gm	38.37		No. 10	2	7.89	1.0%	98.6%						
Tare + DS., gm	38.26		No. 20	0.85	2.76	3.9%	94.8%						
Tare, gm	14.28		No. 40	0.425	0.85	1.2%	93.6%						
Hygroscopic WC	0.46%		No. 60	0.25	0.17	0.2%	93.4%						
-#10 Hydro/Sieve air dry wt.	70.71		No. 140	0.106	5.51	7.7%	85.7%						
Wt. of +#200 Sample, gm	14.02		No. 200	0.075	4.73	6.6%	79.1%						
HYDROMETER (-#10)													
Split Air Dry Wt	71.03						Specific Gravity	2.7					
Hygroscopic WC	0.46%							Assumed					
Corrected Dry wt	70.7		-#10 Dispersed 1min in Hamilton Beach Mixer				a Factor	0.9889					
Elapsed Time (min.)	R Measured	Temp °C	Composite Correction	R Corrected	K Factor	Percent Finer (%)	Particle Diameter (mm)	Adjusted % Finer (%)					
2	44.0	24.0	4.5	39.5	0.0128	55.2	0.0272	54.5%					
5	38.0	24.0	4.5	33.5	0.0128	46.9	0.0181	46.2%					
15	34.0	24.0	4.5	29.5	0.0128	41.3	0.0108	40.7%					
30	31.0	24.1	4.5	26.5	0.0128	37.1	0.0078	36.6%					
60	28.0	24.2	4.5	23.5	0.0128	32.9	0.0056	32.4%					
250	23.0	24.4	4.4	18.6	0.0128	26.0	0.0029	25.7%					
1440	18.0	23.8	4.6	13.4	0.0129	18.7	0.0012	18.5%					
USCS SOIL CLASSIFICATION				USDA CLASSIFICATION									
Corrected For 100% Passing a 3" Sieve				Particle Size (mm)	Percent Finer (%)	Percent of Each Component (Material) (%)		Corrected Percent of -2.0 mm Material for USDA					
% Gravel (-3" & +#4)	0.3	Silt=47.9% Clay=31.2%											
Coarse=0; Fine=0.3		D60, mm	NA										
% Sand (-#4 & +#200)	20.6	D30, mm	NA										
Coarse=1; Medium=5; Fine=14.5		D10, mm	NA										
% Fines (-#200)		79.1	Cc	NA	100	100							
% Plus #200 (-3")		20.9	Cu	NA	2	98.6	Gravel	1.4	0				
USCS Description				0.05			69.2	Sand	29.4	29.8			
SANDY LEAN CLAY								0.002	22.6	Silt	46.6	47.3	
USCS Group Symbol	Atterberg Limits Group Symbol									Clay	22.6		
CL	CL - LEAN CLAY												
Auxiliary Information	Wt Ret, gm	% Retained	% Finer										
12" Sieve - 300 mm	0	0.0	100.0										
6" Sieve - 150 mm	0	0.0	100.0										
3" Sieve - 75 mm	0	0.0	100.0	USDA Classification									
LOAM													

Performed By: RH Input Validation: MA Reviewed By: BS Date Tested: 9/8/2025

LIQUID LIMIT, PLASTIC LIMIT, AND PLASTICITY INDEX OF SOILS
ASTM D4318-17e1

Client	Civil & Environmental Consultants, Inc. (CEC)	Boring	AP-5
Client Project	345-817.0004 AEP Kammer Plant	Depth	6.0'-8.0'
Project No.	25-04143	Sample	BS-1
		Lab Sample	25-04143 -10

Soil Description: BROWN LEAN CLAY
 (-#40 Fraction)



PARTICLE-SIZE ANALYSIS OF SOILS - ASTM D422-63(2007)

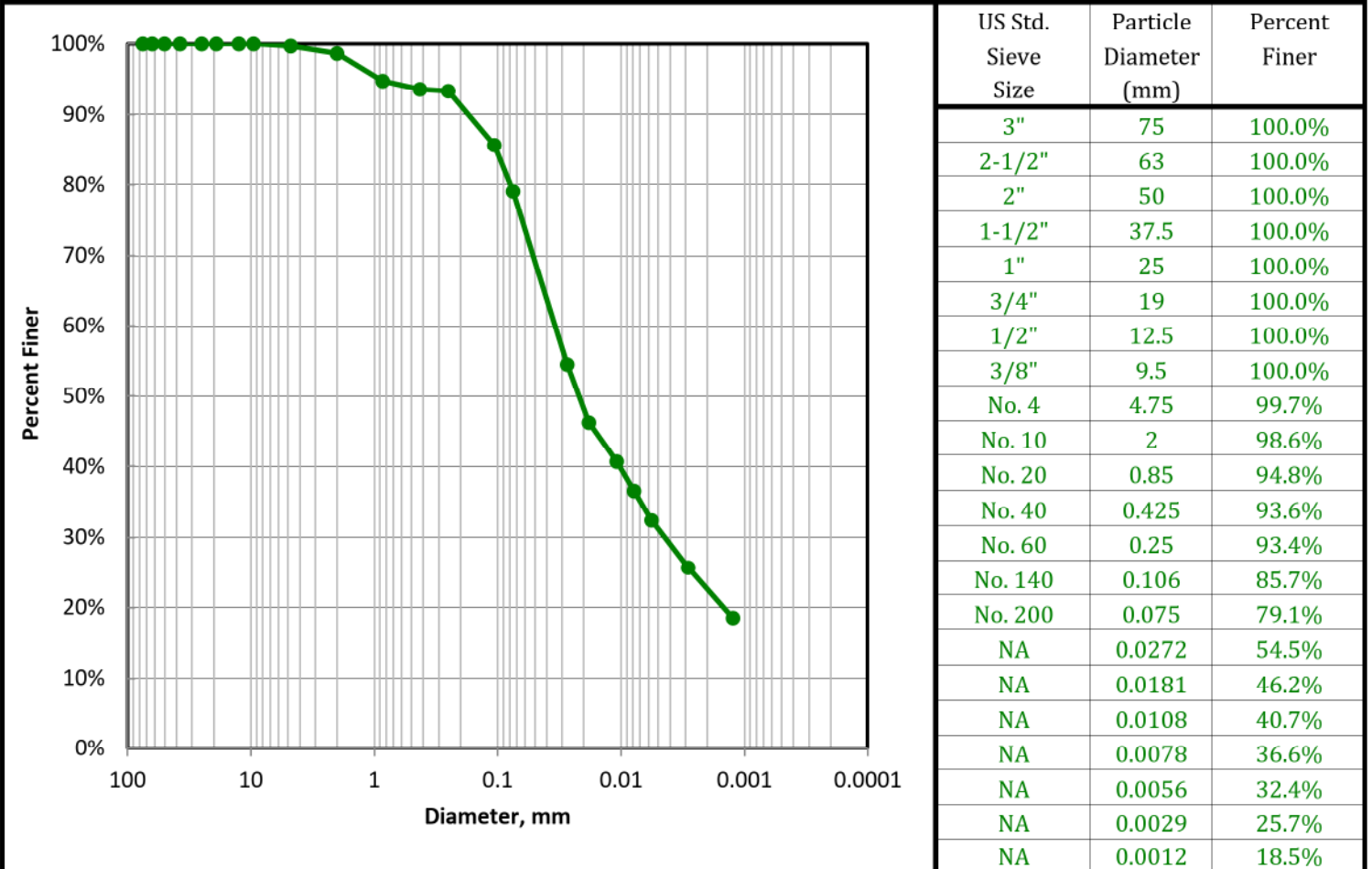
Client	Civil & Environmental Consultants, Inc. (CEC)	Boring	AP-5
Client Project	345-817.0004 AEP Kammer Plant	Depth	6.0'-8.0'
Project No.	25-04143	Sample	BS-1
		Lab Sample	25-04143 -10

Sample Color: **BROWN**

USCS Group Name: **SANDY LEAN CLAY**

USCS Group Symbol: **CL** USDA: **LOAM**

AASHTO: **A-7-6 (18)**



USCS SOIL CLASSIFICATION				USDA CLASSIFICATION					
Corrected For 100% Passing a 3" Sieve				Particle Size (mm)	Percent Finer (%)	Percent of Each Component (Material) (%)		Corrected Percent of -2.0 mm Material for USDA	
% Gravel (-3" & + #4)	0.3	Silt=47.9% Clay=31.2%							
Coarse=0; Fine=0.3		D60, mm	NA						
% Sand (-#4 & + #200)	20.6	D30, mm	NA						
Coarse=1; Medium=5; Fine=14.5		D10, mm	NA						
% Fines (-#200)	79.1	Cc	NA	100	100				
% Plus #200 (-3")	20.9	Cu	NA	2	98.6	Gravel	1.4	0	
USCS Description				0.05	69.2	Sand	29.4	29.8	
SANDY LEAN CLAY				0.002	22.6	Silt	46.6	47.3	
USCS Group Symbol		Atterberg Limits Group Symbol		USDA Classification LOAM					
CL		CL - LEAN CLAY							
Auxiliary Information		Wt Ret, gm	% Retained						% Finer
12" Sieve - 300 mm		0	0.0						100.0
6" Sieve - 150 mm		0	0.0						100.0
3" Sieve - 75 mm		0	0.0	100.0					

USDA CLASSIFICATION CHART

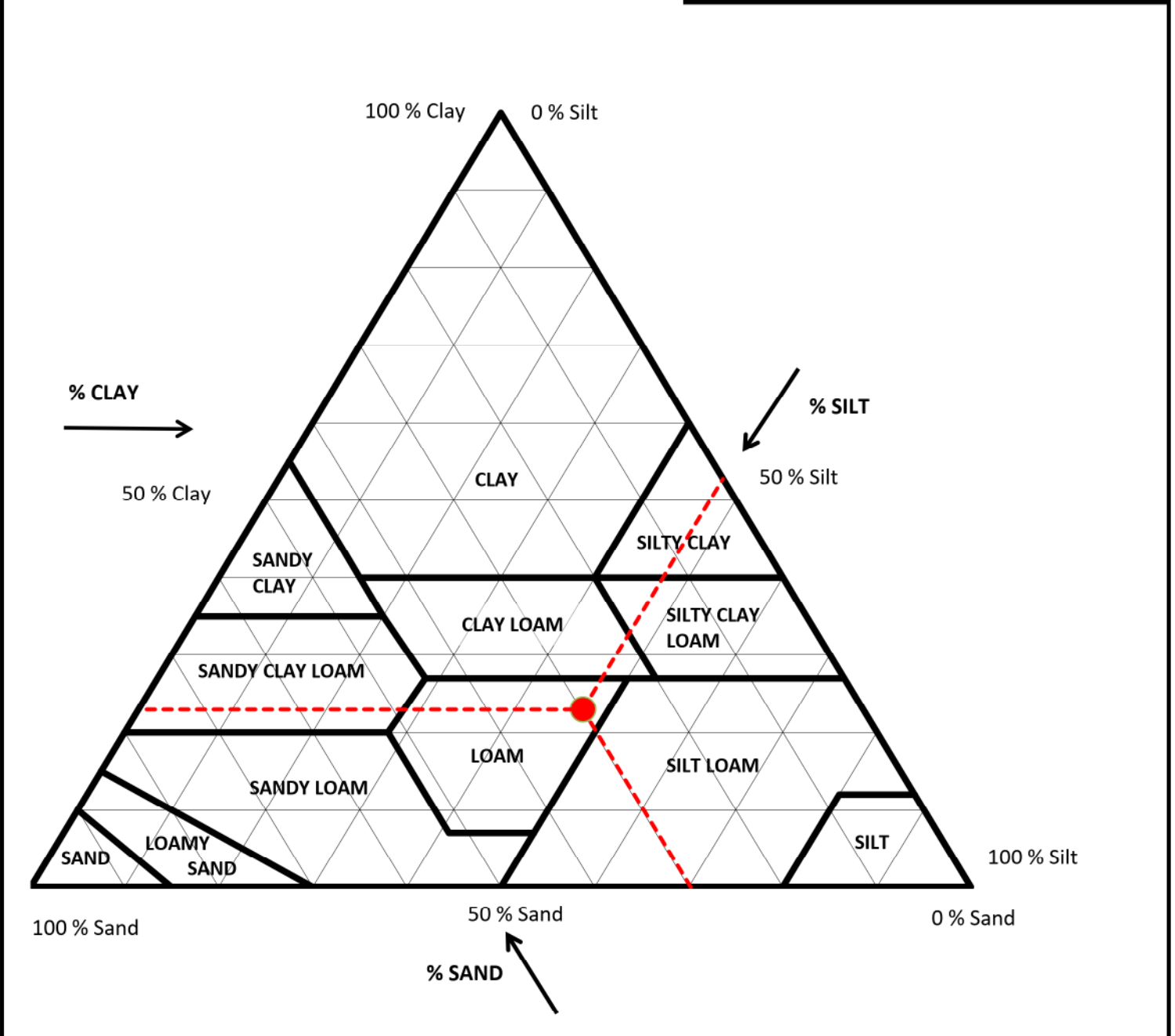
Client	Civil & Environmental Consultants, Inc. (CEC)	Boring	AP-5
Client Project	345-817.0004 AEP Kammer Plant	Depth	6.0'-8.0'
Project No.	25-04143	Sample	BS-1
		Lab Sample	25-04143 -10

Sample Color: **BROWN**
 USCS Group Name: **SANDY LEAN CLAY**
 USCS Group Symbol: **CL**

USDA: **LOAM**

AASHTO: **A-7-6 (18)**

Corrected for 0% gravel		Sand Subsizes	
		Corrected Percentages	
Percent Gravel, %	0.0	Very Coarse Sand; 2-1	3.2
Percent Sand, %	29.8	Coarse Sand; 1-0.5	1.7
Percent Silt, %	47.3	Medium Sand; 0.5-0.25	0.5
Percent Clay, %	22.9	Fine Sand; 0.25-0.1	8.9
		Very Fine Sand; 0.1-0.05	15.5
		Total	29.8

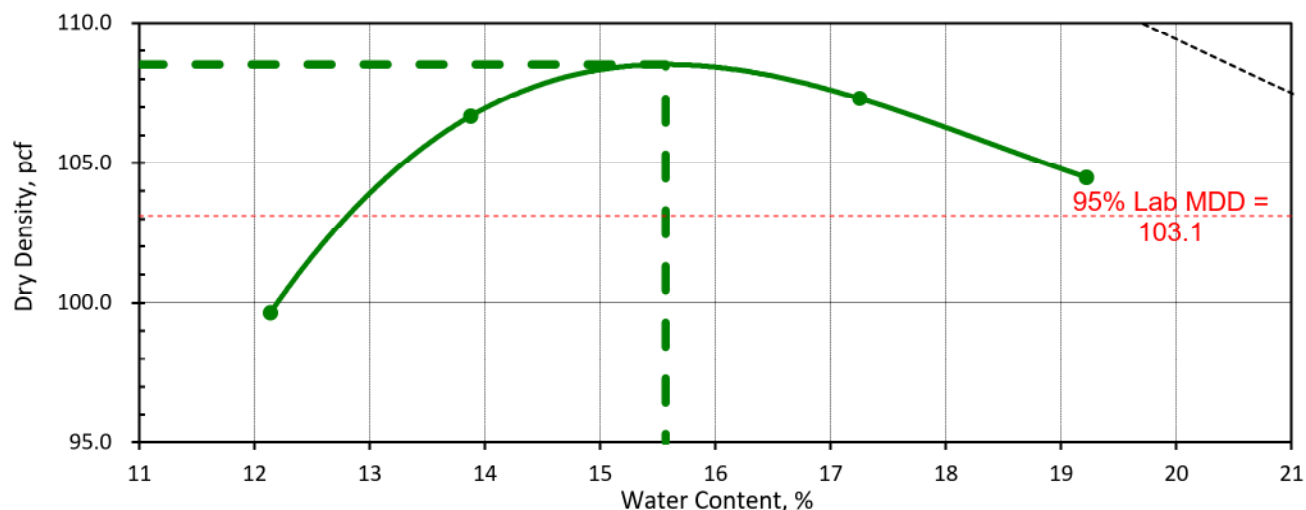


LABORATORY COMPACTION CHARACTERISTICS OF SOIL

Client	Civil & Environmental Consultants, Inc. Boring	AP-5
Client Project	345-817.0004 AEP Kammer Plant	Depth 6.0' - 8.0'
Project No.	25-04143	Sample BS-1
	Lab Sample No.	25-04143-10
Visual Description:	BROWN SANDY LEAN CLAY	

WET DENSITY					TEST PARAMETERS	
Mold ID	J	J	J	J	Test Method	ASTM D698
Compaction Point #	1	2	3	4	Compaction Energy	Standard
Wt. Mold & WS, gm.	10259	10591	10739	10696	Test Procedure	C
Wt. Mold, gm.	6450	6450	6450	6450	Mold Diameter, in	6
Wt. WS, gm.	3809	4141	4289	4246	Compacted Layers	3
Mold Volume, cc	2127	2127	2127	2127	Blows Per Layer	56
Wet Density, gm./cc	1.79	1.95	2.02	2.00	Rammer Weight / Fall	5.5 lbs / 12 in.
Wet Density, pcf	111.7	121.5	125.8	124.6	Size of Material Used	-3/4" Sieve
					Use: <5% Retained on 3/4"	
WATER CONTENT					OVERSIZE PARTICLE CORRECTION	
Tare Number	216	538	118	32	No Corrections Needed	
Wt. Tare & WS, gm.	423.7	481.3	486.8	451.6		
Wt. Tare & DS, gm.	397.3	445.9	427.5	392.2	Percent of Oversize Rock (+3/4" Sieve) = <5% (Based on As-received Screening & Soaking)	
Wt. Tare, gm.	179.8	190.8	83.8	83.2		
Water Content, %	12.1	13.9	17.3	19.2	W.C. of Finer Material, % (-3/4" Sieve) = NA	
DRY DENSITY vs. WATER CONTENT					SAMPLE SUMMARY	
LABORATORY TEST VALUES						
Water Content, %	12.1	13.9	17.3	19.2	Lab Optimum Water Content, %	15.6
Dry Density, pcf	99.6	106.7	107.3	104.5	Lab Maximum Dry Density, pcf	108.5

Note: Maximum Density and Optimum Water Content reported from estimated best fit smooth curve!



Note: Compacted with automatic compaction machine

Input Validation: MA

Reviewed By: BLS

Date Tested: 09/02/25

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PARTICLE-SIZE ANALYSIS OF SOILS - ASTM D422-63(2007)

Client	Civil & Environmental Consultants, Inc. (CEC)	Boring	AP-5
Client Project	345-817.0004 AEP Kammer Plant	Depth	13.0'-15.0'
Project No.	25-04143	Sample	ST-3
		Lab Sample	25-04143 -02

Sample Color: BROWN
USCS Group Name: CLAYEY SAND
USCS Group Symbol: SC

USDA: SANDY LOAM **AASHTO:** A-4 (0)

Dry Prep: R58-11(2018)¹

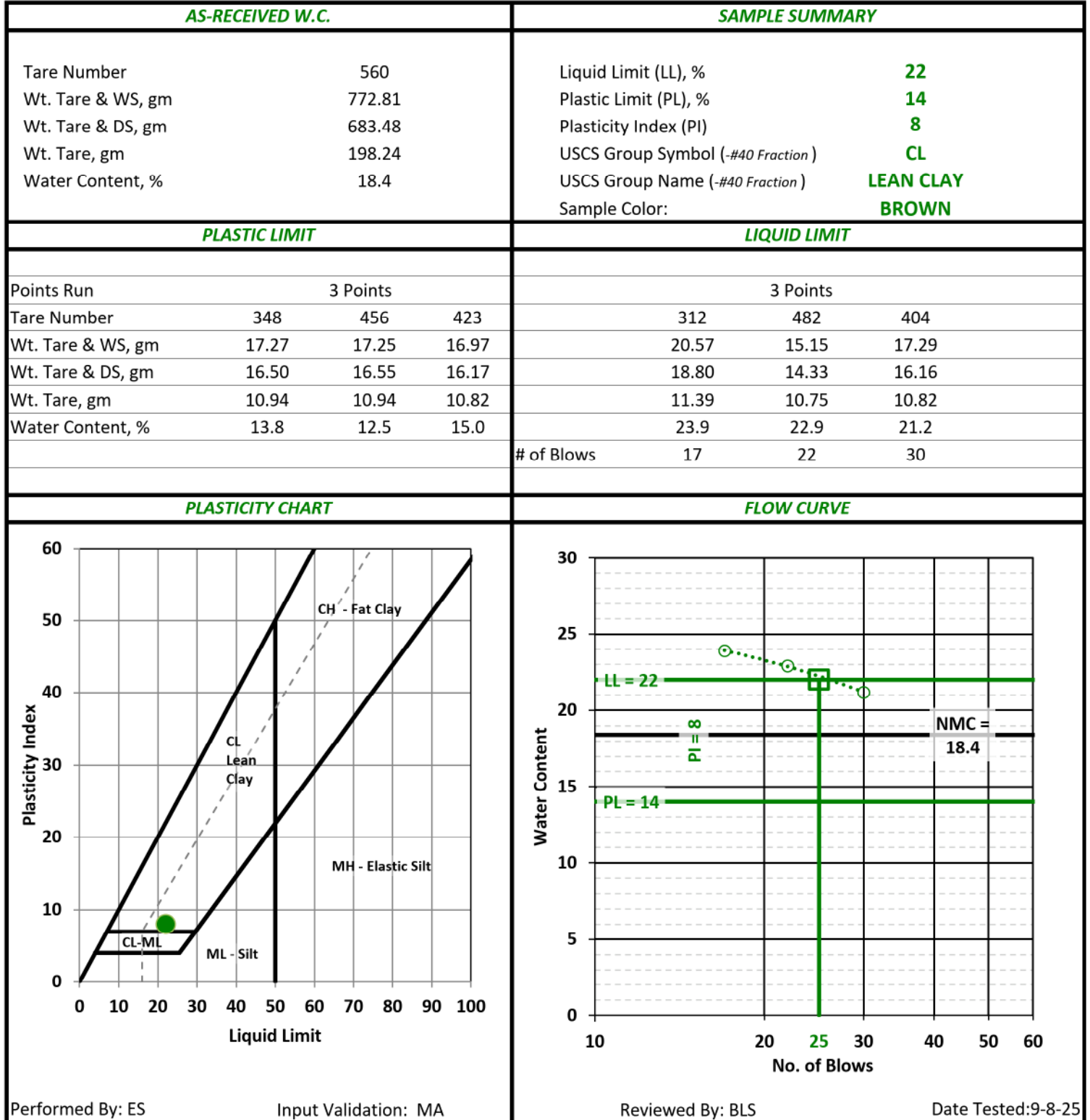
MECHANICAL SIEVE										
Total Sample			Sieve Size	Nominal Opening, mm	Dry Wt, gm	Split Normalized		Project Specifications		
Tare No.	560		3"	75	0	% Retained	% Finer			
Tare + WS., gm	772.81		2-1/2"	63	0	0.0%	100.0%			
Tare + DS., gm	683.48		2"	50	0	0.0%	100.0%			
Tare, gm	198.24		1-1/2"	37.5	0	0.0%	100.0%			
Total sample WC	18.4%		1"	25	0	0.0%	100.0%			
Total Sample Dry Wt, gm (-3")	485		3/4"	19	0	0.0%	100.0%			
Hygroscopic WC (-#10)			1/2"	12.5	0	0.0%	100.0%			
Tare No.	406		3/8"	9.5	0	0.0%	100.0%			
Tare + WS., gm	30.77		No. 4	4.75	0	0.0%	100.0%			
Tare + DS., gm	30.62		No. 10	2	0	0.0%	100.0%			
Tare, gm	10.74		No. 20	0.85	0.13	0.2%	99.8%			
Hygroscopic WC	0.75%		No. 40	0.425	0.49	0.7%	99.1%			
			No. 60	0.25	1.35	1.9%	97.2%			
-#10 Hydro/Sieve air dry wt.	69.91		No. 140	0.106	31.89	45.6%	51.6%			
Wt. of +#200 Sample, gm	40.35		No. 200	0.075	6.49	9.3%	42.3%			
HYDROMETER (-#10)										
Split Air Dry Wt	70.44						Specific Gravity	2.7		
Hygroscopic WC	0.75%							Assumed		
Corrected Dry wt	69.9		-#10 Dispersed 1min in Hamilton Beach Mixer				a Factor	0.9889		
Elapsed Time (min.)	R Measured	Temp °C	Composite Correction	R Corrected	K Factor	Percent Finer (%)	Particle Diameter (mm)	Adjusted % Finer (%)		
2	25.0	23.6	4.7	20.3	0.0129	28.7	0.0318	28.7%		
5	23.5	23.6	4.7	18.8	0.0129	26.6	0.0203	26.6%		
15	21.0	23.6	4.7	16.3	0.0129	23.1	0.0119	23.1%		
30	19.0	23.6	4.7	14.3	0.0129	20.2	0.0085	20.2%		
60	18.5	23.7	4.6	13.9	0.0129	19.7	0.0060	19.7%		
250	17.0	23.9	4.6	12.4	0.0129	17.5	0.0030	17.5%		
1440	15.0	23.9	4.6	10.4	0.0129	14.7	0.0013	14.7%		
USCS SOIL CLASSIFICATION				USDA CLASSIFICATION						
Corrected For 100% Passing a 3" Sieve										
% Gravel (-3" & +#4)	0.0	Silt=23.2% Clay=19.1%		Particle Size (mm)	Percent Finer (%)	Percent of Each Component (Material) (%)		Corrected Percent of -2.0 mm Material for USDA		
Coarse=0; Fine=0		D60, mm NA								
% Sand (-#4 & +#200)	57.7	D30, mm NA		100	100	Gravel 0.0		0		
Coarse=0; Medium=0.9; Fine=56.8		D10, mm NA								
% Fines (-#200)	42.3	Cc NA								
% Plus #200 (-3")	57.7	Cu NA								
USCS Description				2	100.0	Sand 64.1		64.1		
CLAYEY SAND										
USCS Group Symbol		Atterberg Limits Group Symbol								
SC		CL - LEAN CLAY								
Auxiliary Information		Wt Ret, gm	% Retained	% Finer	0.002	16.2	Silt 19.6		19.6	
12" Sieve - 300 mm		0	0.0	100.0			Clay 16.2		16.2	
6" Sieve - 150 mm		0	0.0	100.0						
3" Sieve - 75 mm		0	0.0	100.0						
USDA Classification										
SANDY LOAM										

Performed By: RH Input Validation: MA Reviewed By: BLS Date Tested: 9/8/2025

LIQUID LIMIT, PLASTIC LIMIT, AND PLASTICITY INDEX OF SOILS
ASTM D4318-17e1

Client	Civil & Environmental Consultants, Inc. (CEC)	Boring	AP-5
Client Project	345-817.0004 AEP Kammer Plant	Depth	13.0'-15.0'
Project No.	25-04143	Sample	ST-3
		Lab Sample	25-04143 -02

Soil Description: BROWN LEAN CLAY
 (-#40 Fraction)



PARTICLE-SIZE ANALYSIS OF SOILS - ASTM D422-63(2007)

Client	Civil & Environmental Consultants, Inc. (CEC)	Boring	AP-5
Client Project	345-817.0004 AEP Kammer Plant	Depth	13.0'-15.0'
Project No.	25-04143	Sample	ST-3
		Lab Sample	25-04143 -02

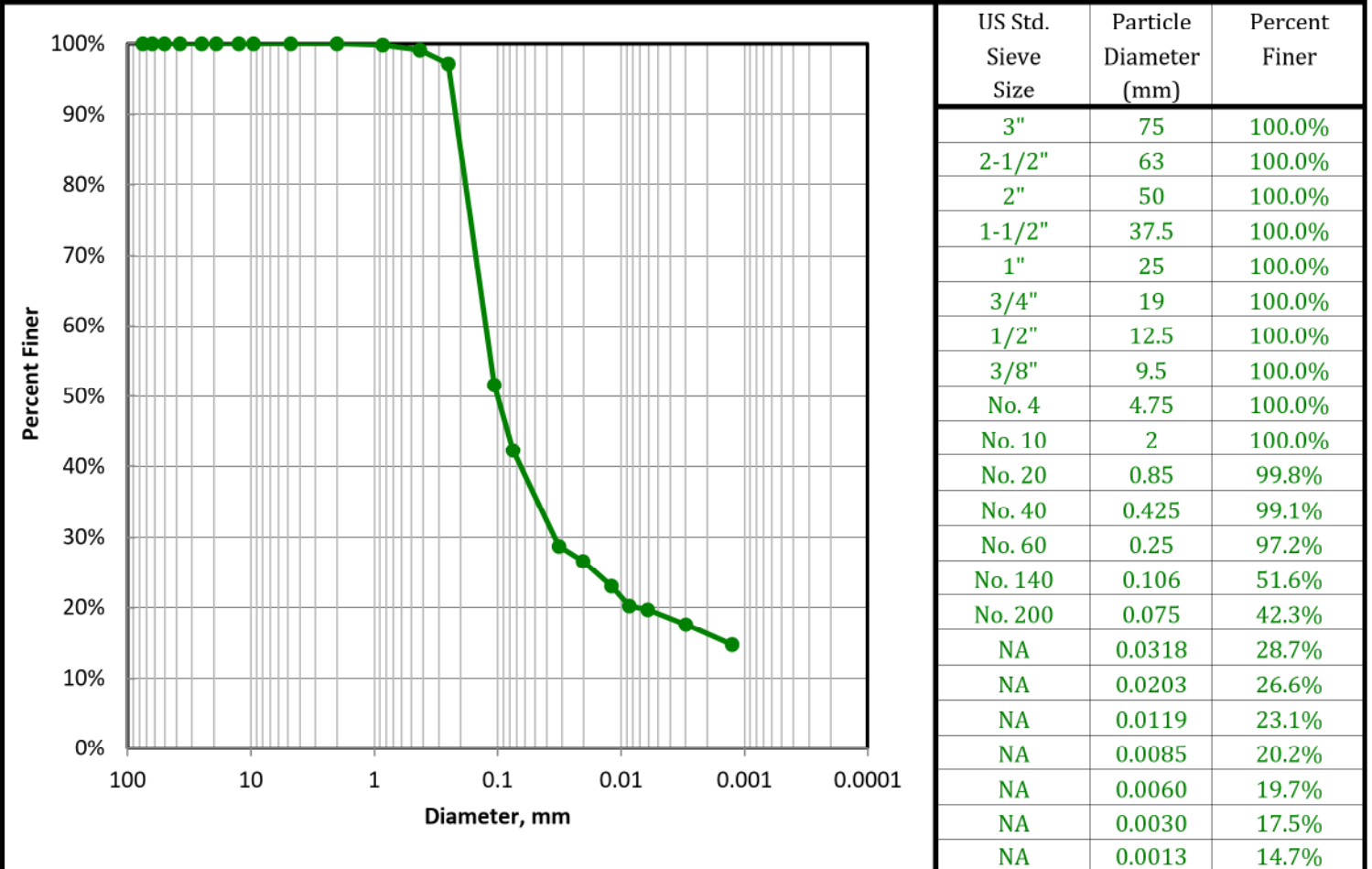
Sample Color: **BROWN**

USCS Group Name: **CLAYEY SAND**

USCS Group Symbol: **SC**

USDA: **SANDY LOAM**

AASHTO: **A-4 (0)**



USCS SOIL CLASSIFICATION				USDA CLASSIFICATION					
Corrected For 100% Passing a 3" Sieve				Particle Size (mm)	Percent Finer (%)	Percent of Each Component (Material) (%)		Corrected Percent of -2.0 mm Material for USDA	
% Gravel (-3" & + #4)	0.0	Silt=23.2% Clay=19.1%							
Coarse=0; Fine=0		D60, mm	NA			Gravel	0.0	0	
% Sand (-#4 & + #200)	57.7	D30, mm	NA						
Coarse=0; Medium=0.9; Fine=56.8		D10, mm	NA						
% Fines (-#200)	42.3	Cc	NA	100	100				
% Plus #200 (-3")	57.7	Cu	NA	2	100.0	Sand	64.1	64.1	
USCS Description				0.05	35.9	Silt	19.6	19.6	
CLAYEY SAND				0.002	16.2	Clay	16.2	16.2	
USCS Group Symbol		Atterberg Limits Group Symbol		USDA Classification SANDY LOAM					
SC		CL - LEAN CLAY							
Auxiliary Information		Wt Ret, gm	% Retained						% Finer
12" Sieve - 300 mm		0	0.0						100.0
6" Sieve - 150 mm		0	0.0						100.0
3" Sieve - 75 mm		0	0.0						100.0

USDA CLASSIFICATION CHART

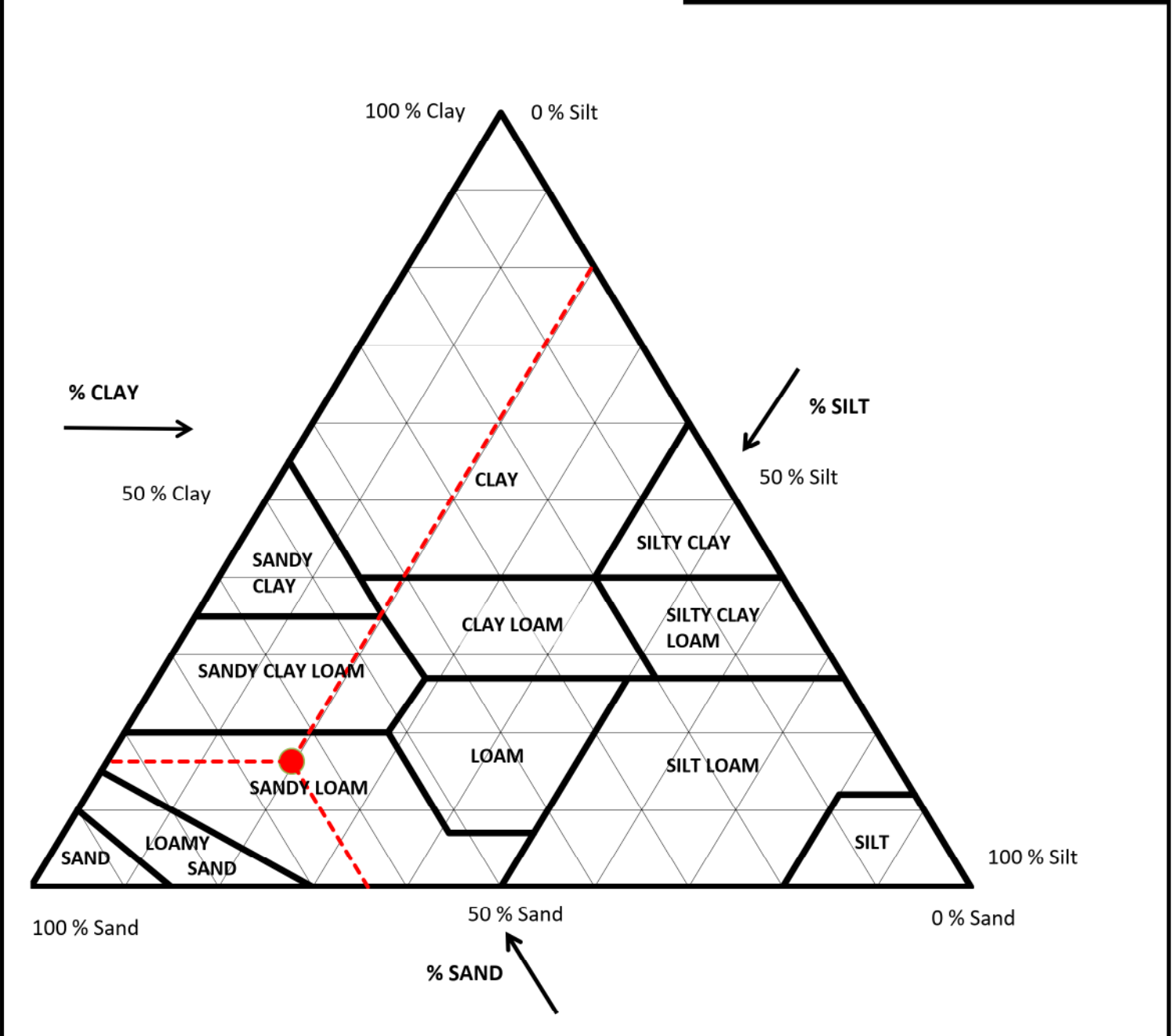
Client	Civil & Environmental Consultants, Inc. (CEC)	Boring	AP-5
Client Project	345-817.0004 AEP Kammer Plant	Depth	13.0'-15.0'
Project No.	25-04143	Sample	ST-3
		Lab Sample	25-04143 -02

Sample Color: **BROWN**
 USCS Group Name: **CLAYEY SAND**
 USCS Group Symbol: **SC**

USDA: **SANDY LOAM**

AASHTO: **A-4 (0)**

Corrected for 0% gravel		Sand Subsizes Corrected Percentages	
Percent Gravel, %	0.0	Very Coarse Sand; 2-1	0.2
Percent Sand, %	64.1	Coarse Sand; 1-0.5	0.6
Percent Silt, %	19.6	Medium Sand; 0.5-0.25	2.1
Percent Clay, %	16.2	Fine Sand; 0.25-0.1	47.2
		Very Fine Sand; 0.1-0.05	14.1
		Total	64.1





GEOTECHNICAL TESTING SERVICES

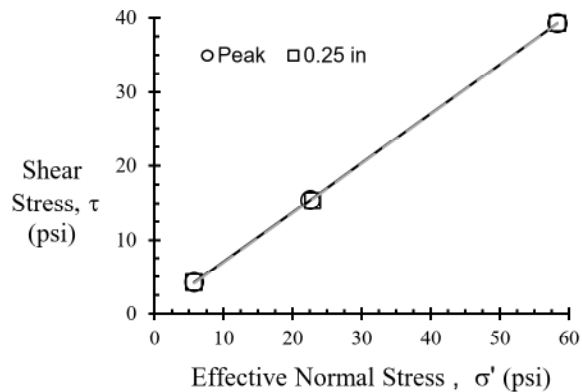
A TRI ENVIRONMENTAL COMPANY

Direct Shear Test Under Consolidated Drained Conditions (ASTM D3080)

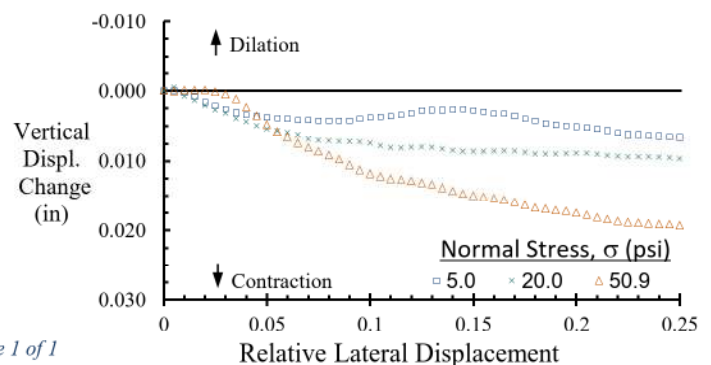
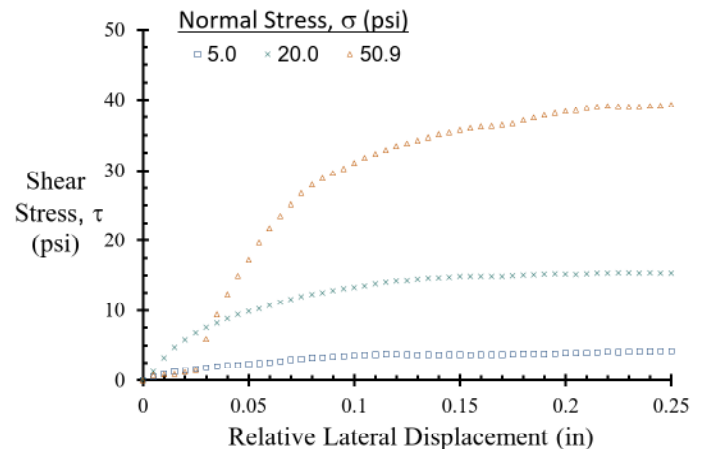
Client: Civil & Environmental Consultants, Inc.
Client Project: 345-817.0004 AEP Kammer Plant
Project No. 25-04143

Boring AP-5
Depth 13.0' - 15.0'
Sample ST-3
Lab No. 25-04143-02

Strength Envelope Linear Regression		
Criterion	C' (psi)	ϕ' (deg)
Peak	0.4	33.7
0.25 in	0.3	33.7



Specimen Number		1	2	3
Initial Condition	Diameter (in)	2.50	2.50	2.50
	Height (in)	1.00	1.00	1.00
	Water Content (%)	18.4	18.4	18.4
	Dry Density (pcf)	105.8	103.9	104.7
Consol	Normal Stress (psi)	5.0	20.0	50.9
	Duration (min)	708	708	708
	Height (in)	1.0	1.0	1.0
Displacement rate (in/min)		6E-04		
Peak	Displacement, in	0.25	0.23	0.25
	Normal Stress (psi)	5.7	22.6	58.3
	Shear Stress (psi)	4.2	15.4	39.3
0.25 in	Normal Stress (psi)	5.7	22.9	58.3
	Shear Stress (psi)	4.2	15.3	39.3



Jeffrey A. Kuhn, Ph.D, P.E. 9/9/2025

Analysis & Quality Review/Date

Page 1 of 1

The testing herein is based upon accepted industry practice as well as the test method listed. Test results reported herein do not apply to samples other than those tested. TRI neither accepts responsibility for nor makes claim as to the final use and purpose of the material. TRI observes and maintains client confidentiality. TRI limits reproduction of this report, except in full, without prior approval of TRI.

GEOTECHNICAL TESTING SERVICES, INC., A TRI ENVIRONMENTAL COMPANY; 1-800-853-7309
103 Coraopolis Road, Coraopolis, PA, 15108

PARTICLE-SIZE ANALYSIS OF SOILS - ASTM D422-63(2007)

Client	Civil & Environmental Consultants, Inc. (CEC)	Boring	AP-5
Client Project	345-817.0004 AEP Kammer Plant	Depth	20.0'-22.0'
Project No.	25-04143	Sample	ST-4
		Lab Sample	25-04143 -03

Sample Color: **BROWN**
 USCS Group Name: **SANDY LEAN CLAY**
 USCS Group Symbol: **CL**

USDA: **LOAM** AASHTO: **A-6 (10)**

Dry Prep: R58-11(2018)¹

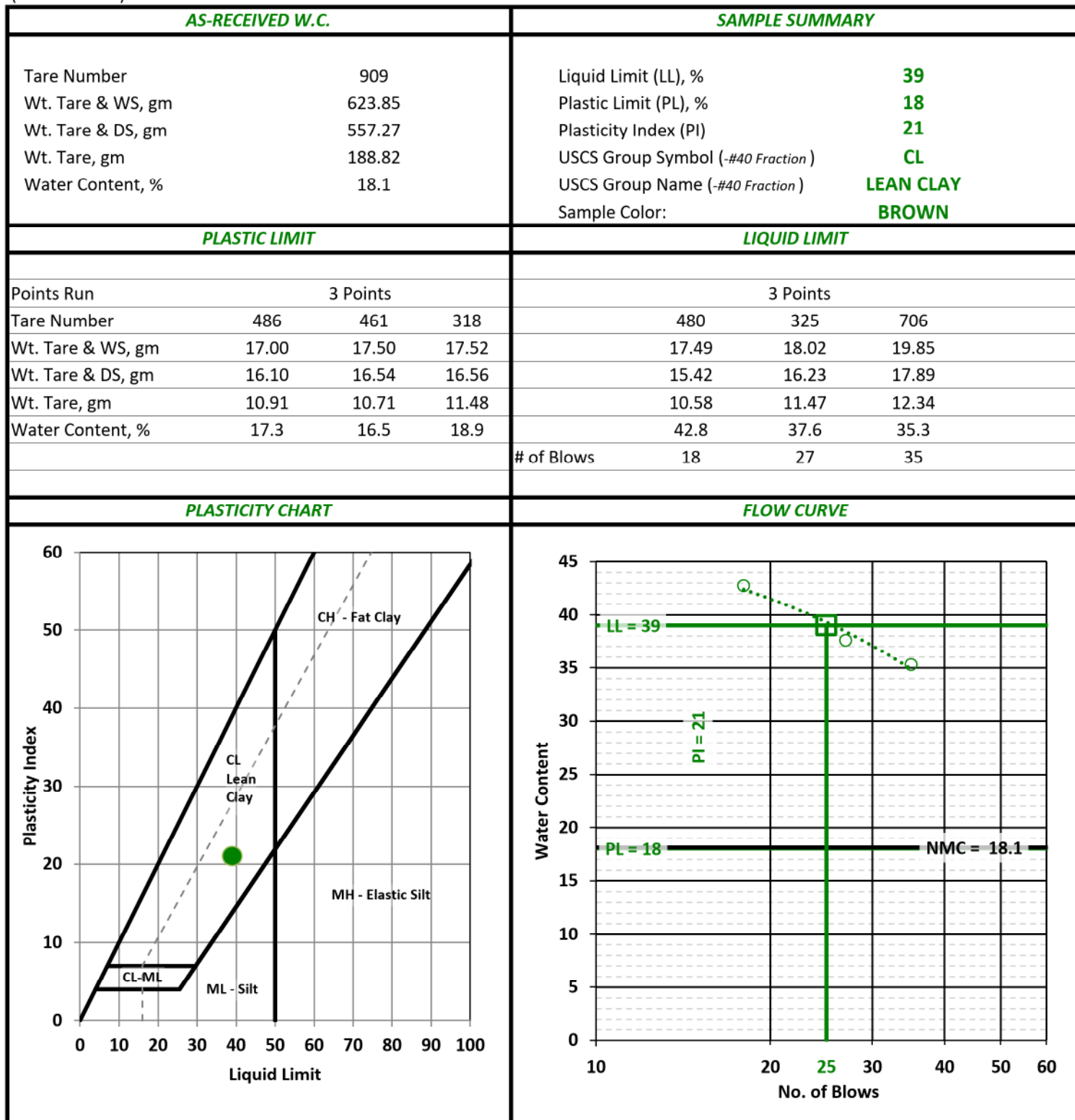
MECHANICAL SIEVE									
Total Sample			Sieve Size	Nominal Opening, mm	Dry Wt, gm	Split Normalized		Project Specifications	
Tare No.	909		3"	75	0	0.0%	100.0%		
Tare + WS., gm	623.85		2-1/2"	63	0	0.0%	100.0%		
Tare + DS., gm	557.27		2"	50	0	0.0%	100.0%		
Tare, gm	188.82		1-1/2"	37.5	0	0.0%	100.0%		
Total sample WC	18.1%		1"	25	0	0.0%	100.0%		
Total Sample Dry Wt, gm (-3")	368		3/4"	19	0	0.0%	100.0%		
Hygroscopic WC (-#10)			1/2"	12.5	0	0.0%	100.0%		
Tare No.	820		3/8"	9.5	0	0.0%	100.0%		
Tare + WS., gm	44.27		No. 4	4.75	0.18	0.0%	100.0%		
Tare + DS., gm	43.86		No. 10	2	0.12	0.0%	99.9%		
Tare, gm	13.79		No. 20	0.85	1.42	2.2%	97.8%		
Hygroscopic WC	1.36%		No. 40	0.425	4.25	6.4%	91.3%		
			No. 60	0.25	3.11	4.7%	86.6%		
-#10 Hydro/Sieve air dry wt.	65.85		No. 140	0.106	16.14	24.5%	62.1%		
Wt. of +#200 Sample, gm	26.53		No. 200	0.075	1.61	2.4%	59.7%		
HYDROMETER (-#10)									
Split Air Dry Wt	66.75						Specific Gravity	2.7	
Hygroscopic WC	1.36%							Assumed	
Corrected Dry wt	65.9	-#10 Dispersed 1min in Hamilton Beach Mixer					a Factor	0.9889	
Elapsed Time (min.)	R Measured	Temp °C	Composite Correction	R Corrected	K Factor	Percent Finer (%)	Particle Diameter (mm)	Adjusted % Finer (%)	
2	40.0	23.6	4.7	35.3	0.0129	53.0	0.0283	53.0%	
5	36.0	23.6	4.7	31.3	0.0129	47.0	0.0185	47.0%	
15	31.0	23.6	4.7	26.3	0.0129	39.5	0.0111	39.5%	
30	29.0	23.6	4.7	24.3	0.0129	36.5	0.0080	36.5%	
60	27.0	23.7	4.6	22.4	0.0129	33.6	0.0057	33.6%	
250	23.0	23.9	4.6	18.4	0.0129	27.6	0.0029	27.6%	
1440	17.0	23.9	4.6	12.4	0.0129	18.6	0.0012	18.6%	
USCS SOIL CLASSIFICATION				USDA CLASSIFICATION					
Corrected For 100% Passing a 3" Sieve				Particle Size (mm)	Percent Finer (%)	Percent of Each Component (Material) (%)		Corrected Percent of -2.0 mm Material for USDA	
% Gravel (-3" & +#4)	0.0	Silt=27.2% Clay=32.5%							
Coarse=0; Fine=0		D60, mm	NA			Gravel	0.1	0	
% Sand (-#4 & +#200)	40.3	D30, mm	NA						
Coarse=0; Medium=8.6; Fine=31.7		D10, mm	NA						
% Fines (-#200)	59.7	Cc	NA						
% Plus #200 (-3")	40.3	Cu	NA	2	99.9	Sand	43.0	43.1	
USCS Description				0.05	56.9	Silt	33.1	33.2	
SANDY LEAN CLAY				0.002	23.7	Clay	23.7	23.8	
USCS Group Symbol		Atterberg Limits Group Symbol		USDA Classification					
CL		CL - LEAN CLAY							
Auxiliary Information		Wt Ret, gm	% Retained	% Finer	LOAM				
12" Sieve - 300 mm		0	0.0	100.0					
6" Sieve - 150 mm		0	0.0	100.0					
3" Sieve - 75 mm		0	0.0	100.0					

Performed By: RH Input Validation: MA Reviewed By: BS Date Tested: 9/8/2025

LIQUID LIMIT, PLASTIC LIMIT, AND PLASTICITY INDEX OF SOILS
ASTM D4318-17e1

Client	Civil & Environmental Consultants, Inc. (CEC)	Boring	AP-5
Client Project	345-817.0004 AEP Kammer Plant	Depth	20.0'-22.0'
Project No.	25-04143	Sample	ST-4
		Lab Sample	25-04143 -03

Soil Description: BROWN LEAN CLAY
 (-#40 Fraction)



Performed By: RH

Input Validation: MA

Reviewed By: BS

Date Tested: 9/4/2025

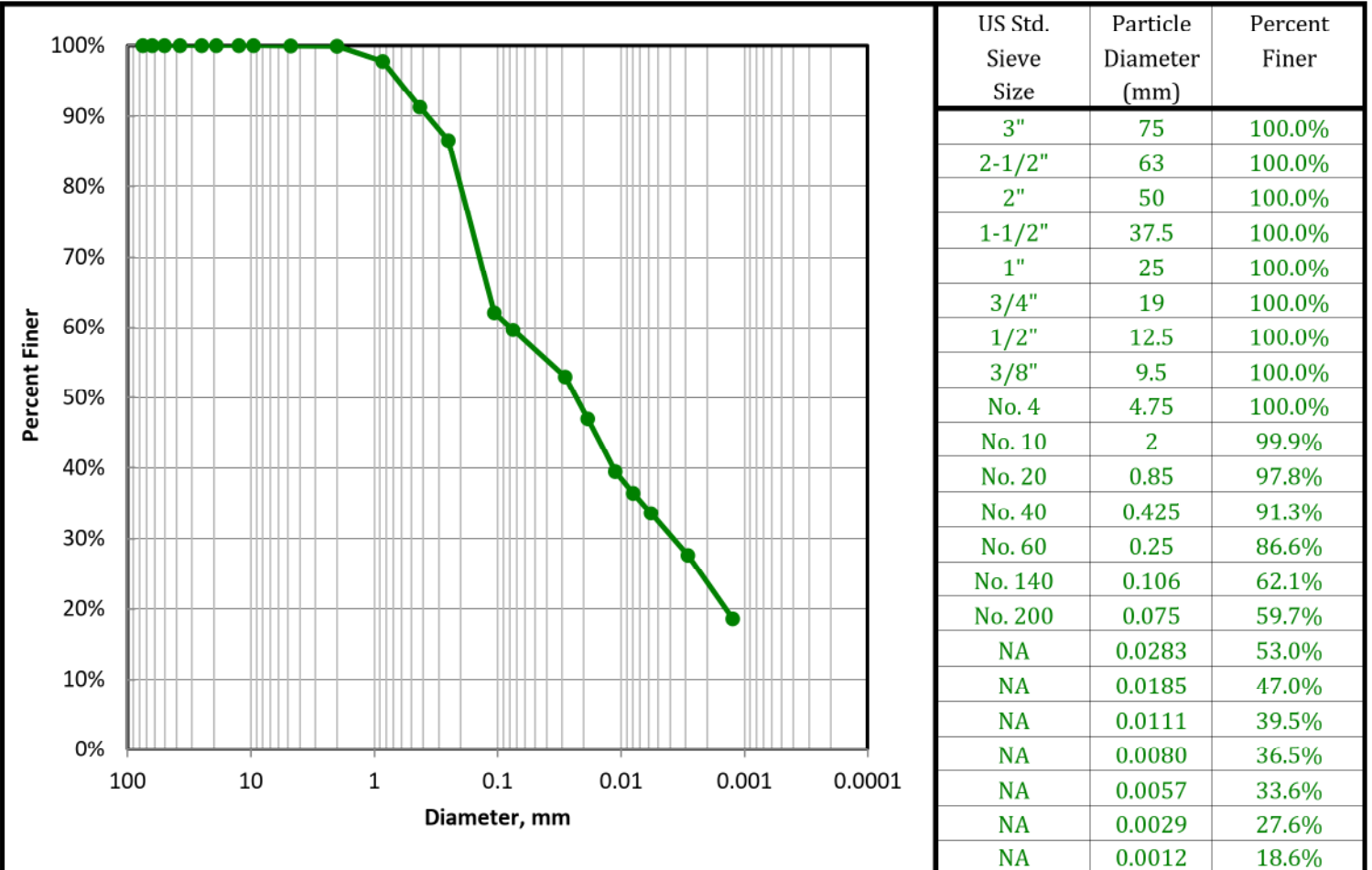
PARTICLE-SIZE ANALYSIS OF SOILS - ASTM D422-63(2007)

Client	Civil & Environmental Consultants, Inc. (CEC)	Boring	AP-5
Client Project	345-817.0004 AEP Kammer Plant	Depth	20.0'-22.0'
Project No.	25-04143	Sample	ST-4
		Lab Sample	25-04143 -03

Sample Color: **BROWN**
 USCS Group Name: **SANDY LEAN CLAY**
 USCS Group Symbol: **CL**

USDA: **LOAM**

AASHTO: **A-6 (10)**



USCS SOIL CLASSIFICATION				USDA CLASSIFICATION			
Corrected For 100% Passing a 3" Sieve				Particle Size (mm)	Percent Finer (%)	Percent of Each Component (Material) (%)	Corrected Percent of -2.0 mm Material for USDA
% Gravel (-3" & + #4)	0.0	Silt=27.2% Clay=32.5%		100	100	Gravel 0.1	0
Coarse=0; Fine=0		D60, mm	NA	2	99.9	Sand 43.0	43.1
% Sand (-#4 & + #200)	40.3	D30, mm	NA	0.05	56.9	Silt 33.1	33.2
Coarse=0; Medium=8.6; Fine=31.7		D10, mm	NA	0.002	23.7	Clay 23.7	23.8
% Fines (-#200)	59.7	Cc	NA	USDA Classification LOAM			
% Plus #200 (-3")	40.3	Cu	NA				
USCS Description SANDY LEAN CLAY							
USCS Group Symbol	Atterberg Limits Group Symbol						
CL	CL - LEAN CLAY						
Auxiliary Information	Wt Ret, gm	% Retained	% Finer				
12" Sieve - 300 mm	0	0.0	100.0				
6" Sieve - 150 mm	0	0.0	100.0				
3" Sieve - 75 mm	0	0.0	100.0				

USDA CLASSIFICATION CHART

Client
Client Project
Project No.

Civil & Environmental Consultants, Inc. (CEC)
345-817.0004 AEP Kammer Plant
25-04143

Boring AP-5
Depth 20.0'-22.0'
Sample ST-4
Lab Sample 25-04143 -03

Sample Color: **BROWN**
USCS Group Name: **SANDY LEAN CLAY**
USCS Group Symbol: **CL**

USDA: **LOAM**

AASHTO: **A-6 (10)**

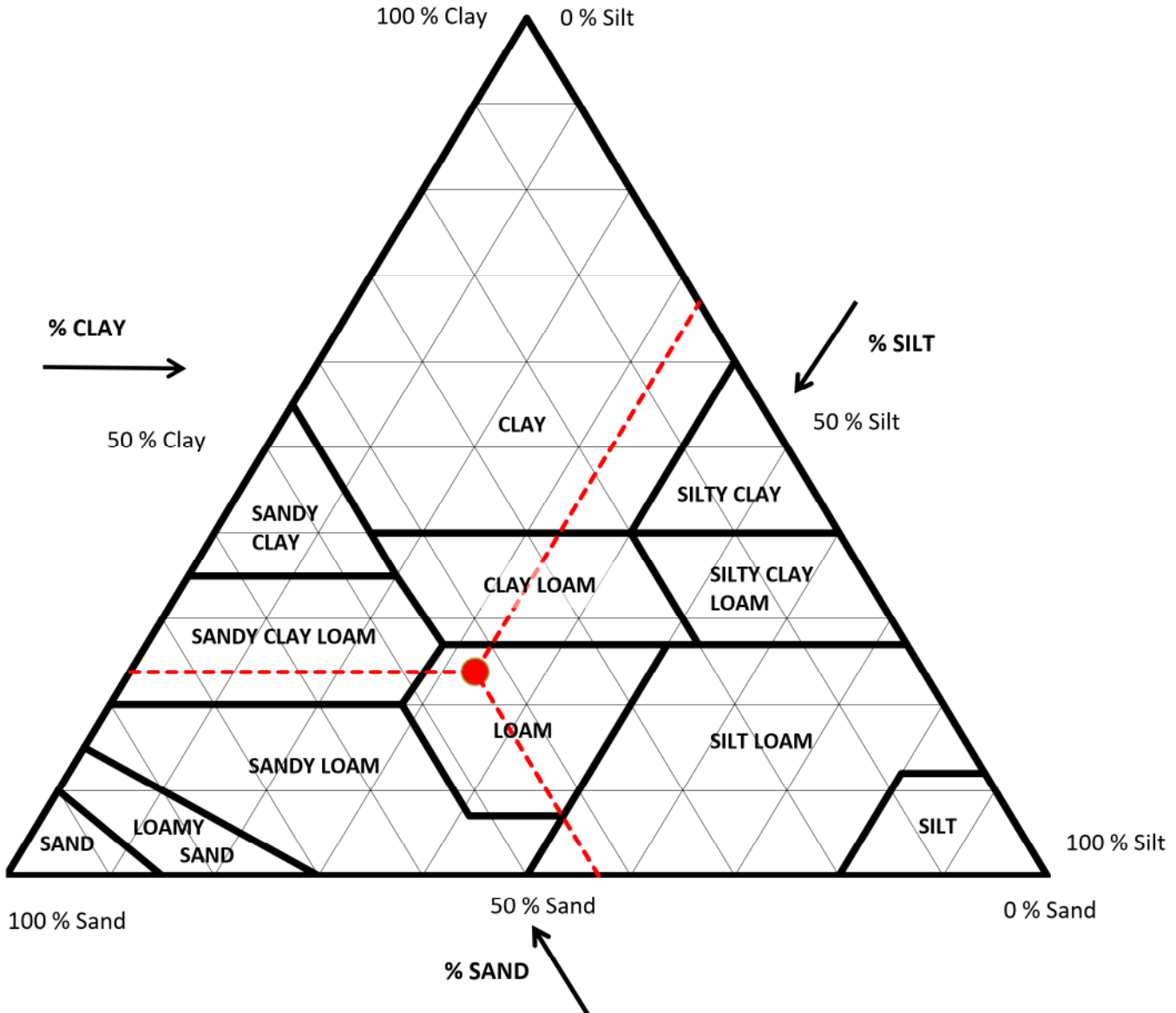
Corrected for 0% gravel

Percent Gravel, %	0.0
Percent Sand, %	43.1
Percent Silt, %	33.2
Percent Clay, %	23.8

Sand Subsizes

Corrected Percentages

Very Coarse Sand; 2-1	1.7
Coarse Sand; 1-0.5	5.4
Medium Sand; 0.5-0.25	6.2
Fine Sand; 0.25-0.1	24.9
Very Fine Sand; 0.1-0.05	4.8
Total	43.1

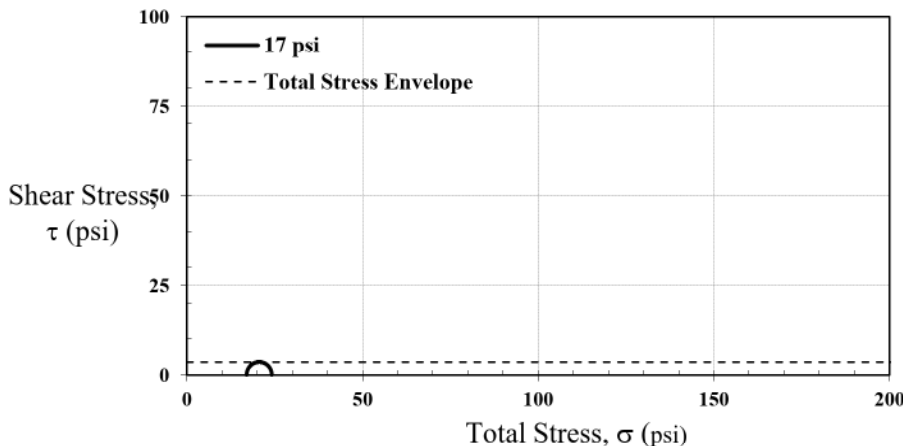
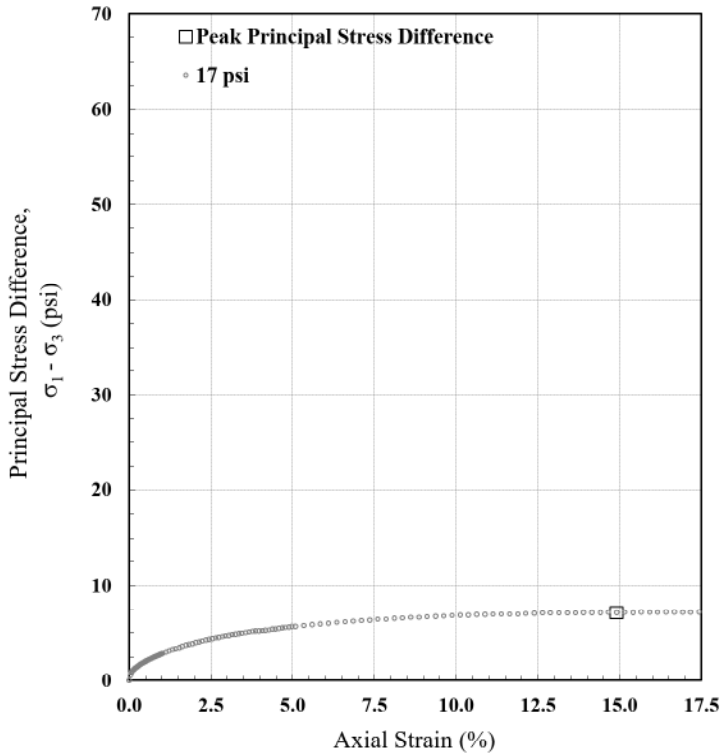




Unconsolidated-Undrained (Q) Triaxial Compression

Client: Civil & Environmental Consultants, Inc.
Project: 345-817.0004 AEP Kammer
Sample: AP-5 (20.0' - 22.0'); ST-4

TRI Log #: 25-04143.3
Test Method: ASTM D2850



Test Parameters	
Minor Principal Stress (psi)	17.0
Rate of Strain (%/hr)	60

Initial Properties	
Avg. Diameter (in)	2.83
Avg. Height (in)	5.91
Avg. Water Content (%)	18.2
Bulk Density (pcf)	135.4
Dry Density (pcf)	114.5
Saturation (%)	100.0
Void Ratio	0.50
Specific Gravity (Assumed)	2.75

At Failure - Maximum Deviator Stress	
Axial Strain at Failure (%)	14.9
Minor Total Stress (psi)	17.0
Major Total Stress (psi)	24.2
Principal Stress Diff. (psi)	7.2

Total Stress Envelope	
Friction Angle (deg)	0
Undrained Shear Strength, S_u (psi)	3.6
S_u / σ_3	0.2

Note: The calculated value of specimen saturation was approximately 95% or greater. The Mohr failure envelope was taken as a horizontal straight line.

Jeffrey A. Kuhn, Ph.D., P.E., 9/9/2025
Analysis & Quality Review/Date

PARTICLE-SIZE ANALYSIS OF SOILS - ASTM D422-63(2007)

Client	Civil & Environmental Consultants, Inc. (CEC)	Boring	AP-5
Client Project	345-817.0004 AEP Kammer Plant	Depth	23.0'-25.0'
Project No.	25-04143	Sample	ST-5
		Lab Sample	25-04143 -04

Sample Color: **BROWN**
 USCS Group Name: **SANDY LEAN CLAY**
 USCS Group Symbol: **CL**

USDA: **SANDY LOAM** AASHTO: **A-6 (6)**

Dry Prep: R58-11(2018)¹

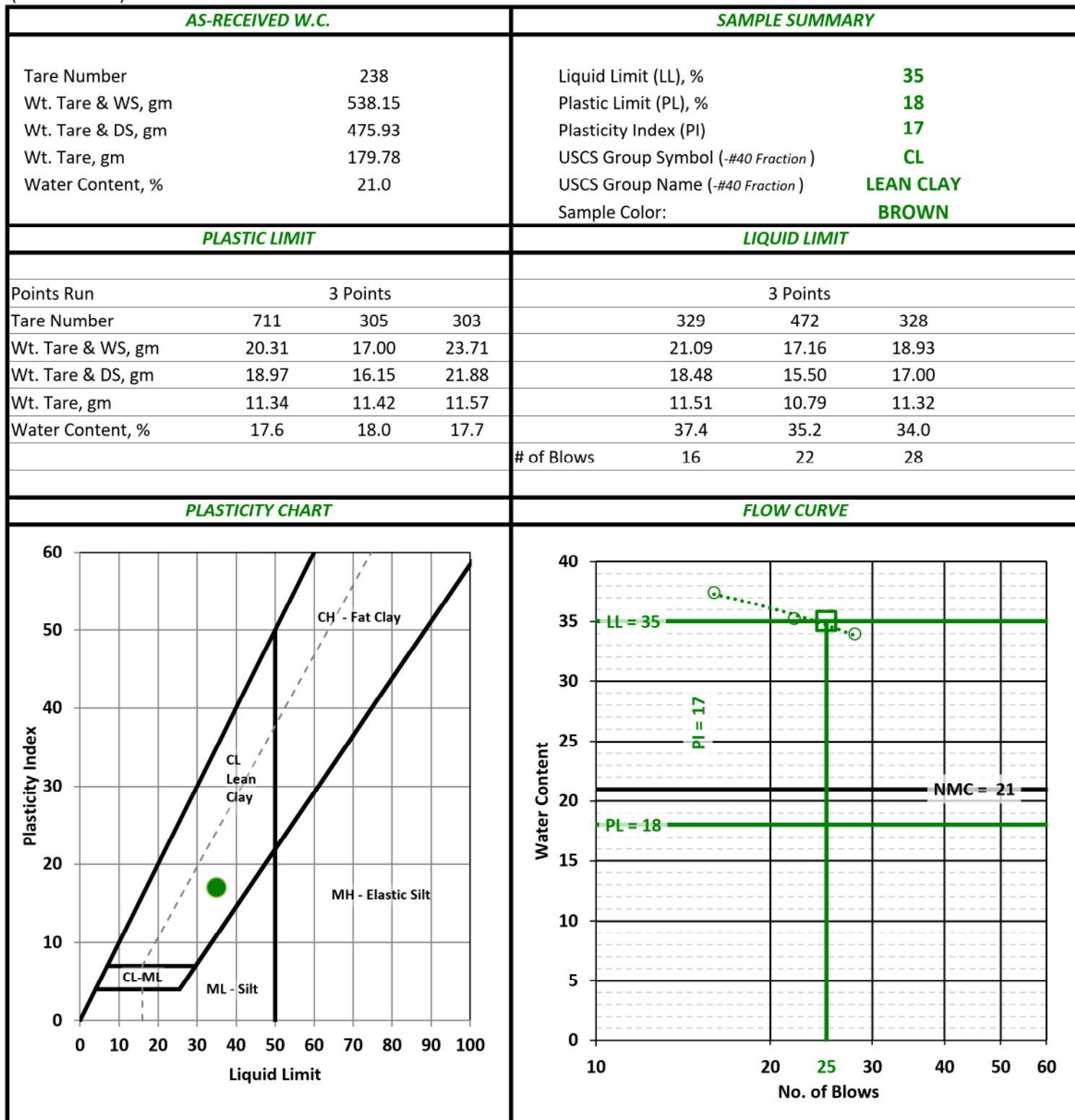
MECHANICAL SIEVE									
Total Sample			Sieve Size	Nominal Opening, mm	Dry Wt, gm	Split Normalized		Project Specifications	
Tare No.	238		3"	75	0	0.0%	100.0%		
Tare + WS., gm	538.15		2-1/2"	63	0	0.0%	100.0%		
Tare + DS., gm	475.93		2"	50	0	0.0%	100.0%		
Tare, gm	179.78		1-1/2"	37.5	0	0.0%	100.0%		
Total sample WC	21.0%		1"	25	0	0.0%	100.0%		
Total Sample Dry Wt, gm (-3")	296		3/4"	19	0	0.0%	100.0%		
Hygroscopic WC (-#10)			1/2"	12.5	0	0.0%	100.0%		
Tare No.	211		3/8"	9.5	0	0.0%	100.0%		
Tare + WS., gm	53.29		No. 4	4.75	0	0.0%	100.0%		
Tare + DS., gm	52.89		No. 10	2	0.55	0.2%	99.8%		
Tare, gm	16.55		No. 20	0.85	0.08	0.1%	99.7%		
Hygroscopic WC	1.10%		No. 40	0.425	0.98	1.6%	98.1%		
			No. 60	0.25	3.86	6.3%	91.8%		
-#10 Hydro/Sieve air dry wt.	61.09		No. 140	0.106	20.14	32.9%	58.9%		
Wt. of +#200 Sample, gm	28.51		No. 200	0.075	3.45	5.6%	53.2%		
HYDROMETER (-#10)									
Split Air Dry Wt	61.76						Specific Gravity	2.7	
Hygroscopic WC	1.10%							Assumed	
Corrected Dry wt	61.1	-#10 Dispersed 1min in Hamilton Beach Mixer					a Factor	0.9889	
Elapsed Time (min.)	R Measured	Temp °C	Composite Correction	R Corrected	K Factor	Percent Finer (%)	Particle Diameter (mm)	Adjusted % Finer (%)	
2	25.0	23.5	4.7	20.3	0.0129	32.9	0.0318	32.8%	
5	22.0	23.5	4.7	17.3	0.0129	28.0	0.0205	28.0%	
15	20.0	23.5	4.7	15.3	0.0129	24.8	0.0120	24.7%	
30	18.0	23.5	4.7	13.3	0.0129	21.5	0.0086	21.5%	
60	17.0	23.6	4.7	12.3	0.0129	19.9	0.0061	19.9%	
250	14.0	23.8	4.6	9.4	0.0129	15.2	0.0030	15.2%	
1440	12.0	23.8	4.6	7.4	0.0129	12.0	0.0013	12.0%	
USCS SOIL CLASSIFICATION				USDA CLASSIFICATION					
Corrected For 100% Passing a 3" Sieve				Particle Size (mm)	Percent Finer (%)	Percent of Each Component (Material) (%)		Corrected Percent of -2.0 mm Material for USDA	
% Gravel (-3" & +#4)	0.0	Silt=34.7% Clay=18.5%							
Coarse=0; Fine=0		D60, mm	NA			Gravel	0.2	0	
% Sand (-#4 & +#200)	46.8	D30, mm	NA						
Coarse=0.2; Medium=1.7; Fine=44.9		D10, mm	NA						
% Fines (-#200)	53.2	Cc	NA						
% Plus #200 (-3")	46.8	Cu	NA	2	99.8	Sand	56.2	56.3	
USCS Description				0.05	43.6	Silt	30.0	30.0	
SANDY LEAN CLAY				0.002	13.6	Clay	13.6	13.7	
USCS Group Symbol		Atterberg Limits Group Symbol		USDA Classification					
CL		CL - LEAN CLAY							
Auxiliary Information		Wt Ret, gm	% Retained	% Finer	SANDY LOAM				
12" Sieve - 300 mm		0	0.0	100.0					
6" Sieve - 150 mm		0	0.0	100.0					
3" Sieve - 75 mm		0	0.0	100.0					

Performed By: RH Input Validation: MA Reviewed By: BLS Date Tested: 9/8/2025

LIQUID LIMIT, PLASTIC LIMIT, AND PLASTICITY INDEX OF SOILS
ASTM D4318-17e1

Client	Civil & Environmental Consultants, Inc. (CEC)	Boring	AP-5
Client Project	345-817.0004 AEP Kammer Plant	Depth	23.0'-25.0'
Project No.	25-04143	Sample	ST-5
		Lab Sample	25-04143 -04

Soil Description: BROWN LEAN CLAY
 (-#40 Fraction)



Performed By: RH

Input Validation: MA

Reviewed By: BS

Date Tested: 9/8/2025

PARTICLE-SIZE ANALYSIS OF SOILS - ASTM D422-63(2007)

Client	Civil & Environmental Consultants, Inc. (CEC)	Boring	AP-5
Client Project	345-817.0004 AEP Kammer Plant	Depth	23.0'-25.0'
Project No.	25-04143	Sample	ST-5
		Lab Sample	25-04143 -04

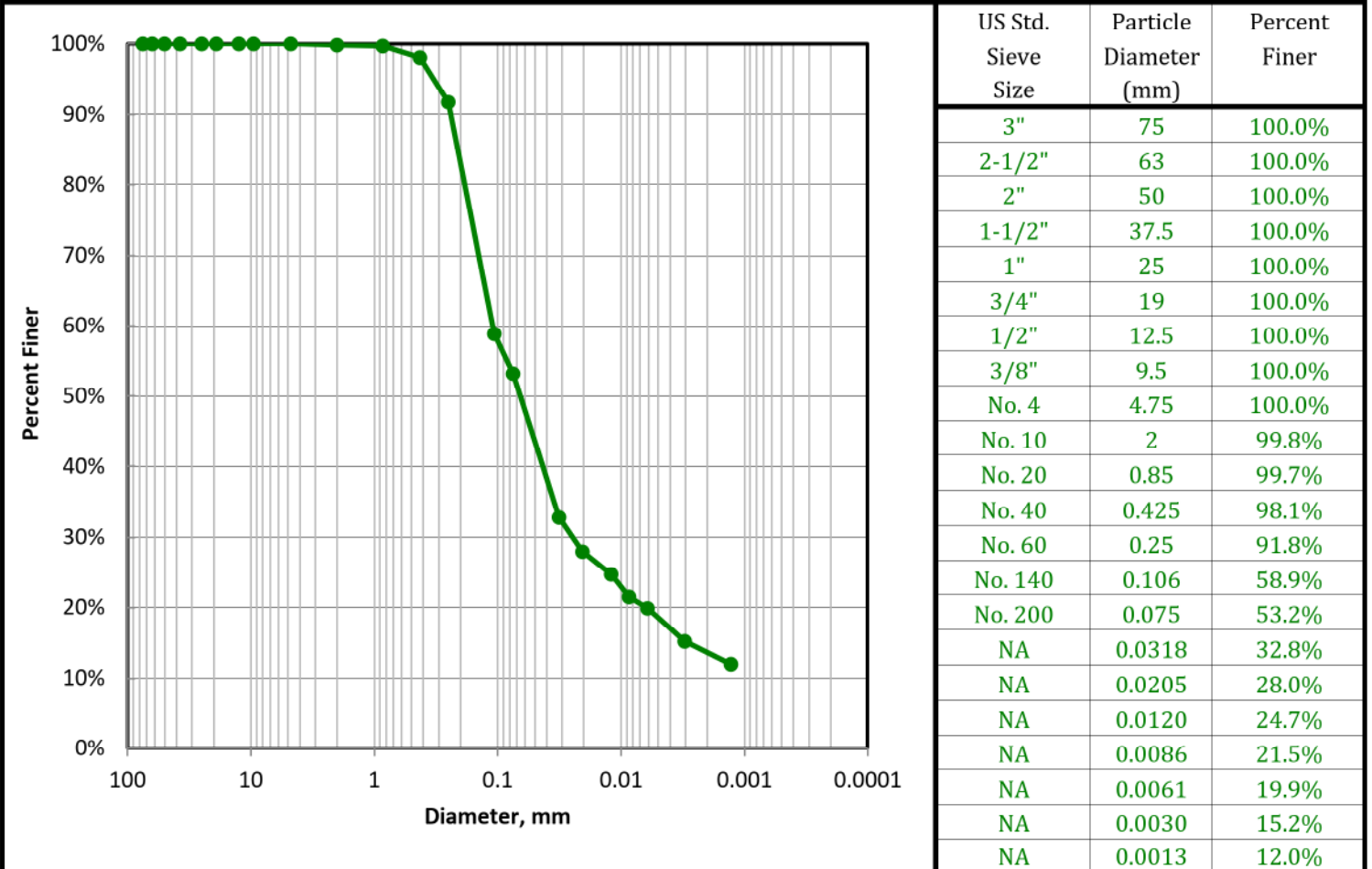
Sample Color: **BROWN**

USCS Group Name: **SANDY LEAN CLAY**

USCS Group Symbol: **CL**

USDA: **SANDY LOAM**

AASHTO: **A-6 (6)**



USCS SOIL CLASSIFICATION				USDA CLASSIFICATION					
Corrected For 100% Passing a 3" Sieve				Particle Size (mm)	Percent Finer (%)	Percent of Each Component (Material) (%)		Corrected Percent of -2.0 mm Material for USDA	
% Gravel (-3" & + #4)	0.0	Silt=34.7% Clay=18.5%							
Coarse=0; Fine=0		D60, mm	NA						
% Sand (-#4 & + #200)	46.8	D30, mm	NA						
Coarse=0.2; Medium=1.7; Fine=44.9		D10, mm	NA						
% Fines (-#200)	53.2	Cc	NA	100	100				
% Plus #200 (-3")	46.8	Cu	NA	2	99.8	Gravel	0.2	0	
USCS Description				0.05	43.6	Sand	56.2	56.3	
SANDY LEAN CLAY				0.002	13.6	Silt	30.0	30.0	
USCS Group Symbol		Atterberg Limits Group Symbol				Clay	13.6	13.7	
CL		CL - LEAN CLAY		USDA Classification					
Auxiliary Information		Wt Ret, gm	% Retained	% Finer	SANDY LOAM				
12" Sieve - 300 mm		0	0.0	100.0					
6" Sieve - 150 mm		0	0.0	100.0					
3" Sieve - 75 mm		0	0.0	100.0					

USDA CLASSIFICATION CHART

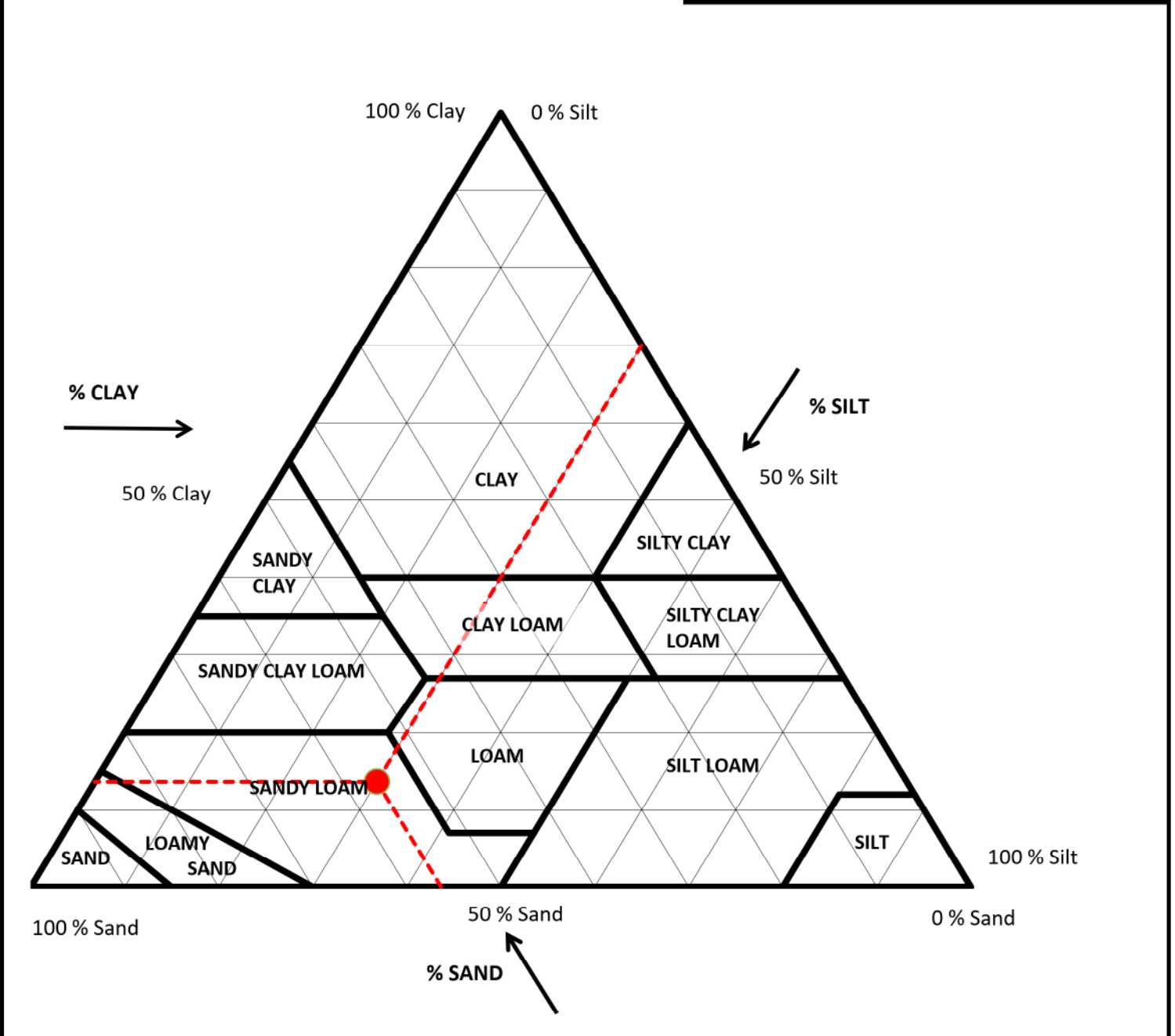
Client	Civil & Environmental Consultants, Inc. (CEC)	Boring	AP-5
Client Project	345-817.0004 AEP Kammer Plant	Depth	23.0'-25.0'
Project No.	25-04143	Sample	ST-5
		Lab Sample	25-04143 -04

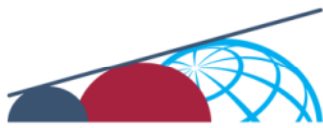
Sample Color: **BROWN**
 USCS Group Name: **SANDY LEAN CLAY**
 USCS Group Symbol: **CL**

USDA: **SANDY LOAM**

AASHTO: **A-6 (6)**

Corrected for 0% gravel		Sand Subsizes	
		Corrected Percentages	
Percent Gravel, %	0.0	Very Coarse Sand; 2-1	0.1
Percent Sand, %	56.3	Coarse Sand; 1-0.5	1.3
Percent Silt, %	30.0	Medium Sand; 0.5-0.25	6.7
Percent Clay, %	13.7	Fine Sand; 0.25-0.1	33.9
		Very Fine Sand; 0.1-0.05	14.4
		Total	56.3





GEOTECHNICAL TESTING SERVICES

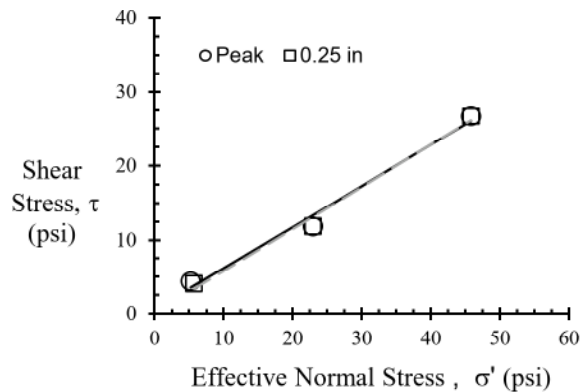
A TRI ENVIRONMENTAL COMPANY

Direct Shear Test Under Consolidated Drained Conditions (ASTM D3080)

Client: Civil & Environmental Consultants, Inc.
 Client Project: 345-817.0004 AEP Kammer Plant
 Project No. 25-04143

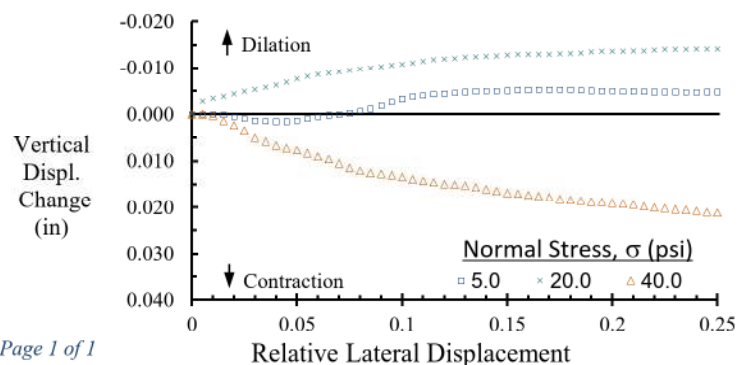
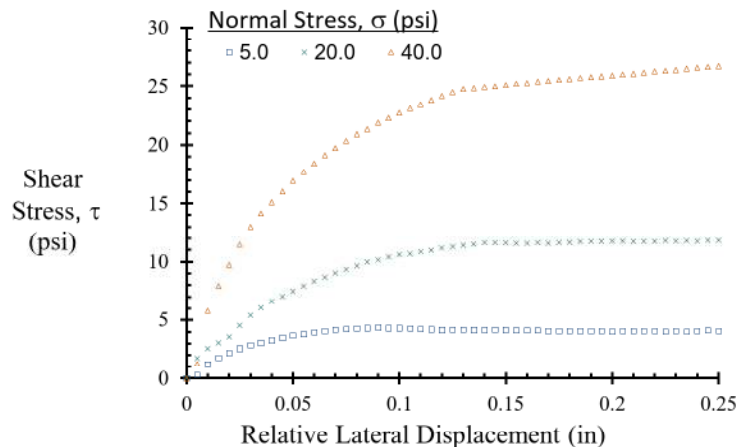
Boring AP-5
 Depth 23.0' - 25.0'
 Sample ST-5
 Lab No. 25-04143-04

Strength Envelope Linear Regression		
Criterion	C' (psi)	ϕ' (deg)
Peak	0.6	29.0
0.25 in	0.1	29.6



Note: Area Correction Has Been Applied

Specimen Number		1	2	3
Initial Condition	Diameter (in)	2.50	2.50	2.50
	Height (in)	1.00	1.00	1.00
	Water Content (%)	21.0	21.0	21.0
	Dry Density (pcf)	102.5	100.5	102.3
Consol	Normal Stress (psi)	5.0	20.0	40.0
	Duration (min)	708	708	708
	Height (in)	1.0	1.1	1.0
Displacement rate (in/min)		6E-04		
Peak	Displacement, in	0.09	0.25	0.25
	Normal Stress (psi)	5.2	22.9	45.8
	Shear Stress (psi)	4.4	11.8	26.7
0.25 in	Normal Stress (psi)	5.7	22.9	45.8
	Shear Stress (psi)	4.1	11.8	26.7



Jeffrey A. Kuhn, Ph.D., P.E. 9/9/2025

Analysis & Quality Review/Date

Page 1 of 1

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GEOTECHNICAL TESTING SERVICES, INC., A TRI ENVIRONMENTAL COMPANY; 1-800-853-7309
103 Coraopolis Road, Coraopolis, PA, 15108

PARTICLE-SIZE ANALYSIS OF SOILS - ASTM D422-63(2007)

Client	Civil & Environmental Consultants, Inc. (CEC)	Boring	AP-5
Client Project	345-817.0004 AEP Kammer Plant	Depth	33.5'-34.5'
Project No.	25-04143	Sample	SS-9A
		Lab Sample	25-04143 31

Sample Color: BROWN
USCS Group Name: SILTY SAND
USCS Group Symbol: SM

USDA: LOAMY SAND **AASHTO:** A-2-4 (0)

Dry Prep: R58-11(2018)¹

MECHANICAL SIEVE									
Total Sample		Sieve Size	Nominal Opening, mm	Dry Wt, gm	Split Normalized		Project Specifications		
Tare No.	2002	3"	75	0	% Retained	% Finer			
Tare + WS., gm	243.26	2-1/2"	63	0	0.0%	100.0%			
Tare + DS., gm	226.45	2"	50	0	0.0%	100.0%			
Tare, gm	151.20	1-1/2"	37.5	0	0.0%	100.0%			
Total sample WC	22.3%	1"	25	0	0.0%	100.0%			
Total Sample Dry Wt, gm (-3")	75	3/4"	19	0	0.0%	100.0%			
Hygroscopic WC (-#10)		1/2"	12.5	0	0.0%	100.0%			
Tare No.	261	3/8"	9.5	1.53	2.0%	98.0%			
Tare + WS., gm	21.04	No. 4	4.75	0.00	0.0%	98.0%			
Tare + DS., gm	20.86	No. 10	2	0.31	0.4%	97.6%			
Tare, gm	16.61	No. 20	0.85	1.64	2.2%	95.3%			
Hygroscopic WC	4.24%	No. 40	0.425	4.94	6.7%	88.7%			
		No. 60	0.25	13.83	18.7%	69.9%			
-#10 Hydro/Sieve air dry wt.	72.13	No. 140	0.106	32.67	44.2%	25.8%			
Wt. of +#200 Sample, gm	54.87	No. 200	0.075	1.79	2.4%	23.3%			
HYDROMETER (-#10)									
Split Air Dry Wt	75.18						Specific Gravity	2.7	
Hygroscopic WC	4.24%							Assumed	
Corrected Dry wt	72.1	-#10 Dispersed 1min in Hamilton Beach Mixer					a Factor	0.9889	
Elapsed Time (min.)	R Measured	Temp °C	Composite Correction	R Corrected	K Factor	Percent Finer (%)	Particle Diameter (mm)	Adjusted % Finer (%)	
2	19.0	23.5	4.7	14.3	0.0129	19.6	0.0331	19.1%	
5	17.5	23.5	4.7	12.8	0.0129	17.5	0.0211	17.1%	
15	13.0	23.6	4.7	8.3	0.0129	11.4	0.0125	11.1%	
30	9.0	23.7	4.6	4.4	0.0129	6.0	0.0090	5.9%	
60	8.0	23.8	4.6	3.4	0.0129	4.7	0.0064	4.5%	
250	6.5	23.8	4.6	1.9	0.0129	2.6	0.0032	2.5%	
1440	5.5	23.8	4.6	0.9	0.0129	1.2	0.0013	1.2%	
USCS SOIL CLASSIFICATION				USDA CLASSIFICATION					
Corrected For 100% Passing a 3" Sieve				Particle Size (mm)	Percent Finer (%)	Percent of Each Component (Material) (%)		Corrected Percent of -2.0 mm Material for USDA	
% Gravel (-3" & +#4)	2.0	Silt=19.5% Clay=3.8%							
Coarse=0; Fine=2		D60, mm	NA			Gravel	2.4	0	
% Sand (-#4 & +#200)	74.6	D30, mm	NA						
Coarse=0.4; Medium=8.9; Fine=65.3		D10, mm	NA						
% Fines (-#200)	23.3	Cc	NA						
% Plus #200 (-3")	76.7	Cu	NA	2	97.6	Sand	76.3	78.2	
USCS Description				0.05	21.3	Silt	19.4	19.9	
SILTY SAND				0.002	1.8	Clay	1.8	1.9	
USCS Group Symbol		Atterberg Limits Group Symbol		USDA Classification					
SM		NP - NON PLASTIC							
Auxiliary Information		Wt Ret, gm	% Retained						% Finer
12" Sieve - 300 mm		0	0.0						100.0
6" Sieve - 150 mm		0	0.0	100.0	LOAMY SAND				
3" Sieve - 75 mm		0	0.0	100.0					

Performed By: RH Input Validation: MA Reviewed By: BS Date Tested: 9/8/2025

LIQUID LIMIT, PLASTIC LIMIT, AND PLASTICITY INDEX OF SOILS
ASTM D4318-17e1

Client	Civil & Environmental Consultants, Inc. (CEC)	Boring	AP-5
Client Project	345-817.0004 AEP Kammer Plant	Depth	33.5'-34.5'
Project No.	25-04143	Sample	SS-9A
		Lab Sample	25-04143 31

Soil Description: BROWN NON PLASTIC MATERIAL
 (-#40 Fraction)

AS-RECEIVED W.C.	SAMPLE SUMMARY																																
<table border="0" style="width: 100%;"> <tr><td style="width: 50%;">Tare Number</td><td style="width: 50%;">2002</td></tr> <tr><td>Wt. Tare & WS, gm</td><td>243.26</td></tr> <tr><td>Wt. Tare & DS, gm</td><td>226.45</td></tr> <tr><td>Wt. Tare, gm</td><td>151.2</td></tr> <tr><td>Water Content, %</td><td>22.3</td></tr> </table>	Tare Number	2002	Wt. Tare & WS, gm	243.26	Wt. Tare & DS, gm	226.45	Wt. Tare, gm	151.2	Water Content, %	22.3	<table border="0" style="width: 100%;"> <tr><td style="width: 50%;">Liquid Limit (LL), %</td><td style="width: 50%; color: green;">NA</td></tr> <tr><td>Plastic Limit (PL), %</td><td style="color: green;">NA</td></tr> <tr><td>Plasticity Index (PI)</td><td style="color: green;">NA</td></tr> <tr><td>USCS Group Symbol (-#40 Fraction)</td><td style="color: green;">NP</td></tr> <tr><td>USCS Group Name (-#40 Fraction)</td><td style="color: green;">NON PLASTIC</td></tr> <tr><td>Sample Color:</td><td style="color: green;">BROWN</td></tr> </table>	Liquid Limit (LL), %	NA	Plastic Limit (PL), %	NA	Plasticity Index (PI)	NA	USCS Group Symbol (-#40 Fraction)	NP	USCS Group Name (-#40 Fraction)	NON PLASTIC	Sample Color:	BROWN										
Tare Number	2002																																
Wt. Tare & WS, gm	243.26																																
Wt. Tare & DS, gm	226.45																																
Wt. Tare, gm	151.2																																
Water Content, %	22.3																																
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PLASTIC LIMIT	LIQUID LIMIT																																
<table border="0" style="width: 100%;"> <tr><td style="width: 50%;">Points Run</td><td style="width: 50%;">0 Non-Plastic</td></tr> <tr><td>Tare Number</td><td></td></tr> <tr><td>Wt. Tare & WS, gm</td><td></td></tr> <tr><td>Wt. Tare & DS, gm</td><td></td></tr> <tr><td>Wt. Tare, gm</td><td></td></tr> <tr><td>Water Content, %</td><td></td></tr> <tr><td> </td><td></td></tr> <tr><td> </td><td></td></tr> </table>	Points Run	0 Non-Plastic	Tare Number		Wt. Tare & WS, gm		Wt. Tare & DS, gm		Wt. Tare, gm		Water Content, %						<table border="0" style="width: 100%;"> <tr><td style="width: 50%;"> </td><td style="width: 50%;">0 Non-Plastic</td></tr> <tr><td> </td><td></td></tr> <tr><td> </td><td></td></tr> <tr><td> </td><td></td></tr> <tr><td> </td><td></td></tr> <tr><td> </td><td></td></tr> <tr><td> </td><td></td></tr> <tr><td> </td><td></td></tr> </table>		0 Non-Plastic														
Points Run	0 Non-Plastic																																
Tare Number																																	
Wt. Tare & WS, gm																																	
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Wt. Tare, gm																																	
Water Content, %																																	
	0 Non-Plastic																																
PLASTICITY CHART	FLOW CURVE																																

PARTICLE-SIZE ANALYSIS OF SOILS - ASTM D422-63(2007)

Client	Civil & Environmental Consultants, Inc. (CEC)	Boring	AP-5
Client Project	345-817.0004 AEP Kammer Plant	Depth	33.5'-34.5'
Project No.	25-04143	Sample	SS-9A
		Lab Sample	25-04143 31

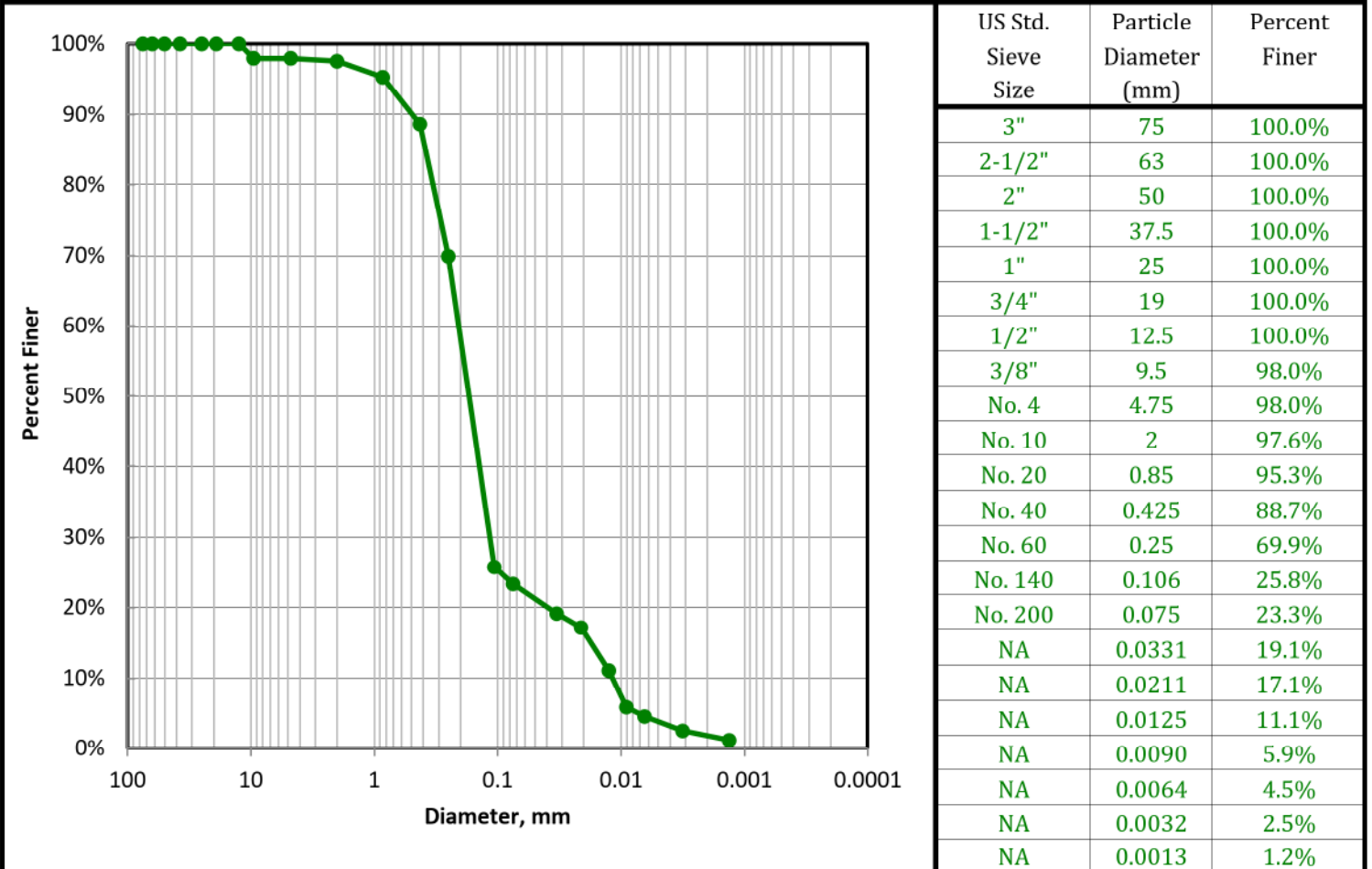
Sample Color: **BROWN**

USCS Group Name: **SILTY SAND**

USCS Group Symbol: **SM**

USDA: **LOAMY SAND**

AASHTO: **A-2-4 (0)**



USCS SOIL CLASSIFICATION				USDA CLASSIFICATION			
Corrected For 100% Passing a 3" Sieve				Particle Size (mm)	Percent Finer (%)	Percent of Each Component (Material) (%)	Corrected Percent of -2.0 mm Material for USDA
% Gravel (-3" & + #4)	2.0	Silt=19.5% Clay=3.8%		100	100	Gravel	2.4
Coarse=0; Fine=2		D60, mm	NA	2	97.6	Sand	76.3
% Sand (-#4 & + #200)	74.6	D30, mm	NA	0.05	21.3	Silt	19.4
Coarse=0.4; Medium=8.9; Fine=65.3		D10, mm	NA	0.002	1.8	Clay	1.8
% Fines (-#200)	23.3	Cc	NA	USDA Classification LOAMY SAND			
% Plus #200 (-3")	76.7	Cu	NA				
USCS Description							
SILTY SAND							
USCS Group Symbol		Atterberg Limits Group Symbol					
SM		NP - NON PLASTIC					
Auxiliary Information	Wt Ret, gm	% Retained	% Finer				
12" Sieve - 300 mm	0	0.0	100.0				
6" Sieve - 150 mm	0	0.0	100.0				
3" Sieve - 75 mm	0	0.0	100.0				

USDA CLASSIFICATION CHART

Client
Client Project
Project No.

Civil & Environmental Consultants, Inc. (CEC)
345-817.0004 AEP Kammer Plant
25-04143

Boring AP-5
Depth 33.5'-34.5'
Sample SS-9A
Lab Sample 25-04143 31

Sample Color: **BROWN**
USCS Group Name: **SILTY SAND**
USCS Group Symbol: **SM**

USDA: **LOAMY SAND**

AASHTO: **A-2-4 (0)**

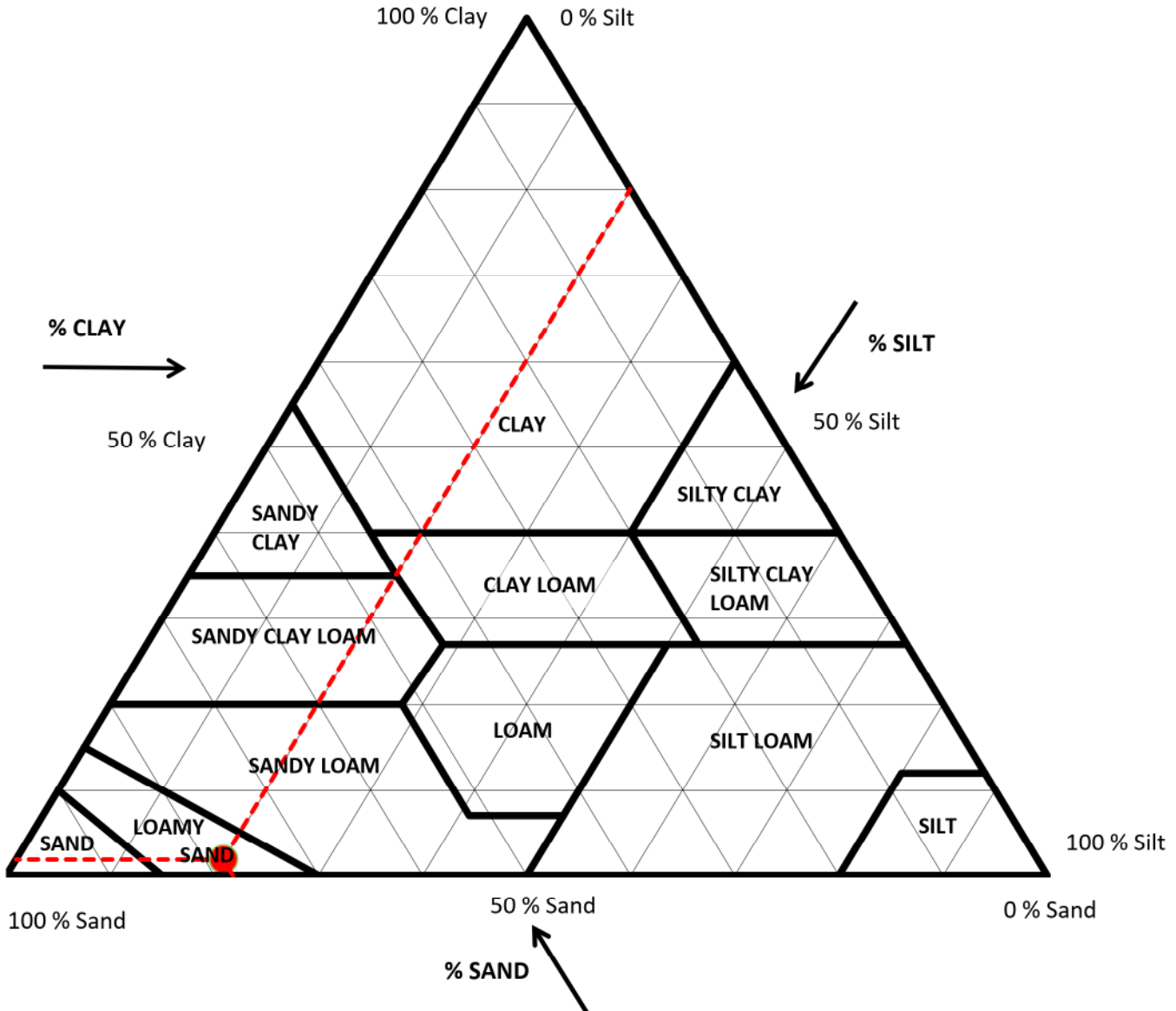
Corrected for 0% gravel

Percent Gravel, %	0.0
Percent Sand, %	78.2
Percent Silt, %	19.9
Percent Clay, %	1.9

Sand Subsizes

Corrected Percentages

Very Coarse Sand; 2-1	1.8
Coarse Sand; 1-0.5	5.7
Medium Sand; 0.5-0.25	20.8
Fine Sand; 0.25-0.1	45.7
Very Fine Sand; 0.1-0.05	4.2
Total	78.2



PARTICLE-SIZE ANALYSIS OF SOILS - ASTM D422-63(2007)

Client	Civil & Environmental Consultants, Inc. (CEC)	Boring	AP-6
Client Project	345-817.0004 AEP Kammer Plant	Depth	33.5'-35.0'
Project No.	25-04143	Sample	SS-9
		Lab Sample	25-04143 -33

Sample Color: **DARK GRAY**

USCS Group Name: **FAT CLAY**

USCS Group Symbol: **CH**

USDA: **CLAY LOAM**

AASHTO: **A-7-6 (34)**

Dry Prep: R58-11(2018)¹

MECHANICAL SIEVE								
Total Sample			Sieve Size	Nominal Opening, mm	Dry Wt, gm	Split Normalized		Project Specifications
Tare No.	139		3"	75	0	% Retained	% Finer	
Tare + WS., gm	388.31		2-1/2"	63	0	% Retained	% Finer	
Tare + DS., gm	310.88		2"	50	0	% Retained	% Finer	
Tare, gm	146.70		1-1/2"	37.5	0	% Retained	% Finer	
Total sample WC	47.2%		1"	25	0	% Retained	% Finer	
Total Sample Dry Wt, gm (-3")	164		3/4"	19	0	% Retained	% Finer	
Hygroscopic WC (-#10)			1/2"	12.5	0	% Retained	% Finer	
Tare No.	223		3/8"	9.5	0	% Retained	% Finer	
Tare + WS., gm	27.46		No. 4	4.75	0	% Retained	% Finer	
Tare + DS., gm	27.29		No. 10	2	0.08	% Retained	% Finer	
Tare, gm	16.71		No. 20	0.85	0.42	% Retained	% Finer	
Hygroscopic WC	1.61%		No. 40	0.425	0.22	% Retained	% Finer	
			No. 60	0.25	0.12	% Retained	% Finer	
-#10 Hydro/Sieve air dry wt.	69.58		No. 140	0.106	3.39	% Retained	% Finer	
Wt. of +#200 Sample, gm	7.67		No. 200	0.075	3.52	% Retained	% Finer	
HYDROMETER (-#10)								
Split Air Dry Wt	70.70						Specific Gravity	2.7
Hygroscopic WC	1.61%							Assumed
Corrected Dry wt	69.6	#10 Dispersed 1min in Hamilton Beach Mixer					a Factor	0.9889
Elapsed Time (min.)	R Measured	Temp °C	Composite Correction	R Corrected	K Factor	Percent Finer (%)	Particle Diameter (mm)	Adjusted % Finer (%)
2	50.0	23.6	4.7	45.3	0.0129	64.4	0.0258	64.3%
5	44.0	23.6	4.7	39.3	0.0129	55.9	0.0173	55.8%
15	37.5	23.6	4.7	32.8	0.0129	46.6	0.0106	46.6%
30	34.0	23.7	4.6	29.4	0.0129	41.8	0.0077	41.8%
60	30.0	23.8	4.6	25.4	0.0129	36.1	0.0056	36.1%
250	25.0	23.9	4.6	20.4	0.0129	29.0	0.0028	29.0%
1440	22.0	23.9	4.6	17.4	0.0129	24.7	0.0012	24.7%
USCS SOIL CLASSIFICATION				USDA CLASSIFICATION				
Corrected For 100% Passing a 3" Sieve				Particle Size (mm)	Percent Finer (%)	Percent of Each Component (Material) (%)		Corrected Percent of -2.0 mm Material for USDA
% Gravel (-3" & +#4)	0.0	Silt=54% Clay=34.9%						
Coarse=0; Fine=0		D60, mm	NA	100	100	Gravel	0.0	0
% Sand (-#4 & +#200)		D30, mm	NA					
Coarse=0; Medium=0.9; Fine=10.1		D10, mm	NA					
% Fines (-#200)		Cc	NA					
% Plus #200 (-3")		Cu	NA	2	100.0			
USCS Description								
FAT CLAY								
USCS Group Symbol		Atterberg Limits Group Symbol						
CH		CH - FAT CLAY		0.05	79.6			
Auxiliary Information		Wt Ret, gm	% Retained					
		% Retained	% Finer					
12" Sieve - 300 mm		0	0.0	100.0	USDA Classification			
6" Sieve - 150 mm		0	0.0	100.0				
3" Sieve - 75 mm		0	0.0	100.0				
					CLAY LOAM			

Performed By: RH

Input Validation: MA

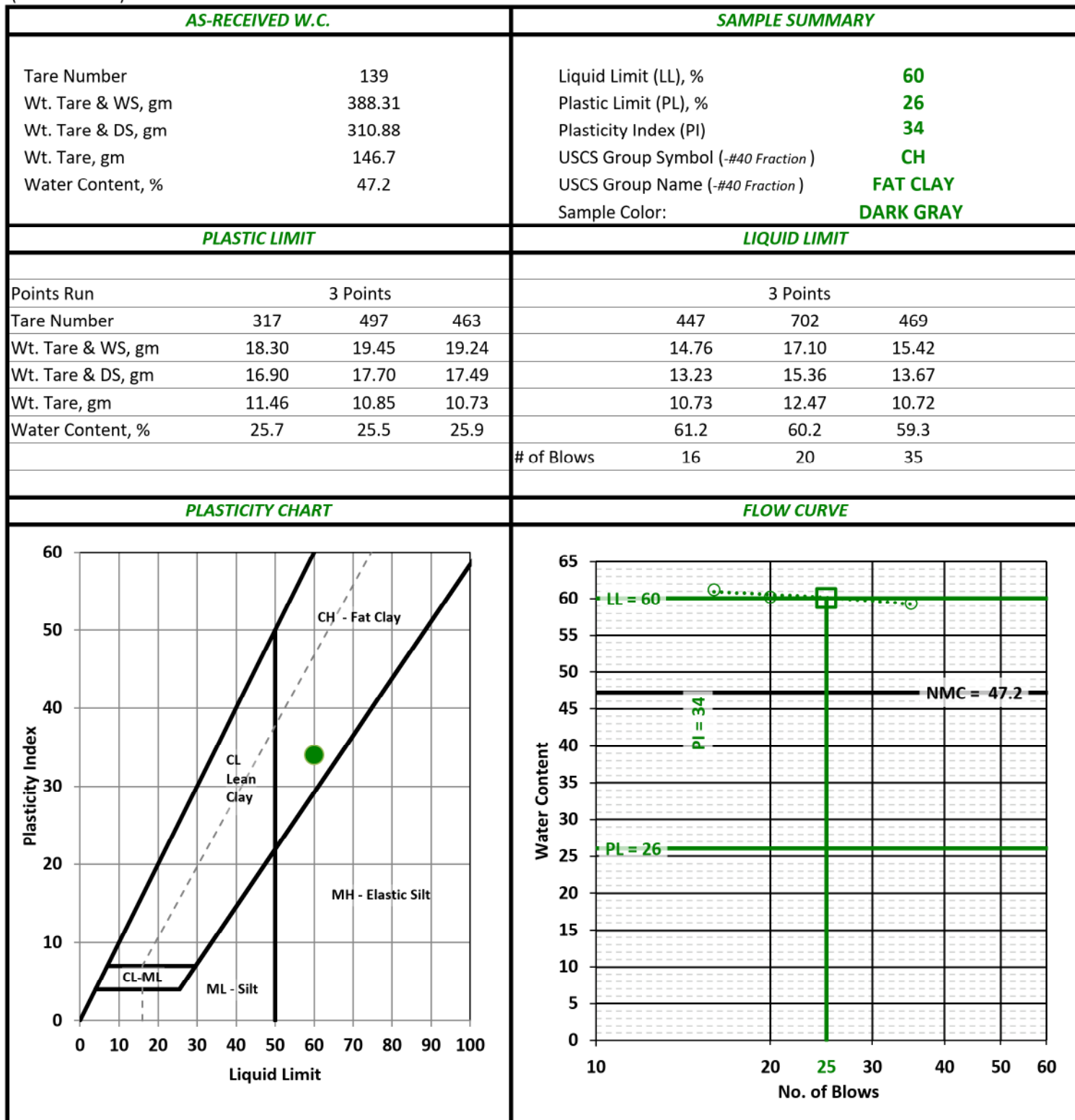
Reviewed By: BS

Date Tested: 9/8/2025

LIQUID LIMIT, PLASTIC LIMIT, AND PLASTICITY INDEX OF SOILS
ASTM D4318-17e1

Client	Civil & Environmental Consultants, Inc. (CEC)	Boring	AP-6
Client Project	345-817.0004 AEP Kammer Plant	Depth	33.5'-35.0'
Project No.	25-04143	Sample	SS-9
		Lab Sample	25-04143 -33

Soil Description: DARK GRAY FAT CLAY
 (-#40 Fraction)



Performed By: RH

Input Validation: MA

Reviewed By: BS

Date Tested: 9/8/2025

PARTICLE-SIZE ANALYSIS OF SOILS - ASTM D422-63(2007)

Client	Civil & Environmental Consultants, Inc. (CEC)	Boring	AP-6
Client Project	345-817.0004 AEP Kammer Plant	Depth	33.5'-35.0'
Project No.	25-04143	Sample	SS-9
		Lab Sample	25-04143 -33

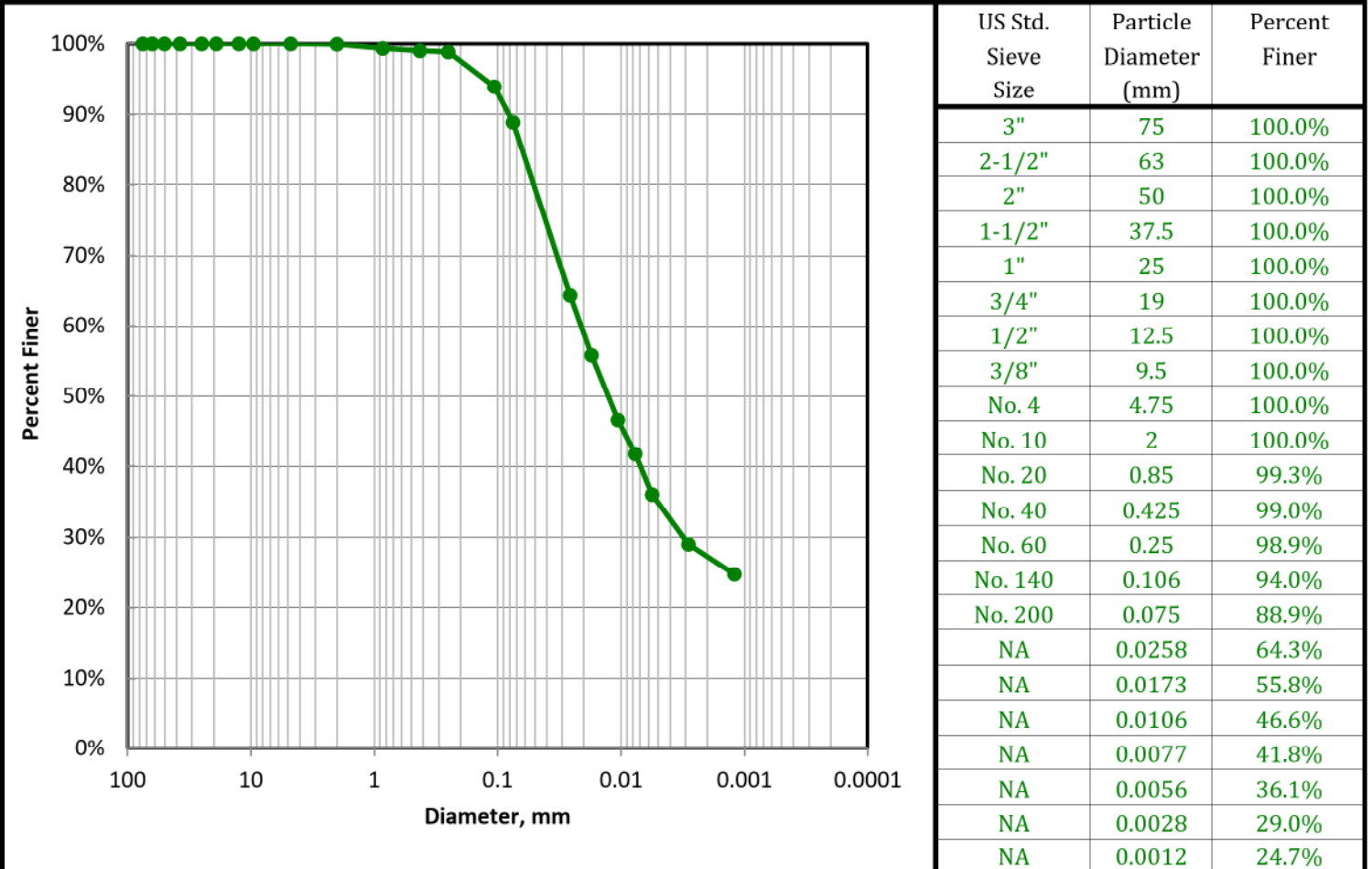
Sample Color: **DARK GRAY**

USCS Group Name: **FAT CLAY**

USCS Group Symbol: **CH**

USDA: **CLAY LOAM**

AASHTO: **A-7-6 (34)**



USCS SOIL CLASSIFICATION

Corrected For 100% Passing a 3" Sieve

% Gravel (-3" & + #4)	0.0	Silt=54% Clay=34.9%
Coarse=0; Fine=0		D60, mm NA
% Sand (-#4 & + #200)	11.1	D30, mm NA
Coarse=0; Medium=0.9; Fine=10.1		D10, mm NA
% Fines (-#200)	88.9	Cc NA
% Plus #200 (-3")	11.1	Cu NA

USCS Description

FAT CLAY

USCS Group Symbol	Atterberg Limits Group Symbol
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CH

CH - FAT CLAY

Auxiliary Information	Wt Ret, gm	% Retained	% Finer
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12" Sieve - 300 mm	0	0.0	100.0
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6" Sieve - 150 mm	0	0.0	100.0
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3" Sieve - 75 mm	0	0.0	100.0
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USDA CLASSIFICATION

Particle Size (mm)	Percent Finer (%)	Percent of Each Component (Material) (%)	Corrected Percent of -2.0 mm Material for USDA
100	100	Gravel 0.0	0
2	100.0	Sand 20.4	20.4
0.05	79.6	Silt 52.3	52.4
0.002	27.2	Clay 27.2	27.3

USDA Classification

CLAY LOAM

USDA CLASSIFICATION CHART

Client
Client Project
Project No.

Civil & Environmental Consultants, Inc. (CEC)
345-817.0004 AEP Kammer Plant
25-04143

Boring AP-6
Depth 33.5'-35.0'
Sample SS-9
Lab Sample 25-04143 -33

Sample Color: **DARK GRAY**
USCS Group Name: **FAT CLAY**
USCS Group Symbol: **CH**

USDA: **CLAY LOAM**

AASHTO: **A-7-6 (34)**

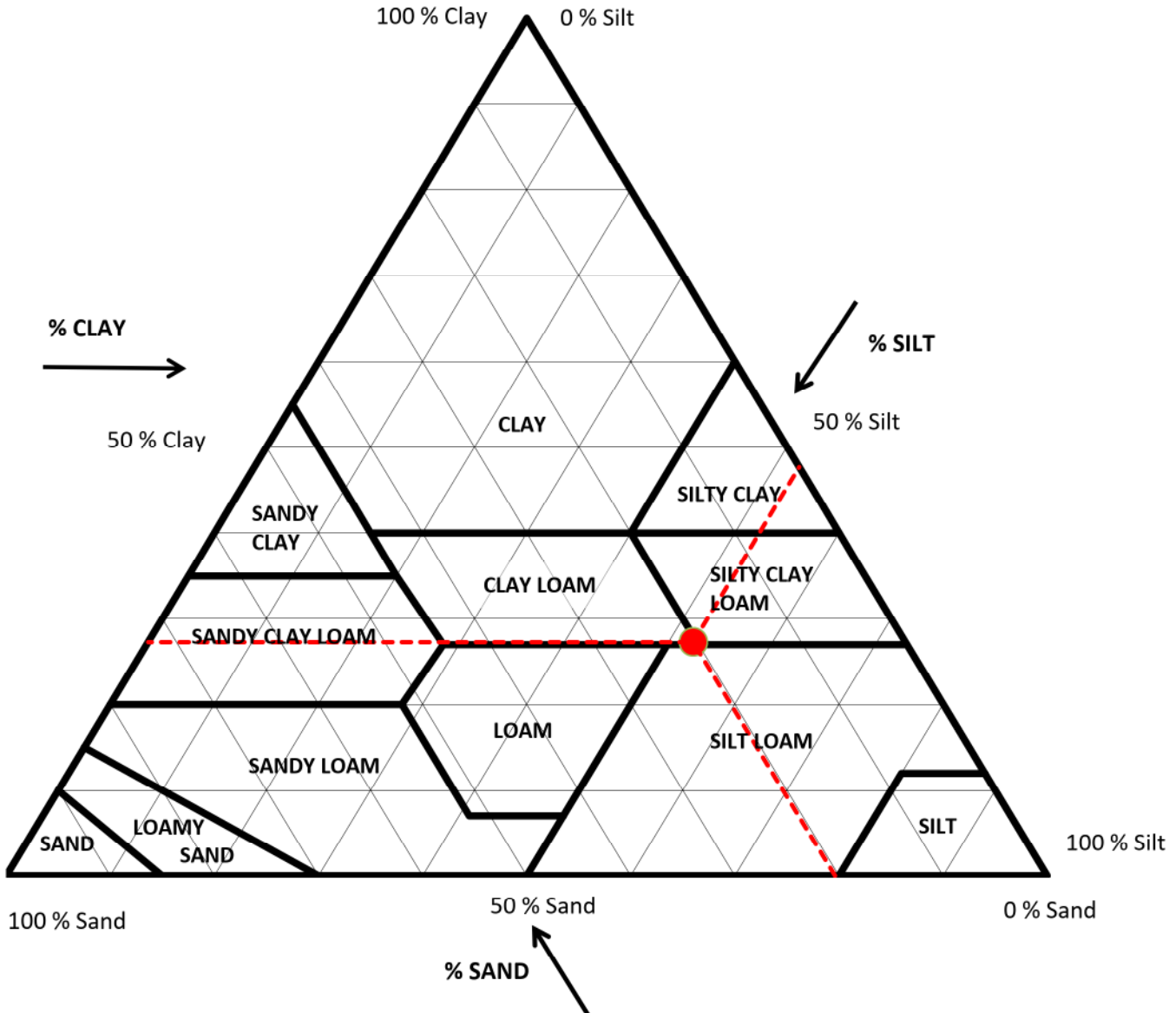
Corrected for 0% gravel

Percent Gravel, %	0.0
Percent Sand, %	20.4
Percent Silt, %	52.4
Percent Clay, %	27.3

Sand Subsizes

Corrected Percentages

Very Coarse Sand; 2-1	0.5
Coarse Sand; 1-0.5	0.4
Medium Sand; 0.5-0.25	0.2
Fine Sand; 0.25-0.1	5.7
Very Fine Sand; 0.1-0.05	13.6
Total	20.4



PARTICLE-SIZE ANALYSIS OF SOILS - ASTM D422-63(2007)

Client	Civil & Environmental Consultants, Inc. (CEC)	Boring	AP-7
Client Project	345-817.0004 AEP Kammer Plant	Depth	3.0'-5.0'
Project No.	25-04143	Sample	ST-1
		Lab Sample	25-04143 -05

Sample Color: **STRONG BROWN**
 USCS Group Name: **SANDY LEAN CLAY**
 USCS Group Symbol: **CL**

USDA: **LOAM** AASHTO: **A-6 (6)**

Dry Prep: R58-11(2018)¹

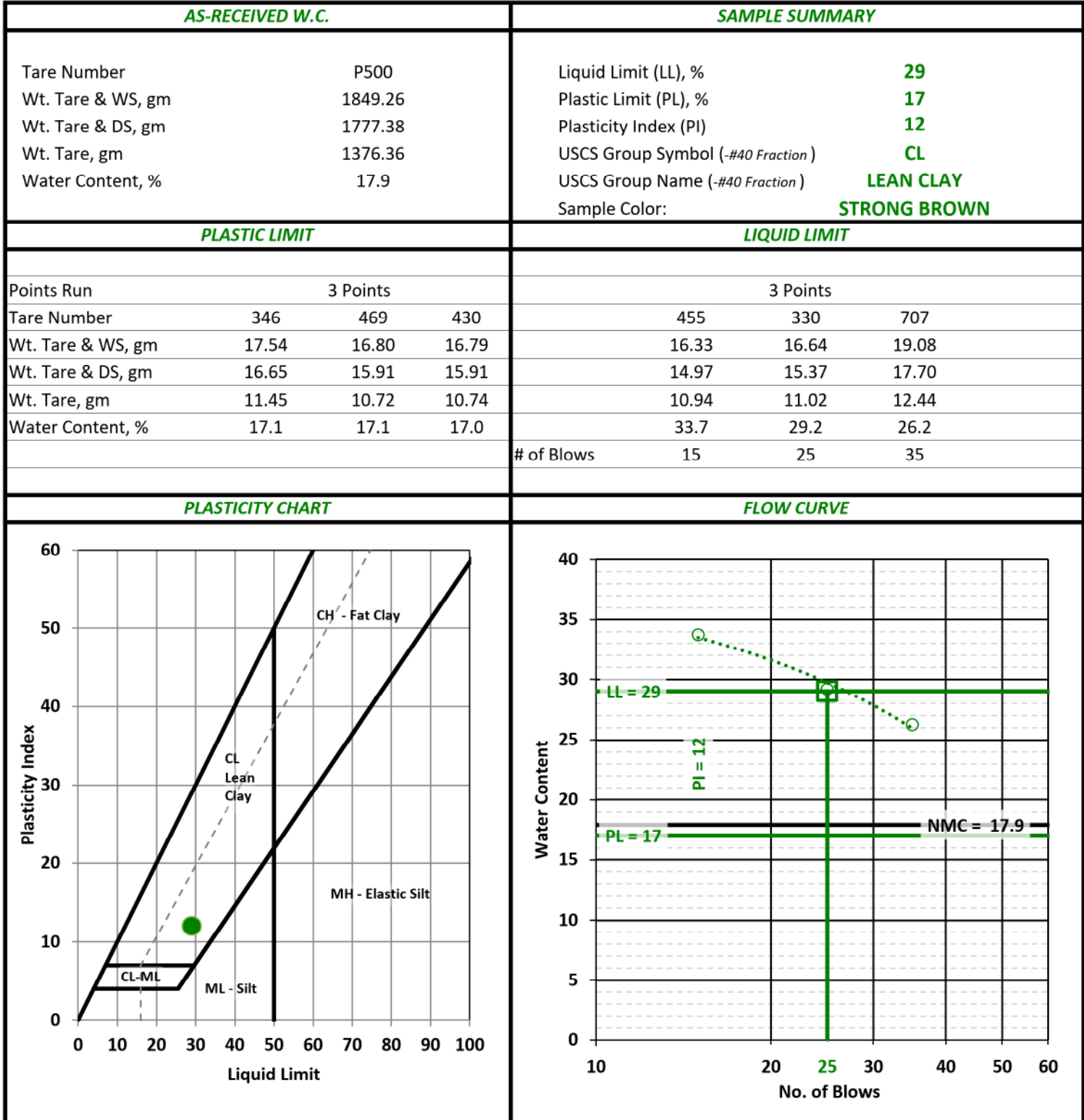
MECHANICAL SIEVE								
Total Sample			Sieve Size	Nominal Opening, mm	Dry Wt, gm	Split Normalized		Project Specifications
Tare No.	P500		3"	75	0	% Retained	% Finer	
Tare + WS., gm	1849.26		2-1/2"	63	0	0.0%	100.0%	
Tare + DS., gm	1777.38		2"	50	0	0.0%	100.0%	
Tare, gm	1376.36		1-1/2"	37.5	0	0.0%	100.0%	
Total sample WC	17.9%		1"	25	0	0.0%	100.0%	
Total Sample Dry Wt, gm (-3")	401		3/4"	19	0	0.0%	100.0%	
Hygroscopic WC (-#10)			1/2"	12.5	0	0.0%	100.0%	
Tare No.	476		3/8"	9.5	0	0.0%	100.0%	
Tare + WS., gm	28.98		No. 4	4.75	0	0.0%	100.0%	
Tare + DS., gm	28.94		No. 10	2	0.17	0.0%	100.0%	
Tare, gm	10.82		No. 20	0.85	0.12	0.2%	99.8%	
Hygroscopic WC	0.22%		No. 40	0.425	0.14	0.2%	99.6%	
			No. 60	0.25	0.15	0.2%	99.3%	
-#10 Hydro/Sieve air dry wt.	67.19		No. 140	0.106	13.99	20.8%	78.5%	
Wt. of + #200 Sample, gm	22.50		No. 200	0.075	8.10	12.0%	66.5%	
HYDROMETER (-#10)								
Split Air Dry Wt	67.34						Specific Gravity	2.7
Hygroscopic WC	0.22%							Assumed
Corrected Dry wt	67.2	#10 Dispersed 1min in Hamilton Beach Mixer					a Factor	0.9889
Elapsed Time (min.)	R Measured	Temp °C	Composite Correction	R Corrected	K Factor	Percent Finer (%)	Particle Diameter (mm)	Adjusted % Finer (%)
2	33.0	23.8	4.6	28.4	0.0129	41.8	0.0299	41.8%
5	29.0	23.8	4.6	24.4	0.0129	35.9	0.0195	35.9%
15	25.0	23.7	4.6	20.4	0.0129	30.0	0.0116	30.0%
30	23.0	23.6	4.7	18.3	0.0129	26.9	0.0083	26.9%
60	21.0	23.6	4.7	16.3	0.0129	24.0	0.0060	24.0%
250	19.0	23.9	4.6	14.4	0.0129	21.2	0.0029	21.2%
1440	17.0	23.9	4.6	12.4	0.0129	18.2	0.0012	18.2%
USCS SOIL CLASSIFICATION				USDA CLASSIFICATION				
Corrected For 100% Passing a 3" Sieve				Particle Size (mm)	Percent Finer (%)	Percent of Each Component (Material) (%)		Corrected Percent of -2.0 mm Material for USDA
% Gravel (-3" & + #4)	0.0	Silt=43.2% Clay=23.3%						
Coarse=0; Fine=0		D60, mm	NA	100	100	Gravel	0.0	0
% Sand (-#4 & + #200)		D30, mm	NA					
Coarse=0; Medium=0.4; Fine=33.1		D10, mm	NA					
% Fines (-#200)		Cc	NA					
% Plus #200 (-3")		Cu	NA	2	100.0			
USCS Description								
SANDY LEAN CLAY								
USCS Group Symbol		Atterberg Limits Group Symbol						
CL		CL - LEAN CLAY		0.05	55.6			
Auxiliary Information		Wt Ret, gm	% Retained					
		% Retained	% Finer					
12" Sieve - 300 mm		0	0.0	100.0	USDA Classification	LOAM		
6" Sieve - 150 mm		0	0.0	100.0				
3" Sieve - 75 mm		0	0.0	100.0				

Performed By: RH Input Validation: MA Reviewed By: BS Date Tested: 9/8/2025

LIQUID LIMIT, PLASTIC LIMIT, AND PLASTICITY INDEX OF SOILS
ASTM D4318-17e1

Client	Civil & Environmental Consultants, Inc. (CEC)	Boring	AP-7
Client Project	345-817.0004 AEP Kammer Plant	Depth	3.0'-5.0'
Project No.	25-04143	Sample	ST-1
		Lab Sample	25-04143 -05

Soil Description: STRONG BROWN LEAN CLAY
 (-#40 Fraction)



Performed By: RH Input Validation: MA Reviewed By: BS Date Tested: 9/9/25

PARTICLE-SIZE ANALYSIS OF SOILS - ASTM D422-63(2007)

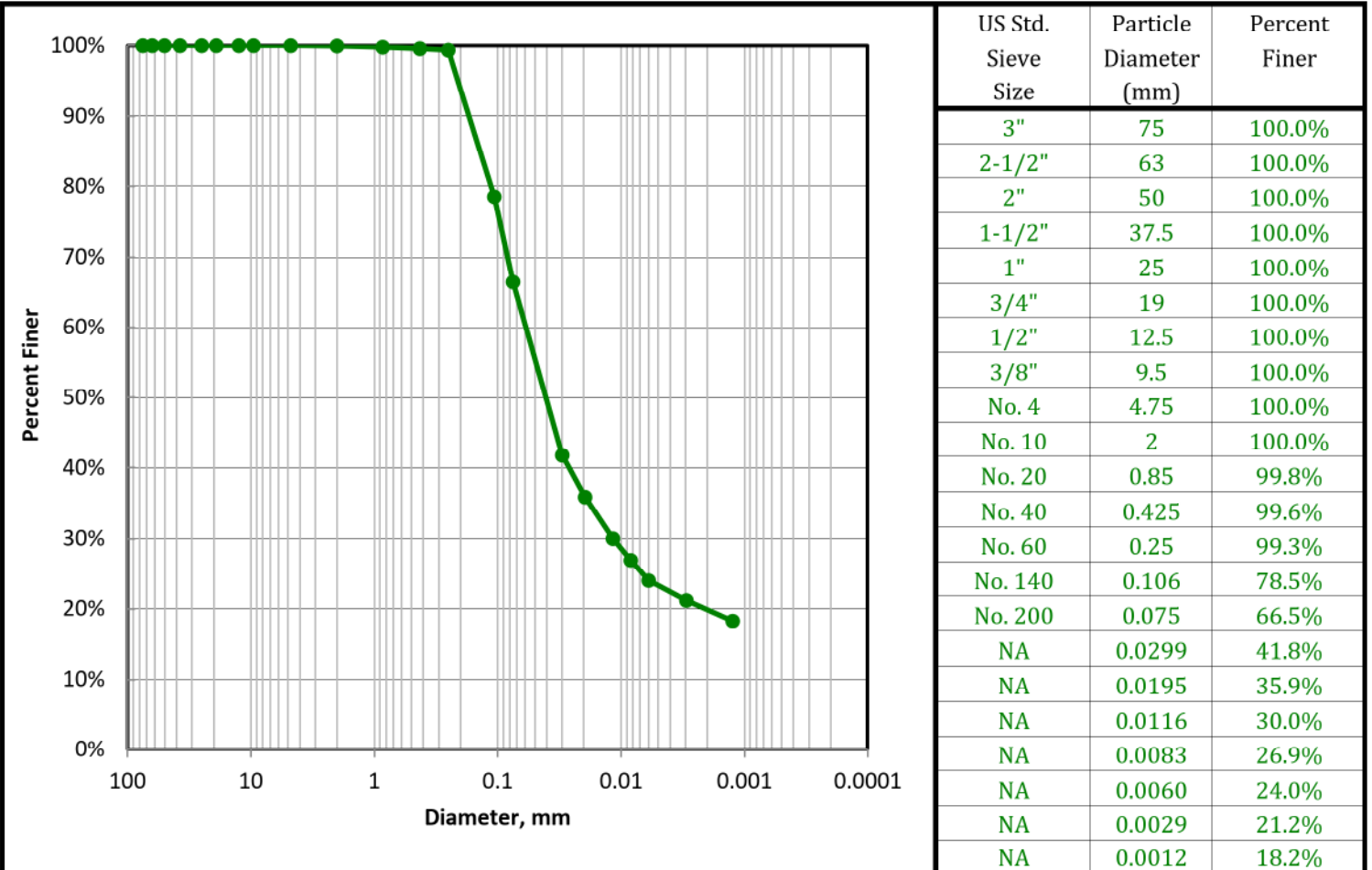
Client	Civil & Environmental Consultants, Inc. (CEC)	Boring	AP-7
Client Project	345-817.0004 AEP Kammer Plant	Depth	3.0'-5.0'
Project No.	25-04143	Sample	ST-1
		Lab Sample	25-04143 -05

Sample Color: **STRONG BROWN**

USCS Group Name: **SANDY LEAN CLAY**

USCS Group Symbol: **CL** USDA: **LOAM**

AASHTO: **A-6 (6)**



USCS SOIL CLASSIFICATION				USDA CLASSIFICATION					
Corrected For 100% Passing a 3" Sieve				Particle Size (mm)	Percent Finer (%)	Percent of Each Component (Material) (%)		Corrected Percent of -2.0 mm Material for USDA	
% Gravel (-3" & + #4)	0.0	Silt=43.2% Clay=23.3%							
Coarse=0; Fine=0		D60, mm	NA						
% Sand (-#4 & + #200)	33.5	D30, mm NA							
Coarse=0; Medium=0.4; Fine=33.1		D10, mm	NA						
% Fines (-#200)	66.5	Cc NA		100	100				
% Plus #200 (-3")	33.5	Cu NA		2	100.0	Gravel	0.0	0	
USCS Description				0.05	55.6	Sand	44.4	44.4	
SANDY LEAN CLAY				0.002	19.9	Silt	35.7	35.7	
USCS Group Symbol		Atterberg Limits Group Symbol				Clay	19.9	19.9	
CL		CL - LEAN CLAY		USDA Classification					
Auxiliary Information		Wt Ret, gm	% Retained	% Finer	LOAM				
12" Sieve - 300 mm		0	0.0	100.0					
6" Sieve - 150 mm		0	0.0	100.0					
3" Sieve - 75 mm		0	0.0	100.0					

USDA CLASSIFICATION CHART

Client
Client Project
Project No.

Civil & Environmental Consultants, Inc. (CEC)
345-817.0004 AEP Kammer Plant
25-04143

Boring AP-7
Depth 3.0'-5.0'
Sample ST-1
Lab Sample 25-04143 -05

Sample Color: **STRONG BROWN**
USCS Group Name: **SANDY LEAN CLAY**
USCS Group Symbol: **CL**

USDA: **LOAM**

AASHTO: **A-6 (6)**

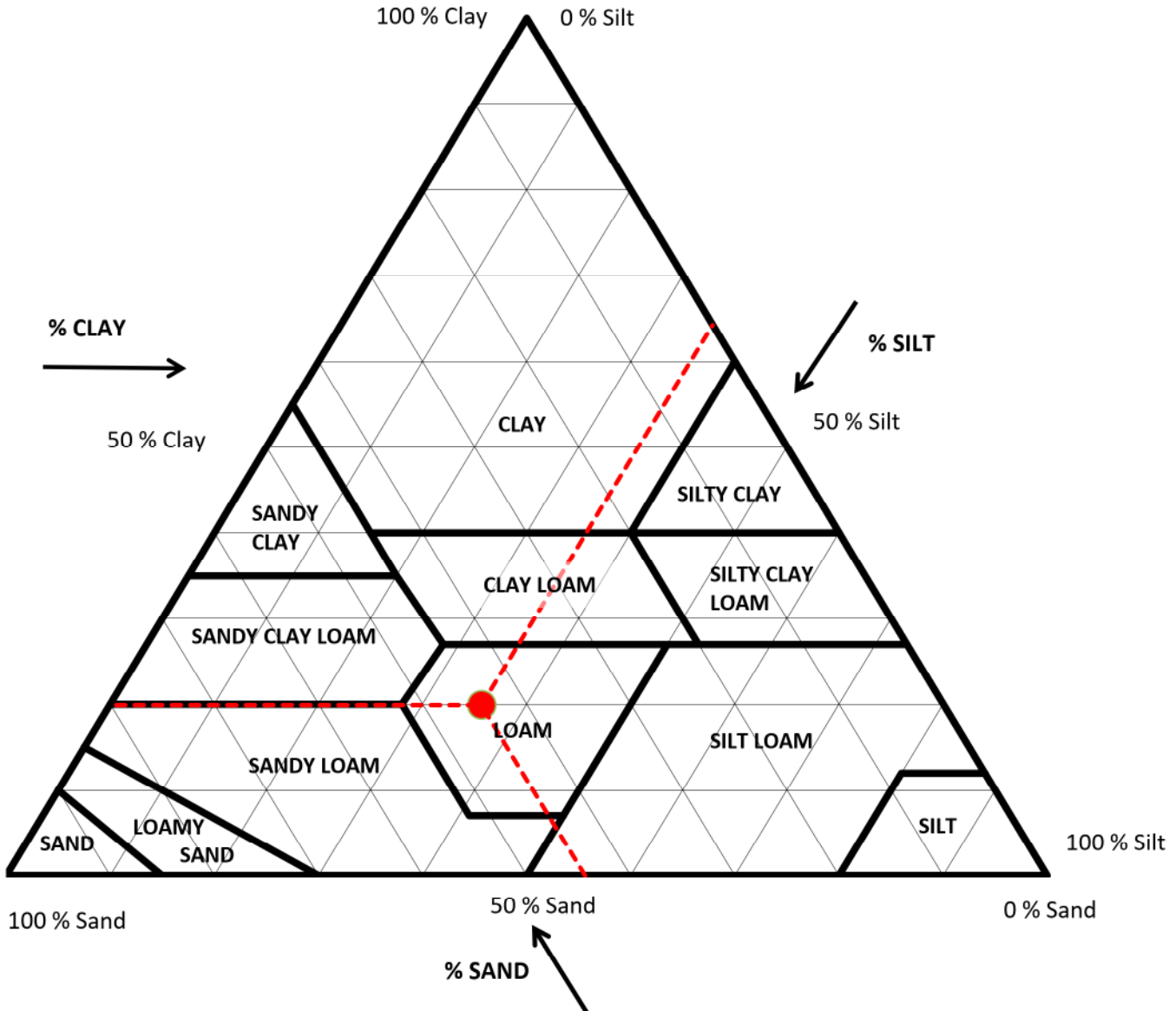
Corrected for 0% gravel

Percent Gravel, %	0.0
Percent Sand, %	44.4
Percent Silt, %	35.7
Percent Clay, %	19.9

Sand Subsizes

Corrected Percentages

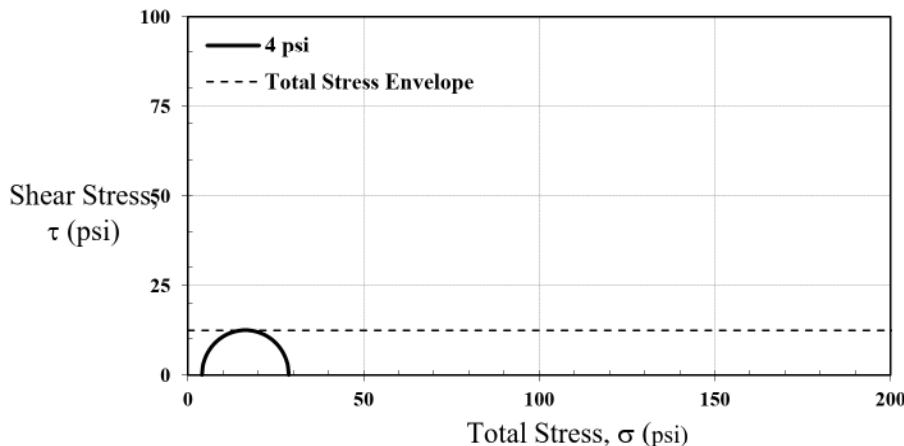
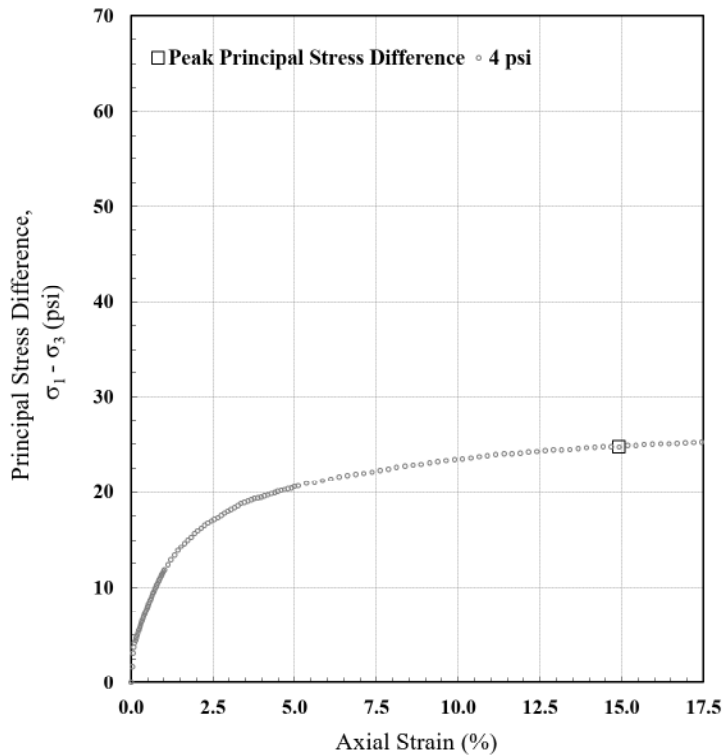
Very Coarse Sand; 2-1	0.1
Coarse Sand; 1-0.5	0.2
Medium Sand; 0.5-0.25	0.3
Fine Sand; 0.25-0.1	22.9
Very Fine Sand; 0.1-0.05	20.9
Total	44.4



Unconsolidated-Undrained (Q) Triaxial Compression

Client: Civil & Environmental Consultants, Inc.
 Project: 345-817.0004 AEP Kammer
 Sample: AP-7 (3.0' - 5.0'); ST-1

TRI Log #: 25-04143.5
 Test Method: ASTM D2850



Test Parameters	
Minor Principal Stress (psi)	4.0
Rate of Strain (%/hr)	60

Initial Properties	
Avg. Diameter (in)	2.78
Avg. Height (in)	6.09
Avg. Water Content (%)	17.4
Bulk Density (pcf)	130.2
Dry Density (pcf)	110.9
Saturation (%)	87.2
Void Ratio	0.55
Specific Gravity (Assumed)	2.75

At Failure - Maximum Deviator Stress	
Axial Strain at Failure (%)	14.9
Minor Total Stress (psi)	4.0
Major Total Stress (psi)	28.7
Principal Stress Diff. (psi)	24.7

Total Stress Envelope	
Friction Angle (deg)	0
Undrained Shear Strength, S_u (psi)	12.4
S_u / σ_3	3.1

Note: The calculated value of specimen saturation was less than 95%. The Mohr failure envelope was taken as a horizontal straight line, but noting that the calculated value of saturation indicates a partially saturated specimen.

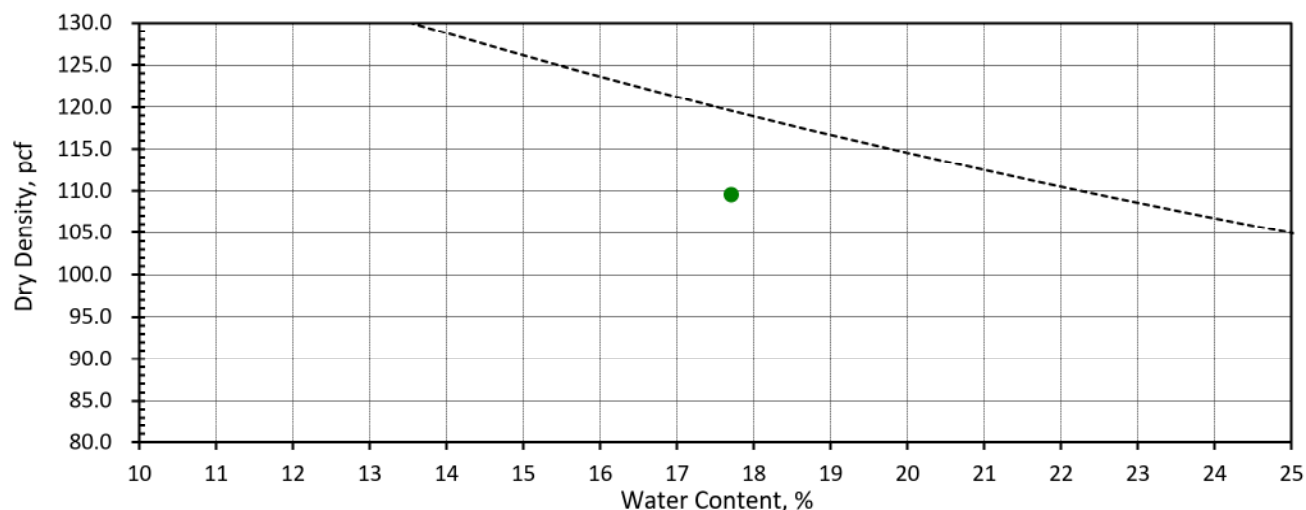
Jeffrey A. Kuhn, Ph.D., P.E., 9/9/2025
 Analysis & Quality Review/Date

LABORATORY COMPACTION CHARACTERISTICS OF SOIL

Client	Civil & Environmental Consultants, Inc. Boring	AP-7
Client Project	345-817.0004 AEP Kammer Plant	Depth 3.0' - 5.0'
Project No.	25-04143	Sample ST-1
	Lab Sample No.	25-04143-05
Visual Description:	STRONG BROWN SANDY LEAN CLAY	

WET DENSITY						TEST PARAMETERS	
Mold ID	G					Test Method	ASTM D1557
Compaction Point #	1					Compaction Energy	Modified
Wt. Mold & WS, gm.	6297.8					Test Procedure	B
Wt. Mold, gm.	4357					Mold Diameter, in	4
Wt. WS, gm.	1941					Compacted Layers	5
Mold Volume, cc	939					Blows Per Layer	25
Wet Density, gm./cc	2.07					Rammer Weight / Fall	10 lbs / 18 in.
Wet Density, pcf	129.0					Size of Material Used	-3/8" Sieve
						Use: <5% Retained on 3/8"	
WATER CONTENT						OVERSIZE PARTICLE CORRECTION	
						No Corrections Needed	
Tare Number	803						
Wt. Tare & WS, gm.	228.9						
Wt. Tare & DS, gm.	209.78					Percent of Oversize Rock (+3/8" Sieve) = <5%	
Wt. Tare, gm.	101.8					(Based on As-received Screening & Soaking)	
Water Content, %	17.7					W.C. of Finer Material, % (-3/8" Sieve) = NA	
DRY DENSITY vs. WATER CONTENT						SAMPLE SUMMARY	
LABORATORY TEST VALUES							
Water Content, %	17.7					Lab 1 Pt Water Content, %	17.7
Dry Density, pcf	109.6					Lab 1 pt Dry Density, pcf	109.6

Note: Maximum Density and Optimum Water Content reported from estimated best fit smooth curve!



Note: Compacted using manual hammer.

Input Validation: JSJ

Reviewed By: BLS

Date Tested: 09/02/25

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PARTICLE-SIZE ANALYSIS OF SOILS - ASTM D422-63(2007)

Client	Civil & Environmental Consultants, Inc. (CEC)	Boring	AP-7
Client Project	345-817.0004 AEP Kammer Plant	Depth	8.0'-10.0'
Project No.	25-04143	Sample	ST-2
		Lab Sample	25-04143 -06

Sample Color: BROWN
USCS Group Name: CLAYEY SAND
USCS Group Symbol: SC

USDA: SANDY LOAM **AASHTO:** A-6 (4)

Dry Prep: R58-11(2018)¹

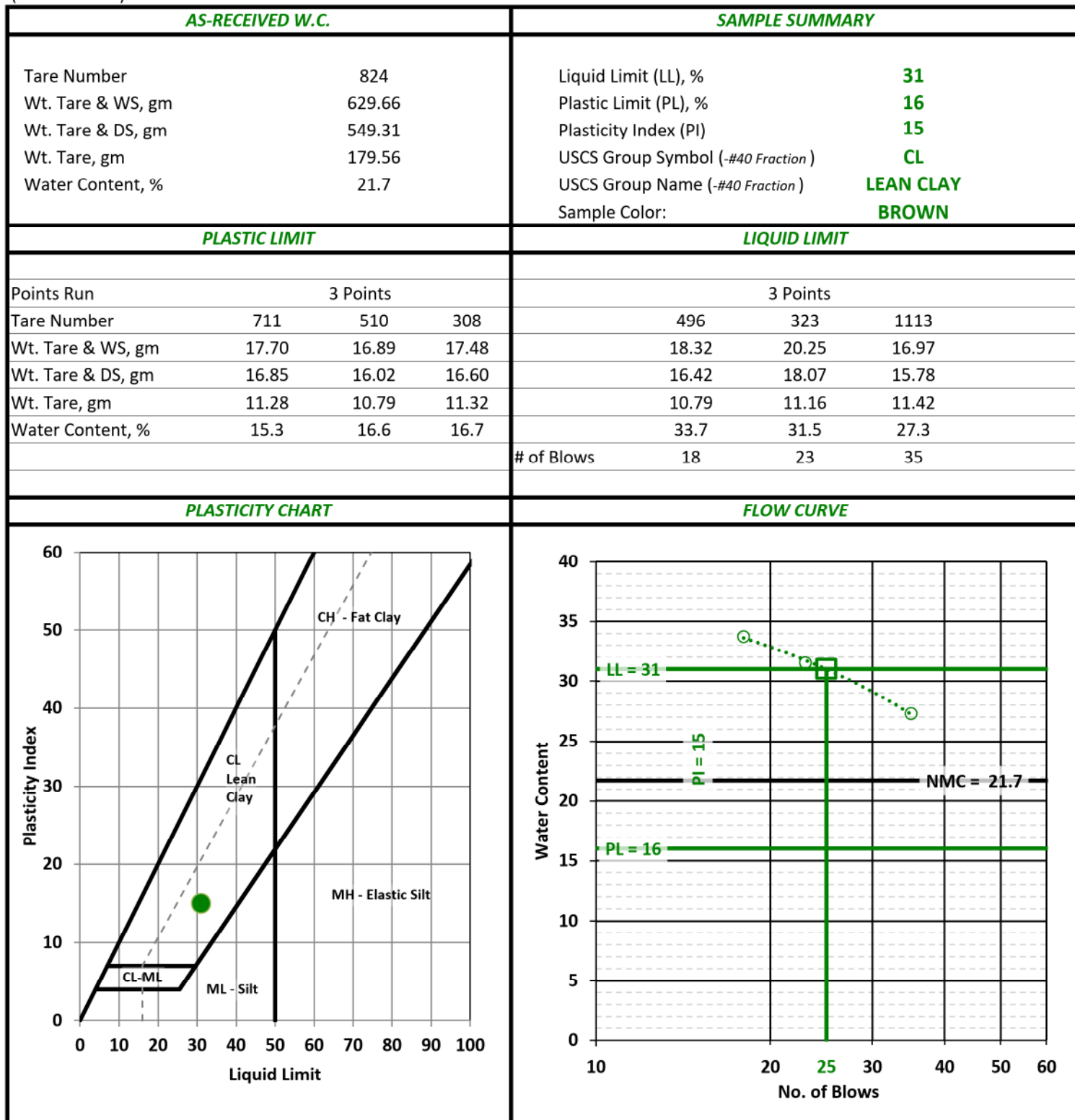
MECHANICAL SIEVE								
Total Sample			Sieve Size	Nominal Opening, mm	Dry Wt, gm	Split Normalized		Project Specifications
Tare No.	824		3"	75	0	% Retained	% Finer	
Tare + WS., gm	629.66		2-1/2"	63	0	0.0%	100.0%	
Tare + DS., gm	549.31		2"	50	0	0.0%	100.0%	
Tare, gm	179.56		1-1/2"	37.5	0	0.0%	100.0%	
Total sample WC	21.7%		1"	25	0	0.0%	100.0%	
Total Sample Dry Wt, gm (-3")	370		3/4"	19	0	0.0%	100.0%	
Hygroscopic WC (-#10)			1/2"	12.5	0	0.0%	100.0%	
Tare No.	257		3/8"	9.5	0	0.0%	100.0%	
Tare + WS., gm	46.92		No. 4	4.75	0	0.0%	100.0%	
Tare + DS., gm	46.64		No. 10	2	0.04	0.0%	100.0%	
Tare, gm	16.30		No. 20	0.85	0.00	0.0%	100.0%	
Hygroscopic WC	0.92%		No. 40	0.425	1.32	2.3%	97.7%	
			No. 60	0.25	1.74	3.0%	94.7%	
-#10 Hydro/Sieve air dry wt.	57.59		No. 140	0.106	21.02	36.5%	58.2%	
Wt. of + #200 Sample, gm	30.03		No. 200	0.075	5.95	10.3%	47.8%	
HYDROMETER (-#10)								
Split Air Dry Wt	58.12						Specific Gravity	2.7
Hygroscopic WC	0.92%							Assumed
Corrected Dry wt	57.6	-#10 Dispersed 1min in Hamilton Beach Mixer					a Factor	0.9889
Elapsed Time (min.)	R Measured	Temp °C	Composite Correction	R Corrected	K Factor	Percent Finer (%)	Particle Diameter (mm)	Adjusted % Finer (%)
2	29.0	23.5	4.7	24.3	0.0129	41.7	0.0309	41.7%
5	27.0	23.5	4.7	22.3	0.0129	38.3	0.0198	38.3%
15	24.0	23.5	4.7	19.3	0.0129	33.1	0.0117	33.1%
30	22.5	23.6	4.7	17.8	0.0129	30.6	0.0083	30.6%
60	20.0	23.7	4.6	15.4	0.0129	26.4	0.0060	26.4%
250	17.0	23.8	4.6	12.4	0.0129	21.3	0.0030	21.3%
1440	15.0	23.8	4.6	10.4	0.0129	17.9	0.0013	17.9%
USCS SOIL CLASSIFICATION				USDA CLASSIFICATION				
Corrected For 100% Passing a 3" Sieve				Particle Size (mm)	Percent Finer (%)	Percent of Each Component (Material) (%)		Corrected Percent of -2.0 mm Material for USDA
% Gravel (-3" & + #4)	0.0	Silt=22.7% Clay=25.1%						
Coarse=0; Fine=0		D60, mm	NA	100	100	Gravel	0.0	0
% Sand (-#4 & + #200)		D30, mm	NA					
Coarse=0; Medium=2.3; Fine=49.8		D10, mm	NA					
% Fines (-#200)		Cc	NA					
% Plus #200 (-3")		Cu	NA	2	100.0	Sand	54.9	54.9
USCS Description								
CLAYEY SAND								
USCS Group Symbol		Atterberg Limits Group Symbol						
SC		CL - LEAN CLAY		0.05	45.0	Silt	25.3	25.3
Auxiliary Information		Wt Ret, gm	% Retained					
12" Sieve - 300 mm		0	0.0	100.0	USDA Classification	SANDY LOAM		
6" Sieve - 150 mm		0	0.0	100.0				
3" Sieve - 75 mm		0	0.0	100.0				

Performed By: RH Input Validation: MA Reviewed By: BS Date Tested: 9/8/2025

LIQUID LIMIT, PLASTIC LIMIT, AND PLASTICITY INDEX OF SOILS
ASTM D4318-17e1

Client	Civil & Environmental Consultants, Inc. (CEC)	Boring	AP-7
Client Project	345-817.0004 AEP Kammer Plant	Depth	8.0'-10.0'
Project No.	25-04143	Sample	ST-2
		Lab Sample	25-04143 -06

Soil Description: BROWN LEAN CLAY
 (-#40 Fraction)



Performed By: RH

Input Validation: MA

Reviewed By: BS

Date Tested: 9/5/25

PARTICLE-SIZE ANALYSIS OF SOILS - ASTM D422-63(2007)

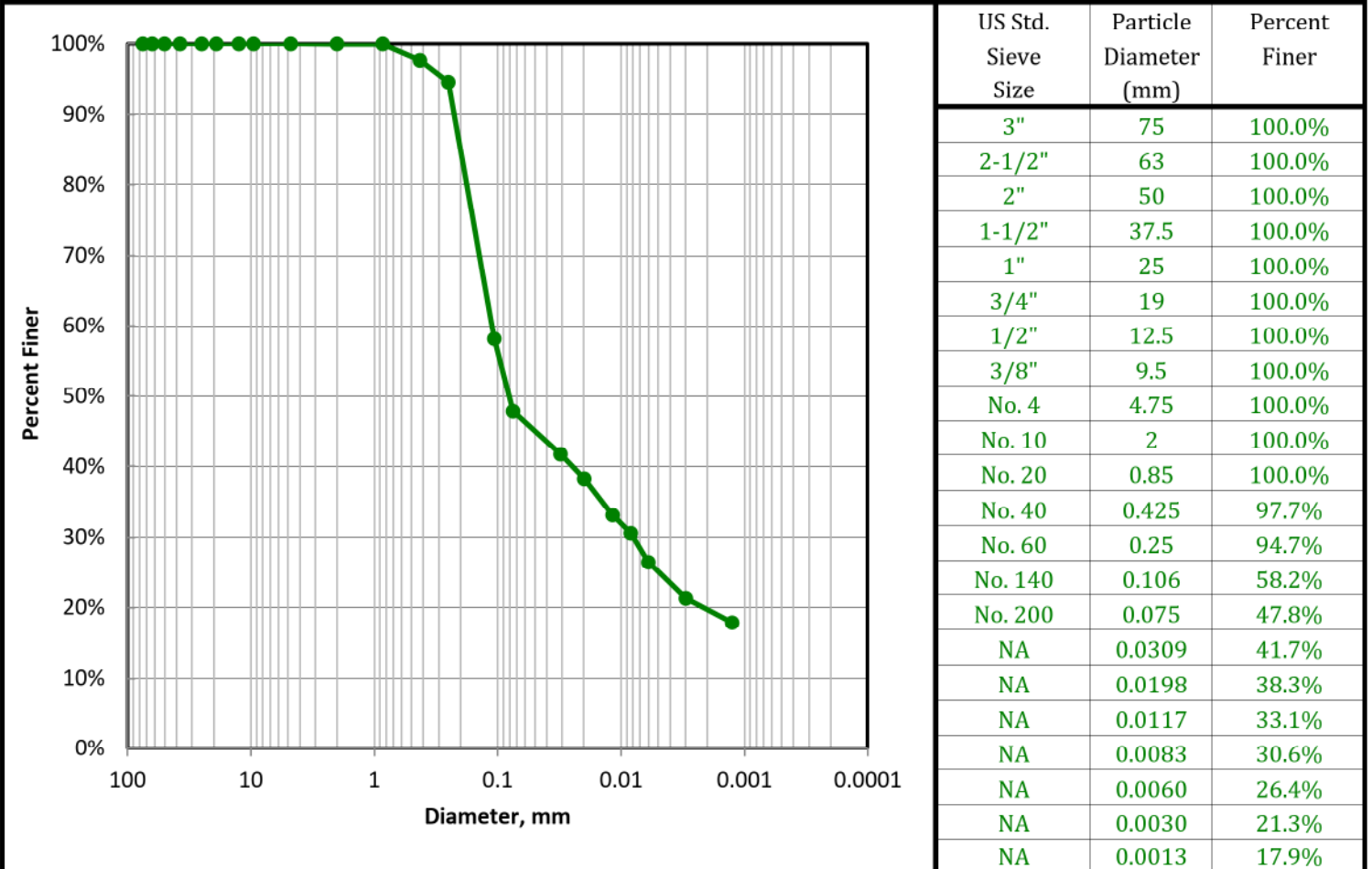
Client	Civil & Environmental Consultants, Inc. (CEC)	Boring	AP-7
Client Project	345-817.0004 AEP Kammer Plant	Depth	8.0'-10.0'
Project No.	25-04143	Sample	ST-2
		Lab Sample	25-04143 -06

Sample Color: **BROWN**

USCS Group Name: **CLAYEY SAND**

USCS Group Symbol: **SC** USDA: **SANDY LOAM**

AASHTO: **A-6 (4)**



USCS SOIL CLASSIFICATION				USDA CLASSIFICATION					
Corrected For 100% Passing a 3" Sieve				Particle Size (mm)	Percent Finer (%)	Percent of Each Component (Material) (%)		Corrected Percent of -2.0 mm Material for USDA	
% Gravel (-3" & + #4)	0.0	Silt=22.7% Clay=25.1%							
Coarse=0; Fine=0		D60, mm	NA						
% Sand (-#4 & + #200)	52.2	D30, mm NA							
Coarse=0; Medium=2.3; Fine=49.8		D10, mm	NA						
% Fines (-#200)	47.8	Cc NA							
% Plus #200 (-3")	52.2	Cu NA		100	100	Gravel0.0	0		
USCS Description				2	100.0				
CLAYEY SAND				0.05	45.0			Sand	54.9
USCS Group Symbol		Atterberg Limits Group Symbol						Silt	25.3
SC		CL - LEAN CLAY				Clay	19.7		
Auxiliary Information		Wt Ret, gm	% Retained	% Finer	0.002	19.7			
12" Sieve - 300 mm		0	0.0	100.0	USDA Classification				
6" Sieve - 150 mm		0	0.0	100.0	SANDY LOAM				
3" Sieve - 75 mm		0	0.0	100.0					

USDA CLASSIFICATION CHART

Client
Client Project
Project No.

Civil & Environmental Consultants, Inc. (CEC)
345-817.0004 AEP Kammer Plant
25-04143

Boring AP-7
Depth 8.0'-10.0'
Sample ST-2
Lab Sample 25-04143 -06

Sample Color: **BROWN**
USCS Group Name: **CLAYEY SAND**
USCS Group Symbol: **SC**

USDA: **SANDY LOAM**

AASHTO: **A-6 (4)**

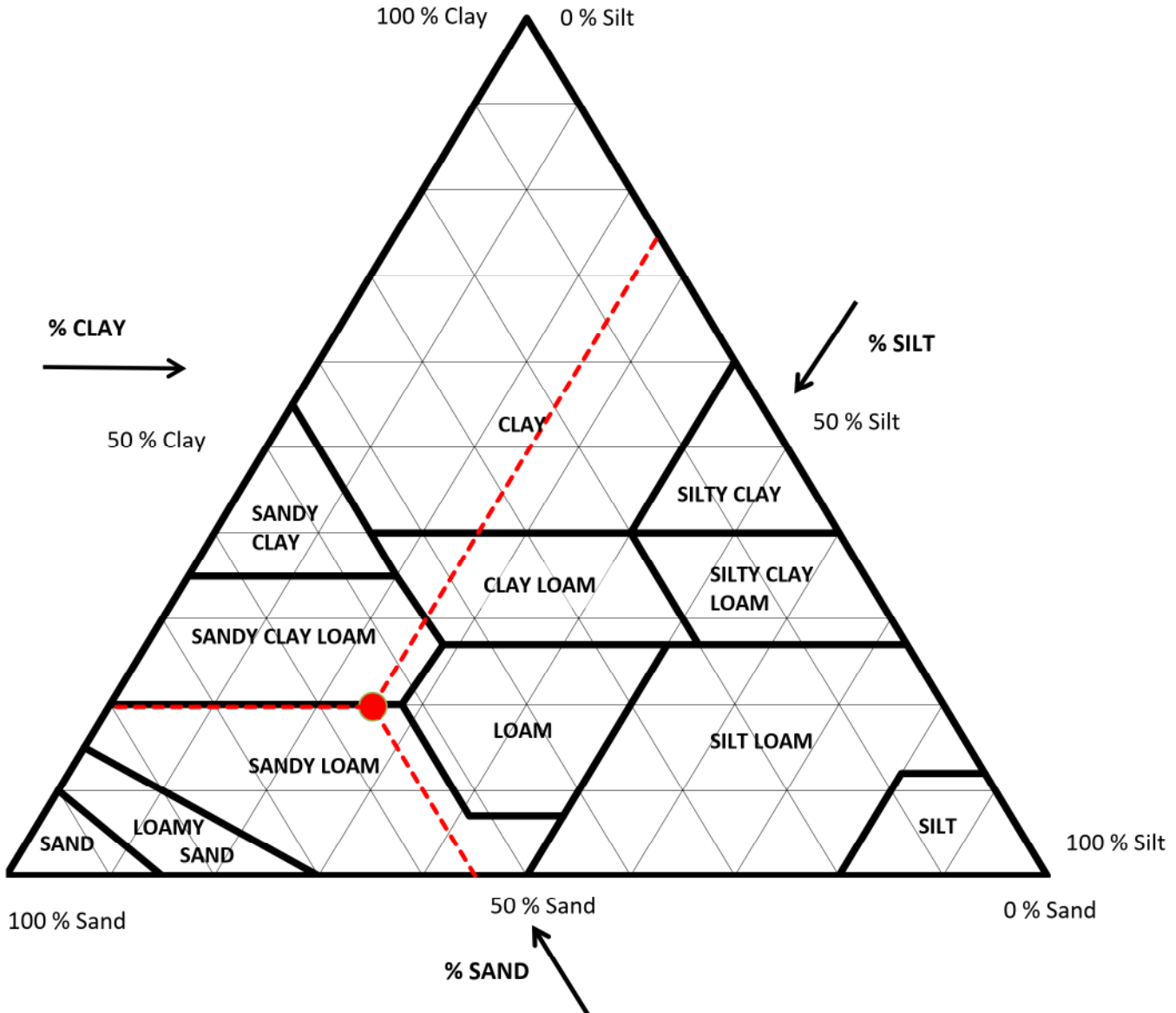
Corrected for 0% gravel

Percent Gravel, %	0.0
Percent Sand, %	54.9
Percent Silt, %	25.3
Percent Clay, %	19.7

Sand Subsizes

Corrected Percentages

Very Coarse Sand; 2-1	0.0
Coarse Sand; 1-0.5	1.8
Medium Sand; 0.5-0.25	3.6
Fine Sand; 0.25-0.1	38.2
Very Fine Sand; 0.1-0.05	11.4
Total	54.9



Consolidated-Undrained Triaxial Compression

Client: Civil & Environmental Consultants, Inc.
 Project: 345-817.0004 AEP Krammer Plant
 Sample: AP-7 (8.0' - 10.0') ST-2

TRI Log #: 25-04143.6
 Test Method: ASTM D4767

Specimens				
Identification	1	2	3	4
Depth/Elev. (ft)	-	-	-	-
Eff. Consol. Stress (psi)	5.0	20.0	40.0	-
Initial Specimen Properties				
Avg. Diameter (in)	2.81	2.82	2.83	-
Avg. Height (in)	5.99	6.02	5.88	-
Avg. Water Content (%)	23.1	22.6	22.6	-
Bulk Density (pcf)	125.1	124.5	126.5	-
Dry Density (pcf)	101.6	101.5	103.2	-
Specific Gravity (Assumed)	2.75			
Saturation (%)	92.2	90.2	93.9	-
Void Ratio, n	0.69	0.69	0.66	-
B-Value, End of Saturation	0.92	0.91	0.91	-

Test Setup	
Specimen Condition	Undisturbed / Intact
Specimen Preparation	Trimmed
Mounting Method	Wet
Consolidation	Isotropic

Post-Consolidation / Pre-Shear				
Void Ratio	0.69	0.67	0.62	-

Shear / Post-Shear				
Rate of Strain (%/hr)	1.00	1.00	1.00	-
Avg. Water Content (%)	23.6	22.0	20.9	-

At Failure								
Failure Criterion: Peak Principal Stress	Difference, $(\sigma_1' - \sigma_3')_{\max}$				Ratio, $(\sigma_1' / \sigma_3')_{\max}$			
Axial Strain at Failure (%), $\epsilon_{a,f}$	15.0	15.0	15.0	-	4.7	9.9	10.5	-
Minor Effective Stress (psi), $\sigma_3'_f$	4.7	5.7	11.9	-	3.1	5.1	11.2	-
Principal Stress Difference (psi), $(\sigma_1 - \sigma_3)_f$	11.7	16.0	30.0	-	9.4	14.9	28.8	-
Pore Water Pressure, Δu_f (psi)	-0.3	14.4	28.1	-	1.3	14.9	28.8	-
Major Effective Stress (psi), $\sigma_1'_f$	16.4	21.7	41.9	-	12.5	20.0	39.9	-
Secant Friction Angle (degrees)	33.8	35.8	33.9	-	37.0	36.3	34.3	-
Effective Friction Angle (degrees)	33.2				32.9			
Effective Cohesion (psi)	0.3				0.6			

Note: The presented M-C parameters are based on a linear regression in modified stress space, across all assigned effective consolidation stresses. This fit does not purported to capture typical curvature of envelopes that may, in particular, be observed across broader range in effective stresses. Please note that the stresses associated with peak principal stress ratio and peak principal stress difference are presented in tabular form on the first page of the report. There are alternate interpretations to these two failure criterion including but not limited to strain compatibility and post-peak.

Jeffrey A. Kuhn, Ph.D., P.E., 09/02/2025
 Analysis & Quality Review/Date

Consolidated-Undrained Triaxial Compression

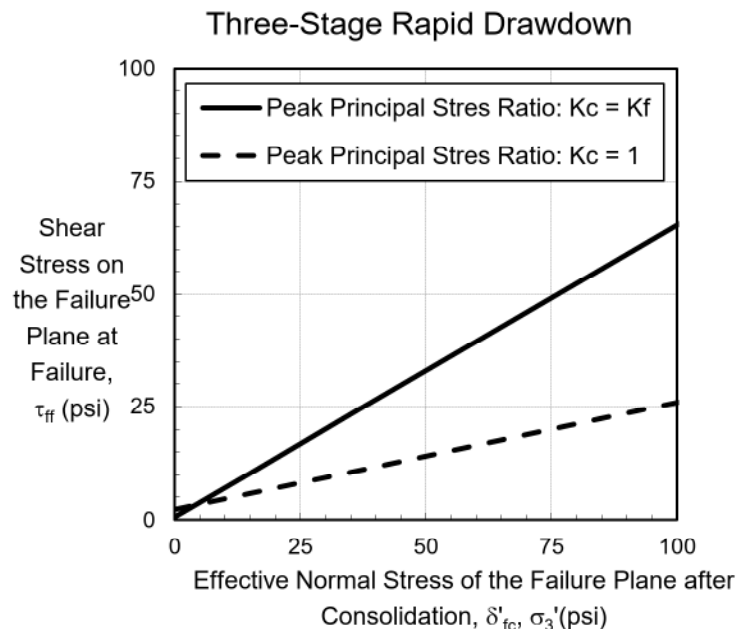
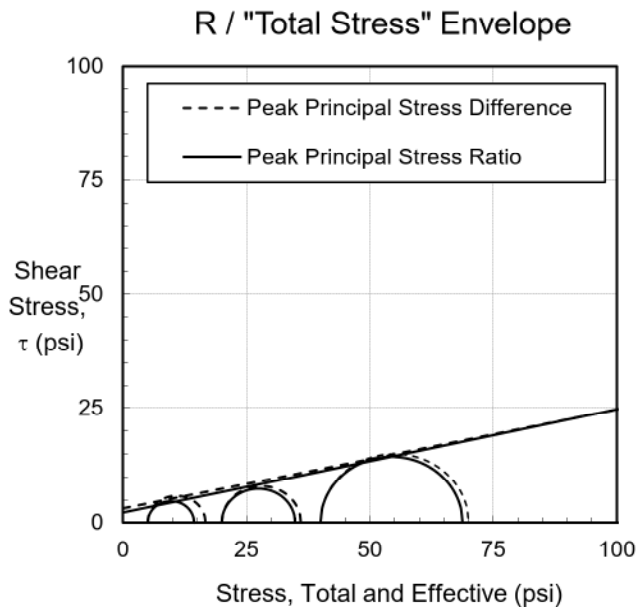
Client: Civil & Environmental Consultants, Inc.
 Project: 345-817.0004 AEP Krammer Plant
 Sample: AP-7 (8.0' - 10.0') ST-2

TRI Log #: 25-04143.6
 Test Method: ASTM D4767

R / "Total Stress" Envelope			
Failure Criterion: Peak Principal Stress		Difference, $(\sigma_1' - \sigma_3')_{\max}$	Ratio, $(\sigma_1' / \sigma_3')_{\max}$
Friction Angle (deg)	ϕ_R	12.1	12.7
Cohesion (psi)	c_R	3.1	2.2

Kc = Kf Envelope, Effective Stress Envelope (Duncan et al. 1990)			
Failure Criterion: Peak Principal Stress		Difference, $(\sigma_1' - \sigma_3')_{\max}$	Ratio, $(\sigma_1' / \sigma_3')_{\max}$
Effective Friction Angle (deg)	ϕ'	33.2	32.9
Effective Cohesion (psi)	c'	0.3	0.6

Kc = 1 (τ_{ff} vs σ'_{fc}) Envelope, Total Stress Envelope (Duncan et al. 1990)			
Failure Criterion: Peak Principal Stress		Difference, $(\sigma_1' - \sigma_3')_{\max}$	Ratio, $(\sigma_1' / \sigma_3')_{\max}$
Friction Angle (deg)	$d_{Kc=1}$	12.6	13.3
Cohesion (psi)	$\Psi_{Kc=1}$	3.2	2.3

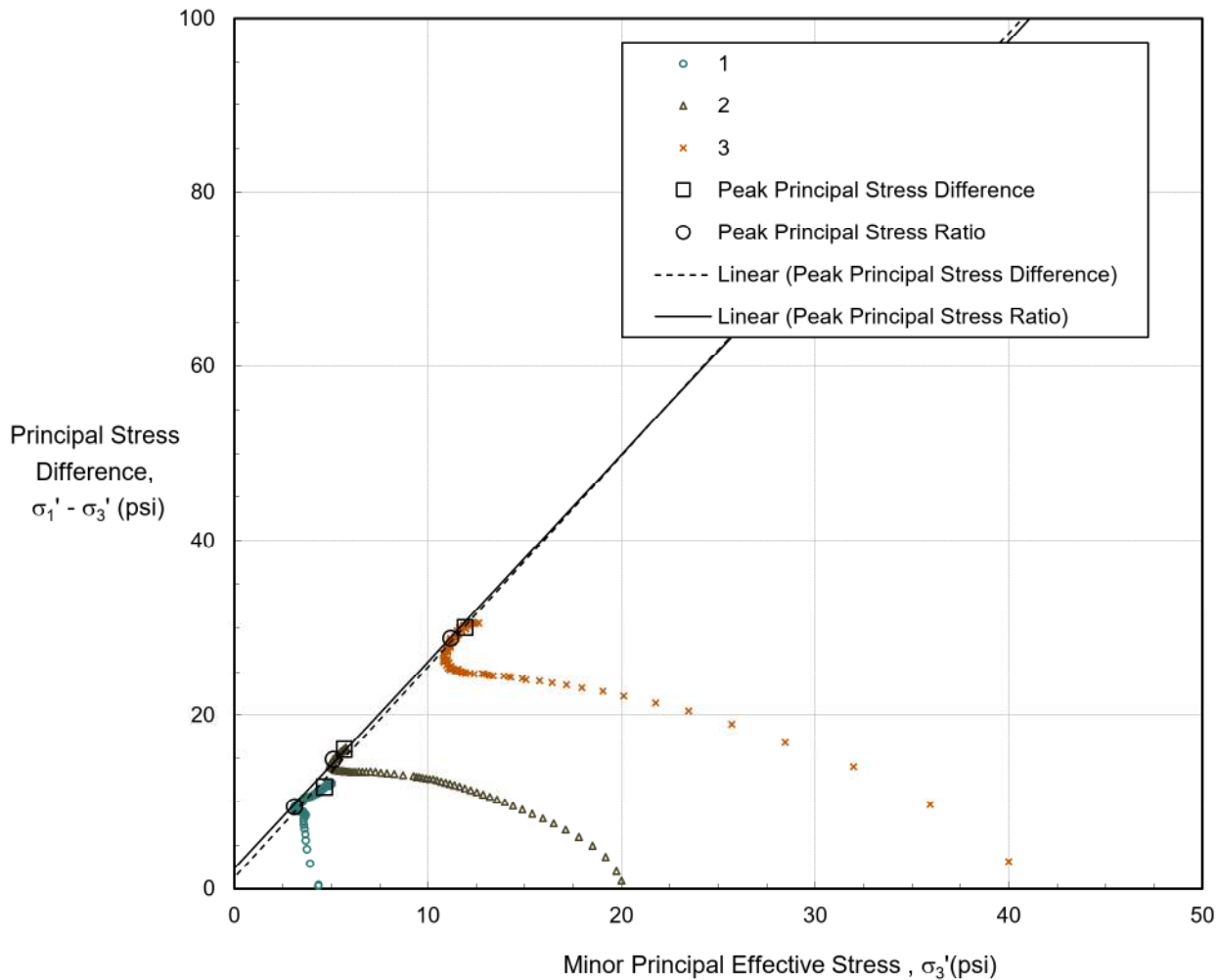


Consolidated-Undrained Triaxial Compression

Client: Civil & Environmental Consultants, Inc.
 Project: 345-817.0004 AEP Krammer Plant
 Sample: AP-7 (8.0' - 10.0') ST-2

TRI Log #: 25-04143.6
 Test Method: ASTM D4767

Modified Mohr-Coulomb



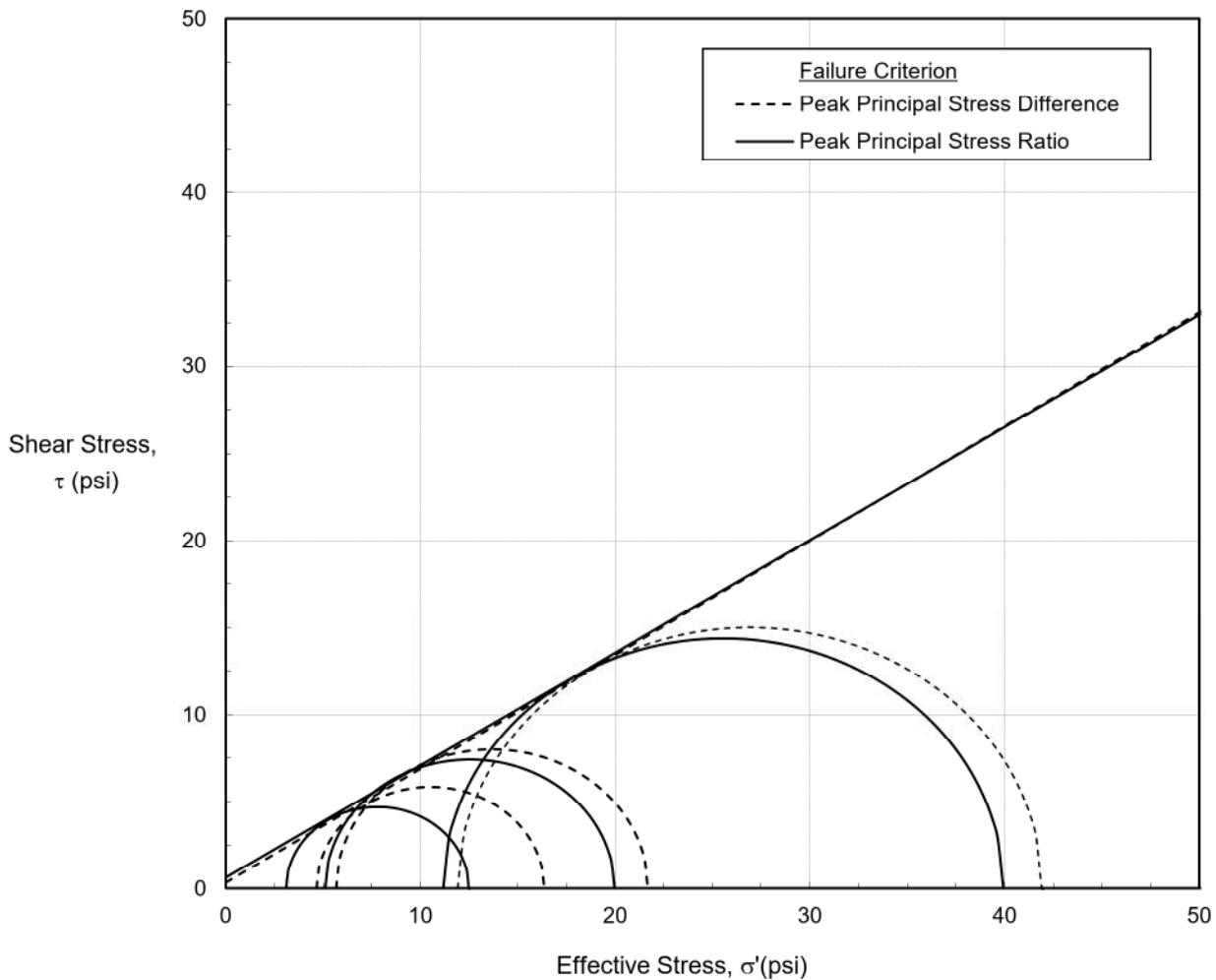
Failure Criterion: Peak Principal Stress	Difference, $(\sigma_1' - \sigma_3')_{max}$	Ratio, $(\sigma_1' / \sigma_3')_{max}$
Effective Friction Angle (deg)	33.2	32.9
Effective Cohesion (psi)	0.3	0.6

Consolidated-Undrained Triaxial Compression

Client: Civil & Environmental Consultants, Inc.
Project: 345-817.0004 AEP Krammer Plant
Sample: AP-7 (8.0' - 10.0') ST-2

TRI Log #: 25-04143.6
Test Method: ASTM D4767

Mohr-Coulomb



Failure Criterion: Peak Principal Stress	Difference, $(\sigma_1' - \sigma_3')_{\max}$	Ratio, $(\sigma_1' / \sigma_3')_{\max}$
Effective Friction Angle (deg)	33.2	32.9
Effective Cohesion (psi)	0.3	0.6

Consolidated-Undrained Triaxial Compression

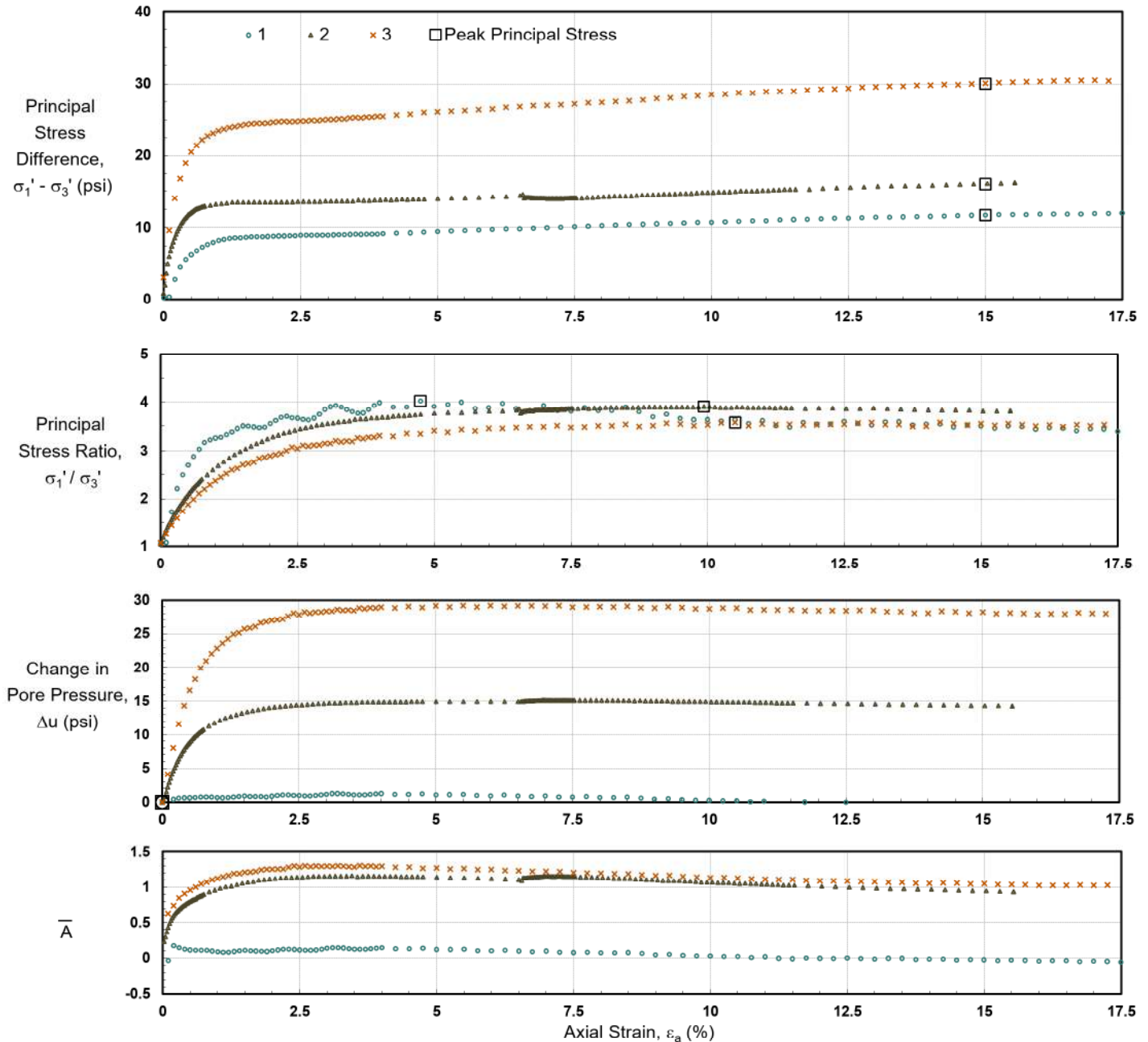
Client: Civil & Environmental Consultants, Inc.

Project: 345-817.0004 AEP Krammer Plant

Sample: AP-7 (8.0' - 10.0') ST-2

TRI Log #: 25-04143.6

Test Method: ASTM D4767

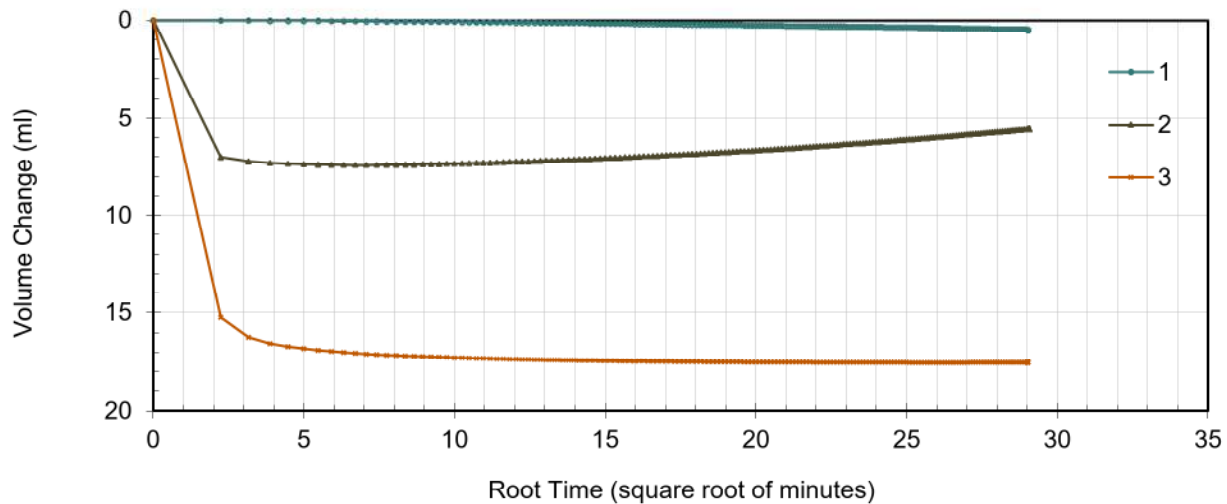
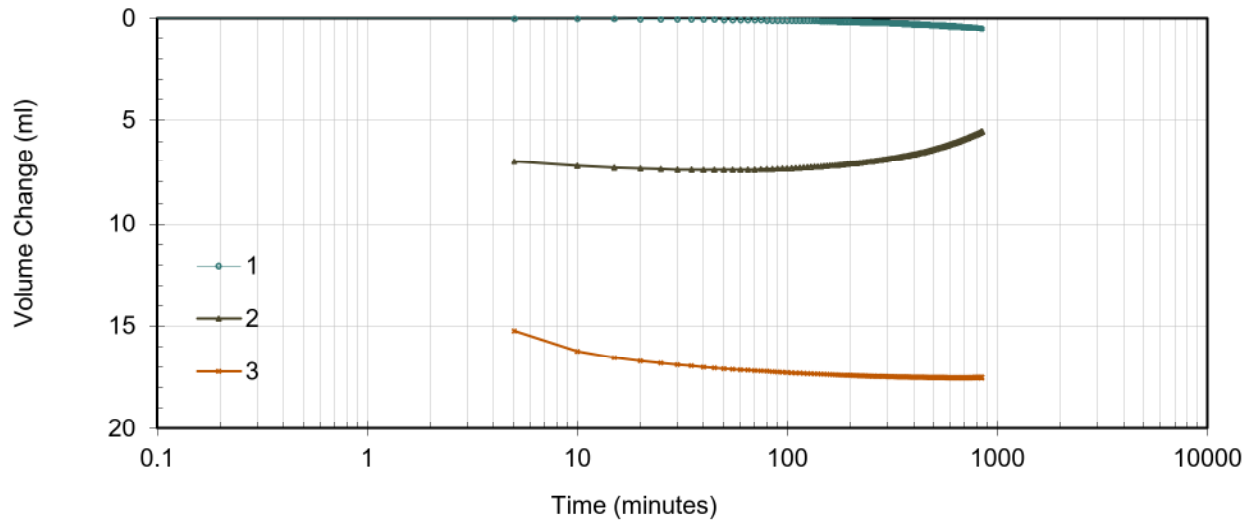


Consolidated-Undrained Triaxial Compression

Client: Civil & Environmental Consultants, Inc.
Project: 345-817.0004 AEP Krammer Plant
Sample: AP-7 (8.0' - 10.0') ST-2

TRI Log #: 25-04143.6
Test Method: ASTM D4767

Consolidation



PARTICLE-SIZE ANALYSIS OF SOILS - ASTM D422-63(2007)

Client	Civil & Environmental Consultants, Inc. (CEC)	Boring	AP-7
Client Project	345-817.0004 AEP Kammer Plant	Depth	11.0'-13.0'
Project No.	25-04143	Sample	ST-3
		Lab Sample	25-04143 -07

Sample Color: **BROWN**
 USCS Group Name: **SANDY LEAN CLAY**
 USCS Group Symbol: **CL**

USDA: **LOAM** AASHTO: **A-6 (7)**

Dry Prep: R58-11(2018)¹

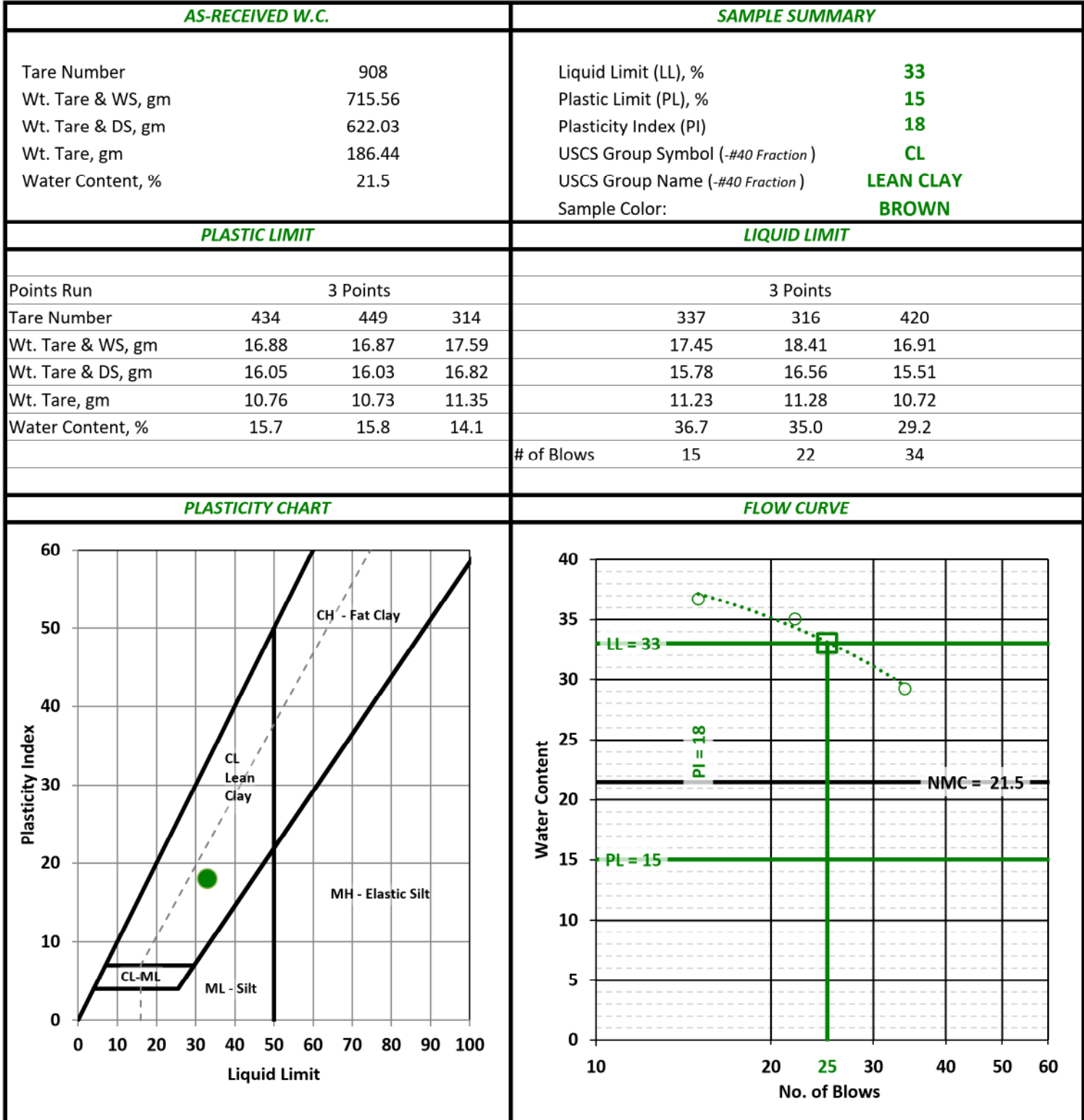
MECHANICAL SIEVE									
Total Sample			Sieve Size	Nominal Opening, mm	Dry Wt, gm	Split Normalized		Project Specifications	
Tare No.	908		3"	75	0	% Retained	% Finer		
Tare + WS., gm	715.56		2-1/2"	63	0	0.0%	100.0%		
Tare + DS., gm	622.03		2"	50	0	0.0%	100.0%		
Tare, gm	186.44		1-1/2"	37.5	0	0.0%	100.0%		
Total sample WC	21.5%		1"	25	0	0.0%	100.0%		
Total Sample Dry Wt, gm (-3")	436		3/4"	19	0	0.0%	100.0%		
Hygroscopic WC (-#10)			1/2"	12.5	0	0.0%	100.0%		
Tare No.	402		3/8"	9.5	0	0.0%	100.0%		
Tare + WS., gm	32.89		No. 4	4.75	0	0.0%	100.0%		
Tare + DS., gm	32.65		No. 10	2	0	0.0%	100.0%		
Tare, gm	10.61		No. 20	0.85	0.01	0.0%	100.0%		
Hygroscopic WC	1.09%		No. 40	0.425	0.04	0.1%	99.9%		
			No. 60	0.25	0.12	0.2%	99.8%		
-#10 Hydro/Sieve air dry wt.	69.66		No. 140	0.106	20.45	29.4%	70.4%		
Wt. of + #200 Sample, gm	30.16		No. 200	0.075	9.54	13.7%	56.7%		
HYDROMETER (-#10)									
Split Air Dry Wt	70.42						Specific Gravity	2.7	
Hygroscopic WC	1.09%							Assumed	
Corrected Dry wt	69.7	-#10 Dispersed 1min in Hamilton Beach Mixer					a Factor	0.9889	
Elapsed Time (min.)	R Measured	Temp °C	Composite Correction	R Corrected	K Factor	Percent Finer (%)	Particle Diameter (mm)	Adjusted % Finer (%)	
2	32.0	23.4	4.7	27.3	0.0129	38.8	0.0303	38.8%	
5	31.0	22.4	5.0	26.0	0.0131	36.9	0.0195	36.9%	
15	27.0	23.4	4.7	22.3	0.0129	31.7	0.0115	31.7%	
30	24.0	23.4	4.7	19.3	0.0129	27.4	0.0083	27.4%	
60	22.5	23.6	4.7	17.8	0.0129	25.3	0.0059	25.3%	
250	20.5	23.8	4.6	15.9	0.0129	22.6	0.0029	22.6%	
1440	17.0	23.8	4.6	12.4	0.0129	17.6	0.0012	17.6%	
USCS SOIL CLASSIFICATION				USDA CLASSIFICATION					
Corrected For 100% Passing a 3" Sieve				Particle Size (mm)	Percent Finer (%)	Percent of Each Component (Material) (%)		Corrected Percent of -2.0 mm Material for USDA	
% Gravel (-3" & + #4)	0.0	Silt=32.1% Clay=24.6%							
Coarse=0; Fine=0		D60, mm	NA			Gravel	0.0	0	
% Sand (-#4 & + #200)	43.3	D30, mm	NA						
Coarse=0; Medium=0.1; Fine=43.2		D10, mm	NA						
% Fines (-#200)	56.7	Cc	NA						
% Plus #200 (-3")	43.3	Cu	NA	2	100.0	Sand	51.3	51.3	
USCS Description				0.05	48.7	Silt	28.3	28.3	
SANDY LEAN CLAY				0.002	20.4	Clay	20.4	20.4	
USCS Group Symbol		Atterberg Limits Group Symbol		USDA Classification					
CL		CL - LEAN CLAY							
Auxiliary Information		Wt Ret, gm	% Retained	% Finer	LOAM				
12" Sieve - 300 mm		0	0.0	100.0					
6" Sieve - 150 mm		0	0.0	100.0					
3" Sieve - 75 mm		0	0.0	100.0					

Performed By: RH Input Validation: MA Reviewed By: BS Date Tested: 9/8/2025

LIQUID LIMIT, PLASTIC LIMIT, AND PLASTICITY INDEX OF SOILS
ASTM D4318-17e1

Client	Civil & Environmental Consultants, Inc. (CEC)	Boring	AP-7
Client Project	345-817.0004 AEP Kammer Plant	Depth	11.0'-13.0'
Project No.	25-04143	Sample	ST-3
		Lab Sample	25-04143 -07

Soil Description: BROWN LEAN CLAY
 (-#40 Fraction)



Performed By: RH Input Validation: MA Reviewed By: BS Date Tested: 9/5/25

PARTICLE-SIZE ANALYSIS OF SOILS - ASTM D422-63(2007)

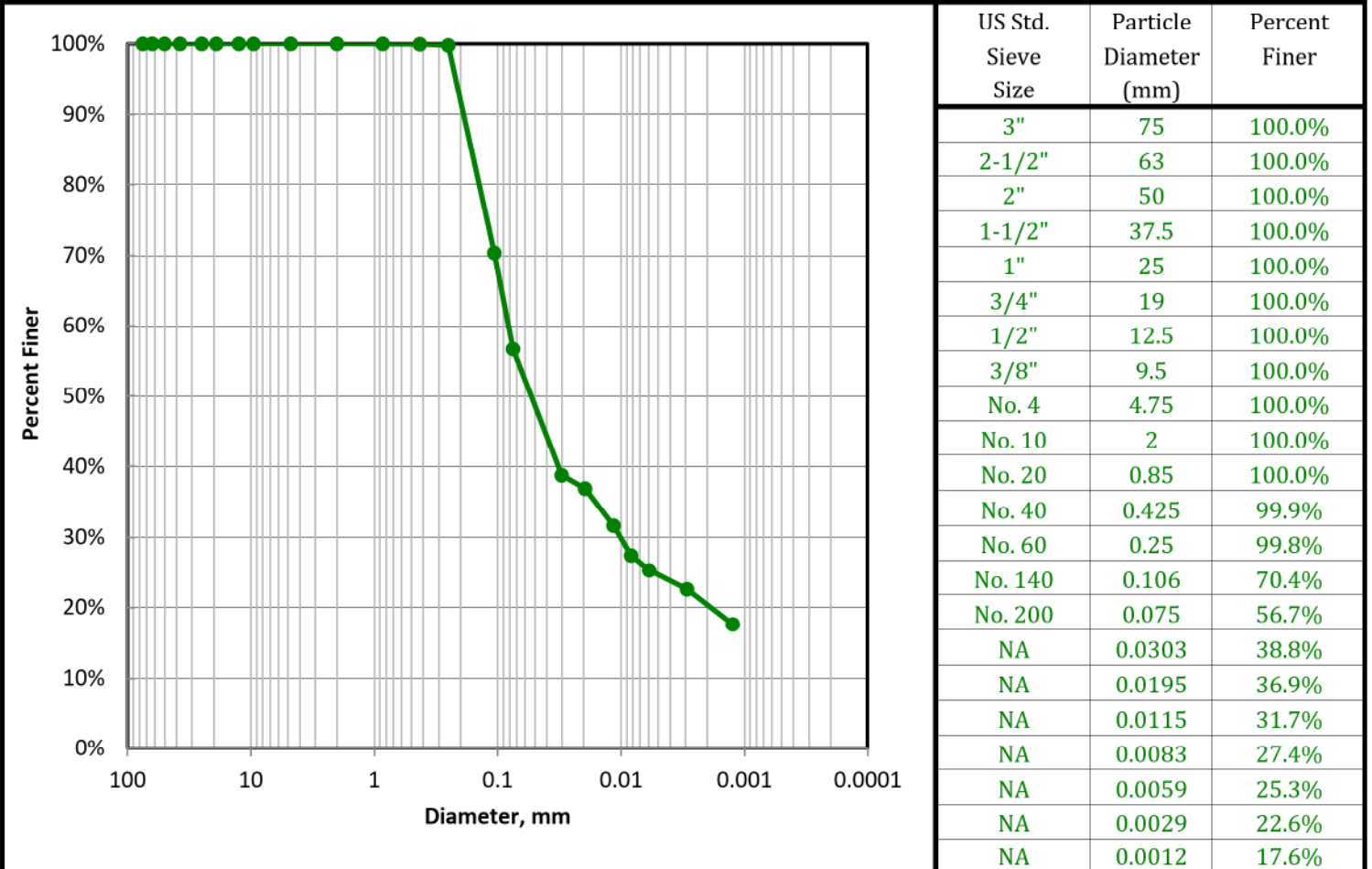
Client	Civil & Environmental Consultants, Inc. (CEC)	Boring	AP-7
Client Project	345-817.0004 AEP Kammer Plant	Depth	11.0'-13.0'
Project No.	25-04143	Sample	ST-3
		Lab Sample	25-04143 -07

Sample Color: **BROWN**

USCS Group Name: **SANDY LEAN CLAY**

USCS Group Symbol: **CL** USDA: **LOAM**

AASHTO: **A-6 (7)**



USCS SOIL CLASSIFICATION				USDA CLASSIFICATION					
Corrected For 100% Passing a 3" Sieve				Particle Size (mm)	Percent Finer (%)	Percent of Each Component (Material) (%)		Corrected Percent of -2.0 mm Material for USDA	
% Gravel (-3" & + #4)		0.0	Silt=32.1% Clay=24.6%						
Coarse=0; Fine=0			D60, mm NA						
% Sand (-#4 & + #200)		43.3	D30, mm NA						
Coarse=0; Medium=0.1; Fine=43.2			D10, mm NA						
% Fines (-#200)		56.7	Cc		NA				
% Plus #200 (-3")		43.3	Cu		NA				
USCS Description				2	100	Gravel 0.0		0	
SANDY LEAN CLAY									
USCS Group Symbol		Atterberg Limits Group Symbol							
CL		CL - LEAN CLAY							
Auxiliary Information		Wt Ret, gm	% Retained						% Finer
12" Sieve - 300 mm		0	0.0	100.0	0.002	20.4	Clay 20.4		20.4
6" Sieve - 150 mm		0	0.0	100.0					
3" Sieve - 75 mm		0	0.0	100.0					
				USDA Classification					
				LOAM					

USDA CLASSIFICATION CHART

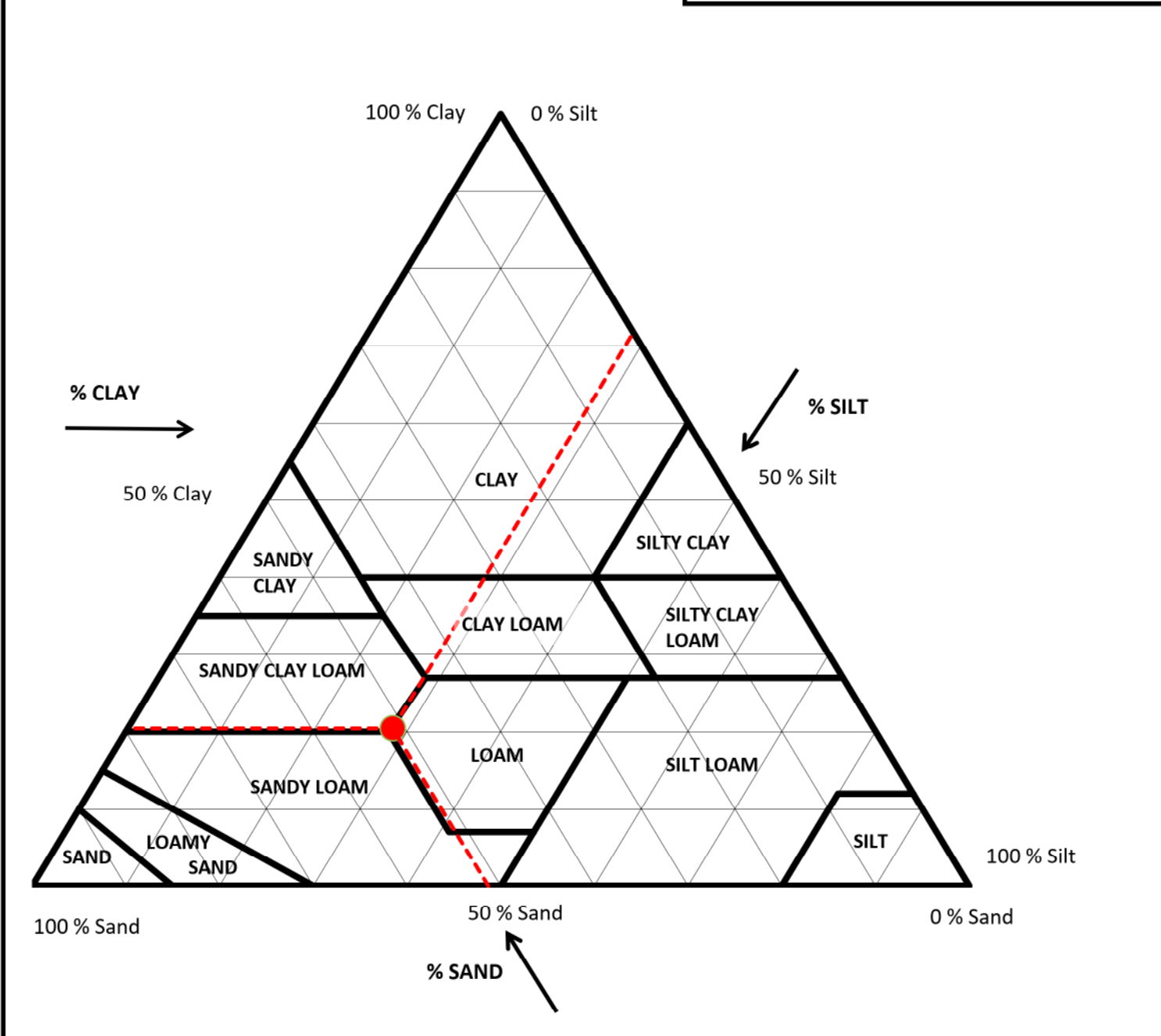
Client	Civil & Environmental Consultants, Inc. (CEC)	Boring	AP-7
Client Project	345-817.0004 AEP Kammer Plant	Depth	11.0'-13.0'
Project No.	25-04143	Sample	ST-3
		Lab Sample	25-04143 -07

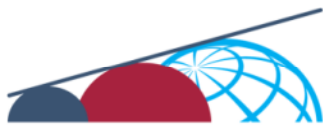
Sample Color: **BROWN**
 USCS Group Name: **SANDY LEAN CLAY**
 USCS Group Symbol: **CL**

USDA: **LOAM**

AASHTO: **A-6 (7)**

Corrected for 0% gravel		Sand Subsizes Corrected Percentages	
Percent Gravel, %	0.0	Very Coarse Sand; 2-1	0.0
Percent Sand, %	51.3	Coarse Sand; 1-0.5	0.0
Percent Silt, %	28.3	Medium Sand; 0.5-0.25	0.2
Percent Clay, %	20.4	Fine Sand; 0.25-0.1	31.7
		Very Fine Sand; 0.1-0.05	19.4
		Total	51.3





GEOTECHNICAL TESTING SERVICES

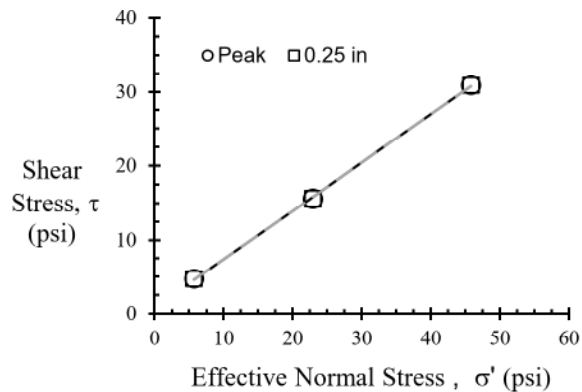
A TRI ENVIRONMENTAL COMPANY

Direct Shear Test Under Consolidated Drained Conditions (ASTM D3080)

Client: Civil & Environmental Consultants, Inc.
 Client Project: 345-817.0004 AEP Kammer Plant
 Project No. 25-04143

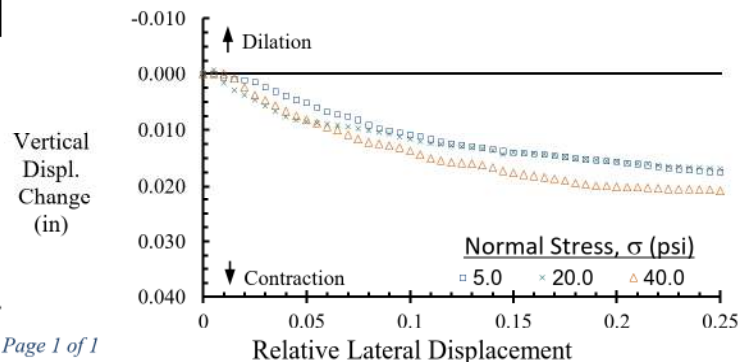
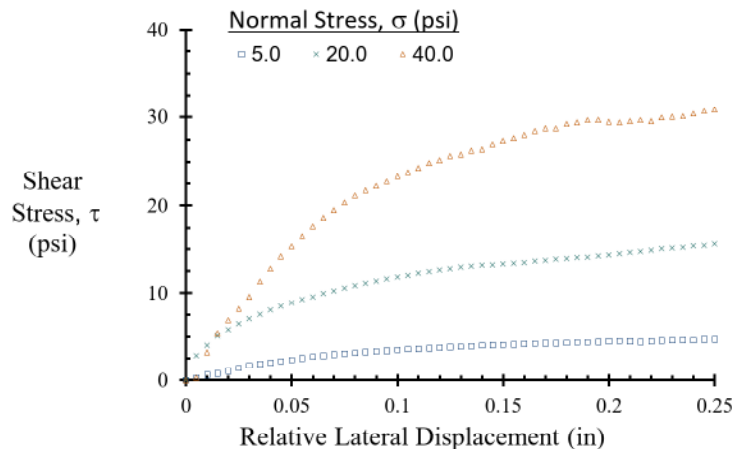
Boring AP-7
 Depth 11.0' - 13.0'
 Sample ST-3
 Lab No. 25-04143-07

Strength Envelope Linear Regression		
Criterion	C' (psi)	ϕ' (deg)
Peak	0.9	33.1
0.25 in	0.9	33.1



Note: Area Correction Has Been Applied

Specimen Number		1	2	3
Initial Condition	Diameter (in)	2.50	2.50	2.50
	Height (in)	1.00	1.00	1.00
	Water Content (%)	21.5	21.5	21.5
	Dry Density (pcf)	96.7	98.2	100.1
Consol	Normal Stress (psi)	5.0	20.0	40.0
	Duration (min)	708	708	708
	Height (in)	1.0	1.0	1.0
Displacement rate (in/min)		6E-04		
Peak	Displacement, in	0.25	0.25	0.25
	Normal Stress (psi)	5.7	22.9	45.8
	Shear Stress (psi)	4.7	15.6	30.8
0.25 in	Normal Stress (psi)	5.7	22.9	45.8
	Shear Stress (psi)	4.7	15.6	30.8



Jeffrey A. Kuhn, Ph.D., P.E. 9/9/2025

Analysis & Quality Review/Date

Page 1 of 1

The testing herein is based upon accepted industry practice as well as the test method listed. Test results reported herein do not apply to samples other than those tested. TRI neither accepts responsibility for nor makes claim as to the final use and purpose of the material. TRI observes and maintains client confidentiality. TRI limits reproduction of this report, except in full, without prior approval of TRI.

GEOTECHNICAL TESTING SERVICES, INC., A TRI ENVIRONMENTAL COMPANY; 1-800-853-7309
103 Coraopolis Road, Coraopolis, PA, 15108

PARTICLE-SIZE ANALYSIS OF SOILS - ASTM D422-63(2007)

Client	Civil & Environmental Consultants, Inc. (CEC)	Boring	AP-7
Client Project	345-817.0004 AEP Kammer Plant	Depth	11.0'-13.0'
Project No.	25-04143	Sample	BS-1
		Lab Sample	25-04143 -11

Sample Color: BROWN
USCS Group Name: SANDY LEAN CLAY
USCS Group Symbol: CL

USDA: LOAM

AASHTO: A-4 (3)

Dry Prep: R58-11(2018)¹

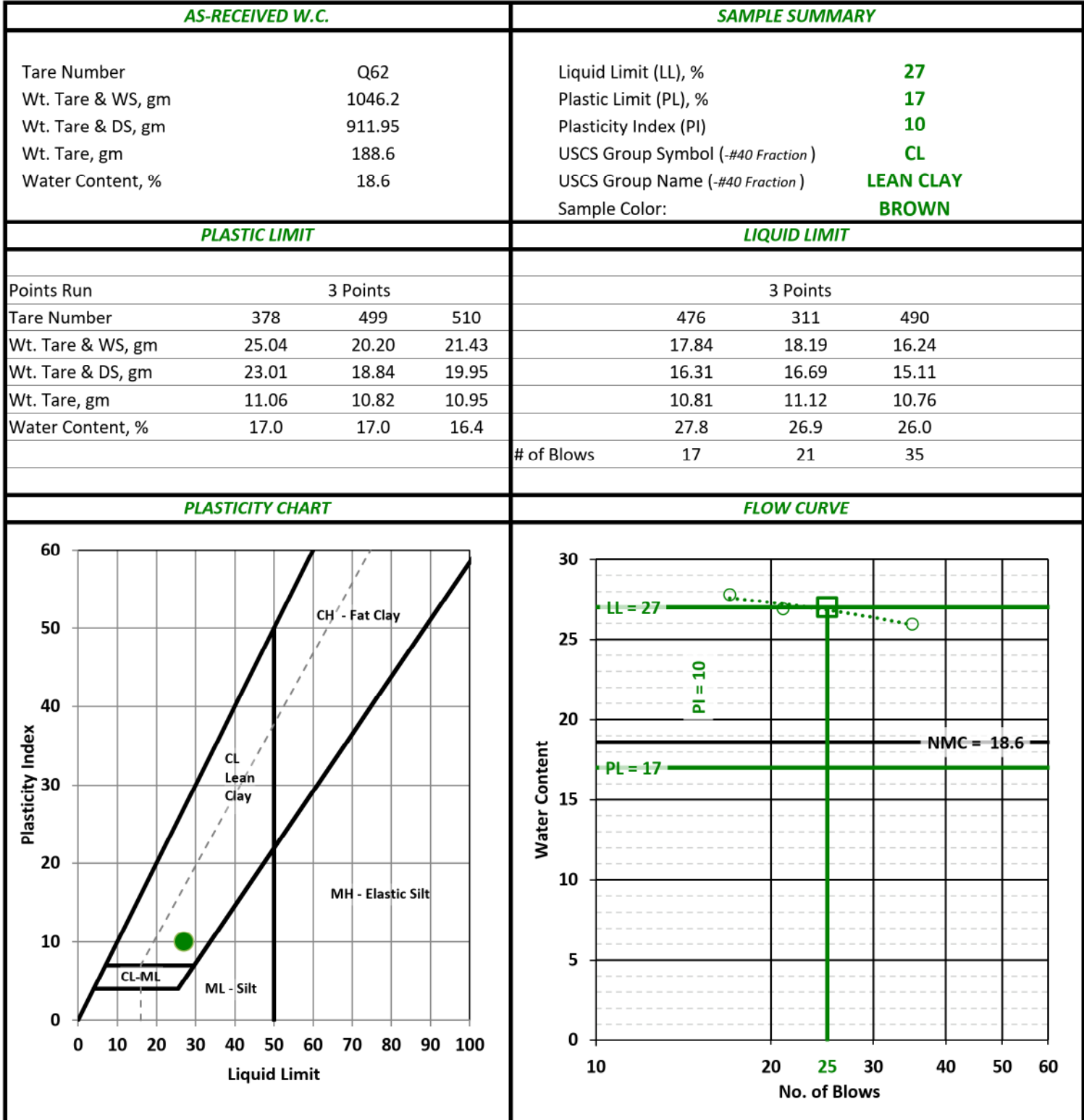
MECHANICAL SIEVE									
Total Sample			Sieve Size	Nominal Opening, mm	Dry Wt, gm	Split Normalized		Project Specifications	
Tare No.	Q62		3"	75	0	% Retained	% Finer		
Tare + WS., gm	1046.20		2-1/2"	63	0	0.0%	100.0%		
Tare + DS., gm	911.95		2"	50	0	0.0%	100.0%		
Tare, gm	188.60		1-1/2"	37.5	0	0.0%	100.0%		
Total sample WC	18.6%		1"	25	0	0.0%	100.0%		
Total Sample Dry Wt, gm (-3")	723		3/4"	19	0	0.0%	100.0%		
Hygroscopic WC (-#10)			1/2"	12.5	0	0.0%	100.0%		
Tare No.	262		3/8"	9.5	0	0.0%	100.0%		
Tare + WS., gm	45.60		No. 4	4.75	1.20	0.2%	99.8%		
Tare + DS., gm	45.49		No. 10	2	4.74	0.7%	99.2%		
Tare, gm	16.87		No. 20	0.85	2.52	3.6%	95.6%		
Hygroscopic WC	0.38%		No. 40	0.425	0.95	1.4%	94.2%		
			No. 60	0.25	0.27	0.4%	93.8%		
-#10 Hydro/Sieve air dry wt.	69.11		No. 140	0.106	15.98	22.9%	70.9%		
Wt. of +#200 Sample, gm	27.69		No. 200	0.075	7.97	11.4%	59.4%		
HYDROMETER (-#10)									
Split Air Dry Wt	69.38						Specific Gravity	2.7	
Hygroscopic WC	0.38%							Assumed	
Corrected Dry wt	69.1	-#10 Dispersed 1min in Hamilton Beach Mixer					a Factor	0.9889	
Elapsed Time (min.)	R Measured	Temp °C	Composite Correction	R Corrected	K Factor	Percent Finer (%)	Particle Diameter (mm)	Adjusted % Finer (%)	
2	33.0	24.0	4.5	28.5	0.0128	40.8	0.0298	40.4%	
5	30.0	24.0	4.5	25.5	0.0128	36.5	0.0193	36.2%	
15	27.0	24.1	4.5	22.5	0.0128	32.2	0.0114	31.9%	
30	25.0	24.2	4.5	20.5	0.0128	29.3	0.0081	29.1%	
60	23.0	24.1	4.5	18.5	0.0128	26.5	0.0058	26.3%	
250	20.0	24.3	4.4	15.6	0.0128	22.3	0.0029	22.1%	
1440	16.0	24.2	4.5	11.5	0.0128	16.5	0.0012	16.3%	
USCS SOIL CLASSIFICATION				USDA CLASSIFICATION					
Corrected For 100% Passing a 3" Sieve				Particle Size (mm)	Percent Finer (%)	Percent of Each Component (Material) (%)		Corrected Percent of -2.0 mm Material for USDA	
% Gravel (-3" & +#4)	0.2	Silt=34.1% Clay=25.3%							
Coarse=0; Fine=0.2		D60, mm	NA			Gravel	0.8	0	
% Sand (-#4 & +#200)	40.4	D30, mm	NA						
Coarse=0.7; Medium=5; Fine=34.8		D10, mm	NA						
% Fines (-#200)	59.4	Cc	NA						
% Plus #200 (-3")	40.6	Cu	NA	2	99.2	Sand	48.1	48.5	
USCS Description				0.05	51.1	Silt	31.5	31.8	
SANDY LEAN CLAY				0.002	19.6	Clay	19.6	19.7	
USCS Group Symbol		Atterberg Limits Group Symbol		USDA Classification					
CL		CL - LEAN CLAY							
Auxiliary Information		Wt Ret, gm	% Retained	% Finer	LOAM				
12" Sieve - 300 mm		0	0.0	100.0					
6" Sieve - 150 mm		0	0.0	100.0					
3" Sieve - 75 mm		0	0.0	100.0					

Performed By: RH Input Validation: MA Reviewed By: BS Date Tested: 9/8/2025

LIQUID LIMIT, PLASTIC LIMIT, AND PLASTICITY INDEX OF SOILS
ASTM D4318-17e1

Client	Civil & Environmental Consultants, Inc. (CEC)	Boring	AP-7
Client Project	345-817.0004 AEP Kammer Plant	Depth	11.0'-13.0'
Project No.	25-04143	Sample	BS-1
		Lab Sample	25-04143 -11

Soil Description: BROWN LEAN CLAY
 (-#40 Fraction)



Performed By: RH Input Validation: MA Reviewed By: BS Date Tested: 9/8/2025

PARTICLE-SIZE ANALYSIS OF SOILS - ASTM D422-63(2007)

Client	Civil & Environmental Consultants, Inc. (CEC)	Boring	AP-7
Client Project	345-817.0004 AEP Kammer Plant	Depth	11.0'-13.0'
Project No.	25-04143	Sample	BS-1
		Lab Sample	25-04143 -11

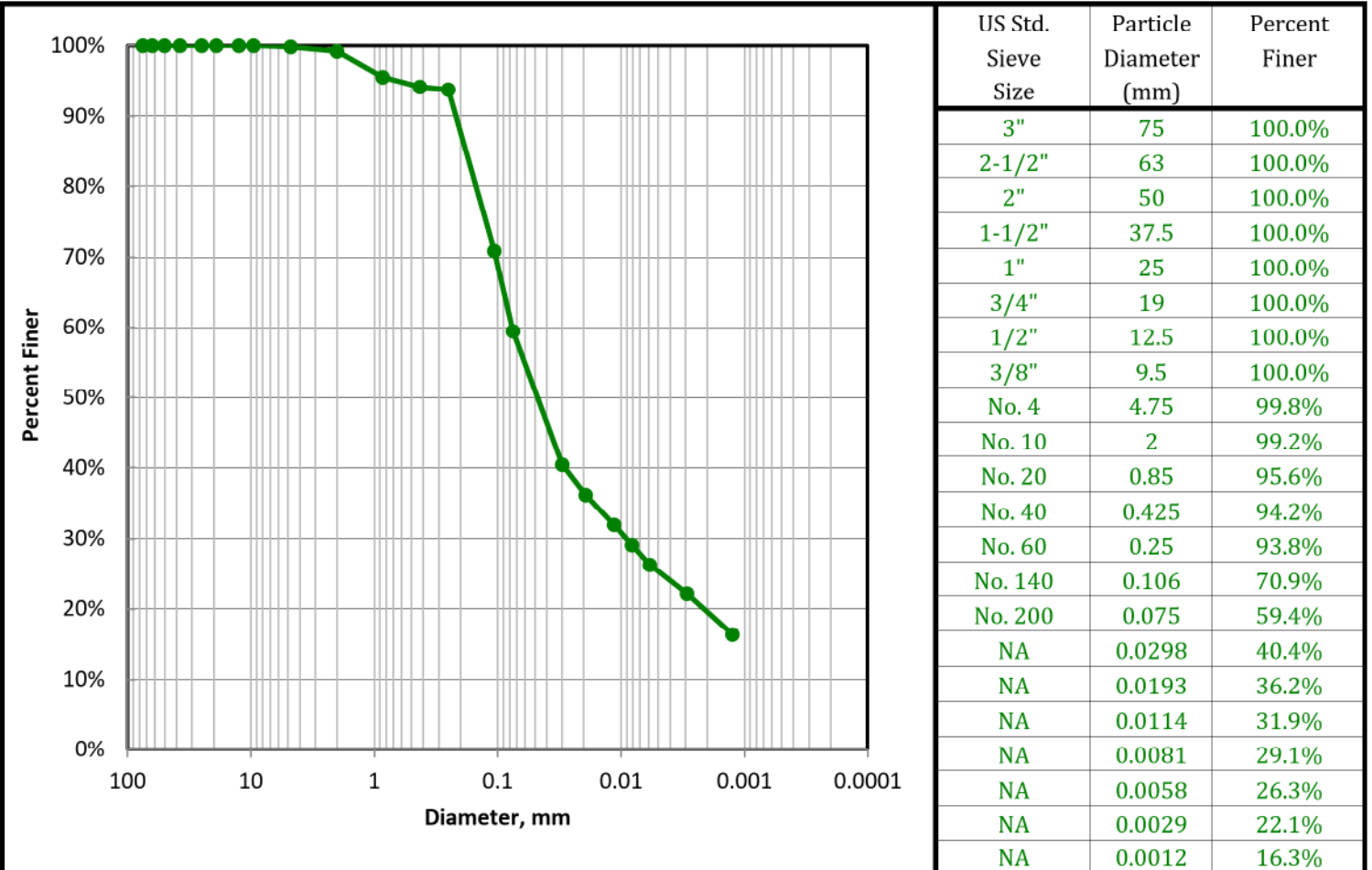
Sample Color: **BROWN**

USCS Group Name: **SANDY LEAN CLAY**

USCS Group Symbol: **CL**

USDA: **LOAM**

AASHTO: **A-4 (3)**



USCS SOIL CLASSIFICATION				USDA CLASSIFICATION				
Corrected For 100% Passing a 3" Sieve				Particle Size (mm)	Percent Finer (%)	Percent of Each Component (Material) (%)		Corrected Percent of -2.0 mm Material for USDA
% Gravel (-3" & + #4)	0.2	Silt=34.1% Clay=25.3%						
Coarse=0; Fine=0.2		D60, mm	NA			Gravel	0.8	0
% Sand (-#4 & + #200)	40.4	D30, mm	NA					
Coarse=0.7; Medium=5; Fine=34.8		D10, mm	NA					
% Fines (-#200)	59.4	Cc	NA					
% Plus #200 (-3")	40.6	Cu	NA	100	100			
USCS Description				2	99.2			
SANDY LEAN CLAY								
USCS Group Symbol		Atterberg Limits Group Symbol		0.05	51.1			
CL		CL - LEAN CLAY						
Auxiliary Information		Wt Ret, gm	% Retained	% Finer	0.002	19.6		
12" Sieve - 300 mm		0	0.0	100.0			Clay	19.6
6" Sieve - 150 mm		0	0.0	100.0	USDA Classification LOAM			
3" Sieve - 75 mm		0	0.0	100.0				

USDA CLASSIFICATION CHART

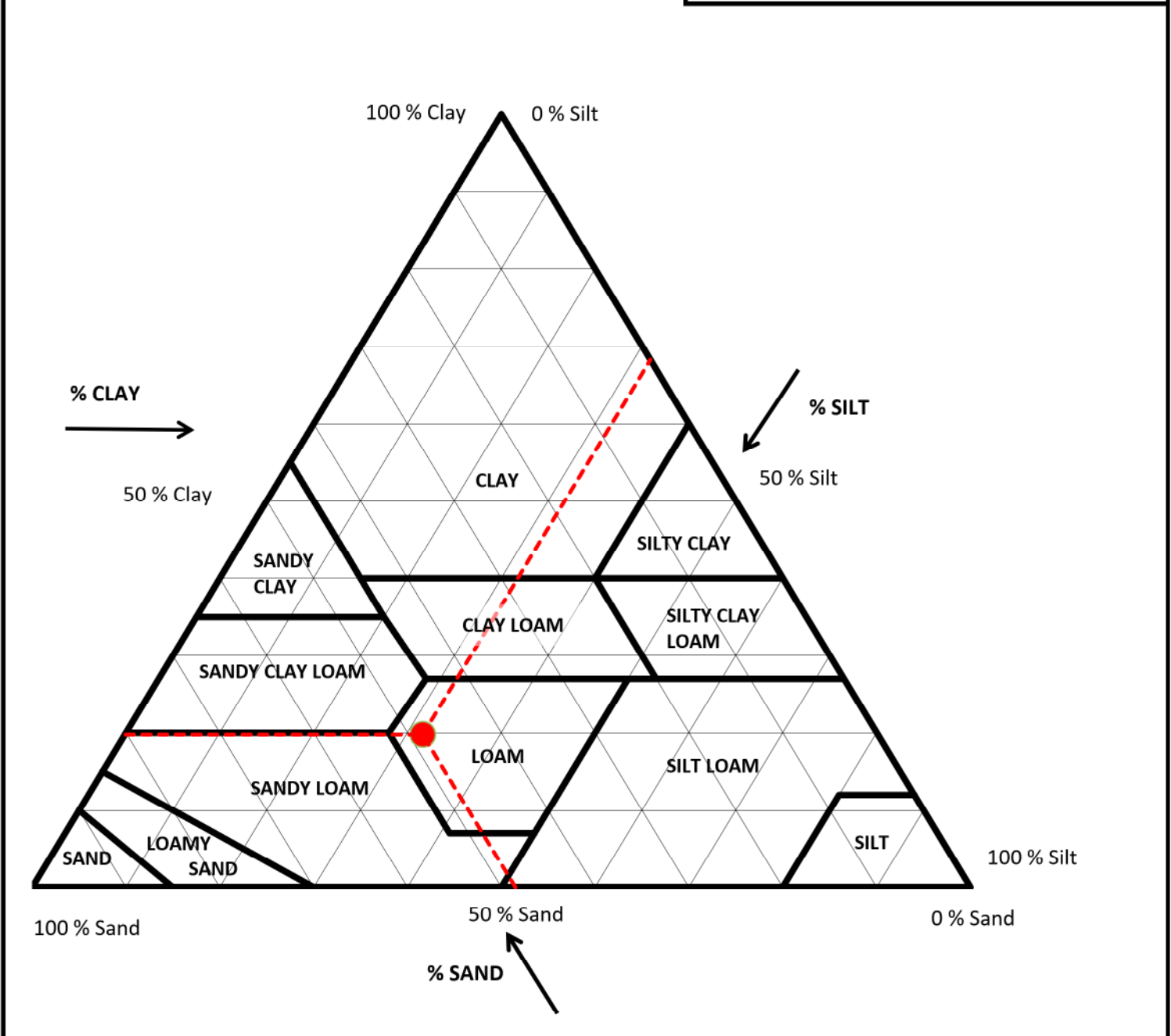
Client	Civil & Environmental Consultants, Inc. (CEC)	Boring	AP-7
Client Project	345-817.0004 AEP Kammer Plant	Depth	11.0'-13.0'
Project No.	25-04143	Sample	BS-1
		Lab Sample	25-04143 -11

Sample Color: **BROWN**
 USCS Group Name: **SANDY LEAN CLAY**
 USCS Group Symbol: **CL**

USDA: **LOAM**

AASHTO: **A-4 (3)**

Corrected for 0% gravel	Sand Subsizes Corrected Percentages
Percent Gravel, % 0.0	Very Coarse Sand; 2-1 3.0
Percent Sand, % 48.5	Coarse Sand; 1-0.5 1.7
Percent Silt, % 31.8	Medium Sand; 0.5-0.25 0.7
Percent Clay, % 19.7	Fine Sand; 0.25-0.1 25.1
	Very Fine Sand; 0.1-0.05 18.0
	Total 48.5

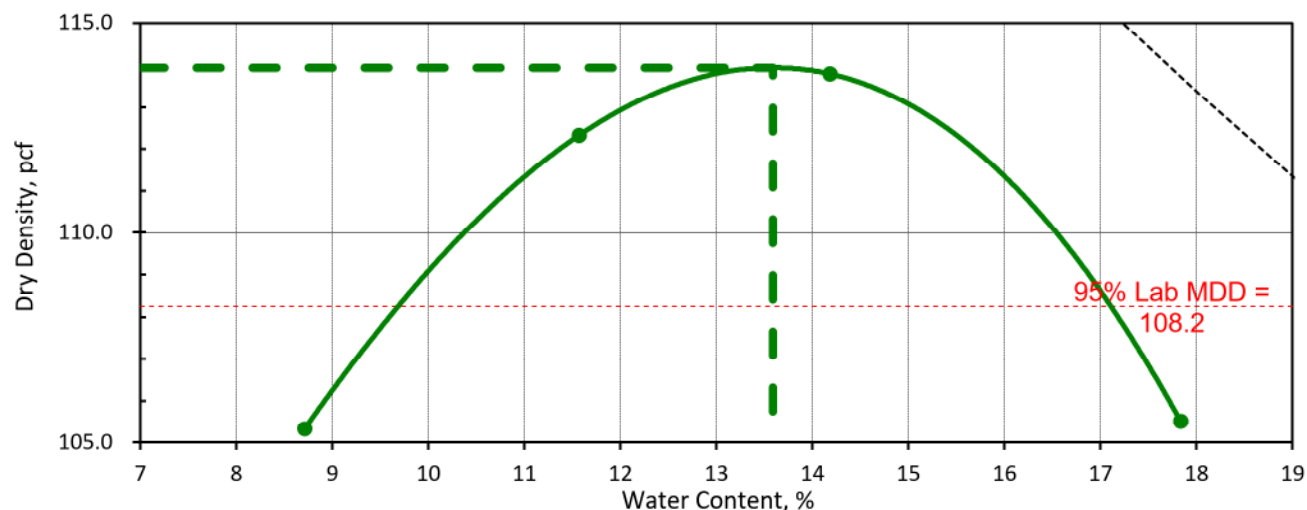


LABORATORY COMPACTION CHARACTERISTICS OF SOIL

Client	Civil & Environmental Consultants, Inc. Boring	AP-7
Client Project	345-817.0004 AEP Kammer Plant	Depth 11.0' - 13.0'
Project No.	25-04143	Sample BS-1
	Lab Sample No.	25-04143-11
Visual Description:	BROWN SANDY LEAN CLAY	

WET DENSITY					TEST PARAMETERS	
Mold ID	J	J	J	J	Test Method	ASTM D698
Compaction Point #	1	2	3	4	Compaction Energy	Standard
Wt. Mold & WS, gm.	10353	10722	10879	10688	Test Procedure	C
Wt. Mold, gm.	6450	6450	6450	6450	Mold Diameter, in	6
Wt. WS, gm.	3903	4272	4429	4238	Compacted Layers	3
Mold Volume, cc	2127	2127	2127	2127	Blows Per Layer	56
Wet Density, gm./cc	1.83	2.01	2.08	1.99	Rammer Weight / Fall	5.5 lbs / 12 in.
Wet Density, pcf	114.5	125.3	129.9	124.3	Size of Material Used	-3/4" Sieve
					Use: <5% Retained on 3/4"	
WATER CONTENT					OVERSIZE PARTICLE CORRECTION	
Tare Number	B06	457	66	B07	No Corrections Needed	
Wt. Tare & WS, gm.	324.7	311.4	435.5	428.5		
Wt. Tare & DS, gm.	305.5	287.9	391.9	376.4	Percent of Oversize Rock (+3/4" Sieve) = <5% (Based on As-received Screening & Soaking)	
Wt. Tare, gm.	85.1	84.8	84.5	84.3		
Water Content, %	8.7	11.6	14.2	17.8	W.C. of Finer Material, % (-3/4" Sieve) = NA	
DRY DENSITY vs. WATER CONTENT					SAMPLE SUMMARY	
LABORATORY TEST VALUES						
Water Content, %	8.7	11.6	14.2	17.8	Lab Optimum Water Content, %	13.6
Dry Density, pcf	105.3	112.3	113.8	105.5	Lab Maximum Dry Density, pcf	113.9

Note: Maximum Density and Optimum Water Content reported from estimated best fit smooth curve!



Note: Compacted with automatic compaction machine

Input Validation: MA

Reviewed By: BLS

Date Tested: 09/02/25

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PARTICLE-SIZE ANALYSIS OF SOILS - ASTM D422-63(2007)

Client	Civil & Environmental Consultants, Inc. (CEC)	Boring	AP-7
Client Project	345-817.0004 AEP Kammer Plant	Depth	14.0'-16.0'
Project No.	25-04143	Sample	ST-4
		Lab Sample	25-04143 -08

Sample Color: BROWN
USCS Group Name: SANDY LEAN CLAY
USCS Group Symbol: CL

USDA: SANDY LOAM **AASHTO:** A-6 (7)

Dry Prep: R58-11(2018)¹

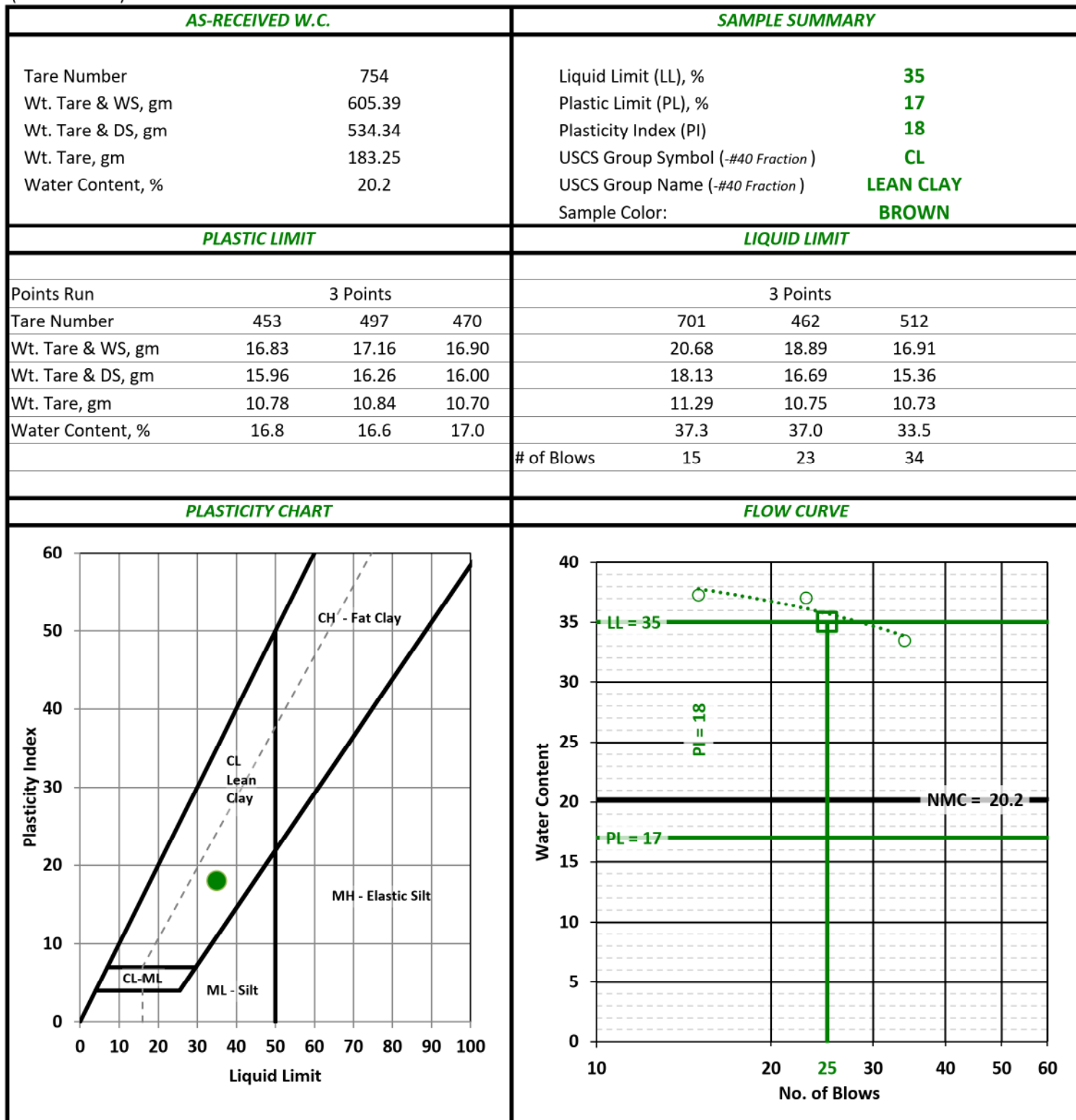
MECHANICAL SIEVE								
Total Sample			Sieve Size	Nominal Opening, mm	Dry Wt, gm	Split Normalized		Project Specifications
Tare No.	754		3"	75	0	% Retained	% Finer	
Tare + WS., gm	605.39		2-1/2"	63	0	0.0%	100.0%	
Tare + DS., gm	534.34		2"	50	0	0.0%	100.0%	
Tare, gm	183.25		1-1/2"	37.5	0	0.0%	100.0%	
Total sample WC	20.2%		1"	25	0	0.0%	100.0%	
Total Sample Dry Wt, gm (-3")	351		3/4"	19	0	0.0%	100.0%	
Hygroscopic WC (-#10)			1/2"	12.5	0	0.0%	100.0%	
Tare No.	503		3/8"	9.5	0	0.0%	100.0%	
Tare + WS., gm	29.82		No. 4	4.75	0	0.0%	100.0%	
Tare + DS., gm	29.65		No. 10	2	0.05	0.0%	100.0%	
Tare, gm	10.63		No. 20	0.85	0.03	0.1%	99.9%	
Hygroscopic WC	0.89%		No. 40	0.425	0.13	0.2%	99.7%	
			No. 60	0.25	0.23	0.4%	99.3%	
-#10 Hydro/Sieve air dry wt.	59.90		No. 140	0.106	17.42	29.1%	70.3%	
Wt. of +#200 Sample, gm	25.69		No. 200	0.075	7.88	13.2%	57.1%	
HYDROMETER (-#10)								
Split Air Dry Wt	60.44						Specific Gravity	2.7
Hygroscopic WC	0.89%							Assumed
Corrected Dry wt	59.9	#10 Dispersed 1min in Hamilton Beach Mixer					a Factor	0.9889
Elapsed Time (min.)	R Measured	Temp °C	Composite Correction	R Corrected	K Factor	Percent Finer (%)	Particle Diameter (mm)	Adjusted % Finer (%)
2	27.5	22.1	5.1	22.4	0.0131	37.0	0.0318	37.0%
5	25.0	23.3	4.7	20.3	0.0129	33.5	0.0202	33.5%
15	23.0	23.3	4.7	18.3	0.0129	30.2	0.0118	30.2%
30	22.0	23.4	4.7	17.3	0.0129	28.6	0.0084	28.6%
60	20.0	23.6	4.7	15.3	0.0129	25.3	0.0060	25.3%
250	15.0	23.8	4.6	10.4	0.0129	17.2	0.0030	17.2%
1440	10.0	23.8	4.6	5.4	0.0129	8.9	0.0013	8.9%
USCS SOIL CLASSIFICATION				USDA CLASSIFICATION				
Corrected For 100% Passing a 3" Sieve				Particle Size (mm)	Percent Finer (%)	Percent of Each Component (Material) (%)		Corrected Percent of -2.0 mm Material for USDA
% Gravel (-3" & +#4)	0.0	Silt=34% Clay=23.1%						
Coarse=0; Fine=0		D60, mm	NA	100	100	Gravel	0.0	0
% Sand (-#4 & +#200)	42.9	D30, mm	NA					
Coarse=0; Medium=0.3; Fine=42.6		D10, mm	NA					
% Fines (-#200)	57.1	Cc	NA					
% Plus #200 (-3")	42.9	Cu	NA	2	100.0			
USCS Description								
SANDY LEAN CLAY								
USCS Group Symbol Atterberg Limits Group Symbol								
CL	CL - LEAN CLAY			0.05	47.6			
Auxiliary Information	Wt Ret, gm	% Retained	% Finer					
12" Sieve - 300 mm	0	0.0	100.0	0.002	13.2			
6" Sieve - 150 mm	0	0.0	100.0					
3" Sieve - 75 mm	0	0.0	100.0					
USDA Classification								
SANDY LOAM								

Performed By: RH Input Validation: MA Reviewed By: BS Date Tested: 9/8/2025

LIQUID LIMIT, PLASTIC LIMIT, AND PLASTICITY INDEX OF SOILS
ASTM D4318-17e1

Client	Civil & Environmental Consultants, Inc. (CEC)	Boring	AP-7
Client Project	345-817.0004 AEP Kammer Plant	Depth	14.0'-16.0'
Project No.	25-04143	Sample	ST-4
		Lab Sample	25-04143 -08

Soil Description: BROWN LEAN CLAY
 (-#40 Fraction)



Performed By: RH

Input Validation: MA

Reviewed By: BS

Date Tested:

PARTICLE-SIZE ANALYSIS OF SOILS - ASTM D422-63(2007)

Client	Civil & Environmental Consultants, Inc. (CEC)	Boring	AP-7
Client Project	345-817.0004 AEP Kammer Plant	Depth	14.0'-16.0'
Project No.	25-04143	Sample	ST-4
		Lab Sample	25-04143 -08

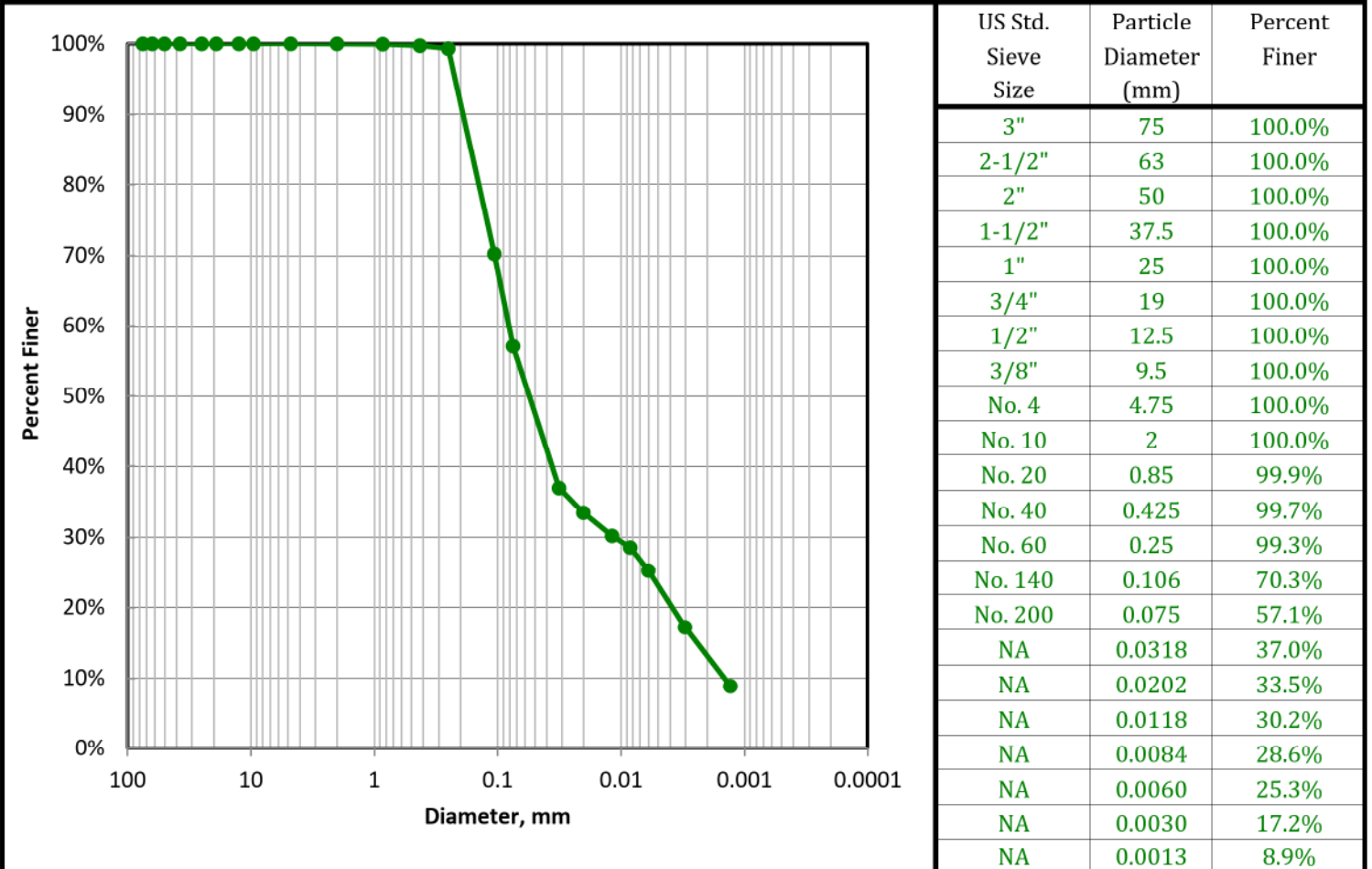
Sample Color: **BROWN**

USCS Group Name: **SANDY LEAN CLAY**

USCS Group Symbol: **CL**

USDA: **SANDY LOAM**

AASHTO: **A-6 (7)**



USCS SOIL CLASSIFICATION				USDA CLASSIFICATION				
Corrected For 100% Passing a 3" Sieve				Particle Size (mm)	Percent Finer (%)	Percent of Each Component (Material) (%)		Corrected Percent of -2.0 mm Material for USDA
% Gravel (-3" & + #4)	0.0	Silt=34% Clay=23.1%						
Coarse=0; Fine=0		D60, mm	NA			Gravel	0.0	0
% Sand (-#4 & + #200)	42.9	D30, mm	NA					
Coarse=0; Medium=0.3; Fine=42.6		D10, mm	NA					
% Fines (-#200)	57.1	Cc	NA					
% Plus #200 (-3")	42.9	Cu	NA	100	100			
USCS Description				2	100.0			
SANDY LEAN CLAY								
USCS Group Symbol		Atterberg Limits Group Symbol		0.05	47.6			
CL		CL - LEAN CLAY						
Auxiliary Information		Wt Ret, gm	% Retained	% Finer	0.002	13.2		
12" Sieve - 300 mm		0	0.0	100.0			Clay	13.2
6" Sieve - 150 mm		0	0.0	100.0	USDA Classification			
3" Sieve - 75 mm		0	0.0	100.0	SANDY LOAM			

USDA CLASSIFICATION CHART

Client
Client Project
Project No.

Civil & Environmental Consultants, Inc. (CEC)
345-817.0004 AEP Kammer Plant
25-04143

Boring AP-7
Depth 14.0'-16.0'
Sample ST-4
Lab Sample 25-04143 -08

Sample Color: **BROWN**
USCS Group Name: **SANDY LEAN CLAY**
USCS Group Symbol: **CL**

USDA: **SANDY LOAM**

AASHTO: **A-6 (7)**

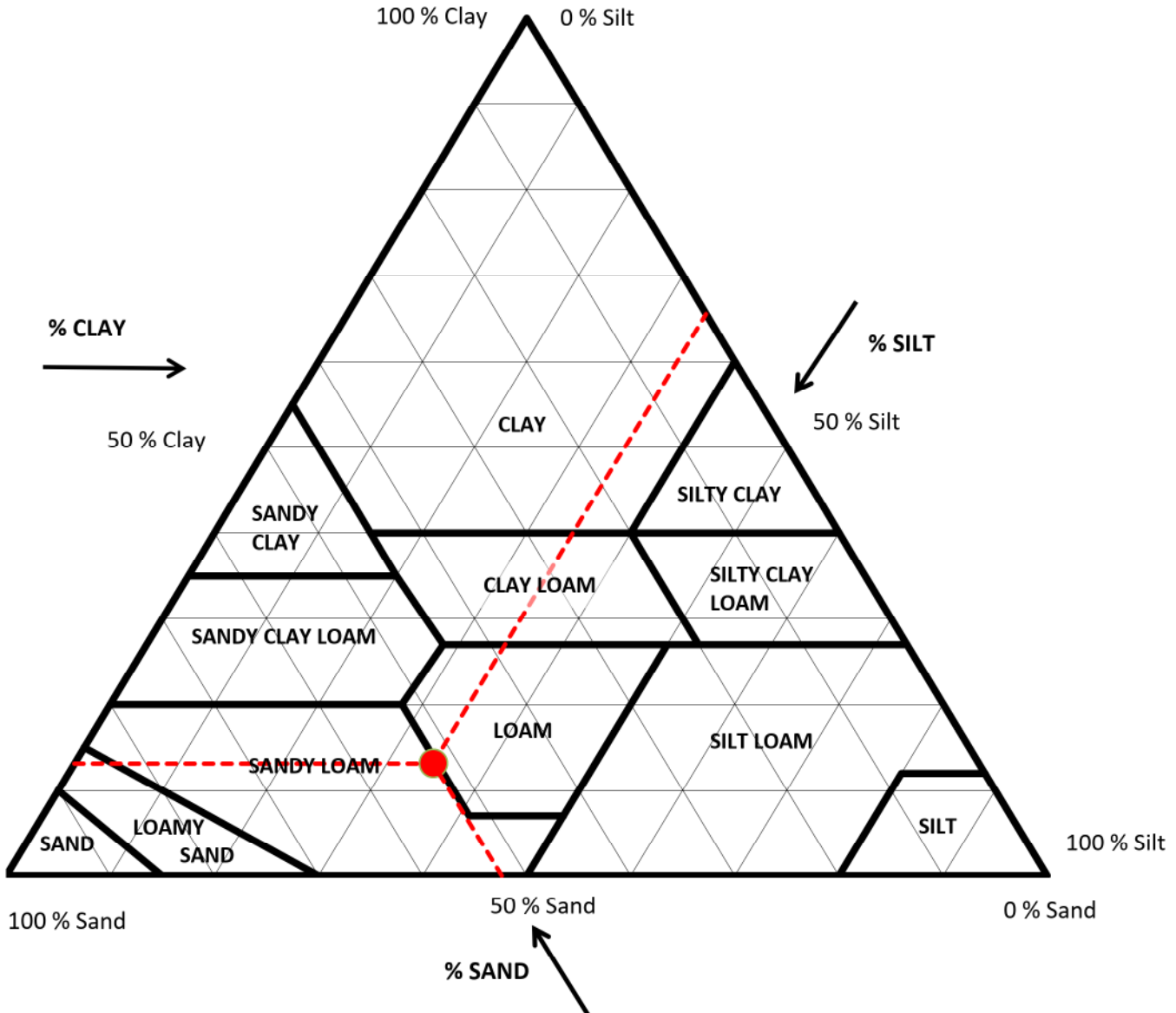
Corrected for 0% gravel

Percent Gravel, %	0.0
Percent Sand, %	52.4
Percent Silt, %	34.5
Percent Clay, %	13.2

Sand Subsizes

Corrected Percentages

Very Coarse Sand; 2-1	0.0
Coarse Sand; 1-0.5	0.2
Medium Sand; 0.5-0.25	0.4
Fine Sand; 0.25-0.1	31.3
Very Fine Sand; 0.1-0.05	20.4
Total	52.4

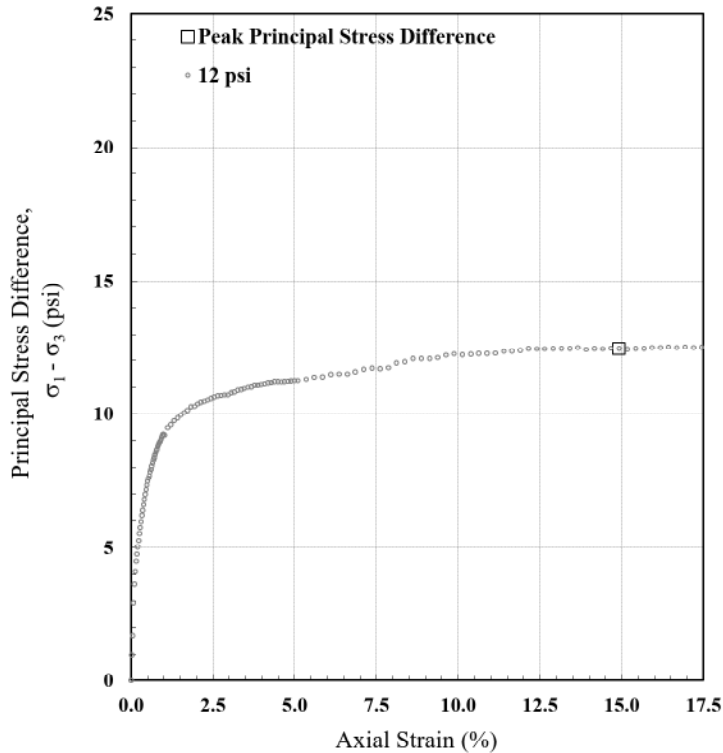




Unconsolidated-Undrained (Q) Triaxial Compression

Client: Civil & Environmental Consultants, Inc.
Project: 345-817.0004 AEP Kammer
Sample: AP-7 (14.0' - 16.0'); ST-4

TRI Log #: 25-04143.8
Test Method: ASTM D2850



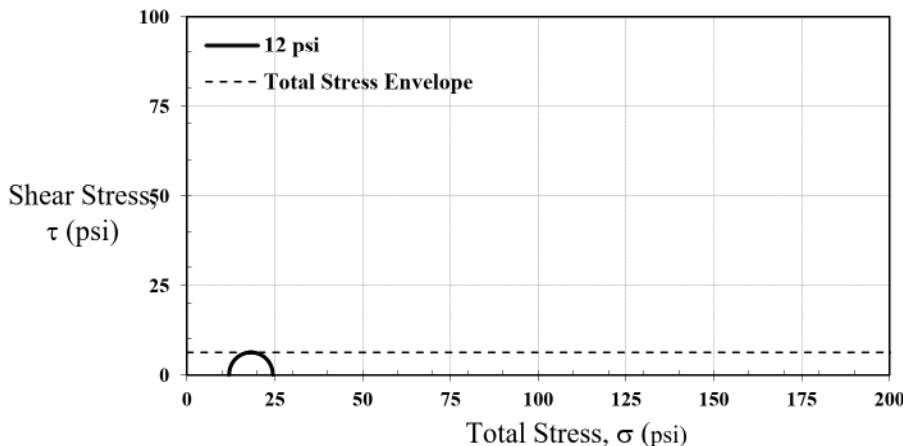
Test Parameters	
Minor Principal Stress (psi)	12.0
Rate of Strain (%/hr)	60

Initial Properties	
Avg. Diameter (in)	2.84
Avg. Height (in)	5.82
Avg. Water Content (%)	21.8
Bulk Density (pcf)	129.3
Dry Density (pcf)	106.2
Saturation (%)	97.1
Void Ratio	0.62
Specific Gravity (Assumed)	2.75

At Failure - Maximum Deviator Stress	
Axial Strain at Failure (%)	14.9
Minor Total Stress (psi)	12.0
Major Total Stress (psi)	24.5
Principal Stress Diff. (psi)	12.5

Total Stress Envelope	
Friction Angle (deg)	0
Undrained Shear Strength, S_u (psi)	6.2
S_u / σ_3	0.5

Note: The calculated value of specimen saturation was approximately 95% or greater. The Mohr failure envelope was taken as a horizontal straight line.



Jeffrey A. Kuhn, Ph.D., P.E., 9/9/2025
Analysis & Quality Review/Date

PARTICLE-SIZE ANALYSIS OF SOILS - ASTM D422-63(2007)

Client	Civil & Environmental Consultants, Inc. (CEC)	Boring	AP-7
Client Project	345-817.0004 AEP Kammer Plant	Depth	18.0'-20.0'
Project No.	25-04143	Sample	ST-5
		Lab Sample	25-04143 -09

Sample Color: **BROWN**
USCS Group Name: **SANDY LEAN CLAY**
USCS Group Symbol: **CL**

USDA: **SANDY LOAM** **AASHTO:** **A-6 (7)**

Dry Prep: R58-11(2018)¹

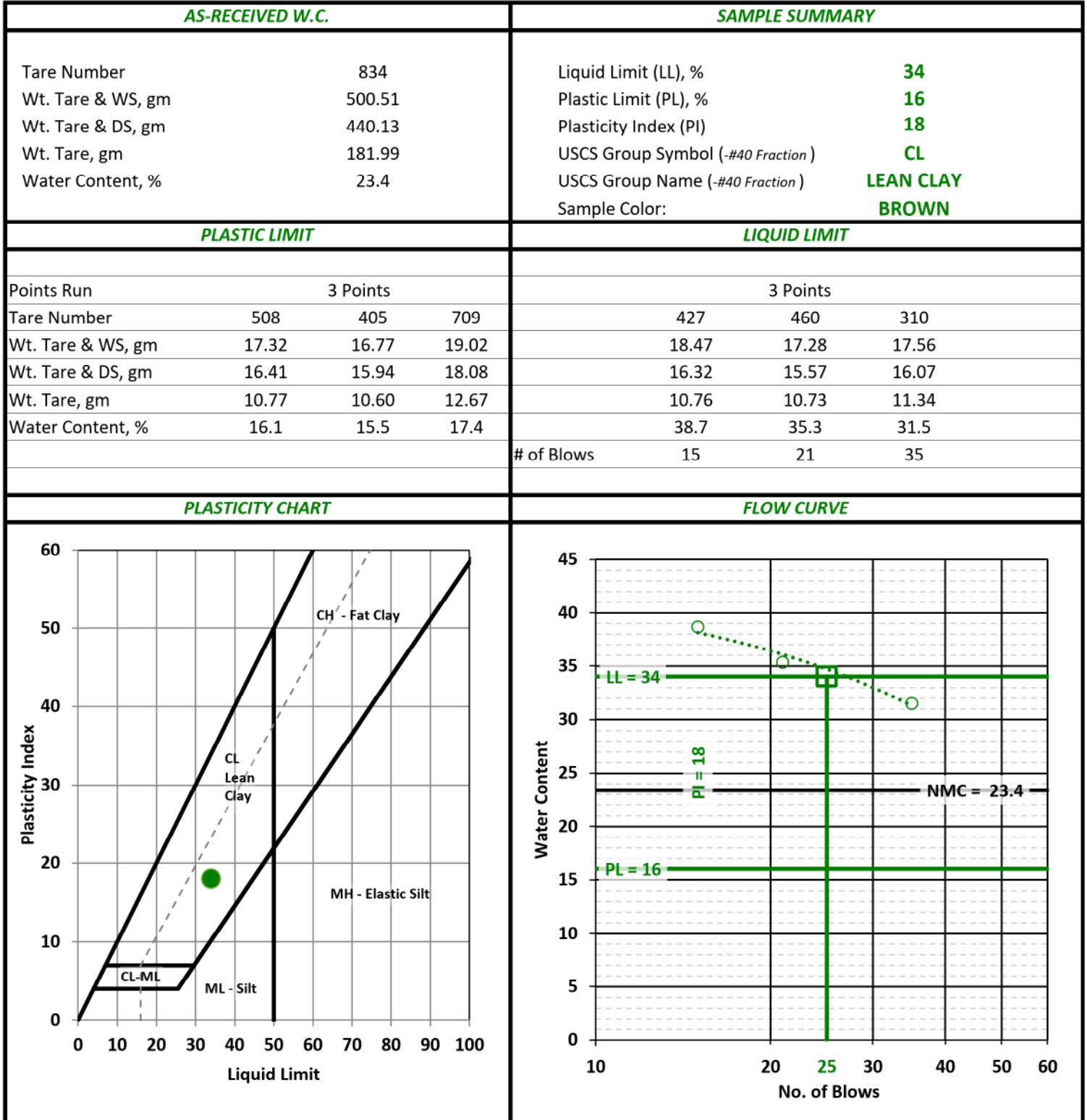
MECHANICAL SIEVE								
Total Sample			Sieve Size	Nominal Opening, mm	Dry Wt, gm	Split Normalized		Project Specifications
Tare No.	834		3"	75	0	% Retained	% Finer	
Tare + WS., gm	500.51		2-1/2"	63	0	0.0%	100.0%	
Tare + DS., gm	440.13		2"	50	0	0.0%	100.0%	
Tare, gm	181.99		1-1/2"	37.5	0	0.0%	100.0%	
Total sample WC	23.4%		1"	25	0	0.0%	100.0%	
Total Sample Dry Wt, gm (-3")	258		3/4"	19	0	0.0%	100.0%	
Hygroscopic WC (-#10)			1/2"	12.5	0	0.0%	100.0%	
Tare No.	203		3/8"	9.5	0	0.0%	100.0%	
Tare + WS., gm	52.95		No. 4	4.75	0	0.0%	100.0%	
Tare + DS., gm	52.44		No. 10	2	0	0.0%	100.0%	
Tare, gm	16.81		No. 20	0.85	0.05	0.1%	99.9%	
Hygroscopic WC	1.43%		No. 40	0.425	0.09	0.1%	99.8%	
			No. 60	0.25	0.10	0.2%	99.6%	
-#10 Hydro/Sieve air dry wt.	61.59		No. 140	0.106	17.42	28.3%	71.3%	
Wt. of +#200 Sample, gm	26.09		No. 200	0.075	8.43	13.7%	57.6%	
HYDROMETER (-#10)								
Split Air Dry Wt	62.47						Specific Gravity	2.7
Hygroscopic WC	1.43%							Assumed
Corrected Dry wt	61.6	-#10 Dispersed 1min in Hamilton Beach Mixer					a Factor	0.9889
Elapsed Time (min.)	R Measured	Temp °C	Composite Correction	R Corrected	K Factor	Percent Finer (%)	Particle Diameter (mm)	Adjusted % Finer (%)
2	27.0	23.6	4.7	22.3	0.0129	35.8	0.0313	35.8%
5	25.0	23.6	4.7	20.3	0.0129	32.6	0.0201	32.6%
15	22.0	23.7	4.6	17.4	0.0129	27.9	0.0118	27.9%
30	21.0	23.7	4.6	16.4	0.0129	26.3	0.0084	26.3%
60	19.0	23.8	4.6	14.4	0.0129	23.1	0.0060	23.1%
250	16.0	23.8	4.6	11.4	0.0129	18.3	0.0030	18.3%
1440	14.0	23.8	4.6	9.4	0.0129	15.1	0.0013	15.1%
USCS SOIL CLASSIFICATION				USDA CLASSIFICATION				
Corrected For 100% Passing a 3" Sieve				Particle Size (mm)	Percent Finer (%)	Percent of Each Component (Material) (%)		Corrected Percent of -2.0 mm Material for USDA
% Gravel (-3" & +#4)	0.0	Silt=35.8% Clay=21.8%						
Coarse=0; Fine=0		D60, mm	NA	100	100	Gravel	0.0	0
% Sand (-#4 & +#200)		D30, mm	NA					
Coarse=0; Medium=0.2; Fine=42.1		D10, mm	NA					
% Fines (-#200)		Cc	NA					
% Plus #200 (-3")		Cu	NA	2	100.0	Sand	52.5	52.5
USCS Description								
SANDY LEAN CLAY								
USCS Group Symbol		Atterberg Limits Group Symbol						
CL		CL - LEAN CLAY		0.05	47.5	Silt	30.7	30.7
Auxiliary Information		Wt Ret, gm	% Retained					
12" Sieve - 300 mm		0	0.0	100.0	USDA Classification	SANDY LOAM		
6" Sieve - 150 mm		0	0.0	100.0				
3" Sieve - 75 mm		0	0.0	100.0				

Performed By: RH Input Validation: MA Reviewed By: BS Date Tested: 9/8/2025

LIQUID LIMIT, PLASTIC LIMIT, AND PLASTICITY INDEX OF SOILS
ASTM D4318-17e1

Client	Civil & Environmental Consultants, Inc. (CEC)	Boring	AP-7
Client Project	345-817.0004 AEP Kammer Plant	Depth	18.0'-20.0'
Project No.	25-04143	Sample	ST-5
		Lab Sample	25-04143 -09

Soil Description: BROWN LEAN CLAY
 (-#40 Fraction)



Performed By: RH

Input Validation: MA

Reviewed By: BS

Date Tested: 9/9/25

PARTICLE-SIZE ANALYSIS OF SOILS - ASTM D422-63(2007)

Client	Civil & Environmental Consultants, Inc. (CEC)	Boring	AP-7
Client Project	345-817.0004 AEP Kammer Plant	Depth	18.0'-20.0'
Project No.	25-04143	Sample	ST-5
		Lab Sample	25-04143 -09

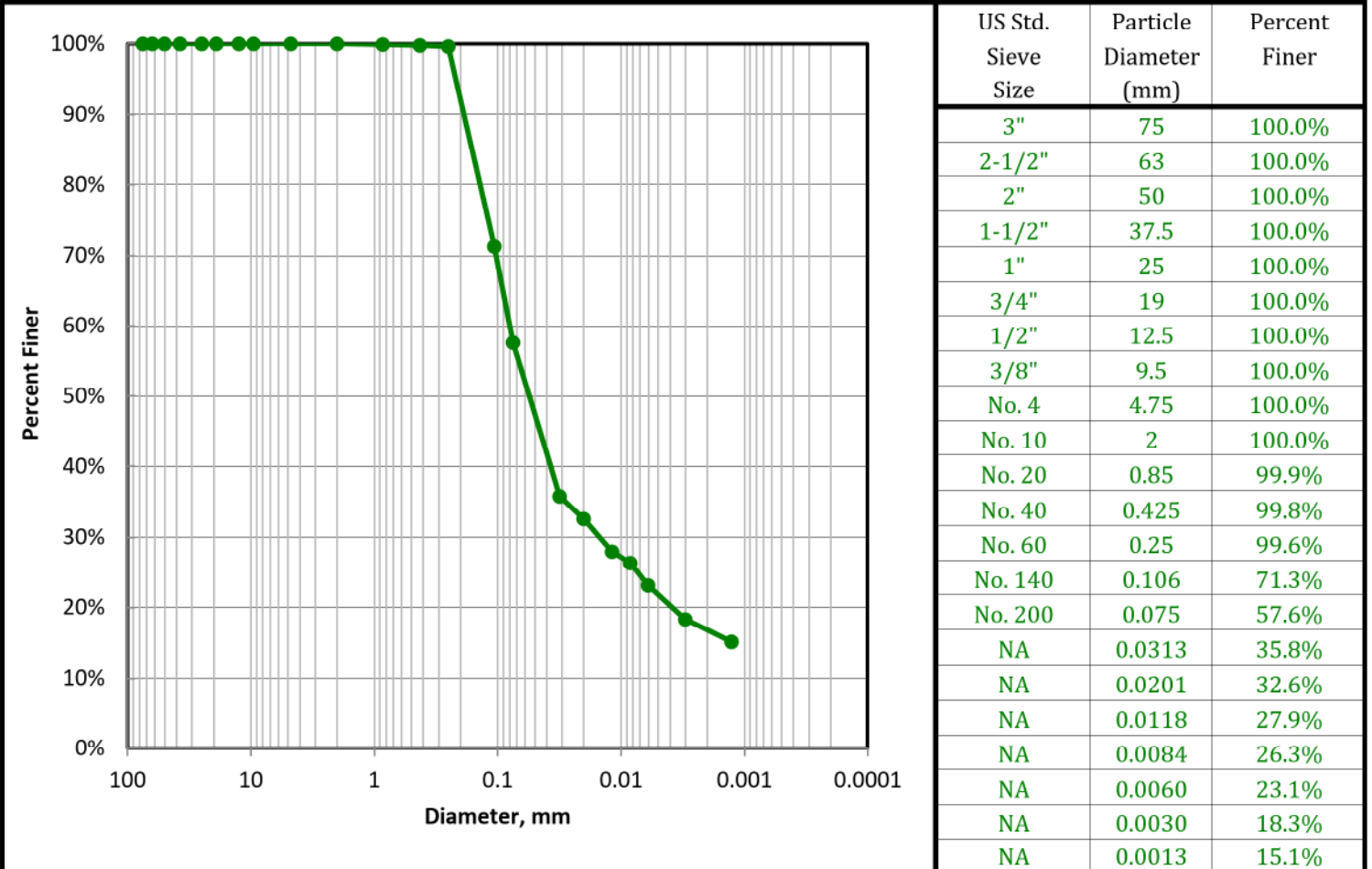
Sample Color: **BROWN**

USCS Group Name: **SANDY LEAN CLAY**

USCS Group Symbol: **CL**

USDA: **SANDY LOAM**

AASHTO: **A-6 (7)**



USCS SOIL CLASSIFICATION				USDA CLASSIFICATION				
Corrected For 100% Passing a 3" Sieve				Particle Size (mm)	Percent Finer (%)	Percent of Each Component (Material) (%)		Corrected Percent of -2.0 mm Material for USDA
% Gravel (-3" & + #4)	0.0	Silt=35.8% Clay=21.8%						
Coarse=0; Fine=0		D60, mm	NA					
% Sand (-#4 & + #200)	42.4	D30, mm	NA					
Coarse=0; Medium=0.2; Fine=42.1		D10, mm	NA					
% Fines (-#200)	57.6	Cc	NA	100	100			
% Plus #200 (-3")	42.4	Cu	NA			Gravel	0.0	0
USCS Description				2	100.0			
SANDY LEAN CLAY						Sand	52.5	52.5
USCS Group Symbol		Atterberg Limits Group Symbol		0.05	47.5			
CL		CL - LEAN CLAY				Silt	30.7	30.7
Auxiliary Information		Wt Ret, gm	% Retained	% Finer	0.002	16.8		
12" Sieve - 300 mm		0	0.0	100.0		Clay	16.8	16.8
6" Sieve - 150 mm		0	0.0	100.0	USDA Classification			
3" Sieve - 75 mm		0	0.0	100.0	SANDY LOAM			

USDA CLASSIFICATION CHART

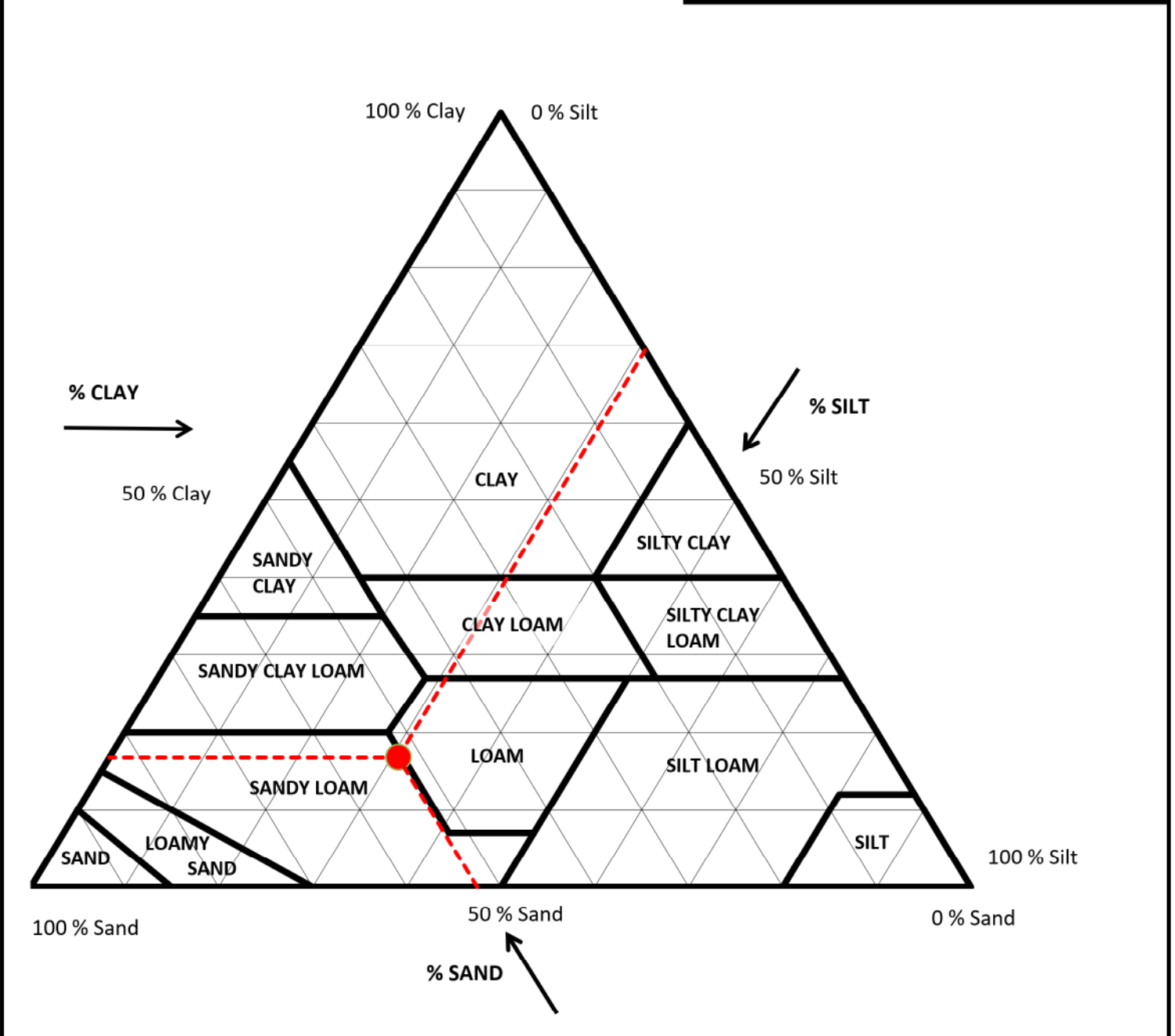
Client	Civil & Environmental Consultants, Inc. (CEC)	Boring	AP-7
Client Project	345-817.0004 AEP Kammer Plant	Depth	18.0'-20.0'
Project No.	25-04143	Sample	ST-5
		Lab Sample	25-04143 -09

Sample Color: **BROWN**
 USCS Group Name: **SANDY LEAN CLAY**
 USCS Group Symbol: **CL**

USDA: **SANDY LOAM**

AASHTO: **A-6 (7)**

Corrected for 0% gravel		Sand Subsizes	
		Corrected Percentages	
Percent Gravel, %	0.0	Very Coarse Sand; 2-1	0.1
Percent Sand, %	52.5	Coarse Sand; 1-0.5	0.1
Percent Silt, %	30.7	Medium Sand; 0.5-0.25	0.2
Percent Clay, %	16.8	Fine Sand; 0.25-0.1	30.6
		Very Fine Sand; 0.1-0.05	21.5
		Total	52.5



Consolidated-Undrained Triaxial Compression

Client: Civil & Environmental Consultants, Inc.
 Project: 345-817.0004 AEP Kammer Plant
 Sample: A-7 (18'-20') ST-5

TRI Log #: 25-04143.9
 Test Method: ASTM D4767

Specimens				
Identification	1	2	3	4
Depth/Elev. (ft)	-	-	-	-
Eff. Consol. Stress (psi)	5.0	20.0	40.0	-
Initial Specimen Properties				
Avg. Diameter (in)	2.81	2.80	2.77	-
Avg. Height (in)	5.92	5.95	5.96	-
Avg. Water Content (%)	22.6	23.2	22.3	-
Bulk Density (pcf)	130.9	131.6	136.3	-
Dry Density (pcf)	106.8	106.9	111.5	-
Specific Gravity (Assumed)	2.75			
Saturation (%)	102.3	105.2	113.5	-
Void Ratio, n	0.61	0.61	0.54	-
B-Value, End of Saturation	0.97	0.99	0.98	-

Test Setup	
Specimen Condition	Undisturbed / Intact
Specimen Preparation	Trimmed
Mounting Method	Wet
Consolidation	Isotropic

Post-Consolidation / Pre-Shear				
Void Ratio	0.61	0.56	0.46	-

Shear / Post-Shear				
Rate of Strain (%/hr)	1.00	1.00	1.00	-
Avg. Water Content (%)	24.2	23.7	23.2	-

At Failure								
Failure Criterion: Peak Principal Stress	Difference, $(\sigma_1' - \sigma_3')_{\max}$				Ratio, $(\sigma_1' / \sigma_3')_{\max}$			
Axial Strain at Failure (%), $\epsilon_{a,f}$	15.0	15.0	15.0	-	12.3	12.2	13.2	-
Minor Effective Stress (psi), $\sigma_3'_f$	5.9	6.9	16.2	-	5.2	6.6	15.8	-
Principal Stress Difference (psi), $(\sigma_1 - \sigma_3)_f$	13.6	19.5	37.9	-	13.2	19.1	37.6	-
Pore Water Pressure, Δu_f (psi)	-0.9	13.1	23.8	-	-0.2	13.4	24.2	-
Major Effective Stress (psi), $\sigma_1'_f$	19.6	26.4	54.2	-	18.4	25.7	53.4	-
Secant Friction Angle (degrees)	32.4	35.9	32.6	-	33.8	36.3	32.9	-
Effective Friction Angle (degrees)	31.6				31.6			
Effective Cohesion (psi)	0.7				0.8			

Note: The presented M-C parameters are based on a linear regression in modified stress space, across all assigned effective consolidation stresses. This fit does not purported to capture typical curvature of envelopes that may, in particular, be observed across broader range in effective stresses. Please note that the stresses associated with peak principal stress ratio and peak principal stress difference are presented in tabular form on the first page of the report. There are alternate interpretations to these two failure criterion including but not limited to strain compatibility and post-peak.

Jeffrey A. Kuhn, Ph.D., P.E., 09/02/2025
 Analysis & Quality Review/Date

Consolidated-Undrained Triaxial Compression

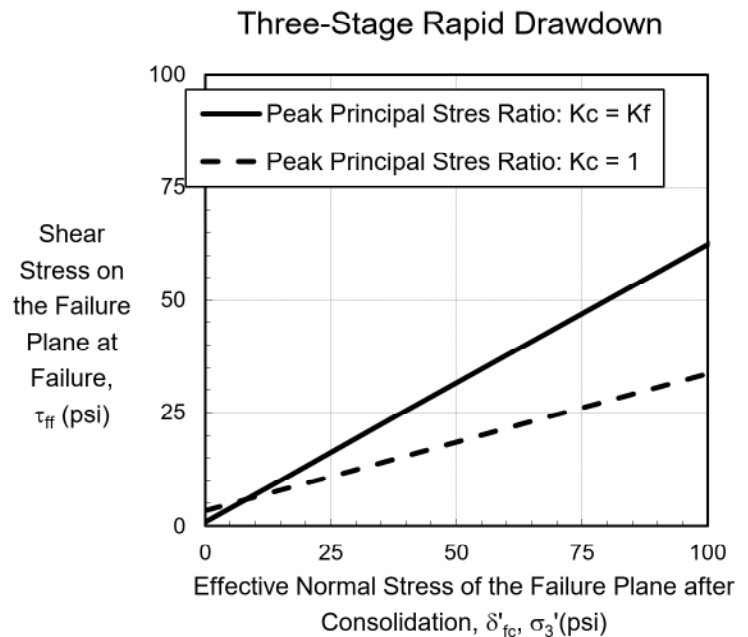
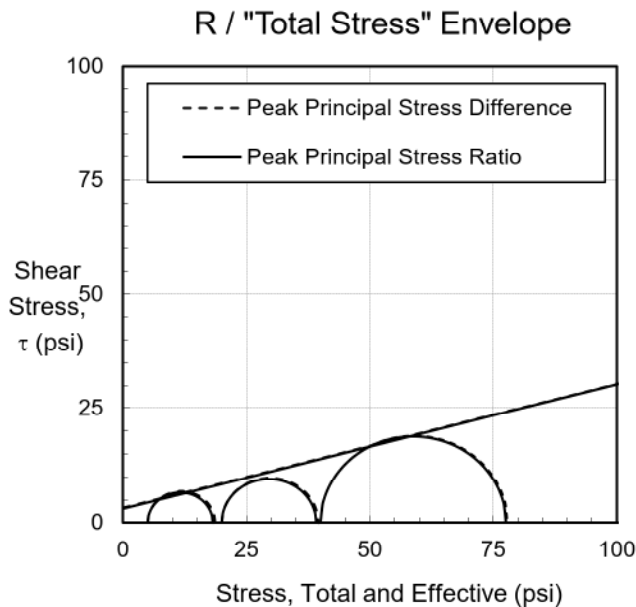
Client: Civil & Environmental Consultants, Inc.
 Project: 345-817.0004 AEP Kammer Plant
 Sample: A-7 (18'-20') ST-5

TRI Log #: 25-04143.9
 Test Method: ASTM D4767

R / "Total Stress" Envelope			
Failure Criterion: Peak Principal Stress		Difference, $(\sigma_1' - \sigma_3')_{\max}$	Ratio, $(\sigma_1' / \sigma_3')_{\max}$
Friction Angle (deg)	ϕ_R	15.1	15.2
Cohesion (psi)	c_R	3.2	3.0

Kc = Kf Envelope, Effective Stress Envelope (Duncan et al. 1990)			
Failure Criterion: Peak Principal Stress		Difference, $(\sigma_1' - \sigma_3')_{\max}$	Ratio, $(\sigma_1' / \sigma_3')_{\max}$
Effective Friction Angle (deg)	ϕ'	31.6	31.6
Effective Cohesion (psi)	c'	0.7	0.8

Kc = 1 (τ_{ff} vs σ'_{fc}) Envelope, Total Stress Envelope (Duncan et al. 1990)			
Failure Criterion: Peak Principal Stress		Difference, $(\sigma_1' - \sigma_3')_{\max}$	Ratio, $(\sigma_1' / \sigma_3')_{\max}$
Friction Angle (deg)	$d_{Kc=1}$	16.7	16.8
Cohesion (psi)	$\Psi_{Kc=1}$	3.6	3.4

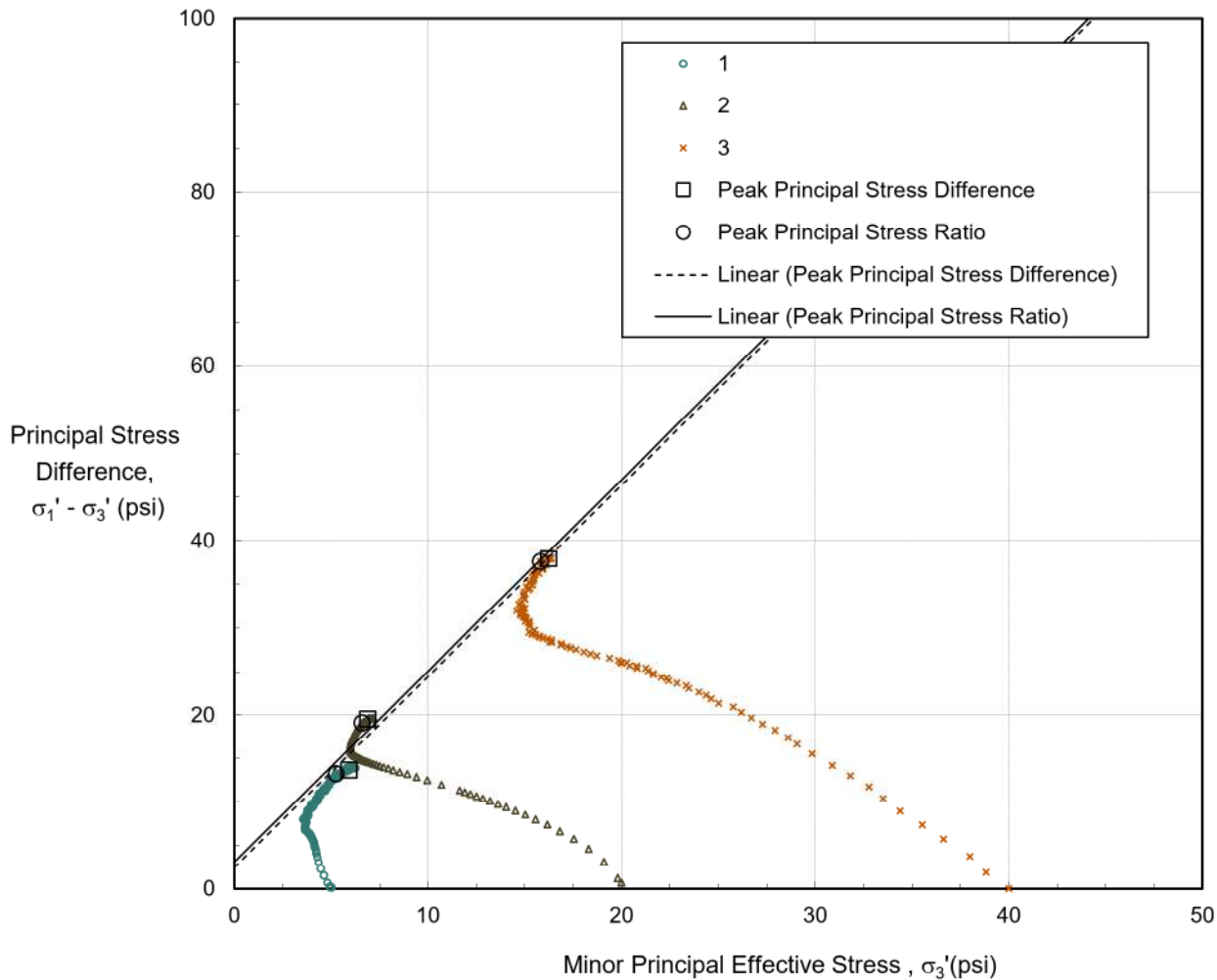


Consolidated-Undrained Triaxial Compression

Client: Civil & Environmental Consultants, Inc.
 Project: 345-817.0004 AEP Kammer Plant
 Sample: A-7 (18'-20') ST-5

TRI Log #: 25-04143.9
 Test Method: ASTM D4767

Modified Mohr-Coulomb



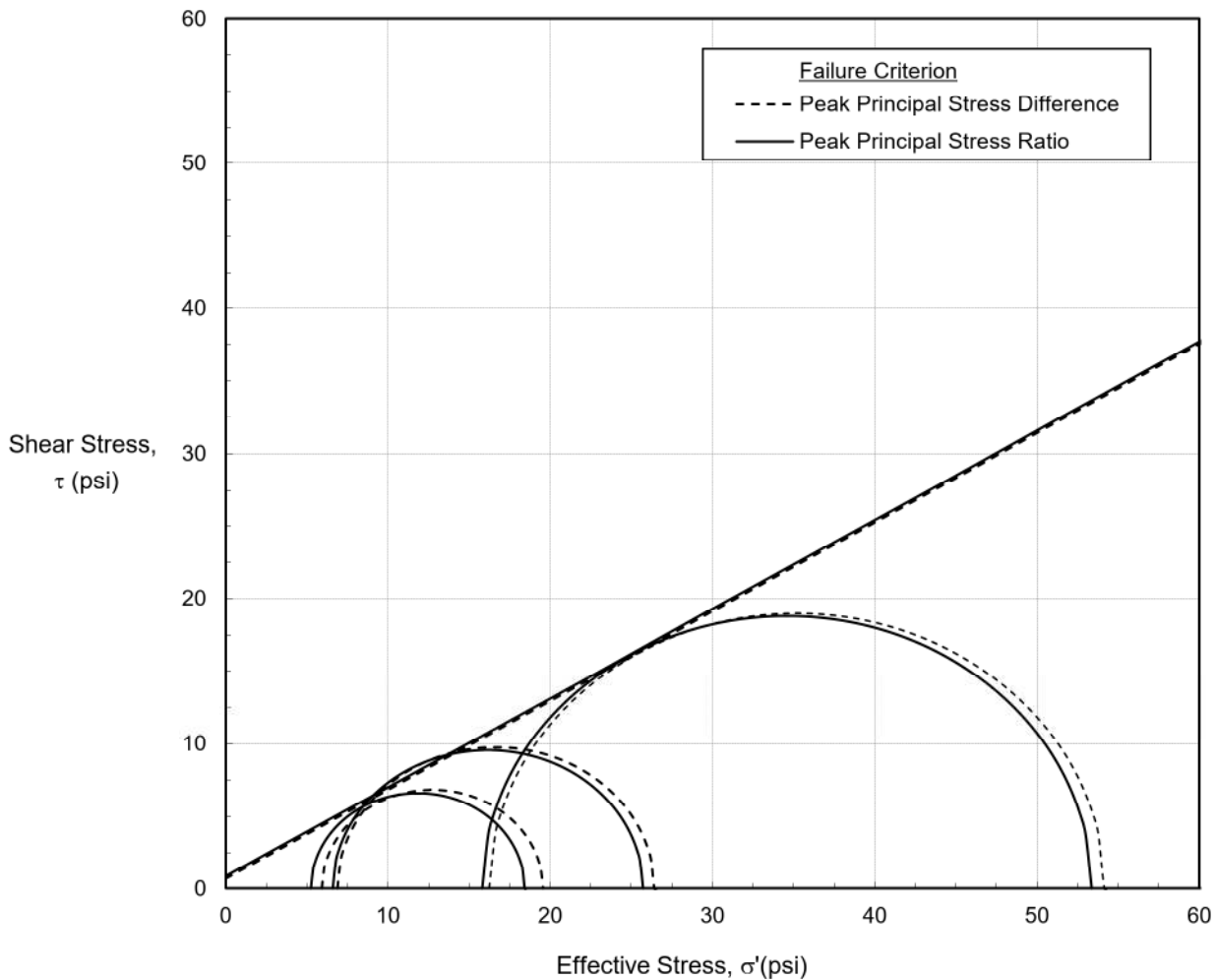
Failure Criterion: Peak Principal Stress	Difference, $(\sigma_1' - \sigma_3')_{max}$	Ratio, $(\sigma_1' / \sigma_3')_{max}$
Effective Friction Angle (deg)	31.6	31.6
Effective Cohesion (psi)	0.7	0.8

Consolidated-Undrained Triaxial Compression

Client: Civil & Environmental Consultants, Inc.
Project: 345-817.0004 AEP Kammer Plant
Sample: A-7 (18'-20') ST-5

TRI Log #: 25-04143.9
Test Method: ASTM D4767

Mohr-Coulomb



Failure Criterion: Peak Principal Stress	Difference, $(\sigma_1' - \sigma_3')_{\max}$	Ratio, $(\sigma_1' / \sigma_3')_{\max}$
Effective Friction Angle (deg)	31.6	31.6
Effective Cohesion (psi)	0.7	0.8

Consolidated-Undrained Triaxial Compression

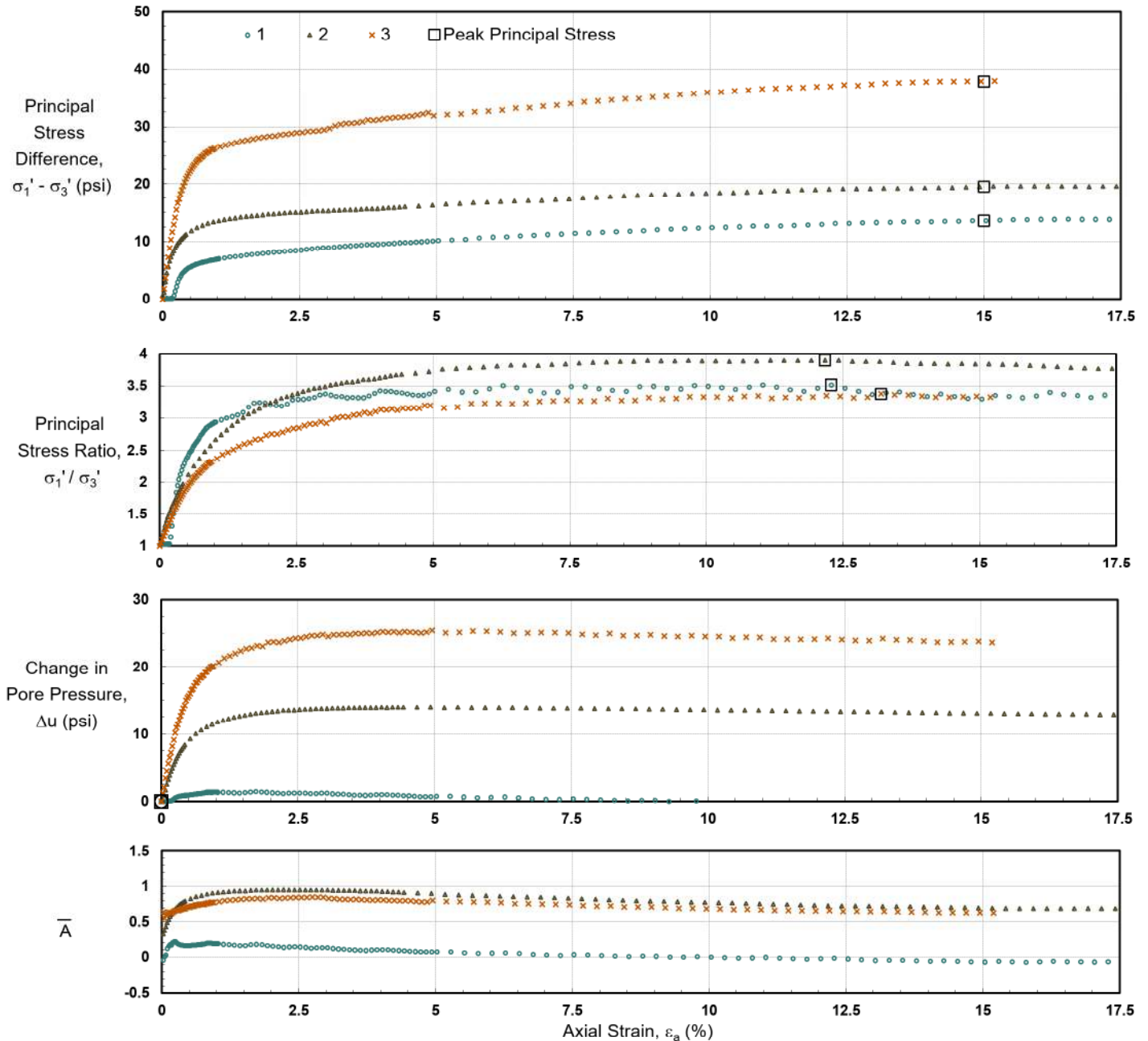
Client: Civil & Environmental Consultants, Inc.

Project: 345-817.0004 AEP Kammer Plant

Sample: A-7 (18'-20') ST-5

TRI Log #: 25-04143.9

Test Method: ASTM D4767

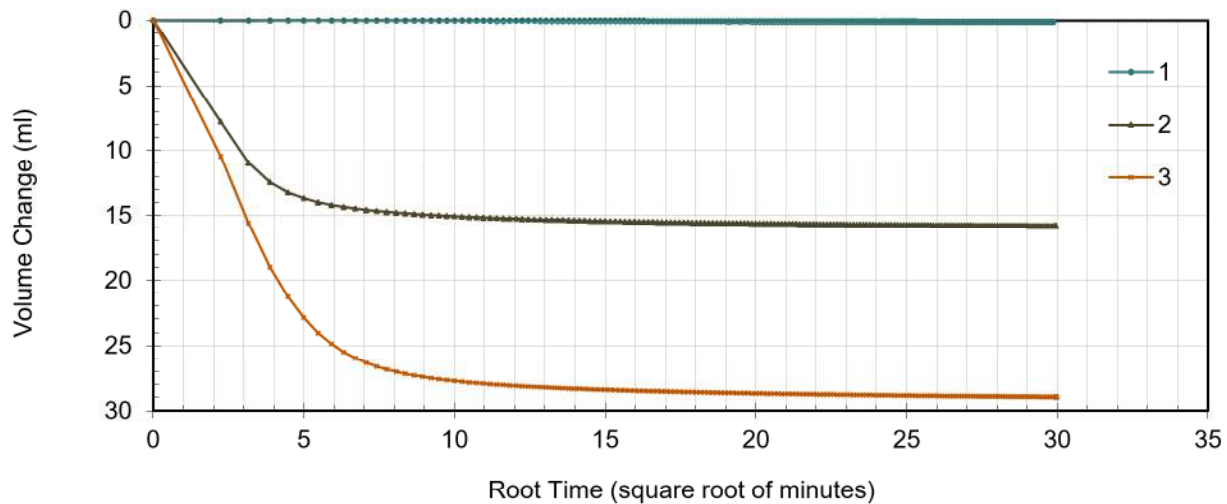
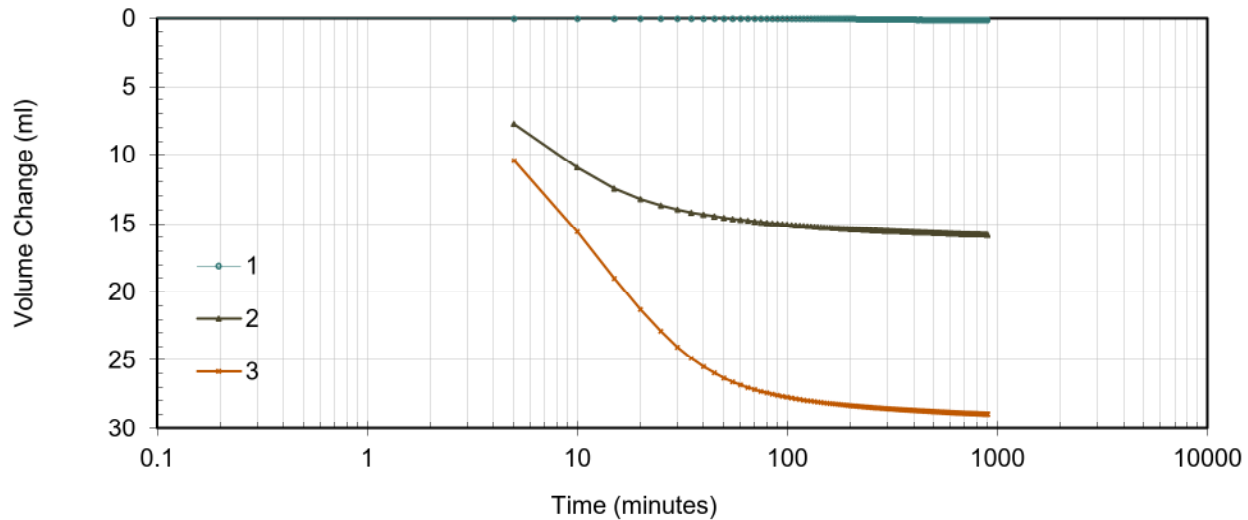


Consolidated-Undrained Triaxial Compression

Client: Civil & Environmental Consultants, Inc.
Project: 345-817.0004 AEP Kammer Plant
Sample: A-7 (18'-20') ST-5

TRI Log #: 25-04143.9
Test Method: ASTM D4767

Consolidation



PARTICLE-SIZE ANALYSIS OF SOILS - ASTM D422-63(2007)

Client	Civil & Environmental Consultants, Inc. (CEC)	Boring	MW-10
Client Project	345-817.0004 AEP Kammer Plant	Depth	8.5'-10.0'
Project No.	25-04143	Sample	SS-2
		Lab Sample	25-04143 -36

Sample Color: BROWN

USCS Group Name: WELL-GRADED GRAVEL WITH SILT AND SAND

Dry Prep: R58-11(2018)¹

USCS Group Symbol: GW-GM

USDA: LOAMY SAND

AASHTO: A-1-b (0)

MECHANICAL SIEVE								
Total Sample			Sieve Size	Nominal Opening, mm	Dry Wt, gm	Split Normalized		Project Specifications
Tare No.	88		3"	75	0	% Retained	% Finer	
Tare + WS., gm	394.38		2-1/2"	63	0	0.0%	100.0%	
Tare + DS., gm	385.73		2"	50	0	0.0%	100.0%	
Tare, gm	145.90		1-1/2"	37.5	0	0.0%	100.0%	
Total sample WC	3.6%		1"	25	48.56	20.2%	79.8%	
Total Sample Dry Wt, gm (-3")	240		3/4"	19	25.87	10.8%	69.0%	
Hygroscopic WC (-#10)			1/2"	12.5	10.8	4.5%	64.5%	
Tare No.	236		3/8"	9.5	6.40	2.7%	61.8%	
Tare + WS., gm	24.99		No. 4	4.75	30.43	12.7%	49.1%	
Tare + DS., gm	24.91		No. 10	2	37.50	15.6%	33.5%	
Tare, gm	16.37		No. 20	0.85	10.35	5.7%	27.8%	
Hygroscopic WC	0.94%		No. 40	0.425	13.89	7.7%	20.1%	
			No. 60	0.25	6.71	3.7%	16.4%	
-#10 Hydro/Sieve air dry wt.	60.64		No. 140	0.106	13.38	7.4%	9.0%	
Wt. of +#200 Sample, gm	46.21		No. 200	0.075	1.88	1.0%	8.0%	
HYDROMETER (-#10)								
Split Air Dry Wt	61.21	23.6					Specific Gravity	2.7
Hygroscopic WC	0.94%							Assumed
Corrected Dry wt	60.6		-#10 Dispersed 1min in Hamilton Beach Mixer				a Factor	0.9889
Elapsed Time (min.)	R Measured	Temp °C	Composite Correction	R Corrected	K Factor	Percent Finer (%)	Particle Diameter (mm)	Adjusted % Finer (%)
2	15.0	23.6	4.7	10.3	0.0129	16.8	0.0338	5.6%
5	11.5	23.6	4.7	6.8	0.0129	11.1	0.0218	3.7%
15	11.0	23.6	4.7	6.3	0.0129	10.3	0.0126	3.4%
30	10.5	23.7	4.6	5.9	0.0129	9.6	0.0090	3.2%
60	9.5	23.8	4.6	4.9	0.0129	8.0	0.0064	2.7%
250	8.5	23.9	4.6	3.9	0.0129	6.4	0.0031	2.1%
1440	7.0	23.9	4.6	2.4	0.0129	3.9	0.0013	1.3%
USCS SOIL CLASSIFICATION				USDA CLASSIFICATION				
Corrected For 100% Passing a 3" Sieve				Particle Size (mm)	Percent Finer (%)	Percent of Each Component (Material) (%)		Corrected Percent of -2.0 mm Material for USDA
% Gravel (-3" & +#4)	50.9	Silt=5.5% Clay=2.5%						
Coarse=31; Fine=19.9		D60, mm	8.61	100	100	Gravel	66.5	0
% Sand (-#4 & +#200)		D30, mm	1.19					
Coarse=15.6; Medium=13.4; Fine=12.1		D10, mm	0.12					
% Fines (-#200)		Cc	1.38					
% Plus #200 (-3")		Cu	72.37	2	33.5		Sand	26.7
USCS Description								
WELL-GRADED GRAVEL WITH SILT AND SAND								
USCS Group Symbol		Atterberg Limits Group Symbol						
GW-GM		NP - NON PLASTIC		0.05	6.8		Silt	5.1
Auxiliary Information		Wt Ret, gm	% Retained					
12" Sieve - 300 mm		0	0.0					
6" Sieve - 150 mm		0	0.0					
3" Sieve - 75 mm		0	0.0	USDA Classification				
LOAMY SAND								

Performed By: RH

Input Validation: MA

Reviewed By: BS

Date Tested: 9/8/2025

LIQUID LIMIT, PLASTIC LIMIT, AND PLASTICITY INDEX OF SOILS
ASTM D4318-17e1

Client	Civil & Environmental Consultants, Inc. (CEC)	Boring	MW-10
Client Project	345-817.0004 AEP Kammer Plant	Depth	8.5'-10.0'
Project No.	25-04143	Sample	SS-2
		Lab Sample	25-04143 -36

Soil Description: BROWN NON PLASTIC MATERIAL
 (-#40 Fraction)

AS-RECEIVED W.C.	SAMPLE SUMMARY																								
<table border="0" style="width: 100%;"> <tr><td style="width: 50%;">Tare Number</td><td style="width: 50%; text-align: right;">88</td></tr> <tr><td>Wt. Tare & WS, gm</td><td style="text-align: right;">394.38</td></tr> <tr><td>Wt. Tare & DS, gm</td><td style="text-align: right;">385.73</td></tr> <tr><td>Wt. Tare, gm</td><td style="text-align: right;">145.9</td></tr> <tr><td>Water Content, %</td><td style="text-align: right;">3.6</td></tr> </table>	Tare Number	88	Wt. Tare & WS, gm	394.38	Wt. Tare & DS, gm	385.73	Wt. Tare, gm	145.9	Water Content, %	3.6	<table border="0" style="width: 100%;"> <tr><td style="width: 50%;">Liquid Limit (LL), %</td><td style="width: 50%; text-align: right; color: green;">NA</td></tr> <tr><td>Plastic Limit (PL), %</td><td style="text-align: right; color: green;">NA</td></tr> <tr><td>Plasticity Index (PI)</td><td style="text-align: right; color: green;">NA</td></tr> <tr><td>USCS Group Symbol (-#40 Fraction)</td><td style="text-align: right; color: green;">NP</td></tr> <tr><td>USCS Group Name (-#40 Fraction)</td><td style="text-align: right; color: green;">NON PLASTIC</td></tr> <tr><td>Sample Color:</td><td style="text-align: right; color: green;">BROWN</td></tr> </table>	Liquid Limit (LL), %	NA	Plastic Limit (PL), %	NA	Plasticity Index (PI)	NA	USCS Group Symbol (-#40 Fraction)	NP	USCS Group Name (-#40 Fraction)	NON PLASTIC	Sample Color:	BROWN		
Tare Number	88																								
Wt. Tare & WS, gm	394.38																								
Wt. Tare & DS, gm	385.73																								
Wt. Tare, gm	145.9																								
Water Content, %	3.6																								
Liquid Limit (LL), %	NA																								
Plastic Limit (PL), %	NA																								
Plasticity Index (PI)	NA																								
USCS Group Symbol (-#40 Fraction)	NP																								
USCS Group Name (-#40 Fraction)	NON PLASTIC																								
Sample Color:	BROWN																								
PLASTIC LIMIT	LIQUID LIMIT																								
<table border="0" style="width: 100%;"> <tr><td style="width: 50%;">Points Run</td><td style="width: 50%; text-align: right;">0 Non-Plastic</td></tr> <tr><td>Tare Number</td><td></td></tr> <tr><td>Wt. Tare & WS, gm</td><td></td></tr> <tr><td>Wt. Tare & DS, gm</td><td></td></tr> <tr><td>Wt. Tare, gm</td><td></td></tr> <tr><td>Water Content, %</td><td></td></tr> </table>	Points Run	0 Non-Plastic	Tare Number		Wt. Tare & WS, gm		Wt. Tare & DS, gm		Wt. Tare, gm		Water Content, %		<table border="0" style="width: 100%;"> <tr><td style="width: 50%;">Points Run</td><td style="width: 50%; text-align: right;">0 Non-Plastic</td></tr> <tr><td>Tare Number</td><td></td></tr> <tr><td>Wt. Tare & WS, gm</td><td></td></tr> <tr><td>Wt. Tare & DS, gm</td><td></td></tr> <tr><td>Wt. Tare, gm</td><td></td></tr> <tr><td>Water Content, %</td><td></td></tr> </table>	Points Run	0 Non-Plastic	Tare Number		Wt. Tare & WS, gm		Wt. Tare & DS, gm		Wt. Tare, gm		Water Content, %	
Points Run	0 Non-Plastic																								
Tare Number																									
Wt. Tare & WS, gm																									
Wt. Tare & DS, gm																									
Wt. Tare, gm																									
Water Content, %																									
Points Run	0 Non-Plastic																								
Tare Number																									
Wt. Tare & WS, gm																									
Wt. Tare & DS, gm																									
Wt. Tare, gm																									
Water Content, %																									
PLASTICITY CHART	FLOW CURVE																								

Performed By: RH

Input Validation: MA

Reviewed By: BS

Date Tested: 9/8/2025

PARTICLE-SIZE ANALYSIS OF SOILS - ASTM D422-63(2007)

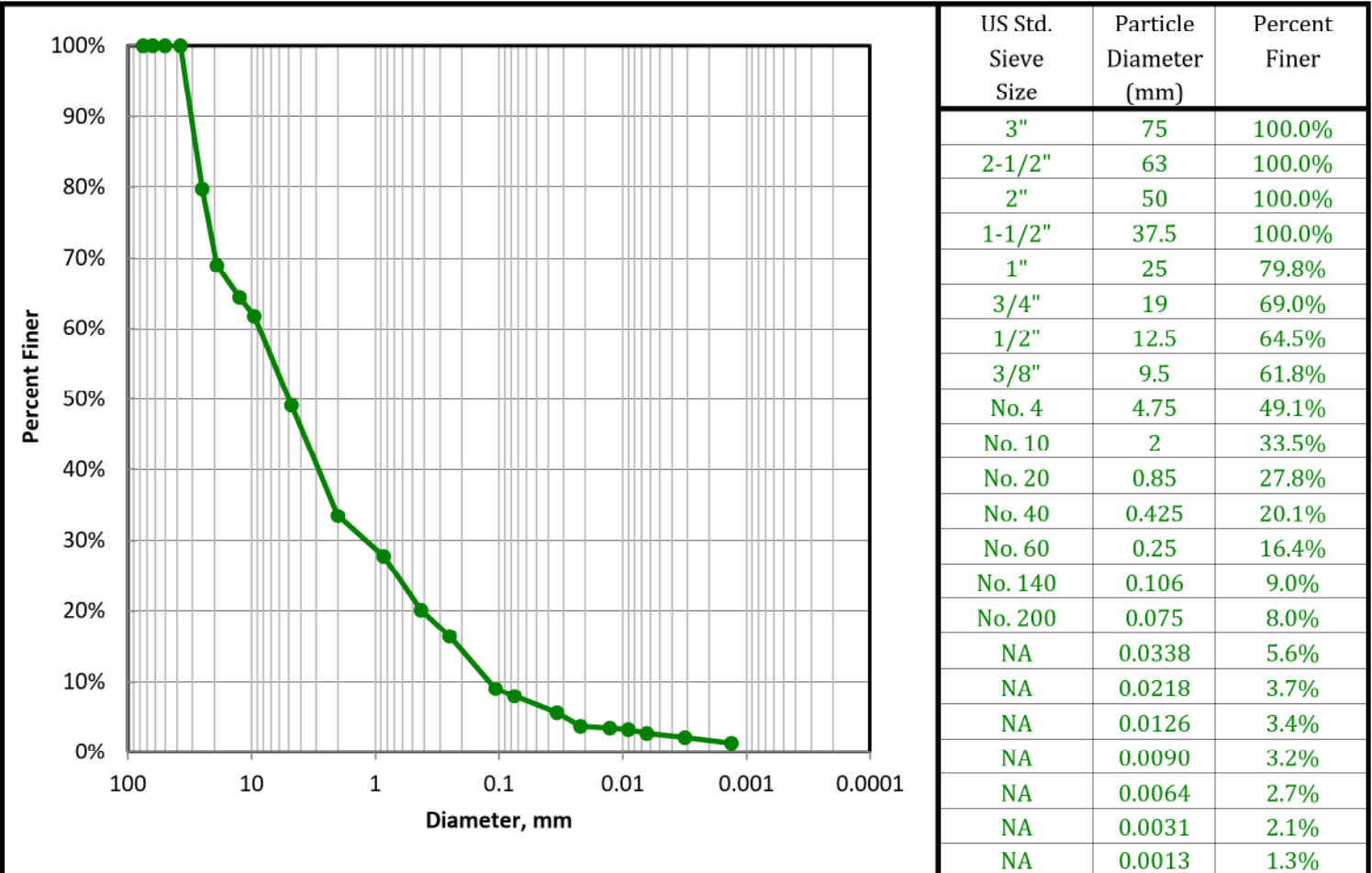
Client	Civil & Environmental Consultants, Inc. (CEC)	Boring	MW-10
Client Project	345-817.0004 AEP Kammer Plant	Depth	8.5'-10.0'
Project No.	25-04143	Sample	SS-2
		Lab Sample	25-04143 -36

Sample Color: **BROWN**

USCS Group Name: **WELL-GRADED GRAVEL WITH SILT AND SAND**

USCS Group Symbol: **GW-GM** USDA: **LOAMY SAND**

AASHTO: **A-1-b (0)**



USCS SOIL CLASSIFICATION				USDA CLASSIFICATION					
Corrected For 100% Passing a 3" Sieve				Particle Size (mm)	Percent Finer (%)	Percent of Each Component (Material) (%)		Corrected Percent of -2.0 mm Material for USDA	
% Gravel (-3" & + #4)		50.9	Silt=5.5% Clay=2.5%						
Coarse=31; Fine=19.9			D60, mm			8.613	Gravel	66.5	0
% Sand (-#4 & + #200)		41.1	D30, mm			1.189			
Coarse=15.6; Medium=13.4; Fine=12.1			D10, mm			0.119			
% Fines (-#200)		8.0	Cc	1.380	100	100	Sand	26.7	79.8
% Plus #200 (-3")		92.0	Cu	72.370	2	33.5			
USCS Description				0.05	6.8				
WELL-GRADED GRAVEL WITH SILT AND SAND				0.002	1.7				
USCS Group Symbol		Atterberg Limits Group Symbol		USDA Classification		LOAMY SAND		5.1	
GW-GM		NP - NON PLASTIC							
Auxiliary Information		Wt Ret, gm	% Retained						% Finer
12" Sieve - 300 mm		0	0.0						100.0
6" Sieve - 150 mm		0	0.0	100.0					
3" Sieve - 75 mm		0	0.0	100.0					

USDA CLASSIFICATION CHART

Client
Client Project
Project No.

Civil & Environmental Consultants, Inc. (CEC)
345-817.0004 AEP Kammer Plant
25-04143

Boring MW-10
Depth 8.5'-10.0'
Sample SS-2
Lab Sample 25-04143 -36

Sample Color: **BROWN**

USCS Group Name: **WELL-GRADED GRAVEL WITH SILT AND SAND**

USCS Group Symbol: **GW-GM**

USDA: **LOAMY SAND**

AASHTO: **A-1-b (0)**

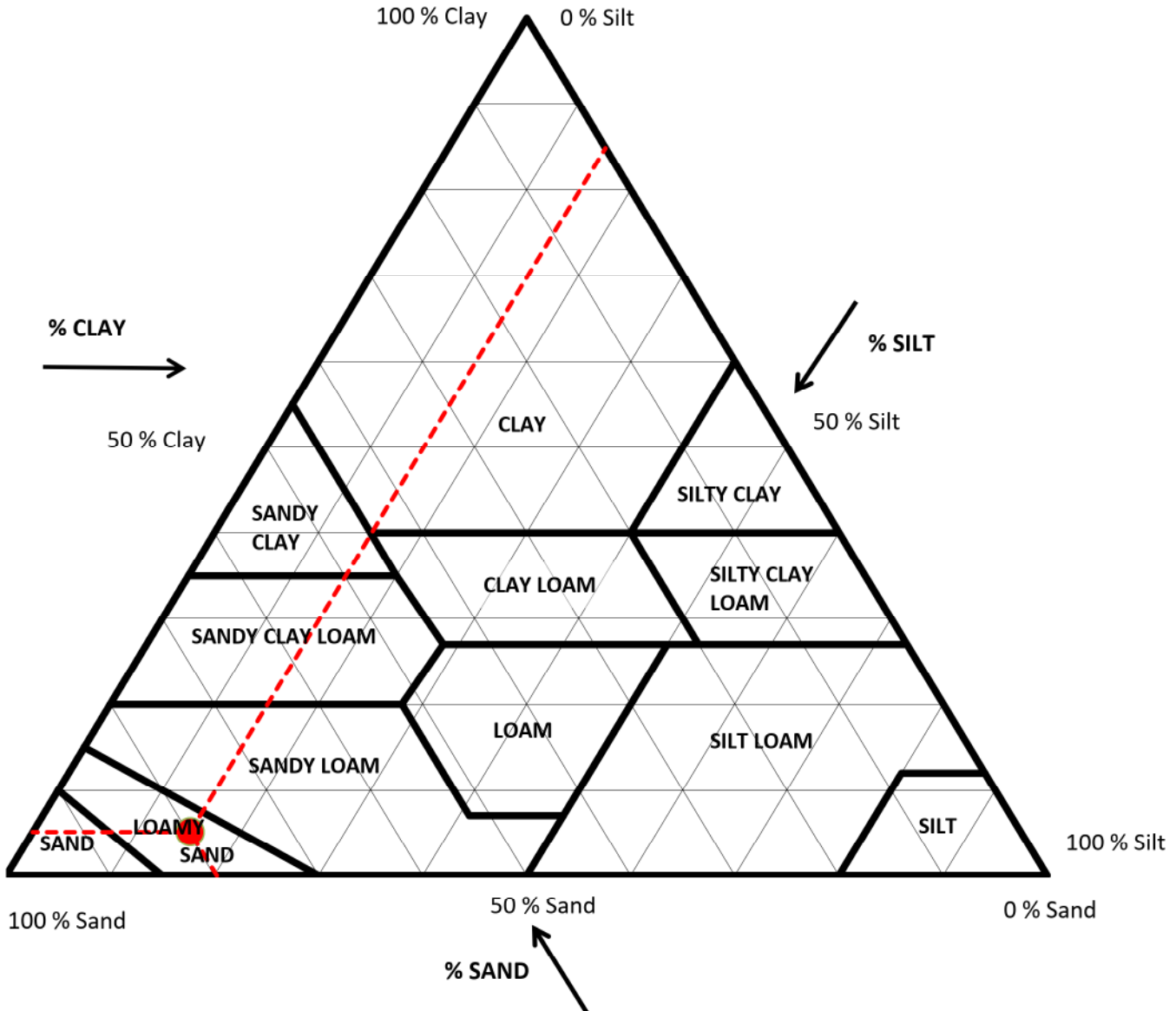
Corrected for 0% gravel

Percent Gravel, %	0.0
Percent Sand, %	79.8
Percent Silt, %	15.1
Percent Clay, %	5.1

Sand Subsizes

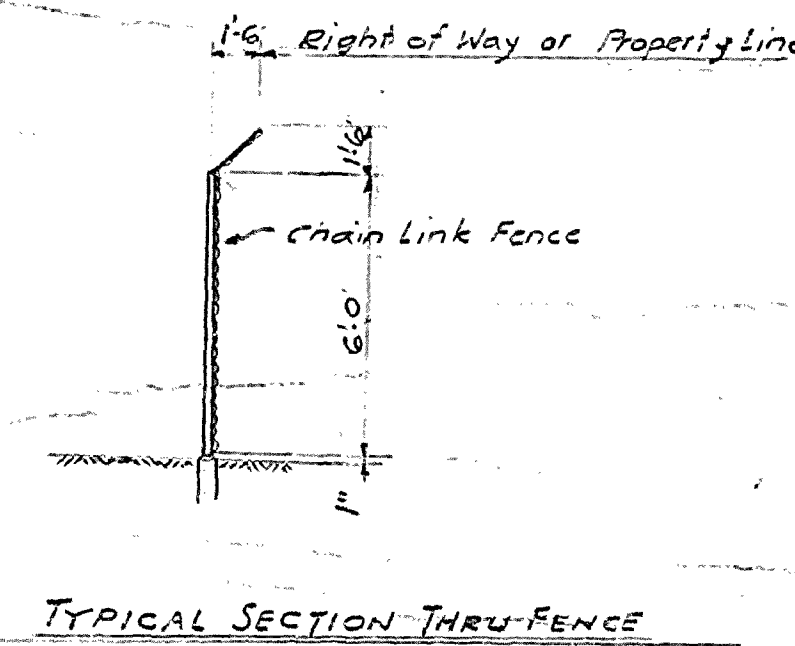
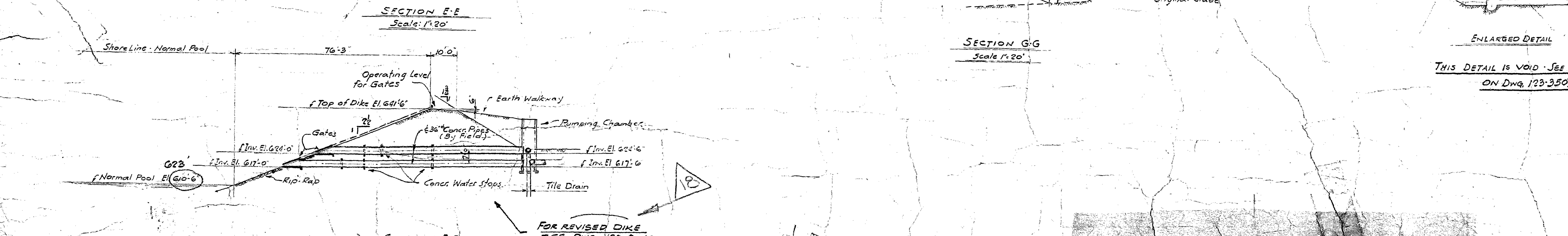
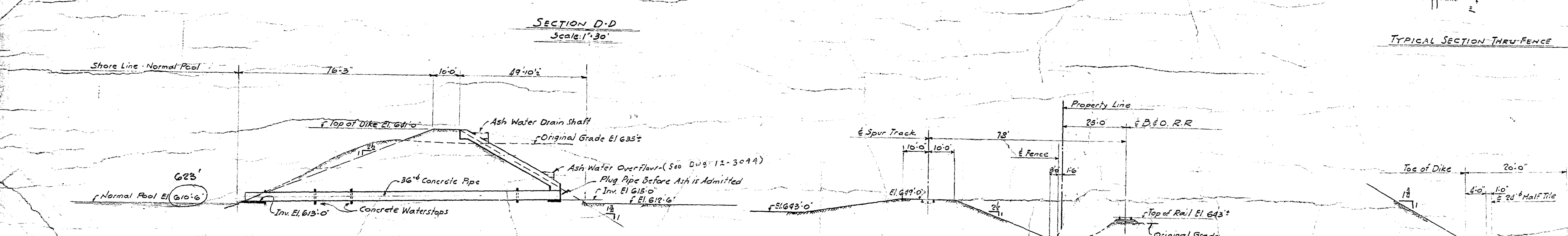
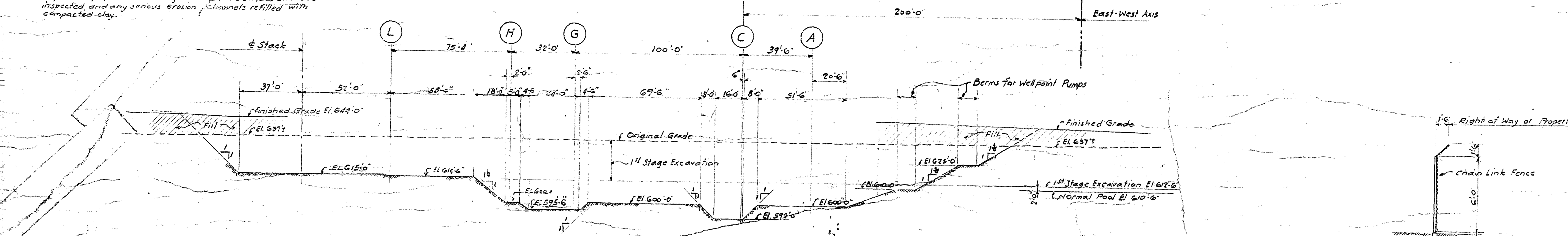
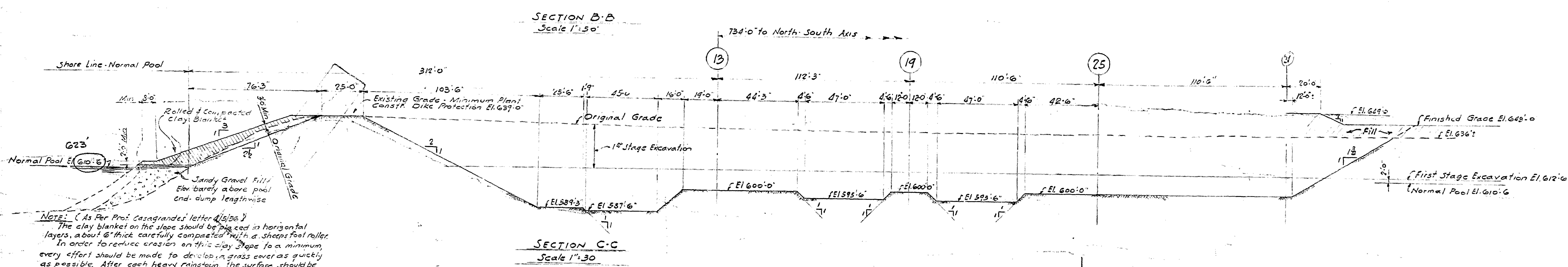
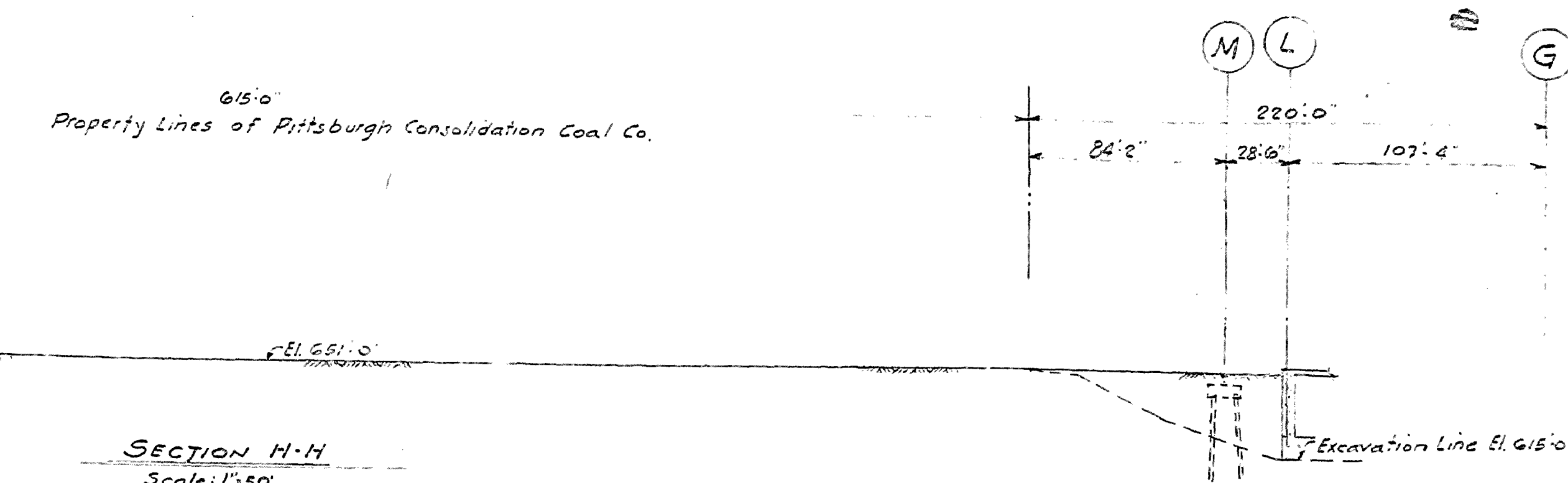
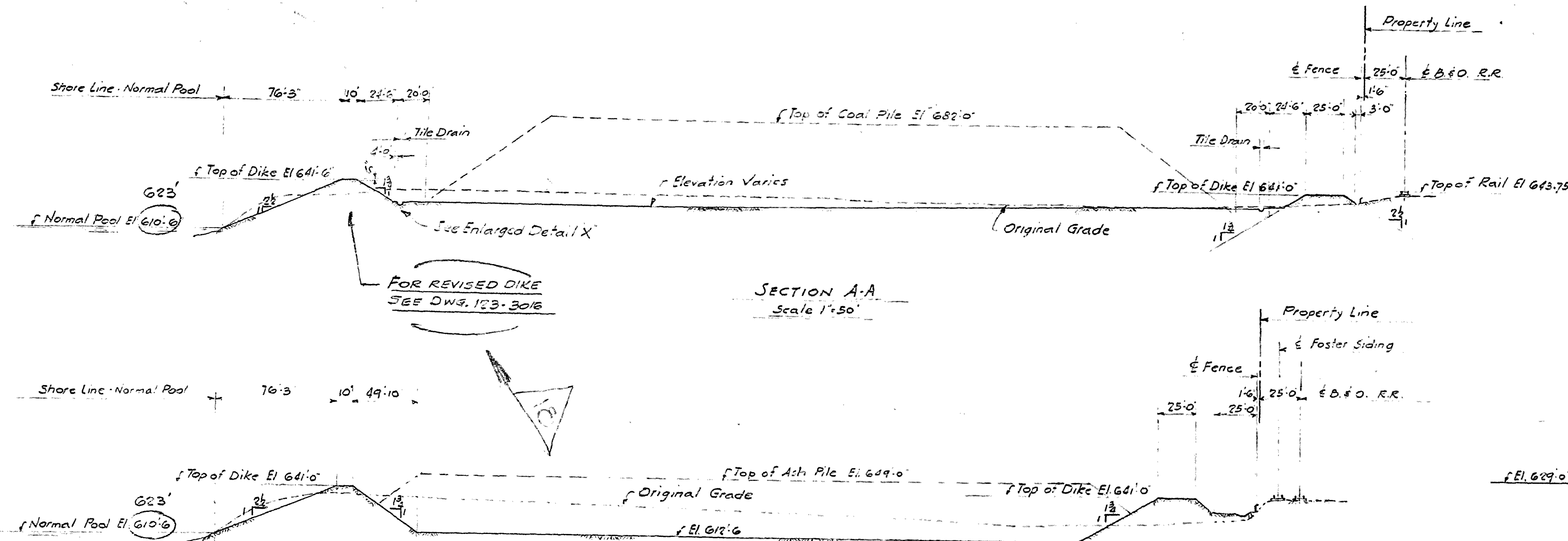
Corrected Percentages

Very Coarse Sand; 2-1	13.8
Coarse Sand; 1-0.5	20.8
Medium Sand; 0.5-0.25	16.4
Fine Sand; 0.25-0.1	22.6
Very Fine Sand; 0.1-0.05	6.1
Total	79.8



ATTACHMENT C

DESIGN DRAWINGS



SECTIONS LOCATED ON DWG. 12-3004 & 12-3016

NO.	DATE	DESCRIPTION	BY	CHKD.
1	12-3005	General Revision	W.S.	
2	12-3005	General Revision	W.S.	
3	12-3005	General Revision	W.S.	
4	12-3005	General Revision	W.S.	
5	12-3005	General Revision	W.S.	
6	12-3005	General Revision	W.S.	
7	12-3005	General Revision	W.S.	
8	12-3005	General Revision	W.S.	
9	12-3005	General Revision	W.S.	
10	12-3005	General Revision	W.S.	
11	12-3005	General Revision	W.S.	
12	12-3005	General Revision	W.S.	
13	12-3005	General Revision	W.S.	
14	12-3005	General Revision	W.S.	
15	12-3005	General Revision	W.S.	
16	12-3005	General Revision	W.S.	
17	12-3005	General Revision	W.S.	
18	12-3005	General Revision	W.S.	
19	12-3005	General Revision	W.S.	
20	12-3005	General Revision	W.S.	

REVISIONS

UNITS 1/2

EXCAVATION PLAN

SECTIONS & DETAILS

OHIO POWER & LIGHT

KAMMPP

CRESAP, W.E.

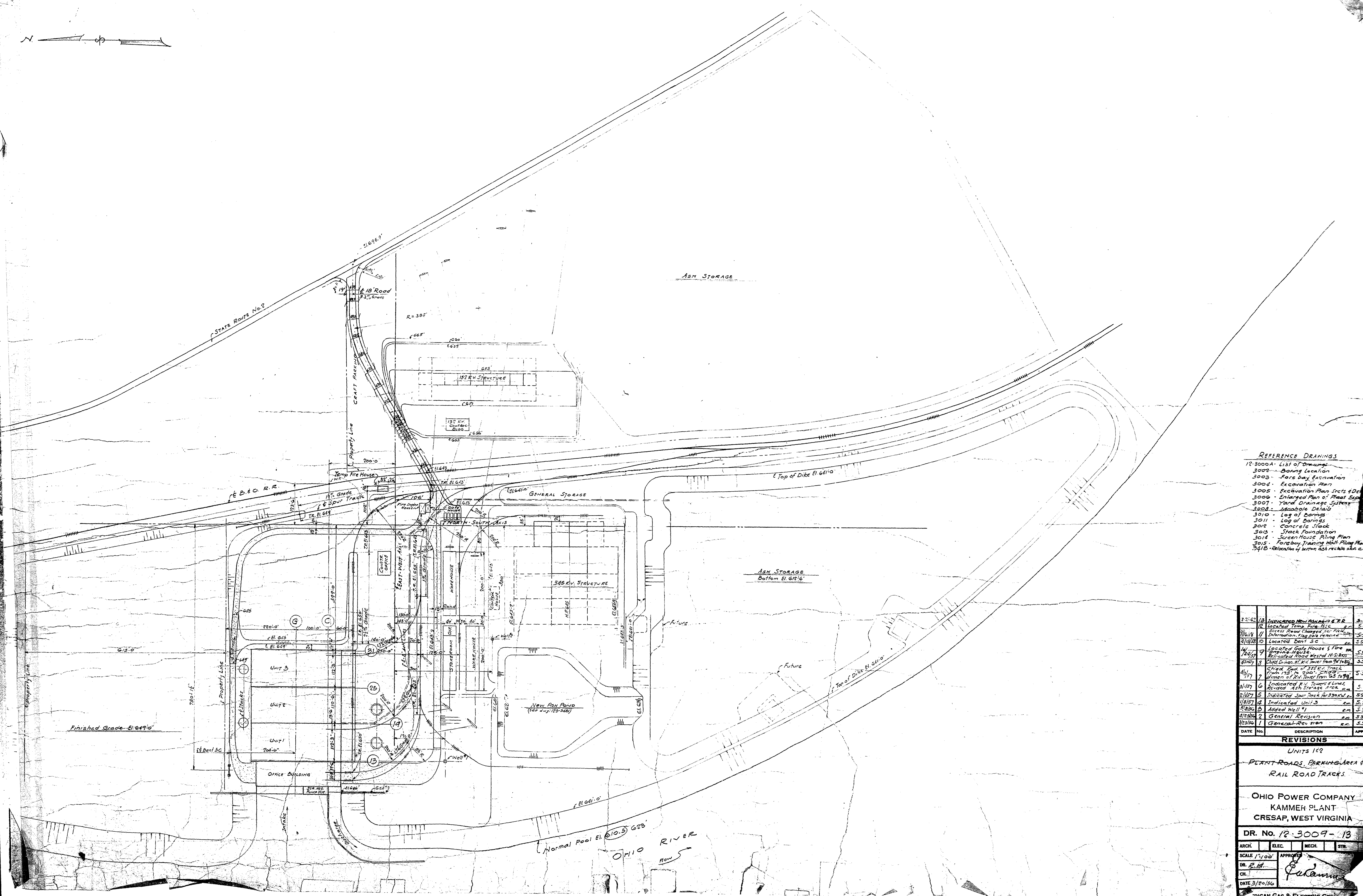
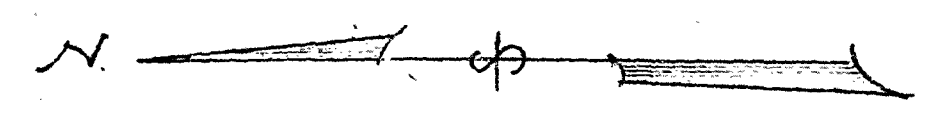
DR. No. 12-3005

ARCH. ELEC. MECH.

SCALE: AS SHOWN

DATE: 12-3005

AMERICAN GAS & ELECTRIC



- REFERENCE DRAWINGS**
- 12-3000A - List of Drawings
 - 3002 - Darning location
 - 3003 - Fore bay excavation
 - 3004 - Excavation Plan
 - 3005 - Excavation Plan Sects & Det
 - 3006 - Enlarged Plan of Plant Area
 - 3007 - Yard Drainage System
 - 3008 - Macabole Detail
 - 3010 - Log of Darnings
 - 3011 - Log of Darnings
 - 3012 - Concrete Slab
 - 3013 - Stack Foundation
 - 3014 - Screen House Piling Plan
 - 3015 - Forebay Training Wall Piling Plan
 - 3016 - Location of bottom ash reclaim area

DATE	NO.	DESCRIPTION	APPROVED
12/2/53	13	Indicated New Ash Pond & R.R.	S.S.
1/10/54	14	Located Time Pile Base	S.S.
1/10/54	15	Revised Pond Layout, 10' from	S.S.
4/15/54	16	Information, Flag pole removed	S.S.
4/15/54	17	Located Ditch S.C.	S.S.
4/15/54	18	Located Gully House & Fire	S.S.
4/15/54	19	Engine House	S.S.
4/15/54	20	Revised Road Detail N.E. 300'	S.S.
4/15/54	21	Shed End of 345 KV Track	S.S.
4/15/54	22	Shed 175' in 200' shed	S.S.
4/15/54	23	Shed 175' in 200' shed	S.S.
4/15/54	24	Indicated R.V. Tower Lines	S.S.
4/15/54	25	Revised Ash Storage Area	S.S.
4/15/54	26	Indicated Spur Track for 345 KV	S.S.
4/15/54	27	Indicated Unit 3	S.S.
4/15/54	28	Added Well 19	S.S.
4/15/54	29	General Revision	S.S.
4/15/54	30	General Revision	S.S.

REVISIONS

UNITS 1 & 2

PLANT ROADS, PARKING AREA & RAIL ROAD TRACKS

OHIO POWER COMPANY
KAMMER PLANT
CRESAP, WEST VIRGINIA

DR. No. 12-3009-13

ARCH.	ELEC.	MECH.	STR.
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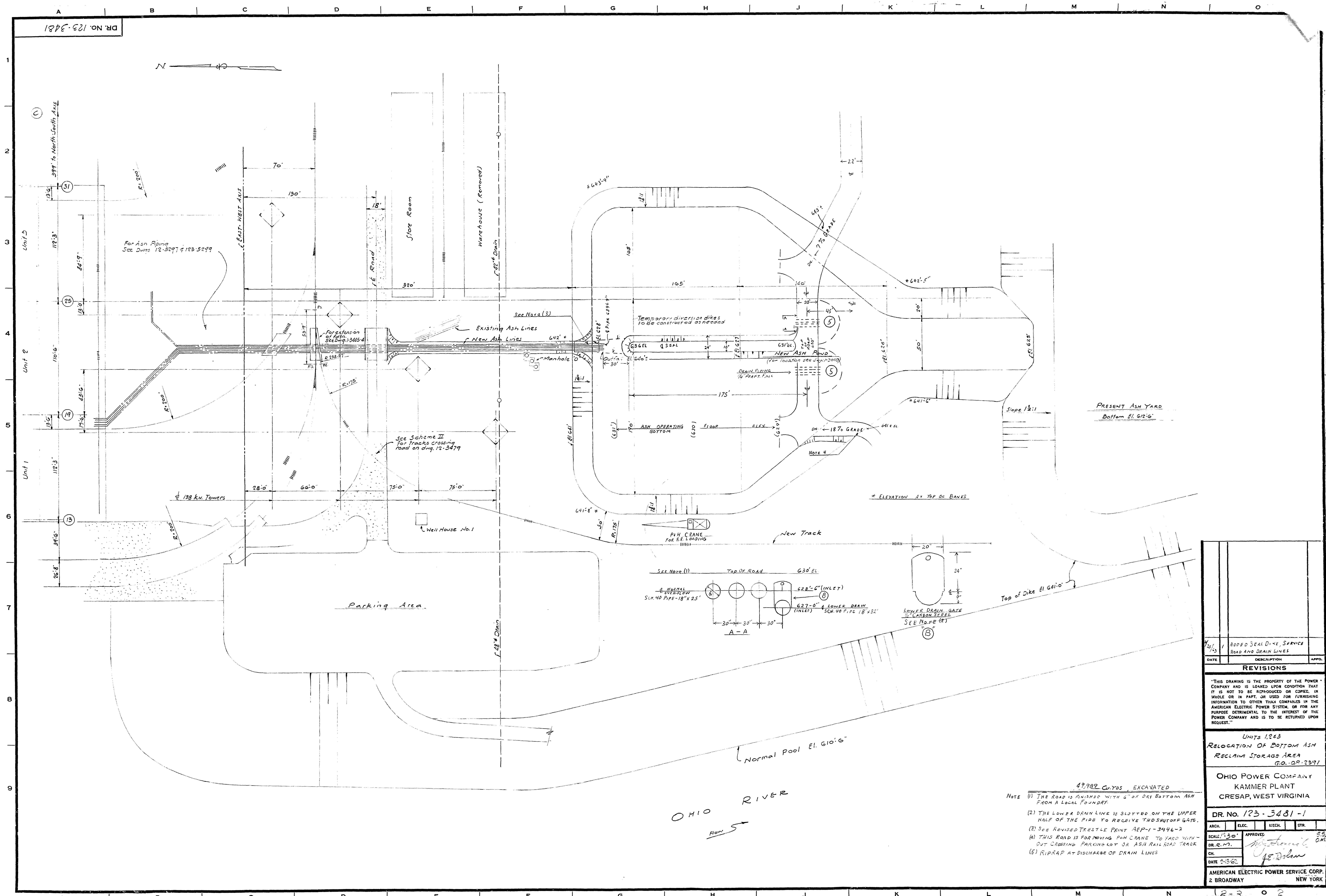
SCALE 1/100'

DATE 3/5/56

APPROVED

DATE 3/5/56

TRICAN GAS & ELECTRIC SERVICE



REVISIONS			
DATE	DESCRIPTION	APPROVED	BY
4/21/53	ADDED SEAL DINE SERVICE ROAD AND DRAIN LINES		

THIS DRAWING IS THE PROPERTY OF THE POWER COMPANY AND IS LOANED UPON CONDITION THAT IT IS NOT TO BE REPRODUCED OR COPIED, IN WHOLE OR IN PART, OR USED FOR FURNISHING INFORMATION TO OTHER THAN COMPANIES IN THE AMERICAN ELECTRIC POWER SYSTEM, OR FOR ANY PURPOSE DETRIMENTAL TO THE INTEREST OF THE POWER COMPANY AND IS TO BE RETURNED UPON REQUEST.

UNITS 1223
RELOCATION OF BOTTOM ASH
RECLAIM STORAGE AREA
G.O. 90-2391

OHIO POWER COMPANY
KAMMER PLANT
CRESAP, WEST VIRGINIA

DR. NO. 123-3481-1

ARCH.	ELEC.	MECH.	STR.

SCALE: 1"=30'

APPROVED: *[Signature]*

CH. *[Signature]*

DATE: 2-13-62

AMERICAN ELECTRIC POWER SERVICE CORP.
2 BROADWAY
NEW YORK

- 47,982 CUBIC YDS. EXCAVATED
- NOTE (1) THE ROAD IS FINISHED WITH 6" OF DRY BOTTOM ASH FROM A LOCAL FOUNDRY.
- (2) THE LOWER DRAIN LINE IS SLOTTED ON THE UPPER HALF OF THE PIPE TO RECEIVE THE SHUT OFF GATE.
- (3) SEE REVISED TRESTLE PRINT AEP-1-3946-3
- (4) THIS ROAD IS FOR MOVING P.H. CRANE TO YARD WITH-OUT CROSSING PARKING LOT OR ASH RAIL ROAD TRACK
- (5) RIPRAP AT DISCHARGE OF DRAIN LINES

ALL CONCRETE MATERIALS AND WORKMANSHIP SHALL CONFORM TO THE A.C.I. & C.E. SPECIFICATIONS FROM DIMENSIONS GIVEN FOR REINFORCING STEEL ARE TO CENTER LINE OF WALL.

CONSTRUCTION JOINTS MAY BE OMITTED WITH THE APPROVAL OF THE SUPERVISING ENGINEER. PROVISIONS FOR THE FORMATION OF JOINTS SHALL BE MADE BY THE CONTRACTOR. JOINTS SHALL BE MADE IN SUCH A MANNER AS TO RESULT IN THE CONCRETE BEING A SINGLE UNIT.

UNLESS PERMITTED BY THE SUPERVISING ENGINEER, CONSTRUCTION JOINTS SHALL NOT BE MADE IN THE FOLLOWING PLACES:

ALL EXPOSED EDGES SHALL HAVE A FINISH CONFORMING TO THE A.C.I. & C.E. SPECIFICATIONS. REINFORCING STEEL SHALL BE PLACED IN SUCH A MANNER AS TO RESULT IN THE CONCRETE BEING A SINGLE UNIT.

LIST OF MATERIALS

CONCRETE 27 Cu. Yds.
HANDRAIL BY LOGAN G. DPKX-4522
MISC STEEL BY ESCO 1000 1151
GRATING BY 500 SFL 500-40
DPKX-4522

REFERENCE DRAWINGS

EXCAV. PLAN 12-3004
UNITS 1 & 2 12-3005
REINFORCING 12-3005
F.A. PIPE DISCHARGE TRUSTLE 1-3446

REVISIONS

UNITS 1 & 2
FLY ASH DRAINAGE SHAFT
MASONRY

OHIO POWER COMPANY
KAMMER PLANT
CRESAP, WEST VIRGINIA

DR. No. 12-3044

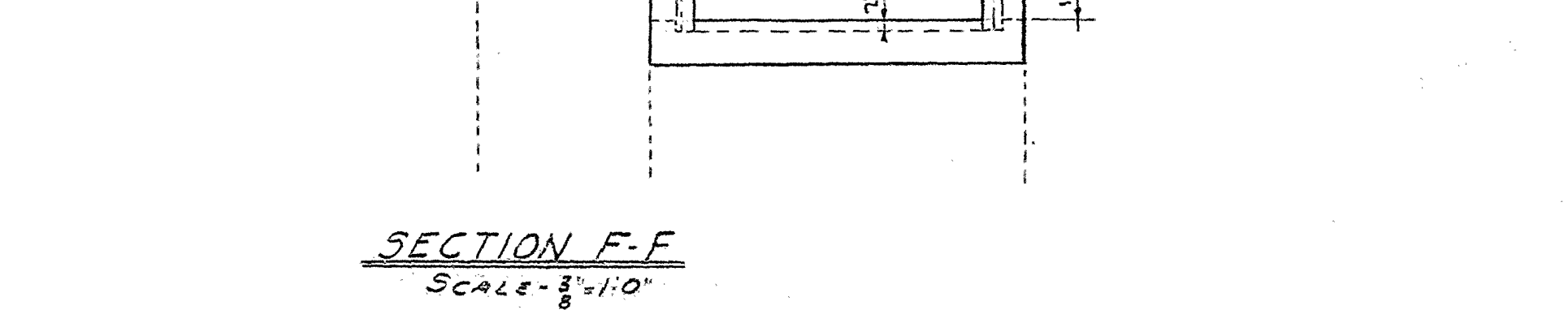
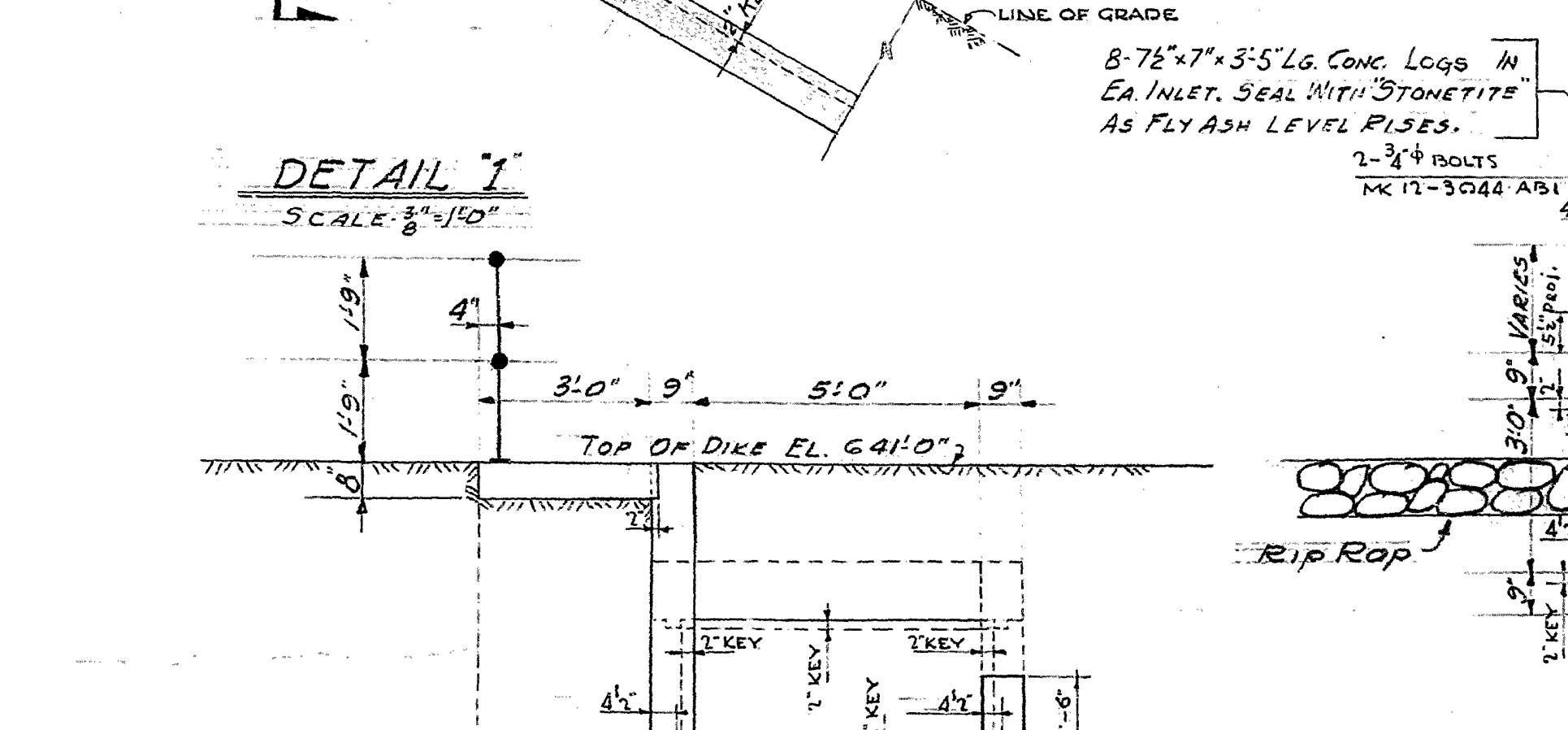
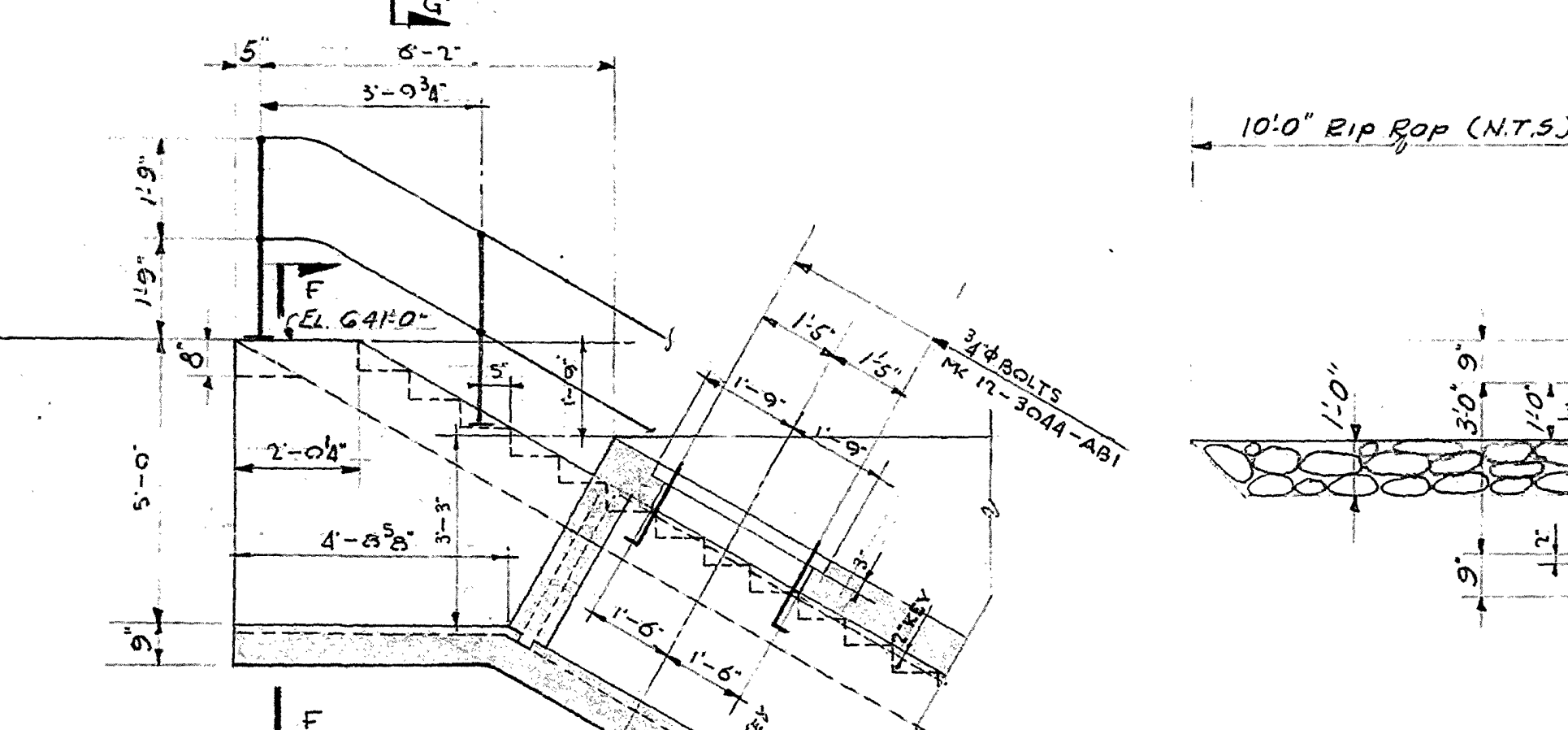
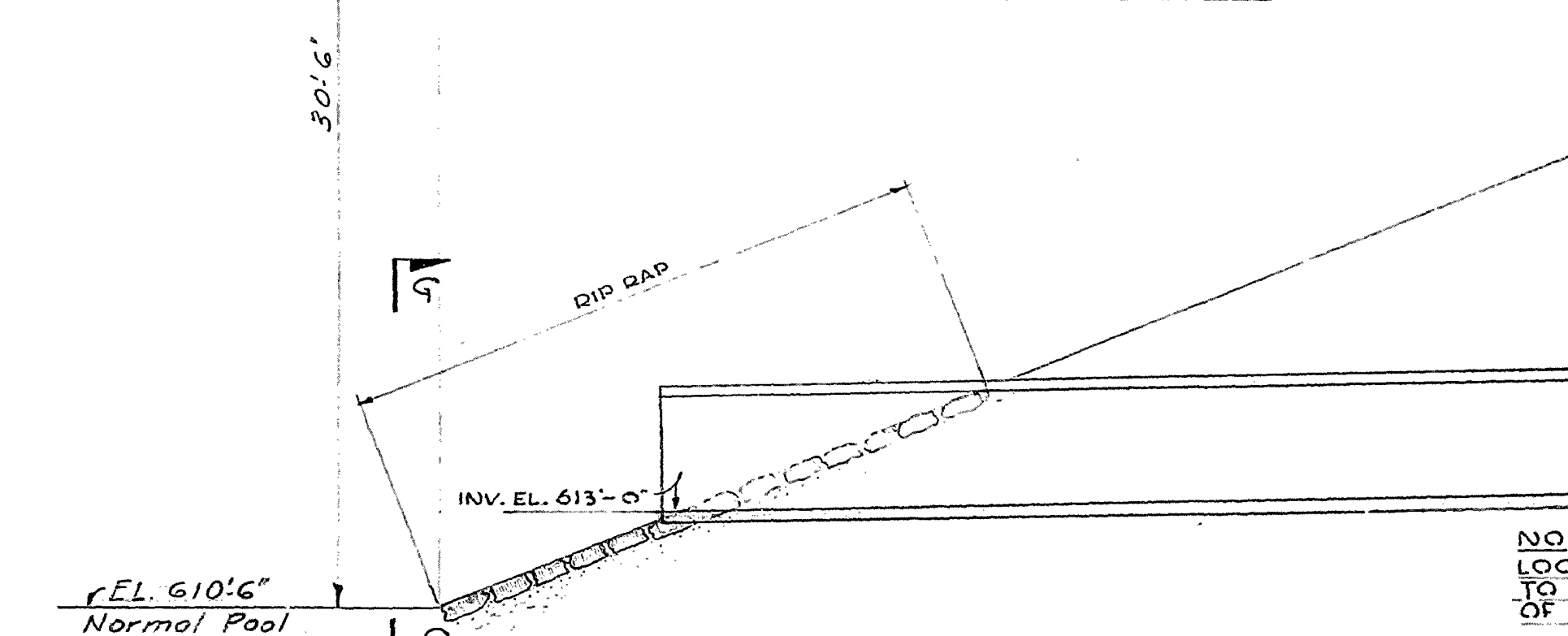
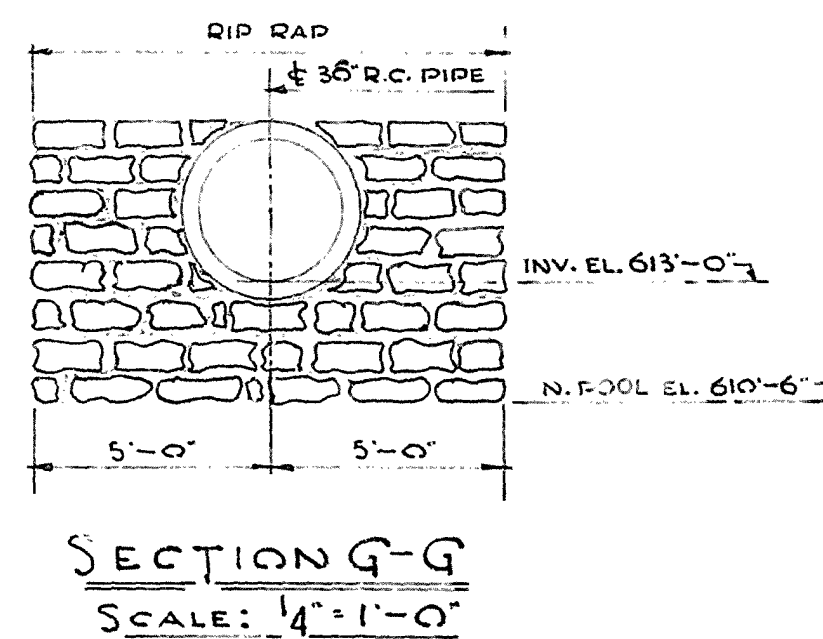
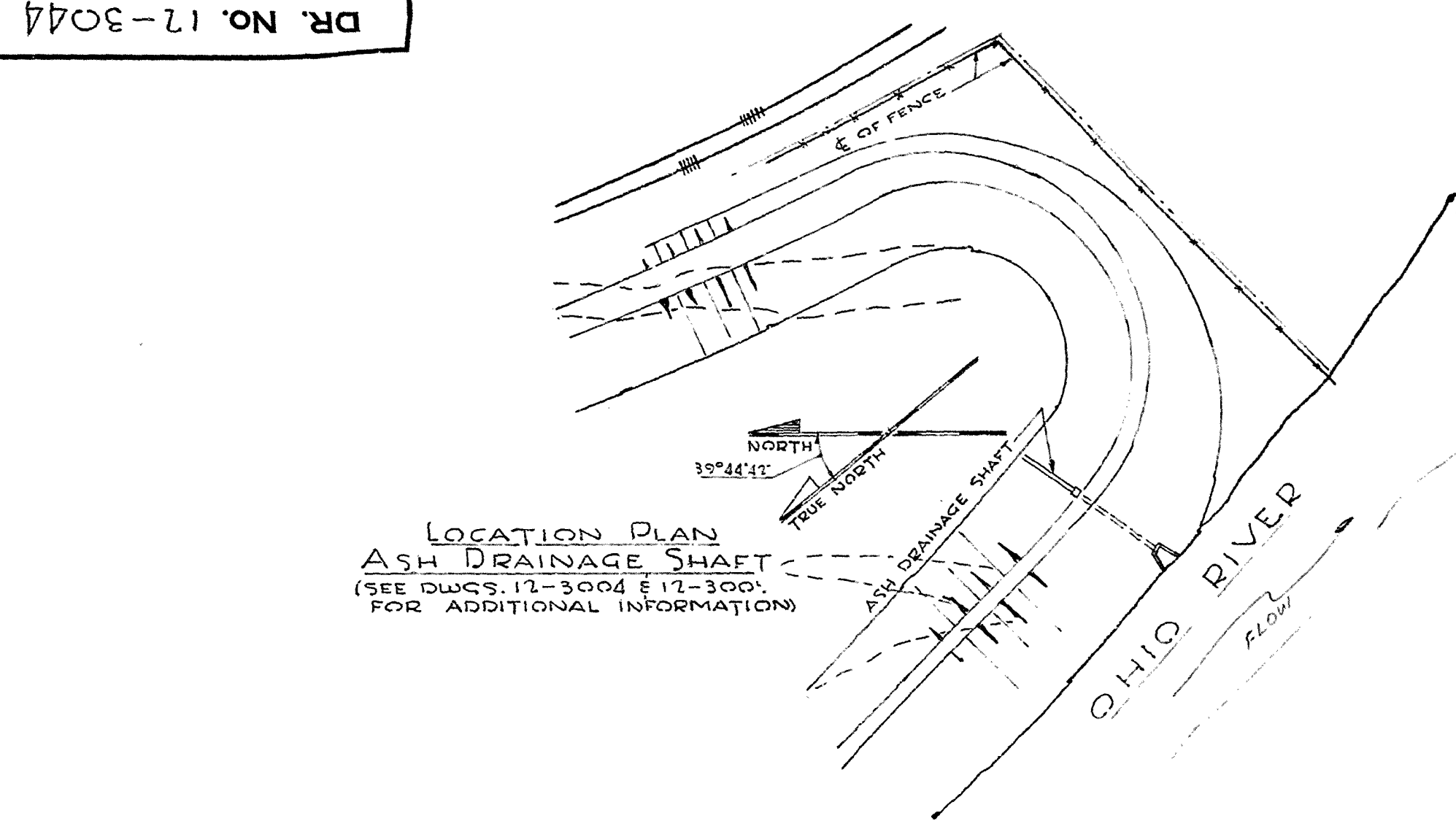
ARCH. ELEC. MECH. STR.

SCALE AS SHOWN APPROVED

DR. W.B. CH. 9-10 DATE 7-25-57

AMERICAN GAS & ELECTRIC SERVICE CORP.
30 CHURCH STREET NEW YORK

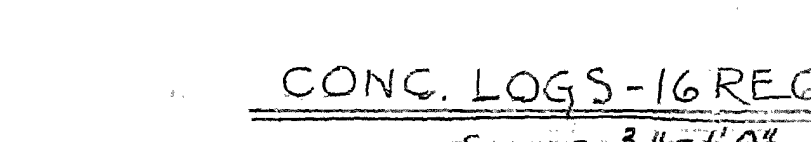
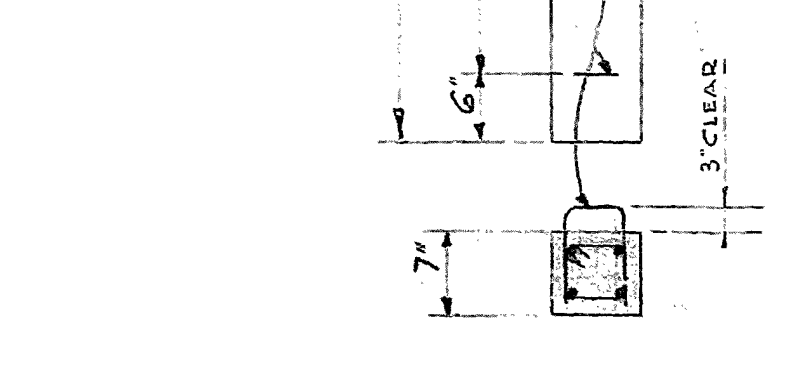
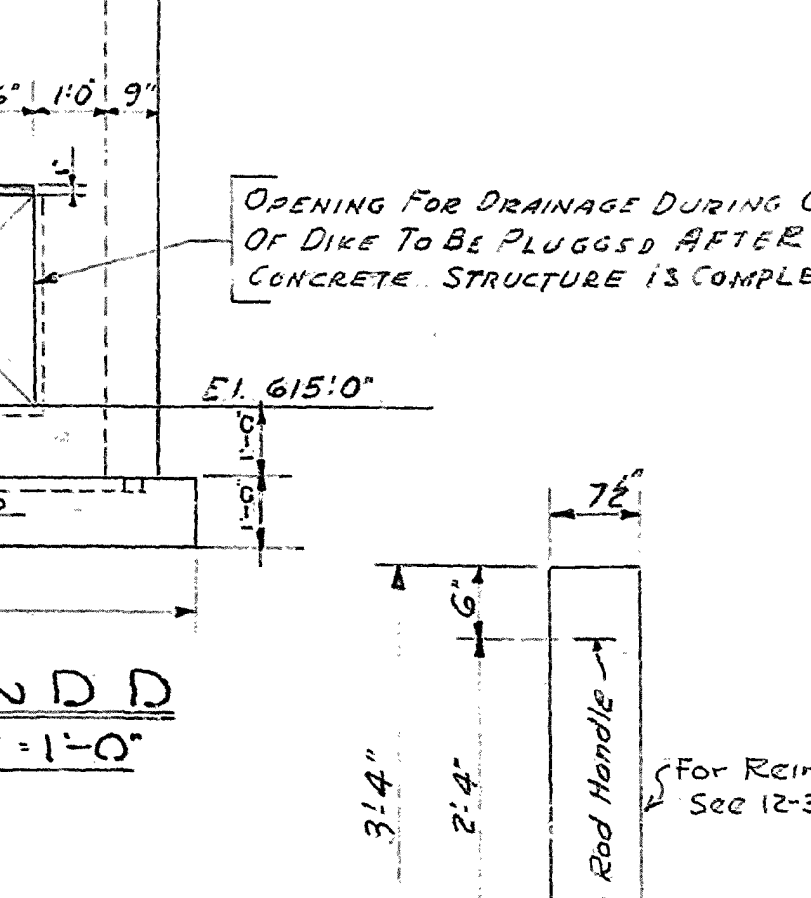
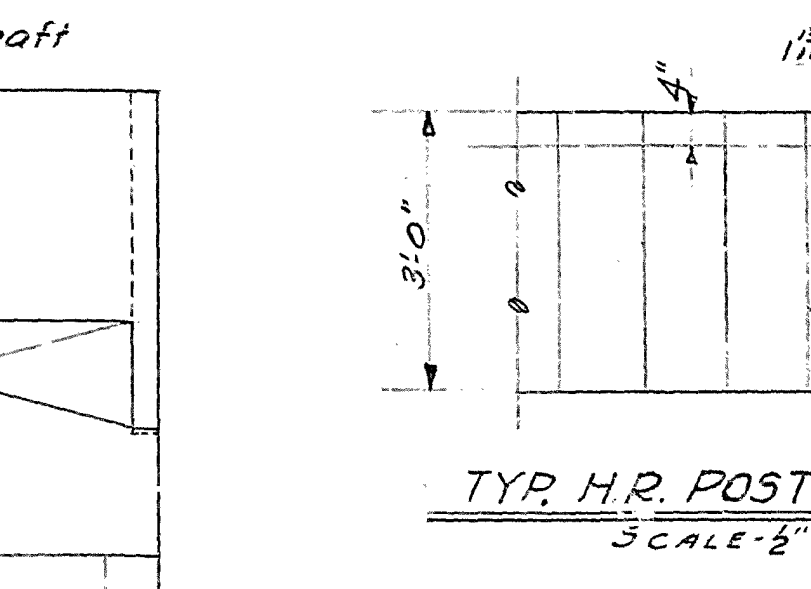
WORK THIS DWG. WITH DWG. 12-3045 (REINFORCING)



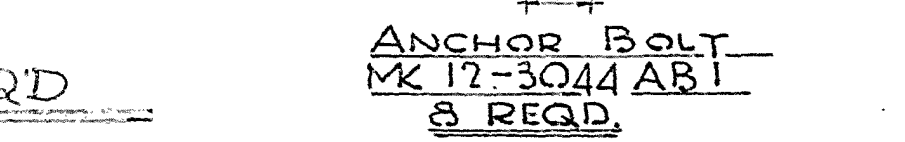
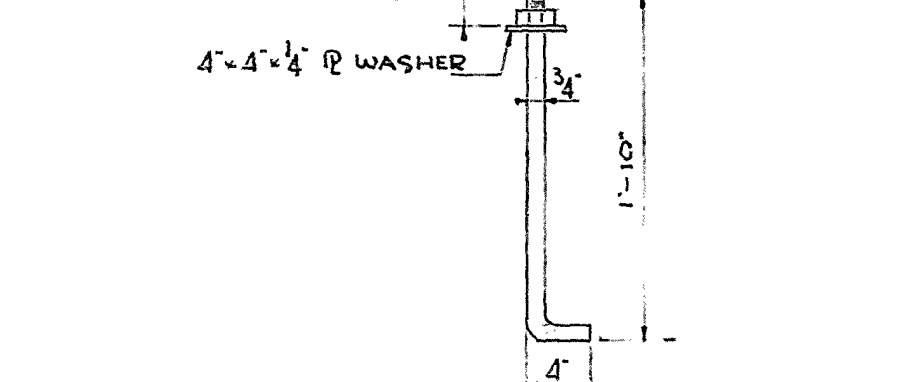
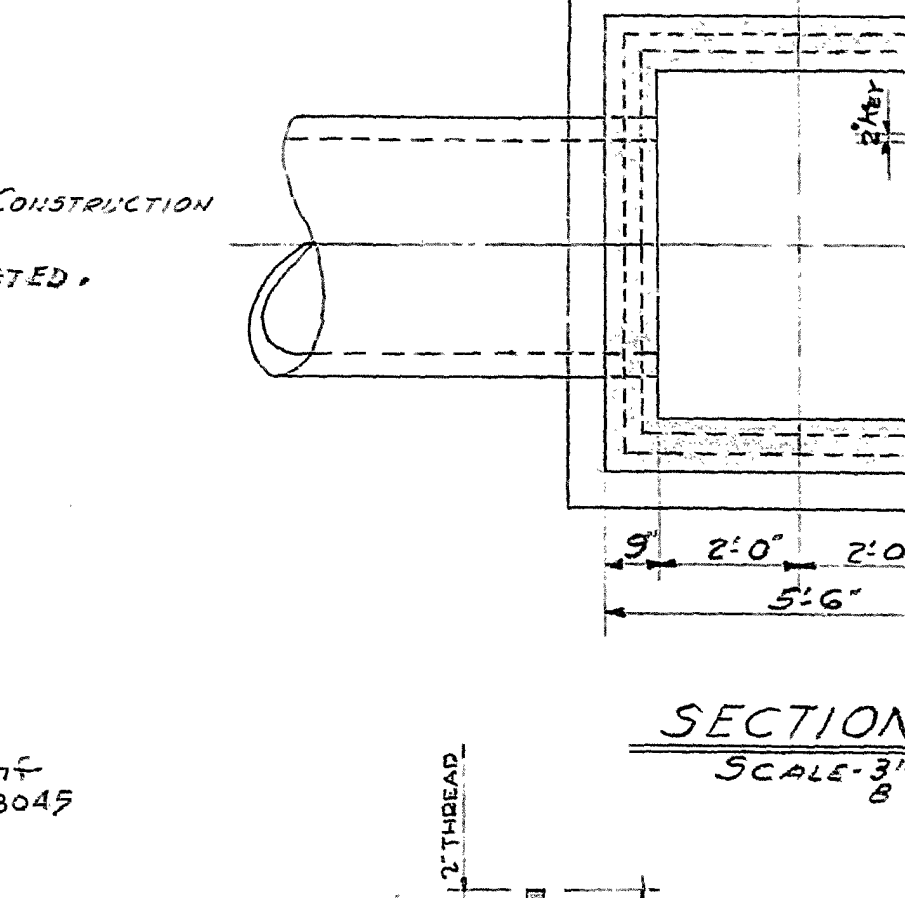
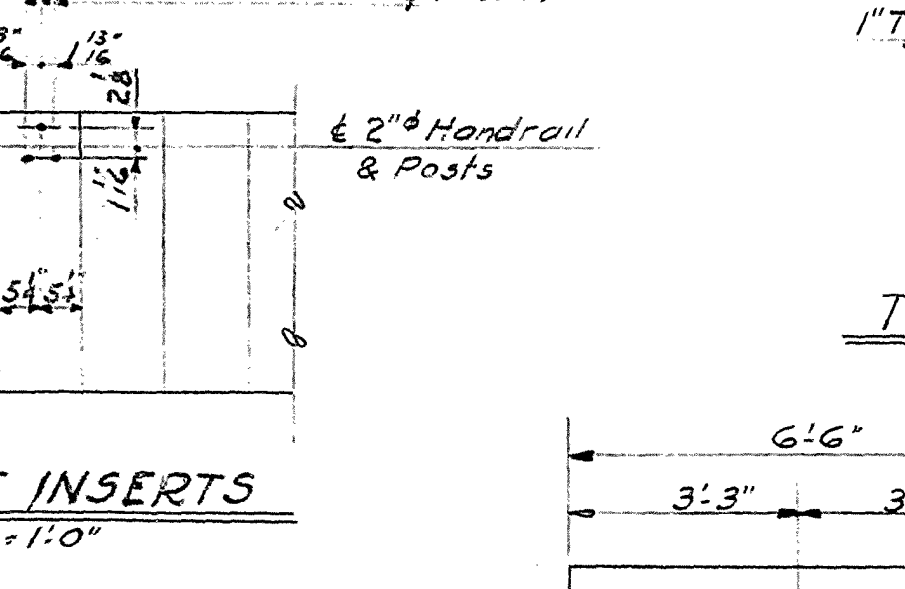
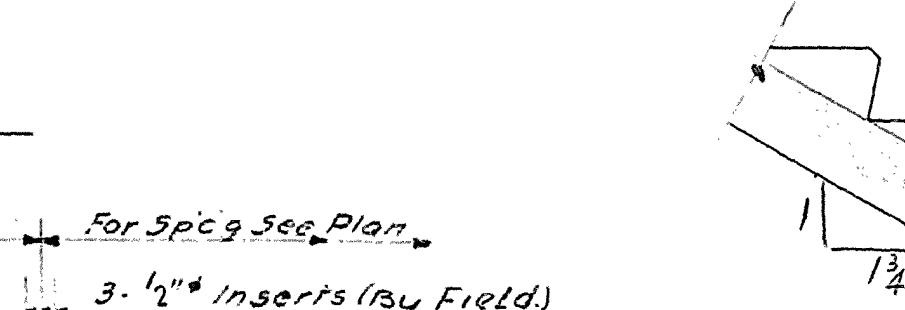
NOTE:
LOCALIZE RIP RAP AROUND ALL INLETS TO DRAINAGE SHAFT FOR A DISTANCE OF 10'-0" ON EACH SIDE OF STRUCTURE.

SECTION A-A
SEE SECTION E-E DWG. 12-3005
SCALE: 1/4" = 1'-0"

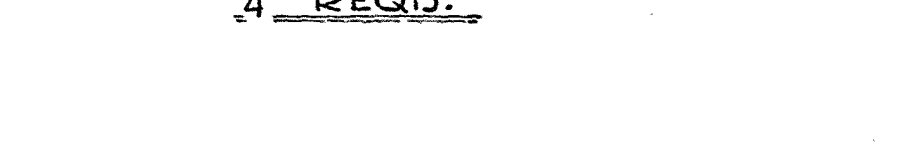
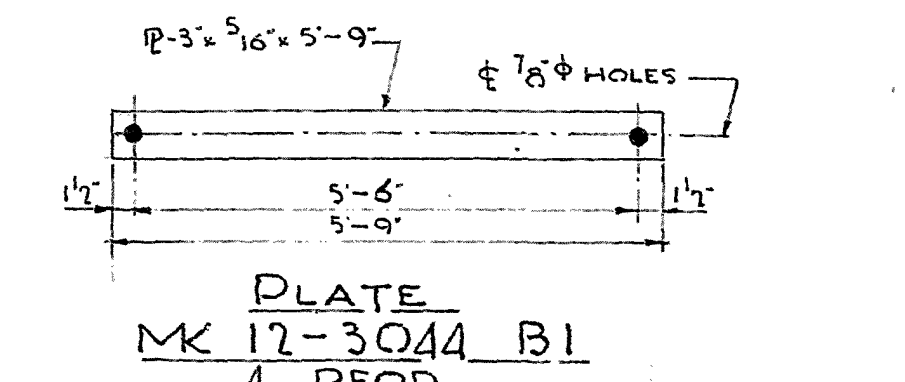
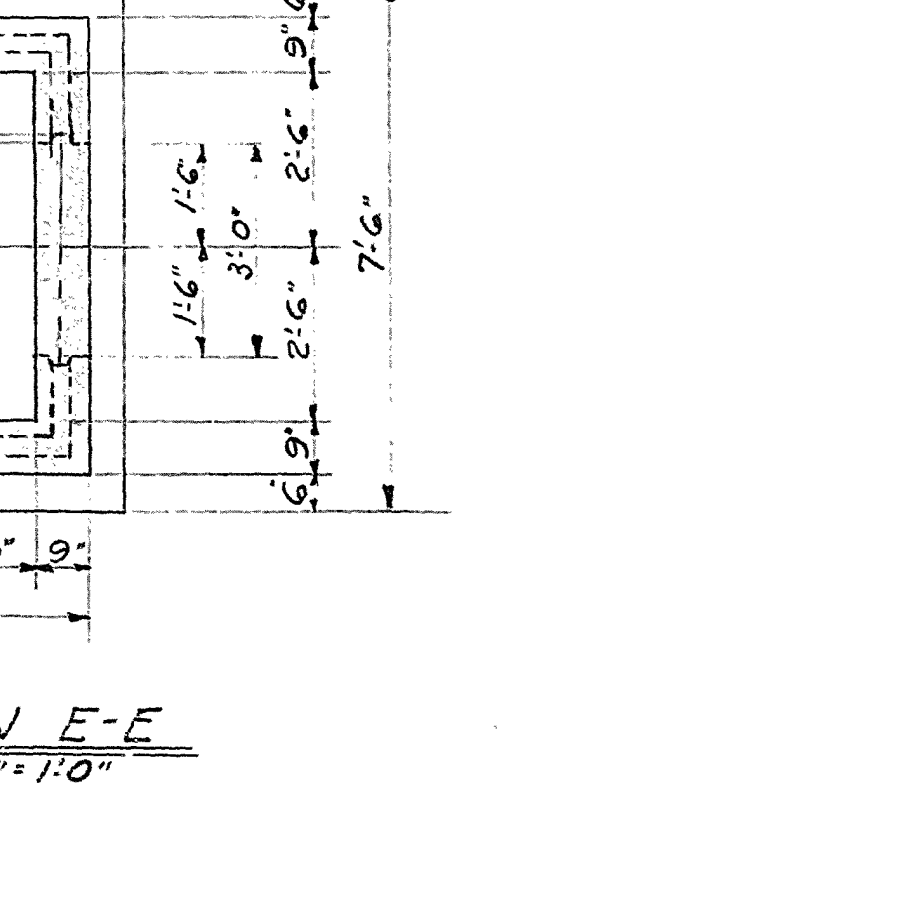
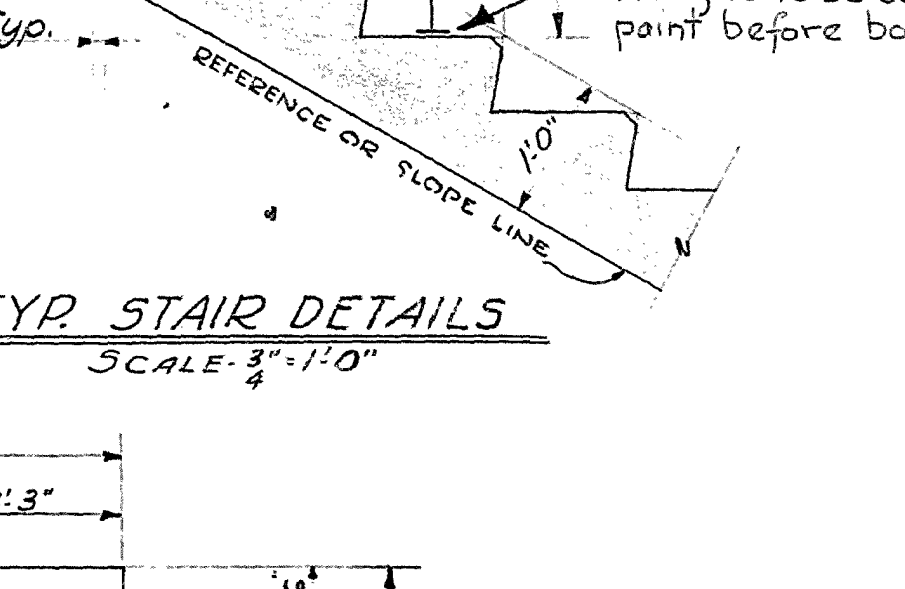
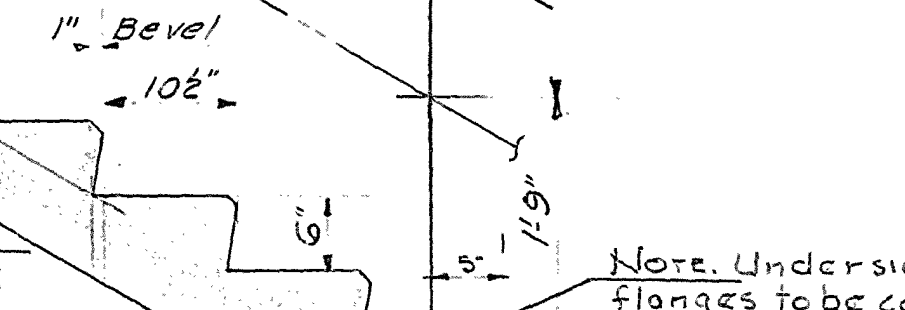
For Spig. See Plan. For Spig. See Plan.
3" x 1/2" Inserts (By Field)



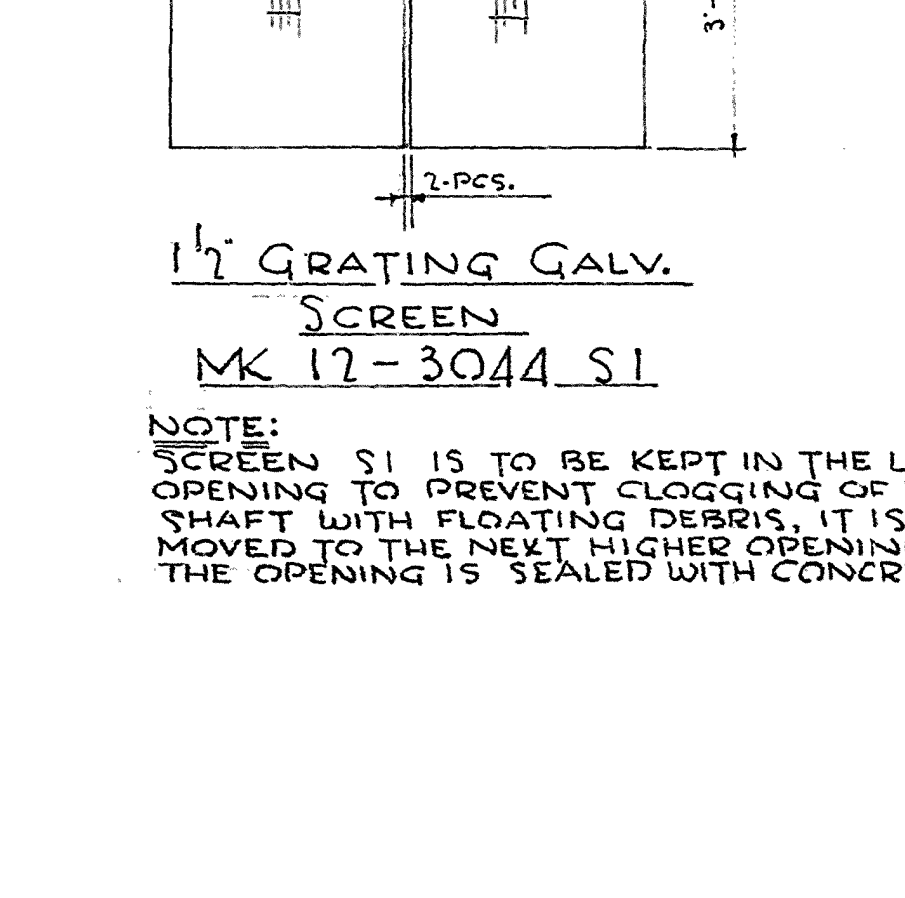
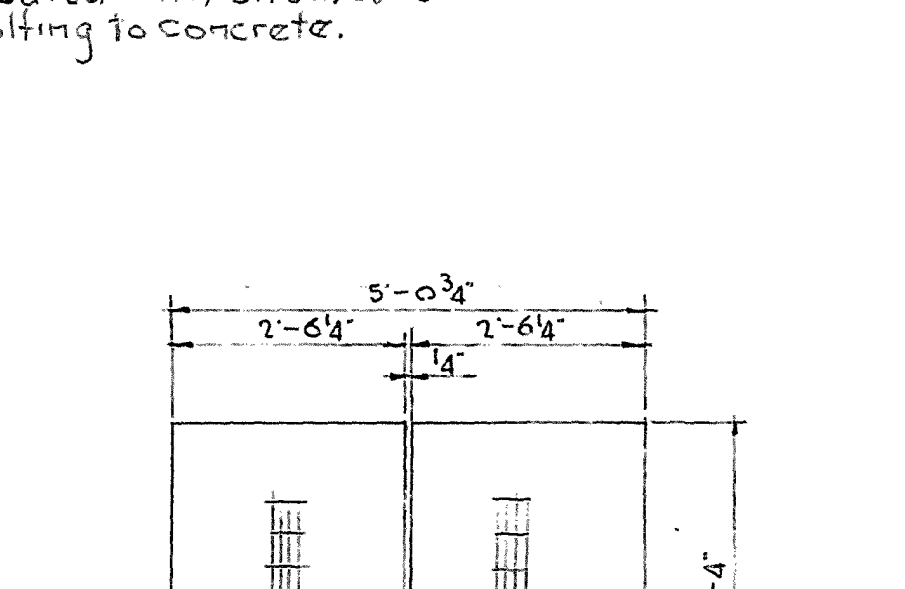
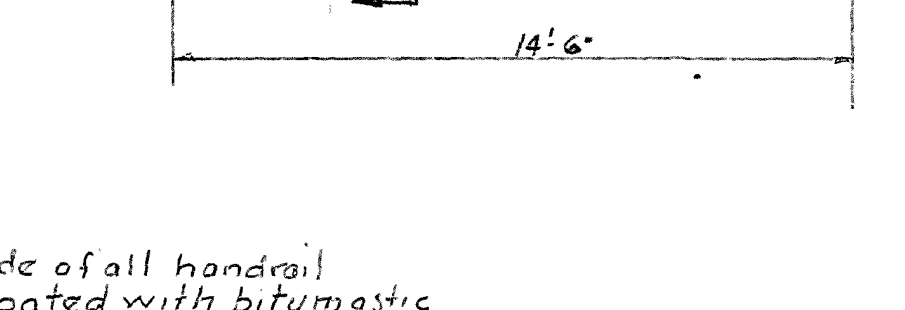
NOTE: UNDERSIDE OF ALL HANDRAIL FLANGES TO BE CAPED WITH BITUMASTIC 1" THICK BEFORE BOLTING TO CONCRETE.



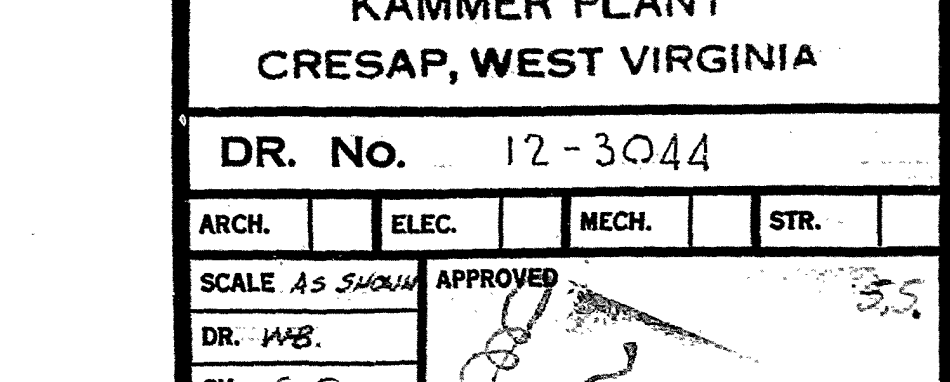
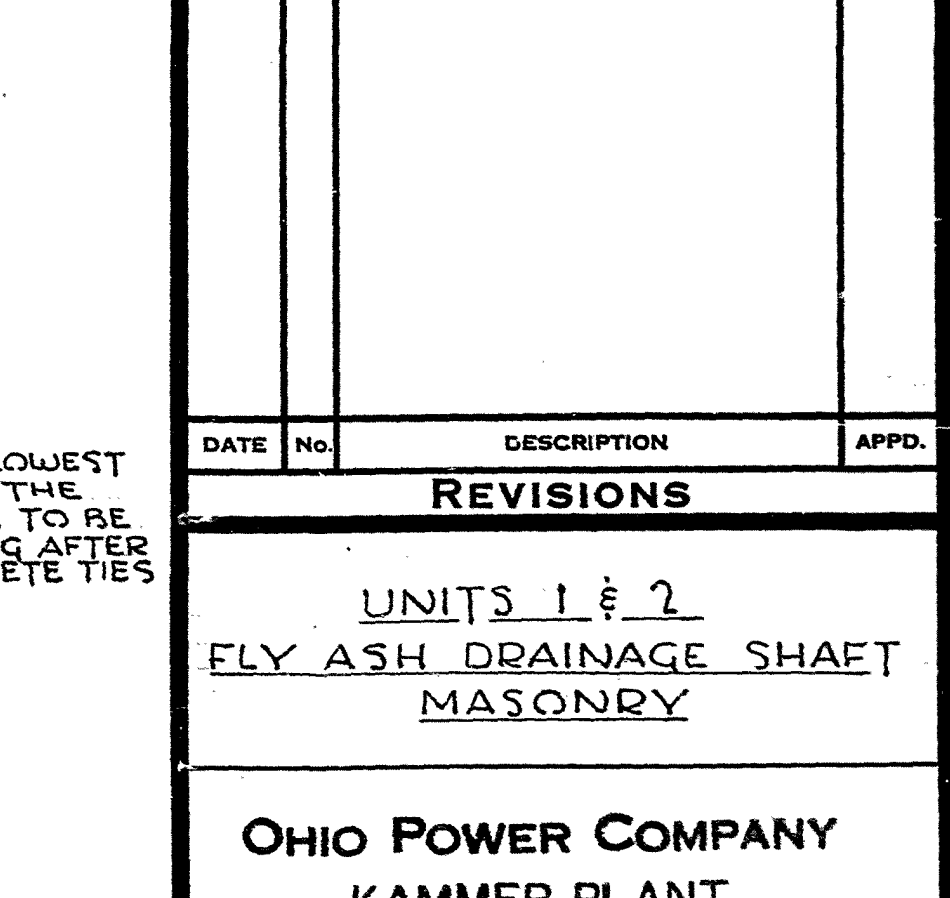
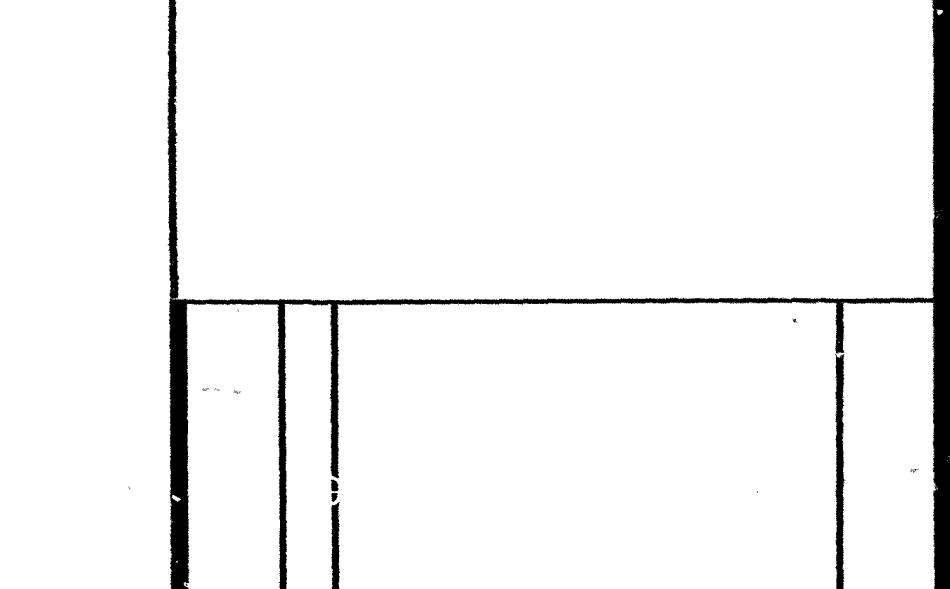
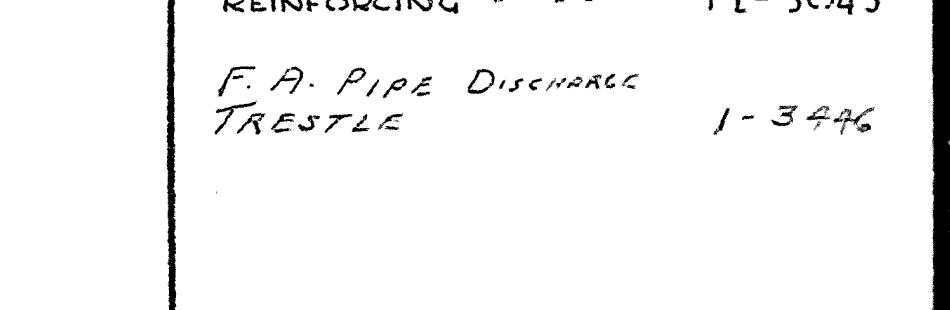
NOTE: UNDERSIDE OF ALL HANDRAIL FLANGES TO BE CAPED WITH BITUMASTIC 1" THICK BEFORE BOLTING TO CONCRETE.



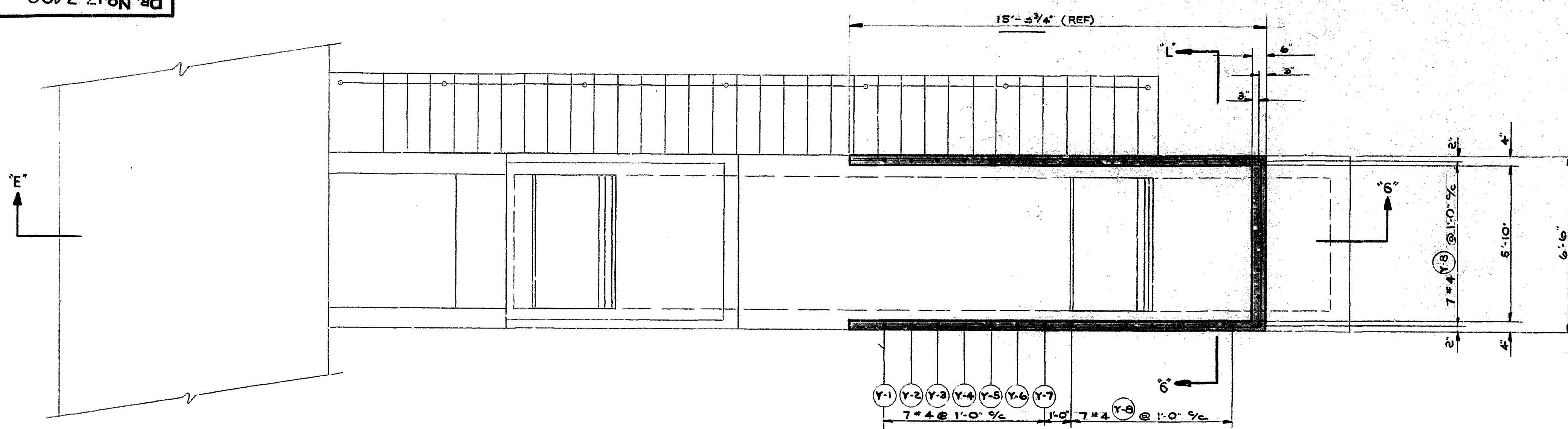
NOTE: UNDERSIDE OF ALL HANDRAIL FLANGES TO BE CAPED WITH BITUMASTIC 1" THICK BEFORE BOLTING TO CONCRETE.



NOTE: UNDERSIDE OF ALL HANDRAIL FLANGES TO BE CAPED WITH BITUMASTIC 1" THICK BEFORE BOLTING TO CONCRETE.



DR. NO. 13-3490

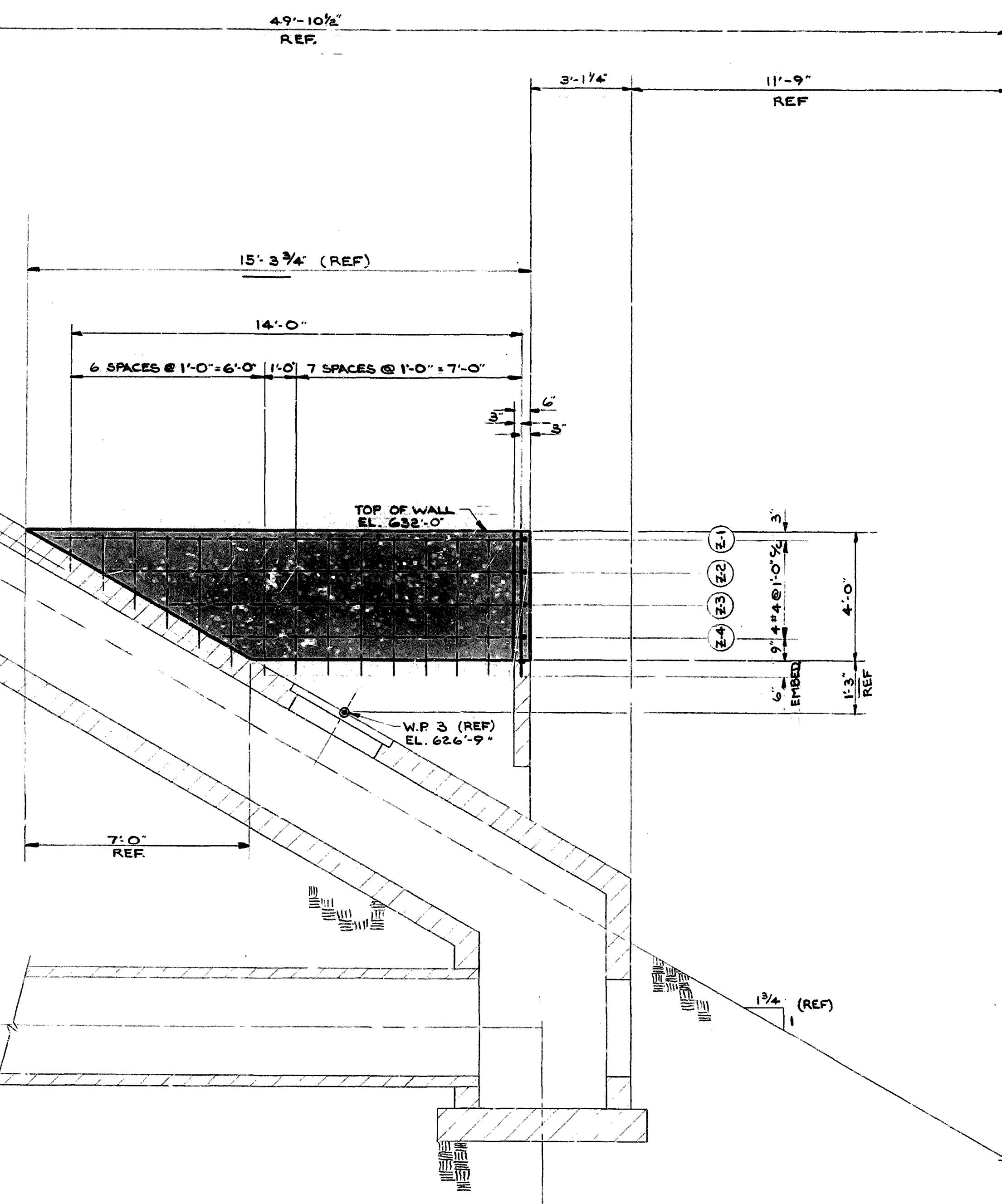


W.P. 5 (REF)
EL. 641'-0"

DIKE EL.

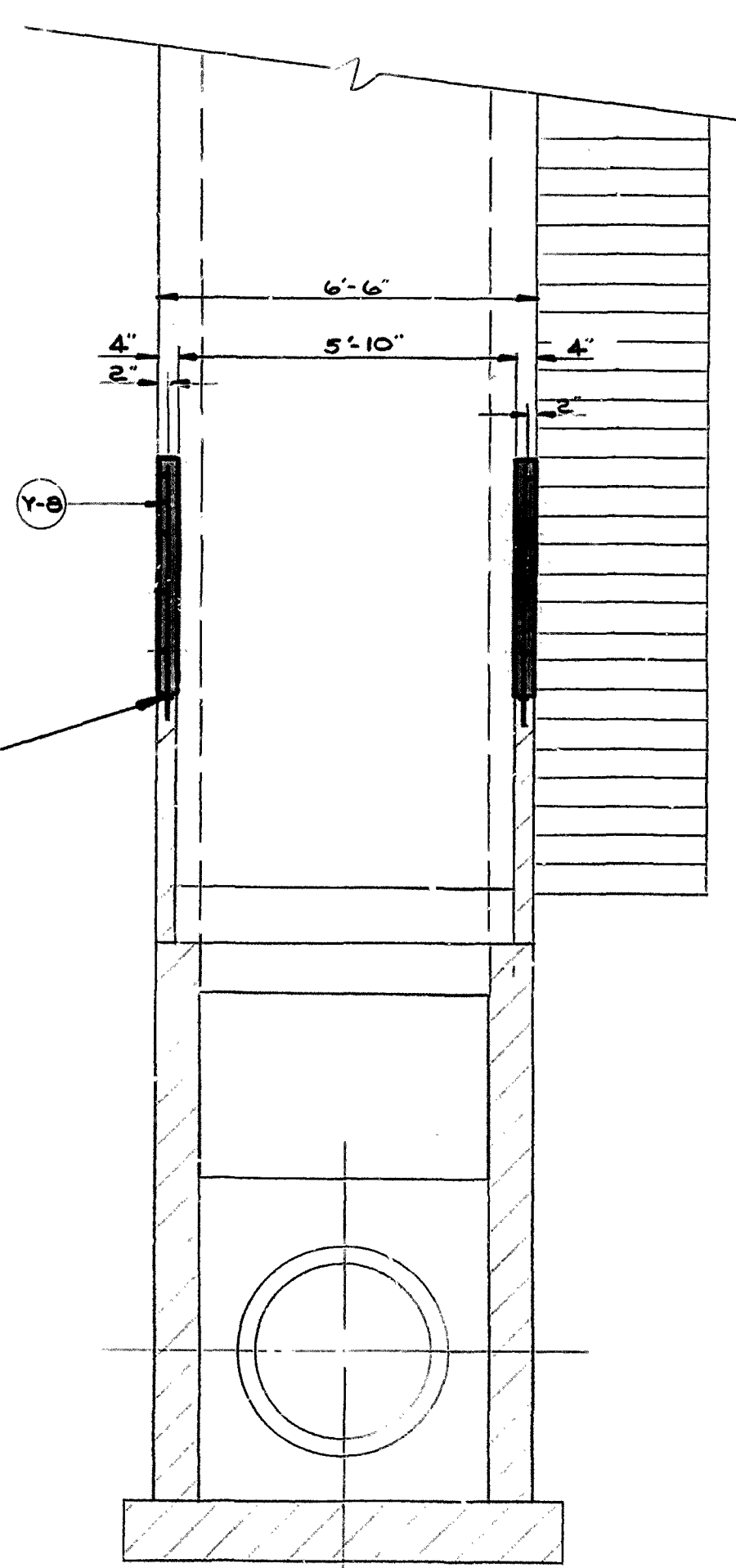
NOTE:

FIELD TO DRILL HOLES FOR NEW #4 BARS IN EXIST. WALL TO DEPTH SHOWN. (FILL W/ HYDRAULIC CEMENT GROUT TO TOP OF WALL.)



SECTION 'E-6' $\frac{1}{2}$ "
SCALE: $\frac{3}{8}$ " = 1'-0"

1 1/2" WIDE x 1" DEEP NOM. KEY
TYP. ALL AROUND



SECTION 'L-6' $\frac{1}{2}$ "
SCALE: $\frac{3}{8}$ " = 1'-0"

GENERAL NOTES

ALL REINFORCING TO BE NEW #4 BARS SPEC. A-615/616/617 OF THE ASTM CRATE 60.
REINFORCING TO BE PLACED LAPPED & WELDED IN ACCORDANCE WITH THE ACT MANUAL 218-73.
PROVIDE A MIN. COVER OF 2" UNLESS NOTED OTHERWISE.
FOR IDENTIFICATION, SEE RE-001 REBAR LIST.
ALL NEW CEMENT TO BE 3000 P.S.I. @ 28 DAYS.

REBAR S. = 172.91 LBS.
D.F.G. UNDERWATER CEMENT = 1482 CUB. YD.

REFERENCE DRAWINGS

12-3044 FLYASH DRAINAGE SHAFT MASONRY
12-3045 FLYASH DRAINAGE SHAFT REINFORCING

CIA 80466
446 703 5010

REVISIONS

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OHIO POWER COMPANY
KAMMER PLANT
CRESAP, WEST VIRGINIA

MODIFICATION OF
ASH POND SKIMMER
CONCRETE REINFORCING

DR. NO. 13-3490-0

DATE	NO.	DESCRIPTION	APPROVED

APPROVED
Maier and Associates, Inc.
North Canton, Ohio

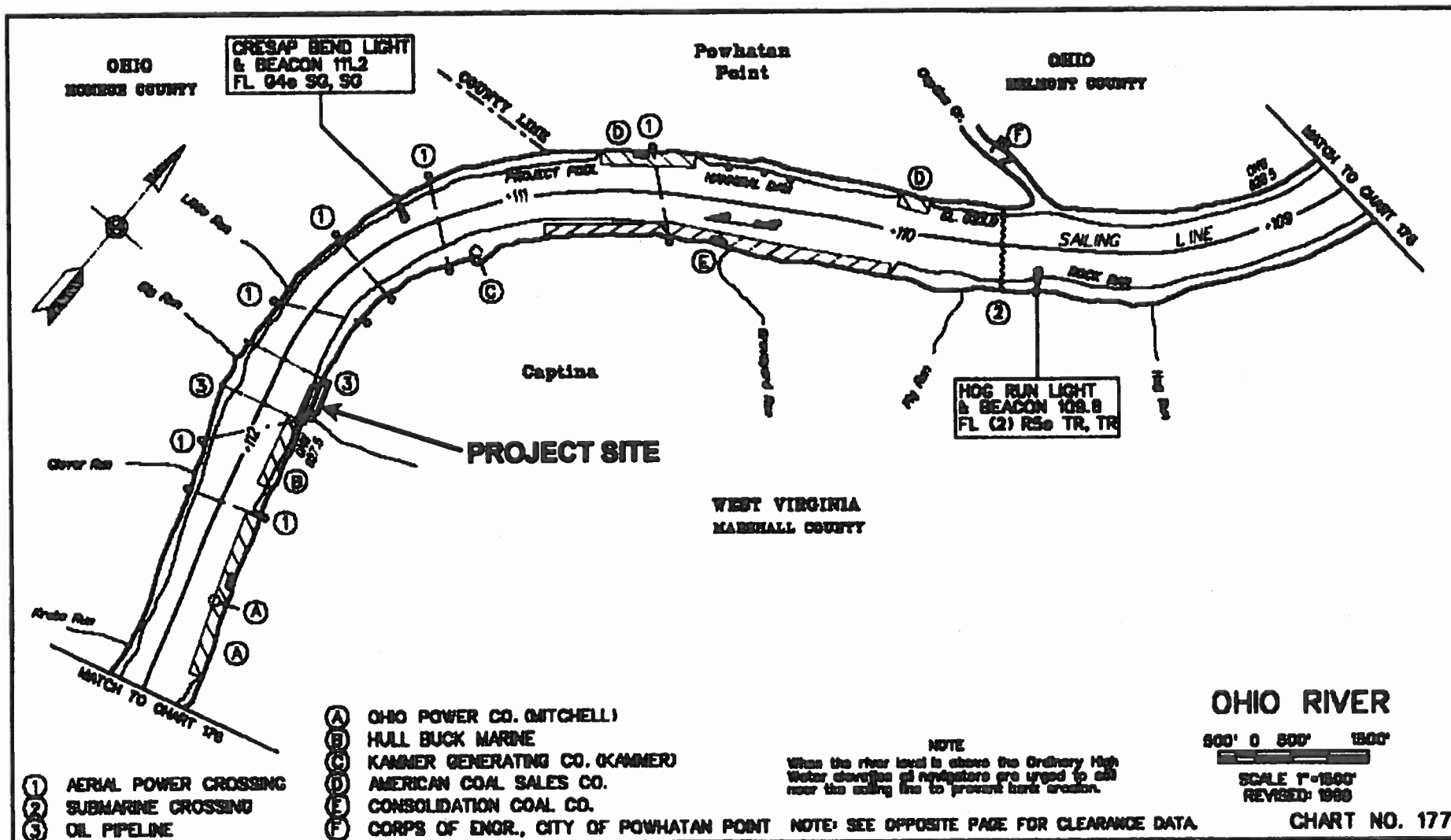
Date: AUG. 2, 1974. By: *[Signature]*



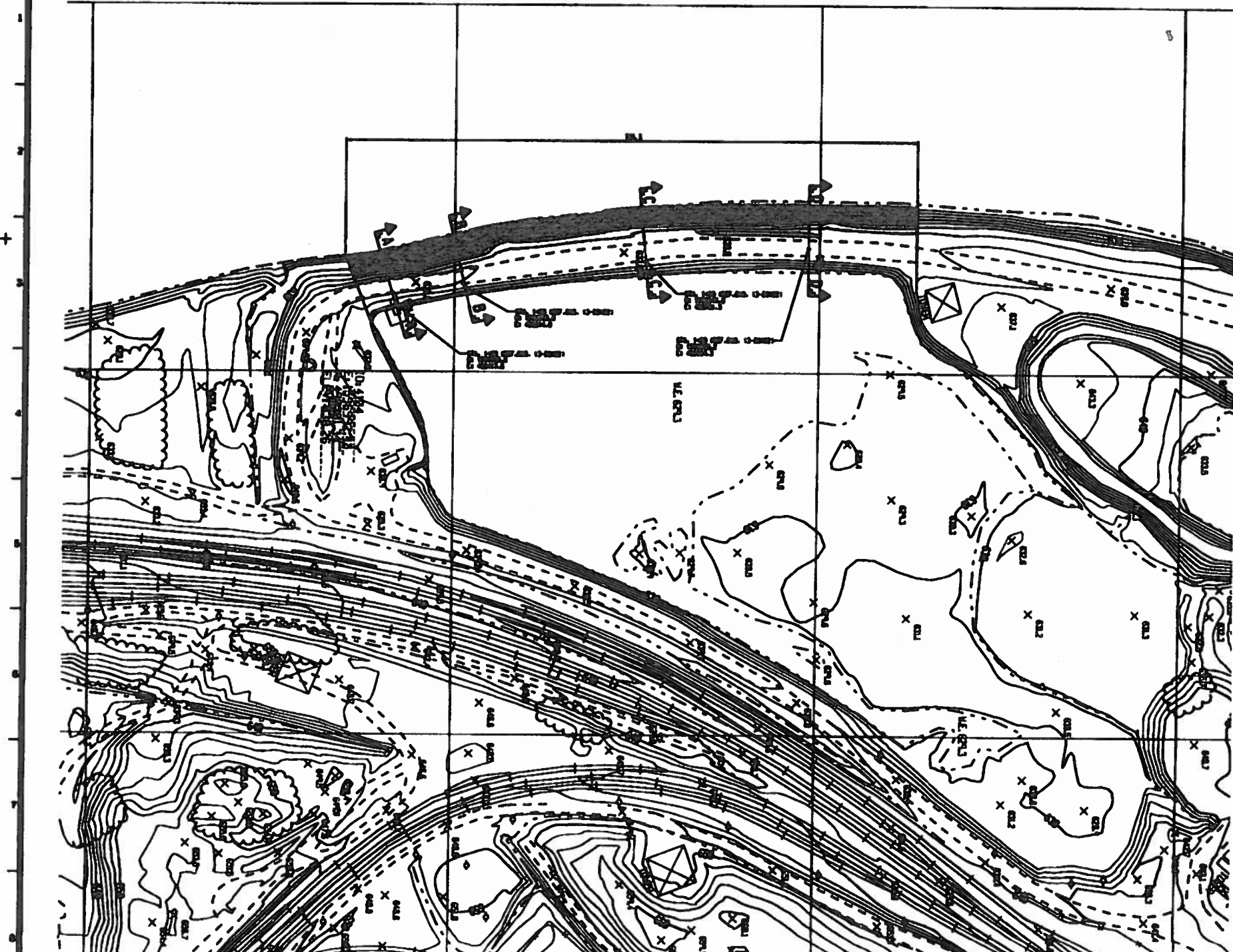
M. MAIER & ASSOCIATES, INC.
NORTH CANTON, OHIO
OHIO ENG. REG. NO. 25789
JOB ORDER NO. J-1704
DWG. NO.

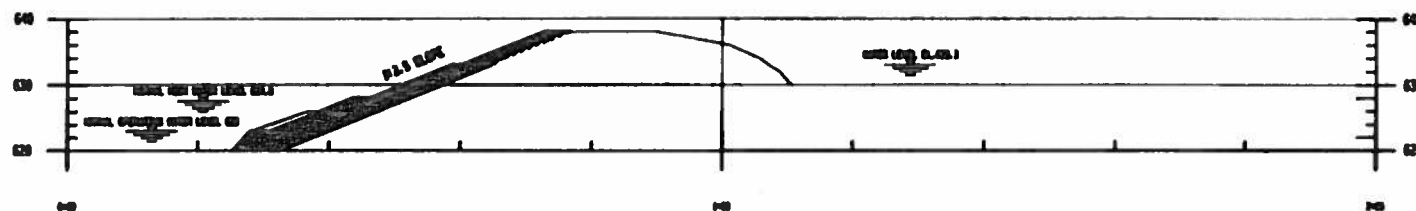
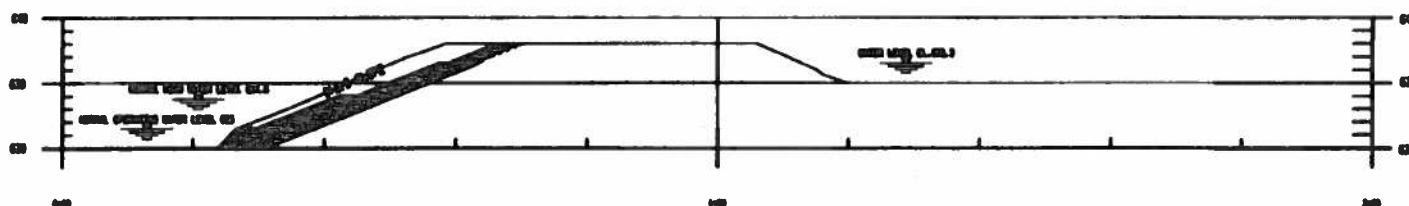
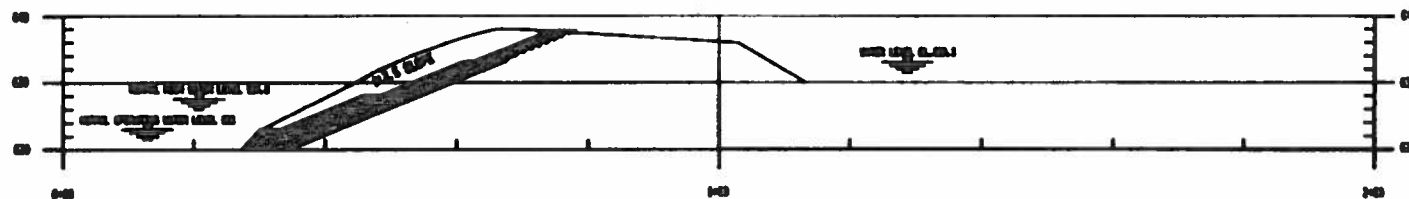
SCALE: 3/8" = 1'-0"
DR. DAVIS
CH. J. MAIER
DATE: 8/1/74
DESIGN DIV.
AMERICAN ELECTRIC POWER SERVICE CORP.

Shoreline Protection



10000-17 10000





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