PRELIMINARY GEOTECHNICAL EVALUATION

WEST VIRGINIA INTERNATIONAL YEAGER AIRPORT
ENVIRONMENTAL IMPACT STATEMENT
RBB Project No. 17386-0 WV

Prepared for:

Ricondo
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Prepared by:

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January 6, 2023

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Ms. Allison Ducar
Director
Ricondo
421 King Street, Suite 400
Alexandria, Virginia 22314

RE: Preliminary Geotechnical Evaluation - FINAL
Environmental Impact Statement
West Virginia International Yeager Airport
Airfield, Safety, and Terminal Improvement Project
RBB Project No. 17386-0 WV

Dear Ms. Ducar:

The Robert B. Balter Company is pleased to submit this preliminary geotechnical evaluation report for the subject project. The purpose of this preliminary evaluation was to assess the site conditions throughout the adjacent Coonskin Park for potential use as fill soils for the future possible runway extension project, and to provide geotechnical related guidelines for future design of a new embankment fill for the runway extension.

Project information provided to us by various parties helped form the basis for our recommendations. We have appreciated this opportunity to be of service. If you have any questions regarding this report, or if we can assist you in any way, please do not hesitate to call our office.

Sincerely,

THE ROBERT B. BALTER COMPANY

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1.0 INTRODUCTION

1.1 General

This preliminary geotechnical assessment was performed as part of an Environmental Impact Statement (EIS) to evaluate the feasibility of the proposed CWVRAA Runway 5-23 extension to the northeast into Coonskin Park. The purpose of our work was to perform a geotechnical evaluation of the subsurface conditions which consisted of subsurface drilling, materials laboratory testing, and preliminary engineering evaluations related to large scale fill placement and reuse of soil and rock materials from Coonskin Park as controlled fill.

1.2 Authorization

The geotechnical evaluation was authorized by Ricondo, per the task order agreement (Task Authorization No. BAL-1217-001) between Ricondo and Balter, dated April 20, 2022.

1.3 Scope

The scope of the geotechnical evaluation included the following: site reconnaissance, subsurface sampling and testing, geotechnical laboratory testing, engineering evaluation and report preparation.

2.0 PROJECT DESCRIPTION

2.1 Site Conditions

West Virginia International Yeager Airport is located just northeast of Charleston, West Virginia, along Interstate 79 (I-79). The Elk River is present between I-79 and the airport which is located on top of an existing graded hillside. Steep slopes are present on all sides which are covered with thick brush and trees. Runway 5-23 is oriented Northeast-Southwest (parallel to I-79). The existing 23-end of the runway is supported on a large slope roughly 200 feet in height with an approximate slope of 2H:1V. Topographic maps of the local area indicate that the terminal area of the airport was lowered down to the present grade and the 23-end of the runway filled to create the current configuration.

To the northeast is the existing Coonskin Park which is a wooded local County park which is comprised of narrow roadways, hiking trails, a golf course, disk golf course, tennis center, soccer stadium, driving range, swimming pool, amphitheater, playgrounds, picnic shelters, and a lake, bordered to the West and North by the Elk River. Similar to the airport, the park includes many steep slopes and hillsides covered in dense trees and brush. Coonskin Park ground elevations generally range from EL 700 to EL 1010. A site vicinity map is included as **Plate 1, Site Vicinity Map**.

2.2 Project Information

The proposed project will consist of the extension of the runway at the 23-end to the Northeast into Coonskin Park. Based on the existing site elevations, fill depths would be up to 200 feet or more in thickness, requiring roughly 25 million cubic yards of material to raise the

site grades up to the current runway elevation. It is desired that the majority of the fill come from Coonskin Park. To generate the quantity of fill required for this project, Coonskin Park would need to be lowered approximately 80 feet on average. Certain areas could require more so as to not be ground obstructions to the proposed new threshold.

The purpose of this study is to determine if use of the subsurface materials in Coonskin Park are feasible for use as controlled fills, as well as the existing ground conditions can support mass quantities of fill required to raise the site grades. Site retaining wall options are being considered to support the fills in lieu of traditional large-scale slopes.

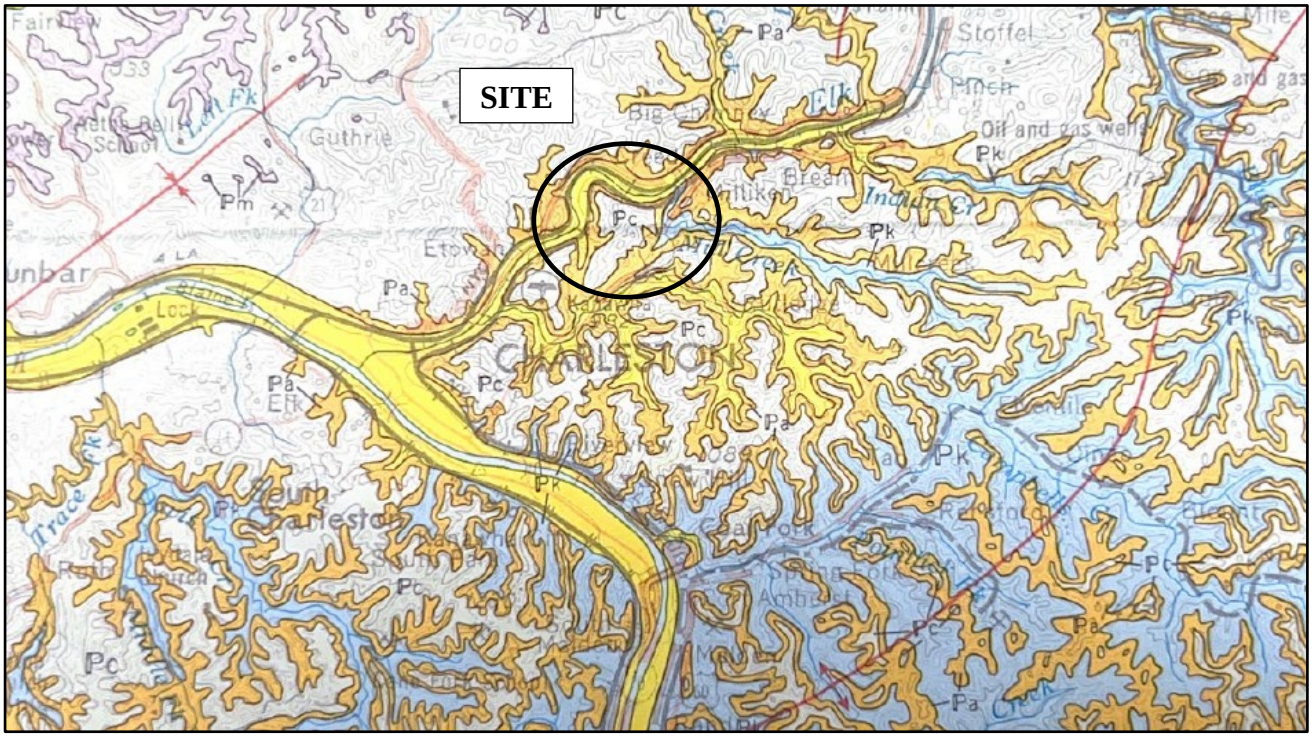
Future plans for the airport will also include a new terminal expansion, which will be addressed in the EIS. Plans for the terminal expansion will include demolition of the existing terminal and construction of seven (7) new gates extending to the edge of the existing concrete apron on the east side of the terminal. A new retaining wall will be constructed to support the slope between the concrete apron and Eagle Mountain Road.

2.3 Site Geology

2.3.1 Geology

According to the Geologic Map of West Virginia (1968), the subject site is comprised of a Pennsylvanian Complex system that has the Conemaugh Group (youngest) overlying the Allegheny Formation which overlies the Kanawha Formation (oldest). The local stream and river channels are filled with Quaternary Alluvium. The general Charleston area is located in an area of heavy ancient tectonic fault zones which have led to the mountains and hills present today which make up the Allegheny Plateau. The area is comprised of significant tectonic anticlines and synclines, including the Warfield Anticline to the southeast, and an unnamed syncline to the northwest. The Jarrett Syncline trends to the southwest through the site but appears to have been cut off by the Elk River. This complex geologic structure throughout the area perhaps provides insight to the complex local geology noted during the geotechnical drilling operations for this project. **Figure 1** provides the relevant portion of this geology map.

Figure 1 – Geologic Map of West Virginia (1968)

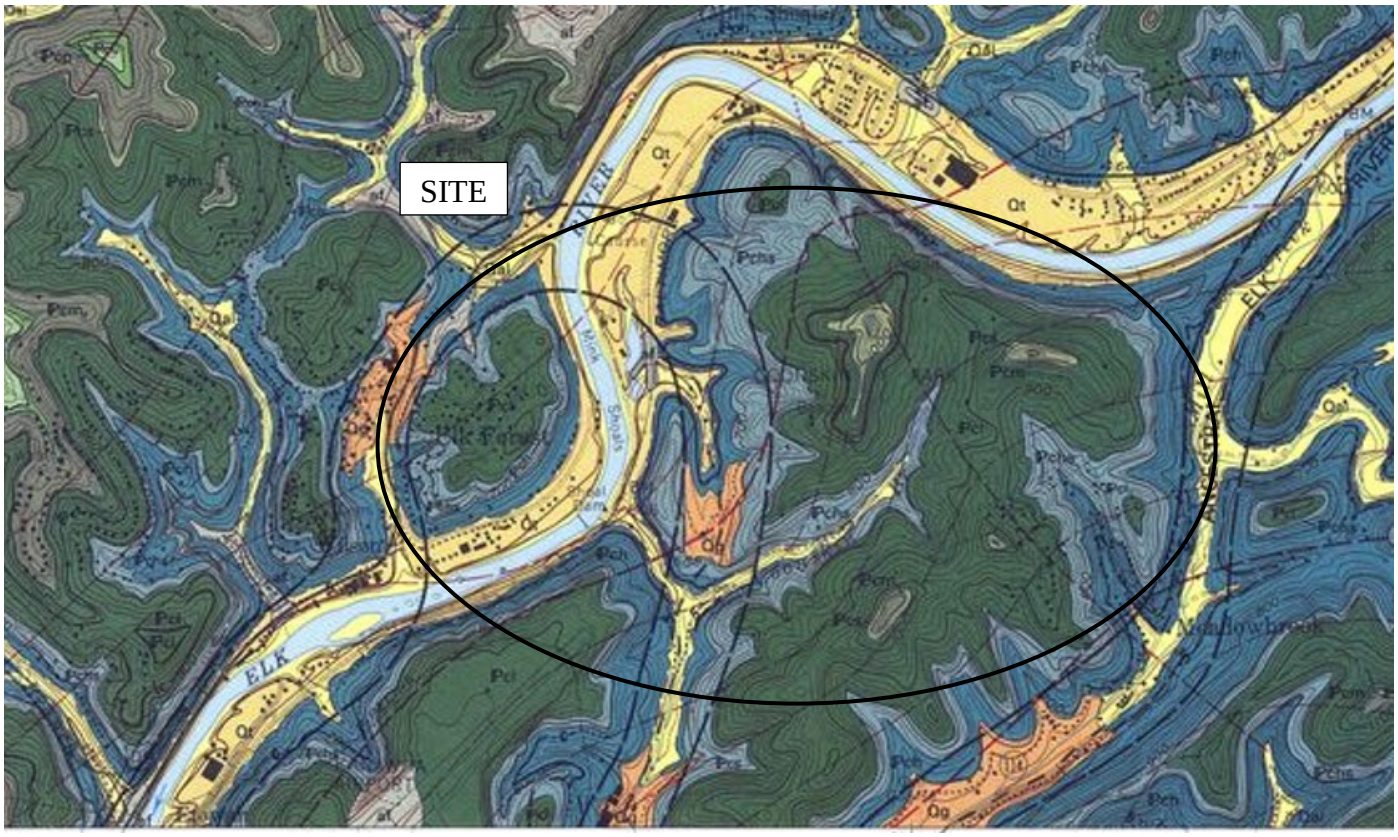


According to the geologic map the subject geologic formations are comprised of the following:

- Quaternary Alluvium (Qal) is generally comprised Alluvial deposits of Sand, Gravel, Silt, and Clay.
- The Conemaugh Group (Pc) is generally comprised of cyclic sequences of red and gray shale, siltstone, and sandstone, with thin limestone and coals.
- The Allegheny Formation (Pa) is generally comprised of cyclic sequences of sandstone, siltstone, shale, limestone, and coal.
- The Kanawha Formation (Pk) is the upper formation of the Pottsville Group. This formation is comprised of Sandstone (~50%), shale, siltstone, and coal. This formation contains several marine zones and becomes more shaly westward in the subsurface. The larger Pottsville Group is predominantly sandstone, some of which are conglomeratic, with thin shales and coals.

According to the Geologic Map of the Big Chimney Quadrangle, Kanawha County, West Virginia (1987), the site is underlain predominately by rocks of the Conemaugh Formation (younger) and Charleston Sandstone (older). The valleys are filled with younger Alluvial soils and Terrace Deposits. Note that this quadrangle map generally identifies the same geologic formations as the larger scale state geology map as discussed above. **Figure 2** provides a portion of this geologic map.

Figure 2 – Geologic Map of the Big Chimney Quadrangle, Kanawha County, WV (1987)



The formations noted above consist of the following:

- Alluvium (Qal) – These Holocene age soils are comprised of gravel, sand, silt, and clay in located in the flood plains.
- Terrace Deposits (Qt) – These Holocene age deposits are located in the higher levels of the Elk River Valley and generally consist of gravel, sand, silt, and clay.
- Terrace Deposits of the Teays River System (Qg) – These Pleistocene age soils are part of the ancient Teays River System which is located about 100 feet above the present Elk River levels. They consist of gravel, sand, silt, clay, and variegated varved-like clay deposits.
- Conemaugh Formation – This Upper Pennsylvanian rock formation is comprised of multiple members, including the Lower Member (Pcl), the Sandy Grove Sandstone Member (Pcs), and the Middle Member (Pcm). Rocks present in this formation consist of:
    - Sandstone – Medium to light gray, very fine to coarse grained locally conglomeratic with well-rounded quartz pebbles and subangular limestone and shale fragments.
    - Siltstone – Medium gray to grayish red, thin bedded.
    - Shale – Medium gray, greenish gray, and grayish red, slightly fissile to poorly bedded, soft, clayey to silty. Includes hematite nodules and discontinuous beds of limestone.
    - Coal – Mostly dull attributes, impure, coarsely cleated, carbonaceous shale partings. Mapped as Little Clarksburg and Brush Creek coal beds.
    - Underclay – Medium Gray, clayey to silty, contains fossil root prints.
    - Semi-Flint Clay – Medium gray to grayish red, poorly-bedded, conchoidal fracture, mapped as clay bed.
    - Limestone – Medium gray to light grayish brown, thin bedded, nodular, paleokarst surfaces, mudstone to packstone.
- Charleston Sandstone (Pchs, Pch) – This Middle Pennsylvanian formation is comprised of:
    - Sandstone – Light gray to medium gray, very fine to coarse-grained, conglomeritic with well-rounded quartz pebbles.
    - Siltstone – Medium gray, thin-bedded.
    - Shale – Medium gray to grayish red, very fissile to poorly bedded, silty, very carbonaceous.
    - Coal – Bright to dull attributes, canneloid to boghead, fusain laminae, coarsely cleated.
    - Underclay – Medium gray, clayey, silty, contains fossil root prints.
    - Semi-Flint Clay – Medium gray to grayish red, poorly bedded.
    - Flint Clay – Light gray to grayish yellow and grayish red, nodular weathering, conchoidal fractures, resistant bedding.

The geologic maps presented above generally include similar formations and material descriptions. The smaller scaled quadrangle map (Big Chimney 1987) does not discuss the

Allegheny or Kanawha formations suggesting they may have been replaced in name with the Charleston Sandstone.

The Landslides and Related Features of the Big Chimney Quadrangle map (Ohlmacher, USGS, Open File Map 83-80) provides a summary of the landslide history and the impact of landslides in the local area. As shown below in **Figure 3** the entire project area, and Charleston area has been impacted by landslides and slope failures. Future design of this project must take into account possible landslides in the local area and address their removal prior to any new embankment fill placed.

Figure 3 – Landslides and Related Features

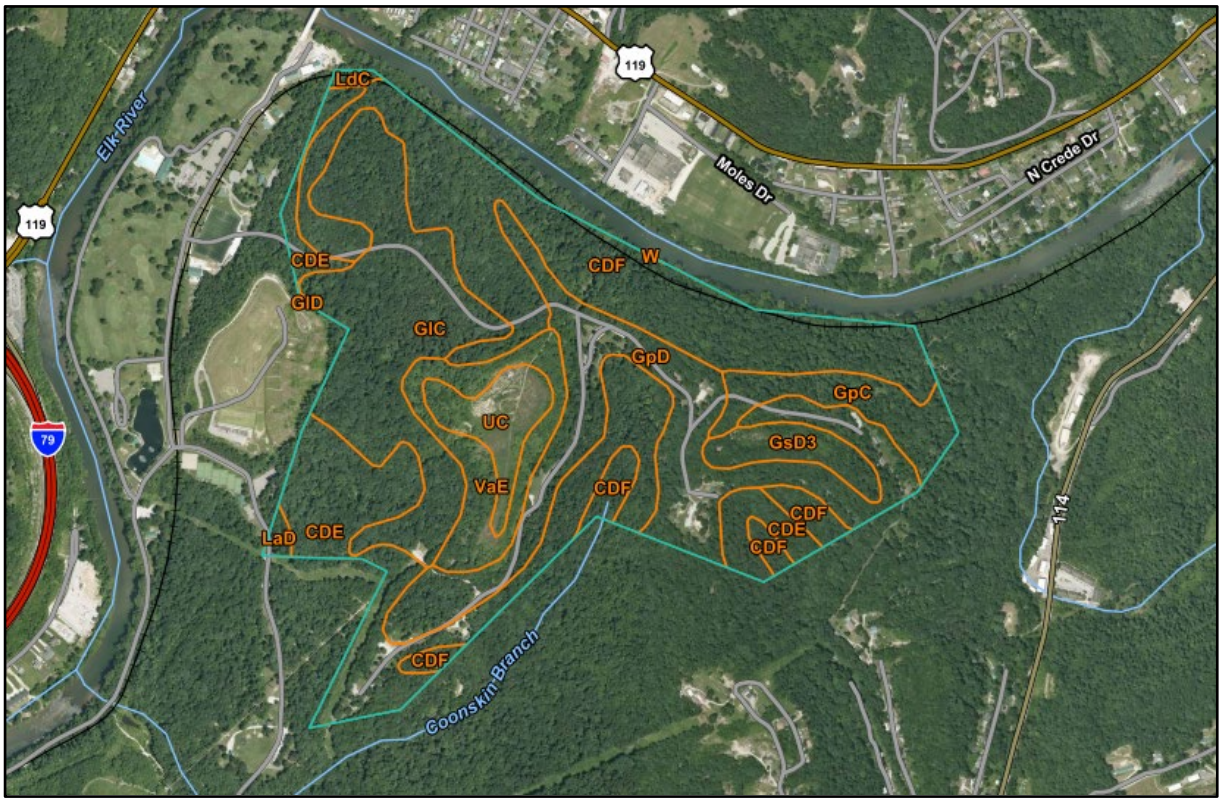
ACTIVE OR RECENTLY ACTIVE LANDSLIDE
Complex landslide composed of earthflow, debris slide, earth and rock slump. Identified from historical records, and from scars, debris and other field evidence. Ground extremely unstable; sliding accelerated by excavation, loading and changes in drainage conditions. May include areas with several active slides too small to be shown separately.

OLD LANDSLIDE
Area of extensive hummocky ground caused by earthflow and earth and rock slump. Lacks clear evidence of active sliding. Relatively stable in natural, undisturbed state, generally not affected by small structures properly sited in areas away from the edge of the toe; can be reactivated by extensive, rapid excavation, loading, and changes in ground water and surface water conditions. Area of old landslide probably includes recent ones not identified from field evidence or otherwise documented. Upslope boundary of landslide generally defined by modified scarp, but downslope (toe) may be gradational and not well defined.

2.3.2 Soil Survey

The Soil Survey of Kanawha County, West Virginia (1981 and current NRCS Website) was reviewed to further understand that characteristics of the site soils which may be used as fill for the runway extension project. These resources can provide some basic insight into the material properties. Note that the cut areas were only reviewed. According to these resources, the site soils present across the Coonskin Park area consist of the Clymer-Dekalb complex (CDE, CDF), Gilpin silt loam (GIC, GID), Gilpin-Upshur silt loam (GpC, GpD), Laidig channery sandy loam (LaD) and loam (LdC), Vandalia Silt Loam (VaE), and Udorthents (UC), as shown below in **Figure 4**. Each soils group is also defined below.

Figure 4 – Coonskin Park Soils – NRCS Soil Survey (2022)



Clymer soils are generally comprised of fine-loamy, well-drained soils that form in acid material weathered from sandstone, siltstone, and interbedded shale. They are located on ridgetops, benches, and side slopes. They are usually mixed with Delkalb soils. These soils have USCS classifications of GM, GC, SM, and ML with low shrink swell potential. Depth to bedrock is 3 feet to 5 feet. The bedrock is defined as hard.

Delkalb soils are generally comprised of loamy-skeletal, moderately deep, well-drained soils that formed in acid material weathered from sandstone and interbedded in places with siltstone and shale. They are usually mixed with Clymer soils. These soils have USCS

classifications of CL, GM, ML, and SM with low shrink swell potential. Depth to bedrock is 1.5 feet to 3.5 feet. The bedrock is defined as hard.

Gilpin soils are generally comprised of fine loamy, well-drained soils that formed in acid material weathered from interbedded shale, siltstone, and sandstone. These soils are oftentimes present with Upshur soils. These soils have USCS classifications of CL, GM, GC, ML, SM, and SC with low shrink swell potential. Depth to bedrock is 1.5 feet to 3.5 feet. The rock is defined as rippable.

Upshur soils are generally comprised of fine, well-drained soils that formed in limy material weathered from red clay shale that contains some carbonates. They are present with Gilpin soils. These soils have USCS classifications of CL-ML, CL, CH, ML, MH with moderate to high shrink swell potential. Depth to bedrock is greater than 3.0 feet. The rock is defined as rippable.

Laidig soils are generally comprised of fine-loamy, well-drained soils that formed in acid colluvial materials that moved downslope mainly from areas of Gilpin, Clymer, and Dekalb soils on uplands. These soils have USCS classifications of CL, GC, GM, ML, SM, SC with low shrink swell potential. Depth to bedrock is greater than 5.0 feet.

Vandalia soils are generally comprised of fine, well-drained soils that formed in lime-influenced colluvial material that moved downslope mainly from Gilpin and Upshur soils on uplands. These soils have USCS classifications of CL, CH, GC, ML, MH with moderate to high shrink swell potential. Depth to bedrock is greater than 6.0 feet.

Udorthents soils are generally comprised of well-drained to excessively drained soils formed in soil material that has been disturbed by excavating, cutting, or filling operations. These soils have a highly variable composition. Some areas have been strip mined, and others have been cut and filled during construction. Bedrock is usually at a depth of more than 2 feet.

3.0 EVALUATION PROGRAM

3.1 Subsurface Explorations

3.1.1 General

The subsurface exploration program for this phase of the study included a total of 19 new Standard Penetration Test (SPT) borings, including A-1 to A-3, located near the airport terminal and at the northeast end of Runway 5-23; and borings P-3, P-4, and P-6 to P-19, located in Coonskin Park. Boring P-5 was deleted from the program due to the difficult access conditions. **Table 1** provides the coordinate locations, as collected using a cell phone GPS.

Table 1 – Approximate Boring Coordinates and Elevations

Boring	*Approximate Ground Elevation (ft)*	*Longitude*	*Latitude*	*Northing*	*Easting*
A-1	900.0	38.382905	-81.585106	504096.173	1800786.733
A-2	900.0	38.381479	-81.584269	503575.378	1801023.372
A-3	952.0	38.370008	-81.594467	499416.781	1798073.433
P-3	761.0	38.384883	-81.582247	504811.306	1801610.744
P-4	700.0	38.383785	-81.580294	504407.955	1802168.021
P-5	Not drilled due to poor access conditions.				
P-6	810.0	38.384891	-81.578037	504806.666	1802817.457
P-7	812.0	38.388068	-81.578074	505963.646	1802814.068
P-8	908.0	38.387458	-81.574048	505734.341	1803966.598
P-9	871.0	38.391533	-81.577635	507224.653	1802947.755
P-10	928.0	38.387177	-81.569829	505624.551	1805175.202
P-11	1010.0	38.391495	-81.573500	507203.456	1804132.760
P-12	814.0	38.395609	-81.577614	508708.906	1802963.024
P-13	900.0	38.386727	-81.568093	505457.628	1805671.765
P-14	869.0	38.393064	-81.574401	507776.412	1803878.075
P-15	928.0	38.390004	-81.569432	507662.020	1805301.511
P-16	897.0	38.392774	-81.571152	507665.053	1804808.568
P-17	938.0	38.389455	-81.566232	506447.775	1806211.232
P-18	915.0	38.389180	-81.563171	506342.287	1807087.931
P-19	935.0	38.390985	-81.564841	507002.497	1806613.299

The attached **Plate 2, Boring Location Plan,** indicates the approximate as-drilled locations of the borings. The borings were drilled between June 13, 2022, and August 20, 2022. Borings A-1 and A-2 were drilled under a runway closure scheduled with CRW OPS. The subsurface data obtained from the recent SPT boring explorations are presented in log form in **Appendix A** and in profile form on **Plates 3** to **8**.

Ground surface elevations shown for the borings were estimated by Balter using the Big Chimney – 7.5-minute series Quadrangle (2019). The numeric values (N-values) shown within the individual boring columns on the Boring Logs and Profiles indicate the standard penetration resistances, in blows per foot, or as otherwise noted.

Boring logs show the estimated general soil classifications and the assumed boundaries between soil types. The actual boundaries in the field could vary significantly from those assumed for the profiles and logs. *It is noted that the subsurface data shown on the figures are an integral portion of this report. Separation of the figures from the remainder of the report may lead to misinterpretation of the data by others.*

3.1.2 Permits

Prior to the start of the field work, 7460-1 forms required by the FAA (7460-1) were submitted to the FAA. Submission of boring locations allowed for FAA notification of potential impact of the drill rig tower to flight operations at CRW. Once the 7460-1 forms

were reviewed by the FAA and determination letters were received, proper notifications of start dates were provided to the required parties. All determination letter indicated no hazards to the airport from Balter's proposed work operations.

Balter assisted Decota Consulting Company, Inc. to obtain permits related to Storm Water Pollution Prevention (SWPP) and Ground Water Protection (GWP). These permits outlined onsite requirements that were maintained throughout the drilling operation. The SWPP Plan included detailed plans showing access roads and required Best Management Practices (BMP) for each boring location. The BMPs included the use of rubber mats to protect the ground during travel and silt socks. The use of the BMPs was documented in inspection reports. Any incidents were recorded on incident forms. Similarly, the GWP required documentation and training of site staff to prevent impact to the local ground water. This generally included documentation of site activities and preparedness, including having a stocked spill kit onsite at all times with the equipment. No emergencies occurred during the field operation that required use of the spill kit.

Areas disturbed by Balter's field operation were repaired in accordance with the SWPP Plan and generally included raking of ruts, seeding, and mulching of these areas. Silt socks were left in place until the grass was established.

Prior to the start of the drilling operation, the borings were cleared for utilities by West Virginia 811. A hydrant permit and water meter were obtained from West Virginia American Water.

A designated staging area was defined in the SWPP Plan and approved by Coonskin Park. This staging area, located near the FAA NAVAID tower within Coonskin Park was used to store supplies and equipment.

3.1.3 SPT Borings

Once the borings were cleared by others, and all permits obtained, Balter mobilized a Mobil B45 rubber track-mounted drill rig to the site to drill the borings. The rig was equipped with conventional 3.25-inch I.D. hollow stem augers and 3.25 I.D. casings, with carbide drill head bits, NQ rock coring equipment, and an automatic hammer.

The borings were drilled to depths ranging from 20 feet below the ground surface (fbgs) to 113 fbgs. Boring depths were modified from the original proposed depths of 50 feet to 150 feet due to time restrictions and findings at each location. Per the scope of work developed by Balter, borings A-1 and A-2 were to be drilled to 150 feet but abandoned at bedrock refusal due to time and budget constraints. Borings P-3, P-4, P-6, and P-7 were planned to be 50 feet deep and generally were drilled to about 50 feet. The remaining borings were planned to be drilled to 75 feet. All of these 75-foot-deep borings were drilled to bedrock refusal which as described below varied in depth. The actual depths were determined by the project engineer onsite at the time of drilling. Shortening of each boring was determined based on the type of rock and quality encountered at that boring along with the surrounding nearby borings.

Standard Penetration Testing (SPT) and sampling were performed through the auger stems at 5-foot intervals to competent bedrock was encountered. One location, A-3, competent bedrock was not encountered, and the boring was abandoned at 60 feet due to difficult drilling conditions.

The testing and sampling procedures were performed in general accordance with ASTM D-1586 procedures, using a standard 2-inch O.D. sampling spoon, driven by a calibrated automatic 140-pound hammer freely falling 30 inches. Once bedrock was encountered, NQ rock coring was performed to depths directed by the Project Engineer.

During the drilling operations, bulk samples of representative soils from each boring were recovered from the auger flights for laboratory evaluation. Shelby tubes were collected at a few locations where fine-grained soils were present.

The drill rig was equipped with an automatic hammer which requires an approximate correction factor of x1.5 to the recorded N-Values based on most recent calibrations. This allows comparison to "standard" N values for a less-efficient manual hammer (N_{60} values, for 60 % energy efficiency). Corrected values (N_{60}) are not shown on the boring logs or profiles but were used in all analyses.

The borings were overseen by an experienced geotechnical engineer or geologist, who logged each boring, collected the samples. The method of classification used in preparing the strata descriptions is based on the Unified Soils Classification System (USCS).

Borings were backfilled with available drill spoils at completion. The three (3) on-airport locations, A-1 through A-3, were grouted at-completion. Remaining drill spoils that would not fit down the borehole were removed from each location and placed on the hilltop near boring P-11. In general, ground water was not encountered in the borings and water was introduced into the ground via the rock coring process. As a result, overnight water levels were not recorded. However, if water was encountered in the boring prior to the coring operation (i.e., borings P-4 and P-16), the boring was allowed to remain open in order to collect an overnight water reading.

3.2 Laboratory Testing Program

One of the purposes of this subsurface study was to evaluate the site soil and rock material for its suitability as reuse as fill for the future runway extension project. As a result, collected soil and pulverized rock samples were selected and subjected to laboratory analyses to estimate their classifications according to the Unified Soils Classification System. This testing included sieve gradation analyses and Atterberg limits determinations.

Bulk samples were collected from various depths of the auger flights. Select samples were evaluated for their compaction properties by the Modified Proctor method. A major concern of the reuse of these soils is the strength of the soils when compacted into a slope. The

selected bulk samples were remolded and subjected to direct shear and residual direct shear testing. Consolidation tests were also performed on these remolded soils to estimate their potential for settlement under the expected significant fill depths. Finally, the SPT samples were tested for their natural moisture contents.

Representative rock samples were subjected to Unconfined Compressive Strength tests. To understand their excavation characteristics. Representative samples of several types of encountered rock were subjected to tests including slaking, Brazilian Tensile, and Cerchar Abrasivity.

The results of our laboratory testing are presented in **Appendix B** and are summarized in **Tables 6** through **7** of Section 4.4 Results of Laboratory Testing. Pocket penetrometer, - #200 sieve, moisture and Atterberg limits testing results are included on the boring logs.

4.0 SUBSURFACE CONDITIONS

4.1 General

This section provides a description of the estimated subsurface conditions encountered at the borings at the time of drilling. Generally, the borings identified a thin surface material (i.e., topsoil, gravel, pavement) overlying natural residual soils overlying Decomposed Rock, Highly Weathered Rock, and Bedrock. A few locations did exhibit man-made fill soils as described below.

The transition between the stratigraphy at the boring locations may be more gradual than indicated on the logs and profiles, and significant variations may occur outside specific boring locations or sampled intervals. The following sections provide a summary of the encountered materials. Note that environmental issues, including contaminated soil and ground water, were not observed at this site.

4.2 Surface Materials

The majority of the borings encountered a thin layer of topsoil at the surface ranging from 1.0 inch to 9.0 inches (0.08 to 0.75 feet) thick. The term “topsoil,” as used in this report refers to surface soils having an apparently significant organic content, based only on visual estimates in the field. It does not imply that the subject materials meet the requirements or specifications for topsoil set by any particular organization or agency.

Two (2) borings, A-1 and P-4 encountered a layer of gravel at the surface ranging from 2.0 inches to 12.0 inches (0.17 to 1.0 feet) thick. Note that boring P-16 was located within in a gravel lot; however, at the boring location there was no discernable thickness of gravel present.

Pavement was encountered in one (1) boring, A-3. The pavement at this location was comprised of 14-inches of concrete (possible P-501) overlying a 7.0-inch-thick aggregate base layer (possible P-209).

No surface material was identified at borings P-3, P-6, P-11, P-15, or P-16. **Table 2** below provides the measured thicknesses of each surface layer.

Table 2 – Measured Surface Layer Thicknesses

Boring	*Topsoil (in)*	*Gravel (in)*	*Total Pavement Thickness (in)*	*Concrete / P-501 (in)*	*Aggregate Base / P-209 (in)*
A-1	---	2.0	---	---	---
A-2	8.0	---	---	---	---
A-3	---	---	21.0	14.0	7.0
P-3	---	---	---	---	---
P-4	---	12.0	---	---	---
P-6	---	---	---	---	---
P-7	1.0	---	---	---	---
P-8	5.0	---	---	---	---
P-9	2.0	---	---	---	---
P-10	1.0	---	---	---	---
P-11	---	---	---	---	---
P-12	9.0	---	---	---	---
P-13	1.0	---	---	---	---
P-14	3.0	---	---	---	---
P-15	---	---	---	---	---
P-16	---	---	---	---	---
P-17	5.0	---	---	---	---
P-18	3.0	---	---	---	---
P-19	4.0	---	---	---	---

4.3 Subsurface Materials

4.3.1 Fill

Fill was identified in the three (3) borings drilled on the airport below the surface materials to depths ranging from 49.5 fbgs to 62 fbgs. This fill was placed as part of the original construction of the airport and is not associated with the limited fill encountered in the Coonskin Park borings. Fill was identified in two (2) borings, P-4 and P-18 within Coonskin Park from below the surface material to depths of 3.0 fbgs and 3.5 fbgs, respectively. Generally, if the soils displayed typical characteristics of fill (i.e., unnatural layers, trash, and debris, etc.) then the soils were labeled as fill. It should be noted that fill soils can be difficult to identify, and detection may not be possible in the field during construction.

The fills encountered on the airport property generally consist of Clay (CL, CL-ML), Sand (SM, SC-SM), Silt (ML), and Gravel (GM). SPT N-values ranged from 3 blows per foot (bpf) to 69 bpf. Denser layers exhibiting N-values of 50 blows for 4 inches to 1 inch of penetration were encountered throughout the fills. These would indicate the presence of layers comprised of rock fragments, or boulders buried in the fill.

The fills encountered in the borings located in Coonskin Park generally consist of soft to stiff Clay (CL) and loose to medium dense Sand (SM) exhibiting SPT N-values ranging from 4 bpf to 15 bpf.

4.3.2 Residual Soils

Residual soil is the result of the in-place weathering of underlying bedrock into soils. These soils were encountered in 15 of the 19 borings at the surface or below the fill soils to depths ranging from 3.0 fbgs to 29.0 fbgs (approximate elevations EL 923.5 to EL 688.0). The residual soils generally consist of soft to hard Clay (CL, CH) and Silt (ML, CL-ML) with some layers of loose to dense Sand (SM, SC). Variable amounts of rock fragments were present throughout the residual soils.

The collected N-values generally ranged from 3 bpf to 48 bpf. Pocket penetrometer values generally ranged from 1.7 tons per square foot (tsf) to 4.5 tsf.

4.3.3 Decomposed Rock

Decomposed Rock was encountered underlying the fills and residual soils in 17 of the 19 borings to depths ranging from 7.0 fbgs to 77.0 fbgs (approximate elevations EL 916.0 to EL 685.0). Balter has defined Decomposed Rock as having SPT N-values greater than 50 bpf and up to 50 blows for 4 inches of penetration. During the sampling process, the split spoon sampler pulverizes the material; therefore, the actual sample may not be representative of the true in-situ condition.

The pulverized Decomposed Rock samples generally consisted of Clay (CL, CH), Silt (ML), and Sand (SM) exhibiting SPT N-values ranging from 50 bpf to 89 bpf and 50 blows for 6 inches to 50 blows for 4 inches of penetration. It must be noted that the subsurface conditions in borings A-2, P-3, P-7, P-8, P-10, P-16, and P-17 encountered Decomposed Rock conditions interbedded with Highly Weathered Rock. This is an indication of higher degrees of weathering that have occurred in the underlying rock profile and will be represented in zones that may require less effort to excavate during construction.

4.3.4 Highly Weathered Rock

Highly Weathered Rock was encountered underlying the residual and Decomposed Rock in 16 of the 19 borings to depths ranging from 20.0 fbgs to 113.0 fbgs (approximate elevations EL 906.0 to EL 789.0). Balter has defined Highly Weathered Rock as having SPT N-values greater than 50 blows for 3 inches of penetration. During the sampling process, the split spoon sampler pulverizes the material; therefore, the actual sample may not be representative of the true in-situ condition.

The pulverized Highly Weathered Rock samples generally consisted of Clay (CL), Silt (ML, CL-ML), Sand (SM), and Rock Fragments (GM). Similarly, Highly Weathered Rock was encountered interbedded with Decomposed Rock in borings A-2, P-3, P-7, P-8, P-10, and P-17. This would represent harder layers exhibiting less weathered zones. In addition, zones of

SPT N-values of 50 blows for 0 inches of penetration were encountered in many of the borings. An N-value of 50 blows for 0 inches of penetration would represent a "competent" bedrock layer; however, based on the field operations, this dense rock was penetrable (albeit slowly) using hollow stem augers. This would suggest that it is excavatable provided appropriate rock excavation equipment is used. In large open areas this layer may be rippable.

All borings, except boring A-3, encountered auger refusal on Bedrock. Bedrock is discussed further below. **Table 3** provides the depths (and approximate elevations) of the materials encountered.

Table 3 – Subsurface Material Depths [(1), (2)]

Boring	*Approximate Ground Elevation (ft)*	*Fill*		*Residual Soil*		*Decomposed Rock [(3)]*		*Highly Weathered Rock [(4)]*		*Bedrock [(5)]*	
		Depth (ft)	*Approx. Elevation (ft)*	*Depth (ft)*	*Approx. Elevation (ft)*	*Depth (ft)*	*Approx. Elevation (ft)*	*Depth (ft)*	*Approx. Elevation (ft)*	*Depth (ft)*	*Approx. Elevation (ft)*
A-1	900.0	0.2	899.8	---	---	57.0	843.0	77.0	823.0	106.0	794.0
A-2	900.0	4.0	896.0	---	---	52.0[(6)]	848.0	72.0	828.0	113.0	787.0
A-3	952.0	1.8	950.3	---	---	---	---	---	---	---	---
P-3	761.0	---	---	0.0	761.0	3.0[(7)]	758.0	17.0	744.0	20.0	741.0
P-4	700.0	1.0	699.0	3.0	697.0	12.0	688.0	---	---	15.0	685.0
P-6	810.0	---	---	0.0	810.0	3.0	807.0	12.0	798.0	20.0	790.0
P-7	812.0	---	---	0.1	811.9	7.0[(8)]	805.0	3.0[(8)]	809.0	43.0	769.0
P-8	908.0	---	---	0.4	907.6	7.0	901.0	37.0	871.0	54.0	854.0
P-9	871.0	---	---	0.1	870.9	3.0	868.0	12.0	859.0	34.0	837.0
P-10	928.0	---	---	0.1	927.9	13.5	914.5	17.0	911.0	26.0	902.0
P-11	1010.0	---	---	---	---	---	---	---	---	0.0	1010.0
P-12	814.0	---	---	0.8	813.3	9.0	805.0	23.5	790.5	25.0	789.0
P-13	900.0	---	---	0.1	899.9	12.5	887.5	17.5	882.5	25.0	875.0
P-14	869.0	---	---	0.3	868.8	14.0	855.0	22.0	847.0	40.0	829.0
P-15	928.0	---	---	0.0	928.0	14.0	914.0	24.0	904.0	58.6	869.4
P-16	896.0	---	---	0.0	896.0	8.0	888.0	22.0	874.0	54.0	842.0
P-17	938.0	---	---	0.4	937.6	14.5	923.5	22.0	916.0	58.0	880.0
P-18	915.0	0.3	914.8	3.5	911.5	13.5	901.5	22.0	893.0	27.0	888.0
P-19	935.0	---	---	0.3	934.7	29.0	906.0	37.0	898.0	53.5	881.5

Notes: (1) First and highest occurrence
(2) P-5 not drilled
(3) N value = greater than 50 bpf to 50 blows for 4 inches of penetration
(4) N value = greater than 50 blows for 3 inches of penetration
(5) N Value = 50 blows for no penetration
(6) Decomposed Rock interbedded with zones of harder Highly Weathered Rock from 49.5 to 72.0 feet.
(7) Decomposed Rock interbedded with zones of harder Highly Weathered Rock from 3.0 to 17.0 feet.
(8) Decomposed Rock and Highly Weathered Rock interbedded from 3.0 to 24.0 feet. Continuous Highly Weathered Rock encountered at 27.0 feet.

4.3.5 Bedrock

As described above, the bedrock encountered at the subject site is consistent with the Conemaugh Formation and the Charleston Sandstone Formation (Windolph, Jr., 1987). These bedrock units are comprised of interbedded layers of Siltstone, Sandstone, and Shale. Seems of Coal were noted in a few boring locations. Bedrock has been arbitrarily defined as having SPT N-values of 50 blows for no penetration. In some instances, including borings A-1, A-2, advancement of the augers deeper was still possible when a 50/0" N-value was achieved, most

likely due to natural fractures, low compressive strength, and joints allowing for pulverization of the bedrock. In these cases, bedrock was determined by the inability to advance the augers deeper (i.e., auger refusal).

The structure of each bedrock type can be defined by the presence of orientation of the discontinuities. The term discontinuity, as applied in this work, refers to naturally occurring discontinuities in the rock mass (e.g., joints, shear zones, and faults). In general, it appears that the siltstone and shale bedrock is very similar in structure with laminar to very thin bedding planes. Sandstone is generally massive; however, that does not suggest it exhibits less discontinuities.

The discontinuities were observed and described in each of new rock cores. The majority of the discontinuities dipped horizontally (0 to 4 degrees) to low angles (5 to 35 degrees), with moderate to high dip angles occurring locally. Rock core descriptions are shown on Rock Core logs provided behind each boring log in **Appendix B**.

The joints throughout the bedrock layers exhibited discoloration of the joint surfaces typically resulting from iron or manganese oxide staining. This is due to water table fluctuations or surface infiltration in the weathered rock leading to precipitation of iron and manganese carried by the groundwater. Ground water was not present in the majority of the borings, so water that flows through the joints appears to be periodic. Infilling with silt and clay is present in many locations.

Overall, the bedrock is in a slightly weathered condition with interbedded zones of fresh rock (little to no weathering) to zones of completely disintegrated rock (i.e., weathered to a residual soil). These zones of complete disintegration would be identified during construction as an area that may be easier to excavate than a fresh rock location.

Rock core recoveries were generally greater than 95 percent, except in boring P-4 where coal was interbedded with shale. Recoveries in those zones were generally less than 20 percent.

The Rock Quality Designation, or RQD, of each rock core specimen was estimated. RQD refers to the percentage of the sampled rock length that consists of continuous, unfractured rock segments of 4 inches or greater (not including mechanical fractures or solution ‘healed’ joints) between discontinuities. Generally, the RQD is directly related to the rock integrity, which in turn is an indication of the effects of tectonic (i.e., stress) history and physical/chemical weathering on the rock. The RQD of the rock cores were commonly in the fair to excellent range (RQD 51 to 100); with some occasional core runs in the poor range (RQD 25 to 49). For this project, it is perhaps desirable to have a lower RQD which would suggest more joints and fractures are present which would be more rippable during construction. Higher RQDs indicate more competent rock possibly indicating a higher degree of rock excavation present.

Table 4 below provides a summary of the rock conditions encountered.

Table 4 – Rock Quality Designations (RQD)

Boring	Ground Elevation (ft)	Core Run	Run Depth (ft)		Run Elevation (ft)		Rock Type	Recovery (%)	RQD (%)	Rock Quality[1]
			Start	End	Start	End				
P-3	761.0	1	20.0	24.0	741.0	737.0	Siltstone	100	83	Good
		2	24.0	29.0	737.0	732.0	Siltstone	100	90	Good
		3	29.0	34.0	732.0	727.0	Siltstone	100	90	Good
		4	34.0	39.0	727.0	722.0	Sandstone	100	93	Excellent
		5	39.0	44.0	722.0	717.0	Siltstone, Sandstone	100	93	Excellent
		6	44.0	49.0	717.0	712.0	Sandstone, Siltstone	100	85	Good
P-4	700.0	1	15.0	19.0	685.0	681.0	Siltstone	100	48	Poor
		2	19.0	24.0	681.0	676.0	Siltstone	100	43	Poor
		3	24.0	29.0	676.0	671.0	Siltstone, Shale, Coal	17	0	Very Poor
		4	29.0	34.0	671.0	666.0	Shale, Coal	100	57	Fair
		5	34.0	39.0	666.0	661.0	Shale, Coal	93	38	Poor
		6	39.0	44.0	661.0	656.0	Shale, Coal	0	0	Very Poor
P-6	810.0	1	20.0	24.5	790.0	785.5	Siltstone	100	81	Good
		2	24.5	29.5	785.5	780.5	Siltstone, Sandstone	100	100	Excellent
		3	29.5	34.5	780.5	775.5	Siltstone	100	100	Excellent
		4	34.5	39.5	775.5	770.5	Siltstone	90	55	Fair
		5	39.5	44.5	770.5	765.5	Sandstone	100	100	Excellent
		6	44.5	49.5	765.5	760.5	Siltstone	100	87	Good
P-8	908.0	1	54.0	59.0	854.0	849.0	Siltstone	100	88	Good
		2	59.0	64.0	849.0	844.0	Siltstone, Shale	100	97	Excellent
		3	64.0	69.0	844.0	839.0	Shale	97	68	Fair
		4	69.0	74.0	839.0	834.0	Shale, Siltstone	95	77	Good
P-9	871.0	1	34.0	39.0	837.0	832.0	Sandstone	100	78	Good
		2	39.0	43.0	832.0	828.0	Sandstone	100	50	Poor
P-10	928.0	1	26.0	29.5	902.0	898.5	Shale, Siltstone	100	87	Good
		2	29.5	34.5	898.5	893.5	Siltstone	100	68	Fair
		3	34.5	39.5	893.5	888.5	Siltstone, Sandstone	100	94	Excellent
		4	39.5	44.5	888.5	883.5	Sandstone	100	99	Excellent
		5	44.5	49.5	883.5	878.5	Sandstone, Shale	93	58	Fair
		6	49.5	54.5	878.5	873.5	Shale, Siltstone, Sandston	98	86	Good
		7	54.5	59.5	873.5	868.5	Sandstone, Siltstone	100	93	Excellent
		8	59.5	64.5	868.5	863.5	Sandstone, Shale	97	93	Excellent

Notes: (1) Rock Quality as defined on Table 39, section 6.2.3 of FHWA-IF-02-034 – Evaluation of Soil and Rock Properties.

Table 4 – Rock Quality Designations (RQD) Cont'd

Boring	Ground Elevation (ft)	Core Run	Run Depth (ft)		Run Elevation (ft)		Rock Type	Recovery (%)	RQD (%)	Rock Quality[1]
			Start	End	Start	End				
P-11	1010.0	1	0	4.2	1010.0	1005.8	Sandstone	100	71	Fair
		2	4.2	9.2	1005.8	1000.8	Sandstone	100	99	Excellent
		3	9.2	14.2	1000.8	995.8	Sandstone	100	92	Excellent
		4	14.2	19.2	995.8	990.8	Siltstone	100	100	Excellent
P-12	814.0	1	25.0	29.6	789.0	784.4	Siltstone	100	75	Fair
		2	29.6	34.6	784.4	779.4	Siltstone, Sandstone	100	70	Fair
		3	34.6	39.6	779.4	774.4	Sandstone	100	100	Excellent
		4	39.6	44.6	774.4	769.4	Sandstone	100	100	Excellent
		5	44.6	49.6	769.4	764.4	Sandstone, Siltstone	100	97	Excellent
P-13	900.0	1	25.0	29.2	875.0	870.8	Sandstone, Siltstone	86	61	Fair
		2	29.2	34.2	870.8	865.8	Shale, Siltstone	100	55	Fair
		3	34.2	39.2	865.8	860.8	Sandstone	100	83	Good
		4	39.2	44.2	860.8	855.8	Sandstone	100	68	Fair
		5	44.2	49.2	855.8	850.8	Sandstone	93	87	Good
P-14	869.0	1	40.0	45.0	829.0	824.0	Sandstone, Shale Siltstone	100	88	Good
		2	45.0	50.0	824.0	839.0	Siltstone	100	100	Excellent
		3	50.0	55.0	839.0	834.0	Siltstone	100	87	Good
		4	55.0	60.0	834.0	829.0	Shale	100	92	Excellent
P-16	896.0	1	54.0	58.3	842.0	837.7	Sandstone	100	42	Poor
		2	58.3	63.3	837.7	832.7	Sandstone	100	57	Fair
		3	63.3	68.3	832.7	827.7	Sandstone	100	95	Excellent
		4	68.3	71.3	827.7	824.7	Sandstone, Shale	100	64	Fair
P-17	938.0	1	58.0	63.0	838.0	833.0	Siltstone	97	60	Fair
		2	63.0	68.0	833.0	828.0	Sandstone, Siltstone	100	74	Fair
		3	68.0	73.0	828.0	823.0	Siltstone, Shale	100	63	Fair
P-18	915.0	1	27.0	31.5	888.0	883.5	Siltstone, Sandstone	100	59	Fair
		2	31.5	36.5	883.5	878.5	Shale, Siltstone	100	58	Fair
		3	36.5	41.5	878.5	873.5	Shale, Siltstone	100	8	Very Poor
		4	41.5	46.5	873.5	868.5	Shale	100	28	Poor
		5	46.5	51.5	868.5	863.5	Siltstone	100	62	Fair
		6	51.5	56.5	863.5	858.5	Siltstone, Sandstone	100	66	Fair
		7	56.5	60	858.5	855.0	Siltstone, Sandstone	100	55	Fair

Notes: (1) Rock Quality as defined on Table 39, section 6.2.3 of FHWA-IF-02-034 – Evaluation of Soil and Rock Properties.

Table 5 summarizes the rock properties for each rock type, which are based on the collected field and laboratory results presented in **Appendix D** of this report.

Table 5 –Bedrock Properties

Rock type	General Weathering	RQD[1] Values	Typical Joint Dip Angles	UC[2] Tests (ksi)	Splitting Tensile Strength (ksi)	Slake Durability (%)
Shale	Slightly Weathered to Fresh	0 – 92 Avg. 54	0 – 84 Avg. 6.8	4.66[3]	(4)	(5)
Siltstone	Slightly Weathered to Fresh	0 - 100 Avg. 74	0 – 79 Avg. 10.0	5.4 – 5.9 Avg. 5.7	0.57 – 1.1 Avg. 0.84	96.9 - 98.0 Avg. 97.4
Sandstone	Slightly Weathered to Fresh	42 – 100 Avg. 81	0 – 77 Avg. 8.6	2.5 – 7.7 Avg. 6.1	0.35 – 0.75 Avg. 0.51	96.5 – 97.8 Avg. 97.1

Notes: (1) RQD – Rock Quality Designation
(2) Unconfined Compression
(3) Only 1 Shale sample tested
(4) Not Tested
(5) Not Tested; assume Low Slake Durability

Future studies for final design will benefit from additional borings to evaluate the rock conditions across the proposed cut area. It would also be beneficial to incorporate a geophysical evaluation using seismic refraction methods. Seismic refraction will produce subsurface shear wave velocities that can be correlated to rippability of the underlying bedrock. This information would be valuable to provide contractors who could potentially provide more competitive pricing.

4.4 Results of Laboratory Testing

The completed laboratory index tests performed on samples of the subsurface materials are summarized on the following **Table 6**. The laboratory results are presented in graphic form in **Appendix B**.

Table 6 – Laboratory Test Results

Boring	Sample Depth (ft)	USCS Class.(1)	In-Place Moisture (%)	Atterberg Limits(2)			- #200 Sieve (%)	Modified Proctor (3)	
				LL	PL	PI		MDD (pcf)	OMC (%)
A-2	43.5-45	CL (F)	9.1	26	18	8	77.0	---	---
A-3	8.5-10	CL (F)	19.7	29	20	9	91.1	---	---
A-3	60-62	CL (F)	13.0	34	19	15	69.1	---	---
P-3	0-1.5	ML (R)	16.9	42	26	16	96.6	---	---
P-4	0-1.5	SM (F)	6.5	NP	NP	NP	28.0	---	---
P-6	3.5-5.0	CL (DR)	9.8	35	24	11	93.8	---	---
P-7	10-15	SM (DR/HWR)	10.5	NP	NP	NP	34.3	128.5	9.1
P-7	18.5-20	CL (DR)	9.3	29	17	12	75.4	---	---
P-8	43.5-45	CL (DR)	6.7	31	19	12	94.5	---	---
P-12	13.5-15	CL (DR)	10.9	34	21	13	98.1	---	---
P-12	20-25	CL (DR)	4.9	25	17	8	63.6	132.6	8.6
P-13	0-5	CH (R)	23.3	51	23	28	77.6	117.8	14.6
P-13	13.5-15	CL (DR)	6.3	26	17	9	91.0	---	---
P-14	8.5-10	CL (R)	13.7	29	18	11	53.4	---	---
P-14	30-35	CL (HWR)	4.7	25	15	10	54.1	139.0	7.2
P-15	30-35	CL (HWR)	6.0	31	17	14	76.0	132.5	8.3
P-16	2-6	CH (R)	21.1	57	21	36	74.6	117.6	15.2
P-16	43.5-45	SC-SM (HWR)	8.3	23	16	7	13.0	---	---
P-18	13.5-15	CL (DR)	6.1	28	16	12	66.4	---	---
P-19	0-5	SC (R)	14.7	29	17	12	47.7	124.5	10.6
P-19	18.5-20.5	CL (R)	14.0	31	20	11	92.8	---	---

Notes: (1) F = Fill; R = Residual; DR = Decomposed Rock, HWR = Highly Weathered Rock
(2) NP = Non-Plastic
(3) Modified Proctor performed in accordance with ASTM D-1557; MDD = Maximum Dry Density, OMC = Optimum Moisture Content

Table 7 below provides the test results for the Consolidation tests, Direct Shear tests, Residual Direct Shear tests, and unit weight tests.

Table 7 – Consolidation and Direct Shear Test Results

Boring	Sample Depth (ft)	USCS	Natural Moisture Content (%)	Atterberg Limits[1]			-#200 Sieve (%)	Direct Shear		Residual Direct Shear		Consolidation			
				LL	PL	PI		C (tsf)	Φ (degrees)	C' (tsf)	Φ' (degrees)	C_V[2] (ft/day)	C_C[3] (tsf)	P_C[4] (tsf)	Swell Pressure (tsf)
A-3	60-62	CL	13.3	34	19	15	69.1	1.15	21.2	---	---	---	---	---	---
P-7	10-15	SM (DR/HWR)	10.5	NP	NP	NP	34.3	---	---	---	---	0.02 / 0.03	0.17	26.0	0.11
P-12	20-25	CL (DR)	4.9	25	17	8	63.6	0.81	28.5	0.60	24.5	---	---	---	
P-13	0-5	CH (R)	23.3	51	23	28	77.6	0.75	26.0	---	---	0.01 / 0.004	0.26	9.0	1.52
P-14	30-35	CL (HWR)	4.7	25	15	10	54.1	0.82	30.5	0.65	17.0	0.04 / 0.03	0.17	11.0	0.63
P-15	30-35	CL (HWR)	6.0	31	17	14	76.0	0.65	23.2	---	---	---	---	---	
P-19	0-5	SC (R)	14.7	29	17	12	47.7	0.54	30.6	---	---	0.02 / 0.03	0.21	16.0	0.8
P-19	20-20.5	CL (R)	14.0	31	20	11	92.8	0.78	27.5	0.00	5.0	---	---	---	

Notes: (1) NP = Non-Plastic
(2) C_V for 0.5 KSF and 2 KSF shown
(3) C_C = Compression Index
(4) P_C = Estimated Preconsolidation Pressure (Tavenas Method)

Table 8 below provides the test results performed on the rock core samples including Unconfined Compression, Splitting (Brazilian) Tensile Strength, Slake Durability, and Cerchar Abrasivity.

Table 8 – Rock Core Test Results

Boring	Depth (ft)	Visual Description	UCT (psi)	Slake Durability Index (%)	Brazilian Tensile Strength (psi)	Cerchar Abrasivity Index
P-8	64-64.5	Shale	4,661	---	---	---
P-8	72-72.5	Siltstone	5,988	---	---	---
P-9	37.5-38	Sandstone	2,547	---	---	---
P-10	45-45.5	Sandstone	5,985	---	---	---
P-11	5-5.5	Sandstone	7,709	---	---	---
P-11	9-9.9	Sandstone	---	---	747	1.52
P-11	14-15.4	Siltstone	---	98.0	572	2.44
P-12	34.7-35.1	Sandstone	---	96.5	349	1.89
P-12	43-43.5	Sandstone	7,330	---	---	---
P-13	44-45.2	Sandstone	---	97.8	445	2.74
P-14	45.6-46.5	Siltstone	---	96.9	1,100	4.21
P-16	60-60.5	Sandstone	7,127	---	---	---
P-18	50-50.5	Siltstone	5,467	---	---	---

Note that the slake durability index indicates that the siltstone and sandstone bedrock does not break down easily when exposed to wetting and drying and that crushing or pulverizing using mechanized equipment will be necessary. It would be expected that the site shale bedrock would break down easier, although equipment may still be necessary. The Cerchar Abrasivity results generally range from medium abrasiveness (<2.0) to high abrasiveness (~2.0 to 4.0) to extreme abrasiveness (>4.0).

4.5 Groundwater Conditions

Groundwater observations were made during the drilling operation and immediately after the augers or casing were withdrawn. In general, during drilling operations ground water was not encountered, except in borings P-4 and P-16 at depths of 12. 0 fbgs (EL 688.0) and 43.0 fbgs (EL 853.0), respectively. Recorded water levels are present on top of the underlying bedrock layer.

Water was not encountered in the other 17 borings; however, that does not mean groundwater is not present only that the borings did not penetrate deep enough to encounter groundwater, or the water is periodic. Evidence of groundwater was noted in joints and fractures in the collected bedrock via weathering and soil infill suggesting water is periodically present in the rock joints and fractures at times. In open cuts water may be observed flowing out of the exposed joints.

Water from other sources (i.e., weather related, runoff, utility leaks) could also affect construction and long-term use; however. Subsurface water levels naturally fluctuate with

changes in rainfall and runoff, construction and development activities, and other causes. Future groundwater levels across the site should be expected to vary from those noted during the recent exploration program.

5.0 EVALUATION AND RECOMMENDATIONS

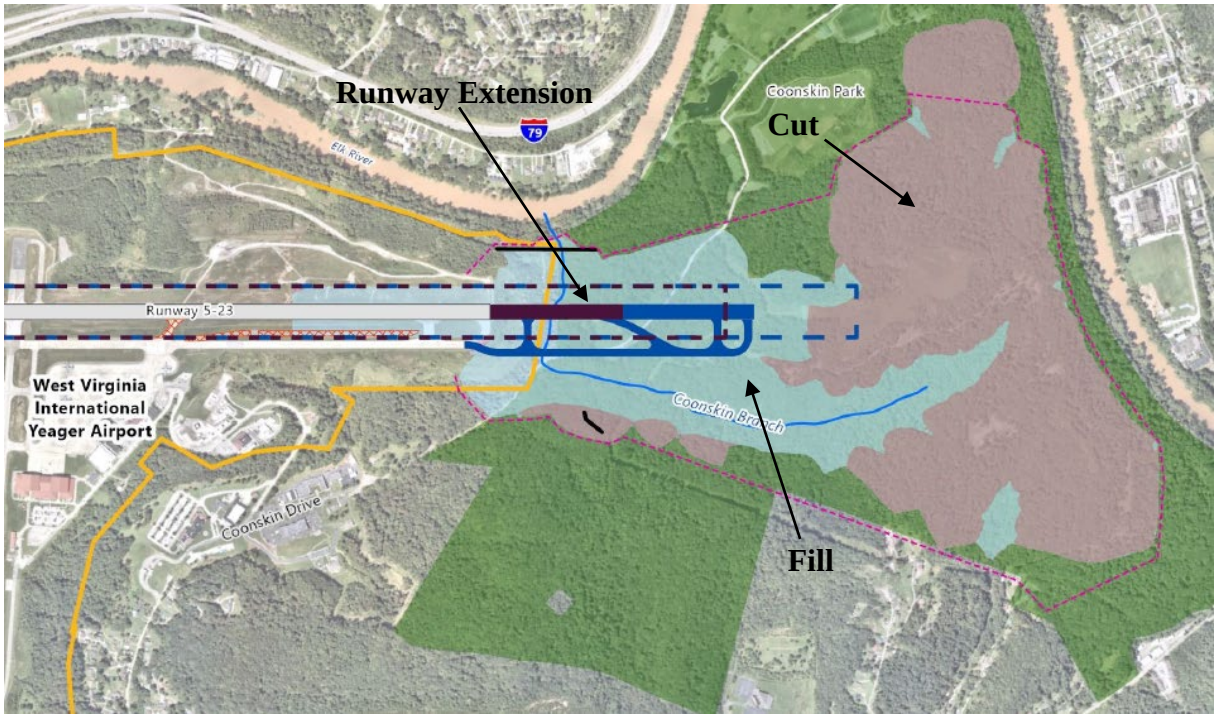
5.1 General

The intent of this geotechnical assessment is to evaluate the suitability of the subsurface materials within Coonskin Park for reuse as controlled, compacted fills in the future runway 5-23 extension. A total of 25 million cubic yards is required to construct the future extension. Further preliminary assessments of the site conditions were also performed at the existing terminal for a future potential gate expansion. Discussions on the feasibility of this project related to geotechnical parameters is provided below. Note that discussions and recommendations provided herein are preliminary and additional geotechnical information and analyses would be required for final design.

5.2 Site Subsurface Conditions and Suitability for Reuse

As described above, the subsurface materials encountered throughout Coonskin Park consisted primarily of natural residual soils overlying Decomposed Rock, Highly Weathered Rock, and bedrock. Upwards of 25 million cubic yards of fill will be required to raise the grade at the northeast end of Runway 5-23 to construct an extension. **Figure 5** below provides an approximate cut/fill boundary within Coonskin Park for the anticipated project.

Figure 5 – Proposed Cut and Fill Areas



The purple-pink area shown in Figure 6 is roughly 8.7 million square feet of area. To generate 25 million cy of fill would require lowering this cut area an average of about 80 feet below the current elevations. A combination of conventional earthwork equipment, blasting, and rock excavation equipment would be necessary to remove these materials. In general, the subsurface layers encountered the following materials:

- Existing fill soils were encountered only in boring P-18 in the cut areas. These fills were comprised of Lean Clay (CL).
- Natural Residual soils were encountered throughout the cut area to depths ranging from 3.0 fbgs to 14.0 fbgs and are generally comprised of Clay (CL, CH) and Silt (ML, CL-ML) with varying amounts of Sand (SM, SC) and rock fragments. The clays should be considered moisture sensitive and can exhibit swelling potential; however, they do include a sand fraction on the order of 20 percent or more in the majority of samples collected. There were some samples tested that exhibited fractions of sand less than 10 percent (P-19, 18.5-20.5 feet), which seems to be common among the Shale and Siltstone Decomposed Rock and Highly Weathered Rock samples, as discussed below.
- Decomposed Rock and Highly Weathered Rock was encountered across the entire area to depths ranging from 7.0 fbgs to 58.6 fbgs. At times they are interbedded indicating excavations will encounter differing degrees of difficult excavating conditions. Although these materials are very hard, they were easily penetrated by the drilling process and pulverized into soil immediately. That suggests these materials, generally classified as Clay (CL, CH), Silt (ML, CL-ML), Sand (SM, SC-SM), and Rock Fragments (GM) will be rippable using conventional excavation equipment. Based on visual observations and laboratory testing, breaking these materials down during the mass grading operation appears feasible using conventional construction equipment. Blasting may still be required in this zone; however. Because of their fine-grained nature, they also be moisture sensitive with a potential for swelling.
- Bedrock was encountered underlying all of the above-mentioned materials. The bedrock is comprised of interbedded layers of Sandstone, Shale, and Siltstone within the cut areas. Based on the rock cores collected and the natural fractures exhibited in the cores, the Shale and Siltstone will be easier to excavate and pulverize than the Sandstone. The natural joints and fractures in the Shale and Siltstone area such that they may be rippable using conventional earthwork equipment; however, rock excavation methods, including blasting, will be required. Sandstone, unless highly fractured may present the biggest challenge to excavation and will likely require methods such as drilling and blasting. Reducing the bedrock to manageable sizes appropriate for use in controlled fills may also be difficult and will require a full-time crushing operation. Full-time inspection oversight along with diligent observations of the crushing operation must be performed to verify that proper sized materials are generated by the Contractor.

In our opinion, the site materials are suitable for use as controlled fills for the future extension project. Although suitable, handling and processing of these materials will be required, including crushing of bedrock. This operation must be overseen by a full-time inspection team to verify suitable sizes are being created and placed properly. Furthermore, all excavation operations should be overseen by a full-time inspection team to identify materials that may not be suitable for reuse, if present. Site materials including asphalt pavements and old concrete structure may be reused in the fills provided they are pulverized into manageable sizes (as described below) and mixed into the site soils.

Future studies for final design will benefit from additional borings to evaluate the rock conditions across the proposed cut area. It would also be beneficial to incorporate a geophysical evaluation using seismic refraction methods. Seismic refraction will produce subsurface shear wave velocities that can be correlated to rippability of the underlying bedrock. This information would be valuable to provide contractors who could potentially provide more competitive pricing.

As generally indicated above, there are issues, such as moisture sensitivity, swelling, oversized rock particles, etc.; however, these materials are commonly used for this purpose and can be placed successfully with a competent contractor and optimal quality assurance oversight.

5.3 Excavation and Fill Placement Methods

Prior to excavation of any fill soil from the cut areas or placement of fill soils, the existing trees, topsoil, and all vegetation must be completely removed and hauled offsite. It is recommended that the tree stumps also be removed completely as they may interfere with the required benching and undercutting requirements for fill placement. Topsoil collected may be reused if surface topsoil is required in the future. Otherwise, it should be hauled away.

The proposed fill areas are generally located through the existing Coonskin Branch valley as well as up the existing hillside slopes. The existing ground surfaces in the valleys must be cleaned of loose, unsuitable materials to expose competent, stable subgrades. Failure to remove these soils may result in excessive settlements as well as unstable slope bases. Soil-bedrock boundaries, if not stabilized (i.e., remove loose materials) could be potential slide surfaces.

It is strongly recommended that all embankment toes are supported on an excavated keyway. Keyways would be excavated down into some competent material at a width of at least 20 feet wide on either side of the embankment toe and then backfilled with compacted soil for the entire embankment toe length on all sides. This will create a stable base for the embankment toe to bear upon. For final design of the project, we recommend that additional borings be drilled along the proposed embankment toe location to identify the subsurface conditions along the final embankment toe location.

Once all fill areas are prepared and suitable base subgrades are achieved, a proper drainage system should be installed. At a minimum, drains should be placed in the existing stream valley as well as along existing major drainage pathways on the hillsides to collect subsurface water flowing through bedrock fractures and drain it away from the fills. Underdrains should be designed to withstand significant fill pressures. Drainage pipes should bear on suitable subgrade soil, Decomposed Rock, Highly Weathered Rock, or bedrock, and be backfilled in accordance with FAA, local, state, or federal requirements. Although the drains would be placed at the base of the embankment fill, they should be placed in a properly excavated trench and backfilled with a granular soil and wrapped in a non-woven geotextile (i.e., Mirafi 160N or equivalent) so that future fill placement does not damage the pipe. Once the drainage system is installed, fill placement can begin. We also recommend drains be placed in the fills at the below mentioned bench locations (~every 50 feet in height). This will allow for capture and removal of water that becomes trapped in the embankment.

The placement of fill in appropriately compacted lifts is critical for future stability of this significant proposed embankment. Placement of fill should be performed in accordance with FAA guidelines and local or state standards. The West Virginia Department of Transportation – Standard Specifications – Roads and Bridges (2017 edition, 2022 Supplemental Specifications) does provide detailed guidelines on embankment fills. Note that this referenced specification allows for rock sizes upwards of 36 inches in any dimension. We recommend that this requirement be reduced to no greater than 12-inches in any dimension. This will permit better inclusion with the soil fraction of the fills and reduce the potential for nesting of rocks in the embankment. Overall, with the exception of the Sandstone bedrock, the site bedrock is such that this should be achievable. Sandstone and some fraction of Siltstone will need to be crushed onsite to achieve this size. Full-time oversight of the crushing operation as well as the fill placement operation must be performed to verify that oversized material is not placed in the site fills. This is critical to construction of a stable slope.

Appropriate equipment, including dozers equipped with or towing sheepsfoot rollers must be used to place, mix, and compact the site soils. Slope faces must be compacted or overbuilt and trimmed at the appropriate slope angle desired. Because the majority of site materials to be used as fill are fine-grained (i.e., clays and silts), they should be placed at moisture contents of $\pm$ 2% of optimum and compacted to at least 95 percent of the Modified Proctor (ASTM D1557).

As fills are placed up the existing hillsides, the exposed hillsides must be vertically benched and compacted fills placed against the vertical benches. Underdrains should also be placed along cut faces of slopes and slope base foundations.

5.4 Preliminary Slope Stability

A preliminary slope stability analysis was performed to support recommendations for the use of onsite soil within the embankment and slopes. For slope stability, Slide 6.0 was used for this preliminary analysis. Slide 6.0 is a two-dimensional slope stability software using various limiting equilibrium procedures by the method of slices (each assumed failure body is divided

into a number of slices, to simplify the calculation of the applicable forces). Multiple methods were used to evaluate the stability with Slide 6.0, including Simplified Janbu and Simplified Bishop. Generally, all methods provided similar results.

The following soil parameters were used in the preliminary evaluation for each soil layer.

Table 9 – Soil Parameters for Preliminary Slope Stability

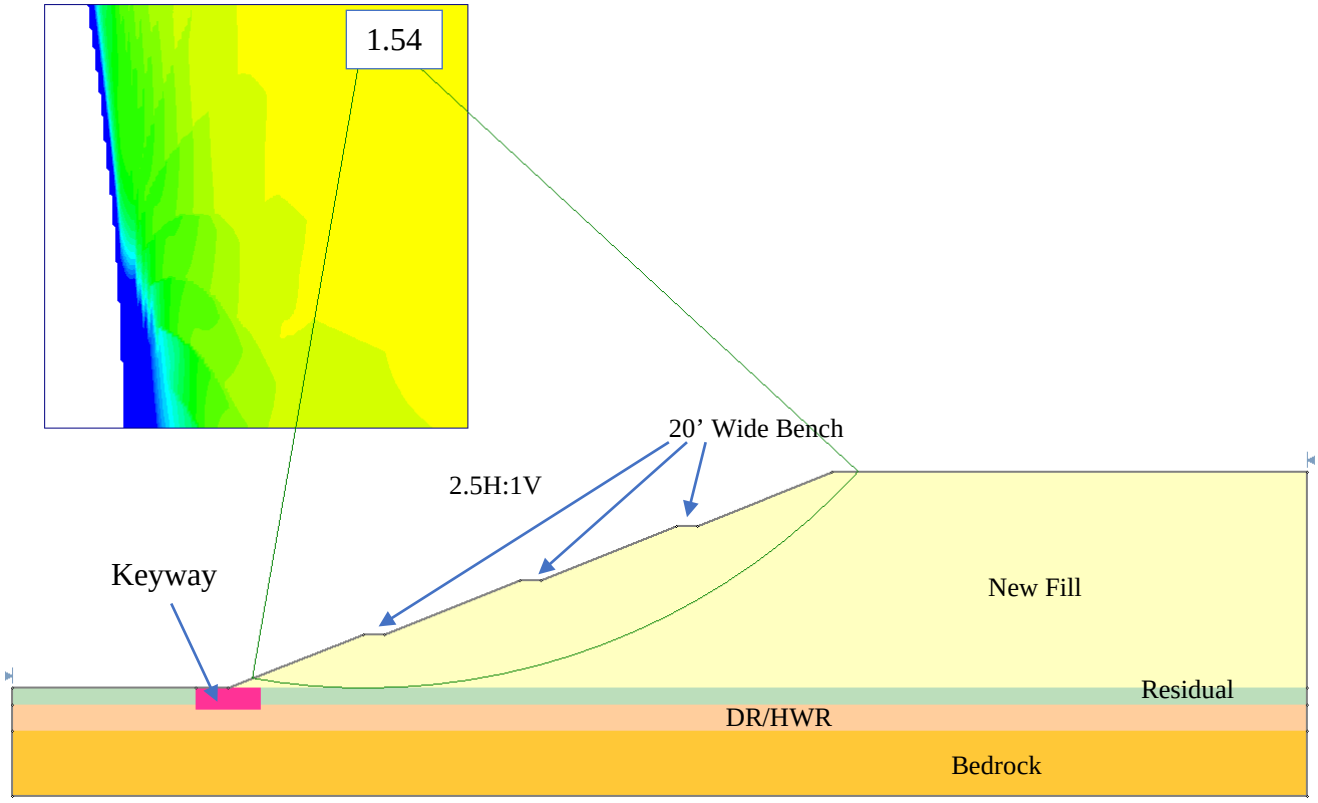
Soil Type	Unit Weight (pcf)	Cohesion (psf)	Friction Angle (°)
New Fill (from Coonskin Park)	130.0	500	23
Residual	135.0	750	28
Decomposed Rock/Highly Weathered Rock	140.0	0	35
Bedrock	155.0	0	42

The parameters used are based on our laboratory testing, which included Proctor compaction tests and direct shear tests. As shown above in Table 7, the cohesions measured for the recompacted soils are higher than the more conservative value of 500 psf used in the evaluation. The most conservative friction angle (23°) was used to model the fills. Recompacted soils tested were compacted to 95 percent of the Modified Proctor of those soils at a moisture content of $\pm$2 percent of the optimum moisture. We assumed water was not present in the fill section.

A few scenarios for the new embankment slope were evaluated, including a 2 Horizontal (H) : 1 Vertical (V) slope and a 2.5H:1V slope. The desired slope factor of safety for stable fill slopes is 1.5. In both cases, factors of safety using the parameters provided in Table 9, factors of safety of 1.1 and 1.4 were reported, respectively, both which do not meet the minimum factor of safety of 1.5.

Alternate slope configurations were also evaluated, including new fill slopes with benches present throughout. There are most likely many configurations; however, for this preliminary assessment we assumed that a bench would be constructed every 50 feet of height in the slope (height of 200 feet). Using the 2H:1V and 2.5H:1V slope configurations factors of safety of 1.4 and 1.54, respectively were achieved. For preliminary design, we recommend that the new embankment consist of a slope configuration that is comprised of 2.5H:1V slopes with benches every 50 feet of height. The benches should have a minimum width of 20 feet. **Figure 6** below provides the Slide 6.0 output for this configuration.

Figure 6 – Preliminary Slope Stability Analysis



The use of benches would also allow for installation of subsurface drains throughout the fill embankment at various elevations to capture water that becomes trapped in the fills via rainfall or heavy precipitation. This would allow for drainage to those benches and diversion of water to a local storm drain and off of the slope.

Note that the recommendation for a 2.5H:1V slope complete with benches is just preliminary. There are potentially other slope stability methods that may be feasible to support, and even steepen the embankment slope if needed. Other methods, including fill placement with geogrid support, soil nailing, etc., could be feasible. Final design should assess those options as well.

5.5 Settlement

Settlement should be expected to occur within the entire embankment not only from the weight of the fill upon itself, but the underlying site soils and rock. In general, the subsurface materials encountered in the borings drilled in the fill areas (P-3, P-4, P-6, and P-7) generally included a thin layer of residual overburden overlying Decomposed Rock, Highly Weathered Rock, and Bedrock. The residual overburden was thicker at boring P-4, which was located at

the lowest point of the study (EL 700) and would require the most fill (200'+). The underlying bedrock also included interbedded layers of shale and coal at this location.

At the deepest areas of fill, such as the P-4 area, fills upwards of 200 feet thick may result in excessive settlements upwards of 10 feet. Conversely settlements at locations higher in elevation with less fill required will result in less settlement. For instance, approximately 88 feet of fill is required in the area of P-7, which would result in about 3 feet of settlement.

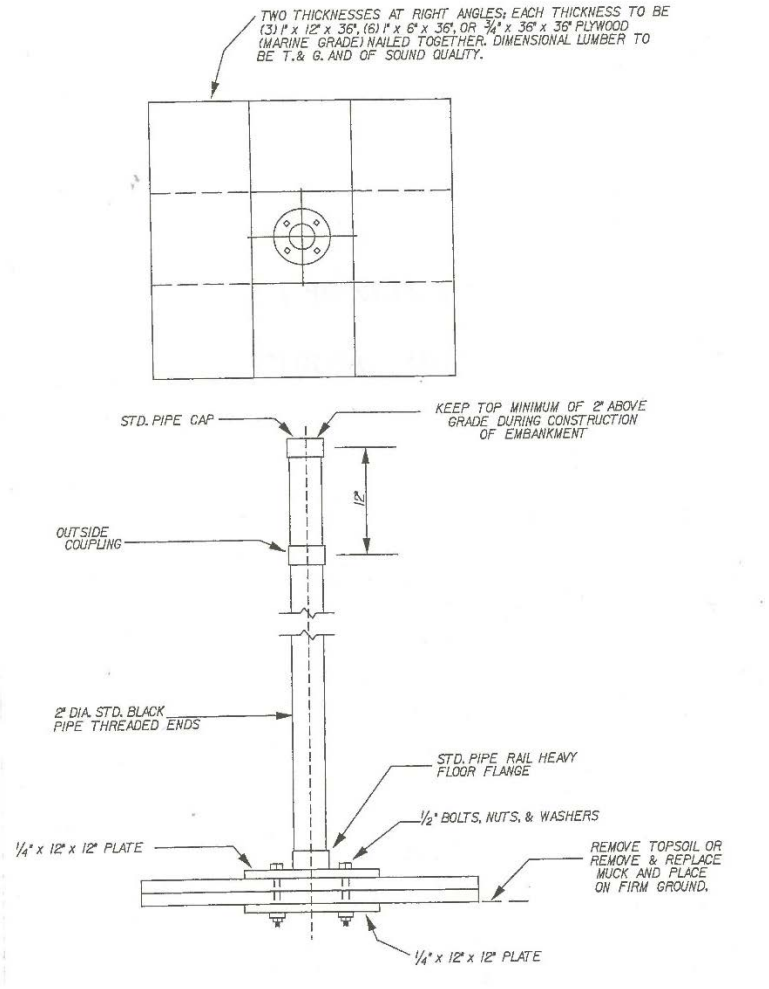
Given the somewhat sandy component of the potential Coonskin Park materials, the probability of a significant amount of rock fill, the placement of drains through the embankment to collect trapped water, we would anticipate settlements could occur rapidly, with much of the settlement being "built-out" during construction. The remaining settlement not "built-out" during construction could be upwards of 2-3 feet and could take more than a year to be completed. Further detailed analyses of this condition must be performed to determine the actual settlements and time for completion.

Additional studies, including borings and laboratory testing, are warranted for further evaluations. Ultimately, the future Contractor must place the layers of fill appropriately and achieve the desired compaction in order to keep these excessive settlements in control.

Future planning of the embankment construction and subsequent runway construction should account for possibly long-term settlements and plan appropriately for the effects of this settlement and future construction of the airport pavements. Additional borings and settlement evaluations are needed to fully address the settlement issue.

Monitoring of the settlements during and after construction should be done with settlement plates. These plates would be placed on the bottom of fill subgrade prior to fill placement. Settlement plates generally consist of a 3-foot square plate placed directly on the stripped subgrade just before fill placement. Connected to the plate is a pipe flange and pipe that can be adjusted as additional fill is placed above. **Figure 7** below provides a typical detail for the settlement plate.

Figure 7 – Settlement Plate Detail



Using the riser pipe of the settlement plate, routine survey measurements can be collected to determine the amount of settlement that has occurred.

5.6 Retaining Walls

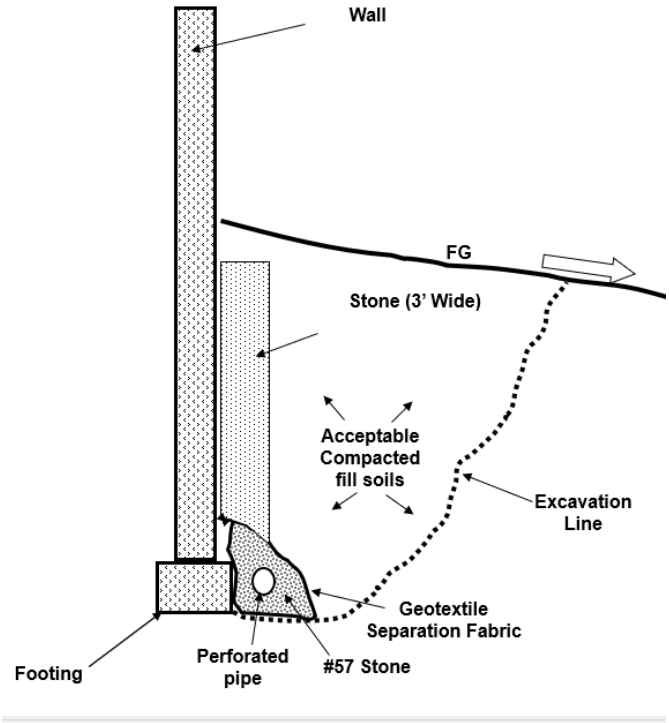
The significant amount of fill required to raise the existing ground surface will cover a very large area throughout Coonskin Park and the surrounding area. In addition, the north and west sides of the future embankment, near the existing Elk River could be impacted by a space issue due to the river embankments. One possible solution could be to use a series of large-scale retaining walls to support the embankment fill. It may also be possible to construct a combined slope and retaining wall system, using retaining walls where space does not allow for the embankment fill footprint.

Retaining walls used for this purpose would need to be significant structures, most likely constructed in tiers with shorter wall heights (less than 50 feet), much like the above-mentioned slope benching system. One large 200-foot-high retaining wall is not feasible or desirable from a design or aesthetic point of view.

For a tiered retaining wall system, it would be imperative that the bottom wall bear in competent natural rock, including Decomposed Rock, Highly Weathered Rock, or bedrock. Wall support will also require tiebacks, anchors, or geogrid for additional support.

Wall design must incorporate appropriate drainage, including drains and granular backfill soil. An example of an appropriate drainage would be a three-foot wide (or wider) zone of compacted clean free-draining aggregate (such as #57 stone), adjacent to the wall, that drains downward to a perforated pipe surrounded by stone aggregate layer placed against the bottom of the wall. The drainage system should be outletted to an existing "daylight" outfall if available. Drainage systems through the embankment fills, as described above could be tied into this system. Examples of the typical types of wall drainage are provided below in **Figure 8**.

Figure 8 – Typical Types of Wall Drainage



Site soils would not be suitable for use as backfill directly behind any wall; therefore all wall backfill would need to be imported. Site soils are acceptable behind this drainage layer. Conversely, walls could be designed to withstand hydrostatic pressures.

For each tier of wall, placement of embankment fills similar to methods above must be performed. The embankment fills would support each additional wall tier as the embankment is constructed.

In our opinion, supporting the embankment using large-scale retaining walls is feasible and will be a significant structural design effort. Proper drainage behind the wall as well as placement of all fills are critical for the success of any wall. Given the settlement potential of the embankment using the Coonskin Park soils, placement of the majority of the slope may be necessary to allow for settlement to occur prior to construction of any wall. Otherwise, settlement of the wall could be an issue if construction of the wall occurs along with placement of the embankment.

5.7 Ground Water Control During Construction

Only two borings, P-4 and P-16 encountered ground water during the field assessment. The encountered ground water appeared to be perched above the underlying bedrock layer. This could be a common occurrence during construction, particularly during wetter than normal periods. It may be possible to encounter ground water during rock excavation of the cut areas of Coonskin Park. Water present in the joints and fractures of the rock would be common in our experience. If ground water is encountered during excavation from the cut area, the Contractor should be prepared to dewater using convention methods, including pumping, or reshaping and allowing for drainage to a localize sump which can then be pumped.

It would be expected that water will be present in the Coonskin Branch during installation of the recommended drain and could be present in any site drainage area. The future Contractor should be prepared to temporarily dewater these features to properly install all drains.

6.0 CONSTRUCTION CONSIDERATIONS

6.1 General

As described above, this anticipated project is extremely reliant on proper fill placement and compaction of each, and every lift of soil placed. It is imperative that the Contractor selected meet all project specifications and requirements. Proper QA/QC of all materials must be performed using full-time qualified, experienced personnel.

The proper equipment, such as earthmovers, dozers, sheepsfoot compactors must be used on this project. Processing of the underlying bedrock will be required with potentially substantial operations to reduce boulder sizes down to appropriate sizes to prevent nesting of rocks that could lead to additional excessive settlements. As recommended above, rock sizes of 12-inches or less in any dimension should be achieved.

It was noted that the measured natural moisture contents are different than the optimum moisture values for most efficient compaction. Ideally, given the fine-grained nature of the site soils, moisture contents of $\pm$2% of optimum should be achieved. This may require wetting of soils during construction. Conversely, those soils that are significantly wetter than optimum

will require drying by special manipulation (aerating, discing, etc.). It should be expected that actual moisture contents will be different at the time construction than reported herein.

Wet weather will exacerbate the potential compaction difficulties. Cement or lime modification, or mixing with drier or more granular soils, or other methods, could also be used to improve wet or unstable soils at the time of compaction. If earthwork operations are performed during the winter months, the contractor must not work with frozen soils.

Finally, coal was not encountered in the cut areas borings, but was encountered in the fill area borings (P-4). Although it was not encountered in the majority of the borings, it still may be present onsite. If encountered, handling of coal must be in accordance with local and state requirements. In general, coal may be reused in the fills provided it is mixed in with the other site soils. It may not be placed as a single layer.

7.0 GENERAL COMMENTS

The evaluations and recommendations contained in this report are preliminary and not considered suitable for final design. Additional subsurface borings will be required for final design based on the final project details. Other subsurface exploration methods may be warranted, including the use of geophysical methods.

Although we have described typical variations which may affect the project, there is the possibility that significant unanticipated conditions may be present outside the specific boring locations. The nature and extent of differing subsurface conditions, as well as their impact on the proposed construction, will most likely not be evident until the time of construction.

West Virginia International Yeager Airport Charleston, West Virginia THE ROBERT B. BALTER COMPANY® Geotechnical and Geo-environmental Engineers	**SITE VICINITY MAP**		**Project No. 17386-0**
	Scale: NTS	**Date: Sept2022**	**Plate 1**

Point ID	Latitude	Longitude
A1	38.38272	-81.58438
A2	38.38171	-81.58295
P3	38.38492	-81.58194
P4	38.38364	-81.58035
P5	38.38188	-81.57889
P6	38.38483	-81.57757
P7	38.38721	-81.57849
P8	38.38764	-81.57407
P9	38.39144	-81.57751
P10	38.38675	-81.57071
P11	38.39066	-81.57341
P12	38.39544	-81.57761
P13	38.38677	-81.56747
P14	38.39327	-81.57460
P15	38.38981	-81.56928
P16	38.39293	-81.57110
P17	38.38930	-81.56619
P18	38.38949	

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Geotechnical Assessment
Environmental Impact Statement
West Virginia International Yeager Airport

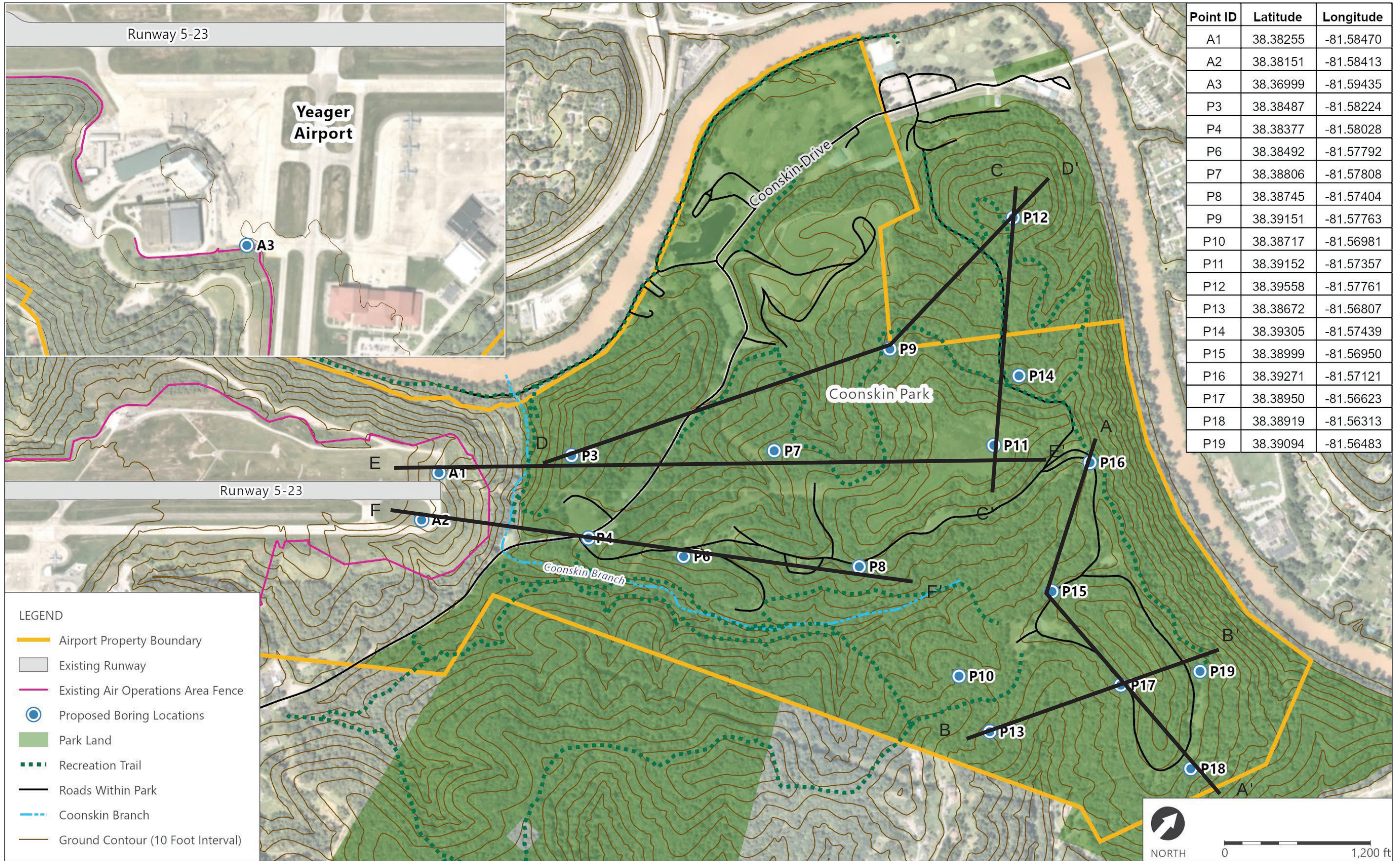
BORING LOCATION PLAN

Project No. 17386-0

Scale: As Shown

Date: September 2022

Plate 2



Point ID	Latitude	Longitude
A1	38.38255	-81.58470
A2	38.38151	-81.58413
A3	38.36999	-81.59435
P3	38.38487	-81.58224
P4	38.38377	-81.58028
P6	38.38492	-81.57792
P7	38.38806	-81.57808
P8	38.38745	-81.57404
P9	38.39151	-81.57763
P10	38.38717	-81.56981
P11	38.39152	-81.57357
P12	38.39558	-81.57761
P13	38.38672	-81.56807
P14	38.39305	-81.57439
P15	38.38999	-81.56950
P16	38.39271	-81.57121
P17	38.38950	-81.56623
P18	38.38919	-81.56313
P19	38.39094	-81.56483

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Geotechnical Assessment
Environmental Impact Statement
West Virginia International Yeager Airport

BORING LOCATION PLAN

Project No. 17386-0

Scale: As Shown

Date: December 2022

Plate 2

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Geotechnical and Environmental Engineers
Materials and Construction Inspection and Testing
Telephone No. (410) 363-1555
www.balterco.com

SUBSURFACE PROFILE A-A'

CLIENT Ricondo

PROJECT NUMBER 17386-0

PROJECT NAME EIS - Yeager Airport (CRW)

PROJECT LOCATION Charleston, WV

Lean Clay
Sandstone
Topsoil
Silty Clay
Decomposed rock
Shale
Sandy Clay
Siltstone
Fat Clay
Fill - Clay

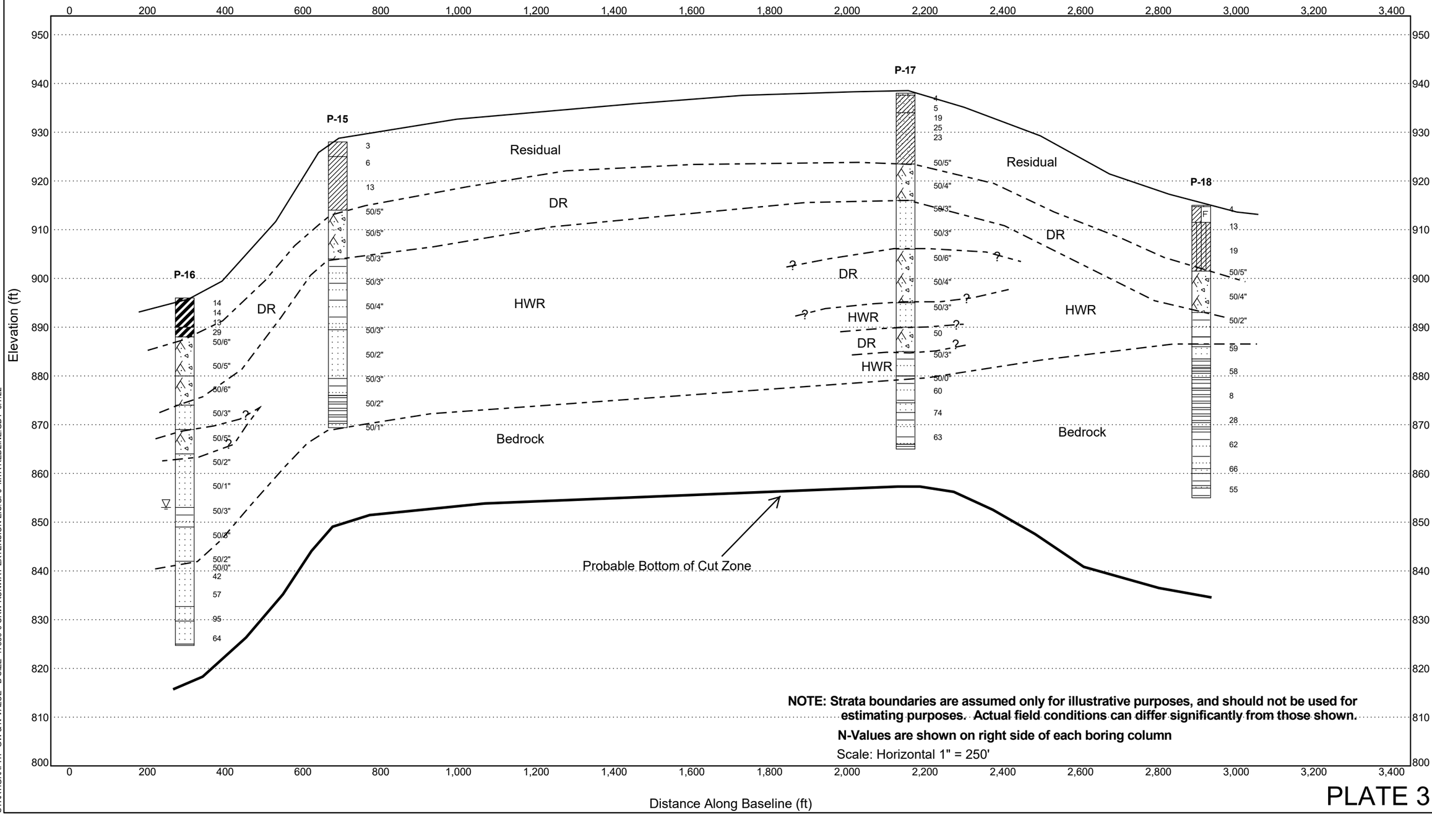

PLATE 3

STRATIGRAPHY - GW & N-VALUE - B SIZE 17386-0 CRW RUNWAY EXTENSION EIS.GPJ MTA REDLINE.GDT 9/7/22

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SUBSURFACE PROFILE B-B'

CLIENT Ricondo

PROJECT NUMBER 17386-0

PROJECT NAME EIS - Yeager Airport (CRW)

PROJECT LOCATION Charleston, WV

Topsoil
Decomposed Rock (DR)
Shale
Silt
Lean Clay
Siltstone
Sandy Clay
Fat Clay
Sandstone
Clayey Sand w/ Rock Frags

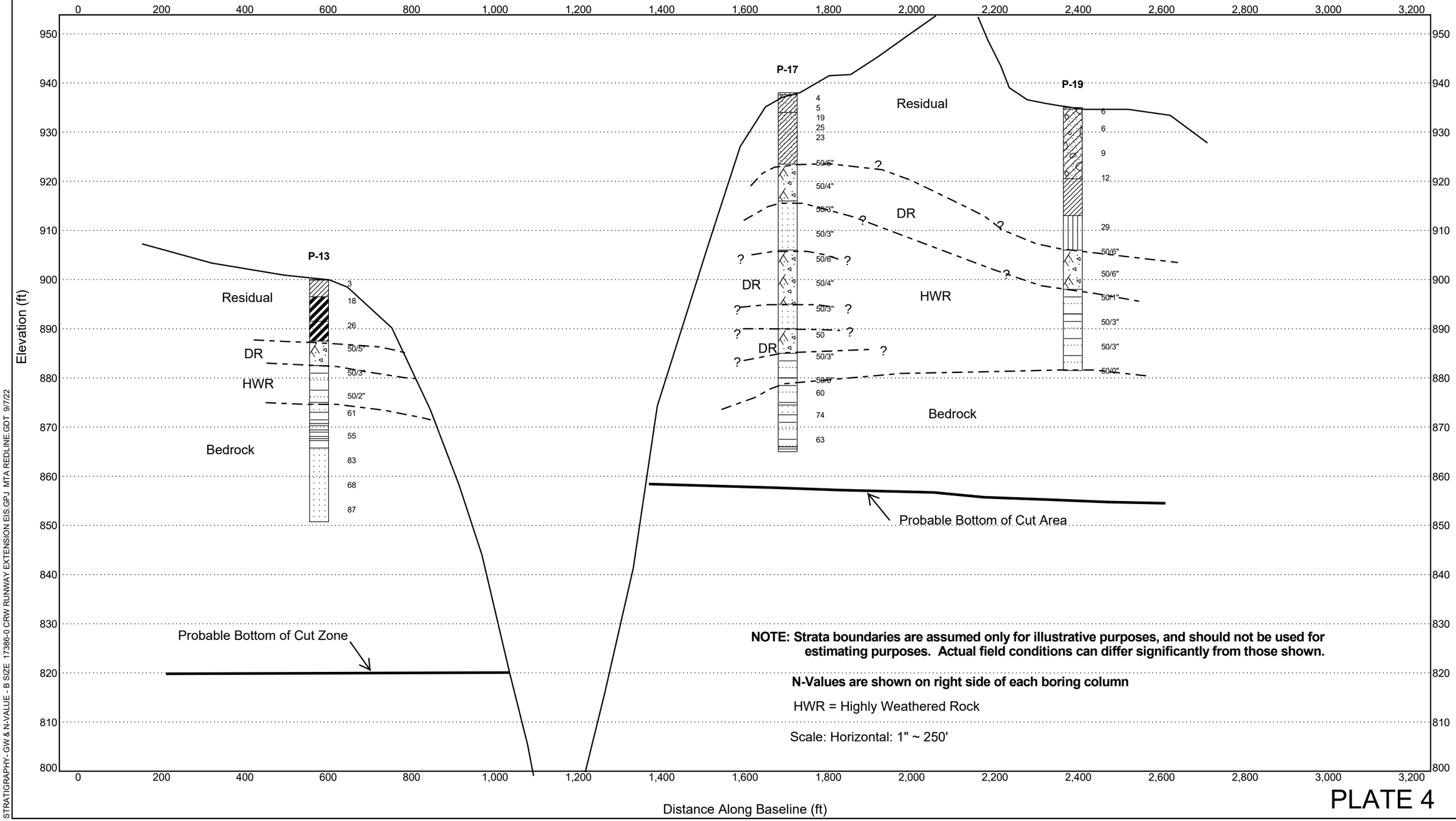

PLATE 4

STRATIGRAPHY - GW & N-VALUE - B SIZE 17386-0 CRW RUNWAY EXTENSION EIS.GPJ MTA REDLINE.GDT 9/7/22

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SUBSURFACE PROFILE C-C'

CLIENT Ricondo

PROJECT NUMBER 17386-0

PROJECT NAME EIS - Yeager Airport (CRW)

PROJECT LOCATION Charleston, WV

Sandstone
Siltstone
Topsoil
Fat Clay
Silty Sand w/ Rock Frags
Decomposed rock
Sandy Clay
Sandy Clay w/ Rock Frags
Shale

NOTE: Strata boundaries are assumed only for illustrative purposes, and should not be used for estimating purposes. Actual field conditions can differ significantly from those shown.

N-Values are shown on right side of each boring column

Scale: Horizontal 1" ~ 200'

HWR = Highly Weathered Rock

Elevation (ft)

Distance Along Baseline (ft)

P-11
71
98
92
100
Bedrock

Probable Bottom
of Cut Zone

P-14
8
16
13
59
50/4"
50/3"
50/0"
50/3"
50/0"
88
100
87
92
Residual
DR
HWR
Bedrock

P-12
4
14
79
66
68
50/1"
75
70
100
100
97
Residual
DR
Bedrock

PLATE 5

STRATIGRAPHY- GW & N-VALUE - B SIZE 17386-0 CRW RUNWAY EXTENSION EIS.GPJ MTA REDLINE.GDT 9/7/22

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SUBSURFACE PROFILE D-D'

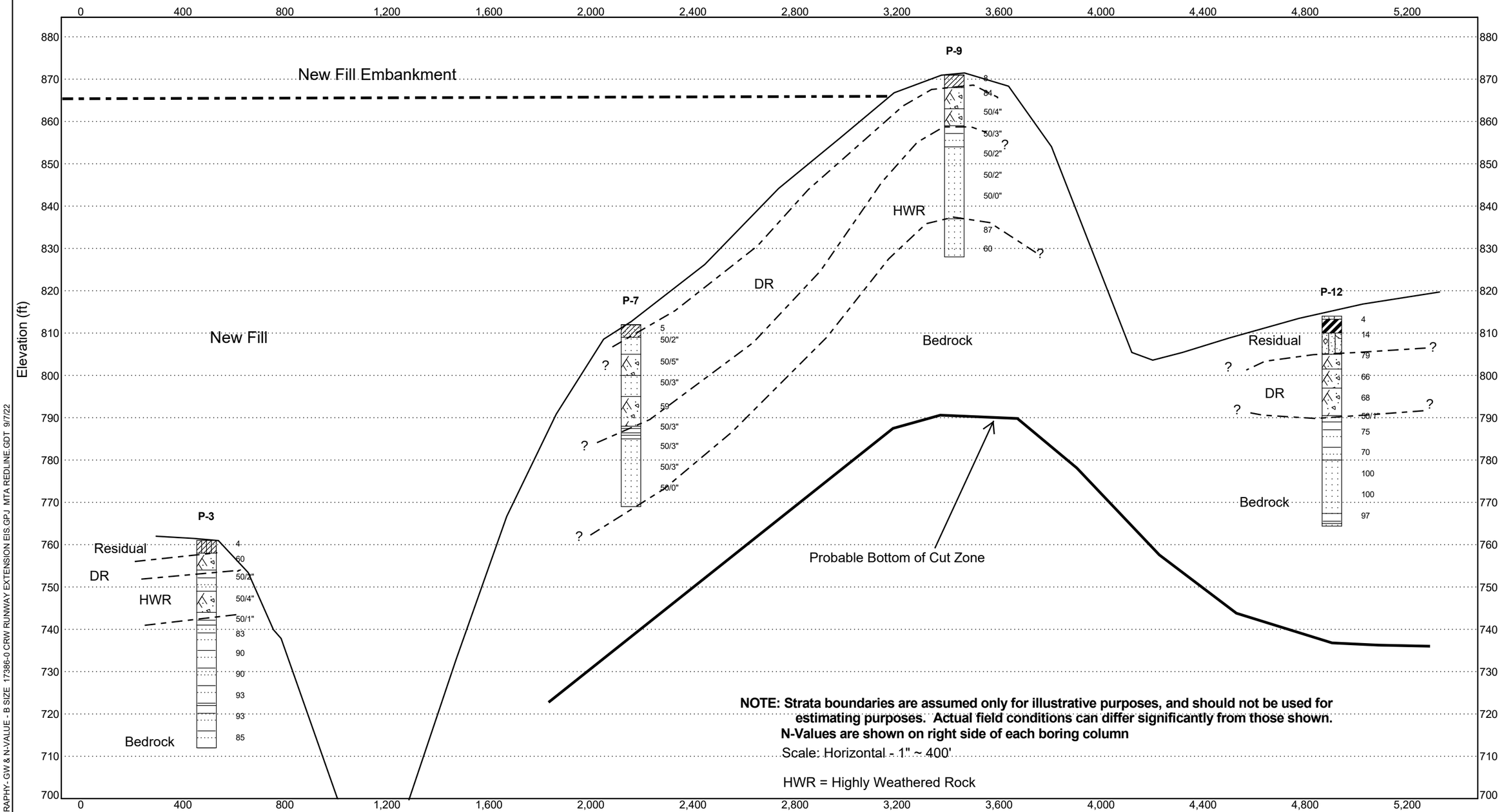
CLIENT Ricondo

PROJECT NUMBER 17386-0

PROJECT NAME EIS - Yeager Airport (CRW)

PROJECT LOCATION Charleston, WV

Topsoil
Decomposed Rock (DR)
Silty Clay
Lean Clay
Fat Clay
Sandstone
Sandy Clay
Silty Sand w/ Rock Frags
Siltstone
Shale



NOTE: Strata boundaries are assumed only for illustrative purposes, and should not be used for estimating purposes. Actual field conditions can differ significantly from those shown.
N-Values are shown on right side of each boring column

Scale: Horizontal - 1" ~ 400'

HWR = Highly Weathered Rock

PLATE 6

STRATIGRAPHY - GW & N-VALUE - B SIZE 17386-0 CRW RUNWAY EXTENSION EIS.GPJ MTA REDLINE.GDT 9/7/22

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SUBSURFACE PROFILE E-E'

CLIENT Ricondo

PROJECT NUMBER 17386-0

PROJECT NAME EIS - Yeager Airport (CRW)

PROJECT LOCATION Charleston, WV

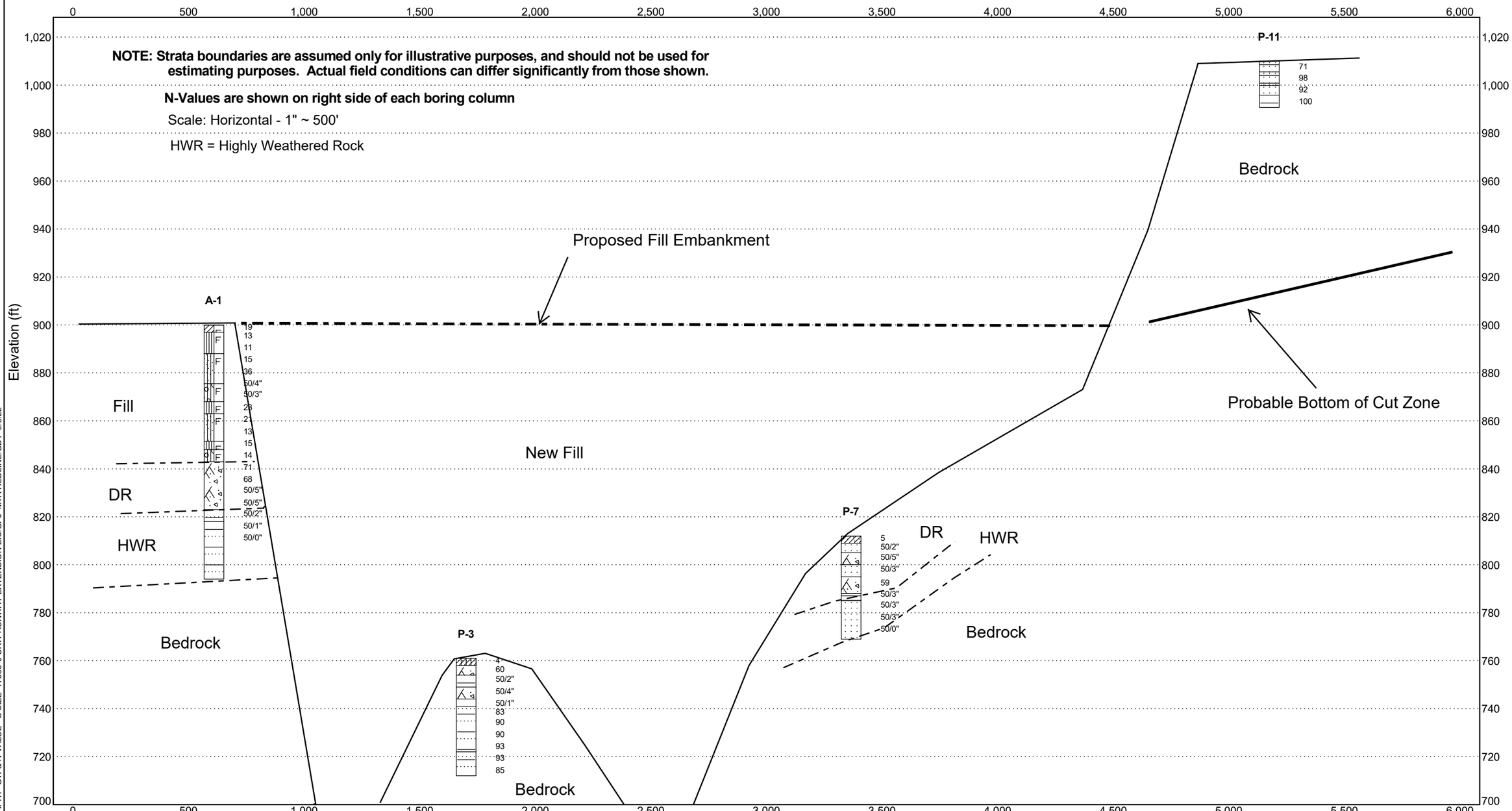
GAB, crushed stone, base stone
Fill - Clay
Fill - Silt
Fill - Silty Sand
Fill - Silty Gravel
Decomposed Rock (DR)
Siltstone
Sandstone
Silty Clay
Topsoil
Sandy Clay
Shale

NOTE: Strata boundaries are assumed only for illustrative purposes, and should not be used for estimating purposes. Actual field conditions can differ significantly from those shown.

N-Values are shown on right side of each boring column

Scale: Horizontal - 1" ~ 500'

HWR = Highly Weathered Rock



STRATIGRAPHY- GW & N-VALUE - B SIZE 17386-0 CRW RUNWAY EXTENSION EIS.GPJ MTA REDLINE.GDT 9/9/22

PLATE 7

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SUBSURFACE PROFILE F-F'

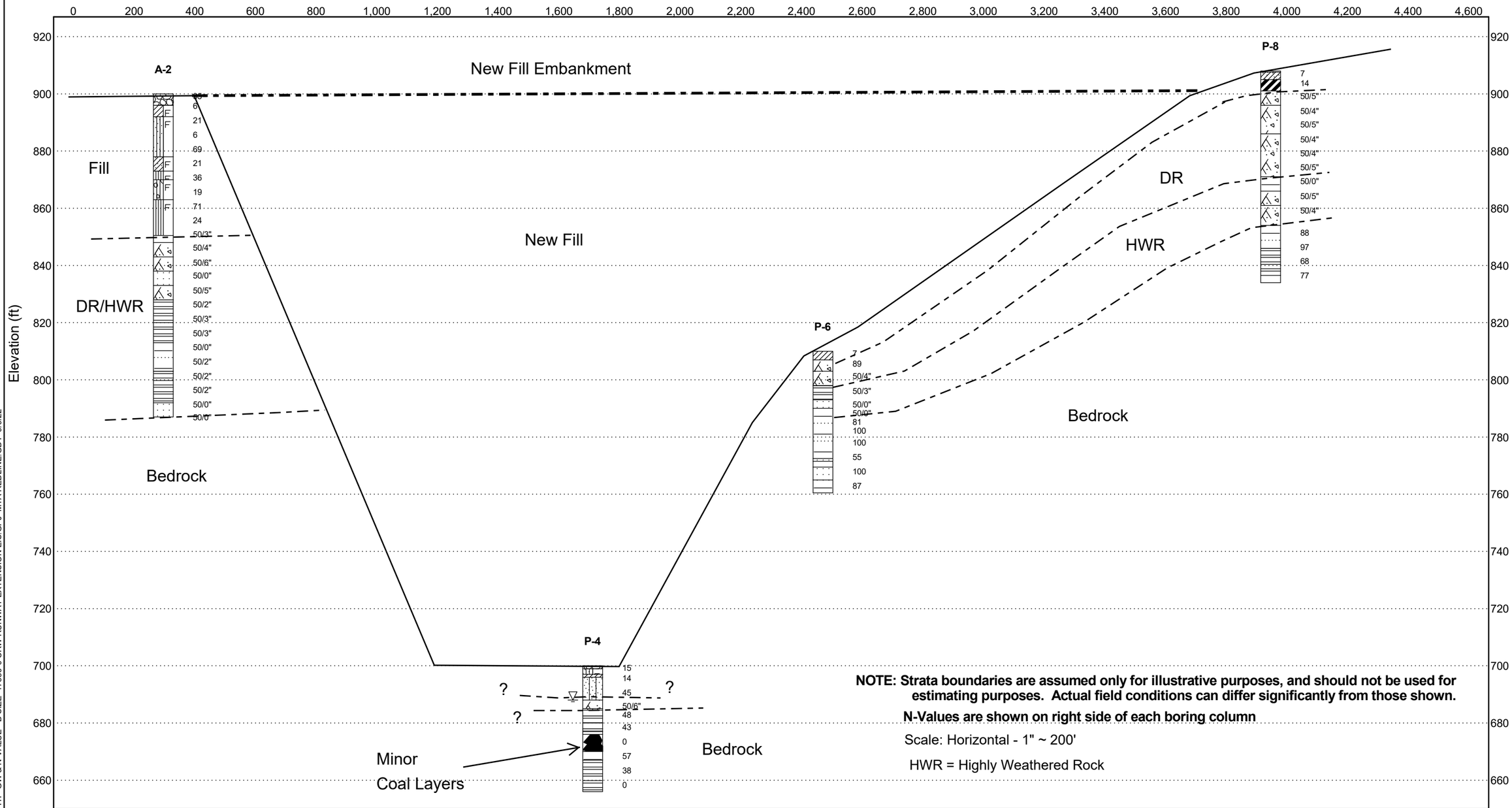
CLIENT Ricondo

PROJECT NUMBER 17386-0

PROJECT NAME EIS - Yeager Airport (CRW)

PROJECT LOCATION Charleston, WV

Topsoil
Fill - Silty Sand
Fill - Silty Gravel
Sandstone
GAB, crushed stone, base stone
Fill - Clayey Sand
Siltstone
Shale
Fill - Clay
Fill-Silt
Decomposed Rock (DR)
Lean Clay



NOTE: Strata boundaries are assumed only for illustrative purposes, and should not be used for estimating purposes. Actual field conditions can differ significantly from those shown.

N-Values are shown on right side of each boring column

Scale: Horizontal - 1" ~ 200'

HWR = Highly Weathered Rock

PLATE 8

STRATIGRAPHY- GW & N-VALUE - B SIZE 17386-0 CRW RUNWAY EXTENSION EIS.GPJ MTA REDLINE.GDT 9/9/22

APPENDIX A

BORING LOGS

THE ROBERT B. BALTER COMPANY

IDENTIFICATION OF SOIL SAMPLES

Soils are described in the boring logs according to the following criteria with the principal constituents written in capital letters. Other constituents are preceded by descriptive terminology that is used to denote the percentage of weight of each component. Soil descriptions are determined visually except where laboratory classification test data are available. Classifications are based on The Robert B. Balter Company's interpretation of ASTM D 2487-00.

COARSE GRAINED SOIL > 50% Retained on No. 200 Sieve	**GRAVEL**	0 to 5% Fines	Well Graded		**GW**	GRAVEL
			Poorly Graded		**GP**	GRAVEL
		6 to 12% Fines	Silty Fines	Well Graded	**GW-GM**	GRAVEL with Silt
				Poorly Graded	**GP-GM**	GRAVEL with Silt
			Clayey Fines	Well Graded	**GW-GC**	GRAVEL with Clay
				Poorly Graded	**GP-GC**	GRAVEL with Clay
		13 to 50% Fines	Silty Fines		**GM**	Silty GRAVEL
			Silty Clay Fines		**GC-GM**	Silty, Clayey GRAVEL
			Clayey Fines		**GC**	Clayey GRAVEL
	SAND	0 to 5% Fines	Well Graded		**SW**	SAND
			Poorly Graded		**SP**	SAND
		6 to 12% Fines	Silty Fines	Well Graded	**SW-SM**	SAND with Silt
				Poorly Graded	**SP-SM**	SAND with Silt
			Clayey Fines	Well Graded	**SW-SC**	SAND with Clay
				Poorly Graded	**SP-SC**	SAND with Clay
		13 to 50% Fines	Silty Fines		**SM**	Silty SAND
			Silty, Clayey Fines		**SC-SM**	Silty, Clayey SAND
			Clayey Fines		**SC**	Clayey SAND
FINE GRAINED SOIL ≥ 50% Passing No. 200 Sieve	**SILT & CLAY (ILL<50)**	Low Plastic Fines, PI<4	Plots below "A" line		**ML**	SILT
		Low Plastic Fines, 4≤PI≤7	Plots on or above "A" line		**CL-ML**	Silty CLAY
		Plastic Fines, PI>7	Plots on or above "A" line		**CL**	Lean CLAY
		Significant Organics, PI<4	Plots below "A" line		**OL**	Organic SILT
		Significant Organics, PI≥4	Plots on or above "A" line		**OL**	Organic CLAY
	SILT & CLAY (LL≥50)	Elastic Fines	Plots below "A" line		**MH**	Elastic SILT
		Plastic Fines	Plots on or above "A" line		**CH**	Fat CLAY
		Significant Organics	Plots below "A" line		**OH**	Organic SILT
		Significant Organics	Plots on or above "A" line		**OH**	Organic CLAY
HIGHLY ORGANIC SOIL		Dark, highly organic, decomposed vegetative tissue			**PT**	PEAT

ADDITIONAL TERMINOLOGY:

Descriptive Components

Descriptive Terms	Proportions
Trace	1 - 5%
Little (Sand, Gravel)	6 - 14%
With (Sand, Gravel)	15 – 30%
With (Silt, Clay)	6 – 12%
Adjective Form (**Sandy, Gravelly**)	31 - 50%
Adjective Form (**Silty, Clayey**)	13 - 50%

Density or Consistency

SAND and GRAVEL		SILT and CLAY	
N-Value	**Density**	**N-Value**	**Consistency**
0-4	Very Loose	0-1	Very Soft
5-10	Loose	2-4	Soft
11-30	Medium Dense	5-8	Medium Stiff
31-50	Dense	9-15	Stiff
> 50	Very Dense	16-30	Very Stiff
		> 30	Hard

Fill materials are placed by man, and may be identified by unnatural artifacts, unnatural mixed grain sizes or layering, or trustworthy documentation of fill placement.
Possible Fill materials are difficult to distinguish from natural soils, exhibiting minor distinctions.
Decomposed Rock consists of residual soil with SPT N-values between 50 blows per foot and blows per 4 inches (50/4").
Highly Weathered Rock consists of residual soil with SPT N-values between 50/3" and 50/1".

THE ROBERT B. BALTER COMPANY
IDENTIFICATION OF ROCK SAMPLES

Rock cores are described based on the following components:

ROCK (CORE) CONTINUITY
Any natural break in a rock core:

Extremely Fractured – Segments <1" long
Moderately Fractured – Segments 1" to 4" long
Slightly Fractured – Segments 4" to 8" long
Sound – Segments >8" long

FIELD HARDNESS

Very Hard	Cannot be scratched w/ knife or pick
Hard	Can be scratch w/knife or pick w/ difficulty
Moderately Hard	Can be readily scratched
Medium	Can be grooved or gouged 1/16" deep by firm pressure on knife
Soft	Can be grooved or gouged easily
Very Soft	Can be carved with a knife

WEATHERING OF ROCK MASS

Fresh	No visible signs of alteration
Slightly Weathered	Discoloration of rock material and discontinuity surfaces
Moderately Weathered	< ½ of material decomposed to Soil
Highly Weathered	> ½ of material decomposed to soil
Saprolite	All rock material disintegrated to soil with rock structure still intact
Residual soil	All rock material converted to soil.

COLOR

TEXTURE

Fine-Grained	grains barely visible to naked eye
Medium-Grained	Grains between 1/16" to 3/16"
Coarse-Grained	Grains between 3/16" to ¼"
Very Coarse Grained	Grains > ¼"

LITHOLOGY – Rock Name

BEDDING OR FOLIATION (THICKNESS OF BEDS)

Laminar	<1/16"
Extremely Thin	1/16" to ¾"
Very Thin	¾" to 2.5"
Thin	2.5" to 8"
Medium	8" to 24"
Thick	24" to 80"
Massive	No bedding observed

DISCONTINUITIES (Natural Breaks)

Joint	Simple fracture with no displacement
Shear	Fractures with movement, surfaces may Be slickensided, polished, or striated
Fault	Major fracture with large displacement

ORIENTATION (DIP ANGLE RELATIVE TO HORIZONTAL)

Horizontal	0º to 5º
Low Angle	6º to 35º
Moderate	36º to 55º
High Angle	56º to 85º
Vertical	86º to 90º

SPACING OF DISCONTINUITIES

Extremely Close	< ¾"
Very Close	¾" to 2.5"
Close	2.5" to 8"
Moderate	8" to 24"

ROUGHNESS OF DISCONTINUITIES
Rough
Smooth
Slickensided

WEATHERING OF DISCONTINUITIES

Fresh	No visible signs of weathering
Discolored	Color of original rock material is changed
Decomposed	Rock is weathered to the condition of soil in which the original fabric is still intact
Disintegrated	Rock is weathered to the condition of soil

APERTURE OF DISCONTINUITIES

Tight	Core pieces on either side of discontinuity can be fitted together so that no visible space remains
Open	Core pieces on either side of discontinuity cannot be fitted together and voids are visible

INFILLING
Material present between the adjacent rock walls of discontinuities, i.e. clay, silt, calcite, etc.

SOLUTION FEATURES (OPENINGS IN ROCK)

Pit	Barely visible up to ¼"
Vug	¼" to 2"
Cavity	2" to 2'
Cave	>2'

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BORING LOG

BORING A-1

CLIENT Ricondo **PROJECT NAME** EIS - Yeager Airport (CRW)

PROJECT LOCATION Charleston, WV **PROJECT NUMBER** 17386-0 **DATE TESTED**

RIG Mobil B45 **METHOD** Hollow Stem Auger **SAMPLER:** 2-in OD SS **HAMMER:** 140# **FALL:** 30" **AUTO?** Yes

DATE STARTED 8/18/22 **COMPLETED** 8/20/22

DRILLER Dustin Hurd **HELPER** Dan Ditman

REVIEWED BY Jaylen Surrency **SITE DELAYS**

LOCATION As Staked **BULK SAMPLES**

WATER LEVELS

DATE	TIME	ELAPSED HOURS	CASING DEPTH (ft)	HOLE DEPTH (ft)	WATER DEPTH (ft)	WATER ELEV (ft)

DEPTH (ft)	SAMPLE TYPE AND NUMBER	SPT BLOWS/6" OR REC IN/IN %	N VALUE OR CORE RQD	STRATUM CHANGE DEPTH/EL (ft)	GRAPHIC LOG	USCS	WATER LEVEL	MATERIAL DESCRIPTION	PP (tsf)	NMC %	- #200	ATTERBERGS PL	ATTERBERGS LL	ATTERBERGS PI	REMARKS
								SURFACE EL = 900.0 ft							
	S1	5-12-7	19	0.2 899.8		CL		Gravel (2-inches) Slightly Moist, Stiff, Brownish Tan with Black Sandy CLAY, little rock fragments (FILL)							
				3.0 897.0											
5	S2	4-6-7	13			CL-ML		Moist, Stiff to Hard, Bluish Gray Sandy Clayey SILT with Rock Fragments (FILL)							
10	S3	4-5-6	11						1.70						
				12.0 888.0											
15	S4	5-6-9	15			SM		Moist, Medium Dense, Gray Silty SAND with Rock Fragments (FILL)							
20	S5	6-19-17	36												
25	S6	10-11-50/4"	50/4"	24.5 875.5											
						GM		Moist, Very Dense, Gray Sandy ROCK FRAGMENTS (FILL)							
30	S7	50/3"	50/3"												
				32.0 868.0											
35	S8	7-7-16	23			CL-ML		Moist, Very Stiff, Brown-Gray Sandy, Clayey SILT with Rock Fragments (FILL)							

REMARKS: (1)Automatic Hammer Failed. Augers advanced to auger refusal. Visually classified drill spoils from auger flights.

(Continued Next Page)

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BORING LOG

CLIENT Ricondo **PROJECT NAME** EIS - Yeager Airport (CRW)

PROJECT LOCATION Charleston, WV **PROJECT NUMBER** 17386-0 **DATE TESTED**

DEPTH (ft)	SAMPLE TYPE AND NUMBER	SPT BLOWS/6" OR REC IN/IN %	N VALUE OR CORE RQD	STRATUM CHANGE DEPTH/EL (ft)	GRAPHIC LOG	USCS	WATER LEVEL	MATERIAL DESCRIPTION	PP (tsf)	NMC %	- #200	ATTERBERGS PL	ATTERBERGS LL	ATTERBERGS PI	REMARKS
					F F	CL-ML		Moist, Very Stiff, Brown-Gray Sandy, Clayey SILT with Rock Fragments (FILL) *(continued)*							
				37.0 863.0	F F			Moist, Medium Dense, Bluish Gray Silty SAND with Rock Fragments (FILL)							
40	S9	7-10-11	21		F F	SM									
45	S10	8-8-5	13		F F										
				48.5 851.5	F F										
50	S11	6-4-11	15			ML		Moist, Medium Stiff to Stiff, Bluish Gray Sandy SILT with Rock Fragments (FILL)							
				52.0 848.0	F F			Wet, Medium Dense, Brown-Gray Sandy ROCK FRAGMENTS (FILL)							
55	S12	48-6-8	14		F	GM									
				57.0 843.0				DECOMPOSED ROCK sampled as: Moist, Hard, Brownish Tan Sandy SILT							
60	S13	13-43-28	71												
65	S14	25-45-23	68												
70	S15	50/5"	50/5"			ML									
75	S16	18-50/5"	50/5"												

REMARKS: (1)Automatic Hammer Failed. Augers advanced to auger refusal. Visually classified drill spoils from auger flights.

(Continued Next Page)

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BORING LOG

CLIENT Ricondo **PROJECT NAME** EIS - Yeager Airport (CRW)

PROJECT LOCATION Charleston, WV **PROJECT NUMBER** 17386-0 **DATE TESTED**

DEPTH (ft)	SAMPLE TYPE AND NUMBER	SPT BLOWS/6" OR REC IN/IN %	N VALUE OR CORE RQD	STRATUM CHANGE DEPTH/EL (ft)	GRAPHIC LOG	USCS	WATER LEVEL	MATERIAL DESCRIPTION	PP (tsf)	NMC %	- #200	ATTERBERGS PL	ATTERBERGS LL	ATTERBERGS PI	REMARKS
				77.0 823.0		ML									
								HIGHLY WEATHERED ROCK sampled as: Moist, Hard, Brown Sandy, Clayey SILT							
80	S17	50/2"	50/2"			CL-ML									
				82.0 818.0				HIGHLY WEATHERED ROCK sampled as: Dry, Hard, Bluish Gray Sandy SILT							
85	S18	50/1"	50/1"												
90	S19	50/0"	50/0"												(1)
95						ML									
100															
105															
				106.0 794.0				AUGER REFUSAL at 106' Terminated at 106.0 feet							

REMARKS: (1)Automatic Hammer Failed. Augers advanced to auger refusal. Visually classified drill spoils from auger flights.

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BORING LOG

BORING A-2

CLIENT Ricondo **PROJECT NAME** EIS - Yeager Airport (CRW)

PROJECT LOCATION Charleston, WV **PROJECT NUMBER** 17386-0 **DATE TESTED**

RIG Mobil B45 **METHOD** Hollow Stem Auger **SAMPLER:** 2-in OD SS **HAMMER:** 140# **FALL:** 30" **AUTO?** Yes

DATE STARTED 8/15/22 **COMPLETED** 8/17/22

DRILLER Dustin Hurd **HELPER** Dan Ditman

REVIEWED BY Jaylen Surrency **SITE DELAYS**

LOCATION As Staked **BULK SAMPLES**

WATER LEVELS

DATE	TIME	ELAPSED HOURS	CASING DEPTH (ft)	HOLE DEPTH (ft)	WATER DEPTH (ft)	WATER ELEV (ft)

DEPTH (ft)	SAMPLE TYPE AND NUMBER	SPT BLOWS/6" OR REC IN/IN %	N VALUE OR CORE RQD	STRATUM CHANGE DEPTH/EL (ft)	GRAPHIC LOG	USCS	WATER LEVEL	MATERIAL DESCRIPTION	PP (tsf)	NMC %	- #200	ATTERBERGS PL	ATTERBERGS LL	ATTERBERGS PI	REMARKS
								SURFACE EL = 900.0 ft							
	S1	30-27-8	35	0.7 / 899.3				Topsoil (8-inches) / Gravel (3.3-feet)							
5	S2	3-3-3	6	4.0 / 896.0		CL		Moist, Medium Stiff, Brown Sandy CLAY, little rock fragments (FILL)							
10	S3	7-8-13	21	8.0 / 892.0		SM		Moist, Loose to Medium Dense to Dense, Gray Silty SAND with Rock Fragments (FILL)							
15	S4	3-3-3	6												
20	S5	13-40-29	69												
25	S6	4-8-13	21	22.0 / 878.0		SC-SM		Wet, Medium Dense, Gray-Brown Silty, Clayey SAND with Rock Fragments (FILL)							
30	S7	8-12-24	36	27.0 / 873.0		ML		Moist, Hard, Brownish Tan with Red Sandy SILT with Siltstone Rock Fragments (FILL)							
35	S8	9-10-9	19	30.0 / 870.0		GM		Wet, Medium Dense, Gray ROCK FRAGMENTS with Silt (FILL)							

REMARKS:

(Continued Next Page)

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BORING LOG

CLIENT Ricondo **PROJECT NAME** EIS - Yeager Airport (CRW)

PROJECT LOCATION Charleston, WV **PROJECT NUMBER** 17386-0 **DATE TESTED**

DEPTH (ft)	SAMPLE TYPE AND NUMBER	SPT BLOWS/6" OR REC IN/IN %	N VALUE OR CORE RQD	STRATUM CHANGE DEPTH/EL (ft)	GRAPHIC LOG	USCS	WATER LEVEL	MATERIAL DESCRIPTION	PP (tsf)	NMC %	- #200	ATTERBERGS PL	ATTERBERGS LL	ATTERBERGS PI	REMARKS
				37.0 / 863.0		GM		Wet, Medium Dense, Gray ROCK FRAGMENTS with Silt (FILL) *(continued)*							
40	S9	6-42-29	71			ML		Wet, Hard, Bluish Gray Sandy SILT with Rock Fragments (FILL)							
45	S10	9-10-14	24							9	77	18	26	8	
50	S11	22-34-50/3"	50/3"	49.5 / 850.5		ML		HIGHLY WEATHERED ROCK sampled as: Dry, Hard, Bluish Tan Sandy SILT with Rock Fragments							
55	S12	50/4"	50/4"	52.0 / 848.0		ML		DECOMPOSED ROCK sampled as: Dry, Hard, Bluish Tan Sandy SILT with Rock Fragments							
60	S13	50-50/6"	50/6"	57.0 / 843.0		SM		DECOMPOSED ROCK sampled as: Moist, Very Dense, Brown Silty SAND with Rock Fragments							
65	S14	50/0"	50/0"	62.0 / 838.0		SM		HIGHLY WEATHERED ROCK sampled as: Moist, Very Dense, Brown Silty SAND with Rock Fragments							
70	S15	50/5"	50/5"	67.0 / 833.0		ML		DECOMPOSED ROCK sampled as: Dry, Hard Bluish Gray SILT, little siltstone fragments							
75	S16	50/2"	50/2"	72.0 / 828.0		GM		HIGHLY WEATHERED ROCK sampled as: Dry, Hard, Gray SHALE Fragments							

REMARKS:

(Continued Next Page)

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BORING LOG

CLIENT Ricondo **PROJECT NAME** EIS - Yeager Airport (CRW)

PROJECT LOCATION Charleston, WV **PROJECT NUMBER** 17386-0 **DATE TESTED**

DEPTH (ft)	SAMPLE TYPE AND NUMBER	SPT BLOWS/6" OR REC IN/IN %	N VALUE OR CORE RQD	STRATUM CHANGE DEPTH/EL (ft)	GRAPHIC LOG	USCS	WATER LEVEL	MATERIAL DESCRIPTION	PP (tsf)	NMC %	- #200	ATTERBERGS PL	ATTERBERGS LL	ATTERBERGS PI	REMARKS
								HIGHLY WEATHERED ROCK sampled as: Dry, Hard, Gray SHALE Fragments *(continued)*							
	S17	50/3"	50/3"			GM									
80															
	S18	50/3"	50/3"												
85															
				87.0 813.0				HIGHLY WEATHERED ROCK sampled as: Slightly Wet to Moist, Hard, Brownish Tan SILT with Siltstone Rock Fragments							
	S19	50/0"	50/0"			ML									
90															
	S20	50/2"	50/2"												
95															
				97.0 803.0				HIGHLY WEATHERED ROCK sampled as: Moist, Hard, Bluish Gray SHALE Rock Fragments with COAL seams							
	S21	50/2"	50/2"			ML									
100															
	S22	50/2"	50/2"												
105															
				108.0 792.0				HIGHLY WEATHERED ROCK sampled as: Moist, Very Dense, Brownish Tan Silty SAND with Sandstone Rock Fragments							
	S23	50/0"	50/0"			SM									
110															
				113.0 787.0				AUGER REFUSAL at 113'							
	S24	50/0"	50/0"					Terminated at 113.0 feet							

REMARKS:

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BORING LOG

BORING A-3

CLIENT Ricondo **PROJECT NAME** EIS - Yeager Airport (CRW)

PROJECT LOCATION Charleston, WV **PROJECT NUMBER** 17386-0 **DATE TESTED**

RIG Mobil B45 **METHOD** Hollow Stem Auger **SAMPLER:** 2-in OD SS **HAMMER:** 140# **FALL:** 30" **AUTO?** Yes

DATE STARTED 8/12/22 **COMPLETED** 8/12/22

DRILLER Dustin Hurd **HELPER** Dan Ditman

REVIEWED BY Jaylen Surrency **SITE DELAYS**

LOCATION As Staked **BULK SAMPLES**

WATER LEVELS

DATE	TIME	ELAPSED HOURS	CASING DEPTH (ft)	HOLE DEPTH (ft)	WATER DEPTH (ft)	WATER ELEV (ft)

DEPTH (ft)	SAMPLE TYPE AND NUMBER	SPT BLOWS/6" OR REC IN/IN %	N VALUE OR CORE RQD	STRATUM CHANGE DEPTH/EL (ft)	GRAPHIC LOG	USCS	WATER LEVEL	MATERIAL DESCRIPTION	PP (tsf)	NMC %	- #200	ATTERBERGS PL	ATTERBERGS LL	ATTERBERGS PI	REMARKS
								SURFACE EL = 952.0 ft							
				1.2				Concrete Pavement (14-inches)							
				950.8				Aggregate Base (7-inches)							
	S2	13-50/4"	50/4"	1.8		CL		Moist, Hard, Gray Sandy CLAY with Green-Gray Rock Fragments (FILL)							
				950.3											
				3.0											
5	S3	3-3-4	7	949.0		CL		Moist, Medium Stiff, Brown Sandy CLAY with Rock Fragments (FILL)							
				7.0											
				945.0				Wet, Soft to Stiff, Brownish Tan CLAY with Rock Fragments (FILL)							
10	S4	1-2-1	3							20	91	20	29	9	
15	S5	2-5-11	16			CL									
20	S6	2-13-6	19												
				22.0											
				930.0				Wet, Very Dense, Blueish Gray ROCK FRAGMENTS with Sandy Clayey Silt (FILL)							
25	S7	50/2"	50/2"			GM									
				28.5											
				923.5		ML		Moist, Very Stiff, Brownish Tan Sandy SILT, little rock fragments (FILL)							
30	S8	4-7-12	19	29.0											
				923.0		ML		Dry, Stiff, Blueish Gray SILTG, little rock fragments (FILL)							
				32.0											
				920.0				Moist, Very Dense, Brownish Tan-Gray Sandy CLAY with Rock Fragments (FILL)							
35	S9	50/1"	50/1"			CL									

REMARKS:

(Continued Next Page)

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BORING LOG

CLIENT Ricondo **PROJECT NAME** EIS - Yeager Airport (CRW)

PROJECT LOCATION Charleston, WV **PROJECT NUMBER** 17386-0 **DATE TESTED**

DEPTH (ft)	SAMPLE TYPE AND NUMBER	SPT BLOWS/6" OR REC IN/IN %	N VALUE OR CORE RQD	STRATUM CHANGE DEPTH/EL (ft)	GRAPHIC LOG	USCS	WATER LEVEL	MATERIAL DESCRIPTION	PP (tsf)	NMC %	- #200	ATTERBERGS PL	ATTERBERGS LL	ATTERBERGS PI	REMARKS
				37.0 / 915.0		CL		Moist, Very Dense, Brownish Tan-Gray Sandy CLAY with Rock Fragments (FILL) *(continued)*							
40	S10	2-3-6	9			ML		Moist, Medium Stiff, Brown Sandy SILT with Rock Fragments (FILL)							
				42.0 / 910.0				Moist, Very Stiff to Hard to Very Stiff, Brown Sandy CLAY, little rock fragments (FILL)							
45	S11	5-8-10	18												
50	S12	7-11-23	34												
55	S13	15-15-7	22			CL									
60	S14	7-12-17	29												
	T1	15 / 24								13	69	19	34	15	
				62.0 / 890.0				Terminated at 62.0 feet							

REMARKS:

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BORING LOG

BORING P-3

CLIENT Ricondo **PROJECT NAME** EIS - Yeager Airport (CRW)

PROJECT LOCATION Charleston, WV **PROJECT NUMBER** 17386-0 **DATE TESTED**

RIG Mobil B45 **METHOD** Hollow Stem Auger **SAMPLER:** 2-in OD SS/NQ Core **HAMMER:** 140# **FALL:** 30" **AUTO?** Yes

DATE STARTED 8/10/22 **COMPLETED** 8/10/22

DRILLER Dustin Hurd **HELPER** Dan Ditman

REVIEWED BY Jaylen Surrency **SITE DELAYS**

LOCATION As Staked **BULK SAMPLES**

WATER LEVELS

DATE	TIME	ELAPSED HOURS	CASING DEPTH (ft)	HOLE DEPTH (ft)	WATER DEPTH (ft)	WATER ELEV (ft)

DEPTH (ft)	SAMPLE TYPE AND NUMBER	SPT BLOWS/6" OR REC IN/IN %	N VALUE OR CORE RQD	STRATUM CHANGE DEPTH/EL (ft)	GRAPHIC LOG	USCS	WATER LEVEL	MATERIAL DESCRIPTION	PP (tsf)	NMC %	- #200	ATTERBERGS PL	ATTERBERGS LL	ATTERBERGS PI	REMARKS
								SURFACE EL = 761.0 ft							
	S1	2-2-2	4			CL-ML		Moist, Soft, Brown Clayey SILT with Rock Fragments		17	97	26	42	16	
				3.0 / 758.0											
5	S2	8-16-44	60			CL		DECOMPOSED ROCK sampled as: Moist, Hard, Brown-Gray CLAY with Shale Fragments		13					
				7.0 / 754.0				HIGHLY WEATHERED ROCK sampled as: Moist, Hard, Brown Sandy CLAY with Siltstone Rock Fragments							
10	S3	50/2"	50/2"			CL				7					
				12.0 / 749.0				DECOMPOSED ROCK sampled as: Moist, Hard, Brown Sandy CLAY with Siltstone Rock							
15	S4	50/4"	50/4"			CL				3					
				17.0 / 744.0				HIGHLY WEATHERED ROCK sampled as: Moist, Hard, Grayish Brown Sandy CLAY with Siltstone Rock Fragments							
20	S5	50/1"	50/1"			CL				3					
				20.0 / 741.0				Slightly Fractured to Sound, Hard, Slightly Weathered, Bluish Gray, Fine-Grained SILTSTONE							
	C1	48 / 48 100%	83												
25	C2	60 / 60 100%	90												
30	C3	60 / 60 100%	90												
35															

REMARKS:

(Continued Next Page)

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BORING LOG

BORING P-3

CLIENT Ricondo **PROJECT NAME** EIS - Yeager Airport (CRW)

PROJECT LOCATION Charleston, WV **PROJECT NUMBER** 17386-0 **DATE TESTED**

DEPTH (ft)	SAMPLE TYPE AND NUMBER	SPT BLOWS/6" OR REC IN/IN %	N VALUE OR CORE RQD	STRATUM CHANGE DEPTH/EL (ft)	GRAPHIC LOG	USCS	WATER LEVEL	MATERIAL DESCRIPTION	PP (tsf)	NMC %	- #200	ATTERBERGS PL	ATTERBERGS LL	ATTERBERGS PI	REMARKS
	C4	60 / 60 100%	93					Slightly Fractured to Sound, Hard, Slightly Weathered, Bluish Gray, Fine-Grained SILTSTONE *(continued)*							
				39.0 722.0											
40	C5	60 / 60 100%	93					Interbedded Sound to Slighlty Fractured to Moderately Fractured, Slightly Weathered, Brownish Tan-Purple to Gray to Bluish Gray, Fine-to Medium-Grained SILTSTONE							
45	C6	60 / 60 100%	85												
				49.0 712.0											
50								Terminated at 50.0 feet							

REMARKS:

THE ROBERT B. BALTER COMPANY

ROCK CORING LOG

Project Name: Yeager Airport Contract No.: 17386-0

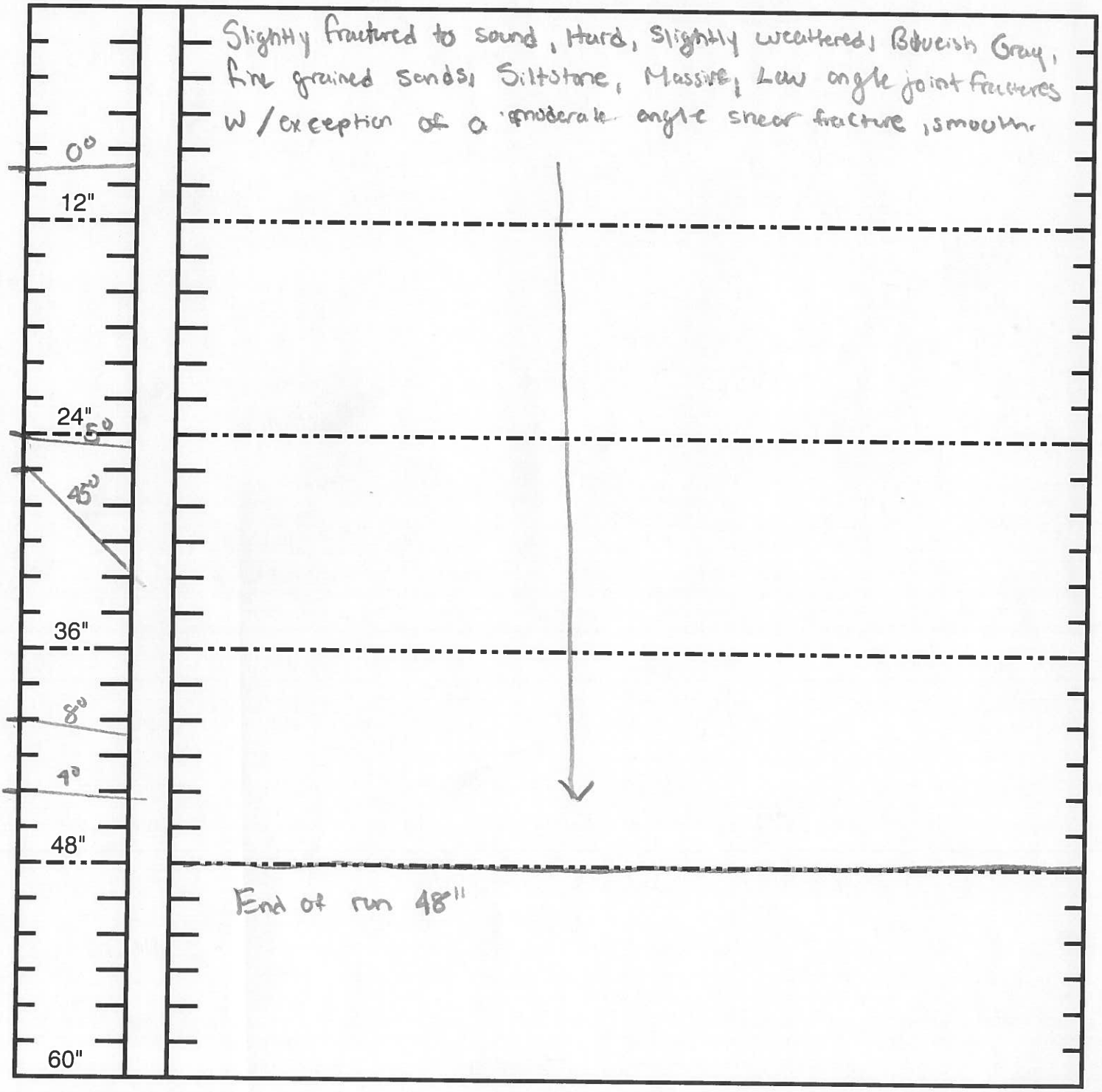
Logged by: J. Surrency Boring No.: P-3

Core Run: 1 Start Depth: 20' End Depth: 24'

Recovery: 48/48 RQD: 40/48 = 83%

DEPTH

GEOLOGIC DESCRIPTION



THE ROBERT B. BALTER COMPANY

ROCK CORING LOG

Project Name: Yeager Airport

Contract No.: 17386-0

Logged by: J. Summey

Boring No.: P-3

Core Run: 2

Start Depth: 24'

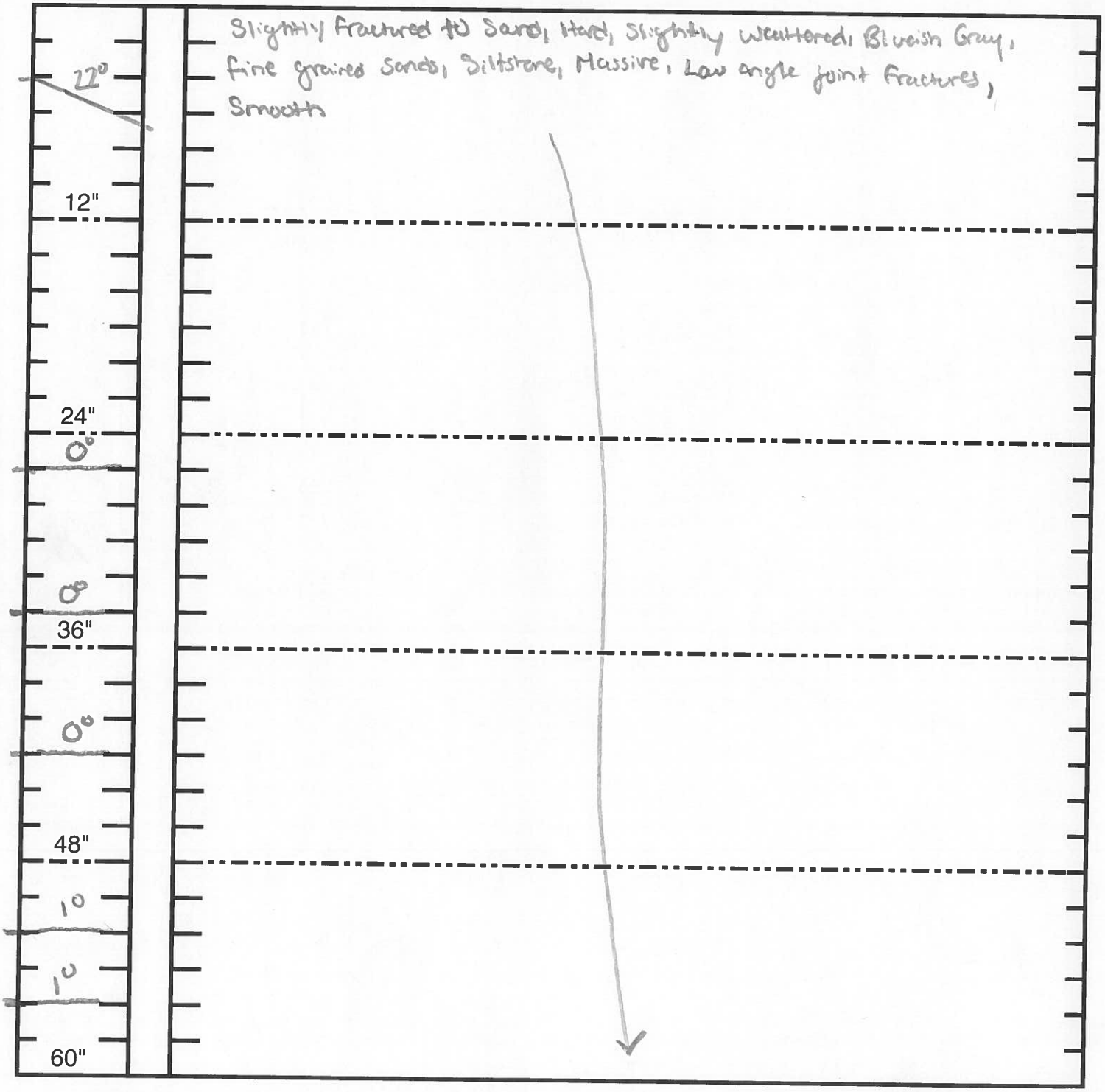
End Depth: 29'

Recovery: 60/60

RQD: 54/60 = 90%

DEPTH

GEOLOGIC DESCRIPTION



THE ROBERT B. BALTER COMPANY

ROCK CORING LOG

Project Name: Yeager Airport Contract No.: 17386-0

Logged by: J. Surrency Boring No.: P-3

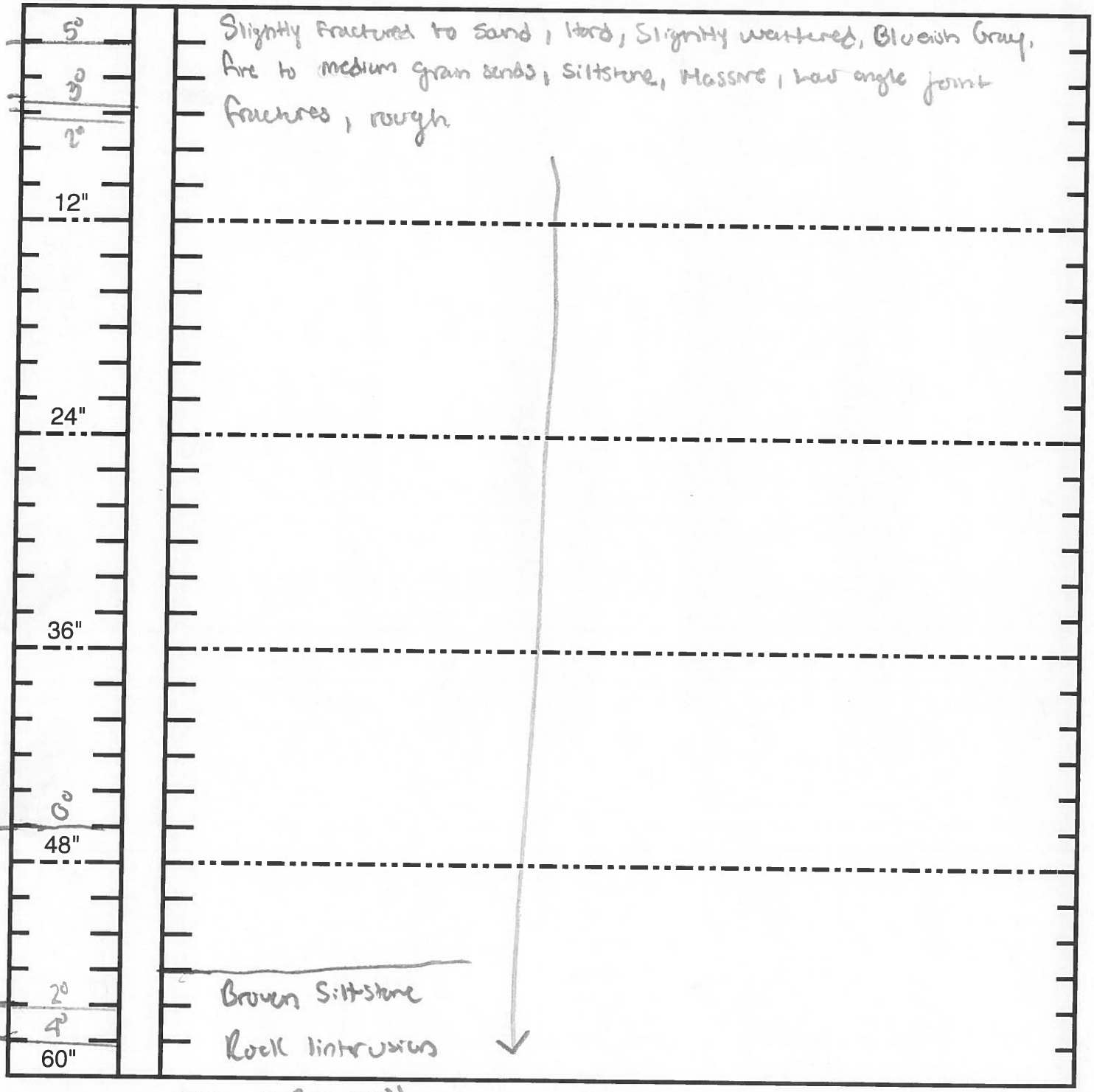
Core Run: 3 Start Depth: 29' End Depth: 34'

Recovery: 60/60 RQD: 54/60 = 90%

DEPTH

0"

GEOLOGIC DESCRIPTION



End of Run 60"

THE ROBERT B. BALTER COMPANY

ROCK CORING LOG

Project Name: Yeager Airport

Contract No.: 17386-0

Logged by: J. Surrency

Boring No.: P-3

Core Run: 4

Start Depth: 34'

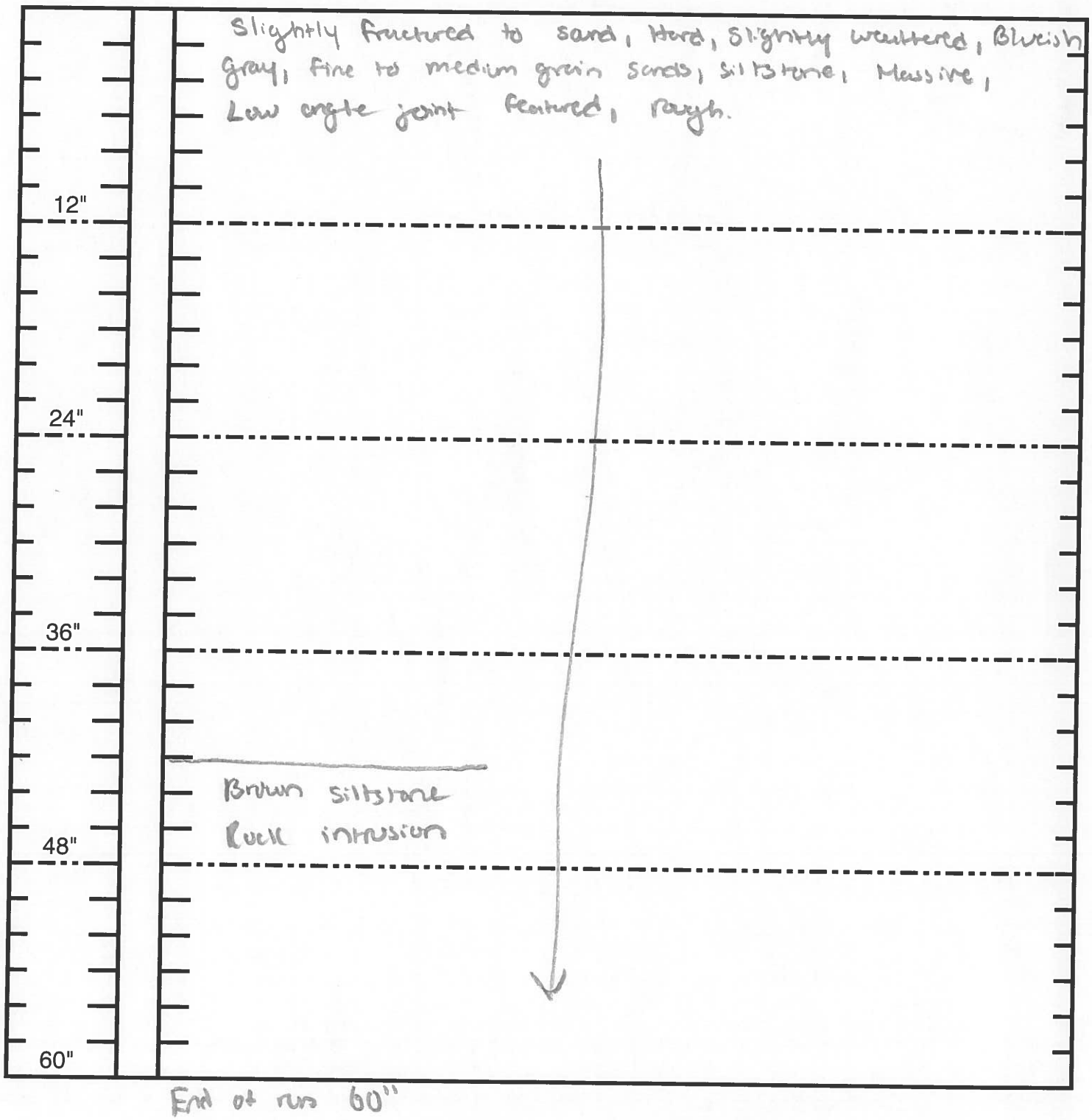
End Depth: 39'

Recovery: 60/60

RQD: 56/60

DEPTH

GEOLOGIC DESCRIPTION



End of run 60"

THE ROBERT B. BALTER COMPANY

ROCK CORING LOG

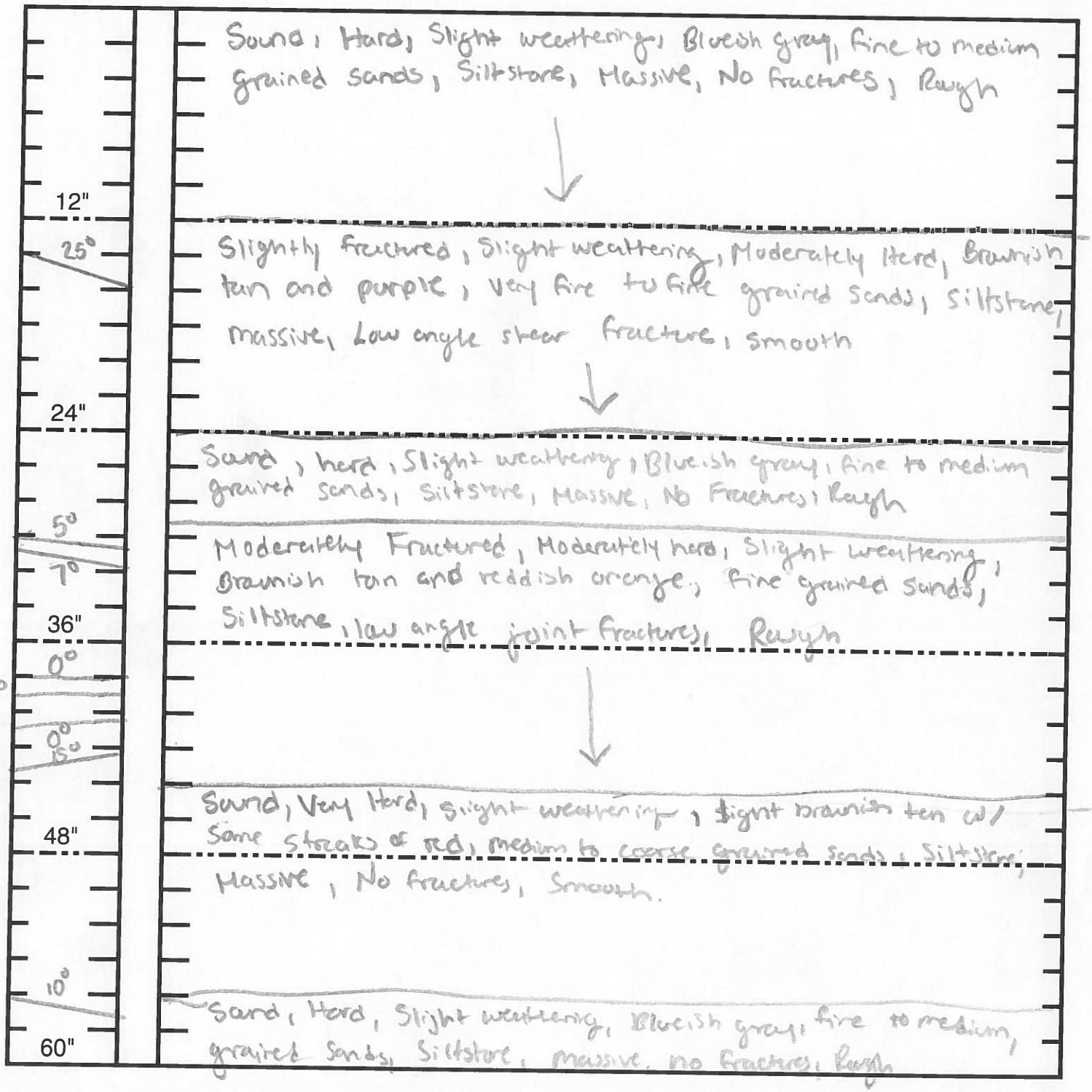
Project Name: Yeager Airport — Contract No.: 17386-0

Logged by: J. Surrency — Boring No.: P-3

Core Run: 5 — Start Depth: 39' — End Depth: 44'

Recovery: 60/60 — RQD: 51/60 = 85%

DEPTH — GEOLOGIC DESCRIPTION



End of run 60"

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ROCK CORING LOG

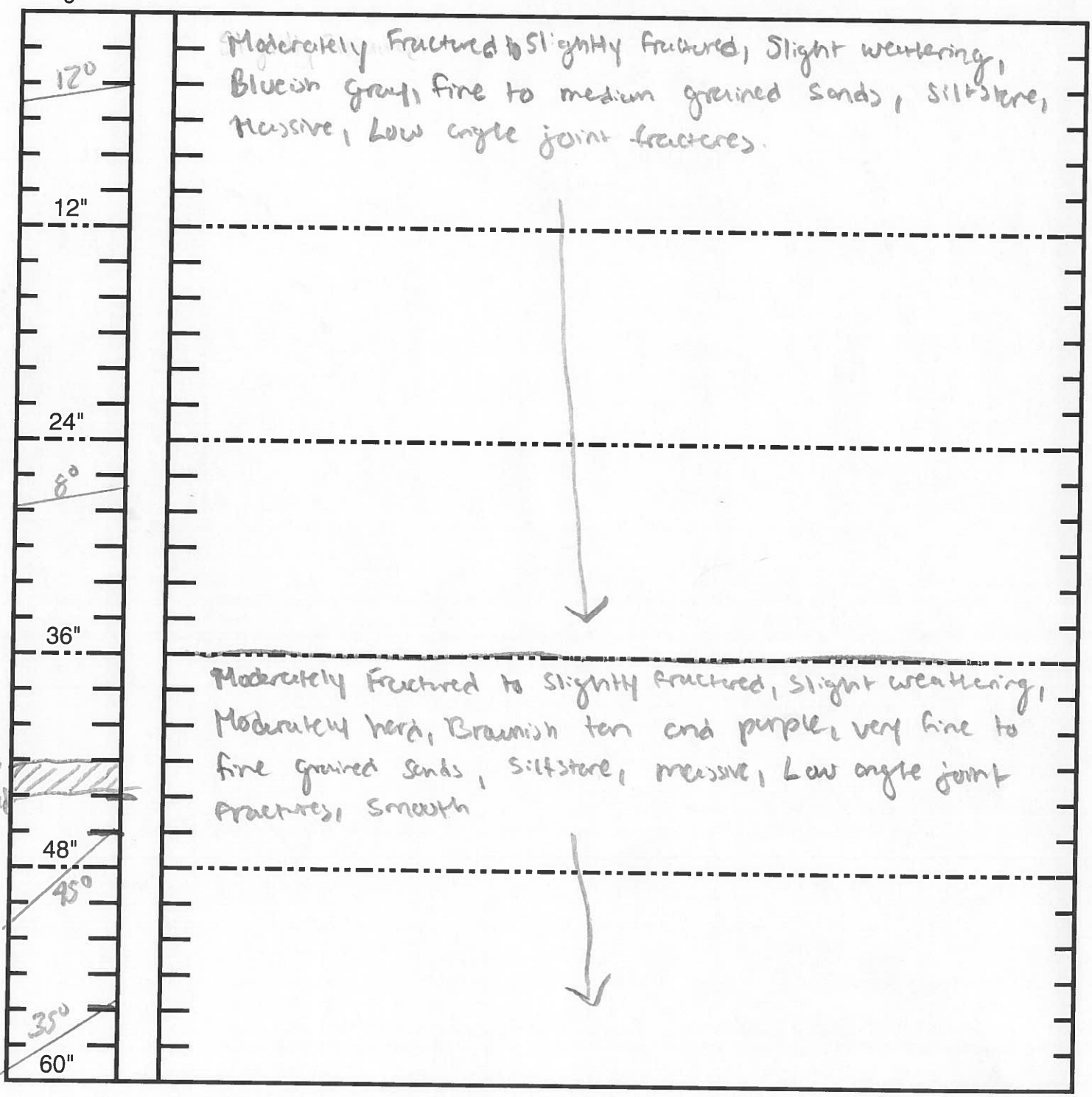
Project Name: Yeager Airport Contract No.: 17388

Logged by: J. Sweeney Boring No.: P-3

Core Run: 6 Start Depth: 49 End Depth: 49

Recovery: 60/60 RQD: 51/60 = 85%

DEPTH GEOLOGIC DESCRIPTION



End of Run 60"

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BORING LOG

BORING P-4

CLIENT Ricondo **PROJECT NAME** EIS - Yeager Airport (CRW)

PROJECT LOCATION Charleston, WV **PROJECT NUMBER** 17386-0 **DATE TESTED**

RIG Mobil B45 **METHOD** Hollow Stem Auger **SAMPLER:** 2-in OD SS **HAMMER:** 140# **FALL:** 30" **AUTO?** Yes

DATE STARTED 8/9/22 **COMPLETED** 8/9/22

DRILLER Dustin Hurd **HELPER** Dan Ditman

REVIEWED BY Jaylen Surrency **SITE DELAYS**

LOCATION As Staked **BULK SAMPLES**

WATER LEVELS

DATE	TIME	ELAPSED HOURS	CASING DEPTH (ft)	HOLE DEPTH (ft)	WATER DEPTH (ft)	WATER ELEV (ft)
8/9/22		0 ▽		40.0	12.0	688.0

DEPTH (ft)	SAMPLE TYPE AND NUMBER	SPT BLOWS/6" OR REC IN/IN %	N VALUE OR CORE RQD	STRATUM CHANGE DEPTH/EL (ft)	GRAPHIC LOG	USCS	WATER LEVEL	MATERIAL DESCRIPTION	PP (tsf)	NMC %	- #200	ATTERBERGS PL	ATTERBERGS LL	ATTERBERGS PI	REMARKS
								SURFACE EL = 700.0 ft							
	S1	7-9-6	15	1.0 / 699.0				Gravel (12-inches)		6	28	NP	NP	NP	
				3.0 / 697.0	F	SM		Moist, Medium Dense, Gray-Brown Silty SAND with Rock Fragments (FILL)							
	S2	4-6-8	14	4.0 / 696.0		CL		Moist, Stiff, Red-Brown CLAY	3.40	24					
5						SM		Moist, Dense, Red-Brown Silty SAND							
10	S3	12-22-23	45							14					
				12.0 / 688.0			▽	DECOMPOSED ROCK sampled as: Moist, Hard, Gray CLAY							
15	S4	13-50/6"	50/6"	15.0		CH		AUGER REFUSAL at 15'		8					
	C1	48 / 48 100%	48	685.0 / 15.5 / 684.5 / 17.5 / 682.5				Decomposed to SILT Moderately Fractured, Moderately Hard, Slightly Weathered, Bluish Gray, Fine-Grained SILTSTONE Extremely to Moderately Fractured, Moderately Hard, Moderately Weathered, Bluish Gray, Very Fine-Grained SHALE.							
20	C2	60 / 60 100%	43	20.0 / 680.0 / 22.0 / 678.0 / 23.0 / 677.0				Moderately Fractured, Moderately Hard, Slightly Weathered, Bluish Gray, Fine-Grained SILTSTONE Extremely Fractured, Moderately Hard, Moderately Weathered, Bluish Gray SHALE							
25	C3	10 / 60 17%	0	24.0 / 676.0				Moderately Fractured, Moderately Hard, Slightly Weathered, Bluish Gray SILTSTONE Moderately Fractured, Moderately Hard, Moderately Weathered, Bluish Gray & Black, Very Fine Grained SHALE and COAL. Coal washed away in drilling process. Visual observations during drilling.							
30	C4	60 / 60 100%	57	30.0 / 670.0 / 33.0 / 667.0				Moderately Fractured, Moderately Hard, Slightly Weathered, Bluish Gray, Very Fine-Grained SILTSTONE							
35															

REMARKS:

(Continued Next Page)

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BORING LOG

BORING P-4

CLIENT Ricondo **PROJECT NAME** EIS - Yeager Airport (CRW)

PROJECT LOCATION Charleston, WV **PROJECT NUMBER** 17386-0 **DATE TESTED**

DEPTH (ft)	SAMPLE TYPE AND NUMBER	SPT BLOWS/6" OR REC IN/IN %	N VALUE OR CORE RQD	STRATUM CHANGE DEPTH/EL (ft)	GRAPHIC LOG	USCS	WATER LEVEL	MATERIAL DESCRIPTION	PP (tsf)	NMC %	- #200	ATTERBERGS PL	ATTERBERGS LL	ATTERBERGS PI	REMARKS
	C5	56 / 60 93%	38					Extremely Fractured, Moderately Hard, Slightly Weathered, Gray to Dark Gray, Very Fine-Grained SHALE/MUDSTONE. Coal seams present. *(continued)*							
40	C6	0 / 60 0%	0												
				44.0 656.0				Terminated at 44.0 feet							

REMARKS:

THE ROBERT B. BALTER COMPANY

ROCK CORING LOG

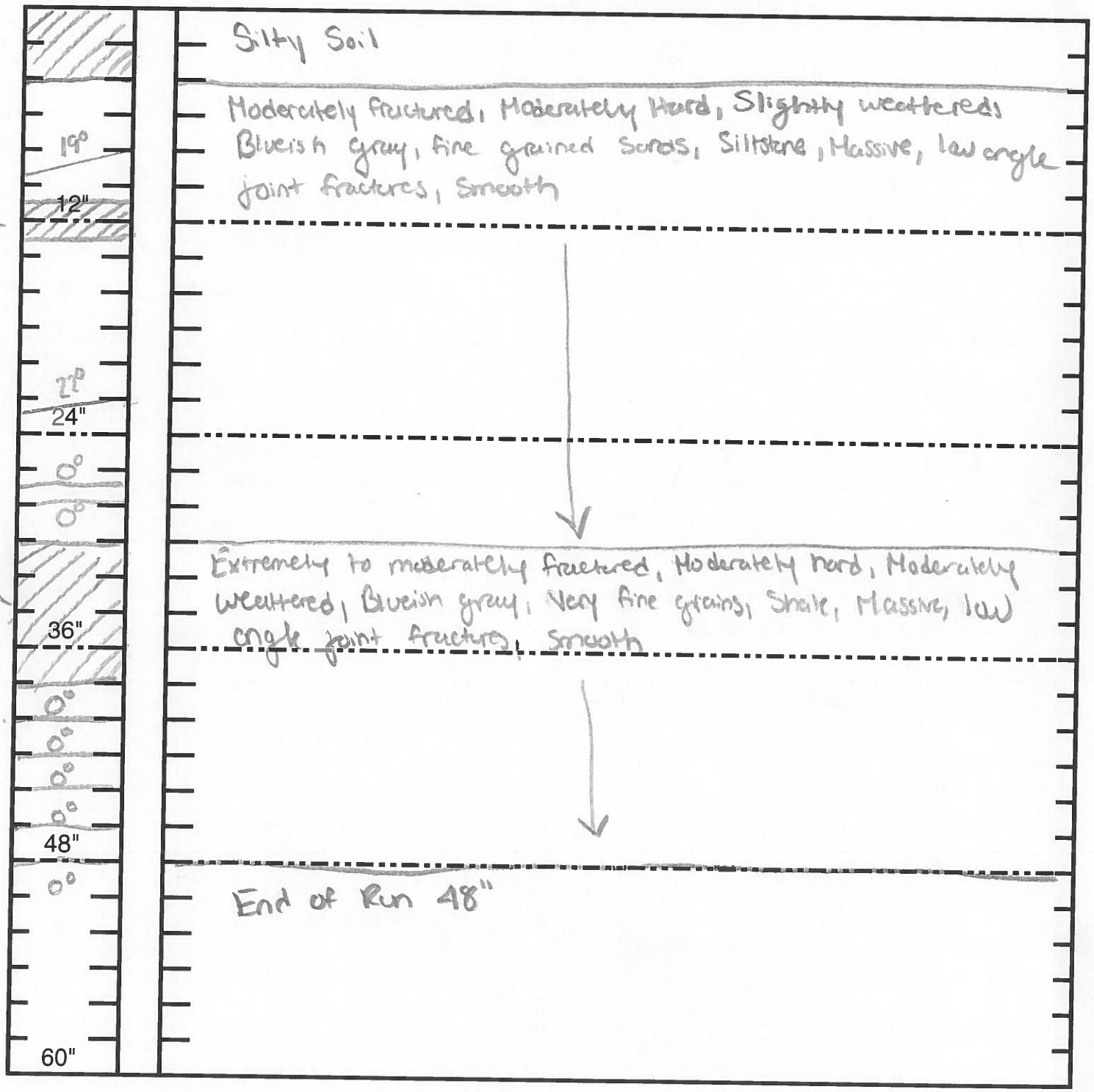
Project Name: Yeager Airport — Contract No.: 17386-0

Logged by: J. Surrency — Boring No.: P-4

Core Run: 1 — Start Depth: 15' — End Depth: 19'

Recovery: 48/48 — RQD: 23/48 - 48%

DEPTH — GEOLOGIC DESCRIPTION



THE ROBERT B. BALTER COMPANY

ROCK CORING LOG

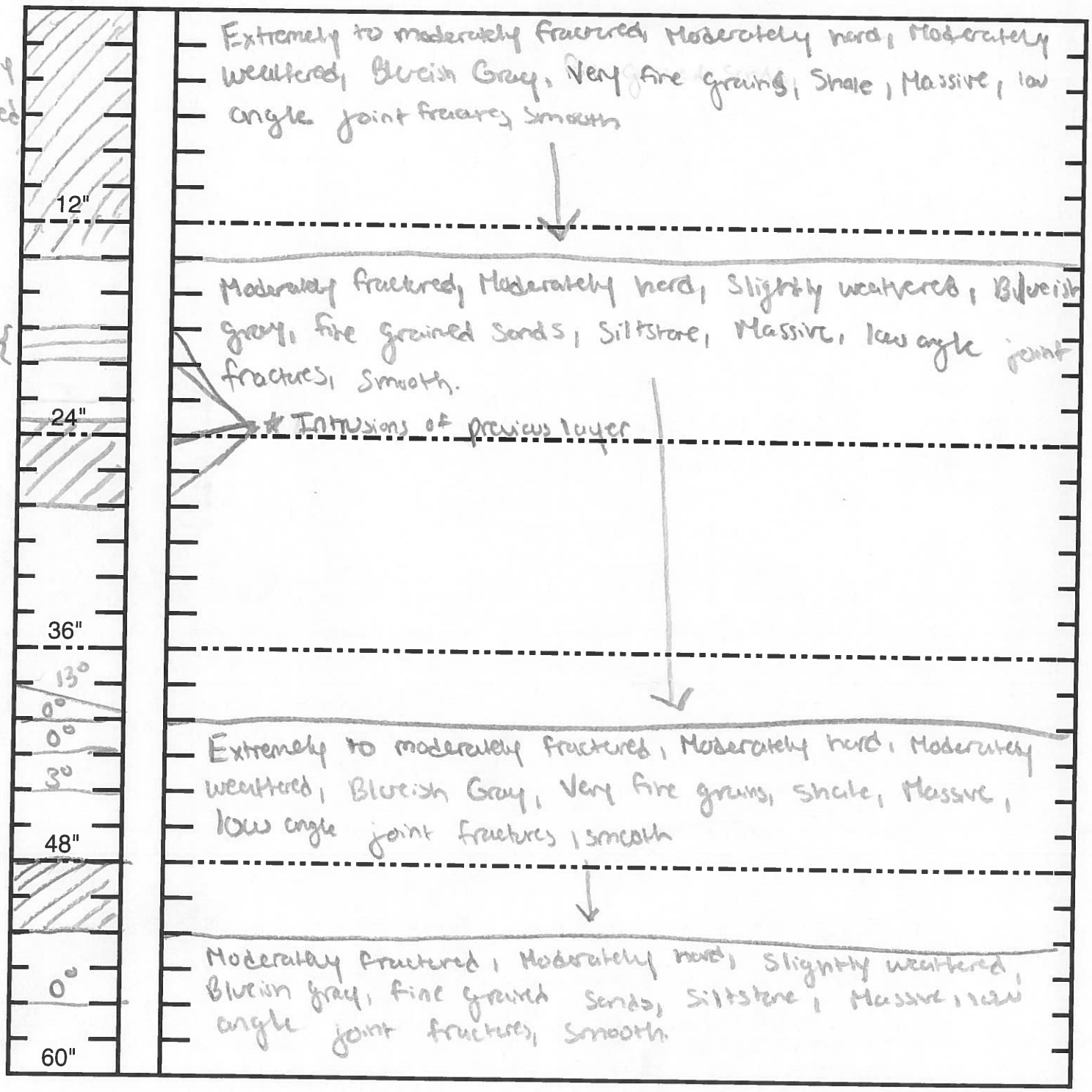
Project Name: Yeager Airport — Contract No.: 17386-0

Logged by: J. Surrency — Boring No.: P-4

Core Run: 2 — Start Depth: 19 — End Depth: 24

Recovery: 60/60 — RQD: 26/60 - 43%

DEPTH — GEOLOGIC DESCRIPTION



THE ROBERT B. BALTER COMPANY

ROCK CORING LOG

Project Name: Yeager Airport

Contract No.: 17386-0

Logged by: J. Surrency

Boring No.: P-4

Core Run: 3

Start Depth: 24

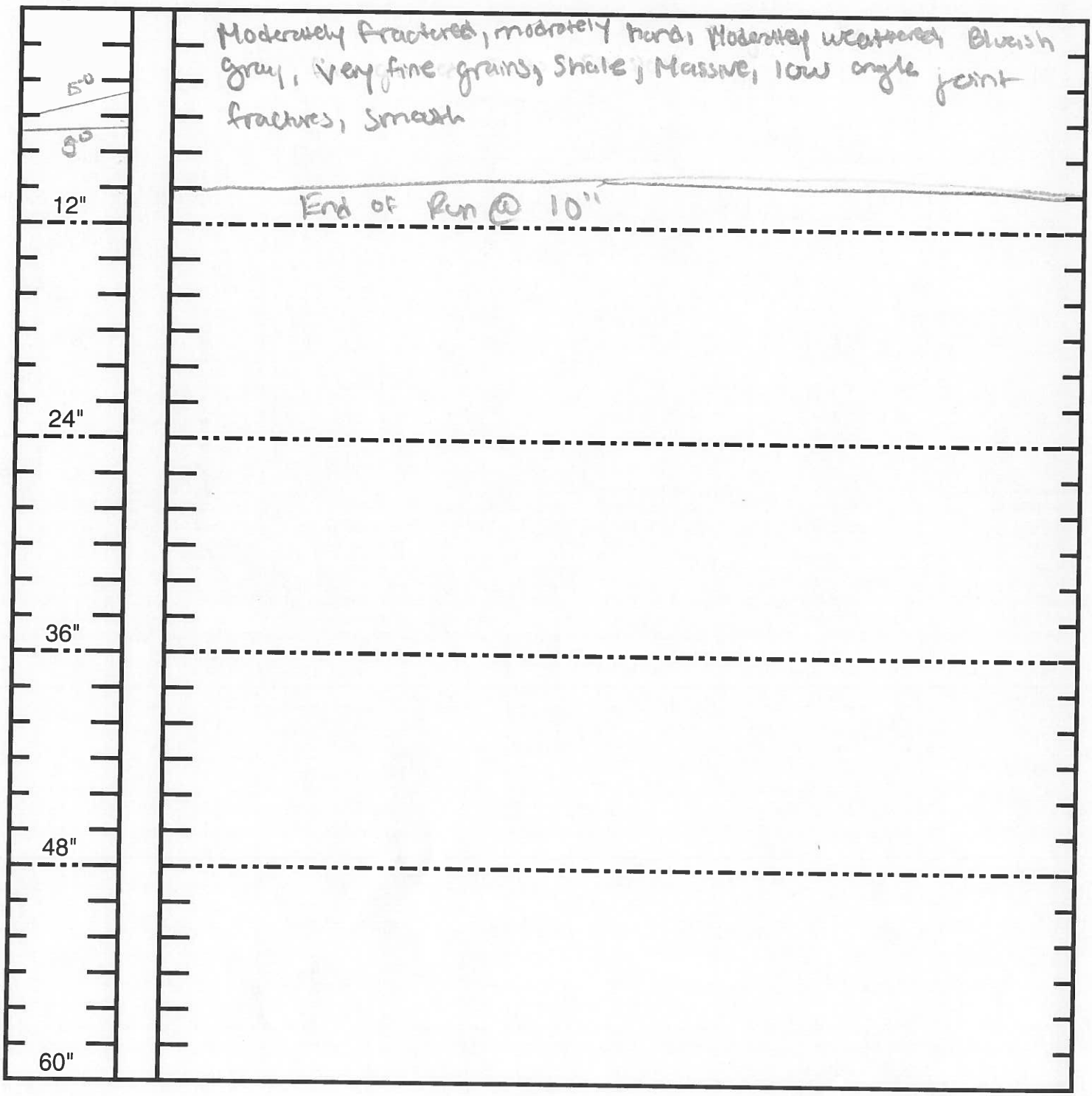
End Depth: 29

Recovery: 10/60

RQD: 0/10 = 0%

DEPTH

GEOLOGIC DESCRIPTION



THE ROBERT B. BALTER COMPANY

ROCK CORING LOG

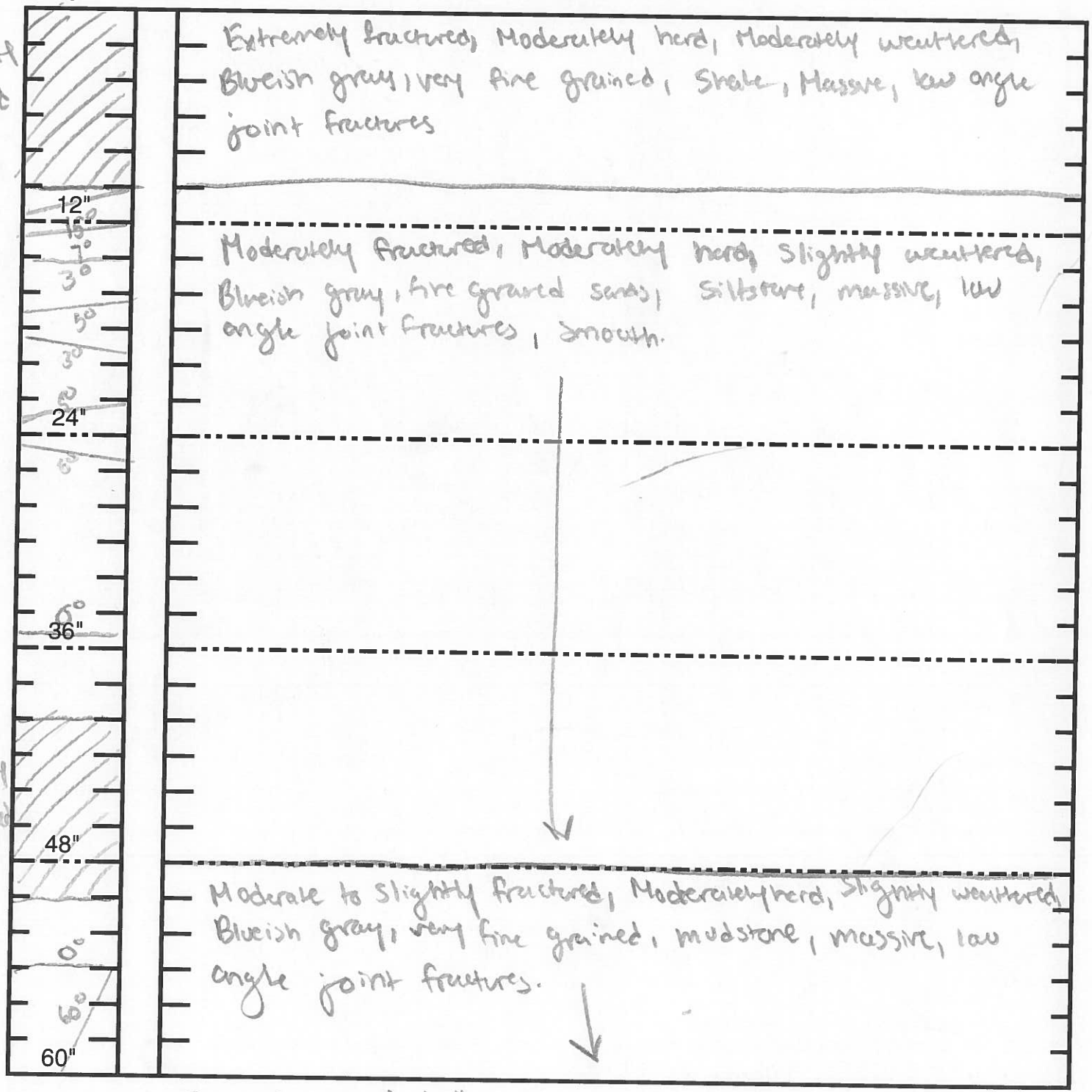
Project Name: Yeager Airport — Contract No.: 17386-0

Logged by: J. Surrena — Boring No.: P-4

Core Run: 4 — Start Depth: 29 — End Depth: 34

Recovery: 60/60 — RQD: 34/60 = 57%

DEPTH — GEOLOGIC DESCRIPTION



End of run at 60"

THE ROBERT B. BALTER COMPANY

ROCK CORING LOG

Project Name: Yeager Airport — Contract No.: 17386-0

Logged by: J. Surrency — Boring No.: P-4

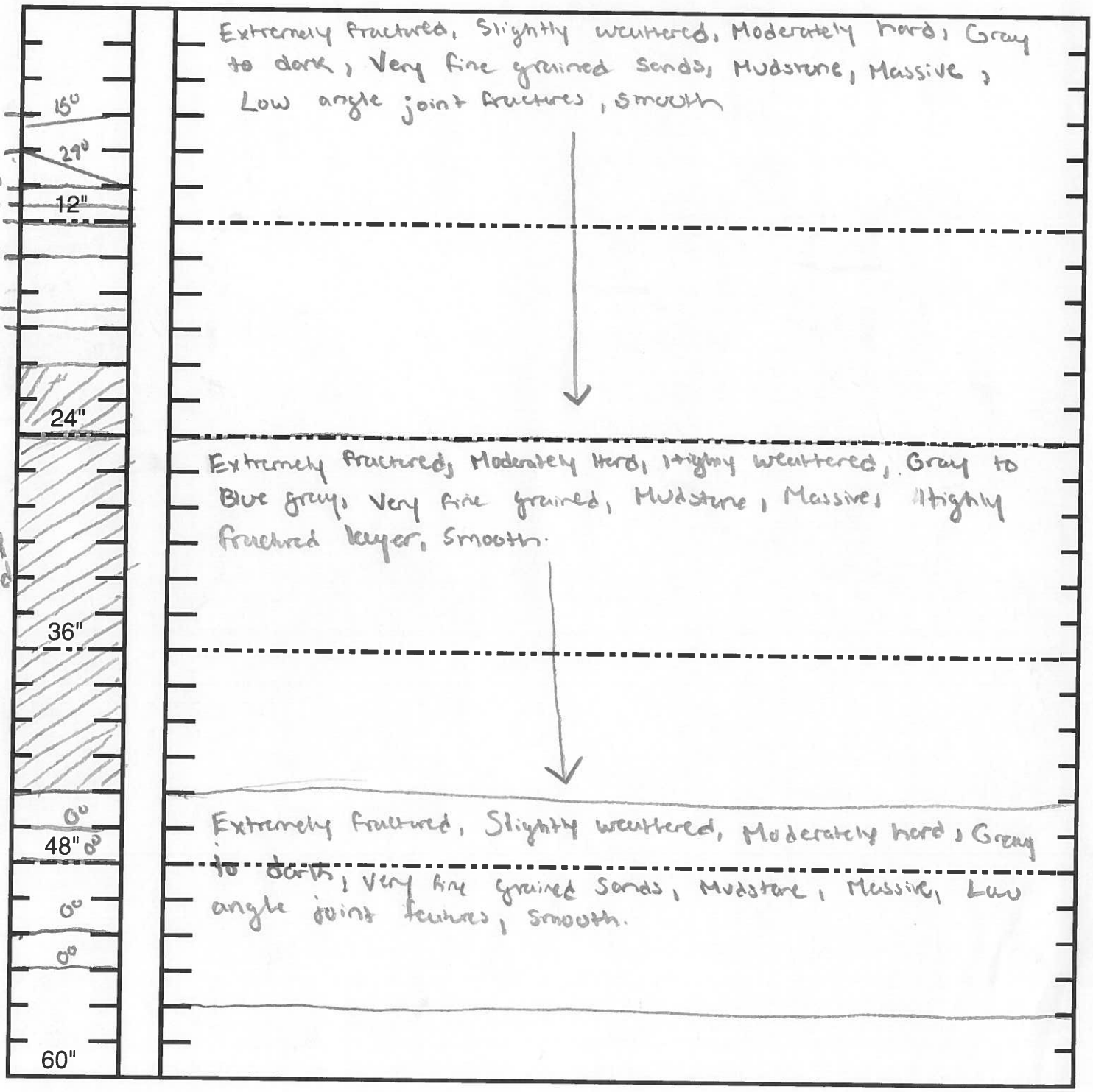
Core Run: 5 — Start Depth: 34' — End Depth: 39'

Recovery: 56"/60 — RQD: 23"/56" - 41%

DEPTH

0"

GEOLOGIC DESCRIPTION



Extremely fractured, Slightly weathered, Moderately hard, Gray to dark, Very fine grained sands, Mudstone, Massive, Low angle joint fractures, Smooth

Extremely fractured, Moderately hard, Highly weathered, Gray to Blue gray, Very fine grained, Mudstone, Massive, Highly fractured layer, Smooth.

Extremely fractured, Slightly weathered, Moderately hard, Gray to dark, Very fine grained sands, Mudstone, Massive, Low angle joint features, Smooth.

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BORING LOG

BORING P-6

CLIENT Ricondo **PROJECT NAME** EIS - Yeager Airport (CRW)

PROJECT LOCATION Charleston, WV **PROJECT NUMBER** 17386-0 **DATE TESTED**

RIG Mobil B45 **METHOD** Hollow Stem Auger **SAMPLER:** 2-in OD SS/NQ Core **HAMMER:** 140# **FALL:** 30" **AUTO?** Yes

DATE STARTED 8/4/22 **COMPLETED** 8/4/22

DRILLER Dustin Hurd **HELPER** Dan Ditman

REVIEWED BY Jaylen Surrency **SITE DELAYS**

LOCATION As Staked **BULK SAMPLES**

WATER LEVELS

DATE	TIME	ELAPSED HOURS	CASING DEPTH (ft)	HOLE DEPTH (ft)	WATER DEPTH (ft)	WATER ELEV (ft)

DEPTH (ft)	SAMPLE TYPE AND NUMBER	SPT BLOWS/6" OR REC IN/IN %	N VALUE OR CORE RQD	STRATUM CHANGE DEPTH/EL (ft)	GRAPHIC LOG	USCS	WATER LEVEL	MATERIAL DESCRIPTION	PP (tsf)	NMC %	- #200	ATTERBERGS PL	ATTERBERGS LL	ATTERBERGS PI	REMARKS
								SURFACE EL = 810.0 ft							
	S1	2-3-4	7			CL		Moist, Soft, Brown CLAY		21					
				3.0 807.0											
5	S2	12-40-49	89			CL		DECOMPOSED ROCK sampled as: Moist, Hard, Tan-Brown CLAY with Siltstone Rock Fragments		10	94	24	35	11	
				7.0 803.0				DECOMPOSED ROCK sampled as: Moist, Very Dense, Brown Silty SAND with Sandstone Rock Fragments							
10	S3	50/4"	50/4"			SM				6					
				12.0 798.0				HIGHLY WEATHERED ROCK sampled as: Moist, Hard, Gray Sandy SILT with Shale Rock Fragments							
15	S4	43-50/3"	50/3"			ML				6					
				17.0 793.0				HIGHLY WEATHERED ROCK sampled as: Moist, Very Dense, Brown Silty SAND with Sandstone Rock Fragments							
20	S5	50/0"	50/0"			SM									
	S6	50/0"	50/0"	20.0 790.0				Slightly Fractured, Moderately Hard, Slightly Weathered, Bluish Gray, Fine-Grained SILTSTONE							
	C1	54 / 54 100%	81												
25	C2	60 / 60 100%	100												
30	C3	60 / 60 100%	100												
35															

REMARKS:

(Continued Next Page)

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BORING LOG

BORING P-6

CLIENT Ricondo **PROJECT NAME** EIS - Yeager Airport (CRW)

PROJECT LOCATION Charleston, WV **PROJECT NUMBER** 17386-0 **DATE TESTED**

DEPTH (ft)	SAMPLE TYPE AND NUMBER	SPT BLOWS/6" OR REC IN/IN %	N VALUE OR CORE RQD	STRATUM CHANGE DEPTH/EL (ft)	GRAPHIC LOG	USCS	WATER LEVEL	MATERIAL DESCRIPTION	PP (tsf)	NMC %	- #200	ATTERBERGS PL	ATTERBERGS LL	ATTERBERGS PI	REMARKS
	C4	54 / 60 90%	55	37.5 772.5				Slightly Fractured, Moderately Hard, Slightly Weathered, Bluish Gray, Fine-Grained SILTSTONE *(continued)*							
				38.5 771.5				Extremely Fractured, Moderately Hard, Moderately Weathered Brownish Red SANDSTONE							
40				40.5 769.5				Slightly to Moderately Fractured, Hard, Slightly Weathered, Tan, Fine- to Medium-Grained SILTSTONE							
	C5	60 / 60 100%	100					Sound, Very Hard, Slightly Weathered, Grayish Tan, Coarse to Very Coarse Grained SANDSTONE							
45				45.0 765.0				Extremely to Moderately Fractured,Soft, Highly Weathered, Bluish Gray, Very Fine Grained SILTSTONE							
	C6	60 / 60 100%	87												
				49.5 760.5				Terminated at 49.5 feet							

REMARKS:

THE ROBERT B. BALTER COMPANY

ROCK CORING LOG

Project Name: Yeager Airport

Contract No.: 17388-0

Logged by: J. Sweeney

Boring No.: P-6

Core Run: 1

Start Depth: 20'

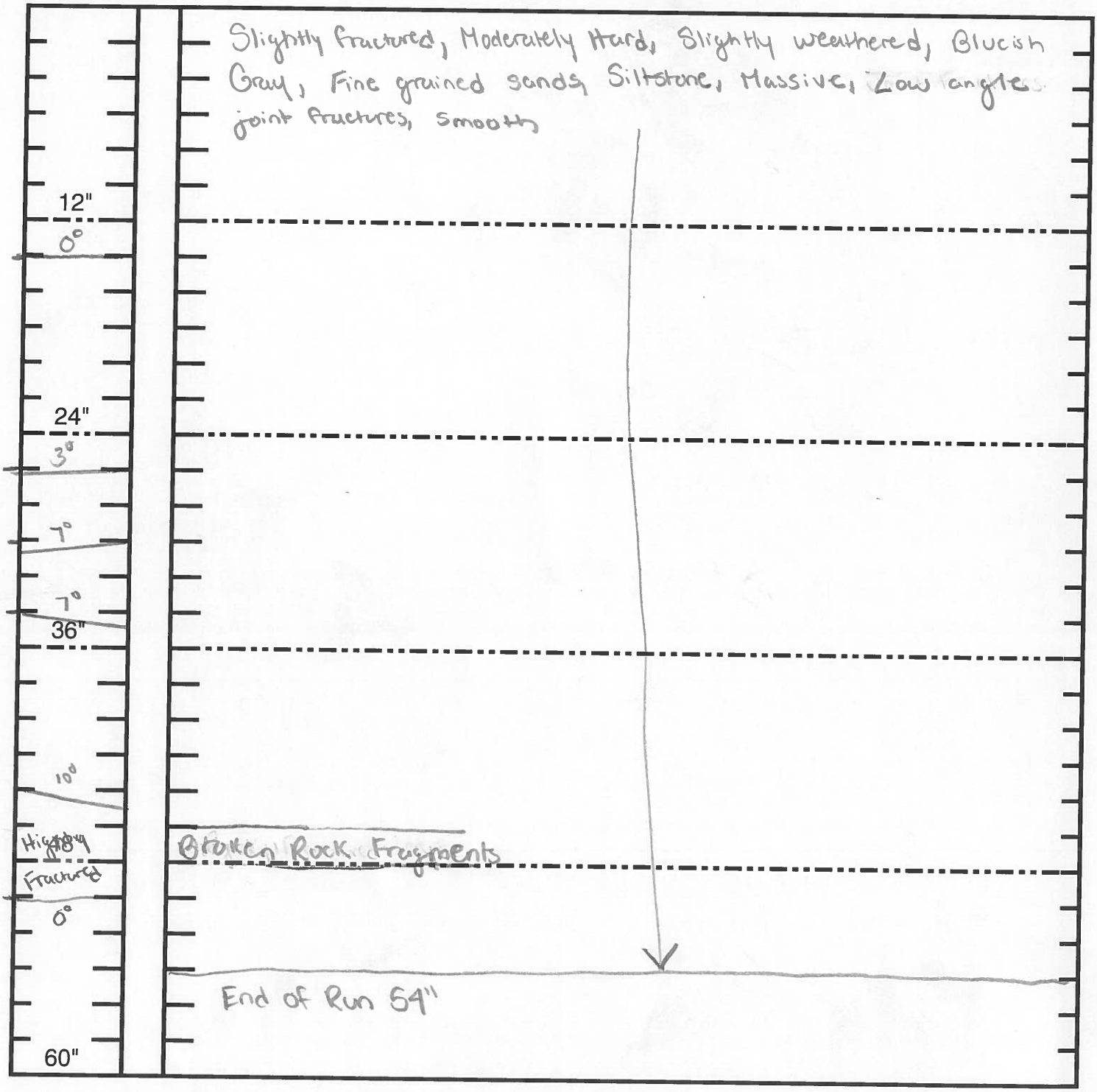
End Depth: 24'/2

Recovery: 54/54

RQD: 44/54 = 81%

DEPTH

GEOLOGIC DESCRIPTION



THE ROBERT B. BALTER COMPANY

ROCK CORING LOG

Project Name: Yeager Airport

Contract No.: 17386-0

Logged by: J. Surrency

Boring No.: P-6

Core Run: 2

Start Depth: 24 1/2

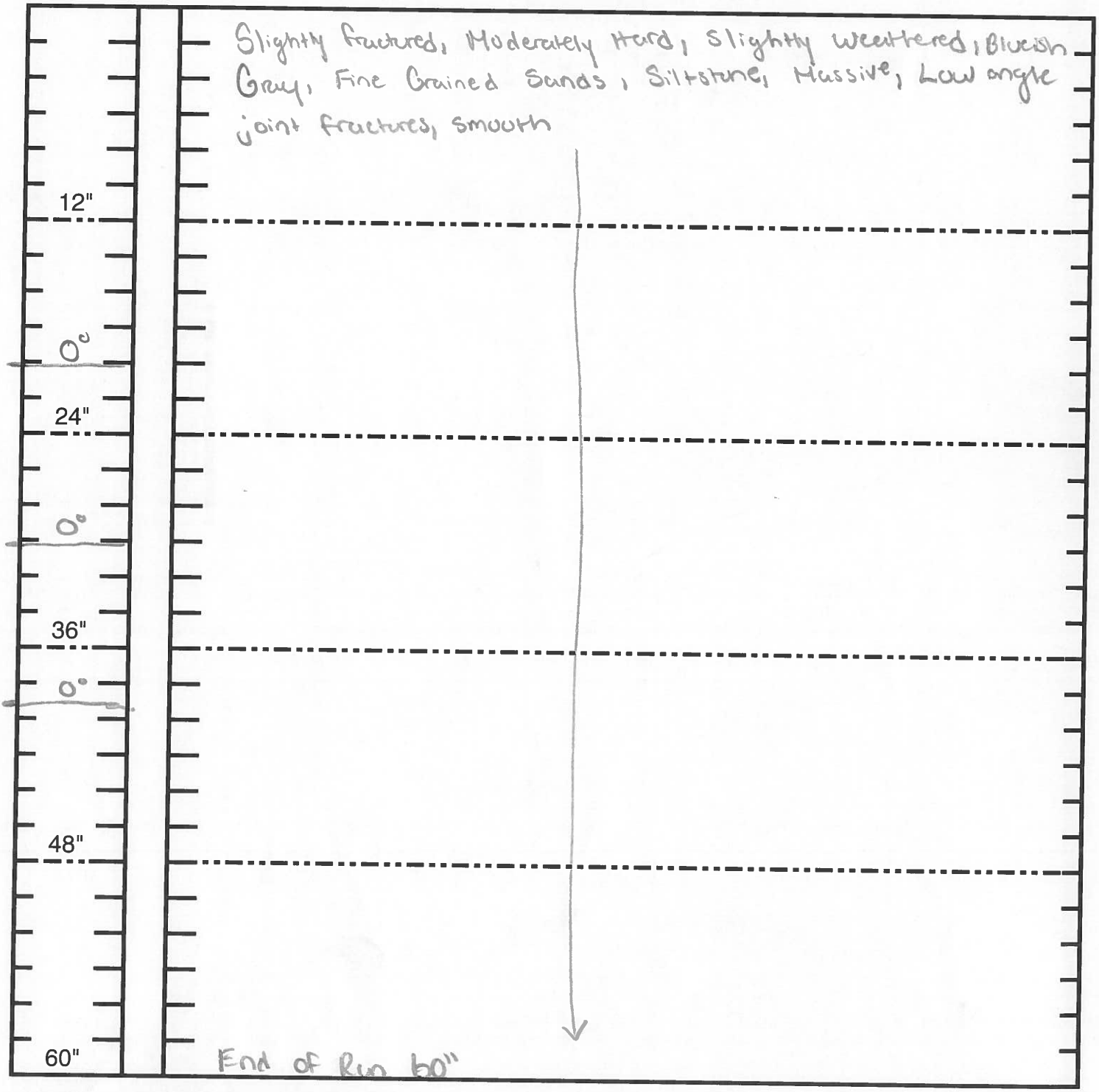
End Depth: 29 1/2

Recovery: 60/60

RQD: 60/60 = 100%

DEPTH

GEOLOGIC DESCRIPTION



THE ROBERT B. BALTER COMPANY

ROCK CORING LOG

Project Name: Yeager Airport Contract No.: 17386-0

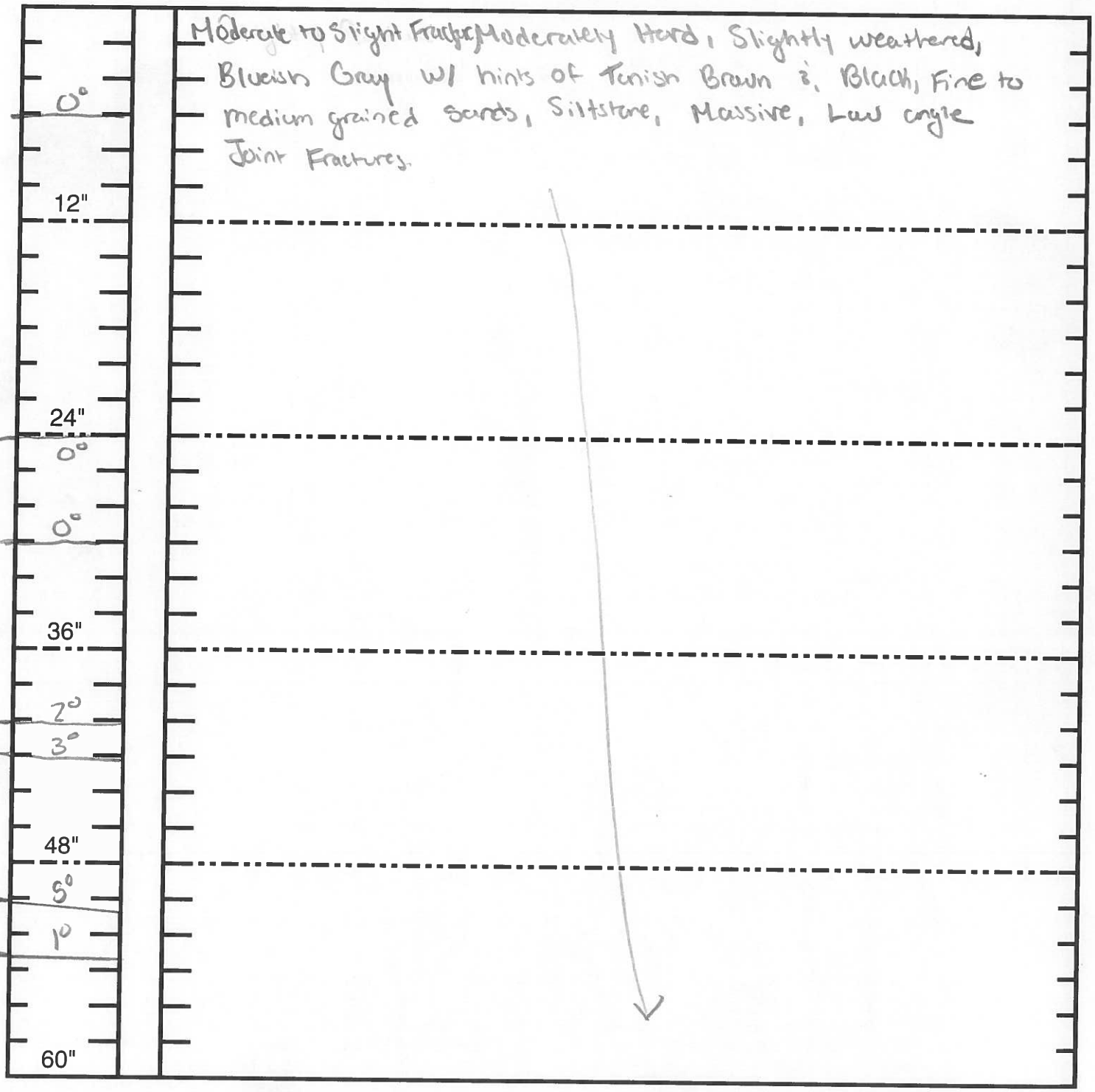
Logged by: J. Surrency Boring No.: P-6

Core Run: 3 Start Depth: 29 1/2 End Depth: 34 1/2

Recovery: 60/60 RQD: 60/60 = 100%

DEPTH

GEOLOGIC DESCRIPTION



THE ROBERT B. BALTER COMPANY

ROCK CORING LOG

Project Name: Yeager Airport Contract No.: 17386-0

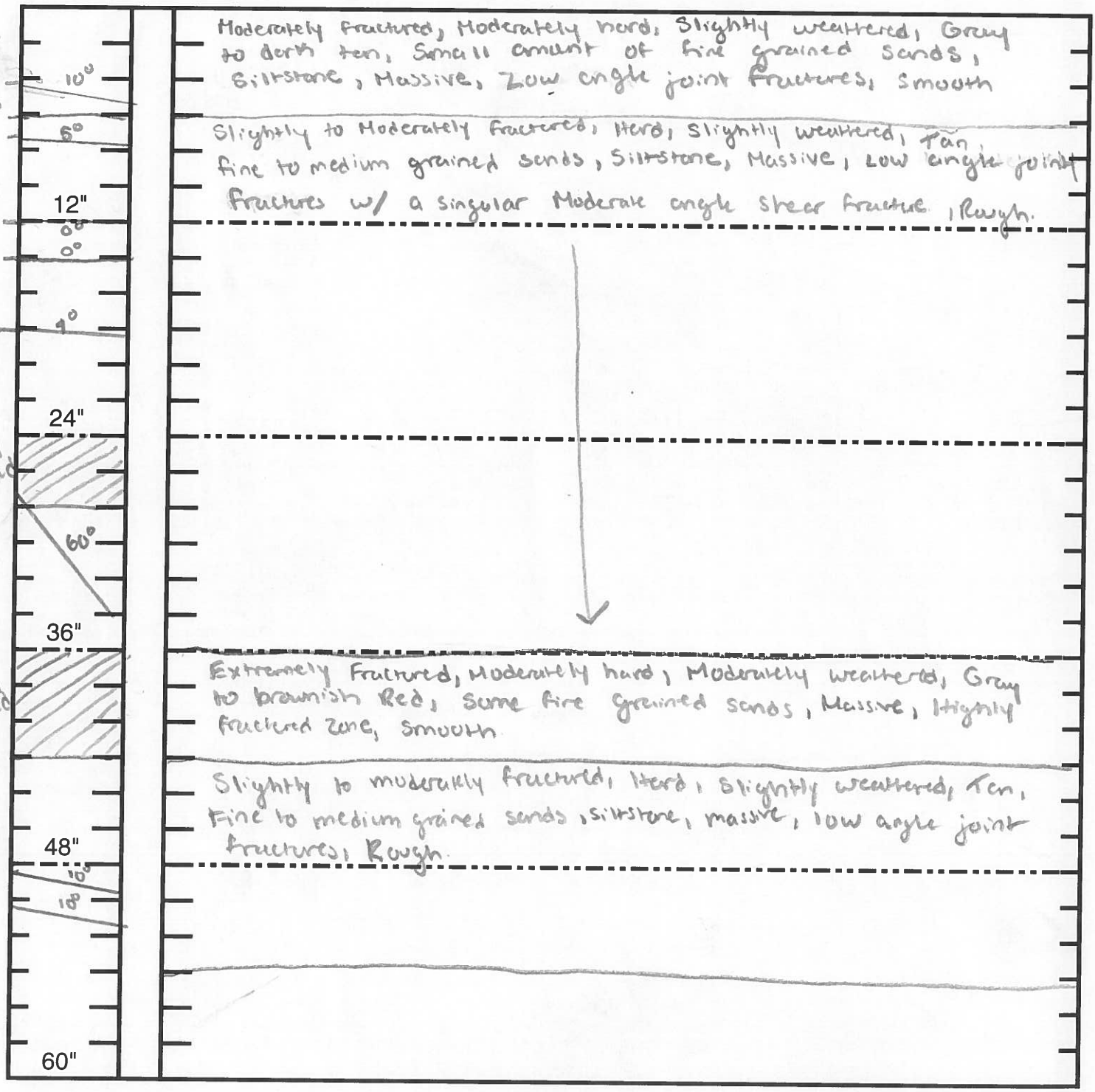
Logged by: J Surrency Boring No.: P-6

Core Run: 4 Start Depth: 34½ End Depth: 39½

Recovery: 84/60 RQD: 33/54 = 61%

DEPTH

GEOLOGIC DESCRIPTION



Moderately Fractured, Moderately hard, Slightly weathered, Gray to dark tan, Small amount of fine grained sands, Siltstone, Massive, Low angle joint fractures, Smooth

Slightly to Moderately Fractured, Hard, Slightly weathered, Tan, fine to medium grained sands, Siltstone, Massive, Low angle joint fractures w/ a singular Moderate angle shear fracture, Rough.

Extremely Fractured, Moderately hard, Moderately weathered, Gray to brownish Red, Some fine grained sands, Massive, Highly fractured zone, Smooth

Slightly to moderately fractured, Hard, Slightly weathered, Tan, Fine to medium grained sands, siltstone, massive, low angle joint fractures, Rough.

THE ROBERT B. BALTER COMPANY

ROCK CORING LOG

Project Name: Yeager Airport

Contract No.: 17386-0

Logged by: J. Surrency

Boring No.: P-6

Core Run: 5

Start Depth: 39 1/2

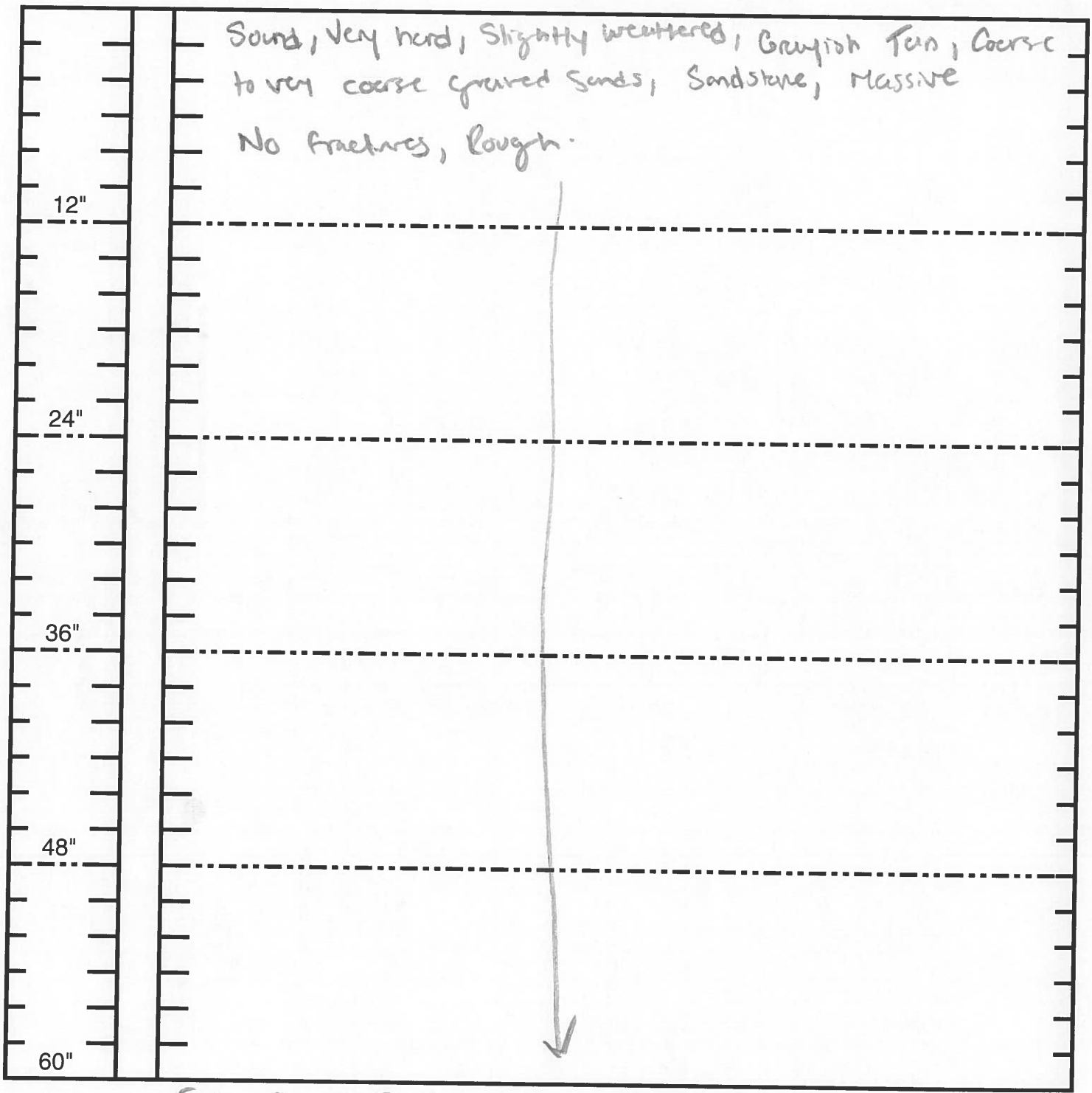
End Depth: 44 1/2

Recovery: 60/60

RQD: 60/60 = 100%

DEPTH

GEOLOGIC DESCRIPTION



End of run @ 60"

THE ROBERT B. BALTER COMPANY

ROCK CORING LOG

Project Name: Yeager Airport

Contract No.: 17386-0

Logged by: J. Surrency

Boring No.: P-6

Core Run: 6

Start Depth: 44.5

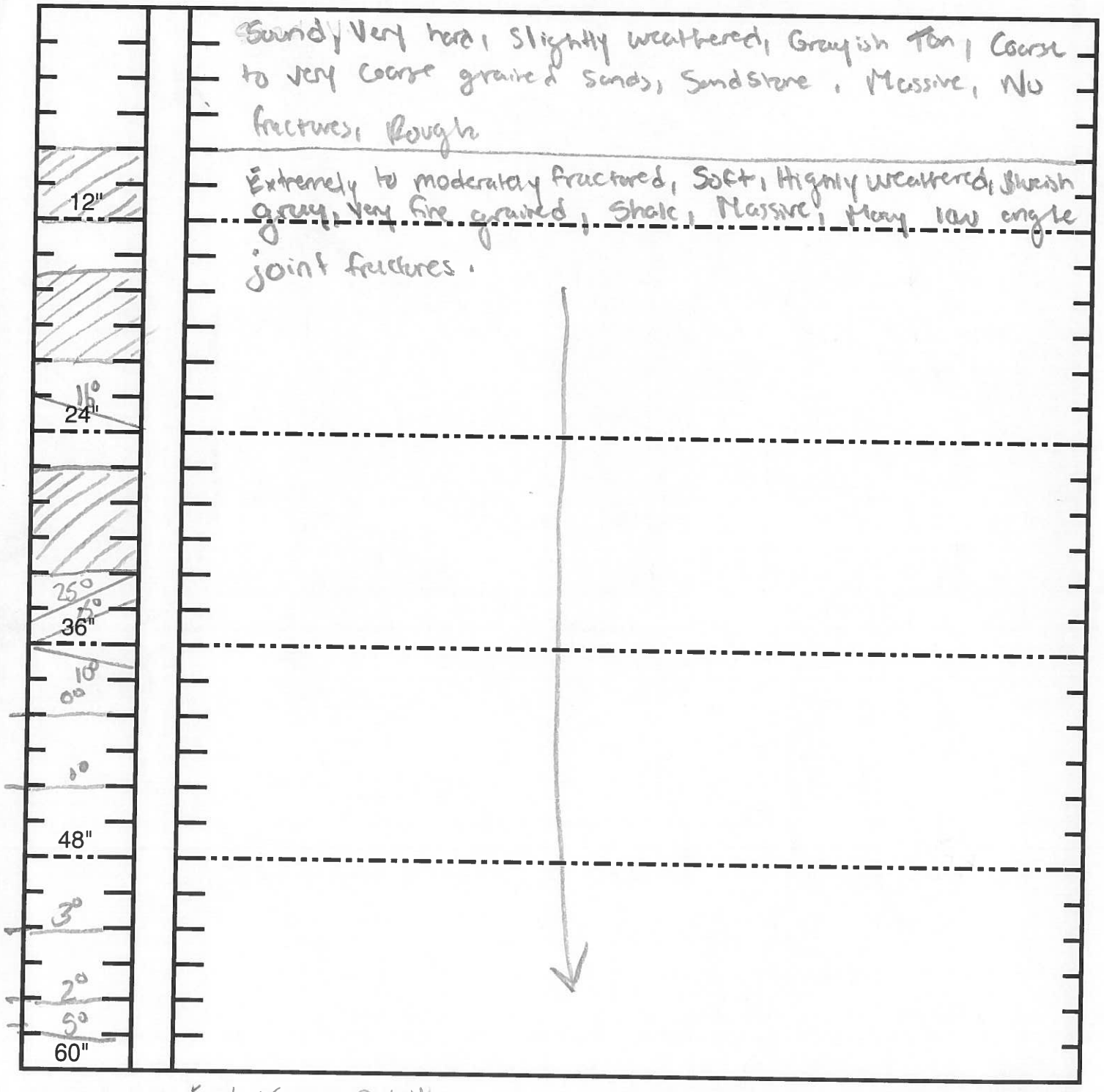
End Depth: 49.5

Recovery: 60/60

RQD: 52/60 = 87%

DEPTH

GEOLOGIC DESCRIPTION



End of run @ 60"

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BORING LOG

BORING P-7

CLIENT Ricondo **PROJECT NAME** EIS - Yeager Airport (CRW)

PROJECT LOCATION Charleston, WV **PROJECT NUMBER** 17386-0 **DATE TESTED**

RIG Mobil B45 **METHOD** Hollow Stem Auger **SAMPLER:** 2-in OD SS **HAMMER:** 140# **FALL:** 30" **AUTO?** Yes

DATE STARTED 8/2/22 **COMPLETED** 8/2/22

DRILLER Dustin Hurd **HELPER** Dan Ditman

REVIEWED BY Jaylen Surrency **SITE DELAYS**

LOCATION As Staked **BULK SAMPLES** 10-15'

WATER LEVELS

DATE	TIME	ELAPSED HOURS	CASING DEPTH (ft)	HOLE DEPTH (ft)	WATER DEPTH (ft)	WATER ELEV (ft)

DEPTH (ft)	SAMPLE TYPE AND NUMBER	SPT BLOWS/6" OR REC IN/IN %	N VALUE OR CORE RQD	STRATUM CHANGE DEPTH/EL (ft)	GRAPHIC LOG	USCS	WATER LEVEL	MATERIAL DESCRIPTION	PP (tsf)	NMC %	- #200	ATTERBERGS PL	ATTERBERGS LL	ATTERBERGS PI	REMARKS
								SURFACE EL = 812.0 ft							
	S1	1-2-3	5	0.1 811.9		CL		Topsoil (1-inch) Moist, Medium Stiff, Brown Sandy CLAY, trace rock fragments	2.90	23					
				3.0 809.0											
	S2	50/2"	50/2"			SM		HIGHLY WEATHERED ROCK sampled as: Moist, Very Dense, Brown Silty SAND with Sandstone Rock Fragments		8					
5				7.0 805.0				DECOMPOSED ROCK Sampled as: Moist, Very Dense, Brown Silty SAND with Sandstone Rock Fragments							
	S3	50/5"	50/5"			SM				5					
10										11	34	NP	NP	NP	
				12.0 800.0				HIGHLY WEATHERED ROCK sampled as: Moist, Very Dense, Brown Silty SAND, little rock fragments							
	S4	50/3"	50/3"			SM									
15				17.0 795.0				DECOMPOSED ROCK Sampled as: Moist, Hard, Orangish Brown SILT, little sand							
	S5	12-24-35	59			ML				9	75	17	29	12	
20															
	S6	27-47-50/3"	50/3"	24.0 788.0		ML		HIGHLY WEATHERED ROCK Sampled as: Moist, Hard, Gray Clayey SILT with Shale Rock Fragments		6					
25				27.0 785.0				HIGHLY WEATHERED ROCK Sampled as: Moist, Very Dense, Brown Silty SAND with Sandstone Rock Fragments AUGER REFUSAL at 43'							
	S7	50/3"	50/3"			SM				8					
30															
	S8	50/3"	50/3"												
35															

REMARKS:

(Continued Next Page)

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BORING LOG

BORING P-7

CLIENT Ricondo **PROJECT NAME** EIS - Yeager Airport (CRW)

PROJECT LOCATION Charleston, WV **PROJECT NUMBER** 17386-0 **DATE TESTED**

DEPTH (ft)	SAMPLE TYPE AND NUMBER	SPT BLOWS/6" OR REC IN/IN %	N VALUE OR CORE RQD	STRATUM CHANGE DEPTH/EL (ft)	GRAPHIC LOG	USCS	WATER LEVEL	MATERIAL DESCRIPTION	PP (tsf)	NMC %	- #200	ATTERBERGS PL	ATTERBERGS LL	ATTERBERGS PI	REMARKS
40	S9	50/0"	50/0"	43.0 769.0		SM		HIGHLY WEATHERED ROCK Sampled as: Moist, Very Dense, Brown Silty SAND with Sandstone Rock Fragments AUGER REFUSAL at 43' *(continued)* Terminated at 43.0 feet							

REMARKS:

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BORING LOG

BORING P-8

CLIENT Ricondo **PROJECT NAME** EIS - Yeager Airport (CRW)

PROJECT LOCATION Charleston, WV **PROJECT NUMBER** 17386-0 **DATE TESTED**

RIG Mobil B45 **METHOD** Hollow Stem Auger **SAMPLER:** 2-in OD SS/NQ Core **HAMMER:** 140# **FALL:** 30" **AUTO?** Yes

DATE STARTED 7/30/22 **COMPLETED** 7/30/22

DRILLER Dustin Hurd **HELPER** Dennis Strawderman

REVIEWED BY Jaylen Surrency **SITE DELAYS**

LOCATION As Staked **BULK SAMPLES**

WATER LEVELS

DATE	TIME	ELAPSED HOURS	CASING DEPTH (ft)	HOLE DEPTH (ft)	WATER DEPTH (ft)	WATER ELEV (ft)

DEPTH (ft)	SAMPLE TYPE AND NUMBER	SPT BLOWS/6" OR REC IN/IN %	N VALUE OR CORE RQD	STRATUM CHANGE DEPTH/EL (ft)	GRAPHIC LOG	USCS	WATER LEVEL	MATERIAL DESCRIPTION	PP (tsf)	NMC %	- #200	ATTERBERGS PL	ATTERBERGS LL	ATTERBERGS PI	REMARKS
								SURFACE EL = 908.0 ft							
	S1	2-2-5	7	0.4 907.6		CL		Topsoil (5-inches) Moist, Medium Stiff, Red-Brown Sandy CLAY	3.00	26					
				3.0 905.0				Moist, Stiff, Brown Fat CLAY with decomposed rock fragments							
5	S2	3-7-7	14			CH			4.50	14					
				7.0 901.0				DECOMPOSED ROCK sampled as: Moist, Hard, Red-Brown Sandy CLAY with Siltstone Rock Fragments							
	S3	50/5"	50/5"			CL				6					
10				12.0 896.0				DECOMPOSED ROCK sampled as: Moist, Hard, Greenish Tan Sandy Clayey SILT with Shale Fragments							
	S4	47- 50/4"	50/4"							9					
15						CL- ML									
	S5	50/5"	50/5"							7					
20				22.0 886.0				DECOMPOSED ROCK sampled as: Moist, Hard, Gray Clayey SILT with Shale Fragments							
	S6	38- 50/4"	50/4"							9					
25															
	S7	50/4"	50/4"			CL- ML				7					
30															
	S8	50/5"	50/5"							6					
35															

REMARKS:

(Continued Next Page)

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BORING LOG

CLIENT Ricondo **PROJECT NAME** EIS - Yeager Airport (CRW)

PROJECT LOCATION Charleston, WV **PROJECT NUMBER** 17386-0 **DATE TESTED**

DEPTH (ft)	SAMPLE TYPE AND NUMBER	SPT BLOWS/6" OR REC IN/IN %	N VALUE OR CORE RQD	STRATUM CHANGE DEPTH/EL (ft)	GRAPHIC LOG	USCS	WATER LEVEL	MATERIAL DESCRIPTION	PP (tsf)	NMC %	- #200	ATTERBERGS PL	ATTERBERGS LL	ATTERBERGS PI	REMARKS
				37.0 871.0		CL-ML		DECOMPOSED ROCK sampled as: Moist, Hard, Gray Clayey SILT with Shale Fragments *(continued)*							
40	S9	50/0"	50/0"	42.0 866.0		ML		HIGHLY WEATHERED ROCK sampled as: Moist, Hard, Gray SILT with Siltstone Fragments							
45	S10	50/5"	50/5"	47.0 861.0		CL		DECOMPOSED ROCK sampled as: Moist, Hard, Tan Lean CLAY		7	95	19	31	12	
50	S11	50/4"	50/4"	54.0 854.0		ML		DECOMPOSED ROCK sampled as: Moist, Hard, Gray SILT with Siltstone Fragments AUGER REFUSAL at 54'							
55	C1	60 / 60 100%	88					Slightly Fractured to Sound, Medium to Moderately Hard to Sound, Slightly Weathered to Fresh, Gray, Fine-Grained SILTSTONE.							
60	C2	60 / 60 100%	97	62.0 846.0				Sound to Moderately Fractured to Extremely Fractured, Moderately Hard to Medium, Fresh to Highly Weathered, Dark Gray to Brown Gray, Fine-Grained SHALE.							
65	C3	58 / 60 97%	68												
70	C4	57 / 60 95%	77	71.5 836.5				Sound, Hard, Fresh, Greenish Gray, Fine-Grained SILTSTONE							
				74.0 834.0				Terminated at 74.0 feet							

REMARKS:

THE ROBERT B. BALTER COMPANY

ROCK CORING LOG

Project Name: Yeager Airport Improvement Project-EIS Contract No.: 17386-0

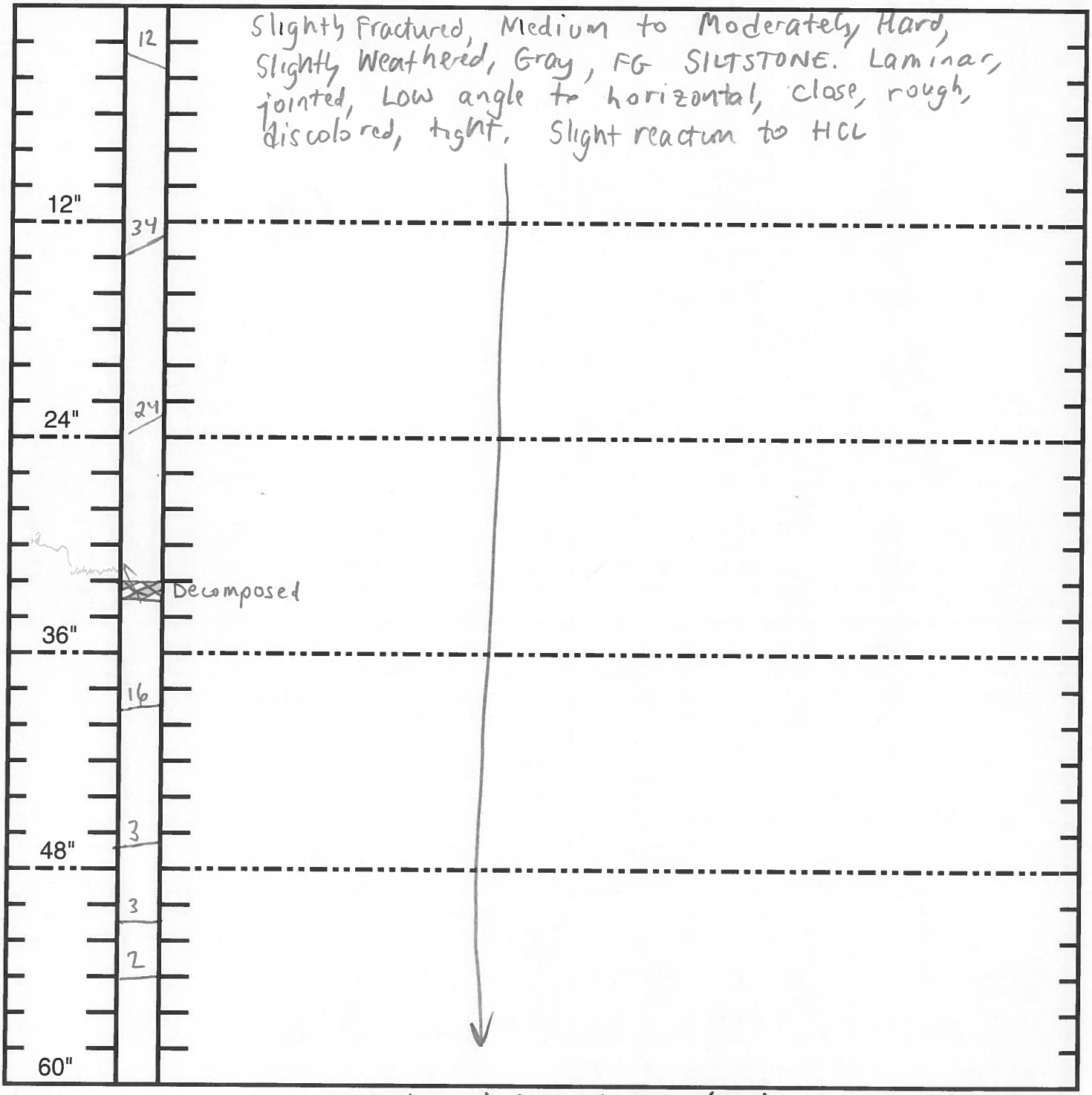
Logged by: KML Boring No.: P-8

Core Run: 1 Start Depth: 54' End Depth: 59'

Recovery: 60/60 = 100%. RQD: 53/60 = 88%.

DEPTH

GEOLOGIC DESCRIPTION



Bottom of Core at 60" (59')

THE ROBERT B. BALTER COMPANY

ROCK CORING LOG

Project Name: Yeager Airport Improvement Project - EIS Contract No.: 17386-0

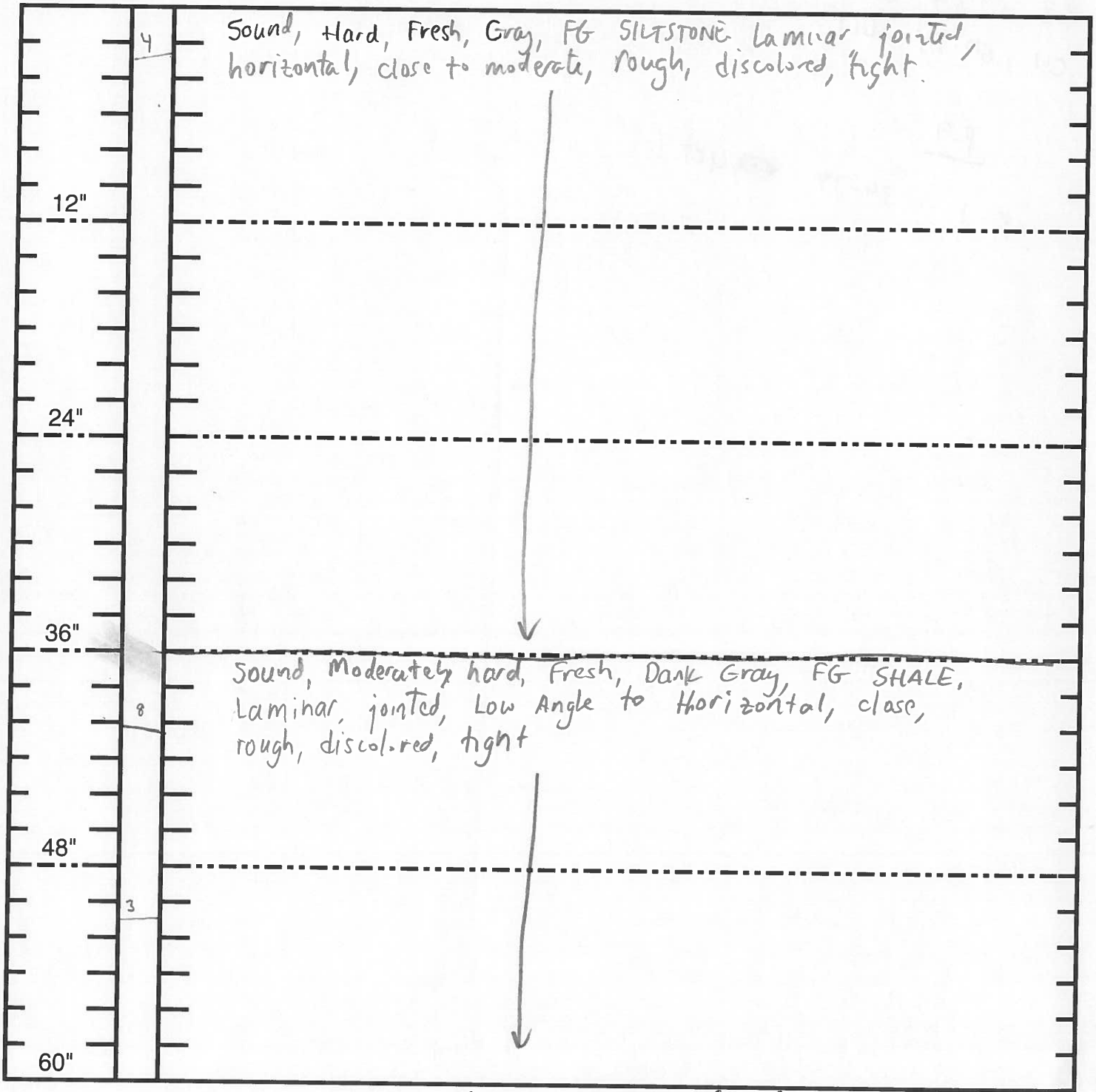
Logged by: kmc Boring No.: P-8

Core Run: 2 Start Depth: 59' End Depth: 64'

Recovery: 60/60 = 100 RQD: 58/60 = 97%

DEPTH

GEOLOGIC DESCRIPTION



Bottom of Core at 60" (64')

THE ROBERT B. BALTER COMPANY

ROCK CORING LOG

Project Name: Yeager Airport Improvement Project-EIS Contract No.: 17386-0

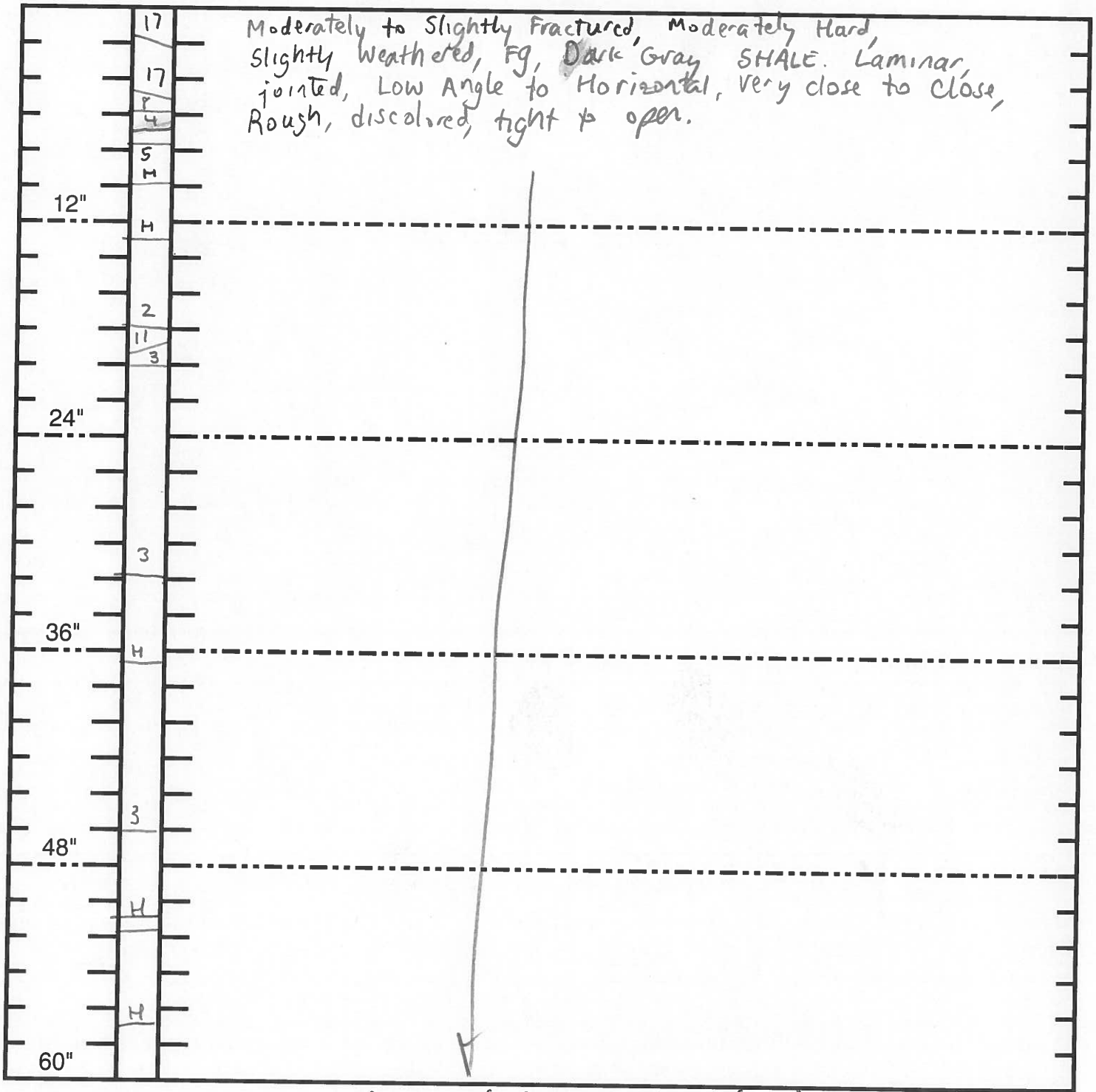
Logged by: KMC Boring No.: P-8

Core Run: 3 Start Depth: 64' End Depth: 69'

Recovery: 58/60 = 97% RQD: 41/60 = 68%

DEPTH

GEOLOGIC DESCRIPTION



Moderately to Slightly Fractured, Moderately Hard, Slightly Weathered, Fg, Dark Gray SHALE. Laminar jointed, Low Angle to Horizontal, very close to Close, Rough, discolored, tight to open.

Bottom of Core at 60" (69')

THE ROBERT B. BALTER COMPANY

ROCK CORING LOG

Project Name: Yeager Airport Improvement Project - EIS Contract No.: 17386-0

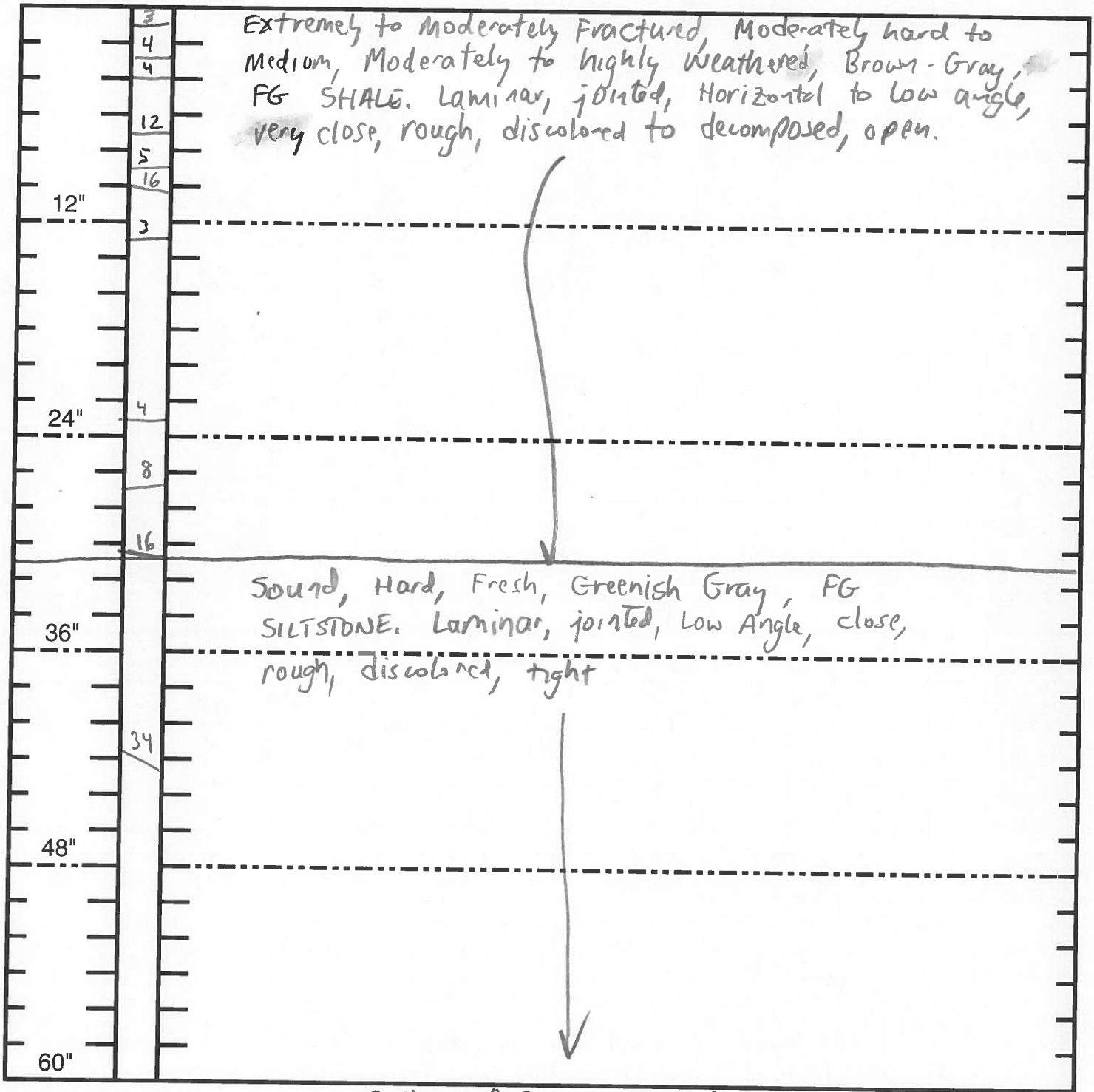
Logged by: KMC Boring No.: P-8

Core Run: 4 Start Depth: 69' End Depth: 74'

Recovery: 57/60 = 95% RQD: 46/60 = 77%

DEPTH

GEOLOGIC DESCRIPTION



Bottom of Core at 60" (74')

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BORING LOG

BORING P-9

CLIENT Ricondo **PROJECT NAME** EIS - Yeager Airport (CRW)

PROJECT LOCATION Charleston, WV **PROJECT NUMBER** 17386-0 **DATE TESTED**

RIG Mobil B45 **METHOD** Hollow Stem Auger **SAMPLER:** 2-in OD SS/NQ Core **HAMMER:** 140# **FALL:** 30" **AUTO?** Yes

DATE STARTED 7/22/22 **COMPLETED** 7/22/22

DRILLER Dustin Hurd **HELPER** Dan Ditman

REVIEWED BY Jaylen Surrency **SITE DELAYS**

LOCATION As Staked **BULK SAMPLES** 0-5', 10-15'

WATER LEVELS

DATE	TIME	ELAPSED HOURS	CASING DEPTH (ft)	HOLE DEPTH (ft)	WATER DEPTH (ft)	WATER ELEV (ft)

DEPTH (ft)	SAMPLE TYPE AND NUMBER	SPT BLOWS/6" OR REC IN/IN %	N VALUE OR CORE RQD	STRATUM CHANGE DEPTH/EL (ft)	GRAPHIC LOG	USCS	WATER LEVEL	MATERIAL DESCRIPTION	PP (tsf)	NMC %	- #200	ATTERBERGS PL	ATTERBERGS LL	ATTERBERGS PI	REMARKS
								SURFACE EL = 871.0 ft							
	S1	3-4-4	8	0.1 870.9		CL		Topsoil (2-inches) Moist, Medium Stiff, Oranish Red-Brown CLAY	4.00						
				3.0 868.0		ML		DECOMPOSED ROCK sampled as: Moist, Hard, Tan Sandy SILT							
5	S2	18-35-49	84												
				8.0 863.0		SM		DECOMPOSED ROCK sampled as: Moist, Very Dense, Brown Silty SAND with Sandstone Fragments							
	S3	50/4"	50/4"												
10				12.0 859.0		ML		HIGHLY WEATHERED ROCK sampled as: Moist, Hard, Yellow-Tan Sandy SILT with Siltstone Rock Fragments							
	S4	47-50/3"	50/3"												
15				17.0 854.0		SM		HIGHLY WEATHERED ROCK sampled as: Moist, Very Dense, Brown Silty SAND with Sandstone Rock Fragments							
	S5	50/2"	50/2"												
20															
	S6	50/2"	50/2"												
25															
	S7	50/0"	50/0"												
30								AUGER REFUSAL at 34'							
				34.0 837.0											
35															

REMARKS: (1)Core barrel jamming during coring operation due to sediment. Boring abandoned.

(Continued Next Page)

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BORING LOG

BORING P-9

CLIENT Ricondo **PROJECT NAME** EIS - Yeager Airport (CRW)

PROJECT LOCATION Charleston, WV **PROJECT NUMBER** 17386-0 **DATE TESTED**

DEPTH (ft)	SAMPLE TYPE AND NUMBER	SPT BLOWS/6" OR REC IN/IN %	N VALUE OR CORE RQD	STRATUM CHANGE DEPTH/EL (ft)	GRAPHIC LOG	USCS	WATER LEVEL	MATERIAL DESCRIPTION	PP (tsf)	NMC %	- #200	ATTERBERGS PL	ATTERBERGS LL	ATTERBERGS PI	REMARKS
	C1	60 / 60 100%	87					Slightly Fractured to Sound to Moderately Fractured, Hard, Slightly Weathered, Brown, Fine- to Coarse-Grained SANDSTONE. *(continued)*							
40	C2	48 / 48 100%	60												
				43.0 828.0				Terminated at 43.0 feet							(1)

REMARKS: (1)Core barrel jamming during coring operation due to sediment. Boring abandoned.

THE ROBERT B. BALTER COMPANY

ROCK CORING LOG

Project Name: Yeager Airport Improvement Project - EIS Contract No.: 17386-0

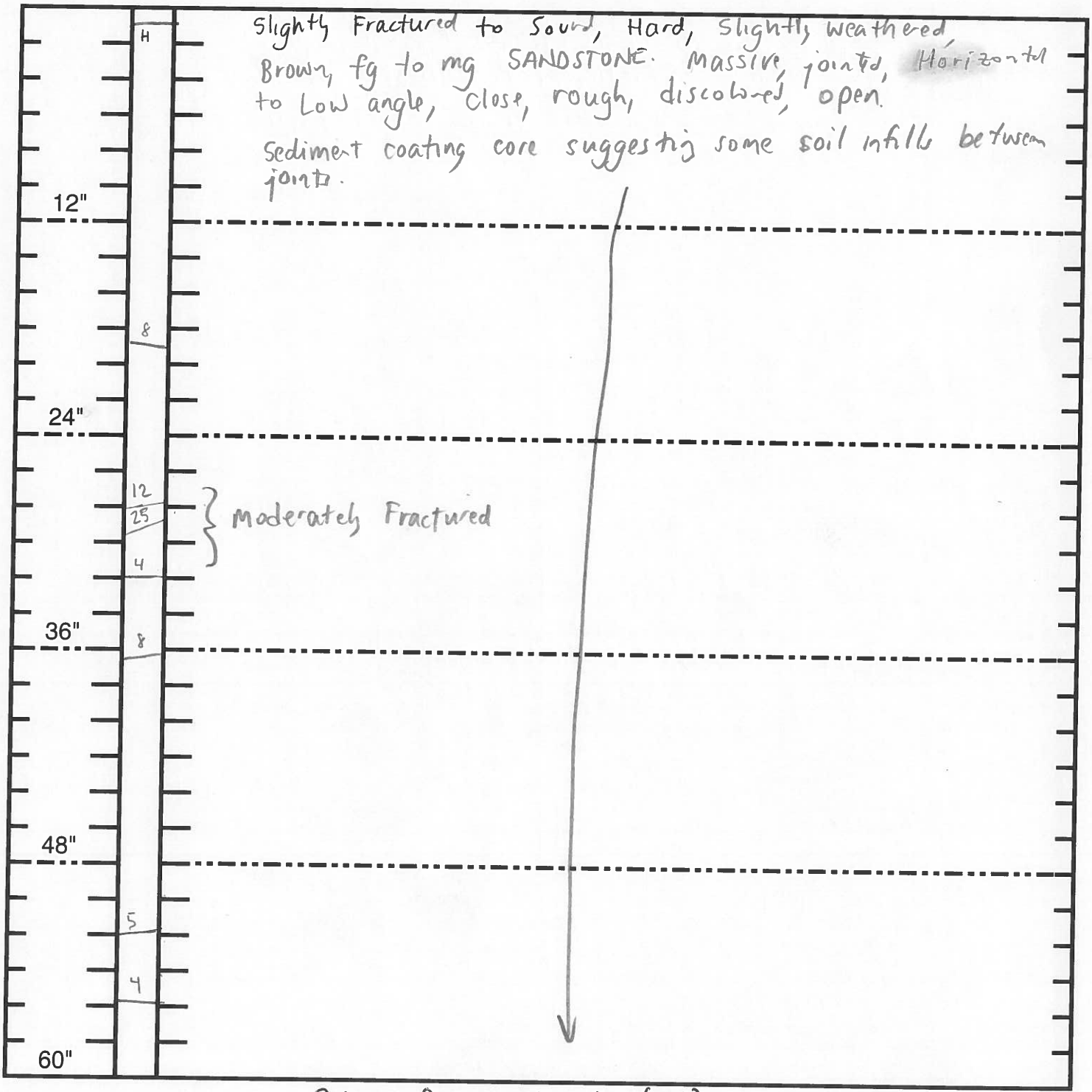
Logged by: KMC Boring No.: P-9

Core Run: 1 Start Depth: 34' End Depth: 39'

Recovery: 60/60 = 100% RQD: 47/60 = 78%

DEPTH

GEOLOGIC DESCRIPTION



Bottom of Core at 60" (39')

THE ROBERT B. BALTER COMPANY

ROCK CORING LOG

Project Name: Yeager Airport Improvement Project - EIS Contract No.: 17386-0

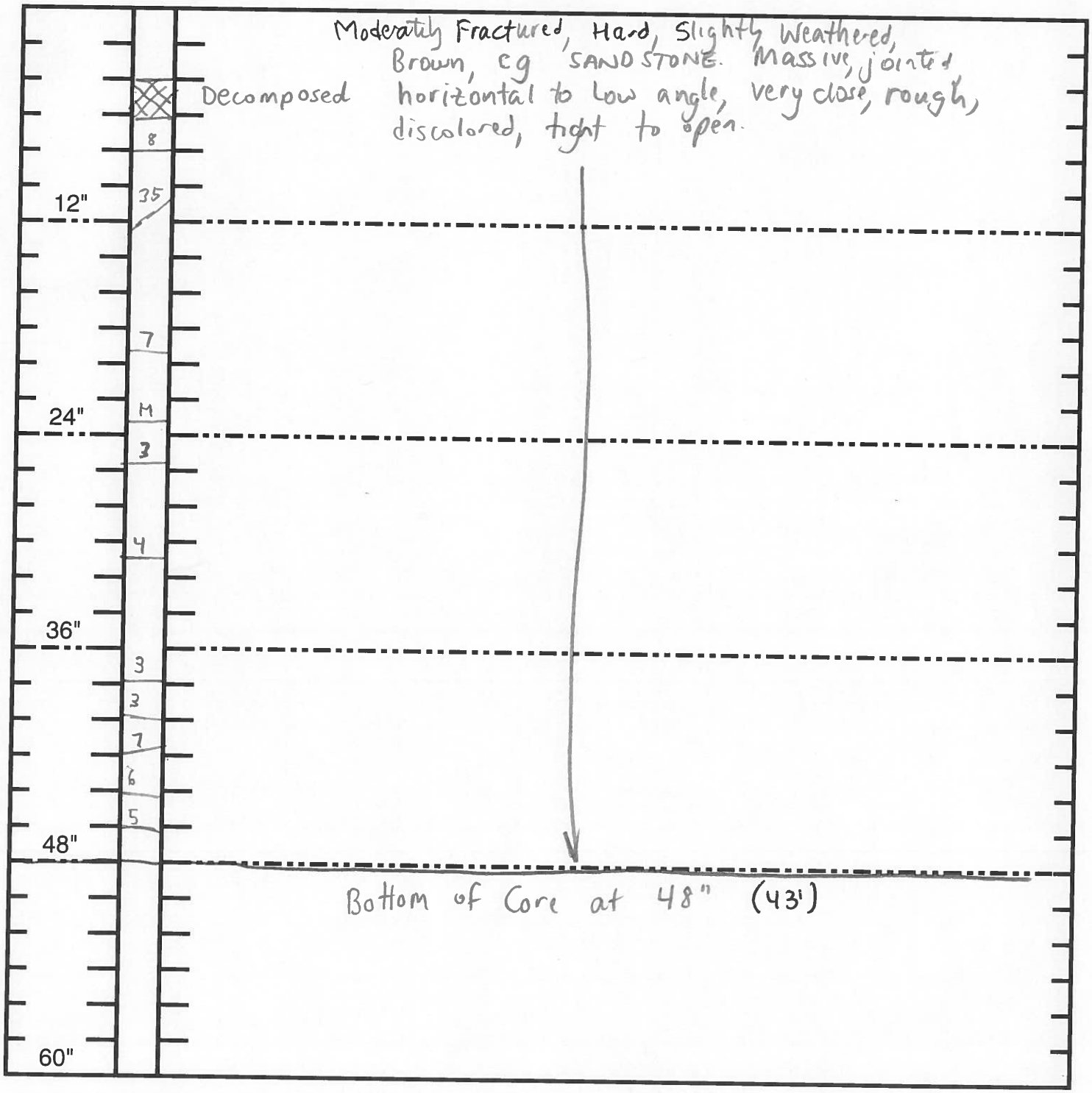
Logged by: KMC Boring No.: P-9

Core Run: 2 Start Depth: 39' End Depth: 43'

Recovery: 48/48 = 100 RQD: 24/48 = 50%.

DEPTH

GEOLOGIC DESCRIPTION



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BORING LOG

BORING P-10

CLIENT Ricondo **PROJECT NAME** EIS - Yeager Airport (CRW)

PROJECT LOCATION Charleston, WV **PROJECT NUMBER** 17386-0 **DATE TESTED**

RIG Mobil B45 **METHOD** Hollow Stem Auger **SAMPLER:** 2-in OD SS **HAMMER:** 140# **FALL:** 30" **AUTO?** Yes

DATE STARTED 7/6/22 **COMPLETED** 7/8/22

DRILLER Dustin Hurd **HELPER** Dennis Strawderman

REVIEWED BY Jaylen Surrency **SITE DELAYS**

LOCATION As Staked **BULK SAMPLES** 0-5'

WATER LEVELS

DATE	TIME	ELAPSED HOURS	CASING DEPTH (ft)	HOLE DEPTH (ft)	WATER DEPTH (ft)	WATER ELEV (ft)

DEPTH (ft)	SAMPLE TYPE AND NUMBER	SPT BLOWS/6" OR REC IN/IN %	N VALUE OR CORE RQD	STRATUM CHANGE DEPTH/EL (ft)	GRAPHIC LOG	USCS	WATER LEVEL	MATERIAL DESCRIPTION	PP (tsf)	NMC %	- #200	ATTERBERGS PL	ATTERBERGS LL	ATTERBERGS PI	REMARKS
								SURFACE EL = 928.0 ft							
	S1	2-3-4	7	0.1 927.9		CL		Topsoil (1-inch) Slightly Moist, Medium Stiff, Reddish Brown Sandy CLAY with Rock Fragments		18					
				3.0 925.0				Moist, Hard, Tannish Brown SILT							
5	S2	7-15-23	38			ML				9					
				8.0 920.0				Moist, Hard, Tan and Gray Clayey SILT with Sand, trace mica							
10	S3	23-20-28	48			CL-ML				9					
				13.5 914.5				DECOMPOSED ROCK sampled as: Moist, Hard, Gray SILT							
15	S4	23-18-50/6"	50/6"			ML				10					
				17.0 911.0				HIGHLY WEATHERED ROCK sampled as: Moist, Hard, Gray SILT							
	S5	50/2"	50/2"												
20						ML									
				22.0 906.0				DECOMPOSED ROCK sampled as: Moist, Hard, Gray SILT							
	S6	50/5"	50/5"												
25						ML									
				26.0 902.0				Moderately to Slightly Fractured, Slightly Weathered, Moderately Hard, Gray SHALE							
	C1	42 / 42 100%	87	27.5 900.5				Sound to Slightly Fractured, Hard to Moderately Hard, Slightly Weathered to Fresh, Gray SILTSTONE							
30															
	C2	60 / 60 100%	68												
				33.5 894.5				HIGHLY WEATHERED SILTSTONE							
35				34.5											

REMARKS:

(Continued Next Page)

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BORING LOG

CLIENT Ricondo **PROJECT NAME** EIS - Yeager Airport (CRW)

PROJECT LOCATION Charleston, WV **PROJECT NUMBER** 17386-0 **DATE TESTED**

DEPTH (ft)	SAMPLE TYPE AND NUMBER	SPT BLOWS/6" OR REC IN/IN %	N VALUE OR CORE RQD	STRATUM CHANGE DEPTH/EL (ft)	GRAPHIC LOG	USCS	WATER LEVEL	MATERIAL DESCRIPTION	PP (tsf)	NMC %	- #200	ATTERBERGS PL	ATTERBERGS LL	ATTERBERGS PI	REMARKS
				893.5				Moderately Fractured, Hard, Slightly Weathered SILTSTONE *(continued)*							
				36.0											
	C3	60 / 60 100%	94	892.0				Sound, Hard, Fresh, Light Gray to Gray, Fine- to Coarse-Grained SANDSTONE. some reaction to HCL							
40															
	C4	60 / 60 100%	99												
45															
	C5	56 / 60 93%	58	47.5											
				880.5				Extremely Fractured, Moderately Hard to Medium, Moderately Weathered, Dark Gray SHALE							
50				50.0											
	C6	59 / 60 98%	86	878.0				Slightly Fractured, Moderately Hard, Fresh, Dark Gray SHALE							
				52.0											
				876.0				Sound, Moderately Hard, Fresh Gray SILTSTONE							
				54.0											
55				874.0				SANDSTONE							
				55.5											
				872.5				SILTSTONE							
				56.0				SANDSTONE							
	C7	60 / 60 100%	93	872.0				SILTSTONE							
				56.5											
				871.5				Sound, Hard, Fresh, Gray SANDSTONE, slight reaction to HCL							
				57.0											
60				871.0				SILTSTONE							
				59.0											
				869.0				Sound, Hard, Fresh, Light Gray SANDSTONE							
				59.5											
	C8	58 / 60 97%	93	868.5				Moderately Fractured to Sound, Moderately Hard, Slightly Weathered to Fresh, Dark Gray SHALE							
				61.0											
				867.0											
				64.5											
				863.5				Terminated at 64.5 feet							

REMARKS:

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ROCK CORING LOG

Project Name: Yeager Airport Improvent Project - EIS Contract No.: 17386-0

Logged by: KMC Boring No.: P-10

Core Run: 1 Start Depth: 26.' End Depth: 29.5'

Recovery: 42/42 = 100%. RQD: 36.5/42 = 87%.

DEPTH

0"

GEOLOGIC DESCRIPTION

Moderately to Slightly Fractured, Slightly weathered, Moderately Hard, Grg FG SHALE. Laminar, jointed, Horizontal to High Angle, very close, rough, discolored, open. Reaction to HCL

2

12"

63

Filled with SILT

55

Sound to Slightly Fractured, Hard, Slightly Weathered, Gray, FG SILTSTONE. Laminar, jointed, Horizontal to Moderate Dip, Close to Very Close, discolored Open. Joints filled with Brown Silt. Reacting to HCL

24"

4

36"

49

Filled with SILT

Bottom of Core at 42" (29.5')

48"

60"

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ROCK CORING LOG

Project Name: Yeager Airport Improvement Project - EIS Contract No.: 17386-0

Logged by: KMC Boring No.: P-10

Core Run: 2 Start Depth: 29.5' End Depth: 34.5'

Recovery: 60/60 = 100% RQD: 41/60 = 68%

DEPTH

0"

GEOLOGIC DESCRIPTION

Slightly Fractured, Moderately Hard, Slightly Weathered, Gray, FG SILTSTONE: Laminar, jointed High Angle to horizontal, Very Close to Close, Rough, discolored, open.

60 R Filled with Brown SILT

12"

3

H

24"

Sound, Moderately Hard, Fresh, Gray FG SILTSTONE. Laminar, jointed, Low Angle, close, Rough, discolored, tight.

8

36"

16

48"

* Rock Fragments + Decomposed Rock

Extremely Fractured, Soft, Highly Weathered to Saprolite, Green-Gray, FG SILTSTONE.

*

60"

Bottom of Core at 60" (34.5')

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ROCK CORING LOG

Project Name: Yeager Airport Improvement Project-EIS Contract No.: 17386-0

Logged by: KMC Boring No.: P-10

Core Run: 3 Start Depth: 34.5' End Depth: 39.5'

Recovery: 60/60 = 100% RQD: 56.5/60 = 94%

DEPTH

0"

GEOLOGIC DESCRIPTION

32

Moderately Fractured, Hard, Slightly Weathered, Dark Grg, FG SILTSTONE. Laminar, jointed, Low Angle to Horizontal, rough, discolored, open

5

2

2

12"

Sound, Hard, Fresh, Light Gray, FG to MG SANDSTONE. Massive, jointed, Horizontal, Discolored, tight. Mica present throughout. Some reaction to HCL.

5

24"

36"

48"

60"

Bottom of Core at 60" (39.5')

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ROCK CORING LOG

Project Name: Yeager Airport Improvement Project-ELS Contract No.: 17386-0

Logged by: KMC Boring No.: P-10

Core Run: 4 Start Depth: 39.5' End Depth: 44.5'

Recovery: 60/60 = 100% RQD: 59.5/60 ~ 99%

DEPTH

0"

GEOLOGIC DESCRIPTION

Sound, Hard, Fresh, Gray, FG to CG SANDSTONE. Massive, jointed, Low Angle to Horizontal, close, rough, discolored, tight. Some reaction to HCL, Mica grains present throughout core.

M
M
M
M

12"

24"

9

36"

2

48"

60"

M = mechanical Breaks

Bottom of Core at 60" (44.5')

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ROCK CORING LOG

Project Name: Yeager Airport Improvement Project- EIS Contract No.: 17386-0

Logged by: KMC Boring No.: P-10

Core Run: 5 Start Depth: 44.5 End Depth: 49.5

Recovery: 56/60 = 93%. RQD: 35/60 = 58%.

DEPTH

GEOLOGIC DESCRIPTION

0"

Sound, Hard, Fresh, Gray, fg to mg SANDSTONE. Massive.

12"

24"

36"

15

4

Extremely Fractured, Moderately Ha-d to Medium, Moderately weathered, FG, Dark Gray SHALE. Laminar, jointed, Horizontal to Low angle, extremely close to close, rough, discolored to decomposed, open.

slight reaction to HCl

48"

12

60"

Bottom of Core @ 60" (49.5')

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ROCK CORING LOG

Project Name: Yeager Airport Improvement Project - EIS Contract No.: 17386-0

Logged by: KMC Boring No.: P-10

Core Run: 6 Start Depth: 49.5' End Depth: 54.5'

Recovery: 59/60 = 98% RQD: 51.5/60 = 86%

DEPTH

0"

GEOLOGIC DESCRIPTION

H
13°
H

Extremely Fractured to Slightly Fractured, Moderately Hard, Slightly Weathered, FG, Dark Grey SHALE. Laminar, jointed, Horizontal to low angle, extremely close to close, rough, discolored, open to tight. Slight reaction to HCL

12"

4

Slightly Fractured, Moderately Hard, Fresh, Dark Grey, FG SHALE. Laminar, jointed, Horizontal, discolored, tight slight reaction to HCL

24"

2

Sound, Mod. Hard, Fresh, Gray, FG SILTSTONE. Laminar, jointed, horizontal, discolored, tight. Very little reaction to HCL

36"

H

48"

6

Slightly Fractured, Hard, Fresh, Light gray, fg to mg SANDSTONE. Massive, jointed, Horizontal to Low angle, discolored, open.

6

H

60"

Bottom of Core at 60" (54.5')

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ROCK CORING LOG

Project Name: Yeager Airport Improvement Project - EIS Contract No.: 17386-0

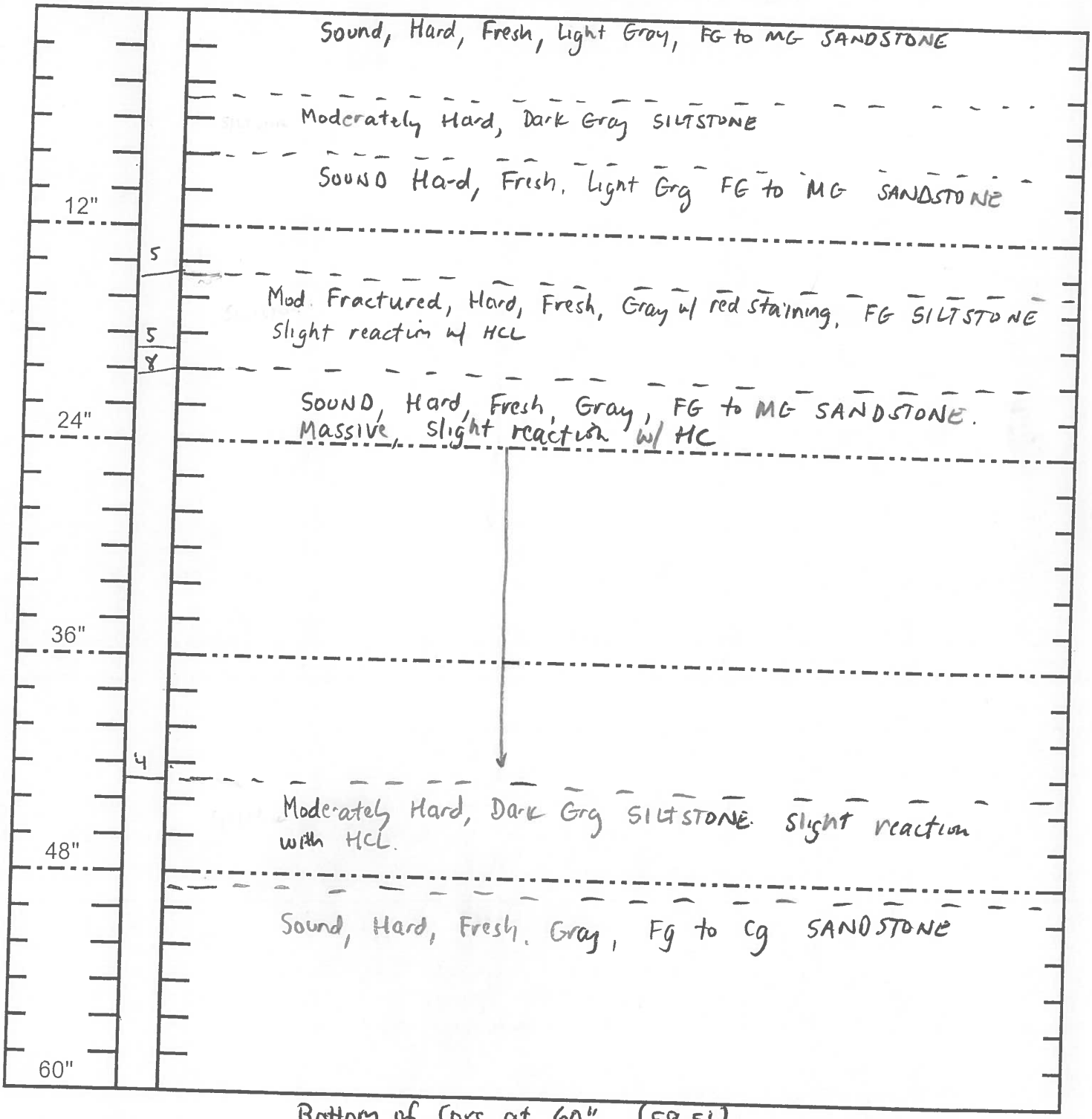
Logged by: KMC Boring No.: P-10

Core Run: 7 Start Depth: 54.5' End Depth: 59.5'

Recovery: 60/60 = 100% RQD: 55.5/60 = 93%

DEPTH

GEOLOGIC DESCRIPTION



Bottom of Core at 60" (59.5')

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ROCK CORING LOG

Project Name: Yeager Airport Improvement Project-EIS Contract No.: 17386-0

Logged by: KMC Boring No.: P-10

Core Run: 8 Start Depth: 59.5' End Depth: 64.5'

Recovery: 58/60 = 97%. RQD: 55.5/60 = 93%.

DEPTH

GEOLOGIC DESCRIPTION

0"

Sound, Very Hard, Fresh, Light Gray, FG to MG SANDSTONE. Massive.

12"

H

Moderately to Slightly Fractured, Moderately Hard, Slightly Weathered, Dark Gray, FG SHALE. Laminar, jointed, close, open. Slight reaction to HCL

24"

6

Sound, Moderately Hard, Fresh, Dark Gray, FG SHALE. Laminar, jointed, Low Angle to Horizontal, Close, Discolored, open. Slight reaction to HCL

36"

48"

H

60"

Bottom of Core at 60" (64.5')

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BORING LOG

BORING P-11

CLIENT Ricondo **PROJECT NAME** EIS - Yeager Airport (CRW)

PROJECT LOCATION Charleston, WV **PROJECT NUMBER** 17386-0 **DATE TESTED**

RIG Mobil B45 **METHOD** Hollow Stem Auger **SAMPLER:** NQ2 Core **HAMMER:** 140# **FALL:** 30" **AUTO?** Yes

DATE STARTED 7/14/22 **COMPLETED** 7/14/22

DRILLER Dustin Hurd **HELPER** Dan Dittman

REVIEWED BY Jaylen Surrency **SITE DELAYS**

LOCATION As Staked **BULK SAMPLES**

WATER LEVELS

DATE	TIME	ELAPSED HOURS	CASING DEPTH (ft)	HOLE DEPTH (ft)	WATER DEPTH (ft)	WATER ELEV (ft)

DEPTH (ft)	SAMPLE TYPE AND NUMBER	SPT BLOWS/6" OR REC IN/IN %	N VALUE OR CORE RQD	STRATUM CHANGE DEPTH/EL (ft)	GRAPHIC LOG	USCS	WATER LEVEL	MATERIAL DESCRIPTION	PP (tsf)	NMC %	- #200	ATTERBERGS PL	ATTERBERGS LL	ATTERBERGS PI	REMARKS
								SURFACE EL = 1010.0 ft							
	C1	52 / 52 100%	71	1.5 1008.5				Extremely Fractured to Moderately Fractured, Moderately Hard, Slightly Weathered, Brown-Gray, Fine-Grained SANDSTONE.							
								Slightly Fractured, Moderately Hard, Slightly Weathered, Brown-Gray, FIne-Grained SANDSTONE							
5				4.5 1005.5				Moderately Fractured, Moderately Hard, Slightly Weathered, Tan, Fine-Grained SANDSTONE.							
	C2	60 / 60 100%	98	6.0 1004.0				Sound, Moderately Hard, Slightly Weathered, Tan, Fine-Grained SANDSTONE							
10				9.2 1000.8				Moderately Fractured, Moderately Hard, Slightly Weathered, Tan, Fine-Grained SANDSTONE							
	C3	60 / 60 100%	92	10.2 999.8				Sound, Hard, Slightly Weathered, Tan, Fine- to Medium-Grained SANDSTONE							
15				14.2 995.8				Sound, Very Hard, Fresh, Brownish Tan, Fine-Grained SILTSTONE							
	C4	60 / 60 100%	100												
				19.3 990.7				Terminated at 19.3 feet							

REMARKS:

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ROCK CORING LOG

Project Name: Yeager Airport Improvement Project - EIS Contract No.: 17386-0

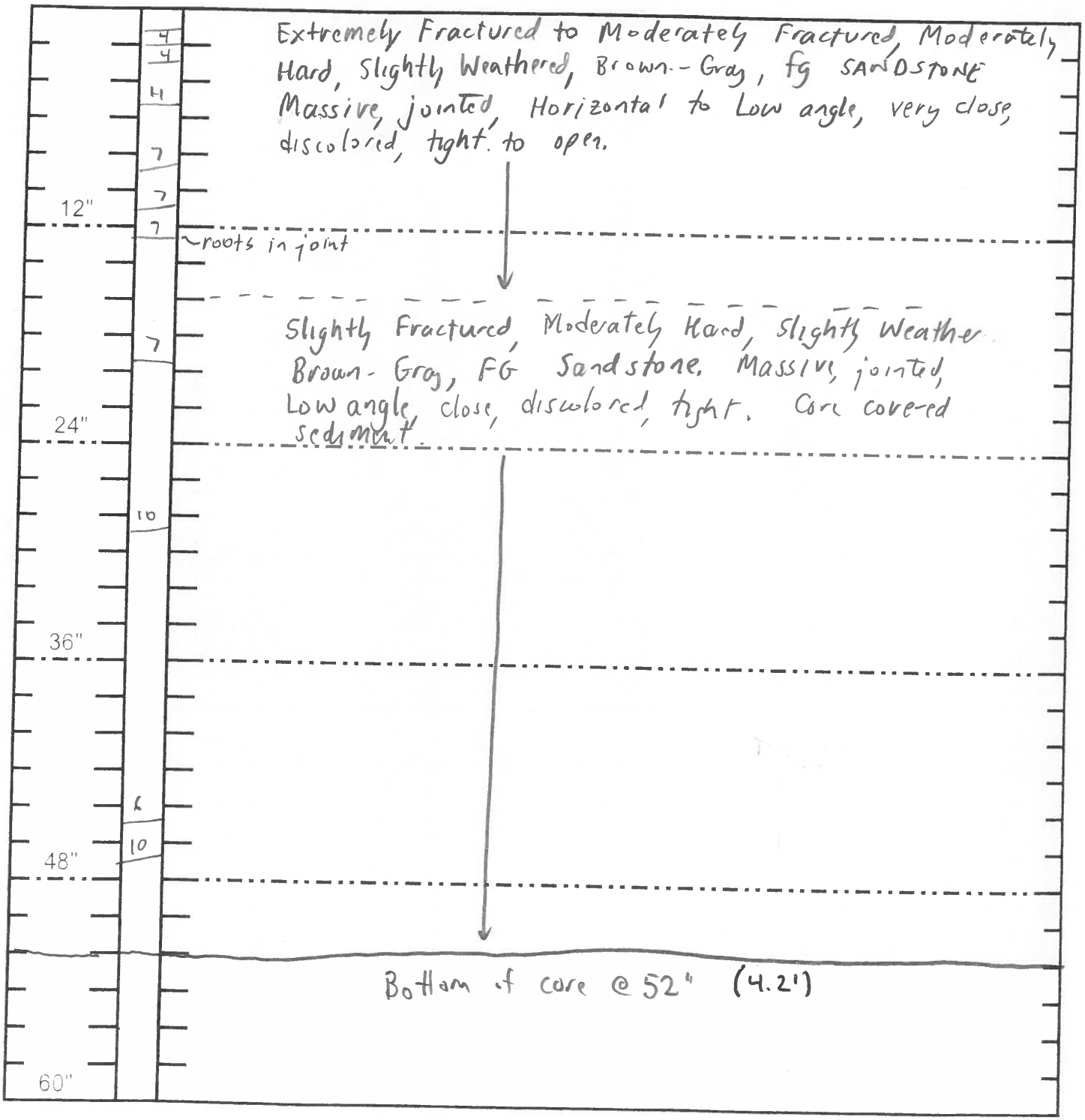
Logged by: KMC Boring No.: P-11

Core Run: 1 Start Depth: 0 End Depth: 4.2'

Recovery: 52/52 RQD: 37/52 = 71%

DEPTH

GEOLOGIC DESCRIPTION



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ROCK CORING LOG

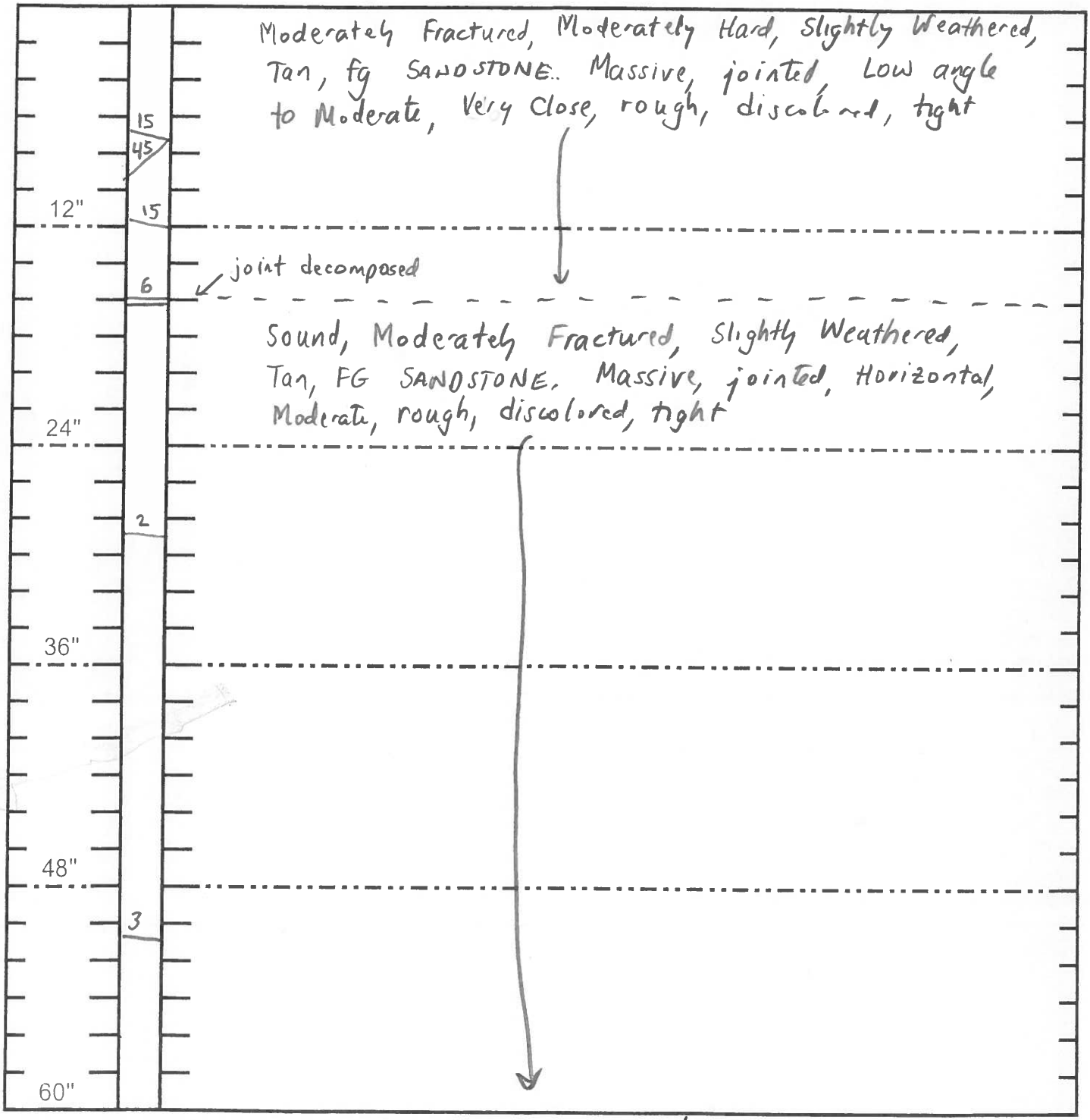
Project Name: Yeager Airport Improvement Project - EIS Contract No.: 17386-0

Logged by: KMC Boring No.: P-11

Core Run: 2 Start Depth: 4.2' End Depth: 9.2'

Recovery: 60/60 = 100%. RQD: 59.5/60 = 99%

DEPTH GEOLOGIC DESCRIPTION



Bottom of Core at 60" (9.2')

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ROCK CORING LOG

Project Name: Yeager Airport Improvement Project - EIS Contract No.: 17386-0

Logged by: KMC Boring No.: P-11

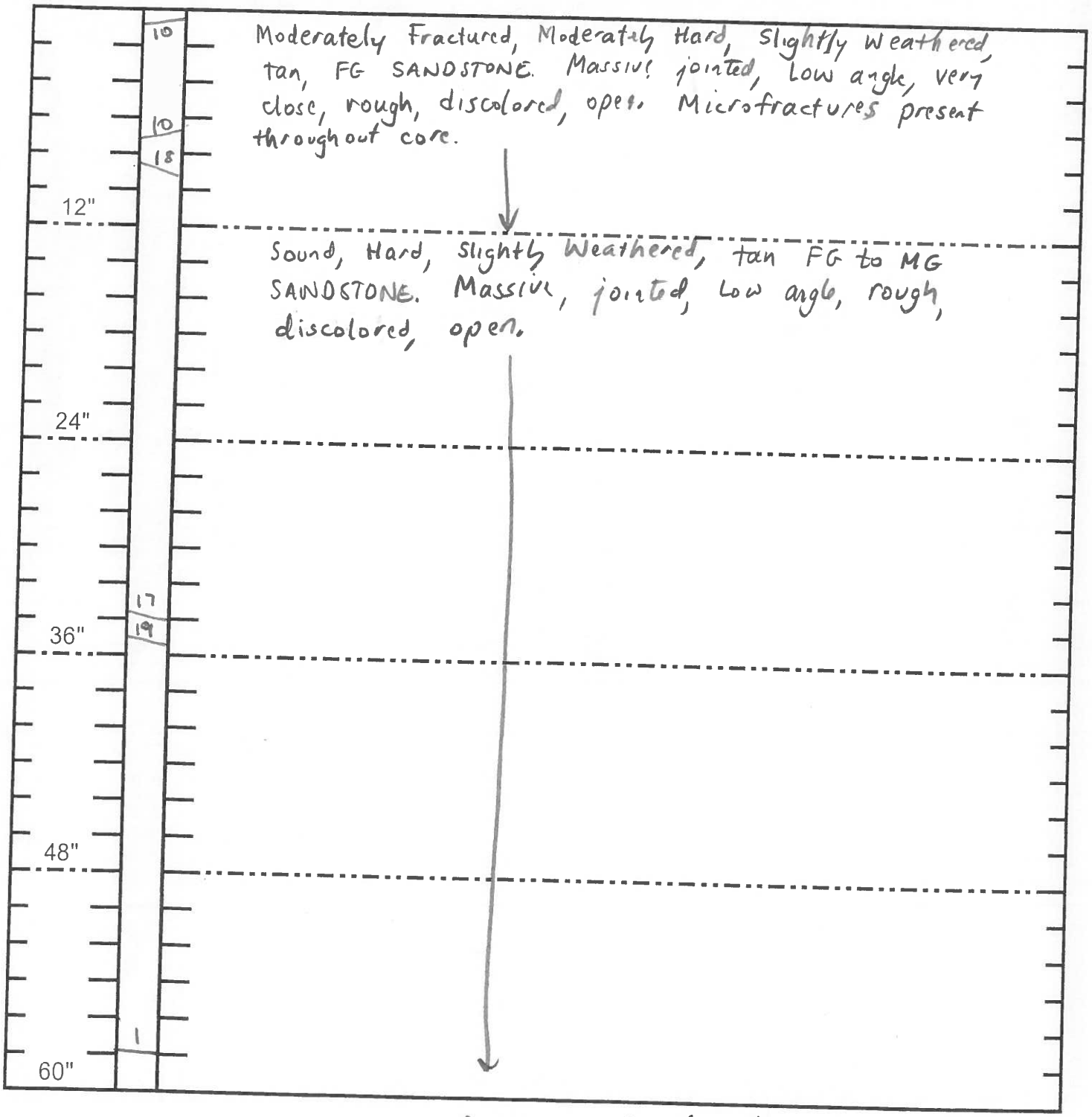
Core Run: 3 Start Depth: 9.2' End Depth: 14.2'

Recovery: 60/60 = 100 % RQD: 55/60 = 92 %

DEPTH

0"

GEOLOGIC DESCRIPTION



Bottom of core @ 60" (14.2')

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ROCK CORING LOG

Project Name: Yeager Airport Improvement Project - EIS Contract No.: 17386-0

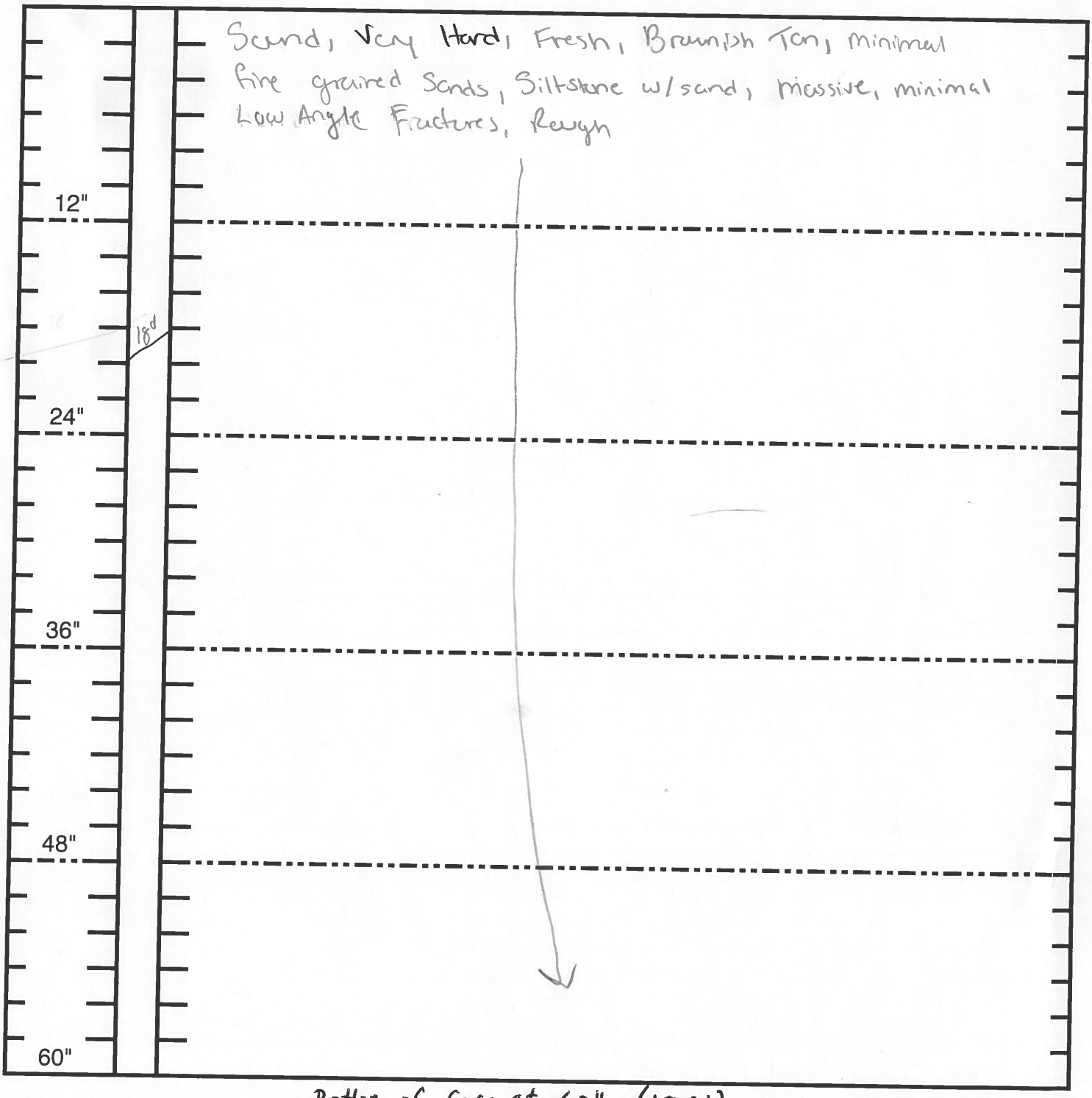
Logged by: Jayler Surrency Boring No.: P-11

Core Run: 4 Start Depth: 14.2' End Depth: 19.2'

Recovery: 60/60 = 100% RQD: 60/60 = 100%

DEPTH

GEOLOGIC DESCRIPTION



Bottom of Core at 60" (19.2')

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BORING LOG

BORING P-12

CLIENT Ricondo **PROJECT NAME** EIS - Yeager Airport (CRW)

PROJECT LOCATION Charleston, WV **PROJECT NUMBER** 17386-0 **DATE TESTED**

RIG Mobil B45 **METHOD** Hollow Stem Auger **SAMPLER:** 2-in OD SS/NQ Core **HAMMER:** 140# **FALL:** 30" **AUTO?** Yes

DATE STARTED 7/18/22 **COMPLETED** 7/18/22

DRILLER Dan Dittman **HELPER** Dustin Hurd

REVIEWED BY Jaylen Surrency **SITE DELAYS**

LOCATION As Staked **BULK SAMPLES** 0-5'

WATER LEVELS

DATE	TIME	ELAPSED HOURS	CASING DEPTH (ft)	HOLE DEPTH (ft)	WATER DEPTH (ft)	WATER ELEV (ft)

DEPTH (ft)	SAMPLE TYPE AND NUMBER	SPT BLOWS/6" OR REC IN/IN %	N VALUE OR CORE RQD	STRATUM CHANGE DEPTH/EL (ft)	GRAPHIC LOG	USCS	WATER LEVEL	MATERIAL DESCRIPTION	PP (tsf)	NMC %	- #200	ATTERBERGS PL	ATTERBERGS LL	ATTERBERGS PI	REMARKS
								SURFACE EL = 814.0 ft							
	S1	2-2-2	4	0.8 813.3		CH		Topsoil (9-inches) Moist, Soft to Medium Stiff, Orange Brown Sandy Fat CLAY	2.50	21					
5	S2	5-5-9	14	4.0 810.0		SM		Moist, Medium Dense, Brown with Some Gray Silty SAND with Rock Fragments		15					
10	S3	18-29-50	79	9.0 805.0		ML		DECOMPOSED ROCK sampled as: Dry, Hard, Tan with Black/Brown SILT, relic rock structure		9					
15	S4	22-29-37	66	12.5 801.5		CL		DECOMPOSED ROCK sampled as: Moist, Hard, Brown Lean CLAY		11	98	21	34	13	
20	S5	17-38-30	68	17.0 797.0		CL		DECOMPOSED ROCK samples as: Moist, Hard, Brown Sandy Lean CLAY		12 5	64	17	25	8	
25	S6	50/1"	50/1"	23.5 790.5		SM		HIGHLY WEATHERED ROCK sampled as: Dry, Very Dense, Grayish Blue Silty SAND							
30	C1	55 / 55 100%	75	25.0 789.0				Moderately Fractured to Sound, Very Hard, Slightly Weathered, Blueish Gray to Brown, FIne-Grained SILTSTONE							
35	C2	60 / 60 100%	70	34.0 780.0											

REMARKS:

(Continued Next Page)

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BORING LOG

BORING P-12

CLIENT Ricondo **PROJECT NAME** EIS - Yeager Airport (CRW)

PROJECT LOCATION Charleston, WV **PROJECT NUMBER** 17386-0 **DATE TESTED**

DEPTH (ft)	SAMPLE TYPE AND NUMBER	SPT BLOWS/6" OR REC IN/IN %	N VALUE OR CORE RQD	STRATUM CHANGE DEPTH/EL (ft)	GRAPHIC LOG	USCS	WATER LEVEL	MATERIAL DESCRIPTION	PP (tsf)	NMC %	- #200	ATTERBERGS PL	ATTERBERGS LL	ATTERBERGS PI	REMARKS
	C3	60 / 60 100%	100					Slightly Fractured to Sound, Very Hard, Fresh, Brownish Tan to Blueish Gray, Coarse-Grained SANDSTONE *(continued)*							
40	C4	60 / 60 100%	100												
45	C5	60 / 60 100%	97	46.6 767.4				Slightly Fractured, Very Hard, Slightly Weathered, Fine-Grained SILTSTONE							
				49.0 765.0				Sound, Very Hard, Fresh, Coarse-Grained SANDSTONE							
				49.6 764.4				Terminated at 49.6 feet							

REMARKS:

THE ROBERT B. BALTER COMPANY

ROCK CORING LOG

Project Name: Yeager Airport Improvement Project-EIS Contract No.: 17388-0

Logged by: Jaylen Surrency Boring No.: P-12

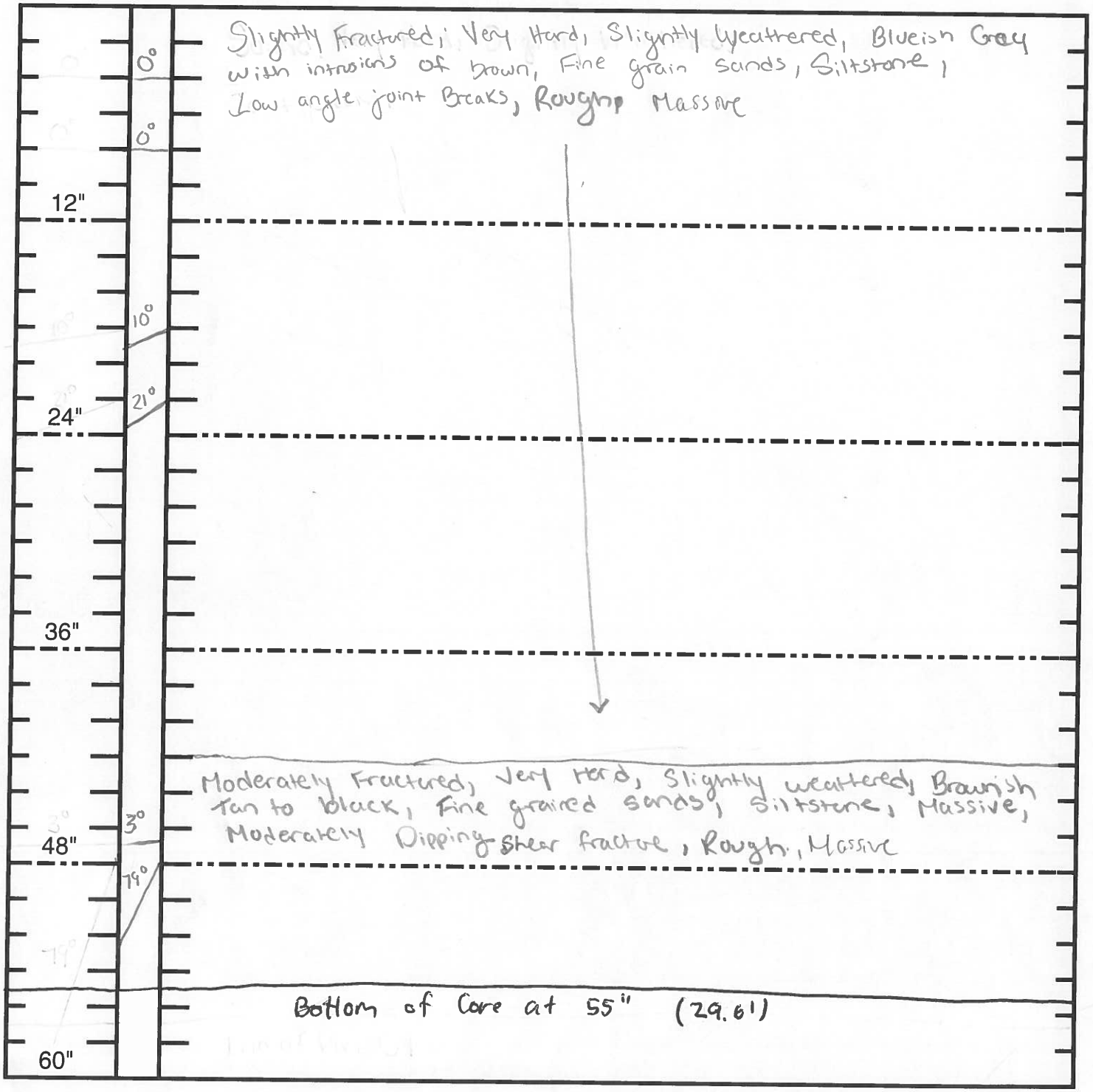
Core Run: 1 Start Depth: 25' End Depth: 29'7"

Recovery: 55/55 RQD: 41/55 - 78%

DEPTH

0"

GEOLOGIC DESCRIPTION



Slightly Fractured, Very Hard, Slightly Weathered, Blueish Grey with intrusions of brown, Fine grain sands, Siltstone, Low angle joint Breaks, Rough Massive

Moderately Fractured, Very Hard, Slightly weathered, Brownish Tan to black, Fine grained sands, Siltstone, Massive, Moderately Dipping Shear fracture, Rough, Massive

Bottom of Core at 55" (29.61)

THE ROBERT B. BALTER COMPANY

ROCK CORING LOG

Project Name: Yeager Airport Improvement Project - EIS Contract No.: 17386.0

Logged by: Jaylen Sweeney Boring No.: P-12

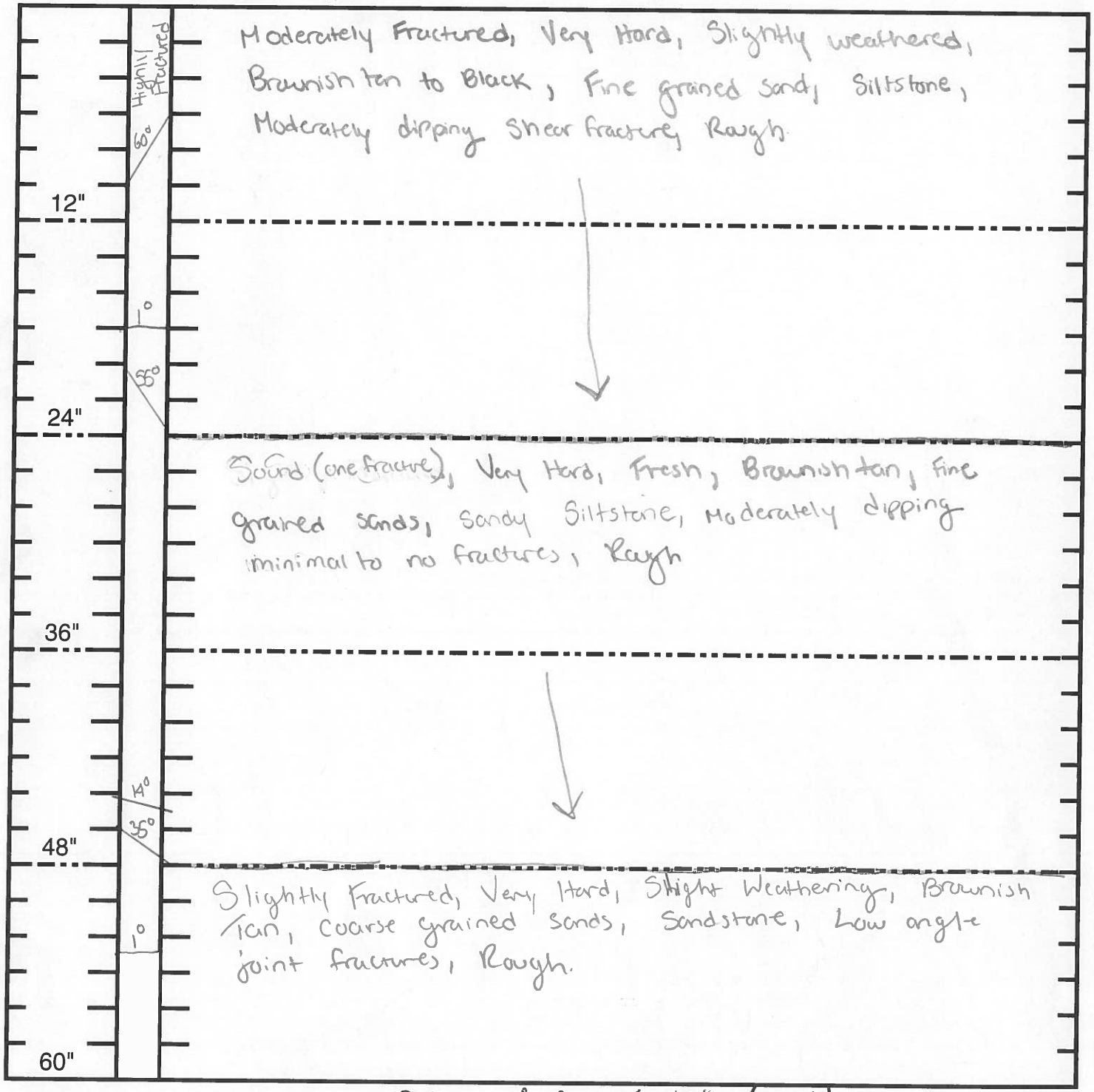
Core Run: 2 Start Depth: 29'7" End Depth: 34'7"

Recovery: 60/60 RQD: 42/60

DEPTH

0"

GEOLOGIC DESCRIPTION



Moderately Fractured, Very Hard, Slightly weathered, Brownish tan to Black, Fine grained sand, Siltstone, Moderately dipping Shear fractures, Rough.

Sound (one fracture), Very Hard, Fresh, Brownish tan, Fine grained sands, Sandy Siltstone, Moderately dipping minimal to no fractures, Rough

Slightly Fractured, Very Hard, Slight Weathering, Brownish Tan, Coarse grained sands, Sandstone, Low angle joint fractures, Rough.

Bottom of Core at 60" (34.6')

THE ROBERT B. BALTER COMPANY

ROCK CORING LOG

Project Name: Yeager Airport Improvement Project - EIS Contract No.: 17386-0

Logged by: Jaylen Surrency Boring No.: P-12

Core Run: 3 Start Depth: 34'7" End Depth: 34'7"

Recovery: 60/60 RQD: 50/60 - 100

DEPTH

0"

GEOLOGIC DESCRIPTION

5°

Sound, Very Hard, Fresh, Brownish Tan, coarse grained Sands, Sandstone, Horizontal angle joint fractures, Rough, Massive

12"

8°

24"

36"

5°

Sand, very Hard, Fresh, Blueish gray, very coarse Grained Sands, Sandstone No joint fractures Rough, Massive

48"

60"

Bottom of Core at 60" (39.6')

THE ROBERT B. BALTER COMPANY

ROCK CORING LOG

Project Name: Yeager Airport Improvement Project - EIS Contract No.: 17386-0

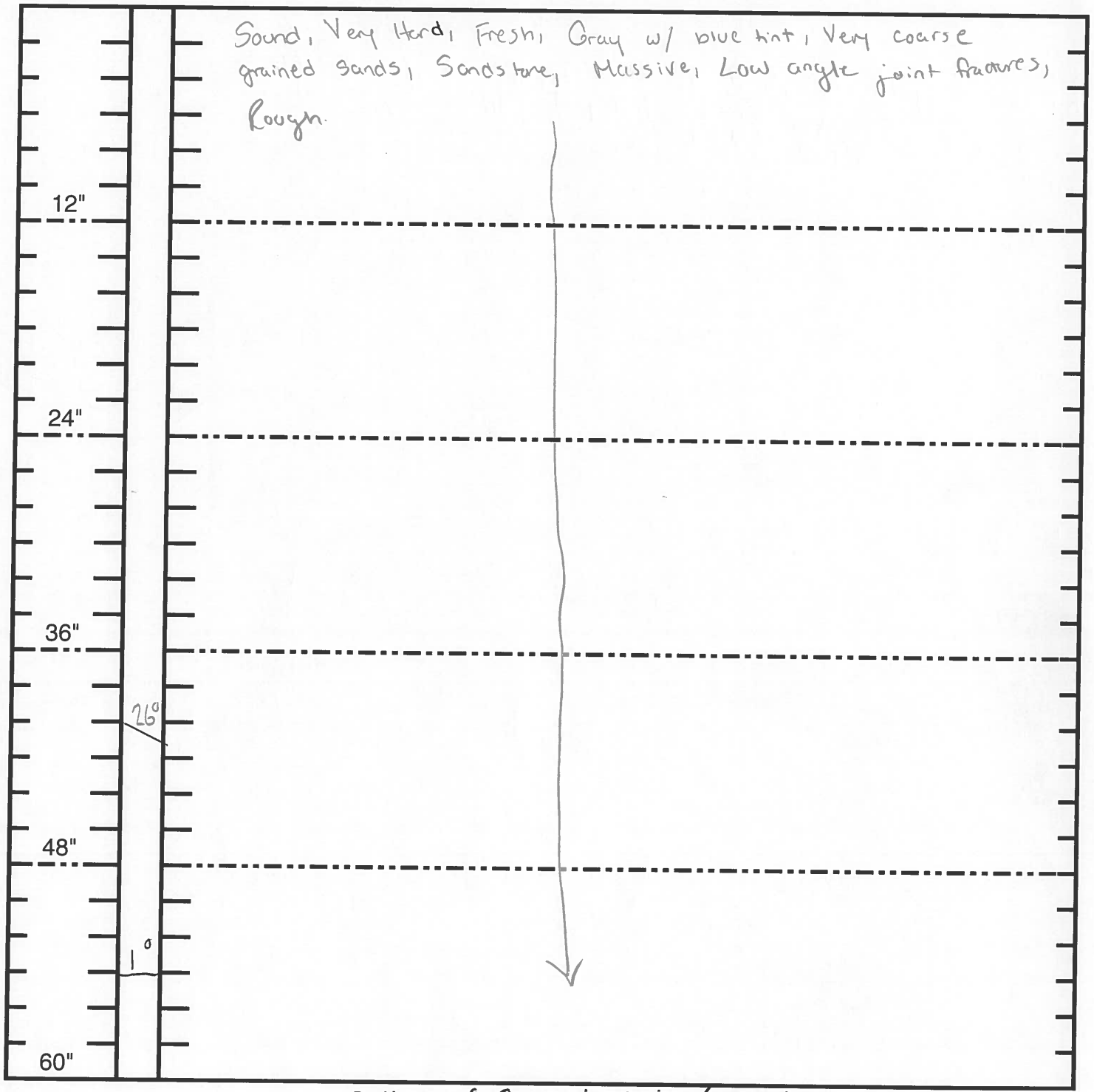
Logged by: Snyder Surveying Boring No.: P-12

Core Run: 4 Start Depth: 39' 7" End Depth: 44' 7"

Recovery: 60/60 = 100% RQD: 60/60 - 100%

DEPTH

GEOLOGIC DESCRIPTION



Bottom of Core at 60" (44.6')

THE ROBERT B. BALTER COMPANY

ROCK CORING LOG

Project Name: Yeager Airport Improvement Project - EIS Contract No.: 17386-C

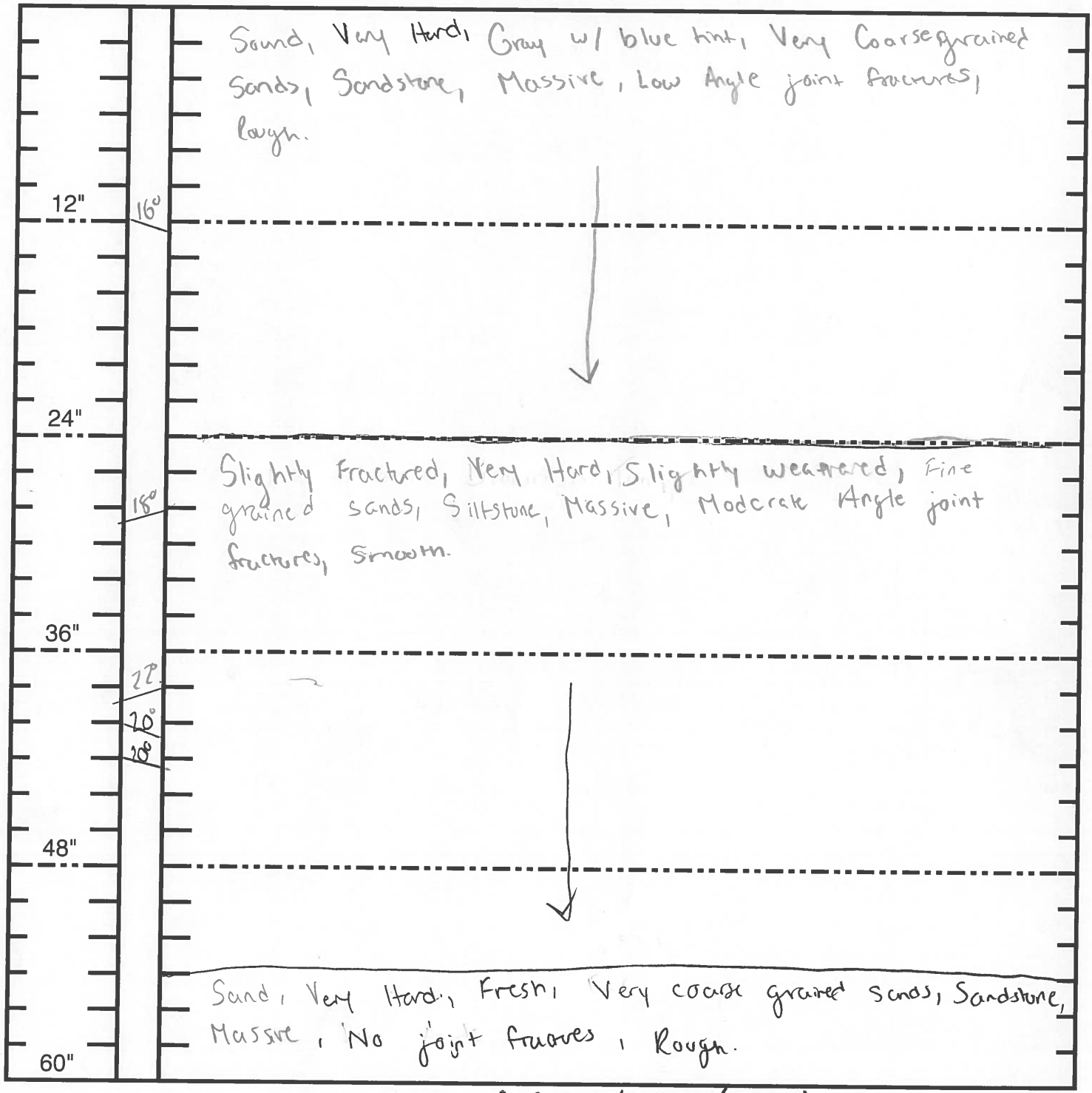
Logged by: Jaylen Surrency Boring No.: P-12

Core Run: 5 Start Depth: 44'7" End Depth: 49'7"

Recovery: 60/60 = 100% RQD: 58/60 - 97%

DEPTH

GEOLOGIC DESCRIPTION



Bottom of Core at 60" (49.6')

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BORING LOG

BORING P-13

CLIENT Ricondo **PROJECT NAME** EIS - Yeager Airport (CRW)

PROJECT LOCATION Charleston, WV **PROJECT NUMBER** 17386-0 **DATE TESTED**

RIG Mobil B45 **METHOD** Hollow Stem Auger **SAMPLER:** 2-in OD SS/NQ Core **HAMMER:** 140# **FALL:** 30" **AUTO?** Yes

DATE STARTED 7/11/22 **COMPLETED** 7/11/22

DRILLER Dustin Hurd **HELPER** Dan Dittman

REVIEWED BY Jaylen Surrency **SITE DELAYS**

LOCATION As Staked **BULK SAMPLES** 0-5'

WATER LEVELS

DATE	TIME	ELAPSED HOURS	CASING DEPTH (ft)	HOLE DEPTH (ft)	WATER DEPTH (ft)	WATER ELEV (ft)

DEPTH (ft)	SAMPLE TYPE AND NUMBER	SPT BLOWS/6" OR REC IN/IN %	N VALUE OR CORE RQD	STRATUM CHANGE DEPTH/EL (ft)	GRAPHIC LOG	USCS	WATER LEVEL	MATERIAL DESCRIPTION	PP (tsf)	NMC %	- #200	ATTERBERGS PL	ATTERBERGS LL	ATTERBERGS PI	REMARKS
								SURFACE EL = 900.0 ft							
	S1	1-1-2	3	0.1 899.9		CL		Topsoil (1-inch) Slightly Moist, Soft, Reddish Brown, Lean CLAY, trace roots and rock fragments	1.80	23	78	23	51	28	
				3.5 896.5											
5	S2	4-8-10	18			CH		Slightly Moist, Medium Stiff, Red w/ Streaks of Gray and Light Brown Fat CLAY	4.50	23					
				8.5 891.5											
10	S3	2-12-14	26			CH		Moist, Stiff, Brown and Tan with purple streaks Fat CLAY		18					
				12.5 887.5											
	S4	25-50/5"	50/5"			CL		DECOMPOSED ROCK sampled as: Dry, Hard, Tan and Purple Lean CLAY		6	91	17	26	9	
15				17.5 882.5											
	S5	38-50/3"	50/3"			ML		HIGHLY WEATHERED ROCK sampled as: Dry, Hard, Tan to Gray SILT		7					
20															
	S6	50/2"	50/2"												
25				25.0 875.0				Slightly Fractured, Hard, Fresh, Gray, Fine-Grained SANDSTONE, slight reaction to HCL							
	C1	44 / 51 86%	61	27.0 873.0				Moderately to Extremely Fractured, Moderately Hard, Slightly Weathered, Gray, Fine-Grained SILTSTONE.							
30				29.3 870.8				Moderately to Slightly Fractured, Moderately Hard, Slightly Weathered, Gray, Fine-Grained SHALE							
	C2	60 / 60 100%	55	32.8 867.3				Extremely Fractured, Medium, Highly Weathered, Gray to Reddish Gray SILTSTONE							
35				34.3 865.8											

REMARKS:

(Continued Next Page)

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BORING LOG

BORING P-13

CLIENT Ricondo **PROJECT NAME** EIS - Yeager Airport (CRW)

PROJECT LOCATION Charleston, WV **PROJECT NUMBER** 17386-0 **DATE TESTED**

DEPTH (ft)	SAMPLE TYPE AND NUMBER	SPT BLOWS/6" OR REC IN/IN %	N VALUE OR CORE RQD	STRATUM CHANGE DEPTH/EL (ft)	GRAPHIC LOG	USCS	WATER LEVEL	MATERIAL DESCRIPTION	PP (tsf)	NMC %	- #200	ATTERBERGS PL	ATTERBERGS LL	ATTERBERGS PI	REMARKS
	C3	60 / 60 100%	83					Sound to Moderately Fractured to Sound, Hard, Fresh to Slightly Weathered, Gray to Greenish Gray, Fine- to Medium-Grained SANDSTONE *(continued)*							
40	C4	60 / 60 100%	68												
45	C5	56 / 60 93%	87												
				49.3 850.8				Terminated at 49.3 feet							

REMARKS:

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ROCK CORING LOG

Project Name: Yeager Airport Improvement Project- EIS Contract No.: 17386-0

Logged by: KMC Boring No.: P-13

Core Run: 1 Start Depth: 25' End Depth: 29.25

Recovery: 44/51 = 86%. RQD: 31/51 = 61%.

DEPTH

0"

GEOLOGIC DESCRIPTION

Slightly Fractured, Hard, Fresh, Gray, FG SANDSTONE. Massive, jointed, close, rough, discolored, tight, slight reactin to HCL.

6

12"

H

24"

1

Moderately Fractured to extremely Fractured, Moderately Hard, Slightly weathered, gray, FG SILTSTONE. Laminar, jointed, Horizontal to moderately dipping, very close, rough, discolored, open.

1

40

36"

H

H

H

48"

Bottom of core = 51" (29.25')

60"

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ROCK CORING LOG

Project Name: Yeager Airport Improvement Project - ELS Contract No.: 17386-0

Logged by: KMC Boring No.: P-13

Core Run: 2 Start Depth: 29.25 End Depth: 34.25

Recovery: 60/60 = 100% RQD: 33/60 = 55%

DEPTH

0"

GEOLOGIC DESCRIPTION

Moderately Fractured to Slightly Fractured, Moderately Hard, Slightly Weathered, GRAY, fg SHALE, Lamnar, Jointed, Horizontal, discolored, tight

H

12"

H

H

H

24"

H

36"

H

H

Extremely Fractured, Medium, Highly Weathered, Gray to Reddish gray SILTSTONE

48"

*

60"

* - completely Broken rock

Bottom of Core at 60" (34.25')

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ROCK CORING LOG

Project Name: Yeager Airport Improvement Project-EIS Contract No.: 17386-0

Logged by: KMC Boring No.: P-13

Core Run: 3 Start Depth: 34.25' End Depth: 39.25'

Recovery: 60/60 = 100%. RQD: 50/60 = 83%.

DEPTH

0"

GEOLOGIC DESCRIPTION

Sound, Hard, Fresh to Slightly weathered, Gray, FG SANDSTONE. Massive, jointed, Low angle to High Angle, very close to Moderate, rough, slightly decomposed, open

11

11

12"

24"

36"

77

48"

50

60"

Bottom of Core at 60" (39.25')

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ROCK CORING LOG

Project Name: Yeager Airport Improvement Project - EIS Contract No.: 17386-0

Logged by: KMC Boring No.: P-13

Core Run: 4 Start Depth: 39.25' End Depth: 44.25'

Recovery: 60/60 = 100% RQD: 41/60 = 68%

DEPTH

0"

GEOLOGIC DESCRIPTION

Slightly to Moderately Fractured, Hard, Fresh to slightly Weathered, Greenish Gray, FG SANDSTONE. Massive, jointed, Horizontal to low angle, discolored, tight to open

12"

24"

36"

48"

60"

H

2

10

2

13

H

30

decomposed

10

H

Bottom of Core at 60" (44.25')

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ROCK CORING LOG

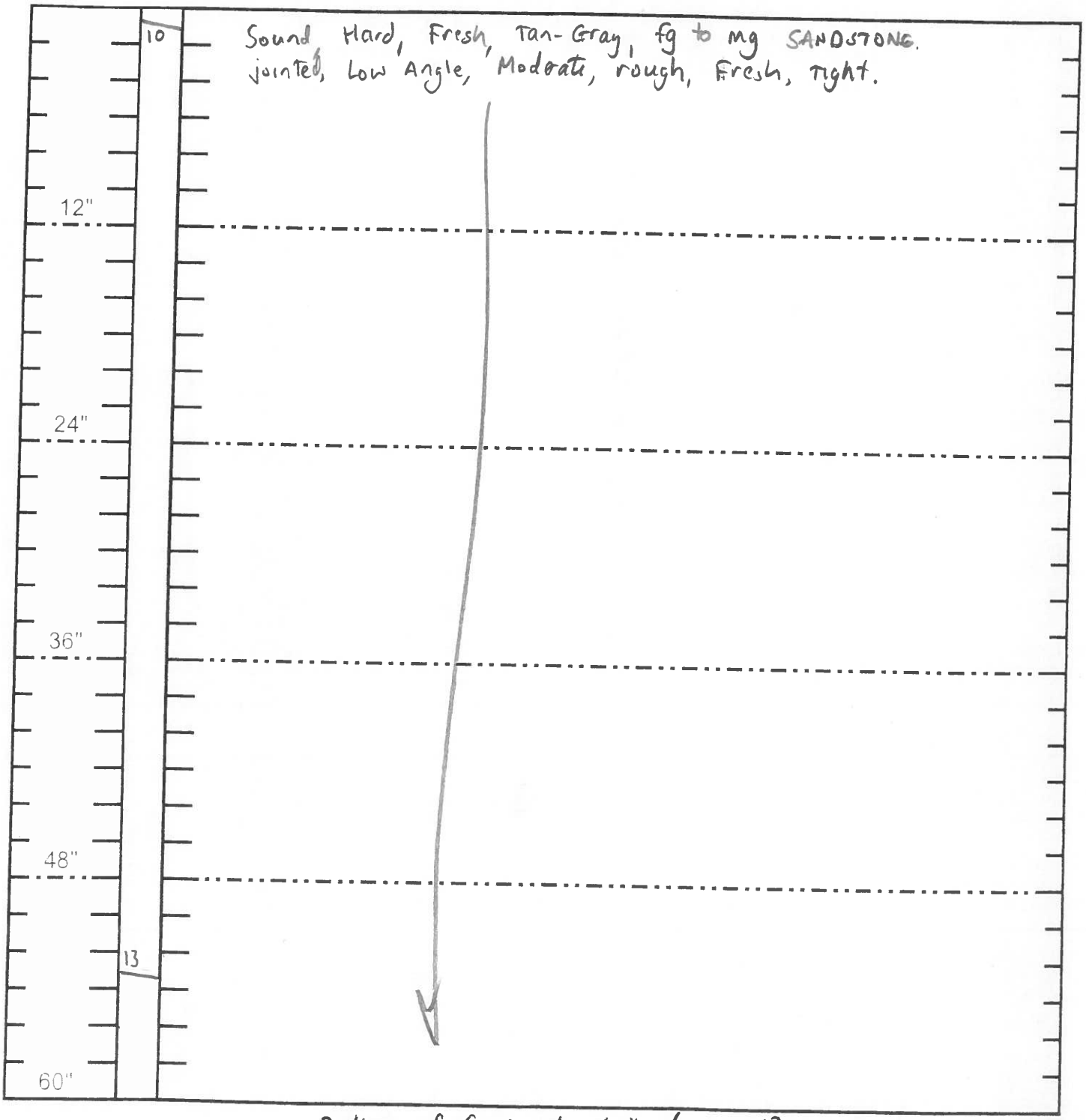
Project Name: Yeager Airport Improvement Project - EIS Contract No.: 17386-0

Logged by: KMC Boring No.: P-13

Core Run: 5 Start Depth: 44.25 End Depth: 49.25

Recovery: 56/60 RQD: 52/60 = 87%

DEPTH GEOLOGIC DESCRIPTION



Bottom of Core at 60" (49.25')

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BORING LOG

BORING P-14

CLIENT Ricondo **PROJECT NAME** EIS - Yeager Airport (CRW)

PROJECT LOCATION Charleston, WV **PROJECT NUMBER** 17386-0 **DATE TESTED**

RIG Mobil B45 **METHOD** Hollow Stem Auger **SAMPLER:** 2-in OD SS/NQ Core **HAMMER:** 140# **FALL:** 30" **AUTO?** Yes

DATE STARTED 7/20/22 **COMPLETED** 7/20/22

DRILLER Dustin Hurd **HELPER** Dan Dittman

REVIEWED BY Jaylen Surrency **SITE DELAYS**

LOCATION As Staked **BULK SAMPLES** 0-5', 20-25', 30-35'

WATER LEVELS

DATE	TIME	ELAPSED HOURS	CASING DEPTH (ft)	HOLE DEPTH (ft)	WATER DEPTH (ft)	WATER ELEV (ft)

DEPTH (ft)	SAMPLE TYPE AND NUMBER	SPT BLOWS/6" OR REC IN/IN %	N VALUE OR CORE RQD	STRATUM CHANGE DEPTH/EL (ft)	GRAPHIC LOG	USCS	WATER LEVEL	MATERIAL DESCRIPTION	PP (tsf)	NMC %	- #200	ATTERBERGS PL	ATTERBERGS LL	ATTERBERGS PI	REMARKS
								SURFACE EL = 869.0 ft							
	S1	2-4-4	8	0.3 868.8		CL		Topsoil (3-inches) Moist, Medium Stiff, Tan-Brown Sandy CLAY with Rock Fragments		15					
				3.0 866.0				Moist, Stiff, Reddish Brown Sandy CLAY, thin layers of coarse sand present in natural joints in clay							
5	S2	6-6-10	16			CL				17					
				8.0 861.0				Moist, Stiff, Tanish Brown Lean CLAY with Rock Fragments and Sand, sand grains coarse							
10	S3	6-6-7	13			CL			3.00	14	53	18	29	11	
15	S4	6-22-37	59	14.0 855.0		ML		DECOMPOSED ROCK sampled as: Dry, Very Stiff, Tan and Brown w/ Streaks of Red SILT		15					
	S5	13-50/4"	50/4"	18.5 850.5		ML		DECOMPOSED ROCK sampled as: Dry, Hard, Bluish Gray SILT		8					
20				22.0 847.0				HIGHLY WEATHERED ROCK sampled as: Dry, Hard, Bluish Gray to Brownish Tan-Red Sandy Lean CLAY							
	S6	50/3"	50/3"												
25															
	S7	50/0"	50/0"			CL				5	54	15	25	10	
30															
	S8	43-50/3"	50/3"												
35															

REMARKS:

(Continued Next Page)

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BORING LOG

BORING P-14

CLIENT Ricondo **PROJECT NAME** EIS - Yeager Airport (CRW)

PROJECT LOCATION Charleston, WV **PROJECT NUMBER** 17386-0 **DATE TESTED**

DEPTH (ft)	SAMPLE TYPE AND NUMBER	SPT BLOWS/6" OR REC IN/IN %	N VALUE OR CORE RQD	STRATUM CHANGE DEPTH/EL (ft)	GRAPHIC LOG	USCS	WATER LEVEL	MATERIAL DESCRIPTION	PP (tsf)	NMC %	- #200	ATTERBERGS PL	ATTERBERGS LL	ATTERBERGS PI	REMARKS
						CL		HIGHLY WEATHERED ROCK sampled as: Dry, Hard, Bluish Gray to Brownish Tan-Red Sandy Lean CLAY *(continued)*							
40	S9	50/0"	50/0"	40.0 829.0											
				41.5 827.5				Sound Very Hard, Slightly Weathered, Coarse-Grained SANDSTONE							
45	C1	60 / 60 100%	88	43.6 825.4				Sound, Moderately Hard, Fresh, Bluish Gray, Very Fine-Grained SHALE							
50	C2	60 / 60 100%	100					Slightly Fractured, Hard to Very Hard, Slightly Weathered, Gray, Fine- to Medium-Grained SILTSTONE							
55	C3	60 / 60 100%	87	53.5 815.5 55.0				Moderately Fractured, Moderately Hard, Moderately Weathered, Bluish Gray, Very Fine-Grained SILTSTONE							
60	C4	60 / 60 100%	92	814.0 60.0 809.0				Moderately fracutred, Moderately Hard, Slightly Weathered, Bluish Gray, Very Fine-Grained SHALE							
								Terminated at 60.0 feet							

REMARKS:

THE ROBERT B. BALTER COMPANY

ROCK CORING LOG

Project Name: Yeager Airport Improvement Project - EIS Contract No.: 17386-0

Logged by: Jaylen Summers Boring No.: P-14

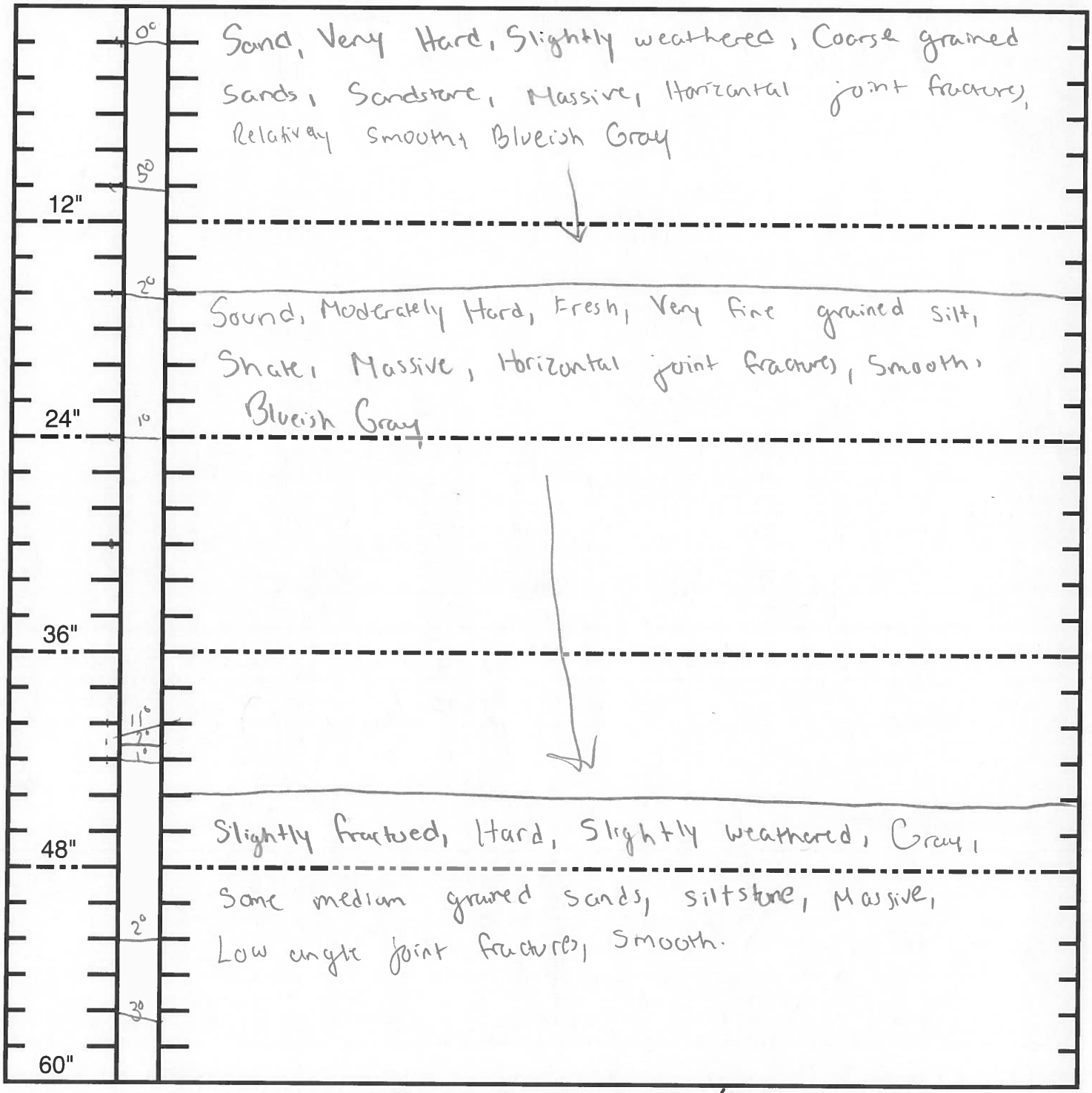
Core Run: 1 Start Depth: 40' End Depth: 45'

Recovery: 60/60 RQD: 53/60 - 88%

DEPTH

0"

GEOLOGIC DESCRIPTION



Sand, Very Hard, Slightly weathered, Coarse grained sands, Sandstone, Massive, Horizontal joint fracture, Relatively Smooth, Blueish Gray

Sound, Moderately Hard, Fresh, Very fine grained Silt, Shale, Massive, Horizontal joint fractures, Smooth, Blueish Gray

Slightly fractured, Hard, Slightly weathered, Gray, Some medium grained sands, siltstone, Massive, Low angle joint fractures, Smooth.

Bottom of Core at 60" (45')

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ROCK CORING LOG

Project Name: Yeager Airport Improvement Project - EIS Contract No.: 17386-0

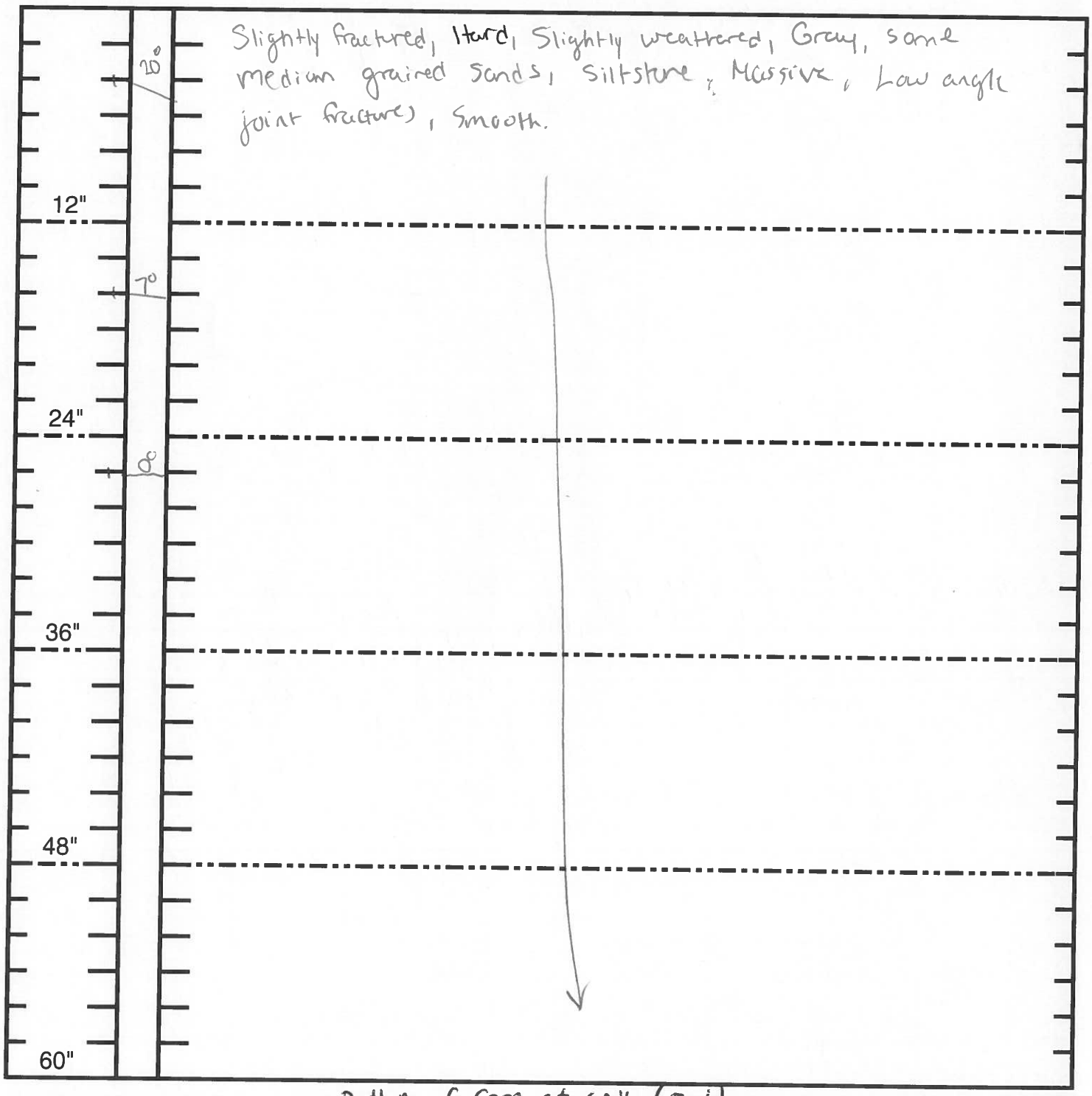
Logged by: Jaylen Surrency Boring No.: P-14

Core Run: 2 Start Depth: 45' End Depth: 50'

Recovery: 60/60 RQD: 60/60 - 100%

DEPTH

GEOLOGIC DESCRIPTION



Bottom of Core at 60" (50')

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ROCK CORING LOG

Project Name: Yeager Airport Improvement Project- EIS Contract No.: 17386-0

Logged by: Jaylen Surrency Boring No.: P-14

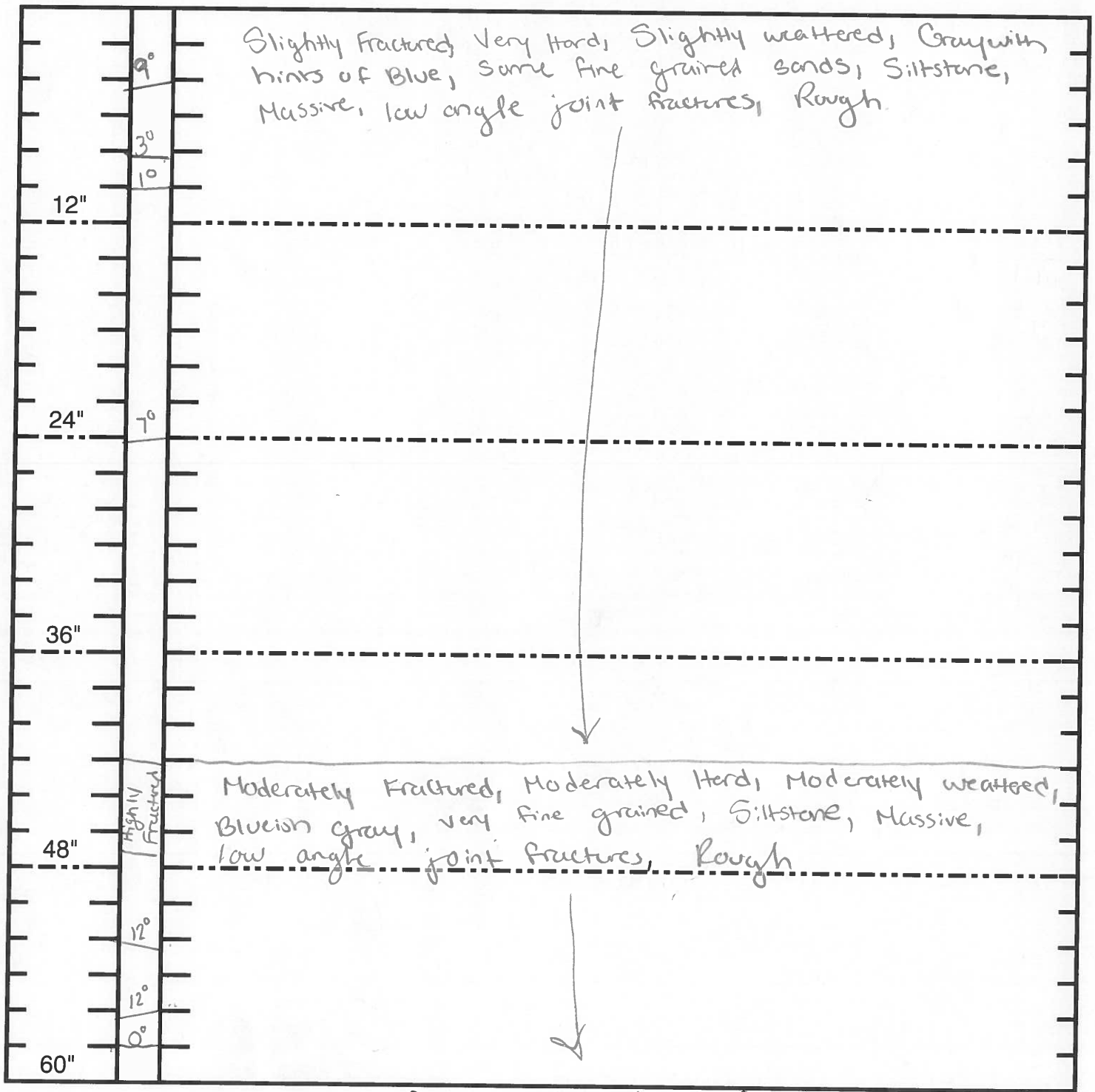
Core Run: 3 Start Depth: 50' End Depth: 55'

Recovery: 60/60 RQD: 52/60 - 87%

DEPTH

0"

GEOLOGIC DESCRIPTION



Slightly Fractured, Very Hard, Slightly weathered, Gray with hints of Blue, Some fine grained sands, Siltstone, Massive, low angle joint fractures, Rough

Moderately Fractured, Moderately Hard, Moderately weathered, Blueish gray, very fine grained, Siltstone, Massive, low angle joint fractures, Rough

Bottom of Core at 60" (55')

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ROCK CORING LOG

Project Name: Yeager Airport Improvement Project-E15 Contract No.: 17386-0

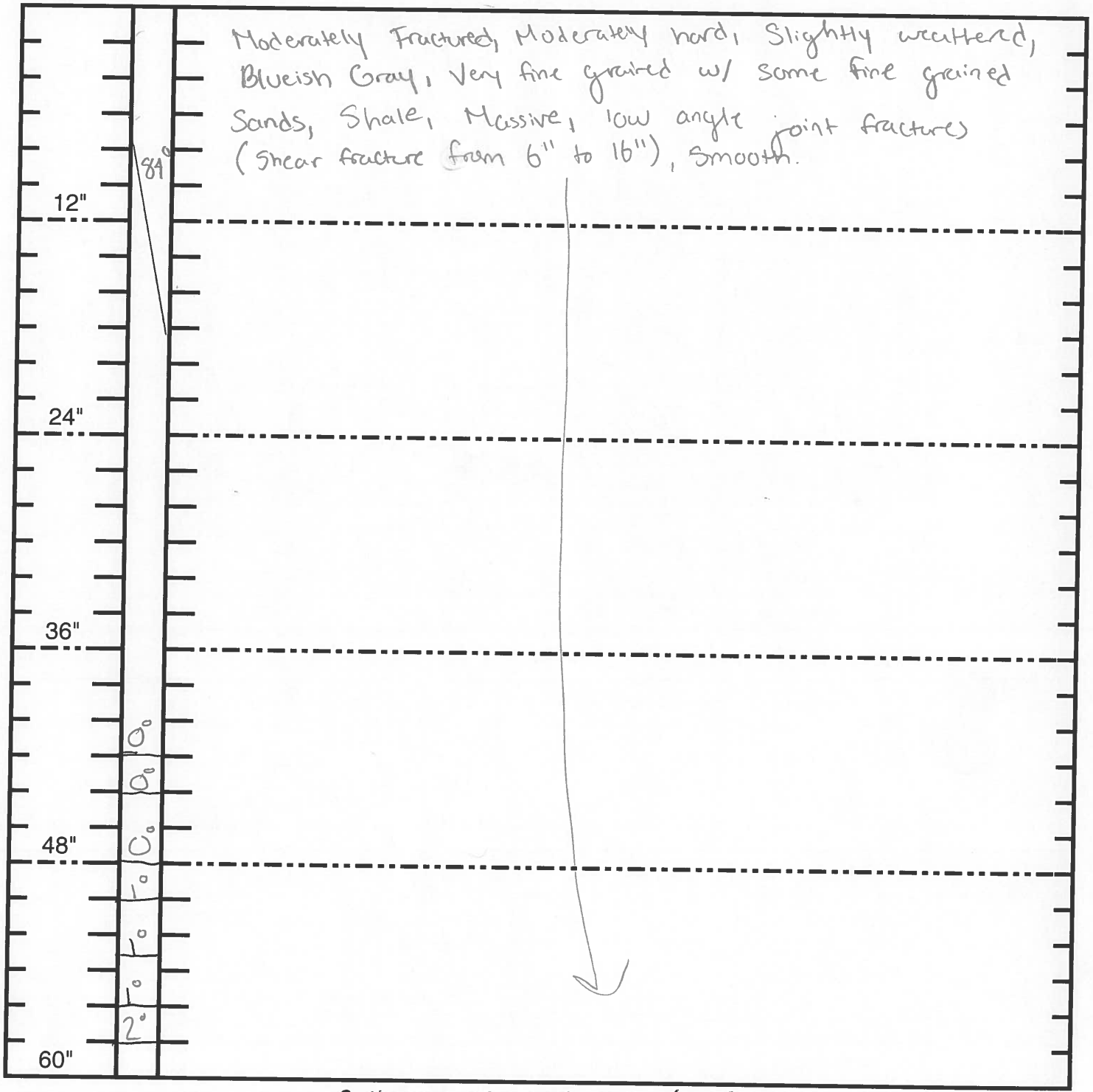
Logged by: Jaylen Sweeney Boring No.: R-14

Core Run: 4 Start Depth: 55' End Depth: 60'

Recovery: 60/60 RQD: 55/60 - 92%

DEPTH

GEOLOGIC DESCRIPTION



Bottom of Core at 60" (60')

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BORING LOG

BORING P-15

CLIENT Ricondo **PROJECT NAME** EIS - Yeager Airport (CRW)

PROJECT LOCATION Charleston, WV **PROJECT NUMBER** 17386-0 **DATE TESTED**

RIG Mobil B45 **METHOD** Hollow Stem Auger **SAMPLER:** 2-in OD SS **HAMMER:** 140# **FALL:** 30" **AUTO?** Yes

DATE STARTED 6/21/22 **COMPLETED** 6/21/22

DRILLER Dustin Hurd **HELPER** Dennis Strawderman

REVIEWED BY Kristopher Crist **SITE DELAYS**

LOCATION As Staked **BULK SAMPLES** 5-10', 30-35'

WATER LEVELS

DATE	TIME	ELAPSED HOURS	CASING DEPTH (ft)	HOLE DEPTH (ft)	WATER DEPTH (ft)	WATER ELEV (ft)
6/21/22		0 ▽		50.0	Dry	

DEPTH (ft)	SAMPLE TYPE AND NUMBER	SPT BLOWS/6" OR REC IN/IN %	N VALUE OR CORE RQD	STRATUM CHANGE DEPTH/EL (ft)	GRAPHIC LOG	USCS	WATER LEVEL	MATERIAL DESCRIPTION	PP (tsf)	NMC %	- #200	ATTERBERGS PL	ATTERBERGS LL	ATTERBERGS PI	REMARKS
								SURFACE EL = 928.0 ft							
	S1	1-1-2	3			CL		Slightly Moist, Soft, Brownish Tan CLAY, little sand and rock fragments	1.80						(1)
				3.0 925.0											
5	S2	2-3-3	6					Moist, Medium Stiff to Stiff, Tan Silty CLAY, trace rock fragments	3.40						
10	S3	4-5-8	13			CL			4.00	18					
15	S4	12-30-50/5"	50/5"	14.0 914.0				DECOMPOSED ROCK sampled as: Moist, Hard, Tan and Brown with gray and purple streaks CLAY with Rock Fragments		10					
20	S5	50/5"	50/5"			CL				10					
25	S6	32-50/3"	50/3"	24.0 904.0				HIGHLY WEATHERED ROCK sampled as: Moist, Hard, Gray Lean CLAY with Sand and Rock Fragments		6					
30	S7	50/3"	50/3"			CL				4					
										6	76	17	31	14	
35	S8	50/4"	50/4"							4					

REMARKS: (1)No surface layer.

(Continued Next Page)

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BORING LOG

BORING P-15

CLIENT Ricondo **PROJECT NAME** EIS - Yeager Airport (CRW)

PROJECT LOCATION Charleston, WV **PROJECT NUMBER** 17386-0 **DATE TESTED**

DEPTH (ft)	SAMPLE TYPE AND NUMBER	SPT BLOWS/6" OR REC IN/IN %	N VALUE OR CORE RQD	STRATUM CHANGE DEPTH/EL (ft)	GRAPHIC LOG	USCS	WATER LEVEL	MATERIAL DESCRIPTION	PP (tsf)	NMC %	- #200	ATTERBERGS PL	ATTERBERGS LL	ATTERBERGS PI	REMARKS
						CL		HIGHLY WEATHERED ROCK sampled as: Moist, Hard, Gray Lean CLAY with Sand and Rock Fragments *(continued)*							
				38.5 889.5											
	S9	50/3"	50/3"					HIGHLY WEATHERED ROCK sampled as: Moist, Very Dense, Brown SIlty SAND with Sandstone Rock Fragments		5					
40															
	S10	50/2"	50/2"			SM									
45															
				48.5 879.5											
	S11	50/3"	50/3"			ML		HIGHLY WEATHERED ROCK sampled as: Moist, Hard, Gray Clayey SILT with Rock Fragments							
50															
				52.0 876.0											
	S12	50/2"	50/2"			GM		HIGHLY WEATHERED ROCK sampled as: Moist, Very Dense, Tanish Gray Shale ROCK FRAGMENTS with Sandy Silt AUGER REFUSAL at 58.6'							
55															
				58.6											
	S13	50/1"	50/1"	869.4				Terminated at 58.6 feet							

REMARKS: (1)No surface layer.

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BORING LOG

BORING P-16

CLIENT Ricondo **PROJECT NAME** EIS - Yeager Airport (CRW)

PROJECT LOCATION Charleston, WV **PROJECT NUMBER** 17386-0 **DATE TESTED**

RIG Mobil B45 **METHOD** Hollow Stem Auger **SAMPLER:** 2-in OD SS/NQ Core **HAMMER:** 140# **FALL:** 30" **AUTO?** Yes

DATE STARTED 6/13/22 **COMPLETED** 6/14/22

DRILLER Dustin Hurd **HELPER** Dennis Strawderman

REVIEWED BY Kristopher Crist **SITE DELAYS**

LOCATION As Staked **BULK SAMPLES** 2-6'

WATER LEVELS

DATE	TIME	ELAPSED HOURS	CASING DEPTH (ft)	HOLE DEPTH (ft)	WATER DEPTH (ft)	WATER ELEV (ft)
6/13/22		0 ▽	45.0		43.0	853.0

DEPTH (ft)	SAMPLE TYPE AND NUMBER	SPT BLOWS/6" OR REC IN/IN %	N VALUE OR CORE RQD	STRATUM CHANGE DEPTH/EL (ft)	GRAPHIC LOG	USCS	WATER LEVEL	MATERIAL DESCRIPTION	PP (tsf)	NMC %	- #200	ATTERBERGS PL	ATTERBERGS LL	ATTERBERGS PI	REMARKS
								SURFACE EL = 896.0 ft							
	S1	7-9-5-5	14					Moist, Very Stiff, Red-Brown to Brown Fat CLAYwith Rock Fragments		28					
	S2	5-7-7-9	14			CH				21	75	21	57	36	
5	S3	4-6-7-9	13							11					
	S4	9-11-18-19	29	6.0 890.0		CH		Moist, Very Stiff, Brown Fat CLAY, relic rock structure							
	S5	19-23-35-50/6"	50/6"	8.0 888.0		CL		DECOMPOSED ROCK sampled as: Moist, Hard, Yellow Brown CLAY		10					
10															
	S6	30-50/5"	50/5"												
15				16.0 880.0											
	S7	50/6"	50/6"			SM		DECOMPOSED ROCK sampled as: Moist, Very Dense, Brown Silty SAND with Sandstone fragments		3					
20				22.0 874.0											
	S8	50/3"	50/3"			SM		HIGHLY WEATHERED ROCK sampled as: Moist, Very Dense, Brown Silty SAND with Sandstone Rock Fragments		4					
25				27.0 869.0											
	S9	50/5"	50/5"			GM		DECOMPOSED ROCK sampled as: Moist, Very Dense, Gray SANDSTONE ROCK FRAGMENTS with Silty Sand							
30				32.0 864.0											
	S10	50/2"	50/2"			GM		HIGHLY WEATHERED ROCK sampled as: Moist, Very Dense, Gray SANDSTONE ROCK FRAGMENTS with Silty Sand		4					
35															

REMARKS:

(Continued Next Page)

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BORING LOG

BORING P-16

CLIENT Ricondo **PROJECT NAME** EIS - Yeager Airport (CRW)

PROJECT LOCATION Charleston, WV **PROJECT NUMBER** 17386-0 **DATE TESTED**

DEPTH (ft)	SAMPLE TYPE AND NUMBER	SPT BLOWS/6" OR REC IN/IN %	N VALUE OR CORE RQD	STRATUM CHANGE DEPTH/EL (ft)	GRAPHIC LOG	USCS	WATER LEVEL	MATERIAL DESCRIPTION	PP (tsf)	NMC %	- #200	ATTERBERGS PL	ATTERBERGS LL	ATTERBERGS PI	REMARKS
								HIGHLY WEATHERED ROCK sampled as: Moist, Very Dense, Gray SANDSTONE ROCK FRAGMENTS with Silty Sand *(continued)*							
40	S11	50/1"	50/1"			GM									
				43.0 853.0			▽	HIGHLY WEATHERED ROCK sampled as: Wet, Hard, Gray Silty, Clayey SAND with Siltstone Rock Fragments		8	13	16	23	7	
45	S12	50/3"	50/3"			SC-SM									
				47.0 849.0				HIGHLY WEATHERED ROCK sampled as: Moist, Very Dense, Red to Brown Silty SAND and Sandstone Rock Fragments		8					
50	S13	50/3"	50/3"			SM									
	S14	50/2"	50/2"	54.0											
55	S15	50/0"	50/0"	842.0				Moderately Fractured to Slightly Fractured, Hard, Slightly Weathered, fine- to medium-grained SANDSTONE							
	C1	52 / 52 100%	42												
60	C2	60 / 60 100%	57												
				63.3 832.7				Moderately Fractured to Sound, Hard, Slightly Weathered, Light Gray SANDSTONE							
65	C3	60 / 60 100%	95	66.3 829.7				Sound to Moderately Fractured, Hard, Slightly Weathered, Tannish Gray, Coarse-Grained SANDSTONE. Reacts with HCL							
70	C4	36 / 36 100%	64												
				71.0 825.0				SHALE							
				71.3 824.7				Terminated at 71.3 feet							

REMARKS:

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ROCK CORING LOG

Project Name: Yeager Airport Improvement Project - EIS Contract No.: 17386-0

Logged by: KML Boring No.: P-16

Core Run: 1 Start Depth: 54' End Depth: 58.3'

Recovery: 52/52 = 100% RQD: 22/52 = 42%

DEPTH

0"

GEOLOGIC DESCRIPTION

Moderately Fractured, Hard, Slightly weathered, Gray, fg to mg SANDSTONE. Laminar to thin, jointed, Horizontal to low angle, very close to close, rough, discolored, open.

12"

24"

36"

48"

60"

11 9 8 5 3 3 1 9 4 4 4 2 13 17 7 7 11

decomposed section

decomposed section

decomposed section

Bottom of rock core @ 52" (58.3')

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ROCK CORING LOG

Project Name: Yeager Airport Improvement Project - EIS Contract No.: 17386-0

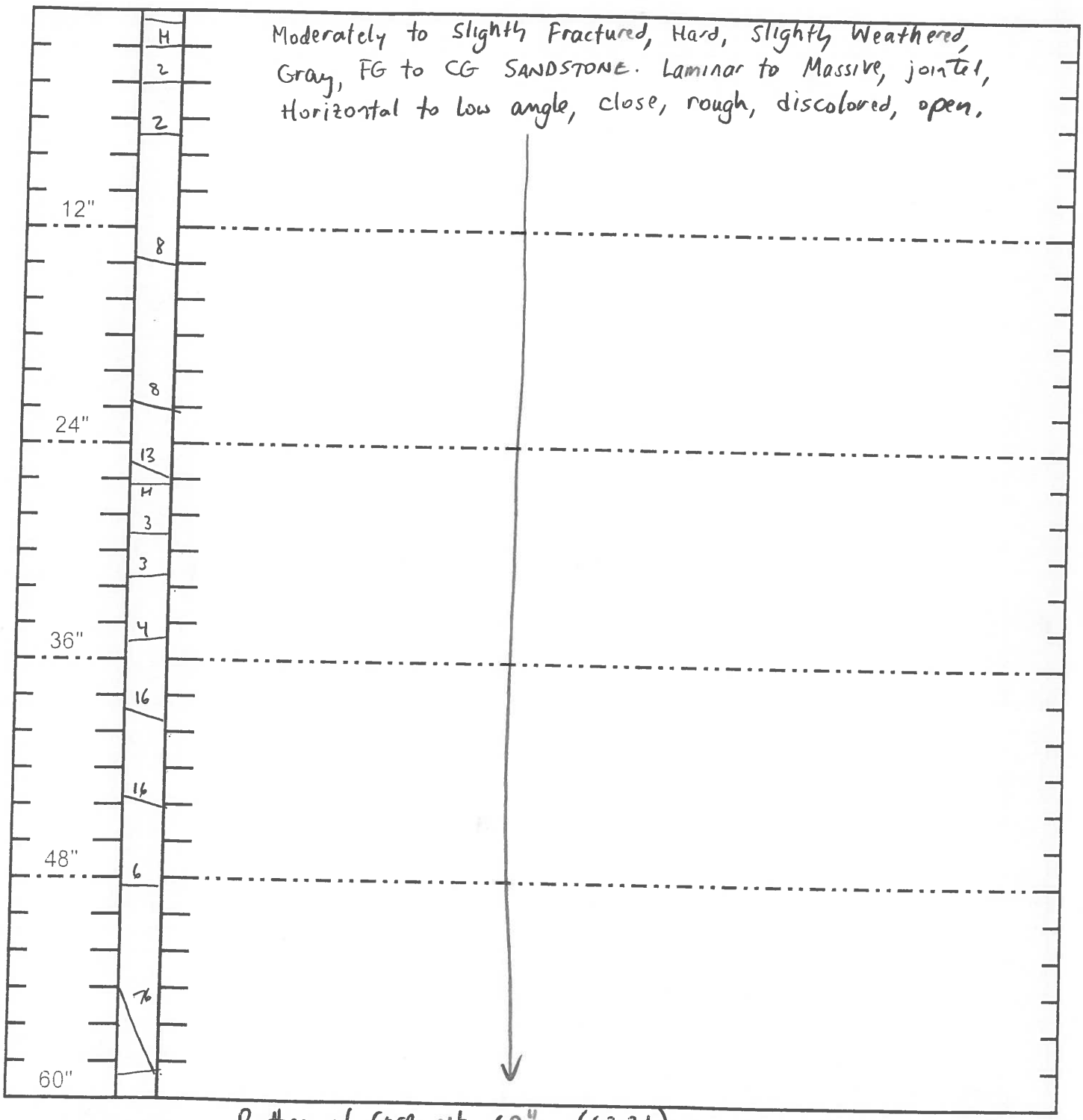
Logged by: KMC Boring No.: P-16

Core Run: 2 Start Depth: 58.3' End Depth: 63.3'

Recovery: 60/60 = 100 RQD: 34/60 = 57%

DEPTH

GEOLOGIC DESCRIPTION



Bottom of Core at 60" (63.3')

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ROCK CORING LOG

Project Name: Yeager Airport Improvement Project - EIS Contract No.: 17386-0

Logged by: KMC Boring No.: P-16

Core Run: 3 Start Depth: 63.3' End Depth: 68.3'

Recovery: 60/60 = 100% RQD: 57/60 = 95%

DEPTH

0"

GEOLOGIC DESCRIPTION

11

Moderately Fractured to Sound, Hard, slightly weathered, Light gray, fg to mg SANDSTONE. massive, jointed, Horizontal to low angle, close, discolored, tight.

3

12"

8

← some silt infill

24"

8

36"

Sound, Hard, Fresh, tannish Gray, cg SANDSTONE. Massive, jointed, Horizontal, Moderate, rough, discolored, open. Reacts with HCL

3

48"

60"

Bottom of Core at 60" (68.3')

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ROCK CORING LOG

Project Name: Yeager Airport Improvement Project - EIS Contract No.: 17386-0

Logged by: KMC Boring No.: P-16

Core Run: 4 Start Depth: 68.3' End Depth: 71.3'

Recovery: 36/36 = 100% RQD: 23/36 = 64%

DEPTH

0"

GEOLOGIC DESCRIPTION

Moderately to slightly Fractured, Hard, Slightly Weathered, Tannish Gray, CG SANDSTONE. Massive, jointed Horizontal, very close to close, rough, discolored, open. Slight reaction with HCL.

3
H
H
4
4

12"

24"

6
6
6

Extremely Fractured, Mod. Hard, Slightly Weathered, Dark Gray-Brown, FG SHALE

36"

Bottom of Core at 36" (71.3')

48"

60"

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BORING LOG

BORING P-17

CLIENT Ricondo **PROJECT NAME** EIS - Yeager Airport (CRW)

PROJECT LOCATION Charleston, WV **PROJECT NUMBER** 17386-0 **DATE TESTED**

RIG Mobil B45 **METHOD** Hollow Stem Auger **SAMPLER:** 2-in OD SS/NQ Core **HAMMER:** 140# **FALL:** 30" **AUTO?** Yes

DATE STARTED 6/16/22 **COMPLETED** 6/16/22

DRILLER Dustin Hurd **HELPER** Dennis Strawderman

REVIEWED BY Kristopher Crist **SITE DELAYS**

LOCATION As Staked **BULK SAMPLES** 5-10', 10-15'

WATER LEVELS

DATE	TIME	ELAPSED HOURS	CASING DEPTH (ft)	HOLE DEPTH (ft)	WATER DEPTH (ft)	WATER ELEV (ft)
6/17/22		0 ▽		55.0	Dry	

DEPTH (ft)	SAMPLE TYPE AND NUMBER	SPT BLOWS/6" OR REC IN/IN %	N VALUE OR CORE RQD	STRATUM CHANGE DEPTH/EL (ft)	GRAPHIC LOG	USCS	WATER LEVEL	MATERIAL DESCRIPTION	PP (tsf)	NMC %	- #200	ATTERBERGS PL	ATTERBERGS LL	ATTERBERGS PI	REMARKS
								SURFACE EL = 938.0 ft							
	S1	1-2-2-1	4	0.4 / 937.6				Topsoil (5-inches)							
						CL		Moist, Soft to Medium Stiff, Brownish Tan Sandy CLAY, little rock fragments	1.70						
	S2	1-2-3-4	5						4.50						
				4.0 / 934.0											
5	S3	5-9-10-12	19					Moist, Very Stiff, Tan with Red streaks Sandy CLAY, little rock fragments							
	S4	8-11-14-15	25												
	S5	9-10-13-16	23												
10						CL									
	S6	7-24-50/5"	50/5"	14.5 / 923.5											
15								DECOMPOSED ROCK sampled as: Moist, Hard, Multi-Colored (black, tan, brown, greenish brown) SILT with Shale Rock Fragments							
	S7	42-50/4"	50/4"			ML									
20															
				22.0 / 916.0				HIGHLY WEATHERED ROCK sampled as: Moist, Very Dense, Grayish Tan Sandstone ROCK FRAGMENTS with Sand							
	S8	50/3"	50/3"												
25															
						SM									
	S9	50/3"	50/3"												
30															
				32.0 / 906.0											
	S10	50/6"	50/6"			SM		DECOMPOSED ROCK sampled as: Moist, Very Dense, Gray Sandstone ROCK FRAGMENTS with Silty Sand							
35															

REMARKS:

(Continued Next Page)

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BORING LOG

BORING P-17

CLIENT Ricondo **PROJECT NAME** EIS - Yeager Airport (CRW)

PROJECT LOCATION Charleston, WV **PROJECT NUMBER** 17386-0 **DATE TESTED**

DEPTH (ft)	SAMPLE TYPE AND NUMBER	SPT BLOWS/6" OR REC IN/IN %	N VALUE OR CORE RQD	STRATUM CHANGE DEPTH/EL (ft)	GRAPHIC LOG	USCS	WATER LEVEL	MATERIAL DESCRIPTION	PP (tsf)	NMC %	- #200	ATTERBERGS PL	ATTERBERGS LL	ATTERBERGS PI	REMARKS
								DECOMPOSED ROCK sampled as: Moist, Very Dense, Gray Sandstone ROCK FRAGMENTS with Silty Sand *(continued)*							
40	S11	50/4"	50/4"			SM									
				43.0 895.0				HIGHLY WEATHERED ROCK sampled as: Moist, Dense, Gray Sandstone ROCK FRAGMENTS with Silty Sand							
45	S12	43- 50/3"	50/3"			SM									
				48.0 890.0				DECOMPOSED ROCK sampled as: Moist, Hard, Red-Brown CLAY with Rock Fragments							
50	S13	9-12- 38	50			CL									
				53.0 885.0				HIGHLY WEATHERED ROCK sampled as: Moist, Hard, Gray Siltstone ROCK FRAGMENTS with Sandy Silt							
55	S14	50/3"	50/3"			ML									
				58.0 880.0				Extremely to Moderately Fractured, Moderately Hard, Slightly Weathered, Greenish Gray, FG Sandy SILTSTONE, little red garnets present							
60	S15	50/0"	50/0"												
	C1	58 / 60 97%	60	63.5 874.5				Moderately to Slightly Fractured, Hard, Slightly Weathered, Gray, FG SANDSTONE. Red garnets present.							
65	C2	60 / 60 100%	74	65.5 872.5				Slightly to Moderately to Slightly Fractured, Hard, Slightly Weathered, Gray, FG SILTSTONE							
70	C3	60 / 60 100%	63	72.0 866.0				Extremely Fractured, Moderately Hard, Moderately Weathered, Brown, FG SHALE							
				73.0 865.0				Terminated at 73.0 feet							

REMARKS:

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ROCK CORING LOG

Project Name: Yeager Airport Improvement Project - EIS Contract No.: 17386-0

Logged by: KML Boring No.: P-17

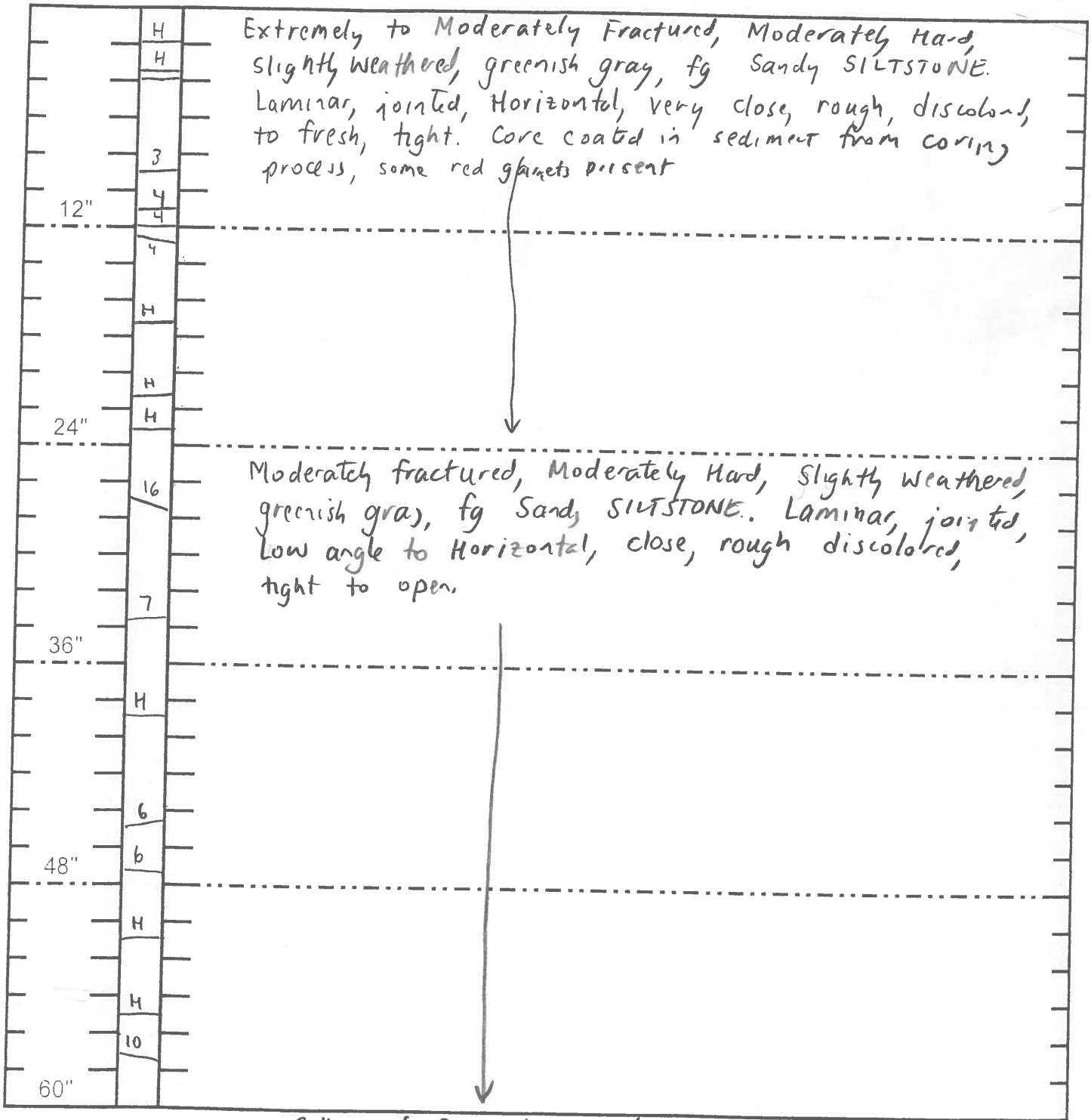
Core Run: 1 Start Depth: 58' End Depth: 63'

Recovery: 58/60 = 97% RQD: 36/60 = 60%

DEPTH

0"

GEOLOGIC DESCRIPTION



Extremely to Moderately Fractured, Moderately Hard, slightly weathered, greenish gray, fg Sandy SILTSTONE. Laminar, jointed, Horizontal, very close, rough, discolored to fresh, tight. Core coated in sediment from coring process, some red garnets present

Moderately fractured, Moderately Hard, Slightly weathered, greenish gray, fg Sandy SILTSTONE. Laminar, jointed, Low angle to Horizontal, close, rough discolored, tight to open.

Bottom of Core at 60" (63')

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ROCK CORING LOG

Project Name: Yeager Airport Improvement Project - EIS Contract No.: 17386-0

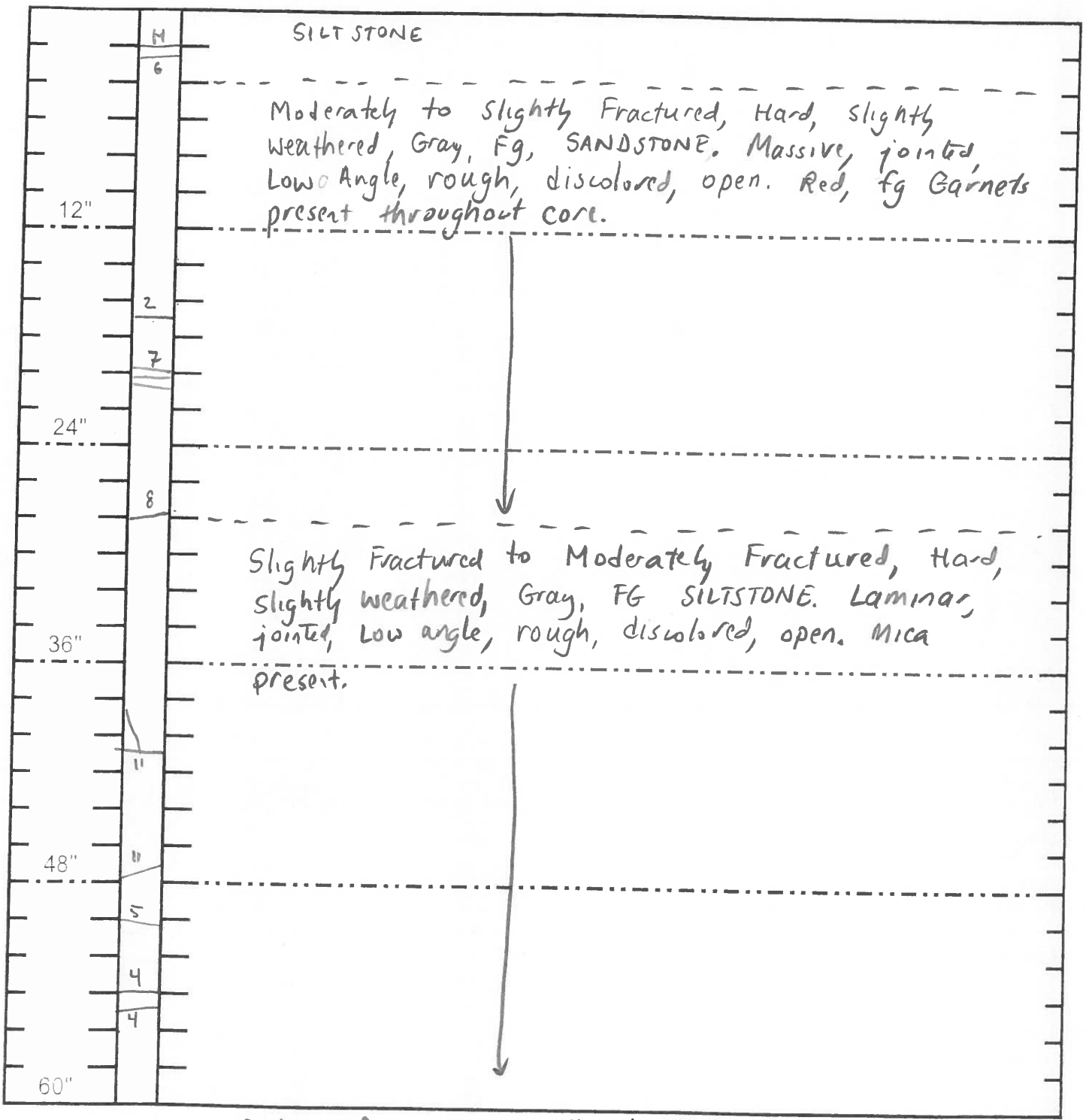
Logged by: KMC Boring No.: P-17

Core Run: 2 Start Depth: 63' End Depth: 68'

Recovery: 60/60 = 100%. RQD: 44.5/60 = 74%.

DEPTH

GEOLOGIC DESCRIPTION



Bottom of core @ 60" (68')

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ROCK CORING LOG

Project Name: Yeager Airport Improvement Project - EIS Contract No.: 17386-0

Logged by: KMC Boring No.: P-17

Core Run: 3 Start Depth: 68' End Depth: 73'

Recovery: 60/60 = 100% RQD: 38/60 = 63%

DEPTH

0"

GEOLOGIC DESCRIPTION

10
12

Moderately to Slightly Fractured, Hard, Slightly Weathered, grg, FG SILTSTONE. Laminar, jointed, Horizontal to Low angle, discolored, open.

12"

2
20

24"

4

36"

13
4

2
4
8

48"

Extremely Fractured, Moderately Hard, Moderately Weathered, Brown, fg SHALE

*

60"

Bottom of Core at 60" (73')

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BORING LOG

BORING P-18

CLIENT Ricondo **PROJECT NAME** EIS - Yeager Airport (CRW)

PROJECT LOCATION Charleston, WV **PROJECT NUMBER** 17386-0 **DATE TESTED**

RIG Mobil B45 **METHOD** Hollow Stem Auger **SAMPLER:** 2-in OD SS/NQ Core **HAMMER:** 140# **FALL:** 30" **AUTO?** Yes

DATE STARTED 6/22/22 **COMPLETED** 6/22/22

DRILLER Dustin Hurd **HELPER** Dennis Strawderman

REVIEWED BY Kristopher Crist **SITE DELAYS**

LOCATION As Staked **BULK SAMPLES**

WATER LEVELS

DATE	TIME	ELAPSED HOURS	CASING DEPTH (ft)	HOLE DEPTH (ft)	WATER DEPTH (ft)	WATER ELEV (ft)

DEPTH (ft)	SAMPLE TYPE AND NUMBER	SPT BLOWS/6" OR REC IN/IN %	N VALUE OR CORE RQD	STRATUM CHANGE DEPTH/EL (ft)	GRAPHIC LOG	USCS	WATER LEVEL	MATERIAL DESCRIPTION	PP (tsf)	NMC %	- #200	ATTERBERGS PL	ATTERBERGS LL	ATTERBERGS PI	REMARKS
								SURFACE EL = 915.0 ft							
	S1	1-1-3	4	0.3 914.8	F	CL		Topsoil (3-inches) Moist, Soft, Reddish Brown CLAY, trace rock fragments (FILL)	2.70	24					
				3.5 911.5											
5	S2	4-5-8	13					Moist, Stiff to Very Stiff, Tan and Brown Clayey SILT, little rock fragments, little relic rock structure	4.50	14					
						CL-ML									
10	S3	7-8-11	19							18					
				13.5 901.5											
	S4	50/5"	50/5"					DECOMPOSED ROCK sampled as: Moist, Hard, Tannish Brown Sandy Lean CLAY		6	66	16	28	12	
15						CL									
	S5	50/4"	50/4"					coarse-grained sand present in sample at 18.5 feet		4					
20				22.0 893.0											
	S6	50/2"	50/2"					HIGHLY WEATHERED ROCK sampled as: Moist, Hard, Gray SILT with Rock Fragments							
25						ML									
				27.0 888.0				AUGER REFUSAL at 27 feet							
	C1	54 / 54 100%	59					Moderately to Extremely Fractured, Hard, Slightly Weathered, Gray SILTSTONE							
				29.0 886.0											
30								Moderately Fractured, Moderately Hard, Slightly Weathered, Tannish White SANDSTONE							
				31.5 883.5											
								Sound, Moderately Hard, Slightly Weathered, Blueish Gray SHALE							
				33.5											
	C2	60 / 60 100%	58	881.5				SILTSTONE							
35				34.0											

REMARKS:

(Continued Next Page)

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BORING LOG

BORING P-18

CLIENT Ricondo **PROJECT NAME** EIS - Yeager Airport (CRW)

PROJECT LOCATION Charleston, WV **PROJECT NUMBER** 17386-0 **DATE TESTED**

DEPTH (ft)	SAMPLE TYPE AND NUMBER	SPT BLOWS/6" OR REC IN/IN %	N VALUE OR CORE RQD	STRATUM CHANGE DEPTH/EL (ft)	GRAPHIC LOG	USCS	WATER LEVEL	MATERIAL DESCRIPTION	PP (tsf)	NMC %	- #200	ATTERBERGS PL	ATTERBERGS LL	ATTERBERGS PI	REMARKS
				881.0				Extremely Fractured, Moderately Hard, Slightly Weathered, Gray SHALE *(continued)*							
				36.5 878.5				SILTSTONE							
40	C3	60 / 60 100%	8	37.5 877.5				Extremely Fractured to Moderately Fractured, Moderately Hard to Soft, Slightly Weathered to Highly Weathered, Blueish Gray SHALE							
45	C4	60 / 60 100%	28					Purple in color							
				46.5 868.5				Moderately Fractured to Slightly Fractured, Moderately Hard, Slightly Weathered to Fresh, Gray SILTSTONE							
50	C5	60 / 60 100%	62												
55	C6	60 / 60 100%	66	54.0 861.0				SANDSTONE							
				55.0 860.0				Slightly Fractured to Extremely Fractured, Moderately Hard, Fresh to Slightly Weathered, Gray to Brown SILTSTONE							
60	C7	42 / 42 100%	55	57.5 857.5 58.0 857.0 60.0 855.0				Extremely Fractured, Moderately Hard, Slightly Weathered to Highly Weathered, Brown to Gray Interbedded SANDSTONE, SILTSTONE and SHALE Moderately Fractured, Hard, Fresh, Gray SILTSTONE Terminated at 60.0 feet							

REMARKS:

THE ROBERT B. BALTER COMPANY

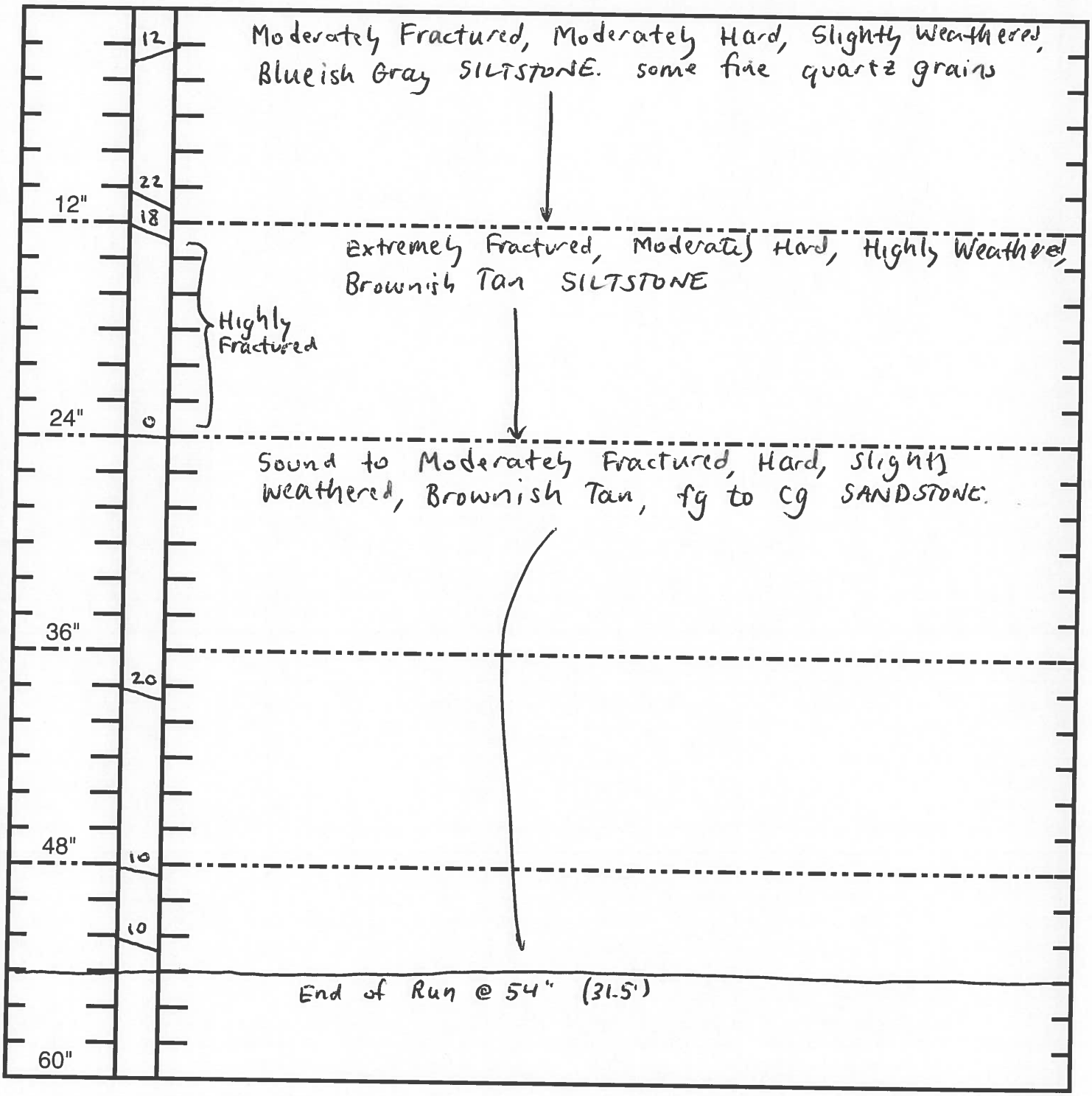
ROCK CORING LOG

Project Name: Yeager Airport Improvement Project-EIS Contract No.: 17386-0

Logged by: Jaylen Surrency Boring No.: P-18

Core Run: 1 Start Depth: 27' End Depth: 31.5'

Recovery: 54/54 = 100%. RQD: 32/54 = 59%.



THE ROBERT B. BALTER COMPANY

ROCK CORING LOG

Project Name: Yeager Airport Improvement Project - EIS Contract No.: 17386-0

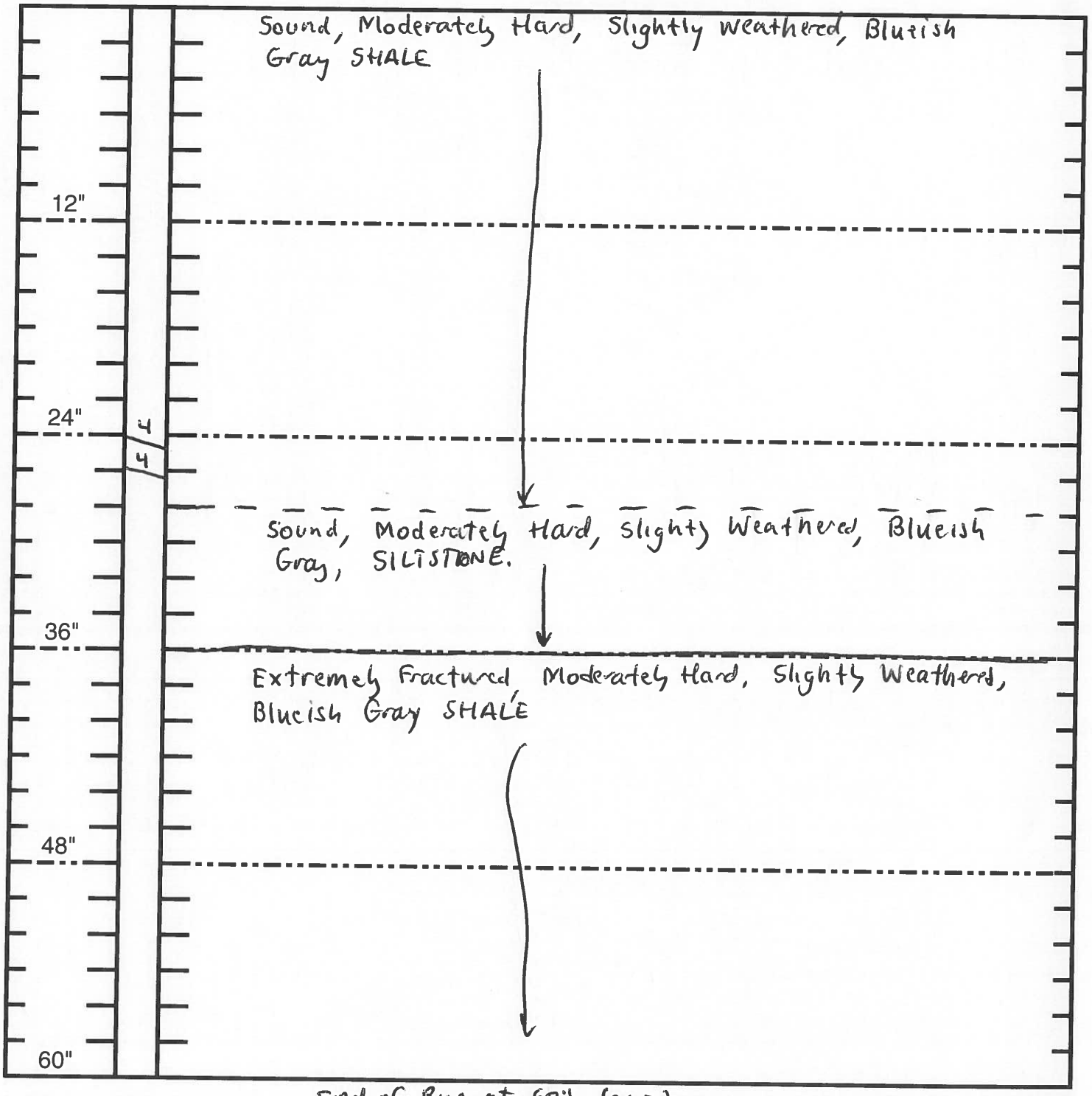
Logged by: Jaylen Surrency Boring No.: P-18

Core Run: 2 Start Depth: 31.5' End Depth: 36.5'

Recovery: 60/60 = 100%. RQD: 35/60 = 58%.

DEPTH

GEOLOGIC DESCRIPTION



End of Run at 60" (36.5')

THE ROBERT B. BALTER COMPANY

ROCK CORING LOG

Project Name: Yeager Airport Improvement Project - EIS Contract No.: 17386-0

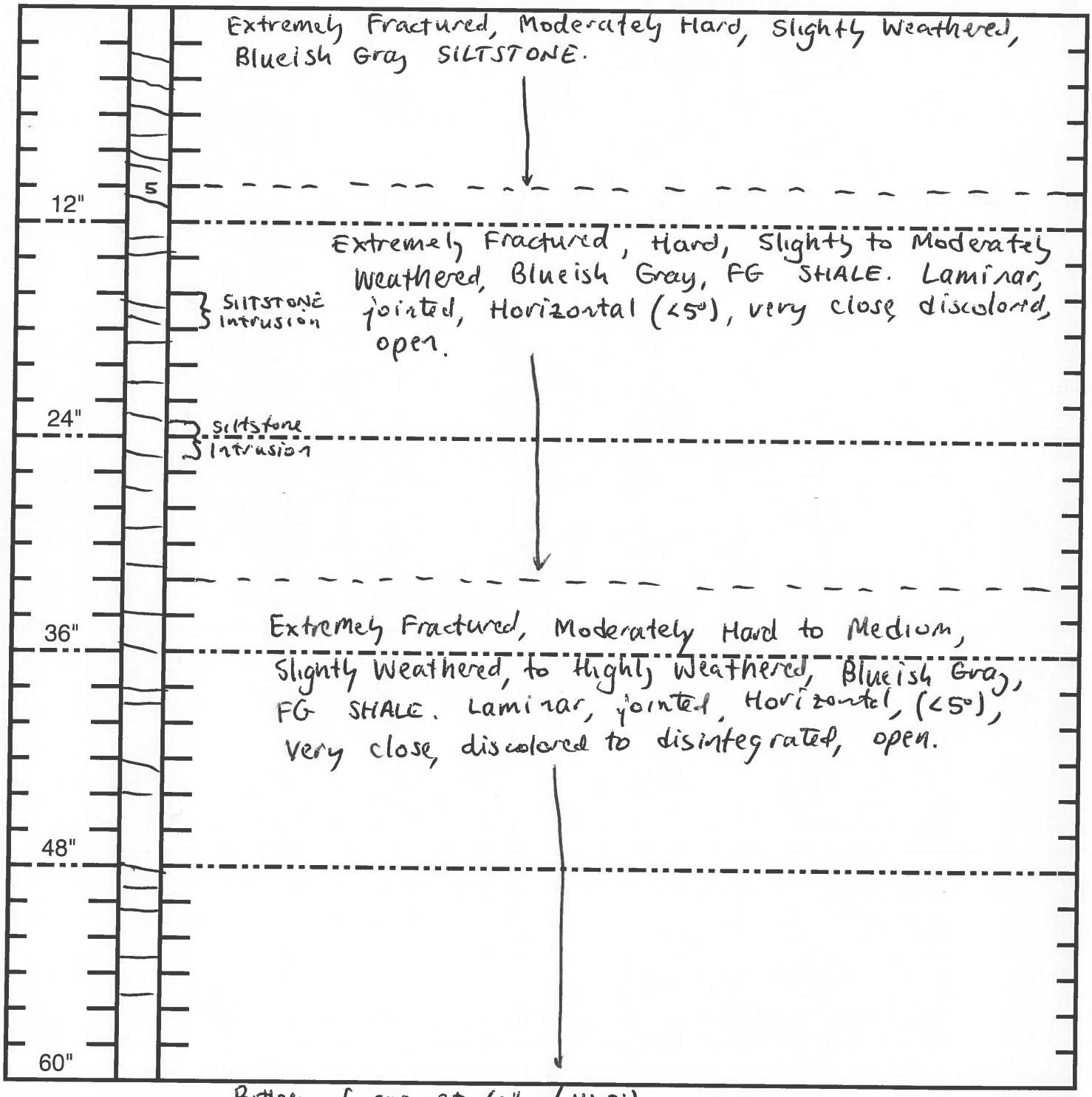
Logged by: Jaylen Surrency Boring No.: P-18

Core Run: 3 Start Depth: 36.5' End Depth: 41.5'

Recovery: 60/60 = 100%. RQD: 5/60 = 8%.

DEPTH

GEOLOGIC DESCRIPTION



Extremely Fractured, Moderately Hard, Slightly Weathered, Blueish Gray SILTSTONE.

Extremely Fractured, Hard, Slightly to Moderately Weathered, Blueish Gray, FG SHALE. Laminar, jointed, Horizontal (<5°), very close discolored, open.

Extremely Fractured, Moderately Hard to Medium, Slightly Weathered, to Highly Weathered, Blueish Gray, FG SHALE. Laminar, jointed, Horizontal, (<5°), very close, discolored to disintegrated, open.

Bottom of core at 60" (41.5')

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ROCK CORING LOG

Project Name: Yeager Airport Improvement Project - EIS Contract No.: 17386-0

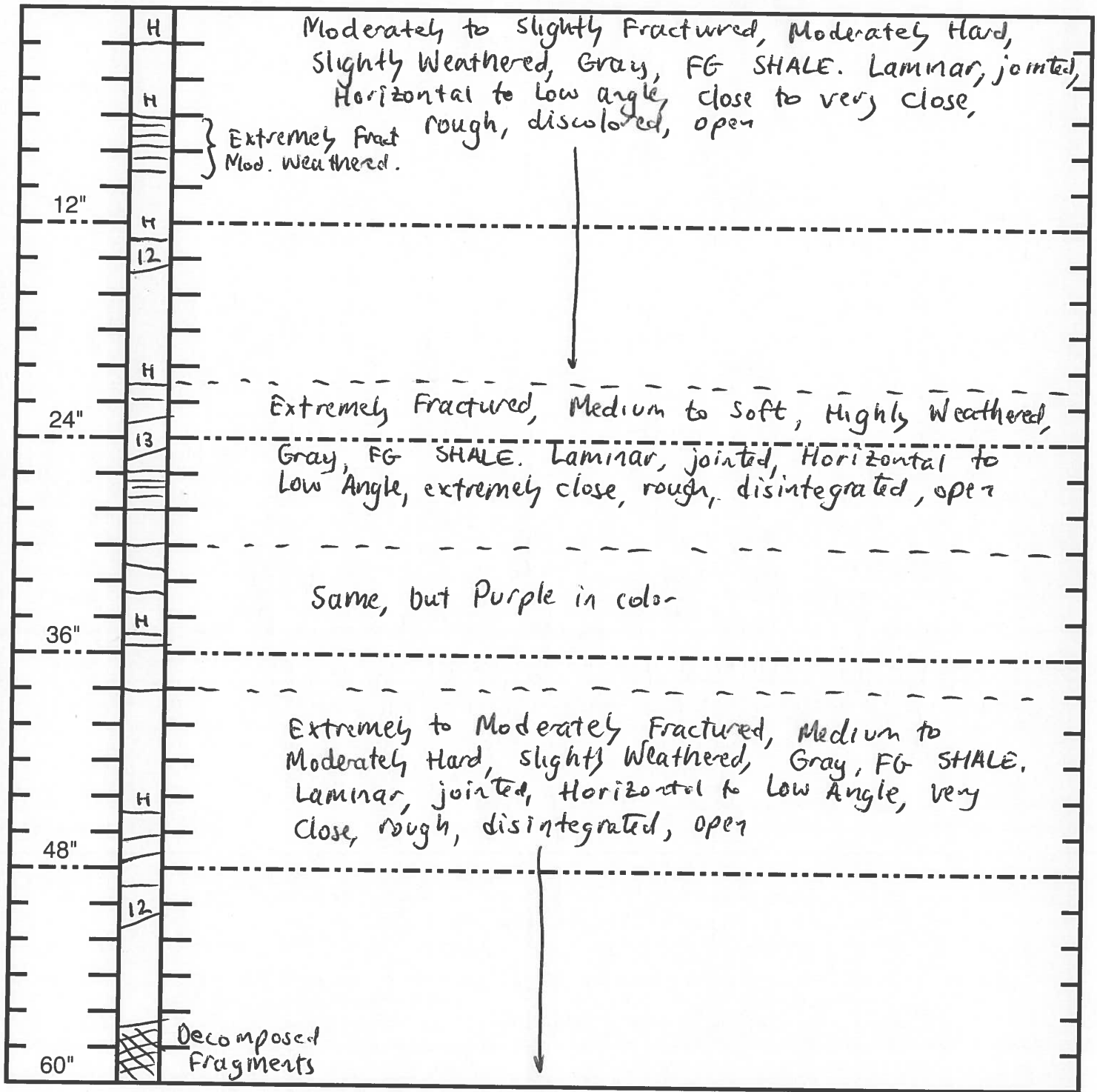
Logged by: kmc Boring No.: P-18

Core Run: 4 Start Depth: 41.5' End Depth: 46.5'

Recovery: 60/60 = 100%. RQD: 17/60 = 28%.

DEPTH

GEOLOGIC DESCRIPTION



Bottom of Core at 60" (46.5')

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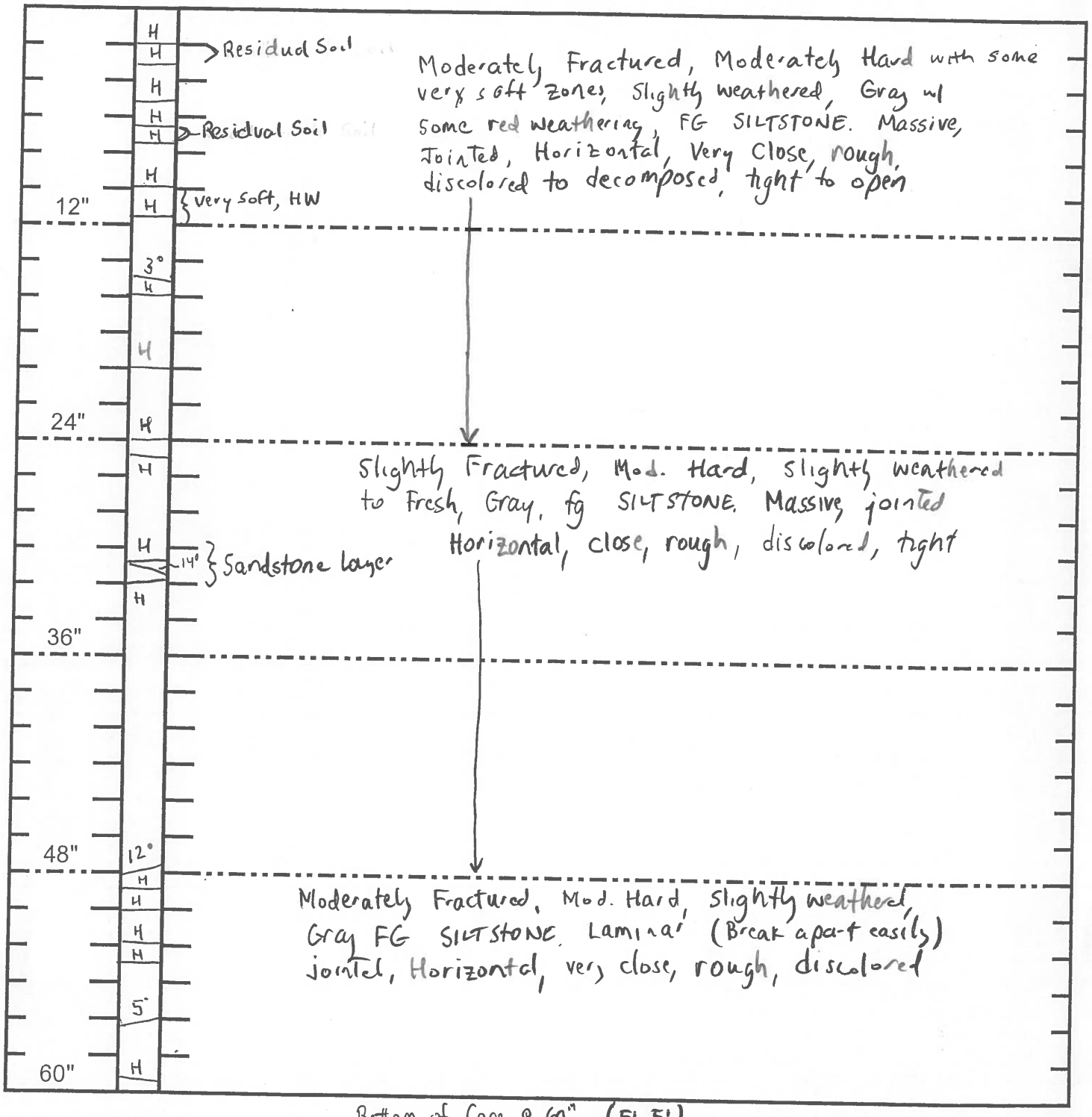
ROCK CORING LOG

Project Name: Yeager Airport Improvement Project - EIS Contract No.: 17386-0

Logged by: KMC Boring No.: P-18

Core Run: 5 Start Depth: 46.5' End Depth: 51.5'

Recovery: 60/60 = 100% RQD: 37/60 = 62%



Bottom of Core @ 60" (51.5')

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ROCK CORING LOG

Project Name: Yeager Airport Improvement Project - EIS Contract No.: 17386-0

Logged by: KMC Boring No.: P-18

Core Run: 6 Start Depth: 51.5 End Depth: 56.5

Recovery: 60/60 = 100%. RQD: 39.5/60 = 66%.

DEPTH

0"

GEOLOGIC DESCRIPTION

8
H
H
15

Moderately Fractured, Moderately Hard, Slightly Weathered, Gray, fg SILTSTONE. Laminar, jointed, Horizontal to Low angle, Very Close, rough, tight.

Siltstone breaks apart in layers with hand pressure, Microfractures present. Slight reaction with HCL

12"

8

Pitting present

8

Zone of Moderately Weathered Soft Rock and Soil

2
H
H

24"

10

5

Soil

7

SANDSTONE

36"

Slightly Fractured, Moderately Hard, Fresh, Gray, FG SILTSTONE, Laminar, jointed, Horizontal to Low angle, close, rough, tight. Slight reaction with HCL

6

48"

4
6

60"

Bottom of Core @ 60" (56.5')

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ROCK CORING LOG

Project Name: Yeager Airport Improvement Project - EIS Contract No.: 17386-0

Logged by: KMC Boring No.: P-18

Core Run: 7 Start Depth: 56.5 End Depth: 60'

Recovery: 42/42 = 100% RQD: 23/42 = 55%.

DEPTH

0"

GEOLOGIC DESCRIPTION

Moderately Fractured, Slightly Weathered, Moderately Hard, Reddish Brown to Gray, FG, SILTSTONE. Laminar, Jointed, Low angle to Moderately dipping, very close, discolored, tight. Slight reaction with HCL

40
5
15

12"

8
H
13
H
5

Extremely Fractured, Moderately Hard, Slightly Weathered to Highly Weathered, Brown to Gray Interbedded SANDSTONE, SILTSTONE and SHALE. Laminar, jointed, Horizontal to Low angle, very close to extremely close, rough, discolored to decomposed, open. Slight reaction to HCL.

24"

H

Moderately Fractured, Hard, Fresh, Gray, FG SILTSTONE. Massive, jointed, Horizontal to Low angle, rough, discolored, tight. Slight reaction to HCL

3
17
10

36"

Bottom of Core @ 42" (60')

48"

60"

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BORING LOG

BORING P-19

CLIENT Ricondo **PROJECT NAME** EIS - Yeager Airport (CRW)

PROJECT LOCATION Charleston, WV **PROJECT NUMBER** 17386-0 **DATE TESTED**

RIG Mobil B45 **METHOD** Hollow Stem Auger **SAMPLER:** 2-in OD SS **HAMMER:** 140# **FALL:** 30" **AUTO?** Yes

DATE STARTED 7/6/22 **COMPLETED** 7/6/22

DRILLER Dustin Hurd **HELPER** Dennis Strawderman

REVIEWED BY Jaylen Surrency **SITE DELAYS**

LOCATION As Staked **BULK SAMPLES** 0-5'

WATER LEVELS

DATE	TIME	ELAPSED HOURS	CASING DEPTH (ft)	HOLE DEPTH (ft)	WATER DEPTH (ft)	WATER ELEV (ft)

DEPTH (ft)	SAMPLE TYPE AND NUMBER	SPT BLOWS/6" OR REC IN/IN %	N VALUE OR CORE RQD	STRATUM CHANGE DEPTH/EL (ft)	GRAPHIC LOG	USCS	WATER LEVEL	MATERIAL DESCRIPTION	PP (tsf)	NMC %	- #200	ATTERBERGS PL	ATTERBERGS LL	ATTERBERGS PI	REMARKS
								SURFACE EL = 935.0 ft							
	S1	3-3-3	6	0.3 934.7				Topsoil (4-inches)	3.00	15	48	17	29	12	
								Moist, Loose, Reddish Brown Clayey SAND with Rock Fragments							
5	S2	2-2-4	6						4.20						
						SC									
10	S3	3-4-5	9						4.50						
15	S4	2-4-8	12	14.5 920.5					3.90						
								Moist, Stiff, Reddish Brown Lean CLAY							
						CL									
20	T5	24 / 24								14	93	20	31	11	
				22.0 913.0											
								Moist, Very Stiff, Brown with Gray and Purple Streaking SILT, little rock fragments							
25	S6	11-13-16	29			ML									
30	S7	11-23-50/6"	50/6"	29.0 906.0											
								DECOMPOSED ROCK sampled as: Moist, Hard, Gray with Red-Staining SILT							
						ML									
35	S8	50/6"	50/6"												

REMARKS:

(Continued Next Page)

APPENDIX B

LABORATORY TEST RESULTS

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BORING LOG

BORING P-19

CLIENT Ricondo **PROJECT NAME** EIS - Yeager Airport (CRW)

PROJECT LOCATION Charleston, WV **PROJECT NUMBER** 17386-0 **DATE TESTED**

DEPTH (ft)	SAMPLE TYPE AND NUMBER	SPT BLOWS/6" OR REC IN/IN %	N VALUE OR CORE RQD	STRATUM CHANGE DEPTH/EL (ft)	GRAPHIC LOG	USCS	WATER LEVEL	MATERIAL DESCRIPTION	PP (tsf)	NMC %	- #200	ATTERBERGS PL	ATTERBERGS LL	ATTERBERGS PI	REMARKS
						ML		DECOMPOSED ROCK sampled as: Moist, Hard, Gray with Red-Staining SILT *(continued)*							
				37.0 898.0				HIGHLY WEATHERED ROCK sampled as: Moist, Hard, SILT, little sand							
	S9	50/1"	50/1"			ML									
40				42.0 893.0				HIGHLY WEATHERED ROCK sampled as: Moist, Very Dense, Gray SILTSTONE ROCK FRAGMENTS and Silt							
	S10	50/3"	50/3"												
45															
						GM									
	S11	50/3"	50/3"												
50															
	S12	50/0"	50/0"	53.5 881.5				AUGER REFUSAL at 53.5' Terminated at 53.5 feet							

REMARKS:

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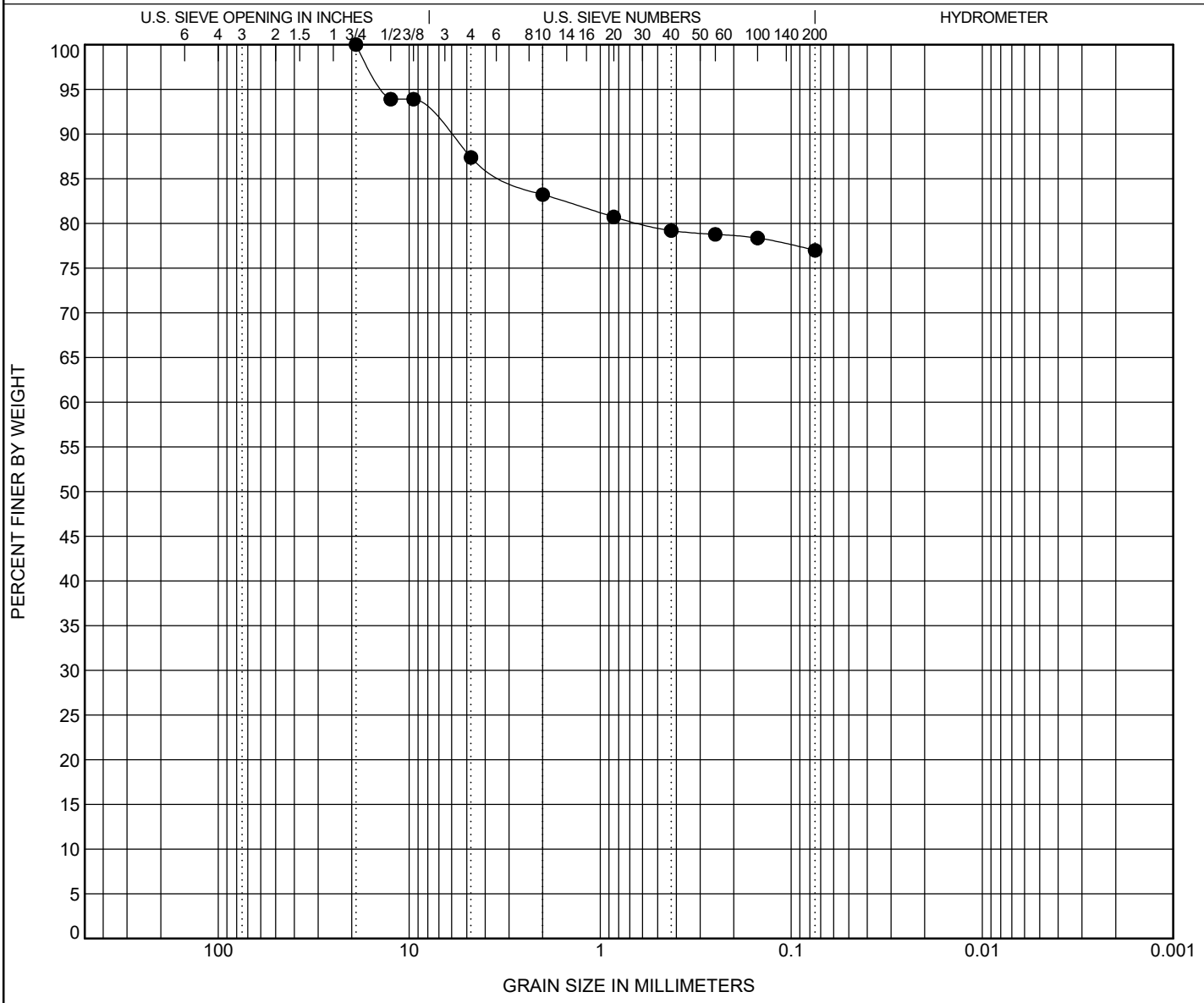
GRAIN SIZE DISTRIBUTION

TEST METHOD ASTM D422

CLIENT Ricondo **PROJECT NAME** EIS - Yeager Airport (CRW)

PROJECT LOCATION Charleston, WV **PROJECT NUMBER** 17386-0



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen Identification	Classification	LL	PL	PI	Cc	Cu
●	A-2, S-10 @ 43.5' - 45.0',	Bluish Gray Lean CLAY with Rock Fragments (CL) (FILL) {A-4, GI=4}	26	18	8		

	Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	A-2, S-10 @ 43.5' - 45.0',	19				12.6	10.4	77.0	

GRAIN SIZE SAM MODIFIED 17386-0 CRW RUNWAY EXTENSION EIS.GPJ MTA REDLINE.GDT 9/8/22

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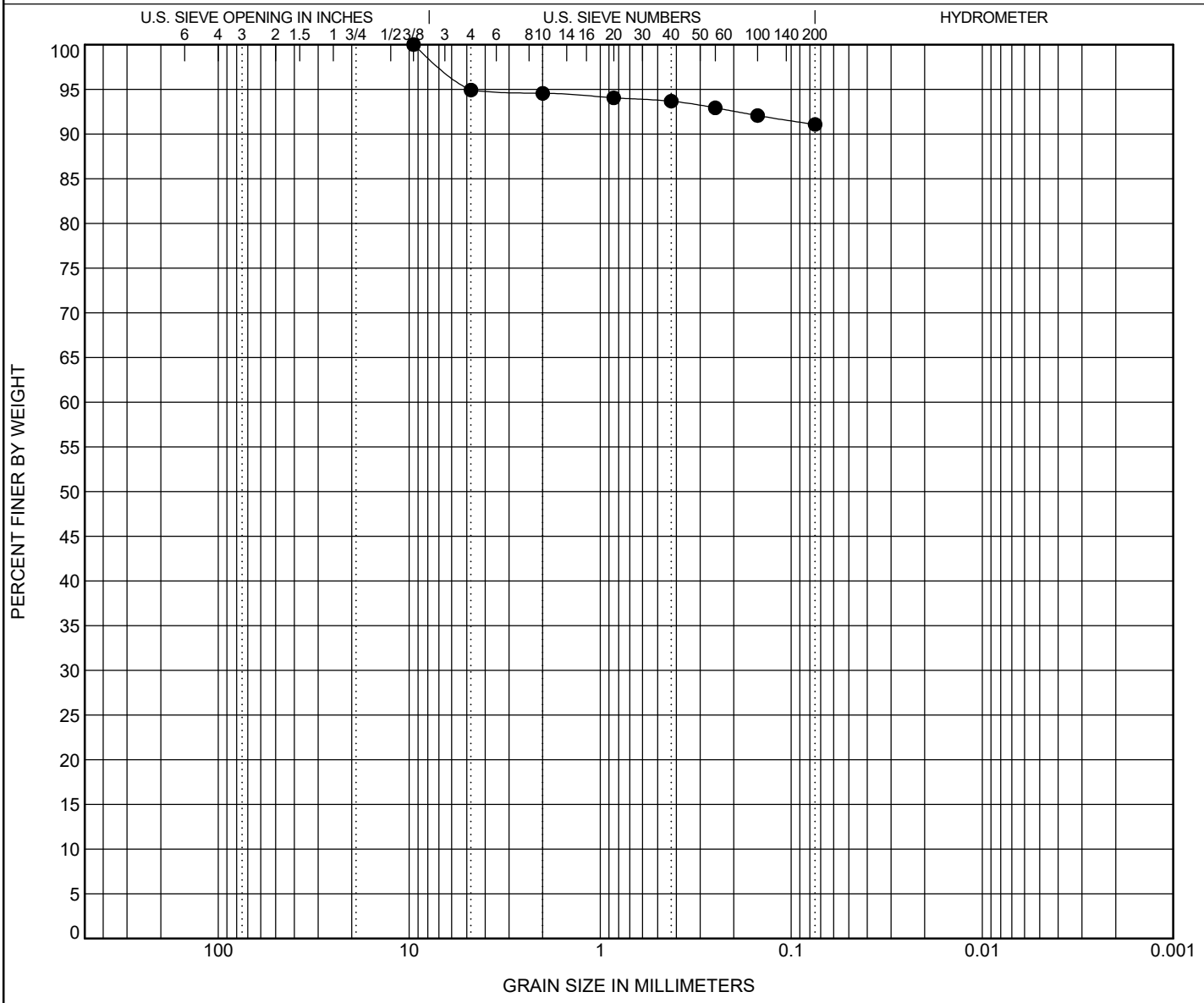
GRAIN SIZE DISTRIBUTION

TEST METHOD ASTM D422

CLIENT Ricondo **PROJECT NAME** EIS - Yeager Airport (CRW)

PROJECT LOCATION Charleston, WV **PROJECT NUMBER** 17386-0



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen Identification	Classification	LL	PL	PI	Cc	Cu
●	A-3, S-4 @ 8.5' - 10.0',	**Brownish Tan Lean CLAY (CL) (FILL) {A-4, GI=7}**	**29**	**20**	**9**		

	Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	A-3, S-4 @ 8.5' - 10.0',	**9.5**				**5.1**	**3.8**	**91.1**	

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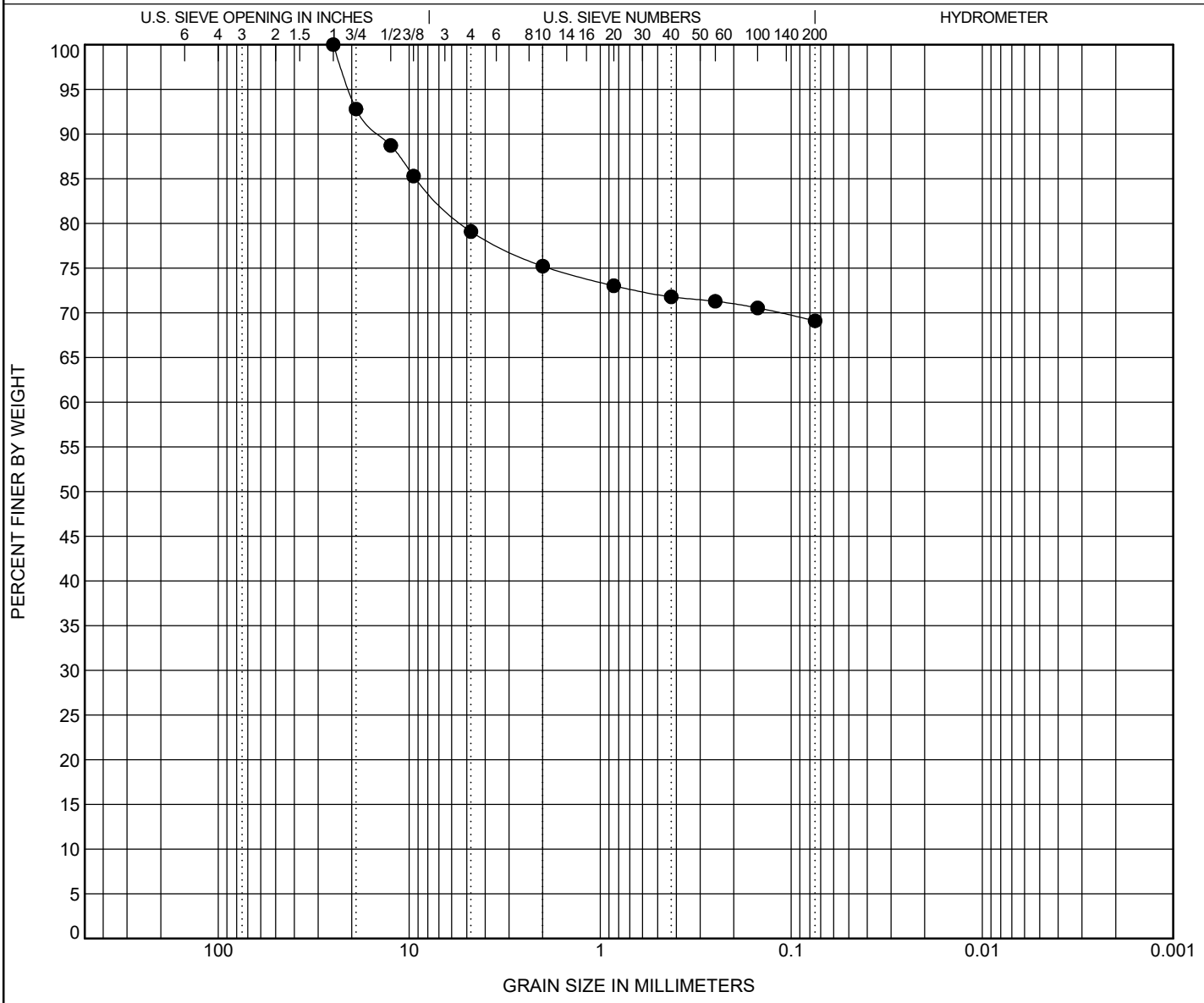
GRAIN SIZE DISTRIBUTION

TEST METHOD ASTM D422

CLIENT Ricondo **PROJECT NAME** EIS - Yeager Airport (CRW)

PROJECT LOCATION Charleston, WV **PROJECT NUMBER** 17386-0 **DATE TESTED**



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen Identification	Classification	LL	PL	PI	Cc	Cu
●	A-3, Shelby @ 60.0' - 62.0',	**GRAVELLY LEAN CLAY(CL) {A-6, GI=8}**	**34**	**19**	**15**		

	Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	A-3, Shelby @ 60.0' - 62.0',	**25**				**20.9**	**10.0**	**69.1**	

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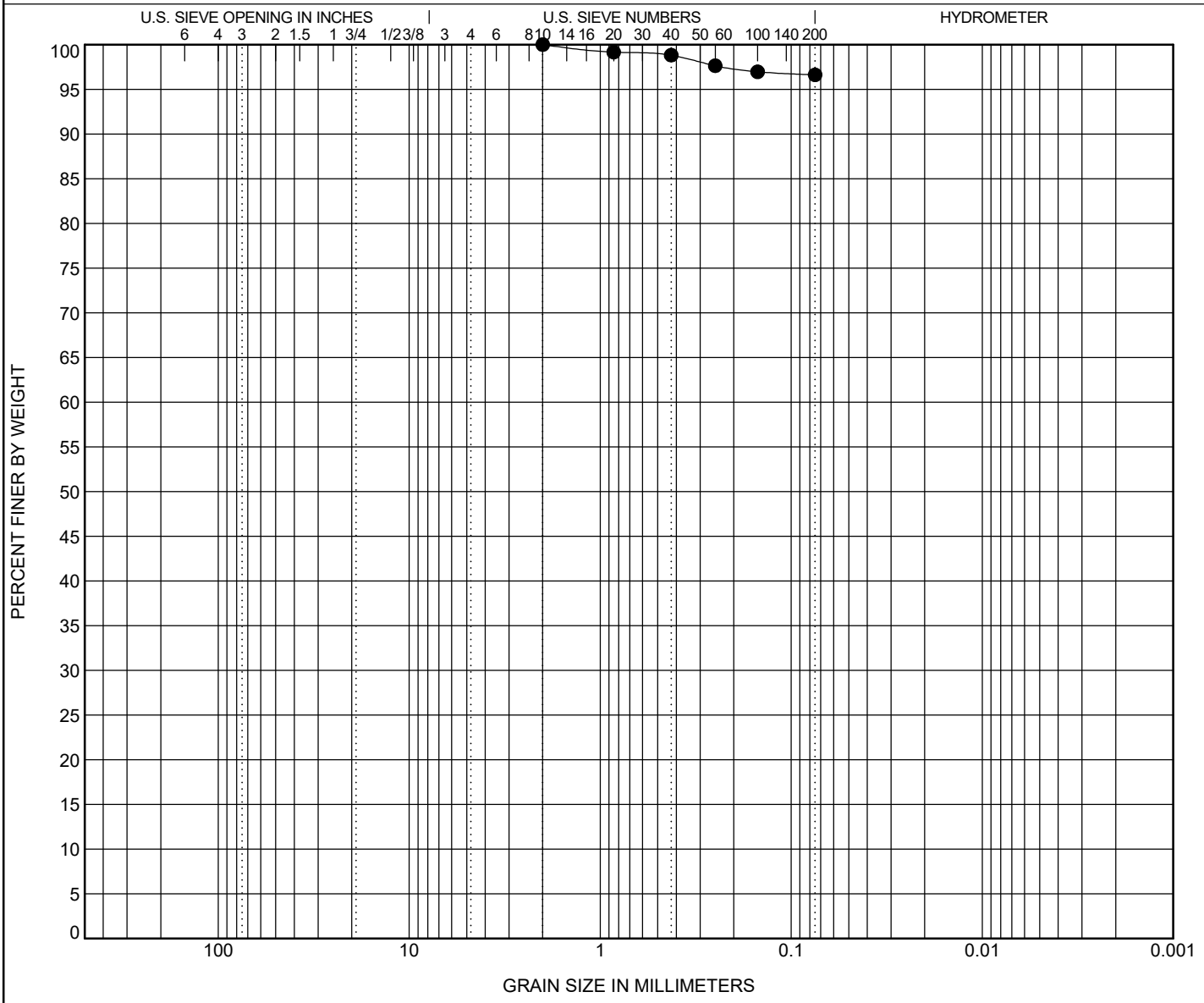

COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen Identification	Classification	LL	PL	PI	Cc	Cu
●	P-3, S-1 @ 0.0' - 1.5',	**Brown SILT (ML) (Residual) {A-7-6, GI=18}**	**42**	**26**	**16**		

	Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	P-3, S-1 @ 0.0' - 1.5',	**2**				**0.0**	**3.4**	**96.6**	

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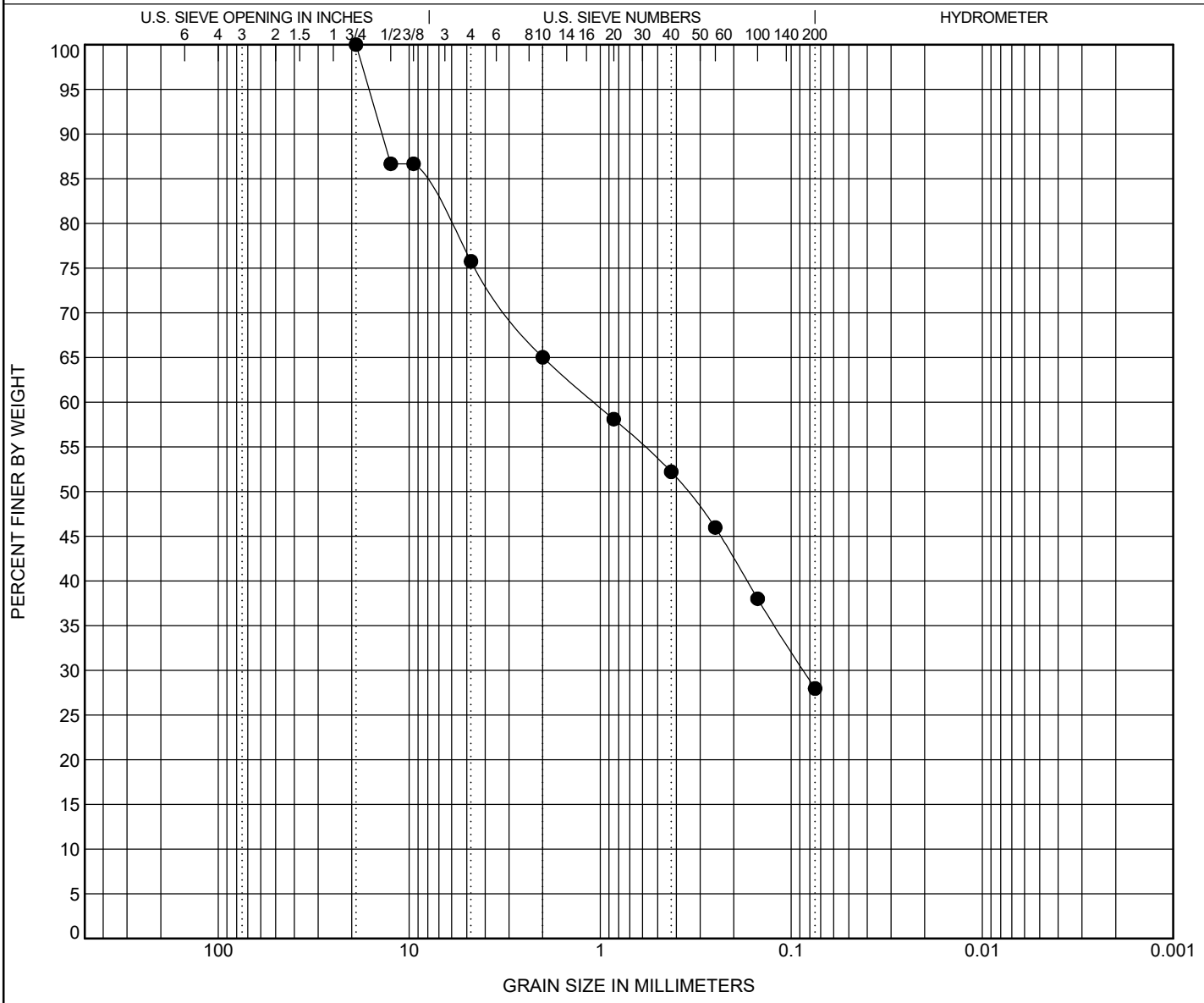

COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen Identification	Classification	LL	PL	PI	Cc	Cu
●	P-4, S-1 @ 0.0' - 1.5',	Gray-Brown Silty SAND with Rock Fragments (SM) (FILL) {A-2-4, GI=0}	NP	NP	NP		

	Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	P-4, S-1 @ 0.0' - 1.5',	19	1.076	0.086		24.2	47.8	28.0	

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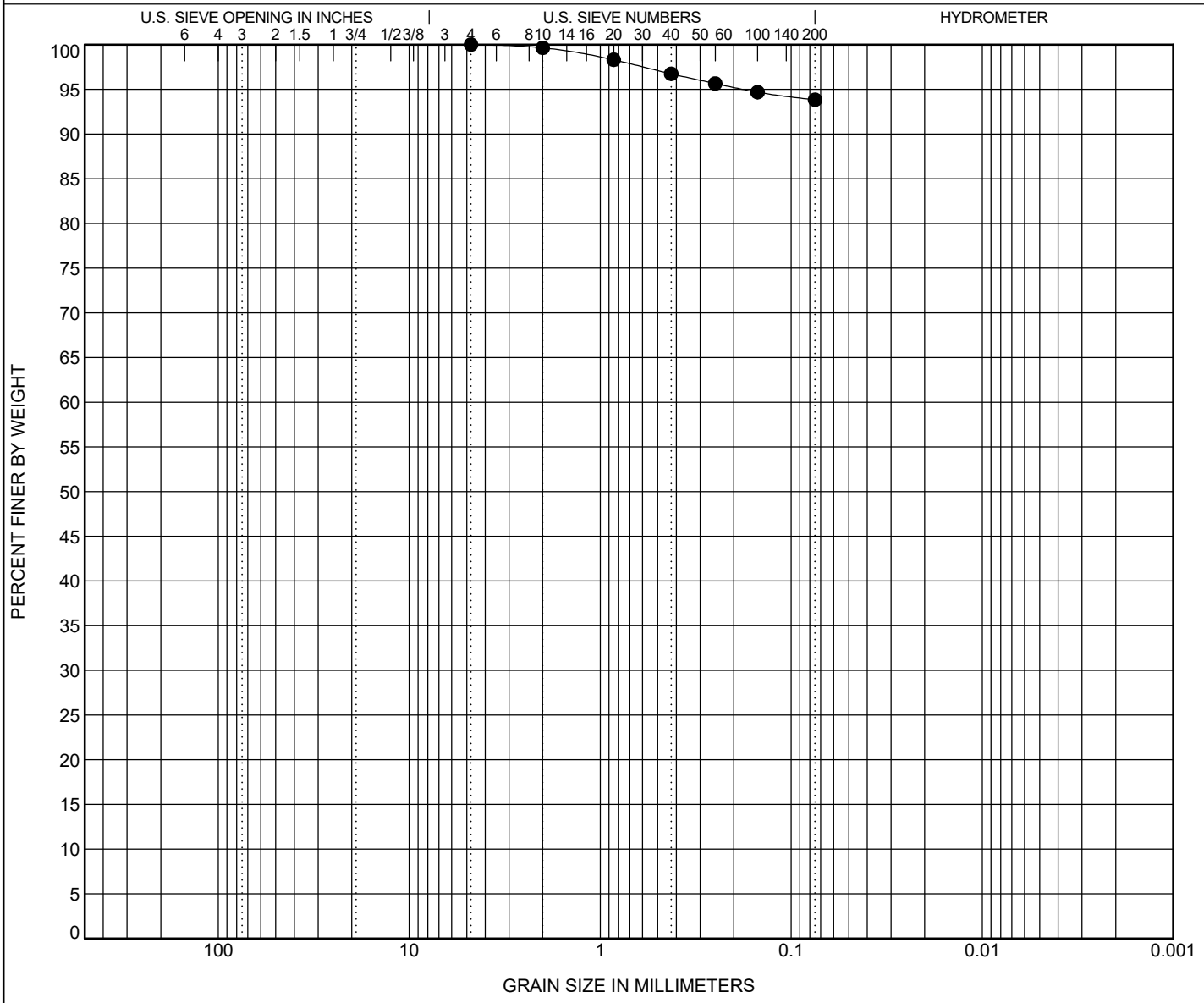

COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen Identification	Classification	LL	PL	PI	Cc	Cu
●	P-6, S-2 @ 3.5' - 5.0',	Tan-Brown Lean CLAY (CL) (Decomposed Rock) {A-6, GI=11}	35	24	11		

	Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	P-6, S-2 @ 3.5' - 5.0',	4.75				0.0	6.2	93.8	

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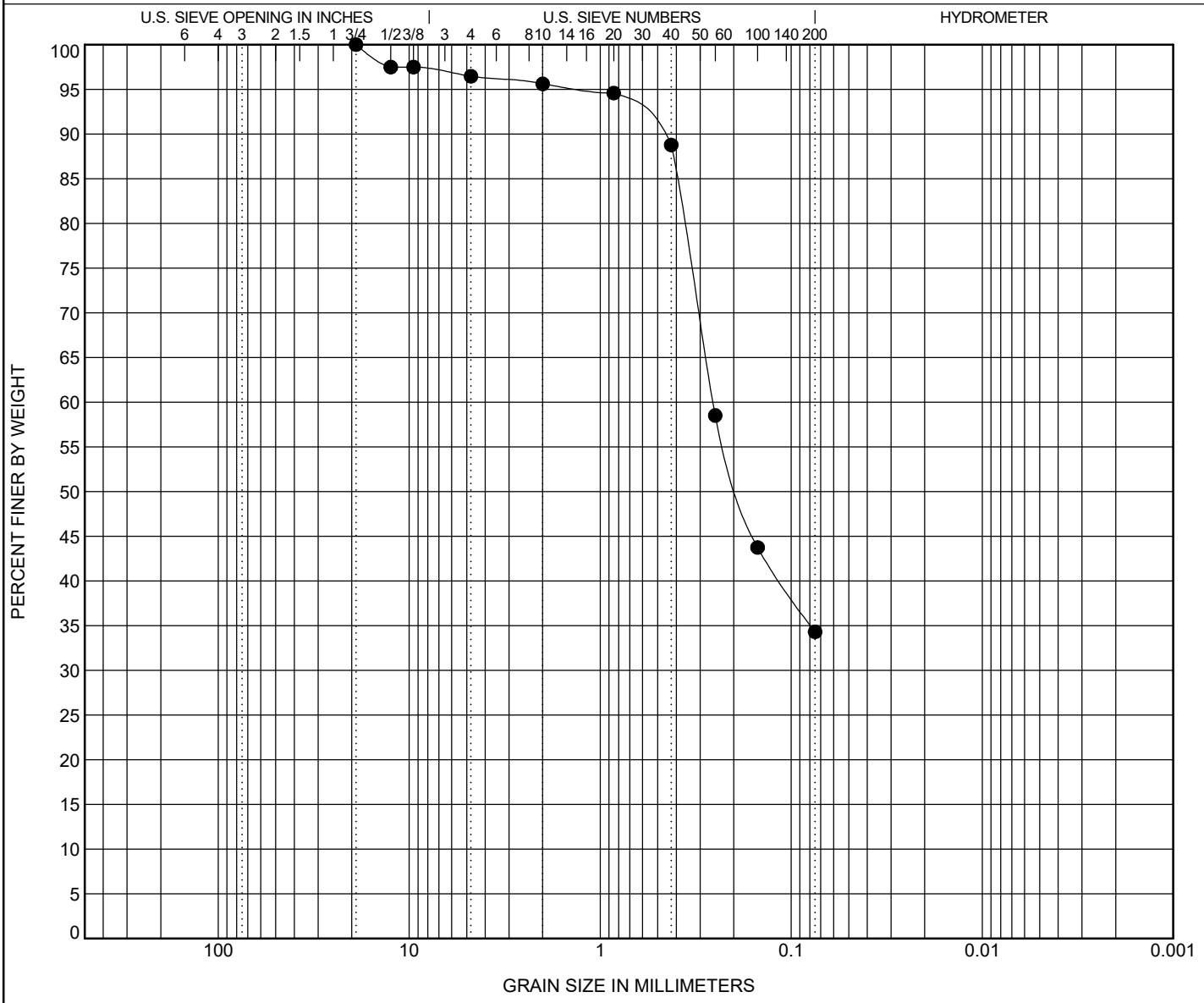

COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen Identification	Classification	LL	PL	PI	Cc	Cu
●	P-7, Bulk @ 10.0' - 15.0',	**Brown Silty SAND (SM) (DR/HWR Mix) {A-2-4, GI=0}**	**NP**	**NP**	**NP**		

	Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	P-7, Bulk @ 10.0' - 15.0',	**19**	**0.257**			**3.5**	**62.2**	**34.3**	

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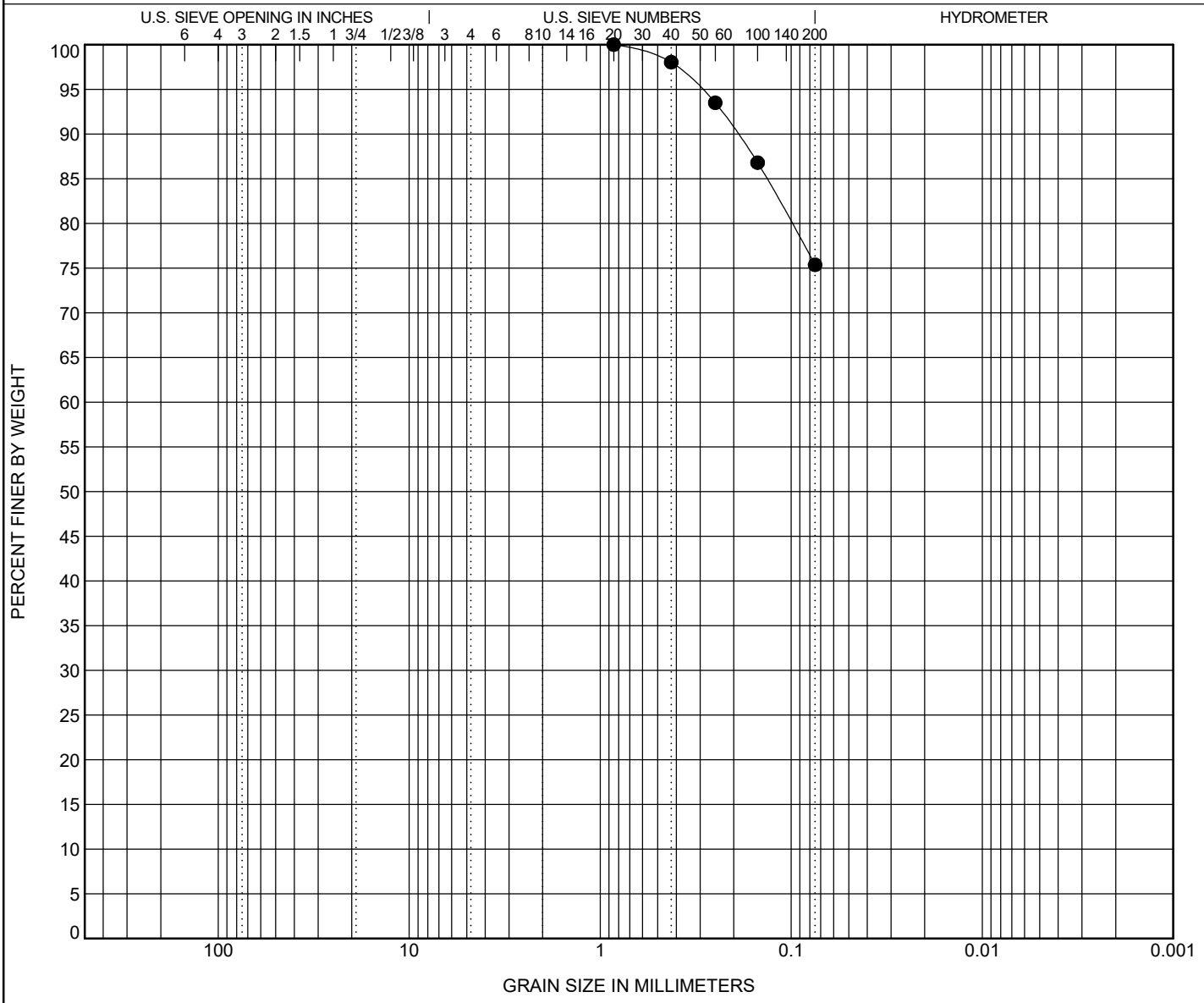

COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen Identification	Classification	LL	PL	PI	Cc	Cu
●	P-7, S-5 @ 18.5' - 20.0',	Orangish Brown Lean CLAY with Sand (CL) (Decomposed Rock) {A-6, GI=7}	29	17	12		

	Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	P-7, S-5 @ 18.5' - 20.0',	0.85				0.0	24.6	75.4	

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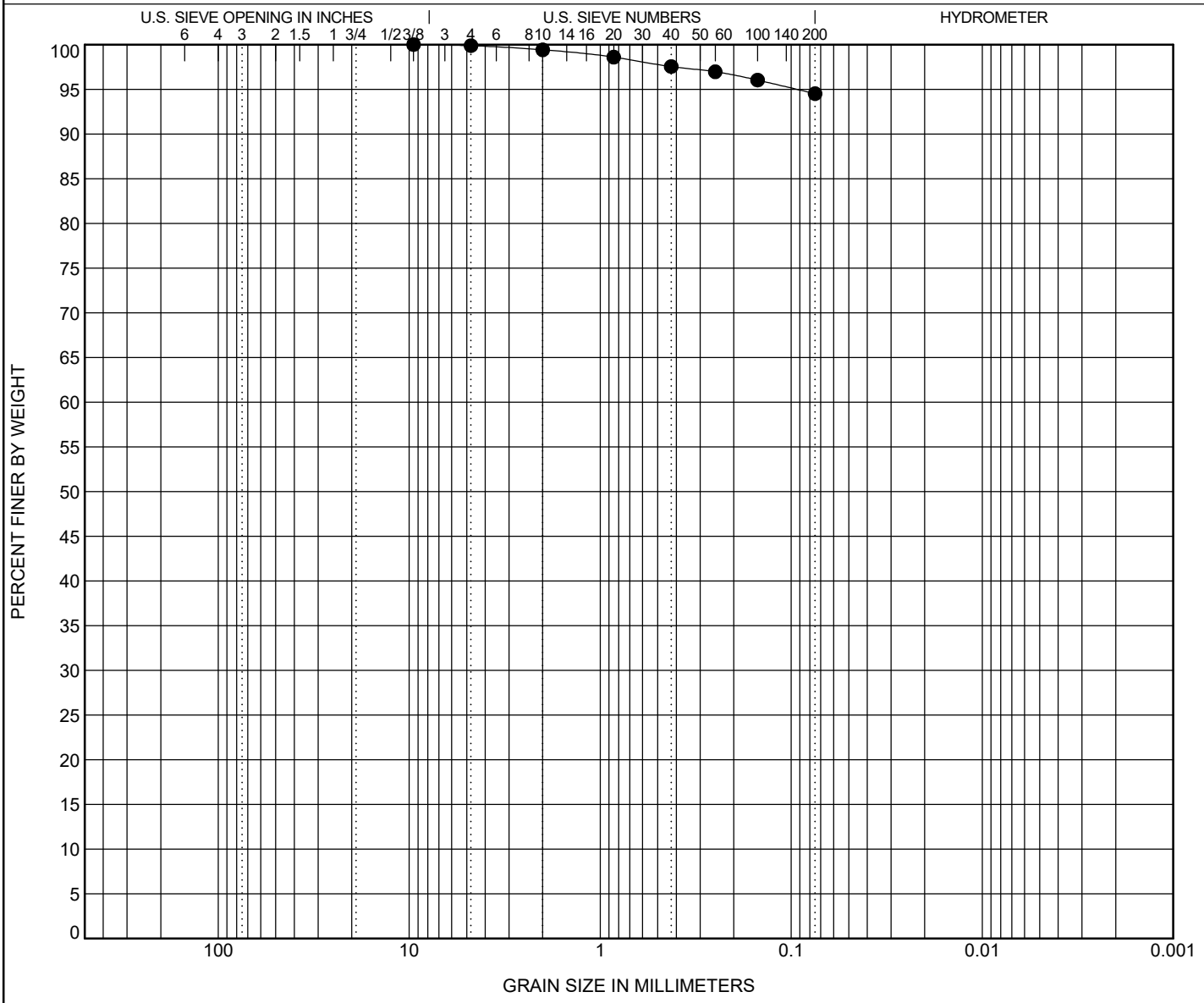

COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen Identification	Classification	LL	PL	PI	Cc	Cu
●	P-8, S-10 @ 43.5' - 45.0',	**Tan Lean CLAY (CL) (Decomposed Rock) {A-6, GI=11}**	**31**	**19**	**12**		

	Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	P-8, S-10 @ 43.5' - 45.0',	**9.5**				**0.1**	**5.4**	**94.5**	

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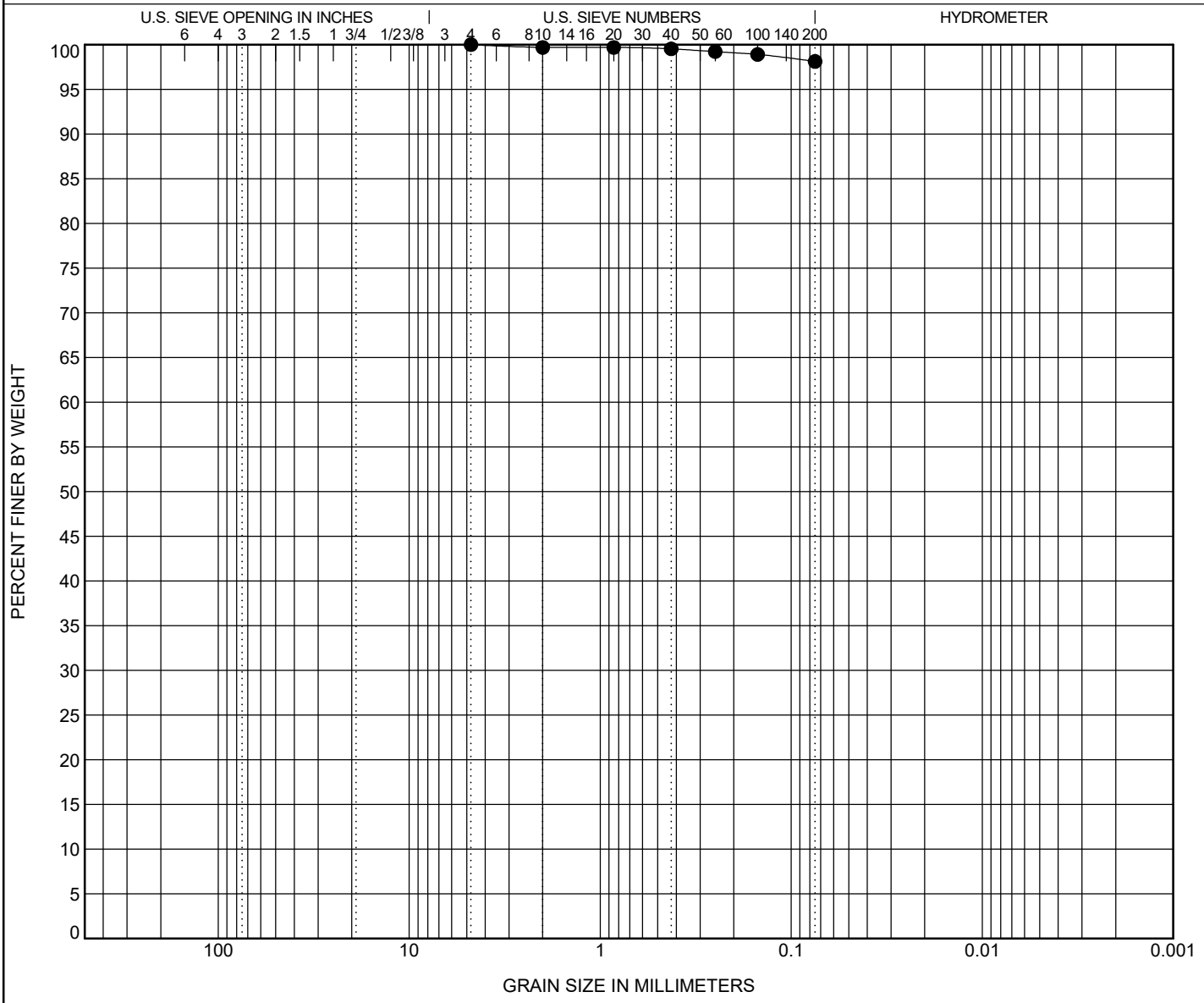

COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen Identification	Classification	LL	PL	PI	Cc	Cu
●	P-12, S-4 @ 13.5' - 15.0',	**Brown Lean CLAY (CL) (Decomposed Rock) {A-6, GI=13}**	**34**	**21**	**13**		

	Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	P-12, S-4 @ 13.5' - 15.0',	**4.75**				**0.0**	**1.9**	**98.1**	

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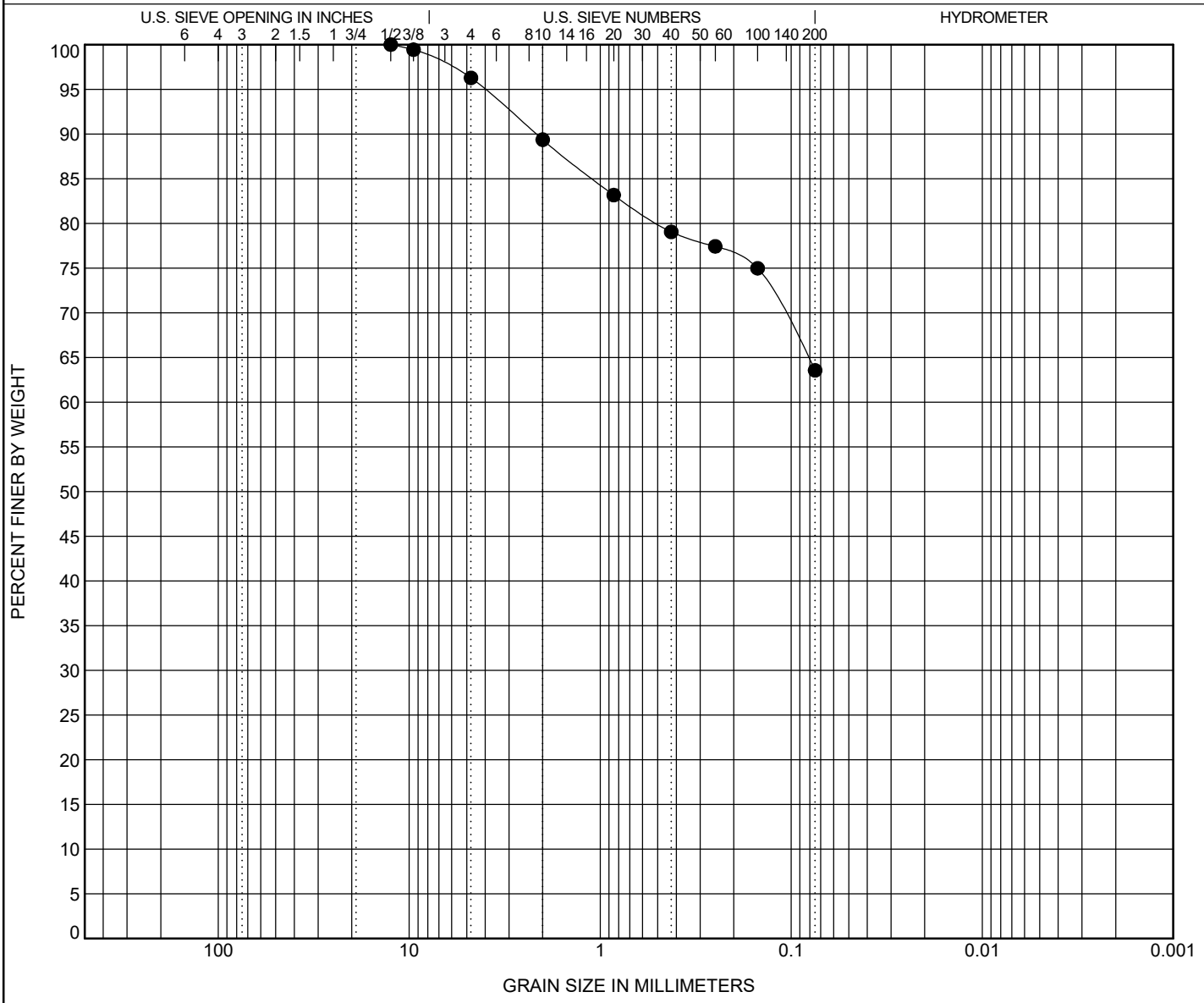

COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen Identification	Classification	LL	PL	PI	Cc	Cu
●	P-12, Bulk @ 20.0' - 25.0',	**Brown Sandy Lean CLAY (CL) (Decomposed Rock) {A-4, GI=3}**	**25**	**17**	**8**		

	Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	P-12, Bulk @ 20.0' - 25.0',	**12.5**				**3.7**	**32.7**	**63.6**	

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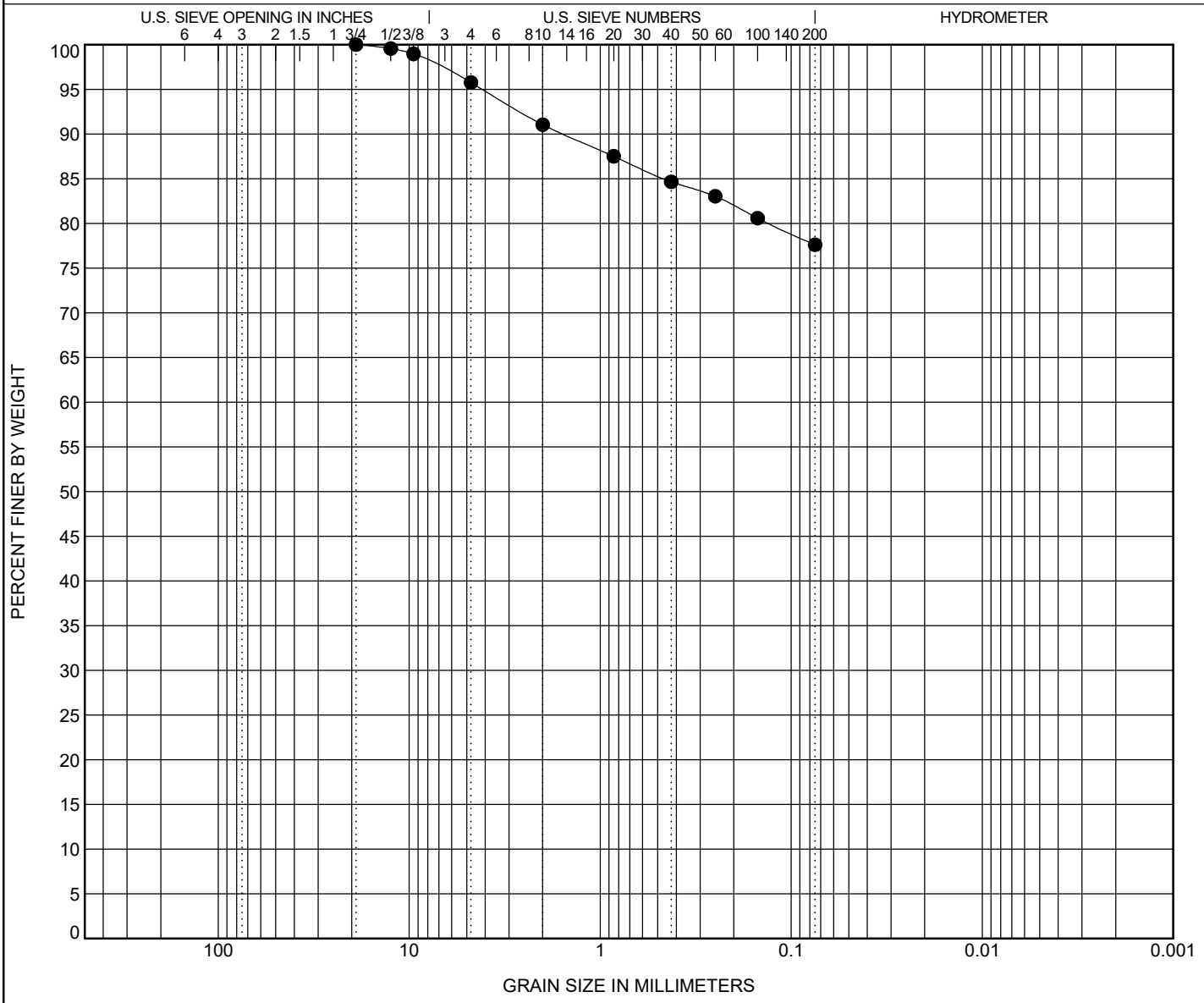

COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen Identification	Classification	LL	PL	PI	Cc	Cu
●	P-13, Bulk @ 0.0' - 5.0',	Reddish Brown Fat CLAY with Sand (CH) (Residual) {A-7-6, GI=22}	51	23	28		

	Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	P-13, Bulk @ 0.0' - 5.0',	19				4.2	18.2	77.6	

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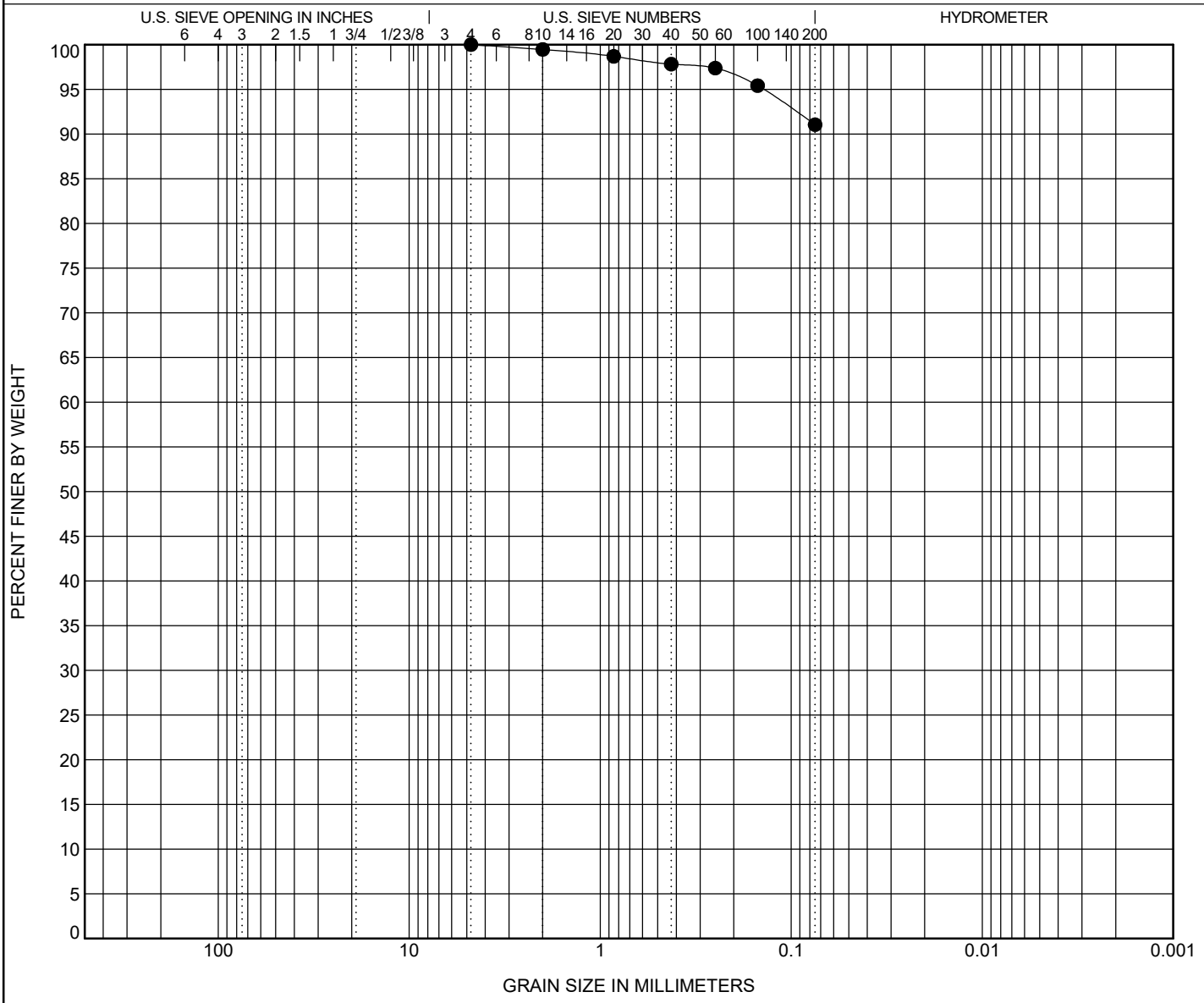

COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen Identification	Classification	LL	PL	PI	Cc	Cu
●	P-13, S-4 @ 13.5' - 15.0',	**Tan & Purple Lean CLAY (CL) (Decomposed Rock) {A-4, GI=7}**	**26**	**17**	**9**		

	Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	P-13, S-4 @ 13.5' - 15.0',	**4.75**				**0.0**	**9.0**	**91.0**	

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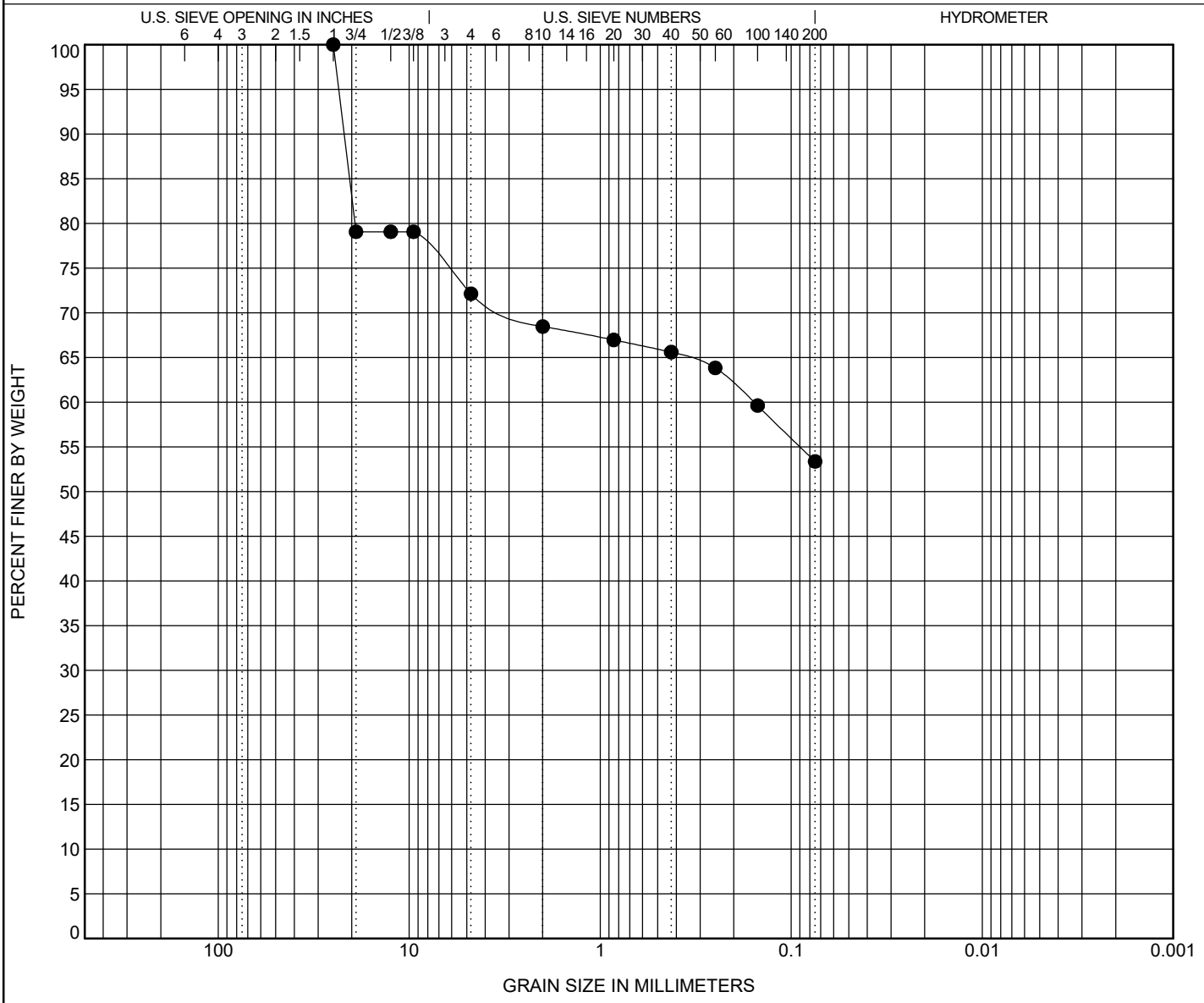

COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen Identification	Classification	LL	PL	PI	Cc	Cu
●	P-14, S-3 @ 8.5' - 10.0',	Tannish Brown Lean CLAY with Sand and Rock Fragments (CL) (Residual) {A-6, GI=3}	29	18	11		

	Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	P-14, S-3 @ 8.5' - 10.0',	25	0.157			27.9	18.8	53.4	

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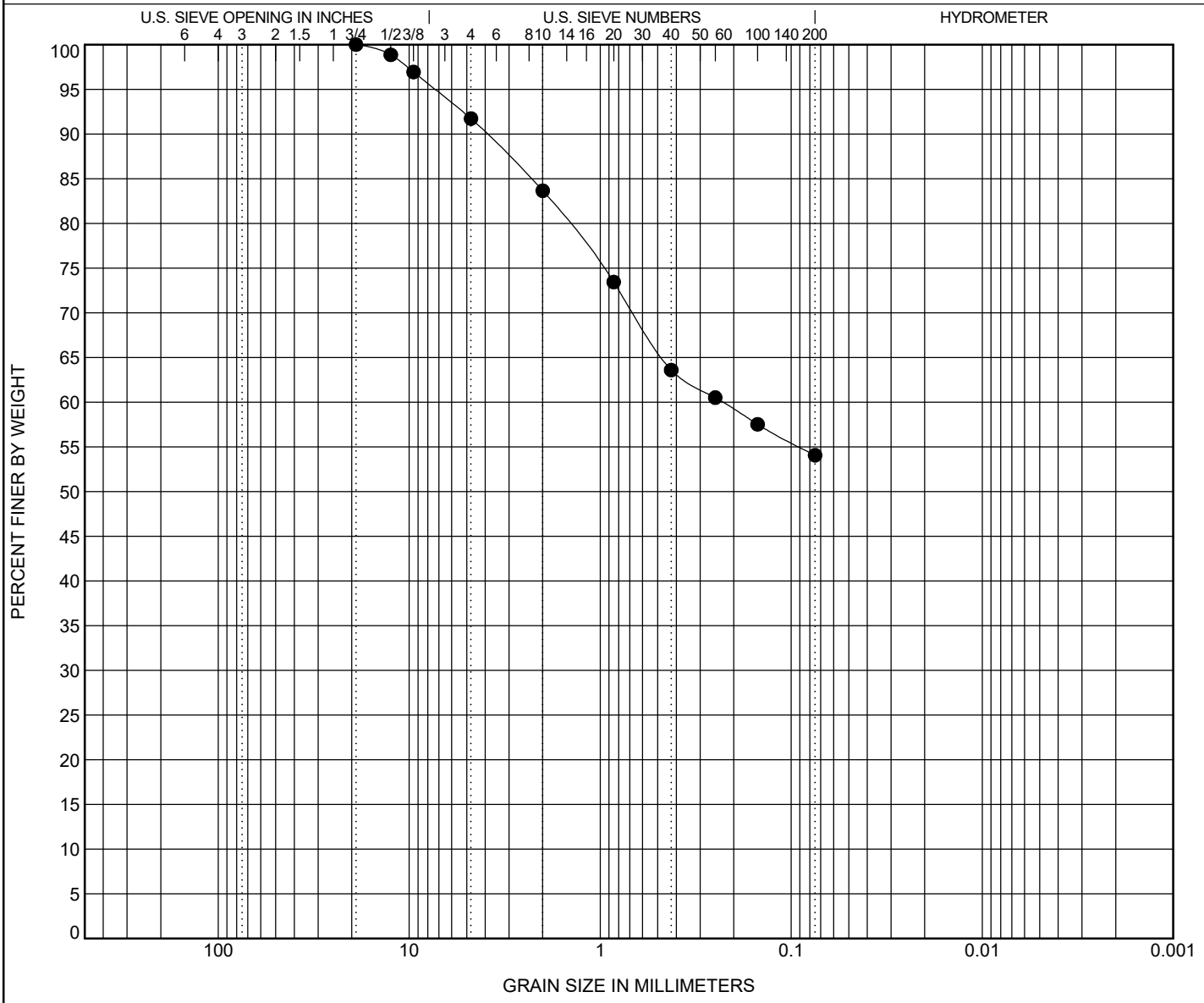

COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen Identification	Classification	LL	PL	PI	Cc	Cu
●	P-14, Bulk @ 30.0' - 35.0',	Bluish Gray to Brown-Tan Red Sandy Lean CLAY (CL) (Highly Weathered Rock) {A-4, GI=2}	25	15	10		

	Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	P-14, Bulk @ 30.0' - 35.0',	19	0.229			8.3	37.7	54.1	

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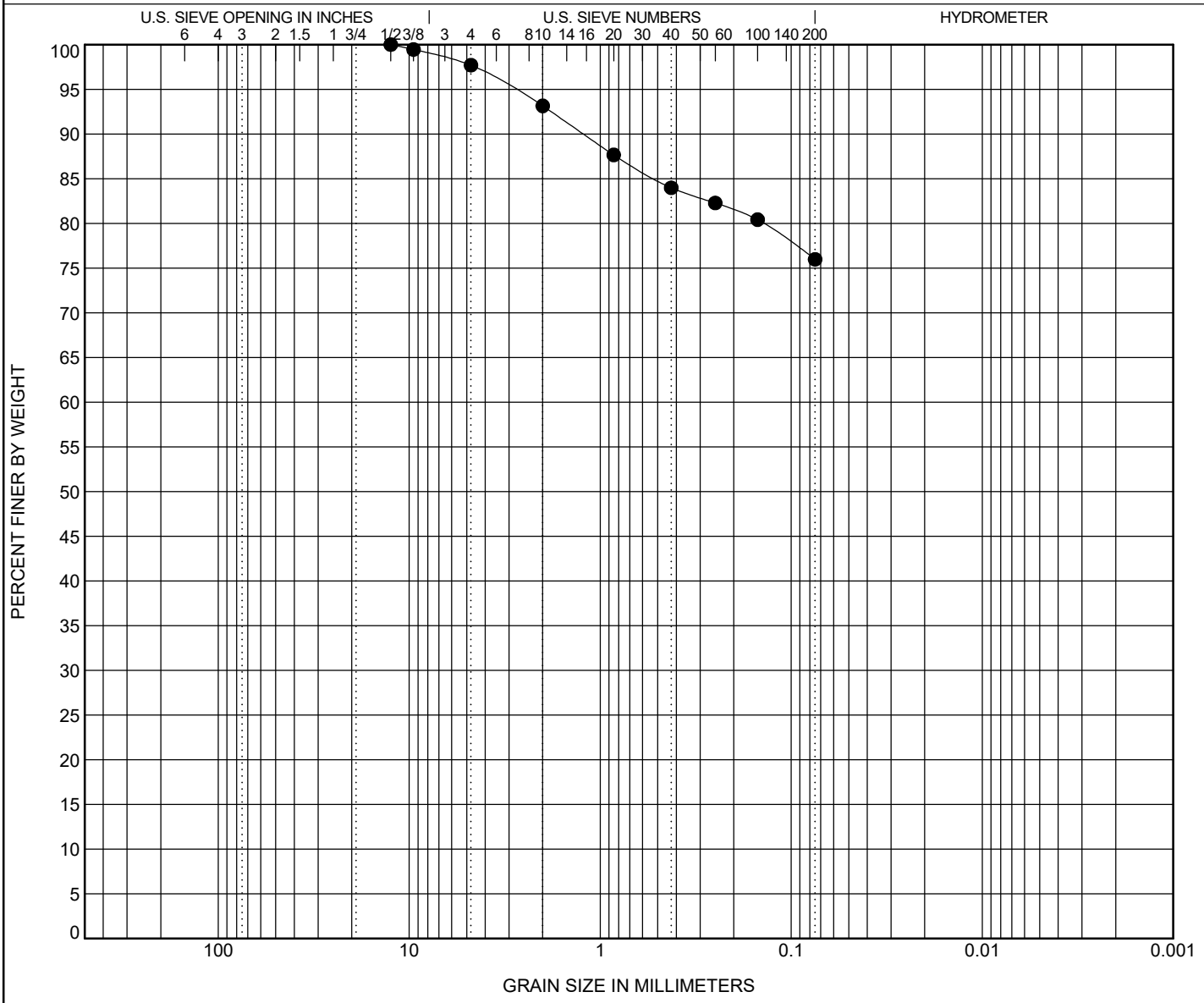

COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen Identification	Classification	LL	PL	PI	Cc	Cu
●	P-15, Bulk @ 30.0' - 35.0',	Gray Lean CLAY with Sand (CL) (Highly Weathered Rock) {A-6, GI=9}	31	17	14		

	Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	P-15, Bulk @ 30.0' - 35.0',	12.5				2.3	21.7	76.0	

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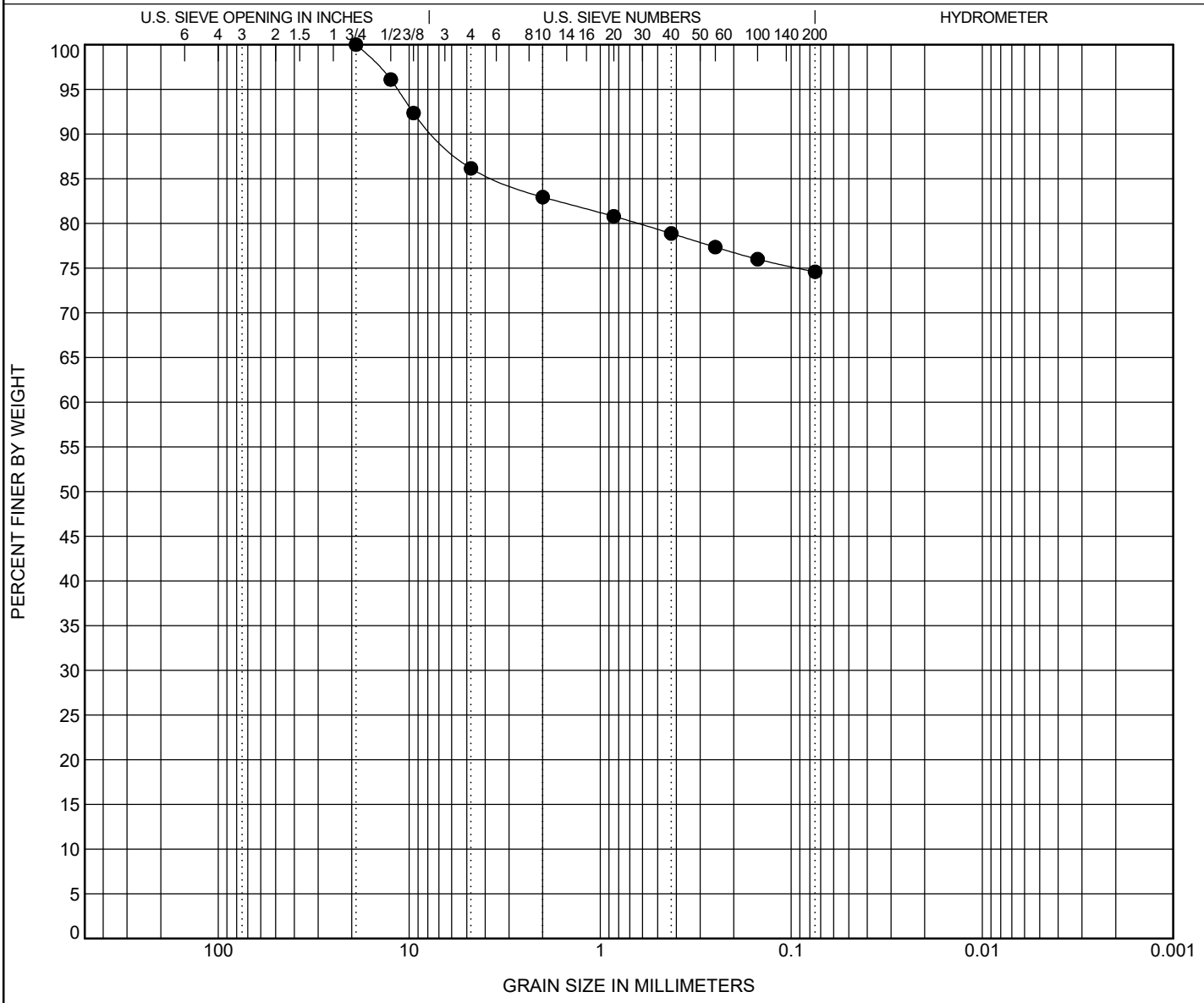

COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen Identification	Classification	LL	PL	PI	Cc	Cu
●	P-16, Bulk @ 2.0' - 6.0',	Red-Brown to Brown Fat CLAY with Rock Fragments (CH) (Residual) {A-7-6, GI=27}	57	21	36		

	Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	P-16, Bulk @ 2.0' - 6.0',	19				13.8	11.6	74.6	

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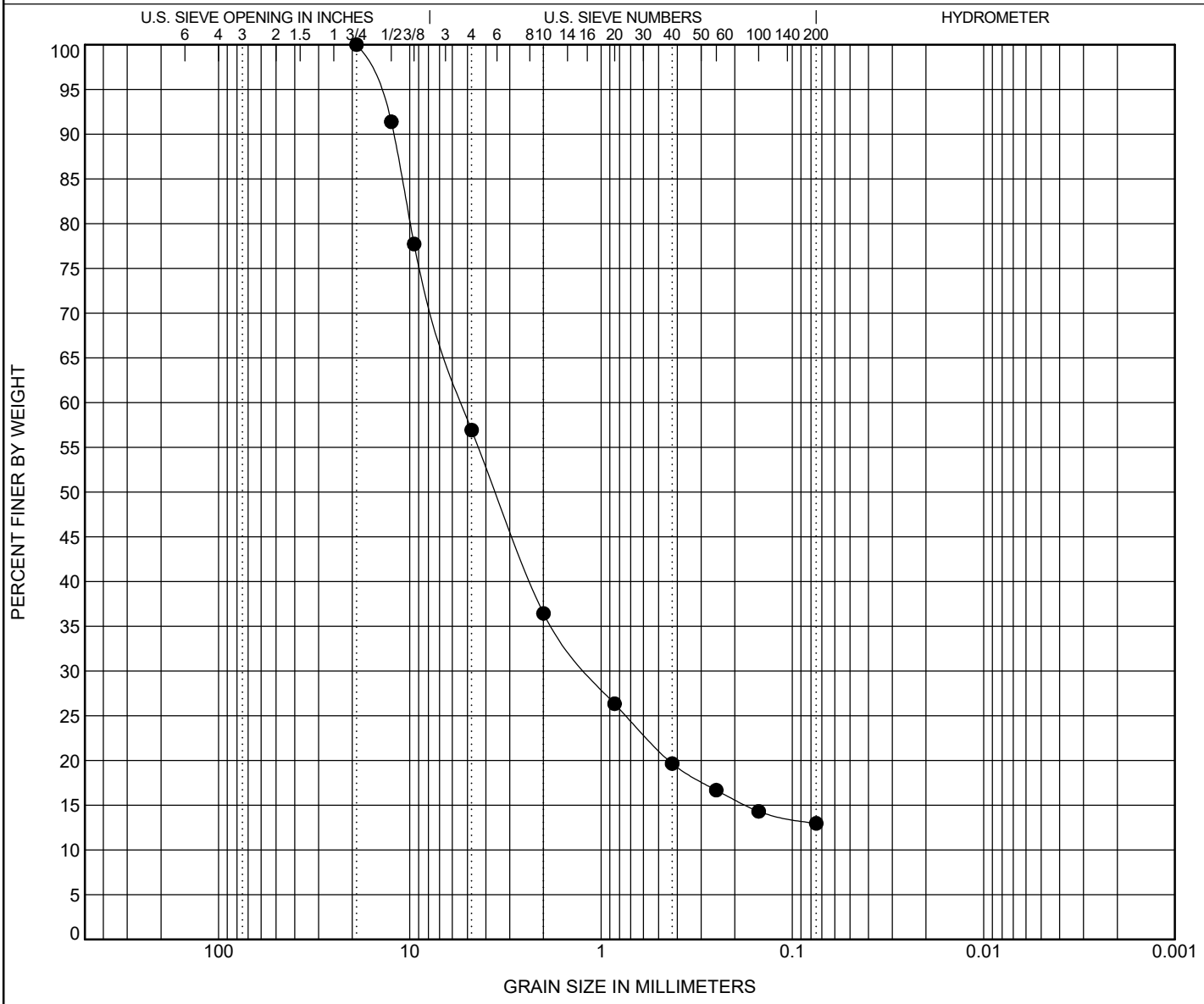

COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen Identification	Classification	LL	PL	PI	Cc	Cu
●	P-16, S-12 @ 43.5' - 45.0',	Gray Silty, Clayey SAND with Rock Fragments (SC-SM) (Highly Weathered Rock) {A-2-4, GI=0}	23	16	7		

	Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	P-16, S-12 @ 43.5' - 45.0',	19	5.262	1.16		43.1	44.0	13.0	

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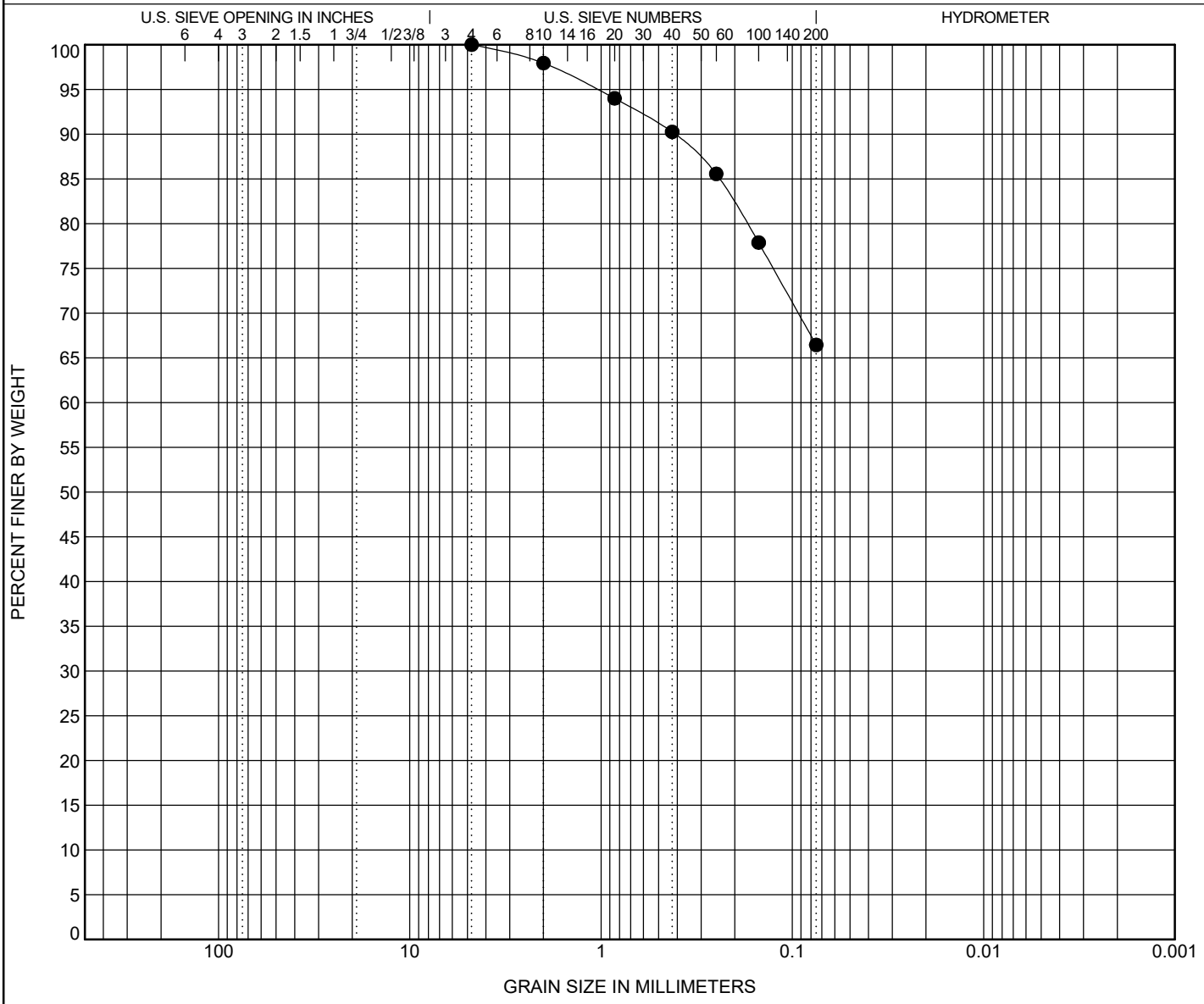

COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen Identification	Classification	LL	PL	PI	Cc	Cu
●	P-18, S-4 @ 13.5' - 15.0',	Tannish Brown Sandy Lean CLAY (CL) (Decomposed Rock) {A-6, GI=5}	28	16	12		

	Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	P-18, S-4 @ 13.5' - 15.0',	4.75				0.0	33.6	66.4	

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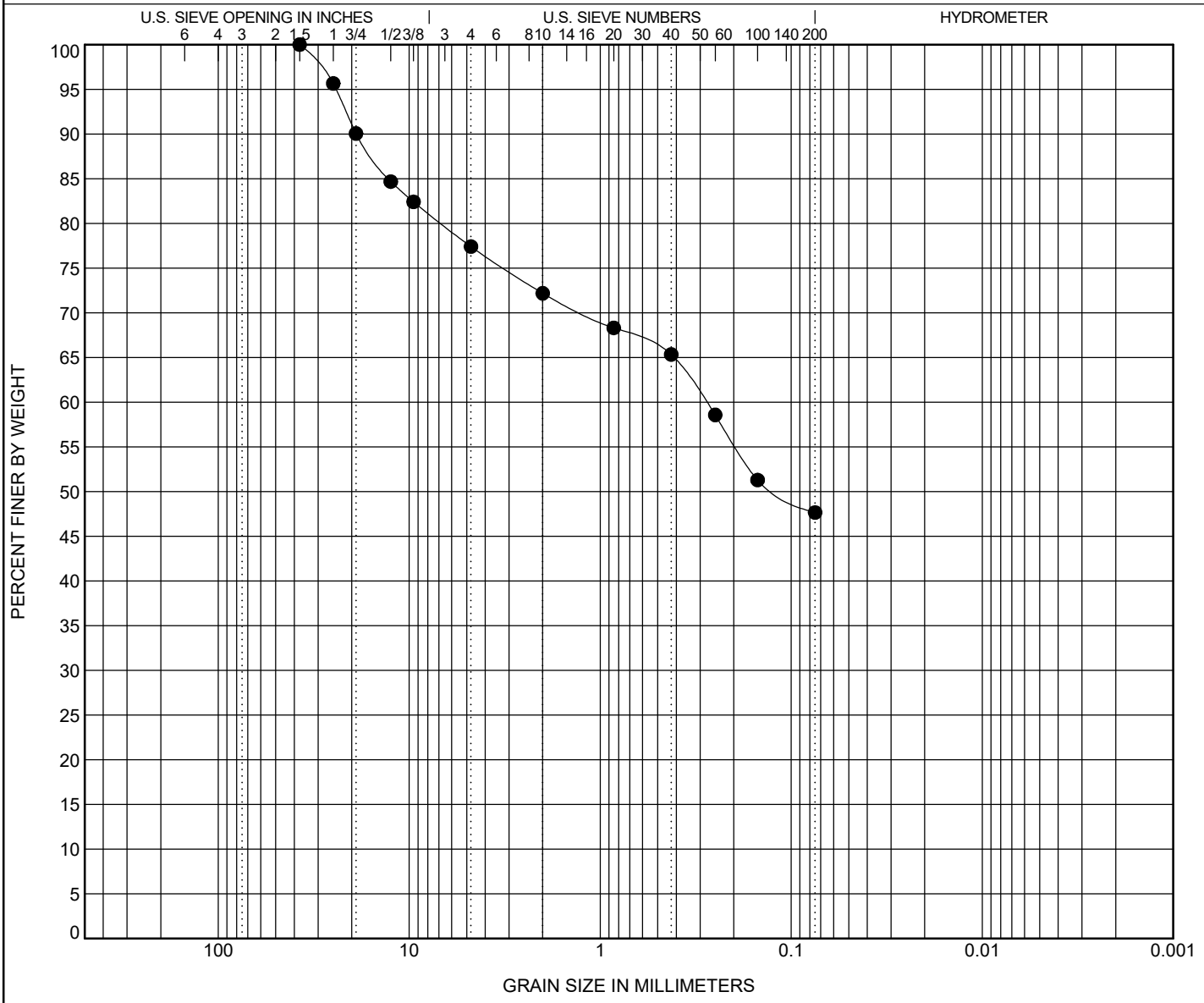

COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen Identification	Classification	LL	PL	PI	Cc	Cu
●	P-19, Bulk @ 0.0' - 5.0',	Reddish Brown Clayey SAND with Rock Fragments (SC) (Residual) {A-6, GI=3}	29	17	12		

	Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	P-19, Bulk @ 0.0' - 5.0',	37.5	0.28			22.6	29.7	47.7	

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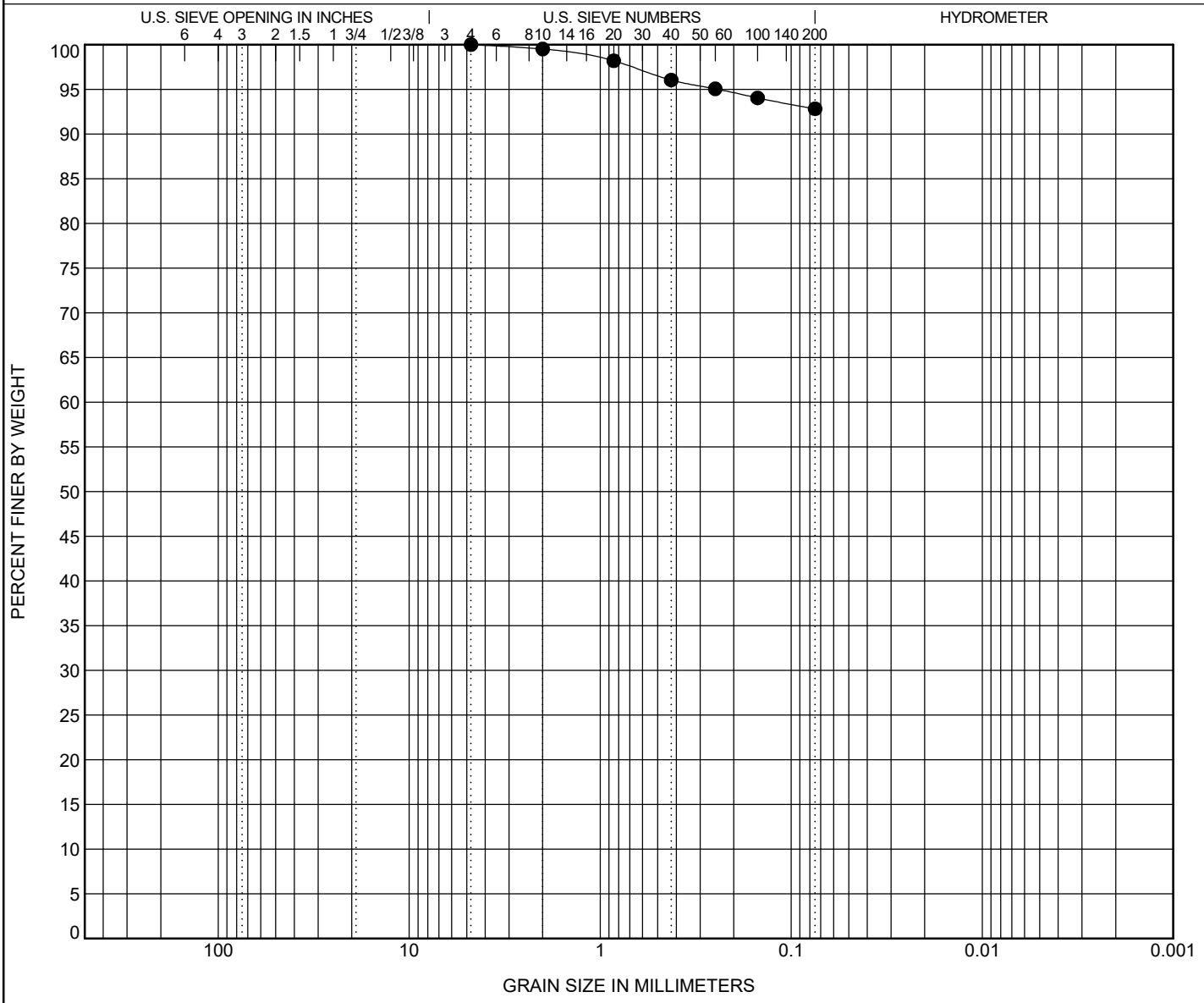

COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen Identification	Classification	LL	PL	PI	Cc	Cu
●	P-19, T-5 @ 18.5' - 20.5',	**Reddish Brown Lean CLAY (CL) (Residual) {A-6, GI=10}**	**31**	**20**	**11**		

	Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	P-19, T-5 @ 18.5' - 20.5',	**4.75**				**0.0**	**7.2**	**92.8**	

GRAIN SIZE SAM MODIFIED 17386-0 CRW RUNWAY EXTENSION EIS.GPJ MTA REDLINE.GDT 9/8/22

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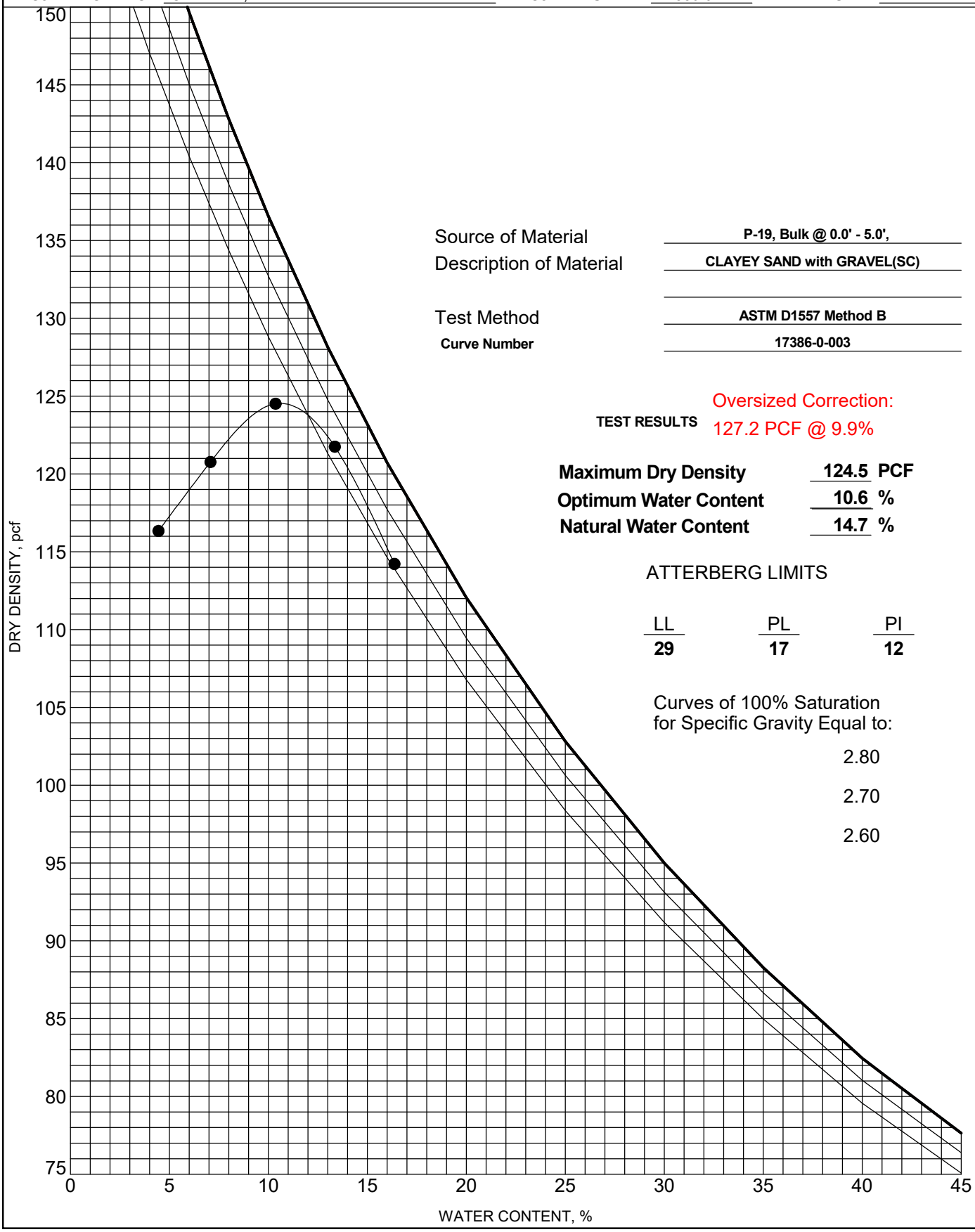
MOISTURE-DENSITY RELATIONSHIP

CLIENT Ricondo **PROJECT NAME** EIS - Yeager Airport (CRW)

PROJECT LOCATION Charleston, WV **PROJECT NUMBER** 17386-0 **DATE TESTED**



Source of Material: P-19, Bulk @ 0.0' - 5.0',

Description of Material: CLAYEY SAND with GRAVEL(SC)

Test Method: ASTM D1557 Method B

Curve Number: 17386-0-003

TEST RESULTS

Oversized Correction:
127.2 PCF @ 9.9%

Maximum Dry Density	**124.5**	**PCF**
Optimum Water Content	**10.6**	**%**
Natural Water Content	**14.7**	**%**

ATTERBERG LIMITS

LL	PL	PI
29	**17**	**12**

Curves of 100% Saturation
for Specific Gravity Equal to:

2.80

2.70

2.60

COMPACTION 17386-0 CRW RUNWAY EXTENSION EIS.GPJ MTA REDLINE.GDT 7/26/22

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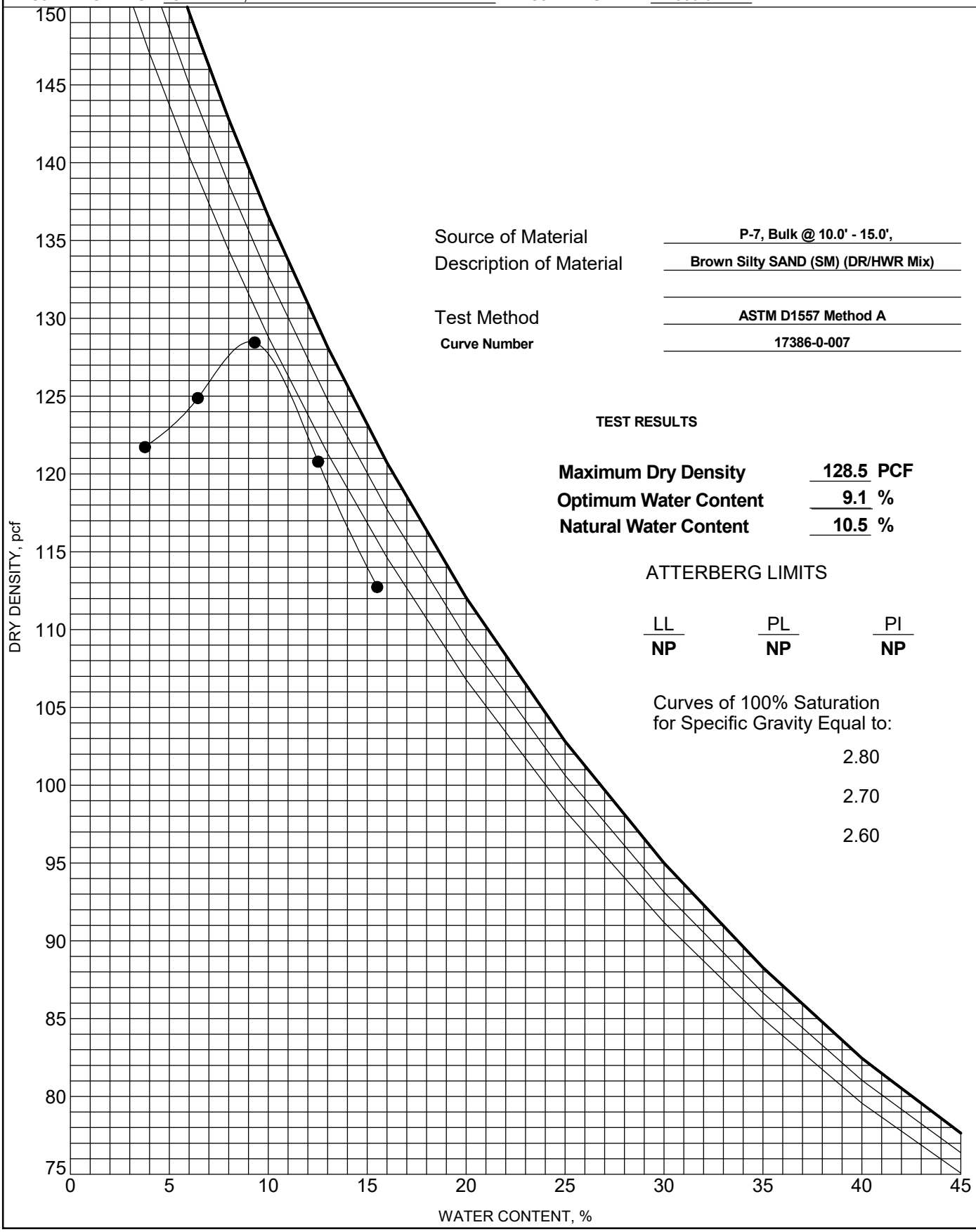
MOISTURE-DENSITY RELATIONSHIP

CLIENT Ricondo **PROJECT NAME** EIS - Yeager Airport (CRW)

PROJECT LOCATION Charleston, WV **PROJECT NUMBER** 17386-0



Source of Material: **P-7, Bulk @ 10.0' - 15.0',**

Description of Material: **Brown Silty SAND (SM) (DR/HWR Mix)**

Test Method: **ASTM D1557 Method A**

Curve Number **17386-0-007**

TEST RESULTS

Maximum Dry Density	**128.5**	**PCF**
Optimum Water Content	**9.1**	**%**
Natural Water Content	**10.5**	**%**

ATTERBERG LIMITS

LL	PL	PI
NP	**NP**	**NP**

Curves of 100% Saturation for Specific Gravity Equal to:

2.80

2.70

2.60

COMPACTION 17386-0 CRW RUNWAY EXTENSION EIS.GPJ MTA REDLINE.GDT 9/8/22

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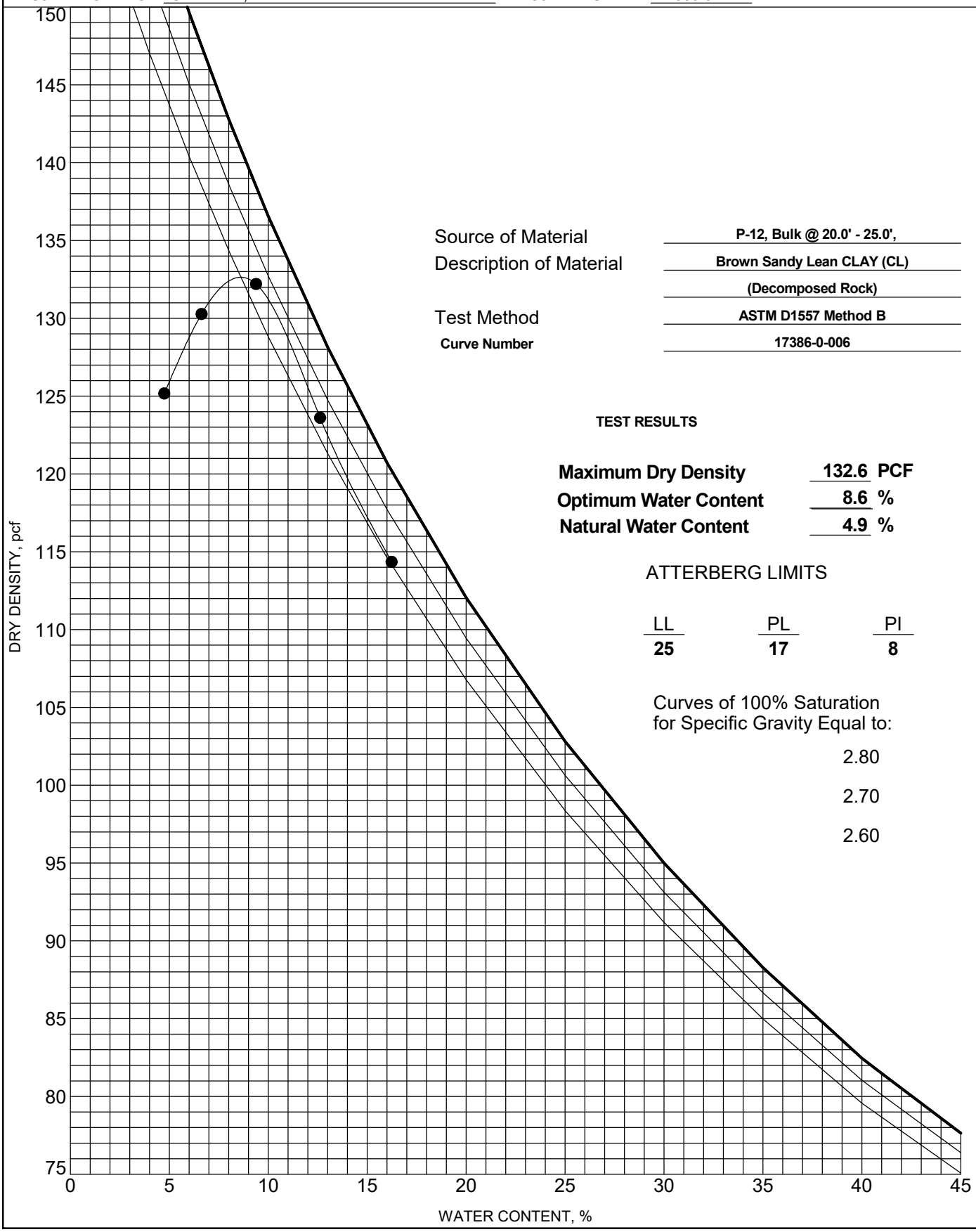
MOISTURE-DENSITY RELATIONSHIP

CLIENT Ricondo **PROJECT NAME** EIS - Yeager Airport (CRW)

PROJECT LOCATION Charleston, WV **PROJECT NUMBER** 17386-0



Source of Material: **P-12, Bulk @ 20.0' - 25.0',**

Description of Material: **Brown Sandy Lean CLAY (CL)**
(Decomposed Rock)

Test Method: **ASTM D1557 Method B**

Curve Number **17386-0-006**

TEST RESULTS

Maximum Dry Density	**132.6**	**PCF**
Optimum Water Content	**8.6**	**%**
Natural Water Content	**4.9**	**%**

ATTERBERG LIMITS

LL	PL	PI
25	**17**	**8**

Curves of 100% Saturation
for Specific Gravity Equal to:

2.80

2.70

2.60

COMPACTION 17386-0 CRW RUNWAY EXTENSION EIS.GPJ MTA REDLINE.GDT 9/8/22

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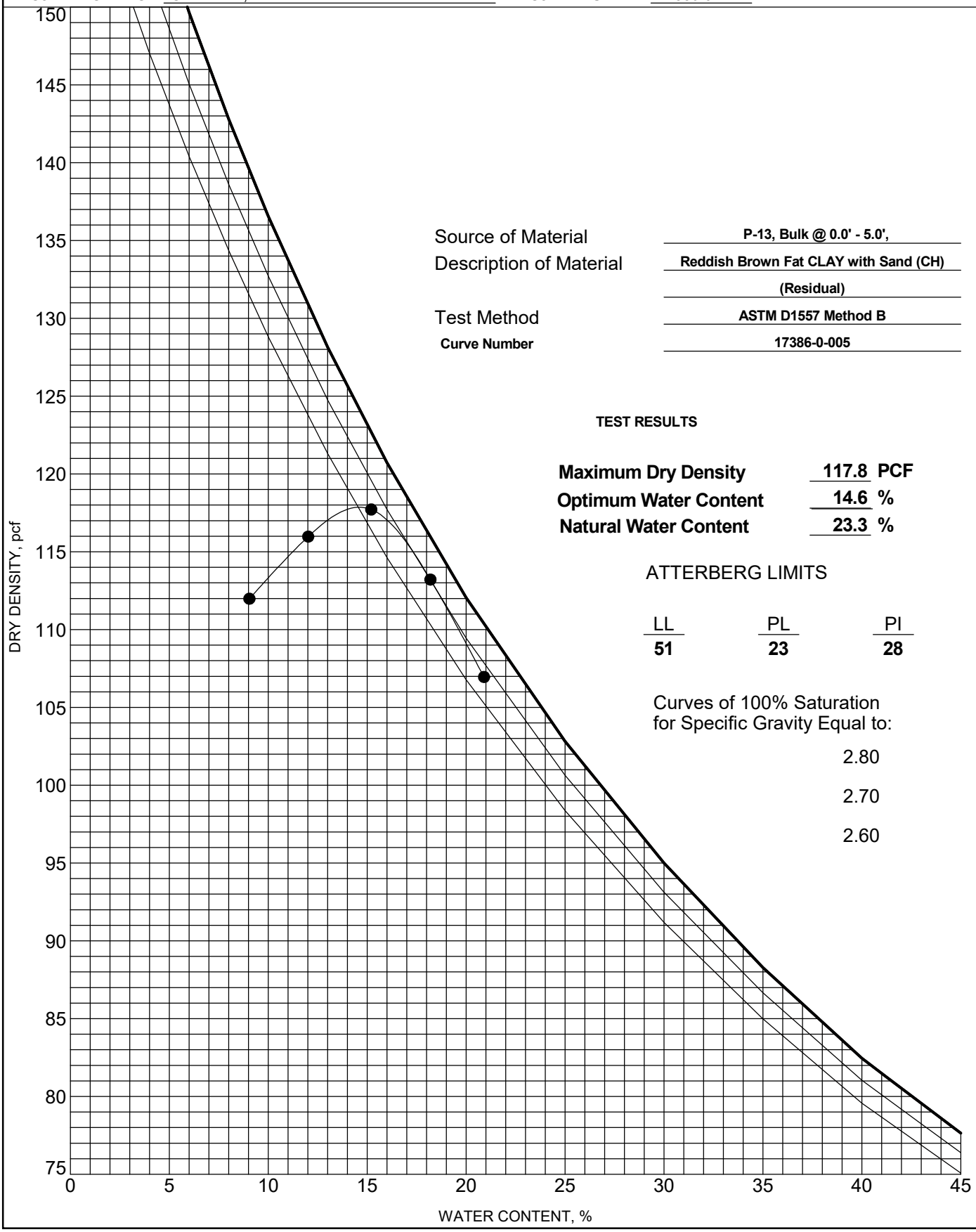
MOISTURE-DENSITY RELATIONSHIP

CLIENT Ricondo **PROJECT NAME** EIS - Yeager Airport (CRW)

PROJECT LOCATION Charleston, WV **PROJECT NUMBER** 17386-0



Source of Material: **P-13, Bulk @ 0.0' - 5.0',**

Description of Material: **Reddish Brown Fat CLAY with Sand (CH)**

(Residual)

Test Method: **ASTM D1557 Method B**

Curve Number **17386-0-005**

TEST RESULTS

Maximum Dry Density	**117.8**	**PCF**
Optimum Water Content	**14.6**	**%**
Natural Water Content	**23.3**	**%**

ATTERBERG LIMITS

LL	PL	PI
51	**23**	**28**

Curves of 100% Saturation
for Specific Gravity Equal to:

2.80

2.70

2.60

COMPACTION 17386-0 CRW RUNWAY EXTENSION EIS.GPJ MTA REDLINE.GDT 9/8/22

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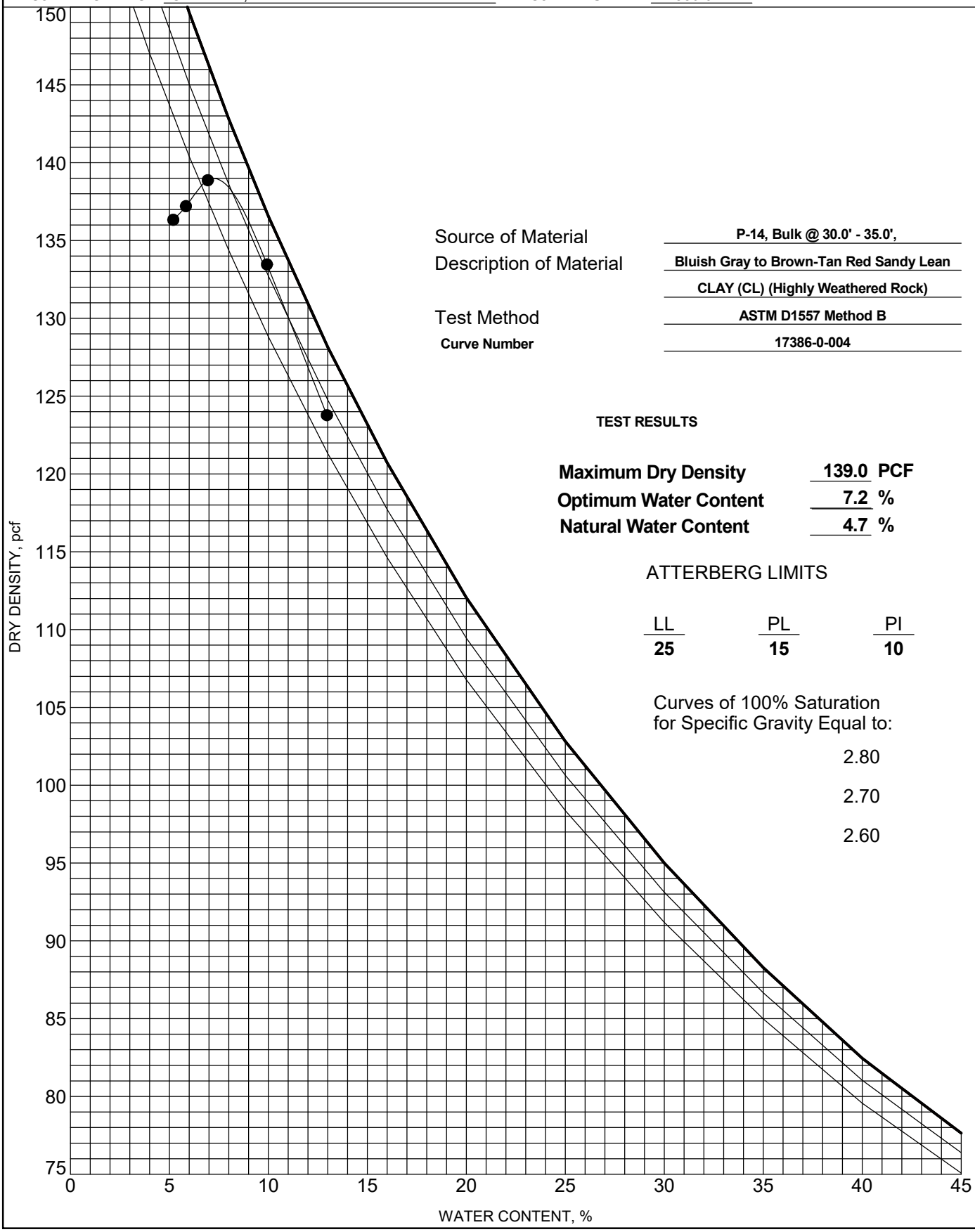
MOISTURE-DENSITY RELATIONSHIP

CLIENT Ricondo **PROJECT NAME** EIS - Yeager Airport (CRW)

PROJECT LOCATION Charleston, WV **PROJECT NUMBER** 17386-0



Source of Material	P-14, Bulk @ 30.0' - 35.0',
Description of Material	Bluish Gray to Brown-Tan Red Sandy Lean CLAY (CL) (Highly Weathered Rock)
Test Method	ASTM D1557 Method B
Curve Number	17386-0-004

TEST RESULTS

Maximum Dry Density	**139.0**	**PCF**
Optimum Water Content	**7.2**	**%**
Natural Water Content	**4.7**	**%**

ATTERBERG LIMITS

LL	PL	PI
25	**15**	**10**

Curves of 100% Saturation for Specific Gravity Equal to:

2.80

2.70

2.60

COMPACTION 17386-0 CRW RUNWAY EXTENSION EIS.GPJ MTA REDLINE.GDT 9/8/22

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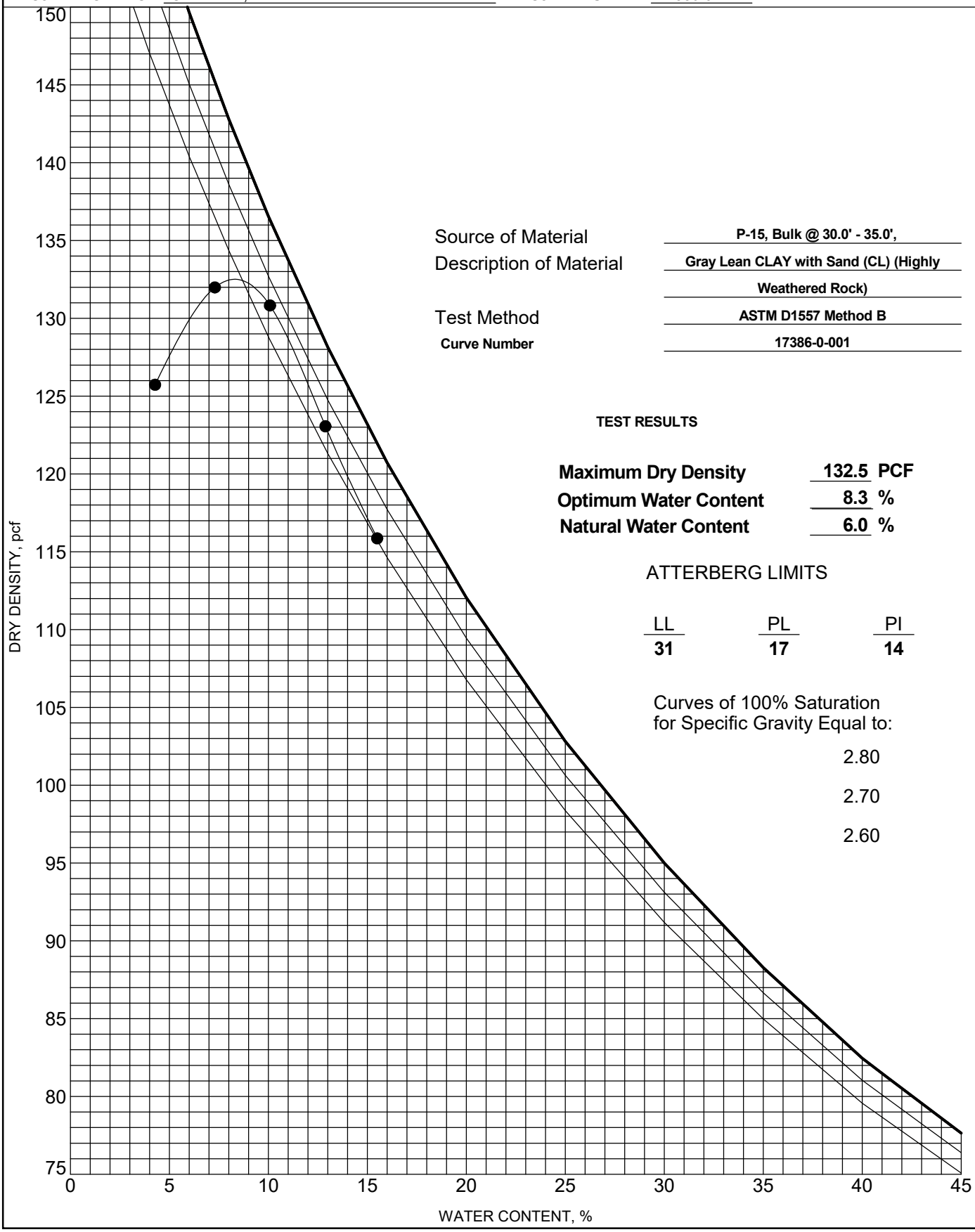
MOISTURE-DENSITY RELATIONSHIP

CLIENT Ricondo **PROJECT NAME** EIS - Yeager Airport (CRW)

PROJECT LOCATION Charleston, WV **PROJECT NUMBER** 17386-0



Source of Material: **P-15, Bulk @ 30.0' - 35.0',**

Description of Material: **Gray Lean CLAY with Sand (CL) (Highly Weathered Rock)**

Test Method: **ASTM D1557 Method B**

Curve Number **17386-0-001**

TEST RESULTS

Maximum Dry Density	**132.5**	**PCF**
Optimum Water Content	**8.3**	**%**
Natural Water Content	**6.0**	**%**

ATTERBERG LIMITS

LL	PL	PI
31	**17**	**14**

Curves of 100% Saturation for Specific Gravity Equal to:

2.80

2.70

2.60

COMPACTION 17386-0 CRW RUNWAY EXTENSION EIS.GPJ MTA REDLINE.GDT 9/8/22

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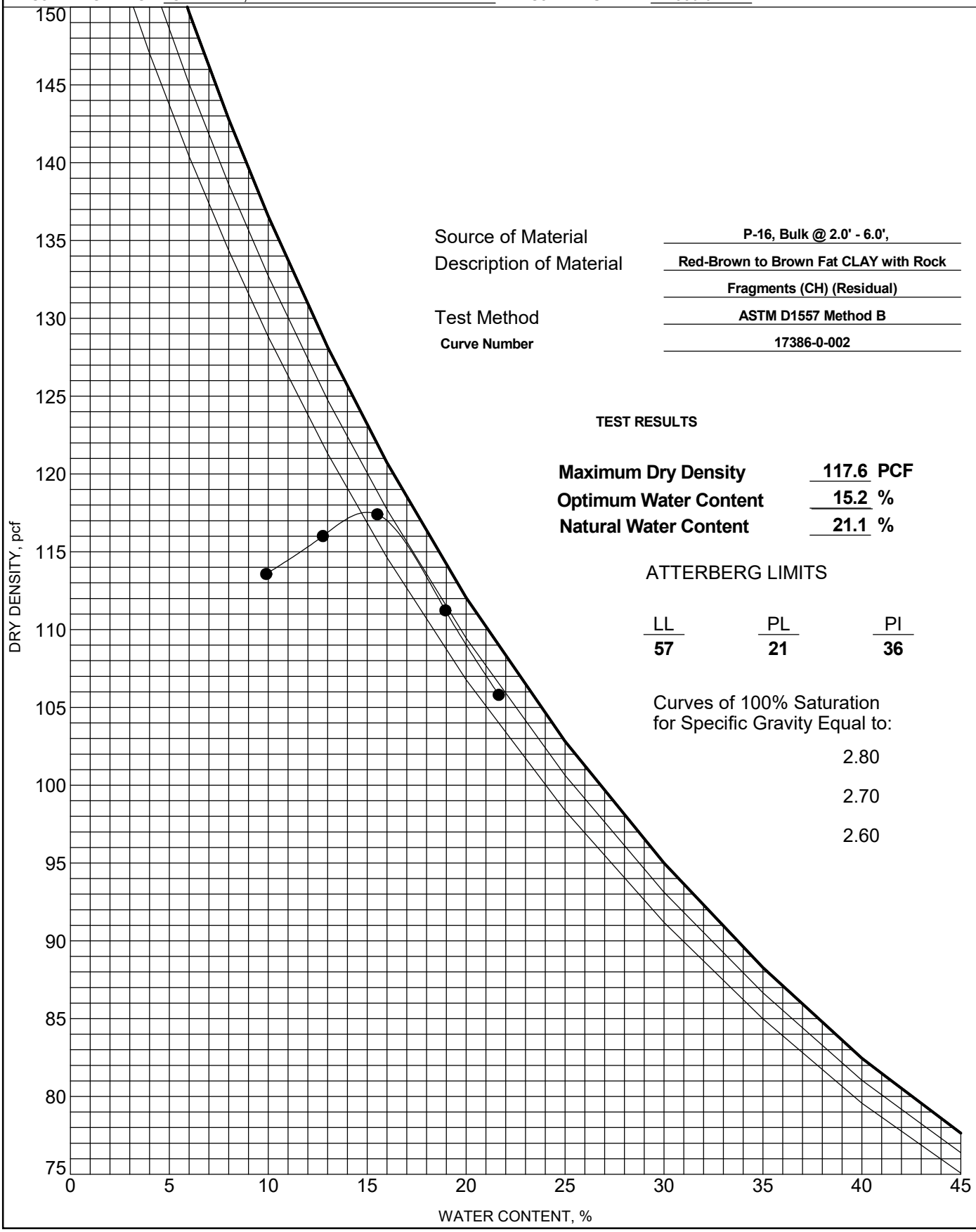
MOISTURE-DENSITY RELATIONSHIP

CLIENT Ricondo **PROJECT NAME** EIS - Yeager Airport (CRW)

PROJECT LOCATION Charleston, WV **PROJECT NUMBER** 17386-0



Source of Material: **P-16, Bulk @ 2.0' - 6.0',**

Description of Material: **Red-Brown to Brown Fat CLAY with Rock Fragments (CH) (Residual)**

Test Method: **ASTM D1557 Method B**

Curve Number **17386-0-002**

TEST RESULTS

Maximum Dry Density	**117.6**	**PCF**
Optimum Water Content	**15.2**	**%**
Natural Water Content	**21.1**	**%**

ATTERBERG LIMITS

LL	PL	PI
57	**21**	**36**

Curves of 100% Saturation for Specific Gravity Equal to:

2.80

2.70

2.60

COMPACTION 17386-0 CRW RUNWAY EXTENSION EIS.GPJ MTA REDLINE.GDT 9/8/22

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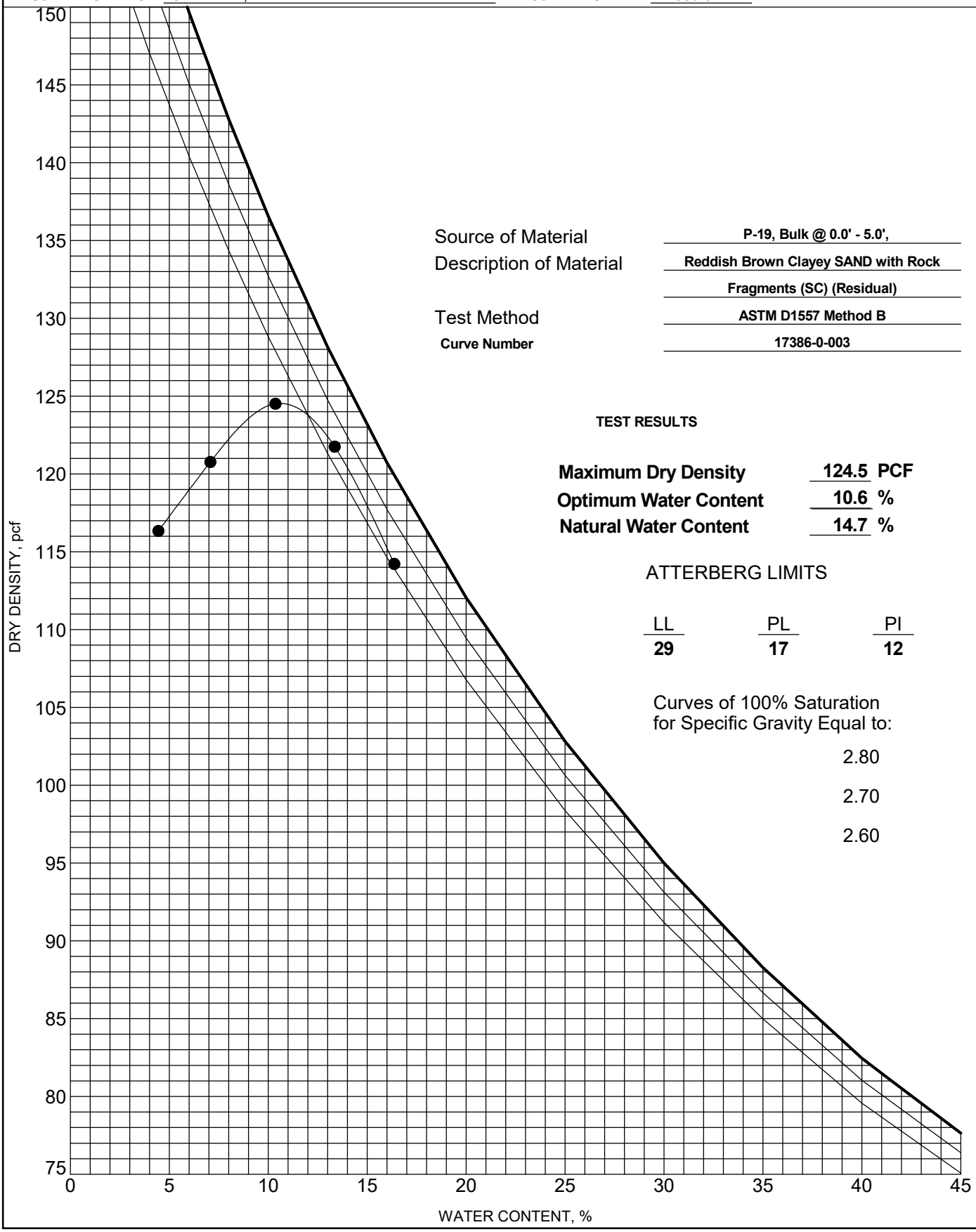
MOISTURE-DENSITY RELATIONSHIP

CLIENT Ricondo **PROJECT NAME** EIS - Yeager Airport (CRW)

PROJECT LOCATION Charleston, WV **PROJECT NUMBER** 17386-0



Source of Material: **P-19, Bulk @ 0.0' - 5.0',**

Description of Material: **Reddish Brown Clayey SAND with Rock Fragments (SC) (Residual)**

Test Method: **ASTM D1557 Method B**

Curve Number **17386-0-003**

TEST RESULTS

Maximum Dry Density	**124.5**	**PCF**
Optimum Water Content	**10.6**	**%**
Natural Water Content	**14.7**	**%**

ATTERBERG LIMITS

LL	PL	PI
29	**17**	**12**

Curves of 100% Saturation for Specific Gravity Equal to:

2.80

2.70

2.60

COMPACTION 17386-0 CRW RUNWAY EXTENSION EIS.GPJ MTA REDLINE.GDT 9/8/22

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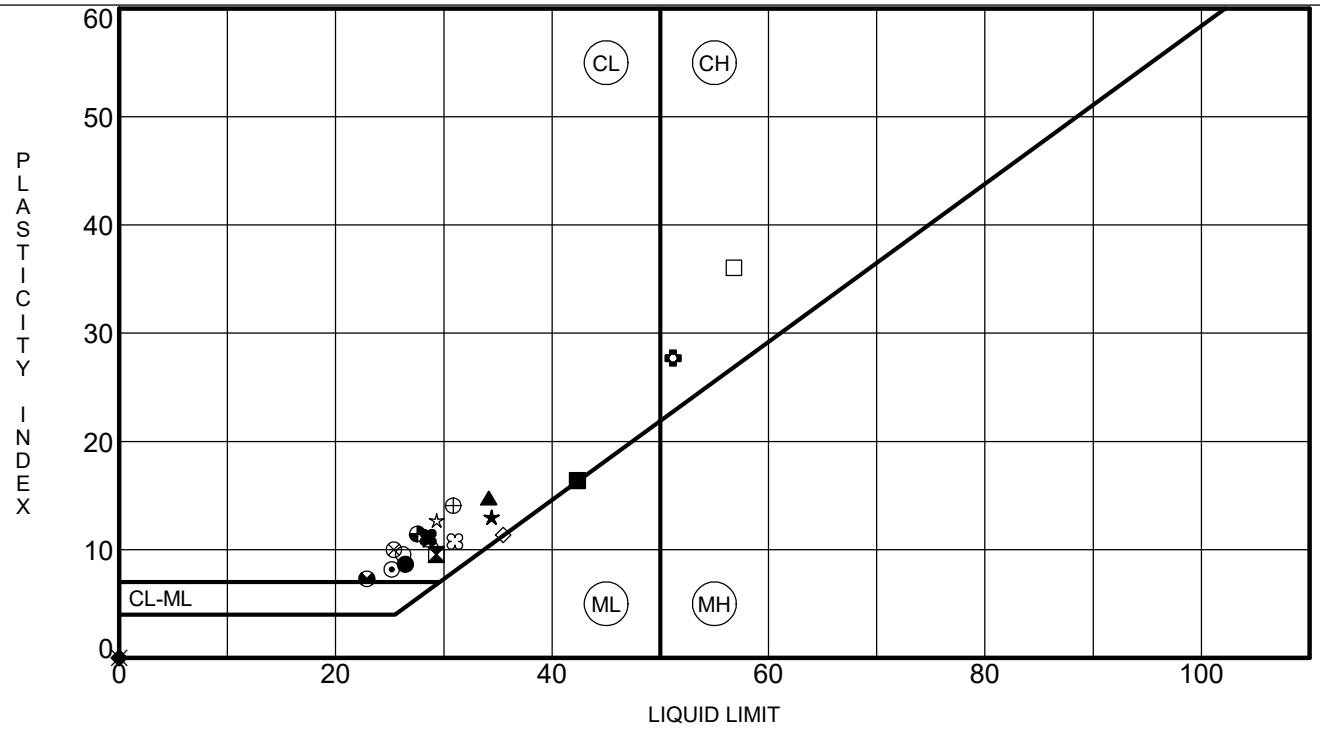
ATTERBERG LIMITS' RESULTS

TEST METHOD ASTM D4318

CLIENT Ricondo **PROJECT NAME** EIS - Yeager Airport (CRW)

PROJECT LOCATION Charleston, WV **PROJECT NUMBER** 17386-0 **DATE TESTED**



	Specimen Identification	LL	PL	PI	Fines	Classification
●	A-2, S-10 @ 43.5' - 45.0',	26	18	8	77	Bluish Gray Lean CLAY with Rock Fragments (CL) (FILL)
⧓	A-3, S-4 @ 8.5' - 10.0',	29	20	9	91	Brownish Tan Lean CLAY (CL) (FILL)
▲	A-3, Shelby @ 60.0' - 62.0',	34	19	15	69	GRAVELLY LEAN CLAY(CL)
★	P-12, S-4 @ 13.5' - 15.0',	34	21	13	98	Brown Lean CLAY (CL) (Decomposed Rock)
⊙	P-12, Bulk @ 20.0' - 25.0',	25	17	8	64	Brown Sandy Lean CLAY (CL) (Decomposed Rock)
✿	P-13, Bulk @ 0.0' - 5.0',	51	23	28	78	Reddish Brown Fat CLAY with Sand (CH) (Residual)
○	P-13, S-4 @ 13.5' - 15.0',	26	17	9	91	Tan & Purple Lean CLAY (CL) (Decomposed Rock)
△	P-14, S-3 @ 8.5' - 10.0',	29	18	11	53	Tannish Brown Lean CLAY with Sand and Rock Fragments (CL) (Residual)
⊗	P-14, Bulk @ 30.0' - 35.0',	25	15	10	54	Bluish Gray to Brown-Tan Red Sandy Lean CLAY (CL) (Highly Weathered Rock)
⊕	P-15, Bulk @ 30.0' - 35.0',	31	17	14	76	Gray Lean CLAY with Sand (CL) (Highly Weathered Rock)
□	P-16, Bulk @ 2.0' - 6.0',	57	21	36	75	Red-Brown to Brown Fat CLAY with Rock Fragments (CH) (Residual)
⊠	P-16, S-12 @ 43.5' - 45.0',	23	16	7	13	Gray Silty, Clayey SAND with Rock Fragments (SC-SM) (Highly Weathered Rock)
◕	P-18, S-4 @ 13.5' - 15.0',	28	16	12	66	Tannish Brown Sandy Lean CLAY (CL) (Decomposed Rock)
☆	P-19, Bulk @ 0.0' - 5.0',	29	17	12	48	Reddish Brown Clayey SAND with Rock Fragments (SC) (Residual)
⊠	P-19, T-5 @ 18.5' - 20.5',	31	20	11	93	Reddish Brown Lean CLAY (CL) (Residual)
■	P-3, S-1 @ 0.0' - 1.5',	42	26	16	97	Brown SILT (ML) (Residual)
◆	P-4, S-1 @ 0.0' - 1.5',	NP	NP	NP	28	Gray-Brown Silty SAND with Rock Fragments (SM) (FILL)
◇	P-6, S-2 @ 3.5' - 5.0',	35	24	11	94	Tan-Brown Lean CLAY (CL) (Decomposed Rock)
⨯	P-7, Bulk @ 10.0' - 15.0',	NP	NP	NP	34	Brown Silty SAND (SM) (DR/HWR Mix)
✿	P-7, S-5 @ 18.5' - 20.0',	29	17	12	75	Orangish Brown Lean CLAY with Sand (CL) (Decomposed Rock)

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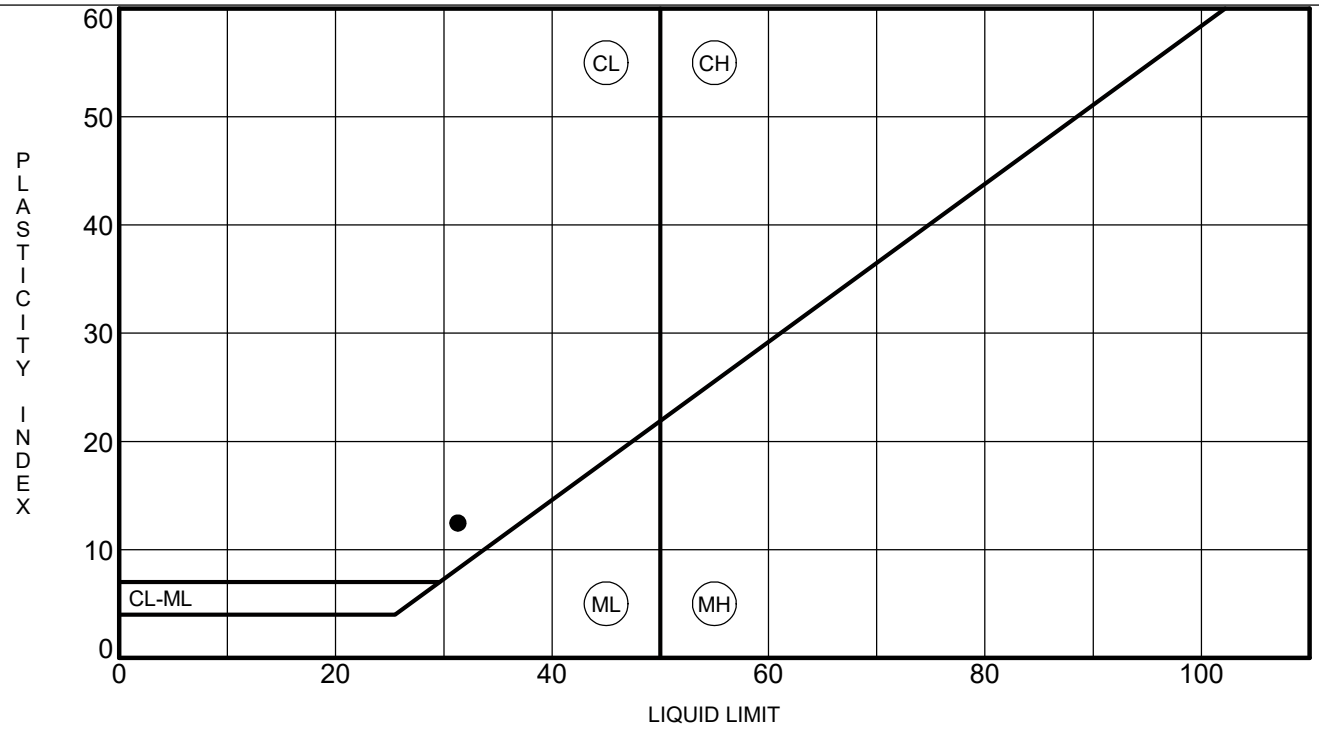
ATTERBERG LIMITS' RESULTS

TEST METHOD ASTM D4318

CLIENT Ricondo **PROJECT NAME** EIS - Yeager Airport (CRW)

PROJECT LOCATION Charleston, WV **PROJECT NUMBER** 17386-0 **DATE TESTED**



	Specimen Identification	LL	PL	PI	Fines	Classification
●	**P-8, S-10 @ 43.5' - 45.0',**	**31**	**19**	**12**	**95**	**Tan Lean CLAY (CL) (Decomposed Rock)**

ATTERBERG LIMITS 17386-0 CRW RUNWAY EXTENSION EIS.GPJ MTA REDLINE.GDT 1/6/23

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SUMMARY OF LABORATORY RESULTS

CLIENT Ricondo **PROJECT NAME** EIS - Yeager Airport (CRW)

PROJECT LOCATION Charleston, WV **PROJECT NUMBER** 17386-0 **DATE TESTED**

Borehole	Depth	Sample Number	Liquid Limit	Plastic Limit	Plasticity Index	Maximum Size (mm)	%<#200 Sieve	Class-ification	Water Content (%)	Max Dry Density (pcf)	Optimum Moisture (%)	CBR Value
A-2	43.5' - 45.0'	S-10	26	18	8	19	77	CL	9.1			
A-3	8.5' - 10.0'	S-4	29	20	9	9.5	91	CL	19.7			
A-3	60.0' - 62.0'	Shelby	34	19	15	25	69	CL	13.0			
P-10	0.0' - 1.5'	S-1							18.3			
P-10	3.5' - 5.0'	S-2							9.1			
P-10	8.5' - 10.0'	S-3							9.3			
P-10	13.5' - 15.0'	S-4							10.1			
P-12	0.0' - 1.5'	S-1							21.3			
P-12	3.5' - 5.0'	S-2							15.3			
P-12	8.5' - 10.0'	S-3							9.3			
P-12	13.5' - 15.0'	S-4	34	21	13	4.75	98	CL	10.9			
P-12	18.5' - 20.0'	S-5							11.6			
P-12	20.0' - 25.0'	Bulk	25	17	8	12.5	64	CL	4.9	132.6	8.6	
P-13	0.0' - 5.0'	Bulk	51	23	28	19	78	CH	23.3	117.8	14.6	
P-13	3.5' - 5.0'	S-2							23.0			
P-13	8.5' - 10.0'	S-3							17.8			
P-13	13.5' - 15.0'	S-4	26	17	9	4.75	91	CL	6.3			
P-13	18.5' - 20.0'	S-5							7.2			
P-14	0.0' - 1.5'	S-1							15.5			
P-14	3.5' - 5.0'	S-2							17.2			
P-14	8.5' - 10.0'	S-3	29	18	11	25	53	CL	13.7			
P-14	13.5' - 15.0'	S-4							15.0			
P-14	18.5' - 20.0'	S-5							8.4			
P-14	30.0' - 35.0'	Bulk	25	15	10	19	54	CL	4.7	139.0	7.2	
P-15	8.5' - 10.0'	S-3							18.2			
P-15	13.5' - 15.0'	S-4							10.1			
P-15	18.5' - 20.0'	S-5							9.8			
P-15	23.5' - 25.0'	S-6							6.0			
P-15	28.5' - 30.0'	S-7							4.5			
P-15	30.0' - 35.0'	Bulk	31	17	14	12.5	76	CL	6.0	132.5	8.3	
P-15	33.5' - 35.0'	S-8							3.9			
P-15	38.5' - 40.0'	S-9							5.0			
P-16	0.0' - 2.0'	S-1							28.3			
P-16	2.0' - 6.0'	Bulk	57	21	36	19	75	CH	21.1	117.6	15.2	
P-16	4.0' - 6.0'	S-3							10.9			
P-16	8.0' - 10.0'	S-5							10.1			
P-16	18.5' - 20.0'	S-7							3.4			
P-16	23.5' - 25.0'	S-8							3.6			
P-16	33.5' - 35.0'	S-10							4.4			
P-16	43.5' - 45.0'	S-12	23	16	7	19	13	SC-SM	8.3			
P-16	48.5' - 50.0'	S-13							8.0			
P-18	0.0' - 1.5'	S-1							23.9			
P-18	3.5' - 5.0'	S-2							13.9			

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SUMMARY OF LABORATORY RESULTS

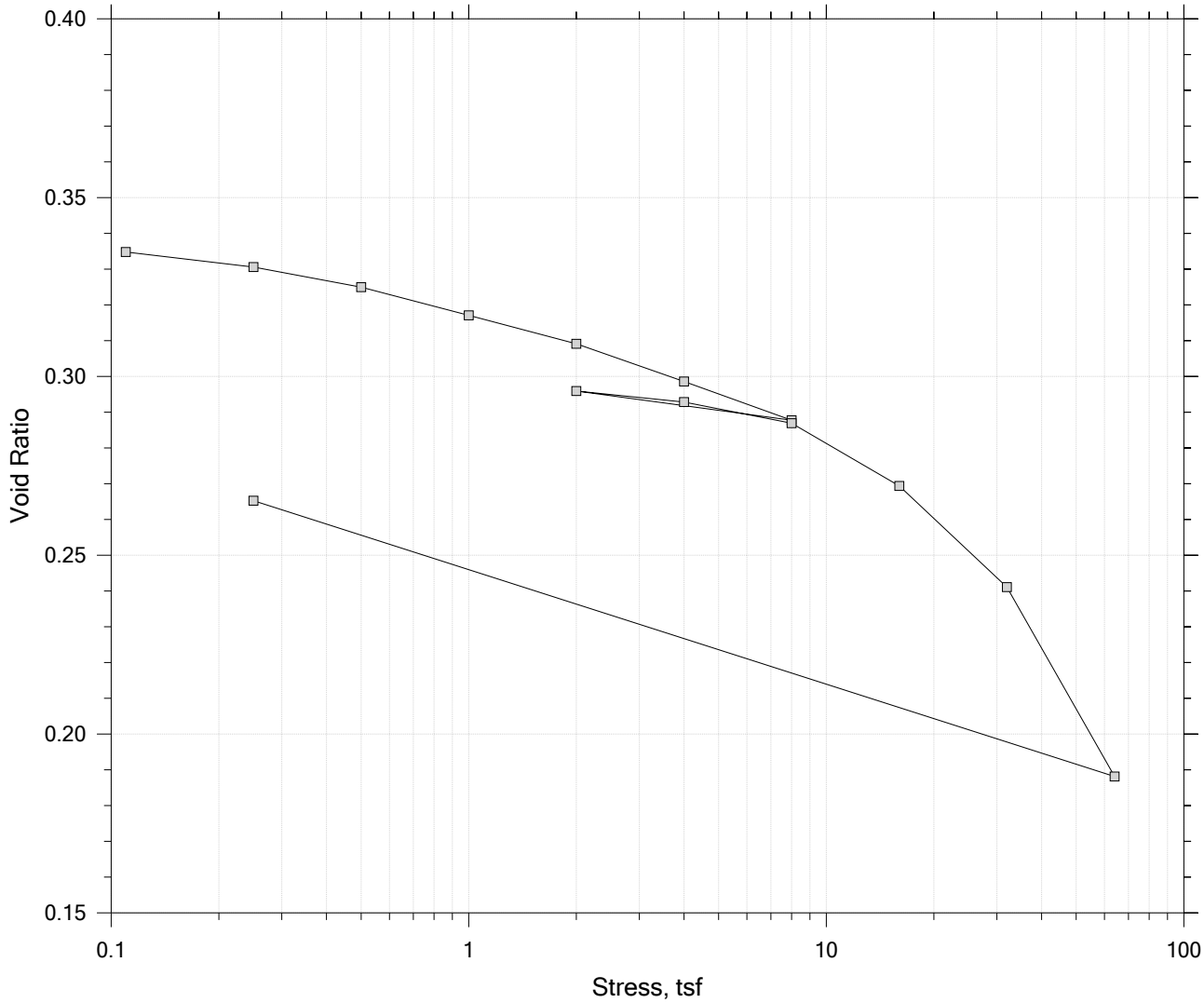
CLIENT Ricondo **PROJECT NAME** EIS - Yeager Airport (CRW)

PROJECT LOCATION Charleston, WV **PROJECT NUMBER** 17386-0 **DATE TESTED**

Borehole	Depth	Sample Number	Liquid Limit	Plastic Limit	Plasticity Index	Maximum Size (mm)	%<#200 Sieve	Class-ification	Water Content (%)	Max Dry Density (pcf)	Optimum Moisture (%)	CBR Value
P-18	8.5' - 10.0'	S-3							18.4			
P-18	13.5' - 15.0'	S-4	28	16	12	4.75	66	CL	6.1			
P-18	18.5' - 20.0'	S-5							4.5			
P-19	0.0' - 5.0'	Bulk	29	17	12	37.5	48	SC	14.7	124.5	10.6	
P-19	18.5' - 20.5'	T-5	31	20	11	4.75	93	CL	14.0			
P-3	0.0' - 1.5'	S-1	42	26	16	2	97	ML	16.9			
P-3	3.5' - 5.0'	S-2							13.3			
P-3	8.5' - 10.0'	S-3							7.0			
P-3	13.5' - 15.0'	S-4							2.9			
P-3	18.5' - 20.0'	S-5							3.2			
P-4	0.0' - 1.5'	S-1	NP	NP	NP	19	28	SM	6.5			
P-4	3.5' - 5.0'	S-2							23.9			
P-4	8.5' - 10.0'	S-3							13.8			
P-4	13.5' - 15.0'	s-4							8.2			
P-6	0.0' - 1.5'	S-1							21.1			
P-6	3.5' - 5.0'	S-2	35	24	11	4.75	94	CL	9.8			
P-6	8.5' - 10.0'	S-3							6.0			
P-6	13.5' - 15.0'	S-4							6.2			
P-7	0.0' - 1.5'	S-1							22.5			
P-7	3.5' - 5.0'	S-2							7.7			
P-7	8.5' - 10.0'	S-3							5.5			
P-7	10.0' - 15.0'	Bulk	NP	NP	NP	19	34	SM	10.5	128.5	9.1	
P-7	18.5' - 20.0'	S-5	29	17	12	0.85	75	CL	9.3			
P-7	23.5' - 25.0'	S-6							6.4			
P-7	28.5' - 30.0'	S-7							7.9			
P-8	0.0' - 1.5'	S-1							26.1			
P-8	3.5' - 5.0'	S-2							14.2			
P-8	8.5' - 10.0'	S-3							6.5			
P-8	13.5' - 15.0'	S-4							8.7			
P-8	18.5' - 20.0'	S-5							7.0			
P-8	23.5' - 25.0'	S-6							8.9			
P-8	28.5' - 30.0'	S-7							6.9			
P-8	33.5' - 35.0'	S-8							5.6			
P-8	43.5' - 45.0'	S-10	31	19	12	9.5	95	CL	6.7			
P-8	59.0' - 64.0'	C-2										
P-8	69.0' - 74.0'	C-4										
P-9	34.0' - 37.0'	C-1										

One-Dimensional Consolidation by ASTM D2435 - Method B

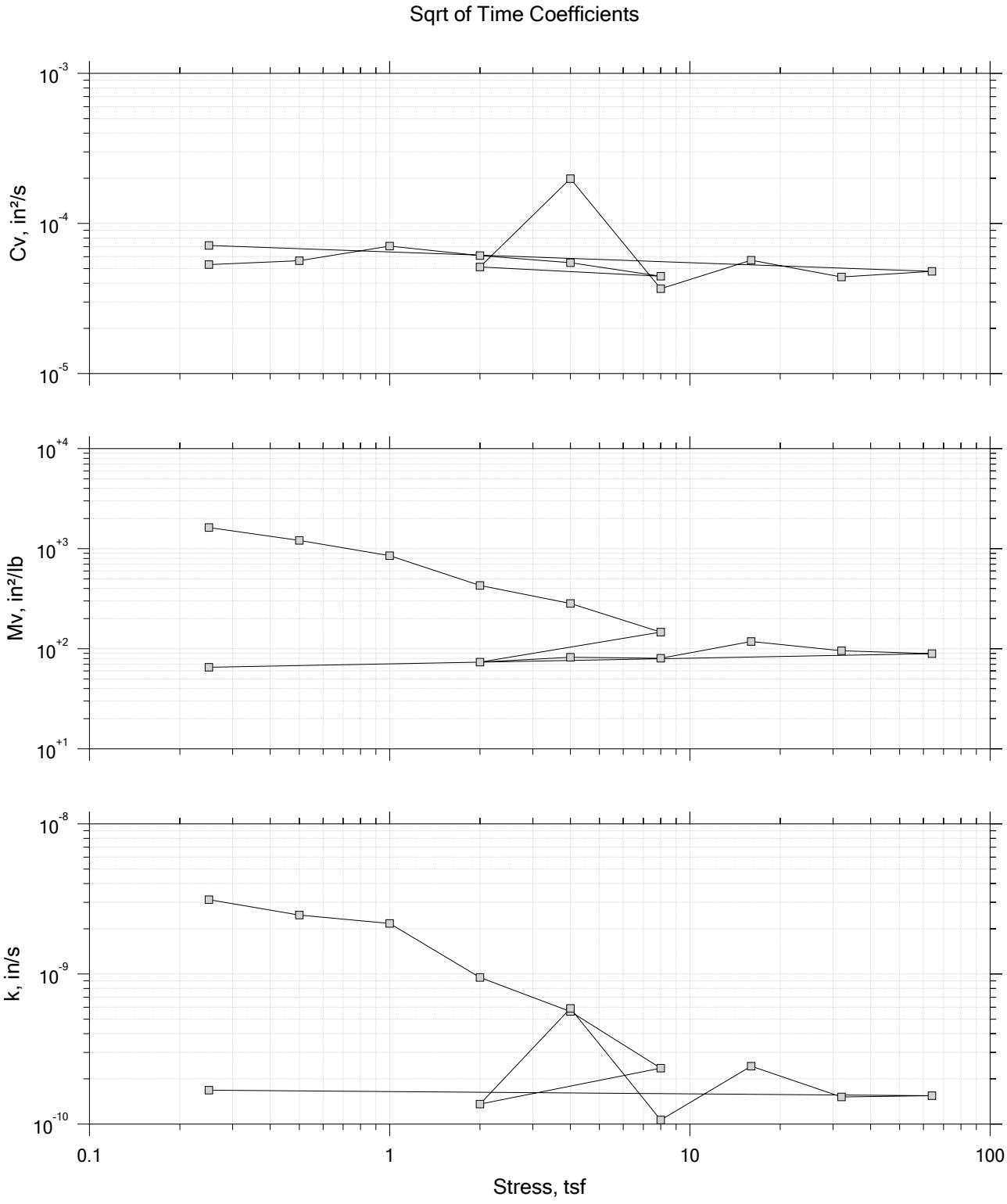
Summary Report



				Before Test	After Test
Current Vertical Effective Stress, tsf: 0				Water Content, %	9.05	11.49
Preconsolidation Stress, tsf: 26				Dry Unit Weight, pcf	121.6	142.58
Compression Index: 0.176		Recompression Index: 0.014		Saturation, %	68.21	100.0
Specimen Diameter, in: 2.496		Specimen Height, in: 0.999		Void Ratio	0.33	0.14
LL: Non-Plastic	PL: Non-Plastic	PI: Non-Plastic	GS: 2.60			

Project Name: Yeager International Airport	Location: West Virginia	Project Number: 17386-0
Boring Number: P-7	Tester: AVF	Checker: JC
Sample Number: Bulk, 10'-15'	Test Date: 9/2/22	Depth: 10-15'
Test Number: 1	Preparation: AVF	Elevation:
Description: Brown Silty Sand (SM)		
Remarks: Recompaction Target: 95% of MDD at OMC% Swell Pressure: 0.11 tsf		
Displacement at End of Increment		

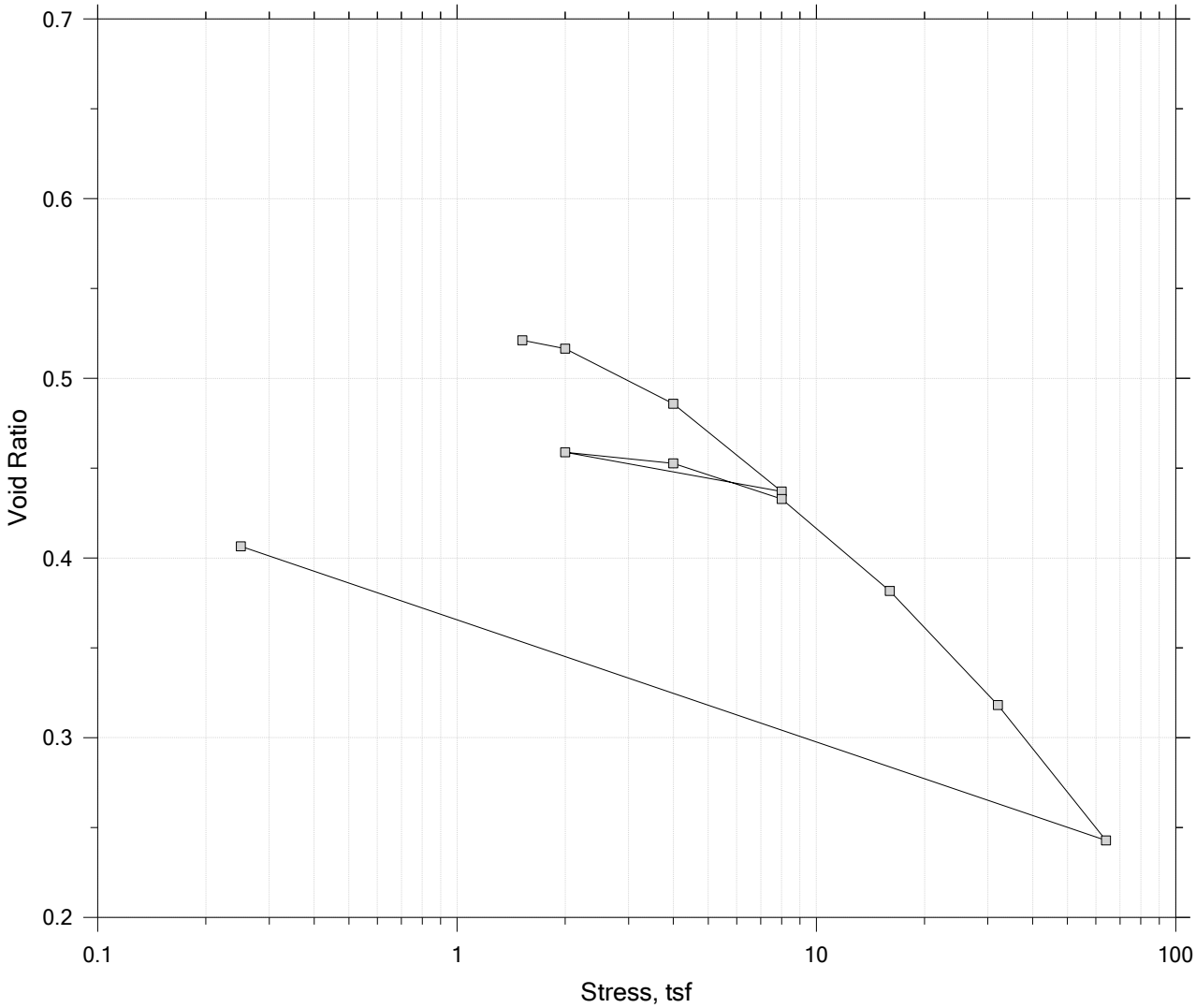
One-Dimensional Consolidation by ASTM D2435 - Method B



Project Name: Yeager International Airport	Location: West Virginia	Project Number: 17386-0
Boring Number: P-7	Tester: AVF	Checker: JC
Sample Number: Bulk	Test Date: 9/2/22	Depth: 10-15'
Test Number: 1	Preparation: AVF	Elevation:
Description: Brown Silty Sand (SM)		
Remarks:		

One-Dimensional Consolidation by ASTM D2435 - Method B

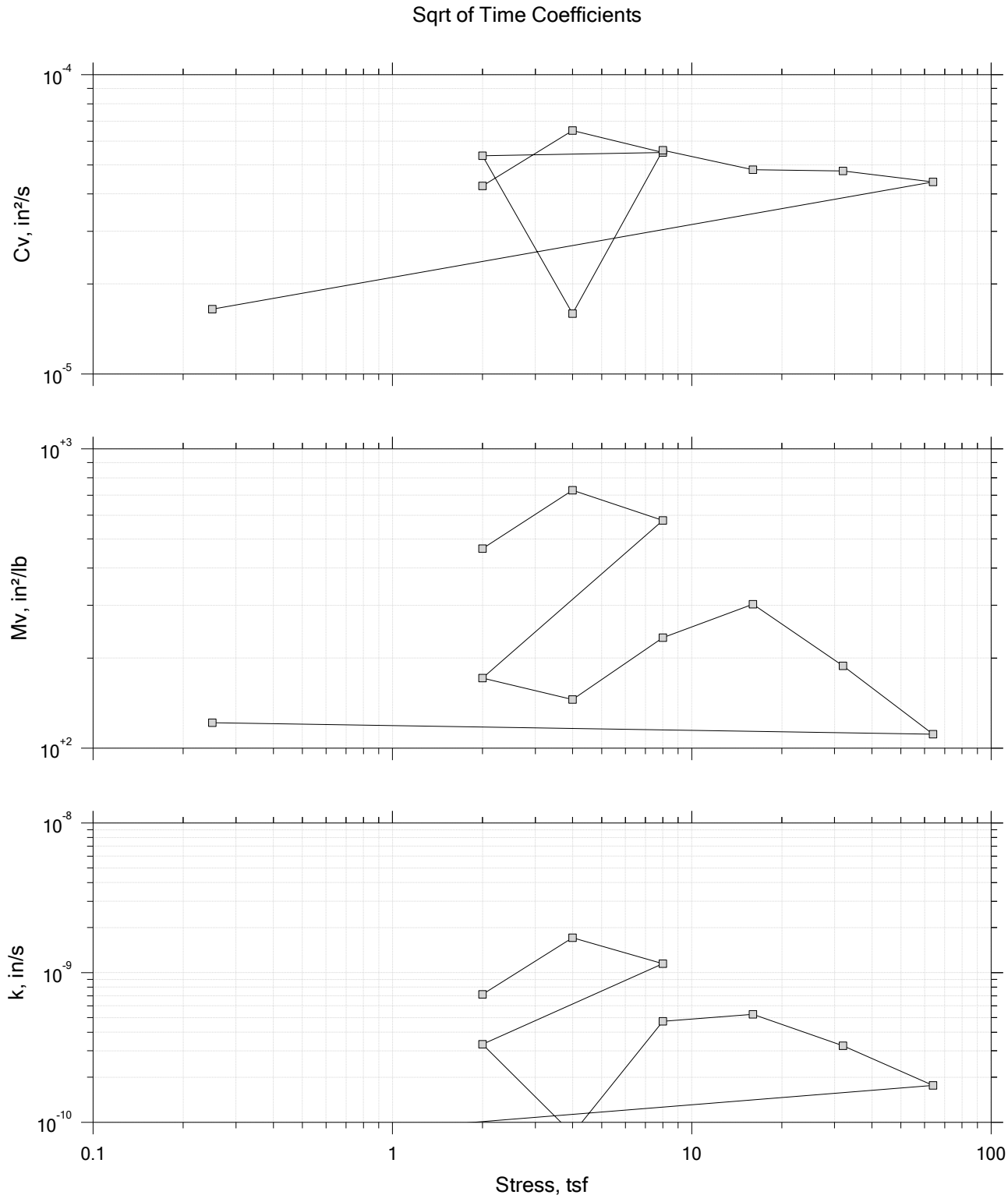
Summary Report



				Before Test	After Test
Current Vertical Effective Stress, tsf: 0				Water Content, %	15.4	18.18
Preconsolidation Stress, tsf: 9				Dry Unit Weight, pcf	110.8	130.15
Compression Index: 0.26		Recompression Index: 0.035		Saturation, %	77.18	100.0
Specimen Diameter, in: 2.496		Specimen Height, in: 1.001		Void Ratio	0.52	0.30
LL: 51	PL: 23	PI: 28	GS: 2.70			

Project Name: Yeager International Airport	Location: West Virginia	Project Number: 17386-0
Boring Number: P-13	Tester: AVF	Checker: JC
Sample Number: Bulk 0'-5'	Test Date: 8/19/22	Depth: 0-5'
Test Number: 1	Preparation: AVF	Elevation:
Description: Reddish Brown Fat Clay with Sand (CH)		
Remarks: Recompaction Target: 95% of MDD at OMC +2% Swell Pressure: 1.52 tsf		
Displacement at End of Increment		

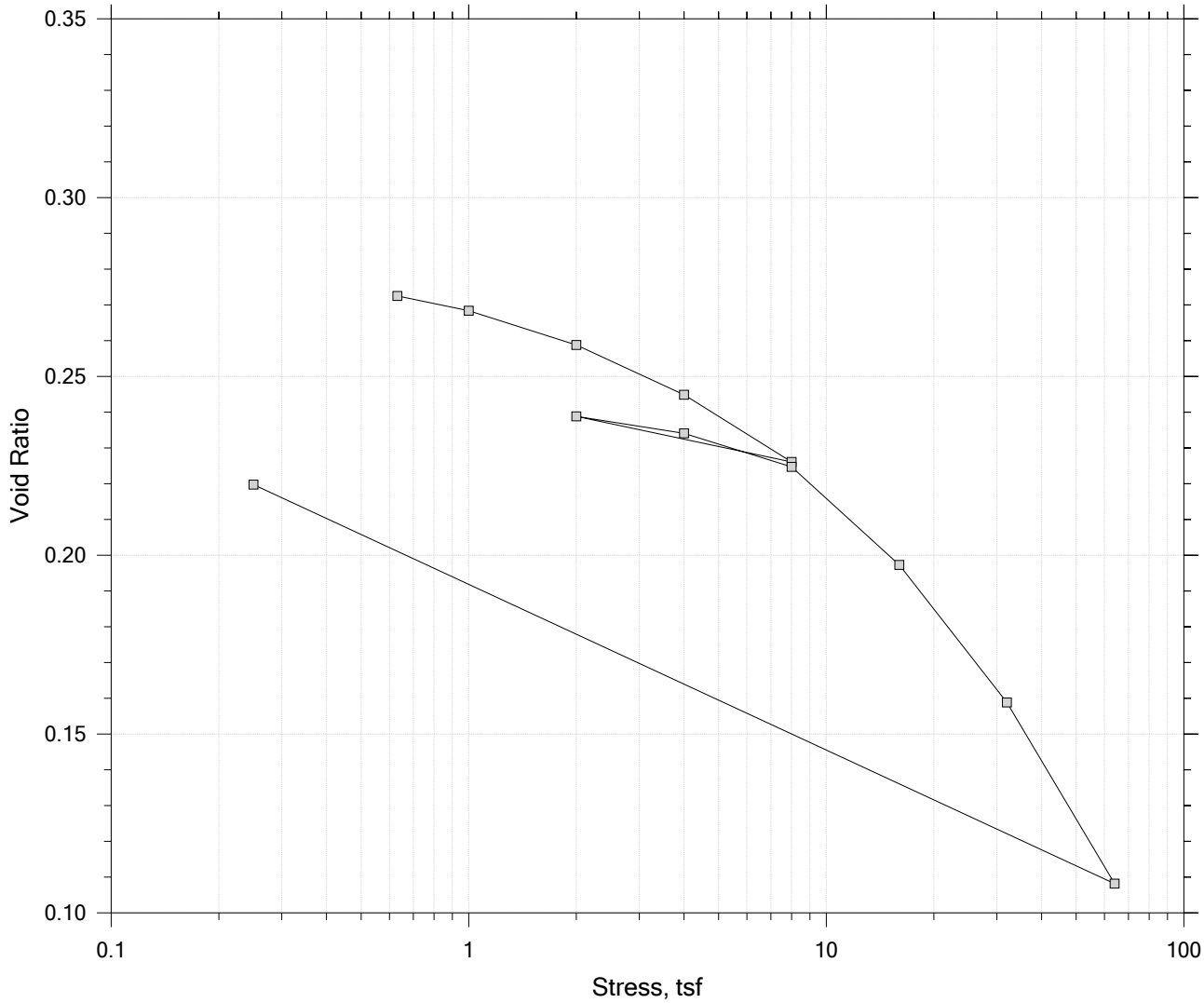
One-Dimensional Consolidation by ASTM D2435 - Method B



Project Name: Yeager International Airport	Location: West Virginia	Project Number: 17386-0
Boring Number: P-13	Tester: AVF	Checker: JC
Sample Number: Bulk	Test Date: 8/19/22	Depth: 0-5'
Test Number: 1	Preparation: AVF	Elevation:
Description: Reddish Brown Fat Clay with Sand (CH)		
Remarks:		

One-Dimensional Consolidation by ASTM D2435 - Method B

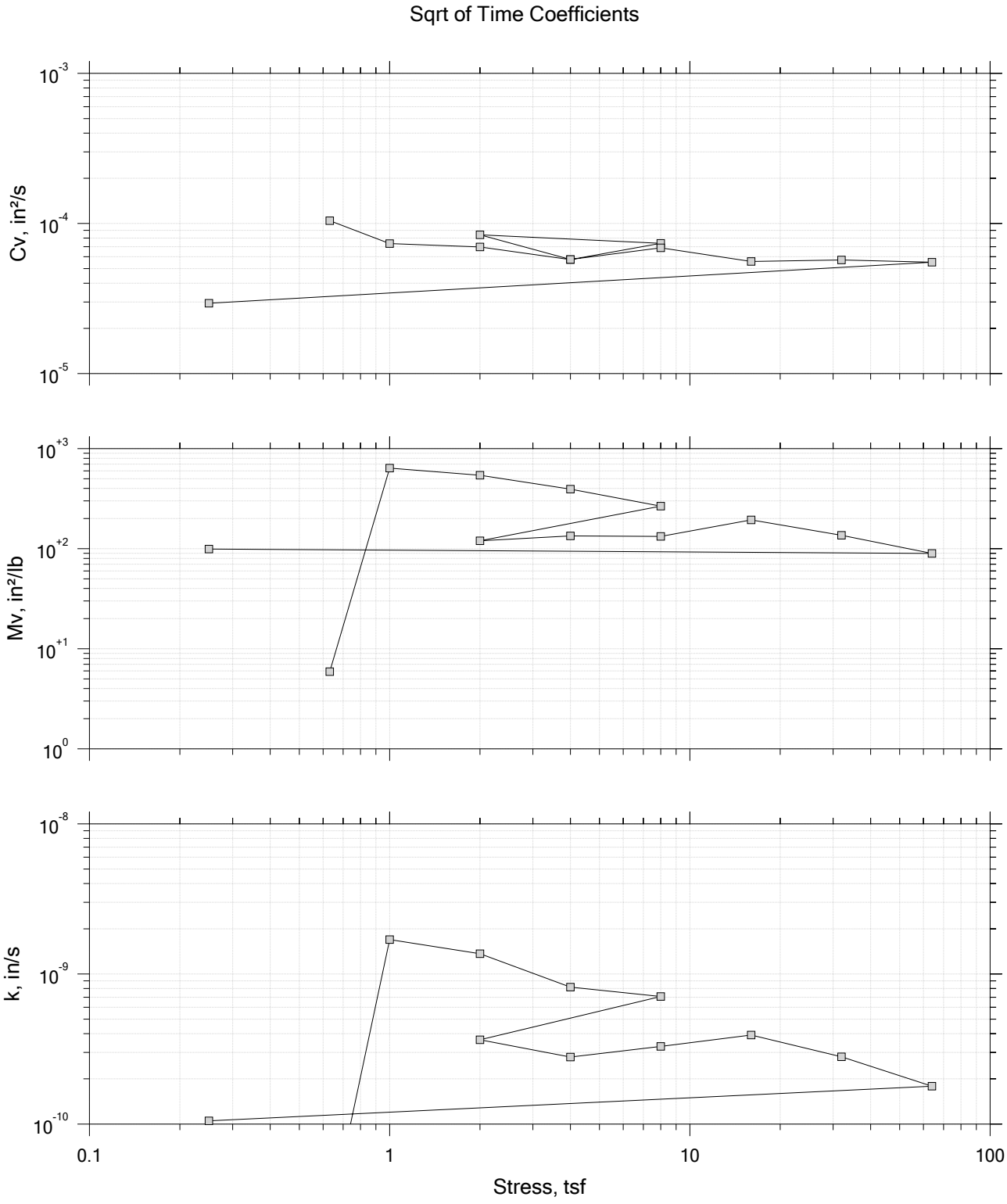
Summary Report



				Before Test	After Test
Current Vertical Effective Stress, tsf: 0				Water Content, %	9.3	10.0
Preconsolidation Stress, tsf: 11				Dry Unit Weight, pcf	132.45	155.4
Compression Index: 0.166		Recompression Index: 0.024		Saturation, %	81.54	100.0
Specimen Diameter, in: 2.494		Specimen Height, in: 0.9996		Void Ratio	0.27	0.08
LL: 25	PL: 15	PI: 10	GS: 2.70			

Project Name: Yeager International Airport	Location: West Virginia	Project Number: 17386-0
Boring Number: P-14	Tester: AVF	Checker: JC
Sample Number: Bulk	Test Date: 8/26/22	Depth: 30-35'
Test Number: 1	Preparation: AVF	Elevation:
Description: Gray Sandy Lean Clay (CL)		
Remarks: Target Compaction: 95% of the MDD (139.0 pcf at the OMC (7.2%) Swell Pressure: 0.63 tsf		
Displacement at End of Increment		

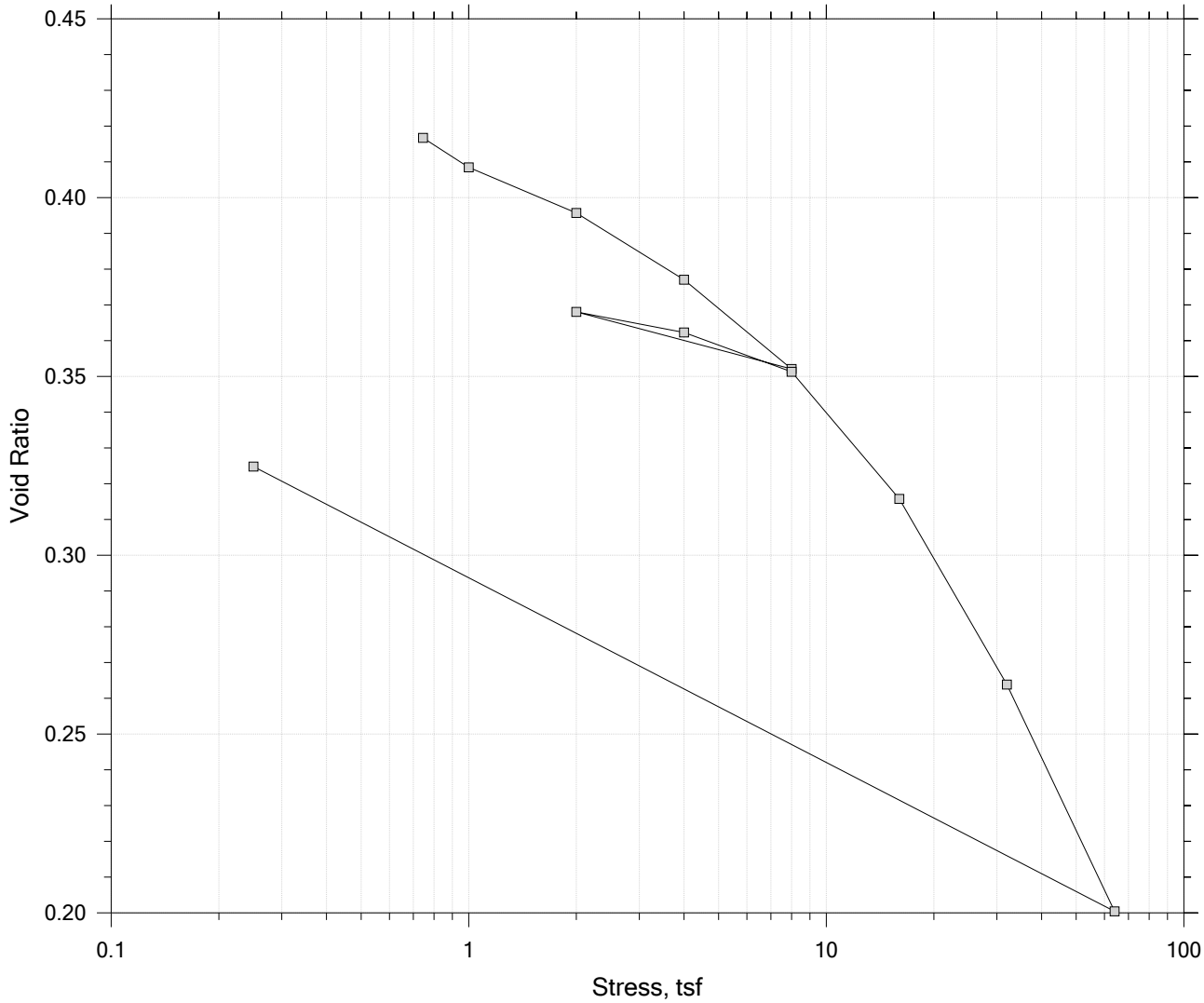
One-Dimensional Consolidation by ASTM D2435 - Method B



Project Name: Yeager International Airport	Location: West Virginia	Project Number: 17386-0
Boring Number: P-14	Tester: AVF	Checker: JC
Sample Number: Bulk	Test Date: 8/26/22	Depth: 30-35'
Test Number: 1	Preparation: AVF	Elevation:
Description: Gray Sandy Lean Clay (CL)		
Remarks:		

One-Dimensional Consolidation by ASTM D2435 - Method B

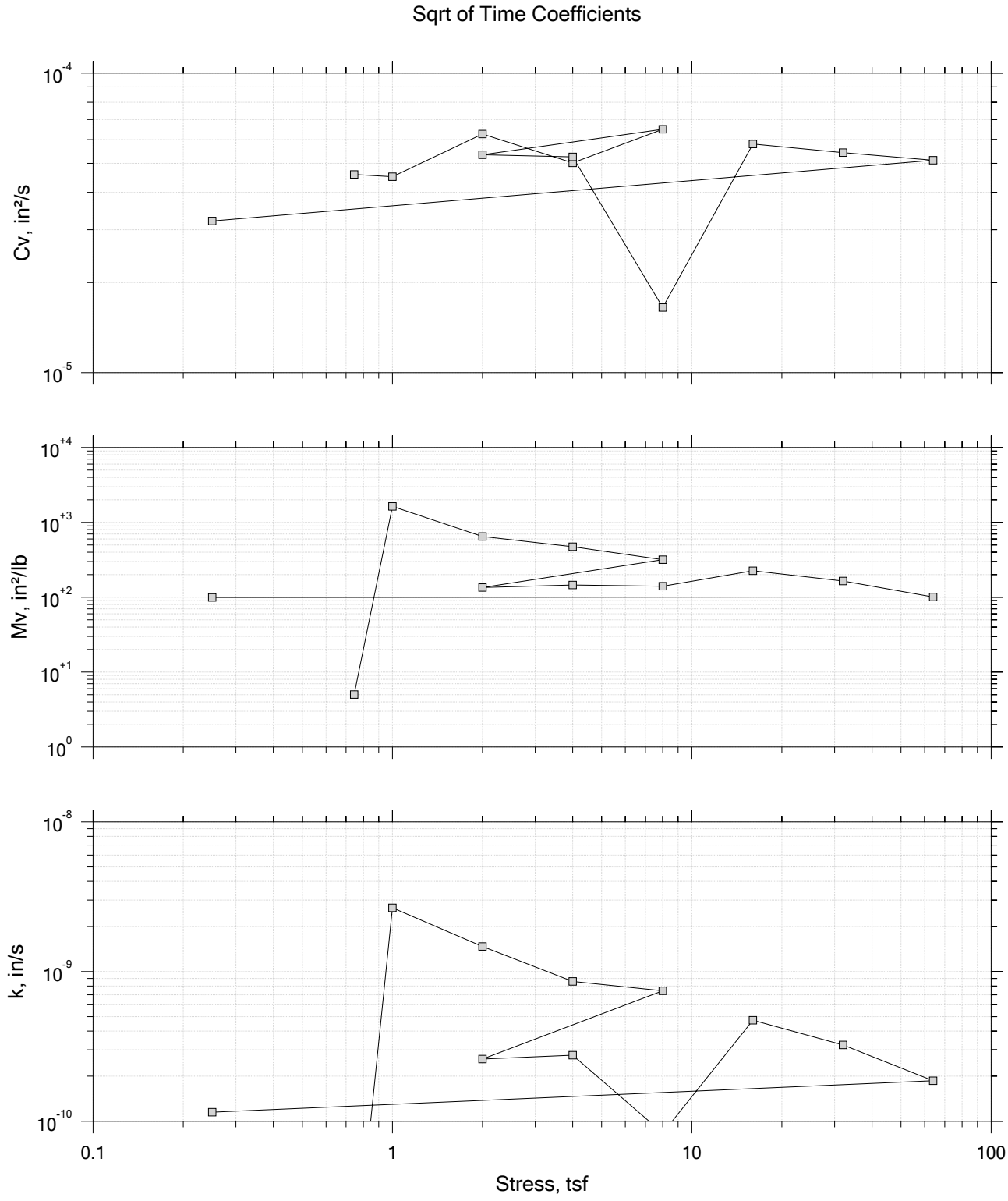
Summary Report



				Before Test	After Test
Current Vertical Effective Stress, tsf: 0.31				Water Content, %	10.6	13.6
Preconsolidation Stress, tsf: 16				Dry Unit Weight, pcf	118.97	139.58
Compression Index: 0.21		Recompression Index: 0.028		Saturation, %	66.27	100.0
Specimen Diameter, in: 2.494		Specimen Height, in: 0.9996		Void Ratio	0.42	0.21
LL: 29	PL: 17	PI: 12	GS: 2.70			

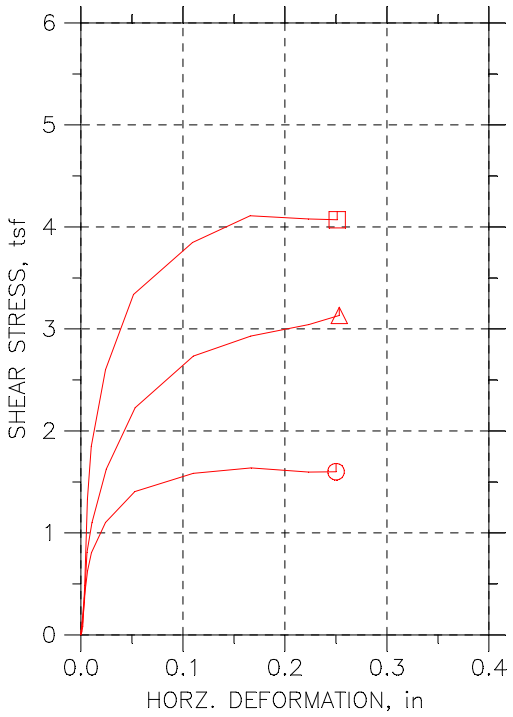
Project Name: Yeager International Airport	Location: West Virginia	Project Number: 17386-0
Boring Number: P-19	Tester: SS	Checker: JC
Sample Number: Bulk	Test Date: 07/28/2022	Depth: 0-5'
Test Number: 1	Preparation: AVF	Elevation:
Description: Clayey Sand with Gravel (SC)		
Remarks: Target Compaction: 95% of the MDD at the OMC Swell Pressure 0.8 tsf		
Displacement at End of Increment		

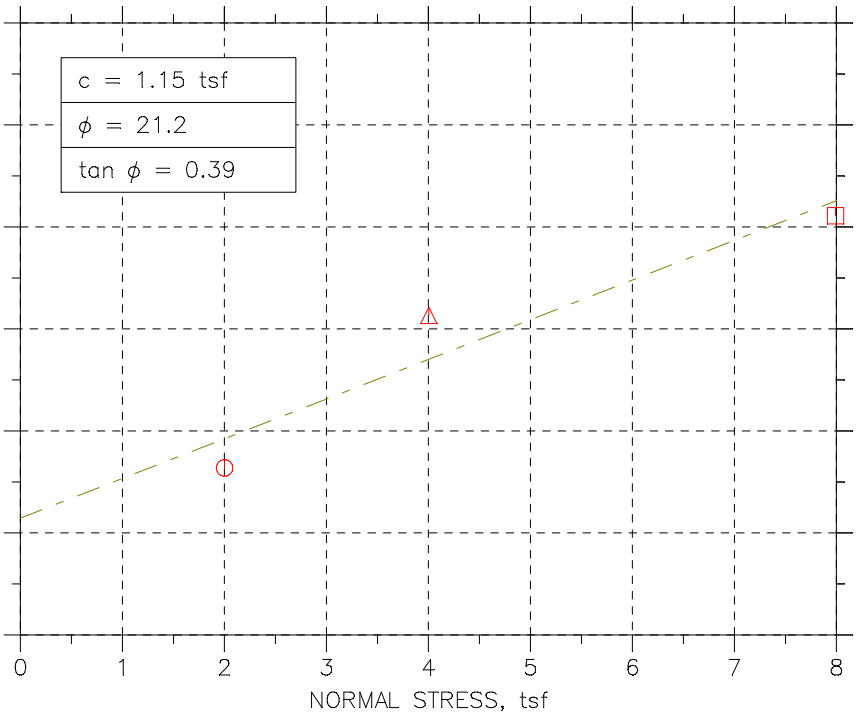
One-Dimensional Consolidation by ASTM D2435 - Method B

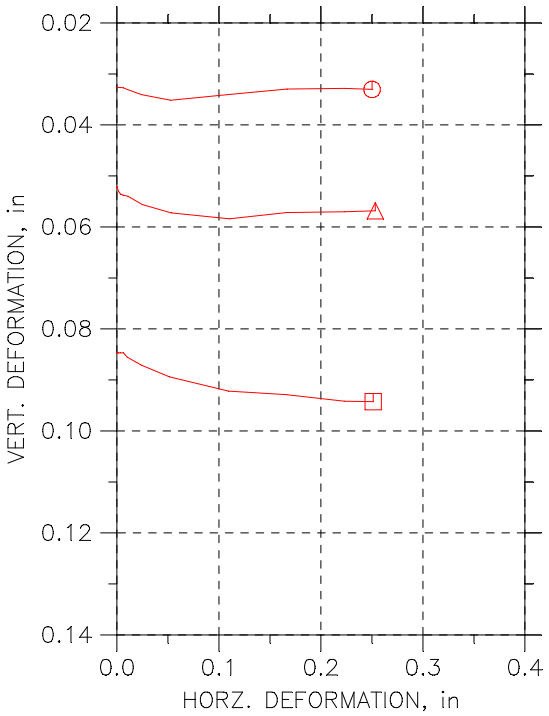


Project Name: Yeager International Airport	Location: West Virginia	Project Number: 17386-0
Boring Number: P-19	Tester: SS	Checker: JC
Sample Number: Bulk	Test Date: 07/28/2022	Depth: 0-5'
Test Number: 1	Preparation: AVF	Elevation:
Description: Clayey Sand with Gravel		
Remarks:		

DIRECT SHEAR TEST REPORT





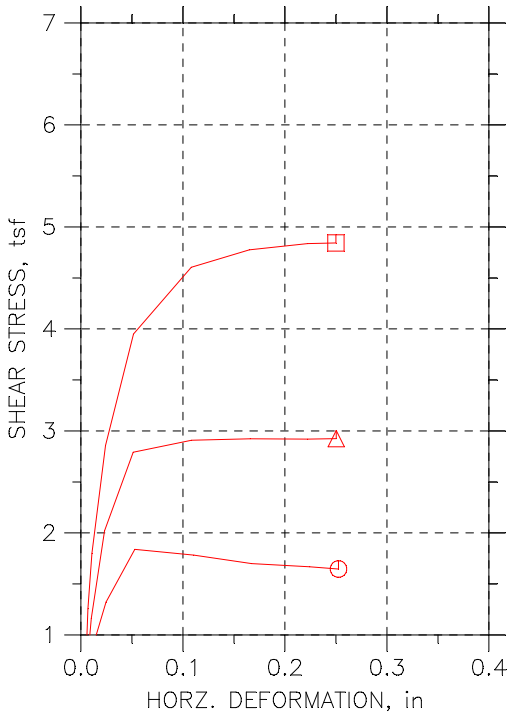


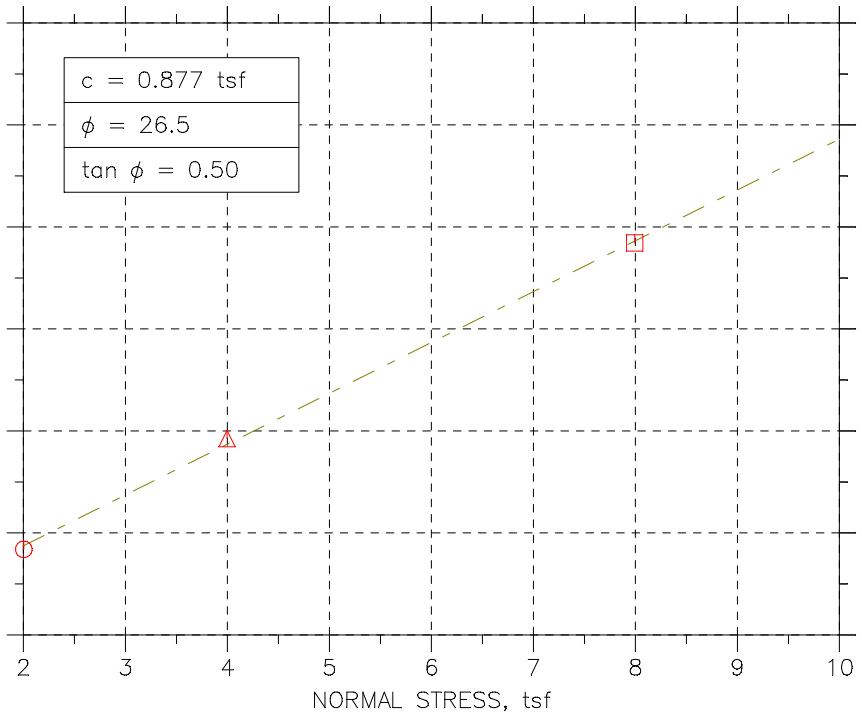
Symbol		○	△	□	
Test No.		1	2	3	
Sample No.		Shelby	Shelby	Shelby	
Shape		Circular	Circular	Circular	
Initial	Dimension, in	2.4938	2.4943	2.4943	
	Area, in^2	4.8844	4.8864	4.8864	
	Height, in	0.987	0.9866	0.9865	
	Water Content, %	14.14	13.16	12.82	
	Dry Density, pcf	122.96	123.54	122.66	
	Saturation, %	108.46	102.81	97.42	
	Void Ratio	0.34545	0.33916	0.34878	
Consol. Height, in		0.95486	0.93507	0.90186	
Consol. Void Ratio		0.30164	0.26921	0.23305	
Final	Water Content, %	14.67	14.02	13.00	
	Dry Density, pcf	127.22	131.09	135.61	
	Saturation, %	100.0	100.0	100.0	
	Void Ratio	0.30041	0.26199	0.21989	
Normal Stress, tsf		2.0014	4.0038	7.9924	
Max. Shear Stress, tsf		1.6373	3.1327	4.1096	
Ult. Shear Stress, tsf		1.6003	3.1327	4.0702	
Time to Failure, min		6.0035	9.0159	6.0034	
Disp. Rate, in/min		0.03	0.03	0.03	
Estimated Specific Gravity		2.65	2.65	2.65	
Liquid Limit		34	34	34	
Plastic Limit		19	19	19	
Plasticity Index		15	15	15	

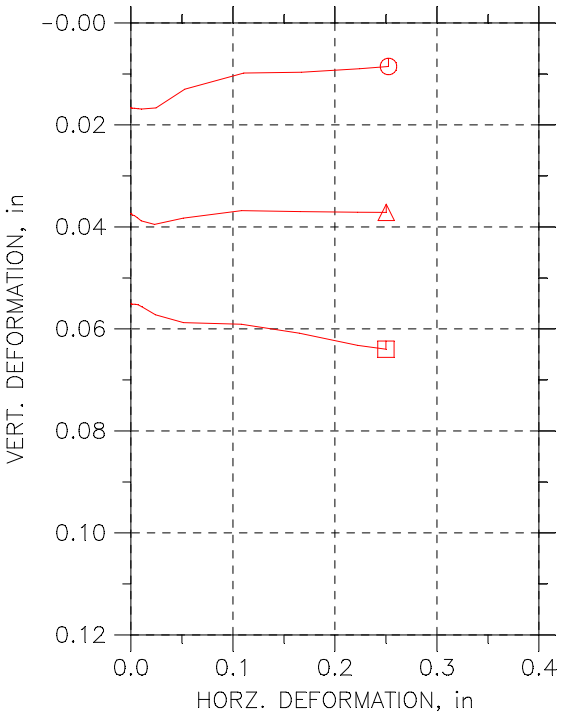
Project: Yeager Airport
Location: Charleston, WV
Project No.: 17386-0
Boring No.: A-3
Sample Type:
Description: Multicolored Gravelly Lean Clay (CL)
Remarks: rock fragments visible

Thu, 22-SEP-2022 15:31:22

DIRECT SHEAR TEST REPORT







Symbol		○	△	□	
Test No.		1	2	3	
Sample No.		Bulk	Bulk	Bulk	
Shape		Circular	Circular	Circular	
Initial	Dimension, in	2.4931	2.4943	2.4944	
	Area, in^2	4.8817	4.8864	4.8868	
	Height, in	0.9876	0.9864	0.9866	
	Water Content, %	9.8	10.2	10.0	
	Dry Density, pcf	125.58	126.81	125.98	
	Saturation, %	90.78	93.05	91.61	
	Void Ratio	0.3174	0.30459	0.31315	
Consol. Height, in		0.97116	0.94914	0.93163	
Consol. Void Ratio		0.29548	0.25531	0.23999	
Final	Water Content, %	13.03	12.73	12.43	
	Dry Density, pcf	126.67	131.77	134.72	
	Saturation, %	112.85	132.10	144.48	
	Void Ratio	0.30601	0.25544	0.22801	
Normal Stress, tsf		2.0034	3.997	7.9934	
Max. Shear Stress, tsf		1.839	2.9241	4.8428	
Ult. Shear Stress, tsf		1.6462	2.9241	4.8428	
Time to Failure, min		2.0038	8.9702	8.9702	
Disp. Rate, in/min		0.03	0.03	0.03	
Estimated Specific Gravity		2.65	2.65	2.65	
Liquid Limit		25	25	25	
Plastic Limit		17	17	17	
Plasticity Index		8	8	8	

Project: Yeager Airport

Location: Charleston, WV

Project No.: 17386-0

Boring No.: P-12

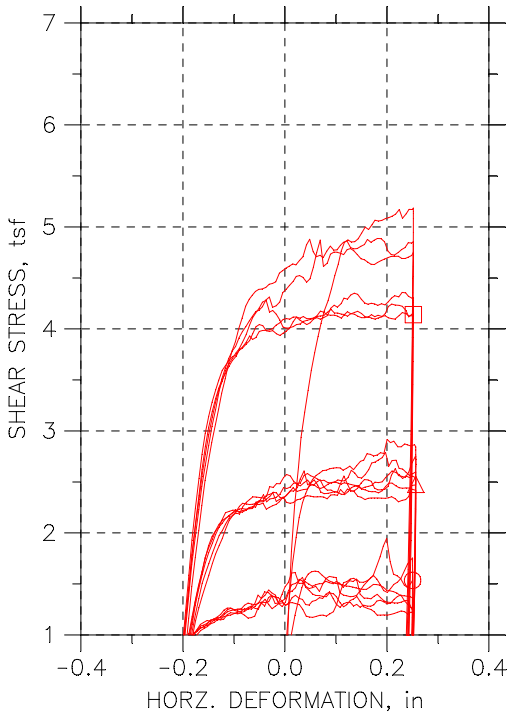
Sample Type: Bulk Sample 20'-25'

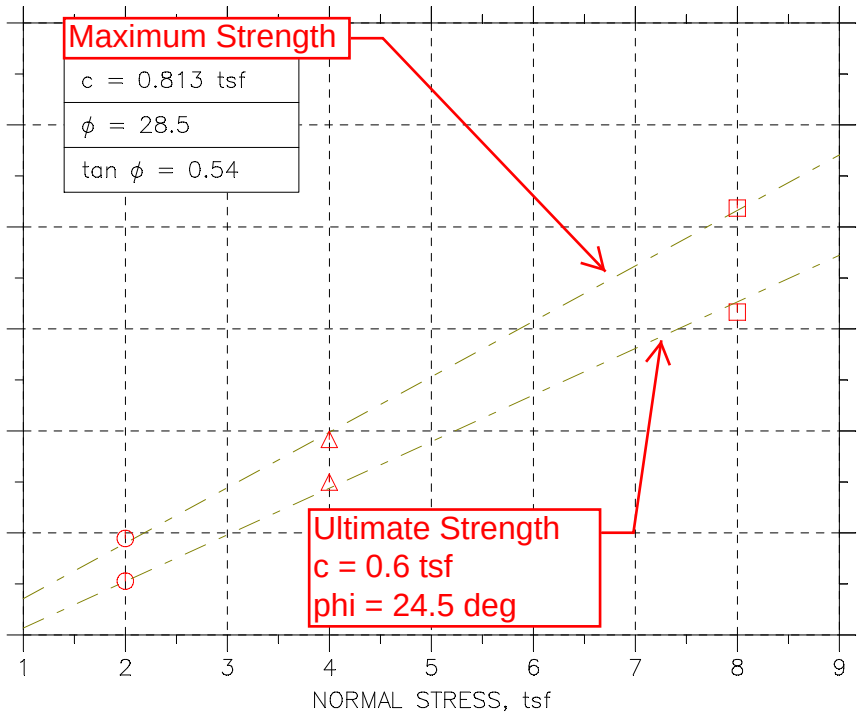
Description: Greenish Gray Sandy Lean Clay (CL)

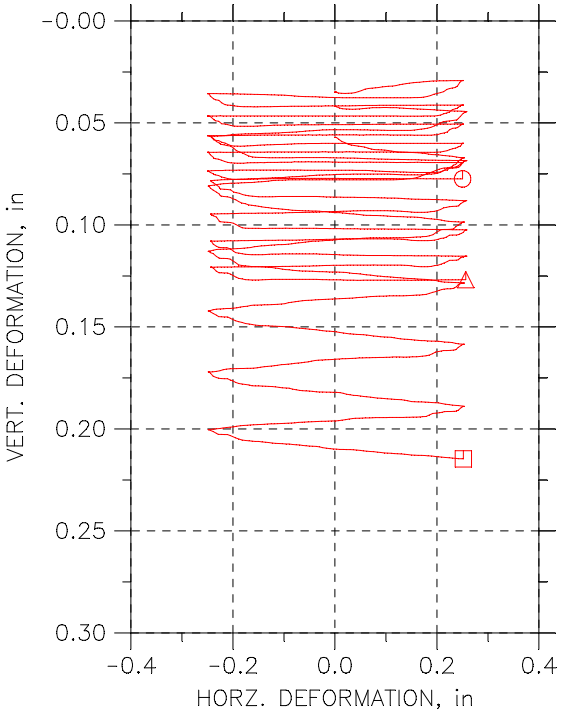
Remarks: Target Recompaction: 95% of the MDD at OMC+2%

Mon, 12-SEP-2022 11:06:41

DIRECT SHEAR TEST REPORT





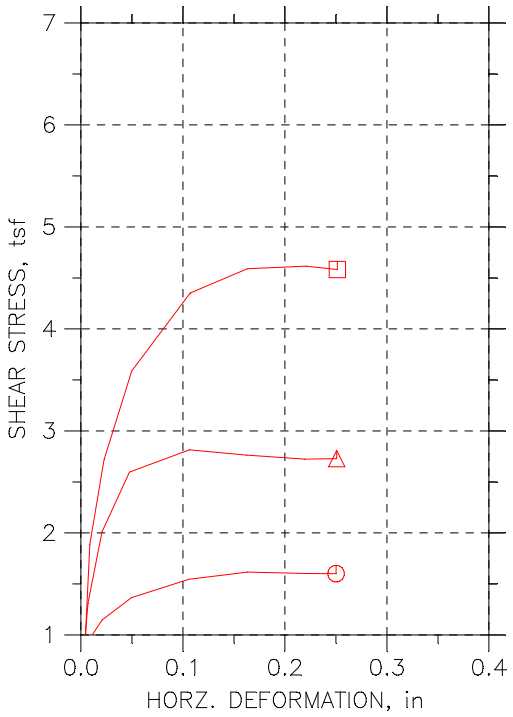


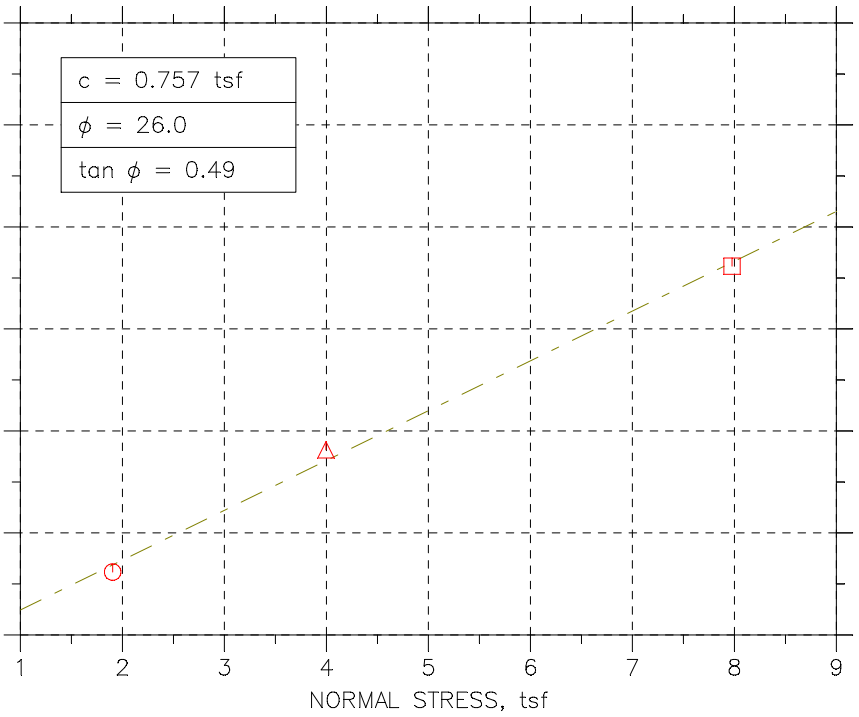
Symbol		○	△	□	
Test No.		1	2	3	
Sample No.		Bulk	Bulk	Bulk	
Shape		Circular	Circular	Circular	
Initial	Dimension, in	2.4946	2.4934	2.493	
	Area, in^2	4.8876	4.8829	4.8813	
	Height, in	0.987	0.987	0.9855	
	Water Content, %	10.6	10.6	10.1	
	Dry Density, pcf	127.6	126.1	126.9	
	Saturation, %	89.3	85.2	83.2	
	Void Ratio	0.32	0.34	0.33	
Consol. Height, in		0.95255	0.94563	0.92851	
Consol. Void Ratio		0.31094	0.35263	0.4282	
Final	Water Content, %	12.83	12.60	11.99	
	Dry Density, pcf	132.16	134.46	139.53	
	Saturation, %	100.0	100.0	100.0	
	Void Ratio	0.25177	0.23034	0.18568	
Normal Stress, tsf		1.9993	3.9982	7.9981	
Max. Shear Stress, tsf		1.946	2.9165	5.1841	
Ult. Shear Stress, tsf		1.5343	2.4764	4.1404	
Time to Failure, min		1611.5	64.002	80.555	
Disp. Rate, in/min		0.0035	0.0035	0.0035	
Estimated Specific Gravity		2.65	2.65	2.65	
Liquid Limit		25	25	25	
Plastic Limit		17	17	17	
Plasticity Index		8	8	8	

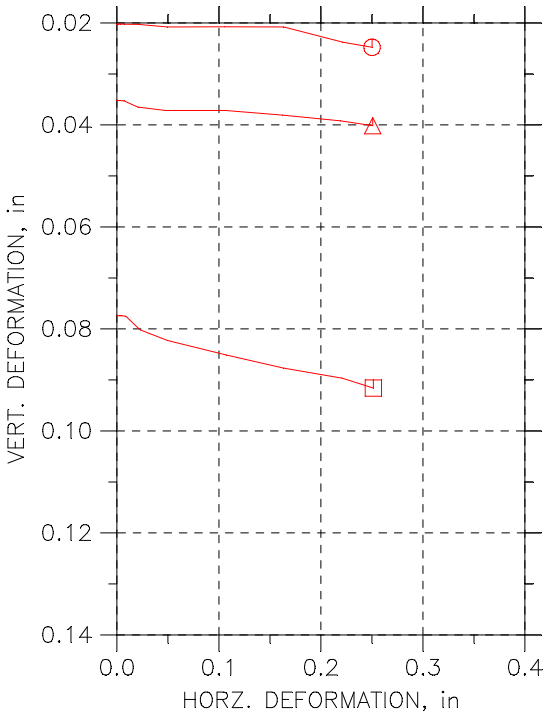
Project: Yeager Airport
Location: West Virginia
Project No.: 17386-0
Boring No.: P-12 **Bulk Sample, 20'-25'**
Sample Type: Remolded
Description: Greenish Gray Sandy Lean Clay (CL)
Remarks: Rock fragments visible **Target Recompaction: 95% of the MDD at OMC+2%**

Mon, 03-OCT-2022 10:36:14

DIRECT SHEAR TEST REPORT







Symbol		○	△	□	
Test No.		1	2	3	
Sample No.		Bulk	Bulk	Bulk	
Shape		Circular	Circular	Circular	
Initial	Dimension, in	2.4954	2.4958	2.4965	
	Area, in^2	4.8907	4.8923	4.895	
	Height, in	0.9918	0.9869	0.985	
	Water Content, %	14.6	14.0	14.4	
	Dry Density, pcf	110.97	112.9	111.75	
	Saturation, %	80.67	80.84	82.56	
	Void Ratio	0.49084	0.46528	0.48045	
Consol. Height, in		0.97153	0.95164	0.90759	
Consol. Void Ratio		0.46037	0.41293	0.3641	
Final	Water Content, %	22.52	20.50	20.02	
	Dry Density, pcf	113.81	117.69	123.2	
	Saturation, %	131.58	133.94	154.74	
	Void Ratio	0.45359	0.40569	0.3428	
Normal Stress, tsf		1.9041	3.9956	7.9766	
Max. Shear Stress, tsf		1.6167	2.8139	4.6151	
Ult. Shear Stress, tsf		1.6007	2.7289	4.5831	
Time to Failure, min		6.0034	4.0037	8.0034	
Disp. Rate, in/min		0.03	0.03	0.03	
Estimated Specific Gravity		2.65	2.65	2.65	
Liquid Limit		51	51	51	
Plastic Limit		23	23	23	
Plasticity Index		28	28	28	

Project: Yeager Airport

Location: Charleston, WV

Project No.: 17386-0

Boring No.: P-13

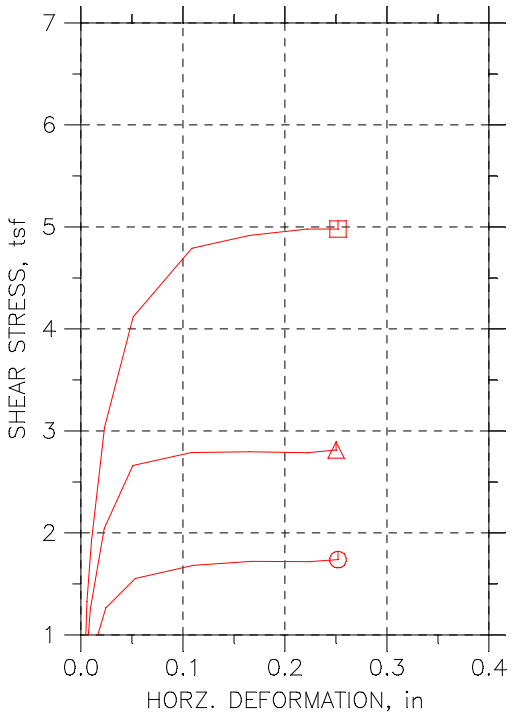
Sample Type: Bulk 0'-5'

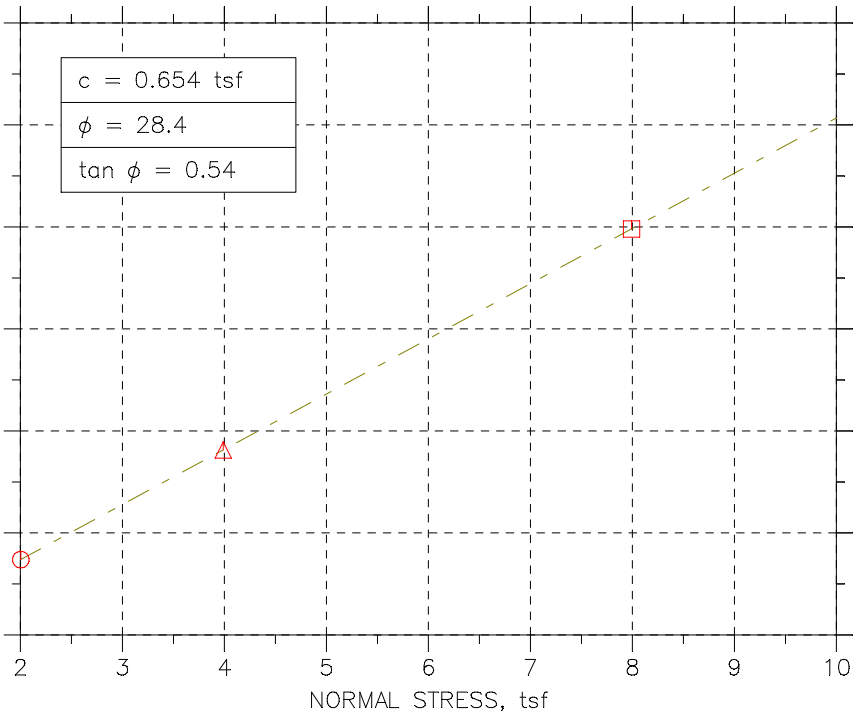
Description: Reddish Brown Fat Clay with Sand (CH)

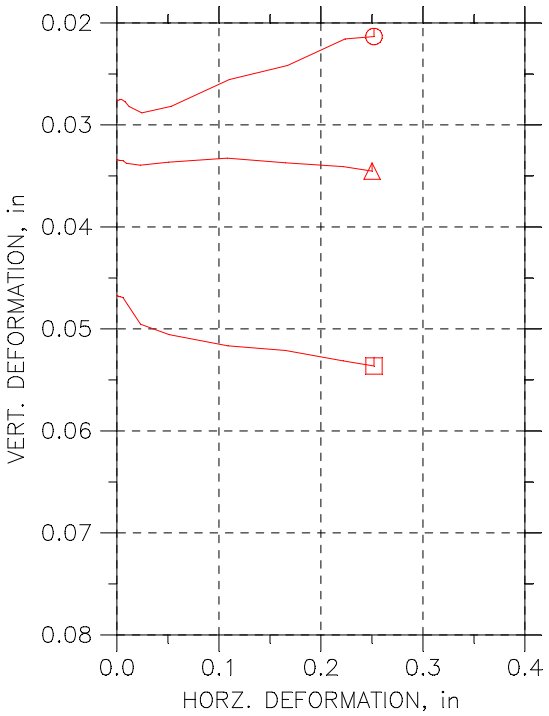
Remarks: Target Recompaction: 95% of MDD at OMC

Wed, 07-SEP-2022 09:37:03

DIRECT SHEAR TEST REPORT





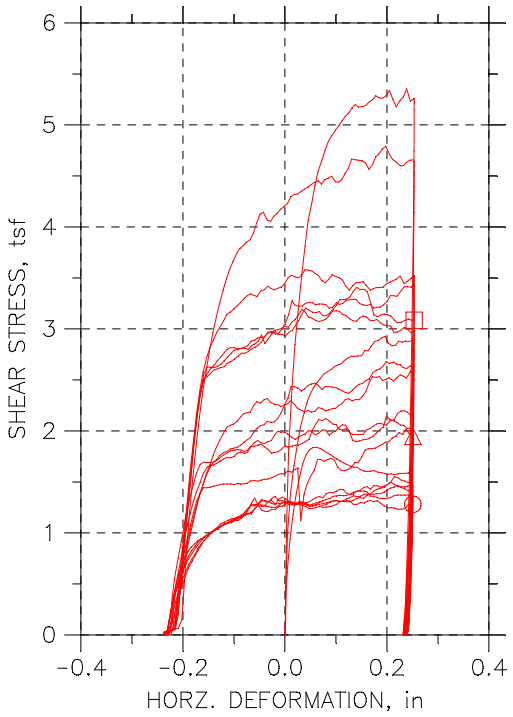


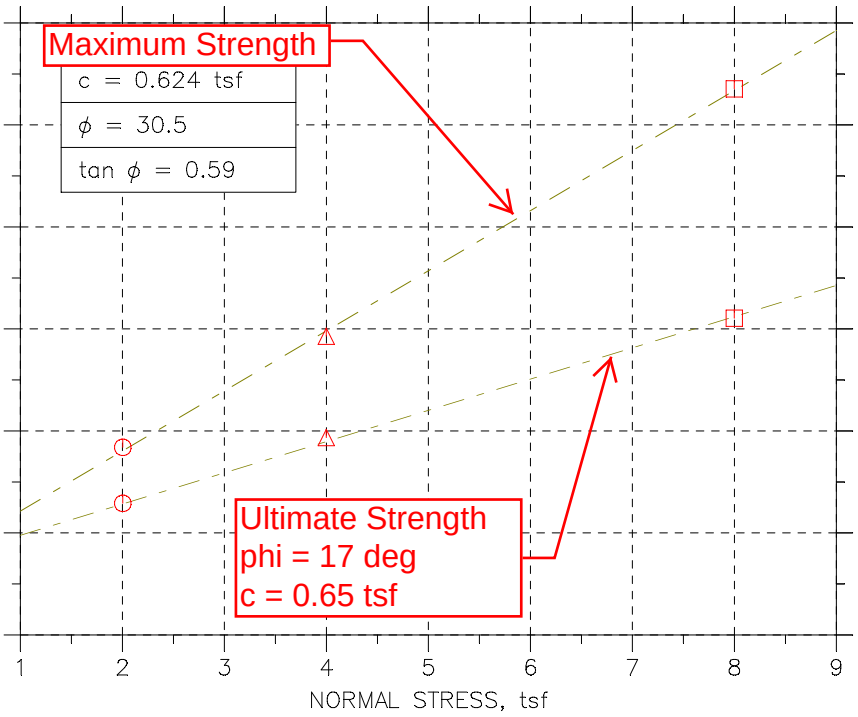
Symbol		○	△	□	
Test No.		1	2	3	
Sample No.		Bulk	Bulk	Bulk	
Shape		Circular	Circular	Circular	
Initial	Dimension, in	2.4963	2.4966	2.4973	
	Area, in^2	4.8942	4.8954	4.8981	
	Height, in	0.9873	0.9868	0.9858	
	Water Content, %	8.6	8.3	8.5	
	Dry Density, pcf	130.94	131.21	131.95	
	Saturation, %	97.02	96.60	94.03	
	Void Ratio	0.26346	0.26085	0.2538	
Consol. Height, in		0.95979	0.9535	0.93913	
Consol. Void Ratio		0.22826	0.21829	0.19444	
Final	Water Content, %	12.09	11.43	11.31	
	Dry Density, pcf	133.83	135.97	139.54	
	Saturation, %	135.67	139.71	161.46	
	Void Ratio	0.23616	0.21672	0.18558	
Normal Stress, tsf		2.0033	3.9888	7.9909	
Max. Shear Stress, tsf		1.7382	2.8129	4.9797	
Ult. Shear Stress, tsf		1.7382	2.8129	4.9797	
Time to Failure, min		8.9661	8.9951	9.0536	
Disp. Rate, in/min		0.03	0.03	0.03	
Estimated Specific Gravity		2.65	2.65	2.65	
Liquid Limit		25	25	25	
Plastic Limit		15	15	15	
Plasticity Index		10	10	10	

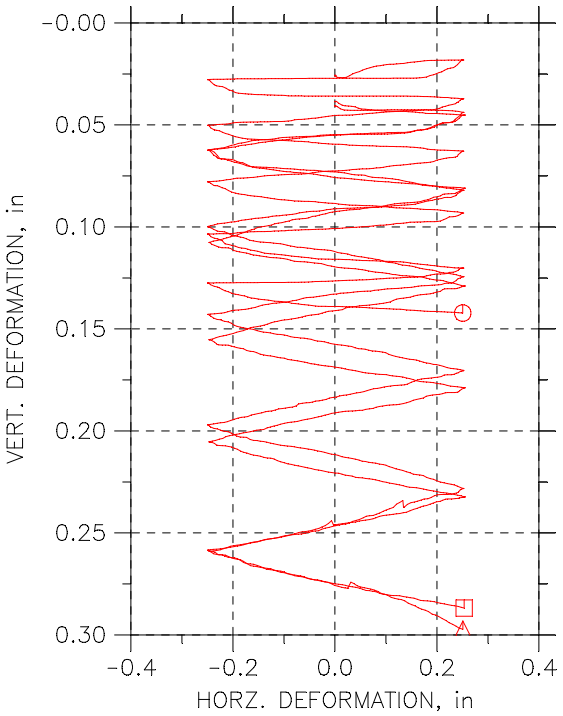
Project: Yeager Airport
Location: Charleston, WV
Project No.: 17386-0
Boring No.: P-14
Sample Type: **Bulk Sample 30'-35'**
Description: Gray Sandy Lean Clay (CL)
Remarks: rock fragments visible **Target Recompaction: 95% of the MDD at OMC**

Thu, 08-SEP-2022 11:54:23

DIRECT SHEAR TEST REPORT





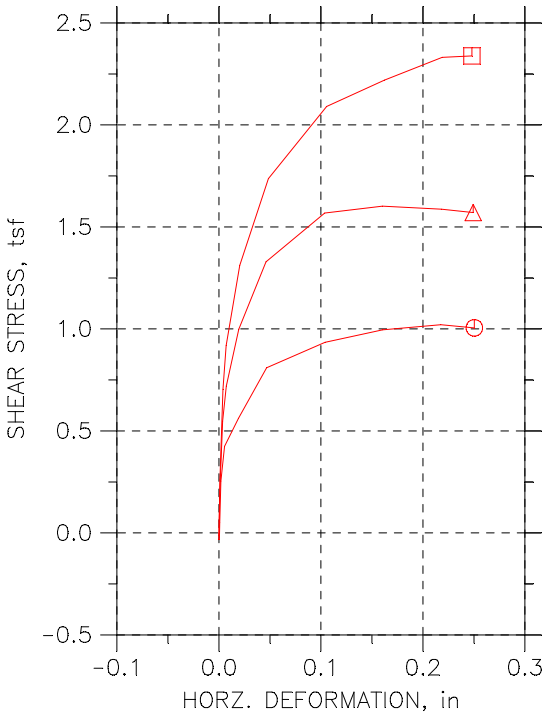


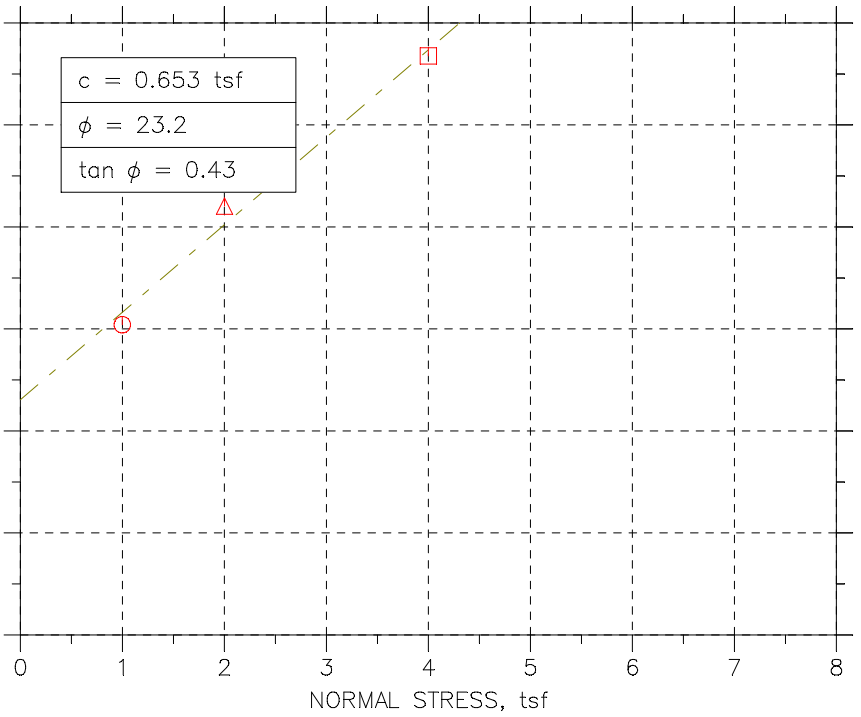
Symbol		⏲	△	⊡	
Test No.		1	2	3	
Sample No.		Bulk	Bulk	Bulk	
Shape		Circular	Circular	Circular	
Initial	Dimension, in	2.4943	2.4938	2.495	
	Area, in^2	4.8864	4.8844	4.8891	
	Height, in	0.9865	0.9864	0.9868	
	Water Content, %	9.1	9.2	8.6	
	Dry Density, pcf	134.6	132.1	132.6	
	Saturation, %	97.6	90.2	85.8	
	Void Ratio	0.42338	0.70729	0.6947	
Consol. Height, in		0.96106	0.94625	0.94831	
Consol. Void Ratio		0.38668	0.63779	0.62859	
Final	Water Content, %	11.42	11.89	11.25	
	Dry Density, pcf	138.37	141.31	140.21	
	Saturation, %	100.0	100.0	100.0	
	Void Ratio	0.21816	0.19284	0.20213	
Normal Stress, tsf		2.004	3.9986	7.9989	
Max. Shear Stress, tsf		1.8389	2.9284	5.3539	
Ult. Shear Stress, tsf		1.2802	1.9472	3.0845	
Time to Failure, min		20.002	62.003	76.001	
Disp. Rate, in/min		0.0035	0.0035	0.0035	
Estimated Specific Gravity		2.70	2.70	2.70	
Liquid Limit		25	25	25	
Plastic Limit		15	15	15	
Plasticity Index		10	10	10	

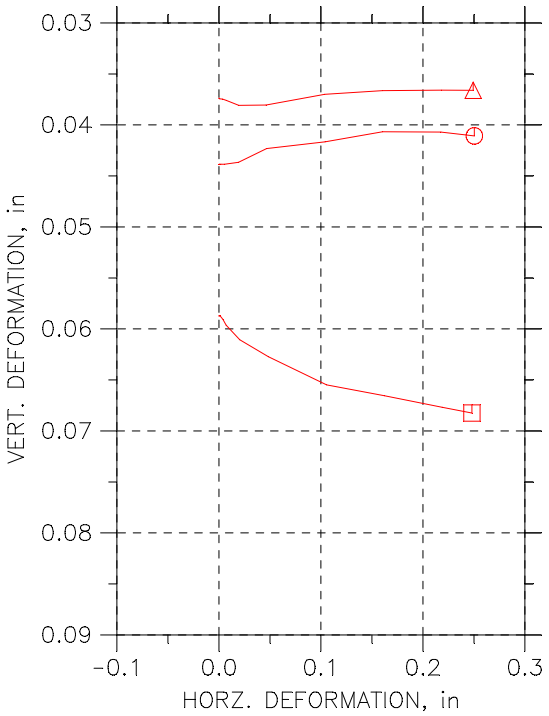
Project: Yeager Airport
Location: West Virginia
Project No.: 17386-0
Boring No.: P-14
Sample Type: Remolded
Description: Gray Sandy Lean Clay (CL)
Remarks: Rock fragments visible

Fri, 23-SEP-2022 10:05:07

DIRECT SHEAR TEST REPORT







Symbol		⏲	△	⊡	
Test No.		1	2	3	
Sample No.		Bulk	Bulk	Bulk	
Shape		Circular	Circular	Circular	
Initial	Dimension, in	2.4859	2.4859	2.4875	
	Area, in^2	4.8535	4.8535	4.8598	
	Height, in	0.9891	0.9891	0.99	
	Water Content, %	11.22	10.51	10.48	
	Dry Density, pcf	124.87	125.31	125.42	
	Saturation, %	91.49	86.95	87.06	
	Void Ratio	0.32488	0.32018	0.31899	
Consol. Height, in		0.94502	0.95171	0.93178	
Consol. Void Ratio		0.26584	0.27027	0.24143	
Final	Water Content, %	16.82	15.17	14.10	
	Dry Density, pcf	130.28	130.13	134.71	
	Saturation, %	100.0	100.0	100.0	
	Void Ratio	0.26987	0.27133	0.22806	
Normal Stress, tsf		0.99856	2.0005	3.9993	
Max. Shear Stress, tsf		1.0206	1.6016	2.338	
Ult. Shear Stress, tsf		1.0053	1.5701	2.338	
Time to Failure, min		8.0033	6.0035	8.9951	
Disp. Rate, in/min		0.03	0.03	0.03	
Estimated Specific Gravity		2.65	2.65	2.65	
Liquid Limit		31	31	31	
Plastic Limit		17	17	17	
Plasticity Index		14	14	14	

Project: Yeager Airport

Location: Charleston, WV

Project No.: 17386-0

Boring No.: P-15

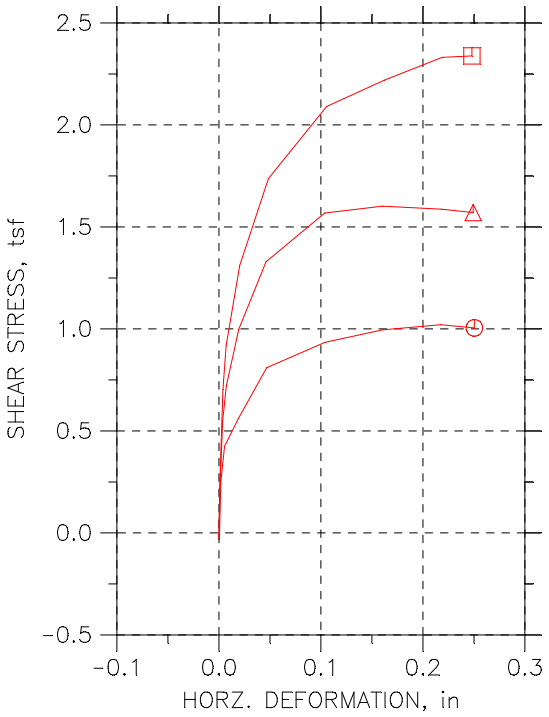
Sample Type: **Bulk 30'-35'**

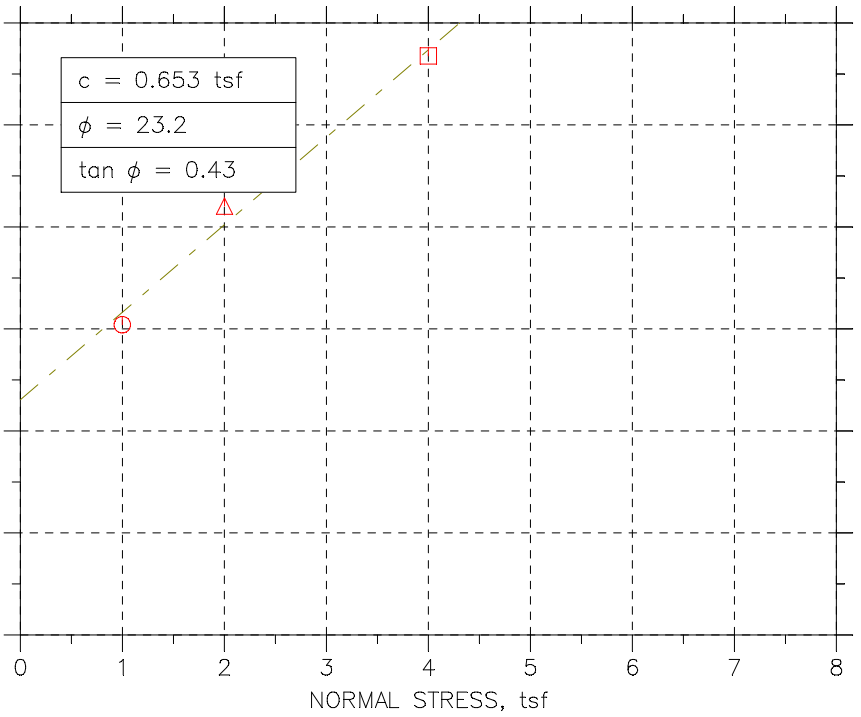
Description: Grey Lean Clay with Sand

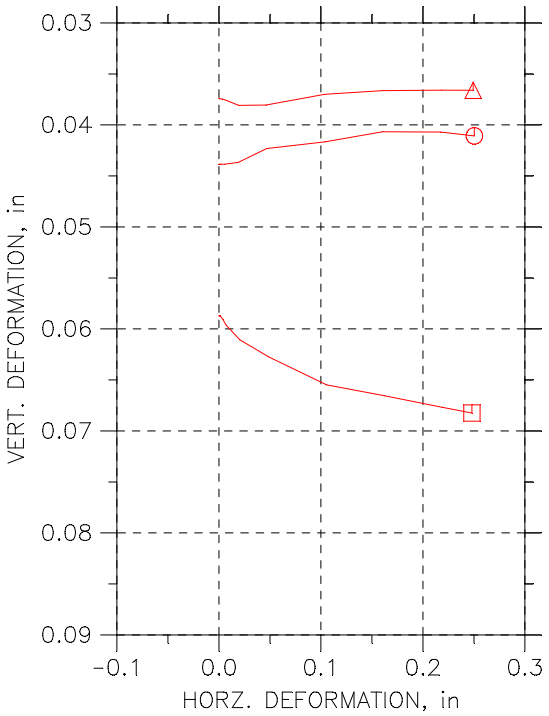
Remarks: **Target Recompaction: 95% of MDD at OMC+2%**

Wed, 27-JUL-2022 10:34:05

DIRECT SHEAR TEST REPORT







Symbol		○	△	□	
Test No.		1	2	3	
Sample No.		Bulk	Bulk	Bulk	
Shape		Circular	Circular	Circular	
Initial	Dimension, in	2.4859	2.4859	2.4875	
	Area, in^2	4.8535	4.8535	4.8598	
	Height, in	0.9891	0.9891	0.99	
	Water Content, %	10.2	10.2	10.1	
	Dry Density, pcf	124.87	125.31	125.42	
	Saturation, %	91.49	86.95	87.06	
	Void Ratio	0.32488	0.32018	0.31899	
Consol. Height, in		0.94502	0.95171	0.93178	
Consol. Void Ratio		0.26584	0.27027	0.24143	
Final	Water Content, %	16.82	15.17	14.10	
	Dry Density, pcf	130.28	130.13	134.71	
	Saturation, %	100.0	100.0	100.0	
	Void Ratio	0.26987	0.27133	0.22806	
Normal Stress, tsf		0.99856	2.0005	3.9993	
Max. Shear Stress, tsf		1.0206	1.6016	2.338	
Ult. Shear Stress, tsf		1.0053	1.5701	2.338	
Time to Failure, min		8.0033	6.0035	8.9951	
Disp. Rate, in/min		0.03	0.03	0.03	
Estimated Specific Gravity		2.65	2.65	2.65	
Liquid Limit		31	31	31	
Plastic Limit		17	17	17	
Plasticity Index		14	14	14	

Project: Yeager Airport

Location: Charleston, WV

Project No.: 17386-0

Boring No.: P-15

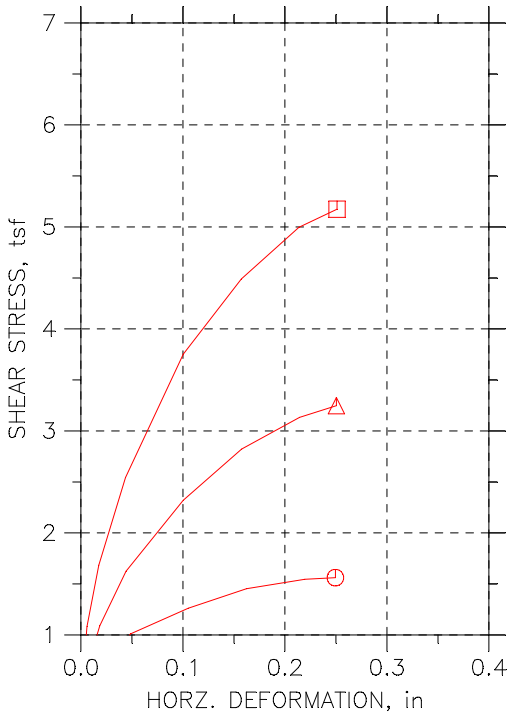
Sample Type: **Bulk 30'-35'**

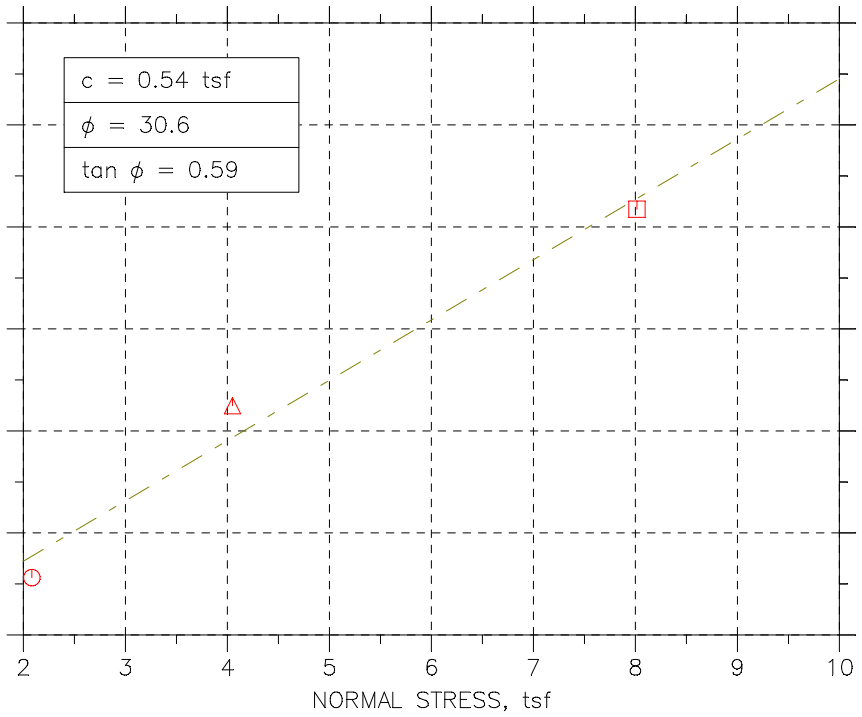
Description: Grey Lean Clay with Sand

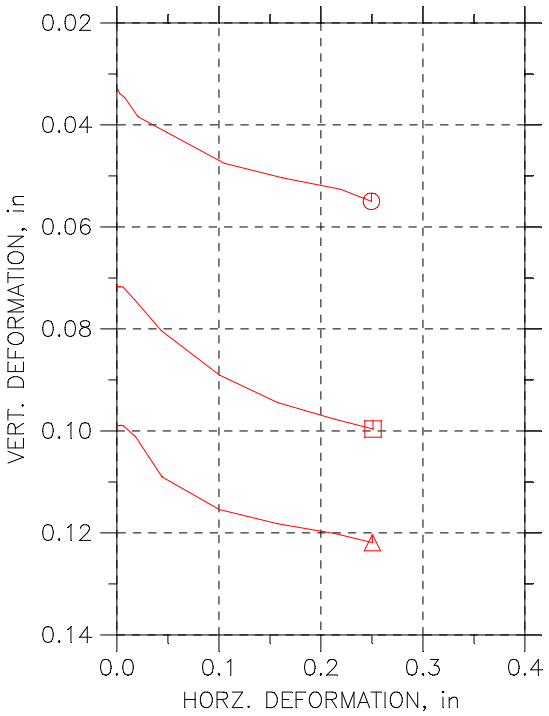
Remarks: **Target Recompaction: 95% of MDD at OMC +2%**

Wed, 27-JUL-2022 10:34:05

DIRECT SHEAR TEST REPORT







Symbol		◷	△	□	
Test No.		1	2	3	
Sample No.		Bulk	Bulk	Bulk	
Shape		Circular	Circular	Circular	
Initial	Dimension, in	2.4939	2.4944	2.4947	
	Area, in^2	4.8848	4.8868	4.8879	
	Height, in	0.9878	0.9938	0.9929	
	Water Content, %	10.3	9.9	10.2	
	Dry Density, pcf	115.52	116.84	115.84	
	Saturation, %	69.50	70.37	68.07	
	Void Ratio	0.43206	0.41588	0.42815	
Consol. Height, in		0.95477	0.89474	0.92115	
Consol. Void Ratio		0.38418	0.27475	0.32495	
Final	Water Content, %	18.30	15.36	15.70	
	Dry Density, pcf	122.33	133.18	128.76	
	Saturation, %	137.65	168.08	146.07	
	Void Ratio	0.35235	0.24218	0.28484	
Normal Stress, tsf		2.0826	4.0492	8.0145	
Max. Shear Stress, tsf		1.5617	3.2481	5.1739	
Ult. Shear Stress, tsf		1.5617	3.2481	5.1739	
Time to Failure, min		9.0743	9.2534	9.3158	
Disp. Rate, in/min		0.03	0.03	0.03	
Estimated Specific Gravity		2.65	2.65	2.65	
Liquid Limit		29	29	29	
Plastic Limit		17	17	17	
Plasticity Index		12	12	12	

Project: Yeager Airport

Location: Charleston, WV

Project No.: 17386-0

Boring No.: P-19

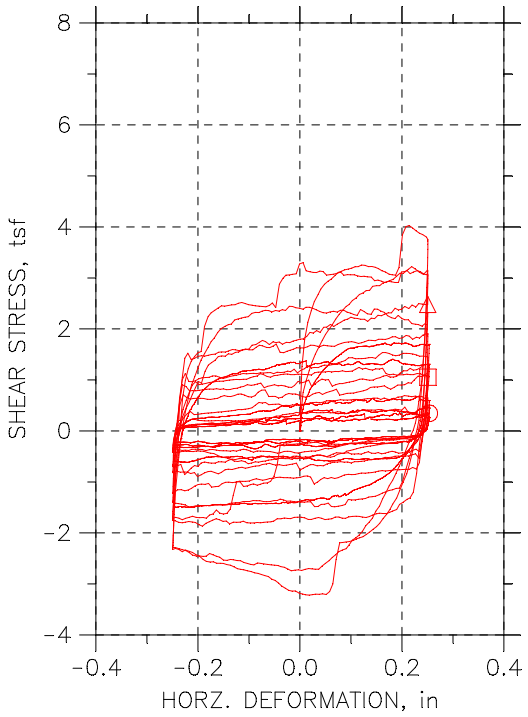
Sample Type: **Bulk Sample 0'-5'**

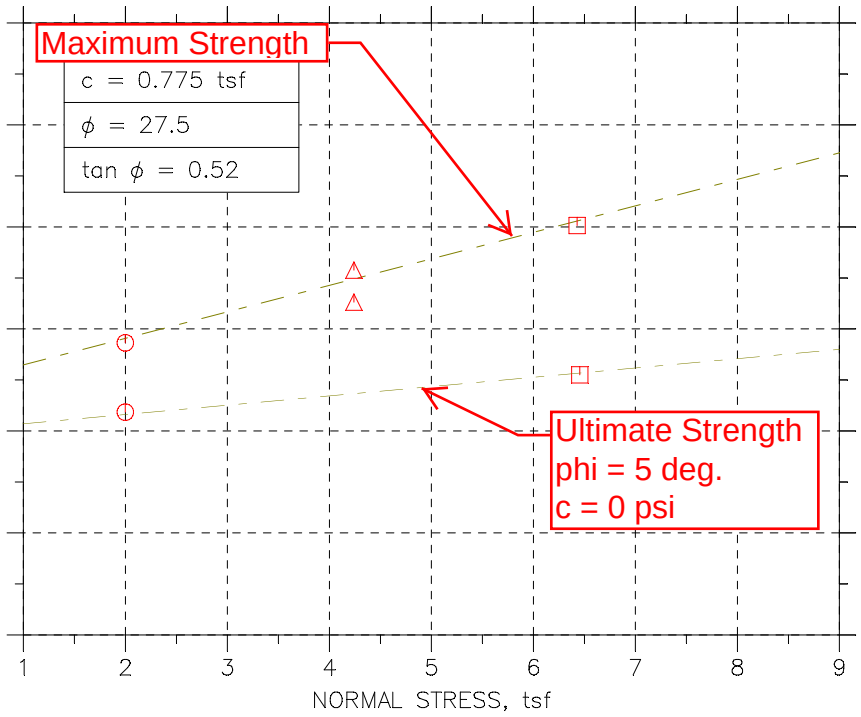
Description: Brown Clayey Sand with Gravel (SC)

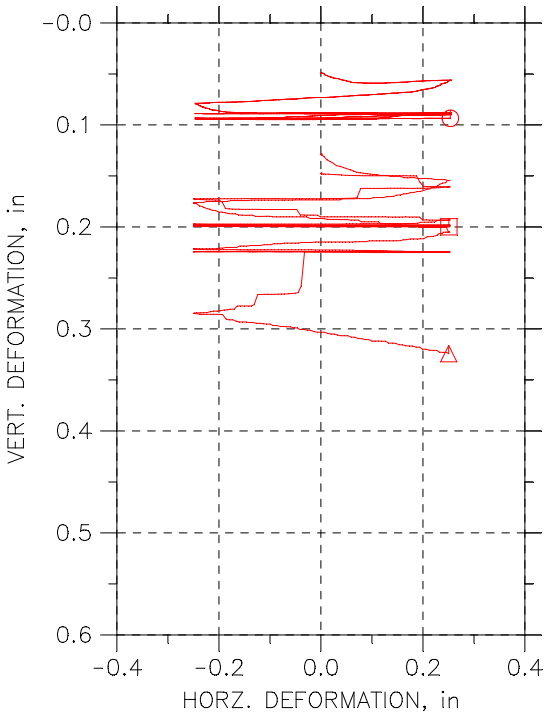
Remarks: **Target Recompaction: 95% of the MDD at OMC**

Wed, 07-SEP-2022 09:17:05

DIRECT SHEAR TEST REPORT







Symbol		○	△	□	
Test No.		1	2	3	
Sample No.		T-5	T-5	T-5	
Shape		Circular	Circular	Circular	
Initial	Dimension, in	2.492	2.4938	2.4926	
	Area, in^2	4.8774	4.8844	4.8797	
	Height, in	0.9901	0.9884	0.9879	
	Water Content, %	12.8	9.9	11.1	
	Dry Density, pcf	120.8	116.2	113.0	
	Saturation, %	87.6	59.4	61.0	
	Void Ratio	0.39	0.45	0.49	
Consol. Height, in		0.94129	0.86193	0.84058	
Consol. Void Ratio		0.5038	0.57637	0.39981	
Final	Water Content, %	19.0	15.3	15.8	
	Dry Density, pcf	120.73	142.37	131.77	
	Saturation, %	100.0	100.0	100.0	
	Void Ratio	0.43231	0.21463	0.31235	
Normal Stress, tsf		1.9992	4.2401	6.4291	
Max. Shear Stress, tsf		1.7273	3.1517	4.0268	
Ult. Shear Stress, tsf		0.34497	2.4812	1.0529	
Time to Failure, min		576	78.205	68.002	
Disp. Rate, in/min		0.00035	0.0035	0.0035	
Estimated Specific Gravity		2.77	2.77	2.77	
Liquid Limit		31	31	31	
Plastic Limit		20	20	20	
Plasticity Index		11	11	11	

Project: Yeager Airport
Location: West Virginia
Project No.: 17386-0
Boring No.: P-19 20'-20.5'
Sample Type: Undisturbed
Description: Green-Brown Lean Clay, trace Sand and Rock Fragments (vis)
Remarks:

Thu, 18-AUG-2022 13:39:17

Rock Comp. Strength

ASTM D2938

Project Name: Yeager Airport **Project #:** 17386-0 **Date:** 08/09/22

Sample ID: P-8 C-2	**Location: Charelston,WV**	**Depth: 64'**
Rock Type: Shale	**Rock Description: Greyish White Shale**	

Unconfined Compressive Strength	
Max Load (lbs)	11205
Unc. Comp. Str. (psi)	4661

Unit Weight	
Mass (g)	N/A

Picture of Sample

Dimensions	
Length (in)	3.67
	3.68
	3.66
Diameter (in)	1.75
	1.75
	1.75

Comments

Laboratory Technician
Name: J. Cooper
Date Tested: 08/09/2022

Rock Comp. Strength

ASTM D2938

Project Name: Yeager Airport **Project #:** 17386-0 **Date:** 08/09/22

Sample ID: P-8 C-4	**Location: Charelston,WV**	**Depth: 72'**
Rock Type: Siltstone	**Rock Description: Greyish White Siltstone**	

Unconfined Compressive Strength	
Max Load (lbs)	14396
Unc. Comp. Str. (psi)	5988

Unit Weight	
Mass (g)	N/A

Picture of Sample

Dimensions	
Length (in)	3.66
	3.65
	3.64
Diameter (in)	1.75
	1.75
	1.75

Comments

Laboratory Technician
Name: J. Cooper
Date Tested: 08/9/2022

Rock Comp. Strength

ASTM D2938

Project Name: Yeager Airport **Project #:** 17386-0 **Date:** 08/09/2022

Sample ID: P-9 C-1	**Location: Charelston,WV**	**Depth: 37.5'**
Rock Type: Sandstone	**Rock Description: Yellow Brown Weathered Sandstone**	

Unconfined Compressive Strength	
Max Load (lbs)	6122
Unc. Comp. Str. (psi)	2547

Unit Weight	
Mass (g)	N/A

Picture of Sample

Dimensions	
Length (in)	3.73
	3.77
	3.73
Diameter (in)	1.75
	1.75
	1.75

Comments

Laboratory Technician
Name: J. Cooper
Date Tested: 08/09/2022

Rock Comp. Strength

ASTM D2938

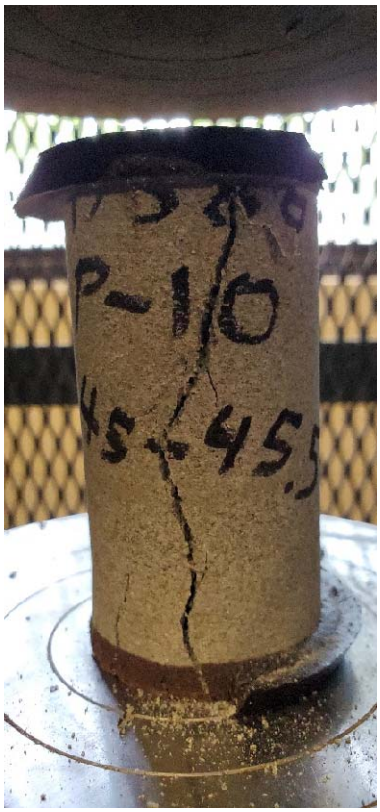
Project Name: Yeager Airport **Project #:** 17386-0 **Date:** 7/25/22

Sample ID: P-10 C-5	**Location: Charelston,WV**	**Depth:45'**
Rock Type: Sandstone	**Rock Description: Greyish white moderately weathered Sandstone**	

Unconfined Compressive Strength	
Max Load (lbs)	14173
Unc. Comp. Str. (psi)	5895

Unit Weight	
Mass (g)	342.7

Picture of Sample



Dimensions	
Length (in)	3.55
	3.55
	3.53
Diameter (in)	1.75
	1.75
	1.75

Comments

Laboratory Technician
Name: Samuel Svoboda
Date Tested: 07/20/2022

Rock Comp. Strength

ASTM D2938

Project Name: Yeager Airport **Project #:** 17386-0 **Date:** 08/09/22

Sample ID: P-11 C-2	**Location: Charelston,WV**	**Depth: 5'**
Rock Type: Sandstone	**Rock Description: Yellow Brown Sandstone**	

Unconfined Compressive Strength	
Max Load (lbs)	18533
Unc. Comp. Str. (psi)	7709

Unit Weight	
Mass (g)	N/A

Picture of Sample

Dimensions	
Length (in)	3.62
	3.63
	3.65
Diameter (in)	1.75
	1.75
	1.75

Comments

Laboratory Technician
Name: J. Cooper
Date Tested: 08/09/2022

Rock Comp. Strength

ASTM D2938

Project Name: Yeager Airport **Project #:** 17386-0 **Date:** 08/09/22

Sample ID: P-12 C-4	**Location: Charelston,WV**	**Depth: 43'**
Rock Type: Sandstone	**Rock Description: Greyish White Sandstone**	

Unconfined Compressive Strength	
Max Load (lbs)	17622
Unc. Comp. Str. (psi)	7330

Unit Weight	
Mass (g)	N/A

Picture of Sample

Dimensions	
Length (in)	3.6
	3.63
	3.63
Diameter (in)	1.75
	1.75
	1.75

Comments

Laboratory Technician
Name: J. Cooper
Date Tested: 08/09/2022

Rock Comp. Strength

ASTM D2938

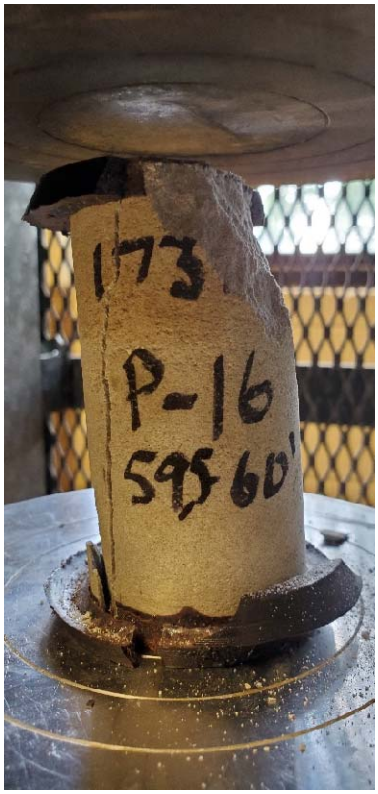
Project Name: Yeager Airport **Project #:** 17386-0 **Date:** 7/25/22

Sample ID: P-16 C-2	**Location: Charelston,WV**	**Depth: 60'**
Rock Type: Sandstone	**Rock Description: Grey moderately weathered Sandstone**	

Unconfined Compressive Strength	
Max Load (lbs)	16938
Unc. Comp. Str. (psi)	7127

Unit Weight	
Mass (g)	319.5

Picture of Sample



Dimensions	
Length (in)	3.46
	3.45
	3.47
Diameter (in)	1.74
	1.73
	1.75

Comments

Laboratory Technician
Name: Samuel Svoboda
Date Tested: 07/20/2022

Rock Comp. Str. and Unit Weight ASTM D2938

Project Name: Yeager Airport **Project #:** 17386-0 **Date:** 7/25/22

Sample ID: P-18 C-5	Location: Charelston,WV	Depth: 50'
Rock Type:Siltstone	Rock Description: Grey moderately weatered Siltstone	

Unconfined Compressive Strength	
Max Load (lbs)	12993
Unc. Comp. Str. (psi)	5467

Unit Weight	
Mass (g)	363.1

Picture of Sample

Dimensions	
Length (in)	3.52
	3.51
	3.53
Diameter (in)	1.74
	1.74
	1.74

Comments

Laboratory Technician
Name: Samuel Svoboda
Date Tested: 07/20/2022

Rock Comp. Strength

ASTM D2938

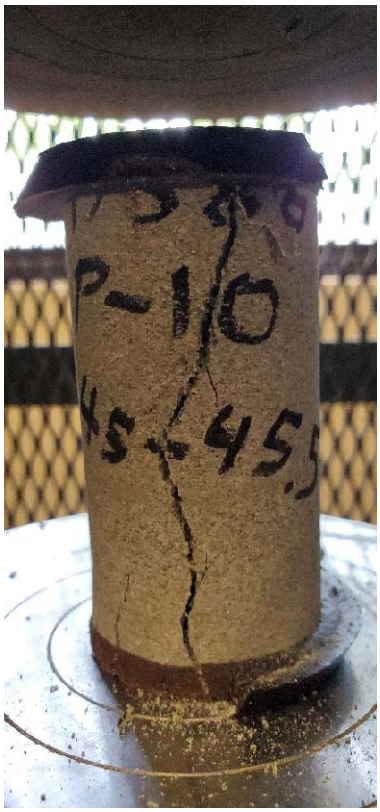
Project Name: Yeager Airport **Project #:** 17386-0 **Date:** 7/25/22

Sample ID: P-10 C-5	**Location: Charelston,WV**	**Depth:45'**
Rock Type: Sandstone	**Rock Description: Greyish white moderately weathered Sandstone**	

Unconfined Compressive Strength	
Max Load (lbs)	14173
Unc. Comp. Str. (psi)	5895

Unit Weight	
Mass (g)	342.7

Picture of Sample



Dimensions	
Length (in)	3.55
	3.55
	3.53
Diameter (in)	1.75
	1.75
	1.75

Comments

Laboratory Technician
Name: Samuel Svoboda
Date Tested: 07/20/2022

Client:	Robert B. Balter Company				
Project:	WV International Yeager Airport				
Location:	Charleston, WV			Project No:	GTX-315900
Boring ID:	P-11	Sample Type:	cylinder	Tested By:	tlm
Sample ID:	C-4	Test Date:	08/24/22	Checked By:	smd
Depth :	14-15.4 ft	Test Id:	681968		
Test Comment:	---				
Visual Description:	See photograph(s)				
Sample Comment:	---				

Slake Durability of Shales and Similar Weak Rocks by ASTM D4644

Boring ID	Sample ID	Depth	Visual Description	Slake Durability Index %	Average water temperature, degrees C	As-Received Water Content %	Description of Fragments
P-11	C-4	14-15.4 ft	See photograph(s)	98.0	21	0.8	Type I

Comments: Description of the appearance of the fragments retained in the drum:

Type I - Retained pieces remain virtually unchanged

Type II - Retained materials consist of large and small fragments

Type III - Retained material is exclusively small fragments

Before Test:

After Test:

Client:	Robert B. Balter Company				
Project:	WV International Yeager Airport				
Location:	Charleston, WV			Project No:	GTX-315900
Boring ID:	P-12	Sample Type:	cylinder	Tested By:	tlm
Sample ID:	C-3	Test Date:	08/24/22	Checked By:	smd
Depth :	34.7-35.1 ft	Test Id:	681969		
Test Comment:	---				
Visual Description:	See photograph(s)				
Sample Comment:	---				

Slake Durability of Shales and Similar Weak Rocks by ASTM D4644

Boring ID	Sample ID	Depth	Visual Description	Slake Durability Index %	Average water temperature, degrees C	As-Received Water Content %	Description of Fragments
P-12	C-3	34.7-35.1 ft	See photograph(s)	96.5	21	0.9	Type I

Comments: Description of the appearance of the fragments retained in the drum:

Type I - Retained pieces remain virtually unchanged

Type II - Retained materials consist of large and small fragments

Type III - Retained material is exclusively small fragments

Before Test:

After Test:

Client:	Robert B. Balter Company				
Project:	WV International Yeager Airport				
Location:	Charleston, WV			Project No:	GTX-315900
Boring ID:	P-13	Sample Type:	cylinder	Tested By:	tlm
Sample ID:	C-5	Test Date:	08/24/22	Checked By:	smd
Depth :	44-45.2 ft	Test Id:	681970		
Test Comment:	---				
Visual Description:	See photograph(s)				
Sample Comment:	---				

Slake Durability of Shales and Similar Weak Rocks by ASTM D4644

Boring ID	Sample ID	Depth	Visual Description	Slake Durability Index %	Average water temperature, degrees C	As-Received Water Content %	Description of Fragments
P-13	C-5	44-45.2 ft	See photograph(s)	97.8	21	0.6	Type I

Comments: Description of the appearance of the fragments retained in the drum:

Type I - Retained pieces remain virtually unchanged

Type II - Retained materials consist of large and small fragments

Type III - Retained material is exclusively small fragments

Before Test:

After Test:

Client:	Robert B. Balter Company				
Project:	WV International Yeager Airport				
Location:	Charleston, WV			Project No:	GTX-315900
Boring ID:	P-14	Sample Type:	cylinder	Tested By:	tlm
Sample ID:	C-2	Test Date:	08/24/22	Checked By:	smd
Depth :	45.5-46.5 ft	Test Id:	681971		
Test Comment:	---				
Visual Description:	See photograph(s)				
Sample Comment:	---				

Slake Durability of Shales and Similar Weak Rocks by ASTM D4644

Boring ID	Sample ID	Depth	Visual Description	Slake Durability Index %	Average water temperature, degrees C	As-Received Water Content %	Description of Fragments
P-14	C-2	45.6-46.5 ft	See photograph(s)	96.9	21	0.3	Type I

Comments: Description of the appearance of the fragments retained in the drum:

Type I - Retained pieces remain virtually unchanged

Type II - Retained materials consist of large and small fragments

Type III - Retained material is exclusively small fragments

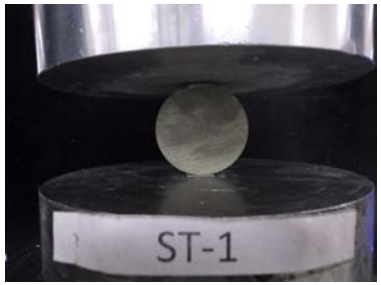
Before Test:

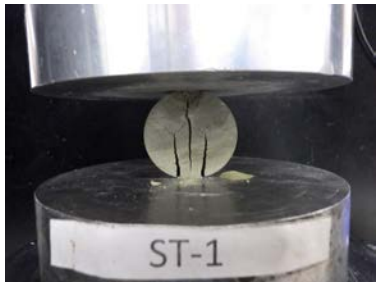
After Test:

Client:	Robert B. Balter Company				
Project:	WV International Yeager Airport				
Location:	Charleston, WV			Project No:	GTX-315900
Boring ID:	P-11	Sample Type:	cylinder	Tested By:	tlm
Sample ID:	C-3	Test Date:	08/29/22	Checked By:	smd
Depth :	9-9.9 ft	Test Id:	681972		
Test Comment:	---				
Visual Description:	---				
Sample Comment:	---				

Splitting Tensile Strength of Intact Rock Core Specimens by ASTM D3967

Specimen Depth	Test No	Thickness (L), in	Diameter (D), in	Thickness to Diameter Ratio (L/D)	Failure Load (P), lbs	Splitting Tensile Strength, psi	Failure Type
9-9.9 ft	ST-1	0.85	1.76	0.49	1,763	747	1





Notes: Strain rate: 2.5%/min.

ASTM requires the thickness-to-diameter ratio (L/D) of each test specimen to be between 0.2 and 0.75.

The reported thickness (L) is the average of three measurements.

The reported diameter(D) is the average of three measurements.

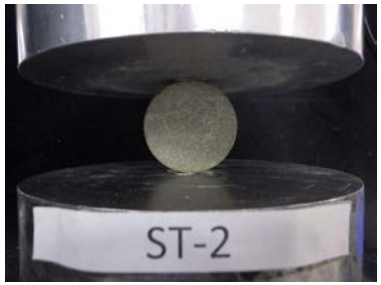
Failure Type: 1 = Intact Material Failure; 2 = Discontinuity Failure; 3 = Intact Material and Discontinuity Failure (See attached photographs)

GeoTesting EXPRESS

Client:	Robert B. Balter Company				
Project:	WV International Yeager Airport				
Location:	Charleston, WV			Project No:	GTX-315900
Boring ID:	P-11	Sample Type:	cylinder	Tested By:	tlm
Sample ID:	C-4	Test Date:	08/29/22	Checked By:	smd
Depth :	14-15.4 ft	Test Id:	681973		
Test Comment:	---				
Visual Description:	---				
Sample Comment:	---				

Splitting Tensile Strength of Intact Rock Core Specimens by ASTM D3967

Specimen Depth	Test No	Thickness (L), in	Diameter (D), in	Thickness to Diameter Ratio (L/D)	Failure Load (P), lbs	Splitting Tensile Strength, psi	Failure Type
14-15.4 ft	ST-2	0.84	1.75	0.48	1,324	572	1



Notes: Strain rate: 2.5%/min.

ASTM requires the thickness-to-diameter ratio (L/D) of each test specimen to be between 0.2 and 0.75.

The reported thickness (L) is the average of three measurements.

The reported diameter(D) is the average of three measurements.

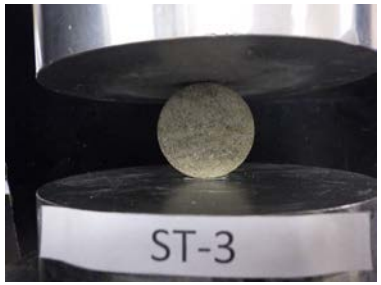
Failure Type: 1 = Intact Material Failure; 2 = Discontinuity Failure; 3 = Intact Material and Discontinuity Failure (See attached photographs)

GeoTesting EXPRESS

Client:	Robert B. Balter Company				
Project:	WV International Yeager Airport				
Location:	Charleston, WV			Project No:	GTX-315900
Boring ID:	P-12	Sample Type:	cylinder	Tested By:	tlm
Sample ID:	C-3	Test Date:	08/29/22	Checked By:	smd
Depth :	34.7-35.1 ft	Test Id:	681974		
Test Comment:	---				
Visual Description:	---				
Sample Comment:	---				

Splitting Tensile Strength of Intact Rock Core Specimens by ASTM D3967

Specimen Depth	Test No	Thickness (L), in	Diameter (D), in	Thickness to Diameter Ratio (L/D)	Failure Load (P), lbs	Splitting Tensile Strength, psi	Failure Type
34.7-35.1 ft	ST-3	0.83	1.75	0.47	793	349	1



Notes: Strain rate: 2.5%/min.

ASTM requires the thickness-to-diameter ratio (L/D) of each test specimen to be between 0.2 and 0.75.

The reported thickness (L) is the average of three measurements.

The reported diameter(D) is the average of three measurements.

Failure Type: 1 = Intact Material Failure; 2 = Discontinuity Failure; 3 = Intact Material and Discontinuity Failure (See attached photographs)

GeoTesting EXPRESS

Client:	Robert B. Balter Company				
Project:	WV International Yeager Airport				
Location:	Charleston, WV			Project No:	GTX-315900
Boring ID:	P-13	Sample Type:	cylinder	Tested By:	tlm
Sample ID:	C-5	Test Date:	08/29/22	Checked By:	smd
Depth :	44-45.2 ft	Test Id:	681975		
Test Comment:	---				
Visual Description:	---				
Sample Comment:	---				

Splitting Tensile Strength of Intact Rock Core Specimens by ASTM D3967

Specimen Depth	Test No	Thickness (L), in	Diameter (D), in	Thickness to Diameter Ratio (L/D)	Failure Load (P), lbs	Splitting Tensile Strength, psi	Failure Type
44-45.2 ft	ST-4	0.92	1.75	0.53	1,130	445	1

Notes: Strain rate: 2.5%/min.

ASTM requires the thickness-to-diameter ratio (L/D) of each test specimen to be between 0.2 and 0.75.

The reported thickness (L) is the average of three measurements.

The reported diameter(D) is the average of three measurements.

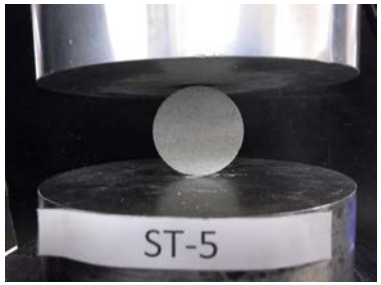
Failure Type: 1 = Intact Material Failure; 2 = Discontinuity Failure; 3 = Intact Material and Discontinuity Failure (See attached photographs)

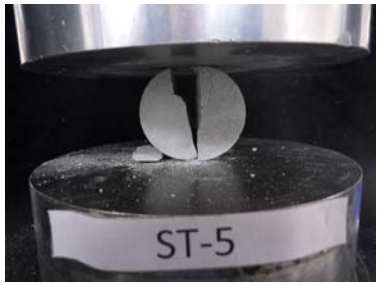
GeoTesting EXPRESS

Client:	Robert B. Balter Company				
Project:	WV International Yeager Airport				
Location:	Charleston, WV			Project No:	GTX-315900
Boring ID:	P-14	Sample Type:	cylinder	Tested By:	tlm
Sample ID:	C-2	Test Date:	08/29/22	Checked By:	smd
Depth :	45.5-46.5 ft	Test Id:	681976		
Test Comment:	---				
Visual Description:	---				
Sample Comment:	---				

Splitting Tensile Strength of Intact Rock Core Specimens by ASTM D3967

Specimen Depth	Test No	Thickness (L), in	Diameter (D), in	Thickness to Diameter Ratio (L/D)	Failure Load (P), lbs	Splitting Tensile Strength, psi	Failure Type
45.5-46.5 ft	ST-5	0.81	1.77	0.46	2,483	1,100	1





Notes: Strain rate: 2.5%/min.

ASTM requires the thickness-to-diameter ratio (L/D) of each test specimen to be between 0.2 and 0.75.

The reported thickness (L) is the average of three measurements.

The reported diameter(D) is the average of three measurements.

Failure Type: 1 = Intact Material Failure; 2 = Discontinuity Failure; 3 = Intact Material and Discontinuity Failure (See attached photographs)

GeoTesting EXPRESS

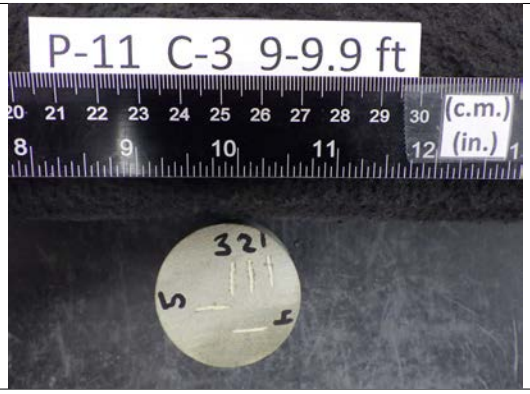
Client:	Robert B. Balter Company				
Project:	WV International Yeager Airport				
Location:	Charleston, WV			Project No:	GTX-315900
Boring ID:	P-11	Sample Type:	cylinder	Tested By:	tlm
Sample ID:	C-3	Test Date:	09/06/22	Checked By:	smd
Depth :	9-9.9 ft	Test Id:	681962		
Test Comment:	---				
Visual Description:	---				
Sample Comment:	---				

Abrasiveness of Rock Using the Cerchar Method by ASTM D7625

Boring ID	Sample ID	Depth	Stylus No	Reading 1	Reading 2	Average	Comments
P-11	C-3	9-9.9 ft	1	1.5	0.9	1.20	
			2	1.6	1.3	1.45	
			3	1.1	0.9	1.00	
			4	1.0	1.0	1.00	
			5	0.5	0.7	0.60	
			Average CAIs			1.05	
			Average CAI *			1.52	
					CERCHAR Abrasiveness Index Classification	**Medium abrasiveness**	

Notes

Test Surface: Saw Cut
Moisture Condition: As Received
Apparatus Type: Original CERCHAR
Stylus Hardness: Rockwell Hardess 54/56 HRC
Stylus Displacement Relative to Rock Fabric:
Styli 1-3: Normal; Styli 4-5: Parallel
* CAI = (0.99 * CAIs) + 0.48
CAIs = CERCHAR index for smooth (saw cut) surface
CAI = CERCHAR index for natural surface
Comments:



GeoTesting EXPRESS

Client:	Robert B. Balter Company				
Project:	WV International Yeager Airport				
Location:	Charleston, WV			Project No:	GTX-315900
Boring ID:	P-11	Sample Type:	cylinder	Tested By:	tlm
Sample ID:	C-4	Test Date:	09/06/22	Checked By:	smd
Depth :	14-15.4 ft	Test Id:	681963		
Test Comment:	---				
Visual Description:	---				
Sample Comment:	---				

Abrasiveness of Rock Using the Cerchar Method by ASTM D7625

Boring ID	Sample ID	Depth	Stylus No	Reading 1	Reading 2	Average	Comments
P-11	C-4	14-15.4 ft	1	1.6	1.7	1.65	
			2	2.4	3.0	2.70	
			3	2.3	1.6	1.95	
			4	1.8	1.5	1.65	
			5	2.0	1.9	1.95	
			Average CAIs			1.98	
			Average CAI *			2.44	
				CERCHAR Abrasiveness Index Classification		**High abrasiveness**	

Notes

Test Surface: Saw Cut
Moisture Condition: As Received
Apparatus Type: Original CERCHAR
Stylus Hardness: Rockwell Hardess 54/56 HRC
Stylus Displacement Relative to Rock Fabric:
Styli 1-3: Normal; Styli 4-5: Parallel
* CAI = (0.99 * CAIs) + 0.48
CAIs = CERCHAR index for smooth (saw cut) surface
CAI = CERCHAR index for natural surface
Comments:

GeoTesting EXPRESS

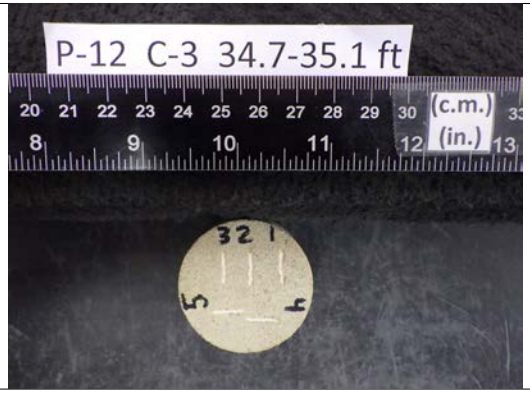
Client:	Robert B. Balter Company				
Project:	WV International Yeager Airport				
Location:	Charleston, WV			Project No:	GTX-315900
Boring ID:	P-12	Sample Type:	cylinder	Tested By:	tlm
Sample ID:	C-3	Test Date:	09/06/22	Checked By:	smd
Depth :	34.7-35.1 ft	Test Id:	681964		
Test Comment:	---				
Visual Description:	---				
Sample Comment:	---				

Abrasiveness of Rock Using the Cerchar Method by ASTM D7625

Boring ID	Sample ID	Depth	Stylus No	Reading 1	Reading 2	Average	Comments
P-12	C-3	34.7-35.1 ft	1	1.5	1.2	1.35	
			2	0.7	0.9	0.80	
			3	2.1	1.9	2.00	
			4	1.4	1.6	1.50	
			5	1.5	1.4	1.45	
			Average CAIs			1.42	
			Average CAI *			1.89	
CERCHAR Abrasiveness Index Classification						**Medium abrasiveness**	

Notes

Test Surface: Saw Cut
Moisture Condition: As Received
Apparatus Type: Original CERCHAR
Stylus Hardness: Rockwell Hardess 54/56 HRC
Stylus Displacement Relative to Rock Fabric:
Styli 1-3: Normal; Styli 4-5: Parallel
* CAI = (0.99 * CAIs) + 0.48
CAIs = CERCHAR index for smooth (saw cut) surface
CAI = CERCHAR index for natural surface
Comments:



GeoTesting EXPRESS

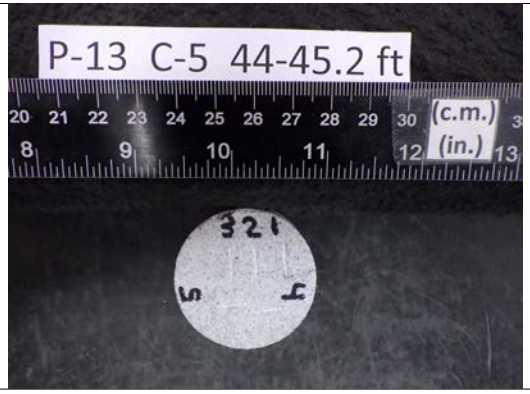
Client:	Robert B. Balter Company				
Project:	WV International Yeager Airport				
Location:	Charleston, WV			Project No:	GTX-315900
Boring ID:	P-13	Sample Type:	cylinder	Tested By:	tlm
Sample ID:	C-5	Test Date:	09/06/22	Checked By:	smd
Depth :	44-45.2 ft	Test Id:	681965		
Test Comment:	---				
Visual Description:	---				
Sample Comment:	---				

Abrasiveness of Rock Using the Cerchar Method by ASTM D7625

Boring ID	Sample ID	Depth	Stylus No	Reading 1	Reading 2	Average	Comments
P-13	C-5	44-45.2 ft	1	2.5	2.9	2.70	
			2	1.8	2.0	1.90	
			3	2.6	2.8	2.70	
			4	2.3	2.2	2.25	
			5	1.7	2.0	1.85	
			Average CAIs			2.28	
			Average CAI *			2.74	
					CERCHAR Abrasiveness Index Classification	**High abrasiveness**	

Notes

Test Surface: Saw Cut
Moisture Condition: As Received
Apparatus Type: Original CERCHAR
Stylus Hardness: Rockwell Hardess 54/56 HRC
Stylus Displacement Relative to Rock Fabric:
Styli 1-3: Normal; Styli 4-5: Parallel
* CAI = (0.99 * CAIs) + 0.48
CAIs = CERCHAR index for smooth (saw cut) surface
CAI = CERCHAR index for natural surface
Comments:



GeoTesting EXPRESS

Client:	Robert B. Balter Company				
Project:	WV International Yeager Airport				
Location:	Charleston, WV			Project No:	GTX-315900
Boring ID:	P-14	Sample Type:	cylinder	Tested By:	tlm
Sample ID:	C-2	Test Date:	09/06/22	Checked By:	smd
Depth :	45.5-46.5 ft	Test Id:	681966		
Test Comment:	---				
Visual Description:	---				
Sample Comment:	---				

Abrasiveness of Rock Using the Cerchar Method by ASTM D7625

Boring ID	Sample ID	Depth	Stylus No	Reading 1	Reading 2	Average	Comments
P-14	C-2	45.5-46.5 ft	1	3.5	3.4	3.45	
			2	2.7	3.0	2.85	
			3	3.6	4.2	3.90	
			4	3.6	3.7	3.65	
			5	4.4	5.6	5.00	
			Average CAIs			3.77	
			Average CAI *			4.21	
					CERCHAR Abrasiveness Index Classification	**Extreme abrasiveness**	

Notes

Test Surface: Saw Cut
Moisture Condition: As Received
Apparatus Type: Original CERCHAR
Stylus Hardness: Rockwell Hardess 54/56 HRC
Stylus Displacement Relative to Rock Fabric:
Styli 1-3: Normal; Styli 4-5: Parallel
* CAI = (0.99 * CAIs) + 0.48
CAIs = CERCHAR index for smooth (saw cut) surface
CAI = CERCHAR index for natural surface
Comments: