

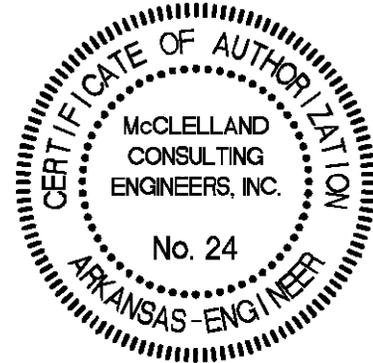
November 7, 2025

**Nabholz Construction Corporation**

3301 N. 2nd Street  
Rogers, Arkansas 72756

**ATTN:** Mr. Bill Earwood  
Project Manager

**RE:** Geotechnical Report for  
Packaging Specialties Expansion  
Fayetteville, Arkansas  
MCE Project Number: 25-3879



Dear Mr. Earwood,

We are submitting herewith the Geotechnical Report on the above-referenced project. We appreciate the opportunity to provide this service to you. If there are any questions regarding the Geotechnical Investigation, please contact us.

Sincerely yours,



A handwritten signature in blue ink that reads "William M. Hopkins".

**William M. Hopkins, PE**  
Associate | Geotechnical Engineer



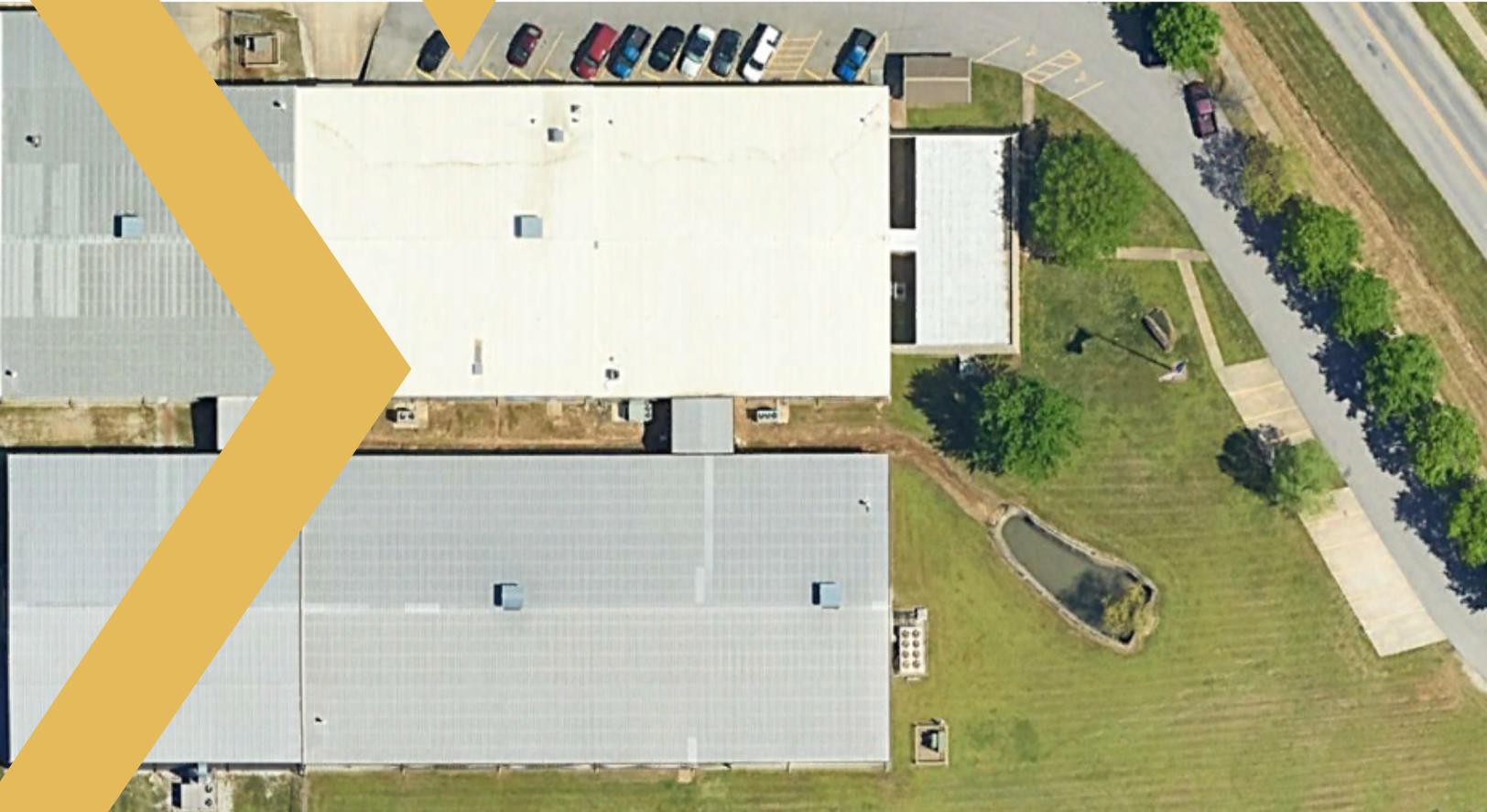
11.07.2025

A handwritten signature in blue ink that reads "Ryan D. Vance".

**Ryan D. Vance**  
Geotechnical Field Professional

**Enclosure:** Geotechnical Report

1580 East Stearns Street  
Fayetteville, Arkansas 72703  
[mce.us.com](http://mce.us.com)



# GEOTECHNICAL INVESTIGATION

**Packaging Specialties Expansion**  
Fayetteville, Arkansas

Project No. 25-3879  
November, 2025

Prepared For:  
**Nabholz Construction Corporation**  
Mr. Bill Earwood  
3301 N. 2nd Street  
Rogers, Arkansas 72756  
[bill.earwood@nabholz.com](mailto:bill.earwood@nabholz.com)

# GEOTECHNICAL REPORT

## Packaging Specialties Expansion

MCE Project Number: 25-3879

Fayetteville, Arkansas

FOR

### **Nabholz Construction Corporation**

3301 N. 2<sup>nd</sup> Street

Rogers, Arkansas 72756

### Executive Summary

This is a report of the findings of the Geotechnical Investigation for an expansion to the Packaging Specialties facility located in Fayetteville, Arkansas. This report includes information on surface materials and subsurface conditions in addition to providing recommendations for site preparation, grading, structure foundations, and minimum recommended pavement sections. The significant findings listed below should not be used separately from the further discussion provided in the body of this report.

- This Geotechnical Investigation consisted of 10 project borings.
  - Perched groundwater was encountered within project borings B-02 and B-03 at depths of approximately 12 feet and three (3) feet below the existing surface elevations, respectively.
  - Auger refusal materials were encountered within project borings B-01 through B-05 at depths ranging from approximately eight (8) to 14 feet below the existing surface elevations.
- Surface materials (Stratum I) encountered across the project site consisted of topsoil materials, gravel, and rigid concrete pavement.
  - The topsoil was observed to have thicknesses ranging from approximately four (4) to five (5) inches, while the gravel was observed to have a thickness of approximately six (6) inches, where encountered. The rigid concrete pavement encountered in project boring B-04 had a thickness of approximately seven (7) inches.
- The materials that make up Stratum II consist of Lean Clay (CL), Lean Clay with Sand (CL), Sandy Lean Clay (CL), and Clayey Sand (SC) materials.
- The materials that make up Stratum III consist of highly weathered shale.
- The materials that make up Stratum IV consist of consistent shale materials, indicative of the Fayetteville Shale Formation.
- Based on the observations made at the time of this investigation, materials in suitable condition for the placement of select fill within the structure footprint were encountered at a depth of approximately two (2) feet below the existing surface elevations.
  - However, the in-situ Stratum II materials are known to be highly susceptible to reduced shear strengths upon exposure to increased moisture conditions. As such, it is generally not recommended that foundation elements bear directly on these materials, unless explicitly reviewed and approved at the time of construction by the Geotechnical Engineer or his/her representative.
  - Based on the expected maximum loading conditions and the subsurface materials encountered during this investigation, it is recommended that a shallow foundation system composed of continuous and/or individual (spread) footings will be suitable for the support of the planned warehouse structure.
  - It is recommended that the shallow foundation elements bear on a minimum of one (1) foot of newly placed, properly compacted select fill materials, bearing on suitable Stratum II materials.

- Within the planned gravel access drive and loading dock, materials in suitable condition for the placement of select fill and/or the direct bearing of the gravel/pavement sections were not observed to be present within the relevant feature locations. As such, considerations for the use of a geogrid and aggregate fill section have been provided in *Section 11.8.1*.
- Within the concrete apron, materials in suitable condition for the placement of select fill were encountered in the upper two (2) feet below the existing surface elevations. However, due to the proximity to the unsuitable materials in the loading dock and gravel access drive, these materials may be present in the south/southwestern portions of the concrete drive as well.
  - Should the conditions encountered within the concrete access drive remain consistent with those observed during this investigation, it is recommended that the pavement materials bear on a minimum of two (2) feet of imported select fill, with an allowance for up to three (3) feet to be placed, should unsuitable conditions be encountered at the time of construction. As an alternative, the Contractor may elect to budget for the placement of the geogrid and aggregate section, as described for the project loading dock in place of the typical imported select fill.

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- Appendix A: Boring Layout
- Appendix B: Boring Logs
- Appendix C: Laboratory Results

## **1.0 Introduction**

McClelland Consulting Engineers, Inc. (MCE) conducted a subsurface investigation for the planned expansion of the Packaging Specialties facility located in Fayetteville, Arkansas. The investigation was requested and authorized by Mr. Bill Earwood, Project Manager with Nabholz Construction Corporation. This investigation was intended to explore the subsurface soil conditions within the project area in order to provide recommendations for site preparation, grading, structure foundations, and recommended minimum pavement sections.

## **2.0 Existing Site Description**

The project site is located at the existing Packaging Specialties facility, at 1663 S. Armstrong Avenue in Fayetteville, Arkansas. The site is primarily located within one (1) parcel with Washington County Parcel ID 765-19973-000, with a portion of the improvements located within the parcel to the south, with a county ID number of 765-19971-000.

The site is currently developed with two (2) structures associated with the Packaging Specialties facility, as well as an access drive, parking areas, and a trailer/equipment laydown area. The laydown area is partially paved with rigid concrete materials, with the remainder covered in gravel. On-site vegetation primarily consists of low to medium cut grass, as well as mature trees along the southern site boundary. Topographically, the site generally exhibits a downward slope from the north to the south, with maximum grade differentials estimated to be on the order of six (6) feet.

## **3.0 Project Scope**

The project scope includes the new construction of a single-story warehouse-type structure intended to house three (3) printing presses, as well as a new gravel access drive along the southern boundary of the site, a new loading dock on an existing building, and a concrete breezeway. The warehouse structure is planned to have a footprint of approximately 28,000 square-feet (SF) and is expected to feature a slab-on-grade. It is anticipated that the building will be constructed of conventional steel framing. Structural loading conditions were not available at the time of preparing this report; however, it is expected that the maximum column and wall loads will not exceed 150 kips and two (2) kips per linear foot (klf), respectively.

The new loading dock is planned to be located on the southeastern portion of the existing southern building. This dock is planned to feature two (2) bays and is expected to be constructed of concrete materials. Access to this loading dock is expected to be provided by a concrete entrance apron (shown in yellow in Figure 1 on the following page). A gravel access drive (shown in blue/green in Figure 1 on the following page) is expected to provide access from this apron to the new warehouse structure.

Figure 1 on the following page is provided as a visual of the site plan provided, as of the issuance of this report.

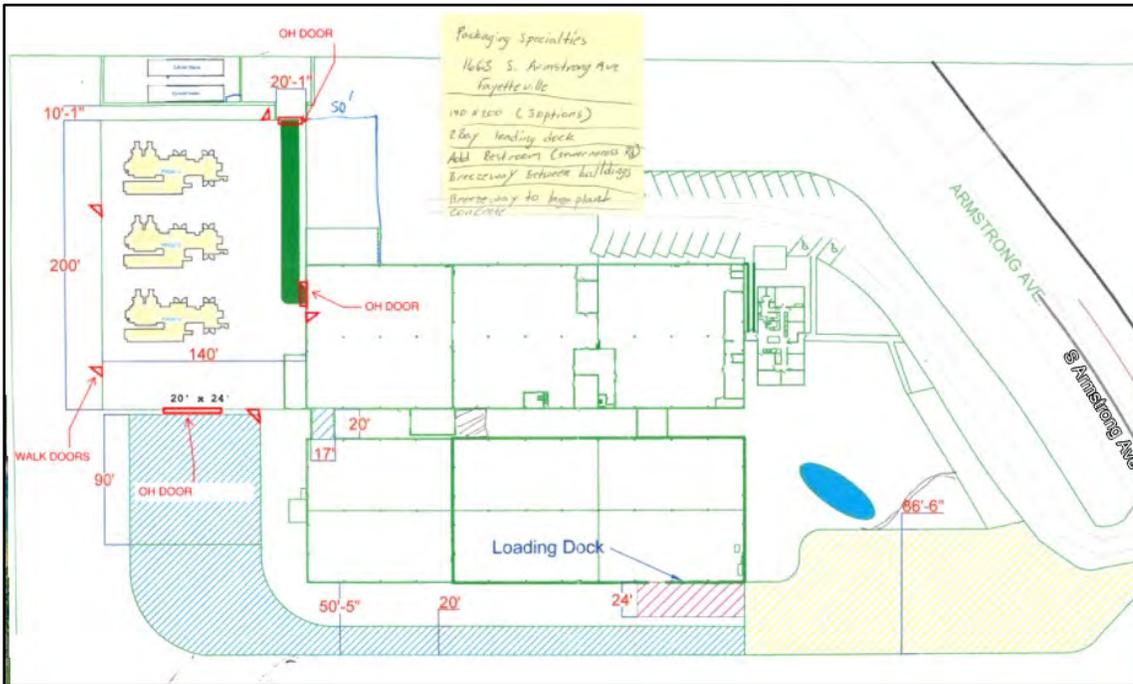


Figure 1: Provided Site Plan

#### 4.0 Field Investigation

Based on the provided information, MCE conducted a Geotechnical Investigation consisting of 10 project borings. These borings were laid out across the project site in an effort to obtain the appropriate subsurface data for the project scope.

Table 1 below provides details on the project borings, their relevant improvement features, and their planned target depths.

Table 1: Project Boring Locations and Target Depths

Boring ID	Target Depth (ft)	Location in the Development Area
B-01	20.0	Warehouse Structure
B-02	20.0	Warehouse Structure
B-03	20.0	Warehouse Structure
B-04	20.0	Warehouse Structure
B-05	20.0	Warehouse Structure
B-06	6.5	Gravel Access Drive
B-07	6.5	Gravel Access Drive
B-08	6.5	Gravel Access Drive
B-09	6.5	Loading Dock & Paved Entrance Apron
B-10	6.5	Paved Entrance Apron

Boring Layouts are provided in Appendix A on Plates 1 and 2, and the boring logs can be referenced in Appendix B on Plates 3 through 12. A key to the terms and symbols utilized on the boring logs is presented in Appendix B on Plate 13.

The project borings were conducted using a CME-45B truck-mounted drill rig, utilizing 4.5-inch diameter solid stem augers. Soil samples were obtained at the depths indicated on the boring logs with the use of a two (2) inch diameter split-spoon sampler.

The split-spoon sampler was driven by blows from a 140-pound automatic hammer dropped from a fixed height of 30 inches. The number of blows required to drive the split-spoon sampler the final 12 inches of an 18-inch drive, or portion thereof, is referred to as the Standard Penetration value, N, and is recorded on the boring logs in units of blows-per-foot. The final drilled depths are shown as the depths achieved by the split-spoon sampler.

In addition to Standard Penetration Testing (SPT), the field tests performed included visual soil/rock classifications and groundwater observations.

Table 2 below provides details for each project boring.

**Table 2: Project Boring Details**

Boring ID	Existing Surface Elevations (ft)	Surface Material	Surface Material Thickness (in)	Groundwater Depth (ft)	Planned Target Depth (ft)	Auger Refusal Depth (ft)	End of Boring Depth (ft)	End of Boring Elevation (ft)
B-01	1,200.0	Topsoil	3.0	-	20.0	14.0	14.0	1,186.0
B-02	1,201.0	Gravel	6.0	12.0	20.0	12.5	12.5	1,188.5
B-03	1,200.0	Gravel	6.0	3.0	20.0	9.5	9.5	1,190.5
B-04	1,200.0	Concrete	7.0	-	20.0	8.0	8.0	1,192.0
B-05	1,198.0	Topsoil	4.0	-	20.0	8.8	8.8	1,189.2
B-06	1,199.0	Gravel	6.0	-	6.5	-	6.5	1,192.5
B-07	1,196.0	Topsoil	4.0	-	6.2	-	6.2	1,189.8
B-08	1,197.0	Topsoil	4.0	-	6.5	-	6.5	1,190.5
B-09	1,199.0	Topsoil	5.0	-	6.5	-	6.5	1,192.5
B-10	1,197.0	Topsoil	4.0	-	6.5	-	6.5	1,190.5

NOTES: Elevations shown in Table 2 are rounded to the nearest one (1) foot and are estimated based on the provided *Topographic Survey*, produced by Blew and Associates, Inc., dated June 3, 2025.

Reported thicknesses of the surface materials are rounded to the nearest one (1) inch.

#### 4.1 Encountered Groundwater Conditions

At the time of the investigation, groundwater was encountered within project borings B-02 and B-03 at depths ranging from three (3) to 12 feet below the existing surface elevations (groundwater elevations ranging from approximately 1189.0 to 1197.0 feet). The installation and periodic measurement of monitoring wells would be required to establish seasonal piezometric surfaces below the project site. Project grading should be properly designed to discharge any surface water that may develop following precipitation events.

Based on the encountered subsurface materials, this encountered water is anticipated to constitute perched groundwater. As a result of the low permeability created by the clays and hard rock materials, groundwater has the potential to collect in a “perched” condition during and after precipitation events.

This could cause significant issues during excavation operations if not properly mitigated. Any groundwater or perched water must be removed, if encountered during construction, prior to the placement of fill or paving elements. To help reduce the potential for issues related to perched water, it is recommended that earthwork operations take place during historically dry portions of the calendar year (June through September). Earthwork operations conducted outside of this recommended timeframe should expect general dewatering measures to be required to maintain a desirable construction schedule.

#### 4.2 Encountered Auger Refusal Materials

Auger refusal materials are generally defined as materials that prevent the advancement of the boring depth through traditional auger drilling techniques. Refusal is somewhat subjective and is dependent on the type of drilling equipment used and the down pressures exerted by the drill rig.

During this investigation, refusal materials were encountered by project borings B-01 through B-05 at depths ranging from approximately eight (8) to 14.5 feet below the existing surface elevations (refusal elevations ranging from approximately 1,186.0 feet to 1,192.0 feet). Based on the observations made during this investigation and the mapped local geology of the project site, it is anticipated that these materials generally consisted of hard shale materials, indicative of the underlying Fayetteville Shale formation.

More information on the local geology and how it may affect the project site can be found in the *Local Geology of the Project Site* section of this report (*Section 7.0*). Additional guidance regarding these materials and the potential for difficult excavation conditions are provided in the *Rock Excavation Considerations* section of this report (*Section 11.4*).

## **5.0 Laboratory Analysis**

Laboratory tests were performed on soil samples recovered from the borings. The laboratory tests were conducted to determine the engineering properties of the project strata. The tests performed on samples from the borings included moisture content, Atterberg Limits, and sieve analyses of the soil samples.

The results of the laboratory testing for the project borings are provided on the boring logs and in the Laboratory Testing Results, found in Appendix C on Plates 14 through 17. Table 3 below shows the relevant test method specifications utilized on the project.

Table 3: Laboratory Test Method Specifications

Test Designation	Test Method
ASTM D2488	Standard Practice for Description and Identification of Soils (Visual)
ASTM D2487	Standard Practice for Classification of Soils for Engineering Purpose (USCS)
ASTM D2216	Standard Test Method for Lab Determination of Water Content of Soil
ASTM D6913	Standard Test Method for Particle-Size Distribution of Soils Using Sieve Analysis
ASTM D4318	Standard Test Method for Liquid Limit, Plastic Limit, and Plasticity Index of Soils

## **6.0 On-Site Soil Conditions**

The following project sections provide information regarding on-site conditions at the project location. This information includes descriptions of the existing soil types, imagery showing the approximate location of the existing soil types, and details about the local geology.

### **6.1 United States Department of Agriculture (USDA) Soil Types and Map**

The following soil types exist in the project area according to current USDA soil maps, with descriptions from the Natural Resources Conservation Service (NRCS). The project site is located in Washington County in Northwest Arkansas. The existing soil types are briefly detailed in Table 4 on the following page.

Table 4: USDA Local Soil Types

USDA Soil Type	USDA Symbol	USDA Descriptions
Savannah Fine Sandy Loam	SfC2	The Savannah series consists of very deep, moderately well-drained, moderately slowly permeable soils on uplands and terraces in the Southern Coastal Plain. They formed in loamy marine or fluvial terrace deposits. Slopes range from 0 to 15 percent.
Sloan Silt Loam	Sn	The Sloan series consists of very deep, very poorly-drained soils formed in loamy alluvium on flood plains. Slope ranges from 0 to two (2) percent.
Taloka Silt Loam	ToA	The Taloka series consists of very deep, somewhat poorly-drained soils that formed in loamy and clayey colluvium and/or alluvium weathered from interbedded shales and sandstone of Pennsylvanian age. These soils are on interfluves and paleo terraces. Slope ranges from 0 to three (3) percent.



**Figure 2: USDA Soil Survey Report Image**  
The image was produced by the United States Department of Agriculture.  
The red outline represents the approximate extent of the project site.

## 7.0 Local Geology of the Project Site

According to maps and literature published by the United States Geological Survey (USGS) and the Arkansas Geological Survey (AGS), the project site is underlain by the Mississippian-Age (300 to 350 million years old) Fayetteville Shale (including the Wedington Sandstone Member) and Boone Formations. Brief descriptions from the Stratigraphic Summary of Arkansas – Information Circular 36 (IC36) of the local geologic formations are provided below, as well as how these materials may impact the project site.

## 7.1 Fayetteville Shale Formation (Including the Wedington Sandstone Member)

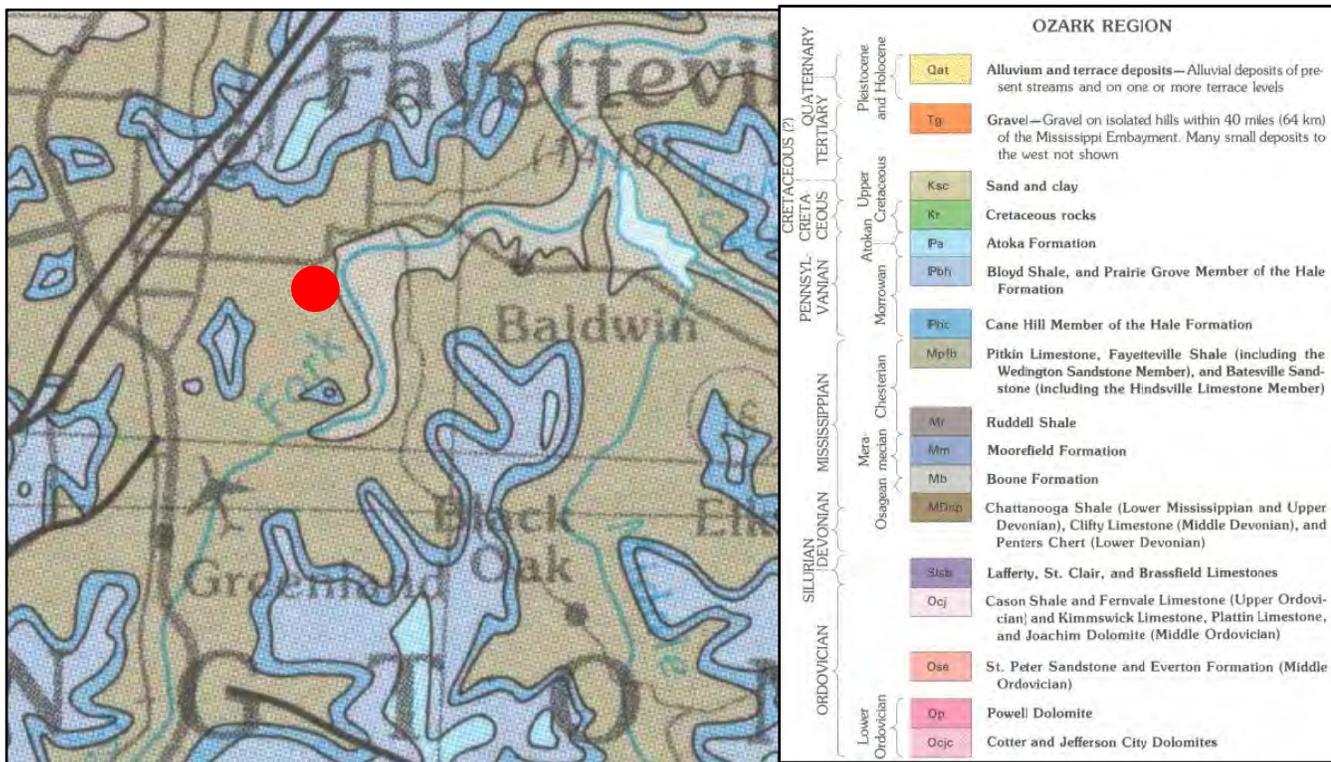
The Fayetteville Shale is a black, fissile, concretionary, clay shale. Dark gray, fine-grained limestones commonly are interbedded with the shales in north-central Arkansas. The Wedington Sandstone Member, known from west Arkansas outcrops, is composed of gray to brown, fine-grained, sometimes calcareous sandstone. Septarian concretions are common in lower beds of the Fayetteville but may be found throughout the formation. Fossils are abundant in some intervals and in local areas. The formation is considered to rest conformably on the Batesville Sandstone (and Hindsville Member). The Fayetteville Shale ranges in thickness from 10 to 400 feet.

## 7.2 Boone Formation

The Boone Formation is primarily comprised of fine to coarse-grained limestone with interbedded chert. The quantity and quality of the chert are known to vary considerably both vertically and horizontally within the Boone Formation. Residual soils formed from the Boone Formation typically consist of various gradations of clay, sand, and chert gravel. The Boone Formation is named after exposures in Boone County, Arkansas. The Boone Formation is well known for its karst features such as springs and sinkholes. The Boone Formation is thought to range from 300 to 400 feet in thickness, according to most literature.

The chert layers associated with the Boone Formation are known to provide excavation difficulties depending on the quality and consistency of the chert. The weathered cherts associated with the Boone have a “chalky” texture and tend to be easier to excavate than those with a more competent structure.

Figure 3 below provides a visual of the local geologic formations in relation to the project site.

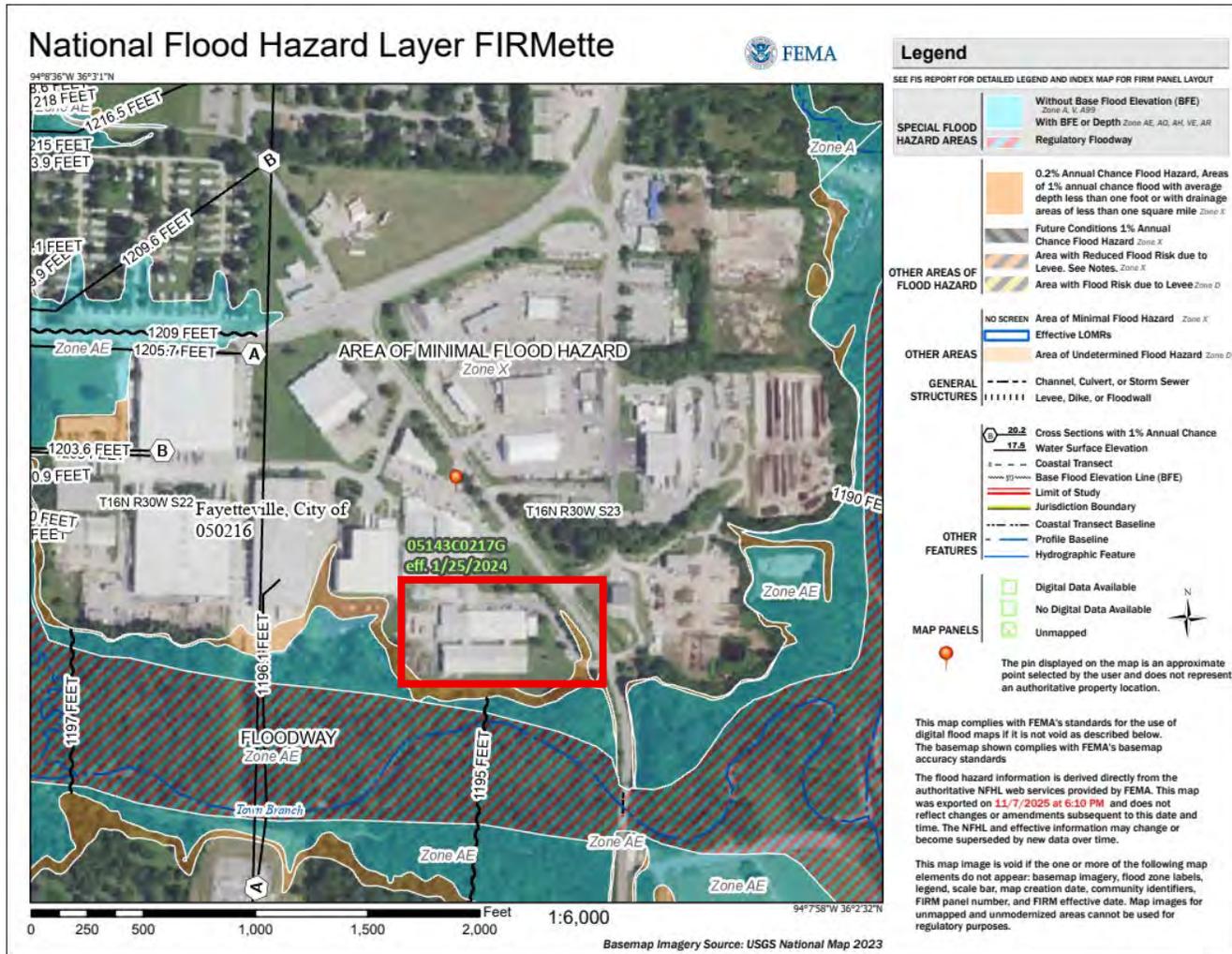


**Figure 3: Image from the Geologic Map of Arkansas (1993)**  
The red dot represents the approximate location of the project site.

## 8.0 Hydrologic Conditions of the Project Site

The subject property is noted to be within a “Flood Hazard Area” and immediately adjacent to an area of “Special Flood Hazard Area (without a Base Flood Elevation)”, as shown on Panel 05143C0217G of the National Flood Hazard Layer FIRMette, produced by the Federal Emergency Management Agency (FEMA). The panel is shown with an effective date of January 25<sup>th</sup>, 2024.

An image of the FEMA Flood Map (Panel 05143C0217G) may be referenced in Figure 4 below.



**Figure 4:** Image from the National Flood Hazard Layer FIRMette, produced by FEMA  
The red outline represents the approximate location of the project site

## 9.0 IBC Site Classification

The proposed development area is recommended to be assigned as a Risk Category II according to Table 1604.5 of the 2021 International Building Code (IBC). The site seismic classification determination may utilize the seismic values outlined in Table 5 on the following page, with reference to Section 1613 of the 2021 IBC and the American Society of Civil Engineers (ASCE) 7-16. These values are based on a Site Class C for the soil profile within the project area.

Table 5: Seismic Design Values

Seismic Values	
$S_s$	0.162
$S_1$	0.092
$F_a$	1.3
$F_v$	1.5
$S_{MS}$	0.211
$S_{M1}$	0.138
$S_{DS}$	0.141
$S_{D1}$	0.092
$T_L$	12
PGA	0.077
$PGA_M$	0.101
$F_{PGA}$	1.3
$I_e$	1
$C_v$	0.7
Seismic Design Category	B

## 10.0 On-Site Soil Stratum Summary

This summary is based on a collection of field notes and field-testing values recorded during investigation, notes recorded during the laboratory analysis, and results from the laboratory testing. The encountered subsurface conditions are summarized below and on the following page.

### 10.1 Stratum I – Surface Materials

The surface materials encountered during the investigations consisted of topsoil materials, gravel, and rigid concrete pavement. The topsoil was observed to have thicknesses ranging from approximately four (4) to five (5) inches, while the gravel was observed to have a thickness of approximately six (6) inches, where encountered. The rigid concrete pavement encountered in project boring B-04 had a thickness of approximately seven (7) inches. These thicknesses are only valid for the project boring locations and may vary in unexplored portions of the project site.

### 10.2 Stratum II – Shallow Subsurface Materials

The materials that make up Stratum II consist of Lean Clay (CL), Lean Clay with Sand (CL), Sandy Lean Clay (CL), and Clayey Sand (SC) materials. These materials were generally encountered in various shades of brown and gray and contained varying amounts and gradations of fines, sand, and gravel.

Table 6 on the following page organizes the consistency, moisture content, and plasticity properties of the Stratum II soils.

Table 6: Stratum II Materials – Classification Data

Property	Stratum II - CL Materials	Stratum II – SC Materials
Consistency Values	Very Soft to Hard	Dense
N-Values	Two (2) to 24	24
Natural Soil Moisture Content (%)	9.6 to 26.2	12.6
Liquid Limit (LL)	31 to 46	36
Plasticity Index (PI)	15 to 27	19
Plasticity Characteristics	Low to Moderate Plasticity	Low to Moderate Plasticity
Fine Fraction of Total Mass (%)	62 to 86	33
Volumetric Change Potential	Low to Moderate Due to Moisture Content Variation	Low to Moderate Due to Moisture Content Variation

### 10.3 Stratum III – Highly Weathered Shale Materials

The materials that make up Stratum III consist of highly weathered shale materials. In accordance with the Unified Soils Classification System (USCS), these materials classified as a Lean Clay with Sand (CL) material.

Table 7 below organizes the consistency, moisture content, and plasticity properties of the Stratum III materials.

Table 7: Stratum III Materials – Classification Data

Property	Stratum III – Highly Weathered Shale
Consistency Values	Soft
N-Values	40
Natural Soil Moisture Content (%)	16.7
Liquid Limit (LL)	41
Plasticity Index (PI)	18
Plasticity Characteristics	Low Plasticity
Fine Fraction of Total Mass (%)	50
Volumetric Change Potential	Low to Moderate Due to Moisture Content Variation

### 10.4 Stratum IV – Consistent Shale Materials

The materials that make up Stratum IV included consistent shale materials indicative of the underlying Fayetteville Shale Formation. These materials were generally encountered as dark gray to black in color.

Table 8 on the following page organizes the consistency, moisture content, and plasticity properties of the Stratum IV materials.

Table 8: Stratum IV Materials – Classification Data

Property	Stratum IV – Shale Materials
Consistency Values	Soft to Hard
N-Values	Greater than 50
Natural Soil Moisture Content (%)	4.7 to 12.1
Liquid Limit (LL)	N/A
Plasticity Index (PI)	N/A
Plasticity Characteristics	Low Plasticity
Fine Fraction of Total Mass (%)	-
Volumetric Change Potential	Moderate Due to Moisture Content Variation

Note: N/A Indicates that Tests related to these values were not run on samples obtained from this Stratum.

## 11.0 Engineer’s Analysis and Recommendations

At the time of preparing this report, it is understood that the project scope includes the new construction of a single-story structure intended to house three (3) printing presses. This structure is expected to be constructed of metal framing with a slab-on-grade and is planned to have a footprint of approximately 28,000 SF. Although final structural loading conditions were not provided at the time of preparing this report, it is expected that maximum column and wall loads will not exceed 150 kips and two (2) klf, respectively.

In addition to the structure, a new loading dock is expected to be constructed on the southern-most existing structure. Access to this loading dock is to be provided by a new concrete entrance apron. From this entrance apron, a gravel drive is expected to provide access to the new warehouse structure.

The purpose of this investigation was to obtain the appropriate subsurface information from which to provide recommendations and considerations for the planned improvements. Those recommendations and considerations are presented in the following sub-sections of this report.

### 11.1 Initial Site Preparation

As previously described in the Stratum I summary (*Section 9.1*), the project borings encountered topsoil materials, gravel, and rigid concrete pavement at the surface of the project site. The topsoil was observed to have thicknesses ranging from approximately four (4) to five (5) inches, the gravel was observed to have a thickness of approximately six (6) inches, and the rigid concrete pavement encountered in project boring B-04 had a thickness of approximately seven (7) inches.

Mature trees were also observed along the southwestern bounds of the site. Within the vicinity of the trees, it is anticipated that the topsoil and organic materials may extend to depths beyond those encountered during this investigation (likely to depths of two (2) feet or greater below the existing surface elevations).

**MCE recommends that all Stratum I surface materials, as well as all organics and otherwise deleterious materials, be removed full-depth as part of the initial site preparation.**

MCE recommends that the Contractor carry an initial budget for the removal of a minimum of 12 inches of surface materials to fully remove the topsoil, gravel, and pavement materials from the project site.

### 11.2 Site Grading Considerations

Although final site grading plans were not available at the time of preparing this report, it is anticipated that a majority of the final site grades will be at or very near those of existing, with only minor cuts and fills required to achieve these elevations.

When existing site elevations are in a “fill” condition, initial site grading operations should consist of stripping the Stratum I surface materials, followed by the evaluation of the underlying in-situ subgrade in accordance with *Section 11.3* of this report. In circumstances where existing site elevations are in a “cut” condition, initial site grading should consist of the stripping of the Stratum I surface materials and initial excavation to the planned finished subgrade elevations, followed by the evaluation of the underlying in-situ subgrade in accordance with *Section 11.3*.

For the purposes of this report, “suitable” material refers to subgrade materials that MCE believes will pass proof rolling operations in their current state. Based on the anticipated loading conditions for the warehouse structure and pavement improvements, these materials are generally anticipated as being adequate for the placement of select fill. However, the in-situ Stratum II materials are known to be highly susceptible to reduced shear strengths upon exposure to increased moisture conditions. As such, it is generally not recommended that foundation elements bear directly on these materials, unless explicitly reviewed and approved at the time of construction by the Geotechnical Engineer or his/her representative.

Based on the observations made at the time of this investigation, materials in suitable condition for the placement of select fill within the structure footprint were encountered at a depth of approximately two (2) feet below the existing surface elevations. Considerations for the use of shallow foundation systems have been provided for the consideration of the Design Team in *Section 11.6*.

Within the planned gravel access drive and loading dock, materials in suitable condition for the placement of select fill and/or the direct bearing of the gravel/pavement sections were not observed to be present within the relevant feature locations. As such, considerations for the use of a geogrid and aggregate fill section have been provided in *Section 11.8.1*. The use of a geogrid and aggregate section is expected to provide added resilience to the development features as well.

Within the concrete apron, materials in suitable condition for the placement of select fill were encountered in the upper two (2) feet below the existing surface elevations. However, due to the proximity to the unsuitable materials in the loading dock and gravel access drive, these materials may be present in the south/southwestern portions of the concrete drive as well.

Considerations and recommendations relating to the project pavement sections have been provided in *Section 11.8* and *Section 11.9*.

It is highly recommended that earthwork operations be conducted in historically dry, warm portions of the calendar year (typically June through September) to avoid increased moisture conditions and freezing weather, as well as the subsequent reduced shear strengths of the Stratum II materials. Should construction occur during historically wetter and/or colder portions of the year, additional undercut and/or subgrade remediation may be necessary to provide adequate bearing conditions.

### 11.2.1 Temporary Slopes During Construction

Excavations should be performed in accordance with the requirements outlined by the Occupational Safety and Health Administration (OSHA) 1926 – Subpart P – Appendix B. Excavated slopes during construction with depths less than 20 feet should be benched or sloped to provide the minimum horizontal-to-vertical (H:V) ratios as noted in Table 9 below.

Table 9: Temporary Slopes During Construction

On-Site Soil Stratum	Material Description	OSHA Soil Type	Maximum Allowable Slopes (H:V)
Stratum II	Shallow Subsurface Materials	Type B Soils	1:1 (45°)
Stratum III	Highly Weathered Shale Materials	Type B Soils*	1 <sup>1</sup> / <sub>2</sub> :1 (34°)
Stratum IV	Consistent Shale Materials	Type A Soils *	3/4:1 (53°)**

NOTES: OSHA Soil Type assignments should be considered preliminary and should be verified at the time of construction, if applicable, by an OSHA-competent person.

\* Stratum III and IV Highly Weathered and Consistent Shale Materials cannot be classified as Stable Rock due to the weathered nature and bedding planes of the encountered materials. These materials may become unstable if excavations experience prolonged exposure to the elements.

\*\* Maximum allowable slopes of 1/2H:1V (63°) may be utilized for temporary slopes in Type A Soils with excavation depths of 12 feet or less.

Sloping or benching of excavations greater than 20 feet deep shall be designed by a licensed Professional Engineer (PE) prior to excavation. Construction slopes steeper than recommended may be unstable, particularly when introduced to moisture increases during precipitation events. If excavation efforts require deep vertical trenching (deeper than five (5) feet), and the minimum allowable slope ratio is not achievable, then the Contractor must establish a comprehensive Shoring Plan. That Shoring Plan should be reviewed and stamped by a licensed PE prior to excavation.

### 11.3 Subgrade Verification Method

Following stripping and initial grading, the development area subgrade should be initially evaluated by the Geotechnical Engineer or his/her representative. All subgrade materials should be proof-rolled with a fully loaded, tandem-axle dump truck weighing approximately 60,000 pounds, or equivalent construction equipment.

The proof-rolling should be observed by the Geotechnical Engineer or his/her representative to verify and document suitable subgrade conditions. Alternate means of subgrade verification may be conducted should proof-rolling not be feasible within excavation or undercut dimensions or would be unreasonable given site conditions at the time of the observation. The implemented means of verification should be under the direction of the Geotechnical Engineer. Any soft and/or yielding subgrade areas encountered should be repaired by undercutting and backfilling with select fill material. These materials should then be subsequently evaluated by the Geotechnical Engineer or his/her representative for approval.

**It is highly recommended that the project pavements and structure footprint are evaluated immediately following initial site stripping and grading to reduce unnecessary undercut.**

### 11.4 Rock Excavation Considerations

Rock excavation is generally defined as igneous, metamorphic, or sedimentary rock that cannot be removed by a Caterpillar D-8 dozer (or equivalent) with a single ripper tooth (mass grading settings) or a Caterpillar 330B tracked excavator (or equivalent) equipped with rock teeth (trench settings).

As mentioned previously in *Section 4.2*, auger refusal materials (expected to be in the form of hard shale) were encountered within five (5) project borings (B-01 through B-05) at depths ranging from approximately eight (8) to 14.5 feet below the existing surface elevations (refusal elevations ranging from approximately 1,186.0 feet to 1,192.0 feet).

Based on the depths at which these rock materials were observed, it is not expected that they will be encountered at the time of construction, unless deep drainage and/or utility features are implemented under the project scope.

### 11.5 General Foundation Recommendations

The foundations relevant to the planned warehouse structure should be sized to meet three (3) conditions. First, the maximum stresses imposed on the foundation strata should not exceed the allowable bearing pressures as determined by the shear strength properties of the bearing strata. Secondly, foundations should be designed to limit the maximum anticipated total and differential settlement to magnitudes that will neither damage nor impair the use of the structures. Finally, the foundation systems must also be designed to resist the anticipated lateral or overturning forces during the most critical loading conditions, including earthquake loadings. These factors, as well as construction considerations related to the existing soil and ground conditions, were influential in the preparation of the recommendations presented hereinafter.

### 11.6 Shallow Foundation Recommendations

As described in *Section 11.0*, final structural loading conditions were not made available at the time of preparing this report. As such, the recommendations contained herein are based on the expectation that the maximum column and wall loads for the structure do not exceed 150 kips and two (2) klf, respectively.

Based on these expected maximum loading conditions and the subsurface materials encountered during this investigation, it is recommended that a shallow foundation system composed of continuous and/or individual (spread) footings will be suitable for the support of the planned warehouse structure. The recommendations contained herein are based on the anticipation that weather conditions at the time of construction are similar to those experienced at the time of this investigation and that finished site grades remain at or very near existing.

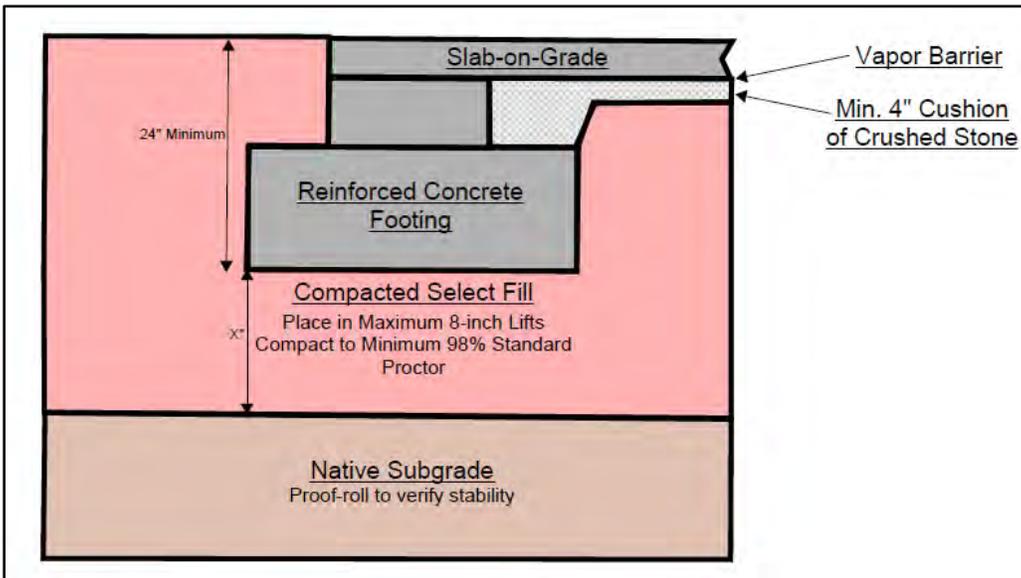
As noted in *Section 11.2*, it is generally not recommended that the shallow foundation elements bear directly on Stratum II materials, as these materials are known to lose significant shear strength if exposed to increased moisture conditions. **It is recommended that the shallow foundation elements bear on a minimum of one (1) foot of newly placed, properly compacted select fill materials, bearing on suitable Stratum II materials.** Materials expected to be in suitable condition for the placement of select fill were first encountered at a depth of approximately two (2) feet below the existing surface elevations.

As a conservative allowance, it is recommended that the Contractor budget for the placement of up to two (2) feet of imported select fill below the structure footings, should unexpected areas of instability be encountered at the time of construction.

Structure footings bearing on properly placed imported select fill bearing on suitable in-situ Stratum II materials may utilize safe allowable bearing capacities of 2,000 psf for continuous footings and 2,200 psf for spread footings.

Suitable subgrade conditions should be exposed prior to the placement of any select fill materials. The allowable bearing capacities provide a minimum factor of safety of three (3) and were calculated using a minimum footing width of three (3) feet, a minimum footing thickness of one (1) foot, and a minimum footing depth of two (2) feet below exterior ground elevations, which is adequate to protect against frost heave in the project area.

Figure 5 below is provided as a visual of the recommended minimum select fill placement below the structure footings. In this instance, the “X” in the “Compacted Select Fill” layer should represent a minimum of one (1) foot, assuming the native subgrade is in suitable condition following initial site stripping and grading operations. As noted, the Contractor is recommended to budget for up to two (2) feet in this “X” layer in the event that additional unsuitable conditions are encountered at the time of construction.



**Figure 5:** Shallow Foundation Select Fill Placement Visual

The total long-term foundation settlement for footings bearing on properly placed select fill material or on suitable in-situ materials with the assumed dimensions and loading is anticipated to be approximately ¾-inch. The maximum differential settlement between footings is anticipated to be on the order of ½-inch between individual footings or along a 40-foot span for continuous footings.

It is highly recommended that the subgrade within the structure footprint be evaluated for stability immediately following initial site stripping and grading in an effort to reduce unnecessary undercut operations. Subgrade stability verification should be performed in accordance with *Section 11.3* of this report.

## 11.7 Structure Slab-on-Grade

Slab-on-grade construction may be utilized for the planned warehouse structure, provided a minimum four (4) inch cushion of sand, crushed stone, or gravel is placed below the slab areas with a vapor barrier directly below the concrete. It is recommended that a **minimum** of one (1) foot of select fill material is properly placed beneath the slab dimensions to provide adequate subgrade support and stable under-slab conditions; however, it is conservatively recommended that the Contractor budget for the placement of a minimum of two (2) feet of imported select fill to be placed below the slab dimensions.

The entirety of the slab subgrade area is recommended to be verified during construction by proof-rolling as previously described in the *Subgrade Verification* section of this report.

## 11.8 Project Pavement Recommendations

Site grading for the planned pavement improvement areas should initially consist of stripping all Stratum I materials, followed by evaluation of the in-situ subgrade materials as previously described. Subgrade preparation and proof rolling should follow the same procedure as described in the *Subgrade Verification* section of this report.

### 11.8.1 Project Pavement Recommendations – Gravel Access Drive & Loading Dock

As noted in *Section 11.2*, materials in suitable condition for the placement of select fill and/or the direct bearing of the gravel/project pavement sections for the gravel access drive and loading dock were not observed to be present. As such, considerations for the use of a geogrid and aggregate fill section have been provided herein to establish suitable subgrade conditions, as well as to provide a more resilient section, as compared to an unsupported gravel road. It should be noted that regardless of the implemented gravel section, intermittent reworking of the gravel will be required over time to maintain a suitable driving surface.

Based on the subsurface conditions encountered within the gravel access drive at the time of this investigation, it is recommended that the Design Team consider the use of a “single-mat” section consisting of (from in-situ subgrade): a single layer of Tensar NX850 geogrid, followed by the placement of a minimum of 16 inches of Class 7 aggregate base. In this instance, this section is generally recommended as being suitable for direct traffic, unless vehicles exceeding 60,000 pounds are to utilize the road. Should this be the case, further analysis may be necessary to establish the minimum recommended section. This section should be further evaluated and may be reconsidered (at the discretion of the Geotechnical Engineer) based on the condition of the subgrade materials at the time of construction.

The above-described section should be constructed as shown in Figure 6 below.

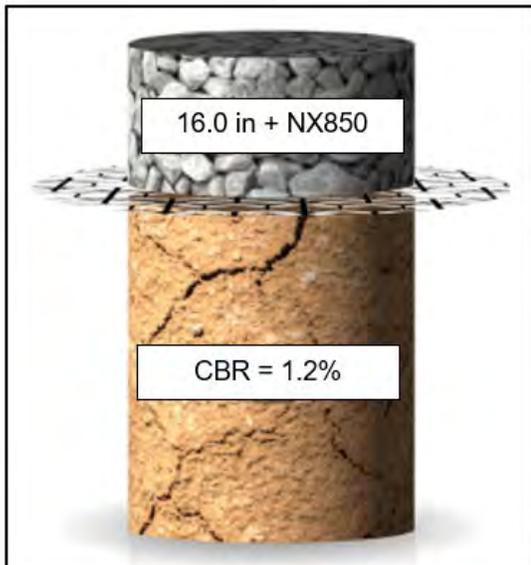
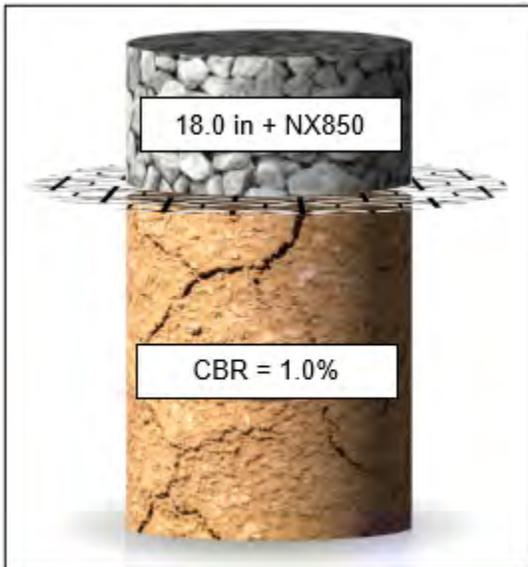


Figure 6: Gravel Access Drive Geogrid Section

Based on the subsurface conditions encountered within the dimensions of the loading dock, it is recommended that the Design Team consider the use of a “single-mat” section consisting of (from in-situ subgrade): a single layer of Tensar NX850 geogrid, followed by the placement of a minimum of 18 inches of Class 7 aggregate base. As with the gravel road section, this initially-recommended section should be further evaluated and may be reconsidered (at the discretion of the Geotechnical Engineer) based on the condition of the subgrade materials at the time of construction. It should be noted that the aggregate base utilized in the geogrid section should not be considered as part of the aggregate portion of the minimum recommended pavement section.

The above-described section should be constructed as shown in Figure 7 below.



**Figure 7: Loading Dock Geogrid Section**

Note: This visual of the section does not account for the aggregate base portion of the project pavement section and is only intended to establish suitable subgrade conditions.

### 11.8.2 Project Pavement Recommendations – Concrete Entrance Apron

Within the concrete apron, materials in suitable condition for the placement of select fill were encountered in the upper two (2) feet below the existing surface elevations. However, due to the proximity to the unsuitable materials in the loading dock and gravel access drive, these materials may be present in the south/southwestern portions of the concrete drive as well. As such, the geogrid and aggregate section described in *Section 11.8.1* for the gravel access drive may be required to establish suitable subgrade conditions, prior to the placement of the concrete pavement section. Should this be the case, the aggregate base utilized in the geogrid section should not be considered as part of the minimum recommended pavement section.

Should the conditions encountered within the concrete access drive remain consistent with those observed during this investigation, it is recommended that the pavement materials bear on a minimum of two (2) feet of imported select fill, with an allowance for up to three (3) feet to be placed, should unsuitable conditions be encountered at the time of construction. As an alternative, the Contractor may elect to budget for the placement of the geogrid and aggregate section, as described for the project loading dock in place of the typical imported select fill. This would reduce the excavation necessary to uncover materials in suitable condition for the placement of select fill, as well as produce a more “weather-proof” gravel section that may be utilized during construction.

Should typical select fill be utilized, thickened or “bridging” lifts on the order of 18 to 24 inches may be utilized to establish suitable subgrade conditions within the planned pavement improvement dimensions. Bridging lifts should only be implemented under the direction of the Geotechnical Engineer. The top eight (8) inches of any thickened lift should be compacted and tested per project specifications. A minimum of one (1) standard lift should be placed above any thickened lift utilized beneath pavement areas.

Select fill and base course material should be placed per the requirements provided in *Section 11.11* of this report.

**Bridging lifts should not be utilized beneath any structure-related elements.**

### 11.9 Minimum Pavement Section Recommendations

The pavement section recommendations provided in this section are based on suitable in-situ subgrade material and/or select fill material existing beneath the recommended sections.

This requirement would be provided by proper placement of approved select fill material and/or geogrid and aggregate section being verified by proof-rolling within the pavement dimensions. The recommended minimum pavement sections for rigid concrete (Table 10) are provided below.

For the recommendations provided in Table 10, light-duty pavements are considered to be those pavements with low-volume traffic areas such as pedestrian walkways, parking, and staging areas, and areas primarily subjected to passenger vehicles. The standard-duty pavements are recommended as performing similarly to a typical city street pavement section with a residential classification. Heavy-duty pavement recommendations are intended to apply to areas subjected to frequent heavy-truck traffic, such as the planned loading dock.

Table 10: Minimum Project Pavement Sections – Concrete Materials

Pavement Type	Pavement Materials	Light Duty	Standard Duty	Heavy Duty
Concrete Pavement	Portland Cement Concrete	5"	5"	6"
	Class 7 Base Course (95% MPD)	4"	6"	8"

The pavement sections provided in Table 10 should be viewed as minimums and can be increased through the design process by the project Civil Engineer if warranted.

### 11.10 Site Retaining Structures – Lateral Earth Pressures

Any earth-retaining structure implemented as part of the Packaging Specialties Expansion should be designed to resist the minimum equivalent fluid weights provided in Table 11 below.

The recommended minimum factor of safety against sliding and overturning is 1.5 and 2.0 respectively. The provided lateral earth pressures assume a drained condition for the backfill material. To achieve a drained condition, retaining structures should be backfilled using a free-draining granular material and be provided with thru-drains or a gravity trench drain system graded to daylight for the release of any hydrostatic pressure that may develop.

Alternate means of drainage may be required if daylighting is not an option; those alternate means would need to be discussed and approved by the Design Team. The values provided in Table 11 for No. 57 or No. 67 crushed stone gravel assume a 1H:1V maximum backfill slope from the heel of the retaining wall foundation. If a vertical "chimney drain" is provided by the No. 57 or No. 67 stone, then the values for on-site soils should be used based on proximity and relevancy to the material behind the gravel.

Table 11: Lateral Earth Pressures

Soil/Backfill Type	Moist Unit Weight (lbs/ft <sup>3</sup> )	Friction Angle $\phi$ (°)	Equivalent Fluid Pressure (lbs/ft <sup>3</sup> )		
			Active	Passive	At-Rest
On-Site Soils – Stratum II	108	21	51	229	69
Select Fill Material (GC, GM, SC)	120	28	43	332	64
No. 57 or No. 67 Stone	95	35	26	351	41

A coefficient of friction of 0.40 may be used provided the retaining structure is supported on a minimum of four (4) inches of placed and compacted Class 7 Base Course material. A friction value of 0.35 may be used provided the retaining structures are supported directly on select fill material or on-site soils.

### 11.11 Select Fill Materials

Any select fill material required for the project is recommended to be an off-site borrow material of locally available silty or clayey chert gravel or clayey sand meeting Unified Soils Classification as a GM, GC, or SC material and having a Plasticity Index of 35 or less, a Liquid Limit of 55 or less, a minimum of 30% retained on the 3/4-inch sieve and a maximum of 35% passing the No. 200 sieve. All fill and backfill should be placed in horizontal lifts.

Variations to the requirements listed above may be considered on a case-by-case basis. **Any material to be used as a select fill on the project should be reviewed and approved by the Geotechnical Engineer.**

When placing fill next to existing slopes, the slope face should be stripped of all vegetation and the face “benched” to allow the placement of horizontal lifts and bonding to the slope face. Table 12 below provides the recommended compaction parameters for select fill and Class 7 base course to be used on the project.

Table 12: Compaction Requirements

Material Type	Test Standard	Minimum Dry Density (%)	Optimum Moisture Range (%)
Select Fill (Structures)	ASTM D698 / AASHTO T99	98	-3% to +3%
Select Fill (Pavements)	ASTM D698 / AASHTO T99	95	-3% to +3%
Base Course	ASTM D1557 / AASHTO T180	95	Near Optimum

### 12.0 Construction Materials Testing and Special Inspections

Construction materials testing and special inspection services are to be provided by MCE to provide consistency with the recommendations in this report and the documentation of those recommendations being implemented during construction. Testing of the earthwork, concrete, paving, structure, and other phases is recommended to be conducted and documented during construction to assure the Owner and Engineer that the construction complies with the specifications. In particular, field verification of earthwork operations will be required to confirm the recommendations contained herein. Additionally, all trenching and excavations should be conducted following the current Arkansas State Law and Occupational Safety and Health Administration (OSHA) guidelines and requirements.

### 13.0 Limitations and Reserved Rights

The recommendations and conclusions made in this report are based on the assumption that the subsoil conditions do not deviate appreciably from those disclosed in the subsurface exploration. Should significant subsoil variations or undesirable conditions be encountered during construction that are not described herein, the Geotechnical Engineer reserves the right to inspect these conditions for the purpose of reevaluating this report. A review of the final construction plans and specifications by this office is encouraged to ensure compliance with the intent of these recommendations.

1580 East Stearns Street  
Fayetteville, Arkansas 72703

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# APPENDIX A: BORING LAYOUT



Prepared For:  
**Nabholz Construction Corporation**  
 Mr. Bill Earwood  
 3301 N. 2nd Street  
 Rogers, Arkansas 72756

**PROJECT NUMBER**

25-3879



[mce.us.com](http://mce.us.com)

**Packaging Specialties Expansion**  
 Fayetteville, Arkansas

PLATE 1



Prepared For:  
**Nabholz Construction Corporation**  
Mr. Bill Earwood  
3301 N. 2nd Street  
Rogers, Arkansas 72756

**PROJECT NUMBER**

**25-3879**

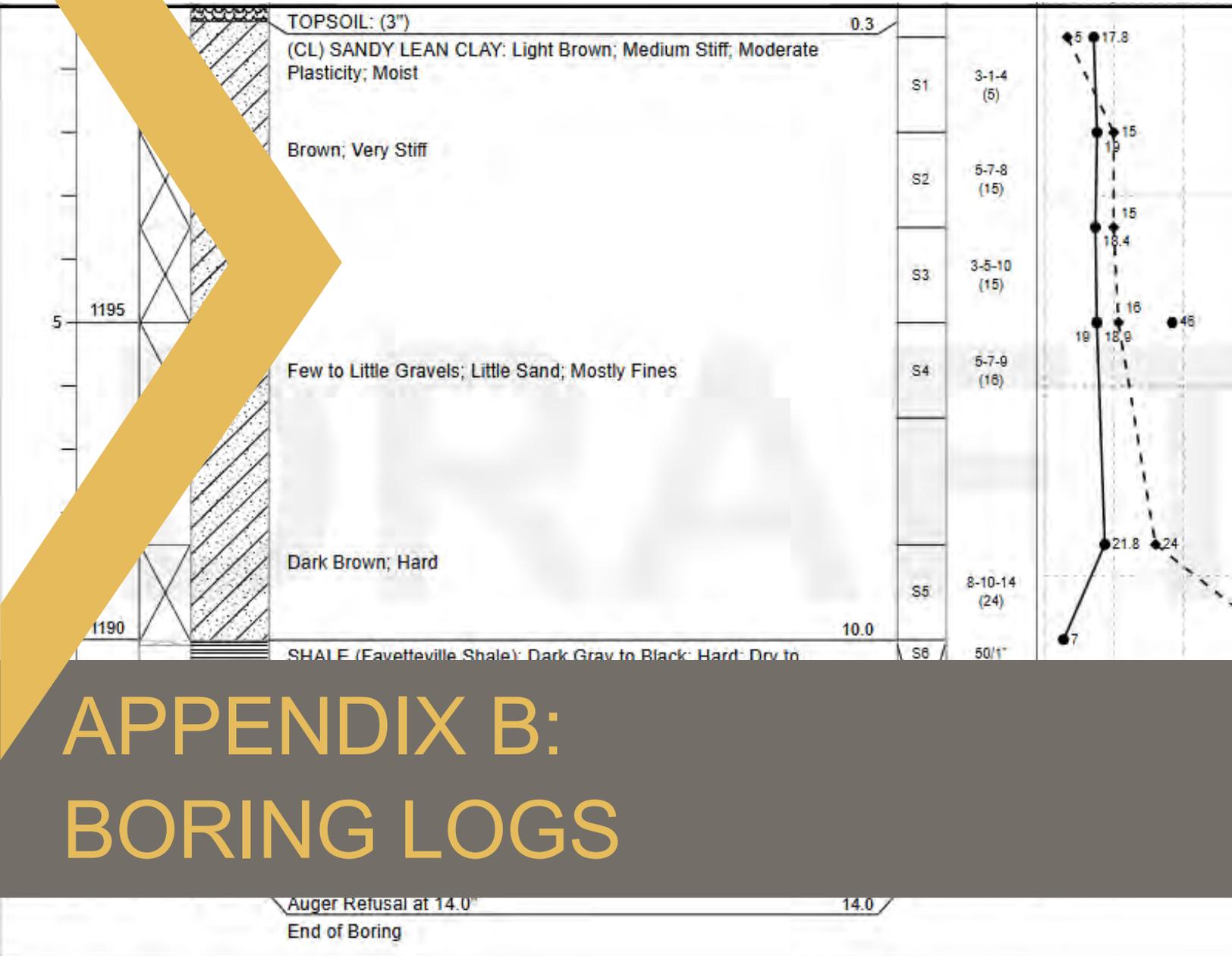


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**Packaging Specialties Expansion**  
Fayetteville, Arkansas

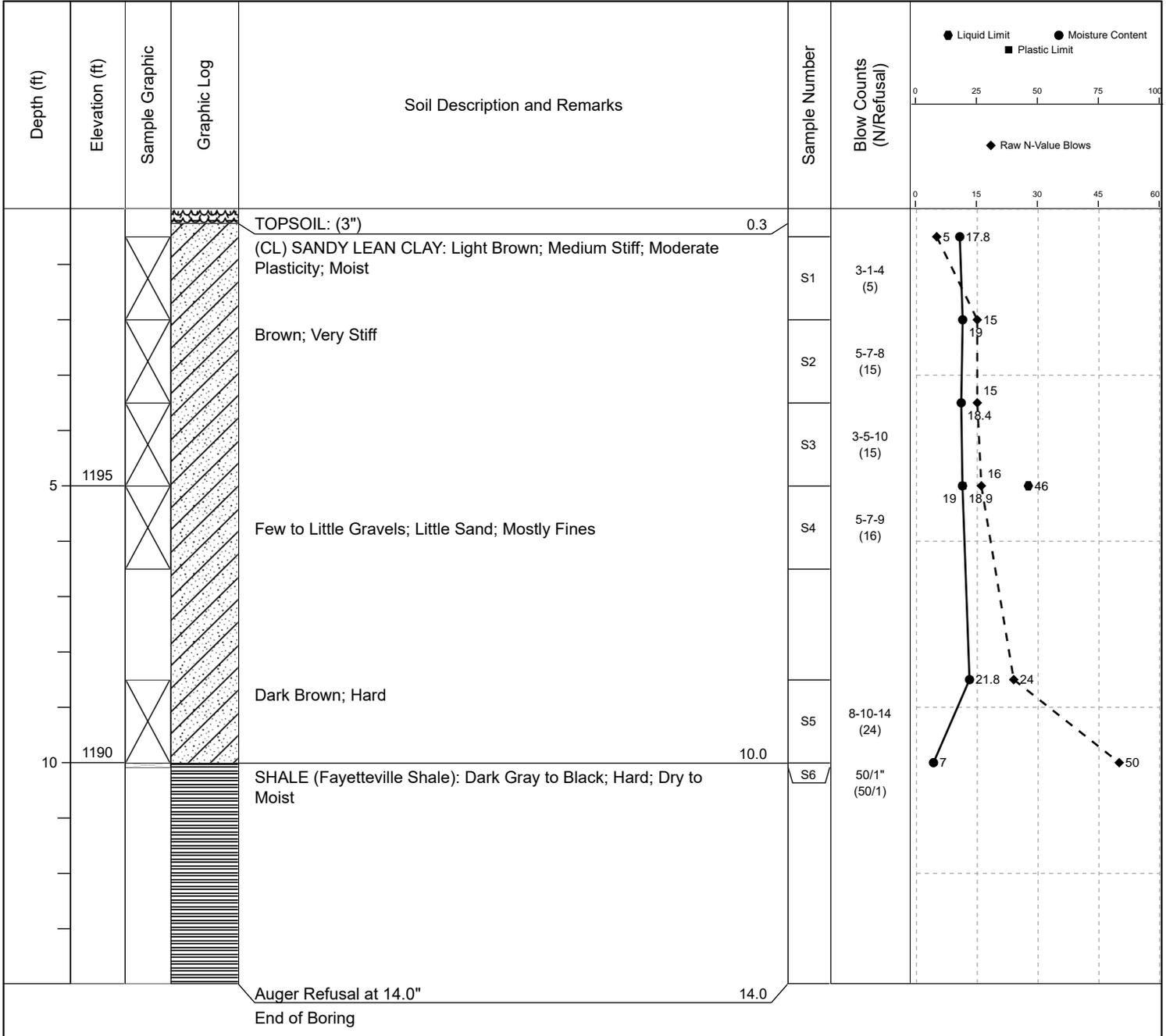
**PLATE 2**

1580 East Stearns Street  
 Fayetteville, Arkansas 72703  
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# APPENDIX B: BORING LOGS

Project Number: 25-3879	Client Name: Nabholz	Coordinates: 36.04519, -94.138427
Date Started: 10/22/2025	Date Completed: 10/22/2025	Ground Elev.: 1200'
Drill Rig: CME-45B	Drilling Method: Auger	Tooling: SPT Sampler
Hammer Type: Auto	Hammer Weight: 140	Drilling Firm: MCE

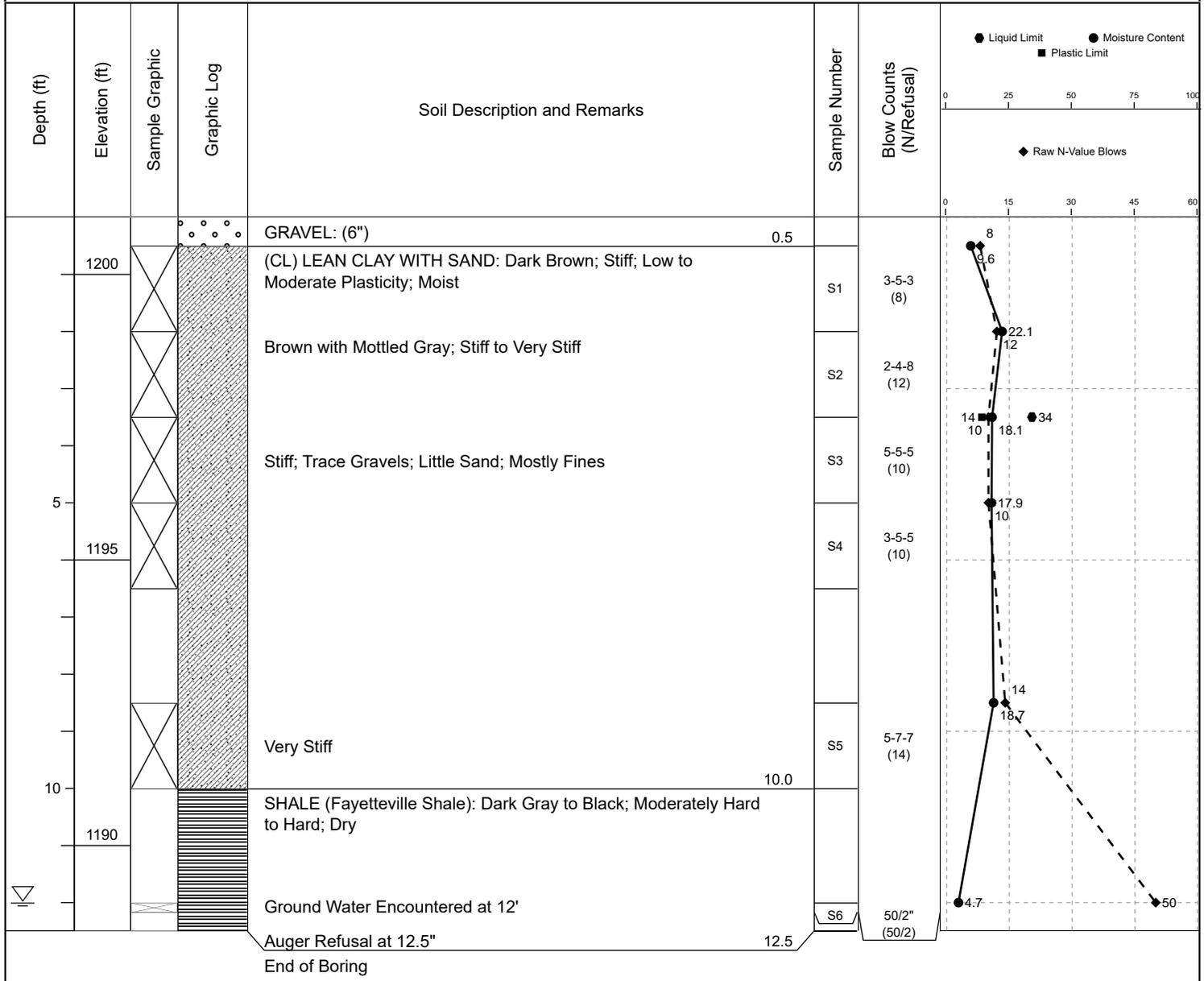


Boring Date: 10/22/2025  
 Field engineer/Technician: C. Chiddister  
 Driller: D. Orozco

Water Level

Depth	Hour	Date
N/A	-	-
N/A	-	-

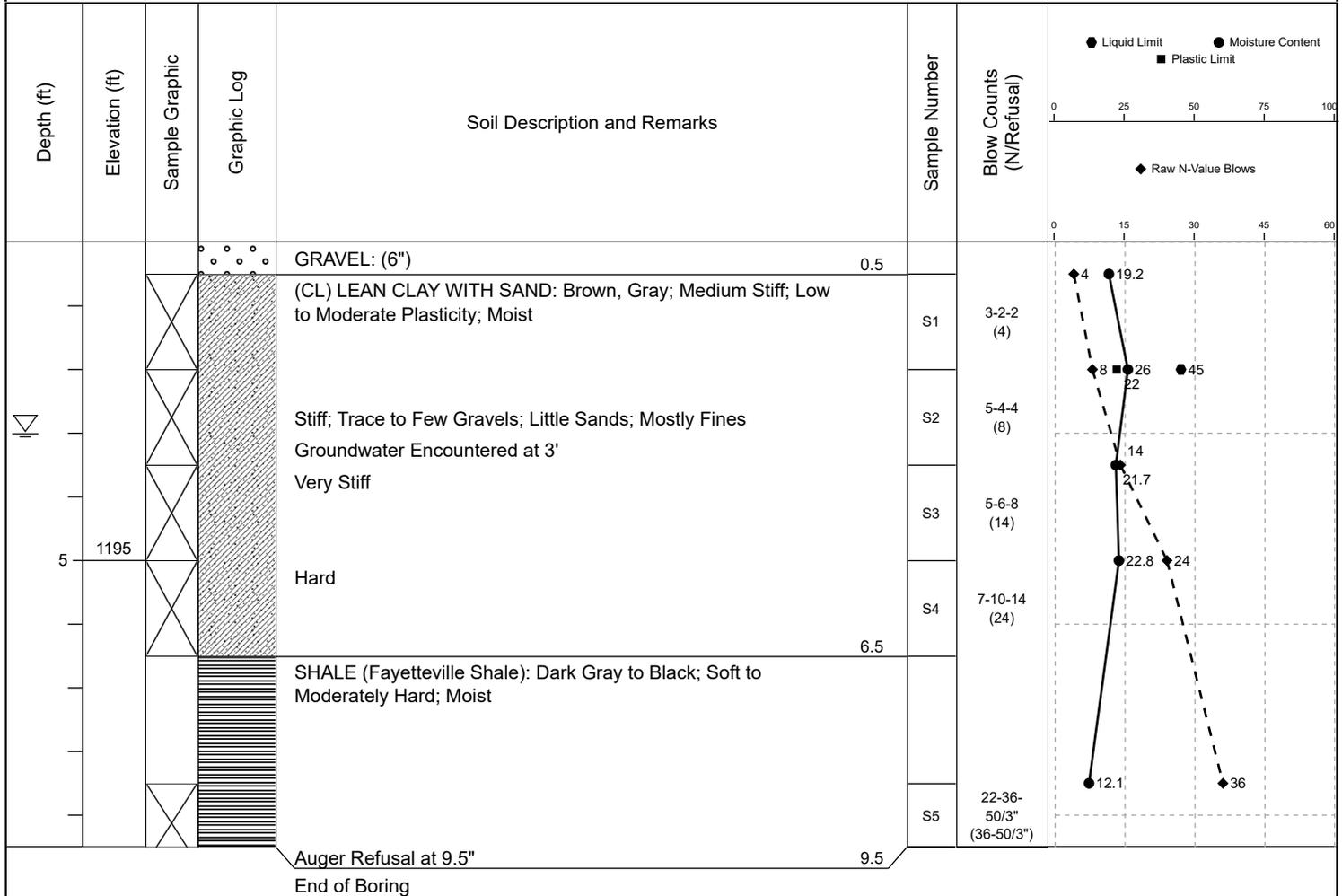
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Date Started:	10/22/2025	Date Completed:	10/22/2025	Ground Elev.:	1201'
Drill Rig:	CME-45B	Drilling Method:	Auger	Tooling:	SPT Sampler
Hammer Type:	Auto	Hammer Weight:	140	Drilling Firm:	MCE



Boring Date: **10/22/2025**  
 Field engineer/Technician: **C. Chiddister**  
 Driller: **D. Orozco**

Water Level		
Depth	Hour	Date
12	05:00	10/22/2025
N/A	-	-

Project Number: 25-3879	Client Name: Nabholz	Coordinates: 36.045011, -94.138522
Date Started: 10/22/2025	Date Completed: 10/22/2025	Ground Elev.: 1200'
Drill Rig: CME-45B	Drilling Method: Auger	Tooling: SPT Sampler
Hammer Type: Auto	Hammer Weight: 140	Drilling Firm: MCE

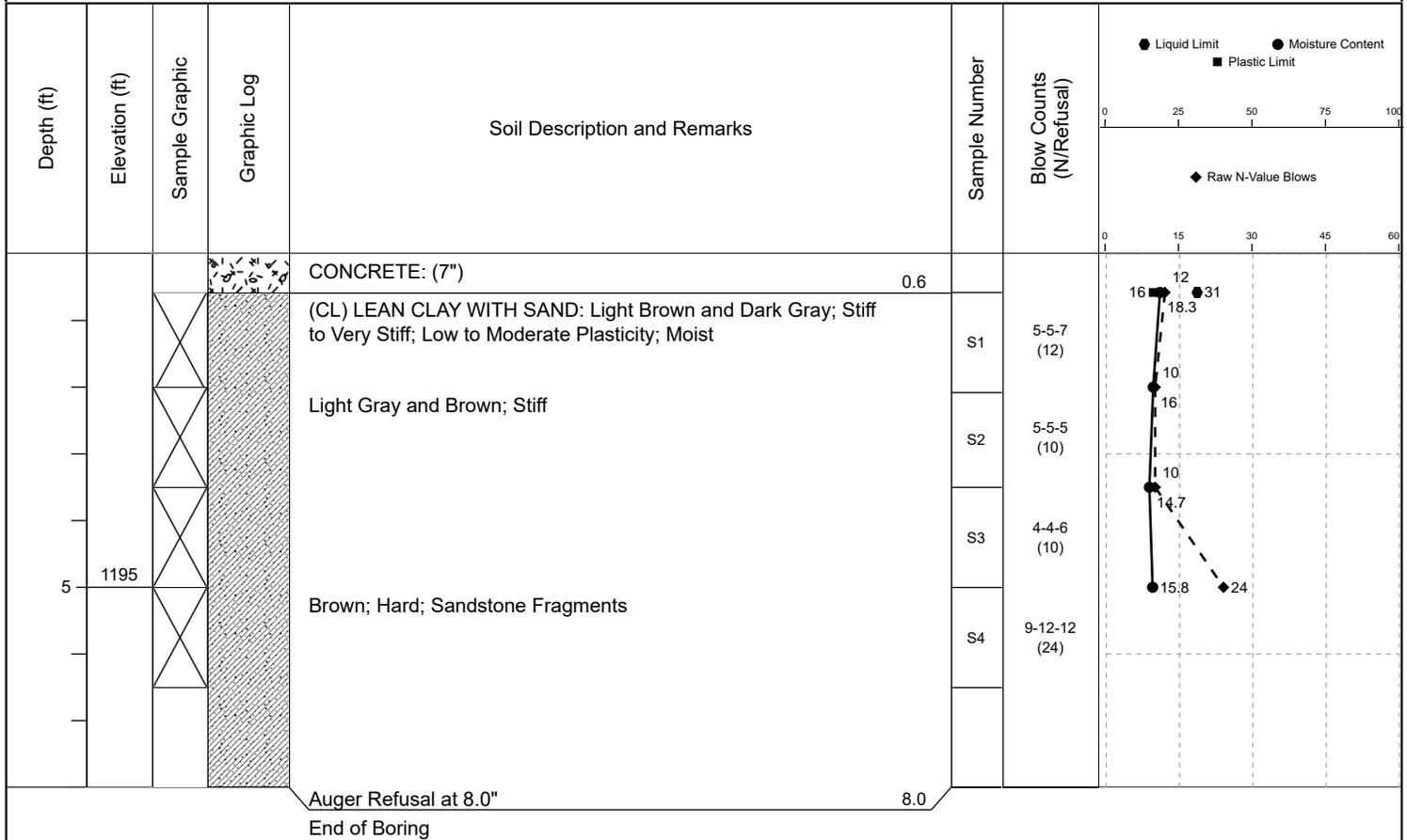


Boring Date: 10/22/2025  
 Field engineer/Technician: C. Chiddister  
 Driller: D. Orozco

Water Level

Depth	Hour	Date
3	05:00	10/22/2025
N/A	-	-

Project Number: 25-3879 Client Name: Nabholz Coordinates: 36.044912, -94.138349  
 Date Started: 10/22/2025 Date Completed: 10/22/2025 Ground Elev.: 1200'  
 Drill Rig: CME-45B Drilling Method: Auger Tooling: SPT Sampler  
 Hammer Type: Auto Hammer Weight: 140 Drilling Firm: MCE



Boring Date: 10/22/2025  
 Field engineer/Technician: Caedmon  
 Driller: David

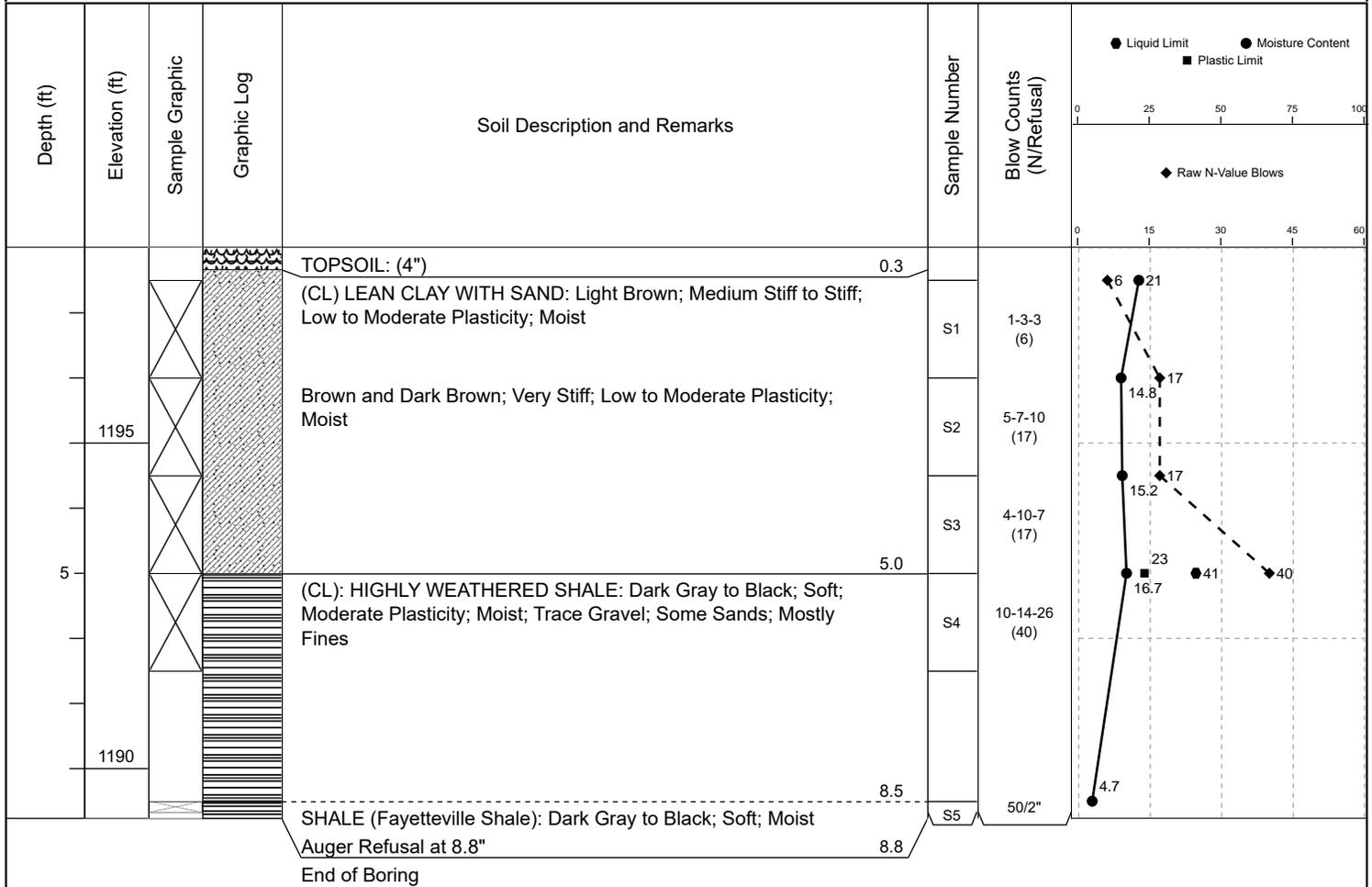
Water Level

Depth	Hour	Date
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N/A	-	-

# Packaging Specialties Expansion

Soil Boring: B-05

Project Number: 25-3879	Client Name: Nabholz	Coordinates: 36.04488, -94.138664
Date Started: 10/22/2025	Date Completed: 10/22/2025	Ground Elev.: 1198'
Drill Rig: CME-45B	Drilling Method: Auger	Tooling: SPT Sampler
Hammer Type: Auto	Hammer Weight: 140	Drilling Firm: MCE



Boring Date: 10/22/2025  
 Field engineer/Technician: C. Chiddister  
 Driller: D. Orozco

Water Level

Depth	Hour	Date
N/A	-	-
N/A	-	-

Log of Soil Boring: B-05

Packaging Specialties Expansion

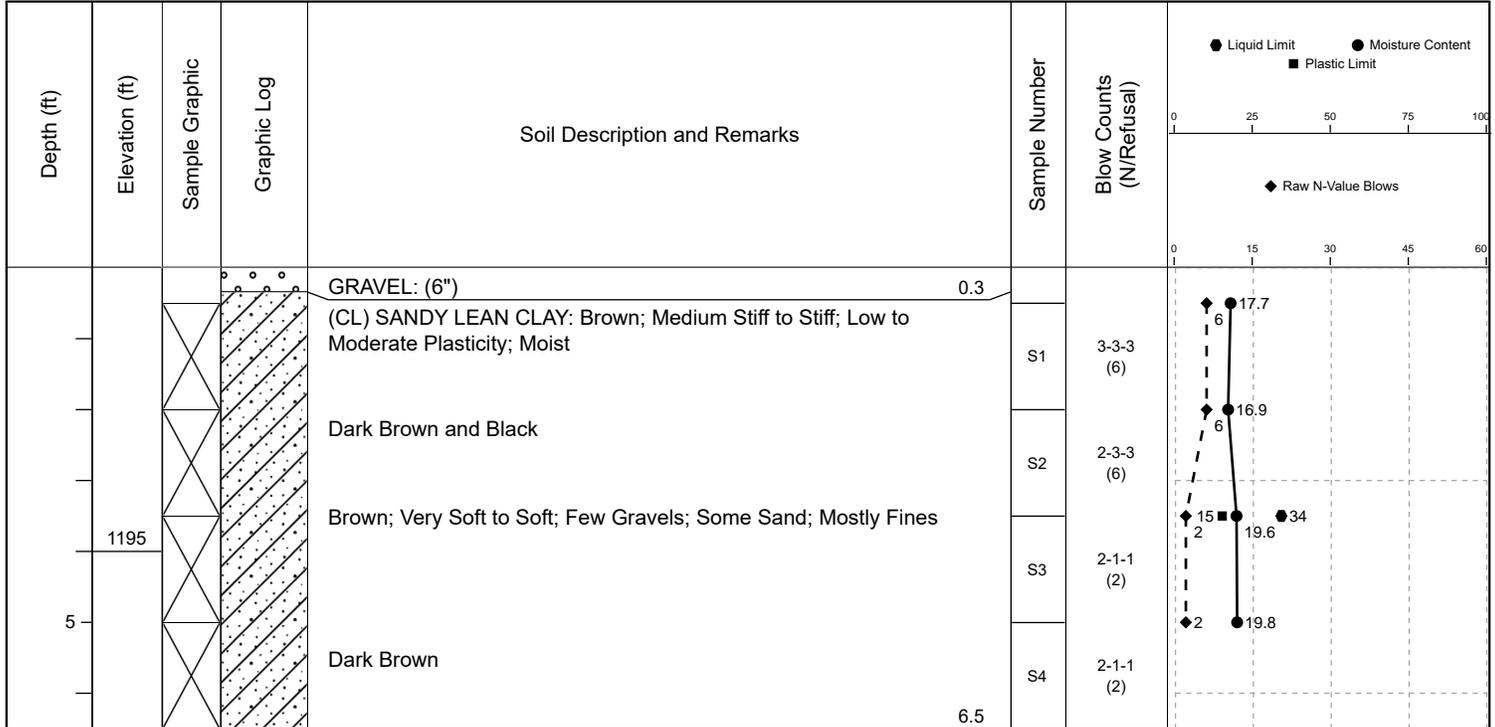
1755 S Armstrong Ave, Fayetteville, AR 72701, USA

Project No.: 25-3879

# Packaging Specialties Expansion

Soil Boring: B-06

Project Number: 25-3879	Client Name: Nabholz	Coordinates: 36.04471, -94.138352
Date Started: 10/22/2025	Date Completed: 10/22/2025	Ground Elev.: 1199'
Drill Rig: CME-45B	Drilling Method: Auger	Tooling: SPT Sampler
Hammer Type: Auto	Hammer Weight: 140	Drilling Firm: MCE



End of Boring

Boring Date: 10/22/2025  
 Field engineer/Technician: C. Chiddister  
 Driller: D. Orozco

Water Level

Depth	Hour	Date
N/A	-	-
N/A	-	-

Log of Soil Boring: B-06

Packaging Specialties Expansion

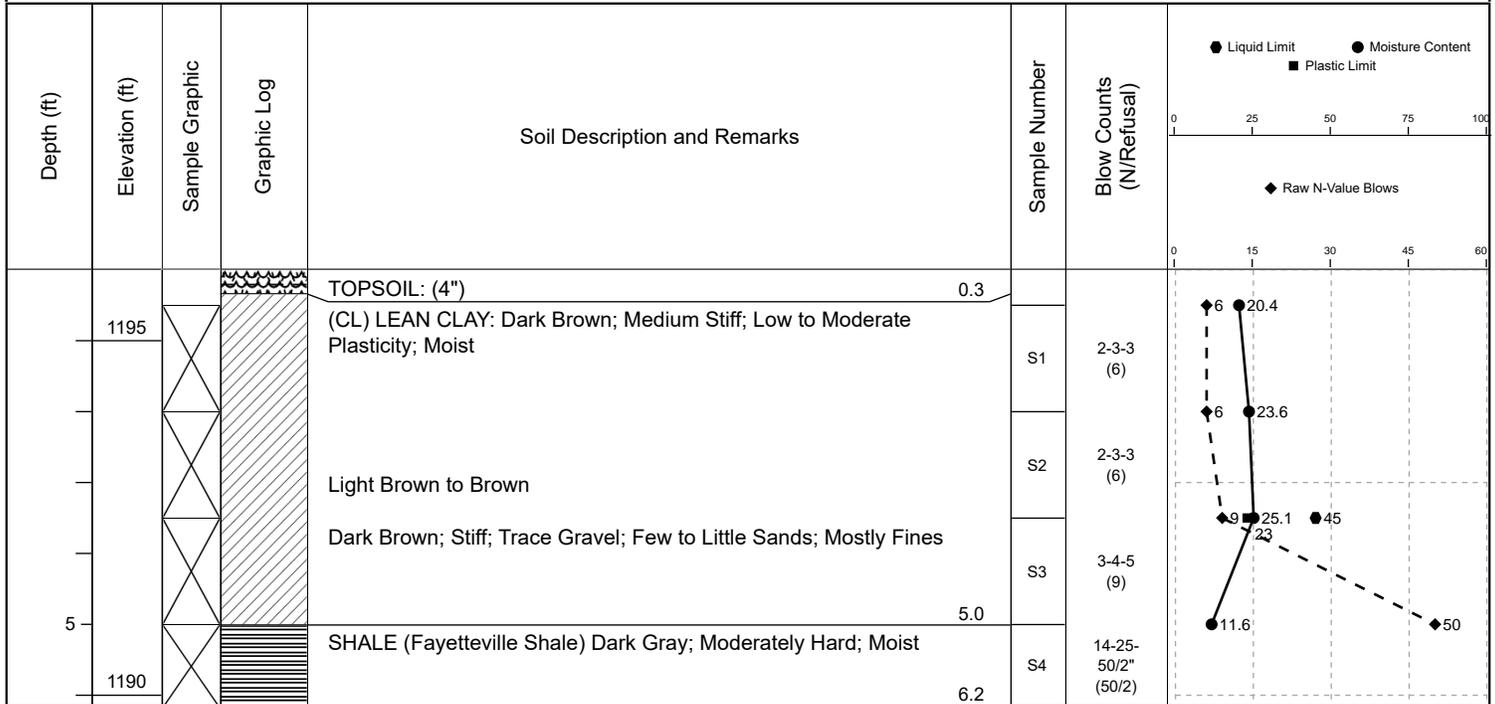
1755 S Armstrong Ave, Fayetteville, AR 72701, USA

Project No.: 25-3879

# Packaging Specialties Expansion

Soil Boring: B-07

Project Number: 25-3879	Client Name: Nabholz	Coordinates: 36.044541, -94.138603
Date Started: 10/22/2025	Date Completed: 10/22/2025	Ground Elev.: 1196'
Drill Rig: CME-45B	Drilling Method: Auger	Tooling: SPT Sampler
Hammer Type: Auto	Hammer Weight: 140	Drilling Firm: MCE



Boring Date: 10/22/2025  
 Field engineer/Technician: C. Chiddister  
 Driller: D. Orozco



Log of Soil Boring: B-07

Packaging Specialties Expansion

1755 S Armstrong Ave, Fayetteville, AR 72701, USA

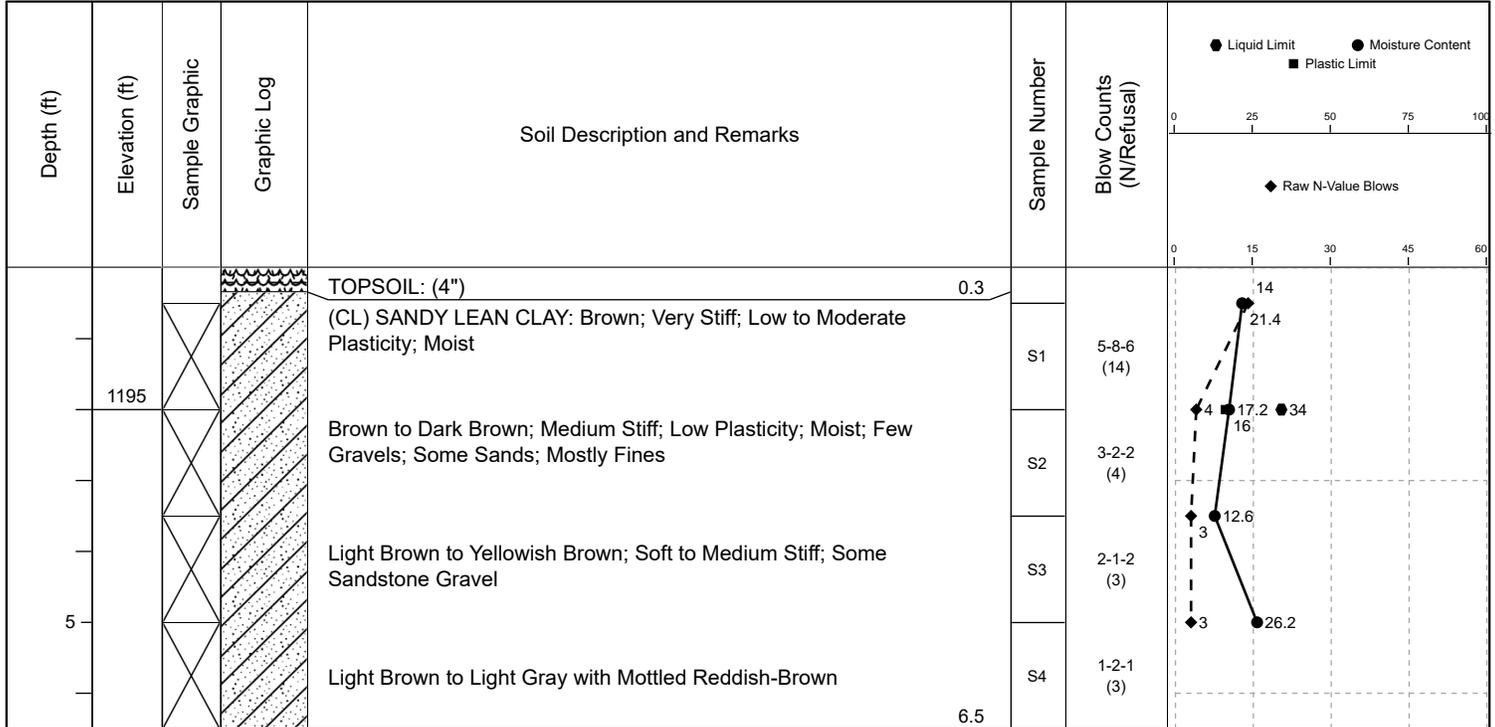
Project No.: 25-3879

Water Level		
Depth	Hour	Date
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N/A	-	-

# Packaging Specialties Expansion

Soil Boring: B-08

Project Number: 25-3879	Client Name: Nabholz	Coordinates: 36.044417, -94.138166
Date Started: 10/22/2025	Date Completed: 10/22/2025	Ground Elev.: 1197'
Drill Rig: CME-45B	Drilling Method: Auger	Tooling: SPT Sampler
Hammer Type: Auto	Hammer Weight: 140	Drilling Firm: MCE



End of Boring

Boring Date: 10/22/2025  
 Field engineer/Technician: C. Chiddister  
 Driller: D. Orozco

Water Level

Depth	Hour	Date
N/A	-	-
N/A	-	-

Log of Soil Boring: B-08

Packaging Specialties Expansion

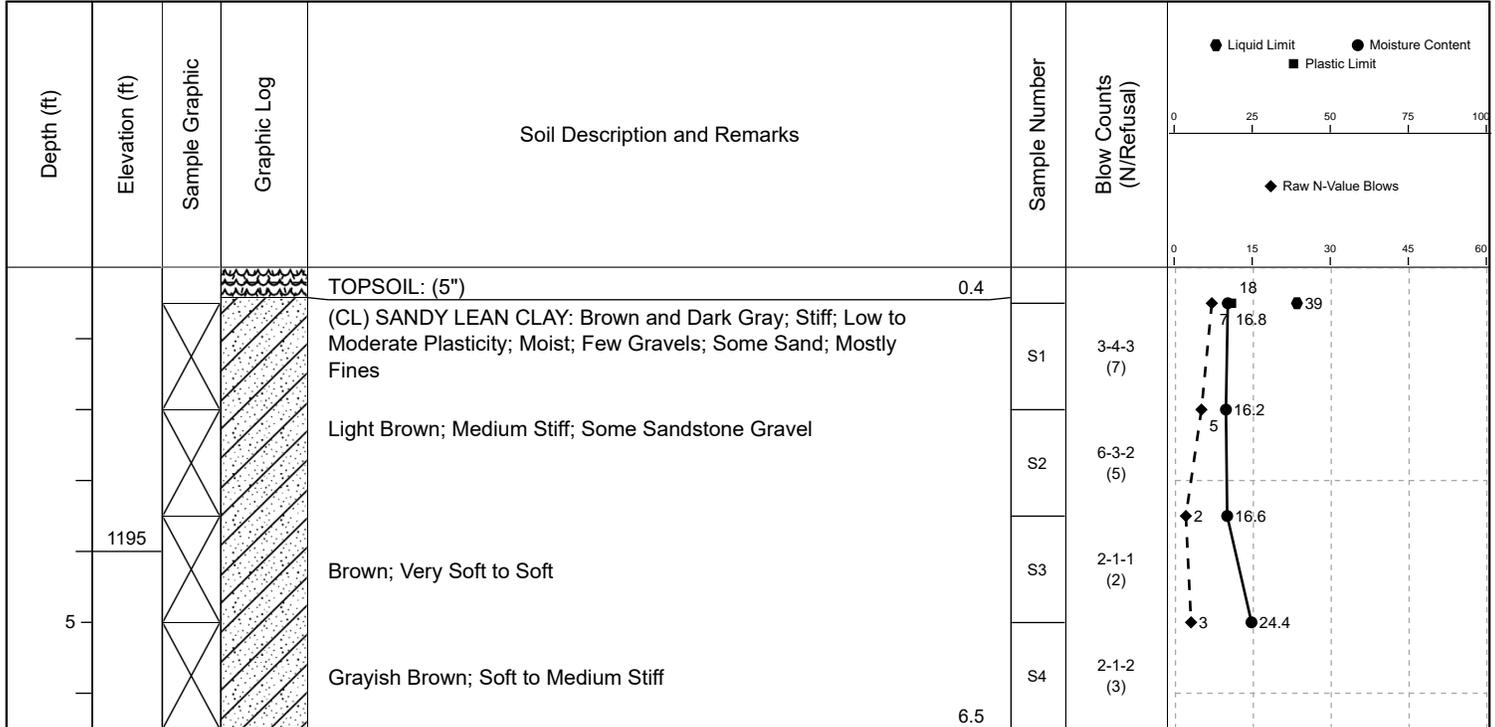
1755 S Armstrong Ave, Fayetteville, AR 72701, USA

Project No.: 25-3879

# Packaging Specialties Expansion

Soil Boring: B-09

Project Number: 25-3879	Client Name: Nabholz	Coordinates: 36.044458, -94.137453
Date Started: 10/22/2025	Date Completed: 10/22/2025	Ground Elev.: 1199'
Drill Rig: CME-45B	Drilling Method: Auger	Tooling: SPT Sampler
Hammer Type: Auto	Hammer Weight: 140	Drilling Firm: MCE



Boring Date: 10/22/2025  
 Field engineer/Technician: C. Chiddister  
 Driller: D. Orozco

Water Level

Depth	Hour	Date
N/A	-	-
N/A	-	-

Log of Soil Boring: B-09

Packaging Specialties Expansion

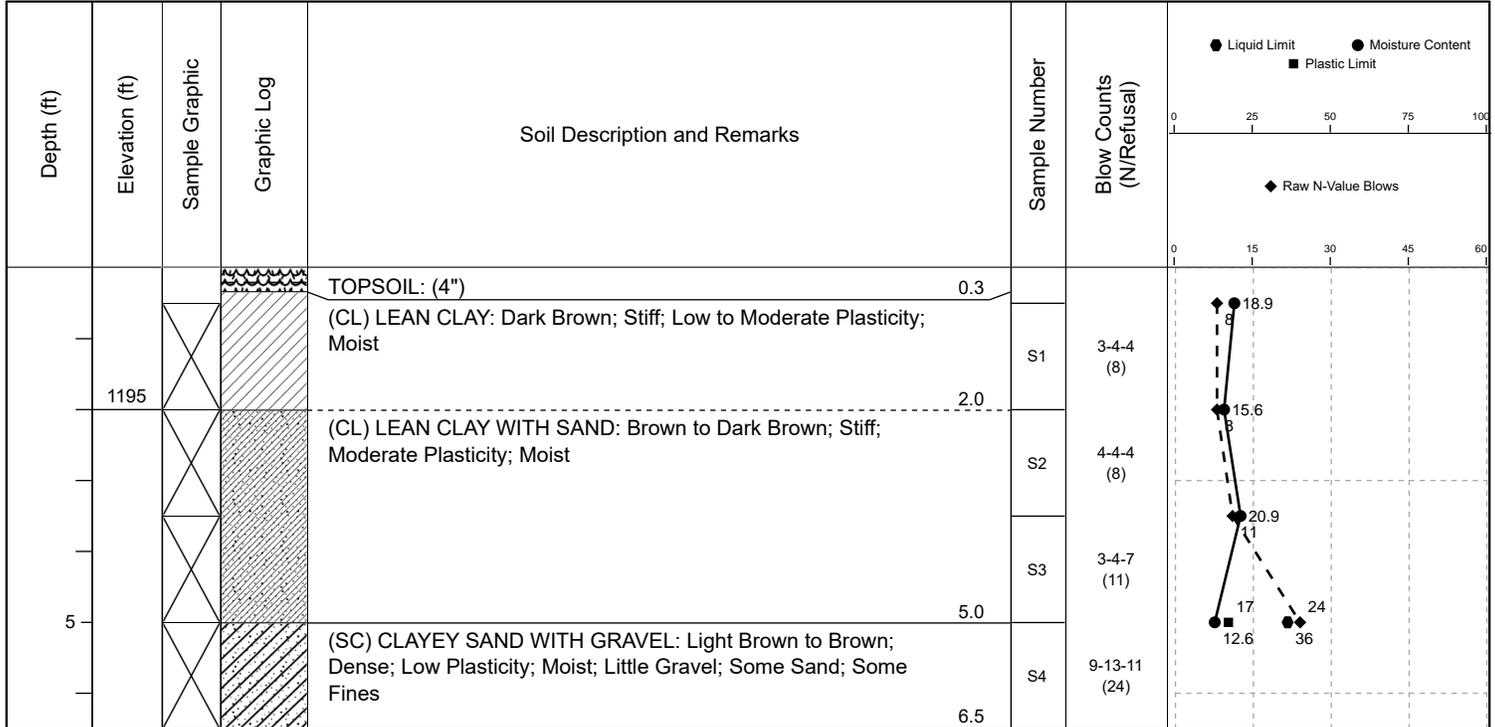
1755 S Armstrong Ave, Fayetteville, AR 72701, USA

Project No.: 25-3879

# Packaging Specialties Expansion

Soil Boring: B-10

Project Number: 25-3879	Client Name: Nabholz	Coordinates: 36.044534, -94.136841
Date Started: 10/22/2025	Date Completed: 10/22/2025	Ground Elev.: 1197'
Drill Rig: CME-45B	Drilling Method: Auger	Tooling: SPT Sampler
Hammer Type: Auto	Hammer Weight: 140	Drilling Firm: MCE



End of Boring

Boring Date: 10/22/2025  
 Field engineer/Technician: C. Chiddister  
 Driller: D. Orozco

Water Level

Depth	Hour	Date
N/A	-	-
N/A	-	-

Log of Soil Boring: B-10

Packaging Specialties Expansion

1755 S Armstrong Ave, Fayetteville, AR 72701, USA

Project No.: 25-3879

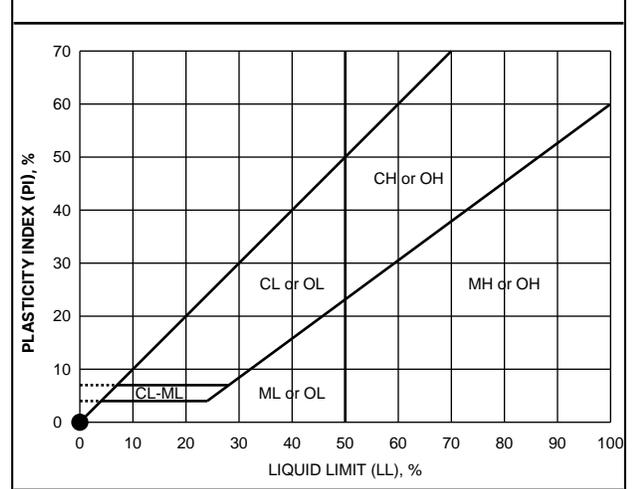
## SOIL CLASSIFICATION CHART PER ASTM D 2488

PRIMARY DIVISIONS			SECONDARY DIVISIONS	
			GROUP SYMBOL	GROUP NAME
COARSE-GRAINED SOILS more than 50% retained on No. 200 sieve	GRAVEL more than 50% of coarse fraction retained on No. 4 sieve	CLEAN GRAVEL less than 5% fines	GW	well-graded GRAVEL
		GRAVEL with DUAL CLASSIFICATIONS 5% to 12% fines	GP	poorly-graded GRAVEL
		GRAVEL with FINES more than 12% fines	GW-GM	well-graded GRAVEL with silt
			GP-GM	poorly-graded GRAVEL with silt
			GW-GC	well-graded GRAVEL with clay
			GP-GC	poorly-graded GRAVEL with clay
	GM	silty GRAVEL		
	GC	clayey GRAVEL		
	GC-GM	silty, clayey GRAVEL		
	SAND 50% or more of coarse fraction retained on No. 4 sieve	CLEAN SAND less than 5% fines	SW	well-graded SAND
		SAND with DUAL CLASSIFICATIONS 5% to 12% fines	SP	poorly-graded SAND
		SAND with FINES more than 12% fines	SW-SM	well-graded SAND with silt
			SP-SM	poorly-graded SAND with silt
		SW-SC	well-graded SAND with clay	
		SP-SC	poorly-graded SAND with clay	
		SM	silty SAND	
		SC	clayey SAND	
		SC-SM	silty, clayey SAND	
SILT and CLAY liquid limit less than 50%		INORGANIC	CL	lean CLAY
	ML	SILT		
	CL-ML	silty CLAY		
	ORGANIC	OL (PI > 4)	organic CLAY	
	OL (PI < 4)	organic CLAY		
	SILT and CLAY liquid limit 50% or more	INORGANIC	CH	fat CLAY
		MH	elastic SILT	
		ORGANIC	OH (plots on or above 'A'-line)	organic CLAY
OH (plots below 'A'-line)	organic SILT			
Highly Organic Soils		PT	Peat	

## GRAIN SIZE

DESCRIPTION		SIEVE SIZE	GRAIN SIZE	APPROXIMATE SIZE
Boulders		> 12"	> 12"	Larger than basketball-sized
Cobbles		3 - 12"	3 - 12"	Fist-sized to basketball-sized
Gravel	Coarse	3/4 - 3"	3/4 - 3"	Thumb-sized to fist-sized
	Fine	#4 - 3/4"	0.19 - 0.75"	Pea-sized to thumb-sized
Sand	Coarse	#10 - #4	0.079 - 0.19"	Rock-salt-sized to pea-sized
	Medium	#40 - #10	0.017 - 0.079"	Sugar-sized to rock-salt-sized
	Fine	#200 - #40	0.0029 - 0.017"	Flour-sized to sugar-sized
Fines		Passing #200	< 0.0029"	Flour-sized and smaller

## PLASTICITY CHART



## APPARENT DENSITY - COARSE-GRAINED SOIL

APPARENT DENSITY	SPOOLING CABLE OR CATHEAD		AUTOMATIC TRIP HAMMER	
	SPT (blows/foot)	MODIFIED SPLIT BARREL (blows/foot)	SPT (blows/foot)	MODIFIED SPLIT BARREL (blows/foot)
Very Loose	≤ 4	≤ 8	≤ 3	≤ 5
Loose	5 - 10	9 - 21	3 - 8	6 - 14
Medium Dense	11 - 30	22 - 63	8 - 23	15 - 42
Dense	31 - 50	64 - 105	23 - 38	43 - 70
Very Dense	> 50	> 105	> 38	> 70

## CONSISTENCY - FINE-GRAINED SOIL

CONSISTENCY	SPOOLING CABLE OR CATHEAD		AUTOMATIC TRIP HAMMER	
	SPT (blows/foot)	MODIFIED SPLIT BARREL (blows/foot)	SPT (blows/foot)	MODIFIED SPLIT BARREL (blows/foot)
Very Soft	< 2	< 3	< 2	< 2
Soft	2 - 4	3 - 5	2 - 3	2 - 3
Medium Stiff	5 - 8	6 - 10	3 - 6	4 - 6
Stiff	9 - 15	11 - 20	6 - 12	7 - 13
Very Stiff	16 - 30	21 - 39	12 - 23	14 - 26
Hard	> 30	> 39	> 23	> 26

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# APPENDIX C: LABORATORY RESULTS

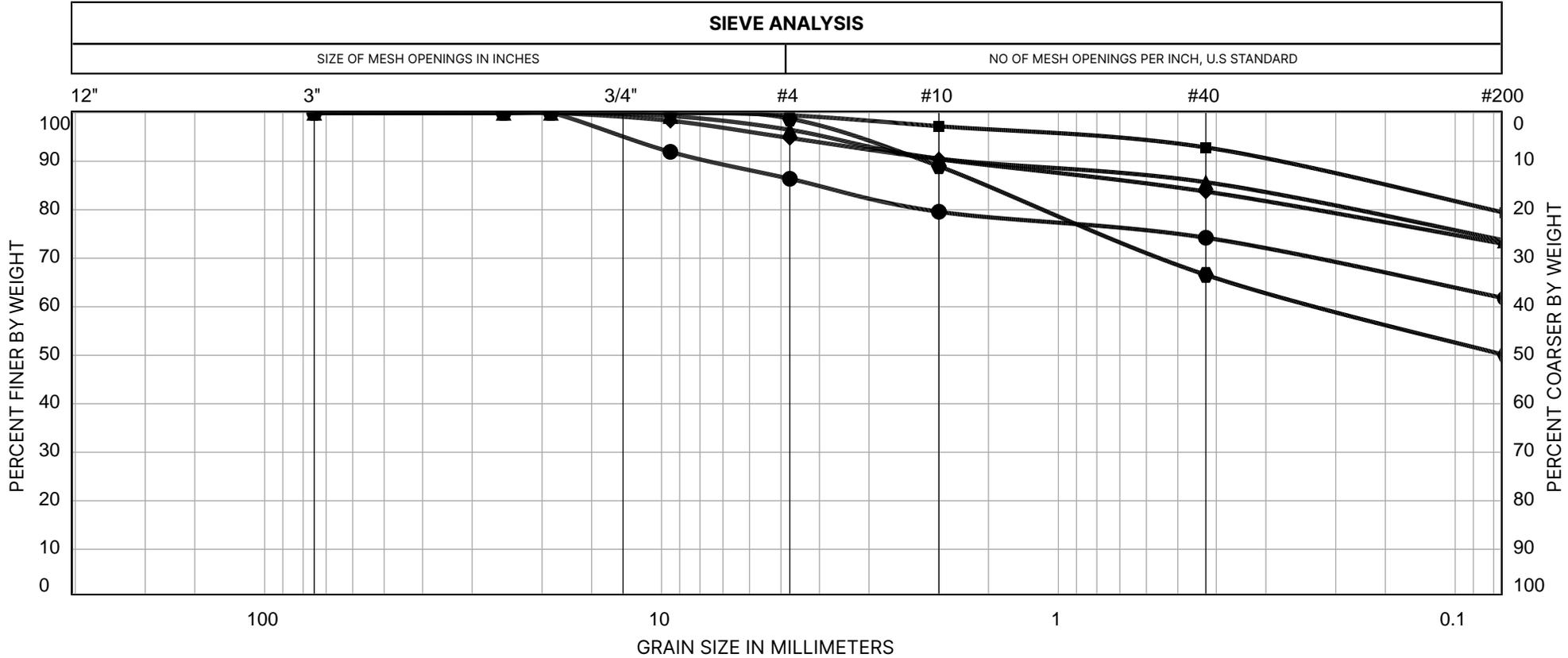
PROJECT Packaging Specialties Expansion				PROJECT NO. 25-3879						
CLIENT Nabholz				LOCATION Fayetteville, AR						
Boring ID	Sample ID	Depth (ft)	Moisture Content (%)	LL	PL	PI	%Gravel	% Sand	% Fines	USCS
B-01	S1	0.5-2	17.8							
B-01	S2	2-3.5	19							
B-01	S3	3.5-5	18.4							
B-01	S4	5-6.5	18.9	46	19	27	14	25	62	CL
B-01	S5	8.5-10	21.8							
B-01	S6	13.5-13.6	7							
B-02	S1	0.5-2	9.6							
B-02	S2	2-3.5	22.1							
B-02	S3	3.5-5	18.1	34	14	20	1	20	79	CL
B-02	S4	5-6.5	17.9							
B-02	S5	8.5-10	18.7							
B-02	S6	13.5-13.7	4.7							
B-03	S1	0.5-2	19.2							
B-03	S2	2-3.5	26	45	22	23	5	22	73	CL
B-03	S3	3.5-5	21.7							
B-03	S4	5-6.5	22.8							
B-03	S5	8.5-9.8	12.1							
B-04	S1	0.5-2	18.3	31	16	15	4	23	74	CL
B-04	S2	2-3.5	16							
B-04	S3	3.5-5	14.7							
B-04	S4	5-6.5	15.8							
B-05	S1	0.5-2	21							
B-05	S2	2-3.5	14.8							
B-05	S3	3.5-5	15.2							
B-05	S4	5-6.5	16.7	41	23	18	1	49	50	CL
B-05	S5	8.5-8.7	4.7							
B-06	S1	0.5-2	17.7							
B-06	S2	2-3.5	16.9							
B-06	S3	3.5-5	19.6	34	15	19	7	25	68	CL
B-06	S4	5-6.5	19.8							
B-07	S1	0.5-2	20.4							
B-07	S2	2-3.5	23.6							
B-07	S3	3.5-5	25.1	45	23	22	1	13	86	CL
B-07	S4	5-6.2	11.6							
B-08	S1	0.5-2	21.4							
B-08	S2	2-3.5	17.2	34	16	18	9	24	68	CL
B-08	S3	3.5-5	12.6							
B-08	S4	5-6.5	26.2							

**PROJECT** Packaging Specialties Expansion  
**CLIENT** Nabholz

**PROJECT NO.** 25-3879  
**LOCATION** Fayetteville, AR

Boring ID	Sample ID	Depth (ft)	Moisture Content (%)	LL	PL	PI	%Gravel	% Sand	% Fines	USCS
B-09	S1	0.5-2	16.8	39	18	21	8	30	62	CL
B-09	S2	2-3.5	16.2							
B-09	S3	3.5-5	16.6							
B-09	S4	5-6.5	24.4							
B-10	S1	0.5-2	18.9							
B-10	S2	2-3.5	15.6							
B-10	S3	3.5-5	20.9							
B-10	S4	5-6.5	12.6	36	17	19	25	42	33	SC

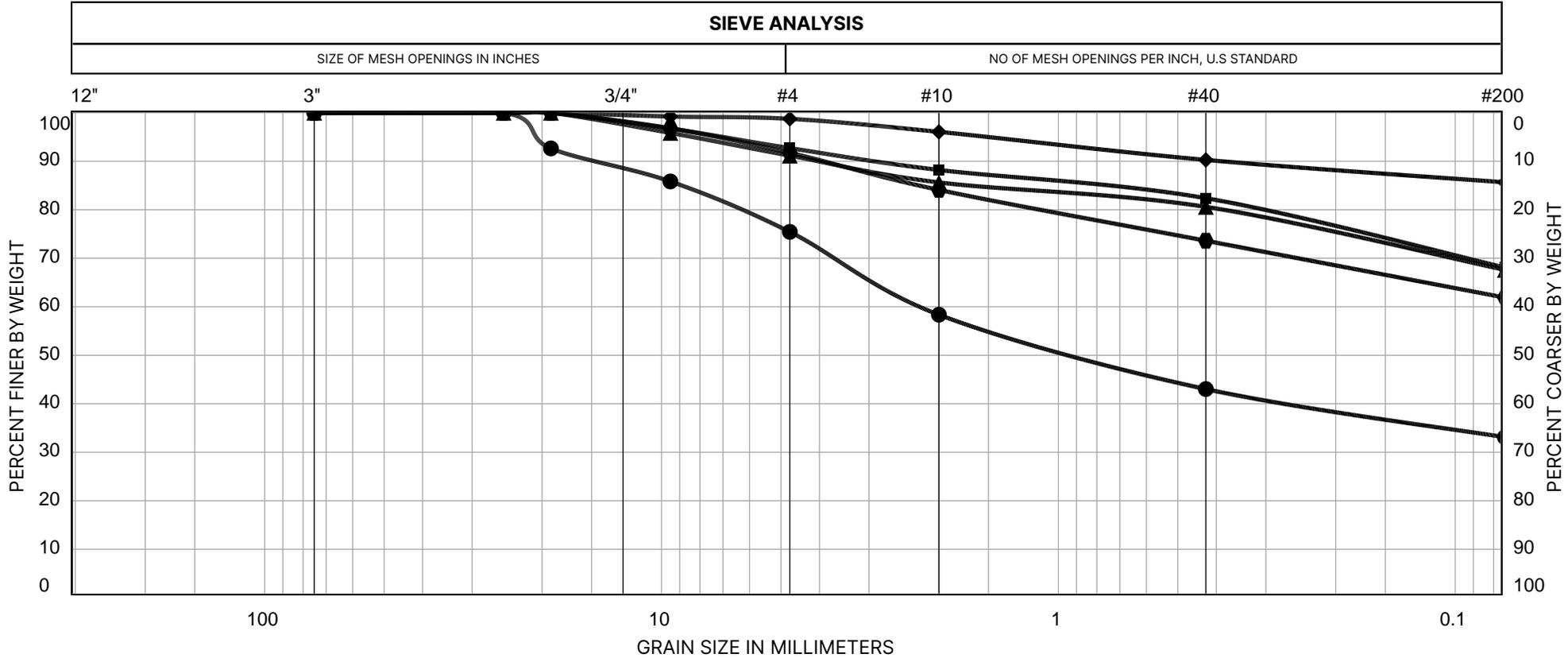
**Packaging Specialties Expansion  
Fayetteville, AR**



COBBLES	COARSE	FINE	COARSE	MEDIUM	FINE
	GRAVEL		SAND		

EXPLORATION	SAMPLE NUMBER	DEPTH	UNIFIED SOIL CLASSIFICATION SYSTEM (USCS) GROUP NAME	USCS SYMBOL	GRAVEL (%)	SAND (%)	FINES (%)	CF (%)	NAT WC (%)	D10	D15	D30	D50	D60	D85	D90	D100	NOTES
●	B-01	S4	5	Sandy LEAN CLAY	CL	14	25	62	18.9						4.21	7.87	50	
■	B-02	S3	3.5	LEAN CLAY with Sand	CL	1	20	79	18.1						0.23	0.36	50	
◆	B-03	S2	2	LEAN CLAY with Sand	CL	5	22	73	26						0.73	1.91	50	
▲	B-04	S1	0.5	LEAN CLAY with Sand	CL	4	23	74	18.3						0.41	1.83	50	
●	B-05	S4	5	Sandy LEAN CLAY	CL	1	49	50	16.7					0.3	1.75	2.3	50	

**Packaging Specialties Expansion  
Fayetteville, AR**



COBBLES	COARSE	FINE	COARSE	MEDIUM	FINE
	GRAVEL		SAND		

EXPLORATION	SAMPLE NUMBER	DEPTH	UNIFIED SOIL CLASSIFICATION SYSTEM (USCS) GROUP NAME	USCS SYMBOL	GRAVEL (%)	SAND (%)	FINES (%)	CF (%)	NAT WC (%)	D10	D15	D30	D50	D60	D85	D90	D100
■	B-06	S3	Sandy LEAN CLAY	CL	7	25	68		19.6						1.14	3.11	50
◆	B-07	S3	LEAN CLAY	CL	1	13	86		25.1							0.4	50
▲	B-08	S2	Sandy LEAN CLAY	CL	9	24	68		17.2						1.81	4.19	50
●	B-09	S1	Sandy LEAN CLAY	CL	8	30	62		16.8						2.34	4.14	50
●	B-10	S4	Clayey SAND with Gravel	SC	25	42	33		12.6				1.2	2.3	9.14	15.39	50