PRELIMINARY STORM WATER POLLUTION PREVENTION PLAN

For

Fordland

330 Town Center Drive, Suite 1100

Dearborn, MI 48126-2738

Blue Oval TE1 & EXP Battery Plant

Site Preparation and Construction

February 3, 2022

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The following exhibits and plan sets are considered part of this SWPPP, provided under separate cover:

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1.0 Introduction

This document is intended as a Storm Water Pollution Prevention Plan (SWPPP), established by the General Permits for Strom Water Discharges from Construction Activities Disturbing 5 Acres or Greater, published by the EPA in conjunction with the Water Quality ACT (WQA), Clean Water Act (CWA), and Federal Water Pollution Control Act (FWPCA). The SWPPP is used in order to outline the pollution prevention and sediment and erosion control measures to be implemented at construction sites.

The SWPPP will provide the framework for a development, implementation and maintenance plan for Barton Malow to reduce the impact the construction of the Blue Oval Battery Plant industrial facility will have on site soil erosion and pollutants in the storm water coming off the site. Construction will be carried out in order that runoff from the site will be collected and treated following the Best Management Practices (BMP) and Storm Water Manuals established by the State of Kentucky and Hardin County.

2.0 General Information

This SWPPP is developed in accordance with the Kentucky General NPDES Permit (KYR100000) and state and local ordinances, using sound engineering practices and design criteria established in the stormwater manual and BMP manual provided by Hardin County. A sample Notice of Intent (NOI) and Notice of Termination (NOT) are included in the appendices. Also included are all plan sets and attachments to illustrate what is presented in this SWPPP.

Owner/Developer: Company
Address
Address
Phone Numbers
Contact Person:
Email:

A Corporate Certification/Signature page is included in the appendix for the owner to fill out. Also, included in the appendix, contractors certification/signature page for each construction work package.

The company will retain copies of the SWPPP and all related documents in the construction office, on-site, at the designated ‘SWPPP STATION’. These documents include, this manual, the completed NOI, the NOC, construction drawings, inspection reports, and correspondence. These documents shall be made available to all persons including staff from Kentucky Division of Water (KDOW), Hardin County, Owner, Contractor(s), and Engineer.

From time to time, as construction progresses, the SWPPP may be updated by the Contractor, Owner/Developer, or Engineer as site conditions or contractors’ operations dictate. These changes will be noted on the plans and drawings located at the SWPPP STATION.

Any Contractor or subcontractor that is responsible for installation, inspection, maintenance of soil erosion and sediment control measures will sign the contractor's certification located on the SWPPP Plans AND sign the NOI

Any correspondence to KDOC, KDOW, or Hardin County shall reference the appropriate tracking numbers and/or permit numbers.

3.0 Existing Site Conditions

Currently the site consists of farmland with small pockets of trees separating the existing fields, with minimal to no development. The site is located southwest of the intersection of I-65 and KY-222 and north of Gilead Church Rd, totaling roughly 1500 acres. The site consists of silt loam soil groups, the majority being Crider, Bedford, Sonora, and Ottwood soil groups, with a hydraulic soil group ranging from A to D, though the majority of the site being soil group B. A foot of topsoil covers the site as well. St. Louis Limestone makes up the majority of the bedrock underneath the site and range from a depth of 23.5 to 94.5 according to the boring logs. This type of bedrock is known to be highly karstic. Due to the site being karstic, construction and excavation activity can cause surface water to enter the limestone bedrock through openings and may cause the bedrock to erode or desiccate the soils. This could lead to sink holes, collapses of underlying rocks and other alterations.

The site has rolling topography with elevations ranging from 750 feet to 670 feet. The site consists of a few major streams that run the length from north/northeast to south, mostly draining to the same southeast stream leaving the site, feeding into the Nolin River. Minor streams are spread throughout the site, feeding into the few major streams. Also located throughout the site are wetlands ranging in size from 1 acre to roughly 4 acres.

Several drainage patterns exist within the proposed site location. The two major drainage areas drain down to the southeast corner and meet to leave the site by one stream. The drainage areas can be found on the existing conditions plan sheet included in the appendix. The proposed site plan will impact both drainage areas. The stream running through the drainage area to the east is to be relocated to the outside of the project area and will continue to allow water pass through the site. The streams and wetlands in the drainage area to the west will be filled in. All streams and wetlands not to be impacted will have 50-foot buffers established on either side of the bank. The locations of buffers will be determined in the field in order to base location on actual field observations. Once the buffer is established, at no time will the contractor infringe on the buffer.

The proposed site plan and grading will impact approximately 702 aces consisting of the proposed buildings, parking lots, internal roadways, and site features. Additional grading will be conducted to create four permanent storm water management basins, three permanent topsoil berms, and two roads that are to connect to the existing roads enclosing the site.

4.0 303(d) Special Requirements

The entire site will drain to the Nolin River south of the property, which is on the 303(d) list for being a Warm Water Aquatic Habitat (WAH). Criteria to protect the stream have been

established by Kentucky's Energy and Environmental Cabinet and can be found in Kentucky Administrative Regulations (KAR) Title 401 10.031 Section 4. The special criteria include natural alkalinity not being reduced more than 25%, pH falling between the range of 6.0 and 9.0 and can't fluctuate more than 1.0 pH over a period of 24 hours, flow can't change to an adverse degree, temperatures of the stream will not exceed 31.7° C or 89° F, and no adverse change in dissolved oxygen, dissolved solids, total suspended solids, ammonia, toxics, and residual chlorine. In order to reduce the potential for stream impairment, temporary sediment basins are designed to retain the run-off of the 10 year- 24-hour storm event and skimmers to reduce the peak flow of the 2 year and 10 year 24-hour storm events to pre-construction levels.

Inspections are to be performed by qualified personnel every seven calendar days and with 24 hours of any rain event of 0.5 inches or more. Inspections cover all disturbed areas, structural controls, sediment basins, outlets, natural conveyances to the receiving waters, and the receiving waters. The inspections ensure that the erosion and sediment control measures are working properly and are effective in preventing impacts to the receiving waters. If during these inspections it is discovered that repair and/or maintenance is required, the responsible contractor shall take actions to correct the problem and document the event. If at any time revision to the SWPPP needs to be conducted due to inadequate levels of protection, changes will be noted on this SWPPP at the SWPPP STATION.

If at any time, the receiving water is becoming or has the potential to become impaired by storm water leaving the site, the contractor(s) shall immediately cease all on-site activities and focus all attention to remediating the concern/problem. The Contractor, State, Owner, or Engineer is empowered with the ability to implement or direct activities to correct or defuse existing or potential impairments to the Nolin River.

The inspector certifies on a weekly basis that the inspection described above (an example log can be found in the Appendices) has been performed and whether or not all the erosion and sediment control measures are installed and working properly. All logs will be kept in construction office and available for anyone concerned to view.

5.0 Project Description

The project consists of developing a 702 acre industrial site, that will require the relocation of topsoil, mass grading, and construction of buildings, roads and parking areas. Also needed is drainage definition for the site to implement of temporary soil erosion control measures, stormwater management, and stormwater infrastructure. The site is to serve as a battery production plan for Fordland. The site is accessed currently from a drive off of Glendale Hodgenville Rd. (KY-222).

The site will be developed in five phases with a soil erosion control plan established for each. The initial phase will be the removal of topsoil and the grading in of sediment basins to allow for mass grading. The next two phases consist of grading the majority of the west side of the project area, including the building pad, topsoil berms, temporary swales, and additional sediment basins. The final two stages focuses on removing the topsoil from the east side of the

development, mass grading for the rest of the building pad and site, temporary swales and the remainder of the sediment basins. A full description of the construction phases can be found in Section 9.0. During the stages of development, the site will consist of areas covered with gravel, primarily the future paved sections and the building pads, and grass. For all phases of development, temporary soil erosion controls will be in place including: silt fence, silt fence outlets, construction entrances, diversions, slope drains, check damns, and stream crossings.

Permanent erosion controls consist of: permanent seeding, erosion matting for slopes and ditches, culverts, culvert outlet energy dissipator, and surface stabilization.

The total project work surface areas are as follows:

The project areas consists of 702 acres, of which the final surface treatments are approximately: X acres of grass restoration, X acres of paved access roads, X acres of parking, X acres of permanent gravel, and X acres of roofs.

The finished site will consist of three drainage areas dividing the site into west, center, and east. All the existing sediment basins will be converted into stormwater detention basins in order to collect the runoff from the site. The temporary swales will be replaced with culverts that will run the length of the development and will empty into the detention basins. Stormwater infrastructure will be used throughout the site to convey stormwater runoff into the catch basins.

6.0 Runoff Calculations

Runoff calculations were conducted using Hydrographs through AutoCad 2020. Mass grading and final surface conditions will increase the peak discharges from the project site. The site has four existing drainage areas, predominately the proposed project area will fall in drainage area 2 with an area of 350 acres. The proposed project will be completed in five phases, with a total of four sediment basins being used to collect runoff from the site. In order to have the most conservative calculations, the largest drainage areas feeding into the sediment ponds were used in order to size the ponds. Sediment basins, according to Kentucky BMP Handbook, have to store 3,600 cubic feet of sediment per acre of drainage area, and to accommodate a 2-year and 10-year 24-hour storm event, with a spillway designed for a 100-year 6-hour storm. Table 1 shows the required storage volumes for the sediment basins.

Drainage Area ID	Area (acres)	Required Storage Volume (cf)
Drainage Area 1	65	234,000
Drainage Area 2	350	1,260,000
Drainage Area 3	225	810,000
Drainage Area 4	171	615,600

Peak discharge from the drainage areas were determined first by assigning a curve number (CN) of 91 for newly graded dirt, and a time of concentration using the TR55 method, calculating the sheet flow, shall concentrated flow, and channel flow. In Table 2, the peak discharges from the largest drainage areas flowing into the ponds are shown for the 2 year and 10 year storm.

Drainage Area ID	Peak flow 2 year storm (cfs)	Peak Flow 10 year storm (cfs)
Drainage Area 1	179.02	269.16
Drainage Area 2	969.93	1458.27
Drainage Area 3	623.53	937.46
Drainage Area 4	473.88	712.47

The sediment basins are designed with a perforated riser in order to allow for a controlled dewatering rate. The performance goal is to have the pond provide 1-2 days of detention time for the 10-year 25-hour storm. The basin is also designed with an emergency spillway for a 100-year 6-hour storm.

After the second phase of construction, the sediment basin for drainage area 1 will have been removed and the runoff from that area will drain into sediment basin 3 along with the drainage area 3. After the final phase of construction, the site will have been graded to create three drainage areas, and the three existing sediment basins will be converted into post construction stormwater detention basins. The curve number for industrial sites is the same as newly graded dirt, 91. The time of concentration was calculated using the same method as the sediment basin, and using those values, the peak discharges were calculated.

The stormwater requirements for Hardin County are that water quality volume is detained and dewatered at a rate of at least 24 hours. The water quality volume is the first 0.6 inch of runoff for each acre of drainage area. Table 3 shows the required water quality volume for the three detention ponds.

Drainage Area	Area (acre)	Area (sf)	Required Treatment Volume (cf)
East	121	5,270,760	263,538
Center	285	12,414,600	620,730
West	223	9,713,880	485,694

The extended detention pond was designed with an outlet control structure with multiple orifices that worked in sync with each other, depending on the storm event, to dewater the pond at a rate less than the pre-development peak flow. The bottom orifice was designed to dewater in less than 48 hours in accordance with the requirements for the WQV of the site. The second orifice has an invert that is above the elevation of the pond that would hold the WQV and is used, along with the bottom orifice, to dewater the 10 year 1-hour storm and the 100 year 1-hour storm. The top of the outlet structure consists of a weir that is used to control the 100 year 6-hour storm in addition to the other two orifices. The extended detention pond also includes an emergency spillway designed in the case that the outlet structure was plugged and couldn’t dewater the pond. See the Appendix for front schematics of the three ponds for orifices sizes, invert elevations, and spillway design. Table 4 shows the comparison between pre-development peak flow rates and the post-construction detained flow rates for the different storm events for each pond.

10 year 1-hour Storm		
Drainage Area	Pre-Development Peak Flow (cfs)	Post Construction Detained Flow (cfs)
Center	50.87	46.17
East	21.60	16.97
West	40.16	23.00
Total	112.63	86.14
100 year 1-hour Storm		
Center	128.19	77.13
East	54.42	28.41
West	101.20	60.01
Total	283.81	165.55
100 year 6-hour Storm		
Center	201.60	196.61
East	86.41	74.61
West	160.67	126.56
Total	448.68	397.78

7.0 Spills and Non-Stormwater Contingencies

Material Delivery Storage & Use- Areas will be designated specifically for material delivery and storage, typically near the construction entrance, away from waterways and storm drain inlets, and if possible the area should be paved. Containment berms or rock check damns will be installed between stored materials such as topsoil or fertilizer and onsite drainage systems. The amount of materials store on site should minimized, especially hazardous waste materials. If hazardous material is to be kept on site, it should be stored in a covered area or indoors if possible. Materials should be kept in the original containers, tightly sealed, and labeled correctly. Inspections should be weekly or after a rainfall event greater than 0.5 inches. Storage areas should be clean with no spills or leaks of material. If any spills occur, clean up promptly. Personnel on site will be instructed on procedures, and the person(s) managing operations will be responsible for following regulations and ensuring complains of practices.

Spill Prevention and Control- To prevent spills, hazardous/toxic materials should be stored indoors if possible, or in areas away from vehicular traffic, vandals, and moving equipment. All materials should be stored away from waterways and storm drain inlets. Cleanup materials will be stockpiled in an easily accessible place. Leaks or spills should be cleaned up immediately, only using dry methods. Spills should never be hosed down or buried. Material used to absorb spills will either be placed in double plastic bagging and discarded with solid waste (small quantities) or disposed of according to material safety data sheet and KY Division of Waste Management (502.564.6716 or www.waste.ky.gov) requirements (large quantities). Major spills or spills that have entered a waterway or a storm drain inlet, will be reported to the Kentucky Division of Water (502.564.2380) or one of the regional offices. Personnel will be trained in spill prevention and response.

Vehicle & Equipment Maintenance- Off-site repair, fueling shops, and vehicle/equipment washouts will be used as much a possible. On-site fuel will be placed on upland areas away from stormwater drainage ditches, inlets and streams, in double containment systems or fuel tanks. Batteries, oil, or other materials will be kept where exposure to runoff will not occur. Drip pans or absorbents will be used under leaking vehicles and equipment. Oil, lubricants, and grease will be properly disposed of. If vehicles and equipment are to be fueled on site, they will be brought to a designated fueling station. On-stie washing areas will use phosphate-free, biodegradable soaps, and will minimize the amount of water used for cleaning. All on-site cleaning, fueling and maintenance areas will use berms or dikes for protection. Inspections will be conducted daily for vehicle/equipment leaks and leaks/spills in fueling areas. Spill cleanup kits will be checked to ensure they are fully stocked. Personnel will be trained

Debris & Trash Management- Potentially hazardous waste, recyclable construction debris and non-recyclable materials will be separated. Debris and trash will be kept in either an enclosed dumpster or other enclosed trash container that will limit contact with ran/runoff and prevent materials from being blown out. All waste materials will be stored away from drainage ditches, swales and catch basins. Trash containers will be prevented from overflowing, and no waste material will be allowed to accumulate on the ground. Littering will be prohibited on the site by any personnel. The site will be inspected daily for litter and debris. All personnel will be instructed of the procedures for waste disposal, and a designated person(s) will oversee and enforce procedures. Construction debris could be hauled to a licenses construction debris landfill or haulers/facilitators approved by the local jurisdiction can remove debris. Workers will be educated about the difference between hazardous waste and solid waste and how to properly dispose of both.

Construction debris includes: dimensional lumber, miscellaneous wood, copper, miscellaneous metal (studs, pipe, conduit, sheathing, nails, etc), insulation, concrete, brick, mortar, shingles, roofing materials, gypsum board, etc.

Trash includes: paper and carboard, plastic, Styrofoam, food/beverage containers, and food waste.

Hazardous Wase Management- Potentially hazardous waste and non-hazardous construction debris will be separated. Chemicals will be kept in appropriate containers such as closed drums and under cover, away from drainage ditches, swales, and catch basins. Containment berms will be constructed around fueling and maintenance areas where spills are more prone to happen. Pain wash water should be minimized and disposed of with other liquid waste by either spreading on graveled sites prepared for new concrete pouring, or areas that are to be paved. Wash water will not be disposed of in ditches or stormwater inlets. Paint, thinners, and other such supplies will be retained until supply is depleted. Liquid will not be disposed on pavement or near stormwater inlets or ditches. Paint rollers, drop cloths, cans, and other wastes will be thoroughly dry before discarding in solid waste containers. All liquid waste should be recycled/disposed of according to material safety data sheets. Hazardous waste storage should always have adequate volume available, conventionally located and are labeled as to what materials can be placed in which. Hazardous waste materials will be removed regularly from the site to prevent accumulation by licensed hazardous waste haulers. Personnel will be instructed on

procedures for chemical storage, chemical identification, spill prevention and response, potential human/environmental dangers, and disposal procedures. Regular meetings will be scheduled to discuss identification, handling, and disposal procedures. A designated person(s) will monitor on-site chemical storage and disposal procedures.

Targeted chemical materials: paints, solvents, stains, wood preservatives, cutting oils, greases, roofing tar, pesticides, herbicides, fertilizer, fuel, lube oils, antifreeze, etc.

Concrete Waste Management- Dumping concrete in unmanaged vacant areas on-site, illicit dumping off site, dumping in ditches or drainage facilities, or dumping wash water from trucks and chutes into storm drains will not be permitted. Waste and wash water will be spread to prevent runoff into areas prepared for new concrete pouring. If a pour site is not available, other safe disposal areas will be designated. Washout areas will have a minimum of six cubic feet of containment area volume for every 10 cubic yards of concrete poured. Waste concrete will not be dumped without property owner's knowledge and consent. Washdown water will be discharged in an area protected by one or more sediment removal BMPS, and will be done in a manner that won't result in groundwater/surface water quality standards violations. Drivers/equipment operators will be instructed in proper disposal and washing practices for equipment. Supervisors will be made aware of potential consequences of not handling concrete waste properly. Designated person(s) will ensure personnel and pre-mix companies are adhering to proper procedures.

Sanitary Facilities- Portable toilets will be proved if no permanent facilities are available on site. The facilities will be provided close to any area where people are working. Any portable toilet will be located 20 feet away form any storm drain inlet, conveyance system, or surface waters. If the 20-foot buffer can't be met, then containment will be provided. Portable toilets will be regularly serviced.

8.0 Phasing of Construction

Phase 1: The initial phase will only disturb 272 acres of the proposed site. Limited clearing and grubbing necessary to install perimeter controls will be performed. Perimeter controls include silt fences, silt fence outlets, and a temporary construction entrance at the north side of the site, located at the end of the existing road leading onto the site. Sediment Basin 1 will be located in the southwest corner of the disturbed area. A six-foot tall berm will be graded in order to create a sediment basin out of the natural topography of the area. The top of the sediment basin will follow the 692 ft contour and reach a depth of six feet. Sediment basin 2 will be graded at the southeast corner of the disturbed area. The pond consists of two detention areas, both reach a depth of ten feet. The two detention ponds will be connected via culvert and will discharge from the right side detention area into the existing stream. Silt fences with silt fence outlets will be established on the downhill side of the berms for both sediment basins. Both sediment basins will use a baffle system and skimmers to help treat sediment collected from the runoff from the site. (Outlet energy dissipator?) Hardin county must conduct a pre-construction inspection of initial erosion control measures prior to any mass land disturbing activity. After receiving approval, topsoil from the disturbed area will be stripped and piled in designated berm sites. Topsoil berms

will be seeded and stabilized as they are constructed. Silt fences will be established around the base of the sites on the down hill side to prevents sediment form leaving the site.

Phase 2: Grading will begin for sediment basin 3, which will cut into the existing sediment basin 1 during construction. Sediment Basin 1 will continue to be active while sediment basin 3 is being constructed. Two swales will be grades along the west and east sides of the disturbed area. Swale 1 will be approximate 4,500 feet and empty into sediment basin 3. The swale will be at a maximum 12 feet deep. Swale 2 will be approximately 5,300 feet and deposit into the left hand basin of sediment basin 2. The swale will reach a maximum depth of 14 feet. Both swales will have check dans throughout their length. The dirt from the north side cut to reach the proposed pad elevation of 704 ft, will be transported to the south side to be used as fill to raise the elevation up to the 704 ft elevation. The mass grading will establish the left side of the proposed building pad and the proposed switch yard at the south. Slopes will be seeded and stabilized to prevent erosion. For future paved areas and building locations, gravel will be laid. Areas to be left vegetative will be seeded.

Phase 3: The limits of disturbance will be expanded to 504 acres. Silt fences and silt fence outlets will be moved to accommodate the new disturbed area. The temporary construction entrance will be relocated to the new location where the entrance road enters the site. Topsoil located within the new disturbed area will be removed and relocated to the existing topsoil berms in the south of the site, seeding and stabilization will be established as they are constructed. Swale 3 will be graded along the newly established east side of the site, reach an approximate length of 5,400 feet, with a maximum depth of 16 feet. Swale 3 will empty into the right side of sediment basin 2. Check dams will be established similar to swale 1 and 2. Mass grading will continue, where cut from the north will be taken to establish fill in the south. The grading will establish a portion of the southeast building pad, the two laydown sites for equipment in the northwest corner, and a section of the north side of the site. Slopes will be seeded and stabilized to prevent erosion. For future paved areas and building locations, gravel will be laid. Areas to be left vegetative will be seeded.

Phase 4: The limit of disturbance will be increased to 702 acres. Silt fences and outlets will be moved to accommodate the new disturbed area. Specifically, silt fences will be placed along the top of the relocated stream. Sediment basin 4 will be graded at the southeast corner of the new disturbed area. Silt fence will be established on the down hill side of the berm to prevent erosion. Topsoil will be removed form the new area of disturbance and placed in a new topsoil berm located between sediment pond 2 and 4. The topsoil berm will be seeded and stabilized as constructed.

Phase 5: Silt fences and outlets will be adjusted with the removal of the entrance road. A new temporary construction entrance will be moved to the new entrance road at the north. A new entrance will be built at the south of the site, and a temporary construction entrance will be placed there as well. Swale 4 will be graded to the east of swale 3, and deposit into sediment basin 4. Swale 3 will be approximately 4,300 feet and a maximum depth of 14 feet. Once topsoil removal has finished, topsoil berms will be covered with final stabilization and remain undisturbed. Mass grading will continue, where the reminder of the site will be established. Cut

from the north side will be used as fill for the south. Slopes will be seeded and stabilized to prevent erosion. For future paved areas and building locations, gravel will be laid. Areas to be left vegetative will be seeded.

9.0 Maintenance/Inspection Procedures

Visual inspections of all cleared and graded areas of the construction site will be performed once every seven calendar days and within 24 hours after storm events of a half inch of precipitation or more. The inspection will be conducted by qualified personal. The inspection will verify that the structural BMPs mentioned in Section 5.0 of this SWPPP are in good condition and are minimizing erosion successfully.

- To ensure erosion and sediment controls are being maintained for silt fences remove sediment when it reaches 1/3 of the height of the fence or a maximum of 9 inches. Inspect fences for tears, if the fabric is attached to the fence post securely, and if fences are firmly in the ground.
- Pipe outlet dissipaters will be inspected for erosion around or below the riprap or if any stones have been dislodged.
- The construction entrance will be inspected for sediment level and clean out. When necessary, replace gravel when surface voids are visible, and remove any materials spilled, washed or tracked onto public roadways. All traffic entering and exiting the site should use construction entrances.
- Sediment Basins should be inspected for any soil erosion or equipment damage and be repaired. When the sediment storage zone is half full, remove sediment and move it to a location that will not erode and not downstream from the embankment. Sediment should never be moved in or adjacent to a stream or floodplain.
- Rock lined channels should be inspected for debris, sediment accumulation, piping, bank stability, and scour holes. Debris should be removed from stream, and stones should be moved or replaced if displaced or missing. Flow should not be restricted when stones are replaced. An erosion should be repaired. Areas of special attention are outlets and points where concentrated flow enters the channel.
- Grass lined channels should be repaired, and grass re-established when necessary. Channels should be inspected for debris, scour, and erosion and repairs should be made immediately. Areas of concern are channel outlets and road crossings. Significant sediment accumulations should be removed, grass kept in a healthy condition, and should be seasonally maintained by mowing and irrigating depending on vegetation type.
- Check dams shall be inspected for sedimentation accumulation, that the center of the dam is lower than the edges of the dam, and that no water is flowing around the edges of the dams. Sediment will be removed from the dam when it reaches one-half the original height of the dam. If erosion is occurring on edges of the dam, the dam must be expanded past the repaired area.
- Erosion Control Blankets and Mats shall be inspected periodically after installation and after significant rainstorms for erosion, undermining, breakage or washouts. Failures

should be repaired immediately. After a washout or breakage occurs, re-installation should take place.

The maintenance inspection report will be made after each inspection. A copy of the report form to be complected by the SWPPP coordinated is provided in Appendix X. Completed forms will be retained at the general contractor's office.

APPENDIX

Corporate Certification

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure the qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manages the system, or those persons directly responsible for gathering information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Signed:_____ Date:_____

CONTRACTOR/SUBCONTRACTOR CERTIFICATION

I certify under penalty of law that I understand the terms and conditions of the general Kentucky Pollutant Discharge Elimination System (KPDES) permit that authorizes the storm water discharges associated with the construction site activity identified as part of this certification.

Contractor	**Responsible for:**	**Signature**
		_____ Name, title Date: _____
		_____ Name, title Date: _____
		_____ Name, title Date: _____
		_____ Name, title Date: _____

Industrial Stormwater Monthly Inspection Report

Inspections must be conducted by a person with the knowledge and skills to assess conditions and activities that could impact stormwater quality at the facility, and evaluate the effectiveness of best management practices required by this permit. Retain a copy of the completed and signed form.

FACILITY NAME:	**INSPECTION TIME:** **DATE:**

WEATHER INFORMATION:

- Description of Weather Conditions (e.g., sunny, cloudy, raining, snowing, etc.):
  _____
  _____
- Was stormwater (e.g., runoff from rain or snowmelt) flowing at outfalls and/or discharge areas shown on the Site Map during the inspection: ☐ **Yes** ☐ **No** ☐ **Comments:**
  _____
  _____

I. POTENTIAL POLLUTANT SOURCE AREA INSPECTION AND BEST MANAGEMENT PRACTICES EVALUATION

	Yes	No	
SWPPP and Site Map: Have a copy of the SWPPP and site map with you during the inspection so that you can ensure they are current and accurate. Use it as an aide in recording the location of any issues you identify during the inspection. • Is the Site Map current and accurate? • Is the SWPPP inventory of activities, materials and products current? Any new potential pollutant sources must be added to the map and reflected in the *SWPPP Facility Assessment & Tables 2, 2A, 3 and 5.*			**Findings and Remedial Action Documentation:** Describe any findings below and the schedule for remedial action completion including the date initiated and date completed or expected to be completed.

Vehicle/Equipment Areas:	**Yes**	**No**	**NA**	**Findings and Remedial Action Documentation:**

Equipment cleaning: Check NA if not performed on-site. Skip section.
 	
Is equipment washed and/or cleaned only in designated areas?
 	
• Observe washing: Is all wash water captured and properly disposed of?
 	
Equipment fueling: Check NA if not performed on-site. Skip section.
 	
• Are all fueling areas free of contaminant buildup and evidence of chronic leaks/spills?
• Are all chemical liquids, fluids, and petroleum products, on an impervious surface that is surrounded with a containment berm or dike that is capable of containing 10% of the total enclosed tank volume or 110% of the volume contained in the largest tank, whichever is greater?
• Are structures in place to prevent precipitation from accumulating in containment areas?
  ○ If not, is there any water or other fluids accumulated within the containment area?
  ○ Note: If containment areas are not covered to prevent water from accumulating, the SWPPP must include a plan describing how accumulated water will be managed and disposed of.				

Equipment maintenance:	**Yes**	**No**	**NA**	**Findings and Remedial Action Documentation:**
• Are maintenance tools, equipment and materials stored under shelter, elevated and covered? • Are all drums and containers of fluids stored with proper cover and containment? • Are exteriors of containers kept outside free of deposits? • Are any vehicles and/or equipment leaking fluids? Identify leaking equipment. • Is there evidence of leaks or spills since last inspection? Identify and address. • Are materials, equipment, and activities located so that leaks are contained in existing containment and diversion systems (confine the storage of leaky or leak-prone vehicles and equipment awaiting maintenance to protected areas)? Add any additional site-specific BMPs: _____ _____ _____ _____				

I. POTENTIAL POLLUTANT SOURCE AREA INSPECTION AND BEST MANAGEMENT PRACTICES EVALUATION				
Good Housekeeping BMPs:	**Yes**	**No**	**NA**	**Findings and Remedial Action Documentation:**
1. Are paved surfaces free of accumulated dust/sediment and debris? • Date of last quarterly vacuum/sweep _____ • Are there areas of erosion or sediment/dust sources that discharge to storm drains?				
2. Are all waste receptacles located outdoors: • In good condition? • Not leaking contaminants? • Closed when is not being accessed? • External surfaces and area free of excessive contaminant buildup?				
3. Are the following areas free of accumulated dust/sediment, debris, contaminants, and/or spills/leaks of fluids? • External dock areas • Pallet, bin, and drum storage areas • Maintenance shop(s) • Equipment staging areas (loaders, tractors, trailers, forklifts, etc) • Around bag-house(s) • Around bone yards • Other areas of industrial activity: _____ _____ _____ _____ _____ _____ _____				

Spill Response and Equipment: Are spill kits available, in the following locations? • Fueling stations • Transfer and mobile fueling units • Vehicle and equipment maintenance areas Do the spill kits contain all the permit required items? • Oil absorbents capable of absorbing 15 gallons of fuel. • A storm drain plug or cover kit. • A water repellant containment boom, a minimum of 10 feet in length with a 12 gallon absorbent capacity. • A non-metallic shovel. • Two five-gallon buckets with lids. Are contaminated absorbent materials properly disposed of?	**Yes**	**No**	**NA**	**Findings and Remedial Action Documentation:**
I. POTENTIAL POLLUTANT SOURCE AREA INSPECTION AND BEST MANAGEMENT PRACTICES EVALUATION				
General Material Storage Areas: • Are damaged materials stored inside a building or another type of storm resistance shelter? • Are all uncontained material piles stored in a manner that does not allow discharge of impacted stormwater? • Are scrap metal bins covered? • Are outdoor containers covered?	**Yes**	**No**	**NA**	**Findings and Remedial Action Documentation:**
Stormwater BMPs and Treatment Structures: Visually inspect all stormwater BMPs and treatment structures devices, discharge areas infiltration and outfalls shown on the Site Map. • Are BMPs and treatment structures in good repair and operational? • Are BMPs and treatment structures free from debris buildup that may impair function? • The permit requires Permittees to clean catch basins when the depth of debris reaches 60% of the sump depth. In addition, the Permittee must keep the debris surface at least 6 inches below the outlet pipe. Based on this, do catch basins need to be cleaned? • Are berms, curbing or other methods used to divert and direct discharges adequate and in good condition?	**Yes**	**No**	**NA**	**Findings and Remedial Action Documentation:**

Observation of Stormwater Discharges:	**Yes**	**No**	**NA**	**Findings and Remedial Action Documentation:**
• Is the discharge free of floating materials, visible oil sheen, discoloration, turbidity, odor, foam or any other signs of contamination? • Water from washing vehicles or equipment, steam cleaning and/or pressure washing is considered process wastewater and is not allowed to comingle with stormwater or enter storm drains. Is process water comingling with stormwater or entering storm drains? • Illicit discharges include domestic wastewater, noncontact cooling water, or process wastewater (including leachate). Were any illicit discharges observed during the inspection?				

II. CORRECTIVE ACTION AND SWPPP MODIFICATIONS DESCRIPTIONS: Additional space to describe inspection findings and corrective actions if needed. Provide brief explanation of the general location and the rationale for the additional or different BMPs.

_____
_____
_____
_____
_____
_____
_____
_____
_____
_____

III. CERTIFICATION STATEMENTS AND SIGNATURES:

Inspector - Certification: This section must be completed by the person who conducted the site inspection prior to submitting this form to the person with signature authority or a duly authorized representative of that person.

☐ *The facility is in compliance with the terms and conditions of the SWPPP and the applicable general permit.*

☐ *The facility is out of compliance with the terms and conditions of the SWPPP and/or the applicable general permit. This report includes the remedial actions that must be taken to meet the requirements of the SWPPP and permit, including a schedule of implementation of the remedial actions.*

"I certify that this report is true, accurate, and complete, to the best of my knowledge and belief."

Inspector's Name – Printed	**Inspector's Signature**	**Inspector's Title**	**Date**

Permittee – Certification:

☐ *The facility is in compliance with the terms and conditions of the SWPPP and the applicable general permit.*

☐ *The facility is out of compliance with the terms and conditions of the SWPPP and the applicable general permit. This report includes the remedial actions that must be taken to meet the requirements of the SWPPP and permit, including a schedule of implementation of the remedial actions.*

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

PRINTED NAME of person with **Signature Authority** or a **Duly Authorized Representative**	SIGNATURE of person with **Signature Authority** or a **Duly Authorized Representative**	**DATE**

TABLE 5-3
TIME OF CONCENTRATION VERSUS RAINFALL INTENSITY

Time of Concentration (minutes)	Intensity (inches/hour)	
	10 year	100 year
10	5.1	6.5
15	4.3	5.4
30	3.1	4.2
60	2.0	2.9

1-HOUR RAINFALL DISTIBUTIONS

Minutes	Cumulative Rainfall (Inches)	
	10-year	100-year
0	0.00	0.00
3	0.24	0.34
6	0.44	0.63
9	0.66	0.95
12	0.86	1.23
15	1.09	1.55
18	1.27	1.81
21	1.43	2.04
24	1.55	2.21
27	1.63	2.32
30	1.69	2.41
33	1.75	2.50
36	1.79	2.55
39	1.85	2.64
42	1.89	2.70
45	1.93	2.76
48	1.95	2.78
51	1.97	2.81
54	1.99	2.84
57	1.99	2.84
60	2.01	2.87

6-HOUR RAINFALL DISTRIBUTION

Minutes	Cumulative Rainfall (Inches)
	100-year
0	0.00
20	0.16
40	0.37
60	0.58
80	0.93
100	1.36
120	1.81
140	2.32
160	2.86
180	3.30
200	3.67
220	3.97
240	4.19
260	4.36
280	4.50
300	4.62
320	4.69
340	4.75
360	4.85

All tables were taken from the Stormwater Manual, published by the Engineering Department of Hardin County, Kentucky in 2005, revised in 2011

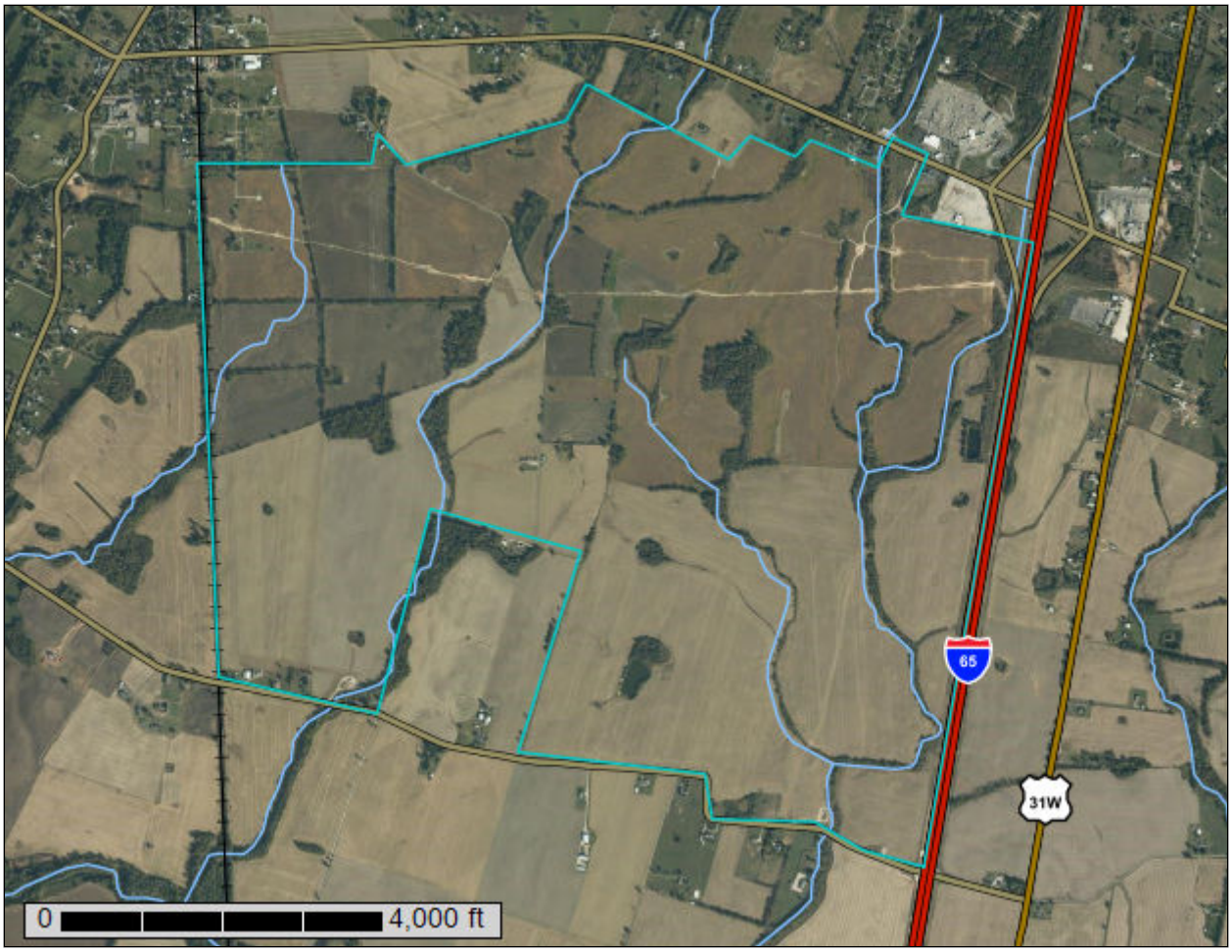
United States Department of Agriculture

NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for Hardin and Larue Counties, Kentucky



December 9, 2021

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

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How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil

scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

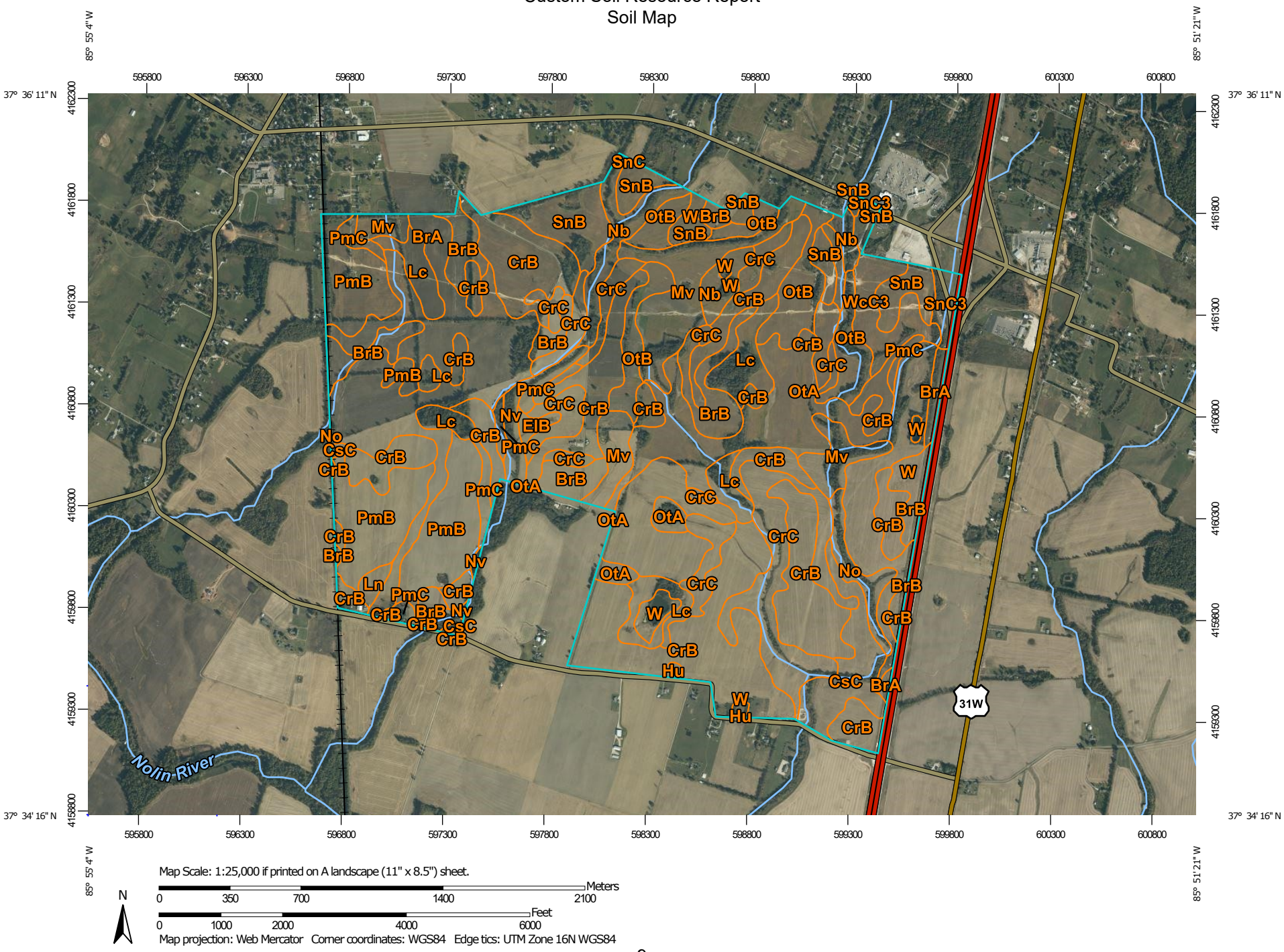
After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report
Soil Map



Map Scale: 1:25,000 if printed on A landscape (11" x 8.5") sheet.

N

Meters: 0 350 700 1400 2100

Feet: 0 1000 2000 4000 6000

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 16N WGS84

MAP LEGEND

Area of Interest (AOI)

- Area of Interest (AOI)

Soils

- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features

- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features

- Streams and Canals

Transportation

- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background

- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:20,000.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Hardin and Larue Counties, Kentucky
Survey Area Data: Version 19, Sep 8, 2021

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Oct 23, 2019—Oct 24, 2019

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
BrA	Bedford silt loam, 0 to 2 percent slopes	151.4	9.6%
BrB	Bedford silt loam, 2 to 6 percent slopes	87.3	5.5%
CrB	Crider silt loam, 2 to 6 percent slopes	405.2	25.7%
CrC	Crider silt loam, 6 to 12 percent slopes	125.9	8.0%
CsC	Cumberland silt loam, 6 to 12 percent slopes	38.2	2.4%
ElB	Elk silt loam, 2 to 6 percent slopes	5.1	0.3%
Hu	Huntington silt loam	1.5	0.1%
Lc	Lawrence silt loam, 0 to 2 percent slopes, rarely flooded	66.9	4.2%
Ln	Lindside silt loam, 0 to 2 percent slopes, frequently flooded	7.8	0.5%
Mv	Melvin silt loam	90.6	5.8%
Nb	Newark silt loam, 0 to 2 percent slopes, frequently flooded	43.3	2.8%
No	Nolin silt loam, 0 to 2 percent slopes, frequently flooded	16.9	1.1%
Nv	Nolin variant fine sandy loam (grigsby)	16.7	1.1%
OtA	Otwood silt loam, 0 to 2 percent slopes, rarely flooded	154.7	9.8%
OtB	Otwood silt loam, 2 to 6 percent slopes, occasionally flooded	78.5	5.0%
PmB	Pembroke silt loam, 2 to 6 percent slopes	131.5	8.4%
PmC	Pembroke silt loam, 6 to 12 percent slopes	23.2	1.5%
SnB	Sonora silt loam, 2 to 6 percent slopes	70.6	4.5%
SnC	Sonora silt loam, 6 to 12 percent slopes	0.2	0.0%
SnC3	Sonora silt loam, 6 to 12 percent slopes, severely eroded	9.5	0.6%
W	Water	11.6	0.7%
WbC	Waynesboro loam, 6 to 12 percent slopes	4.7	0.3%

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
WcC3	Waynesboro clay loam, 6 to 12 percent slopes, severely eroded	32.7	2.1%
Totals for Area of Interest		**1,574.0**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Hardin and Larue Counties, Kentucky

BrA—Bedford silt loam, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: 2wh4f
Elevation: 420 to 1,020 feet
Mean annual precipitation: 39 to 66 inches
Mean annual air temperature: 41 to 68 degrees F
Frost-free period: 139 to 205 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Bedford and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Bedford

Setting

Landform: Ridges
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Crest
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Fine-silty noncalcareous loess over clayey residuum weathered from limestone

Typical profile

Ap - 0 to 9 inches: silt loam
Bt - 9 to 24 inches: silty clay loam
2Btx - 24 to 58 inches: silty clay loam
2Bt - 58 to 80 inches: clay

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: 23 to 35 inches to fragipan
Drainage class: Moderately well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Low to moderately high (0.01 to 0.20 in/hr)
Depth to water table: About 20 to 33 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 4.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2w
Hydrologic Soil Group: C/D
Other vegetative classification: Trees/Timber (Woody Vegetation)
Hydric soil rating: No

Minor Components

Crider

Percent of map unit: 10 percent
Landform: Ridges
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Crest
Down-slope shape: Convex
Across-slope shape: Linear
Other vegetative classification: Trees/Timber (Woody Vegetation)
Hydric soil rating: No

Lawrence

Percent of map unit: 5 percent
Landform: Ridges
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Crest
Down-slope shape: Linear
Across-slope shape: Linear
Other vegetative classification: Trees/Timber (Woody Vegetation)
Hydric soil rating: No

BrB—Bedford silt loam, 2 to 6 percent slopes

Map Unit Setting

National map unit symbol: 2s2cy
Elevation: 420 to 1,210 feet
Mean annual precipitation: 40 to 66 inches
Mean annual air temperature: 41 to 68 degrees F
Frost-free period: 139 to 205 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Bedford and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Bedford

Setting

Landform: Hills
Landform position (two-dimensional): Shoulder, summit
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Noncalcareous loess over loamy noncalcareous loess over clayey residuum weathered from limestone

Typical profile

Ap - 0 to 9 inches: silt loam

Bt - 9 to 24 inches: silty clay loam
2Btx - 24 to 51 inches: silty clay loam
3Bt - 51 to 80 inches: clay

Properties and qualities

Slope: 2 to 6 percent
Depth to restrictive feature: 21 to 35 inches to fragipan
Drainage class: Moderately well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Low to moderately high (0.01 to 0.20 in/hr)
Depth to water table: About 18 to 33 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 4.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: C/D
Other vegetative classification: Trees/Timber (Woody Vegetation)
Hydric soil rating: No

Minor Components

Crider

Percent of map unit: 10 percent
Landform: Hills
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Convex
Other vegetative classification: Trees/Timber (Woody Vegetation)
Hydric soil rating: No

Lawrence

Percent of map unit: 5 percent
Landform: Ridges
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Interfluve
Down-slope shape: Linear
Across-slope shape: Linear
Other vegetative classification: Trees/Timber (Woody Vegetation)
Hydric soil rating: No

CrB—Crider silt loam, 2 to 6 percent slopes

Map Unit Setting

National map unit symbol: 2vp3p
Elevation: 350 to 1,120 feet
Mean annual precipitation: 37 to 62 inches

Mean annual air temperature: 41 to 68 degrees F
Frost-free period: 145 to 212 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Crider and similar soils: 75 percent
Minor components: 25 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Crider

Setting

Landform: Hills
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Crest
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Fine-silty noncalcareous loess over clayey residuum weathered from limestone

Typical profile

Ap - 0 to 7 inches: silt loam
Bt1 - 7 to 32 inches: silty clay loam
2Bt2 - 32 to 80 inches: clay

Properties and qualities

Slope: 2 to 6 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.20 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Moderate (about 7.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: B
Other vegetative classification: Trees/Timber (Woody Vegetation)
Hydric soil rating: No

Minor Components

Bedford

Percent of map unit: 10 percent
Landform: Hills
Landform position (two-dimensional): Shoulder, summit
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear
Other vegetative classification: Trees/Timber (Woody Vegetation)
Hydric soil rating: No

Nolin, ponded

Percent of map unit: 10 percent
Landform: Sinkholes
Landform position (three-dimensional): Talf
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: No

Caneyville

Percent of map unit: 5 percent
Landform: Hills
Landform position (two-dimensional): Shoulder, summit
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear
Other vegetative classification: Trees/Timber (Woody Vegetation)
Hydric soil rating: No

CrC—Crider silt loam, 6 to 12 percent slopes

Map Unit Setting

National map unit symbol: 2vp3r
Elevation: 440 to 990 feet
Mean annual precipitation: 37 to 58 inches
Mean annual air temperature: 43 to 68 degrees F
Frost-free period: 150 to 212 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Crider and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Crider

Setting

Landform: Hills
Landform position (two-dimensional): Shoulder, summit
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Fine-silty noncalcareous loess over clayey residuum weathered from limestone

Typical profile

Ap - 0 to 7 inches: silt loam
Bt1 - 7 to 36 inches: silty clay loam
2Bt2 - 36 to 80 inches: clay

Properties and qualities

Slope: 6 to 12 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.20 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Moderate (about 8.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: B
Other vegetative classification: Trees/Timber (Woody Vegetation)
Hydric soil rating: No

Minor Components

Caneyville

Percent of map unit: 10 percent
Landform: Hills
Landform position (two-dimensional): Shoulder, summit
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear
Other vegetative classification: Trees/Timber (Woody Vegetation)
Hydric soil rating: No

Bedford

Percent of map unit: 7 percent
Landform: Hills
Landform position (two-dimensional): Shoulder, summit
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear
Other vegetative classification: Trees/Timber (Woody Vegetation)
Hydric soil rating: No

Nolin, ponded

Percent of map unit: 3 percent
Landform: Sinkholes
Landform position (three-dimensional): Talf
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: No

CsC—Cumberland silt loam, 6 to 12 percent slopes

Map Unit Setting

National map unit symbol: lhd5
Elevation: 380 to 1,060 feet
Mean annual precipitation: 44 to 58 inches
Mean annual air temperature: 46 to 68 degrees F
Frost-free period: 165 to 205 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Cumberland and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Cumberland

Setting

Landform: Ridges
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Clayey residuum weathered from limestone

Typical profile

H1 - 0 to 5 inches: silt loam
H2 - 5 to 11 inches: silty clay loam
H3 - 11 to 65 inches: clay

Properties and qualities

Slope: 6 to 12 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: High (about 9.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: B
Hydric soil rating: No

Minor Components

Other soils

Percent of map unit: 4 percent
Hydric soil rating: No

Newark

Percent of map unit: 3 percent
Hydric soil rating: No

Huntington

Percent of map unit: 3 percent
Hydric soil rating: No

ElB—Elk silt loam, 2 to 6 percent slopes

Map Unit Setting

National map unit symbol: lhdb
Elevation: 380 to 1,060 feet
Mean annual precipitation: 44 to 58 inches
Mean annual air temperature: 46 to 68 degrees F
Frost-free period: 165 to 205 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Elk, occasionally flooded, and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Elk, Occasionally Flooded

Setting

Landform: Stream terraces
Landform position (three-dimensional): Tread
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Mixed fine-silty alluvium

Typical profile

H1 - 0 to 9 inches: silt loam
H2 - 9 to 26 inches: silt loam
H3 - 26 to 65 inches: silty clay loam

Properties and qualities

Slope: 2 to 6 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: More than 80 inches

Frequency of flooding: OccasionalNone
Frequency of ponding: None
Available water supply, 0 to 60 inches: High (about 11.0 inches)

Interpretive groups
Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: B
Hydric soil rating: No

Minor Components

Nolin
Percent of map unit: 5 percent
Hydric soil rating: No

Other soils
Percent of map unit: 5 percent
Hydric soil rating: No

Hu—Huntington silt loam

Map Unit Setting
National map unit symbol: lhdp
Elevation: 380 to 1,060 feet
Mean annual precipitation: 44 to 58 inches
Mean annual air temperature: 46 to 68 degrees F
Frost-free period: 165 to 205 days
Farmland classification: Prime farmland if protected from flooding or not frequently flooded during the growing season

Map Unit Composition
Huntington, frequently flooded, and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Huntington, Frequently Flooded

Setting
Landform: Flood plains
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Fine-silty alluvium

Typical profile
H1 - 0 to 6 inches: silt loam
H2 - 6 to 65 inches: silt loam

Properties and qualities
Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained

Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: About 48 to 72 inches
Frequency of flooding: FrequentNone
Frequency of ponding: None
Available water supply, 0 to 60 inches: Moderate (about 8.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2w
Hydrologic Soil Group: B
Hydric soil rating: No

Minor Components

Newark

Percent of map unit: 6 percent
Hydric soil rating: No

Other soils

Percent of map unit: 4 percent
Hydric soil rating: No

Lc—Lawrence silt loam, 0 to 2 percent slopes, rarely flooded

Map Unit Setting

National map unit symbol: 2wlvk
Elevation: 380 to 1,070 feet
Mean annual precipitation: 42 to 66 inches
Mean annual air temperature: 42 to 68 degrees F
Frost-free period: 139 to 210 days
Farmland classification: Prime farmland if drained

Map Unit Composition

Lawrence, rarely flooded, and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Lawrence, Rarely Flooded

Setting

Landform: Stream terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Fine-silty loess over clayey residuum weathered from limestone and dolomite

Typical profile

Ap - 0 to 8 inches: silt loam

Bt - 8 to 20 inches: silt loam
Btx - 20 to 48 inches: silt loam
2Bt - 48 to 54 inches: silty clay loam
2C - 54 to 80 inches: silty clay loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: 18 to 32 inches to fragipan
Drainage class: Somewhat poorly drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.03 to 0.20 in/hr)
Depth to water table: About 12 to 18 inches
Frequency of flooding: RareNone
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 4.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: D
Hydric soil rating: No

Minor Components

Robertsville, rarely flooded

Percent of map unit: 4 percent
Landform: Stream terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Concave
Hydric soil rating: Yes

Otwood

Percent of map unit: 2 percent
Landform: Stream terraces
Landform position (three-dimensional): Tread
Down-slope shape: Convex
Across-slope shape: Linear
Hydric soil rating: No

Mcgary, rarely flooded

Percent of map unit: 2 percent
Landform: Stream terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Newark, rarely flooded

Percent of map unit: 2 percent
Landform: Flood plains
Landform position (three-dimensional): Talf
Down-slope shape: Concave
Across-slope shape: Linear
Hydric soil rating: No

Ln—Lindside silt loam, 0 to 2 percent slopes, frequently flooded

Map Unit Setting

National map unit symbol: 2wh4d
Elevation: 400 to 940 feet
Mean annual precipitation: 42 to 58 inches
Mean annual air temperature: 45 to 68 degrees F
Frost-free period: 150 to 205 days
Farmland classification: Prime farmland if protected from flooding or not frequently flooded during the growing season

Map Unit Composition

Lindside, frequently flooded, and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Lindside, Frequently Flooded

Setting

Landform: Flood plains
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Non-acid fine-silty alluvium

Typical profile

Ap - 0 to 7 inches: silt loam
Bw - 7 to 27 inches: silt loam
C - 27 to 80 inches: silty clay loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.02 to 1.98 in/hr)
Depth to water table: About 20 to 36 inches
Frequency of flooding: FrequentNone
Frequency of ponding: None
Available water supply, 0 to 60 inches: Very high (about 12.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2w
Hydrologic Soil Group: C
Hydric soil rating: No

Minor Components

Nolin, frequently flooded
Percent of map unit: 10 percent
Landform: Flood plains
Landform position (three-dimensional): Rise
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Huntington, frequently flooded
Percent of map unit: 5 percent
Landform: Flood plains
Landform position (three-dimensional): Rise
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Newark, frequently flooded
Percent of map unit: 3 percent
Landform: Flood plains
Landform position (three-dimensional): Dip
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Melvin, frequently flooded
Percent of map unit: 2 percent
Landform: Flood plains
Landform position (three-dimensional): Dip
Down-slope shape: Concave
Across-slope shape: Linear
Hydric soil rating: Yes

Mv—Melvin silt loam

Map Unit Setting

National map unit symbol: lhdw
Elevation: 380 to 1,060 feet
Mean annual precipitation: 44 to 58 inches
Mean annual air temperature: 46 to 68 degrees F
Frost-free period: 165 to 205 days
Farmland classification: Prime farmland if drained and either protected from flooding or not frequently flooded during the growing season

Map Unit Composition

Melvin, frequently flooded, and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Melvin, Frequently Flooded

Setting

Landform: Flood plains
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Mixed fine-silty alluvium

Typical profile

H1 - 0 to 8 inches: silt loam
H2 - 8 to 66 inches: silt loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: About 0 to 12 inches
Frequency of flooding: FrequentNone
Frequency of ponding: None
Available water supply, 0 to 60 inches: Very high (about 12.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: B/D
Hydric soil rating: Yes

Minor Components

Other soils

Percent of map unit: 10 percent
Hydric soil rating: No

Nb—Newark silt loam, 0 to 2 percent slopes, frequently flooded

Map Unit Setting

National map unit symbol: 2s2cf
Elevation: 390 to 960 feet
Mean annual precipitation: 40 to 66 inches
Mean annual air temperature: 42 to 68 degrees F
Frost-free period: 139 to 205 days
Farmland classification: Prime farmland if drained and either protected from flooding or not frequently flooded during the growing season

Map Unit Composition

Newark, frequently flooded, and similar soils: 90 percent
Minor components: 10 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Newark, Frequently Flooded

Setting

Landform: Flood plains
Landform position (three-dimensional): Talf
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Mixed fine-silty alluvium

Typical profile

Ap - 0 to 8 inches: silt loam
Bg - 8 to 55 inches: silty clay loam
Cg - 55 to 80 inches: silt loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat poorly drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: About 6 to 20 inches
Frequency of flooding: FrequentNone
Frequency of ponding: None
Available water supply, 0 to 60 inches: High (about 10.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: B/D
Hydric soil rating: No

Minor Components

Nolin, frequently flooded

Percent of map unit: 5 percent
Landform: Flood plains
Landform position (three-dimensional): Rise
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Lindside, frequently flooded

Percent of map unit: 3 percent
Landform: Flood plains
Landform position (three-dimensional): Rise
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Melvin, frequently flooded

Percent of map unit: 2 percent
Landform: Flood plains
Landform position (three-dimensional): Dip
Down-slope shape: Concave
Across-slope shape: Linear

Hydric soil rating: Yes

No—Nolin silt loam, 0 to 2 percent slopes, frequently flooded

Map Unit Setting

National map unit symbol: 2s2cx
Elevation: 380 to 970 feet
Mean annual precipitation: 43 to 62 inches
Mean annual air temperature: 42 to 68 degrees F
Frost-free period: 145 to 205 days
Farmland classification: Prime farmland if protected from flooding or not frequently flooded during the growing season

Map Unit Composition

Nolin, frequently flooded, and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Nolin, Frequently Flooded

Setting

Landform: Flood plains
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Mixed fine-silty alluvium

Typical profile

Ap - 0 to 8 inches: silt loam
Bw - 8 to 72 inches: silt loam
C - 72 to 85 inches: loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: FrequentNone
Frequency of ponding: None
Available water supply, 0 to 60 inches: High (about 10.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2w
Hydrologic Soil Group: B
Hydric soil rating: No

Minor Components

Newark, frequently flooded

Percent of map unit: 5 percent
Landform: Flood plains
Landform position (three-dimensional): Dip
Down-slope shape: Concave
Across-slope shape: Linear
Hydric soil rating: No

Sensabaugh, frequently flooded

Percent of map unit: 3 percent
Landform: Flood plains
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Melvin, frequently flooded

Percent of map unit: 2 percent
Landform: Flood plains
Landform position (three-dimensional): Dip
Down-slope shape: Concave
Across-slope shape: Linear
Hydric soil rating: Yes

Nv—Nolin variant fine sandy loam (grigsby)

Map Unit Setting

National map unit symbol: lhf1
Elevation: 380 to 1,060 feet
Mean annual precipitation: 44 to 58 inches
Mean annual air temperature: 46 to 68 degrees F
Frost-free period: 165 to 205 days
Farmland classification: Prime farmland if protected from flooding or not frequently flooded during the growing season

Map Unit Composition

Grigsby, frequently flooded, and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Grigsby, Frequently Flooded

Setting

Landform: Flood plains
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Mixed coarse-loamy alluvium

Typical profile

H1 - 0 to 9 inches: fine sandy loam
H2 - 9 to 48 inches: fine sandy loam
H3 - 48 to 63 inches: silt loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): High (2.00 to 6.00 in/hr)
Depth to water table: About 36 to 72 inches
Frequency of flooding: FrequentNone
Frequency of ponding: None
Available water supply, 0 to 60 inches: Moderate (about 6.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2w
Hydrologic Soil Group: A
Hydric soil rating: No

Minor Components

Other soils

Percent of map unit: 10 percent
Hydric soil rating: No

OtA—Otwood silt loam, 0 to 2 percent slopes, rarely flooded

Map Unit Setting

National map unit symbol: 2wltw
Elevation: 420 to 890 feet
Mean annual precipitation: 42 to 60 inches
Mean annual air temperature: 44 to 68 degrees F
Frost-free period: 155 to 207 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Otwood, rarely flooded, and similar soils: 83 percent
Minor components: 17 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Otwood, Rarely Flooded

Setting

Landform: Stream terraces
Landform position (three-dimensional): Tread
Down-slope shape: Convex

Across-slope shape: Linear
Parent material: Mixed fine-silty alluvium over old loamy alluvium

Typical profile

Ap - 0 to 8 inches: silt loam
Bt - 8 to 26 inches: silty clay loam
Btx - 26 to 42 inches: silty clay loam
2BC - 42 to 80 inches: silty clay loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: 23 to 35 inches to fragipan
Drainage class: Moderately well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: About 20 to 32 inches
Frequency of flooding: RareNone
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 5.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2w
Hydrologic Soil Group: C/D
Hydric soil rating: No

Minor Components

Elk, rarely flooded

Percent of map unit: 4 percent
Landform: Stream terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Lawrence, rarely flooded

Percent of map unit: 4 percent
Landform: Stream terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Other vegetative classification: Trees/Timber (Woody Vegetation)
Hydric soil rating: No

Nolin, occasionally flooded

Percent of map unit: 4 percent
Landform: Flood plains
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Newark, occasionally flooded

Percent of map unit: 3 percent
Landform: Flood plains
Landform position (three-dimensional): Dip

Down-slope shape: Linear
Across-slope shape: Linear
Other vegetative classification: Trees/Timber (Woody Vegetation)
Hydric soil rating: No

Otwood, occasionally flooded
Percent of map unit: 2 percent
Landform: Stream terraces
Landform position (three-dimensional): Tread
Down-slope shape: Convex
Across-slope shape: Linear
Hydric soil rating: No

OtB—Otwood silt loam, 2 to 6 percent slopes, occasionally flooded

Map Unit Setting
National map unit symbol: 2wv50
Elevation: 400 to 950 feet
Mean annual precipitation: 40 to 66 inches
Mean annual air temperature: 44 to 68 degrees F
Frost-free period: 139 to 205 days
Farmland classification: All areas are prime farmland

Map Unit Composition
Otwood, occasionally flooded, and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Otwood, Occasionally Flooded

Setting
Landform: Stream terraces
Landform position (three-dimensional): Riser
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Mixed fine-silty alluvium

Typical profile
Ap - 0 to 10 inches: silt loam
Bt - 10 to 27 inches: silt loam
Btx - 27 to 46 inches: silt loam
B't - 46 to 83 inches: silt loam
C - 83 to 91 inches: loam

Properties and qualities
Slope: 2 to 6 percent
Depth to restrictive feature: 23 to 31 inches to fragipan
Drainage class: Moderately well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)

Depth to water table: About 20 to 28 inches
Frequency of flooding: OccasionalNone
Frequency of ponding: None
Available water supply, 0 to 60 inches: Moderate (about 6.2 inches)

Interpretive groups
Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: C
Hydric soil rating: No

Minor Components

Lawrence, rarely flooded
Percent of map unit: 4 percent
Landform: Stream terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Other vegetative classification: Trees/Timber (Woody Vegetation)
Hydric soil rating: No

Nolin, occasionally flooded
Percent of map unit: 4 percent
Landform: Flood plains
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Elk, rarely flooded
Percent of map unit: 4 percent
Landform: Stream terraces
Landform position (three-dimensional): Riser
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Newark, occasionally flooded
Percent of map unit: 3 percent
Landform: Flood plains
Landform position (three-dimensional): Dip
Down-slope shape: Linear
Across-slope shape: Linear
Other vegetative classification: Trees/Timber (Woody Vegetation)
Hydric soil rating: No

PmB—Pembroke silt loam, 2 to 6 percent slopes

Map Unit Setting
National map unit symbol: lhf4

Elevation: 380 to 1,060 feet
Mean annual precipitation: 44 to 58 inches
Mean annual air temperature: 46 to 68 degrees F
Frost-free period: 165 to 205 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Pembroke and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Pembroke

Setting

Landform: Ridges
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Thin fine-silty noncalcareous loess over clayey residuum weathered from limestone

Typical profile

H1 - 0 to 7 inches: silt loam
H2 - 7 to 40 inches: silty clay loam
H3 - 40 to 66 inches: silty clay

Properties and qualities

Slope: 2 to 6 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: High (about 11.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: B
Hydric soil rating: No

Minor Components

Newark

Percent of map unit: 4 percent
Hydric soil rating: No

Huntington

Percent of map unit: 4 percent
Hydric soil rating: No

Other soils

Percent of map unit: 2 percent
Hydric soil rating: No

PmC—Pembroke silt loam, 6 to 12 percent slopes

Map Unit Setting

National map unit symbol: lhf5
Elevation: 380 to 1,060 feet
Mean annual precipitation: 44 to 58 inches
Mean annual air temperature: 46 to 68 degrees F
Frost-free period: 165 to 205 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Pembroke and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Pembroke

Setting

Landform: Ridges
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Thin fine-silty noncalcareous loess over clayey residuum weathered from limestone

Typical profile

H1 - 0 to 7 inches: silt loam
H2 - 7 to 40 inches: silty clay loam
H3 - 40 to 66 inches: silty clay

Properties and qualities

Slope: 6 to 12 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: High (about 11.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: B
Hydric soil rating: No

Minor Components

Newark
Percent of map unit: 3 percent
Hydric soil rating: No

Fredonia
Percent of map unit: 3 percent
Hydric soil rating: No

Huntington
Percent of map unit: 3 percent
Hydric soil rating: No

Other soils
Percent of map unit: 1 percent
Hydric soil rating: No

SnB—Sonora silt loam, 2 to 6 percent slopes

Map Unit Setting
National map unit symbol: lhfk
Elevation: 380 to 1,060 feet
Mean annual precipitation: 44 to 58 inches
Mean annual air temperature: 46 to 68 degrees F
Frost-free period: 165 to 205 days
Farmland classification: All areas are prime farmland

Map Unit Composition
Sonora and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Sonora

Setting
Landform: Ridges
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Fine-loamy noncalcareous loess over clayey residuum weathered from sandstone and shale

Typical profile
H1 - 0 to 9 inches: silt loam
H2 - 9 to 25 inches: silt loam
H3 - 25 to 39 inches: loam
H4 - 39 to 71 inches: sandy clay

Properties and qualities

Slope: 2 to 6 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: High (about 10.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: B
Hydric soil rating: No

Minor Components

Gatton

Percent of map unit: 6 percent
Hydric soil rating: No

Other soils

Percent of map unit: 4 percent
Hydric soil rating: No

SnC—Sonora silt loam, 6 to 12 percent slopes

Map Unit Setting

National map unit symbol: lhfl
Elevation: 380 to 1,060 feet
Mean annual precipitation: 44 to 58 inches
Mean annual air temperature: 46 to 68 degrees F
Frost-free period: 165 to 205 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Sonora and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Sonora

Setting

Landform: Ridges
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex

Across-slope shape: Linear
Parent material: Fine-loamy noncalcareous loess over clayey residuum weathered from sandstone and shale

Typical profile

H1 - 0 to 9 inches: silt loam
H2 - 9 to 25 inches: silt loam
H3 - 25 to 39 inches: loam
H4 - 39 to 71 inches: sandy clay

Properties and qualities

Slope: 6 to 12 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: High (about 10.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: B
Hydric soil rating: No

Minor Components

Gatton

Percent of map unit: 6 percent
Hydric soil rating: No

Other soils

Percent of map unit: 4 percent
Hydric soil rating: No

SnC3—Sonora silt loam, 6 to 12 percent slopes, severely eroded

Map Unit Setting

National map unit symbol: lhfm
Elevation: 380 to 1,060 feet
Mean annual precipitation: 44 to 58 inches
Mean annual air temperature: 46 to 68 degrees F
Frost-free period: 165 to 205 days
Farmland classification: Not prime farmland

Map Unit Composition

Sonora, severely eroded, and similar soils: 85 percent
Minor components: 15 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Sonora, Severely Eroded

Setting

Landform: Ridges
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Fine-loamy noncalcareous loess over clayey residuum weathered from sandstone and shale

Typical profile

H1 - 0 to 7 inches: silt loam
H2 - 7 to 23 inches: silt loam
H3 - 23 to 37 inches: loam
H4 - 37 to 69 inches: sandy clay

Properties and qualities

Slope: 6 to 12 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: High (about 10.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: B
Hydric soil rating: No

Minor Components

Other soils

Percent of map unit: 10 percent
Hydric soil rating: No

Gatton

Percent of map unit: 5 percent
Hydric soil rating: No

W—Water

Map Unit Setting

National map unit symbol: lhfs
Elevation: 380 to 1,060 feet

Mean annual precipitation: 44 to 58 inches
Mean annual air temperature: 46 to 68 degrees F
Frost-free period: 165 to 205 days
Farmland classification: Not prime farmland

Map Unit Composition
Water: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

WbC—Waynesboro loam, 6 to 12 percent slopes

Map Unit Setting
National map unit symbol: lhft
Elevation: 380 to 1,060 feet
Mean annual precipitation: 44 to 58 inches
Mean annual air temperature: 46 to 68 degrees F
Frost-free period: 165 to 205 days
Farmland classification: Farmland of statewide importance

Map Unit Composition
Waynesboro and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Waynesboro

Setting
Landform: Ridges
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Clayey residuum weathered from sandstone and shale

Typical profile
H1 - 0 to 12 inches: loam
H2 - 12 to 30 inches: clay loam
H3 - 30 to 60 inches: clay

Properties and qualities
Slope: 6 to 12 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: High (about 9.4 inches)

Interpretive groups
Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: B
Hydric soil rating: No

Minor Components

Nolin

Percent of map unit: 4 percent
Hydric soil rating: No

Newark

Percent of map unit: 4 percent
Hydric soil rating: No

Other soils

Percent of map unit: 2 percent
Hydric soil rating: No

WcC3—Waynesboro clay loam, 6 to 12 percent slopes, severely eroded

Map Unit Setting

National map unit symbol: lhfx
Elevation: 380 to 1,060 feet
Mean annual precipitation: 44 to 58 inches
Mean annual air temperature: 46 to 68 degrees F
Frost-free period: 165 to 205 days
Farmland classification: Not prime farmland

Map Unit Composition

Waynesboro, severely eroded, and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Waynesboro, Severely Eroded

Setting

Landform: Ridges
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Clayey residuum weathered from sandstone and shale

Typical profile

H1 - 0 to 8 inches: clay loam
H2 - 8 to 28 inches: clay loam
H3 - 28 to 60 inches: clay

Properties and qualities

Slope: 6 to 12 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained

Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: High (about 9.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: B
Hydric soil rating: No

Minor Components

Other soils

Percent of map unit: 6 percent
Hydric soil rating: No

Nolin

Percent of map unit: 2 percent
Hydric soil rating: No

Newark

Percent of map unit: 2 percent
Hydric soil rating: No

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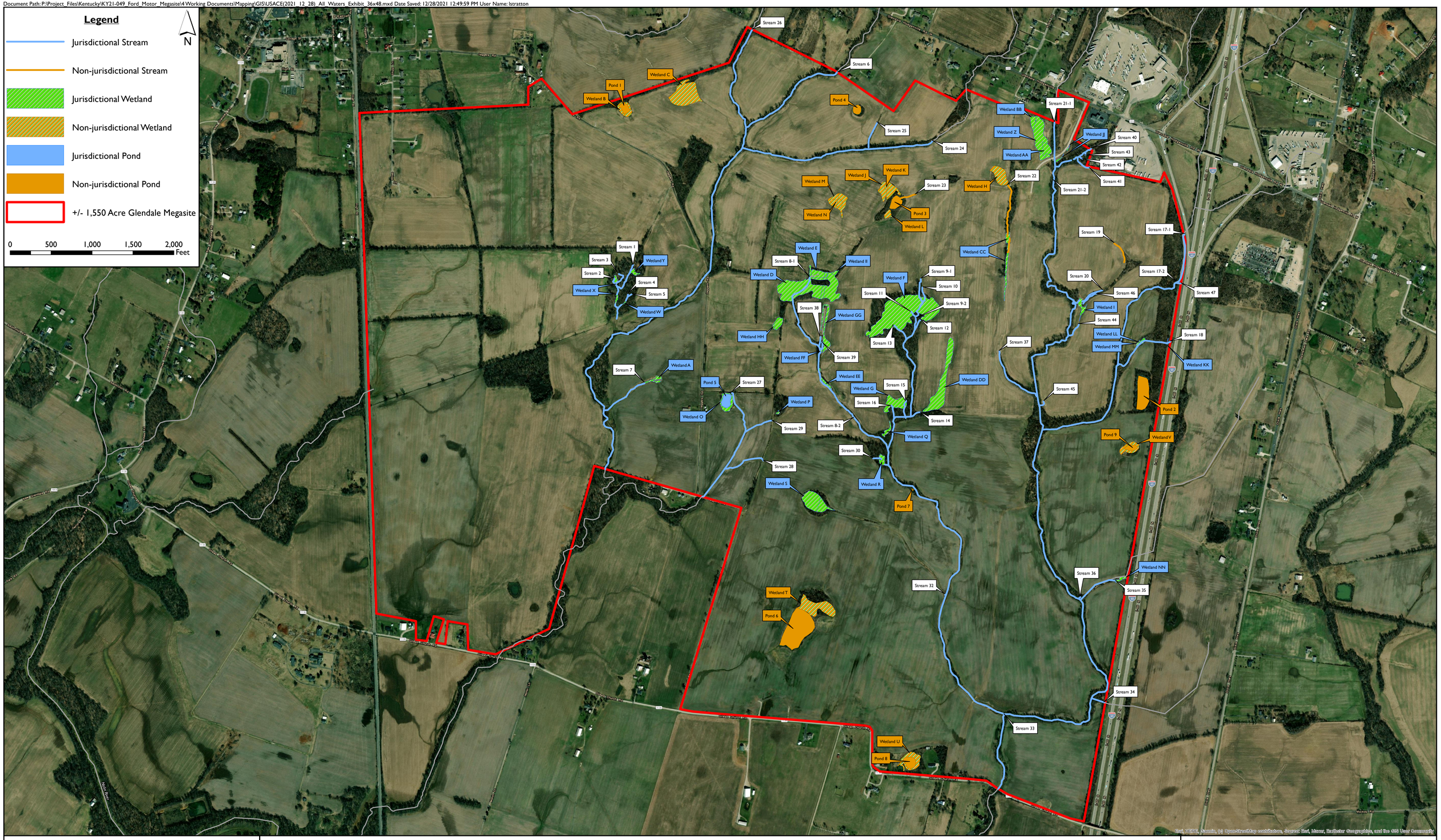

Prepared by: Third Rock Consultants, LLC 2526 Regency Road, Suite 180 Lexington, Kentucky 40503	**All Waters Map** **Elizabethtown-Hardin County Industrial Foundation Megasite** **Glendale, Hardin County, Kentucky**	Blue Oval SK Battery Park Hardin County, Kentucky 37.588248° / -85.886739°

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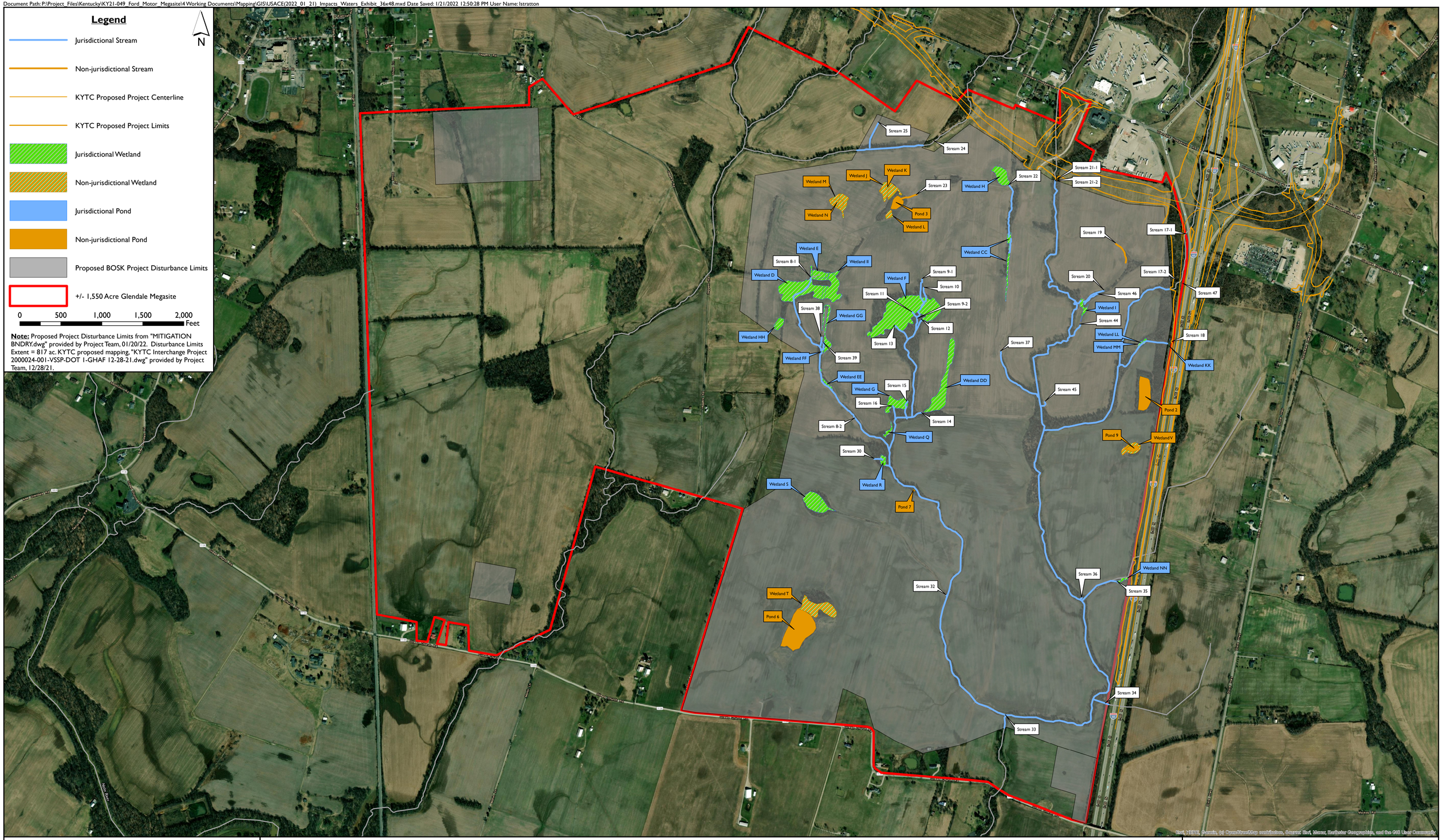

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Waters Impacts
Elizabethtown-Hardin County Industrial Foundation Megasite
Glendale, Hardin County, Kentucky

Blue Oval SK Battery Park
LRL-2021-443-sea
Hardin County, Kentucky
37.588248° / -85.886739°

INNOVATIVE IDEAS
EXCEPTIONAL DESIGN
UNMATCHED CLIENT SERVICE

DRAFT REPORT
OF
STRUCTURE FOUNDATION EXPLORATION

Proposed Hardin County H4 Battery Manufacturing Plant

City of Glendale, Hardin County, Kentucky

Prepared For:

Barton Malow Company
26500 American Drive
Southfield, Michigan 48034

Prepared By:

DLZ Job No. 2150-9519.50

December 24, 2021

EXECUTIVE SUMMARY

To be provided with the final report.

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Appendices

Appendix A

- Location Map
- General Information - Drilling Procedures and Logs of Borings
- Legend - Boring Log Terminology
- Boring Location Plans
- Boring Logs – 219 Borings (to date)
- Subsurface Geotechnical Profiles

Appendix B

- Laboratory Test Results
- Calculations

Appendix C

- Foundation Loading Information (provided by others)
- Slab on Grade Loading information (provided by others)

Appendix D

- General Earthwork Recommendations

1.0 Introduction and General Project Information

DLZ understands that the project will include the construction of two (2) separate 3.148 million square-foot battery manufacturing buildings along with ancillary support structures and site-civil improvements such as roadways, drives, and parking areas. The site reportedly will be constructed in the southwest quadrant of the intersection of State Route 222 (Glendale Hodgenville Road W) and Interstate 65 (Kentucky Turnpike). A Location Map showing the general location of the proposed facility is included in Appendix A of this report.

Based on information provided by others, DLZ further understands that the project will include the following features:

- The two battery manufacturing buildings are each to have a finish floor elevation (FFE) of El. 704.
- Up to 20 feet of cut and 20 feet of fill will be required at the northern and southern ends of the project site, respectively, to obtain proposed site grades.
- Column foundation loads in the two battery manufacturing buildings will vary between 400 kips and 1,500 kips.
- Concrete slabs-on-grade in the two battery manufacturing buildings will vary in loading from 105 pounds per square foot (psf) to 2,506 psf. These loads reportedly will be longer-term loading conditions (i.e. not transient). There reportedly will be no dynamic (e.g. vibratory) loading on the concrete slabs-on-grade.

The purpose of this exploration was to 1) determine the subsurface conditions to the depths of the borings, 2) evaluate the engineering characteristics of the subsurface materials, and 3) provide recommendations for support of the proposed structures.

The geotechnical engineer has planned and supervised the performance of the geotechnical engineering services, has considered the findings, and has prepared this report in accordance with generally accepted geotechnical engineering practices. No other warranties, either expressed or implied, are made as to the professional advice included in this report.

The analysis and recommendations presented in this report have been made on the basis of the foregoing information provided by others. If the proposed location or structural concepts are changed or differ from that assumed, DLZ should be informed of the changes so that recommendations and conclusions presented in this report may be revised as necessary.

2.0 Geology of the Site

2.1 PHYSIOGRAPHY

The project site lies in the northern portion of the Mississippian Plateau - Pennyroyal Region. Many of the state's longest caves as well as terrain pocketed by sinkholes are in this region. The Mississippian Plateau contains tens of thousands of karstic features including sinkholes, sinking streams, streamless valleys, springs, and caverns formed in the erodible limestone present in the region. These karstic features can create openings in the rock from a few inches wide up to large caverns and rooms more than 100 feet wide, resulting in miles of interconnected passages beneath the ground surface.

2.2 SURFACE WATER AND GROUNDWATER

Generally, surface drainage is by both sheet flows to streams and soil and bedrock infiltration. Several unnamed streams are located across the site with stream flows generally going from north-northeast to the southwest. Many of the streams have a similar alignment suggesting that the surface depressions containing the streams are oriented along the joints in the underlying bedrock. There are a few ponds on the site, most of which appeared to have formed in low-lying areas likely created by sinkholes. There are also areas of standing water after precipitation events indicating that some areas are poorly drained.

Groundwater is typically obtained from the underlying bedrock as the clay-rich overburden is generally void of water in sufficient quantities for domestic agricultural or commercial use. Groundwater yields of 50 gallons per minute can be obtained from wells that encounter large solution (karst) openings. Where these openings are not encountered, the prospects for water are meager. The bedrock also supplies water in the form of springs with some of the springs having sufficient flows to provide water for public and industrial water supplies.

2.3 BEDROCK

The St. Louis Limestone is the uppermost bedrock unit beneath the site. This unit is known to be highly karstic. The depth to the top of rock varies significantly across the site due to surface and bedrock topography. Karstification and weathering of the bedrock have also resulted in irregular bedrock surface geometries. Relatively large changes in top of bedrock elevations over short horizontal distances are anticipated. As of the date of this draft report, exploratory borings drilled for the east and west battery manufacturing buildings as well as the stream relocation borings indicated that the depths to top of the rock are mostly between 23.5 and 95.4 feet below the existing ground surface at the respective boring locations.

2.4 SOILS

The United States Department of Agriculture Soil Conservation Service has mapped the soils at the site. The mapping indicated that the soils are primarily part of the Bedford, Crider, and Sonora Soil Groups (making up approximately 58% of the soils) and the Ottwood Soil Group (another 14%). The remaining soil groups occur at around 5% or less for each type. The Bedford, Crider, and Sonora soils are derived from clayey residuum weathered from the underlying limestone. These soils typically have a cap of fine-grained, non-calcareous, windblown silt (loess) overlying the residuum and are located in areas of higher elevation on the site. The Ottwood and minor soils are typically derived from alluvium. These soils tend to be present in the lower-lying areas of the project site as well as along the stream valleys and drainage ways.

2.5 GEOHAZARDS

Surface water can enter into and flow through subterranean openings in the karstic limestone bedrock at the site. Construction activities or excavations that alter the surface conditions can dramatically change the surface and subsurface water flows. The addition or removal of water can then erode or desiccate the soils resulting in sinkholes appearing at the ground surface, collapses of the underlying rock, or other alterations to the ground conditions.

3.0 Field Exploration

The exploration consisted of drilling a total of 219 borings (to date) at the following general locations:

- Ninety-five (95) borings were drilled within the footprint of the proposed west battery manufacturing building.
- Seventy-five (75) borings were drilled within the footprint of the proposed east battery manufacturing building.
- Ten (10) borings were drilled generally parallel to and just west of I-65 for a proposed stream relocation.
- Thirty-nine (39) borings were drilled at various locations across the project site for ancillary support structures and site-civil improvements.

The borings were drilled between October 27, 2021 and December 21, 2021 using a combination of truck- and ATV-mounted rotary drill rigs. The borings were extended to depths of between 23.5 and 95.4 feet below the existing ground surface at the respective boring locations.

Boring Location Plans, boring logs, and information concerning the drilling procedures are included in Appendix A of this report. The boring locations were selected by representatives of Ghafari Associates (Ghafari) and staked in the field and surveyed by representatives of DLZ. In some cases the as-drilled boring locations were

slightly offset from the planned boring locations in order to avoid various existing site features (e.g. wooded areas, streams) or potential hazards to the drilling operations.

4.0 Laboratory Testing Program

The samples from the borings were returned to the DLZ geotechnical laboratory where they were visually classified in accordance with the Unified Soil Classification System (USCS) and logged by an engineering geologist.

The following laboratory tests were performed on selected soil and rock samples:

- Natural water content (ASTM D2216)
- Grain-size analysis (ASTM D7928)
- Atterberg limits (ASTM D4318)
- Unconfined compression strength of soil (ASTM D2166)
- Unconfined compressive strength of rock (ASTM D7012)

The results of these tests are shown on the boring logs in Appendix A. Individual test reports are presented in Appendix B of this report.

5.0 Findings

The following sections present the generalized subsurface conditions encountered by the borings and established via the laboratory testing program. For more detailed information regarding the subsurface conditions at the site please refer to the boring logs and laboratory testing results presented in Appendix A and Appendix B, respectively.

5.1 SOIL AND BEDROCK CONDITIONS

The borings first encountered topsoil at the surface of generally between 0.5 and 12 inches in thickness. However several borings encountered between 13 and 30 inches of topsoil and agricultural plow depth during drilling. Underlying the topsoil, the borings generally encountered very stiff to hard silty clay (CL-ML), lean clay (CL), and fat clay (CH) to depths of approximately 10 feet below the existing ground surface at the respective boring locations. Underlying this layer, the soils became primarily medium stiff to stiff fat clay (CH) containing interbeds of silty clay (CL-ML), lean clay (CL), and isolated layers of clayey or silty sand (SC, SM) and silt (ML) to either the top of rock or the completion depths of the borings (whichever came first). The average soil moisture content from the laboratory testing program was found to be approximately 30 percent.

Bedrock was first encountered in 29 of the borings at depths of between 23.5 and 95.4 feet (elevations 674.2 and 647.3) below the existing ground surface at the respective boring locations. However, bedrock was first encountered in the borings at elevations as high as El. 686.7 (boring SB-07) and as low as El. 637.4 (boring B-066). The bedrock consisted of hard to very hard limestone. The bedrock was moderately to high fractured with karstic solutioning on fractures. The average core recovery percent was 63 percent with the rock core loss suspected to be due to solutioning loss (karstic conditions) of the limestone formation. Rock quality values ranged between 0 and 82 percent, averaging 37 percent.

Bedrock underlying the west building was generally first encountered at elevations between 660.1 and 665.6 with the exception of boring B-066 (located near the southwest corner) where rock was first encountered at an elevation of 637.4. Bedrock under the east building was more variable, being first encountered at elevations between 668.2 and 645.8.

Unconfined compressive strength results for tested intact rock core ranged from 1,227 psi to 24,412 psi, indicating a highly variable rock quality. The average of the unconfined compressive strengths of the tested rock samples is 6,374 psi.

5.2 GROUNDWATER CONDITIONS

Seepage was first encountered in 67 of the 219 borings between depths of 3.5 and 56.0 feet below the existing ground surface (between elevations 715.5 and 642.7). The remaining borings did not encounter any significant seepage during drilling. Groundwater was measured at completion of drilling or prior to rock coring in 66 of the boreholes at depths of between 2.2 and 50.4 feet below the ground surface (between elevations 724.0 to 656.7). No measurable groundwater levels were encountered at completion of drilling in the remaining borings. Table No. 1 below summarizes the groundwater conditions encountered in the borings.

Table 1: Groundwater Conditions at Boring Locations

Boring	Seepage		Water Levels			
			Prior to Adding Water		At Completion	
	Depth (ft)	Elevation	Depth (ft)	Elevation	Depth (ft)	Elevation
B-002	23.5	691.7			11.5	703.7*
B-003	33.5	684.4	18.5	699.4	17.8	700.1*
B-006	23.5	697.0			10.2	710.3*
B-008	22.5	690.5			2.5	710.5*
B-010			50.4	665.1	11.0	704.5*
B-011A	43.5	677.8	18.7	702.6	13.4	707.9*
B-012	16.0	695.1	10.3	700.8	14.8	696.3†
B-013	23.5	686.7			0.5	709.7*
B-015	16.0	695.4			13.3	698.1*
B-018A	37.5	671.7			0.0	709.2†
B-025	26.0	678.6	3.2	701.4	10.1	694.5*
B-033			33.5	673.6	16.5	690.6*
B-033A	43.5	663.6			8.5	698.6†
B-036	26.0	678.2	15.7	688.5	15.7	688.5*
B-038	13.5	686.3			7.7	692.1*
B-048					24.4	671.5*
B-048A	18.5	677.4			13.5	682.4*
B-049	23.5	679.5			0.0	703.0*
B-053	24.8	670.0				
B-055	24.5	678.6	28.1	675.0	15.4	687.7*
B-060	23.5	667.2			0.5	690.2*
B-063	31.0	670.7	27.3	674.4	12.7	689.0*
B-064	15.5	680.6			9.5	686.6*
B-065A	18.5	674.2			17.5	675.2*
B-066	53.5	648.9	44.6	657.8	12.9	689.5*
B-075A	23.5	666.3				
B-078			-	-	19.9	685.4*
B-081	24.0	688.4			24.0	688.4*
B-082	21.0	690.6			23.0	688.6*
B-083	33.5	670.8	38.3	666.0	8.1	696.2†

Boring	Seepage		Water Levels			
			Prior to Adding Water		At Completion	
	Depth (ft)	Elevation	Depth (ft)	Elevation	Depth (ft)	Elevation
B-086	16.0	697.1			13.5	699.6*
B-089	13.5	692.1			11.0	694.6†
B-090			-	-	2.3	710.4*
B-091	23.5	689.1			7.3	705.3†
B-094	3.5	700.1			7.1	696.5†
B-095	21.0	689.3			22.0	688.3†
B-098	56.0	642.7			42.0	656.7†
B-102	23.5	675.9			23.7	675.7*
B-103	8.5	692.9			23.1	678.3*
B-105	33.5	673.7	24	683.2	18.9	688.3†
B-107	18.5	678.7			24.0	673.2†
B-109	16.0	685.1				
B-111	18.5	679.9			5.6	692.8†
B-113	16.0	679.1			13.5	681.6*
B-116	36.0	662.0	40.8	657.2	7.9	690.1†
B-118	16.0	677.8			22.8	671.0†
B-121	21.5	674.0			16.8	678.7*
B-122	3.5	689.4			2.2	690.7†
B-124	16.0	677.8			9.0	684.8†
B-125	13.5	683.4				
B-127	23.5	668.3			3.3	688.5*
B-128	13.5	677.0	8.7	681.8	3.5	687.0†
B-129	21.0	671.7			12.3	680.4†
B-130					15.1	680.7†
B-133	23.5	665.9				
B-135	18.5	675.6			12.0	682.1†
B-140	26.0	666.1	11.9	680.2	13.2	678.9*
B-143	26.0	666.3			24.7	667.6*
B-144	23.5	662.5			11.2	674.8†
B-145	36.0	653.8	28.1	661.7	9.2	680.6*
B-146	16.0	682.3	29.1	669.2	7.2	691.1†

Boring	Seepage		Water Levels			
			Prior to Adding Water		At Completion	
	Depth (ft)	Elevation	Depth (ft)	Elevation	Depth (ft)	Elevation
B-150	23.5	662.3			23.2	662.6*
B-153	31.0	666.6			26.2	671.4*
B-158	8.5	715.5			13.1	710.9†
B-171	23.5	705.5			5.0	724.0*
B-172	23.5	705.5			24.5	704.5*
B-182					15.2	703.8†
B-184	21.7	693.7			21.7	693.7†
B-186	23.5	681.1			14.2	690.4†
B-187	11.0	693.0				
B-190	13.5	688.7			12.0	690.2*
B-192	18.5	682.2			24.5	676.2†
B-197	16.0	664.6			8.0	672.6*
B-199	16.0	666.7			11.6	671.1*

* - measurement taken inside hollowstem augers
† - measurement taken with augers removed from borehole
Blue shaded cells are water levels at completion including added water

It should be noted that some of the groundwater levels were measured inside the hollow stem augers or in bore holes that had collapsed. Additionally, groundwater levels at the site may fluctuate with seasonal variations and following periods of heavy or prolonged precipitation. Therefore, the readings indicated on the boring logs may not be representative of the long-term groundwater levels at the site. Longer-term monitoring would be needed to obtain a more accurate estimate of the groundwater table elevation at the site.

6.0 Conclusions and Recommendations

6.1 GENERAL

The following recommendations assume that the scope of the project, as previously described, does not change and that no significant variations in soils conditions occur from those reported in the final boring logs. The boring logs and laboratory test results depict subsurface conditions only at the specified locations on the site. With these limitations, the following recommendations are given for the proposed structures.

6.2 SITE PREPARATION

Prior to subgrade preparation, all topsoil, soils within the agricultural plow depth, vegetation, organic soils, debris, and other materials deemed unsuitable by the geotechnical engineer, within 10 feet beyond the limits of the pavement and foundation areas, should be stripped and removed. Topsoil and soils containing organics or vegetation can be stockpiled and used as fill within non-structural areas, such as landscaping zones. Thicknesses of these materials as encountered at the boring locations are shown on the boring logs in Appendix A. It should be noted that the actual conditions between the borings may differ than those encountered during this investigation.

Once the site has been stripped and excavated to the proposed subgrade elevation, the proposed pavement and drive areas should be proof-rolled with a heavy piece of construction equipment to determine if any soft yielding areas are present. If any yielding areas are revealed they should be undercut to firm, non-yielding soils, and replaced with engineered fill as outlined in Section 6.3, "Engineered Fill Placement." On-site soils, other than topsoil and fill containing debris and organic material, are acceptable as general fill and backfill materials. However, the material may require moisture adjustments to achieve proper compaction and stability.

Additional recommendations regarding site grading and compaction requirements are included in Appendix D, General Earthwork.

6.3 ENGINEERED FILL PLACEMENT

All fill placed across the site should be compacted to the specified percentage of the maximum dry density as determined by Standard Proctor Test, ASTM D698. Table 2 outlines the required compactive efforts required across the site during site development. Material moisture content may need to be adjusted as required in order to achieve proper compaction and stability.

Table 2: Compaction of Fill Materials

Location of Fill	Lift Thickness (Loose non-compacted)	% of Maximum Dry Density	Percentage Points from Optimum Moisture Content
Yielding Undercuts	8-inch	98	+/- 3
Fill in Pavement Areas	8-inch	98	+/- 3
Fill in Building Areas	8-inch	100	+/- 3

No particle size greater than six inches in any direction should be placed as fill. Any particle size greater than six inches should be broken down until less than six inches or removed from the lift. All potential imported fill materials should be identified and approved by the geotechnical engineer prior to placement. Approval requires that moisture-density relationship tests, hydrometer analysis, and Atterberg limits be determined for each fill material prior to their placement.

6.4 SETTLEMENT CONSIDERATIONS UNDER UNBALANCED FILLS

As discussed earlier in this report, up to 20 feet of cut and 20 feet of fill will be required at the northern and southern ends of the project site, respectively, to obtain proposed final grades. Borings B-066, B-078, B-146, and B-153, drilled near the southern ends of the two battery manufacturing buildings, encountered primarily medium stiff to stiff fat clay foundation soils containing high soil moisture contents to an average depth of 48 feet (where bedrock was encountered). The additional loading on the foundation soils from 20 feet of new soil fill (approximately 2,500 psf) at the southern ends of the battery manufacturing buildings will have the propensity to cause unsatisfactory levels of settlement (consolidation) at the project site. DLZ estimates that settlements on the order of 47 inches could develop near the southern ends of the battery manufacturing buildings under the surcharging effects of 20 feet of new soil fill. Similarly, in areas where the proposed site will be cut (from zero feet up to 20 feet), minimal settlement is anticipated, resulting in a differential settlement of approximately 47 inches over the horizontal distance of the maximum fill/minimum cut operations.

DLZ estimates that the time for 90% of primary consolidation of the foundation soils will be on the order of 4.8 years.

If the proposed construction schedule permits, all of the fill for the project could be constructed to approximate final grades and allowed to pre-load the foundation soils until approximately 90% consolidation has occurred (in approximately 4.8 years). If the construction schedule does not allow for this preloading time, vertical wick drains could be installed in the proposed fill areas. Wick drains consist of prefabricated geofabric-type materials that are installed vertically into the compressible soil layer to reduce the length of the soil seepage path and accelerate the time required for consolidation. DLZ estimates that wick drains installed to a depth of 48 feet and in a triangular pattern on approximately five-foot center-to-center spacing will reduce the time for 90% consolidation to approximately 30 days. A three-foot thick, free-draining sand layer needs to be installed on top of the ground surface (under the proposed fill) in order to provide adequate drainage.

6.5 BUILDING FOUNDATION SUPPORT

The borings drilled for the east and west battery manufacturing buildings generally encountered very stiff to hard silty clay, lean clay, and fat clay to depths of approximately 10 feet below the existing ground surface at the respective boring locations. Underlying this layer the soils became primarily medium stiff to stiff fat clay with high moisture contents to the completion depths of the borings or top of bedrock (whichever was encountered first). Due to the expected low allowable bearing capacity (on the order of 1,500 psf for a 10-foot wide footing) and high compressibility (i.e., excessive settlement) of the in-situ soils at the site, DLZ does not recommend supporting the proposed east and west battery manufacturing buildings on shallow spread footings. DLZ understands that consideration is being given to supporting these two structures on deep foundations such as drilled shafts/caissons, auger-cast piles, or drilled displacement piles.

6.5.1 Drilled Shafts

Drilled shafts should be socketed a minimum of 1.5 times the shaft diameter into competent bedrock with a minimum shaft diameter of 36 inches. The drilled shafts should be straight (not belled) and may be designed based upon a presumptive allowable end bearing capacity in rock of 10,000 psf. The final rock socket diameters should be sufficient to account for all structural loads on the drilled shafts. For constructability purposes the drilled shaft diameter in rock is typically six inches less than the drilled shaft diameter in the overlying overburden soils. It is recommended that skin friction in the overburden soils and rock socket be neglected due to strain compatibility concerns.

Per the Federal Highway Administration (FHWA), Publication No. FHWA-IF-99-025, “Drilled Shafts: Construction Procedures and Design Methods,” approximately 1/2 inch of settlement is required in order for full downdrag (i.e. negative skin friction) to develop on a drilled shaft. Downdrag forces are considered to be additional loads that must be accounted for in the design. Calculations indicated that up to 47 inches of settlement may occur at the site, which

would result in full downdrag forces developing on the drilled shafts. DLZ assumes that the site will be remediated (e.g. wick drains to ensure all settlements have occurred prior to drilled shaft installations) such that downdrag forces on the drilled shafts are not an issue.

As noted earlier in this report the site is characterized by karstic bedrock. This geologic condition represents considerable risk to the project with respect to supporting the structure on drilled shafts socketed into the karstic bedrock. Therefore, it is recommended that, during construction, a proof boring be drilled at each drilled shaft location to verify the condition of the supporting bedrock and the depth to the underlying competent bedrock. Proof borings will need to extend at least two shaft diameters (shaft diameter in the overburden soils) below the proposed bottoms of the drilled shafts. More specific proof boring depths and revised drilled shaft recommendations will be provided with the final geotechnical report for this project based on the results of the pending geophysical evaluations and deeper rock core borings to be performed at the site. Depending on the findings of the proof borings it may be necessary to perform karst remediation (e.g. void grouting) of the bedrock at the drilled shaft locations.

Because of the variable quality of the underlying bedrock, the recommended allowable end bearing value presented above was determined based on the lower end of the unconfined compressive strength of tested intact rock core samples and the average RQD (37%) of the rock cores. This recommended allowable end bearing value may be revised based on the results of the pending geophysical evaluations and deeper rock core borings to be performed at the site, if necessary.

Groundwater seepage should be anticipated during installation of the drilled shafts. Additionally, the weaker soils generally encountered below a depth of 10 feet at the site may not remain stable during excavation. Therefore, temporary casing will likely be required to prevent the sides of the drilled shaft excavations from collapsing during drilling and to prevent excess groundwater from entering the excavations. In addition, drilling fluid or water may be required within the casing to prevent “bottom heave” if groundwater is encountered. During concrete placement, sufficient concrete should be placed inside of the temporary casing prior to casing removal to offset any effects of excess hydrostatic pressures. Failure to do this could result in undesirable displacements of the fluid concrete, producing an unacceptable drilled shaft.

Precautions should be taken to permit the shafts to be drilled and the concrete placed under relatively dry conditions. During simultaneous concrete placement and temporary casing removal operations, sufficient concrete should be maintained inside the casing to offset the hydrostatic head of any groundwater. Extreme care must be exercised during concrete placement and removal of the temporary casing so that soil intrusion is avoided. Concrete may be placed by free fall provided it is directed such that the fall is vertical down the center

of the shaft without striking the sides or reinforcing steel. If the shafts cannot be maintained reasonably dry, the concrete should be pumped or tremied to the bottom of the shafts.

The bottoms of the drilled shaft excavations should be clean and free of loose material prior to placement of concrete. All drilled shaft excavations should be observed by the geotechnical engineer of record or his designated representative and field verified that the drilled shafts are founded on competent materials and the installation procedures meet specifications.

6.5.2 Auger-Cast Piles

In addition to drilled shafts, auger-cast piles or drilled displacement piles were also considered for this project. Auger-cast piles are common for commercial construction and can be constructed as single piles or as part of a pile group. Typical diameters for auger-cast piles range from 12 to 24 inches. DLZ estimates that a 40-foot long, 18-inch diameter auger-cast pile at the site will have a capacity of 17 tons. Similarly, a 40-foot long, 24-inch diameter auger-cast pile will have a capacity of 25 tons. Due to the karstic bedrock conditions at the site it is recommended that auger-cast piles not extend any deeper than five feet above the top of rock at the respective pile locations. Similar to the drilled shaft recommendations above, DLZ assumes that the site will be remediated (e.g. wick drains to ensure all settlements have occurred prior to auger-cast pile installations) such that downdrag forces on the auger-cast piles are not an issue.

Continuous flight augers should be used to drill the piles and auger-cast displacement piles are recommended to provide additional pile capacity and help fill any voids in the overburden soils caused by the karstic bedrock conditions. While advancing the augers to the required depth, it is essential that the auger flights be kept filled with soil so that the stability of the pile hole is maintained. If the augers turn too rapidly, with respect to the rate of penetration into the ground, then the continuous augers may convey soil to the surface. This action can result in a reduction of the horizontal stress necessary to maintain the stability of the pile hole. As a result, lateral movement of soil towards the hole and material loss due to over-excavation can result in ground subsidence at the surface and reduce confinement of nearby installed piles. Once the drilling is complete, grouting should begin immediately.

It is the pile contractor's responsibility to ensure that the pile installation would not cause any subsidence of any adjacent structures, roadways, or utilities. The contractor may monitor any movement of adjacent structures, roadways or utilities throughout the pile installation process, if deemed necessary.

A pile group should consist of a minimum of three piles unless lateral stability is provided by grade beams or other structural elements. The minimum center-to-center spacing of piles should be three pile diameters. All piles should be reinforced full depth with a minimum of

one #11 bar in addition to required moment reinforcement. Additional reinforcing may be needed depending on the structural loading.

Grout for piles should have a minimum unconfined compressive strength of 4,000 psi at 28 days. The contractor and independent laboratory should cast a minimum of two sets of test cubes for each production shift.

Adjacent piles should not be installed until previously installed piles have reached their initial set. Careful observation should be performed to detect any movement of grout between adjacent piles.

The quality of the auger-cast piles is highly dependent upon the skill of the contractor and the specific crew that is assigned to the project. The construction documents should require the proposed auger-cast pile contractor to submit evidence of successful installation of auger-cast piles under similar jobs and subsurface conditions. The pile contractor should also have a minimum of five years of relevant experience. A pile load test program should be considered to verify the capacities of prototype piles.

More specific and revised auger-cast pile recommendations will be provided with the final geotechnical report for this project based on the results of the pending geophysical evaluations and deeper rock core borings to be performed at the site.

6.6 FLOOR SLAB-ON-GRADE RECOMMENDATIONS

The proposed 20 feet of cut-and-fill operations at the site will expose the weaker clays at the northern ends of the two battery manufacturing buildings (cut) while simultaneously producing a foundation grade with higher quality engineered fill at the southern ends of the buildings (fill). These two extremes will result in significantly varying subgrade conditions within the footprint of each building. For consistency, DLZ recommends that a minimum of a twelve-inch layer of compacted open graded crushed stone (ASTM C-33 Size No. 57) be installed below the floor slabs with a moisture barrier placed between the slabs and the open graded crushed stone. A modulus of subgrade reaction of 35 pounds per cubic inch (pci) may be used for the 12-inch layer of compacted open grade crushed stone that overlies either the weak native soils at the site or less than 10 feet of engineered fill. In areas where greater than 10 feet of engineered fill is to be placed a modulus of subgrade reaction of 300 pci may be used for the 12-inch layer of compacted open graded crushed stone. Structural joints should be installed between slabs as needed to accommodate differential slab-on-grade deflections during service.

As discussed earlier, DLZ understands that concrete slabs-on-grade in the two battery manufacturing buildings will vary in loading from 105 pounds per square foot (psf) to 2,506 psf. These loads reportedly will be longer-term loading conditions (i.e., not transient) and no dynamic (e.g., vibratory) loading on

the concrete slabs-on-grade is anticipated. Given the weak native overburden soils and proposed site grading plans, these highly variable loads would incur significant amounts of total and differential settlements across and between the slabs. Based on loading diagrams provided by others and presented in Appendix C, the heaviest loaded slab-on-grade area (70'x280' "Module Storage" area at 2,506 psf) will bear on weak native soils (after cut operations) and not on engineered fill. DLZ estimates that the settlement caused by this loaded slab-on-grade area will be on the order of 18 inches. A similarly loaded footprint in the adjacent "Dock" area (at 210 psf) will result in estimated additional settlement of 2 inches. This information can be used to assist in the design of differential settlement and deflections between adjacent slab areas.

6.7 SEISMIC CONSIDERATIONS

The overburden soils at the site are consistent with Site Class D as defined in Section 11.4.2 of the American Society of Civil Engineers (ASCE) publications ASCE-7, "Minimum Design Loads for Buildings and Other Structures."

6.8 DRAINAGE CONSIDERATIONS

The site should be graded so that surface water flows away from the structures and parking areas and is not allowed to accumulate near or under the floor slabs and pavements. Where sidewalks or paving do not immediately adjoin the structure, protective slopes, at least 5 percent for a minimum of 10 feet from the perimeter walls, are recommended. A drainage system should be installed beneath the concrete slabs-on-grade as needed to remove excess water from the graded crushed stone.

6.9 EXCAVATION, GROUNDWATER, AND FILL CONSIDERATIONS

When excavating for foundations, it is recommended that the excavations be cut to a flat, essentially level bottom undisturbed by the method of excavation. For structures founded on sand deposits, consideration should be given to compacting the bottoms of the excavations with a vibratory compactor if the bottoms cannot be adequately cleaned of material loosened by the excavation operations.

The bottoms of the excavations should be kept essentially dry. Excavations extending below the water table into sand, silt, or gravel deposits can result in a "quick condition" when the confining effect of the overburden is removed. To prevent this occurrence, areas of proposed excavation may need to be dewatered and the water level maintained a minimum of 3 feet below the bottom of the proposed excavation during construction. It is recommended that a dewatering specialist be contacted with regards to dewatering requirements at this site.

Excavations deeper than 5 feet must be laid back or braced to protect workers entering the excavations. All excavations should be constructed in accordance with applicable local, state, and

federal safety regulations including the current OSHA Excavation and Trench Safety Standards (29 CFR Part 1926). Slopes or bracing for excavations 20 feet or more in depth must be designed by a registered professional engineer.

Special consideration will be required when placing additional fill or installing new foundations in areas adjacent to any existing structures or facilities (e.g., existing roadways, underground utilities). It is the contractor's responsibility to prevent undermining of existing foundations and prevent any damage to adjacent structures or facilities.

The Contractor is solely responsible for designing and constructing stable, temporary excavations and should shore, slope, or bench the sides of excavations as required to maintain stability of both the excavation sides and bottom. The above information is provided solely as a service to our client, and under no circumstances is DLZ assuming responsibility for construction site safety or the Contractor's activities.

7.0 Closing

We appreciate having the opportunity to be of service to you on this project. Please do not hesitate to call if you have any questions concerning this report.

Respectfully submitted,

DLZ

Timothy A. Hampshire, P.E.
Director/Geotechnical Engineering

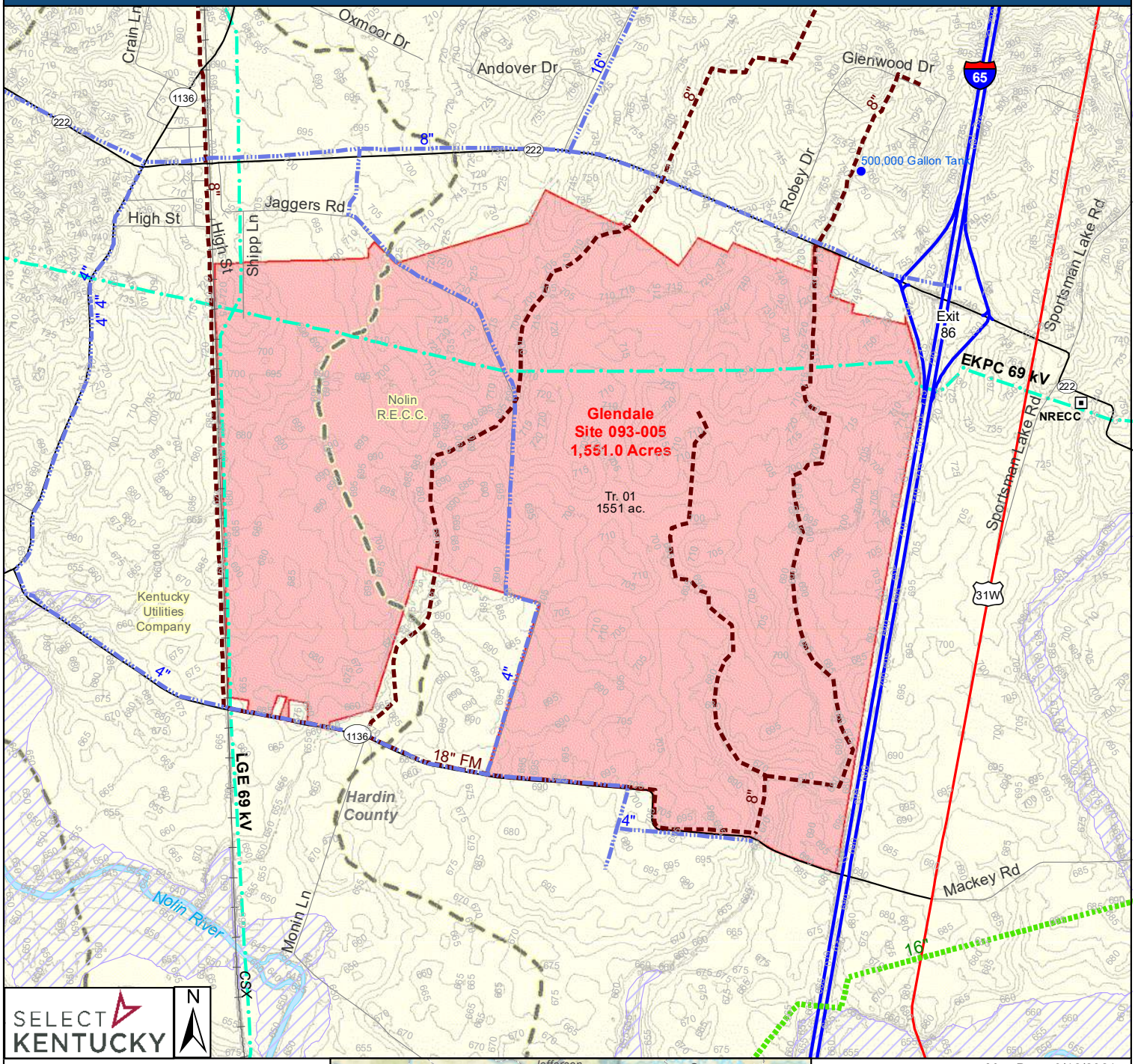
Eric Tse, P.E.
Senior Geotechnical Engineer

Appendices

Appendix A

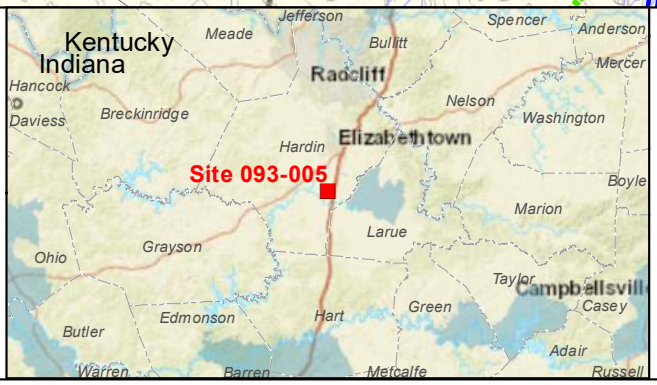
- **Location Map**
- **General Information - Drilling Procedures and Logs of Borings**
- **Legend - Boring Log Terminology**
- **Boring Location Plans**
- **Boring Logs - 219 Borings (to date)**
- **Subsurface Geotechnical Profiles**

Glendale MegaSite
Glendale, KY | Hardin County
Site 093-005 | 1,551.0 Acres Available



SELECT KENTUCKY

- Water Tank
- Water Line
- Sewer Line
- Gas Line
- Substation
- Interstate
- US Highway
- State Road
- Local Road
- Rail
- Electric Transmission Line
- 100 Year Flood Zone
- 5ft Elevation Contours
- Electric Service Area Boundary
- Shovel Ready Site Boundary
- Vacant Tract



0 250 500 1,000 Feet

0 150 300 600 Meters

Map Date: 3/12/2021

All information regarding property is from sources deemed reliable, but no warranty or representation is made by the Commonwealth of Kentucky or any of its agencies as to its accuracy. It is subject to errors, omissions, change of price, prior sale, lease or withdrawal without our knowledge. Further, no warranty or representation is made as to the environmental suitability or condition of the property.

Datasheet: https://properties.zoomprospector.com/KENTUCKY/property/admin/38b42f31-83fe-4928-b6cb-bcc98298959e Google Map: http://maps.google.com/maps?t=h&q=37.58706,-85.88731

GENERAL INFORMATION
DRILLING PROCEDURES AND LOGS OF BORINGS

Drilling and sampling were conducted in accordance with procedures generally recognized and accepted as standardized methods of investigation of subsurface conditions concerning geotechnical engineering considerations. Borings were drilled with either a truck-mounted or ATV-mounted drill rig.

Drive split-barrel sampling was performed in 1.5 foot increments at intervals not exceeding 5 feet. In the event the sampler encountered resistance to penetration of 6 inches or less after 50 blows of the drop hammer, the sampling increment was discontinued. Standard penetration data were recorded and one or more representative samples were preserved from each sampling increment.

In borings where rock was cored, NXM or NQ size diamond coring tools were used.

In the laboratory all samples were visually classified by a soils engineer. Moisture contents of representative fine-grained soil samples were determined. A limited number of samples, considered representative of foundation materials present, were selected for performance of grain-size analyses and plasticity characteristics tests. The results of these tests are shown on the boring logs.

The boring logs included in the Appendix have been prepared on the basis of the field record of drilling and sampling, and the results of the laboratory examination and testing of samples. Stratification lines on the boring logs indicating changes in soil stratigraphy represent depths of changes approximated by the driller, by sampling effort and recovery, and by laboratory test results. Actual depths to changes may differ somewhat from the estimated depths, or transitions may occur gradually and not be sharply defined. The boring logs presented in this report therefore contain both factual and interpretative information and are not an exact copy of the field log.

Although it is considered that the borings have disclosed information generally representative of site conditions, it should be expected that between borings conditions may occur which are not precisely represented by any one of the borings. Soil deposition processes and natural geologic forces are such that soil and rock types and conditions may change in short vertical intervals and horizontal distances.

Soil/rock samples will be stored at our laboratory for a period of six months. After this period of time, they will be discarded, unless notified to the contrary by the client.

LEGEND - BORING LOG TERMINOLOGY

Explanation of each column, progressing from left to right

1. Depth (in feet) - refers to distance below the ground surface.

2. Elevation (in feet) - is referenced to mean sea level, unless otherwise noted.

3. Standard Penetration (N) - the number of blows required to drive a 2-inch O.D., 1-3/8 inch I.D., split-barrel sampler, using a 140-pound hammer with a 30-inch free fall. The blows are recorded in 6-inch drive increments. Standard penetration resistance is determined from the total number of blows required for one foot of penetration by summing the second and third 6-inch increments of an 18-inch drive.

   50/n - indicates number of blows (50) to drive a split-barrel sampler a certain number of inches (n) other than the normal 6-inch increment.

   WOR – indicates the split-barrel sampler advanced the 6-inch increment from the weight of the rods alone.

   WOH – indicates the split-barrel sampler advanced the 6-inch increment from the combined weight of the hammer and rods alone.

4. The length of the sampler drive is indicated graphically by horizontal lines across the “Standard Penetration” and “Recovery” columns.

5. Sample recovery from each drive is indicated numerically in the column headed “Recovery”.

6. The drive sample location is designated by the heavy vertical bar in the “Sample No., Drive” column.

7. The length of hydraulically pressed “Undisturbed” samples is indicated graphically by horizontal lines across the “Press” column.

8. Sample numbers are designated consecutively, increasing in depth.

9. Soil Description

   a. The following terms are used to describe the relative compactness and consistency of soils:

   Granular Soils - Compactness

Term	Blows/Foot Standard Penetration
Very Loose	0 – 4
Loose	4 – 10
Medium Dense	10 – 30
Dense	30 – 50
Very Dense	over 50

   Cohesive Soils – Consistency

Term	Unconfined Compression tons/sq. ft	Blows/Foot Standard Penetration	Hand Manipulation
Very Soft	less than 0.25	below 2	Easily penetrated by fist
Soft	0.25 – 0.50	2 – 4	Easily penetrated by thumb
Medium Stiff	0.50 – 1.0	4 – 8	Penetrated by thumb with moderate pressure
Stiff	1.0 – 2.0	8 – 15	Readily indented by thumb but not penetrated
Very Stiff	2.0 – 4.0	15 – 30	Readily indented by thumb nail
Hard	over 4.0	over 30	Indented with difficulty by thumb nail

   b. Color - If a soil is a uniform color throughout, the term is single, modified by such adjective as light and dark. If the predominant color is shaded by a secondary color, the secondary color precedes the primary color. If two major and distinct colors are swirled throughout the soil, the colors are modified by the term “mottled”.

   c. Texture is based on the Unified Classification System. Soil particle size definitions are as follows:

Description	Size	Description	Size
Boulders	Larger than 8”	Sand-Coarse	4.75 mm to 2.00 mm
Cobbles	8” to 3”	-Medium	2.00 mm to 0.42 mm
Gravel-Coarse	3” to 3/4"	-Fine	0.42 mm to 0.074 mm
-Fine	3/4" to 4.76 mm	Silt	0.074 mm to 0.005 mm
		Clay	Smaller than 0.005 mm

   d. The primary soil component is listed first and may include a modifier before and/or after it as indicated by the USCS classification system. The minor components are listed in order of decreasing percentage of particle size.

Coarse Grained Soils	Fine Grained Soils
5% - 12% silt/clay - “with silt/clay” post-modifier	15% - 30% sand/gravel- “with sand/gravel” post-modifier
> 15% sand/gravel – “with sand/gravel” post-modifier	> 30% sand/gravel – “sandy/gravelly” pre-modifier
> 12% silt/clay – “silty/clayey” pre-modifier	

e. The moisture content of **cohesive soils** (silts and clays) is expressed relative to plastic properties.

Term	Relative Moisture or Appearance
Dry	Powdery
Damp	Moisture content slightly below plastic limit
Moist	Moisture content above plastic limit, but below liquid limit
Wet	Moisture content above liquid limit

f. Moisture content of **cohesionless soils** (sands and gravels) is described as follows:

Term	Relative Moisture or Appearance
Dry	No moisture present
Damp	Internal moisture, but none to little surface moisture
Moist	Free water on surface
Wet	Voids filled with free water

10. Rock hardness and rock quality description.

a. The following terms are used to describe the relative hardness of the **bedrock.**

Term	Description
Very Soft	Difficult to indent with thumb nails; resembles hard soil but has rock structure
Soft	Resists indentation with thumb nail but can be abraded and pierced to a shallow depth by a pencil point.
Medium Hard	Resists pencil point, but can be scratched with a knife blade.
Hard	Can be deformed or broken by light to moderate hammer blows.
Very Hard	Can be broken only by heavy blows, and in some rocks, by repeated hammer blows.

b. Rock Quality Designation, RQD - This value is expressed in percent and is an indirect measure of rock soundness. It is obtained by summing the total length of all core pieces which are at least four inches long, and then dividing this sum by the total length of the core run.

11. Gradation - when tests are performed, the percentage of each particle size is listed in the appropriate column (defined in Item 9c).

12. When a test is performed to determine the natural moisture content, liquid limit moisture content, or plastic limit moisture content, the moisture content is indicated graphically.

13. The corrected standard penetration (N60) value in blows per foot is indicated graphically.

14. Soil Symbology

	GW	Well-graded Gravel
	GP	Poorly-graded Gravel
	GW-GM	Well-graded Gravel with Silt
	GP-GM	Poorly-graded Gravel with Silt
	GM	Silty Gravel
	SW	Well-graded Sand
	SP	Poorly-graded Sand
	SW-SM	Well-graded Sand with Silt

	SP-SM	Poorly-graded Sand with Silt
	SM	Silty Sand
	SC-SM	Clayey, Silty Sand
	SC	Clayey Sand
	ML	Silt
	CL-ML	Low Plasticity Silty Clay
	CL	Low Plasticity Clay

Boring Location Plan

2150-9519.50 - Ford H4 Battery Plant
Glendale, KY 42740

DLZ Ohio, Inc. * 6121 Huntley Road, Columbus, Ohio 43229 * (614) 888-0040

Client: Barton Malow | *Project:* Ford H4 Battery Plant | *Job No.* 2150-9519.50

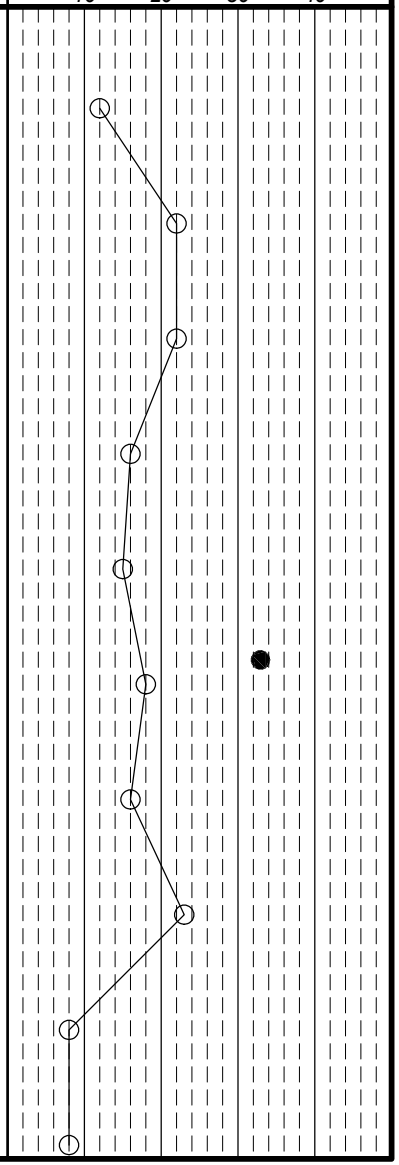
LOG OF: Boring B-001 | *Location:* As per plan | *Date Drilled:* 11/5/2021

WATER OBSERVATIONS:
Water seepage at: None
Water level at completion: None (inside augers)

DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Rig (#) / ER: CME 750X (289498) / 81.0% | *Driller:* T | *Logger:* JC

Depth (ft)	Elev. (ft) 719.0	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	Natural Moisture Content, % - ●
0.8	718.2						Topsoil - 9", Plow Depth - 12"								
3.5	715.5	3 3 6	10	S-1		2.5	Very stiff brown to light brown LEAN CLAY (CL); moist.								
6.0	713.0	4 8 8	9	S-2		3.0	Very stiff light brown and red mottled FAT CLAY (CH); moist.								
		3 8 8	18	S-3		+4.5	Hard light brown and light gray mottled FAT CLAY (CH); moist.								
		2 5 7	13	S-4		+4.5									
		3 5 6	18	S-5		+4.5	@ 11.0', red								
		4 5 8	11	S-6		+4.5									
		3 5 7	18	S-7		+4.5									
		3 8 9	18	S-8		+4.5	@ 18.5', contains gravel and sand size chert								
		1 3 3	12	S-9		1.0	@ 21.0'-25.0', stiff to very stiff								
25.0	694.0	WOH 3 3	18	S-10		3.0	Bottom of Boring - 25.0'								



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Client: Barton Malow | *Project:* Ford H4 Battery Plant | *Job No.* 2150-9519.50

LOG OF: Boring B-001A | *Location:* As per plan | *Date Drilled:* 11/15/2021

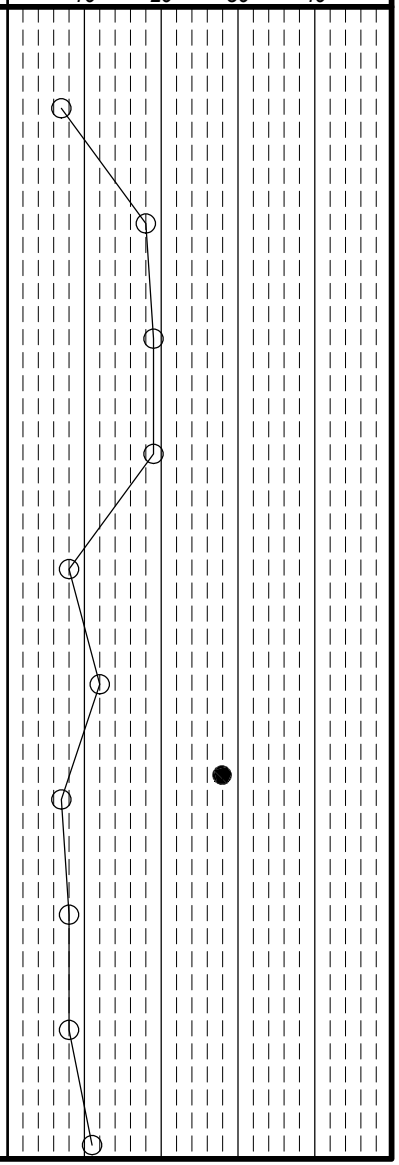
WATER OBSERVATIONS:
Water seepage at: None
Water level at completion: None (inside augers)

DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Rig (#) / ER: CME 750X (289498) / 81.0% | *Driller:* VD | *Logger:* JC

Natural Moisture Content, % - ●
PL ├──┤ LL
N_{60} Value ○ / Non-Plastic - NP
10 20 30 40

Depth (ft)	Elev. (ft) 725.8	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0.4	725.4						Topsoil - 5", Plow Depth - 7"							
		1 2 3	11	S-1		1.75	Stiff red and light brown mottled FAT CLAY (CH); moist.							
3.5	722.3													
5		5 6 7	17	S-2		4.5+	Hard to very stiff red and light brown mottled FAT CLAY (CH); damp to moist.							
		4 6 8	14	S-3		3.0								
10		2 6 8	15	S-4		4.0								
		2 3 3	11	S-5		2.5								
15		3 4 5	18	S-6		2.5								
		1 2 3	18	S-7		1.5	@ 16.0', stiff							
20		1 2 4	18	S-8		1.5								
		1 3 3	14	S-9		1.5								
25.0 25	700.8	2 3 5	18	S-10		1.75	Bottom of Boring - 25.0'							



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Client: Barton Malow | *Project:* Ford H4 Battery Plant | *Job No.* 2150-9519.50

LOG OF: Boring B-002 | *Location:* As per plan | *Date Drilled:* 11/5/2021

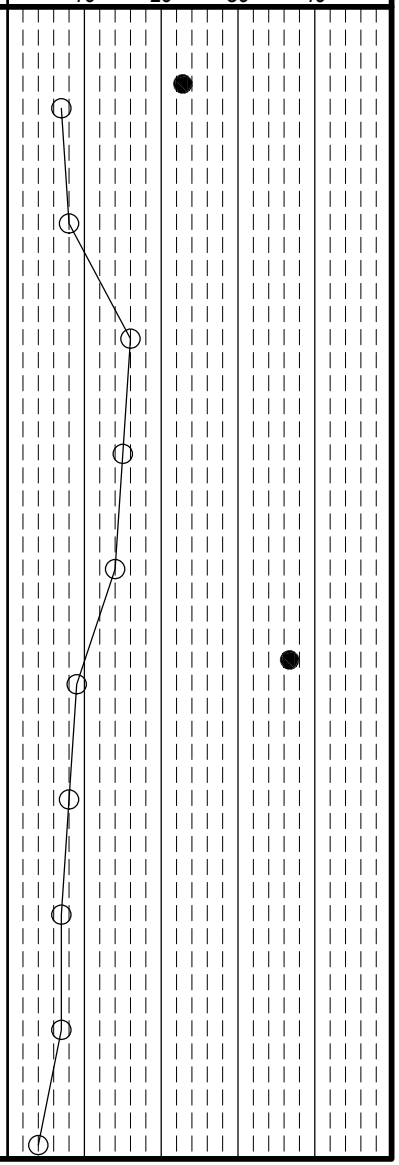
WATER OBSERVATIONS:
Water seepage at: 23.5'
Water level at completion: 11.5' (inside augers) includes water added?

DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Rig (#) / ER: CME 750X (289498) / 81.0% | *Driller:* T | *Logger:* JC

Natural Moisture Content, % - ●
PL ├──┤ *LL*
N_{60} Value ○ / *Non-Plastic -* NP
10 20 30 40

Depth (ft)	Elev. (ft) 715.2	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0.6	714.6						Topsoil - 7", Plow Depth - 12"							
		WOH 2 3	16	S-1		2.5	Very stiff gray, light brown and red SILTY CLAY (CL-ML); damp.							
3.5	711.7													
5		1 2 4	15	S-2		+4.5	Hard red FAT CLAY (CH); contains sand size chert fragments; damp.							
		2 5 7	18	S-3		+4.5								
10		3 5 6	18	S-4		+4.5								
		6 6 4	6	S-5		3.0	@ 11.0'-13.5', very stiff; contains gravel size chert fragments; moist							
13.5	701.7													
15		2 3 4	12	S-6		1.5	Stiff to very stiff red FAT CLAY (CH); moist.							
		2 2 4	18	S-7		2.0	@ 16.0'-18.5', contains chert fragments							
20		2 2 3	18	S-8		2.0								
		3 3 2	11	S-9		1.0	@ 21.0', contains chert fragments							
25.0 25	690.2	3 1 2	18	S-10		1.0	Bottom of Boring - 25.0'							



Client: Barton Malow | *Project:* Ford H4 Battery Plant | *Job No.* 2150-9519.50

LOG OF: Boring B-003 | *Location:* As per plan | *Date Drilled:* 11/7/2021

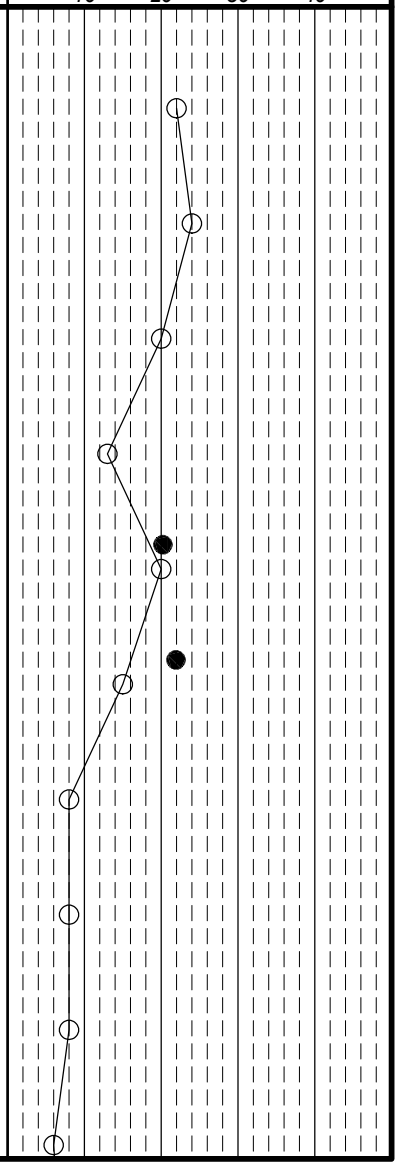
WATER OBSERVATIONS:
Water seepage at: 33.5'
Water level at completion: 18.5' (prior to adding water)
17.8' (inside augers)

DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Rig (#) / ER: CME-850X (400472) / 84.0% | *Driller:* LB | *Logger:* AM

Natural Moisture Content, % - ●
PL ○ / LL ⊢⊣ / Non-Plastic - NP
N_{60} Value 10 20 30 40

Depth (ft)	Elev. (ft) 717.9	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0.5	717.4						Topsoil - 6", Plow Depth - 13"							
		3 5 11	18	S-1		3.0	Very stiff light brown SILTY CLAY (CL-ML); damp.							
3.5	714.4													
		5 7 10	18	S-2			Stiff to very stiff light gray SILTY CLAY (CL-ML); damp.							
5 / 6.0	711.9													
		4 7 7	18	S-3		1.75	Stiff to very stiff light brown FAT CLAY (CH): moist.							
		4 4 5	18	S-4		2.0								
10 / 11.0	706.9													
		5 6 8	18	S-5		3.5	Very stiff red LEAN CLAY (CL); moist.							
13.5	704.4													
		3 5 6	18	S-6		1.5	Stiff light brown FAT CLAY (CH); moist.							
15 / 16.0	701.9													
		3 3 3	18	S-7		1.5	Stiff to very stiff red FAT CLAY (CH); moist.							
		3 3 3	18	S-8		2.0								
20 / 21.0	696.9													
		3 3 3	15	S-9		1.25	Stiff red FAT CLAY (CH); contains chert fragments; moist to wet.							
		3 2 2	17	S-10		1.75								
25	692.9													



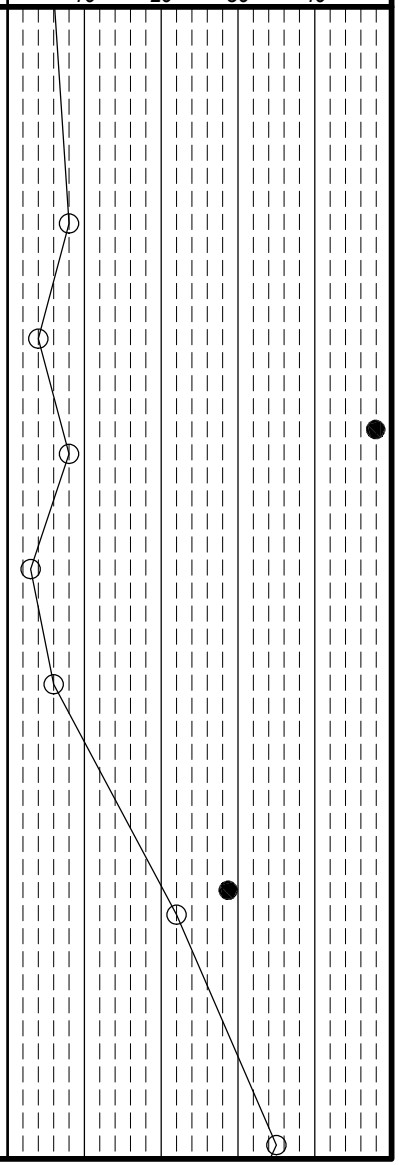
Client: Barton Malow	Project: Ford H4 Battery Plant	Job No. 2150-9519.50
LOG OF: Boring B-003	Location: As per plan	Date Drilled: 11/7/2021

WATER OBSERVATIONS:
Water seepage at: 33.5'
Water level at completion: 18.5' (prior to adding water)
17.8' (inside augers)
DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Rig (#) / ER: CME-850X (400472) / 84.0%
Driller: LB
Logger: AM

Natural Moisture Content, % - ●
PL ├──┤ LL
N_{60} Value ○ / Non-Plastic - NP
10 20 30 40

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
	692.9													
			21		ST-1		Stiff red FAT CLAY (CH); contains chert fragments; moist to wet. (continued) @ 26.0'-28.0', pushed Shelby Tube							
28.5	689.4													
30		3 3 3	18	S-11		1.25	Stiff to medium stiff red FAT CLAY (CH); moist to wet.							
		1 2 1	18	S-12		0.75								
33.5	684.4													
35		2 2 4		S-13		0.0	Very soft to soft red FAT CLAY (CH); wet. @ 35.0'-36.0', drill rig chatter							
		1 1 1		S-14		0.25	@ 37.5'-38.5', drill rig chatter							
38.5	679.4													
40		2 2 2	18	S-15		0.25	Very soft light brown FAT CLAY (CH); moist to wet. @ 40.0'-43.5', drill rig chatter							
43.5	674.4													
45		5 9 7	13	S-16		1.5	Stiff red FAT CLAY (CH); contains chert fragments; moist. @ 45.0'-48.5', drill rig chatter							
50	667.9	17 15 10	18	S-17		1.75								



Client: Barton Malow	Project: Ford H4 Battery Plant	Job No. 2150-9519.50
LOG OF: Boring B-003	Location: As per plan	Date Drilled: 11/7/2021

WATER OBSERVATIONS:
Water seepage at: 33.5'
Water level at completion: 18.5' (prior to adding water)
17.8' (inside augers)

DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Rig (#) / ER: CME-850X (400472) / 84.0%
Driller: LB
Logger: AM

Natural Moisture Content, % - ●
PL ⊢——⊣ LL
N_{60} Value ○ / Non-Plastic - NP
10 20 30 40

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
	667.9													
							Stiff red FAT CLAY (CH); contains chert fragments; moist. (continued) @ 50.0'-53.5', heavy drill rig chatter							
53.5	664.4													
55		7 8 7	16	S-18		1.25	Stiff light brown FAT CLAY (CH); completely decomposed rock; moist. @ 55.0'-59.5', heavy drill rig chatter and difficulty advancing augers							
59.5	658.4													
60							@ 59.5', seated augers for rock coring							
65		Core 120"	Rec 85"	RQD 38%	R-1		Hard to very hard light gray to gray LIMESTONE; very fine to fine grained, slightly to moderately weathered, thickly bedded, moderately fractured to broken, vuggy, Karstic solutioning on fracture surfaces, significant core loss due to solutioning. @ 59.5'-60.5', broken. @ core has 55 " of core loss due to suspected voids.							
69.5	648.4													
70							Bottom of Boring - 69.5'							
75														

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Client: Barton Malow	Project: Ford H4 Battery Plant	Job No. 2150-9519.50
LOG OF: Boring B-004	Location: As per plan	Date Drilled: 11/4/2021

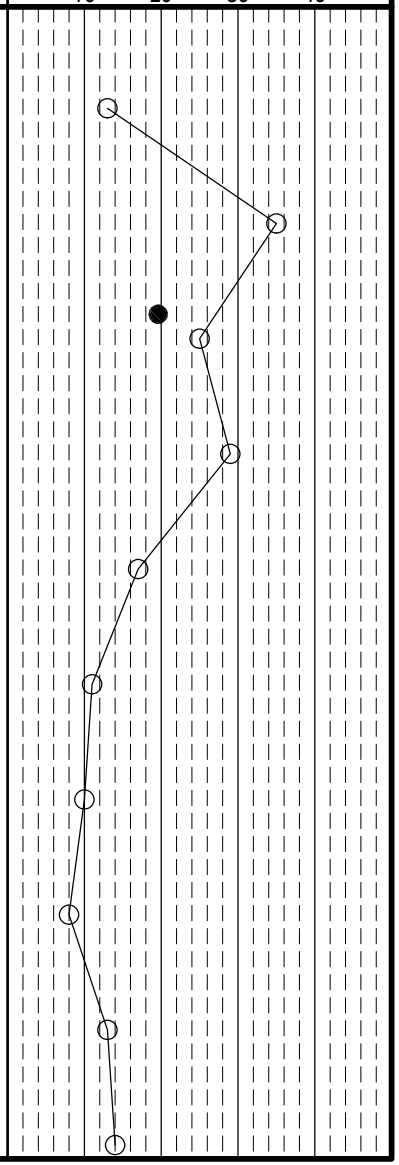
WATER OBSERVATIONS:
Water seepage at: None
Water level at completion: None (inside augers)

DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Rig (#) / ER: CME-850X (400472) / 84.0% — Driller: LB — Logger: AM

Natural Moisture Content, % - ●
PL ⊢——⊣ LL
N_{60} Value ○ / Non-Plastic - NP
10 20 30 40

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
728.0							Topsoil - 17"-18"							
1.5	726.5	3 4 5	10	S-1		1.5	Stiff to very stiff light brown SILTY CLAY (CL-ML); damp to moist.							
5		7 12 13	7	S-2		2.5	@ 3.5'-6.0', contains silty fine sand inclusion							
6.0	722.0	3 8 10	18	S-3		3.0	Very stiff red with brown mottles FAT CLAY (CH); damp to moist.							
10		8 9 12	9	S-4		2.5								
		3 6 6	16	S-5		2.75								
13.5	714.5	4 4 4	15	S-6		1.25	Stiff red FAT CLAY (CH); moist.							
15														
16.0	712.0	3 3 4	13	S-7		1.0	Medium stiff to stiff red sandy LEAN CLAY (CL); moist.							
18.5	709.5	3 3 3	18	S-8		1.5	Stiff to medium stiff red FAT CLAY (CH); moist to wet.							
20														
		3 4 5	17	S-9		1.0								
		4 4 6	14	S-10		1.75								
25.0	703.0						Bottom of Boring - 25.0'							



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Client: Barton Malow | *Project:* Ford H4 Battery Plant | *Job No.* 2150-9519.50

LOG OF: Boring B-005 | *Location:* As per plan | *Date Drilled:* 11/4/2021

WATER OBSERVATIONS:
Water seepage at: None
Water level at completion: None (inside augers)

DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Depth (ft)	Elev. (ft) 720.0	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0.5	719.5						Topsoil - 5"-6", Plow Depth - 12"							
		3 6 7	12	S-1		1.5	Stiff light gray and light brown mottled SILTY CLAY (CL-ML); damp.							
5		4 10 13	14	S-2		1.75								
6.0	714.0													
		4 6 9	13	S-3		2.5	Very stiff light brown FAT CLAY (CH); contains black oxide staining; moist.							
10		5 4 3	14	S-4		2.5								
		4 5 5	15	S-5		2.25	@ 11.0', light brown and light gray mottled							
13.5	706.5													
15		3 5 5	6	S-6		2.75	Stiff to medium stiff reddish light brown FAT CLAY (CH); moist.							
		4 3 5	15	S-7		2.75								
20		3 4 3	18	S-8		0.75								
		- - -		S-9		-								
25.0 25	695.0	- - -		S-10		-	Bottom of Boring - 25.0'							

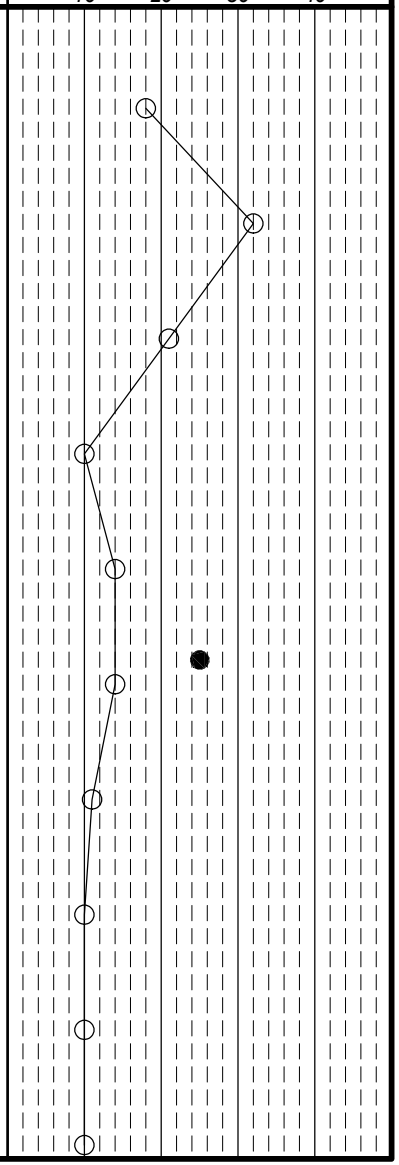
GRADATION

Rig (#) / ER: CME-850X (400472) / 84.0% | Driller: LB | Logger: AM

Natural Moisture Content, % - ●

PL ├──┤ LL

N_{60} Value ○ / Non-Plastic - NP



DLZ Ohio, Inc. * 6121 Huntley Road, Columbus, Ohio 43229 * (614) 888-0040

Client: Barton Malow | *Project:* Ford H4 Battery Plant | *Job No.* 2150-9519.50

LOG OF: Boring B-006 | *Location:* As per plan | *Date Drilled:* 11/5/2021

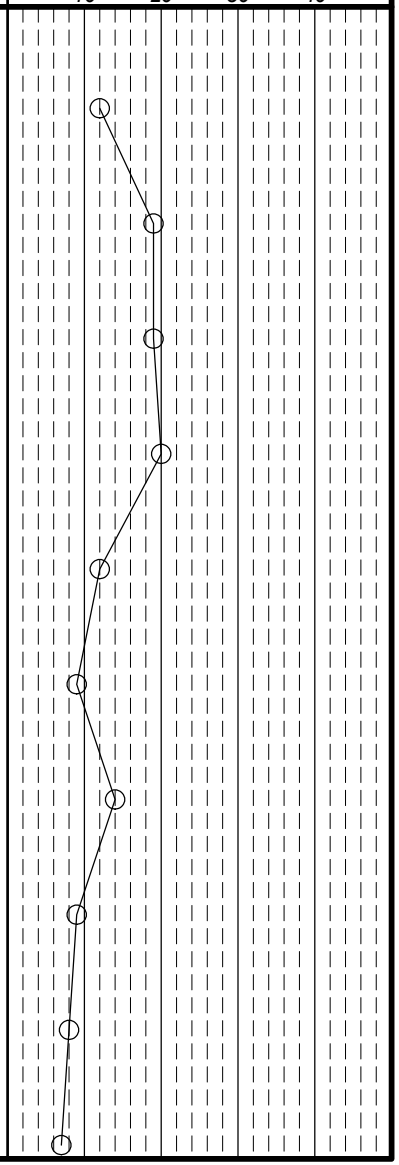
WATER OBSERVATIONS:
Water seepage at: 23.5'
Water level at completion: 10.2' (inside augers) includes water added?

DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Rig (#) / ER: CME 750X (289498) / 81.0% | *Driller:* T | *Logger:* JC

Natural Moisture Content, % - ●
PL ├──┤ LL
N_{60} Value ○ / Non-Plastic - NP
10 20 30 40

Depth (ft)	Elev. (ft) 720.5	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0.7	719.8						Topsoil - 8", Plow Depth - 10"							
		2 3 6	12	S-1		3.0	Very stiff light reddish brown SILTY CLAY (CL-ML); damp.							
3.5	717.0													
5		4 6 8	18	S-2		3.5	Very stiff red LEAN CLAY (CL); damp.							
		3 6 8	9	S-3		3.5								
8.5	712.0													
10		2 5 10	18	S-4		2.5	Very stiff red and light brown mottled FAT CLAY (CH); moist.							
		3 4 5	15	S-5		3.0	@ 11.0', red							
15		2 3 4	18	S-6		1.5	@ 13.5', stiff to very stiff							
		3 4 6	8	S-7		1.5	@16.0'-21.0', contains coarse sand size chert fragments							
20		3 3 4	9	S-8		2.0								
		2 2 4	16	S-9		1.5								
25.0 25	695.5	1 2 3	7	S-10		1.0	@ 23.5', contains chert fragments; moist to wet Bottom of Boring - 25.0'							



DLZ Ohio, Inc. * 6121 Huntley Road, Columbus, Ohio 43229 * (614) 888-0040

Client: Barton Malow | *Project:* Ford H4 Battery Plant | *Job No.* 2150-9519.50

LOG OF: Boring B-006A | *Location:* As per plan | *Date Drilled:* 11/15/2021

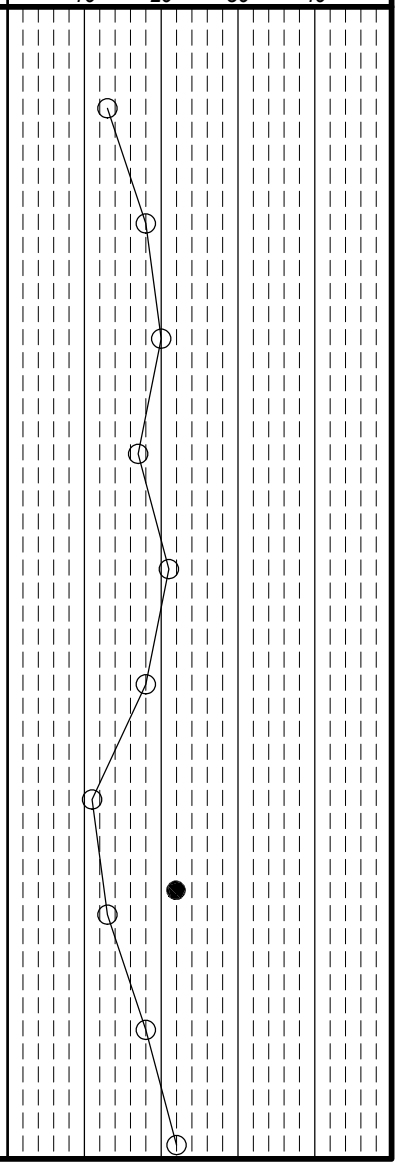
WATER OBSERVATIONS:
Water seepage at: None
Water level at completion: None (inside augers)

DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Rig (#) / ER: CME-850X (400472) / 84.0% | *Driller:* LB | *Logger:* AM

Depth (ft)	Elev. (ft) 726.6	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0.5	726.1						Topsoil - 6', Plow Depth - 9"							
		2 2 7	18	S-1		1.75	Stiff to very stiff light brown SILTY CLAY (CL-ML); moist.							
5		5 6 7	18	S-2		3.25								
6.0	720.6													
		6 6 8	18	S-3		2.5	Very stiff red and light brown LEAN CLAY (CL); moist.							
8.5	718.1													
10		4 5 7	18	S-4		1.75	Stiff to very stiff red FAT CLAY (CH); moist.							
		5 7 8	18	S-5		2.25								
15		3 6 7	18	S-6		1.75								
		5 5 3	18	S-7		1.25								
20		5 4 5	18	S-8		1.25								
		6 7 6	18	S-9		2.5								
23.5	703.1													
25.0 25	701.6	5 9 7	16	S-10			Medium dense red clayey SAND (SC); moist to wet. Bottom of Boring - 25.0'							

Natural Moisture Content, % - ●
PL ├──┤ LL
N_{60} Value ○ / Non-Plastic - NP



DLZ Ohio, Inc. * 6121 Huntley Road, Columbus, Ohio 43229 * (614) 888-0040

Client: Barton Malow | *Project:* Ford H4 Battery Plant | *Job No.* 2150-9519.50

LOG OF: Boring B-007 | *Location:* As per plan | *Date Drilled:* 11/5/2021

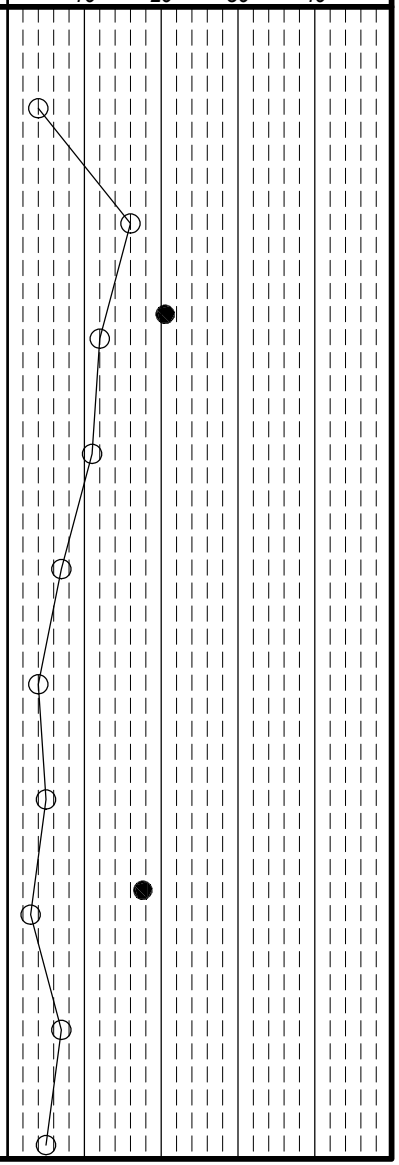
WATER OBSERVATIONS:
Water seepage at: None
Water level at completion: None (inside augers)

DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Rig (#) / ER: CME 750X (289498) / 81.0% | *Driller:* T | *Logger:* JC

Depth (ft)	Elev. (ft) 713.5	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0.6	712.9						Topsoil - 7", Plow Depth - 9"							
3.5	710.0	1 2 1	5	S-1		1.5	Stiff brownish gray SILTY CLAY (CL-ML); damp.							
6.0	707.5	1 5 7	13	S-2		2.5	Very stiff red and light gray mottled LEAN CLAY (CL); moist.							
8.5	705.0	2 4 5	18	S-3		3.5	Very stiff light gray and light brown sandy SILTY CLAY (CL-ML); damp.							
13.5	700.0	2 4 4	18	S-4		1.5	Stiff to medium stiff light brown FAT CLAY (CH); moist.							
		2 2 3	18	S-5		1.5	@ 11.0'-13.5', contains black oxide stains							
18.5	695.0	1 1 2	18	S-6		0.75	Medium stiff to soft light brown FAT CLAY (CH); moist to wet.							
		1 2 2	18	S-7		0.5								
21.0	692.5	WOH 1 1	18	S-8		>0.5	Very soft light brown FAT CLAY (CH); wet.							
25.0	688.5	1 2 3	18	S-9		1.5	Stiff light brown FAT CLAY (CH); moist.							
		2 2 2	18	S-10		1.5	@ 23.5', light brown and light gray mottled Bottom of Boring - 25.0'							

Natural Moisture Content, % - ●
PL ├──┤ LL
N_{60} Value ○ / Non-Plastic - NP



DLZ Ohio, Inc. * 6121 Huntley Road, Columbus, Ohio 43229 * (614) 888-0040

Client: Barton Malow | *Project:* Ford H4 Battery Plant | *Job No.* 2150-9519.50

LOG OF: Boring B-008 | *Location:* As per plan | *Date Drilled:* 11/5/2021

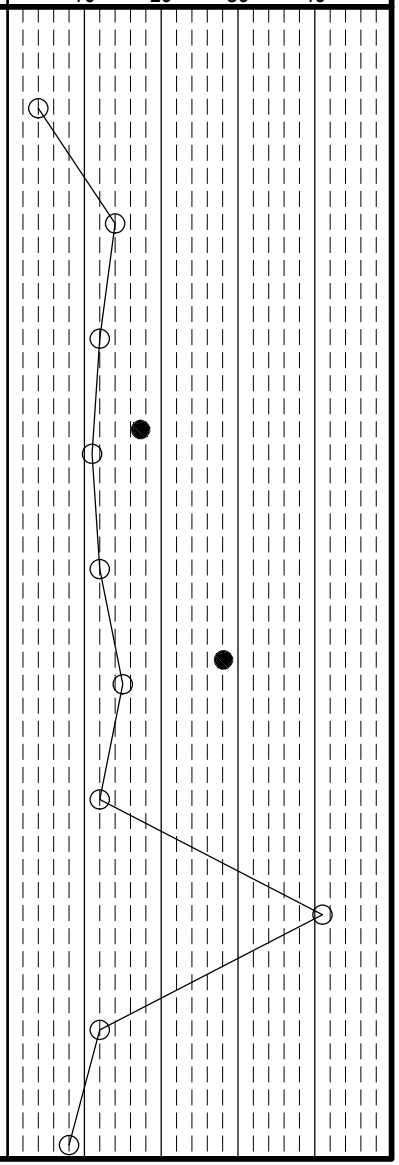
WATER OBSERVATIONS:
Water seepage at: 22.5'
Water level at completion: 2.5' (inside augers) includes water added?

DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Rig (#) / ER: CME 750X (289498) / 81.0% | *Driller:* T | *Logger:* JC

Natural Moisture Content, % - ●
PL ├──┤ LL
N_{60} Value ○ / Non-Plastic - NP
10 20 30 40

Depth (ft)	Elev. (ft) 713.0	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0.7	712.3						Topsoil - 8", Plow Depth - 11"							
3.5	709.5	1 1 2	2	S-1		2.0	Stiff to very stiff brownish gray SILTY CLAY (CL-ML); damp.							
6.0	707.0	3 5 5	15	S-2		2.0	Stiff to very stiff light gray SILTY CLAY (CL-ML); damp.							
8.5	704.5	2 4 5	18	S-3		3.0	Very stiff light brown LEAN CLAY (CL); damp.							
11.0	702.0	3 3 5	10	S-4		2.0	Stiff to very stiff gray LEAN CLAY (CL); contains fine sand; moist.							
13.5	699.5	3 4 5	18	S-5		3.0	Very stiff gray FAT CLAY (CH); moist.							
		3 5 6	18	S-6		+4.5	Hard to very stiff light brown FAT CLAY (CH); contains coarse sand size chert fragments; damp to moist.							
		3 3 6		S-7		3.0								
21.0	692.0	3 6 24	13	S-8		3.0	@ 18.5', contains gravel size chert fragments; moist to wet							
		5 3 6	10	S-9		2.0	Stiff to very stiff red FAT CLAY (CH); moist.							
25.0	688.0	3 3 3	18	S-10		2.0	Bottom of Boring - 25.0'							



DLZ Ohio, Inc. * 6121 Huntley Road, Columbus, Ohio 43229 * (614) 888-0040

Client: Barton Malow | *Project:* Ford H4 Battery Plant | *Job No.* 2150-9519.50

LOG OF: Boring B-009 | *Location:* As per plan | *Date Drilled:* 11/4/2021

WATER OBSERVATIONS:
Water seepage at: None
Water level at completion: None (inside augers)

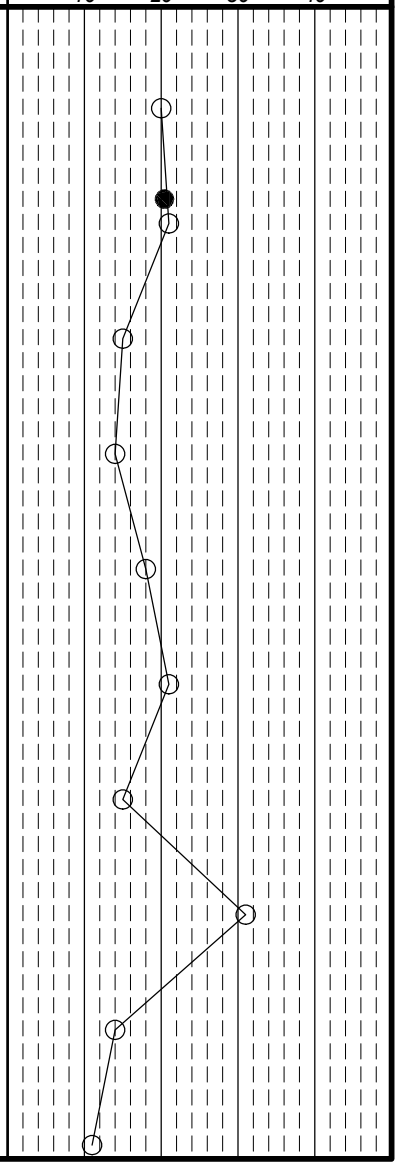
DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Depth (ft)	Elev. (ft) 720.6	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0.6	720.0						Topsoil - 6"-7", Plow Depth - 2.5' (30")							
		4 6 8	15	S-1		3.75	Very stiff brownish red to brown LEAN CLAY (CL); moist to damp.							
3.5	717.1													
5		6 8 7	18	S-2		3.0	Very stiff red LEAN CLAY (CL); contains sandy zone; moist.							
		8 5 6	13	S-3		3.25								
8.5	712.1													
10		4 4 6	13	S-4		2.5	Very stiff red with light brown mottles FAT CLAY (CH); moist.							
		4 5 8	16	S-5		2.5	@ 11.0'-13.5', red with light gray mottles							
15		4 7 8	10	S-6		3.0	@ 13.5', red							
16.0	704.6													
		4 5 6	15	S-7		3.0	Very stiff to stiff red FAT CLAY (CH); contains chert fragments; damp to moist.							
20		10 9 13	8	S-8		2.5								
		3 5 5	12	S-9		2.0								
25.0 25	695.6	3 4 4	18	S-10		1.5	Bottom of Boring - 25.0'							

GRADATION

Rig (#) / ER	Driller	Logger
CME-850X (400472) / 84.0%	LB	AM

Natural Moisture Content, % - ●
PL ├──┤ LL
N_{60} Value ○ / Non-Plastic - NP



DLZ Ohio, Inc. * 6121 Huntley Road, Columbus, Ohio 43229 * (614) 888-0040

Client: Barton Malow | *Project:* Ford H4 Battery Plant | *Job No.* 2150-9519.50

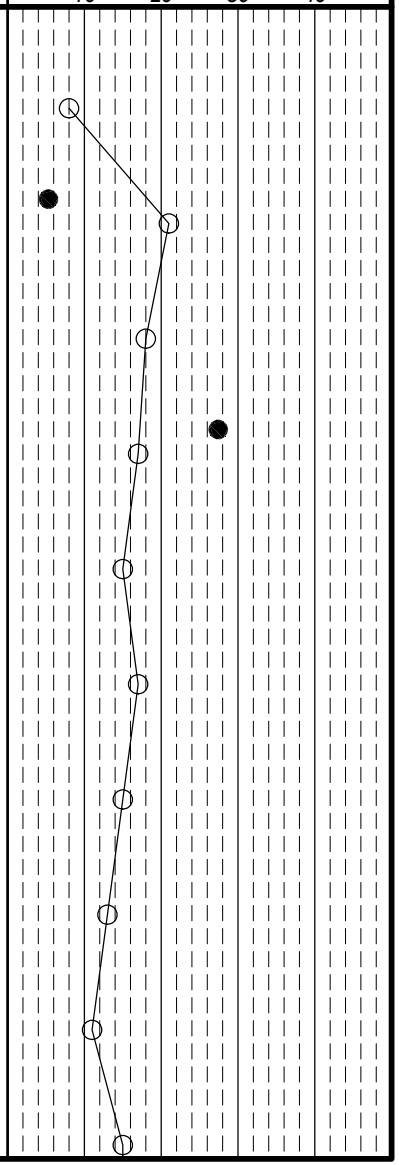
LOG OF: Boring B-010 | *Location:* As per plan | *Date Drilled:* 11/4/2021 to 11/5/2021

WATER OBSERVATIONS:
Water seepage at: None
Water level at completion: 50.4' (prior to adding water)
11.0' (inside augers)
DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Rig (#) / ER: CME-850X (400472) / 84.0% | *Driller:* LB | *Logger:* AM

Natural Moisture Content, % - ●
PL ├──┤ LL
N_{60} Value ○ / Non-Plastic - NP
10 20 30 40

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
	715.5													
0.5	715.0						Topsoil - 6", Plow Depth - 10"							
		1 2 4	15	S-1		0.5	Soft to medium stiff brown LEAN CLAY (CL); moist.							
3.5	712.0													
5		5 8 7	18	S-2		3.5	Very stiff light gray and light brown SILTY CLAY (CL-ML); moist to damp.							
6.0	709.5													
		3 6 7	11	S-3		2.25	Very stiff light brown and light gray FAT CLAY (CH); moist.							
8.5	707.0													
10		3 5 7	15	S-4		4.5	Hard to very stiff red FAT CLAY (CH); damp.							
		3 5 6	17	S-5		2.0								
15		6 6 6	16	S-6		2.25								
		4 6 5	18	S-7		2.25								
18.5	697.0													
20		3 4 5	18	S-8		1.75	Stiff red FAT CLAY (CH); moist to wet.							
21.0	694.5													
		3 4 4	16	S-9		3.0	Very stiff red FAT CLAY (CH); moist.							
25	690.5	3 5 6	18	S-10		2.25								



Client: Barton Malow | *Project:* Ford H4 Battery Plant | *Job No.* 2150-9519.50

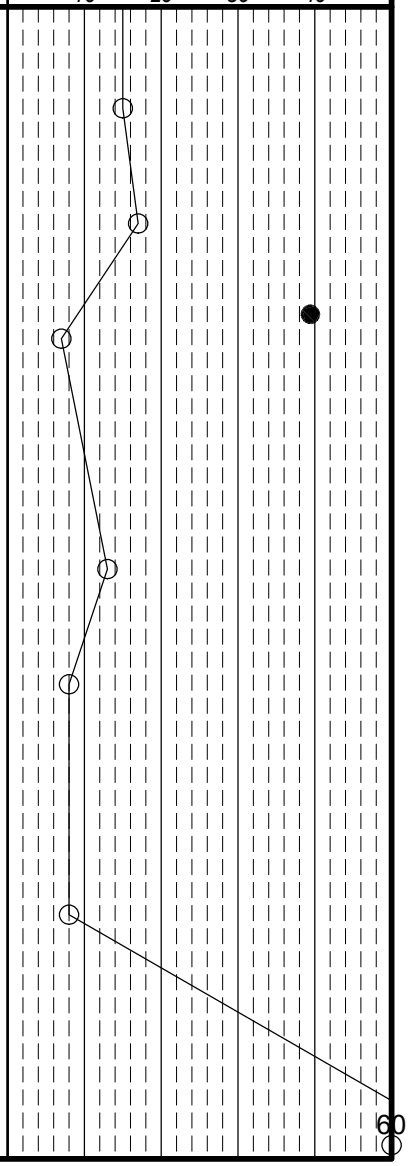
LOG OF: Boring B-010 | *Location:* As per plan | *Date Drilled:* 11/4/2021 to 11/5/2021

WATER OBSERVATIONS:
Water seepage at: None
Water level at completion: 50.4' (prior to adding water)
11.0' (inside augers)

DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Rig (#) / ER: CME-850X (400472) / 84.0% | *Driller:* LB | *Logger:* AM

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
	690.5						Very stiff red FAT CLAY (CH); moist. (continued)							
		5 5 6	18	S-11		2.25								
		4 6 6	10	S-12		2.5								
30														
31.0	684.5						Stiff to medium stiff red FAT CLAY (CH); contains chert fragments; moist to wet.							
		3 3 2	18	S-13		1.5								
35			24		ST-1									
		5 4 5	18	S-14		1.5								
40		3 3 3	18	S-15		0.75								
45		3 3 3	18	S-16		1.0	@ 43.5'-48.5', brown; does not contain chert fragments							
50	665.5	14 24 19	13	S-17		0.75								



Client: Barton Malow | *Project:* Ford H4 Battery Plant | *Job No.* 2150-9519.50

LOG OF: Boring B-010 | *Location:* As per plan | *Date Drilled:* 11/4/2021 to 11/5/2021

WATER OBSERVATIONS:
Water seepage at: None
Water level at completion: 50.4' (prior to adding water)
11.0' (inside augers)
DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Rig (#) / ER: CME-850X (400472) / 84.0% | *Driller:* LB | *Logger:* AM

Natural Moisture Content, % - ●
PL ├──┤ LL
N_{60} Value ○ / Non-Plastic - NP
10 20 30 40

Depth (ft)	Elev. (ft) 665.5	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	Natural Moisture Content, %
53.5	662.0						Stiff to medium stiff red FAT CLAY (CH); contains chert fragments; moist to wet. (continued)								
55.0	660.5	50/1	1	S-18			Light brown decomposed rock								50+
65.0	650.5	Core 120"	Rec 76"	RQD 0%	1		Hard to very hard light gray to gray LIMESTONE; very fine to fine grained, slightly to moderately weathered, thickly bedded, moderately fractured to broken, vuggy, karstic solutioning on fracture surfaces, significant core loss due to solutioning. @ 63.3'-63.8', clay filled void. @ core has 44 " of core loss due to suspected voids.								
							Bottom of Boring - 65.0'								

Depth scale: 55, 60, 65, 70, 75

DLZ Ohio, Inc. * 6121 Huntley Road, Columbus, Ohio 43229 * (614) 888-0040

Client: Barton Malow | *Project:* Ford H4 Battery Plant | *Job No.* 2150-9519.50

LOG OF: Boring B-011 | *Location:* As per plan | *Date Drilled:*

WATER OBSERVATIONS:
Water seepage at:
Water level at completion:

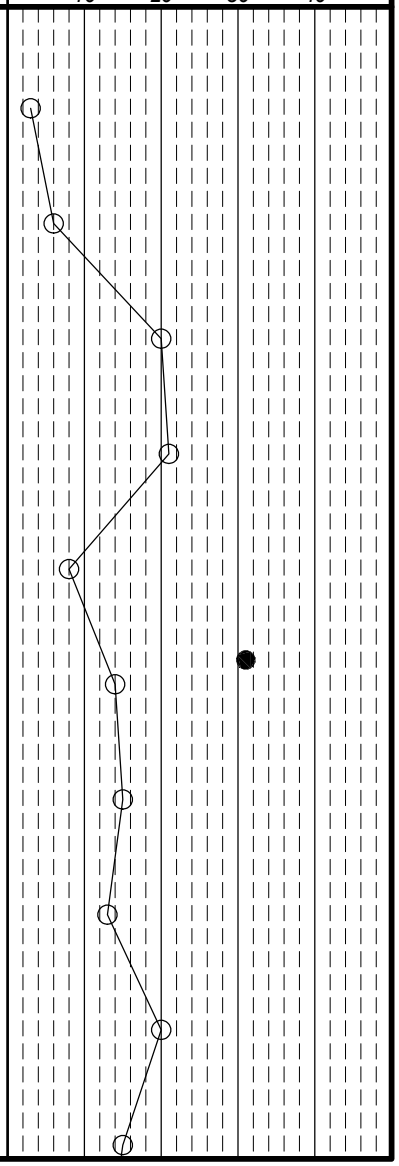
DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Depth (ft)	Elev. (ft) 715.0	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0.8	714.2						Topsoil - 3", Plow Depth - 7"							
		1 1 1		S-1			Soft brown LEAN CLAY (CL); contains root fibers; moist.							
3.5	711.5													
5		2 1 3		S-2			Medium stiff light brown SILTY CLAY (CL-ML); damp.							
6.0	709.0													
		5 7 7		S-3			Very stiff light brown and light gray mottled LEAN CLAY (CL); damp to moist.							
8.5	706.5													
10		5 7 8		S-4			Medium stiff light brown and light gray mottled FAT CLAY (CH); moist.							
		3 3 3		S-5										
13.5	701.5													
15		3 4 6		S-6			Stiff to very stiff red FAT CLAY (CH); contains chert fragments; damp to moist.							
		4 5 6		S-7										
20		4 5 4		S-8			@ 18.5'-21.0', does not contain chert fragments							
		5 6 8		S-9			@ 21.0'-25.5', contains black oxide staining and gravel size chert fragments							
25	690.0	4 5 6		S-10										

GRADATION

Rig (#) / ER	Driller	Logger
CME-850X (400472) / 84.0%	LB	AM

Natural Moisture Content, % - ●
PL ├──┤ LL
N_{60} Value ○ / Non-Plastic - NP



Client: Barton Malow | *Project:* Ford H4 Battery Plant | *Job No.* 2150-9519.50

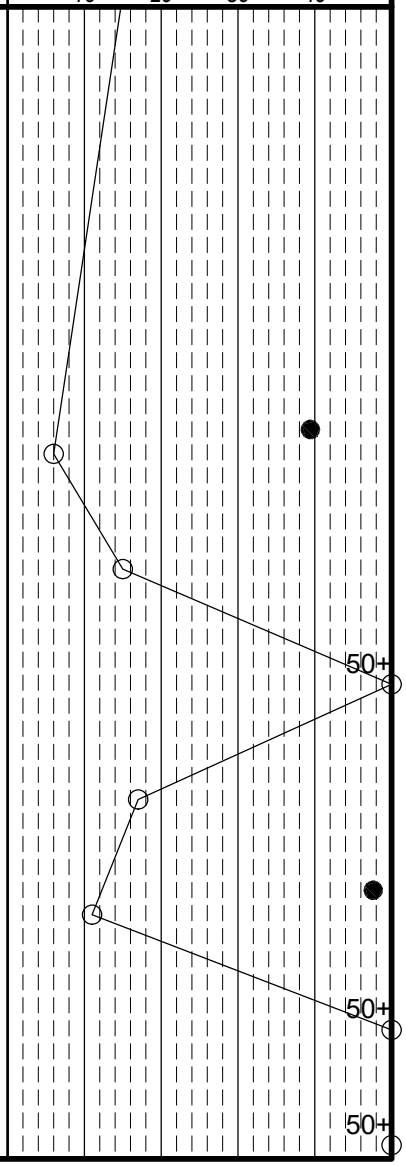
LOG OF: Boring B-011 | *Location:* As per plan | *Date Drilled:*

Rig (#) / ER CME-850X (400472) / 84.0% | *Driller* LB | *Logger* AM

WATER OBSERVATIONS:
Water seepage at:
Water level at completion:

DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Depth (ft)	Elev. (ft) 690.0	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
26.0	689.0			S-11			red FAT CLAY (CH); moist.							
30				S-12										
33.5	681.5													
35		2 2 2		S-13			Medium stiff light brown FAT CLAY (CH); moist to wet.							
36.0	679.0													
		4 6 5		S-14			Stiff to very stiff red FAT CLAY (CH); moist to wet.							
38.5	676.5						@ 37.5', drill rig chatter							
40		6 13 50/3		S-15			Very stiff to hard brown FAT CLAY (CH); contains gravel size stone fragments; moist.							
							@ 40.0', heavy drill rig chatter							
		5 6 6	1	S-16			@ 41.0'-43.5', recovered stone fragments							
43.5	671.5						@ 42.5', drill rig chatter							
45		3 5 3	16	S-17		0.75	Soft to very soft light reddish brown FAT CLAY (CH); wet.							
							@ 45.0', drill rig chatter							
		20 50/2	6	S-18		0.25	@ 46.0', contains stone fragments; wet							
48.5	666.5						@ 47.5', drill rig chatter							
50	665.0	50/2		S-19			decomposed rock and rock chips							



Client: Barton Malow | *Project:* Ford H4 Battery Plant | *Job No.* 2150-9519.50

LOG OF: Boring B-011 | *Location:* As per plan | *Date Drilled:*

Rig (#) / ER CME-850X (400472) / 84.0% | *Driller* LB | *Logger* AM

WATER OBSERVATIONS:
Water seepage at:
Water level at completion:

DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Natural Moisture Content, % - ●
PL ⊢——⊣ *LL*
N_{60} Value ○ / *Non-Plastic -* NP
10 20 30 40

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
	665.0													
52.0	663.0						decomposed rock and rock chips (continued) @ 51.0', drill rig chatter							
55 60 62.0	653.0	Core 120"	Rec 68"	RQD 25%	1		Hard to very hard light gray to gray LIMESTONE; very fine to fine grained, slightly to moderately weathered, thickly bedded, moderately fractured to broken, vuggy, Karstic solutioning on fracture surfaces, significant core loss due to solutioning. @ 52.0'-62.0', core has 62 " of loss due to suspected voids. @ 59.1'-62.0' broken with suspected loss. @ 59.1'-59.4', clay filled void.							
65 70 75							Bottom of Boring - 62.0'							

DLZ Ohio, Inc. * 6121 Huntley Road, Columbus, Ohio 43229 * (614) 888-0040

Client: Barton Malow | *Project:* Ford H4 Battery Plant | *Job No.* 2150-9519.50

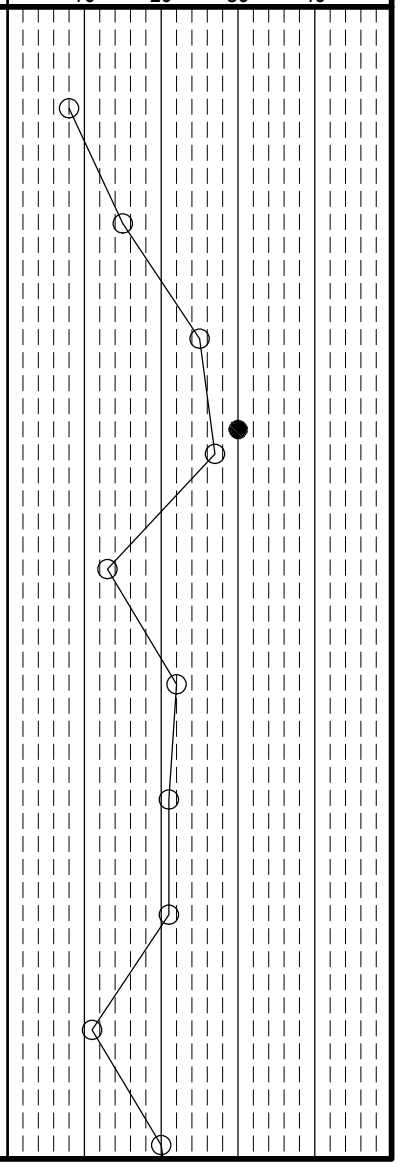
LOG OF: Boring B-011A | *Location:* As per plan | *Date Drilled:* 11/15/2021

WATER OBSERVATIONS:
Water seepage at: 43.5'
Water level at completion: 18.7' (prior to adding water)
13.4' (at completion)
DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Rig (#) / ER: CME-850X (400472) / 84.0% | *Driller:* LB | *Logger:* AM

Natural Moisture Content, % - ●
PL ├──┤ LL
N_{60} Value ○ / Non-Plastic - NP

Depth (ft)	Elev. (ft) 721.3	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0.1	721.2						Topsoil - NO READING							
		3 3 3	18	S-1		1.75	Stiff brown LEAN CLAY (CL); moist							
3.5	717.8													
5		3 5 6	15	S-2		2.75	Very stiff red and light brown mottled LEAN CLAY (CL); moist.							
6.0	715.3													
		3 8 10	18	S-3		3.0	Medium dense red and light brown clayey SAND (SC); moist.							
8.5	712.8													
10		5 8 11	18	S-4		3.75	Very stiff to stiff red and light brown FAT CLAY (CH); damp to moist.							
		3 4 5	18	S-5		2.0								
13.5	707.8													
15		3 7 9	18	S-6		3.75	Very stiff red FAT CLAY (CH); contains chert fragments; damp to moist.							
		5 7 8	18	S-7		3.25								
20		7 5 10	18	S-8		3.5								
		3 4 4		S-9		1.75	@ 21.0', stiff							
25.0 25	696.3	4 6 8		S-10		1.75	Bottom of Boring - 25.0'							



Client: Barton Malow	Project: Ford H4 Battery Plant	Job No. 2150-9519.50
LOG OF: Boring B-011A	Location: As per plan	Date Drilled: 11/15/2021

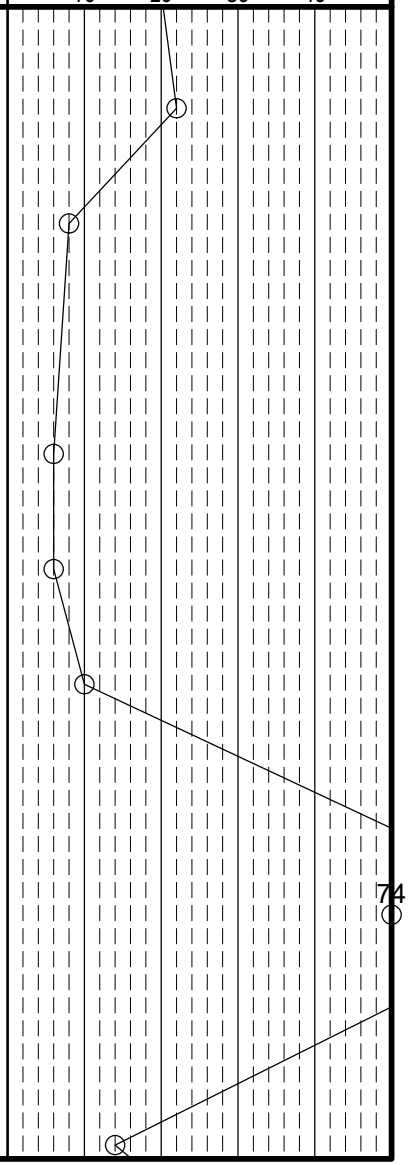
WATER OBSERVATIONS:
Water seepage at: 43.5'
Water level at completion: 18.7' (prior to adding water)
13.4' (at completion)

DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Rig (#) / ER: CME-850X (400472) / 84.0%
Driller: LB
Logger: AM

Natural Moisture Content, % - ●
PL — LL
N_{60} Value ○ / Non-Plastic - NP
10 20 30 40

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
	696.3						Very stiff red FAT CLAY (CH); contains chert fragments; damp to moist. (continued)							
		4 8 8		S-11		1.75								
		4 3 3		S-12		1.25								
30			24		ST-1									
		WOH 3 1	18	S-14		1.25	@ 33.5', contains black oxide staining, moist to wet							
35														
		2 2 2	18	S-15		1.5								
		1 3 4	18	S-16		1.0	@ 38.5', stiff to medium stiff							
40														
43.5	677.8													
		26 34 19	15	S-17			Very dense gray and light red clayey GRAVEL (GC); moist to wet.							
45														
		22 7 3	1	S-18			@ 48.5', only stone fragments recovered							
50														



Client: Barton Malow	Project: Ford H4 Battery Plant	Job No. 2150-9519.50
LOG OF: Boring B-011A	Location: As per plan	Date Drilled: 11/15/2021

WATER OBSERVATIONS:
Water seepage at: 43.5'
Water level at completion: 18.7' (prior to adding water)
13.4' (at completion)

DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Rig (#) / ER: CME-850X (400472) / 84.0%
Driller: LB
Logger: AM

Natural Moisture Content, % - ●
PL ⊢——⊣ LL
N_{60} Value ○ / Non-Plastic - NP
10 20 30 40

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	N60 Value
	671.3						Very dense gray and light red clayey GRAVEL (GC); moist to wet. (continued)								
							@ 50.0', low recovery due to gravel stuck in tip of splitspoon								
		33 50/3		S-19			@ 50.0'-53.5', occasional drill rig chatter								50+
55							@ 56.0'-58.0', heavy chatter and difficulty advancing augers								
60							@ 59.0', 6"-12" void								
							@ 60.0'-63.0', three 4"-6" voids								
		Core 120"	Rec 107"	RQD 75%	R-1		@ 63.0'-68.0', occasional 1"-2" voids								
65															
70															
75															

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Client: Barton Malow | *Project:* Ford H4 Battery Plant | *Job No.* 2150-9519.50

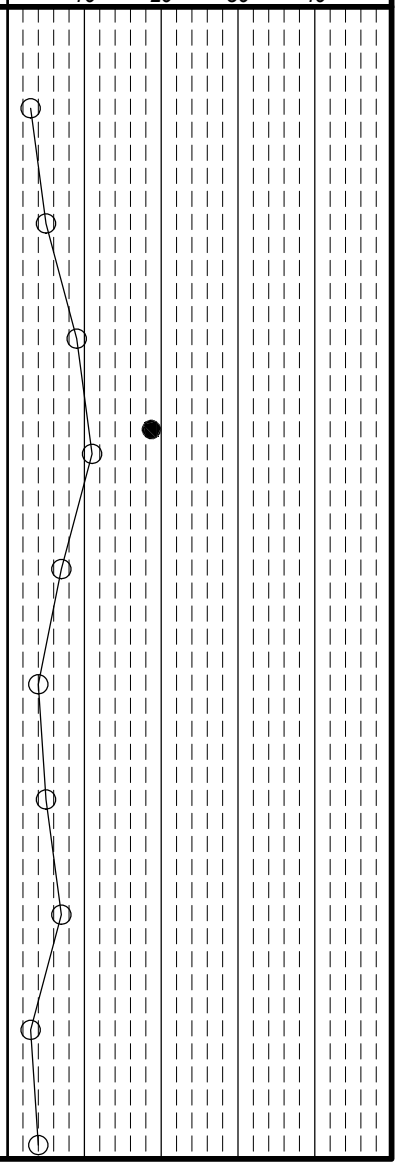
LOG OF: Boring B-012 | *Location:* As per plan | *Date Drilled:* 11/7/2021

WATER OBSERVATIONS:
Water seepage at: 16.0
Water level at completion: 10.3' (prior to adding water) ???
14.8' (with augers removed)
DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Rig (#) / ER: CME 750X (289498) / 81.0% | *Driller:* T | *Logger:* JC

Natural Moisture Content, % - ●
PL ├──┤ LL
N_{60} Value ○ / Non-Plastic - NP
10 20 30 40

Depth (ft)	Elev. (ft) 711.1	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
		WOH 1 1	2	S-1		1.0	Stiff to medium stiff gray LEAN CLAY (CL); moist.							
3.5	707.6													
5		1 1 3	18	S-2		2.5	Very stiff to stiff light brown and light gray mottled FAT CLAY (CH); moist.							
		3 3 4	12	S-3		2.0								
8.5	702.6													
10		2 3 5	18	S-4		0.5	Soft to medium stiff light brown and light gray mottled FAT CLAY (CH): moist to wet.							
		2 2 3	12	S-5		0.5	@ 11.0', light gray							
15		1 1 2	18	S-6		1.0	@ 13.5', stiff to medium stiff							
		1 1 3	18	S-7		1.5	@ 16.0', light brown							
20		1 2 3	18	S-8		1.0	@ 18.5', brown and light gray; moist							
21.0	690.1													
		1 1 1	18	S-9		1.0	Stiff to medium stiff light brown and red FAT CLAY (CH); wet.							
25.0 25	686.1	WOH 1 2	18	S-10		0.5	Bottom of Boring - 25.0'							



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Client: Barton Malow | *Project:* Ford H4 Battery Plant | *Job No.* 2150-9519.50

LOG OF: Boring B-013 | *Location:* As per plan | *Date Drilled:* 11/7/2021

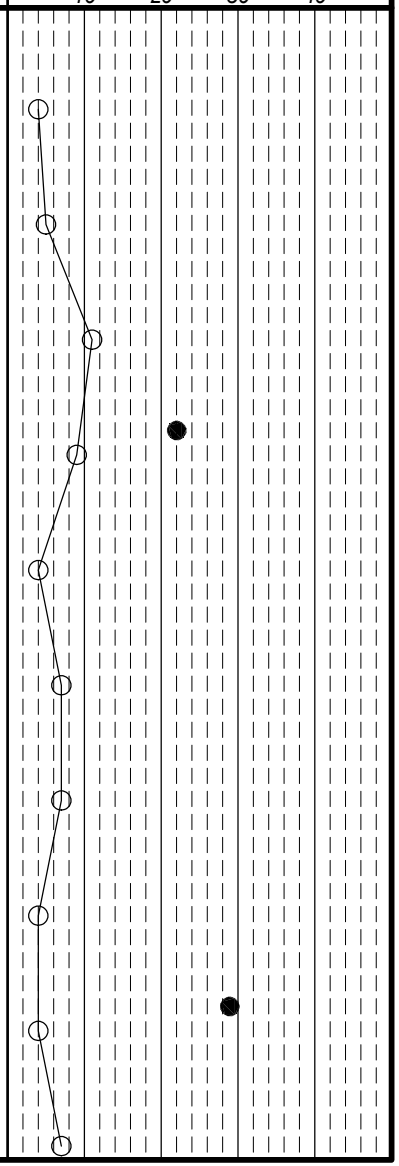
WATER OBSERVATIONS:
Water seepage at: 23.5'
Water level at completion: 0.5' (inside augers) ???

DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Rig (#) / ER: CME 750X (289498) / 81.0% | *Driller:* T | *Logger:* JC

Natural Moisture Content, % - ●
PL ├──┤ LL
N_{60} Value ○ / Non-Plastic - NP
10 20 30 40

Depth (ft)	Elev. (ft) 710.2	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
							Topsoil - 16.5"							
1.4	708.8	1 1 2	15	S-1		2.0	Stiff to very stiff gray SILTY CLAY (CL-ML); moist.							
3.5	706.7	1 2 2	18	S-2		4.0	Hard to very stiff gray LEAN CLAY (CL); moist.							
5		4 4 4	13	S-3		3.5								
8.5	701.7	3 3 4	18	S-4		1.0	Stiff to medium stiff light gray FAT CLAY (CH); moist to wet.							
10		1 1 2	18	S-5		1.0	@ 11.0', light brown and gray							
15		3 3 2	18	S-6		1.0								
16.0	694.2	2 3 2	15	S-7		1.5	Stiff red FAT CLAY (CH); moist.							
18.5	691.7	WOH 1 2	18	S-8		0.5	Soft to medium stiff light brown FAT CLAY (CH); wet.							
20														
21.0	689.2	2 1 2	18	S-9		0.75	Medium stiff to stiff red LEAN CLAY (CL); moist.							
25.0 25	685.2	5 2 3	18	S-10		1.0	Bottom of Boring - 25.0'							



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Client: Barton Malow | *Project:* Ford H4 Battery Plant | *Job No.* 2150-9519.50

LOG OF: Boring B-014 | *Location:* As per plan | *Date Drilled:* 11/4/2021

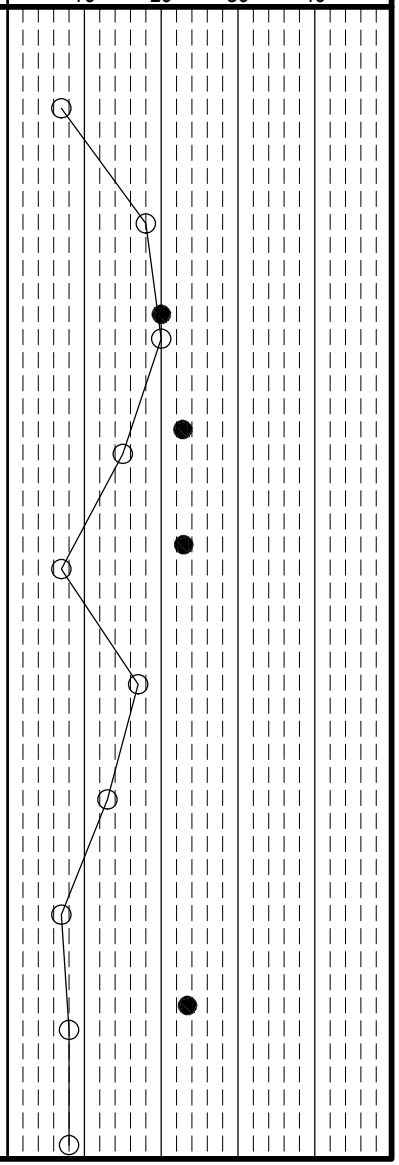
WATER OBSERVATIONS:
Water seepage at: None
Water level at completion: None (inside augers)

DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Rig (#) / ER: CME-850X (400472) / 84.0% | *Driller:* LB | *Logger:* AM

Natural Moisture Content, % - ●
PL ├──┤ LL
N_{60} Value ○ / Non-Plastic - NP
10 20 30 40

Depth (ft)	Elev. (ft) 711.3	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0.4	710.9						Topsoil - 5", Plow Depth - 18"							
		2 2 3	16	S-1		0.75	Medium stiff brown SILTY CLAY (CL-ML); damp to moist.							
5		3 6 7	18	S-2		1.75	@ 3.5', stiff brown with gray mottled; contains black oxide staining							
6.0	705.3													
		3 6 8	18	S-3			Medium dense gray silty SAND (SM); damp.							
8.5	702.8													
10		3 5 6	18	S-4		3.0	Very stiff red and gray LEAN CLAY (CL); contains fine sand inclusions; damp.							
11.0	700.3													
		2 2 3	15	S-5		0.5	Medium stiff to soft red FAT CLAY (CH); wet.							
13.5	697.8													
15		6 6 6	15	S-6		1.5	Stiff to medium stiff red FAT CLAY (CH); moist.							
		3 4 5	16	S-7		0.75	@ 16.0'-18.5', contains black oxide staining							
18.5	692.8													
20		2 2 3	18	S-8		0.5	Medium stiff to soft red and light gray FAT CLAY (CH); moist to wet.							
21.0	690.3													
		1 2 4	16	S-9		0.75	Medium stiff red FAT CLAY (CH); moist.							
25.0 25	686.3	2 2 4	18	S-10		0.75	Bottom of Boring - 25.0'							



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Client: Barton Malow | *Project:* Ford H4 Battery Plant | *Job No.* 2150-9519.50

LOG OF: Boring B-015 | *Location:* As per plan | *Date Drilled:* 11/5/2021

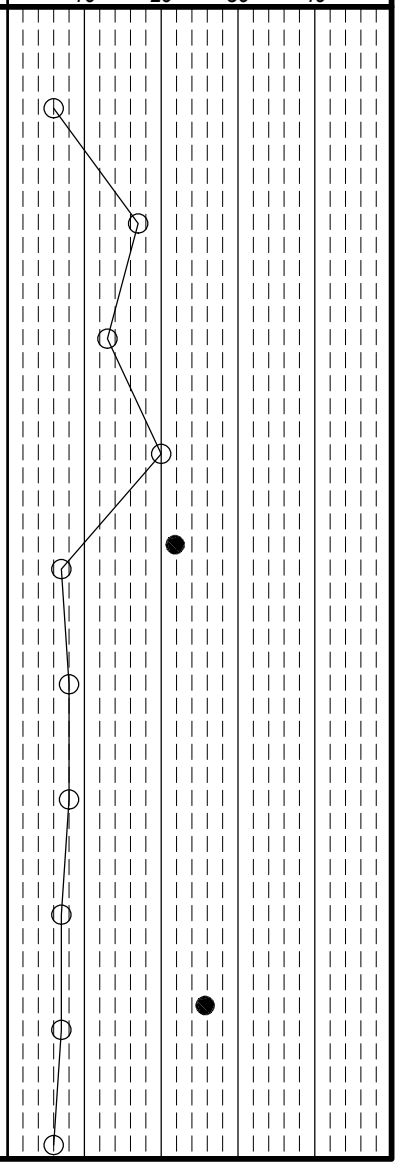
WATER OBSERVATIONS:
Water seepage at: 16.0'
Water level at completion: 13.3' (inside augers)

DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Rig (#) / ER: CME-850X (400472) / 84.0% | *Driller:* LB | *Logger:* AM

Natural Moisture Content, % - ●
PL ├──┤ *LL*
N_{60} Value ○ / *Non-Plastic -* NP

Depth (ft)	Elev. (ft) 711.4	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0.4	711.0						Topsoil - 5", Plow Depth - 13"							
		2 2 2	16	S-1		1.25	Stiff light gray FAT CLAY (CH); moist.							
3.5	707.9													
5		4 5 7	18	S-2		2.75	Very stiff light gray LEAN CLAY (CL); moist.							
6.0	705.4													
		3 4 5	18	S-3		1.75	Stiff light gray FAT CLAY (CH); contains silt and sand; moist.							
8.5	702.9													
10		4 7 7	18	S-4			Medium dense gray clayey SAND (SC); damp.							
11.0	700.4													
		3 2 3	18	S-5		1.0	Medium stiff to stiff brown FAT CLAY (CH); moist.							
15		3 3 3	18	S-6		1.25	@ 13.5'-16.0', reddish brown							
		3 3 3	18	S-7		1.0	@ 16.0', moist to wet							
20		2 2 3	18	S-8		0.75	@ 18.5', contains black oxide staining							
		1 3 2	18	S-9		0.5								
25.0 25	686.4	2 2 2	18	S-10		0.75	Bottom of Boring - 25.0'							



Client: Barton Malow	Project: Ford H4 Battery Plant	Job No. 2150-9519.50
LOG OF: Boring B-016	Location: As per plan	Date Drilled: 11/6/2021

WATER OBSERVATIONS:
Water seepage at: None
Water level at completion: None (inside augers)

DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Rig (#) / ER: CME 750X (289498) / 81.0%
Driller: T
Logger: JC

Natural Moisture Content, % - ●
PL ⊢——⊣ LL
N_{60} Value ○ / Non-Plastic - NP
10 20 30 40

Depth (ft)	Elev. (ft) 711.4	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
							Topsoil - 21"							
1.8	709.6	1 2 3	7	S-1		2.5	Very stiff brown and gray LEAN CLAY (CL); moist.							
5		4 5 6	2	S-2		2.5								
6.0	705.4	2 3 5	18	S-3		2.0	Stiff to very stiff light gray FAT CLAY (CH); moist.							
8.5	702.9	5 6 8	8	S-4		4.5+	Hard light gray and brown LEAN CLAY (CL); damp to moist.							
10														
11.0	700.4	4 7 10	9	S-5		4.5+	Hard red and light brown FAT CLAY (CH); damp.							
13.5	697.9	2 5 9	18	S-6		2.5	Very stiff red and light brown FAT CLAY (CH); moist.							
15														
		3 3 5	18	S-7		3.0								
		2 4 4	10	S-8		3.0								
20														
21.0	690.4	3 3 5	18	S-9		1.5	Medium stiff to stiff red and light brown FAT CLAY (CH); moist.							
25.0	686.4	4 3 4	12	S-10		2.0	Bottom of Boring - 25.0'							

Client: Barton Malow | *Project:* Ford H4 Battery Plant | *Job No.* 2150-9519.50

LOG OF: Boring B-016A | *Location:* As per plan | *Date Drilled:* 11/15/2021

Rig (#) / ER CME-850X (400472) / 84.0% | *Driller* LB | *Logger* AM

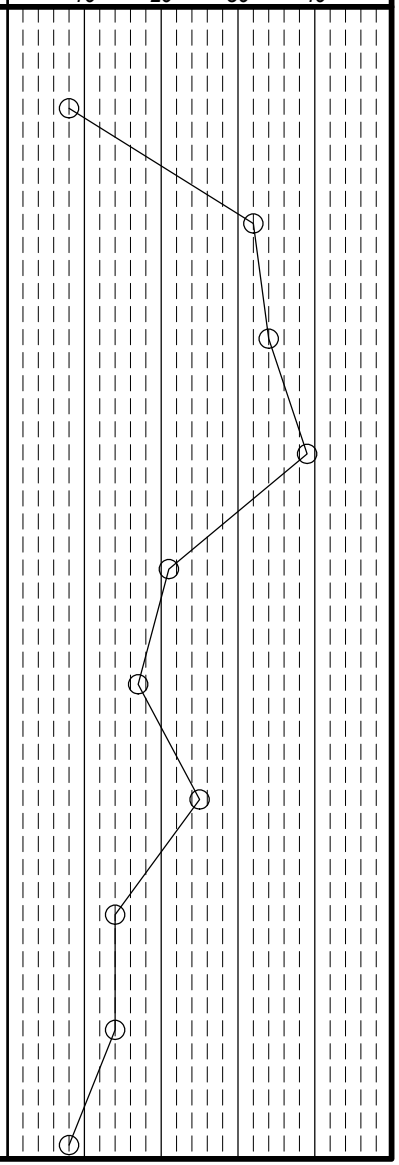
WATER OBSERVATIONS:
Water seepage at: None
Water level at completion: None (inside augers)

DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Depth (ft)	Elev. (ft) 718.3	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
1.0	717.3						Topsoil - 12"							
		1 3 3	8	S-1		1.75	Stiff brown LEAN CLAY (CL); moist.							
3.5	714.8													
5		10 14 9	18	S-2		4.5+	Hard brown FAT CLAY (CH); damp.							
		10 10 14	17	S-3		4.5+								
10		9 13 15	15	S-4		4.5+								
11.0	707.3													
		5 7 8	18	S-5		2.75	Very stiff red and light brown mottled FAT CLAY (CH); moist.							
15		6 6 6	16	S-6		2.25	@ 13.5', red							
16.0	702.3													
		3 10 8	13	S-7		2.0	Stiff to very stiff red FAT CLAY (CH); contains chert fragments; moist.							
20		3 5 5	18	S-8		2.0								
		7 6 4	15	S-9		0.75	@ 21.0', medium stiff, moist to wet							
25.0 25	693.3	1 3 3	18	S-10		0.75	Bottom of Boring - 25.0'							

GRADATION

Natural Moisture Content, % - ●
PL ⊢——⊣ LL
N_{60} Value ○ / Non-Plastic - NP
10 20 30 40



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Client: Barton Malow | *Project:* Ford H4 Battery Plant | *Job No.* 2150-9519.50

LOG OF: Boring B-017 | *Location:* As per plan | *Date Drilled:* 11/7/2021

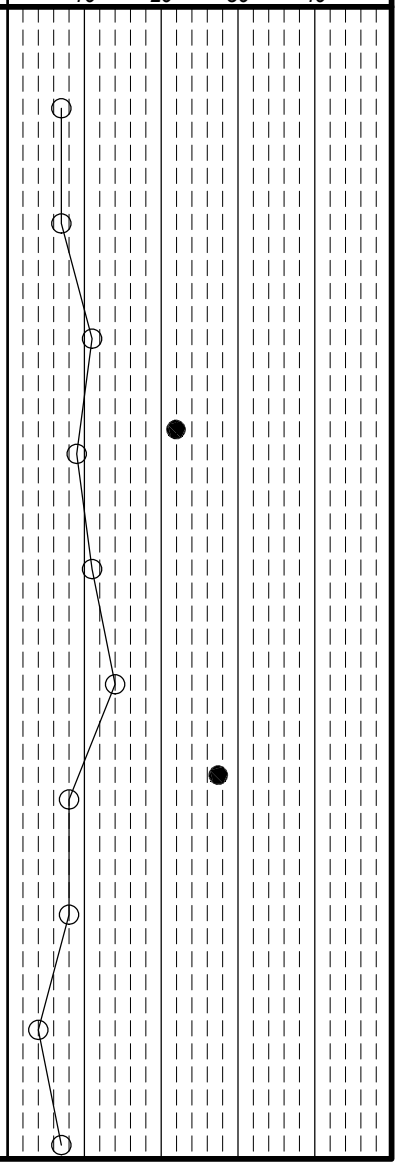
WATER OBSERVATIONS:
Water seepage at: None
Water level at completion: None (inside augers)

DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Rig (#) / ER: CME 750X (289498) / 81.0% | *Driller:* T | *Logger:* JC

Natural Moisture Content, % - ●
PL ├──┤ LL
N_{60} Value ○ / Non-Plastic - NP
10 20 30 40

Depth (ft)	Elev. (ft) 710.3	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
							Topsoil - 16"							
1.3	709.0	1 2 3	6	S-1		1.5	Stiff gray LEAN CLAY (CL); contains roots; moist.							
3.5	706.8	1 2 3	15	S-2		1.0	Stiff to medium stiff light gray FAT CLAY (CH); moist.							
6.0	704.3	2 4 4	15	S-3		2.0	Stiff to very stiff light brown LEAN CLAY (CL); moist.							
8.5	701.8	2 3 4	10	S-4		2.5	Very stiff light brown to light gray FAT CLAY (CH); moist to wet.							
11.0	699.3	2 4 4	17	S-5		2.0	Stiff to very stiff light gray FAT CLAY (CH); moist.							
		2 5 5	14	S-6		2.0								
		3 3 3	18	S-7		2.0	@ 16.5', light brown							
		1 2 4	15	S-8		2.0								
		2 1 2	18	S-9		1.5								
25.0	685.3	5 2 3	18	S-10		1.5	@ 23.5', contains chert fragments Bottom of Boring - 25.0'							



Client: Barton Malow	Project: Ford H4 Battery Plant	Job No. 2150-9519.50
LOG OF: Boring B-018	Location: As per plan	Date Drilled: 11/4/2021

WATER OBSERVATIONS:
Water seepage at: N/A
Water level at completion: None (inside augers)

DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Rig (#) / ER: CME-850X (400472) / 84.0%
Driller: LB
Logger: AM

Natural Moisture Content, % - ●
PL ⊢——⊣ LL
N_{60} Value ○ / Non-Plastic - NP
10 20 30 40

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
	709.2						Topsoil - 10", Plow Depth - 15"							
							@ 0.8'-38', advance augers without sampling							
5														
10														
15														
20														
25	684.2													

Client: Barton Malow	Project: Ford H4 Battery Plant	Job No. 2150-9519.50
LOG OF: Boring B-018	Location: As per plan	Date Drilled: 11/4/2021

WATER OBSERVATIONS:
Water seepage at: N/A
Water level at completion: None (inside augers)

DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Rig (#) / ER: CME-850X (400472) / 84.0%
Driller: LB
Logger: AM

Natural Moisture Content, % - ●
PL ⊢——⊣ LL
N_{60} Value ○ / Non-Plastic - NP
10 20 30 40

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
	684.2													
30														
35							@ 34.0', drill rig chatter @ 36.0', heavy drill rig chatter							
38.0	671.2													
40							@ 38.0', auger refusal Bottom of Boring - 38.0'							
45														
50														

DLZ Ohio, Inc. * 6121 Huntley Road, Columbus, Ohio 43229 * (614) 888-0040

Client: Barton Malow | *Project:* Ford H4 Battery Plant | *Job No.* 2150-9519.50

LOG OF: Boring B-018A | *Location:* As per plan | *Date Drilled:* 11/22/2021

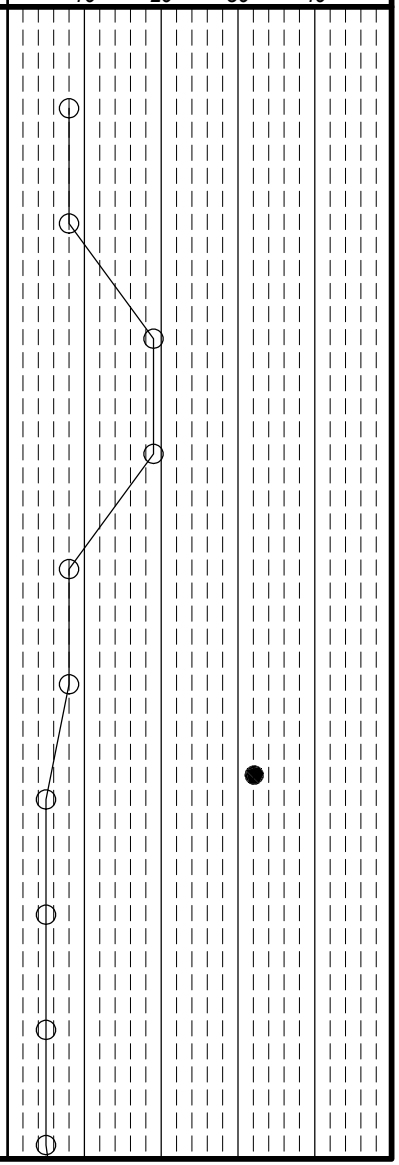
WATER OBSERVATIONS:
Water seepage at: 37.5
Water level at completion: 0.0' (with augers removed)

DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Rig (#) / ER: CME 850 (295502) / 81.2% | *Driller:* VD | *Logger:* JC

Natural Moisture Content, % - ●
PL ├──┤ LL
N_{60} Value ○ / Non-Plastic - NP
10 20 30 40

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
	709.2													
0.5	708.7						Topsoil - 6", Plow Depth - 9"							
		1 4 2	11	S-1		1.5	Stiff light brown and light gray mottled FAT CLAY (CH); moist.							
5		4 4 2	18	S-2		1.5	@ 3.5', gray mottling is siltier than brown							
6.0	703.2													
		3 6 8	18	S-3		2.5	Very stiff light brown sandy LEAN CLAY (CL); moist.							
8.5	700.7													
10		6 7 7	10	S-4		2.0	Stiff to very stiff light brown FAT CLAY (CH); contains rock fragments; moist.							
11.0	698.2													
		2 3 3	18	S-5		2.0	Very stiff to stiff red FAT CLAY (CH); contains chert fragments; moist.							
15		3 3 3	18	S-6		2.0								
		1 2 2	9	S-7		1.5								
20		1 2 2	10	S-8		2.0								
		2 2 2	18	S-9		1.5								
25	684.2	2 2 2	18	S-10		1.5	@ 23.5', moist to wet							



Client: Barton Malow | *Project:* Ford H4 Battery Plant | *Job No.* 2150-9519.50

LOG OF: Boring B-018A | *Location:* As per plan | *Date Drilled:* 11/22/2021

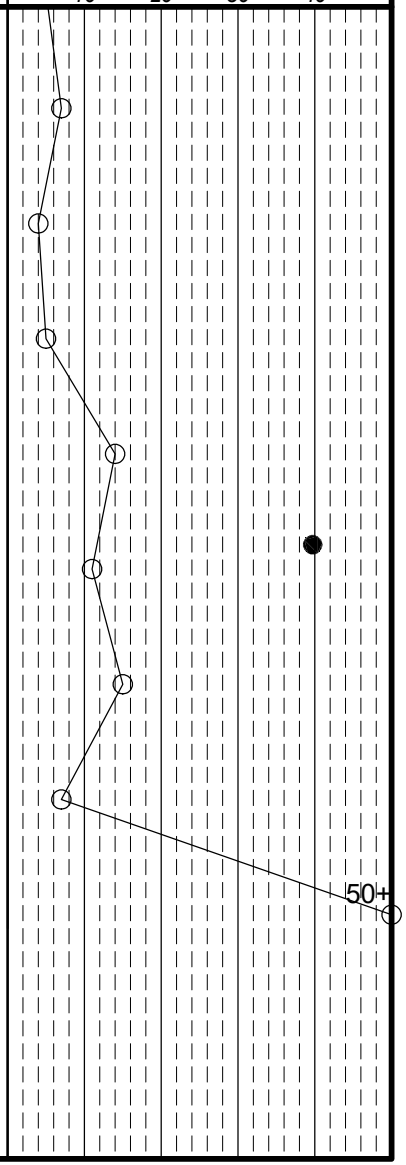
WATER OBSERVATIONS:
Water seepage at: 37.5
Water level at completion: 0.0' (with augers removed)

DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Rig (#) / ER: CME 850 (295502) / 81.2% | *Driller:* VD | *Logger:* JC

Natural Moisture Content, % - ●
PL ├──┤ LL
N_{60} Value ○ / Non-Plastic - NP

Depth (ft)	Elev. (ft) 684.2	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
		2 3 2	18	S-11		1.0	Very stiff to stiff red FAT CLAY (CH); contains chert fragments; moist. (continued)							
30		1 1 2	18	S-12		1.5	@ 28.5'-33.5', contains black oxide staining @ 29.5', 1.5" black coarse sand seam, not organic							
		1 2 2	18	S-13		1.5	@ 32.5'-33.5', drill rig chatter							
35		13 6 4	18	S-14		0.75	Medium stiff light brownish red FAT CLAY (CH); contains rock fragment; moist to wet.							
		4 4 4	18	S-15		0.75								
40		4 5 6	18	S-16		0.75								
43.5	665.7	WOH WOH 5	18	S-17		0.5	@ 41.0', soft to medium stiff							
45.0 45	664.2	23 24 50/5	18	S-18			Very dense clayey GRAVEL (GC) with sand; residuum; damp.							
50							Bottom of Boring - 45.0'							



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Client: Barton Malow	Project: Ford H4 Battery Plant	Job No. 2150-9519.50
LOG OF: Boring B-019	Location: As per plan	Date Drilled: 11/4/2021

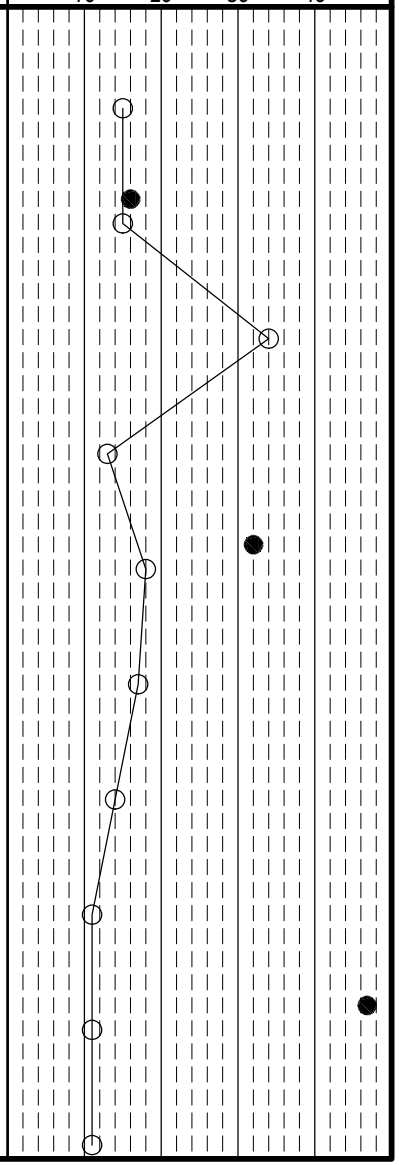
WATER OBSERVATIONS:
Water seepage at: None
Water level at completion: None (inside augers)

DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Rig (#) / ER: CME-850X (400472) / 84.0%
Driller: LB
Logger: AM

Natural Moisture Content, % - ●
PL ○ / LL ⊣ ⊢
N_{60} Value / Non-Plastic - NP

Depth (ft)	Elev. (ft) 711.1	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0.4	710.7						Topsoil - 5", Plow Depth - 9"							
2.0	709.1	6 5 6	15	S-1A S-1B		1.0	Medium stiff to stiff brown LEAN CLAY (CL); damp.							
3.5	707.6						Medium dense light gray silty SAND (SM); damp.							
5 / 6.0	705.1	3 5 6	14	S-2		3.0	Very stiff light gray sand LEAN CLAY (CL); damp.							
8.5	702.6	6 10 14	18	S-3			Dense light gray clayey SAND (SC); moist.							
10		5 4 5	10	S-4		2.5	Very stiff reddish light brown sandy LEAN CLAY (CL); contains chert fragments; moist.							
		6 7 6	18	S-5		3.75								
15 / 16.0	695.1	6 5 7	18	S-6		3.5								
		4 5 5	17	S-7		2.25	Stiff to very stiff red FAT CLAY (CH); contains chert fragments; moist.							
20 / 21.0	690.1	3 4 4	16	S-8		1.75								
		- -		S-9		1.25	Medium stiff to stiff red FAT CLAY (CH); moist to wet.							
25.0 25	686.1	- -		S-10		1.0	Bottom of Boring - 25.0'							



DLZ Ohio, Inc. * 6121 Huntley Road, Columbus, Ohio 43229 * (614) 888-0040

Client: Barton Malow | *Project:* Ford H4 Battery Plant | *Job No.* 2150-9519.50

LOG OF: Boring B-020 | *Location:* As per plan | *Date Drilled:* 11/6/2021

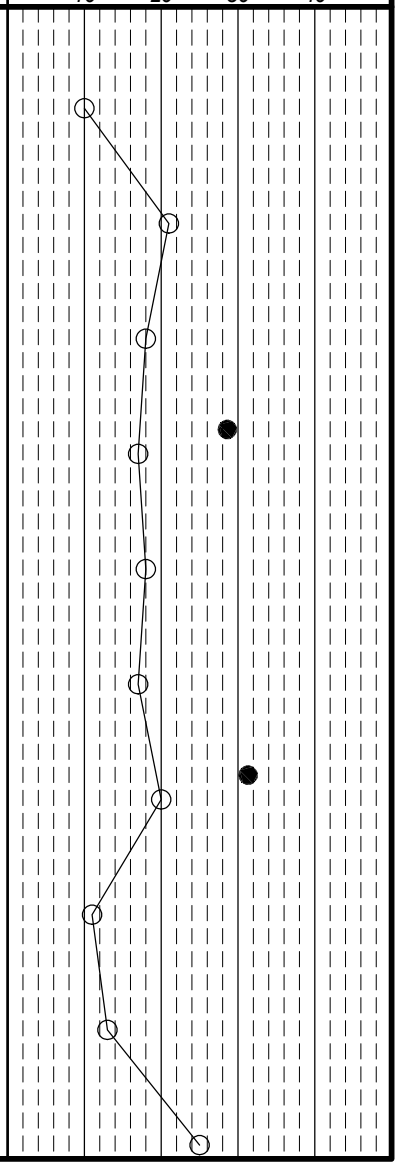
WATER OBSERVATIONS:
Water seepage at: None
Water level at completion: None (inside augers)

DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Rig (#) / ER: CME-850X (400472) / 84.0% | *Driller:* LB | *Logger:* AM

Natural Moisture Content, % - ●
PL ├──┤ LL
N_{60} Value ○ / Non-Plastic - NP
10 20 30 40

Depth (ft)	Elev. (ft) 708.3	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0.5	707.8						Topsoil - 6", Plow Depth - 10"							
3.5	704.8	3 3 4	13	S-1		1.25	Stiff brown and light gray mottled SILTY CLAY (CL-ML); moist.							
6.0	702.3	4 7 8	18	S-2		4.25	Hard brown and black LEAN CLAY (CL); contains possible organics or black oxide staining; damp.							
8.5	699.8	4 7 6	18	S-3		2.75	Very stiff light brown with light gray mottles LEAN CLAY (CL); contains sand in clay matrix; moist.							
11.0	697.3	4 7 5	18	S-4		1.5	Stiff brown with gray mottled FAT CLAY (CH); moist.							
16.0	692.3	6 5 8		S-5		2.75	Very stiff red and light brown mottled FAT CLAY (CH); moist.							
		2 6 6	18	S-6		3.75	@ 13.5'-16.0', light brown							
25.0	683.3	7 7 7	18	S-7		1.0	Stiff to medium stiff red FAT CLAY (CH); contains chert fragments; moist.							
		3 4 4	16	S-8		2.0	@ 18.5'-21.5', very stiff to stiff							
		5 4 5	17	S-9		1.0								
		4 8 10	4	S-10		1.0	Bottom of Boring - 25.0'							



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Client: Barton Malow	Project: Ford H4 Battery Plant	Job No. 2150-9519.50
LOG OF: Boring B-020	Location: As per plan	Date Drilled: 11/6/2021

WATER OBSERVATIONS:
Water seepage at: None
Water level at completion: None (inside augers)

DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Depth (ft)	Elev. (ft) 683.3	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	Rig (#) / ER	Driller	Logger
															CME-850X (400472) / 84.0%	LB	AM

Natural Moisture Content, % - ●
PL ├──┤ LL
N_{60} Value ○ / Non-Plastic - NP
10 20 30 40

30
35
40
45
50

Client: Barton Malow	Project: Ford H4 Battery Plant	Job No. 2150-9519.50
LOG OF: Boring B-020	Location: As per plan	Date Drilled: 11/6/2021

WATER OBSERVATIONS:
Water seepage at: None
Water level at completion: None (inside augers)

DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Rig (#) / ER: CME-850X (400472) / 84.0%
Driller: LB
Logger: AM

Natural Moisture Content, % - ●
PL ⊢——⊣ LL
N_{60} Value ○ / Non-Plastic - NP
10 20 30 40

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
	658.3													
55														
60														
65														
70														
71.0	637.3						Topsoil - 6", Plow Depth - 10"							
75														

DLZ Ohio, Inc. * 6121 Huntley Road, Columbus, Ohio 43229 * (614) 888-0040

Client: Barton Malow	Project: Ford H4 Battery Plant	Job No. 2150-9519.50
LOG OF: Boring B-021	Location: As per plan	Date Drilled: 11/6/2021

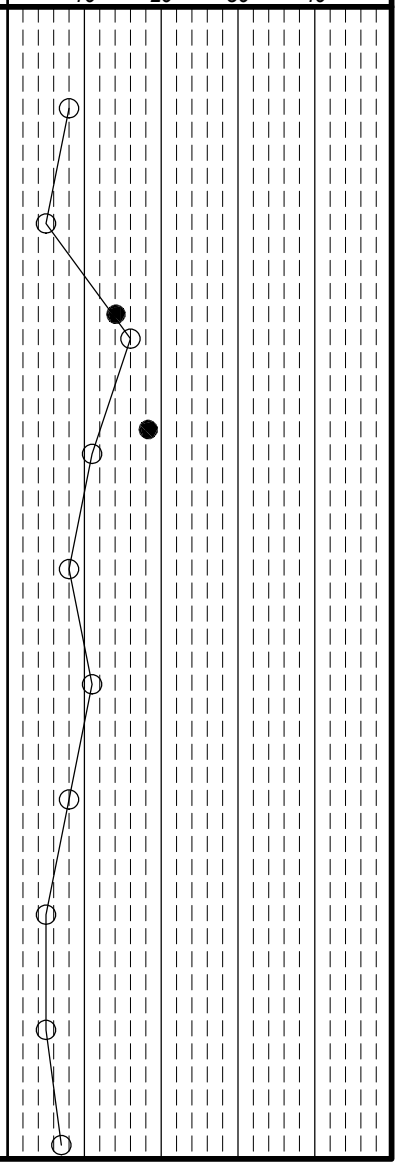
WATER OBSERVATIONS:
Water seepage at: None
Water level at completion: None (inside augers)

DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Rig (#) / ER: CME 750X (289498) / 81.0%
Driller: T
Logger: JC

Natural Moisture Content, % - ●
PL ⊢——⊣ LL
N_{60} Value ○ / Non-Plastic - NP
10 20 30 40

Depth (ft)	Elev. (ft) 711.5	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
							Topsoil - 28"							
2.3	709.2	2 2 4	10	S-1		1.5								
3.5	708.0						Stiff light gray LEAN CLAY (CL); moist.							
5 6.0	705.5	2 2 2	6	S-2		3.0	Very stiff light gray FAT CLAY (CH); moist.							
8.5	703.0	4 6 6	7	S-3		3.0	Very stiff light gray sandy SILTY CLAY (CL-ML); damp.							
10		3 3 5	18	S-4		1.5	Stiff to very stiff light brownish gray FAT CLAY (CH); moist.							
		WOH 3 3	14	S-5		2.5								
15		2 4 4	7	S-6		2.5								
		2 3 3	18	S-7		1.5								
20		1 2 2	18	S-8		1.5	@ 18.5', brown							
		1 1 3	18	S-9		1.5	@ 21.0', light brown							
25.0 25	686.5	1 2 3	18	S-10		1.5	Bottom of Boring - 25.0'							



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Client: Barton Malow | *Project:* Ford H4 Battery Plant | *Job No.* 2150-9519.50

LOG OF: Boring B-021A | *Location:* As per plan | *Date Drilled:* 11/15/2021

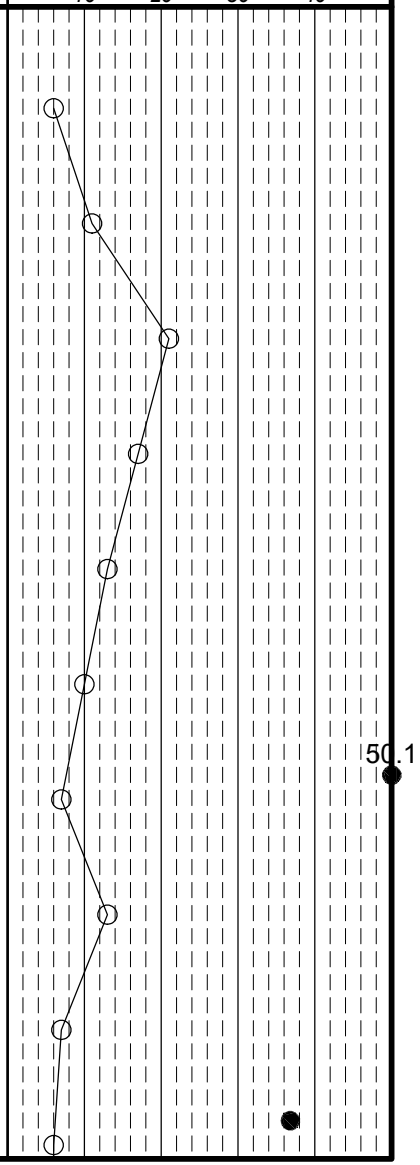
WATER OBSERVATIONS:
Water seepage at: None
Water level at completion: None (inside augers)

DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Rig (#) / ER: CME-850X (400472) / 84.0% | *Driller:* LB | *Logger:* AM

Natural Moisture Content, % - ●
PL ├──┤ *LL*
N_{60} Value ○ / *Non-Plastic -* NP

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
	712.7													
0.3	712.4						Topsoil - 4"							
		1 3 1	7	S-1		0.25	Soft to very soft brown SILTY CLAY (CL-ML); moist.							
3.5	709.2													
5		2 4 4	16	S-2		2.75	Very stiff light gray FAT CLAY (CH); moist.							
6.0	706.7													
		6 8 7	18	S-3		3.75	Very stiff red FAT CLAY (CH); contains black oxide staining; damp to moist.							
10		7 6 6	18	S-4		3.25								
11.0	701.7													
		5 5 4	9	S-5		1.5	Stiff to very stiff red FAT CLAY (CH); contains chert fragments; moist to wet.							
15		4 3 4	18	S-6		2.25								
		2 2 3	18	S-7		1.75								
20		2 4 5	15	S-8		1.5								
		3 2 3	18	S-9		1.25								
23.5	689.2													
25	687.7	2 2 2	18	S-10		0.25	Soft to very soft light brownish red FAT CLAY (CH); moist to wet.							



Client: Barton Malow	Project: Ford H4 Battery Plant	Job No. 2150-9519.50
LOG OF: Boring B-021A	Location: As per plan	Date Drilled: 11/15/2021

WATER OBSERVATIONS:
Water seepage at: None
Water level at completion: None (inside augers)

DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Depth (ft)	Elev. (ft) 687.7	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	Rig (#) / ER	Driller	Logger
															CME-850X (400472) / 84.0%	LB	AM
27.5	685.2	2 2 2	18	S-11		0.25	Soft to very soft light brownish red FAT CLAY (CH); moist to wet. (continued)										
							Bottom of Boring - 27.5'										

Natural Moisture Content, % - ●
PL ├──┤ LL
N_{60} Value ○ / Non-Plastic - NP
10 20 30 40

30
35
40
45
50

DLZ Ohio, Inc. * 6121 Huntley Road, Columbus, Ohio 43229 * (614) 888-0040

Client: Barton Malow | *Project:* Ford H4 Battery Plant | *Job No.* 2150-9519.50

LOG OF: Boring B-022 | *Location:* As per plan | *Date Drilled:* 11/6/2021

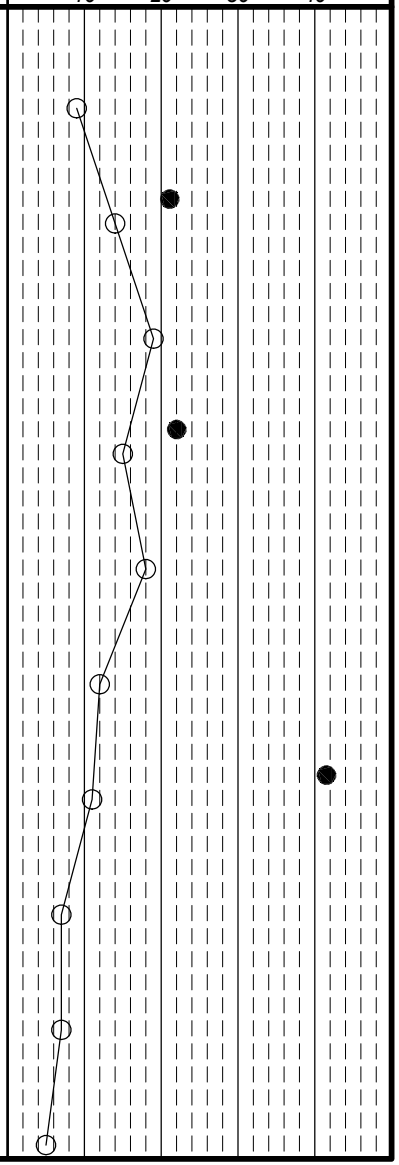
WATER OBSERVATIONS:
Water seepage at: None
Water level at completion: None (inside augers)

DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Rig (#) / ER: CME 750X (289498) / 81.0% | *Driller:* T | *Logger:* JC

Natural Moisture Content, % - ●
PL ├──┤ LL
N_{60} Value ○ / Non-Plastic - NP
10 20 30 40

Depth (ft)	Elev. (ft) 710.0	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
							Topsoil - 30"							
2.5	707.5	2 3 4	7	S-1		2.0								
3.5	706.5						Stiff to very stiff light brown to light gray mottled LEAN CLAY (CL); moist.							
5		5 2 8	18	S-2			Medium dense light brown clayey SAND (SC); damp.							
6.0	704.0													
		5 4 10	16	S-3		4.0	Hard light brown and red FAT CLAY (CH); damp.							
8.5	701.5													
10		4 4 7	18	S-4		3.0	Very stiff light brownish gray FAT CLAY (CH); moist.							
11.0	699.0													
		2 7 6	10	S-5		1.5	Stiff light brown FAT CLAY (CH); moist.							
13.5	696.5													
15		2 5 4	11	S-6		2.0	Stiff to very stiff red LEAN CLAY (CL); contains gravel size chert; moist.							
16.0	694.0													
		1 3 5	9	S-7		2.0	Stiff to very stiff red and light brown mottled FAT CLAY (CH); moist.							
20		2 2 3	12	S-8		1.5	@ 18.5', red; contains sand size chert fragments							
		1 2 3	12	S-9		1.5								
25.0 25	685.0	2 1 3	18	S-10		1.0	Bottom of Boring - 25.0'							



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Client: Barton Malow | *Project:* Ford H4 Battery Plant | *Job No.* 2150-9519.50

LOG OF: Boring B-023 | *Location:* As per plan | *Date Drilled:* 11/4/2021

WATER OBSERVATIONS:
Water seepage at: None
Water level at completion: None (inside augers)

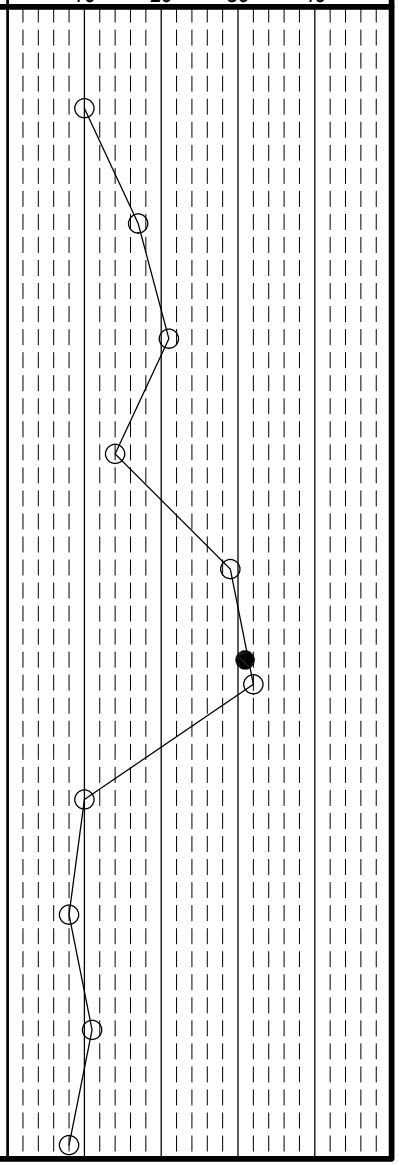
DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Depth (ft)	Elev. (ft) 709.0	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0.6	708.4						Topsoil - 7", Plow Depth - 9"							
		3 4 3	9	S-1		0.75	Medium stiff brown LEAN CLAY (CL); moist.							
3.5	705.5													
5		4 5 7	18	S-2		4.0	Hard grayish brown sandy LEAN CLAY (CL); moist.							
6.0	703.0													
		5 7 8	18	S-3		3.0	Very stiff light gray sandy FAT CLAY (CH); damp.							
8.5	700.5													
10		3 4 6	18	S-4		2.0	Stiff to very stiff brown FAT CLAY (CH); contains fine sand; moist.							
		4 8 13	18	S-5		1.75								
13.5	695.5													
15		5 8 15	18	S-6		2.75	Very stiff to stiff light brown and light gray mottled FAT CLAY (CH); moist.							
		4 4 3	18	S-7		1.5	@ 16.0', red; moist to wet							
18.5	690.5													
20		3 3 3	10	S-8		1.0	Stiff to medium stiff light reddish brown FAT CLAY (CH); moist.							
		3 3 5	5	S-9		1.0	@ 21.0', contains gravel size chert fragments							
25.0 25	684.0	2 3 3	7	S-10		0.5	@ 23.5', soft to medium stiff Bottom of Boring - 25.0'							

GRADATION

Rig (#) / ER	Driller	Logger
CME-850X (400472) / 84.0%	LB	AM

Natural Moisture Content, % - ●
PL ├──┤ LL
N_{60} Value ○ / Non-Plastic - NP



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Client: Barton Malow	Project: Ford H4 Battery Plant	Job No. 2150-9519.50
LOG OF: Boring B-023	Location: As per plan	Date Drilled: 11/4/2021

WATER OBSERVATIONS:
Water seepage at: None
Water level at completion: None (inside augers)

DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Depth (ft)	Elev. (ft) 684.0	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	Rig (#) / ER	Driller	Logger
															CME-850X (400472) / 84.0%	LB	AM

Natural Moisture Content, % - ●
PL ├──┤ LL
N_{60} Value ○ / Non-Plastic - NP
10 20 30 40

30
35
40
45
50

Client: Barton Malow	Project: Ford H4 Battery Plant	Job No. 2150-9519.50
LOG OF: Boring B-023	Location: As per plan	Date Drilled: 11/4/2021

WATER OBSERVATIONS:
Water seepage at: None
Water level at completion: None (inside augers)

DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Rig (#) / ER: CME-850X (400472) / 84.0%
Driller: LB
Logger: AM

Natural Moisture Content, % - ●
PL ⊢——⊣ LL
N_{60} Value ○ / Non-Plastic - NP
10 20 30 40

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
	659.0													
55														
60														
65														
70														
72.0	637.0													
							Topsoil - 7", Plow Depth - 9"							
75														

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Client: Barton Malow | *Project:* Ford H4 Battery Plant | *Job No.* 2150-9519.50

LOG OF: Boring B-024 | *Location:* As per plan | *Date Drilled:* 11/3/2021

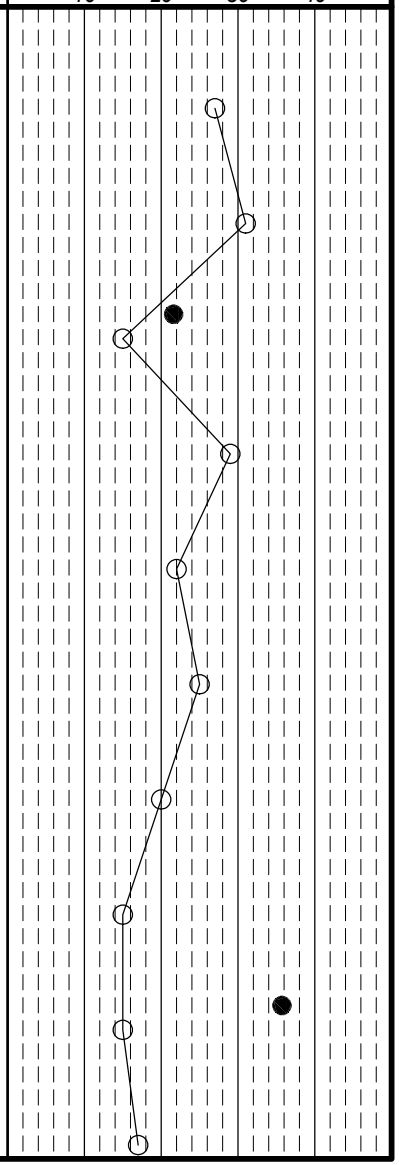
WATER OBSERVATIONS:
Water seepage at: None
Water level at completion: None (inside augers)

DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Rig (#) / ER: CME-850X (400472) / 84.0% | *Driller:* LB | *Logger:* AM

Natural Moisture Content, % - ●
PL ├──┤ LL
N_{60} Value ○ / Non-Plastic - NP
10 20 30 40

Depth (ft)	Elev. (ft) 714.4	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0.6	713.8						Topsoil - 7", Plow Depth - 11"							
3.5	710.9	6 10 9	18	S-1		3.0	Very stiff red LEAN CLAY (CL); moist to damp.							
6.0	708.4	6 10 12	18	S-2		4.0	Hard red FAT CLAY (CH); damp.							
8.5	705.9	6 5 6	18	S-3		3.75	Very stiff red sandy LEAN CLAY (CL); damp.							
11.0	703.4	6 10 11	18	S-4		3.5	Very stiff red and light brown mottled FAT CLAY (CH); moist.							
16.0	698.4	6 6 10	18	S-5		2.75	Very stiff light gray FAT CLAY (CH); moist.							
		6 7 11	17	S-6		2.75	@ 13.5'-15.0', red							
25.0	689.4	4 6 8	16	S-7		2.5	Stiff to very stiff red FAT CLAY (CH); contains sand and gravel size chert fragments; moist.							
		4 5 6	18	S-8		2.0								
		5 6 5	18	S-9		2.5								
		4 6 6	18	S-10		1.75	Bottom of Boring - 25.0'							



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Client: Barton Malow | *Project:* Ford H4 Battery Plant | *Job No.* 2150-9519.50

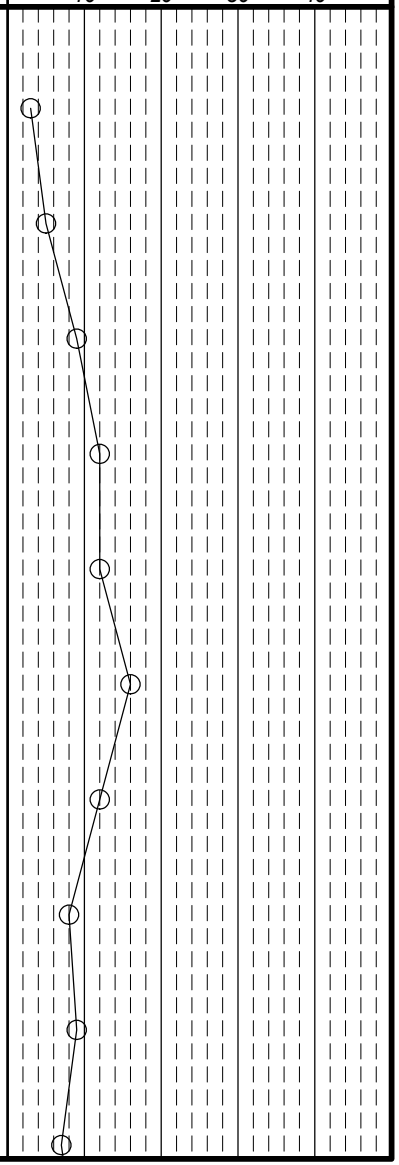
LOG OF: Boring B-025 | *Location:* As per plan | *Date Drilled:* 11/6/2021

WATER OBSERVATIONS:
Water seepage at: 26.0'
Water level at completion: 3.2' (prior to adding water) ??? 10.1' (inside augers)
DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Rig (#) / ER: CME 750X (289498) / 81.0% | *Driller:* T | *Logger:* JC

Natural Moisture Content, % - ●
PL ├──┤ LL
N_{60} Value ○ / Non-Plastic - NP
10 20 30 40

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
	704.6													
0.3	704.3						Topsoil - 4", Plow Depth - 10"							
		1 1 1	6	S-1		0.75	Medium stiff to stiff light grayish brown LEAN CLAY (CL); damp to moist.							
5		2 2 2	18	S-2		1.25								
		3 3 4	18	S-3		2.5								
8.5	696.1													
10		3 4 5	18	S-4		1.25	Medium dense clayey SAND (SC); moist.							
11.0	693.6													
		4 4 5	18	S-5		3.0	Very stiff light reddish brown LEAN CLAY (CL); moist.							
13.5	691.1													
15		3 4 8	18	S-6		1.0	Medium stiff to stiff light gray FAT CLAY (CH); moist.							
16.0	688.6													
		6 4 5	18	S-7		1.5	Medium stiff to stiff red FAT CLAY (CH); contains chert fragments; moist.							
20		8 3 3	17	S-8		1.0								
21.0	683.6													
		3 4 3	16	S-9		1.0	Medium stiff to stiff red FAT CLAY (CH); moist to wet.							
25	679.6	2 3 2	18	S-10		0.75	@ 23.5'-28.5'; contains sand and gravel sized chert fragments.							



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Client: Barton Malow	*Project:* Ford H4 Battery Plant	*Job No.* 2150-9519.50
LOG OF: Boring B-025	*Location:* As per plan	*Date Drilled:* 11/6/2021

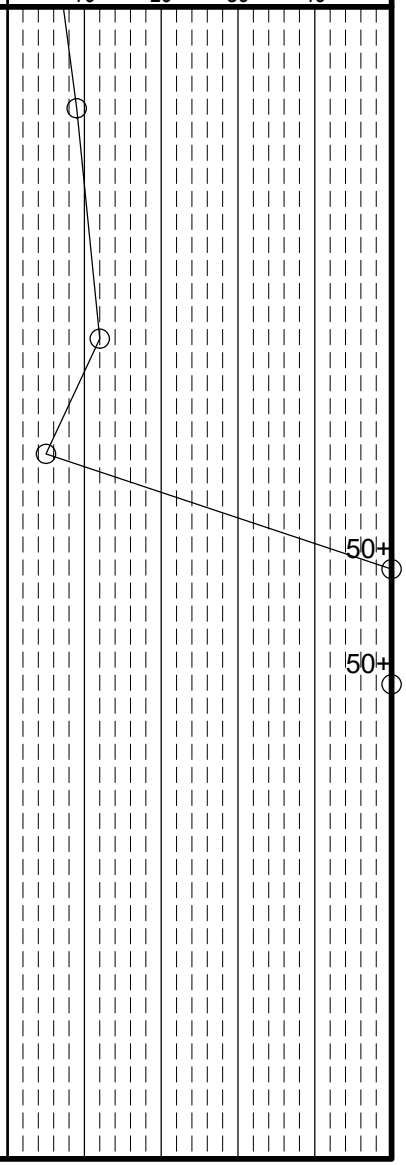
WATER OBSERVATIONS:
Water seepage at: 26.0'
Water level at completion: 3.2' (prior to adding water) ??? 10.1' (inside augers)
DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
	679.6													
		3 4 3	16	S-11		1.25	Medium stiff to stiff red FAT CLAY (CH); moist to wet. (continued)							
30			24		ST-1									
31.0	673.6													
		4 4 5	18	S-12		0.75	Medium stiff light brown FAT CLAY (CH); moist to wet.							
33.5	671.1													
35		2 2 2	14	S-13		0.25	Very soft to soft red FAT CLAY (CH); contains rock fragment; wet.							
							@ 35.0', drill rig chatter							
		50/5	2	S-14			@ 37.5', chert fragment stuck in splitspoon sampler tip							
							@ 37.0', drill rig chatter, pulverized limestone							
39.0	665.6	50/2	2	S-15										
40							Hard to very hard light gray to gray LIMESTONE; very fine to fine grained, slightly to moderately weathered, thickly bedded, moderately to highly fractured, vuggy, Karstic solutioning on fracture surfaces, significant core loss due to solutioning..							
							@ 39.0', auger refusal							
45		Core 120"	Rec 64"	RQD 45%	1		@ 44.5'-45.5',45.7'-48.3', suspected voids.							
50	654.6	c:120"	r:35"	q:10%	2									

GRADATION

Rig (#) / ER	Driller	Logger
CME 750X (289498) / 81.0%	T	JC

Natural Moisture Content, % - ●
PL ├──┤ LL
N_{60} Value ○ / Non-Plastic - NP



Client: Barton Malow	Project: Ford H4 Battery Plant	Job No. 2150-9519.50
LOG OF: Boring B-025	Location: As per plan	Date Drilled: 11/6/2021

WATER OBSERVATIONS:
Water seepage at: 26.0'
Water level at completion: 3.2' (prior to adding water) ???
10.1' (inside augers)
DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Rig (#) / ER: CME 750X (289498) / 81.0% — Driller: T — Logger: JC

Natural Moisture Content, % - ●
PL ⊢——⊣ LL
N_{60} Value ○ / Non-Plastic - NP
10 20 30 40

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
654.6														
55		Core 120"	Rec 35"	RQD 10%	2		Hard to very hard light gray to gray LIMESTONE; very fine to fine grained, slightly to moderately weathered, thickly bedded, moderately to highly fractured, vuggy, Karstic solutioning on fracture surfaces, significant core loss due to solutioning.. (continued) @ 49.0'-59.0', core has 62 " of core loss due to suspected voids.							
59.0	645.6													
60							Bottom of Boring - 59.0' @ 59.0'-69.0', core has 85 " of loss due to suspected voids.							
65														
70														
75														

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Client: Barton Malow | *Project:* Ford H4 Battery Plant | *Job No.* 2150-9519.50

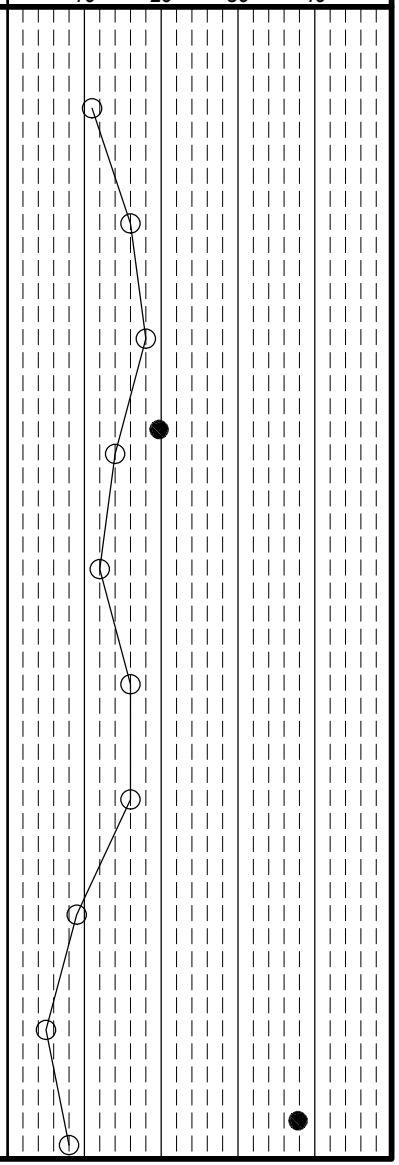
LOG OF: Boring B-026 | *Location:* As per plan | *Date Drilled:* 11/4/2021

WATER OBSERVATIONS:
Water seepage at: None
Water level at completion: None (inside augers)

DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Rig (#) / ER: CME 750X (289498) / 81.0% | *Driller:* T | *Logger:* JC

Depth (ft)	Elev. (ft) 714.6	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0.5	714.1						Topsoil - 6", Plow Depth - 9.5"							
		2 3 5	11	S-1		2.0	Stiff to very stiff light brown SILTY CLAY (CL-ML); damp.							
3.5	711.1													
5		5 6 6	12	S-2		4.5+	Hard to very stiff light brown and light gray FAT CLAY (CH); damp.							
		5 6 7	7	S-3		3.5								
8.5	706.1													
10		2 4 6	18	S-4		4.0	Hard light brown sandy LEAN CLAY (CL); moist.							
11.0	703.6													
		2 5 4	15	S-5			Medium dense reddish brown clayey SAND (SC); damp.							
13.5	701.1													
15		3 4 8	13	S-6		3.0	Very stiff light brown FAT CLAY (CH); moist.							
		5 7 5	7	S-7		2.5	@ 16.0'-18.5', contains gravel size chert fragments							
18.5	696.1													
20		3 3 4	9	S-8		2.5	Very stiff to stiff red FAT CLAY (CH); contains sand and gravel size chert fragments; moist.							
		1 1 3	9	S-9		2.0								
25.0 25	689.6	1 2 4	18	S-10		1.5	@ 23.5', medium stiff Bottom of Boring - 25.0'							



Client: Barton Malow | *Project:* Ford H4 Battery Plant | *Job No.* 2150-9519.50

LOG OF: Boring B-026A | *Location:* As per plan | *Date Drilled:* 11/15/2021

Rig (#) / ER CME-850X (400472) / 84.0% | *Driller* LB | *Logger* AM

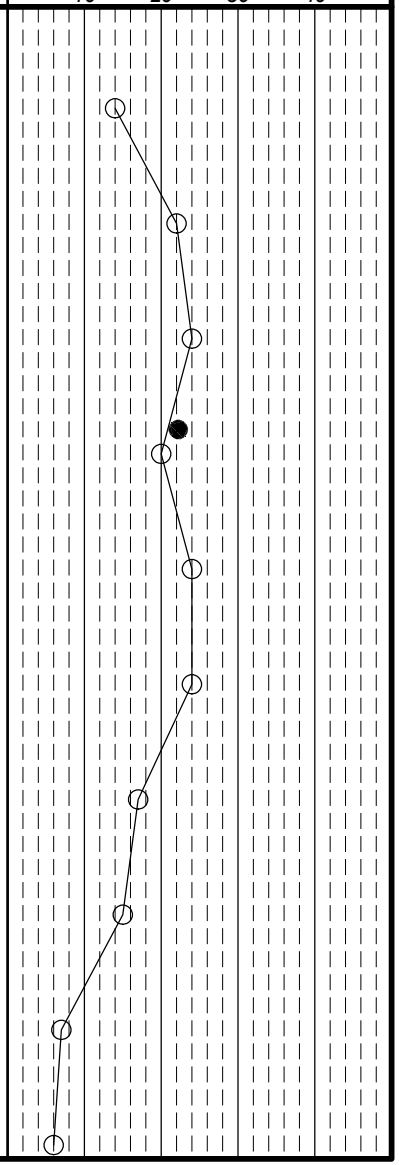
WATER OBSERVATIONS:
Water seepage at: None
Water level at completion: None (inside augers)

DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Depth (ft)	Elev. (ft) 714.8	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0.7	714.1						Topsoil - 8"							
		6 4 6	14	S-1		0.75	Medium stiff light brownish gray SILTY CLAY (CL-ML); damp.							
5		6 6 10	18	S-2		3.25	@ 3.5', very stiff							
6.0	708.8													
		5 8 9	18	S-3		3.0	Very stiff to hard light brown LEAN CLAY (CL); damp to moist.							
10		6 6 8	18	S-4		4.0								
		6 8 9	18	S-5		2.75	@ 11.0', contains rock fragments							
13.5	701.3													
15		6 8 9	18	S-6		3.5	Very stiff to stiff red FAT CLAY (CH); contains chert fragments; moist.							
		3 5 7	18	S-7		2.75								
20		3 5 6	18	S-8		2.0	@ 18.5', stiff to very stiff							
		2 2 3	18	S-9		1.0	@ 21.0', medium stiff to stiff, moist to wet							
25.0	689.8	1 2 2	18	S-10		0.5	@ 23.5', soft to medium stiff, moist to wet Bottom of Boring - 25.0'							

GRADATION

Natural Moisture Content, % - ●
PL ⊢——⊣ LL
N_{60} Value ○ / Non-Plastic - NP
10 20 30 40



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Client: Barton Malow	Project: Ford H4 Battery Plant	Job No. 2150-9519.50
LOG OF: Boring B-027	Location: As per plan	Date Drilled: 11/4/2021

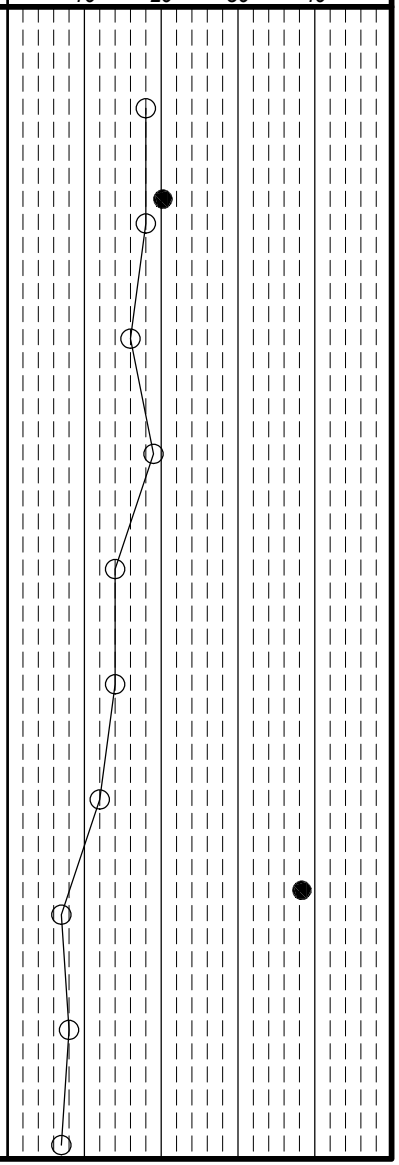
WATER OBSERVATIONS:
Water seepage at: None
Water level at completion: None (inside augers)

DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Rig (#) / ER: CME 750X (289498) / 81.0% — Driller: T — Logger: JC

Natural Moisture Content, % - ●
PL ⊢——⊣ LL
N_{60} Value ○ / Non-Plastic - NP
10 20 30 40

Depth (ft)	Elev. (ft) 713.1	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
		5 6 7	7	S-1			Stiff to very stiff red LEAN CLAY (CL); moist.							
3.5	709.6													
5		4 5 8	15	S-2		3.5	Very stiff to stiff reddish light brown LEAN CLAY (CL); damp.							
		3 6 6	7	S-3		1.5								
8.5	704.6													
10		4 6 8	18	S-4		4.5+	Hard reddish light brown FAT CLAY (CH); damp.							
11.0	702.1													
		3 4 6	8	S-5		3.0	Very stiff light brown with gray mottled FAT CLAY (CH); damp to moist.							
13.5	699.6													
15		5 5 5	13	S-6		4.5+	Hard reddish light brown FAT CLAY (CH); damp.							
16.0	697.1													
		4 5 4	8	S-7		2.0	Stiff to very stiff light reddish brown FAT CLAY (CH); contains chert fragments; moist.							
20		2 2 3	9	S-8		2.0	@ 18.5'-23.5', contains gravel size chert fragments							
		1 2 4	12	S-9		1.5								
23.5	689.6													
25.0 25	688.1	1 2 3	18	S-10		2.0	Stiff light brown FAT CLAY (CH); moist. Bottom of Boring - 25.0'							



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Client: Barton Malow | *Project:* Ford H4 Battery Plant | *Job No.* 2150-9519.50

LOG OF: Boring B-028 | *Location:* As per plan | *Date Drilled:* 11/6/2021

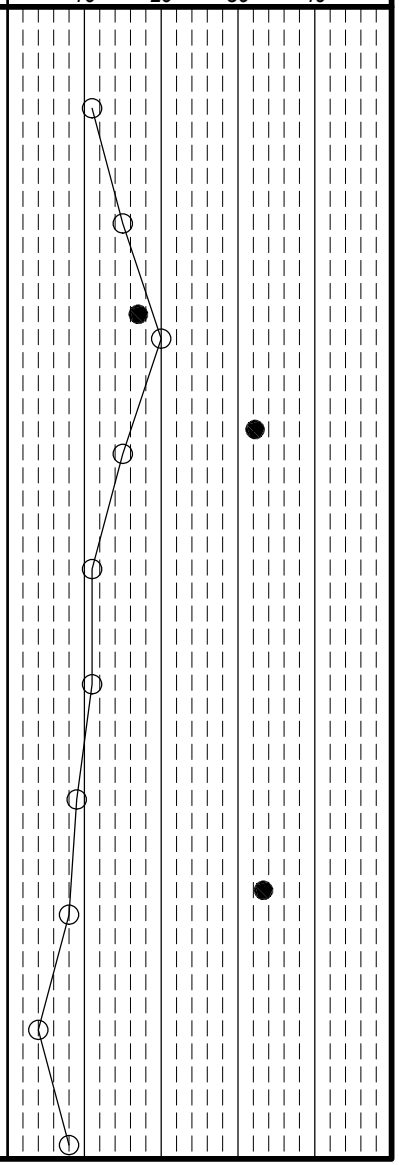
WATER OBSERVATIONS:
Water seepage at: None
Water level at completion: None (inside augers)

DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Rig (#) / ER: CME 750X (289498) / 81.0% | *Driller:* T | *Logger:* JC

Natural Moisture Content, % - ●
PL ├──┤ LL
N_{60} Value ○ / Non-Plastic - NP
10 20 30 40

Depth (ft)	Elev. (ft) 707.4	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
							Topsoil - 15"							
1.3	706.1	5 4 4	6	S-1		1.5	Stiff brown FAT CLAY (CH); moist.							
3.5	703.9	3 4 7	18	S-2		2.5	Very stiff light gray and light brown FAT CLAY (CH); moist.							
6.0	701.4	4 8 7	10	S-3		4.5+	Hard red sandy LEAN CLAY (CL); damp.							
8.5	698.9	4 6 5	10	S-4			Medium dense red clayey SAND (SC); damp.							
11.0	696.4	3 4 4	8	S-5		1.5	Stiff light brown FAT CLAY (CH); moist.							
13.5	693.9	3 3 5	18	S-6		1.5	Stiff to very stiff red FAT CLAY (CH); contains sand and gravel size chert fragments; damp to moist.							
		2 3 4	13	S-7		2.0								
		1 2 4	14	S-8		2.0								
		1 1 2	18	S-9		1.0	@ 21.0'-23.5', medium stiff to stiff							
25.0	682.4	3 2 4	12	S-10		1.5	Bottom of Boring - 25.0'							



Client: Barton Malow | *Project:* Ford H4 Battery Plant | *Job No.* 2150-9519.50

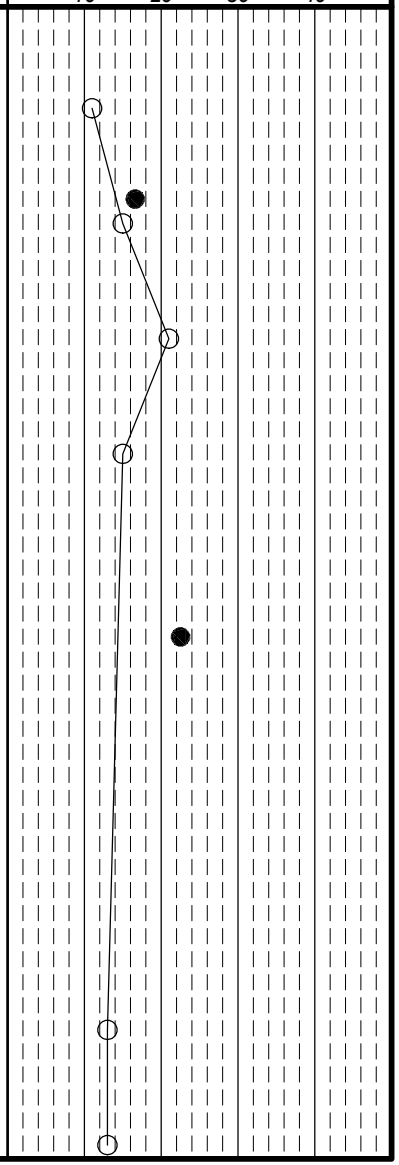
LOG OF: Boring B-029 | *Location:* As per plan | *Date Drilled:*

Rig (#) / ER CME-850X (400472) / 84.0% | *Driller* LB | *Logger* AM

WATER OBSERVATIONS:
Water seepage at:
Water level at completion:

DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Depth (ft)	Elev. (ft) 709.7	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0.5	709.2						Topsoil - 6", Plow Depth - 9"							
		5 4 4	6	S-1			Stiff gray SILTY CLAY (CL-ML); contains coarse gravel; damp.							
3.5	706.2													
		3 4 7	18	S-2		4.0	Hard to stiff brown and light gray mottled LEAN CLAY (CL); contains silty sand in gray soil; moist.							
5														
		4 8 7	18	S-3		2.5								
8.5	701.2													
		4 6 5	18	S-4		2.5	Very stiff to stiff red FAT CLAY (CH); contains chert fragments; moist.							
10														
				S-5		2.75								
				S-6		1.75								
15														
				S-7		2.0	@ 16.0', contains no chert							
18.5	691.2													
				S-8		1.75	Stiff light brown FAT CLAY (CH); moist.							
20														
		3 4 5	10	S-9		0.75	@ 21.0', red with light brown mottled; moist to wet							
		4 5 4	15	S-10		0.75	@ 23.5', contains black oxide staining							
25.0 25	684.7						Bottom of Boring - 25.0'							



Client: Barton Malow | *Project:* Ford H4 Battery Plant | *Job No.* 2150-9519.50

LOG OF: Boring B-030 | *Location:* As per plan | *Date Drilled:* 11/6/2021

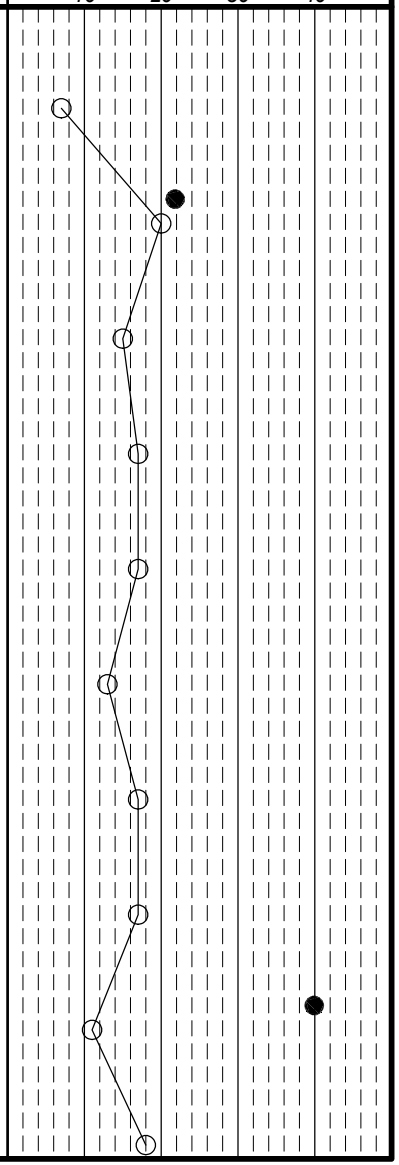
WATER OBSERVATIONS:
Water seepage at: None
Water level at completion: None (inside augers)

DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Rig (#) / ER: CME-850X (400472) / 84.0% | *Driller:* LB | *Logger:* AM

Natural Moisture Content, % - ●
PL ○ / LL Non-Plastic - NP
N_{60} Value 10 20 30 40

Depth (ft)	Elev. (ft) 703.0	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0.3	702.7						Topsoil - 4", Plow Depth - 7"							
		3 2 3	18	S-1		1.5	Stiff light brown LEAN CLAY (CL); moist.							
3.5	699.5													
5		3 6 8	18	S-2		4.5	Hard red, brown, and light gray sandy LEAN CLAY (CL); contains black oxide staining; damp.							
6.0	697.0													
		3 5 6	18	S-3		1.0	Stiff to very stiff light gray FAT CLAY (CH); moist.							
8.5	694.5													
10		3 5 7	18	S-4		3.5	Very stiff red and light brown mottled FAT CLAY (CH); damp to moist.							
		3 5 7	18	S-5		1.75								
15		3 4 5	18	S-6		2.0								
16.0	687.0													
		4 6 6	18	S-7		1.5	Stiff to very stiff red FAT CLAY (CH); contains gravel and sand size chert fragments; moist to wet.							
20		5 6 6	15	S-8		2.0								
		2 3 5	16	S-9		1.5								
25.0	678.0	2 6 7	18	S-10		1.0	Bottom of Boring - 25.0'							



Client: Barton Malow | *Project:* Ford H4 Battery Plant | *Job No.* 2150-9519.50

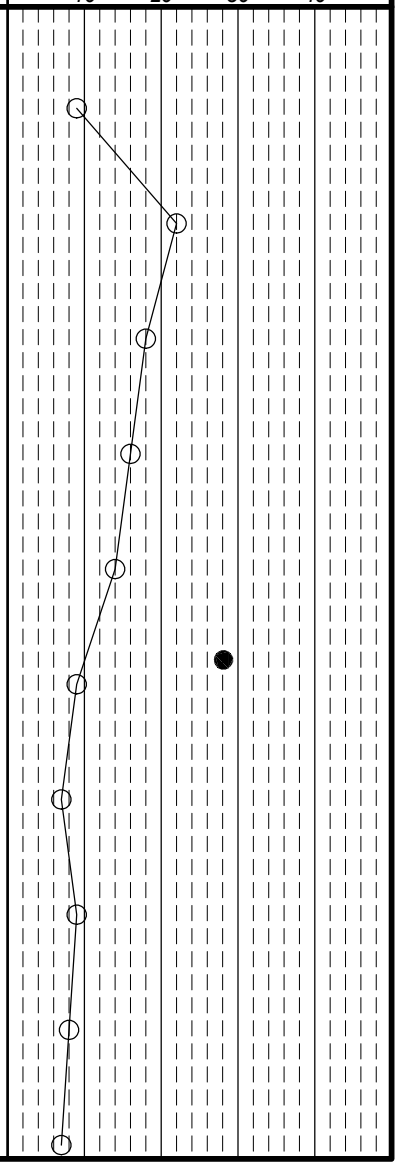
LOG OF: Boring B-031 | *Location:* As per plan | *Date Drilled:* 11/4/2021

Rig (#) / ER: CME 750X (289498) / 81.0% | *Driller:* T | *Logger:* JC

WATER OBSERVATIONS:
Water seepage at: None
Water level at completion: None (inside augers)

DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Depth (ft)	Elev. (ft) 712.8	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0.5	712.3						Topsoil - 6.5", Plow Depth - 9"							
		1 5 2	13	S-1		2.0	Stiff to very stiff light grayish brown SILTY CLAY (CL-ML); damp.							
3.5	709.3													
		5 7 9	12	S-2		2.0	Stiff to very stiff light grayish brown FAT CLAY (CH); moist.							
5														
		4 5 8	18	S-3		2.5								
		4 4 8	18	S-4		3.0	@ 8.5'-11.0', sample contains black oxide stain							
10														
11.0	701.8													
		3 4 6	18	S-5		1.5	Stiff to medium stiff light brown FAT CLAY (CH); contains black oxide stain; moist.							
		1 3 4	18	S-6		1.0								
15														
16.0	696.8													
		1 3 2	18	S-7		1.0	Stiff to medium stiff light brown FAT CLAY (CH) with sand; contains decomposing sand-size rock fragments, contains black oxide stains; moist.							
		2 3 4	15	S-8		1.5								
20														
21.0	691.8													
		1 2 4	14	S-9		2.0	Stiff to very stiff light brown FAT CLAY (CH); contains black oxide stains; moist to wet.							
		2 2 3	18	S-10		2.0								
25.0	687.8						Bottom of Boring - 25.0'							



Client: Barton Malow | *Project:* Ford H4 Battery Plant | *Job No.* 2150-9519.50

LOG OF: Boring B-031A | *Location:* As per plan | *Date Drilled:* 11/17/2021

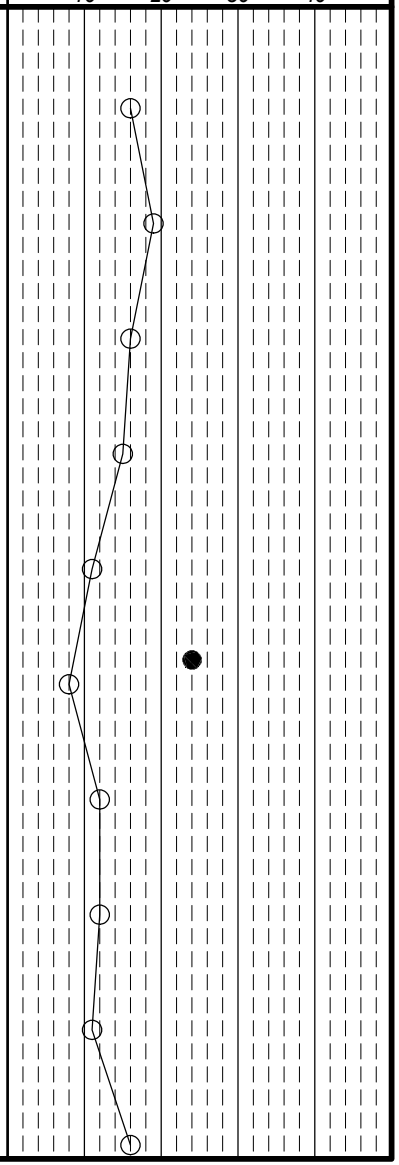
WATER OBSERVATIONS:
Water seepage at: None
Water level at completion: None (inside augers)

DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Rig (#) / ER: CME 750X (289498) / 81.0% | *Driller:* VD | *Logger:* JC

Natural Moisture Content, % - ●
PL ○ / LL — Non-Plastic - NP
N_{60} Value 10 20 30 40

Depth (ft)	Elev. (ft) 712.5	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0.4	712.1						Topsoil - 5", Plow Depth - 8"							
		2 4 8	10	S-1		2.75	Very stiff to stiff light brown FAT CLAY (CH); moist.							
5		3 6 8	18	S-2		2.0								
6.0	706.5													
		4 5 7	12	S-3		3.0	Very stiff red and light brown mottled FAT CLAY (CH); damp to moist.							
8.5	704.0													
10		3 5 6	18	S-4		3.0	Very stiff light gray and light brown mottled FAT CLAY (CH); damp to moist.							
		3 4 4	13	S-5		3.0								
13.5	699.0													
15		1 3 3	18	S-6		0.75	Medium stiff light brown FAT CLAY (CH); contains brown silty sand inclusions; moist.							
16.0	696.5													
		1 4 5	15	S-7		2.5	Very stiff light brown FAT CLAY (CH); contains fine sand; moist.							
20		1 4 5	18	S-8		3.5								
		1 4 4	11	S-9		1.0	@ 21.0', medium stiff to stiff, moist to wet							
25.0 25	687.5	1 3 9	18	S-10		1.25	Bottom of Boring - 25.0'							



Client: Barton Malow | *Project:* Ford H4 Battery Plant | *Job No.* 2150-9519.50

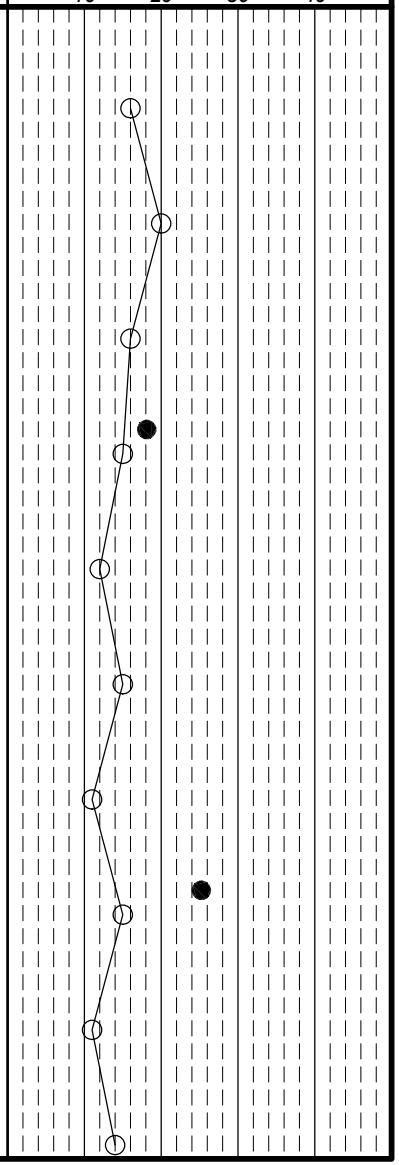
LOG OF: Boring B-032 | *Location:* As per plan | *Date Drilled:* 11/4/2021

WATER OBSERVATIONS:
Water seepage at: None
Water level at completion: None (inside augers)

DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Rig (#) / ER: CME 750X (289498) / 81.0% | *Driller:* T | *Logger:* JC

Depth (ft)	Elev. (ft) 712.1	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
		3 5 7	9	S-1		2.0	Stiff to very stiff reddish light brown LEAN CLAY (CL); damp.							
3.5	708.6													
5		5 6 9	18	S-2		4.5+	Hard red FAT CLAY (CH); dry.							
6.0	706.1													
		3 6 6	9	S-3		4.0	Hard red sandy LEAN CLAY (CL); damp.							
8.5	703.6													
10		3 5 6	12	S-4		2.5	Very stiff reddish light brown LEAN CLAY (CL) with sand; damp.							
11.0	701.1													
		3 4 5	9	S-5		2.0	Stiff to very stiff light brown and light gray LEAN CLAY (CL); moist.							
15		3 5 6	12	S-6		4.5+	@ 13.5'-16.0', drove large chert fragment							
		2 4 4	8	S-7		2.75	@ 16.0', contains gravel size chert fragments							
18.5	693.6													
20		3 5 6	14	S-8		2.5	Very stiff reddish light red SILTY CLAY (CL-ML); damp.							
21.0	691.1													
		2 4 4	10	S-9		2.5	Stiff to very stiff reddish light brown FAT CLAY (CH); contains black oxide stain; moist.							
25		5 5 5	14	S-10		1.5								
25.0	687.1						Bottom of Boring - 25.0'							



Client: Barton Malow	*Project:* Ford H4 Battery Plant	*Job No.* 2150-9519.50
LOG OF: Boring B-033	*Location:* As per plan	*Date Drilled:* 11/3/2021 to 11/9/2021

WATER OBSERVATIONS:
Water seepage at: None
Water level at completion: 33.5' (prior to adding water)
16.5' (inside augers)
6.2' (after 24 hrs. inside augers)
DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Rig (#) / ER: CME 750X (289498) / 81.0%
Driller: VD
Logger: JC

Natural Moisture Content, % - ●
PL ├──┤ *LL*
N_{60} Value ○ / *Non-Plastic -* NP
10 20 30 40

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
	707.1						Topsoil - 9", Plow Depth - 12"							
							@ 0.8'-50.0', advanced augers without sampling							
5														
10														
15														
20														
25	682.1													

Client: Barton Malow	Project: Ford H4 Battery Plant	Job No. 2150-9519.50
LOG OF: Boring B-033	Location: As per plan	Date Drilled: 11/3/2021 to 11/9/2021

WATER OBSERVATIONS:
Water seepage at: None
Water level at completion: 33.5' (prior to adding water)
16.5' (inside augers)
6.2' (after 24 hrs. inside augers)
DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Rig (#) / ER	Driller	Logger
CME 750X (289498) / 81.0%	VD	JC

Natural Moisture Content, % - ●
PL ├──┤ LL
N_{60} Value ○ / Non-Plastic - NP
10 20 30 40

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
	682.1													
30														
35														
40														
45							@ 45.0', heavy drill rig chatter							
50.0 50	657.1						Bottom of Boring - 50.0'							

Client: Barton Malow	Project: Ford H4 Battery Plant	Job No. 2150-9519.50
LOG OF: Boring B-033	Location: As per plan	Date Drilled: 11/3/2021 to 11/9/2021

WATER OBSERVATIONS:
Water seepage at: None
Water level at completion: 33.5' (prior to adding water)
16.5' (inside augers)
6.2' (after 24 hrs. inside augers)
DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Depth (ft)	Elev. (ft) 657.1	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetro-meter (tsf)	DESCRIPTION	Graphic Log	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	Rig (#) / ER	Driller	Logger
															CME 750X (289498) / 81.0%	VD	JC
							@ 50.0', heavy drill rig chatter, bedrock encountered and boring terminated										
55																	
60																	
65																	
70																	
75																	

Natural Moisture Content, % - ●
PL ├──┤ LL
N_{60} Value ○ / Non-Plastic - NP
10 20 30 40

Client: Barton Malow | *Project:* Ford H4 Battery Plant | *Job No.* 2150-9519.50

LOG OF: Boring B-033A | *Location:* As per plan | *Date Drilled:* 11/18/2021 to 11/19/2021

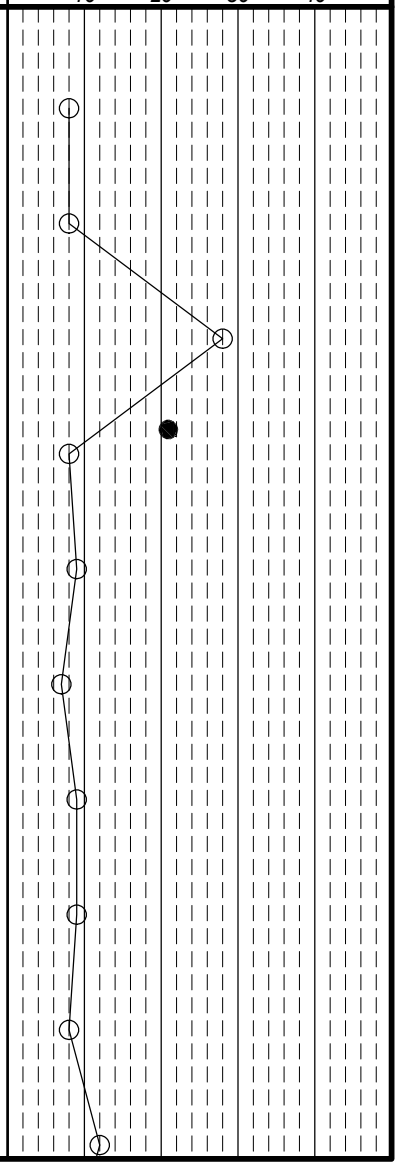
WATER OBSERVATIONS:
Water seepage at: 43.5'
Water level at completion: 8.5' (with augers removed)

DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Rig (#) / ER: CME 750X (289498) / 81.0% | *Driller:* VD | *Logger:* JC

Natural Moisture Content, % - ●
PL ├──┤ *LL*
N_{60} Value ○ / *Non-Plastic -* NP

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
	707.1													
0.7	706.4						Topsoil - 8", Plow Depth - 10"							
		1 2 4	10	S-1		1.5	Stiff light brown LEAN CLAY (CL); contains organic odor; moist.							
3.5	703.6													
5		2 2 4	13	S-2		4.0	Very stiff to hard light brown and red FAT CLAY (CH); moist.							
6.0	701.1													
		4 10 11	9	S-3		1.5	Stiff red and light brown sandy LEAN CLAY (CL); moist.							
8.5	698.6													
10		1 2 4	18	S-4		1.25	Stiff light brown and light gray FAT CLAY (CH); moist.							
11.0	696.1													
		2 3 4	12	S-5		3.0	Very stiff red and light gray mottled FAT CLAY (CH); damp to moist.							
13.5	693.6													
15		1 2 3	18	S-6		1.5	Stiff to very stiff brown FAT CLAY (CH); moist.							
		2 3 4	14	S-7		3.0								
20		2 2 5	18	S-8		2.5								
		2 3 3	13	S-9		2.75								
23.5	683.6													
25	682.1	3 4 5	4	S-10		1.0	Stiff to medium stiff light brown to reddish brown FAT CLAY (CH); contains chert fragments; moist.							



Client: Barton Malow | *Project:* Ford H4 Battery Plant | *Job No.* 2150-9519.50

LOG OF: Boring B-033A | *Location:* As per plan | *Date Drilled:* 11/18/2021 to 11/19/2021

WATER OBSERVATIONS:
Water seepage at: 43.5'
Water level at completion: 8.5' (with augers removed)

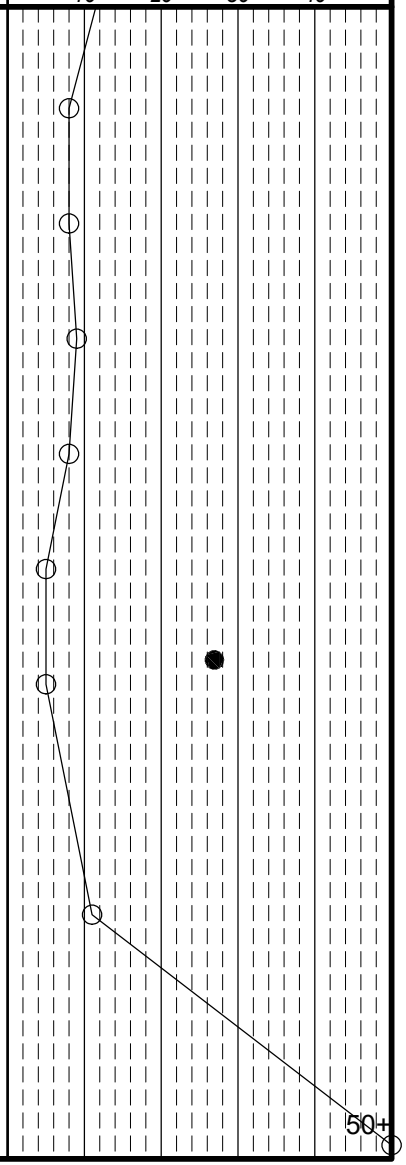
DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Depth (ft)	Elev. (ft) 682.1	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
		2 2 4	18	S-11		1.75	Stiff to medium stiff light brown to reddish brown FAT CLAY (CH); contains chert fragments; moist. (continued)							
30		2 3 3	18	S-12		1.5								
31.0	676.1	1 2 5	15	S-13		0.75	Medium stiff light brown to light gray FAT CLAY (CH); moist.							
33.5	673.6	1 2 4	18	S-14		1.0	Stiff to medium stiff light brown to brown FAT CLAY (CH); contains stone fragments; moist.							
35		2 1 3	18	S-15		1.5								
40		2 1 3	18	S-16		1.5								
45		3 4 4	18	S-17			@ 43.5', light brown, contains disintegrated rock fragments 45.0'-48.5', medium drill rig chatter							
50.0 50	657.1	6 50/5	11	S-18			@48.5, contains broken rock fragment, refusal on presumed top of rock							

GRADATION

Rig (#) / ER	Driller	Logger
CME 750X (289498) / 81.0%	VD	JC

Natural Moisture Content, % - ●
PL ├──┤ LL
N_{60} Value ○ / Non-Plastic - NP



Client: Barton Malow	Project: Ford H4 Battery Plant	Job No. 2150-9519.50
LOG OF: Boring B-033A	Location: As per plan	Date Drilled: 11/18/2021 to 11/19/2021

WATER OBSERVATIONS:
Water seepage at: 43.5'
Water level at completion: 8.5' (with augers removed)

DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Rig (#) / ER: CME 750X (289498) / 81.0%
Driller: VD
Logger: JC

Natural Moisture Content, % - ●
PL ○ LL / Non-Plastic - NP
N_{60} Value 10 20 30 40

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
	657.1						Bottom of Boring - 50.0'							
55														
60														
65														
70														
75														

DLZ Ohio, Inc. * 6121 Huntley Road, Columbus, Ohio 43229 * (614) 888-0040

Client: Barton Malow | *Project:* Ford H4 Battery Plant | *Job No.* 2150-9519.50

LOG OF: Boring B-034 | *Location:* As per plan | *Date Drilled:* 11/3/2021

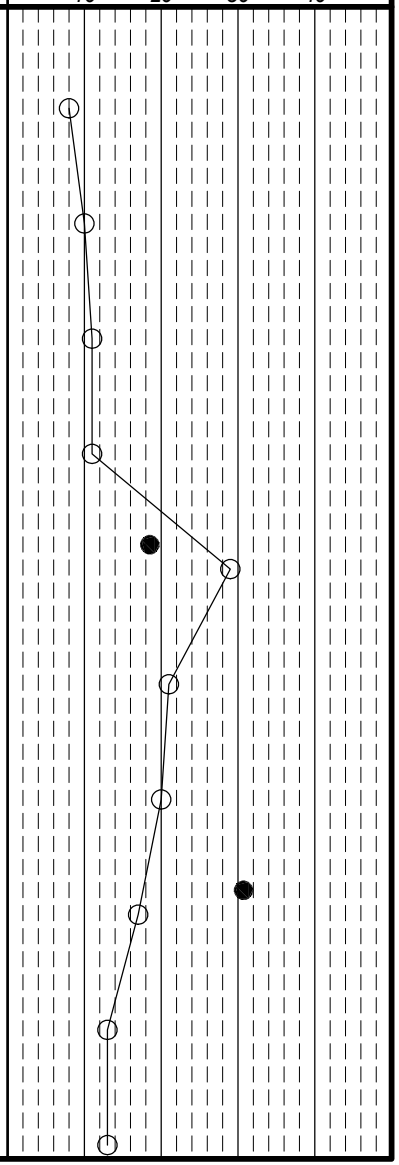
WATER OBSERVATIONS:
Water seepage at: None
Water level at completion: None (inside augers)

DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Rig (#) / ER: CME-850X (400472) / 84.0% | *Driller:* LB | *Logger:* AM

Natural Moisture Content, % - ●
PL ├──┤ LL
N_{60} Value ○ / Non-Plastic - NP
10 20 30 40

Depth (ft)	Elev. (ft) 702.5	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0.5	702.0						Topsoil - 6", Plow Depth - 8"							
		3 3 3	18	S-1			Loose light gray silty SAND (SM); damp.							
3.5	699.0													
5		3 4 3	16	S-2		3.0	Very stiff light gray LEAN CLAY (CL); damp.							
6.0	696.5													
		3 4 4	18	S-3		2.5	Very stiff to stiff light gray FAT CLAY (CH); moist.							
10		3 4 4	18	S-4		1.5								
11.0	691.5													
		6 10 11	18	S-5		2.25	Very stiff to stiff red and light brown mottled FAT CLAY (CH); contains fine sand seams; moist.							
15		7 7 8	13	S-6		1.75								
16.0	686.5													
		5 6 8	15	S-7		2.75	Very stiff reddish light brown FAT CLAY (CH); contains chert fragments; moist.							
18.5	684.0													
20		7 6 6	18	S-8		2.0	Stiff to very stiff light brown FAT CLAY (CH); moist to wet.							
		3 3 6	18	S-9		1.5								
25.0 25	677.5	4 4 5	18	S-10		1.0	@ 23.5', medium stiff to stiff; contains chert fragment Bottom of Boring - 25.0'							



DLZ Ohio, Inc. * 6121 Huntley Road, Columbus, Ohio 43229 * (614) 888-0040

Client: Barton Malow | *Project:* Ford H4 Battery Plant | *Job No.* 2150-9519.50

LOG OF: Boring B-035 | *Location:* As per plan | *Date Drilled:* 11/6/2021

WATER OBSERVATIONS:
Water seepage at: None
Water level at completion: None (inside augers)

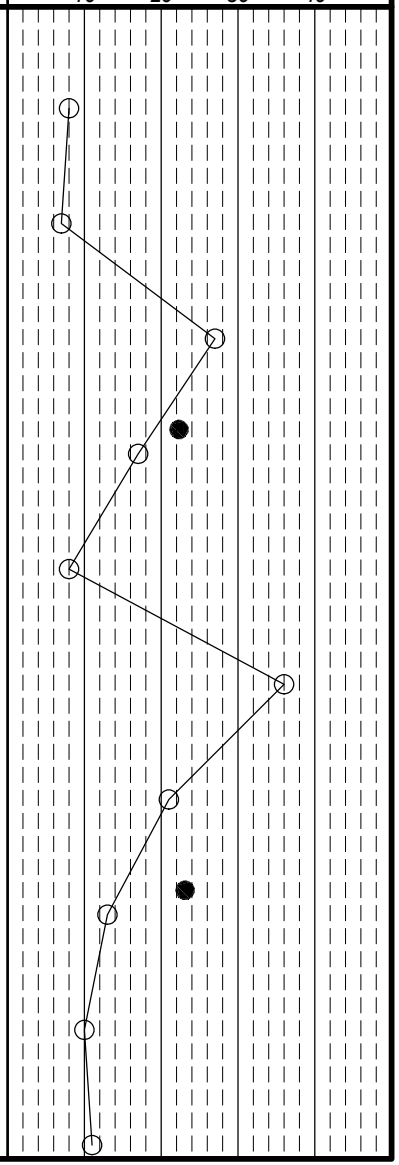
DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Depth (ft)	Elev. (ft) 701.0	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
							Topsoil - 3"-4", Plow Depth - 4"-5"							
		2 2 4	15	S-1		0.5								
5		2 2 3	18	S-2		1.25								
		5 7 12	18	S-3		2.5								
10		3 4 8	18	S-4		1.0								
		1 2 4	18	S-5		1.25								
15		3 5 21	18	S-6		1.0								
		3 5 10	18	S-7		2.0								
20		3 4 5	18	S-8		1.5								
		4 4 3	18	S-9		1.5								
25.0 25	676.0	3 3 5	15	S-10		1.0	Bottom of Boring - 25.0'							

GRADATION

Rig (#) / ER	Driller	Logger
CME-850X (400472) / 84.0%	LB	AM

Natural Moisture Content, % - ●
PL ├──┤ LL
N_{60} Value ○ / Non-Plastic - NP



DLZ Ohio, Inc. * 6121 Huntley Road, Columbus, Ohio 43229 * (614) 888-0040

Client: Barton Malow | *Project:* Ford H4 Battery Plant | *Job No.* 2150-9519.50

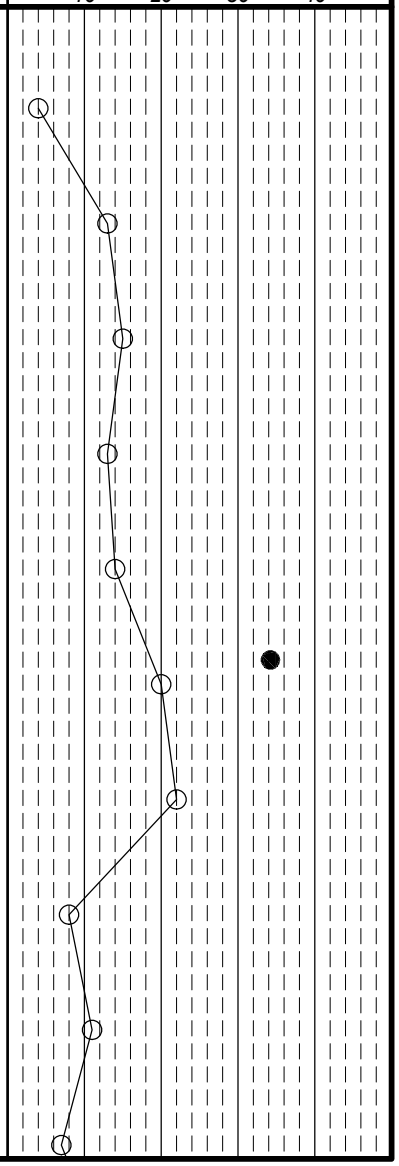
LOG OF: Boring B-036 | *Location:* As per plan | *Date Drilled:* 11/6/2021

WATER OBSERVATIONS:
Water seepage at: 26.0'
Water level at completion: 15.7' (prior to coring)
15.7' (inside augers) ????
DRILLING METHODS - Soil: HS Augers; Rock: NQ2 Core
ABANDONMENT - cuttings and bentonite chips

Rig (#) / ER: CME-850X (400472) / 84.0% | *Driller:* LB | *Logger:* AM

Natural Moisture Content, % - ●
PL ├──┤ LL
N_{60} Value ○ / Non-Plastic - NP

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
	704.2													
0.4	703.8						Topsoil - 5", Plow Depth - 11"							
		1 1 2	13	S-1		1.0	Medium stiff to stiff light brown and light gray mottled SILTY CLAY (CL-ML), contains organics; moist to wet.							
3.5	700.7													
5		3 4 5	18	S-2		3.5	Very stiff light brown and light gray sandy LEAN CLAY (CL); damp.							
		3 5 6	18	S-3		3.5								
8.5	695.7													
10		4 4 5	18	S-4		4.0	Very stiff light brown and light gray FAT CLAY (CH); damp.							
11.0	693.2													
		3 4 6	18	S-5		2.75	Stiff to very stiff red with brown mottled FAT CLAY (CH); moist.							
15		4 5 9	18	S-6		2.75	@ 13.5'-16.0'; contains sand size chert fragments.							
		5 8 8	18	S-7		2.0	@ 16.0'-21.0'; contains sand and gravel size chert fragments.							
20		2 3 3	18	S-8		1.75								
21.0	683.2													
		3 3 5	18	S-9		1.5	Medium stiff to stiff red FAT CLAY (CL); contains oxide staining; moist to wet.							
25	679.2	8 3 2	7	S-10		1.0								



Client: Barton Malow | *Project:* Ford H4 Battery Plant | *Job No.* 2150-9519.50

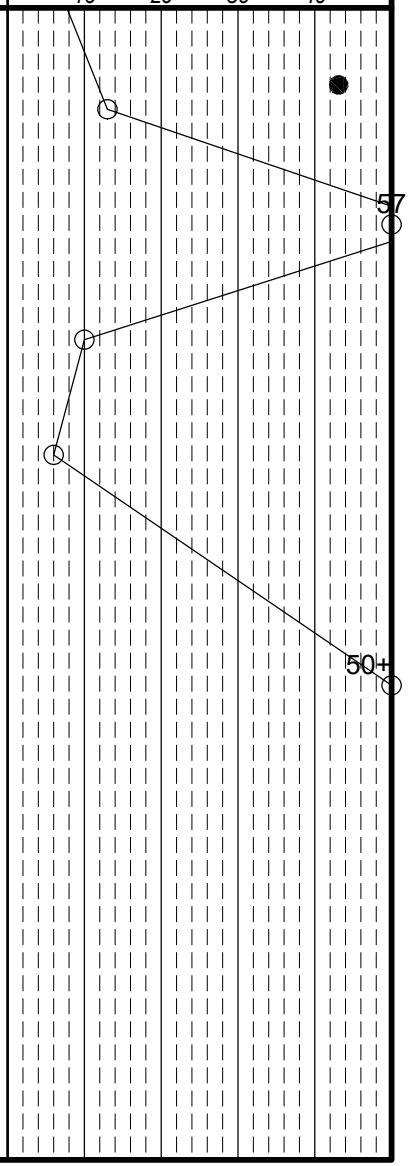
LOG OF: Boring B-036 | *Location:* As per plan | *Date Drilled:* 11/6/2021

WATER OBSERVATIONS:
Water seepage at: 26.0'
Water level at completion: 15.7' (prior to coring)
15.7' (inside augers) ????
DRILLING METHODS - Soil: HS Augers; Rock: NQ2 Core
ABANDONMENT - cuttings and bentonite chips

Rig (#) / ER: CME-850X (400472) / 84.0% | *Driller:* LB | *Logger:* AM

Natural Moisture Content, % - ●
PL ├──┤ *LL*
N_{60} Value ○ / *Non-Plastic -* NP

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
	679.2						Medium stiff to stiff red FAT CLAY (CL); contains oxide staining; moist to wet. (continued)							
		2 3 6	18	S-11		1.0								
30		7 15 26	10	S-12										
		3 3 4	8	S-13		0.75								
35		WOH 2 2	18	S-14		0.25								
			14		ST-1									
		50/1	0	S-15										
40.5 40	663.7						Hard to very hard light gray to gray LIMESTONE; very fine to fine grained, slightly to moderately weathered, thickly bedded, moderately fractured to broken, vuggy, karstic solutioning on fracture surfaces, significant core loss due to solutioning. @ 40.5'-50.5', core has 64" of core loss due to suspected voids.							
45		Core 120"	Rec 56"	RQD 9%	1									
50	654.2													



DLZ Ohio, Inc. * 6121 Huntley Road, Columbus, Ohio 43229 * (614) 888-0040

Client: Barton Malow	Project: Ford H4 Battery Plant	Job No. 2150-9519.50
LOG OF: Boring B-036	Location: As per plan	Date Drilled: 11/6/2021

WATER OBSERVATIONS:
Water seepage at: 26.0'
Water level at completion: 15.7' (prior to coring)
15.7' (inside augers) ????
DRILLING METHODS - Soil: HS Augers; Rock: NQ2 Core
ABANDONMENT - cuttings and bentonite chips

Depth (ft)	Elev. (ft) 654.2	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetro-meter (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	Rig (#) / ER	Driller	Logger
50.5	653.7						Bottom of Boring - 50.5'								CME-850X (400472) / 84.0%	LB	AM

Natural Moisture Content, % - ●
PL ├──┤ LL
N_{60} Value ○ / Non-Plastic - NP
10 20 30 40

55
60
65
70
75

DLZ Ohio, Inc. * 6121 Huntley Road, Columbus, Ohio 43229 * (614) 888-0040

Client: Barton Malow | *Project:* Ford H4 Battery Plant | *Job No.* 2150-9519.50

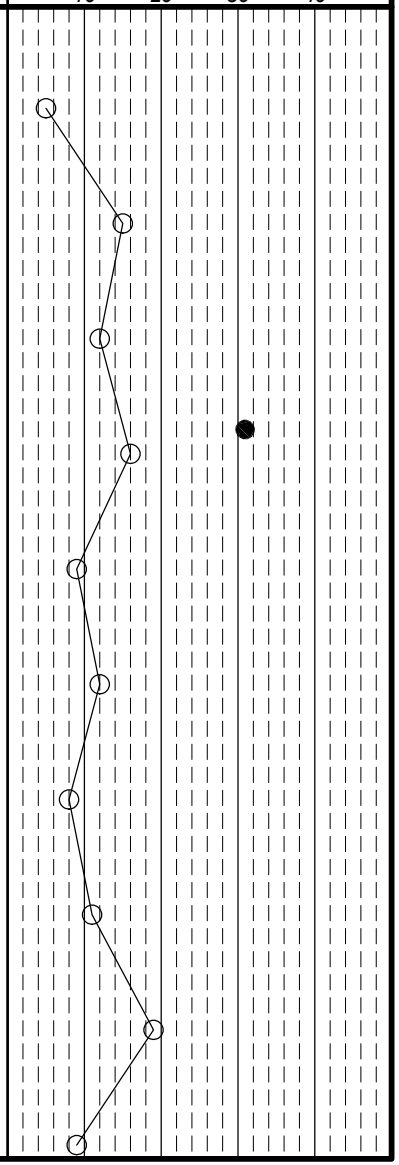
LOG OF: Boring B-037 | *Location:* As per plan | *Date Drilled:* 11/4/2021

WATER OBSERVATIONS:
Water seepage at: None
Water level at completion: None (inside augers) PRESUMABLY? 9.8' (with augers removed) no sounding!
DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Rig (#) / ER: CME 750X (289498) / 81.0% | *Driller:* T | *Logger:* JC

Natural Moisture Content, % - ●
PL ├──┤ LL
N_{60} Value ○ / Non-Plastic - NP

Depth (ft)	Elev. (ft) 702.5	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0.5	702.0						Topsoil - 6", Plow Depth - 8.5"							
3.5	699.0	1 1 3	6	S-1		1.0	Stiff to medium stiff light gray SILTY CLAY (CL-ML); damp.							
6.0	696.5	4 5 6	14	S-2		3.0	Very stiff light brown FAT CLAY (CH); damp.							
8.5	694.0	3 3 6	13	S-3		2.5	Very stiff light brown and red LEAN CLAY (CL); damp.							
11.0	691.5	3 6 6	18	S-4		4.0	Hard red SILTY CLAY (CL-ML); damp.							
		1 3 4	18	S-5		2.5	Very stiff to stiff red FAT CLAY (CH); damp to moist.							
		2 4 5	18	S-6		1.5								
		2 3 3	11	S-7		2.5								
		2 3 5	18	S-8		2.5								
		5 5 9	18	S-9		3.0	@ 21.0'-25.0', contains sand and gravel size chert fragments							
25.0	677.5	3 3 4	18	S-10		1.5	Bottom of Boring - 25.0'							



DLZ Ohio, Inc. * 6121 Huntley Road, Columbus, Ohio 43229 * (614) 888-0040

Client: Barton Malow | *Project:* Ford H4 Battery Plant | *Job No.* 2150-9519.50

LOG OF: Boring B-038 | *Location:* As per plan | *Date Drilled:* 11/3/2021 to 11/4/2021

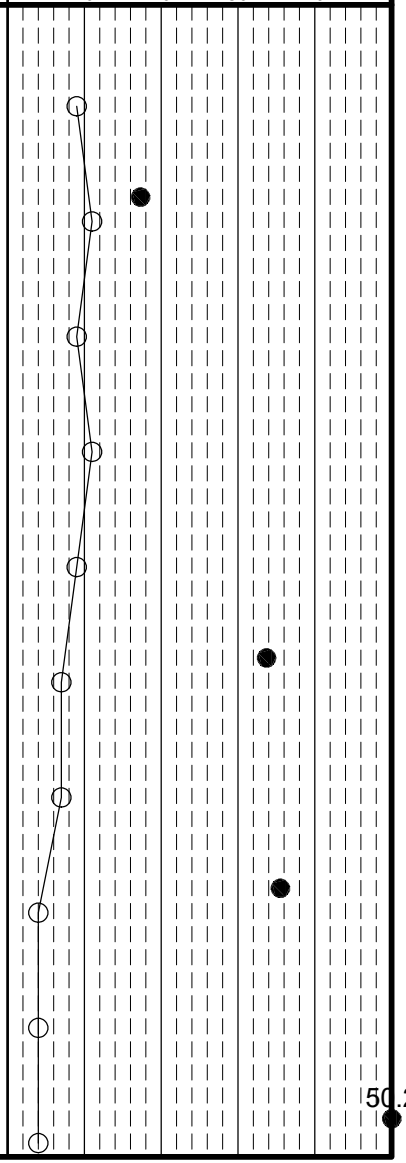
WATER OBSERVATIONS:
Water seepage at: 13.5'
Water level at completion: 7.7' (inside augers) includes water added?

DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Rig (#) / ER: CME 750X (289498) / 81.0% | *Driller:* T | *Logger:* JC

Natural Moisture Content, % - ●
PL ├──┤ *LL*
N_{60} Value ○ / *Non-Plastic -* NP
10 20 30 40

Depth (ft)	Elev. (ft) 699.8	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
		3 3 4	10	S-1		2.0	Stiff to very stiff light gray SILTY CLAY (CL-ML); damp.							
3.5	696.3													
5		3 3 5	14	S-2		2.0	Stiff to very stiff light gray LEAN CLAY (CL); contains thin layers of silt and fine sand; damp to moist.							
6.0	693.8													
		3 3 4	18	S-3		3.0	Very stiff to stiff light brown and light gray FAT CLAY (CH); moist.							
10		3 3 5	12	S-4		2.0								
		2 3 4	18	S-5		3.0	@ 11.0', light brown							
13.5	686.3													
15		1 2 3	16	S-6		2.0	Stiff to very stiff gray FAT CLAY (CH); moist to wet.							
16.0	683.8													
		1 2 3		S-7		2.5	Very stiff red FAT CLAY (CH); contains sand size chert fragments; moist.							
18.5	681.3													
20		1 1 2	18	S-8		1.0	Medium stiff to stiff red and light brown mottled FAT CLAY (CH); moist.							
21.0	678.8													
		1 2 1	18	S-9		1.5	Stiff brown FAT CLAY (CH); contains stone fragments, contains black oxide stain; moist.							
23.5	676.3													
24.0	675.8	WOH 1 2	18	S-10		1.5	Stiff brown FAT CLAY (CH); moist to wet.							
25.0 25	674.8						Stiff dark gray sandy LEAN CLAY (CL); moist.							



DLZ Ohio, Inc. * 6121 Huntley Road, Columbus, Ohio 43229 * (614) 888-0040

Client: Barton Malow	Project: Ford H4 Battery Plant	Job No. 2150-9519.50
LOG OF: Boring B-038	Location: As per plan	Date Drilled: 11/3/2021 to 11/4/2021

WATER OBSERVATIONS:
Water seepage at: 13.5'
Water level at completion: 7.7' (inside augers) includes water added?

DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Depth (ft)	Elev. (ft) 674.8	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	Rig (#) / ER	Driller	Logger
							Bottom of Boring - 25.0'								CME 750X (289498) / 81.0%	T	JC
30																	
35																	
40																	
45																	
50																	

Natural Moisture Content, % - ●
PL ├──┤ LL
N_{60} Value ○ / Non-Plastic - NP
10 20 30 40

DLZ Ohio, Inc. * 6121 Huntley Road, Columbus, Ohio 43229 * (614) 888-0040

Client: Barton Malow | *Project:* Ford H4 Battery Plant | *Job No.* 2150-9519.50

LOG OF: Boring B-039 | *Location:* As per plan | *Date Drilled:* 11/3/2021

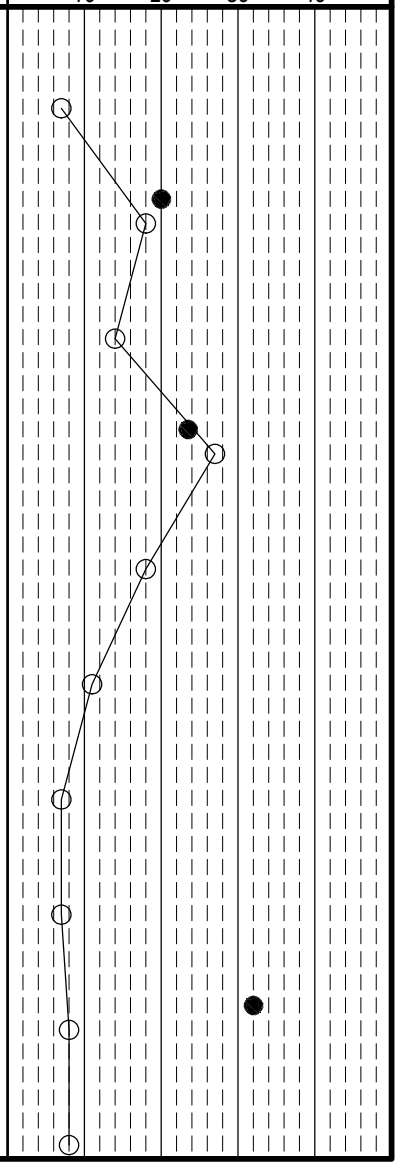
WATER OBSERVATIONS:
Water seepage at: None
Water level at completion: None (inside augers)

DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Depth (ft)	Elev. (ft) 699.2	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0.5	698.7						Topsoil - 5"-6", Plo wDepth - 12"-13"							
		2 2 3	18	S-1		0.75	Soft to medium stiff gray FAT CLAY (CH); moist to wet.							
3.5	695.7													
5		3 5 8	18	S-2		2.5	Stiff gray FAT CLAY (CH); moist.							
6.0	693.2													
		3 5 5	18	S-3		2.0	Very stiff light gray and brown mottled sandy FAT CLAY (CH); moist.							
8.5	690.7													
10		6 8 11	18	S-4		1.75	Stiff to medium stiff light gray FAT CLAY (CH); moist.							
11.0	688.2													
		5 6 7		S-5		2.25	Medium stiff to stiff light brown and gray FAT CLAY (CH); contains sand and gravel size chert fragments; moist.							
15		4 4 4		S-6		3.0								
		3 2 3	18	S-7A S-7B		2.0 < 0.25	@ 16.0', very stiff to stiff							
18.5	680.7													
20		1 2 3	14	S-8		1.5	Stiff to medium stiff red FAT CLAY (CH); contains sand and gravel size chert fragments; moist to wet.							
		3 3 3	18	S-9		1.5								
25.0 25	674.2	3 3 3	18	S-10		1.75	Bottom of Boring - 25.0'							

Rig (#) / ER CME-850X (400472) / 84.0% | *Driller* LB | *Logger* AM

Natural Moisture Content, % - ●
PL ├──┤ LL
N_{60} Value ○ / Non-Plastic - NP



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Client: Barton Malow | *Project:* Ford H4 Battery Plant | *Job No.* 2150-9519.50

LOG OF: Boring B-040 | *Location:* As per plan | *Date Drilled:* 11/2/2021

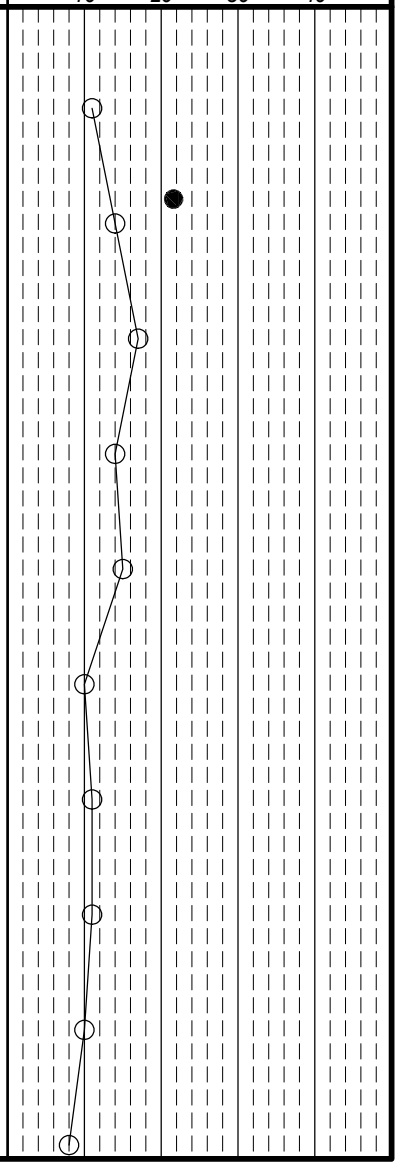
WATER OBSERVATIONS:
Water seepage at: None
Water level at completion: None (inside augers)

DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Rig (#) / ER: CME-850X (400472) / 84.0% | *Driller:* LB | *Logger:* AM

Natural Moisture Content, % - ●
PL ├──┤ LL
N_{60} Value ○ / Non-Plastic - NP
10 20 30 40

Depth (ft)	Elev. (ft) 698.9	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0.7	698.2						Topsoil - 8", Plow Depth - 18"-19"							
		3 4 4	15	S-1		0.5	Soft to medium stiff light gray LEAN CLAY (CL); contains root fibers; damp to moist.							
3.5	695.4													
5		3 4 6	18	S-2		1.5	Medium stiff to stiff light gray FAT CLAY (CH); moist.							
		3 5 7	18	S-3		1.0								
10		3 6 4	18	S-4		1.0	@ 8.5'-11.0'; gray with brown mottling, contains black oxide staining.							
11.0	687.9													
		3 6 5	18	S-5		1.75	Medium stiff to stiff light brown FAT CLAY (CH); contains sand size chert fragments; moist.							
15		3 4 3	18	S-6		1.0								
		3 4 4	18	S-7		1.5								
18.5	680.4													
20		4 4 4	18	S-8		0.5	Soft to medium stiff light brown FAT CLAY (CH); contains sand and gravel size chert fragments; moist.							
21.0	677.9													
		3 4 3	18	S-9		1.0	Medium stiff to stiff red FAT CLAY (CH); contains sand and gravel size chert fragments; moist.							
25.0 25	673.9	2 3 3	18	S-10		1.25	Bottom of Boring - 25.0'							



DLZ Ohio, Inc. * 6121 Huntley Road, Columbus, Ohio 43229 * (614) 888-0040

Client: Barton Malow | *Project:* Ford H4 Battery Plant | *Job No.* 2150-9519.50

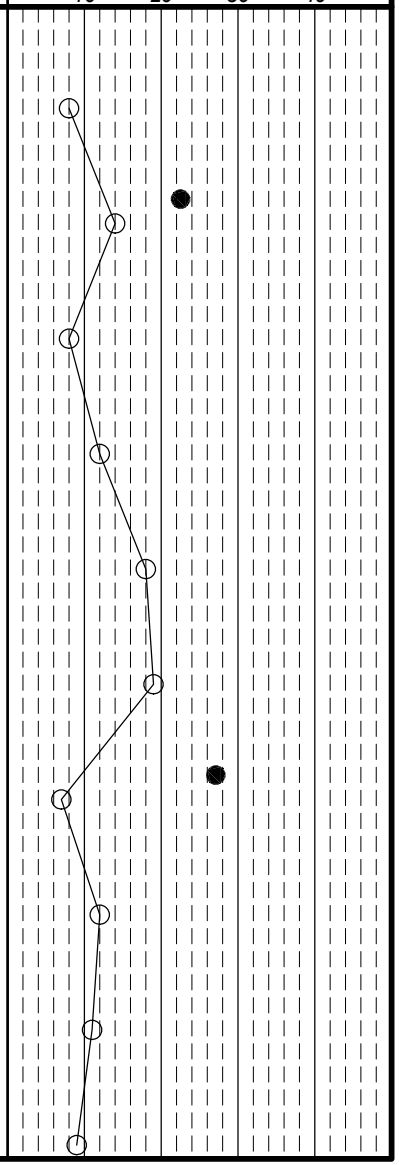
LOG OF: Boring B-041 | *Location:* As per plan | *Date Drilled:* 11/2/2021

WATER OBSERVATIONS:
Water seepage at: None
Water level at completion: None (inside augers)

DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Rig (#) / ER: CME 750X (289498) / 81.0% | *Driller:* T | *Logger:* JC

Depth (ft)	Elev. (ft) 700.4	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0.8	699.6						Topsoil - 9", Plow Depth - 12"							
3.5	696.9	1 2 4	13	S-1		2.0	Stiff to very stiff light gray with light brown mottling LEAN CLAY (CL); damp to moist.							
6.0	694.4	2 4 6	15	S-2		2.0	Stiff to very stiff light gray LEAN CLAY (CL); moist.							
		2 3 3	14	S-3		2.5	Very stiff light gray and light brown mottled FAT CLAY (CH); moist.							
		2 4 5	18	S-4		3.5								
		5 9 4	13	S-5		3.0	@ 11.0'-16.0', contains chert fragments							
16.0	684.4	5 7 7	6	S-6		3.0								
		2 2 3	16	S-7		3.0	Very stiff light brown FAT CLAY (CH); contains chert fragments; moist.							
		3 3 6	9	S-8		3.0								
		1 2 6	18	S-9		2.5	@ 21.0', moist to wet							
25.0	675.4	2 3 4	7	S-10		2.5	@ 23.5', contains black oxidized stain Bottom of Boring - 25.0'							



DLZ Ohio, Inc. * 6121 Huntley Road, Columbus, Ohio 43229 * (614) 888-0040

Client: Barton Malow | *Project:* Ford H4 Battery Plant | *Job No.* 2150-9519.50

LOG OF: Boring B-042 | *Location:* As per plan | *Date Drilled:* 11/3/2021

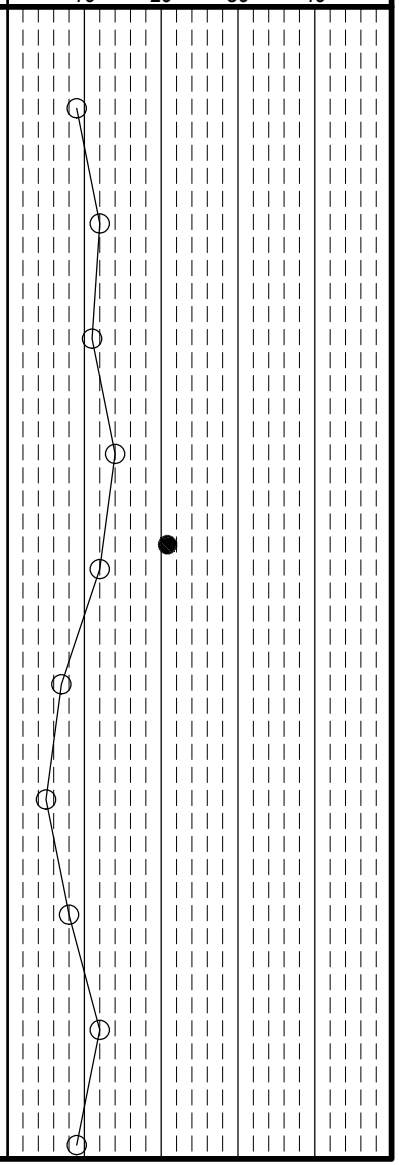
WATER OBSERVATIONS:
Water seepage at: None
Water level at completion: None (inside augers)

DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Rig (#) / ER: CME 750X (289498) / 81.0% | *Driller:* T | *Logger:* JC

Natural Moisture Content, % - ●
PL ├──┤ LL
N_{60} Value ○ / Non-Plastic - NP
10 20 30 40

Depth (ft)	Elev. (ft) 699.3	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0.7	698.6						Topsoil - 8.5", Plow Depth - 11"							
3.5	695.8	1 3 4	12	S-1		1.5	Stiff light gray LEAN CLAY (CL); moist.							
6.0	693.3	2 5 4	4	S-2		2.0	Stiff to very stiff light gray SILTY CLAY (CL-ML); damp.							
11.0	688.3	2 3 5	18	S-3		3.5	Very stiff light gray FAT CLAY (CH); moist.							
		2 4 6	15	S-4		3.0								
16.0	683.3	2 4 5	13	S-5		2.0	Stiff to very stiff light brown FAT CLAY (CH); moist to wet.							
		2 3 2	18	S-6		1.5								
25.0	674.3	3 2 2	13	S-7		1.5	Stiff to medium stiff light brown FAT CLAY (CH); contains chert fragments; moist to wet.							
		2 3 3	11	S-8		1.0								
		4 4 5	6	S-9		1.0								
		2 2 5	12	S-10		1.0	@ 23.5', sample contains 5-10% sample size chert fragments							



Client: Barton Malow	Project: Ford H4 Battery Plant	Job No. 2150-9519.50
LOG OF: Boring B-042	Location: As per plan	Date Drilled: 11/3/2021

WATER OBSERVATIONS:
Water seepage at: None
Water level at completion: None (inside augers)

DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Rig (#) / ER: CME 750X (289498) / 81.0%
Driller: T
Logger: JC

Natural Moisture Content, % - ●
PL ⊢——⊣ LL
N_{60} Value ○ / Non-Plastic - NP
10 20 30 40

Depth (ft)	Elev. (ft) 674.3	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
							Bottom of Boring - 25.0'							
30														
35														
40														
45														
50														

DLZ Ohio, Inc. * 6121 Huntley Road, Columbus, Ohio 43229 * (614) 888-0040

Client: Barton Malow | *Project:* Ford H4 Battery Plant | *Job No.* 2150-9519.50

LOG OF: Boring B-043 | *Location:* As per plan | *Date Drilled:* 11/3/2021

WATER OBSERVATIONS:
Water seepage at: None
Water level at completion: None (inside augers)

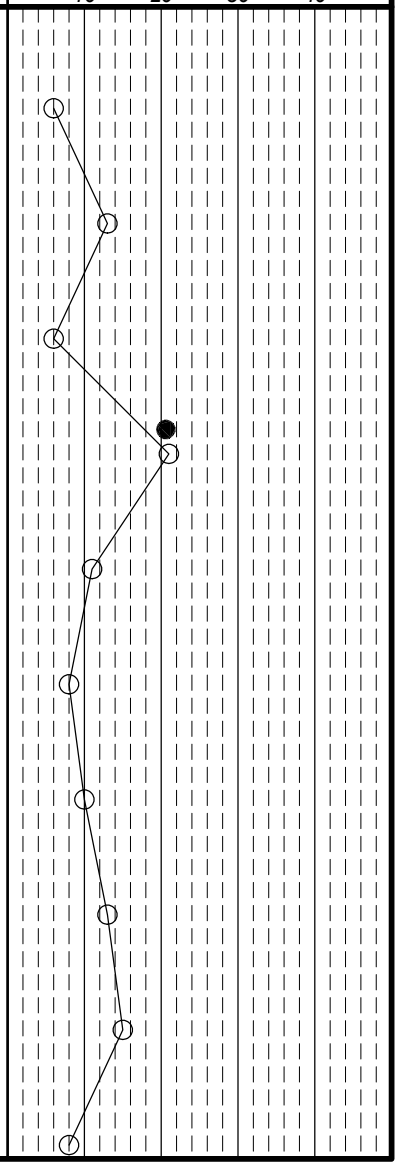
DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Depth (ft)	Elev. (ft) 696.9	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
							Topsoil - 18"							
1.5	695.4	1 2 2	8	S-1		0.5	Soft to medium stiff gray LEAN CLAY (CL); contains organics; moist.							
3.5	693.4	2 4 5	18	S-2		1.0	Medium stiff to stiff gray SILTY CLAY (CL-ML); damp.							
		1 2 2	18	S-3		0.75	@ 6.0'-8.5'; light brown and light gray mottled.							
8.5	688.4	7 8 7	18	S-4		1.75	Stiff light gray and light brown FAT CLAY (CH); contains gravel size chert fragments; moist.							
		3 4 4	18	S-5		1.5	@ 11.0'-16.0'; brown.							
		6 3 3	18	S-6		1.5								
16.0	680.9	3 4 3	18	S-7		1.75	Medium stiff to stiff red FAT CLAY (CH); moist.							
		4 4 5	18	S-8		1.5	@ 18.5'-25.0'; red and light brown mottled.							
		1 5 6	13	S-9		1.0	@ 21.0'; contains chert fragments.							
25.0	671.9	3 3 3	18	S-10		0.75	Bottom of Boring - 25.0'							

GRADATION

Rig (#) / ER	Driller	Logger
CME-850X (400472) / 84.0%	LB	AM

Natural Moisture Content, % - ●
PL ├──┤ LL
N_{60} Value ○ / Non-Plastic - NP



DLZ Ohio, Inc. * 6121 Huntley Road, Columbus, Ohio 43229 * (614) 888-0040

Client: Barton Malow	Project: Ford H4 Battery Plant	Job No. 2150-9519.50
LOG OF: Boring B-044	Location: As per plan	Date Drilled: 11/2/2021

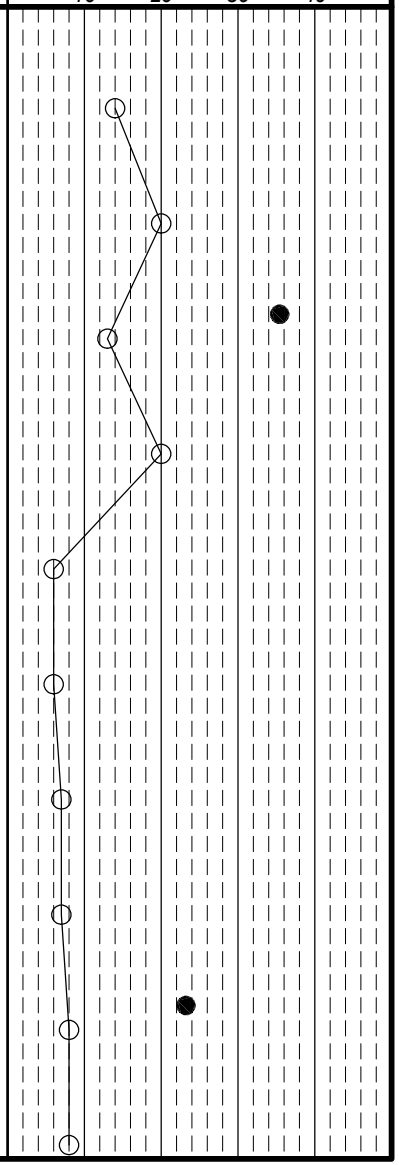
WATER OBSERVATIONS:
Water seepage at: None
Water level at completion: None (inside augers)

DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Rig (#) / ER: CME-850X (400472) / 84.0% | Driller: LB | Logger: AM

Natural Moisture Content, % - ●
PL ⊢——⊣ LL
N_{60} Value ○ / Non-Plastic - NP
10 20 30 40

Depth (ft)	Elev. (ft) 698.7	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0.3	698.4						Topsoil -4", Plow Depth - 9"							
		2 4 6	18	S-1		3.25	Very stiff brown and gray LEAN CLAY (CL); moist.							
3.5	695.2													
5		4 6 8	18	S-2		3.25	Very stiff brown and gray sandy SILTY CLAY (CL-ML); damp.							
6.0	692.7													
		3 4 5	18	S-3		3.25	Very stiff red FAT CLAY (CH); contains sand and gravel size chert fragments; damp.							
10		4 6 8	18	S-4		2.25								
		4 2 2	18	S-5		3.25								
15		3 2 2	18	S-6		1.25	@ 13.5'-16.0'; stiff.							
16.0	682.7													
		2 2 3	18	S-7		2.0	Stiff to very stiff light brown FAT CLAY (CH); moist.							
18.5	680.2													
20		1 3 2	18	S-8		0.5	Soft to medium stiff red FAT CLAY (CH); contains sand size chert fragments; moist.							
		1 3 3	17	S-9		0.75								
25.0 25	673.7	WOH 3 3	18	S-10		0.75	@ 23.5'-25.0'; no chert fragments. Bottom of Boring - 25.0'							



DLZ Ohio, Inc. * 6121 Huntley Road, Columbus, Ohio 43229 * (614) 888-0040

Client: Barton Malow | *Project:* Ford H4 Battery Plant | *Job No.* 2150-9519.50

LOG OF: Boring B-045 | *Location:* As per plan | *Date Drilled:* 11/2/2021

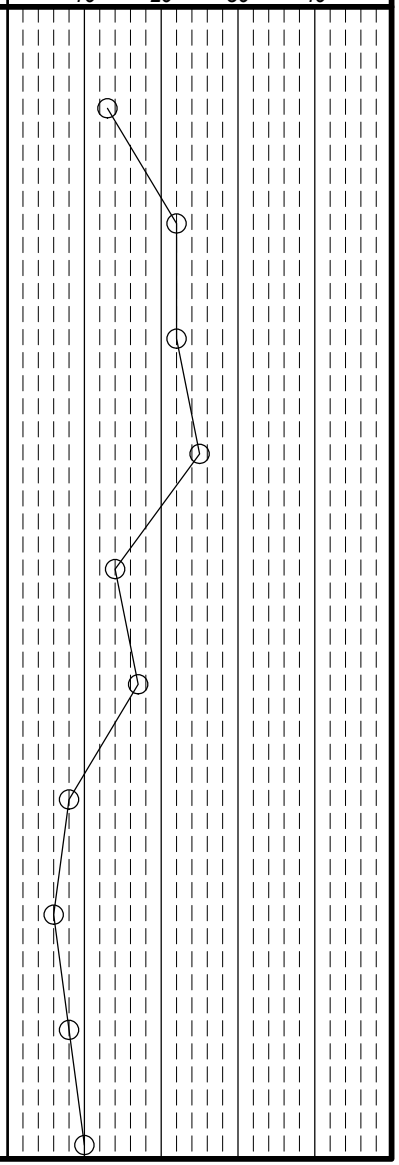
WATER OBSERVATIONS:
Water seepage at: None
Water level at completion: None (inside augers)

DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Rig (#) / ER: CME-850X (400472) / 84.0% | *Driller:* LB | *Logger:* AM

Natural Moisture Content, % - ●
PL ├──┤ LL
N_{60} Value ○ / Non-Plastic - NP
10 20 30 40

Depth (ft)	Elev. (ft) 700.7	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0.7	700.0						Topsoil - 8", Plow Depth - 13"							
3.5	697.2	3 3 6	16	S-1		0.75	Medium stiff brown red and light gray LEAN CLAY (CL); contains organics; moist.							
6.0	694.7	6 7 9	18	S-2		2.5	Very stiff light brown and light gray mottled SILTY CLAY (CL-ML); damp.							
11.0	689.7	5 7 9	7	S-3		3.0	Very stiff light gray LEAN CLAY (CL); damp.							
		7 8 10	7	S-4		3.0	@ 8.5'-11.0'; red and light gray mottled.							
16.0	684.7	4 4 6	5	S-5		2.5	Stiff to very stiff red FAT CLAY (CH); moist.							
		5 6 6	18	S-6		2.0	@ 13.5'-16.0'; contains large gravel size chert.							
25.0	675.7	3 3 3	18	S-7		0.5	Soft to medium stiff red FAT CLAY (CH); contains chert fragments; moist to wet.							
		1 2 2	18	S-8		0.25	@ 18.5'-21.0'; very soft to soft.							
		2 3 3	15	S-9		0.5								
		6 3 4	16	S-10		0.5	Bottom of Boring - 25.0'							



DLZ Ohio, Inc. * 6121 Huntley Road, Columbus, Ohio 43229 * (614) 888-0040

Client: Barton Malow | *Project:* Ford H4 Battery Plant | *Job No.* 2150-9519.50

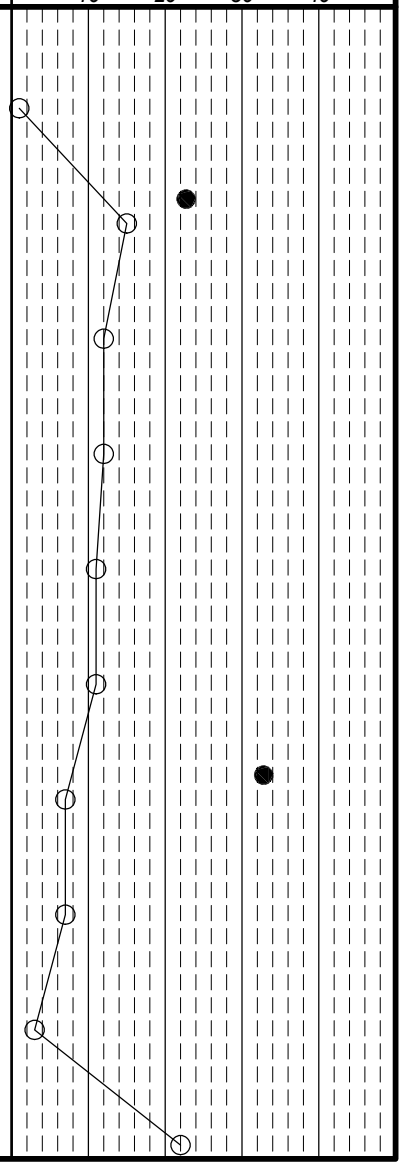
LOG OF: Boring B-046 | *Location:* As per plan | *Date Drilled:* 11/2/2021

WATER OBSERVATIONS:
Water seepage at: None
Water level at completion: None (inside augers)

DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Rig (#) / ER: CME 750X (289498) / 81.0% | *Driller:* T | *Logger:* JC

Depth (ft)	Elev. (ft) 698.6	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0.6	698.0						Topsoil - 7", Plow Depth - 7"							
3.5	695.1	WOH 1 0	7	S-1		1.5	Stiff gray SILTY CLAY (CL-ML); damp.							
6.0	692.6	3 5 6	18	S-2		4.5+	Very stiff gray LEAN CLAY (CL); contains brown silt in soil cracks; moist.							
11.0	687.6	3 4 5	16	S-3		3.0	Very stiff light brown and light gray FAT CLAY (CH); moist.							
		5 5 4	6	S-4		2.0	@ 8.5'-11.0', Stiff to very stiff, drove large stone fragments, sample contains chert fragments							
13.5	685.1	3 3 5	15	S-5		3.5	Very stiff red FAT CLAY (CH); damp to moist.							
16.0	682.6	2 3 5	5	S-6		1.0	Medium stiff to stiff red FAT CLAY (CH) with sand; contains sand and gravel size chert fragments; wet.							
		2 2 3	18	S-7		2.0	Stiff to very stiff red and light brownish gray FAT CLAY (CH); moist to wet.							
		1 1 4	2	S-8		1.0								
		WOH 1 1	10	S-9		1.5	@ 21.0'-23.3', shelby tube collected in offset boring B-046A, pushed at 600 psi, 5' offset from B-046							
25.0	673.6	WOH 3 13	5	S-10		1.0	Bottom of Boring - 25.0'							



DLZ Ohio, Inc. * 6121 Huntley Road, Columbus, Ohio 43229 * (614) 888-0040

Client: Barton Malow | *Project:* Ford H4 Battery Plant | *Job No.* 2150-9519.50

LOG OF: Boring B-047 | *Location:* As per plan | *Date Drilled:* 11/2/2021

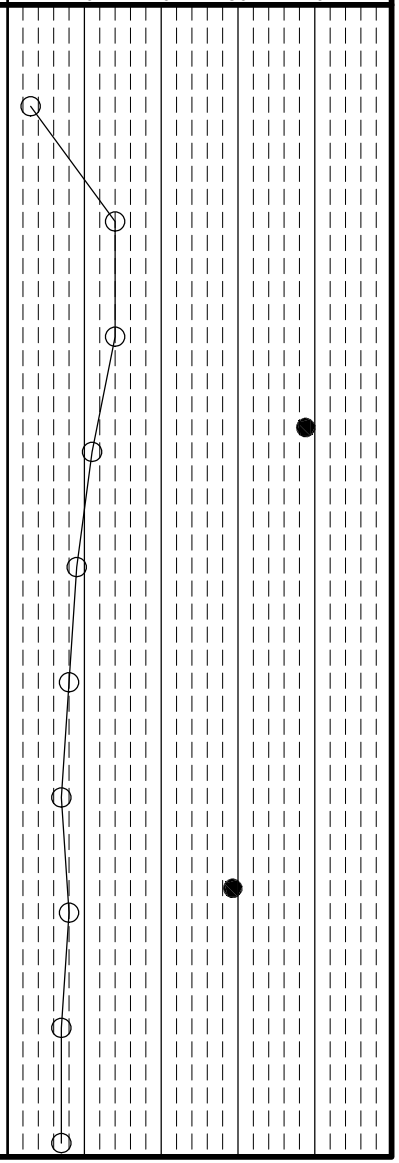
WATER OBSERVATIONS:
Water seepage at: None
Water level at completion: None (inside augers)

DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Rig (#) / ER: CME 750X (289498) / 81.0% | *Driller:* T | *Logger:* JC

Natural Moisture Content, % - ●
PL ├──┤ LL
N_{60} Value ○ / Non-Plastic - NP
10 20 30 40

Depth (ft)	Elev. (ft) 696.7	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
1.0	695.7						Topsoil - 12", Plow Depth - 16"							
3.5	693.2	1 1 1	5	S-1		0.75	Medium stiff gray LEAN CLAY (CL); moist.							
6.0	690.7	3 4 6	18	S-2		2.5	Very stiff light gray FAT CLAY (CH); moist.							
8.5	688.2	3 5 5	13	S-3		4.5+	Hard reddish light brown FAT CLAY (CH): damp to moist.							
13.5	683.2	1 3 5	18	S-4		3.0	Very stiff light brown and light gray FAT CLAY (CH); moist.							
		2 3 4	12	S-5		3.0								
16.0	680.7	2 3 3	16	S-6		2.0	Stiff to very stiff light reddish brown FAT CLAY (CH); contains sand seams; moist. @ 13.5'-16.0', encountered gravel size chert fragments in sample							
18.5	678.2	1 2 3	9	S-7		4.0	Very stiff to hard red FAT CLAY (CH); moist.							
21.0	675.7	2 3 3	18	S-8		2.0	Stiff to very stiff red FAT CLAY (CH); contains fine sand; moist.							
25.0	671.7	2 2 3	6	S-9		1.0	Medium stiff to stiff light brown FAT CLAY (CH); contains chert fragments; moist.							
		1 2 3		S-10		1.5	Bottom of Boring - 25.0'							



Client: Barton Malow	Project: Ford H4 Battery Plant	Job No. 2150-9519.50
LOG OF: Boring B-048	Location: As per plan	Date Drilled: 11/1/2021

WATER OBSERVATIONS:
Water seepage at: N/A
Water level at completion: 24.4' (inside augers)

DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Rig (#) / ER: CME-850X (400472) / 84.0%
Driller: LB
Logger: AM

Natural Moisture Content, % - ●
PL ⊢——⊣ LL
N_{60} Value ○ / Non-Plastic - NP
10 20 30 40

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
	695.9						Topsoil - 8"-9"							
							@ 0.8'-42.0', advanced auger without sampling							
5														
10														
							@ 12.0'-15.0', drill rig chatter							
15														
20														
25	670.9													

Client: Barton Malow	Project: Ford H4 Battery Plant	Job No. 2150-9519.50
LOG OF: Boring B-048	Location: As per plan	Date Drilled: 11/1/2021

WATER OBSERVATIONS:
Water seepage at: N/A
Water level at completion: 24.4' (inside augers)

DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Rig (#) / ER: CME-850X (400472) / 84.0%
Driller: LB
Logger: AM

Natural Moisture Content, % - ●
PL ⊢——⊣ LL
N_{60} Value ○ / Non-Plastic - NP
10 20 30 40

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
	670.9													
30														
							@ 33.0'-42.0', drill rig chatter							
35														
							@ 37.5', drill rig chatter							
40														
42.0	653.9													
							@ 42.0', auger refusal Bottom of Boring - 42.0'							
45														
50														

Client: Barton Malow | *Project:* Ford H4 Battery Plant | *Job No.* 2150-9519.50

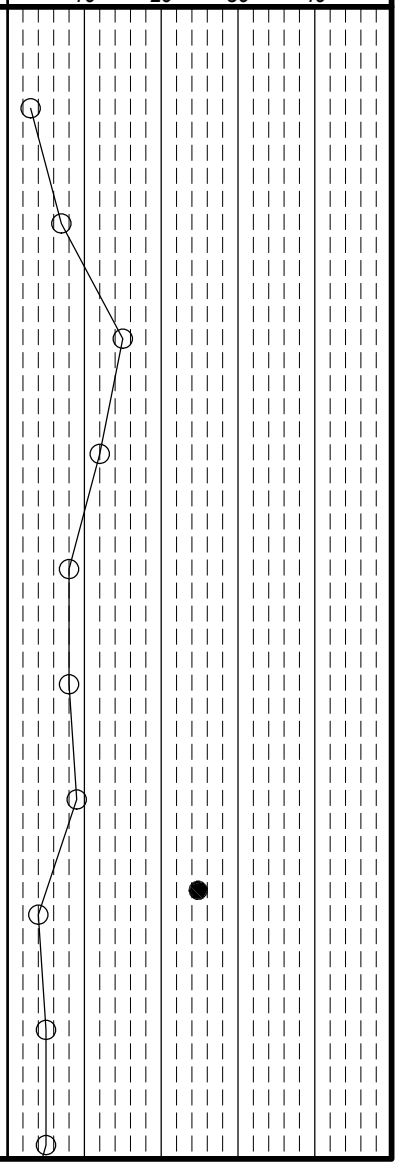
LOG OF: Boring B-048A | *Location:* As per plan | *Date Drilled:* 11/22/2021

Rig (#) / ER CME 750X (289498) / 81.0% | *Driller* VD | *Logger* JC

WATER OBSERVATIONS:
Water seepage at: 18.5'
Water level at completion: 13.5' (inside augers)

DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Depth (ft)	Elev. (ft) 695.9	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
1.0	694.9						Topsoil - 26"							
3.5	692.4	WOH 1 1	8	S-1		0.75	Medium stiff red and brown LEAN CLAY (CL); moist.							
6.0	689.9	3 4 1	12	S-2		2.5	Very stiff light brown FAT CLAY (CH); moist.							
8.5	687.4	6 5 6	18	S-3		1.25	Stiff reddish brown FAT CLAY (CH); contains black oxide staining; damp to moist.							
13.5	682.4	2 4 5	18	S-4		2.25	Very stiff to stiff red and gray mottled FAT CLAY (CH); moist.							
		2 3 3	18	S-5		1.75								
16.0	679.9	1 3 3	18	S-6		2.25	Very stiff red FAT CLAY (CH); moist.							
		1 3 4	18	S-7		1.25	Stiff red FAT CLAY (CH); moist to wet.							
		2 1 2	18	S-8		1.25								
		1 2 2	8	S-9		1.25								
25	670.9	1 2 2		S-10		1.25	@ 23.5', contains black oxide staining							



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Client: Barton Malow | *Project:* Ford H4 Battery Plant | *Job No.* 2150-9519.50

LOG OF: Boring B-048A | *Location:* As per plan | *Date Drilled:* 11/22/2021

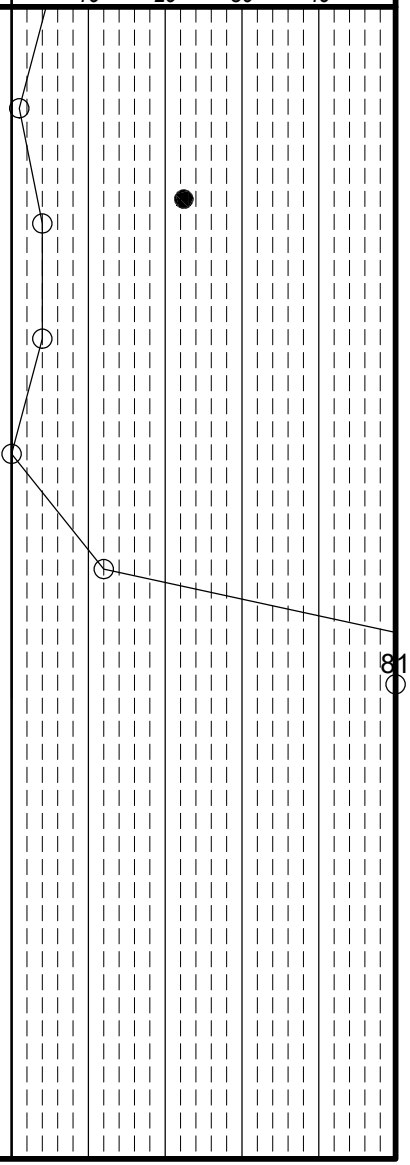
WATER OBSERVATIONS:
Water seepage at: 18.5'
Water level at completion: 13.5' (inside augers)

DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Rig (#) / ER: CME 750X (289498) / 81.0% | *Driller:* VD | *Logger:* JC

Natural Moisture Content, % - ●
PL ├──┤ *LL*
N_{60} Value ○ / *Non-Plastic -* NP

Depth (ft)	Elev. (ft) 670.9	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
		WOH WOH 1		S-11		1.25	Stiff red FAT CLAY (CH); moist to wet. (continued)							
28.5	667.4													
30		1 1 2	18	S-12			Loose light brown silty SAND (SM); damp.							
31.0	664.9													
		1 2 1		S-13		1.25	Medium stiff light brown FAT CLAY (CH); moist to wet.							
33.5	662.4													
35		WOR WOR WOR	15	S-14		<0.25	Very soft light brown FAT CLAY (CH); wet.							
		WOH WOH 9	18	S-15		<0.25								
38.5	657.4													
40.0 40	655.9	12 30 30		S-16			Soft light brown decomposed LIMESTONE							
							Bottom of Boring - 40.0'							
45														
50														



DLZ Ohio, Inc. * 6121 Huntley Road, Columbus, Ohio 43229 * (614) 888-0040

Client: Barton Malow | *Project:* Ford H4 Battery Plant | *Job No.* 2150-9519.50

LOG OF: Boring B-049 | *Location:* As per plan | *Date Drilled:* 11/1/2021

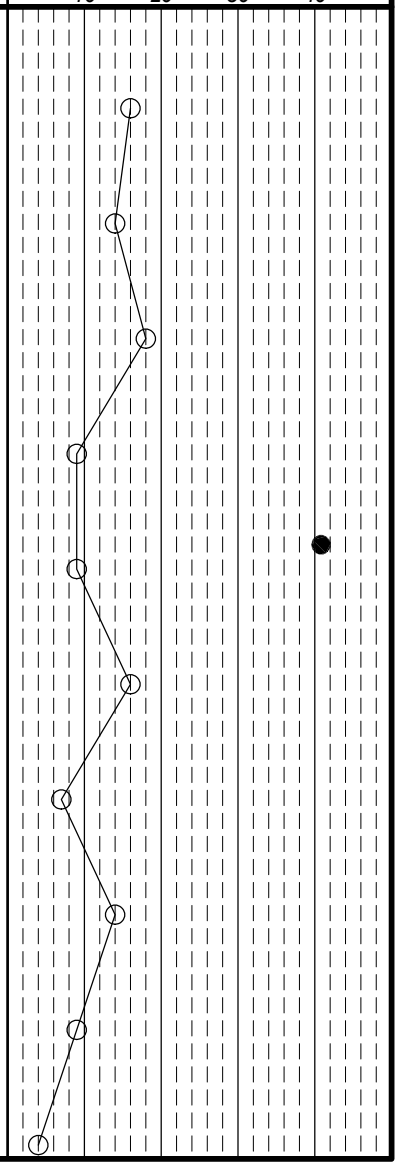
WATER OBSERVATIONS:
Water seepage at: 23.5'
Water level at completion: 0.0' (inside augers) ???

DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Rig (#) / ER: CME 750X (289498) / 81.0% | *Driller:* T | *Logger:* JC

Natural Moisture Content, % - ●
PL ├──┤ LL
N_{60} Value ○ / Non-Plastic - NP

Depth (ft)	Elev. (ft) 703.0	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0.7	702.3						Topsoil - 8.5"							
		3 5 7	13	S-1		4.5+	Hard red FAT CLAY (CH); damp.							
5		3 5 5	18	S-2		4.5+								
		4 6 7	13	S-3		4.0								
10		3 2 5	15	S-4		3.5	@ 8.5', very stiff; damp to moist.							
11.0	692.0													
		3 3 4	9	S-5		2.5	Very stiff red FAT CLAY (CH); contains chert fragments; moist.							
15		2 3 9	16	S-6		2.5	@ 13.5'-16.0', contains gravel size chert fragments							
16.0	687.0													
		1 2 3	18	S-7		1.5	16.0'-18.0', stiff							
20		1 4 6	18	S-8		2.5								
		2 4 3	12	S-9		3.0								
23.5	679.5													
25.0 25	678.0	1 1 2	9	S-10		2.0	Stiff to very stiff light brown FAT CLAY (CH); moist to wet. Bottom of Boring - 25.0'							



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Client: Barton Malow | *Project:* Ford H4 Battery Plant | *Job No.* 2150-9519.50

LOG OF: Boring B-050 | *Location:* As per plan | *Date Drilled:* 11/1/2021

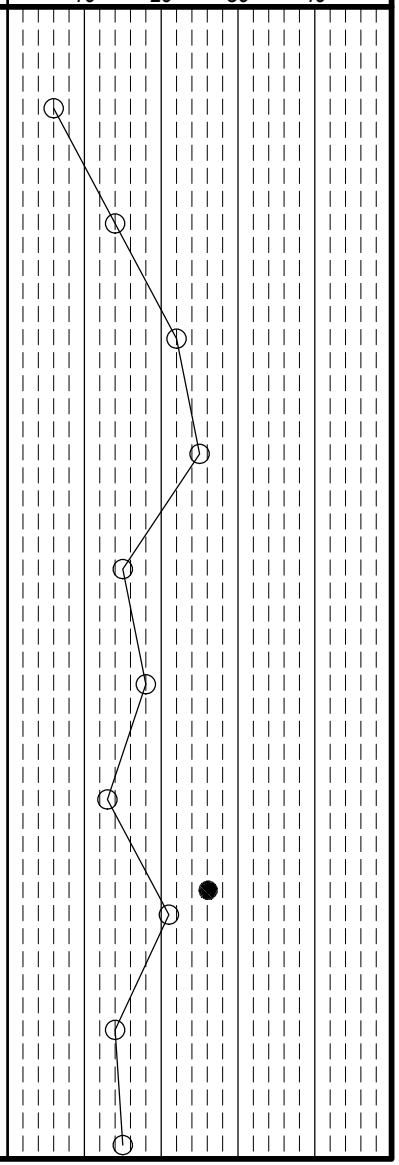
WATER OBSERVATIONS:
Water seepage at: None
Water level at completion: None (inside augers)

DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Rig (#) / ER: CME-850X (400472) / 84.0% | *Driller:* LB | *Logger:* AM

Natural Moisture Content, % - ●
PL ├──┤ LL
N_{60} Value ○ / Non-Plastic - NP
10 20 30 40

Depth (ft)	Elev. (ft) 710.5	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0.5	710.0						Topsoil - 6", Plow Depth - 14"							
		2 2 2	12	S-1		0.5	Medium stiff to stiff reddish brown LEAN CLAY (CL); moist to wet.							
3.5	707.0													
5		3 4 6	13	S-2		2.0	Stiff to very stiff red LEAN CLAY (CL); moist.							
6.0	704.5													
		4 7 9	18	S-3		2.25	Very stiff red FAT CLAY (CH); damp to moist.							
10		4 8 10	18	S-4		2.5								
		3 4 7	18	S-5		2.0	@ 11.0'-13.5', stiff to very stiff; contains orange verigation							
15		3 7 6	18	S-6		2.25								
16.0	694.5													
		3 4 5	18	S-7		1.75	Stiff red LEAN CLAY (CL);contains zones of black oxide staining; moist.							
20		3 9 6	18	S-8		1.25								
21.0	689.5													
		3 4 6	18	S-9		1.25	Stiff red FAT CLAY (CH); contains trace organics; moist.							
25.0 25	685.5	3 5 6	18	S-10		1.0	Bottom of Boring - 25.0'							



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Client: Barton Malow | *Project:* Ford H4 Battery Plant | *Job No.* 2150-9519.50

LOG OF: Boring B-051 | *Location:* As per plan | *Date Drilled:* 10/31/2021

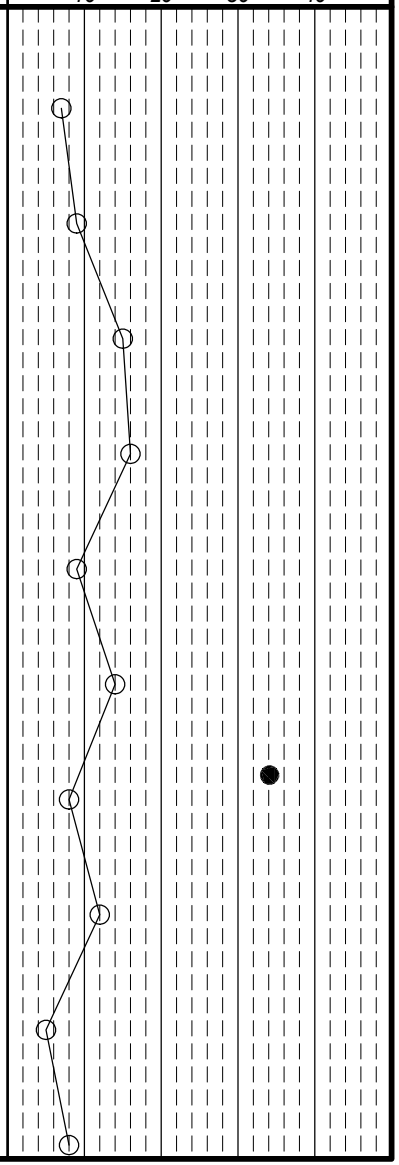
WATER OBSERVATIONS:
Water seepage at: None
Water level at completion: None (inside augers)

DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Rig (#) / ER: CME 750X (289498) / 81.0% | *Driller:* T | *Logger:* JC

Natural Moisture Content, % - ●
PL ├──┤ LL
N_{60} Value ○ / Non-Plastic - NP
10 20 30 40

Depth (ft)	Elev. (ft) 703.9	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0.5	703.4						Topsoil - 5.5", Plow Depth - 7.5"							
		1 2 3	10	S-1		1.5	Stiff to very stiff brown LEAN CLAY (CL); moist.							
5		2 3 4	15	S-2		2.0	@ 3.5'-6.0'; brown and light gray mottled.							
6.0	697.9													
		2 4 7	15	S-3		3.5	Very stiff to hard red FAT CLAY (CH); damp to moist.							
10		6 7 5	13	S-4		4.5+								
11.0	692.9													
		2 3 4	18	S-5		2.25	Stiff to very stiff red FAT CLAY (CH); contain chert fragments; moist.							
15		2 4 6	5	S-6		1.5								
		1 3 3	18	S-7		2.0	@ 16.0'-18.5'; no chert fragments.							
20		3 5 4	11	S-8		1.75								
		1 1 3	11	S-9		1.5								
25.0 25	678.9	2 2 4	18	S-10		1.5	Bottom of Boring - 25.0'							



DLZ Ohio, Inc. * 6121 Huntley Road, Columbus, Ohio 43229 * (614) 888-0040

Client: Barton Malow | *Project:* Ford H4 Battery Plant | *Job No.* 2150-9519.50

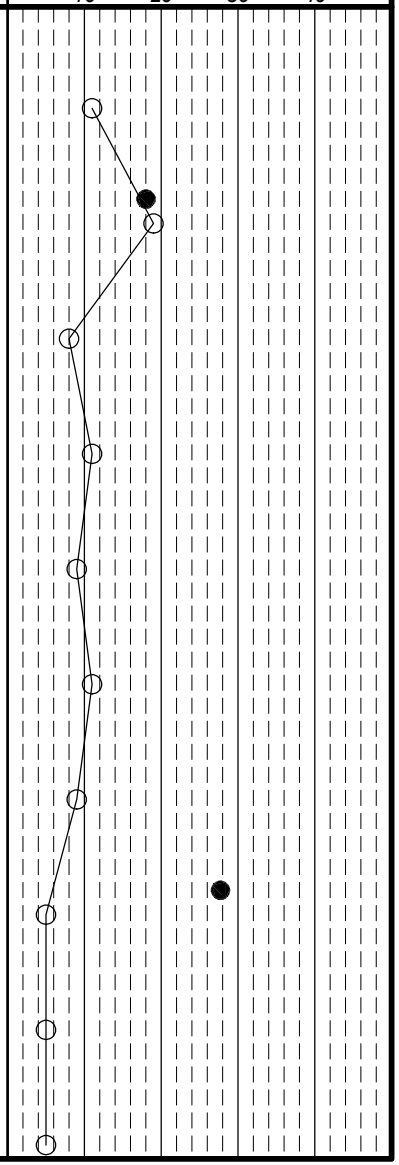
LOG OF: Boring B-052 | *Location:* As per plan | *Date Drilled:* 10/31/2021

WATER OBSERVATIONS:
Water seepage at: None
Water level at completion: None (inside augers)

DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Rig (#) / ER: CME 750X (289498) / 81.0% | *Driller:* T | *Logger:* JC

Depth (ft)	Elev. (ft) 699.6	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0.5	699.1						Topsoil -5.5", Plow Depth - 7.5"							
3.5	696.1	2 2 6	12	S-1		2.0	Very stiff gray SILTY CLAY (CL-ML); damp.							
6.0	693.6	4 7 7	13	S-2		2.5	Very stiff light gray LEAN CLAY (CL); moist.							
8.5	691.1	2 3 3	18	S-3		2.5	Very stiff light gray FAT CLAY (CH); moist.							
13.5	686.1	2 3 5		S-4		4.5+	Very stiff to hard red to light reddish brown FAT CLAY (CH); damp.							
		3 3 4	18	S-5		3.5								
16.0	683.6	2 3 5	18	S-6		3.5	Very stiff red and light brown mottled FAT CLAY (CH); contains chert fragments; damp.							
21.0	678.6	2 3 4	16	S-7		2.5	Very stiff red and light brown mottled FAT CLAY (CH); moist.							
		2 1 3	18	S-8		2.5								
25.0	674.6	2 2 2	18	S-9		2.0	Stiff to very stiff red FAT CLAY (CH); contains chert fragments; moist.							
		2 2 2	13	S-10		1.5	Bottom of Boring - 25.0'							



Client: Barton Malow | *Project:* Ford H4 Battery Plant | *Job No.* 2150-9519.50

LOG OF: Boring B-053 | *Location:* As per plan | *Date Drilled:* 11/1/2021

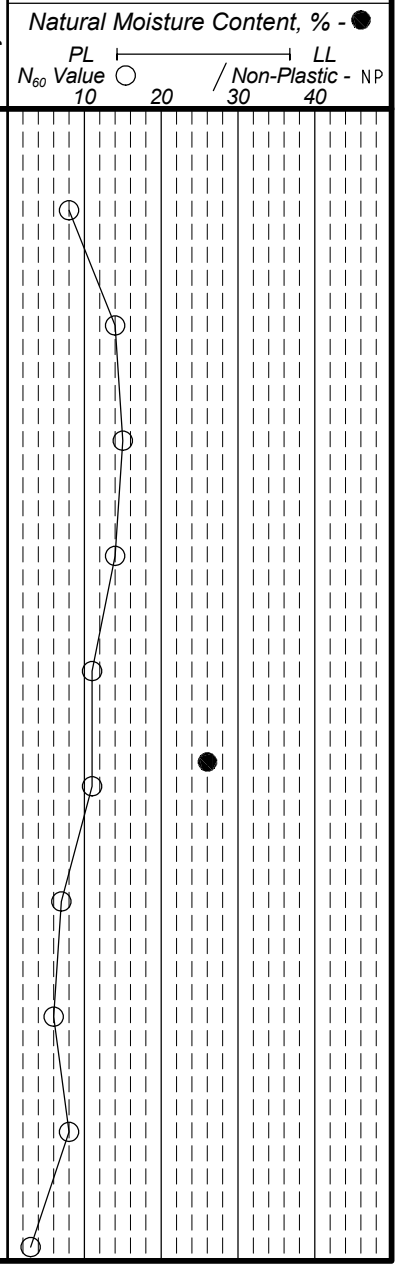
Rig (#) / ER: CME-850X (400472) / 84.0% | *Driller:* LB | *Logger:* AM

WATER OBSERVATIONS:
Water seepage at: 24.8'
Water level at completion: None (inside augers)

DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Depth (ft)	Elev. (ft) 694.8	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0.3	694.5						Topsoil - 4"							
		2 3 3	13	S-1		1.75	Stiff gray SILTY CLAY (CL-ML); moist.							
3.5	691.3													
		3 4 6	16	S-2		3.25	Very stiff gray SILTY CLAY (CL-ML); damp.							
5														
6.0	688.8													
		2 5 6	18	S-3		2.5	Very stiff brown CLAN CLAY (CL); contains black oxide staining; moist.							
8.5	686.3													
		3 4 6	18	S-4		1.5	Stiff to very stiff red FAT CLAY (CH); moist.							
10														
		4 3 5	18	S-5		2.75								
		4 3 5	15	S-6		1.75								
15														
		2 2 3	18	S-7		1.5								
18.5	676.3													
		2 2 2	18	S-8		0.25	Soft to very soft red to reddish light brown FAT CLAY (CH); contains rock fragments; moist to wet.							
20														
		3 2 4	18	S-9		0.25								
23.5	671.3													
25.0	669.8	2 1 1	18	S-10		< 0.25	Very soft light brown LEAN CLAY (CL) with sand; wet. Bottom of Boring - 25.0'							
25														

GRADATION



DLZ Ohio, Inc. * 6121 Huntley Road, Columbus, Ohio 43229 * (614) 888-0040

Client: Barton Malow | *Project:* Ford H4 Battery Plant | *Job No.* 2150-9519.50

LOG OF: Boring B-054 | *Location:* As per plan | *Date Drilled:* 11/1/2021

WATER OBSERVATIONS:
Water seepage at: None
Water level at completion: None (inside augers)

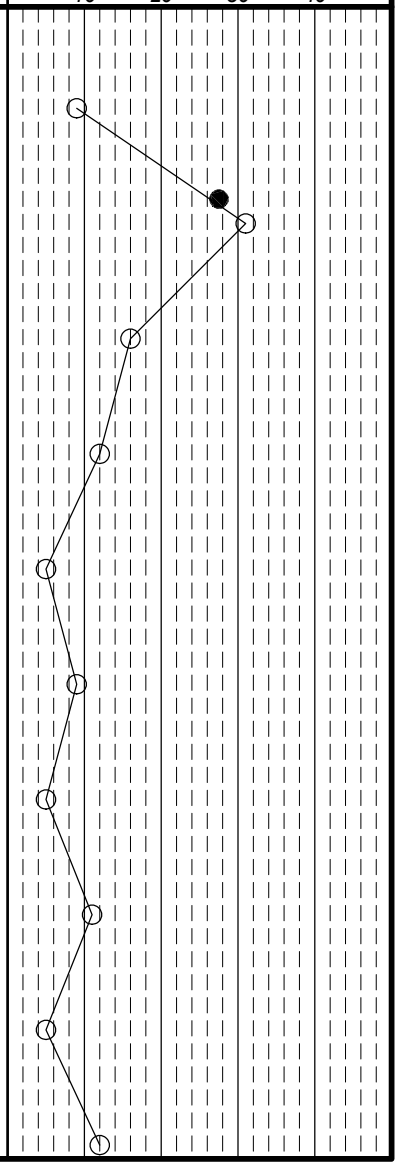
DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Depth (ft)	Elev. (ft) 697.6	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0.7	696.9						Topsoil - 8", Plow Depth - 9"							
		2 3 4	8	S-1		1.5	Stiff brown LEAN CLAY (CL); damp.							
3.5	694.1													
5		6 11 12	10	S-2		2.0	Stiff to very stiff light yellowish gray and red LEAN CLAY (CL) with gravel; contains large stone fragments; damp.							
6.0	691.6													
		4 5 7	9	S-3		3.0	Very stiff red LEAN CLAY (CL); contains decomposed chert fragments; damp to moist.							
10		3 4 5	14	S-4		3.0								
		WOH 1 3		S-5		2.5								
15		2 4 3	14	S-6		1.5	@ 13.0'-16.0', stiff; contains sand size chert fragments							
		1 2 2	11	S-7		2.0								
20		1 4 4	12	S-8		2.5								
21.0	676.6													
		2 2 2	18	S-9		1.5	Medium stiff to stiff light reddish brown FAT CLAY (CH); moist.							
25.0 25	672.6	WOH 5 4	10	S-10		1.0	Bottom of Boring - 25.0'							

GRADATION

Rig (#) / ER	Driller	Logger
CME 750X (289498) / 81.0%	T	JC

Natural Moisture Content, % - ●
PL ├──┤ LL
N_{60} Value ○ / Non-Plastic - NP



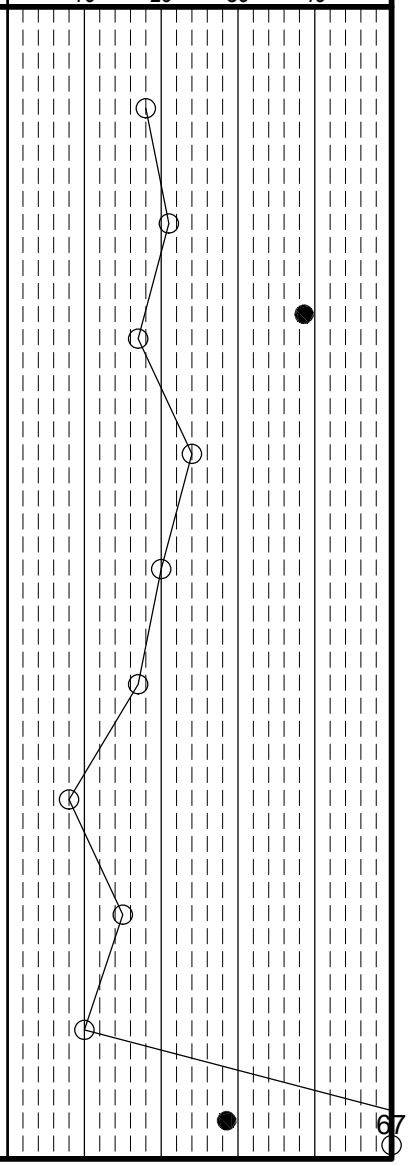
Client: Barton Malow | *Project:* Ford H4 Battery Plant | *Job No.* 2150-9519.50

LOG OF: Boring B-055 | *Location:* As per plan | *Date Drilled:* 11/4/2021

WATER OBSERVATIONS:
Water seepage at: 24.5'
Water level at completion: 28.1' (prior to adding water)
15.4' (inside augers)
DRILLING METHODS - Soil: HS Augers; Rock: NQ2 Core
ABANDONMENT - cuttings and bentonite chips

Rig (#) / ER: CME-850X (400472) / 84.0% | *Driller:* LB | *Logger:* AM

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0.5	702.6						Topsoil - 6", Plow Depth - 9"-10"							
		5 6 7	18	S-1		1.25	Stiff red FAT CLAY (CH); damp to moist.							
3.5	699.6													
5		6 6 9	15	S-2		2.75	Very stiff red FAT CLAY (CH); contains broken chert fragments; damp.							
		5 6 6	18	S-3		3.0								
10		5 6 11	18	S-4		2.75								
11.0	692.1													
		5 6 8	14	S-5		1.75	Stiff red FAT CLAY (CH); moist.							
13.5	689.6													
15		3 7 5	15	S-6		1.5	Stiff to very stiff red FAT CLAY (CH); contains broken chert fragments; moist.							
		3 3 3	18	S-7		2.0								
20		4 6 5	16	S-8		1.5								
21.0	682.1						@ 20.0'-21.0', slight drill rig chatter							
		2 3 4	18	S-9			Stiff light brown FAT CLAY (CH); moist.							
23.9	679.2													
25	678.1	7 13 35	18	S-10			Very dense SILTY CLAY (CL-ML); decomposed rock; moist.							



Client: Barton Malow | *Project:* Ford H4 Battery Plant | *Job No.* 2150-9519.50

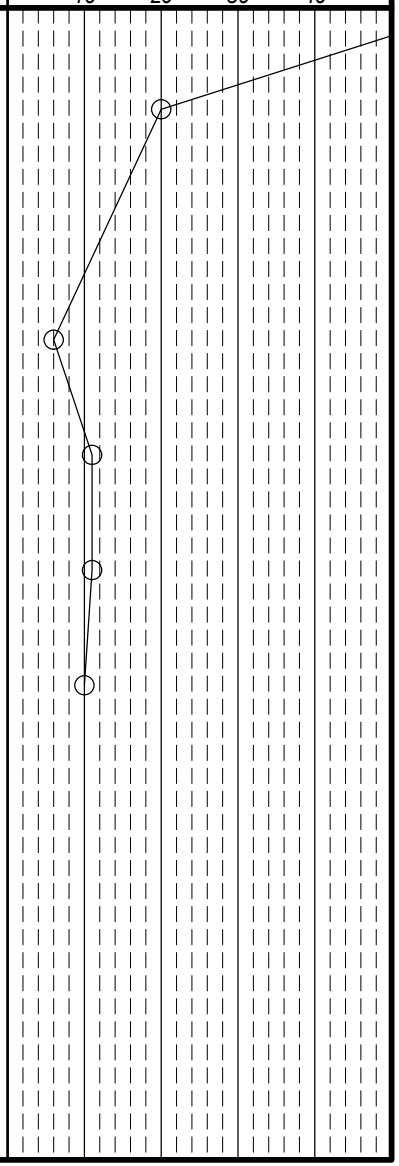
LOG OF: Boring B-055 | *Location:* As per plan | *Date Drilled:* 11/4/2021

WATER OBSERVATIONS:
Water seepage at: 24.5'
Water level at completion: 28.1' (prior to adding water)
15.4' (inside augers)
DRILLING METHODS - Soil: HS Augers; Rock: NQ2 Core
ABANDONMENT - cuttings and bentonite chips

Rig (#) / ER: CME-850X (400472) / 84.0% | *Driller:* LB | *Logger:* AM

Natural Moisture Content, % - ●
PL ├──┤ LL
N_{60} Value ○ / Non-Plastic - NP

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
	678.1													
26.0	677.1						@ 25.0'-26.0', drill rig chatter Very dense SILTY CLAY (CL-ML); decomposed rock; moist. (continued)							
		3 6 8	18	S-11			Medium stiff to stiff red sandy FAT CLAY (CH); moist to wet.							
30			24		ST-1		@ 30.0'-31.0', brief drill rig chatter							
		3 2 2	18	S-12			@ 32.5'-33.5', drill rig chatter							
33.5	669.6													
35		3 4 4		S-13			Stiff pale green LEAN CLAY (CL); contains disintegrated rock fragments; moist. @ 35.0'-36.0', drill rig chatter							
36.0	667.1													
		1 3 5		S-14			Medium stiff red FAT CLAY (CL); moist to wet. @ 37.5'-38.5', occasional drill rig chatter							
38.5	664.6													
40		5 4 3		S-15			Decomposed limestone, soft. @ 40.0'-43.0', heavy drill rig chatter							
43.0	660.1						@ 43.0', auger refusal							
45		Core 120"	Rec 73"	RQD 25%	1									
50	653.1													



Client: Barton Malow	Project: Ford H4 Battery Plant	Job No. 2150-9519.50
LOG OF: Boring B-055	Location: As per plan	Date Drilled: 11/4/2021

WATER OBSERVATIONS:
Water seepage at: 24.5'
Water level at completion: 28.1' (prior to adding water)
15.4' (inside augers)
DRILLING METHODS - Soil: HS Augers; Rock: NQ2 Core
ABANDONMENT - cuttings and bentonite chips

Rig (#) / ER: CME-850X (400472) / 84.0%
Driller: LB
Logger: AM

Natural Moisture Content, % - ●
PL ⊢——⊣ LL
N_{60} Value ○ / Non-Plastic - NP
10 20 30 40

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
	653.1													
		Core 120"	Rec 73"	RQD 25%	1		Decomposed limestone, soft. (continued) Hard to very hard, gray to light gray, LIMESTONE, very fine grained, slightly weathered, thick to very thickly bedded, broken to moderately fracturedd, contains karstik dissolutioning, vuggy. @ 43.0'-53.0', core has 47" of core loss due to suspected voids. Hard to very hard, gray to light gray, LIMESTONE, very fine grained, slightly weathered, thick to very thickly bedded, broken to moderately fracturedd, contains karstik dissolutioning, vuggy. (continued)							
53.0	650.1													
55														
60														
65														
70														
75														

Bottom of Boring - 53.0'

DLZ Ohio, Inc. * 6121 Huntley Road, Columbus, Ohio 43229 * (614) 888-0040

Client: Barton Malow | *Project:* Ford H4 Battery Plant | *Job No.* 2150-9519.50

LOG OF: Boring B-056 | *Location:* As per plan | *Date Drilled:* 10/29/2021

WATER OBSERVATIONS:
Water seepage at: None
Water level at completion: None (inside augers)

DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Depth (ft)	Elev. (ft) 710.7	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0.7	710.0						Topsoil - 8.5", Plow Depth - 14.5"							
		1 2 3	14	S-1		2.0	Stiff to very stiff light brown LEAN CLAY (CL); moist.							
3.5	707.2													
5		4 5 7	17	S-2		3.5	Very stiff red and brown mottled FAT CLAY (CH); moist.							
		2 5 7	18	S-3		3.0								
8.5	702.2													
10		2 4 7	15	S-4		2.25	Very stiff red FAT CLAY (CH); contains black oxide stain; moist.							
		2 5 4	11	S-5		3.0								
13.5	697.2													
15		1 4 3	18	S-6		2.25	Stiff to very stiff red FAT CLAY (CH); moist.							
		1 3 4	18	S-7		1.5								
20		1 2 4	13	S-8		1.75								
		2 5 3	18	S-9		1.75								
25.0 25	685.7	1 3 5	16	S-10		2.25	@ 23.5'-25.0'; damp. Bottom of Boring - 25.0'							

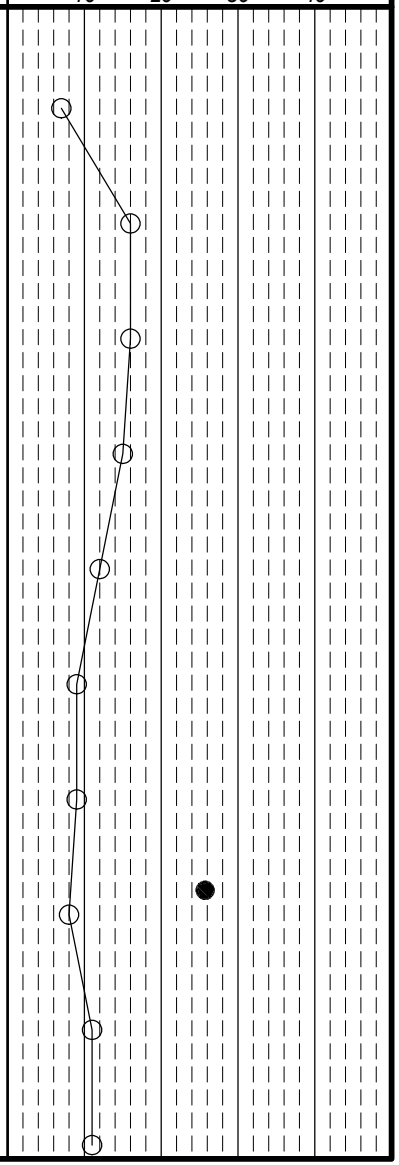
GRADATION

Rig (#) / ER: CME 750X (289498) / 81.0% | Driller: T | Logger: JC

Natural Moisture Content, % - ●

PL ├──┤ LL

N_{60} Value ○ / Non-Plastic - NP



DLZ Ohio, Inc. * 6121 Huntley Road, Columbus, Ohio 43229 * (614) 888-0040

Client: Barton Malow | *Project:* Ford H4 Battery Plant | *Job No.* 2150-9519.50

LOG OF: Boring B-057 | *Location:* As per plan | *Date Drilled:* 10/31/2021 to 11/1/2021

WATER OBSERVATIONS:
Water seepage at: None
Water level at completion: None (inside augers)

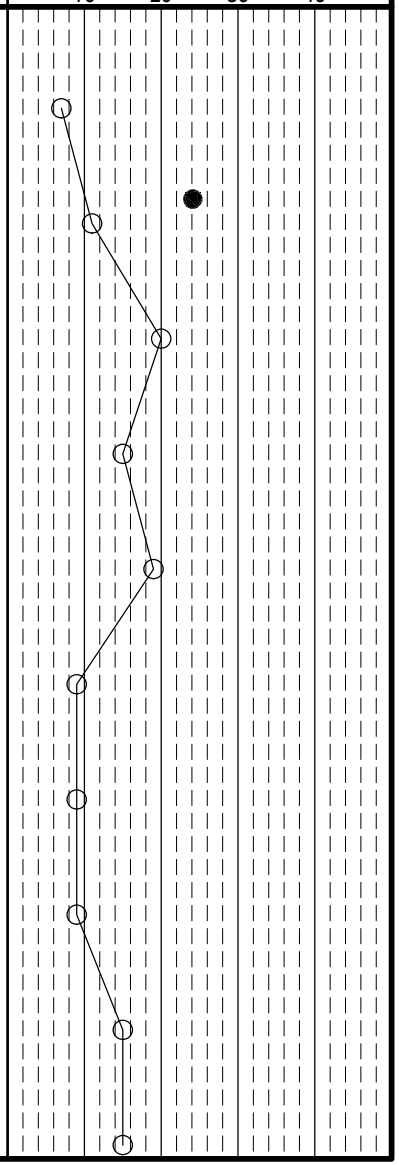
DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Depth (ft)	Elev. (ft) 708.4	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0.5	707.9						Topsoil - 6.5", Plow Depth - 8.5"							
		1 2 3	12	S-1		0.25	Soft to very soft light brown LENA CLAY (CL); wet.							
3.5	704.9													
5		3 3 5	18	S-2		4.5+	Very stiff to hard red LEAN CLAY (CL); damp to moist.							
		1 7 8	18	S-3		4.0								
10		3 4 7	18	S-4		3.0								
		4 6 8	18	S-5		3.0								
15		2 3 4	16	S-6		2.5								
		1 3 4	17	S-7		2.0								
18.5	689.9													
20		2 3 4	18	S-8		2.0	Stiff to very stiff red FAT CLAY (CH); moist.							
		4 6 5	18	S-9		2.0								
25.0 25	683.4	3 4 7	18	S-10		1.5	Bottom of Boring - 25.0'							

GRADATION

Rig (#) / ER	Driller	Logger
CME 750X (289498) / 81.0%	T	JC

Natural Moisture Content, % - ●
PL ├──┤ LL
N_{60} Value ○ / Non-Plastic - NP



Client: Barton Malow | *Project:* Ford H4 Battery Plant | *Job No.* 2150-9519.50

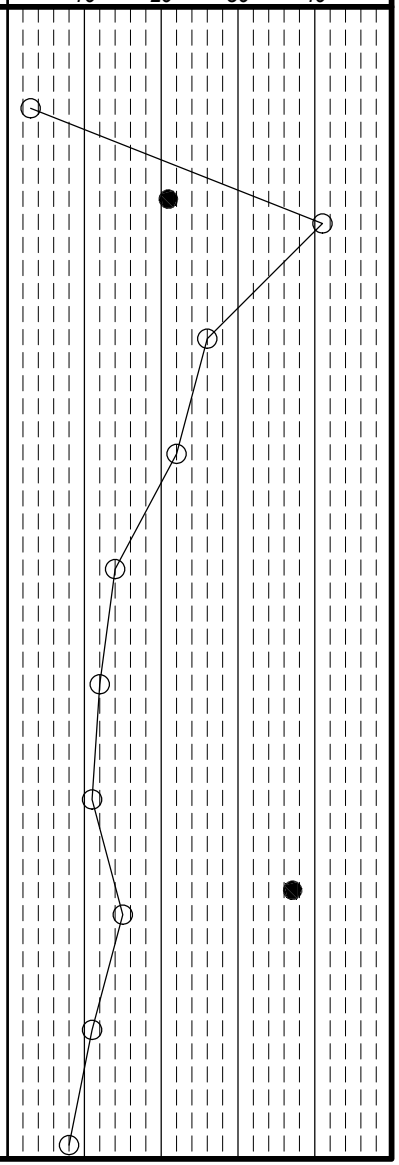
LOG OF: Boring B-058 | *Location:* As per plan | *Date Drilled:* 11/1/2021

WATER OBSERVATIONS:
Water seepage at: None
Water level at completion: None (inside augers)

DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Rig (#) / ER: CME 750X (289498) / 81.0% | *Driller:* T | *Logger:* JC

Depth (ft)	Elev. (ft) 700.7	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0.8	699.9						Topsoil - 9.5", Plow Depth - 11.0"							
		WOH WOH 2	12	S-1		0.75	Soft brown SILTY CLAY (CL-ML); moist.							
3.5	697.2													
		3 13 17	10	S-2		2.0	Stiff to very stiff red and light reddish brown LEAN CLAY (CL) with gravel; contains rock fragments; damp.							
5 6.0	694.7													
		9 9 10	6	S-3		2.5	Medium dense white and red GRAVEL (GP-GC) with clay; damp.							
8.5	692.2													
		4 7 9	5	S-4		2.0	Stiff to very stiff red FAT CLAY (CH); damp.							
10														
		3 4 6	18	S-5		3.5								
		3 4 5	18	S-6		3.0								
15 16.0	684.7													
		3 4 4	12	S-7		1.5	Stiff to medium stiff red FAT CLAY (CH); moist.							
		2 2 9	9	S-8		1.5								
20														
		2 3 5	7	S-9		1.0	@ 21.0', contains sand size decomposed chert fragments							
		2 3 3	18	S-10		1.0								
25.0 25	675.7						Bottom of Boring - 25.0'							



DLZ Ohio, Inc. * 6121 Huntley Road, Columbus, Ohio 43229 * (614) 888-0040

Client: Barton Malow | *Project:* Ford H4 Battery Plant | *Job No.* 2150-9519.50

LOG OF: Boring B-059 | *Location:* As per plan | *Date Drilled:* 11/1/2021

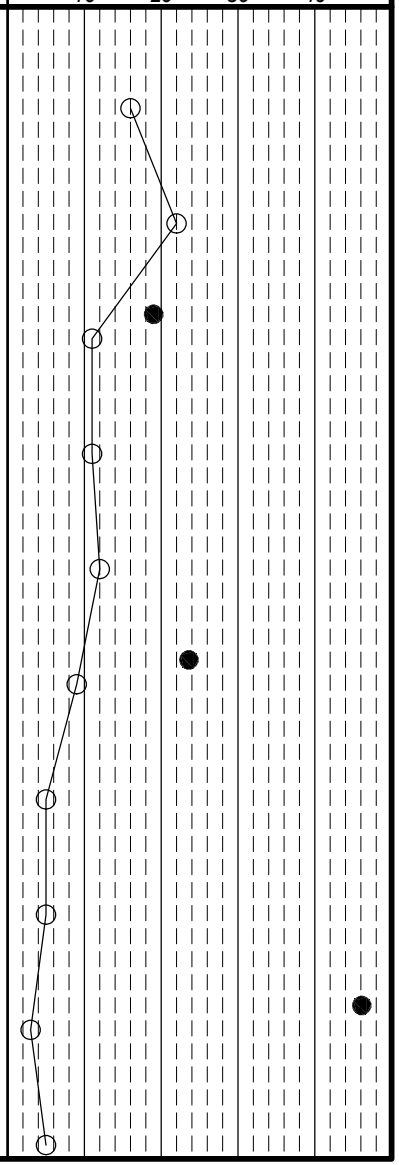
WATER OBSERVATIONS:
Water seepage at: None
Water level at completion: None (inside augers)

DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Rig (#) / ER: CME 750X (289498) / 81.0% | *Driller:* T | *Logger:* JC

Depth (ft)	Elev. (ft) 694.6	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0.7	693.9						Topsoil - 8", Plow Depth - 11.5"							
		2 5 7	16	S-1		2.0	Stiff to very stiff light grayish brown LEAN CLAY (CL); damp to moist.							
5		3 6 10	13	S-2		2.5								
6.0	688.6													
		2 4 4	18	S-3		2.5	Very stiff light gray SILTY CLAY (CL-ML); damp to moist.							
8.5	686.1													
10		2 3 5	18	S-4		2.0	Stiff to very stiff light brown LEAN CLAY (CL); contains black oxide staining; moist.							
		2 5 4	9	S-5		2.0								
13.5	681.1													
15		2 3 4	13	S-6		1.5	Stiff brown to reddish brown LEAN CLAY (CL); contains sand size decomposed chert; damp.							
16.0	678.6													
		1 2 2	9	S-7		1.5	Stiff to medium stiff red FAT CLAY (CH); damp to moist.							
20		2 2 2	18	S-8		1.0								
21.0	673.6													
		1 1 1	18	S-9		0.75	Medium stiff to stiff red FAT CLAY (CH); moist to wet.							
25.0 25	669.6	1 2 2	18	S-10		1.0	@ 23.5', contains decomposed chert fragments Bottom of Boring - 25.0'							

Natural Moisture Content, % - ●
PL ├──┤ LL
N_{60} Value ○ / Non-Plastic - NP



DLZ Ohio, Inc. * 6121 Huntley Road, Columbus, Ohio 43229 * (614) 888-0040

Client: Barton Malow | *Project:* Ford H4 Battery Plant | *Job No.* 2150-9519.50

LOG OF: Boring B-060 | *Location:* As per plan | *Date Drilled:* 11/1/2021

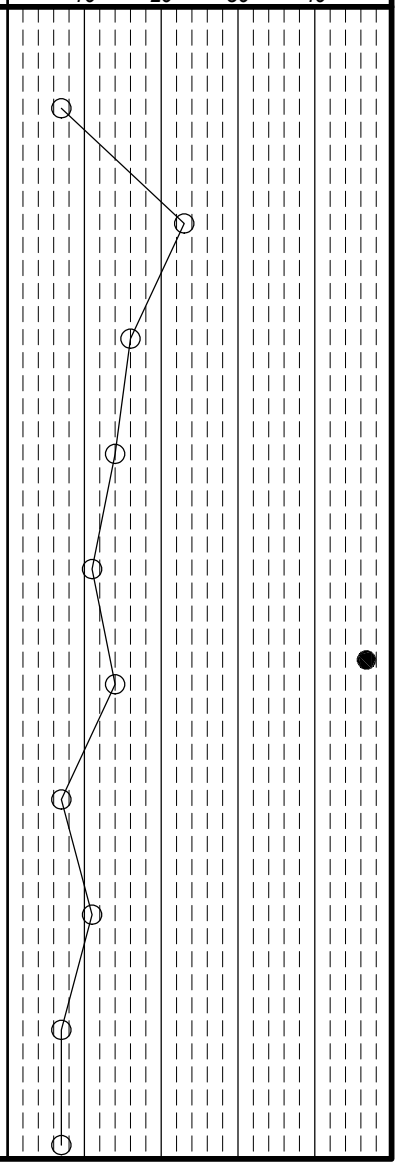
WATER OBSERVATIONS:
Water seepage at: 23.5'
Water level at completion: 0.5' (inside augers) ???

DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Rig (#) / ER: CME 750X (289498) / 81.0% | *Driller:* T | *Logger:* JC

Natural Moisture Content, % - ●
PL ├──┤ LL
N_{60} Value ○ / Non-Plastic - NP
10 20 30 40

Depth (ft)	Elev. (ft) 690.7	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0.5	690.2						Topsoil - 6", Plow Depth - 9.5"							
		WOH 1 4	11	S-1		1.5	Stiff light brown LEAN CLAY (CL); moist.							
3.5	687.2													
5		5 6 11	17	S-2		2.5	Very stiff light brownish gray FAT CLAY (CH); moist.							
6.0	684.7													
		4 5 7	12	S-3		3.0	Very stiff to hard red and light gray FAT CLAY (CH); moist.							
10		5 4 6	18	S-4		4.5+								
		2 3 5	12	S-5		2.5								
13.5	677.2													
15		1 3 7	10	S-6		1.75	Stiff red FAT CLAY (CH); contains sand size decomposed chert suspended in clay matrix; moist.							
		1 2 3	18	S-7		1.5								
18.5	672.2													
20		3 3 5	13	S-8		2.0	Stiff to very stiff red and light brown FAT CLAY (CH); moist.							
21.0	669.7													
		2 2 3	7	S-9		1.0	Medium stiff to stiff red FAT CLAY (CH); contain chert fragments, contains black oxide staining; moist to wet.							
25.0 25	665.7	2 2 3	10	S-10		1.0	Bottom of Boring - 25.0'							



DLZ Ohio, Inc. * 6121 Huntley Road, Columbus, Ohio 43229 * (614) 888-0040

Client: Barton Malow | *Project:* Ford H4 Battery Plant | *Job No.* 2150-9519.50

LOG OF: Boring B-060A | *Location:* As per plan | *Date Drilled:* 11/17/2021

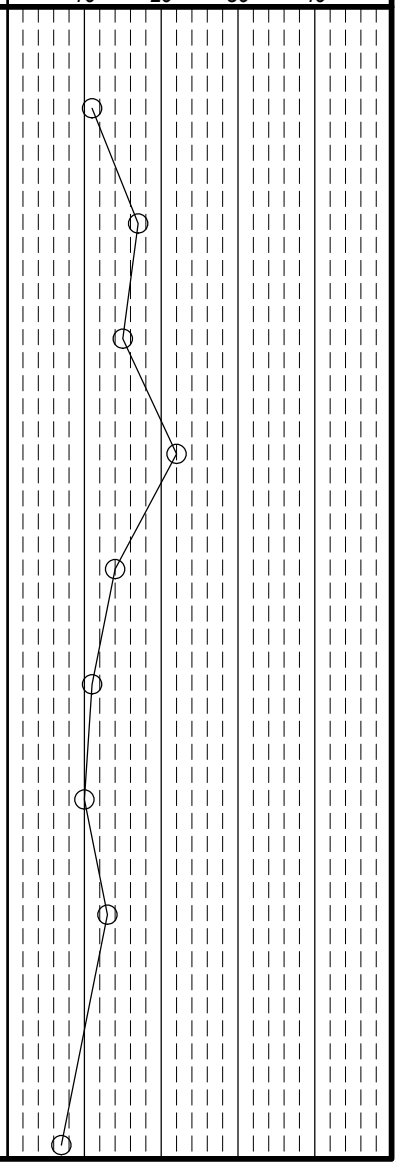
WATER OBSERVATIONS:
Water seepage at: None
Water level at completion: None (inside augers)

DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Rig (#) / ER: CME-850X (400472) / 84.0% | *Driller:* LB | *Logger:* AM

Natural Moisture Content, % - ●
PL ├──┤ LL
N_{60} Value ○ / Non-Plastic - NP
10 20 30 40

Depth (ft)	Elev. (ft) 695.4	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0.1	695.3						Topsoil - NO READING							
3.5	691.9	2 3 5	18	S-1		1.25	Stiff light brown FAT CLAY (CH); moist.							
6.0	689.4	2 4 8	14	S-2		1.5	Stiff light brown SILTY CLAY (CL-ML); damp to moist.							
8.5	686.9	4 4 7	18	S-3		2.0	Stiff to very stiff light brown FAT CLAY (CH); moist.							
11.0	684.4	9 9 7	18	S-4		3.5	Very stiff light brown FAT CLAY (CH); contains chert fragments; moist.							
		4 4 6	18	S-5		2.75	Very stiff to stiff red FAT CLAY (CH); contains chert fragments; moist.							
		2 3 5	18	S-6		1.5								
		2 3 4	17	S-7		1.25								
		2 4 5	18	S-8		0.5	@ 18.5', soft to medium stiff, moist to wet							
23.5	671.9		20		ST-1									
25.0	670.4	1 2 3	18	S-10		1.0	Medium stiff to stiff light brown FAT CLAY (CH); moist. Bottom of Boring - 25.0'							



DLZ Ohio, Inc. * 6121 Huntley Road, Columbus, Ohio 43229 * (614) 888-0040

Client: Barton Malow | *Project:* Ford H4 Battery Plant | *Job No.* 2150-9519.50

LOG OF: Boring B-061 | *Location:* As per plan | *Date Drilled:* 10/29/2021

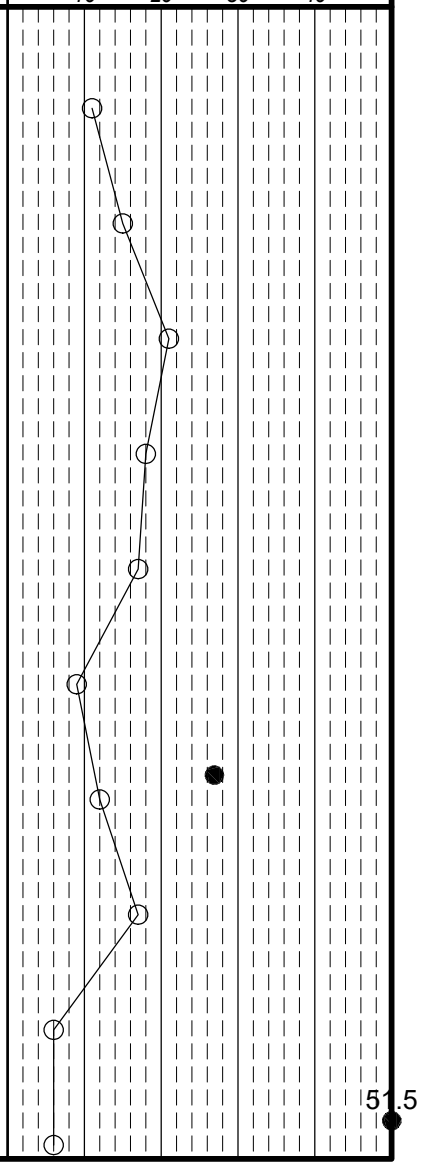
WATER OBSERVATIONS:
Water seepage at: None
Water level at completion: None (inside augers)

DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Rig (#) / ER: / 90.0% | *Driller:* T | *Logger:* JC

Natural Moisture Content, % - ●
PL ├──┤ LL
N_{60} Value ○ / Non-Plastic - NP
10 20 30 40

Depth (ft)	Elev. (ft) 709.8	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0.5	709.3						Topsoil - 6.5", Plow Depth - 8.5"							
		1 2 5	11	S-1		3.25	Very stiff light brown LEAN CLAY (CL); moist.							
3.5	706.3													
5		3 6 4	15	S-2		3.25	Very stiff to hard red with light brown mottling FAT CLAY (CH); damp to moist.							
		3 7 7	16	S-3		4.5+								
10		3 5 7	18	S-4		4.0								
11.0	698.8													
		3 4 7	18	S-5		3.5	Very red FAT CLAY (CH); moist.							
13.5	696.3													
15		2 2 4	18	S-6		2.5	Stiff to very stiff red FAT CLAY (CH); contains chert fragments; moist.							
		3 3 5	18	S-7		2.5								
20		3 5 6	4	S-8		2.0	@ 18.5', low recovery on first drive, drove second splitspoon							
		WOH 1 3	17	S-9		1.75								
25.0 25	684.8	1 2 2	18	S-10		1.5	Bottom of Boring - 25.0'							



DLZ Ohio, Inc. * 6121 Huntley Road, Columbus, Ohio 43229 * (614) 888-0040

Client: Barton Malow | *Project:* Ford H4 Battery Plant | *Job No.* 2150-9519.50

LOG OF: Boring B-062 | *Location:* As per plan | *Date Drilled:* 10/29/2021

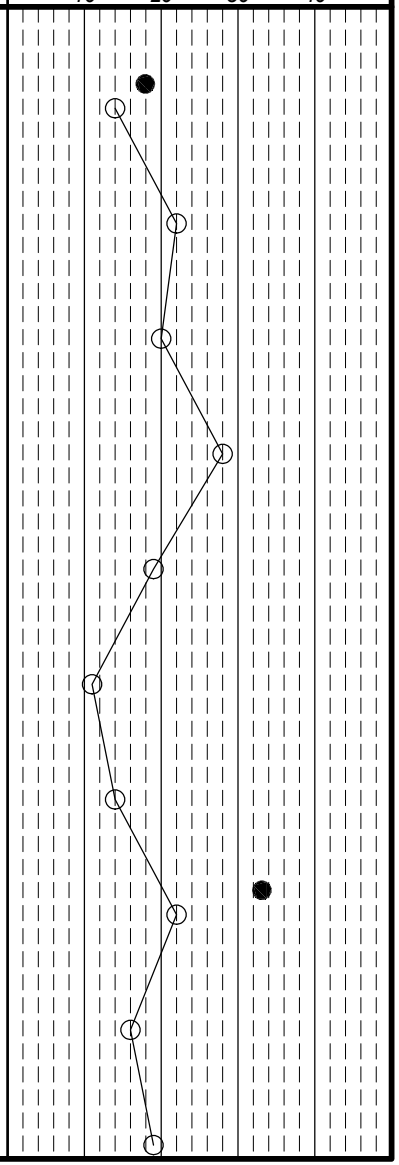
WATER OBSERVATIONS:
Water seepage at: None
Water level at completion: None (inside augers)

DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Depth (ft)	Elev. (ft) 710.5	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0.5	710.0						Topsoil - 6.5", Plow Depth - 10.5"							
		3 4 6	16	S-1		2.5	Very stiff red FAT CLAY (CH); damp.							
3.5	707.0													
		2 6 10	18	S-2		4.0	Hard red with orange verigation FAT CLAY (CH); damp.							
		5 6 9	18	S-3		4.5+								
		4 7 14	18	S-4		4.5+								
11.0	699.5													
		2 7 7	18	S-5		3.5	Very stiff red FAT CLAY (CH); contains weathered chert fragments; moist.							
		2 4 4	18	S-6		2.75								
		4 4 6	18	S-7		3.5								
		2 6 10	18	S-8		3.0								
21.0	689.5													
		5 6 6	5	S-9		1.5	Stiff red FAT CLAY (CH); contains sand and gravel sized weathered chert fragments in clay matrix; moist.							
		5 6 8	18	S-10		1.5								
25.0	685.5						Bottom of Boring - 25.0'							

Rig (#) / ER: CME 750X (289498) / 81.0% | *Driller:* T | *Logger:* JC

Natural Moisture Content, % - ●
PL ├──┤ LL
N_{60} Value ○ / Non-Plastic - NP



Client: Barton Malow | *Project:* Ford H4 Battery Plant | *Job No.* 2150-9519.50

LOG OF: Boring B-063 | *Location:* As per plan | *Date Drilled:* 10/31/2021

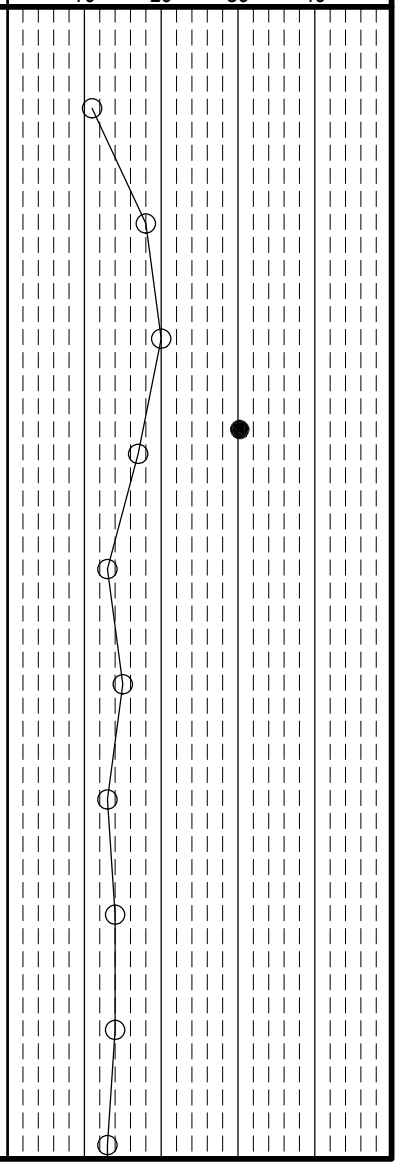
Rig (#) / ER: CME-850X (400472) / 84.0% | *Driller:* LB | *Logger:* AM

WATER OBSERVATIONS:
Water seepage at: 31.0'
Water level at completion: 27.3' (prior to adding water)
12.7' (including coring water)

DRILLING METHODS - Soil: HS Augers

ABANDONMENT - cuttings and bentonite chips

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0.7	701.0						Topsoil - 8", Plow Depth - 14"							
		1 4 4	18	S-1		1.25	Stiff red and brown LEAN CLAY (CL); moist.							
		4 6 7	18	S-2		1.5								
6.0	695.7													
		4 6 8	18	S-3		3.25	Very stiff red LEAN CLAY (CL); moist.							
8.5	693.2													
		5 5 7	18	S-4		3.0	Very stiff red SILTY CLAY (CL-ML); damp to moist.							
		2 4 5	18	S-5		2.5								
13.5	688.2													
		2 5 6	18	S-6		2.0	Stiff to very stiff red FAT CLAY (CH); moist.							
		2 4 5		S-7		1.5								
		3 5 5		S-8		3.5	@ 18.5'-21.0', very stiff							
		5 5 5	18	S-9		1.5								
	676.7	4 4 5	18	S-10		1.25								



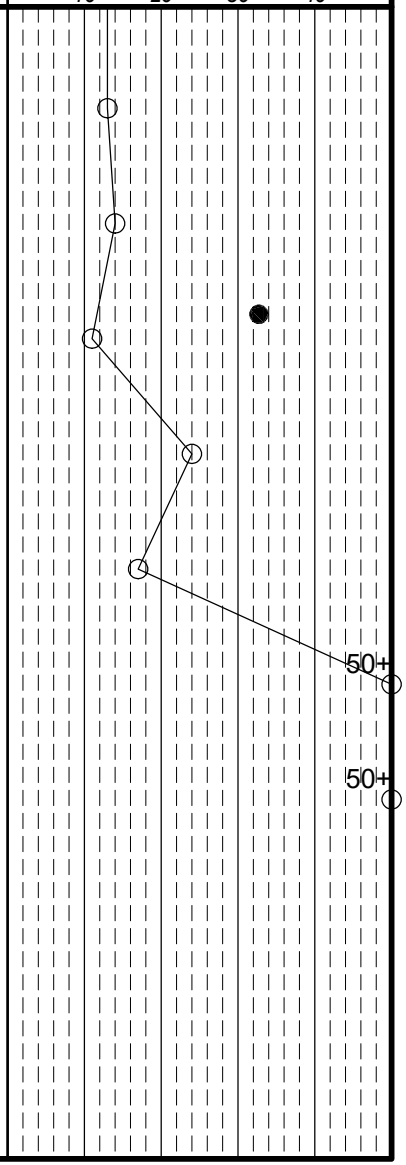
Client: Barton Malow	Project: Ford H4 Battery Plant	Job No. 2150-9519.50
LOG OF: Boring B-063	Location: As per plan	Date Drilled: 10/31/2021

WATER OBSERVATIONS:
Water seepage at: 31.0'
Water level at completion: 27.3' (prior to adding water)
12.7' (including coring water)
DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Rig (#) / ER: CME-850X (400472) / 84.0% — Driller: LB — Logger: AM

Natural Moisture Content, % - ●
PL ├──┤ LL
N_{60} Value ○ / Non-Plastic - NP

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
	676.7													
26.0	675.7						Stiff to very stiff red FAT CLAY (CH); moist. (continued)							
		3 5 4	18	S-11		1.0	Medium stiff to stiff FAT CLAY (CH); contains decomposed chert fragments suspended in clay matrix; moist.							
		6 5 5		S-12		1.0								
30														
		3 3 5	18	S-13		1.5								
		10 7 10	16	S-14		0.25	@ 33.5', soft to very soft; moist to wet							
35														
		1 4 8	18	S-15		0.5	@ 36.0', soft to medium stiff; contains large decomposed rock fragments							
38.5	663.2													
		25 50/5		S-16			Soft yellowish gray decomposed LIMESTONE and limestone fragments.							
40							@ 40.0', occasional drill rig chatter							
		29 50/3	8	S-17			@ 41.0', rock fragments							
44.0	657.7						@ 43.5', drill rig chatter @ 44.0', seated augers to begin rock coring							
45		Core 60"	Rec 25"	RQD 76%	1		Hard to very hard light gray to gray LIMESTONE; very fine to fine grained, slightly to moderately weathered, thickly bedded, moderately fractured to broken, vuggy, Karstic solutioning on fracture surfaces, significant core loss due to solutioning. @ 44.3'-44.5', clay filled void.							
49.0	652.7						@ 45.5'-46.9', suspected void with 4" of clay infilling at the bottom.							
50	651.7	c:60"	r:57"	q:56%	2									



Client: Barton Malow	Project: Ford H4 Battery Plant	Job No. 2150-9519.50
LOG OF: Boring B-063	Location: As per plan	Date Drilled: 10/31/2021

WATER OBSERVATIONS:
Water seepage at: 31.0'
Water level at completion: 27.3' (prior to adding water)
12.7' (including coring water)
DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Rig (#) / ER: CME-850X (400472) / 84.0%
Driller: LB
Logger: AM

Natural Moisture Content, % - ●
PL ⊢——⊣ LL
N_{60} Value ○ / Non-Plastic - NP
10 20 30 40

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
	651.7													
		Core 60"	Rec 57"	RQD 56%	2		@ 46.0'-51.0', core has 35" of core loss due to suspected voids. Hard to very hard light gray to gray LIMESTONE; very fine to fine grained, slightly to moderately weathered, thickly bedded, moderately fractured, vuggy, karstic solutioning on fracture surfaces, significant core loss due to solutioning. (continued)							
54.0	647.7						Bottom of Boring - 54.0'							
55														
60														
65														
70														
75														

DLZ Ohio, Inc. * 6121 Huntley Road, Columbus, Ohio 43229 * (614) 888-0040

Client: Barton Malow | *Project:* Ford H4 Battery Plant | *Job No.* 2150-9519.50

LOG OF: Boring B-064 | *Location:* As per plan | *Date Drilled:* 10/29/2021

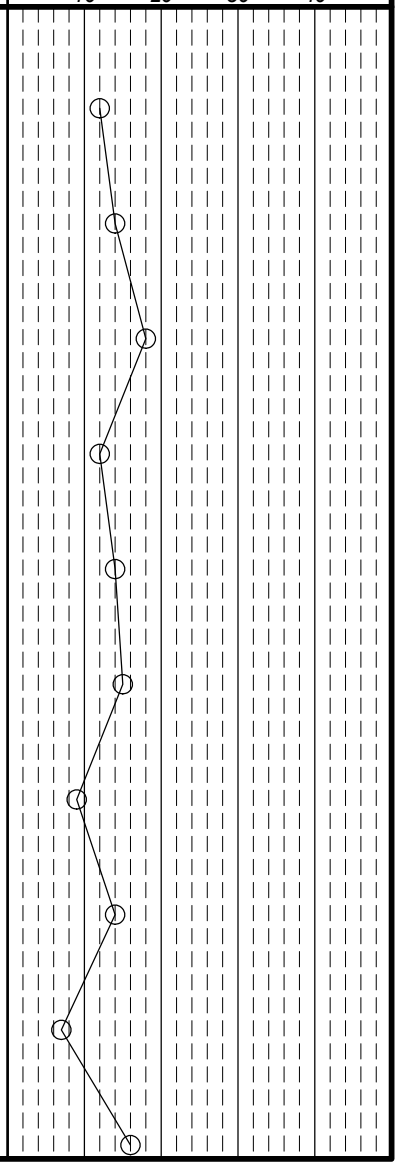
WATER OBSERVATIONS:
Water seepage at: 23.5 or 15.5?
Water level at completion: 9.5' (inside augers)

DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Rig (#) / ER: CME 750X (289498) / 81.0% | *Driller:* T | *Logger:* JC

Natural Moisture Content, % - ●
PL ├──┤ LL
N_{60} Value ○ / Non-Plastic - NP
10 20 30 40

Depth (ft)	Elev. (ft) 696.1	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0.4	695.7						Topsoil - 4.5", Plow Depth - 8.5"							
		2 4 5	11	S-1		1.0	Stiff to medium stiff light brown LEAN CLAY (CL); damp.							
3.5	692.6													
5		2 5 5	18	S-2		3.0	Very stiff reddish light brown LEAN CLAY (CL); damp.							
6.0	690.1													
		2 6 7	11	S-3		3.5	Very stiff red and light brown FAT CLAY (CH); moist.							
8.5	687.6													
10		3 4 5	18	S-4		2.5	Stiff to very stiff, light grayish brown FAT CLAY (CH); contains chert fragments; moist.							
		5 4 6	14	S-5		2.0								
13.5	682.6													
15		2 5 6	13	S-6		2.75	Very stiff red FAT CLAY (CH); contains sand size decomposed chert fragments suspended in clay matrix; moist.							
		2 3 4	12	S-7		2.75								
20		2 3 7	12	S-8		2.25								
21.0	675.1													
		2 2 3	18	S-9		2.25	Very stiff red FAT CLAY (CH) with gravel; contains gravel size decomposed chert; moist.							
23.5	672.6													
25.0 25	671.1	2 7 5	18	S-10		1.5	Stiff red FAT CLAY (CH); contains decomposed chert fragments; moist to wet.							



Client: Barton Malow	Project: Ford H4 Battery Plant	Job No. 2150-9519.50
LOG OF: Boring B-064	Location: As per plan	Date Drilled: 10/29/2021

WATER OBSERVATIONS:
Water seepage at: 23.5 or 15.5?
Water level at completion: 9.5' (inside augers)

DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Rig (#) / ER: CME 750X (289498) / 81.0%
Driller: T
Logger: JC

Natural Moisture Content, % - ●
PL ○ LL / Non-Plastic - NP
N_{60} Value

Depth (ft)	Elev. (ft) 671.1	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	GRADATION
							Bottom of Boring - 25.0'								
30															
35															
40															
45															
50															

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Client: Barton Malow | *Project:* Ford H4 Battery Plant | *Job No.* 2150-9519.50

LOG OF: Boring B-065 | *Location:* As per plan | *Date Drilled:* 10/29/2021

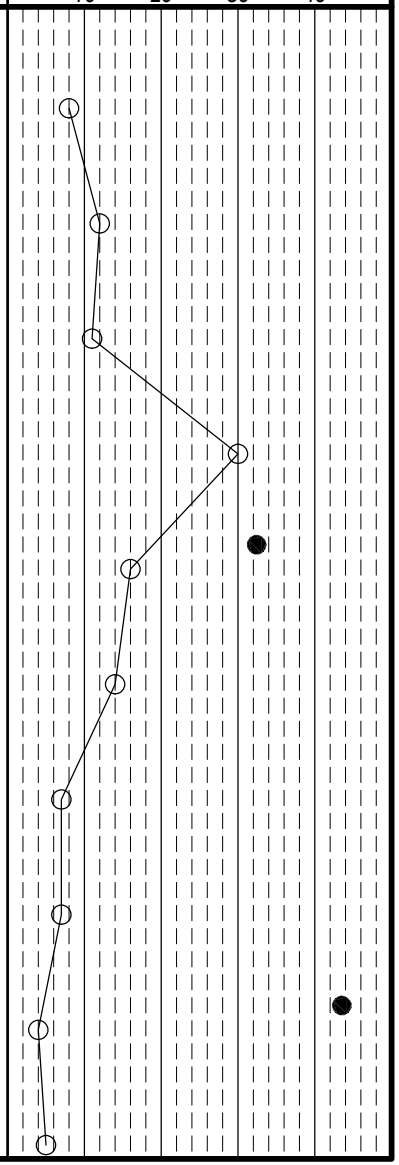
WATER OBSERVATIONS:
Water seepage at: None
Water level at completion: None (inside augers)

DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Rig (#) / ER: CME 750X (289498) / 81.0% | *Driller:* T | *Logger:* JC

Natural Moisture Content, % - ●
PL ├──┤ LL
N_{60} Value ○ / Non-Plastic - NP
10 20 30 40

Depth (ft)	Elev. (ft) 695.3	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0.4	694.9						Topsoil - 5", Plow Depth - 12.5"							
		1 2 4	10	S-1		4.5+	Hard brown LEAN CLAY (CL); moist.							
3.5	691.8													
5		1 5 4	16	S-2		2.0	Stiff to very stiff light gray SILTY CLAY (CL-ML); damp.							
6.0	689.3													
		1 4 4	12	S-3		4.5+	Hard light brownish gray LEAN CLAY (CL); damp.							
8.5	686.8													
10		3 12 10	13	S-4		4.5+	Hard light brown LEAN CLAY (CL); contains large decomposed rock fragments; damp.							
11.0	684.3													
		4 6 6	16	S-5		3.0	Very stiff red LEAN CLAY (CL); contains decomposed chert fragments; damp.							
15		2 4 6	15	S-6		3.5								
16.0	679.3													
		1 2 3	15	S-7		1.25	Stiff to medium stiff red FAT CLAY (CH); contains decomposed chert fragments; moist.							
20		1 2 3	16	S-8		1.0								
21.0	674.3													
		1 2 1	18	S-9		0.75	Soft to medium stiff red FAT CLAY (CH); contains decomposed chert fragments; wet.							
25.0 25	670.3	1 2 2	18	S-10		0.5	Bottom of Boring - 25.0'							



Client: Barton Malow | *Project:* Ford H4 Battery Plant | *Job No.* 2150-9519.50

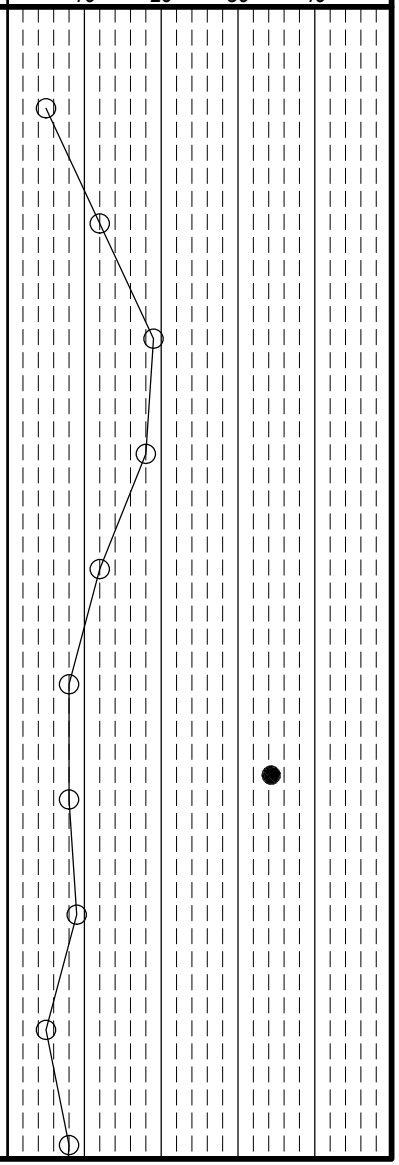
LOG OF: Boring B-065A | *Location:* As per plan | *Date Drilled:* 11/18/2021 to 11/19/2021

WATER OBSERVATIONS:
Water seepage at: 18.5'
Water level at completion: 17.5' (inside augers)
3.5' (with augers removed - 25 hrs)
DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Rig (#) / ER: CME 750X (289498) / 81.0% | *Driller:* VD | *Logger:* JC

Natural Moisture Content, % - ●
PL ○ / LL ⊣ ⊢ / Non-Plastic - NP
N_{60} Value 10 20 30 40

Depth (ft)	Elev. (ft) 692.7	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0.8	691.9						Topsoil - 9", Plow Depth - 11"							
3.5	689.2	2 2 2	10	S-1		2.5	Very still brown LEAN CLAY (CL); damp to moist.							
6.0	686.7	4 4 5	11	S-2		4.5+	Hard gray FAT CLAY (CH); contains stone fragments; damp.							
8.5	684.2	4 6 8	9	S-3		4.5+	Hard brown and gray FAT CLAY (CH); contains stone fragments; moist.							
		4 6 7	18	S-4		2.5	Stiff to very stiff gray FAT CLAY (CH); contains stone fragments; moist.							
13.5	679.2	4 5 4	18	S-5		2.0								
16.0	676.7	1 2 4	12	S-6		2.0	Stiff to very stiff reddish brown FAT CLAY (CH); contains stone fragments; moist.							
		2 3 3	5	S-7		1.25	Stiff light brown FAT CLAY (CH); moist to wet.							
21.0	671.7	4 4 3	9	S-8		1.5	@ 18.5', red							
23.5	669.2	1 2 2	7	S-9		1.0	Medium stiff to stiff light reddish brown and gray FAT CLAY (CH); wet.							
	667.7	2 2 4	12	S-10			Loose light brown SAND (SP); wet.							



Client: Barton Malow | *Project:* Ford H4 Battery Plant | *Job No.* 2150-9519.50

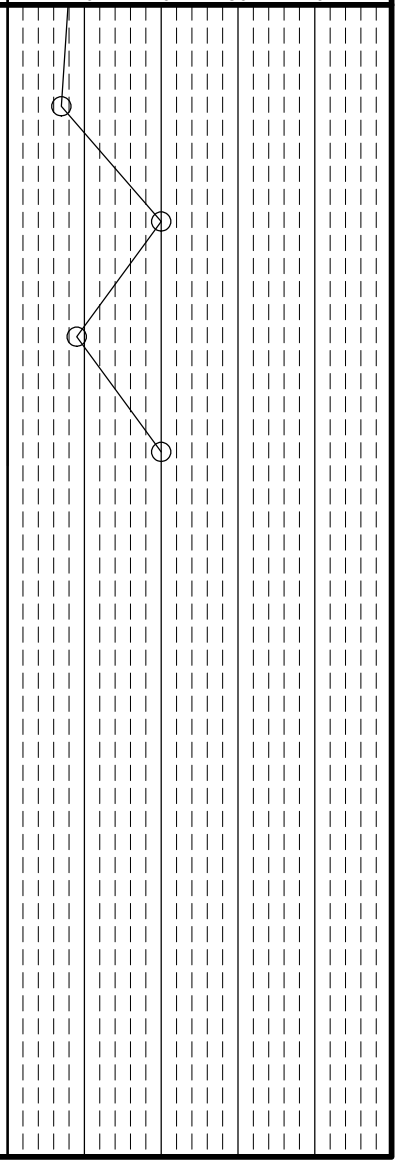
LOG OF: Boring B-065A | *Location:* As per plan | *Date Drilled:* 11/18/2021 to 11/19/2021

WATER OBSERVATIONS:
Water seepage at: 18.5'
Water level at completion: 17.5' (inside augers)
3.5' (with augers removed - 25 hrs)
DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Rig (#) / ER: CME 750X (289498) / 81.0% | *Driller:* VD | *Logger:* JC

Natural Moisture Content, % - ●
PL ├──┤ LL
N_{60} Value ○ / Non-Plastic - NP

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
	667.7													
							Loose light brown SAND (SP); wet. (continued)							
		WOH 2 3	12	S-11										
		1 6 9	14	S-12			@ 28.5', medium dense							
31.0	661.7													
		1 2 5	18	S-13		0.75	Medium stiff light reddish brown FAT CLAY (CH); wet.							
33.5	659.2						@ 32.5'-33.5', mild drill rig chatter							
35.0	657.7	7 8 7	13	S-14		2.5	Medium dense light brownish gray SAND (SP-SM) with silt; decomposed rock; moist.							
							Bottom of Boring - 35.0'							



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Client: Barton Malow | *Project:* Ford H4 Battery Plant | *Job No.* 2150-9519.50

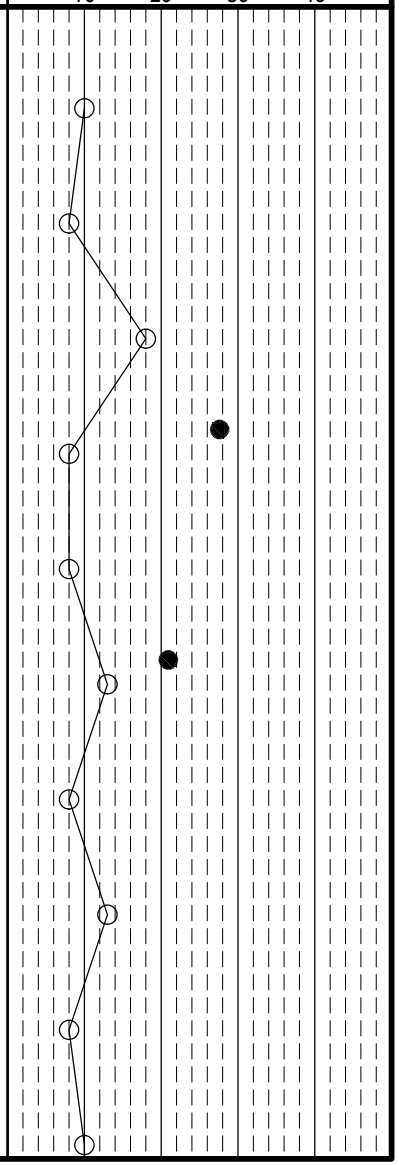
LOG OF: Boring B-066 | *Location:* As per plan | *Date Drilled:* 10/31/2021

WATER OBSERVATIONS:
Water seepage at: 53.5'
Water level at completion: 44.6' (prior to adding water)
12.9' (includes coring water)
DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Rig (#) / ER: CME-850X (400472) / 84.0% | *Driller:* LB | *Logger:* AM

Natural Moisture Content, % - ●
PL ├──┤ LL
N_{60} Value ○ / Non-Plastic - NP

Depth (ft)	Elev. (ft) 702.4	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0.7	701.7						Topsoil - 8"							
		3 2 5	16	S-1		1.5	Stiff gray SILTY CLAY (CL-ML); moist.							
3.5	698.9													
5		1 2 4	15	S-2		3.25	Very stiff to stiff light brown and gray mottled LEAN CLAY (CL); moist.							
		3 6 7		S-3		1.25								
8.5	693.9													
10		4 2 4		S-4		1.5	Stiff light brown LEAN CLAY (CL); moist.							
11.0	691.4													
		2 2 4		S-5		1.0	Medium stiff to stiff brown LEAN CLAY (CL); contains black oxide staining; moist.							
13.5	688.9													
15		3 4 5		S-6		3.0	Very stiff brown and black SILTY CLAY (CL-ML); contains black oxide staining; damp.							
16.0	686.4													
		3 3 3	18	S-7		2.5	Very stiff light grayish brown SILTY CLAY (CL-ML); moist.							
20		2 4 5	18	S-8		3.0								
21.0	681.4													
		3 3 3	15	S-9		1.5	Stiff to medium stiff light gray and brown LEAN CLAY (CL); moist.							
25	677.4	4 3 4	18	S-10		1.0								



Client: Barton Malow | *Project:* Ford H4 Battery Plant | *Job No.* 2150-9519.50

LOG OF: Boring B-066 | *Location:* As per plan | *Date Drilled:* 10/31/2021

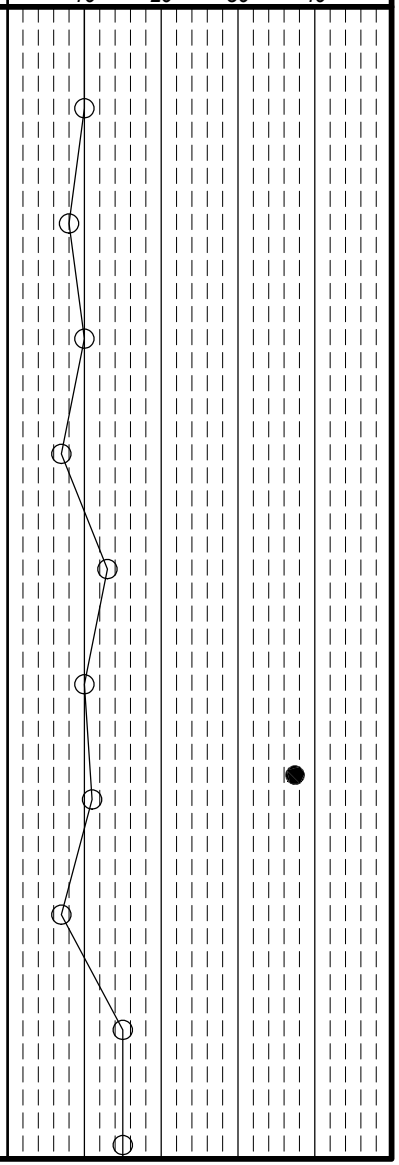
Rig (#) / ER: CME-850X (400472) / 84.0% | *Driller:* LB | *Logger:* AM

WATER OBSERVATIONS:
Water seepage at: 53.5'
Water level at completion: 44.6' (prior to adding water)
12.9' (includes coring water)

DRILLING METHODS - Soil: HS Augers

ABANDONMENT - cuttings and bentonite chips

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
677.4														
		2 3 4	18	S-11		1.5	Stiff to medium stiff light gray and brown LEAN CLAY (CL); moist. (continued)							
28.5	673.9													
30		2 2 4	18	S-12		1.25	Medium stiff to stiff red FAT CLAY (CH); moist.							
		2 3 4	18	S-13		1.0								
33.5	668.9													
35		3 2 3	18	S-14		1.25	Stiff red LEAN CLAY (CL); moist.							
		2 5 4	18	S-15		1.5								
38.5	663.9													
40		2 3 4	18	S-16		1.0	Medium stiff to stiff red FAT CLAY (CH); contains sand and gravel sized decomposed chert fragments; moist.							
		3 4 4	18	S-17		1.0								
45		3 2 3	10	S-18		0.75								
		1 4 7	18	S-19		1.25								
50	652.4	2 4 7	18	S-20		0.75								



Client: Barton Malow | *Project:* Ford H4 Battery Plant | *Job No.* 2150-9519.50

LOG OF: Boring B-066 | *Location:* As per plan | *Date Drilled:* 10/31/2021

Rig (#) / ER CME-850X (400472) / 84.0% | *Driller* LB | *Logger* AM

WATER OBSERVATIONS:
Water seepage at: 53.5'
Water level at completion: 44.6' (prior to adding water)
12.9' (includes coring water)

DRILLING METHODS - Soil: HS Augers

ABANDONMENT - cuttings and bentonite chips

Depth (ft)	Elev. (ft) 652.4	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
			24		ST-1		Medium stiff to stiff red FAT CLAY (CH); contains sand and gravel sized decomposed chert fragments; moist. (continued)							
53.5	648.9													
55		3 4 7	12	S-21		0.5	Soft to medium stiff LEAN CLAY (CL) with gravel; wet.							
56.0	646.4													
		3 5 4	13	S-22			Medium dense light brown GRAVEL (GP-GC) with clay; wet.							
58.5	643.9						@ 57.5', drill rig chatter							
60		6 4 7	14	S-23			Rock fragments, decomposed LIMESTONE.							
		50/3	3	S-24			@ 60.0', occasional drill rig chatter							
65.0 65	637.4						@ 65.0', seated augers to begin rock coring							
70		Core 60"	Rec 7"	RQD 0%	1		Light gray to gray LIMESTONE; very fine to fine grained, karstic solutioning on fracture surfaces, significant core loss due to solutioning. @ 65.0'-70.0', core has 53" of loss due to suspected voids.							
70.5	631.9													
75							Bottom of Boring - 70.5'							

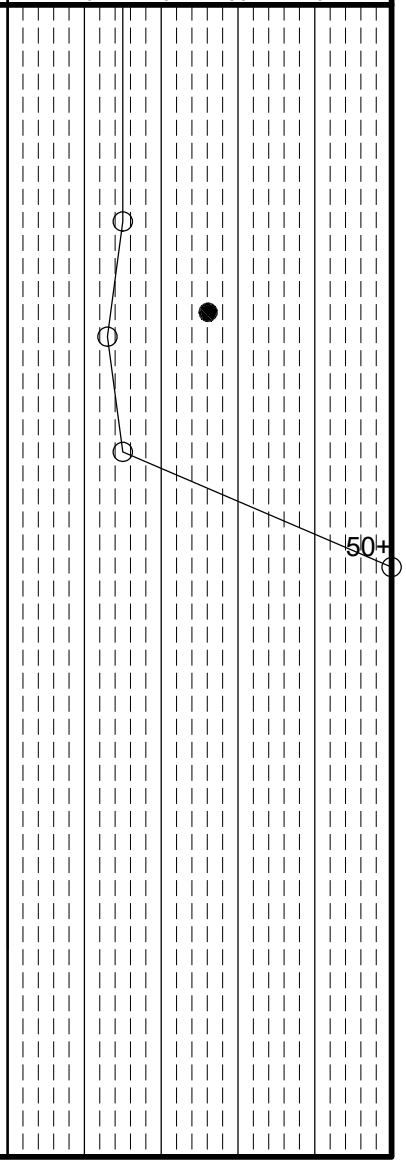
GRADATION

Natural Moisture Content, % - ●

PL ⊢——⊣ LL

N_{60} Value ○ / Non-Plastic - NP

10 20 30 40



DLZ Ohio, Inc. * 6121 Huntley Road, Columbus, Ohio 43229 * (614) 888-0040

Client: Barton Malow | *Project:* Ford H4 Battery Plant | *Job No.* 2150-9519.50

LOG OF: Boring B-067 | *Location:* As per plan | *Date Drilled:* 10/29/2021

WATER OBSERVATIONS:
Water seepage at: None
Water level at completion: None (inside augers)

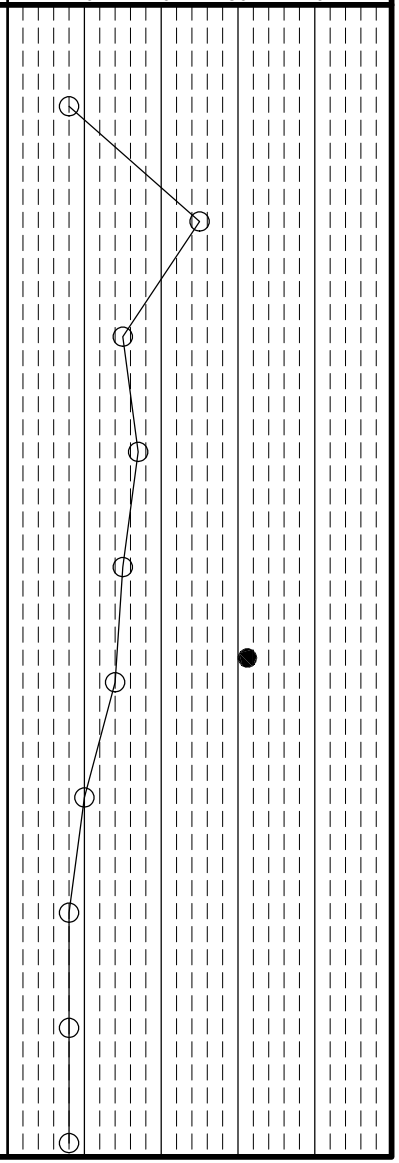
DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Depth (ft)	Elev. (ft) 700.2	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0.4	699.8						Topsoil - 5", Plow Depth - 12"							
		3 3 3	18	S-1		0.75	Medium stiff gray LEAN CLAY (CL); moist.							
3.5	696.7													
5		4 8 10	18	S-2		3.5	Very stiff gray LEAN CLAY (CL); contains stone fragments and oxide stain; damp.							
6.0	694.2													
		6 6 5	18	S-3		3.0	Very stiff ted and light brown mottled FAT CLAY (CH); moist.							
8.5	691.7													
10		4 6 6	18	S-4		3.5	Very stiff red FAT CLAY (CH); contains chert fragments, black oxide staining; moist.							
		3 5 6	18	S-5		2.75								
15		5 4 6	18	S-6		2.25								
		3 4 3	18	S-7		1.5	@ 16.0'-21.0'; stiff.							
20		3 3 3	18	S-8		1.25								
21.0	679.2													
		3 3 3	18	S-9		0.75	Soft to medium stiff red FAT CLAY (CH); moist.							
25.0 25	675.2	3 3 3	18	S-10		0.5	Bottom of Boring - 25.0'							

GRADATION

Rig (#) / ER: CME-850X (400472) / 84.0%
Driller: LB
Logger: AM

Natural Moisture Content, % - ●
PL ├──┤ LL
N_{60} Value ○ / Non-Plastic - NP



DLZ Ohio, Inc. * 6121 Huntley Road, Columbus, Ohio 43229 * (614) 888-0040

Client: Barton Malow | *Project:* Ford H4 Battery Plant | *Job No.* 2150-9519.50

LOG OF: Boring B-068 | *Location:* As per plan | *Date Drilled:* 10/29/2021

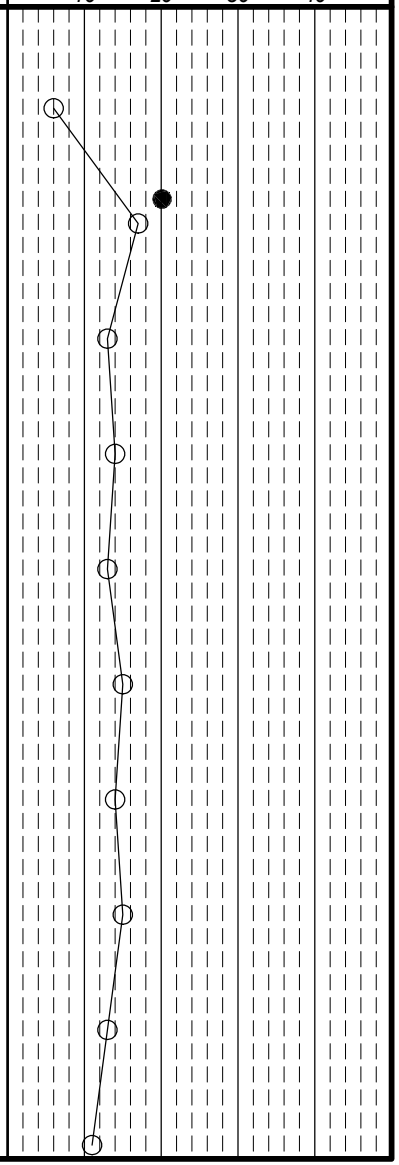
WATER OBSERVATIONS:
Water seepage at: None
Water level at completion: None (inside augers)

DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Rig (#) / ER: CME-850X (400472) / 84.0% | *Driller:* LB | *Logger:* AM

Natural Moisture Content, % - ●
PL ├──┤ LL
N_{60} Value ○ / Non-Plastic - NP
10 20 30 40

Depth (ft)	Elev. (ft) 697.1	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0.4	696.7						Topsoil - 5", Plow Depth - 11"-12"							
		2 2 2	16	S-1		1.5	Medium stiff gray LEAN CLAY (CL); contains black oxide staining; moist.							
3.5	693.6													
5		3 6 6	18	S-2		4.5+	Hard light brown and light gray LEAN CLAY (CL); damp.							
6.0	691.1													
7.0	690.1	4 4 5	18	S-3		2.75	Very stiff light brown and light gray mottled FAT CLAY (CH); damp to moist.							
							Stiff to very stiff red FAT CLAY (CH): damp.							
10		5 4 6	17	S-4		1.75								
		4 5 4	18	S-5		3.75								
15		5 5 6	18	S-6		3.0	@ 13.5'-16.0'; contains black oxide stain.							
16.0	681.1						@ 15.0'-16.0', slight continuous drill rig chatter							
		4 4 6	18	S-7		2.25	Stiff to very stiff red FAT CLAY (CH); contains chert fragments; damp.							
20		5 5 6	18	S-8		2.0								
21.0	676.1													
		3 4 5	18	S-9		1.75	Stiff red FAT CLAY (CH); moist.							
25.0 25	672.1	3 4 4	18	S-10		1.75	Bottom of Boring - 25.0'							



DLZ Ohio, Inc. * 6121 Huntley Road, Columbus, Ohio 43229 * (614) 888-0040

Client: Barton Malow	Project: Ford H4 Battery Plant	Job No. 2150-9519.50
LOG OF: Boring B-069	Location: As per plan	Date Drilled: 10/29/2021

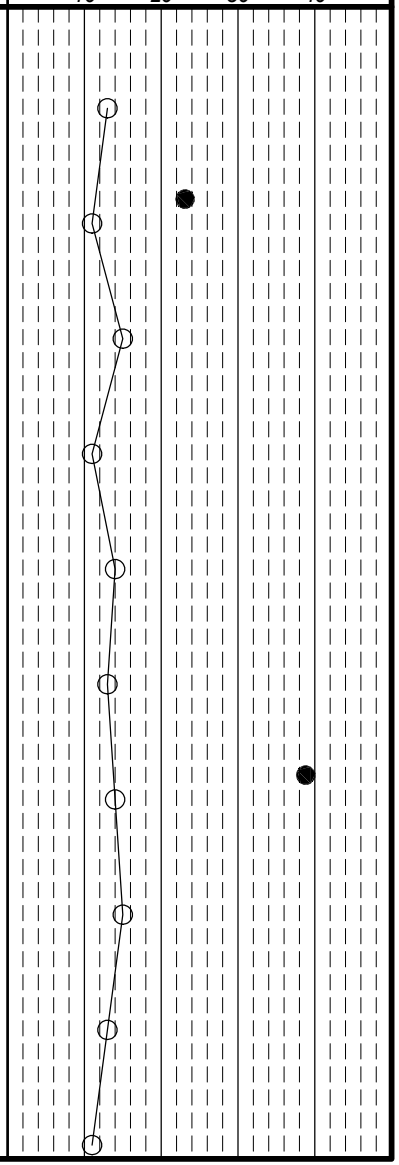
WATER OBSERVATIONS:
Water seepage at: None
Water level at completion: None (inside augers)

DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Rig (#) / ER: CME-850X (400472) / 84.0% — Driller: LB — Logger: AM

Natural Moisture Content, % - ●
PL ⊢——⊣ LL
N_{60} Value ○ / Non-Plastic - NP
10 20 30 40

Depth (ft)	Elev. (ft) 693.5	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0.6	692.9						Topsoil - 7", Plow Depth - 12"							
		3 5 4	15	S-1		1.5	Stiff gray LEAN CLAY (CL); moist.							
3.5	690.0													
5		6 4 4	18	S-2		3.25	Very stiff gray and brown mottled LEAN CLAY (CL); contains silty sand seams; damp.							
6.0	687.5													
		3 6 5	18	S-3		2.75	Stiff to very stiff red FAT CLAY (CH); damp to moist.							
10		2 3 5	18	S-4		1.5								
		4 5 5	18	S-5		2.75								
13.5	680.0													
15		6 4 5	18	S-6		2.75	Very stiff reddish light brown FAT CLAY (CH); moist.							
16.0	677.5													
		3 5 5	18	S-7		1.25	Stiff red FAT CLAY (CH); damp.							
20		3 5 6	18	S-8		1.5								
21.0	672.5													
		6 3 6	18	S-9		1.0	Medium stiff to stiff red FAT CLAY (CH); contains chert fragments; moist.							
25.0 25	668.5	3 4 4	16	S-10		0.75	Bottom of Boring - 25.0'							



DLZ Ohio, Inc. * 6121 Huntley Road, Columbus, Ohio 43229 * (614) 888-0040

Client: Barton Malow | *Project:* Ford H4 Battery Plant | *Job No.* 2150-9519.50

LOG OF: Boring B-070 | *Location:* As per plan | *Date Drilled:* 10/29/2021

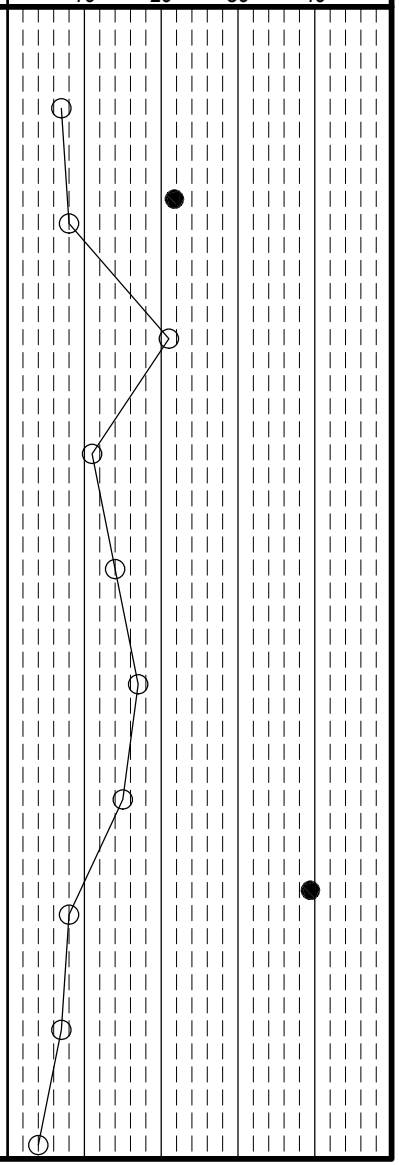
WATER OBSERVATIONS:
Water seepage at: None
Water level at completion: None (inside augers)

DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Rig (#) / ER: CME-850X (400472) / 84.0% | *Driller:* LB | *Logger:* AM

Natural Moisture Content, % - ●
PL ├──┤ LL
N_{60} Value ○ / Non-Plastic - NP
10 20 30 40

Depth (ft)	Elev. (ft) 692.3	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0.4	691.9						Topsoil - 4"-5", Plow Depth - 12"							
		3 2 3	16	S-1		1.0	Medium stiff to stiff light brown LEAN CLAY (CL); moist.							
3.5	688.8													
5		2 3 3	11	S-2		1.75	Stiff gray SILTY CLAY (CL-ML); damp.							
6.0	686.3													
		5 7 8	16	S-3		2.5	Very stiff gray FAT CLAY (CH); damp to moist.							
10		3 4 4	18	S-4		2.5								
11.0	681.3													
		3 4 6	18	S-5		3.5	Very stiff red FAT CLAY (CH); damp to moist.							
13.5	678.8													
15		3 5 7	18	S-6		2.0	Stiff to very stiff red FAT CLAY (CH); contains chert fragments; moist.							
		3 5 6	8	S-7		1.5								
18.5	673.8													
20		2 3 3	18	S-8		1.5	Stiff light reddish brown FAT CLAY (CH); moist.							
21.0	671.3													
		2 2 3	18	S-9		1.0	Medium stiff to stiff light brown FAT CLAY (CH); moist.							
25.0 25	667.3	2 1 2	18	S-10		0.75	@ 23.5'-25.0'; gray, moist to moist. Bottom of Boring - 25.0'							



DLZ Ohio, Inc. * 6121 Huntley Road, Columbus, Ohio 43229 * (614) 888-0040

Client: Barton Malow	Project: Ford H4 Battery Plant	Job No. 2150-9519.50
LOG OF: Boring B-070A	Location: As per plan	Date Drilled: 11/19/2021

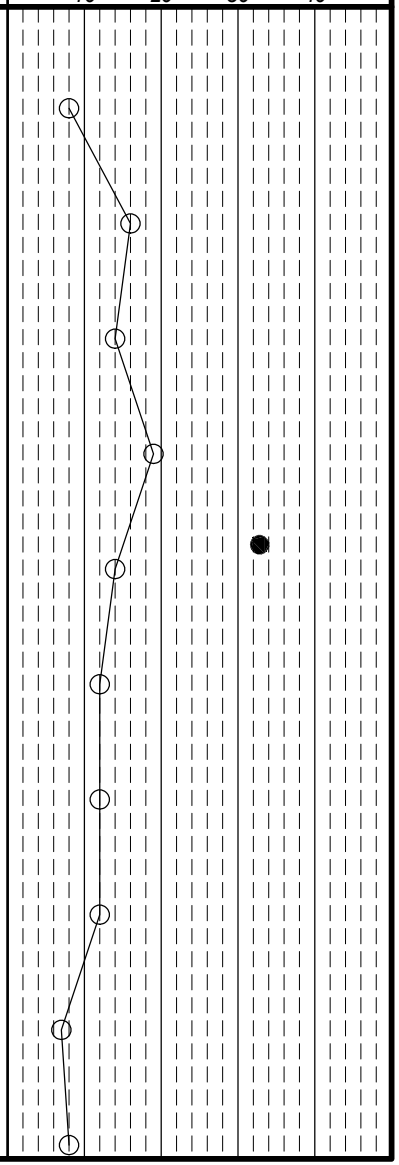
WATER OBSERVATIONS:
Water seepage at: None
Water level at completion: None (inside augers)

DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Rig (#) / ER: CME 750X (289498) / 81.0% — Driller: VD — Logger: JC

Natural Moisture Content, % - ●
PL — LL
N_{60} Value ○ / Non-Plastic - NP
10 20 30 40

Depth (ft)	Elev. (ft) 692.2	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0.4	691.8						Topsoil - 5", Plow Depth - 8"							
		4 2 4	7	S-1		2.0	Stiff to very stiff light brown LEAN CLAY (CL); moist.							
3.5	688.7													
5		2 5 7	12	S-2		4.5	Hard light brown and light gray mottled LEAN CLAY (CL); moist.							
6.0	686.2													
		3 5 5	13	S-3		2.75	Very stiff light brown FAT CLAY (CH); contains decomposed rock fragments; moist.							
8.5	683.7													
10		5 7 7	18	S-4		3.0	Very stiff light gray and red FAT CLAY (CH); contains decomposed rock fragments; moist.							
11.0	681.2													
		3 5 5	18	S-5		3.5	Very stiff to stiff red FAT CLAY (CH); contains chert fragments; moist.							
15		3 4 5	18	S-6		2.5								
		4 4 5	18	S-7		2.5								
20		3 4 5	18	S-8		2.0								
		2 2 3	18	S-9		2.0								
25.0 25	667.2	1 2 4	18	S-10		2.0	Bottom of Boring - 25.0'							



DLZ Ohio, Inc. * 6121 Huntley Road, Columbus, Ohio 43229 * (614) 888-0040

Client: Barton Malow | *Project:* Ford H4 Battery Plant | *Job No.* 2150-9519.50

LOG OF: Boring B-071 | *Location:* As per plan | *Date Drilled:* 10/28/2021

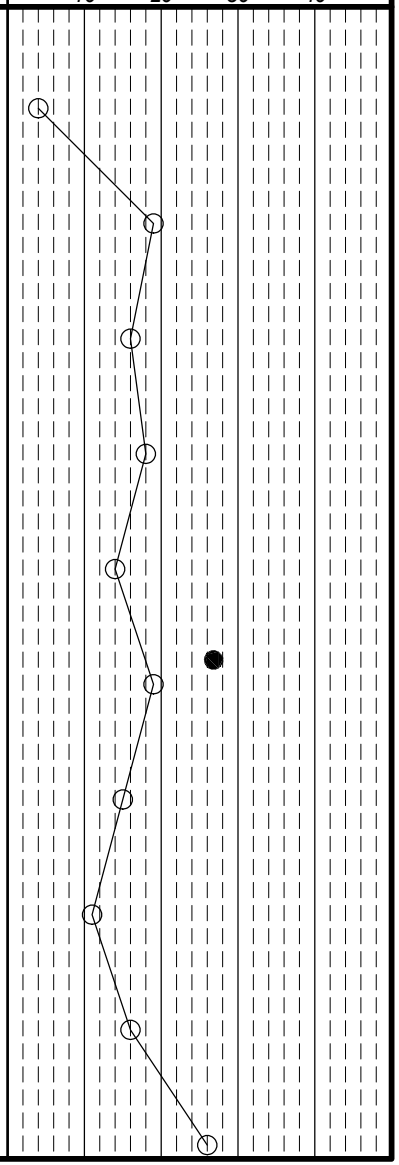
WATER OBSERVATIONS:
Water seepage at: None
Water level at completion: None (inside augers)

DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Depth (ft)	Elev. (ft) 706.6	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
		1 1 2	12	S-1		0.75	Medium stiff light brown LEAN CLAY (CL); moist.							
3.5	703.1													
5		2 6 8	15	S-2		4.5+	Hard dark reddish brown and gray FAT CLAY (CH); moist.							
6.0	700.6													
		3 5 7	18	S-3		3.0	Very stiff red FAT CLAY (CH); moist.							
10		3 5 8	18	S-4		2.75								
		3 5 5	18	S-5		2.5								
15		4 ? 9	18	S-6		3.0	@ 13.5'-16.0', contains chert fragments							
		3 4 7	15	S-7		2.75								
20		2 2 6	18	S-8		3.5								
		3 3 9	18	S-9		2.75	@ 21.0'-25.0', contains chert fragments							
25.0 25	681.6	3 9 10	18	S-10		3.25	Bottom of Boring - 25.0'							

Rig (#) / ER: CME 750X (289498) / 81.0% | *Driller:* T | *Logger:* JC

Natural Moisture Content, % - ●
PL ├──┤ LL
N_{60} Value ○ / Non-Plastic - NP



DLZ Ohio, Inc. * 6121 Huntley Road, Columbus, Ohio 43229 * (614) 888-0040

Client: Barton Malow | *Project:* Ford H4 Battery Plant | *Job No.* 2150-9519.50

LOG OF: Boring B-072 | *Location:* As per plan | *Date Drilled:* 10/28/2021

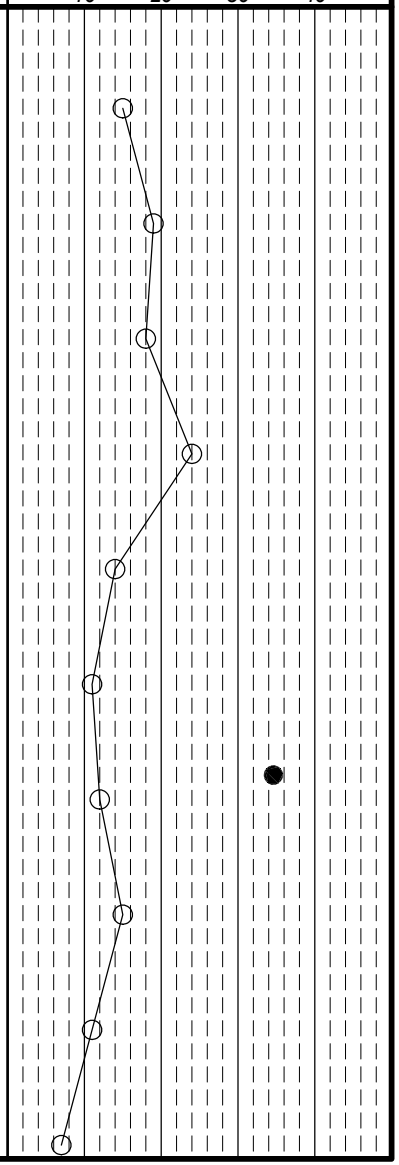
WATER OBSERVATIONS:
Water seepage at: None
Water level at completion: None (inside augers)

DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Depth (ft)	Elev. (ft) 706.3	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0.6	705.7						Topsoil - 7"							
		2 5 6		S-1		3.0	Very stiff red and light brown FAT CLAY (CH); moist.							
3.5	702.8													
		3 6 8	18	S-2		2.75	Very stiff red FAT CLAY (CH); damp to moist.							
		2 6 7	17	S-3		3.5								
		2 8 10	18	S-4		3.0								
		2 4 6	17	S-5		3.75								
		2 2 6	18	S-6		?								
		2 3 6	18	S-7		2.75								
		1 5 6	17	S-8		2.25	@ 18.5'-23.5', contains sand and fine gravel sized chert							
		1 4 4	16	S-9		2.5								
		2 2 3	18	S-10		1.5	@ 23.5', stiff							
25.0	681.3						Bottom of Boring - 25.0'							

Rig (#) / ER: CME 750X (289498) / 81.0%
Driller: T
Logger: JC

Natural Moisture Content, % - ●
PL ├──┤ LL
N_{60} Value ○ / Non-Plastic - NP



DLZ Ohio, Inc. * 6121 Huntley Road, Columbus, Ohio 43229 * (614) 888-0040

Client: Barton Malow | *Project:* Ford H4 Battery Plant | *Job No.* 2150-9519.50

LOG OF: Boring B-073 | *Location:* As per plan | *Date Drilled:* 10/28/2021

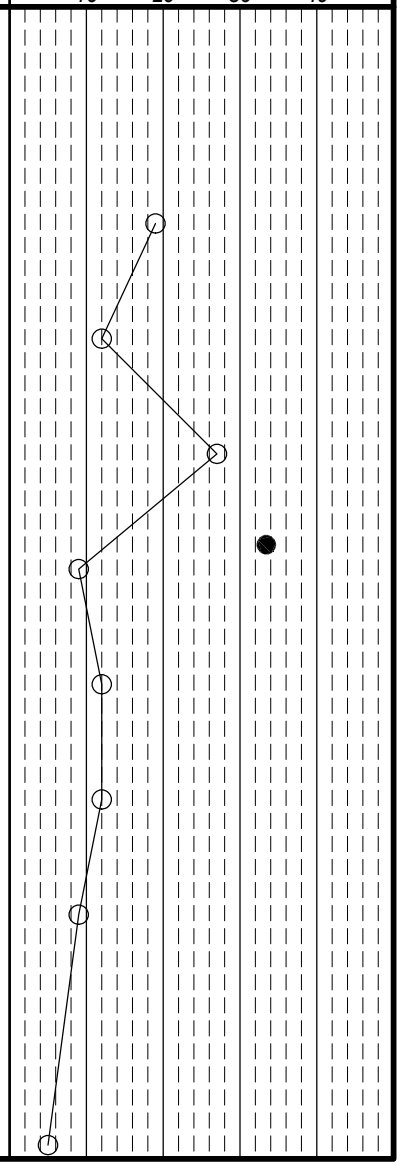
WATER OBSERVATIONS:
Water seepage at: None
Water level at completion: None (inside augers)

DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Rig (#) / ER: CME 750X (289498) / 81.0% | *Driller:* T | *Logger:* JC

Natural Moisture Content, % - ●
PL ├──┤ LL
N_{60} Value ○ / Non-Plastic - NP
10 20 30 40

Depth (ft)	Elev. (ft) 699.3	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0.7	698.6						Topsoil - 8"							
				S-1		1.5	Stiff light grayish brown LEAN CLAY (CL); contains trace organics; moist.							
3.5	695.8													
		4 6 8	16	S-2		2.5	Very stiff red FAT CLAY (CH); contains sand and gravel sized chert in the clay matrix; moist. @ 3.5'-6', black and orange iron oxide staining							
		2 4 5	18	S-3		2.0								
		5 7 13	12	S-4		3.5								
		2 3 4	18	S-5		3.5								
		2 3 6	18	S-6		3.0								
		7 5 4	18	S-7		2.25								
		2 2 5	17	S-8		2.5								
				S-9		1.25	@ 21.0'-24.5', stiff							
25.0	674.3	1 2 2	18	S-10		2.25	Bottom of Boring - 25.0'							



DLZ Ohio, Inc. * 6121 Huntley Road, Columbus, Ohio 43229 * (614) 888-0040

Client: Barton Malow | *Project:* Ford H4 Battery Plant | *Job No.* 2150-9519.50

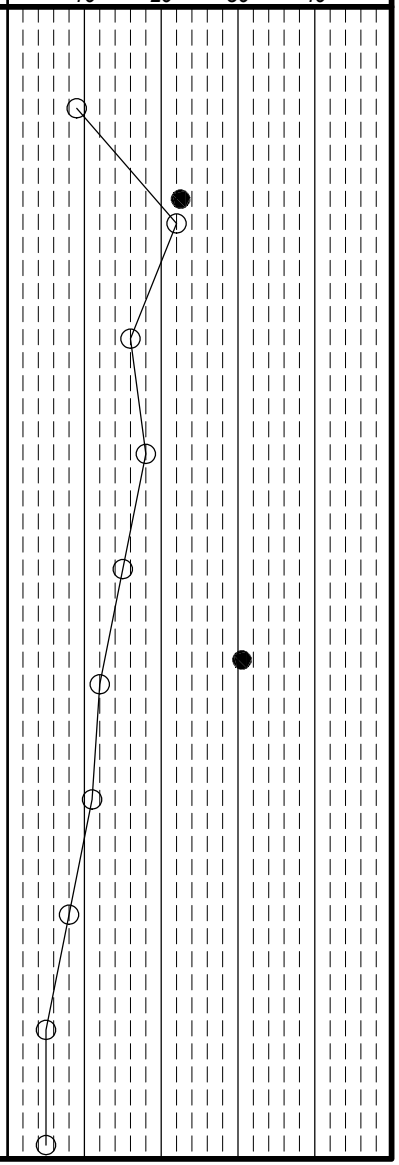
LOG OF: Boring B-074 | *Location:* As per plan | *Date Drilled:* 10/28/2021

WATER OBSERVATIONS:
Water seepage at: None
Water level at completion: None (inside augers)

DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Rig (#) / ER: CME 750X (289498) / 81.0% | *Driller:* T | *Logger:* JC

Depth (ft)	Elev. (ft) 695.1	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0.4	694.7						Topsoil - 5"							
		1 3 4	16	S-1		1.25	Stiff light grayish brown LEAN CLAY (CL); moist.							
3.5	691.6													
5		4 6 10	18	S-2		2.5	Very stiff light gray LEAN CLAY (CL); moist.							
6.0	689.1													
		4 5 7	13	S-3		3.5	Very stiff to hard red FAT CLAY (CH); contains sand and gravel sized decomposing chert in the clay matrix; moist.							
10		3 6 7	18	S-4		2.75								
		3 4 7	18	S-5		4.0								
15		3 4 5	11	S-6		2.75								
		2 3 5		S-7		2.0								
18.5	676.6													
20		2 3 3		S-8		1.25	Stiff red FAT CLAY (CH); contains decomposed chert suspended in clay matrix; moist.							
		2 2 2	11	S-9		1.5								
25.0 25	670.1	1 2 2		S-10		1.25	Bottom of Boring - 25.0'							



DLZ Ohio, Inc. * 6121 Huntley Road, Columbus, Ohio 43229 * (614) 888-0040

Client: Barton Malow | *Project:* Ford H4 Battery Plant | *Job No.* 2150-9519.50

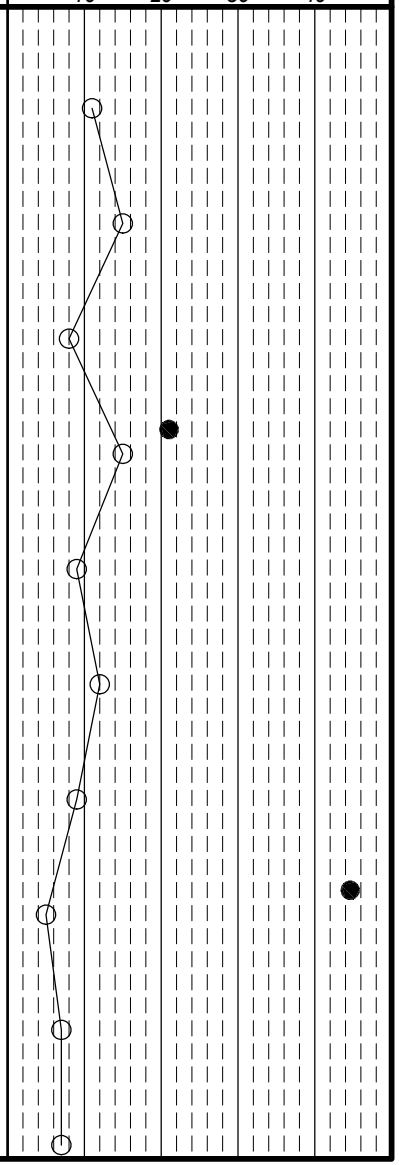
LOG OF: Boring B-075 | *Location:* As per plan | *Date Drilled:* 10/29/2021

WATER OBSERVATIONS:
Water seepage at: None
Water level at completion: None (inside augers)

DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Rig (#) / ER: CME 750X (289498) / 81.0% | *Driller:* T | *Logger:* JC

Depth (ft)	Elev. (ft) 692.0	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	Natural Moisture Content, %
0.5	691.5						Topsoil - 6", Plow Depth - 11"								
		2 3 5	14	S-1		2.75	Very stiff gray FAT CLAY (CH); moist.								
5		2 5 6	18	S-2		2.5									
		2 2 4	18	S-3		2.75									
8.5	683.5														
10		2 5 6	18	S-4		2.0	Stiff to very stiff red and gray FAT CLAY (CH); moist.								
		2 4 3	18	S-5		2.25									
13.5	678.5														
15		3 4 5	18	S-6		2.5	Stiff to very stiff red FAT CLAY (CH); contains chert fragments; moist.								
		1 3 4	16	S-7		2.0									
20		2 2 2	14	S-8		1.5	@ 18.5'-23.5'; contains large chert fragments.								
		1 3 2	18	S-9		1.5									
23.5	668.5														
25.0 25	667.0	1 2 3	18	S-10		2.25	Very stiff light reddish brown FAT CLAY (CH); moist. Bottom of Boring - 25.0'								



DLZ Ohio, Inc. * 6121 Huntley Road, Columbus, Ohio 43229 * (614) 888-0040

Client: Barton Malow	Project: Ford H4 Battery Plant	Job No. 2150-9519.50
LOG OF: Boring B-075A	Location: As per plan	Date Drilled: 11/19/2021

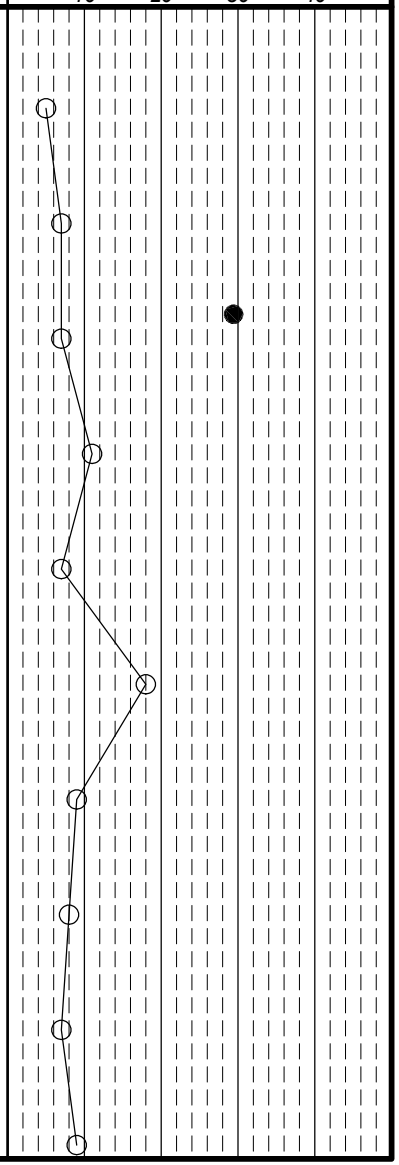
WATER OBSERVATIONS:
Water seepage at: 23.5'
Water level at completion: None (inside augers) ?

DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Rig (#) / ER: CME 750X (289498) / 81.0% — Driller: VD — Logger: JC

Natural Moisture Content, % - ●
PL — LL
N_{60} Value ○ / Non-Plastic - NP
10 20 30 40

Depth (ft)	Elev. (ft) 689.8	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0.4	689.4						Topsoil - 5", Plow Depth - 9"							
		1 2 2	6	S-1		1.0	Stiff to medium stiff brown LEAN CLAY (CL); moist.							
3.5	686.3													
5		1 2 3	10	S-2		1.0	Stiff to medium stiff light brownish gray FAT CLAY (CH); moist to wet.							
		1 2 3	12	S-3		1.0								
8.5	681.3													
10		3 3 5	18	S-4		2.5	Very stiff red and light gray mottled FAT CLAY (CH); moist.							
		3 5 0	13	S-5		3.0								
13.5	676.3													
15		4 4 9	13	S-6		2.0	Stiff to very stiff red FAT CLAY (CH); contains stone fragments; moist.							
		2 2 5	10	S-7		1.5								
20		2 3 3	12	S-8		1.5								
		2 2 3	9	S-9		1.75								
23.5	666.3													
25.0 25	664.8	1 3 4	18	S-10		1.5	Stiff brown FAT CLAY (CH); moist. Bottom of Boring - 25.0'							



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Client: Barton Malow	Project: Ford H4 Battery Plant	Job No. 2150-9519.50
LOG OF: Boring B-076	Location: As per plan	Date Drilled: 10/27/2021

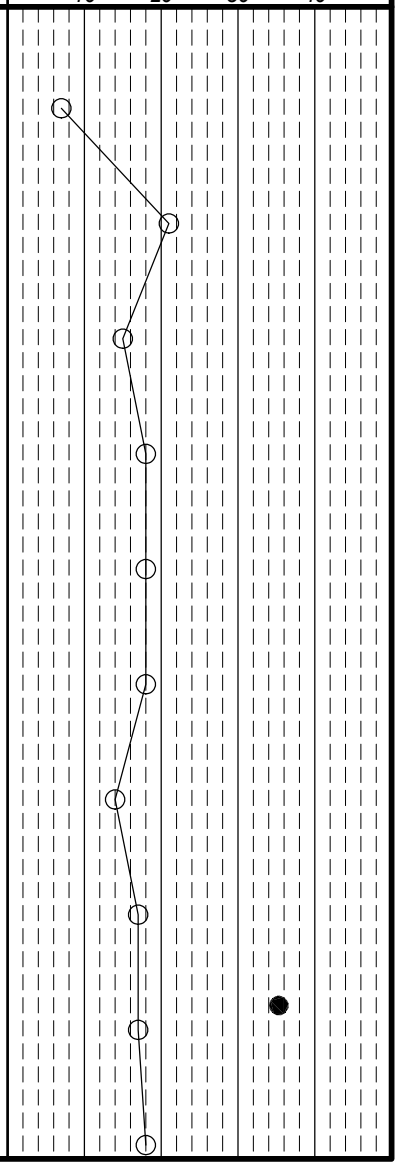
WATER OBSERVATIONS:
Water seepage at: None
Water level at completion: None (inside augers)

DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Rig (#) / ER: CME-850X (400472) / 84.0%
Driller: LB
Logger: AM

Natural Moisture Content, % - ●
PL — LL
N_{60} Value ○ / Non-Plastic - NP
10 20 30 40

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
709.0														
0.3	708.8						Topsoil - 3"-4", Plow Depth - 10"-12"							
		2 3 2	17	S-1		1.5	Stiff to very stiff light brown LEAN CLAY (CL); moist.							
5		3 6 9	18	S-2		2.5								
6.0	703.0													
		3 5 6	18	S-3		3.25	Very stiff to hard red and orange FAT CLAY (CH); contains sand size decomposed chert in clay matrix; moist.							
10		3 6 7	18	S-4		3.25								
		4 6 7	18	S-5		4.0								
15		4 6 7	18	S-6		2.5								
		3 5 5	17	S-7		4.0								
20		6 6 6	18	S-8		3.75	@ 18.5'-21.0', contains large decomposed chert fragments							
		5 5 7	18	S-9		2.75								
25.0 25	684.0	5 7 6	18	S-10		2.75	Bottom of Boring - 25.0'							



Client: Barton Malow	Project: Ford H4 Battery Plant	Job No. 2150-9519.50
LOG OF: Boring B-077	Location: As per plan	Date Drilled: 10/27/2021

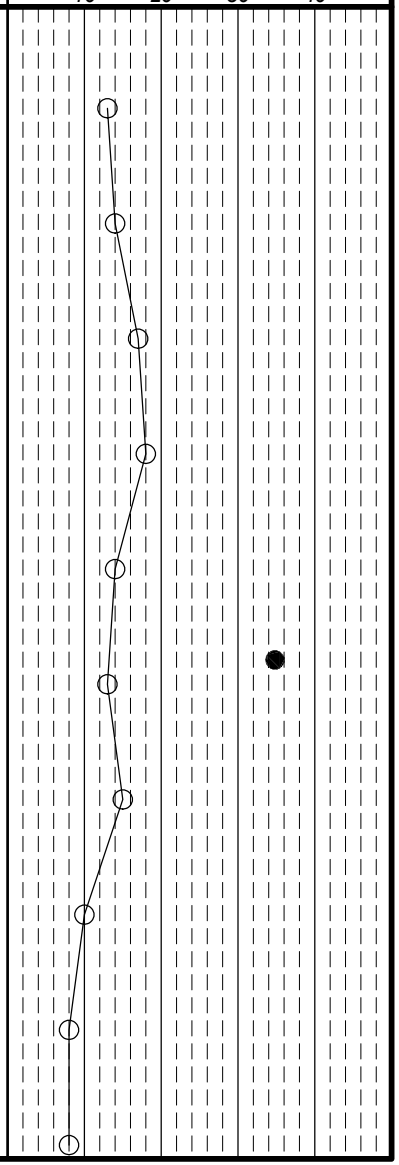
WATER OBSERVATIONS:
Water seepage at: None
Water level at completion: None (inside augers)

DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Rig (#) / ER: CME-850X (400472) / 84.0% — Driller: LB — Logger: AM

Natural Moisture Content, % - ●
PL — LL
N_{60} Value ○ / Non-Plastic - NP
10 20 30 40

Depth (ft)	Elev. (ft) 704.9	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0.4	704.5						Topsoil - 5", Plow Depth - 10"							
		3 5 4	15	S-1		2.25	Very stiff light brown LEAN CLAY (CL); moist.							
5		4 5 5	18	S-2		3.0								
6.0	698.9													
		3 5 7	18	S-3		4.5+	Hard red FAT CLAY (CH); damp to moist.							
8.5	696.4													
10		4 6 7	17	S-4		4.5+	Hard to very stiff red and orange with orange verigation FAT CLAY (CH); moist.							
		6 4 6	18	S-5		4.0								
15		4 5 4	18	S-6		3.5								
		5 5 6	16	S-7		4.5								
20		3 3 4	18	S-8		3.0								
21.0	683.9													
		3 3 3	16	S-9		2.25	Very stiff to stiff red FAT CLAY (CH); contains sand and gravel size chert suspended in clay matrix; moist.							
25.0 25	679.9	3 3 3	7	S-10		1.75	Bottom of Boring - 25.0'							



Client: Barton Malow | *Project:* Ford H4 Battery Plant | *Job No.* 2150-9519.50

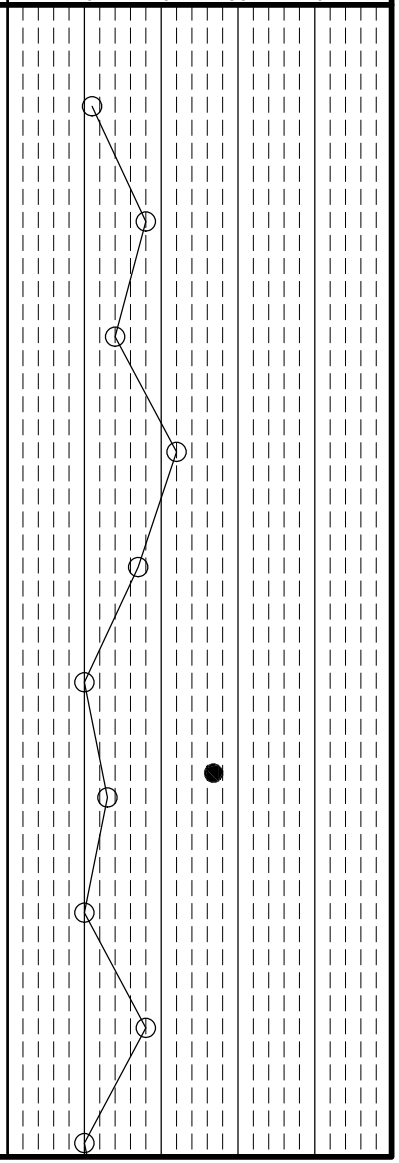
LOG OF: Boring B-078 | *Location:* As per plan | *Date Drilled:* 10/28/2021

WATER OBSERVATIONS:
Water seepage at: None
Water level at completion: None (prior to coring)
19.9' (including coring water)
DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Rig (#) / ER: CME-850X (400472) / 84.0% | *Driller:* LB | *Logger:* AM

Natural Moisture Content, % - ●
PL ├──┤ LL
N_{60} Value ○ / Non-Plastic - NP
10 20 30 40

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
	705.3													
0.3	705.0						Topsoil - 4", Plow Depth - 8"-9"							
		3 4 4	16	S-1		2.75	Very stiff light brown LEAN CLAY (CL); moist.							
3.5	701.8													
5		4 5 8	18	S-2		4.5+	Hard red and light brown FAT CLAY (CH); damp to moist.							
		3 4 6	18	S-3		4.5+								
8.5	696.8													
10		5 7 9	18	S-4		4.5+	Hard red FAT CLAY (CH); contains black oxide staining; damp to moist.							
11.0	694.3													
		5 5 7	18	S-5		4.5+	Hard to very stiff red variegated with orange FAT CLAY (CH); damp to moist.							
15		3 4 3	18	S-6		4.5+								
		3 4 5	18	S-7		3.5								
18.5	686.8													
20		3 4 3	18	S-8		2.5	Very stiff red FAT CLAY (CH); moist.							
		3 5 8	18	S-9		2.5								
23.5	681.8													
25	680.3	3 4 3	18	S-10		1.75								



Client: Barton Malow | *Project:* Ford H4 Battery Plant | *Job No.* 2150-9519.50

LOG OF: Boring B-078 | *Location:* As per plan | *Date Drilled:* 10/28/2021

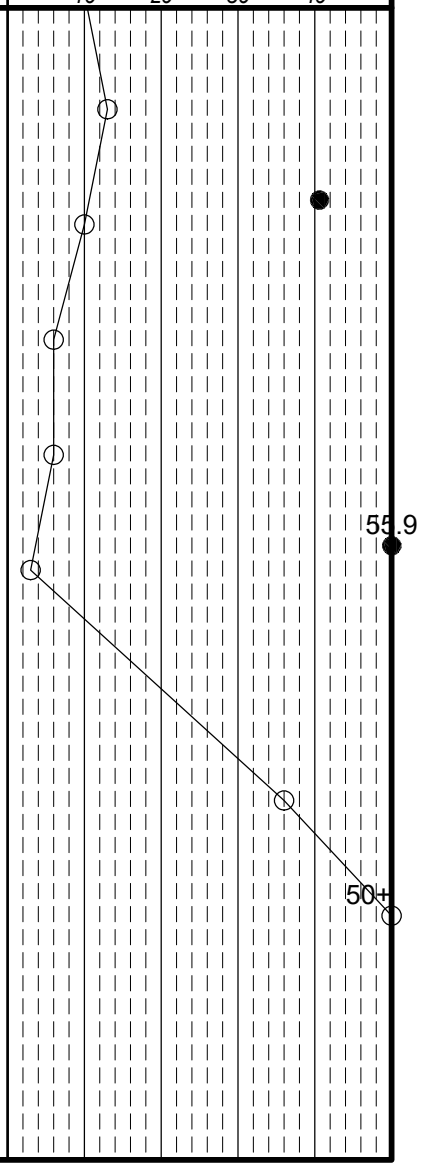
WATER OBSERVATIONS:
Water seepage at: None
Water level at completion: None (prior to coring)
19.9' (including coring water)
DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION
	680.3						
		WOH 5 4	18	S-11		1.0	Medium stiff to stiff red FAT CLAY (CH); contains sand and gravel size decomposed chert suspended in the clay matrix; moist. (continued)
28.5	676.8						
		2 4 3	18	S-12		1.0	Medium stiff to stiff red FAT CLAY (CH); contains sand size decomposed chert suspended in clay matrix; moist.
31.0	674.3						
		WOH 2 2	18	S-13		0.75	Medium stiff light brown FAT CLAY (CH); contains chert fragments; moist.
33.5	671.8						
		2 2 2	18	S-14		0.25	Soft to very soft light brownish gray FAT CLAY (CH); wet.
		WOH 1 1	15	S-15		< 0.25	
			24		ST-1		
41.0	664.3						
		12 12 14	18	S-16			Dense light gray clayey SAND (SC); damp.
43.7	661.6	50/2	0	S-17			
		Core 90"	Rec 87"	RQD 68%	1		Hard to very hard light gray LIMESTONE; very fine to fine grained, slightly to moderately weathered, thickly bedded, moderately fractured to highly, vuggy, Karstic solutioning on fracture surfaces, significant core loss due to solutioning. @ 43.7', auger refusal
50	655.3						

Graphic Log | GRADATION: % Aggregate, % C. Sand, % M. Sand, % F. Sand, % Silt, % Clay

Rig (#) / ER: CME-850X (400472) / 84.0% | Driller: LB | Logger: AM

Natural Moisture Content, % - ●
PL ├──┤ LL
N_{60} Value ○ / Non-Plastic - NP



Client: Barton Malow	Project: Ford H4 Battery Plant	Job No. 2150-9519.50
LOG OF: Boring B-078	Location: As per plan	Date Drilled: 10/28/2021

WATER OBSERVATIONS:
Water seepage at: None
Water level at completion: None (prior to coring)
19.9' (including coring water)
DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Rig (#) / ER: CME-850X (400472) / 84.0%
Driller: LB
Logger: AM

Natural Moisture Content, % - ●
PL ⊢——⊣ LL
N_{60} Value ○ / Non-Plastic - NP
10 20 30 40

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
	655.3													
		Core 90"	Rec 87"	RQD 68%	1		Hard to very hard light gray LIMESTONE; very fine to fine grained, slightly to moderately weathered, thickly bedded, moderately fractured to highly, vuggy, Karstic solutioning on fracture surfaces, significant core loss due to solutioning. (continued)							
55		Core 60"	Rec 45"	RQD 61%	2									
57.5	647.8						@ 56.7'-57.8', highly fractured with red clay infilling.							
							Bottom of Boring - 57.5'							
							@ 58.5'-63.3', filled void.							
60														
							@ 63.6'-63.8', void.							
65														
70														
75														

DLZ Ohio, Inc. * 6121 Huntley Road, Columbus, Ohio 43229 * (614) 888-0040

Client: Barton Malow | *Project:* Ford H4 Battery Plant | *Job No.* 2150-9519.50

LOG OF: Boring B-079 | *Location:* As per plan | *Date Drilled:*

WATER OBSERVATIONS:
Water seepage at: None
Water level at completion: None (inside augers)

DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Depth (ft)	Elev. (ft) 699.6	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0.7	698.9						Topsoil - 7"-8", Plow Depth - 9"							
		3 4 2	18	S-1		1.5	Medium stiff red and light brown LEAN CLAY (CL); moist.							
3.5	696.1													
5		4 3 5	18	S-2		1.75	Stiff to very stiff red FAT CLAY (CH); moist.							
		3 4 7		S-3		3.25								
10		2 5 4	18	S-4		2.25								
		4 5 9	18	S-5		1.5								
15		6 5 3	15	S-6		2.25	@ 13.5'-16.0', contains sand and gravel size decomposed chert fragments							
		3 4 5	18	S-7		2.25	@ 16.0'-21.0', contains sand size decomposed chert fragments							
20		3 5 4	18	S-8		2.0								
21.0	678.6													
		3 2 3	18	S-9		0.75	Soft to medium stiff red FAT CLAY (CH); moist.							
25.0 25	674.6	3 2 3	18	S-10		0.5	Bottom of Boring - 25.0'							

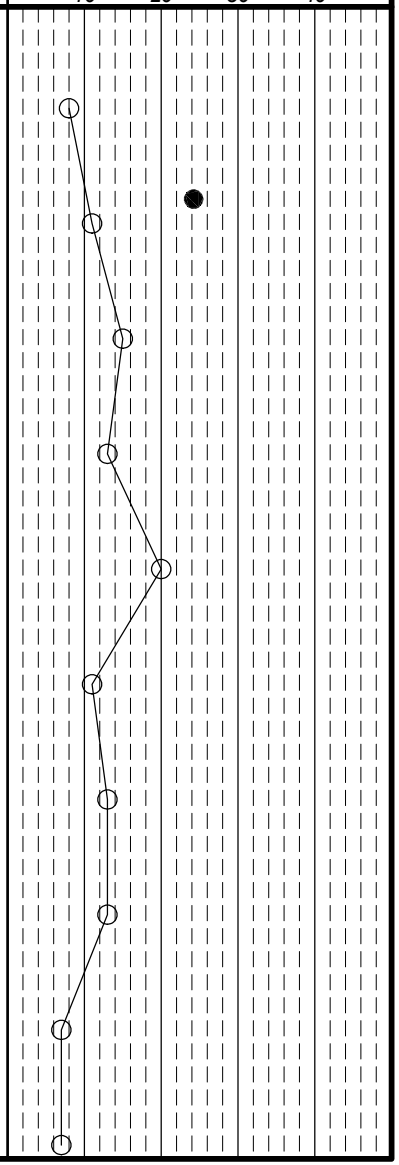
GRADATION

Rig (#) / ER: CME-850X (400472) / 84.0% | Driller: LB | Logger: AM

Natural Moisture Content, % - ●

PL ├──┤ LL

N_{60} Value ○ / Non-Plastic - NP



DLZ Ohio, Inc. * 6121 Huntley Road, Columbus, Ohio 43229 * (614) 888-0040

Client: Barton Malow | *Project:* Ford H4 Battery Plant | *Job No.* 2150-9519.50

LOG OF: Boring B-080 | *Location:* As per plan | *Date Drilled:* 10/29/2021

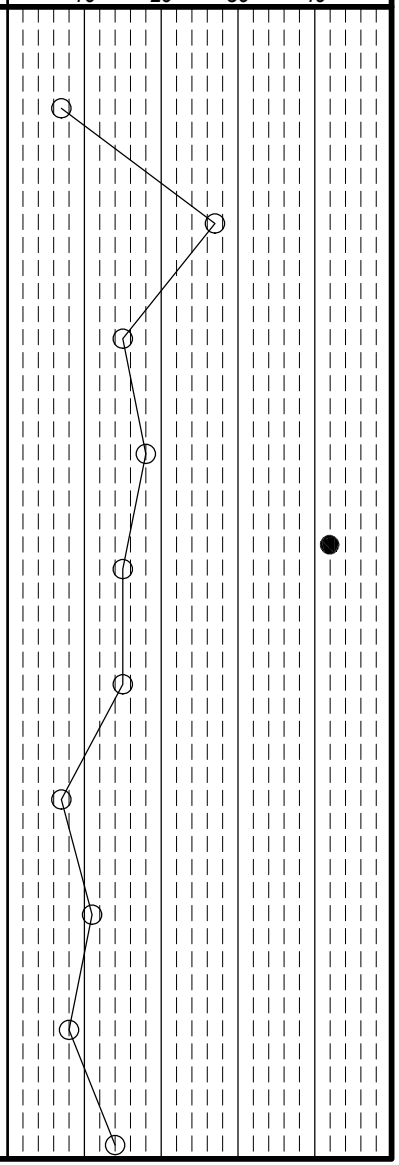
WATER OBSERVATIONS:
Water seepage at: None
Water level at completion: None (inside augers)

DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Rig (#) / ER: CME-850X (400472) / 84.0% | *Driller:* LB | *Logger:* AM

Natural Moisture Content, % - ●
PL ├──┤ LL
N_{60} Value ○ / Non-Plastic - NP
10 20 30 40

Depth (ft)	Elev. (ft) 692.0	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0.5	691.5						Topsoil - 6", Plow Depth - 12"-14"							
		3 3 2	14	S-1		1.5	Stiff light brown LEAN CLAY (CL); damp to moist.							
5		3 7 12	9	S-2		1.75	@ 3.5'-6.0'; contains gravel size chert fragments.							
6.0	686.0													
		5 5 6	18	S-3		3.0	Very stiff red FAT CLAY (CH); contains sand and gravel size chert fragments; damp to moist.							
10		3 5 8	18	S-4		2.5								
		3 5 6	18	S-5		2.5								
15		5 6 5	15	S-6		2.75								
16.0	676.0													
		2 2 3	18	S-7		0.75	Medium stiff to stiff red FAT CLAY (CH); moist.							
20		3 4 4	18	S-8		1.5								
		3 3 3	18	S-9		1.0								
25.0 25	667.0	3 5 5	18	S-10		0.75	Bottom of Boring - 25.0'							



DLZ Ohio, Inc. * 6121 Huntley Road, Columbus, Ohio 43229 * (614) 888-0040

Client: Barton Malow | *Project:* Ford H4 Battery Plant | *Job No.* 2150-9519.50

LOG OF: Boring B-081 | *Location:* As per plan | *Date Drilled:* 11/22/2021 to 11/23/2021

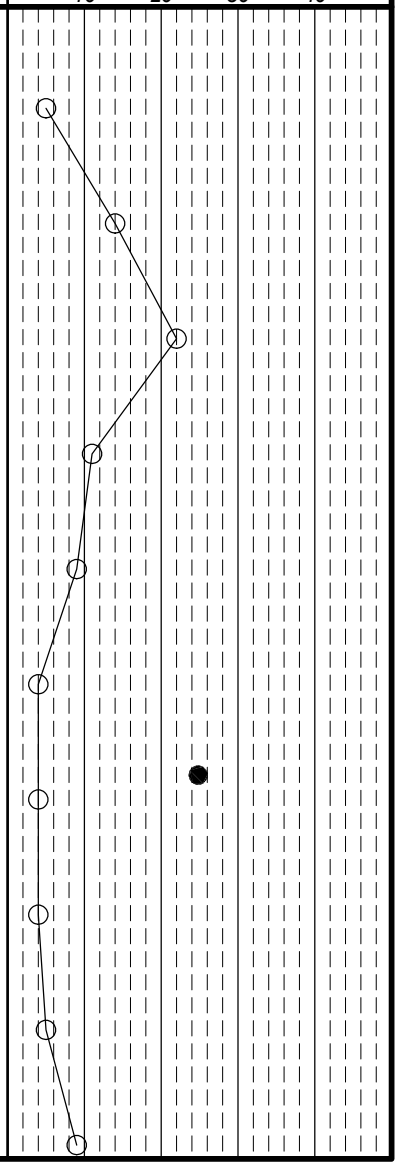
WATER OBSERVATIONS:
Water seepage at: 24.0'
Water level at completion: 24.0' (inside augers)

DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Rig (#) / ER: CME 750X (289498) / 81.0% | *Driller:* VD | *Logger:* JC

Natural Moisture Content, % - ●
PL ├──┤ LL
N_{60} Value ○ / Non-Plastic - NP
10 20 30 40

Depth (ft)	Elev. (ft) 712.4	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0.5	711.9						Topsoil - 6", Plow Depth - 10"							
		1 2 2	7	S-1		1.5	Stiff brown LEAN CLAY (CL); moist.							
3.5	708.9													
5		5 5 5	18	S-2		2.5	Very stiff light gray LEAN CLAY (CL); moist.							
6.0	706.4													
		2 9 7	15	S-3		2.75	Very stiff to stiff light gray FAT CLAY (CH); moist							
10		2 3 5	18	S-4		2.0	@ 8.5', light gray and light brown							
		2 3 4	12	S-5		2.0								
13.5	698.9													
15		WOH 1 2	18	S-6		0.75	Medium stiff light grayish brown FAT CLAY (CH); moist to wet.							
		1 2 1		S-7		0.75	@ 16.0', light reddish brown							
18.5	693.9													
20		WOH 1 2	18	S-8		1.5	Stiff light brown FAT CLAY (CH); moist.							
		WOH 2 2	18	S-9		1.5								
23.5	688.9													
25.0 25	687.4	2 3 4	18	S-10		1.25	Stiff red FAT CLAY (CH); moist. Bottom of Boring - 25.0'							



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Client: Barton Malow | *Project:* Ford H4 Battery Plant | *Job No.* 2150-9519.50

LOG OF: Boring B-082 | *Location:* As per plan | *Date Drilled:* 11/30/2021

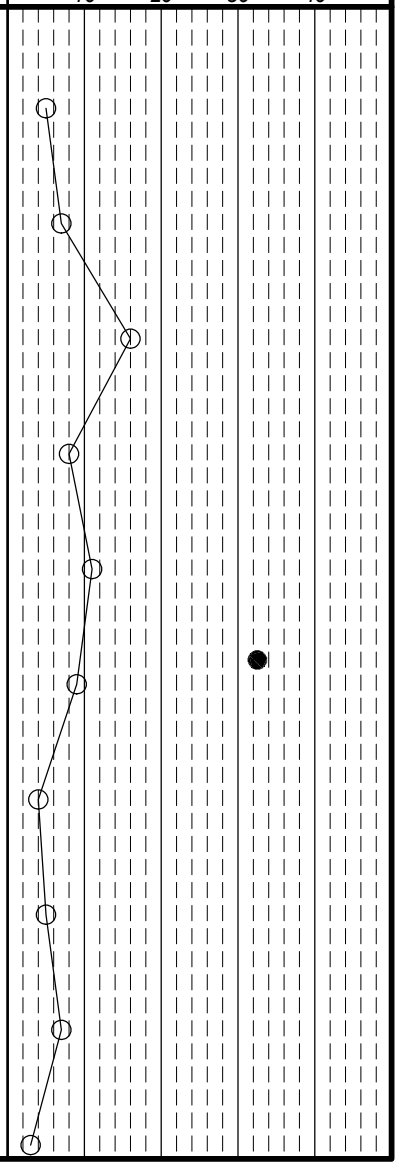
WATER OBSERVATIONS:
Water seepage at: 21.0'
Water level at completion: 23.0' (inside augers)

DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Rig (#) / ER: CME 750X (289498) / 81.0% | *Driller:* KC | *Logger:* JC

Natural Moisture Content, % - ●
PL ├──┤ *LL*
N_{60} Value ○ / *Non-Plastic -* NP
10 20 30 40

Depth (ft)	Elev. (ft) 711.6	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0.3	711.4						Topsoil - 3"							
		2 2 2	9	S-1		2.5	Very stiff red LEAN CLAY (CL); moist.							
3.5	708.1													
5		1 2 3	10	S-2		2.0	Stiff to very stiff red and light brown mottled LEAN CLAY (CL); moist.							
6.0	705.6													
		3 5 7	13	S-3		2.5	Very stiff red and light gray mottled to light brown FAT CLAY (CH); damp to moist.							
10		2 2 4	18	S-4		2.75								
		3 3 5	15	S-5		2.25								
15		2 3 4	18	S-6		2.75								
16.0	695.6													
		2 2 1	5	S-7		1.0	Medium stiff to stiff red FAT CLAY (CH); contains chert fragments; moist.							
20		1 2 2	12	S-8		1.5								
		WOH 2 3	11	S-9		0.5	@ 21.0', soft to medium stiff, moist to wet							
25.0 25	686.6	WOH 1 1	14	S-10		< 0.25	@ 23.5', soft to very soft, wet Bottom of Boring - 25.0'							



DLZ Ohio, Inc. * 6121 Huntley Road, Columbus, Ohio 43229 * (614) 888-0040

Client: Barton Malow | *Project:* Ford H4 Battery Plant | *Job No.* 2150-9519.50

LOG OF: Boring B-083 | *Location:* As per plan | *Date Drilled:* 12/8/2021

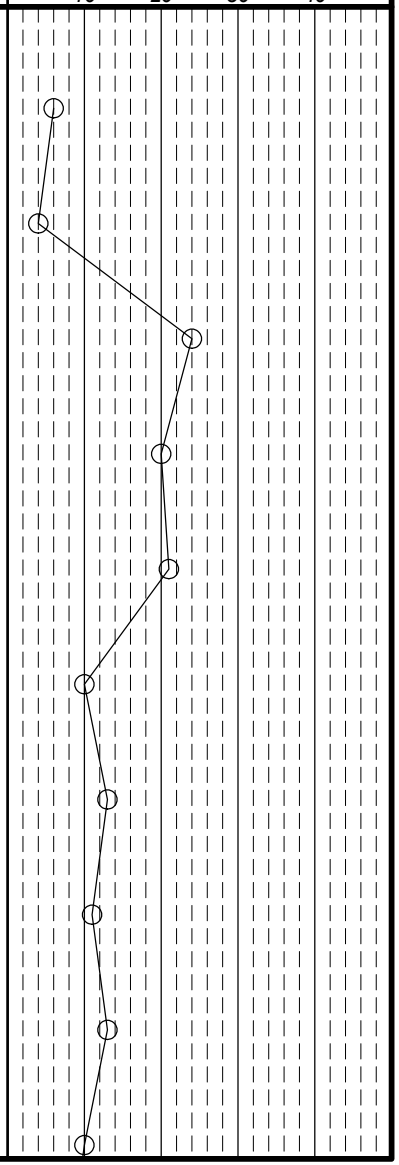
WATER OBSERVATIONS:
Water seepage at: 33.5'
Water level at completion: 38.3' (prior to adding water)
8.1' (with augers removed)

DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Rig (#) / ER: CME-850X (400472) / 84.0% | *Driller:* LB | *Logger:* AM

Natural Moisture Content, % - ●
PL ├──┤ LL
N_{60} Value ○ / Non-Plastic - NP
10 20 30 40

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
	704.3													
1.3	703.1						Topsoil - 15"							
		2 2 2	18	S-1		0.25	Soft to very soft brownish gray LEAN CLAY (CL); moist to wet.							
3.5	700.8													
5		1 2 1	16	S-2		0.25	Soft to very soft gray and brown mottled SILTY CLAY (CL-ML); moist to wet.							
6.0	698.3													
		4 8 9	18	S-3		3.5	Very stiff red, light gray, and brown FAT CLAY (CH); moist.							
8.5	695.8													
10		2 8 6	18	S-4		2.5	Very stiff to stiff red FAT CLAY (CH); contains chert fragments; moist.							
		10 8 7	18	S-5		1.5								
15		4 3 4	18	S-6		1.25								
		4 4 5	18	S-7		1.75								
20		4 4 4	18	S-8		1.25								
		4 4 5	18	S-9		1.25								
25	679.3	3 3 4	18	S-10		1.0	@ 23.5', stiff to medium stiff							



Client: Barton Malow | *Project:* Ford H4 Battery Plant | *Job No.* 2150-9519.50

LOG OF: Boring B-083 | *Location:* As per plan | *Date Drilled:* 12/8/2021

Rig (#) / ER CME-850X (400472) / 84.0% | *Driller* LB | *Logger* AM

WATER OBSERVATIONS:
Water seepage at: 33.5'
Water level at completion: 38.3' (prior to adding water)
8.1' (with augers removed)

DRILLING METHODS - Soil: HS Augers

ABANDONMENT - cuttings and bentonite chips

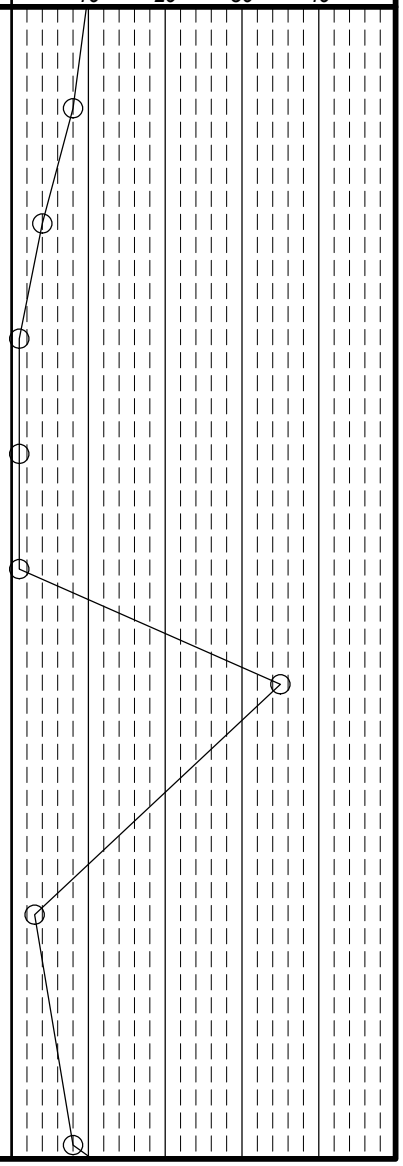
Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
	679.3													
		2 3 3	18	S-11		1.0	Very stiff to stiff red FAT CLAY (CH); contains chert fragments; moist. (continued)							
28.5	675.8													
30		1 1 2	9	S-12		0.5	Soft to medium stiff red FAT CLAY (CH); contains chert fragments; moist to wet.							
		WOH WOH 1	18	S-13		0.5								
35		WOH WOH 1	18	S-14		0.25	@ 33.5', soft to very soft, wet							
36.0	668.3													
		WOH WOH 1	18	S-15		0.25	Soft to very soft light brown FAT CLAY (CH); moist.							
38.5	665.8													
40		14 13 12	15	S-16			Dense light browy clayey SAND (SC); contains broken and decomposed rock fragments, possible cobble or boulder; wet.							
43.5	660.8													
45		1 1 1	18	S-17		< 0.25	Very soft reddish brown FAT CLAY (CH); contains stone fragments; moist to wet.							
50	654.3	3 3 3	18	S-18		< 0.25								

GRADATION

Natural Moisture Content, % - ●

PL ⊢——⊣ LL

N_{60} Value ○ / Non-Plastic - NP



Client: Barton Malow	Project: Ford H4 Battery Plant	Job No. 2150-9519.50
LOG OF: Boring B-083	Location: As per plan	Date Drilled: 12/8/2021

WATER OBSERVATIONS:
Water seepage at: 33.5'
Water level at completion: 38.3' (prior to adding water)
8.1' (with augers removed)

DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Rig (#) / ER: CME-850X (400472) / 84.0%
Driller: LB
Logger: AM

Natural Moisture Content, % - ●
PL ⊢——⊣ LL
N_{60} Value ○ / Non-Plastic - NP
10 20 30 40

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	N60 Value
	654.3														
							Very soft reddish brown FAT CLAY (CH); contains stone fragments; moist to wet. (continued) @ 50.0'-53.5, drill rig chatter								
53.5	650.8														
		50/3	3	S-19			Light brown mottled weathered LIMESTONE								50+
54.5	649.8														
55							Hard to very hard orandish brown to orangish yellow gray LIMESTONE; very fine grained, slightly weathered to decomposed, thickly bedded, moderately fractured to broken; rock contains visual evidence of solutioning, significant core loss is attributed to solutioning, suspected voids are open or clay filled.								
60		Core 120"	Rec 76"	RQD 45%	R-1										
64.5	639.8														
65							Bottom of Boring - 64.5'								
70															
75															

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Client: Barton Malow | *Project:* Ford H4 Battery Plant | *Job No.* 2150-9519.50

LOG OF: Boring B-084 | *Location:* As per plan | *Date Drilled:* 12/1/2021

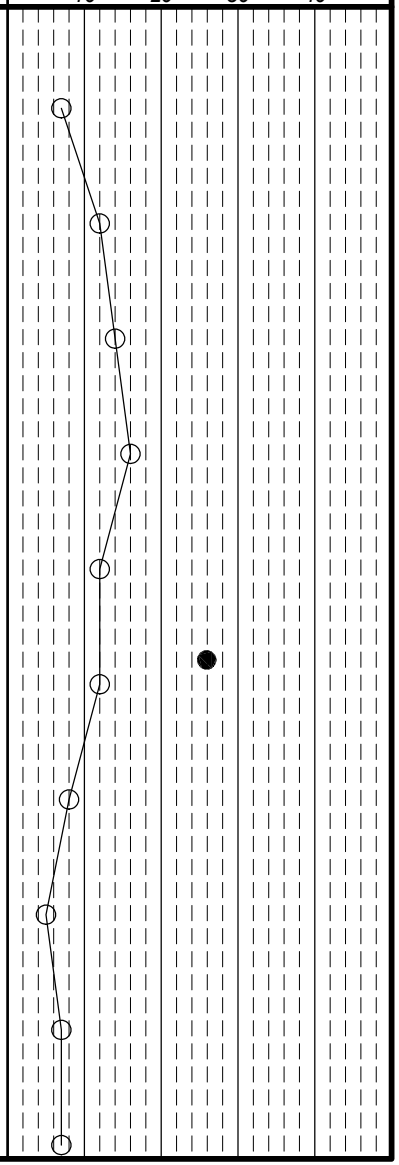
WATER OBSERVATIONS:
Water seepage at: None
Water level at completion: None (inside augers)

DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Rig (#) / ER: CME 750X (289498) / 81.0% | *Driller:* KC | *Logger:* JC

Natural Moisture Content, % - ●
PL ├──┤ LL
N_{60} Value ○ / Non-Plastic - NP
10 20 30 40

Depth (ft)	Elev. (ft) 708.5	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0.4	708.1						Topsoil - 5', Plow Depth - 6"							
		2 2 3	5	S-1		2.0	Stiff to very stiff grayish brown LEAN CLAY (CL); moist.							
3.5	705.0													
5		2 3 6	18	S-2		3.5	Very stiff light brown and light gray FAT CLAY (CH); damp to moist.							
		3 4 6	11	S-3		2.5								
10		4 5 7	18	S-4		2.25								
		4 4 5	14	S-5		2.0	@ 11.0', stiff to very stiff							
15		4 4 5	18	S-6		2.25	@ 13.5'-16.0', light brown							
		2 3 3	12	S-7		1.5	@ 16.0'-18.5', moist to wet							
18.5	690.0													
20		1 2 2	18	S-8		2.5	Very stiff light brown FAT CLAY (CH); moist.							
		2 2 3	18	S-9		2.25								
25.0 25	683.5	2 2 3	18	S-10		2.5	Bottom of Boring - 25.0'							



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Client: Barton Malow | *Project:* Ford H4 Battery Plant | *Job No.* 2150-9519.50

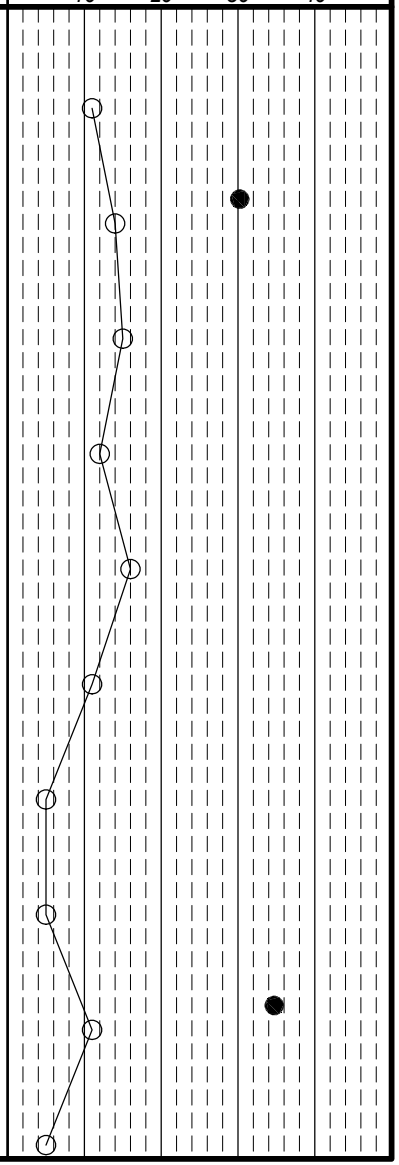
LOG OF: Boring B-085 | *Location:* As per plan | *Date Drilled:* 12/1/2021

WATER OBSERVATIONS:
Water seepage at: None
Water level at completion: None (inside augers)

DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Rig (#) / ER: CME 750X (289498) / 81.0% | *Driller:* T | *Logger:* JC

Depth (ft)	Elev. (ft) 712.9	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0.3	712.7						Topsoil - 3", Plow Depth - 6"							
		3 3 5	18	S-1		3.0	Very stiff light brown and light gray mottled LEAN CLAY (CL); moist.							
3.5	709.4													
5		3 4 6	13	S-2		4.5	Hard to very stiff red and light brown mottled FAT CLAY (CH); damp to moist.							
		4 4 7	18	S-3		3.5								
8.5	704.4													
10		2 4 5	12	S-4		4.0	Very stiff red FAT CLAY (CH); contains chert fragments; damp.							
		2 5 7	18	S-5		2.25								
15		3 3 5	13	S-6		2.75								
16.0	696.9													
		1 2 2	18	S-7		2.0	Stiff to very stiff red FAT CLAY (CH); moist.							
18.5	694.4													
20		1 2 2	11	S-8		0.5	Soft to medium stiff red FAT CLAY (CH); contains chert fragments; moist to wet.							
		2 4 4	18	S-9		1.0	@ 21.0', medium stiff to stiff							
25.0 25	687.9	1 2 2		S-10		1.0	Bottom of Boring - 25.0'							



DLZ Ohio, Inc. * 6121 Huntley Road, Columbus, Ohio 43229 * (614) 888-0040

Client: Barton Malow | *Project:* Ford H4 Battery Plant | *Job No.* 2150-9519.50

LOG OF: Boring B-086 | *Location:* As per plan | *Date Drilled:* 11/22/2021 to 11/23/2021

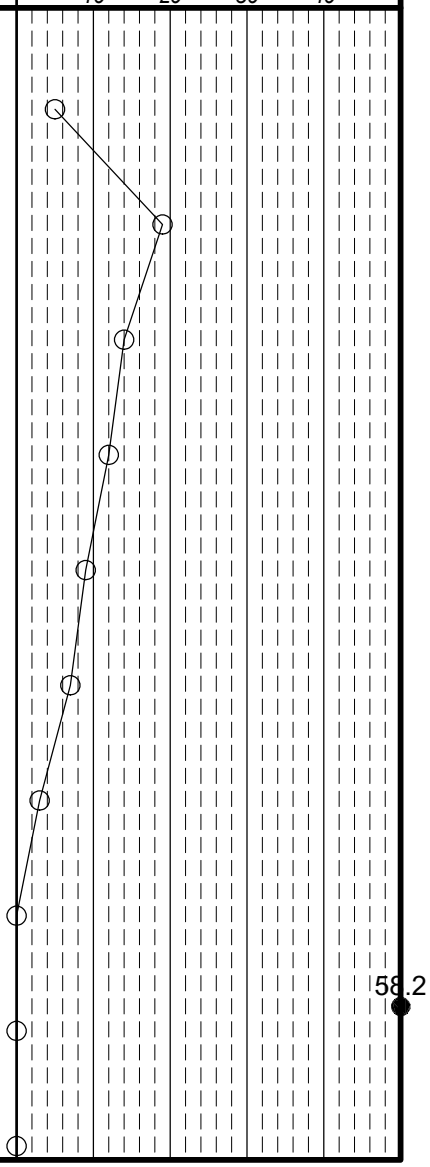
WATER OBSERVATIONS:
Water seepage at: 16.0'
Water level at completion: 13.5' (inside augers)

DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Rig (#) / ER: CME 750X (289498) / 81.0% | *Driller:* VD | *Logger:* JC

Natural Moisture Content, % - ●
PL ├──┤ *LL*
N_{60} Value ○ / *Non-Plastic -* NP

Depth (ft)	Elev. (ft) 713.1	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0.4	712.7						Topsoil - 5", Plow Depth - 8"							
		1 1 3	8	S-1		1.5	Stiff light brown LEAN CLAY (CL); moist.							
3.5	709.6													
5		5 7 7		S-2		3.5	Very stiff light gray and light brown sandy SILTY CLAY (CL-ML); damp.							
6.0	707.1													
		3 5 5	10	S-3		3.25	Very stiff light brown LEAN CLAY (CL); moist.							
8.5	704.6													
10		3 5 4	18	S-4		2.5	Very stiff to stiff red FAT CLAY (CH); moist.							
		2 2 5	9	S-5		2.0								
15		2 2 3	15	S-6		3.0								
16.0	697.1													
		1 2 0	2	S-7			Very soft to soft red FAT CLAY (CH); contains chert fragments; moist to wet.							
20		WOH WOH WOH	2	S-8										
		WOH WOH WOH	4	S-9		< 0.25								
25.0 25	688.1	WOH WOH WOH	5	S-10		< 0.25	Bottom of Boring - 25.0'							



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Client: Barton Malow | *Project:* Ford H4 Battery Plant | *Job No.* 2150-9519.50

LOG OF: Boring B-087 | *Location:* As per plan | *Date Drilled:* 11/23/2021

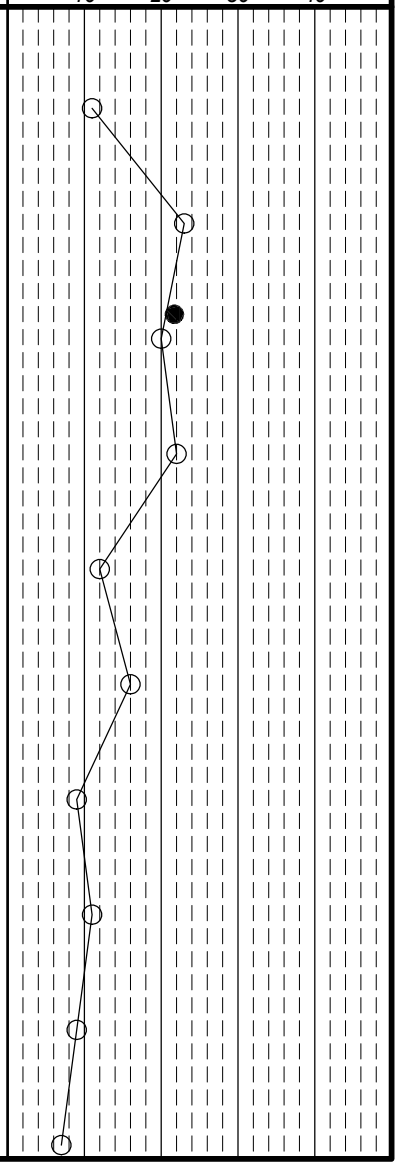
WATER OBSERVATIONS:
Water seepage at: None
Water level at completion: None (inside augers)

DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Depth (ft)	Elev. (ft) 722.8	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	Rig (#) / ER	Driller	Logger
0.5	722.3						Topsoil - 6", Plow Depth - 9"								CME 750X (289498) / 81.0%	VD	JC
		2 3 5	12	S-1		3.0	Very stiff light brown LEAN CLAY (CL); moist.										
3.5	719.3																
		7 8 9	18	S-2		4.5+	Hard to very soft FAT CLAY (CH); damp to moist.										
		4 7 8	13	S-3		3.5											
		5 7 9	18	S-4		3.0											
		4 4 5	15	S-5		3.0											
13.5	709.3																
		5 5 7	18	S-6		2.0	Very stiff to stiff red FAT CLAY (CH); moist.										
		2 3 4	18	S-7		2.0											
		4 4 4	18	S-8		1.25											
		3 3 4	18	S-9		1.0	@ 21.0'-23.5', medium stiff to stiff, contains large chert fragment										
25.0	697.8	2 2 3	18	S-10		1.75	Bottom of Boring - 25.0'										

GRADATION

Natural Moisture Content, % - ●
PL ├──┤ LL
N_{60} Value ○ / Non-Plastic - NP



Client: Barton Malow | *Project:* Ford H4 Battery Plant | *Job No.* 2150-9519.50

LOG OF: Boring B-088 | *Location:* As per plan | *Date Drilled:* 11/23/2021

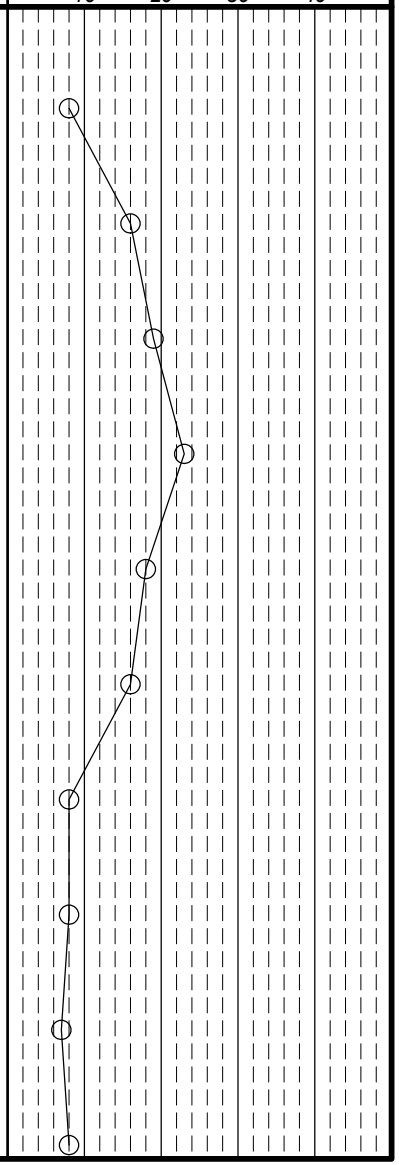
WATER OBSERVATIONS:
Water seepage at: None
Water level at completion: None (inside augers)

DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Rig (#) / ER: CME 750X (289498) / 81.0% | *Driller:* VD | *Logger:* JC

Natural Moisture Content, % - ●
PL ○ / Non-Plastic - NP ; LL
N_{60} Value 10 20 30 40

Depth (ft)	Elev. (ft) 713.1	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0.3	712.8						Topsoil - 4", Plow Depth - 6"							
		1 2 4	12	S-1		2.5	Very stiff brown LEAN CLAY (CL); moist.							
3.5	709.6													
5		3 4 8	18	S-2		3.0	Very stiff brown SILTY CLAY (CL-ML); moist.							
6.0	707.1													
		4 6 8	18	S-3		4.5+	Hard brown sandy SILTY CLAY (CL-ML); moist.							
8.5	704.6													
10		4 8 9	18	S-4		4.5+	Hard to very stiff red FAT CLAY (CH); contains chert fragments; damp to moist.							
		4 5 8	18	S-5		3.5								
15		3 5 7	4	S-6		3.75								
		3 2 4	14	S-7		2.0	@ 16.0', stiff to very stiff; moist							
20		2 2 4	12	S-8		2.0								
		1 2 3	18	S-9		1.25								
25.0 25	688.1	3 3 3	18	S-10		2.0	Bottom of Boring - 25.0'							



DLZ Ohio, Inc. * 6121 Huntley Road, Columbus, Ohio 43229 * (614) 888-0040

Client: Barton Malow	Project: Ford H4 Battery Plant	Job No. 2150-9519.50
LOG OF: Boring B-089	Location: As per plan	Date Drilled: 12/1/2021

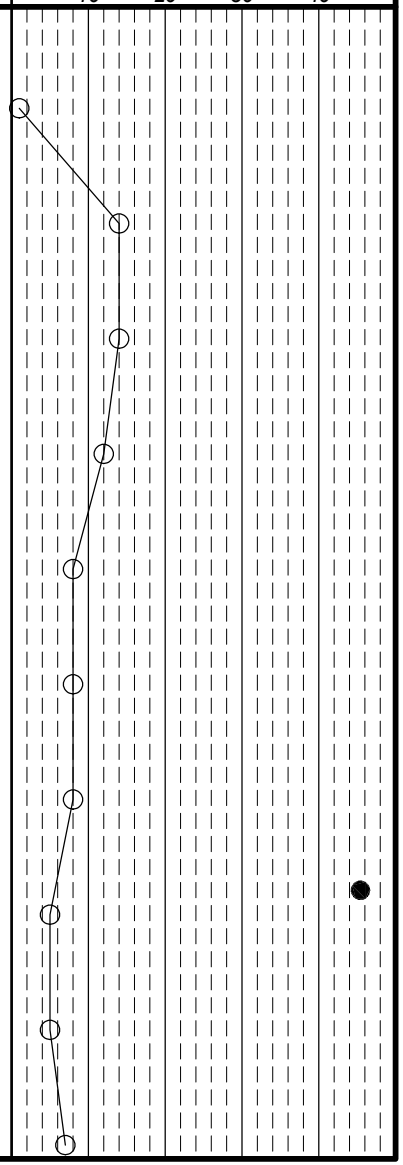
WATER OBSERVATIONS:
Water seepage at: 13.5'
Water level at completion: 11.0' (with augers removed)

DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Rig (#) / ER: CME 750X (289498) / 81.0% — Driller: T — Logger: JC

Natural Moisture Content, % - ●
PL — LL
N_{60} Value ○ / Non-Plastic - NP
10 20 30 40

Depth (ft)	Elev. (ft) 705.6	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0.4	705.2						Topsoil - 5", Plow Depth - 6"							
		1 0 1	2	S-1		0.5	Soft to medium stiff brown LEAN CLAY (CL); contains organics; moist.							
3.5	702.1													
5		2 3 7	6	S-2		1.0	Medium dense light brown silty SAND (SM); wet.							
6.0	699.6													
		2 5 5	16	S-3		3.0	Very stiff light gray and brown mottled FAT CLAY (CH); damp to moist.							
10		2 4 5	18	S-4		2.5								
11.0	694.6													
		2 2 4	18	S-5		1.5	Stiff to very stiff light brown FAT CLAY (CH); moist.							
15		3 3 3	18	S-6		2.0								
16.0	689.6													
		2 2 4	18	S-7		1.5	Stiff red and light brown variegated FAT CLAY (CH); moist.							
18.5	687.1													
20		1 2 2	18	S-8		0.75	Medium stiff to stiff red FAT CLAY (CH); contains chert fragments; moist.							
		1 2 2	18	S-9		1.0								
25.0 25	680.6	1 2 3	16	S-10		1.0	@ 23.5', red and light brown variegated Bottom of Boring - 25.0'							



DLZ Ohio, Inc. * 6121 Huntley Road, Columbus, Ohio 43229 * (614) 888-0040

Client: Barton Malow | *Project:* Ford H4 Battery Plant | *Job No.* 2150-9519.50

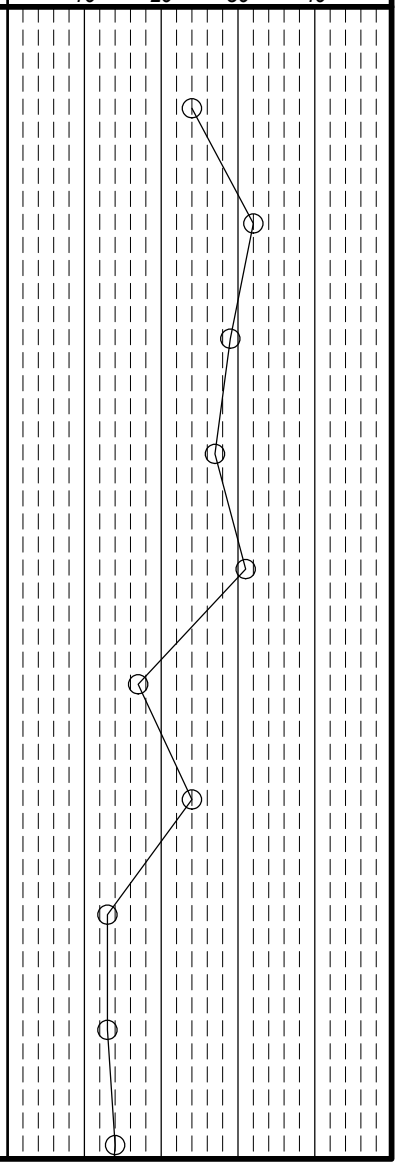
LOG OF: Boring B-090 | *Location:* As per plan | *Date Drilled:* 12/9/2021

WATER OBSERVATIONS:
Water seepage at: None
Water level at completion: None (prior to adding water)
2.3' (includes coring water)
DRILLING METHODS - Soil: HS Augers; Rock: NQ2 Core
ABANDONMENT - cuttings and bentonite chips

Rig (#) / ER: CME-850X (400472) / 84.0% | *Driller:* LB | *Logger:* AM

Natural Moisture Content, % - ●
PL ├──┤ LL
N_{60} Value ○ / Non-Plastic - NP

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
	712.7													
0.6	712.1						Topsoil - 7", Plow Depth - 13"							
		2 6 11	18	S-1		2.75	Very stiff light brown LEAN CLAY (CL); moist.							
3.5	709.2													
5		5 11 12	18	S-2		4.5+	Hard light brown and red mottled LEAN CLAY (CL); damp.							
6.0	706.7													
		5 10 11	9	S-3		2.5	Very stiff red FAT CLAY (CH); contains broken chert fragments; moist.							
8.5	704.2													
10		5 8 11	18	S-4		1.25	Stiff red FAT CLAY (CH); contains chert fragments; moist.							
11.0	701.7													
		5 11 11	18	S-5		1.25	Stiff to very stiff red FAT CLAY (CH); moist.							
15		7 6 6	18	S-6		2.0								
16.0	696.7													
		8 9 8	18	S-7		2.75	Very stiff to stiff red FAT CLAY CH); contains chert fragments; moist.							
20		6 4 5	18	S-8		2.0								
		4 5 4	18	S-9		1.25	@ 21.0'-26.0', moist to wet							
25	687.7	5 5 5	18	S-10		1.25								



Bottom of Boring - 49.5'

DLZ Ohio, Inc. * 6121 Huntley Road, Columbus, Ohio 43229 * (614) 888-0040

Client: Barton Malow | *Project:* Ford H4 Battery Plant | *Job No.* 2150-9519.50

LOG OF: Boring B-090 | *Location:* As per plan | *Date Drilled:* 12/9/2021

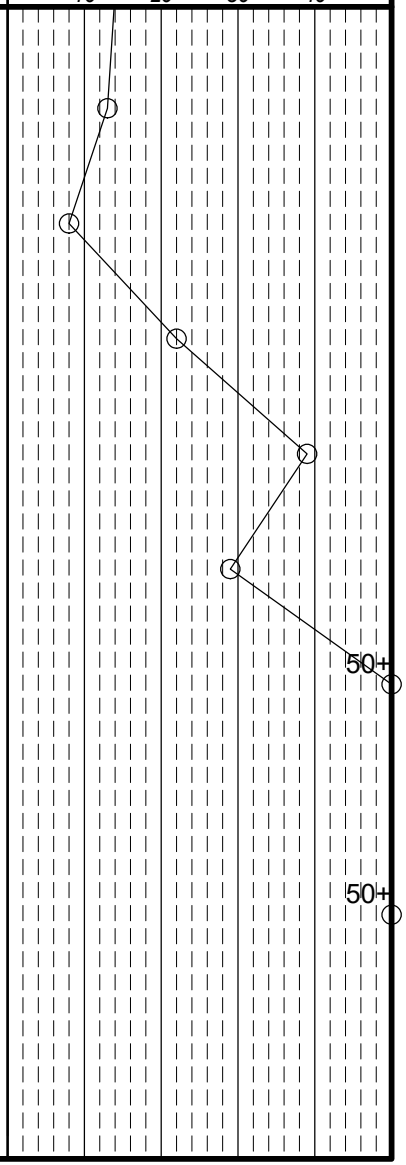
WATER OBSERVATIONS:
Water seepage at: None
Water level at completion: None (prior to adding water)
2.3' (includes coring water)
DRILLING METHODS - Soil: HS Augers; Rock: NQ2 Core
ABANDONMENT - cuttings and bentonite chips

Depth (ft)	Elev. (ft) 687.7	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
26.0	686.7						Medium stiff to stiff light grayish brown and red FAT CLAY (CH); moist to wet.							
		4 5 4	18	S-11		1.25								
		4 3 3	18	S-12		1.0								
31.0	681.7													
		5 9 7	18	S-13		1.0	Stiff to medium stiff red FAT CLAY (CH); contains chert fragments; moist.							
33.5	679.2													
		11 16 12	18	S-14		4.5+	Hard red FAT CLAY (CH); contains chert fragments; damp.							
36.0	676.7													
		5 10 11	18	S-15		2.0	Stiff to very stiff FAT CLAY (CH); contains chert fragments; damp to moist. @ 37.5'-38.5', slight drill rig chatter							
38.5	674.2													
		50/2		S-16			Light gray weathered LIMESTONE @ 39.5', auger refusal @ 40.0'-43.5', drill rig chatter							
		50/1	0	S-17										
44.5	668.2													
		Core 120"	Rec 73"	RQD 37%	1		Hard to very hard gray LIMESTONE; very fine grained, slightly weathered to decomposed, thickly bedded, moderately fractured to broken; rock contains visual evidence of solutioning , significant core loss is attributed to solutioning, most suspected voids are open and not clay filled.							
49.5	663.2													

GRADATION

Rig (#) / ER	Driller	Logger
CME-850X (400472) / 84.0%	LB	AM

Natural Moisture Content, % - ●
PL ├──┤ LL
N_{60} Value ○ / Non-Plastic - NP



Bottom of Boring - 49.5'

Client: Barton Malow	Project: Ford H4 Battery Plant	Job No. 2150-9519.50
LOG OF: Boring B-090	Location: As per plan	Date Drilled: 12/9/2021

WATER OBSERVATIONS:
Water seepage at: None
Water level at completion: None (prior to adding water)
2.3' (includes coring water)

DRILLING METHODS - Soil: HS Augers; Rock: NQ2 Core

ABANDONMENT - cuttings and bentonite chips

Rig (#) / ER: CME-850X (400472) / 84.0%
Driller: LB
Logger: AM

Natural Moisture Content, % - ●
PL ⊢——⊣ LL
N_{60} Value ○ / Non-Plastic - NP
10 20 30 40

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
	662.7													
		Core 120"	Rec 73"	RQD 37%	1		Hard to very hard gray LIMESTONE; very fine grained, slightly weathered to decomposed, thickly bedded, moderately fractured to broken; rock contains visual evidence of solutioning , significant core loss is attributed to solutioning, most suspected voids are open and not clay filled. (continued)							
55														
60														
65														
70														
75														

Bottom of Boring - 49.5'

DLZ Ohio, Inc. * 6121 Huntley Road, Columbus, Ohio 43229 * (614) 888-0040

Client: Barton Malow	Project: Ford H4 Battery Plant	Job No. 2150-9519.50
LOG OF: Boring B-091	Location: As per plan	Date Drilled: 12/8/2021

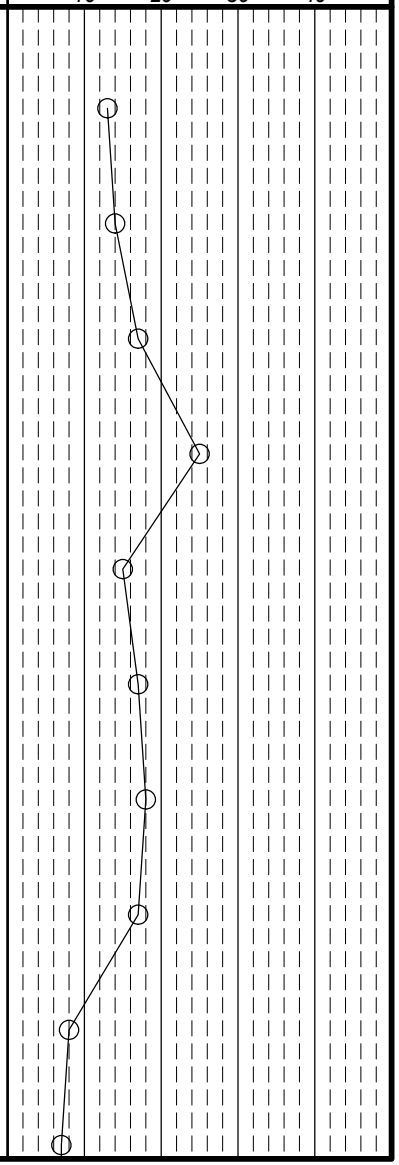
WATER OBSERVATIONS:
Water seepage at: 23.5'
Water level at completion: 7.3' (with augers removed)

DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Rig (#) / ER: CME-850X (400472) / 84.0% | Driller: LB | Logger: AM

Natural Moisture Content, % - ●
PL ⊢——⊣ LL
N_{60} Value ○ / Non-Plastic - NP
10 20 30 40

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0.1	712.5						Topsoil - NO READING							
		3 4 5	18	S-1		2.75	Very stiff brown SILTY CLAY (CL-ML); damp to moist.							
3.5	709.1													
5		4 5 5	18	S-2		2.25	Very stiff light brown and gray LEAN CLAY (CL); moist.							
6.0	706.6													
		5 6 6	18	S-3		2.25	Very stiff light brown, light gray, and red sandy FAT CLAY (CH); moist.							
8.5	704.1													
10		5 8 10	18	S-4		3.25	Very stiff red and light brown sandy FAT CLAY (CH); moist.							
11.0	701.6													
		5 5 6	18	S-5		1.75	Stiff red FAT CLAY (CH); moist.							
15		4 5 7	18	S-6		1.5	@ 13.5', contains light brown and green mottled							
16.0	696.6													
		5 6 7	18	S-7		1.5	Stiff to very stiff light reddish brown FAT CLAY (CH); moist.							
20		4 6 6	18	S-8		2.25								
		1 3 3	18	S-9		0.75	@ 21.0'-23.5', medium stiff							
25	687.6	3 2 3	18	S-10		1.5	Stiff red FAT CLAY (CH); moist.							



Client: Barton Malow | *Project:* Ford H4 Battery Plant | *Job No.* 2150-9519.50

LOG OF: Boring B-091 | *Location:* As per plan | *Date Drilled:* 12/8/2021

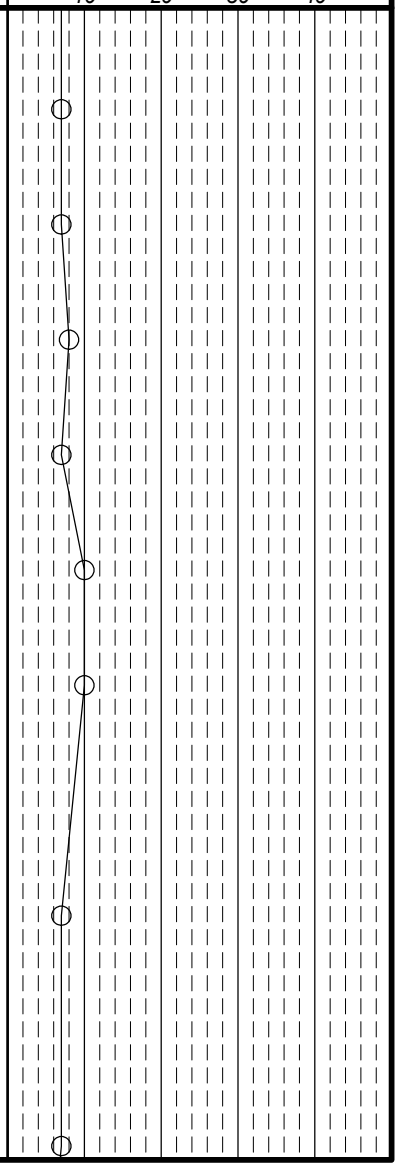
WATER OBSERVATIONS:
Water seepage at: 23.5'
Water level at completion: 7.3' (with augers removed)

DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Rig (#) / ER: CME-850X (400472) / 84.0% | *Driller:* LB | *Logger:* AM

Natural Moisture Content, % - ●
PL ├──┤ LL
N_{60} Value ○ / Non-Plastic - NP
10 20 30 40

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
	687.6													
26.0	686.6						Stiff red FAT CLAY (CH); moist. (continued)							
		2 2 3	18	S-11		0.75	Medium stiff light brown FAT CLAY (CH); moist to wet.							
30		2 2 3	18	S-12		0.75								
31.0	681.6													
		1 3 3	18	S-13		1.5	Stiff to medium stiff red FAT CLAY (CH); moist.							
35		3 2 3	18	S-14		1.0								
36.0	676.6													
		3 4 3	12	S-15		0.5	Soft to medium stiff red FAT CLAY (CH); contains stone fragments; wet.							
40		2 3 4	16	S-16		0.25	@ 38.5'-43.5', soft to very soft							
45		2 2 3	18	S-17		0.75								
48.5	664.1													
50	662.6	2 2 3	18	S-18		0.75	Medium stiff light greenish brown FAT CLAY (CH); moist to wet.							



Client: Barton Malow	Project: Ford H4 Battery Plant	Job No. 2150-9519.50
LOG OF: Boring B-091	Location: As per plan	Date Drilled: 12/8/2021

WATER OBSERVATIONS:
Water seepage at: 23.5'
Water level at completion: 7.3' (with augers removed)

DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Rig (#) / ER: CME-850X (400472) / 84.0%
Driller: LB
Logger: AM

Natural Moisture Content, % - ●
PL ⊢——⊣ LL
N_{60} Value ○ / Non-Plastic - NP
10 20 30 40

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
	662.6													
							Medium stiff light greenish brown FAT CLAY (CH); moist to wet. (continued) @ 50.0'-53.5', occasional drill rig chatter							
53.5	659.1													
54.5	658.1	WOR WOR 50/1	3	S-19			Very loose light reddish brown silty SAND (SM); wet.							
55							Rock @ 54.5', top of rock @ 55.0'-58.5, rod dropped 2'-3' after putting center plug down borehole, suspect void or open fracture, drill rig chatter, difficulty advancing augers							
59.5	653.1													
60							Bottom of Boring - 59.5'							
65														
70														
75														

DLZ Ohio, Inc. * 6121 Huntley Road, Columbus, Ohio 43229 * (614) 888-0040

Client: Barton Malow | *Project:* Ford H4 Battery Plant | *Job No.* 2150-9519.50

LOG OF: Boring B-092 | *Location:* As per plan | *Date Drilled:* 11/23/2021

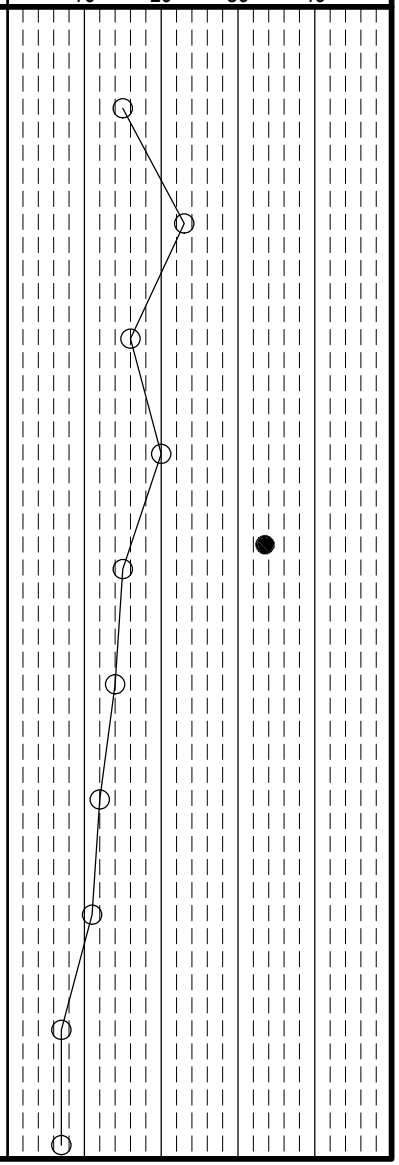
WATER OBSERVATIONS:
Water seepage at: None
Water level at completion: None (inside augers)

DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Depth (ft)	Elev. (ft) 717.2	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0.4	716.8						Topsoil - 5", Plow Depth - 8"							
		2 4 7	16	S-1		3.0	Very stiff reddish brown LEAN CLAY (CL); damp to moist.							
5		2 6 11	18	S-2		3.5	@ 3.5', red							
6.0	711.2													
		3 6 6	17	S-3		3.0	Very stiff to hard red FAT CLAY (CH); damp.							
10		2 5 10	18	S-4		3.5								
		3 5 6	18	S-5		4.5+								
15		4 5 5		S-6		4.5+								
		4 4 5	18	S-7		4.0								
20		3 3 5	15	S-8		3.5	@ 18.5'-21.0', contains large chert fragments							
		1 2 3	5	S-9		3.5								
25.0 25	692.2	2 2 3	18	S-10		2.5	@ 23.5', contains chert fragments Bottom of Boring - 25.0'							

Rig (#) / ER	Driller	Logger
CME 750X (289498) / 81.0%	VD	JC

Natural Moisture Content, % - ●
PL ├──┤ LL
N_{60} Value ○ / Non-Plastic - NP



DLZ Ohio, Inc. * 6121 Huntley Road, Columbus, Ohio 43229 * (614) 888-0040

Client: Barton Malow | *Project:* Ford H4 Battery Plant | *Job No.* 2150-9519.50

LOG OF: Boring B-093 | *Location:* As per plan | *Date Drilled:* 11/23/2021

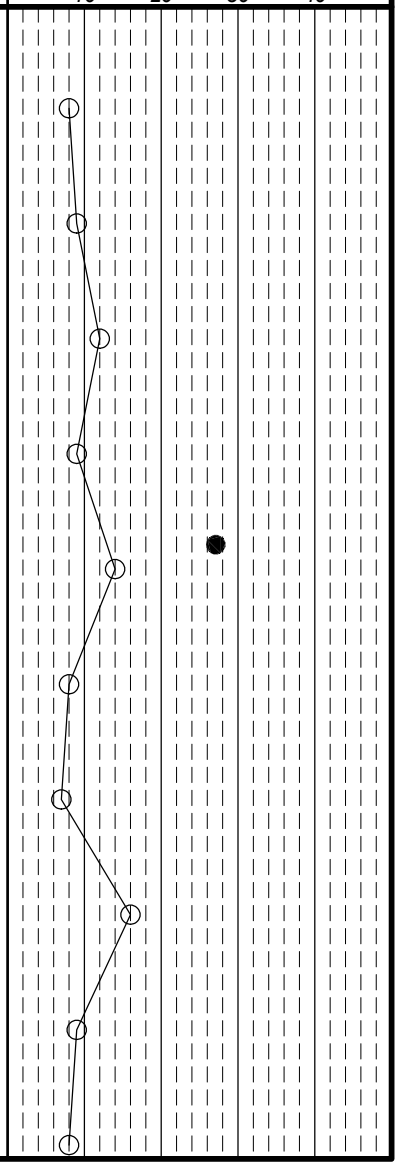
WATER OBSERVATIONS:
Water seepage at: None
Water level at completion: None (inside augers)

DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Rig (#) / ER: CME 750X (289498) / 81.0% | *Driller:* VD | *Logger:* JC

Natural Moisture Content, % - ●
PL ├──┤ LL
N_{60} Value ○ / Non-Plastic - NP
10 20 30 40

Depth (ft)	Elev. (ft) 706.7	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0.5	706.2						Topsoil - 6", Plow Depth - 8"							
		1 2 4	7	S-1		1.75	Stiff brown SILTY CLAY (CL-ML); moist.							
3.5	703.2													
5		3 3 4	18	S-2		3.25	Very stiff to hard light brown LEAN CLAY (CL); moist.							
		2 4 5	15	S-3		4.5+								
8.5	698.2													
10		2 3 4	18	S-4		2.0	Stiff to very stiff light gray to red FAT CLAY (CH); moist.							
		3 4 6	18	S-5		3.5								
13.5	693.2													
15		2 2 4	16	S-6		2.0	Stiff to very stiff red and light brown mottled FAT CLAY (CH); moist.							
		2 2 3	18	S-7		2.0								
18.5	688.2													
20		4 5 7	16	S-8		2.0	Stiff to very stiff red FAT CLAY (CH); contains chert fragments; moist.							
		2 3 4	18	S-9		2.5								
25.0 25	681.7	2 2 4	18	S-10		1.75	Bottom of Boring - 25.0'							



DLZ Ohio, Inc. * 6121 Huntley Road, Columbus, Ohio 43229 * (614) 888-0040

Client: Barton Malow | *Project:* Ford H4 Battery Plant | *Job No.* 2150-9519.50

LOG OF: Boring B-094 | *Location:* As per plan | *Date Drilled:* 12/3/2021

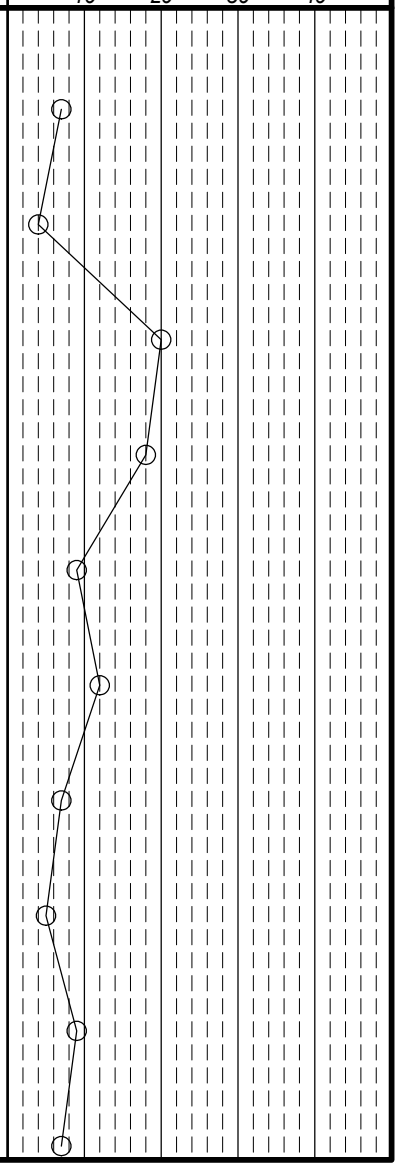
WATER OBSERVATIONS:
Water seepage at: 3.5', 16.0'
Water level at completion: 7.1' (with augers removed)

DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Rig (#) / ER: CME 750X (289498) / 81.0% | *Driller:* T | *Logger:* AM

Natural Moisture Content, % - ●
PL ├──┤ *LL*
N_{60} Value ○ / *Non-Plastic -* NP
10 20 30 40

Depth (ft)	Elev. (ft) 703.6	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0.1	703.5						Topsoil - NO READING							
3.5	700.1	3 3 2	16	S-1		1.25	Stiff light brown LEAN CLAY (CL); moist.							
6.0	697.6	1 1 2	18	S-2		0.75	Medium stiff light brownish gray LEAN CLAY (CL); moist to wet.							
8.5	695.1	3 6 9	15	S-3		2.5	Very stiff red and light gray FAT CLAY (CH); moist.							
11.0	692.6	4 6 7	11	S-4		2.0	Very stiff to stiff red FAT CLAY (CH); contains chert fragments and broken chert gravel; moist.							
18.5	685.1	3 4 3	18	S-5		1.75	Stiff to medium stiff red FAT CLAY (CH); contains chert fragments; moist.							
		6 5 4	18	S-6		1.75								
		2 2 3	18	S-7		1.0								
21.0	682.6	2 2 2	18	S-8		2.25	Very stiff red FAT CLAY (CH); moist.							
25.0	678.6	3 4 3	15	S-9		1.75	Stiff red and light brown mottled FAT CLAY (CH); contains chert fragments; moist.							
		2 2 3	18	S-10		1.5	@ 23.5', no chert fragments Bottom of Boring - 25.0'							



DLZ Ohio, Inc. * 6121 Huntley Road, Columbus, Ohio 43229 * (614) 888-0040

Client: Barton Malow | *Project:* Ford H4 Battery Plant | *Job No.* 2150-9519.50

LOG OF: Boring B-095 | *Location:* As per plan | *Date Drilled:* 12/2/2021

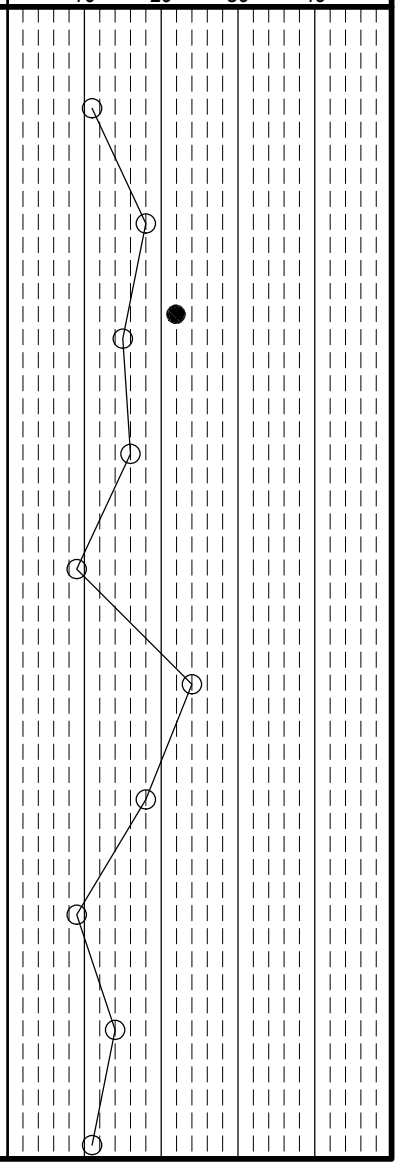
WATER OBSERVATIONS:
Water seepage at: 21.0'
Water level at completion: 22.0' (with augers removed)

DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Rig (#) / ER: CME 750X (289498) / 81.0% | *Driller:* T | *Logger:* JC

Natural Moisture Content, % - ●
PL ├──┤ LL
N_{60} Value ○ / Non-Plastic - NP

Depth (ft)	Elev. (ft) 710.3	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0.3	710.0						Topsoil - 4", Plow Depth - 6"							
		1 4 4	16	S-1		2.75	Very stiff to hard red and light brown FAT CLAY (CH); moist.							
		3 6 7	18	S-2		4.5+								
		2 5 6	18	S-3		3.0								
		2 4 8	18	S-4		4.0								
		2 3 4	18	S-5		2.5								
13.5	696.8													
		4 9 9	12	S-6		1.5	Stiff red to brown FAT CLAY (CH); contains chert; damp to moist.							
16.0	694.3													
		3 3 10	18	S-7		2.5	Stiff to very stiff red FAT CLAY (CH); contains chert fragments; moist.							
		1 3 4	18	S-8		2.0								
		3 4 6	8	S-9		2.0								
		3 4 4	18	S-10		1.5								
25.0	685.3						Bottom of Boring - 25.0'							



DLZ Ohio, Inc. * 6121 Huntley Road, Columbus, Ohio 43229 * (614) 888-0040

Client: Barton Malow | *Project:* Ford H4 Battery Plant | *Job No.* 2150-9519.50

LOG OF: Boring B-096 | *Location:* As per plan | *Date Drilled:* 11/24/2021

WATER OBSERVATIONS:
Water seepage at: None
Water level at completion: None (inside augers)

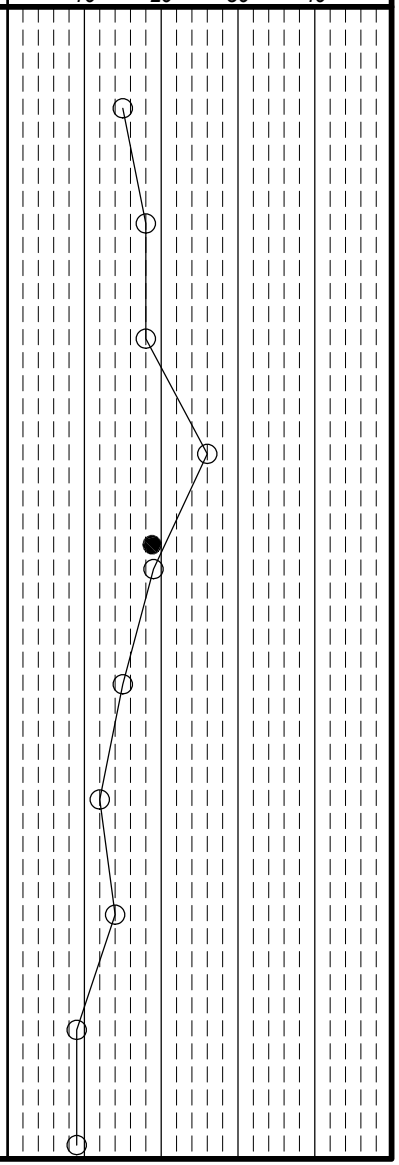
DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Depth (ft)	Elev. (ft) 713.7	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0.5	713.2						Topsoil - 6", Plow Depth - 8"							
		4 5 6	11	S-1		3.5	Very stiff light brown SILTY CLAY (CL-ML); damp to moist.							
3.5	710.2													
5		3 5 8	15	S-2		4.5+	Hard red and light brown mottled LEAN CLAY (CL); moist.							
6.0	707.7													
		3 6 7	14	S-3		4.5+	Hard to very stiff red FAT CLAY (CH); moist.							
10		3 9 10	18	S-4		4.0	@ 8.5'-10.5', contains fine sand layer							
		4 5 9	14	S-5		4.5+								
15		3 5 6	18	S-6		3.5								
16.0	697.7													
		2 2 7	18	S-7		2.0	Stiff to very stiff light brown FAT CLAY (CH); moist.							
18.5	695.2													
20		3 5 5	18	S-8		3.0	Very stiff red FAT CLAY (CH); moist.							
							@ 20.0'-21.0'. light drill rig chatter							
		3 3 4	7	S-9		2.5	@ 21.0'-23.5', contains chert fragments							
25.0 25	688.7	3 3 4	18	S-10		2.25	Bottom of Boring - 25.0'							

GRADATION

Rig (#) / ER	Driller	Logger
CME 750X (289498) / 81.0%	VD	JC

Natural Moisture Content, % - ●
PL ├──┤ LL
N_{60} Value ○ / Non-Plastic - NP



DLZ Ohio, Inc. * 6121 Huntley Road, Columbus, Ohio 43229 * (614) 888-0040

Client: Barton Malow | *Project:* Ford H4 Battery Plant | *Job No.* 2150-9519.50

LOG OF: Boring B-097 | *Location:* As per plan | *Date Drilled:* 11/23/2021

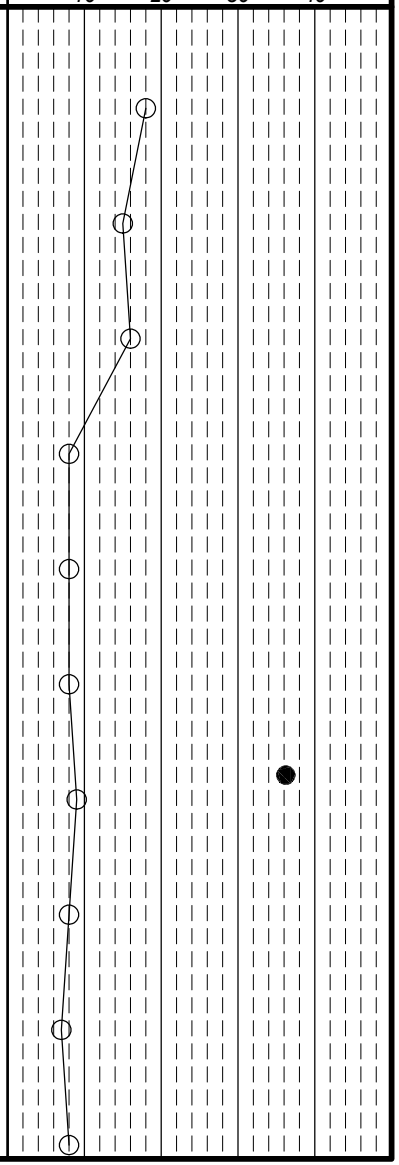
WATER OBSERVATIONS:
Water seepage at: None
Water level at completion: None (inside augers)

DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Depth (ft)	Elev. (ft) 705.6	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0.4	705.2						Topsoil - 5", Plow Depth - 8"							
		3 6 7	18	S-1		4.5+	Hard red and light brown FAT CLAY (CH); moist to damp.							
5		3 5 6	18	S-2		4.5+								
		2 5 7	18	S-3		4.0								
8.5	697.1													
10		3 3 3	18	S-4		2.5	Very stiff red FAT CLAY (CH); moist.							
		2 3 3	18	S-5		2.75								
13.5	692.1													
15		2 2 4	18	S-6		2.5	Stiff to very stiff FAT CLAY (CH); contains chert fragments; moist.							
		2 3 4	18	S-7		3.0								
20		2 3 3	18	S-8		2.0								
		1 2 3	13	S-9		1.5								
25.0 25	680.6	3 2 4	14	S-10		1.5	Bottom of Boring - 25.0'							

Rig (#) / ER CME 750X (289498) / 81.0% | *Driller* VD | *Logger* JC

Natural Moisture Content, % - ●
PL ├──┤ LL
N_{60} Value ○ / Non-Plastic - NP



DLZ Ohio, Inc. * 6121 Huntley Road, Columbus, Ohio 43229 * (614) 888-0040

Client: Barton Malow | *Project:* Ford H4 Battery Plant | *Job No.* 2150-9519.50

LOG OF: Boring B-098 | *Location:* As per plan | *Date Drilled:* 11/30/2021

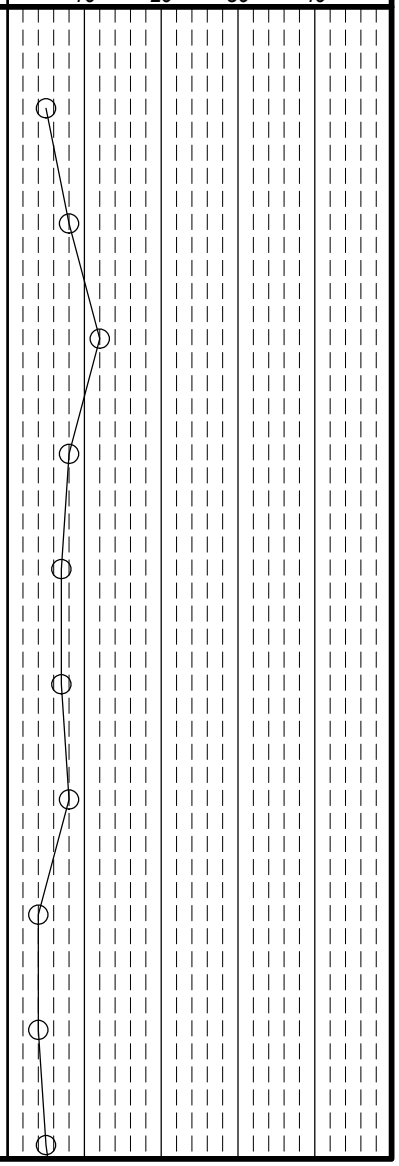
WATER OBSERVATIONS:
Water seepage at: 56.0'
Water level at completion: 42.0' (with augers removed)

DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Rig (#) / ER: CME 750X (289498) / 81.0% | *Driller:* KC | *Logger:* JC

Natural Moisture Content, % - ●
PL ├──┤ LL
N_{60} Value ○ / Non-Plastic - NP
10 20 30 40

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
	698.7													
							Topsoil - 22"							
1.8	696.9	2 2 2	4	S-1		1.0								
							Medium stiff to stiff brown to dark brown SILTY CLAY (CL-ML); damp.							
3.5	695.2													
5		1 1 5	11	S-2		0.5	Soft to medium stiff grayish brown sandy LEAN CLAY (CL); wet.							
6.0	692.7													
		2 5 4	12	S-3			Stiff to very stiff light brown FAT CLAY (CH); moist.							
8.5	690.2													
10		2 3 3	13	S-4		1.5	Stiff light gray and light brown mottled FAT CLAY (CH); moist.							
		2 2 3	15	S-5		1.5								
15		2 2 3	14	S-6		1.5								
16.0	682.7													
		1 3 3	18	S-7		1.0	Stiff to medium stiff light brown FAT CLAY (CH); moist to wet.							
18.5	680.2													
20		1 1 2	18	S-8		0.5	Soft to medium stiff brown FAT LAY (CH); contains fine sand; moist to wet.							
		1 1 2	18	S-9		0.5								
25	673.7	2 2 2	18	S-10		0.5								



Client: Barton Malow | *Project:* Ford H4 Battery Plant | *Job No.* 2150-9519.50

LOG OF: Boring B-098 | *Location:* As per plan | *Date Drilled:* 11/30/2021

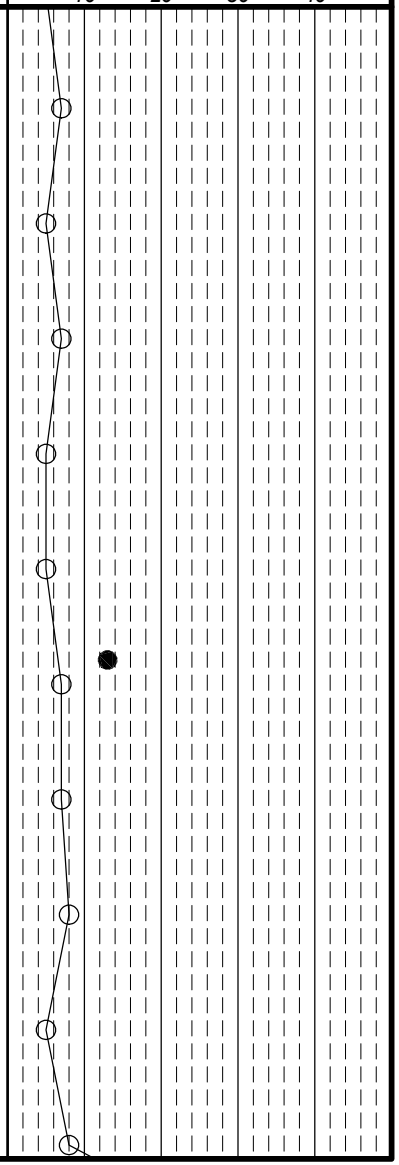
WATER OBSERVATIONS:
Water seepage at: 56.0'
Water level at completion: 42.0' (with augers removed)

DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Rig (#) / ER: CME 750X (289498) / 81.0% | *Driller:* KC | *Logger:* JC

Natural Moisture Content, % - ●
PL ├──┤ LL
N_{60} Value ○ / Non-Plastic - NP
10 20 30 40

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
	673.7						Soft to medium stiff brown FAT LAY (CH); contains fine sand; moist to wet. (continued)							
		2 2 3	18	S-11		0.5								
30		1 2 2	15	S-12		1.0	@ 28.5'-31.0', medium stiff to stiff							
		1 2 3	18	S-13		0.5								
35		2 2 2	18	S-14		0.5								
		1 1 3	18	S-15		0.5								
40		2 2 3	18	S-16		0.5								
		1 1 4	18	S-17		0.5								
45		1 2 4	18	S-18		0.75								
		2 2 2	18	S-19		0.5								
50	648.7	2 2 4	18	S-20		1.0								



DLZ Ohio, Inc. * 6121 Huntley Road, Columbus, Ohio 43229 * (614) 888-0040

Client: Barton Malow | *Project:* Ford H4 Battery Plant | *Job No.* 2150-9519.50

LOG OF: Boring B-098 | *Location:* As per plan | *Date Drilled:* 11/30/2021

WATER OBSERVATIONS:
Water seepage at: 56.0'
Water level at completion: 42.0' (with augers removed)

DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Depth (ft)	Elev. (ft) 648.7	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
51.0	647.7													
		18 20 7	14	S-21		2.0	Stiff to very stiff brown and red mottled FAT CLAY (CH); contains large broken chert fragment; damp to moist.							
53.5	645.2													
55		4 4 8	18	S-22		0.5	Soft to medium stiff brown FAT CLAY (CH); contains stone fragment; moist.							
56.0	642.7													
		4 4 11	18	S-23		0.5	Soft to medium stiff red FAT CLAY (CH); contains stone fragment; moist.							
58.5	640.2													
60		15 16 16	12	S-24			Dense brown and reddish brown clayey SAND (SC); contains stone fragment; moist to wet. @ 60.0'-61.0', light drill rig chatter							
61.0	637.7													
		25 50/4	10	S-25			Light brown Rock fragments; sampler refusal at top of rock							
62.5	636.2													
							Bottom of Boring - 62.5'							
65														
70														
75														

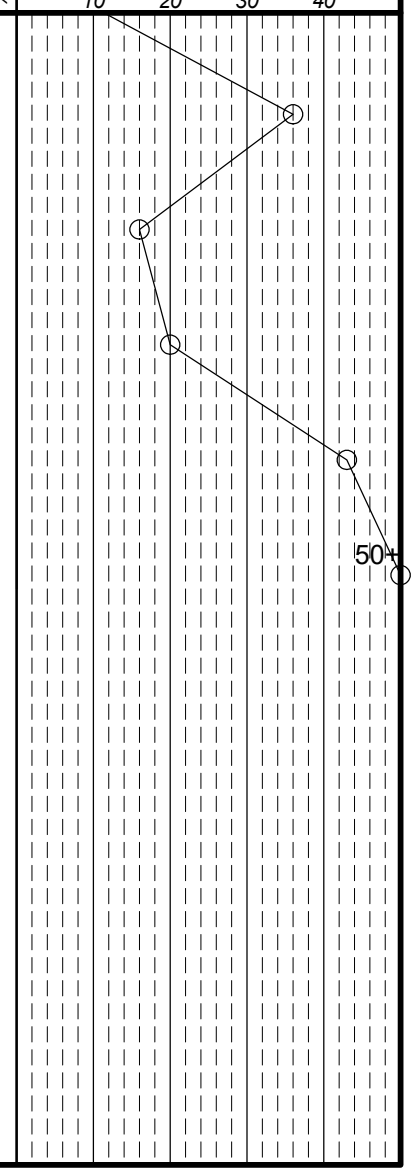
GRADATION

Rig (#) / ER	Driller	Logger
CME 750X (289498) / 81.0%	KC	JC

Natural Moisture Content, % - ●

PL ├──┤ LL

N_{60} Value ○ / Non-Plastic - NP



DLZ Ohio, Inc. * 6121 Huntley Road, Columbus, Ohio 43229 * (614) 888-0040

Client: Barton Malow | *Project:* Ford H4 Battery Plant | *Job No.* 2150-9519.50

LOG OF: Boring B-099 | *Location:* As per plan | *Date Drilled:* 12/3/2021

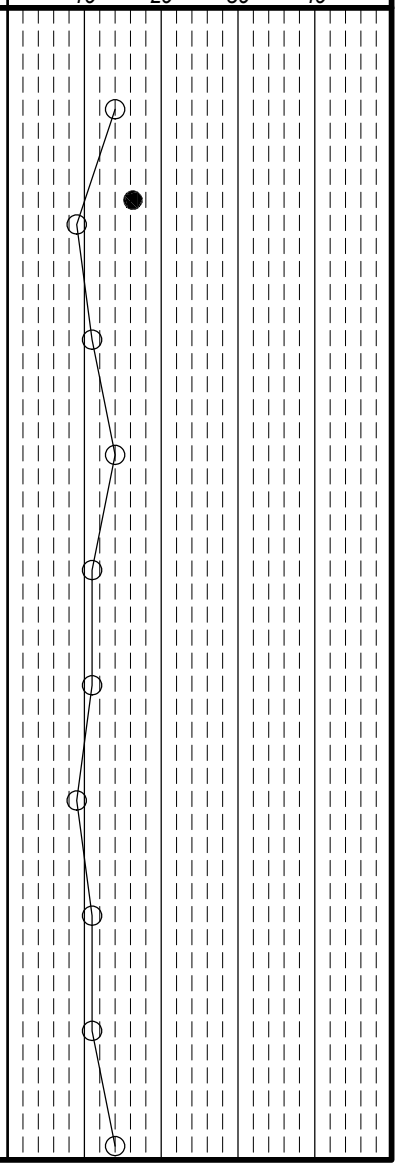
WATER OBSERVATIONS:
Water seepage at: None
Water level at completion: None (inside augers)

DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Rig (#) / ER: CME 750X (289498) / 81.0% | *Driller:* T | *Logger:* JC

Depth (ft)	Elev. (ft) 707.1	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0.3	706.9						Topsoil - 3", Plow Depth - 8"							
		2 4 6	11	S-1		2.0	Stiff to very stiff light brown LEAN CLAY (CL); damp.							
3.5	703.6													
5		3 3 4	10	S-2		2.0	Stiff to very stiff SILTY CLAY (CL-ML); damp.							
6.0	701.1													
		2 4 4	18	S-3		3.5	Very stiff light brown and light gray FAT CLAY (CH); moist.							
10		2 4 6	18	S-4		2.75								
11.0	696.1													
		2 3 5	18	S-5		2.0	Very stiff to stiff red and light gray mottled FAT CLAY (CH); moist.							
13.5	693.6													
15		3 3 5	16	S-6		1.25	Stiff to very stiff red FAT CLAY (CH); moist.							
		2 3 4	18	S-7		2.5	@ 16.0'-21.0', contains black oxide staining							
20		3 4 4	18	S-8		3.0								
		2 3 5	18	S-9		2.75								
25.0 25	682.1	3 5 5	18	S-10		2.5	@ 23.5', light brown and red, contains stone fragments Bottom of Boring - 25.0'							

Natural Moisture Content, % - ●
PL ├──┤ LL
N_{60} Value ○ / Non-Plastic - NP



DLZ Ohio, Inc. * 6121 Huntley Road, Columbus, Ohio 43229 * (614) 888-0040

Client: Barton Malow | *Project:* Ford H4 Battery Plant | *Job No.* 2150-9519.50

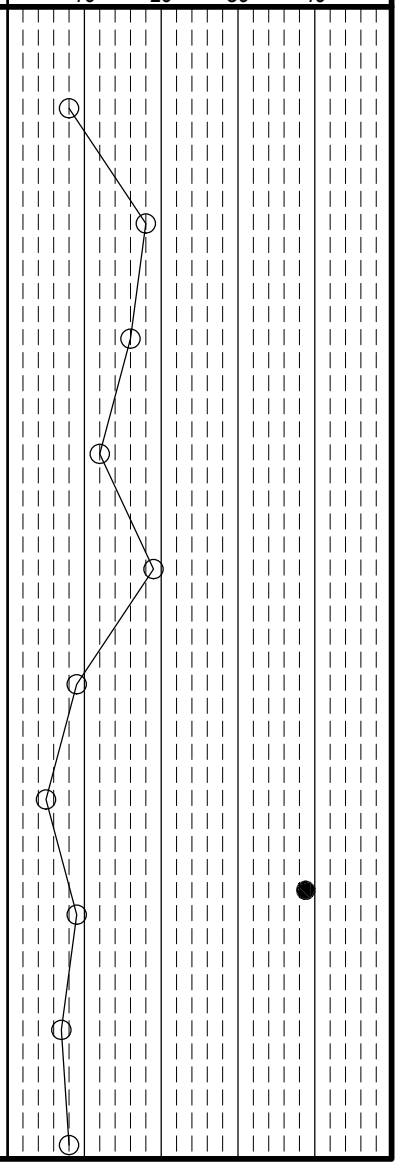
LOG OF: Boring B-100 | *Location:* As per plan | *Date Drilled:* 12/2/2021

WATER OBSERVATIONS:
Water seepage at: None
Water level at completion: None (inside augers)

DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Rig (#) / ER: CME 750X (289498) / 81.0% | *Driller:* T | *Logger:* JC

Depth (ft)	Elev. (ft) 708.6	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0.3	708.3						Topsoil - 4", Plow Depth - 5"							
3.5	705.1	3 3 3	10	S-1		0.75	Medium stiff brown SILTY CLAY (CL-ML); moist.							
6.0	702.6	4 7 6	18	S-2		0.75	Medium stiff red FAT CLAY (CH); moist to wet.							
8.5	700.1	5 6 6	18	S-3		4.5+	Hard red and light brown FAT CLAY (CH); moist.							
11.0	697.6	3 3 6	18	S-4		2.5	Very stiff red and light gray FAT CLAY (CH); moist.							
21.0	687.6	5 7 7	18	S-5		1.75	Medium stiff to stiff red FAT CLAY (CH); contains chert fragments; moist.							
		3 3 4	18	S-6		1.5								
		2 2 2	12	S-7		1.0								
		4 3 4	6	S-8		1.0								
25.0	683.6	2 2 3	18	S-9		2.0	Stiff to very stiff red FAT CLAY (CH); moist.							
		2 3 3	13	S-10		1.75	Bottom of Boring - 25.0'							



DLZ Ohio, Inc. * 6121 Huntley Road, Columbus, Ohio 43229 * (614) 888-0040

Client: Barton Malow | *Project:* Ford H4 Battery Plant | *Job No.* 2150-9519.50

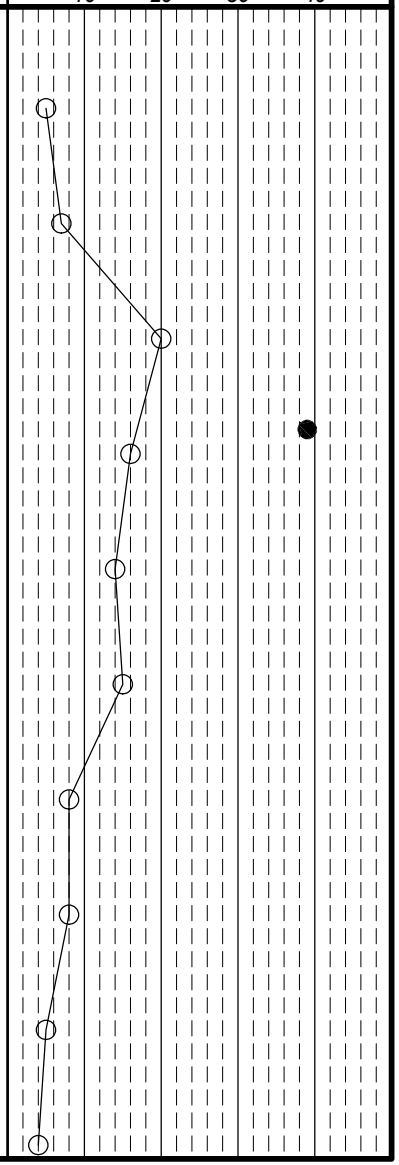
LOG OF: Boring B-101 | *Location:* As per plan | *Date Drilled:* 11/29/2021

WATER OBSERVATIONS:
Water seepage at: None
Water level at completion: None (inside augers)

DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Rig (#) / ER: CME 750X (289498) / 81.0% | *Driller:* KC | *Logger:* JC

Depth (ft)	Elev. (ft) 707.2	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	Natural Moisture Content, % - ●
0.4	706.8						Topsoil - 5", Plow Depth - 8"								
		WOH 2 2	10	S-1		1.5	Stiff red FAT CLAY (CH); moist.								
3.5	703.7														
5		1 2 3	16	S-2		3.5	Very stiff to hard red FAT CLAY (CH); contains chert fragments; moist to damp.								
		5 7 8	12	S-3		4.5+	@ 6.0'-11.0', contains broken large chert fragments								
10		4 4 8	18	S-4		3.5									
		3 4 6	14	S-5		2.0	@ 11.0'-13.5', very stiff to stiff								
15		2 5 6	18	S-6		2.25									
		2 2 4	15	S-7		2.0	@ 16.0', stiff to very stiff								
20		2 2 4	18	S-8		1.5									
21.0	686.2														
		1 2 2	16	S-9		1.0	Medium stiff to stiff red FAT CLAY (CH); moist.								
25.0 25	682.2	1 1 2	18	S-10		1.5	Bottom of Boring - 25.0'								



DLZ Ohio, Inc. * 6121 Huntley Road, Columbus, Ohio 43229 * (614) 888-0040

Client: Barton Malow | *Project:* Ford H4 Battery Plant | *Job No.* 2150-9519.50

LOG OF: Boring B-102 | *Location:* As per plan | *Date Drilled:* 12/4/2021

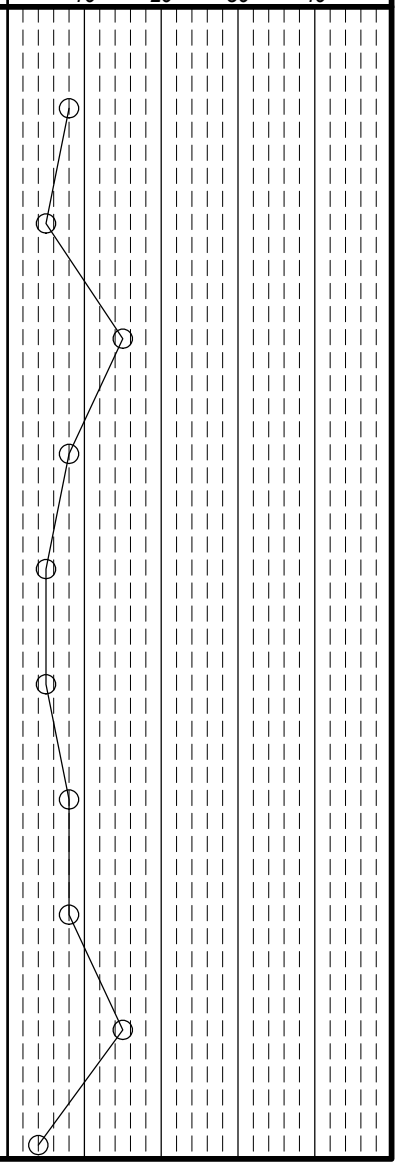
WATER OBSERVATIONS:
Water seepage at: 23.5'
Water level at completion: 23.7' (inside augers)

DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Rig (#) / ER: CME 750X (289498) / 81.0% | *Driller:* T | *Logger:* AM

Natural Moisture Content, % - ●
PL ├──┤ LL
N_{60} Value ○ / Non-Plastic - NP
10 20 30 40

Depth (ft)	Elev. (ft) 699.4	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0.6	698.8						Topsoil - 7', Plow Depth - 9"							
3.5	695.9	3 3 3	8	S-1			Loose light brown to brown SAND (SP-SM) with silt; damp.							
6.0	693.4	2 2 2	7	S-2			Loose light brown and light gray SAND (SP-SC) with clay; moist.							
8.5	690.9	2 5 6	10	S-3			Medium dense light bluish gray SAND (SP-SC) with clay; moist							
11.0	688.4	2 3 3	15	S-4		1.75	Stiff light brown LEAN CLAY (CL); moist.							
16.0	683.4	WOH 2 2	16	S-5		1.0	Stiff to medium stiff brown FAT CLAY (CH); moist.							
		3 2 2	12	S-6		0.75								
21.0	678.4	1 3 3	18	S-7		1.75	Stiff light brown FAT CLAY (CH); contains black oxide staining; moist.							
		3 2 4	18	S-8		1.25								
23.5	675.9	5 6 5	18	S-9		3.25	Very stiff brown FAT CLAY (CH); contains chert fragments and black oxide staining; moist.							
25.0	674.4	3 1 2	9	S-10		0.75	Medium stiff red FAT CLAY (CH); contains chert fragments; wet.							



Client: Barton Malow	Project: Ford H4 Battery Plant	Job No. 2150-9519.50
LOG OF: Boring B-102	Location: As per plan	Date Drilled: 12/4/2021

WATER OBSERVATIONS:
Water seepage at: 23.5'
Water level at completion: 23.7' (inside augers)

DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Rig (#) / ER: CME 750X (289498) / 81.0%
Driller: T
Logger: AM

Natural Moisture Content, % - ●
PL ⊢——⊣ LL
N_{60} Value ○ / Non-Plastic - NP
10 20 30 40

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
	674.4						Bottom of Boring - 25.0'							
30														
35														
40														
45														
50														

DLZ Ohio, Inc. * 6121 Huntley Road, Columbus, Ohio 43229 * (614) 888-0040

Client: Barton Malow | *Project:* Ford H4 Battery Plant | *Job No.* 2150-9519.50

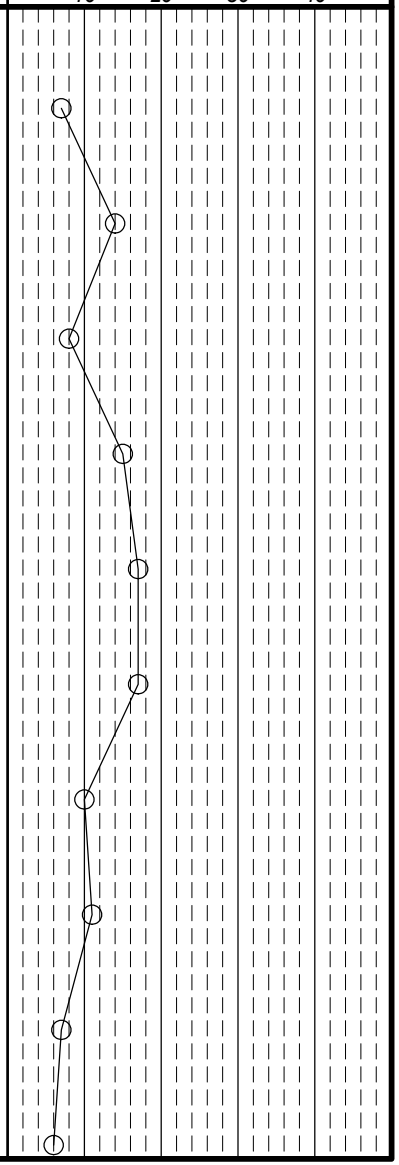
LOG OF: Boring B-103 | *Location:* As per plan | *Date Drilled:* 12/3/2021

WATER OBSERVATIONS:
Water seepage at: 8.5'
Water level at completion: 23.1' (inside augers)
10.2' (inside augers after 16 hours)
DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Rig (#) / ER: CME-850X (400472) / 84.0% | *Driller:* T | *Logger:* AM

Natural Moisture Content, % - ●
PL ⊢—⊣ LL
N_{60} Value ○ / Non-Plastic - NP

Depth (ft)	Elev. (ft) 701.4	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0.2	701.2						Topsoil - 2", Plow Depth - 10"							
3.5	697.9	3 2 3	13	S-1		1.75	Stiff brown to light brown FAT CLAY (CH); moist.							
6.0	695.4	3 4 6	14	S-2		4.5	Hard light brown and light gray SILTY CLAY (CL-ML) with sand; damp.							
8.5	692.9	3 3 3	18	S-3		3.0	Very stiff light brown FAT CLAY (CH); moist.							
13.5	687.9	4 5 6	18	S-4		1.0	Stiff to medium stiff light brown FAT CLAY (CH); contains large broken chert fragment; moist.							
		6 6 6	14	S-5		0.75								
16.0	685.4	6 5 7	6	S-6		2.25	Very stiff red FAT CLAY (CH); contains large broken chert fragments; moist.							
21.0	680.4	3 4 3	18	S-7		1.25	Stiff red FAT CLAY (CH); contains chert fragments; moist.							
		3 4 4	17	S-8		1.25								
25.0	676.4	3 2 3	18	S-9		2.0	Stiff red FAT CLAY (CH); moist.							
		3 2 2	18	S-10		1.5	Bottom of Boring - 25.0'							



DLZ Ohio, Inc. * 6121 Huntley Road, Columbus, Ohio 43229 * (614) 888-0040

Client: Barton Malow | *Project:* Ford H4 Battery Plant | *Job No.* 2150-9519.50

LOG OF: Boring B-104 | *Location:* As per plan | *Date Drilled:* 12/3/2021

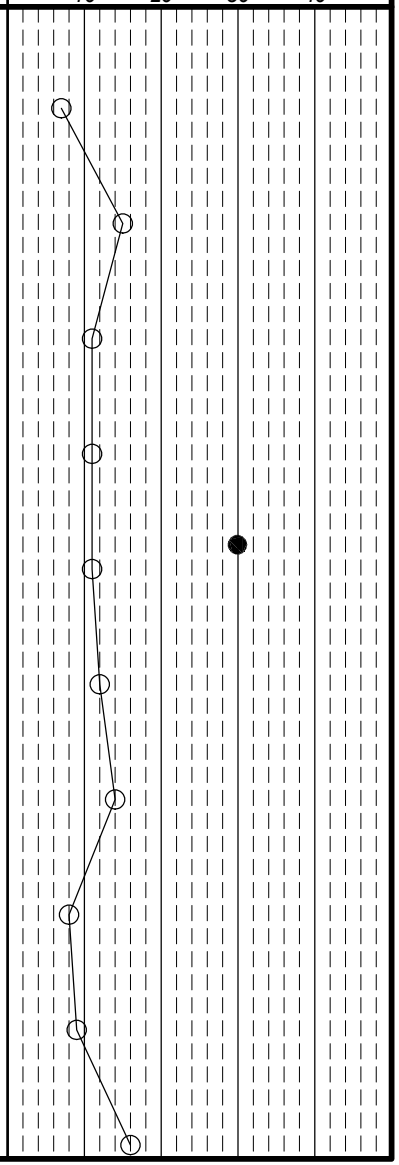
WATER OBSERVATIONS:
Water seepage at: None
Water level at completion: None (inside augers)

DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Rig (#) / ER: CME 750X (289498) / 81.0% | *Driller:* T | *Logger:* JC

Natural Moisture Content, % - ●
PL ├──┤ LL
N_{60} Value ○ / Non-Plastic - NP
10 20 30 40

Depth (ft)	Elev. (ft) 707.0	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0.1	706.9						Topsoil - NO READING							
		2 2 3	18	S-1		1.5	Stiff reddish light brown LEAN CLAY (CL); moist to wet.							
3.5	703.5													
5		3 4 7	18	S-2		2.5	Very stiff to stiff red and light brown mottled FAT CLAY (CL); moist.							
		2 4 4	18	S-3		2.5								
10		2 3 5	18	S-4		2.0								
		2 3 5	18	S-5		2.5								
13.5	693.5													
15		3 3 6	16	S-6		2.5	Very stiff to stiff red FAT CLAy (CH); moist.							
		2 3 7		S-7		2.0	@ 17.5'-18.5'. light drill rig chatter							
18.5	688.5													
20		2 2 4	15	S-8		1.5	Stiff to very stiff red FAT CLAY (CH); contains chert fragments; moist.							
		2 3 4	18	S-9		1.5								
25.0 25	682.0	3 6 6		S-10			Bottom of Boring - 25.0'							



DLZ Ohio, Inc. * 6121 Huntley Road, Columbus, Ohio 43229 * (614) 888-0040

Client: Barton Malow | *Project:* Ford H4 Battery Plant | *Job No.* 2150-9519.50

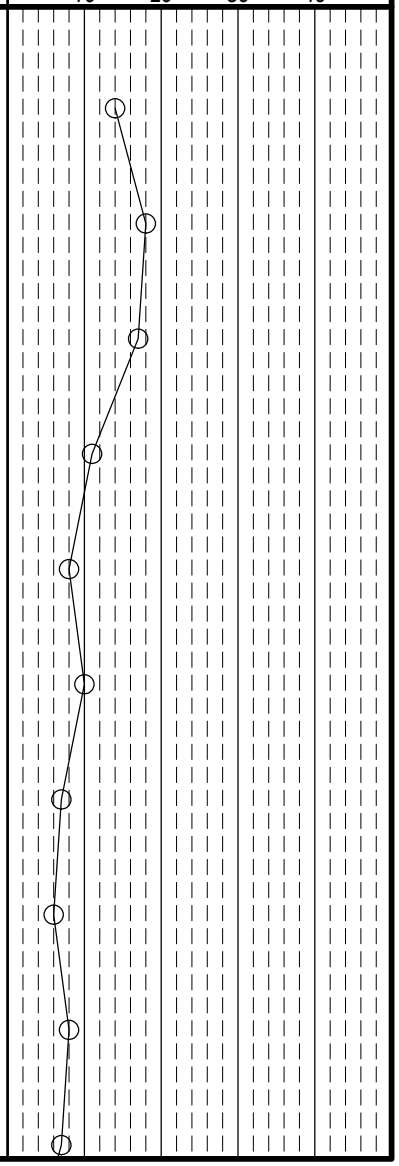
LOG OF: Boring B-105 | *Location:* As per plan | *Date Drilled:* 12/9/2021

WATER OBSERVATIONS:
Water seepage at: 33.5'
Water level at completion: 24.0' (prior to adding water)
18.9' (with augers removed)
DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Rig (#) / ER: CME-850X (400472) / 84.0% | *Driller:* LB | *Logger:* AM

Natural Moisture Content, % - ●
PL ├──┤ LL
N_{60} Value ○ / Non-Plastic - NP
10 20 30 40

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
	707.2													
0.3	706.9						Topsoil - 4"							
		2 3 7	18	S-1		1.0	Stiff to medium stiff light brown and light gray mottled SILTY CLAY (CL-ML); damp.							
3.5	703.7													
5		6 7 6	15	S-2		4.5	Hard light gray with brown mottled LEAN CLAY (CL); damp to moist.							
6.0	701.2													
		4 5 7	18	S-3		2.5	Very stiff light gray and brown mottled FAT CLAY (CH); moist.							
8.5	698.7													
10		3 4 4	18	S-4		2.0	Stiff to very stiff red and light brown mottled FAT CLAY (CH); moist.							
		3 3 3	18	S-5		2.0	@ 11.0'-13.5', contins black oxide staining							
15		3 4 3	18	S-6		1.5								
		2 2 3	18	S-7		1.0	@ 16.0'-18.5', medium stiff to stiff, moist to wet							
18.5	688.7													
20		2 2 2	18	S-8		0.5	Medium stiff to soft red FAT CLAY (CH); contains chert fragments; moist to wet.							
		2 3 3	9	S-9		< 0.25								
25	682.2	3 2 3	3	S-10		<0.25								



Client: Barton Malow | *Project:* Ford H4 Battery Plant | *Job No.* 2150-9519.50

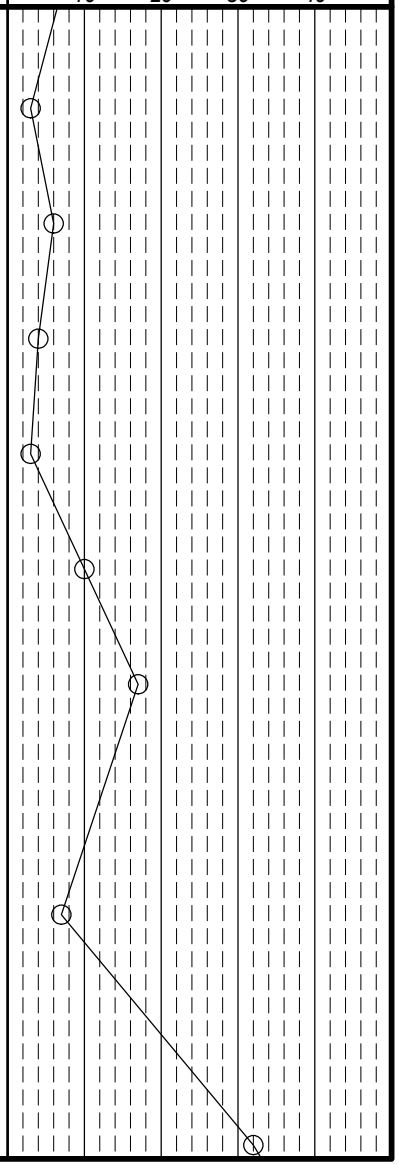
LOG OF: Boring B-105 | *Location:* As per plan | *Date Drilled:* 12/9/2021

WATER OBSERVATIONS:
Water seepage at: 33.5'
Water level at completion: 24.0' (prior to adding water)
18.9' (with augers removed)
DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Rig (#) / ER: CME-850X (400472) / 84.0% | *Driller:* LB | *Logger:* AM

Natural Moisture Content, % - ●
PL ├──┤ LL
N_{60} Value ○ / Non-Plastic - NP
10 20 30 40

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
	682.2						Medium stiff to soft red FAT CLAY (CH); contains chert fragments; moist to wet. (continued)							
		1 1 1	18	S-11		0.5								
30		1 3 1	18	S-12		0.25	@ 28.5'-31.0', soft to very soft, wet							
		1 2 1	18	S-13		0.5								
35		1 1 1	18	S-14		0.75								
		2 3 4	18	S-15		0.5								
40		3 7 5	18	S-16		1.0								
43.5	663.7													
45		3 2 3	18	S-17		0.5	Soft to medium stiff light brown and red FAT CLAY (CH); contains stone fragments and black oxide staining; moist to wet.							
48.5	658.7													
50	657.2	8 13 10	18	S-18			Dense light brown SAND (SP-SC) with clay and gravel; decomposed rock; wet.							



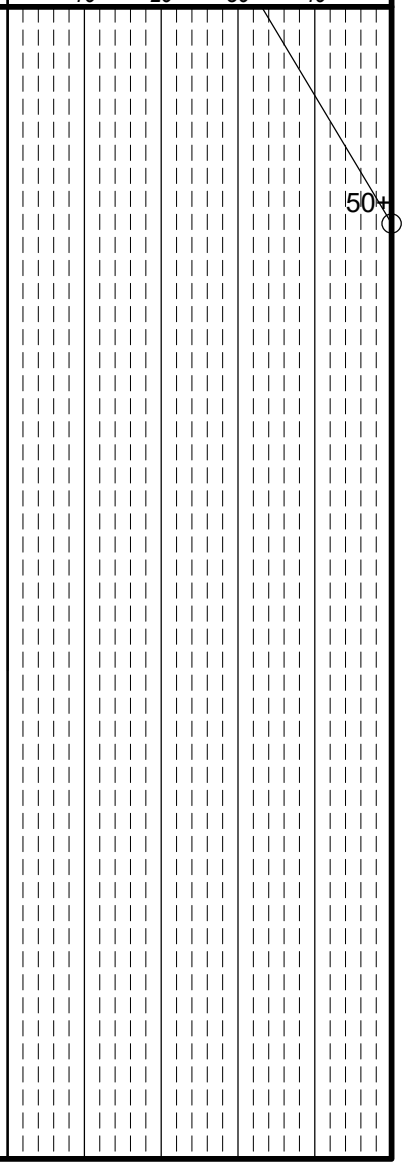
Client: Barton Malow	Project: Ford H4 Battery Plant	Job No. 2150-9519.50
LOG OF: Boring B-105	Location: As per plan	Date Drilled: 12/9/2021

WATER OBSERVATIONS:
Water seepage at: 33.5'
Water level at completion: 24.0' (prior to adding water)
18.9' (with augers removed)
DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Rig (#) / ER: CME-850X (400472) / 84.0%
Driller: LB
Logger: AM

Natural Moisture Content, % - ●
PL ⊢—⊣ LL
N_{60} Value ○ / Non-Plastic - NP

Depth (ft)	Elev. (ft) 657.2	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	Natural Moisture Content, %
							Dense light brown SAND (SP-SC) with clay and gravel; decomposed rock; wet. (continued)								
53.5	653.7	50/3	0	S-19			@ 53.5', no sample recovered, top of competent rock								
54.4	652.8						LIMESTONE @ 54.4', auger refusal								
55							Hard to very hard gray to light yellow gray LIMESTONE; very fine grained, slightly weathered to decomposed, thickly bedded, moderately to highly fractured; rock contains significant visual evidence of solutioning, significant core loss is attributed to solutioning, suspected voids are open or clay filled, contains 1.8' long near verical fracture.								
60		Core 120"	Rec 84"	RQD 23%	1										
64.4	642.8														
65							Bottom of Boring - 64.4'								
70															
75															



Client: Barton Malow | *Project:* Ford H4 Battery Plant | *Job No.* 2150-9519.50

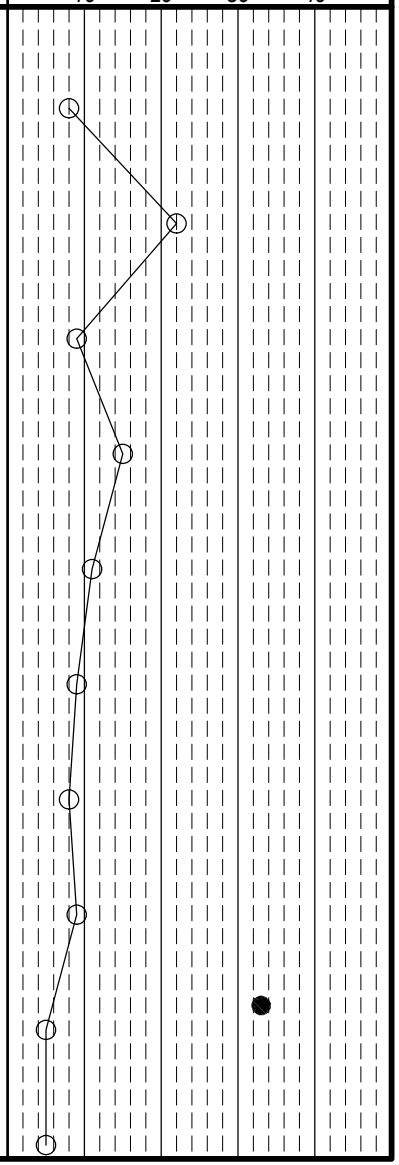
LOG OF: Boring B-106 | *Location:* As per plan | *Date Drilled:* 11/29/2021

Rig (#) / ER CME 750X (289498) / 81.0% | *Driller* KC | *Logger* JC

WATER OBSERVATIONS:
Water seepage at: None
Water level at completion: None (inside augers)

DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Depth (ft)	Elev. (ft) 700.4	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0.4	700.0						Topsoil - 5", Plow Depth - 7"							
		3 3 3	18	S-1		1.0	Stiff to medium stiff light brown LEAN CLAY (CL); moist.							
3.5	696.9													
5		4 7 9	9	S-2		2.0	Very stiff to stiff red and light gray FAT CLAY (CH); contains chert fragments; moist.							
		4 4 3	14	S-3		2.0								
8.5	691.9													
10		5 4 7	12	S-4		4.0	Hard to very stiff red FAT CLAY (CH); contains chert fragments; damp to moist.							
		3 4 4	18	S-5		3.0								
15		2 3 4	11	S-6		3.5								
		2 3 3	18	S-7		2.5								
18.5	681.9													
20		4 3 4	12	S-8		1.5	Loose red clayey SAND (SC); contains chert fragments; moist.							
21.0	679.4													
		2 2 2	18	S-9		1.5	Stiff light greenish gray FAT CLAY (CH); moist.							
25.0 25	675.4	1 2 2	14	S-10		1.75	Bottom of Boring - 25.0'							



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Client: Barton Malow | *Project:* Ford H4 Battery Plant | *Job No.* 2150-9519.50

LOG OF: Boring B-107 | *Location:* As per plan | *Date Drilled:* 11/29/2021

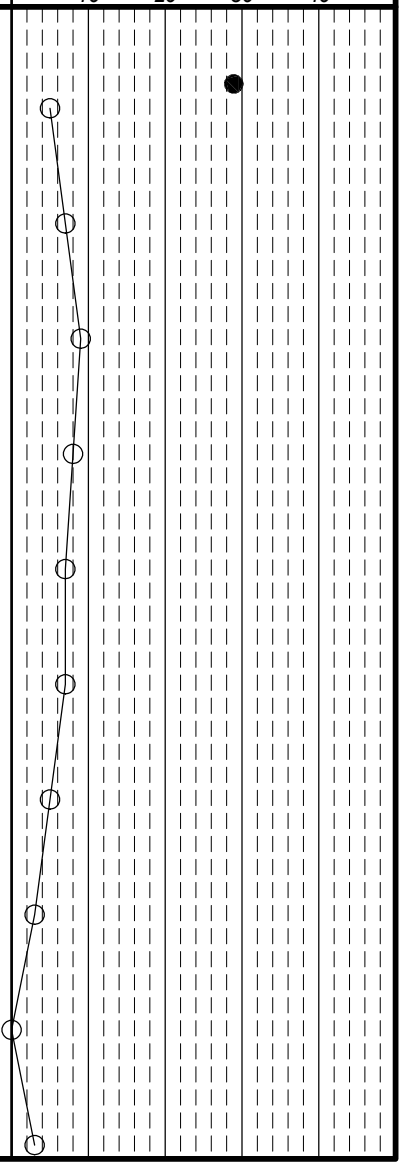
WATER OBSERVATIONS:
Water seepage at: 18.5'
Water level at completion: 24.0' (with augers removed)

DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Rig (#) / ER: CME 750X (289498) / 81.0% | *Driller:* KC | *Logger:* JC

Natural Moisture Content, % - ●
PL ├──┤ *LL*
N_{60} Value ○ / *Non-Plastic -* NP
10 20 30 40

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
	697.2													
0.5	696.7						Topsoil - 6", Plow Depth - 8"							
		1 2 2	13	S-1		0.5	Soft to medium stiff sandy LEAN CLAY (CL); contains black oxide staining; moist to wet.							
3.5	693.7													
5		1 2 3	17	S-2		1.75	Stiff to medium stiff light brown to light gray mottled FAT CLAY (CH); moist.							
		3 3 4	18	S-3		1.0								
10		2 2 4	17	S-4		1.5								
11.0	686.2													
		2 2 3	18	S-5		1.25	Stiff to medium stiff light gray FAT CLAY (CH); moist to wet.							
15		2 2 3	18	S-6		1.0								
		1 2 2	18	S-7		1.0								
20		WOH 1 1	18	S-8		0.75								
		WOH WOH WOH	18	S-9		0.75								
23.5	673.7													
25.0 25	672.2	WOH 1 1	18	S-10		0.75	Medium stiff red and gray variegated FAT CLAY (CH); moist to wet.							



DLZ Ohio, Inc. * 6121 Huntley Road, Columbus, Ohio 43229 * (614) 888-0040

Client: Barton Malow	Project: Ford H4 Battery Plant	Job No. 2150-9519.50
LOG OF: Boring B-107	Location: As per plan	Date Drilled: 11/29/2021

WATER OBSERVATIONS:
Water seepage at: 18.5'
Water level at completion: 24.0' (with augers removed)

DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Depth (ft)	Elev. (ft) 672.2	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetro-meter (tsf)	DESCRIPTION	Graphic Log	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	Rig (#) / ER	Driller	Logger
							Bottom of Boring - 25.0'								CME 750X (289498) / 81.0%	KC	JC

Natural Moisture Content, % - ●
PL ├──┤ LL
N_{60} Value ○ / Non-Plastic - NP
10 20 30 40

30
35
40
45
50

DLZ Ohio, Inc. * 6121 Huntley Road, Columbus, Ohio 43229 * (614) 888-0040

Client: Barton Malow | *Project:* Ford H4 Battery Plant | *Job No.* 2150-9519.50

LOG OF: Boring B-108 | *Location:* As per plan | *Date Drilled:* 12/4/2021

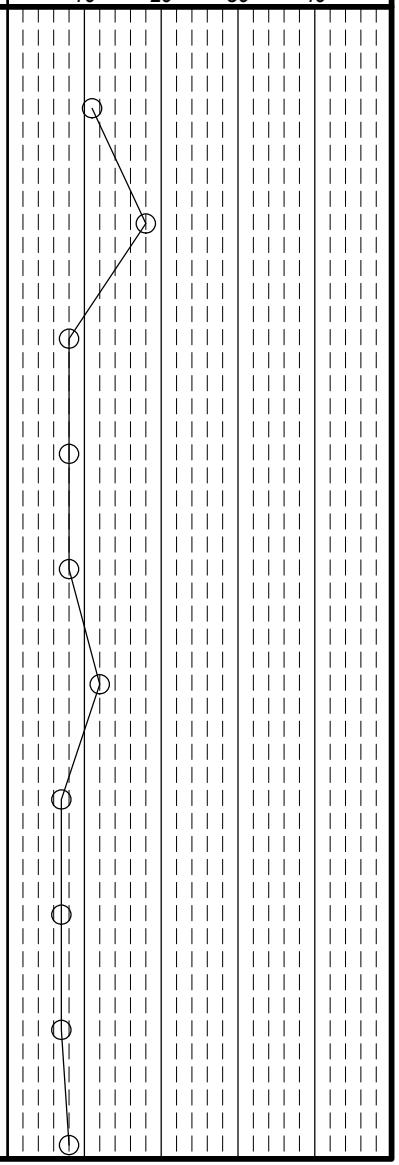
WATER OBSERVATIONS:
Water seepage at: None
Water level at completion: None (inside augers)

DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Rig (#) / ER: CME 750X (289498) / 81.0% | *Driller:* T | *Logger:* AM

Natural Moisture Content, % - ●
PL ├──┤ LL
N_{60} Value ○ / Non-Plastic - NP

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0.1	698.2						Topsoil - NO READING							
3.5	694.8	5 4 4	18	S-1		1.25	Stiff light brown and light gray SILTY CLAY (CL-ML); damp to moist.							
6.0	692.3	3 6 7	15	S-2		2.5	Very stiff red, light brown, and light gray SILTY CLAY (CL-ML); damp to moist.							
11.0	687.3	4 3 3	18	S-3		1.5	Stiff light gray FAT CLAY (CH); moist.							
		3 3 3	18	S-4		1.5								
16.0	682.3	1 3 3	18	S-5		3.5	Very stiff to stiff brown and light gray mottled FAT CLAY (CH); moist.							
		3 4 5	7	S-6		2.0								
21.0	677.3	3 3 2	18	S-7		1.5	Stiff red and light brown mottled FAT CLAY (CH); moist.							
		2 2 3	13	S-8		1.25								
23.5	674.8	3 3 2	16	S-9		1.25	Stiff brown to red FAT CLAY (CH); contains chert fragments; moist.							
25.0	673.3	3 3 3	18	S-10		0.25	Soft to medium stiff red FAT CLAY (CH); contains chert fragments; moist.							



Client: Barton Malow	Project: Ford H4 Battery Plant	Job No. 2150-9519.50
LOG OF: Boring B-108	Location: As per plan	Date Drilled: 12/4/2021

WATER OBSERVATIONS:
Water seepage at: None
Water level at completion: None (inside augers)

DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Rig (#) / ER: CME 750X (289498) / 81.0%
Driller: T
Logger: AM

Natural Moisture Content, % - ●
PL ⊢——⊣ LL
N_{60} Value ○ / Non-Plastic - NP
10 20 30 40

Depth (ft)	Elev. (ft) 673.3	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
							Bottom of Boring - 25.0'							
30														
35														
40														
45														
50														

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Client: Barton Malow | *Project:* Ford H4 Battery Plant | *Job No.* 2150-9519.50

LOG OF: Boring B-109 | *Location:* As per plan | *Date Drilled:* 12/3/2021

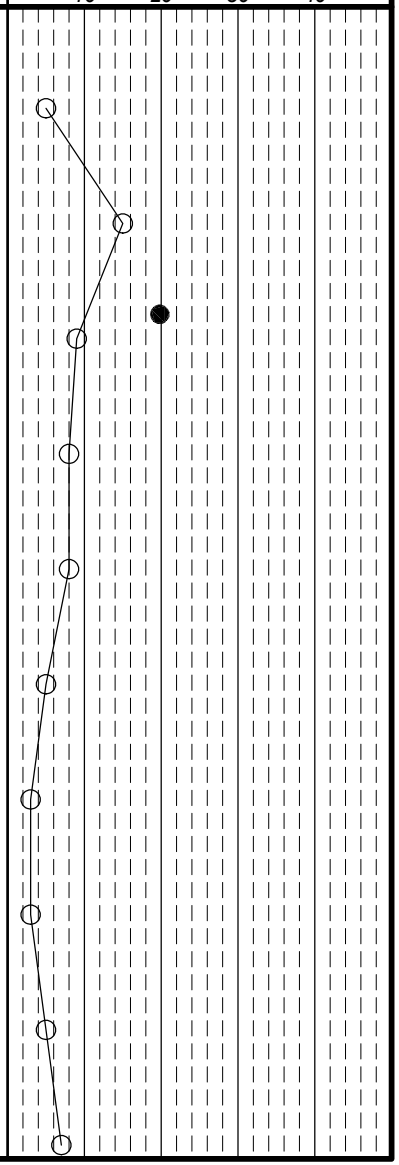
WATER OBSERVATIONS:
Water seepage at: 16.0'
Water level at completion: NO READING (inside augers)

DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Rig (#) / ER: CME 750X (289498) / 81.0% | *Driller:* T | *Logger:* JC

Natural Moisture Content, % - ●
PL ├──┤ LL
N_{60} Value ○ / Non-Plastic - NP
10 20 30 40

Depth (ft)	Elev. (ft) 701.1	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0.1	701.0						Topsoil - NO READING							
3.5	697.6	1 1 3	10	S-1		1.0	Stiff to medium stiff brown SILTY CLAY (CL-ML); moist.							
8.5	692.6	3 5 6	12	S-2		1.75	Stiff to very stiff light gray FAT CLAY (CH); moist.							
		3 3 4	18	S-3		3.0								
11.0	690.1	2 3 3	18	S-4		1.25	Stiff gray FAT CLAY (CH); moist.							
13.5	687.6	1 3 3	18	S-5		1.0	Stiff to medium stiff red FAT CLAY (CH); moist to wet.							
21.0	680.1	3 2 2	16	S-6		1.0	Stiff to medium stiff red FAT CLAY (CH); contains chert fragments; moist to wet.							
		1 1 1	18	S-7		0.75								
		WOH 1 1		S-8		0.5	@ 18.5', soft to medium stiff, contains chert fragments, wet							
23.5	677.6	4 2 2	3	S-9		0.75	Medium stiff gray FAT CLAY (CH); wet.							
25.0	676.1	2 2 3	18	S-10		1.0	Medium stiff to stiff red FAT CLAY (CH); contains chert fragments; wet.							



Client: Barton Malow	Project: Ford H4 Battery Plant	Job No. 2150-9519.50
LOG OF: Boring B-109	Location: As per plan	Date Drilled: 12/3/2021

WATER OBSERVATIONS:
Water seepage at: 16.0'
Water level at completion: NO READING (inside augers)

DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Rig (#) / ER: CME 750X (289498) / 81.0% — Driller: T — Logger: JC

Natural Moisture Content, % - ●
PL ○ LL / Non-Plastic - NP
N_{60} Value

Depth (ft)	Elev. (ft) 676.1	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
							Bottom of Boring - 25.0'							
30														
35														
40														
45														
50														

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Client: Barton Malow | *Project:* Ford H4 Battery Plant | *Job No.* 2150-9519.50

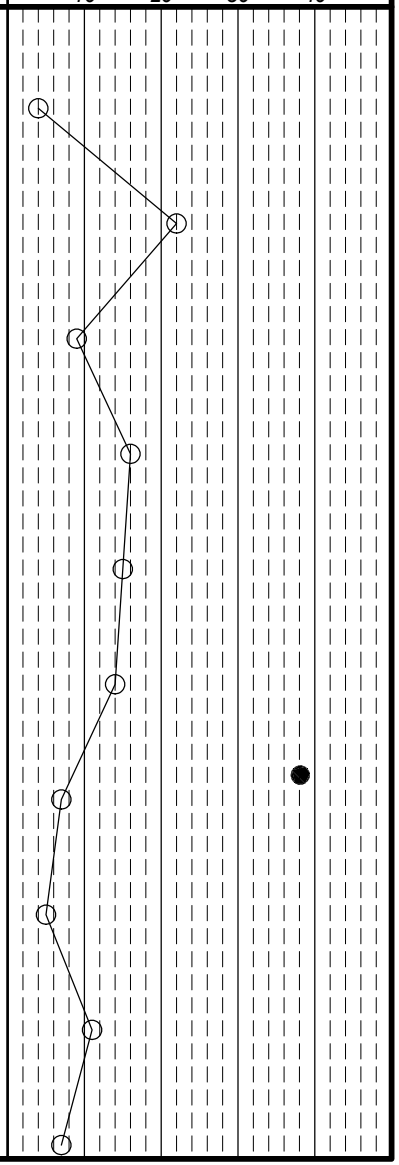
LOG OF: Boring B-110 | *Location:* As per plan | *Date Drilled:* 12/2/2021

WATER OBSERVATIONS:
Water seepage at: None
Water level at completion: None (inside augers)

DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Rig (#) / ER: CME 750X (289498) / 81.0% | *Driller:* T | *Logger:* JC

Depth (ft)	Elev. (ft) 704.1	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0.3	703.8						Topsoil - 3", Plow Depth - 6"							
3.5	700.6	1 1 2	6	S-1		1.0	Stiff to medium stiff brown SILTY CLAY (CL-ML); moist.							
6.0	698.1	5 6 10	13	S-2		4.5+	Hard red FAT CLAY (CH); contains chert fragments and black oxide staining; damp to moist.							
		4 4 3	18	S-3		3.0	Very stiff to stiff red FAT CLAY (CH); contains chert fragments; moist.							
		4 7 5	15	S-4		3.0								
		4 6 5	18	S-5		2.0								
		4 5 5	12	S-6		2.0	@ 13.5'-16.0', contains two large broken chert fragments							
		2 2 3		S-7		1.5								
21.0	683.1	2 2 2	18	S-8		1.25								
23.5	680.6	2 3 5	18	S-9		1.5	Stiff light brownish gray FAT CLAY (CH); moist to wet.							
25.0	679.1	2 2 3	4	S-10		1.5	Stiff red FAT CLAY (CH); contains chert fragments; moist. Bottom of Boring - 25.0'							



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Client: Barton Malow | *Project:* Ford H4 Battery Plant | *Job No.* 2150-9519.50

LOG OF: Boring B-111 | *Location:* As per plan | *Date Drilled:* 11/23/2021

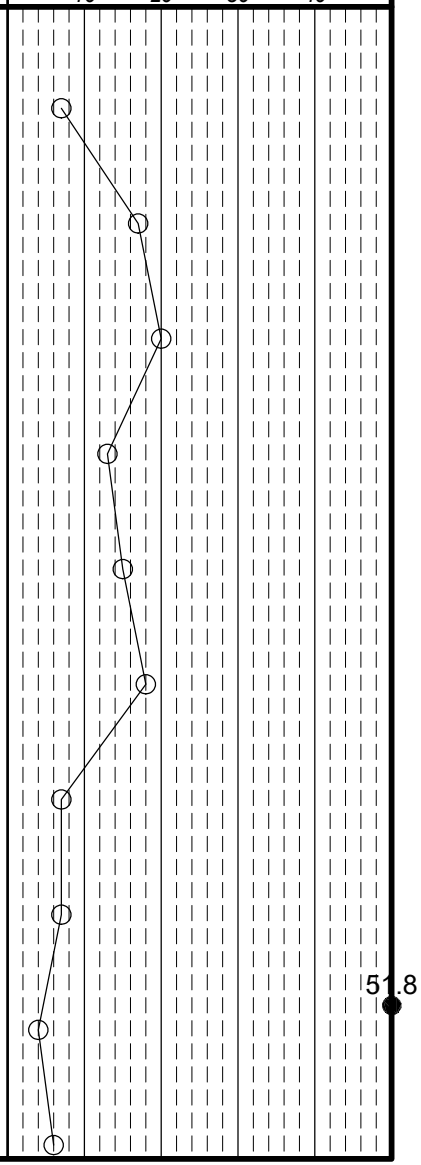
WATER OBSERVATIONS:
Water seepage at: 18.5'
Water level at completion: 5.6' (with augers removed) ?????

DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Rig (#) / ER: CME-850X (400472) / 84.0% | *Driller:* P | *Logger:* AM

Natural Moisture Content, % - ●
PL ├──┤ *LL*
N_{60} Value ○ / *Non-Plastic -* NP
10 20 30 40

Depth (ft)	Elev. (ft) 698.4	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0.4	698.0						Topsoil - 5", Plow Depth - 8"							
		1 3 2	18	S-1		0.25	Soft to very stiff light gray LEAN CLAY (CL); moist.							
5		3 5 7	18	S-2		1.5	@ 3.5', stiff							
6.0	692.4													
		5 7 7	18	S-3			Stiff brown gravely LEAN CLAY (CL); contains chert fragments; moist.							
8.5	689.9													
10		4 4 5	18	S-4		1.5	Stiff to medium stiff red FAT CLAY (CH); moist.							
		3 5 6	18	S-5		1.0								
15		3 5 8	18	S-6		1.25								
		2 2 3		S-7		2.0								
18.5	679.9													
20		2 2 3	18	S-8		0.5	Soft to medium stiff red FAT CLAY (CH); wet.							
		1 2 1	8	S-9		0.75								
25.0 25	673.4	1 2 2	18	S-10		0.75	@ 23.5', moist to wet Bottom of Boring - 25.0'							



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Client: Barton Malow | *Project:* Ford H4 Battery Plant | *Job No.* 2150-9519.50

LOG OF: Boring B-112 | *Location:* As per plan | *Date Drilled:* 11/23/2021

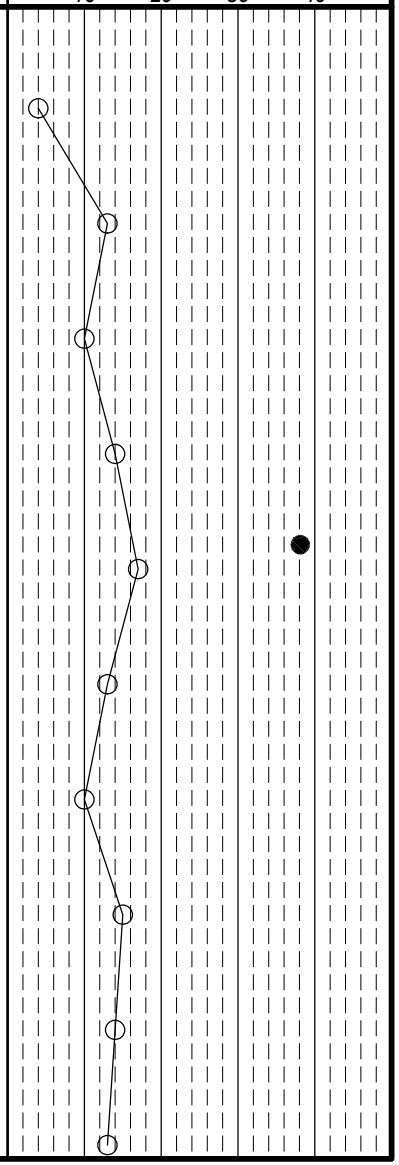
WATER OBSERVATIONS:
Water seepage at: None
Water level at completion: None (inside augers)

DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Rig (#) / ER: CME-850X (400472) / 84.0% | *Driller:* P | *Logger:* AM

Natural Moisture Content, % - ●
PL ├──┤ LL
N_{60} Value ○ / Non-Plastic - NP
10 20 30 40

Depth (ft)	Elev. (ft) 695.9	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0.8	695.1						Topsoil - 9"							
		WOH 1 2	18	S-1		0.25	Vert soft to soft gray SILTY CLAY (CL-ML); wet.							
5		3 4 5	2	S-2			@ 3.5', low recovery due to encountered wood or roots							
6.0	689.9													
		4 3 4	18	S-3		3.0	Very stiff light gray FAT CLAY (CH); moist.							
8.5	687.4													
10		2 4 6	18	S-4		1.5	Stiff to medium stiff light gray FAT CLAY (CH); contains large chert fragments; moist.							
		4 6 6	18	S-5		1.0	@ 11.5', red and light gray							
13.5	682.4													
15		4 4 5	18	S-6		1.0	Stiff to medium stiff red FAT CLAY (CH); moist.							
		3 4 3	16	S-7		1.0								
20		4 5 6	18	S-8		1.25	@ 18.5'-21.0', contains chert fragments							
							@ 20.0'-21.0', slight drill rig chatter							
		3 5 5	18	S-9		2.25	@ 21.0'-23.5', very stiff							
25.0 25	670.9	4 5 4	18	S-10		1.25	@ 23.5', light brown and red mottled Bottom of Boring - 25.0'							



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Client: Barton Malow | *Project:* Ford H4 Battery Plant | *Job No.* 2150-9519.50

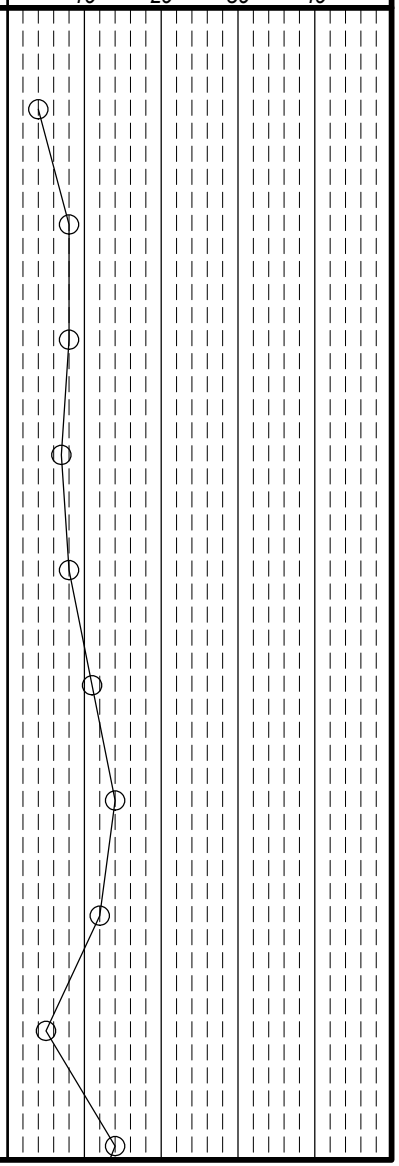
LOG OF: Boring B-113 | *Location:* As per plan | *Date Drilled:* 12/4/2021

WATER OBSERVATIONS:
Water seepage at: 16.0'
Water level at completion: 13.5' (inside augers)
7.4' (inside augers after 15 hours)
DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Rig (#) / ER: CME 750X (289498) / 81.0% | *Driller:* T | *Logger:* AM

Natural Moisture Content, % - ●
PL ├──┤ LL
N_{60} Value ○ / Non-Plastic - NP
10 20 30 40

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
	695.1													
0.1	695.0						Topsoil - NO READING							
		WOH 1 2	13	S-1		0.5	Soft to medium stiff gray to light gray SILTY CLAY (CL-ML); moist.							
3.5	691.6													
5		2 3 3	14	S-2		3.0	Very stiff light brown and light gray SILTY CLAY (CL-ML); damp.							
6.0	689.1													
		1 3 3	18	S-3		1.5	Stiff light gray FAT CLAY (CH); moist.							
10		1 2 3	14	S-4		1.75								
		2 3 3	18	S-5		1.25								
13.5	681.6													
15		3 4 4	18	S-6		1.0	Stiff to medium stiff light brown FAT CLAY (CH); moist to wet.							
		4 5 5	18	S-7		1.0	@ 16.0'-18.5', contains stone fragments							
20		3 4	15	S-8		1.0								
21.0	674.1													
		1 2 2	18	S-9		0.75	Stiff to medium stiff ligh brown to brown FAT CLAY (CH); conains sand and gravel size chert fragments; moist to wet.							
25	670.1	3 7 3	18	S-10		1.75								



Client: Barton Malow | *Project:* Ford H4 Battery Plant | *Job No.* 2150-9519.50

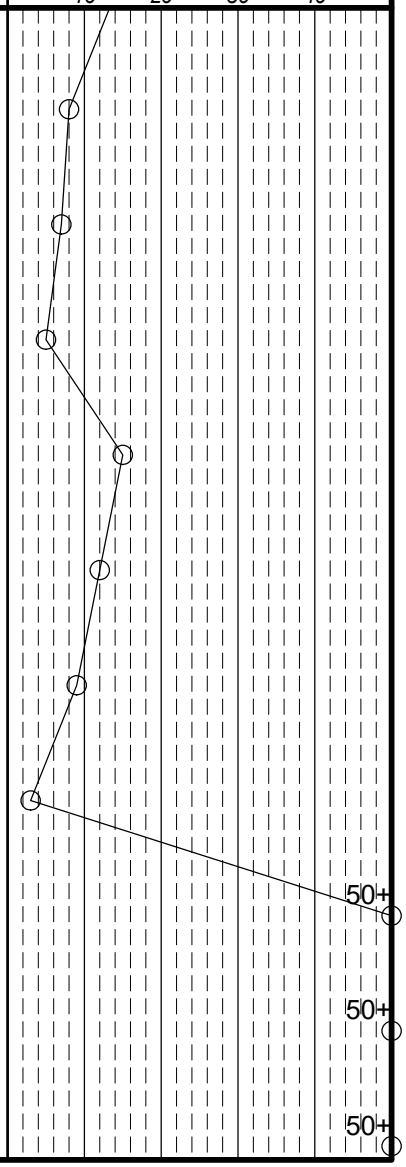
LOG OF: Boring B-113 | *Location:* As per plan | *Date Drilled:* 12/4/2021

WATER OBSERVATIONS:
Water seepage at: 16.0'
Water level at completion: 13.5' (inside augers)
7.4' (inside augers after 15 hours)
DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Rig (#) / ER: CME 750X (289498) / 81.0% | *Driller:* T | *Logger:* AM

Natural Moisture Content, % - ●
PL ├──┤ LL
N_{60} Value ○ / Non-Plastic - NP

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
	670.1													
		3 3 3	18	S-11		1.25	Stiff to medium stiff ligh brown to brown FAT CLAY (CH); conains sand and gravel size chert fragments; moist to wet. (continued)							
30		3 2 3	18	S-12		1.25								
		3 2 2	13	S-13		1.25								
35		3 4 7	18	S-14		1.5								
36.0	659.1													
		3 4 5	18	S-15		1.0	Stiff to medium stiff brown to black FAT CLAY (CH); contains stone fragments and black oxide staining, possible organic odor; moist.							
38.5	656.6													
40		2 3 4		S-16		1.25	Stiff light brown FAT CLAY (CH); contains chert fragments; moist. @ 40.0'-41.0', drill rig chatter							
41.0	654.1													
		3 1 1	18	S-17		1.25	Stiff light brownish gray FAT CLAY (CH); moist.							
43.5	651.6													
45		5 5 50/5	18	S-18		0.5	Soft to medium stiff light brown FAT CLAY (CH); contains stone fragments; wet. @ 45.0'-46.0', drill rig chatter							
46.0	649.1													
		50/4	4	S-19			Very dense light brown GRAVEL (GP-GM) with silt; decomposed to highly weathered rock; wet. @ 47.5'-48.5', drill rig chatter							
		50/5	5	S-20										
50	645.1													



Client: Barton Malow	Project: Ford H4 Battery Plant	Job No. 2150-9519.50
LOG OF: Boring B-113	Location: As per plan	Date Drilled: 12/4/2021

WATER OBSERVATIONS:
Water seepage at: 16.0'
Water level at completion: 13.5' (inside augers)
7.4' (inside augers after 15 hours)

DRILLING METHODS - Soil: HS Augers

ABANDONMENT - cuttings and bentonite chips

Rig (#) / ER: CME 750X (289498) / 81.0%
Driller: T
Logger: AM

Natural Moisture Content, % - ●
PL ⊢——⊣ LL
N_{60} Value ○ / Non-Plastic - NP
10 20 30 40

Depth (ft)	Elev. (ft) 645.1	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	N60 Value
51.0	644.1						@ 50.0'-51.0', heavy drill rig chatter, difficulty advancing augers								
		50/1		S-21			Bottom of Boring - 51.0'								50+
54.4	640.7														
55		Core 120"	Rec 85"	RQD 23%	R-1										
60															
65															
70															
75															

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Client: Barton Malow | *Project:* Ford H4 Battery Plant | *Job No.* 2150-9519.50

LOG OF: Boring B-114 | *Location:* As per plan | *Date Drilled:* 12/2/2021

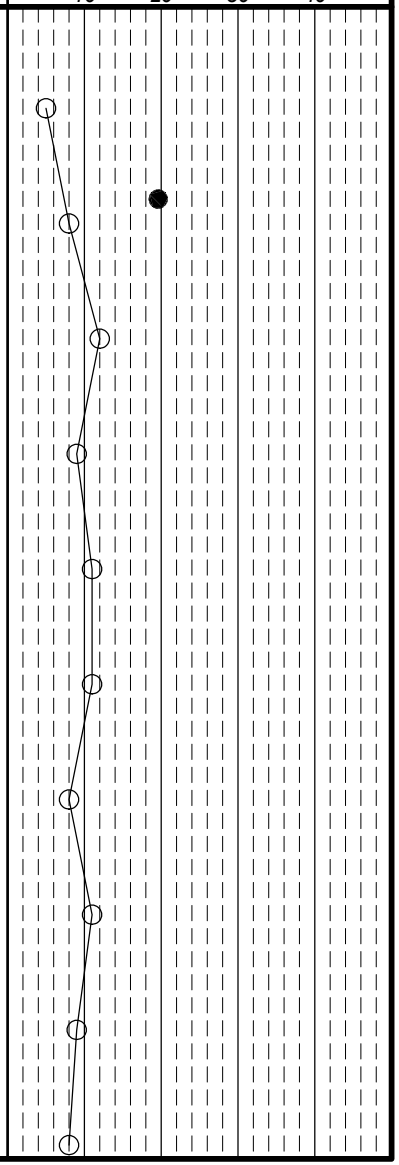
WATER OBSERVATIONS:
Water seepage at: None
Water level at completion: None (inside augers)

DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Rig (#) / ER: CME 750X (289498) / 81.0% | *Driller:* T | *Logger:* JC

Natural Moisture Content, % - ●
PL ├──┤ LL
N_{60} Value ○ / Non-Plastic - NP
10 20 30 40

Depth (ft)	Elev. (ft) 699.1	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0.1	699.0						Topsoil - NO READING							
3.5	695.6	2 2 2	6	S-1		2.0	Stiff to very stiff brown LEAN CLAY (CL); moist.							
6.0	693.1	2 4 2	18	S-2		2.5	Very stiff light gray and light brown FAT CLAY (CH); moist.							
8.5	690.6	3 4 5	18	S-3		3.0	Very stiff light brown and light gray SILT (ML); damp.							
16.0	683.1	2 3 4	18	S-4		3.0	Very stiff light gray and light brown mottled FAT CLAY (CH); moist.							
		2 3 5	18	S-5		2.25								
		2 4 4	18	S-6		2.5								
18.5	680.6	2 2 4	18	S-7		1.75	Stiff light brown FAT CLAY (CH); moist.							
21.0	678.1	2 3 5	18	S-8		3.5	Very stiff light brown FAT CLAY (CH); contains fine sand; moist.							
25.0	674.1	1 3 4	18	S-9		2.0	Stiff to very stiff light brown FAT CLAY (CH); moist.							
		2 3 3	18	S-10		1.0	@ 23.5', medium stiff to stiff Bottom of Boring - 25.0'							



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Client: Barton Malow | *Project:* Ford H4 Battery Plant | *Job No.* 2150-9519.50

LOG OF: Boring B-115 | *Location:* As per plan | *Date Drilled:* 12/2/2021

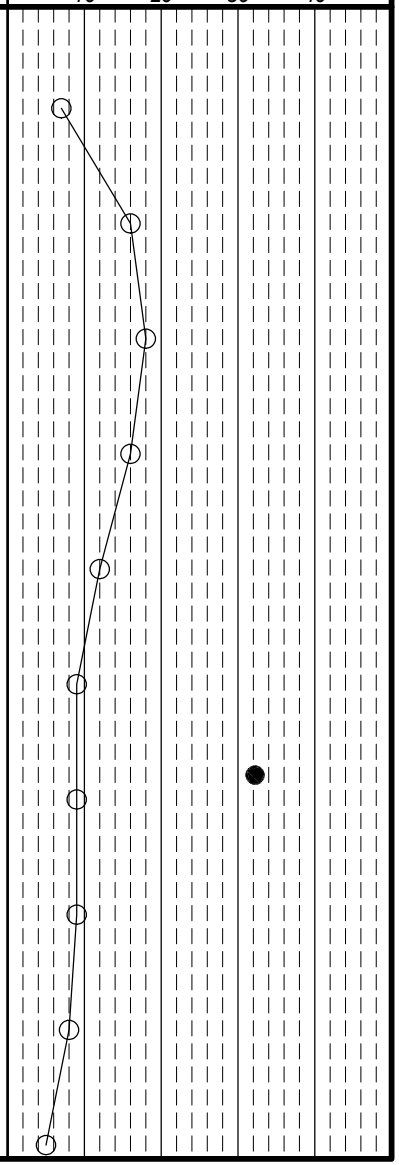
WATER OBSERVATIONS:
Water seepage at: None
Water level at completion: None (inside augers)

DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Rig (#) / ER: CME 750X (289498) / 81.0% | *Driller:* T | *Logger:* JC

Natural Moisture Content, % - ●
PL ├──┤ LL
N_{60} Value ○ / Non-Plastic - NP
10 20 30 40

Depth (ft)	Elev. (ft) 701.0	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0.3	700.7						Topsoil - 4", Plow Depth - 6"							
		1 2 3	15	S-1		1.5	Stiff light brown LEAN CLAY (CL); moist.							
3.5	697.5													
5		3 4 8	14	S-2		2.25	Very stiff red, light brown, and light gray mottled FAT CLAY (CH); moist.							
		4 4 9	18	S-3		2.5								
10		4 5 7	13	S-4		3.25	@ 8.5'-11.0', very stiff, contains chert fragments							
11.0	690.0													
		3 3 6	18	S-5		4.0	Very stiff to hard red FAT CLAY (CH); damp to moist.							
13.5	687.5													
15		3 3 4	12	S-6		2.5	Stiff to very stiff red FAT CLAY (CH); contains chert fragments; moist.							
		2 3 4	13	S-7		1.5								
20		2 3 4	14	S-8		2.0								
21.0	680.0													
		2 3 3	18	S-9		2.25	Very stiff light brown FAT CLAY (CH); moist to wet.							
23.5	677.5													
25.0 25	676.0	1 2 2	12	S-10		1.5	Stiff red FAT CLAY (CH); contains chert fragment; moist. Bottom of Boring - 25.0'							



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Client: Barton Malow | *Project:* Ford H4 Battery Plant | *Job No.* 2150-9519.50

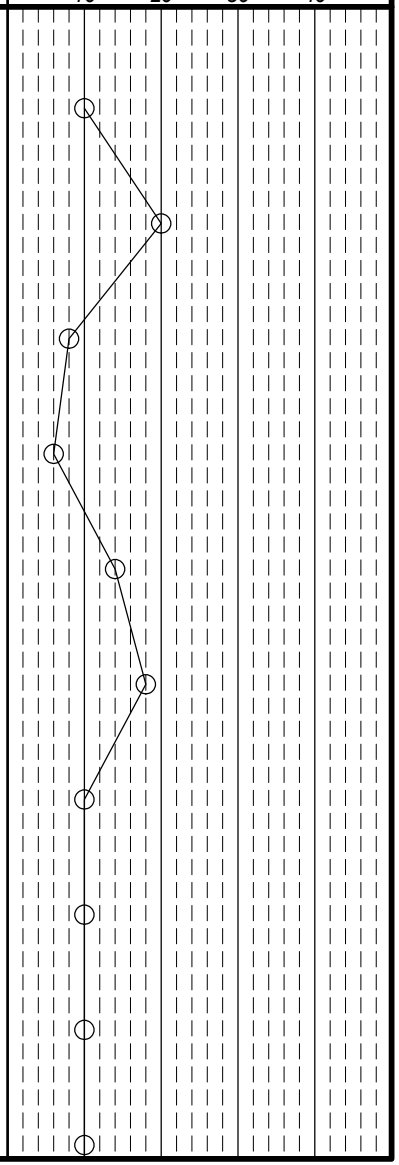
LOG OF: Boring B-116 | *Location:* As per plan | *Date Drilled:* 12/8/2021

WATER OBSERVATIONS:
Water seepage at: 36.0'
Water level at completion: 40.8' (prior to adding water)
7.9' (with augers removed)
DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Rig (#) / ER: CME-850X (400472) / 84.0% | *Driller:* KC | *Logger:* AM

Natural Moisture Content, % - ●
PL ├──┤ LL
N_{60} Value ○ / Non-Plastic - NP

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
	698.0													
0.1	697.9						Topsoil - NO READING							
		2 3 4	18	S-1		1.25	Medium stiff gray FAT CLAY (CH); moist.							
5		3 8 6	18	S-2		2.25	@ 3.5', very stiff to stiff							
		3 3 3	6	S-3		2.0								
8.5	689.5													
10		3 2 2	18	S-4		0.5	Soft to medium stiff borwn and light gray FAT CLAY (CH); moist.							
11.0	687.0													
		4 5 5	18	S-5		2.0	Stiff to very stiff red FAT CLAY (CH); moist.							
15		7 8 5	18	S-6		1.75								
		3 4 3	18	S-7		1.25								
18.5	679.5													
20		3 4 3	18	S-8		1.0	Medium stiff to stiff red FAT CLAY (CH); contains one large chert fragment; moist.							
21.0	677.0													
		3 4 3	18	S-9		2.0	Very stiff to stiff red FAT CLAY (CH); contains chert fragments; moist.							
25	673.0	3 4 3	18	S-10		1.5								



Client: Barton Malow | *Project:* Ford H4 Battery Plant | *Job No.* 2150-9519.50

LOG OF: Boring B-116 | *Location:* As per plan | *Date Drilled:* 12/8/2021

WATER OBSERVATIONS:
Water seepage at: 36.0'
Water level at completion: 40.8' (prior to adding water)
7.9' (with augers removed)

DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Rig (#) / ER: CME-850X (400472) / 84.0% | *Driller:* KC | *Logger:* AM

Natural Moisture Content, % - ●
PL ⊢——⊣ LL
N_{60} Value ○ / Non-Plastic - NP
10 20 30 40

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
	673.0													
		4 4 3	18	S-11		2.25	Very stiff to stiff red FAT CLAY (CH); contains chert fragments; moist. (continued)							
28.5	669.5													
30		3 6 5	18	S-12		1.0	Stiff to medium stiff reddish brown FAT CLAY (CH); contains chert fragments; moist.							
		3 4 4	18	S-13		0.75								
33.5	664.5													
35		3 10 8	18	S-14		1.25	Medium dense light brown clayey GRAVEL (GC); contains large stone fragment; wet.							
36.0	662.0													
		WOR WOH 4	4	S-15		0.25	Very soft to soft light brown sandy FAT CLAY (CH); contains rock fragments; wet.							
							@ 36.0'-43.5', advanced augers from 36.0' to 43.5' and began coring rock							
40							@ 40.0'-43.5', drill rig chatter							
43.5	654.5						@ 43.5', auger refusal							
45		Core 120"	Rec 97"	RQD 33%	R-1		Hard to very hard gray to light yellowish gray and brown LIMESTONE; very fine grained, moderatly weathered to decomposed, thickly bedded, moderately to highly fractured; rock contains significant visual evidence of solutioning, significant core loss is attributed to solutioning, suspected voids are open or clay filled.							
50	648.0													

Client: Barton Malow	Project: Ford H4 Battery Plant	Job No. 2150-9519.50
LOG OF: Boring B-116	Location: As per plan	Date Drilled: 12/8/2021

WATER OBSERVATIONS:
Water seepage at: 36.0'
Water level at completion: 40.8' (prior to adding water)
7.9' (with augers removed)

DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Rig (#) / ER: CME-850X (400472) / 84.0%
Driller: KC
Logger: AM

Natural Moisture Content, % - ●
PL ⊢——⊣ LL
N_{60} Value ○ / Non-Plastic - NP
10 20 30 40

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
	648.0													
		Core 120"	Rec 97"	RQD 33%	R-1									
54.0	644.0													
55							Bottom of Boring - 54.0'							
60														
65														
70														
75														

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Client: Barton Malow | *Project:* Ford H4 Battery Plant | *Job No.* 2150-9519.50

LOG OF: Boring B-117 | *Location:* As per plan | *Date Drilled:* 11/23/2021

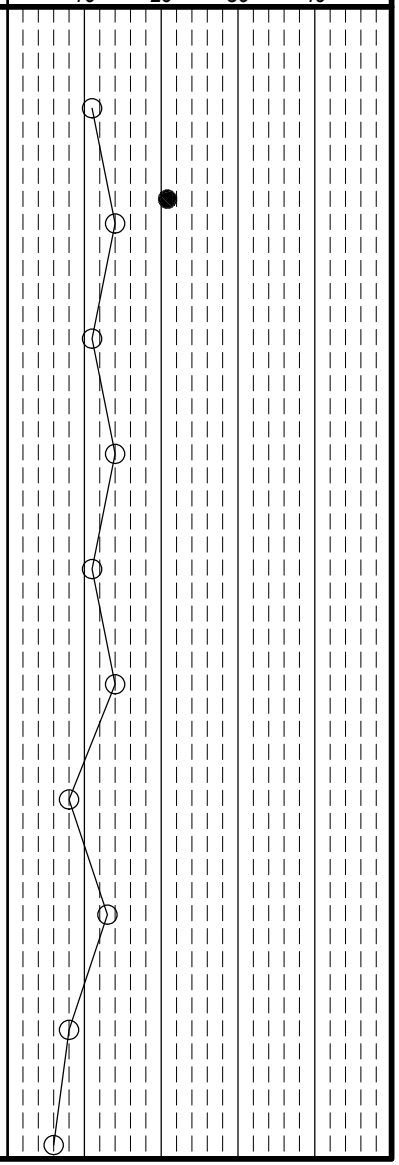
WATER OBSERVATIONS:
Water seepage at: None
Water level at completion: NOT RECORDED

DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Rig (#) / ER: CME-850X (400472) / 84.0% | *Driller:* P | *Logger:* AM

Natural Moisture Content, % - ●
PL ├──┤ LL
N_{60} Value ○ / Non-Plastic - NP
10 20 30 40

Depth (ft)	Elev. (ft) 696.8	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0.4	696.4						Topsoil - 4"-5", Plow Depth - 9"							
3.5	693.3	3 4 4	18	S-1		2.5	Very stiff light brown LEAN CLAY (CL); moist.							
6.0	690.8	4 4 6	18	S-2		1.5	Stiff light gray LEAN CLAY (CL); moist.							
8.5	688.3	3 4 4	18	S-3		2.25	Very stiff gray FAT CLAY (CH); moist.							
11.0	685.8	5 5 5	18	S-4		2.75	Very stiff light brown with gray mottling FAT CLAY (CH); contains blue oxide staining; moist.							
13.5	683.3	3 4 4	18	S-5		1.5	Stiff light brown FAT CLAY (CH); moist.							
16.0	680.8	3 4 6	18	S-6		1.75	Stiff light brown FAT CLAY (CH); contains black oxide staining; moist.							
		3 3 3	18	S-7		1.0	Medium stiff to stiff FAT CLAY (CH); moist.							
		1 5 4	18	S-8		1.0								
		3 3 3	8	S-9		1.5								
25.0	671.8	3 2 2	18	S-10		1.0	@ 23.5', moist to wet. Bottom of Boring - 25.0'							



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Client: Barton Malow | *Project:* Ford H4 Battery Plant | *Job No.* 2150-9519.50

LOG OF: Boring B-118 | *Location:* As per plan | *Date Drilled:* 12/5/2021

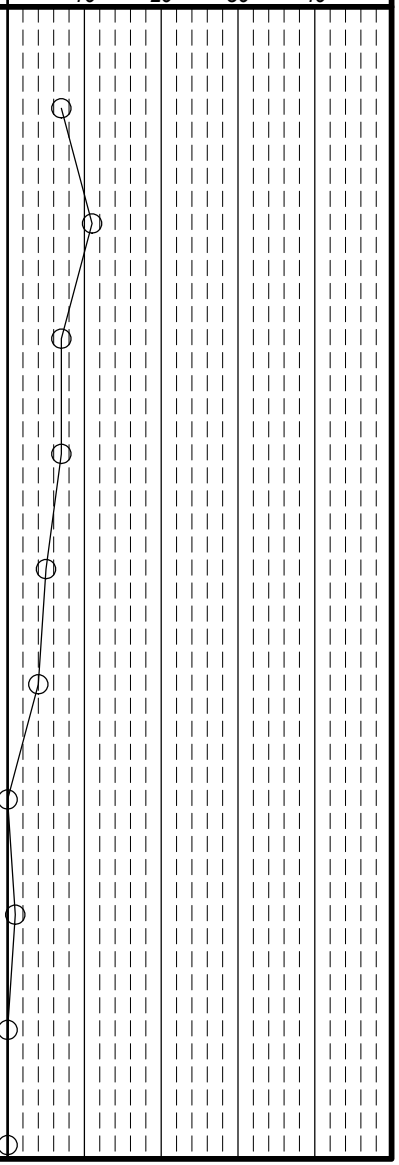
WATER OBSERVATIONS:
Water seepage at: 16.0'
Water level at completion: 22.8' (with augers removed)

DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Rig (#) / ER: CME 750X (289498) / 81.0% | *Driller:* T | *Logger:* AM

Natural Moisture Content, % - ●
PL ├──┤ LL
N_{60} Value ○ / Non-Plastic - NP
10 20 30 40

Depth (ft)	Elev. (ft) 693.8	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
1.1	692.7						Topsoil - 13"							
		1 2 3	8	S-1		0.5	Soft to medium stiff brown SILTY CLAY (CL-ML); moist.							
3.5	690.3													
5		3 4 4	15	S-2		1.25	Stiff brown and gray mottled LEAN CLAY (CL); moist.							
6.0	687.8													
		2 3 2	18	S-3		3.5	Very stiff to stiff light brown and light gray FAT CLAY (CH); moist.							
10		2 3 2	18	S-4		1.5								
		2 1 3	18	S-5		0.75	@ 11.0', medium stiff							
15		2 1 2	18	S-6		0.5	@ 13.5', medium stiff to soft							
16.0	677.8													
		WOH WOH WOH	18	S-7		0.5	Soft to medium stiff gray FAT CLAY (CH); moist to wet.							
20		WOH WOH 1	18	S-8		0.5								
		WOH WOH WOH	18	S-9		0.25	@ 21.0', soft to very soft							
25.0 25	668.8	WOH WOH WOH	18	S-10		0.25	Bottom of Boring - 25.0'							



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Client: Barton Malow | *Project:* Ford H4 Battery Plant | *Job No.* 2150-9519.50

LOG OF: Boring B-119 | *Location:* As per plan | *Date Drilled:* 12/2/2021

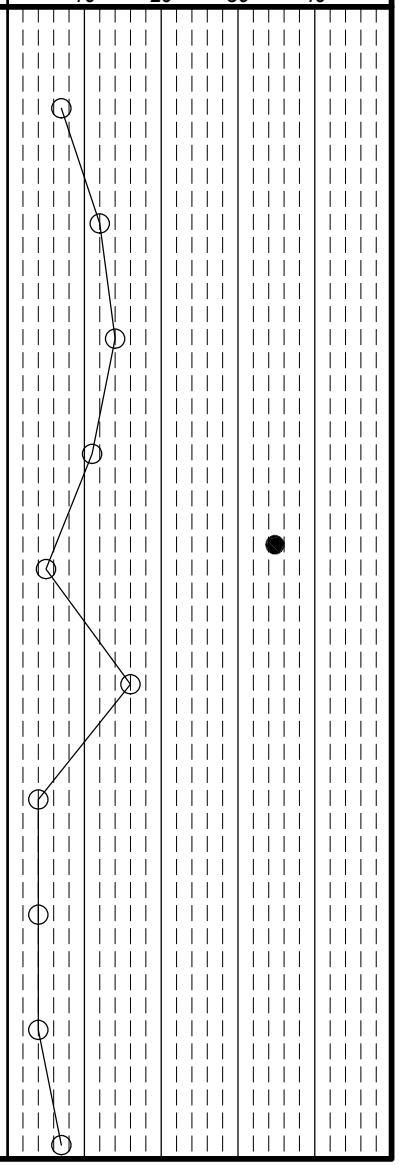
WATER OBSERVATIONS:
Water seepage at: None
Water level at completion: None (inside augers)

DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Rig (#) / ER: CME 750X (289498) / 81.0% | *Driller:* T | *Logger:* JC

Natural Moisture Content, % - ●
PL ├──┤ LL
N_{60} Value ○ / Non-Plastic - NP
10 20 30 40

Depth (ft)	Elev. (ft) 695.0	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0.3	694.7						Topsoil - 4", Plow Depth - 6"							
3.5	691.5	2 3 2	9	S-1		0.75	Medium stiff light brown LEAN CLAY (CL); moist.							
6.0	689.0	2 4 5	18	S-2		2.0	Stiff to very stiff light brown and light gray mottled FAT CLAY (CH); moist.							
11.0	684.0	3 4 6	18	S-3		2.5	Very stiff to stiff light brown and light gray mottled sandy FAT CLAY (CH); moist.							
		3 3 5	18	S-4		1.5								
16.0	679.0	2 2 2	16	S-5		1.5	Stiff brown FAT CLAY (CH); moist.							
		2 3 9	10	S-6		1.5	@ 15.0'-16.0', light drill rig chatter							
18.5	676.5	1 1 2	18	S-7		0.5	Soft to medium stiff gray FAT CLAY (CH); contains chert fragments; moist.							
21.0	674.0	1 1 2	18	S-8		0.5	Soft to medium stiff brown and gray FAT CLAY (CH); moist.							
25.0	670.0	1 1 2	18	S-9		1.0	Medium stiff to stiff brown FAT CLAY (CH); moist.							
		2 2 3	18	S-10		0.75	Bottom of Boring - 25.0'							



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Client: Barton Malow | *Project:* Ford H4 Battery Plant | *Job No.* 2150-9519.50

LOG OF: Boring B-120 | *Location:* As per plan | *Date Drilled:* 11/29/2021

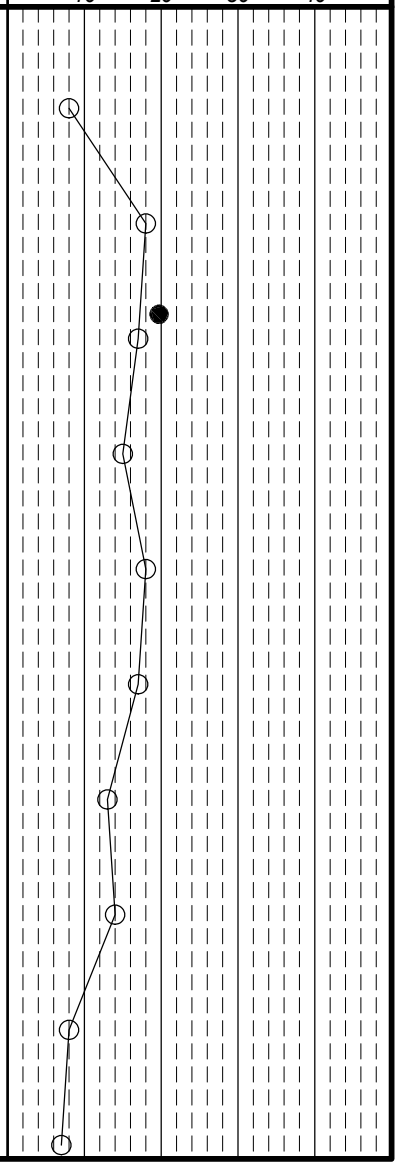
WATER OBSERVATIONS:
Water seepage at: None
Water level at completion: None (inside augers)

DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Rig (#) / ER: CME-850X (400472) / 84.0% | *Driller:* P | *Logger:* AM

Natural Moisture Content, % - ●
PL ├──┤ LL
N_{60} Value ○ / Non-Plastic - NP
10 20 30 40

Depth (ft)	Elev. (ft) 695.6	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0.4	695.2						Topsoil - 4"-5", Plow Depth - 10"							
		WOH 2 4	15	S-1		1.75	Stiff light brown sandy LEAN CLAY (CL); moist.							
3.5	692.1													
5		3 5 8	12	S-2		2.0	Stiff to very stiff light brown SILTY CLAY (CL-ML); contains black oxide staining and stone fragments; moist.							
6.0	689.6													
		5 7 5	16	S-3		1.5	Stiff light gray FAT CLAY (CH); moist.							
8.5	687.1													
10		5 5 6	18	S-4		2.75	Very stiff to stiff red and light brown mottled FAT CLAY (CH); contains chert fragments; moist.							
		5 7 6	11	S-5		2.25	@ 11.0'-13.5', contains large broken chert fragments							
15		5 6 6	18	S-6		2.5								
		3 6 3	18	S-7		2.0								
20		4 5 5	18	S-8		2.0	@ 18.5'-21.0', sample contains no chert							
		2 3 3	18	S-9		1.0	@ 21.0', medium stiff to stiff							
25.0 25	670.6	2 3 2		S-10		1.25	Bottom of Boring - 25.0'							



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Client: Barton Malow | *Project:* Ford H4 Battery Plant | *Job No.* 2150-9519.50

LOG OF: Boring B-121 | *Location:* As per plan | *Date Drilled:* 11/22/2021

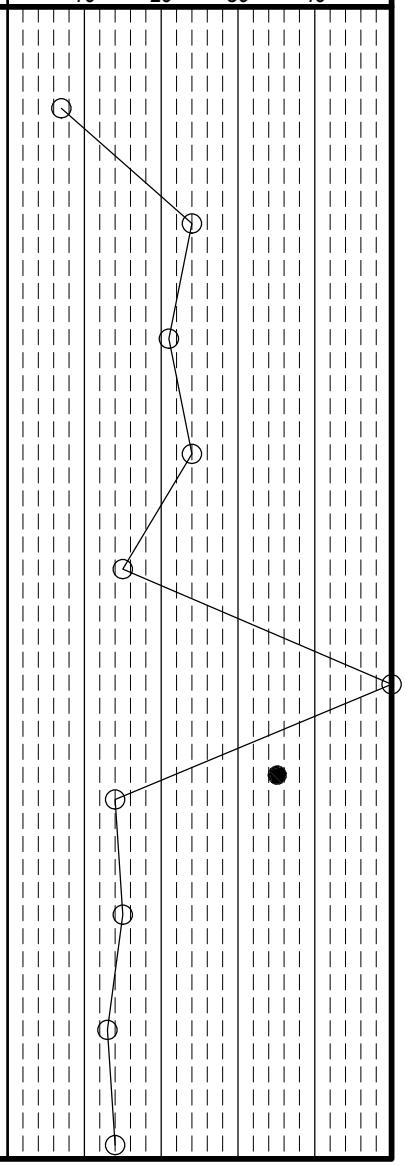
WATER OBSERVATIONS:
Water seepage at: 21.5'
Water level at completion: 16.8' (inside augers)

DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Rig (#) / ER: CME-850X (400472) / 84.0% | *Driller:* P | *Logger:* AM

Natural Moisture Content, % - ●
PL ├──┤ *LL*
N_{60} Value ○ / *Non-Plastic -* NP

Depth (ft)	Elev. (ft) 695.5	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0.6	694.9						Topsoil - 6", Plow Depth - 10"-11"							
		2 3 2	18	S-1		2.75	Very stiff light brown SILTY CLAY (CL-ML); damp to moist.							
3.5	692.0													
5		3 8 9	18	S-2		2.75	Very stiff light gray and light brown LEAN CLAY (CL); moist.							
6.0	689.5													
		5 8 7	18	S-3		2.0	Stiff to very stiff red FAT CLAY (CH); contains chert fragments; moist.							
10		5 9 8	18	S-4		2.25								
		4 5 6	18	S-5		1.5								
15		3 20 16	10	S-6		2.25								
							@ 15.0'-16.0', augers grinding and scraping							
		3 4 6	6	S-7		1.0	@ 16.0'-18.5', medium stiff to stiff, moist to wet							
20		3 5 6	8	S-8		1.75								
21.0	674.5													
21.5	674.0	5 4 5	18	S-9A S-9B		3.0	Medium dense light brown clayey SAND (SC); damp. ▼							
							Very stiff light brown FAT CLAY (CH); moist.							
25.0 25	670.5	3 4 6	18	S-10		2.25	Bottom of Boring - 25.0'							



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Client: Barton Malow | *Project:* Ford H4 Battery Plant | *Job No.* 2150-9519.50

LOG OF: Boring B-122 | *Location:* As per plan | *Date Drilled:*

WATER OBSERVATIONS:
Water seepage at: 3.5'
Water level at completion: 2.2' (with augers removed) ?

DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Rig (#) / ER: CME-850X (400472) / 84.0% | *Driller:* LB | *Logger:* AM

Natural Moisture Content, % - ●
PL ├──┤ *LL*
N_{60} Value ○ / *Non-Plastic -* NP
10 20 30 40

Depth (ft)	Elev. (ft) 692.9	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0.5	692.4						Topsoil - 6"							
		1 2 2	18	S-1		0.25	Soft to very soft gray SILTY CLAY (CL-ML); wet.							
3.5	689.4													
5		WOH WOH WOH	16	S-2		< 0.25	Very loose gray clayey SAND (SC); wet.							
6.0	686.9													
		4 4 3	18	S-3		2.0	Stiff to very stiff gray FAT CLAY (CH); moist.							
8.5	684.4													
10		2 3 2	18	S-4		0.75	Medium stiff light brown and light gray mottled sandy FAT CLAY (CH); moist.							
11.0	681.9													
		2 3 2	18	S-5		1.0	Medium stiff to stiff light brown and light gray FAT CLAY (CH); moist.							
15		1 3 1	18	S-6		1.75								
16.0	676.9													
		1 3 2	18	S-7		1.25	Stiff light brown FAT CLAY (CH); contains black oxide staining; moist.							
18.5	674.4													
20		3 3 3	18	S-8		0.75	Medium stiff brown FAT CLAY (CH); moist.							
		1 3 2	24		ST-9									
23.5	669.4													
25.0 25	667.9	1 2 2	18	S-10		1.0	Stiff to medium stiff light greenish gray FAT CLAY (CH); moist.							

Client: Barton Malow	Project: Ford H4 Battery Plant	Job No. 2150-9519.50
LOG OF: Boring B-122	Location: As per plan	Date Drilled:

WATER OBSERVATIONS:
Water seepage at: 3.5'
Water level at completion: 2.2' (with augers removed) ?

DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Rig (#) / ER: CME-850X (400472) / 84.0%
Driller: LB
Logger: AM

Natural Moisture Content, % - ●
PL ⊢——⊣ LL
N_{60} Value ○ / Non-Plastic - NP
10 20 30 40

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
	667.9						Bottom of Boring - 25.0'							
30														
35														
40														
45														
50														

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Client: Barton Malow | *Project:* Ford H4 Battery Plant | *Job No.* 2150-9519.50

LOG OF: Boring B-123 | *Location:* As per plan | *Date Drilled:* 11/23/2021

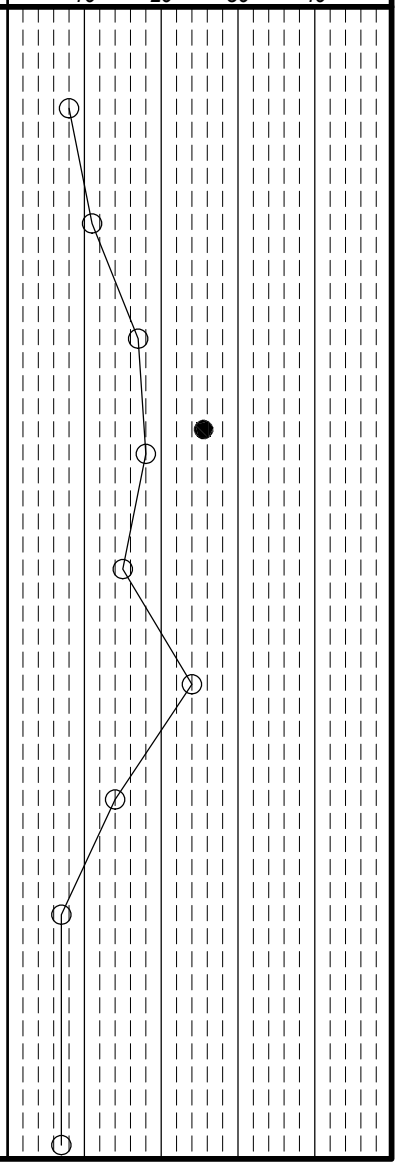
WATER OBSERVATIONS:
Water seepage at: None
Water level at completion: None (inside augers)

DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Rig (#) / ER: CME-850X (400472) / 84.0% | *Driller:* P | *Logger:* AM

Natural Moisture Content, % - ●
PL ├──┤ LL
N_{60} Value ○ / Non-Plastic - NP
10 20 30 40

Depth (ft)	Elev. (ft) 684.9	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0.8	684.1						Topsoil - 9"							
3.5	681.4	1 3 3	15	S-1		1.5	Stiff light gray SILTY CLAY (CL-ML); moist.							
6.0	678.9	3 4 4	14	S-2			Medium dense light gray SILT (ML); damp.							
8.5	676.4	3 6 6	18	S-3		1.25	Stiff light brown LEAN CLAY (CL); moist.							
		4 6 7	17	S-4		2.25	Very stiff light brown FAT CLAY (CH); contains chert fragments; moist.							
		5 6 5	18	S-5		2.5								
		7 9 8	18	S-6		2.5								
		3 5 5	18	S-7		2.25	@ 16.0', light reddish brown to red							
		2 2 3	18	S-8		2.0								
			24		S-9									
23.5	661.4													
25.0	659.9	1 2 3	18	S-10		0.75	Medium stiff light brown FAT CLAY (CH); moist. Bottom of Boring - 25.0'							



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Client: Barton Malow | *Project:* Ford H4 Battery Plant | *Job No.* 2150-9519.50

LOG OF: Boring B-124 | *Location:* As per plan | *Date Drilled:* 11/29/2021

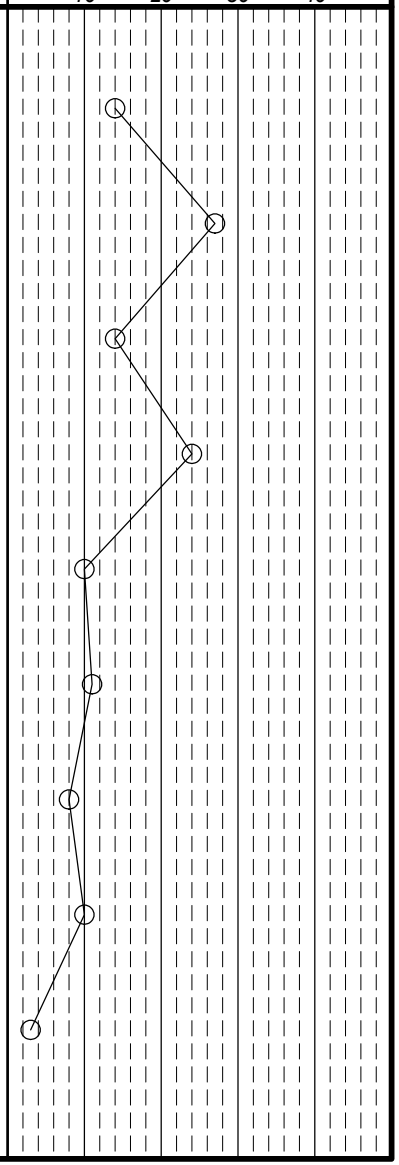
WATER OBSERVATIONS:
Water seepage at: 16.0'
Water level at completion: 9.0' (with augers removed)

DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Rig (#) / ER: CME-850X (400472) / 84.0% | *Driller:* P | *Logger:* AM

Natural Moisture Content, % - ●
PL ├──┤ *LL*
N_{60} Value ○ / *Non-Plastic -* NP

Depth (ft)	Elev. (ft) 693.8	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0.4	693.4						Topsoil - 5", Plow Depth - 10"							
		1 4 6	18	S-1		1.0	Medium stiff to stiff light grayish brown LEAN CLAY (CL); moist.							
3.5	690.3													
5		4 8 11		S-2		1.5	Stiff light brown and light gray sand LEAN CLAY (CL); moist.							
6.0	687.8													
		3 4 6	18	S-3		1.25	Stiff light gray FAT CLAY (CH); moist.							
8.5	685.3													
10		3 4 13		S-4		2.5	Very stiff light gray with light brown mottling FAT CLAY (CH); contains chert fragments; moist.							
		2 3 4	18	S-5		2.25								
15		4 4 4	18	S-6		3.0	@ 13.5'-16.0', sample contains large chert fragments							
16.0	677.8													
		1 3 3	18	S-7		1.5	Stiff to medium stiff red FAT CLAY (CH); contains chert fragments; moist.							
20		3 3 4	18	S-8		1.0								
21.0	672.8													
		1 1 1	17	S-9		0.75	Medium stiff light greenish gray FAT CLAY (CH); moist to wet.							
			23		S-10		@ 23.0'-25.0', pushed Shelby Tube at 500 psi							
25.0 25	668.8						Bottom of Boring - 25.0'							



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Client: Barton Malow | *Project:* Ford H4 Battery Plant | *Job No.* 2150-9519.50

LOG OF: Boring B-125 | *Location:* As per plan | *Date Drilled:* 11/29/2021

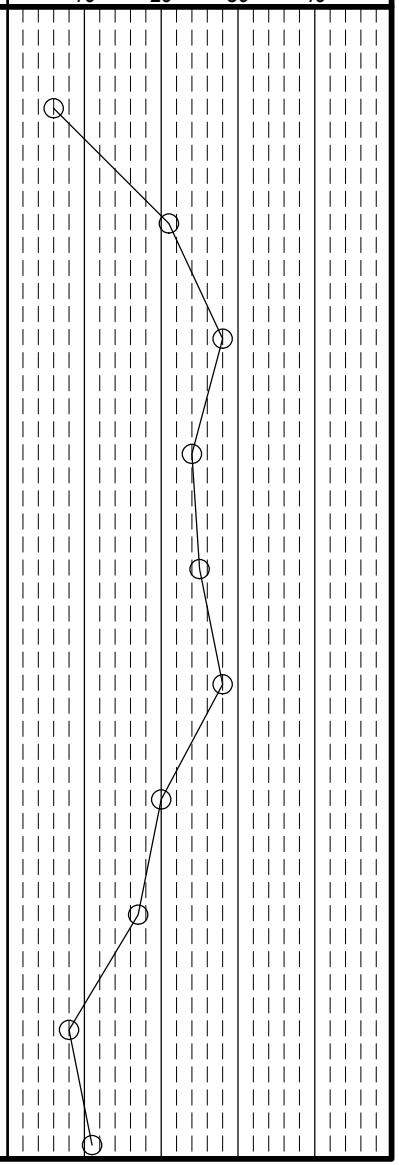
WATER OBSERVATIONS:
Water seepage at: 13.5'
Water level at completion: None (inside augers)

DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Rig (#) / ER: CME-850X (400472) / 84.0% | *Driller:* P | *Logger:* AM

Natural Moisture Content, % - ●
PL ├──┤ LL
N_{60} Value ○ / Non-Plastic - NP
10 20 30 40

Depth (ft)	Elev. (ft) 696.9	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0.6	696.3						Topsoil - 6"-7", Plow Depth - 12"							
		2 1 3	14	S-1		0.75	Medium stiff light brown FAT CLAY (CH); moist.							
3.5	693.4													
5		4 6 9	18	S-2		2.25	Very stiff light brown and light gray mottled LEAN CLAY (CL); moist.							
		5 10 10	7	S-3			@ 6.0'-8.5', sample contains approximately 25% broken large chert fragments							
8.5	688.4													
10		5 8 9	18	S-4		2.0	Stiff to very stiff light gray FAT CLAY (CH); contains chert fragments; moist.							
11.0	685.9													
		9 8 10		S-5		1.0	Stiff to medium stiff red and brown mottled FAT CLAY (CH); contains chert fragments; moist.							
15		5 10 10		S-6		1.25	@ 13.5'-16.0', contains approximately 25% broken large chert fragments							
		5 6 8		S-7		1.25								
18.5	678.4													
20		3 6 6		S-8		0.5	Soft to medium stiff red FAT CLAY (CH); contains chert fragments; moist to wet.							
21.0	675.9													
		3 3 3	18	S-9		1.0	Stiff to medium stiff light brown to light greenish gray FAT CLAY (CH); moist.							
25.0 25	671.9	3 5 3	18	S-10		1.25	Bottom of Boring - 25.0'							



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Client: Barton Malow | *Project:* Ford H4 Battery Plant | *Job No.* 2150-9519.50

LOG OF: Boring B-126 | *Location:* As per plan | *Date Drilled:* 11/22/2021

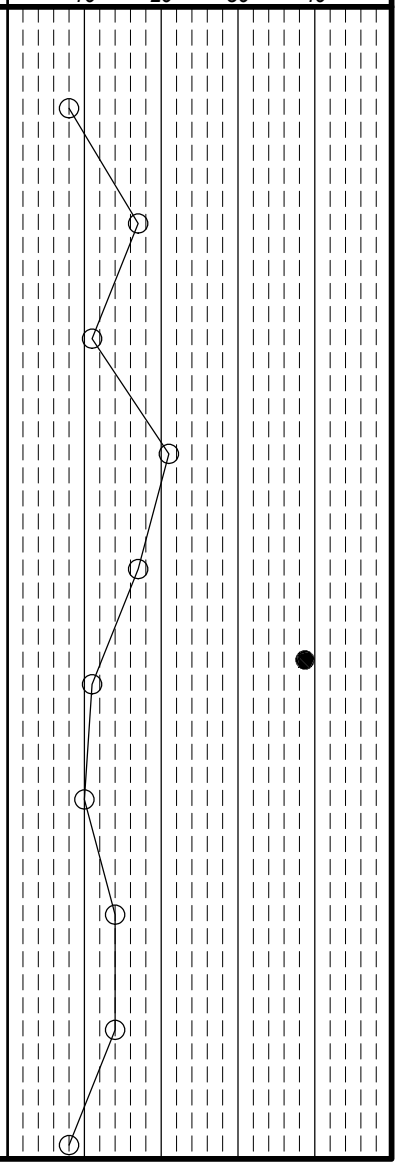
WATER OBSERVATIONS:
Water seepage at: None
Water level at completion: None (inside augers)

DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Rig (#) / ER: CME-850X (400472) / 84.0% | *Driller:* P | *Logger:* AM

Natural Moisture Content, % - ●
PL ├──┤ LL
N_{60} Value ○ / Non-Plastic - NP
10 20 30 40

Depth (ft)	Elev. (ft) 693.0	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0.1	692.9						Topsoil - NO READING							
		1 3 3	18	S-1		0.5	Soft to medium stiff light brown SILTY CLAY (CL-ML); moist to wet.							
3.5	689.5													
5		5 5 7	18	S-2		3.0	Very stiff to stiff light gray to light brown LEAN CLAY (CL); moist.							
6.0	687.0													
		4 3 5	17	S-3		2.0	Very stiff light brown LEAN CLAY (CL); contains black oxide stain; moist.							
10		3 7 8	18	S-4		2.75								
11.0	682.0													
		3 5 7	17	S-5		1.75	Stiff red FAT CLAY (CH); contains chert fragments; moist.							
15		3 3 5	18	S-6		1.25								
		1 3 4	18	S-7		1.0								
20		2 4 6	18	S-8		1.25								
21.0	672.0													
		1 5 5	18	S-9		1.5	Stiff red FAT CLAY (CH); contains black oxide staining; moist to wet.							
25.0 25	668.0	2 3 3	18	S-10		1.25	Bottom of Boring - 25.0'							



DLZ Ohio, Inc. * 6121 Huntley Road, Columbus, Ohio 43229 * (614) 888-0040

Client: Barton Malow | *Project:* Ford H4 Battery Plant | *Job No.* 2150-9519.50

LOG OF: Boring B-127 | *Location:* As per plan | *Date Drilled:* 11/22/2021

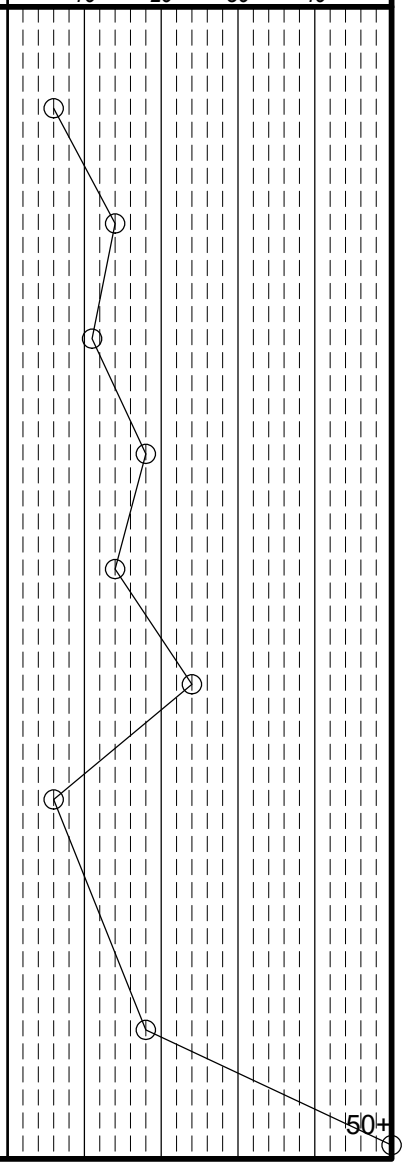
WATER OBSERVATIONS:
Water seepage at: 23.5'
Water level at completion: ??? 3.3' (inside augers) ???

DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Rig (#) / ER: CME-850X (400472) / 84.0% | *Driller:* P | *Logger:* AM

Natural Moisture Content, % - ●
PL ├──┤ LL
N_{60} Value ○ / Non-Plastic - NP
10 20 30 40

Depth (ft)	Elev. (ft) 691.8	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0.5	691.3						Topsoil - 6", Plow Depth - 9"							
		1 2 2	16	S-1		1.75	Medium stiff light brown SILTY CLAY (CL-ML); moist.							
5		WOH 3 7	18	S-2		0.25	@ 3.5', very soft to soft, wet							
6.0	685.8													
		5 5 3	18	S-3		2.5	Stiff to very stiff red FAT CLAY (CH); contains chert fragments; moist.							
10		3 5 8	18	S-4		2.75								
		3 5 5	18	S-5		2.5								
15		6 9 8	13	S-6		1.25								
16.0	675.8													
		2 2 2	18	S-7		0.5	Soft to medium stiff black ORGANIC CLAY (OL); wet.							
20			24		S-8									
21.0	670.8													
		4 6 7	9	S-9		1.25	Stiff reddish light brown FAT CLAY (CH); wet.							
		20 50/3	10	S-10			@ 24.3', possible top of bedrock containing large stone fragments							
25.0 25	666.8													



Client: Barton Malow	Project: Ford H4 Battery Plant	Job No. 2150-9519.50
LOG OF: Boring B-127	Location: As per plan	Date Drilled: 11/22/2021

WATER OBSERVATIONS:
Water seepage at: 23.5'
Water level at completion: ??? 3.3' (inside augers) ???

DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Rig (#) / ER: CME-850X (400472) / 84.0% | Driller: P | Logger: AM

Natural Moisture Content, % - ●
PL ⊢——⊣ LL
N_{60} Value ○ / Non-Plastic - NP
10 20 30 40

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
	666.8						Bottom of Boring - 25.0'							
30														
35														
40														
45														
50														

DLZ Ohio, Inc. * 6121 Huntley Road, Columbus, Ohio 43229 * (614) 888-0040

Client: Barton Malow | *Project:* Ford H4 Battery Plant | *Job No.* 2150-9519.50

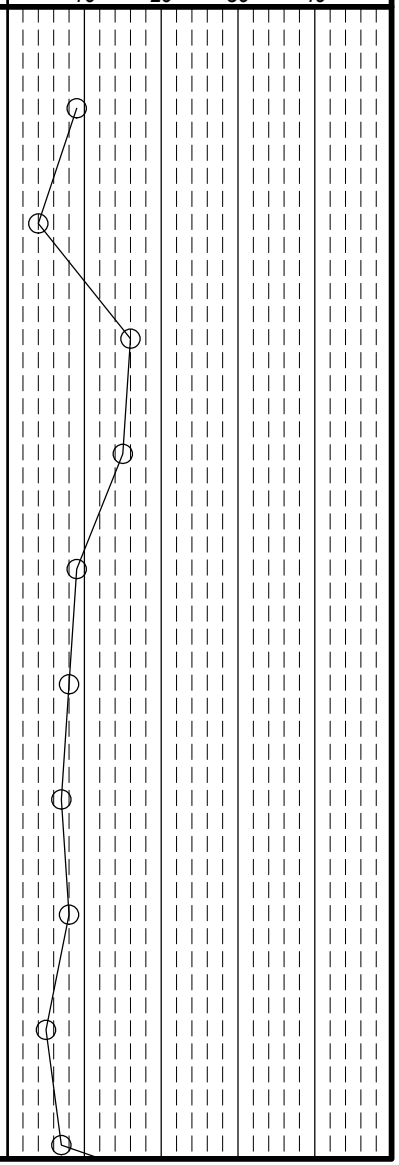
LOG OF: Boring B-128 | *Location:* As per plan | *Date Drilled:* 12/7/2021

WATER OBSERVATIONS:
Water seepage at: 13.5'
Water level at completion: 8.7' (prior to coring)
3.5' (with augers removed)
DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Rig (#) / ER: CME 750X (289498) / 81.0% | *Driller:* T | *Logger:* AM

Natural Moisture Content, % - ●
PL ├──┤ LL
N_{60} Value ○ / Non-Plastic - NP
10 20 30 40

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
	690.5						Topsoil - 15"-18"							
1.5	689.0	3 3 4	18	S-1		1.5	Stiff brown SILTY CLAY (CL-ML); moist.							
3.5	687.0	1 2 1	18	S-2		< 0.25	Very soft gray (CL-ML); wet.							
6.0	684.5	3 5 7	18	S-3		1.75	Stiff brown LEAN CLAY (CL0; contains stone fragments; moist.							
8.5	682.0	5 5 6	18	S-4		3.0	Very stiff red FAT CLAY (CH); contains black oxide staining; moist.							
11.0	679.5	3 3 4	18	S-5		3.0	Very stiff red FAT CLAY (CH); contains stone fragments; moist.							
13.5	677.0	3 3 3	18	S-6		0.75	Medium stiff reddish brown FAT CLAY (CH); contains stone fragments; moist to wet.							
16.0	674.5	2 3 2	18	S-7		2.0	Very stiff to stiff red FAT CLAY (CH); moist.							
18.5	672.0	2 3 3	18	S-8		1.0	Stiff to medium stiff red FAT CLAY (CH); contains chert fragments; moist.							
		2 2 2	14	S-9		0.5								
	665.5	2 3 2	18	S-10		1.0								



Client: Barton Malow	Project: Ford H4 Battery Plant	Job No. 2150-9519.50
LOG OF: Boring B-128	Location: As per plan	Date Drilled: 12/7/2021

WATER OBSERVATIONS:
Water seepage at: 13.5'
Water level at completion: 8.7' (prior to coring)
3.5' (with augers removed)

DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Rig (#) / ER: CME 750X (289498) / 81.0%
Driller: T
Logger: AM

Natural Moisture Content, % - ●
PL ⊢——⊣ LL
N_{60} Value ○ / Non-Plastic - NP
10 20 30 40

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	N60 Value
	665.5														
		3 8 50/1		S-11		0.25	Stiff to medium stiff red FAT CLAY (CH); contains chert fragments; moist. (continued) @ 26.0'-27.5', soft to very soft, wet, gravel stuck in splitspoon sampler tip @ 27.5'-28.5', drill rig chatter								50+
28.5	662.0														
		50/4	4	S-12			Very dense light greenish gray clayey GRAVEL (GC); decomposed rock; moist. @ 30.0'-31.0', drill rig chatter								50+
30															
		50/3	1	S-13			@ 32.5'-33.5', drill rig chatter and difficulty advancing augers								50+
33.5	657.0														
35		Core 120"	Rec 114"	RQD 82%	1		Hard to very hard gray to light yellowish gray and brown LIMESTONE; very fine grained, moderatly weathered to decomposed, thickly bedded, moderately to highly fractured; rock contains significant visual evidence of solutioning, contains zones of significant pitting, core loss is attributed to solutioning.								
40															
43.5	647.0														
							Bottom of Boring - 43.5'								
45															
50															

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Client: Barton Malow | *Project:* Ford H4 Battery Plant | *Job No.* 2150-9519.50

LOG OF: Boring B-129 | *Location:* As per plan | *Date Drilled:* 11/23/2021

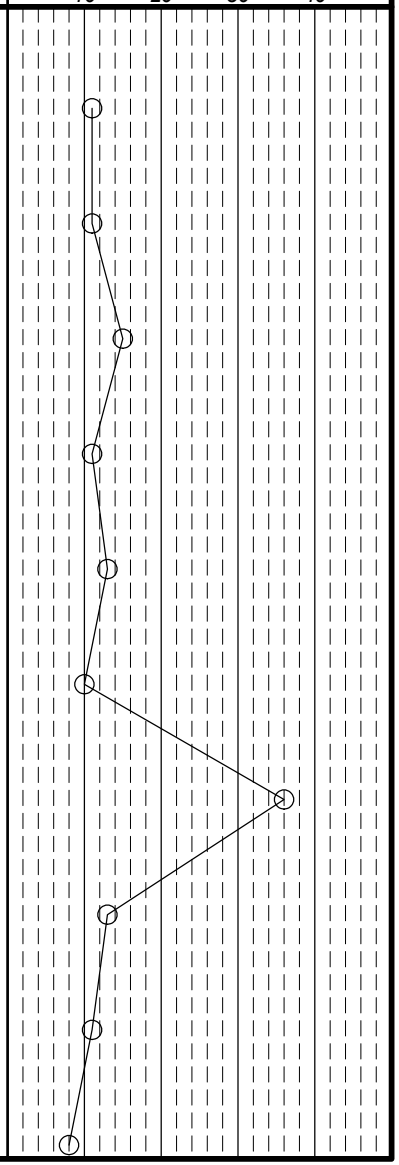
WATER OBSERVATIONS:
Water seepage at: 21.0'
Water level at completion: 12.3' (with augers removed) ???

DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Rig (#) / ER: CME-850X (400472) / 84.0% | *Driller:* LB | *Logger:* AM

Natural Moisture Content, % - ●
PL ├──┤ LL
N_{60} Value ○ / Non-Plastic - NP
10 20 30 40

Depth (ft)	Elev. (ft) 692.7	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0.4	692.3						Topsoil - 5", Plow Depth - 13"							
		2 4 4	15	S-1		1.0	Stiff to medium stiff light brown FAT CLAY (CH); damp.							
3.5	689.2													
5		4 5 3	18	S-2		4.0	Very stiff to hard light gray SILTY CLAY (CL-ML); damp.							
6.0	686.7													
		4 5 6	18	S-3		1.5	Stiff light gray and light brown FAT CLAY (CH); moist.							
8.5	684.2													
10		4 5 3	18	S-4		1.25	Stiff to medium stiff brown FAT CLAY (CH); moist.							
		3 4 5	18	S-5		0.75								
15		4 4 3	18	S-6		1.25	@ 13.5', contains gravel size chert							
		3 20 6	18	S-7		0.75	@ 16.0'-18.5', contains broken large cherts and gray silt mostly from chert weathering @ 17.5'-18.5', drill rig chatter							
20		3 5 4	18	S-8		2.25	@ 18.5'-21.0', very stiff							
		4 4 4	18	S-9		0.75	@ 21.0'-23.5', moist to wet							
25.0 25	667.7	3 3 3	18	S-10		1.0	Bottom of Boring - 25.0'							



DLZ Ohio, Inc. * 6121 Huntley Road, Columbus, Ohio 43229 * (614) 888-0040

Client: Barton Malow | *Project:* Ford H4 Battery Plant | *Job No.* 2150-9519.50

LOG OF: Boring B-130 | *Location:* As per plan | *Date Drilled:* 11/29/2021

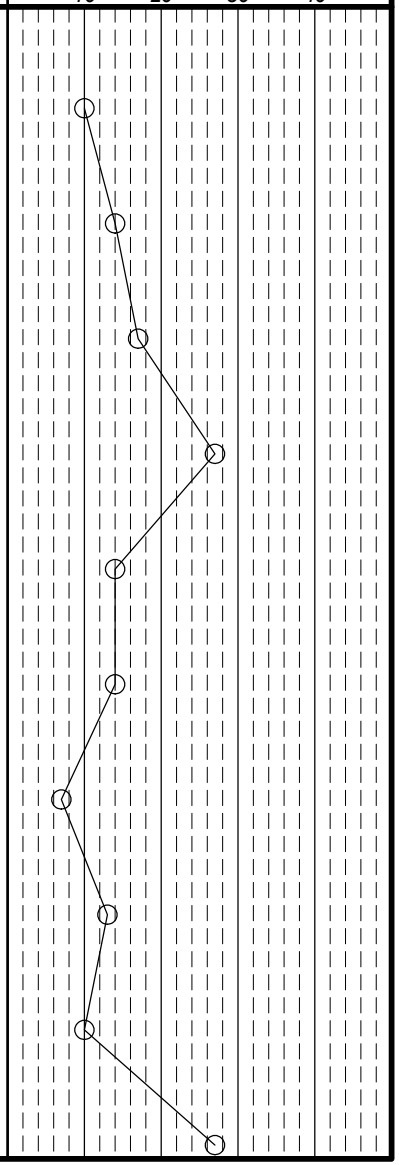
WATER OBSERVATIONS:
Water seepage at: None
Water level at completion: 15.1' (with augers removed) ?

DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Rig (#) / ER: CME-850X (400472) / 84.0% | *Driller:* LB | *Logger:* AM

Natural Moisture Content, % - ●
PL ├──┤ LL
N_{60} Value ○ / Non-Plastic - NP

Depth (ft)	Elev. (ft) 695.8	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0.1	695.7						Topsoil - NO READING							
3.5	692.3	1 3 4	16	S-1		1.75	Stiff light brown SILTY CLAY (CL-ML); contains black oxide staining; moist.							
6.0	689.8	3 4 6	18	S-2		3.5	Very stiff light gray and light brown mottled SILTY CLAY (CL-ML); moist.							
8.5	687.3	6 5 7	18	S-3		2.75	Very stiff red FAT CLAY (CH); contains weathered stone fragments; moist.							
11.0	684.8	4 7 12	18	S-4			Medium dense red silty SAND (SM); damp.							
13.5	682.3	4 4 6	18	S-5		2.5	Very stiff reddish brown FAT CLAY (CH); mosit.							
16.0	679.8	3 4 6	18	S-6		3.0	Very stiff light red and brown mottled FAT CLAY (CH); contains black oxide staining; moist.							
18.5	677.3	2 3 2	18	S-7		1.5	Stiff light gray FAT CLAY (CH); moist.							
		1 3 6	18	S-8		1.0	Medium stiff to stiff red FAT CLAY (CH); moist.							
		5 3 4	18	S-9		0.75								
25.0	670.8	9 9 10	9	S-10		0.5	@ 23.5', soft to medium stiff contains large decomposed stone fragments							



Client: Barton Malow	Project: Ford H4 Battery Plant	Job No. 2150-9519.50
LOG OF: Boring B-130	Location: As per plan	Date Drilled: 11/29/2021

WATER OBSERVATIONS:
Water seepage at: None
Water level at completion: 15.1' (with augers removed) ?

DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Rig (#) / ER: CME-850X (400472) / 84.0%
Driller: LB
Logger: AM

Natural Moisture Content, % - ●
PL ⊢——⊣ LL
N_{60} Value ○ / Non-Plastic - NP
10 20 30 40

Depth (ft)	Elev. (ft) 670.8	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
							Bottom of Boring - 25.0'							
30														
35														
40														
45														
50														

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Client: Barton Malow | *Project:* Ford H4 Battery Plant | *Job No.* 2150-9519.50

LOG OF: Boring B-131 | *Location:* As per plan | *Date Drilled:* 11/21/2021

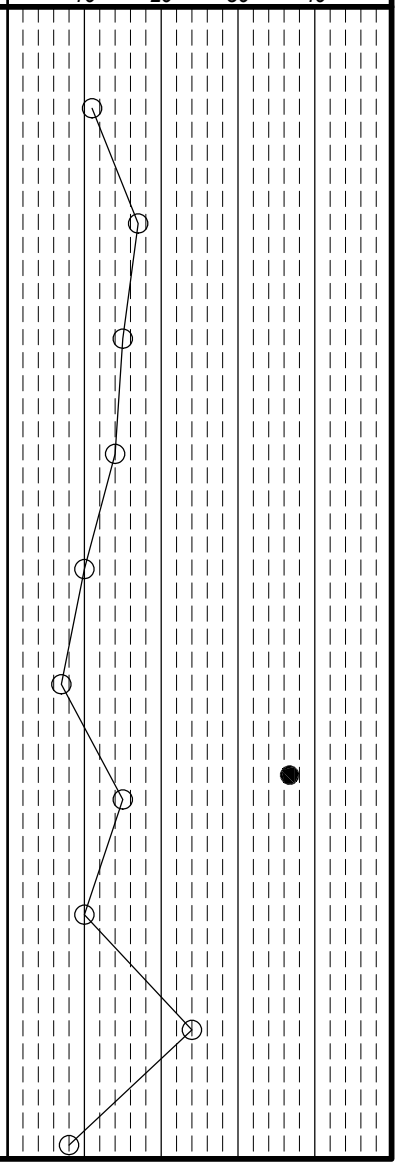
WATER OBSERVATIONS:
Water seepage at: None
Water level at completion: None (inside augers)

DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Rig (#) / ER: CME-850X (400472) / 84.0% | *Driller:* LB | *Logger:* AM

Natural Moisture Content, % - ●
PL ├──┤ LL
N_{60} Value ○ / Non-Plastic - NP

Depth (ft)	Elev. (ft) 695.7	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0.1	695.6						Topsoil - NO READING							
		3 3 5	15	S-1		1.0	Stiff to medium stiff light brown SILTY CLAY (CL-ML); moist.							
3.5	692.2													
5		4 5 7	18	S-2		2.0	Stiff to very stiff light brown and light gray SILTY CLAY (CL-ML); damp.							
6.0	689.7													
		3 5 6	18	S-3		3.75	Very stiff red LEAN CLAY (CL); contains black oxide staining; damp to moist.							
8.5	687.2													
10		6 4 6	18	S-4		2.25	Very stiff red FAT CLAY (CH); contains black oxide staining; moist.							
11.0	684.7													
		3 3 4	18	S-5		2.0	Stiff to very stiff red FAT CLAY (CH); contains chert fragments; moist to wet.							
15		3 2 3	18	S-6		2.25								
		5 6 5	18	S-7		1.5								
20		2 3 4	15	S-8		1.5								
		6 8 9	18	S-9		1.5								
25.0 25	670.7	3 4 2		S-10		1.5	Bottom of Boring - 25.0'							



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Client: Barton Malow | *Project:* Ford H4 Battery Plant | *Job No.* 2150-9519.50

LOG OF: Boring B-132 | *Location:* As per plan | *Date Drilled:* 11/22/2021

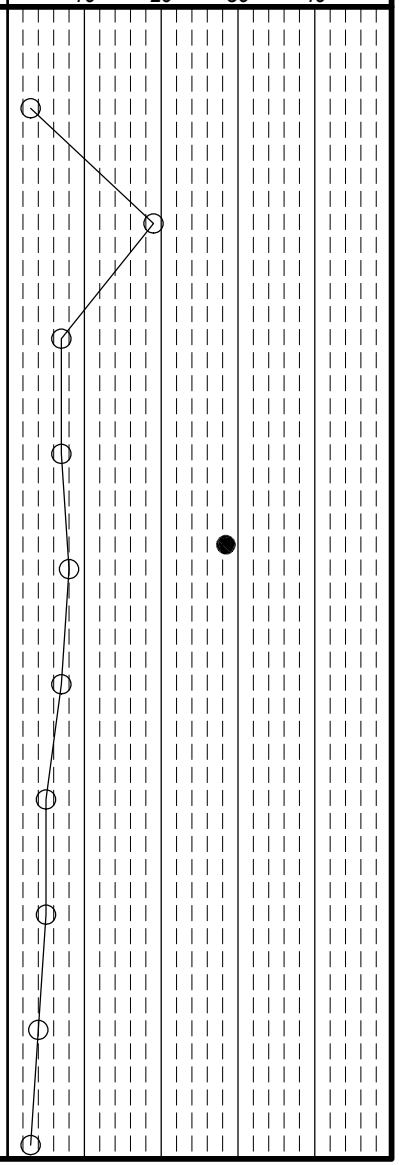
WATER OBSERVATIONS:
Water seepage at: None
Water level at completion: None (inside augers)

DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Rig (#) / ER: CME 750X (289498) / 81.0% | *Driller:* P | *Logger:* AM

Natural Moisture Content, % - ●
PL ├──┤ LL
N_{60} Value ○ / Non-Plastic - NP
10 20 30 40

Depth (ft)	Elev. (ft) 691.4	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0.3	691.1						Topsoil - 4", Plow Depth - 11"							
		WOH WOH 2	6	S-1		1.75	Stiff to very stiff light brown LEAN CLAY (CL); moist.							
5		4 6 8	18	S-2		3.0								
6.0	685.4													
		3 3 2	18	S-3		1.75	Stiff to medium stiff light brownish gray FAT CLAY (CH); moist.							
10		3 2 3	18	S-4		1.0	@ 8.5'-13.5', light brown with black oxide staining							
		1 3 3	18	S-5		0.75								
13.5	677.9													
15		2 2 3	18	S-6		1.0	Stiff to medium stiff light brown and light gray FAT CLAY (CH); wet.							
		1 2 2	18	S-7		0.5	@ 16.0', soft to medium stiff							
20		1 2 2		S-8		0.5	@ 18.5', light reddish brown							
		2 2 1	18	S-9		0.5	@ 21.0', red							
25.0 25	666.4	3 1 1	18	S-10		0.5	@ 23.5', contains chert fragments Bottom of Boring - 25.0'							



Client: Barton Malow | *Project:* Ford H4 Battery Plant | *Job No.* 2150-9519.50

LOG OF: Boring B-133 | *Location:* As per plan | *Date Drilled:* 11/22/2021

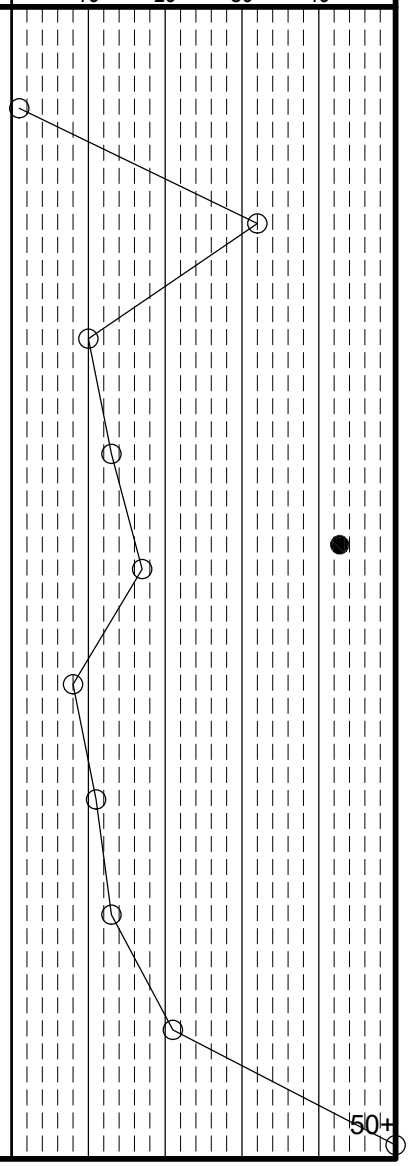
WATER OBSERVATIONS:
Water seepage at: 23.5'
Water level at completion: NOTHING RECORDED

DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Rig (#) / ER: CME-850X (400472) / 84.0% | *Driller:* P | *Logger:* AM

Natural Moisture Content, % - ●
PL ○ / LL — Non-Plastic - NP
N_{60} Value 10 20 30 40

Depth (ft)	Elev. (ft) 689.4	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0.3	689.1						Topsoil - 4", Plow Depth - 20"							
		WOH WOH 1	18	S-1		0.5	Soft to medium stiff light brown SILTY CLAY (CL-ML); wet.							
3.5	685.9													
		6 13 10	15	S-2			Dense light brown clayey SAND (SC); contains loose to broken stone fragments; damp.							
5														
6.0	683.4													
		3 3 4	18	S-3		2.5	Very stiff light brown and red mottled FAT CLAY (CH); moist.							
		3 4 5	18	S-4		2.5	@ 8.5', contains black oxide staining							
10														
11.0	678.4													
		5 6 6	18	S-5		2.5	Very stiff to stiff red FAT CLAY (CH); contains chert fragments; moist.							
		4 3 3	13	S-6		2.5								
15														
		3 4 4	18	S-7		1.75								
		5 4 5	18	S-8		1.75								
20														
		2 2 13	18	S-9		1.0	@ 21.0', medium stiff to stiff							
							@ 22.5'-23.5', slight drill rig chatter							
		50/3	18	S-10			@ 23.5', contains broken rock fragments, possible top of rock							
25.0	664.4													



Client: Barton Malow	Project: Ford H4 Battery Plant	Job No. 2150-9519.50
LOG OF: Boring B-133	Location: As per plan	Date Drilled: 11/22/2021

WATER OBSERVATIONS:
Water seepage at: 23.5'
Water level at completion: NOTHING RECORDED

DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Rig (#) / ER: CME-850X (400472) / 84.0% | Driller: P | Logger: AM

Natural Moisture Content, % - ●
PL ⊢——⊣ LL
N_{60} Value ○ / Non-Plastic - NP
10 20 30 40

Depth (ft)	Elev. (ft) 664.4	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetro-meter (tsf)	DESCRIPTION	Graphic Log	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
							Bottom of Boring - 25.0'							
30														
35														
40														
45														
50														

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Client: Barton Malow | *Project:* Ford H4 Battery Plant | *Job No.* 2150-9519.50

LOG OF: Boring B-134 | *Location:* As per plan | *Date Drilled:* 11/23/2021

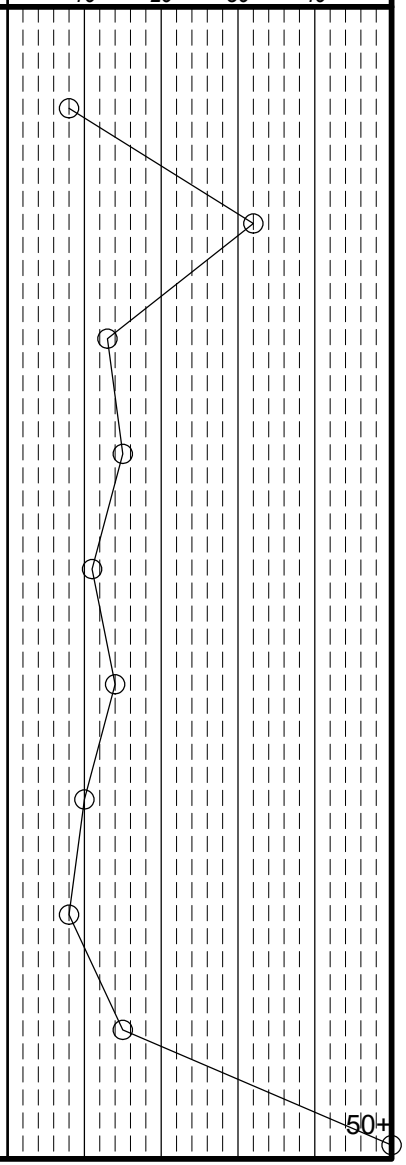
WATER OBSERVATIONS:
Water seepage at: None
Water level at completion: NOTHING RECORDED

DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Rig (#) / ER: CME-850X (400472) / 84.0% | *Driller:* P | *Logger:* AM

Natural Moisture Content, % - ●
PL ├──┤ LL
N_{60} Value ○ / Non-Plastic - NP

Depth (ft)	Elev. (ft) 690.3	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0.3	690.0						Topsoil - 3", Plow Depth - 12"							
		2 3 3	18	S-1		1.5	Stiff light brown LEAN CLAY (CL); moist.							
3.5	686.8													
5		7 10 13	18	S-2		1.75	Stiff light brown and light gray LEAN CLAY (CL); contains black oxide staining and silt and fine sand layer; moist.							
6.0	684.3													
		4 5 4	18	S-3		1.75	Stiff to very stiff red FAT CLAY (CH); contains chert fragments; moist.							
10		3 5 6	18	S-4		3.0								
		4 4 4	18	S-5		3.25								
15		4 4 6	18	S-6		3.0								
		3 3 4	15	S-7		1.0	@ 16.0', medium stiff to stiff							
18.5	671.8													
20		3 3 3	1	S-8		1.0	Medium stiff to stiff light brown FAT CLAY (CH); moist.							
		4 5 6	18	S-9		1.5								
23.5	666.8													
25.0 25	665.3	10 50/2	7	S-10		0.75	Medium stiff red FAT CLAY (CH); contains stone fragments; moist.							



Client: Barton Malow	Project: Ford H4 Battery Plant	Job No. 2150-9519.50
LOG OF: Boring B-134	Location: As per plan	Date Drilled: 11/23/2021

WATER OBSERVATIONS:
Water seepage at: None
Water level at completion: NOTHING RECORDED

DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Rig (#) / ER: CME-850X (400472) / 84.0% | Driller: P | Logger: AM

Natural Moisture Content, % - ●
PL ⊢——⊣ LL
N_{60} Value ○ / Non-Plastic - NP
10 20 30 40

Depth (ft)	Elev. (ft) 665.3	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
							@ 24.1', possible top of rock Bottom of Boring - 25.0'							
30														
35														
40														
45														
50														

Client: Barton Malow | *Project:* Ford H4 Battery Plant | *Job No.* 2150-9519.50

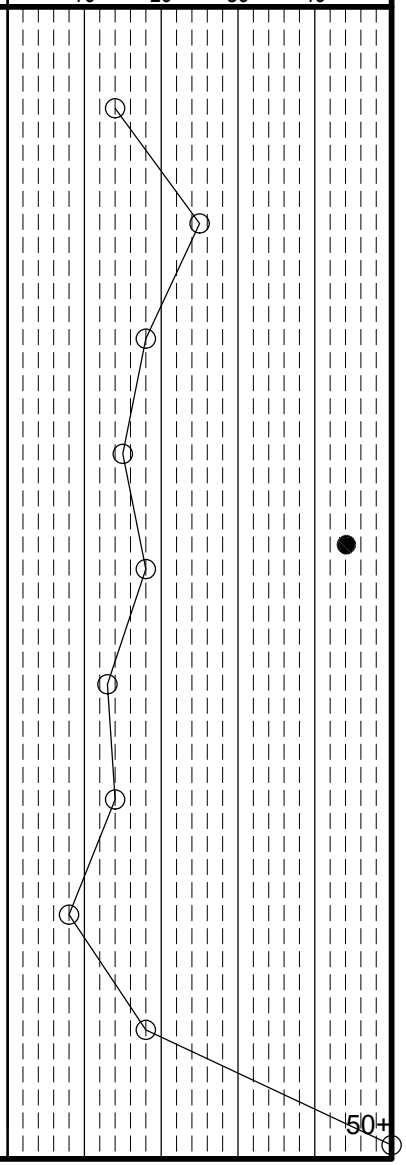
LOG OF: Boring B-135 | *Location:* As per plan | *Date Drilled:* 11/29/2021 to 11/30/2021

WATER OBSERVATIONS:
Water seepage at: 18.5'
Water level at completion: 12.0' (with augers removed)

DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Rig (#) / ER: CME-850X (400472) / 84.0% | *Driller:* P | *Logger:* AM

Depth (ft)	Elev. (ft) 694.1	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0.1	694.0						Topsoil - NO READING							
		2 4 6	8	S-1		0.75	Medium stiff light brown FAT CLAY (CH); moist to wet.							
3.5	690.6													
5		7 7 11	15	S-2		1.5	Stiff light grayish brown FAT CLAY (CH); moist.							
6.0	688.1													
		3 6 7	18	S-3		2.0	Stiff to very stiff red FAT CLAY (CH); contains chert fragments; moist.							
10		3 5 6	18	S-4		3.5								
		2 6 7	18	S-5		3.0	@ 11.0'-18.5', contains black oxide staining							
15		4 5 4	17	S-6		0.5	@ 13.5'-16.0', soft to medium stiff @ 13.5', left augers in ground overnight on 11/29							
		2 4 6	18	S-7		3.25								
18.5	675.6													
20		1 3 3	18	S-8		1.75	Medium stiff light greenish gray to red FAT CLAY (CH); moist. @ 20.0'-21.0', drill rig chatter, difficulty advancing augers							
21.0	673.1													
		13 10 3	14	S-9		1.0	Medium stiff to stiff reddish brown FAT CLAY (CH); contains chert fragments; moist.							
23.5	670.6													
24.3	669.8	1 50/4	10	S-10		0.75	Stiff brown and red variegated FAT CLAY (CH); moist. @ 24.3', sampler refusal, gravel stuck in tip of splitspoon							
25														



Bottom of Boring - 24.3'

Client: Barton Malow	Project: Ford H4 Battery Plant	Job No. 2150-9519.50
LOG OF: Boring B-135	Location: As per plan	Date Drilled: 11/29/2021 to 11/30/2021

WATER OBSERVATIONS:
Water seepage at: 18.5'
Water level at completion: 12.0' (with augers removed)

DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Depth (ft)	Elev. (ft) 669.1	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetro-meter (tsf)	DESCRIPTION	Graphic Log	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	Rig (#) / ER	Driller	Logger
							sampler								CME-850X (400472) / 84.0%	P	AM

Natural Moisture Content, % - ●
PL ├──┤ LL
N_{60} Value ○ / Non-Plastic - NP
10 20 30 40

30
35
40
45
50

Bottom of Boring - 24.3'

DLZ Ohio, Inc. * 6121 Huntley Road, Columbus, Ohio 43229 * (614) 888-0040

Client: Barton Malow	Project: Ford H4 Battery Plant	Job No. 2150-9519.50
LOG OF: Boring B-136	Location: As per plan	Date Drilled: 11/20/2021

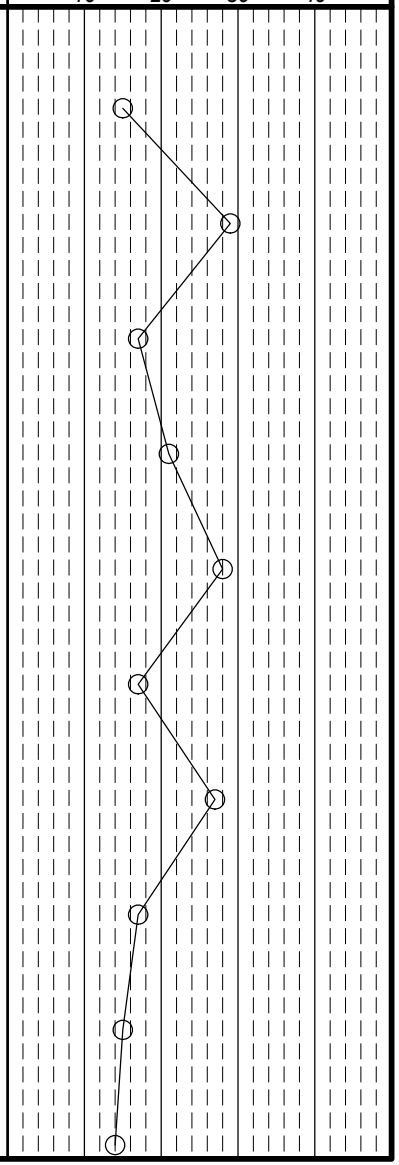
WATER OBSERVATIONS:
Water seepage at: None
Water level at completion: None

DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Rig (#) / ER: CME-850X (400472) / 84.0% | Driller: LB | Logger: AM

Natural Moisture Content, % - ●
PL ⊢——⊣ LL
N_{60} Value ○ / Non-Plastic - NP
10 20 30 40

Depth (ft)	Elev. (ft) 704.5	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0.5	704.0						Topsoil - 6", Plow Depth - 14"							
		6 6 5	17	S-1		3.25	Very stiff red FAT CLAY (CH); damp to moist.							
		7 9 12	18	S-2		2.5								
5														
6.0	698.5													
		6 6 6	18	S-3		3.5	Very stiff red FAT CLAY (CH); contains chert fragments; damp to moist.							
		5 6 9	18	S-4		3.0								
10														
		7 8 12	18	S-5		2.5								
		5 5 7	18	S-6		2.25								
15														
		5 7 12	18	S-7		2.25								
		5 6 6	18	S-8		2.0	@ 18.5', stiff to very stiff							
20														
21.0	683.5													
		5 6 5	18	S-9		2.25	Very stiff red and light brown mottled FAT CLAY (CH); contains black oxide staining; moist.							
23.5	681.0													
25.0 25	679.5	3 5 5	18	S-10		2.0	Very stiff to stiff red FAT CLAY (CH); contains chert fragments; moist.							



Client: Barton Malow	Project: Ford H4 Battery Plant	Job No. 2150-9519.50
LOG OF: Boring B-136	Location: As per plan	Date Drilled: 11/20/2021

WATER OBSERVATIONS:
Water seepage at: None
Water level at completion: None

DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Rig (#) / ER: CME-850X (400472) / 84.0%
Driller: LB
Logger: AM

Natural Moisture Content, % - ●
PL ⊢——⊣ LL
N_{60} Value ○ / Non-Plastic - NP
10 20 30 40

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
	679.5						Bottom of Boring - 25.0'							
30														
35														
40														
45														
50														

DLZ Ohio, Inc. * 6121 Huntley Road, Columbus, Ohio 43229 * (614) 888-0040

Client: Barton Malow | *Project:* Ford H4 Battery Plant | *Job No.* 2150-9519.50

LOG OF: Boring B-137 | *Location:* As per plan | *Date Drilled:* 11/20/2021

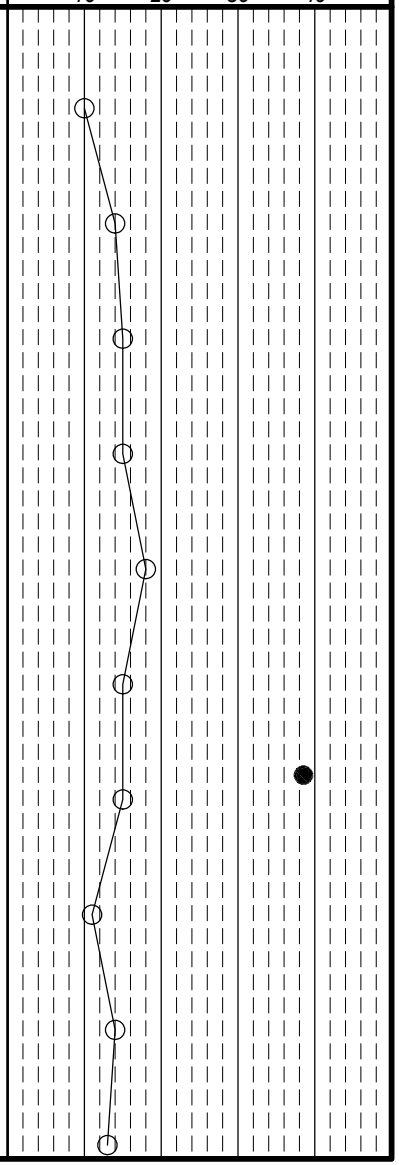
WATER OBSERVATIONS:
Water seepage at: None
Water level at completion: None (inside augers)

DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Rig (#) / ER: CME-850X (400472) / 84.0% | *Driller:* LB | *Logger:* AM

Natural Moisture Content, % - ●
PL ├──┤ LL
N_{60} Value ○ / Non-Plastic - NP

Depth (ft)	Elev. (ft) 695.9	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0.1	695.8						Topsoil - NO READING							
		3 2 5	18	S-1		2.75	Very stiff red FAT CLAY (CH); contains chert fragments and black oxide staining; moist.							
3.5	692.4													
5		3 5 5	18	S-2		1.75	Stiff red and light brown mottled FAT CLAY (CH); moist.							
6.0	689.9													
		5 5 6	18	S-3		1.25	Stiff dark red FAT CLAY (CH); contains black oxide staining; moist.							
10		3 5 6	18	S-4		1.75								
11.0	684.9													
		3 6 7	18	S-5		2.0	Stiff to very stiff red FAT CLAY (CH); contains chert fragments; moist.							
15		6 5 6	18	S-6		2.0								
		5 5 6	18	S-7		1.5								
20		3 4 4	18	S-8		1.5								
		3 4 6	18	S-9		1.75								
25.0 25	670.9	4 4 5	14	S-10		0.75	@ 23.5', medium stiff Bottom of Boring - 25.0'							



DLZ Ohio, Inc. * 6121 Huntley Road, Columbus, Ohio 43229 * (614) 888-0040

Client: Barton Malow | *Project:* Ford H4 Battery Plant | *Job No.* 2150-9519.50

LOG OF: Boring B-138 | *Location:* As per plan | *Date Drilled:* 11/19/2021

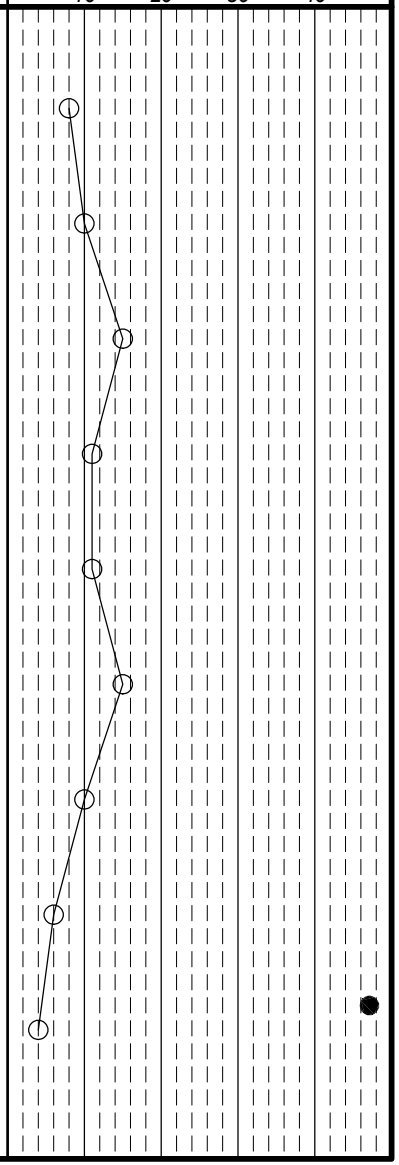
WATER OBSERVATIONS:
Water seepage at: None
Water level at completion: None (inside augers)

DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Rig (#) / ER: CME-850X (400472) / 84.0% | *Driller:* LB | *Logger:* AM

Natural Moisture Content, % - ●
PL ├──┤ LL
N_{60} Value ○ / Non-Plastic - NP
10 20 30 40

Depth (ft)	Elev. (ft) 688.6	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0.1	688.5						Topsoil - NO READING							
		WOH 3 3	13	S-1		1.5	Stiff light brown SILTY CLAY (CL-ML); wet.							
3.5	685.1													
5		3 4 3	14	S-2		2.75	Very stiff light brown LEAN CLAY (CL); moist.							
6.0	682.6													
		4 5 6	18	S-3		1.5	Stiff red FAT CLAY (CH); moist to wet.							
8.5	680.1													
10		4 4 4	18	S-4		2.75	Stiff to very stiff red FAT CLAY (CH); contains black oxide staining; moist.							
		5 4 4	18	S-5		1.75								
15		4 5 6	18	S-6		1.75								
16.0	672.6													
		1 3 4	16	S-7		0.5	Medium stiff to soft red FAT CLAY (CH); contains chert fragments; moist.							
20		2 2 2	17	S-8		0.25	@ 18.5', soft to very soft							
21.0	667.6													
		1 2 1	18	S-9		0.25	Soft to very soft light brown FAT CLAY (CH); moist to wet.							
25.0 25	663.6		22		S-10		Bottom of Boring - 25.0'							



DLZ Ohio, Inc. * 6121 Huntley Road, Columbus, Ohio 43229 * (614) 888-0040

Client: Barton Malow | *Project:* Ford H4 Battery Plant | *Job No.* 2150-9519.50

LOG OF: Boring B-139 | *Location:* As per plan | *Date Drilled:* 11/30/2021

WATER OBSERVATIONS:
Water seepage at: None
Water level at completion: None (inside augers)

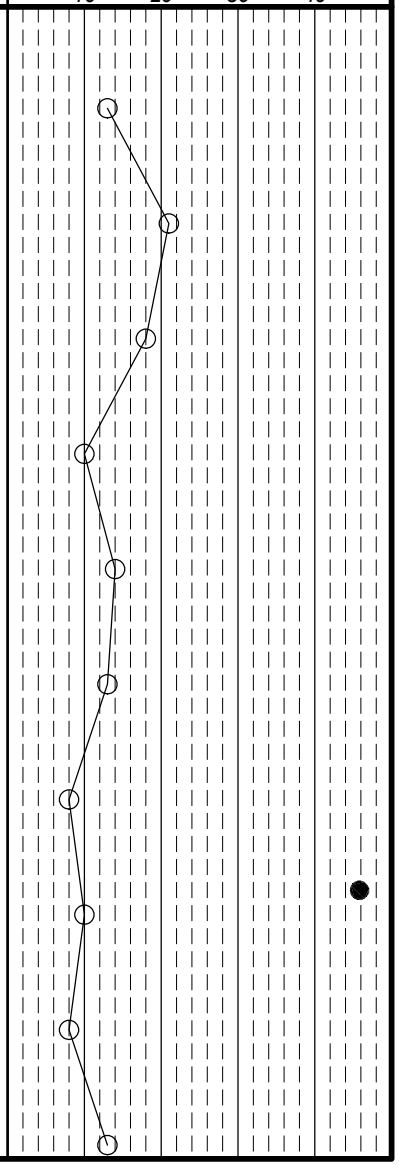
DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Depth (ft)	Elev. (ft) 687.5	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0.1	687.4						Topsoil - NO READING							
		3 3 6	18	S-1		1.25	Stiff light brown LEAN CLAY (CL); moist.							
3.5	684.0													
5		6 6 9	16	S-2		1.5	Stiff light brown and red mottled FAT CLAY (CH); contains large chert fragments; moist.							
6.0	681.5						@ 5.0'-6.0', slight drill rig chatter							
		3 4 9	18	S-3		2.5	Very stiff red FAT CLAY (CH); contains chert fragments; damp to moist.							
10		3 3 4	18	S-4		3.75								
11.0	676.5						@ 10.0'-11.0', drill rig chatter and auger scraping, difficulty advancing augers							
		4 5 5	18	S-5		1.25	Stiff to very stiff red FAT CLAY (CH); moist.							
15		3 4 5	18	S-6		2.25								
16.0	671.5													
		2 3 3	18	S-7		1.0	Stiff to medium stiff red FAT CLAY (CH); contains chert fragments; moist to wet.							
20		3 3 4	7	S-8		1.5								
		3 3 3	17	S-9		0.75	@ 21.0'-23.5', contains large chert fragments							
25.0 25	662.5	2 4 5		S-10		0.5	Bottom of Boring - 25.0'							

GRADATION

Rig (#) / ER	Driller	Logger
CME-850X (400472) / 84.0%	P	AM

Natural Moisture Content, % - ●
PL ├──┤ LL
N_{60} Value ○ / Non-Plastic - NP



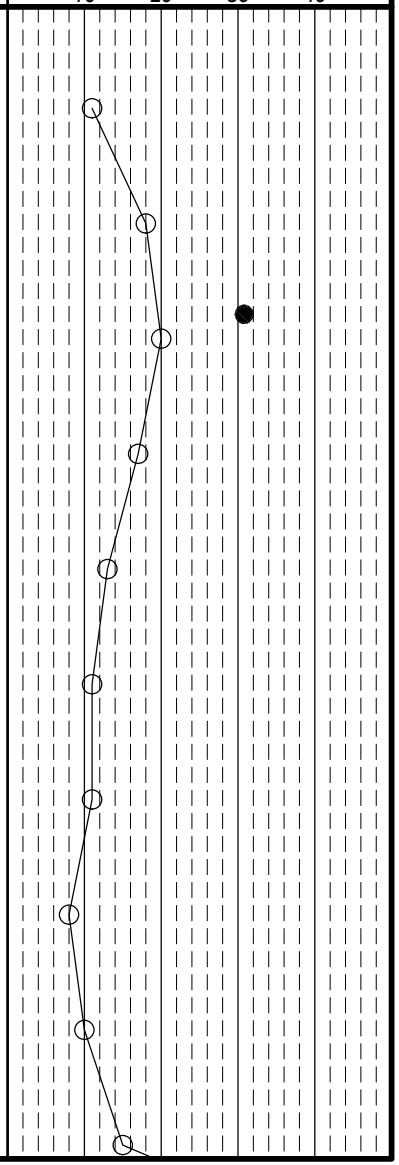
Client: Barton Malow | *Project:* Ford H4 Battery Plant | *Job No.* 2150-9519.50

LOG OF: Boring B-140 | *Location:* As per plan | *Date Drilled:* 12/1/2021

Rig (#) / ER CME-850X (400472) / 84.0% | *Driller* KC | *Logger* AM

WATER OBSERVATIONS:
Water seepage at: 26.0' ???
Water level at completion: 11.9' (prior to adding water)
13.2' (including coring water)
DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Depth (ft)	Elev. (ft) 692.1	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0.1	692.0						Topsoil - NO READING							
		3 4 4	18	S-1		2.25	Very stiff light brown FAT CLAY (CH); moist.							
3.5	688.6													
5		3 6 7	18	S-2		2.25	Very stiff red and brown mottled FAT CLAY (CH); contains chert fragments; moist.							
		5 5 9	18	S-3		2.5								
10		4 5 7	18	S-4		3.0								
11.0	681.1													
		3 4 5	18	S-5		1.5	Stiff light brown FAT CLAY (CH); moist.							
13.5	678.6													
15		3 4 4	18	S-6		2.25	Very stiff light greenish gray FAT CLAY (CH); moist.							
16.0	676.1													
		2 3 5	18	S-7		1.75	Stiff light brown and red mottled FAT CLAY (CH); moist.							
18.5	673.6													
20		1 3 3	18	S-8		1.0	Soft to medium stiff red and brown mottled FAT CLAY (CH); contains chert fragments; moist to wet.							
		6 5 2	18	S-9		0.5								
23.5	668.6													
25	667.1	3 5 6	18	S-10		0.25	Soft to very soft red FAT CLAY (CH); wet.							



DLZ Ohio, Inc. * 6121 Huntley Road, Columbus, Ohio 43229 * (614) 888-0040

Client: Barton Malow	Project: Ford H4 Battery Plant	Job No. 2150-9519.50
LOG OF: Boring B-140	Location: As per plan	Date Drilled: 12/1/2021

WATER OBSERVATIONS:
Water seepage at: 26.0' ???
Water level at completion: 11.9' (prior to adding water)
13.2' (including coring water)
DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Rig (#) / ER: CME-850X (400472) / 84.0% — Driller: KC — Logger: AM

Natural Moisture Content, % - ●
PL ├──┤ LL
N_{60} Value ○ / Non-Plastic - NP
10 20 30 40

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	Natural Moisture Content, %
	667.1														
26.0	666.1						@ 25.0'-26.0', light drill rig chatter Soft to very soft red FAT CLAY (CH); wet. (continued)								
		50/5	5	S-11			Hard clayey SAND (SC); moist. @ 27.5'-28.5', light drill rig chatter								50+
28.5	663.6	50/5	5	S-12			Soft yellowish gray decomposed rock @ 30.0'-31.0', heavy drill rig chatter								50+
31.0	661.1	50/2	2	S-13			Soft to medium hard, light gray LIMESTONE, decomposed to highly weathered. @ 32.5'-33.5', heavy drill rig chatter, difficulty advancing augers								50+
		50/2	2	S-14											50+
		50/2	2	S-15											50+
38.5	653.6	19 40 48	18	S-16			Soft yellowish gray decomposed rock @ 40.0'-41.0', drill rig chatter								123
		23 30 50	18	S-17											112
43.5	648.6	50/2	2	S-18			Rock fragments @ 44.0', auger refusal								50+
		Core 60"	Rec 33"	RQD 0%	1										
	642.1	c:60"	r:15"	q:0%	2										

Client: Barton Malow	Project: Ford H4 Battery Plant	Job No. 2150-9519.50
LOG OF: Boring B-140	Location: As per plan	Date Drilled: 12/1/2021

WATER OBSERVATIONS:
Water seepage at: 26.0' ???
Water level at completion: 11.9' (prior to adding water)
13.2' (including coring water)
DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Rig (#) / ER: CME-850X (400472) / 84.0% | Driller: KC | Logger: AM

Natural Moisture Content, % - ●
PL ⊢——⊣ LL
N_{60} Value ○ / Non-Plastic - NP
10 20 30 40

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
	642.1													
		Core 60"	Rec 15"	RQD 0%	2		Rock fragments (continued)							
54.0	638.1													
55							Bottom of Boring - 54.0'							
60														
65														
70														
75														

Client: Barton Malow	*Project:* Ford H4 Battery Plant	*Job No.* 2150-9519.50
LOG OF: Boring B-141	*Location:* As per plan	*Date Drilled:* 11/20/2021

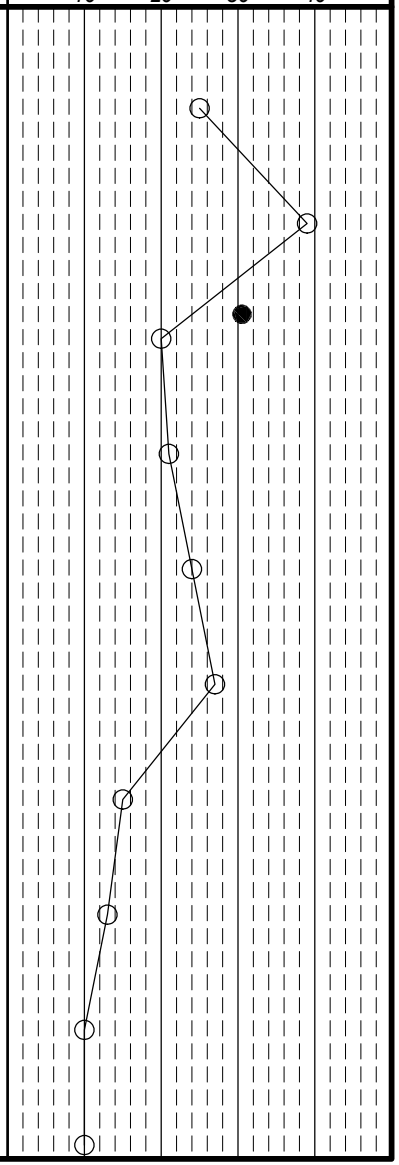
WATER OBSERVATIONS:
Water seepage at: None
Water level at completion: None (inside augers)

DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Rig (#) / ER: CME-850X (400472) / 84.0% — *Driller:* LB — *Logger:* AM

Natural Moisture Content, % - ●
PL — LL
N_{60} Value ○ / Non-Plastic - NP

Depth (ft)	Elev. (ft) 705.0	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0.1	704.9						Topsoil - NO READING							
		6 10 8	13	S-1		0.5	Soft to medium stiff reddish brown FAT CLAY (CH); moist to wet.							
3.5	701.5													
5		9 15 13	18	S-2		3.75	Very stiff to stiff red FAT CLAY (CH); contains chert fragments; moist.							
		5 6 8	18	S-3		4.5+	@ 6.0'-11.0', sample does not contain chert fragments							
10		6 6 9	18	S-4		3.0								
		6 7 10	18	S-5		4.0	@ 11.0'-13.5', sample contains large chert fragment							
15		6 9 10	18	S-6		2.0								
		4 5 6	14	S-7		2.0								
20		4 4 5		S-8		2.5								
		2 3 4	18	S-9		1.75								
25.0 25	680.0	2 3 4		S-10		2.25	Bottom of Boring - 25.0'							



Client: Barton Malow | *Project:* Ford H4 Battery Plant | *Job No.* 2150-9519.50

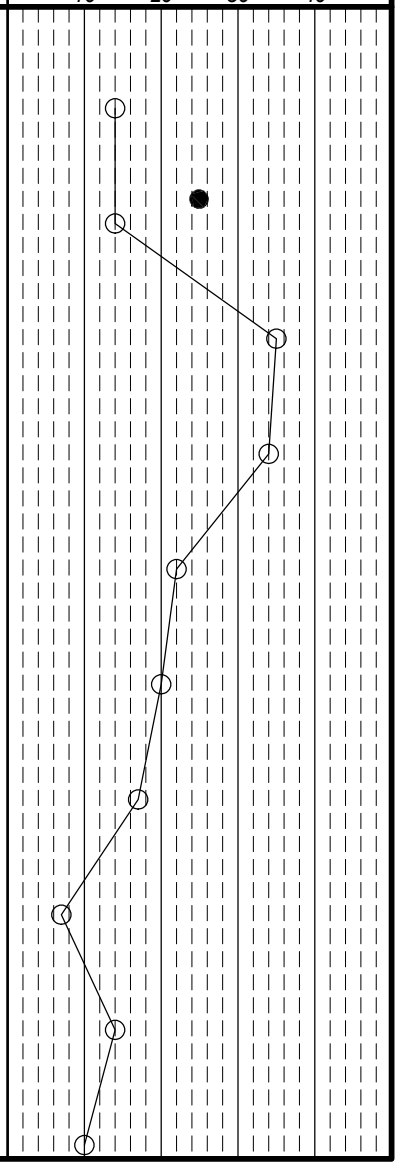
LOG OF: Boring B-142 | *Location:* As per plan | *Date Drilled:*

Rig (#) / ER: CME-850X (400472) / 84.0% | *Driller:* LB | *Logger:* AM

WATER OBSERVATIONS:
Water seepage at: None
Water level at completion: None (inside augers)

DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Depth (ft)	Elev. (ft) 704.0	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0.1	703.9						Topsoil - NO READING							
		4 5 5	18	S-1		2.0	Stiff to very stiff red FAT CLAY (CH); moist.							
3.5	700.5													
5		4 5 5	18	S-2		4.0	Very stiff to hard red LEAN CLAY (CL); contains black oxide staining; damp to moist.							
6.0	698.0													
		9 10 15	18	S-3		3.25	Very stiff to hard red FAT CLAY (CH); contains chert fragments; moist.							
10		6 10 14	18	S-4		4.5								
11.0	693.0													
		8 7 9	18	S-5		3.5	Very stiff red FAT CLAY (CH); damp to moist.							
15		5 7 7	18	S-6		1.5	@ 13.5', stiff							
16.0	688.0													
		5 6 6	18	S-7		1.5	Stiff to very stiff red FAT CLAY (CH); contains chert fragments; moist.							
20		2 2 3	17	S-8		2.0								
		5 7 3	18	S-9		1.25								
25.0 25	679.0	2 3 4	18	S-10		1.25	Bottom of Boring - 25.0'							



Client: Barton Malow | *Project:* Ford H4 Battery Plant | *Job No.* 2150-9519.50

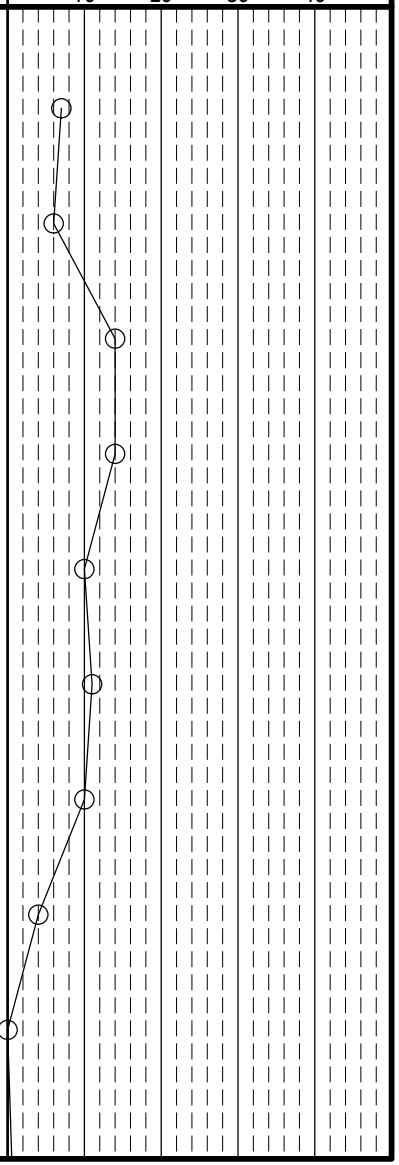
LOG OF: Boring B-143 | *Location:* As per plan | *Date Drilled:* 11/19/2021

WATER OBSERVATIONS:
Water seepage at: 26.0'
Water level at completion: 24.7' (inside augers)

DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Rig (#) / ER: CME-850X (400472) / 84.0% | *Driller:* LB | *Logger:* AM

Depth (ft)	Elev. (ft) 692.3	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0.1	692.2						Topsoil - NO READING							
		2 3 2	16	S-1		1.25	Stiff to very stiff light brown to brown LEAN CLAY (CL); moist.							
5		3 2 2	12	S-2		2.0								
6.0	686.3													
		3 4 6	18	S-3		2.0	Stiff to very stiff light gray FAT CLAY (CH); moist.							
8.5	683.8													
10		4 4 6	18	S-4		2.0	Stiff to very stiff red FAT CLAY (CH); contains black oxide staining and chert fragments; moist.							
		3 3 4	18	S-5		1.5								
15		4 4 4	18	S-6		2.0								
		4 3 4	5	S-7		1.5	@ 16.0'-18.5', low recovery due to large stone fragments in sample							
20		3 1 2	18	S-8		0.5								
21.0	671.3													
		WOR WOR WOH	13	S-9		0.25	Soft to very soft red FAT CLAY (CH); contains chert fragments; moist to wet.							
25	667.3		19		ST-1									



Client: Barton Malow | *Project:* Ford H4 Battery Plant | *Job No.* 2150-9519.50

LOG OF: Boring B-143 | *Location:* As per plan | *Date Drilled:* 11/19/2021

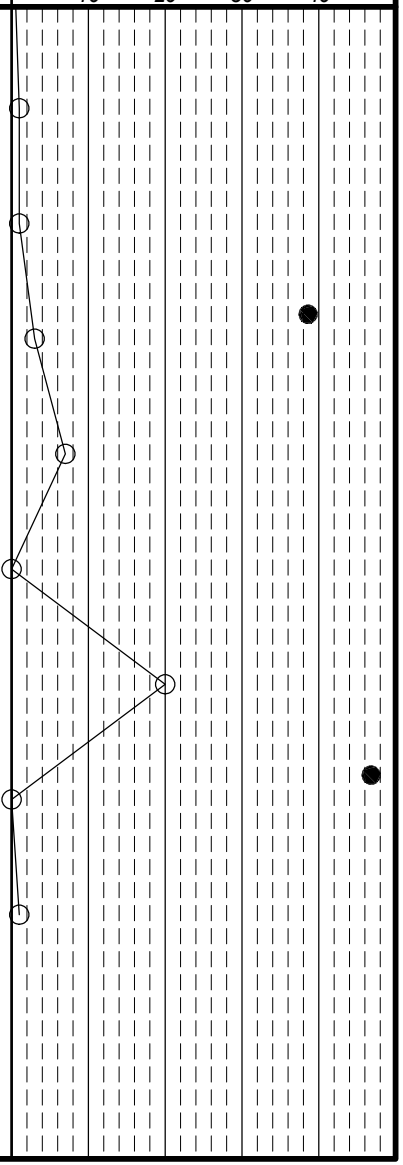
Rig (#) / ER CME-850X (400472) / 84.0% | *Driller* LB | *Logger* AM

WATER OBSERVATIONS:
Water seepage at: 26.0'
Water level at completion: 24.7' (inside augers)

DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION
	667.3						
		WOH WOH 1	9	S-11		0.25	Soft to very soft red FAT CLAY (CH); contains chert fragments; moist to wet. (continued)
28.5	663.8						
30		WOH WOH 1	18	S-12		0.25	Soft to very soft light brown FAT CLAY (CH); moist to wet.
		WOR WOR 2	13	S-13		0.25	
35		WOH 2 3	18	S-14		0.25	
36.0	656.3						
		WOH WOH WOH	18	S-15		< 0.25	Very soft FAT CLAY (CH); contains stone fragments; wet.
40		4 9 5	18	S-16		0.25	
		WOR WOR WOR	8	S-17		< 0.25	
							@ 42.5', rods dropped 5' below augers with center plug on
45		WOR WOH 1		S-18		< 0.25	
							@ 45.0'; advanced augers without sampling to 72.0'. @ 45.0', rods dropped to 55.0' with center plug on
50	642.3						

Graphic Log | GRADATION: % Aggregate | % C. Sand | % M. Sand | % F. Sand | % Silt | % Clay



Client: Barton Malow	Project: Ford H4 Battery Plant	Job No. 2150-9519.50
LOG OF: Boring B-143	Location: As per plan	Date Drilled: 11/19/2021

WATER OBSERVATIONS:
Water seepage at: 26.0'
Water level at completion: 24.7' (inside augers)

DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Rig (#) / ER: CME-850X (400472) / 84.0%
Driller: LB
Logger: AM

Natural Moisture Content, % - ●
PL ⊢——⊣ LL
N_{60} Value ○ / Non-Plastic - NP
10 20 30 40

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
	642.3													
55														
60														
65														
							@ 67.0'-69.0', drill rig chatter							
70														
							@ 72.0'; auger refusal.							
72.0	620.3													
							Bottom of Boring - 72.0'							
75														

Client: Barton Malow | *Project:* Ford H4 Battery Plant | *Job No.* 2150-9519.50

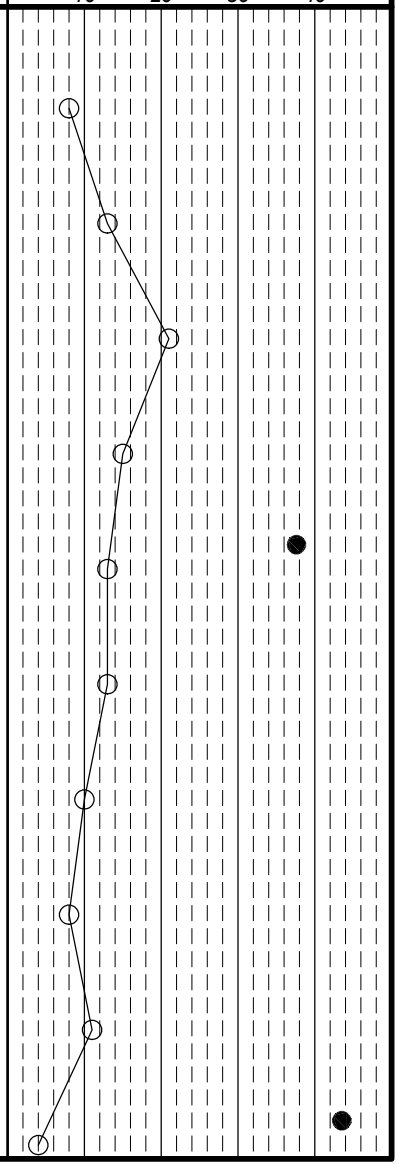
LOG OF: Boring B-144 | *Location:* As per plan | *Date Drilled:* 12/1/2021

WATER OBSERVATIONS:
Water seepage at: 23.5'
Water level at completion: 11.2' (with augers removed) ???

DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Rig (#) / ER: CME-850X (400472) / 84.0% | *Driller:* P | *Logger:* AM

Depth (ft)	Elev. (ft) 686.0	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0.1	685.9						Topsoil - NO READING							
		3 3 3	12	S-1			Loose light brown SAND (SP-SC) with clay; moist.							
3.5	682.5													
5		3 4 5	16	S-2		1.75	Stiff red and light brown FAT CLAY (CH); moist.							
		3 8 7	9	S-3		1.25								
8.5	677.5													
10		5 5 6	18	S-4		2.5	Very stiff to stiff red and light gray mottled FAT CLAY (CH); contains chert fragments; damp to moist.							
		4 4 5	18	S-5		2.5								
15		4 5 4	15	S-6		1.5								
16.0	670.0													
		1 3 4	18	S-7		1.25	Stiff light brown FAT CLAY (CH); contains stone fragments; moist.							
18.5	667.5													
20		1 3 3	18	S-8		1.0	Stiff to medium stiff light brown to light greenish gray FAT CLAY (CH); moist							
21.0	665.0													
		1 2 6	18	S-9		0.75	Stiff reddish brown FAT CLAY (CH); contains chert fragments; moist.							
23.5	662.5													
25.0 25	661.0	1 1 2	18	S-10		0.25	Soft to very soft light greenish gray to red mottled FAT CLAY (CH); moist to wet.							



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Client: Barton Malow	Project: Ford H4 Battery Plant	Job No. 2150-9519.50
LOG OF: Boring B-144	Location: As per plan	Date Drilled: 12/1/2021

WATER OBSERVATIONS:
Water seepage at: 23.5'
Water level at completion: 11.2' (with augers removed) ???

DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Depth (ft)	Elev. (ft) 661.0	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetro-meter (tsf)	DESCRIPTION	Graphic Log	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	Rig (#) / ER	Driller	Logger
							Bottom of Boring - 25.0'								CME-850X (400472) / 84.0%	P	AM

Natural Moisture Content, % - ●
PL ├──┤ LL
N_{60} Value ○ / Non-Plastic - NP
10 20 30 40

30
35
40
45
50

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Client: Barton Malow | *Project:* Ford H4 Battery Plant | *Job No.* 2150-9519.50

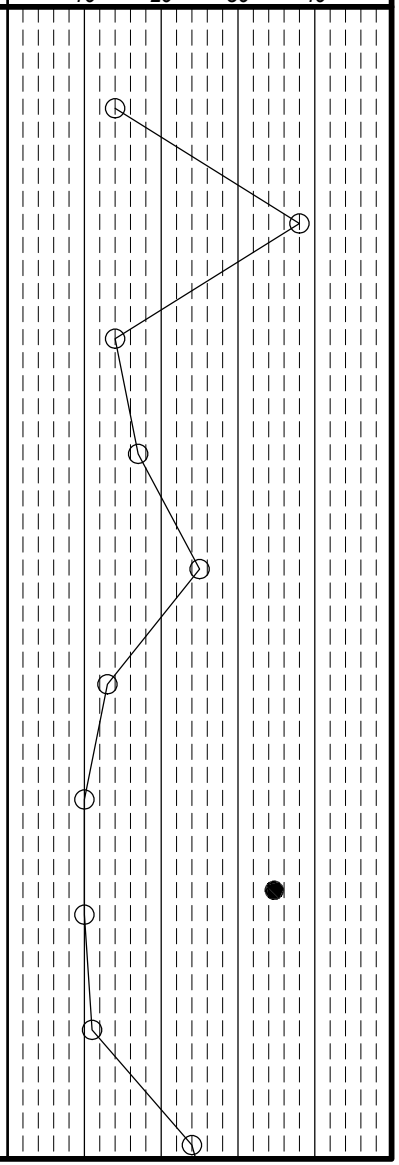
LOG OF: Boring B-145 | *Location:* As per plan | *Date Drilled:* 12/2/2021

WATER OBSERVATIONS:
Water seepage at: 36.0'
Water level at completion: 28.1' (prior to add water)
9.2' (includes coring water)
DRILLING METHODS - Soil: HS Augers; Rock: NQ2 Core
ABANDONMENT - cuttings and bentonite chips

Rig (#) / ER: CME-850X (400472) / 84.0% | *Driller:* KC | *Logger:* AM

Natural Moisture Content, % - ●
PL ├──┤ LL
N_{60} Value ○ / Non-Plastic - NP

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
	689.8													
0.1	689.7						Topsoil - NO READING							
		3 5 5	18	S-1		2.75	Very stiff light brown LEAN CLAY (CL); moist.							
3.5	686.3													
5		5 12 15	18	S-2		2.0	Very stiff to stiff brown and light brown mottled LEAN CLAY (CL); moist.							
6.0	683.8													
		4 5 5	18	S-3		4.0	Very stiff to hard reddish brown FAT CLAY (CH); contains black oxide staining; damp to moist.							
10		5 7 5	18	S-4		2.0	@ 8.5', stiff to very stiff							
11.0	678.8													
		5 6 12	18	S-5		3.5	Very stiff red FAT CLAY (CH); moist.							
13.5	676.3													
15		4 4 5	18	S-6		2.25	Very stiff to stiff red FAT CLAY (CH); contains chert fragments; moist.							
		3 3 4	18	S-7		1.5								
20		3 3 4	18	S-8		2.0								
		2 4 4	18	S-9		1.5								
25	664.8	8 8 9	18	S-10		2.25								



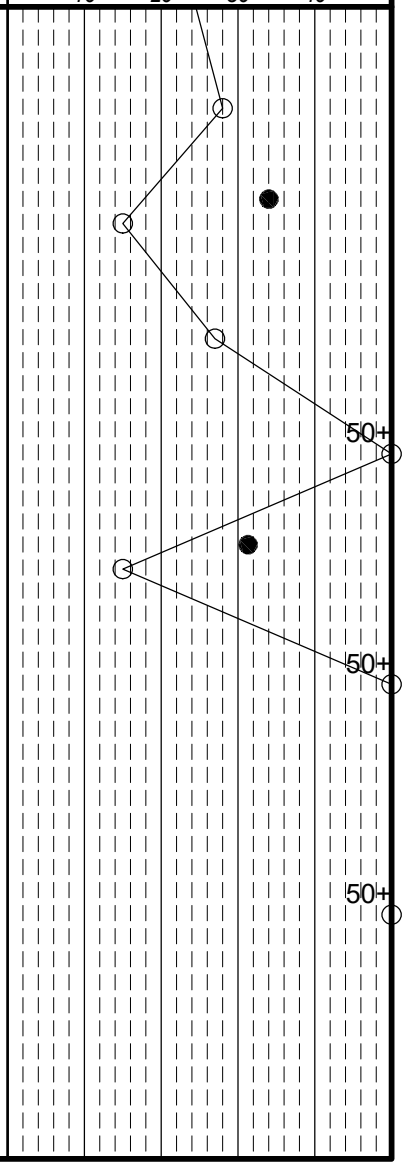
Client: Barton Malow	Project: Ford H4 Battery Plant	Job No. 2150-9519.50
LOG OF: Boring B-145	Location: As per plan	Date Drilled: 12/2/2021

WATER OBSERVATIONS:
Water seepage at: 36.0'
Water level at completion: 28.1' (prior to add water)
9.2' (includes coring water)
DRILLING METHODS - Soil: HS Augers; Rock: NQ2 Core
ABANDONMENT - cuttings and bentonite chips

Rig (#) / ER: CME-850X (400472) / 84.0%
Driller: KC
Logger: AM

Natural Moisture Content, % - ●
PL ├──┤ LL
N_{60} Value ○ / Non-Plastic - NP

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
	664.8						Very stiff to stiff red FAT CLAY (CH); contains chert fragments; moist. (continued)							
		4 5 15	18	S-11		0.75	@ 26.0', medium stiff, color grades from red to light gray							
30		4 5 6	18	S-12		1.0	@ 28.5'-31.0', medium stiff to stiff, red							
							@ 30.0'-31.0', drill rig chatter							
		2 12 7	18	S-13		1.0	@ 31.0'-33.5', red and brown mottled							
							@ 32.5'-33.5', drill rig chatter							
		50/2	2	S-14		1.5	@ 33.5'-36.0', low recovery, contains large stone fragment							
35							@ 35.0'-36.0', occasional drill rig chatter							
		4 5 6	18	S-15		0.25	@ 36.0', soft to very soft red, moist to wet							
38.5	651.3						@ 37.5'-38.5', heavy drill rig chatter							
		5 50/5		S-16			Soft gray decomposed LIMESTONE							
40														
		50/3	2	S-17			@ 43.5', rock fragments							
45		Core 54"	Rec 39"	RQD 56%	1		@ 44.0', auger refusal							
50	639.8	Core 60"	Rec 43"	RQD 50%	2									



Client: Barton Malow	Project: Ford H4 Battery Plant	Job No. 2150-9519.50
LOG OF: Boring B-145	Location: As per plan	Date Drilled: 12/2/2021

WATER OBSERVATIONS:
Water seepage at: 36.0'
Water level at completion: 28.1' (prior to add water)
9.2' (includes coring water)
DRILLING METHODS - Soil: HS Augers; Rock: NQ2 Core
ABANDONMENT - cuttings and bentonite chips

Rig (#) / ER: CME-850X (400472) / 84.0% | Driller: KC | Logger: AM

Natural Moisture Content, % - ●
PL ⊢——⊣ LL
N_{60} Value ○ / Non-Plastic - NP
10 20 30 40

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
639.8														
		Core 60"	Rec 43"	RQD 50%	2		Soft gray decomposed LIMESTONE (continued)							
53.5	636.3													
							Bottom of Boring - 53.5'							
55														
60														
65														
70														
75														

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Client: Barton Malow | *Project:* Ford H4 Battery Plant | *Job No.* 2150-9519.50

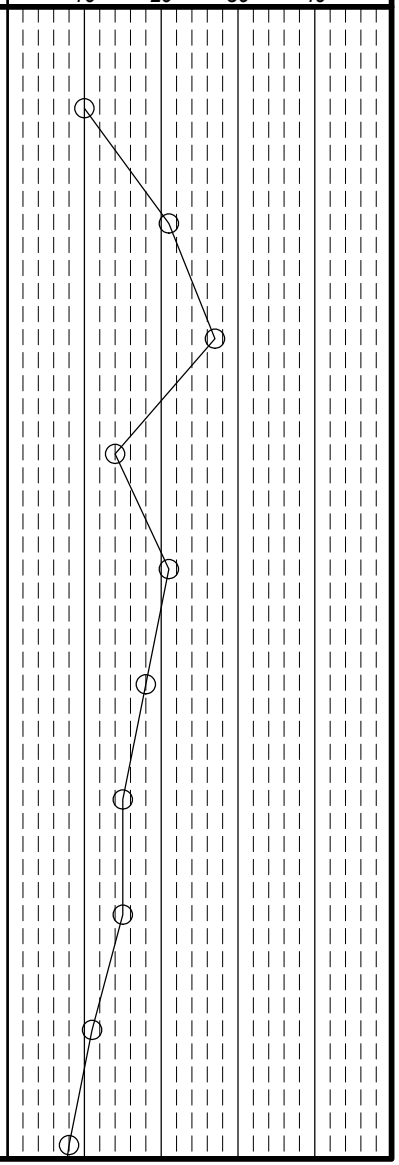
LOG OF: Boring B-146 | *Location:* As per plan | *Date Drilled:* 11/20/2021

WATER OBSERVATIONS:
Water seepage at: 16.0'
Water level at completion: 29.1' (prior to adding water)
7.2' (with augers removed) ?
DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Rig (#) / ER: CME-850X (400472) / 84.0% | *Driller:* LB | *Logger:* AM

Natural Moisture Content, % - ●
PL ├──┤ LL
N_{60} Value ○ / Non-Plastic - NP
10 20 30 40

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0.1	698.2						Topsoil - NO READING							
3.5	694.8	1 3 4	14	S-1		1.5	Stiff light brown FAT CLAY (CH); moist.							
6.0	692.3	5 6 9	16	S-2		2.5	Very stiff light brown LEAN CLAY (CL); moist.							
8.5	689.8	5 9 10	18	S-3		3.25	Very stiff light borwn and light gray mottled SILTY CLAY (CL-ML); damp.							
10.0	688.3	3 4 6	18	S-4		2.25	Very stiff red FAT CLAY (CH); contains black oxide staining; moist.							
11.0	687.3						MISSING PAGE 3 OF FIELD LOG							
		3 7 8	18	S-5		2.25	Very stiff red FAT CLAY (CH); moist.							
		4 6 7	18	S-6		2.5								
16.0	682.3	4 5 6	18	S-7		1.5	Stiff to medium stiff red FAT CLAY (CH); contains chert fragments; moist.							
		4 5 6		S-8		1.25	@ 18.5'-21.0', contains gravel size chert and chert fragments							
		4 4 4	18	S-9		0.75								
	673.3	2 2 4	17	S-10		0.75								



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Client: Barton Malow | *Project:* Ford H4 Battery Plant | *Job No.* 2150-9519.50

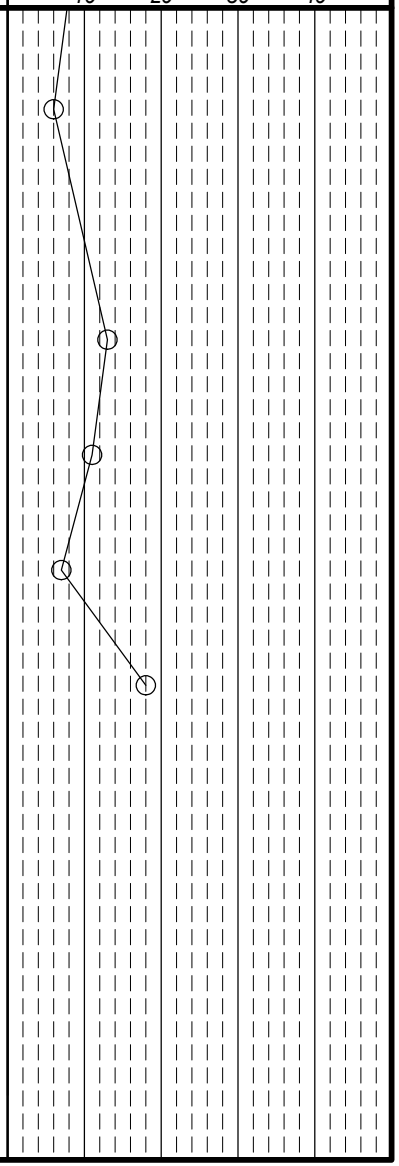
LOG OF: Boring B-146 | *Location:* As per plan | *Date Drilled:* 11/20/2021

WATER OBSERVATIONS:
Water seepage at: 16.0'
Water level at completion: 29.1' (prior to adding water)
7.2' (with augers removed) ?
DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Rig (#) / ER: CME-850X (400472) / 84.0% | *Driller:* LB | *Logger:* AM

Natural Moisture Content, % - ●
PL ├──┤ LL
N_{60} Value ○ / Non-Plastic - NP
10 20 30 40

Depth (ft)	Elev. (ft) 673.3	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
26.0	672.3						Soft to medium stiff red FAT CLAY (CH); contains chert fragments; moist to wet.							
		WOH WOH 4	18	S-11		0.5								
30			24		ST-1									
		4 5 4	18	S-13		0.5								
33.5	664.8													
35		3 4 4	8	S-14		0.75	Medium stiff reddish brown FAT CLAY (CH); contains chert fragments; moist to wet. @ 35.0'-36.0', occasional drill rig chatter							
36.0	662.3													
		WOH 1 4	18	S-15		0.5	Soft to medium stiff light brown FAT CLAY (CH); contains stone fragments; moist to wet. @ 37.5'-38.5', slight drill rig chatter							
40		4 5 8	16	S-16		0.75	@ 40.0'-43.5', drill rig chatter							
45							@ 43.5', single chert gravel blocking splitspoon sampler @ 45.0'-48.0', heavy drill rig chatter							
48.6	649.7	Core 120"	Rec 86"	RQD %	R-1		@ 48.0', auger refusal							
50							Bottom of Boring - 48.6' @ 48.6', no sample recovery, assume top of rock							



Client: Barton Malow	Project: Ford H4 Battery Plant	Job No. 2150-9519.50
LOG OF: Boring B-146	Location: As per plan	Date Drilled: 11/20/2021

WATER OBSERVATIONS:
Water seepage at: 16.0'
Water level at completion: 29.1' (prior to adding water)
7.2' (with augers removed) ?

DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Rig (#) / ER: CME-850X (400472) / 84.0%
Driller: LB
Logger: AM

Natural Moisture Content, % - ●
PL ⊢——⊣ LL
N_{60} Value ○ / Non-Plastic - NP
10 20 30 40

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
	648.3													
55		Core 120"	Rec 86"	RQD %	R-1									
60		Core 60"	Rec 58"	RQD %	R-2									
65														
70														
75														

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Client: Barton Malow | *Project:* Ford H4 Battery Plant | *Job No.* 2150-9519.50

LOG OF: Boring B-147 | *Location:* As per plan | *Date Drilled:* 11/18/2021

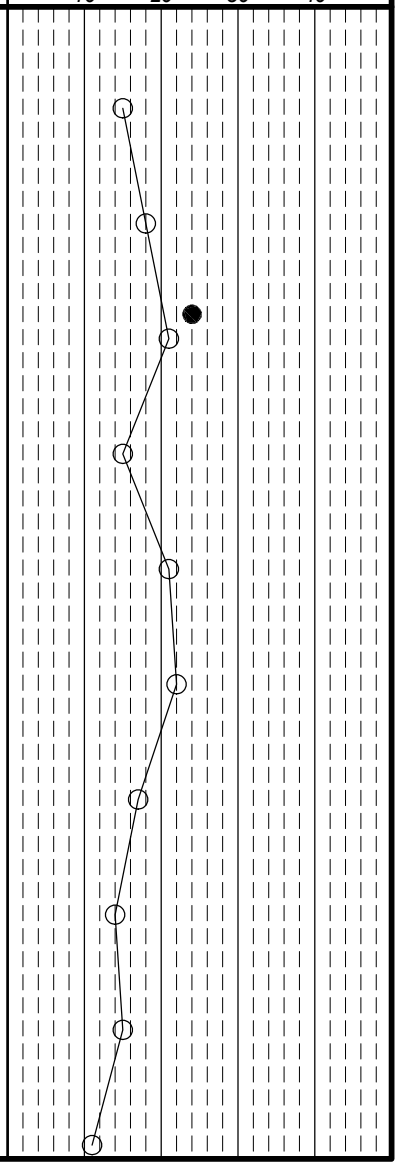
WATER OBSERVATIONS:
Water seepage at: None
Water level at completion: None (inside augers)

DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Rig (#) / ER: CME-850X (400472) / 84.0% | *Driller:* LB | *Logger:* AM

Natural Moisture Content, % - ●
PL ├──┤ LL
N_{60} Value ○ / Non-Plastic - NP
10 20 30 40

Depth (ft)	Elev. (ft) 705.3	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0.1	705.2						Topsoil - NO READING							
		3 5 6	18	S-1		2.0	Stiff to very stiff light reddish brown to red LEAN CLAY (CL); moist.							
3.5	701.8													
5		3 6 7		S-2		3.0	Very stiff to stiff red FAT CLAY (CH); moist.							
		7 7 8	18	S-3		3.0								
10		3 6 5	18	S-4		2.75	@ 8.5'-11.0', sample contains chert fragments							
		7 6 9	18	S-5		2.5								
13.5	691.8													
15		8 8 8	18	S-6		225	Very stiff to stiff red FAT CLAY (CH); contains chert fragments; moist.							
		5 6 6	18	S-7		2.25								
20		4 5 5	18	S-8		2.0								
		6 5 6	18	S-9		2.25								
25.0 25	680.3	3 3 5	11	S-10		1.75	Bottom of Boring - 25.0'							



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Client: Barton Malow | *Project:* Ford H4 Battery Plant | *Job No.* 2150-9519.50

LOG OF: Boring B-148 | *Location:* As per plan | *Date Drilled:* 11/18/2021

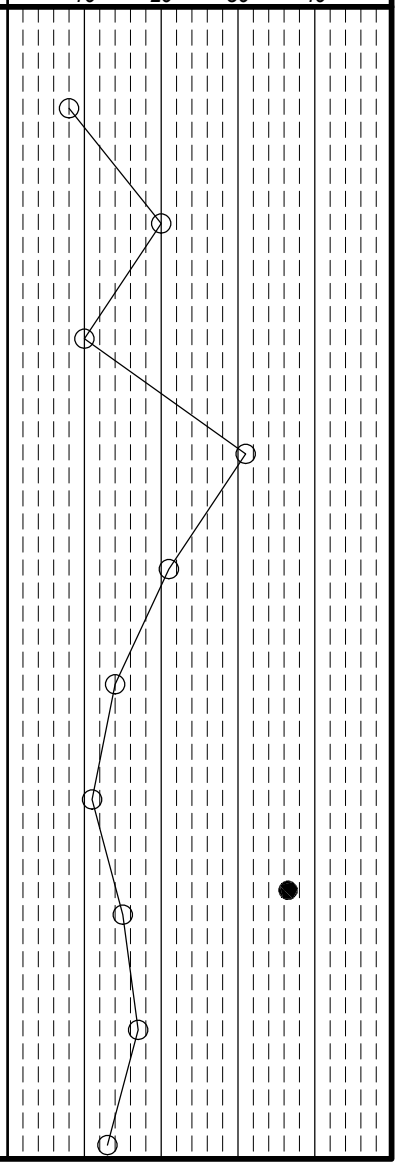
WATER OBSERVATIONS:
Water seepage at: None
Water level at completion: None (inside augers)

DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Depth (ft)	Elev. (ft) 692.9	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0.1	692.8						Topsoil - NO READING							
		2 3 3	18	S-1		1.5	Stiff light brown LEAN CLAY (CL); moist.							
3.5	689.4													
5		4 7 7	18	S-2		2.75	Very stiff to stiff light brown LEAN CLAY (CL); contains black oxide staining; moist.							
		4 3 4	18	S-3		1.75								
8.5	684.4													
10		5 9 13	18	S-4		2.5	Very stiff light gray and red mottled FAT CLAY (CH); moist.							
11.0	681.9													
		5 8 7	18	S-5		2.25	Very stiff to stiff red FAT CLAY (CH); moist.							
15		3 5 5	18	S-6		2.0								
		5 4 4	18	S-7		1.5								
20		5 5 6		S-8		1.5								
		3 3 9	18	S-9		1.75								
25.0 25	667.9	3 4 5	18	S-10		1.5	Bottom of Boring - 25.0'							

Rig (#) / ER CME-850X (400472) / 84.0% | *Driller* LB | *Logger* AM

Natural Moisture Content, % - ●
PL ├──┤ LL
N_{60} Value ○ / Non-Plastic - NP



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Client: Barton Malow | *Project:* Ford H4 Battery Plant | *Job No.* 2150-9519.50

LOG OF: Boring B-149 | *Location:* As per plan | *Date Drilled:* 11/18/2021

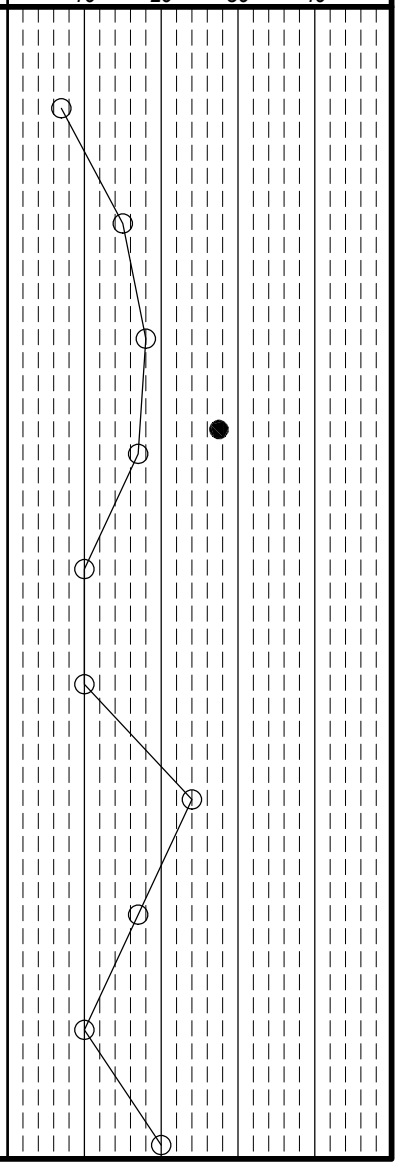
WATER OBSERVATIONS:
Water seepage at: None
Water level at completion: None (inside augers)

DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Rig (#) / ER: CME-850X (400472) / 84.0% | *Driller:* LB | *Logger:* AM

Natural Moisture Content, % - ●
PL ├──┤ LL
N_{60} Value ○ / Non-Plastic - NP
10 20 30 40

Depth (ft)	Elev. (ft) 685.8	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0.1	685.7						Topsoil - NO READING							
		1 2 3	18	S-1		0.5	Soft to medium stiff light brown FAT CLAY (CH); moist to wet.							
3.5	682.3													
5		5 5 6	14	S-2		2.25	Very stiff to stiff red FAT CLAY (CH); contains chert fragments; damp to moist.							
		5 6 7	18	S-3		1.75								
10		5 6 6	17	S-4		2.25								
		4 4 3	6	S-5		1.0	@ 11.0'-13.5', stiff to medium stiff, color gradient to light brown							
13.5	672.3													
15		1 3 4	18	S-6		1.25	Stiff to medium stiff light brown FAT CLAY (CH); contains chert fragments; moist. @ 15.0'-16.0', drill rig chatter							
		10 13 4	18	S-7		0.75	@ 17.5'-18.5', drill rig chatter							
18.5	667.3													
20		4 5 7	13	S-8			Medium dense light brown to white clayey SAND (SC); consists of sand with rock fragments; moist.							
21.0	664.8													
		3 3 4	18	S-9		0.5	Soft to medium stiff light brown FAT CLAY (CH); wet.							
23.5	662.3													
25.0 25	660.8	3 6 8	10	S-10			Decomposed rock Bottom of Boring - 25.0'							



DLZ Ohio, Inc. * 6121 Huntley Road, Columbus, Ohio 43229 * (614) 888-0040

Client: Barton Malow | *Project:* Ford H4 Battery Plant | *Job No.* 2150-9519.50

LOG OF: Boring B-150 | *Location:* As per plan | *Date Drilled:* 12/2/2021

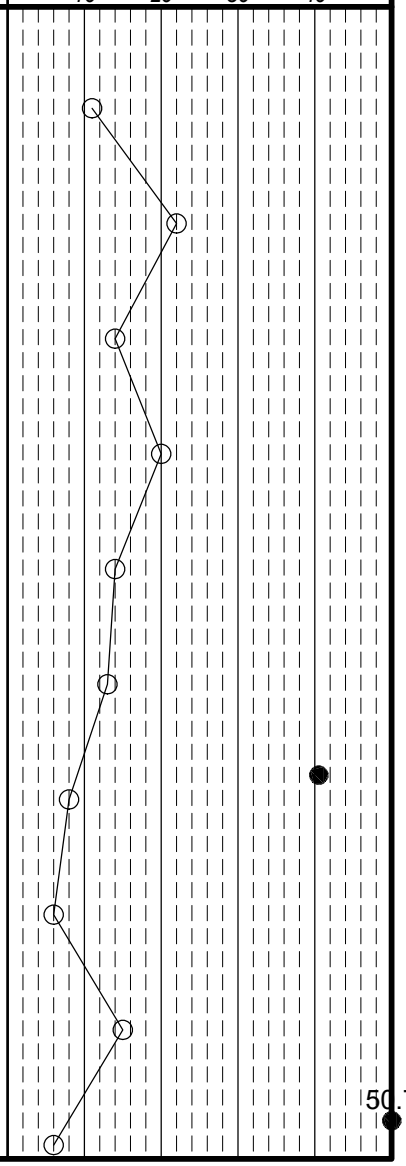
WATER OBSERVATIONS:
Water seepage at: 23.5'
Water level at completion: 23.2' (inside augers)

DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Rig (#) / ER: CME-850X (400472) / 84.0% | *Driller:* KC | *Logger:* AM

Natural Moisture Content, % - ●
PL ├──┤ LL
N_{60} Value ○ / Non-Plastic - NP

Depth (ft)	Elev. (ft) 685.8	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0.5	685.3						Topsoil - NO READING							
		2 3 5	17	S-1		0.75	[TOPSOIL] Medium stiff brown LEAN CLAY (CL); moist.							
3.5	682.3													
5		7 9 7	18	S-2		4.5+	Hard red, light brown, and light gray FAT CLAY (CH); contains chert fragments; damp.							
6.0	679.8													
		4 5 5	16	S-3		2.5	Very stiff to stiff red FAT CLAY (CH); contains chert fragments; moist.							
10		5 8 6	18	S-4		2.75								
		4 5 5	18	S-5		1.75								
13.5	672.3													
15		4 5 4	8	S-6		1.0	Stiff to medium stiff red FAT CLAY (CH); contains chert fragments and black oxide staining; moist.							
		WOH 3 3	18	S-7		1.0	@ 16.0' color grades from red to light brown							
18.5	667.3													
20		2 2 2	18	S-8		0.5	Soft to medium stiff light grayish brown FAT CLAY (CH); moist to wet.							
		4 5 6	18	S-9		0.5	@ 21.0'-23.5', contains chert fragments							
		3 2 2	18	S-10		0.25	@ 23.5', soft to very soft							
25.0 25	660.8						Bottom of Boring - 25.0'							



DLZ Ohio, Inc. * 6121 Huntley Road, Columbus, Ohio 43229 * (614) 888-0040

Client: Barton Malow | *Project:* Ford H4 Battery Plant | *Job No.* 2150-9519.50

LOG OF: Boring B-151 | *Location:* As per plan | *Date Drilled:* 11/17/2021

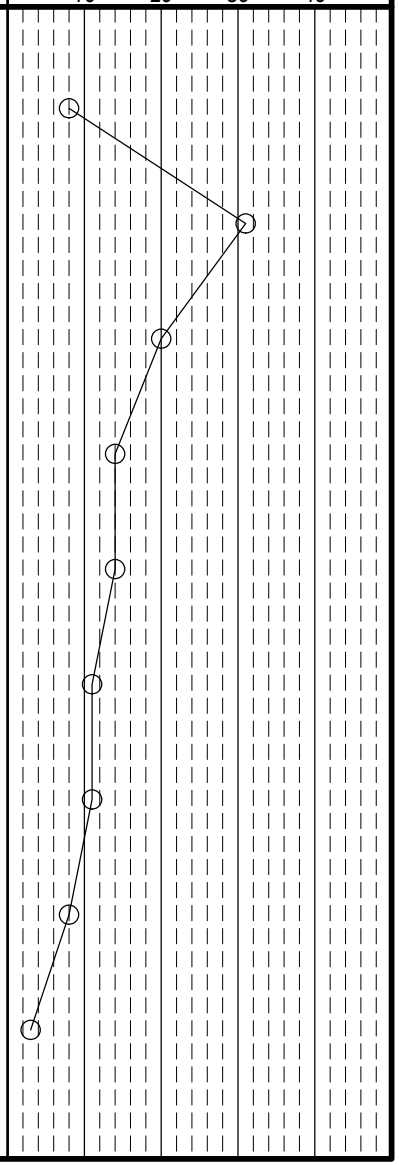
WATER OBSERVATIONS:
Water seepage at: None
Water level at completion: None (inside augers)

DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Rig (#) / ER: CME-850X (400472) / 84.0% | *Driller:* LB | *Logger:* AM

Natural Moisture Content, % - ●
PL ├──┤ LL
N_{60} Value ○ / Non-Plastic - NP
10 20 30 40

Depth (ft)	Elev. (ft) 692.8	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0.1	692.7						Topsoil - NO READING							
		2 3 3	15	S-1		1.75	Stiff light brown LEAN CLAY (CL); moist.							
5		3 13 9	11	S-2		1.5								
6.0	686.8													
		5 6 8	18	S-3		3.5	Very stiff red FAT CLAY (CH); contains black oxide staining; moist.							
10		5 5 5	18	S-4		3.5								
11.0	681.8													
		3 4 6	17	S-5		2.5	Very stiff to stiff red FAT CLAY (CH); contains chert fragments; moist.							
15		3 4 4	18	S-6		2.0								
		2 5 3	11	S-7		1.75								
20		1 3 3	1	S-8			@ 18.5'-21.0', low sample recovery due to lone chert fragment blocking sample							
		WOH 1 1	9	S-9			@ 21.0', soft to very soft							
25.0 25	667.8		20		ST-1		Bottom of Boring - 25.0'							



DLZ Ohio, Inc. * 6121 Huntley Road, Columbus, Ohio 43229 * (614) 888-0040

Client: Barton Malow | *Project:* Ford H4 Battery Plant | *Job No.* 2150-9519.50

LOG OF: Boring B-152 | *Location:* As per plan | *Date Drilled:* 11/17/2021

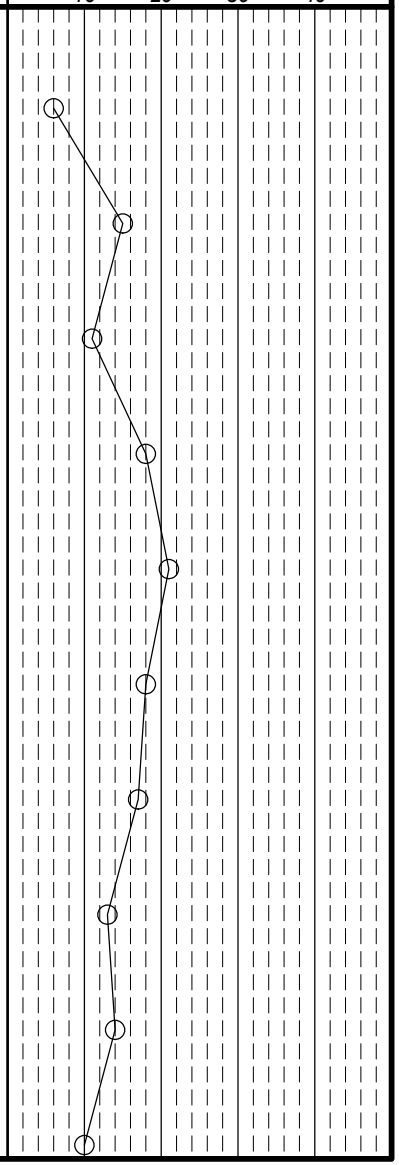
WATER OBSERVATIONS:
Water seepage at: None
Water level at completion: None (inside augers)

DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Rig (#) / ER: CME-850X (400472) / 84.0% | *Driller:* LB | *Logger:* AM

Natural Moisture Content, % - ●
PL ├──┤ LL
N_{60} Value ○ / Non-Plastic - NP
10 20 30 40

Depth (ft)	Elev. (ft) 698.8	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0.1	698.7						Topsoil - NO READING							
		3 2 2	18	S-1		0.75	Medium stiff brown LEAN CLAY (CL); moist.							
5		4 4 7	18	S-2		2.25	@ 3.5'-6.0', very stiff, damp to moist							
6.0	692.8													
		6 4 4	18	S-3		3.75	Very stiff red FAT CLAY (CH); moist.							
10		6 7 6	18	S-4		3.0								
		6 7 8	18	S-5		3.0								
15		5 6 7	18	S-6		3.0								
16.0	682.8													
		3 4 8	18	S-7		1.25	Stiff to medium stiff red FAT CLAY (CH); contains chert fragments; moist.							
20		6 5 4	16	S-8		1.0	@ 18.5'-21.0', contains large decomposed rock fragments							
		5 5 5	18	S-9		1.0								
25.0 25	673.8	5 4 3	18	S-10		1.0	Bottom of Boring - 25.0'							



Client: Barton Malow	Project: Ford H4 Battery Plant	Job No. 2150-9519.50
LOG OF: Boring B-153	Location: As per plan	Date Drilled: 11/19/2021

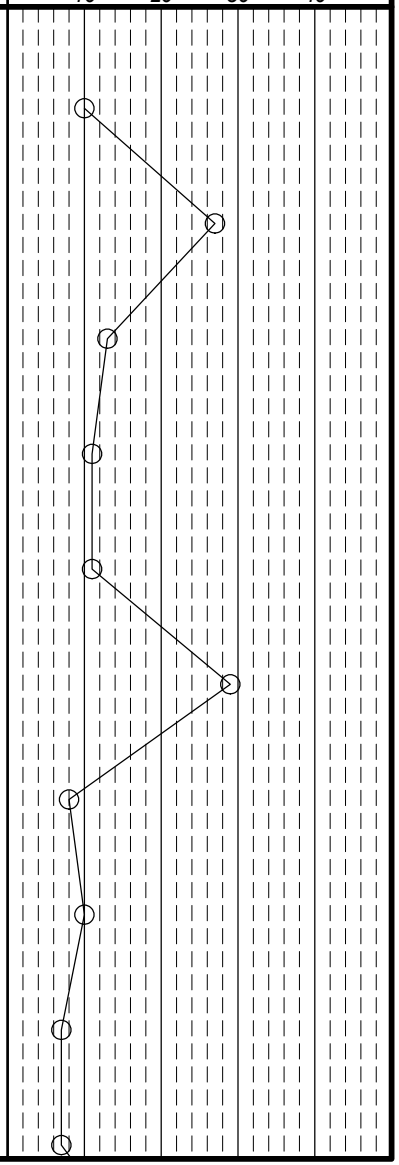
WATER OBSERVATIONS:
Water seepage at: 31.0'
Water level at completion: 26.2' (inside augers)

DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Rig (#) / ER: CME-850X (400472) / 84.0%
Driller: LB
Logger: AM

Natural Moisture Content, % - ●
PL ⊢——⊣ LL
N_{60} Value ○ / Non-Plastic - NP
10 20 30 40

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0.1	697.5						Topsoil - NO READING							
		3 4 3	14	S-1		1.25	Stiff brown LEAN CLAY (CL); moist.							
3.5	694.1													
5		7 9 10	18	S-2		4.0	Very stiff to hard red FAT CLAY (CH); contains chert fragments; moist.							
		7 5 4	18	S-3		3.0								
10		5 4 4	18	S-4		2.5								
		3 4 4		S-5		2.75								
15		6 10 11	2	S-6		1.25	@ 13.5', stiff, low recovery due to large rock fragment blocking sample							
		3 3 3	18	S-7		1.5	@ 16.0', stiff							
20		3 3 4	18	S-8		1.5								
		3 2 3	18	S-9		1.75								
25	672.6	2 2 3	7	S-10		1.25	@ 23.5', moist to wet							



Client: Barton Malow	Project: Ford H4 Battery Plant	Job No. 2150-9519.50
LOG OF: Boring B-153	Location: As per plan	Date Drilled: 11/19/2021

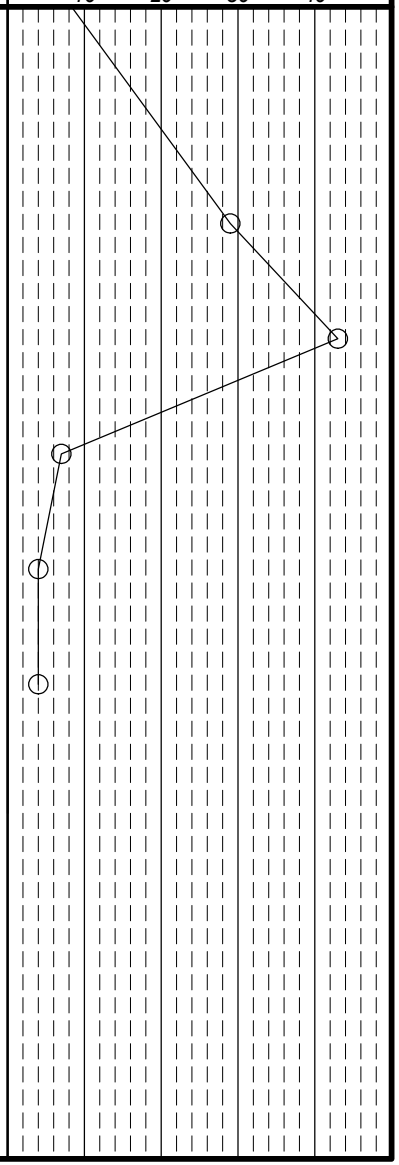
WATER OBSERVATIONS:
Water seepage at: 31.0'
Water level at completion: 26.2' (inside augers)

DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Rig (#) / ER: CME-850X (400472) / 84.0%
Driller: LB
Logger: AM

Natural Moisture Content, % - ●
PL — LL
N_{60} Value ○ / Non-Plastic - NP
10 20 30 40

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
	672.6													
			21		ST-1		Very stiff to hard red FAT CLAY (CH); contains chert fragments; moist. (continued)							
28.5	669.1													
30		6 9 12	18	S-12		0.5	Soft to medium stiff light brown FAT CLAY (CH); contains stone fragments; moist to wet.							
		9 11 20	12	S-13			@ 31.0'-33.5', decomposed rock							
35		10 2 3	1	S-14			@ 33.5'-36.0', low recovery due to single large rock fragment							
36.0	661.6													
		4 2 1	18	S-15		0.25	Soft to very soft light brown sandy FAT CLAY (CH); contains stone fragments; wet.							
38.5	659.1													
40		WOR 2 1		S-16		< 0.25	Very soft to soft light brown FAT CLAY (CH); wet.							
42.5	655.1													
45							Bottom of Boring - 42.5'							
50														



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Client: Barton Malow | *Project:* Ford H4 Battery Plant | *Job No.* 2150-9519.50

LOG OF: Boring B-154 | *Location:* As per plan | *Date Drilled:* 11/18/2021

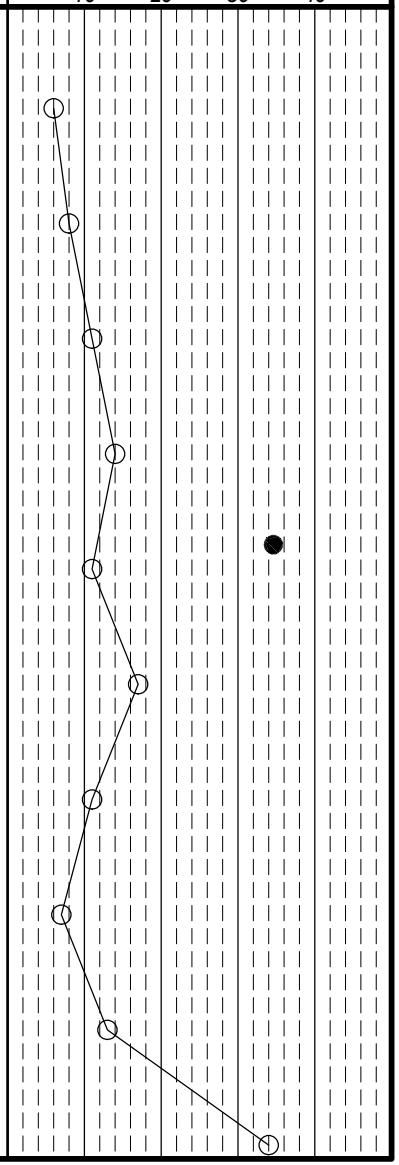
WATER OBSERVATIONS:
Water seepage at: None
Water level at completion: None (inside augers)

DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Rig (#) / ER: CME-850X (400472) / 84.0% | *Driller:* LB | *Logger:* AM

Natural Moisture Content, % - ●
PL ├──┤ LL
N_{60} Value ○ / Non-Plastic - NP
10 20 30 40

Depth (ft)	Elev. (ft) 686.0	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0.1	685.9						Topsoil - NO READING							
		1 1 3	15	S-1		0.25	Soft to very soft brown SILTY CLAY (CL-ML); moist to wet.							
5		3 3 3	4	S-2		0.5	@ 3.5', soft to medium stiff, contains large crushed stone fragments							
6.0	680.0													
		3 4 4	18	S-3		2.5	Very stiff red LEAN CLAY (CL); moist.							
8.5	677.5													
10		3 5 5	18	S-4		2.0	Stiff to very stiff red FAT CLAY (CH); contains chert fragments; moist.							
		3 4 4	17	S-5		20								
15		6 5 7	18	S-6		1.25								
		4 3 5	18	S-7		2.0								
18.5	667.5													
20		3 2 3	18	S-8		1.25	Stiff red and light brown mottled FAT CLAY (CH); moist.							
21.0	665.0						@ 20.0'-21.0', slight drill rig chatter							
		3 5 4	15	S-9		1.5	Stiff light reddish brown FAT CLAY (CH); contains disintegrated stone fragments; moist.							
25.0 25	661.0	3 9 15	16	S-10		1.5	@ 23.5', approximately 50% of sample is rock fragment Bottom of Boring - 25.0'							



DLZ Ohio, Inc. * 6121 Huntley Road, Columbus, Ohio 43229 * (614) 888-0040

Client: Barton Malow | *Project:* Ford H4 Battery Plant | *Job No.* 2150-9519.50

LOG OF: Boring B-155 | *Location:* As per plan | *Date Drilled:* 11/18/2021

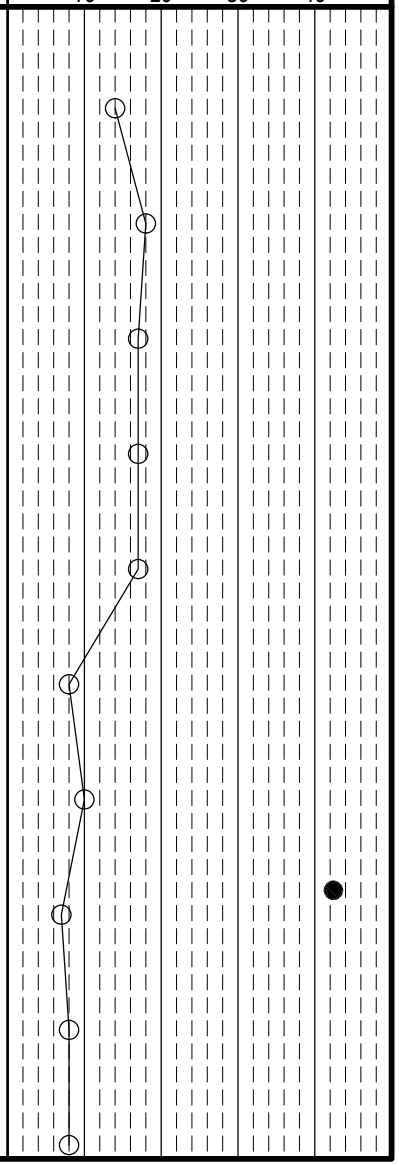
WATER OBSERVATIONS:
Water seepage at: None
Water level at completion: None (inside augers)

DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Rig (#) / ER: CME-850X (400472) / 84.0% | *Driller:* LB | *Logger:* AM

Natural Moisture Content, % - ●
PL ├──┤ LL
N_{60} Value ○ / Non-Plastic - NP

Depth (ft)	Elev. (ft) 682.0	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0.1	681.9						Topsoil - NO READING							
		3 4 6	17	S-1			Medium dense light brown silty SAND (SM); damp.							
3.5	678.5													
5		6 6 7	16	S-2		3.0	Very stiff light brown LEAN CLAY (CL); contains silt sand and stone fragments; damp to moist.							
6.0	676.0													
		3 6 6	18	S-3		1.75	Stiff light brown LEAN CLAY (CL); moist.							
10		4 6 6	18	S-4		1.5								
11.0	671.0													
		4 6 6	14	S-5		0.5	Soft to medium stiff brown FAT CLAY (CH); contains large stone fragments; moist.							
13.5	668.5													
15		3 3 3	18	S-6		1.75	Stiff to medium stiff red FAT CLAY (CH); moist.							
		WOH 4 3	18	S-7		0.75								
18.5	663.5													
20		WOH 2 3	16	S-8		0.75	Stiff to medium stiff red FAT CLAY (CH); contains chert fragments; moist.							
		3 3 3	18	S-9		1.75								
25.0 25	657.0	2 3 3	18	S-10		1.25	Bottom of Boring - 25.0'							



DLZ Ohio, Inc. * 6121 Huntley Road, Columbus, Ohio 43229 * (614) 888-0040

Client: Barton Malow	Project: Ford H4 Battery Plant	Job No. 2150-9519.50
LOG OF: Boring B-156	Location: As per plan	Date Drilled: 11/15/2002

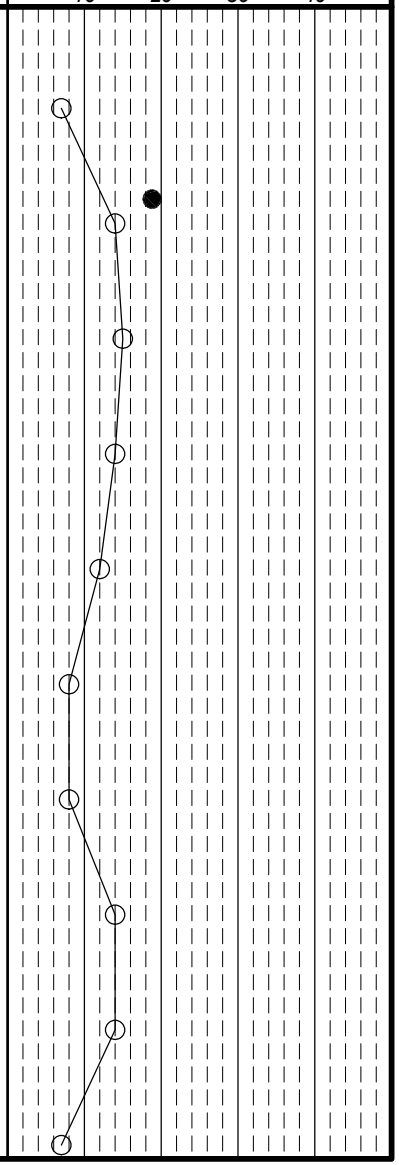
WATER OBSERVATIONS:
Water seepage at: None
Water level at completion: None (inside augers)

DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Rig (#) / ER: CME 750X (289498) / 81.0% — Driller: VD — Logger: JC

Natural Moisture Content, % - ●
PL — LL
N_{60} Value ○ / Non-Plastic - NP
10 20 30 40

Depth (ft)	Elev. (ft) 714.9	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0.4	714.5						Topsoil - 5", Plow Depth - 8"							
		1 2 3	6	S-1		2.5	Very stiff to hard brown to light brown LEAN CLAY (CL); contains black oxide staining; damp to moist.							
5		5 4 6	16	S-2		4.5+								
6.0	708.9													
		2 5 6	13	S-3		2.75	Very stiff light brown and light gray FAT CLAY (CH); moist.							
8.5	706.4													
10		5 4 6	18	S-4		3.0	Very stiff red FAT CLAY (CH); contains chert fragments; moist.							
11.0	703.9													
		3 4 5	10	S-5		3.0	Very stiff red FAT CLAY (CH); moist.							
15		3 3 3	18	S-6		2.25								
		2 3 3	10	S-7		2.5								
20		2 3 7	18	S-8		3.5								
		2 3 7	18	S-9		3.0	@ 21.0'-23.5', contains chert fragments							
25.0 25	689.9	2 2 3	12	S-10		1.5	@ 23.5', stiff Bottom of Boring - 25.0'							



DLZ Ohio, Inc. * 6121 Huntley Road, Columbus, Ohio 43229 * (614) 888-0040

Client: Barton Malow | *Project:* Ford H4 Battery Plant | *Job No.* 2150-9519.50

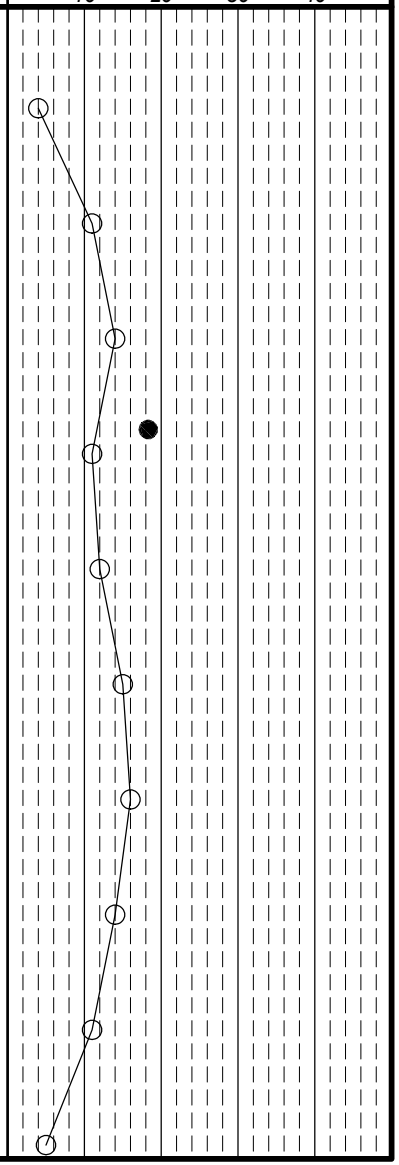
LOG OF: Boring B-157 | *Location:* As per plan | *Date Drilled:* 11/15/2002

WATER OBSERVATIONS:
Water seepage at: None
Water level at completion: None (inside augers)

DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Rig (#) / ER: CME 750X (289498) / 81.0% | *Driller:* VD | *Logger:* JC

Depth (ft)	Elev. (ft) 716.7	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0.5	716.2						Topsoil - 6", Plow Depth - 9"							
		WOH 1 2	4	S-1		0.5	Soft to medium stiff gray and red FAT CLAY (CH); moist.							
3.5	713.2													
5		1 2 6	14	S-2		3.0	Very stiff to stiff light brown graded to light gray FAT CLAY (CH); moist.							
		3 5 5	18	S-3		2.0	@ 6.0', gray							
10		3 3 5	18	S-4		2.5	@ 8.5', gray and light brown mottled							
		3 4 5	18	S-5		3.0								
13.5	703.2													
15		4 4 7	18	S-6		2.5	Very stiff red FAT CLAY (CH); moist.							
		3 7 5	15	S-7		2.75	@ 16.0', light brown							
20		3 5 5	18	S-8		2.5								
		3 4 4	16	S-9		2.5								
23.5	693.2													
25.0 25	691.7	2 2 2	18	S-10		1.5	Stiff light brown FAT CLAY (CH); moist. Bottom of Boring - 25.0'							



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Client: Barton Malow | *Project:* Ford H4 Battery Plant | *Job No.* 2150-9519.50

LOG OF: Boring B-158 | *Location:* As per plan | *Date Drilled:* 11/16/2021

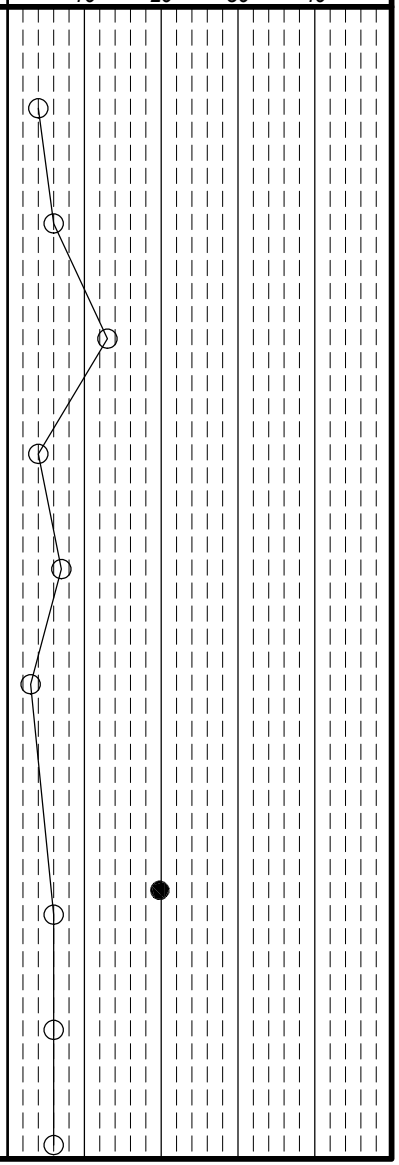
WATER OBSERVATIONS:
Water seepage at: 8.5'
Water level at completion: 13.1' (with augers removed)

DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Rig (#) / ER: CME-850X (400472) / 84.0% | *Driller:* LB | *Logger:* AM

Natural Moisture Content, % - ●
PL ├──┤ *LL*
N_{60} Value ○ / *Non-Plastic -* NP

Depth (ft)	Elev. (ft) 724.0	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0.7	723.3						Topsoil - 8'							
		2 1 2	16	S-1		1.0	Stiff to medium stiff light gray with light brown mottling FAT CLAY (CH); moist to wet.							
5		WOH 1 3	11	S-2		1.25								
		3 4 5	17	S-3		2.25	@ 6.0', very stiff, damp to moist.							
8.5	715.5													
10		2 1 2	12	S-4		< 0.25	Very soft to soft gray sandy FAT CLAY (CH); wet.							
		3 2 3	15	S-5		0.25								
13.5	710.5													
15		1 1 1	4	S-6		0.25	Soft to very soft FAT CLAY (CH); contains organics; moist to wet.							
			24		ST-1									
18.5	705.5													
20		2 2 2	18	S-8		0.75	Soft light brown FAT CLAY (CH); contains fines; moist.							
21.0	703.0													
		2 2 2	18	S-9		0.25	Very soft to soft FAT CLAY (CH); moist.							
23.5	700.5													
25.0 25	699.0	1 2 2		S-10		0.5	Soft to medium stiff brown FAT CLAY (CH); contains fine sand; moist to wet.							



Client: Barton Malow	Project: Ford H4 Battery Plant	Job No. 2150-9519.50
LOG OF: Boring B-158	Location: As per plan	Date Drilled: 11/16/2021

WATER OBSERVATIONS:
Water seepage at: 8.5'
Water level at completion: 13.1' (with augers removed)

DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Rig (#) / ER: CME-850X (400472) / 84.0%
Driller: LB
Logger: AM

Natural Moisture Content, % - ●
PL ⊢——⊣ LL
N_{60} Value ○ / Non-Plastic - NP

Depth (ft)	Elev. (ft) 699.0	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	N60 Value (10, 20, 30, 40)
							Bottom of Boring - 25.0'								
30															
35															
40															
45															
50															

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Client: Barton Malow | *Project:* Ford H4 Battery Plant | *Job No.* 2150-9519.50

LOG OF: Boring B-159 | *Location:* As per plan | *Date Drilled:* 12/1/2021

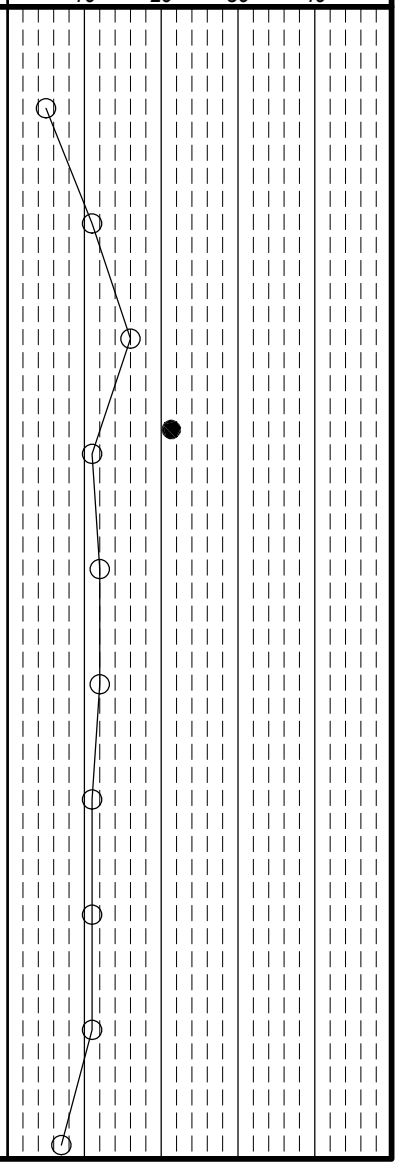
WATER OBSERVATIONS:
Water seepage at: None
Water level at completion: None (inside augers)

DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Rig (#) / ER: CME 750X (289498) / 81.0% | *Driller:* KC | *Logger:* JC

Natural Moisture Content, % - ●
PL ├──┤ LL
N_{60} Value ○ / Non-Plastic - NP
10 20 30 40

Depth (ft)	Elev. (ft) 721.2	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0.1	721.1						Topsoil - NO READING							
		2 2 2	12	S-1		1.5	Stiff brown LEAN CLAY (CL); moist.							
3.5	717.7													
5		3 4 4	18	S-2		2.5	Very stiff to hard red and light brown mottled FAT CLAY (CH); moist.							
		4 5 7	14	S-3		4.0								
10		3 3 5	18	S-4		2.5								
		3 4 5	12	S-5		2.0	@ 11.0'-13.5', stiff to very stiff contains chert fragments							
13.5	707.7													
15		3 4 5	18	S-6		2.5	Very stiff to stiff red FAT CLAY (CH) contains black oxide staining; moist.							
		2 3 5	13	S-7		2.25								
20		2 3 5	13	S-8		2.5								
		2 4 4	14	S-9		1.75								
25.0 25	696.2	2 2 3	18	S-10		2.0	Bottom of Boring - 25.0'							



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Client: Barton Malow | *Project:* Ford H4 Battery Plant | *Job No.* 2150-9519.50

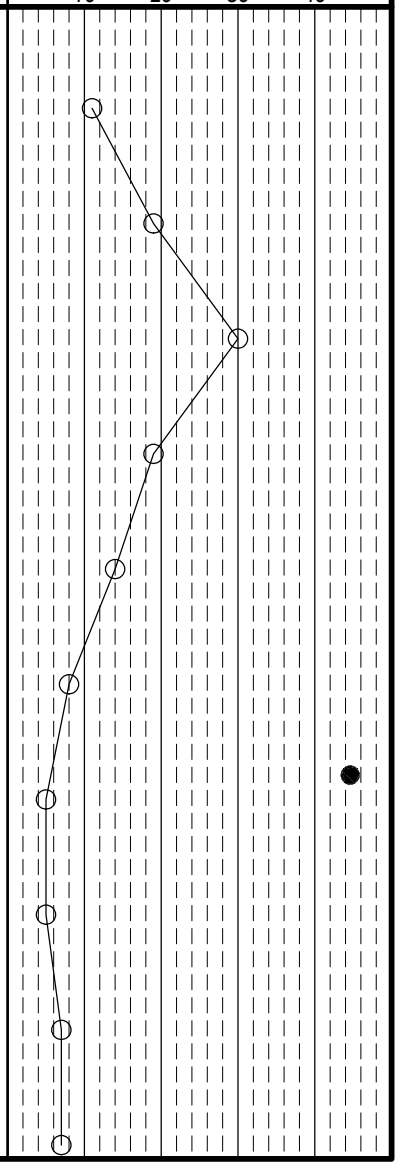
LOG OF: Boring B-160 | *Location:* As per plan | *Date Drilled:* 12/1/2021

WATER OBSERVATIONS:
Water seepage at: None
Water level at completion: None (inside augers)

DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Rig (#) / ER: CME 750X (289498) / 81.0% | *Driller:* T | *Logger:* JC

Depth (ft)	Elev. (ft) 714.9	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0.3	714.6						Topsoil - 4", Plow Depth - 7"							
		3 3 5	15	S-1		1.5	Stiff light brown LEAN CLAY (CL); moist.							
3.5	711.4													
5		4 6 8	15	S-2		4.0	Hard to very stiff red and light gray mottled FAT CLAY (CH); moist.							
6.0	708.9													
		5 11 11	16	S-3		4.0	Hard to very stiff red FAT CLAY (CH); contains chert fragments; moist.							
10		4 7 7	12	S-4		4.0								
		3 5 5	11	S-5		4.5+								
15		2 2 4	14	S-6		1.75	@ 13.5', stiff to very stiff							
		1 2 2	18	S-7		2.0								
20		2 2 2	12	S-8		1.5								
		1 2 3	18	S-9		1.5								
23.5	691.4													
25.0 25	689.9	2 3 2	18	S-10		1.75	Stiff light brown FAT CLAY (CH); moist. Bottom of Boring - 25.0'							



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Client: Barton Malow | *Project:* Ford H4 Battery Plant | *Job No.* 2150-9519.50

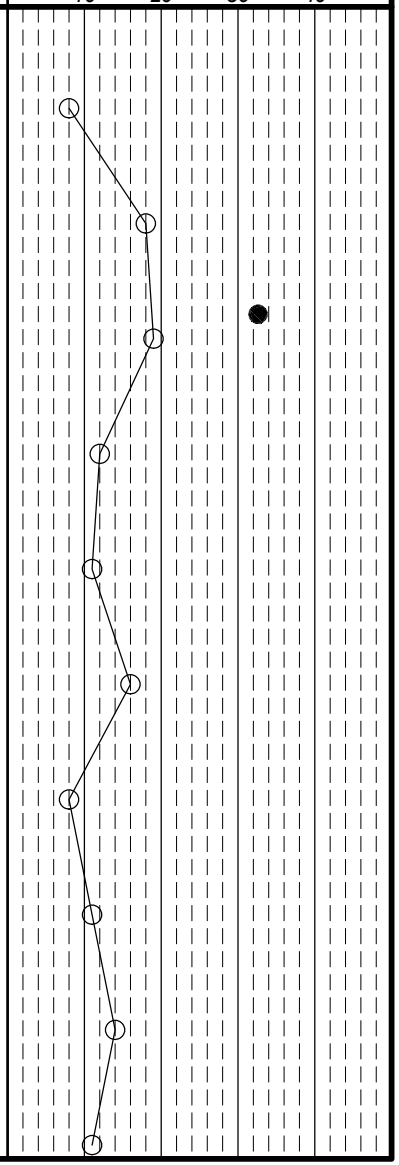
LOG OF: Boring B-161 | *Location:* As per plan | *Date Drilled:* 11/22/2021

WATER OBSERVATIONS:
Water seepage at: None
Water level at completion: None (inside augers)

DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Rig (#) / ER: CME 750X (289498) / 81.0% | *Driller:* VD | *Logger:* JC

Depth (ft)	Elev. (ft) 729.0	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0.6	728.4						Topsoil - 7", Plow Depth - 10"							
		3 3 3	15	S-1		2.0	Stiff to very stiff brown SILTY CLAY (CL-ML); damp.							
3.5	725.5													
5		3 6 7	18	S-2		4.5+	Hard red and light brown mottled LEAN CLAY (CL); damp to moist.							
		3 5 9	12	S-3		4.5+								
8.5	720.5													
10		4 4 5	18	S-4		3.5	Very stiff red and light gray mottled FAT CLAY (CH); moist.							
11.0	718.0													
		3 3 5	18	S-5		3.0	Stiff to very stiff red FAT CLAY (CH); contains chert fragments; damp to moist.							
15		2 3 9	16	S-6		2.0								
		3 4 2		S-7		4.0								
20		4 2 6	14	S-8		3.5								
		3 3 7	12	S-9		2.5								
23.5	705.5													
25.0 25	704.0	3 3 5	15	S-10		1.5	Stiff red FAT CLAY (CH); moist. Bottom of Boring - 25.0'							



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Client: Barton Malow | *Project:* Ford H4 Battery Plant | *Job No.* 2150-9519.50

LOG OF: Boring B-162 | *Location:* As per plan | *Date Drilled:* 11/8/2021

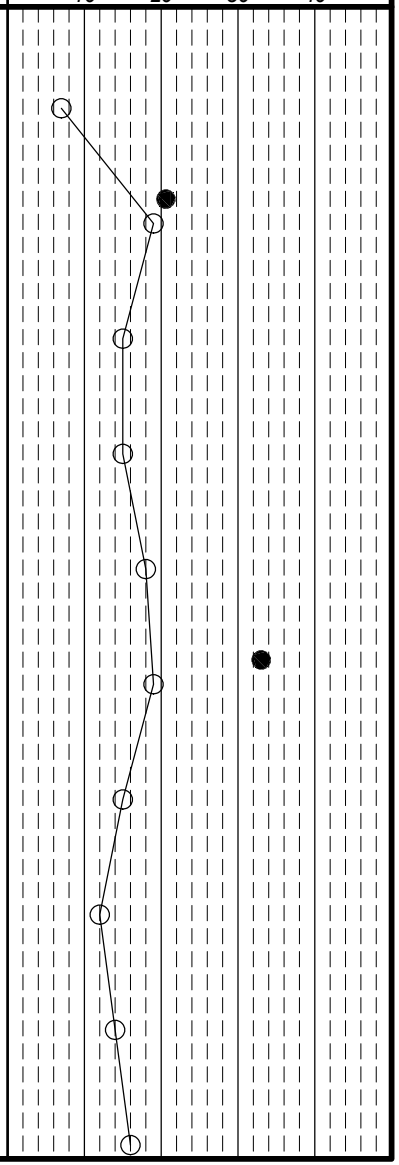
WATER OBSERVATIONS:
Water seepage at: None
Water level at completion: None (inside augers)

DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Rig (#) / ER: CME 750X (289498) / 81.0% | *Driller:* T | *Logger:* JC

Natural Moisture Content, % - ●
PL ├──┤ LL
N_{60} Value ○ / Non-Plastic - NP
10 20 30 40

Depth (ft)	Elev. (ft) 727.5	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0.6	726.9						Topsoil - 5"-7"							
		2 2 3	10	S-1		0.5	Soft to medium stiff red FAT CLAY (CH); wet.							
3.5	724.0													
5		4 6 8	12	S-2		4.5+	Hard red LEAN CLAY (CL); contains fine sand; moist to damp.							
6.0	721.5													
		3 6 5	18	S-3		4.5+	Hard red and light brown FAT CLAY (CH); damp.							
10		3 4 7	18	S-4		4.0	@ 8.5', red							
		3 6 7	18	S-5		4.0								
15		4 6 8	18	S-6		4.0								
		3 5 6	18	S-7		4.0								
20		3 3 6	18	S-8		3.0	@ 18.5', very stiff							
		3 4 6	16	S-9		3.0								
25.0 25	702.5	4 5 7	18	S-10		1.5	@ 23.5', stiff; contains chert fragment Bottom of Boring - 25.0'							



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Client: Barton Malow | *Project:* Ford H4 Battery Plant | *Job No.* 2150-9519.50

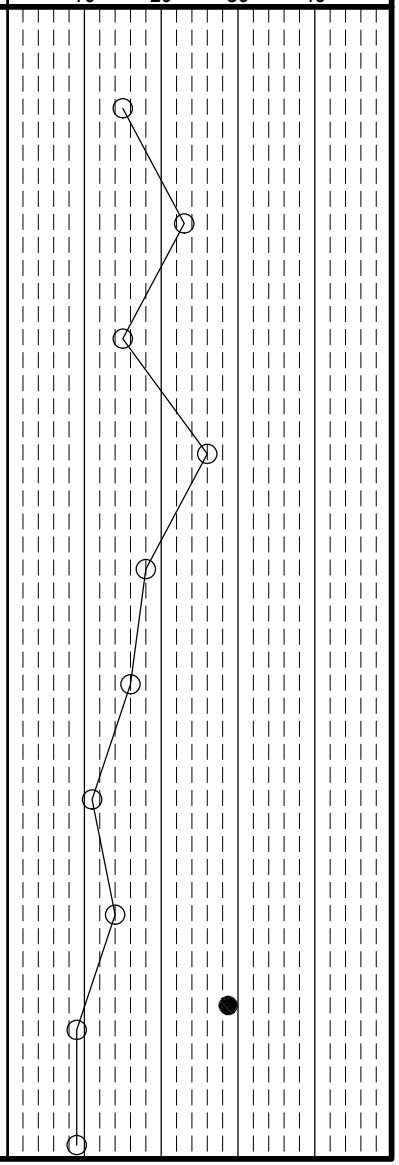
LOG OF: Boring B-163 | *Location:* As per plan | *Date Drilled:* 11/8/2021

WATER OBSERVATIONS:
Water seepage at: None
Water level at completion: None (inside augers)

DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Rig (#) / ER: CME 750X (289498) / 81.0% | *Driller:* T | *Logger:* JC

Depth (ft)	Elev. (ft) 729.4	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0.5	728.9						Topsoil - 6", Plow Depth - 7"							
		3 5 6	9	S-1		4.0	Hard brown LEAN CLAY (CL); contains roots and fine sand; damp.							
3.5	725.9													
5		3 8 9	18	S-2		4.5+	Hard red and light gray FAT CLAY (CH); damp.							
6.0	723.4													
		3 5 6	18	S-3		4.5+	Hard to very stiff red FAT CLAY (CH); contains gravel and sand size chert fragments; damp to moist.							
10		6 8 11	18	S-4		3.5								
		3 7 6	12	S-5		3.0								
15		3 5 7	18	S-6		4.5+								
		3 4 4	18	S-7		1.5	@ 16.0', stiff							
20		2 6 4	6	S-8		1.5								
21.0	708.4													
		2 4 3	18	S-9		2.0	Stiff to very stiff light brown FAT CLAY (CH); contains black oxide stain; moist.							
23.5	705.9													
25.0 25	704.4	2 3 4	18	S-10		1.5	Stiff red FAT CLAY (CH); moist to wet. Bottom of Boring - 25.0'							



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Client: Barton Malow | *Project:* Ford H4 Battery Plant | *Job No.* 2150-9519.50

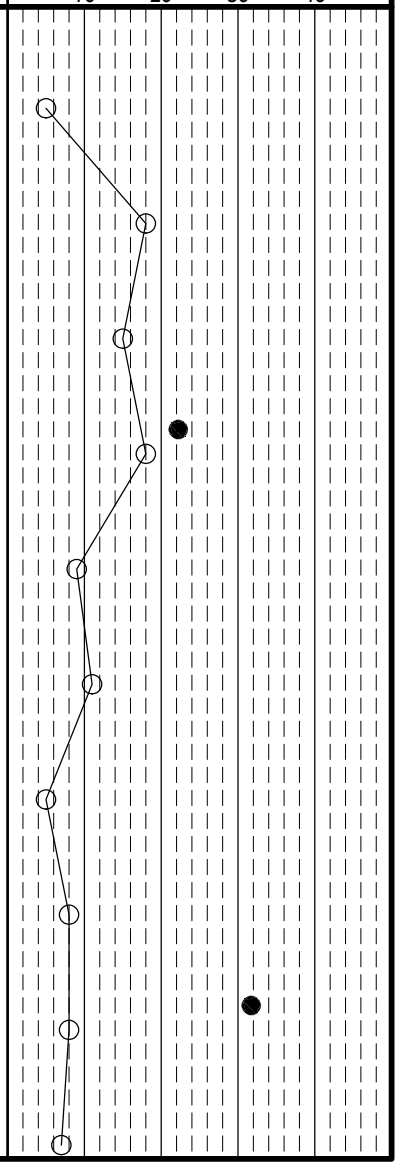
LOG OF: Boring B-166 | *Location:* As per plan | *Date Drilled:* 11/8/2021

WATER OBSERVATIONS:
Water seepage at: None
Water level at completion: None (inside augers)

DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Rig (#) / ER: CME 750X (289498) / 81.0% | *Driller:* T | *Logger:* JC

Depth (ft)	Elev. (ft) 714.6	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0.6	714.0						Topsoil - 7", Plow Depth - 11"							
3.5	711.1	1 2 2	7	S-1		1.25	Stiff gray sandy LEAN CLAY (CL); contains roots and organic material; damp.							
6.0	708.6	4 7 6	18	S-2		3.75	Very stiff light brown with light gray mottling LEAN CLAY (CL); contains black oxide staining; damp.							
8.5	706.1	4 5 6	18	S-3		3.75	Very stiff light gray FAT CLAY (CH); moist.							
11.0	703.6	4 7 6	18	S-4		2.75	Very stiff light brown and light gray mottled FAT CLAY (CH); contains silty sand seam; moist.							
		3 3 4	18	S-5		2.0	Very stiff to stiff red with light brown mottled FAT CLAY (CH); moist.							
16.0	698.6	2 4 4	18	S-6		1.75	@ 13.5', light brown							
		3 2 2	18	S-7		0.75	Medium stiff light brown FAT CLAY (CH); moist to wet.							
		2 2 4	18	S-8		0.75	@ 18.5', red							
		4 3 3	7	S-9		0.25	@ 21.0'-23.5', very soft to soft; contains gravel size chert fragments							
25.0	689.6	1 2 3	18	S-10		1.0	@ 23.5', medium stiff to stiff Bottom of Boring - 25.0'							



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Client: Barton Malow	Project: Ford H4 Battery Plant	Job No. 2150-9519.50
LOG OF: Boring B-167	Location: As per plan	Date Drilled: 11/7/2021

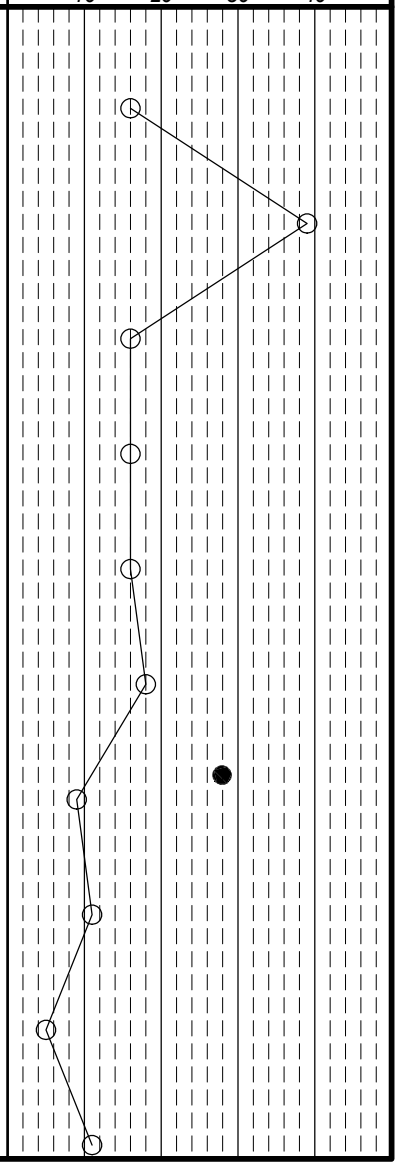
WATER OBSERVATIONS:
Water seepage at: None
Water level at completion: None (inside augers)

DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Rig (#) / ER: CME 750X (289498) / 81.0% — Driller: T — Logger: JC

Natural Moisture Content, % - ●
PL — LL
N_{60} Value ○ / Non-Plastic - NP
10 20 30 40

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
	726.5						Hard brown LEAN CLAY (CL); damp.							
		4 5 7	8	S-1		4.5+								
3.5	723.0													
5		6 13 16	18	S-2		4.0	Hard red with brown mottled LEAN CLAY (CL); contains decomposing stone fragments; damp.							
		4 5 7	7	S-3		4.0								
8.5	718.0													
10		2 5 7	18	S-4		3.0	Very stiff red FAT CLAY (CH); moist to damp.							
		3 5 7	14	S-5		2.5								
15		4 6 7	18	S-6		2.5								
		1 3 4	15	S-7		2.5								
20		3 4 4	18	S-8		1.5	@ 18.5', medium stiff to very stiff							
		3 2 2	18	S-9		2.0								
25.0	701.5	3 4 4	18	S-10		2.0	Bottom of Boring - 25.0'							



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Client: Barton Malow	*Project:* Ford H4 Battery Plant	*Job No.* 2150-9519.50
LOG OF: Boring B-168	*Location:* As per plan	*Date Drilled:* 11/8/2021

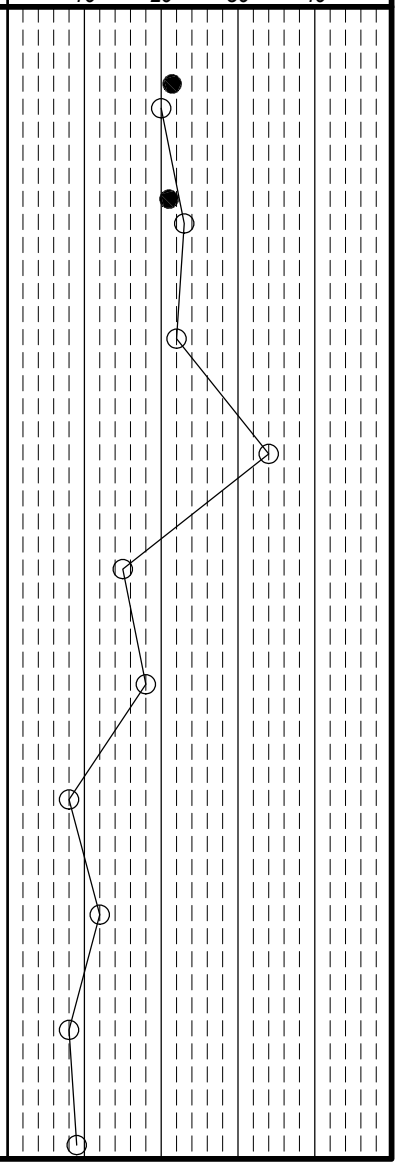
WATER OBSERVATIONS:
Water seepage at: None
Water level at completion: None (inside augers)

DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Depth (ft)	Elev. (ft) 727.3	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0.5	726.8						Topsoil - 6", Plow Depth - 7"							
		3 7 8	18	S-1		2.0	Stiff to very stiff brown SILTY CLAY (CL-ML); damp.							
3.5	723.8													
5		4 9 8	18	S-2		4.0	Hard red FAT CLAY (CL); damp to moist.							
6.0	721.3													
		5 7 9	18	S-3		4.5+	Hard to very stiff red FAT CLAY (CH); contains gravel and coarse sand size chert fragments; damp to moist.							
10		4 12 13	12	S-4		4.5+								
		3 5 6	18	S-5		3.0								
							@ 12.5'-13.5', light drill rig chatter							
15		3 5 8	18	S-6		2.5								
		2 3 3	6	S-7		4.5+								
18.5	708.8						@ 17.5'-18.5', moderate drill rig chatter							
20		2 3 6	18	S-8		3.5	Very stiff to stiff red FAT CLAY (CH); contains fine sand; moist.							
		3 3 3	18	S-9		2.0	@ 21.0', contains black oxide staining							
23.5	703.8													
25.0 25	702.3	2 3 4	18	S-10		2.5	Very stiff light brown FAT CLAY (CH); contains chert fragments; moist.							

Rig (#) / ER	Driller	Logger
CME 750X (289498) / 81.0%	T	JC

Natural Moisture Content, % - ●
PL ├──┤ LL
N_{60} Value ○ / Non-Plastic - NP



Client: Barton Malow	*Project:* Ford H4 Battery Plant	*Job No.* 2150-9519.50
LOG OF: Boring B-168	*Location:* As per plan	*Date Drilled:* 11/8/2021

WATER OBSERVATIONS:
Water seepage at: None
Water level at completion: None (inside augers)

DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Rig (#) / ER: CME 750X (289498) / 81.0%
Driller: T
Logger: JC

Depth (ft)	Elev. (ft) 702.3	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	Natural Moisture Content, % - ● PL ○ LL / Non-Plastic - NP; N_{60} Value 10 20 30 40
							Bottom of Boring - 25.0'								
30															
35															
40															
45															
50															

Client: Barton Malow	Project: Ford H4 Battery Plant	Job No. 2150-9519.50
LOG OF: Boring B-168	Location: As per plan	Date Drilled: 11/8/2021

WATER OBSERVATIONS:
Water seepage at: None
Water level at completion: None (inside augers)

DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Rig (#) / ER: CME 750X (289498) / 81.0%
Driller: T
Logger: JC

Natural Moisture Content, % - ●
PL ⊢——⊣ LL
N_{60} Value ○ / Non-Plastic - NP
10 20 30 40

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
	677.3													
55														
60														
65														
70														
74.0	653.3													
75							Topsoil - 6", Plow Depth - 7"							

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Client: Barton Malow | *Project:* Ford H4 Battery Plant | *Job No.* 2150-9519.50

LOG OF: Boring B-171 | *Location:* As per plan | *Date Drilled:* 11/6/2021 to 11/7/2021

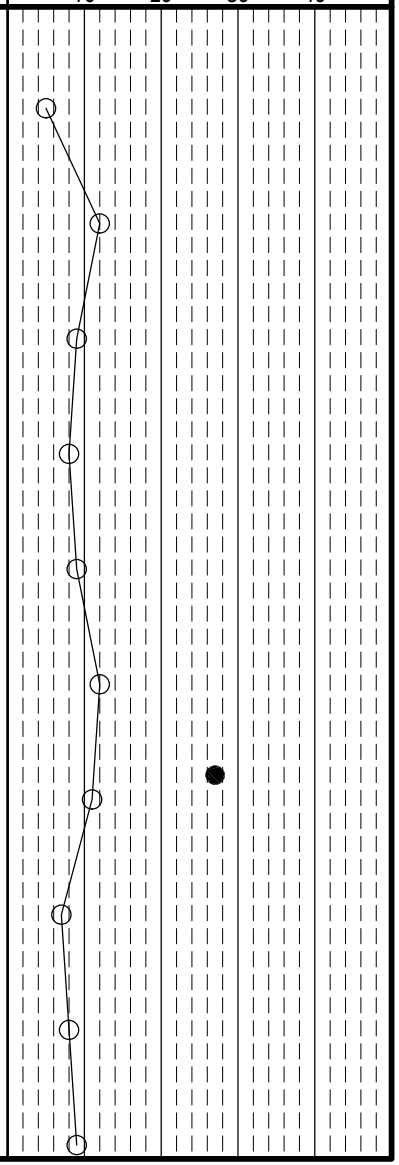
WATER OBSERVATIONS:
Water seepage at: 23.5'
Water level at completion: 5.0' (inside augers)

DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Rig (#) / ER: CME 750X (289498) / 81.0% | *Driller:* T | *Logger:* JC

Natural Moisture Content, % - ●
PL ├──┤ LL
N_{60} Value ○ / Non-Plastic - NP
10 20 30 40

Depth (ft)	Elev. (ft) 711.9	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0.7	711.2						Topsoil - 8", Plow Depth - 12"							
		1 1 3	7	S-1		2.0	Stiff to very stiff gray brown and red, LEAN CLAY (CL); moist.							
3.5	708.4													
5		3 4 5	16	S-2		4.5+	Hard light brown LEAN CLAY (CL); moist to damp.							
6.0	705.9													
		2 3 4	10	S-3		2.0	Stiff to very stiff light gray FAT CLAY (CH); moist.							
10		3 3 3	14	S-4		1.5	@ 8.5', moist to wet							
		2 3 4	10	S-5		1.5								
15		3 4 5	18	S-6		4.0	@ 13.5'-16.0', moist to damp							
		2 4 4	13	S-7		1.0	@ 16.0', medium stiff to stiff							
18.5	693.4													
20		2 2 3	18	S-8		2.0	Stiff to very stiff light brown FAT CLAY (CH); moist.							
		2 3 3	9	S-9		1.5								
25.0 25	686.9	2 3 4		S-10		2.0	@ 23.5', red and light brown Bottom of Boring - 25.0'							



DLZ Ohio, Inc. * 6121 Huntley Road, Columbus, Ohio 43229 * (614) 888-0040

Client: Barton Malow | *Project:* Ford H4 Battery Plant | *Job No.* 2150-9519.50

LOG OF: Boring B-172 | *Location:* As per plan | *Date Drilled:* 11/2/2021

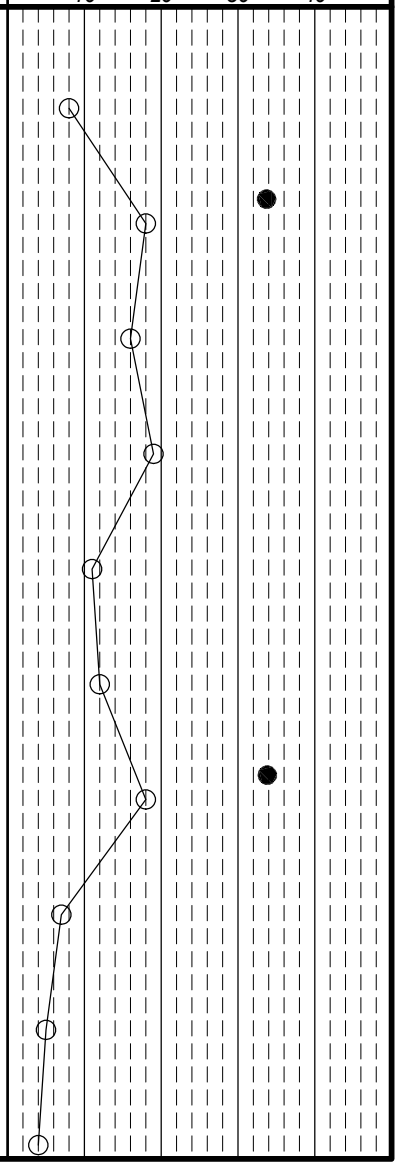
WATER OBSERVATIONS:
Water seepage at: 23.5'
Water level at completion: 24.5' or 0.5' (inside augers) ???

DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Rig (#) / ER: CME 750X (289498) / 81.0% | *Driller:* T | *Logger:* JC

Natural Moisture Content, % - ●
PL ├──┤ LL
N_{60} Value ○ / Non-Plastic - NP
10 20 30 40

Depth (ft)	Elev. (ft) 703.1	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0.8	702.3						Topsoil - 9", Plow Depth - 10"							
		1 2 4	10	S-1		2.0	Stiff to very stiff light gray LEAN CLAY (CL); moist.							
3.5	699.6													
5		3 7 6	12	S-2		3.5	Very stiff to hard red and light brown mottled LEAN CLAY (CL); moist.							
		1 5 7	18	S-3		4.5+								
8.5	694.6													
10		3 6 8	9	S-4		3.5	Very stiff light brown and light gray mottled FAT CLAY (CH); damp to moist.							
		3 3 5	18	S-5		3.0								
13.5	689.6													
15		2 2 7	18	S-6		3.0	Very stiff light brown and red mottled FAT CLAY (CH); moist.							
		3 8 5	11	S-7		2.5	@ 16.0'-18.5', contains large chert fragments							
18.5	684.6													
20		2 2 3	18	S-8		2.0	Very stiff to stiff red FAT CLAY (CH); moist.							
							@ 20.0', splitspoon sampler bent							
		2 2 2	18	S-9		2.5								
25.0 25	678.1	1 1 2		S-10		1.0	@ 23.5', medium stiff to stiff; moist to wet Bottom of Boring - 25.0'							



DLZ Ohio, Inc. * 6121 Huntley Road, Columbus, Ohio 43229 * (614) 888-0040

Client: Barton Malow	Project: Ford H4 Battery Plant	Job No. 2150-9519.50
LOG OF: Boring B-172	Location: As per plan	Date Drilled: 11/2/2021

WATER OBSERVATIONS:
Water seepage at: 23.5'
Water level at completion: 24.5' or 0.5' (inside augers) ???

DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Depth (ft)	Elev. (ft) 678.1	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetro-meter (tsf)	DESCRIPTION	Graphic Log	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	Rig (#) / ER	Driller	Logger
															CME 750X (289498) / 81.0%	T	JC

Natural Moisture Content, % - ●
PL ├──┤ LL
N_{60} Value ○ / Non-Plastic - NP
10 20 30 40

30
35
40
45
50

DLZ Ohio, Inc. * 6121 Huntley Road, Columbus, Ohio 43229 * (614) 888-0040

Client: Barton Malow	Project: Ford H4 Battery Plant	Job No. 2150-9519.50
LOG OF: Boring B-172	Location: As per plan	Date Drilled: 11/2/2021

WATER OBSERVATIONS:
Water seepage at: 23.5'
Water level at completion: 24.5' or 0.5' (inside augers) ???

DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Depth (ft)	Elev. (ft) 653.1	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetro-meter (tsf)	DESCRIPTION	Graphic Log	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	Rig (#) / ER	Driller	Logger
															CME 750X (289498) / 81.0%	T	JC

Natural Moisture Content, % - ●
PL ├──┤ LL
N_{60} Value ○ / Non-Plastic - NP
10 20 30 40

55
60
65
70
75

Client: Barton Malow	Project: Ford H4 Battery Plant	Job No. 2150-9519.50
LOG OF: Boring B-172	Location: As per plan	Date Drilled: 11/2/2021

WATER OBSERVATIONS:
Water seepage at: 23.5'
Water level at completion: 24.5' or 0.5' (inside augers) ???

DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Depth (ft)	Elev. (ft) 628.1	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetro-meter (tsf)	DESCRIPTION	Graphic Log	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	Rig (#) / ER	Driller	Logger
															CME 750X (289498) / 81.0%	T	JC
							Topsoil - 9", Plow Depth - 10"										
80																	
85																	
90																	
95																	
100																	

Natural Moisture Content, % - ●
PL ├──┤ LL
N_{60} Value ○ / Non-Plastic - NP
10 20 30 40

DLZ Ohio, Inc. * 6121 Huntley Road, Columbus, Ohio 43229 * (614) 888-0040

Client: Barton Malow | *Project:* Ford H4 Battery Plant | *Job No.* 2150-9519.50

LOG OF: Boring B-173 | *Location:* As per plan | *Date Drilled:* 11/2/2021

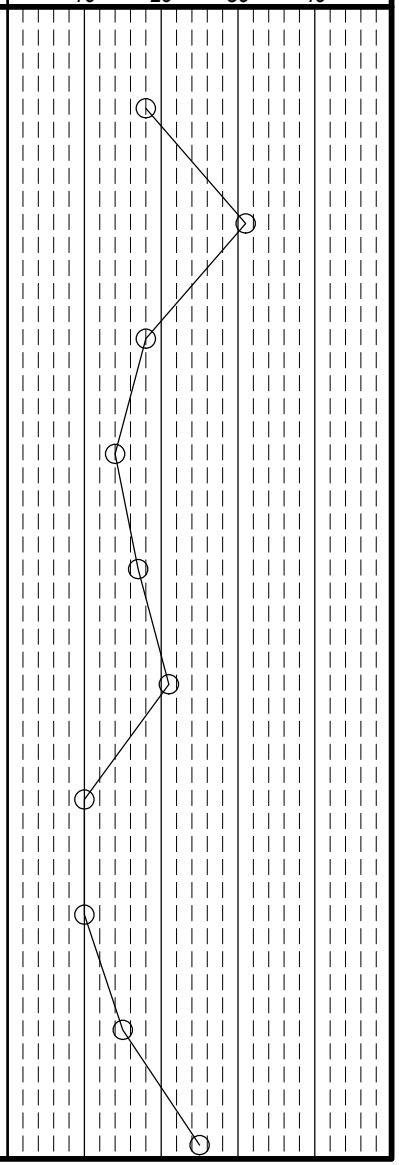
WATER OBSERVATIONS:
Water seepage at: None
Water level at completion: None (inside augers)

DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Rig (#) / ER: CME-850X (400472) / 84.0% | *Driller:* LB | *Logger:* AM

Natural Moisture Content, % - ●
PL ├──┤ LL
N_{60} Value ○ / Non-Plastic - NP
10 20 30 40

Depth (ft)	Elev. (ft) 700.5	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0.6	699.9						Topsoil - 7", Plow Depth - 11"							
		3 5 8	17	S-1		3.5	Very stiff light brown sandy LEAN CLAY (CL); damp.							
5		8 9 13	17	S-2		3.0								
6.0	694.5													
		5 5 8	18	S-3		2.75	Very stiff red and light brown mottled FAT CLAY (CH); damp.							
10		3 5 5	18	S-4		2.75	@ 8.5'-11.0'; contains chert fragments.							
11.0	689.5													
		3 5 7	18	S-5		2.5	Very stiff red FAT CLAY (CH); damp to moist.							
15		5 6 9		S-6		3.0								
16.0	684.5						@ 15.0'-16.0', slight difficulty advancing augers (drill rig bogging down)							
		3 3 4	18	S-7		2.5	Stiff to very stiff red FAT CLAY (CH); contains chert fragments; moist.							
20		2 3 4	16	S-8		1.25								
22.3	678.2	2 2 9		S-9A S-9B		1.25								
							Decomposed LIMESTONE.							
25.0 25	675.5	23 10 8		S-10			Bottom of Boring - 25.0'							



DLZ Ohio, Inc. * 6121 Huntley Road, Columbus, Ohio 43229 * (614) 888-0040

Client: Barton Malow | *Project:* Ford H4 Battery Plant | *Job No.* 2150-9519.50

LOG OF: Boring B-175 | *Location:* As per plan | *Date Drilled:* 10/28/2021

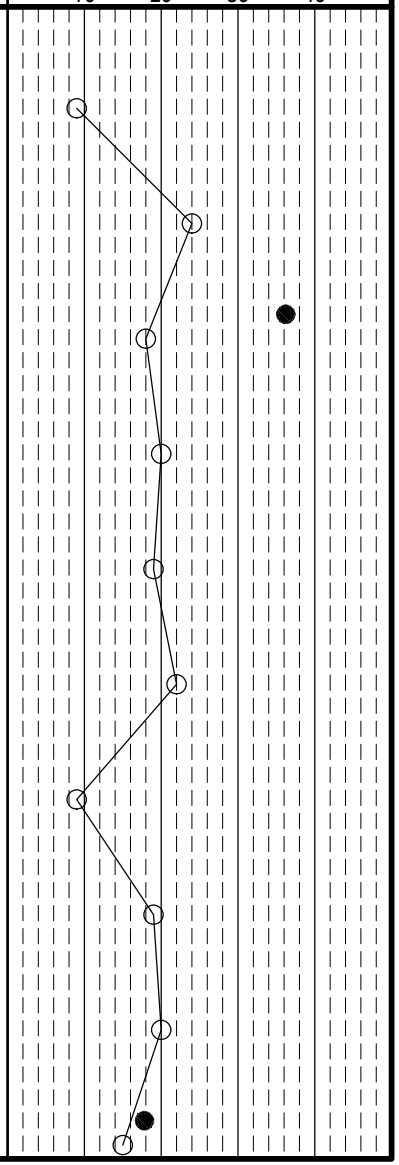
WATER OBSERVATIONS:
Water seepage at: None
Water level at completion: None (Inside augers)

DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Rig (#) / ER: CME 750X (289498) / 81.0% | *Driller:* T | *Logger:* JC

Natural Moisture Content, % - ●
PL ├──┤ LL
N_{60} Value ○ / Non-Plastic - NP
10 20 30 40

Depth (ft)	Elev. (ft) 705.9	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
		2 3 4	14	S-1		?	Very stiff light brown SILTY CLAY (CL-ML); damp to moist.							
3.5	702.4													
5		5 8 10	11	S-2		4.5+	Hard red and light brown mottled FAT CLAY (CH); damp.							
		3 5 8	13	S-3		4.5+								
10		5 5 10	11	S-4		4.5+								
		3 6 8	18	S-5		4.5+								
15		5 7 9		S-6		4.5+	@ 13.5'-16.0', contains chert fragments							
16.0	689.9													
		2 2 5	18	S-7		2.75	Very stiff red FAT CLAY (CH); contains decomposed chert fragment; moist.							
20		5 7 7	15	S-8		2.5								
		5 7 8	18	S-9		2.5	@ 21.0'-23.5', sample contains severely decomposed chert fragments							
23.5	682.4													
25.0 25	680.9	3 3 8	15	S-10		2.75	Medium dense red clayey SAND (SC); damp to moist. Bottom of Boring - 25.0'							



DLZ Ohio, Inc. * 6121 Huntley Road, Columbus, Ohio 43229 * (614) 888-0040

Client: Barton Malow | *Project:* Ford H4 Battery Plant | *Job No.* 2150-9519.50

LOG OF: Boring B-176 | *Location:* As per plan | *Date Drilled:* 10/29/2021

WATER OBSERVATIONS:
Water seepage at: None
Water level at completion: None (inside augers)

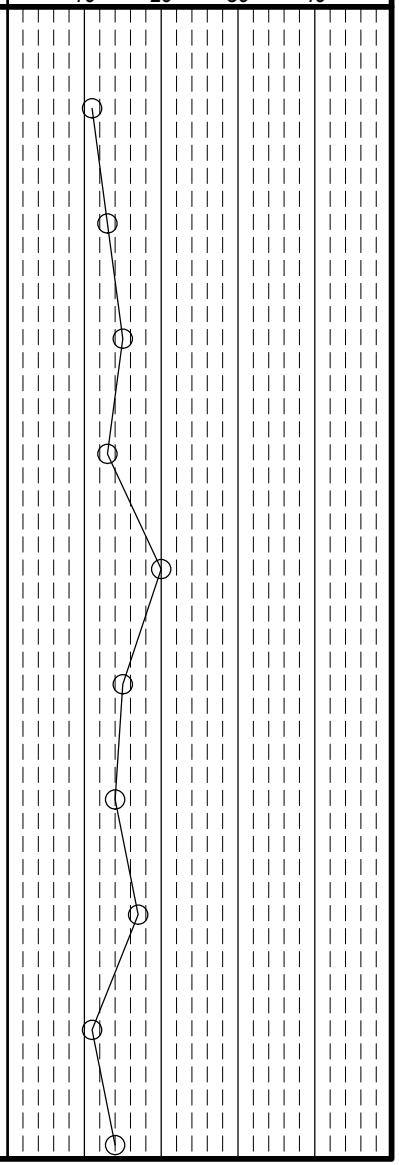
DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Depth (ft)	Elev. (ft) 689.2	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
							Topsoil - 6"-7", Plow Depth - 11"							
		3 4 4	13	S-1		1.5								
5		3 4 5	15	S-2		2.0								
		4 5 6	15	S-3		2.0								
10		4 4 5	18	S-4		2.0								
		5 6 8	18	S-5		1.75								
15		6 6 5	18	S-6		3.5								
		4 5 5	18	S-7		2.5								
20		5 5 7	18	S-8		1.25								
		3 4 4	18	S-9		1.0								
25.0 25	664.2	4 5 5	14	S-10		0.75	Bottom of Boring - 25.0'							

GRADATION

Rig (#) / ER	Driller	Logger
CME-850X (400472) / 84.0%	LB	AM

Natural Moisture Content, % - ●
PL ├──┤ LL
N_{60} Value ○ / Non-Plastic - NP



DLZ Ohio, Inc. * 6121 Huntley Road, Columbus, Ohio 43229 * (614) 888-0040

Client: Barton Malow | *Project:* Ford H4 Battery Plant | *Job No.* 2150-9519.50

LOG OF: Boring B-177 | *Location:* As per plan | *Date Drilled:* 10/28/2021

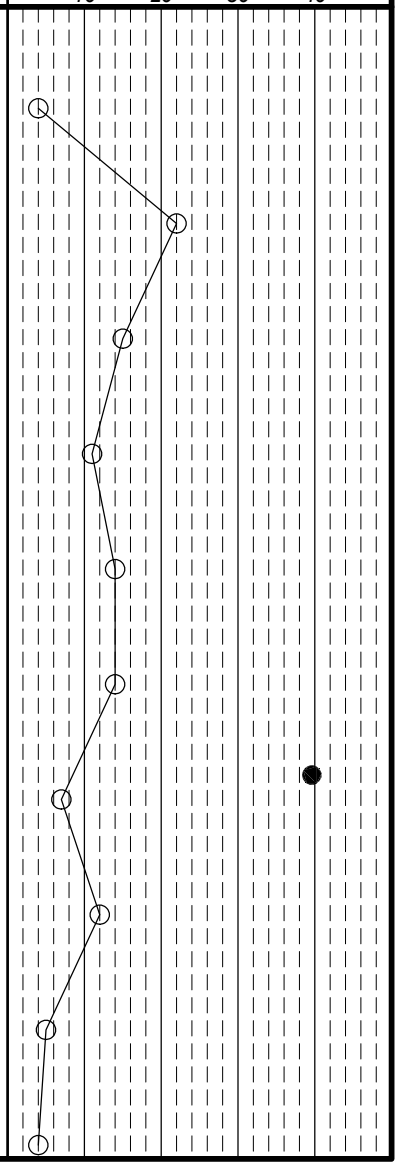
WATER OBSERVATIONS:
Water seepage at: None
Water level at completion: None (inside augers)

DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Rig (#) / ER: CME 750X (289498) / 81.0% | *Driller:* T | *Logger:* JC

Natural Moisture Content, % - ●
PL ├──┤ LL
N_{60} Value ○ / Non-Plastic - NP
10 20 30 40

Depth (ft)	Elev. (ft) 694.8	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0.5	694.3						Topsoil - 6"							
		1 1 2	17	S-1		0.75	Medium stiff light brown LEAN CLAY (CL); moist.							
3.5	691.3													
5		4 8 8	17	S-2		4.5+	Hard to very stiff red FAT CLAY (CH); damp to moist.							
		4 5 6	18	S-3		3.5								
10		4 3 5	16	S-4		2.5								
11.0	683.8													
		5 5 5	8	S-5		2.5	Very stiff red FAT CLAY (CH); contains chert fragments; damp to moist.							
15		3 4 6	18	S-6		3.25								
		2 3 2	16	S-7		3.5								
20		3 5 4	5	S-8		2.25								
21.0	673.8													
		1 2 2	14	S-9		?	Soft to very soft FAT CLAY (CH); contains chert fragments; moist to wet.							
25.0 25	669.8	1 1 2	16	S-10		?	Bottom of Boring - 25.0'							



DLZ Ohio, Inc. * 6121 Huntley Road, Columbus, Ohio 43229 * (614) 888-0040

Client: Barton Malow | *Project:* Ford H4 Battery Plant | *Job No.* 2150-9519.50

LOG OF: Boring B-178 | *Location:* As per plan | *Date Drilled:* 10/29/2021

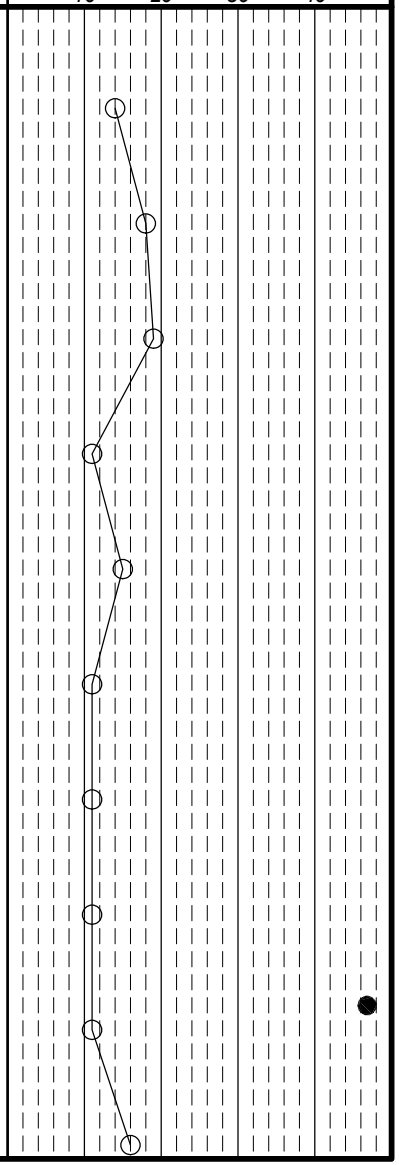
WATER OBSERVATIONS:
Water seepage at: None
Water level at completion: None (inside augers)

DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Rig (#) / ER: CME 750X (289498) / 81.0% | *Driller:* T | *Logger:* JC

Natural Moisture Content, % - ●
PL ├──┤ LL
N_{60} Value ○ / Non-Plastic - NP
10 20 30 40

Depth (ft)	Elev. (ft) 692.9	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0.4	692.5						Topsoil - 5", Plow Depth - 12"							
		4 5 5	18	S-1		2.5	Very stiff reddish light brown FAT CLAY (CH); moist.							
3.5	689.4													
5		5 5 8	18	S-2		3.5	Very stiff red FAT CLAY (CH); damp to moist.							
		4 6 8	18	S-3		3.0								
10		6 4 4	14	S-4		3.0								
		3 5 6	18	S-5		3.25								
13.5	679.4													
15		2 3 5	18	S-6		2.5	Very stiff red FAT CLAY (CH); contains chert fragments; moist.							
		3 3 5	18	S-7		2.25	@ 16.0'-18.5', sample contains large decomposed chert fragments							
18.5	674.4													
20		2 4 4	12	S-8		1.75	Stiff red FAT CLAY (CH); contains chert fragments; moist to wet.							
		1 3 5	18	S-9		1.5								
25.0 25	667.9	2 4 8	18	S-10		1.5	Bottom of Boring - 25.0'							



DLZ Ohio, Inc. * 6121 Huntley Road, Columbus, Ohio 43229 * (614) 888-0040

Client: Barton Malow | *Project:* Ford H4 Battery Plant | *Job No.* 2150-9519.50

LOG OF: Boring B-180 | *Location:* As per plan | *Date Drilled:* 10/27/2021

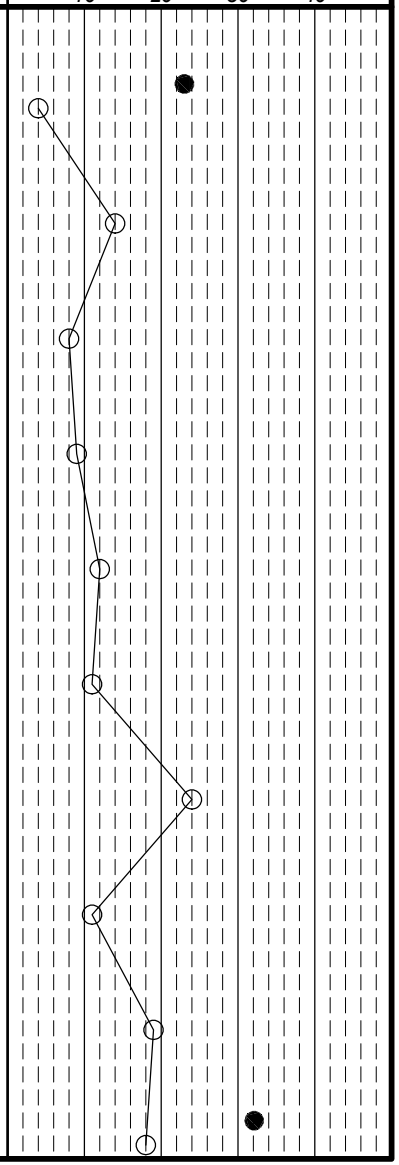
WATER OBSERVATIONS:
Water seepage at: None
Water level at completion: None (inside augers)

DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Rig (#) / ER: CME 750X (289498) / 81.0% | *Driller:* T | *Logger:* JC

Depth (ft)	Elev. (ft) 694.8	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0.7	694.1						Topsoil - 8"							
		WOH WOH 3	18	S-1		0.75	Medium stiff light brown SILTY CLAY (CL-ML); moist.							
3.5	691.3													
5		2 5 5	18	S-2		3.25	Very stiff red FAT CLAY (CH); damp.							
6.0	688.8													
		2 2 4		S-3		3.5	Very stiff red FAT CLAY (CH); contains chert fragments; damp to moist.							
10		2 3 4	18	S-4		2.75								
		WOH 2 7	16	S-5			@ 11.0'-13.5', sample contains large chert fragments							
15		5 4 4	18	S-6		2.5								
		4 10 8	11	S-7		3.0	@ 16.0'-18.5', brown, contains wood roots							
20		2 3 5	18	S-8		2.5								
		2 3 11	12	S-9		2.75								
23.5	671.3						@ 22.5'-23.5', slight drill rig chatter							
25.0 25	669.8	7 6 7		S-10		2.5	Very stiff brown FAT CLAY (CH) with fine sand; contains stone fragments; moist to wet.							

Natural Moisture Content, % - ●
PL ├──┤ LL
N_{60} Value ○ / Non-Plastic - NP



Client: Barton Malow	Project: Ford H4 Battery Plant	Job No. 2150-9519.50
LOG OF: Boring B-180	Location: As per plan	Date Drilled: 10/27/2021

WATER OBSERVATIONS:
Water seepage at: None
Water level at completion: None (inside augers)

DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Rig (#) / ER: CME 750X (289498) / 81.0%
Driller: T
Logger: JC

Natural Moisture Content, % - ●
PL ⊢——⊣ LL
N_{60} Value ○ / Non-Plastic - NP
10 20 30 40

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
	669.8						Bottom of Boring - 25.0'							
30														
35														
40														
45														
50														

DLZ Ohio, Inc. * 6121 Huntley Road, Columbus, Ohio 43229 * (614) 888-0040

Client: Barton Malow | *Project:* Ford H4 Battery Plant | *Job No.* 2150-9519.50

LOG OF: Boring B-181 | *Location:* As per plan | *Date Drilled:* 11/30/2021

WATER OBSERVATIONS:
Water seepage at: None
Water level at completion: None (inside augers)

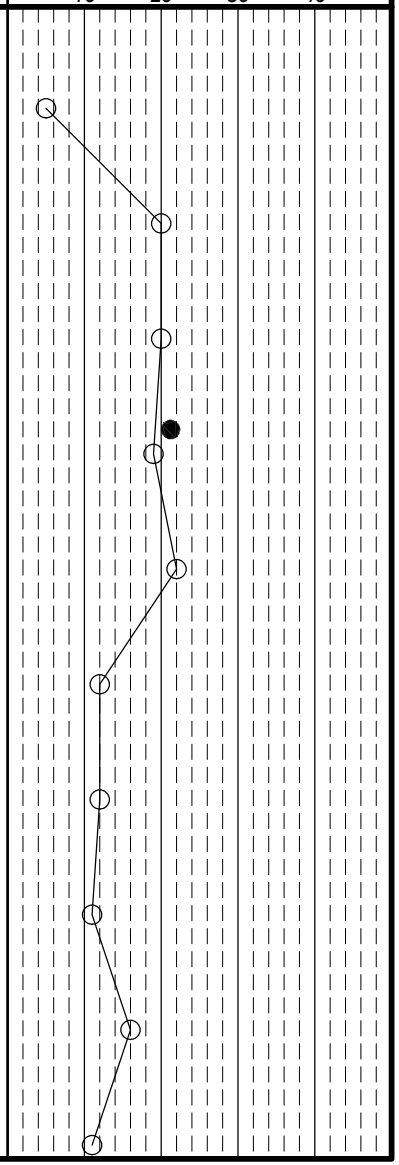
DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Depth (ft)	Elev. (ft) 739.1	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0.3	738.8						Topsoil - 4", Plow Depth - 7"							
		2 2 2	10	S-1		1.0	Medium stiff to stiff brown FAT CLAY (CH); moist.							
3.5	735.6													
5		6 6 9	18	S-2		4.5+	Hard red FAT CLAY (CH); damp to moist.							
		4 7 8	18	S-3		4.5+								
10		4 6 8	18	S-4		4.5+								
		3 7 9		S-5		4.5+								
13.5	725.6													
15		3 4 5	18	S-6		2.5	Very stiff to stiff red FAT CLAY (CH); moist.							
		4 4 5	13	S-7		2.0								
20		3 3 5		S-8		2.25								
		5 5 7	12	S-9		2.5								
25.0 25	714.1	4 4 4	18	S-10		2.0	Bottom of Boring - 25.0'							

GRADATION

Rig (#) / ER	Driller	Logger
CME 750X (289498) / 81.0%	KC	JC

Natural Moisture Content, % - ●
PL ├──┤ LL
N_{60} Value ○ / Non-Plastic - NP



DLZ Ohio, Inc. * 6121 Huntley Road, Columbus, Ohio 43229 * (614) 888-0040

Client: Barton Malow | *Project:* Ford H4 Battery Plant | *Job No.* 2150-9519.50

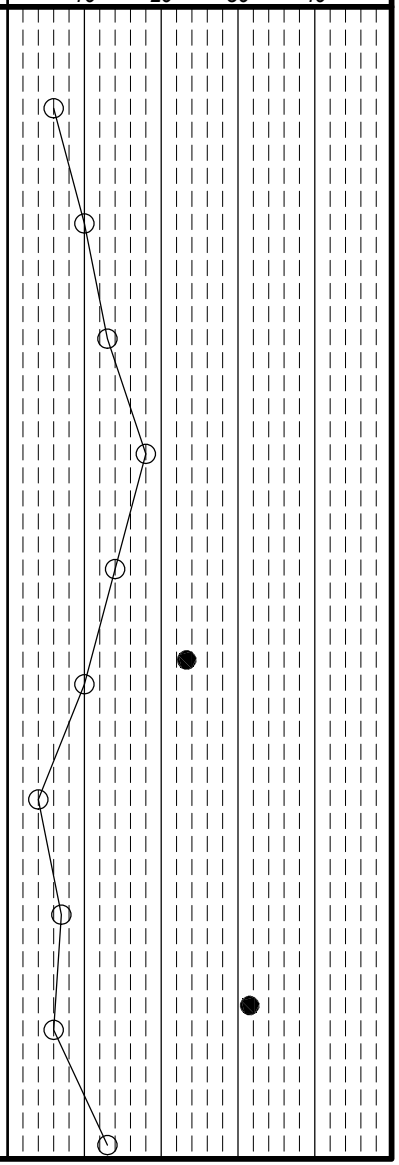
LOG OF: Boring B-182 | *Location:* As per plan | *Date Drilled:* 11/16/2021

WATER OBSERVATIONS:
Water seepage at: None
Water level at completion: 15.2' (with augers removed)

DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Rig (#) / ER: CME-850X (400472) / 84.0% | *Driller:* LB | *Logger:* AM

Depth (ft)	Elev. (ft) 719.0	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	Natural Moisture Content, % - ●
0.5	718.5						Topsoil - 6", Plow Depth - 13"								
		1 1 3	6	S-1		0.25	Soft to very soft light brownish gray LEAN CLAY (CL); moist.								
3.5	715.5	4 3 4	16	S-2		2.0	Stiff to very stiff gray FAT CLAY (CH); moist.								
		3 4 5	18	S-3		2.25	@ 6.0', light gray to light brown mottled								
8.5	710.5	3 5 8	18	S-4		2.25	Stiff to very stiff red with light gray mottling FAT CLAY (CH); moist.								
		4 5 5	18	S-5		2.5									
		2 3 4	18	S-6		1.0									
		2 1 2	18	S-7		1.25	@ 16.0'-18.5', damp to moist								
18.5	700.5	2 2 3	18	S-8		0.5	Medium stiff to soft red FAT CLAY (CH); moist.								
		1 2 2	18	S-9		< 0.25	@ 21.0'-23.5', very soft								
25.0	694.0	2 2 7	18	S-10		1.0	Bottom of Boring - 25.0'								



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Client: Barton Malow | *Project:* Ford H4 Battery Plant | *Job No.* 2150-9519.50

LOG OF: Boring B-183 | *Location:* As per plan | *Date Drilled:* 11/15/2021

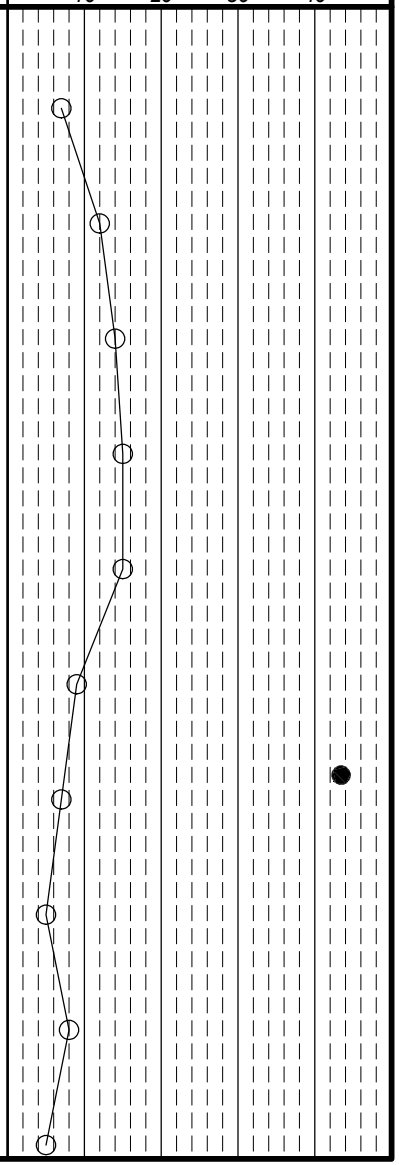
WATER OBSERVATIONS:
Water seepage at: None
Water level at completion: None (inside augers)

DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Rig (#) / ER: CME 750X (289498) / 81.0% | *Driller:* VD | *Logger:* JC

Natural Moisture Content, % - ●
PL ├──┤ LL
N_{60} Value ○ / Non-Plastic - NP
10 20 30 40

Depth (ft)	Elev. (ft) 713.9	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0.6	713.3						Topsoil - 7", Plow Depth - 9"							
		2 2 3	18	S-1		2.25	Very stiff brown LEAN CLAY (CL); moist.							
3.5	710.4													
5		2 3 6	18	S-2		3.5	Very stiff light brown and light gray mottled FAT CLAY (CH); moist.							
6.0	707.9													
		3 3 7	18	S-3		4.5+	Hard red and light gray mottled FAT CLAY (CH); moist.							
8.5	705.4													
10		6 5 6	15	S-4		3.5	Very stiff to stiff red FAT CLAY (CH); contains chert fragments; moist.							
		5 5 6	5	S-5		2.5								
15		3 3 4	18	S-6		2.75								
		1 2 3	11	S-7		1.5								
20		1 2 2	18	S-8		1.5								
21.0	692.9													
		2 2 4	12	S-9		1.0	Stiff to medium stiff red FAT CLAY (CH); moist.							
23.5	690.4													
25.0 25	688.9	1 2 2	18	S-10		1.0	Stiff to medium stiff light brown FAT CLAY (CH); moist. Bottom of Boring - 25.0'							



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Client: Barton Malow | *Project:* Ford H4 Battery Plant | *Job No.* 2150-9519.50

LOG OF: Boring B-184 | *Location:* As per plan | *Date Drilled:* 11/16/2021

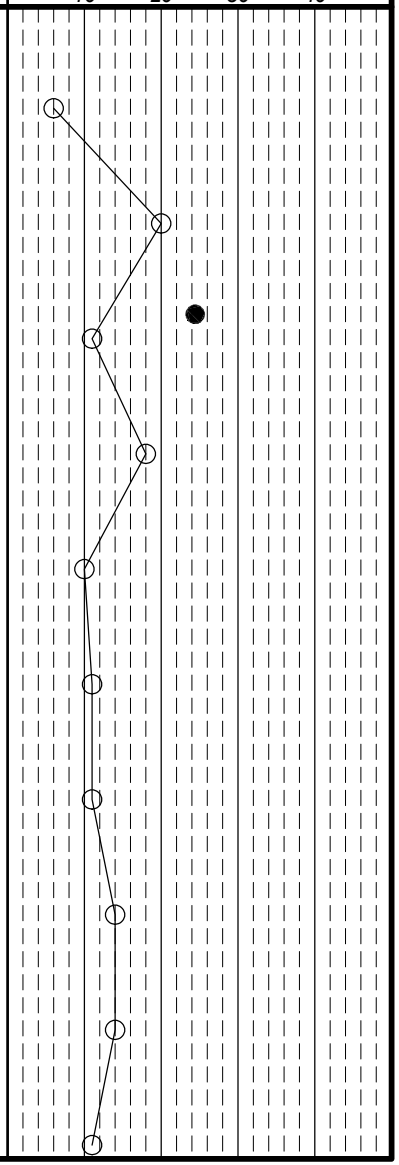
WATER OBSERVATIONS:
Water seepage at: 21.7'
Water level at completion: 21.7' (with augers removed)

DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Rig (#) / ER: CME-850X (400472) / 84.0% | *Driller:* LB | *Logger:* AM

Natural Moisture Content, % - ●
PL ├──┤ LL
N_{60} Value ○ / Non-Plastic - NP

Depth (ft)	Elev. (ft) 715.4	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0.1	715.3						Topsoil - NO READING							
		2 2 2	7	S-1		1.0	Stiff to medium stiff light grayish brown SILTY CLAY (CL-ML); damp to moist.							
3.5	711.9													
5		4 6 8	18	S-2		3.5	Very stiff red, light gray, and light brown mottled LEAN CLAY (CL); damp to moist.							
6.0	709.4													
		4 4 4	18	S-3		1.5	Stiff light gray FAT CLAY (CH); moist.							
8.5	706.9													
10		4 6 7	18	S-4		3.5	Very stiff red and light brown mottled FAT CLAY (CH); moist.							
		2 3 4	18	S-5		1.5	@ 11.0', stiff light brown; contains chert fragments							
13.5	701.9													
15		2 4 4	18	S-6		3.5	Very stiff to stiff red FAT CLAY (CH); contains chert fragments; moist.							
		2 4 4	18	S-7		2.25								
20		2 3 7	16	S-8		3.0								
		4 5 5	13	S-9		1.75								
25.0 25	690.4	1 2 6	18	S-10		1.25	Bottom of Boring - 25.0'							



Client: Barton Malow | *Project:* Ford H4 Battery Plant | *Job No.* 2150-9519.50

LOG OF: Boring B-185 | *Location:* As per plan | *Date Drilled:* 11/17/2021

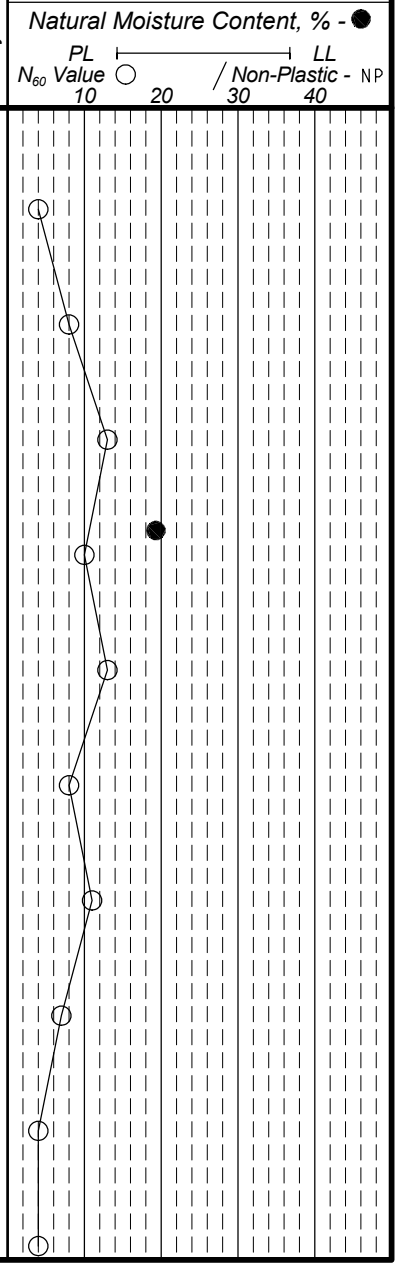
WATER OBSERVATIONS:
Water seepage at: None
Water level at completion: None (inside augers)

DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Rig (#) / ER: CME-850X (400472) / 84.0% | *Driller:* LB | *Logger:* AM

Depth (ft)	Elev. (ft) 709.5	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0.1	709.4						Topsoil - NO READING							
		1 2 1	4	S-1		0.5	Soft to medium stiff brown FAT CLAY (CH); moist to wet.							
5		2 3 3	9	S-2		0.75								
6.0	703.5													
		4 4 5	18	S-3		1.75	Stiff light gray and light brown FAT CLAY (CH); moist.							
8.5	701.0													
10		3 3 4	18	S-4		1.5	Stiff light brown sandy LEAN CLAY (CL); moist to wet.							
11.0	698.5													
		1 3 6	14	S-5			Medium dense red clayey SAND (SC); moist.							
13.5	696.0													
15		2 3 3	18	S-6		2.0	Stiff to very stiff light brown and light gray mottled FAT CLAY (CH); moist.							
16.0	693.5													
		2 3 5	18	S-7		2.5	Stiff to very stiff light gray FAT CLAY (CH); moist to wet.							
20		2 3 2	18	S-8		1.25								
21.0	688.5													
		WOH 1 2	18	S-9		0.25	Soft to very soft light brown FAT CLAY (CH); moist to wet.							
25	684.5	1 2 1	18	S-10		0.5	@ 23.5', soft to medium stiff							

GRADATION



Client: Barton Malow	Project: Ford H4 Battery Plant	Job No. 2150-9519.50
LOG OF: Boring B-185	Location: As per plan	Date Drilled: 11/17/2021

WATER OBSERVATIONS:
Water seepage at: None
Water level at completion: None (inside augers)

DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Rig (#) / ER: CME-850X (400472) / 84.0%
Driller: LB
Logger: AM

Natural Moisture Content, % - ●
PL ⊢——⊣ LL
N_{60} Value ○ / Non-Plastic - NP
10 20 30 40

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
	684.5													
			24		ST-1		Soft to very soft light brown FAT CLAY (CH); moist to wet. (continued)							
27.0	682.5						Bottom of Boring - 27.0'							
30														
35														
40														
45														
50														

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Client: Barton Malow | *Project:* Ford H4 Battery Plant | *Job No.* 2150-9519.50

LOG OF: Boring B-186 | *Location:* As per plan | *Date Drilled:* 12/3/2021

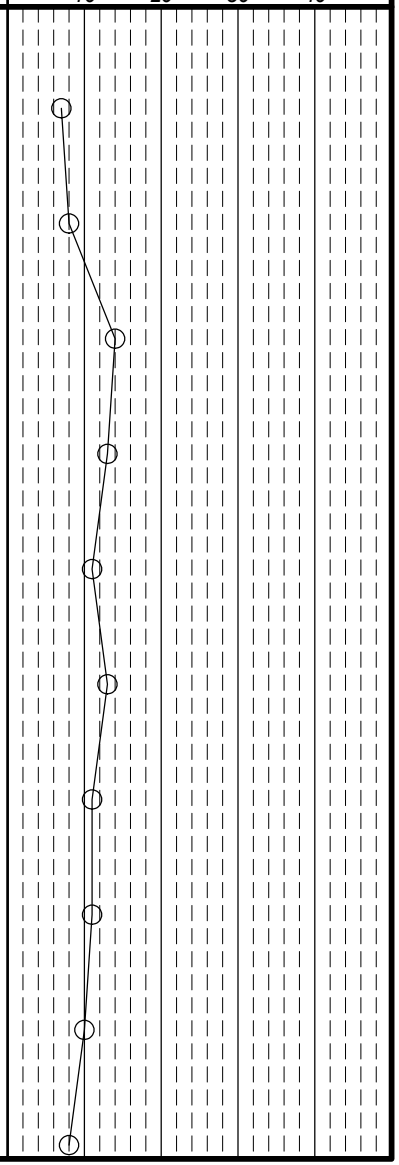
WATER OBSERVATIONS:
Water seepage at: 23.5'
Water level at completion: 14.2', (with augers removed)

DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Rig (#) / ER: CME-850X (400472) / 84.0% | *Driller:* TR | *Logger:* AM

Natural Moisture Content, % - ●
PL ├──┤ *LL*
N_{60} Value ○ / *Non-Plastic -* NP
10 20 30 40

Depth (ft)	Elev. (ft) 704.6	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0.7	703.9						Topsoil - 8"							
		1 3 2	3	S-1		2.25	Very stiff brown LEAN CLAY (CL); damp to moist.							
3.5	701.1													
5		3 3 3	14	S-2		1.0	Stiff to medium stiff light gray and borwn LEAN CLAY (CL); contains black oxide staining; moist.							
		3 4 6	18	S-3		1.75								
10		3 4 5	18	S-4		1.5								
11.0	693.6													
		3 3 5	18	S-5		1.5	Stiff red and light gray mottled FAT CLAY (CH); moist.							
13.5	691.1													
15		3 5 4	18	S-6		1.25	Stiff red and light brown mottled FAT CLAY (CH); mosit to wet.							
		3 4 4	18	S-7		1.5								
20		3 4 4	18	S-8		1.25								
		3 3 4	18	S-9		1.0	@ 21.0', medium stiff to stiff							
25.0 25	679.6	2 2 4	18	S-10		1.5	Bottom of Boring - 25.0'							



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Client: Barton Malow | *Project:* Ford H4 Battery Plant | *Job No.* 2150-9519.50

LOG OF: Boring B-187 | *Location:* As per plan | *Date Drilled:* 11/17/2021

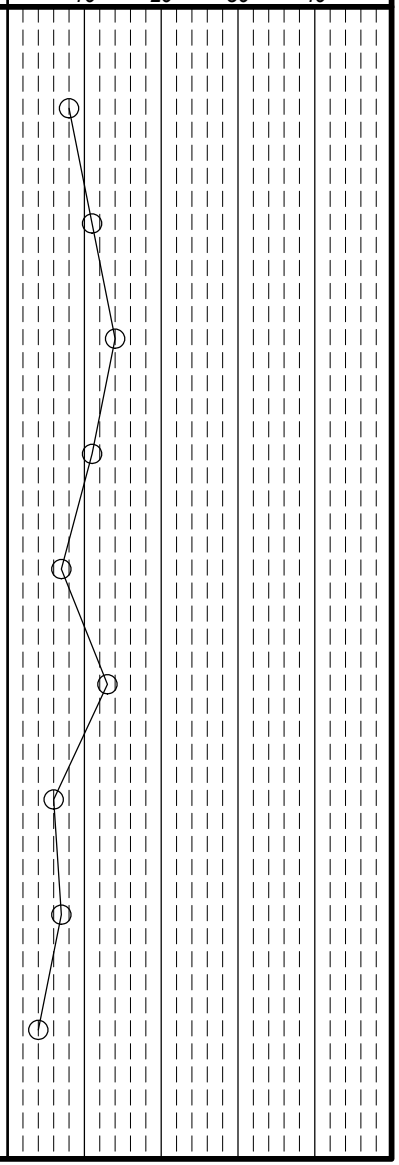
WATER OBSERVATIONS:
Water seepage at: 11.0'
Water level at completion: None (inside augers)

DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Rig (#) / ER: CME-850X (400472) / 84.0% | *Driller:* VD | *Logger:* AM

Natural Moisture Content, % - ●
PL ├──┤ LL
N_{60} Value ○ / Non-Plastic - NP
10 20 30 40

Depth (ft)	Elev. (ft) 704.0	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0.5	703.5						Topsoil - NO READING							
		2 3 3	8	S-1		1.0	Medium stiff to stiff light brown LEAN CLAY (CL); moist to wet.							
3.5	700.5													
5		3 4 4	15	S-2		1.5	Stiff to very stiff light brown and gray mottled FAT CLAY (CH); moist.							
		3 4 6	18	S-3		2.0								
10		3 3 5	16	S-4		1.5								
11.0	693.0													
		3 2 3	18	S-5		2.5	Very stiff to stiff light reddish brown FAT CLAY (CH); moist.							
15		3 4 5	13	S-6		2.75								
		4 2 2	7	S-7		1.25								
20		2 2 3	10	S-8		1.5	@ 18.5', moist to wet							
21.0	683.0													
		1 2 1	18	S-9		0.5	Soft to stiff red FAT CLAY (CH); wet.							
25.0 25	679.0		23		ST-1		Bottom of Boring - 25.0'							



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Client: Barton Malow | *Project:* Ford H4 Battery Plant | *Job No.* 2150-9519.50

LOG OF: Boring B-188 | *Location:* As per plan | *Date Drilled:* 12/3/2021

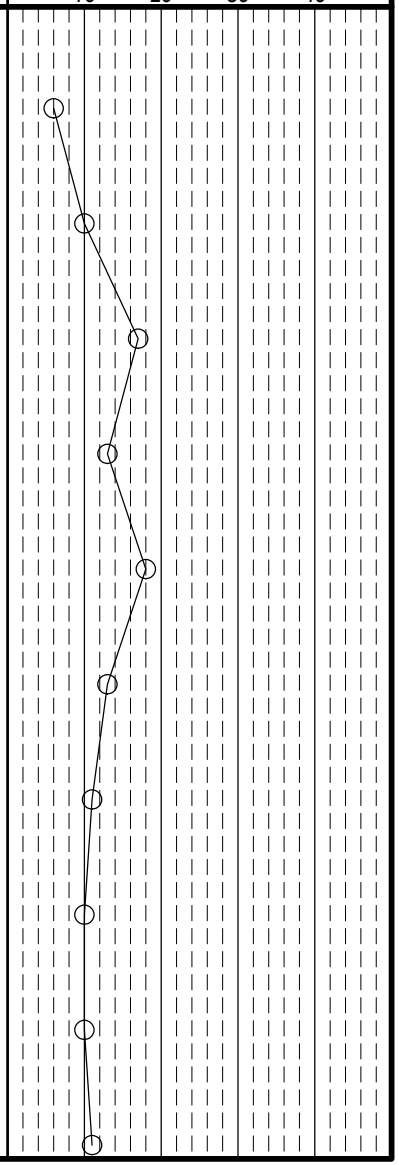
WATER OBSERVATIONS:
Water seepage at: None
Water level at completion: None (inside augers)

DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Rig (#) / ER: CME-850X (400472) / 84.0% | *Driller:* KC | *Logger:* AM

Natural Moisture Content, % - ●
PL ├──┤ LL
N_{60} Value ○ / Non-Plastic - NP

Depth (ft)	Elev. (ft) 700.6	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0.1	700.5						Topsoil - NO READING							
		3 2 2	17	S-1		0.5	Soft to medium stiff light brownish gray SILTY CLAY (CL-ML); moist to wet.							
3.5	697.1													
5		3 3 4	18	S-2		1.5	Stiff gray LEAN CLAY (CL); moist.							
6.0	694.6													
		4 7 5	16	S-3		1.75	Stiff gray FAT CLAY (CH); moist.							
8.5	692.1													
10		3 5 4	18	S-4		2.25	Very stiff red and light gray FAT CLAY (CH); moist.							
		5 5 8	6	S-5		1.0	@ 11.0', contains large chert fragments, low recovery due to rock blocking sample							
13.5	687.1													
15		3 4 5	18	S-6		1.5	Stiff red FAT CLAY (CH); moist.							
		2 4 4	18	S-7		1.25								
18.5	682.1													
20		3 4 3	18	S-8		2.0	Stiff to very stiff red FAT CLAY (CH); contains chert fragments; moist.							
		3 3 4	18	S-9		1.75								
25.0 25	675.6	3 4 4	18	S-10		2.25	Bottom of Boring - 25.0'							



DLZ Ohio, Inc. * 6121 Huntley Road, Columbus, Ohio 43229 * (614) 888-0040

Client: Barton Malow | *Project:* Ford H4 Battery Plant | *Job No.* 2150-9519.50

LOG OF: Boring B-189 | *Location:* As per plan | *Date Drilled:* 12/3/2021

WATER OBSERVATIONS:
Water seepage at: None
Water level at completion: None (inside augers)

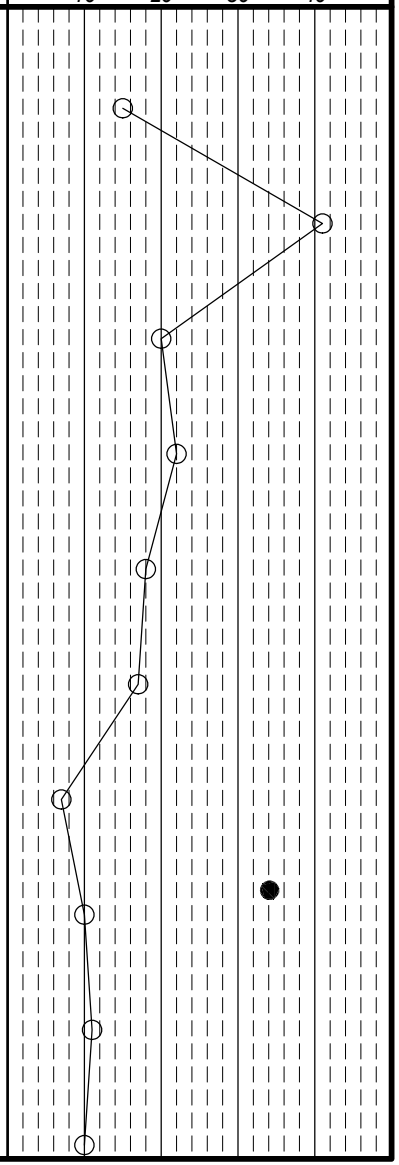
DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Depth (ft)	Elev. (ft) 708.4	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0.6	707.8						Topsoil - 7", Plow Depth - 10"-11"							
3.5	704.9	3 6 5	16	S-1		1.75	Stiff brown LEAN CLAY (CL); moist.							
6.0	702.4	8 12 17	18	S-2		4.5+	Hard light brown red and light gray mottled FAT CLAY (CH); damp.							
8.5	699.9	5 6 8	18	S-3		3.0	Very stiff red and light gray mottled FAT CLAY (CH); damp to moist.							
11.0	697.4	5 8 8	13	S-4		3.0	Very stiff red FAT CLAY (CH); contains single large chert fragment; moist.							
16.0	692.4	5 5 8	18	S-5		2.25	Stiff to very stiff red FAT CLAY (CH); contains sand size chert fragments; moist.							
		5 6 6	18	S-6		1.75								
23.5	684.9	2 2 3	18	S-7		1.5	Stiff to medium stiff red FAT CLAY (CH); moist.							
		2 3 4	18	S-8		0.75								
		3 4 4	18	S-9		0.75								
25.0	683.4	2 3 4	18	S-10		1.5	Stiff red FAT CLAY (CH); moist; contains large chert fragments; moist.							

GRADATION

Rig (#) / ER	Driller	Logger
CME-850X (400472) / 84.0%	KC	AM

Natural Moisture Content, % - ●
PL ├──┤ LL
N_{60} Value ○ / Non-Plastic - NP



Client: Barton Malow	Project: Ford H4 Battery Plant	Job No. 2150-9519.50
LOG OF: Boring B-189	Location: As per plan	Date Drilled: 12/3/2021

WATER OBSERVATIONS:
Water seepage at: None
Water level at completion: None (inside augers)

DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Rig (#) / ER: CME-850X (400472) / 84.0% | Driller: KC | Logger: AM

Natural Moisture Content, % - ●
PL ⊢——⊣ LL
N_{60} Value ○ / Non-Plastic - NP
10 20 30 40

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
	683.4						Bottom of Boring - 25.0'							
30														
35														
40														
45														
50														

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Client: Barton Malow	*Project:* Ford H4 Battery Plant	*Job No.* 2150-9519.50
LOG OF: Boring B-190	*Location:* As per plan	*Date Drilled:* 11/20/2021 to 11/21/2021

WATER OBSERVATIONS:
Water seepage at: 13.5'
Water level at completion: 12.0' (inside augers)

DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Rig (#) / ER: CME 750X (289498) / 81.0% — *Driller:* VD — *Logger:* JC

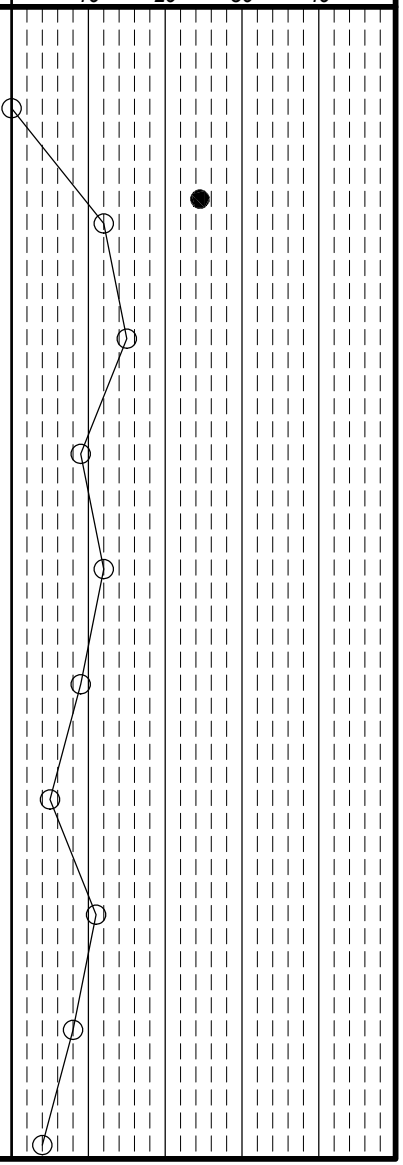
Depth (ft)	Elev. (ft) 702.2	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0.8	701.4						Topsoil - 10"							
3.5	698.7	WOH WOH WOH	3	S-1		< 0.25	Very soft brown and gray LEAN CLAY (CL); contains organics; moist to wet.							
5		2 4 5	18	S-2		2.0	Stiff to very stiff light gray and light brown mottled LEAN CLAY (CL); moist.							
8.5	693.7	4 6 5	12	S-3		3.0	@ 6.0'-8.5', contains chert fragments							
10		1 3 4	18	S-4		3.0	Stiff to very stiff red and light brown FAT CLAY (CH); moist.							
		2 4 5	11	S-5		3.5								
15		1 3 4	18	S-6		2.0								
16.0	686.2													
		1 2 2	18	S-7		1.5	Stiff red FAT CLAY (CH); moist.							
20		1 1 7	18	S-8		1.5								
		2 3 3	10	S-9		1.5								
25.0	677.2	1 1 2	18	S-10		1.5	@ 23.5', contains numerous chert fragments Bottom of Boring - 25.0'							

GRADATION

Natural Moisture Content, % - ●

PL — LL

N_{60} Value ○ / Non-Plastic - NP



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Client: Barton Malow | *Project:* Ford H4 Battery Plant | *Job No.* 2150-9519.50

LOG OF: Boring B-191 | *Location:* As per plan | *Date Drilled:* 11/17/2021

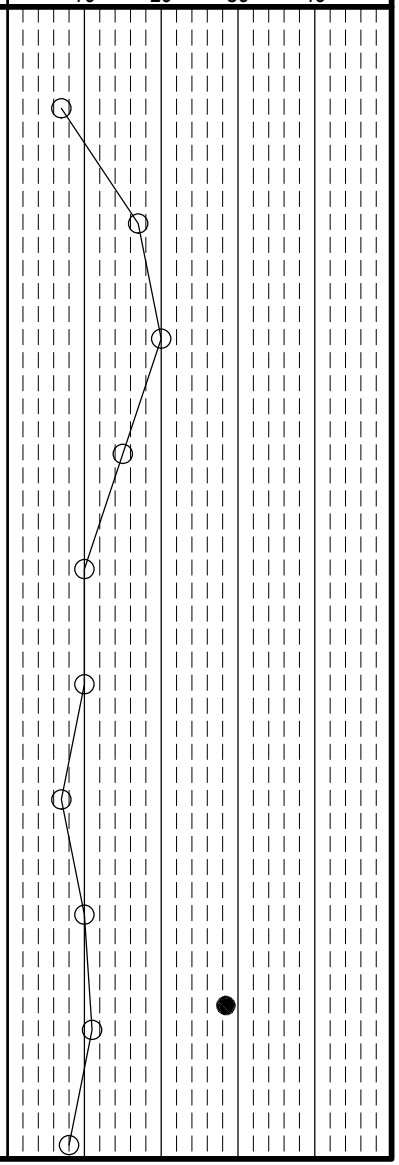
WATER OBSERVATIONS:
Water seepage at: None
Water level at completion: None (inside augers)

DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Rig (#) / ER: CME-850X (400472) / 84.0% | *Driller:* LB | *Logger:* AM

Natural Moisture Content, % - ●
PL ├──┤ LL
N_{60} Value ○ / Non-Plastic - NP

Depth (ft)	Elev. (ft) 690.6	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0.1	690.5						Topsoil - NO READING							
		3 2 3	9	S-1		1.25	Stiff light gray LEAN CLAY (CL); moist.							
3.5	687.1													
5		5 5 7	18	S-2		3.0	Stiff to very stiff gray and red mottled FAT CLAY (CH); contains chert fragments; moist.							
		5 6 8	16	S-3		2.25								
10		3 4 7	18	S-4		1.5								
		2 3 4	18	S-5		1.75								
13.5	677.1													
15		5 3 4	18	S-6		2.5	Very stiff red and light gray mottled FAT CLAY (CH); moist.							
16.0	674.6													
		1 2 3	18	S-7		1.25	Stiff red FAT CLAY (CH); contains chert fragments; moist.							
18.5	672.1													
20		3 4 3	10	S-8		1.5	Stiff light brown FAT CLAY (CH); contains chert fragments; moist.							
21.0	669.6													
		3 4 4	18	S-9		1.5	Stiff light brown FAT CLAY (CH); contains black oxide staining; moist.							
25.0 25	665.6	3 3 3	18	S-10		1.25	Bottom of Boring - 25.0'							



DLZ Ohio, Inc. * 6121 Huntley Road, Columbus, Ohio 43229 * (614) 888-0040

Client: Barton Malow | *Project:* Ford H4 Battery Plant | *Job No.* 2150-9519.50

LOG OF: Boring B-192 | *Location:* As per plan | *Date Drilled:*

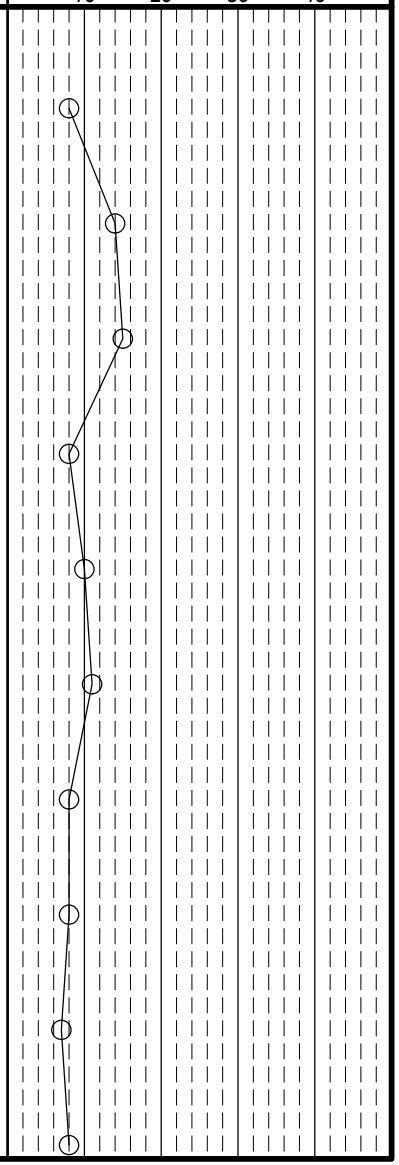
WATER OBSERVATIONS:
Water seepage at: 18.5'
Water level at completion: 24.5' (with augers removed) ?

DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Rig (#) / ER: CME-850X (400472) / 84.0% | *Driller:* LB | *Logger:* AM

Natural Moisture Content, % - ●
PL ├──┤ *LL*
N_{60} Value ○ / *Non-Plastic -* NP
10 20 30 40

Depth (ft)	Elev. (ft) 700.7	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0.1	700.6						Topsoil - NO READING							
3.5	697.2	2 3 3	18	S-1		1.25	Stiff brown LEAN CLAY (CL); moist.							
6.0	694.7	3 4 6	16	S-2		2.5	Very stiff light gray SILTY CLAY (CL-ML); damp.							
8.5	692.2	4 5 6	18	S-3		2.5	Very stiff light brown LEAN CLAY (CL); contains black oxide staining; damp to moist.							
11.0	689.7	3 3 3	18	S-4		1.25	Stiff light gray FAT CLAY (CH); moist.							
18.5	682.2	3 3 4	18	S-5		1.25	Stiff to very stiff red FAT CLAY (CH); contains chert fragments; moist.							
		3 4 4	18	S-6		1.5								
		4 3 3	18	S-7		2.0								
21.0	679.7	3 3 3	4	S-8		<0.25	Very soft red FAT CLAY (CH); wet.							
25.0	675.7	1 2 3	15	S-9		1.5	Stiff red FAT CLAY (CH); contains chert fragments; moist.							
		2 3 3	10	S-10		1.5	Bottom of Boring - 25.0'							



DLZ Ohio, Inc. * 6121 Huntley Road, Columbus, Ohio 43229 * (614) 888-0040

Client: Barton Malow | *Project:* Ford H4 Battery Plant | *Job No.* 2150-9519.50

LOG OF: Boring B-193 | *Location:* As per plan | *Date Drilled:* 12/2/2021

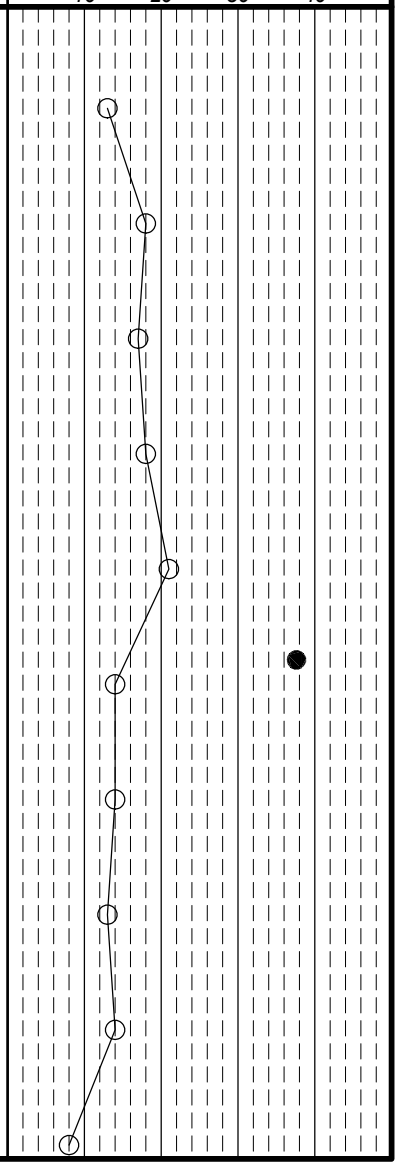
WATER OBSERVATIONS:
Water seepage at: None
Water level at completion: None (inside augers)

DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
	695.3													
0.3	695.0						Topsoil - 3", Plow Depth - 10"							
		4 4 5	18	S-1		2.25	Very stiff reddish brown FAT CLAY (CH); moist.							
3.5	691.8													
		6 7 6	18	S-2		2.5	Very stiff red and brown FAT CLAY (CH); contains black oxide staining; moist.							
		4 6 6	18	S-3		3.0								
		4 6 7	18	S-4		3.0								
11.0	684.3													
		7 7 8	18	S-5		3.0	Very stiff to stiff red FAT CLAY (CH); contains chert fragments; moist.							
		7 6 4	18	S-6		2.5								
		4 5 5	18	S-7		3.0								
		3 4 5	18	S-8		2.5								
		2 6 4	16	S-9		2.0								
		2 3 3	18	S-10		1.75								
25.0	670.3						Bottom of Boring - 25.0'							

Rig (#) / ER: CME-850X (400472) / 84.0%
Driller: KC
Logger: AM

Natural Moisture Content, % - ●
PL ├──┤ LL
N_{60} Value ○ / Non-Plastic - NP



DLZ Ohio, Inc. * 6121 Huntley Road, Columbus, Ohio 43229 * (614) 888-0040

Client: Barton Malow | *Project:* Ford H4 Battery Plant | *Job No.* 2150-9519.50

LOG OF: Boring B-194 | *Location:* As per plan | *Date Drilled:* 11/20/2021

WATER OBSERVATIONS:
Water seepage at: None
Water level at completion: None (inside augers)

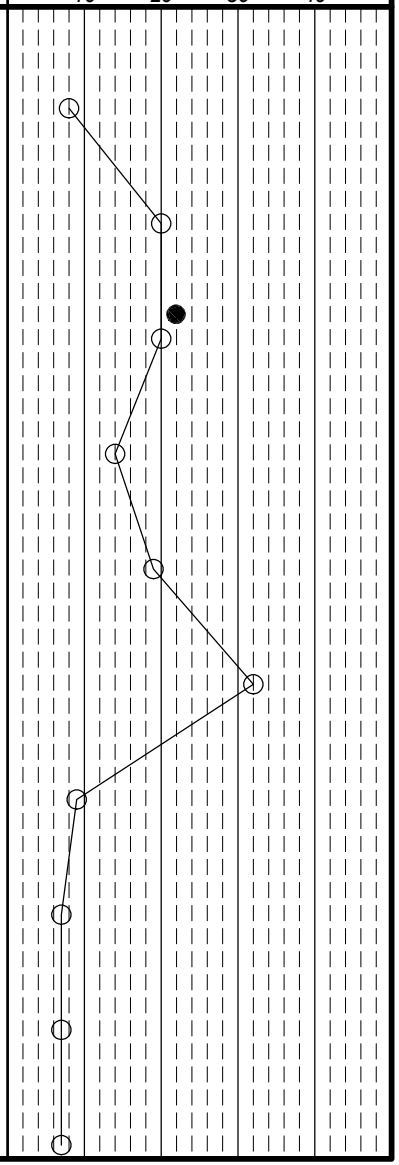
DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
	693.8													
0.1	693.7						Topsoil - NO READING							
		2 2 4	9	S-1		3.5	Very stiff light gray SILTY CLAY (CL-ML); damp.							
3.5	690.3													
5		3 7 8	18	S-2		4.5+	Hard red and light brown LEAN CLAY (CL); damp.							
6.0	687.8													
		3 7 8	15	S-3		4.5+	Hard red, light gray and light brown mottled LEAN CLAY (CL); contains black oxide staining; damp to moist.							
8.5	685.3													
10		3 4 6	18	S-4		2.5	Very stiff red FAT CLAY (CH); damp.							
11.0	682.8													
		5 6 8	15	S-5		2.5	Very stiff to stiff red FAT CLAY (CH); contains chert fragments; moist.							
15		4 15 9	14	S-6		2.5	@ 13.5'-16.0', contains large broken chert fragments							
		2 4 3	18	S-7		2.5								
20		2 2 3	18	S-8		2.0								
		2 2 3	18	S-9		2.0								
25.0 25	668.8	2 2 3	13	S-10		2.0	Bottom of Boring - 25.0'							

GRADATION

Rig (#) / ER	Driller	Logger
CME 750X (289498) / 81.0%	VD	JC

Natural Moisture Content, % - ●
PL ├──┤ LL
N_{60} Value ○ / Non-Plastic - NP



DLZ Ohio, Inc. * 6121 Huntley Road, Columbus, Ohio 43229 * (614) 888-0040

Client: Barton Malow	Project: Ford H4 Battery Plant	Job No. 2150-9519.50
LOG OF: Boring B-195	Location: As per plan	Date Drilled: 11/19/2021

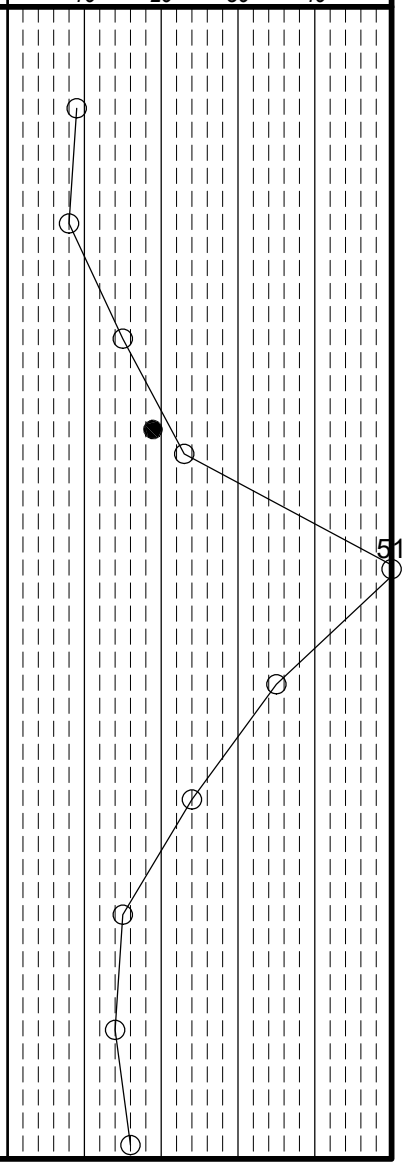
WATER OBSERVATIONS:
Water seepage at: None
Water level at completion: None (inside augers)

DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Rig (#) / ER: CME 750X (289498) / 81.0% — Driller: VD — Logger: JC

Natural Moisture Content, % - ●
PL — LL
N_{60} Value ○ / Non-Plastic - NP
10 20 30 40

Depth (ft)	Elev. (ft) 707.2	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0.6	706.6						Topsoil - 7", Plow Depth - 10"							
		1 3 4	10	S-1		1.5	Stiff light brown LEAN CLAY (CL); moist.							
3.5	703.7													
5		4 3 3	18	S-2		3.5	Very stiff to hard red FAT CLAY (CH); damp to moist. @ 5.0'-6.0', light drill rig chatter							
		5 5 6	18	S-3		4.5+								
8.5	698.7													
10		5 7 10	12	S-4		4.0	Hard red sandy LEAN CLAY (CL); damp to moist. @ 10.0'-11.0', medium drill rig chatter							
11.0	696.2													
		9 19 19	6	S-5			Very dense red fine clayey SAND (SC); damp.							
13.5	693.7													
15		4 12 14	18	S-6			Dense to medium dense light reddish brown SAND (SP-SM) with silt; damp.							
		5 10 8	10	S-7			@ 16.0', red							
18.5	688.7													
20		4 5 6	14	S-8		4.0	Hard to very stiff light brown FAT CLAY (CH); moist.							
		4 3 7	8	S-9		4.0								
25.0 25	682.2	4 5 7		S-10		4.0	Bottom of Boring - 25.0'							



DLZ Ohio, Inc. * 6121 Huntley Road, Columbus, Ohio 43229 * (614) 888-0040

Client: Barton Malow | *Project:* Ford H4 Battery Plant | *Job No.* 2150-9519.50

LOG OF: Boring B-196 | *Location:* As per plan | *Date Drilled:* 11/19/2021

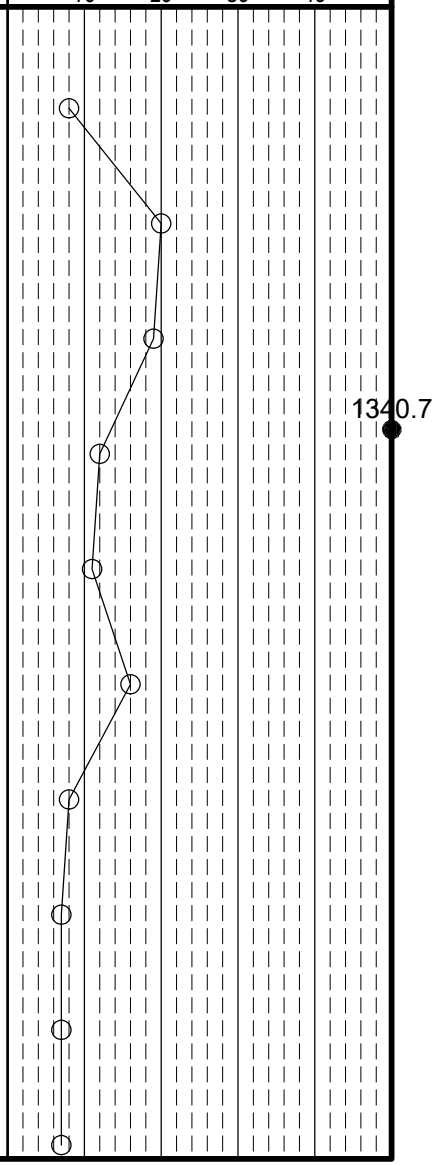
WATER OBSERVATIONS:
Water seepage at: None
Water level at completion: None (inside augers)

DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Rig (#) / ER: CME 750X (289498) / 81.0% | *Driller:* VD | *Logger:* JC

Natural Moisture Content, % - ●
PL ├──┤ LL
N_{60} Value ○ / Non-Plastic - NP

Depth (ft)	Elev. (ft) 688.2	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0.8	687.4						Topsoil - 9", Plow Depth - 13"							
		2 2 4	8	S-1		2.0	Stiff to very stiff light brown FAT CLAY (CH); moist.							
3.5	684.7													
5		4 5 10	18	S-2		4.5+	Hard light gray FAT CLAY (CH); contains black oxide staining; damp to moist.							
		3 5 9	8	S-3		4.5+	@ 6.0', light brown							
8.5	679.7													
10		3 3 6	18	S-4		3.5	Very stiff to stiff red FAT CLAY (CH); damp to moist.							
		3 3 5	10	S-5		2.0								
13.5	674.7													
15		3 3 9	15	S-6		2.0	Very stiff to stiff red FAT CLAY (CH); contains chert fragments; moist.							
		2 2 4	11	S-7		2.0								
20		1 2 3	9	S-8		2.0	@ 18.5'-23.5', light reddish brown							
		WOH 2 3	13	S-9		1.25								
23.5	664.7													
25.0 25	663.2	1 2 3	18	S-10		4.5	Hard light brown FAT CLAY (CH); contains chert fragments; moist.							



DLZ Ohio, Inc. * 6121 Huntley Road, Columbus, Ohio 43229 * (614) 888-0040

Client: Barton Malow	Project: Ford H4 Battery Plant	Job No. 2150-9519.50
LOG OF: Boring B-196	Location: As per plan	Date Drilled: 11/19/2021

WATER OBSERVATIONS:
Water seepage at: None
Water level at completion: None (inside augers)

DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Depth (ft)	Elev. (ft) 663.2	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetro-meter (tsf)	DESCRIPTION	Graphic Log	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	Rig (#) / ER	Driller	Logger
							Bottom of Boring - 25.0'								CME 750X (289498) / 81.0%	VD	JC

Natural Moisture Content, % - ●
PL ├──┤ LL
N_{60} Value ○ / Non-Plastic - NP
10 20 30 40

30
35
40
45
50

DLZ Ohio, Inc. * 6121 Huntley Road, Columbus, Ohio 43229 * (614) 888-0040

Client: Barton Malow | *Project:* Ford H4 Battery Plant | *Job No.* 2150-9519.50

LOG OF: Boring B-197 | *Location:* As per plan | *Date Drilled:* 11/19/2021 to 11/20/2021

WATER OBSERVATIONS:
Water seepage at: 16.0'
Water level at completion: 8.0' (inside augers)

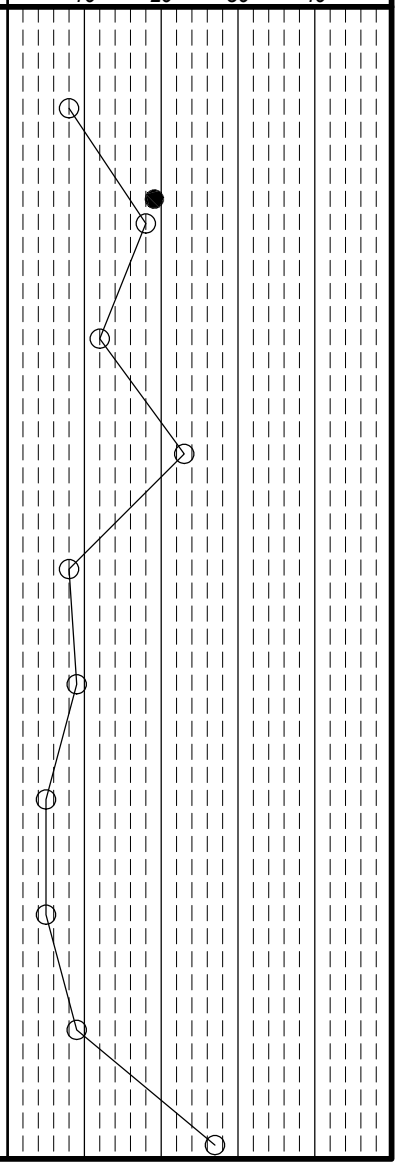
DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Depth (ft)	Elev. (ft) 680.6	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0.1	680.5						Topsoil - NO READING							
		1 2 4	7	S-1		1.0	Stiff to very stiff light grayish brown SILTY CLAY (CL-ML); damp.							
3.5	677.1													
5		3 6 7	12	S-2		1.0	Stiff to medium stiff light grayish brown LEAN CLAY (CL); moist.							
		2 4 5	10	S-3		2.5	@ 6.0', very stiff, contains black oxide staining							
8.5	672.1													
10		4 6 11	6	S-4		2.0	Stiff to very stiff reddish brown FAT CLAY (CH); contains chert fragments; moist.							
11.0	669.6													
		3 3 3	9	S-5		2.0	Stiff to very stiff red FAT CLAY (CH); moist.							
							@ 12.5'-13.5', light drill rig chatter							
15		2 3 4	18	S-6		2.0								
16.0	664.6													
		2 2 2	9	S-7		1.5	Medium stiff to stiff red FAT CLAY (CH); contains chert fragments; moist.							
20		1 2 2	10	S-8		1.0								
							@ 20.0'-21.0', heavy drill rig chatter, possible cobble							
		3 5 2	4	S-9			@ 21.0', sample consists of mostly broken rock fragments							
23.5	657.1													
25.0 25	655.6	5 5 15	11	S-10		0.25	Soft to very soft light reddish brown FAT CLAY (CH); contains chert fragments; wet.							

GRADATION

Rig (#) / ER	Driller	Logger
CME 750X (289498) / 81.0%	VD	JC

Natural Moisture Content, % - ●
PL ├──┤ LL
N_{60} Value ○ / Non-Plastic - NP



DLZ Ohio, Inc. * 6121 Huntley Road, Columbus, Ohio 43229 * (614) 888-0040

Client: Barton Malow	Project: Ford H4 Battery Plant	Job No. 2150-9519.50
LOG OF: Boring B-197	Location: As per plan	Date Drilled: 11/19/2021 to 11/20/2021

WATER OBSERVATIONS:
Water seepage at: 16.0'
Water level at completion: 8.0' (inside augers)

DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Depth (ft)	Elev. (ft) 655.6	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	Rig (#) / ER	Driller	Logger
							Bottom of Boring - 25.0'								CME 750X (289498) / 81.0%	VD	JC
30																	
35																	
40																	
45																	
50																	

Natural Moisture Content, % - ●
PL ├──┤ LL
N_{60} Value ○ / Non-Plastic - NP
10 20 30 40

Client: Barton Malow	Project: Ford H4 Battery Plant	Job No. 2150-9519.50
LOG OF: Boring B-198	Location: As per plan	Date Drilled: 11/19/2021

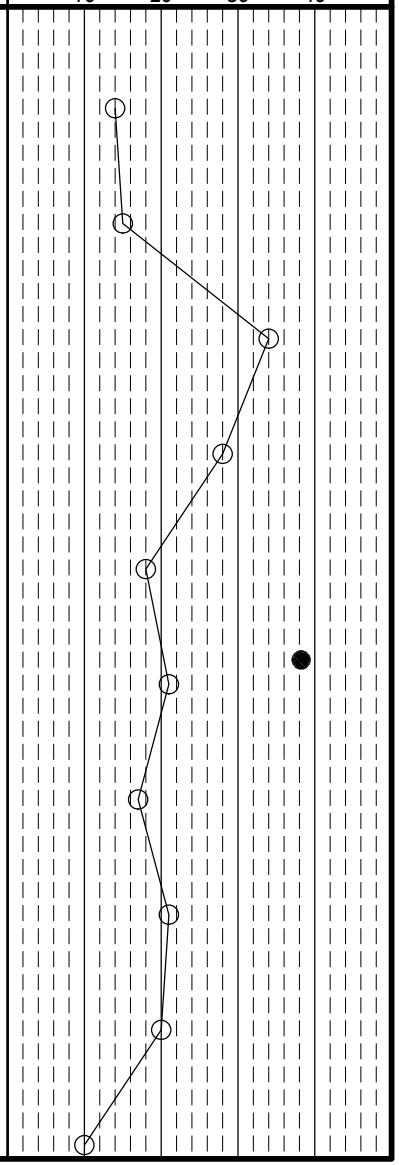
WATER OBSERVATIONS:
Water seepage at: None
Water level at completion: None (inside augers)

DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Rig (#) / ER: CME-850X (400472) / 84.0%
Driller: LB
Logger: AM

Natural Moisture Content, % - ●
PL ⊢——⊣ LL
N_{60} Value ○ / Non-Plastic - NP
10 20 30 40

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0.1	693.7						Topsoil - NO READING							
		4 4 6	16	S-1		1.5	Stiff light brown FAT CLAY (CH); moist.							
3.5	690.3													
5		3 5 6	18	S-2		2.5	Very stiff brown FAT CLAY (CH); contains black oxide staining; moist.							
6.0	687.8													
		5 8 16	18	S-3		4.5	Hard to very stiff red FAT CLAY (CH); contains chert fragments; moist.							
10		9 10 10	18	S-4		3.5								
		6 6 7	18	S-5		2.0	@ 11.0'-13.5', stiff to very stiff							
15		6 8 7	18	S-6		2.75								
		5 7 5	17	S-7		1.75	@ 16.0', stiff to very stiff							
20		8 9 6	18	S-8		2.0								
21.0	672.8													
		5 5 9	18	S-9		2.0	Stiff to very stiff light reddish brown FAT CLAY (CH); contains chert fragments; moist.							
25.0 25	668.8	5 3 4	18	S-10		1.25	@ 23.5', red Bottom of Boring - 25.0'							



DLZ Ohio, Inc. * 6121 Huntley Road, Columbus, Ohio 43229 * (614) 888-0040

Client: Barton Malow	Project: Ford H4 Battery Plant	Job No. 2150-9519.50
LOG OF: Boring B-199	Location: As per plan	Date Drilled: 12/3/2021

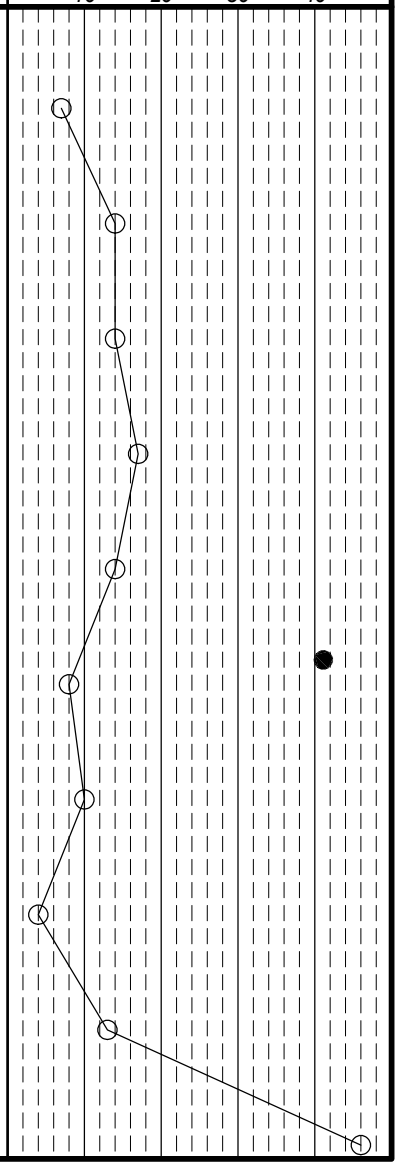
WATER OBSERVATIONS:
Water seepage at: 16.0'
Water level at completion: 11.6' (???)

DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Rig (#) / ER: CME-850X (400472) / 84.0%
Driller: KC
Logger: AM

Natural Moisture Content, % - ●
PL ├──┤ LL
N_{60} Value ○ / Non-Plastic - NP
10 20 30 40

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0.3	682.4						Topsoil - 3", Plow Depth - 8"-10"							
		2 2 3	18	S-1		1.25	Stiff brown LEAN CLAY (CL); moist.							
3.5	679.2													
5		2 4 6	18	S-2		1.75	Stiff light brown and red mottled FAT CLAY (CH); contains black oxide staining; moist.							
		4 5 5	18	S-3		1.5								
10		5 5 7	10	S-4		1.25	@ 8.5', contains chert fragments							
		4 5 5	18	S-5		1.25								
15		3 3 3	18	S-6		1.0								
		3 3 4	13	S-7		1.0								
18.5	664.2													
20		WOH 1 2	18	S-8		0.75	Medium stiff to stiff light red FAT CLAY (CH); contains chert fragments; wet.							
		3 4 5	18	S-9		1.0	@ 21.0', contains large rock fragment, moist							
23.5	659.2													
25.0 25	657.7	5 29 4	7	S-10			Dense light brown GRAVEL (GP); contains stone fragments; wet.							



Client: Barton Malow	Project: Ford H4 Battery Plant	Job No. 2150-9519.50
LOG OF: Boring B-199	Location: As per plan	Date Drilled: 12/3/2021

WATER OBSERVATIONS:
Water seepage at: 16.0'
Water level at completion: 11.6' (???)

DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Rig (#) / ER: CME-850X (400472) / 84.0%
Driller: KC
Logger: AM

Natural Moisture Content, % - ●
PL ⊢——⊣ LL
N_{60} Value ○ / Non-Plastic - NP
10 20 30 40

Depth (ft)	Elev. (ft) 657.7	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
							Bottom of Boring - 25.0'							
30														
35														
40														
45														
50														

DLZ Ohio, Inc. * 6121 Huntley Road, Columbus, Ohio 43229 * (614) 888-0040

Client: Barton Malow | *Project:* Ford H4 Battery Plant | *Job No.* 2150-9519.50

LOG OF: Boring B-200 | *Location:* As per plan | *Date Drilled:* 11/20/2021

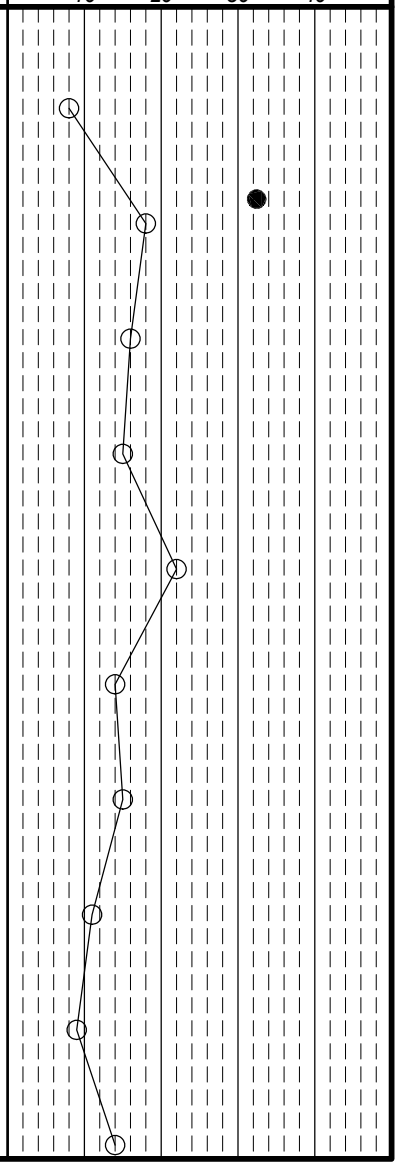
WATER OBSERVATIONS:
Water seepage at: None
Water level at completion: None (inside augers)

DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Rig (#) / ER: CME 750X (289498) / 81.0% | *Driller:* VD | *Logger:* JC

Natural Moisture Content, % - ●
PL ├──┤ LL
N_{60} Value ○ / Non-Plastic - NP
10 20 30 40

Depth (ft)	Elev. (ft) 686.0	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0.4	685.6						Topsoil - 5", Plow Depth - 10"							
		2 3 3	10	S-1		3.0	Very stiff hard red FAT CLAY (CH); moist.							
5		3 6 7	18	S-2		3.0								
		3 5 7	11	S-3		4.5+								
10		3 5 6	18	S-4		4.5+								
11.0	675.0													
		3 8 8	18	S-5		3.0	Very stiff reddish brown sandy FAT CLAY (CH); contains black oxide staining; moist.							
13.5	672.5													
15		3 4 6	18	S-6		2.75	Very stiff red FAT CLAY (CH); contains black oxide staining; moist.							
16.0	670.0													
		3 5 6	17	S-7		2.5	Very stiff red FAT CLAY (CH); contains chert fragments; moist.							
18.5	667.5													
20		3 3 5	11	S-8		3.0	Very stiff red FAT CLAY (CH); moist.							
21.0	665.0						@ 20.0'-21.0', drove large gravel							
		2 4 3	9	S-9		1.75	Very stiff to stiff red FAT CLAY (CH); contains chert fragments; moist.							
25.0 25	661.0	1 4 6	7	S-10		2.0	Bottom of Boring - 25.0'							



DLZ Ohio, Inc. * 6121 Huntley Road, Columbus, Ohio 43229 * (614) 888-0040

Client: Barton Malow | *Project:* Ford H4 Battery Plant | *Job No.* 2150-9519.50

LOG OF: Boring B-201 | *Location:* As per plan | *Date Drilled:* 11/20/2021

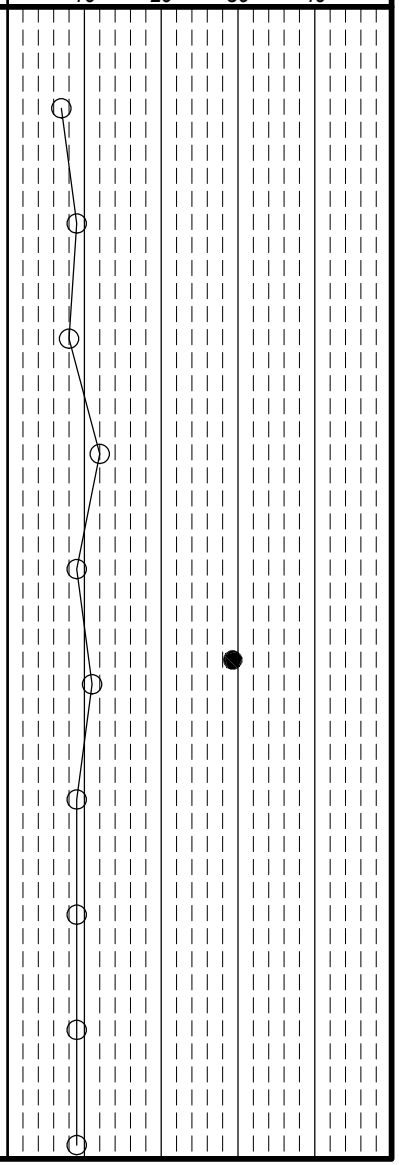
WATER OBSERVATIONS:
Water seepage at: None
Water level at completion: None (inside augers)

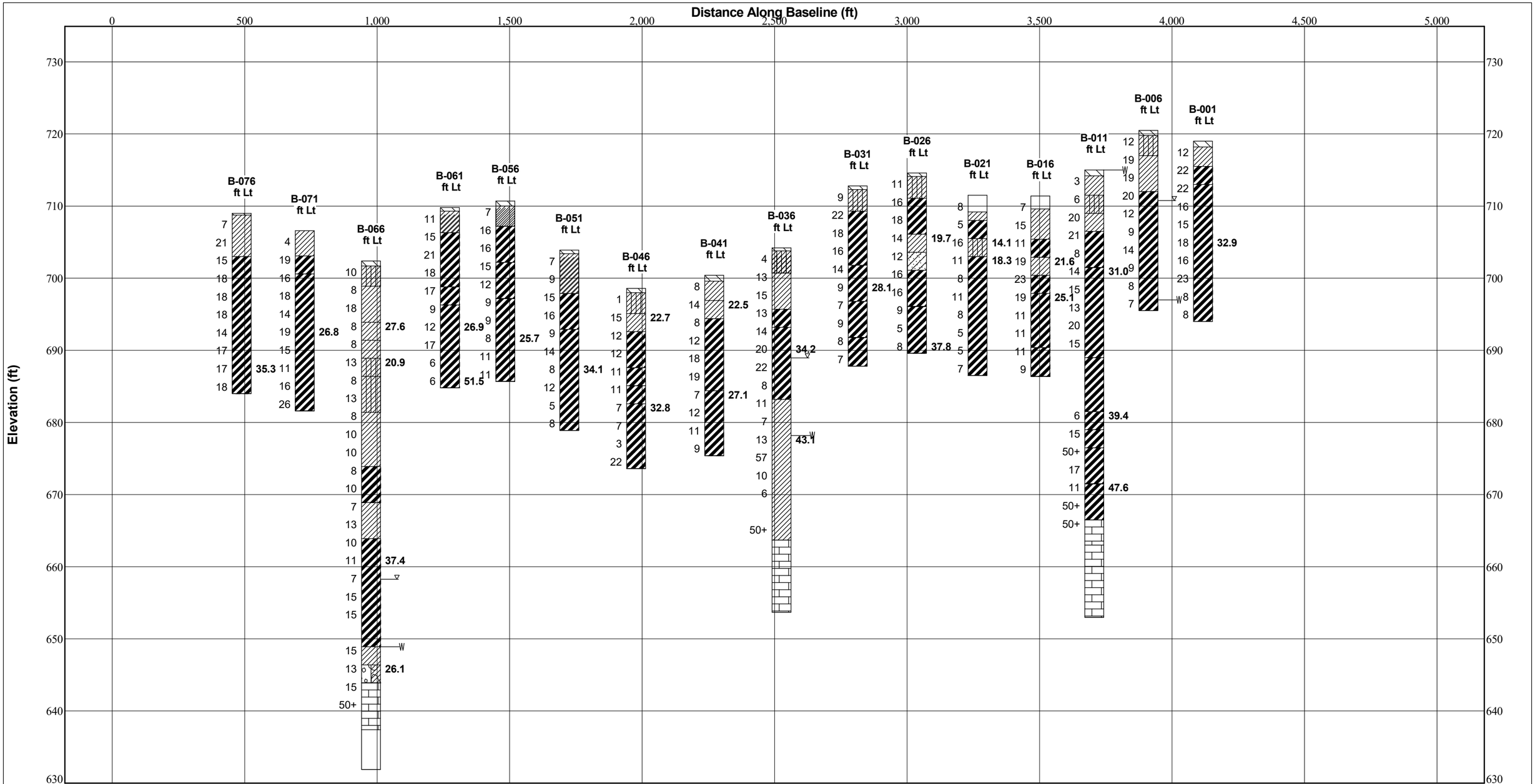
DRILLING METHODS - Soil: HS Augers
ABANDONMENT - cuttings and bentonite chips

Rig (#) / ER: CME 750X (289498) / 81.0% | *Driller:* VD | *Logger:* JC

Natural Moisture Content, % - ●
PL ├──┤ LL
N_{60} Value ○ / Non-Plastic - NP
10 20 30 40

Depth (ft)	Elev. (ft) 685.0	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	Graphic Log	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0.5	684.5						Topsoil - NO READING							
		2 2 3	9	S-1		2.0	Very stiff to stiff brown LEAN CLAY (CL); damp to moist.							
3.5	681.5													
5		1 3 4	17	S-2		2.0	Very stiff red and light gray mottled FAT CLAY (CH); moist.							
6.0	679.0													
		2 3 3	17	S-3		2.25	Very stiff to stiff FAT CLAY (CH); contains black oxide staining; moist.							
10		2 4 5	16	S-4		1.5								
		2 3 4	10	S-5		2.25								
15		2 4 4	18	S-6		2.0								
		2 2 5	17	S-7		2.5								
18.5	666.5													
20		3 4 3	18	S-8		2.5	Very stiff to stiff red FAT CLAY (CH); moist.							
		3 4 3	18	S-9		2.5								
25.0 25	660.0	2 3 4	18	S-10		2.0	Bottom of Boring - 25.0'							





Legend

SPT N Value 10 13.0 *Moisture Content (%) / LI (in app.)*

Seepage Encountered

Water Level (drilling water added)

Water Level

Top of Rock

Strata Symbols

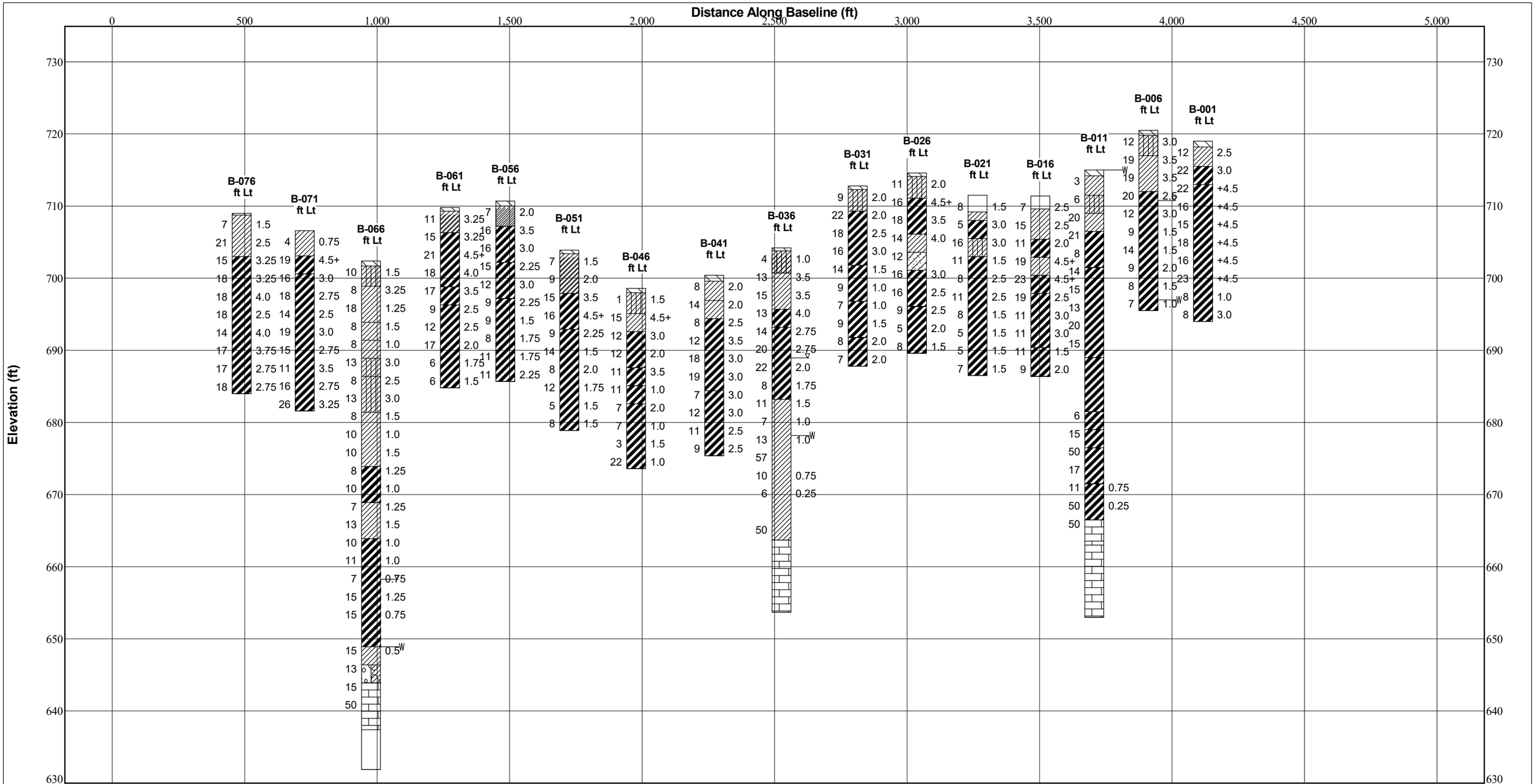
- Sod and Topsoil
- Ohio DOT: Limestone
- USCS Low Plasticity Clay
- USCS Clayey Sand
- USCS High Plasticity Clay
- USCS Poorly-graded Gravel with Clay
- USCS Low Plasticity Silty Clay

S-N 1

SUBSURFACE PROFILE

Ford H4 Battery Plant

PROJECT NO. 2150-9519.50



Legend

SPT N Value 10 3.0 Hand Penetrometer (tsf)

W Seepage Encountered

Water Level (drilling water added)

Water Level

TR Top of Rock

Strata Symbols

TOPSOIL

LIMESTONE

CL

SC

CH

GP-GC

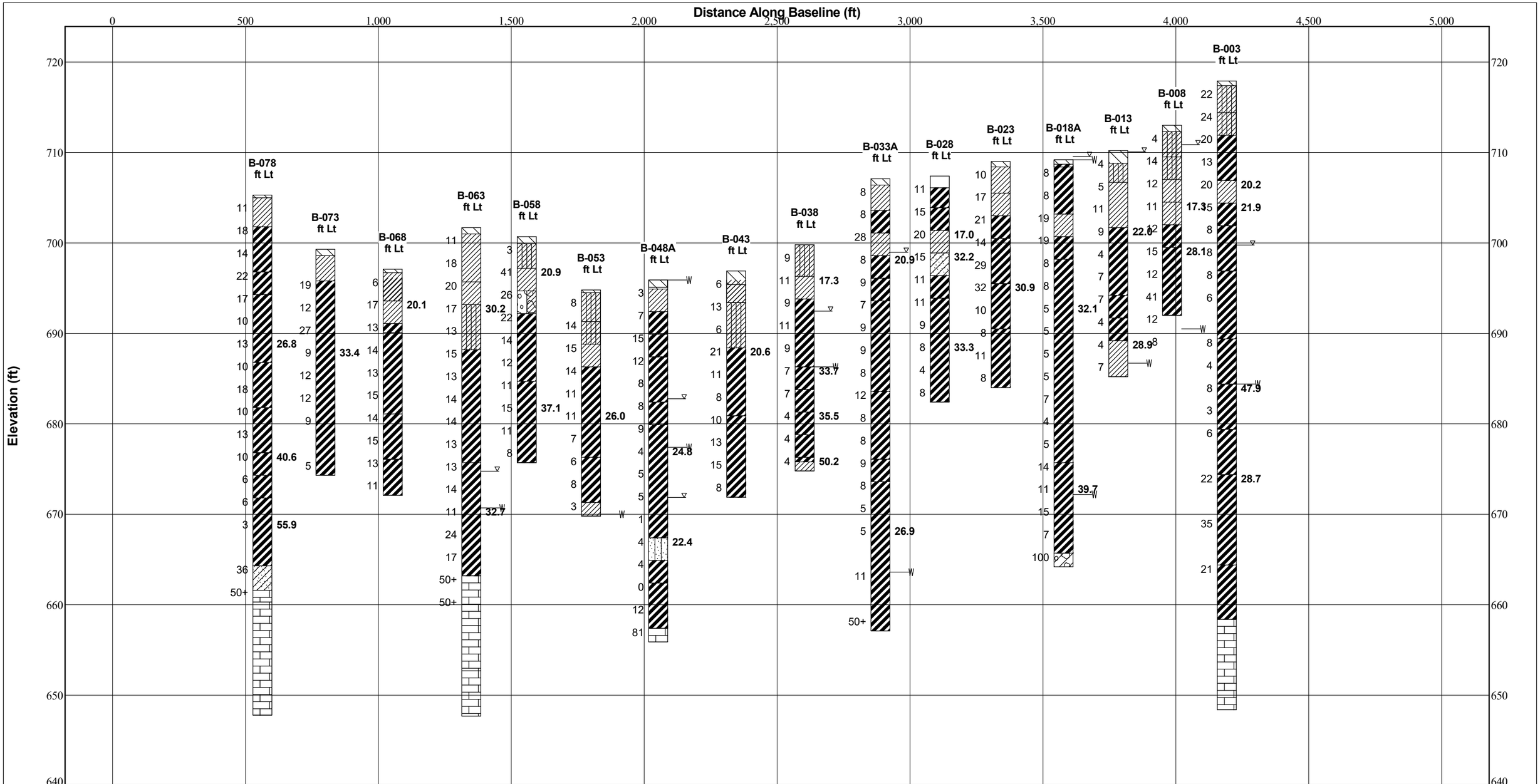
CL-ML

S-N 1

SUBSURFACE PROFILE

Ford H4 Battery Plant

PROJECT NO. 2150-9519.50



Legend

SPT N Value 10 13.0 *Moisture Content (%) / LI (in app.)*

Seepage Encountered

Water Level (drilling water added)

Water Level

Top of Rock

Strata Symbols

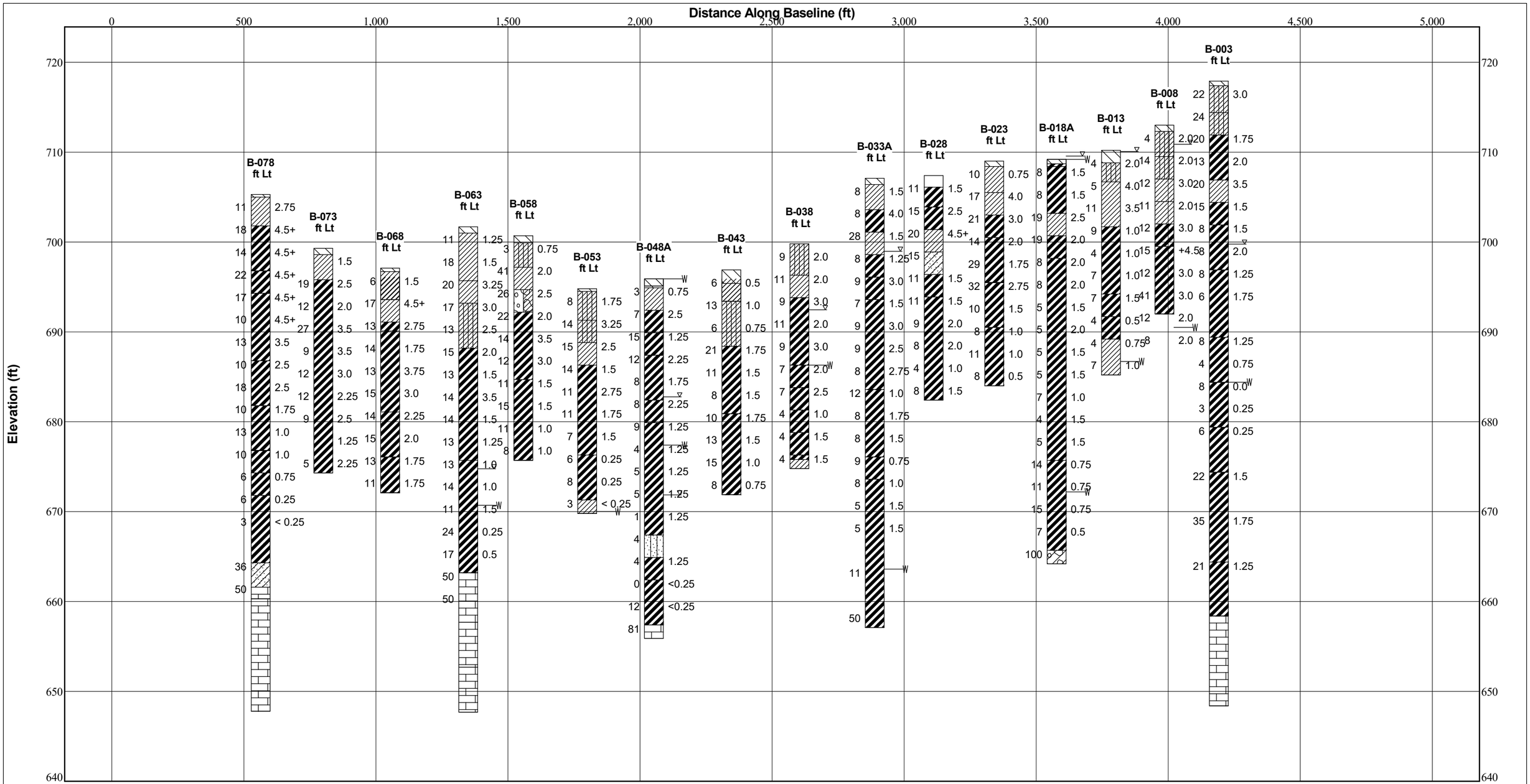
- Sod and Topsoil
- Ohio DOT: Limestone
- USCS Poorly-graded Gravel with Clay
- USCS Low Plasticity Silty Clay
- USCS Clayey Gravel
- USCS High Plasticity Clay
- USCS Clayey Sand
- USCS Low Plasticity Clay
- USCS Silty Sand

S-N 2

SUBSURFACE PROFILE

Ford H4 Battery Plant

PROJECT NO. 2150-9519.50



Legend

SPT N Value 10 3.0 Hand Penetrometer (tsf)

Seepage Encountered

Water Level (drilling water added)

Water Level

Top of Rock

Strata Symbols

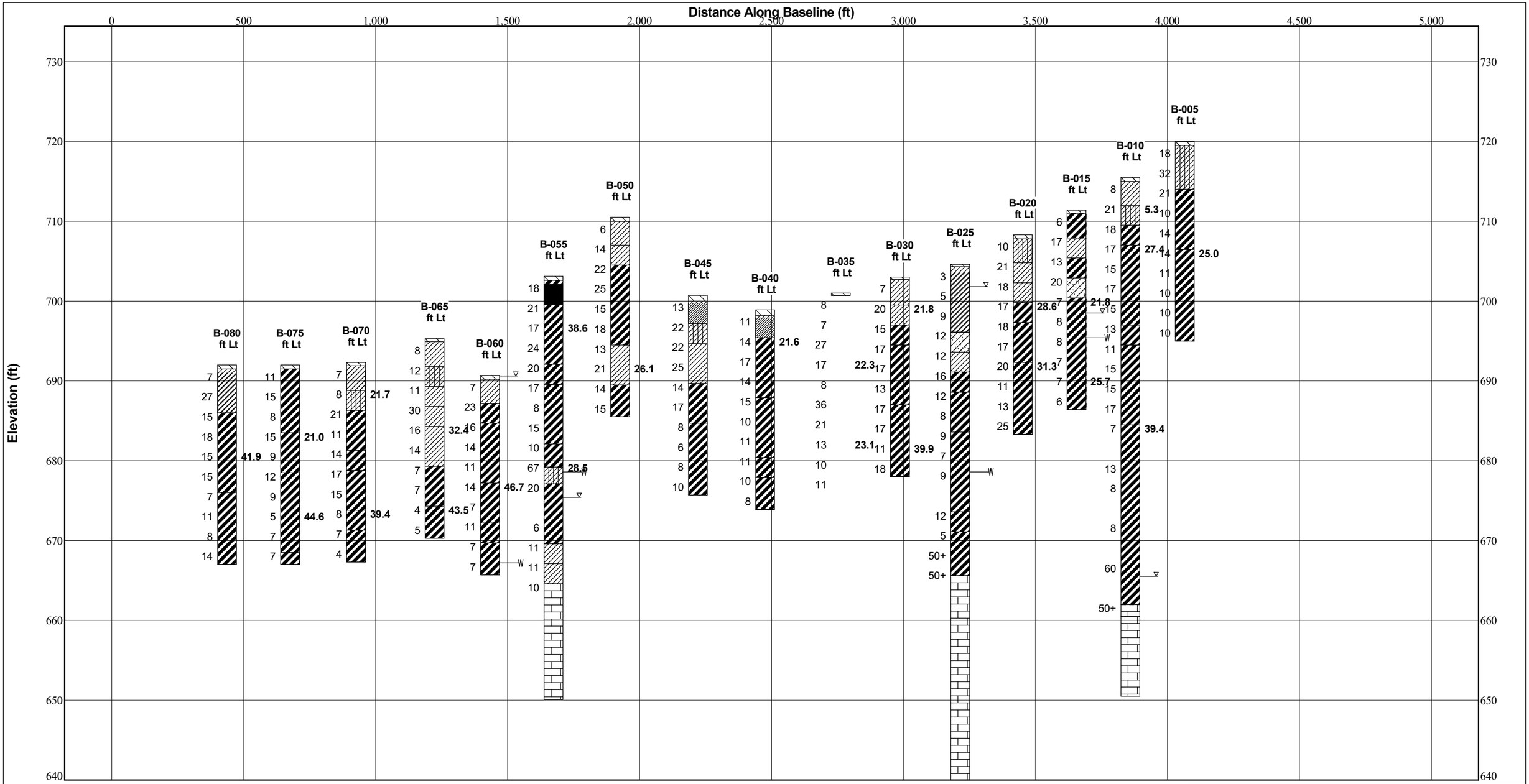
TOPSOIL, CL-ML, CH, CL, LIMESTONE, GC, SC, SM, GP-GC

S-N 2

SUBSURFACE PROFILE

Ford H4 Battery Plant

PROJECT NO. 2150-9519.50



Legend

SPT N Value 10 13.0 Moisture Content (%) / LI (in app.)

W Seepage Encountered

Water Level (drilling water added)

Water Level

TR Top of Rock

Strata Symbols

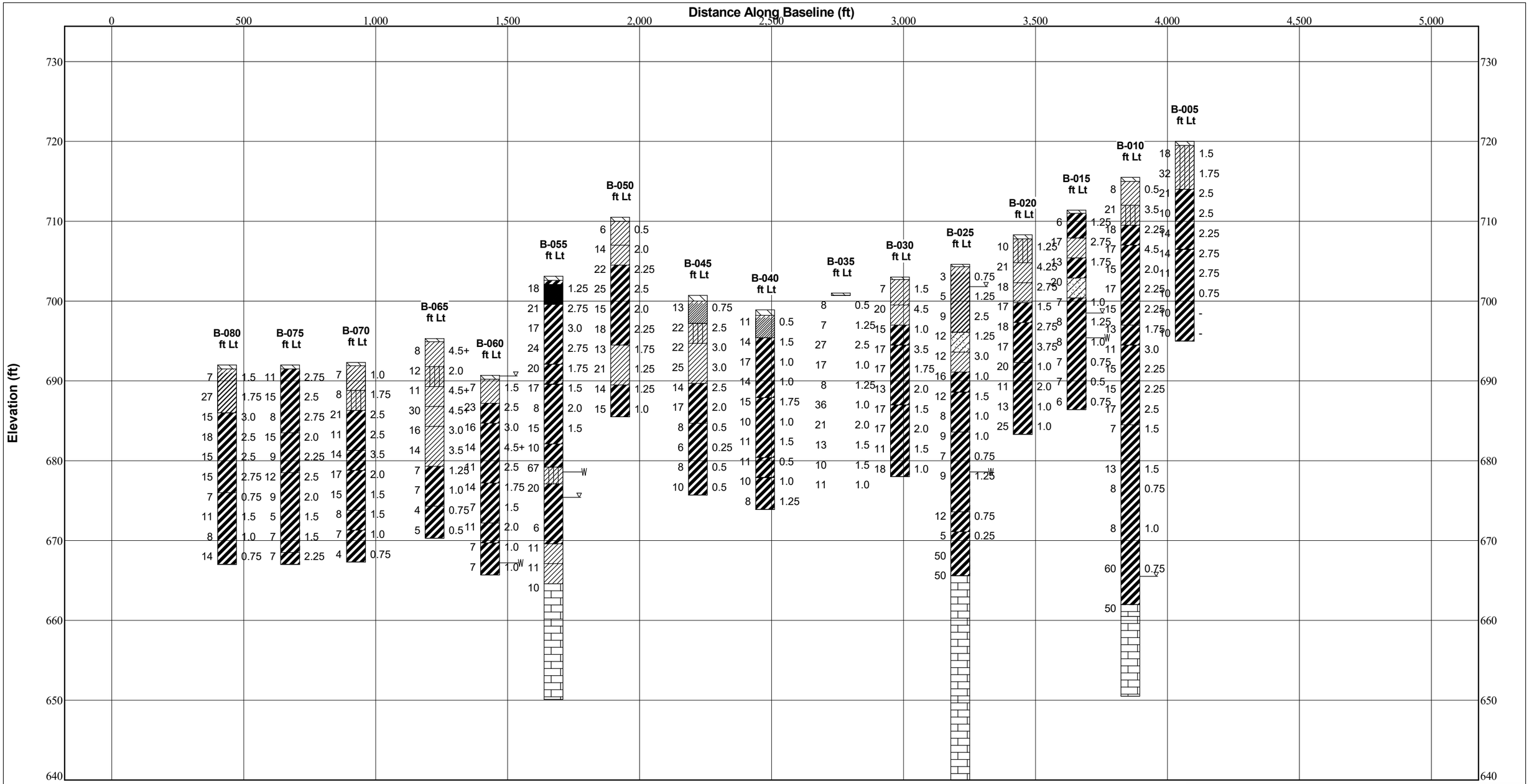
- Sod and Topsoil
- Ohio DOT: Limestone
- USCS Low Plasticity Silty Clay
- USCS Clayey Sand
- USCS High Plasticity Clay
- USCS Low Plasticity Clay

S-N 3

SUBSURFACE PROFILE

Ford H4 Battery Plant

PROJECT NO. 2150-9519.50



Legend

SPT N Value 10 3.0 Hand Penetrometer (tsf)

W Seepage Encountered

Water Level (drilling water added)

Water Level

TR Top of Rock

Strata Symbols

TOPSOIL

CL-ML

CH

CL

LIMESTONE

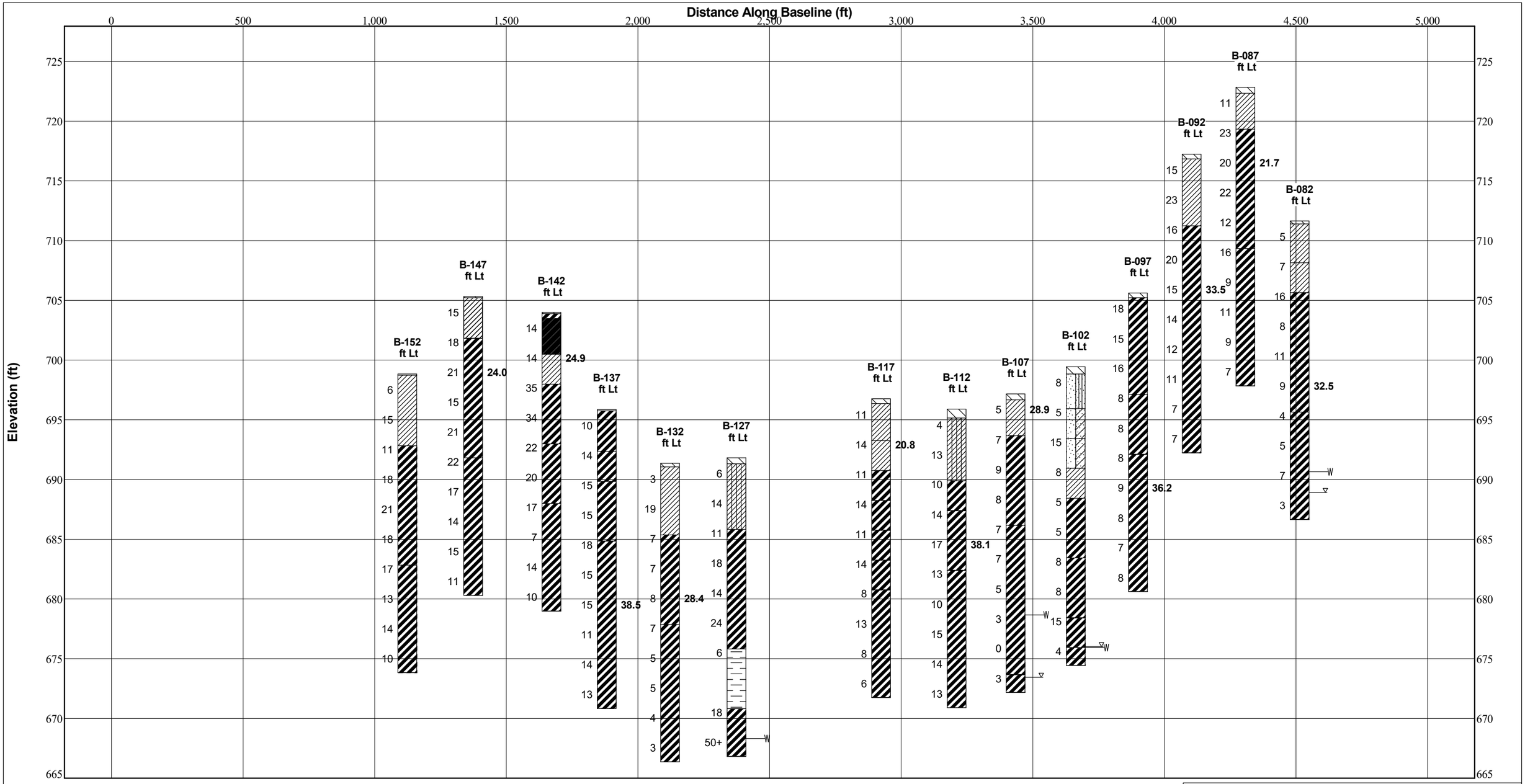
SC

S-N 3

SUBSURFACE PROFILE

Ford H4 Battery Plant

PROJECT NO. 2150-9519.50



Legend

SPT N Value 10 13.0 Moisture Content (%) / LI (in app.)

Seepage Encountered

Water Level (drilling water added)

Water Level

Top of Rock

Strata Symbols

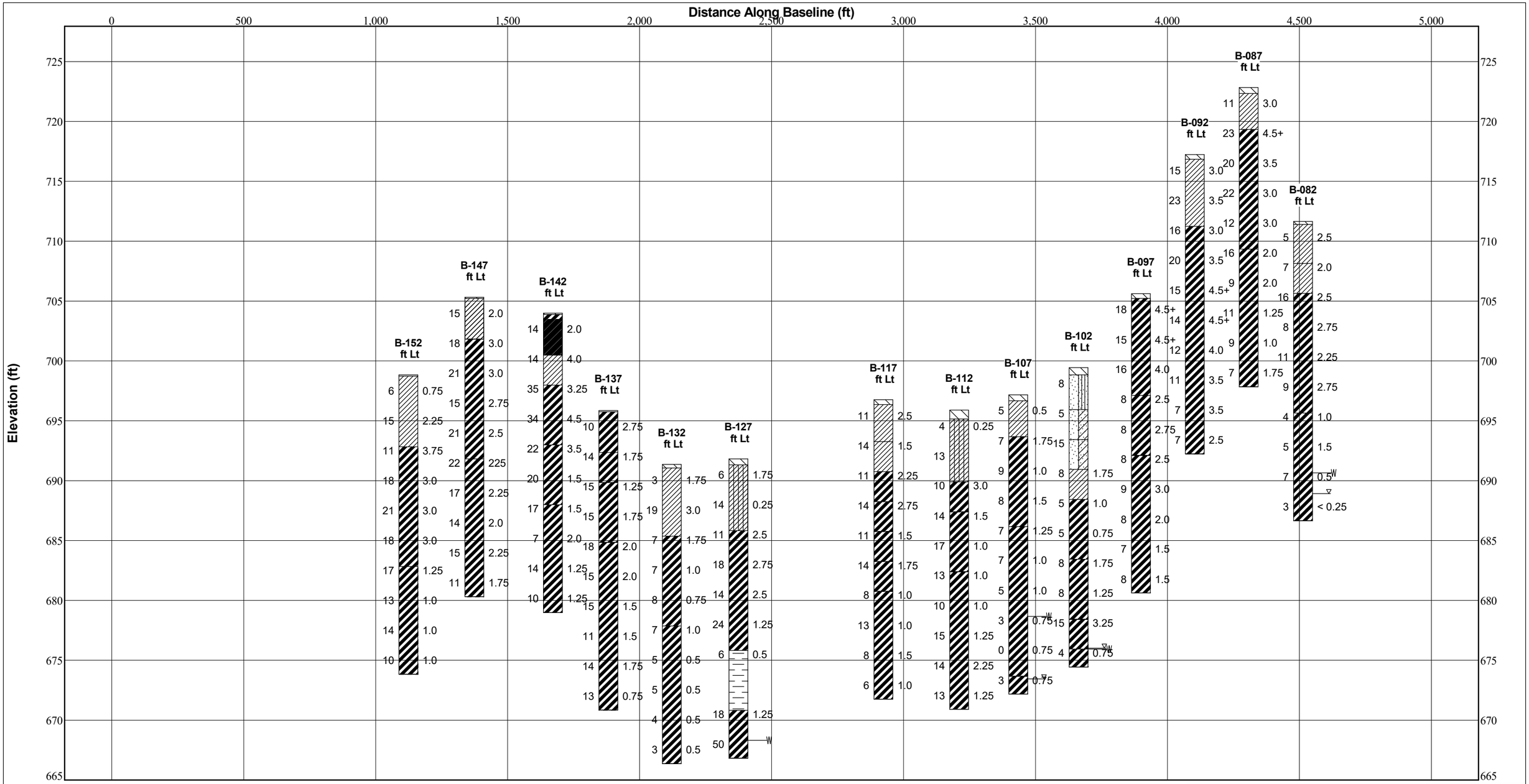
- Sod and Topsoil
- USCS Poorly-graded Sand with Clay
- USCS Low Plasticity Clay
- USCS Low Plasticity Silty Clay
- USCS High Plasticity Clay
- USCS Low Plasticity Organic silt or clay
- USCS Poorly-graded Sand with Silt

S-N 4

SUBSURFACE PROFILE

Ford H4 Battery Plant

PROJECT NO. 2150-9519.50



Legend

SPT N Value 10 3.0 Hand Penetrometer (tsf)

Seepage Encountered

Water Level (drilling water added)

Water Level

Top of Rock

Strata Symbols

TOPSOIL

CL

CH

SP-SM

SP-SC

CL-ML

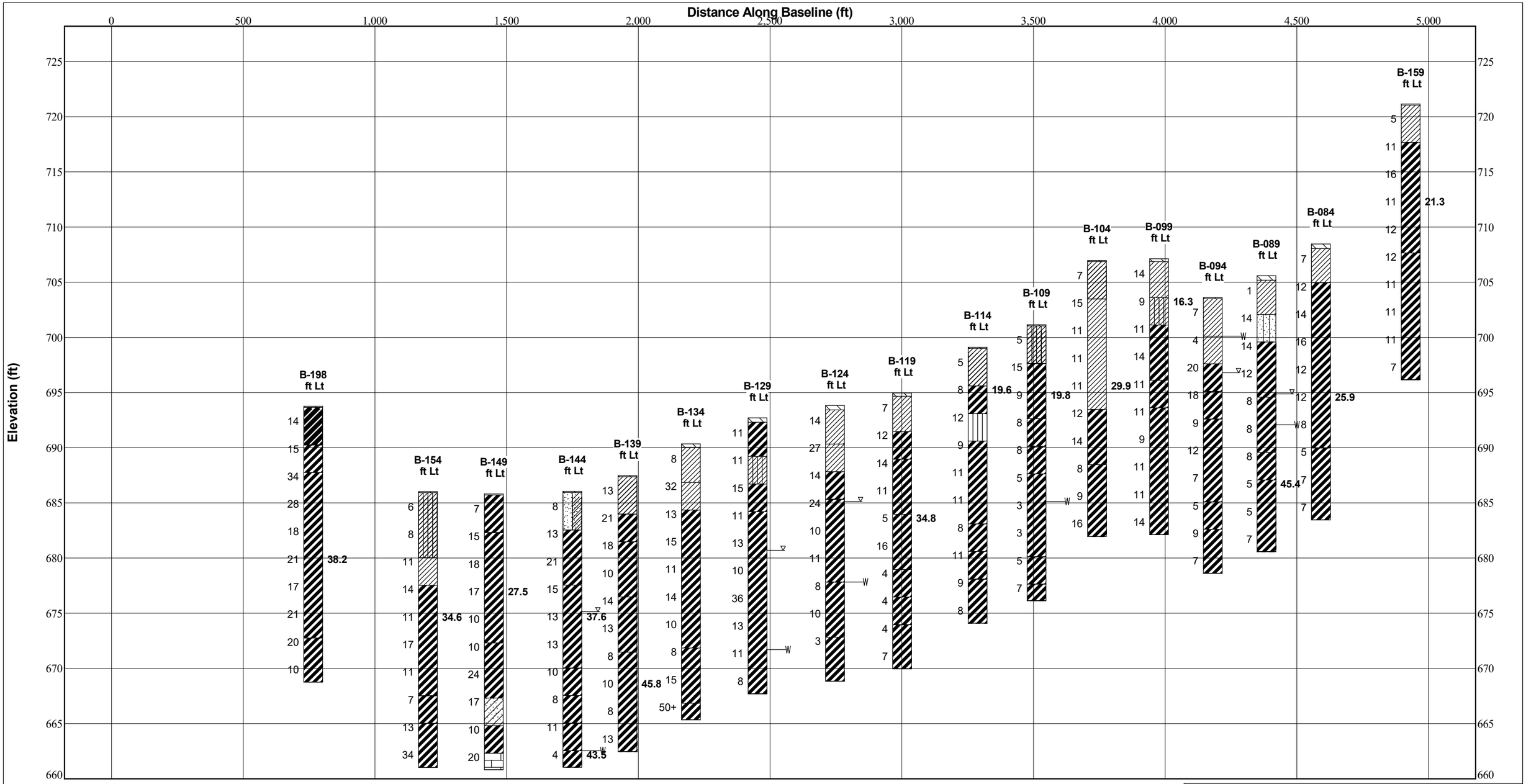
OL

S-N 4

SUBSURFACE PROFILE

Ford H4 Battery Plant

PROJECT NO. 2150-9519.50



Legend

SPT N Value 10 13.0 Moisture Content (%) / LI (in app.)

Seepage Encountered

Water Level (drilling water added)

Water Level

Top of Rock

Strata Symbols

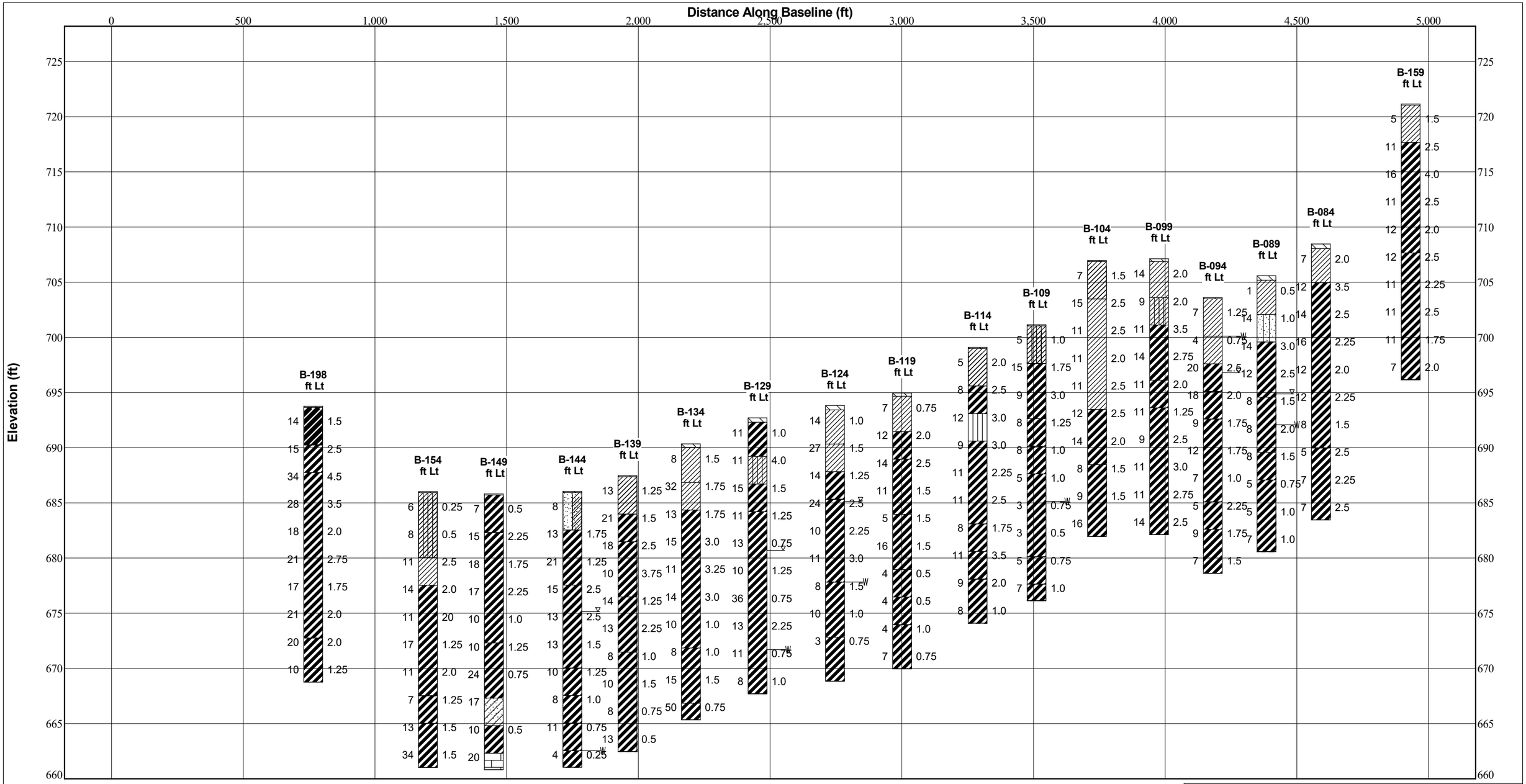
- Sod and Topsoil
- USCS Low Plasticity Clay
- USCS High Plasticity Clay
- USCS Silty Sand
- USCS Low Plasticity Silty Clay
- USCS Silt
- USCS Poorly-graded Sand with Clay
- USCS Clayey Sand
- Ohio DOT: Limestone

S-N 5

SUBSURFACE PROFILE

Ford H4 Battery Plant

PROJECT NO. 2150-9519.50



Legend

SPT N Value 10 3.0 Hand Penetrometer (tsf)

Seepage Encountered

Water Level (drilling water added)

Water Level

Top of Rock

Strata Symbols

TOPSOIL

CL

CH

SM

CL-ML

ML

SP-SC

SC

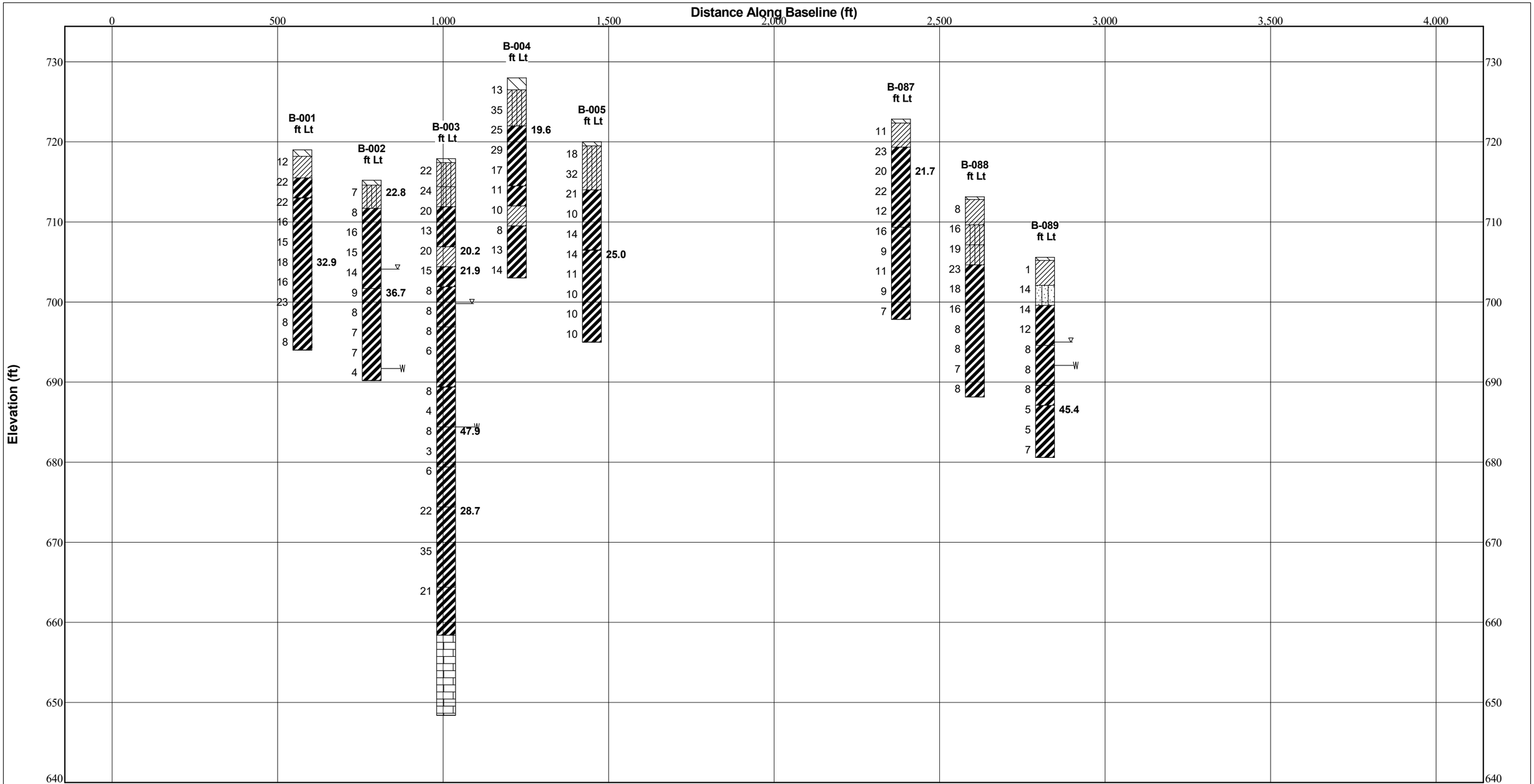
LIMESTONE

S-N 5

SUBSURFACE PROFILE

Ford H4 Battery Plant

PROJECT NO. 2150-9519.50



Legend

SPT N Value 10 13.0 *Moisture Content (%) / LI (in app.)*

Seepage Encountered

Water Level (drilling water added)

Water Level

Top of Rock

Strata Symbols

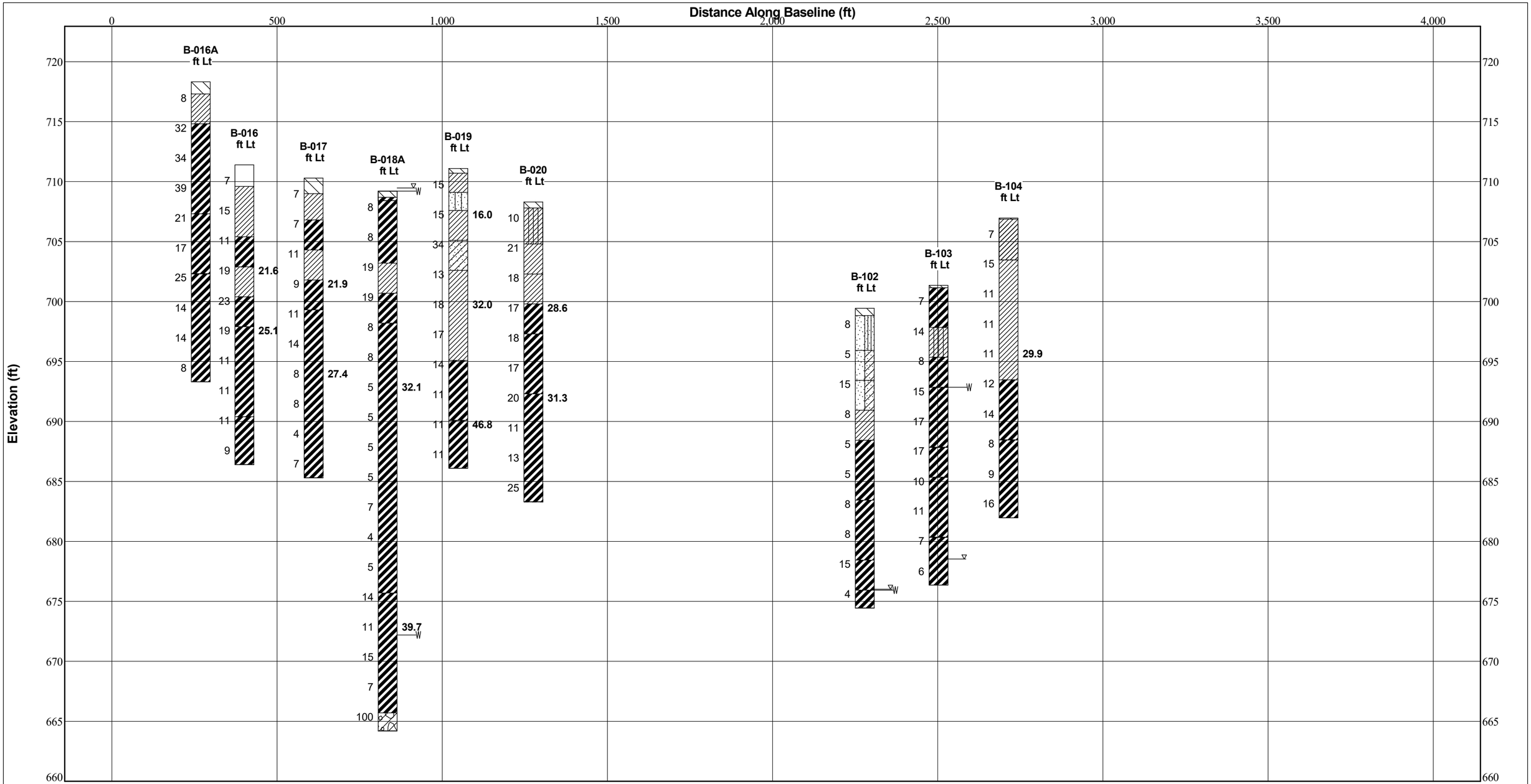
- Sod and Topsoil
- Ohio DOT: Limestone
- USCS Low Plasticity Clay
- USCS Silty Sand
- USCS High Plasticity Clay
- USCS Low Plasticity Silty Clay

W-E 1

SUBSURFACE PROFILE

Ford H4 Battery Plant

PROJECT NO. 2150-9519.50



Legend

SPT N Value 10 13.0 — Moisture Content (%) / LI (in app.)

W — Seepage Encountered

Water Level (drilling water added)

Water Level

TR — Top of Rock

Strata Symbols

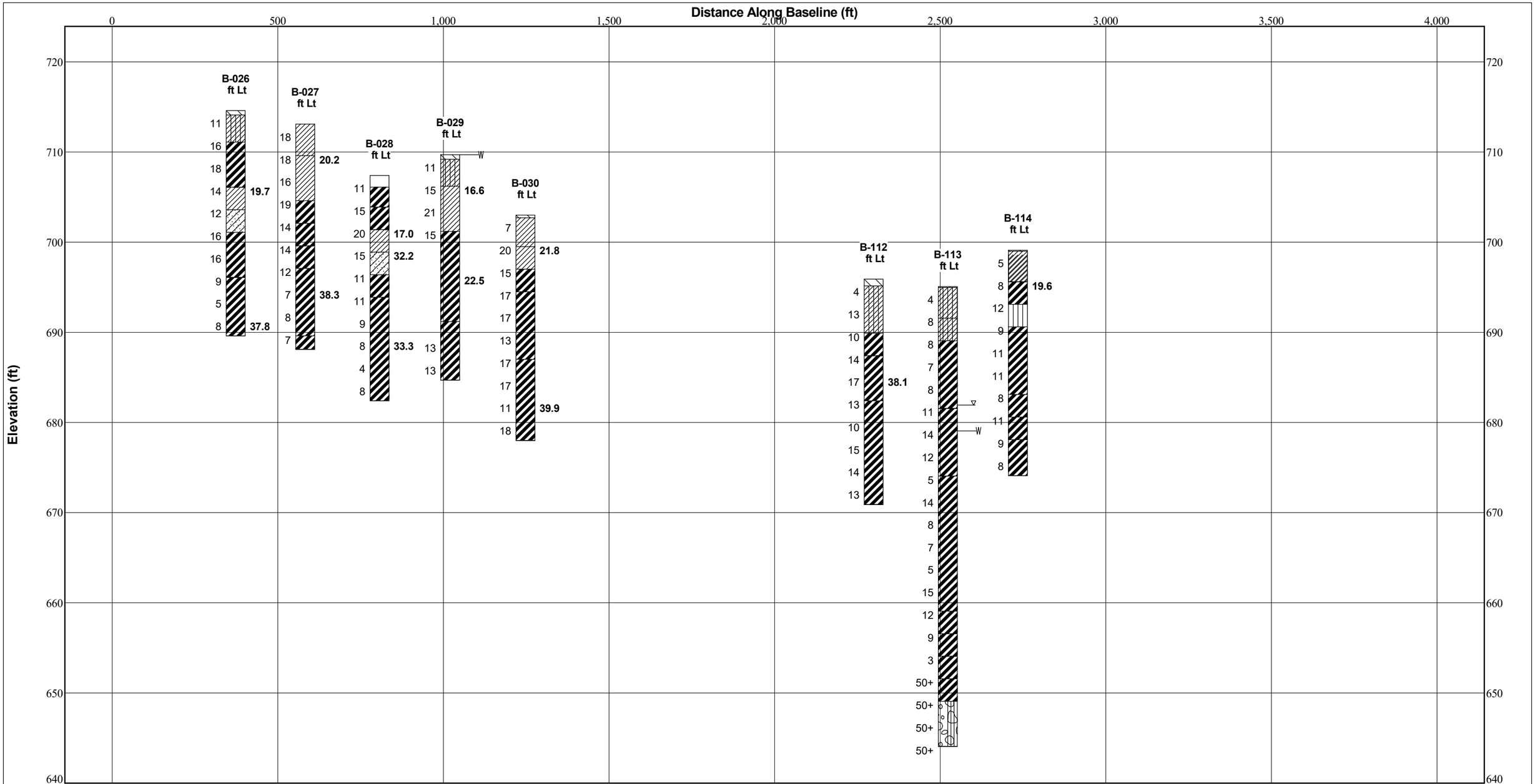
- USCS Low Plasticity Clay
- USCS Silty Sand
- USCS Poorly-graded Sand with Clay
- USCS High Plasticity Clay
- USCS Clayey Sand
- Sod and Topsoil
- USCS Low Plasticity Silty Clay
- USCS Clayey Gravel
- USCS Poorly-graded Sand with Silt

W-E 2

SUBSURFACE PROFILE

Ford H4 Battery Plant

PROJECT NO. 2150-9519.50



Legend

SPT N Value 10 13.0 *Moisture Content (%) / LI (in app.)*

Seepage Encountered

Water Level (drilling water added)

Water Level

Top of Rock

Strata Symbols

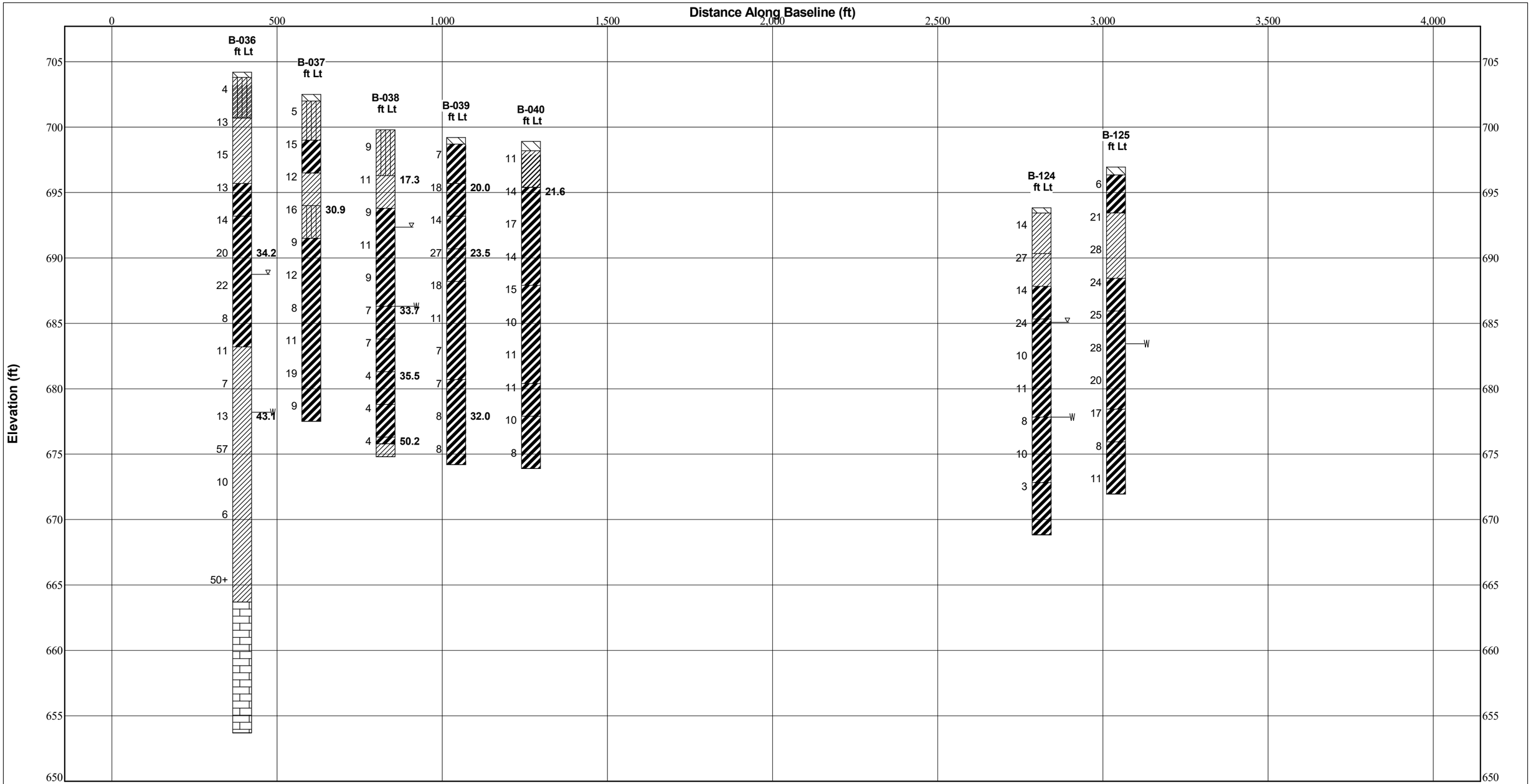
- Sod and Topsoil
- USCS Clayey Sand
- USCS Low Plasticity Silty Clay
- USCS Poorly-graded Gravel with Silt
- USCS High Plasticity Clay
- USCS Silt
- USCS Low Plasticity Clay

W-E 3

SUBSURFACE PROFILE

Ford H4 Battery Plant

PROJECT NO. 2150-9519.50



Legend

SPT N Value 10 13.0 *Moisture Content (%) / LI (in app.)*

Seepage Encountered

Water Level (drilling water added)

Water Level

Top of Rock

Strata Symbols

Sod and Topsoil

Ohio DOT: Limestone

USCS Low Plasticity Silty Clay

USCS Low Plasticity Clay

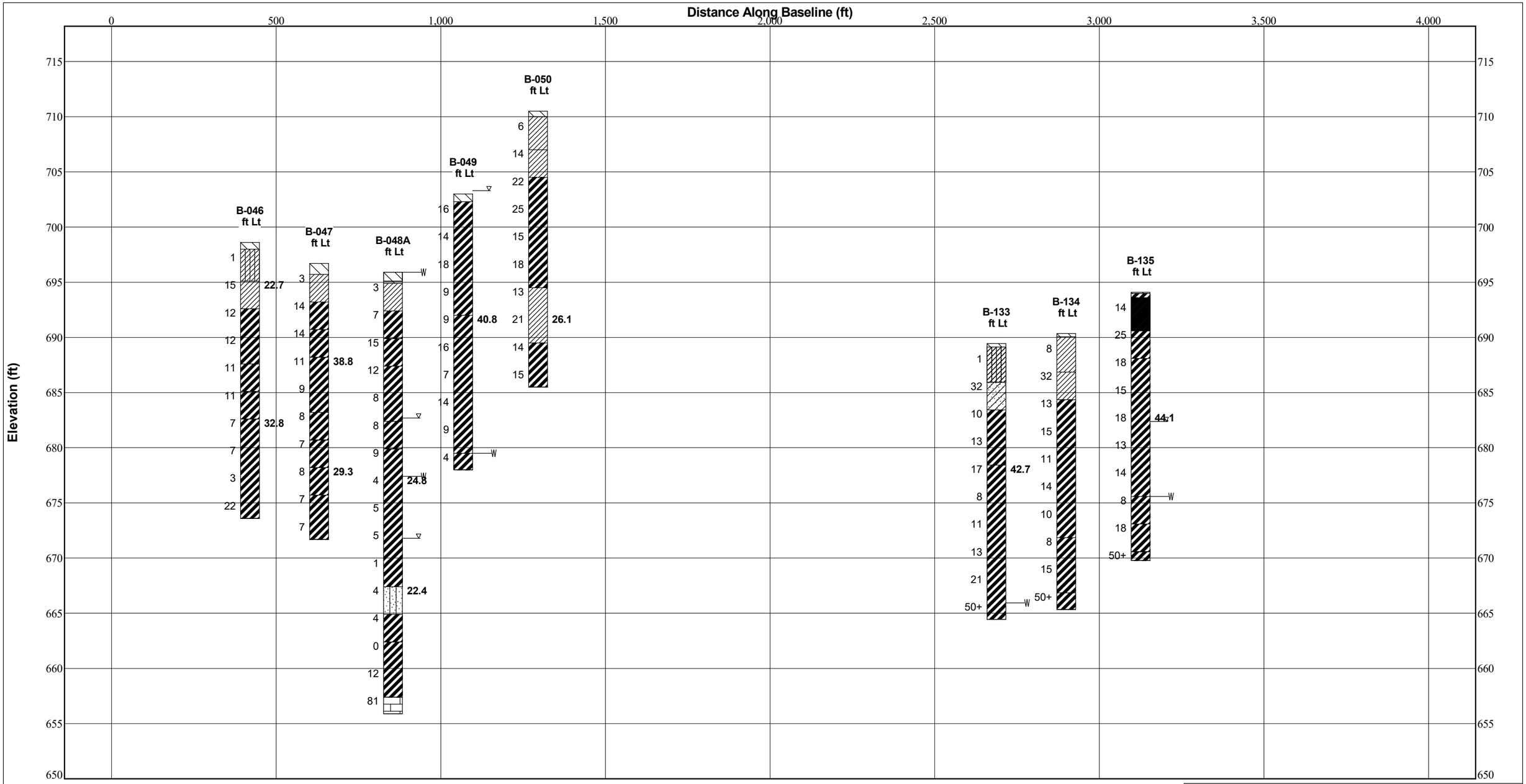
USCS High Plasticity Clay

W-E 4

SUBSURFACE PROFILE

Ford H4 Battery Plant

PROJECT NO. 2150-9519.50



Legend

SPT N Value 10 13.0 — Moisture Content (%) / LI (in app.)

W — Seepage Encountered

Water Level (drilling water added)

Water Level

TR — Top of Rock

Strata Symbols

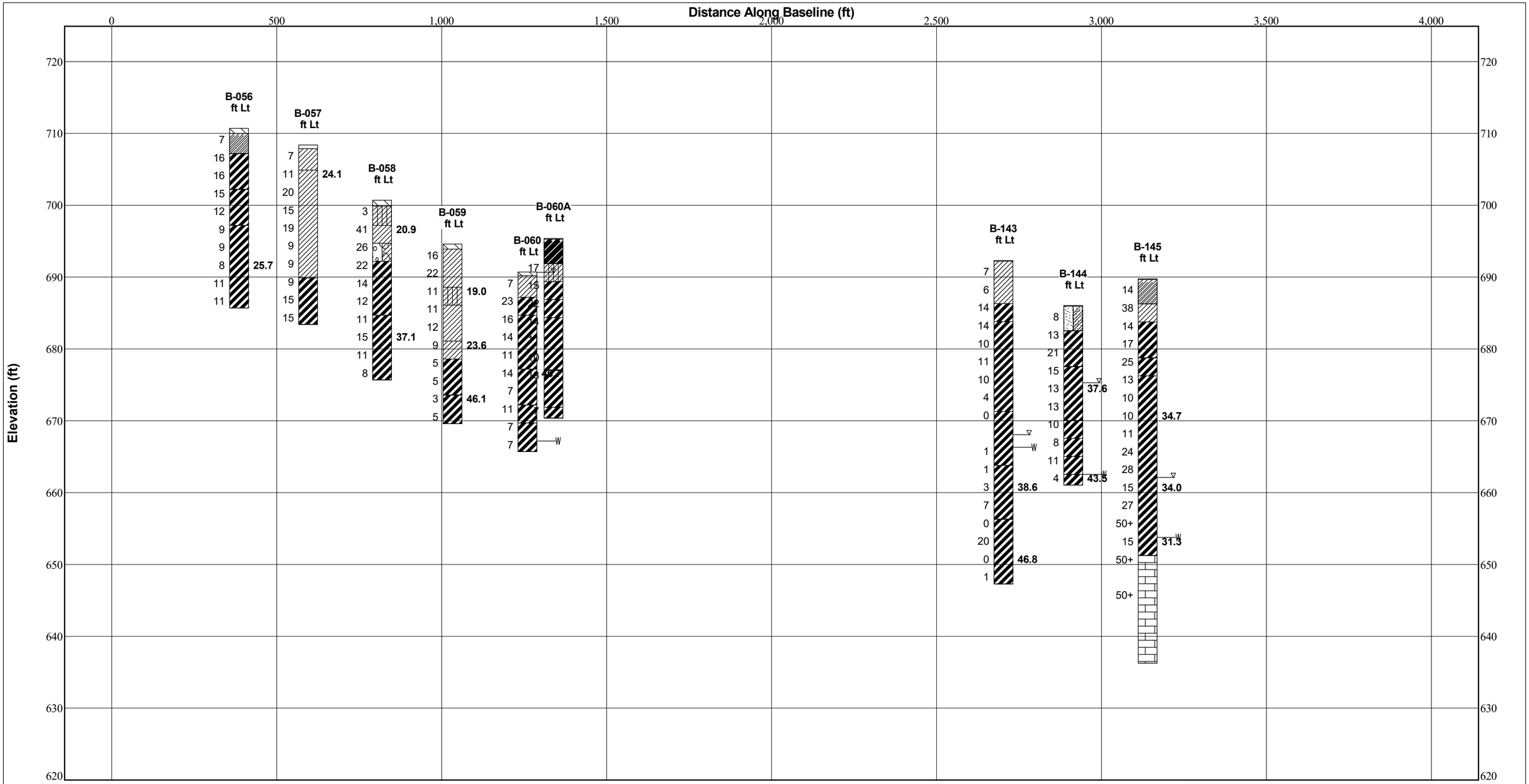
- Sod and Topsoil
- USCS Silty Sand
- USCS Low Plasticity Silty Clay
- Ohio DOT: Limestone
- USCS Low Plasticity Clay
- USCS Clayey Sand
- USCS High Plasticity Clay

W-E 5

SUBSURFACE PROFILE

Ford H4 Battery Plant

PROJECT NO. 2150-9519.50



Legend

SPT N Value 10 13.0 *Moisture Content (%) / LI (in app.)*

W *Seepage Encountered*

Water Level (drilling water added)

Water Level

TR *Top of Rock*

Strata Symbols

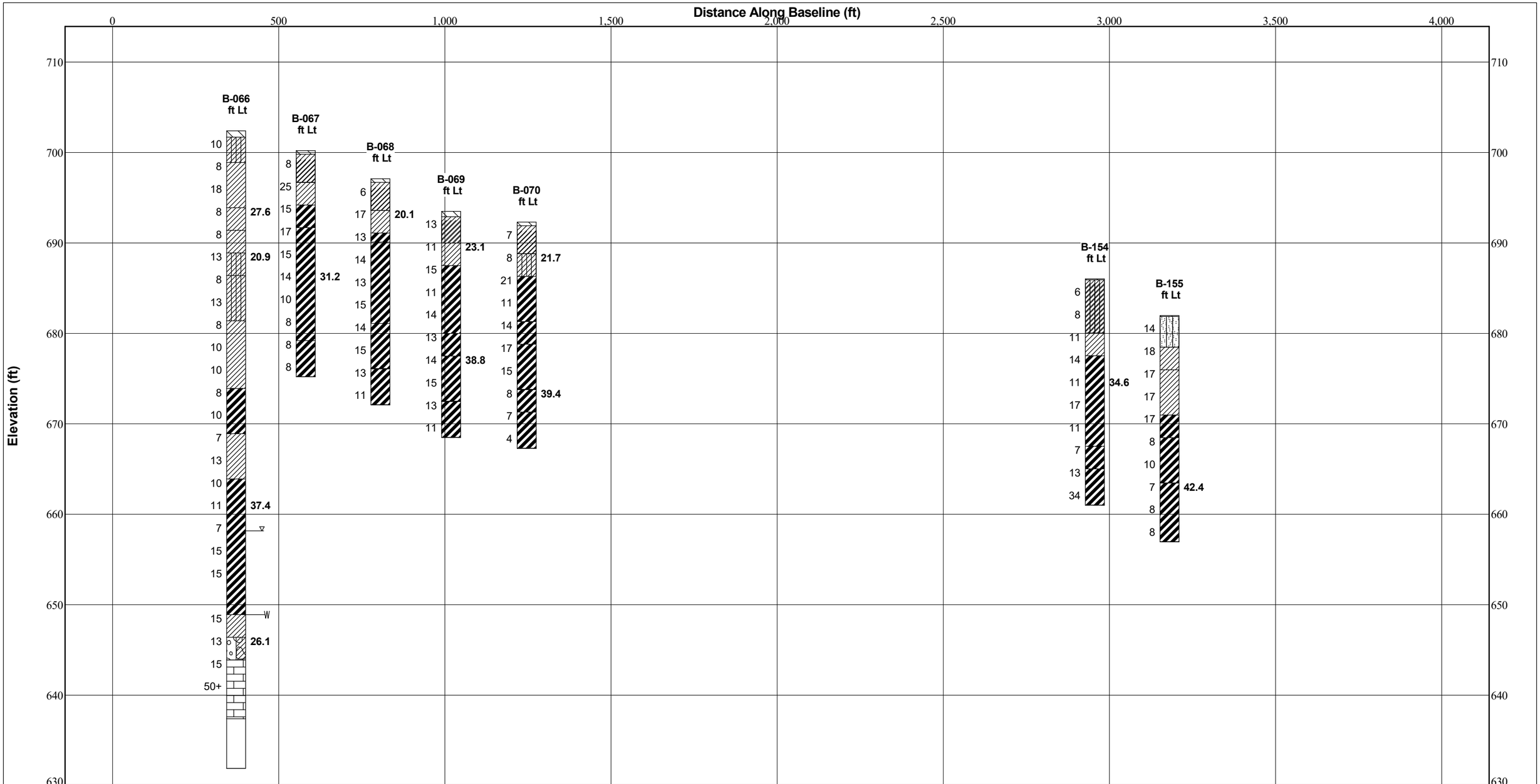
- Sod and Topsoil
- USCS Low Plasticity Clay
- USCS High Plasticity Clay
- USCS Low Plasticity Silty Clay
- USCS Poorly-graded Gravel with Clay
- USCS Poorly-graded Sand with Clay
- Ohio DOT: Limestone

W-E 6

SUBSURFACE PROFILE

Ford H4 Battery Plant

PROJECT NO. 2150-9519.50



Legend

SPT N Value 10 13.0 *Moisture Content (%) / LI (in app.)*

Seepage Encountered

Water Level (drilling water added)

Water Level

Top of Rock

Strata Symbols

- Sod and Topsoil
- USCS Poorly-graded Gravel with Clay
- USCS Low Plasticity Silty Clay
- Ohio DOT: Limestone
- USCS Low Plasticity Clay
- USCS Silty Sand
- USCS High Plasticity Clay

W-E 7

SUBSURFACE PROFILE

Ford H4 Battery Plant

PROJECT NO. 2150-9519.50

Appendix B

- **Laboratory Test Results**
- **Calculations**

Boring	Sample	Depth	USCS	Gradation						Atterberg Limits			Moisture	Group
Number	Number	(feet)	Class.	% AGG	% C. Snd	% M. Snd	% F. Snd	% Silt	% Clay	LL	PL	PI	Content %	Index
B-001	S-6	13.5	ML	0	0	1	15	19	65		NP		33	8
B-001A	S-7	16	ML	0	0	1	20	32	47		NP		28	8
B-002	S-1	1	CL	0	0	5	16	50	29	31	17	14	23	10
B-002	S-6	13.5	ML	0	0	0	9	18	72		NP		37	8
B-003	S-5	11	SC	0	0	1	49	14	36	36	18	18	20	6
B-003	S-6	13.5	ML	0	0	1	48	32	20	7	39	-32	22	3
B-003	S-13	33.5	CH	16	3	10	9	10	45	53	18	35	48	13
B-003	S-16	43.5				-				0	0	0	29	0
B-004	S-3	6				-				0	0	0	20	0
B-005	S-6	13.5	CL	0	0	1	35	27	38	32	18	14	25	8
B-006A	S-8	18.5	SM	0	0	2	49	17	33		NP		22	3
B-007	S-3	6	CL	0	0	1	26	38	35	29	15	14	21	9
B-007	S-8	18.5				-				0	0	0	18	0
B-008	S-4	8.5	CL	0	0	1	36	40	23	23	9	14	17	7
B-008	S-6	13.5				-				0	0	0	28	0
B-009	S-2	3.5	CL	0	0	1	36	17	46	38	16	22	20	10
B-010	S-2	3.5				-				0	0	0	5	0
B-010	S-4	8.5	CH	0	0	0	10	24	65	54	20	34	27	19
B-010	S-13	31	CL	0	0	1	6	16	77	48	25	23	39	15
B-010	ST-1	33	CL	0	0	1	26	15	58	38	17	21	32	12
B-011	S-6	13.5				-				0	0	0	31	0
B-011	S-13	33.5	CH	0	0	0	0	24	76	54	21	33	39	19
B-011	S-17	43.5				-				0	0	0	48	0
B-011A	S-4	8.5	ML	0	0	0	5	22	73		NP		30	8
B-011A	ST-1	31	CL	0	0	8	11	28	52	44	22	22	38	14
B-012	S-4	8.5	CL	0	0	1	32	37	29	22	10	12	19	7
B-013	S-4	8.5				-				0	0	0	22	0
B-013	S-9	21	CL	0	0	0	12	38	49	37	15	22	29	13
B-014	S-3	6	ML	0	0	1	44	25	30		NP		20	4
B-014	S-4	8.5	CL	0	0	1	44	18	37	30	14	16	23	6
B-014	S-5	11				-				0	0	0	23	0
B-014	S-9	21	CL	0	0	2	12	49	36	34	13	21	23	12
B-015	S-5	11				-				0	0	0	22	0
B-015	S-9	21	ML	0	0	2	30	30	39		NP		26	7
B-016	S-4	8.5	CL	0	0	1	35	25	39	35	14	21	22	10
B-016	S-6	13.5	CL	0	0	1	19	32	48	39	21	18	25	11
B-017	S-4	8.5				-				0	0	0	22	0
B-017	S-7	16	CL	0	0	1	20	33	46	38	18	20	27	12
B-018A	S-7	16	CL	0	0	1	12	25	62	39	21	18	32	11
B-018A	S-15	36	CH	0	0	0	2	33	65	59	20	39	40	20
B-019	S-2	3.5	CL	0	0	1	41	36	22	20	12	8	16	4
B-019	S-5	11	ML	0	0	0	10	13	76	45	27	18	32	12
B-019	S-9	21	CH	0	0	0	7	12	81	51	23	28	47	17
B-020	S-4	8.5	CL	0	0	0	23	22	55	48	16	32	29	18
B-020	S-7	16				-				0	0	0	31	0
B-021	S-3	6	CL	0	0	1	21	47	31	25	13	12	14	9
B-021	S-4	8.5				-				0	0	0	18	0
B-021A	S-7	16		0	0	0	2	11	87	0	0	0	50	0
B-021A	S-10	23.5				-				0	0	0	37	0
B-022	S-2	3.5	CL	0	0	1	49	18	32	34	15	19	21	6
B-022	S-4	8.5	CL	3	1	1	15	43	37	36	14	22	22	13
B-022	S-7	16	MH	0	0	0	2	14	83	58	32	26	42	18
B-023	S-6	13.5	MH	0	0	0	3	30	67	53	29	24	31	16
B-024	S-3	6	SM	0	0	1	52	9	37	5	20	-15	22	2
B-024	S-9	21	MH	12	1	2	3	18	64	58	32	26	36	18
B-025	ST-1	28	CL	0	0	1	22	19	58	41	18	23	32	13
B-026	S-4	8.5	SC	0	0	1	55	13	31	32	18	14	20	3
B-026	S-10	23.5				-				0	0	0	38	0
B-026A	S-4	8.5	ML	0	0	1	42	17	40		NP		22	4
B-027	S-2	3.5	CL	0	0	1	38	21	40	38	19	19	20	9
B-027	S-8	18.5	CL	0	0	7	15	22	56	46	27	19	38	13
B-028	S-3	6	CL	0	0	1	44	29	26	25	14	11	17	4
B-028	S-4	8.5	MH	5	1	1	10	24	58	50	29	21	32	14
B-028	S-8	18.5	CH	0	0	0	1	26	74	60	22	38	33	20
B-029	S-2	3.5				-				0	0	0	17	0
B-029	S-6	13.5	CH	0	0	4	13	31	51	53	17	36	23	19
B-030	S-2	3.5				-				0	0	0	22	0
B-030	S-9	21	CH	0	0	1	5	12	82	60	26	34	40	20
B-031	S-6	13.5				-				0	0	0	28	0
B-031A	S-6	13.5		0	0	1	35	30	34	0	0	0	24	0
B-032	S-4	8.5	SC	0	0	1	57	15	27	29	17	12	18	2

Boring	Sample	Depth	USCS	Gradation						Atterberg Limits			Moisture	Group
Number	Number	(feet)	Class.	% AGG	% C. Snd	% M. Snd	% F. Snd	% Silt	% Clay	LL	PL	PI	Content %	Index
B-032	S-8	18.5	ML	2	1	3	23	27	45	36	25	11	25	8
B-033A	S-4	8.5		0	0	1	31	41	27	0	0	0	21	0
B-033A	S-16	38.5		0	0	6	20	33	41	0	0	0	27	0
B-034	S-5	11	SC	0	0	2	55	14	29	27	10	17	19	4
B-034	S-8	18.5				-				0	0	0	31	0
B-035	S-4	8.5	CL	0	0	1	31	29	38	32	15	17	22	9
B-035	S-8	18.5	CL	0	0	2	21	35	43	34	14	20	23	12
B-036	S-6	13.5	CH	3	2	2	18	11	64	55	26	29	34	19
B-036	S-11	26	CH	0	0	0	1	44	54	51	22	29	43	18
B-036	ST-1	36	CH	0	0	0	3	36	61	51	17	34	35	18
B-037	S-4	8.5	ML	0	0	1	19	18	62		NP		31	8
B-038	S-2	3.5				-				0	0	0	17	0
B-038	S-6	13.5				-				0	0	0	34	0
B-038	S-8	18.5	CH	0	0	1	3	25	71	57	23	34	36	19
B-038	S-10	23.5	CH	0	0	1	9	31	59	59	23	36	50	20
B-039	S-2	3.5				-				0	0	0	20	0
B-039	S-4	8.5	ML	22	3	3	11	17	44		NP		24	5
B-039	S-9	21				-				0	0	0	32	0
B-040	S-2	3.5	CL	0	0	0	5	45	50	37	15	22	22	13
B-041	S-2	3.5	CH	0	0	0	8	52	40	50	12	38	23	18
B-041	S-7	16				-				0	0	0	27	0
B-041	0	189.9				-				0	0	0	18	0
B-042	S-5	11				-				0	0	0	21	0
B-043	S-4	8.5	CL	28	1	2	9	21	38	38	17	21	21	9
B-044	S-3	6	ML	5	1	1	7	21	65		NP		35	8
B-044	S-9	21	CL	3	0	1	25	36	35	30	15	15	23	9
B-046	S-2	3.5	CL	0	0	1	12	50	37	33	15	18	23	11
B-046	S-7	16	CH	0	0	0	3	30	66	53	21	32	33	19
B-047	S-4	8.5	ML	0	0	1	7	17	75		NP		39	8
B-047	S-8	18.5	CL	8	1	1	7	30	52	34	17	17	29	11
B-048A	S-8	18.5		0	0	1	50	21	28	0	0	0	25	0
B-048A	S-12	28.5		0	0	1	56	19	23	0	0	0	22	0
B-049	S-5	11	CH	2	1	2	4	19	71	59	26	33	41	20
B-050	S-8	18.5	CL	0	0	1	16	39	44	38	18	20	26	12
B-051	S-7	16	CH	0	0	0	11	19	69	50	28	22	34	15
B-052	S-2	3.5	CL-ML	0	0	1	22	51	26	22	15	7	18	8
B-052	S-8	18.5				-				0	0	0	28	0
B-053	S-6	13.5	CL	0	0	1	10	34	54	37	14	23	26	13
B-054	S-2	3.5	ML	37	1	4	5	11	41		NP		28	4
B-055	S-3	6	CH	1	0	1	2	12	84	61	28	33	39	20
B-055	S-10	23.5	CH	1	0	1	4	41	52	90	21	69	29	20
B-056	S-8	18.5	CL	0	0	2	20	30	47	35	13	22	26	13
B-057	S-2	3.5	ML	0	0	1	16	31	52	43	27	16	24	11
B-058	S-2	3.5	CL	9	1	2	14	47	26	30	15	15	21	10
B-058	S-8	18.5	ML	0	0	1	11	16	72	25	42	-17	37	8
B-059	S-3	6	CL	0	0	0	13	54	33	22	14	8	19	8
B-059	S-6	13.5	CL	22	3	2	13	22	38	32	16	16	24	7
B-059	S-9	21				-				0	0	0	46	0
B-060	S-6	13.5	ML	0	0	0	1	7	91		NP		47	8
B-061	S-7	16	CH	0	1	2	23	19	55	56	18	38	27	19
B-061	S-10	23.5	CH	2	1	1	3	11	82	91	27	64	52	20
B-062	S-1	1				-				0	0	0	18	0
B-062	S-8	18.5	CH	0	0	0	8	21	71	53	21	32	33	19
B-063	S-4	8.5	CL	0	0	1	15	19	64	46	19	27	30	16
B-063	S-13	31	ML	11	3	4	13	21	47		NP		33	7
B-065	S-5	11	CL	0	0	1	17	23	58	48	25	23	32	15
B-065	S-9	21				-				0	0	0	44	0
B-065A	S-7	16		0	0	2	5	23	71	0	0	0	34	0
B-066	S-4	8.5				-				0	0	0	28	0
B-066	S-6	13.5	CL	1	0	5	18	52	24	25	17	8	21	8
B-066	S-17	41	CH	0	0	2	20	20	57	55	22	33	37	19
B-066	S-22	56	GC	24	9	10	14	12	19	37	14	23	26	2
B-067	S-6	13.5	ML	5	1	1	9	19	65		NP		31	8
B-068	S-2	3.5				-				0	0	0	20	0
B-069	S-2	3.5	ML	0	0	2	11	42	45		NP		23	8
B-069	S-7	16				-				0	0	0	39	0
B-070	S-2	3.5	ML	0	0	2	10	53	35		NP		22	8
B-070	S-8	18.5		0	0	1	2	21	76	0	0	0	39	0
B-070A	S-5	11	ML	0	0	5	15	28	52		NP		33	8
B-071	S-6	13.5	CH	2	1	4	22	19	52	55	18	37	27	18
B-072	S-7	16	MH	0	0	1	16	11	72	55	30	25	35	17

Boring	Sample	Depth	USCS	Gradation						Atterberg Limits			Moisture	Group
Number	Number	(feet)	Class.	% AGG	% C. Snd	% M. Snd	% F. Snd	% Silt	% Clay	LL	PL	PI	Content %	Index
B-073	S-5	11	CH	5	1	2	7	20	67	60	25	35	33	20
B-074	S-2	3.5				-				0	0	0	23	0
B-074	S-6	13.5	CH	19	3	5	7	18	48	52	27	25	31	14
B-075	S-4	8.5				-				0	0	0	21	0
B-075	S-8	18.5	CH	1	1	3	9	0	0	53	28	25	45	17
B-075A	S-3	6		0	0	0	2	-28	43	0	0	0	29	0
B-076	S-9	21	CL	0	0	1	11	16	73	45	18	27	35	16
B-077	S-6	13.5	CH	0	0	0	16	11	73	60	22	38	35	20
B-078	S-7	16	CL	0	0	1	23	0	0	48	16	32	27	18
B-078	S-12	28.5				-				0	0	0	41	0
B-078	S-15	36	CH	4	0	1	2	0	0	70	16	54	56	20
B-078	ST-1	38	CH	0	0	0	0	21	78	54	28	26	52	17
B-079	S-2	3.5	CL	0	0	2	9	50	39	37	17	20	24	12
B-080	S-5	11	CH	3	3	4	9	15	66	67	25	42	42	20
B-081	S-7	16				-				0	0	0	25	0
B-082	S-6	13.5		0	0	0	3	-44	58	0	0	0	33	0
B-084	S-6	13.5	CL	0	0	0	14	38	47	42	21	21	26	13
B-085	S-2	3.5		0	0	0	2	-47	58	48	26	22	30	0
B-085	S-9	21				-				0	0	0	35	0
B-086	S-9	21	MH	1	0	0	4	11	83	60	36	24	58	18
B-087	S-3	6	ML	0	0	1	36	21	42		NP		22	6
B-089	S-8	18.5	MH	0	0	0	3	14	83	64	33	31	45	20
B-092	S-5	11	CL	0	0	0	12	13	74	29	7	22	34	13
B-093	S-5	11		0	0	0	22	25	52	0	0	0	27	0
B-095	S-3	6	ML	0	0	1	9	52	38		NP		22	8
B-096	S-5	11		0	0	1	64	8	26	0	0	0	19	0
B-097	S-7	16				-				44	24	20	36	0
B-098	S-16	38.5	SM	0	0	37	18	25	19		NP		13	2
B-099	S-2	3.5		0	0	0	13	0	30	0	0	0	16	0
B-100	S-8	18.5		0	0	2	6	11	81	0	0	0	39	0
B-101	S-4	8.5		0	0	6	5	15	73	0	0	0	39	0
B-104	S-5	11		0	0	1	14	27	59	0	0	0	30	0
B-106	S-9	21		0	0	0	0	30	69	0	0	0	33	0
B-107	S-5	11		0	0	0	2	57	41	0	0	0	29	0
B-109	S-3	6		0	0	1	32	39	28	0	0	0	20	0
B-110	S-7	16		3	3	3	12	25	54	0	0	0	38	0
B-111	S-9	21		1	0	1	5	15	78	0	0	0	52	0
B-112	S-5	11		3	1	1	15	19	61	0	0	0	38	0
B-114	S-2	3.5				-				0	0	0	20	0
B-115	S-7	16		2	3	4	15	17	59	0	0	0	32	0
B-117	S-2	3.5				-				0	0	0	21	0
B-119	S-5	11		0	0	0	5	25	70	0	0	0	35	0
B-120	S-3	6		10	2	3	29	28	27	0	0	0	20	0
B-121	S-7	16		15	4	5	5	11	60	0	0	0	35	0
B-123	S-4	8.5		0	0	0	6	0	0	0	0	0	26	0
B-123	S-9	21		0	0	3	17	31	48	0	0	0	28	0
B-126	S-6	13.5	CH	0	0	1	2	21	76	125	24	101	39	20
B-127	S-8	18.5		0	0	2	4	29	64	0	0	0	37	0
B-131	S-7	16		7	1	1	5	20	66	0	0	0	37	0
B-132	S-5	11	MH	0	0	1	10	46	42	64	50	14	28	14
B-133	S-7	16	MH	24	4	7	6	17	42	54	44	10	43	6
B-135	S-5	11	CH	0	4	1	2	14	80	66	30	36	44	20
B-137	S-7	16	ML	0	0	1	8	16	75	49	28	21	39	14
B-138	S-9	21				-				0	0	0	47	0
B-138	S-10	23		9	1	0	2	35	53	0	0	0	36	0
B-139	S-8	18.5		4	0	1	3	14	78	0	0	0	46	0
B-140	S-3	6	CH	11	2	2	7	23	55	60	28	32	31	20
B-141	S-3	6	MH	0	0	0	11	14	75	56	47	9	31	11
B-142	S-2	3.5		0	0	1	12	39	47	0	0	0	25	0
B-143	ST-1	23		6	1	3	7	19	64	0	0	0	46	0
B-143	S-13	31		27	2	3	5	19	45	0	0	0	39	0
B-143	S-17	41		12	3	4	6	36	39	0	0	0	47	0
B-144	S-5	11		15	1	1	3	14	66	0	0	0	38	0
B-144	S-10	23.5				-				0	0	0	44	0
B-145	S-8	18.5	CL	0	0	1	8	23	68	48	21	27	35	16
B-145	S-12	28.5	CH	1	0	1	4	33	60	53	19	34	34	19
B-145	S-15	36				-				0	0	0	31	0
B-147	S-3	6		0	0	1	13	39	47	0	0	0	24	0
B-148	S-8	18.5	CH	0	0	1	11	19	69	55	26	29	37	19
B-149	S-4	8.5				-				0	0	0	28	0
B-150	S-7	16		6	0	2	3	21	69	0	0	0	41	0

Boring	Sample	Depth	USCS	Gradation						Atterberg Limits			Moisture	Group
Number	Number	(feet)	Class.	% AGG	% C. Snd	% M. Snd	% F. Snd	% Silt	% Clay	LL	PL	PI	Content %	Index
B-150	S-10	23.5				-				0	0	0	51	0
B-151	ST-1	23		1	1	2	5	30	61	0	0	0	41	0
B-153	ST-1	26		0	0	2	3	31	64	0	0	0	41	0
B-154	S-5	11	CH	2	1	2	10	25	61	59	22	37	35	20
B-155	S-8	18.5	CH	1	0	1	8	23	66	61	21	40	42	20
B-156	S-2	3.5		0	0	1	22	43	33	0	0	0	19	0
B-157	S-4	8.5	ML	0	0	1	35	31	34	16	35	-19	18	6
B-158	ST-1	15		0	0	1	31	29	38	0	0	0	27	0
B-158	S-8	18.5				-				0	0	0	20	0
B-159	S-4	8.5		0	0	1	43	41	15	0	0	0	21	0
B-160	S-7	16	CH	0	0	1	2	21	77	60	12	48	45	20
B-161	S-3	6	MH	0	0	0	12	23	64	54	36	18	33	14
B-162	S-2	3.5	SM	0	0	4	49	11	37		NP		21	2
B-162	S-6	13.5				-				0	0	0	33	0
B-163	S-9	21	CL	0	0	1	24	27	48	35	10	25	29	14
B-166	S-4	8.5	CL	0	0	2	28	33	37	35	13	22	22	12
B-166	S-9	21				-				0	0	0	32	0
B-167	S-7	16	CL	0	0	1	20	27	52	40	14	26	28	14
B-168	S-1	1	ML	0	0	1	13	54	32	14	37	-23	21	8
B-168	S-2	3.5				-				0	0	0	21	0
B-171	S-7	16	CL	0	0	0	21	33	46	36	16	20	27	12
B-172	S-2	3.5				-				0	0	0	34	0
B-172	S-7	16	CL	3	0	1	14	22	58	46	27	19	34	13
B-175	S-3	6	ML	0	0	1	13	15	72	48	41	7	36	10
B-175	S-10	23.5	SC	1	0	1	60	11	26	27	15	12	18	1
B-177	S-7	16	MH	0	0	0	5	10	84	63	34	29	40	20
B-178	S-9	21	CH	0	0	0	1	16	83	109	22	87	47	20
B-180	S-1	1	CL	0	0	2	6	62	29	32	19	13	23	9
B-180	S-10	23.5				-				0	0	0	32	0
B-181	S-4	8.5	CL	0	0	1	44	15	40	38	21	17	21	7
B-182	S-6	13.5	CL	0	0	1	32	32	35	32	17	15	23	8
B-182	S-9	21				-				0	0	0	32	0
B-183	S-7	16		6	1	1	2	17	74	0	0	0	43	0
B-184	S-3	6	CL	0	0	1	23	41	35	31	18	13	24	9
B-185	S-4	8.5		0	0	2	56	18	24	0	0	0	19	0
B-185	ST-1	25		0	0	0	23	--76--	0	0	0	0	30	0
B-187	ST-1	23	CL	2	0	1	9	19	70	45	26	19	41	13
B-189	S-8	18.5	CL	0	0	0	16	27	57	41	24	17	34	11
B-190	S-2	3.5		0	0	2	13	49	36	0	0	0	25	0
B-191	S-9	21	CL	3	1	3	13	30	50	46	20	26	28	16
B-193	S-6	13.5		5	1	1	3	20	70	0	0	0	38	0
B-194	S-3	6	CL	0	0	2	14	44	40	39	21	18	22	11
B-195	S-4	8.5		0	0	0	59	8	32	0	0	0	19	0
B-196	S-4	8.5	MH	2	1	1	4	15	76	70	48	22	1341	17
B-197	S-2	3.5		0	4	14	16	44	22	0	0	0	19	0
B-198	S-6	13.5	CH	0	0	1	4	24	71	63	27	36	38	20
B-199	S-6	13.5		4	1	2	3	22	69	0	0	0	41	0
B-200	S-2	3.5	MH	0	1	2	13	24	60	50	30	20	32	14
B-201	S-6	13.5	CL	0	0	3	12	37	48	40	25	15	29	10

CLIENT	Barton Malow	DLZ JOB NUMBER	2150-9519.50
PROJECT	BMC: Ford Willow	SHEET NO.	1 OF 11
SUBJECT		TEST COMP. BY	TM DATE 12/2/21
EQUIPMENT	Concrete Load Frame	CHECKED BY	SR DATE 12/22/21

Unconfined Compressive Strength of Intact Rock Core Specimen (ASTM D7012)

Boring No.: B-010 Rock Description: Limestone

Run No.: R-1 Moisture Condition at Test: As Received

Depth: 62.7'-63.4'

Diameter:	1.978	1.982	1.982	1.983	1.982	1.983	**1.982** in
	(D_1)	(D_2)	(D_3)	(D_4)	(D_5)	(D_6)	(D_{AVG})

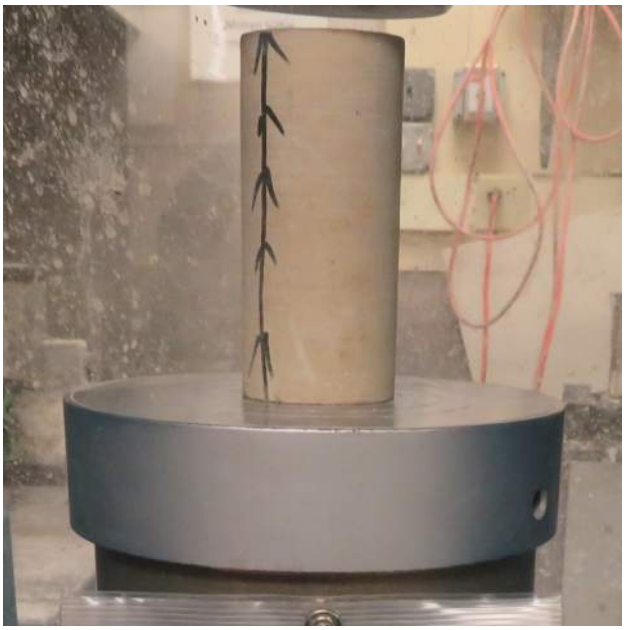
Length:	4.554	4.560	4.569	**4.561** in	$\frac{L}{D}$ = 2.302
	(L_1)	(L_2)	(L_3)	(L_{AVG})	

Volume: 0.008136994 ft^3 Mass: 517.76 g Unit Weight: **140.28** pcf

Failure Load: 16,862 lbs

Strength: 5,467 psi

Original Specimen



Fractured Specimen

Remarks:

6121 Huntley Road * Columbus, Ohio 43229-1003 * (614) 888-0040 * FAX (614) 431-4024

CLIENT	Barton Malow	DLZ JOB NUMBER	2150-9519.50
PROJECT	BMC: Ford Willow	SHEET NO.	2 OF 11
SUBJECT		TEST COMP. BY	KS DATE 12/22/21
EQUIPMENT	Concrete Load Frame	CHECKED BY	SR DATE 12/22/21

Unconfined Compressive Strength of Intact Rock Core Specimen (ASTM D7012)

Boring No.: B-011A Rock Description: Limestone

Run No.: R-1 Moisture Condition at Test: As Received

Depth: 63.0'-63.4'

Diameter:	1.983 (D_1)	1.977 (D_2)	1.977 (D_3)	1.991 (D_4)	1.975 (D_5)	1.979 (D_6)	**1.980** in (D_{AVG})
Length:	4.357 (L_1)	4.330 (L_2)	4.360 (L_3)	**4.349** in (L_{AVG})			
Capped Length	4.492 (L_1)	4.492 (L_2)	4.513 (L_3)	**4.499** in (L_{AVG})			

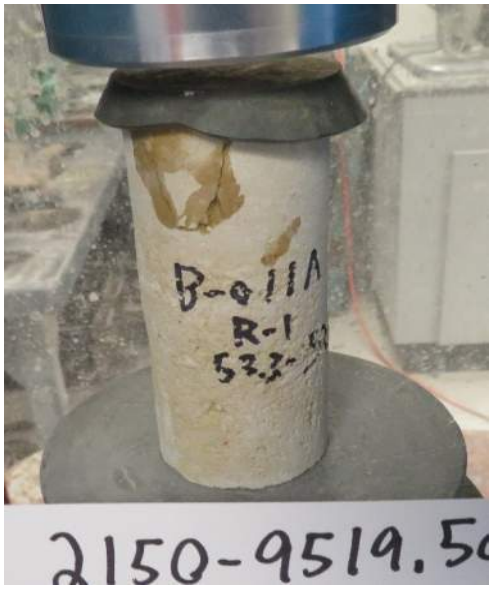
$\frac{L}{D}$ = 2.27

Volume: 0.007748341 ft^3 Mass: 438.26 g Unit Weight: **124.7** pcf

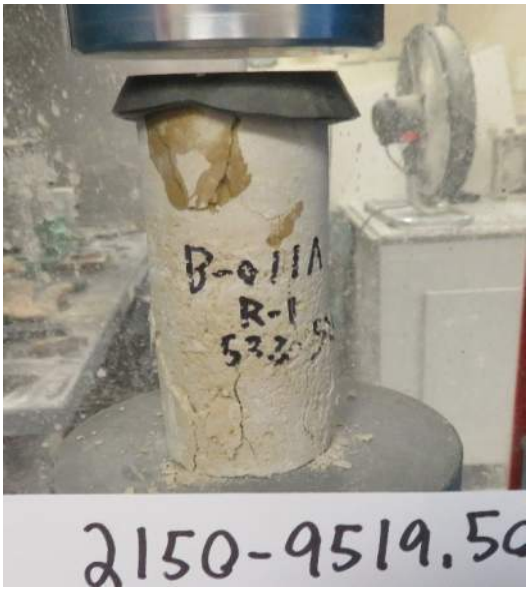
Failure Load: 3,778 lbs

Strength: 1,227 psi

Original Specimen



Fractured Specimen



Remarks:

6121 Huntley Road * Columbus, Ohio 43229-1003 * (614) 888-0040 * FAX (614) 431-4024

CLIENT	Barton Malow	DLZ JOB NUMBER	2150-9519.50
PROJECT	BMC: Ford Willow	SHEET NO.	3 OF 11
SUBJECT		TEST COMP. BY	TM DATE 12/2/21
EQUIPMENT	Concrete Load Frame	CHECKED BY	SR DATE 12/22/21

Unconfined Compressive Strength of Intact Rock Core Specimen (ASTM D7012)

Boring No.: B-011 Rock Description: Limestone

Run No.: R-1 Moisture Condition at Test: As Received

Depth: 53.1-53.6

Diameter:	1.985	1.978	1.981	1.986	1.982	1.988	**1.983** in
	(D_1)	(D_2)	(D_3)	(D_4)	(D_5)	(D_6)	(D_{AVG})

Length:	4.848	4.845	4.844	**4.846** in
	(L_1)	(L_2)	(L_3)	(L_{AVG})

$\frac{L}{D}$ = 2.443

Volume: 0.008659398 ft^3 Mass: 606.40 g Unit Weight: **154.39** pcf

Failure Load: 24,734 lbs

Strength: 8,006 psi

Original Specimen

Fractured Specimen

Remarks:

CLIENT	Barton Malow	DLZ JOB NUMBER	2150-9519.50
PROJECT	BMC: Ford Willow	SHEET NO.	4 OF 11
SUBJECT		TEST COMP. BY	TM DATE 12/2/21
EQUIPMENT	Concrete Load Frame	CHECKED BY	SR DATE 12/22/21

Unconfined Compressive Strength of Intact Rock Core Specimen (ASTM D7012)

Boring No.: B-025 Rock Description: Limestone

Run No.: R-1 Moisture Condition at Test: As Received

Depth: 39.0'-39.9'

Diameter:	1.980	1.984	1.982	1.983	1.985	1.982	**1.983** in
	(D_1)	(D_2)	(D_3)	(D_4)	(D_5)	(D_6)	(D_{AVG})

Length:	3.978	3.986	3.975	**3.980** in
	(L_1)	(L_2)	(L_3)	(L_{AVG})

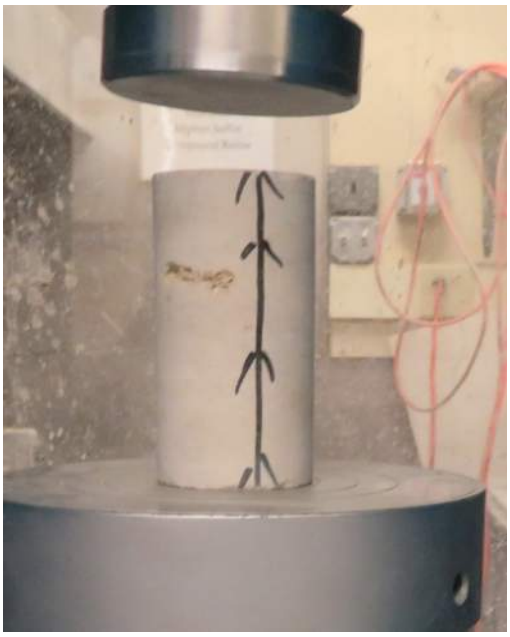
$\frac{L}{D}$ = 2.007

Volume: 0.007107041 ft^3 Mass: 501.42 g Unit Weight: **155.54** pcf

Failure Load: 48,357 lbs

Strength: 15,663 psi

Original Specimen



Fractured Specimen

Remarks:

6121 Huntley Road * Columbus, Ohio 43229-1003 * (614) 888-0040 * FAX (614) 431-4024

CLIENT	Barton Malow	DLZ JOB NUMBER	2150-9519.50
PROJECT	BMC: Ford Willow	SHEET NO.	5 OF 11
SUBJECT		TEST COMP. BY	TM DATE 12/2/21
EQUIPMENT	Concrete Load Frame	CHECKED BY	SR DATE 12/22/21

Unconfined Compressive Strength of Intact Rock Core Specimen (ASTM D7012)

Boring No.: B-025 Rock Description: Limestone

Run No.: R-1 Moisture Condition at Test: As Received

Depth: 43.0'-44.0'

Diameter:	1.973	1.980	1.973	1.978	1.983	1.978	**1.978** in
	(D_1)	(D_2)	(D_3)	(D_4)	(D_5)	(D_6)	(D_{AVG})

Length:	4.712	4.698	4.695	**4.702** in	$\frac{L}{D}$ = 2.378
	(L_1)	(L_2)	(L_3)	(L_{AVG})	

Volume: 0.008352713 ft^3 Mass: 523.13 g Unit Weight: **138.08** pcf

Failure Load: 7,565 lbs

Strength: 2,463 psi

Original Specimen

Fractured Specimen

Remarks:

6121 Huntley Road * Columbus, Ohio 43229-1003 * (614) 888-0040 * FAX (614) 431-4024

CLIENT	Barton Malow	DLZ JOB NUMBER	2150-9519.50
PROJECT	BMC: Ford Willow	SHEET NO.	6 OF 11
SUBJECT		TEST COMP. BY	KS DATE 12/22/21
EQUIPMENT	Concrete Load Frame	CHECKED BY	SR DATE 12/22/21

Unconfined Compressive Strength of Intact Rock Core Specimen (ASTM D7012)

Boring No.: B-083 Rock Description: Limestone

Run No.: R-1 Moisture Condition at Test: As Received

Depth: 57.3'-57.9'

Diameter:	2.000	2.000	2.000	2.010	2.007	1.998	**2.003** in
	(D_1)	(D_2)	(D_3)	(D_4)	(D_5)	(D_6)	(D_{AVG})

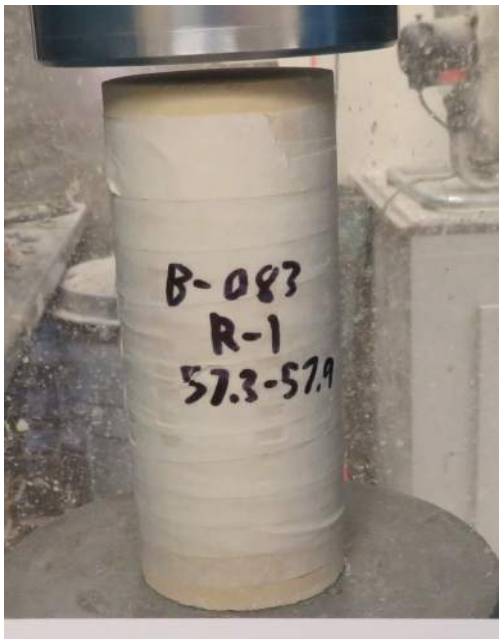
Length:	5.032	5.038	5.030	**5.033** in	$\frac{L}{D}$ = 2.514
	(L_1)	(L_2)	(L_3)	(L_{AVG})	

Volume: 0.009169454 ft^3 Mass: 533.48 g Unit Weight: **128.27** pcf

Failure Load: 5,390 lbs

Strength: 1,711 psi

Original Specimen



Fractured Specimen

Remarks:

6121 Huntley Road * Columbus, Ohio 43229-1003 * (614) 888-0040 * FAX (614) 431-4024

CLIENT	Barton Malow	DLZ JOB NUMBER	2150-9519.50
PROJECT	BMC: Ford Willow	SHEET NO.	7 OF 11
SUBJECT		TEST COMP. BY	KS DATE 12/22/21
EQUIPMENT	Concrete Load Frame	CHECKED BY	SR DATE 12/22/21

Unconfined Compressive Strength of Intact Rock Core Specimen (ASTM D7012)

Boring No.: B-090 Rock Description: Limestone

Run No.: R-1 Moisture Condition at Test: As Received

Depth: 45.5'-45.9'

Diameter:	1.987 (D_1)	1.990 (D_2)	1.997 (D_3)	1.985 (D_4)	1.993 (D_5)	1.997 (D_6)	**1.992** in (D_{AVG})
Length:	4.388 (L_1)	4.369 (L_2)	4.378 (L_3)	**4.378** in (L_{AVG})			
Capped Length	4.491 (L_1)	4.492 (L_2)	4.495 (L_3)	**4.493** in (L_{AVG})			

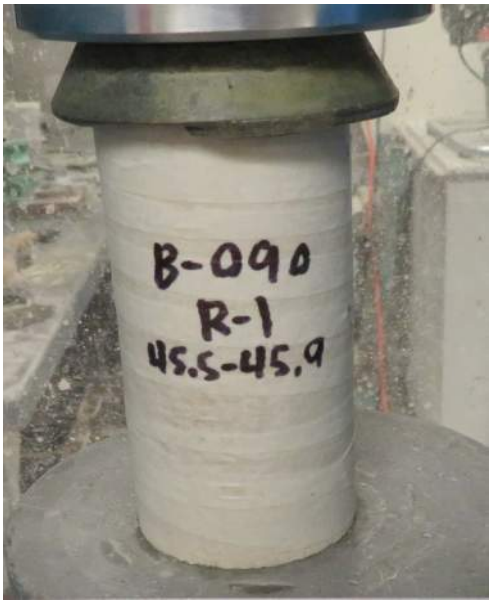
$\frac{L}{D}$ = 2.26

Volume: 0.007888822 ft^3 Mass: 462.77 g Unit Weight: **129.3** pcf

Failure Load: 7,775 lbs

Strength: 2,496 psi

Original Specimen



Fractured Specimen

Remarks:

6121 Huntley Road * Columbus, Ohio 43229-1003 * (614) 888-0040 * FAX (614) 431-4024

CLIENT	Barton Malow	DLZ JOB NUMBER	2150-9519.50
PROJECT	BMC: Ford Willow	SHEET NO.	8 OF 11
SUBJECT		TEST COMP. BY	KS DATE 12/22/21
EQUIPMENT	Concrete Load Frame	CHECKED BY	SR DATE 12/22/21

Unconfined Compressive Strength of Intact Rock Core Specimen (ASTM D7012)

Boring No.: B-116 Rock Description: Limestone

Run No.: R-1 Moisture Condition at Test: As Received

Depth: 53.3'-53.6'

Diameter:	1.980 (D_1)	1.985 (D_2)	1.985 (D_3)	1.980 (D_4)	1.973 (D_5)	1.983 (D_6)	**1.981** in (D_{AVG})
Length:	3.460 (L_1)	3.467 (L_2)	3.484 (L_3)	**3.470** in (L_{AVG})			
Capped Length	3.708 (L_1)	3.722 (L_2)	3.718 (L_3)	**3.716** in (L_{AVG})			

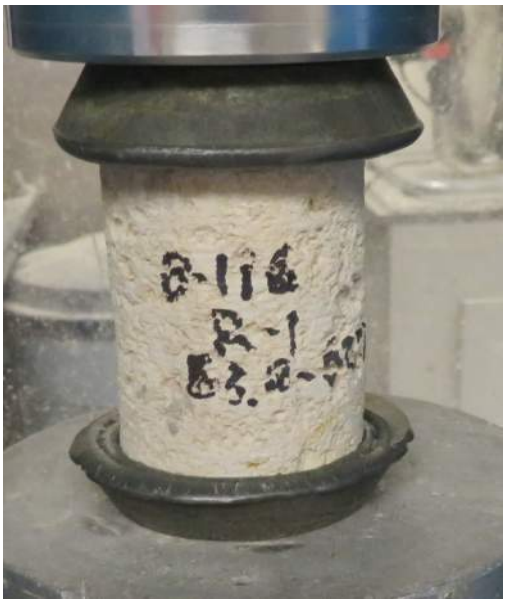
$\frac{L}{D}$ = 1.88

Volume: 0.006187039 ft^3 Mass: 345.17 g Unit Weight: **123.0** pcf

Failure Load: 5,563 lbs

Strength: 1,805 psi

Original Specimen



Fractured Specimen

Remarks:

6121 Huntley Road * Columbus, Ohio 43229-1003 * (614) 888-0040 * FAX (614) 431-4024

CLIENT	Barton Malow	DLZ JOB NUMBER	2150-9519.50
PROJECT	BMC: Ford Willow	SHEET NO.	9 OF 11
SUBJECT		TEST COMP. BY	KS DATE 12/22/21
EQUIPMENT	Concrete Load Frame	CHECKED BY	SR DATE 12/22/21

Unconfined Compressive Strength of Intact Rock Core Specimen (ASTM D7012)

Boring No.: B-128 Rock Description: Limestone

Run No.: R-1 Moisture Condition at Test: As Received

Depth: 42.1'-42.5'

Diameter:	1.989 (D_1)	1.989 (D_2)	1.986 (D_3)	1.983 (D_4)	1.985 (D_5)	1.990 (D_6)	**1.987** in (D_{AVG})
Length:	4.925 (L_1)	4.900 (L_2)	4.894 (L_3)	**4.906** in (L_{AVG})			
Capped Length	4.999 (L_1)	5.012 (L_2)	4.992 (L_3)	**5.001** in (L_{AVG})			

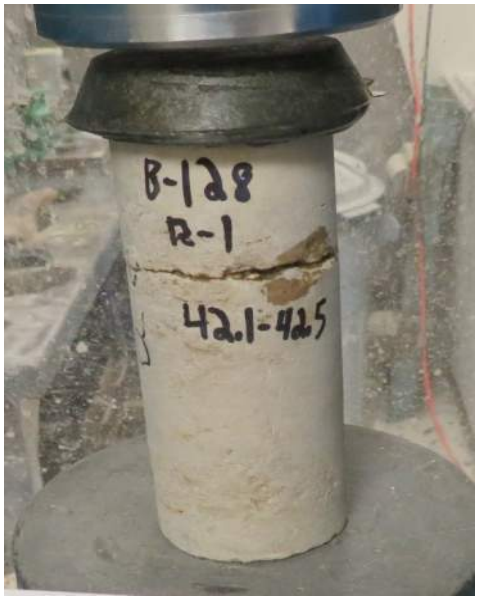
$\frac{L}{D}$ = 2.52

Volume: 0.00880026 ft^3 Mass: 579.60 g Unit Weight: **145.2** pcf

Failure Load: 12,567 lbs

Strength: 4,053 psi

Original Specimen



Fractured Specimen

Remarks:

6121 Huntley Road * Columbus, Ohio 43229-1003 * (614) 888-0040 * FAX (614) 431-4024

CLIENT	Barton Malow	DLZ JOB NUMBER	2150-9519.50
PROJECT	BMC: Ford Willow	SHEET NO.	10 OF 11
SUBJECT		TEST COMP. BY	KS DATE 12/22/21
EQUIPMENT	Concrete Load Frame	CHECKED BY	SR DATE 12/22/21

Unconfined Compressive Strength of Intact Rock Core Specimen (ASTM D7012)

Boring No.: B-145 Rock Description: Limestone

Run No.: R-1 Moisture Condition at Test: As Received

Depth: 44.8'-45.3'

Diameter:	1.988	1.988	1.989	1.988	1.986	1.985	**1.987** in
	(D_1)	(D_2)	(D_3)	(D_4)	(D_5)	(D_6)	(D_{AVG})

Length:	4.996	4.996	5.001	**4.998** in
	(L_1)	(L_2)	(L_3)	(L_{AVG})

$\frac{L}{D}$ = 2.515

Volume: 0.008967089 ft^3 Mass: 668.30 g Unit Weight: **164.31** pcf

Failure Load: 75,723 lbs

Strength: 24,412 psi

Original Specimen

Fractured Specimen

Remarks:

6121 Huntley Road * Columbus, Ohio 43229-1003 * (614) 888-0040 * FAX (614) 431-4024

CLIENT	Barton Malow	DLZ JOB NUMBER	2150-9519.50
PROJECT	BMC: Ford Willow	SHEET NO.	11 OF 11
SUBJECT		TEST COMP. BY	KS DATE 12/22/21
EQUIPMENT	Concrete Load Frame	CHECKED BY	SR DATE 12/22/21

Unconfined Compressive Strength of Intact Rock Core Specimen (ASTM D7012)

Boring No.: B-128 Rock Description: Limestone

Run No.: R-1 Moisture Condition at Test: As Received

Depth: 42.1'-42.5'

Diameter:	1.984 (D_1)	1.990 (D_2)	1.989 (D_3)	1.983 (D_4)	1.990 (D_5)	1.987 (D_6)	**1.987** in (D_{AVG})
Length:	4.598 (L_1)	4.606 (L_2)	4.600 (L_3)	**4.601** in (L_{AVG})			
Capped Length	4.702 (L_1)	4.705 (L_2)	4.691 (L_3)	**4.699** in (L_{AVG})			

$\frac{L}{D}$ = 2.36

Volume: 0.008254581 ft^3 Mass: 528.77 g Unit Weight: **141.2** pcf

Failure Load: 8,732 lbs

Strength: 2,816 psi

Original Specimen

Fractured Specimen

Remarks:

6121 Huntley Road * Columbus, Ohio 43229-1003 * (614) 888-0040 * FAX (614) 431-4024

DLZ
ARCHITECTURE • ENGINEERING • PLANNING
SURVEYING • CONSTRUCTION SERVICES

CLIENT: Barton Malow
PROJECT: Ford H4 Battery Plant
SUBJECT: Settlement

PROJECT NO. 2150-9519.50
SHEET NO. 1 OF 2
COMP. BY TKWA DATE 12/21/21
CHECKED BY _____ DATE _____

- Estimate C_c from USACE 1110-1-1904, Table 3-7
  - $C_c = 0.012 W_n$

    Avg $W_n = 30\%$ from laboratory test results
  - $C_c = (0.012)(30)$

    $\boxed{C_c = 0.36}$

  - $e_o = W_n G_s$

    $= (0.30)(2.7)$

    $\boxed{e_o = 0.81}$ average

  - C_v from FHWA NHI-01-023, "Shallow Foundations," Figure 4-21

    Avg LL = 41 from laboratory test results

    $\boxed{C_v = 0.28 \text{ ft}^2/\text{day}}$

- Time for 90% consolidation

  $$t = \frac{T_v (H_d)^2}{C_v}$$

  $T_v = 0.848$ (for 90% consolidation)

  $H_d = (48'/2) = 24'$ (double drainage)

  $$t = \frac{(.848)(24')^2}{.28} = 1{,}744 \text{ days} \quad (4.8 \text{ years})$$

DLZ
ARCHITECTURE • ENGINEERING • PLANNING
SURVEYING • CONSTRUCTION SERVICES

CLIENT: Barton Malow
PROJECT: Ford H4 Battery Plant
SUBJECT: Settlements

PROJECT NO. 2150-9519.50
SHEET NO. 2 OF 2
COMP. BY TKW DATE 12/21/21
CHECKED BY _____ DATE _____

- Minimum practical wick drain installation spacing during construction is five feet:

$$\tau = \frac{(.848)(5/2)^2}{.28}$$

$$\rightarrow \tau = 19 \text{ days}$$

- Therefore, install wick drains at six-foot spacing

$$\tau = \frac{(.848)(6/2)^2}{.28}$$

$$\boxed{\tau = 27 \text{ say } 30 \text{ days}}$$

DLZ
ARCHITECTURE • ENGINEERING • PLANNING
SURVEYING • CONSTRUCTION SERVICES

CLIENT Barton Malow
PROJECT Ford HV Battery Plant
SUBJECT Bearing Capacity in Canada

PROJECT NO. 2150-9579.50
SHEET NO. 1 OF 1
COMP. BY TMM DATE 12/21/21
CHECKED BY _____ DATE _____

$$q_{ULT} = c(N_c) + \cancel{q(N_q - 1)}^{\,0} + (0.5)(\gamma)(B_f)(N_\gamma)$$

say $\phi = 24°$ (long term)

$c = 1{,}000$ psf (short term)

$B_f = 10$ feet

from $\phi = 24°$

$N_c = 5.70$ $(\phi = 0°)$

$N_\gamma = 7.8$ $(\phi = 24°)$

$\therefore$

$q_{ULT} = (0.5)(115)(10)(7.80)$

$= 4{,}485$ psf

$q_{ALL} = 1{,}495$ psf (F.S = 3.0) (long term)

$q_{ULT} = (1000)(5.70)$

$= 5{,}700$ psf

$q_{ALL} = 1{,}900$ psf (F.S. = 3.0) (short term)

SUBJECT	Barton Malow	JOB NUMBER	2150-9519.50
	Ford H4 Battery Plant	SHEET NO.	1 OF 1
	Augered Cast-in-Place Pile Calculations	COMP. BY	ET DATE 12/21/2021
		CHECKED BY	TAH DATE 12/22/2021

Capacity of an Augered Cast-in-Place Pile

FHWA Method (O'Neil and Reese, 1999)

B	=	18	inches	pile diameter
L	=	40	ft	length of pile
z_{gs}	=	0	ft	depth or elevation of ground surface
z_{gw}	=	0	ft	groundwater depth or elevation (normal pool)
z_{tp}	=	0	ft	depth or elevation of top of pile
z_{bp}	=	40	ft	depth or elevation of tip of pile

Do not include cohesive soil (clay) if it is within five feet of the ground surface or if it is within one pile diameter of the base.

Capacity

$$R_T = R_S + R_B = \pi B \sum f_{max} \Delta z + \pi \frac{B^2}{4} q_{max}$$

Clay

$f_{max} = 0.55\, s_u$ $\quad f_{max}$ < 3,000 psf (1.5 pa)

$q_{max} = 9\, s_u$

Sand

$f_{max} = \beta \cdot \sigma'_v$ $\quad f_{max}$ < 4,000 psf

$\beta = 1.5 - 0.135\sqrt{z}$ for N_{spt} > 15

$\beta = \frac{N_{spt}}{15}\left(1.5 - 0.135\sqrt{z}\right)$ for N_{spt} < 15

0.25 < β < 1.20

σ'_v = effective vertical overburden stress

z = depth to the middle of the soil layer in feet

$q_{max} = 1200\, N_{spt}$ (psf)

	Ultimate Capacity				Allowable Capacity			
					FS	=	2.5	safety factor
Skin Friction	R_S	=	38.9	tons	$\boldsymbol{R_S}$	**=**	**15.6**	**tons**
End Bearing	R_B	=	6.0	tons	R_B	=	2.4	tons
Total	R_T	=	44.8	tons	R_T	=	17.9	tons

Based on Boring NE-09

Soil Layer			Soil	Unit	Clays	Sands		Skin Friction				Bearing
Top	Bottom	Thick-ness,	Type	Weight	s_u	N_{spt}	β	Δz	σ'_v	f_{max}	$f_{max} \cdot \Delta z$	q_{max}
ft	ft	ft		pcf	psf	blows		feet	psf	psf	lb/ft	psf
0	60	60	clay	115	750		---	40	1,052	413	16,500	6,750
60	80	20	clay	115	750		---	0	0	0	0	
80	90	10	clay	115	750		---	0	0	0	0	
90	100	10	clay	115	750		---	0	0	0	0	

$\Sigma f_{max} \cdot \Delta z =$ 16,500

Notes:

1. The unit weight is the moist or saturated unit weight.
2. The blow count for sands, N_{spt}, is not corrected for overburden pressure.
3. The effective vertical overburden stress, σ'_v, is calculated at the middle of the pile segment within the soil layer.

From Ohio Basic Building Code (2002)

Minimum pile diamer is 12 inches

Maximum pile length = $30 \cdot B$ = 45 feet

Allowable structural capacity of unreinforced pile

$Area \cdot \frac{1}{4} f'_c$ = 127 tons

f'_c = 4,000 psi compressive strength of grout

Reference: O'Neil, M.W. and Reese, L.C. (1999) *Drilled Shafts: Construction Procedures and Design Methods*, FHWA-IF-99-025, Federal Highway Administration, Washington, D.C.

SUBJECT	Barton Malow	JOB NUMBER	2150-9519.50	
	Ford H4 Battery Plant	SHEET NO.	1 OF	1
	Augered Cast-in-Place Pile Calculations	COMP. BY	ET	DATE 12/21/2021
		CHECKED BY	TAH	DATE 12/22/2021

Capacity of an Augered Cast-in-Place Pile

FHWA Method (O'Neil and Reese, 1999)

B	=	24	inches	pile diameter
L	=	40	ft	length of pile
z_{gs}	=	0	ft	depth or elevation of ground surface
z_{gw}	=	0	ft	groundwater depth or elevation (normal pool)
z_{tp}	=	0	ft	depth or elevation of top of pile
z_{bp}	=	40	ft	depth or elevation of tip of pile

Do not include cohesive soil (clay) if it is within five feet of the ground surface or if it is within one pile diameter of the base.

Capacity

$$R_T = R_S + R_B = \pi B \sum f_{max} \Delta z + \pi \frac{B^2}{4} q_{max}$$

Clay

$f_{max} = 0.55\, s_u$ $\quad f_{max}$ < 3,000 psf (1.5 pa)

$q_{max} = 9\, s_u$

Sand

$f_{max} = \beta \cdot \sigma'_v$ $\quad f_{max}$ < 4,000 psf

$\beta = 1.5 - 0.135\sqrt{z}$ for N_{spt} > 15

$\beta = \frac{N_{spt}}{15}\left(1.5 - 0.135\sqrt{z}\right)$ for N_{spt} < 15

0.25 < β < 1.20

σ'_v = effective vertical overburden stress

z = depth to the middle of the soil layer in feet

$q_{max} = 1200\, N_{spt}$ (psf)

	Ultimate Capacity				Allowable Capacity			
					FS	=	2.5	safety factor
Skin Friction	R_S	=	51.8	tons	$\boldsymbol{R_S}$	**=**	**20.7**	**tons**
End Bearing	R_B	=	10.6	tons	R_B	=	4.2	tons
Total	R_T	=	62.4	tons	R_T	=	25.0	tons

Based on Boring NE-09

Soil Layer			Soil	Unit	Clays	Sands		Skin Friction				Bearing
Top	Bottom	Thick-ness,	Type	Weight	s_u	N_{spt}	β	Δz	σ'_v	f_{max}	$f_{max} \cdot \Delta z$	q_{max}
ft	ft	ft		pcf	psf	blows		feet	psf	psf	lb/ft	psf
0	60	60	clay	115	750		---	40	1,052	413	16,500	6,750
60	80	20	clay	115	750		---	0	0	0	0	
80	90	10	clay	115	750		---	0	0	0	0	
90	100	10	clay	115	750		---	0	0	0	0	

$\Sigma f_{max} \cdot \Delta z =$ 16,500

Notes:

1. The unit weight is the moist or saturated unit weight.
2. The blow count for sands, N_{spt}, is not corrected for overburden pressure.
3. The effective vertical overburden stress, σ'_v, is calculated at the middle of the pile segment within the soil layer.

From Ohio Basic Building Code (2002)

Minimum pile diamer is 12 inches

Maximum pile length = 30·B = 60 feet

Allowable structural capacity of unreinforced pile

$Area \cdot \frac{1}{4} f'_c$ = 226 tons

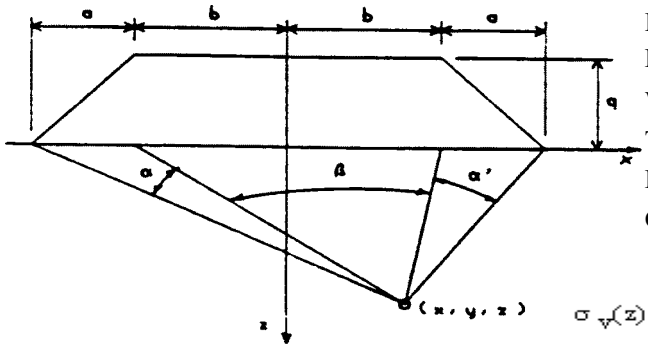
f'_c = 4,000 psi compressive strength of grout

Reference: O'Neil, M.W. and Reese, L.C. (1999) *Drilled Shafts: Construction Procedures and Design Methods*, FHWA-IF-99-025, Federal Highway Administration, Washington, D.C.

SUBJECT					
Client	Barton Malow	JOB NUMBER			
Project	Ford H4 Battery Plant	SHEET NO.	1	OF	1
Item	Estimate of Settlement under	COMP. BY	TAH	DATE	12/20/21
	Maximum Fill Height (20 feet)	CHECKED BY		DATE	

SETTLEMENT ANALYSIS - EMBANKMENT

Embankment Informaiton:



Groundwater Table:	D=	15.0	ft			
Embankment Height:	H =	20	ft			
Fill Unit Weight:	g_{emb} =	125	pcf	q =	2,500	psf
Width of Slope:	a =	40				
Top half-width of Emb:	b =	500				
Distance from CL:	x =	0				
Output Range:	z =	0	to	58	ft	

**See Data output Attached*

$$\sigma_v(z) := \left(\frac{q}{\pi a}\right)\left(a\cdot(\alpha(z)+\beta(z)+\alpha'(z)) + b\cdot(\alpha(z)+\alpha'(z)) + x\cdot(\alpha(z)-\alpha'(z))\right)$$

$$\beta(z) := \operatorname{atan}\left[\frac{(b-x)}{z}\right] + \operatorname{atan}\left[\frac{(b+x)}{z}\right] \qquad \alpha'(z) := \operatorname{atan}\left[\frac{(a+b-x)}{z}\right] - \operatorname{atan}\left[\frac{(b-x)}{z}\right] \qquad \alpha(z) := \operatorname{atan}\left[\frac{(a+b+x)}{z}\right] - \operatorname{atan}\left[\frac{(b+x)}{z}\right]$$

Reference: US Army Corps of Engineers EM 1110-1-1904 "Settlement Analysis", Table C-1

Soil Properites: *Settlement is calculated at mid-point of layer*

No.	Bot. of Laye		Soil Type	g_{soil} (pcf)	s'$_c$ (psf)	s'$_o$ (psf)	Dsz (psf)	s'$_f$ (psf)	Cohesionless Soils C'	Cohesive Soils C_r	C_c	e_o
1	5.0	ft	Clay	115	288	288	2,500	2,787			0.36	0.810
2	15.0	ft	Clay	115	1,150	1,150	2,500	3,650			0.36	0.810
3	25.0	ft	Clay	115	1,988	1,988	2,500	4,488			0.36	0.810
4	35.0	ft	Clay	115	2,514	2,514	2,500	5,014			0.36	0.810
5	45.0	ft	Clay	115	3,040	3,040	2,500	5,540			0.36	0.810
6	48.0	ft	Clay	115	3,382	3,382	2,499	5,881			0.36	0.810
7	58.0	ft	Rock	155	3,924	3,924	2,499	6,423	10000.0			
8	0.0			0	0							
9	0.0			0	0							
10	0.0			0	0							

No.	Settlement:		Total Settlement
1	0.980	ft	
2	0.998	ft	**3.940 ft**
3	0.703	ft	
4	0.596	ft	
5	0.518	ft	**47.3 in**
6	0.143	ft	
7	0.000	ft	
8			
9			
10			

Reference: Geotechnical Engineering Principles and Practices; Coduto, 1999

Overconsolidated Soils - Case I (s'$_0$<s'$_c$) Eqn:11.24

$$(\delta_c)_{ult} = \Sigma \frac{C_r}{1+e_0} H \log\left(\frac{\sigma'_f}{\sigma'_0}\right)$$

Overconsolidated Soils - Case II (s'$_0$<s'$_c$<s$_f$) Eqn:11.25

$$(\delta_c)_{ult} = \Sigma\left[\frac{C_r}{1+e_0} H \log\left(\frac{\sigma'_c}{\sigma'_0}\right) + \frac{C_c}{1+e_0} H \log\left(\frac{\sigma'_f}{\sigma'_c}\right)\right]$$

Normally Consolidated Soils (s'$_0$=s'$_c$) Eqn: 11.23

$$(\delta_c)_{ult} = \Sigma \frac{C_c}{1+e_0} H \log\left(\frac{\sigma'_f}{\sigma'_0}\right)$$

Reference: FHWA NHI-00-045

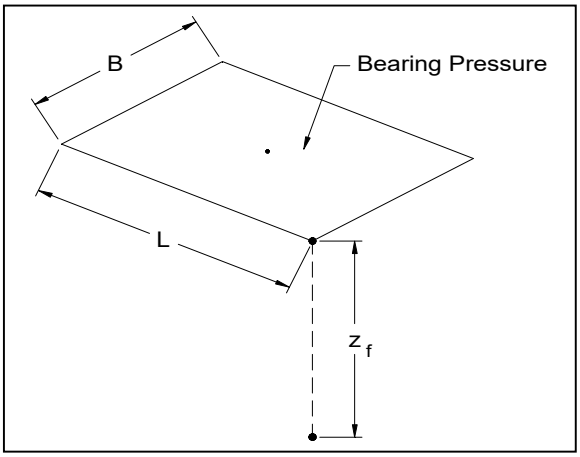
Cohesionless Soils (s'$_0$=s'$_c$)

$$(\delta_c)_{ult} = \Sigma \frac{1}{C'} H \log\left(\frac{\sigma'_f}{\sigma'_0}\right)$$

SUBJECT			
Client	Barton Malow	JOB NUMBER	2150-9519.50
Project	Ford H4 Battery Plant	SHEET NO.	1 OF 1
Item	Settlement under 2506 psf SOG loads	COMP. BY	TAH DATE 12/21/21
		CHECKED BY	DATE

*Settlement at **Point A** (Corner of Building)*

SETTLEMENT ANALYSIS - RECTANGULAR FOOTING



Profile Information

Groundwater Table: D= 15.0 ft

Output Range: z = 0 to 58 ft

Footprint and Loading

Bearing Pressure	q =	2506	psf
Width	B =	70	ft
Length	L =	280	ft
Multipication Factor	x =	1	Factor for **Ds**z (Superposition)

Reference: Newmark (1935); Geotechnical Engineering Principles and Practices; Coduto, 1999

Soil Properites: *Settlement is calculated at mid-point of layer*

No.	Bot. of Laye		Soil Type	g_{soil} (pcf)	s'$_c$ (psf)	s'$_o$ (psf)	Dsz (psf)	s'$_f$ (psf)	Cohesionless Soils C'	Cohesive Soils C_r	C_c	e_o
1	5.0	ft	Clay	115	288	288	626	914			0.36	0.810
2	15.0	ft	Clay	115	1,150	1,150	626	1,776			0.36	0.810
3	25.0	ft	Clay	115	1,988	1,988	621	2,609			0.36	0.810
4	35.0	ft	Clay	115	2,514	2,514	610	3,124			0.36	0.810
5	45.0	ft	Clay	115	3,040	3,040	592	3,632			0.36	0.810
6	48.0	ft	Clay	115	5,348	5,348	576	5,924			0.36	0.810
7	58.0	ft	Rock	155	6,295	6,295	560	6,855	10000.0			
8							0					
9												
10												

No.	Settlement:		Total Settlement
1	0.500	ft	
2	0.375	ft	**1.478 ft**
3	0.235	ft	
4	0.188	ft	
5	0.154	ft	**17.7 in**
6	0.027	ft	
7	0.000	ft	
8			
9			
10			

Reference: Geotechnical Engineering Principles and Practices; Coduto, 1999

Overconsolidated Soils - Case I (s'$_0$<s'$_c$) Eqn:11.24

$$(\delta_c)_{ult} = \Sigma \frac{C_r}{1+e_0} H \log\left(\frac{\sigma'_f}{\sigma'_0}\right)$$

Overconsolidated Soils - Case II (s'$_0$<s'$_c$<s$_f$) Eqn:11.25

$$(\delta_c)_{ult} = \Sigma\left[\frac{C_r}{1+e_0} H \log\left(\frac{\sigma'_c}{\sigma'_0}\right) + \frac{C_c}{1+e_0} H \log\left(\frac{\sigma'_f}{\sigma'_c}\right)\right]$$

Normally Consolidated Soils (s'$_0$=s'$_c$) Eqn: 11.23

$$(\delta_c)_{ult} = \Sigma \frac{C_c}{1+e_0} H \log\left(\frac{\sigma'_f}{\sigma'_0}\right)$$

Reference: FHWA NHI-00-045

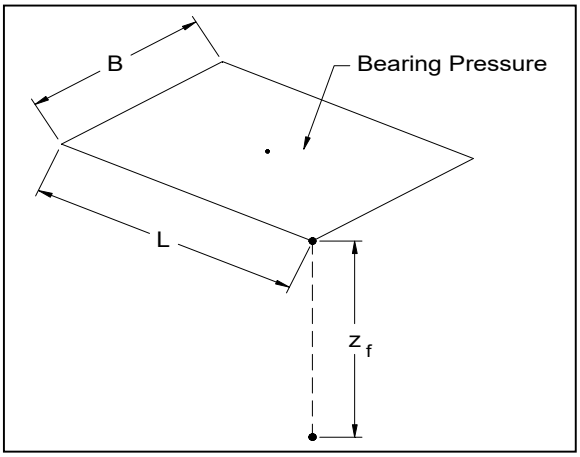
Cohesionless Soils (s'$_0$=s'$_c$)

$$(\delta_c)_{ult} = \Sigma \frac{1}{C'} H \log\left(\frac{\sigma'_f}{\sigma'_0}\right)$$

SUBJECT				
Client	Barton Malow	JOB NUMBER	2150-9519.50	
Project	Ford H4 Battery Plant	SHEET NO.	1 OF 1	
Item	Settlement under 210 psf SOG loads	COMP. BY	TAH	DATE 12/21/21
		CHECKED BY		DATE

*Settlement at **Point A** (Corner of Building)*

SETTLEMENT ANALYSIS - RECTANGULAR FOOTING



Profile Information

Groundwater Table: D= 15.0 ft

Output Range: z = 0 to 58 ft

Footprint and Loading

Bearing Pressure	q =	210	psf
Width	B =	70	ft
Length	L =	280	ft
Multipication Factor	x =	1	Factor for **Ds**z (Superposition)

Reference: Newmark (1935); Geotechnical Engineering Principles and Practices; Coduto, 1999

Soil Properites: *Settlement is calculated at mid-point of layer*

No.	Bot. of Laye		Soil Type	g_{soil} (pcf)	s'$_c$ (psf)	s'$_o$ (psf)	Dsz (psf)	s'$_f$ (psf)	Cohesionless Soils C'	Cohesive Soils C_r	C_c	e_o
1	5.0	ft	Clay	115	288	288	52	340			0.36	0.810
2	15.0	ft	Clay	115	1,150	1,150	52	1,202			0.36	0.810
3	25.0	ft	Clay	115	1,988	1,988	52	2,040			0.36	0.810
4	35.0	ft	Clay	115	2,514	2,514	51	2,565			0.36	0.810
5	45.0	ft	Clay	115	3,040	3,040	50	3,090			0.36	0.810
6	48.0	ft	Clay	115	5,348	5,348	48	5,396			0.36	0.810
7	58.0	ft	Rock	155	6,295	6,295	47	6,342	10000.0			
8							0					
9												
10												

No.	Settlement:		Total Settlement
1	0.072	ft	
2	0.039	ft	**0.167 ft**
3	0.022	ft	
4	0.017	ft	
5	0.014	ft	**2.0 in**
6	0.002	ft	
7	0.000	ft	
8			
9			
10			

Reference: Geotechnical Engineering Principles and Practices; Coduto, 1999

Overconsolidated Soils - Case I (s'$_0$<s'$_c$) Eqn:11.24

$$(\delta_c)_{ult} = \Sigma \frac{C_r}{1+e_0} H \log\left(\frac{\sigma'_f}{\sigma'_0}\right)$$

Overconsolidated Soils - Case II (s'$_0$<s'$_c$<s$_f$) Eqn:11.25

$$(\delta_c)_{ult} = \Sigma\left[\frac{C_r}{1+e_0} H \log\left(\frac{\sigma'_c}{\sigma'_0}\right) + \frac{C_c}{1+e_0} H \log\left(\frac{\sigma'_f}{\sigma'_c}\right)\right]$$

Normally Consolidated Soils (s'$_0$=s'$_c$) Eqn: 11.23

$$(\delta_c)_{ult} = \Sigma \frac{C_c}{1+e_0} H \log\left(\frac{\sigma'_f}{\sigma'_0}\right)$$

Reference: FHWA NHI-00-045

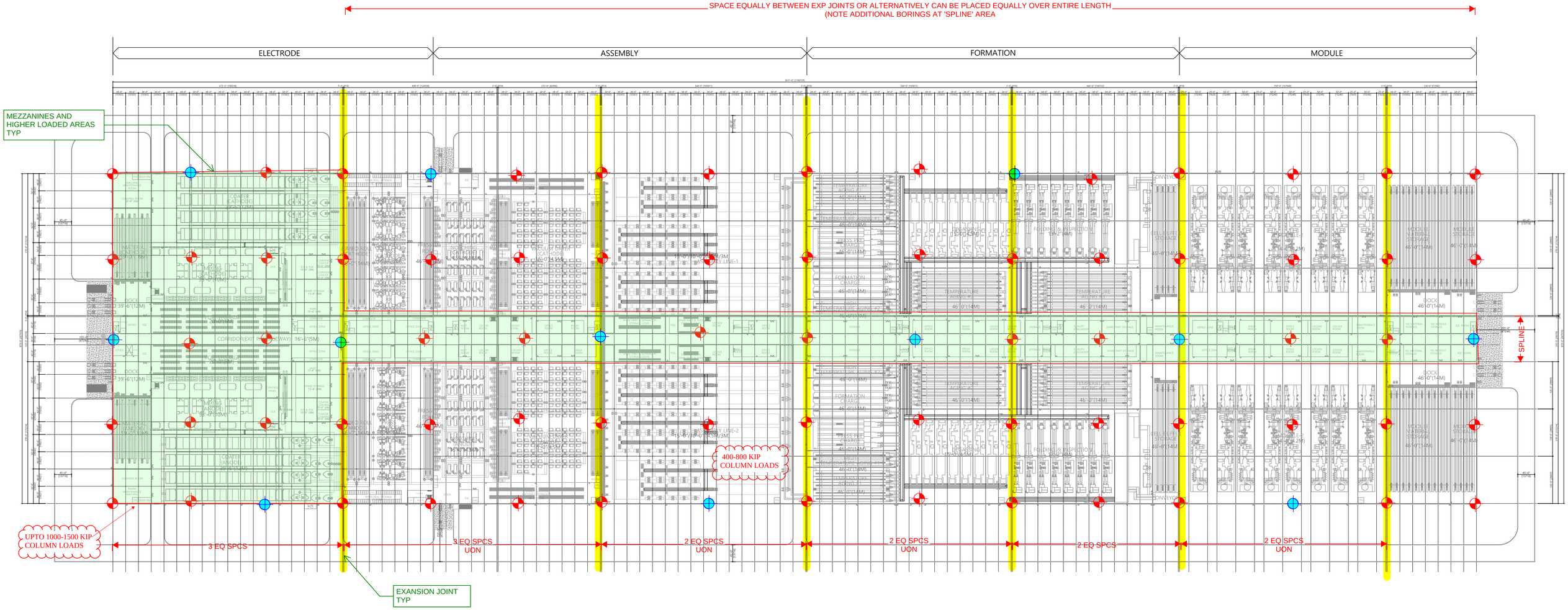
Cohesionless Soils (s'$_0$=s'$_c$)

$$(\delta_c)_{ult} = \Sigma \frac{1}{C'} H \log\left(\frac{\sigma'_f}{\sigma'_0}\right)$$

Appendix C

- **Foundation Loading Information (provided by others)**
- **Slab on Grade Loading information (provided by others)**

10/18/2021



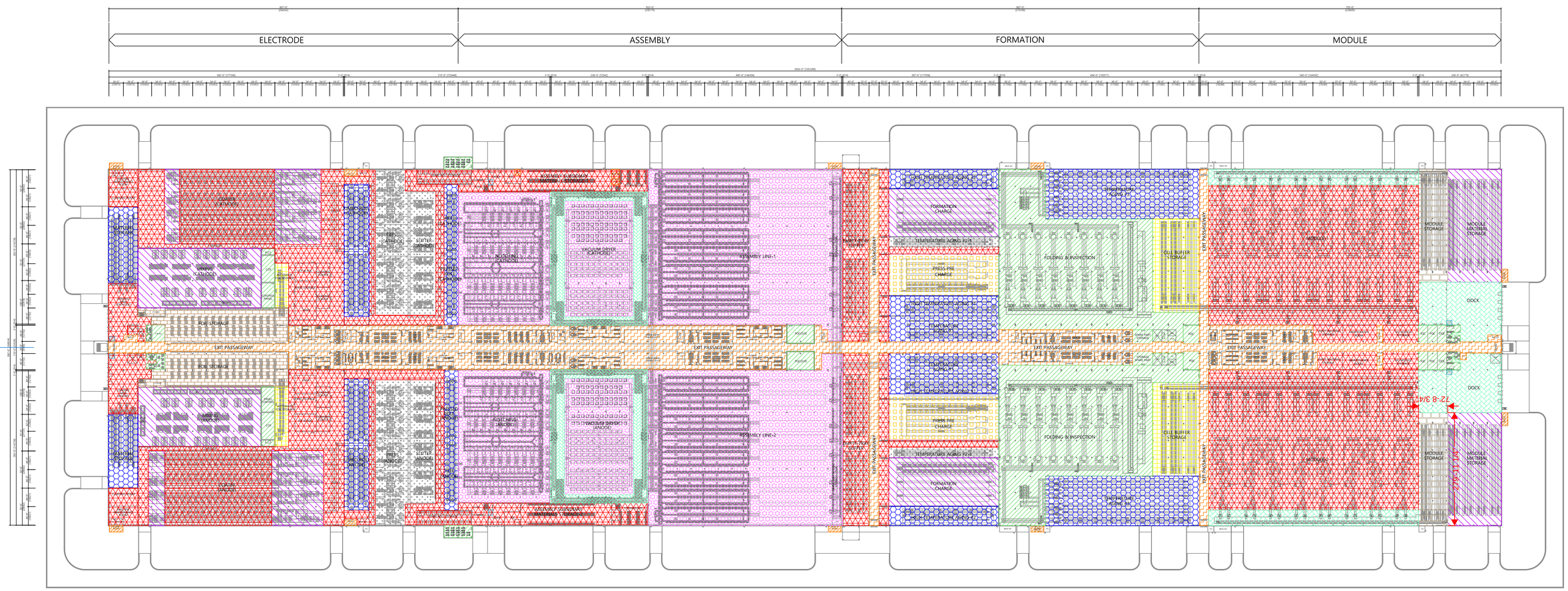
지상 1층 평면도

* RACK 높이는 표기 외 ALL 46'-0"(14M) : 방화구획 : EXIT PASSAGEWAY

KEY PLAN

DRILL TO REFUSAL (MIN 12 AS SHOWN) ← expect to be 30-55 FEET +/-

25 FT DEPTH (TYP)



■ LEGEND

- 5 kN/㎡ (105 lbf/sqft)
- 10 kN/㎡ (210 lbf/sqft)
- 15 kN/㎡ (315 lbf/sqft)
- 20 kN/㎡ (420 lbf/sqft)
- 30 kN/㎡ (630 lbf/sqft)
- 40 kN/㎡ (840 lbf/sqft)
- 50 kN/㎡ (1,045 lbf/sqft)
- 60 kN/㎡ (1,255 lbf/sqft)
- 70 kN/㎡ (1,465 lbf/sqft)
- 80 kN/㎡ (1,675 lbf/sqft)
- 90 kN/㎡ (1,880 lbf/sqft)
- 100 kN/㎡ (2,090 lbf/sqft)
- 120 kN/㎡ (2,506 lbf/sqft)

1st FLOOR PLAN

Appendix D

- **General Earthwork Recommendations**

GENERAL EARTHWORK

Earthwork is most efficiently accomplished using large, heavy duty equipment, unimpeded by obstacles. Consequently, it is preferable to complete as much of this work as is possible prior to initiating other phases of construction, such as footing excavation and installation of underground utilities. The following is recommended concerning earthwork construction.

1. Stripping, clearing and grubbing

   In areas where fill is to be placed to support structures, drive and parking areas the following is proposed:

   Strip and remove all sod, topsoil, and organic contaminated soils.

   Remove all trees and shrubs, designated to be cleared, inclusive of grubbing roots of larger trees.

   Remove all trash, debris, rubble, existing random fill, soil softened by standing water, and any other soft soil as determined necessary by the geotechnical engineer. The fill placement should begin on firm, relatively unyielding foundation material.

   The fill foundation should be stripped and cleared beyond the limits of the structure by a distance equal to not less than the thickness of the fill below the structure foundation plus 10 feet. For drives and parking areas, the fill foundation should be stripped and cleared for a distance of at least 5 feet beyond the limits of the pavement.

2. Fill Material - Composition

   Material satisfactory for use as fill includes clayey silt and silty clay soils or sand and gravel, free of topsoil, organic or other decomposable matter, rocks having a major dimension greater than 2 inches, or frozen soil.

   Soils having a maximum dry density of less than 90 pounds per cubic foot as determined by the moisture-density relationship are not considered suitable for use as fill.

   Soils described as SILT (USCS ML, MH, or ODOT A-4B) are considered questionably suitable for use as fill material because the stability of these materials is very sensitive to increases in moisture. These soils should not be placed within three feet of the top of the subgrade.

   For lawn areas, landscaping areas and screening mounds not supporting any construction, topsoil or waste clean soil from site grading may be used.

3. Fill Material - Moisture

Predominantly fine grained fill materials, clayey silts, and silty clays are recommended to contain moisture not exceeding two percent above optimum moisture as determined by the moisture-density relationship, or less if found to be needed to obtain stability below the compaction equipment. This provides the best assurance of establishing not only adequate density for ultimate support of construction but also provides stability of the compacted soil under the dynamic loading induced by the heavy weight construction equipment during placement.

Predominantly sand and gravel fill material is not as sensitive to moisture content with regard to stability. Therefore, we recommend no specified limitation, as long as specified density and stability can be established.

4. Moisture Adjustment

If the moisture content of the material from the fill source is not appropriate to establish density, moisture adjustment of the fill will be required.

If the moisture content of the fill being placed is too high, appropriate adjustment entails spreading and exposing to the sun and wind for drying and using equipment such as a disc and/or a grader.

If the moisture content of the fill is too low, a water truck with a sprinkler bar may be required. After sprinkling, the soil should be thoroughly mixed with a disc and/or a grader.

5. Equipment

Equipment to compact the fill should be heavy duty. For example:

Fine-grained materials clayey silts and silty clays may be efficiently compacted using a sheepsfoot roller comparable to a caterpillar 815 self-propelled roller.

Coarse-grained materials (sand and gravels) having little or no silt and clay sizes, may be efficiently compacted using a heavy, self propelled, vibratory smooth wheel roller.

Coarse-grained materials having about 10% or more silt and clay sizes may be efficiently compacted using a sheepsfoot roller comparable to a caterpillar 815 self-propelled roller.

6. Lift Thickness

Fill should be placed in horizontal layers, 8-inch loose thickness, compacted uniformly to approximately 6-inch thickness.

If equipment is used which is lighter weight than recommended above, lift thickness should be appropriately thinner.

7. Fill Density

In areas to support pavements and building construction, the fill and backfill should be compacted to the density requirements as recommended in the main body of the report.

8. Season of earthwork

Weather conditions are very important to efficiency in working soils. Generally earthwork is accomplished most efficiently between May and November. Cold periods may hamper moisture adjustment. If the temperature is below 32° F. for prolonged periods, frozen material on the fill surface must be removed before subsequent lifts may be placed. Also, densification of fill is more difficult when air temperatures are below freezing. Granular material, such as bank run sand and gravel is somewhat less sensitive to weather conditions but is not immune from difficulties that may be presented by precipitation and low temperatures.

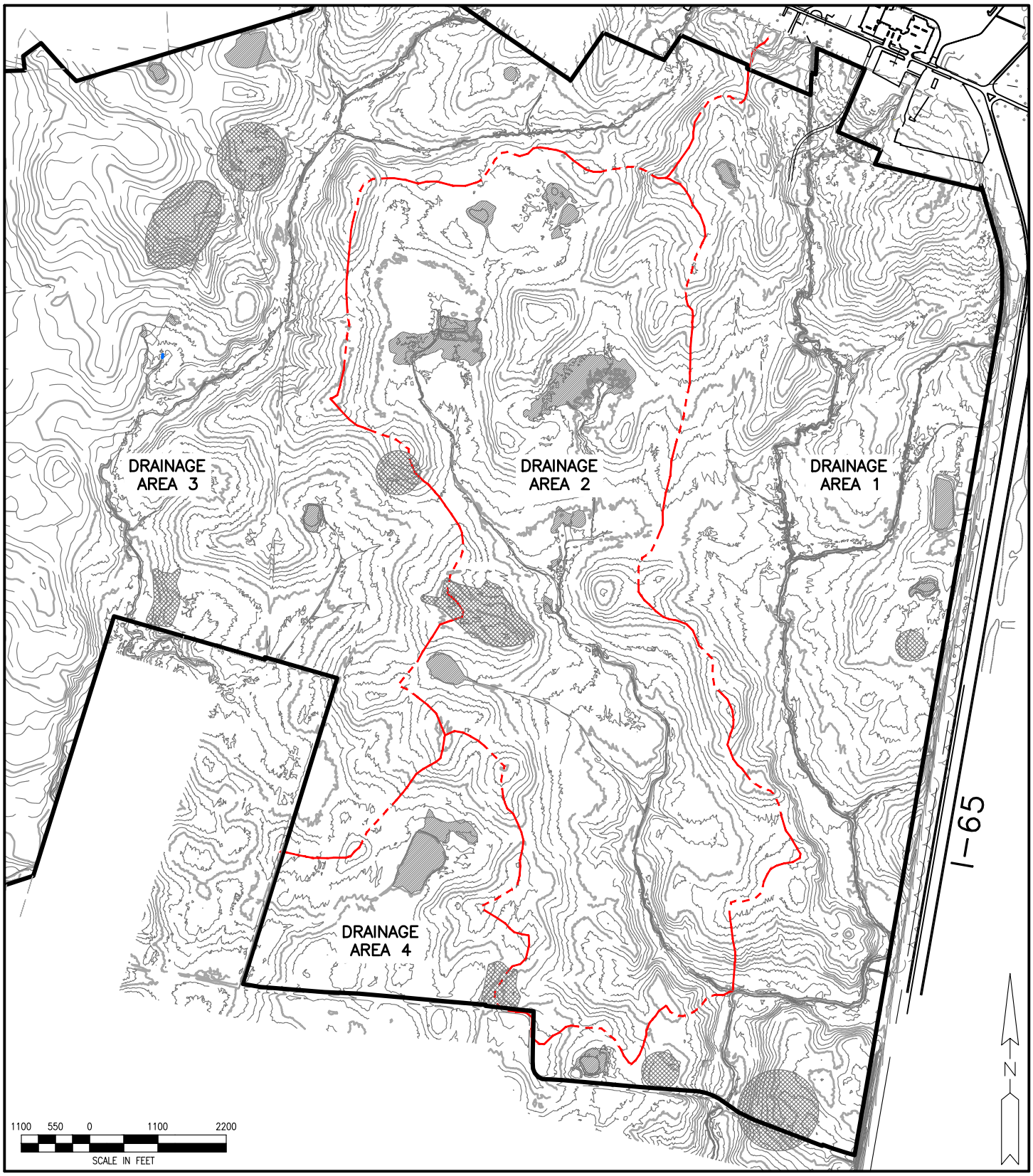
9. Trench Backfill

Trench backfill should be controlled, compacted fill, placed in accordance with recommendations presented above.

It is recommended that suitable granular material be used to backfill trenches that traverse beneath buildings, drives or parking areas.

10. General

All fill should be placed and compacted under continuous observation and testing by a soils technician under the general guidance of the geotechnical engineer.



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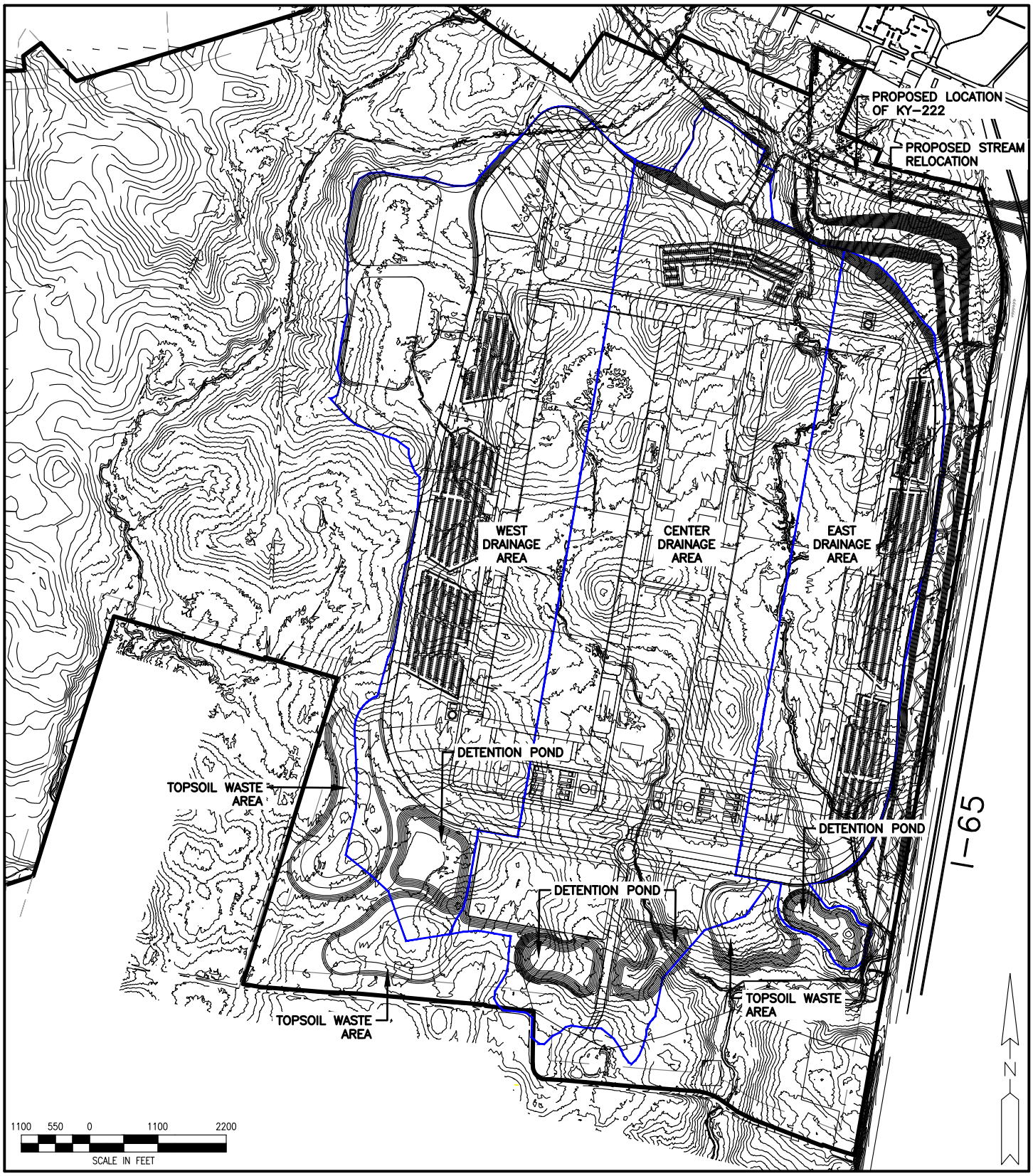

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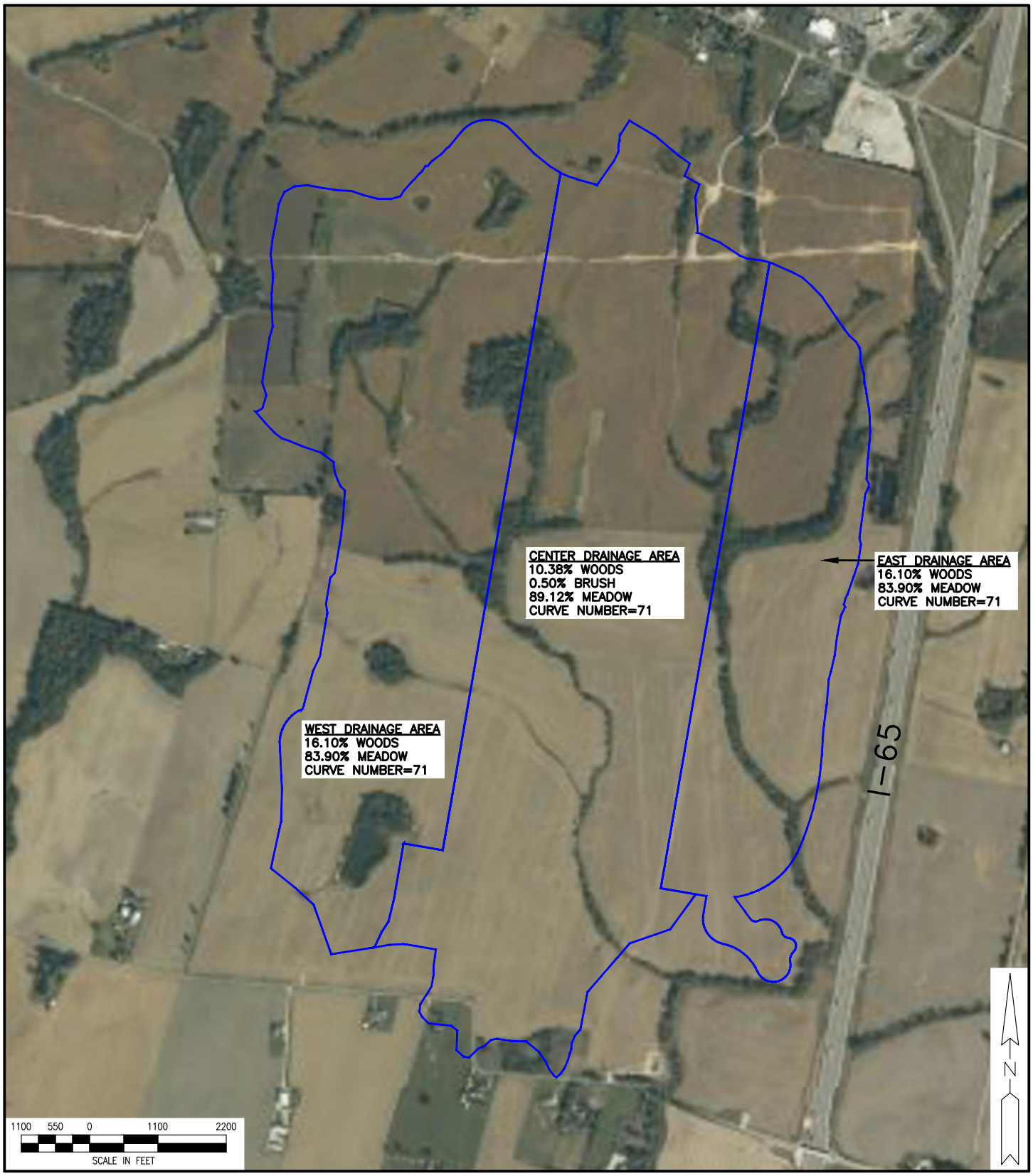

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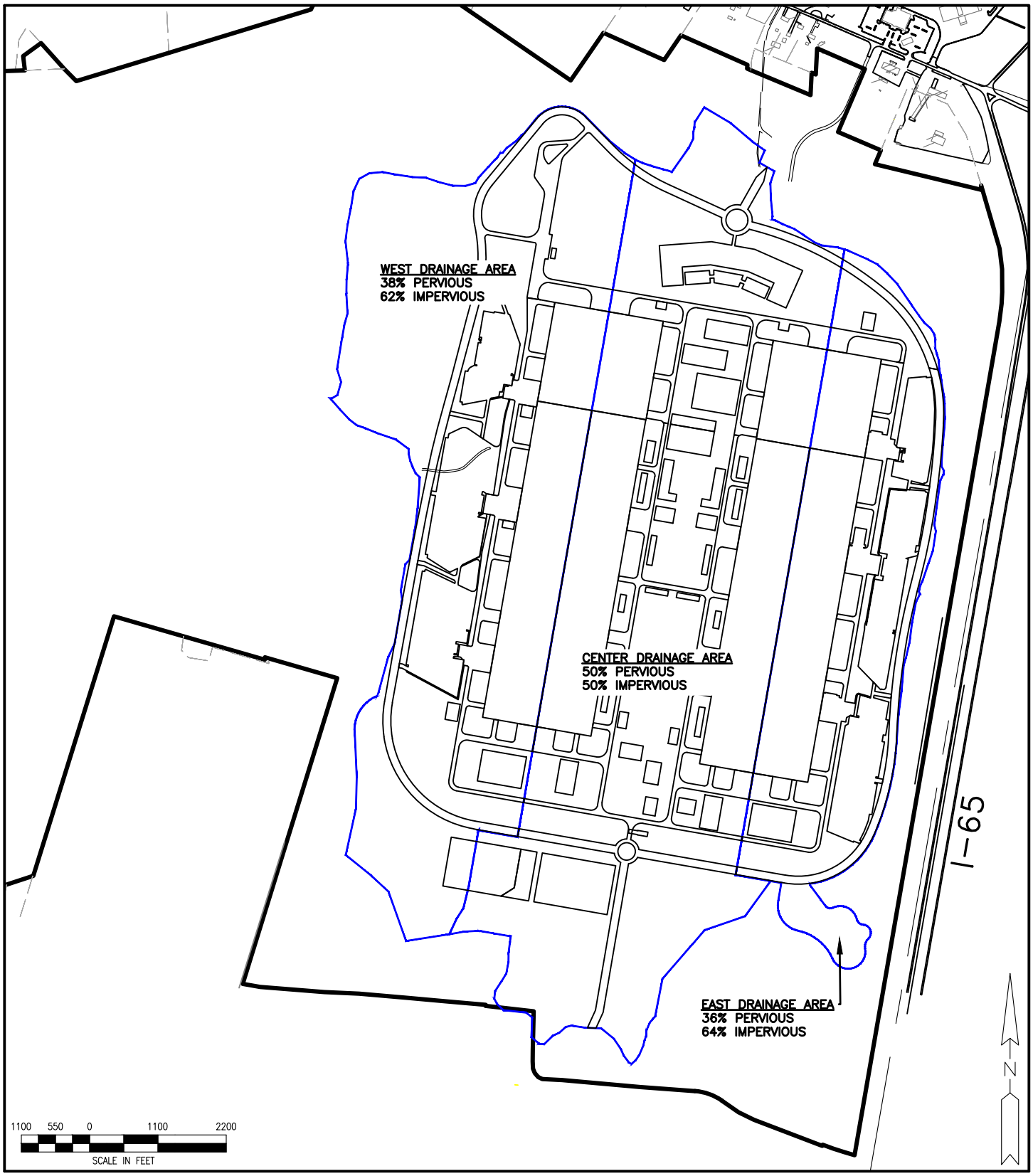

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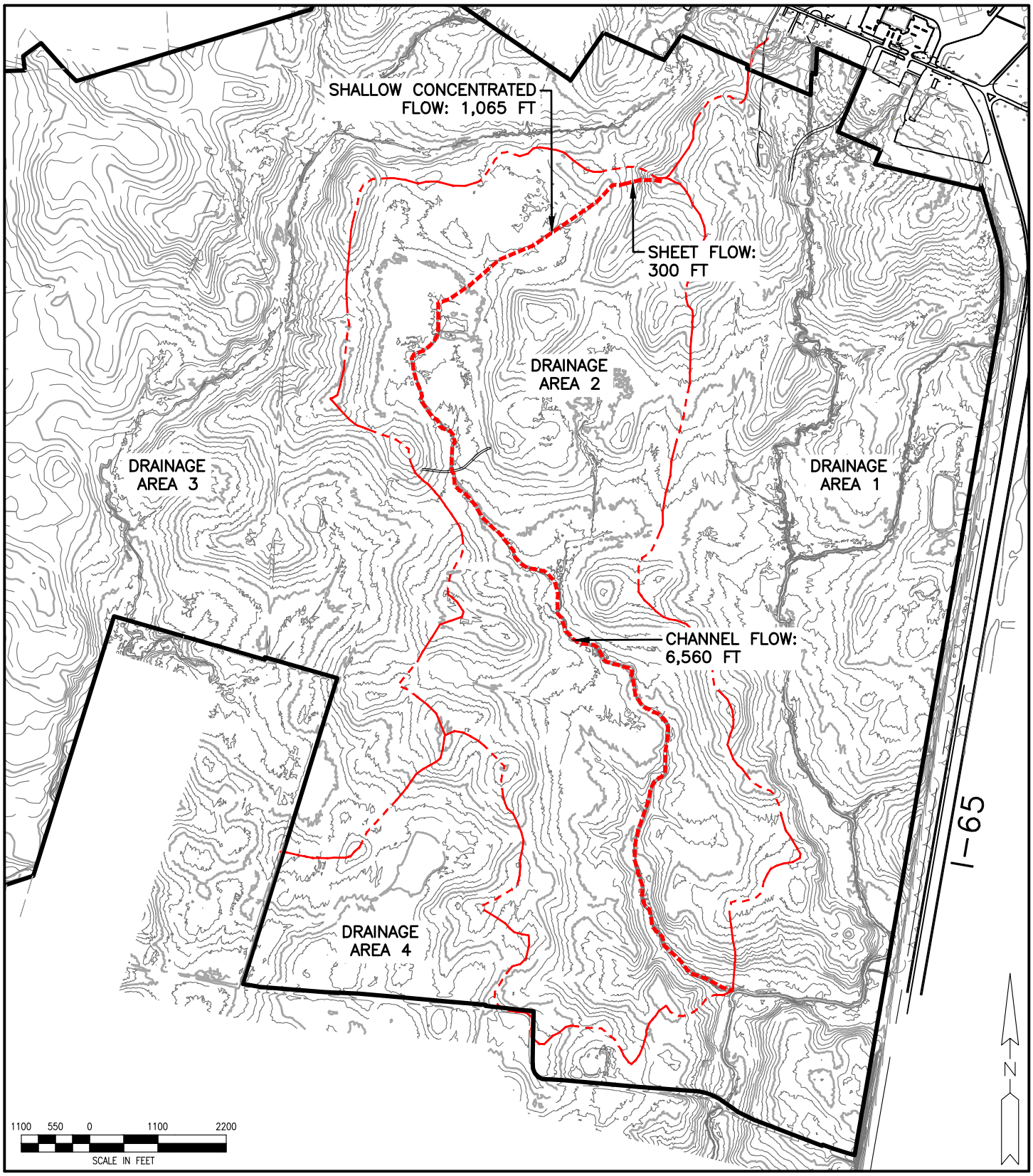

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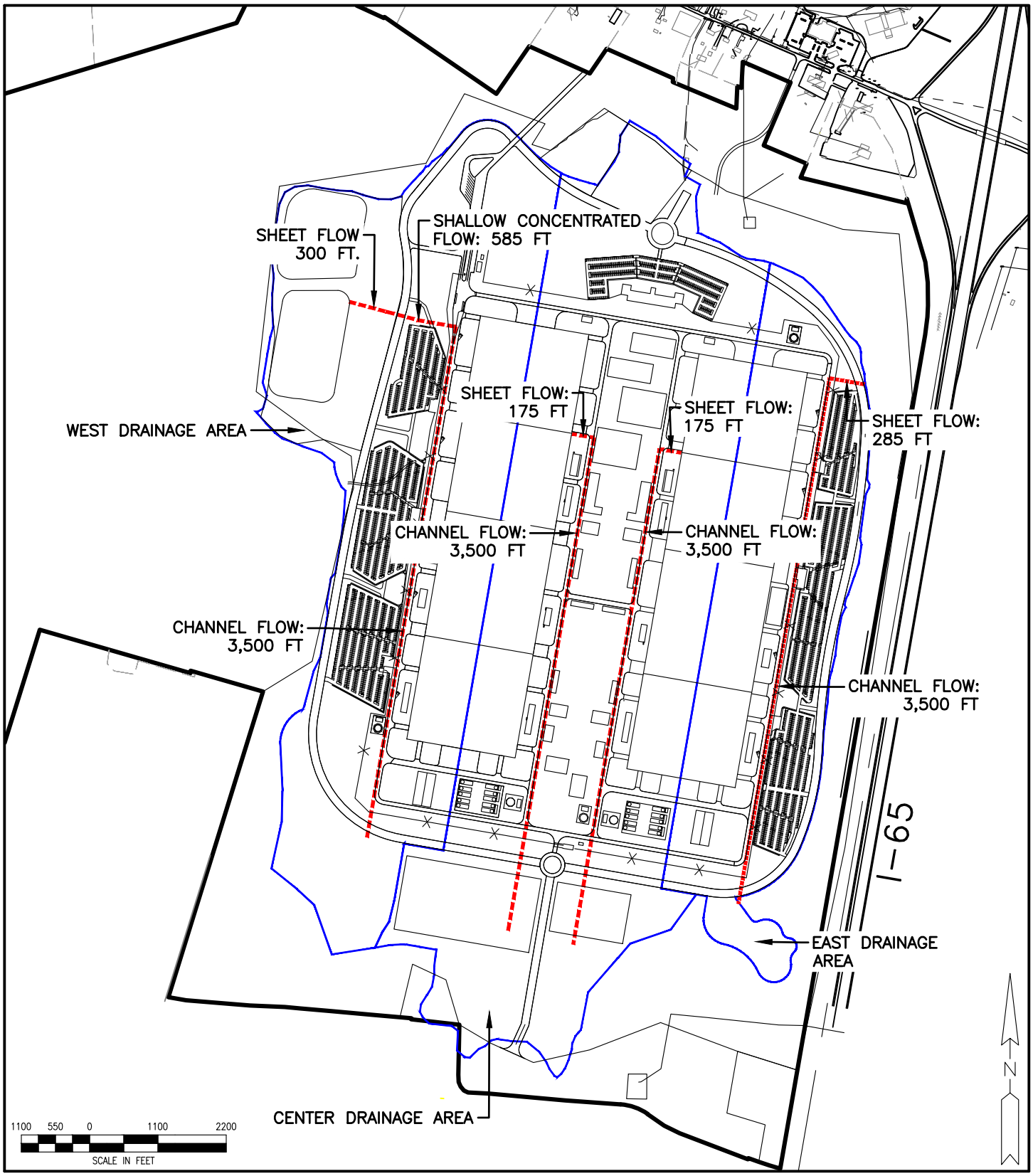

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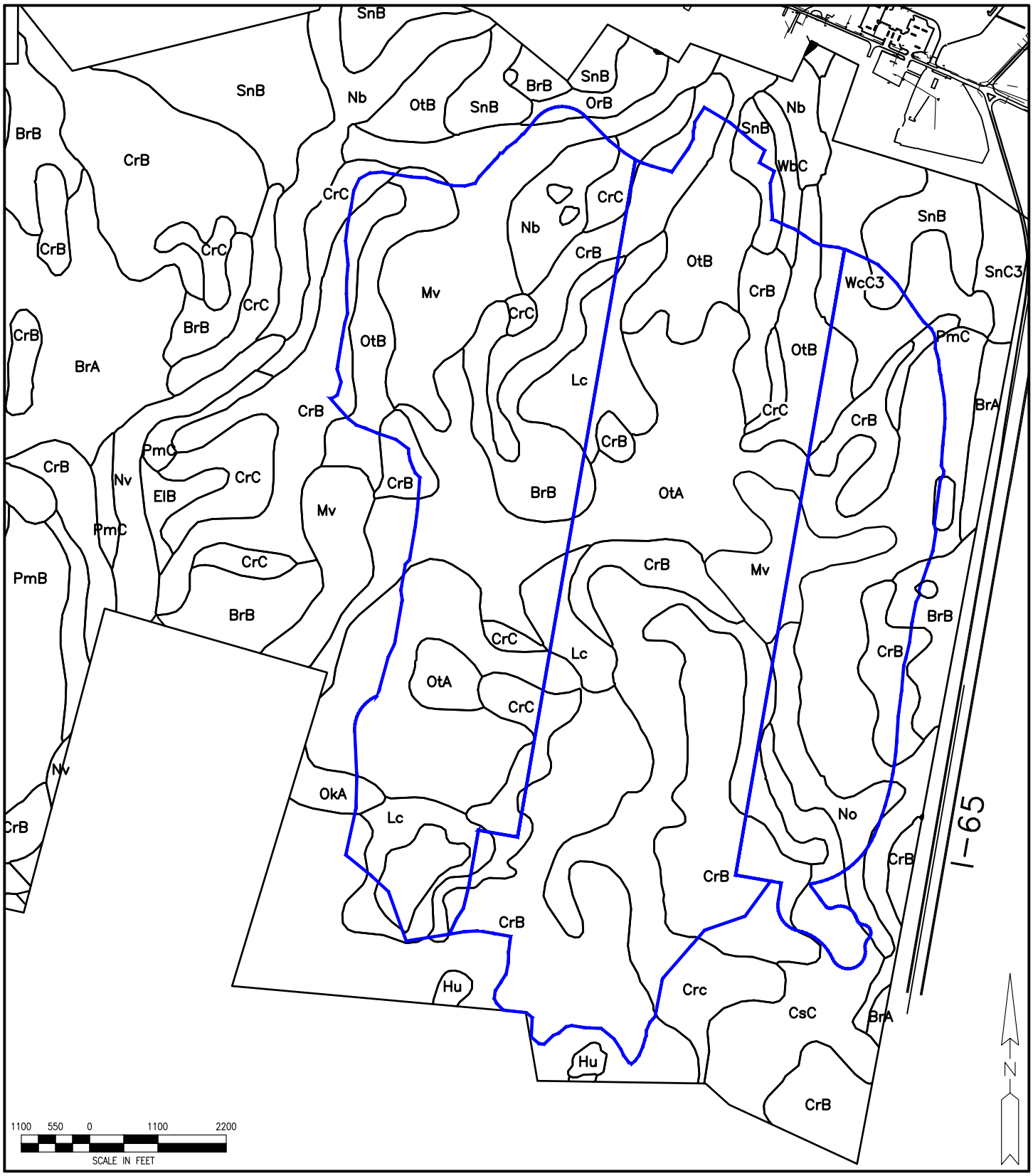

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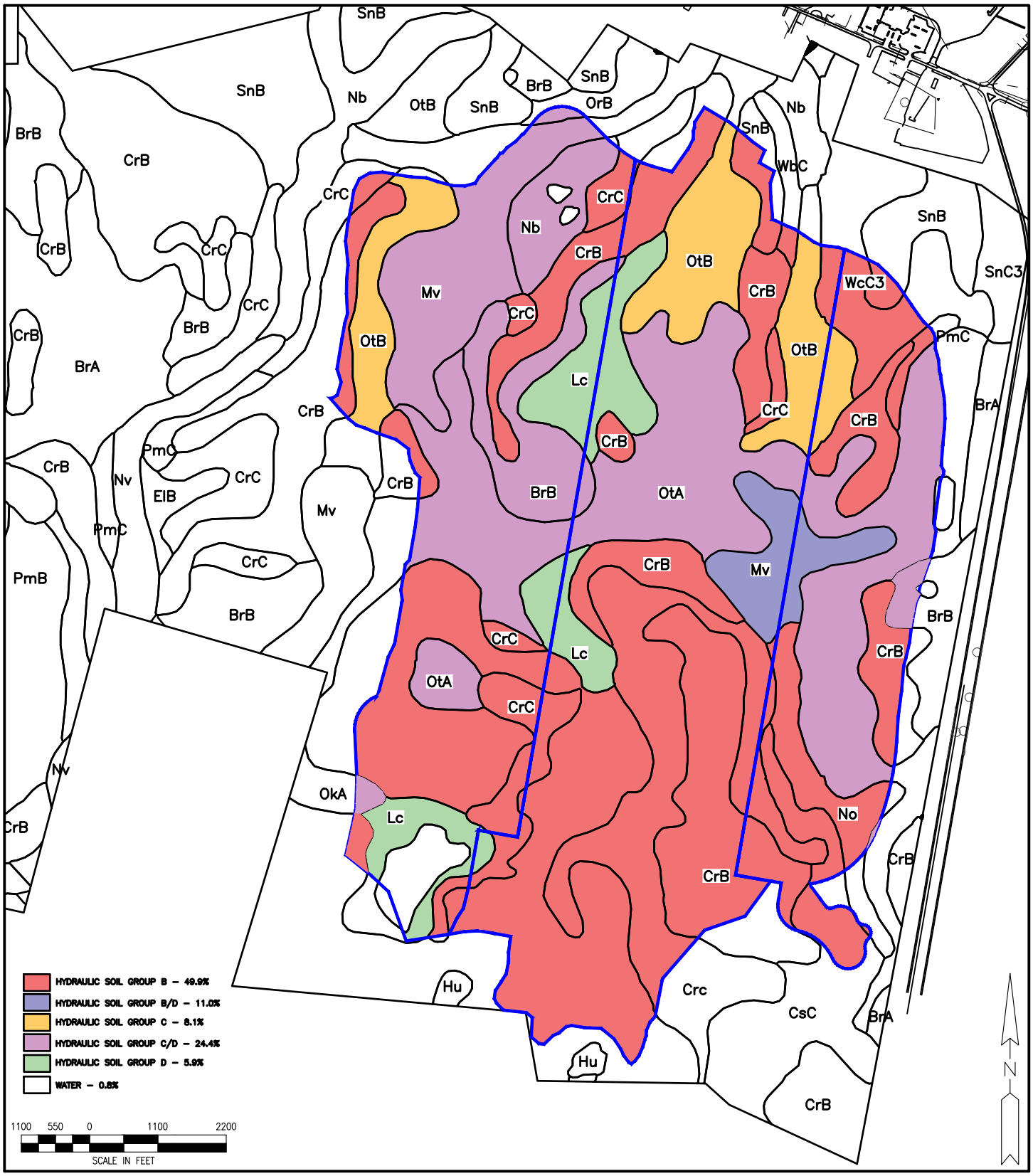

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