



INVITATION FOR BIDS

CCK-2617.0-11-25
UK Agriculture Research Facility 1 – BP06 Fitout Group 1
PROJECT # 2617.0
ADDENDUM # 2
01/08/2025

IMPORTANT: BID AND ADDENDUM MUST BE RECEIVED BY 01/22/2025 @ 3:00 P.M. LEXINGTON, KY TIME

Bidder must acknowledge receipt of this and any addendum as stated in the Invitation for Bids.

ITEM #1: BIDDER NOTICES

Per KY Revised Statute (KRS45A_183) Turner Construction Company (Construction Manager) is notifying all potential bidders that it intends to competitively bid TC-030 General Trades and TC-036 Drywall and Ceilings as self-perform packages.

ITEM #2: CLARIFICATIONS AND MODIFICATIONS TO THE CONTRACT DOCUMENTS:

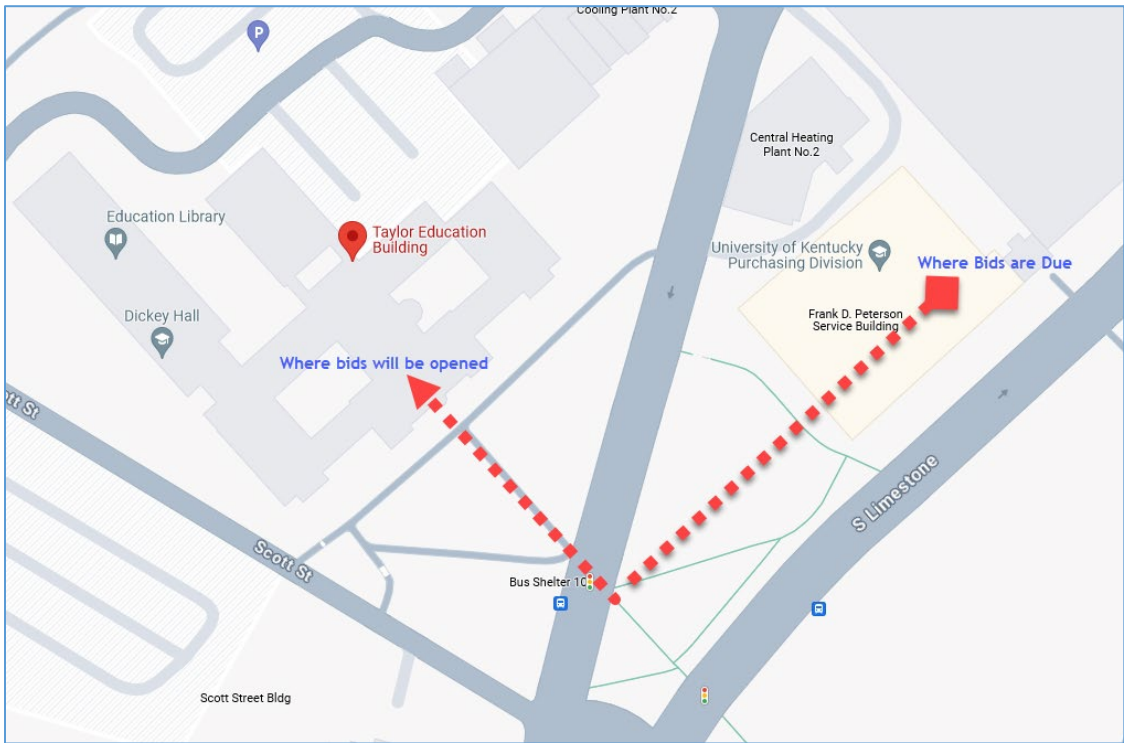
Bidders are instructed to review and incorporate into their offers the enclosed Addendum #2 from Turner Construction Company

ITEM #3: BID OPENING LOCATION

AFTER submitting the bid at the bid clerk's desk

322 Peterson Service Building
411 S. Limestone
Lexington, KY, 40506

Contractors should relocate to the Taylor Education Building Auditorium across Upper street, where the bid results will be publicly read. No bids will be accepted at this location. A rough map of the location is available on the following page.



OFFICIAL APPROVAL
UNIVERSITY OF KENTUCKY



Contracting Officer / (859) 257-9102

SIGNATURE

Typed or Printed Name



**UK AG Research Building
BID PACKAGE – 06 Fitout
ADDENDUM No. 2
CCK-2617.0-11-25
1/8/2025**

TCCO Addendum #2

Advertisement For Bid:

- Per KY Revised Statute (KRS45A_183) Turner Construction Company (Construction Manager) is notifying all potential bidders that it intends to competitively bid TC-030 General Trades and TC-036 Drywall and Ceilings as self-perform packages.

Attachments:

- Replace Attachment G with revised construction schedule data date 1/3/2025
- Geotechnical Report provided for reference
- Substitution Request form provided for material substitution requests
- Pre-bid meeting slide deck included for reference

Attachments Included:

- Attachment G – UPDATED Construction Schedule
- Geotechnical Report
- Substitution Request Form
- Pre-Bid Meeting Slide Deck

Activity ID	Activity Name	Orig Dur	Rem Dur	% Compl	Start	Finish	Total Float	Calendar	2025												2026											
									D	J	F	M	A	M	J	J	A	S	O	N	D	D	J	F	M	A	M	J	J	A	S	O
UK AG Research Working Schedule		567	507		07-Oct-24 A	31-Dec-26	0																									
Milestones		486	486		31-Jan-25	31-Dec-26	0	UK 5 days w/ Basic Holidays																								
MS 110	Enabling Work Complete	0	0	0%		31-Jan-25	66	UK 5 days w/ Basic Holidays	◆ Enabling Work Complete																							
MS 200	Relocate Site Utilities Complete	0	0	0%	19-Feb-25		84	UK 5 days w/ Basic Holidays	◆ Relocate Site Utilities Complete																							
MS 210	Re-open Tobacco Research Loading Dock Access Road	0	0	0%		14-Mar-25*	0	UK 5 days w/ Basic Holidays	◆ Re-open Tobacco Research Loading Dock Access Road																							
MS 190	Start Fitout Construction	0	0	0%	22-May-25		22	UK 5 days w/ Basic Holidays	◆ Start Fitout Construction																							
COM 180	Permanent Power	0	0	0%		11-Nov-25	54	UK 5 days w/ Basic Holidays	◆ Permanent Power																							
COM 190	AHU Start-up (Temp Heat for Construction	5	5	0%	12-Nov-25	18-Nov-25	54	UK 5 days w/ Basic Holidays	■ AHU Start-up (Temp Heat for Construction)																							
MS 140	Building Dry-In	0	0	0%		25-Nov-25	49	UK 5 days w/ Basic Holidays	◆ Building Dry-In																							
MS 150	Substantial Completion - AG Research Lvl 1-3, Rooftop Greenhouse	0	0	0%		04-Nov-26*	0	UK 5 days w/ Basic Holidays	◆ Substantial Completion - AG Research Lvl 1-3, Rooftop Greenhouse																							
MS 220	Substantial Completion - Auditorium, Lvl 4 offices	0	0	0%		30-Nov-26*	0	UK 5 days w/ Basic Holidays	◆ Substantial Completion - Auditorium, Lvl 4 offices																							
MS 160	Project Complete	0	0	0%		31-Dec-26	0	UK 5 days w/ Basic Holidays	◆ Project Complete																							
Permitting		60	10		01-Nov-24 A	16-Jan-25	121	UK 5 days w/ Basic Holidays																								
PER130	Teaching Greenhouse - Building Permit	60	10	83.33%	01-Nov-24 A	16-Jan-25	121	UK 5 days w/ Basic Holidays	■ Teaching Greenhouse - Building Permit																							
Contracting		52	34		02-Dec-24 A	19-Feb-25	22	UK 5 days w/ Basic Holidays																								
BP-01 Greenhouses		5	5		02-Dec-24 A	09-Jan-25	26	UK 5 days w/ Basic Holidays																								
CTR410	Award Contract- Teaching Greenhouse	5	5	0%	02-Dec-24 A	09-Jan-25	26	UK 5 days w/ Basic Holidays	■ Award Contract- Teaching Greenhouse																							
BP-05 Fitout		52	34		06-Dec-24 A	19-Feb-25	22	UK 5 days w/ Basic Holidays																								
CTR220	Bid Period Fitout	20	14	30%	06-Dec-24 A	22-Jan-25	22	UK 5 days w/ Basic Holidays	■ Bid Period Fitout																							
CTR190	Fitout Contracts	20	20	0%	23-Jan-25	19-Feb-25	22	UK 5 days w/ Basic Holidays	■ Fitout Contracts																							
Submittals		119	59		07-Oct-24 A	26-Mar-25	223																									
BP-01 Greenhouses		60	60		10-Jan-25	10-Mar-25	36	UK 7 days no Holidays																								
SUB270	Teaching Greenhouse Shop Drawings	60	60	0%	10-Jan-25	10-Mar-25	36	UK 7 days no Holidays	■ Teaching Greenhouse Shop Drawings																							
BP-04 Core & Shell		62	20		07-Oct-24 A	30-Jan-25	262	UK 5 days w/ Basic Holidays																								
SUB120	Storm Detention Submittals	25	5	80%	07-Oct-24 A	09-Jan-25	277	UK 5 days w/ Basic Holidays	■ Storm Detention Submittals																							
SUB210	TC-020 Storefront Curtainwall Glazing	20	20	0%	06-Dec-24 A	30-Jan-25	199	UK 5 days w/ Basic Holidays	■ TC-020 Storefront Curtainwall Glazing																							
SUB220	TC-021 CFMF, Metal Panels, Terracotta	20	10	50%	06-Dec-24 A	16-Jan-25	164	UK 5 days w/ Basic Holidays	■ TC-021 CFMF, Metal Panels, Terracotta																							
SUB230	TC-022 Roofing, Sheet Metal	20	10	50%	06-Dec-24 A	16-Jan-25	115	UK 5 days w/ Basic Holidays	■ TC-022 Roofing, Sheet Metal																							
SUB240	TC-023 Masonry	20	10	50%	06-Dec-24 A	16-Jan-25	99	UK 5 days w/ Basic Holidays	■ TC-023 Masonry																							
SUB250	TC-024 Fireproofing	20	10	50%	06-Dec-24 A	16-Jan-25	119	UK 5 days w/ Basic Holidays	■ TC-024 Fireproofing																							
SUB260	TC-015 Structural Steel	20	10	50%	06-Dec-24 A	16-Jan-25	0	UK 5 days w/ Basic Holidays	■ TC-015 Structural Steel																							
BP-05 Fitout		25	25		20-Feb-25	26-Mar-25	22	UK 5 days w/ Basic Holidays																								
APP210	Fitout Submittals	25	25	0%	20-Feb-25	26-Mar-25	22	UK 5 days w/ Basic Holidays	■ Fitout Submittals																							
Fabrication & Delivery		260	180		25-Nov-24 A	16-Sep-25	162																									
BP-03 Foundations & Long Lead Equipment		260	180		25-Nov-24 A	16-Sep-25	54	UK 5 days w/ Basic Holidays																								
FAB200	Long Lead Electrical Equipment Fab and Delivery	260	180	30.77%	25-Nov-24 A	16-Sep-25	54	UK 5 days w/ Basic Holidays	■ Long Lead Electrical Equipment Fab and Delivery																							
BP-04 Core & Shell		124	106		06-Dec-24 A	02-Jun-25	236																									
A120	Long Lead Mechanical Equipment Fab and Delivery	100	80	20%	06-Dec-24 A	24-Apr-25	209	UK 5 days w/ Basic Holidays	■ Long Lead Mechanical Equipment Fab and Delivery																							
A670	Structural Steel Fab & Delivery	50	30	40%	19-Dec-24 A	13-Feb-25*	0	UK 5 days w/ Basic Holidays	■ Structural Steel Fab & Delivery																							
A200	Storm Detention Fab and Delivery	60	60	0%	10-Jan-25	03-Apr-25	277	UK 5 days w/ Basic Holidays	■ Storm Detention Fab and Delivery																							
A480	Teaching Greenhouse Fabrication and Procurement	84	84	0%	11-Mar-25	02-Jun-25	36	UK 7 days no Holidays	■ Teaching Greenhouse Fabrication and Procurement																							
BP-05 Fitout		40	40		27-Mar-25	21-May-25	22	UK 5 days w/ Basic Holidays																								
A110	Fitout Material Fab and Delivery	40	40	0%	27-Mar-25	21-May-25	22	UK 5 days w/ Basic Holidays	■ Fitout Material Fab and Delivery																							

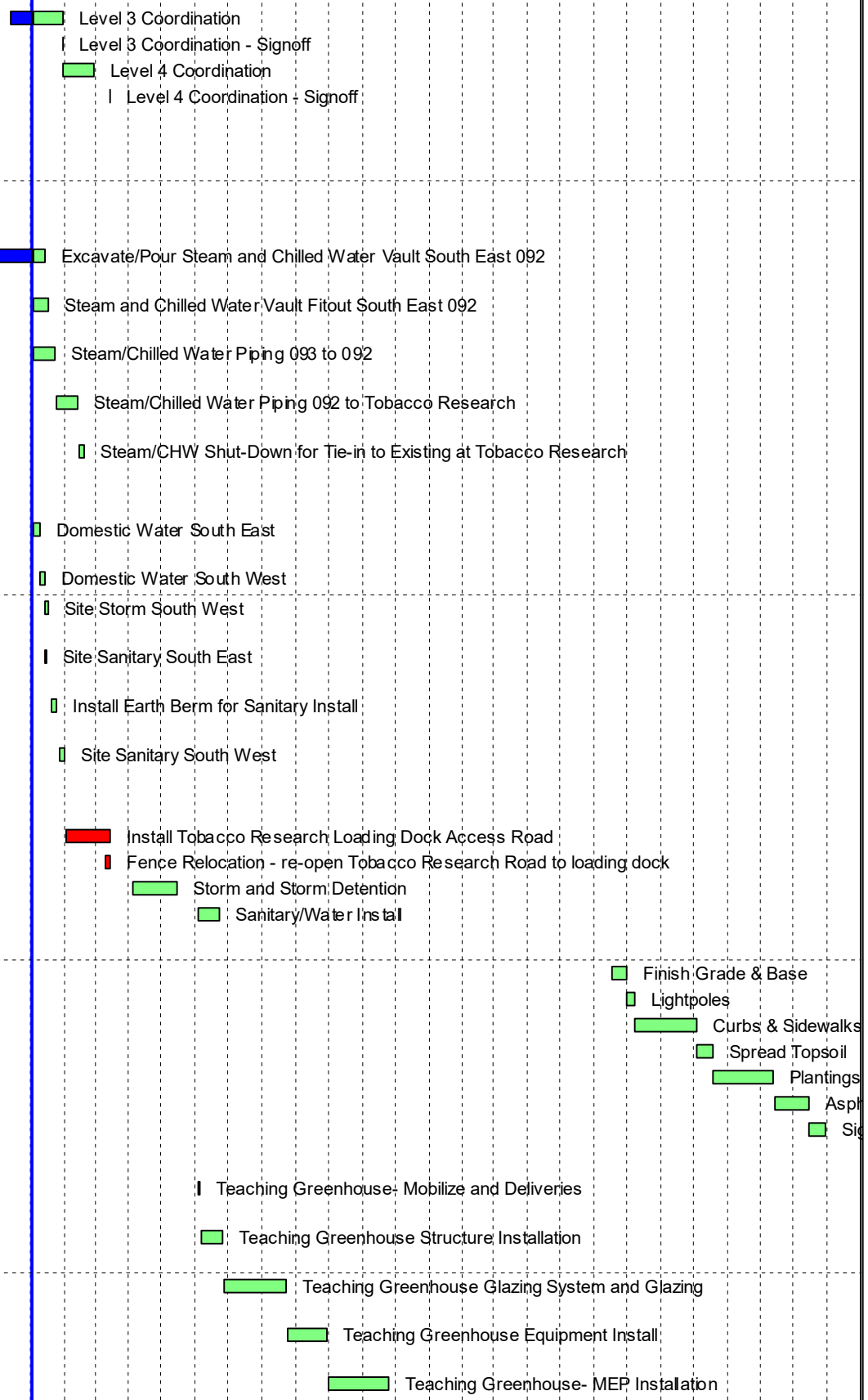
■ Remaining Level of Effort ◆ Milestone
■ Actual Level of Effort
■ Actual Work
■ Remaining Work
■ Critical Remaining Work

UK AG Research Working Schedule
Data Date 03-Jan-25



Start Date 02-Oct-23
 Finish Date 31-Dec-26
 Data Date 03-Jan-25

Activity ID	Activity Name	Orig Dur	Rem Dur	% Compl	Start	Finish	Total Float	Calendar	2025												2026												027
									D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	
VDC / BIM		64	51		13-Dec-24 A	14-Mar-25	98	UK 5 days w/ Basic Holidays																									
BIM 150	Level 3 Coordination	20	20	0%	13-Dec-24 A	30-Jan-25	67	UK 5 days w/ Basic Holidays																									
BIM 180	Level 3 Coordination - Signoff	1	1	0%	30-Jan-25	30-Jan-25	67	UK 5 days w/ Basic Holidays																									
BIM 170	Level 4 Coordination	20	20	0%	31-Jan-25	27-Feb-25	98	UK 5 days w/ Basic Holidays																									
BIM 190	Level 4 Coordination - Signoff	1	1	0%	14-Mar-25	14-Mar-25	98	UK 5 days w/ Basic Holidays																									
Construction		565	505		07-Oct-24 A	29-Dec-26	2																										
Site		565	505		07-Oct-24 A	29-Dec-26	2																										
Enabling		93	33		07-Oct-24 A	18-Feb-25	84																										
Steam/Chilled Water Relocation		93	33		07-Oct-24 A	18-Feb-25	84																										
ES 290	Excavate/Pour Steam and Chilled Water Vault South East 092	15	7	53.33%	07-Oct-24 A	13-Jan-25	104	UK 5 days w/ Basic Holidays																									
ES 320	Steam and Chilled Water Vault Fitout South East 092	10	10	0%	03-Jan-25	16-Jan-25	104	UK 5 days w/ Basic Holidays																									
ES 540	Steam/Chilled Water Piping 093 to 092	15	15	0%	03-Jan-25	23-Jan-25	84	UK 5 days w/ Basic Holidays																									
ES 400	Steam/Chilled Water Piping 092 to Tobacco Research	15	15	0%	24-Jan-25	13-Feb-25	84	UK 5 days w/ Basic Holidays																									
ES 390	Steam/CHW Shut-Down for Tie-in to Existing at Tobacco Research	5	5	0%	14-Feb-25	18-Feb-25	119	UK 7 days no Holidays																									
Sanitary/Water/Storm		21	21		03-Jan-25	31-Jan-25	66	UK 5 days w/ Basic Holidays																									
ES 860	Domestic Water South East	5	5	0%	03-Jan-25	09-Jan-25	66	UK 5 days w/ Basic Holidays																									
ES 890	Domestic Water South West	2	2	0%	10-Jan-25	13-Jan-25	66	UK 5 days w/ Basic Holidays																									
ES 130	Site Storm South West	4	4	0%	14-Jan-25	17-Jan-25	66	UK 5 days w/ Basic Holidays																									
ES 930	Site Sanitary South East	2	2	0%	14-Jan-25	15-Jan-25	68	UK 5 days w/ Basic Holidays																									
ES 1110	Install Earth Berm for Sanitary Install	5	5	0%	20-Jan-25	24-Jan-25	66	UK 5 days w/ Basic Holidays																									
ES 940	Site Sanitary South West	5	5	0%	27-Jan-25	31-Jan-25	66	UK 5 days w/ Basic Holidays																									
Sitework		100	100		03-Feb-25	23-Jun-25	251	UK 5 days w/ Basic Holidays																									
A270	Install Tobacco Research Loading Dock Access Road	30	30	0%	03-Feb-25	14-Mar-25*	0	UK 5 days w/ Basic Holidays																									
A330	Fence Relocation - re-open Tobacco Research Road to loading dock	5	5	0%	10-Mar-25	14-Mar-25	0	UK 5 days w/ Basic Holidays																									
A390	Storm and Storm Detention	30	30	0%	04-Apr-25	15-May-25	277	UK 5 days w/ Basic Holidays																									
A380	Sanitary/Water Install	15	15	0%	03-Jun-25	23-Jun-25	251	UK 5 days w/ Basic Holidays																									
Final Sitework		135	135		17-Jun-26	29-Dec-26	2	UK 5 days w/ Basic Holidays																									
FS 100	Finish Grade & Base	10	10	0%	17-Jun-26	30-Jun-26	2	UK 5 days w/ Basic Holidays																									
FS 110	Lightpoles	5	5	0%	01-Jul-26	08-Jul-26	2	UK 5 days w/ Basic Holidays																									
FS 120	Curbs & Sidewalks	40	40	0%	09-Jul-26	02-Sep-26	2	UK 5 days w/ Basic Holidays																									
FS 130	Spread Topsoil	10	10	0%	03-Sep-26	17-Sep-26	2	UK 5 days w/ Basic Holidays																									
FS 140	Plantings & Landscape	40	40	0%	18-Sep-26	12-Nov-26	2	UK 5 days w/ Basic Holidays																									
FS 150	Asphalt Paving & Striping	20	20	0%	13-Nov-26	14-Dec-26	2	UK 5 days w/ Basic Holidays																									
FS 160	Signage	10	10	0%	15-Dec-26	29-Dec-26	2	UK 5 days w/ Basic Holidays																									
Teaching Greenhouse		173	173		03-Jun-25	06-Feb-26	183	UK 5 days w/ Basic Holidays																									
ENV 170	Teaching Greenhouse- Mobilize and Deliveries	3	3	0%	03-Jun-25	05-Jun-25	25	UK 5 days w/ Basic Holidays																									
ENV 190	Teaching Greenhouse Structure Installation	15	15	0%	06-Jun-25	26-Jun-25	25	UK 5 days w/ Basic Holidays																									
ENV 200	Teaching Greenhouse Glazing System and Glazing	40	40	0%	27-Jun-25	22-Aug-25	25	UK 5 days w/ Basic Holidays																									
ENV 210	Teaching Greenhouse Equipment Install	25	25	0%	25-Aug-25	29-Sep-25	25	UK 5 days w/ Basic Holidays																									
ENV 220	Teaching Greenhouse- MEP Installation	40	40	0%	30-Sep-25	24-Nov-25	183	UK 5 days w/ Basic Holidays																									



**SECTION 003132
GEOTECHNICAL DATA**

PART 1 - GENERAL

1.1 GEOTECHNICAL DATA

- A. This Document, with its referenced attachments, is part of the Procurement and Contracting Requirements for the Project. They provide Owner's information for Bidders' convenience and are intended to supplement rather than serve in lieu of Bidders' own investigations. They are made available for Bidders' convenience and information. This Document and its attachments are not part of the Contract Documents.
- B. Because subsurface conditions indicated by the soil borings are a sampling in relation to the entire construction area, and for other reasons, Owner, Architect, Architect's consultants, and the firm reporting the subsurface conditions do not warranty the conditions below the depths of the borings or that the strata logged from the borings are necessarily typical of the entire site. Any party using the information described in the soil borings and geotechnical report accepts full responsibility for its use.
- C. A Geotechnical Investigation Report for Project, prepared by Terracon dated May 17, 2024 is available for viewing as appended to this Project Manual.
 - 1. The opinions expressed in this report are those of a geotechnical engineer and represent interpretations of subsoil conditions, tests, and results of analyses conducted by a geotechnical engineer. Owner is not responsible for interpretations or conclusions drawn from the data.
 - 2. Any party using information described in the geotechnical report will make additional test borings and conduct other exploratory operations that may be required to determine the character of subsurface materials that may be encountered.

PART 2 - PRODUCTS (Not Used)
PART 3 - EXECUTION (Not Used)

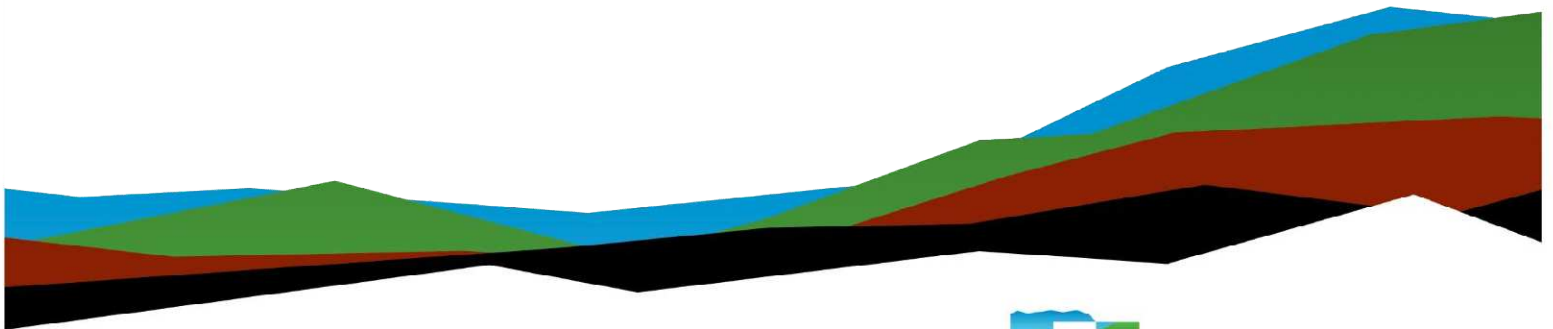
END OF SECTION 003132

University of Kentucky Agriculture Research Building Project

Geotechnical Engineering Report

Prepared for:

BHDP
302 W 3rd St Ste 500
Cincinnati, Ohio 45202



Nationwide
Terracon.com

- Facilities
- Environmental
- Geotechnical
- Materials



2460 Palumbo Drive
Lexington, KY 40509
P (859) 303-9000
Terracon.com

May 17, 2024

BHDP
302 W 3rd St Ste 500
Cincinnati, Ohio 45202

Attn: Alejandro Medina
P: (513) 527-0230
E: AMedina@bhdp.com

Re: Geotechnical Engineering Report
University of Kentucky Agriculture Research Building Project
Farm Road
Lexington, Kentucky
Terracon Project No. N3235060

Dear Mr. Medina:

We have completed the scope of Geotechnical Engineering services for the above referenced project in general accordance with Terracon Proposal No. PN3225070 dated July 18, 2023. This report presents the findings of the subsurface exploration and provides geotechnical recommendations concerning earthwork and the design and construction of foundations and floor slabs for the proposed project.

We appreciate the opportunity to be of service to you on this project. If you have any questions concerning this report or if we may be of further service, please contact us.

Sincerely,

Terracon

Isaac T. Hardesty
Group Manager

Samuel G. Guy, P.E.
Office Manager

Prasad S. Rege, P.E.*
Senior Principal
(*Ohio, West Virginia, Pennsylvania, Michigan)

Table of Contents

Introduction	1
Project Description	1
Site Conditions	3
Geotechnical Characterization	3
Geologic Hazards	4
Seismic Site Class	5
Geotechnical Overview	6
Earthwork	7
Site Grading	8
Site Preparation	10
Subgrade Preparation	10
Excavation	11
Soil Stabilization	12
Fill Material Types	13
Fill Placement and Compaction Requirements	14
Utility Trench Backfill	15
Grading and Drainage	16
Earthwork Construction Considerations	17
Construction Observation and Testing	17
Shallow Foundations	18
Design Parameters – Compressive Loads	18
Foundation Construction Considerations	19
Deep Foundation	20
Drilled Shaft Design Parameters	20
Drilled Shaft Lateral Loading	23
Drilled Shaft Construction Considerations	24
Floor Slabs	26
Floor Slab Design Parameters	27
Floor Slab Construction Considerations	28
Lateral Earth Pressures	28
Design Parameters	28
Pavements	30
General Pavement Comments	30
Pavement Design Parameters	30
Pavement Section Thicknesses	30
Pavement Drainage	31
Pavement Maintenance	32
General Comments	32

Figures

GeoModel

Attachments


Exploration and Testing Procedures

Photography Log

Site Location and Exploration Plans

Exploration and Laboratory Results

Supporting Information

Note: This report was originally delivered in a web-based format. **Blue Bold** text in the report indicates a referenced section heading. The PDF version also includes hyperlinks which direct the reader to that section and clicking on the  Terracon logo will bring you back to this page. For more interactive features, please view your project online at client.terracon.com.

Refer to each individual Attachment for a listing of contents.

Introduction

This report presents the results of our subsurface exploration and Geotechnical Engineering services performed for the proposed University of Kentucky Agriculture Research Building to be located along Farm Road in Lexington, Kentucky. The purpose of these services was to provide information and geotechnical engineering recommendations relative to:

- Subsurface soil (and rock) conditions
- Groundwater conditions
- Seismic site classification per IBC
- Site preparation and earthwork
- Foundation design and construction
- Floor slab design and construction
- Lateral earth pressure
- Pavement design and construction

The geotechnical engineering Scope of Services for this project included the advancement of test borings, laboratory testing, engineering analysis, and preparation of this report.

Drawings showing the site and boring locations are shown on the [Site Location](#) and [Exploration Plan](#), respectively. The results of the laboratory testing performed on soil samples obtained from the site during our field exploration are included on the boring logs and/or as separate graphs in the [Exploration Results](#) section.

Project Description

Our initial understanding of the project was provided in our proposal and was discussed during project planning. A period of collaboration has transpired since the project was initiated, and our final understanding of the project conditions is as follows:

Item	Description
Information Provided	Project information was provided via email by Mr. Alejandro Medina, of BHDP on July 17, 2023.

Item	Description
Project Description	A new, five-story, University of Kentucky College of Agriculture Research building. The provided information indicates the new building will have a useable space of 184,000 SF. The new development will also consist of three loading docks and nine parking spaces. Terracon was provided a site grading plan on Thursday May 9 th , 2024.
Proposed Structure	The building is anticipated to be a five-story structure with a one-story auditorium and a usable space of about 184,000 SF.
Building Construction	Structural steel framed auditorium and the main building will be a reinforced concrete structure for the first two elevated levels and then consist of a structural steel framed construction for the next two floors and roof.
Finished Floor Elevation	1,000.33 feet (+/-)
Maximum Loads	Structural loading information for column gravity loads was provided by Brad Saalfeld with THP Limited for our use in estimating settlement: <ul style="list-style-type: none"> ■ Exterior Columns for Auditorium: 100 kips ■ Interior Columns for Building: 1,000-1,200 kips ■ Slabs (assumed): 150 pounds per square foot (psf)
Grading/Slopes	Based on review of the provided mass grading plan, proposed slopes across the site are as steep as 3H:1V. Grading will include up to about 5 feet of fill and 5 feet of cut.
Below-Grade Structures	Elevator shaft pits. No basements are anticipated
Free-Standing Retaining Walls	Details not provided at this time.
Pavements	We assume both rigid (concrete) and flexible (asphalt) pavement sections should be considered. Per the provided Minimum Pavement Design Recommendations, the pavement design life is 20 years, and anticipated traffic is as follows: <ul style="list-style-type: none"> ■ 2 Semi tractor trailers per day ■ 1 Farm equipment trailer per day ■ 5 Box delivery trucks per day ■ 35 Passenger vehicles
Building Code	2018 IBC

Terracon should be notified if any of the above information is inconsistent with the planned construction, especially the grading limits, as modifications to our recommendations may be necessary.

Site Conditions

The following description of site conditions is derived from our site visit in association with the field exploration and our review of publicly available geologic and topographic maps.

Item	Description
Parcel Information	The project is located along Farm Road in Lexington, Kentucky. 38.025793, -84.508840 (See Exhibit D) See Site Location
Existing Improvements	Existing grass lot with sidewalks, parking and trees.
Current Ground Cover	Asphalt, concrete, and light vegetation comprised mostly of grass
Existing Topography	Based on a review of Google Earth topography, the site appears to be gently sloping from west to east with an approximate elevation range of 988 to 1002 feet.

We also collected photographs at the time of our field exploration program. Representative photos are provided in our [Photography Log](#).

Geotechnical Characterization

We have developed a general characterization of the subsurface conditions based upon our review of the subsurface exploration, laboratory data, geologic setting and our understanding of the project. This characterization, termed GeoModel, forms the basis of our geotechnical calculations and evaluation of the site. Conditions observed at each exploration point are indicated on the individual logs. The individual logs can be found in the [Exploration Results](#) and the GeoModel can be found in the [Figures](#) attachment of this report.

As part of our analyses, we identified the following model layers within the subsurface profile. For a more detailed view of the model layer depths at each boring location, refer to the GeoModel.

Model Layer	Layer Name	General Description
1	Surface	Topsoil
2	Lean Clay	Lean Clay (CL), moderate plasticity clay with chert, stiff to very stiff, light brown
3	Fat Clay	Fat Clay (CH), high plasticity clay with chert and limestone fragments, stiff to very stiff, brown
4	Weathered Bedrock	Weathered Limestone, highly weathered, gray
5	Limestone	Limestone, slightly weathered, close fracture spacing, medium strong to strong rock

The borings were advanced in the dry using a rotary drilling technique that allow short term groundwater observations to be made while drilling. Groundwater seepage was not encountered within the maximum drilling depth at the time of our field exploration. Groundwater conditions may be different at the time of construction. Groundwater conditions may change because of seasonal variations in rainfall, runoff, and other conditions not apparent at the time of drilling. Long-term groundwater monitoring was outside the scope of services for this project.

Geologic Hazards

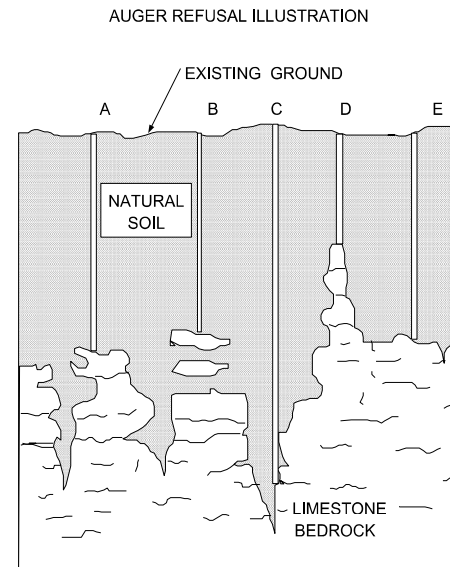
Karst features (including clay seams, caverns, sinkholes, and highly irregular rock surfaces) are common features within carbonate rocks like those encountered in this exploration. The initial limited desktop study performed for this report found that the site is within formations with “very high” karst potential. While no sinkholes were mapped within the project boundaries, multiple sinkholes were mapped within one-half mile of the project site. Practical refusal (presumed top of rock) was encountered in all borings at depths ranging from about 2.2 to 7.1 feet.

The scope of services for this geotechnical engineering report did not include exploration for the presence of underground voids or solution cavities that are known to occur within this type of geology. To determine the likelihood of karst activity at the site, additional studies would need to be undertaken and can be performed as an additional scope of work, upon request. Further assessment of specific, unusual features may include additional exploration and/or geophysical analysis (i.e., resistivity study) to better understand the risk and to aid in generating informed decisions. It is possible that documentation exists regarding the extent of existing depressions and sink holes in the surrounding area and the risk these depressions pose to present infrastructure within

the vicinity of the project area. If this documentation is available, it should be provided to Terracon so that we may reassess and revise our recommendations, if necessary.

In an area of limestone bedrock, auger refusal can result on slabs of unweathered limestone suspended in the residual soil matrix ("floaters"), on rock "pinnacles" rising above the surrounding bedrock surface, in widened (soil-filled) joints that may extend well below the surrounding bedrock surface, or on the upper surface of continuous bedrock. Several of these possible auger refusal conditions are illustrated in the figure at right.

The Tanglewood Limestone bedrock is known for producing several obstructions that can cause the augers to refuse above sound bedrock. These obstructions can range from floaters to rock pinnacles as illustrated in examples A, B, C, and D in the figure. Depth to competent bedrock in areas of karst geology can vary greatly over short distances. It is possible that the above-mentioned obstructions or sound bedrock will be encountered at depths shallower or deeper than those shown on our boring logs. The possibility of varying depths to bedrock as well as encountering various karst features should be considered when developing the design and construction/excavation plans for this project as well as developing a construction QA/QC plan. A contingency should be included in the site development budget in the event such conditions are encountered during the course of construction.



THIS FIGURE IS FOR ILLUSTRATIVE PURPOSES ONLY AND DOES NOT NECESSARILY DEPICT THE SPECIFIC BEDROCK CONDITIONS AT THIS SITE

Seismic Site Class

The seismic design requirements for buildings and other structures are based on Seismic Design Category. Site Classification is required to determine the Seismic Design Category for a structure. The Site Classification is based on the upper 100 feet of the site profile defined by a weighted average value of either shear wave velocity, standard penetration resistance, or undrained shear strength in accordance with Section 20.4 of ASCE 7 and the International Building Code (IBC). Based on the average shear wave velocities derived from our seismic survey lines, our professional opinion is for that a **Seismic Site Classification of B** be considered for the project.

Geotechnical Overview

The site appears suitable for the proposed construction based upon geotechnical conditions encountered in the test borings, provided that the recommendations provided in this report are implemented in the design and construction phases of this project.

Grading plans were not available at the time this report was being developed. However, conversation with the design team indicates approximately 4 to 6 feet of cut and/or fill to bring the site to design grade. Once grading plans are available, they should be provided to Terracon for our review so we may modify our recommendations, where appropriate.

The subsurface materials generally consisted of moderate to high plasticity clay with varying amounts of chert and limestone fragments underlain by limestone bedrock. Groundwater was not encountered within the maximum depths of exploration during or at the completion of drilling.

The near surface, medium stiff to very stiff moderate to high plasticity clay could become unstable with typical earthwork and construction traffic, especially after precipitation events. The effective drainage should be completed early in the construction sequence and maintained after construction to avoid potential issues. If possible, the grading should be performed during the warmer and drier times of the year. If grading is performed during the winter months, an increased risk for possible undercutting and replacement of unstable subgrade will persist. Additional site preparation recommendations, including subgrade improvement and fill placement, are provided in the **Earthwork** section.

Based on the conditions encountered and estimated load-settlement relationships, the proposed structure can be supported on conventional shallow foundations bearing on bedrock or on lean concrete extending to bedrock, as outlined in the **Shallow Foundations** Section of the report. As an alternative, the structure may also be supported on deep foundations; specifically, drilled shafts extending to bedrock, as outlined in the **Deep Foundations** section. Recommendations for the design and construction of the building's floor slab can be found in **Floor Slabs**.

The existing soils which may form the bearing stratum for floor slabs in at least a portion of the site are highly plastic and may exhibit potential for shrink-swell movements with changes in moisture. We do not expect significant dead load on the floors and recommend the following be considered where floor slab design grade elevation encounters native soils: 1.) overexcavation of near-surface fat clays (where

encountered) and replacement with low-volume-change soils to reduce the heave potential, 2. Treating the soils with a chemical admixture such as hydrated lime to modify the soils characteristic, or 3.) use of suspended slabs to accommodate potential ground heave. Further, it may be prudent to consider performing swell testing on select samples of subgrade soils to determine the swell potential of the material beneath floor slabs. Swell testing will provide an indication of the need for remedial action (if at all). The **Floor Slabs** section addresses slab-on-grade support of the building using overexcavation techniques.

Potentially-expansive soils are present on this site. This report provides recommendations to help mitigate the effects of soil shrinkage and expansion. However, even if these procedures are followed, some movement and (at least minor) cracking in the structure should be anticipated. The severity of cracking and other damage such as uneven floor slabs will probably increase if modification of the site results in excessive wetting or drying of the expansive soils. Eliminating the risk of movement and distress may not be feasible, but it may be possible to further reduce the risk of movement if significantly more expensive measures are used during construction. Some of these options were discussed previously in this report such as complete replacement of expansive soils or a structural slab.

Based on boring log information, slightly weathered limestone bedrock was encountered at this site. Bedrock competency and hardness typically increase with depth. Weathered bedrock can typically be excavated using conventional excavation equipment equipped with rock removal tools. However, while grading plans were not available for our review at the time of this report, it is expected that any planned excavations may encounter medium strong to strong, competent bedrock. The earthwork contractor should be prepared to use methods such as pneumatic hammering to excavate to design floor slab subgrade and footing elevations. We recommend that the potential earthwork contractors the opportunity to perform independent rock cores prior to bidding for their own evaluation of rock excavatability across the site.

The recommendations contained in this report are based upon the results of field and laboratory testing (presented in the **Exploration Results**), engineering analyses, and our current understanding of the proposed project. The **General Comments** section provides an understanding of the report limitations.

Earthwork

Earthwork is anticipated to include clearing and grubbing, excavations, and engineered fill placement. The following sections provide recommendations for use in the preparation of specifications for the work. Recommendations include critical quality criteria, as necessary, to render the site in the state considered in our geotechnical engineering evaluation for foundations and floor slabs.

Earthwork activities on the project should be observed and evaluated by Terracon. The evaluation of earthwork should include observation of the removal of topsoil, removal of existing below-grade utilities, the observation and testing of newly placed engineered fill, subgrade preparation, foundation bearing soils, and other geotechnical conditions exposed during the construction of the project.

Proposed Grading

Existing surface grades in the area of proposed improvements range from elevations of about 994 feet to 1,004 feet. Based on the available site plan and proposed finished floor elevations, we anticipate that site grading will consist of adding up to approximately 5 feet of fill and up to approximately 5 feet of cut in the proposed improvement areas to achieve the proposed design surface grades.

The following table summarizes approximate cut/fill based on review of the mass grading plan and material anticipated at the subgrade elevation based on our [Exploration Results](#):

Boring No. ¹	Location	Existing Ground Elevation (feet) ¹	Approx. Final Finished Grade (feet) ¹	Approximate Cut (-)/ Fill (+) (feet)	Anticipated Subgrade (GeoModel Layer)
B-1	Proposed Building Area	994.5	999.33	+5	Structural Fill
B-2	Proposed Building Area	997.0	999.33	+2	Structural Fill
B-3	Proposed Building Area	999.0	999.33	0	Structural Fill
B-4	Proposed Building Area	997.0	999.33	+2	Structural Fill
B-5	Proposed Building Area	999.0	999.33	-1	Stiff Lean Clay (2)
B-6	Proposed Building Area	1,000.5	999.33	-1	Stiff Lean Clay (2)

Boring No.¹	Location	Existing Ground Elevation (feet)¹	Approx. Final Finished Grade (feet)¹	Approximate Cut (-)/ Fill (+) (feet)	Anticipated Subgrade (GeoModel Layer)
B-7	Proposed Building Area	1,000.5	999.33	-1	Stiff Lean Clay (2)
B-8	Proposed Building Area	1,004	999.33	-5	Stiff Fat Clay (3)
B-9	Proposed Building Area	994.0	999.33	+5	Structural Fill
B-10	Proposed Building Area	997.0	999.33	+2	Structural Fill
B-11	Proposed Building Area	994.0	999.33	+5	Structural Fill
B-12	Proposed Building Area	996.0	999.33	+3	Structural Fill
B-13	Proposed Building Area	998.0	999.33	+1	Structural Fill
B-14	Proposed Building Area	1,003.5	999.33	-4	Stiff Fat Clay (3)

1. Approximate Final Finished Grade based on provided grading plan and Finished Floor Elevation of 1000.33.

Review of grading plans indicates cut and fill slopes as steep as 3H:1V are proposed. Our scope of work did not include exploration, stability analysis, or recommendations related to cut and fill slope design. These services can be provided upon request. General considerations related to cut and fill slopes are provided in the **Earthwork** section of this report.

Site Preparation

Prior to placing fill, existing vegetation, topsoil, and root mats should be removed. Complete stripping of the topsoil should be performed in the proposed building and parking/driveway areas.

The proposed construction will be located near or within the footprints of existing buildings and within the footprints of park and drive areas and landscaping. We anticipate that as part of the initial site grading preparation, all existing construction debris (foundation elements, pavements, concrete curbs, underground utilities, etc.), as well as any other existing deleterious materials encountered within the proposed construction limits will be completely removed. We would anticipate removal and relocation, or re-routing, of any existing utilities which currently exist within the footprint of the proposed development area that would interfere with new construction. Any abandoned underground pipes, left in place, should be fully grouted. The stability of existing backfill above pipes left in place should be evaluated in the presence of geotechnical personnel by such means as proofrolling, in-place density testing and hand-augering. Excavations created due to utility relocations or demolition activities should be backfilled with structural fill materials, placed and compacted in accordance with the recommendations provided in the following paragraphs or with lean concrete or flowable fill. If lean concrete is used as backfill, the contractor should refer to all of the new build Mechanical-Electrical-Plumbing (MEP) and foundation drawings to confirm that the concrete backfill materials will not conflict with any new item installations or construction.

Subgrade Preparation

Subgrade soils beneath the proposed building addition appear suitable for construction.

The subgrade should be proofrolled with an adequately loaded vehicle such as a fully loaded tandem-axle dump truck. The proofrolling should be performed under the observation of the Geotechnical Engineer or representative. Areas excessively deflecting under the proofroll should be delineated and subsequently addressed by the Geotechnical Engineer. Such areas should either be removed or modified by treating/applying/mixing with lime. Excessively wet or dry material should either be removed, or moisture conditioned and recompacted.

The bearing material for floor slabs should remain uniform across the entire footprint of the building structure to minimize risks associated with differential settlement. Depending on finished floor elevation and the relatively shallow depth to bedrock (generally encountered across the site between about 2.2 ft and 6.9 ft), it may be necessary to over-excavate bedrock a minimum of 12 inches and replace with a volume of consistent material, specifically a 12-inch dense grade aggregate layer to limit the potential for differential settlement near the interface of soil and bedrock supported

sections of the grade supported floor slab. Differential settlement would likely manifest at this interface.

All exposed areas which will receive fill, once properly cleared and benched where necessary, should be scarified to a minimum depth of 10 inches, moisture conditioned as necessary, and compacted per the compaction requirements in this report. Compacted structural fill soils should then be placed to the proposed design grade and the moisture content and compaction of subgrade soils should be maintained until foundation construction.

Based upon the subsurface conditions determined from the geotechnical exploration, subgrade soils exposed during construction are anticipated to be relatively workable; however, the workability of the subgrade may be affected by precipitation, repetitive construction traffic or other factors. If unworkable conditions develop, workability may be improved by scarifying and drying.

Excavation

While grading plans were not available for our review at the time this report was being developed, it is anticipated that cuts could vary from 4 to 6 feet across the project site. Relatively shallow, medium strong to strong limestone bedrock was encountered in all borings at depths ranging from about 2.2 to 6.9 feet. Based on the encountered subsurface conditions, we believe heavy-duty construction equipment, such as a hoe ram, a heavy dozer equipped with a ripper, a rock saw or jack hammer or with rock trenching equipment, is likely suitable for grading, shallow excavations, and utility trench excavations.

The descriptions provided below are a guide to conditions generally encountered in the region of the project site. Required excavation techniques will vary based on weathering of the materials to be excavated, and the fracturing, jointing and overall stratigraphy of the feature. Actual field conditions usually display a gradual weathering progression with poorly defined and uneven boundaries between layers of different materials. We recommend that the following definitions for rock in earthwork excavation and drilled-pier construction be included in bid documents:

Excavation Type	Definition
Mass Excavation	Any material occupying an original volume of more than 1 cubic yard which cannot be excavated with a single-toothed ripper drawn by a crawler tractor having a minimum draw bar pull rating of not less than 80,000 pounds usable pull (Caterpillar D-8 or larger).

Excavation Type	Definition
Trench Excavation	Any material occupying an original volume of more than 1/2 cubic yard which cannot be excavated with a backhoe having a bucket curling rate of not less than 40,000 pounds, using a rock bucket and rock teeth (a John Deere 790 or larger).
Drilled Pier Excavation	Any natural hard and dense undisturbed subsurface material which cannot be removed with an earth auger or under-reaming tool, or for which the penetration rate is less than 2 inches per 5 minutes of drilling at full crowd force (with a rock auger or core barrel with hard formation drilling bit)

Soil Stabilization

Methods of subgrade improvement, as described below, could include scarification, moisture conditioning and re-compaction, removal of unstable materials and replacement with granular fill (with or without geosynthetics), and chemical stabilization. The appropriate method of improvement, if required, would be dependent on factors such as schedule, weather, the size of area to be stabilized, and the nature of the instability. More detailed recommendations can be provided during construction as the need for subgrade stabilization occurs. Performing site grading operations during warm seasons and dry periods would help reduce the amount of subgrade stabilization required.

If the exposed subgrade is unstable during proofrolling operations, it could be stabilized using one of the methods outlined below.

- **Scarification and Re-compaction** - It may be feasible to scarify, dry, and recompact the exposed soils. The success of this procedure would depend primarily upon favorable weather and sufficient time to dry the soils. Stable subgrades likely would not be achievable if the thickness of the unstable soil is greater than about 1 foot, if the unstable soil is at or near groundwater levels, or if construction is performed during a period of wet or cool weather when drying is difficult.
- **Crushed Stone** - The use of crushed stone or crushed gravel is a common procedure to improve subgrade stability. Typical undercut depths would be expected to be approximately 12 inches below finished subgrade elevation. The use of high modulus geotextiles (i.e., engineering fabric or geogrid) could also be considered after underground work such as utility construction is completed. Prior to placing the fabric or geogrid, we recommend that all below grade construction, such as utility line installation, be completed to avoid damaging the fabric or geogrid. Equipment should not be operated above the fabric or geogrid until one

full lift of crushed stone fill is placed above it. The maximum particle size of granular material placed over geotextile fabric or geogrid should not exceed 1-1/2 inches.

- **Chemical Modification** - Improvement of subgrades with Portland cement or hydrated lime could be considered for improving unstable soils or modifying moderate to high plasticity soils. Chemical modification should be performed by a pre-qualified contractor having experience with successfully stabilizing subgrades in the project area on similar sized projects with similar soil conditions. Results of chemical analysis of the additive materials should be provided to the geotechnical engineer prior to use. The hazards of chemicals blowing across the site or onto adjacent property should also be considered. Additional testing would be needed to develop specific recommendations to improve subgrade stability by blending chemicals with the site soils. Additional testing could include, but not be limited to, determining the most suitable stabilizing agent, the optimum amounts required, the presence of sulfates in the soil, and freeze-thaw durability of the subgrade.

Further evaluation of the need and recommendations for subgrade stabilization can be provided during construction as the geotechnical conditions are exposed.

Fill Material Types

Fill required to achieve design grade should be classified as structural fill and general fill. Structural fill is material used below or within 10 feet of structures, pavements or constructed slopes. General fill is material used to achieve grade outside of these areas.

Reuse of On-Site Soil: Excavated on-site soil may be selectively reused as fill, however, given that these soils have moderate to high plasticity’s, chemical treatment would be needed to effectively utilize these materials in structural areas. The on-site soil have an elevated fines content and will be sensitive to moisture conditions (particularly during seasonally wet periods) and may not be suitable for reuse when above optimum moisture content. The natural moisture contents of the native soils generally range from 22 to 27 percent, which is likely up to 5 percent above the optimum moisture content for material of this type.

Material property requirements for on-site soil for use as general fill and structural fill are noted in the table below:

Property	General Fill	Structural Fill
Composition	Free of deleterious material	Free of deleterious material

Property	General Fill	Structural Fill
Maximum particle size	6 inches (or 2/3 of the lift thickness)	3 inches
Fines content	Not limited	Less than 10% Passing No. 200 sieve (Local standard)
Plasticity ³	Not limited	Maximum plasticity index of 22
GeoModel Layer Expected to be Suitable ¹	2, 3	2, 3 ²

1. Based on subsurface exploration. Actual material suitability should be determined in the field at time of construction.
2. Model layer 3 with chemical treatment.
3. If plasticity requirements are met, this can be considered low volume change material.

Imported Fill Materials: Imported fill materials should meet the following material property requirements. Regardless of its source, compacted fill should consist of approved materials that are free of organic matter and debris. Frozen material should not be used, and fill should not be placed on a frozen subgrade.

Soil Type ¹	USCS Classification	Acceptable Parameters (for Structural Fill)
Low Plasticity Cohesive (Low Volume Change)	CL, CL-ML, SM, SC	Liquid Limit less than 40 Plasticity index less than 22 Less than 25% retained on No. 200 sieve
Granular (Low Volume Change)	GW, GP, GM, GC, SW, SP, SM, SC	Less than 50% passing No. 200 sieve

1. Structural and general fill should consist of approved materials free of organic matter and debris. Frozen material should not be used, and fill should not be placed on a frozen subgrade. A sample of each material type should be submitted to the Geotechnical Engineer for evaluation prior to use on this site. Additional geotechnical consultation should be provided prior to use of uniformly graded gravel on the site.

Fill Placement and Compaction Requirements

Structural and general fill should meet the following compaction requirements.

Item	Structural Fill	General Fill
Maximum Lift Thickness	8 inches or less in loose thickness when heavy, self-propelled compaction equipment is used 4 to 6 inches in loose thickness when hand-guided equipment (i.e. jumping jack or plate compactor) is used	Same as structural fill
Minimum Compaction Requirements ^{1,2,3}	98% of max. below foundations and within 1 foot of finished pavement subgrade 95% of max. above foundations, below floor slabs, and more than 1 foot below finished pavement subgrade	92% of max.
Water Content Range ¹	Low plasticity cohesive: -2% to +3% of optimum High plasticity cohesive: 0 to +4% of optimum Granular: -3% to +3% of optimum	As required to achieve min. compaction requirements

1. Maximum density and optimum water content as determined by the standard Proctor test (ASTM D 698).
2. High plasticity cohesive fill should not be compacted to more than 100% of standard Proctor maximum dry density and should be limited to landscaped areas
3. If the granular material is a coarse sand or gravel, or of a uniform size, or has a low fines content, compaction comparison to relative density may be more appropriate. In this case, granular materials should be compacted to at least 70% relative density (ASTM D 4253 and D 4254). Materials not amenable to density testing should be placed and compacted to a stable condition observed by the Geotechnical Engineer or representative.

Utility Trench Backfill

Any soft or unsuitable materials encountered at the bottom of utility trench excavations should be removed and replaced with structural fill or bedding material in accordance with public works specifications for the utility to be supported. This recommendation is particularly applicable to utility work requiring grade control and/or in areas where subsequent grade raising could cause settlement in the subgrade supporting the utility. Trench excavation should not be conducted below a downward 1:1 projection from existing foundations without engineering review of shoring requirements and geotechnical observation during construction.

On-site materials are considered suitable for backfill of utility and pipe trenches from 1 foot above the top of the pipe to the final ground surface, provided the material is free of organic matter and deleterious substances.

Trench backfill should be mechanically placed and compacted as discussed earlier in this report. Compaction of initial lifts should be accomplished with hand-operated tampers or other lightweight compactors. Where trenches are placed beneath slabs or footings, the backfill should satisfy the gradation and expansion index requirements of engineered fill discussed in this report. Flooding or jetting for placement and compaction of backfill is not recommended.

For low permeability subgrades, utility trenches are a common source of water infiltration and migration. Utility trenches penetrating beneath the building should be effectively sealed to restrict water intrusion and flow through the trenches, which could migrate below the building. The trench should provide an effective trench plug that extends at least 5 feet from the face of the building exterior. The plug material should consist of cementitious flowable fill or low permeability clay. The trench plug material should be placed to surround the utility line. If used, the clay trench plug material should be placed and compacted to comply with the water content and compaction recommendations for structural fill stated previously in this report.

Grading and Drainage

All grades must provide effective drainage away from the building during and after construction and should be maintained throughout the life of the structure. Water retained next to the building can result in soil movements greater than those discussed in this report. Greater movements can result in unacceptable differential floor slab and/or foundation movements, cracked slabs and walls, and roof leaks. The roof should have gutters/drains with downspouts that discharge onto splash blocks at a distance of at least 10 feet from the building.

Exposed ground should be sloped and maintained at a minimum 5% away from the building for at least 10 feet beyond the perimeter of the building. Locally, flatter grades may be necessary to transition ADA access requirements for flatwork. After building construction and landscaping have been completed, final grades should be verified to document effective drainage has been achieved. Grades around the structure should also be periodically inspected and adjusted, as necessary, as part of the structure's maintenance program. Where paving or flatwork abuts the structure, a maintenance program should be established to effectively seal and maintain joints and prevent surface water infiltration.

Earthwork Construction Considerations

Shallow excavations for the proposed structure are anticipated to be accomplished with heavy-duty construction equipment. Upon completion of filling and grading, care should be taken to maintain the subgrade water content prior to construction of grade-supported improvements such as floor slabs. Construction traffic over the completed subgrades should be avoided. The site should also be graded to prevent ponding of surface water on the prepared subgrades or in excavations. Water collecting over or adjacent to construction areas should be removed. If the subgrade freezes, desiccates, saturates, or is disturbed, the affected material should be removed, or the materials should be scarified, moisture conditioned, and recompacted prior to floor slab construction.

Although not encountered at the time of our field investigation, the groundwater table (as well as stormwater inflow) could affect overexcavation efforts, especially for overexcavation and replacement of lower strength soils. A temporary dewatering system consisting of sumps with pumps may be necessary to achieve the recommended depth of overexcavation depending on groundwater and stormwater conditions at the time of construction.

As a minimum, excavations should be performed in accordance with OSHA 29 CFR, Part 1926, Subpart P, "Excavations" and its appendices, and in accordance with any applicable local and/or state regulations.

Construction site safety is the sole responsibility of the contractor who controls the means, methods, and sequencing of construction operations. Under no circumstances shall the information provided herein be interpreted to mean Terracon is assuming responsibility for construction site safety or the contractor's activities; such responsibility shall neither be implied nor inferred.

Excavations or other activities resulting in ground disturbance have the potential to affect adjoining properties and structures. Our scope of services does not include review of available final grading information or consider potential temporary grading performed by the contractor for potential effects such as ground movement beyond the project limits. A preconstruction/ precondition survey should be conducted to document nearby property/infrastructure prior to any site development activity. Excavation or ground disturbance activities adjacent or near property lines should be monitored or instrumented for potential ground movements that could negatively affect adjoining property and/or structures.

Construction Observation and Testing

The earthwork efforts should be observed by the Geotechnical Engineer (or others under their direction). Observation should include documentation of adequate removal of

surficial materials (vegetation, topsoil, and pavements), evaluation and remediation of existing fill materials, as well as proofrolling and mitigation of unsuitable areas delineated by the proofroll.

Each lift of compacted fill should be tested, evaluated, and reworked, as necessary, as recommended by the Geotechnical Engineer prior to placement of additional lifts. Each lift of fill should be tested for density and water content at a frequency of at least one test for every 2,500 square feet of compacted fill in the building areas and 5,000 square feet in pavement areas. Where not specified by local ordinance, one density and water content test should be performed for every 100 linear feet of compacted utility trench backfill and a minimum of one test performed for every 12 vertical inches of compacted backfill.

In areas of foundation excavations, the bearing subgrade should be evaluated by the Geotechnical Engineer. If unanticipated conditions are observed, the Geotechnical Engineer should prescribe mitigation options.

In addition to the documentation of the essential parameters necessary for construction, the continuation of the Geotechnical Engineer into the construction phase of the project provides the continuity to maintain the Geotechnical Engineer’s evaluation of subsurface conditions, including assessing variations and associated design changes.

Shallow Foundations

If the site has been prepared in accordance with the requirements noted in **Earthwork**, the following design parameters are applicable for shallow foundations.

Design Parameters – Compressive Loads

Item	Description
Maximum Net Allowable Bearing Pressure ^{1, 2}	10,000 psf (shallow footing foundations bearing directly on competent limestone bedrock or lean concrete overlying the competent limestone bedrock)
Required Bearing Stratum ³	Competent Limestone Bedrock
Minimum Foundation Dimensions	Columns: 24 inches Continuous: 18 inches
Ultimate Passive Resistance ⁴ (equivalent fluid pressures)	240 pcf
Sliding Resistance ⁵	0.5 allowable coefficient of friction - bedrock

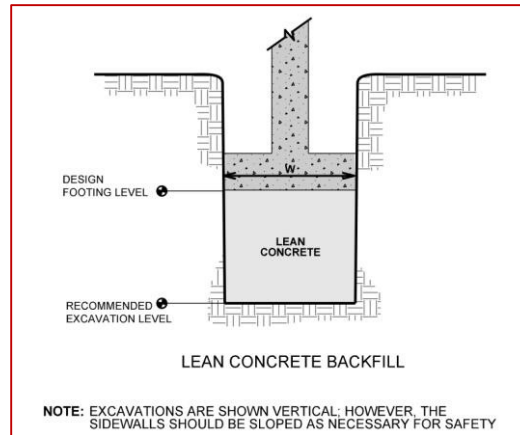
Item	Description
Minimum Embedment below Finished Grade ⁶	24 inches
Estimated Total Settlement from Structural Loads ²	Less than about 1 inch
Estimated Differential Settlement ^{2, 7}	About 1/2 of total settlement

1. The maximum net allowable bearing pressure is the pressure in excess of the minimum surrounding overburden pressure at the footing base elevation. Values assume that exterior grades are no steeper than 20% within 10 feet of structure.
2. Values provided are for maximum loads noted in **Project Description**. Additional geotechnical consultation will be necessary if higher loads are anticipated.
3. Unsuitable, loose, or soft bedrock materials should be over-excavated and replaced with lean concrete extending to competent bedrock or the foundations extended to bear directly on limestone bedrock
4. Use of passive earth pressures require the sides of the excavation for the spread footing foundation to be nearly vertical and the concrete placed neat against these vertical faces or that the footing forms be removed and compacted structural fill be placed against the vertical footing face. Assumes no hydrostatic pressure.
5. Can be used to compute sliding resistance where foundations are placed on suitable soil/materials. Frictional resistance for granular materials is dependent on the bearing pressure which may vary due to load combinations. For fine-grained materials, lateral resistance using cohesion should not exceed 1/2 the dead load.
6. Embedment necessary to minimize the effects of frost and/or seasonal water content variations. For sloping ground, maintain depth below the lowest adjacent exterior grade within 5 horizontal feet of the structure.
7. Differential settlements are noted for equivalent-loaded foundations and bearing elevation as measured over a span of 50 feet.

Foundation Construction Considerations

As noted in **Earthwork**, the footing excavations should be evaluated under the observation of the Geotechnical Engineer. The base of all foundation excavations should be free of water and loose soil, prior to placing concrete. Concrete should be placed soon after excavating to reduce bearing material disturbance. Any loose/disturbed material in the bottom of the footing excavations should be removed/reconditioned before foundation concrete is placed. Where competent, hard, bedrock is encountered we recommend placement of at least 2-inch-thick mud mat below foundation bearing elevation to allow for a level, uniform bearing surface.

As discussed previously, foundations should bear directly on competent limestone bedrock or on lean concrete backfill placed in the excavations extending to bedrock. The lean concrete replacement zone is illustrated on the sketch below.



Deep Foundation

Drilled Shaft Design Parameters

Drilled shaft foundations may also be considered for support of the proposed development. Design parameters for drilled shaft foundations are provided below based on exploration results of Boring B-1 through 14. If the location of the new structures change, we should be consulted prior to the design and construction of foundations. The structures can be supported on drilled shaft foundations with a minimum drilled shaft length of 10 ft.

Soil design parameters are provided below in the **Drilled Shaft Design Summary** table for the design of drilled shaft foundations within the proposed structures. The values presented for allowable side friction and end bearing include a factor of safety. Design of the deep foundations should be completed by the structural engineer using the geotechnical engineering design criteria provided herein. The required foundation size and depth should be determined based upon analyses for vertical loads and overturning moments. All shafts should be reinforced to full depth for the applied axial, lateral and uplift stresses imposed. For this project, use of a minimum shaft diameter of 30 inches is recommended for the foundations.

Drilled Shaft Design Summary ¹

Stratigraphy ²		Allowable Skin Friction (psf) ^{3, 7}	Allowable End Bearing Pressure (psf) ^{4, 7}
No.	Material		
2, 3	Stiff to Very Stiff Cohesive (CH/CL)	--	--

Drilled Shaft Design Summary ¹

Stratigraphy ²		Allowable Skin Friction (psf) ^{3, 7}	Allowable End Bearing Pressure (psf) ^{4, 7}
No.	Material		
4	Weathered Rock	--	-- ⁵
5	Strong Rock (Limestone)	7,500	80,000 ⁶

1. Design capacities are dependent upon the method of installation and quality control parameters. The values provided are estimates and should be verified when installation protocol have been finalized.
2. See Subsurface Profile in [Geotechnical Characterization](#) for more details on stratigraphy.
3. Applicable for compressive loading only. Reduce to 2/3 of values shown for uplift loading. The effective weight of the shaft can be added to uplift load resistance to the extent permitted by IBC.
4. Shafts should extend at least 5 feet into the bedrock bearing stratum for end bearing to be considered.
5. It is not recommended to bear shafts within the weathered rock zone. Project geotechnical engineer should confirm whether the planned bearing stratum is suitable for end bearing or should be extended to deeper depth.
6. Due to potential for soft zones and voids associated with karst, probe holes required with an air track drill rig. Please refer to [Drilled Shaft Construction Considerations](#) section for more detail.
7. Unit Resistances include a factor of safety of 3.

The table below summarizes estimated Top-of-Rock-Socket Elevation in the vicinity of each boring location if the drilled shaft option is used. Actual top-of-rock-socket elevation will need to be confirmed in the field during drilled shaft installation based on encountered conditions and field observation.

Boring Number	Approximate Surface Elevation at Boring Location (feet)	Approximate Top-of-Rock-Socket Elevation (feet) ¹	Minimum Rock Socket Length (feet)
B-1	987.5	982	5
B-2	993.7	986	5
B-3	992.4	987	5

Boring Number	Approximate Surface Elevation at Boring Location (feet)	Approximate Top-of-Rock-Socket Elevation (feet) ¹	Minimum Rock Socket Length (feet)
B-4	988.6	982	5
B-5	990.7	985	5
B-6	997.3	995	5
B-7	1001.2	995	5
B-8	1006.6	1000	5
B-9	996.9	991	5
B-10	999.5	995	5
B-11	991.2	985	5
B-12	992.1	987	5
B-13	993.7	991	5
B-14	999.4	994	5

1. Approximate top-of-rock-socket elevation in the vicinity of each structure boring is estimated from review of surface elevation obtained for each boring in the field by Terracon during site staking and the depth to top of bedrock at each boring. Minimum drilled shaft length requirement of 10 ft. also needs to be satisfied along the 5 ft. minimum rock socket length requirement.

Shafts should be adequately reinforced as designed by the Structural Engineer for both tension and shear to sufficient depths. Buoyant unit weights of the soil and concrete should be used in the calculations below the highest anticipated groundwater elevation.

Drilled shaft should have a minimum (center-to-center) spacing of three drilled shaft diameters. Closer spacing may require a reduction in axial load capacity. Axial capacity reduction can be determined by comparing the allowable axial capacity determined from the sum of individual piles in a group versus the capacity calculated using the perimeter and base of the pile group acting as a unit. The lesser of the two capacities should be used in design.

A minimum shaft diameter of 2½ feet should be used. Drilled shafts should have a minimum length of 10 feet and also satisfy the minimum 5 feet rock socket length requirement to develop the allowable end-bearing pressures listed in the above table. As mentioned earlier, shaft should not be bear on weathered bedrock zone.

Post-construction settlements of drilled shafts designed and constructed as described in this report are estimated to range from about ½ to ¾ inch. Differential settlement between individual shafts is expected to be ½ to ⅔ of the total settlement.

Drilled Shaft Lateral Loading

The following table lists input values for use in LPILE analyses. Such analysis should be considered if lateral loads exceed 5 kips. For k_h and E_{50} , use the default values. LPILE provide estimated default values of k_h and E_{50} based on strength and are recommended for the project. Since deflection or a service limit criterion will most likely control lateral capacity design, no safety/resistance factor is included with the parameters.

Stratigraphy ^{1, 4}		L-Pile Model	S_u (psf) ²	ϕ ²	γ' (pcf) ^{2, 3}	ϵ_{50}	K (pci)
No.	Material						
2, 3	Stiff to Very Stiff Cohesive	Stiff Clay w/o Free Water	2,000	---	128	Use Default Value	
4	Weathered Rock	Stiff Clay w/o Free Water	4,000	---	130	Use Default Value	
Stratigraphy ¹		L-Pile Model	Initial Rock Mass Modulus (psf) ²	RQD (%)	γ' (pcf) ²	Uniaxial Compressive Strength (psi)	Strain Factor (k_{mn})
No.	Material						
5	Bedrock (Limestone)	Strong Rock	---	---	150	4,500	---

1. See Subsurface Profile in [Geotechnical Characterization](#) for more details on Stratigraphy.
2. Definition of Terms:
 S_u : Undrained shear strength
 ϕ : Internal friction angle
 γ' : Effective unit weight
3. Buoyant unit weight values should be used below water table
4. Lateral resistance in the upper 3 feet should be ignored due to the potential for disturbance caused during the drilled shaft construction operation

Spacing closer than 3D (where D is the diameter of the shaft) is not recommended without additional geotechnical consultation due to potential for the installation of a new shaft disturbing an adjacent installed shaft likely resulting in axial capacity reduction.

The load capacities provided herein are based on the stresses induced in the supporting bearing strata. The structural capacity of the shafts should be checked to assure they

can safely accommodate the combined stresses induced by axial and lateral forces. Lateral deflections of shafts should be evaluated using an appropriate analysis method, and will depend upon the shaft's diameter, length, configuration, stiffness and "fixed head" or "free head" condition. We can provide additional analyses and estimates of lateral deflections for specific loading conditions upon request. The load-carrying capacity of shafts may be improved by increasing the diameter and possibly the length.

Drilled Shaft Construction Considerations

The drilling contractor should be experienced in the subsurface conditions observed at the site, and the excavations should be performed with equipment capable of providing a clean bearing surface. The drilled straight-shaft foundation system should be installed in general accordance with the procedures presented in "Standard Specification for the Construction of Drilled Piers", ACI Publication No. 336.1-01.

The contractor is generally expected to use conventional "dry" techniques for installation of the drilled shaft. Subsurface water was not encountered in boring during the drilling activities. Subsurface water levels are influenced by seasonal and climatic conditions, which result in fluctuations in subsurface water elevations. Additionally, it is common for water to be present after periods of significant rainfall. Water, if encountered, should be removed from each shaft hole prior to concrete placement.

Due to the potential for bedrock within the possible deep foundation depth, rock coring or augers fitted with rock teeth will be required to advance the drilled shaft excavations to the proposed depth. If caving soils are encountered, temporary casing or drilling slurry will likely be required in order to advance the drilled shafts to design depth. Temporary casing should also be used whenever shafts are installed adjacent to any existing structures or improvements, to reduce the potential for ground loss and movement due to drilled shaft excavation. Casing should be installed for the full shaft depth if downhole inspection and clean out is required. Shaft concrete should be placed immediately after completion of drilling and cleaning. If shaft concrete cannot be placed in dry conditions, a tremie should be used for concrete placement. Due to potential sloughing and raveling, foundation concrete quantities may exceed calculated geometric volumes.

Where casing is used for drilled shaft construction, it should be withdrawn in a slow continuous manner maintaining a sufficient head of concrete to prevent infiltration of water or the creation of voids in the concrete. The concrete should have a relatively high fluidity when placed in cased holes or through a tremie. Concrete with slump in the range of 6 to 8 inches is recommended.

Free-fall concrete placement in drilled shaft excavations will only be acceptable in dry holes and if provisions are taken to avoid striking the concrete on the sides of the hole or reinforcing steel. The use of a bottom-dump hopper, or an elephant's trunk

discharging near the bottom of the hole where concrete segregation will be minimized, is recommended.

The actual bearing elevation at each drilled shaft location should be determined in the field during construction through inspection by an authorized representative of the geotechnical engineer. Shaft bearing surfaces should be cleaned prior to concrete placement. A representative of the geotechnical engineer should inspect the bearing surface and shaft configuration. If the soil conditions encountered differ significantly from those presented in this report, supplemental recommendations will be required.

During drilled shaft installation process, the Geotechnical Engineer or representative should be present to evaluate the subsurface soil conditions and investigate for the presence of subsurface voids that could affect the deep foundations. The Geotechnical Engineer should document the shaft installation process including soil and groundwater conditions encountered, consistency with expected conditions, and details of the installed shaft.

- Contractor should advance a test hole with an air track drill through the bedrock bearing surface to a depth of at least two times the pier diameter to check for discontinuities in the bedrock that may require additional rock removal.
- The number of test holes at each pier location would be determined by the Geotechnical Engineer based on the field test results.
- Significant discontinuous rock layers may require additional rock removal as directed by the engineer's representative.
- Prior to installation of the reinforcing steel cage, the base of each pier should be sounded to check for voids or clay seams in the underlying bedrock. This could be done by dropping the drill rig Kelly bar onto the exposed bedrock surface at selected locations.
- Visual evaluation of the exposed bearing surface should be performed by the Geotechnical Engineer to confirm that the base is free from loose material, soil, water or other unsuitable materials. Visual inspection to determine the suitability of the shaft bottom may be conducted using a flashlight or reflected light with a mirror from the ground surface.
- Identification of cavities and seams along the sides and beneath the base is an essential part of the construction and inspection process. The presence of sound rock for a depth of at least 2 shaft diameters below the bottom of the rock socket should be verified with an air track drill rig. Typically, the air track rig accesses the shaft locations prior to excavation, tests each shaft location to determine optimal depth (per shaft). If shafts are to be designed with only friction of the shafts, it's still recommended that air track drilling be performed to verify that no significant void is encountered within the zone, potentially resulting in loss of frictional capacity. Further, air track drilling can identify large solution zones that may result in loss of concrete during placement which would afford time to provide a remedial option, such as casing, low mobility grout, etc.

The bottom of the shaft should be free of loose soil or debris prior to reinforcing steel and concrete placement. We recommend that the specifications state that reinforcing steel and pier concrete be placed the same day as the shaft is drilled. No completed shaft excavation should be allowed to remain open overnight. It is suitable, however, for the contractor to excavate a portion of the drilled shaft and then complete the shaft excavation the next day.

To facilitate drilled shaft construction, concrete should be on-site and ready for placement as drilled shaft excavations are completed. It is recommended that no completed drilled shaft holes be left open overnight without being filled with concrete.

The drilled shaft installation process should be performed under the observation of the Geotechnical Engineer. The Geotechnical Engineer should document the shaft installation process including soil/rock and groundwater conditions observed, consistency with expected conditions, and details of the installed shaft.

Floor Slabs

Design parameters for floor slabs assume the requirements for **Earthwork** have been followed. Specific attention should be given to positive drainage away from the structure and positive drainage of the aggregate base beneath the floor slab.

The subgrade soils are comprised of moderate to high plasticity clays that have the potential to swell with increased water content. Construction of the floor slab, combined with the removal of trees, and revising site drainage creates the potential for gradual increased water contents within the clays. Increases in water content may cause the clays to swell and damage the floor slab. To reduce the risk of swell potential directly beneath the floor slab, we recommend the upper 12 inches of subgrade soils below the floor slab (excluding the floor slab support course) be an approved Low Volume Change (LVC) material consisting of lean clays, dense grade aggregate, or in-situ material that has been chemically treated.

In areas where shallow bedrock is encountered at floor slab subgrade elevation, and to allow for a more uniform bearing material beneath the subgrade, a 12-inch buffer of LVC structural fill should lie between base slab elevation and bedrock, as stated in our **Earthwork** section. The granular base layer can be included as a part of this structural fill buffer.

Due to the potential for significant moisture fluctuations of subgrade material beneath floor slabs supported at-grade, the Geotechnical Engineer should evaluate the material within 12 inches of the bottom of the LVC zone immediately prior to placement of

additional fill or floor slabs. Soils below the specified water contents within this zone should be moisture conditioned or replaced with structural fill as stated in our [Earthwork](#) section.

Floor Slab Design Parameters

Item	Description
Floor Slab Support¹	Minimum 6 inches of free-draining (less than 5% passing the U.S. No. 200 sieve) crushed aggregate compacted to at least 95% of ASTM D 698 ^{2, 3} At least 18 inches of low plasticity cohesive or granular soils with at least 18% passing the U.S. No. 200 sieve material should be present below floor slabs where lean to fat clay or fat clay soils are present.
Estimated Modulus of Subgrade Reaction ²	100 pounds per square inch per inch (psi/in) for point loads

1. Floor slabs should be structurally independent of building footings or walls to reduce the possibility of floor slab cracking caused by differential movements between the slab and foundation.
2. Modulus of subgrade reaction is an estimated value based upon our experience with the subgrade condition, the requirements noted in [Earthwork](#), and the floor slab support as noted in this table. It is provided for point loads. For large area loads the modulus of subgrade reaction would be lower.
3. Free-draining granular material should have less than 5% fines (material passing the No. 200 sieve). Other design considerations such as cold temperatures and condensation development could warrant more extensive design provisions.

The use of a vapor retarder should be considered beneath concrete slabs on grade covered with wood, tile, carpet, or other moisture sensitive or impervious coverings, when the project includes humidity-controlled areas, or when the slab will support equipment sensitive to moisture. When conditions warrant the use of a vapor retarder, the slab designer should refer to ACI 302 and/or ACI 360 for procedures and cautions regarding the use and placement of a vapor retarder.

Saw-cut contraction joints should be placed in the slab to help control the location and extent of cracking. For additional recommendations, refer to the ACI Design Manual. Joints or cracks should be sealed with a waterproof, non-extruding compressible compound specifically recommended for heavy duty concrete pavement and wet environments.

Where floor slabs are tied to perimeter walls or turn-down slabs to meet structural or other construction objectives, our experience indicates differential movement between the walls and slabs will likely be observed in adjacent slab expansion joints or floor slab cracks beyond the length of the structural dowels. The Structural Engineer should account for potential differential settlement through use of sufficient control joints, appropriate reinforcing or other means.

Floor Slab Construction Considerations

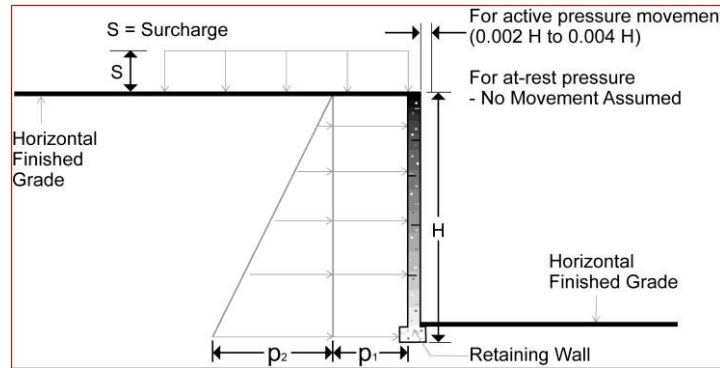
Finished subgrade, within and for at least 10 feet beyond the floor slab, should be protected from traffic, rutting, or other disturbance and maintained in a relatively moist condition until floor slabs are constructed. If the subgrade should become damaged or desiccated prior to construction of floor slabs, the affected material should be removed, and structural fill should be added to replace the resulting excavation. Final conditioning of the finished subgrade should be performed immediately prior to placement of the floor slab support course.

The Geotechnical Engineer should observe the condition of the floor slab subgrades immediately prior to placement of the floor slab support course, reinforcing steel, and concrete. Attention should be paid to high traffic areas that were rutted and disturbed earlier, and to areas where backfilled trenches are located.

Lateral Earth Pressures

Design Parameters

Structures with unbalanced backfill levels on opposite sides should be designed for earth pressures at least equal to values indicated in the following table. Earth pressures will be influenced by structural design of the walls, conditions of wall restraint, methods of construction, and/or compaction and the strength of the materials being restrained. Two wall restraint conditions are shown in the diagram below. Active earth pressure is commonly used for design of free-standing cantilever retaining walls and assumes wall movement. The "at-rest" condition assumes no wall movement and is commonly used for basement walls, loading dock walls, or other walls restrained at the top. The recommended design lateral earth pressures do not include a factor of safety and do not provide for possible hydrostatic pressure on the walls (unless stated).



Lateral Earth Pressure Design Parameters

Earth Pressure Condition ¹	Coefficient for Backfill Type ²	Surcharge Pressure ³ p ₁ (psf)	Equivalent Fluid Pressures (psf) ^{2,4}	
			Unsaturated ⁵	Submerged ⁵
Active (K _a)	Granular - 0.31	(0.31)S	(40)H	(80)H
	Fine Grained - 0.41	(0.41)S	(50)H	(85)H
At-Rest (K _o)	Granular - 0.47	(0.47)S	(55)H	(90)H
	Fine Grained - 0.58	(0.58)S	(70)H	(95)H

1. For active earth pressure, wall must rotate about base, with top lateral movements 0.002 H to 0.004 H, where H is wall height. For passive earth pressure, wall must move horizontally to mobilize resistance. Fat clay or other expansive soils should not be used as backfill behind the wall.
2. Uniform, horizontal backfill, with a maximum unit weight of 120 pcf for cohesive soils and 150 pcf for granular soils.
3. Uniform surcharge, where S is surcharge pressure.
4. Loading from heavy compaction equipment is not included.
5. To achieve "Unsaturated" conditions, follow guidelines in **Subsurface Drainage for Below-Grade Walls** below. "Submerged" conditions are recommended when drainage behind walls is not incorporated into the design.

Backfill placed against structures should consist of granular soils or low plasticity cohesive soils. For the granular values to be valid, the granular backfill must extend out and up from the base of the wall at an angle of at least 45 degrees from vertical for the active case.

Footings, floor slabs or other loads bearing on backfill behind walls may have a significant influence on the lateral earth pressure. Placing footings within wall backfill and in the zone of active soil influence on the wall should be avoided unless structural analyses indicate the wall can safely withstand the increased pressure.

The lateral earth pressure recommendations given in this section are applicable to the design of rigid retaining walls subject to slight rotation, such as cantilever, or gravity type concrete walls. These recommendations are not applicable to the design of modular block - geogrid reinforced backfill walls (also termed MSE walls). Recommendations covering these types of wall systems are beyond the scope of services for this assignment. However, we would be pleased to develop a proposal for evaluation and design of such wall systems upon request.

Pavements

General Pavement Comments

Pavement designs are provided for the traffic conditions and pavement life conditions as noted in **Project Description** and in the following sections of this report. A critical aspect of pavement performance is site preparation. Pavement designs noted in this section must be applied to the site which has been prepared as recommended in the **Earthwork** section.

Support characteristics of subgrade for pavement design do not account for shrink/swell movements of an expansive clay subgrade, such as soils observed on this project. Thus, the pavement may be adequate from a structural standpoint, yet still experience cracking and deformation due to shrink/swell related movement of the subgrade.

Pavement Design Parameters

A California Bearing Ratio (CBR) of 2 was used for the subgrade for the asphaltic concrete (AC) pavement designs. A modulus of subgrade reaction of 89 pci was used for the portland cement concrete (PCC) pavement designs. The value was empirically derived based upon our experience with the native clay subgrade soils and our expectation of the quality of the subgrade as prescribed by the **Site Preparation** conditions as outlined in **Earthwork**. A modulus of rupture of 580 psi was used in design for the concrete (based on correlations with a minimum 28-day compressive strength of 4,000 psi).

Pavement Section Thicknesses

The following table provides our opinion of minimum thickness for AC sections:

Layer	Thickness (inches)	
	Light Duty ¹	Heavy Duty ^{1, 5}
Asphaltic Concrete Design ³		
AC Surface Course ²	1 ½	1 ½
AC Base Course	3	4
Aggregate Base	8	10
Portland Cement Concrete Design ^{3, 4, 5}		
PCC	5	6
Aggregate Base	6	6

1. See **Project Description** for more specifics regarding Light-Duty and Heavy-Duty traffic.
2. A minimum 1.5-inch surface course should be used on ACC pavements.
3. All materials should meet the current Kentucky Transportation Cabinet (KYTC) Standard Specifications for Highway and Bridge Construction.
4. All materials, placement, and jointing per ACI 330.2R-17.
5. It is recommended dumper pads have a Portland Cement Concrete thickness of 8 inches and Aggregate Base thickness of 6 inches

Pavement Drainage

Pavements should be sloped to provide rapid drainage of surface water. Water allowed to pond on or adjacent to the pavements could saturate the subgrade and contribute to premature pavement deterioration. In addition, the pavement subgrade should be graded to provide positive drainage within the granular base section. Appropriate sub-drainage or connection to a suitable daylight outlet should be provided to remove water from the granular subbase.

Subdrainage should be a primary consideration in the proposed pavement areas to prevent water from accumulating within the aggregate base course and causing softening of the subgrade, shrink/swell volume change, or frost heave. To this end, we recommend the installation of pipe underdrains (finger drains) radiating from all catch basins within the pavement. Where surrounded by pavement, the finger drains should be installed on all four sides of the catch basins. At catch basins located along the edge of the pavement, the finger drains should be installed on the sides that abut pavement. Subgrade surfaces should be fine graded so that water seepage under the pavements will flow to the underdrains or to other suitable drainage outlets. Establishing subgrade slopes during site grading to promote rapid surface and base course drainage away from the pavement will extend its useful life.

Pavement Maintenance

The pavement sections represent minimum recommended thicknesses and, as such, periodic upkeep should be anticipated. Preventive maintenance should be planned and provided for through an on-going pavement management program. Maintenance activities are intended to slow the rate of pavement deterioration and to preserve the pavement investment. Pavement care consists of both localized (e.g., crack and joint sealing and patching) and global maintenance (e.g., surface sealing). Additional engineering consultation is recommended to determine the type and extent of a cost-effective program. Even with periodic maintenance, some movements and related cracking may still occur, and repairs may be required.

Pavement performance is affected by its surroundings. In addition to providing preventive maintenance, the civil engineer should consider the following recommendations in the design and layout of pavements:

- Final grade adjacent to paved areas should slope down from the edges at a minimum 2%.
- Subgrade and pavement surfaces should have a minimum 2% slope to promote proper surface drainage.
- Install pavement drainage systems surrounding areas anticipated for frequent wetting.
- Install joint sealant and seal cracks immediately.
- Seal all landscaped areas in or adjacent to pavements to reduce moisture migration to subgrade soils.
- Place compacted, low permeability backfill against the exterior side of curb and gutter.

General Comments

Our analysis and opinions are based upon our understanding of the project, the geotechnical conditions in the area, and the data obtained from our site exploration. Variations will occur between exploration point locations or due to the modifying effects of construction or weather. The nature and extent of such variations may not become evident until during or after construction. Terracon should be retained as the Geotechnical Engineer, where noted in this report, to provide observation and testing services during pertinent construction phases. If variations appear, we can provide further evaluation and supplemental recommendations. If variations are noted in the absence of our observation and testing services on-site, we should be immediately notified so that we can provide evaluation and supplemental recommendations.

Our Scope of Services does not include either specifically or by implication any environmental or biological (e.g., mold, fungi, bacteria) assessment of the site or identification or prevention of pollutants, hazardous materials or conditions. If the owner is concerned about the potential for such contamination or pollution, other studies should be undertaken.

Our services and any correspondence are intended for the sole benefit and exclusive use of our client for specific application to the project discussed and are accomplished in accordance with generally accepted geotechnical engineering practices with no third-party beneficiaries intended. Any third-party access to services or correspondence is solely for information purposes to support the services provided by Terracon to our client. Reliance upon the services and any work product is limited to our client and is not intended for third parties. Any use or reliance of the provided information by third parties is done solely at their own risk. No warranties, either express or implied, are intended or made.

Site characteristics as provided are for design purposes and not to estimate excavation cost. Any use of our report in that regard is done at the sole risk of the excavating cost estimator as there may be variations on the site that are not apparent in the data that could significantly effect excavation cost. Any parties charged with estimating excavation costs should seek their own site characterization for specific purposes to obtain the specific level of detail necessary for costing. Site safety and cost estimating including excavation support and dewatering requirements/design are the responsibility of others. Construction and site development have the potential to affect adjacent properties. Such impacts can include damages due to vibration, modification of groundwater/surface water flow during construction, foundation movement due to undermining or subsidence from excavation, as well as noise or air quality concerns. Evaluation of these items on nearby properties are commonly associated with contractor means and methods and are not addressed in this report. The owner and contractor should consider a preconstruction/precondition survey of surrounding development. If changes in the nature, design, or location of the project are planned, our conclusions and recommendations shall not be considered valid unless we review the changes and either verify or modify our conclusions in writing.

Geotechnical Engineering Report

University of Kentucky Agriculture Research Building Project | Lexington, Kentucky

May 17, 2024 | Terracon Project No. N3235060

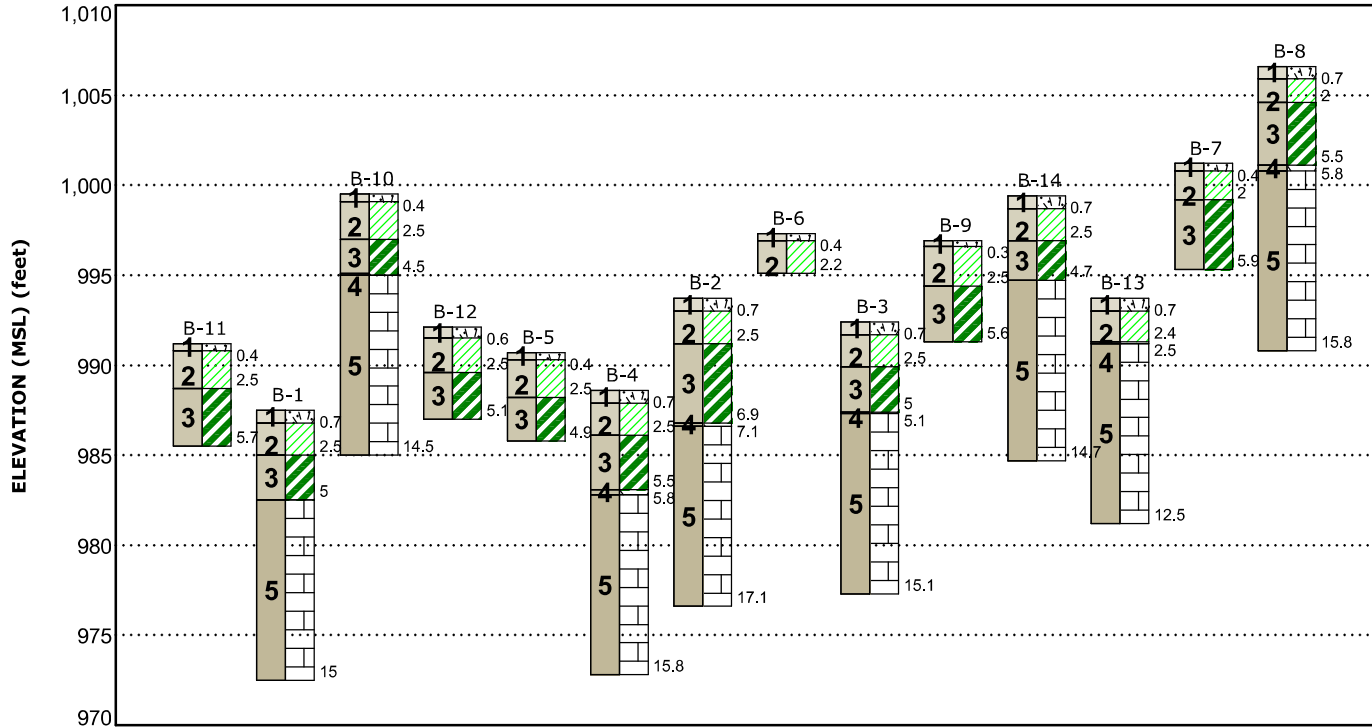


Figures

Contents:

GeoModel

GeoModel



This is not a cross section. This is intended to display the Geotechnical Model only. See individual logs for more detailed conditions.

Model Layer	Layer Name	General Description	Legend	
1	Surface	Topsoil	Topsoil	Lean Clay
2	Lean Clay	Lean Clay (CL), moderate plasticity clay with chert, stiff, light brown	Fat Clay	Limestone
3	Fat Clay	Fat Clay (CH), high plasticity clay with chert and limestone fragments, stiff to very stiff, brown	Weathered Rock	
4	Weathered Rock	Weathered Limestone, highly weathered, gray		
5	Limestone	Limestone, slightly weathered, close fracture spacing, medium strong to strong rock, gray		

NOTES:

Layering shown on this figure has been developed by the geotechnical engineer for purposes of modeling the subsurface conditions as required for the subsequent geotechnical engineering for this project.
 Numbers adjacent to soil column indicate depth below ground surface.

Geotechnical Engineering Report

University of Kentucky Agriculture Research Building Project | Lexington, Kentucky

May 17, 2024 | Terracon Project No. N3235060



Attachments

Exploration and Testing Procedures

Field Exploration

Number of Borings	Approximate Boring Depth (feet)	Location
14	2.2 to 17.1	Building

Boring Layout and Elevations: Terracon personnel provided the boring layout using handheld GPS equipment (estimated horizontal accuracy of about ±10 feet) and referencing existing site features. Approximate ground surface elevations were obtained in the field using EOS Arrow 100 GNSS. If elevations and a more precise boring layout are desired, we recommend the as-drilled boring locations be surveyed.

Subsurface Exploration Procedures: We advanced the borings with a track-mounted, rotary drill rig using continuous flight augers (hollow stem, as necessary, depending on soil conditions). One to two samples were obtained before refusal conditions were encountered. In the split-barrel sampling procedure, a standard 2-inch outer diameter split-barrel sampling spoon was driven into the ground by a 140-pound automatic hammer falling a distance of 30 inches. The number of blows required to advance the sampling spoon the last 12 inches of a normal 18-inch penetration is recorded as the Standard Penetration Test (SPT) resistance value. The SPT resistance values, also referred to as N-values, are indicated on the boring logs at the test depths. We observed and recorded groundwater levels during drilling and sampling. For safety purposes, all borings were backfilled with auger cuttings after their completion.

We also observed the boreholes while drilling and at the completion of drilling for the presence of groundwater. Groundwater was not observed at these times in the boreholes.

The boring was extended into the bedrock with NX-size double tube-swivel core barrel. Percent recovery and rock quality designation (RQD) were calculated for the core samples and are noted at their depths of occurrence on the boring logs. RQD is the percent of total length cored consisting only of rock pieces at least 4 inches or more in length and is a measure of the integrity of the rock mass in-situ. The recovered samples were sent to the laboratory for classification.

The sampling depths, penetration distances, and other sampling information was recorded on the field boring logs. The samples were placed in appropriate containers and taken to our soil laboratory for testing and classification by a Geotechnical Engineer. Our exploration team prepared field boring logs as part of the drilling operations. These field logs included visual classifications of the materials observed during drilling and our interpretation of the subsurface conditions between samples. Final boring logs were

prepared from the field logs. The final boring logs represent the Geotechnical Engineer's interpretation of the field logs and include modifications based on observations and tests of the samples in our laboratory.

Laboratory Testing

The project engineer reviewed the field data and assigned laboratory tests. The laboratory testing program included the following types of tests:

- Moisture Content
- Unconfined Compression
- Atterberg Limits

The laboratory testing program often included examination of soil samples by an engineer. Based on the results of our field and laboratory programs, we described and classified the soil samples in accordance with the Unified Soil Classification System.

Rock classification was conducted using locally accepted practices for engineering purposes; petrographic analysis may reveal other rock types. Rock core samples typically provide an improved specimen for this classification. Boring log rock classification was determined using the Description of Rock Properties.

Photography Log



Photo 1: Northwest side of the site facing north



Photo 2: Northeast side of the site facing east



Photo 3: West side of the site facing north



Photo 4: South side of the site facing east

Geotechnical Engineering Report

University of Kentucky Agriculture Research Building Project | Lexington, Kentucky

May 17, 2024 | Terracon Project No. N3235060



Site Location and Exploration Plans

Contents:

Site Location Plan

Exploration Plan

Note: All attachments are one page unless noted above.

Site Location

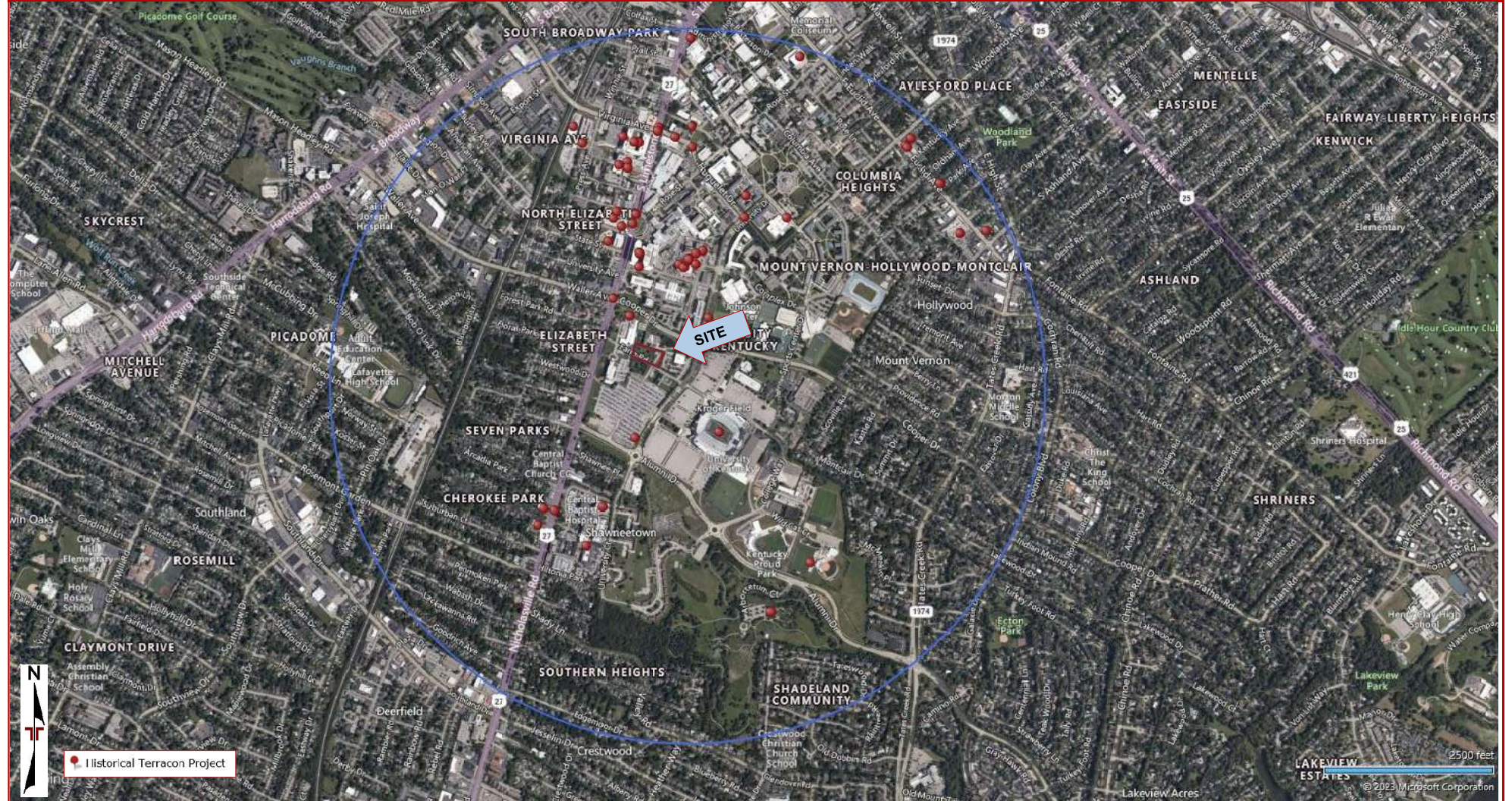


DIAGRAM IS FOR GENERAL LOCATION ONLY, AND IS NOT INTENDED FOR CONSTRUCTION PURPOSES

MAP PROVIDED BY MICROSOFT BING MAPS

Exploration Plan



DIAGRAM IS FOR GENERAL LOCATION ONLY, AND IS NOT INTENDED FOR CONSTRUCTION PURPOSES

MAP PROVIDED BY MICROSOFT BING MAPS

Exploration and Laboratory Results

Contents:

Boring Logs (B-1 through B-14)
Atterberg Limits

Note: All attachments are one page unless noted above.

Boring Log No. B-1

Model Layer	Graphic Log	Location: See Exploration Plan Latitude: 38.0260° Longitude: -84.5091° Depth (Ft.) Elevation: 987.5 (Ft.) +/-	Depth (Ft.)	Water Level Observations	Sample Type	Recovery (In.)	Field Test Results	RQD (%)	HP (psi)	Unconfined Compressive Strength (psi)	Water Content (%)	Atterberg Limits
												LL-PL-PI
1		TOPSOIL 0.7 986.8										
2		LEAN CLAY (CL) , with chert, light brown, stiff 2.5 985				15	6-6-7 N=13		4.50 (HP)		18.3	
3		FAT CLAY (CH) , with chert and limestone fragments, brown, stiff to very stiff 5.0 982.5				14	9-5-20 N=25		3.75 (HP)		26.9	
5		LIMESTONE , gray, close fracture spacing, slightly weathered, medium strong 15.0 972.5				56		64		6,410		
		Auger Refusal at 15 Feet	15			58.5		79				

See [Exploration and Testing Procedures](#) for a description of field and laboratory procedures used and additional data (If any).
 See [Supporting Information](#) for explanation of symbols and abbreviations.
 Elevation Reference: Elevations measured in the field

Water Level Observations
 Groundwater not encountered

Drill Rig
 #629 Acker Rebe;

Hammer Type
 Automatic

Driller
 AC

Notes

Advancement Method
 4.00 inch HSA to 5 feet.
 NX rock coring from 5 feet to 15 feet.

Logged by
 AR

Boring Started
 10-30-2023

Abandonment Method
 Boring backfilled with Auger Cuttings and/or Bentonite

Boring Completed
 10-30-2023

Boring Log No. B-2

Model Layer	Graphic Log	Location: See Exploration Plan Latitude: 38.0258° Longitude: -84.5085° Depth (Ft.) Elevation: 993.7 (Ft.) +/-	Depth (Ft.)	Water Level Observations	Sample Type	Recovery (In.)	Field Test Results	RQD (%)	HP (psi)	Unconfined Compressive Strength (psi)	Water Content (%)	Atterberg Limits
												LL-PL-PI
1		TOPSOIL	0.7									
2		LEAN CLAY (CL) , with chert, light brown, stiff	993									
2			2.5			10	5-4-5 N=9		4.50 (HP)		17.3	
3		FAT CLAY (CH) , with chert and limestone fragments, brown, stiff to very stiff	991.2									
3			6.9			7	5-7-8 N=15		3.50 (HP)		21.6	
4		WEATHERED LIMESTONE , gray, highly weathered, weak rock	986.8									
4		LIMESTONE , gray, close fracture spacing, slightly weathered, medium strong	986.6			4	3-50/5"				12.2	
5			7.1			21.5		77				
5			17.1			60		55				
5			17.1			36		97		5,780		
Auger Refusal at 17.1 Feet												

See [Exploration and Testing Procedures](#) for a description of field and laboratory procedures used and additional data (If any).
 See [Supporting Information](#) for explanation of symbols and abbreviations.
 Elevation Reference: Elevations measured in the field

Water Level Observations
 Groundwater not encountered

Drill Rig
 #629 Acker Rebe;

Hammer Type
 Automatic

Driller
 AC

Notes

Advancement Method
 4.00 inch HSA to 7.1 feet.
 NX rock coring from 7.1 feet to 17.1 feet.

Logged by
 AR

Boring Started
 10-31-2023

Abandonment Method
 Boring backfilled with Auger Cuttings and/or Bentonite

Boring Completed
 10-31-2023

Boring Log No. B-3

Model Layer	Graphic Log	Location: See Exploration Plan Latitude: 38.0257° Longitude: -84.5082° Depth (Ft.) Elevation: 992.4 (Ft.) +/-	Depth (Ft.)	Water Level Observations	Sample Type	Recovery (In.)	Field Test Results	RQD (%)	HP (psi)	Unconfined Compressive Strength (psi)	Water Content (%)	Atterberg Limits
												LL-PL-PI
1		TOPSOIL	0.7	991.7								
2		LEAN CLAY (CL) , with chert, light brown, stiff	2.5	989.9		18	8-7-7 N=14		4.50 (HP)		17.6	
3		FAT CLAY (CH) , with chert and limestone fragments, brown, stiff to very stiff	5.0	987.4		14	4-5-6 N=11		3.75 (HP)		30.7	59-27-32
4		WEATHERED LIMESTONE , gray, highly weathered, weak rock LIMESTONE , gray, close fracture spacing, slightly weathered, medium strong	5.1	987.3								
5			15.1	977.3		60		60				
		Auger Refusal at 15.1 Feet	15			60		97				

<p>See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).</p> <p>See Supporting Information for explanation of symbols and abbreviations.</p> <p>Elevation Reference: Elevations measured in the field</p>	<p>Water Level Observations Groundwater not encountered</p>	<p>Drill Rig #629 Acker Rebe;</p> <p>Hammer Type Automatic</p> <p>Driller AC</p>
<p>Notes</p>	<p>Advancement Method 4.00 inch HSA to 5.1 feet. NX rock coring from 5.1 feet to 15.1 feet.</p> <p>Abandonment Method Boring backfilled with Auger Cuttings and/or Bentonite</p>	<p>Logged by AR</p> <p>Boring Started 10-31-2023</p> <p>Boring Completed 10-31-2023</p>

Boring Log No. B-4

Model Layer	Graphic Log	Location: See Exploration Plan Latitude: 38.0255° Longitude: -84.5088° Depth (Ft.) Elevation: 988.6 (Ft.) +/-	Depth (Ft.)	Water Level Observations	Sample Type	Recovery (In.)	Field Test Results	RQD (%)	HP (psi)	Unconfined Compressive Strength (psi)	Water Content (%)	Atterberg Limits
												LL-PL-PI
1		TOPSOIL	0.7									
2		LEAN CLAY (CL) , with chert, light brown, stiff to very stiff	2.5			14	6-8-8 N=16		4.50 (HP)		17.7	43-23-20
3		FAT CLAY (CH) , with chert and limestone fragments, brown, stiff to very stiff	5.5			6	5-6-6 N=12		4.50 (HP)		27.2	
4		WEATHERED LIMESTONE , gray, highly weathered, weak rock LIMESTONE , gray, close fracture spacing, slightly weathered, medium strong	5.8									
5			15.8									
		Auger Refusal at 15.8 Feet	15.8									

See [Exploration and Testing Procedures](#) for a description of field and laboratory procedures used and additional data (If any).
 See [Supporting Information](#) for explanation of symbols and abbreviations.
 Elevation Reference: Elevations measured in the field

Water Level Observations
 Groundwater not encountered

Drill Rig
 #629 Acker Rebe;
Hammer Type
 Automatic
Driller
 AC

Notes

Advancement Method
 4.00 inch HSA to 5.8 feet.
 NX rock coring from 5.8 feet to 15.8 feet.

Logged by
 AR
Boring Started
 10-31-2023
Boring Completed
 10-31-2023



Abandonment Method
 Boring backfilled with Auger Cuttings and/or Bentonite

Boring Log No. B-5

Model Layer	Graphic Log	Location: See Exploration Plan Latitude: 38.0259° Longitude: -84.5087° Depth (Ft.) Elevation: 990.7 (Ft.) +/-	Depth (Ft.)	Water Level Observations	Sample Type	Recovery (In.)	Field Test Results	RQD (%)	HP (psi)	Unconfined Compressive Strength (psi)	Water Content (%)	Atterberg Limits
												LL-PL-PI
1		TOPSOIL 0.4	990.3									
2		LEAN CLAY (CL) , brown, medium stiff to stiff 2.5	988.2			13	3-4-4 N=8		1.50 (HP)		26.7	
3		FAT CLAY (CH) , brown, stiff to very stiff 4.9	985.8			13	4-5-50/4"		3.25 (HP)		29.1	
Auger Refusal at 4.9 Feet												

<p>See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any). See Supporting Information for explanation of symbols and abbreviations. Elevation Reference: Elevations measured in the field</p>	<p>Water Level Observations Groundwater not encountered</p>	<p>Drill Rig #629 Acker Rebe; Hammer Type Automatic Driller AC</p>
<p>Notes</p>	<p>Advancement Method 4.00 inch HSA.</p> <p>Abandonment Method Boring backfilled with Auger Cuttings and/or Bentonite</p>	<p>Logged by AR Boring Started 02-08-2024 Boring Completed 02-08-2024</p>

Boring Log No. B-6

Model Layer	Graphic Log	Location: See Exploration Plan Latitude: 38.0256° Longitude: -84.5084° Depth (Ft.) Elevation: 997.3 (Ft.) +/-	Depth (Ft.)	Water Level Observations	Sample Type	Recovery (In.)	Field Test Results	RQD (%)	HP (psi)	Unconfined Compressive Strength (psi)	Water Content (%)	Atterberg Limits
												LL-PL-PI
1		TOPSOIL 0.4	996.9									
2		LEAN CLAY (CL) , with chert, brown, very stiff 2.2	995.1		X	9	3-6-50/2"		2.00 (HP)		17.3	
Auger Refusal at 2.2 Feet												






<p>See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).</p> <p>See Supporting Information for explanation of symbols and abbreviations.</p> <p>Elevation Reference: Elevations measured in the field</p>	<p>Water Level Observations Groundwater not encountered</p>	<p>Drill Rig #629 Acker Rebe;</p> <p>Hammer Type Automatic</p> <p>Driller AC</p>
<p>Notes</p>	<p>Advancement Method 4.00 inch HSA.</p> <p>Abandonment Method Boring backfilled with Auger Cuttings and/or Bentonite</p>	<p>Logged by AR</p> <p>Boring Started 02-08-2024</p> <p>Boring Completed 02-08-2024</p>

Boring Log No. B-7

Model Layer	Graphic Log	Location: See Exploration Plan Latitude: 38.0253° Longitude: -84.5077° Depth (Ft.) Elevation: 1001.2 (Ft.) +/-	Depth (Ft.)	Water Level Observations	Sample Type	Recovery (In.)	Field Test Results	RQD (%)	HP (psi)	Unconfined Compressive Strength (psi)	Water Content (%)	Atterberg Limits
												LL-PL-PI
1		TOPSOIL	0.4									
2		LEAN CLAY (CL) , with chert, light brown, stiff to very stiff	2.0			12	4-6-6 N=12		4.50 (HP)		20.2	
3		FAT CLAY (CH) , with chert and limestone fragments, brown, stiff to very stiff	5.9			16	3-5-5 N=10		2.50 (HP)		33.0	81-25-56
		Auger Refusal at 5.9 Feet										

<p>See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any). See Supporting Information for explanation of symbols and abbreviations. Elevation Reference: Elevations measured in the field</p>	<p>Water Level Observations Groundwater not encountered</p>	<p>Drill Rig #629 Acker Rebe; Hammer Type Automatic Driller AC</p>
<p>Notes</p>	<p>Advancement Method 4.00 inch HSA.</p> <p>Abandonment Method Boring backfilled with Auger Cuttings and/or Bentonite</p>	<p>Logged by AR Boring Started 02-08-2024 Boring Completed 02-08-2024</p>

Boring Log No. B-8

Model Layer	Graphic Log	Location: See Exploration Plan Latitude: 38.0251° Longitude: -84.5074° Depth (Ft.) Elevation: 1006.6 (Ft.) +/-	Depth (Ft.)	Water Level Observations	Sample Type	Recovery (In.)	Field Test Results	RQD (%)	HP (psi)	Unconfined Compressive Strength (psi)	Water Content (%)	Atterberg Limits
												LL-PL-PI
1		TOPSOIL	0.7	1005.9								
2		LEAN CLAY (CL) , with chert, light brown, medium stiff to stiff	2.0	1004.6		10	3-2-4 N=6		1.75 (HP)		24.5	
3		FAT CLAY (CH) , with chert and limestone fragments, brown, stiff to very stiff	5.5	1001.1		10	4-3-4 N=7		2.75 (HP)		30.9	
4		WEATHERED LIMESTONE , gray, highly weathered, weak rock	5.8	1000.8								
5		LIMESTONE , gray, close fracture spacing, slightly weathered, medium strong	15.8	990.8		60		84				
		Boring Terminated at 15.8 Feet				60		94				

See [Exploration and Testing Procedures](#) for a description of field and laboratory procedures used and additional data (If any).
 See [Supporting Information](#) for explanation of symbols and abbreviations.
 Elevation Reference: Elevations measured in the field

Water Level Observations
 Groundwater not encountered

Drill Rig
 #629 Acker Rebe;
Hammer Type
 Automatic
Driller
 AC

Notes

Advancement Method
 4.00 inch HSA to 5.8 feet.
 NX rock coring from 5.8 feet to 15.8 feet.

Logged by
 AR
Boring Started
 02-08-2024
Boring Completed
 02-08-2024

Abandonment Method
 Boring backfilled with Auger Cuttings and/or Bentonite

Boring Log No. B-9

Model Layer	Graphic Log	Location: See Exploration Plan Latitude: 38.0256° Longitude: -84.5081° Depth (Ft.) Elevation: 996.9 (Ft.) +/-	Depth (Ft.)	Water Level Observations	Sample Type	Recovery (In.)	Field Test Results	RQD (%)	HP (psi)	Unconfined Compressive Strength (psi)	Water Content (%)	Atterberg Limits
												LL-PL-PI
1		TOPSOIL	0.3									
2		LEAN CLAY (CL) , with chert, light brown, stiff	2.5			12	2-4-9 N=13		2.50 (HP)		24.1	
3		FAT CLAY (CH) , with chert and limestone fragments, light brown and gray, stiff	5.6			18	4-6-5 N=11		2.50 (HP)		31.5	
		Auger Refusal at 5.6 Feet										

<p>See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any). See Supporting Information for explanation of symbols and abbreviations. Elevation Reference: Elevations measured in the field</p>	<p>Water Level Observations Groundwater not encountered</p>	<p>Drill Rig #629 Acker Rebe; Hammer Type Automatic Driller AC</p>
<p>Notes</p>	<p>Advancement Method 4.00 inch HSA.</p> <p>Abandonment Method Boring backfilled with Auger Cuttings and/or Bentonite</p>	<p>Logged by AR Boring Started 02-08-2024 Boring Completed 02-08-2024</p>

Boring Log No. B-10

Model Layer	Graphic Log	Location: See Exploration Plan Latitude: 38.0261° Longitude: -84.5088° Depth (Ft.) Elevation: 999.5 (Ft.) +/-	Depth (Ft.)	Water Level Observations	Sample Type	Recovery (In.)	Field Test Results	RQD (%)	HP (psi)	Unconfined Compressive Strength (psi)	Water Content (%)	Atterberg Limits
												LL-PL-PI
1		TOPSOIL	0.4									
2		LEAN CLAY (CL) , with chert, light brown, medium stiff	2.5			12	2-2-5 N=7		3.25 (HP)		24.8	
3		FAT CLAY (CH) , with chert and limestone fragments, brown, very stiff	4.5			7	4-50/4"		3.50 (HP)		37.6	
4		WEATHERED LIMESTONE , gray, highly weathered, weak rock LIMESTONE , gray, close fracture spacing, slightly weathered, strong rock	14.5			58		62		8,507		
5		Boring Terminated at 14.5 Feet	985			60		70				

<p>See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).</p> <p>See Supporting Information for explanation of symbols and abbreviations.</p> <p>Elevation Reference: Elevations measured in the field</p>	<p>Water Level Observations Groundwater not encountered</p>	<p>Drill Rig #629 Acker Rebe;</p> <p>Hammer Type Automatic</p> <p>Driller AC</p>
<p>Notes</p>	<p>Advancement Method 4.00 inch HSA to 4.5 feet. NX rock coring from 4.5 feet to 14.5 feet.</p> <p>Abandonment Method Boring backfilled with Auger Cuttings and/or Bentonite</p>	<p>Logged by AR</p> <p>Boring Started 02-09-2024</p> <p>Boring Completed 02-09-2024</p>

Boring Log No. B-11

Model Layer	Graphic Log	Location: See Exploration Plan Latitude: 38.0259° Longitude: -84.5092° Depth (Ft.) Elevation: 991.2 (Ft.) +/-	Depth (Ft.)	Water Level Observations	Sample Type	Recovery (In.)	Field Test Results	RQD (%)	HP (psi)	Unconfined Compressive Strength (psi)	Water Content (%)	Atterberg Limits
												LL-PL-PI
1		TOPSOIL	0.4									
2		LEAN CLAY (CL) , with chert, light brown, stiff	2.5			13	4-5-6 N=11		1.75 (HP)		25.2	
3		FAT CLAY (CH) , with chert and limestone fragments, brown, stiff	5.7			13	4-5-7 N=12		3.75 (HP)		30.3	69-23-46
		Auger Refusal at 5.7 Feet	5.7									

<p>See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).</p> <p>See Supporting Information for explanation of symbols and abbreviations.</p> <p>Elevation Reference: Elevations measured in the field</p>	<p>Water Level Observations Groundwater not encountered</p>	<p>Drill Rig #629 Acker Rebe;</p> <p>Hammer Type Automatic</p> <p>Driller AC</p>
<p>Notes</p>	<p>Advancement Method 4.00 inch HSA.</p> <p>Abandonment Method Boring backfilled with Auger Cuttings and/or Bentonite</p>	<p>Logged by AR</p> <p>Boring Started 02-08-2024</p> <p>Boring Completed 02-08-2024</p>

Boring Log No. B-12

Model Layer	Graphic Log	Location: See Exploration Plan Latitude: 38.0255° Longitude: -84.5089°	Depth (Ft.)	Elevation: 992.1 (Ft.) +/-	Water Level Observations	Sample Type	Recovery (In.)	Field Test Results	RQD (%)	HP (psi)	Unconfined Compressive Strength (psi)	Water Content (%)	Atterberg Limits
													LL-PL-PI
1		TOPSOIL	0.6	991.5									
2		LEAN CLAY (CL) , with chert, light brown, stiff	2.5	989.6			13	3-4-5 N=9		2.25 (HP)		23.9	
3		FAT CLAY (CH) , with chert and limestone fragments, brown, stiff to very stiff	5.1	987			14	4-5-50/5"		2.00 (HP)		29.2	
Auger Refusal at 5.1 Feet													

<p>See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).</p> <p>See Supporting Information for explanation of symbols and abbreviations.</p> <p>Elevation Reference: Elevations measured in the field</p>	<p>Water Level Observations Groundwater not encountered</p>	<p>Drill Rig #629 Acker Rebe;</p> <p>Hammer Type Automatic</p> <p>Driller AC</p>
<p>Notes</p>	<p>Advancement Method 4.00 inch HSA.</p> <p>Abandonment Method Boring backfilled with Auger Cuttings and/or Bentonite</p>	<p>Logged by AR</p> <p>Boring Started 02-08-2024</p> <p>Boring Completed 02-08-2024</p>

Boring Log No. B-13

Model Layer	Graphic Log	Location: See Exploration Plan Latitude: 38.0258° Longitude: -84.5078° Depth (Ft.) Elevation: 993.7 (Ft.) +/-	Depth (Ft.)	Water Level Observations	Sample Type	Recovery (In.)	Field Test Results	RQD (%)	HP (psi)	Unconfined Compressive Strength (psi)	Water Content (%)	Atterberg Limits
												LL-PL-PI
1		TOPSOIL	0.7	993								
2		LEAN CLAY (CL) , with chert, light brown, very stiff	2.4	991.3	X	10	5-43-50/4"		3.25 (HP)		23.4	
4		WEATHERED LIMESTONE , gray, highly weathered, weak rock LIMESTONE , gray, close fracture spacing, slightly weathered, medium strong	2.5	991.2	█	44		9		3,762		
5			12.5	981.2	█	59		100				
		Boring Terminated at 12.5 Feet				13		100				

<p>See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).</p> <p>See Supporting Information for explanation of symbols and abbreviations.</p> <p>Elevation Reference: Elevations measured in the field</p>	<p>Water Level Observations Groundwater not encountered</p>	<p>Drill Rig #629 Acker Rebe;</p> <p>Hammer Type Automatic</p> <p>Driller AC</p>
<p>Notes</p>	<p>Advancement Method 4.00 inch HSA to 2.5 feet. NX rock coring from 2.5 feet to 12.5 feet.</p> <p>Abandonment Method Boring backfilled with Auger Cuttings and/or Bentonite</p>	<p>Logged by AR</p> <p>Boring Started 02-09-2024</p> <p>Boring Completed 02-09-2024</p>

UNIAXIAL COMPRESSIVE STRENGTH OF INTACT ROCK CORE

ASTM D7012 method C

Project Number:	<u>N3235060</u>	Project Name:	<u>UK AG Research</u>		
Boring Number:	<u>B-1</u>	Depth:	<u>5.0'-10.0'</u>		
Height (in.):	<u>3.72</u>	<u>3.72</u>	<u>3.72</u>	<u>3.72</u>	Avg. (in): <u>3.72</u>
Diameter (in.):	<u>1.86</u>	<u>1.86</u>	<u>1.87</u>	<u>1.87</u>	Avg. (in): <u>1.87</u>
Specimen Weight (gms.):	<u>437.72</u>		Load (lbs.):	<u>17,510</u>	at failure
Compressive Strength:	<u>6,410</u>	Unit Weight (lbs/ft ³)	<u>164.1</u>		
Boring Number:	<u>B-2</u>	Depth:	<u>14.1'-17.1'</u>		
Height (in.):	<u>3.77</u>	<u>3.76</u>	<u>3.76</u>	<u>3.77</u>	Avg. (in): <u>3.77</u>
Diameter (in.):	<u>1.85</u>	<u>1.86</u>	<u>1.85</u>	<u>1.86</u>	Avg. (in): <u>1.86</u>
Specimen Weight (gms.):	<u>443.90</u>		Load (lbs.):	<u>15,620</u>	at failure
Compressive Strength:	<u>5,780</u>	Unit Weight (lbs/ft ³)	<u>166.2</u>		
Boring Number:	<u>B-10</u>	Depth:	<u>7.0'-7.4'</u>		
Height (in.):	<u>3.72</u>	<u>3.73</u>	<u>3.72</u>	<u>3.73</u>	Avg. (in): <u>3.73</u>
Diameter (in.):	<u>1.86</u>	<u>1.86</u>	<u>1.86</u>	<u>1.87</u>	Avg. (in): <u>1.86</u>
Specimen Weight (gms.):	<u>441.60</u>		Load (lbs.):	<u>23,188</u>	at failure
Compressive Strength:	<u>8,510</u>	Unit Weight (lbs/ft ³)	<u>165.8</u>		
Boring Number:	<u>B-13</u>	Depth:	<u>5.0'-5.4'</u>		
Height (in.):	<u>3.77</u>	<u>3.76</u>	<u>3.77</u>	<u>3.77</u>	Avg. (in): <u>3.77</u>
Diameter (in.):	<u>1.85</u>	<u>1.85</u>	<u>1.85</u>	<u>1.86</u>	Avg. (in): <u>1.85</u>
Specimen Weight (gms.):	<u>443.90</u>		Load (lbs.):	<u>10,145</u>	at failure
Compressive Strength:	<u>3,760</u>	Unit Weight (lbs/ft ³)	<u>166.5</u>		







Supporting Information

Contents:

General Notes
Unified Soil Classification System
Description of Rock Properties
Seismic Report

Note: All attachments are one page unless noted above.

General Notes

Sampling	Water Level	Field Tests
 Rock Core  Standard Penetration Test	 Water Level Initially Encountered  Water Level After a Specified Period of Time  Water Level After a Specified Period of Time  Cave In Encountered Water levels indicated on the soil boring logs are the levels measured in the borehole at the times indicated. Groundwater level variations will occur over time. In low permeability soils, accurate determination of groundwater levels is not possible with short term water level observations.	N Standard Penetration Test Resistance (Blows/Ft.) (HP) Hand Penetrometer (T) Torvane (DCP) Dynamic Cone Penetrometer UC Unconfined Compressive Strength (PID) Photo-Ionization Detector (OVA) Organic Vapor Analyzer

Descriptive Soil Classification

Soil classification as noted on the soil boring logs is based Unified Soil Classification System. Where sufficient laboratory data exist to classify the soils consistent with ASTM D2487 "Classification of Soils for Engineering Purposes" this procedure is used. ASTM D2488 "Description and Identification of Soils (Visual-Manual Procedure)" is also used to classify the soils, particularly where insufficient laboratory data exist to classify the soils in accordance with ASTM D2487. In addition to USCS classification, coarse grained soils are classified on the basis of their in-place relative density, and fine-grained soils are classified on the basis of their consistency. See "Strength Terms" table below for details. The ASTM standards noted above are for reference to methodology in general. In some cases, variations to methods are applied as a result of local practice or professional judgment.

Location And Elevation Notes

Exploration point locations as shown on the Exploration Plan and as noted on the soil boring logs in the form of Latitude and Longitude are approximate. See Exploration and Testing Procedures in the report for the methods used to locate the exploration points for this project. Surface elevation data annotated with +/- indicates that no actual topographical survey was conducted to confirm the surface elevation. Instead, the surface elevation was approximately determined from topographic maps of the area.

Strength Terms

Relative Density of Coarse-Grained Soils (More than 50% retained on No. 200 sieve.) Density determined by Standard Penetration Resistance		Consistency of Fine-Grained Soils (50% or more passing the No. 200 sieve.) Consistency determined by laboratory shear strength testing, field visual-manual procedures or standard penetration resistance		
Relative Density	Standard Penetration or N-Value (Blows/Ft.)	Consistency	Unconfined Compressive Strength Qu (psi)	Standard Penetration or N-Value (Blows/Ft.)
Very Loose	0 - 3	Very Soft	less than 3.50	0 - 1
Loose	4 - 9	Soft	3.5 to 7.0	2 - 4
Medium Dense	10 - 29	Medium Stiff	7.0 to 14.0	4 - 8
Dense	30 - 50	Stiff	14.0 to 28.0	8 - 15
Very Dense	> 50	Very Stiff	28.0 to 55.5	15 - 30
		Hard	> 55.5	> 30

Relevance of Exploration and Laboratory Test Results

Exploration/field results and/or laboratory test data contained within this document are intended for application to the project as described in this document. Use of such exploration/field results and/or laboratory test data should not be used independently of this document.

Unified Soil Classification System

Criteria for Assigning Group Symbols and Group Names Using Laboratory Tests ^A				Soil Classification	
				Group Symbol	Group Name ^B
Coarse-Grained Soils: More than 50% retained on No. 200 sieve	Gravels: More than 50% of coarse fraction retained on No. 4 sieve	Clean Gravels: Less than 5% fines ^C	Cu ≥ 4 and 1 ≤ Cc ≤ 3 ^E	GW	Well-graded gravel ^F
		Gravels with Fines: More than 12% fines ^C	Cu < 4 and/or [Cc < 1 or Cc > 3.0] ^E	GP	Poorly graded gravel ^F
			Fines classify as ML or MH	GM	Silty gravel ^{F, G, H}
		Sands: 50% or more of coarse fraction passes No. 4 sieve	Clean Sands: Less than 5% fines ^D	Fines classify as CL or CH	GC
	Cu ≥ 6 and 1 ≤ Cc ≤ 3 ^E			SW	Well-graded sand ^I
	Sands with Fines: More than 12% fines ^D		Cu < 6 and/or [Cc < 1 or Cc > 3.0] ^E	SP	Poorly graded sand ^I
			Fines classify as ML or MH	SM	Silty sand ^{G, H, I}
	Fine-Grained Soils: 50% or more passes the No. 200 sieve	Silts and Clays: Liquid limit less than 50	Inorganic:	PI > 7 and plots above "A" line ^J	CL
PI < 4 or plots below "A" line ^J				ML	Silt ^{K, L, M}
Organic:			$\frac{LL \text{ oven dried}}{LL \text{ not dried}} < 0.75$	OL	Organic clay ^{K, L, M, N}
					Organic silt ^{K, L, M, O}
Silts and Clays: Liquid limit 50 or more		Inorganic:	PI plots on or above "A" line	CH	Fat clay ^{K, L, M}
			PI plots below "A" line	MH	Elastic silt ^{K, L, M}
		Organic:	$\frac{LL \text{ oven dried}}{LL \text{ not dried}} < 0.75$	OH	Organic clay ^{K, L, M, P}
					Organic silt ^{K, L, M, Q}
Highly organic soils:	Primarily organic matter, dark in color, and organic odor			PT	Peat

^A Based on the material passing the 3-inch (75-mm) sieve.

^B If field sample contained cobbles or boulders, or both, add "with cobbles or boulders, or both" to group name.

^C Gravels with 5 to 12% fines require dual symbols: GW-GM well-graded gravel with silt, GW-GC well-graded gravel with clay, GP-GM poorly graded gravel with silt, GP-GC poorly graded gravel with clay.

^D Sands with 5 to 12% fines require dual symbols: SW-SM well-graded sand with silt, SW-SC well-graded sand with clay, SP-SM poorly graded sand with silt, SP-SC poorly graded sand with clay.

^E $Cu = D_{60}/D_{10}$ $Cc = \frac{(D_{30})^2}{D_{10} \times D_{60}}$

^F If soil contains ≥ 15% sand, add "with sand" to group name.

^G If fines classify as CL-ML, use dual symbol GC-GM, or SC-SM.

^H If fines are organic, add "with organic fines" to group name.

^I If soil contains ≥ 15% gravel, add "with gravel" to group name.

^J If Atterberg limits plot in shaded area, soil is a CL-ML, silty clay.

^K If soil contains 15 to 29% plus No. 200, add "with sand" or "with gravel," whichever is predominant.

^L If soil contains ≥ 30% plus No. 200 predominantly sand, add "sandy" to group name.

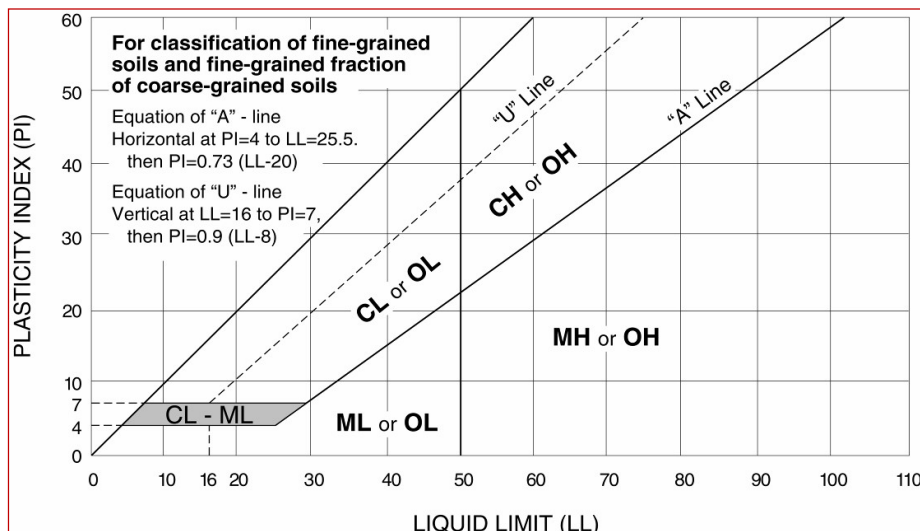
^M If soil contains ≥ 30% plus No. 200, predominantly gravel, add "gravelly" to group name.

^N PI ≥ 4 and plots on or above "A" line.

^O PI < 4 or plots below "A" line.

^P PI plots on or above "A" line.

^Q PI plots below "A" line.



Rock Classification Notes

WEATHERING	
Term	Description
Fresh	Mineral crystals appear bright; show no discoloration. Features show little or now staining on surfaces. Discoloration does not extend into intact rock.
Slightly weathered	Rock generally fresh except along fractures. Some fractures stained and discoloration may extend <0.5 inches into rock.
Moderately weathered	Significant portions of rock are dull and discolored. Rock may be significantly weaker than in fresh state near fractures. Soil zones of limited extent may occur along some fractures.
Highly weathered	Rock dull and discolored throughout. Majority of rock mass is significantly weaker and has decomposed and/or disintegrated; isolated zones of stronger rock and/or soil may occur throughout.
Completely weathered	All rock material is decomposed and/or disintegrated to soil. The rock mass or fabric is still evident and largely intact. Isolated zones of stronger rock may occur locally.

STRENGTH OR HARDNESS		
Description	Field Identification	Uniaxial Compressive Strength, psi
Extremely strong	Can only be chipped with geological hammer. Rock rings on hammer blows. Cannot be scratched with a sharp pick. Hand specimens require several hard hammer blows to break.	>36,000
Very strong	Several blows of a geological hammer to fracture. Cannot be scratched with a 20d common steel nail. Can be scratched with a geologist's pick only with difficulty.	15,000-36,000
Strong	More than one blow of a geological hammer needed to fracture. Can be scratched with a 20d nail or geologist's pick. Gouges or grooves to ¼ inch deep can be excavated by a hard blow of a geologist's pick. Hand specimens can be detached by a moderate blow.	7,500-15,000
Medium strong	One blow of geological hammer needed to fracture. Can be distinctly scratched with 20d nail. Can be grooved or gouged 1/16 in. deep by firm pressure with a geologist's pick point. Can be fractured with single firm blow of geological hammer. Can be excavated in small chips (about 1-in. maximum size) by hard blows of the point of a geologist's pick;	3,500-7,500
Weak	Shallow indent by firm blow with geological hammer point. Can be gouged or grooved readily with geologist's pick point. Can be excavated in pieces several inches in size by moderate blows of a pick point. Small thin pieces can be broken by finger pressure.	700-3,500
Very weak	Crumbles under firm blow with geological hammer point. Can be excavated readily with the point of a geologist's pick. Pieces 1-in. or more in thickness can be broken with finger pressure. Can be scratched readily by fingernail.	150-700

DISCONTINUITY DESCRIPTION			
Fracture Spacing (Joints, Faults, Other Fractures)		Bedding Spacing (May Include Foliation or Banding)	
Description	Spacing	Description	Spacing
Intensely fractured	< 2.5 inches	Laminated	< ½-inch
Highly fractured	2.5 – 8 inches	Very thin	½ – 2 inches
Moderately fractured	8 inches to 2 feet	Thin	2 inches – 1 foot
Slightly fractured	2 to 6.5 feet	Medium	1 – 3 feet
Very slightly fractured	> 6.5 feet	Thick	3 – 10 feet
		Massive	> 10 feet

ROCK QUALITY DESIGNATION (RQD) ¹	
Description	RQD Value (%)
Very Poor	0 - 25
Poor	25 - 50
Fair	50 - 75
Good	75 - 90
Excellent	90 - 100

1. The combined length of all sound and intact core segments equal to or greater than 4 inches in length, expressed as a percentage of the total core run length.



611 Lunken Park Dr.
Cincinnati, Ohio 45226
P (513) 321-5816
[Terracon.com](https://www.terracon.com)

March 13, 2024

BHDP
302 W 3rd St Ste 500
Cincinnati, Ohio 45202

Attn: Mr. Alejandro Medina
P: (503) 527-0230
E: AMedina@bhdp.com

Re: Geophysical Exploration Report
University of Kentucky Ag Research
Farm Road
Lexington, KY
Terracon Project No. N3235060

Dear Mr. Medina:

Terracon Consultants, Inc. (Terracon) performed a surface seismic geophysical survey on November 6, 2023, at the project site. The surface geophysical seismic survey was performed using the Multi-Channel Analysis of Surface Waves (MASW) method, as described in the following sections. This report includes our geophysical findings and limitations.

Geophysical Exploration

The geophysical survey used a seismic system consisting of a Geometrics Geode seismograph with a linear array of 24 geophones to derive subsurface seismic velocity information using the Multi-Channel Analysis of Surface Waves (MASW) method. Two (2) linear arrays (identified as Line 1 and Line 2) were placed on the project site (see Exhibit 1). The line locations were selected based on site accessibility near the planned construction. Geophones were attached to spikes and inserted into the ground. The seismic response from seismic source shots using a sledgehammer striking a steel plate was recorded. Ambient seismic noises (e.g., vehicular traffic, walking along the line, nearby equipment) were also recorded.

The data was then processed using dispersion analysis software (SurfSeis, engineered by the Kansas Geological Survey) that extracts the fundamental-mode dispersion curve(s). The curves were inverted and modeled to yield a 1D shear-wave velocity profile along each array for a corresponding depth.

Geophysical Findings

Two lines were collected at the project site, as displayed on Exhibit 1. The shear wave velocity versus depth profiles for Lines 1 and 2 are displayed on Exhibits 2 and 3, respectively. Based on the velocities and depth to bedrock, a Site Class B is appropriate for design. This seismic site classification designation supersedes the seismic site classification designation provided in the geotechnical engineering report (Project No. N3235060, submitted on February 29, 2024) submitted for this project. The weighted average shear wave velocities over a depth of 100 feet below existing ground surface are:

- Line 1: 3,210 feet/sec
- Line 2: 3,353 feet/sec

Limitations

All geophysical testing methods rely on instrument signals to indicate physical conditions in the field. Signal information can be affected by on-site conditions beyond the control of the operator, such as, but not limited to, cultural features, standing water, ground water, buried objects, and cultural noise (e.g. traffic). Interpretation of those signals is based on a combination of known factors combined with the experience of the operator and geophysical scientist evaluating the results.

This report has been prepared for the application discussed and in accordance with generally accepted geophysical practices. No warranties, expressed or implied, are intended or made. The findings presented in this report are based on the data obtained from the geophysical surveys and other information discussed in this report. This report does not reflect variations that may occur in areas not tested or inaccessible to the geophysical equipment, across the site, or due to the modifying effects of construction or weather.

Geophysical Exploration Report

UK Ag Research | Lexington, KY

March 13, 2024 | Terracon Project No. N3235060



We appreciate the opportunity to be of service to you on this project. Please don't hesitate to contact the undersigned if you may have questions.

Sincerely,

Terracon

For: 

Kyle J. Shalek, Ph.D.
Senior Geophysicist

Samuel Guy, P.E.
Office Manager

Prasad Rege, P.E.
Divisional Manager

Attachments: Exhibit 1 – MASW Survey Map
Exhibit 2 – MASW Line 1
Exhibit 3 – MASW Line 2

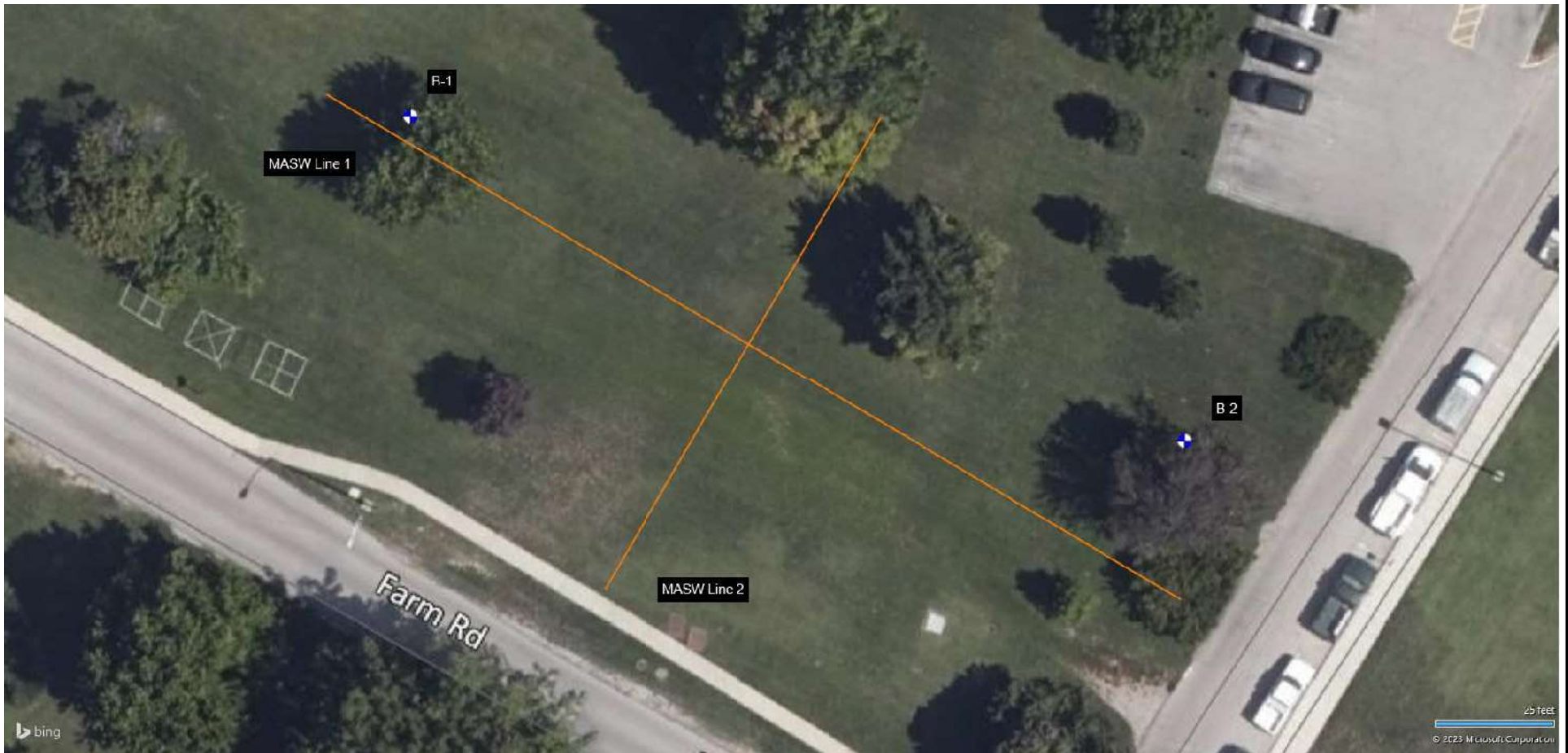


DIAGRAM IS FOR GENERAL LOCATION ONLY, AND IS NOT INTENDED FOR CONSTRUCTION PURPOSES

Project No. N3235060	Date: 11/14/2023
Project Manager: ITH	Drawn by: KJS
File Name: exhibits.pdf	
Scale: N.T.S.	



611 Lunken Park Dr. Cincinnati, OH
PH. (513) 612-9081 FAX. (513) 321-0294

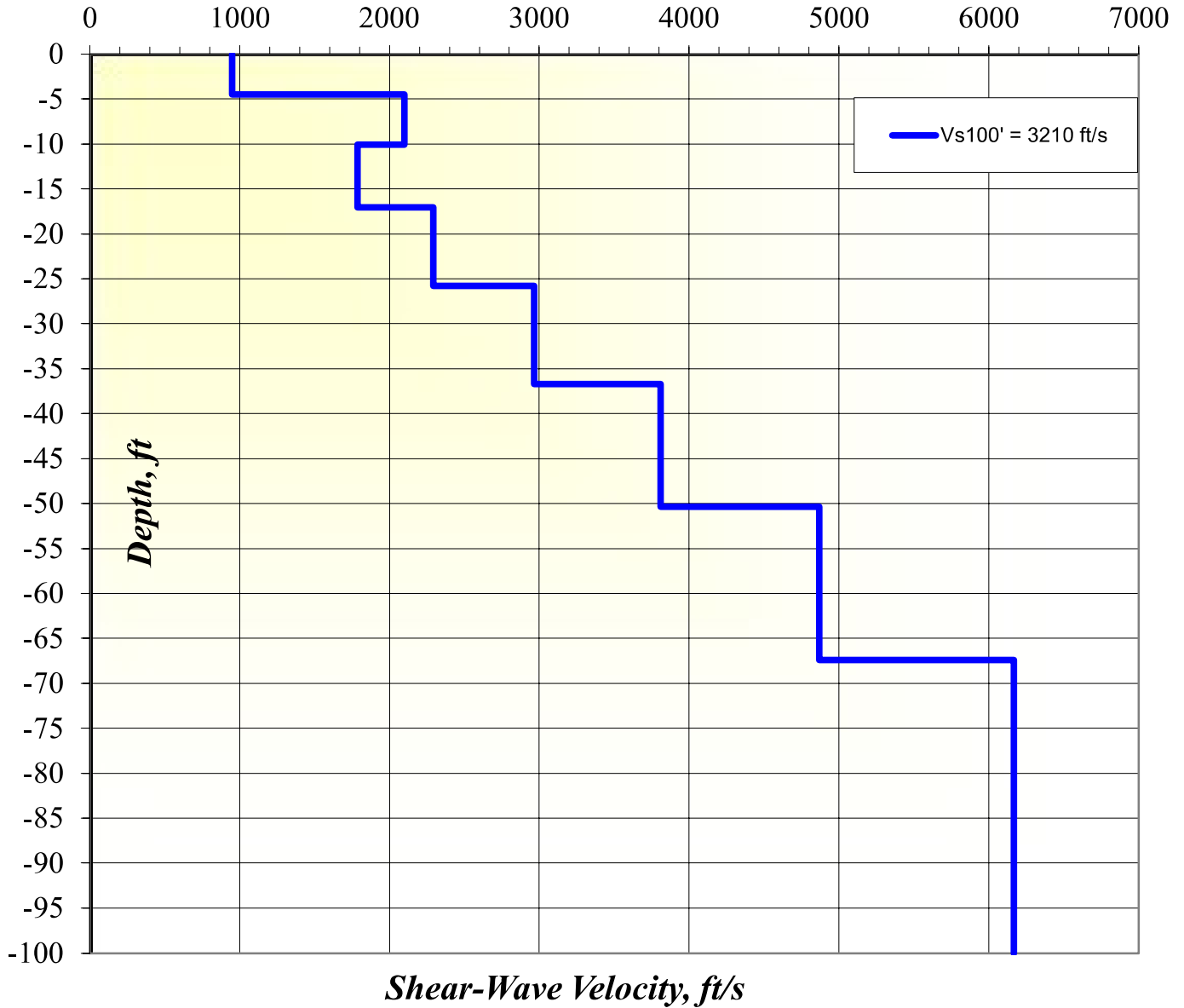
MASW Survey Plan

UK Ag Research
Farm Road
Lexington, KY

Exhibit

1

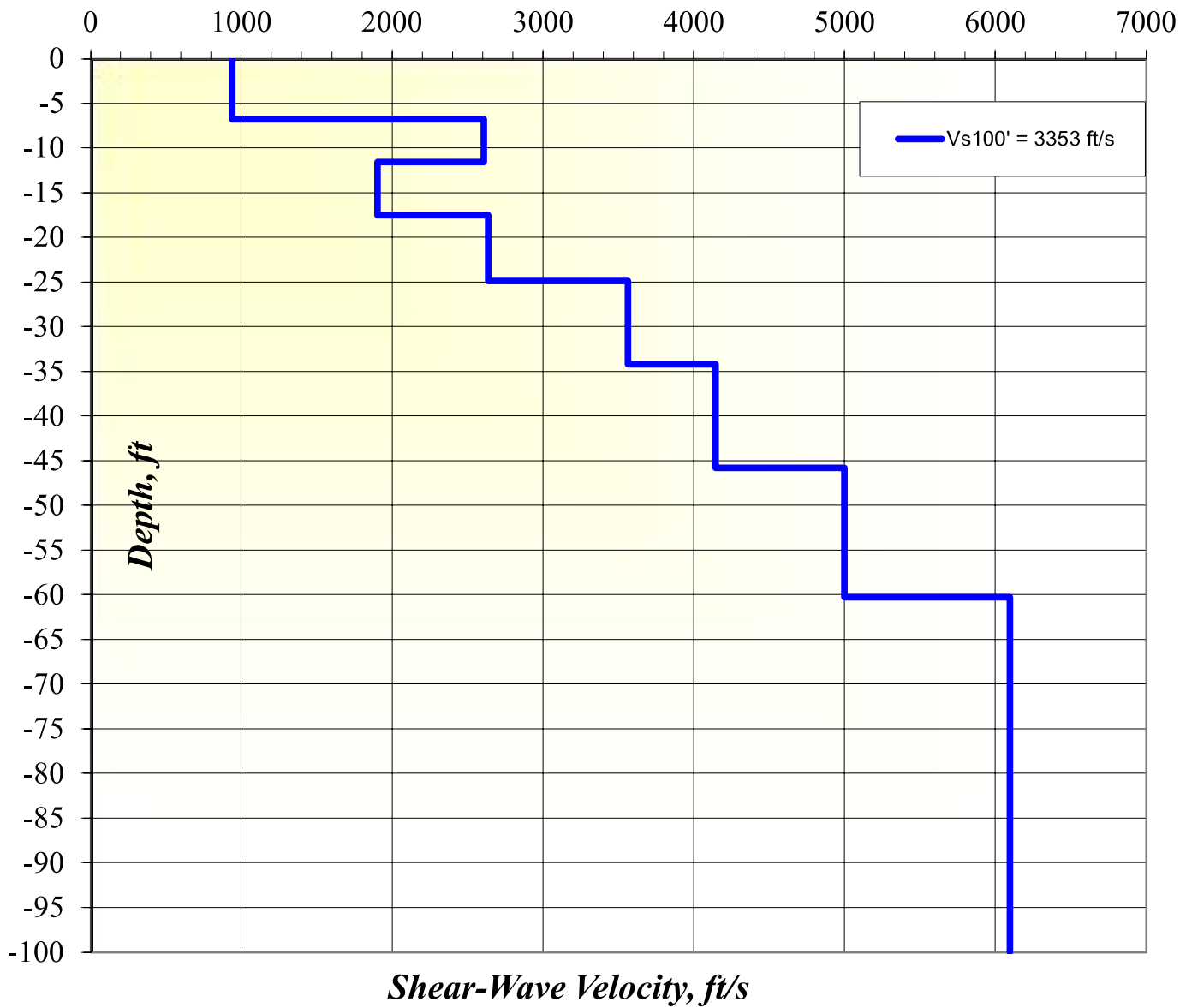
Vs Model



Depth Interval (ft)			Vs (ft/s)
0	to	-4	948
-4	to	-10	2098
-10	to	-17	1788
-17	to	-26	2292
-26	to	-37	2966
-37	to	-50	3809
-50	to	-67	4870
-67	to	-100	6167

Project No. N3235060 Project Manager: ITH File Name: MASW Scale: N.T.S.	Date: 11/14/2023 Drawn by: KJS	 Explore with us 611 Lunken Park Dr. Cincinnati, OH PH. (513) 612-9081 FAX. (513) 321-0294	MASW Line 1 UK Ag Research Farm Road Lexington, KY	Exhibit <div style="font-size: 2em; font-weight: bold;">2</div>
--	---	--	--	--

Vs Model



Depth Interval (ft)			Vs (ft/s)
0	to	-3	942
-3	to	-7	940
-7	to	-12	2610
-12	to	-18	1905
-18	to	-25	2637
-25	to	-34	3563
-34	to	-46	4145
-46	to	-60	4999
-60	to	-100	6095

Project No. N3235060 Project Manager: ITH File Name: MASW Scale: N.T.S.	Date: 11/14/2023 Drawn by: KJS	 611 Lunken Park Dr. Cincinnati, OH PH. (513) 612-9081 FAX. (513) 321-0294	MASW Line 2 UK Ag Research Farm Road Lexington, KY	Exhibit <div style="font-size: 2em; font-weight: bold;">3</div>
--	---	---	--	--



611 Lunken Park Dr.
Cincinnati, Ohio 45226
P (513) 321-5816
[Terracon.com](https://www.terracon.com)

March 13, 2024

BHDP
302 W 3rd St Ste 500
Cincinnati, Ohio 45202

Attn: Mr. Alejandro Medina
P: (503) 527-0230
E: AMedina@bhdp.com

Re: Geophysical Exploration Report
University of Kentucky Ag Research
Farm Road
Lexington, KY
Terracon Project No. N3235060

Dear Mr. Medina:

Terracon Consultants, Inc. (Terracon) performed a surface seismic geophysical survey on November 6, 2023, at the project site. The surface geophysical seismic survey was performed using the Multi-Channel Analysis of Surface Waves (MASW) method, as described in the following sections. This report includes our geophysical findings and limitations.

Geophysical Exploration

The geophysical survey used a seismic system consisting of a Geometrics Geode seismograph with a linear array of 24 geophones to derive subsurface seismic velocity information using the Multi-Channel Analysis of Surface Waves (MASW) method. Two (2) linear arrays (identified as Line 1 and Line 2) were placed on the project site (see Exhibit 1). The line locations were selected based on site accessibility near the planned construction. Geophones were attached to spikes and inserted into the ground. The seismic response from seismic source shots using a sledgehammer striking a steel plate was recorded. Ambient seismic noises (e.g., vehicular traffic, walking along the line, nearby equipment) were also recorded.

The data was then processed using dispersion analysis software (SurfSeis, engineered by the Kansas Geological Survey) that extracts the fundamental-mode dispersion curve(s). The curves were inverted and modeled to yield a 1D shear-wave velocity profile along each array for a corresponding depth.

Geophysical Findings

Two lines were collected at the project site, as displayed on Exhibit 1. The shear wave velocity versus depth profiles for Lines 1 and 2 are displayed on Exhibits 2 and 3, respectively. Based on the velocities and depth to bedrock, a Site Class B is appropriate for design. This seismic site classification designation supersedes the seismic site classification designation provided in the geotechnical engineering report (Project No. N3235060, submitted on February 29, 2024) submitted for this project. The weighted average shear wave velocities over a depth of 100 feet below existing ground surface are:

- Line 1: 3,210 feet/sec
- Line 2: 3,353 feet/sec

Limitations

All geophysical testing methods rely on instrument signals to indicate physical conditions in the field. Signal information can be affected by on-site conditions beyond the control of the operator, such as, but not limited to, cultural features, standing water, ground water, buried objects, and cultural noise (e.g. traffic). Interpretation of those signals is based on a combination of known factors combined with the experience of the operator and geophysical scientist evaluating the results.

This report has been prepared for the application discussed and in accordance with generally accepted geophysical practices. No warranties, expressed or implied, are intended or made. The findings presented in this report are based on the data obtained from the geophysical surveys and other information discussed in this report. This report does not reflect variations that may occur in areas not tested or inaccessible to the geophysical equipment, across the site, or due to the modifying effects of construction or weather.

Geophysical Exploration Report

UK Ag Research | Lexington, KY

March 13, 2024 | Terracon Project No. N3235060



We appreciate the opportunity to be of service to you on this project. Please don't hesitate to contact the undersigned if you may have questions.

Sincerely,

Terracon

For: 

Kyle J. Shalek, Ph.D.
Senior Geophysicist

Samuel Guy, P.E.
Office Manager

Prasad Rege, P.E.
Divisional Manager

Attachments: Exhibit 1 – MASW Survey Map
Exhibit 2 – MASW Line 1
Exhibit 3 – MASW Line 2

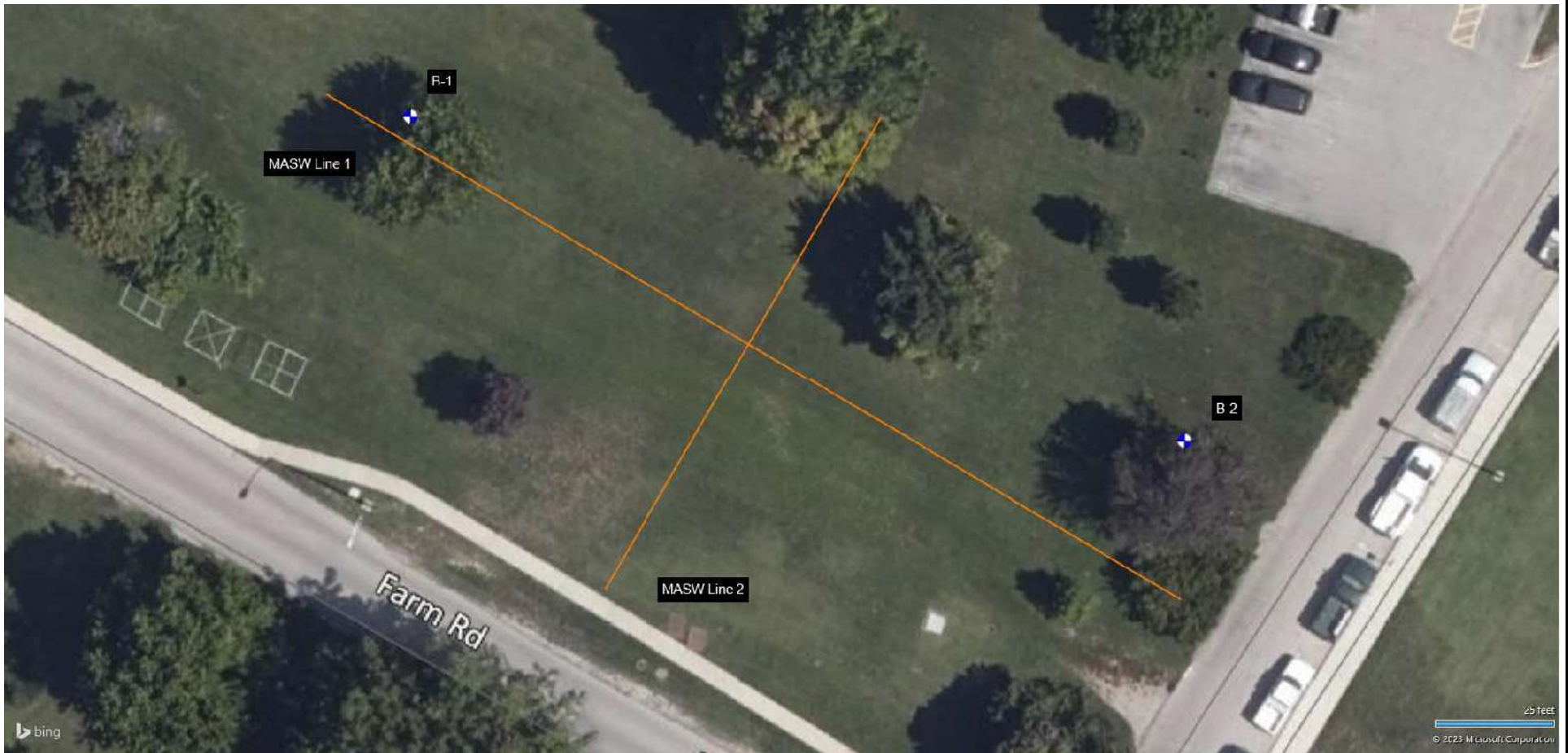


DIAGRAM IS FOR GENERAL LOCATION ONLY, AND IS NOT INTENDED FOR CONSTRUCTION PURPOSES

Project No. N3235060	Date: 11/14/2023
Project Manager: ITH	Drawn by: KJS
File Name: exhibits.pdf	
Scale: N.T.S.	



611 Lunken Park Dr. Cincinnati, OH
PH. (513) 612-9081 FAX. (513) 321-0294

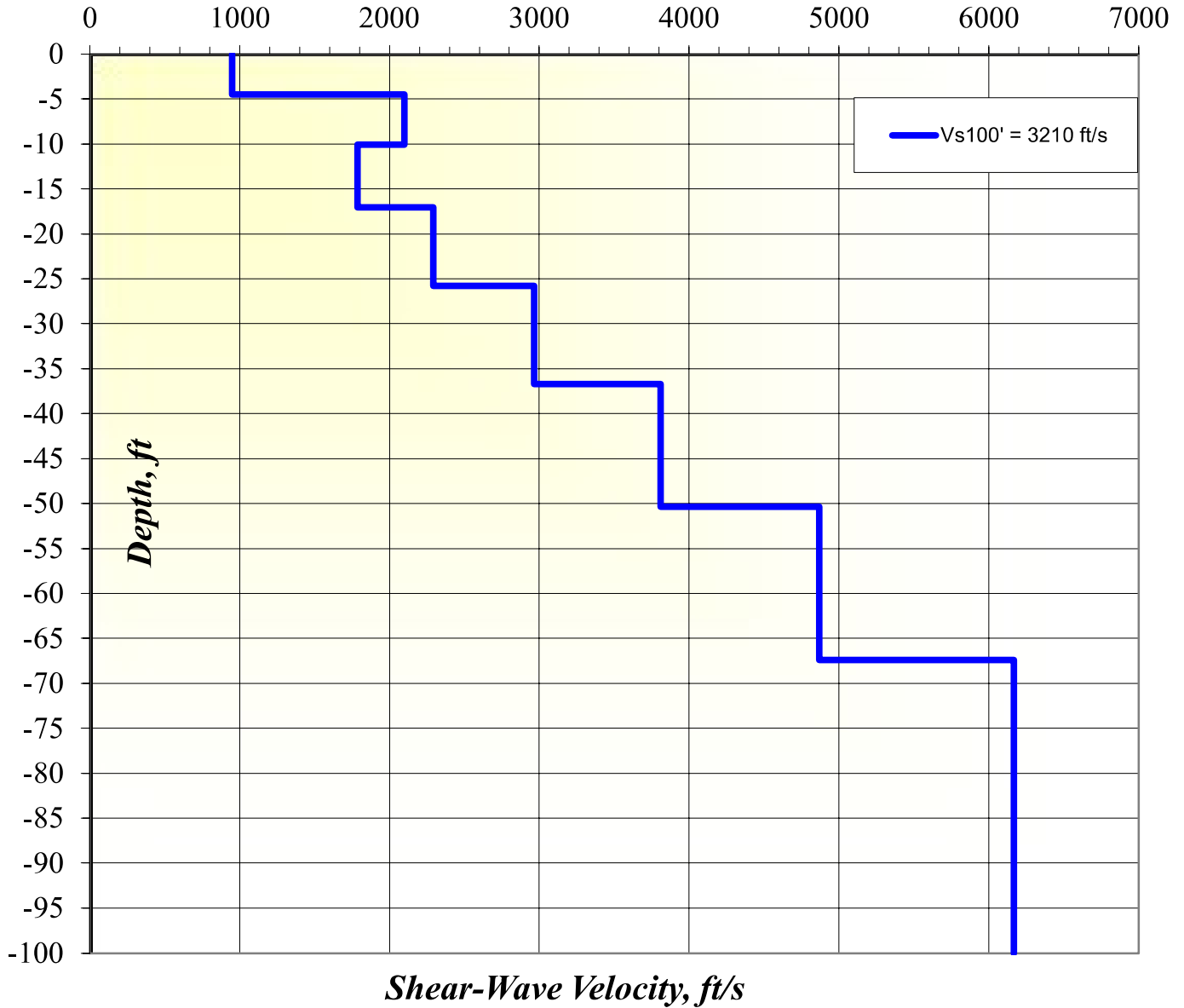
MASW Survey Plan

UK Ag Research
Farm Road
Lexington, KY

Exhibit

1

Vs Model



Depth Interval (ft)			Vs (ft/s)
0	to	-4	948
-4	to	-10	2098
-10	to	-17	1788
-17	to	-26	2292
-26	to	-37	2966
-37	to	-50	3809
-50	to	-67	4870
-67	to	-100	6167

Project No. N3235060 Project Manager: ITH File Name: MASW Scale: N.T.S.	Date: 11/14/2023 Drawn by: KJS	 611 Lunken Park Dr. Cincinnati, OH PH. (513) 612-9081 FAX. (513) 321-0294	MASW Line 1 UK Ag Research Farm Road Lexington, KY	Exhibit 2
--	---	---	---	--

Vs Model



Depth Interval (ft)			Vs (ft/s)
0	to	-3	942
-3	to	-7	940
-7	to	-12	2610
-12	to	-18	1905
-18	to	-25	2637
-25	to	-34	3563
-34	to	-46	4145
-46	to	-60	4999
-60	to	-100	6095

<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="font-size: small;">Project No.</td> <td style="font-size: small;">Date:</td> </tr> <tr> <td>N3235060</td> <td>11/14/2023</td> </tr> <tr> <td style="font-size: small;">Project Manager:</td> <td style="font-size: small;">Drawn by:</td> </tr> <tr> <td>ITH</td> <td>KJS</td> </tr> <tr> <td style="font-size: small;">File Name:</td> <td></td> </tr> <tr> <td>MASW</td> <td></td> </tr> <tr> <td style="font-size: small;">Scale:</td> <td></td> </tr> <tr> <td>N.T.S.</td> <td></td> </tr> </table>	Project No.	Date:	N3235060	11/14/2023	Project Manager:	Drawn by:	ITH	KJS	File Name:		MASW		Scale:		N.T.S.		 <p style="font-size: x-small;">611 Lunken Park Dr. Cincinnati, OH PH. (513) 612-9081 FAX. (513) 321-0294</p>	<p style="font-size: large; font-weight: bold;">MASW Line 2</p> <p style="font-size: large;">UK Ag Research Farm Road Lexington, KY</p>	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="font-size: x-small;">Exhibit</td> </tr> <tr> <td style="font-size: large; font-weight: bold;">3</td> </tr> </table>	Exhibit	3
Project No.	Date:																				
N3235060	11/14/2023																				
Project Manager:	Drawn by:																				
ITH	KJS																				
File Name:																					
MASW																					
Scale:																					
N.T.S.																					
Exhibit																					
3																					

SUBSTITUTION REQUEST

(During the Bid Period)

Project: _____ Substitution Request Number: _____

From: _____

To: _____ Date: _____

A/E Project Number: _____

Re: _____ Contract For: _____

Specification Title: _____ Description: _____

Section: _____ Page: _____ Article/Paragraph: _____

Proposed Substitution: _____

Manufacturer: _____ Address: _____ Phone: _____

Trade Name: _____ Model No.: _____

Attached data includes product description, specifications, drawings, photographs, and performance and test data adequate for evaluation of the request; applicable portions of the data are clearly identified.

Attached data also includes a description of changes to the Contract Documents that the proposed substitution will require for its proper installation.

The Undersigned certifies:

- Proposed substitution has been fully investigated and determined to be equal or superior in all respects to specified product.
- Same warranty will be furnished for proposed substitution as for specified product.
- Same maintenance service and source of replacement parts, as applicable, is available.
- Proposed substitution will have no adverse effect on other trades and will not affect or delay progress schedule.
- Proposed substitution does not affect dimensions and functional clearances.

Submitted by: _____

Signed by: _____

Firm: _____

Address: _____

Telephone: _____

A/E's REVIEW AND ACTION

- Substitution approved - Make submittals in accordance with applicable contract document requirements.
- Substitution approved as noted - Make submittals in accordance with applicable contract document requirements.
- Substitution rejected - Use specified materials.
- Substitution Request received too late - Use specified materials.

Signed by: _____

Date: _____

Supporting Data Attached: Drawings Product Data Samples Tests Reports _____

University of Kentucky

UK Agricultural Research Facility 1

CCK-2617.0-11-25 BP-06 Interior Fit-Out Group 1

January 3, 2025

Pre-Proposal Conference

CCK-2617.0-11-25

TC-030 General Trades

TC-031 Fire Protection

TC-032 Plumbing

TC-033 Mechanical

TC-034 Electrical

TC-035 Technology

TC-036 Drywall & Ceilings

TC-037 Doors & Hardware

TC-038 Masonry



Turner

University of Kentucky

UK Agricultural Research Facility 1

CCK-2617.0-11-25 BP-06 Interior Fit-Out Group 1

Agenda

- 1. Introduction of Project Team**
- 2. Review of Procurement Process**
Joe Wietmarschen, Turner Construction
Corey Leslie / Ken Scott, UK Purchasing
- 3. Review of Project Scope, Schedule and Site Logistics**
Joe Wietmarschen, Turner Construction
- 4. Review Project Safety Requirements**
Joe Wietmarschen, Turner Construction
- 5. Review Proposal Format and Content**
UK Purchasing and Turner Construction
- 6. Questions**

The logo for Turner, featuring the word "Turner" in a bold, black, sans-serif font. The letters are thick and blocky, with a white background behind the text.

University of Kentucky

UK Agricultural Research Facility 1
CCK-2617.0-11-25 BP-06 Interior Fit-Out Group 1

1

Introduction of Project Team

Joe Wietmarschen, Turner Construction

Turner

University of Kentucky

UK Agricultural Research Facility 1

CCK-2617.0-11-25 BP-06 Interior Fit-Out Group 1

Owner

Wayne Thomas – Capital Construction Director
Kevin Locke – Capital Construction Director
Angela Powell – CPMD PM
Corey Leslie – UK Purchasing Division

Design Consultants

Design Architect – Flad Architects Laboratory Designers
Design Architect – BHDP Architects Architect/Interior Designers
Structural Engineer – THP
MEP Engineer – CMTA
Civil and Landscaping – Bell Engineering

Construction Manager

Turner Construction Company
Dave Opalka – Project Executive
Joe Wietmarschen – Project Manager
Stephanie Sharp – Project Engineer
Tim Taylor – Project Engineer
Chris Coleman – General Superintendent
Thomas Turkington – MEP Superintendent
Travis Evans – Project Safety Manager
Sherry Macht – Project Accountant

The logo for Turner Construction Company, featuring the word "Turner" in a bold, white, sans-serif font on a dark blue background.

University of Kentucky

UK Agricultural Research Facility 1
CCK-2617.0-11-25 BP-06 Interior Fit-Out Group 1

2

Review of Procurement Process

*Corey Leslie, UK Purchasing
Joe Wietmarschen, Turner Construction*

Turner

University of Kentucky

UK Agricultural Research Facility 1

CCK-2617.0-11-25 BP-06 Interior Fit-Out Group 1

- **Bid Submission**
 - *Wednesday, January 22nd, 3:00 PM (Lexington Time)*
 - *Peterson Building, Room 322 (Directly to UK Purchasing)*
 - *411 South Limestone, Lexington, KY 40506*
 - *Post-Bid Review: TBA*
- **Confirmation of Receipt of Bid Package Documents and Addenda**
- **Due Date for Submission of Written Questions**
 - *Wednesday, January 8th, at 1:00 pm (Lexington Time)*
 - *All questions must be submitted in writing and must be submitted to Corey Leslie at cckbidquestions@uky.edu*
 - *Please use bid number and title in the 'Subject' line of your e-mail*
- **Note: Offerors shall NOT submit their standard terms and conditions.**

The logo for Turner, featuring the word "Turner" in a bold, black, sans-serif font. The letters are thick and closely spaced, with a white background behind the text.

University of Kentucky

UK Agricultural Research Facility 1

CCK-2617.0-11-25 BP-06 Interior Fit-Out Group 1

3

Review of Project Scope, Schedule & Site Logistics

Joe Wietmarschen, Turner Construction

Turner

University of Kentucky

UK Agricultural Research Facility 1

CCK-2617.0-11-25 BP-06 Interior Fit-Out Group 1

Project Overview

- **This package includes the Construction Phase Fitout that includes General Trades, Fire Protection, Plumbing, Mechanical, Electrical, Technology, Drywall & Ceilings, Doors & Hardware & Masonry**
 - *Project is a new build located on Farm Road directly in front of the UK Football Stadium.*
 - *Project is adjacent to the UK Plant Sciences, Tobacco Research, Good Barn and Barnhart Buildings*
 - *Project is approx. 270,000 sq.ft. and 5 stories (including rooftop greenhouses). Building has no basement.*
 - *Project will contain teaching and research laboratories for the College of Agriculture, Food, and Environment. The building will have a concrete structure for levels 1-3 and structural steel for levels 3-5.*
- **The work will be performed under contract with the Construction Manger, Turner Construction Company**

The logo for Turner Construction Company, featuring the word "Turner" in a bold, black, sans-serif font on a white rectangular background.

University of Kentucky

UK Agricultural Research Facility 1

CCK-2617.0-11-25 BP-06 Interior Fit-Out Group 1

Project Scope Key Items

3. GENERAL WORK REQUIREMENTS - Specific contractors have work items listed that need to be included in your bid cost.
 - All subcontractor pay applications will be per Textura-CPM – please review fees per General Work Requirements.
 - Electronic DCR, Safety Forms, and QA/QC will be utilized on this project for quality management thru Procore.
 - Each Trade contractor and their subs are required to have cellular iPads.
 - Off hour work may be required. Make sure to review ALL project information.
 - Contractor responsible for daily clean up of work area and transporting daily debris to project dumpster(s)
 - UK Project Management Software - eCommunications

The logo for Turner, featuring the word "Turner" in a bold, black, sans-serif font. The letters are white and set against a solid black rectangular background.

University of Kentucky

UK Agricultural Research Facility 1

CCK-2617.0-11-25 BP-06 Interior Fit-Out Group 1

Project Scope Key Items

4. GENERAL ITEMS

- Storage:
 - Bulk storage on site is not available. Trade partners are limited to material that can be installed in-place within a 10 day or less period. All material shall be stored on wheels, pallets or dunnage.
- Composite Cleaning:
 - Each trade partner to include 2% of total labor hours
- Contractor Parking:
 - No specific parking provisions for trade partners have been made. No trade partner parking will be permitted on the jobsite.
- UBE Inclusion
 - University of Kentucky inclusion goal for UBE is 10%
 - Each Prime Contractor will be required to submit UBE % of contracted work awarded with each payment application.



University of Kentucky

UK Agricultural Research Facility 1

CCK-2617.0-11-25 BP-06 Interior Fit-Out Group 1

Project Scope Key Items

1. ATTACHMENT "B" – SCOPES OF WORK....

- **ALL SCOPES**

- *Alternates: See specification 01 2300*
 1. *Fourth Floor Build Out*
 2. *Autoclaves*
 3. *Greenhouse Tables & Shelving*
 4. *Roller Window Shades in Rooms A0100 & A0102*
 5. *Greenhouse Card Readers*

Turner

University of Kentucky

UK Agricultural Research Facility 1 CCK-2617.0-11-25 BP-06 Interior Fit-Out Group 1

Project Scope Key Items

1. ATTACHMENT “B” – SCOPES OF WORK....

- *TC-030 General Trades*
 - Construction Phase Services
 - Tracked Skid Steer, Water Truck, Off Road Fork Truck
 - Hoist/elevator operators & yard boss
 - Tent & HVAC rental
 - Temporary restrooms inside building
 - Roof protection – “Rhino Tile FR”
 - General Work Requirements (Dumpsters, cleaning, etc)

05 5000 – Metal Fabrications

05 5213 – Pipe and Tube Railings

05 7300 – Decorative Metal Railings

05 7500 – Decorative Formed Metal

06 1000- Rough Carpentry (as related to this scope)

06 1600 – Sheathing (as related to this scope)

07 8413 – Penetration Firestopping (as related to this scope)

07 8413 – Joint Firestopping (as related to this scope)

07 9200 – Joint Sealants (as related to this scope)

07 9200.13 – Joint Sealants – Laboratory and Vivarium (as related to this scope)

07 9219 – Acoustical Joint Sealants (as related to this scope)

07 9513.13 – Interior Expansion Joint Cover Assemblies

08 1113 – Hollow Metal Doors and Frames (as related to this scope)

08 1416 – Flush Wood Doors (as related to this scope)

08 3113 – Access Doors and Frames (as related to this scope)

08 4113 – Aluminum-Framed Entrances and Storefronts

08 4126.23 – Interior All-Glass Entrances

08 7100 – Door Hardware (as related to this scope)

08 7113 – Power Door Operators

08 8000 – Glazing

08 8300 – Mirrors

08 8773 – Light Filtering Glazing Film

08 8813 – Fire-Rated Glazing

10 1100 – Visual Display Units

10 2313.19 – Plastic Toilet Compartments

10 2123.23 – Blackout Curtain and Track

10 2213 – Wire Mesh Partitions

10 2600 – Wall and Door Protection

10 2800 – Toilet Accessories

10 4413 – Fire Protection Cabinets

10 4416 – Fire Extinguishers

10 5123 – Plastic Laminate-Clad Lockers

11 3013 – Residential Appliances

11 5213 – Projection Screens

12 2413 – Roller Window Shades

13 1926 – Animal Penning System

41 2223.26 – Monorail and Hoist System



University of Kentucky

UK Agricultural Research Facility 1

CCK-2617.0-11-25 BP-06 Interior Fit-Out Group 1

Project Scope Key Items

1. ATTACHMENT “B” – SCOPES OF WORK....

- *TC-031 Fire Protection*
 - Construction Phase Services
 - Fire protection excavation, backfill, haul off, new piping, etc.
 - Fire Pump, Jockey Pump, Fire Pump Electrical Panel/ATS, Jockey Pump Panel, Conduit, Wiring, Hose Cabinets, Tamper Switches, Flow Switches, Signage, controls, alarms, etc. for a complete operational system. Coordinate with electrical contractor.
 - Access doors, joint sealants, firestopping
 - Startup, Testing & Commissioning, Final Commissioning
 - BIM Modeling
 - Prefabricate off-site



University of Kentucky

UK Agricultural Research Facility 1

CCK-2617.0-11-25 BP-06 Interior Fit-Out Group 1

Project Scope Key Items

1. ATTACHMENT “B” – SCOPES OF WORK....

- *TC-032 Plumbing*
 - Construction Phase Services
 - Plumbing, SWV, AW, Domestic Water, RO/DI Water, Compressed Air, Vacuum and CO2 Systems materials and installations
 - Inertia bases, grout bases for pumps
 - Floor drains & trench drains
 - Plumbing fixtures
 - Fuel oil systems
 - complete chlorination of entire Domestic Water systems including all previously installed equipment and systems
 - Access doors, joint sealants, firestopping
 - Temporary Restrooms
 - Startup, Testing & Commissioning, Final Commissioning
 - BIM Modeling
 - Prefabricate off-site



University of Kentucky

UK Agricultural Research Facility 1

CCK-2617.0-11-25 BP-06 Interior Fit-Out Group 1

Project Scope Key Items

1. ATTACHMENT “B” – SCOPES OF WORK....

- *TC-033 Mechanical*

- Construction Phase Services

- Receive and install all TC-025 Owner Purchased Air Handlers, Energy Recovery Chillers and Laboratory Exhaust Fans
 - Water & Air balancing
 - Exhaust fans & gravity vents
 - VAV boxes & Phoenix valves
 - Duct mounted smoke detectors & fire smoke dampers
 - Fan coil units
 - Condensate piping
 - VFDs
 - Building automation controls system
 - Access doors, joint sealants, firestopping
 - Startup, Testing & Commissioning, Final Commissioning
 - BIM Modeling
 - Prefabricate off-site
 - Greenhouse Controls (pathways, wiring, terminations, mounting equipment)

Turner

University of Kentucky

UK Agricultural Research Facility 1

CCK-2617.0-11-25 BP-06 Interior Fit-Out Group 1

Project Scope Key Items

1. ATTACHMENT “B” – SCOPES OF WORK....

- *TC-034 Electrical*
 - Construction Phase Services
 - Temp power & lighting
 - Electrical systems
 - Grounding
 - Lightning Protection
 - lighting control systems
 - Fire alarm system including JCI contract
 - Install VFDs & motor starters/switches
 - Receive and Install all Electrical Equipment from the Owner procured in TC-010 including switchgear, distribution gear, panelboards, etc.
 - Access doors, joint sealants, firestopping
 - Startup, Testing & Commissioning, Final Commissioning
 - BIM Modeling
 - Prefabricate off-site



University of Kentucky

UK Agricultural Research Facility 1

CCK-2617.0-11-25 BP-06 Interior Fit-Out Group 1

Project Scope Key Items

1. ATTACHMENT “B” – SCOPES OF WORK....

- *TC-035 Technology*
 - Construction Phase Services
 - Complete technology system
 - Raceways
 - Voice data network system
 - AV system
 - Security/Access control system
 - Access doors, joint sealants, firestopping
 - Startup, Testing & Commissioning, Final Commissioning
 - BIM Modeling
 - Prefabricate off-site

The logo for Turner, featuring the word "Turner" in a bold, black, sans-serif font. The letters are thick and closely spaced, with a white background behind the text.

University of Kentucky

UK Agricultural Research Facility 1

CCK-2617.0-11-25 BP-06 Interior Fit-Out Group 1

Project Scope Key Items

1. ATTACHMENT “B” – SCOPES OF WORK....

- *TC-036 Drywall & Ceilings*
 - Construction Phase Services
 - Slotted framing system
 - Insect control treatment
 - Install HM frames
 - Penetration & joint firestopping & joint sealants
 - Gypsum Shaft wall assemblies
 - Non-Structural metal framing
 - Gypsum board & sheathing
 - Acoustical and metal ceilings
 - Stairwell scaffoldings

Turner

University of Kentucky

UK Agricultural Research Facility 1

CCK-2617.0-11-25 BP-06 Interior Fit-Out Group 1

Project Scope Key Items

1. ATTACHMENT "B" – SCOPES OF WORK....

- *TC-037 Doors & Hardware*
 - Construction Phase Services
 - Furnish all HM & wood doors & frames & associated glazing
 - Pre-install all door hardware
 - Pre-wiring doors
 - Electrified hardware device schedule & hardware consultant
 - Wiring diagrams
 - Temporary cores

University of Kentucky

UK Agricultural Research Facility 1

CCK-2617.0-11-25 BP-06 Interior Fit-Out Group 1

Project Scope Key Items

1. ATTACHMENT "B" – SCOPES OF WORK....

- *TC-038 Masonry*
 - Construction Phase Services
 - CMU partitions
 - Firestopping, joint sealants & acoustical sealants
 - Insect control treatment
 - Setting/grouting HM frames in masonry partitions

Turner

University of Kentucky

UK Agricultural Research Facility 1

CCK-2617.0-11-25 BP-06 Interior Fit-Out Group 1

Project Scope Key Items

6. ATTACHMENT “E” – ACCOUNTNG PROCEDURES

- Textura will be used for pay applications

7. ATTACHMENT “F” – PERCENTAGE MARKUP

- Contractors will receive 10% markup on change orders

8. ATTACHMENT “I” – LEAN SUBCONTRACT EXHIBIT

- WWP will be submitted from each contractor on a weekly basis
- Daily huddles and weekly subcontractor meetings will be held with onsite foreman.

9. ATTACHMENT “J” – ELECTRONIC AGREEMENT

- A copy of the design model to aid the bidders to better understand the overall design of the building and façade.
- This document must be signed and returned in order to gain access to this model.



University of Kentucky

UK Agricultural Research Facility 1

CCK-2617.0-11-25 BP-06 Interior Fit-Out Group 1

Project Schedule Key Items

12. ATTACHMENT “G” – BID SCHEDULE

- Refer to Attachment G for Project Milestone Schedule
-
- Bid Date 1/22/2025
 - Scope Review & Contracts 1/23/2025 – 2/13/2025
 - Structural Steel start March 2025
 - Interior Framing and OH MEP Begin June 2025
 - Buck Hoist Install June 2025
 - Exterior Skin start June 2025
 - Curtainwall/Glazing start July 2025
 - Roofing start August 2025
 - Level 1-3 + Roof Greenhouse Substantial Completion 11/4/2026
 - Schedule requires multiple crews to achieve milestone dates
 - Level 4 & Auditorium Substantial Completion 11/30/2026



University of Kentucky

UK Agricultural Research Facility 1

CCK-2617.0-11-25 BP-06 Interior Fit-Out Group 1

Project Scope Key Items

9. ATTACHMENT “L” - CONTRACTOR CONTROLLED INSURANCE PROGRAM (CCIP)

- ALL Contractors will be required to enroll in the CCIP.
- Turner is responsible for ONSITE Coverage, Trade Contractors and Sub Tiers are responsible for Auto and OFFSITE Coverage
- The CCIP Manual is considered a contractual document.
- All TSIB forms in the CCIP manual are required to be submitted and approved by TSIB prior to starting work.
- All Lower Tier Subcontractors will be required to enroll in the CCIP and complete TSIB forms as well. It will be the Prime Contractors responsibility to ensure that lower tier subs are enrolled and compliant prior to starting work on site.
- Each Prime Contractor and Lower Tier Subcontractors are required to submit a Form-4 Payroll report to TSIB every month that you are enrolled on the project. This is not the same as the Certified Payroll Reports.



University of Kentucky

UK Agricultural Research Facility 1

CCK-2617.0-11-25 BP-06 Interior Fit-Out Group 1

4

Review Project Safety Requirements

Joe Wietmarschen, Turner Construction

Turner

University of Kentucky

UK Agricultural Research Facility 1

CCK-2617.0-11-25 BP-06 Interior Fit-Out Group 1

Project Safety Requirements

- Compliance with Turner Jobsite Safety Program – Attachment C
- Building L.I.F.E. principles will be fully integrated into all facets of the Project – READ THROUGH THIS. This is an updated program for 2024.
- Negative Drug Test required to start onsite – costs paid by TC's
- Hardhats, Safety Spoggle Glasses, High Vis, and Gloves are required 100%.
- OSHA 30 Hour for Supervisor/foreman (1 person onsite per contractor)
- Tobacco Free Campus & Jobsite
- Each contractor must have a competent person on site AT ALL TIMES to perform any work.
- Each contractor's foremen are required to attend Building L.I.F.E. training before beginning work.
- Any signaling shall be by a qualified signal person.
- Rigging must be done by qualified rigger and shall inspect rigging before each use.
- Full time safety manager required for contracts over \$5 million and/or over 25 workers onsite



University of Kentucky

UK Agricultural Research Facility 1

CCK-2617.0-11-25 BP-06 Interior Fit-Out Group 1

Project Safety Requirements (cont.)

- All scissor and boom lifts to have shroud or guard over the joystick/controls. Scissor lifts to have “timeout” feature which disables the lift/lower and drive functions. Boom lifts to have anti-crush or secondary guard technology
- Nothing Hits the Ground – Practice good construction practices. We expect all materials able to be readily movable (pallets, dunnage, etc.) and that cutting is completed off the ground and in a manner where cleanup is part of the activity.
- 100% Fall protection when working 6’ and above – fall protection plan will be required. Contractor to supply the correct fall protection for the task.
- Each contractor will be required to preform a Pre-Task Plan after stretch and flex before starting work every day. These will be an in depth review with the workers to determine what work will be done for that day, what the hazards are associated with this work, and how to mitigate these hazards. The workers will initial out at the end of the day and the contractor will submit this digitally.
- 100% fall protection required when working in any lifts.



University of Kentucky

UK Agricultural Research Facility 1

CCK-2617.0-11-25 BP-06 Interior Fit-Out Group 1

5

Review Proposal Format & Content

Joe Wietmarschen, Turner Construction

Turner

University of Kentucky

UK Agricultural Research Facility 1

CCK-2617.0-11-25 BP-06 Interior Fit-Out Group 1

Proposal Format & Content

- Form of Proposal and Work Category Description
 - Bid must be signed
 - Addenda (if any) must be acknowledged
- Hourly Rates, UBE form, and materials list must be filled out
- Authentication of Bid
- Business Classification
- 5% Bid Bond
- Payment and Performance bonds are NOT to be included base bid price.

The logo for Turner, featuring the word "Turner" in a bold, black, sans-serif font. The letters are thick and closely spaced, with a white background behind the text.

University of Kentucky

UK Agricultural Research Facility 1

CCK-2617.0-11-25 BP-06 Interior Fit-Out Group 1

Bid Form – Must fill out all blanks (including alternates)

FOR THE LUMP SUM OF _____
(USE WORDS)

_____ DOLLARS AND _____ CENTS.
(USE WORDS) (USE WORDS)

(\$ _____) **BIDDER MUST TURN IN BID BREAKOUT SHEET WITH THIS FORM OF PROPOSAL**
(USE FIGURES)

Turner

University of Kentucky

UK Agricultural Research Facility 1 CCK-2617.0-11-25 BP-06 Interior Fit-Out Group 1

Bid Form – Bid Breakout

- This must be completed for bid to be accepted

	Description of Work	Labor Hours	Quantity	Unit	Unit Cost	Total
1	Engineering & Submittals				\$	\$
2	Layout, Permits & fees				\$	\$
3	Temp Lighting & Power				\$	\$
4	Electrical Power Underground and Duct Banks				\$	\$
5	Communications Underground and Duct Banks				\$	\$
6	Risers Electric Power				\$	\$
7	Risers Communication				\$	\$
8	1000 kVA Transformer				\$	\$
9	Testing and Inspection				\$	\$
10					\$	\$
11						
12						
Please list and breakdown below any work that has not been listed above						
13					\$	\$
14					\$	\$
15					\$	\$
16					\$	\$
17					\$	\$
18	Management				\$	\$
19	Safety and Housekeeping				\$	\$
20	General Work Requirements				\$	\$
21	Overhead and Profit				\$	\$
Allowances (to be included in bid amount)						
1	Underground Utility Coordination				\$	\$30,000
2						
TOTAL BID AMOUNT (This amount should match the Lump Sum listed on Form of Proposal)						\$
Cost of Payment & Performance Bond (DO NOT INCLUDE THIS COST IN BID AMOUNT)						\$



University of Kentucky

UK Agricultural Research Facility 1
CCK-2617.0-11-25 BP-06 Interior Fit-Out Group 1

6

Questions

Joe Wietmarschen, Turner Construction

Turner

University of Kentucky

UK Agricultural Research Facility 1
CCK-2617.0-11-25 BP-06 Interior Fit-Out Group 1

Questions

All questions must be submitted in writing and must be submitted to Corey Leslie at cckbidquestions@uky.edu

Turner