University of Kentucky
Procurement Services

REQUEST FOR PROPOSALS

UK-2861.0-1-25
TREE CELL PROJECT
ADDENDUM # 3
4/11/2025

ATTENTION: This is not an order. Read all instructions, terms and conditions carefully.

IMPORTANT: RFP AND ADDENDUM MUST BE RECEIVED BY 4/22/2025 @ 3:00 P.M. LEXINGTON, KY TIME

Offeror must acknowledge receipt of this and any addendum as stated in the Request for Proposals.

ITEM #1: BIDDER NOTICES

- Attached are the results of the Geotechnical Exploration Report.

OFFICIAL APPROVAL
UNIVERSITY OF KENTUCKY

Brian Schwegman
Contracting Officer / (859) 257-9100

SIGNATURE

_____
Typed or Printed Name

University of Kentucky
Procurement Services
322 Peterson Service Building
Lexington, KY 40506-0005

SOLID GROUND
— CONSULTING ENGINEERS —

April 10, 2025

Mr. Scott Bowles
Project Manager
University of Kentucky
Capital Project Management Division
222 Frank D. Peterson Service Building
Lexington, KY 40506

Subject: **Limited Geotechnical Exploration**
University of Kentucky – Silva Cell Parking Lot Improvements
Lexington, Kentucky
Solid Ground Project No.: 25-197

Mr. Bowles,

Solid Ground Consulting Engineers (Solid Ground) is pleased to present this letter as a summary of the limited geotechnical exploration performed for the proposed Silva Cell Parking Lot Improvements project located behind Memorial Coliseum in Lexington, Kentucky. The approximate coordinates of the site are 38.040383°N, - 84.499778°W. This letter and subsequent attachments were prepared in general accordance with the scope of work agreed upon in Solid Ground Proposal No. 105525 dated March 12, 2025.

Summary of Findings

Solid Ground performed three (3) soil borings and three (3) modified cased borehole infiltration tests. Borings and the infiltration test were located as close to the proposed work area as possible. Soil overburden generally consisted of a layer of asphalt underlain by fill soils described as Lean to Fat Clay (CH-CL) with varying amounts of gravel and organics to approximately 7.5 feet. The fill soils were underlain by natural soils described as Lean Clay (CL). Three (3) borings were terminated at a depth of 16.5 feet, one (1) boring was terminated at a depth of 6.5 feet, and the remaining two (2) borings were terminated at a depth of 5.0 feet. The shallower borings were terminated to perform the modified cased bore hole infiltration tests. The approximate site location is depicted below in Figure 1.

Figure 1: Approximate Site Location

Site Conditions

The site is located on the north side of the Memorial Coliseum parking lot in Lexington, Fayette County, Kentucky. The development area is currently an asphalt parking lot.

Review of Previous Site Development and Historical Information

Based on review of historical maps provided by the United States Geological Survey (USGS) (Figures 2 & 3) and historical imagery provided by Google Earth (Figures 4 & 5), it appears there has been very little grading onsite over the last 70 years.

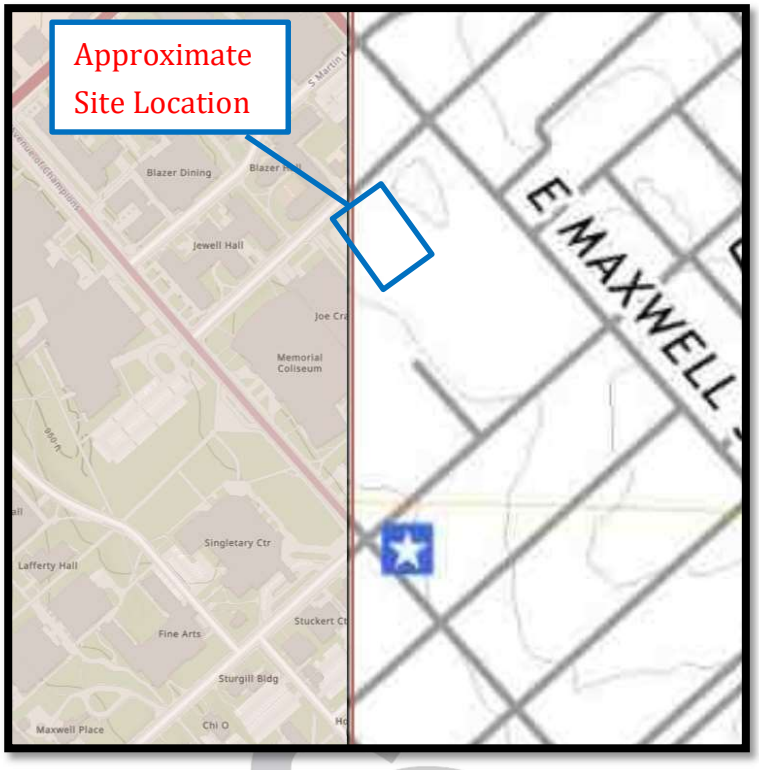

Figure 2: 2022 USGS Topographic Map of the Lexington East Quadrangle

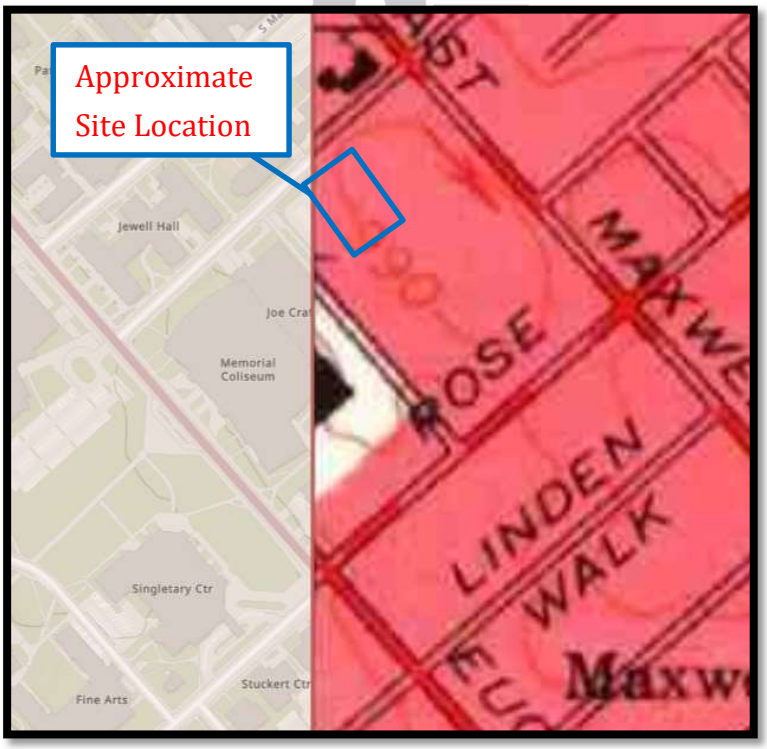

Figure 3: 1952 USGS Topographic Map of the Berea Quadrangle

Figure 4: 2024 Google Earth Imagery

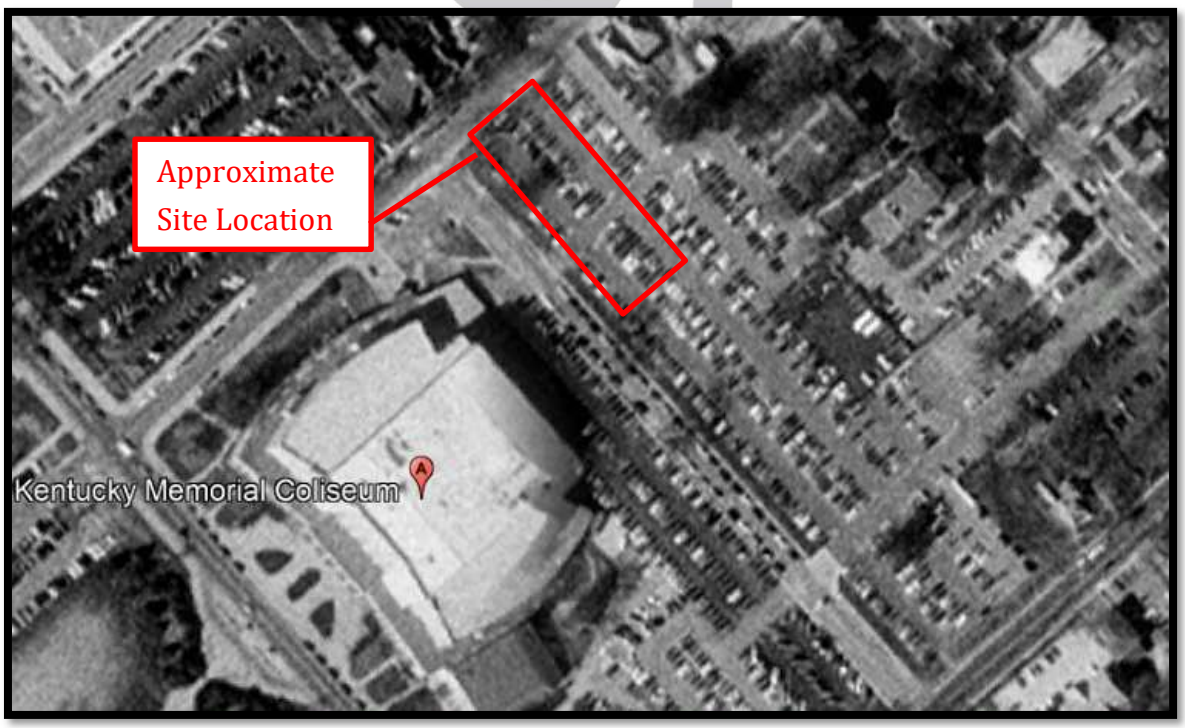

Figure 5: 1997 Google Earth Imagery

Published Geologic Information

Geologic information was referenced from the Kentucky Geological Survey (KGS), geologic map of the Lexington East Quadrangle, (Figure 6). The site is underlain by the Tanglewood Limestone Member. Locally, the Tanglewood Limestone Member is described as limestone and shale. Lower Ordovician to Middle Ordovician in age.

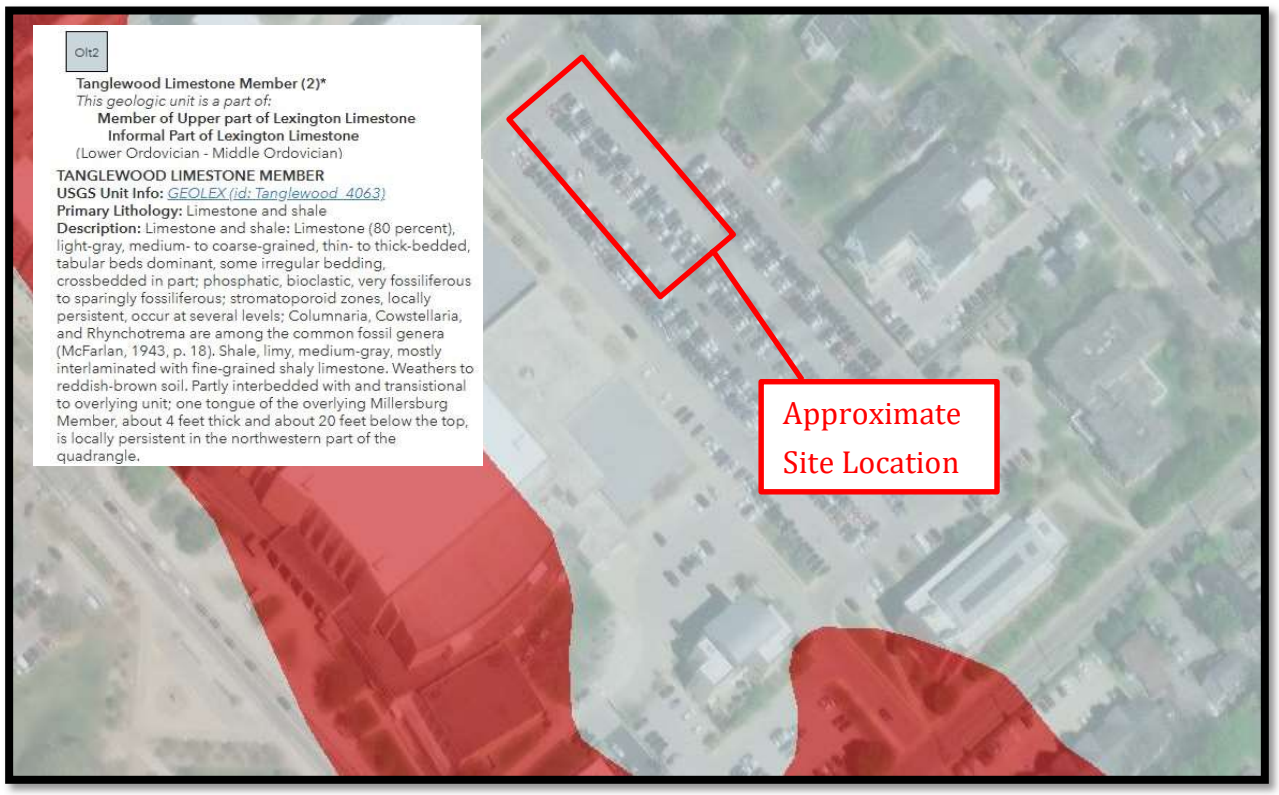

Figure 6: KGS Geologic Mapping

The KGS mapping (Figure 7) indicates that the underlying rock units have intense karst potential, with no mapped sinkholes within the vicinity of the site. Solid Ground should be contacted if any karst activity is encountered during construction for remediation recommendations.

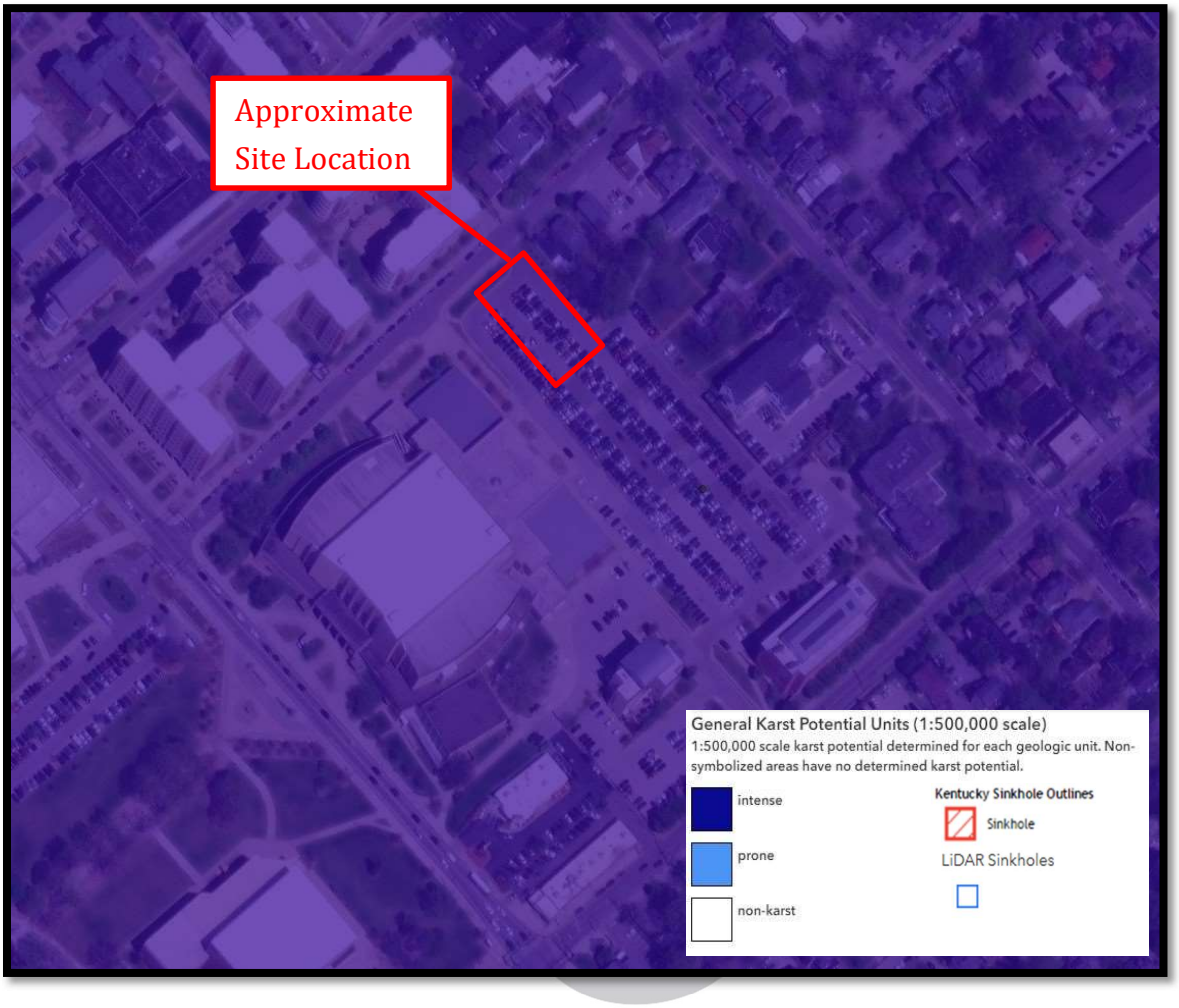

Figure 7: KGS Karst Potential Mapping

Subsurface Exploration Program

Solid Ground conducted a total of three (3) soil test borings and performed three (3) modified cased borehole infiltration test. Soil samples were taken at one (1) of the infiltration test locations, boring I-3. Borings were located within the approximate boundaries of the proposed retention pond locations, as site conditions allowed.

Boring surface elevations were estimated utilizing ArcGIS and LiDAR data. Therefore, the locations and surface elevations should be considered approximate. It should be noted that the subsurface conditions will vary, and the representative profile is based upon the number of borings drilled during the field operations. Detailed descriptions and strength characteristics are included on the boring logs in Appendix A. Boring locations are shown in Figure 8 below.

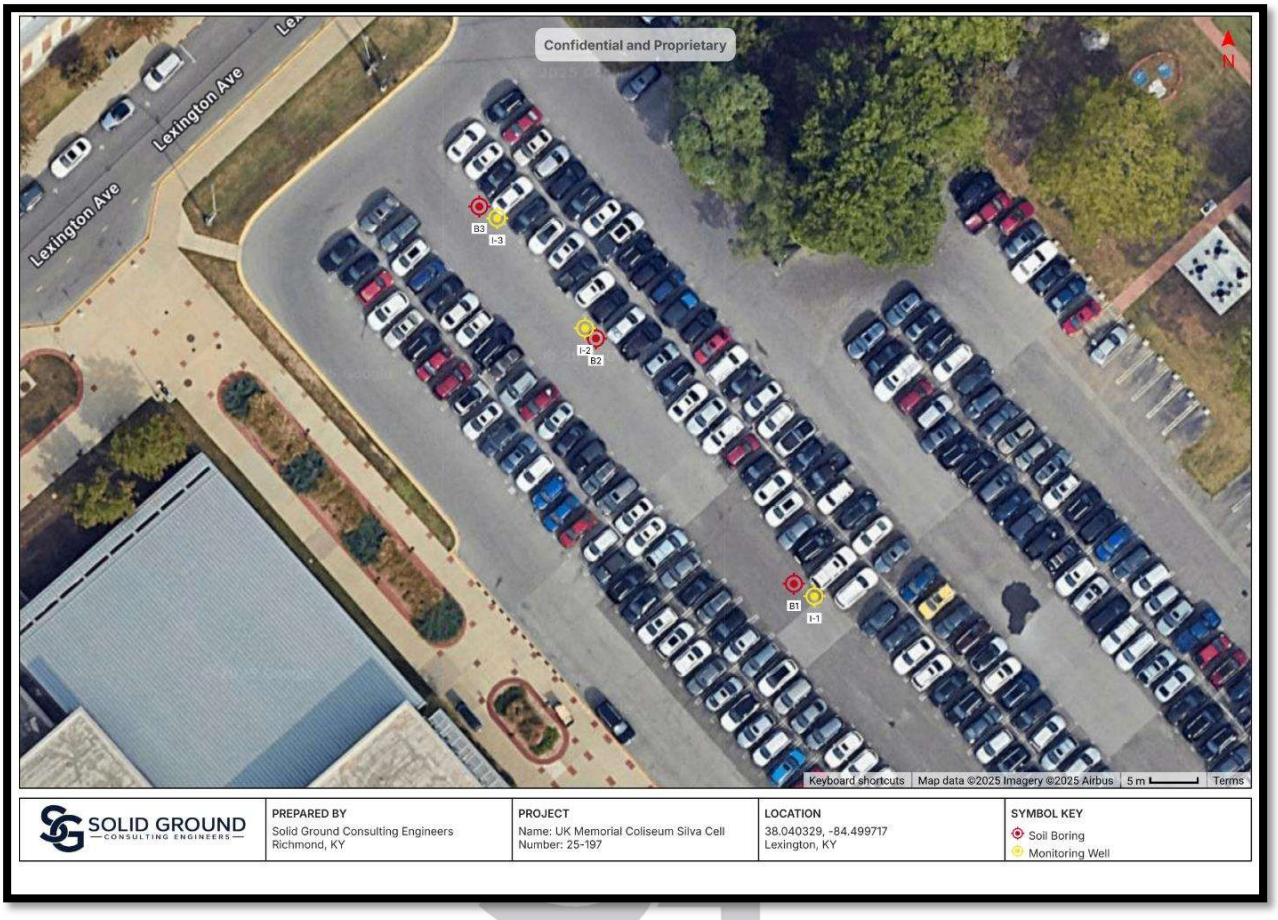

Figure 8– Boring Locations

Subsurface Conditions

The soil samples were classified by Solid Ground personnel according to the Unified Soil Classification System (USCS ASTM D2488; USCS ASTM 2487 for select samples). A description of each soil layer is as follows.

Surficial Materials – The four (4) sample borings encountered a surficial layer of asphalt (4 inches). It should be noted that thicknesses of these materials may vary across the site. The thicknesses presented in this report should be considered approximate.

Fill and Natural Soils - The borings encountered fill soils underlying the surficial materials layer described as Lean to Fat Clay (CL-CH) to depths of 7.5 feet underlain by natural soils described as Lean Clay (CL) with varying amounts of sand gravel and organics to auger termination depths.

Auger Termination – Three (3) borings were terminated at 16.5 feet and one (1) boring was terminated at 6.5 feet. The remaining two (2) borings were terminated at 5.0 feet.

Detailed descriptions and strength characteristics are included on the boring logs in Appendix A.

Groundwater - Solid Ground should be contacted if groundwater is encountered during earthwork operations. Please note, the groundwater table can fluctuate significantly which could have an impact on the subsurface soils. Table 1 summarizes our findings.

Table 1: Boring Summary

Boring Number	Approximate Surface Elevation (ft)	Auger Termination Depth (ft)	Final Elevation (ft)
B-1	989.0	16.5	972.5
B-2	988.0	16.5	971.5
B-3	985.0	16.5	968.5
I-1	989.0	5.0	984.0
I-2	988.0	5.0	983.0
I-3	985.0	6.5	978.5

Modified Infiltration Test

Solid Ground performed three (3) modified cased borehole infiltration tests in the work area of the parking lot. The approximate location of the infiltration test can be found in Figure 8. Infiltration testing was performed by drilling a hole to a depth of 5.0 or 6.5 feet and installing a PVC casing into the bottom of the borehole. Water was added to the casing to observe the infiltration rate. Solid Ground recorded an infiltration rate of approximately 0.00 inches/per hour during all three (3) infiltration tests.

At the time of observation, Solid Ground waited a 24-hour period after the last recorded rainfall in the area to perform the modified cased boring infiltration tests. The previous week, Kentucky experienced record amounts of rainfall across the state and in the project area that could have possibly skewed infiltration results. The test data is included in Appendix C.

Silva Cells

We understand that this project intends to utilize Silva Cells as a bioretention stormwater management system. Based on our exploration and research, Silva Cells can be incorporated into the design of the proposed development to support sustainable urban forestry and integrated stormwater management. Due to the measured infiltration testing showing impermeable or near-impermeable subsurface conditions, we recommend that the stormwater management function of the Silva Cells be modified from infiltration to a water retention and conveyance role. To ensure effective performance in these conditions, the following considerations are recommended:

Drainage and Overflow Management- Silva Cell installations should include a well-designed underdrain system with connections to adjacent storm infrastructure. Since infiltration is not feasible, all captured runoff should be directed to a positive outlet to avoid prolonged water retention and potential tree root stress.

Waterproofing and Protection Layers- In areas with prolonged water contact, appropriate membranes and protective geotextiles should be considered to maintain system integrity and prevent water migration into surrounding subgrade materials.

Subgrade Preparation- The subgrade below the Silva Cells should be proof-rolled and compacted to a minimum of 95% of the Standard Proctor Maximum Dry Density (SPMDD). Any highly plastic clays or organic materials encountered should be removed and replaced with structural fill.

Stormwater System Integration- Coordination with the civil engineering and stormwater management teams is essential to ensure that the Silva Cell system functions as part of a larger network designed to handle site runoff via conveyance rather than infiltration.

While the site's low infiltration capacity precludes traditional bioretention within the Silva Cells, the system remains an effective solution for improving soil quality beneath paved surfaces and temporarily detaining stormwater prior to discharge. Final design should be confirmed by the project's civil engineer in coordination with the Silva Cell manufacturer. Solid Ground should be contacted if any unexpected subsurface conditions are encountered during earthwork construction. It is important that Solid Ground observe earthwork construction.

Earthwork Recommendations

Site Preparation

- Asphalt and other surficial materials should be stripped to prepare the site for construction.
    - In-place density testing should be performed to check that the recommended compaction criteria have been achieved.
    - Fill placement should be monitored on a full-time basis by Solid Ground during site grading.
- After stripping and cutting operations, the subgrade should be evaluated by Solid Ground. Possible remediation methods may be required if the subgrade and site soils are exposed to wet weather conditions.

Fill Placement

Backfill materials for structural fill placement may consist of soil or durable crushed stone. The following steps are recommended for fill placement within the Silva Cells. **The onsite soils are likely to meet the requirements for structural fill material. Off-site borrow material cannot be ruled out without a review of the site grading plan.**

Structural fill material, if required, is defined as the following:

- Inorganic natural soil with maximum particle sizes of 2 inches.
- Plasticity Index of no greater than 30 percent and liquid limit less than 50.
- Solid Ground should observe the material to confirm the soils meet applicable standards for structural fill.
- Other sources of structural fill should be verified by Solid Ground.
    - If other sources of structural fill are anticipating, Solid Ground should collect a bulk sample for standard Proctor testing.

The following are recommendations for placement of soil structural fill:

- Structural fill should be placed in 6-inch to no greater than 8-inch-thick layers.
- Structural fill should be compacted to at least 95 percent of the soil's maximum dry density as determined by the standard Proctor compaction test (ASTM D698).
- The moisture content of the fill material should be maintained at about 2 percent (above or below) of its standard Proctor optimum moisture content.
- In-place density testing should be performed to determine if the previously recommended compaction criteria have been achieved.
- Fill placement should be monitored on a full-time basis by Solid Ground during site grading.

- Confined backfill should be placed in no greater than 6-inch-thick layers due to smaller compaction equipment.

Pavement Recommendations

General

Based on our experience with similar traffic loading (assumed) and subsurface conditions, the subgrade soils are assumed to have a CBR of 2.0 for the pavement analysis based on SPT correlation. American Association of State Highway and Transportation Officials (AASHTO) Guide for Design of Pavement Structures (1993) was used for the analysis. The assumptions are listed below for the pavement analysis.

If the following assumptions are incorrect, Solid Ground should be contacted to provide additional recommendations.

- Initial Serviceability of 4.2
- Resilient Modulus of 3,000
- Terminal Serviceability of 2.0
- Reliability of 80%
- Life of 20 years
- Maximum Estimated Equivalent Single Axle Load (ESAL's) of 25,000 for Light Duty with the following assumptions:
    - 5 Package Delivery Vehicles per day
    - 300 Passenger Cars per day
- Maximum Estimated Equivalent Single Axle Load (ESAL's) of 80,000 for Heavy Duty, with the following assumptions:
    - 1 Tractor Trailer per day
    - 2 Garbage Trucks per week
    - 5 Package Delivery Vehicles per day
    - 300 Passenger Cars per day

Flexible Asphalt Pavements

Based on the design assumptions detailed above, we recommend the following asphalt pavement sections in Tables 2 and 3:

Table 2: Light Duty Asphalt Pavement Section

Material	Light Duty Thickness (Inches)
Asphalt Surface Course	1.5
Asphalt Base Course	2.0
Compacted Crushed Stone Base	8.0

Table 3: Heavy Duty Asphalt Pavement Section

Material	Heavy Duty Thickness (Inches)
Asphalt Surface Course	2.0
Asphalt Base Course	2.0
Compacted Crushed Stone Base	9.0

Rigid Concrete Pavements

Based on the assumptions given in Section 5.5.1, the following concrete pavement sections are recommended in Tables 4 and 5:

Table 4: Light Duty Rigid Concrete Pavement

Material	Light Duty Thickness (Inches)	Designed Compressive Strength (psi)
Concrete	6.0	4,000
Compacted Crushed Stone Base	7.0	

Table 5: Heavy Duty Rigid Concrete Pavement

Material	Heavy Duty Thickness (Inches)	Designed Compressive Strength (psi)
Concrete	7.0	4,000
Compacted Crushed Stone Base	7.0	

If needed, we recommend the dumpster pad be constructed of concrete:

- The dumpster pad apron should extend the entire length of the garbage truck beyond the face of the dumpster.

This report contains our findings for the UK Memorial Coliseum Pavement project in Lexington, Kentucky. Once completed, it is recommended that Solid Ground have the opportunity to review plans and specifications. In addition, it is recommended that Solid

Ground be retained to perform observations during earthwork construction. Solid Ground will not be held responsible for interpretations and field observations made by others.

We appreciate the opportunity to provide our consulting services to you. We look forward to working with you on this and future projects.

Sincerely,

SOLID GROUND CONSULTING ENGINEERS,

Beck Smith, PE
Senior Engineer
Kentucky License Number 37415

Emily D. Kerns
Staff Engineer

Attachments: *Boring Logs*

Laboratory Analysis Results

Modified Borehole Infiltration Test Results

Soil Boring: B1

SOLID GROUND
CONSULTING ENGINEERS

Project: UK Memorial Coliseum Silva Cell
Location: Lexington, KY
Project Number: 25-197

Date Started: 04/08/2025	Date Completed: 04/08/2025	Coordinates: 38.04017, -84.49954
Location Accuracy: Estimated from Google Maps	Client Name: University of Kentucky	Hammer Type: Auto
Method: Auger	Depth: 16.5'	

Rig Type: Mobile B-25
Tooling: 3-1/4" Hollow Stem Auger
Surface Elevation: 989.0'

Depth (ft)	Elevation (ft)	Visual Classification and Remarks	Depth of Sample (ft)	Sample Graphic	Blow Counts	Uncorrected N-Value	Moisture Content (%)
		Asphalt 0.3					
		FILL, **Lean to Fat Clay**, firm, moist, brown, trace gravel (CL-CH)	2.5 ft		3-4-5	9	26.10
	985						
5			5 ft		4-4-4	8	26.60
		5'; firm, some organics					
		7.5	7.5 ft				
		Lean Clay, stiff, moist, light brown, some organics (CL)			3-5-8	13	
	980						
10			10 ft				
		10'; very stiff, dry, trace gravel			8-9-10	19	
	975						
15			15 ft				
		15'; soft			3-2-3	5	29.60
		16.5					
		Boring terminated at 16.5'					

Graphics Legend

- CL-CH
- CL
- Asphalt
- SS - Small Split Spoon

Water Levels

- -
- -

Soil Boring: B2

SOLID GROUND
CONSULTING ENGINEERS

Project: UK Memorial Coliseum Silva Cell
Location: Lexington, KY
Project Number: 25-197

Date Started: 04/08/2025	Date Completed: 04/08/2025	Coordinates: 38.0404, -84.49978
Location Accuracy: -	Client Name: University of Kentucky	Hammer Type: Auto
Method: Auger	Depth: 16.5'	

Rig Type: Mobile B-25
Tooling: 3-1/4" Hollow Stem Auger
Surface Elevation: 988.0'

Depth (ft)	Elevation (ft)	Visual Classification and Remarks	Depth of Sample (ft)	Sample Graphic	Blow Counts	Uncorrected N-Value	Moisture Content (%)
		Asphalt 0.3					
		FILL, **Lean to Fat Clay**, firm, moist, brown, some organics (CL-CH)	2.5 ft		4-3-4	7	25.70
	985						
5			5 ft		4-4-5	9	
			7.5 ft		3-5-6	11	40.20
	980	7.5'; stiff					
10		10.0	10 ft		3-6-10	16	
		Lean Clay, very stiff, light brown, some organics (CL)					
	975						
15			15 ft		6-5-8	13	
		15'; stiff 16.5					
		Boring terminated at 16.5'					

Graphics Legend

- CL-CH
- CL
- Asphalt
- SS - Small Split Spoon

Water Levels

- -
- -

Soil Boring: B3

SOLID GROUND
CONSULTING ENGINEERS

Project: UK Memorial Coliseum Silva Cell
Location: Lexington, KY
Project Number: 25-197

Date Started: 04/08/2025	Date Completed: 04/08/2025	Coordinates: 38.04053, -84.49992
Location Accuracy: -	Client Name: University of Kentucky	Hammer Type: Auto
Method: Auger	Depth: 16.5'	

Rig Type: Mobile B-25
Tooling: 3-1/4" Hollow Stem Auger
Surface Elevation: 985.0'

Depth (ft)	Elevation (ft)	Visual Classification and Remarks	Depth of Sample (ft)	Sample Graphic	Blow Counts	Uncorrected N-Value	Moisture Content (%)
		Asphalt 0.3					
		FILL, **Lean Clay**, stiff, dry to moist, reddish brown, some organics (CL)	2.5 ft		4-5-6	11	26.30
5	980		5 ft		5-6-7	13	
		7.5	7.5 ft		3-4-8	12	
		Lean Clay, very stiff, dry to moist, light brown, some organics (CL)					
10	975	10'; moist, very stiff	10 ft		5-5-13	18	36.40
15	970	15'; hard	15 ft		50/0.4'		
		16.5					
		Boring terminated at 16.5'					

Graphics Legend

- CL
- Asphalt
- SS - Small Split Spoon

Water Levels

- -
- -

Monitoring Well: I-1

SOLID GROUND
CONSULTING ENGINEERS

Project: UK Memorial Coliseum Silva Cell
Location: Lexington, KY
Project Number: 25-197

Date Started: 04/08/2025	Date Completed: 04/08/2025	Coordinates: 38.04016, -84.49952
Location Accuracy: -	Client Name: University of Kentucky	Hammer Type: Auto
Method: Auger	Depth: 5'	

Rig Type: Mobile B-25
Tooling: 3-1/4" Hollow Stem Auger
Surface Elevation: 989.0'

Depth (ft)	Elevation (ft)	Graphic Log	Visual Classification and Remarks
	985		**Asphalt** 0.3
5			5.0

Boring terminated at 5'

Graphics Legend

Asphalt

Water Levels

- -
- -

Monitoring Well: I-2

SOLID GROUND
CONSULTING ENGINEERS

Project: UK Memorial Coliseum Silva Cell
Location: Lexington, KY
Project Number: 25-197

Date Started: 04/08/2025	Date Completed: 04/08/2025	Coordinates: 38.04041, -84.4998
Location Accuracy: Estimated from Google Maps	Client Name: University of Kentucky	Hammer Type: Auto
Method: Auger	Depth: 5'	

Depth (ft)	Elevation (ft)	Graphic Log	Rig Type: Mobile B-25 Tooling: 3-1/4" Hollow Stem Auger Surface Elevation: 988.0' Visual Classification and Remarks
	985		**Asphalt** 0.3
5			5.0

Boring terminated at 5'

Graphics Legend

Asphalt

Water Levels

- -
- -

Monitoring Well: I-3

SOLID GROUND
CONSULTING ENGINEERS

Project: UK Memorial Coliseum Silva Cell
Location: Lexington, KY
Project Number: 25-197

Date Started: 04/08/2025	Date Completed: 04/08/2025	Coordinates: 38.04052, -84.4999
Location Accuracy: Estimated from Google Maps	Client Name: University of Kentucky	Hammer Type: Auto
Method: Auger	Depth: 6.5'	

Depth (ft)	Elevation (ft)	Graphic Log	Rig Type: Mobile B-25 Tooling: 3-1/4" Hollow Stem Auger Surface Elevation: 985.0' Visual Classification and Remarks	Samples: Depth of Sample (ft)	Samples: Sample Graphic	Samples: Blow Counts	Samples: Uncorrected N-Value	Lab: Moisture Content (%)
			Asphalt 0.3					
			Lean Clay, firm, moist, reddish brown, some organics (CL)	2.5 ft				
						3-4-5	9	27.40
5	980			5 ft				
			5'; stiff 6.5			5-5-6	11	
			Boring terminated at 6.5'					

Graphics Legend

- Asphalt
- CL
- SS - Small Split Spoon

Water Levels

- -
- -

Natural Moisture Content Determination (ASTM D2216)

Project Name: UK Memorial Coliseum Silva Cells Date: 4/10/2025

Project Number: 25-197 Page: 1 of 1

Boring Number	Sample Depth	Can ID Number	Can Weight	Wet Weight + Can	Dry Weight + Can	Moisture %
B1	2.5	13	13.9	71.1	59.2	26.3
		15	13.9	70.0	58.4	25.9
B1	5	22	13.5	71.9	59.8	26.1
		27	13.8	70.2	58.2	27.0
B1	15	38	13.5	70.3	57.3	29.7
		49	13.4	71.0	57.9	29.4
B2	2.5	108	13.5	70.6	58.9	25.8
		114	13.8	70.5	58.9	25.7
B2	7.5	128	13.9	70.5	54.2	40.4
		31	13.6	70.4	54.2	39.9
B3	2.5	147	13.7	69.9	58.4	25.7
		188	13.6	70.3	58.3	26.8
B3	10	233	13.8	70.7	55.6	36.1
		33	13.4	70.9	55.5	36.6
B4	2.5	17	13.5	69.2	57.1	27.8
		6	13.6	71.4	59.1	27.0

SOLID GROUND
CONSULTING ENGINEERS

Infiltration Testing Log

Project Name: UK Memorial Coliseum
Project Number: 25-197
Date Tested: 4/8/2025
Solid Ground Rep: Emily Kerns, Staff Engineer

Infiltration Test Results - Cased Borehole

Test Hole Number	Surface Elevation (ft)	Infiltration Depth (ft)	*Drop in Water during Presoak (in)		**Drop in Water within the Casing at Time (in)										Infiltration Rate (Kv) (inches per hour)
			30 min	60 min	30 min	60 min	90 min	120 min							
I-1	989.00	5.00	0.50	0.25	0.00	0.00	0.00	0.00							0.00
I-2	988.00	5.00	0.25	0.25	0.00	0.00	0.00	0.00							0.00
I-3	985.00	5.00	0.50	0.25	0.00	0.00	0.00	0.00							0.00

*If infiltration rates are less than 2.0 inches per hour during presoak, take measurements in 30 minute increments, otherwise take measurements in 10 minute increments. Casing is refilled after each reading.

**A minimum of 4 readings should be taken and readings should continue until a stabilized rate of drop is obtained. A 1/4 inch or less of drop between the highest and lowest readings of four consecutive readings is considered stabilized.

Indicates the final reading that was utilized to determine the infiltration rate