

Geotechnical Exploration Report

OLDHAM VILLAGE

Lee's Summit, Missouri
CFS Project No. 24-5632

Prepared For

Oldham Investors, LLC
PO Box 24302
Overland Park, Kansas 66283

November 19, 2024



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One Vision. One Team. One Call.



Oldham Investors, LLC
PO Box 66283
Overland Park, Kansas

November 19, 2024

Re: OLDHAM VILLAGE | Lee's Summit, Missouri
CFS Project No: 24-5632

Mr. Olson,

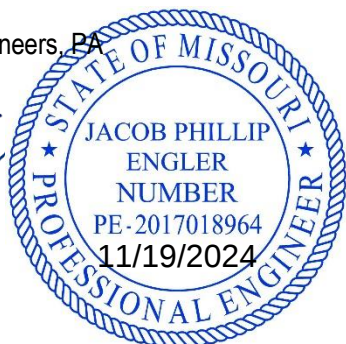
A subsurface exploration and an evaluation were performed at the planned Oldham Village project site located in Lee's Summit, Missouri to provide geotechnical engineering related recommendations for design and construction of the proposed project. The focus of this report is general site development recommendations. CFS recommends supplementary explorations be performed within the footprint of each structure, as necessary, to provide individualized foundations recommendations once structure type, elevation, and loading information is available.

Exploratory soil borings have been drilled and a laboratory testing program was conducted on selected soil samples. The data has been analyzed based upon the project information provided by Oldham Investors, LLC. The results of the exploration and analysis indicate that, in general, conventional spread and continuous wall footings will be suitable for support of single-story, lightly loaded structures. However, undocumented fill comprising clay soil with gravel and roots was encountered throughout the site. Undocumented fill is inconsistent and unpredictable in nature, and it should not be used in support of any foundation systems. Undocumented fill is permitted beneath non load bearing floor slabs and pavements given it is thoroughly evaluated by CFS during construction by means of a proof roll. Upon completion of grading and prior to construction of any buildings, CFS recommends supplementary evaluations be performed within the structure footprints to further evaluate the condition and suitability of the undocumented fill. Larger and heavier structures such as the apartment building will likely require rammed aggregate piers be utilized to strengthen and stabilize the subsurface materials prior to loading, or remediation of undocumented fill prior to construction. This should be evaluated once final structure type, location, elevation, and loading information is available.

We truly appreciate the opportunity to work on this project and are eager to continue providing geotechnical engineering services, as well as construction materials testing and inspections services as the project progresses. Please let us know if there are any questions or concerns.

Respectfully Submitted,
Cook, Flatt & Strobel Engineers, PA


Jacob Engler, PE
Geotechnical Engineer




Adam McEachron, PE
Senior Geotechnical Engineer

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Project Number: 24-5632

November 19, 2024

1 INTRODUCTION

1.1 PURPOSE

The purpose of this geotechnical exploration was to evaluate the underlying materials at the Oldham Village project site, and based upon this information, provide geotechnical engineering related recommendations for design and construction of the planned project. This exploration was performed in accordance with Cook Flatt & Strobel Engineers' P.A. (CFS) proposal number 24-182, dated October 9, 2024, and authorized by Oldham Investors, LLC. The focus of this report is general site development recommendations. CFS recommends supplementary explorations be performed within the footprint of each structure, as necessary, to provide individualized foundations recommendations once structure type, elevation, and loading information is available.

This report includes geotechnical recommendations and considerations pertaining to site development, general foundation support, and concrete slab on grade and pavement construction. Also included in this report are earthwork, construction and drainage considerations associated with the proposed project.

1.2 SCOPE OF SERVICES

This exploration and analysis included an engineering reconnaissance of the planned site, a subsurface exploration as outlined below, a field and laboratory testing program, and an engineering analysis and evaluation of the subsurface materials.

The scope of services did not include any environmental assessment for wetlands or hazardous materials in the soil, surface water, groundwater, air, or surrounding area. Any statement in this report or on the boring logs regarding odors, colors or unusual or suspicious items is strictly for the information of the client.

1.3 GENERAL

The general subsurface conditions used in this analysis are based upon an interpolation of the subsurface data between the borings; varying conditions may be encountered between boring locations. If deviations from the noted subsurface conditions are encountered during construction, they should be brought to the attention of the Geotechnical Engineer.

The recommendations submitted for the proposed structure are based on the available soil information and the preliminary design details. Any revision in the plans for the proposed structure from those described in this report should be brought to the attention of the Geotechnical Engineer to determine if changes in the foundation recommendations are required.

The Geotechnical Engineer warrants that the findings, recommendations, specifications, and professional advice contained, herein, have been presented after being prepared in accordance with generally accepted professional engineering practice in the fields of foundation engineering, soil mechanics and engineering geology. No other warranties are implied or expressed.

After the plans and specifications are complete, it is recommended that the Geotechnical Engineer be provided the opportunity to review the final design and specifications to verify that the earthwork and foundation recommendations are properly interpreted and implemented. Additionally, CFS should be allowed to perform construction inspections on any foundation elements of the project to validate these recommendations.

2 PROJECT DESCRIPTION

It is understood that the planned project comprises a new residential and commercial development in Lee's Summit, Missouri. The overall development will include convenience stores, restaurants, a fitness center, and an apartment building. CFS was provided with the August 7, 2024, revision of the civil engineering plans created by Engineering & Solutions. The focus of this report is general site development recommendations. CFS recommends supplementary explorations be performed within the footprint of each structure, as necessary, to provide individualized foundations recommendations once structure type, elevation, and loading information is available. Please refer to the following table for assumed design parameters associated with the planned project.

ITEM	PARAMETER	
BUILDING TYPE	VARIES	
FINISH FLOOR ELEVATIONS (feet above sea level)	VARIES	
CUT & FILL QUANTITIES	-10 to +20 feet	
LOADING	Column	Continuous Wall
	50 to 300 kips	3-5 kips per linear foot
PAVEMENT	Sidewalks & Pedestrian use	

Table 1: Assumed Design Parameters

If any changes to the project occur, please notify CFS to allow for a review of these changes and, if necessary, amend this report.

2.1 SITE LOCATION & SURFACE CONDITIONS

The project site is in the southwest quadrant of the intersection of Missouri Highway 291 and Missouri Highway 50 in Lee's Summit, Missouri. The site is bound by Oldham Parkway to the north, which turns into Southwest Jefferson Street along the east border, Southwest Persels Road to the south, and a residential neighborhood to the west. The site is currently a ford car storage lot with smaller commercial development lots along the east side. In general, the site slopes downward from north to south and east to west. However, the southeast corner of the lot slopes downward from south to north.

2.2 SITE GEOLOGY

Soils in the greater Kansas City area are generally residual soils, alluvial deposits, or tills. Residual soils formed as a result of weathering of bedrock, or by weathering of sediments that were transported by water, ice, wind, or a

combination of these. Regional soils derived from shale, limestone, and loess have high shrink-swell potentials. Major alluvial deposits occur along the Missouri and Kansas rivers and their tributaries. These consist of clay, sand, and gravel sized sediments. Northern parts of the city were glaciated during the early Pleistocene time resulting in till deposits. Surface bedrock in northeastern Kansas and northwestern Missouri generally consists of limestone and shale (with sandstone found in prehistoric channels) arranged in nearly horizontal beds or layers that can be followed continuously over long distances. These bedrocks are part of the Pennsylvanian bedrock system.

3 SUBSURFACE EXPLORATION

Based on the project information as outlined above, CFS Engineers conducted a field exploration to determine the underlying materials at the proposed project site and to establish their engineering characteristics.

3.1 SCOPE OF WORK

This geotechnical exploration consisted of drilling 47 borings throughout the project site. The structure and pavement borings had planned depths of 20 and ten (10) feet beneath existing site grade, respectively. The borings were drilled to their planned depth or auger refusal, whichever occurred first. The boring locations can be seen on the Boring Location Plan which is included in [Appendix A](#).

The boring locations were determined in the field using measurements from existing landmarks and should be considered accurate only to the degree implied. The locations were established by Cook, Flatt & Strobel Engineers.

The elevation of the ground surface shown on each test boring log was taken from Google Earth and should be considered accurate only to the extent implied.

Boring logs representing the materials encountered in the borings are included in [Appendix B](#). The boring logs represent CFS Engineers' interpretation of the field logs combined with laboratory observations and testing of the samples. The stratification boundaries indicated on the boring logs were based on field observations, an extrapolation of information obtained by examining samples from the borings, and comparisons of soils and/or bedrock types with similar engineering characteristic. As such, the boundaries between subsurface strata should be expected to vary from the logs to some extent.

The depth to groundwater, if encountered, was recorded in each test boring during drilling and can be seen in [Section 3.5, Groundwater Conditions](#). After completion of drilling, sampling, and field testing, the excavations were backfilled with auger cuttings.

3.2 DRILLING AND SAMPLING PROCEDURES

The auger borings were drilled using both a truck mounted SIMCO 2400 drill rig equipped with a rotary head and a truck mounted Dietrich D50 drill rig with a rotary head. 3.25-inch solid-stem augers were used to drill the holes. During drilling, field logs were created and maintained by CFS personnel to catalog the materials encountered.

Representative samples were obtained during drilling using split-barrel sampling procedures in general accordance with the procedures for "Standard Test Methods for Standard Penetration Test (SPT) and Split-Barrel Sampling of Soils" (ASTM D 1586).

Upon completion of drilling, the samples were then sealed and returned to CFS's laboratory for further examination, classification, and testing. The samples recovered were identified, classified, and evaluated by a Geotechnical Engineer.

3.3 FIELD TESTS AND MEASUREMENTS

During the soil boring procedure, Standard Penetration Tests (SPT) were performed at pre-determined intervals to obtain the standard penetration value of the soil as outlined in the ASTM D1586 test method. The standard penetration value (N) is defined as the number of blows of a 140-pound hammer falling 30 inches, required to advance the split-barrel sampler one foot into the soil. The sampler is lowered to the bottom of the previously cleaned drill hole and advanced by blows from the hammer.

The number of blows is recorded for each of three successive increments of six inches penetration. The "N" value is then obtained by adding the second and third incremental numbers. The results of the standard penetration test are shown on the Boring Logs and indicate the relative density of cohesionless soils and comparative consistency of cohesive soils, and thereby provide a basis for estimating the relative strength and compressibility of the soil profile components.

The Standard Penetration Test (SPT) was also used to evaluate the consistency of the in-situ materials. The N-values for the site's materials were found to range from two 20 to 50+ blows/foot.

3.4 SUBSURFACE CONDITIONS

The materials encountered in the test borings have been visually classified according to the Unified Soil Classification System (USCS). Specific subsurface conditions encountered—including field tests, lab tests, and water level observations—at the boring locations are also presented on the individual boring logs found in [Appendix B](#) of this report.

3.5 GROUNDWATER CONDITIONS

Groundwater was encountered in some of the borings during drilling. It is likely this water is perched atop restrictive bedrock layers such as those encountered. Water infiltration may occur in excavations that penetrate the underlying shale materials. CFS recommends test pits or wells be installed at the start of construction throughout the site to better establish the groundwater table. Typical sump pumps and construction techniques should be able to dewater the excavations.

Please note, the reported groundwater levels reflect the conditions observed at the time the borings were drilled. Groundwater levels should be expected to fluctuate with changes in grading, precipitation changes, and seasonal changes. The water levels included in this report do not indicate a permanent groundwater condition. Additionally, the materials encountered during this exploration are, generally, low permeable soils.

4 LABORATORY TESTING

Upon completion of drilling, the samples were returned to CFS's laboratory located in Kansas City, Kansas for laboratory testing. A supplemental laboratory testing program was conducted to evaluate additional engineering characteristics of the in-situ soils necessary in analyzing the behavior of the support systems for the proposed building.

The laboratory testing program included the following tests:

- Supplementary visual classification (ASTM D2488) of all samples,
- Water content (ASTM D2216) of all samples, and
- Atterberg limit tests (ASTM D4318) on a selected sample.

The results of the laboratory testing program can be seen in on the boring logs in [Appendix B](#). The Atterberg limits can be seen in the following table.

BORING ID	SAMPLE #	MOISTURE CONTENT (%)	ATTERBERG LIMITS			USCS CLASSIFICATION
			LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	
B8	SPT-1	23	49	15	34	FAT CLAY (CH)
B17	SPT-1	23	40	16	24	LEAN CLAY (CL)
CB2	SPT-1	24	47	16	31	LEAN CLAY (CL)
CB6	SPT-1	27	41	16	25	LEAN CLAY (CL)
E11	SPT-1	20	42	16	26	LEAN CLAY (CL)
G2	SPT-1	31	52	15	37	FAT CLAY (CH)

Table 2: Atterberg Limits Results

The overburden materials encountered are not suitable for direct support of concrete floor slabs. To limit the risk of differential slab movements, all concrete slabs on grade should be constructed in accordance with [Section 7.3, "Slab on Grade Recommendations"](#) of this report.

5 GEOTECHNICAL CONCERNS

The following geotechnical concerns are based upon the subsurface materials encountered during this exploration and CFS's understanding of the project as described in [Section 2, "Project Description"](#) of this report. If any changes to the planned structure's location, loading or elevations occur, CFS must be allowed to review these changes, and if necessary, issue amendments to this report and its recommendations.

1. *Foundation Concerns:* The results of the exploration and analysis indicate that, in general, conventional spread and continuous wall footings will be suitable for support of single-story, lightly loaded structures. However, undocumented fill comprising clay soil with gravel and roots was encountered throughout the site. Undocumented fill is any foreign material that was placed or dumped in an uncontrolled manner (i.e., no records of testing exist from the time of placement). Undocumented fill is inconsistent and unpredictable in nature, and it should not be used in support of any foundation systems. Undocumented fill is permitted beneath non load bearing floor slabs and pavements given it is thoroughly evaluated by CFS during construction by means of a proof roll. Upon completion of grading and prior to construction of any buildings, CFS recommends supplementary evaluations be performed within the structure footprints to further evaluate the condition and suitability of the undocumented fill. Larger and heavier structures such as the apartment building will likely require rammed aggregate piers be utilized to strengthen and stabilize the subsurface materials prior to loading, or remediation of undocumented fill prior to construction. This should be evaluated once structure type, elevation, and loading information is available.
2. *Proposed Grading:* The boring logs should be referenced during design to establish a balanced cut and fill site which is most economical. Topsoil or waste materials should not be placed within areas where future structures are scheduled, as they are not suitable for support of buildings. Shallow shale bedrock was encountered along the northeast side of the site which may require breakers to remove. Hydraulic breakers typically slow construction and increase the cost. Fat clay soils and shale bedrock should not be utilized as fill within two feet of finish floor slabs or foundation walls. The shale had interbedded sandstone seams. When utilized as fill, shale should be pulverized to less than 1-inch particle size and adhere to the fat clay soil moisture specification during placement. All site development and fill placement should adhere to [Section 6, "Earthwork and Site Development"](#) below.

3. *Significant Fill Amounts:* CFS understands fill amounts on the order of 20 feet are scheduled along the south side of the far west border of the development which is where the fitness tenant is planned. The fill tapers off to the north and east. The imposed load attributed to this amount of fill can result in long- and short-term settlement in excess of tolerable limits. CFS recommends settlement monitoring plates be installed during grading to ensure consolidation has completed prior to the construction of any buildings. CFS anticipates consolidation to occur within four (4) to six (6) months of completion of grading. See [Section 6.2, "Settlement Monitoring Program"](#) below for settlement monitoring recommendations and methods of reducing consolidation periods.
4. *Groundwater:* Groundwater was encountered in some of the borings during drilling. It is likely this water is perched atop restrictive bedrock layers such as those encountered. Water infiltration may occur in excavations that penetrate the underlying shale or limestone bedrock. CFS recommends test pits or wells be installed at the start of construction throughout the site to better establish the groundwater table. Typical sump pumps and construction techniques should be able to dewater the excavations. Exposed subgrades should be sloped to facilitate water runoff. Additionally, it is likely that perched water pockets will be encountered beneath the existing pavements.
5. *West Retaining Wall:* CFS understands the west retaining wall is bordered by residential homes and has a maximum height on the order of 25 feet. Due to limited access in these areas, shoring may be necessary during construction. Shoring should be designed by a licensed installer. Additionally, this wall, and any others on site, should be evaluated for global stability by the wall designer. Please note, the soils in this area should be proportioned for 2,000 pounds per square foot if settlement is to be limited to 1-inch or less.
6. *Expansive Clay Soils:* Expansive clay soils were encountered during this exploration. The on-site materials are NOT suitable for direct support of concrete slabs and/or concrete wall backfill. It is recommended that all walls be backfilled with open graded stone (such as No. 57 as referenced in ASTM C33) extending two (2) feet behind the wall for the entire height of the wall to within 12-inches of the surface to allow for proper drainage and relief of any hydrostatic pressure build-ups that may occur in the native fat clay. All slabs on grade should be supported by a minimum 24-in-thick mat of low volume change material (LVC) constructed in accordance with Section 7.3, "Slab on Grade Recommendations" of this report.

6 EARTHWORK & SITE DEVELOPMENT

6.1 SITE PREPARATION

Prior to filling, the grass and topsoil should be stripped from all structural areas and be stockpiled for later use in landscape areas, or it should be wasted. Any trees and shrubs should be removed including the entirety of the root ball and root systems. The upper 12-inches of the subgrade should be moisture conditioned and recompacted, as necessary, to provide a stable subgrade upon which to begin placement of engineered fill.

Upon completion of stripping and prior to filling, the newly exposed subgrade should be evaluated by a qualified professional for stability by means of proof rolling. The proof roll should be conducted using a fully loaded, tandem axle dump truck weighing more than 25 tons. Any soft or unsuitable areas identified during the proof roll should be corrected by means of additional moisture conditioning and recompacting, or removal and replacement with acceptable material.

6.2 SETTLEMENT MONITORING PROGRAM (FITNESS TENANT BUILDING)

CFS understands fill amounts on the order of 20 feet are scheduled along the south side of the far west border of the development which is where the fitness tenant is planned. The fill tapers off to the north and east. The imposed load attributed to this amount of fill can result in long- and short-term settlements in excess of tolerable limits. Wherever fill exceeds eight (8) feet in depth, CFS recommends settlement monitoring plates be installed during grading to ensure consolidation of the existing materials and the new fill has completed prior to the construction of any structures. CFS anticipates consolidation to occur within four (4) to six (6) months of completion of grading.

Prior to placement of fill on the building pad, four (4) settlement plates should be installed uniformly across the pad at existing grade as directed by the Geotechnical Engineer. Rigid steel settlement plates should be a minimum of two (2) feet by two (2) feet. Steel rod(s) should be located in the center of the plate that extends above the proposed fill. The rod should be encapsulated by a 2-inch diameter PVC pipe to permit free movement of the plate and rod. The rods should be painted for visibility and protected from construction traffic. Settlement/movement of the plates should be performed initially prior to fill placement and twice per week by the project registered surveyor. Settlement plate elevations should be surveyed and evaluated until consolidation has completed.

Consolidation times can be reduced with the usage of a 12-inch-thick drainage blanket comprising sand or clean gravel located at the interface of the new fill and the existing overburden materials. A 5-foot-thick surcharge load comprising clay soil or site spoils with a minimum wet density of 120 lbs/ft³ can also be utilized to reduce consolidation times. If utilized, the surcharge load should extend a minimum of five (5) feet laterally beyond the building footprint. Alternatively, if time restrictions prohibit settlement monitoring, rammed aggregate piers (RAPs) can be utilized to stabilize the materials and support the planned structure.

6.3 FILL MATERIALS

All general and structural fill should be free of debris and defined by ASTM 2487 as CH, CL, ML, GW, GP, SM, SW, SC, and SP. The onsite soils tend to meet this requirement; however, please note that CH (fat clay) classification materials should NOT be used as structural fill within two (2) feet of the finished grade supporting the building slab and within ten (10) feet laterally outside of the building footprint. Fat clays (CH) with Liquid Limits of greater than 55 should not be used in the upper one (1) foot beneath the pavement without being treated with cement as outlined later in this report.

The on-site topsoil contains organic material and is unsuitable for use as structural fill. Unsuitable materials are those defined by ASTM 2487 as MH, OL, OH, and PT.

6.4 ENGINEERED FILL PLACEMENT

For the purpose of this report, engineered fill means fill placed in controlled layers and compacted and tested according to accepted geotechnical engineering practices to ensure that it meets the required specifications. Structural fill refers to any engineered fill placed within the footprint of the planned structures or pavements. Engineered fill materials should be free of organic matter. During placement, engineered fill materials should be within the specified moisture contents and compacted to the specified densities given below in Tables two (2) and three (3). Maximum dry density and optimum moisture content should be determined by the Standard Proctor test (ASTM D 698).

Fill should be placed in six (6) inch lifts (compacted thickness) in mass fill areas, and as needed to obtain the proper compaction in utility trenches and behind walls. Structural fill should extend a minimum of two (2) feet beyond any structure lines. Additionally, where slopes exist, engineered fill must be properly benched into the existing materials.

ENGINEERED FILL MATERIAL	MAXIMUM BELOW OPTIMUM	MAXIMUM ABOVE OPTIMUM
Lean Clay (CL)	-2%	+3%
Fat Clay (CH)	0%	+4%
Compacted Base Rock (i.e., MODOT Type 5, AB3 or equivalent)	NA	NA

Table 3: Recommended Moisture Ranges

LOCATION OR AREA	REQUIRED COMPACTION (%) (ASTM D 698, DRY DENSITY)	TESTING FREQUENCY 3 PER LIFT PER ...
Building Walkways	95%	20,000 sf
Retaining Walls	95%	1,000 sf
Trenches	95%	150 lf
Lawn or Unimproved Areas	92%	20,000 sf
Structural Fill (i.e., building and pavement subgrades)	95%	10,000 sf
Out-Parcels	95%	20,000 sf

Table 4: Compaction Requirements & Testing Frequency

A representative of the Geotechnical Engineer should monitor filling operations on a full-time basis. Enough density tests should be taken to verify that the specified compaction is obtained. See the table above for required testing frequency.

6.5 EXCAVATIONS & TRENCHES

All temporary slopes and excavations should conform to Occupational Safety and Health Administration (OSHA) Standards for the Construction Industry (29 CFR Part 1926, Subpart P). Excavations at this site are *expected* to be made in "Type C" clayey soil. Soil types should be verified in the field by a competent individual.

All excavations should be kept dry during subgrade preparation. Storm water runoff should be controlled and removed to prevent severe erosion of the subgrade and eliminate free standing water. Subgrade that has been rendered unsuitable from erosion or excessive wetting should be removed and replaced with controlled fill. Excavations through the hard shale bedrocks will likely be necessary. The Boring Logs ([Appendix B](#)) and the Boring Location Plan (Figure 2, [Appendix A](#)) should be consulted in estimating the amount of rock to be excavated.

Trenches should be excavated so that pipes and culverts can be laid straight at uniform grade between the terminal elevations. Trench width should provide adequate working space and sidewall clearances. Trench subgrade should be removed and replaced with controlled fill if found to be wet, soft, loose, or frozen. Trench sub-grades should be compacted above 95% of the maximum dry density in accordance with ASTM D 698 at moisture contents between -3% to +3% of the optimum moisture content.

Granular bedding materials for pipes, such as well-graded sand or gravel, may be used provided that the bottom of the trench is graded so that water flows away from the structure.

Bedding material should be graded to provide continuous support beneath all points of the pipe and joints. Embedment material should be deposited and compacted uniformly and simultaneously on each side of the pipe to prevent lateral displacement. Compacted control fill material will be required for the full depth of the trench above the embedment material except in area landscape area with the compaction may be reduced to 90% Standard Proctor ASTM D 698. No backfill should be deposited or compacted in standing water.

Precautions should be taken by the contractor to avoid undermining the newly constructed foundations/ RAP. Shoring and excavations supports may need to be designed to account for the existing building loads.

Permanent slopes greater than 3 horizontals to 1 vertical should not be used unless additional testing and slope analysis is performed.

6.6 DRAINAGE AND DEWATERING

Normal seasonal weather conditions should be anticipated and planned for during earthwork. It is recommended that the Contractor determine the actual groundwater levels at the site at the time of the construction activities to assess the impact groundwater may have on construction. Water should not be allowed to collect in the foundation excavations, on floor slab areas, or on prepared subgrades of the construction area either during or after construction. Undercut or excavated areas should be sloped toward one corner to facilitate removal of collected rainwater, groundwater, or surface runoff. Positive site drainage should be provided to reduce infiltration of surface water around the perimeter of the building and beneath the floor slabs. The grades should be sloped away from the building and surface drainage should be collected and discharged such that water is not permitted to infiltrate the backfill and floor slab areas of the building.

The site should be graded such that positive drainage (normally 2% minimum) is provided away from any structures. Where sidewalks or paving do not immediately adjoin the building, protective slopes of at least 5% for a minimum of 10 feet from the perimeter walls are recommended. Roof drains and downpours should also be directed away from the building. Open-graded stone is not recommended for use under sidewalks unless the stone is adequately drained to prevent collection of water under the walks.

The site should also be graded to avoid water flows, concentrations, or pools behind retaining walls, curbs, or similar structures. When swales are designed at the top of the walls, proper line and slope should be considered to avoid any flow down behind walls. Special attention is needed for sources of storm water from slopes, building roofs, gutter downspouts and paved areas draining to one point.

Perforated plastic pipes should be placed on the backfilled side of the walls near the bottom and day lighted. Six inches of open graded crushed rock wrapped with geo-textile fabric should be placed behind the walls up to a depth of two feet below the finished grade. As an alternative to the open graded crushed rock, a manufactured geo-composite sheet drain such as Mirafi G100N, Contech C-Drain, or equivalent, may be used in conjunction with the perforated pipe.

6.7 LANDSCAPING

Landscaping and irrigation should be limited adjacent to buildings and pavements to reduce the potential for large moisture changes. Trees and large bushes can develop intricate root systems that can draw moisture from the subgrade, resulting in shrinkage of the bearing material during dry periods of the year. Desiccation of bearing material below foundations may result in foundation settlement.

Landscaped areas near pavements and sidewalks should include a drainage system that prevents over saturation of the subgrade beneath asphalt and concrete surfaces. Drainage systems in irrigation areas should be incorporated into the storm drain system.

7 GEOTECHNICAL ENGINEERING RECOMMENDATIONS

7.1 FOUNDATIONS RECOMMENDATIONS – SINGLE STORY, LIGHTLY LOADED

The results of the exploration and analysis indicate that, in general, conventional spread and continuous wall footings will be suitable for support of single-story, lightly loaded structures. However, undocumented fill comprising clay soil with gravel and roots was encountered throughout the site. Undocumented fill is inconsistent and unpredictable in nature, and it should not be used in support of any foundation systems. Undocumented fill is permitted beneath non load bearing floor slabs and pavements given it is thoroughly evaluated by CFS during construction by means of a proof roll. Upon completion of grading and prior to construction of any buildings, CFS recommends supplementary evaluations be performed within the structure footprints to further evaluate the condition and suitability of the undocumented fill. Larger and heavier structures such as the apartment building will likely require rammed aggregate piers be utilized to strengthen and stabilize the subsurface materials prior to loading, or remediation of undocumented fill prior to construction. This should be evaluated once final structure type, location, elevation, and loading information is available. Please refer to the table below for general design parameters associated with shallow foundations.

DESIGN PARAMETER	RECOMMENDED VALUE	COMMENTS
Allowable Bearing Capacity ⁽¹⁾ (shallow foundations)	2,000 psf	Evaluated based on field and laboratory testing results ⁽¹⁾ .
Recommended Bearing Material ⁽²⁾	CLAY SOIL	Suitable bearing material required beneath entirety of foundation system ⁽²⁾ . CFS anticipates over excavations of up to three (3) feet may be necessary to achieve a suitable bearing condition.
Anticipated Total Settlement	< 1-inch	Maximum
Anticipated Differential Settlement	< ¾ -inch	Maximum per 100 feet of linear footing
Minimum Recommended width	24 and 16 inches	Spread and trench, respectively
Minimum Recommended Depth	36-inches	Based on seasonal freeze-thaw cycles

(1) If over excavation of any footing is required to reach design bearing capacity, backfill of the footing should be done with lean concrete.

(2) A uniform bearing condition should exist beneath the entirety of the foundation system for a given structure. A representative of the Geotechnical Engineer should test the materials in the footing excavations to verify the material and design bearing pressure.

Table 5: Shallow Foundation Design Parameters

If over excavation of footings becomes necessary to achieve the desired bearing pressure or a uniform bearing condition, backfill of the footing should be done with lean concrete. Footings should be suitably reinforced to reduce the effects of differential movement that may occur due to variations in the properties of the supporting soils. Top and bottom reinforcing steel is recommended for continuous wall footings to reduce differential settlement due to possible varying bearing capacities of the existing fill soils.

Every effort should be made to keep the footing excavations dry as the soils will tend to soften when exposed to free water. Footing bottoms should be free of loose soil and concrete should be placed as soon as possible to prevent drying of the foundation soils.

7.2 FOUNDATION RECOMMENDATIONS (APARTMENT BUILDING)

Due to the presence of undocumented fill as discussed above, the planned apartment building may require rammed aggregate piers (RAPs) be utilized to strengthen and stabilize the subsurface materials prior to loading. However, this should be evaluated once final structure type, location, elevation, and loading information is available as it may be more economical to remove and replaced the undocumented fill during grading and eliminate the need for RAPs.

RAPs are used to improve the load carrying capacity of marginal soils by ramming aggregate into the unstable subgrade. Generally, a hole is first drilled into the subgrade and successive layers of aggregate are placed and driven into the unstable soils forming an “aggregate bulb” at the base, and thus providing lateral and vertical strengthening of the existing materials. RAPs are a patented design-build intermediate foundation system. The respective companies should be contacted to design the foundation system.

In conjunction with the recommended ground improvement system, it is recommended that spread and trench footings have a minimum width of 24 and 16-inches, respectively. Footings should be suitably reinforced to reduce the effects of differential movement that may occur due to variations in the properties of the supporting soils. Top and bottom reinforcing steel is recommended for continuous wall footings to reduce differential settlement due to possible varying bearing capacities of the existing fill soils.

Every effort should be made to keep the footing excavations dry as the soils will tend to soften when exposed to free water. Footing bottoms should be free of loose soil and concrete should be placed as soon as possible to prevent drying of the foundation soils.

Based on the seasonal freeze-thaw cycles associated with the project site, shallow foundation systems should bear a minimum of 36-inches beneath the ground surface for adequate frost protection.

7.3 SEISMIC ANALYSIS

The determination of the seismic class is based on ASCE Standard 7: Minimum Design Loads for Building and Other Structures. Based upon this information, the seismic properties of the soil were interpolated from the standard penetration test values. A Seismic Site Class “D” was determined for this site. In addition, there is no significant risk of liquefaction or mass movement of the on-site soils due to a seismic event.

7.4 SLAB ON GRADE RECOMMENDATIONS

In its current state, the overburden materials (i.e., Fat Clay and Undocumented Fill) encountered during this exploration are unsuitable for direct support of the planned slab on grade. CFS recommends all concrete slabs on grade be supported by a minimum of 24-inches of Low Volume Change (LVC) material. LVC material should consist of KDOT AB3, crushed limestone screenings, or equivalent. A low volume change material is defined as a material with a liquid limit less than 45 and a plasticity index less than 25. The subgrade can be constructed as outlined below.

1. Cut the subgrade to a minimum depth of 24-inches beneath the planned bottom of slab elevation. The exposed material at this depth should be moisture conditioned and re-compacted, as necessary, to pass a proof roll as specified in Section 6.1, “Site Preparation” of this report.
2. Twenty (20) inches of compacted LVC material should be placed atop the exposed slab subgrade. The LVC should be placed in lifts no greater than 8-inches-thick (compacted thickness) and compacted to 95% of the maximum dry density as determined by ASTM D698. Limestone based LVC material should be compacted at a moisture content sufficient to achieve the desired compaction.

(*) Please note, in lieu of limestone based LVC, the on-site soils can be stabilized with Portland Cement mixed at a concentration of 5% by dry unit weight to a depth of 20-inches. See [Section 7.5.1](#) for more information on cement stabilization requirements.

3. A 4-inch-thick layer of open graded stone (ASTM C33 or equivalent material) should be placed atop the 20-inches of compacted LVC material to return the subgrade to the original bottom of slab elevation. The open-graded stone will ease construction and provide a capillary break between the LVC and concrete slab.

If any trenching or excavation of the LVC layer occurs after the building pad has been established, all backfill material should comprise engineered fill and the LVC layer should be reestablished. A subgrade reaction modulus value of 150 psi/in can be used for 20-inches of compacted granular fill such as KDOT AB3, MODOT Type 5 or equivalent.

Every floor slab should be evaluated to determine if a vapor retarder under the concrete floor is required. The slab designer should refer to ACI 302 and/or ACI 360 for procedures regarding the use and placement of a vapor retarder.

To reduce the effects of differential movement, slabs-on-grade should not be rigidly connected to columns, walls, or foundations unless it is designed to withstand the additional resultant forces. Floor slabs should not extend beneath exterior doors or over foundation grade beams, unless saw cut at the beam after construction. Expansion joints may be used to allow unrestrained vertical movement of the slabs. The floor slabs should be designed to have an adequate number of joints to reduce cracking resulting from differential movement and shrinkage. CFS suggests joints be provided at a minimum spacing of twelve (12) feet on center. For additional recommendations refer to the ACI Design Manual. The requirements for the slab reinforcement should be established by the designer based on experience and the intended slab use.

7.5 LATERAL EARTH PRESSURES

Lateral earth pressures are determined by multiplying the vertical applied pressure by the appropriate lateral earth pressure coefficient. If the foundation walls are rigidly attached to the building and not free to rotate or deflect at the top, CFS recommends designing the walls for the *at-rest* earth pressure coefficient. Walls that are permitted to rotate and deflect at the top can be designed for the *active* lateral earth pressure condition. Horizontal loads acting on shallow foundations are resisted by friction along the foundation base and by *passive* pressure against the footing face that is perpendicular to the line of applied force.

It is recommended that all walls be backfilled with open graded stone (such as No. 57 as referenced in ASTM C33) extending to two (2) feet behind the wall for the entire height of the wall to within 12-inches of the surface to allow for proper drainage and relief of any hydrostatic pressure build-ups that may occur in the native clay. The use of stone to backfill behind the walls will expedite construction, reduce potential settlement between the wall and the floor slab and lower the pressure induced on the wall from the backfill thus potentially reducing the thickness of the walls. A wrapped drainage pipe should be located at the base of the walls to facilitate removal of water.

MATERIAL	ACTIVE (K _a)	PASSIVE (K _p)	AT-REST (K _o)	ALLOWABLE BASE FRICTION	UNIT WEIGHT (pcf)
Open-graded crushed limestone	0.27	3.69	0.43	0.47	130-140
In-situ lean clay soils	0.40	2.5	0.68	0.32	120-125
In-situ fat clay soils	0.49	2.04	0.66	0.24	120-125
Lean clay – conditioned and compacted	0.32	3.12	0.48	0.35	120-125
Fat clay/Weathered Shale – conditioned and compacted	0.45	2.2	0.63	0.27	120-130
Limestone Bedrock	-	-	-	0.55	140-150

Table 6: Earth Pressure and Friction Coefficients

These earth pressure coefficients do not include the effect of surcharge loads, hydrostatic loading, or a sloping backfill. Nor do they incorporate a factor of safety. Also, these earth pressure coefficients do not account for high lateral pressures that may result from volume changes when expansive clay soils are used as backfill behind walls with unbalanced fill depths. In addition, any disturbed soils that are relied upon to provide some level of passive resistance should be placed in lifts not exceeding six (6) inches in thickness and compacted to a minimum density of 95% of the Standard Proctor (ASTM D698) maximum dry density at a moisture content within $\pm 3\%$ of the optimum moisture content. It is recommended that a representative of CFS should verify the compaction of any such materials relied upon to provide passive pressure.

The actual earth pressure on the walls will vary according to material types and backfill materials used and how the backfill is compacted. If the backfill conditions are different than the ones used above, CFS should be notified so the recommendations can be modified. The buildup of water behind a wall will increase the lateral pressure imposed on below-grade walls. Adequate drainage should be provided behind any below grade walls as described in this report. The walls should also be designed for appropriate surcharge pressures such as adjacent traffic, interior building floor slab loads, and construction equipment.

7.6 PAVEMENT RECOMMENDATIONS – CITY OF LEE'S SUMMIT

CFS Engineers understand this project will be governed by the City of Lee's Summit's standard pavement sections for the planned traffic usage. Lee's Summit's standards will apply to both public and private streets. It is CFS's opinion that the city standard section is suitable for support of the anticipated traffic conditions. Please note, no ESAL values or traffic data was available at the time of this report. CFS anticipates these streets will service primarily passenger car vehicles with the occasional trash truck and delivery truck usage.

8 GENERAL COMMENTS

When the plans and specifications are complete, or if significant changes are made in the character or location of the proposed building, a consultation should be arranged to review the changes with respect to the prevailing soil conditions. At that time, it may be necessary to submit supplementary recommendations.

It is recommended that the services of Cook, Flatt & Strobel Engineers be engaged to test and evaluate the compaction of any additional fill materials and to test and evaluate the bearing value of the soils in the footing excavations.



APPENDIX A

Figures



1100 W. Cambridge Circle Dr, Ste 700
Kansas City, Kansas 66103

Project: **OLDHAM VILLAGE**

Project Location: Lee's Summit, MO

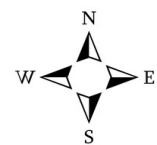
Client: Oldham Investors, LLC

Date: 11/19/2024

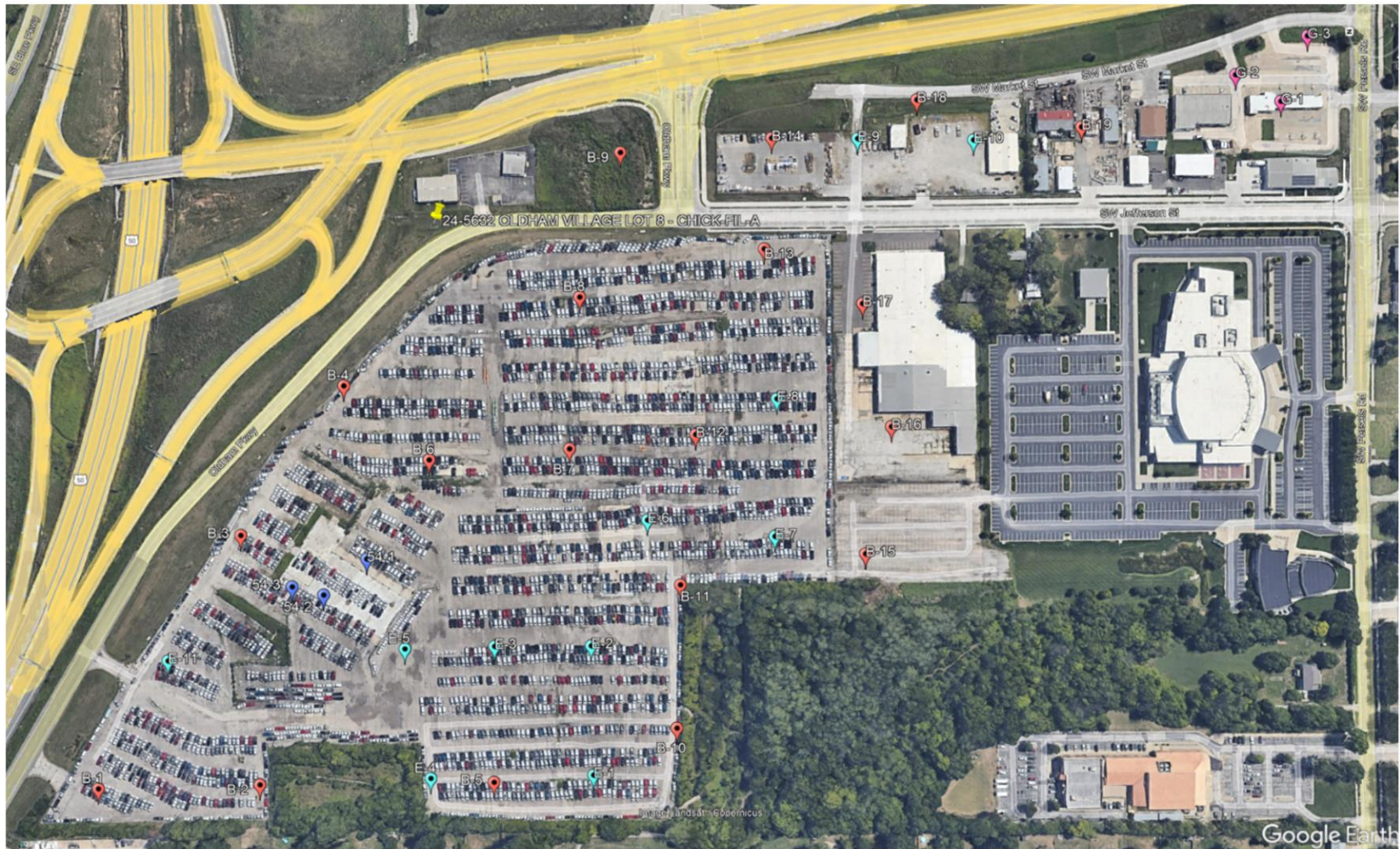
Project #: 24-5632

Comments:

Figure 1: **SITE LOCATION PLAN**



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1100 W. Cambridge Circle Dr, Ste 700
Kansas City, Kansas 66103

Project: **OLDHAM VILLAGE**

Project Location: Lee's Summit, MO

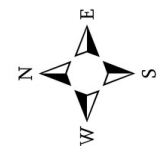
Client: Oldham Investors, LLC

Date: 11/19/2024

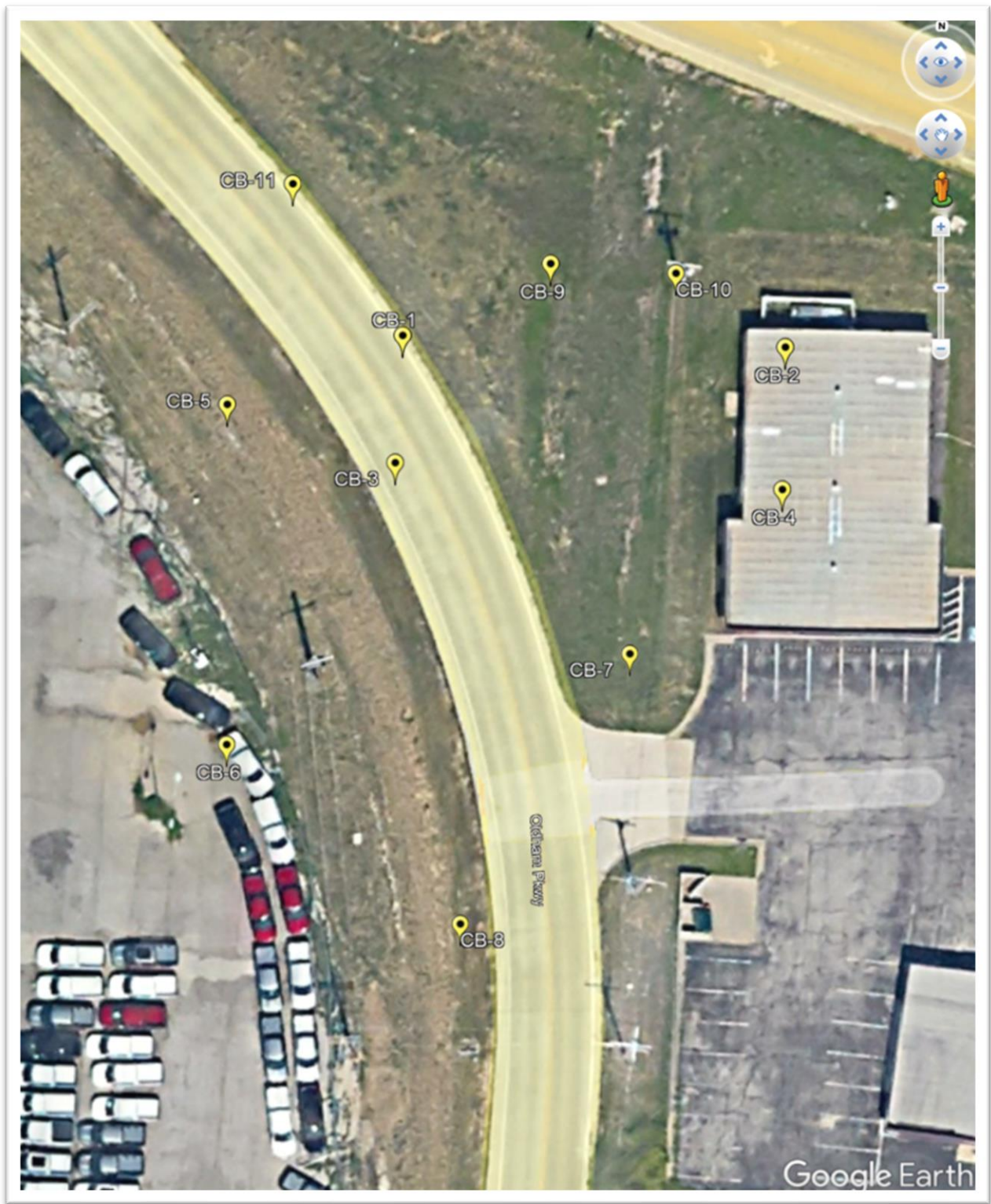
Project #: 24-5632

Comments:

Figure 2: **BORING LOCATION PLAN**
1/2



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1100 W. Cambridge Circle Dr, Ste 700
Kansas City, Kansas 66103

Project:	OLDHAM VILLAGE LOT 8 - CHICK-FIL-A	Figure 2:	BORING LOCATION PLAN 2/2
Project Location:	Lee's Summit, MO	Project #:	24-5632
Client:	Oldham Investors, LLC	Date:	11/19/2024
Comments			



APPENDIX B

Boring Logs



CFS Engineers

CLIENT Oldham Investors, LLCPROJECT NAME OLDHAM VILLAGEPROJECT NUMBER 24-5632PROJECT LOCATION Lee's Summit, MODATE STARTED 11/6/24COMPLETED 11/6/24GROUND ELEVATION 1037 ftHOLE SIZE 4 inchesDRILLING CONTRACTOR CFS Engineers

GROUND WATER LEVELS:

DRILLING METHOD Solid Flight AugersAT TIME OF DRILLING --- No Free Water EncounteredLOGGED BY CMCHECKED BY JEAT END OF DRILLING --- No Free Water Encountered

NOTES

AFTER DRILLING --- No Free Water Encountered

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS			UNCONFINED COMP (psf)
									LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	
0		2-inches of ASPHALT										
		LEAN CLAY, SANDY, (CL) blueish gray brown, moist, and tan with fragments (FILL)	SPT 1	100	5-3-5 (8)	1.75		16				
		FAT CLAY, (CH) gray, moist, mottled brown with gravel (FILL)	SPT 2	100	3-3-5 (8)	3.5		21				
5		(CH) roots and wood at 6'	SPT 3	100	2-4-5 (9)	3.5		25				
		FAT CLAY, (CH) grayish brown and brown, moist, stiff, with iron nodules	SPT 4	100	5-6-9 (15)	3.75		20				
10		SANDSTONE, unweathered, tan, with SHALE seams	SPT 5	100	13-24-39 (63)	2.5		18				
15			SPT 6	100	50/3"	0		15				
Refusal at 18.7 feet. Bottom of borehole at 18.7 feet.												



CFS Engineers

CLIENT Oldham Investors, LLC

PROJECT NAME OLDHAM VILLAGE

PROJECT NUMBER 24-5632

PROJECT LOCATION Lee's Summit, MO

DATE STARTED 11/7/24

COMPLETED 11/7/24

GROUND ELEVATION 1039 ft

HOLE SIZE 4 inches

DRILLING CONTRACTOR CFS Engineers

GROUND WATER LEVELS:

DRILLING METHOD Solid Flight Augers

AT TIME OF DRILLING --- No Free Water Encountered

LOGGED BY CM

CHECKED BY JE

AT END OF DRILLING --- No Free Water Encountered

NOTES

AFTER DRILLING --- No Free Water Encountered

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS			UNCONFINED COMP (psf)
									LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	
0		5-inches of CONCRETE (GP) 6-inches of BASE ROCK										
		FAT CLAY, (CH) brown and gray, moist, with sand and gravel (FILL)	SPT 1	28	2-3-6 (9)	2.25		21				
		(CH) dark brown and tan with SHALE fragments below 3'										
5			SPT 2	83	4-4-6 (10)	2.5		18				
		(CH) with gravel below 6'										
			SPT 3	100	4-4-5 (9)	2.5		25				
		(CH) with fine sand below 9'										
10			SPT 4	94	4-8-9 (17)	4.5+		15				
		(CH) blueish gray and dark brown (POSSIBLE POND OR CREEK BED MATERIAL)										
			SPT 5	94	4-4-6 (10)	2.75		25				
15												
		SANDSTONE, moderately weathered to unweathered, blueish gray, wet	SPT 6	100	4-19-50/3"	1		37				
20												

Bottom of borehole at 20.0 feet.

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CFS Engineers

CLIENT Oldham Investors, LLC

PROJECT NAME OLDHAM VILLAGE

PROJECT NUMBER 24-5632

PROJECT LOCATION Lee's Summit, MO

DATE STARTED 11/5/24

COMPLETED 11/5/24

GROUND ELEVATION 1039 ft

HOLE SIZE 4 inches

DRILLING CONTRACTOR CFS Engineers

GROUND WATER LEVELS:

DRILLING METHOD Solid Flight Augers

AT TIME OF DRILLING --- No Free Water Encountered

LOGGED BY CM

CHECKED BY JE

AT END OF DRILLING --- No Free Water Encountered

NOTES

AFTER DRILLING --- No Free Water Encountered

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS			UNCONFINED COMP (psf)
									LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	
0		3-inches of CONCRETE (GP) 15-inches of BASE ROCK										
		FAT CLAY, (CH) dark brown blueish gray, moist, and brown with gravel (FILL)	SPT 1	67	3-3-3 (6)	3.5		21				
5		(CH) dark brown below 6'	SPT 2	94	3-3-4 (7)	2.75		27				
			SPT 3	89	7-5-6 (11)	3		23				
10		FAT CLAY, (CH) grayish brown and blueish gray, moist, stiff, with trace of fine sand	SPT 4	89	3-5-6 (11)	3.25		23				
15			SPT 5	100	3-4-7 (11)	3.5		26				
20		LEAN CLAY, (CL) dark brown, moist, stiff, with organic odor	SPT 6	100	3-4-6 (10)	2.75		27				

Bottom of borehole at 20.0 feet.

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CFS Engineers

BORING NUMBER B1

PAGE 1 OF 1

CLIENT Oldham Investors, LLC
PROJECT NUMBER 24-5632
DATE STARTED 11/5/24 COMPLETED 11/5/24
DRILLING CONTRACTOR CFS Engineers
DRILLING METHOD Solid Flight Augers
LOGGED BY CM CHECKED BY JE
NOTES _____

PROJECT NAME OLDHAM VILLAGE
PROJECT LOCATION Lee's Summit, MO
GROUND ELEVATION 1027 ft HOLE SIZE 4 inches
GROUND WATER LEVELS:
AT TIME OF DRILLING --- No Free Water Encountered
AT END OF DRILLING --- No Free Water Encountered
AFTER DRILLING --- No Free Water Encountered

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DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS			UNCONFINED COMP (psf)
									LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	
0		5-inches of ASPHALT										
		(GP) 4-inches of BASE ROCK										
		LEAN CLAY, (CL) dark brown, moist, with roots (FILL)	SPT 1	94	3-5-6 (11)	1.25		16				
		LEAN CLAY, SANDY, (CL) brown, moist, very stiff, with iron nodules (HIGHLY WEATHERED SANDSTONE)										
			SPT 2	89	7-9-17 (26)	3.5		16				
5		SANDSTONE, highly weathered, tan, with SHALE seams										
		Unweathered below 6'	SPT 3	100	20-50/5"	3		17				
			SPT 4	100	50/5"	0		18				

Refusal at 8.9 feet.
Bottom of borehole at 8.9 feet.



CFS Engineers

CLIENT Oldham Investors, LLCPROJECT NAME OLDHAM VILLAGEPROJECT NUMBER 24-5632PROJECT LOCATION Lee's Summit, MODATE STARTED 11/5/24 COMPLETED 11/5/24GROUND ELEVATION 1017 ft HOLE SIZE 4 inchesDRILLING CONTRACTOR CFS Engineers

GROUND WATER LEVELS:

DRILLING METHOD Solid Flight AugersAT TIME OF DRILLING --- No Free Water EncounteredLOGGED BY CM CHECKED BY JEAT END OF DRILLING --- No Free Water Encountered

NOTES _____

AFTER DRILLING --- No Free Water Encountered

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DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS			UNCONFINED COMP (psf)
									LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	
0		5-inches of ASPHALT										
		(GP) 4-inches of BASE ROCK										
		FAT CLAY, (CH) dark brown and brown, moist, (FILL)	SPT 1	67	3-3-5 (8)	2.75		23				
		LEAN CLAY, SANDY, (CL) tan, moist, very stiff	SPT 2	89	5-7-10 (17)	2		18				
5		SANDSTONE, tan	SPT 3	86	22-50/1"	0		25				

Refusal at 7.5 feet.
Bottom of borehole at 7.5 feet.



CFS Engineers

CLIENT Oldham Investors, LLCPROJECT NAME OLDHAM VILLAGEPROJECT NUMBER 24-5632PROJECT LOCATION Lee's Summit, MODATE STARTED 11/5/24 COMPLETED 11/5/24GROUND ELEVATION 1039 ft HOLE SIZE 4 inchesDRILLING CONTRACTOR CFS Engineers

GROUND WATER LEVELS:

DRILLING METHOD Solid Flight AugersAT TIME OF DRILLING --- No Free Water EncounteredLOGGED BY CM CHECKED BY JEAT END OF DRILLING --- No Free Water Encountered

NOTES

AFTER DRILLING --- No Free Water Encountered

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS			UNCONFINED COMP (psf)
									LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	
0		(GP) 15-inches of GRAVEL										
		FAT CLAY, (CH) dark blueish gray, moist, with fine sand (FILL)	SPT 1	78	4-4-4 (8)	4.5		24				
5			SPT 2	72	2-3-5 (8)	2.75		28				
			SPT 3	39	0-2-3 (5)	1.25		21				
10		LEAN CLAY, (CL) blueish gray and dark brown, moist to wet, stiff, with organic odor (POSSIBLE CREEK OR POND BOTTOM MATERIAL)	SPT 4	100	3-5-7 (12)	1.5		25				
15			SPT 5	100	2-4-5 (9)	2.5		26				
20		FAT CLAY, (CH) grayish brown, moist, stiff, mottled brown with trace of fine sand	SPT 6	100	3-4-6 (10)	3.75		29				

Bottom of borehole at 20.0 feet.

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CFS Engineers

CLIENT Oldham Investors, LLCPROJECT NAME OLDHAM VILLAGEPROJECT NUMBER 24-5632PROJECT LOCATION Lee's Summit, MODATE STARTED 10/28/24 COMPLETED 10/28/24GROUND ELEVATION 1044 ft HOLE SIZE 4 inchesDRILLING CONTRACTOR CFS Engineers

GROUND WATER LEVELS:

DRILLING METHOD Solid Flight AugersAT TIME OF DRILLING --- No Free Water EncounteredLOGGED BY CM CHECKED BY JEAT END OF DRILLING --- No Free Water Encountered

NOTES _____

AFTER DRILLING --- No Free Water Encountered

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS			UNCONFINED COMP (psf)
									LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	
0												
		3-inches of ASPHALT										
		(GP) 5-inches of BASE ROCK										
		FAT CLAY, (CH) dark brown and blueish gray, moist, with sand and gravel (FILL)	SPT 1	89	6-7-7 (14)	4.25		20				
5			SPT 2	100	3-4-7 (11)	2.5		21				
			SPT 3	72	3-4-5 (9)	3		20				
10		FAT CLAY, (CH) blueish gray, moist to wet, medium stiff	SPT 4	100	3-3-4 (7)	2.75		25				
15		SANDSTONE, highly weathered, brown, with SHALE seams	SPT 5	100	10-9-10 (19)	2		17				
		Unweathered below 15'										
20			SPT 6	100	50/5"	1		14				

Bottom of borehole at 20.0 feet.

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CFS Engineers

CLIENT Oldham Investors, LLCPROJECT NAME OLDHAM VILLAGEPROJECT NUMBER 24-5632PROJECT LOCATION Lee's Summit, MODATE STARTED 10/30/24 COMPLETED 10/30/24GROUND ELEVATION 1021 ft HOLE SIZE 4 inchesDRILLING CONTRACTOR CFS Engineers

GROUND WATER LEVELS:

DRILLING METHOD Solid Flight AugersAT TIME OF DRILLING --- No Free Water EncounteredLOGGED BY CM CHECKED BY JEAT END OF DRILLING --- No Free Water Encountered

NOTES

AFTER DRILLING --- No Free Water Encountered

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DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS			UNCONFINED COMP (psf)
									LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	
0												
		3-inches of ASPHALT										
		(GP) 5-inches of BASE ROCK										
		LEAN CLAY, (CL) grayish brown and brown, moist, stiff, with iron nodules	SPT 1	94	3-3-5 (8)	3.25		26				
5			SPT 2	100	3-3-5 (8)	3		22				
		SANDSTONE, tan, with SHALE seams	SPT 3	100	9-27-50/5"	2.5		19				
			SPT 4	100	50/3"	0		11				

Refusal at 8.8 feet.
Bottom of borehole at 8.8 feet.



CFS Engineers

CLIENT Oldham Investors, LLC

PROJECT NAME OLDHAM VILLAGE

PROJECT NUMBER 24-5632

PROJECT LOCATION Lee's Summit, MO

DATE STARTED 10/29/24 COMPLETED 10/29/24

GROUND ELEVATION 1043 ft HOLE SIZE 4 inches

DRILLING CONTRACTOR CFS Engineers

GROUND WATER LEVELS:

DRILLING METHOD Solid Flight Augers

▽ AT TIME OF DRILLING 5.00 ft / Elev 1038.00 ft

LOGGED BY CM CHECKED BY JE

▼ AT END OF DRILLING 7.60 ft / Elev 1035.40 ft

NOTES

AFTER DRILLING --- Not Recorded

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS			UNCONFINED COMP (psf)
									LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	
0		5-inches of ASPHALT										
		(GP) 5-inches of BASE ROCK										
		FAT CLAY, (CH) grayish brown and blueish gray, moist, with roots and wood debris (FILL)	SPT 1	22	3-2-3 (5)	1		22				
		(CH) wet below 3'										
5			SPT 2	39	1-1-1 (2)	.5		24				
		(CH) additional roots at 6'										
			SPT 3	33	3-2-3 (5)	1.5		28				
10		SHALE, highly weathered to slightly weathered, tan, with SANDSTONE seams	SPT 4	50	5-10-21 (31)	1		19				
		Tan and gray below 13'										
15			SPT 5	100	50/3"	0		11				
20			SPT 6	100	50/3"	2.5		17				

Bottom of borehole at 20.0 feet.

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CFS Engineers

CLIENT Oldham Investors, LLC

PROJECT NAME OLDHAM VILLAGE

PROJECT NUMBER 24-5632

PROJECT LOCATION Lee's Summit, MO

DATE STARTED 10/29/24 COMPLETED 10/29/24

GROUND ELEVATION 1032 ft HOLE SIZE 4 inches

DRILLING CONTRACTOR CFS Engineers

GROUND WATER LEVELS:

DRILLING METHOD Solid Flight Augers

AT TIME OF DRILLING --- No Free Water Encountered

LOGGED BY CM CHECKED BY JE

AT END OF DRILLING --- No Free Water Encountered

NOTES

AFTER DRILLING --- No Free Water Encountered

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS			UNCONFINED COMP (psf)
									LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	
0		4-inches of ASPHALT										
		(GP) 4-inches of BASE ROCK										
		LEAN CLAY, (CL) dark brown and blueish gray, dry to moist, (FILL)	SPT 1	83	3-4-5 (9)	2.5		28				
		LEAN CLAY, (CL) grayish brown and brown, moist, stiff, mottled red with iron nodules	SPT 2	100	3-3-6 (9)	1.5		25				
5			SPT 3	100	4-4-7 (11)	3		21				
			SPT 4	78	7-17-15 (32)	1.5		22				
10		SANDSTONE, moderately weathered to unweathered, tan and reddish brown, with SHALE seams	SPT 5	100	36-50/2"	1.5		12				
15			SPT 6	100	50/3"	0		12				
20												

Bottom of borehole at 20.0 feet.

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CFS Engineers

CLIENT Oldham Investors, LLC

PROJECT NAME OLDHAM VILLAGE

PROJECT NUMBER 24-5632

PROJECT LOCATION Lee's Summit, MO

DATE STARTED 10/28/24 COMPLETED 10/28/24

GROUND ELEVATION 1033 ft HOLE SIZE 4 inches

DRILLING CONTRACTOR CFS Engineers

GROUND WATER LEVELS:

DRILLING METHOD Solid Flight Augers

AT TIME OF DRILLING --- No Free Water Encountered

LOGGED BY CM CHECKED BY JE

AT END OF DRILLING --- No Free Water Encountered

NOTES

AFTER DRILLING --- No Free Water Encountered

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS			UNCONFINED COMP (psf)
									LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	
0		4-inches of ASPHALT										
		(GP) 4-inches of BASE ROCK										
		FAT CLAY, (CH) grayish brown, dry to moist, stiff, mottled red with iron striations	SPT 1	61	5-5-6 (11)	2.5		23	49	15	34	
5			SPT 2	83	4-4-5 (9)	2.5		22				
			SPT 3	89	4-4-6 (10)	3.25		27				
		(CH) SHALE and SANDSTONE fragments below 8'	SPT 4	100	4-4-6 (10)	1.25		28				
10		SHALE, unweathered, tan, with SANDSTONE seams										
			SPT 5	100	50/3"	0		13				
15												
			SPT 6	100	50/3"	0		10				
20												

Bottom of borehole at 20.0 feet.

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CFS Engineers

CLIENT Oldham Investors, LLCPROJECT NAME OLDHAM VILLAGEPROJECT NUMBER 24-5632PROJECT LOCATION Lee's Summit, MODATE STARTED 11/7/24 COMPLETED 11/7/24GROUND ELEVATION 1038 ft HOLE SIZE 4 inchesDRILLING CONTRACTOR CFS Engineers

GROUND WATER LEVELS:

DRILLING METHOD Solid Flight AugersAT TIME OF DRILLING --- No Free Water EncounteredLOGGED BY CM CHECKED BY JEAT END OF DRILLING --- No Free Water Encountered

NOTES

AFTER DRILLING --- No Free Water Encountered

GEOTECH BH COLUMNS - GINT STD US LAB.GDT - 11/19/24 12:39 - G:\SHARED DRIVES\245632\GEOTECH\EXPLORATION REPORTS\24-5632.GPJ

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS			UNCONFINED COMP (psf)
									LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	
0		LEAN CLAY, (CL) dark brown, dry to moist, with grass (TOPSOIL)										
		LEAN CLAY, (CH) dark brown and gray, moist, stiff, with gravel (FILL)										
			SPT 1	78	3-5-4 (9)	4		26				
		FAT CLAY, (CH) dark grayish brown and brown, moist, stiff, mottled red with iron nodules and trace of fine sand										
			SPT 2	56	4-4-4 (8)	4		25				
			SPT 3	94	3-5-4 (9)	2.5		27				
		SHALE, moderately weathered to unweathered, tan, with SANDSTONE seams										
			SPT 4	94	7-11-50/5"	3.75		18				
			SPT 5	100	50/3"	0		15				

Refusal at 13.8 feet.
Bottom of borehole at 13.8 feet.



CFS Engineers

CLIENT Oldham Investors, LLC

PROJECT NAME OLDDHAM VILLAGE

PROJECT NUMBER 24-5632

PROJECT LOCATION Lee's Summit, MO

DATE STARTED 10/29/24 COMPLETED 10/29/24

GROUND ELEVATION 1011 ft HOLE SIZE 4 inches

DRILLING CONTRACTOR CFS Engineers

GROUND WATER LEVELS:

DRILLING METHOD Solid Flight Augers

AT TIME OF DRILLING --- No Free Water Encountered

LOGGED BY CM CHECKED BY JE

AT END OF DRILLING --- No Free Water Encountered

NOTES

AFTER DRILLING --- No Free Water Encountered

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DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS			UNCONFINED COMP (psf)
									LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	
0												
		3-inches of ASPHALT										
		(GC) 4-inches of BASE ROCK										
		LEAN CLAY, (CL) dark brown, dry to moist, (FILL)	SPT 1	83	4-5-6 (11)	2.5		21				
			SPT 2	89	3-4-6 (10)	2		22				
5		FAT CLAY, (CH) light gray, moist, stiff										
			SPT 3	100	4-4-6 (10)	2.5		21				
		SANDSTONE, slightly weathered to unweathered, tan, with SHALE seams	SPT 4	78	20-50/3"	.5		14				
10												
			SPT 5	100	50/3"	0		15				
15												
		LIMESTONE, moderately weathered										

Refusal at 16.9 feet.
Bottom of borehole at 16.9 feet.



CFS Engineers

CLIENT Oldham Investors, LLC
PROJECT NUMBER 24-5632
DATE STARTED 10/29/24 COMPLETED 10/29/24
DRILLING CONTRACTOR CFS Engineers
DRILLING METHOD Solid Flight Augers
LOGGED BY CM CHECKED BY JE
NOTES _____

PROJECT NAME OLDHAM VILLAGE
PROJECT LOCATION Lee's Summit, MO
GROUND ELEVATION 1018 ft HOLE SIZE 4 inches
GROUND WATER LEVELS:
AT TIME OF DRILLING --- No Free Water Encountered
AT END OF DRILLING --- No Free Water Encountered
AFTER DRILLING --- No Free Water Encountered

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS			UNCONFINED COMP (psf)
									LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	
0		5-inches of ASPHALT										
		(GP) 4-inches of BASE ROCK										
		LEAN CLAY, (CL) dark brown, moist, with gravel (FILL)	SPT 1	56	3-4-5 (9)	1.5		13				
		LEAN CLAY, (CL) grayish brown, moist, stiff, mottled brown with trace of fine sand	SPT 2	100	5-6-8 (14)	3		21				
5		FAT CLAY, (CH) gray and brown, moist, stiff, with iron nodules	SPT 3	100	3-4-6 (10)	2.5		27				
			SPT 4	100	3-3-5 (8)	2		22				
10		SANDSTONE, unweathered, tan, with SHALE seams										
			SPT 5	100	50/3"	0						
15												
			SPT 6	100	50/3"			15				
20												

Bottom of borehole at 20.0 feet.



CFS Engineers

CLIENT Oldham Investors, LLC
PROJECT NUMBER 24-5632
DATE STARTED 10/29/24 COMPLETED 10/29/24
DRILLING CONTRACTOR CFS Engineers
DRILLING METHOD Solid Flight Augers
LOGGED BY CM CHECKED BY JE
NOTES

PROJECT NAME OLDHAM VILLAGE
PROJECT LOCATION Lee's Summit, MO
GROUND ELEVATION 1026 ft HOLE SIZE 4 inches
GROUND WATER LEVELS:
AT TIME OF DRILLING --- No Free Water Encountered
AT END OF DRILLING --- No Free Water Encountered
AFTER DRILLING --- No Free Water Encountered

Table with 12 columns: DEPTH (ft), GRAPHIC LOG, MATERIAL DESCRIPTION, SAMPLE TYPE NUMBER, RECOVERY % (RQD), BLOW COUNTS (N VALUE), POCKET PEN. (tsf), DRY UNIT WT. (pcf), MOISTURE CONTENT (%), ATTERBERG LIMITS (LIQUID LIMIT, PLASTIC LIMIT, PLASTICITY INDEX), UNCONFINED COMP (psf). Rows include data for depths 0 to 20 feet, describing materials like ASPHALT, FAT CLAY, and SANDSTONE, along with SPT test results.

Bottom of borehole at 20.0 feet.



CFS Engineers

CLIENT Oldham Investors, LLC
PROJECT NUMBER 24-5632
DATE STARTED 10/28/24 COMPLETED 10/28/24
DRILLING CONTRACTOR CFS Engineers
DRILLING METHOD Solid Flight Augers
LOGGED BY CM CHECKED BY JE
NOTES _____

PROJECT NAME OLDHAM VILLAGE
PROJECT LOCATION Lee's Summit, MO
GROUND ELEVATION 1033 ft HOLE SIZE 4 inches
GROUND WATER LEVELS:
AT TIME OF DRILLING --- No Free Water Encountered
AT END OF DRILLING --- No Free Water Encountered
AFTER DRILLING --- No Free Water Encountered

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DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS			UNCONFINED COMP (psf)
									LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	
0												
		3-inches of ASPHALT										
		(GP) 5-inches of BASE ROCK										
		FAT CLAY, (CH) dark brown and brown, moist, (FILL)	SPT 1	89	4-5-6 (11)	1.5		24				
		FAT CLAY, (CH) grayish brown, moist, stiff, with iron nodules	SPT 2	89	3-3-6 (9)	1.5		28				
5		SANDY SHALE, moderately weathered to unweathered, tan, with SANDSTONE seams	SPT 3	83	8-14-19 (33)	2.5		15				
			SPT 4	100	15-30- 50/5"	4.5+		15				
10												
		Gray below 13.5'										
			SPT 5	100	50/5"	1.5		9				
		LIMESTONE										

Refusal at 14.7 feet.
Bottom of borehole at 14.7 feet.



CFS Engineers

CLIENT Oldham Investors, LLC
PROJECT NUMBER 24-5632
DATE STARTED 11/7/24 COMPLETED 11/7/24
DRILLING CONTRACTOR CFS Engineers
DRILLING METHOD Solid Flight Augers
LOGGED BY CM CHECKED BY JE
NOTES

PROJECT NAME OLDDHAM VILLAGE
PROJECT LOCATION Lee's Summit, MO
GROUND ELEVATION 1035 ft HOLE SIZE 4 inches
GROUND WATER LEVELS:
AT TIME OF DRILLING --- No Free Water Encountered
AT END OF DRILLING --- No Free Water Encountered
AFTER DRILLING --- No Free Water Encountered

Table with 12 columns: DEPTH (ft), GRAPHIC LOG, MATERIAL DESCRIPTION, SAMPLE TYPE NUMBER, RECOVERY % (RQD), BLOW COUNTS (N VALUE), POCKET PEN. (tsf), DRY UNIT WT. (pcf), MOISTURE CONTENT (%), ATTERBERG LIMITS (LIQUID LIMIT, PLASTIC LIMIT, PLASTICITY INDEX), UNCONFINED COMP (psf). Rows include soil data from 0 to 15 feet depth, including asphalt, base rock, fat clay, shale, and gray layers.

Bottom of borehole at 15.0 feet.

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CFS Engineers

CLIENT Oldham Investors, LLC
PROJECT NUMBER 24-5632
DATE STARTED 11/7/24 COMPLETED 11/7/24
DRILLING CONTRACTOR CFS Engineers
DRILLING METHOD Solid Flight Augers
LOGGED BY CM CHECKED BY JE
NOTES

PROJECT NAME OLDHAM VILLAGE
PROJECT LOCATION Lee's Summit, MO
GROUND ELEVATION 1029 ft HOLE SIZE 4 inches
GROUND WATER LEVELS:
AT TIME OF DRILLING 13.00 ft / Elev 1016.00 ft
AT END OF DRILLING 12.00 ft / Elev 1017.00 ft
AFTER DRILLING --- Not Recorded

Table with 12 columns: DEPTH (ft), GRAPHIC LOG, MATERIAL DESCRIPTION, SAMPLE TYPE NUMBER, RECOVERY % (RQD), BLOW COUNTS (N VALUE), POCKET PEN. (tsf), DRY UNIT WT. (pcf), MOISTURE CONTENT (%), ATTERBERG LIMITS (LIQUID LIMIT, PLASTIC LIMIT, PLASTICITY INDEX), UNCONFINED COMP (psf). Rows include soil layers like ASPHALT, BASE ROCK, FAT CLAY, and SANDSTONE with associated SPT data.

Bottom of borehole at 15.0 feet.

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CFS Engineers

CLIENT Oldham Investors, LLC

PROJECT NAME OLDDHAM VILLAGE

PROJECT NUMBER 24-5632

PROJECT LOCATION Lee's Summit, MO

DATE STARTED 11/5/24

COMPLETED 11/5/24

GROUND ELEVATION 1032 ft

HOLE SIZE 4 inches

DRILLING CONTRACTOR CFS Engineers

GROUND WATER LEVELS:

DRILLING METHOD Solid Flight Augers

▽ AT TIME OF DRILLING 3.00 ft / Elev 1029.00 ft

LOGGED BY CM

CHECKED BY JE

▼ AT END OF DRILLING 3.00 ft / Elev 1029.00 ft

NOTES

AFTER DRILLING --- Not Recorded

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS			UNCONFINED COMP (psf)
									LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	
0		7-inches of ASPHALT										
		(GP) 4-inches of BASE ROCK										
		FAT CLAY, (CH) gray and brown, moist to wet, soft, with iron nodules	SPT 1	61	1-1-2 (3)	1.25		28				
		(CH) medium stiff below 3'										
5			SPT 2	50	2-2-3 (5)	1		27				
		SHALE, moderately weathered to unweathered, brown, wet	SPT 3	56	2-2-11 (13)	1.5		24				
10			SPT 4	100	3-11-23 (34)	2.5		24				
		Unweathered, with SANDSTONE seams below 13'										
			SPT 5	93	22-40- 50/3"	0		19				
15												
			SPT 6	100	50/4"	0		24				
20												

Bottom of borehole at 20.0 feet.

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CFS Engineers

CLIENT Oldham Investors, LLC
PROJECT NUMBER 24-5632
DATE STARTED 10/25/24 COMPLETED 10/25/24
DRILLING CONTRACTOR CFS Engineers
DRILLING METHOD Solid Flight Augers
LOGGED BY CM CHECKED BY JE
NOTES _____

PROJECT NAME OLDHAM VILLAGE
PROJECT LOCATION Lee's Summit, MO
GROUND ELEVATION 1033 ft HOLE SIZE 4 inches
GROUND WATER LEVELS:
AT TIME OF DRILLING --- No Free Water Encountered
AT END OF DRILLING --- No Free Water Encountered
AFTER DRILLING --- No Free Water Encountered

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS			UNCONFINED COMP (psf)
									LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	
0		16-inches of ASPHALT										
		LEAN CLAY, (CL) dark brown, moist, with gravel (FILL)	SPT 1	72	3-3-5 (8)	2.25		23	40	16	24	
		FAT CLAY, (CH) blueish gray, moist, medium stiff, mottled brown with iron nodules	SPT 2	67	2-2-3 (5)	1		31				
5		(CH) orange mottling below 6'	SPT 3	100	2-2-3 (5)	1.5		29				
		SHALE, highly weathered to moderately weathered, tan and gray	SPT 4	100	3-2-23 (25)	.5		51				
10			SPT 5	94	7-9-15 (24)	3		18				
15		Unweathered, gray below 18'	SPT 6	100	32-50/4"	4.5+		11				
Refusal at 19.3 feet. Bottom of borehole at 19.3 feet												

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CFS Engineers

CLIENT Oldham Investors, LLC
PROJECT NUMBER 24-5632
DATE STARTED 11/7/24 COMPLETED 11/7/24
DRILLING CONTRACTOR CFS Engineers
DRILLING METHOD Solid Flight Augers
LOGGED BY CM CHECKED BY JE
NOTES _____

PROJECT NAME OLDHAM VILLAGE
PROJECT LOCATION Lee's Summit, MO
GROUND ELEVATION 1037 ft HOLE SIZE 4 inches
GROUND WATER LEVELS:
AT TIME OF DRILLING --- No Free Water Encountered
AT END OF DRILLING --- No Free Water Encountered
AFTER DRILLING --- No Free Water Encountered

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DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS			UNCONFINED COMP (psf)
									LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	
0		(GW) 14-inches of GRAVEL										
		LEAN CLAY, (CL) dark brown, dry to moist, medium stiff	SPT 1	39	3-3-4 (7)	4.5		19				
		FAT CLAY, (CH) grayish brown, moist, medium stiff, mottled gray with iron nodules	SPT 2	67	3-2-4 (6)	2		27				
5		(CH) stiff, gray and orangish brown below 6'	SPT 3	100	3-3-5 (8)	2.25		30				
			SPT 4	100	4-4-4 (8)	3		29				
10		LIMESTONE, moderately weathered										

Refusal at 10.9 feet.
Bottom of borehole at 10.9 feet.



CFS Engineers

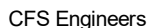
CLIENT Oldham Investors, LLC
PROJECT NUMBER 24-5632
DATE STARTED 10/25/24 COMPLETED 10/25/24
DRILLING CONTRACTOR CFS Engineers
DRILLING METHOD Solid Flight Augers
LOGGED BY CM CHECKED BY JE
NOTES _____

PROJECT NAME OLDHAM VILLAGE
PROJECT LOCATION Lee's Summit, MO
GROUND ELEVATION 1045 ft HOLE SIZE 4 inches
GROUND WATER LEVELS:
▽ AT TIME OF DRILLING 6.00 ft / Elev 1039.00 ft
AT END OF DRILLING --- dry after drilling
AFTER DRILLING --- Not Recorded

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS			UNCONFINED COMP (psf)
									LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	
0		4-inches of ASPHALT										
		FAT CLAY, (CH) dark grayish brown and blueish gray, moist, stiff, with petroleum odor	SPT 1	67	2-4-4 (8)	1.75		32				
		(CH) gray and brown with iron nodules below 3'	SPT 2	100	2-4-4 (8)	1.5		27				
5		▽ (CH) medium stiff, gray mottled brown with iron striations below 6'	SPT 3	100	2-2-4 (6)	1		26				
		(CH) grayish brown below 8'	SPT 4	100	3-3-4 (7)	1.75		22				
10												
		SHALE, highly weathered, tan and brown	SPT 5	100	6-8-9 (17)	3.5		24				
15												
		Maroon below 19'	SPT 6	100	9-11-17 (28)	4.5+		19				
20												

Bottom of borehole at 20.0 feet.

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PROJECT NAME OLDHAM VILLAGE

PROJECT LOCATION Lee's Summit, MO

GROUND ELEVATION 1047 ft **HOLE SIZE** 4 inches

GROUND WATER LEVELS:

AT TIME OF DRILLING --- No Free Water Encountered

AT END OF DRILLING --- No Free Water Encountered

AFTER DRILLING --- No Free Water Encountered

[illegible]



CFS Engineers

CLIENT Oldham Investors, LLC

PROJECT NAME OLDDHAM VILLAGE

PROJECT NUMBER 24-5632

PROJECT LOCATION Lee's Summit, MO

DATE STARTED 11/6/24

COMPLETED 11/6/24

GROUND ELEVATION 1045 ft

HOLE SIZE 4 inches

DRILLING CONTRACTOR CFS Engineers

GROUND WATER LEVELS:

DRILLING METHOD Solid Flight Augers

AT TIME OF DRILLING --- No Free Water Encountered

LOGGED BY CM

CHECKED BY JE

AT END OF DRILLING --- No Free Water Encountered

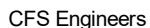
NOTES LOT 8 - CHICK-FIL-A

AFTER DRILLING --- No Free Water Encountered

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DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS			UNCONFINED COMP (psf)
									LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	
0												
		LEAN CLAY, (CL) dark brown, dry to moist, with vegetation (TOPSOIL)										
		LEAN CLAY, (CL) grayish brown, moist, with gravel and roots (FILL)	SPT 1	67	3-4-4 (8)	3.25		24	47	16	31	
		SANDY SHALE, moderately weathered, tan and gray	SPT 2	78	4-9-16 (25)	4		24				
5												
		Slightly weathered, below 6'	SPT 3	100	12-21-28 (49)	4.5+		16				
		Unweathered, below 9'	SPT 4	100	13-29-50/5"	4.5+		15				
10												
			SPT 5	100	15-35-50/2"	4.5+		12				
15												

Bottom of borehole at 15.0 feet.



PROJECT NAME OLDHAM VILLAGE

PROJECT LOCATION Lee's Summit, MO

GROUND ELEVATION 1045 ft **HOLE SIZE** 4 inches

GROUND WATER LEVELS:

AT TIME OF DRILLING --- No Free Water Encountered

AT END OF DRILLING --- No Free Water Encountered

AFTER DRILLING --- No Free Water Encountered

[illegible]

Bottom of borehole at 15.0 feet.



CFS Engineers

CLIENT Oldham Investors, LLC

PROJECT NAME OLDDHAM VILLAGE

PROJECT NUMBER 24-5632

PROJECT LOCATION Lee's Summit, MO

DATE STARTED 11/6/24

COMPLETED 11/6/24

GROUND ELEVATION 1045 ft

HOLE SIZE 4 inches

DRILLING CONTRACTOR CFS Engineers

GROUND WATER LEVELS:

DRILLING METHOD Solid Flight Augers

AT TIME OF DRILLING --- No Free Water Encountered

LOGGED BY CM

CHECKED BY JE

AT END OF DRILLING --- No Free Water Encountered

NOTES LOT 8 - CHICK-FIL-A

AFTER DRILLING --- No Free Water Encountered

GEOTECH BH COLUMNS - GINT STD US LAB.GDT - 11/19/24 12:39 - G:\SHARED DRIVES\245632\GEOTECH\EXPLORATION REPORTS\24-5632.GPJ

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS			UNCONFINED COMP (psf)
									LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	
0												
		LEAN CLAY, (CL) dark brown, dry to moist, with vegetation (TOPSOIL)										
		FAT CLAY, (CH) gray and brown, moist, stiff, with fine sand (HIGHLY WEATHERED SHALE)	SPT 1	44	3-3-5 (8)	4.25		23				
		SANDY SHALE, moderately weathered to slightly weathered, tan	SPT 2	83	7-13-20 (33)	3.25		15				
5												
		Unweathered below 6'	SPT 3	100	17-27-36 (63)	4.5+		16				
			SPT 4	100	16-35-50/4"	4.5+		14				
10												

Bottom of borehole at 10.0 feet.



CFS Engineers

CLIENT Oldham Investors, LLC

PROJECT NAME OLDDHAM VILLAGE

PROJECT NUMBER 24-5632

PROJECT LOCATION Lee's Summit, MO

DATE STARTED 11/6/24

COMPLETED 11/6/24

GROUND ELEVATION 1045 ft

HOLE SIZE 4 inches

DRILLING CONTRACTOR CFS Engineers

GROUND WATER LEVELS:

DRILLING METHOD Solid Flight Augers

AT TIME OF DRILLING --- No Free Water Encountered

LOGGED BY CM

CHECKED BY JE

AT END OF DRILLING --- No Free Water Encountered

NOTES LOT 8 - CHICK-FIL-A

AFTER DRILLING --- No Free Water Encountered

GEOTECH BH COLUMNS - GINT STD US LAB.GDT - 11/19/24 12:39 - G:\SHARED DRIVES\245632\GEOTECH\EXPLORATION REPORTS\24-5632.GPJ

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS			UNCONFINED COMP (psf)
									LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	
0												
		2-inches of ASPHALT										
		(GP) 4-inches of BASE ROCK										
		FAT CLAY, (CH) dark grayish brown and brown, moist, stiff, mottled reddish brown with nodules	SPT 1	89	2-4-5 (9)	2		29				
5			SPT 2	100	4-5-6 (11)	4.5+		19				
		SANDY SHALE, highly weathered, tan	SPT 3	94	4-8-16 (24)	3.5		22				
		Slightly weathered, below 8'	SPT 4	100	11-16-23 (39)	4.5+		17				
10												

Bottom of borehole at 10.0 feet.



CFS Engineers

CLIENT Oldham Investors, LLCPROJECT NAME OLDHAM VILLAGEPROJECT NUMBER 24-5632PROJECT LOCATION Lee's Summit, MODATE STARTED 11/6/24COMPLETED 11/6/24GROUND ELEVATION 1042 ftHOLE SIZE 4 inchesDRILLING CONTRACTOR CFS Engineers

GROUND WATER LEVELS:

DRILLING METHOD Solid Flight AugersAT TIME OF DRILLING --- No Free Water EncounteredLOGGED BY CMCHECKED BY JEAT END OF DRILLING --- No Free Water EncounteredNOTES LOT 8 - CHICK-FIL-AAFTER DRILLING --- No Free Water Encountered

GEOTECH BH COLUMNS - GINT STD US LAB.GDT - 11/19/24 12:39 - G:\SHARED DRIVES\245632\GEOTECH\EXPLORATION REPORTS\24-5632.GPJ

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS			UNCONFINED COMP (psf)
									LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	
0												
		2-inches of ASPHALT										
		(GP) 4-inches of BASE ROCK										
		LEAN CLAY, (CL) dark blueish gray, moist, stiff, with iron nodules	SPT 1	94	2-4-4 (8)	3.25		27	41	16	25	
		FAT CLAY, (CH) grayish brown, moist, stiff, mottled reddish	SPT 2	100	3-4-7 (11)	4		25				
5			SPT 3	100	4-5-6 (11)	2.5		24				
		SANDY SHALE, moderately weathered to slightly weathered, tan	SPT 4	100	4-9-18 (27)	4		19				
10												

Bottom of borehole at 10.0 feet.



CFS Engineers

CLIENT Oldham Investors, LLC

PROJECT NAME OLDDHAM VILLAGE

PROJECT NUMBER 24-5632

PROJECT LOCATION Lee's Summit, MO

DATE STARTED 11/6/24

COMPLETED 11/6/24

GROUND ELEVATION 1040 ft

HOLE SIZE 4 inches

DRILLING CONTRACTOR CFS Engineers

GROUND WATER LEVELS:

DRILLING METHOD Solid Flight Augers

AT TIME OF DRILLING --- No Free Water Encountered

LOGGED BY CM

CHECKED BY JE

AT END OF DRILLING --- No Free Water Encountered

NOTES LOT 8 - CHICK-FIL-A

AFTER DRILLING --- No Free Water Encountered

GEOTECH BH COLUMNS - GINT STD US LAB.GDT - 11/19/24 12:39 - G:\SHARED DRIVES\245632\GEOTECH\EXPLORATION REPORTS\24-5632.GPJ

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS			UNCONFINED COMP (psf)
									LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	
0		6-inches of ASPHALT										
		(GP) 7-inches of BASE ROCK										
		FAT CLAY, (CH) dark blueish gray, moist, medium stiff, with iron nodules	SPT 1	94	2-3-3 (6)	2.5		29				
		(CH) grayish brown and gray below 3'										
			SPT 2	78	2-3-3 (6)	3.5		22				
5												
		SANDY SHALE, moderately weathered to slightly weathered, tan	SPT 3	89	6-10-15 (25)	4.5+		19				
			SPT 4	100	6-10-18 (28)	4.5+		18				
10												

Bottom of borehole at 10.0 feet.



CFS Engineers

CLIENT Oldham Investors, LLCPROJECT NAME OLDHAM VILLAGEPROJECT NUMBER 24-5632PROJECT LOCATION Lee's Summit, MODATE STARTED 11/6/24COMPLETED 11/6/24GROUND ELEVATION 1040 ftHOLE SIZE 4 inchesDRILLING CONTRACTOR CFS Engineers

GROUND WATER LEVELS:

DRILLING METHOD Solid Flight AugersAT TIME OF DRILLING --- No Free Water EncounteredLOGGED BY CMCHECKED BY JEAT END OF DRILLING --- No Free Water EncounteredNOTES LOT 8 - CHICK-FIL-AAFTER DRILLING --- No Free Water Encountered

GEOTECH BH COLUMNS - GINT STD US LAB.GDT - 11/19/24 12:39 - G:\SHARED DRIVES\245632\GEOTECH\EXPLORATION REPORTS\24-5632.GPJ

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS			UNCONFINED COMP (psf)
									LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	
0		8-inches of CONCRETE										
		(GP) 7-inches of BASE ROCK										
		FAT CLAY, (CH) gray and brown, moist, medium stiff	SPT 1	89	3-2-4 (6)	2		28				
			SPT 2	94	2-4-12 (16)	3		20				
5		SANDY SHALE, moderately weathered to slightly weathered, tan and gray										
			SPT 3	100	13-17-18 (35)	3.5		16				
			SPT 4	100	19-50/3"	4.5+		14				
10		Unweathered, below 9'										

Bottom of borehole at 10.0 feet.



CFS Engineers

CLIENT Oldham Investors, LLCPROJECT NAME OLDHAM VILLAGEPROJECT NUMBER 24-5632PROJECT LOCATION Lee's Summit, MODATE STARTED 11/6/24 COMPLETED 11/6/24GROUND ELEVATION 1048 ft HOLE SIZE 4 inchesDRILLING CONTRACTOR CFS Engineers

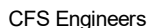
GROUND WATER LEVELS:

DRILLING METHOD Solid Flight AugersAT TIME OF DRILLING --- No Free Water EncounteredLOGGED BY CM CHECKED BY JEAT END OF DRILLING --- No Free Water EncounteredNOTES LOT 8 - CHICK-FIL-AAFTER DRILLING --- No Free Water Encountered

GEOTECH BH COLUMNS - GINT STD US LAB.GDT - 11/19/24 12:39 - G:\SHARED DRIVES\245632\GEOTECH\EXPLORATION REPORTS\24-5632.GPJ

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS			UNCONFINED COMP (psf)
									LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	
0		LEAN CLAY, (CL) dark brown, dry to moist, with vegetation (TOPSOIL)										
		FAT CLAY, (CH) grayish brown, dry, mottled reddish brown and brown with nodules (FILL)	SPT 1	89	3-7-8 (15)	4.5+		15				
			SPT 2	72	3-4-6 (10)	4.5+		18				
5		SANDY SHALE, slightly weathered to unweathered, tan and gray										
			SPT 3	100	12-32- 50/5"	4.5+		14				
			SPT 4	100	22-37- 50/4"	4.5+		15				
10												

Bottom of borehole at 10.0 feet.



PROJECT NAME OLDHAM VILLAGE

PROJECT LOCATION Lee's Summit, MO

GROUND ELEVATION 1046 ft **HOLE SIZE** 4 inches

GROUND WATER LEVELS:

AT TIME OF DRILLING --- No Free Water Encountered

AT END OF DRILLING --- No Free Water Encountered

AFTER DRILLING --- No Free Water Encountered

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Bottom of borehole at 15.0 feet.



CFS Engineers

BORING NUMBER CB11

PAGE 1 OF 1

CLIENT Oldham Investors, LLC
PROJECT NUMBER 24-5632
DATE STARTED 11/6/24 COMPLETED 11/6/24
DRILLING CONTRACTOR CFS Engineers
DRILLING METHOD Solid Flight Augers
LOGGED BY CM CHECKED BY JE
NOTES LOT 8 - CHICK-FIL-A

PROJECT NAME OLDHAM VILLAGE
PROJECT LOCATION Lee's Summit, MO
GROUND ELEVATION 1047 ft HOLE SIZE 4 inches
GROUND WATER LEVELS:
AT TIME OF DRILLING --- No Free Water Encountered
AT END OF DRILLING --- No Free Water Encountered
AFTER DRILLING --- No Free Water Encountered

GEOTECH BH COLUMNS - GINT STD US LAB.GDT - 11/19/24 12:39 - G:\SHARED DRIVES\245632\GEOTECH\EXPLORATION REPORTS\24-5632.GPJ

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS			UNCONFINED COMP (psf)
									LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	
0		8.5-inches of CONCRETE										
		(GP) 7-inches of BASE ROCK										
		SANDY SHALE, slightly weathered, tan and gray	SPT 1	100	10-21-35 (56)	4.5+		17				
		Unweathered, below 3'	SPT 2	100	17-31-50 (81)	4.5+		14				
5			SPT 3	100	24-41- 50/4"	4.5+		15				
			SPT 4	100	43-50/3"	2		11				

Refusal at 9.3 feet.
Bottom of borehole at 9.3 feet.



CFS Engineers

BORING NUMBER E1

PAGE 1 OF 1

CLIENT Oldham Investors, LLC
PROJECT NUMBER 24-5632
DATE STARTED 10/30/24 COMPLETED 10/30/24
DRILLING CONTRACTOR CFS Engineers
DRILLING METHOD Solid Flight Augers
LOGGED BY CM CHECKED BY JE
NOTES _____

PROJECT NAME OLDHAM VILLAGE
PROJECT LOCATION Lee's Summit, MO
GROUND ELEVATION 1014 ft HOLE SIZE 4 inches
GROUND WATER LEVELS:
AT TIME OF DRILLING --- No Free Water Encountered
AT END OF DRILLING --- No Free Water Encountered
AFTER DRILLING --- No Free Water Encountered

GEOTECH BH COLUMNS - GINT STD US LAB.GDT - 11/19/24 12:39 - G:\SHARED DRIVES\245632\GEOTECH\EXPLORATION REPORTS\24-5632.GPJ

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS			UNCONFINED COMP (psf)
									LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	
0												
		4-inches of ASPHALT										
		(GP) 3-inches of BASE ROCK										
		FAT CLAY, (CH) blueish gray and dark brown, moist, medium stiff, with iron nodules	SPT 1	89	3-3-4 (7)	3		34				
		(CH) stiff, gray mottled red below 3'										
5			SPT 2	100	3-4-5 (9)	3		22				
			SPT 3	100	3-4-5 (9)	2.75		27				
10		SANDSTONE, slightly weathered to unweathered, brown, with SHALE seams	SPT 4	94	4-11-50/5"	2.5		17				
			SPT 5	100	50/3"	0		13				

Refusal at 13.8 feet.
Bottom of borehole at 13.8 feet.



CFS Engineers

BORING NUMBER E2

PAGE 1 OF 1

CLIENT Oldham Investors, LLC
PROJECT NUMBER 24-5632
DATE STARTED 10/30/24 COMPLETED 10/30/24
DRILLING CONTRACTOR CFS Engineers
DRILLING METHOD Solid Flight Augers
LOGGED BY CM CHECKED BY JE
NOTES _____

PROJECT NAME OLDHAM VILLAGE
PROJECT LOCATION Lee's Summit, MO
GROUND ELEVATION 1023 ft HOLE SIZE 4 inches
GROUND WATER LEVELS:
AT TIME OF DRILLING --- No Free Water Encountered
AT END OF DRILLING --- No Free Water Encountered
AFTER DRILLING --- No Free Water Encountered

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS			UNCONFINED COMP (psf)
									LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	
0												
		4-inches of ASPHALT										
		(GP) 4-inches of BASE ROCK										
		FAT CLAY, (CH) dark blueish gray, moist, stiff, with iron nodules	SPT 1	94	4-4-5 (9)	3.25		24				
		(CH) grayish brown below 3'										
5			SPT 2	100	4-5-7 (12)	3.75		24				
		(CH) medium stiff, gray and brown with iron striations below 6'										
			SPT 3	100	3-3-3 (6)	.25		41				
10		SANDY SHALE, slightly weathered to unweathered, brown, with SANDSTONE seams	SPT 4	100	2-6-27 (33)	1.5		24				
			SPT 5	100	50/3"	.25		19				
15												
			SPT 6	100	50/3"	0		22				
Refusal at 18.8 feet. Bottom of borehole at 18.8 feet.												

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CFS Engineers

BORING NUMBER E3

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CLIENT Oldham Investors, LLC
PROJECT NUMBER 24-5632
DATE STARTED 10/30/24 COMPLETED 10/30/24
DRILLING CONTRACTOR CFS Engineers
DRILLING METHOD Solid Flight Augers
LOGGED BY CM CHECKED BY JE
NOTES _____

PROJECT NAME OLDHAM VILLAGE
PROJECT LOCATION Lee's Summit, MO
GROUND ELEVATION 1025 ft HOLE SIZE 4 inches
GROUND WATER LEVELS:
AT TIME OF DRILLING --- No Free Water Encountered
AT END OF DRILLING --- No Free Water Encountered
AFTER DRILLING --- No Free Water Encountered

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS			UNCONFINED COMP (psf)
									LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	
0												
		3-inches of ASPHALT										
		(GP) 4-inches of BASE ROCK										
		FAT CLAY, (CH) gray and brown, moist, stiff, with iron nodules and striations	SPT 1	94	3-4-7 (11)	3.75		25				
		(CH) medium stiff below 3'										
5			SPT 2	100	3-3-4 (7)	2.5		25				
		(CH) stiff below 6'										
		SANDY SHALE, moderately weathered to unweathered, brown, with SANDSTONE seams	SPT 3	100	4-5-10 (15)	2		24				
10			SPT 4	100	10-19- 50/5"	2		18				
			SPT 5	100	50/3"	0		16				
Refusal at 13.8 feet. Bottom of borehole at 13.8 feet.												

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CFS Engineers

BORING NUMBER E4

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CLIENT Oldham Investors, LLC
PROJECT NUMBER 24-5632
DATE STARTED 10/30/24 COMPLETED 10/30/24
DRILLING CONTRACTOR CFS Engineers
DRILLING METHOD Solid Flight Augers
LOGGED BY CM CHECKED BY JE
NOTES _____

PROJECT NAME OLDHAM VILLAGE
PROJECT LOCATION Lee's Summit, MO
GROUND ELEVATION 1016 ft HOLE SIZE 4 inches
GROUND WATER LEVELS:
AT TIME OF DRILLING --- No Free Water Encountered
AT END OF DRILLING --- No Free Water Encountered
AFTER DRILLING --- No Free Water Encountered

GEOTECH BH COLUMNS - GINT STD US LAB.GDT - 11/19/24 12:39 - G:\SHARED DRIVES\245632\GEOTECH\EXPLORATION REPORTS\24-5632.GPJ

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS			UNCONFINED COMP (psf)
									LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	
0												
		4-inches of ASPHALT										
		(GP) 4-inches of BASE ROCK										
		LEAN CLAY, (CL) dark blackish gray and grayish brown, moist, medium stiff, with iron nodules and trace of fine sand	SPT 1	72	3-3-4 (7)	1.25		28				
		SANDY, (CL) and stiff below 3'	SPT 2	100	2-3-5 (8)	2.75		23				
5		SANDSTONE, unweathered, brown, with SHALE seams	SPT 3	100	30-50/5"			12				
			SPT 4		50/3"			12				

Refusal at 8.8 feet.
Bottom of borehole at 8.8 feet.

CFSENGINEERS

CFS Engineers

BORING NUMBER E5

PAGE 1 OF 1

CLIENT Oldham Investors, LLC

PROJECT NAME OLDDHAM VILLAGE

PROJECT NUMBER 24-5632

PROJECT LOCATION Lee's Summit, MO

DATE STARTED 10/30/24

COMPLETED 10/30/24

GROUND ELEVATION 1028 ft

HOLE SIZE 4 inches

DRILLING CONTRACTOR CFS Engineers

GROUND WATER LEVELS:

DRILLING METHOD Solid Flight Augers

AT TIME OF DRILLING --- No Free Water Encountered

LOGGED BY CM

CHECKED BY JE

AT END OF DRILLING --- No Free Water Encountered

NOTES

AFTER DRILLING --- No Free Water Encountered

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS			UNCONFINED COMP (psf)
									LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	
0		5-inches of ASPHALT										
		(GP) 4-inches of BASE ROCK										
		LEAN CLAY, (CL) blueish gray and brown, moist, with gravel (FILL)	SPT 1	83	3-3-3 (6)	3.5		22				
		FAT CLAY, (CH) blueish gray and brown, moist, stiff, with iron nodules	SPT 2	100	4-5-7 (12)	4.25		25				
5		(CH) grayish brown below 6'	SPT 3	100	3-5-7 (12)	2.75		22				
		SHALE, highly weathered to slightly weathered, gray and tan, with SANDSTONE seams	SPT 4	100	7-10-16 (26)	3.25		21				
10			SPT 5	100	50/3"			12				
15		LIMESTONE, moderately weathered										
Refusal at 15.4 feet. Bottom of borehole at 15.4 feet.												

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CFS Engineers

BORING NUMBER E6

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CLIENT Oldham Investors, LLC

PROJECT NAME OLDHAM VILLAGE

PROJECT NUMBER 24-5632

PROJECT LOCATION Lee's Summit, MO

DATE STARTED 10/29/24 COMPLETED 10/29/24

GROUND ELEVATION 1022 ft HOLE SIZE 4 inches

DRILLING CONTRACTOR CFS Engineers

GROUND WATER LEVELS:

DRILLING METHOD Solid Flight Augers

AT TIME OF DRILLING --- No Free Water Encountered

LOGGED BY CM CHECKED BY JE

AT END OF DRILLING --- No Free Water Encountered

NOTES _____

AFTER DRILLING --- No Free Water Encountered

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS			UNCONFINED COMP (psf)
									LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	
0												
		3-inches of ASPHALT										
		(GP) 7-inches of BASE ROCK										
		LEAN CLAY, (CL) dark brown, moist, with gravel (FILL)	SPT 1	100	4-7-7 (14)	3.25		21				
		FAT CLAY, (CH) grayish brown, moist, stiff, with iron nodules	SPT 2	94	3-3-5 (8)	3.25		22				
5			SPT 3	100	3-4-5 (9)	2		34				
		(CH) medium stiff, with trace of fine sand below 8'	SPT 4	100	3-3-4 (7)	1.75		28				
10		SHALE, unweathered, brown, with SANDSTONE seams	SPT 5	100	50/5"	0		13				
15			SPT 6	100	50/3"	0		13				
20												

Bottom of borehole at 20.0 feet.



CFS Engineers

BORING NUMBER E7

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CLIENT Oldham Investors, LLC
PROJECT NUMBER 24-5632
DATE STARTED 10/28/24 COMPLETED 10/28/24
DRILLING CONTRACTOR CFS Engineers
DRILLING METHOD Solid Flight Augers
LOGGED BY CM CHECKED BY JE
NOTES _____

PROJECT NAME OLDHAM VILLAGE
PROJECT LOCATION Lee's Summit, MO
GROUND ELEVATION 1027 ft HOLE SIZE 4 inches
GROUND WATER LEVELS:
AT TIME OF DRILLING --- No Free Water Encountered
AT END OF DRILLING --- No Free Water Encountered
AFTER DRILLING --- No Free Water Encountered

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS			UNCONFINED COMP (psf)
									LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	
0		4-inches of ASPHALT										
		(GP) 4-inches of BASE ROCK										
		FAT CLAY, (CH) dark brown and blueish gray, moist, with gravel (FILL)	SPT 1	83	3-3-5 (8)	3.5		26				
5			SPT 2	67	3-3-4 (7)	3.5		20				
		(CH) grayish brown below 7'	SPT 3	89	2-3-4 (7)	2.5		29				
		LEAN CLAY, (CL) dark brown, moist, medium stiff, (possible FILL)	SPT 4	100	3-3-4 (7)	2		28				
10												
		(CL) stiff below 13'	SPT 5	83	4-6-7 (13)	1.25		23				
15												
		SHALE, unweathered, brown, with SANDSTONE seams	SPT 6	100	50/5"	0		10				
20												

Bottom of borehole at 20.0 feet.



CFS Engineers

BORING NUMBER E8

PAGE 1 OF 1

CLIENT Oldham Investors, LLC
PROJECT NUMBER 24-5632
DATE STARTED 10/28/24 COMPLETED 10/28/24
DRILLING CONTRACTOR CFS Engineers
DRILLING METHOD Solid Flight Augers
LOGGED BY CM CHECKED BY JE
NOTES _____

PROJECT NAME OLDHAM VILLAGE
PROJECT LOCATION Lee's Summit, MO
GROUND ELEVATION 1029 ft HOLE SIZE 4 inches
GROUND WATER LEVELS:
AT TIME OF DRILLING --- No Free Water Encountered
AT END OF DRILLING --- No Free Water Encountered
AFTER DRILLING --- No Free Water Encountered

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS			UNCONFINED COMP (psf)
									LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	
0												
		2-inches of ASPHALT										
		(GP) 4-inches of BASE ROCK										
		LEAN CLAY, (CL) dark brown, dry to moist, with gravel (FILL)	SPT 1	83	3-5-6 (11)	3.75		27				
5			SPT 2	83	2-3-4 (7)	2.5		30				
			SPT 3	100	3-4-5 (9)	4		25				
		FAT CLAY, (CH) grayish brown, moist, stiff, with trace of fine sand										
		(CH) medium stiff, blueish gray and dark brown below 8'	SPT 4	89	4-3-4 (7)	4		27				
10												
		(CH) stiff below 13'	SPT 5	56	4-6-8 (14)	4.25		21				
15												
20		SHALE, moderately weathered to unweathered, brown										

Bottom of borehole at 20.0 feet.



CFS Engineers

BORING NUMBER E9

PAGE 1 OF 1

CLIENT Oldham Investors, LLC
PROJECT NUMBER 24-5632
DATE STARTED 11/7/24 COMPLETED 11/7/24
DRILLING CONTRACTOR CFS Engineers
DRILLING METHOD Solid Flight Augers
LOGGED BY CM CHECKED BY JE
NOTES _____

PROJECT NAME OLDHAM VILLAGE
PROJECT LOCATION Lee's Summit, MO
GROUND ELEVATION 1037 ft HOLE SIZE 4 inches
GROUND WATER LEVELS:
AT TIME OF DRILLING --- No Free Water Encountered
AT END OF DRILLING --- No Free Water Encountered
AFTER DRILLING --- No Free Water Encountered

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS			UNCONFINED COMP (psf)
									LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	
0		(GP) 10-inches of GRAVEL										
		FAT CLAY, (CH) dark brown and grayish brown, moist, stiff, mottled red with finger roots	SPT 1	72	4-4-5 (9)	2.75		28				
			SPT 2	94	4-4-5 (9)	2.75		30				
5		(CH) gray and brown below 6'	SPT 3	100	4-4-6 (10)	2.5		30				
		LIMESTONE, moderately weathered										

Refusal at 8.5 feet.
Bottom of borehole at 8.5 feet.



CFS Engineers

CLIENT Oldham Investors, LLC

PROJECT NAME OLDHAM VILLAGE

PROJECT NUMBER 24-5632

PROJECT LOCATION Lee's Summit, MO

DATE STARTED 11/5/24

COMPLETED 11/5/24

GROUND ELEVATION 1040 ft

HOLE SIZE 4 inches

DRILLING CONTRACTOR CFS Engineers

GROUND WATER LEVELS:

DRILLING METHOD Solid Flight Augers

AT TIME OF DRILLING --- No Free Water Encountered

LOGGED BY CM

CHECKED BY JE

AT END OF DRILLING --- No Free Water Encountered

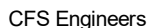
NOTES

AFTER DRILLING --- No Free Water Encountered

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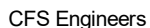
DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS			UNCONFINED COMP (psf)
									LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	
0		(GP) 12-inches of GRAVEL										
		FAT CLAY, (CH) dark grayish brown and brown, moist, stiff, with iron nodules	SPT 1	50	4-4-4 (8)	3.25		27				
		(CH)										
5			SPT 2	94	3-3-6 (9)	3.75		23				
			SPT 3	100	3-4-4 (8)	3.25		25				
10			SPT 4	100	3-4-5 (9)	3		30				
		SHALE, slightly weathered to unweathered, gray and brown, with fine sand	SPT 5	100	16-20-30 (50)	4.5+		19				
15		LIMESTONE, moderately weathered										

Refusal at 16.7 feet.
Bottom of borehole at 16.7 feet.



AFTER DRILLING --- Not Recorded

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AFTER DRILLING --- No Free Water Encountered

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS			UNCONFINED COMP (psf)
									LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	
0												
		5-inches of CONCRETE ----- (GP) 4-inches of BASE ROCK ----- LEAN CLAY, (CL) dark brown, moist, with gravel (FILL)	SPT 1	50	3-3-7 (10)	2.5		18				
		FAT CLAY, (CH) dark grayish brown, moist, medium stiff, with iron nodules	SPT 2	94	2-3-4 (7)	1.5		29				
5		(CH) gray and brown, stiff, with iron striations below 6'	SPT 3	100	3-3-5 (8)	1.75		28				
			SPT 4	100	3-3-6 (9)	3.75		20				
10			SPT 5	100	3-4-6 (10)	3		22				
15		LIMESTONE, moderately weathered	SPT 6	100	50/3"	.75		26				
Refusal at 18.8 feet. Bottom of borehole at 18.8 feet.												



CFS Engineers

BORING NUMBER G2

PAGE 1 OF 1

CLIENT Oldham Investors, LLC
PROJECT NUMBER 24-5632
DATE STARTED 10/25/24 COMPLETED 10/25/24
DRILLING CONTRACTOR CFS Engineers
DRILLING METHOD Solid Flight Augers
LOGGED BY CM CHECKED BY JE
NOTES CASEYS

PROJECT NAME OLDHAM VILLAGE
PROJECT LOCATION Lee's Summit, MO
GROUND ELEVATION 1045 ft HOLE SIZE 4 inches
GROUND WATER LEVELS:
▽ AT TIME OF DRILLING 9.00 ft / Elev 1036.00 ft
AT END OF DRILLING --- Not Recorded
AFTER DRILLING --- Not Recorded

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DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS			UNCONFINED COMP (psf)
									LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	
0		6-inches of CONCRETE										
		(GP) 6-inches of BASE ROCK										
		FAT CLAY, (CH) gray and brown, moist, stiff, with iron nodules and striations	SPT 1	94	2-3-5 (8)	2.5		31	52	15	37	
5			SPT 2	100	3-3-5 (8)	3		28				
		(CH) medium stiff below 6'	SPT 3	100	3-3-4 (7)	3.5		22				
		(CH) stiff below 8'	SPT 4	100	3-3-5 (8)	3.5		27				
10			SPT 5	100	2-5-9 (14)	3.25		28				
15												
		LIMESTONE, moderately weathered										

Refusal at 18.3 feet.
Bottom of borehole at 18.3 feet.



CFS Engineers

BORING NUMBER G3

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CLIENT Oldham Investors, LLC
PROJECT NUMBER 24-5632
DATE STARTED 10/25/24 COMPLETED 10/25/24
DRILLING CONTRACTOR CFS Engineers
DRILLING METHOD Solid Flight Augers
LOGGED BY CM CHECKED BY JE
NOTES CASEYS

PROJECT NAME OLDHAM VILLAGE
PROJECT LOCATION Lee's Summit, MO
GROUND ELEVATION 1046 ft HOLE SIZE 4 inches
GROUND WATER LEVELS:
AT TIME OF DRILLING --- No Free Water Encountered
AT END OF DRILLING --- No Free Water Encountered
AFTER DRILLING --- No Free Water Encountered

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS			UNCONFINED COMP (psf)
									LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	
0		7-inches of CONCRETE										
		(GP) 4-inches of BASE ROCK										
		FAT CLAY, (CH) dark grayish brown, moist, stiff, with iron nodules	SPT 1	89	5-5-5 (10)	3		35				
5			SPT 2	100	3-4-5 (9)	1.75		28				
		(CH) gray and brown, mottled red below 6'	SPT 3	100	2-3-4 (7)	2		30				
		(CH) medium stiff below 6'	SPT 4	100	3-4-6 (10)	3		23				
10			SPT 5	100	4-7-11 (18)	4.5+		19				
15		Stiff below 8' SHALE, highly weathered to moderately weathered, tan										
		LIMESTONE, moderately weathered	SPT 6	100	50/1"							
		Refusal at 18.7 feet. Bottom of borehole at 18.7 feet.										

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