

Geotechnical Investigation



Perkinsville 40

Perkinsville Road and Road 1E
Chino Valley, Arizona
ProTeX Job No.: 10413



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August 13, 2020

Sage Land Holdings, LLC

Re: **Geotechnical Investigation**

Project: Perkinsville 40
Perkinsville Road and Road 1E
Chino Valley, Arizona

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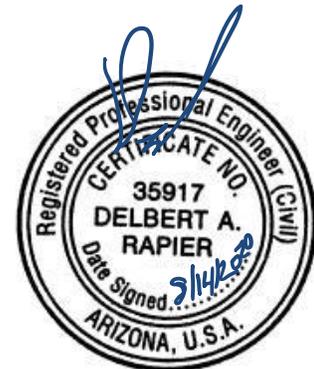
Attention: Mr. Craig Helsing

At your request, ProTeX has completed a soil investigation for the subject project. The accompanying report includes field observations and laboratory testing supporting our conclusions and recommendations for the proposed development.

Respectfully submitted,
ProTeX - the PT Xperts, LLC



Date Expires: 3/31/2021
Thomas M. Perkins, P.E.



Date Expires: 3/31/2022
Delbert A. Rapier, M.S.E., P.E.



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APPENDICES

Appendix A – Laboratory Test Results

Hydro-Collapse Tests/In-Situ Moisture and Densities
Grain Size Distribution, Atterberg Limits and Expansion Tests
Chloride, Sulfate

Appendix B – Site Information

Site Plan

Appendix C-Field Testing

Boring Logs

Appendix D-USCS Classification Chart

Legend

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Executive Summary

ProTeX was contracted by Sage Land Holdings, LLC to provide general information with respect to the engineering characteristics of onsite soils and provide recommendations for foundations and pad preparation for the site referred to as Perkinsville 40 located at Perkinsville Road and Road 1E in Chino Valley, Arizona.

This firm understands the proposed development will consist of one or two story single family residential structures imposing relatively light to moderate foundation loads.

Field investigation and laboratory testing indicated that the site consists mainly of silty sand, sandy silt, lean clay and fat clay. The expansion potential for site soils when foundation bearing soils are exposed to a moisture increase is anticipated to be low to medium for the surface level soils. All lots are subject to expansive soils and post-tensioned slab/foundation systems are recommended.

Settlements at the site are anticipated to be within acceptable tolerances provided that pad preparation is performed as specified and no significant changes in moisture content of foundation/floor slab bearing soils occur and proper drainage and irrigation control are maintained. Drainage should be directed away from the structure and off the lot during and after construction and should be maintained for the life of the project. In no case, should long-term ponding be allowed near structures. Proper design and placement of yard vegetation and irrigation systems should be used so that structural foundation slab bearing soils are not exposed to moisture content fluctuations.

The site is located within an area of regional groundwater withdrawal; however, based on the Earth fissure Maps provided by the Arizona Geological Survey, there is no indication of earth fissures on site or within approximately 80 miles of the site.

Based on the findings of the soils investigation, the site is considered suitable to construct single family residential structures imposing relatively light to moderate foundation loads provided floor and foundation systems are properly designed, soils properly conditioned as specified and proper maintenance of drainage and irrigation systems. All parties should be aware that the site soils are clayey and have a potential for expansion. Fluctuation in moisture content of foundation bearing soils may result in slight movements that may result in cosmetic distress.

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1.0 INTRODUCTION

1.1 Scope

ProTeX was retained by Sage Land Holdings, LLC to evaluate the surface and subsurface soil conditions. The report contains the findings from the field exploration and laboratory testing, with supporting recommendations for the proposed development.

1.2 Proposed Site Development

It is this firm's understanding the proposed development will consist of one or two story single family residential structures using masonry, wood and/or steel frame construction imposing relatively light to moderate foundation loads.

1.3 Terms and Conditions

This report was prepared for Sage Land Holdings, LLC. The contents of this report may not be relied upon by any other party without the expressed written permission of ProTeX - the PT Xperts, LLC and the written permission of Sage Land Holdings, LLC. The report presents site conditions at the time of the investigation and for the aforementioned proposed development. The report should be updated prior to construction if a maximum of one year has elapsed from the issued date.



2.0 FIELD AND LABORATORY TESTING

2.1 Geotechnical Site Reconnaissance

The site consists of approximately 44.3 acres of currently developed residential and agricultural/ranch land. At the time of the field site visit on July 30, 2020 the following site conditions were observed:

- Existing structures were located on site, including residential, wells house, storage, livestock and greenhouse structures
- Various water wells were located on site
- Two (2) trash pits were identified by the contact on site (See the site map in Appendix B for approximate locations)
- Underground utilities including power and water were located on the site
- Overhead power lines transverse from north to south along the alley road
- Moderate coverage of vegetation consisting mainly of grasses and small trees
- General slope and drainage of the site trends toward the north east direction



Figure 1: Existing structures on site



Figure 2: Existing Structures on site



2.2 Historical Aerial Investigation

The following descriptions and Historical Aerial Photographs were obtained from Google Earth and show evidence of former site activities and conditions. Former land use is identified by historical aerial photographs and described based on engineering experience.

Former land use was identified on the property. Former land use included residential homes and storage/agricultural structures. Structures were present on the site prior to 1972.



Figure 1: April of 1972



Figure 2: May of 2003

2.3 Field Investigation

A total of ten (10) test holes were completed at the site for the purpose of evaluating subsurface conditions. Test holes were terminated at a nominal depth of 15 feet. At each test hole location, the soils encountered were visually observed, classified, logged and representative samples were obtained where applicable. Refer to the site plan in Appendix B for approximate test hole locations.

2.4 Laboratory Testing

Subsequent to the field investigation, soil samples were submitted for laboratory testing. Tests were performed to determine the following:

- **Hydro-collapse-** Used to evaluate undisturbed lateral ring confined (obtained from a split-barrel California-type Sampler) one-dimensional vertical soil movement under load (1500 and 3000 psf) to water inundation/saturation in general accordance with the American Society for Testing and Materials (ASTM) Test Method D4546.



- Sieve Analysis and Atterberg Limits-** Used for formal classification of soils in general accordance with the Unified Soil Classification System (USCS) per ASTM Test Method D2487. Sieve analysis is performed in general accordance with ASTM Test Methods D421, D422 and D1140. The Atterberg Limits were determined in general accordance with ASTM Test Method D4318.
- Expansion Index-** To determine the potential expansion of remolded soils based on the Expansion Index Test Method (ASTM D4829).

Expansion Index- Expansive Potential Categorization	
0-20	Very Low
21-50	Low
51-90	Medium
91-130	High
>130	Very High
- Sulfates and Chlorides-** To determine levels of water soluble sulfate (ARIZ 733) and chloride (ARIZ 736) content, which could negatively impact project steel/concrete.

Laboratory Test Summary

Location	Depth (ft)	PI	%Passing #200	% < 0.002mm	USCS Soil Class	Expansion Index
B1	0-3	17	80		CL	
B1	6-8	31	66		CL	
B1	11-13	24	85		CL	
B2	0-3	23	78		CL	
B3	0-3	15	69		ML	
B3	12-14	19	49		SC	
B4	0-3	15	63		ML	
B5	0-3	16	37	5	SM	30
B6	0-3	19	89		ML	
B7	0-3	21	87		CL	58
B7	6-8	32	90		CH	
B8	0-3	15	75		ML	
B9	0-3	21	69		CL	
B10	0-3	16	63		ML	

See Appendix A for a detailed compilation of the laboratory test results.



3.0 GENERAL SITE CONDITIONS

3.1 Soil Stratigraphy

Based on the field exploration and laboratory testing, the subsurface profile to the depths explored, consist primarily of silty sand, sandy silt, lean clay and fat clay of medium to high plasticity. Refer to the boring logs in Appendix C for a detailed description of the subsurface soil profile.

3.2 Potential for Soil Hydro-Collapse (Settlement Potential)

Laboratory tests and Blow Counts (N-values) indicate the subsurface soils are loose/soft and susceptible to hydro-collapse at the anticipated foundation load of 1500psf (See the attached laboratory test results and boring logs). The potential for hydro-consolidation of the subsurface soils can be mitigated. Foundation bearing soils should be over-excavated and re-compacted. (See Section 5.0 – Site Preparation).

3.3 Potential for Soil Expansion (Expansion Potential)

The expansion potential of the native soils, to the depths explored based on ASTM test method D4829, is considered low to medium (Expansion indexes of 30 and 58). Soils selected for testing for expansion potential were those that represented clayey soils with varying plasticity index values to determine the range of expansive potential soils across the site. The Expansion Index values typically tend to be higher with higher plasticity indices as can be seen in the test data for the site.

3.4 Potential for Corrosion

Soils were tested for water soluble sulfates and chlorides The International Building Code specifies limits for soluble sulfate levels of 1000ppm. The soils tested yielded results below these levels and do not require any specialized design requirements. The test results are presented in Appendix A.

3.5 Excavation and Workability

Based on the soil borings, it is anticipated that conventional excavation equipment may be utilized to depths of 15 feet. However, this generalized assessment is not intended to be the sole basis for contractors preparing earthwork bids. Undiscovered shallow bedrock, cemented soils, cobbles, boulders, and weathered/broken bedrock may make excavation more difficult than expected. In

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addition, the relative ease/efficiency of excavation is heavily dependent on operator skill and the type of equipment assigned to the project. Thus, prospective earthwork contractors bidding on this project need to assess site excavation conditions for themselves. Trench shoring, benching, or laying back of excavations greater than 3 feet in depth may be required to satisfy government safety regulations for personnel safety.

3.6 Earth Fissure Review

The site is located within an area of regional groundwater withdrawal. Arizona Geological Survey has been commissioned to study earth fissures associated with the groundwater withdrawal. The Earth Fissure Maps provided by the Arizona Geological Survey indicate no known earth fissures on site or within approximately 80 miles of the site.

3.7 Seismic Characteristics

The subject site is located in an area of low seismic activity. Values have been developed based on knowledge of the local geological conditions, soils encountered during the site investigation of the subsurface soils, and the 2018 International Building Code (IBC). The 2018 IBC references the American Society of Civil Engineers (ASCE) 7-16 standard. Based on knowledge of the geology of the area a 100 feet boring was not advanced.

Site Class	D (Stiff Soil Profile)
Central Latitude	34.7727597°N
Central Longitude	112.4443582 W
S _s Spectral Acceleration for Short Period	0.362g
S ₁ Spectral Acceleration for a 1-Second period	0.112g
F _a Site Coefficient for Short Period	1.51
F _v Site Coefficient for a 1-second Period	2.376



3.8 Liquefaction Potential

The soil encountered during the site investigation consisted of silty sands, sandy silts, lean clays and fat clays. Based on the soil types and the low ground motion hazard (relatively low ground acceleration), the potential for liquefaction of the site soils is considered to be negligible.

3.9 Flood Plains

ProTeX reviewed the Federal Emergency Management Agency (FEMA) Flood Maps and determined the subject site is not within the 100-year flood zone. A partial copy of the FEMA Flood Map with site location is shown to the right. The map indicates the subject site is located in a Zone X, which is an area of 0.2% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood. The FEMA map reviewed is Map Number 04025C21315G and revision date of September 3, 2010.

3.10 Groundwater

ProTeX reviewed the Arizona Department of Water Resources (ADWR), GIS Groundwater Data and referenced monitored wells within the vicinity of the subject site. Wells located within this radius indicated depths of water ranging from 25 to 116 feet below ground surface. Wells were measured using different techniques such as ADWR calibrated electric sounder and steel tape.

3.11 Shrinkage

Field and laboratory tests such as blow counts (N-values), in-situ densities, and hydro-collapse testing indicates that during grading, soils will likely be compacted to densities greater than the current density of the native soils. Both site specific testing and experience indicates that there is variability of the site soils subsurface and thus shrinkage across the site will vary such that uniform shrinkage across this site during earthwork operations is unlikely. The shrinkage values provided are based on standard construction techniques and may vary depending on the equipment used and the manner in which the grading is performed.

Depth (ft)	Estimated Shrinkage (%)
0-3	15-20



4.0 RECOMMENDATIONS

The recommendations contained herein are based on the findings of the field investigation, laboratory test results and local experience.

4.1 Foundations

It is highly recommended that the design of foundations be done under the direction of a registered professional engineer with structural expertise. Post-tension slab-on-grade foundations may be utilized in the design of light to moderately loaded single family residential structures. Conventional foundations can be utilized for isolated patio footings, site walls or in conjunction with post-tensioned slabs. It is recommended that foundation excavations be inspected prior to placement of concrete to ensure they are free of debris and loose soils. Laboratory testing indicates that the expansion potential varies at the site ranging from very low to high: thus, it is recommended that a post-grading soils report be performed following site grading activities to determine final foundation design parameters.

4.1.1 Conventional Foundation System for Patios and Site Walls

Shallow foundations systems should bear a minimum of 2.0 feet (for patios) and 1.5 feet (for site and retaining walls) below lowest adjacent grade extending laterally within 5 lateral feet from the edge of foundation. Due to the properties of the native soils as indicated by laboratory testing, it is recommended that foundations bear on native undisturbed soils or controlled compacted fill. Controlled compacted fill may consist of on-site and/or imported material that is placed or areas that are scarified, moisture processed and re-compacted. The following table provides allowable bearing capacities for the site.

Allowable Bearing Capacity for Shallow Depth Conventional Foundation Systems for Patios:

*Footing Depth (ft.)	Bearing Stratum	Allowable Soil Bearing Capacity
2.0	Firm Undisturbed Native soils or Controlled Compacted Fill	1500 psf

**Depth to base of perimeter footings is measured from the lowest adjacent finished grade elevation within 5 feet of edge of footing. Depth to base of interior footings measured from top of floor slab.*

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Allowable Bearing Capacity for Shallow Depth Conventional Foundation Systems for Site and Retaining Walls:

*Footing Depth (ft.)	Bearing Stratum	Allowable Soil Bearing Capacity
1.5	Firm Undisturbed Native soils or Controlled Compacted Fill	1500 psf

**Depth to base of perimeter footings is measured from the lowest adjacent finished grade elevation within 5 feet of edge of footing. Depth to base of interior footings measured from top of floor slab.*

Foundation widths should meet building code minimums and should not be larger than 7 feet and 4 feet, for spread and continuous foundations, respectively.

The recommended foundation bearing pressures should be considered allowable maximums for dead plus design live loads and may be increased by one-third when considering total loads including transient wind or seismic forces. The weight of the foundation concrete below grade may be neglected in dead load computations.

Foundation excavations should be inspected to verify that they are free of loose soil that may have blown or sloughed into the excavations and ensure that the footings will bear upon firm native undisturbed soils or engineered fill.

The stem walls should be well reinforced to distribute stresses caused by possible non-uniform bearing capacity and/or minor differential foundation movements. It is recommended that stem walls and footings be reinforced. The structural engineer should design the footings and stems for the site soil conditions.

Preparation of the site to raise or lower the building pad should be done in accordance to the Section 5 - Site Preparation.



4.1.2 Post-tension Slab-on-Grade Foundation System

For the purpose of the post-tension slab design an allowable bearing capacity of 1250psf is assigned. The post-tensioned foundation system should bear on the existing soils provided they are firm.

The following design parameters are assigned for use in the structural design of the foundation systems. **Turndowns shall be embedded 18 inches to meet Yavapai County frost penetration requirements and provide a limited vertical moisture barrier.** The following design parameters are based on the turndowns on the perimeter of the structure extending to a depth of 18 inches.

<i>Soil Subgrade Modulus (Ks)(for compacted fill):</i>	<i>150pci</i>
<i>Edge Moisture Variation (Em):</i>	
<i>Edge Lift Condition:</i>	<i>3.9 feet</i>
<i>Center Lift Condition:</i>	<i>7.5 feet</i>
<i>Maximum Differential Soil Movement (Ym):</i>	
<i>Edge Lift Condition:</i>	<i>1.5 inches</i>
<i>Center Lift Condition</i>	<i>0.7 inches</i>

4.2 Exterior Slab-on-Grade

Exterior slabs on grade should bear directly on grade and contain a minimum of 5.0 sacks of Portland cement per cubic yard with a minimum thickness of 5 inches. A minimum of 6 inches of subgrade should be scarified moisture processed and compacted to the specifications in the earthwork section of this report.

4.3 Lateral Loadings

The design of retaining walls for the site should be designed to retain the lateral loads applied by the site soils. The following values are provided in Equivalent Fluid Pressures for unrestrained, restrained and passive resistance.



Lateral Equivalent Fluid Pressures for Backfill:	
*Unrestrained Walls	35 pcf
*Restrained Walls	50 pcf
Passive Resistance	373 pcf
Coefficient of Base Friction:	0.50

**The backfill pressures stated do not include temporary forces imposed during compaction of the backfill, swelling pressures developed by over-compacted clayey backfill soils, hydrostatic pressures from inundation of backfills, and/or surcharge loads. Walls should be suitably braced during backfilling to prevent damage and deflection.*

Design of below grade structures should account for or prevent potential hydrostatic buildup. In addition, any below grade structure penetrations to facilitate drainage may allow piping of soil and water if not addressed properly in the design of the structure.

4.4 Drainage

Establishment and long term maintenance of proper lot post-construction surface drainage is critical. Because of the potential for an adverse effect

on structures, it is highly recommended that moisture infiltration and fluctuation of bearing soils for structural foundation/floor be minimized. Roof runoff should be collected and discharged away from the house structures. Drainage of surface water away from the



structures should be provided during construction and maintained by the homeowner throughout the life of the structure. In no case, should long-term ponding be allowed near house structures. IRC Section R401.3 specifically requires “The grade away from the foundation walls shall fall a minimum of 6 inches within the first 10 feet. Where lot lines, walls, slopes or other physical barriers prohibit 6 inches of fall within 10 feet, drains or swales shall be provided to ensure drainage away from the house structure”. Thus, un-drained landscape “islands” bounded by concrete flatwork and/or foundation wall/slab elements are to be avoided. Installation of rain gutters along the perimeter of the residential structure with drain systems to transport water away from the foundation and to the outfall of the lot is recommended to minimize moisture infiltration and fluctuation of bearing soils for structural foundation/floor systems.

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In yard areas, it is suggested that, where possible, finished slopes extend a minimum of 10 feet horizontally from building walls and have a minimum vertical fall of 6 inches. Backfill against footings, exterior walls and in utility trenches should be compacted to minimize the possibility of moisture infiltration through loose soil.

Drainage and moisture infiltration should be considered during landscaping design and placement to ensure foundation and slab bearing soils are not exposed to moisture infiltration or moisture content fluctuation. Distance from house structures to vegetative plants, planters, irrigation lines or landscape borders should not be less than 3 feet. Trees should be placed at a distance of 8 feet or more. Landscape irrigation schedules should be adjusted for climatic changes to minimize moisture content fluctuation of foundation bearing soils.

4.5 Slope Stability

Stability of cut and fill slopes are dependent on soil properties such as density, cohesion, moisture content, etc. Site specific laboratory testing and experience indicates that these properties can vary significantly across the site. Temporary slopes for installation of underground utilities or structures should follow OSHA guidelines. A minimum slope of 2.5:1 horizontal to vertical may be utilized for design of cut slopes and compacted fill slopes. The slope recommendation does not consider safety for fall dangers.

4.6 Pavement Section Recommendations

The pavement recommendations have been prepared in accordance with ADOT requirements. The design for local/residential streets is based on surface soil properties, ADOT Pavement Design Manual and local engineering experience. The pavement design was based on the following parameters for local/residential roadways:

Analysis Period	20years
Change in Serviceability Factor	1.6
Regional Factor	2.7
*Design R-value	18.0
Resilient Modulus	5845psi
Reliability	75%

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Standard Deviation	0.45
Structural Coefficients	
Asphaltic Concrete	0.44
Aggregate Base	0.14
Equivalent Single Axle Load (ESAL)	
Local/residential Streets	200,000
Calculated Minimum Structural Number	2.61
<i>*R-value is based on the corrected R-values using percent passing #200 and PI</i>	

Recommendations for pavement sections utilizing Asphaltic Concrete (AC) Pavement:

Street Classification	AC (inches)	ABC (inches)	Design SN
Local Streets/Residential Streets	3.0	10.0	2.72

It should be noted that the design for Pavement Sections only account for subgrade soil properties with respect to traffic loads/volumes and does not take in to account the potential for heave from expansive soils found on-site. Following the movement of site soils during rough grading and earthwork construction, additional samples may be taken within the limits of the proposed roadway to confirm subgrade classification according to. If soils are classified as expansive then alternative corrective measures shall be recommended by the geotechnical engineer.

Care should be taken with regard to parkway grading, placement of landscape vegetation and irrigation systems to minimize moisture infiltration in subgrade soils below pavement sections. In addition, the use of monolithic curb/sidewalk combination placement and soil cement of subgrade soils may be considered for long-term performance.

Pavement materials and placement should conform to ADOT specifications. In no case should pavement surfacing be placed on unstable wet subgrade and/or aggregate base course.

5.0 SITE PREPARATION

The following recommendations are presented for site grading. *It is recommended that a ProTeX geotechnical engineer's representative observe and test the earthwork and foundation portions of this project to ensure compliance with this Soil Investigation report.*

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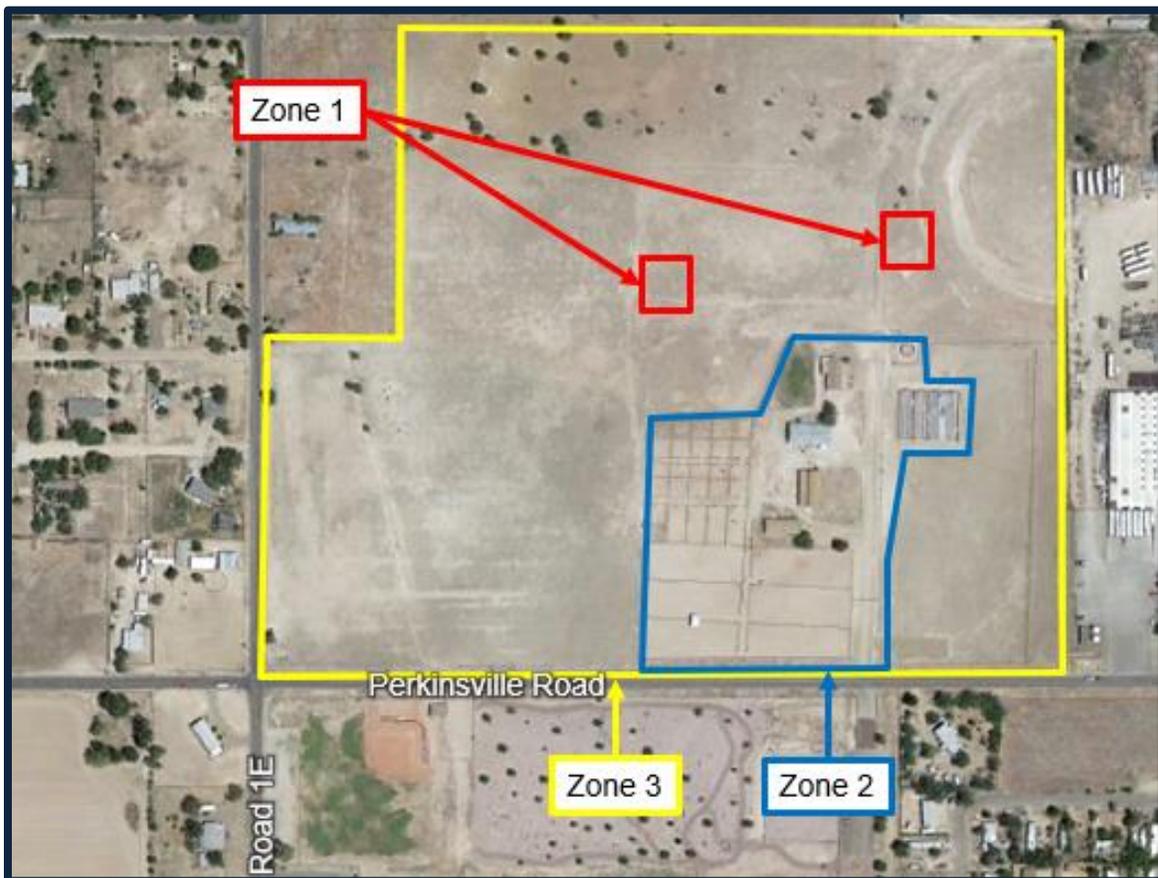


Prior to placement of fill a representative of ProTeX should observe the clearing process. Clearing will include removal of (including but not necessarily limited to):

- Abandoned utilities
- Septic tanks/wells
- Possible buried trash/debris
- Existing structures, foundations and concrete flat work

The areas cleared should be inspected prior to and during scarification for evidence of organic material or loose areas that may require additional removal or processing.

Due to the former development, the site has been divided into three (3) over excavation zones. See the map below for Over Excavation Zone designations.





Zone 1 (Red) – Trash Pit Area

Due to possible buried debris and/or undocumented fill, the surface soils should be over-excavated a minimum depth of 10.0 foot below existing grade or to firm native soils. Firm native soils should be verified by a representative of ProTeX prior to backfill. Additional investigation may be performed to further identify the area.

Zone 2 (Blue) – Existing Structures

Due to existing structures and abandoned underground utilities, the surface soils should be over-excavated a minimum depth of 2.0 foot below existing grade or 1.0 foot below final pad elevation, whichever is deeper. All abandoned underground utilities should be chased and removed.

Zone 3 (Yellow) – Remainder of the site

Due to loose/soft surface soils and site vegetation, the surface soils should be over-excavated a minimum depth of 1.0 foot below existing grade or 1.0 foot below final ad elevation, whichever is deeper.

It is recommended that the over-excavation extend across the entire building pad and to a minimum lateral distance of five feet beyond foundation edges.

After clearing and over-excavation, **the exposed soils should be scarified a minimum of 8 inches, moisture conditioned and compacted.** The surface should be free from ruts, or other uneven features that would tend to prevent uniform compaction by the equipment used.

Sloping areas steeper than 5:1 (horizontal: vertical) should be benched to reduce the potential for slippage between slopes and fills. Benches should be level and wide enough to accommodate compaction and earth moving equipment.

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If deep cuts are needed on site, special care should be taken to avoid placement of soils like those found, at boring location B1 and B7 below 6 feet, are not placed in the building pad areas due to higher potential for expansion. Fill material should be free of organics, vegetative matter, deleterious or foreign material, rocks, and lumps having a diameter of more than 6 inches. Native soils may be used as fill material provided; they are compacted as specified. If imported fill material is required, it should be approved very low expansive potential soils.

Fill material should be placed in layers, that when compacted, do not exceed 6 inches. Each layer should then be placed evenly and thoroughly mix during spreading to ensure uniformity of moisture throughout each layer. Each fill layer should be compacted to specified density and moisture content. **Special care should be taken during the backfill operations for the deep fills in the trash pit (Zone 1) area, to ensure compliance with the deeper compaction specifications listed in the table below.**

Compaction equipment should be able to compact the fill to the specified density. Compaction of each layer should be continuous over its entire area and the compaction equipment should make sufficient passes to ensure that density has been obtained.

Soil compaction is recommended to the following densities and moisture contents as determined in accordance with ASTM D-698, AASHTO T-99 or applicable equivalent:

Compaction Specifications for Post-Tension and Conventional Foundations		
Material	Compaction	Percent Moisture
Below Conventional Foundation Level and Post-Tension Slab-on-Grade	90-95%	Optimum to +4
Fills at Depths 5 to 10 Feet Below Finish Grade	98% Min	-2 to +2 of Optimum
Fills at Depths 10 Feet or Greater Below Finish Grade	100% Min	-2 to +2 of Optimum

A ProTeX geotechnical engineer’s representative should observe the grading operations to verify that all cut and fill areas are in accordance with the specifications. This office should be notified prior to earthwork operations so that appropriate observation and materials testing can be provided.

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When work is interrupted by heavy rains, fill operations should not be resumed until the geotechnical engineer's representative indicates that the moisture content and density of the previously placed fill are as specified.

If building pads are altered or portions excavated as a part of construction activities, fill soils should be compacted as specified. If pads are not built on for an extended period of time, reconditioning of build pads may be required. Should this be the case, a representative of ProTeX should evaluate the pads for further recommendations.

6.0 CLOSURE

6.1 Limitations

The recommendations contained in this report are based on the assumption that the subsurface conditions do not deviate appreciably from those disclosed by the test holes. Should unusual material or conditions be encountered during construction, the ProTeX geotechnical engineer should be notified to make supplemental recommendations should this be required. This report is issued with the understanding that it is the responsibility of the owner to see that its provisions are carried out or brought to the attention of those concerned.

The scope of services for this project does not include any environmental assessment of the site or identification of contaminated or hazardous materials or conditions.

The findings of this report are considered valid as of the present date. However, changes in the conditions of the site can occur with the passage of time, whether due to natural events or to human activities on this or adjacent sites. In addition, changes in applicable or appropriate codes and standards may occur, whether they result from legislation or the broadening of knowledge. Accordingly, this report may become invalidated wholly or partially by changes outside our control. Therefore, this report is subject to review and revision as changed conditions are identified.



6.2 Recommended Additional Services

The recommendations provided in this report are based on the assumption that a testing plan will be implemented with an adequate schedule of testing to ensure that the construction process meets the recommendations/specifications presented in this report. The testing and observation should be performed under the direction of the ProTeX Geotechnical Engineer/representative and should include, but not necessarily be limited to the following:

1. Observe and document that the existing surface and subsurface structures, vegetation and abandoned utilities are removed from the site as required in the earthwork section.
2. Approve and document that fill material used as engineered fill in building and pavement areas meets the specifications.
3. After clearing the site; monitor the over excavation, scarification and removal of any soft/loose conditions down to firm native soils.
4. Monitor and test placement of fill soils in building and pavement locations to verify and document conformance with project specifications.

Appendix A

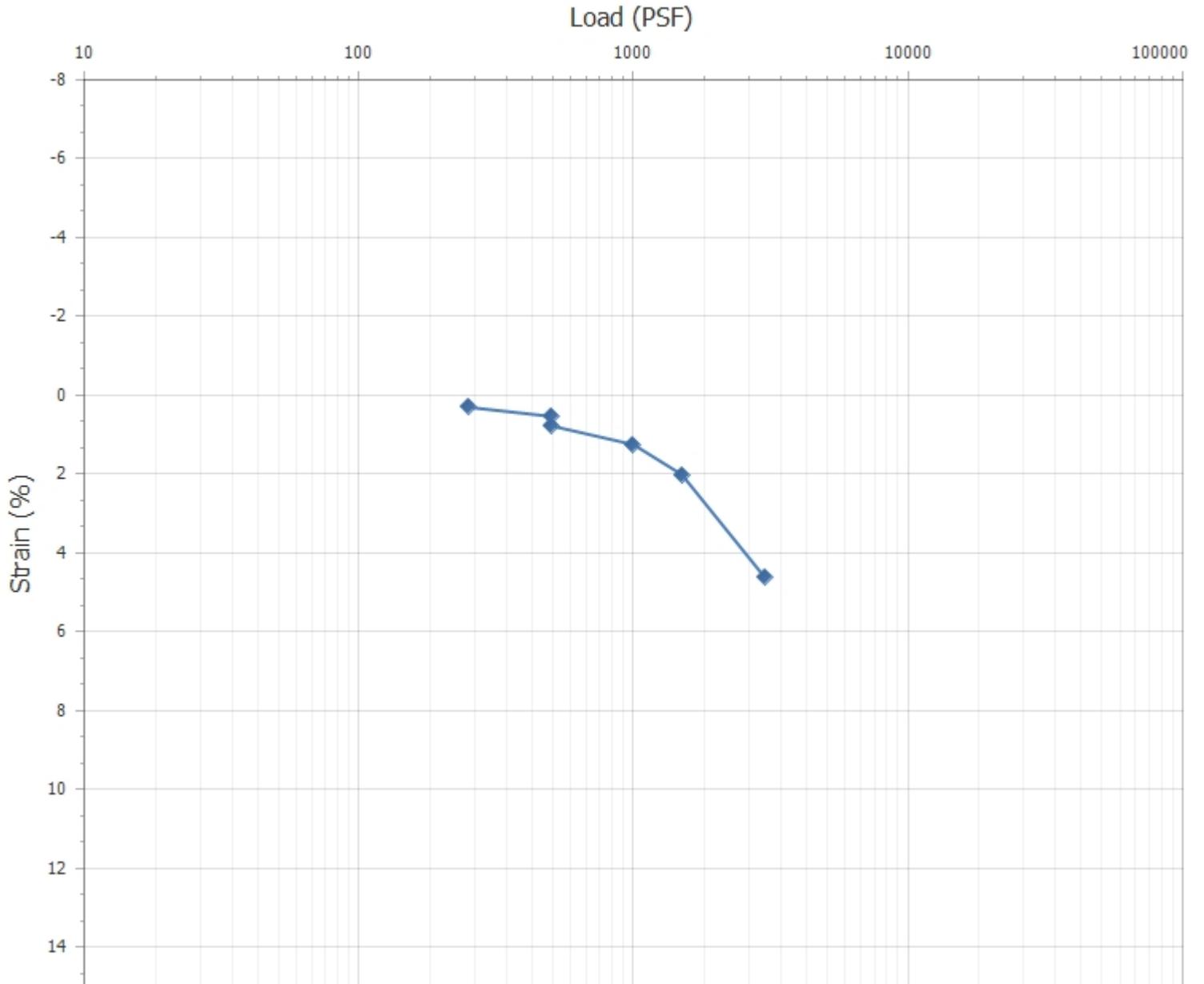


ProTeX the PT Xperts LLC
 1102 W. Southern Ave., Ste. 4 Office: (602)-272-7891
 Tempe, AZ 85282 Fax: (602) 272-7892

Consolidation

Client: Sage Land Holding, LLC
 Project Name: Perkinsville 40
 Job Name: 1204 E Perkinsville Rd
 Material: Geo (Native)
 Material Supplier: -
 Sample Location: B1 (Ring 1.5')

ProTeX Job No: 10413
 ProTeX Lab No: 204974 - Phoenix
 Date Received: 8/3/2020
 Sampled By: Amos McCurdy
 Date Sampled: 7/30/2020
 Submitted By: Amos McCurdy



Source: B1 - Ring 1.5'

Moisture Content: 9.6 %

Sample Type: Undisturbed

Dry Unit Weight: 88.7 lb/ft³

Load at Saturation: 500 PSF

Remarks:

Reviewed By: jgrossarth

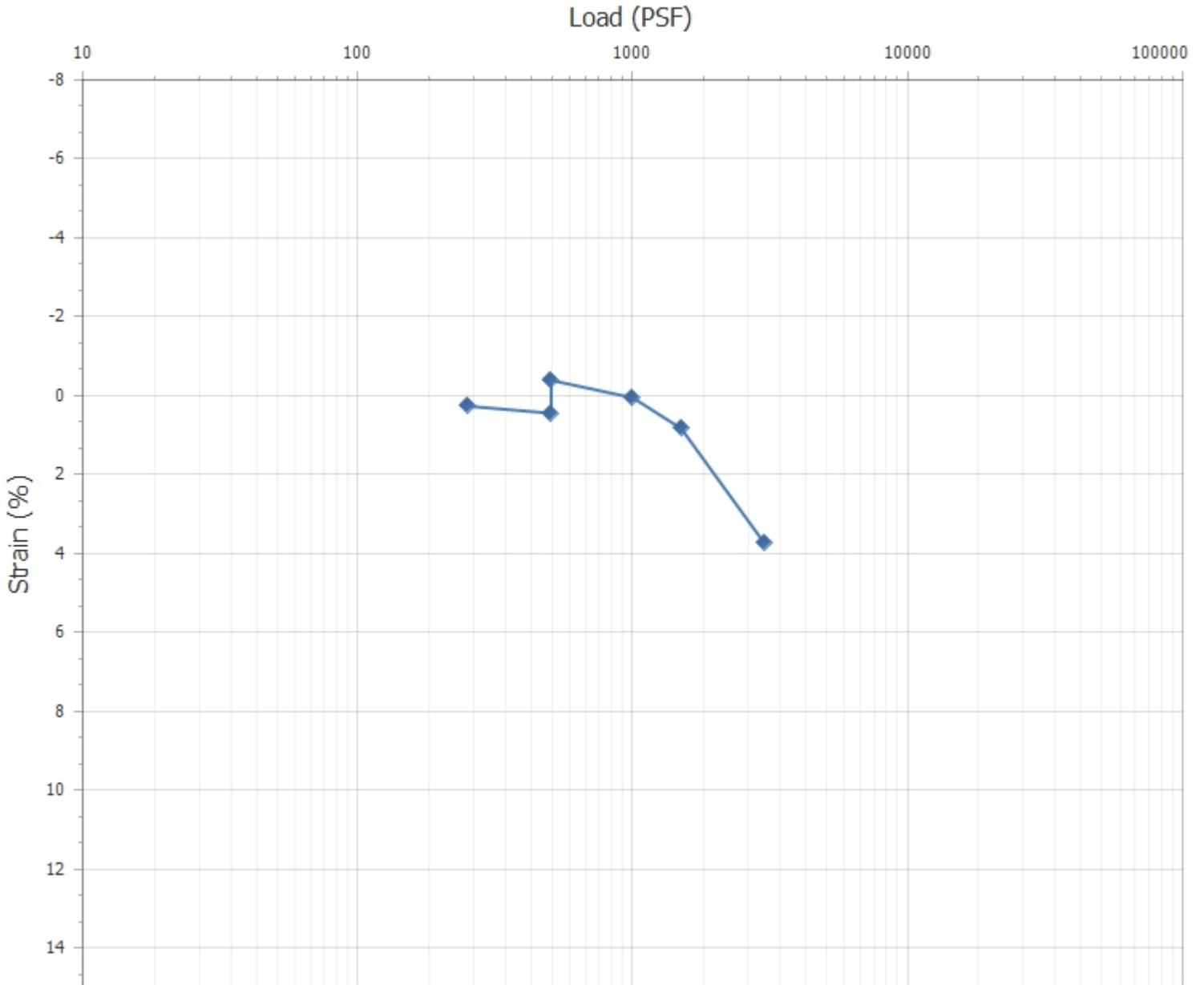


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Consolidation

Client: Sage Land Holding, LLC
 Project Name: Perkinsville 40
 Job Name: 1204 E Perkinsville Rd
 Material: Geo (Native)
 Material Supplier: -
 Sample Location: B1 (Ring 5')

ProTeX Job No: 10413
 ProTeX Lab No: 204975 - Phoenix
 Date Received: 8/3/2020
 Sampled By: Amos McCurdy
 Date Sampled: 7/30/2020
 Submitted By: Amos McCurdy



Source: B1 - Ring 5'

Moisture Content: 11.8 %

Sample Type: Undisturbed

Dry Unit Weight: 85.6 lb/ft³

Load at Saturation: 500 PSF

Remarks:

Reviewed By: jgrossarth



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Soils Summary

Client: Sage Land Holding, LLC
 Project Name: Perkinsville 40
 Job Name: 1204 E Perkinsville Rd
 Material: Geo (Native)
 Material Supplier: -
 Sample Location: B1 (0-3')

ProTeX Job No: 10413
 ProTeX Lab No: 204960 - Phoenix
 Date Received: 8/3/2020
 Sampled By: Amos McCurdy
 Date Sampled: 7/30/2020
 Submitted By: Amos McCurdy

ASTM D4318	
Plasticity Index	
Liquid Limit	39
Plastic Limit	22
Plasticity Index	17

Expansion Index, (EI)	Potential Expansion
0 - 20	Very Low
21 - 51	Low
52 - 90	Medium
91 - 130	High
> 130	Very High

Expansion Index	
EI =	NA

Percent Swell of Soil	
% Swell	NV
Notes:	

pH and Resistivity	
pH Reading:	NA
Resistivity (ohms-cm)	NA

Moisture Density (Proctor)	
Max. Dry Density	NV
Opt. Moisture %	NV
Corr. Max. Dry Density	NV
Corr. Opt. Moisture %	NV
% Rock	0

Class: Lean clay with sand
 Symbol: CL

* = out of specification

ASTM D1140 / D422			
Sieve	% Pass	Specs	*
1"	100		
1/2"	100		
#4	100		
#10	98		
#40	91		
#100	84		
#200	80		

Remarks:

Reviewed By:

Jayde Moloney



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Soils Summary

Client: Sage Land Holding, LLC
 Project Name: Perkinsville 40
 Job Name: 1204 E Perkinsville Rd
 Material: Geo (Native)
 Material Supplier: -
 Sample Location: B1 (6-8')

ProTeX Job No: 10413
 ProTeX Lab No: 204961 - Phoenix
 Date Received: 8/3/2020
 Sampled By: Amos McCurdy
 Date Sampled: 7/30/2020
 Submitted By: Amos McCurdy

ASTM D4318	
Plasticity Index	
Liquid Limit	49
Plastic Limit	18
Plasticity Index	31

Expansion Index, (EI)	Potential Expansion
0 - 20	Very Low
21 - 51	Low
52 - 90	Medium
91 - 130	High
> 130	Very High

Expansion Index	
EI =	NA

Percent Swell of Soil	
% Swell	NV
Notes:	

pH and Resistivity	
pH Reading:	NA
Resistivity (ohms-cm)	NA

Moisture Density (Proctor)	
Max. Dry Density	NV
Opt. Moisture %	NV
Corr. Max. Dry Density	NV
Corr. Opt. Moisture %	NV
% Rock	1

Class: Sandy lean clay

Symbol: CL

* = out of specification

ASTM D1140 / D422			
Sieve	% Pass	Specs	*
1"	100		
1/2"	100		
#4	99		
#10	96		
#40	86		
#100	75		
#200	66		

Remarks:

Reviewed By:

Jayde Moloney



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Soils Summary

Client: Sage Land Holding, LLC
 Project Name: Perkinsville 40
 Job Name: 1204 E Perkinsville Rd
 Material: Geo (Native)
 Material Supplier: -
 Sample Location: B1 (11-13')

ProTeX Job No: 10413
 ProTeX Lab No: 204962 - Phoenix
 Date Received: 8/3/2020
 Sampled By: Amos McCurdy
 Date Sampled: 7/30/2020
 Submitted By: Amos McCurdy

ASTM D4318	
Plasticity Index	
Liquid Limit	42
Plastic Limit	18
Plasticity Index	24

Expansion Index, (EI)	Potential Expansion
0 - 20	Very Low
21 - 51	Low
52 - 90	Medium
91 - 130	High
> 130	Very High

Expansion Index	
EI =	NA

Percent Swell of Soil	
% Swell	NV
Notes:	

pH and Resistivity	
pH Reading:	NA
Resistivity (ohms-cm)	NA

Moisture Density (Proctor)	
Max. Dry Density	NV
Opt. Moisture %	NV
Corr. Max. Dry Density	NV
Corr. Opt. Moisture %	NV
% Rock	NV

Class: Lean clay with sand

Symbol: CL

* = out of specification

ASTM D1140 / D422			
Sieve	% Pass	Specs	*
1"	100		
1/2"	100		
#4	100		
#10	99		
#40	96		
#100	89		
#200	85		

Remarks:

Reviewed By:

Jayde Moloney



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Soils Summary

Client: Sage Land Holding, LLC
 Project Name: Perkinsville 40
 Job Name: 1204 E Perkinsville Rd
 Material: Geo (Native)
 Material Supplier: -
 Sample Location: B2 (0-3')

ProTeX Job No: 10413
 ProTeX Lab No: 204963 - Phoenix
 Date Received: 8/3/2020
 Sampled By: Amos McCurdy
 Date Sampled: 7/30/2020
 Submitted By: Amos McCurdy

ASTM D4318	
Plasticity Index	
Liquid Limit	47
Plastic Limit	24
Plasticity Index	23

Expansion Index, (EI)	Potential Expansion
0 - 20	Very Low
21 - 51	Low
52 - 90	Medium
91 - 130	High
> 130	Very High

Expansion Index	
EI =	NA

Percent Swell of Soil	
% Swell	NV
Notes:	

pH and Resistivity	
pH Reading:	NA
Resistivity (ohms-cm)	NA

Moisture Density (Proctor)	
Max. Dry Density	NV
Opt. Moisture %	NV
Corr. Max. Dry Density	NV
Corr. Opt. Moisture %	NV
% Rock	3

Class: Lean clay with sand

Symbol: CL

* = out of specification

ASTM D1140 / D422			
Sieve	% Pass	Specs	*
1"	100		
1/2"	98		
#4	97		
#10	96		
#40	91		
#100	84		
#200	78		

Remarks:

Reviewed By:

Jayde Moloney



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Soils Summary

Client: Sage Land Holding, LLC
 Project Name: Perkinsville 40
 Job Name: 1204 E Perkinsville Rd
 Material: Geo (Native)
 Material Supplier: -
 Sample Location: B3 (0-3')

ProTeX Job No: 10413
 ProTeX Lab No: 204964 - Phoenix
 Date Received: 8/3/2020
 Sampled By: Amos McCurdy
 Date Sampled: 7/30/2020
 Submitted By: Amos McCurdy

ASTM D4318	
Plasticity Index	
Liquid Limit	42
Plastic Limit	27
Plasticity Index	15

Expansion Index, (EI)	Potential Expansion
0 - 20	Very Low
21 - 51	Low
52 - 90	Medium
91 - 130	High
> 130	Very High

Expansion Index	
EI =	NA

Percent Swell of Soil	
% Swell	NV
Notes:	

pH and Resistivity	
pH Reading:	NA
Resistivity (ohms-cm)	NA

Moisture Density (Proctor)	
Max. Dry Density	NV
Opt. Moisture %	NV
Corr. Max. Dry Density	NV
Corr. Opt. Moisture %	NV
% Rock	5

Class: Sandy silt

Symbol: ML

* = out of specification

ASTM D1140 / D422			
Sieve	% Pass	Specs	*
1"	100		
1/2"	100		
#4	95		
#10	92		
#40	83		
#100	75		
#200	69		

Remarks:

Reviewed By:

Jayde Moloney



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Soils Summary

Client: Sage Land Holding, LLC
 Project Name: Perkinsville 40
 Job Name: 1204 E Perkinsville Rd
 Material: Geo (Native)
 Material Supplier: -
 Sample Location: B3 (12-14')

ProTeX Job No: 10413
 ProTeX Lab No: 204965 - Phoenix
 Date Received: 8/3/2020
 Sampled By: Amos McCurdy
 Date Sampled: 7/30/2020
 Submitted By: Amos McCurdy

ASTM D4318	
Plasticity Index	
Liquid Limit	38
Plastic Limit	19
Plasticity Index	19

Expansion Index, (EI)	Potential Expansion
0 - 20	Very Low
21 - 51	Low
52 - 90	Medium
91 - 130	High
> 130	Very High

Expansion Index	
EI =	NA

Percent Swell of Soil	
% Swell	NV
Notes:	

pH and Resistivity	
pH Reading:	NA
Resistivity (ohms-cm)	NA

Moisture Density (Proctor)	
Max. Dry Density	NV
Opt. Moisture %	NV
Corr. Max. Dry Density	NV
Corr. Opt. Moisture %	NV
% Rock	17

Class: Clayey sand with gravel

Symbol: SC

* = out of specification

ASTM D1140 / D422			
Sieve	% Pass	Specs	*
1"	100		
1/2"	92		
#4	83		
#10	77		
#40	62		
#100	53		
#200	49		

Remarks:

Reviewed By:

Jayde Moloney



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Soils Summary

Client: Sage Land Holding, LLC
 Project Name: Perkinsville 40
 Job Name: 1204 E Perkinsville Rd
 Material: Geo (Native)
 Material Supplier: -
 Sample Location: B4 (0-3')

ProTeX Job No: 10413
 ProTeX Lab No: 204966 - Phoenix
 Date Received: 8/3/2020
 Sampled By: Amos McCurdy
 Date Sampled: 7/30/2020
 Submitted By: Amos McCurdy

ASTM D4318	
Plasticity Index	
Liquid Limit	44
Plastic Limit	29
Plasticity Index	15

Expansion Index, (EI)	Potential Expansion	Expansion Index
0 - 20	Very Low	
21 - 51	Low	
52 - 90	Medium	
91 - 130	High	
> 130	Very High	

Percent Swell of Soil	
% Swell	NV
Notes:	

pH and Resistivity	
pH Reading:	NA
Resistivity (ohms-cm)	NA

Moisture Density (Proctor)	
Max. Dry Density	NV
Opt. Moisture %	NV
Corr. Max. Dry Density	NV
Corr. Opt. Moisture %	NV
% Rock	1

Class: Sandy silt

Symbol: ML

* = out of specification

ASTM D1140 / D422			
Sieve	% Pass	Specs	*
1"	100		
1/2"	100		
#4	99		
#10	98		
#40	90		
#100	76		
#200	63		

Remarks:

Reviewed By:

Jayde Moloney



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Soils Summary

Client: Sage Land Holding, LLC
 Project Name: Perkinsville 40
 Job Name: 1204 E Perkinsville Rd
 Material: Geo (Native)
 Material Supplier: -
 Sample Location: B5 (0-3')

ProTeX Job No: 10413
 ProTeX Lab No: 204967 - Phoenix
 Date Received: 8/3/2020
 Sampled By: Amos McCurdy
 Date Sampled: 7/30/2020
 Submitted By: Amos McCurdy

ASTM D4318	
Plasticity Index	
Liquid Limit	46
Plastic Limit	30
Plasticity Index	16

ASTM D4829		
Expansion Index, (EI)	Potential Expansion	Expansion Index
0 - 20	Very Low	
21 - 51	Low	
52 - 90	Medium	
91 - 130	High	
> 130	Very High	

Percent Swell of Soil	
% Swell	NV
Notes:	

pH and Resistivity	
pH Reading:	NA
Resistivity (ohms-cm)	NA

Moisture Density (Proctor)	
Max. Dry Density	NV
Opt. Moisture %	NV
Corr. Max. Dry Density	NV
Corr. Opt. Moisture %	NV
% Rock	4

Class: Silty sand
 Symbol: SM

* = out of specification

ASTM D1140 / D422			
Sieve	% Pass	Specs	*
1"	100		
1/2"	100		
#4	96		
#10	81		
#40	55		
#100	44		
#200	37		

Remarks:

Reviewed By:

Jayde Moloney



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Soils Summary

Client: Sage Land Holding, LLC
 Project Name: Perkinsville 40
 Job Name: 1204 E Perkinsville Rd
 Material: Geo (Native)
 Material Supplier: -
 Sample Location: B6 (0-3')

ProTeX Job No: 10413
 ProTeX Lab No: 204968 - Phoenix
 Date Received: 8/3/2020
 Sampled By: Amos McCurdy
 Date Sampled: 7/30/2020
 Submitted By: Amos McCurdy

ASTM D4318	
Plasticity Index	
Liquid Limit	48
Plastic Limit	29
Plasticity Index	19

Expansion Index, (EI)	Potential Expansion
0 - 20	Very Low
21 - 51	Low
52 - 90	Medium
91 - 130	High
> 130	Very High

Expansion Index	
EI =	NA

Percent Swell of Soil	
% Swell	NV
Notes:	

pH and Resistivity	
pH Reading:	NA
Resistivity (ohms-cm)	NA

Moisture Density (Proctor)	
Max. Dry Density	NV
Opt. Moisture %	NV
Corr. Max. Dry Density	NV
Corr. Opt. Moisture %	NV
% Rock	2

Class: Silt
 Symbol: ML

* = out of specification

ASTM D1140 / D422			
Sieve	% Pass	Specs	*
1"	100		
1/2"	100		
#4	98		
#10	96		
#40	93		
#100	91		
#200	89		

Remarks:

Reviewed By:

Jayde Moloney



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Soils Summary

Client: Sage Land Holding, LLC
 Project Name: Perkinsville 40
 Job Name: 1204 E Perkinsville Rd
 Material: Geo (Native)
 Material Supplier: -
 Sample Location: B7 (0-3')

ProTeX Job No: 10413
 ProTeX Lab No: 204969 - Phoenix
 Date Received: 8/3/2020
 Sampled By: Amos McCurdy
 Date Sampled: 7/30/2020
 Submitted By: Amos McCurdy

ASTM D4318	
Plasticity Index	
Liquid Limit	48
Plastic Limit	27
Plasticity Index	21

ASTM D4829		
Expansion Index, (EI)	Potential Expansion	Expansion Index EI = 58
0 - 20	Very Low	
21 - 51	Low	
52 - 90	Medium	
91 - 130	High	
> 130	Very High	

Percent Swell of Soil	
% Swell	NV
Notes:	

pH and Resistivity	
pH Reading:	NA
Resistivity (ohms-cm)	NA

Moisture Density (Proctor)	
Max. Dry Density	NV
Opt. Moisture %	NV
Corr. Max. Dry Density	NV
Corr. Opt. Moisture %	NV
% Rock	2

Class: Lean clay

Symbol: CL

* = out of specification

ASTM D1140 / D422			
Sieve	% Pass	Specs	*
1"	100		
1/2"	100		
#4	98		
#10	97		
#40	92		
#100	89		
#200	87		

Remarks:

Reviewed By:

Jerald W Grossarth



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Soils Summary

Client: Sage Land Holding, LLC
 Project Name: Perkinsville 40
 Job Name: 1204 E Perkinsville Rd
 Material: Geo (Native)
 Material Supplier: -
 Sample Location: B7 (6-8')

ProTeX Job No: 10413
 ProTeX Lab No: 204970 - Phoenix
 Date Received: 8/3/2020
 Sampled By: Amos McCurdy
 Date Sampled: 7/30/2020
 Submitted By: Amos McCurdy

ASTM D4318	
Plasticity Index	
Liquid Limit	60
Plastic Limit	28
Plasticity Index	32

Expansion Index, (EI)	Potential Expansion
0 - 20	Very Low
21 - 51	Low
52 - 90	Medium
91 - 130	High
> 130	Very High

Expansion Index	
EI =	NA

Percent Swell of Soil	
% Swell	NV
Notes:	

pH and Resistivity	
pH Reading:	NA
Resistivity (ohms-cm)	NA

Moisture Density (Proctor)	
Max. Dry Density	NV
Opt. Moisture %	NV
Corr. Max. Dry Density	NV
Corr. Opt. Moisture %	NV
% Rock	3

Class: Fat clay

Symbol: CH

* = out of specification

ASTM D1140 / D422			
Sieve	% Pass	Specs	*
1"	100		
1/2"	100		
#4	97		
#10	97		
#40	94		
#100	92		
#200	90		

Remarks:

Reviewed By:

Jayde Moloney



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Soils Summary

Client: Sage Land Holding, LLC
 Project Name: Perkinsville 40
 Job Name: 1204 E Perkinsville Rd
 Material: Geo (Native)
 Material Supplier: -
 Sample Location: B8 (0-3')

ProTeX Job No: 10413
 ProTeX Lab No: 204971 - Phoenix
 Date Received: 8/3/2020
 Sampled By: Amos McCurdy
 Date Sampled: 7/30/2020
 Submitted By: Amos McCurdy

ASTM D4318	
Plasticity Index	
Liquid Limit	42
Plastic Limit	27
Plasticity Index	15

Expansion Index, (EI)	Potential Expansion
0 - 20	Very Low
21 - 51	Low
52 - 90	Medium
91 - 130	High
> 130	Very High

Expansion Index	
EI =	NA

Percent Swell of Soil	
% Swell	NV
Notes:	

pH and Resistivity	
pH Reading:	NA
Resistivity (ohms-cm)	NA

Moisture Density (Proctor)	
Max. Dry Density	NV
Opt. Moisture %	NV
Corr. Max. Dry Density	NV
Corr. Opt. Moisture %	NV
% Rock	NV

Class: Silt with sand

Symbol: ML

* = out of specification

ASTM D1140 / D422			
Sieve	% Pass	Specs	*
1"	100		
1/2"	100		
#4	100		
#10	99		
#40	94		
#100	86		
#200	75		

Remarks:

Reviewed By:

Jayde Moloney



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Soils Summary

Client: Sage Land Holding, LLC
 Project Name: Perkinsville 40
 Job Name: 1204 E Perkinsville Rd
 Material: Geo (Native)
 Material Supplier: -
 Sample Location: B9 (0-3')

ProTeX Job No: 10413
 ProTeX Lab No: 204972 - Phoenix
 Date Received: 8/3/2020
 Sampled By: Amos McCurdy
 Date Sampled: 7/30/2020
 Submitted By: Amos McCurdy

ASTM D4318	
Plasticity Index	
Liquid Limit	43
Plastic Limit	22
Plasticity Index	21

Expansion Index, (EI)	Potential Expansion
0 - 20	Very Low
21 - 51	Low
52 - 90	Medium
91 - 130	High
> 130	Very High

Expansion Index	
EI =	NA

Percent Swell of Soil	
% Swell	NV
Notes:	

pH and Resistivity	
pH Reading:	NA
Resistivity (ohms-cm)	NA

Moisture Density (Proctor)	
Max. Dry Density	NV
Opt. Moisture %	NV
Corr. Max. Dry Density	NV
Corr. Opt. Moisture %	NV
% Rock	0

Class: Sandy lean clay

Symbol: CL

* = out of specification

ASTM D1140 / D422			
Sieve	% Pass	Specs	*
1"	100		
1/2"	100		
#4	100		
#10	99		
#40	90		
#100	76		
#200	69		

Remarks:

Reviewed By:

Jayde Moloney



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Soils Summary

Client: Sage Land Holding, LLC
 Project Name: Perkinsville 40
 Job Name: 1204 E Perkinsville Rd
 Material: Geo (Native)
 Material Supplier: -
 Sample Location: B10 (0-3')

ProTeX Job No: 10413
 ProTeX Lab No: 204973 - Phoenix
 Date Received: 8/3/2020
 Sampled By: Amos McCurdy
 Date Sampled: 7/30/2020
 Submitted By: Amos McCurdy

ASTM D4318	
Plasticity Index	
Liquid Limit	46
Plastic Limit	30
Plasticity Index	16

Expansion Index, (EI)	Potential Expansion
0 - 20	Very Low
21 - 51	Low
52 - 90	Medium
91 - 130	High
> 130	Very High

Expansion Index	
EI =	NA

Percent Swell of Soil	
% Swell	NV
Notes:	

pH and Resistivity	
pH Reading:	NA
Resistivity (ohms-cm)	NA

Moisture Density (Proctor)	
Max. Dry Density	NV
Opt. Moisture %	NV
Corr. Max. Dry Density	NV
Corr. Opt. Moisture %	NV
% Rock	0

Class: Sandy silt
 Symbol: ML

* = out of specification

ASTM D1140 / D422			
Sieve	% Pass	Specs	*
1"	100		
1/2"	100		
#4	100		
#10	99		
#40	93		
#100	76		
#200	63		

Remarks:

Reviewed By:

Jayde Moloney



Summary of Laboratory Test Results Potential for Corrosion

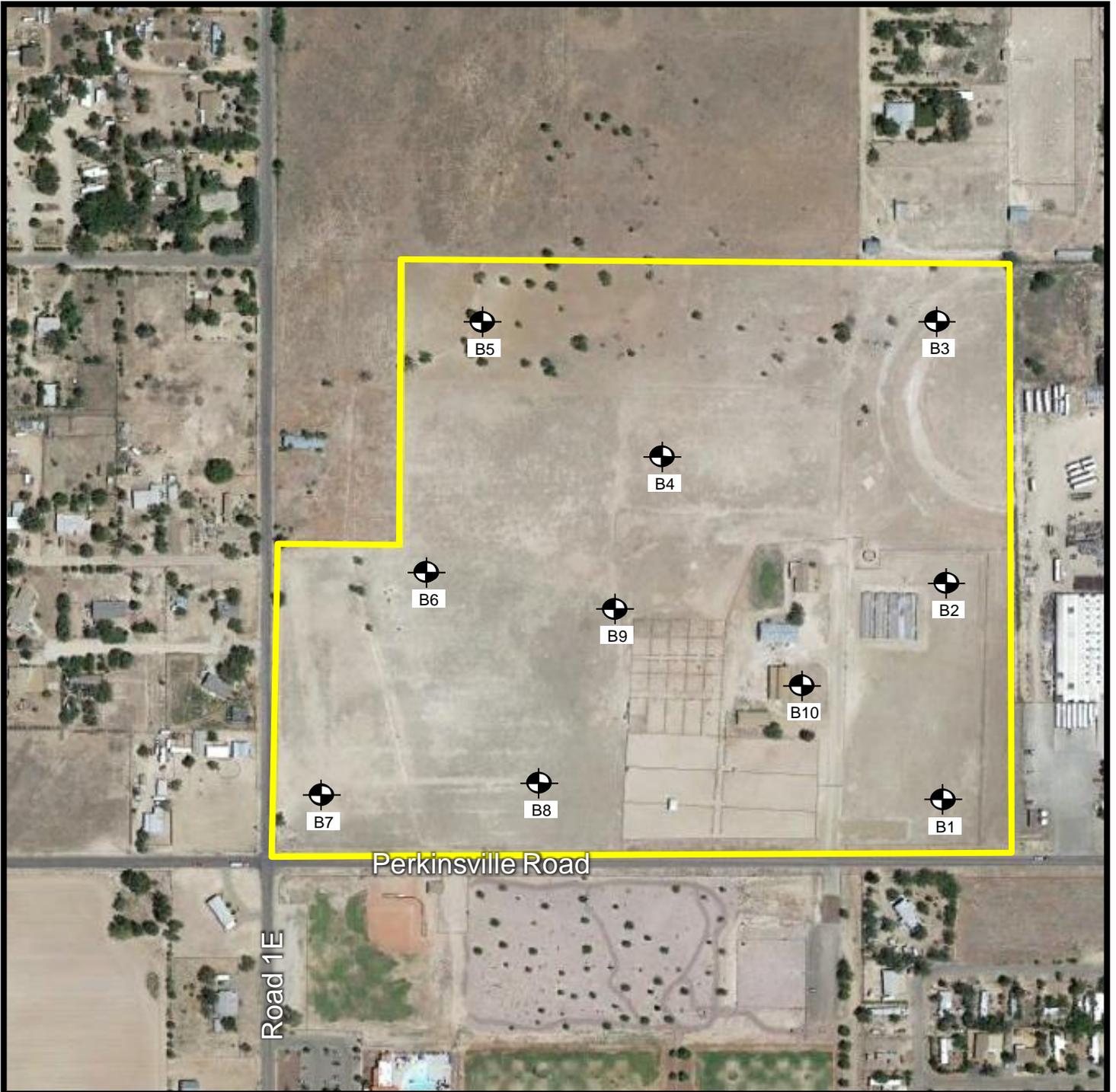
Client: Sage Land Holding, LLC Builder: Sage Land Holding, LLC Project Name: Perkinsville 40

Job Name: 1204 E Perkinsville Rd

Job ID #: 10413

ProTeX Lab#	Location	Depth	Material Type	Sample Date	Sulfate (SO4) (ppm)	Chloride (CL) (ppm)	Soluble Salts (ppm)	Minimum Resistivity (ohms-cm)	pH	Oxidation- Reduction Potential of Water (mV)
204964	B3	0-3'	Geo	7/30/2020	7	32				
204968	B6	0-3'	Geo	7/30/2020	16	24				
204971	B8	0-3'	Geo	7/30/2020	14	36				

Appendix B



Legend:



Approximate Boring Location



Site Plan

Scale: N.T.S.

Drawn by: MSK

Date: 08/10/2020

Perkinsville 40
 Perkinsville Road and Road 1E
 Chino Valley, Arizona



ProTeX Job No.: 10413

Appendix C



LOG OF BORING No. B1

PROJECT: Perkinsville 40 **PROJECT NO.:** 10413
CLIENT: Sage Land Holdings, LLC
PROJECT LOCATION: Perkinsville Road and Road 1E
LOCATION: See Site Plan **ELEVATION:** _____
DRILLER: D&S Drilling **LOGGED BY:** AM
DRILLING METHOD: 6" Flight Auger **DATE:** 7/30/2020
DEPTH TO - WATER> INITIAL: ∞ **AFTER 24 HOURS:** ∞ **CAVING> C:** _____

This information pertains only to this boring and should not be interpreted as being indicative of the site.

Depth (feet)	Description	Graphic	Sample No.	Blow Counts	TEST RESULTS	
					Plastic Limit Liquid Limit	Water Content - Penetration -
0	(CL) Lean Clay, medium plasticity, light brown, damp		204960	80		
2.5				R 16 20		
5	Soil transitions to high plasticity		204961	66		
7.5				R 9 10		
10	Soil transitions to medium-high plasticity		204962	85		
12.5						
15	Boring terminated at 15 ft.					
17.5						



LOG OF BORING No. B2

PROJECT: Perkinsville 40 **PROJECT NO.:** 10413
CLIENT: Sage Land Holdings, LLC
PROJECT LOCATION: Perkinsville Road and Road 1E
LOCATION: See Site Plan **ELEVATION:** _____
DRILLER: D&S Drilling **LOGGED BY:** AM
DRILLING METHOD: 6" Flight Auger **DATE:** 7/30/2020
DEPTH TO - WATER> INITIAL: ∞ **AFTER 24 HOURS:** ∞ **CAVING>** C

This information pertains only to this boring and should not be interpreted as being indicative of the site.

Depth (feet)	Description	Graphic	Sample No.	Blow Counts	% < #200	TEST RESULTS	
						Plastic Limit	Liquid Limit
0	(CL) Lean Clay, medium-high plasticity, light brown, slightly damp		204963		78		
2.5							
5							
7.5							
10							
12.5							
15	Boring terminated at 15 ft.						
17.5							



LOG OF BORING No. B3

PROJECT: Perkinsville 40 **PROJECT NO.:** 10413
CLIENT: Sage Land Holdings, LLC
PROJECT LOCATION: Perkinsville Road and Road 1E
LOCATION: See Site Plan **ELEVATION:** _____
DRILLER: D&S Drilling **LOGGED BY:** AM
DRILLING METHOD: 6" Flight Auger **DATE:** 7/30/2020
DEPTH TO - WATER> INITIAL: ∞ **AFTER 24 HOURS:** ∞ **CAVING>** C

This information pertains only to this boring and should not be interpreted as being indicative of the site.

Depth (feet)	Description	Graphic	Sample No.	Blow Counts	TEST RESULTS	
					Plastic Limit	Liquid Limit
0	(ML) Sandy Silt trace Gravel, medium plasticity, light brown, slightly damp		204964	69	Water Content - ●	Penetration -
2.5					R 9 12	
5				R 8 12		
7.5						
10	(SC) Clayey Sand with Gravel, medium plasticity		204965	49	Plastic Limit ----- Liquid Limit	
12.5					12-14'	-----
15	Boring terminated at 15 ft.					
17.5						



LOG OF BORING No. B4

PROJECT: Perkinsville 40 **PROJECT NO.:** 10413
CLIENT: Sage Land Holdings, LLC
PROJECT LOCATION: Perkinsville Road and Road 1E
LOCATION: See Site Plan **ELEVATION:** _____
DRILLER: D&S Drilling **LOGGED BY:** AM
DRILLING METHOD: 6" Flight Auger **DATE:** 7/30/2020
DEPTH TO - WATER> INITIAL: ∞ **AFTER 24 HOURS:** ∞ **CAVING>** C

This information pertains only to this boring and should not be interpreted as being indicative of the site.

Depth (feet)	Description	Graphic	Sample No.	Blow Counts	% < #200	TEST RESULTS				
						Plastic Limit	Liquid Limit	Water Content - ●		
						Penetration - ▨				
						10	20	30	40	50
0	(ML) Sandy Silt, medium plasticity, light brown, slightly damp		204966		63					
2.5										
5										
7.5										
10										
12.5										
15	Boring terminated at 15 ft.									
17.5										



LOG OF BORING No. B5

PROJECT: Perkinsville 40 **PROJECT NO.:** 10413
CLIENT: Sage Land Holdings, LLC
PROJECT LOCATION: Perkinsville Road and Road 1E
LOCATION: See Site Plan **ELEVATION:** _____
DRILLER: D&S Drilling **LOGGED BY:** AM
DRILLING METHOD: 6" Flight Auger **DATE:** 7/30/2020
DEPTH TO - WATER> INITIAL: ∞ **AFTER 24 HOURS:** ∞ **CAVING>** C

This information pertains only to this boring and should not be interpreted as being indicative of the site.

Depth (feet)	Description	Graphic	Sample No.	Blow Counts	% < #200	TEST RESULTS	
						Plastic Limit	Liquid Limit
0	(SM) Silty Sand, medium plasticity, light brown, slightly damp		204967	37		Water Content - ●	
2.5						Penetration -	
5				R 15			
7.5							
10	Soil transitions to brown						
12.5							
15	Boring terminated at 15 ft.						
17.5							



LOG OF BORING No. B6

PROJECT: Perkinsville 40 **PROJECT NO.:** 10413
CLIENT: Sage Land Holdings, LLC
PROJECT LOCATION: Perkinsville Road and Road 1E
LOCATION: See Site Plan **ELEVATION:** _____
DRILLER: D&S Drilling **LOGGED BY:** AM
DRILLING METHOD: 6" Flight Auger **DATE:** 7/30/2020
DEPTH TO - WATER> INITIAL: ∞ **AFTER 24 HOURS:** ∞ **CAVING>** C

This information pertains only to this boring and should not be interpreted as being indicative of the site.

Depth (feet)	Description	Graphic	Sample No.	Blow Counts	% < #200	TEST RESULTS				
						Plastic Limit	Liquid Limit			
						Water Content - ●	Penetration - ▨			
						10	20	30	40	50
0	(ML) Sandy Silt, medium plasticity, light brown, slightly damp		204968		89					
2.5										
5										
7.5										
10	Soil transitions to brown									
12.5										
15	Boring terminated at 15 ft.									
17.5										



LOG OF BORING No. B7

PROJECT: Perkinsville 40 **PROJECT NO.:** 10413
CLIENT: Sage Land Holdings, LLC
PROJECT LOCATION: Perkinsville Road and Road 1E
LOCATION: See Site Plan **ELEVATION:** _____
DRILLER: D&S Drilling **LOGGED BY:** AM
DRILLING METHOD: 6" Flight Auger **DATE:** 7/30/2020
DEPTH TO - WATER> INITIAL: ∞ **AFTER 24 HOURS:** ∞ **CAVING>** C

This information pertains only to this boring and should not be interpreted as being indicative of the site.

Depth (feet)	Description	Graphic	Sample No.	Blow Counts	% < #200	TEST RESULTS	
						Plastic Limit	Liquid Limit
0	(CL) Lean Clay, medium plasticity, light brown, slightly damp		204969	87			
2.5				R 6 6			
5				R 6 8			
6.8	(CH) Fat Clay, high plasticity, light brown, slightly damp		204970	90			
7.5							
10							
12.5							
15	Boring terminated at 15 ft.						
17.5							



LOG OF BORING No. B8

PROJECT: Perkinsville 40 **PROJECT NO.:** 10413
CLIENT: Sage Land Holdings, LLC
PROJECT LOCATION: Perkinsville Road and Road 1E
LOCATION: See Site Plan **ELEVATION:** _____
DRILLER: D&S Drilling **LOGGED BY:** AM
DRILLING METHOD: 6" Flight Auger **DATE:** 7/30/2020
DEPTH TO - WATER> INITIAL: ∞ **AFTER 24 HOURS:** ∞ **CAVING>** C

This information pertains only to this boring and should not be interpreted as being indicative of the site.

Depth (feet)	Description	Graphic	Sample No.	Blow Counts	% < #200	TEST RESULTS				
						Plastic Limit	Water Content - ●	Liquid Limit		
						Penetration - ▨				
						10	20	30	40	50
0	(ML) Sandy Silt, medium plasticity, light brown, slightly damp		204971		75					
2.5										
5										
7.5										
10										
12.5										
15	Boring terminated at 15 ft.									
17.5										



LOG OF BORING No. B9

PROJECT: Perkinsville 40 **PROJECT NO.:** 10413
CLIENT: Sage Land Holdings, LLC
PROJECT LOCATION: Perkinsville Road and Road 1E
LOCATION: See Site Plan **ELEVATION:** _____
DRILLER: D&S Drilling **LOGGED BY:** AM
DRILLING METHOD: 6" Flight Auger **DATE:** 7/30/2020
DEPTH TO - WATER> INITIAL: ∞ **AFTER 24 HOURS:** ∞ **CAVING>** C

This information pertains only to this boring and should not be interpreted as being indicative of the site.

Depth (feet)	Description	Graphic	Sample No.	Blow Counts	% < #200	TEST RESULTS	
						Plastic Limit	Liquid Limit
0	(CL) Lean Clay, medium plasticity, light brown, slightly damp		204972		69		
2.5							
5	Soil transitions to white						
7.5							
10							
12.5							
15	Boring terminated at 15 ft.						
17.5							



LOG OF BORING No. B10

PROJECT: Perkinsville 40 **PROJECT NO.:** 10413
CLIENT: Sage Land Holdings, LLC
PROJECT LOCATION: Perkinsville Road and Road 1E
LOCATION: See Site Plan **ELEVATION:** _____
DRILLER: D&S Drilling **LOGGED BY:** AM
DRILLING METHOD: 6" Flight Auger **DATE:** 7/30/2020
DEPTH TO - WATER> INITIAL: ∞ **AFTER 24 HOURS:** ∞ **CAVING>** C

This information pertains only to this boring and should not be interpreted as being indicative of the site.

Depth (feet)	Description	Graphic	Sample No.	Blow Counts	% < #200	TEST RESULTS		
						Plastic Limit	Liquid Limit	Water Content - ●
0	(ML) Sandy Silt, medium plasticity, light brown, slightly damp		204973		63			
2.5								
5								
7.5								
10								
12.5								
15	Boring terminated at 15 ft.							
17.5								

Appendix D

Key To Soil Symbols and Classifications

Common Strata Symbols

	High plasticity clay (CH -- C)		Well graded gravel with clay (GW-GC -- 83O)
	Inorganic silts and clays (CH-MH -- MC)		Well graded gravel with silt (GW-GM -- 83Z)
	Low plasticity clay (CL -- O)		Well graded gravel/clayey gravel (GW-GP -- 83G)
	Low-high plasticity clays (CL-CH -- CO)		Well graded gravel and sand (GW-SW -- 83D)
	Silty low plasticity clay (CL-ML -- CZ)		Elastic silt (MH -- M)
	Fill (FILL -- F)		Silt (ML -- Z)
	Clayey gravel (GC -- O8)		High plasticity organic clays (OH -- 5)
	Clayey sand and gravel (GC-SC -- DO8)		Low plasticity organic silts (OL -- 4)
	Silty gravel (GM -- Z8)		Basalt (or generic rock) (ROCK --)
	Silty clayey gravel (GM-GC -- ZO8)		Clayey sand (SC -- DO)
	Silty sand and gravel (GM-SM -- O8)		Silty sand (SM -- O)
	Poorly graded gravel (GP -- G)		Poorly graded clayey silty sand (SC-SM -- :ZO)
	Poorly graded gravel with clay (GP-GC -- DGO3)		Poorly graded silty fine sand (SM-ML -- :Z)
	Poorly graded gravel with silt (GP-GM -- DGZ3)		Poorly graded sand (SP -- :)
	Poorly graded gravel and sand (GP-SP -- :G)		Poorly graded sand with clay (SP-SC -- :R)
	Well graded gravel (GW -- 83)		Poorly graded sand with silt (SP-SM -- :=)
	Well graded sand (SW -- D)		Well graded sand with gravel (SW -- D9)
	Well graded sand with clay (SW-SC -- DR)		Silty sand with gravel (SM -- O9)
	Well graded sand with silt (SW-SM -- D=)		Clayey sand with gravel (SC -- DO9)

Relative Density of Cohesionless Soils (blows/ft)

Very Loose	0 to 4
Loose	5 to 10
Medium	11 to 30
Dense	31 to 50
Very Dense	over 50

Relative Degree of Plasticity (PI)

Non-Plastic	0
Low	1 to 7
Low-Medium	8 to 14
Medium	15 to 21
Medium-High	22 to 28
High	29 to 35
Very High	Over 35

Relative Proportions (%)

Trace	5 to 10
Some	10 to 15
With	15 to 35
And	35 to 50

Particle Size Identification (Diameter)

Boulder	8.0" or Larger
Cobbles	3.0" to 8.0"
Coarse Gravel	0.75" to 3.0"
Fine Gravel	5.0 mm to 3.0"
Coarse Sand	2.0 mm to 5.0 mm
Medium Sand	0.4 mm to 2.0 mm
Fine Sand	0.07 mm to 0.4 mm
Silt	0.002 mm to 0.07 mm
Clay	Less Than 0.002

PLASTICITY CHART

