Geotechnical Investigation

Osban Residence

525 S Page Road
Colorado Springs, Colorado 80930
ProTeX Job No.: 14889

11881 East 33rd Avenue, Unit B
Aurora, Colorado 80010
720-638-9122
www.protex-az.com

January 8, 2024

Debbie and Craig Osban
839 Querida Drive
Colorado Springs, CO 80909

Re: **Geotechnical Investigation**

Project: Osban Residence
525 S Page Road
Colorado Springs, Colorado 80930

ProTeX Job No.: 14889

Attention: Ms. Debbie Osban

At your request, ProTeX – the PT Xperts, LLC, has completed a soil investigation for the purpose of providing geotechnical design recommendations for the above listed 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

Tim Pachak
Division Lead

Jones Tembo, P.E.
Expires: 10/31/2025

11881 East 33rd Avenue Unit B
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1.0 INTRODUCTION

1.1 Scope

ProTeX – the PT Xperts, LLC was retained by Ms. Debbie Osban, to evaluate the surface and subsurface soil conditions for the purpose of providing geotechnical design and construction recommendations for a residential structure with a raised structural supported floor. This report contains the findings from the field exploration and laboratory testing, with supporting recommendations for the proposed development.

1.2 Proposed Site Development

This firm understands that the proposed development will consist of a one- or two-story residential structure with a raised structural supported floor. The structure is anticipated to be constructed of wood and/or steel framing and impose relatively light to moderate foundation loads.

1.3 Terms and Conditions

This report was prepared for Ms. Debbie Osban. 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 Ms. Debbie Osban. 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 9.72 acres of native land. At the time of the field site visit on December 20, 2023, the following site conditions were observed:

- The site has moderate to heavy native grass,
- The site slopes generally towards the easterly direction,
- Site has existing electrical utilities installed,
- There is an RV residence with outbuildings associated with the current residence.

2.2 Field Investigation

Two (2) test holes were completed at the site for the purpose of evaluating subsurface conditions. The test holes were terminated at a depth of 10 feet below existing grade. Groundwater was not encountered. At each test hole location, the soils encountered were visually and physically observed, classified, logged and representative samples were obtained where applicable. Refer to the site plan in Appendix B for approximate test hole locations.

2.3 Laboratory Testing

Subsequent to the field investigation, soil samples were selected by our engineer to be submitted for laboratory testing. Tests were performed to determine the following:

- **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.

Laboratory Test Summary

Location	Depth (ft)	Plasticity Index (PI)	Percent Passing #200 Sieve	USCS Soil Classification
TP1	0-3	NP	34	SM
TP1	4-6	NP	9	SP-SM
TP1	7-10	NP	9	SP-SM
TP2	0-3	NP	47	SM
TP2	5-8	NP	8	SP-SM
TP2	10-14	NP	8	SP-SM

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 consists primarily of non-plastic silty sand to 3 feet below existing grade and poorly graded sand with silt in Test Hole

1 and Test Hole 2 to the full depths explored. Refer to the test pit logs in Appendix C for a detailed description of the subsurface soil profile.

3.2 Geological Hazards

The area presents soils that have minor challenges for geotechnical engineering due to the presence of low expansion potential that might constitute a geologic hazard. Due to the nature of the subsoils in this location, there is a low risk of expansive soils having a potential to damage slabs-on-grade and foundations. Proper design, construction and maintenance of foundations and slabs can mitigate, but not eliminate the risk of movement. It is essential that the recommendations referenced in this report are followed to reduce this risk.

3.2.1 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 and the 2021 International Residential Code (IRC). The 2021 IRC references the American Society of Civil Engineers (ASCE/SEI) 7-16 standard. Based on knowledge of the geology of the area a 100-ft boring was not advanced.

Site Class	D (Stiff Soil Profile)
Central Latitude	38.82853° N
Central Longitude	104.49338° W
S_s Spectral Acceleration for Short Period	0.173
S_1 Spectral Acceleration for a 1-Second period	0.054
F_a Site Coefficient for Short Period	0.16
F_v Site Coefficient for a 1-second Period	2.40

3.2.2 Liquefaction Potential

Based on the soil encountered during the site investigation and the low ground motion hazard (relatively low ground acceleration), the potential for liquefaction of the site soils is considered to be negligible.

3.3 Excavation and Workability

Based on the soil borings, it is anticipated that conventional excavation equipment may be utilized to depths of approximately 10 feet below existing site grade. However, this generalized assessment is not intended to be the sole basis for contractors preparing earthwork bids. Cemented soils, cobbles, boulders, and weathered/broken bedrock may make excavation more difficult than expected. In 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.

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

Our investigation indicates that the site soils in their current moisture state have a low potential for heave with a surcharge of 500 psf at the depths explored. The soils influence on the performance of shallow foundations and slabs-on-grade is anticipated to be low.

A depth of wetting of 10 feet was considered for the evaluation of anticipated heave. Refer to the Laboratory data in Appendix A of this report. The following foundation design and construction criteria are provided for foundations associated with the project. These criteria were developed from analysis of field and laboratory data and our experience. The builder and structural engineer should also consider design and construction details established by the structural warrantor (if any) that may impose additional foundation design and installation requirements.

4.1.1 Foundation System for Lightly Loaded Foundations

The following recommendations are provided for the use of foundation systems associated with lightly loaded residential structures. If structural movements cannot be tolerated, contact ProTeX to provide other options for design.

1. Footings should be constructed on firm native soil or properly compacted fill or natural soils. Loose soils resulting from excavations or during the footing forming process, should be removed and re-compacted to the moisture and density criteria presented in **Section 5 - SITE PREPARATION**, prior to placing concrete.
2. Due to frost depth. Design of surface level foundations should have a maximum allowable soil bearing capacity of 2,500 psf with a minimum embedment of 3.0 feet below final (exterior) grade.
3. Continuous foundations should have a minimum width of 16 inches. Isolated column foundations should be a minimum of 18 inches by 18 inches.
4. Foundation walls should be well-reinforced. We recommend reinforcement sufficient to span an unsupported distance of at least 10 feet or the distance between pads, whichever is greater. Reinforcement should be designed by the structural engineer considering lateral earth pressure and the effects of large openings on wall performance.
5. Exterior foundations should be protected from frost action. Exterior foundations should be protected with a minimum cover of 3 feet.
6. **Following the foundation excavation, a representative of ProTeX should observed the excavation to confirm the subsurface conditions are as anticipated from our borings.**
7. Excessive wetting of foundation soils after site grading, during and after construction, can cause heave and/or softening and settlement of foundation soils and result in footing movements. Proper surface drainage around the residence is critical to control wetting. The foundation drains and utility service trenches should be braced or adequately sloped away from the footings to reduce the risk of undermining the footings. Sump pit construction should avoid undermining the footings. Voids around the sump pit excavation should be backfilled with on-site soils or “flowable fill” to reduce settlements.

4.2 Interior Floors

4.2.1 Slab-On-Grade Floors

Native surface soils are anticipated to have a low potential for expansion based on laboratory testing. Thus, if water gets to slab bearing soils, slight movements could occur. Control of cracks is a priority, therefore, 6 inches of gravel or aggregate base course should be placed below the slab and compacted to a minimum of 95% of ASTM D698 (or equivalent).

Control joints should be placed in the slab to reduce damage that may occur due to shrinkage. The spacing of the joints should be no more than 15 feet on center. The actual joint spacing should be based on the design of slab reinforcing, if any.

4.2.2 Structurally Supported Floors

Non-basement floors should be structurally supported. The structural floor should be designed to be supported by the foundation system. As a part of the design for structurally supported slabs, the following should be considered.

- **Lateral loads:** Basement and/or foundation walls and grade beams that extend below grade should be designed to resist lateral earth pressures where backfill is not present to about the same extent on both sides of the wall. Refer to Section 4.4 of this report.
- **Crawl space** requirements are based on construction materials used. Building codes require a clear space of 18 inches between exposed earth and untreated wood floor components. Consideration of increasing the air space to at least 20 inches to allow for some expansion of subsurface soils should be given, if untreated wood floor components are used and the ground surface is exposed. For non-organic floor systems, we recommend a minimum clear space of 12 inches. This minimum clear space should be maintained between any point on the underside of the floor system (including beams, plumbing pies, and floor drain traps) and the soils.
- **Utility connections** used with structurally supported floors (e.g., water, gas, air duct, and exhaust stack) to floor supported appliances should be capable of absorbing some deflection of the floor. Plumbing lines passing through the floor should be hung from the underside of the structural floor and not on the bottom of the excavation. This configuration

may not be achievable for some parts of the installation. If trenching is required to maintain clearance, then it is recommended that trenches be sloped to foundation drain systems for discharge of moisture.

- **Control of humidity** in crawl spaces is important for indoor air quality and performance of wood floor systems. Best practices to minimize humidity is using a vapor retarder or barrier (10 mil minimum) placed on the exposed soils below accessible sub-floor areas. The vapor retarder/barrier should be sealed at joints and attached to concrete foundation elements. The foundation drain system should incorporate a vapor retarder. Review of current best practice for the control of humidity in crawl spaces have been compiled by the Moisture Management Task Force of Metro Denver "Guidelines for Design and Construction of New Homes with Below-Grade Under-Floor Spaces," Moisture Management Task Force, October 30, 2003

4.3 Exterior Slab-on-Grade and Patios

Native surface soils are anticipated to have a low potential for expansion based on laboratory testing. Thus, if water gets to slab bearing soils, slight movements could occur. Control of cracks is a priority, therefore, 6 inches of gravel or aggregate base course should be placed below the slab and compacted to a minimum of 95% of ASTM D698 (or equivalent).

Control joints should be placed in the slab to reduce damage that may occur due to shrinkage. The spacing of the joints should be no more than 15 feet on center. The actual joint spacing should be based on the design of slab reinforcing, if any.

Porches and decks with roofs that are integral part of the residential structure should be integrated with the same foundation design of the main structure. Deck foundations should be designed by a structural engineer. Decks not considered an integral part of the structure and can tolerate some movement, use of short pier or footing foundations at a depth of at least 4 feet below grade can be considered.

Porches, patio slabs, and other exterior flatwork should be isolated from the structures. Porch slabs can be constructed to reduce the likelihood that settlement or heave will affect the slabs.

4.4 Lateral Loading

The design of retaining walls for the site should be designed to retain the lateral loads applied by the site soils. Many factors affect the value of the design lateral earth pressure. These factors include, but are not limited to the type, compaction, slope and drainage of the backfill, and the rigidity of the wall against rotation and deflection. The following values are provided in Equivalent Fluid Pressures for unrestrained, restrained and passive resistance.

Lateral Equivalent Fluid Pressures for Backfill:	
*Unrestrained Walls	45 pcf
*Restrained Walls	60 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.

4.5 Drainage

Establishment and long-term maintenance of proper lot post-construction surface drainage is also 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 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. The grade away from the foundation walls shall fall a minimum of 12 inches within the first 10 feet. 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 an option to minimizes moisture infiltration and fluctuation of bearing soils for structural

foundation/floor systems. Roof down spouts should be connected to an underground drain system or discharge well beyond the limits of the backfill.

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 12 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 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.

In addition to a surface drainage plan, a subsurface foundation drain or equivalent protection system should be designed to redirect moisture around and away from the foundation of the structure. This system is recommended around the perimeter of all habitable or storage spaces located below grade (including crawlspace areas). Actual drain requirements to be determined at the time of the open hole inspection. It should be noted that properly installed and functioning drainage systems do not completely eliminate the potential for foundation movement if exposed to subsurface moisture. Refer to Drainage Detail 1 in Appendix B of this report.

4.6 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.

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.*

Surface vegetation and trash should be removed from the proposed building footprint. All underground structures, utilities and tree roots should be chased and removed. Removal should extend across the entire building pad and to a minimum lateral distance of five feet beyond foundation edges. It is assumed that the results in the report are representative of the subsurface conditions throughout the site.

A representative of ProTeX should be contacted to inspect the completed excavation for foundation placement prior to the placement of form boards and reinforcing steel. ProTeX should be contacted by 4 pm the day prior to the requested visit for inspection. The recommendations of this report will be considered to be not applicable if this inspection is not performed.

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.

Fill material should be free of organics, vegetative matter, deleterious or foreign material, rocks, and lumps having a nominal diameter of 6 inches. Native soils may be used as fill material provided; they are compacted as specified. If needed, imported fill material 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.

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 Basement Foundations, Structurally Supported Floor Foundations and Slab-on-Grade for Native and Approved Import Soils		
Material	**Compaction**	**Percent Moisture**
Below Foundation Level	Min 95%	-2 to +2 of Optimum
Below Exterior Slab on Grade	Min 95%	-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.

When work is interrupted by heavy rains, snow or frost, 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. Should this be the case, a representative of ProTeX should evaluate the pads for further recommendations.

6.0 CLOSURE

6.1 Geotechnical Risk

Risk is an aspect of any geotechnical evaluation. Geotechnical evaluations are based on limited subsurface investigation. We never have a complete knowledge of the subsurface conditions. Our

analysis is tempered with engineering judgement and experience. Thus, recommendations provided in any geotechnical evaluation is not considered risk free. Following the recommendations in this report will minimize the risk associated with the site conditions. It is also the imperative that the home owner understands the risks and that there is a requirement on their part to maintain the structures during construction and after construction.

6.2 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 the necessary supplemental recommendations. 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.

6.3 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
Tempe, AZ 85282
Office: (602)-272-7891
Fax: (602) 272-7892

Soils Summary

Client:	Debbie and Craig Osban	ProTeX Job No:	14889
Project Name:	Page Rd and Hwy 94	ProTeX Lab No:	2400002 - Denver
Job Name:	525 N Page Rd	Date Received:	1/2/2024
Material:	Geo (Onsite)	Sampled By:	Rebecca Faulkner
Material Supplier:		Date Sampled:	12/20/2023
Sample Location:	TP1 (0-3)	Submitted By:	Tim C Pachak

ASTM D4318

Plasticity Index

Liquid Limit	**NV**
Plastic Limit	**NP**
Plasticity Index	**NP**

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**

Class: Silty sand

Symbol: SM

Moisture Density (Proctor)

Max. Dry Density	**NV**
Opt. Moisture %	**NV**
Corr. Max. Dry Density	**NV**
Corr. Opt. Moisture %	**NV**
% Rock	**NV**

* = out of specification

ASTM D1140 / D422

Sieve	% Pass	Specs	*
1"	100		
1/2"	100		
#4	100		
#10	96		
#40	70		
#100	47		
#200	34		

Remarks:

Reviewed By:

Tim C Pachak

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

Soils Summary

Client:	Debbie and Craig Osban	ProTeX Job No:	14889
Project Name:	Page Rd and Hwy 94	ProTeX Lab No:	2400003 - Denver
Job Name:	525 N Page Rd	Date Received:	1/2/2024
Material:	Geo (Onsite)	Sampled By:	Rebecca Faulkner
Material Supplier:		Date Sampled:	12/20/2023
Sample Location:	TP1 (4-6)	Submitted By:	Tim C Pachak

ASTM D4318

Plasticity Index

Liquid Limit	**NV**
Plastic Limit	**NP**
Plasticity Index	**NP**

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**

Class: Poorly-graded sand with silt

Symbol: SP-SM

Moisture Density (Proctor)

Max. Dry Density	**NV**
Opt. Moisture %	**NV**
Corr. Max. Dry Density	**NV**
Corr. Opt. Moisture %	**NV**
% Rock	**0**

* = out of specification

ASTM D1140 / D422

Sieve	% Pass	Specs	*
1"	100		
1/2"	100		
#4	100		
#10	94		
#40	42		
#100	18		
#200	8.9		

Remarks:

Reviewed By:

Tim C Pachak

ProTeX the PT Xperts LLC
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Tempe, AZ 85282
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Fax: (602) 272-7892

Soils Summary

Client:	Debbie and Craig Osban	ProTeX Job No:	14889
Project Name:	Page Rd and Hwy 94	ProTeX Lab No:	2400004 - Denver
Job Name:	525 N Page Rd	Date Received:	1/2/2024
Material:	Geo (Onsite)	Sampled By:	Rebecca Faulkner
Material Supplier:		Date Sampled:	12/20/2023
Sample Location:	TP1 (7-10)	Submitted By:	Tim C Pachak

ASTM D4318

Plasticity Index

Liquid Limit	**NV**
Plastic Limit	**NP**
Plasticity Index	**NP**

Expansion Index, (EI)	Potential Expansion
0 - 20	Very Low
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Notes:

pH and Resistivity

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Symbol: SP-SM

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Opt. Moisture %	**NV**
Corr. Max. Dry Density	**NV**
Corr. Opt. Moisture %	**NV**
% Rock	**NV**

* = out of specification

ASTM D1140 / D422

Sieve	% Pass	Specs	*
1"	100		
1/2"	100		
#4	100		
#10	94		
#40	46		
#100	20		
#200	8.8		

Remarks:

Reviewed By:

Tim C Pachak

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1102 W. Southern Ave., Ste. 4
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Soils Summary

Client:	Debbie and Craig Osban	ProTeX Job No:	14889
Project Name:	Page Rd and Hwy 94	ProTeX Lab No:	2400005 - Denver
Job Name:	525 N Page Rd	Date Received:	1/2/2024
Material:	Geo (Onsite)	Sampled By:	Rebecca Faulkner
Material Supplier:		Date Sampled:	12/20/2023
Sample Location:	TP2 (0-3)	Submitted By:	Tim C Pachak

ASTM D4318

Plasticity Index

Liquid Limit	**NV**
Plastic Limit	**NP**
Plasticity Index	**NP**

Expansion Index, (EI)	Potential Expansion
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Corr. Opt. Moisture %	**NV**
% Rock	**NV**

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ASTM D1140 / D422

Sieve	% Pass	Specs	*
1"	100		
1/2"	100		
#4	100		
#10	99		
#40	87		
#100	63		
#200	47		

Remarks:

Reviewed By:

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Soils Summary

Client:	Debbie and Craig Osban	ProTeX Job No:	14889
Project Name:	Page Rd and Hwy 94	ProTeX Lab No:	2400006 - Denver
Job Name:	525 N Page Rd	Date Received:	1/2/2024
Material:	Geo (Onsite)	Sampled By:	Rebecca Faulkner
Material Supplier:		Date Sampled:	12/20/2023
Sample Location:	TP2 (4-6)	Submitted By:	Tim C Pachak

ASTM D4318

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Plastic Limit	**NP**
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Symbol: SP-SM

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Corr. Max. Dry Density	**NV**
Corr. Opt. Moisture %	**NV**
% Rock	**NV**

* = out of specification

ASTM D1140 / D422

Sieve	% Pass	Specs	*
1"	100		
1/2"	100		
#4	100		
#10	93		
#40	41		
#100	18		
#200	8.3		

Remarks:

Reviewed By:

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Soils Summary

Client:	Debbie and Craig Osban	ProTeX Job No:	14889
Project Name:	Page Rd and Hwy 94	ProTeX Lab No:	2400007 - Denver
Job Name:	525 N Page Rd	Date Received:	1/2/2024
Material:	Geo (Onsite)	Sampled By:	Rebecca Faulkner
Material Supplier:		Date Sampled:	12/20/2023
Sample Location:	TP2 (7-10)	Submitted By:	Tim C Pachak

ASTM D4318

Plasticity Index

Liquid Limit	**NV**
Plastic Limit	**NP**
Plasticity Index	**NP**

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**

Class: Poorly-graded sand with silt

Symbol: SP-SM

Moisture Density (Proctor)

Max. Dry Density	**NV**
Opt. Moisture %	**NV**
Corr. Max. Dry Density	**NV**
Corr. Opt. Moisture %	**NV**
% Rock	**NV**

* = out of specification

ASTM D1140 / D422

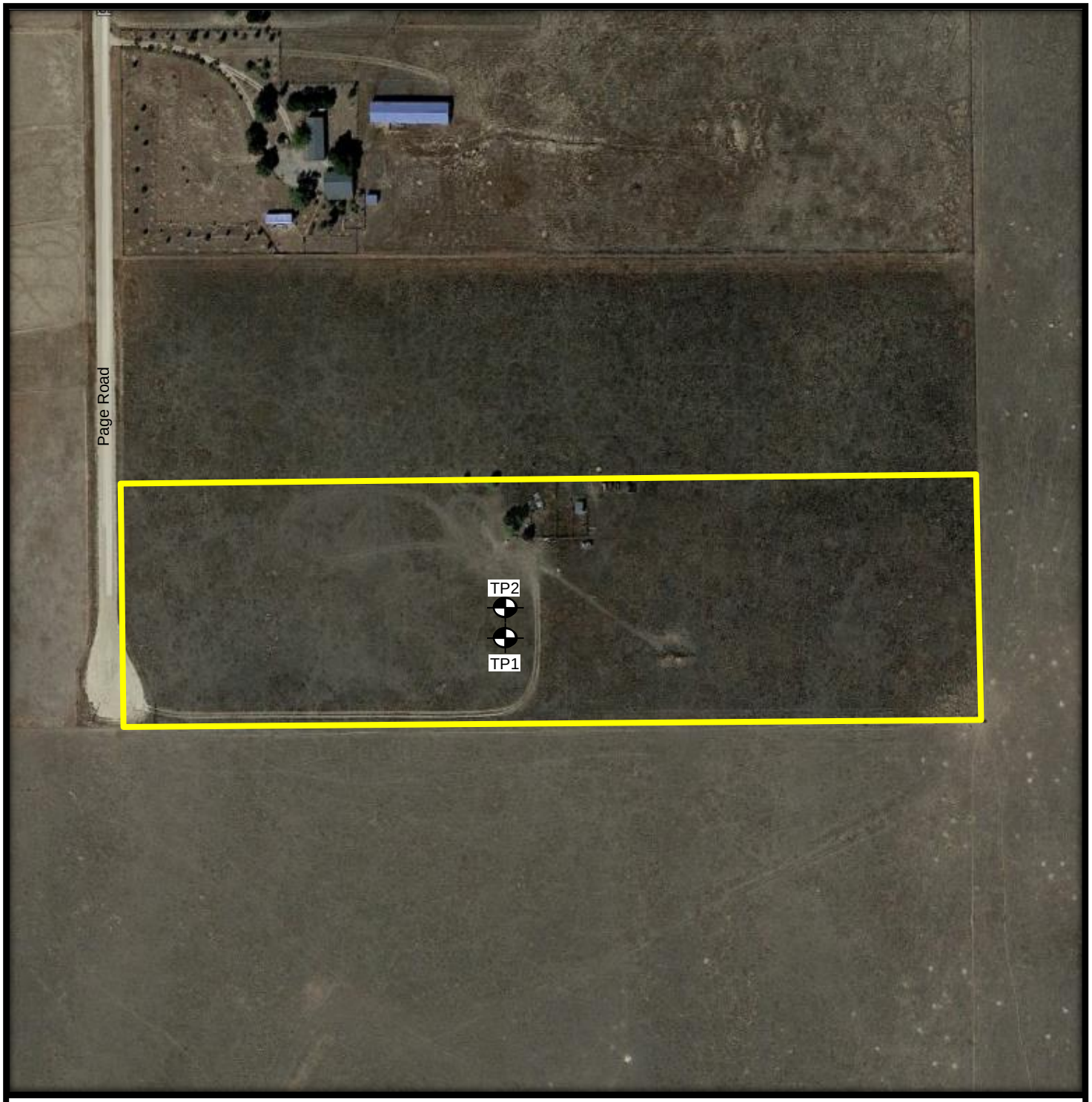
Sieve	% Pass	Specs	*
1"	100		
1/2"	100		
#4	100		
#10	98		
#40	57		
#100	21		
#200	8.4		

Remarks:

Reviewed By:

Tim C Pachak

Appendix B



Legend:

Approximate Test Pit Location

N

Site Plan

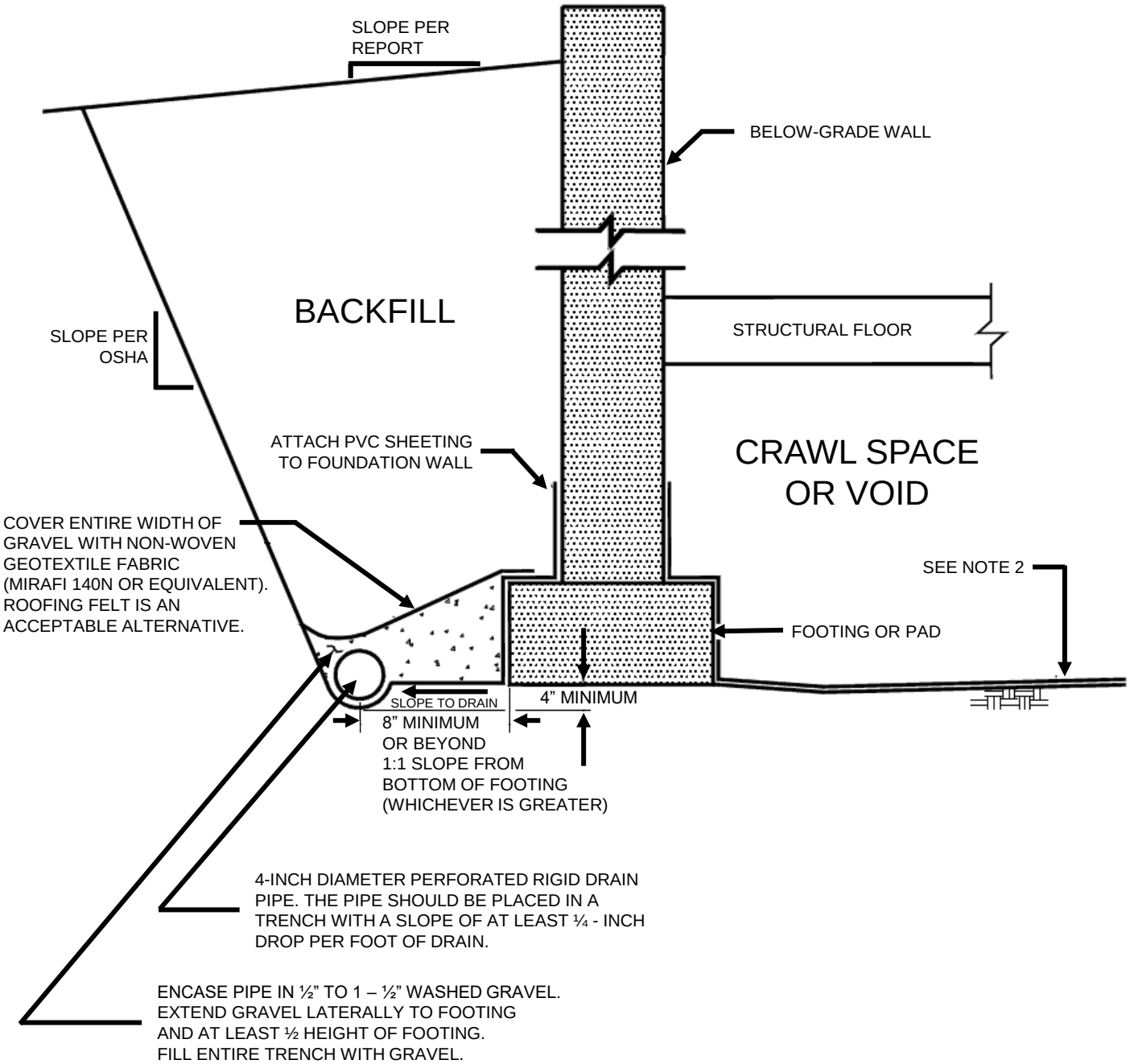
Scale: N.T.S.	Drawn by: TCP	Date: 1/2/2024

Osban Residence

525 S Page Road

Colorado Springs, Colorado 80930

ProTeX Job No.: 14889



NOTES:

1) THE BOTTOM OF THE DRAIN SHOULD BE AT LEAST 4 INCHES BELOW BOTTOM OF FOOTING AT THE HIGHEST POINT AND SLOPE DOWNWARD TO A POSITIVE GRAVITY OUTLET OR TO A SUMP WHERE WATER CAN BE REMOVED BY PUMPING.

2) TO HELP CONTROL THE HUMIDITY IN THE CRAWL SPACE, A MINIMUM 10-MIL POLYETHYLENE VAPOR RETARDER MAY BE PLACED OVER THE CRAWL SPACE SOILS, AT THE BUILDER'S OPTION. THE RETARDER SHOULD BE ATTACHED TO CONCRETE FOUNDATION ELEMENTS AND EXTEND UP FOUNDATION WALLS AT LEAST 8 INCHES ABOVE TOP OF FOOTING. OVERLAP JOINTS 3 FEET AND SEAL.

Detail 1: Wall Foundation Drainage - SS

Scale: N.T.S.		Version: 02/26/2020

Osban Residence
525 S Page Road
Colorado Springs, Colorado 80930

ProTeX Job No.: 14889

Appendix C

LOG OF BORING No. TP1

PROJECT: Osban Residence **PROJECT NO.:** 14889
CLIENT: Debbie and Craig Osban
PROJECT LOCATION: 525 S Page Rd
LOCATION: See Site Plan **ELEVATION:**
DRILLER: Tim Pachak **LOGGED BY:** Rebecca Faulkner
DRILLING METHOD: Mini-Excavator **DATE:** 12/20/2023
DEPTH TO - WATER> INITIAL: **AFTER 24 HOURS:** **CAVING>** C

Depth (feet)	Description	Graphic	Sample No.	Blow Counts	% < #200
0					
	(SM) Silty Sand, Non-Plastic, Brown, Slightly Damp		2400002		34
				4-6	
5	(SP-SM) Pooly graded Sand with Silt, Non-Plastic, Tan, Slightly Damp		2400003		9
	Damp		2400004		9
10	Boring terminated at 10 ft.				
15					
20					
25					
30					
35					

TEST RESULTS
Plastic Limit ⊢——⊣ Liquid Limit
Water Content - ●
Penetration - ▨
10 20 30 40 50

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

LOG OF BORING No. TP2

PROJECT: Osban Residence **PROJECT NO.:** 14889
CLIENT: Debbie and Craig Osban
PROJECT LOCATION: 525 S Page Rd
LOCATION: See Site Plan **ELEVATION:**
DRILLER: Tim Pachak **LOGGED BY:** Rebecca Faulkner
DRILLING METHOD: Mini-Excavator **DATE:** 12/20/2023
DEPTH TO - WATER> INITIAL: **AFTER 24 HOURS:** **CAVING>** C

Depth (feet)	Description	Graphic	Sample No.	Blow Counts	% < #200	TEST RESULTS: Plastic Limit — Liquid Limit; Water Content - ●; Penetration - ▨ (10 20 30 40 50)
0						
	(SM) Silty Sand, Non-Plastic, Brown, Slightly Damp		2400005		47	
	4-6					
5	(SP-SM) Poorly graded Sand with Silt, Non-Plastic, Tan, Slightly Damp		2400006		8	
	Damp		2400007		8	
10						
	Boring terminated at 10 ft.					
15						
20						
25						
30						
35						

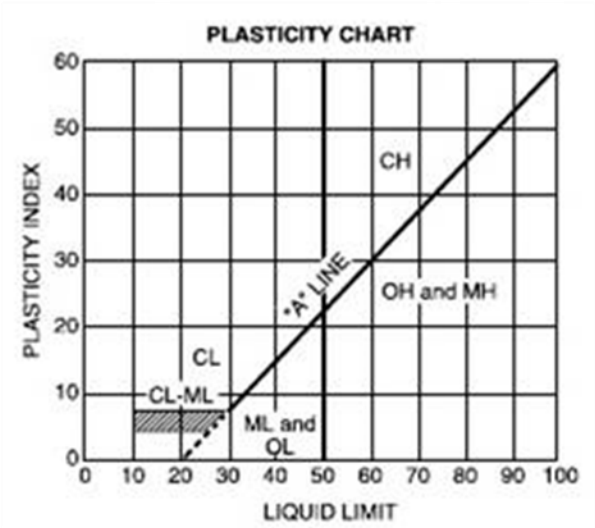
This information pertains only to this boring and should not be interpreted as being indicitive of the site.

Appendix D

Key To Soil Symbols and Classifications

Common Strata Symbols

- High plasticity clay (CH -- C)
- Inorganic silts and clays (CH-MH -- MC)
- Low plasticity clay (CL -- O)
- Low-high plasticity clays (CL-CH -- CO)
- Silty low plasticity clay (CL-ML -- CZ)
- Fill (FILL -- F)
- Clayey gravel (GC -- 08)
- Clayey sand and gravel (GC-SC -- DO8)
- Silty gravel (GM -- Z8)
- Silty clayey gravel (GM-GC -- ZO8)
- Silty sand and gravel (GM-SM -- 08)
- Poorly graded gravel (GP -- G)
- Poorly graded gravel with clay (GP-GC -- DGO3)
- Poorly graded gravel with silt (GP-GM -- DGZ3)
- Poorly graded gravel and sand (GP-SP -- :G)
- Well graded gravel (GW -- 83)
- Well graded sand (SW -- D)
- Well graded sand with clay (SW-SC -- DR)
- Well graded sand with silt (SW-SM -- D=)
- Well graded gravel with clay (GW-GC -- 83O)
- Well graded gravel with silt (GW-GM -- 83Z)
- Well graded gravel/ clayey gravel (GW-GP -- 83G)
- Well graded gravel and sand (GW-SW -- 83D)
- Elastic silt (MH -- M)
- Silt (ML -- Z)
- High plasticity organic clays (OH -- 5)
- Low plasticity organic silts (OL -- 4)
- Basalt (or generic rock) (ROCK --])
- Clayey sand (SC -- DO)
- Silty sand (SM -- 0)
- Poorly graded clayey silty sand (SC-SM -- :ZO)
- Poorly graded silty fine sand (SM-ML -- :Z)
- Poorly graded sand (SP -- :)
- Poorly graded sand with clay (SP-SC -- :R)
- Poorly graded sand with silt (SP-SM -- :=)
- Well graded sand with gravel (SW -- D9)
- Silty sand with gravel (SM -- 09)
- 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