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SOILS AND GEOLOGY STUDY
HANCOCK SUBDIVISION
15220 LEATHER CHAPS DRIVE
EL PASO COUNTY, COLORADO

Prepared for:

Bill and Vickie Hancock
15220 Leather Chaps Drive
Colorado Springs, Colorado 80921

March 16, 2026

Respectfully Submitted,

ENTECH ENGINEERING, INC.

Logan L. Langford, P.G.
Sr. Geologist

Reviewed by:

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JOSEPH COLLIN GOODE
23725
PROFESSIONAL ENGINEER

Digitally signed by Joseph C Goode Jr.
Date: 03/17/26

Joseph C. Goode, Jr., P.E.
President

Entech Job No. 230921
LLL/JCG

PCD No. VR254

Table of Contents

1 SUMMARY

Project Location

The project site is located within the NE¼ of Section 36, Township 11 South, Range 67 West of the 6th Principal Meridian in El Paso County, Colorado. The site is located northeast of the north of Leather Chaps Drive and Struthers Loop. The location of the site is as shown in the Vicinity Map (Figure 1).

Project Description

A two-lot rural residential subdivision is proposed for the 5.05-acre parcel. The lots will be approximately 2.5 acres and will be serviced by an individual water well and an on-site wastewater treatment system (OWTS). The existing metal building and future residence will be located on Lot 1, and the existing residence, OWTS, and water well will remain on Lot 2.

Scope of Report

This report presents the results of our geologic evaluation and treatment of engineering geologic hazard study with respect to the proposed subdivision.

Land Use and Engineering Geology

This site was found to be suitable for the proposed development; however, geologic conditions in certain areas will impose some minor constraints on development and land use. These include areas of potentially expansive soils, loose soils, and the potential for elevated radon levels. These conditions are discussed in greater detail in this report.

In general, it is our opinion that the development can be achieved if the observed geologic conditions on site are either properly mitigated or avoided. All recommendations are subject to the limitations discussed in the report.

2 GENERAL SITE CONDITIONS AND PROJECT DESCRIPTION

The topography of the site is generally gradually sloping to the southwest. No drainages were observed on the site. The site boundaries are indicated in the USGS Map (Figure 2). Previous land uses have included rural residential. Vegetation observed on the site includes field grasses, weeds, bushes, and trees. Site photographs are included in Appendix A.

The project consists of the subdividing of the 5.05-acre parcel into a 2-lot rural residential subdivision. The lots will be approximately 2.5 acres and will be serviced by an individual water well and an on-site wastewater treatment system (OWTS). The existing metal building and future residence will be located on Lot 1, and the existing residence, OWTS, and water well will remain on Lot 2. The proposed lot configuration is shown in the Site and Exploration Plan (Figure 3).

3 SCOPE OF THE REPORT

The scope of this report includes a general geologic analysis utilizing published geologic data. Detailed site-specific mapping was conducted to obtain general information with respect to major geographic and geologic features, geologic descriptions, and their effects on the development of the property in accordance with the El Paso Land Development Code.

4 FIELD INVESTIGATION

Our field investigation consisted of the preparation of a geologic map of any bedrock features and significant surficial deposits. The site was also evaluated using the Web Soil Survey from the Natural Resource Conservation Service (NRCS), formerly known as the Soil Conservation Service (SCS). The position of mappable units within the subject property is shown on the Geologic Map. Our mapping procedures involved both field reconnaissance and measurements and air photo reconnaissance and interpretation. The same mapping procedures have also been utilized to produce the Geology/Engineering Geology Map, which identified pertinent geologic conditions affecting development. The field mapping was performed by personnel of Entech on January 30, 2026. Site photographs are included in Appendix A.

One (1) additional test boring was drilled to determine the classification and engineering characteristics of the soils, and to install a temporary piezometer to evaluate the potential for shallow groundwater. The boring was drilled to a depth of 20 feet using a truck-mounted, continuous flight auger drilling rig supplied and operated by Entech.

The locations of the test borings are indicated on the Site and Exploration Plan (Figure 3). The Test Boring Log, and Laboratory Test Results are included in Appendix B. The results of the testing will be discussed later in this report.

Laboratory testing was performed to classify and determine the engineering characteristics of the soils. Laboratory tests included moisture content testing (ASTM D2216) and grain-size analysis (ASTM D422). Results of the laboratory testing are included in Appendix B.

4.1.1 Previous Investigations

Entech previously completed a Subsurface Soil Investigation for the site, (Reference 1, Appendix C), and the JDM Consulting, LLC, *OWTS Site Evaluation* (Reference 3, Appendix D). Information from these reports were used in the preparation of this report. The site evaluation completed by JDM encountered redoximorphic features at 1'9" and 2'6" in the test pits.

5 SOIL, GEOLOGY, AND ENGINEERING GEOLOGY

5.1 General Geology

The site lies in the western portion of the Great Plains Physiographic Province just south of the Palmer Divide. A major structural feature known as the Rampart Range Fault lies approximately 4 miles to the west. This fault marks the boundary between the Great Plains Physiographic Province and the Southern Rocky Mountain Province. The site exists within the southeastern edge of a large structural feature known as the Denver Basin. Bedrock in the area tends to be very gently dipping in a northeasterly direction (Reference 1). The rocks in the area of the site are sedimentary in nature and typically Tertiary to Cretaceous in age. The bedrock underlying the site consists of the Dawson Arkose Formation of Tertiary to Cretaceous Age. Overlying this formation are residual soils of Quaternary Age. The residual soils are produced by the in-situ action of weathering of the bedrock on site. The site's stratigraphy will be discussed in more detail in Section 5.3.

5.2 Soil Conservation Survey

The Natural Resource Conservation Service (Reference 2), previously the Soil Conservation Service (Reference 3), has mapped two soil types on the site (Figure 4). In general, they are loamy sands. The soils are described in Exhibit 1 below.

Exhibit 1: Soil Survey Description

Type	Description
68	Peyton-Pring complex, 3 to 8% slopes
93	Tomah-Crowfoot complex, 8 to 15% slopes

Complete descriptions of each soil type are presented in Appendix D. The soils have generally been described as having moderately high to high permeabilities. Limitations on development include limited ability to support a load, shrink-swell potential, slopes, and frost action potential. Possible hazards with soil erosion are present on the site. The erosion potential can be controlled with vegetation. The soil has been described to have moderate erosion hazards.

5.3 Site Stratigraphy

The Geologic Map of the Monument Quadrangle showing the site is presented in Figure 5 (Reference 7). The Geology/Engineering Geology Map prepared for the site is presented in Figure 6. One mappable unit was identified on this site that is described as follows:

Qc/Tkd **Colluvium of Quaternary Age overlying Dawson Formation of Tertiary to Cretaceous Age:** The Dawson Formation typically consists of arkosic sandstone with interbedded fine-grained sandstone, siltstone, and claystone. Overlying this formation is a variable layer of colluvium and residual soils. The residual soils were derived from the in-situ weathering of the bedrock materials on-site. These soils consist of clayey sands and sandy clays. The colluvial materials are derived from the bedrock materials and have been re-deposited by the action of sheetwash and gravity.

The soils listed above were mapped from site-specific mapping, the *Geologic Map of the Monument Quadrangle* distributed by the Colorado Geological Survey in 2002 (Reference 4), the *Geologic Map of the Pikeview Quadrangle* distributed by the Colorado Geological Survey in 2001 (Reference 5), the *Geologic Map of the Colorado Springs-Castle Rock Area*, distributed by the US Geological Survey in 1979 (Reference 6), and the *Geologic Map of the Denver 1^0 x 2^0 Quadrangle*, distributed by the US Geological Survey in 1981 (Reference 7). The Test Borings and Test Pit Logs used in evaluating the site are included in Appendix B. The Geology/Engineering Geology Map prepared for the site is presented in Figure 6.

5.4 Soil Conditions

The soils encountered in the test boring drilled on the site can be grouped into four general soil and rock types. The soils were classified using the Unified Soil Classification System (USCS).

Soil Type 1 classified as a sandy clay (CL). The clay was encountered in the test borings at the existing surface and extending to depths of 3 to 4 feet below the existing grade surface (bgs). The clay was encountered at stiff consistencies and moist conditions.

Soil Type 2 classified as a silty sand (SM). The sand was encountered in the test borings at 3 to 14 feet bgs. The sand was encountered at loose to medium dense states and moist conditions.

Soil Type 3 classified as highly weathered sandstone or silty sand or clayey sand when classified as a soil (SM, SC). The sandstone was encountered in TB-1 and TB-2 at depths of 12 and 19 feet bgs and extending to a depth of the termination depth of the boring (20 feet). The sandstone was encountered at very dense states and moist conditions.

Soil Type 4 classified as weathered claystone or sandy clay when classified as a soil (CL). The claystone was encountered in TB-1 and TB-2 at depths of 14 and 16 feet bgs and extending to the 19 feet bgs in TB-1 and to the termination depth of TB-2 (20 feet). Residually weathered claystone was encountered at 14 feet bgs in TB-3 and extended to the termination depth of the boring (20 feet). The claystone was encountered at hard states and moist conditions.

The test boring log and laboratory test results pertaining to this investigation are included in Appendix B.

5.5 Groundwater

Groundwater was not encountered in the test borings which were drilled to 20 feet during or subsequent to drilling. A temporary piezometer was installed in TB-3, and was dry to a depth of 20 feet. The piezometer will continue to be periodically monitored during the coming seasons to evaluate for the potential of any groundwater flucation. These areas are discussed in the following section. Fluctuation in groundwater conditions may occur due to variations in rainfall and other factors including development of the site and surrounding areas.

For the sandy materials on site, it should be noted that some groundwater conditions might be encountered due to the variability in the soil profile. Isolated sand and gravel layers within the soils, sometimes only a few feet in thickness and width, can carry water in the subsurface. Groundwater may also flow on top of the underlying bedrock or clays. Builders and planners should monitor potential occurrences of such subsurface water features during construction on-site and mitigate as necessary at the time of construction.

6 ENGINEERING GEOLOGY – IDENTIFICATION AND MITIGATION OF GEOLOGIC HAZARDS

Detailed mapping has been performed on this site to produce a Geology/Engineering Geology Map (Figure 6). This map shows the location of various geologic conditions the developers should monitor during the planning, design, and construction stages of the project. No significant geologic hazards were identified on the site; however, the following constraints have been identified on the site: potentially expansive soils, loose soils, and the potential for elevated radon levels. These constraints and the recommended mitigation techniques are discussed below.

Artificial Fill – Constraint

These are areas of man-placed fill associated with the existing residence on the site. Other areas of fill may exist on the site other than those mapped.

Mitigation: The fill on this site is considered uncontrolled for construction purposes. Any uncontrolled fill encountered beneath foundations will require removal and recompaction at a minimum of 95% of the Modified Procter (ASTM D1557) maximum dry density.

Potentially Expansive Soils – Constraint

The site is classified in an area of low swell potential according to the *Map of Potentially Swelling Soil and Rock in the Front Range Urban Corridor, Colorado* by Hart, 1974 (Reference 10). Expansive clays and claystone bedrock are commonly interbedded in the Dawson Formation. These occurrences are typically sporadic; therefore, none have been indicated on the maps. These clays, if encountered beneath foundations, can cause differential movement in the structure foundation.

Mitigation: Should expansive soils be encountered beneath foundations; mitigation will be necessary. Mitigation of expansive soils will require special foundation design. Overexcavation and replacement with non-expansive soils at a minimum of 95% of the Modified Proctor (ASTM D1557) maximum dry density is a suitable mitigation, which is common in the area. Overexcavation depths of 3 to 5 feet may be necessary depending on soil conditions. An alternative option to overexcation in areas of highly expansive soils is the use of drilled pier foundation systems. Typical minimum pier depths are on the order of 25 feet or more and require penetration into the bedrock material a minimum of 4 to 6 feet, depending upon building loads. Floor slabs on expansive soils should be expected to experience movement. Overexcavation and replacement have been successful in minimizing slab movements. The use of structural floors

should be considered for basement construction on highly expansive clays. Final recommendations should be made after additional investigation of each building site.

Loose/Collapsible Soils – Constraint

The majority of the soils encountered on-site do not exhibit collapsible characteristics, however, minor areas of loose soils were encountered in the test borings drilled on site.

Mitigation: Should loose or collapsible soils be encountered beneath foundations, recompaction and moisture conditioning of the upper 2 feet of soil at a minimum of 95% of the Modified Proctor (ASTM D1557) maximum dry density.

Drainage and Floodplain Areas – Constraint

The site is not mapped within any floodplains according to FEMA Map No. 08041C0287G (Figure 6, Reference 11). No drainages are located on the site. Specific drainage studies and floodplain locations are beyond the scope of this report. Groundwater was not encountered in the borings drilled on the site, and the piezometer has been dry to a depth of 20 feet. However, redoximorphic features were encountered at shallow depths in the test pits evaluated by JDM (Reference 3, Appendix D).

Foundations on this site must have a minimum 30-inch depth for frost protection. Buildings should be a minimum of 3 feet above groundwater levels. Subsurface perimeter drains are recommended for any usable below-grade areas including crawlspaces. Typical drain details are presented in Figure 9. Should groundwater be encountered within 3 feet of foundation grade, additional drains that could include but are not limited to interceptor drains, underslab drains (capillary break), and overexcavation drains may be needed. Typical drain details are presented in Figures 9 through 11. Any grading in these areas should be done to direct surface flow around construction to avoid areas of ponded water. Structures should not block drainages. All organic material should be completely removed prior to any fill placement. Septic fields should not be placed in areas where there is the potential for shallow groundwater.

Slope Stability and Landslide Susceptibility – Hazard

The majority of the slopes on the site are gradually sloping and do not exhibit any past or potential unstable slopes or landslides. It is recommended that any future grading or fill slopes be 3:1 or flatter.

Debris Flow Susceptibility – Hazard

The site is not located within an area of debris flow susceptibility according to the *Debris Flow Susceptibility Map of El Paso County, Colorado* by McCoy et al. in 2018 (Reference 13).

Radon – Hazard

Radon is a colorless, tasteless radioactive gas with a United States Environmental Protection Agency (EPA) specified action level of 4.0 picocuries per liter (pCi/L) of air. Radon gas has a very short half-life of 3.8 days. Radon levels for the area have been reported by the Colorado Geologic Survey in the open file, Report No. 91-4 (Reference 14). The average radon level for the 80921 zip code is 1.90 pCi/l. The average radon levels are presented in Exhibit 2 below.

Exhibit 2: Average Radon Levels

Average Radon Levels for the 80921 Zip Code	
0 < 4 pCi/L	100.00%
4 < 10 pCi/L	0.00%
10 < 20 pCi/L	0.00%
> 20 pCi/L	0.00%

Mitigation: The potential for high radon levels is present for the site. Build-up of radon gas can usually be mitigated by providing increased ventilation of basement and crawlspace and sealing joints. **Specific requirements for mitigation should be based on site specific testing.**

6.1 Relevance of Geologic Conditions to Land Use Planning

We understand that the development will be rural residential. A new residence is proposed on Lot 1 and the existing residence on Lot 2 will remain. It is our opinion that the existing geologic and engineering geologic conditions will impose some minimal constraints on the proposed development of Lot 1. The most significant problems affecting Lot 1 will be those associated with the potentially expansive soils, and potential for loose soils. The constraints/hazards on the site may be satisfactorily mitigated through proper engineering design and construction practices.

The granular soils were encountered at loose to medium dense states. The granular soils encountered in the upper soil profiles of the test boring should provide good support for foundations. Foundations anticipated for the site are standard spread footings on the medium dense granular soils or structural fill. Should loose or collapsible soils be encountered beneath foundations, recompaction and moisture conditioning of the upper 2 feet of soil at a minimum of 95% of the Modified Proctor (ASTM D1557) maximum dry density.

Expansive layers may also be encountered in the soil and bedrock on this site. Areas of expansive soils encountered on site are sporadic; therefore, none have been indicated on the maps. Expansive soils, if encountered, will require special foundation design and/or overexcavation. These soils will not prohibit development. Site-specific subsurface investigations will need to be conducted.

In summary, development of the site can be achieved if the items mentioned above are mitigated. These items can be mitigated through proper design and construction or through avoidance. Investigation of the individual lots and building sites is recommended prior to construction.

7 ECONOMIC MINERAL RESOURCES

Some of the sandy materials on site could be considered a low-grade sand resource. According to the *El Paso County Aggregate Resource Evaluation Map* (Reference 15), the site is not mapped within any aggregate resources. According to the *Atlas of Sand, Gravel and Quarry Aggregate Resources, Colorado Front Range Counties* distributed by the Colorado Geological Survey (Reference 16), areas of the site are not mapped with any resources. According to the *Evaluation of Mineral and Mineral Fuel Potential* (Reference 17), the area of the site has been mapped as "Proven" for industrial minerals. It is possible that sand materials on site could be an aggregate resource. However, considering the silty to clayey nature of many of these materials, the abundance of similar materials throughout the region, shallow bedrock, and the proximity to developed land, they would be considered to have little significance as an economic resource.

According to the *Evaluation of Mineral and Mineral Fuel Potential of El Paso County State Mineral Lands* (Reference 17), the site is mapped within the Denver Basin Coal Region. However, the area of the site has been mapped as "Poor" for coal resources. No active or inactive mines have been mapped near the site. No metallic mineral resources have been mapped on the site (Reference 17).

The site has been mapped as "Fair" for oil and gas resources (Reference 16). No oil or gas fields have been discovered near the site. The sedimentary rocks in the area may lack the geologic structure for trapping oil or gas; therefore, they may not be considered a significant resource. Hydraulic fracturing is a new method used to extract oil and gas from rocks. It utilizes pressurized fluid to extract oil and gas from rocks that would not normally be productive. The area of the site has not been explored to determine if the rocks underlying the site would be commercially viable

utilizing hydraulic fracturing. The practice of hydraulic fracturing has come under review due to concerns about environmental impacts, health, and safety.

8 EROSION CONTROL

The soil types observed on the site are mildly to highly susceptible to wind erosion and moderately to highly susceptible to water erosion. A minor wind erosion and dust problem may be created for a short time during and immediately after construction. Should the problem be considered severe enough during this time, watering of the cut areas or the use of chemical palliative may be required to control dust. However, once construction has been completed and vegetation re-established, the potential for wind erosion should be considerably reduced.

Regarding water erosion, loosely compacted soils will be the most susceptible to water erosion; residually weathered soils and weathered bedrock materials become increasingly less susceptible to water erosion. For the typical soils observed on site, allowable velocities or unvegetated and unlined earth channels would be on the order of 3 to 4 feet/second, depending upon the sediment load carried by the water. Permissible velocities may be increased through the use of vegetation to something on the order of 4 to 7 feet/second, depending upon the type of vegetation established. Should the anticipated velocities exceed these values, some form of channel lining material may be required to reduce erosion potential. These might consist of synthetic channel lining materials available on the market or conventional riprap. In cases where ditch-lining materials are still insufficient to control erosion, small check dams or sediment traps may be required. The check dams will serve to reduce flow velocities as well as provide small traps for containing sediment. The determination of the amount, location, and placement of ditch linings, check dams, and special erosion control features should be performed by or in conjunction with the drainage engineer who is more familiar with the flow quantities and velocities.

Cut and fill slope areas will be subjected primarily to sheetwash and rill erosion. Unchecked rill erosion can eventually lead to concentrated flows of water and gully erosion. The best means to combat this type of erosion is, where possible, the adequate re-vegetation of cut and fill slopes. Cut and fill slopes having gradients more than three (3) horizontal to one (1) vertical become increasingly more difficult to revegetate successfully. Therefore, recommendations pertaining to the vegetation of the cut and fill slopes may require input from a qualified landscape architect and/or the Soil Conservation Service.

9 PRIVATE DRIVEWAY CONSTRUCTION RECOMMENDATIONS

The site soils encountered in the test boring are suitable for the proposed driveway. Any areas to receive fill should have all topsoil, organic material, or debris removed. Prior to fill placement, Entech should observe the subgrade. Fill must be properly benched and compacted to minimize potentially unstable conditions in slope areas. Fill slopes should be 3:1 or flatter. The subgrade should be scarified and moisture conditioned to within 2% of optimum moisture content and compacted to a minimum of 95% of the Modified Proctor (ASTM D1557) maximum dry density prior to placing new fill. Areas receiving fill may require stabilization with rock or fabric if shallow groundwater conditions are encountered.

New fill should be placed in thin lifts not to exceed 6 inches after compaction while maintaining at least 95% of the Modified Proctor (ASTM D1557) maximum dry density. These materials should be placed at a moisture content conducive to compaction, usually 0 to +/-2% of the Proctor optimum moisture content. The placement and compaction of fill should be observed and tested by Entech during construction. Entech should approve any imported materials prior to placing or hauling them to the site. Additional investigation will be required for pavement designs once roadway grading is completed and utilities are installed.

10 CLOSURE

It is our opinion that the existing geologic engineering and geologic conditions will impose minimal constraints on development and construction on Lot 1. The site conditions can be mitigated through proper engineering design and construction practices. The proposed development and use are consistent with anticipated geologic and engineering geologic conditions.

It should be pointed out that because of the nature of data obtained by random sampling of such variable and non-homogeneous materials as soil and rock, it is important that we be informed of any differences observed between surface and subsurface conditions encountered in construction and those assumed in the body of this report. Construction and design personnel should be made familiar with the contents of this report.

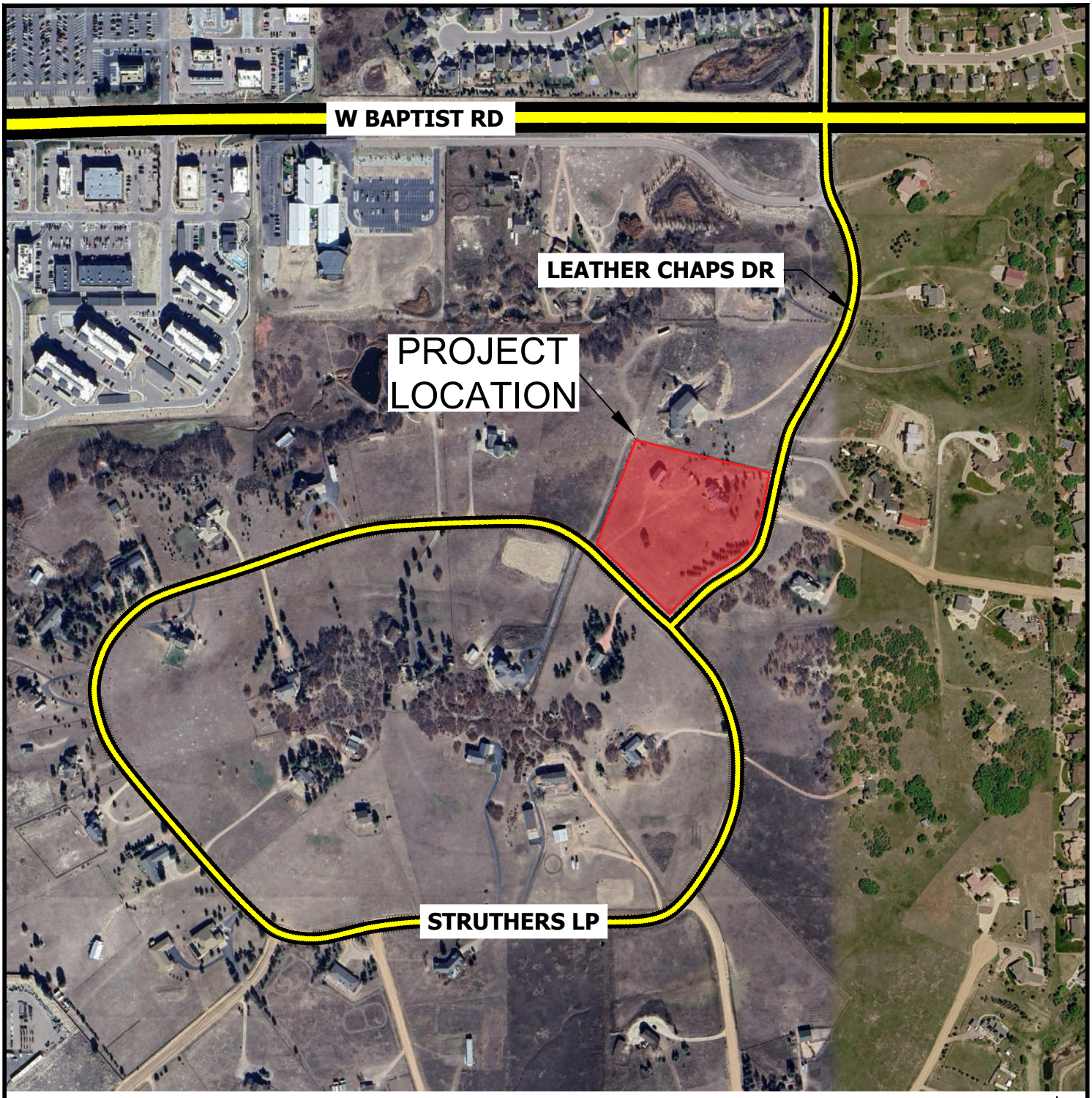
This report has been prepared for Bill and Vickie Hancock for application to the proposed project in accordance with generally accepted geologic soil and engineering practices. No other warranty, expressed or implied, is made.

We trust that this report has provided you with all the information that you require. Should you require additional information, please do not hesitate to contact Entech Engineering, Inc.

11 REFERENCES

1. Entech Engineering, Inc. June 20, 2023. *Subsurface Soil Investigation, 15520 Leather Chaps Drive, Lot 39, Chaparral Hills Subdivision, Colorado Springs, Colorado.* Entech Job No. 230921.
2. JDM Consulting, LLC, dated November 4, 2022. *OWTS Site Evaluation, 15220 Leather Chaps Drive, Colorado Springs, CO.* JDM Job No. 22-244.
3. Colorado Geological Survey review, dated January 6, 2026. *Hancock Subdivision VR – Final Plat, Colorado Springs, El Paso County, CO.* County File VR254; CGS Unique No. EP-25-0062_3.
4. Bryant, Bruce, McGrew, Laura W., and Wobus, Reinhard A. 1981. *Geologic Structure Map of the Denver 1º x 2º Quadrangle, North-Central Colorado*. U.S. Geologic Survey. Map 1-1163.
5. Natural Resource Conservation Service, June 20, 2007. *Web Soil Survey.* United States Department Agriculture, hhtp://web soil survey.nrcs.usda.gov.
6. United States Department of Agriculture Soil Conservation Service. June 1981. *Soil Survey of El Paso County Area, Colorado.*
7. Thorson, Jon P. and Madole, Richard F. 2003. *Geologic Map of the Monument Quadrangle, El Paso County, Colorado*. Colorado Geological Survey. Open-File Report 02-4.
8. Trimble, Donald E. and Machette, Michael N. 1979. *Geologic Map of the Colorado Springs-Castle Rock Area, Front Range Urban Corridor, Colorado*. USGS, Map I-857-F.
9. Bryant, Bruce, McGrew, Laura W., and Wobus, Reinhard A. 1981. *Geologic Map of the Denver 1º x 2º Quadrangle, North-Central Colorado*. U.S. Geologic Survey. Map 1-1163.
10. Hart, Stephen S. 1974. *Potentially Swelling Soil and Rock in the Front Range Urban Corridor, Colorado*. Colorado Springs-Castle Rock Map. Colorado Geological Survey. Environmental Geology 7.
11. Federal Emergency Management Agency. December 7, 2018. *Flood Insurance Rate Maps for the City of Colorado Springs, Colorado.* Map Number 08041C0295G and 08041C0287G.
12. U.S. Fish & Wildlife Service, May 1, 2020. *National Wetlands Inventory*. Department of the Interior, fws.gov/wetlands/data/Mapper.html.
13. McCoy, KM; Morgan, ML; Berry, KL. 2018. *Debris Flow Susceptibility Map of El Paso County, Colorado.* Colorado Geological Survey. Open-File Report 18-11.
14. Colorado Geological Survey. 1991. *Results of the 1987-88 EPA Supported Radon Study in Colorado.* Open-file Report 91-4.
15. El Paso County Planning Development. December 1995. *El Paso County Aggregate Resource Evaluation Maps.*
16. Schwochow, S.D., Shroba, R.R., and Wicklein, P.C. 1974. *Atlas of Sand, Gravel, and Quarry Aggregate Resources, Colorado Front Range Counties*. Colorado Geological Survey. Special Publication 5-B.
17. Keller, John W., TerBest, Harry, and Garrison, Rachel E. 2003. *Evaluation of Mineral and Mineral Fuel Potential of El Paso County State Mineral Lands Administered by the Colorado State Land Board*. Colorado Geological Survey. Open-File Report 03-07.

FIGURES



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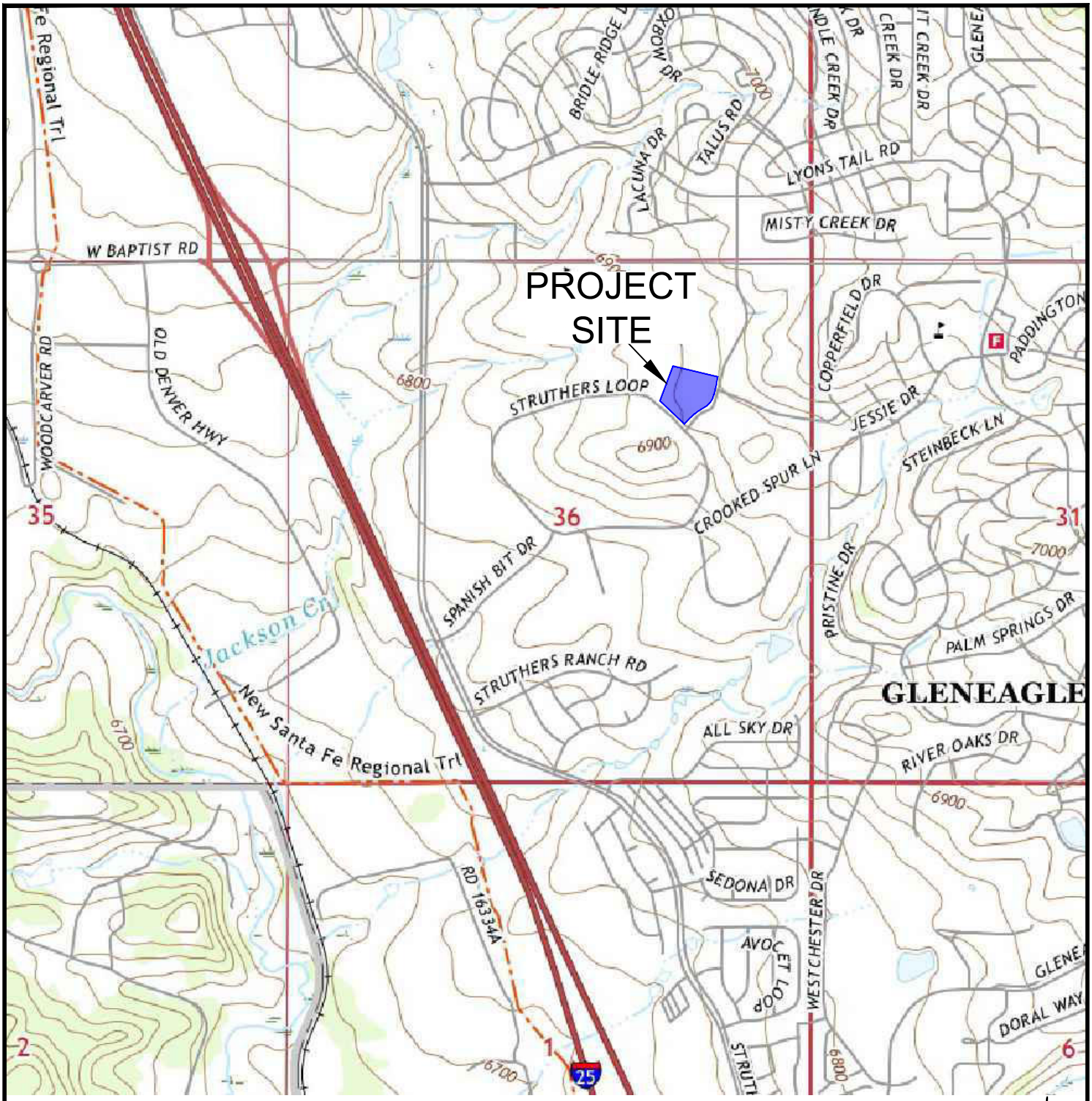
VICINITY MAP

15220 LEATHER CHAPS DRIVE
BILL AND VICKIE HANCOCK

JOB NO. 230921

FIG. 1



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ENTECH ENGINEERING, INC.

USGS TOPOGRAPHY MAP

15220 LEATHER CHAPS DRIVE
BILL AND VICKIE HANCOCK

JOB NO. 230921

FIG. 2

TB- APPROXIMATE TEST BORING LOCATION AND NUMBER

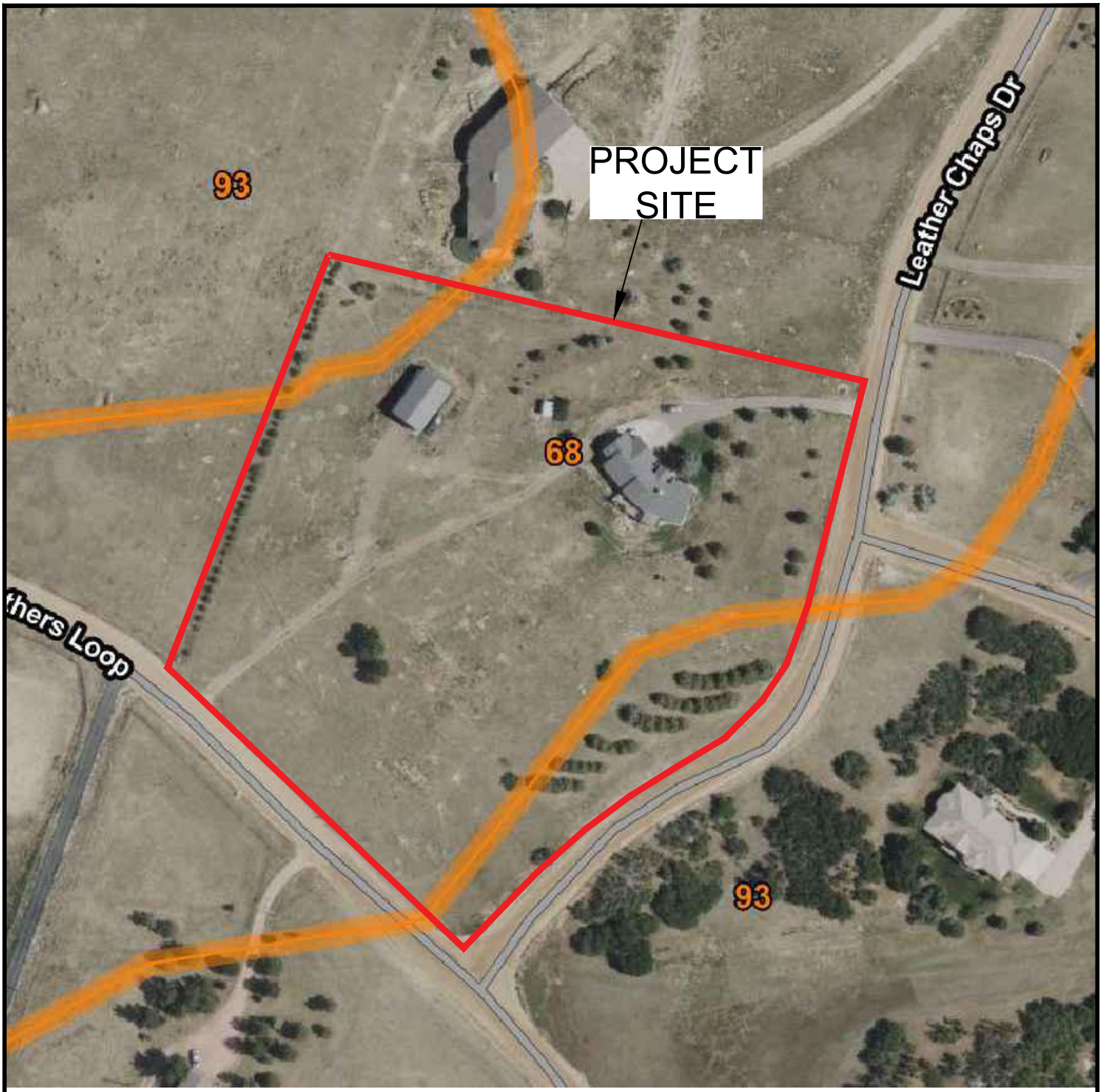
ENTECH ENGINEERING, INC.

SITE AND EXPLORATION MAP

15220 LEATHER CHAPS DRIVE
BILL AND VICKIE HANCOCK

JOB NO. 230921

FIG. 3



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SOIL SURVEY MAP

15220 LEATHER CHAPS DRIVE
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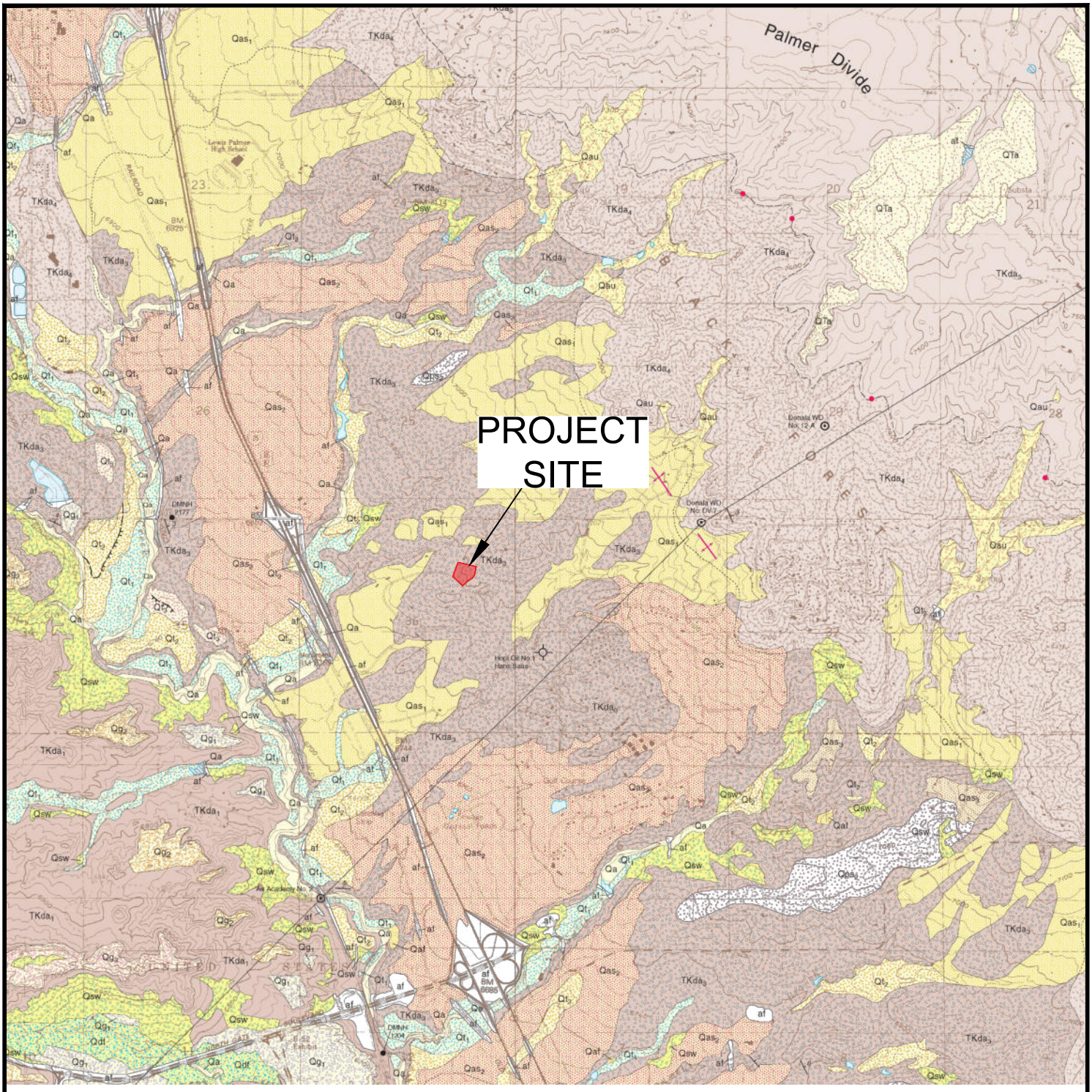
FIG. 4



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GEOLOGIC MAP OF THE MONUMENT QUADRANGLE

15220 LEATHER CHAPS DRIVE
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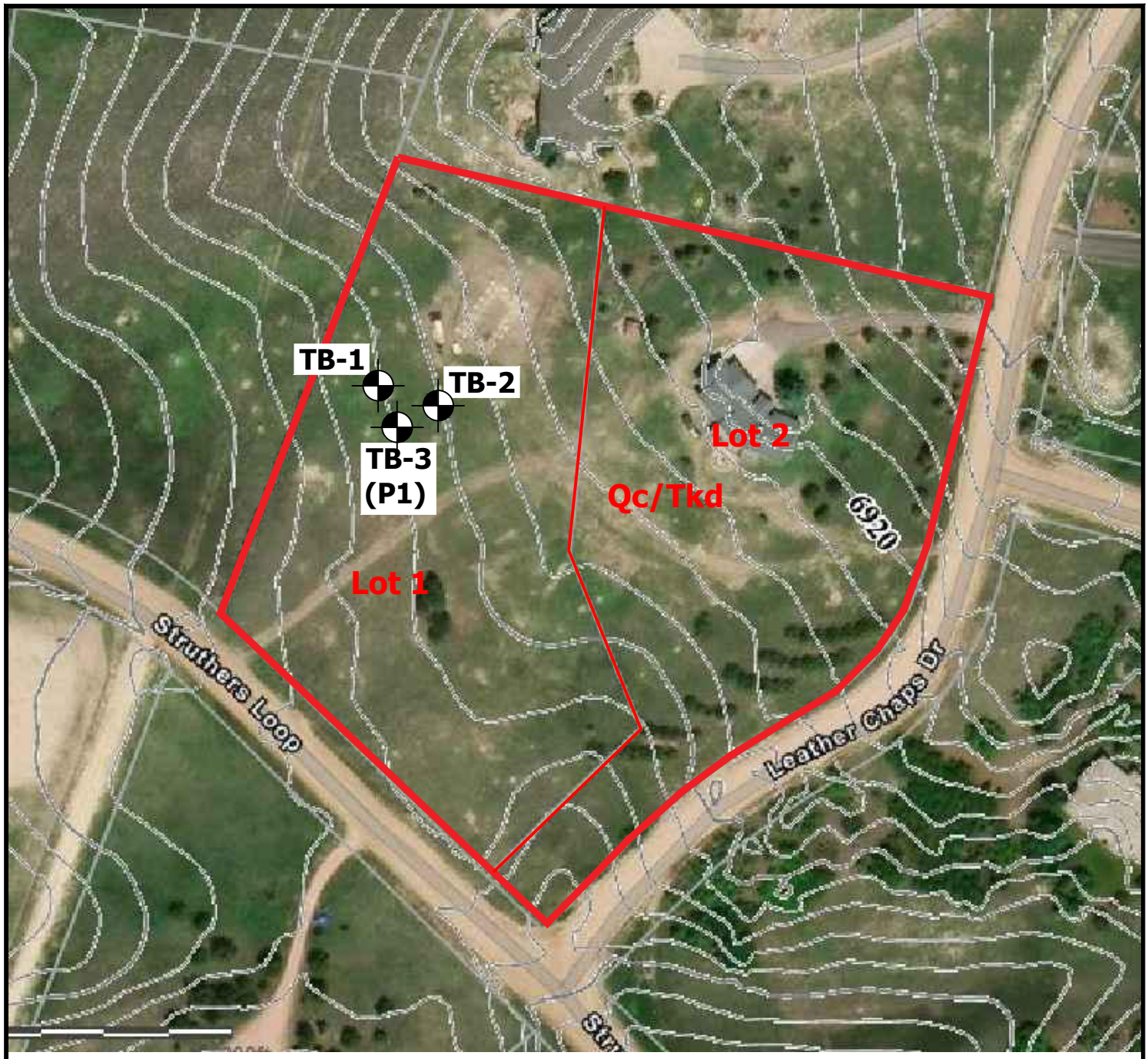
FIG. 5



Legend

Qc/Tkd- **Colluvium of Quaternary Age Overlying the Dawson Formation of Tertiary to Cretaceous Age:**
Sheetwash and residual soil deposits overlying arkosic sandstone with interbedded siltstone and claystone

N

- APPROXIMATE TEST BORING LOCATION AND NUMBER

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GEOLOGY/ENGINEERING GEOLOGY MAP
15220 LEATHER CHAPS DRIVE
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FIG. 6

N

ENTECH ENGINEERING, INC.

FEMA FLOODPLAIN MAP

15220 LEATHER CHAPS DRIVE
BILL AND VICKIE HANCOCK

JOB NO. 230921

FIG. 7

APPENDIX A: Site Photographs

1

Looking north from the southwest portion of the site.

January 30, 2026

2

Looking northeast from the southwest portion of the site.

January 30, 2026

Job No. 230921

3

Looking east from the southwest portion of the site.

January 30, 2026

4

Looking south from the western portion of the site.

January 30, 2026

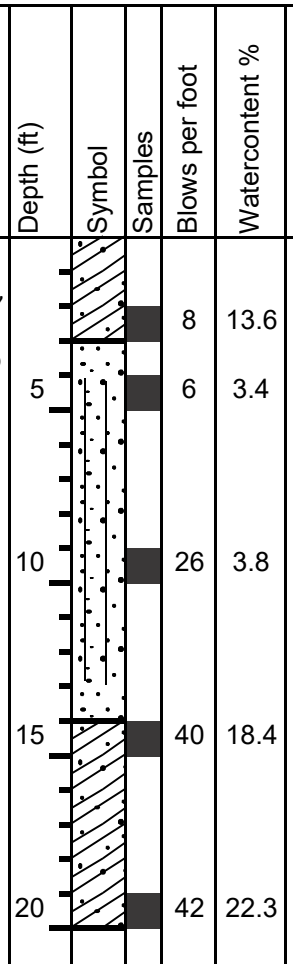
Job No. 230921

APPENDIX B: Test Boring Log and Laboratory Test Results

TEST BORING 3
DATE DRILLED 6/6/2023

REMARKS

DRY TO 20', 2/16/26



ENTECH ENGINEERING, INC.

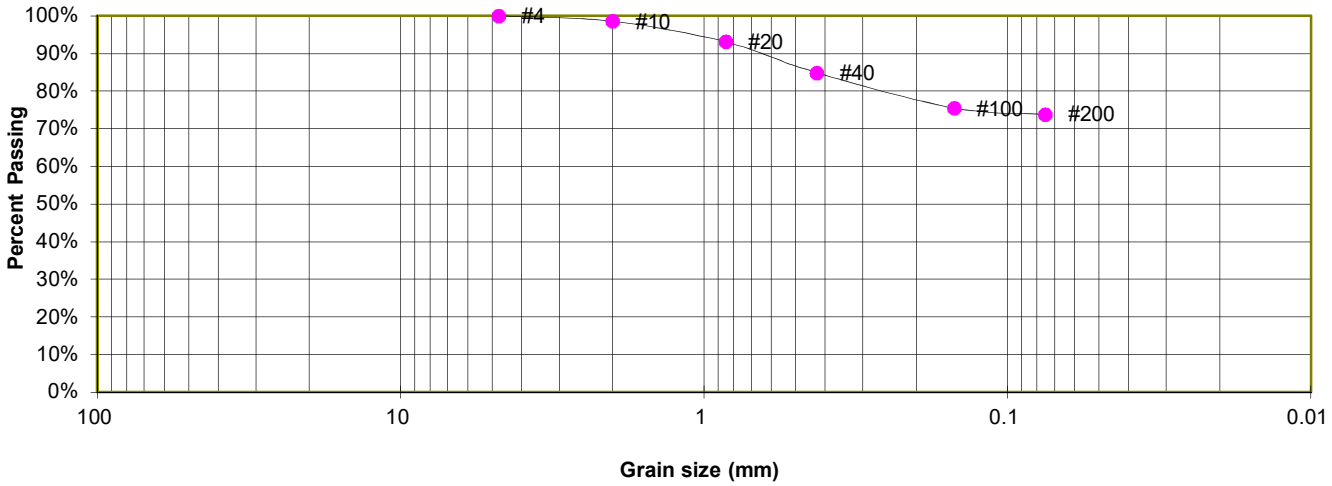
TEST BORING LOGS

15220 LEATHER CHAPS DRIVE
BILL AND VICKIE HANCOCK

JOB NO. 230921

FIG. B-1

TEST BORING	3	SOIL DESCRIPTION	CLAY, WITH SAND
DEPTH (FT)	2-3		



GRAIN SIZE ANALYSIS

U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	
4	100.0%
10	98.6%
20	93.1%
40	84.9%
100	75.5%
200	73.8%

SOIL CLASSIFICATION

USCS CLASSIFICATION: CL

ENTECH ENGINEERING, INC.

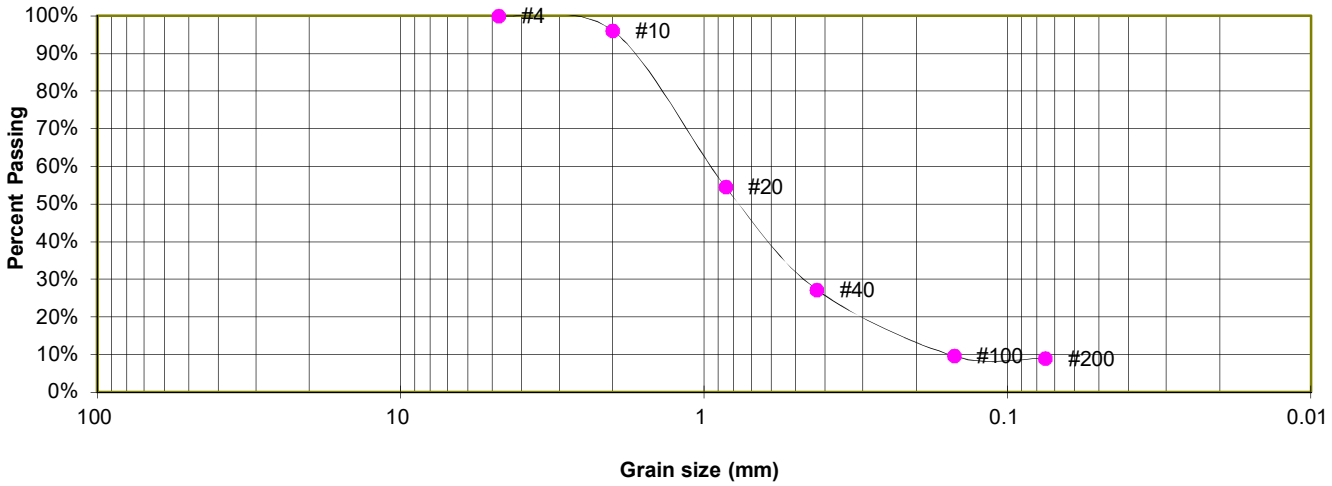
LABORATORY TEST RESULTS

15220 LEATHER CHAPS DRIVE
BILL AND VICKIE HANCOCK

JOB NO. 230921

FIG. B-2

TEST BORING	3	SOIL DESCRIPTION	SAND, WITH SILT
DEPTH (FT)	10		



GRAIN SIZE ANALYSIS

U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	
4	100.0%
10	96.1%
20	54.6%
40	27.3%
100	9.6%
200	9.0%

SOIL CLASSIFICATION

USCS CLASSIFICATION: SW-SM

ENTECH ENGINEERING, INC.

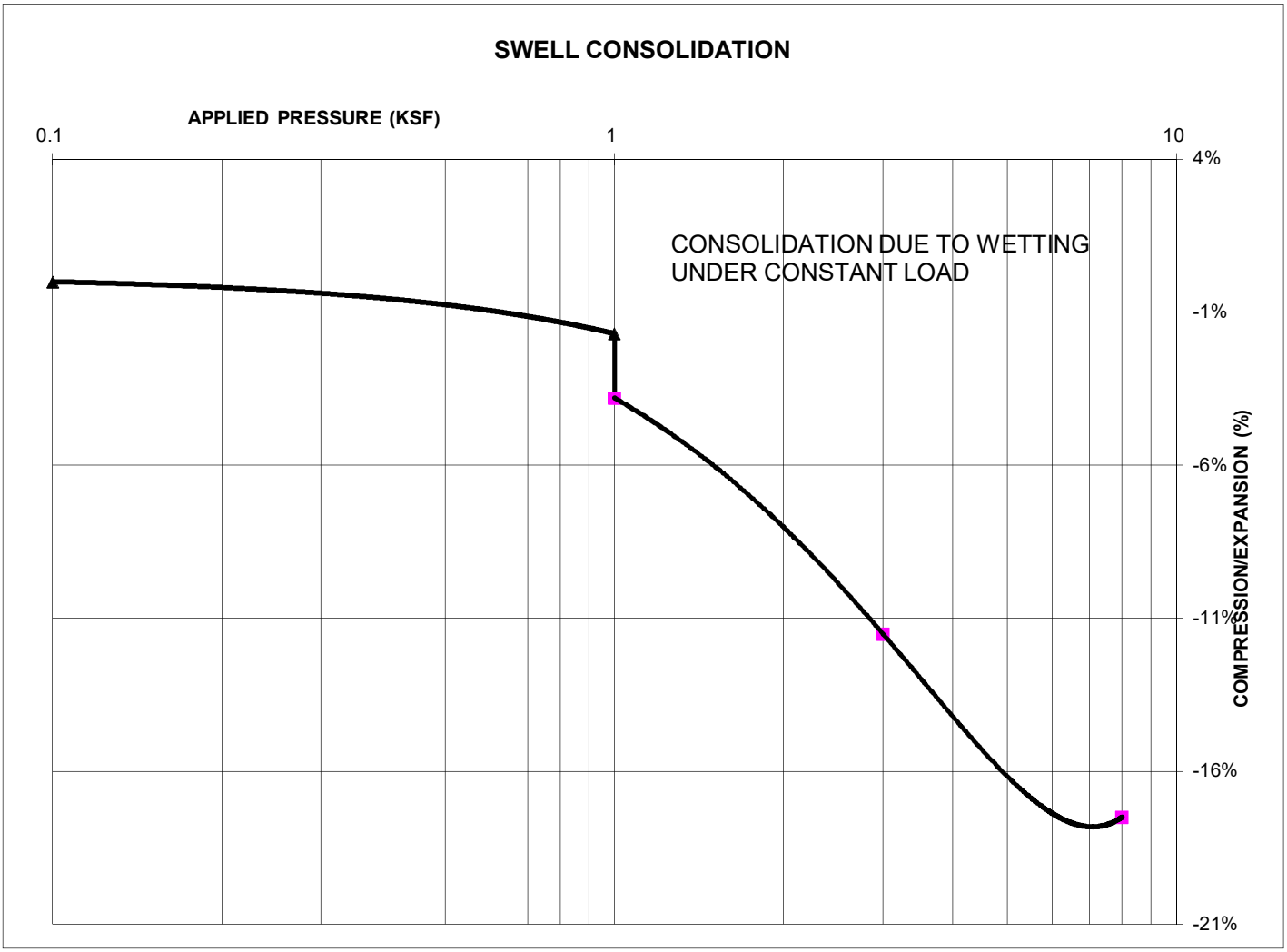
LABORATORY TEST RESULTS

15220 LEATHER CHAPS DRIVE
BILL AND VICKIE HANCOCK

JOB NO. 230921

FIG. B-3

TEST BORING	3	SOIL DESCRIPTION	CLAY, WITH SAND
DEPTH (FT)	2-3		



SWELL/CONSOLIDATION TEST RESULTS

NATURAL UNIT DRY WEIGHT (PCF):	86
NATURAL MOISTURE CONTENT:	22.1%
SWELL/CONSOLIDATION (%):	-2.1%

ENTECH ENGINEERING, INC.

SWELL/CONSOLIDATION TEST RESULTS

15220 LEATHER CHAPS DRIVE
BILL AND VICKIE HANCOCK

JOB NO. 230921

FIG. B-4

APPENDIX C: Entech, Subsurface Soil Investigation, Entech Job No. 230921

ENTECH
ENGINEERING, INC.
505 ELKTON DRIVE
COLORADO SPRINGS, CO 80907
PHONE (719) 531-5599

June 20, 2023

Bill & Vickie Hancock
15520 Leather Chaps Drive
Monument, CO 80921

Attn: Bill & Vickie Hancock

Re: Subsurface Soil Investigation
15520 Leather Chaps Drive
Lot 39, Chaparral Hills Subdivision
Colorado Springs, Colorado
Entech Job No. 230921

Dear Mr. and Mrs. Hancock:

Personnel of Entech Engineering, Inc. (Entech) drilled two 20-foot test borings at the address referenced above on June 6, 2023. Specific findings for the site are presented in this letter.

Site Conditions:

At the time of our site exploration the site was an approximately 2.5 acre vacant lot on a gradual southwest facing slope. The vegetation consists of native field grasses and weeds.

Soil Classification:

Subsurface conditions observed in the borings drilled on this site were found to consist of 4 feet of stiff clay with sand overlying loose to medium dense silty sand with underlying sandy clay, claystone and sandstone bedrock.

Allowable Bearing Capacity:

An allowable bearing capacity of 2,200 pounds per square foot (psf) is recommended for the recompacted on-site silty sand or imported granular fill.

Lateral Earth Pressure:

An equivalent hydrostatic fluid pressure (in the active state) of 45 pounds per cubic foot (pcf) is recommended for the on-site or imported granular sand. Surficial clays shall not be used as foundation backfill.

Soil Moisture Conditions:

Moist to dry.

Expansion Potential:

FHA swell testing on a sample of sandy clay from Test Boring 1 resulted in a swell pressure of 1,820 pounds per square foot, this indicates a moderate to high expansion potential.

Swell/consolidation testing on a sample of claystone from Test Boring No. 1 at a depth of 15 feet resulted in a volume change of 2.0 percent which indicates a moderate expansion potential.

Swell/consolidation testing on a sample of sandy clay from Test Boring 2 at a depth of 10 feet resulted in a volume change of 1.8 percent which also indicates a moderate expansion potential.

Fill:

Fill soils were not encountered during our subsurface investigation.

Special Considerations:

Expansive clay and claystone was encountered throughout both test borings completed on site. Additionally, loose sands were encountered at a depth of 5 feet in both borings.

We recommend that all clays be removed and loose soils be recompacted below all footings and slabs-on-grade. An exploratory boring or test pit should be completed from the final subgrade elevation and slab-on-grade elevation to a depth of 4 feet. If expansive soil or bedrock is encountered within 4 feet of the bottom foundation elevation or on-grade floor slab elevation, it must be penetrated or removed and replaced with compacted granular fill (see Granular Fill and Backfill Recommendations section). Where encountered, loose sands should be overexcavated a minimum 16-inches or to underlying dense and unyielding subgrade, whichever is greater, and recompacted to 95% of its maximum Modified Proctor Dry Density ASTM D-1557. The depth of overexcavation, if needed, should be determined during the excavation observation.

The use of on-site sand or any imported material should be approved by Entech prior to placement or hauling it to site. Excavation should be feasible with rubber-tired equipment.

Foundation Type:

A 16-inch minimum spread footing and stemwall foundation system is anticipated for this site. Point load bearing pads should be sized for the allowable bearing capacity given. **This does not constitute a foundation design.** Qualified personnel should verify that building loads do not exceed the bearing value given in this letter. The bottoms of exterior foundations should be located at least 30 inches below finished grade for frost protection.

Reinforcing:

Reinforcing should be designed to permit foundation walls to span a minimum of 10 feet under the design load. Foundation walls should be designed to resist lateral earth pressures as discussed in the Lateral Earth Pressure section.

Floor Slabs:

Floor slabs-on-grade, if any, should be separated from structural portions of the building and allowed to float freely. Interior partitions must be constructed in such a manner that they do not transmit floor slab movement to the roof or overlying floor. Backfill placed below floor slabs should be compacted to a minimum of 95% of its maximum Modified Proctor Dry Density, ASTM D-1557.

Drainage and Grading:

The ground surface must be sloped away from the building to provide positive drainage away from the foundation. We recommend an equivalent slope of 6 inches in the first 10 feet (5%) surrounding the structure, where possible, or as required to quickly remove surface water. Where a 5% slope cannot be achieved practically, such as around patios, at inside foundation corners, and between a building and nearby sidewalk, we believe it is desirable to establish as much slope as possible and to avoid irrigation in the area. Roof downspouts should discharge beyond the limits of backfill. We recommend providing splash blocks and downspout extensions to discharge runoff beyond the limits of backfill.

Homeowners should maintain the surface grading and drainage installed by the builder to assure

water is not directed toward the foundations and does not pond near the building. Landscaping should be carefully designed to minimize irrigation adjacent to the foundation. We do not recommend use of impervious plastic membranes below landscaped areas near foundations; geotextile fabrics can control weed growth while allowing evaporation. Plants used close to foundation walls should be limited to those with low moisture requirements; irrigated grass should not be located within 5 feet of the foundation. Sprinklers should not discharge water within 5 feet of foundations. Irrigation should be limited to the minimum amount sufficient to maintain vegetation. Application of more water will increase the potential for slab and foundation movement.

Subdrain:

A subsurface drain is recommended around portions of the structure which will have useable space located below the finished ground surface or for the entire structure if overexcavation is required. Typical drain details are included with this letter.

Granular Fill and Backfill Recommendations:

Granular fill placed beneath foundation components and floor slabs shall consist of non-expansive, granular soil, free of organic matter, unsuitable materials, debris and cobbles greater than 3-inches in diameter. Surficial clays shall not be used as backfill. If approved by Entech, on-site, properly processed and broken down non-expansive sandstone may be used as granular fill. Entech should approve any imported granular or structural fill to be used within the foundation area prior to delivery to the site.

Backfill should be compacted to 95% of its maximum Modified Proctor Dry Density, ASTM D-1557. Backfill must be compacted by mechanical means. No water flooding techniques of any type should be used in the compaction of backfill on this site. Expansive soils are not to be used as backfill.

Concrete:

Type II cement is recommended for all concrete on this site. Concrete should not be placed on frozen or wet ground. Care should be taken to prevent the accumulation and ponding of water in the footing excavation prior to the placement of concrete. If standing water is present in the excavation, it should be removed by installing sumps and pumping the water away from the building area. If concrete is placed during periods of cold temperatures, the concrete must be kept from freezing. This may require covering the concrete with insulated blankets and heating to prohibit freezing.

Open Foundation Excavation Observation:

The open foundation excavation should be observed prior to construction of the foundation in order to verify that no anomalies are present, that materials at the proper design bearing capacity have been encountered, and that no soft spots or debris are present in the foundation area.

Remarks:

The recommendations provided in this letter are based upon the observed soil conditions, anticipated foundation loads, and accepted engineering procedures. The recommendations are intended to minimize differential movement resulting from the heaving of expansive soils or resulting from settlement induced by the application of building loads. It must be recognized that the foundation may undergo movement. In addition, concrete floor slabs may experience

movement; therefore, adherence to those recommendations which would isolate floor slabs from columns, walls, partitions or other structural components is extremely important, if damage to the superstructure is to be minimized. Any subsequent owners should be apprised of the soil conditions and advised to maintain good practice in the future with regard to surface and subsurface drainage, framing of partitions above floor slabs, drywall and finish work above floor slabs, etc.

We trust this has provided you with the information you required. If you have any questions or need additional information, please do not hesitate to contact us.

Respectfully Submitted,

ENTECH ENGINEERING, INC.

Stuart Wood
Geologist

Reviewed by:

COLORADO LICENSED
JOSEPH C GOODE III
52381
PROFESSIONAL ENGINEER

Digitally signed by Joseph C Goode III
Date: 2023.06.20 17:11:22 -06'00'

Joseph C. Goode III, P.E.
Project Engineer

Encl.

SW/jcg
AAprojects/2023/230921-ssi

ENTECH ENGINEERING, INC.

SITE AND EXPLORATION PLAN

15220 LEATHER CHAPS DRIVE
BILL AND VICKIE HANCOCK

JOB NO.
230921

FIG. 1

TEST BORING 1
DATE DRILLED 6/6/2023

REMARKS

DRY TO 20', 6/6/23

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
			12	17.4	
			7	1.7	
5					
			37	8.9	
10					
			50	18.4	
15			11"		
			50	15.8	
20			8"		

CLAY, WITH SAND, BROWN, STIFF, MOIST

SAND, SILTY, TAN to BROWN, LOOSE to DENSE, DRY to MOIST

CLAYSTONE, WEAK, BROWN, HIGHLY WEATHERED. (CLAY, SANDY, HARD, MOIST)

SANDSTONE, VERY WEAK, GRAY, HIGHLY WEATHERED. (SAND, CLAYEY, VERY DENSE, MOIST)

TEST BORING 2
DATE DRILLED 6/6/2023

REMARKS

DRY TO 20', 6/6/23

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
			9	18.6	
			8	1.5	
5					
			19	13.3	
10					
			50	5.4	
15			7"		
			50	12.7	
20			8"		

CLAY, WITH SAND, BROWN, STIFF, MOIST

SAND, SILTY, TAN to DARK GRAY, LOOSE to MEDIUM DENSE, DRY to MOIST

CLAY, SANDY, GRAY to BROWN, VERY STIFF, MOIST

SANDSTONE, VERY WEAK, BROWN, HIGHLY WEATHERED. (SAND, SILTY, VERY DENSE, MOIST)

CLAYSTONE, WEAK, MODERATLEY WEATHERED. (CLAY, SANDY, HARD, MOIST)

ENTECH ENGINEERING, INC.

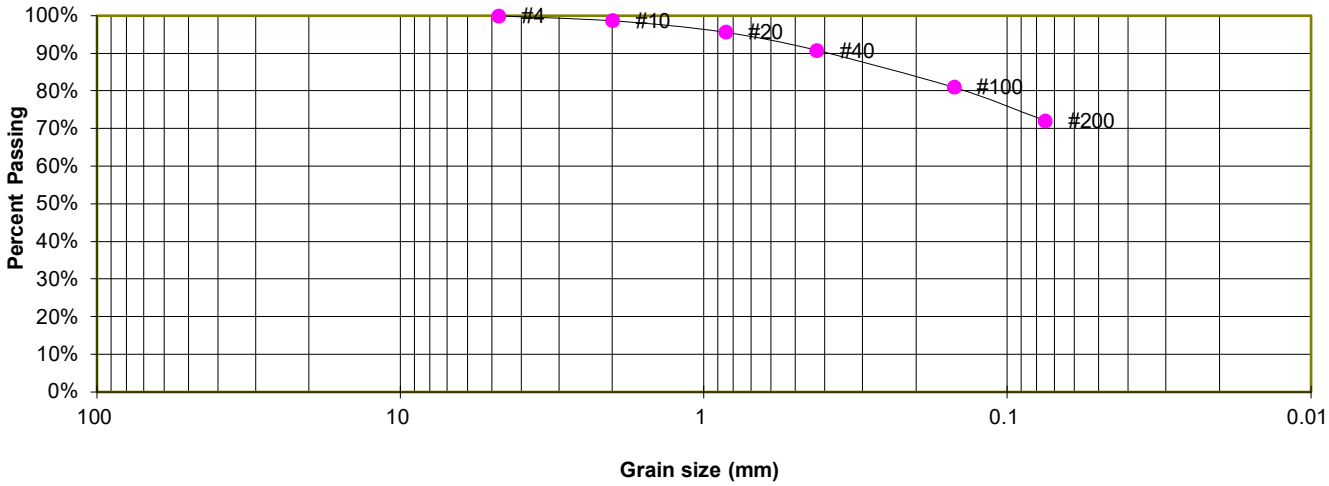
TEST BORING LOGS

15220 LEATHER CHAPS DRIVE
BILL AND VICKIE HANCOCK

JOB NO. 230921

FIG. 2

TEST BORING	1	SOIL DESCRIPTION	CLAY, WITH SAND
DEPTH (FT)	2-3		



GRAIN SIZE ANALYSIS

U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	
4	100.0%
10	98.7%
20	95.6%
40	90.8%
100	81.0%
200	72.2%

FHA SWELL

Moisture at start	6.8%
Moisture at finish	16.7%
Moisture increase	9.8%
Initial dry density (pcf)	103
Swell (psf)	1820

SOIL CLASSIFICATION

USCS CLASSIFICATION: CL

ENTECH ENGINEERING, INC.

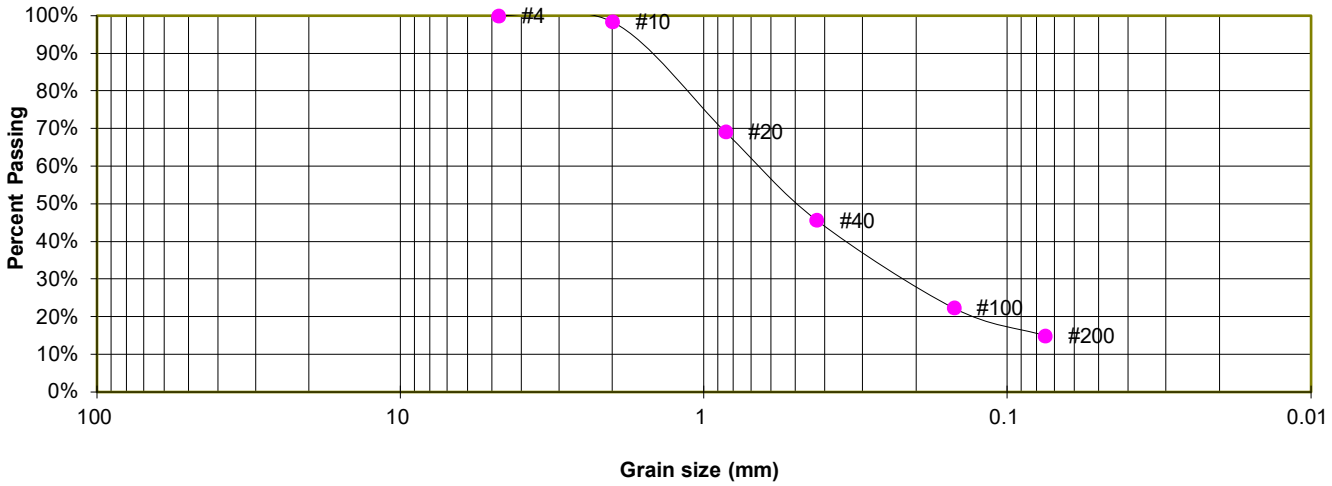
LABORATORY TEST RESULTS

15220 LEATHER CHAPS DRIVE
BILL AND VICKIE HANCOCK

JOB NO. 230921

FIG. 3

TEST BORING	1	SOIL DESCRIPTION	SAND, SILTY
DEPTH (FT)	5		



GRAIN SIZE ANALYSIS

U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	
4	100.0%
10	98.4%
20	69.1%
40	45.7%
100	22.4%
200	15.0%

SOIL CLASSIFICATION

USCS CLASSIFICATION: SM

ENTECH ENGINEERING, INC.

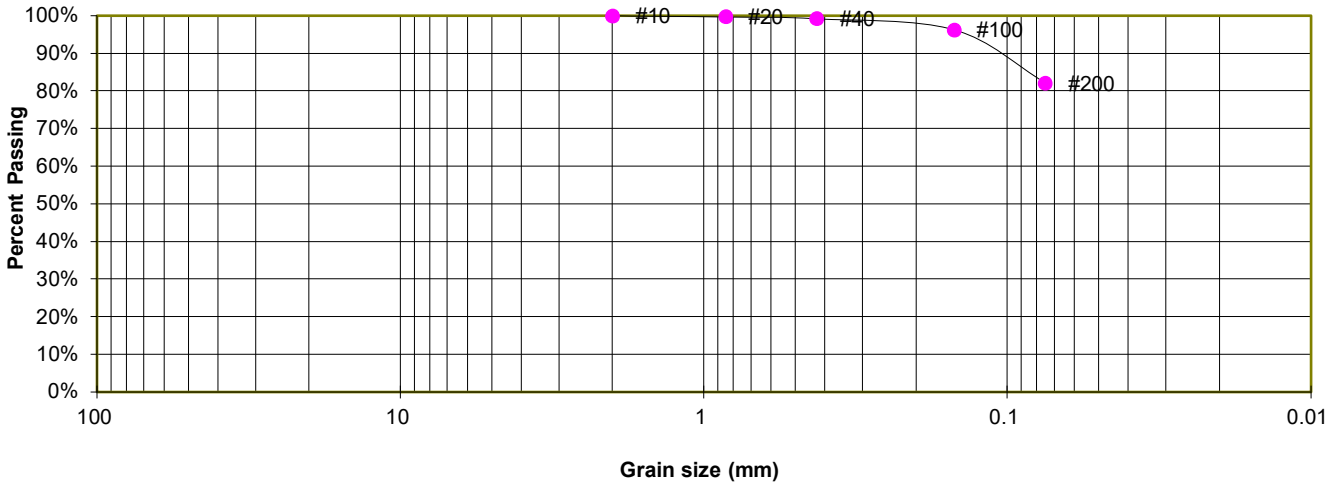
LABORATORY TEST RESULTS

15220 LEATHER CHAPS DRIVE
BILL AND VICKIE HANCOCK

JOB NO. 230921

FIG. 4

TEST BORING	1	SOIL DESCRIPTION	CLAYSTONE. (CLAY, SANDY)
DEPTH (FT)	15		



GRAIN SIZE ANALYSIS

U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	
4	
10	100.0%
20	99.7%
40	99.3%
100	96.3%
200	82.2%

SOIL CLASSIFICATION

USCS CLASSIFICATION: CL

ENTECH ENGINEERING, INC.

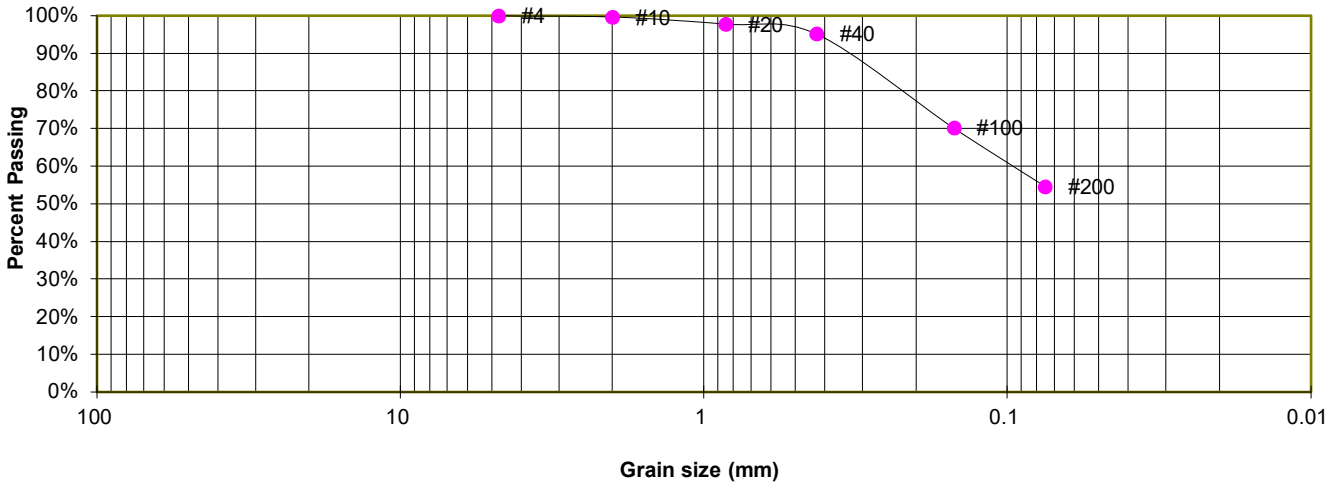
LABORATORY TEST RESULTS

15220 LEATHER CHAPS DRIVE
BILL AND VICKIE HANCOCK

JOB NO. 230921

FIG. 5

TEST BORING	2	SOIL DESCRIPTION	CLAY, SANDY
DEPTH (FT)	10		



GRAIN SIZE ANALYSIS

U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	
4	100.0%
10	99.7%
20	97.8%
40	95.2%
100	70.2%
200	54.6%

SOIL CLASSIFICATION

USCS CLASSIFICATION: CL

ENTECH ENGINEERING, INC.

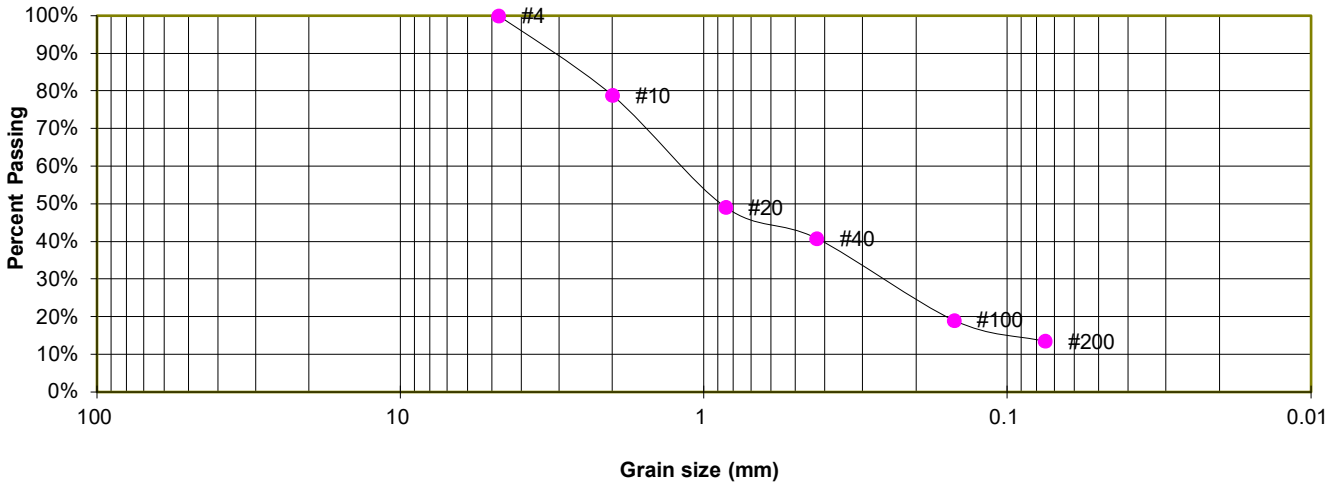
LABORATORY TEST RESULTS

15220 LEATHER CHAPS DRIVE
BILL AND VICKIE HANCOCK

JOB NO. 230921

FIG. 6

TEST BORING	2	SOIL DESCRIPTION	SANDSTONE. (SAND, SILTY)
DEPTH (FT)	15		



GRAIN SIZE ANALYSIS

U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	
4	100.0%
10	78.8%
20	49.2%
40	40.8%
100	19.1%
200	13.6%

SOIL CLASSIFICATION

USCS CLASSIFICATION: SM

ENTECH ENGINEERING, INC.

LABORATORY TEST RESULTS

15220 LEATHER CHAPS DRIVE
BILL AND VICKIE HANCOCK

JOB NO. 230921

FIG. 7

TEST BORING	1	SOIL DESCRIPTION	CLAYSTONE. (CLAY, SANDY)
DEPTH (FT)	15		

SWELL/CONSOLIDATION TEST RESULTS

NATURAL UNIT DRY WEIGHT (PCF): 100
NATURAL MOISTURE CONTENT: 24.6%
SWELL/CONSOLIDATION (%): 2.0%

ENTECH ENGINEERING, INC.

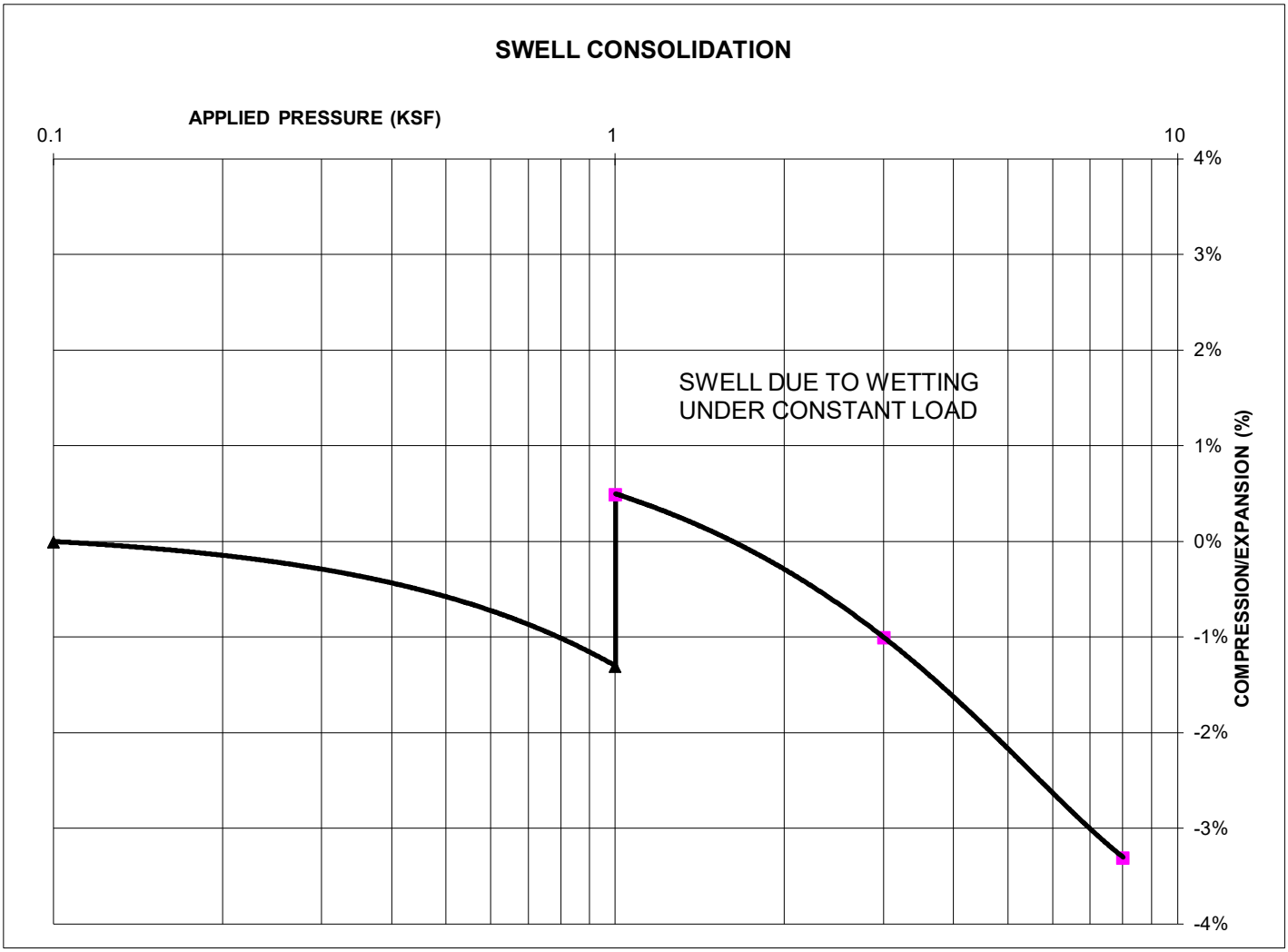
SWELL/CONSOLIDATION TEST RESULTS

15220 LEATHER CHAPS DRIVE
BILL AND VICKIE HANCOCK

JOB NO. 230921

FIG. 8

TEST BORING	2	SOIL DESCRIPTION	CLAY, SANDY
DEPTH (FT)	10		



SWELL/CONSOLIDATION TEST RESULTS

NATURAL UNIT DRY WEIGHT (PCF): 118
NATURAL MOISTURE CONTENT: 14.6%
SWELL/CONSOLIDATION (%): 1.8%

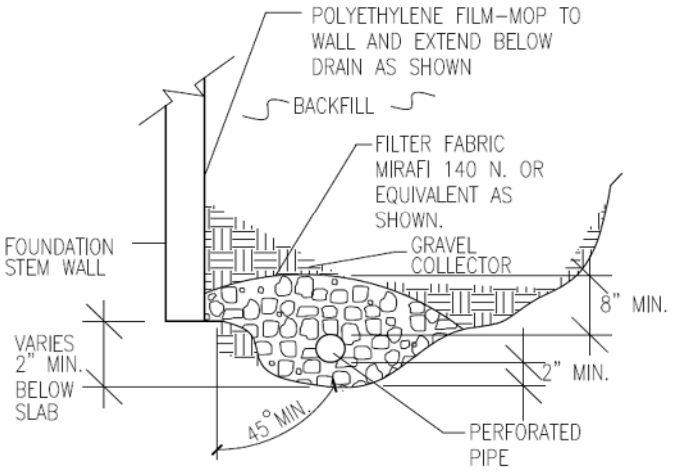
ENTECH ENGINEERING, INC.

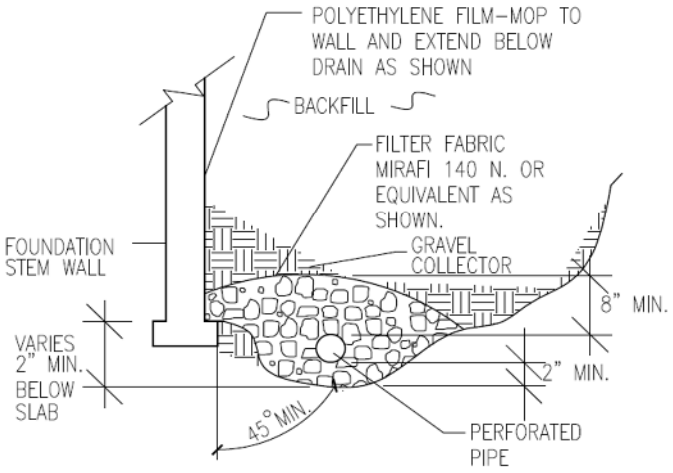
SWELL/CONSOLIDATION TEST RESULTS

15220 LEATHER CHAPS DRIVE
BILL AND VICKIE HANCOCK

JOB NO. 230921

FIG. 9





NOTES:

–GRAVEL SIZE IS RELATED TO DIAMETER OF PIPE PERFORATIONS–85% GRAVEL GREATER THAN 2x PERFORATION DIAMETER.

–PIPE DIAMETER DEPENDS UPON EXPECTED SEEPAGE. 4–INCH DIAMETER IS MOST OFTEN USED.

–ALL PIPE SHALL BE PERFORATED PLASTIC. THE DISCHARGE PORTION OF THE PIPE SHOULD BE NON–PERFORATED PIPE.

–FLEXIBLE PIPE MAY BE USED UP TO 8 FEET IN DEPTH, IF SUCH PIPE IS DESIGNED TO WITHSTAND THE PRESSURES. RIGID PLASTIC PIPE WOULD OTHERWISE BE REQUIRED.

–MINIMUM GRADE FOR DRAIN PIPE TO BE 1% OR 3 INCHES OF FALL IN 25 FEET.

–DRAIN TO BE PROVIDED WITH A FREE GRAVITY OUTFALL, IF POSSIBLE. A SUMP AND PUMP MAY BE USED IF GRAVITY OUT FALL IS NOT AVAILABLE.

ENTECH ENGINEERING, INC.

PERIMETER DRAIN DETAIL

15220 LEATHER CHAPS DRIVE
BILL AND VICKIE HANCOCK

JOB NO. 230921

FIG. 10

APPENDIX D: JDM Consulting, LLC, OWTS Site Evaluation, JDM Job No. 22-244

wastewater Info 1 - 15

JDM CONSULTING, LLC

P.O. Box 26137, Colorado Springs, CO 80936
p. 719.251.5291 267.261.1825
e. daniel@jdmengineers.com jared@jdmengineers.com

Property Address:	15220 Leather Chaps Drive Colorado Springs, CO 80921	Date:	November 4, 2022
		Job #:	22-244
Endorsement:	Daniel J. Mizicko, P.E.		

Purpose of Investigation: To determine the subsurface suitably for an Onsite Wastewater Treatment System (OWTS) as well as outline design criteria for a future Soil Treatment Area (STA) through both visual and tactile evaluations of the onsite subsurface soil. The onsite evaluation and associated soil testing were conducted in compliance with the El Paso County Board of Health OWTS Regulations

Profile Pit Summary	
Profile Pit #1	
Lat:	39° 3'10.62"N
Long:	104°50'9.33"W
0 - 0'-3"	Topsoil
0'-3" - 2'-6"	Soil Type 4
2'-6" - 6'-0"	Soil Type 4
6'-0" - 8'-0"	Soil Type 2
-	-
Profile Pit #2	
Lat:	39° 3'10.75"N
Long:	104°50'10.14"W
0 - 0'-3"	Topsoil
0'-3" - 1'-9"	Soil Type 4
1'-9" - 2'-6"	Soil Type 4
2'-6" - 8'-0"	Soil Type 2
-	-
Existing Well (If applicable)	
Lat:	39° 3'11.59"N
Long:	104°50'4.86"W

Profile Pit #1		Profile Pit #2	
	Topsoil		Topsoil
1'-0"	Soil Type 4	1'-0"	Soil Type 4
2'-0"		2'-0"	Soil Type 4
3'-0"	Soil Type 4	3'-0"	Soil Type 2
4'-0"		4'-0"	
5'-0"		5'-0"	
6'-0"		6'-0"	
	Soil Type 2		
7'-0"		7'-0"	
8'-0"		8'-0"	
9'-0"		9'-0"	

Recommendations:

An Engineered On-Site Wastewater Treatment System (OWTS) will be required for this site due to: (a) Soil Type 4 identified in the treatment zone of Profile Pit #1 & Profile Pit #2. (b) Redoximorphic features (groundwater and/or seasonally saturated soils) identified in Profile Pit #1 & Profile Pit #2. A mounded sand filter meeting the requirements in Chapter 8 of the El Paso County Board of Health On-Site Wastewater Treatment Systems (OWTS) Regulations is recommended. Soil Type 4 (LTAR = 0.20, Treatment Level 1) will be the most restrictive soil in the treatment zone of the soil treatment area.

JDM CONSULTING, LLC

P.O. Box 26137, Colorado Springs, CO 80936
p. 719.251.5291 267.261.1825
e. daniel@jdmengineers.com jared@jdmengineers.com

Site Map:

JDM CONSULTING, LLC

P.O. Box 26137, Colorado Springs, CO 80936
p. 719.251.5291 267.261.1825
e. daniel@jdmengineers.com jared@jdmengineers.com

Job Number:	22-241	Test Pit#	Pit #1
Date of Evaluation:	October 31, 2022	Total Depth:	8'-0"
Evaluator:	J.Dumke	STA Slope and Direction:	S 60° W @ +/-4%
Excavator:	Homeowner	Latitude:	39° 3'10.62"N
Equipment:	Mini Excavator	Longitude:	104°50'9.33"W

15220 Leather Chaps Drive, 80921

Depth Below Grade	Sample Depth	USDA Soil texture	USDA Soil Structure - Type	USDA Soil Structure Grade	Soil Type	Redoximorphic Features Present (Y/N)
0 - 0'-3"	**Topsoil**					
0'-3" - 2'-6"	**2'-0"**	**Clay**	**Blocky**	**Strong**	**Soil Type 4**	**No**
2'-6" - 6'-0"	-	**Clay**	**Blocky**	**Strong**	**Soil Type 4**	**Yes***
6'-0" - 8'-0"	**7'-0"**	**Sandy Loam**	**Granular**	**Moderate**	**Soil Type 2**	**Yes***
-	-	-	-	-	-	-

Total Depth =	**8'-0"**		
Groundwater Evidence?	**Yes**	If yes, what depth?	**2'-6"**
Bedrock Encountered?	**No**	If yes, what depth?	-
Is Dawson Arkose (DA) or Cemented Sands (CS) Present?			**No**
Is the material fractured and/or Jointed			**No**
If Yes, what is the cementation class?			-
Is the Dawson Arkose or Cemented Sand a limiting layer?			-
Type "R" Soils (High Rock Content) Encountered?			**No**

Comments:

***Redoximorphic features (groundwater and/or seasonally saturated soils) identified in Profile Pit #1.**

Profile Pits were excavated prior to our visit on site.

JDM CONSULTING, LLC

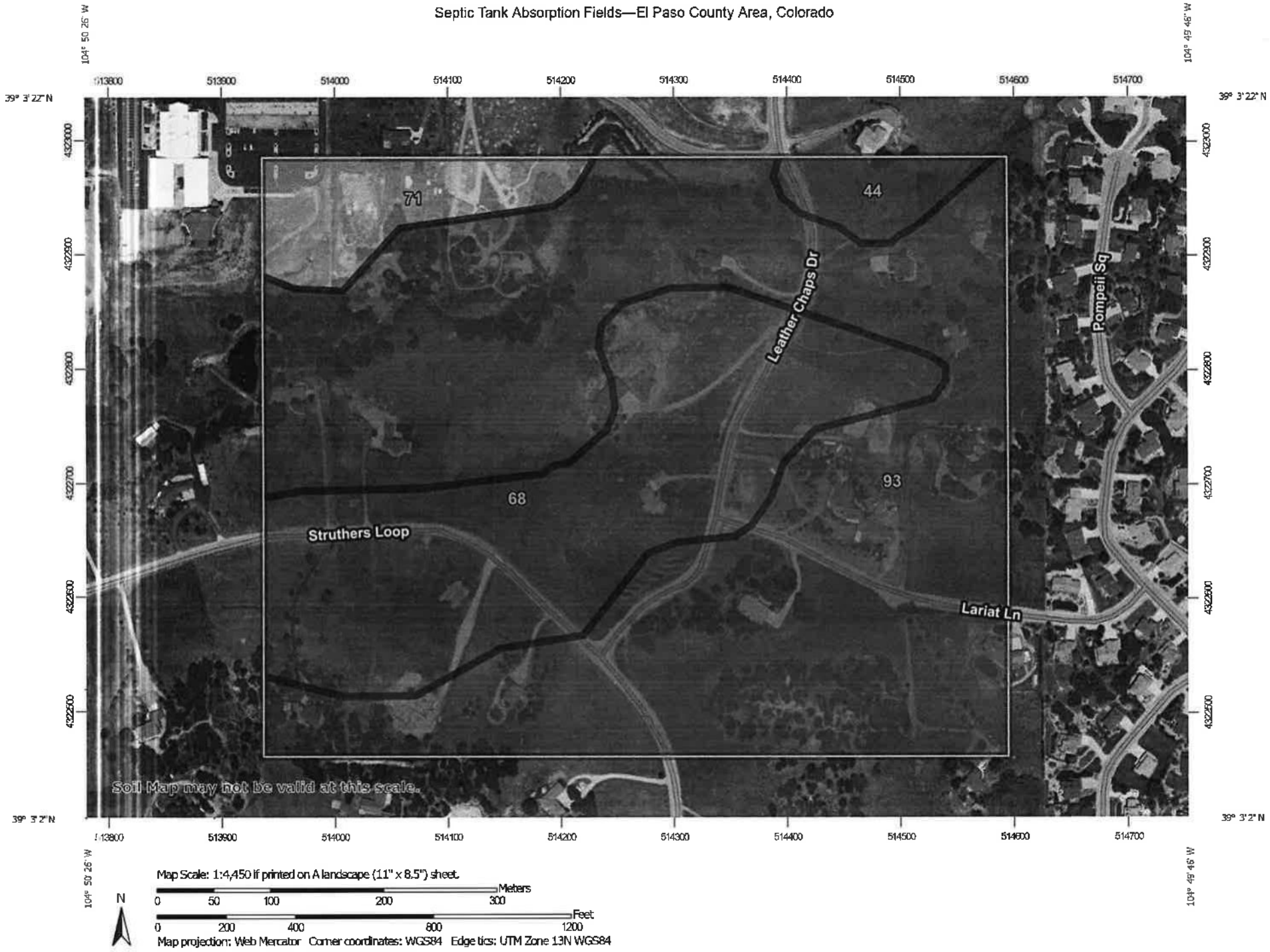
P.O. Box 26137, Colorado Springs, CO 80936
p. 719.251.5291 267.261.1825
e. daniel@jdmengineers.com jared@jdmengineers.com

Job Number:	22-241	Test Pit#	Pit #2
Date of Evaluation:	October 31, 2022	Total Depth:	8'-0"
Evaluator:	J.Dumke	STA Slope and Direction:	S 60° W @ +/-4%
Excavator:	Homeowner	Latitude:	39° 3'10.75"N
Equipment:	Mini Excavator	Longitude:	104°50'10.14"W

15220 Leather Chaps Drive, 80921

Depth Below Grade	Sample Depth	USDA Soil texture	USDA Soil Structure - Type	USDA Soil Structure Grade	Soil Type	Redoximorphic Features Present (Y/N)
0 - 0'-3"	**Topsoil**					
0'-3" - 1'-9"	-	**Clay**	**Blocky**	**Strong**	**Soil Type 4**	**No**
1'-9" - 2'-6"	-	**Clay**	**Blocky**	**Strong**	**Soil Type 4**	**Yes***
2'-6" - 8'-0"	-	**Sandy Loam**	**Granular**	**Moderate**	**Soil Type 2**	**Yes***
-	-	-	-	-	-	-

Total Depth =	**8'-0"**			Comments:
Groundwater Evidence?	**Yes**	If yes, what depth?	1'-9"	***Redoximorphic features (groundwater and/or seasonally saturated soils) identified in Profile Pit #2.**
Bedrock Encountered?	**No**	If yes, what depth?	-	
Is Dawson Arkose (DA) or Cemented Sands (CS) Present?			**No**	**Profile Pits were excavated prior to our visit on site.**
Is the material fractured and/or Jointed			**No**	
If Yes, what is the cementation class?			-	
Is the Dawson Arkose or Cemented Sand a limiting layer?			-	
Type "R" Soils (High Rock Content) Encountered?			**No**	


104° 50' 25" W
104° 49' 46" W
39° 3' 22" N
39° 3' 2" N
513800
513900
514000
514100
514200
514300
514400
514500
514600
514700
4323000
4322900
4322800
4322700
4322600
4322500
71
44
68
93
Leather Chaps Dr
Pompeii Sq
Struthers Loop
Lariat Ln
Soil Map may not be valid at this scale.
Map Scale: 1:4,450 if printed on A landscape (11" x 8.5") sheet.
N
Meters
0 50 100 200 300
Feet
0 200 400 800 1200
Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 13N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Background
- Aerial Photography

Soils

Soil Rating Polygons
- Very limited
- Somewhat limited
- Not limited
- Not rated or not available

Soil Rating Lines
- Very limited
- Somewhat limited
- Not limited
- Not rated or not available

Soil Rating Points
- Very limited
- Somewhat limited
- Not limited
- Not rated or not available

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: El Paso County Area, Colorado
Survey Area Data: Version 20, Sep 2, 2022

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jun 9, 2021—Jun 12, 2021

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

2

Septic Tank Absorption Fields

Map unit symbol	Map unit name	Rating	Component name (percent)	Rating reasons (numeric values)	Acres in AOI	Percent of AOI
44	Kutch clay loam, 3 to 5 percent slopes	Very limited	Kutch (98%)	Slow water movement (1.00)	2.4	2.8%
				Depth to bedrock (1.00)		
68	Peyton-Pring complex, 3 to 8 percent slopes	Very limited	Peyton (40%)	Slow water movement (1.00)	23.5	27.4%
71	Pring coarse sandy loam, 3 to 8 percent slopes	Not limited	Pring (85%)		5.1	6.0%
93	Tomah-Crowfoot complex, 8 to 15 percent slopes	Very limited	Tomah (50%)	Seepage, bottom layer (1.00)	54.7	63.8%
				Slope (0.63)		
				Slow water movement (0.50)		
			Crowfoot (30%)	Seepage, bottom layer (1.00)		
				Slope (0.63)		
				Slow water movement (0.50)		
Totals for Area of Interest					**85.7**	**100.0%**

Rating	Acres in AOI	Percent of AOI
Very limited	80.6	94.0%
Not limited	5.1	6.0%
Totals for Area of Interest	**85.7**	**100.0%**

Description

Septic tank absorption fields are areas in which effluent from a septic tank is distributed into the soil through subsurface tiles or perforated pipe. Only that part of the soil between depths of 24 and 60 inches is evaluated. The ratings are based on the soil properties that affect absorption of the effluent, construction and maintenance of the system, and public health. Saturated hydraulic conductivity (Ksat), depth to a water table, ponding, depth to bedrock or a cemented pan, and flooding affect absorption of the effluent. Stones and boulders, ice, and bedrock or a cemented pan interfere with installation. Subsidence interferes with installation and maintenance. Excessive slope may cause lateral seepage and surfacing of the effluent in downslope areas.

Some soils are underlain by loose sand and gravel or fractured bedrock at a depth of less than 4 feet below the distribution lines. In these soils the absorption field may not adequately filter the effluent, particularly when the system is new. As a result, the ground water may become contaminated.

The ratings are both verbal and numerical. Rating class terms indicate the extent to which the soils are limited by all of the soil features that affect the specified use. "Not limited" indicates that the soil has features that are very favorable for the specified use. Good performance and very low maintenance can be expected. "Somewhat limited" indicates that the soil has features that are moderately favorable for the specified use. The limitations can be overcome or minimized by special planning, design, or installation. Fair performance and moderate maintenance can be expected. "Very limited" indicates that the soil has one or more features that are unfavorable for the specified use. The limitations generally cannot be overcome without major soil reclamation, special design, or expensive installation procedures. Poor performance and high maintenance can be expected.

Numerical ratings indicate the severity of individual limitations. The ratings are shown as decimal fractions ranging from 0.01 to 1.00. They indicate gradations between the point at which a soil feature has the greatest negative impact on the use (1.00) and the point at which the soil feature is not a limitation (0.00).

The map unit components listed for each map unit in the accompanying Summary by Map Unit table in Web Soil Survey or the Aggregation Report in Soil Data Viewer are determined by the aggregation method chosen. An aggregated rating class is shown for each map unit. The components listed for each map unit are only those that have the same rating class as listed for the map unit. The percent composition of each component in a particular map unit is presented to help the user better understand the percentage of each map unit that has the rating presented.

Other components with different ratings may be present in each map unit. The ratings for all components, regardless of the map unit aggregated rating, can be viewed by generating the equivalent report from the Soil Reports tab in Web Soil Survey or from the Soil Data Mart site. Onsite investigation may be needed to validate these interpretations and to confirm the identity of the soil on a given site.

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

Engineering Properties

This table gives the engineering classifications and the range of engineering properties for the layers of each soil in the survey area.

Hydrologic soil group is a group of soils having similar runoff potential under similar storm and cover conditions. The criteria for determining Hydrologic soil group is found in the National Engineering Handbook, Chapter 7 issued May 2007(http://directives.sc.egov.usda.gov/OpenNonWebContent.aspx?content=17757.wba). Listing HSGs by soil map unit component and not by soil series is a new concept for the engineers. Past engineering references contained lists of HSGs by soil series. Soil series are continually being defined and redefined, and the list of soil series names changes so frequently as to make the task of maintaining a single national list virtually impossible. Therefore, the criteria is now used to calculate the HSG using the component soil properties and no such national series lists will be maintained. All such references are obsolete and their use should be discontinued. Soil properties that influence runoff potential are those that influence the minimum rate of infiltration for a bare soil after prolonged wetting and when not frozen. These properties are depth to a seasonal high water table, saturated hydraulic conductivity after prolonged wetting, and depth to a layer with a very slow water transmission rate. Changes in soil properties caused by land management or climate changes also cause the hydrologic soil group to change. The influence of ground cover is treated independently. There are four hydrologic soil groups, A, B, C, and D, and three dual groups, A/D, B/D, and C/D. In the dual groups, the first letter is for drained areas and the second letter is for undrained areas.

The four hydrologic soil groups are described in the following paragraphs:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

Depth to the upper and lower boundaries of each layer is indicated.

Texture is given in the standard terms used by the U.S. Department of Agriculture. These terms are defined according to percentages of sand, silt, and clay in the fraction of the soil that is less than 2 millimeters in diameter. "Loam," for example, is soil that is 7 to 27 percent clay, 28 to 50 percent silt, and less than 52 percent sand. If the content of particles coarser than sand is 15 percent or more, an appropriate modifier is added, for example, "gravelly."

Classification of the soils is determined according to the Unified soil classification system (ASTM, 2005) and the system adopted by the American Association of State Highway and Transportation Officials (AASHTO, 2004).

The Unified system classifies soils according to properties that affect their use as construction material. Soils are classified according to particle-size distribution of the fraction less than 3 inches in diameter and according to plasticity index, liquid limit, and organic matter content. Sandy and gravelly soils are identified as GW, GP, GM, GC, SW, SP, SM, and SC; silty and clayey soils as ML, CL, OL, MH, CH, and OH; and highly organic soils as PT. Soils exhibiting engineering properties of two groups can have a dual classification, for example, CL-ML.

The AASHTO system classifies soils according to those properties that affect roadway construction and maintenance. In this system, the fraction of a mineral soil that is less than 3 inches in diameter is classified in one of seven groups from A-1 through A-7 on the basis of particle-size distribution, liquid limit, and plasticity index. Soils in group A-1 are coarse grained and low in content of fines (silt and clay). At the other extreme, soils in group A-7 are fine grained. Highly organic soils are classified in group A-8 on the basis of visual inspection.

If laboratory data are available, the A-1, A-2, and A-7 groups are further classified as A-1-a, A-1-b, A-2-4, A-2-5, A-2-6, A-2-7, A-7-5, or A-7-6. As an additional refinement, the suitability of a soil as subgrade material can be indicated by a group index number. Group index numbers range from 0 for the best subgrade material to 20 or higher for the poorest.

Percentage of rock fragments larger than 10 inches in diameter and 3 to 10 inches in diameter are indicated as a percentage of the total soil on a dry-weight basis. The percentages are estimates determined mainly by converting volume percentage in the field to weight percentage. Three values are provided to identify the expected Low (L), Representative Value (R), and High (H).

Percentage (of soil particles) passing designated sieves is the percentage of the soil fraction less than 3 inches in diameter based on an ovendry weight. The sieves, numbers 4, 10, 40, and 200 (USA Standard Series), have openings of 4.76, 2.00, 0.420, and 0.074 millimeters, respectively. Estimates are based on laboratory tests of soils sampled in the survey area and in nearby areas and on estimates made in the field. Three values are provided to identify the expected Low (L), Representative Value (R), and High (H).

Liquid limit and *plasticity index* (Atterberg limits) indicate the plasticity characteristics of a soil. The estimates are based on test data from the survey area or from nearby areas and on field examination. Three values are provided to identify the expected Low (L), Representative Value (R), and High (H).

References:

American Association of State Highway and Transportation Officials (AASHTO). 2004. Standard specifications for transportation materials and methods of sampling and testing. 24th edition.

Engineering Properties–El Paso County Area, Colorado														
Map unit symbol and soil name	Pct. of map unit	Hydrologic group	Depth	USDA texture	Classification		Pct Fragments		Percentage passing sieve number—				Liquid limit	Plasticity index
					Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
			In				*L-R-H*	*L-R-H*	*L-R-H*	*L-R-H*	*L-R-H*	*L-R-H*	*L-R-H*	*L-R-H*
93—Tomah-Crowfoot complex, 8 to 15 percent slopes														
Tomah	50	B	0-10	Loamy sand	SM	A-2-4	0-0-0	0-0-0	100-100-100	100-100-100	50-60-70	15-23-30	20-23-25	NP-3-5
			10-22	Coarse sand	SW-SM, SP-SM	A-1, A-2, A-3	0-0-0	0-0-0	100-100-100	100-100-100	45-55-65	5-8-10	—	NP
			22-48	Stratified coarse sand to sandy clay loam	SC-SM, SP-SM, SC, SM	A-1, A-2-4, A-4	0-0-0	0-0-0	85-93-100	80-90-100	35-63-90	5-28-50	20-25-30	NP-5-10
			48-60	Coarse sand, loamy coarse sand	SC-SM, SP-SM, SM	A-1, A-2-4, A-3	0-0-0	0-0-0	85-93-100	80-90-100	35-53-70	5-15-25	20-23-25	NP-3-5
Crowfoot	30	B	0-12	Loamy sand	SM	A-1, A-2-4	0-0-0	0-5-10	85-93-100	80-90-100	40-58-75	15-23-30	20-23-25	NP-3-5
			12-23	Sand	SP-SM, SM	A-1, A-2, A-3	0-0-0	0-5-10	85-93-100	80-90-100	40-55-70	5-10-15	—	NP
			23-36	Sandy clay loam	SC-SM, CL-ML, SC	A-2-4, A-4, A-6	0-0-0	0-5-10	85-93-100	80-90-100	65-78-90	30-43-55	25-30-35	5-10-15
			36-60	Coarse sand, loamy coarse sand	SP-SM, SM	A-1, A-2	0-0-0	0-5-10	85-93-100	80-90-100	35-53-70	5-15-25	—	NP

Data Source Information

Soil Survey Area: El Paso County Area, Colorado
Survey Area Data: Version 20, Sep 2, 2022

Engineering Properties–El Paso County Area, Colorado														
Map unit symbol and soil name	Pct. of map unit	Hydrologic group	Depth	USDA texture	Classification		Pct Fragments		Percentage passing sieve number—				Liquid limit	Plasticity index
					Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
			In				*L-R-H*	*L-R-H*	*L-R-H*	*L-R-H*	*L-R-H*	*L-R-H*	*L-R-H*	*L-R-H*
68—Peyton-Pring complex, 3 to 8 percent slopes														
Peyton	40	B	0-12	Sandy loam	SC-SM, SC	A-2-4, A-4	0- 0- 0	0- 0- 0	85-93-100	80-90-100	50-60-70	25-33-40	25-28-30	5-8 -10
			12-25	Sandy clay loam	SC-SM, CL-ML, CL, SC	A-2, A-4, A-6	0- 0- 0	0- 0- 0	85-93-100	80-90-100	65-78-90	30-43-55	25-30-35	5-10-15
			25-35	Sandy clay loam, sandy loam	SC-SM, CL-ML, SC	A-2, A-4	0- 0- 0	0- 0- 0	85-93-100	80-90-100	50-70-90	25-40-55	25-28-30	5-8 -10
			35-60	Sandy loam	SM	A-2-4, A-4	0- 0- 0	0- 0- 0	85-93-100	80-90-100	50-60-70	25-33-40	20-23-25	NP-3 -5
Pring	30	B	0-14	Coarse sandy loam	SC-SM, SC	A-1, A-2-4	0- 0- 0	0- 5- 10	85-93-100	80-90-100	45-55-65	20-25-30	25-28-30	5-8 -10
			14-60	Gravelly sandy loam	GC-GM, SC-SM, SM	A-1-b, A-2	0- 0- 0	0- 5- 10	60-80-100	55-78-100	35-43-50	20-25-30	20-23-25	NP-3 -5
71—Pring coarse sandy loam, 3 to 8 percent slopes														
Pring	85	B	0-14	Coarse sandy loam	SC-SM, SC	A-1, A-2-4	0- 0- 0	0- 5- 10	85-93-100	80-90-100	45-55-65	20-25-30	25-28-30	5-8 -10
			14-60	Gravelly sandy loam	GC-GM, SC-SM, SM	A-1-b, A-2	0- 0- 0	0- 5- 10	60-80-100	55-78-100	35-43-50	20-25-30	20-23-25	NP-3 -5

Report—Engineering Properties

Absence of an entry indicates that the data were not estimated. The asterisk '*' denotes the representative texture; other possible textures follow the dash. The criteria for determining the hydrologic soil group for individual soil components is found in the National Engineering Handbook, Chapter 7 issued May 2007(http://directives.sc.egov.usda.gov/OpenNonWebContent.aspx?content=17757.wba). Three values are provided to identify the expected Low (L), Representative Value (R), and High (H).

Engineering Properties–El Paso County Area, Colorado

Map unit symbol and soil name	Pct. of map unit	Hydrologic group	Depth	USDA texture	Classification		Pct Fragments		Percentage passing sieve number—				Liquid limit	Plasticity index
					Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
			In				*L-R-H*	*L-R-H*	*L-R-H*	*L-R-H*	*L-R-H*	*L-R-H*	*L-R-H*	*L-R-H*
44—Kutch clay loam, 3 to 5 percent slopes														
Kutch	98	C	0-10	Clay loam	CL	A-6	0- 0- 0	0- 5- 10	85-93-100	80-90-100	75-88-100	60-70-80	30-33-35	10-13-15
			10-17	Clay, clay loam	CL	A-6, A-7-6	0- 0- 0	0- 8- 15	85-93-100	80-90-100	75-88-100	60-78-95	35-43-50	15-20-25
			17-28	Clay loam, clay	CL	A-6, A-7-6	0- 0- 0	0- 8- 15	85-93-100	80-90-100	75-88-100	60-78-95	35-43-50	15-20-25
			28-36	Extremely gravelly clay loam	CL	A-6	0- 0- 0	0- 3- 5	85-93-100	80-90-100	75-88-100	60-70-80	30-35-40	10-15-20
			36-40	Weathered bedrock	—	—	—	—	—	—	—	—	—	—

APPENDIX E: USDA Soil Survey Descriptions

El Paso County Area, Colorado

68—Peyton-Pring complex, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: 369f
Landscape: Uplands
Elevation: 6,800 to 7,600 feet
Farmland classification: Not prime farmland

Map Unit Composition

Peyton and similar soils: 45 percent
Pring and similar soils: 35 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Peyton

Setting

Landscape: Uplands
Landform: Hills
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Arkosic alluvium derived from sedimentary rock and/or arkosic residuum weathered from sedimentary rock

Typical profile

A - 0 to 12 inches: sandy loam
Bt - 12 to 25 inches: sandy clay loam
BC - 25 to 35 inches: sandy loam
C - 35 to 60 inches: sandy loam

Properties and qualities

Slope: 3 to 5 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.60 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Moderate (about 7.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4c
Hydrologic Soil Group: B
Ecological site: R049XY216CO - Sandy Divide

Hydric soil rating: No

Description of Pring

Setting

Landform: Hills
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Arkosic alluvium derived from sedimentary rock

Typical profile

A - 0 to 14 inches: coarse sandy loam
C - 14 to 60 inches: gravelly sandy loam

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): High (2.00 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 6.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: B
Ecological site: R048AY222CO - Loamy Park
Hydric soil rating: No

Minor Components

Other soils

Percent of map unit: 15 percent
Hydric soil rating: No

Pleasant

Percent of map unit: 5 percent
Landform: Depressions
Hydric soil rating: Yes

Data Source Information

Soil Survey Area: El Paso County Area, Colorado
Survey Area Data: Version 23, Aug 29, 2025

El Paso County Area, Colorado

93—Tomah-Crowfoot complex, 8 to 15 percent slopes

Map Unit Setting

National map unit symbol: 36bb
Elevation: 7,300 to 7,600 feet
Farmland classification: Not prime farmland

Map Unit Composition

Tomah and similar soils: 50 percent
Crowfoot and similar soils: 30 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Tomah

Setting

Landform: Hills, Alluvial fans
Landform position (three-dimensional): Crest, side slope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium derived from arkose and/or residuum weathered from arkose

Typical profile

A - 0 to 10 inches: loamy sand
E - 10 to 22 inches: coarse sand
Bt - 22 to 48 inches: stratified coarse sand to sandy clay loam
C - 48 to 60 inches: coarse sand

Properties and qualities

Slope: 8 to 15 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 4.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: B
Ecological site: R049XY216CO - Sandy Divide
Hydric soil rating: No

Description of Crowfoot

Setting

Landform: Hills, Alluvial fans
Landform position (three-dimensional): Crest, side slope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium

Typical profile

A - 0 to 12 inches: loamy sand
E - 12 to 23 inches: sand
Bt - 23 to 36 inches: sandy clay loam
C - 36 to 60 inches: coarse sand

Properties and qualities

Slope: 8 to 15 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 4.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: B
Ecological site: R049XY216CO - Sandy Divide
Hydric soil rating: No

Minor Components

Other soils

Percent of map unit: 15 percent
Hydric soil rating: No

Pleasant

Percent of map unit: 5 percent
Landform: Depressions
Hydric soil rating: Yes

Data Source Information

Soil Survey Area: El Paso County Area, Colorado
Survey Area Data: Version 23, Aug 29, 2025

APPENDIX F: Existing El Paso County Health Department Septic Records

#5408

EL PASO COUNTY DEPARTMENT OF HEALTH AND ENVIRONMENT
INDIVIDUAL SEWAGE DISPOSAL SYSTEM INSPECTION FORM

Permit # 8134
Date 6/9/94

APPROVED: YES ✓ NO #7136002004 ENVIRONMENTALIST KRUEGER

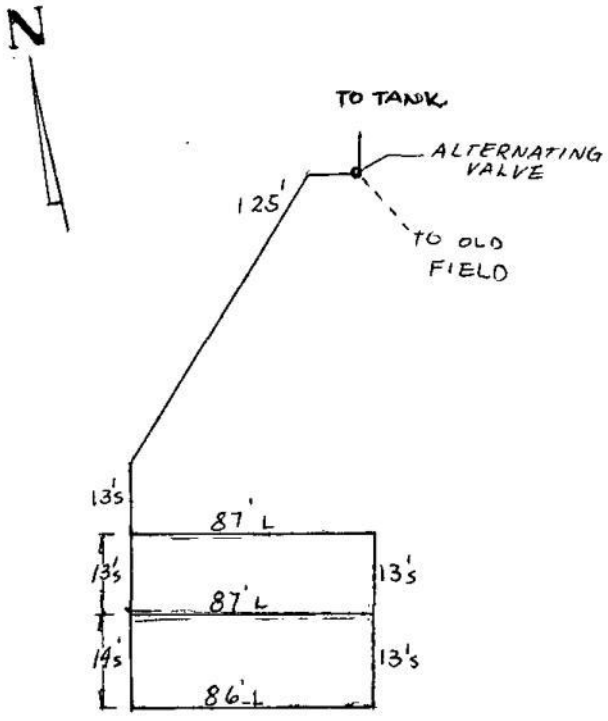
Address 15220 LEATHER CHAPS Owner CRUISE

Legal Description LOT 39 CHAPPARAL HILLS
Residence ✓, # of bedrooms 3; Commercial ____; System Installer SUN CONST.

SEPTIC TANK: EXISTING
Commercial ____; Noncommercial ____, L ____, W ____, WD ____
Construction Material ____, capacity 1250 gallons.

DISPOSAL FIELD:
Rock Systems:
Trench: depth 24"-36", width 36", total length 260', sq. feet 780
Bed: depth ____, length ____, width ____, sq. feet ____
Rock type RED QUARRY, depth 12", under PVC 6", over PVC 2"
Seepage Pits: # of pits ____, total # of rings ____, working depth(s) ____
size of pit(s) L X W ____, lining material ____, total sq. feet ____
Rockless Systems:
Chamber: Type ____, number of chambers ____, bed ____, trench ____
sq. ft./section ____, reduction allowed ____%, sq. ft required ____
total sq. ft. installed ____, depth of installation ____
Engineer Design Y or (N), Designing Engineer ____,
Approval letter provided? Y or N
Well 50 feet from tank (Y) or N 100 feet from leach field (Y) or N
Well installed at time of septic system inspection (Y) or N Public Water ___
*Approval will be revoked if in the future the well is found to be within 50 feet of the septic tank and/or 100 feet of the disposal field.

NOTES:



Acres 5 **EL PASO COUNTY • DEPARTMENT OF HEALTH AND ENVIRONMENT** Permit 8134

301 South Union Blvd. • Colorado Springs, Colorado • 578-3125

Water Supply well Receipt No. NO FEE

REPAIR

PERMIT

TO CONSTRUCT, ALTER, REPAIR OR MODIFY ANY INDIVIDUAL SEWAGE DISPOSAL SYSTEM

Issued to BEN GRUISE Date 6-1-94

Address of Property 15220 LEATHER CHAP DRIVE, LOT 39, CHAPPARAL HILLS Phone

(Permit valid at this address only)

Sewage-Disposal System work to be performed by SUN CONSTRUCTION Phone 520-9994

This Permit is issued in accordance with 25-10-106 Colorado Revised Statutes 1973, as amended. PERMIT EXPIRES upon completion-installation of sewage-disposal system or at the end of twelve (12) months from date of issue–whichever occurs first-(unless work is in progress). This permit is revokable if all stated requirements are not met.

–THIS PERMIT DOES NOT DENOTE APPROVAL OF ZONING AND ACREAGE REQUIREMENTS-

NO FEE - REPAIR
PERMIT FEE (NOT REFUNDABLE)

John B. Funk, M.D.
DIRECTOR, DEPARTMENT OF HEALTH AND ENVIRONMENT

6-1-95
DATE OF EXPIRATION

D. Wisniewski for D. Krueger
ENVIRONMENTALIST

NOTE: LEAVE ENTIRE SEWAGE-DISPOSAL SYSTEM UNCOVERED FOR FINAL INSPECTION. 48 HOUR ADVANCE NOTICE REQUIRED.

SEPTIC TANK:	TRENCH SYSTEM:	BED SYSTEM:	SEEPAGE PIT SYSTEM:
	total square feet *764		total square feet
EXISTING	ft. of trench inches wide		
gallons	ft. of trench inches wide	total square feet	rings or diam.x w/d

NOTES: UTILIZE EXISTING LEACH AS BACKUP IF POSSIBLE. MEET DISTANCE REQUIREMENTS. STAY IN PERC TEST LOCATION. *RECOMMEND ADDITIONAL 60 PER CENT.

The Health Office shall assume no responsibility in case of failure or inadequacy of a sewage-disposal system, beyond consulting in good faith with the property owner or representative. Free access to the property shall be authorized at reasonable time for the purpose of making such inspections as are necessary to determine compliance with requirements of this law.

Repair

EL PASO COUNTY DEPARTMENT OF HEALTH AND ENVIRONMENT
301 South Union Boulevard
Colorado Springs, CO 80910-3123

APPLICATION FOR A PERMIT TO CONSTRUCT, REMODEL, OR INSTALL A SEWAGE DISPOSAL SYSTEM

Name of Owner Ben Cruise Daytime Phone _____

Address of Property 15220 Leather Chap Drive Date 10/12/94

Legal Descripion of Property Lot 39 Chaparral Hills

Tax Schedule Number _____ Septic Contractor/Phone Sun Const. Inc 520-9994

Type of House Construction Frame Source of Water Well

Size of Lot 5 Acre Basement (Y or N) Percolation Test Attached (Y or N)

MAXIMUM POTENTIAL NUMBER OF BEDROOMS three

I have supplied a plot plan as described on the back of this form. I acknowledge the completeness of the application is conditional upon such further mandatory & additional tests & reports as may be required by the Department to be made & furnished by the applicant for purposes of evaluating the application, & issuance of the permit is subject to such terms & conditions as deemed necessary to ensure compliance with rules & regulations adopted pursuant to C.R.S. 1973, 10-25-101 et. seq. I hereby certify all statements made, information and reports submitted by me are or will be represented to be true & correct to the best of my knowledge & belief, & are designed to be relied on by the El Paso County Department of Health in evaluating the same for purposes of issuing the permit applied for herein. I further understand any falsification or misrepresentation may result in the denial of the application or revocation of any permit granted based upon said application & in legal action for perjury as provided by law.

OWNER'S SIGNATURE Benedict B Cruise

****

DEPARTMENT OF HEALTH USE ONLY

Absorption Area *764# Tank Capacity EXISTING Date/Site Inspection ✓

Remarks: UTILIZE EXISTING LEACH AS BACKUP IF POSSIBLE
MEET DISTANCE REQUIREMENTS, STAY IN PERC TEST LOCATION
* RECOMMEND ADDITIONAL 60% (REPAIR)

Application is (+ approved ( ) denied

Environmentalist Lmeyer Date 5/25/94

****

Permit # 8134 Receipt # None Date to Planning Dept N/A

EHS-10/93

PROPERTY AND PERC HOLES MUST BE CLEARLY MARKED/POSTED

The following information must be on your plot plan.
Please check ( ) the items that apply.

( ) Property Lines
( ) Property Dimensions
( ) Proposed Septic System Site
( ) Well(s)
( ) Adjacent Well(s)
( ) Building(s)
( ) Proposed Building(s)
( ) Water Line
( ) Cistern
( ) Subsoil Drain(s)

Are any of these within 100 feet of your proposed septic system (including adjoining property)? Also draw on the plot plan.

Spring(s) N/A
Lake(s) N/A
Pond(s) N/A
Stream(s) N/A
Dry Gulch(s) N/A
Natural Drainage Course(s) _____

Give complete directions to the property from a main highway.

I-25 To Baptist Rd East → South to Leather Chap Drive

EXCAVATION & SEPTIC SERVICES, INC.
3220 N. Nevada Ave.
Colorado Springs, CO 80907
719-475-2252

15220 Leather Chaps
7136Ø02ØØ4
E
6-9-94

SOIL PERCOLATION DATA SHEET

DATE: May 19, 1994

Client Name: Mr. Ben Cruise
Client Address: 15220 Leather Chap, Colorado Springs, CO 80921 **Telephone: 719-481-2537**
County: ElPaso **Location Of Test: SAME**

No. Acres: 5 **Water Supply: Well**

PERCOLATION RATE MEASUREMENT RESULTS

ITEM NO.	Hole Depth	TIME: 6:10	DEPTH TIME: 6:25	TO TIME: 6:40	WATER TIME: 6:55	Last Drop	Min Per Inch:
#1	36"	20 1/4	20 11/16	21 1/8	21 9/16	9/16	34.28
#2	36"	21 1/2	21 15/16	22 3/8	22 13/16	7/16	34.28
#3	36"	22 5/8	23 3/16	23 3/4	24 5/16	9/16	26.66

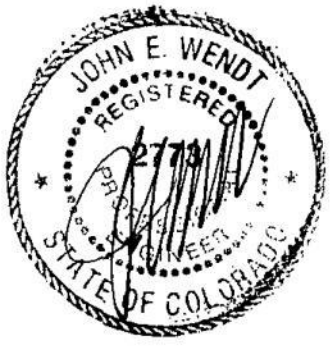
AVERAGE:31.74

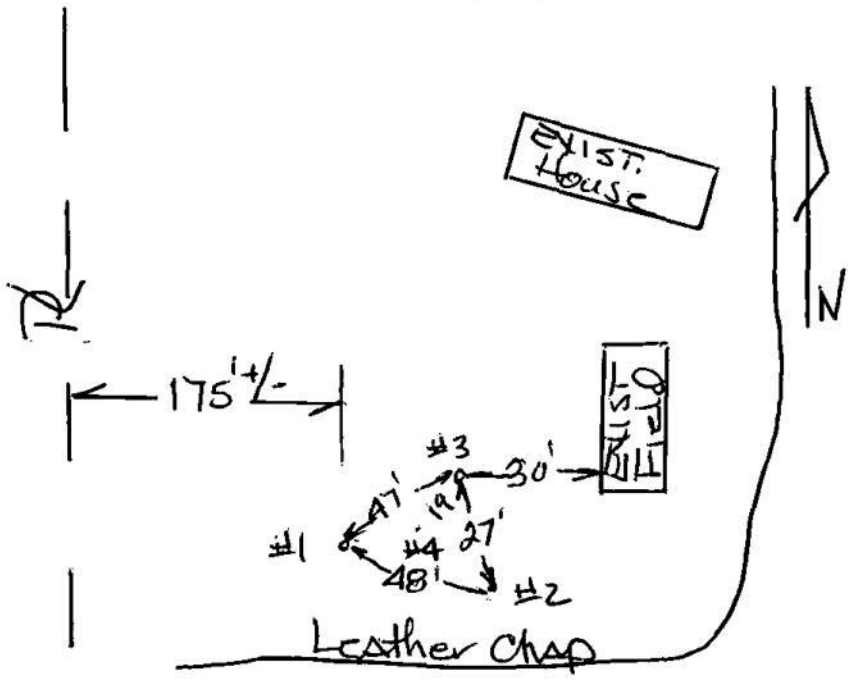
PROFILE:

#4 DEPTH	SOIL DESCRIPTION	Ground Water: No
0" to 13"	Topsoil	Bedrock: None
13" to 27"	Fine Course Sand w/Some Clay	Grade of Site: 3% DN to S
27" to 58"	Lite Brown Fine Sand w/Trace Clay	
58" to 102"	Fine Silty Sand w/Moderate Clay - Damp Hard Pack	

REMARKS:

N.T.S. **DIAGRAM:**





ENTECH ENGINEERING, INC.

APPENDIX J: Colorado Geological Survey, Review Letter dated January 6, 2026; CGS Unique No. EP-25-0062_3

COLORADO GEOLOGICAL SURVEY

1801 Moly Road
Golden, Colorado 80401

Matthew L. Morgan
State Geologist

January 6, 2026

Lisa Elgin
El Paso County Planning and Community Development
2880 International Circle, Suite 110
Colorado Springs, CO 80910

Location:
Portions of
SW ¼ of NE ¼ and
SE ¼ of NE ¼ of Sec 36
T11S, R67W of the 6th PM
39.0523°, -104.8355°

Subject: **Hancock Subdivision VR - Final Plat**
Colorado Springs, El Paso County, CO
County File VR254; CGS Unique No. EP-25-0062_3

Dear Lisa,

As requested, the Colorado Geological Survey (CGS) has reviewed the most recent resubmittal materials for the Hancock Subdivision VR – Final Plat (County File VR254; CGS No. EP-25-0062).

Materials Reviewed in This Resubmittal

Based on the documents provided through EDARP, the current resubmittal includes:

- Final Drainage Plan and Report (Oliver E. Watts, revised December 31, 2024), and
- Final Plat Drawings dated **September 18, 2025**.

No new geotechnical, soils, or geologic reports were submitted with this resubmittal. The Entech Subsurface Soil Investigation, previously reviewed by CGS, was submitted in August 2025 and is not part of the current submittal package.

Status of Prior CGS Comments

CGS previously issued review letters dated May 14, 2025, and August 18, 2025. Those letters identified the need for a formal geologic hazard evaluation under Section 8.4.9 of the El Paso County Land Development Code and Appendix C of the Engineering Criteria Manual (ECM) and recommended specific plat notes addressing shallow groundwater and site-specific geotechnical requirements.

The documents submitted with the current resubmittal do not address these outstanding CGS comments. Although the drainage report addresses surface water considerations, it does not evaluate subsurface geologic hazards or groundwater variability. Likewise, the Final Plat Drawings dated September 18, 2025, do not incorporate the plat notes previously recommended by CGS.

Outstanding Requirements

The following items remain outstanding and unresolved:

1. **Geologic Hazard Evaluation**
   A geologic hazard evaluation prepared by a qualified geologist is required to assess site-specific geologic constraints, including:
   - Extent and seasonal variability of shallow groundwater,
   - Expansive or compressible soils,
   - Slope stability and drainage/erosion interactions, and
   - Depth to bedrock and other relevant geologic hazards.
2. **Shallow Groundwater Assessment**
   Previously submitted OWTS investigations documented shallow groundwater at depths as little as approximately

1.9 feet below ground surface. These conditions require interpretation within a geologic hazard framework to evaluate implications for foundations, basements, drainage, and long-term site performance.

3. **Final Plat Notes**
   CGS-recommended plat notes addressing groundwater limitations and site-specific soils and foundation investigations have not been added to the Final Plat.

CGS Recommendation

Because the outstanding CGS comments from prior reviews have not been addressed, CGS does not recommend approval of the Hancock Subdivision Final Plat at this time. CGS further recommends that approval be deferred until a compliant geologic hazard evaluation is submitted and the Final Plat is revised to incorporate CGS-recommended notes.

Thank you for the opportunity to assist with this review. Please don't hesitate to contact me at jlovekin@mines.edu if you need additional clarification.

Sincerely,

Jonathan R. Lovekin, P.G.
Senior Engineering Geologist