

Architectural  
Structural  
Geotechnical



Materials Testing  
Forensic  
Civil/Planning

## **SOIL, GEOLOGY, AND WASTEWATER STUDY**

**15435 East Chaparral Loop  
Lot 62, Peyton Ranches  
El Paso County, Colorado**

### **PREPARED FOR:**

**Michael Cartmell  
5625 Dusty Chap Drive  
Colorado Springs, CO 80923**

**JOB NO. 186430**

**January 26, 2022**

**Respectfully Submitted,  
RMG – Rocky Mountain Group**

**Reviewed by,  
RMG – Rocky Mountain Group**

**Kelli Zigler  
Environmental Professional**



**Tony Munger, P.E.  
Geotechnical Project Manager**

---

## TABLE OF CONTENTS

---

|  |    |
|--|----|
| 1.0 GENERAL SITE AND PROJECT DESCRIPTION.....                            | 4  |
| 1.1 Project Location .....   | 4  |
| 1.2 Existing Land Use .....  | 4  |
| 1.3 Project Description .....  | 4  |
| 2.0 QUALIFICATIONS OF PREPARERS .....                                    | 4  |
| 3.0 STUDY OVERVIEW .....   | 5  |
| 3.1 Scope and Objective .....  | 5  |
| 3.2 Site Evaluation Techniques .....                                     | 6  |
| 3.3 Additional Documents.....  | 6  |
| 4.0 SITE CONDITIONS .....  | 6  |
| 4.1 Existing Site Conditions .....                                       | 6  |
| 4.2 Topography .....   | 6  |
| 4.3 Vegetation .....   | 6  |
| 4.4 Aerial photographs and remote-sensing imagery .....                  | 7  |
| 5.0 FIELD INVESTIGATION AND LABORATORY TESTING .....                     | 7  |
| 5.1 Test Pit Excavations .....   | 7  |
| 5.2 OWTS Visual and Tactile Evaluation .....                             | 7  |
| 5.3 Groundwater.....   | 7  |
| 6.0 SOIL, GEOLOGY, AND ENGINEERING GEOLOGY .....                         | 7  |
| 6.1 Subsurface Soil Conditions .....                                     | 8  |
| 6.2 Bedrock Conditions.....  | 8  |
| 6.3 U.S. Soil Conservation Service .....                                 | 8  |
| 6.4 General Geologic Conditions .....                                    | 8  |
| 6.5 Engineering Geology.....   | 9  |
| 6.6 Structural Features.....   | 9  |
| 6.7 Surficial (Unconsolidated) Deposits.....                             | 9  |
| 6.8 Features of Special Significance .....                               | 9  |
| 6.9 Drainage of Water and Groundwater .....                              | 9  |
| 6.10 Flooding and Surface Drainage .....                                 | 10 |
| 7.0 ECONOMIC MINERAL RESOURCES.....                                      | 10 |
| 8.0 IDENTIFICATION AND MITIGATION OF POTENTIAL GEOLOGIC CONDITIONS ..... | 10 |
| 8.1 Faults and Seismicity.....   | 11 |
| 8.2 Radon.....   | 11 |
| 8.3 Expansive Soils and Bedrock .....                                    | 12 |
| 9.0 ON-SITE WASTEWATER TREATMENT SYSTEMS.....                            | 12 |
| 10.0 BEARING OF GEOLOGIC CONDITIONS UPON PROPOSED DEVELOPMENT.....       | 13 |
| 11.0 ADDITIONAL STUDIES .....  | 13 |
| 12.0 CONCLUSIONS .....   | 14 |
| 13.0 CLOSING.....  | 14 |
| FIGURES  |    |
| Site Vicinity Map .....  | 1  |
| Proposed Lot Layout .....  | 2  |
| USGS Topo Map.....   | 3  |
| Test Pit Logs .....  | 4  |
| USDA Soil Survey Map.....  | 5  |
| Engineering and Geology Map .....  | 6  |
| FEMA Map .....   | 7  |
| Test Pit Location Map.....   | 8  |
| Septic Suitability Map.....  | 9  |
| Perimeter Drain Detail .....   | 10 |

APPENDIX A

Additional Reference Documents

APPENDIX B

El Paso County Health Department – Sewage Disposal System Permit

# 1.0 GENERAL SITE AND PROJECT DESCRIPTION

---

## 1.1 Project Location

The project lies in NE 1/4 of the NW ¼ of section 33, Township 11 South, Range 63 West of the 6<sup>th</sup> Principal Meridian in El Paso County, Colorado, and is generally located northeast of the intersection of Murphy Road and Peyton Highway. The approximate location of the site is shown on the Site Vicinity Map, Figure 1.

## 1.2 Existing Land Use

The site currently consists of one parcel (per the El Paso County Assessor's website) of approximately 17.82 acres:

- El Paso County Schedule No. 3133001001, current land use is classified as single-family residence with well, septic, and four sheds/miscellaneous structures

The current zoning is "RR-5" – *Residential Rural*. The parcel is partially developed along the northern property boundary with a single-family modular home and four additional shed structures.

## 1.3 Project Description

An existing single-story modular residence and four shed structures are located near the northern boundary of the lot. It is our understanding the existing 17.82 acres is to be subdivided into a total of three lots. It is unknown at this time the approximate acreage of each lot, but each lot is to be a minimum of 5 acres. Lot 1, closest to Chaparral Loop, is to contain a new single-family residence, well, and septic. Lot 2, near the center of the site, is to retain the existing residence, well, septic, and shed structures. Lot 3, farthest from the road, is to contain a new single-family residence, well, and septic. The Proposed Lot Layout is presented in Figure 2.

The new lots are to be serviced by on-site wastewater treatment systems (OWTS) and individual water supply wells. Lots 1 and 2 are to be accessed from the existing driveway off of Chaparral Loop, near the northwest corner of the property. Lot 3 is to be accessed from a proposed new driveway extending along the southern property line.

# 2.0 QUALIFICATIONS OF PREPARERS

---

This Soil, Geology, and Wastewater Study was prepared by a professional geologist as defined by Colorado Revised Statutes section 34-1-201(3) and by a qualified geotechnical engineer as defined by policy statement 15, "Engineering in Designated Natural Hazards Areas" of the Colorado State Board of Registration for Professional Engineers and Professional Land Surveyors. (Ord. 96-74; Ord. 01-42)

The principle investigators for this study are Kelli Zigler P.G., and Tony Munger, P.E. Ms. Zigler is a Professional Geologist as defined by State Statute (C.R.S 34-1-201) with over 21 years of experience in the geological and geotechnical engineering field. Ms. Kelli Zigler holds a B.S. in Geology from the University of Tulsa. Ms. Zigler has supervised and performed numerous geological and geotechnical field investigations throughout Colorado.



Tony Munger, P.E. is a licensed professional engineer with over 21 years of experience in the construction engineering (residential) field. Mr. Munger holds a B.S. in Architectural Engineering from the University of Wyoming.

## 3.0 STUDY OVERVIEW

---

The purpose of this investigation is to characterize the general geotechnical, geologic site conditions, and on-site wastewater treatment system (OWTS) feasibility and present our opinions of the potential effect of these conditions on the proposed development within El Paso County, Colorado. As such, our services exclude evaluation of the environmental and/or human, health related work products or recommendations previously prepared, by others, for this project.

Revisions to the conclusions presented in this report may be issued based upon submission of the Development Plan. This study has been prepared in accordance with the requirements outlined in the El Paso County Land Development Code (LDC) specifically Chapter 8, last updated August 27, 2019. Applicable sections include 8.4.8 and 8.4.9, and the El Paso County Engineering Criteria Manual (ECM), specifically Appendix C last updated July 9, 2019.

### 3.1 Scope and Objective

The scope of this study is to include a physical reconnaissance of the site and a review of pertinent, publically available documents including, but not limited to, previous geologic and geotechnical reports, overhead and remote sensing imagery, published geology and/or hazard maps, design documents, etc.

The objectives of our study are to:

- Identify geologic conditions present on the site
- Analyze potential negative impacts of these conditions on the proposed site development
- Analyze potential negative impacts to surrounding properties and/or public services resulting from the proposed site development as it relates to existing geologic conditions
- Provide our opinion of suitable techniques that may be utilized to mitigate any potential negative impacts identified herein

This report presents the findings of the study performed by RMG-Rocky Mountain Group relating to the geologic conditions of the above-referenced site. Revisions and modifications to this report may be issued subsequently by RMG, based upon:

- Additional observations made during grading and construction which may indicate conditions that require re-evaluation of some of the criteria presented in this report
- Review of pertinent documents (development plans, plat maps, drainage reports/plans, etc.) not available at the time of this study
- Comments received from the governing jurisdiction and/or their consultants subsequent to submission of this document

### 3.2 Site Evaluation Techniques

The information included in this report has been compiled from several sources, including:

- Field reconnaissance
- Geologic and topographic maps
- Review of selected publicly available, pertinent engineering reports
- Available aerial photographs
- Test pit subsurface exploration
- Visual and tactile characterization of representative site soil and rock samples
- Geologic research and analysis
- Proposed lot layout prepared by Michael Cartmell

Geophysical investigations were not considered necessary for characterization of the site geology. Monitoring programs, which typically include instrumentation and/or observations for changes in groundwater, surface water flows, slope stability, subsidence, and similar conditions, are not known to exist and were not considered applicable for the scope of this report.

### 3.3 Additional Documents

Additional documents reviewed during the performance of this study are included in Appendix A.

## 4.0 SITE CONDITIONS

---

### 4.1 Existing Site Conditions

The site is partially developed. An existing stock tank, well, and trash dump area was observed during site reconnaissance on proposed lot 3 near the northeast portion of the property and can be seen in Figure 6, Engineering and Geology Map. The site is generally located northeast of the intersection of Murphy Road and Peyton Highway in El Paso County, Colorado and comprises approximately 17.82 acres. The site is zoned “RR-5” - *Rural Residential*. Adjacent properties to the north, south, and west are zoned “RR-5” - *Rural Residential*. The property to the east is zoned “PUD” – *Planned Unit Development*.

### 4.2 Topography

Based on our site reconnaissance on October 29, 2021 and USGS 2019 topographic map of the Peyton Quadrangle, the site generally slopes down from east to west with an elevation difference of approximately 93 feet across the site. An apparent drainage area traverses the northwest portion of the parcel from northeast to southwest toward Chaparral Loop. The drainage area can be seen in Figure 6, Engineering and Geology Map. The water levels within the drainage area are anticipated to vary, depending upon local precipitation events.

### 4.3 Vegetation

Site vegetation primarily consists of native grasses and weeds. Deciduous trees exist along the driveway leading up to the house.

#### **4.4 Aerial photographs and remote-sensing imagery**

Personnel of RMG reviewed aerial photos available through Google Earth Pro dating back to 1999, CGS surficial geologic mapping, and historical photos by [historicaerials.com](http://historicaerials.com) dating back to 1952. Historically, the site was undeveloped vacant land prior to 1970. A graded dirt driveway and single-family residence were reportedly constructed around 1979. The four shed structures were reportedly constructed in 1970.

### **5.0 FIELD INVESTIGATION AND LABORATORY TESTING**

---

It is our understanding the existing 17.82 acres is to be subdivided into a total of three lots. It is unknown at this time the approximate acreage of each lot, but each lot is to be a minimum of 5 acres. Lot 1, closest to Chaparral Loop, is to contain a new single-family residence, well, and septic. Lot 2, near the center of the site, is to retain the existing residence, well, septic, and shed structures. Lot 3, farthest from the road, is to contain a new single-family residence, well, and septic. The Proposed Lot Layout is presented in Figure 2.

#### **5.1 Test Pit Excavations**

Two test pits were performed by RMG on November 4, 2021 to explore the subsurface soils underlying the proposed new on-site wastewater treatment systems. The number of test pits is in accordance with the Regulations of the El Paso County Board of Health, Chapter 8, On-site Wastewater Treatment Systems (OWTS) as required by 8.5.D.3.a.

The test pits were excavated to 8 feet below the existing ground surface. Additional information is provided in section **9.0 On-site Disposal of Wastewater**.

#### **5.2 OWTS Visual and Tactile Evaluation**

A visual and tactile evaluation was performed by RMG for this investigation. The soils were evaluated to determine the soils types and structure. Neither bedrock nor limiting layers were encountered in the test pits. The soil descriptions of the test pit evaluation are presented in Figure 4, Test Pit Logs.

#### **5.3 Groundwater**

Groundwater was not encountered in the test pits performed by RMG. No indications of redoximorphic conditions were observed.

Fluctuations in groundwater and subsurface moisture conditions may occur due to variations in rainfall and other factors not readily apparent at this time. Development of the property and adjacent properties may also affect groundwater levels.

### **6.0 SOIL, GEOLOGY, AND ENGINEERING GEOLOGY**

---

The site is located within the central portion of the Great Plains Physiographic Province. A major structural feature known as the Rampart Range Fault is located approximately 28 miles west of the site. The Rampart Range Fault marks the boundary between the Great Plains Physiographic Province and the Southern Rocky Mountain Province. The site exists within the southwest portion of a large structural feature known as the Denver Basin. In general, the geology at the site consists of arkosic loamy colluvium

and sheetwash alluvium overlying the upper part of the Dawson Arkose formation consisting of arkosic sandstone and conglomerate. The alluvium generally consists of sand, silt, clay, and gravel. The upper part of the Dawson Formation is generally comprised of the arkosic sandstone, claystone, mudstone, conglomerate, and localized coal beds.

### **6.1 Subsurface Soil Conditions**

The subsurface soils encountered in the RMG test pit excavations were classified using the United States Department of Agriculture (USDA) soil descriptions. The on-site soils classified as loamy sand, sandy clay loam, sandy loam, and sand.

The classifications shown on the logs are based upon the engineer's classification of the samples at the depths indicated. Stratification lines shown on the logs represent the approximate boundaries between material types and the actual transitions may be gradual and vary with location.

### **6.2 Bedrock Conditions**

Bedrock (as defined by the USDA) was not encountered in the test pit excavations performed for this investigation. In general, the bedrock beneath the site is considered to be part of the Upper Dawson Arkose Formation which consists of very thick-bedded to massive, cross-bedded, light-colored arkose, pebbly arkose, and arkosic pebble conglomerate. The sandstone is poorly sorted with moderate to high clay content. The sandstone is generally permeable, well drained, and has good foundation characteristics. The Dawson sandstone is generally not considered a limiting layer for OWTS.

### **6.3 U.S. Soil Conservation Service**

The U.S. Soil Conservation Service along with United States Department of Agriculture (USDA) identifies the site soils as:

- 8 – Blakeland loamy sand, 1 to 9 percent slopes. Properties of the loam include somewhat excessively drained soils, depth of the water table is anticipated to be greater than 80 inches, runoff is anticipated to be low, frequency of flooding and ponding is none, and landforms include hills and flats.
- 84 – Stapleton sandy loam, 8 to 15 percent slopes. Properties of the loam include well drained soils, depth of the water table is anticipated to be greater than 80 inches, runoff is anticipated to be low, frequency of flooding and ponding is none, and landforms include hills.
- 95 – Truckton loamy sand, 1 to 9 percent slopes. Properties of the loam include well drained soils, depth of the water table is anticipated to be greater than 80 inches, runoff is anticipated to be low, frequency of flooding and ponding is none, and landforms include fan remnants and interfluves.

The USDA Soil Survey Map is presented in Figure 5.

### **6.4 General Geologic Conditions**

Based on our field observations and review of relevant geologic maps, a geologic map was prepared which identifies the geologic conditions affecting the development. The geologic conditions affecting the development are presented in the Engineering and Geology Map, Figure 6.

The site generally consists of alluvium and colluvium deposits overlying sandstone bedrock. Four geologic units were mapped at the site as:

- *cac* – Arkosic loamy colluvium and sheetwash alluvium
- *tdu* – Upper Part of Dawson Arkose – arkosic sandstone, conglomerate, and shale
- *psw* – Potentially Seasonally Wet Area – drainage area in the northwest portion of the parcel
- *af* – Artificial Fill Area – Artificial fill placed between 1970 and 1979 during the construction of the existing structures.

## **6.5 Engineering Geology**

Charles Robinson and Associates (1977) have mapped four environmental engineering units at the site as:

- *1A* – Stable alluvium, colluvium and bedrock on flat to gentle slopes (0-5%)
- *2A* – Stable alluvium, colluvium and bedrock on gentle to moderate slopes (5-12%)
- *7A* – Physiographic floodplain where erosion and deposition presently occur and is generally subject to recurrent flooding. Includes 100-year floodplain along major streams where floodplain studies have been conducted
- *c Tkd* – colluvium, Dawson Formation (Upper part)

## **6.6 Structural Features**

Structural features such as schistosity, folds, zones of contortion or crushing, joints, shear zones or faults were not observed on the site, in the surrounding area, or in the soil samples collected for laboratory testing.

## **6.7 Surficial (Unconsolidated) Deposits**

Lake and pond sediments, swamp accumulations, sand dunes, marine terrace deposits, talus accumulations, creep, or slope wash were not observed on the site. Slump and slide debris were also not observed on the site.

## **6.8 Features of Special Significance**

Features of special significance such as accelerated erosion, (advancing gully head, badlands, or cliff reentrants) were not observed on the property. Features indicating settlement or subsidence such as fissures, scarplets, and offset reference features were not observed on the study site or surrounding areas. Features indicating creep, slump, or slide masses in bedrock and surficial deposits were not observed on the property.

## **6.9 Drainage of Water and Groundwater**

The overall topography of the site slopes down from east to west. It is anticipated the direction of surface water and groundwater generally flow in the same direction. Groundwater was not encountered in the test pits performed for this study, and is not anticipated to affect shallow foundations. An apparent drainage area traverses the northwest portion of the parcel from northeast to southwest toward Chaparral Loop. The drainage area can be seen in Figure 6, Engineering and Geology Map. The water levels within the drainage area are anticipated to vary, depending upon local precipitation events.

## 6.10 Flooding and Surface Drainage

Based on our review of the Federal Emergency Management Agency (FEMA) Community Panel No. 08041C0375G and the online ArcGIS El Paso County Risk Map, the entire site lies outside of identified regulatory floodway and 100 or 500-year floodplains. The site lies in Zone X. Zone X is defined by FEMA as an area of minimal flood hazard that is determined to be outside the Special Flood Hazard Area and higher than the elevation of the 0.2-percent-annual-chance (or 500-year) flood. The FEMA Map is presented in Figure 7.

## 7.0 ECONOMIC MINERAL RESOURCES

---

Under the provision of House Bill 1529, it was made a policy by the State of Colorado to preserve for extraction commercial mineral resources located in a populous county. Review of the *El Paso Aggregate Resource Evaluation Map, Master Plan for Mineral Extraction, Map 1* indicates the site is identified as Upland Deposits and Valley Fill. The upland deposits contain sand, gravel, silt, and clay. Remnants of older streams deposited on topographic highs or bench like features are present. The valley fill consists of sand and gravel with silt and clay deposited by water in one or a series of stream valleys.

According to the *Evaluation of Mineral and Mineral Fuel Potential of El Paso County State Mineral Lands*, the site is mapped within the southern part of the Denver Basin Coal Region. However, the area of the site has been mapped "Poor" for coal resources. The nearest historic coal mine sites are located about 10 miles east of the tract in the Ramah-Fondis coal field (Carroll and Bauer, 2002). In this part of the Denver coal region, coal resources are locally present within the lower part of the Laramie Formation of Upper Cretaceous age, and in the upper part of the Denver Formation of Paleocene age. In the vicinity of this tract, the coal-bearing beds of the Laramie Formation lie at a depth of about 1,400 feet (Kirkham and Ladwig, 1979). The coal seams in the Laramie Formation tend to be lenticular and discontinuous in comparison to areas currently being mined in western Colorado. This tract is not prospective for metallic mineral resources. No oil and gas wells are drilled on this tract. The sedimentary rocks in this area lack one or more of the essential elements. The existing geologic control is insufficient to determine the presence of a local trap or reservoir. The alluvium in the area may contain sand or gravel. However, the Piney Creek Alluvium is often silty or clayey in this area. It often does not contain useable sand and gravel resources.

## 8.0 IDENTIFICATION AND MITIGATION OF POTENTIAL GEOLOGIC CONDITIONS

---

The El Paso County Engineering Criteria Manual recognizes and delineates the difference between geologic hazards and constraints. A *geologic hazard* is one of several types of adverse geologic conditions capable of causing significant damage or loss of property and life. Geologic hazards are defined in Section C.2.2 Sub-section E.1 of the ECM. A *geologic constraint* is one of several types of adverse geologic conditions capable of limiting or restricting construction on a particular site. Geologic constraints are defined in Section C.2.2 Sub-section E.2 of the ECM (1.15 Definitions of Specific Terms and Phrases). The following geologic constraints were considered in the preparation of this report. They are not anticipated to pose a significant risk to the proposed development:

- Avalanches
- Debris Flows-Fans/Mudslides
- Compressible Soils

- Floodplains
- Ground Subsidence
- Landslides
- Rockfall
- Ponding water
- Steeply Dipping Bedrock
- Unstable or Potentially Unstable Slopes
- Scour, erosion, accelerated erosion along creek banks and drainage ways
- Corrosive Minerals
- History of Landfill Activity
- Uncontrolled/Undocumented Grading Fill, Valley Fill, and/or Drainage Infill

The following section presents the geologic conditions that have been identified on the property:

## 8.1 Faults and Seismicity

Based on review of the Earthquake and Late Cenozoic Fault and Fold Map Server provided by CGS located at <http://dnrwebmapgdev.state.co.us/CGSOnline/> and the recorded information dating back to November of 1900, Colorado Springs has not experienced a recorded earthquake with a magnitude greater than 1.6 during that period. The nearest recorded earthquakes over 1.6 occurred in December of 1995 in Manitou Springs, which experienced magnitudes ranging between 2.8 to 3.5. Additional earthquakes over 1.6 occurred between 1926 and 2001 in Woodland Park, which experienced magnitudes ranging from 2.7 to 3.3. Both of these locations are located near the Ute Pass Fault, which is greater than 10 miles from the subject site.

Earthquakes felt at this site will most likely result from minor shifting of the granite mass within the Pikes Peak Batholith, which includes pull from minor movements along faults found in the Denver basin. It is our opinion that ground motions resulting from minor earthquakes may affect structures (and the surrounding area) at this site if minor shifting were to occur.

### Mitigation

The Pikes Peak Regional Building Code, 2017 Edition, indicates maximum considered earthquake spectral response accelerations of 0.176g for a short period ( $S_s$ ) and 0.053g for a 1-second period ( $S_1$ ). Based on the results of our experience with similar subsurface conditions, we recommend the site be classified as Site Class D, with average shear wave velocities ranging from 2,500 to 5,000 feet per second for the materials in the upper 100 feet.

## 8.2 Radon

*"Radon Act 51 passed by Congress set the natural outdoor level of radon gas (0.4 pCi/L) as the target radon level for indoor radon levels".*

Northern El Paso County and the 80831 zip code in which the site is located, has an EPA assigned Radon Zone of 1. A radon Zone of 1 predicts an average indoor radon screening level greater than 0.4 pCi/L (picocuries per liter), which is above the recommended levels assigned by the EPA. *The EPA recommends corrective measures to reduce exposure to radon gas.*

All of the State of Colorado is considered EPA Zone 1 based on the information provided at [https://county-radon.info/CO/El\\_Paso.html](https://county-radon.info/CO/El_Paso.html). Elevated hazardous levels of radon from naturally occurring sources are not anticipated at this site.

#### Mitigation

Radon hazards are best mitigated at the building design and construction phases. Providing increased ventilation of basements, crawlspaces, creating slightly positive pressures within structures, and sealing of joints and cracks in the foundations and below-grade walls can help mitigate radon hazards. Passive radon mitigation systems are also available.

Passive and active mitigation procedures are commonly employed in this region to effectively reduce the buildup of radon gas. Measures that can be taken after the residence is enclosed during construction include installing a blower connected to the foundation drain and sealing the joints and cracks in concrete floors and foundation walls. If the occurrence of radon is a concern, it is recommended that the residence be tested after they are enclosed and commonly utilized techniques are in place to minimize the risk.

### **8.3 Expansive Soils and Bedrock**

Based on the test pits performed by RMG for this investigation and our experience with similar materials in this area, the silty to sandy clay and silty to sandy clay loam generally possess low to moderate swell potential. The Dawson formation is known to have moderate to high swell potential in some locations. It is anticipated that expansive soil/bedrock may be encountered at depths anticipated to affect residential foundations. If these materials are encountered in the excavations for the proposed residences, they can readily be mitigated with typical construction practices common to this region of El Paso County, Colorado.

#### Mitigation

Foundation design and construction are typically adjusted for expansive soils. Mitigation of expansive soils may include overexcavation and replacement with non-expansive structural fill. Drilled piers are not anticipated. Floor slabs bearing directly on expansive soils are expected to experience movement. Overexcavation and replacement with compacted non-expansive soils can be successful in reducing slab movement.

If expansive soils or bedrock are encountered during construction, mitigation of these expansive materials should follow the recommendations presented in a lot-specific subsurface soil investigation performed for each proposed structure.

## **9.0 ON-SITE WASTEWATER TREATMENT SYSTEMS**

---

It is our understanding that On-site Wastewater Treatment Systems (OWTS) are proposed for the development. The site was evaluated in general accordance with the El Paso Land Development Code, specifically sections 8.4.8. Two 8-foot deep test pits were performed across the site to obtain a general understanding of the soil and bedrock conditions. The Test Pits Logs are presented in Figure 4.

The United States Department of Agriculture (USDA) soil types encountered in our test pits as consisted of loamy sand, sandy clay loam, sandy loam and sand. Limiting layers were not encountered in the test pits. The long term acceptance rates (LTAR) associated with the soils observed in the test pits ranged from



0.35 to 0.80 (soil type 1-3) gallons per day per square foot. Signs of seasonal groundwater were not observed in the test pits.

Contamination of surface and subsurface water resources should not occur provided the OWTS sites are evaluated and installed according to the El Paso County Board of Health Guidelines and property maintained.

Treatment areas, at a minimum, must achieve the following:

- Treatment areas must be 4 feet above groundwater or bedrock as defined by the Definitions 8.3.4 of the Regulations of the El Paso County Board of Health, Chapter 8 OWTS Regulations, most recently amended May 23, 2018;
- Each lot (after purchase but prior to construction of an OWTS) will require an OWTS Site Evaluation report prepared per *the Regulations of the El Paso County Board of Health, Chapter 8 OWTS Regulations*. During the site reconnaissance, a minimum of two 8-foot deep test pits will need to be excavated in the vicinity of the proposed treatment area;
- Comply with any physical setback requirements of Table 7-1 of the El Paso County Department of Health and Environment (EPCHDE);
- Treatment areas are to be located a minimum 100 feet from any well (existing or proposed), including those located on adjacent properties per Table 7-2 per the EPCHDE;
- Each lot shall be designed to insure that a minimum of 2 sites are appropriate for a OWTS and do not fall within the restricted areas identified on the Engineering and Geology Map, Figure 6, (e.g. existing ponds, existing septic fields that may remain).

It is our opinion that if the EPCHDE physical setback requirements are met for each lot, there are no restrictions on the placement of the individual On-site Wastewater Systems.

Soil and groundwater conditions at the site are suitable for individual treatment systems. It should be noted that the LTAR values stated above are for the test pit locations performed for this report only. The LTAR values may change throughout the site. If an LTAR value of less than 0.35 (or soil types 3 to 5) are encountered at the time of the site-specific OWTS evaluation, an "engineered system" will be required.

## 10.0 BEARING OF GEOLOGIC CONDITIONS UPON PROPOSED DEVELOPMENT

---

Geologic hazards (as described in Section 8.0 of this report) found to be present at this site include faults/seismicity and radon. It is our opinion that the existing geologic and engineering conditions can be satisfactorily mitigated through proper engineering, design, and construction practices.

## 11.0 ADDITIONAL STUDIES

---

The findings, conclusions and recommendations presented in this report were provided to evaluate the suitability of the site for future development. Unless indicated otherwise, the test pits, laboratory test results, conclusions and recommendations presented in this report are not intended for use for design and construction.

***A lot-specific subsurface soil investigation will be required for all proposed structures including (but not limited to) residences, retaining walls (if proposed), etc.***

## 12.0 CONCLUSIONS

---

Based upon our evaluation of the geologic conditions, it is our opinion that the proposed development is feasible. The geologic conditions identified are considered typical for the Front Range region of Colorado. Mitigation of geologic conditions is most effectively accomplished by avoidance. However, where avoidance is not a practical or acceptable alternative, geologic conditions should be mitigated by implementing appropriate planning, engineering, and suitable construction practices.

In addition to the previously identified mitigation alternatives, surface and subsurface drainage systems should be considered. Exterior, perimeter foundation drains should be installed around below-grade habitable or storage spaces. A typical perimeter drain detail is presented in Figure 10. Surface water should be efficiently removed from the building area to prevent ponding and infiltration into the subsurface soil.

We believe the sand and loamy sand will classify as Type C material, and the sandy loam and sandy clay loam will classify as type B material as defined by OSHA in 29 CFR Part 1926. OSHA requires that temporary excavations made in Type C materials be laid back at ratios no steeper than 1 ½:1 (34°) (horizontal to vertical) and temporary excavations made in type B materials be laid back no steeper than 1:1 (45 °) (horizontal to vertical) unless the excavation is shored and braced. Excavations deeper than 20 feet, or when water is present, should always be braced or the slope designed by a professional engineer.

Long term cut slopes in the upper soil should be limited to no steeper than 3:1 (horizontal to vertical). Flatter slopes will likely be necessary should groundwater conditions occur. It is recommended that long term fill slopes be no steeper than 3:1 (horizontal to vertical).

Revisions and modifications to the conclusions and recommendations presented in this report may be issued subsequently by RMG based upon additional observations made during grading and construction, which may indicate conditions that require re-evaluation of some of the criteria presented in this report.

It is important for the Owner(s) of the property to read and understand this report, and to carefully familiarize themselves with the geologic hazards associated with construction in this area. This report only addresses the geologic constraints contained within the boundaries of the site referenced above.

***The foundation systems for the proposed single-family residential structures and any retention/detention facilities should be designed and constructed based upon recommendations developed in a site-specific subsurface soil investigation.***

## 13.0 CLOSING

---

This report is for the exclusive purpose of providing geologic hazards information and preliminary geotechnical engineering recommendations. The scope of services did not include, either specifically or by implication, evaluation of wild fire hazards, environmental assessment of the site, or identification of contaminated or hazardous materials or conditions. Development of recommendations for the mitigation of environmentally related conditions, including but not limited to, biological or toxicological issues, are beyond the scope of this report. If the owner is concerned about the potential for such contamination or conditions, other studies should be undertaken.

This report has been prepared for **Michael Cartmell** in accordance with generally accepted geotechnical engineering and engineering geology practices. The conclusions and recommendations in this report are based in part upon data obtained from review of available topographic and geologic maps, review of available reports of previous studies conducted in the site vicinity, a site reconnaissance, and research of available published information, soil test borings, soil laboratory testing, and engineering analyses. The nature and extent of variations may not become evident until construction activities begin. If variations then become evident, RMG should be retained to re-evaluate the recommendations of this report, if necessary.

Our professional services were performed using that degree of care and skill ordinarily exercised, under similar circumstances, by geotechnical engineers and engineering geologists practicing in this or similar localities. RMG does not warrant the work of regulatory agencies or other third parties supplying information which may have been used during the preparation of this report. No warranty, express or implied, is made by the preparation of this report. Third parties reviewing this report should draw their own conclusions regarding site conditions and specific construction techniques to be used on this project.

## APPENDIX A

### Additional Reference Documents

1. *Proposed Lot Layout Map, 15435 Chaparral Loop East, El Paso County, Colorado*, prepared by Michael Cartmell
2. *Flood Insurance Rate Map, El Paso County, Colorado and Unincorporated Areas, Community Panel No. 08041C0375G*, Federal Emergency Management Agency (FEMA), effective December 7, 2018.
3. *Generalized Surficial Geologic Map of the Denver 1 degree X 2 degree Quadrangle, Colorado*, compiled by Moore, Straub, Berry, Baker, and Brandt, 2003, U.S. Geological Survey, Miscellaneous Field Studies Map MF-2347.
4. *Geologic Map of Colorado, compiled by Ogden Tweto, 1979*. U.S. Geological Survey
5. *Bijou Basin and Peyton Quadrangle, Environmental and Engineering Geologic Map for Land Use*, compiled by Dale M. Cochran, Charles S. Robinson & Associates, Inc., Golden, Colorado, 1977.
6. *Bijou Basin and Peyton Quadrangle, Map of Potential Geologic Hazards and Surficial Deposits*, compiled by Dale M. Cochran, Charles S. Robinson & Associates, Inc., Golden, Colorado, 1977.
7. *Pikes Peak Regional Building Department*: <https://www.pprbd.org/>.
8. El Paso County Assessor Website  
<https://property.spatalest.com/co/elpaso/#/property/3133001001>  
Schedule No. 3133001001
9. *Colorado Geological Survey, USGS Geologic Map Viewer*:  
<http://coloradogeologicalsurvey.org/geologic-mapping/6347-2/>.
10. *Historical Aerials*: <https://www.historicaerials.com/viewer>, Images dated 1952, 1955, 1968, 1984, 1999, 2005, 2009, 2011, 2013, 2015, and 2017.
11. *USGS Historical Topographic Map Explorer*: <http://historicalmaps.arcgis.com/usgs/>  
Colorado Springs, Peyton Quadrangle dated 1970, 2010, 2013, 2016, and 2019.
12. *Google Earth Pro*, Imagery dated 1999, 2004, 2005, 2006, 2011, 2013, 2015, 2017, 2019 and 2020.
13. *Colorado Springs and Vicinity Natural Hazards Explorer ARC GIS Web Viewer*  
<https://www.arcgis.com/apps/MapSeries/index.html?appid=dce03f88b282442d8ec751fd439e357e>
14. *USDA Web Soil Survey*  
<https://websoilsurvey.sc.egov.usda.gov/App/WebSoilSurvey.aspx>

**APPENDIX B**  
**El Paso County Health Department – Sewage Disposal System**  
**Permit**

## ON-SITE WASTEWATER SYSTEM INSPECTION FORM

PERMIT # 011601

DATE 8/20/12

APPROVED YES ☒ NO ☐Environmental Health Specialist: Seurala RobbinAddress: 15435 Chaparral Loop EastOwner: Gail TabinLegal Description: Lot 62 Peyton RanchesResidence ☒ #Bedrooms 2 Commercial ☐System Installer: Acme SepticSEPTIC TANK: Construction Material                     Capacity Gallon 1250 (via Acme receipt)

## DISPOSAL FIELD:

Trench: Depth (Range) 3' Width 3' Total Length 90 Sq. Ft. 270Bed: Depth (Range)                      Width                      Total Length                      Sq. Ft.                     Depth of Rock 12" Under PVC 6" Type of cover on Rock UnknownDRYWELLS: # of Pits                      Rings (Pit 1)                      Rings (Pit 2)                      Working Depth #1                      #2                     Size (L x W) #1                      #2                      Total Sq. Ft.                     

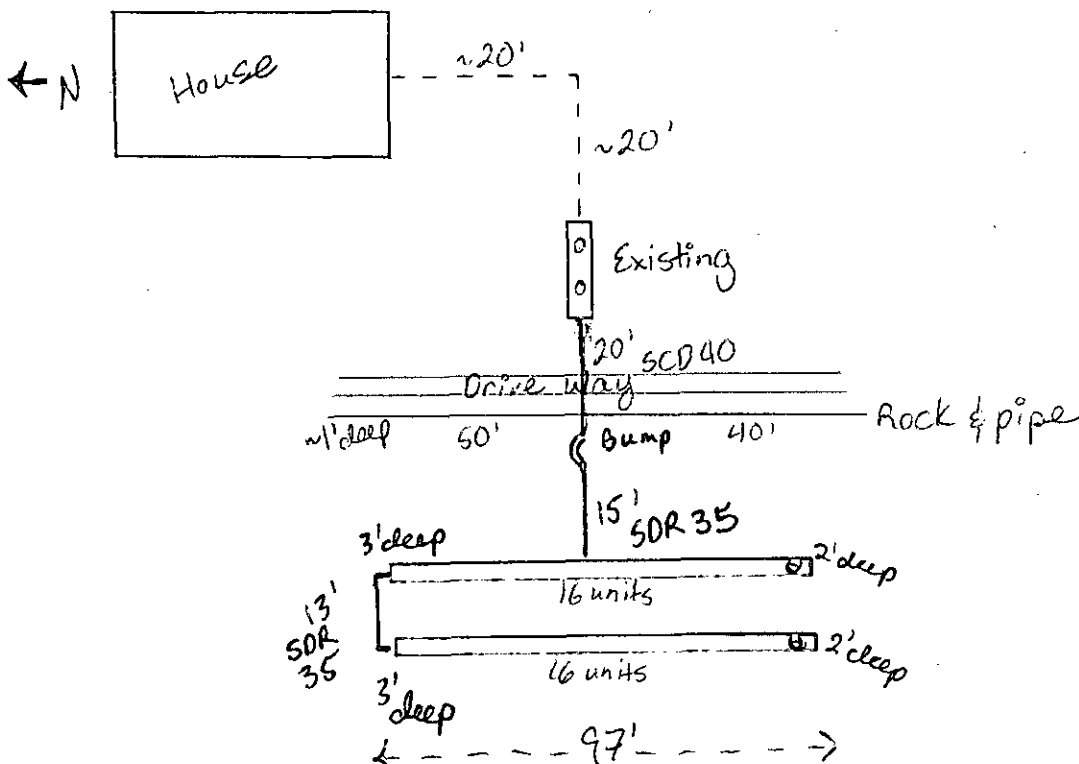
## ROCKLESS SYSTEMS:

Standard Chamber: Type Standard #Chambers ~32 Sq. Ft./Chamber 15.5 Bed                      Trench ☒High Profile Units: Type                      #Chambers                      Sq. Ft./Chamber                      Bed                      Trench                     Reduction Allowed 40 % Sq. Ft. Required                      Depth (Range) 2-3ftSq. Ft. Installed (826) Equivalent Sq. Ft. Installed with Reduction 826Engineer Design: Y ☐ N ☒ Engineering Firm                     Approval Letter Provided: Y ☐ N ☐Well installed at time of septic inspection: Y ☒ N ☐ Public Water: Y ☐ N ☒

\*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: Dennis with ACME just reconnected the secondary chamber lines.

@well



Acres 17

EL PASO COUNTY

• DEPARTMENT OF HEALTH AND ENVIRONMENT

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

Water Supply well

Permit

011601**PERMIT****TO CONSTRUCT, ALTER, REPAIR OR MODIFY ANY INDIVIDUAL SEWAGE DISPOSAL SYSTEM**Receipt No. NONEIssued to GAIL TOBINDate 8-18-97Address of Property 15435 CHAPARRAL LOOP EAST, LOT 62, PEYTON RANCHES

Phone

749-2527 *disconnected*

(Permit valid at this address only)

Sewage-Disposal System work to be performed by OWNER

Phone

This Permit is issued in accordance with 25-10-106 Colorado Revised Statutes 1973, as amended. PERMIT EXPIRES upon completion of 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 - ADDITION

PERMIT FEE (NOT REFUNDABLE)

8-18-98

DATE OF EXPIRATION

DIRECTOR, DEPARTMENT OF HEALTH AND ENVIRONMENT

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:

ADD 250

total square feet

ADDITION 100 FT. OF CHAMBERS.

ft. of trench

inches wide

ft. of trench

inches wide

total square feet

total square feet

rings or diam.x w/d

**NOTES:**

ORIGINAL SYSTEM CALLED FOR 2 BEDROOM; 3 BEDROOM HOME REQUIRES 1250 GALLON SEPTIC TANK.

OWNER ADDING 2-FIFTY FOOT ROWS OF CHAMBERS, I.E., 16 CHAMBERS. TO BE APPROVED

FOR A 3-BEDROOM HOME, TANK CAPACITY MUST BE 1250 GALLONS, IN ADDITION TO REQUESTED ADDITION OF LEACH FIELD.

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.

APPLICATION FOR A NEW, REMODEL, REPAIR, OR ADDITION

TO AN INDIVIDUAL SEWAGE DISPOSAL SYSTEM (W) 592-4634

Owner GAIL Tobin Phone 719-749-2527  
Address of Property 15435 Chaparral Loop East Lot Size 17 Water Supply Well  
Tax Sch # \_\_\_\_\_ Septic Contractor & Phone # Oniscas  
Legal Description Modification to Existing System  
Type of Building Modular Owner's Mailing Address Same (80831)

MAXIMUM POTENTIAL BEDROOMS 3

Basement ☒ Y ☒ N Percolation Test Attached ☒ Y ☒ N Garbage Disposal ☒ Y ☒ N Clothes Washer ☒ Y ☒ N

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 and additional tests and reports as may be required by the Department to be made and furnished by a applicant for purposes of evaluating the application, and issuance of the permit is subject to such terms and conditions as deemed necessary to ensure compliance with rules and regulations adopted pursuant to C.R.S. 10-25-101 et. seq. I hereby certify all represented to be true and correct to the best of my knowledge and belief, and are designed to be relied on by the El Paso County Department of Health and Environment 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 and in legal action for perjury as provided by law.

OWNER'S SIGNATURE Gail A. Tobin

Date 8-12-97

DEPARTMENT OF HEALTH USE ONLY

100 ft of Chambers Add 250 gal. 8/15/97  
Absorption Area Tank Capacity Date of Site Inspection

REMARKS: Original system called for 2 BR, 3 BR home  
requires 1250 gal tank. Owner adding 2-ft by 8  
chambers, in 16 chambers. To be approved for a 3 BR  
home, tank capacity must be 1250 in addition to  
requested addition of leach field.

EHS INSPECTOR Larry Schaal

Date 8/15/97

☒ APPROVED

☐ DENIED

PERMIT # 11601

FEE

☒ NO FEE

DATE TO EPC PLANNING DEPT N/A

mail permit  
8/18/97 jrn



We require the ORIGINAL of your percolation (PERC) TEST.

The following information must be on your PLOT PLAN.

Property lines

Proposed septic system site

Well(s)

Building(s)

Water line

Subsoil drain(s)

Property dimensions

Designated alternate septic system site

Adjacent property well(s)

Proposed building(s)

Cistern

If any of these are within 100 feet of your proposed septic system  
include on your plot plan

Spring(s)

Pond(s)

Dry Gulch(s)

Lake(s)

Stream(s)

Natural drainage course(s)

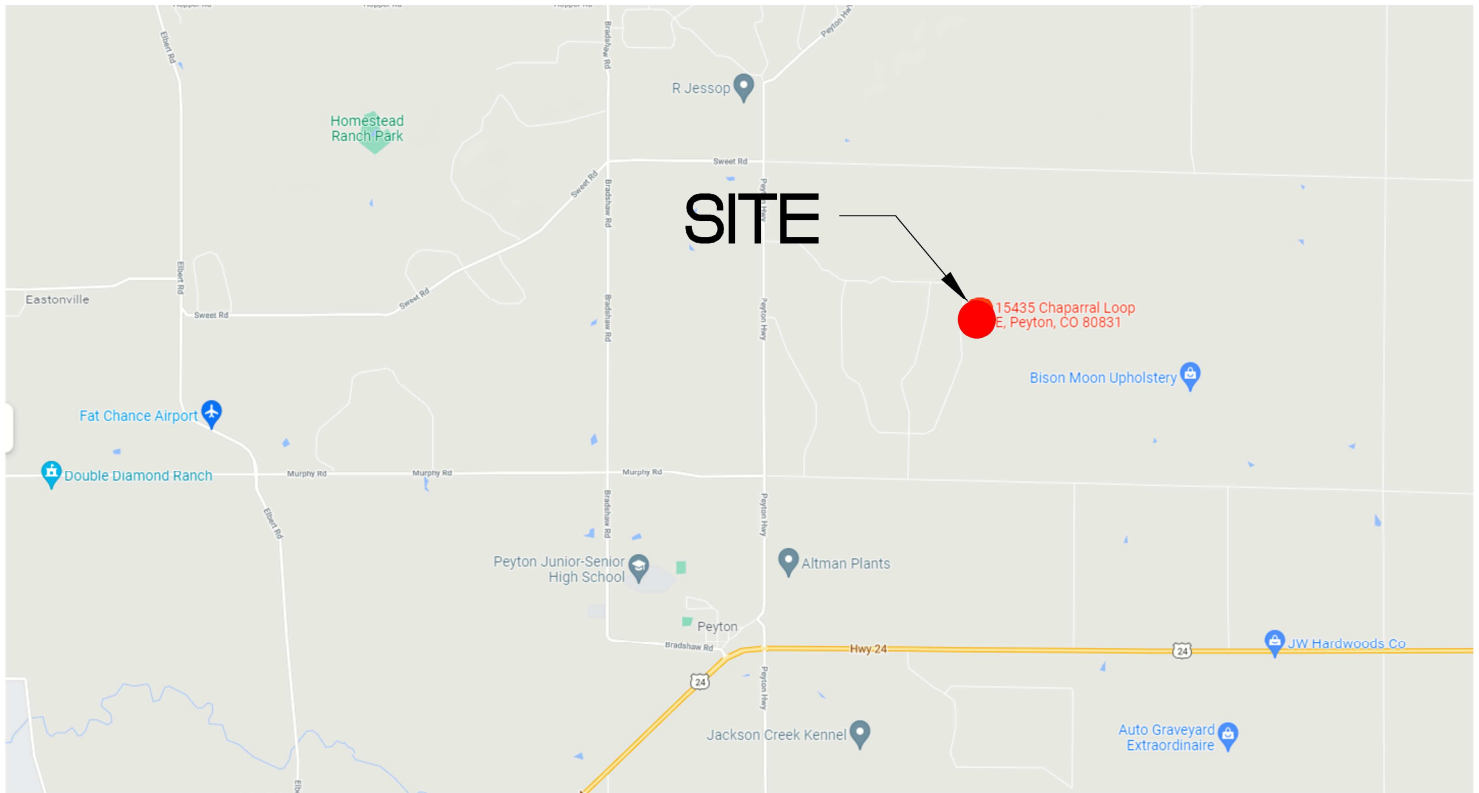
PROPERTY AND PERC HOLES MUST BE CLEARLY MARKED OR POSTED

GIVE COMPLETE DIRECTIONS TO THE PROPERTY FROM A MAIN HIGHWAY

*See w/s report - attached*

*No locked gate + No logs*

## FIGURES



NOT TO SCALE



ROCKY MOUNTAIN GROUP

Southern Office  
Colorado Springs, CO  
80918  
(719) 548-0600  
Central Office:  
Englewood, CO 80112  
(303) 688-9475  
Northern Office:  
Greeley / Evans, CO 80620  
(970) 330-1071

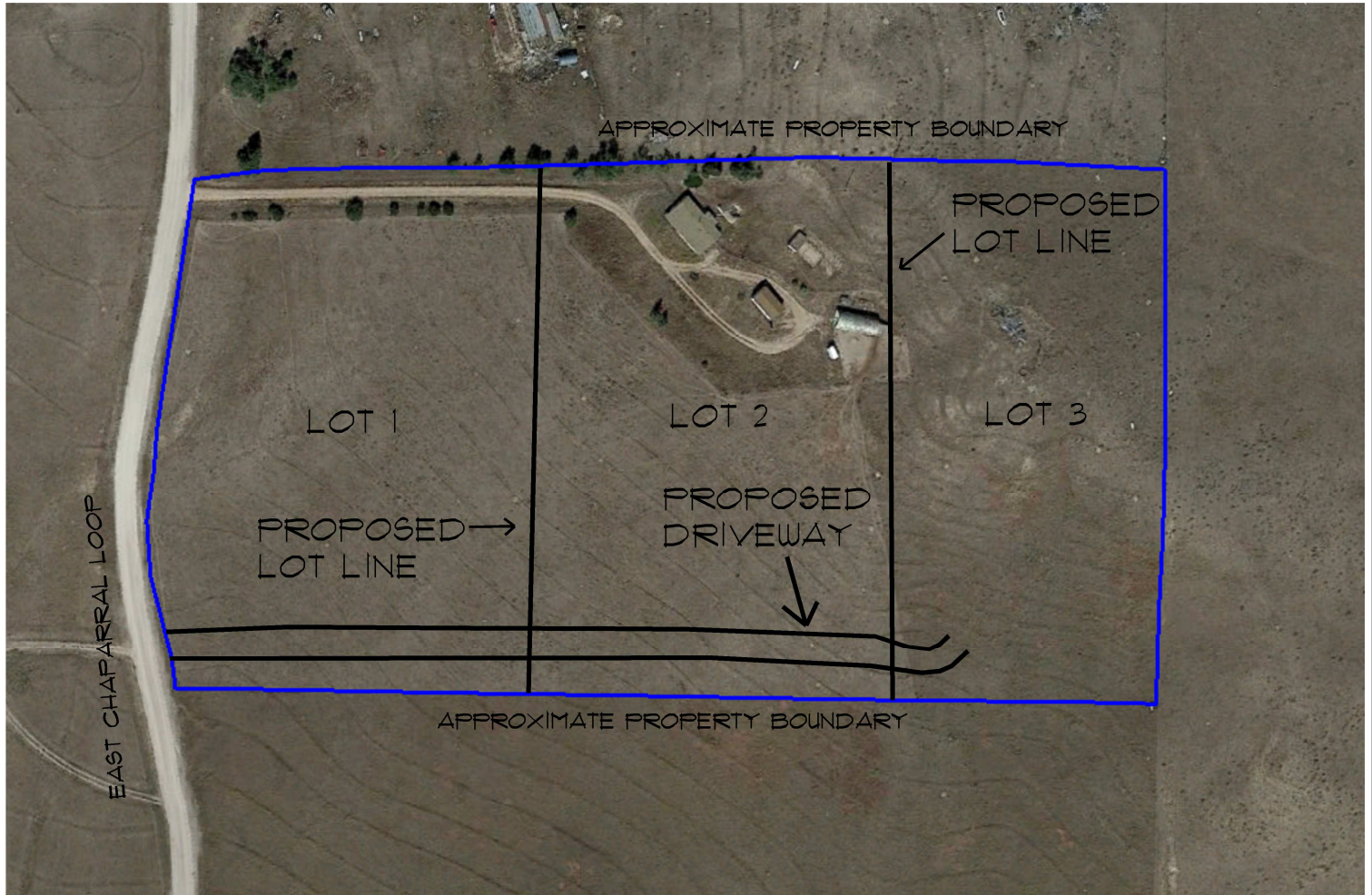
## SITE VICINITY MAP

15435 EAST CHAPARRAL LOOP  
LOT 62, PEYTON RANCHES  
EL PASO COUNTY, COLORADO  
MICHAEL CARTMELL

JOB No. 186430

FIG No. 1

DATE 1-26-2022



NOT TO SCALE



ROCKY MOUNTAIN GROUP

Southern Office  
Colorado Springs, CO  
80918  
(719) 548-0600  
Central Office:  
Englewood, CO 80112  
(303) 688-9475  
Northern Office:  
Greeley / Evans, CO 80620  
(970) 330-1071

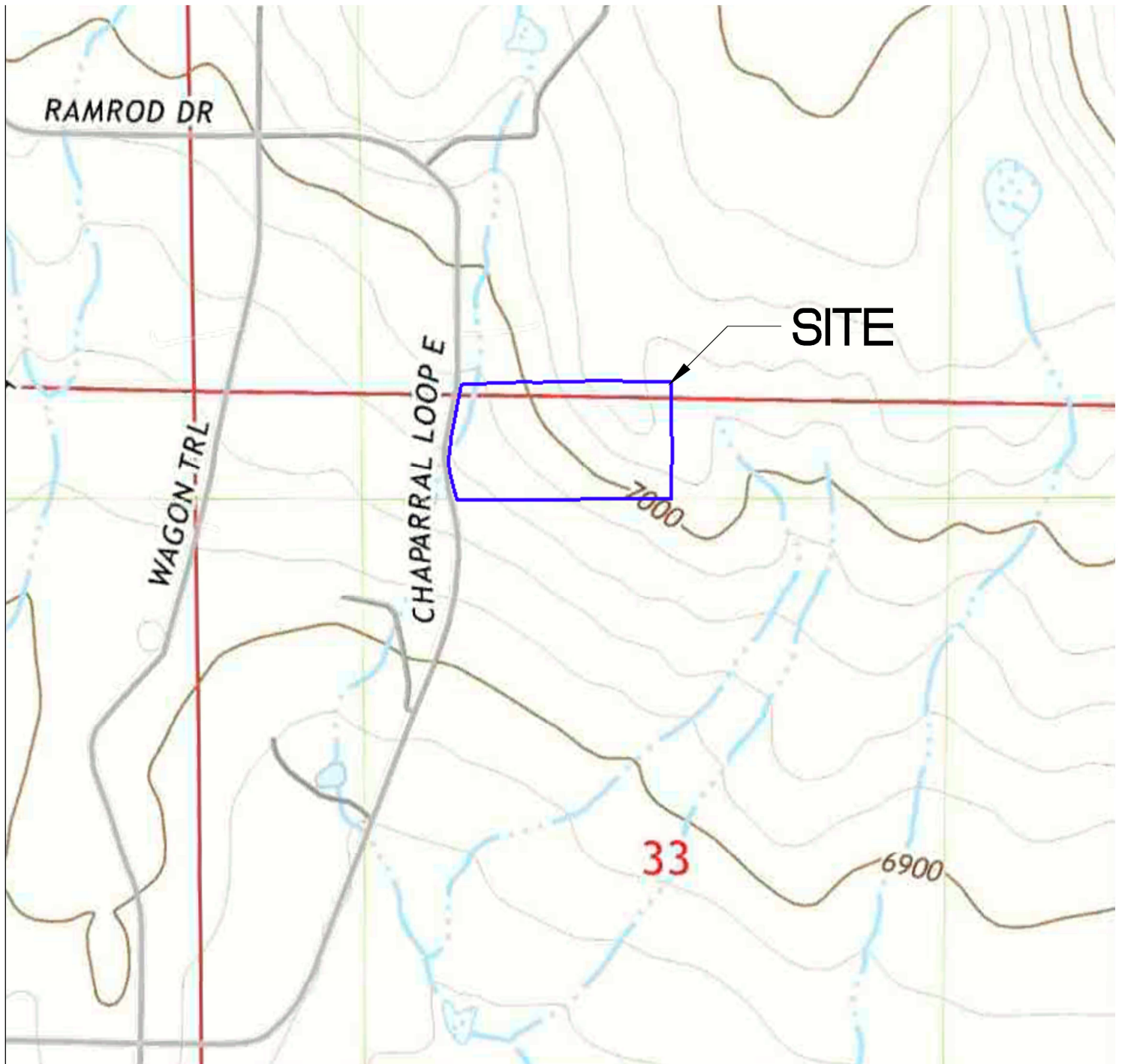
## PROPOSED LOT LAYOUT

15435 EAST CHAPARRAL LOOP  
LOT 62, PEYTON RANCHES  
EL PASO COUNTY, COLORADO  
MICHAEL CARTMELL

JOB No. 186430

FIG No. 2

DATE 1-26-2022



NOT TO SCALE



ROCKY MOUNTAIN GROUP

Southern Office  
Colorado Springs, CO  
80918  
(719) 548-0600  
Central Office:  
Englewood, CO 80112  
(303) 688-9475  
Northern Office:  
Greeley / Evans, CO 80620  
(970) 330-1071



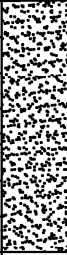
## USGS TOPO MAP



15435 EAST CHAPARRAL LOOP  
LOT 62, PEYTON RANCHES  
EL PASO COUNTY, COLORADO  
MICHAEL CARTMELL

JOB No. 186430

FIG No. 3

DATE 1-26-2022

| TEST PIT TP-1                                 |            |  |           |
|---|------------|--|-----------|
| DATE OBSERVED: 11/4/21                        |            |  |           |
| SOIL DESCRIPTION                              | DEPTH (FT) | SYMBOL   | SOIL TYPE |
| 0 - 3.0 FT<br>LOAMY SAND<br>(STRUCTURELESS)   | 2ft        |   | 1         |
| 3.0 - 4.5 FT<br>SANDY CLAY LOAM<br>(MODERATE) | 4ft        |   | 3         |
| 4.5 - 8.0 FT<br>SAND<br>(STRUCTURELESS)       | 6ft<br>8ft |  | 1         |
|   |            |  |           |

| TEST PIT TP-2                              |                   |  |           |
|--|-------------------|--|-----------|
| DATE OBSERVED: 11/4/21                     |                   |  |           |
| SOIL DESCRIPTION                           | DEPTH (FT)        | SYMBOL   | SOIL TYPE |
| 0 - 3.0 FT<br>SANDY LOAM<br>(MODERATE)     | 2ft               |   | 2         |
| 3.0 FT - 8.0 FT<br>SAND<br>(STRUCTURELESS) | 4ft<br>6ft<br>8ft |  | 1         |
|  |                   |  |           |

### SOIL DESCRIPTIONS



LOAMY SAND



SANDY LOAM



SAND



SANDY CLAY LOAM



ROCKY MOUNTAIN GROUP

*Southern Office*  
Colorado Springs, CO  
80918  
(719) 548-0600  
*Central Office:*  
Englewood, CO 80112  
(303) 688-9475  
*Northern Office:*  
Greeley / Evans, CO 80620  
(970) 330-1071

## TEST PIT LOGS

15435 EAST CHAPARRAL LOOP  
LOT 62, PEYTON RANCHES  
EL PASO COUNTY, COLORADO  
MICHAEL CARTMELL

JOB No. 186430

FIG No. 4

DATE 1-26-2022





- 8 - Blakeland loamy sand, 1 to 9 percent slopes
- 84 - Stapleton sandy loam, 8 to 15 percent slopes
- 95 - Truckton loamy sand, 1 to 9 percent slopes



NOT TO SCALE



Southern Office  
Colorado Springs, CO  
80918  
(719) 548-0600  
Central Office:  
Englewood, CO 80112  
(303) 688-9475  
Northern Office:  
Greeley / Evans, CO 80620  
(970) 330-1071

## USDA SOIL SURVEY MAP

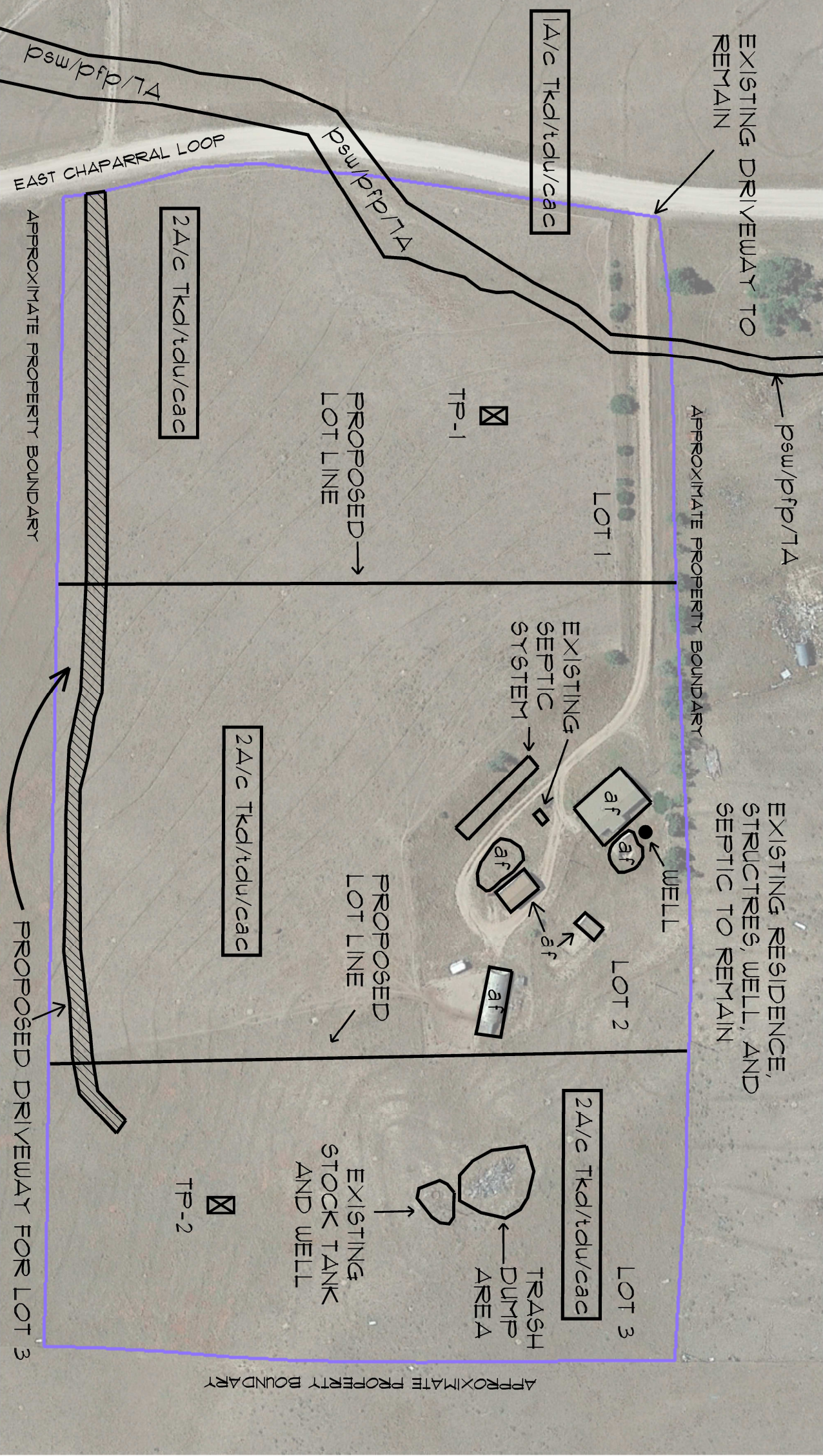
15435 EAST CHAPARRAL LOOP  
LOT 62, PEYTON RANCHES  
EL PASO COUNTY, COLORADO  
MICHAEL CARTMELL

JOB No. 186430

FIG No. 5

DATE 1-26-2022





Geologic

cac - Arkosic loamy colluvium and sheetwash alluvium  
tdu - Upper part of Dawson Arkose - arkosic sandstone, conglomerate, and shale  
psw - Potentially Seasonally Wet Area  
af - Artificial Fill Area

Engineering

1A - Stable alluvium, colluvium and bedrock on flat to gentle slopes (0-5%)  
2A - Stable alluvium, colluvium and bedrock on gentle to moderate slopes (5-12%)  
7A - Physiographic floodplain  
c Tkd - Colluvium, Dawson Formation (Upper Part)



DENOTES APPROXIMATE LOCATION OF TEST PITS



REFERENCE  
NOT TO SCALE

JOB No. 186430



ROCKY MOUNTAIN GROUP

**Southern Office**  
Colorado Springs, CO 80918  
(719) 548-0600  
**Central Office:**  
Englewood, CO 80112  
(303) 688-9475  
**Northern Office:**  
Greeley / Evans, CO 80620  
(970) 330-1071  
**Woodland Park Office:**  
(719) 687-6077  
**Monument Office:**  
(719) 488-2145  
**Pueblo / Canon City:**  
(719) 544-7750

15435 EAST CHAPARRAL LOOP  
LOT 62, PEYTON RANCHES

EL PASO COUNTY, COLORADO  
MICHAEL CARTMELL

| ENGINEER:   | TECH      |
|-------------|-----------|
| DRAWN BY:   | KCR       |
| CHECKED BY: | TEH       |
| ISSUED:     | 1-26-2022 |

ENGINEERING  
AND GEOLOGY  
MAP

SHEET No.  
**FIG-6**



# National Flood Hazard Layer FIRMette



104°27'30"W 39°3'34"N



0 250 500 1,000 1,500 2,000 Feet 1:6,000

Basemap: USGS National Map: Orthoimagery: Data refreshed October, 2020

## Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

|                             |   |
|-----------------------------|---|
| SPECIAL FLOOD HAZARD AREAS  | Without Base Flood Elevation (BFE)<br>Zone A, V, AE, AH, VE, AR   |
|                             | With BFE or Depth Zone AE, AO, AH, VE, AR   |
|                             | Regulatory Floodway   |
| OTHER AREAS OF FLOOD HAZARD | 0.2% Annual chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile Zone X |
|                             | Future Conditions 1% Annual Chance Flood Hazard Zone X  |
|                             | Area with Reduced Flood Risk due to Levee. See Notes, Zone X  |
|                             | Area with Flood Risk due to Levee Zone D  |
|                             | Area of Minimal Flood Hazard Zone X   |
| OTHER AREAS                 | Effective LOMRs   |
|                             | Area of Undetermined Flood Hazard Zone D  |
| GENERAL STRUCTURES          | Channel, culvert, or Storm Sewer  |
|                             | Levee, Dike, or Floodwall   |
| OTHER FEATURES              | Cross Sections with 1% Annual chance Water Surface Elevation  |
|                             | Coastal Transect  |
|                             | Base Flood Elevation Line (BFE)   |
|                             | Limit of Study  |
|                             | Jurisdiction Boundary   |
|                             | Coastal Transect Baseline   |
| MAP PANELS                  | Profile Baseline  |
|                             | Hydrographic Feature  |
|                             | Digital Data Available  |
| MAP PANELS                  | No Digital Data Available   |
|                             | Unmapped  |

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards.

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 12/7/2021 at 5:41 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.



NOT TO SCALE

## FEMA MAP

15435 EAST CHAPARRAL LOOP  
LOT 62, PEYTON RANCHES  
EL PASO COUNTY, COLORADO  
MICHAEL CARTMELL

JOB No. 186430

FIG No. 7

DATE 1-26-2022



Southern Office  
Colorado Springs, CO  
80918  
(719) 548-0600  
Central Office  
Englewood, CO 80112  
(303) 688-9475  
Northern Office  
Greeley / Evans, CO 80620  
(970) 330-1071



DENOTES APPROXIMATE  
LOCATION OF TEST PITS



NOT TO SCALE



ROCKY MOUNTAIN GROUP

Southern Office  
Colorado Springs, CO  
80918  
(719) 548-0600  
Central Office:  
Englewood, CO 80112  
(303) 688-9475  
Northern Office:  
Greeley / Evans, CO 80620  
(970) 330-1071

## TEST PIT LOCATION MAP

15435 EAST CHAPARRAL LOOP  
LOT 62, PEYTON RANCHES  
EL PASO COUNTY, COLORADO  
MICHAEL CARTMELL

JOB No. 186430

FIG No. 8

DATE 1-26-2022





DENOTES PRIMARY AND  
ALTERNATE SEPTIC  
LOCATIONS



NOT TO SCALE



ROCKY MOUNTAIN GROUP

Southern Office  
Colorado Springs, CO  
80918  
(719) 548-0600  
Central Office:  
Englewood, CO 80112  
(303) 688-9475  
Northern Office:  
Greeley / Evans, CO 80620  
(970) 330-1071

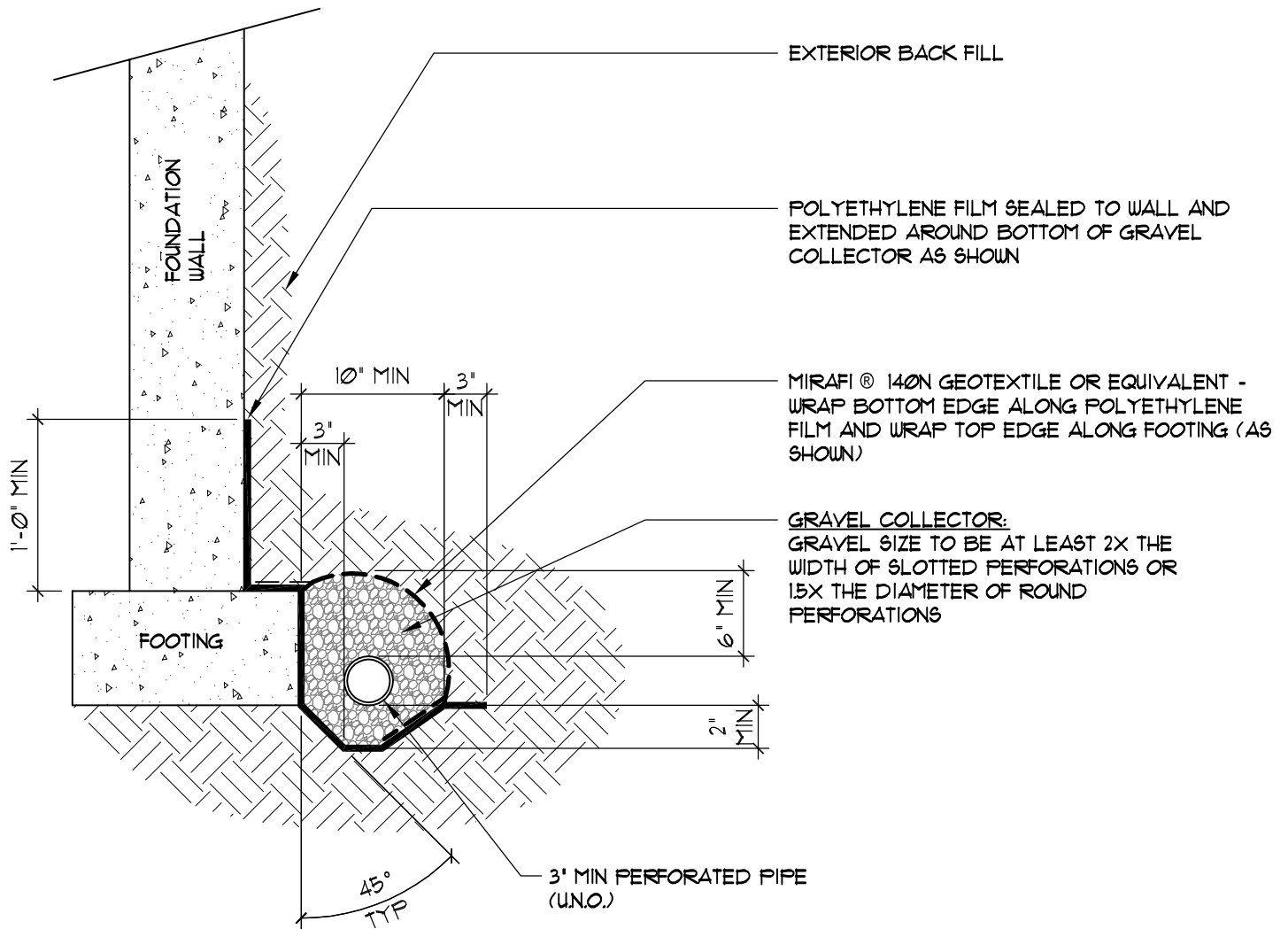
## SEPTIC SUITABILITY MAP

15435 EAST CHAPARRAL LOOP  
LOT 62, PEYTON RANCHES  
EL PASO COUNTY, COLORADO  
MICHAEL CARTMELL

JOB No. 186430

FIG No. 9

DATE 1-26-2022



**GENERAL NOTES:**

1. BOTTOM OF DRAIN PIPE SHALL BE AT OR BELOW BOTTOM OF FOOTING AT ALL LOCATIONS
2. ALL DRAIN PIPE SHALL BE PERFORATED PLASTIC, WITH THE EXCEPTION OF THE DISCHARGE PORTION WHICH SHALL BE SOLID, NON-PERFORATED PIPE.
3. DRAIN PIPE SHALL HAVE POSITIVE FALL THROUGHOUT.
4. DRAIN PIPE SHALL BE PROVIDED WITH A FREE GRAVITY OUTFALL, IF POSSIBLE. IF A GRAVITY OUTFALL CANNOT BE ACHIEVED, THEN A SUMP PIT AND PUMP SHALL BE USED.
5. ALL DRAIN COMPONENTS SHALL BE RATED/APPROVED BY THE MANUFACTURER FOR THE INSTALLED DEPTH AND APPLICATION
6. DRAIN SYSTEM, INCLUDING THE OUTFALL OF THE DRAIN, SHALL BE OBSERVED BY QUALIFIED PERSONNEL PRIOR TO BACKFILLING TO VERIFY INSTALLATION.



*Southern Office*  
Colorado Springs, CO  
80918  
(719) 548-0600  
*Central Office:*  
Englewood, CO 80112  
(303) 688-9475  
*Northern Office:*  
Greeley / Evans, CO 80620  
(970) 330-1071

**PERIMETER DRAIN**

**FIG No. 10**