

Architectural
Structural
Geotechnical



Materials Testing
Forensic
Civil/Planning

SOIL AND GEOLOGY STUDY

**Graupner Subdivison
Tanner Road
El Paso County, Colorado**

PREPARED FOR:

**Garrett Graupner
14710 Tanner Trail
Elbert, CO 80106**

JOB NO. 192447

May 2, 2023

Respectfully Submitted,

RMG – Rocky Mountain Group

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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	5
3.3 Previous Studies and Filed Investigation	6
3.4 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	6
5.0 FIELD INVESTIGATION AND LABORATORY TESTING	6
5.1 Laboratory Testing	7
5.2 Groundwater.....	7
6.0 SOIL, GEOLOGY, AND ENGINEERING GEOLOGY	7
6.1 Subsurface Soil Conditions	7
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 Surface Water and Groundwater	9
6.10 Surface Drainage	9
7.0 ECONOMIC MINERAL RESOURCES.....	10
8.0 IDENTIFICATION AND MITIGATION OF POTENTIAL GEOLOGIC CONDITIONS	10
8.1 Expansive Soils and Bedrock	11
8.2 Seasonal Surface and Subsurface Water	11
8.3 Faults and Seismicity.....	12
8.4 Radon.....	12
8.5 Proposed Grading, Erosion Control, Cuts and Masses of Fill.....	13
9.0 ON-SITE WASTEWATER TREATMENT SYSTEMS.....	13
10.0 BEARING OF GEOLOGIC CONDITIONS UPON PROPOSED DEVELOPMENT WIHTOUT CONTROL	14
11.0 ADDITIONAL STUDIES.....	15
12.0 CONCLUSIONS	15
13.0 CLOSING.....	16
 FIGURES	
Site Vicinity Map	1
Lot Layout Plan	2
Test Boring and Test Pit Location Plan	3
Explanation of Test Boring Logs	4
Test Boring and Test Pit Logs	5-6
Summary of Laboratory Test Results	7
Soil Classification Data	8

USDA Soil Survey Map9
Engineering and Geology Map10
Perimeter Drain Detail11

Appendix A – Additional Reference Documents

Appendix B – Sewage Disposal Inspection Form, El Paso County Department of Health and Environment

Appendix C – Wastewater Study

1.0 GENERAL SITE AND PROJECT DESCRIPTION

1.1 Project Location

The project lies in the south ½ of Section 32, Township 11 South, Range 64 west of the 6th Principle Meridian in El Paso County, Colorado, and is generally located southwest of the intersection of Eastonville Road and Bucknell Circle W. The approximate location of the site is shown on the Site Vicinity Map, Figure 1.

1.2 Existing Land Use

The site consists of one parcel. It is approximately 41.06 acres and is partially developed. The parcel included is:

- Schedule No. 4132000010 – currently addressed as 14710 Tanner Trail, is zoned "RR-5" – *Residential Rural*.

1.3 Project Description

The site consists of approximately 41.06 acres and is partially developed. The site is to be subdivided into 4 lots, three of which are to range between 5.00 to 5.027 acres. The fourth lot is to comprise the remaining acreage of approximately 25.989 acres. The existing single-family residence, sheds, miscellaneous structures, well and septic are to remain on the larger lot. The Proposed Lot Layout is presented in Figure 2.

Each lot is to be serviced by an on-site wastewater treatment system (OWTS) and an individual water supply well. It is our understanding site grading activities are to be limited to the extent necessary to facilitate construction of individual homes, drainage, and utilities. The site is to be accessed from the existing gravel driveway that extends south and east from Tanner Trail. The existing driveway is not proposed to be converted to a public County road.

2.0 QUALIFICATIONS OF PREPARERS

This Soil and Geology 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 onsite wastewater treatment system (OWTS) feasibility and present our opinions of the potential effect of these conditions on the proposed residential 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 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
- Subsurface exploration
- Laboratory testing of representative site soil and rock samples

- Geologic research and analysis

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 Previous Studies and Field Investigation

Reports of previous geotechnical engineering/geologic investigations for this site or nearby sites were not available for our review.

3.4 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 single family residence and four shed/miscellaneous structures are located near the southeast portion of the property. A dry drainageway traverses the site near the northern property boundary. The drainageway continues south, north of the existing residence, then exits the site near the southeast corner of the property.

4.2 Topography

Based on our site reconnaissance on March 10, 2023 and USGS 2013 topographic map of the Eastonville Quadrangle, the site generally slopes down from west to east with an elevation difference of approximately 58 to 60 feet across the entire site.

4.3 Vegetation

Site vegetation primarily consists of native grasses and other alpine-type vegetation. Coniferous trees are spread sparsely across the site but are denser around the existing residence.

4.4 Aerial photographs and remote-sensing imagery

Personnel of RMG reviewed aerial photos available through Google Earth Pro dating back to 1985, CGS surficial geologic mapping, and historical photos by historicaerials.com dating back to 1947. Historically, the site has remained vacant land prior to 1983. The existing residence was reportedly construction in 1983, along with the miscellaneous structures. Since 1983, the site has undergone little change.

5.0 FIELD INVESTIGATION AND LABORATORY TESTING

The subsurface conditions within the property were explored by drilling two (2) exploratory test borings to depths of 20-feet below the existing ground surface on March 2, 2023 and two 6 to 8-foot deep test pits on March 10, 2023. The test pits were excavated for on-site wastewater treatment system (OWTS)

purposes. The total number of borings generally meets the minimum criteria as stipulated in the ECM, Section C.3.3.

The test borings were drilled with a power-driven, continuous-flight auger drill rig. Samples were obtained during drilling of the test borings in general accordance with ASTM D-1586 and D-3550, utilizing a 2-inch O.D. Split Barrel Sampler. The test pits were excavated with a Case mini-excavator. Results of penetration tests are shown on the drilling logs. The test boring locations are presented in the Test Boring and Test Pit Location Map, Figure 3. An Explanation of Test Boring Logs is presented in Figure 4, the Test Boring and Test Pit Logs are presented in Figures 5 and 6.

5.1 Laboratory Testing

Soil laboratory testing was performed as part of this investigation. Laboratory testing included moisture content, grain-size analysis and Atterberg Limits. A Summary of Laboratory Test Results is presented in Figure 7. Soil Classification Data is presented in Figure 8.

5.2 Groundwater

Groundwater was not encountered in the test borings or test pits during the field exploration for this investigation. Indications of groundwater (redox) was not observed in the test pits.

Fluctuations in groundwater and subsurface moisture conditions may occur due to variations in precipitation, landscape irrigation, and modifications in land use in the area. Development of adjacent properties may also affect groundwater levels.

6.0 SOIL, GEOLOGY, AND ENGINEERING GEOLOGY

The site is located within the western portion of the Great Plains Physiographic Province. A major structural feature known as the Rampart Range Fault is located more than 15 miles west of the site. Rampart Range Fault marks the boundary between the Great Plains Physiographic Province and the Southern Rocky Mountain Province. The site exists within the southern edge of a large structural feature known as the Denver Basin. In general, the geology at the site consists of alluvium overlying the bedrock of the Upper part of the Dawson Formation. The alluvium generally consists of gravelly loamy sands to extremely gravelly loamy sands. 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 materials encountered in the test borings were classified within the laboratory using the Unified Soil Classification System (USCS). The materials classify primarily as silty to clayey sandstone (SC-SM) bedrock. Alluvial material was not encountered above the sandstone in the test borings, but was encountered in the test pits.

Additional descriptions and the interpreted distribution (approximate depths) of the subsurface materials are presented on the Test Boring Logs. The classifications shown on the log are based upon visual description 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 was encountered in both test borings performed for this study. In general, the bedrock (as mapped by Colorado Geologic Survey - CGS) is considered part of the Dawson formation and consists of silty to clayey sandstone with interbedded layers of claystone. The claystone was not observed in the samples obtained from the test borings but is anticipated to be thinly interbedded within the sandstone. The Dawson formation is thick-bedded to massive, generally light colored arkose, pebbly, and pebble conglomerate. The sandstone is generally poorly sorted with various amounts of clay content. The sandstone is generally permeable, well drained, and has good foundation characteristics. The claystone is generally well sorted with high sand content. The claystone (if encountered) is less permeable than the sandstone and is generally not suitable for direct bearing of shallow foundations. Bedrock is anticipated in the excavations and utility trenches for the proposed development.

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:

- 71 – Pring coarse sandy loam, 3 to 8 percent slopes. The Pring coarse sandy loam encompasses the majority of the property. Properties of the Pring coarse sandy loam include, well-drained soil, depth of the water table is anticipated to be more than 80 inches, runoff is anticipated to be low, frequency of flooding is none and ponding is none. Landforms include hills. The hydrologic soil group of the unit is B.
- 19 – Columbine gravelly sand loam, 0 to 3 percent slopes. The Columbine encompasses a small section near the northeast corner of the property, on the larger lot, where new construction is currently not proposed. For this reason, the Columbine gravelly sand loam is not described in detail.

The USDA Soil Survey Map is presented in Figure 9.

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 identified geologic conditions affecting the development are presented in the Engineering and Geology Map, Figure 10.

The site generally consists of alluvial material overlying sandstone bedrock. The geologic units mapped at the site are:

- *TKda5 – Dawson formation, facies unit five* – white to light tan, thin to medium bedded, fine to medium-grained feldspathic sandstone or pebbly conglomerate. The Dawson is known to contain occasional interbedded sandy claystone. Estimated thickness is around 500 feet. The Dawson sandstone was encountered in the test boring near the surface and extended to the 20-foot termination depth of the boring. The sandstone bedrock is anticipated to be encountered at various depths across the site.
- *Qa3 – Alluvium three* (upper Pleistocene) – tan to reddish brown to grayish brown, poorly sorted, moderately consolidated, silt, sand, gravel, and cobbly gravel and occasional boulders in stream terrace deposits above the modern floodplain. The unit forms terraces that reach a maximum height of 30 feet above current stream level.

- *Qa₄* – *Alluvium four* (late middle Pleistocene) – dark grayish-brown to yellow-reddish-brown, poorly sorted, moderately consolidated, silt, sand, gravel and cobbly gravel and occasional boulders in stream terrace deposits above modern floodplain or as non-terrace forming alluvium in valley headwaters that underlies the younger alluviums. Terrace heights reach as much as 40 feet above current stream level. Maximum exposed thickness of unit locally exceeds 60 feet.
- *psw* – *potential seasonally wet* - areas that may collect surface water during high moisture events.
- *da* – *disturbed areas* – areas no longer in their native state due to residential construction.

6.5 Engineering Geology

Charles Robinson and Associates (1977) have mapped one environmental engineering unit across the entire site as:

- *IA* – Stable alluvium, colluvium and bedrock on flat to gentle slopes (0-5%).

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 Surface Water and Groundwater

The overall topography of the site slopes down from the west to the east. It is anticipated the direction of surface water and groundwater is to flow in the same direction. Groundwater was not encountered in the test boring performed for this study.

6.10 Floodplain

Based on our review of the Federal Emergency Management Agency (FEMA) Community Panel No. 08041C0340G and the online ArcGIS El Paso County Risk Map, the entire site lies outside the 100- and 500-year floodplains of both Black Squirrel Creek and Sand Creek. The site currently lies in the 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.

A natural drainage features was observed at this site. It's anticipated that the area serves as a conduit for surface runoff water during periods of rain and snowmelt. As such, this area is mapped on Figure 10 as potentially seasonally wet.

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 2* indicates the site is identified as Upland Deposits. The overburden upland deposits consist of sand and gravel with silt and clay deposited by older stream deposits on topographic highs or beach like features. Extraction of the sand and gravel more than likely would not be considered to be economical compared to materials available elsewhere within the county.

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 "Somewhat Poor" for coal resources, no active or inactive mines have been mapped in the area of the site. No metallic mineral resources have been mapped on the site. No oil and gas wells are drilled on this tract, or within two miles of it. There are no historic coal mines in the vicinity. 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.

The alluvium on this tract may contain sand or gravel. Due to the high clay content in the sandstone of the upper Dawson Formation and the interbedded claystone, the sand and gravel are often unusable.

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 and are not anticipated to pose a significant risk to the proposed development:

- Avalanches
- Compressible Soils
- Debris Flow-Fans/Mudslides
- Downhill/Downslope Creep
- 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
- Undocumented Fill or History of Landfill

The following sections present geologic constraints that have been identified on the property:

8.1 Expansive Soils and Bedrock

Based on our experience with the soils and bedrock in the vicinity, sandy clay and claystone (if encountered) generally possess low to high swell potential. It is anticipated if expansive clay soils or claystone bedrock are encountered at the time of the site-specific subsurface soil investigation and/or excavation observation, additional mitigations will be required. These materials are readily mitigated with typical construction practices common to this region of El Paso County, Colorado.

Mitigation

Sporadic areas of expansive soils and bedrock are anticipated. If expansive soils or bedrock are encountered beneath the foundations, mitigation will be required. “Mass” subexcavation during land development is currently not proposed. Lot-specific overexcavation and replacement with non-expansive soils is a suitable mitigation. Floor slabs bearing directly on expansive material should be expected to experience movement. Overexcavation and replacement has also been successful in reducing slab movement. Overexcavation is not anticipated for the majority of the lots. However, if clay or claystone seams are encountered, overexcavation depths of 3 to 4 feet are anticipated.

The final determination of mitigation alternatives and foundation design criteria is to be made in site-specific subsurface soil investigations for each lot. Provided that appropriate mitigations and/or foundation design adjustments are implemented, the presence of expansive soils or bedrock is not considered to pose a risk to the proposed structures.

8.2 Seasonal Surface and Subsurface Water

Based on our site observations and review of the Black Forest Quadrangle and Google Earth images dating back to September 1999, springs do not appear to originate on the subject site. Groundwater was not encountered at the time of drilling for this investigation. Shallow groundwater is not anticipated to impact the proposed development. However, the site conditions indicate the potential for concentrated flows of surface runoff water in the drainageway in times of heavy rainfall or snowmelt. The proposed development should consider the potential impacts of surface runoff water (particularly within the drainageway) when selecting locations for the proposed structures and wastewater treatment areas.

Due to the potential for seasonal fluctuations in groundwater, 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. Groundwater information obtained for the current investigation performed prior to the land development phase may or may not be representative of the conditions present at the time of construction. Furthermore, the development processes (reshaping of the ground surface, installation of buried utilities, installation of an underdrain below the roadways, etc.) can significantly alter the depth and flow paths of the subsurface water. The construction of surrounding lots can also alter the amount and depth of subsurface groundwater below a given lot. The potential exists

for elevated groundwater levels during high moisture periods and if structures encroach on these areas, the following mitigations should be followed.

Mitigation:

Foundations must have a minimum 30-inch depth for frost protection. Perimeter drains are recommended around portions of the structures which will have habitable or storage space located below the finished ground surface. This includes crawlspace areas but not the walkout trench, if applicable. Perimeter drains are recommended for portions of the structures which will have below-grade spaces to help reduce the intrusion of water into areas below grade. A typical perimeter drain detail is presented in Figure 11.

If groundwater is encountered at the time of the site-specific subsurface soil investigations within 4 to 6 feet of the proposed basement slab elevation, an underslab drain would be considered in conjunction with the perimeter drain. It must be understood that subsurface drains are designed to intercept some types of subsurface moisture and not others. Therefore, the drain(s) could operate properly and not mitigate all moisture problems relating to foundation performance or moisture intrusion into the basement areas.

8.3 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 0.185g for a short period (S_s) and 0.059g 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 B, with average shear wave velocities ranging from 2,500 to 5,000 feet per second for the materials in the upper 100 feet.

8.4 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 80106 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. 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.

8.5 Proposed Grading, Erosion Control, Cuts and Masses of Fill

A preliminary grading plan was not available for this site. It is our understanding that site grading is to be limited to the building and OWTS locations and will alter the existing topography only to the extent necessary to accommodate the proposed development. Based on the test boring for this investigation, excavations are anticipated to encounter clayey sandstone with the potential for thinly interbedded sandy claystone seams.

Mitigation

The on-site soils can be used as site grading fill, though the claystone should be avoided in areas where the proposed foundations are not anticipated to penetrate through the grading fill.

The on-site soils are mildly susceptible to wind and water erosion. Minor wind erosion and dust may be an issue for a short time during and immediately after construction. Should the problem be considered severe during construction, watering of the cut areas may be required. Once construction is complete, vegetation should be re-established.

Prior to placement of overlot fill or removal and recompaction of the existing materials, topsoil, low-density native soil, all uncontrolled or undocumented fill, and organic matter should be removed from the proposed fill area. The subgrade should be scarified, moisture conditioned to facilitate compaction (usually within 2% of the optimum moisture content), and recompacted to the same degree as the overlying fill to be placed. The placement and compaction of fill should be periodically observed and tested by a representative of RMG during construction.

9.0 ON-SITE WASTEWATER TREATMENT SYSTEMS

It is our understanding that On-site Wastewater Treatment Systems (OWTS) are proposed for the site. The site was evaluated in general accordance with the El Paso Land Development Code, specifically sections 8.4.8. Two test pits to depths of 6 to 8 feet were performed across the site to obtain a general understanding of the soil and bedrock conditions. The Test Pit Logs are presented in Figure 6.

The United States Department of Agriculture (USDA) soil types, as discussed in section 6.3, consisted of sand, sandy clay loam, and sandy clay. Limiting layers were encountered in one of the test pits at a depth of 6 feet. The estimated long term acceptance rates (LTAR) associated with the soils observed in the test pits range from 0.2 to 1.0 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 (EPCDHE);
- 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 EPCDHE;
- 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 10, (e.g. existing ponds, existing septic fields that may remain).

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

Soil and groundwater conditions at the site are suitable for individual treatment systems. It should be noted, if LTAR values of less than 0.35 (or soil types 3A to 5) or greater than 0.80 (soil type 0) are encountered at the time of the site specific OWTS evaluation an, "engineered system" will be required.

Additionally, based on the depth of the limiting layer encountered at approximately 6 to 7 feet below the existing ground surface, the maximum depth of the OWTS components may be limited to 2 feet below the existing ground surface or mounded systems may be required. The Wastewater Study is included in Appendix C.

10.0 BEARING OF GEOLOGIC CONDITIONS UPON PROPOSED DEVELOPMENT WITHOUT CONTROL

Geologic hazards (as described in Section 8 of this report) found to be present at this site include seismicity and radon. The most significant geologic constraints to development recognized at this site are expansive soils and the potential for seasonal groundwater. The geologic conditions encountered at this site are relatively common to the immediate area and mitigation can be accomplished by implementing common engineering and construction practices. None of these conditions are anticipated to preclude the proposed development.

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 borings, laboratory test results, conclusions and recommendations presented in this report are not intended for use for design and construction of individual OWTS or foundations. ***A site-specific subsurface soil investigation will be required for all proposed structures including (but not limited to) residences and retaining walls (if needed).***

To develop recommendations for construction of the proposed roadways, a pavement design investigation should be performed. This investigation should consist of additional test borings, soil laboratory testing and specific recommendations for the design and construction of roadway pavement sections.

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. Surface water should be efficiently removed from the building area to prevent ponding and infiltration into the subsurface soil.

The foundation and floor slabs of the structures should be designed using the recommendations provided in the site-specific Subsurface Soil Investigation performed for each lot. In addition, appropriate surface drainage should be established during construction and maintained by the homeowner.

The recommendations in this and the referenced report are intended to address normal surface drainage conditions, assuming the presence of groundcover (established vegetation, paved surfaces, and/or structures) throughout the regions upslope from this structure. However, groundcover may not be present due to a variety of factors (ongoing construction/development, wildfires, etc.). During periods when groundcover is not present in the "upslope" regions, higher than normal surface drainage conditions may occur, resulting in perched water tables, excess runoff, flash floods, etc. In these cases, the surface drainage recommendations presented herein (even if properly maintained) may not mitigate all groundwater problems or moisture intrusion into the structure.

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.

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 **Garrett Graupner** 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.

FIGURES



NOT TO SCALE
 BASE MAP PROVIDED BY MAPQUEST



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

GRAUPNER SUBDIVISION
 TANNER TRAIL
 EL PASO COUNTY, CO
 GARRETT GRAUPNER

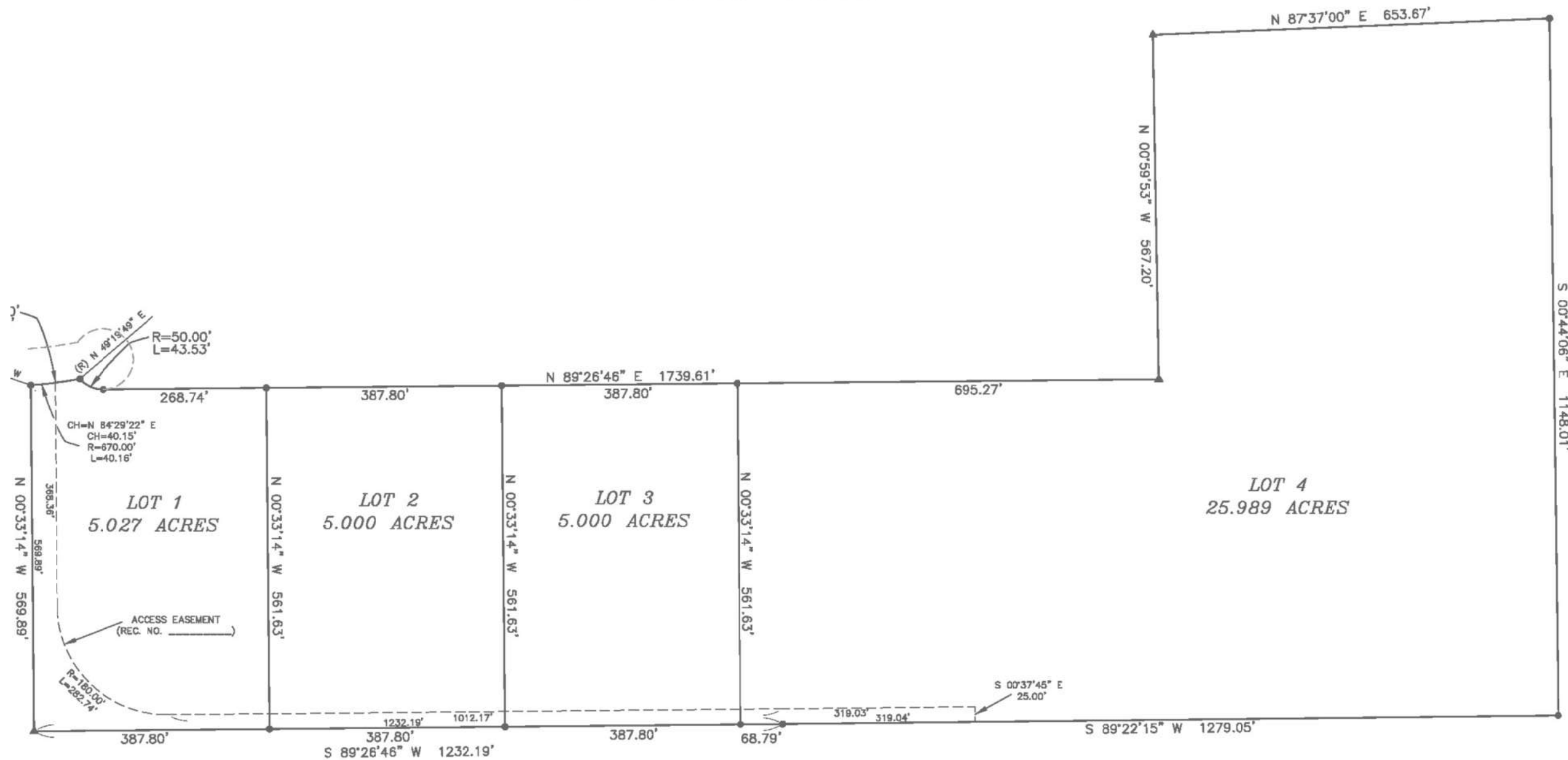
JOB No. 192447

FIG No. 1

DATE 5-2-2023

GRAUPNER SUBDIVISION

A SUBDIVISION OF A PART OF THE SOUTH 1/2 OF SECTION 32
 TOWNSHIP 11 SOUTH, RANGE 64 WEST OF THE 6TH P.M.,
 COUNTY OF EL PASO, STATE OF COLORADO.
 AREA = 41.016 ACRES, MORE OR LESS



AS REPLATTED

LEGEND

- SET NO. 5 REBAR WITH SURVEYORS
CAP STAMPED "37634"
- ▲ RECOVERED AS NOTED
- BOUNDARY LINE
- - - EASEMENT LINE
- (M) MEASURED DIMENSION



NOT TO SCALE
 BASE MAP PROVIDED BY EAGLE LAND SURVEYING

JOB No. 192447



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 (970) 330-1071
Woodland Park Office:
 (719) 687-6077
Monument Office:
 (719) 488-2145
Pueblo / Canon City:
 (719) 544-7750

GRAUPNER SUBDIVISION
 TANNER TRAIL
 EL PASO COUNTY, CO
 GARRETT GRAUPNER

ENGINEER:	TM
DRAWN BY:	KZ
CHECKED BY:	TM
ISSUED:	5-02-2023
REVISION:	DATE:
	JOB #:

PROPOSED
 DEVELOPMENT
 PLAN

SHEET No.
FIG-2



ROCKY MOUNTAIN GROUP

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 (970) 330-1071
Woodland Park Office:
 (719) 687-6077
Monument Office:
 (719) 488-2145
Pueblo / Canon City:
 (719) 544-7750



GRAUPNER SUBDIVISION
 TANNER TRAIL
 EL PASO COUNTY, CO
 GARRETT GRAUPNER

ENGINEER:	TM
DRAWN BY:	KZ
CHECKED BY:	TM
ISSUED:	5-02-2023
REVISION:	DATE:
	JOB #:

TEST BORING AND
 TEST PIT
 LOCATION PLAN

SHEET No.
FIG-3

⊙ DENOTES APPROXIMATE LOCATION OF
 TEST BORINGS PERFORMED FOR
 THIS INVESTIGATION

⊠ DENOTES APPROXIMATE LOCATION OF
 TEST PITS PERFORMED INCONJUNCTION
 WITH THIS INVESTIGATION



NOT TO SCALE
 BASE MAP PROVIDED BY EAGLE LAND SURVEYING

SOILS DESCRIPTION



SANDSTONE

UNLESS NOTED OTHERWISE, ALL LABORATORY TESTS PRESENTED HEREIN WERE PERFORMED BY:
RMG - ROCKY MOUNTAIN GROUP
2910 AUSTIN BLUFFS PARKWAY
COLORADO SPRINGS, COLORADO

SYMBOLS AND NOTES



XX

STANDARD PENETRATION TEST - MADE BY DRIVING A SPLIT-BARREL SAMPLER INTO THE SOIL BY DROPPING A 140 LB. HAMMER 30", IN GENERAL ACCORDANCE WITH ASTM D-1586. NUMBER INDICATES NUMBER OF HAMMER BLOWS PER FOOT (UNLESS OTHERWISE INDICATED).



XX

UNDISTURBED CALIFORNIA SAMPLE - MADE BY DRIVING A RING-LINED SAMPLER INTO THE SOIL BY DROPPING A 140 LB. HAMMER 30", IN GENERAL ACCORDANCE WITH ASTM D-3550. NUMBER INDICATES NUMBER OF HAMMER BLOWS PER FOOT (UNLESS OTHERWISE INDICATED).



FREE WATER TABLE



DEPTH AT WHICH BORING CAVED



BULK DISTURBED BULK SAMPLE



AUG AUGER "CUTTINGS"

4.5

WATER CONTENT (%)

ROCKY MOUNTAIN GROUP

Architectural
Structural
Forensics



Engineers / Architects

Colorado Springs: (Corporate Office)
2910 Austin Bluffs Parkway
Colorado Springs, CO 80918
(719) 548-0600

SOUTHERN COLORADO, DENVER METRO, NORTHERN COLORADO

Geotechnical
Materials Testing
Civil, Planning

EXPLANATION OF TEST BORING LOGS

JOB No. 192447

FIGURE No. 4

DATE May/02/2023

TEST BORING: 1 DATE DRILLED: 3/2/23 NO GROUNDWATER ON 3/2/23	DEPTH (FT)	SYMBOL	SAMPLES	BLOWS PER FT.	WATER CONTENT %	TEST BORING: 2 DATE DRILLED: 3/2/23 NO GROUNDWATER ON 3/2/23	DEPTH (FT)	SYMBOL	SAMPLES	BLOWS PER FT.	WATER CONTENT %
SANDSTONE, SILTY TO CLAYEY, olive brown and tan to gray, hard to very hard, moist	5	[Symbol]	[Samples]	50/10"	19.8	SANDSTONE, SILTY TO CLAYEY, olive brown and tan to gray, hard to very hard, moist	5	[Symbol]	[Samples]	25	9.1
	10	[Symbol]	[Samples]	50/7"	13.5		10	[Symbol]	[Samples]	50/6"	12.0
	15	[Symbol]	[Samples]	50/6"	9.3		15	[Symbol]	[Samples]	50/10"	17.9
	20	[Symbol]	[Samples]	50/8"	11.0		20	[Symbol]	[Samples]	50/4"	8.8
		[Symbol]	[Samples]					[Symbol]	[Samples]		

ROCKY MOUNTAIN GROUP

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Structural
Forensics



Engineers / Architects

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Colorado Springs, CO 80918
(719) 548-0600

SOUTHERN COLORADO, DENVER METRO, NORTHERN COLORADO

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Materials Testing
Civil, Planning

TEST BORING LOG

JOB No. 192447

FIGURE No. 5

DATE May/02/2023

TEST PIT TP-1			
DATE OBSERVED: 3/10/23			
SOIL DESCRIPTION	DEPTH (FT)	SYMBOL	SOIL TYPE
0 - 1.5 FT SAND (SINGLE GRAIN, STRUCTURELESS 35% > 2MM)	2ft		1 / R-0
1.5 - 4.0 FT SANDY CLAY, LOAM (GRANULAR, STRONG 45% > 2MM)			3 / R-1
4.0 - 8.0 FT SAND (SINGLE GRAIN, STRUCTURELESS 46% > 2MM)	6ft		1 / R-0
NO GROUNDWATER NO LIMITING LAYER	8ft		

TEST PIT TP-2			
DATE OBSERVED: 3/10/23			
SOIL DESCRIPTION	DEPTH (FT)	SYMBOL	SOIL TYPE
0 - 3.5 FT SAND (SINGLE GRAIN, STRUCTURELESS 35% > 2MM)	2ft		1 / R-0
3.5 - 4.5 FT SANDY, CLAY (GRANULAR, BLOCKY, MODERATE)			4
4.5 - 6.0 FT SANDY, CLAY, LOAM (GRANULAR, STRONG, 45% > 2MM)	6ft		3 / R-1
NO GROUNDWATER LIMITING LAYER @ 6 FEET BEDROCK	8ft		

SOIL DESCRIPTIONS



SAND



SANDY CLAY LOAM



SANDY CLAY

Architecture
Structural
Geotechnical



Materials Testing
Forensics
Civil / Planning

Engineers / Architects

SOUTHERN COLORADO OFFICE
2910 AUSTIN BLUFFS PKWY, SUITE 100,
COLORADO SPRINGS, CO 80918

(719) 548-0600 ~ WWW.RMGENGINEERS.COM
SOUTHERN COLORADO, DENVER METRO, NORTHERN COLORADO

TEST PIT LOGS

GRAUPNER SUBDIVISION
TANNER TRAIL
EL PASO COUNTY, COLORADO
GARRETT GRAUPNER

JOB No. 192447

FIG No. 6

DATE 5-2-2023

Test Boring No.	Depth	Water Content (%)	Dry Density (pcf)	Liquid Limit	Plasticity Index	% Retained No.4 Sieve	% Passing No. 200 Sieve	Load at Saturation (psf)	% Swell/ Collapse	USCS Classification
1	4.0	19.8		51	30	0.5	48.8			SC
1	9.0	13.5								
1	14.0	9.3								
1	19.0	11.0								
2	2.0	9.1		38	22	0.0	47.3			SC
2	7.0	12.0				0.6	25.3			
2	14.0	17.9								
2	19.0	8.8								

ROCKY MOUNTAIN GROUP

Architectural
Structural
Forensics



Engineers / Architects

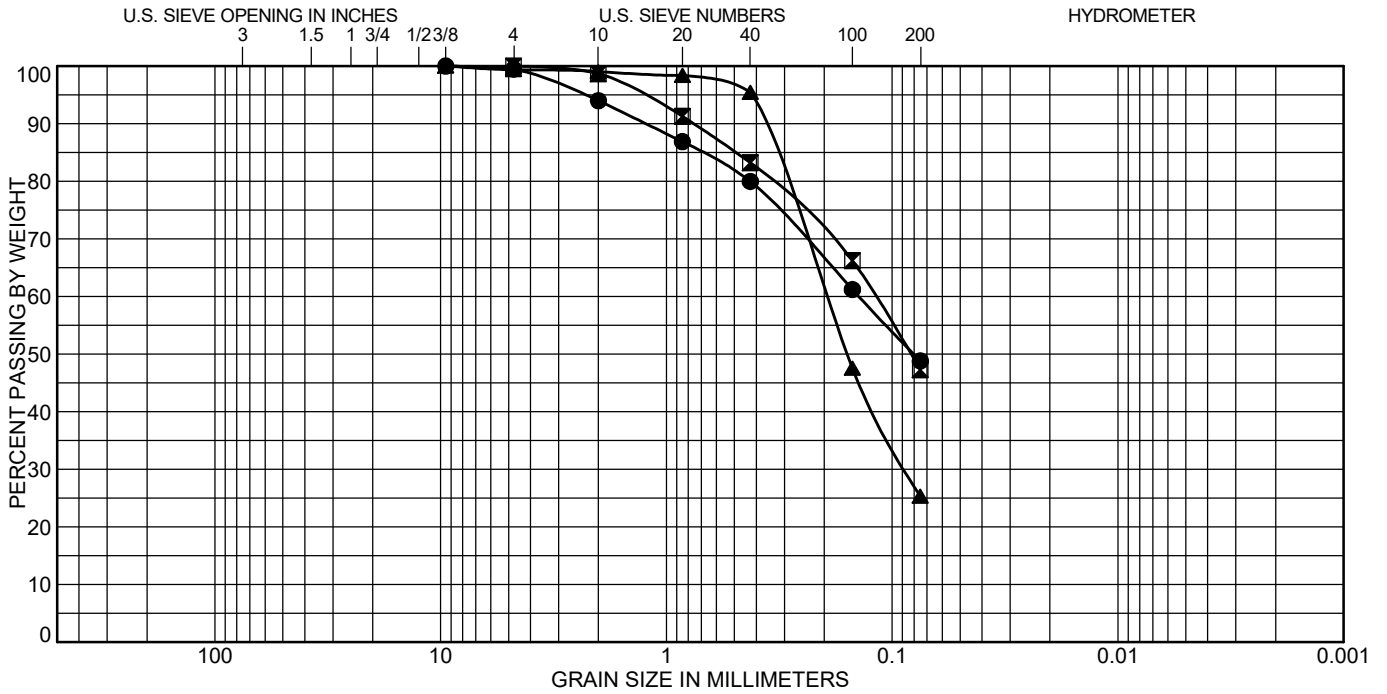
Colorado Springs: (Corporate Office)
2910 Austin Bluffs Parkway
Colorado Spings, CO 80918
(719) 548-0600

SOUTHERN COLORADO, DENVER METRO, NORTHERN COLORADO

Geotechnical
Materials Testing
Civil, Planning

SUMMARY OF LABORATORY TEST RESULTS

JOB No. 192447
 FIGURE No. 7
 PAGE 1 OF 1
 DATE May/02/2023



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Test Boring	Depth (ft)	Classification	LL	PL	PI
● 1	4.0	CLAYEY SAND(SC)	51	21	30
☒ 2	2.0	CLAYEY SAND(SC)	38	16	22
▲ 2	7.0				

Test Boring	Depth (ft)	%Gravel	%Sand	%Silt	%Clay
● 1	4.0	0.5	50.6	48.8	
☒ 2	2.0	0.0	52.7	47.3	
▲ 2	7.0	0.6	74.0	25.3	

ROCKY MOUNTAIN GROUP

RMG
Engineers / Architects

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Colorado Springs, CO 80918
(719) 548-0600
SOUTHERN COLORADO, DENVER METRO, NORTHERN COLORADO

Architectural
Structural
Forensics

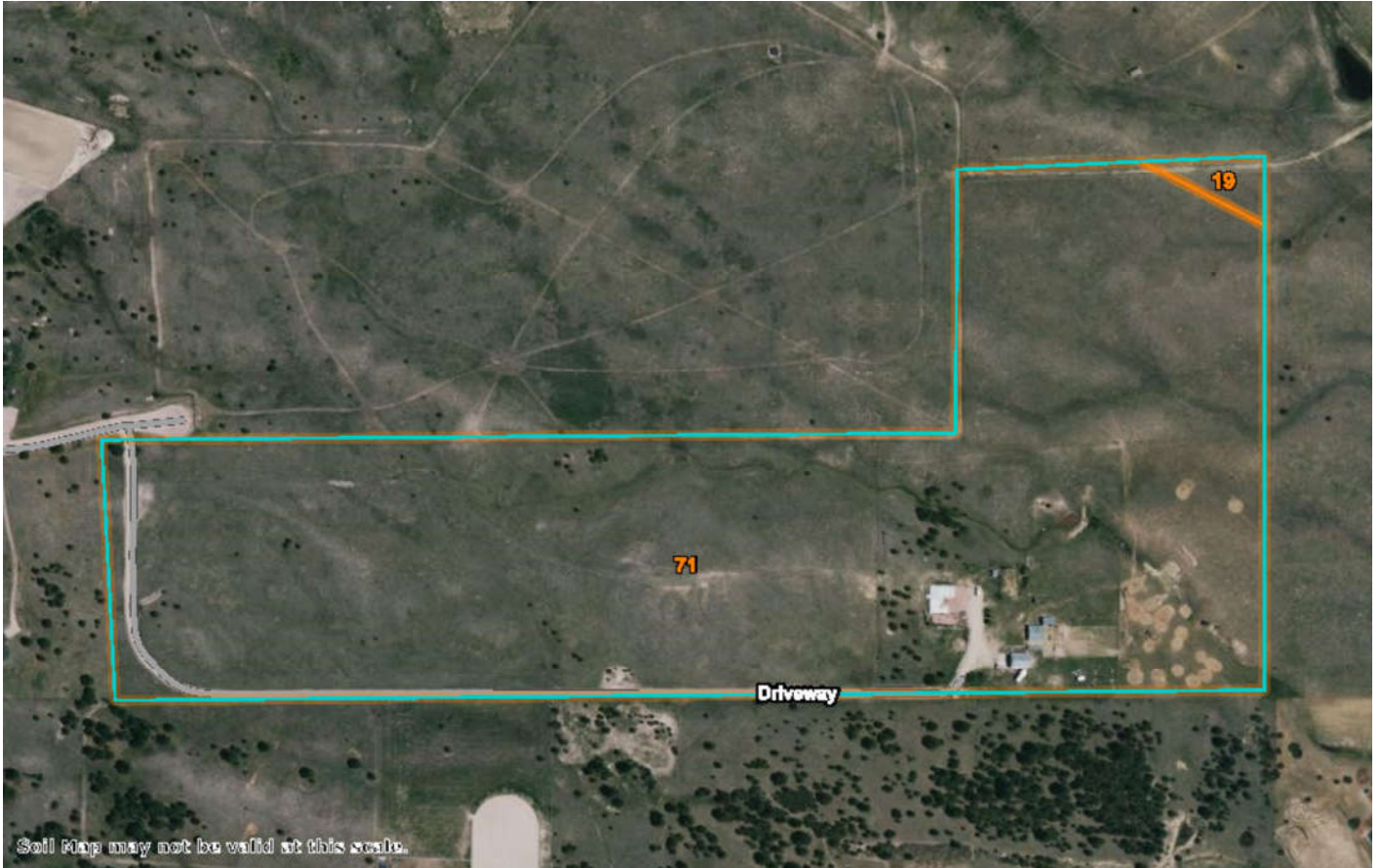
Geotechnical
Materials Testing
Civil, Planning

SOIL CLASSIFICATION DATA

JOB No. 192447

FIGURE No. 8

DATE May/02/2023



71 - PRING COURSE SANDY LOAM, 3 TO 8 PERCENT SLOPES
 19 - COLUMBINE GRAVELLY SAND LOAM, 0 TO 3 PERCENT SLOPES



NOT TO SCALE
 BASE MAP PROVIDED BY USDA



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**USDA SOIL
 SURVEY MAP**
 GRAUPNER SUBDIVISION
 TANNER TRAIL
 EL PASO COUNTY, CO
 GARRETT GRAUPNER

JOB No. 192447
 FIG No. 9
 DATE 5-2-2023

APPENDIX A

Additional Reference Documents

1. *Site Survey – Graupner Subdivision* – prepared by Eagle Land Surveying, Inc., dated December 26, 2022, Job Number 22140-02.
2. *Flood Insurance Rate Map, El Paso County, Colorado and Unincorporated Areas, Community Panel No. 081041C0512G*, Federal Emergency Management Agency (FEMA), effective December 7, 2018. *FEMA Flood Map Service Center*: <https://msc.fema.gov/portal/home>.
3. *Environmental and Engineering Geologic Map for Land Use*, compiled by Dale M. Cochran, Charles S. Robinson & Associates, Inc., Golden, Colorado, 1977.
4. *Map of Potential Geologic Hazards and Surficial Deposits*, compiled by Dale M. Cochran, Charles S. Robinson & Associates, Inc., Golden, Colorado, 1977.
5. *El Paso County, Master Plan for Mineral Extraction*, dated February 8, 1996.
6. *Evaluation of Mineral and Mineral Fuel Potential of El Paso County State Mineral Lands Administered by the Colorado State Land Board*, prepared by Colorado Geological Survey, dated February 19, 2003, Open-file Report OF-03-07.
7. *USDA – Natural Resources Conservation Service, Web Soil Survey* <https://websoilsurvey.sc.egov.usda.gov/App/WebSoilSurvey.aspx>
8. *Colorado Geological Survey, USGS Geologic Map Viewer*: <http://coloradogeologicalsurvey.org/geologic-mapping/6347-2/>.
9. *Pikes Peak Regional Building Department*: <https://www.pprbd.org/>.
10. El Paso County Assessor Website <https://property.spatalest.com/co/elpaso/#!/property/4132000010> Schedule No. 4132000010
11. *Colorado Geological Survey, USGS Geologic Map Viewer*: <http://coloradogeologicalsurvey.org/geologic-mapping/6347-2/>.
12. *Historical Aerials*: <https://www.historicaerials.com/viewer>, Images dated 1952, 1955, 1983, 1984, 1999, 2005, 2009, 2011, 2013, 2015, and 2017.
13. *USGS Historical Topographic Map Explorer*: <http://historicalmaps.arcgis.com/usgs/> El Paso County, Images dated 1894, 1913, 1940, 1944, 1960, 1975, and 1983.
14. *Google Earth Pro*, Imagery dated 1999, 2004, 2005, 2006, 2011, 2013, 2015, 2017, 2019, 2020, and 2022.

APPENDIX B

Sewage Disposal Inspection Form, El Paso County Department of Health
and Environment

EL PASO COUNTY HEALTH DEPARTMENT
COLORADO SPRINGS, COLORADO

#2864 P

SEWAGE DISPOSAL INSPECTION FORM

APPROVAL:
YES NO

#4132000010

DATE 4-19-85

ENVIRONMENTALIST Paul Brockhausen

LOCATION (street number) 14710 ~~Terrace~~ **Tal B** OCCUPANT Alan Talbot

LEGAL DESCRIPTION Lot 1 Woodlake E & B

TYPE OF CONSTRUCTION _____ NO. OF BEDROOMS 3

SYSTEM INSTALLED BY Orville Hansen

COMMERCIAL MFG. Pro Coat SIZE 1500 gal

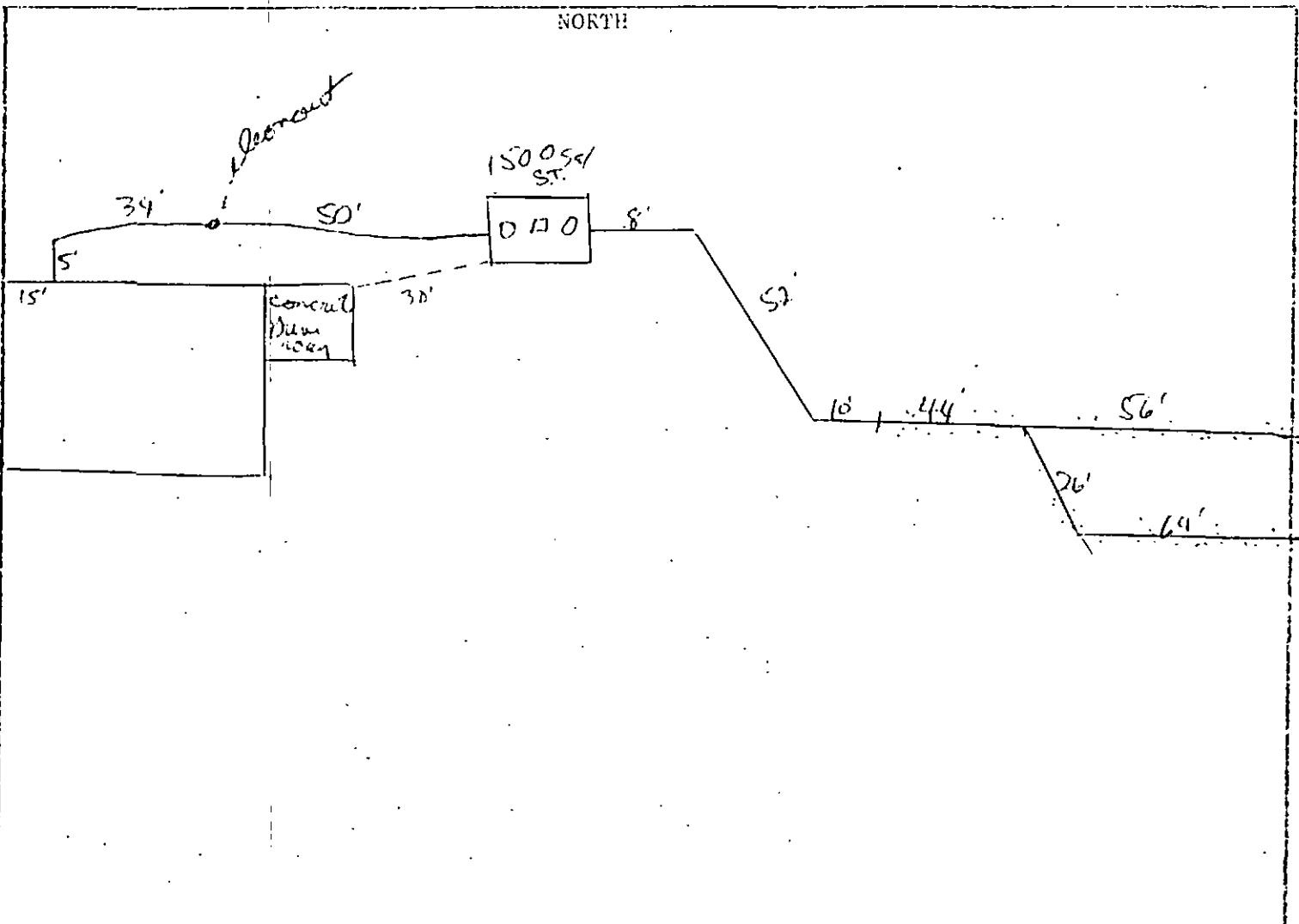
TYPE OF MATERIAL _____ NO. COMPARTMENTS _____

WIDTH _____ LENGTH _____ DEPTH (total) _____ LIQ. CAP. _____

DISPOSAL FIELD: PCD OR TRENCH DEPTH 2 1/2 - 3' WIDTH 3' LENGTH 182' SQ. FT. 546^{sq}

DISTANCE BETWEEN LINES 20' ROCK RR DEPTH 18" UNDER 12" OVER 2"

LEACHING PITS (NO.) _____ LINING MATERIAL _____ CAPACITY SQ. FT. _____



Acres. 41.

EL PASO COUNTY • COUNTY HEALTH DEPARTMENT

Permit NO 2864

501 North Foote Avenue • Colorado Springs, Colorado • 636-0125

Water Supply _____

PERMIT

Receipt No. 7118

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

Issued To Glen & Bernadine S Tabor Date July 23, 1984

Address of Property 14710 Tanner Tr., Elbert, 80106 Phone 495-2062

(Permit valid at this address only)

Sewage-Disposal System work to be performed by Same as above Phone _____

This Permit is issued in accordance with 25-10-106 Colorado Revised Statute, 1973, as amended. PERMIT EXPIRES upon completion-installation of sewage-disposal system or at the end of six (6) months from date of issue — whichever occurs first — (unless work is in progress).

— THIS PERMIT DOES NOT DENOTE APPROVAL OF SEWAGE TREATMENT AND ABSENGE REQUIREMENTS —

\$145.00 FEE NOT REFUNDABLE

PERMIT FEE
January 23, 1985

DATE OF EXPIRATION

[Signature]
DIRECTOR, CITY-COUNTY HEALTH DEPARTMENT
[Signature]
ENVIRONMENTALIST

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

SEPTIC TANK SIZE	<u>1250</u>	GALLONS	TOTAL ABSORPTION AREA	<u>537</u>	SQ. FT.
TRENCH SYSTEM	BED SYSTEM		SEEPAGE PIT SYSTEM		
<u>179</u> ft. of trench <u>36</u> inches wide	_____ ft. x _____ ft.		_____ rings or _____ diam. x _____ w/d		

NOTES:

Serial distribtuion will probably be necessary. Keep trenches 100 feet from well, tank 50 feet from well.

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 times for the purpose of making such inspections as are necessary to determine compliance with requirements of this law.

El Paso County Health Department
501 North Foote Avenue
Colorado Springs, CO 80909-4598
(303) 636-0125

Julie

*Septic system
for main house*

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

NAME OF OWNER *GLEN + BERNADINE TABOR* HOME PHONE *495-2062* WORK PHONE *577-1265*

ADDRESS OF PROPERTY *14710 TANNER TR. ELBERT, 80106* DATE *7-2-84*

LEGAL DESCRIPTION OF PROPERTY *LOT 1 Woodlake Estates*

TAX SCHEDULE NUMBER *41,000-00-178* SYSTEM CONTRACTOR *SAME* PHONE

OWNER'S ADDRESS IF DIFFERENT

TYPE OF HOUSE CONSTRUCTION *Log* SOURCE AND TYPE OF WATER SUPPLY *Well*

SIZE OF LOT *41 Acs* MAXIMUM POTENTIAL NUMBER OF BEDROOMS *3* BASEMENT (yes or no)

PERCOLATION TEST RESULTS ATTACHED (yes or no)

A plot plan and accompanying information are essential; it may be drawn on the back of this application or be attached. Please include by measured distance the location of wells including neighbors' wells, springs, water supply lines, cisterns, buildings, proposed structures, property lines, property dimensions, subsoil drains, lakes, ponds, water courses, streams, and dry gulches. Please show the location of the proposed septic system by directions and distances from actual and/or proposed dwellings, structures, or fixed reference objects. Give complete directions to the property from major highways.

Applicant acknowledges that 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 the applicant for purposes of evaluation of 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 under Article 10, Title 25, C.R.S. 1973 as amended. The undersigned hereby certifies that all statements made, information and reports submitted by the applicant are or will be 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 Health Dept. in evaluating the same for purposes of issuing the permit applied for herein. I further understand that 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.

2 septic systems on the same property - (main house system) per this permit SIGNATURE *Bernadine Tabor*

HEALTH DEPARTMENT USE ONLY

PERMIT NUMBER RECEIPT NUMBER DATE TO LAND USE DEPARTMENT *7/6*

ABSORPTION AREA *537* TANK CAPACITY *1250* DATE OF SITE INSPECTION *7/10/84*

REMARKS: *Perc test data from 1982 is acceptable. Site is okay - gently sloping hill. Soil distribution will probably be necessary. Keep trenches 100' from well, tank 50' from well. 179 lined feet of 3' trench.*

APPLICATION IS APPROVED DENIED DATE *7/10/84* ENVIRONMENTALIST *Julie Schneider*

APPENDIX C

Wastewater Study

Job No. 192447

May 2, 2023

Garrett Graupner
14710 Tanner Trail
Elbert, CO 80106

Re: Wastewater Study
Graupner Subdivision
Tanner Road
El Paso County, Colorado

Ref: *Survey, Graupner Subdivision, prepared by Eagle Land Surveying, Inc., dated December 26, 2022, Job Number 22140-02.*

Dear Mr. Graupner:

As requested, personnel of RMG – Rocky Mountain Group has performed a preliminary investigation and site reconnaissance at the above referenced address. It is our understanding the parcel included in this study is:

- Schedule No. 4132000010 – currently addressed as 14710 Tanner Trail, is zoned "RR-5" – *Residential Rural*.

The approximate location of the site is shown on the Site Vicinity Map, Figure 1.

PROJECT DESCRIPTION

The site consists of approximately 41.06 acres and is partially developed. The proposed subdivision is to consist of 4 lots, three of which are to range between 5.00 to 5.027 acres. The fourth lot will comprise the remaining acreage of approximately 25.989 acres. The existing single-family residence, sheds, miscellaneous structures, well and septic are to remain on the larger lot. The Proposed Lot Layout is presented in Figure 2.

Each lot is to be serviced by an on-site wastewater treatment system (OWTS) and an individual water supply well. It is our understanding site grading activities are to be limited to the extent necessary to facilitate construction of individual homes, drainage, and utilities. The site is to be accessed from the existing gravel driveway that extends south and east from Tanner Trail. The existing driveway is not proposed to be converted to a public County road.

This letter is to provide information for the on-site wastewater report per the On-Site Wastewater Treatment Systems (OWTS) Regulations of the El Paso County Board of Health pursuant to Chapter 8.

The following are also excluded from the scope of this report including (but not limited to) foundation recommendations, site grading/surface drainage recommendations, subsurface drainage recommendations, geologic, natural and environmental hazards such as landslides, unstable slopes, seismicity, snow avalanches, water flooding, corrosive soils, erosion, radon, wild fire protection, hazardous waste and natural resources.

Previous Studies and Field Investigation

Reports of previous geotechnical engineering/geologic investigations for this site were available for our review and are listed below:

1. *Soil and Geology Study, Graupner Subdivision, Tanner Road, El Paso County, Colorado*, prepared by RMG – Rocky Mountain Group, Job No. 192447, dated May 2, 2023.

The findings, conclusions and recommendations contained in this report was considered during the preparation of this report.

SITE CONDITIONS

Personnel of RMG performed a reconnaissance visit on March 10, 2023. The purpose of the reconnaissance visit was to evaluate the site surface characteristics including landscape position, topography, vegetation, natural and cultural features, and current and historic land uses. Two test pits were performed on the proposed new lots. A Test Boring and Test Pit Location Plan is presented in Figure 3.

The site surface characteristics were observed to consist of low lying grasses and weeds across the entire site. No deciduous trees are located on the property.

The following conditions were observed with regard to the 41.06-acre parcel:

- A well currently **does not** exist on the existing 41.06-acre site;
- No runoff or irrigation features anticipated to cause deleterious effects to treatment systems on the site were observed;
- A drainageway exist on the northern portion of property. The entire site lies outside the designated floodway or floodplain;
- Slopes greater than 20 percent **do not** exist on the site; and
- Significant man-made cuts **do not** exist on the site.

Treatment Areas

Treatment areas at a minimum must achieve the following:

- The 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*, effective July 7, 2018;
- Prior to construction of an OWTS, an OWTS design prepared per *the Regulations of the El Paso County Board of Health, Chapter 8, OWTS Regulations* will need to be completed.

A scaled site plan and engineered design will also be required prior to obtaining a building permit;

- Comply with any physical setback requirements of Table 7-1 of the El Paso County Department of Health and Environment (EPCDHE);
- 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 EPCDHE;
- Treatment areas must also be located a minimum 50 feet from any spring, lake, water course, irrigation ditch, stream or wetland, and 25 feet from dry gulches;
- Other setbacks include the treatment area to be located a minimum 10 feet from property lines, cut banks and fill areas (from the crest);
- The new lots shall be laid out to ensure that the proposed OWTS does not fall within any restricted areas, (e.g. utility easements, right of ways). Based on the test pit observations, each lot has a minimum of two locations for the OWTS.

Contamination of surface and subsurface water resources should not occur if the treatment areas are evaluated and installed according to El Paso County Health Department and State Guidelines in conjunction with proper maintenance.

DOCUMENT REVIEW

RMG has reviewed the above referenced survey reflecting the proposed lot layout. We have identified the soil conditions anticipated to be encountered during construction of the proposed OWTS for the three new lots. We reviewed the Natural Resource Conservation Service - NRCS data provided by websoilsurvey.nrcs.usda.gov. and the Soil Survey Descriptions are presented below. A review of FEMA Map No. 08041C0340G, effective December 7, 2018 indicates that the proposed treatment areas are not located within an identified floodplain.

SOIL EVALUATION

Personnel of RMG performed a soil evaluation to include two test pits 6 to 8-foot deep on March 24, 2023 (Test Pit TP-1 and TP-2), utilizing the visual and tactile method for the evaluation of the site soils. The test pits were excavated in areas that appeared most likely to be used for residential construction. The Test Pit Logs are presented in Figure 4. A Septic Suitability map is presented in Figure 5.

The soil conditions as indicated by the NRCS data are anticipated to consist of:

- 71 – Pring coarse sandy loam, 3 to 8 percent slopes. The Pring coarse sandy loam encompasses the majority of the property. Properties of the Pring coarse sandy loam include, well-drained soil, depth of the water table is anticipated to be more than 80 inches, runoff is anticipated to be low, frequency of flooding is none and ponding is none. Landforms include hills. The hydrologic soil group of the unit is B.
- 19 – Columbine gravelly sand loam, 0 to 3 percent slopes. The Columbine encompasses a small section near the northeast corner of the property, on the larger lot, where new construction is currently not proposed. For this reason, the Columbine gravelly sand loam is not described in detail.

A USDA Soil Survey Map is presented in Figure 6.

Groundwater was not encountered in the test pits. Bedrock (limiting layer) was encountered in one of the test pits performed by RMG.

An OWTS is proposed for each new lot and should conform to the recommendations of a future OWTS site evaluation, performed in accordance with the applicable health department codes prior to construction. This report may require additional test pits in the vicinity of the proposed treatment field. A minimum separation of 4 feet shall be maintained from groundwater and bedrock to the infiltrative surface.

Redoximorphic features indicating the fluctuation of groundwater or higher ground water levels were not observed in the test pits.

CONCLUSIONS

In summary, it is our opinion the site is suitable for individual on-site wastewater treatment systems within the cited limitations. There are no foreseeable or stated construction related issues or land use changes proposed at this time.

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 3A to 5) or greater than 0.80 (soil type 0) are encountered at the time of the site specific OWTS evaluation, an "engineered system" will be required.

Additionally, based on the depth of the limiting layer (bedrock) encountered at a depth of 6 feet below the existing ground surface in the test pits but at the ground surface in the test borings, the maximum depth of the OWTS components may be limited to 2 feet below the existing ground surface or mound systems (above surface) may be required.

LIMITATIONS

The information provided in this report is based upon the subsurface conditions observed in the profile pit excavations and accepted engineering procedures. The subsurface conditions encountered in the excavation for the treatment area may vary from those encountered in the test pit excavations. Therefore, depth to limiting or restrictive conditions, bedrock, and groundwater may be different from the results reported in this letter.

An OWTS site evaluation will need to be performed in accordance with the applicable health department codes prior to construction.

I hope this provides the information you have requested. Should you have questions, please feel free to contact our office.

Cordially,

Reviewed by,

RMG – Rocky Mountain Group

RMG – Rocky Mountain Group



Kelli Zigler
Project Geologist

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



NOT TO SCALE
 BASE MAP PROVIDED BY MAPQUEST



ROCKY MOUNTAIN GROUP

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

SITE VICINITY MAP

GRAUPNER SUBDIVISION
 TANNER TRAIL
 EL PASO COUNTY, CO
 GARRETT GRAUPNER

JOB No. 192447

FIG No. 1

DATE 5-2-2023

GRAUPNER SUBDIVISION

A SUBDIVISION OF A PART OF THE SOUTH 1/2 OF SECTION 32
 TOWNSHIP 11 SOUTH, RANGE 64 WEST OF THE 6TH P.M.,
 COUNTY OF EL PASO, STATE OF COLORADO.
 AREA = 41.016 ACRES, MORE OR LESS



AS REPLATTED

LEGEND

- SET NO. 5 REBAR WITH SURVEYORS
CAP STAMPED "37634"
- ▲ RECOVERED AS NOTED
- BOUNDARY LINE
- - - EASEMENT LINE
- (M) MEASURED DIMENSION



NOT TO SCALE
 BASE MAP PROVIDED BY EAGLE LAND SURVEYING

JOB No. 192447



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 (970) 330-1071
Woodland Park Office:
 (719) 687-6077
Monument Office:
 (719) 488-2145
Pueblo / Canon City:
 (719) 544-7750

GRAUPNER SUBDIVISION
 TANNER TRAIL
 EL PASO COUNTY, CO
 GARRETT GRAUPNER

ENGINEER:	TM
DRAWN BY:	KZ
CHECKED BY:	TM
ISSUED:	5-02-2023
REVISION:	DATE:
	JOB #:

PROPOSED
 DEVELOPMENT
 PLAN

SHEET No.
FIG-2



ROCKY MOUNTAIN GROUP

Southern Office
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 80918
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Woodland Park Office:
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Monument Office:
 (719) 488-2145
Pueblo / Canon City:
 (719) 544-7750



NOT TO SCALE
 BASE MAP PROVIDED BY EAGLE LAND SURVEYING

GRAUPNER SUBDIVISION
 TANNER TRAIL
 EL PASO COUNTY, CO
 GARRETT GRAUPNER

ENGINEER:	TM
DRAWN BY:	KZ
CHECKED BY:	TM
ISSUED:	3-24-2023
REVISION:	DATE: JOB #:

TEST BORING
 LOCATION
 PLAN

SHEET No.
FIG-3

TEST PIT TP-1			
DATE OBSERVED: 3/10/23			
SOIL DESCRIPTION	DEPTH (FT)	SYMBOL	SOIL TYPE
0 - 1.5 FT SAND (SINGLE GRAIN, STRUCTURELESS 35% > 2MM)	2ft		1 / R-0
1.5 - 4.0 FT SANDY CLAY, LOAM (GRANULAR, STRONG 45% > 2MM)	4ft		3 / R-1
4.0 - 8.0 FT SAND (SINGLE GRAIN, STRUCTURELESS 46% > 2MM)	6ft		1 / R-0
NO GROUNDWATER NO LIMITING LAYER	8ft		

TEST PIT TP-2			
DATE OBSERVED: 3/10/23			
SOIL DESCRIPTION	DEPTH (FT)	SYMBOL	SOIL TYPE
0 - 3.5 FT SAND (SINGLE GRAIN, STRUCTURELESS 35% > 2MM)	2ft		1 / R-0
3.5 - 4.5 FT SANDY, CLAY (GRANULAR, BLOCKY, MODERATE)	4ft		4
4.5 - 6.0 FT SANDY, CLAY, LOAM (GRANULAR, STRONG, 45% > 2MM)	6ft		3 / R-1
NO GROUNDWATER LIMITING LAYER @ 6 FEET BEDROCK	8ft		

SOIL DESCRIPTIONS



SAND



SANDY CLAY LOAM



SANDY CLAY

Architecture
Structural
Geotechnical



Materials Testing
Forensics
Civil / Planning

Engineers / Architects

SOUTHERN COLORADO OFFICE
2910 AUSTIN BLUFFS PKWY, SUITE 100,
COLORADO SPRINGS, CO 80918

(719) 548-0600 ~ WWW.RMGENGINEERS.COM
SOUTHERN COLORADO, DENVER METRO, NORTHERN COLORADO

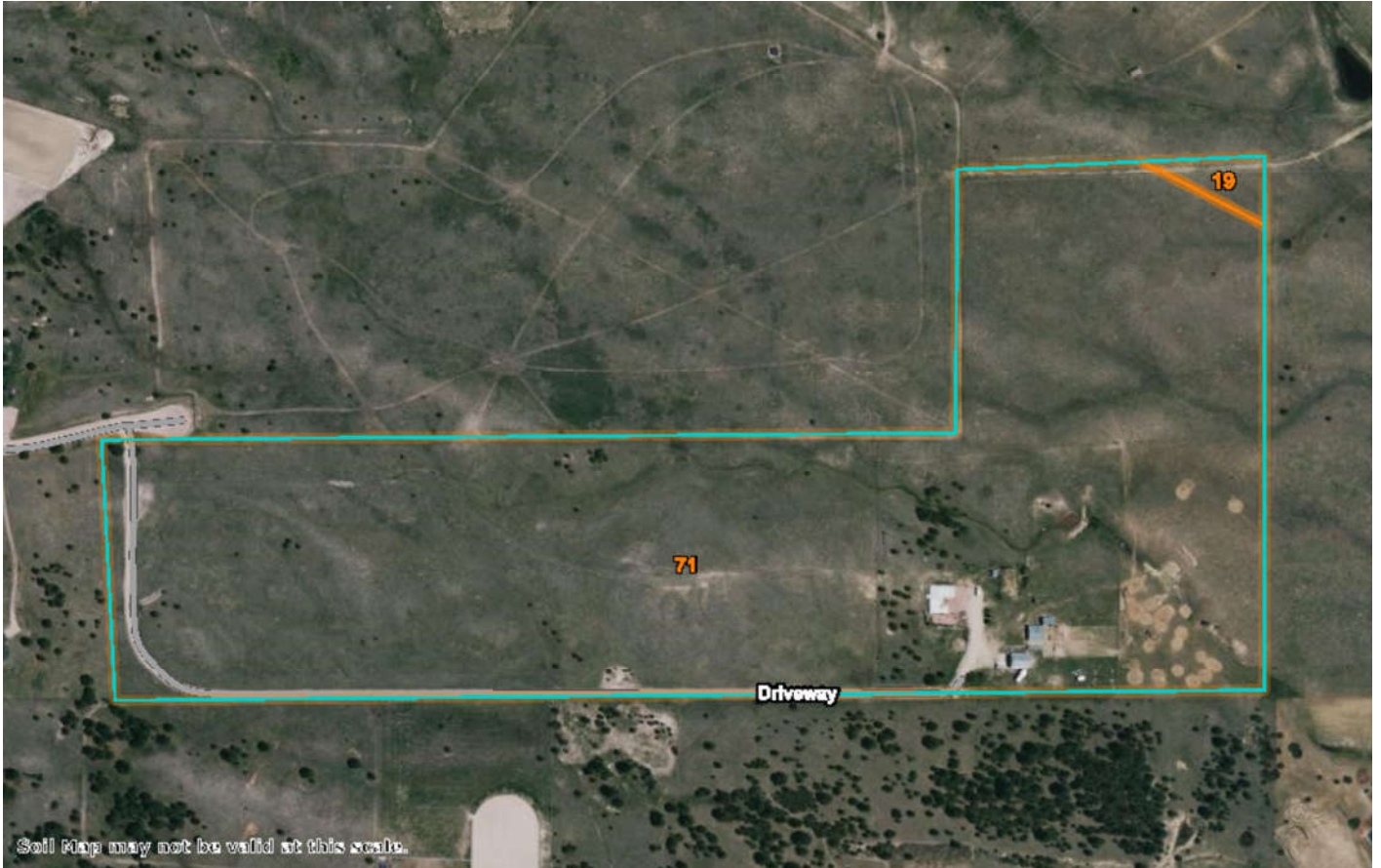
TEST PIT LOGS

GRAUPNER SUBDIVISION
TANNER TRAIL
EL PASO COUNTY, COLORADO
GARRETT GRAUPNER

JOB No. 192447

FIG No. 4

DATE 5-2-2023



71 - PRING COURSE SANDY LOAM, 3 TO 8 PERCENT SLOPES
 19 - COLUMBINE GRAVELLY SAND LOAM, 0 TO 3 PERCENT SLOPES



NOT TO SCALE
 BASE MAP PROVIDED BY USDA



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USDA SOIL SURVEY MAP

GRAUPNER SUBDIVISION
 TANNER TRAIL
 EL PASO COUNTY, CO
 GARRETT GRAUPNER

JOB No. 192447

FIG No. 6

DATE 5-2-2023

EL PASO COUNTY HEALTH DEPARTMENT
COLORADO SPRINGS, COLORADO

#2864 P

SEWAGE DISPOSAL INSPECTION FORM

APPROVAL:
YES NO

#4132000010

DATE 4-19-85

ENVIRONMENTALIST Paul Brockhausen

LOCATION (street number) 14710 Tanager Trail B OCCUPANT Alan Taylor

LEGAL DESCRIPTION Lot 1 Woodlake E & B

TYPE OF CONSTRUCTION _____ NO. OF BEDROOMS 3

SYSTEM INSTALLED BY Orville Hansen

COMMERCIAL MFG. Pro Coat SIZE 1500 gal

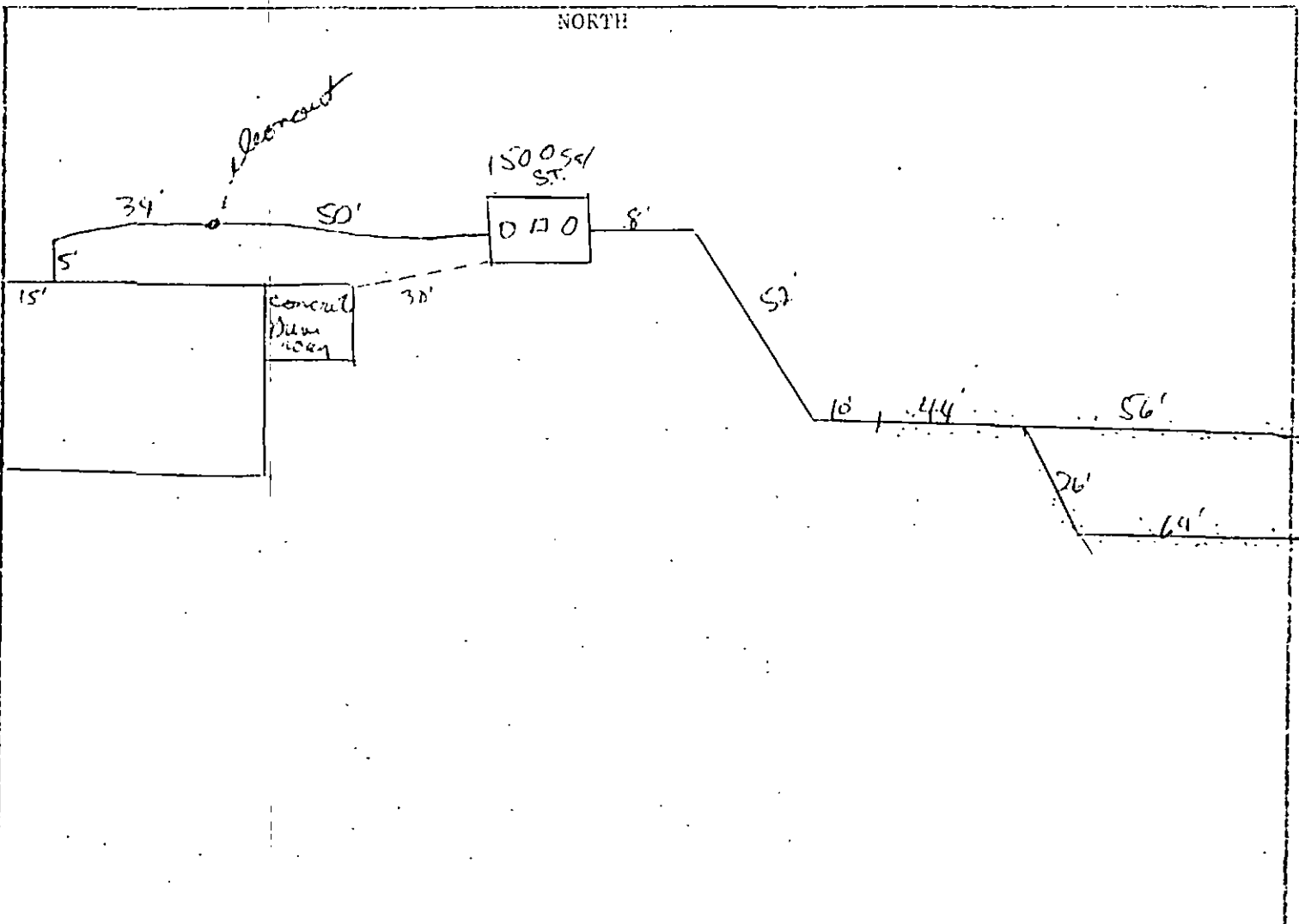
TYPE OF MATERIAL _____ NO. COMPARTMENTS _____

WIDTH _____ LENGTH _____ DEPTH (total) _____ LIQ. CAP. _____

DISPOSAL FIELD: PCD OR TRENCH DEPTH 2 1/2 - 3' WIDTH 3' LENGTH 182' SQ. FT. 546'

DISTANCE BETWEEN LINES 20' ROCK RR DEPTH 18" UNDER 12" OVER 2"

LEACHING PITS (NO.) _____ LINING MATERIAL _____ CAPACITY SQ. FT. _____



Acres. 41.

EL PASO COUNTY • COUNTY HEALTH DEPARTMENT

Permit NO 2864

501 North Foote Avenue • Colorado Springs, Colorado • 636-0125

Water Supply _____

PERMIT

Receipt No. 7118

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

Issued To Glen & Bernadine S Tabor Date July 23, 1984

Address of Property 14710 Tanner Tr., Elbert, 80106 Phone 495-2062

(Permit valid at this address only)

Sewage-Disposal System work to be performed by Same as above Phone _____

This Permit is issued in accordance with 25-10-106 Colorado Revised Statute, 1973, as amended. PERMIT EXPIRES upon completion-installation of sewage-disposal system or at the end of six (6) months from date of issue — whichever occurs first — (unless work is in progress).

— THIS PERMIT DOES NOT DENOTE APPROVAL OF SEWAGE TREATMENT AND ABSENGE REQUIREMENTS —

\$145.00 FEE NOT REFUNDABLE

PERMIT FEE
January 23, 1985

DATE OF EXPIRATION

[Signature]
DIRECTOR, CITY-COUNTY HEALTH DEPARTMENT
[Signature]
ENVIRONMENTALIST

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

SEPTIC TANK SIZE	<u>1250</u>	GALLONS	TOTAL ABSORPTION AREA	<u>537</u>	SQ. FT.
TRENCH SYSTEM	BED SYSTEM		SEEPAGE PIT SYSTEM		
<u>179</u> ft. of trench <u>36</u> inches wide	_____ ft. x _____ ft.		_____ rings or _____ diam. x _____ w/d		

NOTES:

Serial distribtuion will probably be necessary. Keep trenches 100 feet from well, tank 50 feet from well.

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 times for the purpose of making such inspections as are necessary to determine compliance with requirements of this law.

El Paso County Health Department
501 North Foote Avenue
Colorado Springs, CO 80909-4598
(303) 636-0125

Julie

*Septic system
for main house*

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

NAME OF OWNER *GLEN + BERNADINE TABOR* HOME PHONE *495-2062* WORK PHONE *577-1265*

ADDRESS OF PROPERTY *14710 TANNER TR. ELBERT, 80106* DATE *7-2-84*

LEGAL DESCRIPTION OF PROPERTY *LOT 1 Woodlake Estates*

TAX SCHEDULE NUMBER *41,000-00-178* SYSTEM CONTRACTOR *SAME* PHONE

OWNER'S ADDRESS IF DIFFERENT

TYPE OF HOUSE CONSTRUCTION *Log* SOURCE AND TYPE OF WATER SUPPLY *Well*

SIZE OF LOT *41 Acs* MAXIMUM POTENTIAL NUMBER OF BEDROOMS *3* BASEMENT (yes or no)

PERCOLATION TEST RESULTS ATTACHED (yes or no)

A plot plan and accompanying information are essential; it may be drawn on the back of this application or be attached. Please include by measured distance the location of wells including neighbors' wells, springs, water supply lines, cisterns, buildings, proposed structures, property lines, property dimensions, subsoil drains, lakes, ponds, water courses, streams, and dry gulches. Please show the location of the proposed septic system by directions and distances from actual and/or proposed dwellings, structures, or fixed reference objects. Give complete directions to the property from major highways.

Applicant acknowledges that 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 the applicant for purposes of evaluation of 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 under Article 10, Title 25, C.R.S. 1973 as amended. The undersigned hereby certifies that all statements made, information and reports submitted by the applicant are or will be 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 Health Dept. in evaluating the same for purposes of issuing the permit applied for herein. I further understand that 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.

2 septic systems on the same property - (main house system) per this permit

SIGNATURE *Bernadine Tabor*

HEALTH DEPARTMENT USE ONLY

PERMIT NUMBER RECEIPT NUMBER DATE TO LAND USE DEPARTMENT *7/6*

ABSORPTION AREA *537* TANK CAPACITY *1250* DATE OF SITE INSPECTION *7/10/84*

REMARKS: *Perc test data from 1982 is acceptable. Site is okay - gently sloping hill. Soil distribution will probably be necessary. Keep trenches 100' from well, tank 50' from well. 179 lined feet of 3' trench.*

APPLICATION IS APPROVED DENIED DATE *7/10/84* ENVIRONMENTALIST *Julie Schneider*