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SOIL, GEOLOGY, AND WASTEWATER STUDY

22755 McDaniels Road
El Paso County, Colorado

PREPARED FOR:

William Guman & Associates, Ltd
731 North Weber Street, Ste 10
Colorado Springs, CO 80903

JOB NO. 184735

December 20, 2021

Respectfully Submitted,
RMG – Rocky Mountain Group

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Kelli Zigler
Project Geologist

Reviewed by,
RMG – Rocky Mountain Group

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Geotechnical Project Manager

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1.0 GENERAL SITE AND PROJECT DESCRIPTION

1.1 Project Location

The project lies in the NE ¼ of the NE ¼ of Section 11, Township 14 South, Range 63 West of the 6th Principal Meridian in El Paso County, Colorado, and is generally located northwest of the intersection of N Ellicott Highway and CO-94. The approximate location of the site is shown on the Site Vicinity Map, Figure 1.

1.2 Existing and Proposed Land Use

The site currently consists of one parcel (per the El Paso County Assessor's website). It is approximately 40 acres. The parcel included is:

- Schedule No. 3400000295, current land use is classified as single family residence with well and septic

single family residence

The current zoning is *"A-35" – Agricultural District.* The parcel is currently partially developed in the northeast portion of the site where the existing residence, well, and septic are located. The future zoning designation is to be "*PUD" – Planned Unit Development.*

The future zoning is RR-5. revise accordingly

1.3 Project Description

The site consists of approximately 40 acres and is partially developed. An existing single-story residence is located near the northeast corner of the property. It is our understanding that the property is to be subdivided into four lots of approximately 9.74 acres. Each lot is to be developed with a single-family residence, well, and septic. The Proposed Lot Layout is presented in Figure 2.

Each new lot will be served by an on-site wastewater treatment system (OWTS) and an individual water-supply well. Each lot is to be accessed from McDaniels Road by individual driveways.

2.0 QUALIFICATIONS OF PREPARERS

This Soil, Geology, and Wastewater Study was prepared by a professional geologist as defined by Colorado Revised Statures 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 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
- Subsurface exploration

- Visual and tactile characterization of representative site soil and rock samples
- Geologic research and analysis
- Site layout concept plans provided by William Guman & Associates, Ltd.

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. The site is generally located northwest of the intersection of N Ellicott Highway and CO-94 in El Paso County, Colorado and comprises approximately 40 acres. The site is currently zoned A-35, agricultural district but is to be designated as PUD, planned unit development, in the future. Adjacent properties to the north, south, east and west are zoned A-35.

4.2 Topography

Based on our site reconnaissance on September 8, 2021 and USGS 2019 topographic map of the Ellicott Quadrangle, the site generally slopes down to the southeast with an elevation change of about 35 feet. A large drainage ditch traverses the site from northwest to southeast, as shown in Figure 6, Engineering and Geology Map. The water levels in the irrigation ditch areas are anticipated to vary depending upon local precipitation events.

4.3 Vegetation

Site vegetation primarily consists of native grasses, weeds, and other prairie-type vegetation. A few deciduous trees are scattered within the drainage ditch.

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 dating back to 1947. Historically, the site has remained partially developed land where the existing residence, well, and septic are located since 2000, when the house was built. The parcel is vacant land on the remainder of the property.

5.0 FIELD INVESTIGATION AND LABORATORY TESTING

It is our understanding the existing 40 acres is to be subdivided into a total of four lots. Each lot is to consist of approximately 9.74 acres and to contain a single-family residence with well and septic. Each lot is to have driveway access off of McDaniels Road.

5.1 Test Pit Excavations

Three test pits were performed by RMG to explore the subsurface soils underlying the proposed 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 Wastewater Treatment Systems.

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. Bedrock was not encountered in the test pits. A restrictive layer in the form of an R-type soil was encountered in test pit TP-1 from 2.5 to 4.5 feet below the existing surface. 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 on September 2, 2021. No indications of redoximorhpic 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 25 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 southern portion of a large structural feature known as the Denver Basin. In general, the geology at the site consists of Louviers and Slocum alluvium composed of sand, silt, clay, and gravel. Its origins can be traced back to the Bull Lake glaciation of the late middle Pleistocene.

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) Natural Resources Conservation Service (NRCS) Soil Classification System. The on-site soils classified as sand (SW), loam (ML), clay loam (CL), sandy clay loam (SC), and loamy sand (SM).

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 USDA Soil Structure and Grade) 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. The Dawson formation is thick-bedded to massive, generally light colored arkose. The sandstones are poorly sorted with variable clay contents. The sandstone is generally permeable, well drained, and has good foundation support characteristics. The Dawson sandstone is generally not considered a restrictive 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:

- 19 – Columbine gravelly sandy loam, 0 to 3 percent slopes. Properties of the sandy loam include well drained soils, depth of the water table is anticipated to be greater than 80 inches, runoff is anticipated to be very low, frequency of flooding and ponding is none, and landforms include flood plains, fan terraces, and fans.

- 28 – Ellicott loamy coarse sand, 0 to 5 percent slopes. Properties of the loamy coarse sand include somewhat excessively drained soils, depth of the water table is anticipated to be greater than 80 inches, runoff is anticipated to be very low, frequency of flooding is frequent to none and ponding is none, and landforms include flood plains and stream terraces.

- 95 – Truckton loamy sand, 1 to 9 percent slopes. Properties of the loamy sand 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 Soils 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 deposits of the Quaternary overlying the Dawson Arkose Formation of Tertiary age. Four geologic units were mapped at the site as:

- *ags* – Alluvial sand, silt, clay and gravel (Louviers and Slocum Alluviums, undivided; late middle Pleistocene)
- *Tkda* – Dawson Formation (Upper Cretaceous and Paleocene)
- *sw* – Seasonally wet area
- *af* – Artificial fill area – man-placed artificial fill placed around 2000 with the construction of the existing single-family residence

6.5 Engineering Geology

An environmental and engineering geologic map for land use was not found for the area in which the subject property is located. Based on nearby projects and our knowledge and experience in surrounding areas, we anticipate that the engineering geology units are as follows:

- *1A* – Stable alluvium, and bedrock on flat to gentle slopes (0-5%).
- *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

The map unit descriptions for these units are provided by Charles Robinson and Associates (1977).

6.6 Structural Features

Structural features such as schistocity, 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 to the southeast. It is anticipated the direction of surface water and groundwater is to 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. A large drainage area traverses the site from northwest to southeast.

6.10 Flooding and Surface Drainage

Based on our review of the Federal Emergency Management Agency (FEMA) Community Panel No. 08041C0810G and 08041C0807G and the online ArcGIS El Paso County Risk Map, the site lies within a 100-year floodplain. The site is within the boundaries of Zone X, Zone A, Zone AE and a regulatory floodway.

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.

Zone A is defined as an area subject to inundation by a 1-percent-annual-chance flood event, Base Flood Elevations (BFEs) are not shown. Zone AE is defined as an area subject to inundation by a 1-percent-annual chance flood event, BFEs are shown. A regulatory floodway is defined as the channel of a river or other watercourse and the adjacent land areas that must be reserved in order to discharge the base flood without cumulatively increasing the water surface elevation more than a designated height. Communities must regulate development in these floodways to ensure that there are no increases in upstream flood elevations.

It is our recommendation that the floodplain within the property boundary be designated as a "No-Build" area. This "No-Build" area is shown in Figure 6, the Engineering and Geology Map.

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. The deposits are composed of sand, gravel with silt and clay. These deposits are remnants of older streams deposited on topographic highs or bench like features.

According to the *Evaluation of Mineral and Mineral Fuel Potential of El Paso County State Mineral Lands*, the site is mapped within the Denver Basin Coal Region, the tract identifier is 41-40. However, the area of the site has been mapped “Poor" for coal resources. 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 area contains strata that may contain coal. This area is not prospective for metallic mineral resources. No oil and gas wells are drilled in the area, or within two miles of it. Alluvial deposits are commonly mined in the region for sand and gravel. Several inactive sand and gravel pits are located within two miles of the area. Alluvial deposits containing gravel and/or sand cover about 620 acres of tract 41-40. Assuming a mineable thickness of 15 feet, this represents 22.5 million tons of potentially useable resource. In the vicinity of this area, the coal-bearing beds of the Laramie Formation lie at a depth of about 800 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.

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

- Avalanches
- Debris Flow-Fans/Mudslides
- Expansive Soils
- 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

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

8.1 Compressible Soils

The site contains alluvial deposits consisting of sand, loamy sand, sandy clay loam, clay loam and loam. These materials are anticipated to exhibit low compressibility potential.

It is unknown at this time whether the proposed single-family residences will have crawlspaces, basements or a combination of both. Foundation design and construction are typically adjusted for collapsible soils.

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

The lot-specific subsurface soil investigation performed for each proposed structure should consider mitigation of compressible soils.

8.2 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.

8.3 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 80908/80831 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. 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.

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. Three 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 soils encountered in the test pits were classified using the United States Department of Agriculture (USDA) Natural Resource Conservation Service (NRCS) Soil Classification System as sand, loam, clay loam, sandy clay loam, and loamy sandy. An R-0 soil was encountered in the test pits, and constitutes a limiting layer designation applies. The long term acceptance rates (LTAR) associated with the soils observed in the test pits range from 0.35 to 1.0 (soil types R-0 to 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 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;
- OWTS systems shall 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 not recommended that the existing septic systems be utilized for new construction. The existing systems were constructed between 1964 and 1994. The average life span of systems constructed between those dates was approximately 20 to 30 years. It is unlikely the existing septic systems will meet the current criteria for a Transfer of Title Inspection per 8.4 (O).6 per EPCHDE;
- If an existing system is to be removed (e.g. tank, components and/or soil), it shall be disposed of in an approved off-site location;
- New treatment areas are not to be located within the existing septic field areas unless the existing system has been properly abandoned or removed.

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 3A 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 of this report) found to be present at this site include faults/seismicity and radon. Geologic constraints (as described in section 8 of this report) found to be present at this site include flooding and surface drainage and compressible soils. 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 borings, laboratory test results, conclusions and recommendations presented in this report are not intended for use for design and construction. A site-specific subsurface soil investigation will be required for all proposed structures.

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 sandy clay loam and clay loam will classify as Type A materials and the sand and loamy sand will classify as Type C materials as defined by OSHA in 29 CFR Part 1926. OSHA requires that temporary excavations made in Type A and C materials be laid back at ratios no steeper than 3/4:1 (horizontal to vertical) and 1 ½:1 (horizontal to vertical), respectively, 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 **William Guman & Associates, Ltd** 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, Zindorf McDaniels Site, 22755 McDaniels Road, Ellicott, Colorado*, prepared by William Guman & Associates, last dated February 12, 2018.
2. *Flood Insurance Rate Map, El Paso County, Colorado and Unincorporated Areas, Community Panel No. 08041C0810G,* Federal Emergency Management Agency (FEMA), effective December 7, 2018.
3. *Geologic Map of Colorado, Ogden, 1979, U.S. Geological Survey*
4. *Generalized Surficial Geologic Map of the Pueblo 1 degree X 2 degree Quadrangle, Colorado. U.S. Geological Survey, Map MF-2388, 2002.*
5. *Geologic Map of the Pueblo 1 Degree X 2 Degrees Quadrangle, South-Central Colorado, U.S. Geological Survey*. Compiled by Scott, Taylor, Epis and Wobus, 1976.
6. *Notes on the Denver Basin Geologic Maps: Bedrock Geology, Structure, and Isopach Maps of the Upper Cretaceous to Paleogene Strata between Greely and Colorado Springs, Colorado, Colorado Geological Survey.* Compiled by Dechesne, Raynolds, Barkmann and Johnson, 2011.
7. *Environmental and Engineering Geologic Map for Land Use*, compiled by Dale M. Cochran, Charles S. Robinson & Associates, Inc., Golden, Colorado, 1977.
8. *Pikes Peak Regional Building Department:* https://www.pprbd.org/.
9. El Paso County Assessor Website
   https://property.spatialest.com/co/elpaso/#/property/3400000295
   Schedule No. 3400000295
10. *Colorado Geological Survey, USGS Geologic Map Viewer*:
    http://coloradogeologicalsurvey.org/geologic-mapping/6347-2/.
11. *Historical Aerials:* https://www.historicaerials.com/viewer, Images dated 1952, 1955, 1983, 1984, 1999, 2005, 2009, 2011, 2013, 2015, and 2017.
12. *USGS Historical Topographic Map Explorer:* http://historicalmaps.arcgis.com/usgs/ El Paso County, Ellicott Quadrangle, 2019.
13. *Google Earth Pro*, Imagery dated 1999, 2004, 2005, 2006, 2011, 2013, 2015, 2017, 2019 and 2020.
14. Kirkham, R.M., and Ladwig, L.R., 1979, Coal resources of the Denver and Cheyenne basins, Colorado: Colorado Geological Survey Resource Series 5, 70 p., 5 plates
15. Carroll, C.J., and Bauer, M.A., 2002, Historic coal mines of Colorado: Colorado Geological Survey Information Series 64, CD ROM.
16. Keller, J.W., Phillips, R.C., and Morgan, Karen, 2002, Digital inventory of industrial mineral mines and mine permit locations in Colorado: Colorado Geological Survey Information Series IS-62, CD ROM.
17. Mason, G. T., and Arndt, R. E., 1996, Mineral resource data system (MRDS): U.S. Geological Survey Digital Data Series DDS-20 (CD-ROM)
18. Scott, Glenn R., Taylor, R.B., Epis, R.C., and Wobus, R.A., 1978, Geologic map of the Pueblo 1 x 2 quadrangle, south-central Colorado: U.S. Geological Survey Miscellaneous Investigation Series, Map I-1022, scale 1:250,000.
19. *Evaluation of Mineral and Mineral Fuel Potential of El Paso County State Mineral Lands*
20. the *El Paso Aggregate Resource Evaluation Map, Master Plan for Mineral Extraction*, *Map 1*
21. Generalized surficial geologic map of the Pueblo 1 degree X 2 degree quadrangle, Colorado. Moore, D.W., Straub, A.W., Berry, M.E., Baker, M.L., and Brandt, T.R

APPENDIX B

Individual Sewage Disposal System Permit, El Paso County Department of Health and Environment

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

Permit # ONOOO2326
Date 10/30/00

#3400000295

APPROVED: YES X NO ____ ENVIRONMENTALIST Jan Atencio

Address 22755 McDaniels Rd. Owner RHonda Winkler

Legal Description N.E. 1/4 of the NE 1/4, Section 11, Township 14 South Range 63 West of the 6th P.M. County of El Paso State of Colorado

Residence ✓, # of bedrooms 4; Commercial ____; System Installer ↳ Owner.

SEPTIC TANK:

Commercial ✓; Noncommercial ____, L ____, W ____, WD ____

Construction Material Pre Cast Concrete, capacity 1500 gallons.

DISPOSAL FIELD:

Rock Systems:

Trench: depth ____, width ____, total length ____, sq. feet ____

Bed: depth ____, length ____, width ____, sq. feet ____

Rock type ____, depth ____, under PVC ____, over PVC ____

Seepage Pits: # of pits ____, total # of rings ____, working depth(s) ____

size of pit(s) L X W ____, lining material ____, total sq. feet ____

Rockless Systems:

Chamber: Type Infiltrators, number of chambers 45, bed ____, trench ✓

sq. ft./section 15.5, reduction allowed 35 %, sq. ft required 1155

total sq. ft. installed 1,155, depth of installation 30-40 inches

Engineer Design Y or (N), Designing Engineer ____,

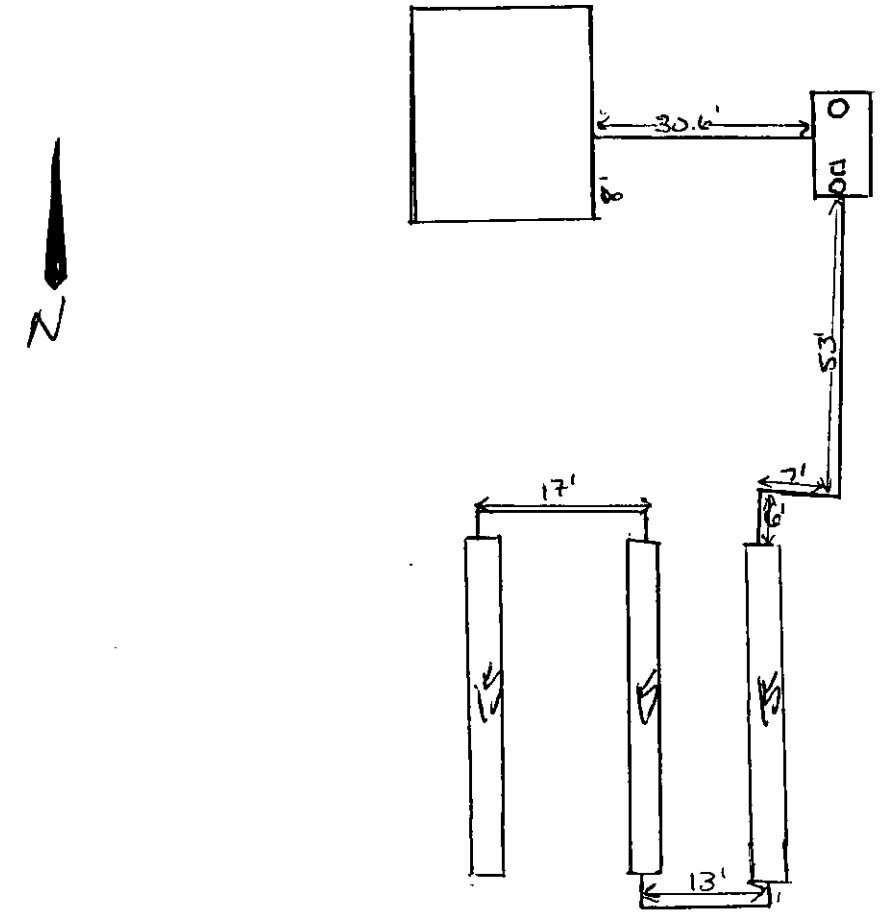
Approval letter provided? Y or N

Well 50 feet from tank (Y) or N 100 feet from leach field (Y) or N

Well installed at time of septic system inspection (Y) or N Public Water ____

*Approval will be revoked if in the future the well is found to be within 50 feet of the septic tank and/or 100 feet of the disposal field.

NOTES: Well is more then 50 feet from Septic tank.



EL PASO COUNTY

DEPARTMENT OF HEALTH AND ENVIRONMENT
301 S Union Blvd, Colorado Springs, Colorado 719-578-3126

John Futts
683-5406

INDIVIDUAL SEWAGE DISPOSAL SYSTEM PERMIT

WATER SOURCE: WELL

PERMIT NUMBER: ON0002326

OWNER NAME: RHONDA WINKLER

DATE PERMITTED: 9/1/00

ADDRESS: 22755 MCDANIELS RD

CITY,STATE,ZIP: CALHAN CO 80808

PHONE NUMBER: 7196834359

INSTALLED BY:

This permit is issued in accordance with 25-10-107 Colorado Revised Statues. PERMIT EXPIRES upon completion-installation of sewage-disposal system or at the end of twelve (12) months from date of issue- whichever occurs first-(unless work is in progress). If both a building and an ISDS permit are issued for the same property and construction has not commenced prior to the expiration date of the building permit, the ISDS permit shall expire at the same time as the building permit. This permit is revokable if all stated requirements are not met.
Sewage disposal system to be installed by an El Paso County Licensed System Contractor or the property owner.

THIS PERMIT DOES NOT DENOTE APPROVAL OF ZONING AND ACREAGE REQUIREMENTS.

Jisha Downs

DIRECTOR, EL PASO COUNTY DEPARTMENT OF HEALTH AND ENVIRONMENT

PERMIT FEE(NON REFUNDABLE) :
New Permit-----$ 300.00
ISDS Repair -$ 50.00
Voided/Altered permit --$ 25.00

PERMIT EXPIRATION DATE :
Expires twelve months from date of issue

Jan Alter 578-3787
ENVIRONMENTALIST / PHONE NUMBER

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

MINIMUM SEPTIC TANK SIZE: 1,500 GALLONS *MINIMUM ABSORPTION AREA REQUIRED* 1,155 SQ FT

PLANNING DEPARTMENT ENUMERATION FLOOD PLAIN WASTEWATER

COMMENTS:

A CONVENTIONAL ABSORPTION TRENCH OR SEEPAGE BED TYPE SEPTIC SYSTEM SHALL NOT BE INSTALLED EXCEEDING THE PREFERRED MAXIMUM DEPTH OF 3 FEET BELOW NATIVE GROUND SURFACE.

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.

Inspector Jason Record I.D. 2326

EL PASO COUNTY ENVIRONMENTAL HEALTH SERVICES

301 South Union Boulevard • Colorado Springs, CO • 80910-3123 • (719) 578-3126

APPLICATION FOR A ☒ NEW ☐ REMODEL ☐ REPAIR OR ☐ ADDITION

TO AN INDIVIDUAL SEWAGE DISPOSAL SYSTEM ☐ P.E. DESIGN

Owner Rhonda L. Winkler Daytime Phone 719-683-4359

Address of Property 22755 McDaniels Road City & Zip Calhan 80808

Legal Description N.E. 1/4 of the NE 1/4, Section 11, Township 14 South, Range 63 West of the 6th P.M. County of El Paso, State of Colorado

Master Tax Schedule # 34000-00-183 Lot Size 10 Acres Septic Contractor

Inside City Limits ☒ No ☐ Yes-City Water Supply ☒ Well or Spring ☐ Cistern ☐ Public

Type of Building ☐ Frame ☒ Modular ☐ Mobile ☐ Commercial ☐ Manufactured ☐ Other

Owner's MAILING Address 5753 Log Road City, State & Zip Calhan, CO 80808

☐ MAIL PERMIT OR ☒ PICK UP PERMIT ☐ THERE IS AN ADDITIONAL RESIDENCE ON THIS PROPERTY

MAXIMUM POTENTIAL BEDROOMS 4

Percolation Test Attached (Y) N Garbage Disposal Y (N) Basement 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 an 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. 25-10-107 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 Rhonda L. Winkler Date 8/23/00

DEPARTMENT OF HEALTH USE ONLY

1155	1500	8/29/00
Minimum Absorption Area	Minimum Tank Capacity	Date of Site Inspection

REMARKS A conventional absorbtion trench or seepage bed type septic system shall not be installed exceeding the preferred maximum depth of 3 feet below native ground surface.

Approved pending receipt of Comments from County Planning / Flood plain / RBD

EHS INSPECTOR Jason Aker DATE 8/29/00 APPROVED DENIED

FEE AS OF 8/1/00: NEW $315 -
REPAIR TO LEACH FIELD $150 -
REPAIR TO TANK OR LINE $75 -

DATE TO PLANNING / WASTEWATER 8/24/00

8/00.DEB

1) We require a copy of your percolation **(PERC) TEST** with an original professional engineer's (PE) stamp and signature.

2) A **PLOT PLAN** must be drawn (not to scale) on a 8 ½ x 11 sheet of paper. The plot plan must include
   1) a north bearing
   2) property lines
   3) property dimensions
   4) all buildings (proposed or existing)
   5) proposed septic system site
   6) designated alternate septic system site
   7) driveway (proposed or existing and name of adjoining street)

3) Initial any of the following features that apply to your property and include them on your plot plan..

   Nw Well(s) ____ Adjacent property well(s) ___ Subsoil drain

   ____ Cistern ____ Water line

4) Initial any of the following that are within 100 feet of your proposed septic system and include on your plot plan.

   _____Spring(s) _____Lake(s)

   _____Pond(s) _____Stream(s)

   _____Dry Gulch(es) _____Natural drainage course(s)

5) **PROPERTY ADDRESS OR LOT NUMBER MUST BE POSTED AND CLEARLY VISIBLE FROM ROAD. PERC HOLES MUST BE CLEARLY MARKED.**

6) GIVE COMPLETE DIRECTIONS TO THE PROPERTY FROM A MAIN HIGHWAY

Take Highway 94 East toward Ellicott. Turn left (North) onto Log Road. Go 1 mile to McDaniels Road, and turn left (west) onto McDaniels. First driveway on the left.

Property is located on the southwest corner of Log Road & McDaniels Road.

APPENDIX C
Site Reconnaissance Photos


NE
E
SE
S
60
90
120
150
180
114°SE (T)
38°51'8"N, 104°24'25"W ±16ft
6075ft
Overview
Kyle Reamer-Staff
Geologist-RMG
184735 - 22755
McDaniels Road
08 Sep 2021, 11:21:54 AM


E
SE
S
60
90
120
150
180
125°SE (T)
38°51'8"N, 104°24'25"W ±16ft
6087ft
Overview
Kyle Reamer-Staff
Geologist-RMG
184735 - 22755
McDaniels Road
08 Sep 2021, 11:22:55 AM


N
NE
E
0
30
60
90
120
60°NE (T)
38°51'8"N, 104°24'23"W ±16ft
6079ft
TAG
Overview
Kyle Reamer-Staff
Geologist-RMG
184735 - 22755
McDaniels Road
08 Sep 2021, 11:24:11 AM


N
NE
E
0
30
60
90
51°NE (T)
38°51'8"N, 104°24'23"W ±16ft
6079ft
Overview
Kyle Reamer-Staff
Geologist-RMG
184735 - 22755
McDaniels Road
08 Sep 2021, 11:24:24 AM


NE
E
SE
60
90
120
150
107°E (T) 38°51'9"N, 104°24'21"W ±16ft 6084ft
Overview
Kyle Reamer-Staff
Geologist-RMG
184735 - 22755
McDaniels Road
08 Sep 2021, 11:25:20 AM


NE
E
SE
S
60
90
120
150
18
110°E (T) 38°51'9"N, 104°24'21"W ±16ft 6082ft
Overview
Kyle Reamer-Staff
Geologist-RMG
184735 - 22755
McDaniels Road
08 Sep 2021, 11:25:39 AM


NW
N
NE
300
330
0
30
60
357°N (T) 38°51'9"N, 104°24'21"W ±16ft 6084ft
Overview
Kyle Reamer-Staff
Geologist-RMG
184735 - 22755
McDaniels Road
08 Sep 2021, 11:25:49 AM


SW
W
NW
210
240
70
300
330
268°W (T) 38°51'9"N, 104°24'21"W ±16ft 6082ft
Overview
Kyle Reamer-Staff
Geologist-RMG
184735 - 22755
McDaniels Road
08 Sep 2021, 11:25:55 AM


W
270
NW
300
330
N
0
30
322°NW (T)
38°51'9"N, 104°24'21"W ±16ft
6083ft
Overview
Kyle Reamer-Staff
Geologist-RMG
184735 - 22755
McDaniels Road
08 Sep 2021, 11:26:01 AM


S
180
210
SW
240
W
270
300
231°SW (T) 38°51'8"N, 104°24'23"W ±16ft 6085ft
Overview
Kyle Reamer-Staff
Geologist-RMG
184735 - 22755
McDaniels Road
08 Sep 2021, 11:27:41 AM


SW
W
NW
210
240
300
330
269°W (T) 38°51'9"N, 104°24'37"W ±16ft 6093ft
Overview
Kyle Reamer-Staff
Geologist-RMG
184735 - 22755
McDaniels Road
08 Sep 2021, 11:30:41 AM


NW
N
NE
300
330
30
60
360°N (T) 38°51'9"N, 104°24'37"W ±16ft 6093ft
Overview
Kyle Reamer-Staff
Geologist-RMG
184735 - 22755
McDaniels Road
08 Sep 2021, 11:30:57 AM


SE
120
150
210
240
SW
179°S (T)
38°51'9"N, 104°24'37"W ±16ft
6093ft
Overview
Kyle Reamer-Staff
Geologist-RMG
184735 - 22755
McDaniels Road
08 Sep 2021, 11:31:05 AM


E
SE
S
60
90
120
150
180
123°SE (T) 38°51'9"N, 104°24'37"W ±16ft 6093ft
Overview
Kyle Reamer-Staff
Geologist-RMG
184735 - 22755
McDaniels Road
08 Sep 2021, 11:31:11 AM


E
SE
S
90
120
150
180
210
155°SE (T) 38°51'9"N, 104°24'37"W ±16ft 6094ft
Overview
Kyle Reamer-Staff
Geologist-RMG
184735 - 22755
McDaniels Road
08 Sep 2021, 11:31:19 AM


SW
W
NW
210
240
270
300
261°W (T) 38°51'9"N, 104°24'37"W ±16ft 6096ft
Overview
Kyle Reamer-Staff
Geologist-RMG
184735 - 22755
McDaniels Road
08 Sep 2021, 11:31:29 AM


W
NW
N
270
300
330
0
313°NW (T) 38°51'8"N, 104°24'36"W ±16ft 6086ft
Overview
Kyle Reamer-Staff
Geologist-RMG
184735 - 22755
McDaniels Road
08 Sep 2021, 11:33:01 AM


E
SE
S
SW
90
120
150
180
210
158°SE (T) 38°51'8"N, 104°24'36"W ±16ft 6088ft
Overview
Kyle Reamer-Staff
Geologist-RMG
184735 - 22755
McDaniels Road
08 Sep 2021, 11:33:11 AM


SE
S
SW
120
150
180
210
162°S (T) 38°51'7"N, 104°24'36"W ±16ft 6079ft
Overview
Kyle Reamer-Staff
Geologist-RMG
184735 - 22755
McDaniels Road
08 Sep 2021, 11:33:37 AM


NE
E
SE
30
60
90
120
73°E (T) 38°51'5"N, 104°24'34"W ±16ft 6078ft
Overview
Kyle Reamer-Staff
Geologist-RMG
184735 - 22755
McDaniels Road
08 Sep 2021, 11:34:19 AM


E
90
SE
120
150
S
180
210
141°SE (T) 38°51'5"N, 104°24'34"W ±16ft 6077ft
Overview
Kyle Reamer-Staff
Geologist-RMG
184735 - 22755
McDaniels Road
08 Sep 2021, 11:34:27 AM


N
NE
E
0
30
60
90
120
53°NE (T) 38°51'2"N, 104°24'35"W ±16ft 6083ft
Overview
Kyle Reamer-Staff
Geologist-RMG
184735 - 22755
McDaniels Road
08 Sep 2021, 11:35:24 AM


SW
W
NW
0
240
270
300
330
282°W (T)
38°50'57"N, 104°24'37"W ±16ft
6075ft
Overview
Kyle Reamer-Staff
Geologist-RMG
184735 - 22755
McDaniels Road
08 Sep 2021, 11:36:59 AM


SE
S
SW
150
180
210
240
196°S (T) 38°50'57"N, 104°24'37"W ±16ft 6076ft
Overview
Kyle Reamer-Staff
Geologist-RMG
184735 - 22755
McDaniels Road
08 Sep 2021, 11:37:13 AM


NE
E
SE
30
60
90
120
15
80°E (T) 38°50'57"N, 104°24'37"W ±16ft 6077ft
Overview
Kyle Reamer-Staff
Geologist-RMG
184735 - 22755
McDaniels Road
08 Sep 2021, 11:37:23 AM


NW
N
NE
300
330
0
30
60
3°N (T)
38°50'57"N, 104°24'37"W ±16ft
6078ft
Overview
Kyle Reamer-Staff
Geologist-RMG
184735 - 22755
McDaniels Road
08 Sep 2021, 11:37:34 AM


N
NE
E
330
0
30
60
90
39°NE (T)
38°50'57"N, 104°24'36"W ±16ft
6081ft
Overview
Kyle Reamer-Staff
Geologist-RMG
184735 - 22755
McDaniels Road
08 Sep 2021, 11:37:58 AM


NE
E
SE
30
60
90
120
75°E (T) 38°50'56"N, 104°24'21"W ±16ft 6068ft
Overview
Kyle Reamer-Staff
Geologist-RMG
184735 - 22755
McDaniels Road
08 Sep 2021, 11:41:22 AM


E
SE
S
SW
90
120
150
180
210
160°S (T)
38°50'57"N, 104°24'21"W ±16ft
6068ft
Overview
Kyle Reamer-Staff
Geologist-RMG
184735 - 22755
McDaniels Road
08 Sep 2021, 11:41:33 AM


NW
N
NE
300
330
0
30
60
358°N (T) 38°50'57"N, 104°24'21"W ±16ft 6067ft
Overview
Kyle Reamer-Staff
Geologist-RMG
184735 - 22755
McDaniels Road
08 Sep 2021, 11:41:43 AM


SW
W
NW
240
270
300
330
285°W (T)
38°50'57"N, 104°24'21"W ±16ft
6066ft
Overview
Kyle Reamer-Staff
Geologist-RMG
184735 - 22755
McDaniels Road
08 Sep 2021, 11:41:56 AM


W NW N NE
70 300 330 0 30
339°N (T) 38°50'57"N, 104°24'21"W ±16ft 6065ft
Overview
Kyle Reamer-Staff
Geologist-RMG
184735 - 22755
McDaniels Road
08 Sep 2021, 11:42:03 AM


W
NW
N
240
270
300
330
0
304°NW (T) 38°50'59"N, 104°24'21"W ±16ft 6070ft
Overview
Kyle Reamer-Staff
Geologist-RMG
184735 - 22755
McDaniels Road
08 Sep 2021, 11:43:05 AM


S
SW
W
150
180
240
270
210°SW (T)
38°51'0"N, 104°24'23"W ±16ft
6074ft
Overview
Kyle Reamer-Staff
Geologist-RMG
184735 - 22755
McDaniels Road
08 Sep 2021, 11:43:30 AM


S
180
210
SW
240
W
270
225°SW (T) 38°51'2"N, 104°24'26"W ±16ft 6077ft
Overview
Kyle Reamer-Staff
Geologist-RMG
184735 - 22755
McDaniels Road
08 Sep 2021, 11:44:21 AM


E
SE
S
90
120
180
210
150°SE (T) 38°51'2"N, 104°24'27"W ±16ft 6075ft
Overview
Kyle Reamer-Staff
Geologist-RMG
184735 - 22755
McDaniels Road
08 Sep 2021, 11:44:46 AM

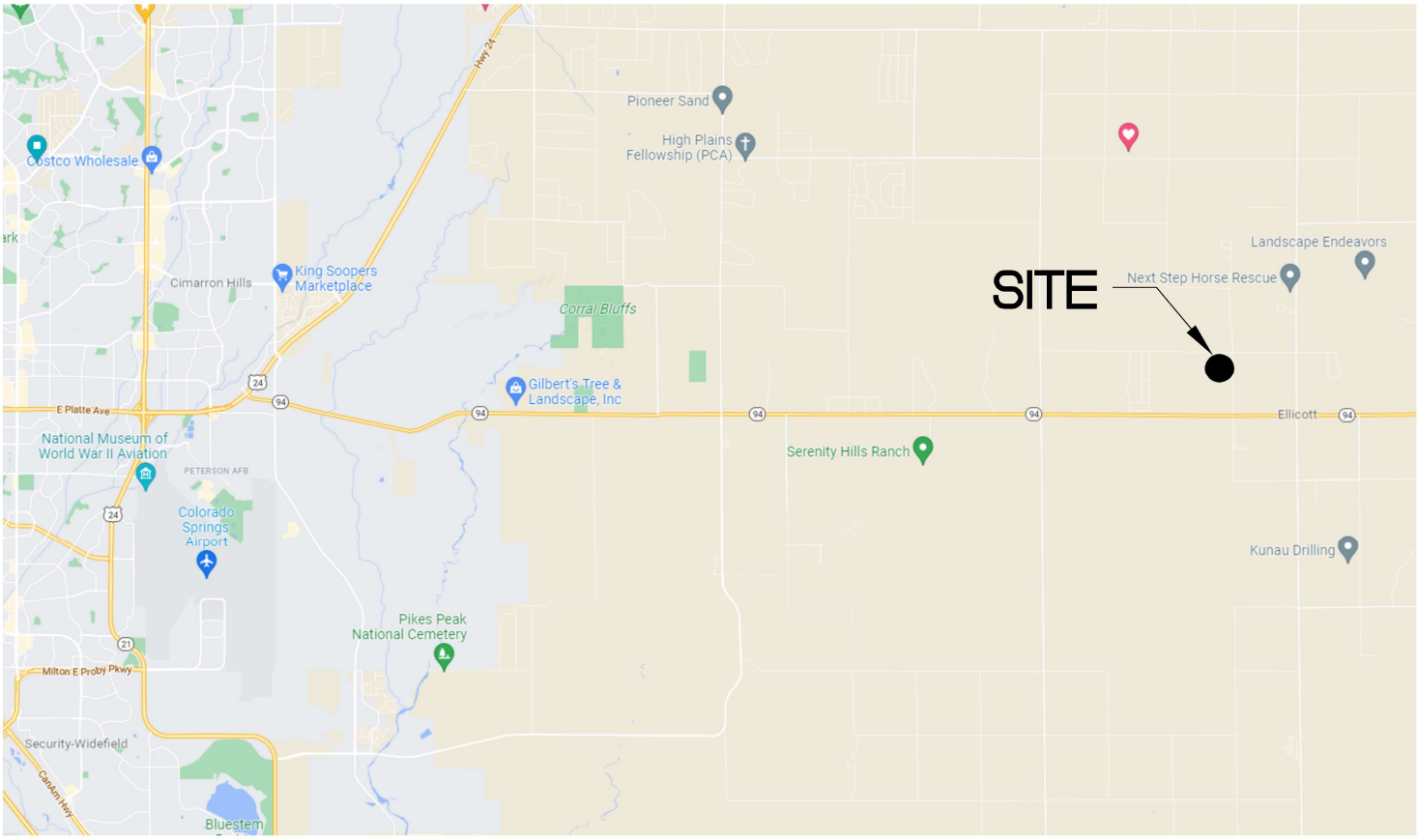

W
NW
N
240
270
30
330
0
302°NW (T) 38°51'2"N, 104°24'28"W ±16ft 6077ft
Overview
Kyle Reamer-Staff
Geologist-RMG
184735 - 22755
McDaniels Road
08 Sep 2021, 11:45:03 AM


W
NW
N
240
270
330
0
298°NW (T)
38°51'3"N, 104°24'30"W ±16ft
6076ft
Overview
Kyle Reamer-Staff
Geologist-RMG
184735 - 22755
McDaniels Road
08 Sep 2021, 11:45:36 AM


W
270
NW
300
330
N
0
30
323°NW (T) 38°51'3"N, 104°24'32"W ±16ft 6077ft
Overview
Kyle Reamer-Staff
Geologist-RMG
184735 - 22755
McDaniels Road
08 Sep 2021, 11:46:16 AM


W
270
NW
300
330
N
0
317°NW (T)
38°51'7"N, 104°24'35"W ±16ft
6081ft
Overview
Kyle Reamer-Staff
Geologist-RMG
184735 - 22755
McDaniels Road
08 Sep 2021, 11:47:25 AM

FIGURES



NOT TO SCALE

ARCHITECTS RMG ENGINEERS
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

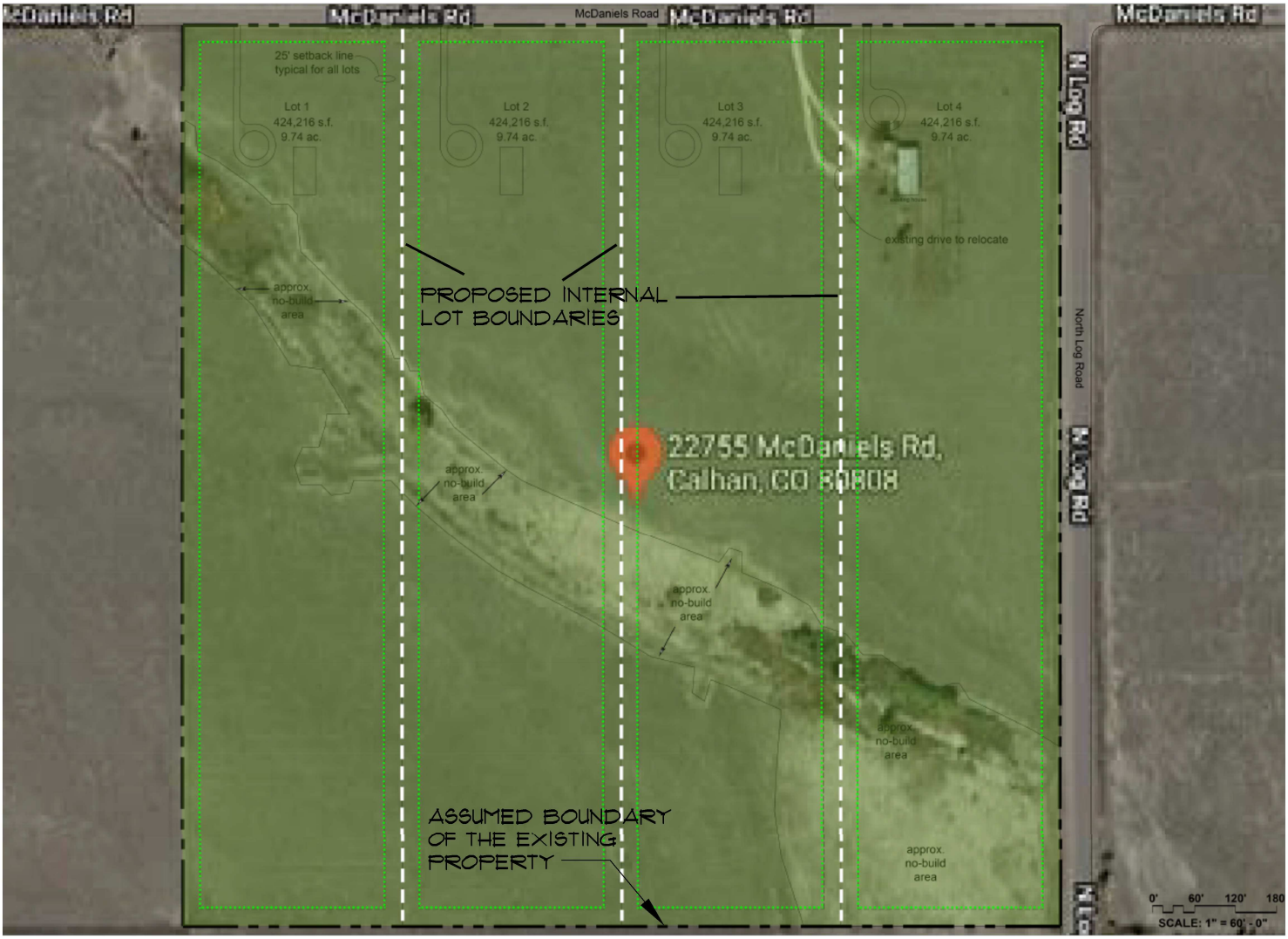
SITE VICINITY MAP

22755 MCDANIELS ROAD
EL PASO COUNTY, COLORADO
WILLIAM GUMAN AND ASSOCIATES, LTD

JOB No. 184735

FIG No. 1

DATE 12-20-2021



NOT TO SCALE

ARCHITECTS RMG ENGINEERS
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

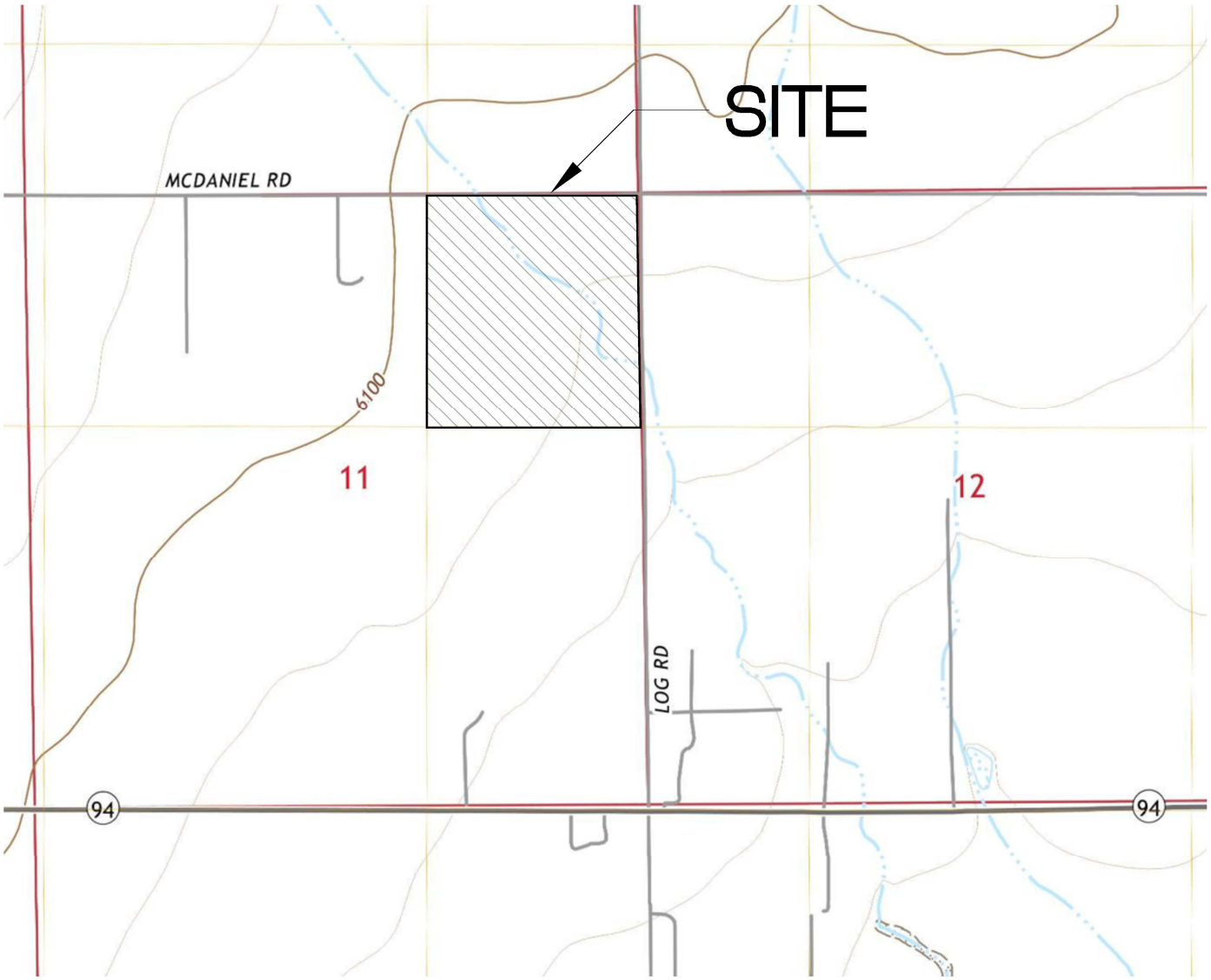
PROPOSED LOT LAYOUT

22755 MCDANIELS ROAD
EL PASO COUNTY, COLORADO
WILLIAM GUMAN AND ASSOCIATES, LTD

JOB No. 184735

FIG No. 2

DATE 12-20-2021



NOT TO SCALE

ARCHITECTS RMG ENGINEERS
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

22755 MCDANIELS ROAD
EL PASO COUNTY, COLORADO
WILLIAM GUMAN AND ASSOCIATES, LTD

JOB No. 184735

FIG No. 3

DATE 12-20-2021

TEST PIT TP-1

DATE OBSERVED: 09/02/21

SOIL DESCRIPTION	DEPTH (FT)	SYMBOL	SOIL TYPE
0 - 2.5 FT SAND (STRUCTURELESS)	2ft		1
2.5 FT - 4.5 FT SAND (STRUCTURELESS)	4ft		R-0
4.5 FT - 8.0 FT SAND (STRUCTURELESS)	6ft		1
	8ft		

TEST PIT TP-2

DATE OBSERVED: 09/02/21

SOIL DESCRIPTION	DEPTH (FT)	SYMBOL	SOIL TYPE
0 - 2.5 FT LOAM (STRONG)	2ft		2
2.5 FT - 5.0 FT CLAY LOAM (MODERATE)	4ft		3
5.0 FT - 8.0 FT SANDY CLAY LOAM (MODERATE)	6ft		3
	8ft		

SOIL DESCRIPTIONS


CLAY LOAM


SAND
(SOIL TYPE 1)


SAND
(SOIL TYPE R-0)


SANDY CLAY LOAM


LOAM

ARCHITECTS RMG ENGINEERS
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

22755 MCDANIELS ROAD
EL PASO COUNTY, COLORADO
WILLIAM GUMAN AND ASSOCIATES, LTD

JOB No. 184735

FIGURE No. 4

DATE 12-20-2021

TEST PIT TP-3			
DATE OBSERVED: 09/02/21			
SOIL DESCRIPTION	DEPTH (FT)	SYMBOL	SOIL TYPE
0 - 2.5 FT LOAMY SAND (STRUCTURELESS)	2ft		1
2.5 - 4.0 FT SAND (STRUCTURELESS)	4ft		1
4.0 FT - 8.0 FT LOAMY SAND (STRUCTURELESS)	6ft		1
	8ft		

SOIL DESCRIPTIONS

SAND

LOAMY SAND

ARCHITECTS RMG ENGINEERS
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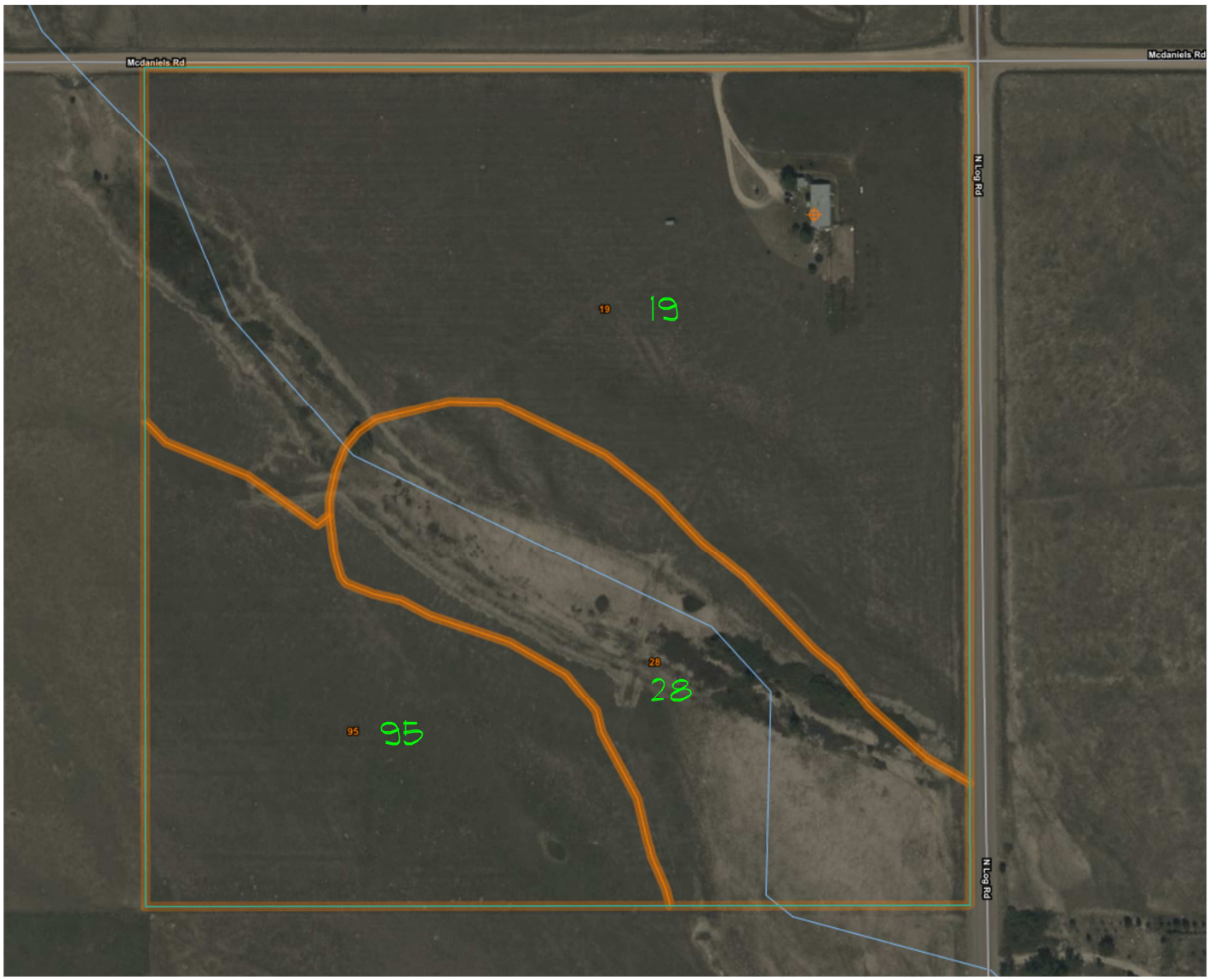
TEST PIT LOGS

22755 MCDANIELS ROAD
EL PASO COUNTY, COLORADO
WILLIAM GUMAN AND ASSOCIATES, LTD

JOB No. 184735

FIGURE No. 4

DATE 12-20-2021



19 - Columbine gravelly sandy loam, 0 to 3 percent slopes

28 - Ellicott loamy coarse sand, 0 to 5 percent slopes

95 - Truckton loamy sand, 1 to 9 percent slopes

NOT TO SCALE

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USDA SOIL SURVEY MAP

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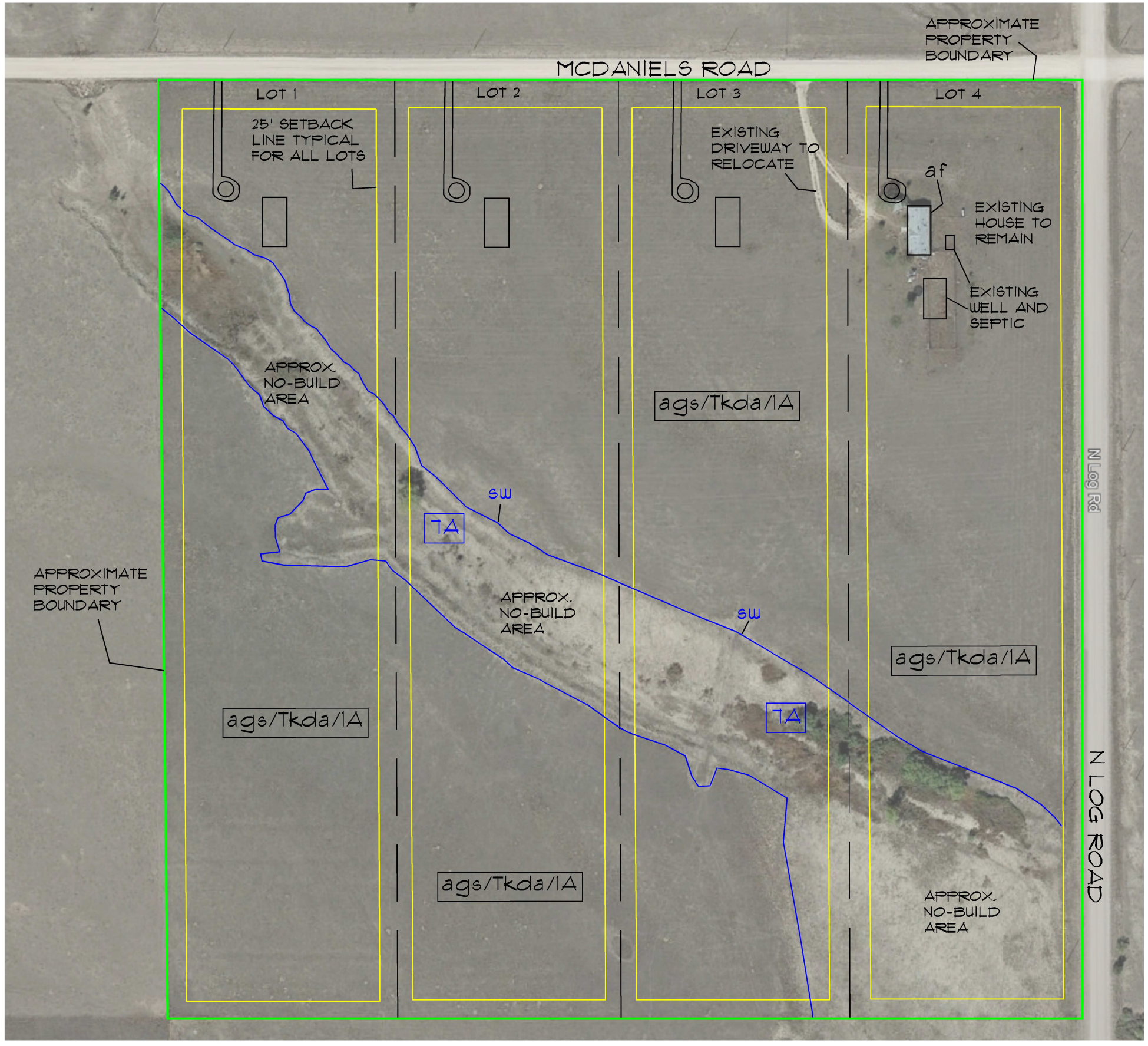
FIG No. 5

DATE 12-20-2021



NOT TO SCALE

Geologic

ags - Alluvial sand, silt, clay and gravel (Louviers and Slocum Alluviums, undivided, late middle Pleistocene)

Tkda - Dawson Formation (Upper Cretaceous and Paleocene)

sw - Seasonally wet area

af - Artificial fill area - man-placed artificial fill placed around 2000 with the construction of the existing single-family residence

Engineering

1A - Stable alluvium, and bedrock on flat to gentle slopes (0-5%)

7A - Physiographic Floodplain, no-build area

Proposed single-family residences

Proposed lot boundaries

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22755 MCDANIELS ROAD

EL PASO COUNTY, COLORADO
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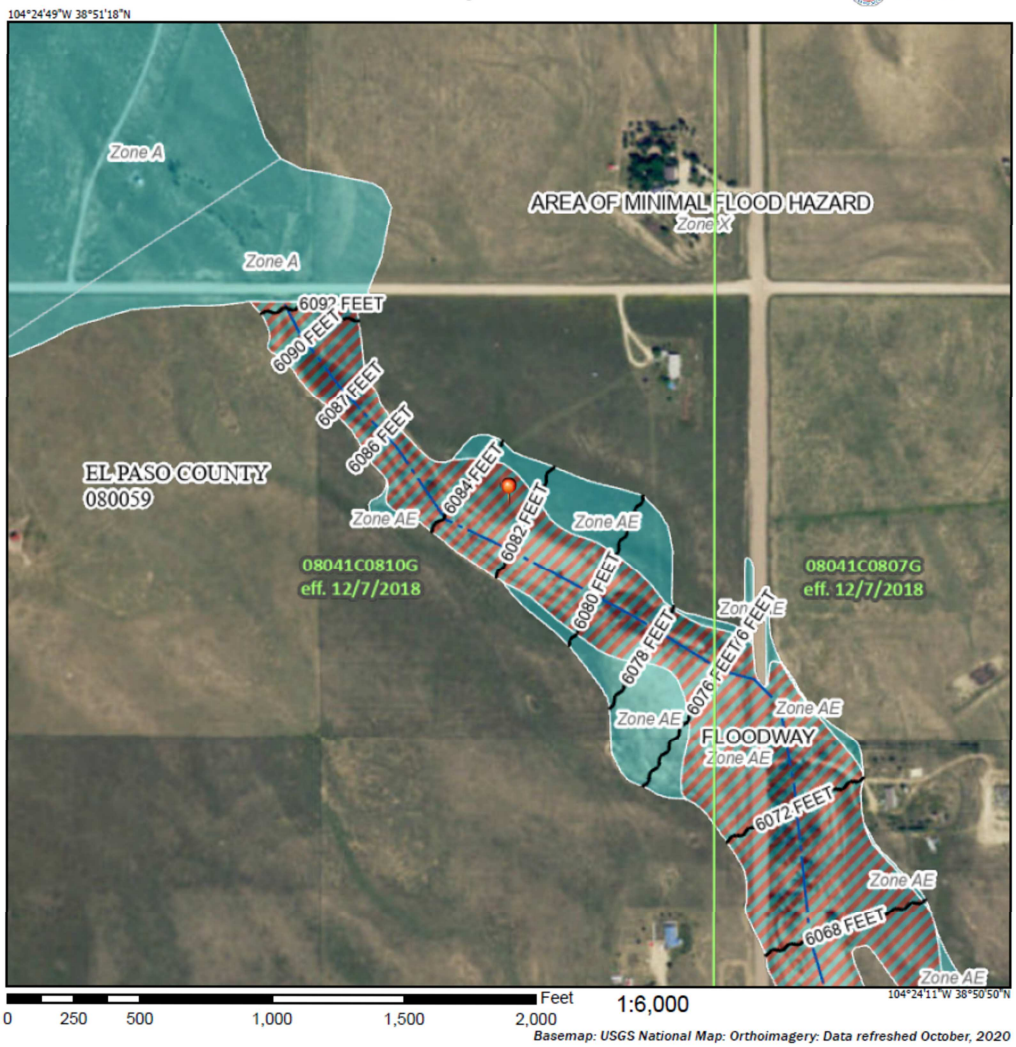
ENGINEER:	TPM
DRAWN BY:	KCR
CHECKED BY:	TPM
ISSUED:	12-20-2021

ENGINEERING AND GEOLOGY MAP

SHEET No.
FIG-6

National Flood Hazard Layer FIRMette



FEMA

Legend

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

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) Zone A, V, A99
- 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

OTHER AREAS
- NO SCREEN Area of Minimal Flood Hazard Zone X
- Effective LOMRs
- Area of Undetermined Flood Hazard Zone D

GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

OTHER FEATURES
- 20.2 / 17.5 Cross Sections with 1% Annual Chance Water Surface Elevation
- Coastal Transect
- Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature

MAP PANELS
- Digital Data Available
- No Digital Data Available
- Unmapped

N

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 10/26/2021 at 1:09 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.

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FEMA MAP

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FIG No. 7

DATE 12-20-2021

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DENOTES APPROXIMATE LOCATION OF TEST PITS

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TEST PIT LOCATION MAP

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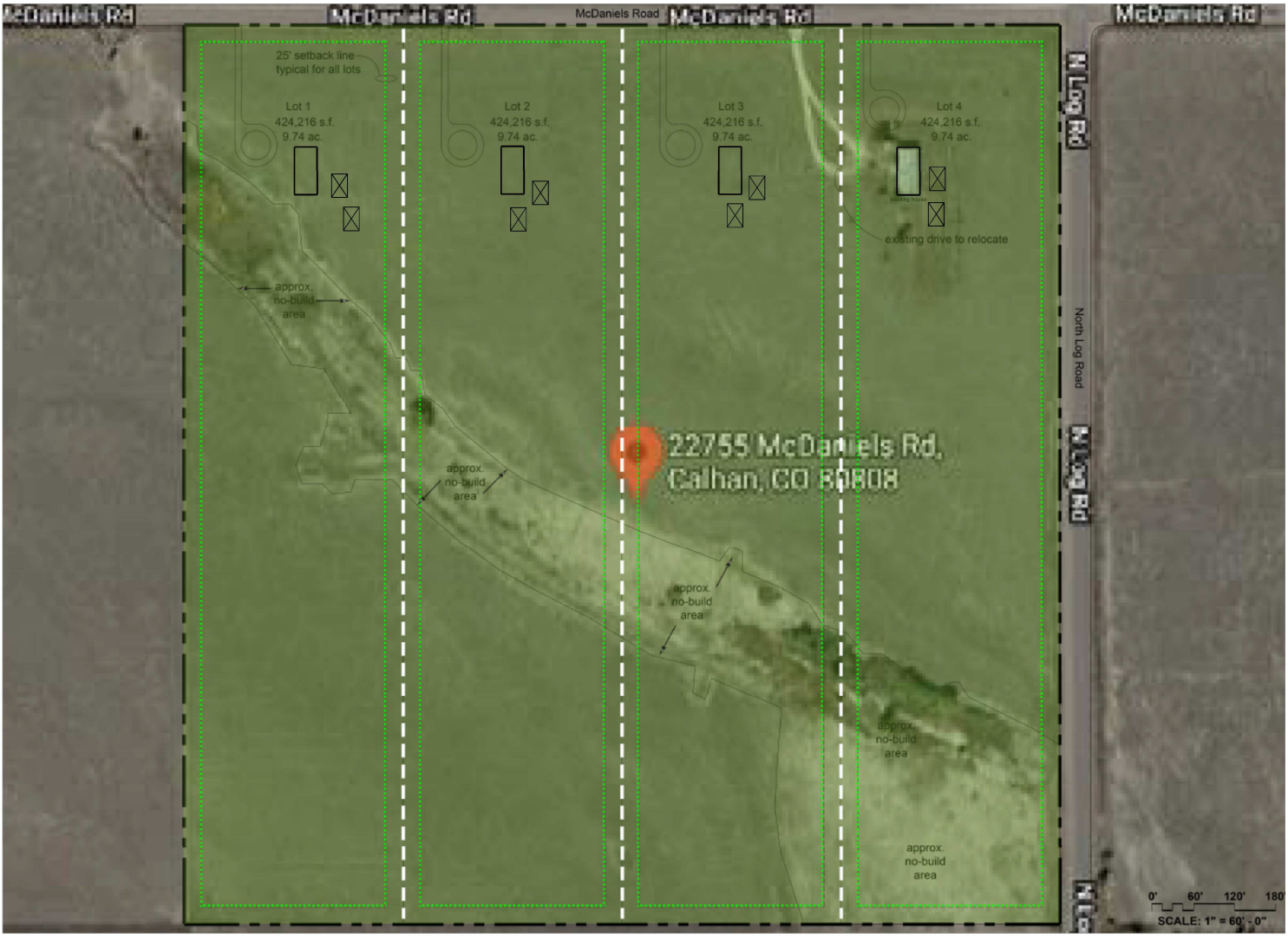
FIG No. 8

DATE 12-20-2021



DENOTES PROPOSED PRELIMINARY HOUSE LOCATIONS

DENOTES PROPOSED PRIMARY AND ALTERNATE SEPTIC LOCATIONS

NOT TO SCALE

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SEPTIC SUITABILITY MAP

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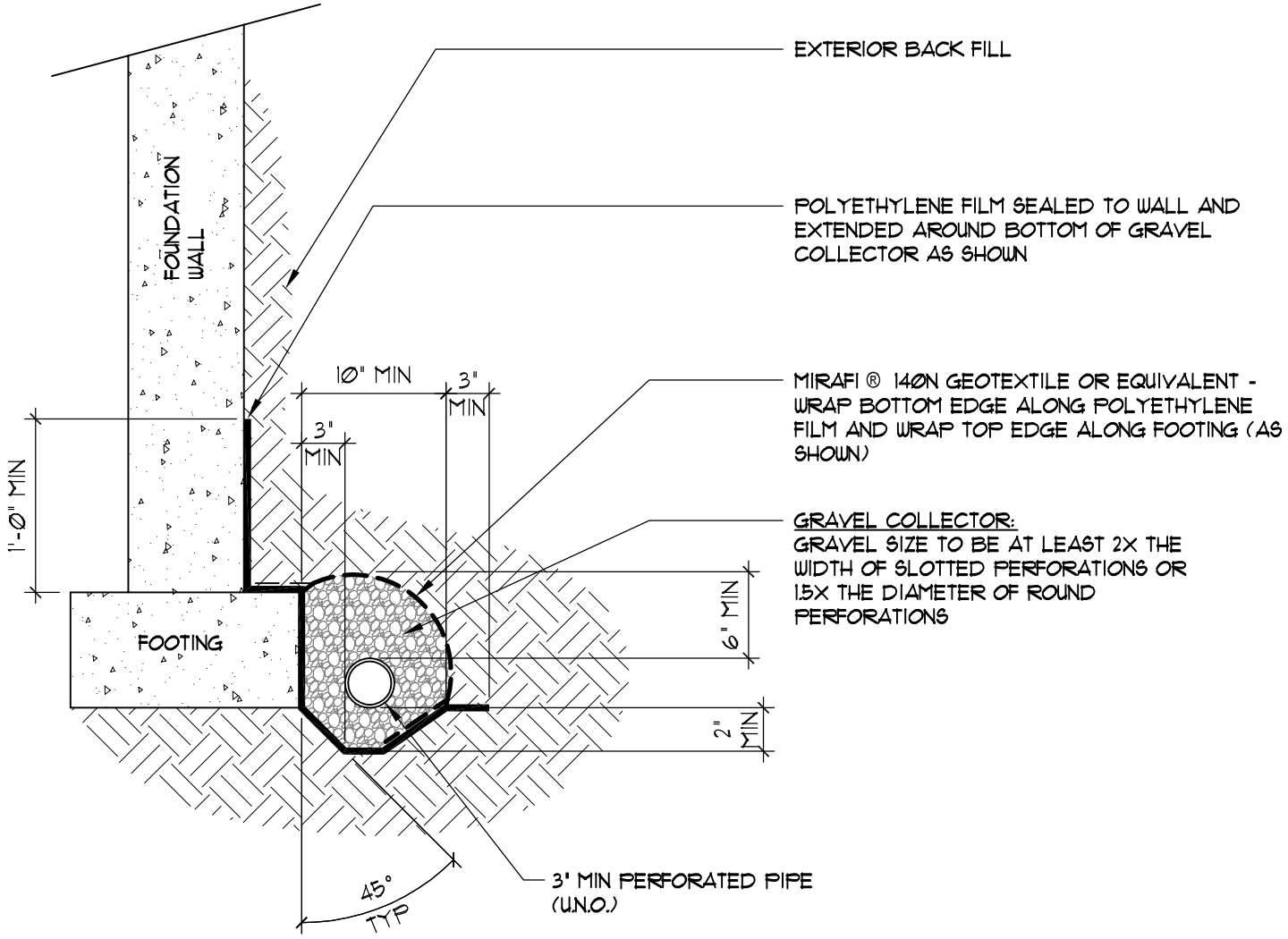
FIG No. 9

DATE 12-20-2021



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.

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PERIMETER DRAIN

FIG No. 10