

Architectural
Structural
Geotechnical



Materials Testing
Forensic
Civil/Planning

SOIL AND GEOLOGY STUDY

**Falcon Storage
7630 Bent Grass Meadows Drive
El Paso County, Colorado**

PREPARED FOR:

**Vollmer Road Partners, LLP
6035 Erin Park Dr, Ste #103
Colorado Springs, CO 80918**

JOB NO. 193324

June 23, 2023

Respectfully Submitted,

RMG – Rocky Mountain Group

A handwritten signature in blue ink that reads 'Kelli Zigler'.

**Kelli Zigler
Project Geologist**

Reviewed by,

RMG – Rocky Mountain Group

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



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1.0 GENERAL SITE AND PROJECT DESCRIPTION

1.1 Project Location

The project lies in the W ½ of Section 01, Township 13 South, Range 65 West of the 6th Principal Meridian in El Paso County, Colorado. The site is generally located north and west of the intersection of Woodmen Road and Bent Grass Meadows Drive. 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):

- Schedule No. 5301000018, currently labeled as Bent Grass Meadows Drive, zoned I-2, consists of approximately 5.0 acres, and land use is classified as agricultural grazing land;

The site is currently being used as an RV storage lot. It is a 5-acre unplatted lot that is adjacent to / contiguous with the Falcon Storage, which was platted as Lot 1, Latigo Business Center, Filing No. 1. The lot is accessed from the existing Bent Grass Meadows Drive. The site is to remain a RV storage lot.

1.3 Project Description

It is our understanding that the lot is required to be platted to comply with County requirements and criteria. No new structures or on-site wastewater treatment systems (OWTS) are currently proposed. The Proposed Lot Layout is presented in Figure 2.

1.4 Previous Investigations

One previous geotechnical engineering investigation for the lot to the south of the site was available for our review and is listed below:

1. *Subsurface Soil Investigation, 7630 Bent Grass Meadow Drive, 80831*, Parr Engineering, Job Number CS.13.289, dated November 20, 2013.

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 22 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 22 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 present our opinions of the potential effect of these conditions on the proposed development within the Town of Peyton, 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
- 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 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 currently vacant undeveloped land. The site is generally located north and west of the intersection of Woodmen Road and Bent Grass Meadows Drive, within El Paso County, Colorado. The site is bound to the north by Falcon Meadows at Bent Grass, a single family development, to the south by Falcon Meadows current RV storage lot, to the east by Bent Grass Meadows Drive, and to the west by vacant 5-acre lots within the Meadow Lake Estates subdivision, a single family development. A cluster of end dump piles is located near the central portion of the lot portion of the property.

4.2 Topography

Based on our site reconnaissance on May 12, 2023 and USGS 2022 topographic map of the Falcon NW Quadrangle, the site generally slopes down to the south and east. No drainageways or natural waterways exist on the property.

4.3 Vegetation

The site vegetation primarily consists of tall native grasses, cacti, weeds, and other prairie-type vegetation.

4.4 Aerial Photographs and Remote-Sensing Imagery

Personnel of RMG reviewed aerial photos available through Google Earth Pro dating back to 1985, Colorado Geological Survey (CGS) surficial geologic mapping, and historical photos by historicaerials.com dating back to 1947. Other than the expansion of the RV storage facility, the site has remained vacant, undeveloped land.

5.0 FIELD INVESTIGATION AND LABORATORY TESTING

The subsurface conditions were explored by RMG by drilling two (2) exploratory borings on March 12, 2023, extending to depths of approximately 20 feet below the existing ground surface. Test pits were not considered necessary at this time since an on-site wastewater system is currently not proposed. The test borings were spaced to provide preliminary soil information across the site. New foundations are currently not proposed. The Test Boring Location Plan is presented in Figure 3.

The test borings were drilled with a power-driven, continuous-flight auger drill rig. Samples were obtained during drilling of the test boring in general accordance with ASTM D-1586 and D-3550, utilizing a 2-inch O.D. Split Barrel Sampler. The test pits were performed with a mini-excavator, provided by others, and observed by RMG at the time of excavation. An Explanation of Test Boring Logs and the Test Boring Logs are presented in Figures 4 and 5.

5.1 Laboratory Testing

Soil laboratory testing was performed as part of this investigation. The laboratory tests included moisture content, grain-size analyses, and Atterberg Limit tests. A Summary of Laboratory Test Results is presented in Figure 6. Soils Classification Data is presented in Figure 7.

6.0 SOIL, GEOLOGY, AND ENGINEERING GEOLOGY

The site is located within the central portion of the Great Plains Physiographic 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 alluvium and eolian composed of sand, silt, clay, gravel, and occasional boulders that overlie the Dawson Arkose.

6.1 Subsurface Soil Conditions

The subsurface materials encountered in the test borings were classified visually in the field and within the laboratory using the Unified Soil Classification System (USCS). The materials were identified and classified as well-graded silty sand (SW-SM) and silty sand (SM).

Additional descriptions and the interpreted distribution (approximate depths) of the subsurface materials are presented on the Test Boring Logs. The classifications shown on the logs are based upon the visual 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

In general, the bedrock (as mapped by Colorado Geologic Survey - CGS) beneath the site is considered to be part of the Dawson Formation. The sandstone bedrock was not encountered in the RMG test borings. Currently structures are not proposed, however, if future structures were to be considered, the soils are generally suitable for shallow foundations. Overall, the on-site sands can readily be excavated with standard construction equipment such as a front-end loader or excavator.

6.3 U.S. Soil Conservation Service

The USDA/NRCS soil survey identified one soil type on the property:

- 19 – Columbine gravelly sandy loam, 0 to 3 percent slopes. The Columbine gravelly sandy loam was mapped by the USDA to encompass the majority of the property. Properties of the sandy loam include, well-drained soils, depth of the water table is anticipated to be greater than 6.5 feet, runoff is anticipated to be low, frequency of flooding and/or ponding is none, and landforms include fans, floodplain and fan terraces.

The USDA Soil Survey Map is presented in Figure 8.

6.4 General Geologic Conditions

Based on our field observations and review of relevant geologic maps, we identified the geologic conditions (listed below) affecting the development, as shown on the Engineering Geology Map, Figure 9.

The site generally consists of alluvium and eolian deposits of the Holocene and Upper Pleistocene overlying the Dawson Formation. Two units were mapped at the site as:

- *Qa₃ – Alluvium three (upper Pleistocene)* – tan to reddish brown to grayish brown, poorly sorted, moderately consolidated, poorly to moderately stratified silt, sand, gravel, and cobbly gravel. Maximum exposed thickness of the unit locally exceeds 20 feet.
- *Af- Artificial Fill* – man placed, soil stockpiles near the southern property boundary.

6.5 Engineering Geology

Two engineering geology units were mapped at the site and are shown on the Engineering Geology Map, Figure 9.

- *2B* – Stable alluvium, colluvium and bedrock on flat to moderate slopes (0-12%)

The map unit description for the above units were provided by Charles Robinson and Associates (1977).

6.6 Structural Features

Structural features such as schistosity, folds, zones of contortion or crushing, joints, shear zones or faults were not observed by RMG on the site or in the surrounding area.

6.7 Surficial (Unconsolidated) Deposits

Lake and pond sediments, swamp accumulations, sand dunes, marine terrace deposits, talus accumulations, and creep was 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 Groundwater and Drainage of Surface Water

The overall topography of the site slopes down to the south and west. Groundwater was encountered at the time of drilling.

It should be noted that in granular soils and bedrock, some subsurface water conditions might be encountered due to the variability of the soil profile. Isolated sand and gravel layers within the soil, even those of limited thickness and width, can convey subsurface water. Subsurface water may also flow atop the interface between the upper soils and the underlying bedrock. While not indicative of a "groundwater" condition, these occurrences of subsurface water migration can (especially in times of heavy rainfall or snowmelt) result in water migration into the excavation or (once construction is complete) the building envelope. Builders and planners should be cognizant of the potential for the occurrence of subsurface water conditions during on-site construction, and be prepared to evaluate and mitigate each individual occurrence as necessary.

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.

6.10 Flooding and Surface Drainage

Based on our review of the Federal Emergency Management Agency (FEMA) Community Panel No. 08041C0535G and the online ArcGIS El Paso County Risk Map, the majority of the site lies outside of a 100-year floodplain. The site is within the boundaries of Zone X and Zone A.

Zone X is defined by FEMA as an area of minimal flood hazard that is determined to be outside the Special Flood Hazard Area and higher than the elevation of the 0.2-percent-annual-chance (or 500-year) flood. The entire site lies within Zone X. The FEMA Map is presented in Figure 11.

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 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. The tract is underlain primarily by the Dawson Arkose, a sedimentary formation of Tertiary age related to uplift and erosion of the Front Range.

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. 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. There is an active gravel pit approximately one mile to the south of the site and several within a five-mile radius of it.

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 hazards and constraints were considered in the preparation of this report and are not anticipated to pose a significant risk to the proposed development:

- Avalanches
- Debris Flow-Fans/Mudslides
- Expansive Soils
- Ground Subsidence and Abandoned Mining Activity
- Landslides
- Rockfall
- Steeply Dipping Bedrock
- History of Landfill
- Valley Fill
- Downhill/Down-slope Creep
- Soil Slumps and Undercutting
- Scour, Erosion, Accelerated Erosion Along Creek Banks and Drainageways
- Corrosive Minerals

The following sections present the geologic conditions that have been identified on (or anticipated to be on) the property:

8.1 Compressible Soils - constraint

Based on the test borings performed for this investigation, the sand with various amounts of silt and clay underlies the entire site. If future excavations are proposed, it's anticipated that the on-site sand soils will be encountered within the building excavations. In some cases, the sands encountered in the excavations may be loose.

Mitigation

If loose soils are encountered beneath any future foundations, mitigation will be required. Mitigations are anticipated to consist of additional compaction to achieve suitable allowable bearing pressures. Fluctuations in material density may occur. In some cases, removal and recompaction of up to 2 to 3 feet of soil may be required. The removal and recompaction shall extend a minimum of the same distance beyond the building perimeter, and at least that same distance beyond the perimeter of counterfort and "T" wall footings. The use of track-mounted excavation equipment, or other low ground pressure equipment, is recommended on loose soils to reduce the likelihood of loss of stability during excavation.

8.2 Springs and Groundwater – constraint

Based on the site observations, review of USGS topographic maps dating back to 1951, and review of Google Earth images dating back to 1999, springs do not appear to originate on the subject site. Furthermore, water and areas of seasonal shallow groundwater were not encountered during our investigation.

Drilling occurred in March, generally when seasonal groundwater levels are considered slightly higher than the winter months (November through February). The presence of groundwater was observed in the test borings for this investigation. Groundwater measurements are limited to the time of year measured and are considered snapshots only.

Fluctuations in groundwater and subsurface moisture conditions may occur due to variations in rainfall and other factors not readily apparent at this time. Groundwater information obtained at the time of the preliminary investigations performed prior to any future land development 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 high groundwater levels during high moisture periods and should structures encroach on these areas, the following mitigations should be followed.

Mitigation

Currently, no new structures are proposed. If development is proposed in the future, it is anticipated to consist of wood framed shops/garages or pre-engineered metal buildings (PEMB) with equipment storage. These types of structures are generally constructed atop a slab-on-grade foundations without crawlspaces or basements. Slab-on-grade foundations are anticipated to have adequate separation from the groundwater encountered in our borings.

It is assumed underground water beneath the subject site predominates in fractured weathered consolidated sedimentary bedrock located at depth. If deeper foundations are proposed in the future or if shallower underground water conditions are encountered during the site-specific subsurface soil investigations and/or open excavation observations, mitigations are to be provided at that time.

Due to the limited cut and fills proposed, groundwater is not anticipated to be encountered in the excavations or utility trenches. 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 help reduce the risk of the intrusion of water into areas below grade.

8.3 Uncontrolled/Undocumented Fill Placement - constraint

Stockpiles of soil were observed near the center of the property. The stockpiles of soil are considered uncontrolled fill and are not suitable for support of any future foundations.

Mitigation

It is anticipated the majority of the stockpiles would be relocated or redistributed if any future development is proposed. If unsuitable fill soils remain below future foundation components, they will require removal (overexcavation) and replacement with newly placed and compacted structural fill. The zone of overexcavation shall extend to the bottom of the unsuitable fill zone and shall extend at least that same distance beyond the building perimeter (or lateral extent of the fill, if encountered first).

8.4 Faults and Seismicity - hazard

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 0.213g 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.

8.5 Radon – constraint

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

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

All of the State of Colorado is considered EPA Zone 1 based on the information provided at https://county-radon.info/CO/El_Paso.html. 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 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 and seismicity. Geologic conditions (as described in section 8 of this report) found to be present at this site include potentially compressible soils, seasonally shallow groundwater and radon. It is our opinion that the existing geologic and engineering conditions can be satisfactorily mitigated through proper engineering, design, and construction practices.

10.0 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 any future proposed structures including any proposed retaining walls, etc.*

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.

11.0 CONCLUSIONS

Based upon our evaluation of the geologic conditions, it is our opinion any proposed future 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 for any future structures. 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.

We believe the well graded silty sand to silty sand will classify as Type B material as defined by OSHA. OSHA requires that temporary excavations made in Type B materials be laid back at ratios no steeper than 1:1 (horizontal to vertical), unless the excavation is shored and braced. Excavations deeper than 20 feet, or when water is present, should always be braced or the slope designed by a professional engineer.

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

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

It is important for the Owner(s) of each lot 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.

12.0 CLOSING

This report has been prepared for the exclusive purpose of providing geotechnical engineering information and recommendations for development described in this report. RMG should be retained to review the final construction documents prior to construction to verify our findings, conclusions and recommendations have been appropriately implemented.

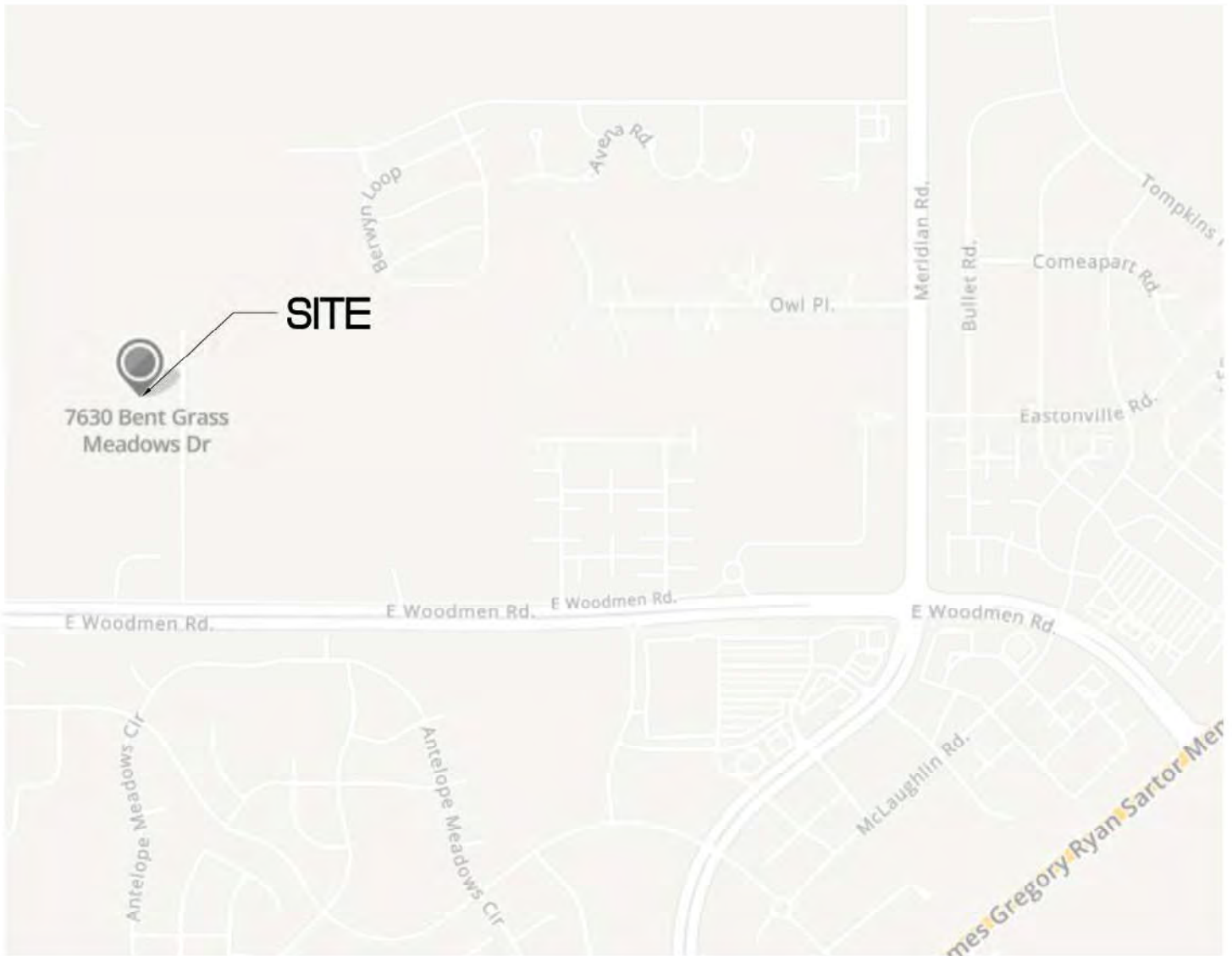
This report has been prepared for the exclusive use by **Vollmer Road Partners, LLP** for application as an aid in the design and construction of the proposed development in accordance with generally accepted geotechnical engineering practices. The analyses and recommendations in this report are based in part upon data obtained from test borings, site observations and the information presented in referenced reports. The nature and extent of variations may not become evident until construction. If variations then become evident, RMG should be retained to review the recommendations presented in this report considering the varied condition, and either verify or modify them in writing.

Our professional services were performed using that degree of care and skill ordinarily exercised, under similar circumstances, by geotechnical engineers 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.

The scope of services for this project does not include, either specifically or by implication, 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 Client desires investigation into the potential for such contamination or conditions, other studies should be undertaken.

If we can be of further assistance in discussing the contents of this report or analysis of the proposed development, from a geotechnical engineering point-of-view, please feel free to contact us.

FIGURES



NOT TO SCALE

Architecture
Structural
Geotechnical



Engineers / Architects

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COLORADO SPRINGS, CO 80918

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SOUTHERN COLORADO, DENVER METRO, NORTHERN COLORADO

Materials Testing
Forensics
Civil / Planning

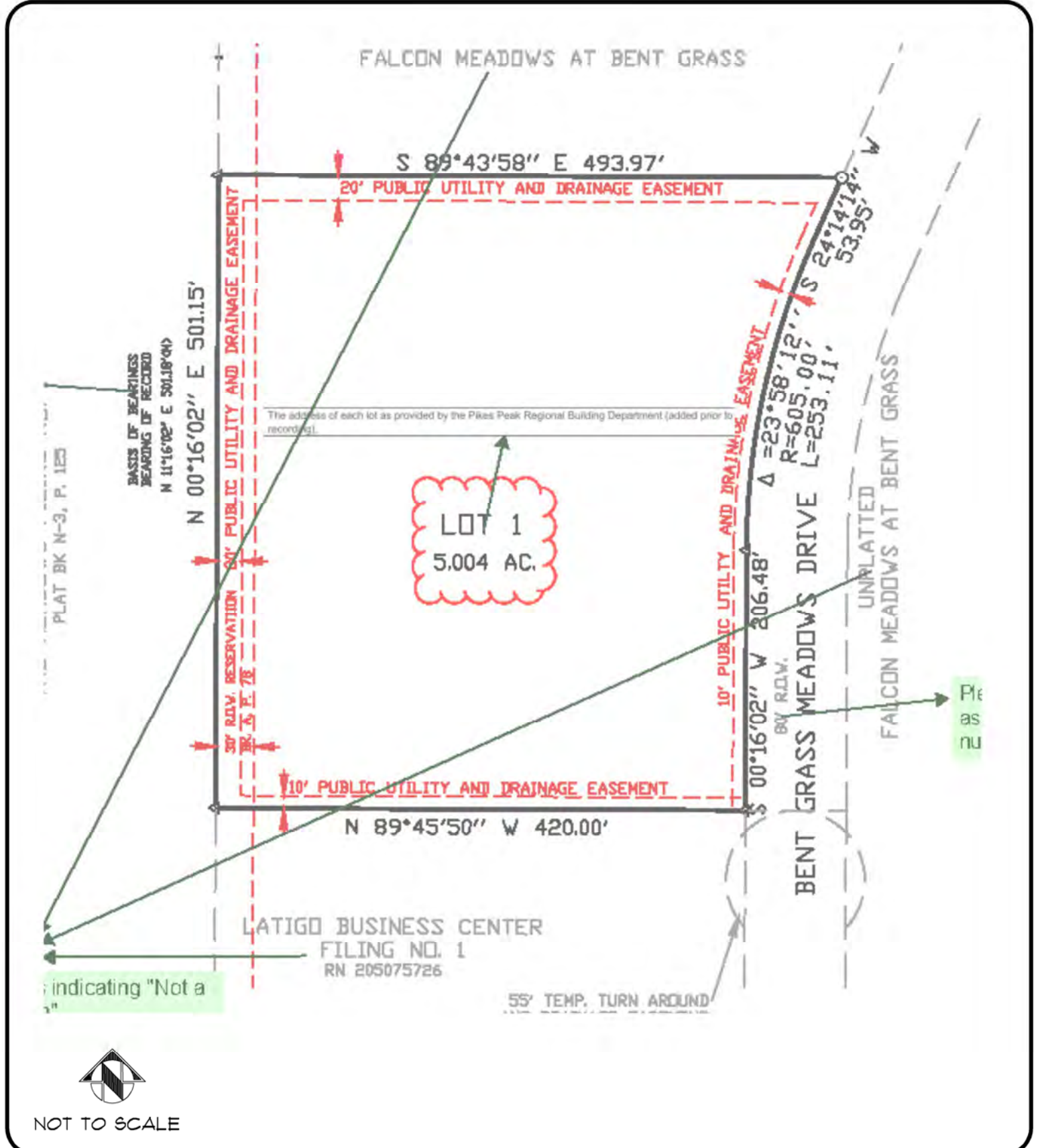
SITE VICINITY MAP

FALCON STORAGE
7630 BENT GRASS MEADOWS DRIVE
EL PASO COUNTY, COLORADO
VOLLMER ROAD PARTNERS, LLP

JOB No. 193324

FIG No. 1

DATE 6-23-2023



PLAT BK N-3, P. 123

BASIS OF BEARINGS
BEARING OF RECORD
N 11°16'02" E 501.18' (41)

N 00°16'02" E 501.15'

30' R.O.V. RESERVATION BY PUBLIC UTILITY AND DRAINAGE EASEMENT

S 89°43'58" E 493.97'

20' PUBLIC UTILITY AND DRAINAGE EASEMENT

LOT 1
5.004 AC.

The address of each lot as provided by the Pikes Peak Regional Building Department (added prior to recording).

10' PUBLIC UTILITY AND DRAINAGE EASEMENT

Δ = 23°58'12"

R = 605.00'

L = 253.11'

S 24°14'14" W
53.95'

BENT GRASS MEADOWS DRIVE

BY R.O.V.

30' R.O.V. RESERVATION BY BK. & P. 78

10' PUBLIC UTILITY AND DRAINAGE EASEMENT

N 89°45'50" W 420.00'

UNRELATED
FALCON MEADOWS AT BENT GRASS

LATIGO BUSINESS CENTER
FILING NO. 1
RN 205075726

indicating "Not a"

55' TEMP. TURN AROUND



NOT TO SCALE

Architecture
Structural
Geotechnical

RMG

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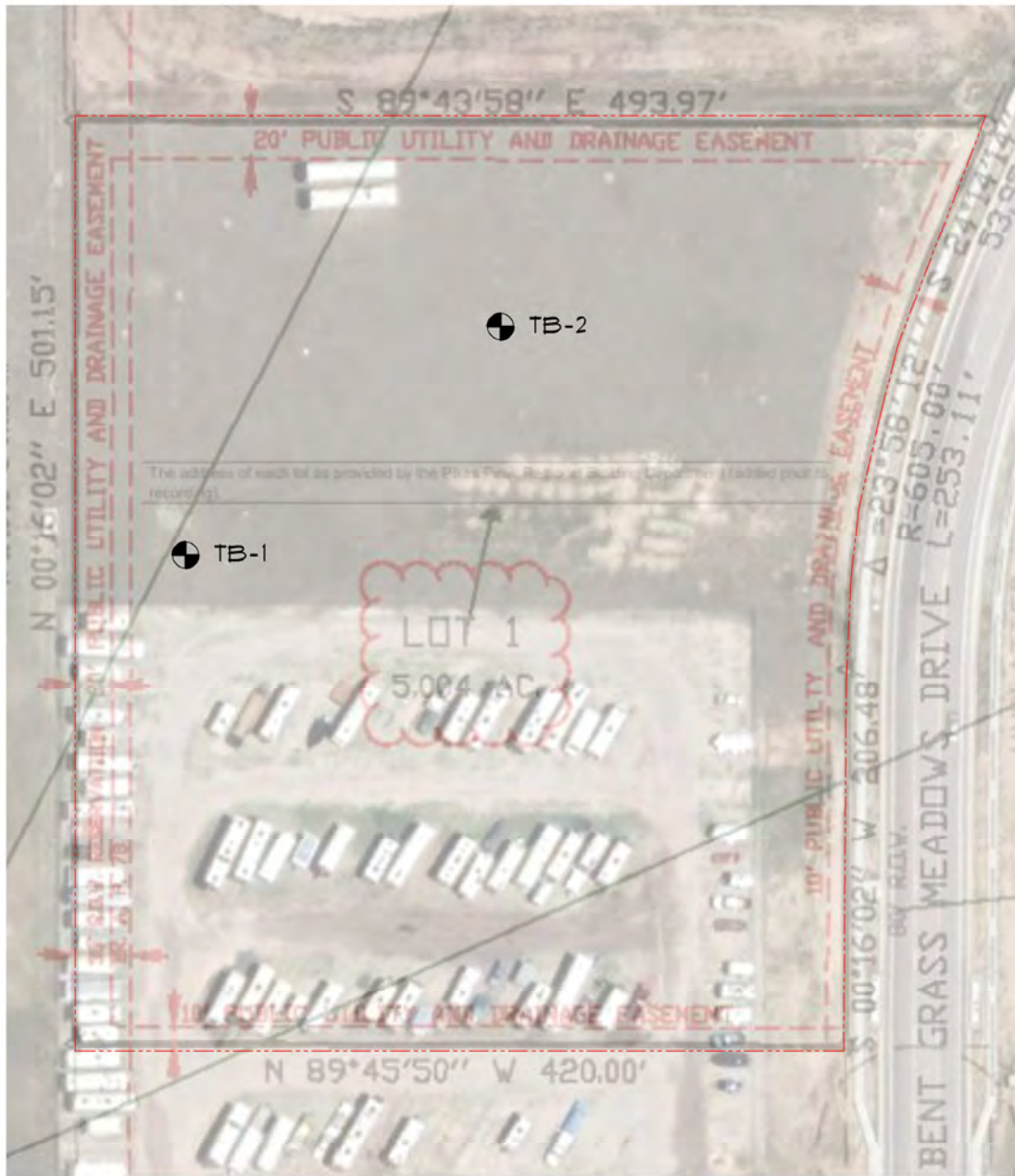
PROPOSED LOT LAYOUT

FALCON STORAGE
7630 BENT GRASS MEADOWS DRIVE
EL PASO COUNTY, COLORADO
VOLLMER ROAD PARTNERS, LLP

JOB No. 193324

FIG No. 2

DATE 6-23-2023



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DENOTES APPROXIMATE LOCATION OF TEST BORINGS

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TEST BORING LOCATION MAP

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EL PASO COUNTY, COLORADO
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FIG No. 3

DATE 6-23-2023

SOILS DESCRIPTION



SAND WITH VARYING AMOUNTS OF SILT AND CLAY

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

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EXPLANATION OF TEST BORING LOGS

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FIGURE No. 4

DATE Jun/23/2023



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	2.0	6.1		NP	NP	1.3	30.7			SM
1	7.0	3.3								
1	14.0	20.0								
2	4.0	2.2		NP	NP	8.6	9.8			SW-SM
2	9.0	4.6								
2	14.0	15.5								



ROCKY MOUNTAIN GROUP

Architectural
Structural
Forensics



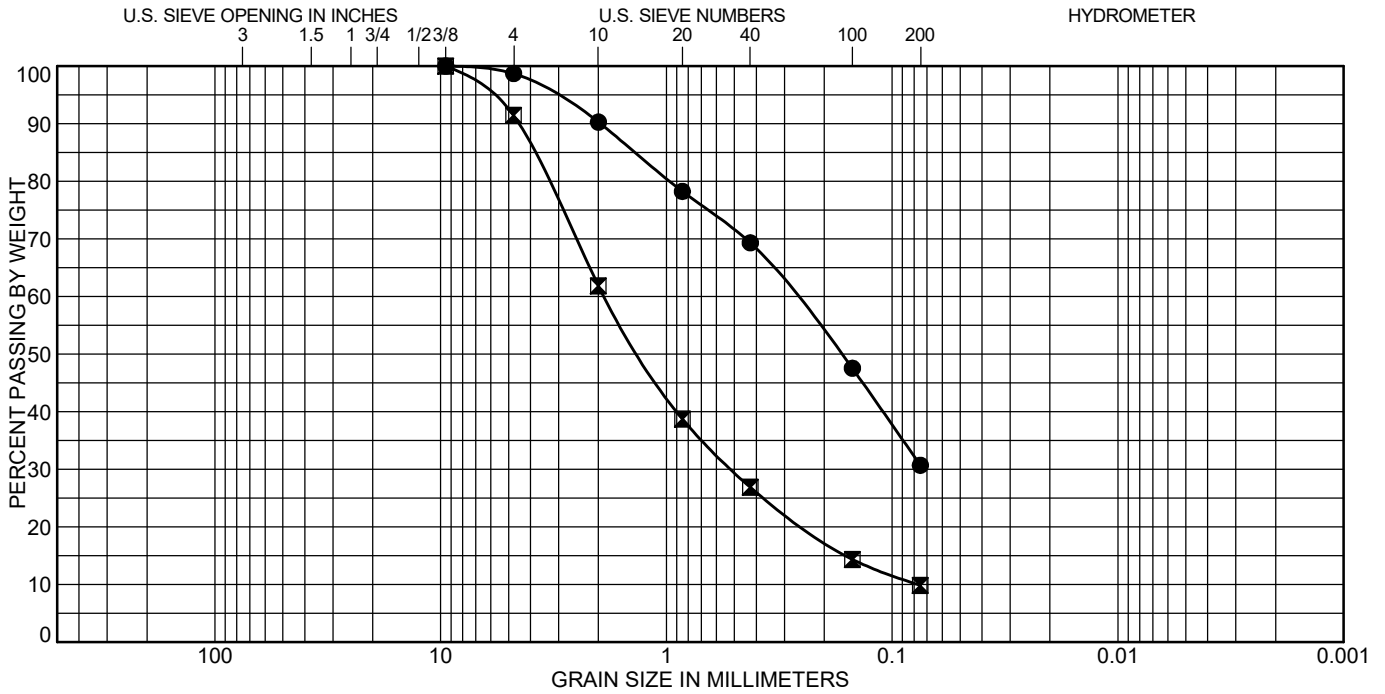
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SUMMARY OF LABORATORY TEST RESULTS

JOB No. 193324
FIGURE No. 6
PAGE 1 OF 1
DATE Jun/23/2023



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Test Boring	Depth (ft)	Classification	LL	PL	PI
● 1	2.0	SILTY SAND(SM)	NP	NP	NP
☒ 2	4.0	WELL-GRADED SAND with SILT(SW-SM)	NP	NP	NP

Test Boring	Depth (ft)	%Gravel	%Sand	%Silt	%Clay
● 1	2.0	1.3	68.0	30.7	
☒ 2	4.0	8.6	81.6	9.8	

ROCKY MOUNTAIN GROUP

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SOIL CLASSIFICATION DATA

JOB No. 193324

FIGURE No. 7

DATE Jun/23/2023

Soil Map—El Paso County Area, Colorado



SITE

19
18



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

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USDA SOIL SURVEY MAP

**FALCON STORAGE
7630 BENT GRASS MEADOWS DRIVE
EL PASO COUNTY, COLORADO
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FIG No. 8

DATE 6-23-2023



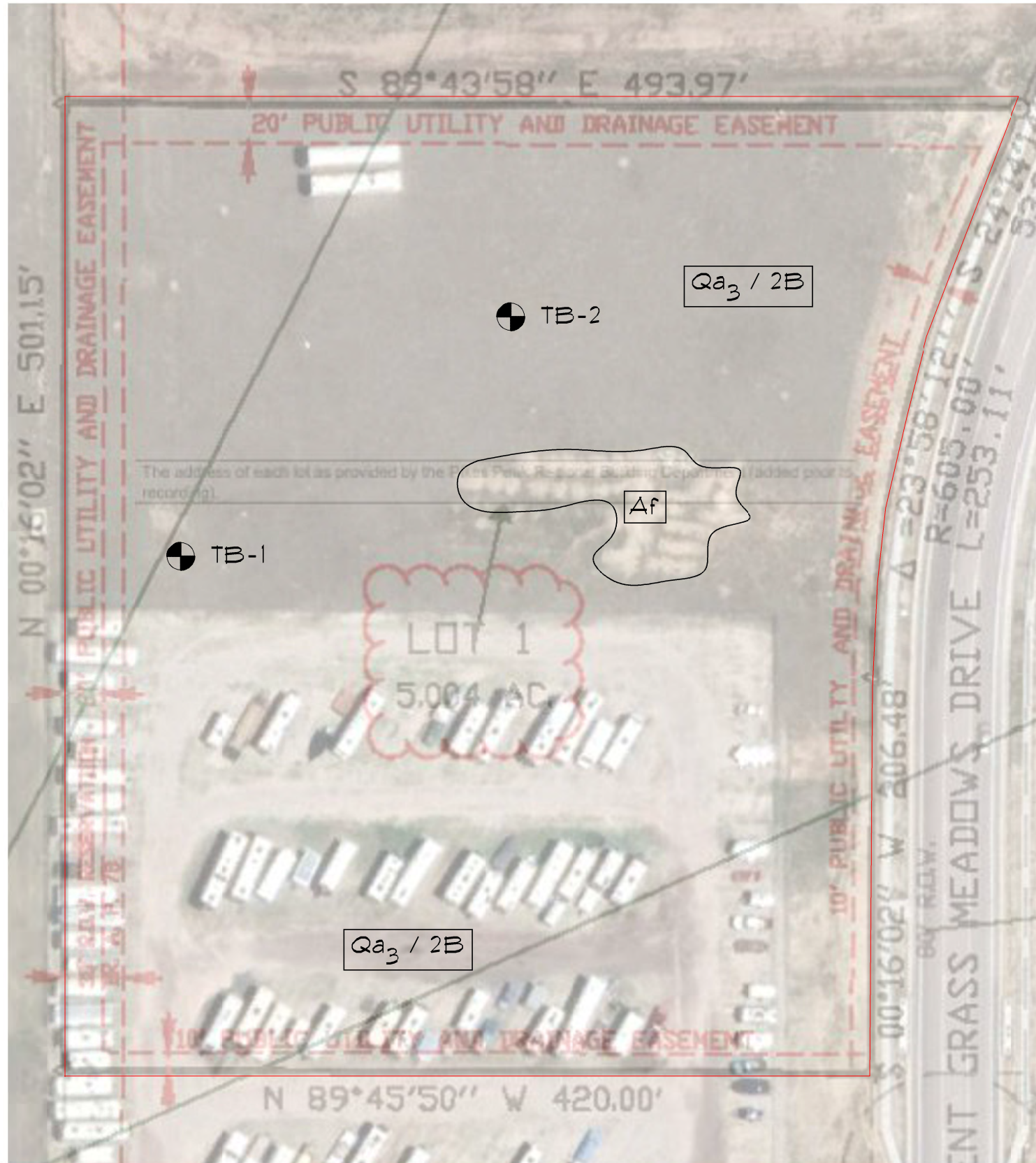
FALCON STORAGE
7630 BENT GRASS MEADOWS DRIVE

EL PASO COUNTY, COLORADO
VOLLMER ROAD PARTNERS, LLP

ENGINEER:	RT
DRAWN BY:	RT
CHECKED BY:	RT
ISSUED:	6-23-2023

ENGINEERING
AND GEOLOGY
MAP

SHEET No.
FIG-9



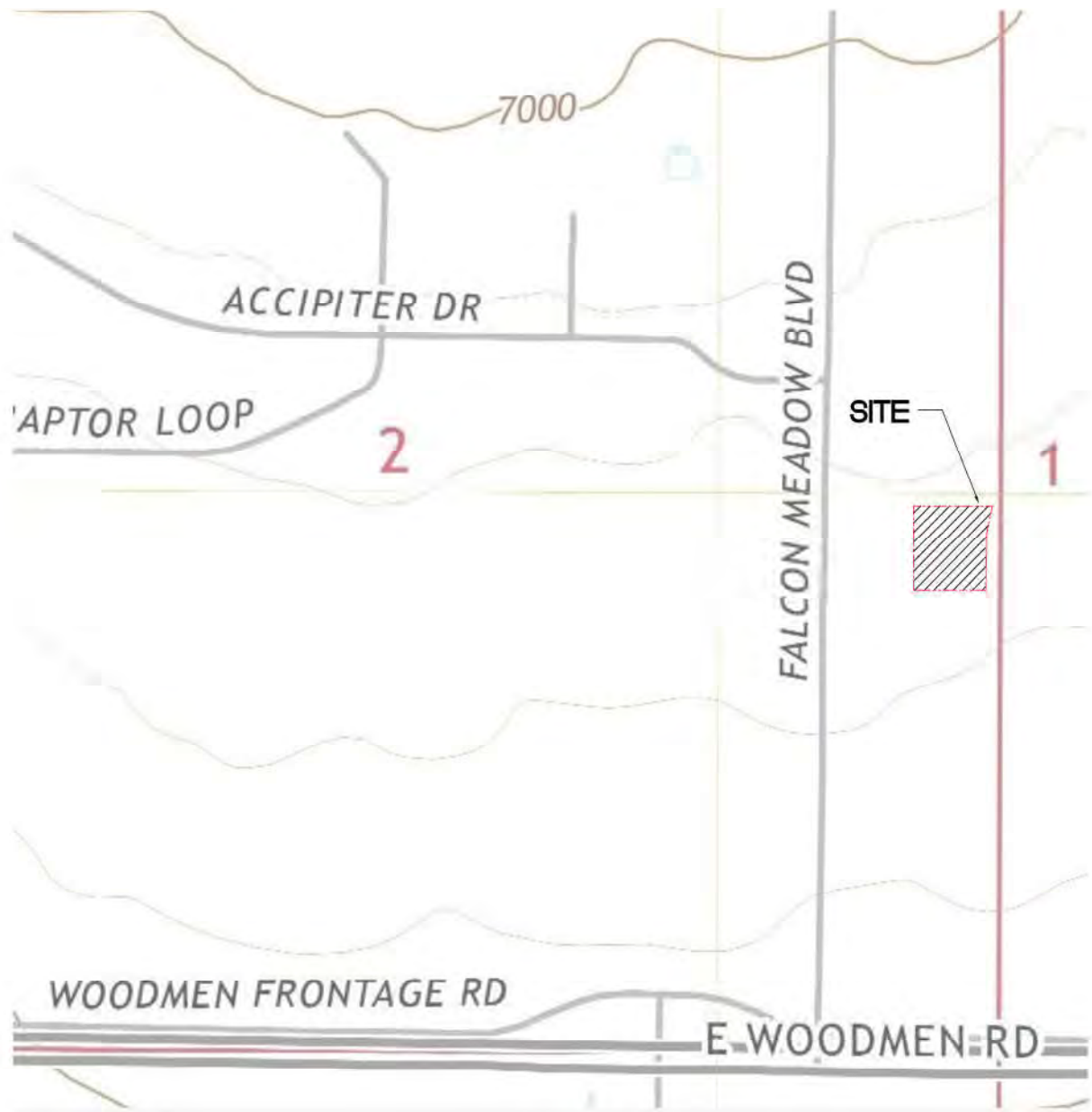
Geologic Conditions

- *Qa₃* - Alluvium three (upper Pleistocene) - tan to reddish brown to grayish brown, poorly sorted, moderately consolidated, poorly to moderately stratified silt, sand, gravel, and cobbly gravel. Maximum exposed thickness of the unit locally exceeds 20 feet.
- *Af* - Artificial Fill - Man-placed, soil stockpiles near the southern property boundary

Engineering Conditions

- *2B* - Stable alluvium, colluvium and bedrock on flat to moderate slopes (0-12%)

⊙ DENOTES APPROXIMATE LOCATION OF TEST BORINGS PERFORMED BY RMG FOR THIS STUDY



NOT TO SCALE

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USGS TOPO MAP

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FIG No. 10

DATE 6-23-2023



NOT TO SCALE

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Materials Testing
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Civil / Planning

FEMA MAP

FALCON STORAGE
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EL PASO COUNTY, COLORADO
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FIG No. 11

DATE 6-23-2023

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. 08041C0535G*, Federal Emergency Management Agency (FEMA), effective December 7, 2018.
3. *Environmental and Engineering Geologic Map for Land Use, Falcon NW Quadrangle*, compiled by Dale M. Cochran, Charles S. Robinson & Associates, Inc., Golden, Colorado, 1977.
4. *Map of Potential Geologic Hazards and Surficial Deposits, Falcon NW Quadrangle*, compiled by Dale M. Cochran, Charles S. Robinson & Associates, Inc., Golden, Colorado, 1977.
5. *Pikes Peak Regional Building Department*: <https://www.pprbd.org/>.
6. El Paso County Assessor Website
<https://property.spatalest.com/co/elpaso/#/property/5301000018>
Schedule No. 5301000018
7. *Colorado Geological Survey, USGS Geologic Map Viewer*:
<http://coloradogeologicalsurvey.org/geologic-mapping/6347-2/>.
8. *Historical Aerials*: <https://www.historicaerials.com/viewer>, Images dated 1947, 1955, 1960, 1969, 1983, 1999, 2005, 2009, 2011, 2013, 2015, 2017, and 2019.
9. *USGS Historical Topographic Map Explorer*: <http://historicalmaps.arcgis.com/usgs/> El Paso County, Falcon Quadrangle, 2022.
10. *Google Earth Pro*, Imagery dated 1999, 2003, 2004, 2005, 2006, 2011, 2013, 2015, 2017, 2019, 2020, 2021, and 2022.
11. 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
12. Mason, G. T., and Arndt, R. E., 1996, Mineral resource data system (MRDS): U.S. Geological Survey Digital Data Series DDS-20 (CD-ROM).
13. *Evaluation of Mineral and Mineral Fuel Potential of El Paso County State Mineral Lands*
14. *The El Paso Aggregate Resource Evaluation Map, Master Plan for Mineral Extraction, Map 1*