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SOILS AND GEOLOGY STUDY
MONUMENT RIDGE EAST
PARCEL NOS. 55092-00-002
MONUMENT HILL ROAD AND PALMER DIVIDE ROAD
EL PASO COUNTY, COLORADO

Prepared for:

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Attn: Norbie Larsen

March 7, 2023

Respectfully Submitted,

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1.0 SUMMARY

Project Location

The project lies in portions of the W½ of Section 2, Township 11 South, Range 67 West of the 6th Principal Meridian in El Paso County, Colorado. The site is located at the southeast corner of Monument Hill Road and Palmer Divide East just north of Monument, Colorado.

Project Description

Total acreage involved in the project is 59.48 acres. The proposed site development consists of residential development consisting of duplex, three-plex, four-plex, single family lots, and other associated site improvements. The development will be serviced by Woodmoor Water and Sanitation District No. 1.

Scope of Report

This report presents the results of our geologic evaluation and treatment of engineering geologic hazard study.

Land Use and Engineering Geology

This site was found to be suitable for the proposed development. Areas were encountered where the geologic conditions will impose constraints on development and land use. These include areas of artificial fill, potentially expansive soils, shallow groundwater, seasonally wet, potentially seasonally wet, and potential areas of shallow bedrock. Based on the proposed site plan, it appears that these areas will have some impacts on the development. These conditions will be discussed in greater detail in the report.

In general, it is our opinion that the development can be achieved if the observed geologic conditions on site can be properly mitigated with site grading and engineering design. All recommendations are subject to the limitations discussed in the report.

2.0 GENERAL SITE CONDITIONS AND PROJECT DESCRIPTION

The site is in portions of the W½ of Section 2, Township 11 South, Range 67 West of the 6th Principal Meridian in El Paso County, Colorado. The site is located at the southeast corner of Monument Hill Road and Palmer Divide East just north of Monument, Colorado. The location of the site is as shown on the Vicinity Map, Figure 1.

The topography of the site is generally gradually to moderately sloping to the east, west, and north along a drainage through the central portion of the site. Portions of the drainage were wet, however, flowing water was not observed. Several minor drainage swales were observed across the site. The drainages onsite flow in a northerly direction. The site is currently mostly undeveloped with an old farm house and barn located in the central portion of the site. Misty Acres Boulevard extends into the site and is partially paved. The site boundaries are indicated on the USGS Map, Figure 2. Previous land uses have included agricultural grazing and pasture land. The site contains primarily field grasses, weeds, scrub oak, and ponderosa pines. Site photographs, taken February 28, 2023, are included in Appendix A.

Total acreage involved in the proposed development is approximately 59.48 acres. The proposed site development consists of residential development consisting of duplex, three-plex, four-plex, single family lots, and other associated site improvements. Preliminary plans indicate significant grading will be performed to develop the site. An existing Woodmoor Water and Sanitation sewer main is located in the central and northern portions of the site. Ten (10) Test Borings were drilled across the site to determine general soil and bedrock characteristics for a Preliminary Subsurface Soil Investigation dated January 17, 2022 (Reference 1). The locations of the test borings are indicated on the Site Plan/Test Boring Location Map, Figure 3.

3.0 SCOPE OF THE REPORT

The scope of the report will include a general geologic analysis utilizing published geologic data. Detailed site-specific mapping will be conducted to obtain general information in respect to major geographic and geologic features, geologic descriptions and their effects on the development of the property.

4.0 FIELD INVESTIGATION

Our field investigation consisted of the preparation of a geologic map of any bedrock features and significant surficial deposits. The Natural Resource Conservation Service (NRCS), previously the Soil Conservation Service (SCS) survey was also reviewed to evaluate the site. The position of mappable units within the subject property are shown on the Geologic Map. Our mapping procedures involved both field reconnaissance, measurements and air photo reconnaissance and interpretation. The same mapping procedures have also been utilized to produce the Engineering Geology Map which identified pertinent geologic conditions affecting development. The field mapping was performed by personnel of Entech Engineering, Inc. on February 28, 2023.

Ten (10) Test Borings were performed on the site to determine general soil and bedrock characteristics. The locations of the test borings are indicated on the Site Plan/Test Boring Location Map, Figure 3. The Test Boring Logs are presented in Appendix B. Results of this testing will be discussed later in this report.

Laboratory testing was also performed on some of the soils to classify and determine the soils engineering characteristics. Laboratory tests included grain-size analysis, ASTM D-422, and Atterberg Limits, ASTM D-4318. Swell/Consolidation and FHA Swell Testing to evaluate expansion potential. Sulfate testing was performed on selected samples to evaluate potential for below grade concrete degradation due to sulfate attack. A Summary of Laboratory Test Results is included in Appendix B.

5.0 SOIL, GEOLOGY AND ENGINEERING GEOLOGY

5.1 General Geology

Physiographically, the site lies in the western portion of the Great Plains Physiographic Province. Approximately 3 miles to the west is a major structural feature known as the Rampart Range Fault. This fault marks the boundary between the Great Plains Physiographic Province and the Southern Rocky Mountain Province. The site exists within the southeastern edge of a large structural feature known as the Denver Basin. Bedrock in the area tends to be very gently dipping in a northeasterly direction (Reference 2). The rocks in the area of the site are sedimentary in nature and typically Upper Cretaceous in age. The bedrock underlying the site

consists of the Pierre Shale Formation. Overlying this formation are unconsolidated deposits of artificial fill deposits, residual soils, sheetwash and alluvial soils of Quaternary Age. The site's stratigraphy will be discussed in more detail in Section 5.3.

5.2 Soil Conservation Survey

The Natural Resource Conservation Service (Reference 3), previously the Soil Conservation Service (Reference 4) has mapped four soil types on the site Figure 5. In general, the soils classify as loamy sand, sandy loam, loam, and clay loam. The soils are described as follows:

Type	Description
1	Alamosa Loam, 1 to 3% slopes
69	Peyton-Pring Complex, 8 to 15% slopes
92	Tomah-Crowfoot Loamy Sands, 3 to 8% slopes

Complete descriptions of each soil type are presented in Appendix C. The soils have generally been described to have rapid to moderate permeabilities. Possible hazards with soil erosion are present on the site. The erosion potential can be controlled with vegetation. The majority of the soils have been described to have moderate erosion hazards.

5.3 Site Stratigraphy

The Greenland and Monument Quadrangles Geology Map showing the site is presented in (Figure 5, References 5 and 6). The Geology/Engineering Geology Map prepared for the site is presented in Figure 6. Three mappable units were identified on this site which are described as follows:

Qaf **Artificial Fill of Holocene Age:** These are man-made fill deposits associated with a minor fill areas observed on the site, and along the existing Woodmoor Water and Sanitation sewer main through the central portion of the site.

Qau **Alluvium Undivided of Holocene and Pleistocene Age:** These are alluvial filled valley heads consisting of sheetwash, and stream-deposited alluvium. Typically consisting of poorly sorted sand and fine gravel.

Qc/Tkd **Colluvium of Quaternary Age overlying Dawson Arkose of Tertiary to Cretaceous Age:** These materials consist of silty to clayey sands, cobbles and boulders deposited by the action of sheetwash and gravity. Some alluvial soils deposited by water and residual soil from in-situ weathering exist in this mapping. These soils are overlying the Dawson Formation. The Dawson Formation typically consists of coarse-grained, arkosic sandstone with interbedded lenses of fine-grained sandstone, siltstone and claystone.

The soils listed above were mapped from site-specific mapping, the *Geologic Maps of the Greenland and Monument Quadrangles* distributed by the Colorado Geological Survey in 2003 (References 5 and 6), the *Geologic Map of the Colorado Springs-Castle Rock Area*, distributed by the US Geological Survey in 1979 (Reference 7), and the *Geologic Map of the Denver $1^0 \times 2^0$ Quadrangle*, distributed by the US Geological Survey in 1981 (Reference 8). The Test Borings were also used in evaluating the site and are included in Appendix B. The Geology Map prepared for the site is presented in Figure 6.

5.4 Soil Conditions

Two soil types and one bedrock types were observed during drilling which consisted of Type 1: native silty to clean to very silty sand (SM, SW), Type 2: native very clayey sand (SC), and Type 3: silty to clayey sandstone (SM, SC). The topsoil was relatively thin on the site. Each soil type was classified in accordance with the Unified Soil Classification System (USCS) using the laboratory testing results and the observations made during drilling.

Soil Type 1 classified as clean to silty to very silty sand (SM, SW). The sand was encountered in 8 of the 10 test borings directly beneath the topsoil extending to depths of 4 feet below ground surface (bgs) to termination of boring at 20 feet below ground surface (bgs). Standard Penetration Testing on the sand resulted in N-values of 11 to 49 bpf, indicating medium dense to very dense states. Water content and grain size testing resulted in approximately 2 to 15 percent water content with 5 to 45 percent of the soil size particles passing the No. 200 sieve. Atterberg Limits indicated that the sand is non-plastic. Sulfate testing resulted in less than 0.01 percent soluble sulfate by weight, indicating a negligible potential for below grade concrete degradation due to sulfate attack.

Soil Type 2 classified as native very clayey sand (SC). The clayey sand was encountered in two of the test borings (Test Boring Nos. 3 and 4) at depths from the ground surface and extending to 7 to 9 feet and again from 13 to depth drilled (20 feet) in Test Boring No. 4. Standard Penetration Testing on the clayey sand resulted in an N-values of 6 to 38 bpf indicating loose to dense states. Water content and grain size testing resulted in 6 to 19 percent water content and approximately 38 to 43 percent of the soil size particles passing the No. 200 sieve. Atterberg Limits testing on the very clayey sand resulted in a liquid limit of 34 and plastic index of 18. A Swell/Consolidation test resulted in a volume change of 2.8%, indicating a moderate to high expansion potential. Sulfate testing resulted in less than 0.01 percent soluble sulfate by weight, indicating a negligible potential for below grade concrete degradation due to sulfate attack.

Soil Type 3 classified as a silty to clayey sandstone bedrock. The sandstone was encountered in four of the test borings at depths of 4 to 19 feet and extended to termination of borings at 20 feet. Standard Penetration Testing on the clayey to silty sandstone resulted in N-values of greater than 50 bpf indicating very dense states. Water content and grain size testing resulted in approximately 9 to 17 percent water content with 25 to 29 percent of soil size particles passing the No. 200 sieve. Atterberg limits testing resulted in a liquid limit of 32 percent and a plastic index of 16 percent. The sandstone is anticipated to have low expansion potential. Sulfate Testing resulted in less than 0.01 percent soluble sulfate by weight, indicating a negligible potential for below grade degradation due to sulfate attack.

Additional soil descriptions are presented on the enclosed drill logs. A Summary of Laboratory Test Results and the Test Boring Logs are presented in Appendix B. The soils were classified using the results of the laboratory testing, the Unified Soil Classification System (USCS), and visual classification. The soil types are expected to vary across the site. Also, stratification lines shown on the logs represent the approximate boundary between soil types and the actual transition are expected to be gradual and vary with location.

5.5 Groundwater

Groundwater was encountered in Test Boring Nos. 1 – 4 at depths ranging from 1 to 10 feet which were drilled to depths of 20 feet. Fluctuation in groundwater conditions may occur due to variations in rainfall and other factors not readily apparent at this time. Wetlands, areas of

seasonally shallow and potentially seasonal shallow groundwater were observed on the site and further discussed in the following sections. It should be noted that in the sandy materials on site, some groundwater conditions might be encountered due to the variability in the soil profile. Isolated sand and gravel layers within the soils, sometimes only a few feet in thickness and width, can carry water in the subsurface. Groundwater may also flow on top of the underlying bedrock. Builders and planners should be cognizant of the potential for the occurrence of such subsurface water features during construction on-site and deal with each individual problem as necessary at the time of construction.

6.0 ENGINEERING GEOLOGY – IDENTIFICATION AND MITIGATION OF GEOLOGIC HAZARDS

Detailed mapping has been performed on this site to produce an Engineering Geology Map Figure 6. This map shows the location of various geologic conditions of which the developers should be cognizant during the planning, design and construction stages of the project. Constraints/Hazards include areas of artificial fill, potentially expansive soils, shallow groundwater, seasonally wet, potentially seasonally wet, and potential areas of shallow bedrock. These hazards and the recommended mitigation techniques are as follows:

Artificial Fill – Constraint

Fill was not encountered in the test borings, however, minor areas of fill were observed on the site, and fill associated with the existing sewer main located through the central portion of the site. Additionally, other areas of artificial fill may be encountered in areas other than those mapped. The fill and fill piles are considered uncontrolled for construction purposes.

Mitigation: It is anticipated the minor areas of fill will be removed prior to construction during site grading. Any uncontrolled fill encountered beneath foundations or retaining walls will require removal and recompaction at a minimum of 95% of its maximum Standard Proctor Dry Density, ASTM D-698. Fill place at depths greater than 10 feet will require 100% of its maximum Standard Proctor Dry Density, ASTM D-698. Any organic material or mulch should be removed prior to placing controlled fill.

Expansive Soils – Constraint

Expansive soils are common in the area, and were encountered in the test borings drilled on site. Swells ranged from low to moderate in the soils tested. The clay and claystone, if encountered beneath foundations, can cause differential movement in the structure foundation. These occurrences should be identified and dealt with on an individual basis or possibly mitigated during site grading.

Mitigation Should expansive soils be encountered beneath the foundation; mitigation will be necessary. Mitigation of expansive soils will require special foundation design. Overexcavation and replacement with non-expansive soils at a minimum of 95 percent of its maximum Modified Proctor Dry Density, ASTM D-1557 is a suitable mitigation, which is common in the area. Floor slabs on expansive soils should be expected to experience movement. Overexcavation and replacement has been successful in minimizing slab movements. Overexcavation depths of 4 to 6 feet are anticipated for the site. Mitigation may also include moisture conditioning and recompaction of the clay soils.

Drilled piers are another option that is used in areas where highly expansive soils are encountered. Typical minimum pier depths are on the order of 25 feet or more and require penetration into the bedrock material a minimum of 4 to 6 feet, depending upon building loads. Final recommendations should be determined after additional investigation of the lots.

Floodplain and Drainage Areas – Constraint

A drainage is located in the central portion of the site and flows in a northerly direction. The site is not mapped within any floodplain zones according to the FEMA Map Nos. 08041CO065G and 08041CO276G, dated December 7, 2018 (Figure 8, Reference 9). Wet areas were observed in the northern portion of the site along the drainage in the area mapped as wetlands. Additionally, areas of seasonal and potentially seasonal shallow groundwater were observed across the site. In these areas, we would anticipate the potential for periodically high subsurface moisture conditions and frost heave potential. These are low-lying areas along the drainage and minor drainages across the site. These areas can likely be avoided or properly mitigated by development. Perched water conditions could be encountered across the entire site where water can flow within permeable sand layers overlying impermeable bedrock. These areas should be identified on an individual basis at the time of construction. Where perched water conditions are encountered, the mitigation recommendations for seasonal and potentially

seasonal shallow groundwater should be followed. Foundations should maintain a minimum separation of 3 feet between the foundation grade and the maximum anticipated groundwater level. These areas are discussed below.

The seasonally shallow groundwater and potentially seasonal shallow groundwater areas located on the site are shown on the Geology Map, Figure 6. Portions of these areas mapped with these hazards have been identified in the National Wetland Inventory as a Freshwater Emergent Wetland habitat classified as PEM1C (Palustrine – P, Emergent – EM, Persistent – 1, Seasonally Flooded – C), Freshwater Forested/Shrub Wetland habitat classified as PSS1C (Palustrine – P, Scrub-Shrub – SS, Broad-Leaved Deciduous – 1), and Riverine habitat classified as R4SBC (Riverine – R, Intermittent – 4, Streambed – SB, Seasonally Flooded – C), (Figure 8, Reference 10).

sw, psw – Seasonal and Potentially Seasonal shallow groundwater areas: In these areas, we would anticipate the potential for periodically high subsurface moisture conditions, frost heave potential, and highly organic soils. Areas where perched water conditions are encountered should also follow these recommendations. Construction proposed in or adjacent to these areas, should follow these precautions:

Mitigation: In these locations, foundations are subject to severe frost heave and should penetrate to a sufficient depth so as to prevent the formation of ice lenses beneath foundations. At this location and elevation, a foundation depth for frost protection of 30-inches is recommended. In areas where high subsurface moisture conditions are anticipated periodically, a subsurface perimeter drain will be necessary to help prevent the seepage of water into areas below grade. A typical perimeter drain detail is presented in Figure 8. Any grading in these areas should be done in a manner that directs surface flow around construction to avoid areas of ponded water. Areas of organic material will require removal prior to any fill placement. Unstable soil conditions should be expected in areas of shallow groundwater. Where foundations approach the groundwater level, stabilization of the excavations utilizing shot rock may be necessary. Underslab drains or capillary breaks, and interceptor drains may be necessary to prevent intrusion of water into areas below grade. Typical drain details are presented in Figures 10 and 12.

Proposed grading plans indicate these areas that have been mapped in lot areas will be filled and raised above the seasonally shallow and potentially seasonally shallow groundwater areas. Additional investigation once grading has been completed to evaluate the groundwater levels is recommended.

w – Areas of ponded water/wetlands: These are areas where water could potentially pool in low-lying areas of the drainages. According to the site plan, Figure 6 these areas are within designated as open space. Any areas of ponded water to be filled or regraded should have all soft organic soils removed prior to fill placement. All uncontrolled fill associated with the dams should be recompacted at a minimum of 95% of its maximum Modified Dry Density ASTM D-1557.

Shallow Bedrock – Constraint

Bedrock was encountered five of the ten test borings at depths ranging from 4 to 19 feet. A Summary of the Depth to Bedrock is included in Table 1. Shallow bedrock will be encountered in some areas of this site, particularly those mapped as Qc/Tkd: colluvial soils overlying the Dawson Formation. Where shallow claystone, sandstone, and siltstone are encountered, excavation/grading may be difficult requiring track-mounted excavators. Bedrock may be encountered cuts for roadways and utility excavations.

6.1 Relevance of Geologic Conditions to Land Use Planning

The proposed development will consist of residential development. It is our opinion that the existing geologic and engineering geologic conditions will impose some constraints on the proposed development and construction. The most significant problems affecting development will be those associated with the artificial fill, potentially expansive soils, shallow groundwater, seasonally wet, potentially seasonally wet, and potential areas of shallow bedrock on-site that can be satisfactorily mitigated through proper engineering design and construction practices.

The upper materials are typically at loose to medium states and firm to very stiff consistencies. Expansive soils were encountered in some of the test borings that will require mitigation. Loose soils if encountered at foundation depth will require recompaction. Foundations anticipated for the site are standard spread footings in conjunction with overexcavation in areas of expansive soils or loose soils. Excavation of the sand and clay soils is anticipated to be moderate with

rubber-tired equipment. Excavation of claystone and shale may be difficult and require track-mounted equipment. Expansive soils will require special foundation design and/or overexcavation. These soils will not prohibit development.

Areas of fill exist on the site. These are areas associated minor areas of fill observed across the site, and fill associated with the existing sewer line. We would anticipate that the fill piles would be removed during site grading. Any uncontrolled fill encountered beneath foundations will require removal and recompaction at a minimum of 95% of its maximum Standard Proctor Dry Density, ASTM D-698. Fill placed at depths greater than 10 feet will require 100% of its maximum Standard Proctor Dry Density, ASTM D-698 (clay soils), and 98% of its maximum Modified Proctor Dry Density, ASTM D-1557 (granular soils). Any organic material or mulch should be removed prior to placing controlled fill.

A drainage is located in the central portion of the site and flows in a northerly direction. The site is not mapped within any floodplain zones according to the FEMA Map Nos. 08041CO065G and 08041CO276G, dated December 7, 2018 (Figure 8, Reference 9). Wet areas were observed in the northern portion of the site along the drainage in the area mapped as wetlands. Additionally, areas of seasonal and potentially seasonal shallow groundwater were observed across the site. In these areas, we would anticipate the potential for periodically high subsurface moisture conditions and frost heave potential. These are low-lying areas along the drainage and minor drainages across the site. Foundations should maintain a minimum separation of 3 feet between the foundation grade and the maximum anticipated groundwater level. Proposed grading plans indicate these areas will be filled and raised above the seasonally shallow and potentially seasonally shallow groundwater areas. **Additional investigation once grading has been completed to evaluate the groundwater levels is recommended.**

These above constraints can be mitigated through proper design and construction or through avoidance. Additional subsurface soil investigation is recommended for each building site prior to construction. Observation and testing of overlot fill/grading is recommended.

7.0 ECONOMIC MINERAL RESOURCES

According to the *El Paso County Aggregate Resource Evaluation Map* (Reference 11), the area is not mapped with any aggregate deposits. According to the *Atlas of Sand, Gravel and Quarry Aggregate Resources, Colorado Front Range Counties* distributed by the Colorado Geological Survey (Reference 12), areas of the site are not mapped with any resources. According to the *Evaluation of Mineral and Mineral Fuel Potential* (Reference 13), the area of the site has been mapped as "Fair" for industrial minerals. However, considering the clayey silty nature of the soils, they would be considered to have little significance as an economic resource.

According to *the Evaluation of Mineral and Mineral Fuel Potential of El Paso County State Mineral Lands* (Reference 13), the site is mapped within the Denver Basin Coal Region. However, the area of the site has been mapped as "Poor" for coal resources. No active or inactive mines have been mapped in the area of the site. No metallic mineral resources have been mapped on-site (Reference 13).

The site has been mapped as "Fair" for oil and gas resources (Reference 13). No oil or gas fields have been discovered in the area of the site. The sedimentary rocks in the area may lack the geologic structure for trapping oil or gas; therefore, it may not be considered a significant resource. Hydraulic fracturing is a new method that is being used to extract oil and gas from rocks. It utilizes pressurized fluid to extract oil and gas from rocks that would not normally be productive. The area of the site has not been explored to determine if the rocks underlying the site would be commercially viable utilizing hydraulic fracturing. The practice of hydraulic fracturing has come under review due to concerns about environmental impacts, health and safety.

8.0 EROSION CONTROL

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

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

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

9.0 ROADWAY AND EMBANKMENT CONSTRUCTION RECOMMENDATIONS

In general, the site soils are suitable for the proposed roadways and embankments. Groundwater may be encountered in deeper cuts and along drainages and low areas. If excavations encroach on the groundwater level unstable soil conditions may be encountered. Excavation of saturated soils may be difficult with rubber-tired equipment. Stabilization using shot rock or geogrids may be necessary.

Swell/Consolidation testing was conducted on the site subgrade soils which exhibited a swell of 2.8 percent. These results indicate that soil mitigation due to expansive soils may be required for the roadways. Overexcavation and cement-stabilization are suitable mitigation methods for the expansive soils in the roadways. Additional investigation for the proposed roadways will be required once site grading has been completed and utilities have been installed.

Any areas to receive fill should have all topsoil, organic material or debris removed. Prior to fill placement Entech should observe the subgrade. Fill must be properly benched and compacted to minimize potentially unstable conditions in slope areas. Fill slopes should be 3:1. The subgrade should be scarified and moisture conditioned to within 2 percent of optimum moisture content and compacted to a minimum of 95 percent of its maximum Modified Proctor Dry Density, ASTM D-1557, prior to placing new fill. Areas receiving fill may require stabilization with rock or fabric if shallow groundwater conditions are encountered.

New fill should be placed in thin lifts not to exceed 6 inches after compaction while maintaining at least 95 percent of its maximum Modified Proctor Dry Density, ASTM D-1557 for sandy soils, and clay soils should be compacted to a minimum of 95 percent of its maximum Standard Proctor Dry Density, ASTM D-698 at 0 to 4 percent of optimum moisture content. **Fill placed at depths greater than 10 feet will require 100% of its maximum Standard Proctor Dry Density, ASTM D-698 (clay soils), and 98% of its maximum Modified Proctor Dry Density, ASTM D-1557 (granular soils).** These materials should be placed at a moisture content conducive to compaction, usually 0 to ±2 percent of Proctor optimum moisture content. The placement and compaction of fill should be observed and tested by Entech during construction. Entech should approve any import materials prior to placing or hauling them to the site. Additional investigation will be required for pavement designs once roadway grading is completed and utilities are installed.

10.0 CLOSURE

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

It should be pointed out that because of the nature of data obtained by random sampling of such variable and non-homogeneous materials as soil and rock, it is important that we be informed of any differences observed between surface and subsurface conditions encountered in construction and those assumed in the body of this report. Individual investigations for building sites will be required prior to construction. Construction and design personnel should be made familiar with the contents of this report. Reporting such discrepancies to Entech Engineering, Inc. soon after they are discovered would be greatly appreciated and could possibly help avoid construction and development problems.

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

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

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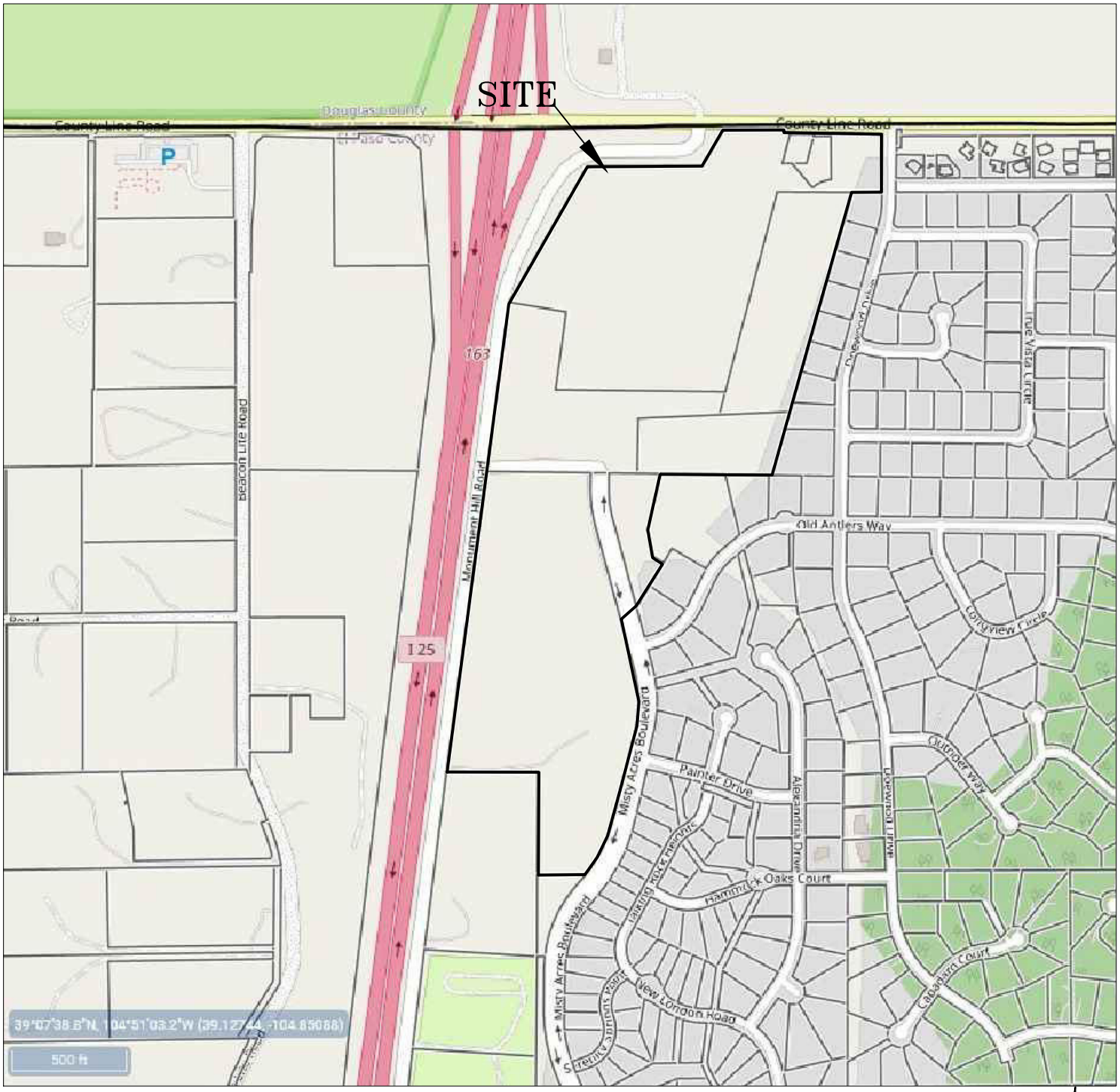
TABLE

Table 1: Summary Test Boring Results

Test Boring No.	Depth to Bedrock (ft.)	Depth to Groundwater (ft.)
1	>20	9
2	19	9
3	19	1
4	>20	10
5	13	>19
6	4	>18
7	>20	>20
8	10	>20
9	>20	>20
10	>20	>19

FIGURES



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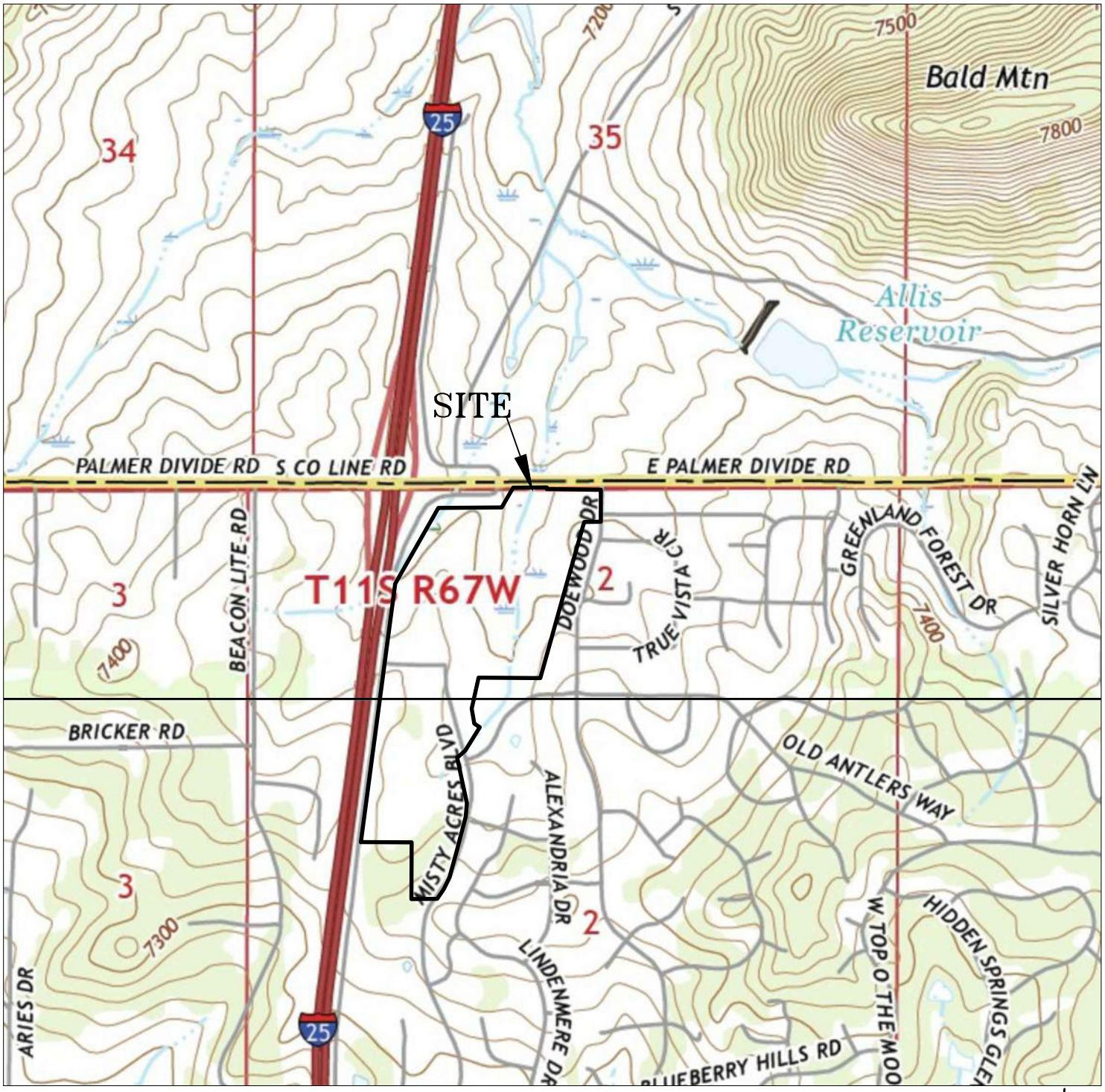
VICINITY MAP
MONUMENT RIDGE EAST
MONUMENT HILL ROAD & PALMER DIVIDE ROAD
EL PASO COUNTY, CO.
FOR: MONUMENT RIDGE EAST, LLC

DRAWN:	DATE:	CHECKED:	DATE:
LLL	3/1/23		

JOB NO.: 230248

FIG NO.: 1



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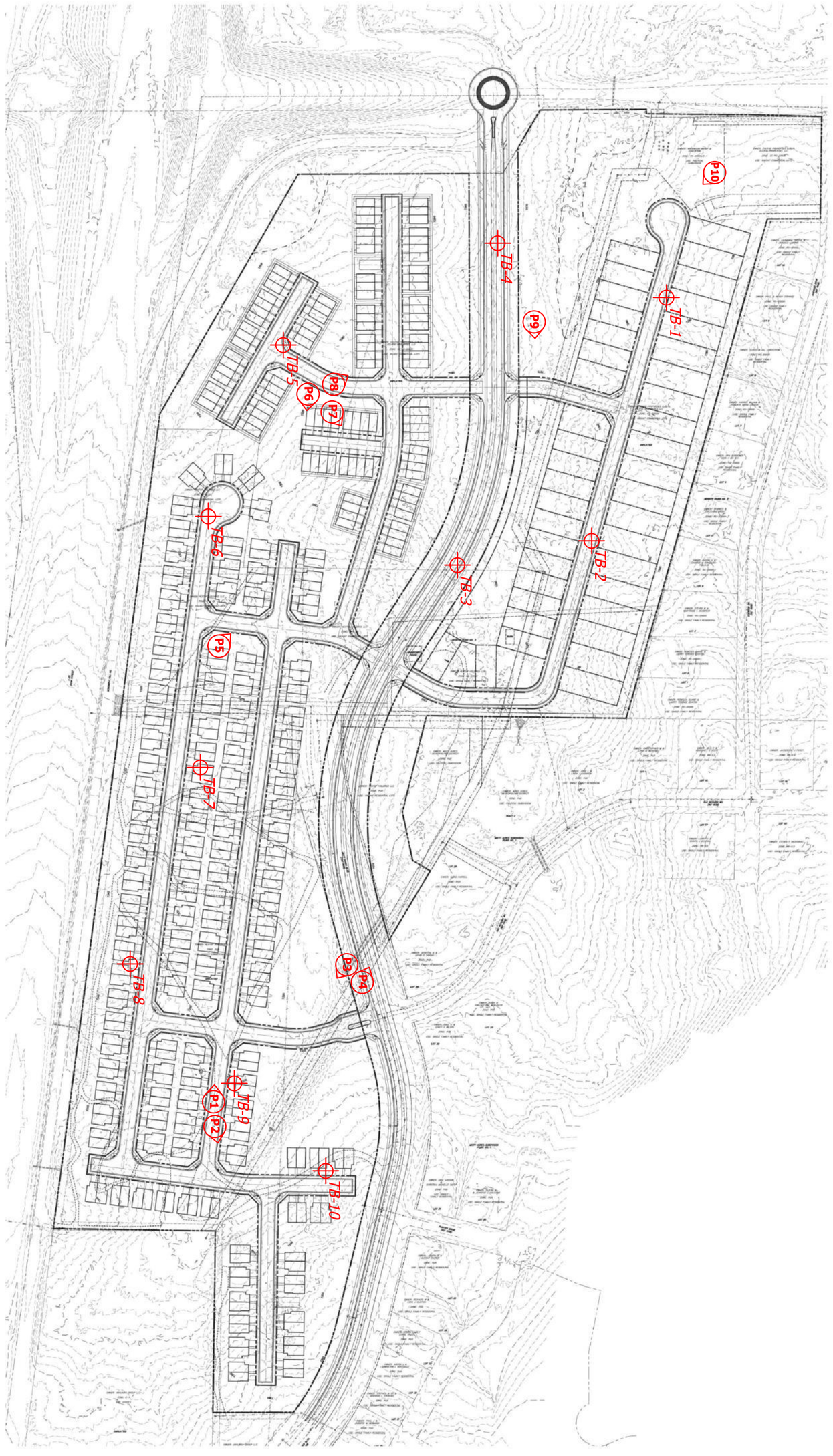
USGS TOPOGRAPHY MAP
MONUMENT RIDGE EAST
MONUMENT HILL ROAD & PALMER DIVIDE ROAD
EL PASO COUNTY, CO.
FOR: MONUMENT RIDGE EAST, LLC

DRAWN:	DATE:	CHECKED:	DATE:
LLL	3/1/23		

JOB NO.: 230248

FIG NO.: 2



SITE PLAN/TEST BORING LOCATION MAP
MONUMENT RIDGE EAST
MONUMENT HILL ROAD & PALMER DIVIDE ROAD
EL PASO COUNTY, CO.
FOR: MONUMENT RIDGE EAST, LLC

DRAWN: LLL
CHECKED:
DATE: 3/11/23
SCALE: AS SHOWN
JOB NO. 230248
FIGURE No. 3

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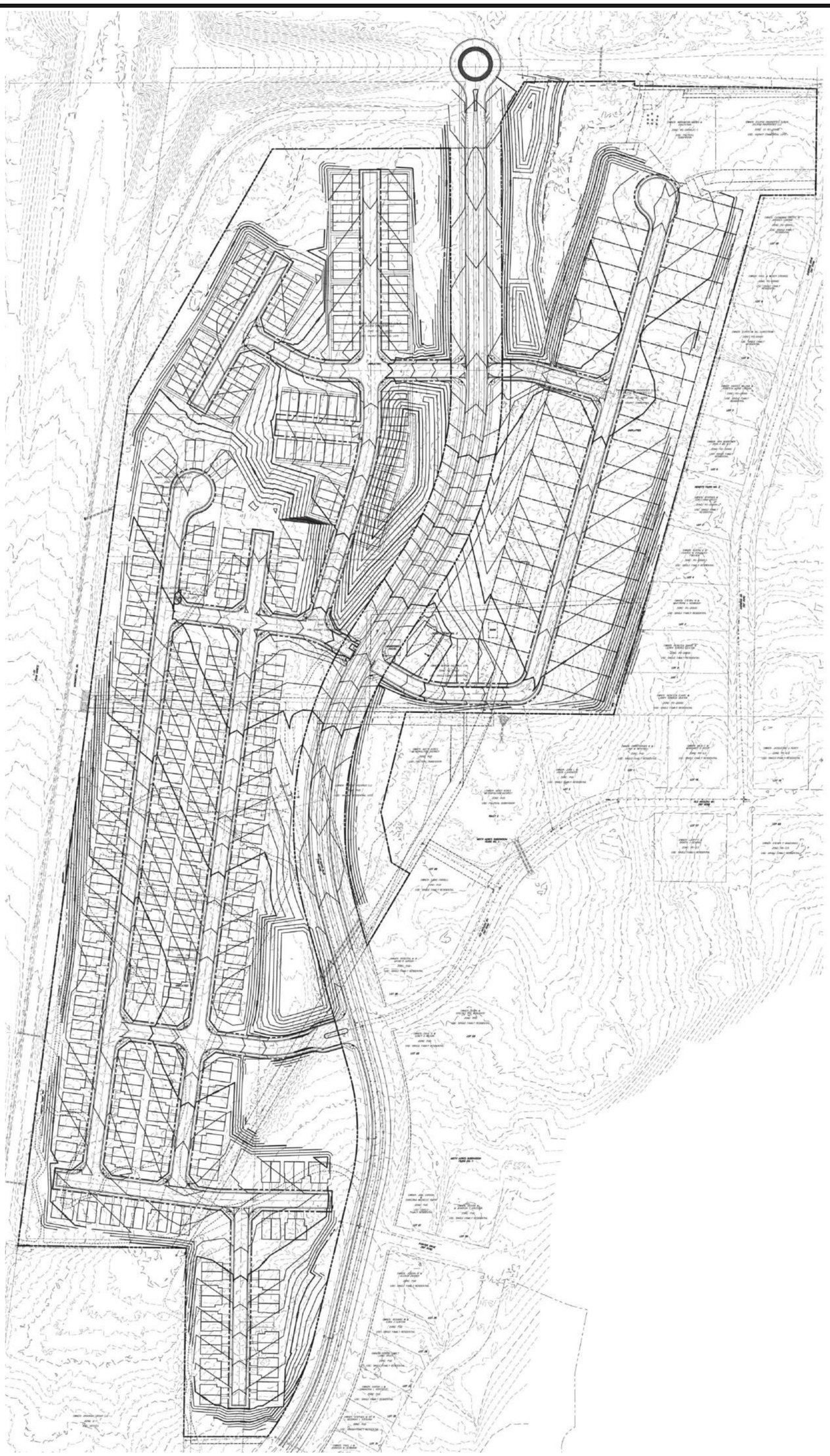

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DRAWN LLL
CHECKED

DATE 3/11/23
SCALE AS SHOWN
JOB NO. 230248
FIGURE No. 4

PROPOSED GRADING PLAN
MONUMENT RIDGE EAST
MONUMENT HILL ROAD & PALMER DIVIDE ROAD
EL PASO COUNTY, CO.
FOR: MONUMENT RIDGE EAST, LLC

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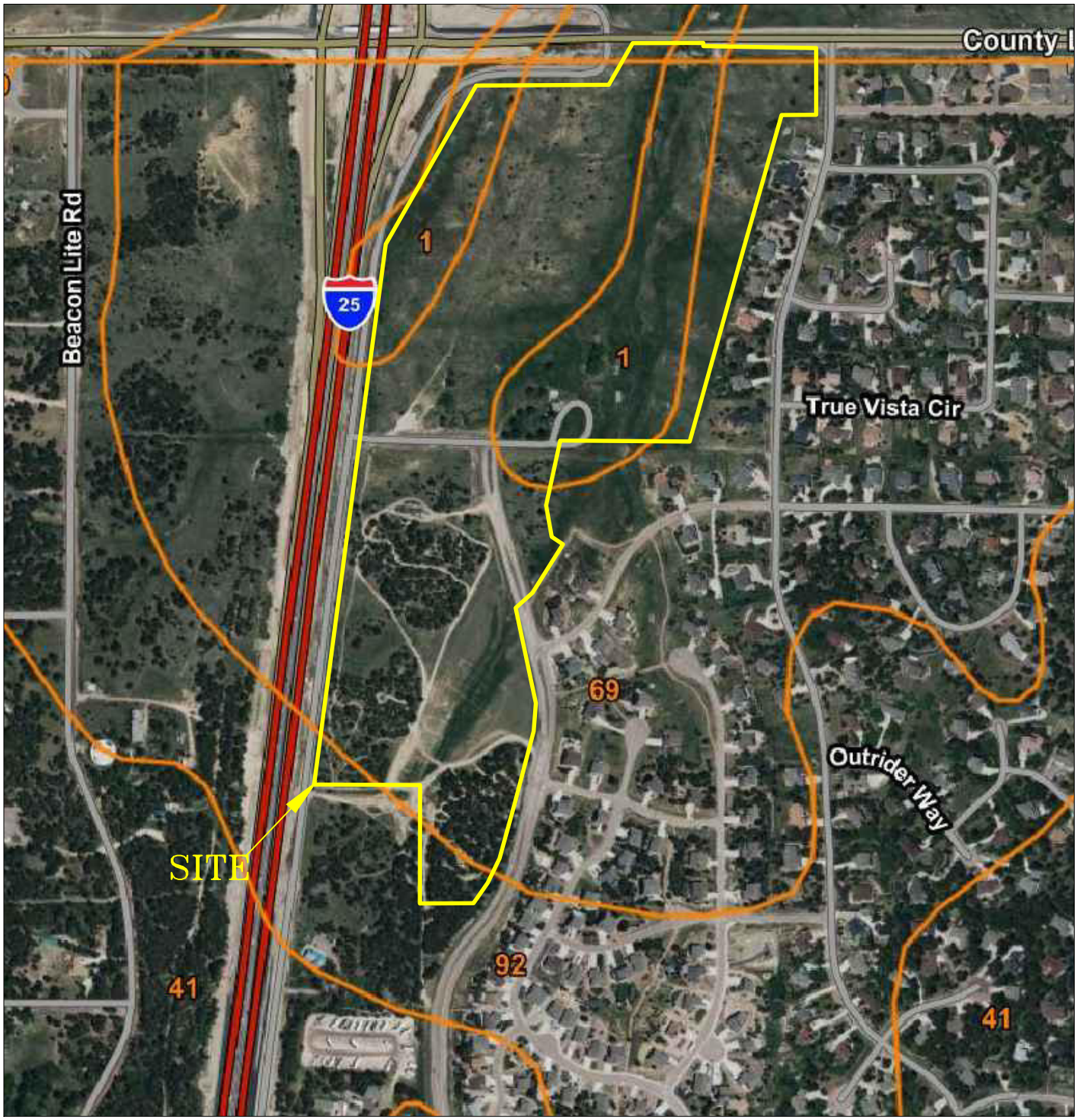

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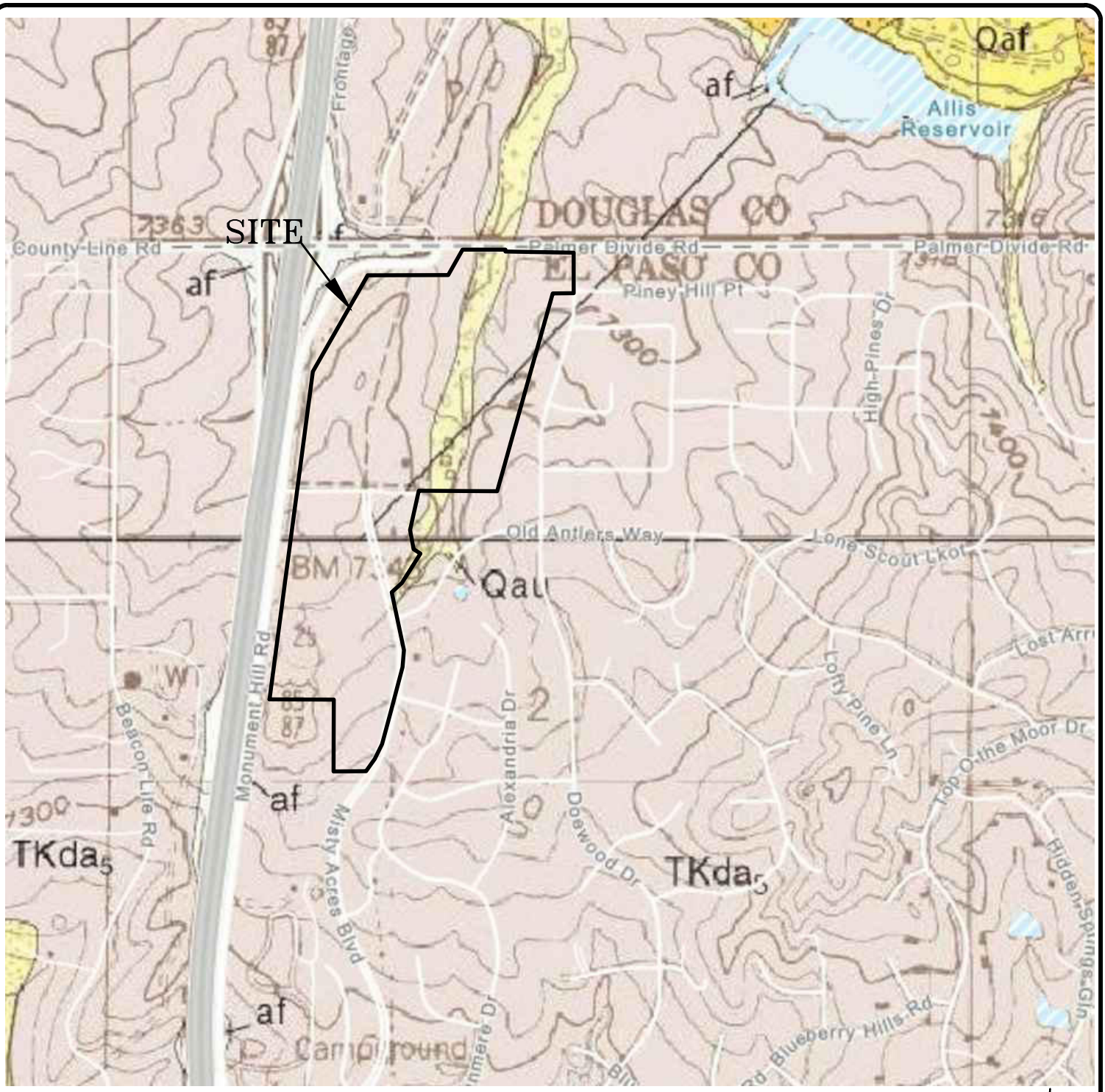
SOIL SURVEY MAP
MONUMENT RIDGE EAST
MONUMENT HILL ROAD & PALMER DIVIDE ROAD
EL PASO COUNTY, CO.
FOR: MONUMENT RIDGE EAST, LLC

DRAWN:	DATE:	CHECKED:	DATE:
LLL	3/1/23		

JOB NO.: 230248

FIG NO.: 5



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GREENLAND & MONUMENT QUADRANGLE GEOLOGIC MAPS
MONUMENT RIDGE EAST
MONUMENT HILL ROAD & PALMER DIVIDE ROAD
EL PASO COUNTY, CO.
FOR: MONUMENT RIDGE EAST, LLC

DRAWN:	DATE:	CHECKED:	DATE:
LLL	3/1/23		

JOB NO.: 230248

FIG NO.: 6

Legend:

Qaf - Artificial Fill of Holocene Age
man-made fill deposits associated with fill along the existing sewer main

Qau - Alluvium Undivided of Holocene and Pleistocene Age:
sheetwash and channel deposited alluvium along active drainage way

QcTKd - Colluvium of Quaternary Age overlying Dawson Formation of Tertiary to Cretaceous Age:
colluvial and residual soils overlying arkosic sandstone with interbedded fine-grained sandstone, siltstone and claystone

psw - potentially shallow groundwater area
sw - seasonally shallow groundwater area
w - standing water/wetlands

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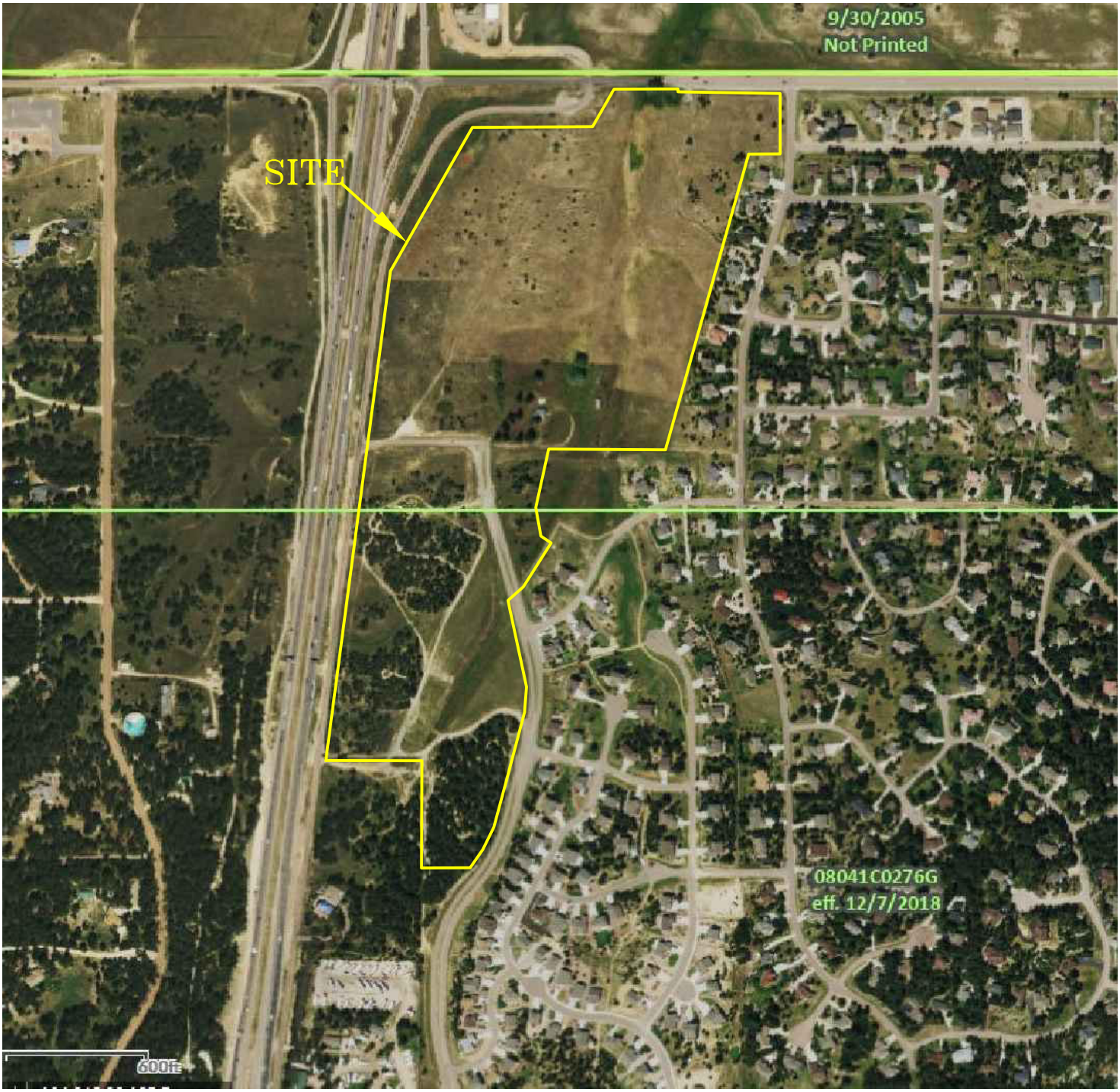
(719) 531-5599

GEOLOGY/ENGINEERING GEOLOGY MAP
MONUMENT RIDGE EAST
MONUMENT HILL ROAD & PALMER DIVIDE ROAD
EL PASO COUNTY, CO.
FOR: MONUMENT RIDGE EAST, LLC

DRAWN	LLL
CHECKED	
DATE	3/1/23
SCALE	AS SHOWN
JOB NO.	230248
FIGURE No.	7



N

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FEMA FLOODPLAIN MAP
HIGH FOREST ESTATES SUBDIVISION FIL. NO 1
8855 WALKER ROAD
EL PASO COUNTY, CO.
FOR: PAULA DONOHOO

DRAWN:	DATE:	CHECKED:	DATE:
LLL	10/24/22		

JOB NO.: 230248

FIG NO.: 8

N

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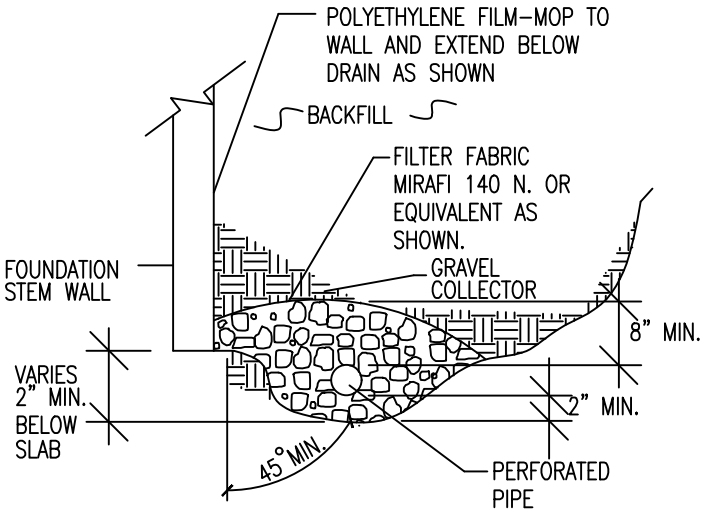
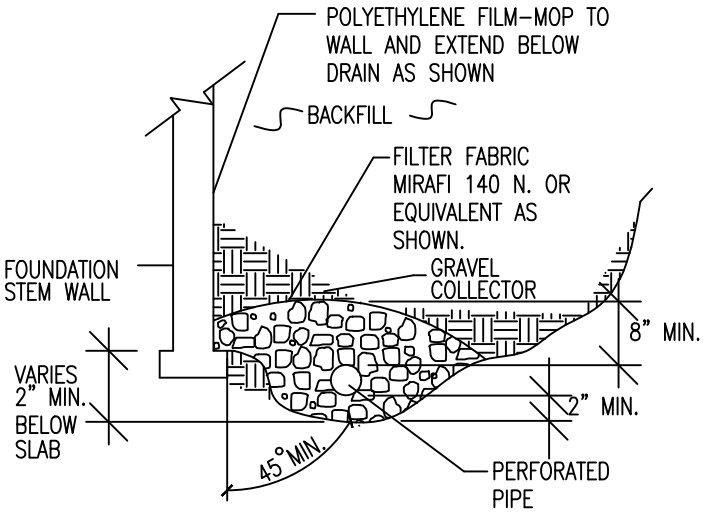
NATIONAL WETLANDS INVENTORY MAP
MONUMENT RIDGE EAST
MONUMENT HILL ROAD & PALMER DIVIDE ROAD
EL PASO COUNTY, CO.
FOR: MONUMENT RIDGE EAST, LLC

DRAWN:	DATE:	CHECKED:	DATE:
LLL	3/1/23		

JOB NO.: 230248

FIG NO.: 9





NOTES:

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

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

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

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

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

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

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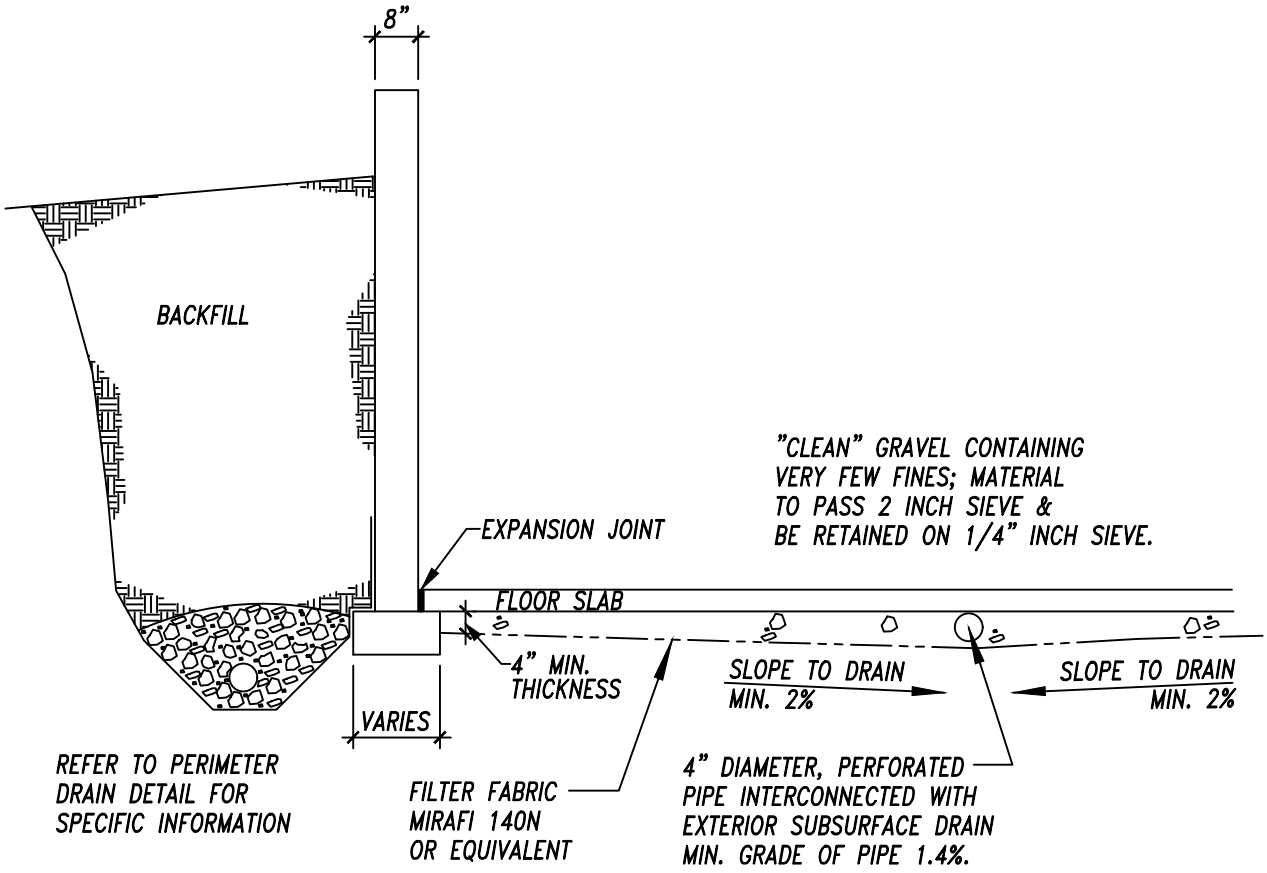
PERIMETER DRAIN DETAIL

DRAWN:	DATE:	DESIGNED:	CHECKED:

JOB NO.: 230248

FIG NO.: 10



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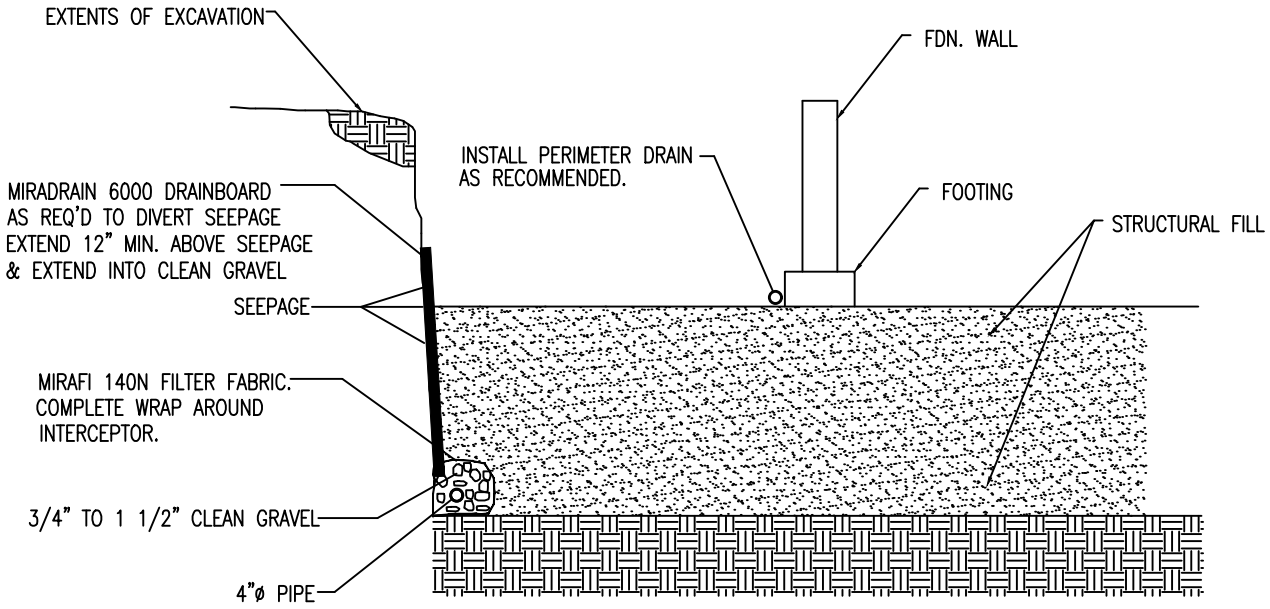
TYP. UNDERSLAB DRAINAGE LAYER (CAPILLARY BREAK)

DRAWN BY:	DATE DRAWN:	DESIGNED BY:	CHECKED:

JOB NO.: 230248

FIG NO.: 11



NOTE:
EXTEND INTERCEPTOR DRAIN TO UNDERDRAIN OR TO SUMP.
BENCH DRAIN INTO NATIVE SOILS 12 INCHES MINIMUM.

INTERCEPTOR DRAIN DETAIL

N.T.S.

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COLORADO SPRINGS, CO. 80907 (719) 531-5599

INTERCEPTOR DRAIN DETAIL

DRAWN BY:	DATE DRAWN:	DATE	CHECKED:
DPS			DPS

JOB NO.: 230248

FIG. NO.: 12

APPENDIX A: Site Photographs

1

Looking north from the southern portion of the site.

February 28, 2023

2

Looking south from the southern portion of the site.

February 28, 2023

Job No. 230248

3

Looking southwest along drainage from Misty Acres Boulevard in the southern portion of the site.

February 28, 2023

4

Looking northwest from Misty Acres Boulevard in the southern portion of the site.

February 28, 2023

Job No. 230248

5

Looking north from the western side of the site.

February 28, 2023

6

Looking south from the western portion of the site.

February 28, 2023

Job No. 230248

7

Looking southeast from northwestern portion of the site.

February 28, 2023

8

Looking east from the northwestern portion of the site.

February 28, 2023

Job No. 230248

9

Looking south along drainage from the north-central portion of the site.

February 28, 2023

10

Looking southwest from northeast portion of the site.

February 28, 2023

Job No. 230248

APPENDIX B: Entech Engineering, Inc., Subsurface Soil Investigation, Entech Job No. 212536

TABLE 1

SUMMARY OF LABORATORY TEST RESULTS

CLIENT MONUNMENT RIDGE EAST, LLC
PROJECT MONUNMENT RIDGE EAST
JOB NO. 212536

SOIL TYPE	TEST BORING NO.	DEPTH (FT)	WATER (%)	DRY DENSITY (PCF)	PASSING NO. 200 SIEVE (%)	LIQUID LIMIT (%)	PLASTIC INDEX (%)	SULFATE (WT %)	FHA SWELL (PSF)	SWELL/ CONSOL (%)	UNIFIED CLASSIFICATION	SOIL DESCRIPTION
1	1	2-3			4.5	NV	NP	<0.01			SW	SAND
1	5	5			26.7						SM	SAND, SILTY
1	7	2-3			38.4						SM	SAND, VERY SILTY
1	8	10			33.3						SM	SAND, SILTY
1	9	5			43.5				20		SM	SAND, VERY SILTY
1	10	2-3			20.8						SM	SAND, SILTY
2	3	2-3	17.9	95.1	42.9	34	18	<0.01		2.8	SC	SAND, VERY CLAYEY
2	4	5			38.0						SC	SAND, VERY CLAYEY
3	6	5			28.8						SM	SANDSTONE, SILTY
3	2	20			24.6	32	16	<0.01			SC	SANDSTONE, CLAYEY

TEST BORING NO. 1
DATE DRILLED 10/1/2021
Job # 212536

REMARKS	Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
WATER @ 9', 10/11/21						
SAND, CLEAN TO SILTY, FINE TO COARSE GRAINED, BROWN TO TAN, MEDIUM DENSE TO DENSE, DRY TO MOIST				11	2.2	1
	5			14	9.4	1
	10			37	11.4	1
	15			31	13.1	1
	20			42	11.6	1

TEST BORING NO. 2
DATE DRILLED 10/1/2021
CLIENT MONUNMENT RIDGE EAST, LLC
LOCATION MONUNMENT RIDGE EAST

REMARKS	Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
WATER @ 9', 10/11/21						
SAND, SILTY, FINE TO COARSE GRAINED, BROWN TO TAN, MEDIUM DENSE TO DENSE, MOIST				17	7.4	1
	5			12	11.3	1
	10			16	11.6	1
	15			38	10.8	1
SANDSTONE, CLAYEY, FINE TO MEDIUM GRAINED, TAN, VERY DENSE, MOIST	20			50/10"	9.7	3

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TEST BORING LOG

DRAWN:	DATE:	CHECKED: SW	DATE: 10-20-21

JOB NO.: 212536
FIG NO.: A- 1

TEST BORING NO. 3
DATE DRILLED 10/1/2021
Job # 212536

REMARKS

WATER @ 1', 10/11/21

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type	
			6	16.7	2	SAND, VERY CLAYEY, FINE GRAINED, GRAY, LOOSE TO MEDIUM DENSE, MOIST TO WET
5			10	20.5	2	
						SAND, SILTY, FINE TO COARSE GRAINED, TAN, MEDIUM DENSE TO DENSE, MOIST
10			13	13.8	1	
15			38	10.5	1	
20			50/7"	11.6	3	SANDSTONE, CLAYEY, FINE TO MEDIUM GRAINED, TAN, VERY DENSE, MOIST

TEST BORING NO. 4
DATE DRILLED 10/1/2021
CLIENT MONUNMENT RIDGE EAST, LLC
LOCATION MONUNMENT RIDGE EAST

REMARKS

WATER @ 10', 10/11/21

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type	
			26	5.7	2	SAND, VERY CLAYEY, FINE GRAINED, BROWN, LOOSE TO MEDIUM DENSE, MOIST TO WET
5			17	10.6	2	
10			16	15.7	1	SAND, SILTY, FINE GRAINED, GRAY, MEDIUM DENSE, MOIST
15			6	18.7	2	SAND, VERY CLAYEY, GRAY, FINE TO MEDIUM GRAINED, LOOSE, VERY MOIST
20			15	18.7	2	

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COLORADO SPRINGS, COLORADO 80907

TEST BORING LOG

DRAWN:	DATE:	CHECKED:	DATE:
		SW	10-20-21

JOB NO.: 212536
FIG NO.: A- 2

TEST BORING NO. 5
DATE DRILLED 10/1/2021
Job # 212536

REMARKS

DRY TO 19', 10/11/21

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
			24	5.8	1
			24	8.4	1
5					
			40	9.3	1
10					
			50/9"	11.3	3
15					
			25	13.6	3
20					

SAND, SILTY, FINE TO COARSE GRAINED, BROWN TO RED BROWN, MEDIUM DENSE TO VERY DENSE, MOIST

WEATHERED TO FORMATIONAL SANDSTONE, SILTY, FINE TO COARSE GRAINED, RED BROWN, VERY DENSE TO MEDIUM DENSE, MOIST

HIGHLY WEATHERED ZONE

TEST BORING NO. 6
DATE DRILLED 10/4/2021
CLIENT MONUNMENT RIDGE EAST, LLC
LOCATION MONUNMENT RIDGE EAST

REMARKS

DRY TO 18', 10/11/21

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
			37	5.5	1
5			50/6"	8.8	3
10			50/10"	8.8	3
15			50/10"	9.6	3
20			50/9"	10.4	3

SAND, SILTY, FINE TO COARSE GRAINED, TAN, DENSE, MOIST

SANDSTONE, SILTY, FINE TO COARSE GRAINED, BROWN TO TAN, VERY DENSE, MOIST

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505 ELKTON DRIVE
COLORADO SPRINGS, COLORADO 80907

TEST BORING LOG

DRAWN:	DATE:	CHECKED: SW	DATE: 10-20-21

JOB NO.: 212536
FIG NO.: A- 3

TEST BORING NO. 7
DATE DRILLED 10/4/2021
Job # 212536

REMARKS

DRY TO 20', 10/11/21

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type	
						SAND, VERY SILTY TO SILTY, FINE TO MEDIUM GRAINED, TAN TO BROWN, MEDIUM DENSE TO DENSE, MOIST
			20	4.2	1	
5			15	8.9	1	
10			19	12.4	1	
15			31	8.4	1	
20			28	8.4	1	

TEST BORING NO. 8
DATE DRILLED 10/4/2021
CLIENT MONUNMENT RIDGE EAST, LLC
LOCATION MONUNMENT RIDGE EAST

REMARKS

DRY TO 20', 10/11/21

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type	
						SAND, SILTY, FINE TO COARSE GRAINED, BROWN TO TAN, MEDIUM DENSE TO DENSE, MOIST
			18	3.0	1	
5			18	11.3	1	
10			44	10.0	1	
						SANDSTONE, CLAYEY, FINE TO MEDIUM GRAINED, RED BROWN, VERY DENSE, MOIST
15			50/7"	17.1	3	
20			50/5"	9.1	3	

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505 ELKTON DRIVE
COLORADO SPRINGS, COLORADO 80907

TEST BORING LOG

DRAWN:	DATE:	CHECKED:	DATE:
		SW	10-20-21

JOB NO.: 212536
FIG NO.: A- 4

TEST BORING NO. 9
DATE DRILLED 10/4/2021
Job # 212536

REMARKS	Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
DRY TO 20', 10/11/21						
SAND, VERY SILTY TO SILTY, FINE TO MEDIUM GRAINED, BROWN, MEDIUM DENSE, MOIST				15	11.2	1
	5			17	6.8	1
CLAYEY LENS	10			28	10.3	1
	15			17	9.0	1
	20			27	12.0	1

TEST BORING NO. 10
DATE DRILLED 10/4/2021
CLIENT MONUNMENT RIDGE EAST, LLC
LOCATION MONUNMENT RIDGE EAST

REMARKS	Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
DRY TO 19', 10/11/21						
SAND, SILTY, FINE TO COARSE GRAINED WITH FINE GRAINED INTERBEDS, BROWN TO TAN, MEDIUM DENSE TO VERY DENSE, MOIST				22	4.1	1
	5			36	5.3	1
	10			26	8.2	1
	15			39	10.3	1
	20			49	15.2	1

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COLORADO SPRINGS, COLORADO 80907

TEST BORING LOG

DRAWN:	DATE:	CHECKED:	DATE:
		SW	10-20-21

JOB NO.: 212536
FIG NO.: A- 5

APPENDIX C: USDA Soil Survey Descriptions

El Paso County Area, Colorado

1—Alamosa loam, 1 to 3 percent slopes

Map Unit Setting

National map unit symbol: 3670
Elevation: 7,200 to 7,700 feet
Farmland classification: Prime farmland if irrigated and reclaimed of excess salts and sodium

Map Unit Composition

Alamosa and similar soils: 85 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Alamosa

Setting

Landform: Fans, flood plains
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium

Typical profile

A - 0 to 6 inches: loam
Bt - 6 to 14 inches: clay loam
Btk - 14 to 33 inches: clay loam
Cg1 - 33 to 53 inches: sandy clay loam
Cg2 - 53 to 60 inches: sandy loam

Properties and qualities

Slope: 1 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.60 in/hr)
Depth to water table: About 12 to 18 inches
Frequency of flooding: NoneFrequent
Frequency of ponding: None
Calcium carbonate, maximum content: 5 percent
Maximum salinity: Very slightly saline to strongly saline (2.0 to 16.0 mmhos/cm)
Available water supply, 0 to 60 inches: High (about 10.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 5w
Hydrologic Soil Group: D
Ecological site: R048AY241CO - Mountain Meadow
Hydric soil rating: Yes

Minor Components

Other soils

Percent of map unit:
Hydric soil rating: No

Data Source Information

Soil Survey Area: Castle Rock Area, Colorado
Survey Area Data: Version 15, Sep 1, 2022

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

El Paso County Area, Colorado

69—Peyton-Pring complex, 8 to 15 percent slopes

Map Unit Setting

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

Map Unit Composition

Peyton and similar soils: 40 percent
Pring and similar soils: 30 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Peyton

Setting

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

Typical profile

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

Properties and qualities

Slope: 8 to 9 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.60 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Moderate (about 7.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: B
Ecological site: R049XY216CO - Sandy Divide
Hydric soil rating: No

Description of Pring

Setting

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

Typical profile

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

Properties and qualities

Slope: 8 to 15 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): High (2.00 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 6.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: B
Ecological site: R048AY222CO - Loamy Park
Hydric soil rating: No

Minor Components

Other soils

Percent of map unit:
Hydric soil rating: No

Pleasant

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

Data Source Information

Soil Survey Area: Castle Rock Area, Colorado
Survey Area Data: Version 15, Sep 1, 2022

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

El Paso County Area, Colorado

92—Tomah-Crowfoot loamy sands, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: 36b9
Elevation: 7,300 to 7,600 feet
Farmland classification: Not prime farmland

Map Unit Composition

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

Description of Tomah

Setting

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

Typical profile

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

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 4.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: B
Ecological site: R049XY216CO - Sandy Divide
Hydric soil rating: No

Description of Crowfoot

Setting

Landform: Hills, alluvial fans
Landform position (three-dimensional): Side slope, crest
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium

Typical profile

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

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 4.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: B
Ecological site: R049XY216CO - Sandy Divide
Hydric soil rating: No

Minor Components

Other soils

Percent of map unit:
Hydric soil rating: No

Pleasant

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

Data Source Information

Soil Survey Area: Castle Rock Area, Colorado
Survey Area Data: Version 15, Sep 1, 2022

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