April 17, 2026

ENTECH
ENGINEERING, INC.
505 ELKTON DRIVE
COLORADO SPRINGS, CO 80907
PHONE (719) 531-5599

Central Colorado Builders, Inc.
4430 Red Rock Ranch Road
Monument, CO 80132

Attn: John Cressman

Re: **Geologic Hazard Review – Revised No-Build Line**
4619 Redstone Ridge Road – Guest House
El Paso County, Colorado
Entech Job No. 260429

Dear Mr. Cressman:

As requested, personnel of Entech Engineering, Inc. (Entech) have investigated the above-referenced site to evaluate the conditions with respect to geology and geologic hazards affecting the proposed revised no-build line on the lot. The proposed project is to consist of the construction of guest house in the southeastern portion of the lot. The location of the site is shown in the Vicinity Map, Figure 1, and the USGS Topography Map in Figure 2.

The site was previously investigated by Entech as part of the *Soil, Geology and Wastewater Study* dated July 14, 2004 completed for the Red Rock Reserve Subdivision (Reference 1). The slope north of the proposed building area for the guest house was identified as a downslope creep area, and was included in no-build area as part of the original plat. The site was revisited by personnel of Entech on March 6, 2026 to evaluate the proposed building area and revised no-build line.

Site Conditions

The site is located in a portion of the SE¼ of the SW¼ of Section 8, Township 11 South, Range 67 West, in northern El Paso County northwest of the town of Monument. The site topography varies from generally gradually sloping towards the southeast within the proposed building area, with a moderate to steep slopes along a south facing ridge north of the building area.

The conditions on the site were investigated by Entech with results provided in the Geotechnical Report dated April 17, 2027, Entech Job No. 260429 (Reference 2, Appendix B). The investigation consisted of drilling two borings within the proposed footprint of the guest house. The approximate locations of the test borings are shown in the Site and Exploration Plan, Figure 3. Site photographs taken March 5, 2026, are included in Appendix C.

Subsurface Conditions

Subsurface conditions observed in TB-1 drilled on this site consisted of approximately 9 feet of medium dense clayey sand overlying highly weathered sandstone bedrock, or very dense clayey sand when classified as a soil, which extended to the termination depth of the boring 20 feet. TB-2 consisted of medium dense to loose clayey sand, which extended to the termination depth of the boring 25 feet.

Depth to groundwater was measured in the borings at the conclusion of, and subsequent to drilling. Groundwater was not encountered in the borings which were drilled to depths of 20 to 25 feet. Groundwater is not anticipated to affect the proposed shallow foundation. Fluctuations in groundwater conditions may occur due to variations in rainfall and other factors not readily apparent at this time. Isolated sand layers within the soil profile, sometimes only a few feet in thickness and width, can carry water in the subsurface. Contractors should be cognizant of the potential for the occurrence of such subsurface water features during construction.

Geologic Conditions

The geology of the site was evaluated using, the referenced previous investigation, the results of the test borings completed by Entech, the *Geologic Map of the Palmer Lake Quadrangle,* distributed by the Colorado Geological Survey in 2007 (Reference 3, Figure 4), and site-specific mapping of the site. The Geology/Engineering Geology Map prepared for the site is presented in Figure 5.

Approximately 1 of a mile west of the site is a major structural feature known as the Rampart Range Fault. Along this fault system, older Precambrian rocks to the west of the fault have been uplifted against younger sediments east of the fault. The bedrock underlying the site consists of the Dawson Formation of Tertiary to Cretaceous Age (Tkd). According to the Geologic Map of the Palmer Lake Quadrangle the site is mapped in an area of alluvial deposits (Qa_1) of late to early Holocene Age, and the Dawson Formation of Tertiary to Cretaceous Age (TKd) (Reference 3, Figure 4). The Geology/Engineering Geology Map prepared for the site is shown in Figure 5. Two mappable units were identified on the site: Colluvium of Holocene Age (Qc) and Colluvium of Holocene Age overlying the Dawson Formation of Cretaceous Age.

Engineering Geologic Constraints/Hazards

The geologic constraints identified on this site, included downslope creep, and potential seasonally shallow groundwater and is indicated on the Geology/Engineering Geology Map, Figure 5. These hazards and recommended mitigation have been addressed below:

Landslide Hazard and Slope Stability

No areas of unstable or potentially unstable slopes were identified on the lot, however, the slopes north of the proposed guest house location were previously identified as downslope creep areas. These slopes are located within an existing no-build easement and will remain within the no-build area with the proposed revised no-build line.

Where grading is required, slopes should be regraded to no steeper than 3:1. Retaining walls should be designed by a qualified professional. Revegetation of disturbed areas along the slope is recommended to reduce erosion. The site development can be achieved with the soil mitigation recommended in the geotechnical report.

Faults – Hazard

The closest fault is the Rampart Range Fault, located approximately 0.5 mile west of the site. No faults are mapped in the site itself. Previously, Colorado was mapped entirely within Seismic Zone 1, a very low seismic risk. Additionally, the International Residence Code (IRC), 2003, currently places this area in Seismic Design Category B, also a low seismic risk. According to a report by the Colorado Geological Survey by Kirkman and Rogers, Bulletin 43 (1981) (Reference 14), this area should be designed for Zone 2 due to more recent data on the potential for movement in this area and any resultant earthquakes.

Floodplain, Groundwater and Drainage Areas

The site is not located within any floodplain zones according to the FEMA Map No. 08041C0256G (Reference 4, Figure 6). Groundwater was not encountered in the test borings drilled on the site (Reference 2) and is not anticipated to affect the construction of the proposed shallow foundation. **Specific drainage studies and floodplain locations are beyond the scope of this report.**

Debris Flow Susceptibility

The site is not mapped within any areas identified as susceptible to debris flows according to the *Debris Flow Susceptibility Map of El Paso County, Colorado,* by McCoy, Morgan, and Berry (Reference 5). Based on site observations, recent debris flows or active debris fans were not observed on the site.

Closure

The revised no-build line is appropriate for the site conditions.

It should be pointed out that because of the nature of data obtained by random sampling of such variable nonhomogeneous 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. Construction and design personnel should be made familiar with the contents of this report.

This report has been prepared for Central Colorado Builders, Inc. for application to the proposed project in accordance with generally accepted geologic, soil and engineering practices. No other warranty expresses 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 us.

Respectfully Submitted,

ENTECH ENGINEERING, INC.

Logan L. Langford, P.G.
Sr. Geologist

Reviewed by:

COLORADO LICENSED JOSEPH COLLIN GOODE 23725 PROFESSIONAL ENGINEER

Digitally signed by Joseph C. Goode Jr.
Date: 04/17/26

Joseph C. Goode, Jr., P.E.
President

LLL/JCG

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Entech Job No. 260429

References

1. Entech Engineering, Inc., dated July 14, 2004. *Soil, Geology and Wastewater Study, Red Rock Reserve Subdivision, El Paso County, Colorado.* Entech Job No. 22794.
2. Keller, JW, Siddoway, CS; Morgan, ML; Route, EE; Grizzell, MT; Sacerdoti, R; Stevenson, A. 2003. *Geologic Map of the Manitou Springs Quadrangle, El Paso County, Colorado.* Colorado Geological Survey. Open-File Report 03-19.
3. Entech Engineering, Inc., April 2, 2026. *Geotechnical Report, 4619 Redstone Ridge Road – Guest House, El Paso County, Colorado*. Entech Job No. 260429.
4. Federal Emergency Management Agency. December 7, 2018. *Flood Insurance Rate Maps for the City of Colorado Springs, Colorado*. Map Number 08041C0256G.
5. McCoy, KM; Morgan, ML; Berry, KL. 2018. *Debris Flow Susceptibility Map of El Paso County, Colorado.* Colorado Geological Survey. Open-File Report 18-11.
6. Kirkman, Robert M. and Rogers, William P., 1981. *Earthquake Potential in Colorado Springs, Colorado*. Geologic Survey. Bulletin 43.
7. Colorado Geological Survey. 1991. *Results of the 1987-88 EPA Supported Radon Study in Colorado.* Open-file Report 91-4.

FIGURES

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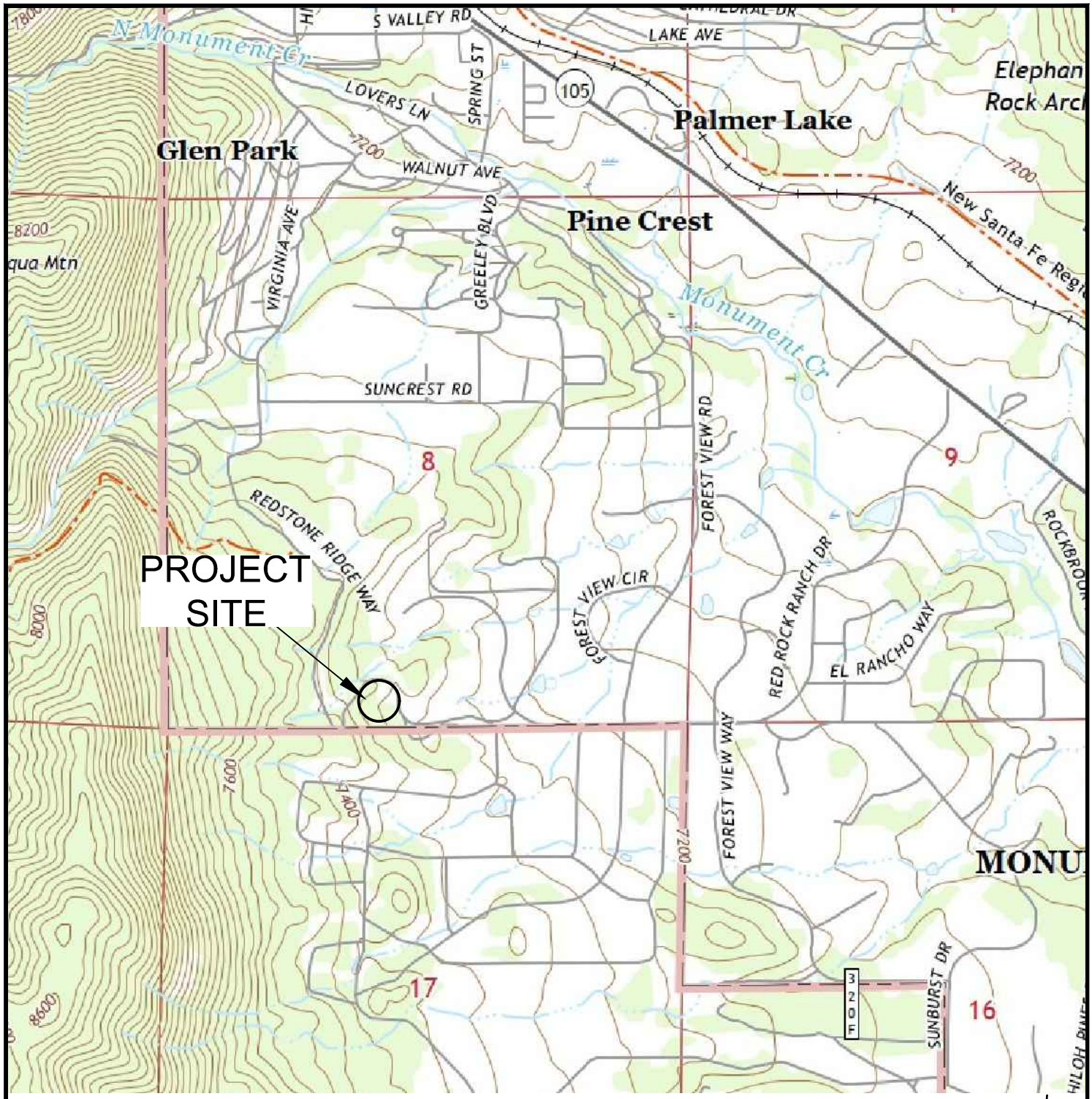
ENTECH ENGINEERING, INC.

VICINITY MAP

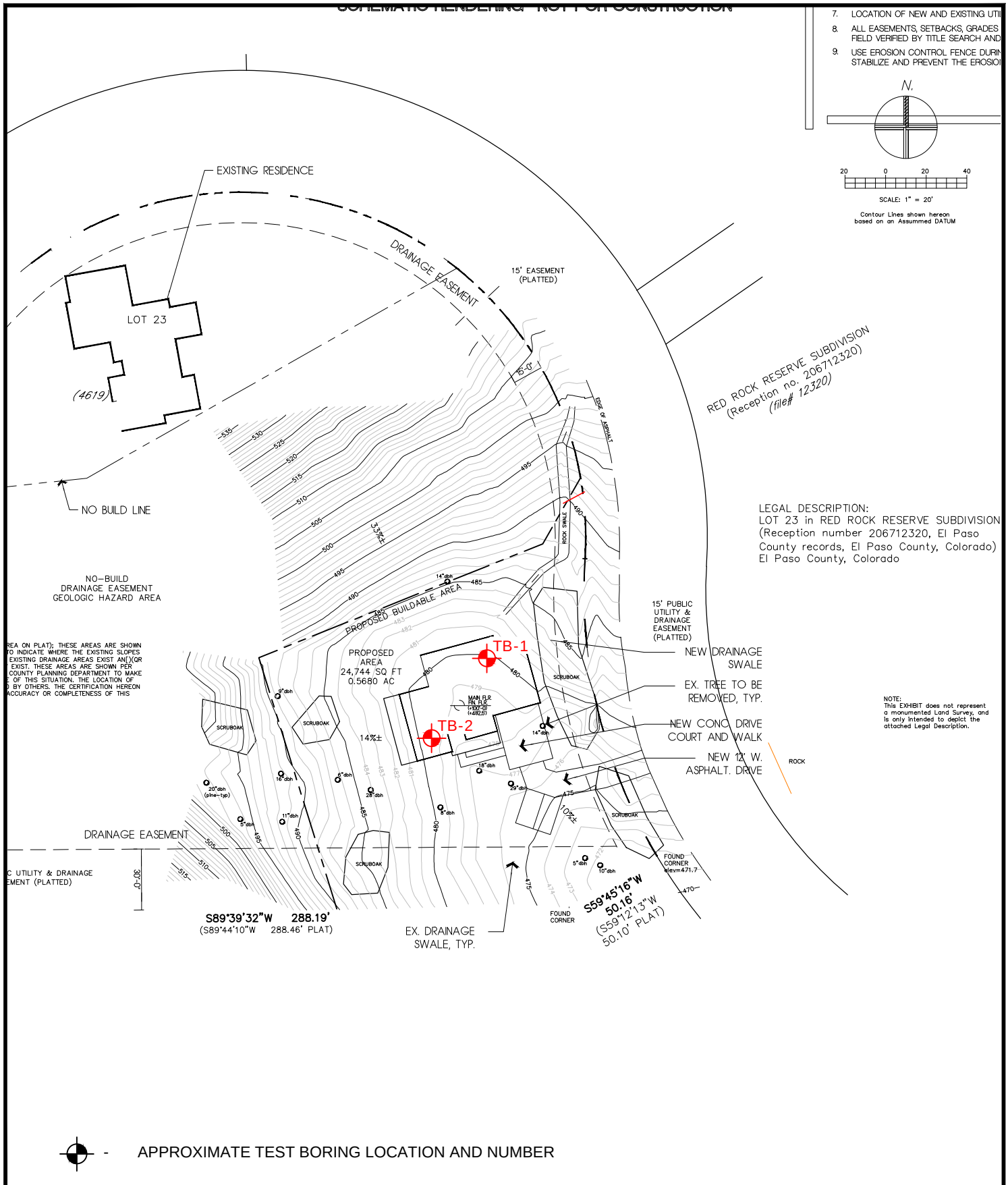
4619 REDSTONE RIDGE ROAD - GUEST HOUSE
COLORADO CENTRAL BUILDERS, INC.

JOB NO.
260429

FIG. 1



ENTECH ENGINEERING, INC.	**USGS TOPOGRAPHY MAP** **4619 REDSTONE RIDGE ROAD - GUEST HOUSE** **CENTRAL COLORADO BUILDERS, INC.**	**JOB NO. 260429** **FIG. 2**



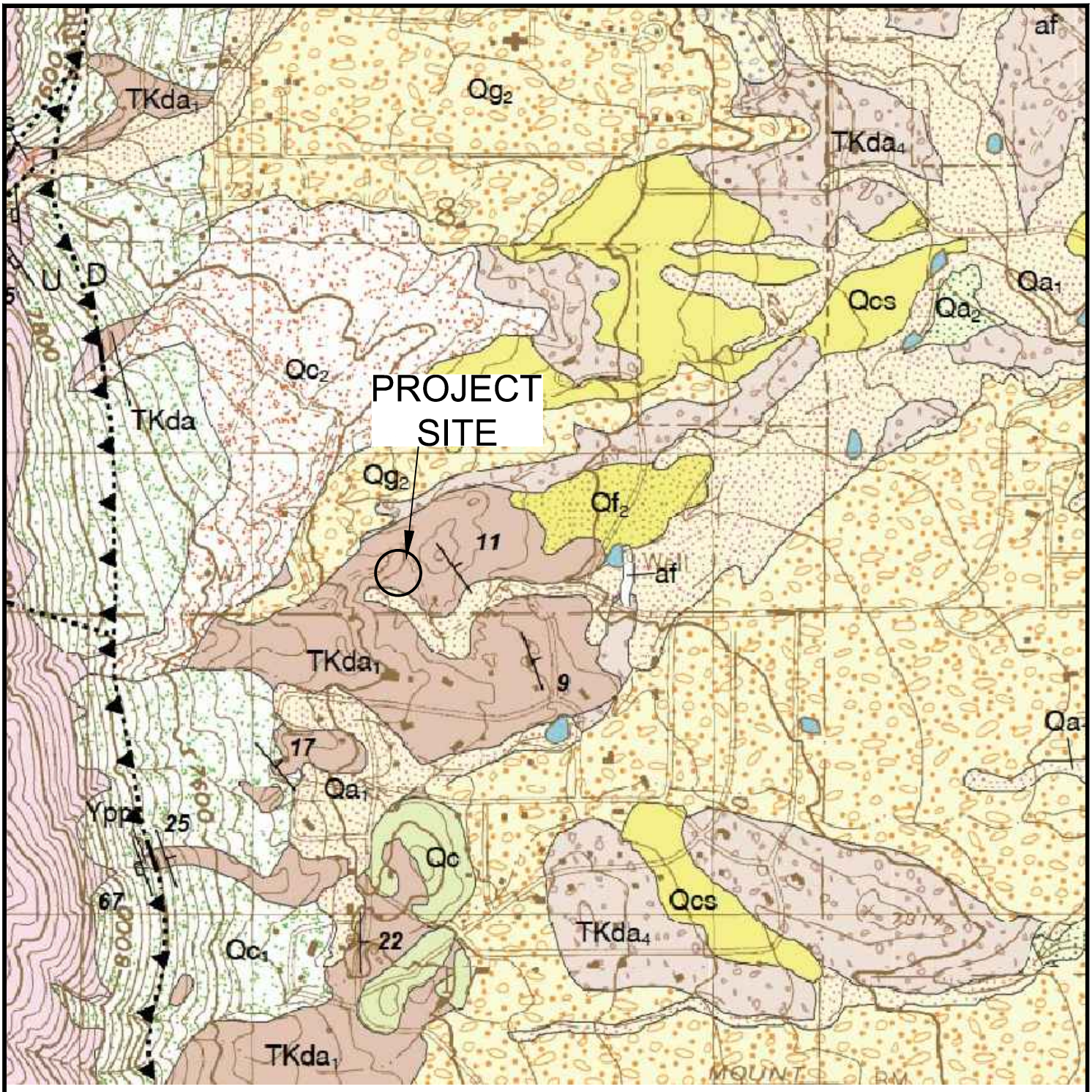
ENTECH ENGINEERING, INC.

SITE AND EXPLORATION MAP

4619 REDSTONE RIDGE ROAD - GUEST HOUSE
CENTRAL COLORADO BUILDERS, INC.

JOB NO. 260429

FIG. 3



N

ENTECH ENGINEERING, INC.

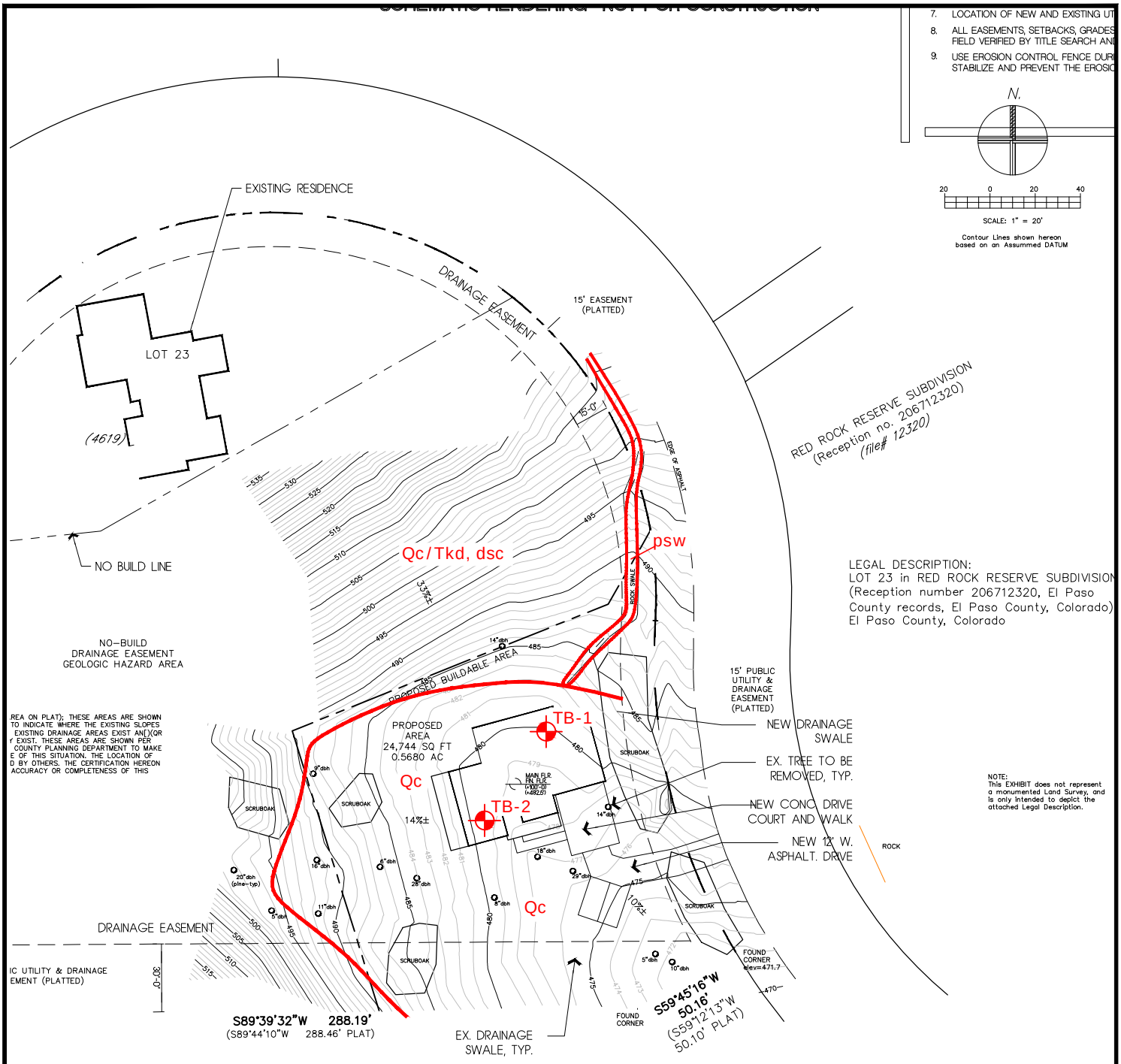
GEOLOGIC MAP OF THE PALMER LAKE QUADRANGLE

4619 REDSTONE RIDGE ROAD - GUEST HOUSE

CENTRAL COLORADO BUILDERS, INC.

JOB NO. 260429

FIG. 4



Legend

Qc - Colluvium of Holocene Age: sheetwash and residual soil derived form the in-situ weathering of the bedrock materials

Tkd - Colluvium of Holocene Age overlying the Dawson Formation of Tertiary to Cretaceous Age: sheetwash and residual soil deposits overlying arkosic sandstone with interbedded siltstone and claystone

dsc- downslope creep
psw - potential seasonal shallow groundwater area

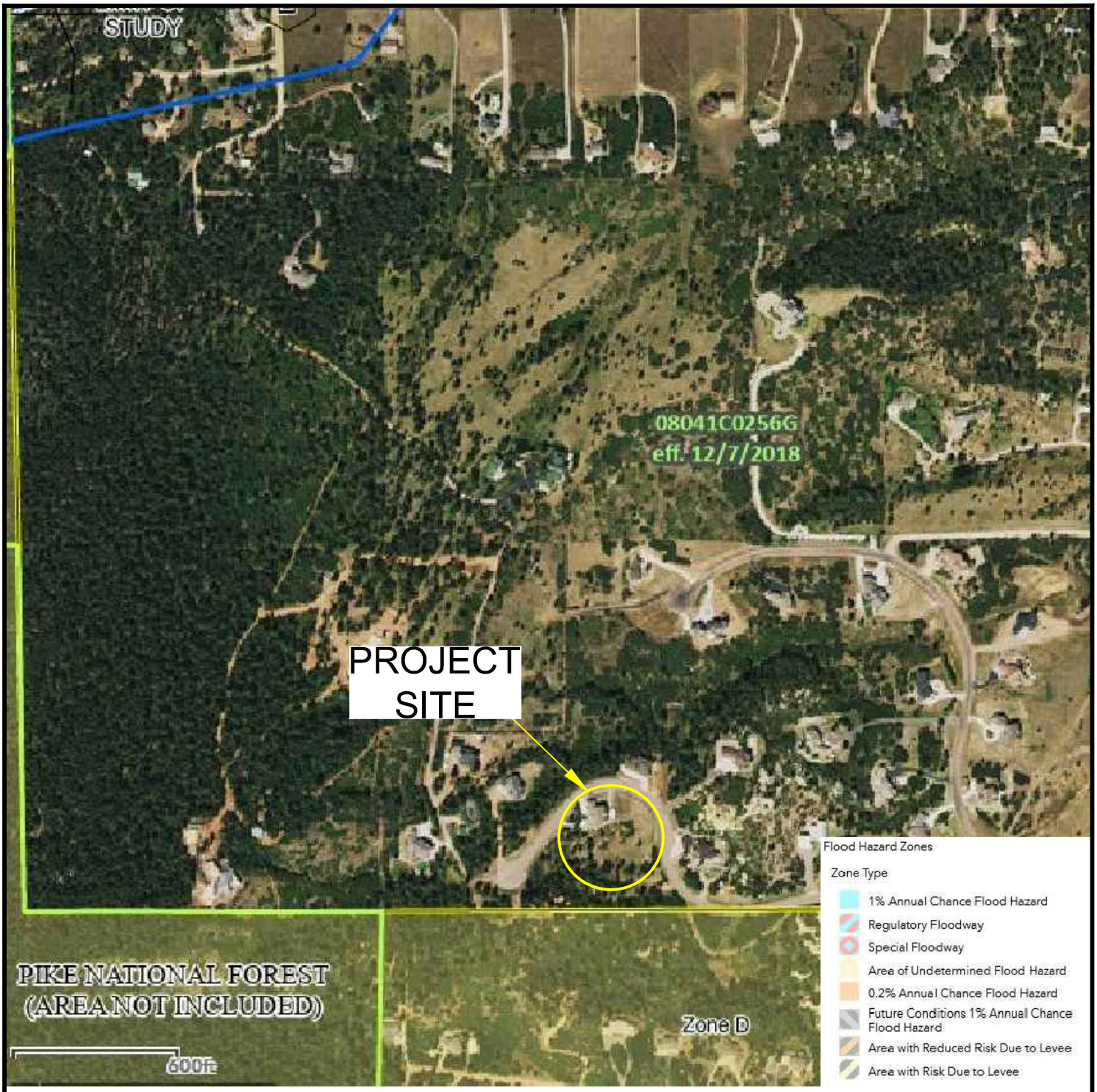
ENTECH ENGINEERING, INC.

GEOLOGY/ENGINEERING GEOLOGY MAP

4619 REDSTONE RIDGE ROAD - GUEST HOUSE
CENTRAL COLORADO BUILDERS, INC.

JOB NO. 260429

FIG. 5



ENTECH ENGINEERING, INC.

FEMA FLOODPLAIN MAP

4619 REDSTONE RIDGE ROAD - GUEST HOUSE
CENTRAL COLORADO BUILDERS, INC.

JOB NO. 260429

FIG. 6

APPENDIX A: Entech, Soil, Geology and Wastewater Study, Red Rock Reserve Subdivision, Entech Job No. 22794

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SOIL, GEOLOGY AND WASTEWATER STUDY
RED ROCK RESERVE SUBDIVISION
EL PASO COUNTY, COLORADO

Prepared for

Copper Valley Builders
c/o Land Resource Associates
9736 Mountain Road
Chipita Park, Colorado 80809

Attn: Dave Jones

July 14, 2004

Respectfully Submitted,

ENTECH ENGINEERING, INC.

Kristen A. Andrew-Hoeser
Professional Geologist

KAH/ek

Encl.

Entech Job No. 22794
2MSW/rep/2004/22794sgws

Reviewed by:

Joseph C. Goode, Jr., P.E.
President

COLORADO REGISTERED
JOSEPH COLLIN GOODE JR.
23725
PROFESSIONAL ENGINEER

TABLE OF CONTENTS

1.0 SUMMARY

Project Location

The project lies in the S½ of Section 8, Township 11 South, Range 67 West of the 6th Principal Meridian in El Paso County, Colorado. The site is located approximately 1 mile south of Palmer Lake along the north end of Red Rock Ranch.

Project Description

Total acreage involved in the project is 68 acres. The proposed site development consists of 23 single-family residential lots ranging from 2.5 to 2.9 acres in size. The development will utilize individual wells and sewage treatment systems.

Scope of Report

This report presents the results of our geologic investigation, treatment of engineering geologic hazard study and wastewater study for individual sewage treatment systems.

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 some constraints on development and land use. These include areas of artificial fill, seasonally wet areas, drainage areas, downslope creep areas, unstable slopes and rockfall hazard. Based on the proposed development plan, it appears that these areas will have some impact 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 are either avoided or properly mitigated. All recommendations are subject to the limitations discussed in the report.

2.0 GENERAL SITE CONDITIONS AND PROJECT DESCRIPTION

The site is located in the S½ of Section 8, Township 11 South, Range 67 West of the 6th Principal Meridian in El Paso County, Colorado. The site is located south of Palmer Lake, Colorado, northwest of the intersection of Red Rock Ranch Drive and Spruce Road. The location of the site is as shown on the Vicinity Map, Figure 1.

The topography of the site is gently to steeply sloping generally to the east. The site boundaries are indicated on the USGS Map, Figure 2. Previous land uses have included grazing and pasture land. The site contains low grasses, dense scrub oak and Ponderosa Pines. The drainages on site trend in easterly to northeasterly directions. No water was observed flowing in these drainages at the time of this investigation. Areas of ponded water exist behind several small earthen dams on the site. The site photographs are included in Appendix A. The locations and directions of the photographs are indicated on Figure 3.

Total acreage involved in the proposed development is 68 acres. 23 single-family residential lots are proposed. The lots will range from 2.5 to 2.9 acres in size. The Development Plan is presented in Figure 3. The area will be serviced by individual wells and sewage treatment systems.

3.0 SCOPE OF THE REPORT

The scope of the report will include the following:

- 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.

- The site will be evaluated for individual sewage treatment systems in accordance with El Paso Land Development Code.

4.0 FIELD INVESTIGATION

Our field investigation on this site consisted of the preparation of a geologic map of any bedrock features and significant surficial deposits. 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 and 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.

A Soil, Geology and Wastewater Study was previously performed by Entech Engineering, Inc. for this parcel and one to the north, revise dated January 20, 2002 (Reference 1). Eight percolation tests were performed as a part of the investigation to determine general suitability of the site for the use of individual wastewater treatment systems. Five of these percolation tests are located on this parcel. The locations of these percolation tests are shown on Figure 3. 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 include grain-size analysis, ASTM D-422, and Atterberg Limits, ASTM D-4318. Swell testing included FHA tests. Results of the laboratory testing are 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 1000 feet 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 an easterly direction. The rocks in the area of the site are sedimentary in nature, and typically Tertiary to Upper Cretaceous in age. The bedrock underlying the site

consists of the Dawson Arkose Formation. Overlying this formation are unconsolidated deposits of Residual, Colluvial and Alluvial soils of the Quaternary Age. The Residual soils are produced by the in-situ action of weathering of the bedrock on site. Some Colluvial soils exist which are deposited by gravity and sheetwash. The Alluvial soils were deposited by water in the major drainages during the Holocene Epoch and as terrace deposits during the Pleistocene Epoch. The site's stratigraphy will be discussed in more detail in Section 5.3.

5.2 Soil Conservation Service

The Soil Conservation Service has mapped four (4) soil types on the site (Figure 4)(Reference 2). In general, they vary from sandy loam to gravelly loamy sand with some sandy clay loam subsoil. The soils are described as follows:

Type	Description
38	Jarre-Tecolote complex, 8-65% slopes
65	Perry park gravelly sandy loam, 3-9%
77	Rock outcrop – Coldcreek-Tolman complex, 9-90%
93	Tomah-Crowfoot loamy sands, 8-15% slopes

Complete descriptions of each soil type are presented in Figures 5 through 8. The soils have generally been described to have moderate to moderately rapid permeabilities. Limitations on development include steep slopes, rock outcrops, limited ability to support a load, shrink swell potential and depth to bedrock. 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 to high erosion hazards.

5.3 Site Stratigraphy

The Front Range Geology Map showing the site is presented in Figure 9 (Reference 3). The Geology Map prepared for the site is presented in Figure 10. Four mappable units were identified on this site which are identified as follows:

- **Qaf** **Artificial Fill of Quaternary Age:** These are man-made fill deposits associated with small earth dam embankments and erosion berms.

- **Qal** **Recent Alluvium of Quaternary Age:** Recent stream deposits.

- **Qc/Tkd** **Colluvium of Quaternary Age overlying Dawson Arkose of Tertiary to Cretaceous Age:** These materials consist of silty to clayey sands, cobbles and boulder 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 as described below.

- **Qv** **Verdos Alluvium of Quaternary Age:** This material consists of silty sands and gravels with scattered cobble and boulder sized material. It is typically red brown in color and was deposited as terrace deposits along the mountain front.

- **Qrf** **Rocky Flats Alluvium of Quaternary Age:** These are alluvial terrace deposits occurring as silty to clayey sands and gravels.

- **Tkd** **Dawson Arkose of Tertiary to Cretaceous Age:** This formation consists of arkosic sandstone with interbedded lenses of fine grained sandstone, claystone or siltstone. Typically, it is buff to light brown and light gray in color. Above the Dawson in many areas on this site is a Residual soil layer of variable thickness derived from the in-situ weathering of the bedrock on site.

The soils listed above were mapped from the Geologic Map of the Colorado Springs-Castle Rock area, distributed by the USGS in 1979 (Reference 3) and the Soil, Geology and Geologic Hazard Study performed by Entech Engineering, Inc. revise dated January 20, 2002 (Reference 1). The Geology Map prepared for the site is presented in Figure 10.

5.4 Soil Conditions

The soils encountered in the profile holes of the percolation tests can be grouped into two general soil types. The soils were classified using the Unified Soil Classification System (USCS).

Soil Type 1 consists of silty and clayey sand (SC). The sands were encountered in the upper soil profile at depths ranging from 1 to 10 feet. These soils were encountered at loose to dense states and moist conditions.

Soil Type 2 consists of the silty sandstone bedrock (SM). The sandstone was encountered in the Profile Holes of Test Nos. 1 and 3 at 7 and 9 feet, respectively. The sandstone was encountered at very dense states and moist conditions.

5.5 Groundwater

Groundwater was not encountered in any of the profile holes which were drilled to depths of 10 feet. Fluctuation in groundwater conditions may occur due to variations in rainfall and other factors not readily apparent at this time.

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 or clays. 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

As mentioned previously, detailed mapping has been performed on this site to produce an Engineering Geology Map (Figure 10). 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. These hazards and the recommended mitigation techniques are as follows:

af *Artificial Fill*

These are man-made fill deposits associated with small earth dams and erosion berms on site.

Mitigation: Due to lot size, the earth dams could probably be avoided as building sites. If the earth dams are not removed and regraded, they should be designed to serve as a

part of the storm drainage system. Additional investigation of the embankment may be required depending on the intended use of the dams. It is recommended that the small dam on Lot 16 be removed to prevent ponding in that area. Specific drainage studies are beyond the scope of this report.

Small erosion berms could be penetrated by foundations. Should any uncontrolled fill be encountered beneath foundations, removal and recompaction at 90% of Modified Proctor Dry Density, ASTM D-1557 will be required.

sw *Seasonal High Groundwater Area*

In these areas, we would anticipate periodically high subsurface moisture conditions, frost heave potential and highly organic soils. The majority of these areas lie within defined drainages. Construction in any portions of these areas should follow these precautions.

Mitigation: In these locations, foundation in areas subject to severe frost heave potential should penetrate to a sufficient depth so as to discourage the formation of ice lenses beneath foundations. At this location and elevation, a foundation depth for frost protection of 3 feet 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 located below grade. A typical perimeter drain detail is presented in Figure 12. 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 before any filling is done. Structures should not block drainages. No areas of the site are mapped with a floodplain zone according to the FEMA Map No. 08041CO260F Figure 11 (Reference 4). Finished floor levels must be a minimum of 1 foot above floodplain levels. Exact floodplain locations and drainage studies are beyond the scope of this report.

w *Wet Areas*

These are areas where standing water was observed behind small earth dams on-site. The majority of these areas lie within defined drainages. Due to the size, it is anticipated these areas could be avoided as building sites.

dsc *Downslope Creep Areas*

The areas identified with this hazard include the hillsides around the steeper knolls and ridges on the property and some of the steeper drainages. In these areas we would anticipate lateral and vertical movement of the near surface soils in the downslope direction. These areas, however, are acceptable as building sites with the following constraints on construction.

Mitigation: This type of movement will increase lateral pressures against foundation walls on the uphill side of structures. The design of foundations in these areas should account for this additional pressure. A lateral pressure detail is shown in Figure 13. Where possible in areas of downslope creep, structures should be designed to be as compact and rigid as possible. This will help them better tolerate the vertical and lateral movements to which the foundation system may be subjected with minimal damage. Long, rambling, irregular structures should be avoided in these areas as they are associated with a much greater potential for damaging differential movement. Due to lot size, it is anticipated that the majority of the areas could be avoided as building sites. Lots most affected by downslope creep include Lots 18 and 19. Reinforcement or tie beams in the foundation may be necessary on these lots. Any cuts steeper than 3:1 should be retained by walls designed for the sloping conditions.

us *Unstable Slopes*

These are areas steep slopes due to erosion in some of the drainages on site. Most of the slopes are less than 5 feet high and can be avoided by construction. In areas where construction encroaches on unstable slopes, regrading and erosion protection will be necessary.

rf *Rockfall Hazard*

Areas were encountered on site where sandstone outcrops are exposed and produce boulder and cobble-sized talus. The areas of this rockfall hazard are divided into two separate zones based on the severity of the hazard. Areas lying topographically below the rfr zone would be considered reasonably safe from rockfall. Rockfall zones are shown on the Engineering Geology Map, Figure 10. Recommendations for the rockfall areas are presented as follows:

rfs – rockfall source area: This zone delineates the major rockfall source areas or the sandstone bluffs and outcrops themselves. This area carries the highest risk of damaging rockfall, but also is an area which is not likely to be considered for development for many reasons. Some of the rock fragments located within this zone could be stabilized or knocked down to more stable areas, lessening the hazard in areas below this zone. The outcrops in some areas are not loose and may not require mitigation, however, shallow bedrock may be encountered.

Mitigation: Stabilization of the area can include removal of loose blocks of rock, often referred to as scaling. Other techniques include stabilization of loose blocks mechanically and may involve pinning the loose rocks to the face of the cliff to prevent dislodgment. This may be accomplished with Portland cement grout, gunite or a combination of mechanical rock bolts and some form of netting material such as chainlink fence or other similar materials. Some of these techniques, although effective in controlling rockfall, can be very unpleasing aesthetically.

rfr – rockfall runout zone: This area delineates the runout zone immediately beneath the rockfall source areas. Permanent structures in this zone could be anticipated to be subject to impact from boulders having a low to moderately high velocity depending upon their position in the zone and the steepness of the slope.

Mitigation: Should construction in the runout zone or immediately adjacent to this zone be considered, the following mitigations should be followed: We would recommend that concrete foundation walls on the upslope side be extended a minimum of 4 feet above grade, and that no windows be located in this portion of the concrete wall, to help prevent catastrophic damage to a structure in the event of rockfall impact. In addition, the use of earthen berms sloping away from structure foundations for a distance of at least 15 feet may also be used to significantly reduce the danger of damage from rockfall impact. Grades of 8 to 10 percent are recommended. An alternative to the earthern berms includes cable fencing and concrete or rock building walls designed to catch debris that may be dislodged. Loose blocks will require stabilization as discussed under the rockfall source area that include grouting. It is anticipated that the rockfall mitigation will incorporate several of the above systems. Areas for each mitigation will be determined as the site work is performed. Lots containing rockfall include Lots 13, 16, 17 and 18. An area exists on the west half of Lot 17 that is more suitable for building outside of rockfall zones. Lot 16 is most affected by rockfall runout. Sufficient building

area exists on the southeast half of the lot to avoid rockfall areas. Lots 13 and 18 have sufficient building area on most of the lots that construction can avoid rockfall areas.

6.1 Relevance of Geologic Conditions to Land Use Planning

As mentioned earlier in this report, we understand that the development will be residential. 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 problem affecting development will be that of downslope creep areas and rockfall hazards. Many of the hazards noted on the site can be avoided. Other hazards on site may be satisfactorily mitigated through proper engineering design and construction practices.

The upper residual soils are typically at loose to moderate densities. Foundations anticipated for the site are standard spread footings/ stemwall-on-grade configurations. Areas of loose soils encountered in building areas may require recompaction. Areas containing arkosic sandstone will have high allowable bearing conditions. Difficult excavation should be anticipated in areas of shallow bedrock. Areas of exposed bedrock have been mapped on the Geology Map (Figure 10) and are labeled as rock outcrops. Expansive layers may also be encountered in the soil and bedrock on this site. Expansive soils, if encountered, will require special foundation design and/or overexcavation. These soils will not prohibit development.

Areas of seasonally high groundwater areas were encountered on site. Due to the size of the lots, the majority of these areas could be avoided by construction. Numerous small drainages are located across the property. Any construction crossing drainages should include swales or culverts to direct surface water away from structures, driveways and roadways and avoid areas of concentrated surface flows or areas of ponded water. The small drainage that crosses Lots 15, 16 and 17 could be re-directed closer to the proposed Redstone Ridge roadway to allow more buildable area on these lots. All soft, wet, or organic soils should be removed prior to any filling. Where structures are adjacent to drainage areas, perimeter drains may be necessary to help prevent the intrusion of water into area below grade. A typical perimeter drain detail is included in Figure 12.

Several outcrops exist in the southwestern portion of the site. Many of these outcrops do not contain loose rocks and do not pose a rockfall hazard. Some areas contain some loose and

unstable rocks and the areas that pose a rockfall hazard below these outcrops are identified as rockfall runout zone. Lots most affected with this hazard include Lots 16 and 17. Building areas exist on these lots that are outside of rockfall hazard areas. Buildings in or near these areas will require mitigation. Specific requirements will be determined for each lot when development plans are available.

Areas of downslope creep exist on the site. The majority of these areas can be avoided by building pads. Lots most affected by downslope creep include Lots 18 and 19. Reinforcement or tie backs in the foundation may be necessary in these lots. All cuts steeper than 3:1 should be retained by walls designed for the sloping conditions. A lateral pressure diagram is included in Figure 13. Lots 18 and 19 may require designed retaining walls for driveways in downslope creep areas to access buildable areas of the lots. Specific requirements for downslope creep mitigation should be determined for each lot as building plans are developed.

In summary, development of the site can be achieved if the items mentioned above are mitigated. These items can be mitigated through proper design and construction or through avoidance.

7.0 ON-SITE DISPOSAL OF WASTEWATER

The site was evaluated for individual sewage treatment systems in accordance with El Paso Land Development Code. Eight (8) percolation tests were performed as a part of a Soil, Geology and Wastewater Study for the site and an area north of the site (Reference 1). Five (5) of these percolation tests are located on this site. Percolation tests may not be located in the exact areas of proposed systems. Access was limited on much of the site due to slopes and vegetation. The approximate location of the percolation tests is shown in Figures 3 and 10. A table showing the results of the percolation tests is presented in Table 1. The specific test results are presented in Appendix C of this report.

The Soil Conservation Service soil map and soil descriptions are presented in Figures 4 through 8. The site has been mapped with 4 soil descriptions. The soils are described as having moderate to moderately rapid percolation rates.

The individual percolation test results ranged from 7 minutes per inch to 17 minutes per inch. All of the percolation rates are suitable for individual sewage treatment systems. The average of the five percolation tests on the site is 11 minutes per inch. Bedrock was encountered at 7 feet and 9 feet in the profile holes of Percolation Test Nos. 1 and 3, respectively. Standard penetration testing, ASTM D-1586, was performed in each profile hole to evaluate the density of the soil and the presence of bedrock. Lots with shallow bedrock may require designed systems.

A Septic Evaluation Map is presented in Figure 14. Areas where designed systems may be necessary due to shallow bedrock or groundwater are indicated on this map. Access to these areas was not available with the drill rig at the time of this report. Areas other than those indicated on the map may also encounter shallow bedrock. Expanded maps for Lots 17 through 20 are presented in Figures 15 through 18. These maps show possible areas for a building pad, well, and two septic sites. The areas for the building pads are an 80-foot square. Typically, the structures in this area are smaller than this pad site. Due to limited space in the building area of Lots 18 and 19, septic systems may need to be located at lower areas of the lot. Designed systems may be required on these lots. Mitigation for downslope creep will also be necessary for the structures on these lots. The drainage area on Lot 17 could be relocated closer to the roadway to allow more buildable area on that lot. These maps indicate only one possible location for building pad, well, and 2 septic sites. Others are possible that may require mitigation for geologic conditions. These will not prohibit development.

Leach fields must be maintained a minimum of 4 feet above groundwater. Groundwater was not encountered in any of the profile holes which were drilled to depths of 10 feet. Should any be encountered within 6 feet of the surface, shallow leaching fields would be recommended. In areas where groundwater is less than 4 feet, designed systems will be required.

All of the percolation rates measured for the tests were found to be in the range which is acceptable for conventional systems using absorption trenches or absorption beds for the disposal of sewage effluent into the subsurface. El Paso County guidelines require designed systems for percolation rates exceed 60 minutes per inch. Bedrock was encountered in two of the profile holes at depths that would not affect conventional systems. Some areas may contain shallow bedrock. Where bedrock is encountered above 6 feet, designed systems may be required. Due to the size of the building lots, it is anticipated that suitable areas will be available where conventional systems may be utilized on the majority of the lots. In areas where suitable percolation rates cannot be found, shallow groundwater exists or shallow bedrock exists, designed systems will be required.

8.0 ECONOMIC MINERAL RESOURCES

Some of the sandy materials on-site could be considered a low grade sand resource. According to the El Paso County Aggregate Resource Evaluation Map (Reference 5), the area is not mapped as any significant resource. Considering the silty nature of these materials and abundance of similar materials through the region, they would be considered to have little significance as an economic resource.

9.0 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 reestablished, 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 and weathered bedrock materials 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.

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 avoided by construction. Others can be mitigated through proper engineering design and construction practices.

It should be pointed out that because of the nature of data obtained by random sampling of such variable and nonhomogeneous 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 and septic systems 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 Copper Valley Builders/ Land Resource Associates 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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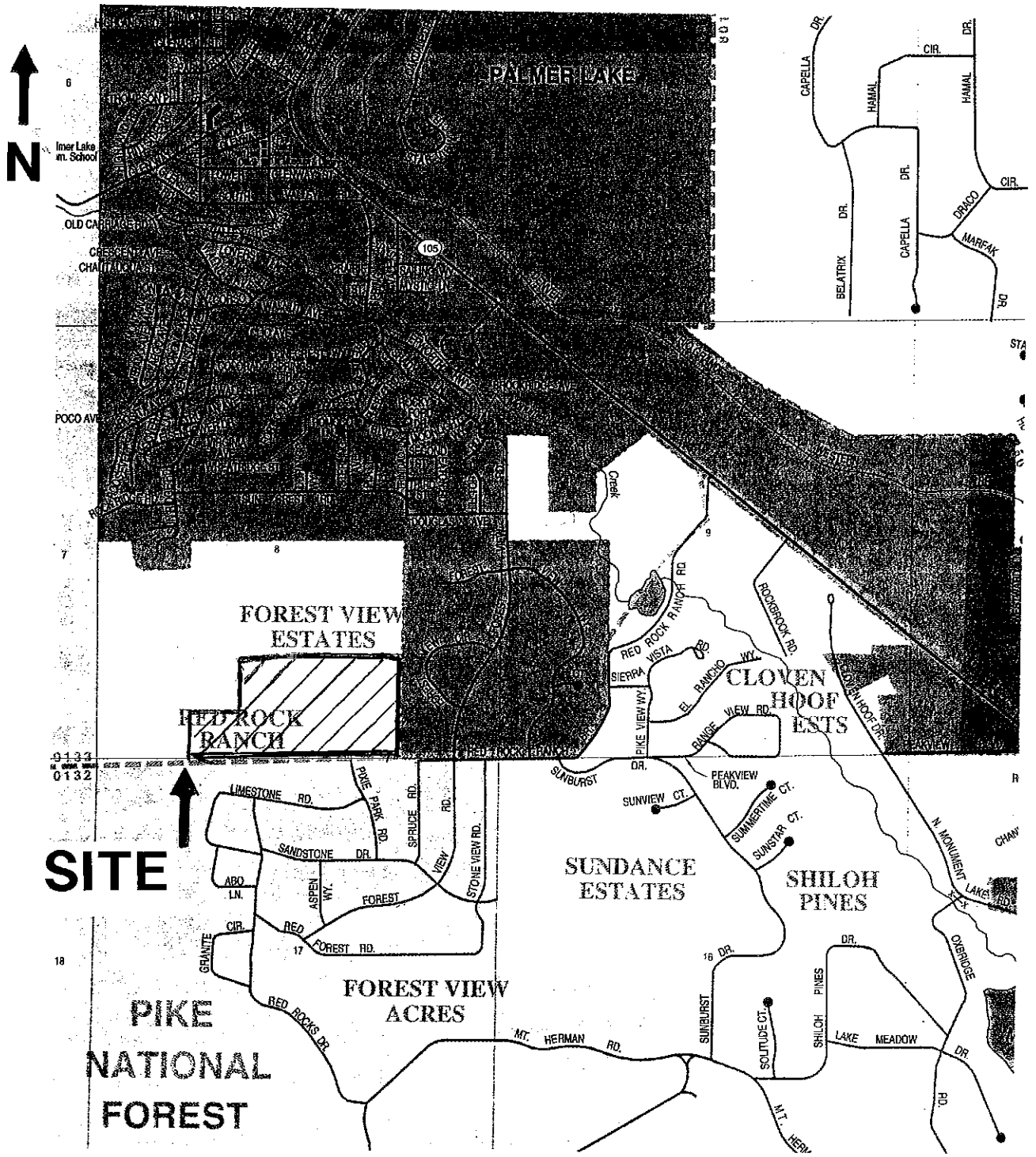
TABLE

Table 1

Percolation Test Results

Test No.	Average Percolation Rate (min/in)	Depth to Bedrock (ft)	Depth to Groundwater (ft)
1	11	7	>10
2	6	>10	>10
3	7	9	>10
4	17	>10	>10
5	13	>10	>10

FIGURES



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VICINITY MAP

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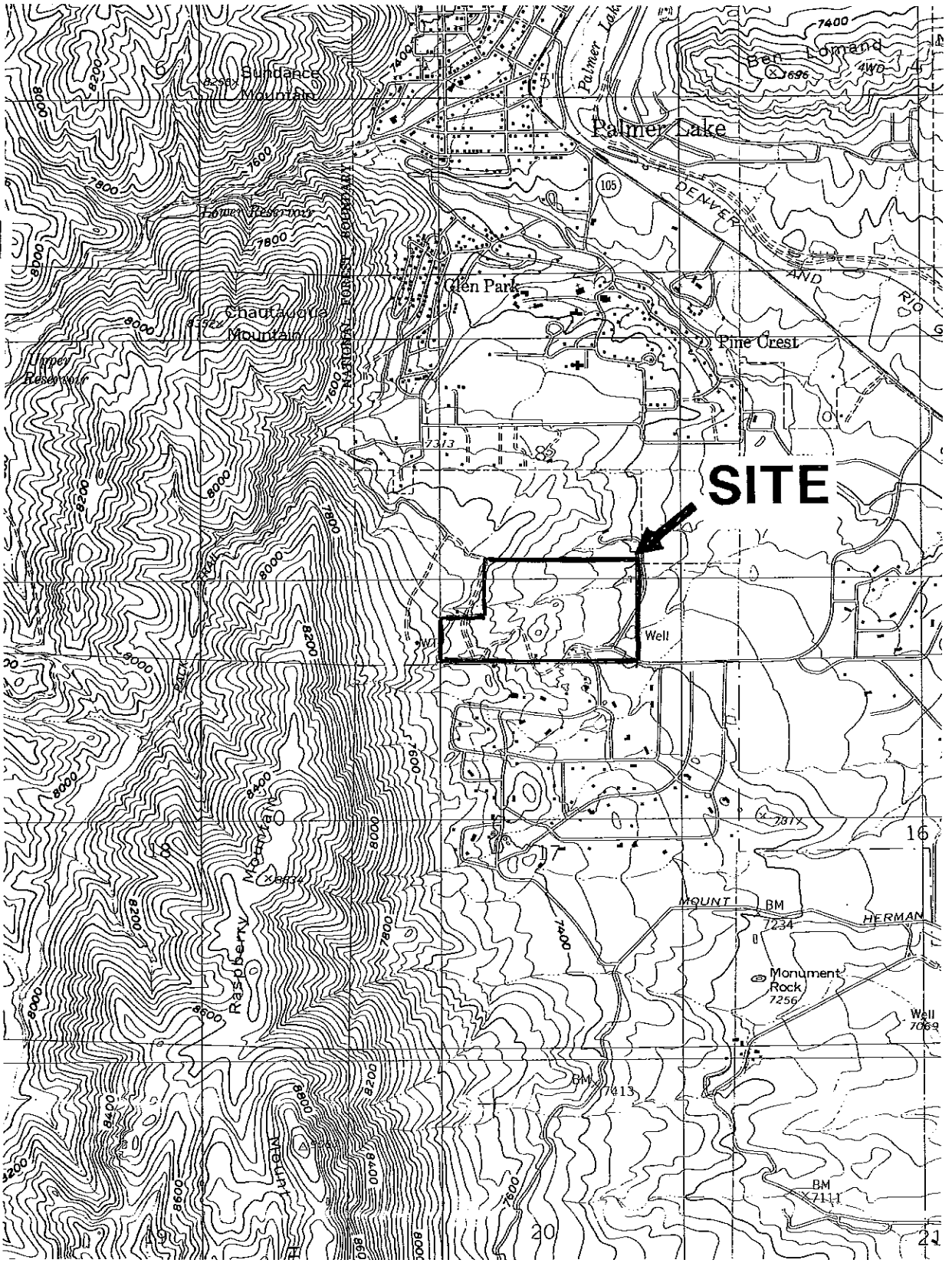
Job No. 22794

Fig. No. 1



ENTECH ENGINEERING, INC.

USGS MAP

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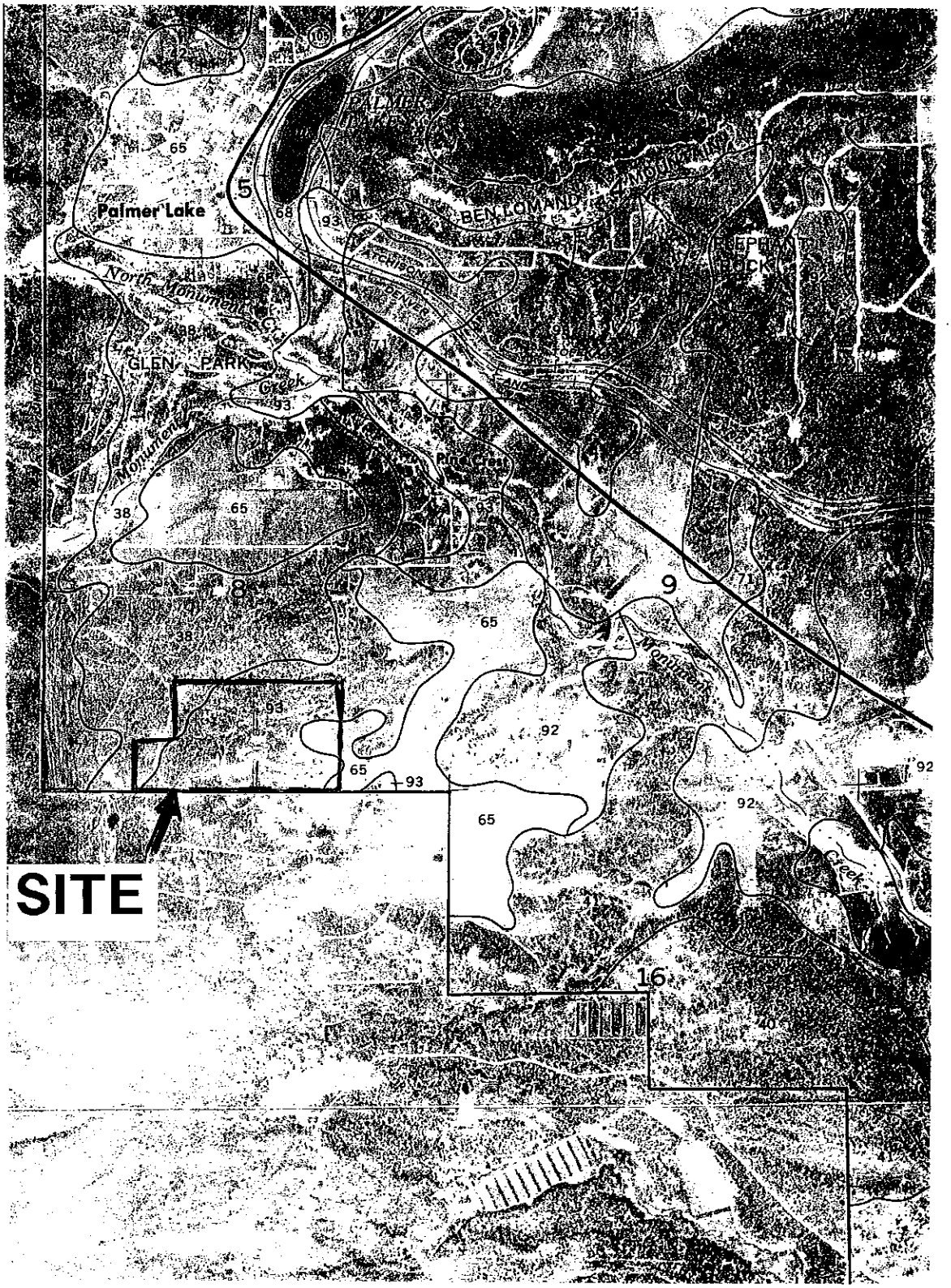
Fig. No. 2



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SCS MAP

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Fig. No. 4

38—Jarre-Tecolote complex, 8 to 65 percent slopes. These moderately sloping to very steep soils are on alluvial fans. Elevation ranges from 6,700 to 7,500 feet. The average annual precipitation is about 18 inches, and the average annual air temperature is about 43 degrees F.

The Jarre soil makes up about 40 percent of the complex, the Tecolote soil about 30 percent, and other soils about 30 percent.

Included with this complex in mapping are areas of Jarre gravelly sandy loam, 1 to 8 percent slopes; Kettle gravelly loamy sand, 8 to 40 percent slopes; Kutch clay loam, 5 to 20 percent slopes; and Chaseville gravelly sandy loam, 8 to 40 percent slopes.

The Jarre soil is deep and well drained. It formed in alluvium derived from sandy sediment. It has slopes of 1 to 30 percent. Typically, the surface layer is dark grayish brown gravelly sandy loam about 5 inches thick. Coarse fragments on the surface range from 5 to 15 percent. The subsoil is brown gravelly sandy clay loam about 17 inches thick. The substratum to a depth of 60 inches is brown very gravelly sandy loam.

Permeability of the Jarre soil is moderate. Effective rooting depth is 60 inches or more. Available water capacity is moderate. Surface runoff is medium to rapid, and the hazard of erosion is moderate to high. Typically, this complex has a large amount of cobbles and stones on the surface, and in some areas there are large boulders.

The Tecolote soil is deep and well drained. It formed in alluvial fan sediment derived from acid igneous rock. Cobbles and stones on the surface range from about 30 to 50 percent. Typically, the surface layer is dark brown very stony loam about 3 inches thick. The subsurface layer is pinkish gray very gravelly loamy sand about 9 inches thick. The subsoil is reddish brown extremely gravelly sandy clay loam about 33 inches thick. The substratum to a depth of 60 inches or more is light brown extremely gravelly loamy sand.

Permeability of the Tecolote soil is moderate. Effective rooting depth is 40 inches or more. Available water capacity is low to moderate. Surface runoff is medium, and the hazard of erosion is moderate.

The soils in this complex are used for woodland, rangeland, recreation, wildlife habitat, and homesites.

The Jarre soil is well suited to the production of native vegetation suitable for grazing by cattle and sheep. Rangeland vegetation is mainly mountain muhly, little bluestem, needleandthread, Parry oatgrass, and junegrass.

Deferment of grazing in spring helps to maintain vigor and production of the cool-season bunchgrasses on the Jarre soil. Fencing and properly locating livestock watering facilities help to control grazing.

The Tecolote soil is suited to the production of Douglas-fir. It is capable of producing about 2,240 cubic feet, or 4,900 board feet (International rule), of merchantable timber per acre from a fully stocked, even-aged stand of 80-year-old trees. The main limitations for timber production are slope and hazard of erosion. Special attention must be given to keep erosion to a minimum when harvesting.

Windbreaks and environmental plantings are suited to the Jarre soil. Available water capacity is the main limitation for the establishment of tree and shrub plantings. Summer fallow a year in advance and continued cultivation for weed control are needed to insure survival. Trees that are best suited and have good survival are Rocky Mountain juniper, eastern redcedar, ponderosa pine, and Siberian elm. Shrubs that are best suited are skunkbush sumac and lilac.

The Jarre soil is best suited to habitat for openland and rangeland wildlife. Rangeland wildlife, such as pronghorn antelope, can be encouraged by developing livestock watering facilities, properly managing livestock grazing, and reseeding range where needed.

The Tecolote soil is best suited to woodland wildlife, especially mule deer, wild turkey, and blue grouse. To encourage wild turkey in areas where there is little or no water, wildlife watering facilities, such as guzzlers, can be developed. Because of the steep slopes, livestock grazing should be discouraged, which would benefit the wildlife that use these areas.

The main limitations for urban development on the Jarre soil are slope, shrink-swell potential, and moderate frost action potential. Special site or building designs are required because of the slope and shrink-swell potential. Designs to overcome the limitations of slope, shrink-swell potential, and moderate frost-action potential are also required for roads and streets. Practices must be provided to minimize surface runoff and erosion.

The main limitations for urban development on the Tecolote soil are steep slopes and the presence of stones. The presence of stones can cause problems when excavating for installation of underground utilities. Heavy equipment can be used to move the stones when preparing building sites or when constructing roads. Plans for homesite development should provide for the preservation of as many trees as possible to maintain the esthetic value of the sites. Capability subclass VIIe.

65—Perrypark gravelly sandy loam, 3 to 9 percent slopes. This deep, well drained soil is in the northwestern part of the survey area, west of Monument Creek. It formed in arkosic alluvium derived from sedimentary and granite bedrock on alluvial fans and valley side slopes. Elevation ranges from about 7,000 to 7,500 feet. The average annual precipitation is about 17 inches, the average annual air temperature is about 43 degrees F, and the average frost-free period is about 120 days.

Typically, the surface layer is very dark grayish brown gravelly sandy loam about 4 inches thick. The subsoil is reddish gray sandy clay loam about 44 inches thick. The substratum is light reddish brown gravelly sandy loam to a depth of 60 inches.

Included with this soil in mapping are small areas of Tomah-Crowfoot loamy sands, 3 to 8 percent slopes, and Jarre gravelly sandy loam, 1 to 8 percent slopes.

Permeability of this Perrypark soil is moderate. Effective rooting depth is 60 inches or more. Available water capacity is high. Runoff is medium, and the hazard of erosion is slight to moderate.

This soil is used as rangeland, for wildlife habitat, and for homesites.

This soil is well suited to the production of native vegetation suitable for grazing by cattle and sheep. The native vegetation is mainly mountain muhly, little bluestem, needleandthread, Parry oatgrass, and junegrass.

Deferment of grazing in spring helps to maintain the vigor and production of the cool-season bunchgrasses. Fences and proper location of livestock watering facilities help to control grazing.

Windbreaks and environmental plantings generally are suited to this soil. Soil blowing is the main limitation to the establishment of trees and shrubs. This limitation can be overcome by cultivating only in the tree rows and leaving a strip of vegetation between the rows. Supplemental irrigation may be needed when planting and during dry periods. Trees that are best suited and have good survival are Rocky Mountain juniper, eastern redcedar, ponderosa pine, Siberian elm, Russian-olive, and hackberry. Shrubs that are best suited are skunkbush sumac, lilac, and Siberian peashrub.

This soil is best suited to habitat for openland and rangeland wildlife. In cropland areas, habitat favorable for ring-necked pheasant, mourning dove, and many nongame species can be developed by establishing areas for nesting and escape cover. Rangeland wildlife, such as pronghorn antelope, can be encouraged by developing livestock watering facilities, properly managing livestock grazing, and reseeding range where needed.

This soil has fair potential for use as homesites. The main limitations are its limited ability to support a load, shrink-swell potential, and the potential for frost action. Buildings and roads must be designed to overcome these limitations. Capability subclass IVe.

77—Rock outcrop-Coldcreek-Tolman complex, 9 to 90 percent slopes. This strongly sloping to extremely steep complex is on mountains. The average annual precipitation is about 20 inches, and the average annual air temperature is about 42 degrees F.

Rock outcrop makes up about 30 percent of the complex, the Coldcreek soil about 30 percent, the Tolman soil about 20 percent, and other soils about 20 percent.

Included with this complex in mapping are areas of Kutler-Broadmoor-Rock outcrop complex, 25 to 90 percent slopes; Fortwingate-Rock outcrop complex, 15 to 60 percent slopes; and Nederland cobbly sandy loam, 9 to 25 percent slopes. Areas of talus occur below some areas of Rock outcrop.

Rock outcrop occurs throughout the complex. It is most commonly on the upper part of the slopes. Runoff is rapid.

The Coldcreek soil is deep and well drained. It formed in mixed, acid igneous material. Typically, the surface layer is dark gray cobbly loam about 6 inches thick. The subsurface layer is light gray extremely cobbly sandy loam that is mixed with a lesser amount of brown clay loam and is about 25 inches thick. The subsoil is brown extremely cobbly clay loam that has coatings of light gray and is about 12 inches thick. Hard fractured bedrock is at a depth of about 43 inches.

Permeability of the Coldcreek soil is moderate. Effective rooting depth is 40 inches or more. Available water capacity is moderate. Surface runoff is medium, and the hazard of erosion is moderate.

The Tolman soil is shallow and well drained. It formed in medium textured residuum derived from acid igneous rock. Typically, the surface layer is dark grayish brown gravelly sandy loam about 4 inches thick. The subsoil is brown very cobbly sandy clay loam about 9 inches thick. Hard igneous bedrock is at a depth of 13 inches.

Permeability of the Tolman soil is moderate. Effective rooting depth is 10 to 20 inches. Available water capacity is low. Surface runoff is medium, and the hazard of erosion is moderate.

The Coldcreek soil is used mainly for woodland, recreation, and wildlife habitat and as a source of gravel. The Tolman soil is used mainly as rangeland and for wildlife habitat.

The Coldcreek soil is suited to the production of Douglas-fir. It is capable of producing about 690 cubic feet, or 1,000 board feet (International rule), of merchantable timber per acre from a fully stocked, even-aged stand of 80-year-old trees. The main limitations for its use for timber production are slope, hazard of erosion, and the presence of stones on the surface. The stones can hinder felling, yarding, and other operations involving the use of equipment. Practices must be used to minimize erosion when harvesting timber.

The Tolman soil is suited to vegetation suitable for grazing and to the production of some firewood. Rangeland vegetation is mainly mountain muhly, big bluestem, little bluestem, side-oats grama, and western wheatgrass. The common shrubs and trees are mountainmahogany, skunkbush sumac, and Rocky Mountain juniper. There are lesser amounts of ponderosa pine.

Proper range management is necessary on the Tolman soil. Properly locating livestock watering facilities helps to control grazing. Deferment of grazing helps to maintain vigor and production of plants.

The Coldcreek soil is suited to habitat suitable for woodland wildlife, especially mule deer, wild turkey, and blue grouse. To encourage wild turkey in areas where there is little or no water, wildlife watering facilities, such as guzzlers, can be developed. Because of the steep slopes, livestock grazing should be discouraged, which would benefit the wildlife that use these areas.

Rangeland wildlife, such as antelope, cottontail, coyote, and scaled quail, is best adapted for life on the Tolman soil. Forage production is typically low, and proper livestock grazing management is necessary if wildlife and livestock share the range. Livestock watering developments are needed, and they are used by various wildlife species.

The main limitations of the soils of this complex for urban use or homesite development are rock outcrops, stones, depth to bedrock, especially on the Tolman soil, and steep slope. Homesites should be located in places where these limitations are the least severe. Special designs for buildings and roads are required to overcome these limitations. Capability subclass VIIe.

93—Tomah-Crowfoot loamy sands, 8 to 15 percent slopes. These moderately sloping to strongly sloping soils are on alluvial fans, hills, and ridges in the uplands. Elevation ranges from about 7,300 to 7,600 feet. The average annual precipitation is about 17 inches, the average annual air temperature is about 42 degrees F, and the average frost-free period is about 120 days.

The Tomah soil makes up about 50 percent of the complex, the Crowfoot soil about 30 percent, and other soils about 20 percent.

Included with these soils in mapping are areas of Elbeth sandy loam, 8 to 15 percent slopes; Peyton-Pring complex, 8 to 15 percent slopes; and Kettle gravelly loamy sand, 8 to 40 percent slopes.

The Tomah soil is deep and well drained. It formed in alluvium or residuum derived from arkose beds. Typically, the surface layer is dark grayish brown loamy sand about 10 inches thick. The subsurface layer is very pale brown coarse sand about 12 inches thick. The subsoil, about 26 inches thick, consists of a matrix of very pale brown coarse sandy clay loam. The substratum is very pale brown coarse sand to a depth of 60 inches or more.

Permeability of the Tomah soil is moderately rapid. Effective rooting depth is 60 inches or more. Available water capacity is moderate. Surface runoff is medium, and the hazard of erosion is moderate. Some gullies are present in some drainageways and along stock trails.

The Crowfoot soil is deep and well drained. It formed in sediment weathered from arkosic sandstone. Typically, the surface layer is grayish brown loamy sand about 12 inches thick. The subsurface layer is very pale brown sand about 11 inches thick. The subsoil is light yellowish brown sandy clay loam about 13 inches thick. The substratum is very pale brown coarse sand to a depth of about 68 inches.

Permeability of the Crowfoot soil is moderate. Effective rooting depth is 60 inches or more. Available water capacity is moderate. Surface runoff is medium, and the hazard of erosion is moderate. Some gullies are present in some drainageways and along stock trails.

The soils in this complex are used as rangeland, for recreation and wildlife habitat, and as homesites.

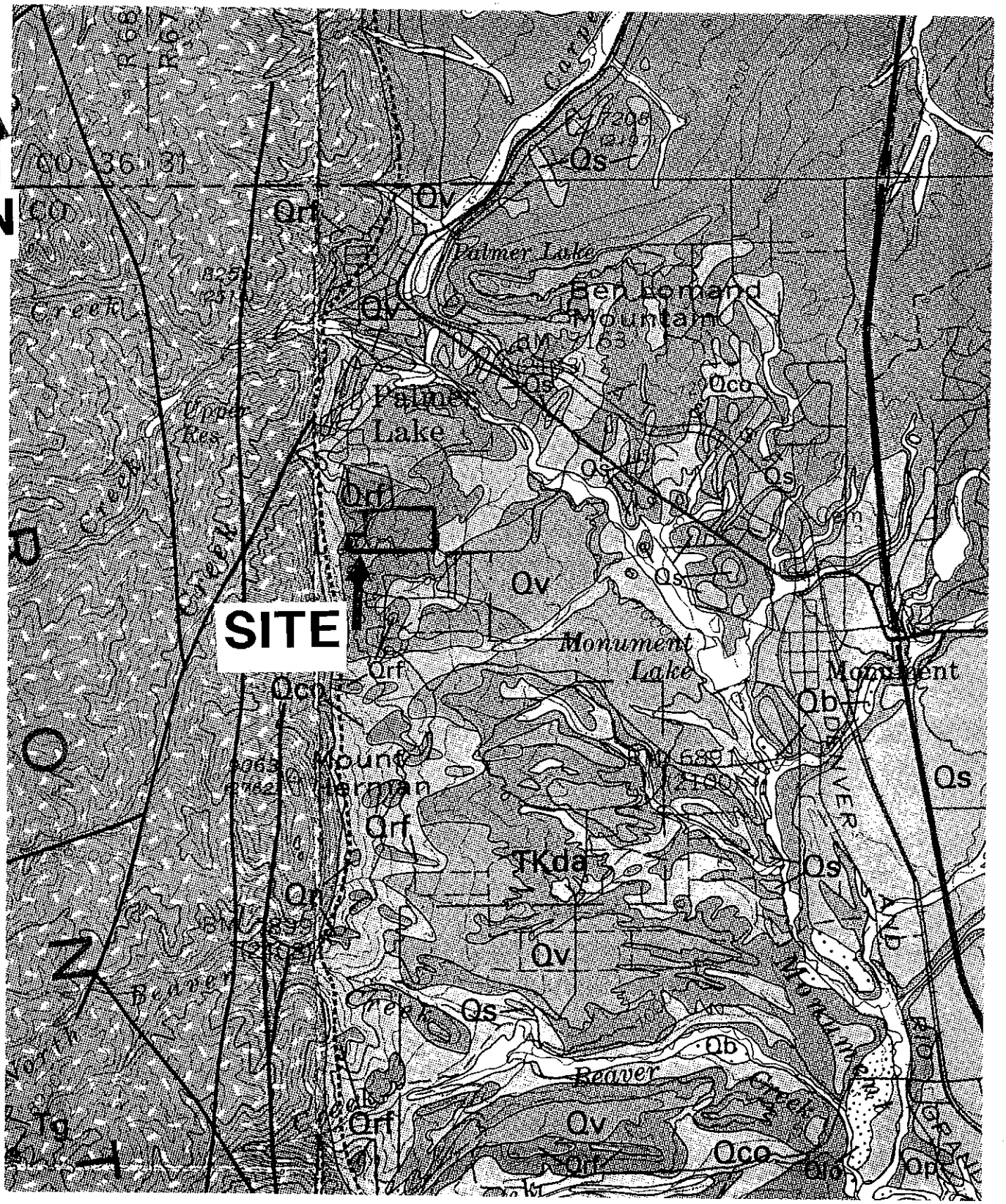
Native vegetation is mainly mountain muhly, bluestem, mountain brome, needleandthread, and blue grama. These soils are subject to invasion by Kentucky bluegrass and Gambel oak. Noticeable forbs are hairy goldenrod, geranium, milkvetch, low larkspur, fringed sage, and buckwheat.

Proper location of livestock watering facilities helps to control grazing. Timely deferment of grazing is needed to protect the plant cover.

Windbreaks and environmental plantings are fairly well suited to these soils. Blowing sand and moderate available water capacity are the main limitations for the establishment of trees and shrubs. The soils are so loose that trees need to be planted in shallow furrows and plant cover needs to be maintained between the rows. Supplemental irrigation may be needed to insure survival. Trees that are best suited and have good survival are Rocky Mountain juniper, eastern redcedar, ponderosa pine, and Siberian elm. Shrubs that are best suited are skunkbush sumac, lilac, and Siberian peashrub.

These soils are best suited to habitat for openland wildlife species, such as pronghorn antelope and sharp-tailed grouse. Although sharp-tailed grouse are not plentiful, they could be encouraged on these soils, especially where brush species are interspersed with grasses and forbs. If these soils are used as rangeland, wildlife production can be increased by managing livestock grazing to preclude overuse of the more desirable grass species and depletion of the various brush species.

The main limitations for urban uses are frost-action potential and slope on the Crowfoot soil and slope on the Tomah soil. Buildings and roads must be designed to overcome these limitations. Access roads must have adequate cut-slope grade and be provided with drains to control surface runoff. Maintaining the existing vegetation on building sites during construction helps to control erosion. Capability subclass VIe.



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FRONT RANGE GEOLOGY MAP

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Job No. 22794

Fig. No. 9

LEGEND

SPECIAL FLOOD HAZARD AREAS INUNDATED BY 100-YEAR FLOOD

ZONE A No base flood elevations determined.

ZONE AE Base flood elevations determined.

ZONE AH Flood depths of 1 to 3 feet (usually areas of ponding); base flood elevations determined.

ZONE AO Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.

ZONE A99 To be protected from 100-year flood by Federal flood protection system under construction; no base elevations determined.

ZONE V Coastal flood with velocity hazard (wave action); no base flood elevations determined.

ZONE VE Coastal flood with velocity hazard (wave action); base flood elevations determined.

FLOODWAY AREAS IN ZONE AE

OTHER FLOOD AREAS

ZONE X Areas of 500-year flood; areas of 100-year flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 100-year flood.

OTHER AREAS

ZONE X Areas determined to be outside 500-year floodplain.

ZONE D Areas in which flood hazards are undetermined.

UNDEVELOPED COASTAL BARRIERS

Identified 1983 | Identified 1990 | Otherwise Protected Areas

Coastal barrier areas are normally located within or adjacent to Special Flood Hazard Areas.

Flood Boundary

Floodway Boundary

Zone D Boundary

Boundary Dividing Special Flood Hazard Zones, and Boundary Dividing Areas of Different Coastal Base Flood Elevations Within Special Flood Hazard Zones.

513 — Base Flood Elevation Line; Elevation in Feet. See Map Index for Elevation Datum.

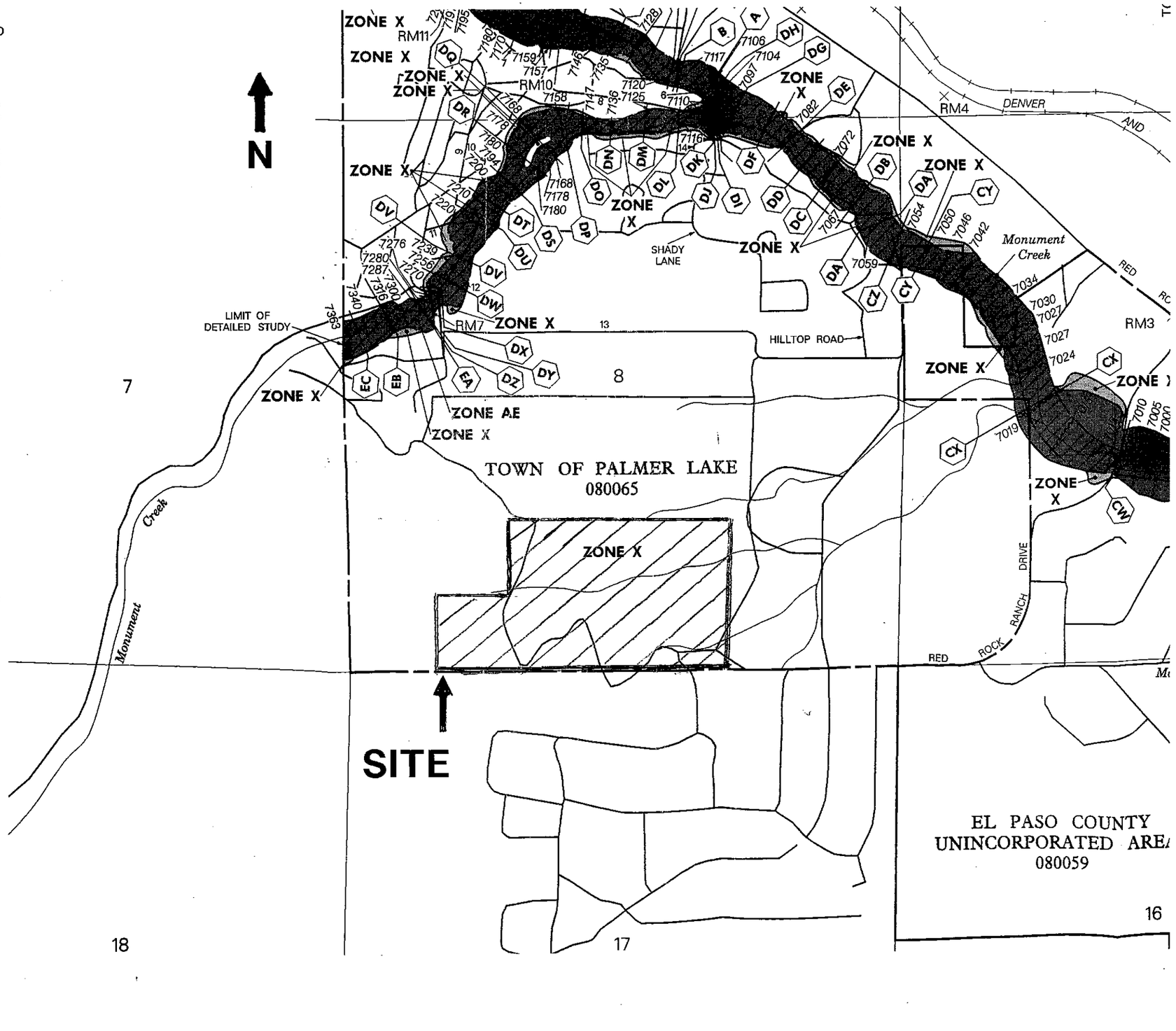
D — D — Cross Section Line

(EL 987) — Base Flood Elevation in Feet Where Uniform Within Zone. See Map Index for Elevation Datum.

RM7 — Elevation Reference Mark

M2 — River Mile

97°07'30", 32°22'30" — Horizontal Coordinates Based on North American Datum of 1927 (NAD 27) Projection.



REVISION	BY

ENTECH ENGINEERING, INC.
505 ELKTON DRIVE (719) 531-5599
COLORADO SPRINGS, CO. 80907

FLOODPLAIN MAP

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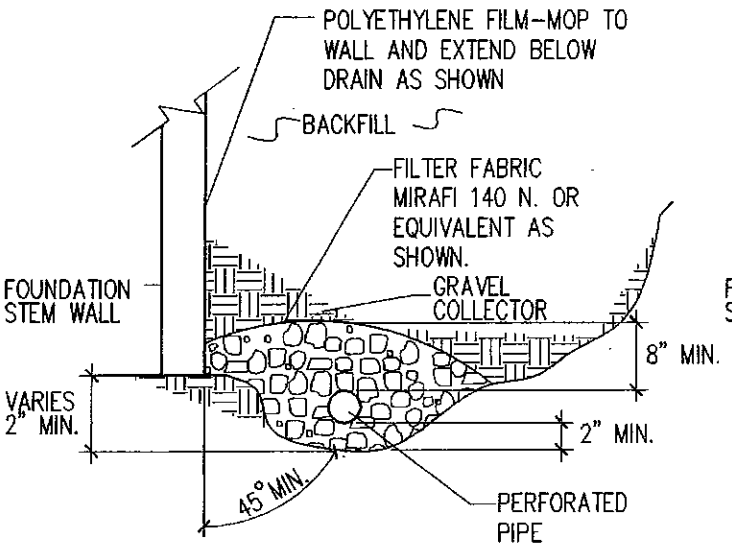
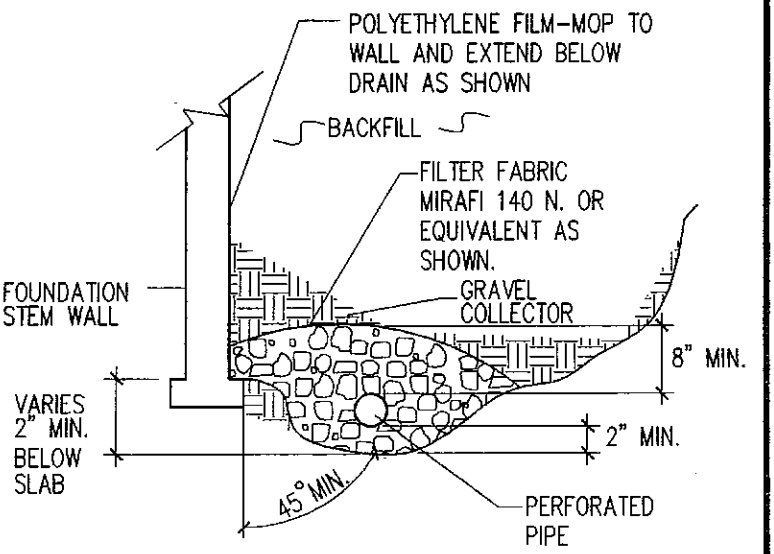
CHECKED:	KAH
DATE:	7/14/04
SCALE:	AS SHOWN
JOB NO.:	22794
FIG. NO.:	11





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.

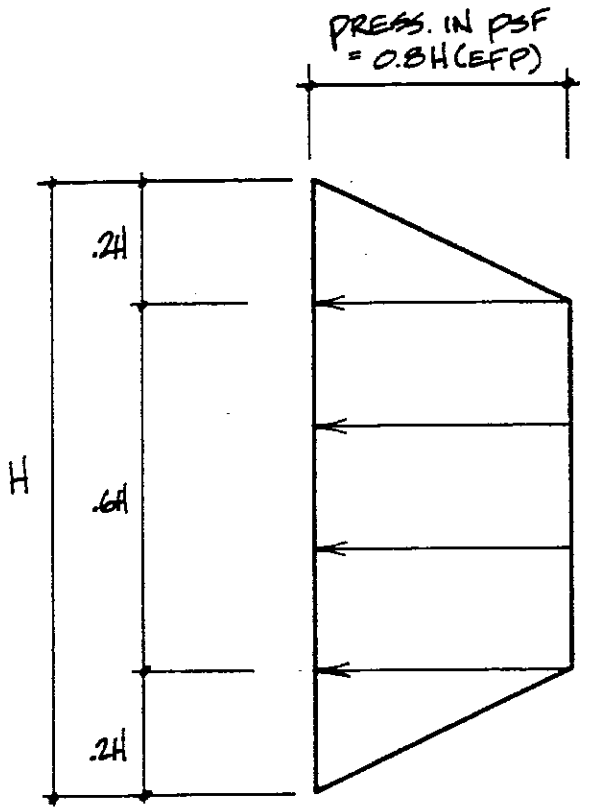
–DRAIN TO BE PROVIDED WITH A FREE GRAVITY OUTFALL, IF POSSIBLE. A SUMP AND PUMP MAY BE USED IF GRAVITY OUT FALL IS NOT AVAILABLE.

DRAWN:	M. VAN KAMPEN
CHECKED:	K.A.H.
DATE:	7/10/09
SCALE:	NTS
JOB NO.:	22794
FIG. NO.:	12

PERIMETER DRAIN DETAILS

ENTECH ENGINEERING, INC.
505 ELKTON DRIVE
COLORADO SPRINGS, CO. 80907 (719) 531-5599

REVISION	BY



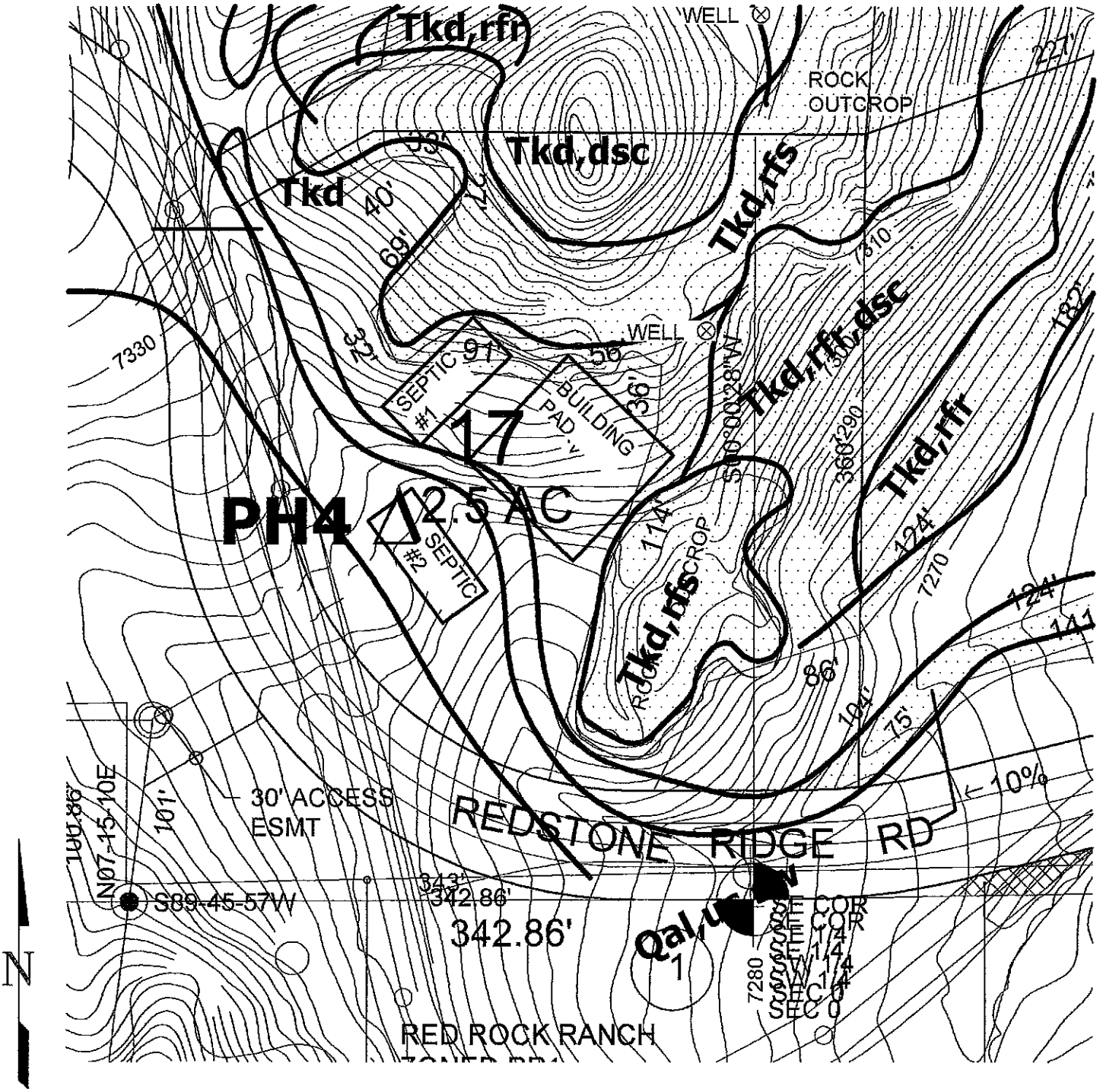
PRESSURE DISTRIBUTION

ENTECH
ENGINEERING, INC.

LATERAL
PRESSURE DISTRIBUTION
AREA WITH CREEP

Drawn	Date	Checked	Date
SEH	5-8-85	JCAH	7/11/04

Job No.
22794
Fig. No.
13



ENTECH ENGINEERING, INC.
505 ELKTON DRIVE
COLORADO SPRINGS, CO. 80907 (719)531-5599

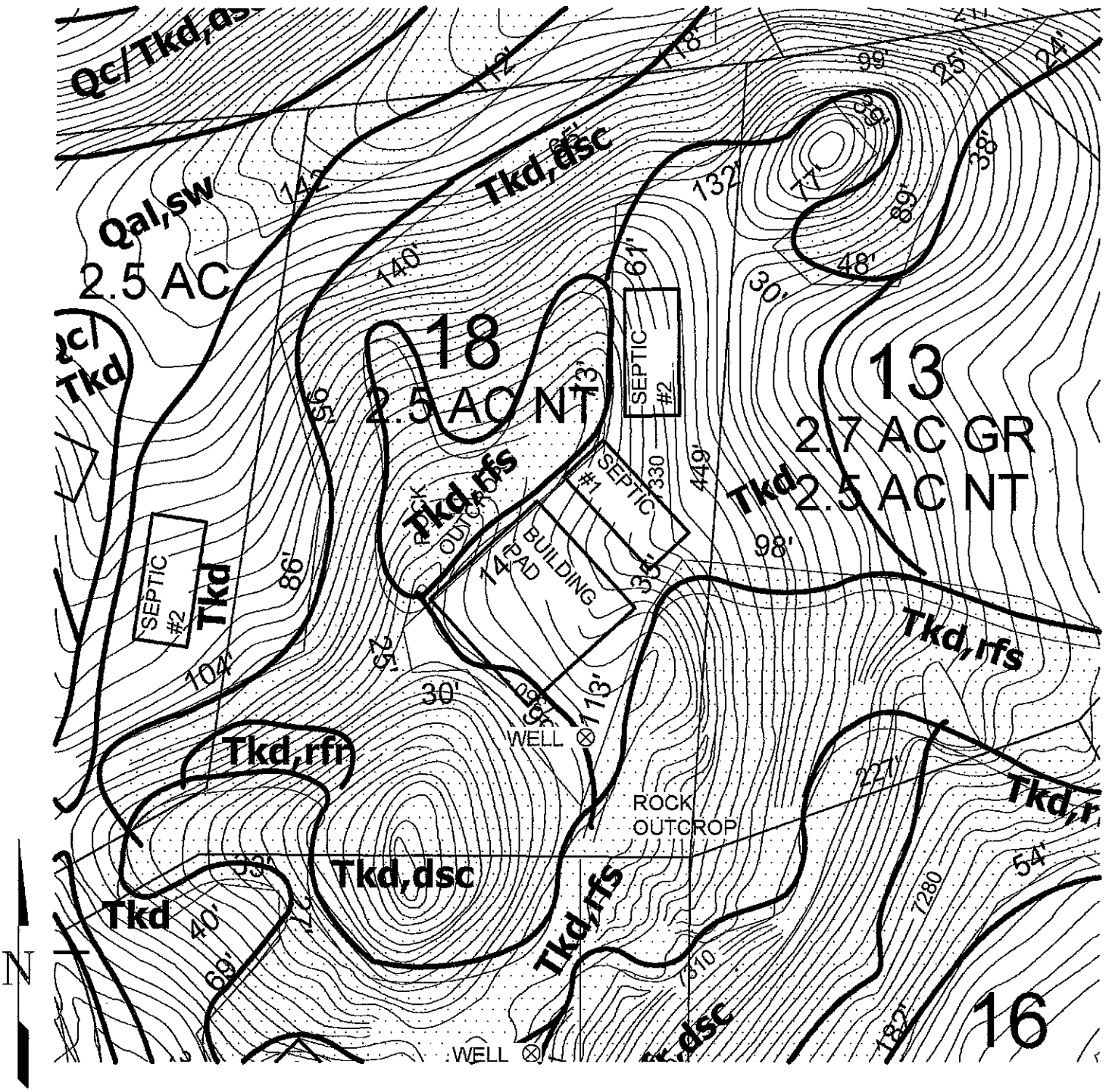
LOT 17 EXPANDED
RED ROCK RESERVE SUB. EL PASO COUNTY, CO.
FOR: COPPER VALLEY BUILDERS

DRAWN:	DATE:	CHECKED:	DATE:
RJO	14JUL04		

JOB NO.: 22794

FIG NO.: 15

C:\1a_Drafting\2004\GEOHAZ MAPS\RED ROCK SUB\22794\[RED ROCK SUB]septic fig 15_18.dwg



ENTECH ENGINEERING, INC.
505 ELKTON DRIVE
COLORADO SPRINGS, CO. 80907 (719) 531-5599

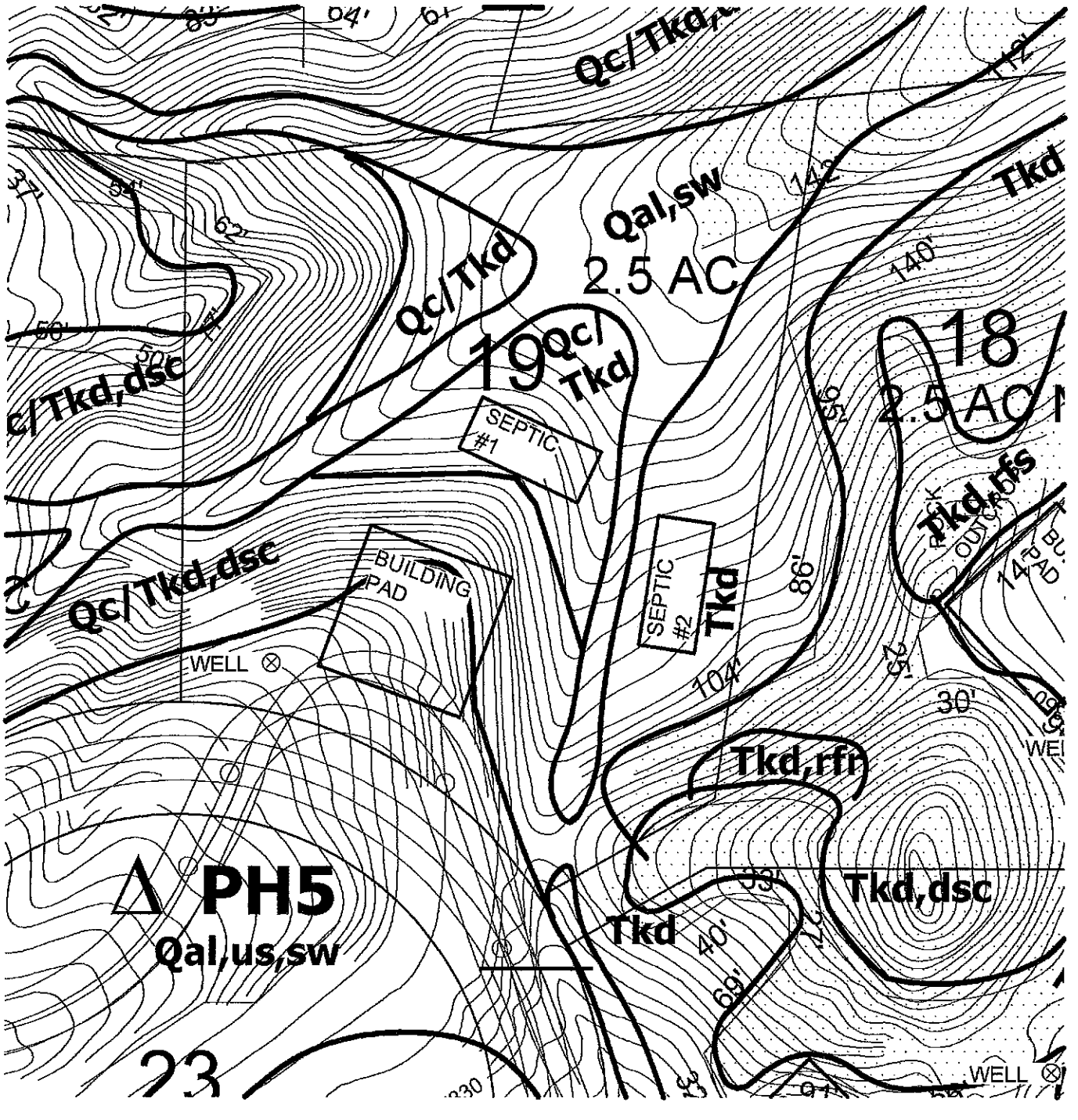
LOT 18 EXPANDED
RED ROCK RESERVE SUB.
EL PASO COUNTY, CO.
FOR: COPPER VALLEY BUILDERS

DRAWN:	DATE:	CHECKED:	DATE:
RJO	14JUL04		

JOB NO.: 22794

FIG NO.: 16

C:\1a_Drafting\22894\GEOHAZ MAPS\RED ROCK SUB\22794(RED ROCK SUB)\septic fig 15_18.dwg



SCALE: 1"=80'

ENTECH
ENGINEERING, INC.
505 ELKTON DRIVE
COLORADO SPRINGS, CO. 80907 (719) 531-5599

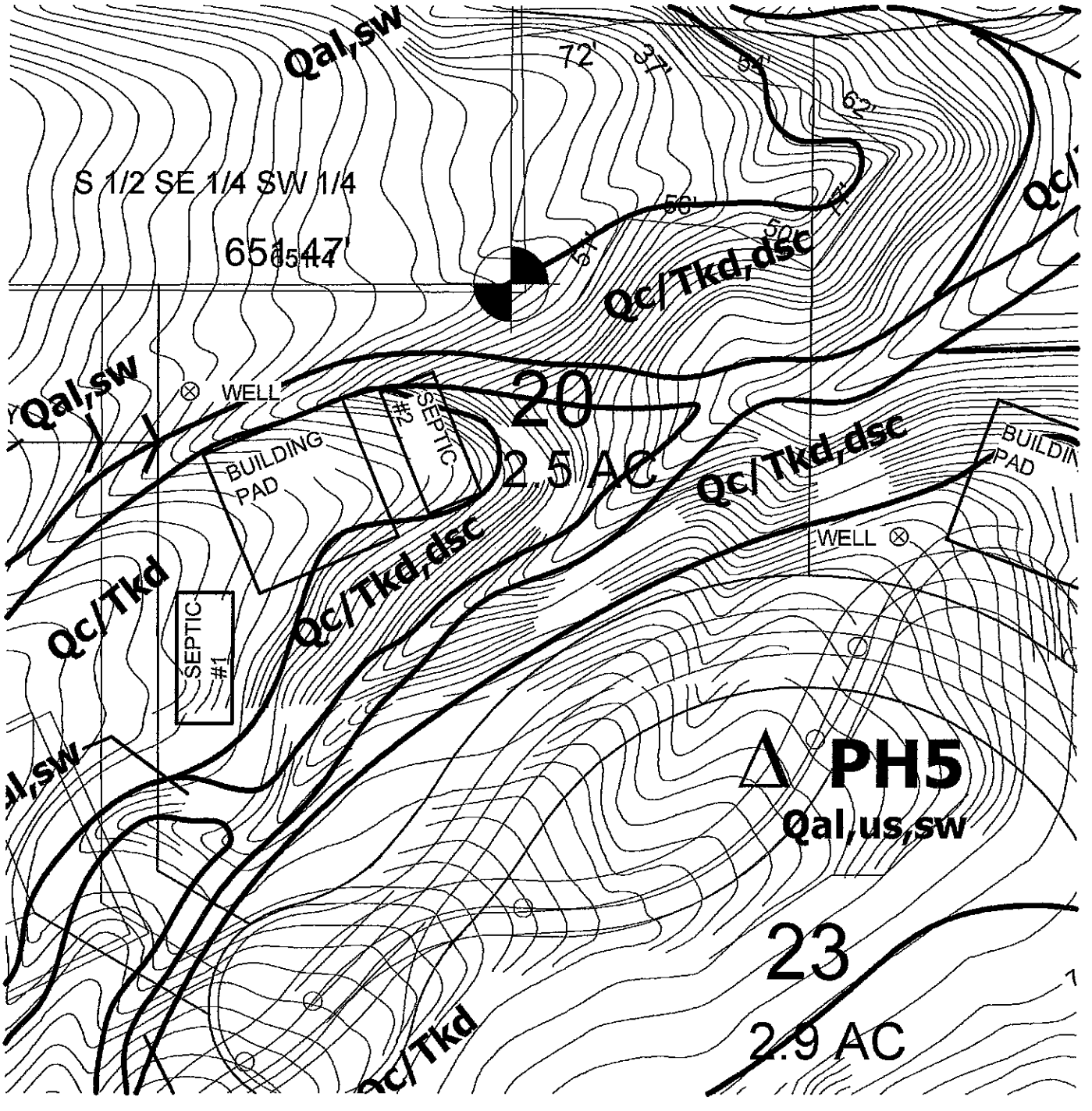
LOT 19 EXPANDED
RED ROCK RESERVE SUB.
EL PASO COUNTY, CO.
FOR: COPPER VALLEY BUILDERS

DRAWN:	DATE:	CHECKED:	DATE:
RJO	14JUL04		

JOB NO.: 22794

FIG NO.: 17

C:\1a_Drafting\2004\GEOHAZ MAPS\RED ROCK SUB\22794(RED ROCK SUB)septic fig 15_18.dwg



SCALE: 1"=80'

ENTECH ENGINEERING, INC.
505 ELKTON DRIVE
COLORADO SPRINGS, CO. 80907 (719) 531-5599

LOT 20 EXPANDED
RED ROCK RESERVE SUB.
EL PASO COUNTY, CO.
FOR: COPPER VALLEY BUILDERS

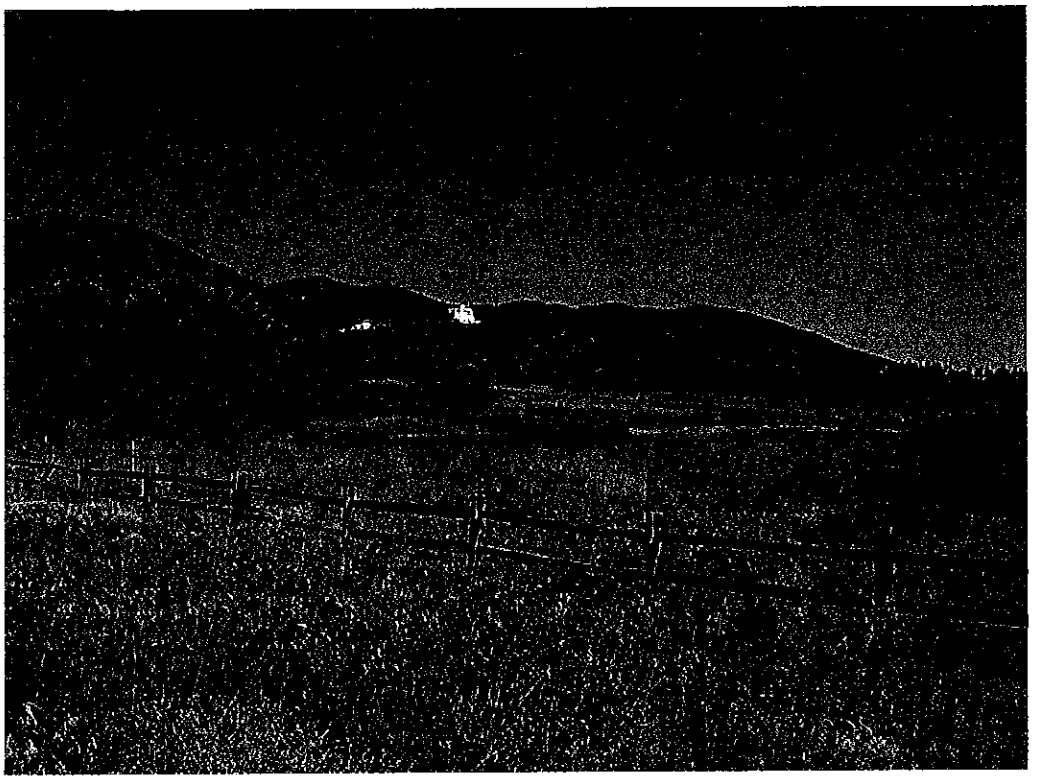
DRAWN:	DATE:	CHECKED:	DATE:
RJO	14JUL04		

JOB NO.: 22794

FIG NO.: 18

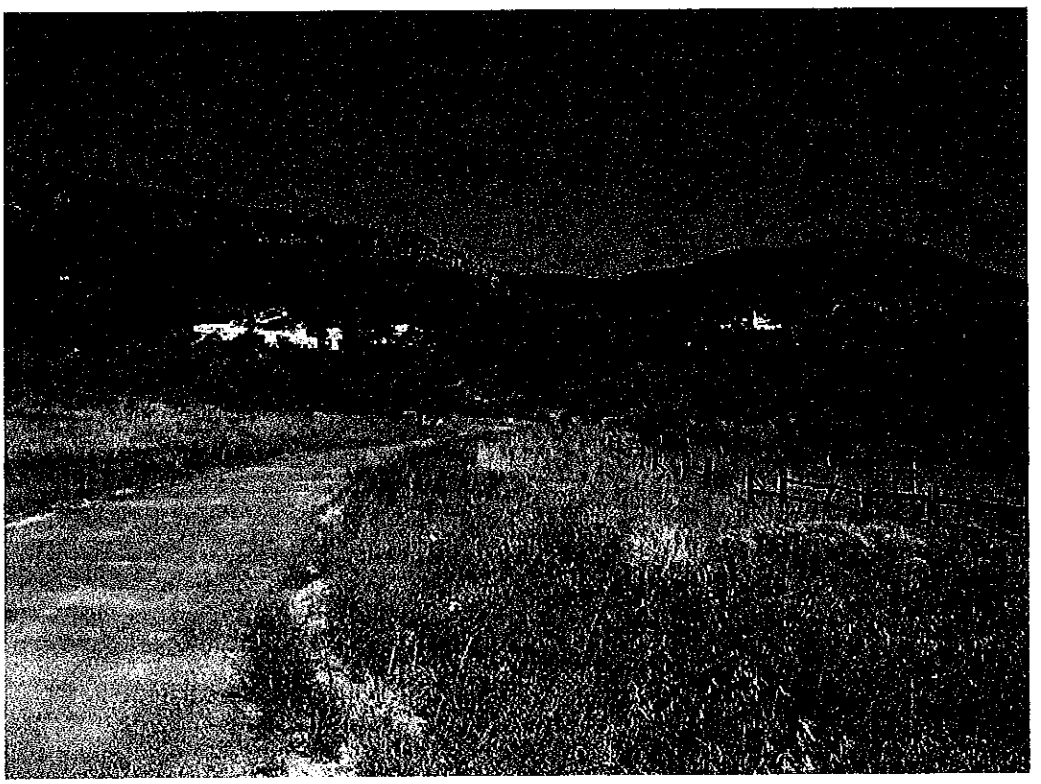
C:\fe_Drafting\20044\GEOHAZ MAPS\RED ROCK SUB\22794(RED ROCK SUB)septic fig 15_18.dwg

APPENDIX A: Site Photographs



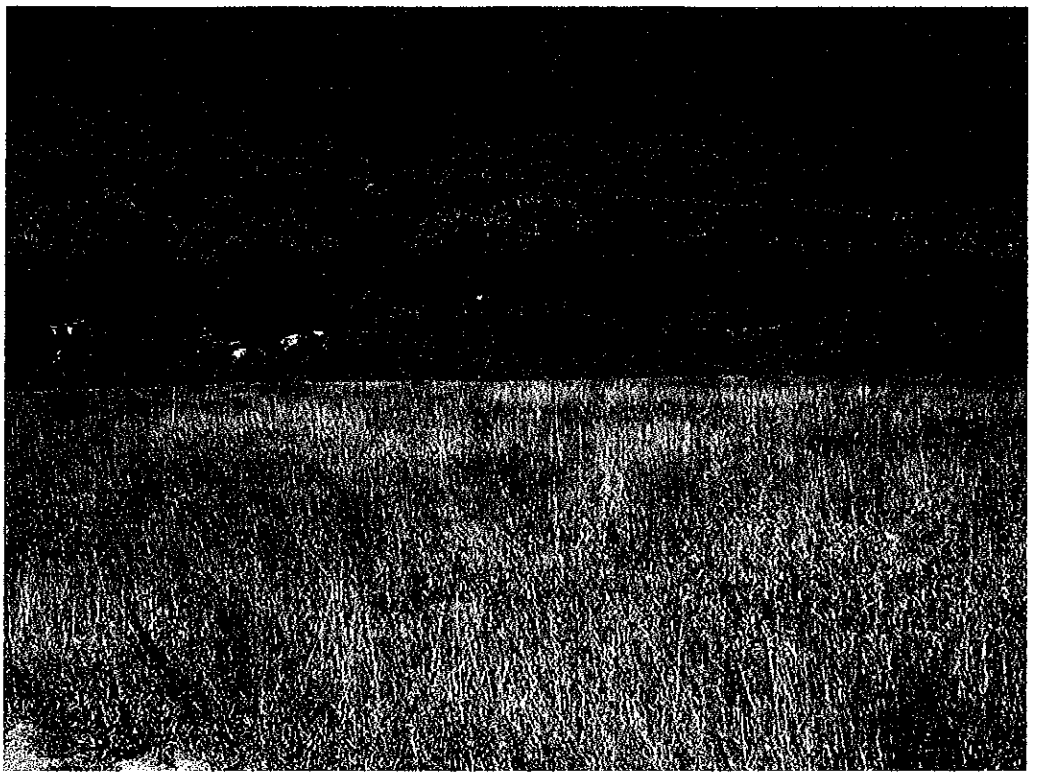
1

From southeast corner of site, looking northwest.



2

From southeast corner of site, looking west.



3

From northeast portion of site, looking southwest.

4

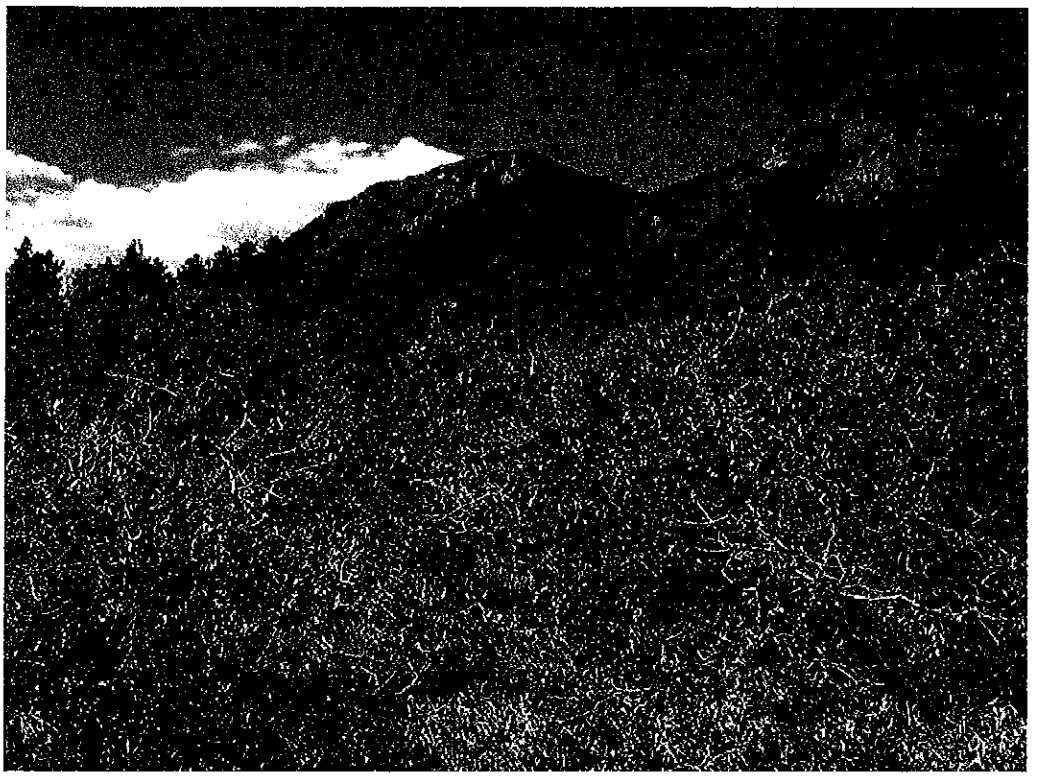
From south-central portion of site, looking north.

5

From south-central portion of site, looking northeast.

6

From northwest of site, looking southeast.



7

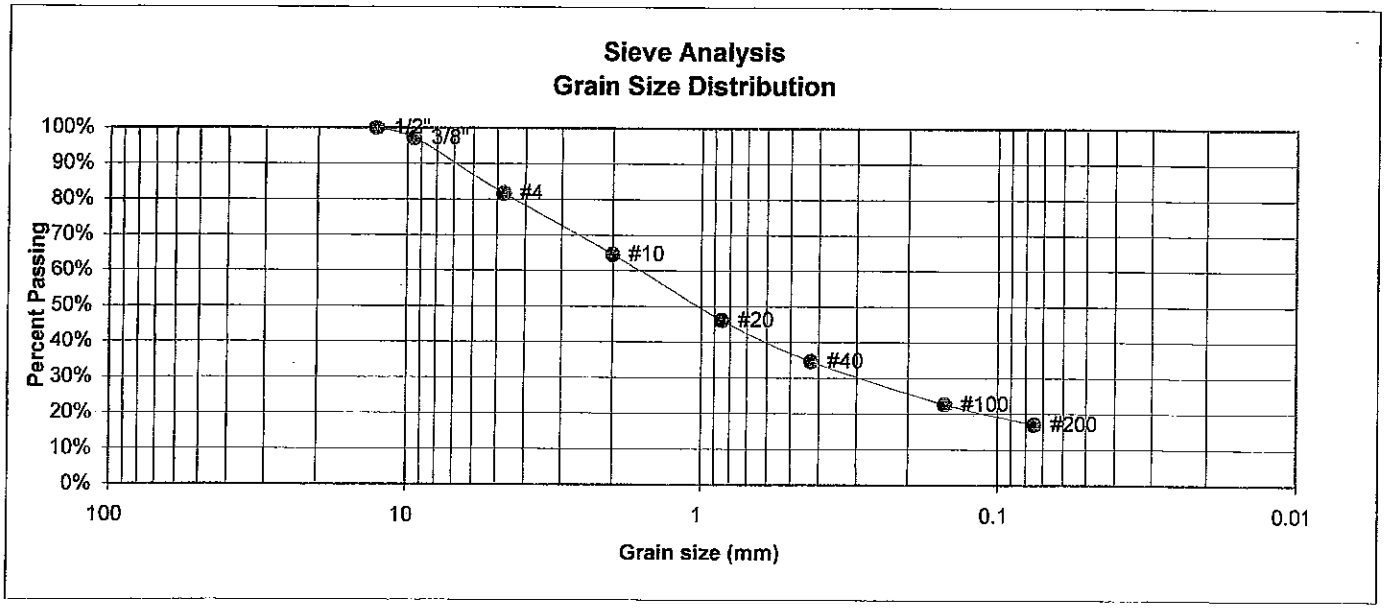
From north-central portion of site, looking south.

8

From north-central portion of site, looking southeast.

APPENDIX B: Laboratory Test Results

SOIL TYPE #	1, PH 8 @ 5'	UNIFIED CLASSIFICATION	SM-SC	TEST BY	DG
CLIENT	LAND RESOURCE ASSOC.	AASHTO CLASSIFICATION		JOB NO.	13670
PROJECT	108 ACRE NEVINS/SCHMIDT				



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	100.0%
3/8"	97.2%
4	81.7%
10	64.6%
20	46.2%
40	34.7%
100	22.7%
200	17.1%

Atterberg Limits	
Plastic Limit	18
Liquid Limit	23
Plastic Index	6

Swell	
Moisture at start	
Moisture at finish	
Moisture increase	
Initial dry density (pcf)	
Swell (psf)	

ENTECH ENGINEERING, INC.

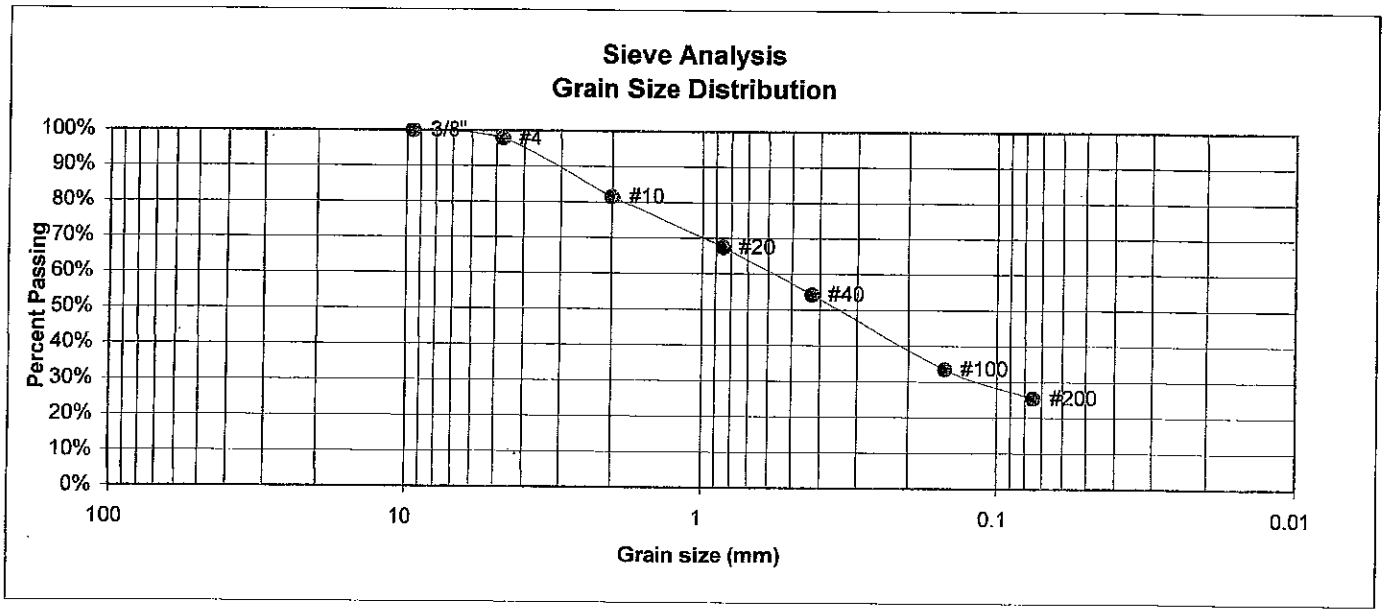
LABORATORY TEST RESULTS

Drawn	Date	Checked	Date
		KAH	11/25/01

Job No. 22794

Fig. No. B-1

SOIL TYPE #	2, PH 1 @ 10'	UNIFIED CLASSIFICATION	SM	TEST BY	DG
CLIENT	LAND RESOURCE ASSOC.	AASHTO CLASSIFICATION		JOB NO.	13670
PROJECT	108 ACRE NEVINS/SCHMIDT				



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	100.0%
4	97.7%
10	81.6%
20	67.4%
40	54.2%
100	33.4%
200	25.4%

Atterberg Limits	
Plastic Limit	27
Liquid Limit	31
Plastic Index	4

Swell	
Moisture at start	
Moisture at finish	
Moisture increase	
Initial dry density (pcf)	
Swell (psf)	

ENTECH ENGINEERING, INC.

LABORATORY TEST RESULTS

Drawn	Date	Checked	Date
		KAH	11/25/01

Job No. 22794
Fig. No. B-2

APPENDIX C: Percolation Test Results

Client: Land Resources Associates Job Number: 13670
Test Location: 108 Acre Nevis \ Schmidt Parcel

PERCOLATION HOLES-TEST NO. 1

Date Holes Prepared: 01/15/2001 Date Hole Completed: 01/16/2001

Hole No. 1
Depth: 32"

Trial	Time (min.)	Water Level Change (in.)
1	10	2 1/4
2	10	1 1/8
3	10	1 3/8

Perc Rate (min./in.): 6

Hole No. 2
Depth: 24"

Trial	Time (min.)	Water Level Change (in.)
1	10	1
2	10	1/16
3	10	1/2

Perc Rate (min./in.): 19

Hole No. 3
Depth: 34"

Trial	Time (min.)	Water Level Change (in.)
1	10	1
2	10	1 3/4
3	10	1 1/16

Perc Rate (min./in.): 8

Average Perc Rate (min./in.) 11

PROFILE HOLE

Date Profile Hole Completed: 01/15/2001

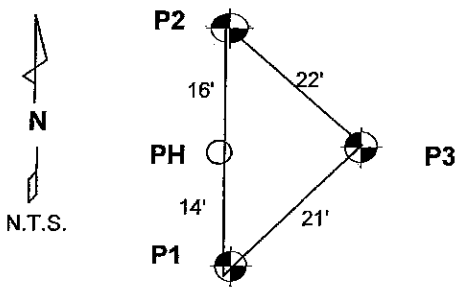
Depth	Visual Classification	Remarks
0-7'	Sand, silty, coarse grained, light brown	Bedrock @ 7'
7'-10'	Sandstone, silty, coarse grained, light brown	No Groundwater

14 Blows / ft. @ 4'
50 Blows / 10in. @ 9'

Required Area of Absorption Field: 0.67 Sq. Ft./gpd sewage volume
Required Area of Absorption Field: 150 Sq. Ft./bedroom
Required Area of Absorption Field: 240 Sq. Ft./bedroom with garbage disposal and washing machine
Remarks:

Observer: T. Schaffer

By:



ENTECH ENGINEERING, INC.

PERCOLATION TEST RESULTS

Drawn	Date	Checked	Date
		KDH	1/25/01

Job No. 22794
Fig. No. C-1

Client: Land Resources Associates
Test Location: 108 Acre Nevis \ Schmidt Parcel
Job Number: 13670

PERCOLATION HOLES-TEST NO. 2

Date Holes Prepared: 01/15/2001
Date Hole Completed: 01/16/2001

Hole No. 1
Depth: 22"

Trial	Time (min.)	Water Level Change (in.)
1	10	1 3/4
2	10	1 1/4
3	10	1 1/8

Perc Rate (min./in.): 7

Hole No. 2
Depth: 30"

Trial	Time (min.)	Water Level Change (in.)
1	10	2
2	10	1 3/4
3	10	1 1/2

Perc Rate (min./in.): 6

Hole No. 3
Depth: 25'

Trial	Time (min.)	Water Level Change (in.)
1	10	1 3/8
2	10	2
3	10	1 1/4

Perc Rate (min./in.): 6

Average Perc Rate (min./in.) 6

PROFILE HOLE

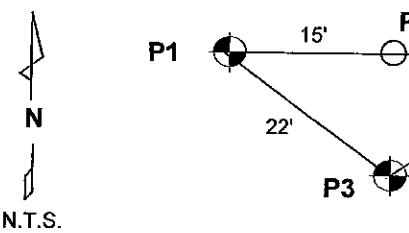
Date Profile Hole Completed: 01/15/2001

Depth	Visual Classification	Remarks
0-10'	Sand, slighlty clayey, coarse grained, reddish brown	No Bedrock No Groundwater

6 Blows / ft. @ 4'
11 Blows / ft. @ 9'

Required Area of Absorption Field: 0.51 Sq. Ft./gpd sewage volume
Required Area of Absorption Field: 115 Sq. Ft./bedroom
Required Area of Absorption Field: 183 Sq. Ft./bedroom with garbage disposal and washing machine
Remarks:

Observer: T. Schaffer
By:



ENTECH ENGINEERING, INC.

PERCOLATION TEST RESULTS

Drawn	Date	Checked	Date
		KAK	1/25/01

Job No. 22794
Fig. No. C-2

Client: Land Resources Associates
Test Location: 108 Acre Nevis \ Schmidt Parcel
Job Number: 13670

PERCOLATION HOLES-TEST NO. 3

Date Holes Prepared: 01/22/2001
Date Hole Completed: 01/23/2001

Hole No. 1
Depth: 28"

Trial	Time (min.)	Water Level Change (in.)
1	10	3 1/8
2	10	2 1/8
3	10	2 3/8

Perc Rate (min./in.): 4*

Hole No. 2
Depth: 25"

Trial	Time (min.)	Water Level Change (in.)
1	10	1 5/8
2	10	1 1/4
3	10	1 1/2

Perc Rate (min./in.): 7

Hole No. 3
Depth: 26"

Trial	Time (min.)	Water Level Change (in.)
1	10	1 5/8
2	10	7/8
3	10	1 1/4

Perc Rate (min./in.): 8

Average Perc Rate (min./in.) 7

PROFILE HOLE

Date Profile Hole Completed: 01/22/2001

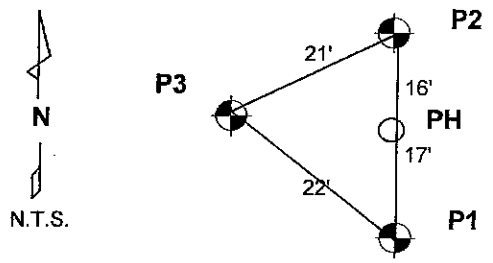
Depth	Visual Classification	Remarks
0-6'	Sand, silty, gravelly, reddish brown, cobbles	
6'-9'	Sand, silty, light brown	Bedrock @ 9'
9'-10'	Sandstone, slightly clayey, coarse grained, light brown	No Groundwater

50** Blows / 9in. @ 4'
50 Blows / 8in. @ 9'

Required Area of Absorption Field: 0.53 Sq. Ft./gpd sewage volume
Required Area of Absorption Field: 119 Sq. Ft./bedroom
Required Area of Absorption Field: 190 Sq. Ft./bedroom with garbage disposal and washing machine
Remarks:
* 5 minutes per inch used in calculations.
** High blow counts due to cobbles.

Observer: M. Toomey

By:



ENTECH ENGINEERING, INC.

PERCOLATION TEST RESULTS

Drawn	Date	Checked	Date
		KAH	1/25/01

Job No. 22794
Fig. No. C-3

Client: Land Resources Associates
Test Location: 108 Acre Nevis \ Schmidt Parcel
Job Number: 13670

PERCOLATION HOLES-TEST NO. 4

Date Holes Prepared: 01/15/2001
Date Hole Completed: 01/16/2001

Hole No. 1
Depth: 29"

Trial	Time (min.)	Water Level Change (in.)
1	10	5/8
2	10	5/16
3	10	1/8

Perc Rate (min./in.): 28

Hole No. 2
Depth: 23'

Trial	Time (min.)	Water Level Change (in.)
1	10	15/16
2	10	9/16
3	10	3/16

Perc Rate (min./in.): 18

Hole No. 3
Depth: 28"

Trial	Time (min.)	Water Level Change (in.)
1	10	3 1/8
2	10	2
3	10	1 3/8

Perc Rate (min./in.): 5

Average Perc Rate (min./in.) 17

PROFILE HOLE

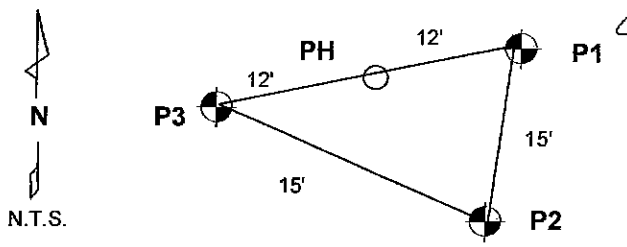
Date Profile Hole Completed: 01/15/2001

Depth	Visual Classification	Remarks
0-10'	Sand, silty to slightly clayey, medium to coarse grained, reddish brown	No Bedrock No Groundwater

5 Blows / ft. @ 4'
13 Blows / ft. @ 9'

Required Area of Absorption Field: 0.82 Sq. Ft./gpd sewage volume
Required Area of Absorption Field: 185 Sq. Ft./bedroom
Required Area of Absorption Field: 296 Sq. Ft./bedroom with garbage disposal and washing machine
Remarks:

Observer: M. Toomey
By:



ENTECH ENGINEERING, INC.

PERCOLATION TEST RESULTS

Drawn	Date	Checked	Date
		KAH	1/25/01

Job No. 22794
Fig. No. C-4

Client: Land Resources Associates
Test Location: 108 Acre Nevis \ Schmidt Parcel
Job Number: 13670

PERCOLATION HOLES-TEST NO. 5

Date Holes Prepared: 01/23/2001
Date Hole Completed: 01/24/2001

Hole No. 1
Depth: 25"

Trial	Time (min.)	Water Level Change (in.)
1	10	5/8
2	10	9/16
3	10	3/8

Perc Rate (min./in.): 19

Hole No. 2
Depth: 26"

Trial	Time (min.)	Water Level Change (in.)
1	10	1 1/4
2	10	1
3	10	1 1/8

Perc Rate (min./in.): 9

Hole No. 3
Depth: 25'

Trial	Time (min.)	Water Level Change (in.)
1	10	1
2	10	1
3	10	7/8

Perc Rate (min./in.): 10

Average Perc Rate (min./in.) 13

PROFILE HOLE

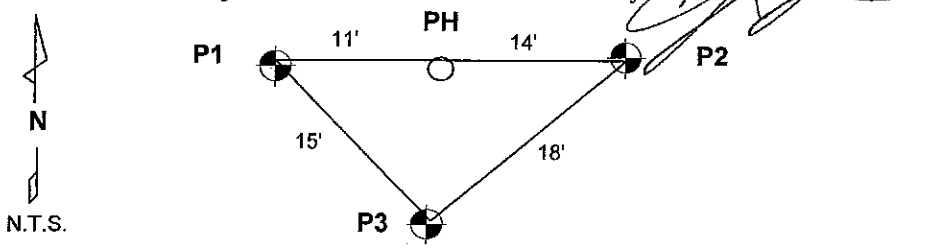
Date Profile Hole Completed: 01/23/2001

Depth	Visual Classification	Remarks
0-10'	Sand, silty, gravelly, reddish brown scattered cobbles, 0-9'	No Bedrock No Groundwater

9 Blows / ft. @ 4'
16 Blows / ft. @ 9'

Required Area of Absorption Field: 0.72 Sq. Ft./gpd sewage volume
Required Area of Absorption Field: 161 Sq. Ft./bedroom
Required Area of Absorption Field: 258 Sq. Ft./bedroom with garbage disposal and washing machine
Remarks:

Observer: M. Toomey
By:



ENTECH ENGINEERING, INC.

PERCOLATION TEST RESULTS

Drawn	Date	Checked	Date
		KAH	1/25/01

Job No. 22794
Fig. No. C-5

APPENDIX B : Entech, Geotechnical Report, 4619 Redstone Ranch Drive, Entech Job No. 260429

ENTECH
ENGINEERING, INC.
505 ELKTON DRIVE
COLORADO SPRINGS, CO 80907
PHONE (719) 531-5599

April 17, 2026

Central Colorado Builders, Inc.
4430 Red Rock Ranch Road
Monument, CO 80132

Attn: John Cressman

Re: Geotechnical Report
4619 Redstone Ridge Road – Guest House
El Paso County, Colorado
Entech Job No. 260429

Dear Mr. Cressman:

Personnel of Entech Engineering, Inc. (Entech) drilled two test borings to depths of 20 to 25 feet (designated TB-1 and TB-2) for a new guest house at the address referenced above on March 5, 2026. A general vicinity map is shown in Figure 1, and a site and exploration plan is shown in Figure 2. Specific findings for the site are presented in this letter.

Site Conditions:

The proposed guest house is located in the southeast portion of the lot with the building area gradually sloping to the southeast. Moderate to steep slopes exist north of the building area. Vegetation consisted of native grasses, scrub oak, and ponderosa pines.

Subsurface Conditions:

Subsurface conditions observed in TB-1 drilled on this site consisted of approximately 9 feet of medium dense clayey sand overlying highly weathered sandstone bedrock, or very dense clayey sand when classified as a soil, which extended to the termination depth of the boring 20 feet. TB-2 consisted of medium dense to loose clayey sand, which extended to the termination depth of the boring 25 feet.

Allowable Bearing Capacity:

An allowable bearing capacity of 2,000 pounds per square foot (psf) is recommended for the medium dense site soils or granular fill placed on the site.

Lateral Earth Pressure:

An equivalent hydrostatic fluid pressure (in the active state) of 45 pounds per cubic foot (pcf) is recommended for the sand encountered on this site. Sloping backfill will increase lateral pressures on walls.

Soil Moisture Conditions:

Moist.

Expansion Potential:

Swell/Collapse testing on a sample of the clayey sand from TB-2 at a depth of 10 feet resulted in a collapse of 0.2% indicating a low collapse potential.

The sand and sandstone are anticipated to exhibit a low expansion potential.

Fill:

None.

Special Considerations:

If loose soils are encountered at foundation grade, the foundation and slab-on-grade subgrade should be overexcavated and recompacted a minimum of 2 feet. Once suitable materials are encountered, the subgrade should be scarified to a depth of 6 inches and recompacted to 95% of the Modified Proctor (ASTM D1557) maximum dry density within +/- 2% of the optimum moisture content. The overexcavated material can then be replaced in 6-inch lifts and recompacted to the same specifications as described above. The suitability of subgrades and/or overexcavation depth should be determined during the excavation observation. The on-site sands can be used for granular fill or backfill pending approval by Entech.

Excavation of the sand is anticipated to be moderate with rubber-tired equipment. The site sands should be suitable for backfill provided it is free of any rocks (greater than 3 inches nominal diameter).

Foundation Type:

A 16-inch minimum spread footing and stemwall foundation system is anticipated for this site. Point load bearing pads should be sized for the allowable bearing capacity given. **This does not constitute a foundation design.** Qualified personnel should verify that building loads do not exceed the bearing value given in this letter. The bottoms of exterior foundations should be located at least 30 inches below finished grade for frost protection.

Reinforcing:

Reinforcing should be designed to permit foundation walls to span a minimum of 10 feet under the design load. Foundation walls should be designed to resist lateral earth pressures as discussed in the Lateral Earth Pressures section.

Floor Slabs:

Floor slabs-on-grade, if any, should be separated from structural portions of the building and allowed to float freely. Interior partitions must be constructed in such a manner that they do not transmit floor slab movement to the roof or overlying floor. Backfill placed below floor slabs should be compacted to a minimum of 95% of the Modified Proctor (ASTM D1557) maximum dry density.

Drainage and Grading:

The ground surface must be sloped away from the building to provide positive drainage away from the foundation. We recommend an equivalent slope of 6 inches in the first 10 feet (5%) surrounding the structure, where possible, or as required to quickly remove surface water. Where a 5% slope cannot be achieved practically, such as around patios, at inside foundation corners, and between a building and nearby sidewalk, we believe it is desirable to establish as much slope as possible and to avoid irrigation in the area. Roof downspouts should discharge beyond the limits of backfill. We recommend providing splash blocks and downspout extensions to discharge runoff beyond the limits of backfill.

Homeowners should maintain the surface grading and drainage installed by the builder to ensure water is not directed toward the foundations and does not pond near the building. Landscaping should be carefully designed to minimize irrigation adjacent to the foundation. We do not recommend the use of impervious plastic membranes below landscaped areas near foundations; geotextile fabrics can control weed growth while allowing evaporation. Plants used close to foundation walls should be limited to those with low moisture requirements; irrigated grass should not be located within 5 feet of the foundation. Sprinklers should not discharge water within 5 feet of foundations. Irrigation should be limited to the minimum amount sufficient to maintain vegetation. The application of more water will increase the potential for slab and foundation movement.

Subdrain:

A subsurface perimeter drain is recommended for all useable space below grade (areas where the interior slab or bottom of the crawlspace is below the exterior grade). A typical perimeter drain detail is included with this report in Figure 9.

Granular Fill and Backfill Recommendations:

Granular fill placed beneath foundation components and floor slabs shall consist of nonexpansive, granular soil, free of organic matter, unsuitable materials, debris, and cobbles greater than 3 inches in diameter. Entech should approve any imported granular or structural fill to be used within the foundation area prior to delivery to the site.

Backfill should be compacted to 95% of the Modified Proctor (ASTM D1557) maximum dry density within +/- 2% of the optimum moisture content. Backfill must be compacted by mechanical means. No water flooding techniques of any type should be used in the compaction of backfill on this site. Expansive soils are not to be used as backfill.

Concrete:

Type 1L cement is recommended for all concrete on this site. Concrete should not be placed on frozen or wet ground. Care should be taken to prevent the accumulation and ponding of water in the footing excavation prior to the placement of concrete. If standing water is present in the excavation, it should be removed by installing sumps and pumping the water away from the building area. If concrete is placed during periods of cold temperatures, the concrete must be kept from freezing. This may require covering the concrete with insulated blankets and heating to prohibit freezing.

Open Foundation Excavation Observation:

The open foundation excavation should be observed prior to construction of the foundation in order to verify that no anomalies are present, that materials at the proper design bearing capacity have been encountered, and that no soft spots or debris are present in the foundation area.

Remarks:

The recommendations provided in this letter are based on the observed soil conditions, anticipated foundation loads, and accepted engineering procedures. The recommendations are intended to minimize differential movement resulting from the adverse subsurface conditions induced by the application of building loads. It must be recognized that the foundation may

undergo movement. In addition, concrete floor slabs may experience movement; therefore, adherence to those recommendations that would isolate floor slabs from columns, walls, partitions, or other structural components is extremely important if damage to the superstructure is to be minimized. Any subsequent owners should be apprised of the soil conditions and advised to maintain good practice in the future with regard to surface and subsurface drainage, framing of partitions above floor slabs, drywall, and finish work above floor slabs, etc.

We trust this has provided you with the information you require. If you have any questions or need additional information, please do not hesitate to contact us.

Respectfully Submitted,

ENTECH ENGINEERING, INC.

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Reviewed by:

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LLL:JCG
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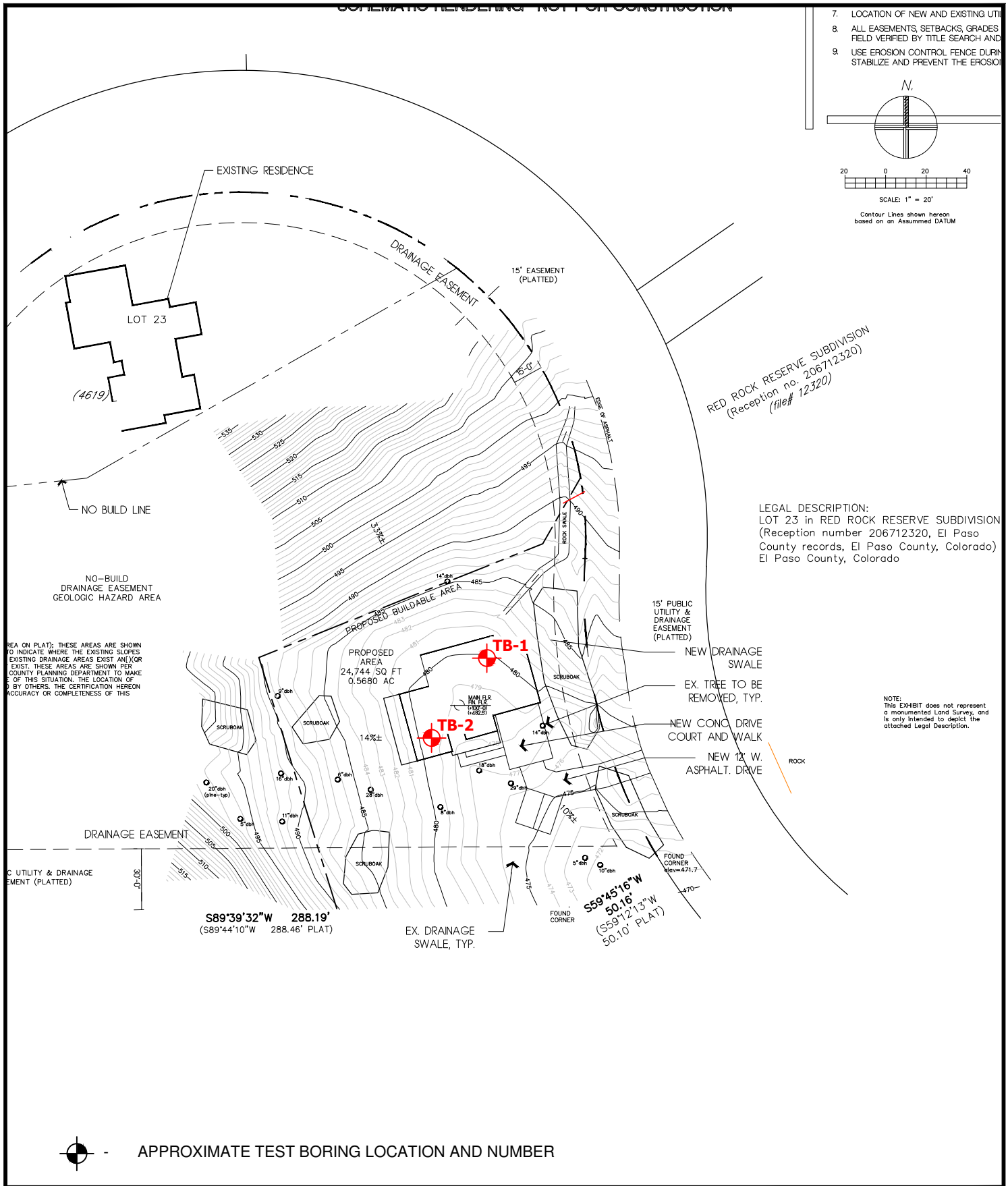
ENTECH ENGINEERING, INC.

VICINITY MAP

4619 REDSTONE RIDGE ROAD - GUEST HOUSE
COLORADO CENTRAL BUILDERS, INC.

JOB NO. 260429

FIG. 1



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SITE AND EXPLORATION MAP

4619 REDSTONE RIDGE ROAD - GUEST HOUSE
CENTRAL COLORADO BUILDERS, INC.

JOB NO. 260429

FIG. 2

TEST BORING 1
DATE DRILLED 3/5/2026

REMARKS

DRY TO 20', 3/6/26

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %
	6" TOPSOIL SAND, CLAYEY, LIGHT BROWN, MEDIUM DENSE, MOIST		12	6.2
5			13	7.4
10	SANDSTONE, VERY WEAK, LIGHT BROWN, HIGHLY WEATHERED (SAND, CLAYEY, VERY DENSE, MOIST)		50/3"	7.7
15			50/3"	5.9
20			50/3"	7.2

TEST BORING 2
DATE DRILLED 3/5/2026

REMARKS

DRY TO 25', 3/6/26

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %
	6" TOPSOIL SAND, CLAYEY, LIGHT BROWN, MEDIUM DENSE to LOOSE, MOIST		19	12.8
5			11	5.2
10			13	5.7
15			8	16.0
20			5	13.0
25			10	9.4

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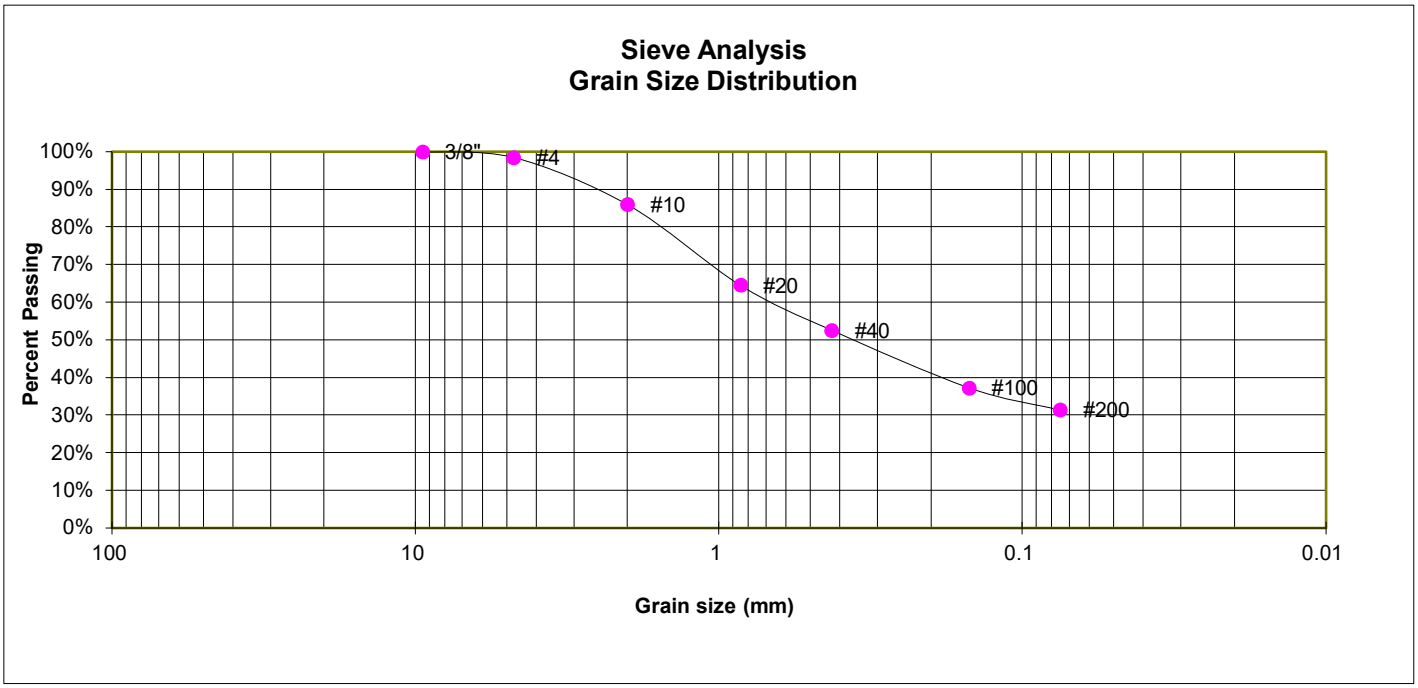
TEST BORING LOGS

4619 REDSTONE RIDGE ROAD
CENTRAL COLORADO BUILDERS

JOB NO. 260429

FIG. 3

TEST BORING	1	SOIL DESCRIPTION	SAND, CLAYEY
DEPTH (FT)	2-3		



GRAIN SIZE ANALYSIS

U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	100.0%
4	98.5%
10	86.0%
20	64.6%
40	52.5%
100	37.3%
200	31.4%

SOIL CLASSIFICATION

USCS CLASSIFICATION: SC

ENTECH ENGINEERING, INC.

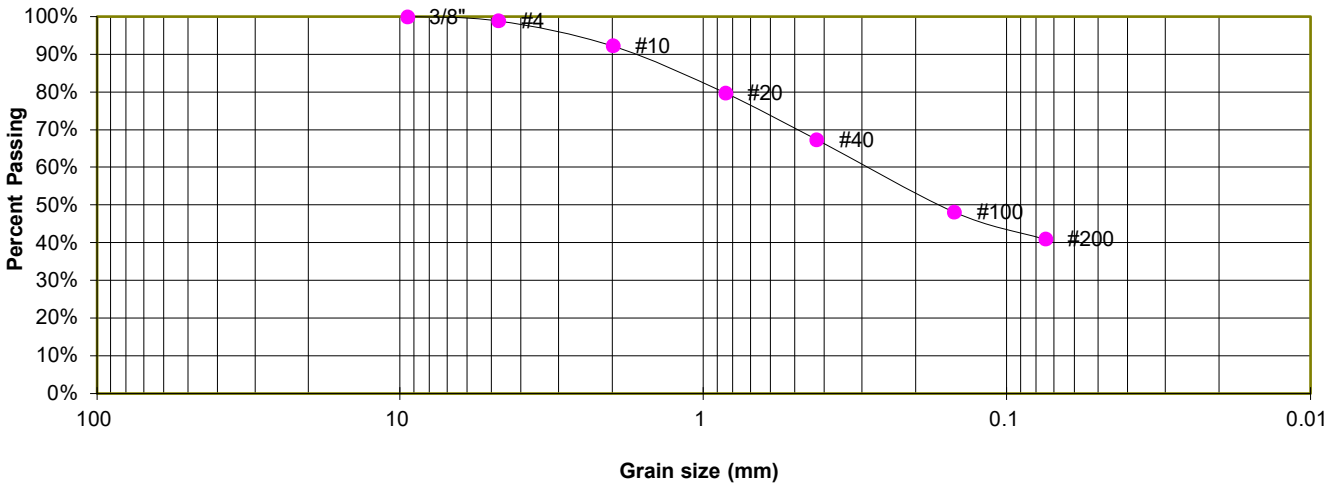
LABORATORY TEST RESULTS

4619 REDSTONE RIDGE ROAD
CENTRAL COLORADO BUILDERS

JOB NO.
260429

FIG. 4

TEST BORING	1	SOIL DESCRIPTION	SANDSTONE (SAND, CLAYEY)
DEPTH (FT)	10		



GRAIN SIZE ANALYSIS

U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	100.0%
4	98.9%
10	92.3%
20	79.8%
40	67.4%
100	48.2%
200	41.0%

SOIL CLASSIFICATION

USCS CLASSIFICATION: SC

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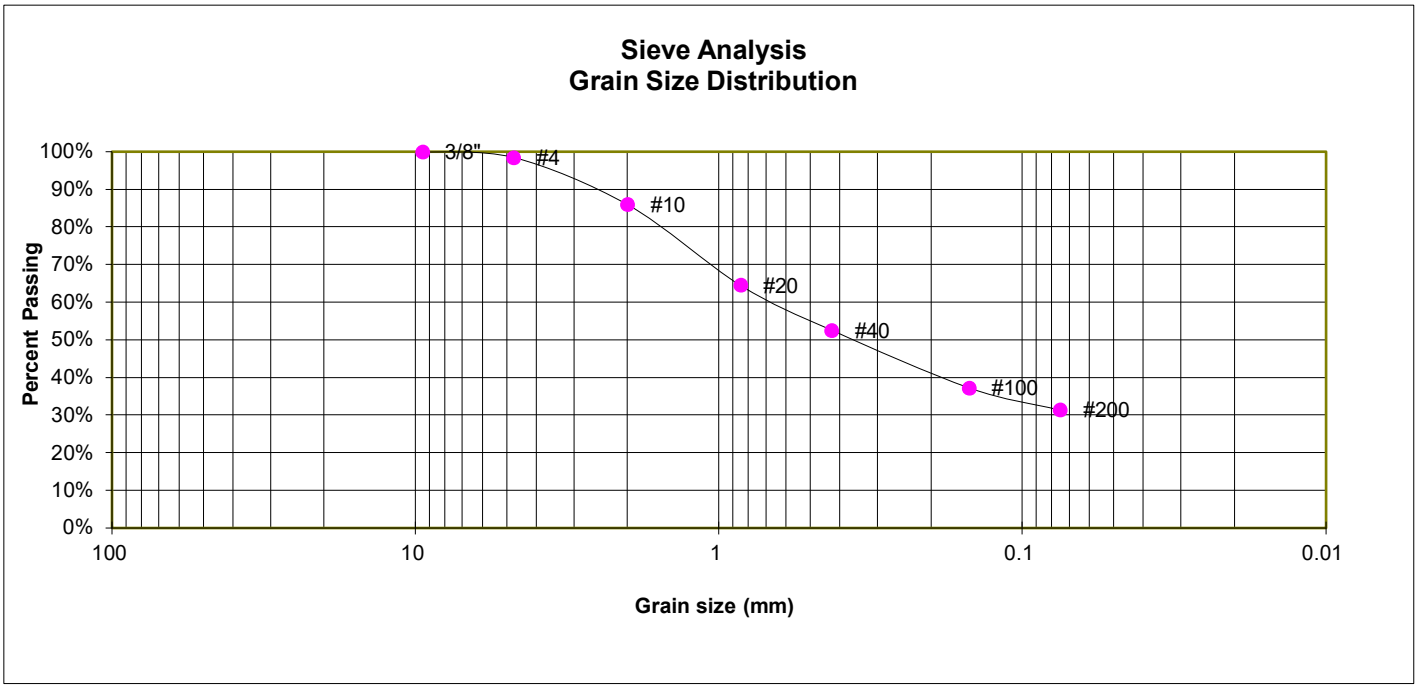
LABORATORY TEST RESULTS

4619 REDSTONE RIDGE ROAD
CENTRAL COLORADO BUILDERS

JOB NO. 260429

FIG. 5

TEST BORING	2	SOIL DESCRIPTION	SAND, CLAYEY
DEPTH (FT)	2-3		



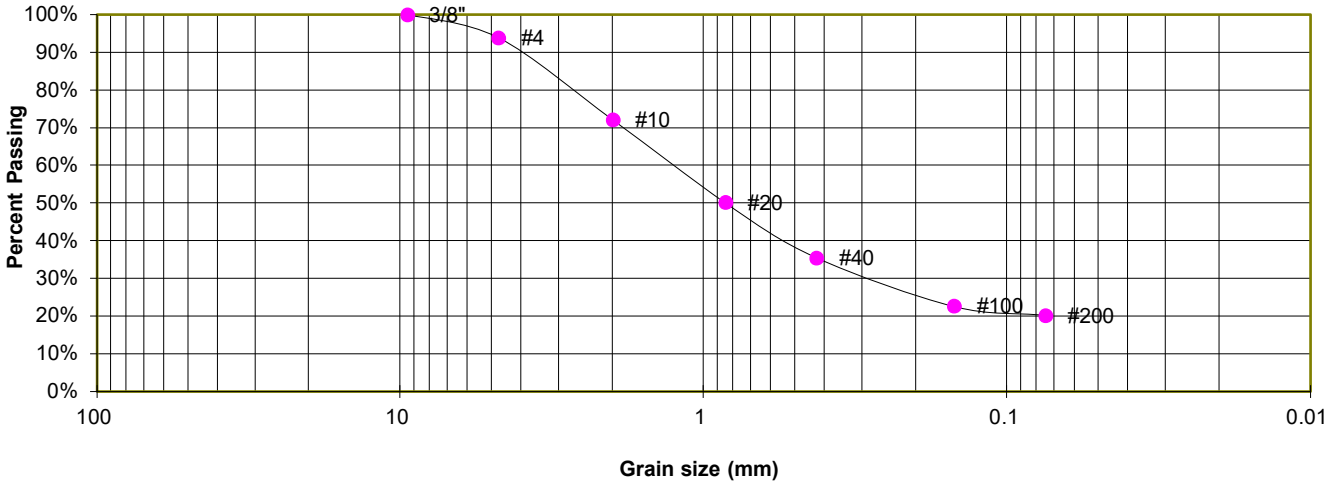
GRAIN SIZE ANALYSIS

U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	100.0%
4	98.5%
10	86.0%
20	64.6%
40	52.5%
100	37.3%
200	31.4%

SOIL CLASSIFICATION

USCS CLASSIFICATION: SC

TEST BORING	2	SOIL DESCRIPTION	SAND, CLAYEY
DEPTH (FT)	5		



GRAIN SIZE ANALYSIS

U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	100.0%
4	93.9%
10	72.2%
20	50.2%
40	35.5%
100	22.6%
200	20.2%

SOIL CLASSIFICATION

USCS CLASSIFICATION: SC

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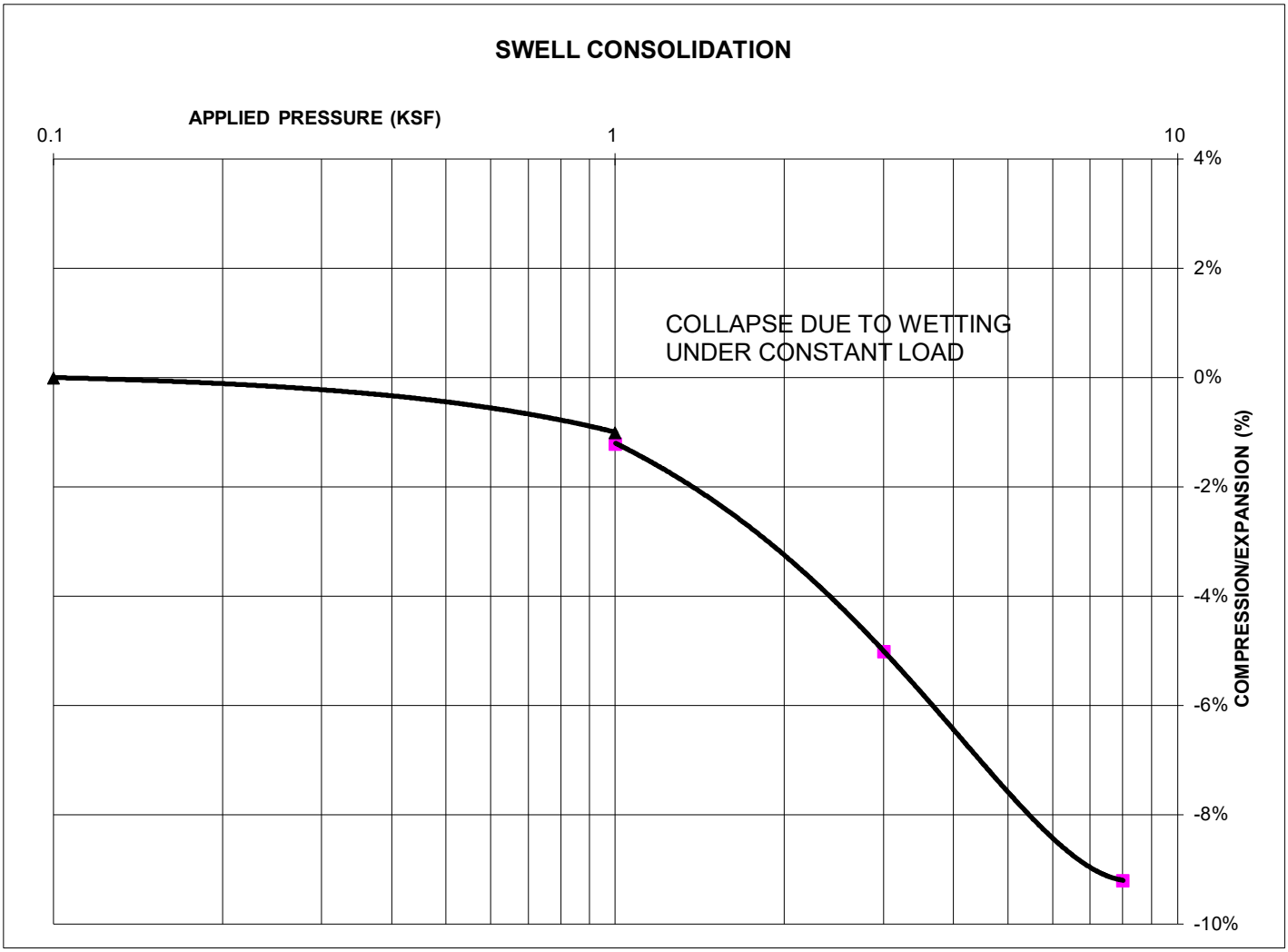
LABORATORY TEST RESULTS

4619 REDSTONE RIDGE ROAD
CENTRAL COLORADO BUILDERS

JOB NO. 260429

FIG. 7

TEST BORING	2	SOIL DESCRIPTION	SAND, CLAYEY
DEPTH (FT)	10		



SWELL/COLLAPSE TEST RESULTS

NATURAL UNIT DRY WEIGHT (PCF): 95
NATURAL MOISTURE CONTENT: 18.1%
SWELL/COLLAPSE (%): -0.2%

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SWELL TEST RESULTS

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CENTRAL COLORADO BUILDERS

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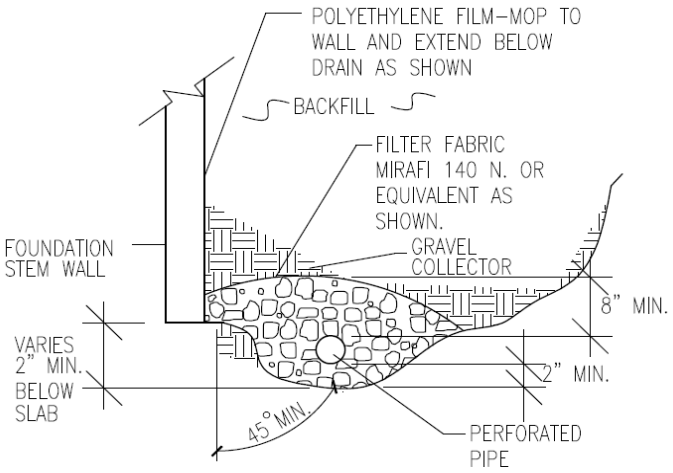
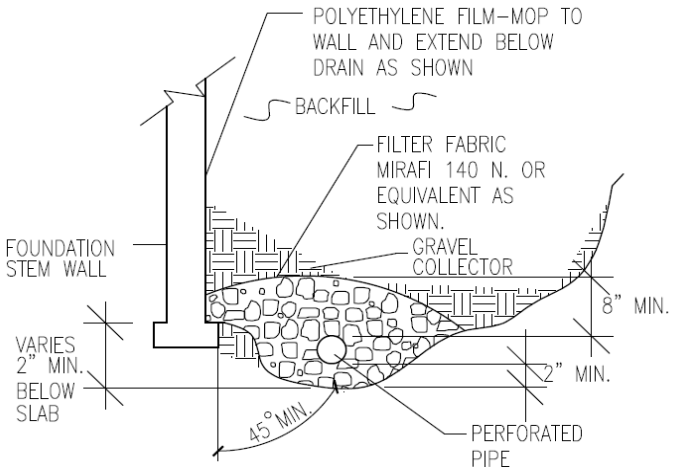
FIG. 8





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

4619 REDSTONE RIDGE ROAD
CENTRAL COLORADO BUILDERS

JOB NO. 260429

FIG. 9

APPENDIX C: Site Photographs

1

Looking northwest from the proposed building area.

June 10, 2025

2

Looking northeast from the proposed building area.

June 10, 2025

Job No. 260429