

June 15, 2021

Ramses II Properties, LLC
7985 Burgess Road
Colorado Springs, CO 80909



ENTECH
ENGINEERING, INC.

505 ELKTON DRIVE
COLORADO SPRINGS, CO 80907
PHONE (719) 531-5599
FAX (719) 531-5238

Attn: Donnie Wisenbaker

Re: Soil, Geology, and Geologic Hazard Study
Skyfall Subdivision
Parcel No. 52212-00-027
7985 Burgess Road
El Paso County, Colorado

Dear Mr. Wisenbaker:

GENERAL SITE CONDITIONS AND PROJECT DESCRIPTION

The site is located in a portion of the E $\frac{1}{2}$ of the NW $\frac{1}{4}$ of Section 21 Township 12 South, Range 65 West of the 6th Principal Meridian in El Paso County, Colorado. The site is located immediately north of Colorado Springs city limits, north of Old Ranch Road and approximately 1 mile west of Burgess Road and Vollmer Road, in El Paso County, Colorado. The location of the site is as shown on the Vicinity Map, Figure 1.

The topography of the site is gradually to moderately sloping to the south-southeast. A minor drainage swale is located in the northern portion of the property. Water was not observed in the drainages at the time of this investigation. The site boundaries are indicated on the USGS Map, Figure 2. Previous land uses have included undeveloped and rural residential. The site contains field grasses, weeds, and ponderosa pines. The existing house with a water well and septic system located on Lot 2, will remain. Site photographs were taken and site mapping was completed on was April 22, 2021. Site photographs are included in appendix A. Test Borings and Test Pits were performed on April, 29, 2021.

Total acreage involved in the proposed subdivision is 20-acres. Three rural residential lots are proposed as part of the subdivision. The proposed lot sizes range from 5.0-acres to 9.1-acres. The existing house located on Lot 2 will remain. The new lots will be serviced by individual wells and on-site wastewater treatment systems. The Site Plan is presented in Figure 3.

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 potentially seasonal shallow groundwater and shallow bedrock. Based on the proposed development plan, it appears that these areas will have minor impacts on the development. These conditions will be discussed in greater detail in the report.

In general, it is our opinion that the development can be achieved if the observed geologic conditions on site are either avoided or properly mitigated. All recommendations are subject to the limitations discussed in the report.

Ramses II Properties, LLC
Soil, Geology, and Geologic Hazard Study
Skyfall Subdivision
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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.

FIELD INVESTIGATION

Our field investigation consisted of the preparation of a geologic map of bedrock features and significant surficial deposits. The Natural Resource Conservation Service (NRCS), previously the Soil Conservation Service (SCS) survey was also reviewed to evaluate the site. The position of mappable units within the subject property are shown on the Geologic Map. Our mapping procedures involved both field reconnaissance and measurements, and aerial photo reconnaissance and interpretation. The same mapping procedures have also been utilized to produce the Geology/Engineering Geology Map which identified pertinent geologic conditions affecting development. The field mapping was performed by personnel of Entech Engineering, Inc. on April 22, 2021.

Two test borings were drilled, and two test pits were excavated on the site to determine general suitability of the soil characteristics for residential construction. The locations of the test borings/pits are indicated on the Site Plan/Test Boring Location Map, Figure 3. The Test Boring and Test Pit Logs are presented in Appendix B. Results of this testing will be discussed later in this report.

Laboratory testing was also performed on some of the soils to classify and determine the soils engineering characteristics. Laboratory tests included grain-size analysis, ASTM D-422. Results of the laboratory testing are included in Appendix C.

SOIL AND GEOLOGIC CONDITIONS

Soil Survey

The Natural Resource Conservation Service (NRCS) (Reference 1, Figure 4), previously the Soil Conservation Service (Reference 2) has mapped one soil type on the site. Complete descriptions of the soil type are presented in Appendix D. In general, the soils consist of sandy loam to gravelly loamy sand. The soils are described as follows:

<u>Type</u>	<u>Description</u>
41	Kettle gravelly, loamy sand, 8 – 40% Slopes

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The soils have been described to have rapid permeabilities. The soils are described as well suited for use as home sites. Possible hazards with soils erosion are present on the site. The erosion potential can be controlled with vegetation. The soils have been described to have moderate erosion hazards (Reference 2).

Soils

The soils encountered in the test borings consisted of silty to very clayey sand overlying silty to very silty sandstone. Bedrock was encountered at depths of 1 to 4 feet in the test borings. The upper sands were encountered at medium dense states and moderate moisture conditions. The sandstone was encountered at very dense states and moderate moisture conditions. The samples of very clayey sand tested had 49 percent of the soil size particles passing the No. 200 sieve. FHA Swell Testing resulted in an expansion pressure of 670 psf, indicating a low expansion potential. The samples of sandstone tested had 17 to 41 percent of the soil size particles passing the No. 200 sieve. The silty sand and sandstone typically have low expansion potential. Highly expansive claystone and siltstone lenses are commonly interbedded in the sandstone in the area.

Groundwater

Groundwater was not encountered in the test borings which were drilled to depths of 15 to 20 feet. Groundwater is not anticipated to affect shallow foundations on the majority of the site. Fluctuations in groundwater conditions may occur due to variations in rainfall or other factors not readily apparent at this time. Isolated sand layers within the soil profile can carry water in the subsurface. Contractors should be cognizant of the potential for the occurrence of subsurface water features during construction.

Geology

Approximately 12¼ miles west of the site 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 a large structural feature known as the Denver Basin. Bedrock in the area is typically gently dipping in a northerly direction (Reference 3). The bedrock underlying the site consists of the Dawson Formation of Tertiary to Cretaceous Age. The Dawson Formation typically consists of coarse-grained arkosic sandstone with interbedded layers of claystone or siltstone.

The geology of the site was evaluated using the *Geologic Map of the Falcon NW Quadrangle*, by Madole in 2003, (Reference 4, Figure 5). The Geology Map for the site is presented in Figure 6. One mappable unit was identified on this site which is described as follows:

Qc/Tkd Colluvium of Quaternary Age overlying Dawson Formation of Tertiary to Cretaceous Age: The materials consist of colluvial or residual soils overlying the bedrock materials on-site. The colluvial soils were deposited by the action of sheetwash and gravity. The residual soils were derived from the in-situ weathering of the bedrock on site. These materials typically consist of silty to clayey sand with

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potential areas of sandy clays. The bedrock consists of the Dawson Formation. The Dawson Formation typically consists of coarse-grained, arkosic sandstone with interbedded lenses of fine-grained sandstone, siltstone and claystone.

The soils listed above were mapped from site-specific mapping, the *Geologic Map of the Falcon NW Quadrangle* distributed by the Colorado Geologic Survey in 2003 (Reference 4, Figure 5), the *Geologic Map of the Colorado Springs-Castle Rock Area*, distributed by the US Geological Survey in 1979 (Reference 5), and the *Geologic Map of the Pueblo 1° x 2° Quadrangle*, distributed by the US Geological Survey in 1978 (Reference 6). The test borings were used in evaluating the site and are included in Appendix B. The Geology Map prepared for the site is presented in Figure 6.

ENGINEERING GEOLOGIC HAZARDS

Mapping has been performed on this site to identify areas where various geologic conditions exist of which developers should be cognizant during the planning, design and construction stages where new construction is proposed. The engineering geologic constraints identified on this site include potentially seasonal shallow groundwater, and shallow bedrock, as indicated on the Engineering Geology Map, Figure 6. Potential Hazards including expansive soils and minor drainage swales, have also been addressed below. These hazards and recommended mitigation techniques are discussed as follows:

Expansive Soils - Constraint

Expansive soils were not encountered in the test borings or pits. However, highly expansive claystone and siltstone are commonly interbedded in the sandstone of the Dawson Formation. Expansive clays, if encountered beneath foundations, can cause differential movement in the structure foundation.

Mitigation: Should expansive soils be encountered beneath the foundation; mitigation will be necessary. Mitigation of expansive soils will require special foundation design. Overexcavation and replacement with non-expansive soils at a minimum of 95% of its maximum Modified Proctor Dry Density, ASTM D-1557 is a suitable mitigation, which is common in the area. Floor slabs on expansive soils should be expected to experience movement. Overexcavation and replacement has been successful in minimizing slab movements.

Drainage Areas

Minor drainage areas exist in the southwestern portion of Lot 1 and southern portion of Lot 3. No water was observed flowing in the drainages at the time of the investigation, however, these areas have the potential for seasonal shallow groundwater. These areas are indicated in the Geology/Engineering Geology Map (Figure 6) and are discussed below. Due to the size of the proposed lots these areas can be avoided or redirected around proposed structures or proposed soil treatment areas. The proposed building areas are not affected by these areas. The site does not lie within any floodplain zones according to the FEMA Map No.

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08041CO535G dated December 7, 2018 (Figure 7, Reference 7). Exact locations of floodplain and specific drainage studies are beyond the scope of this report.

Potentially Seasonal Shallow Groundwater Area - Constraint

In these areas, we would anticipate the potential for periodically high subsurface moisture conditions, frost heave potential and highly organic soils. These areas lie within defined minor drainages and can be avoided by the proposed development. Construction in any portions of these areas, if required, or immediately adjacent to these areas should follow these precautions.

Mitigation: Foundations must have a minimum 30-inch depth for frost protection. In areas where high subsurface moisture conditions are anticipated periodically, subsurface perimeter drains are recommended to help prevent the intrusion of water into areas below grade. Typical drain details are presented in Figure 8. Any grading in these areas should be done to direct surface flow around construction to avoid areas of ponded water. All organic material would be completely removed prior to any fill placement. **Specific drainage studies are beyond the scope of this report.**

RELEVANCE OF GEOLOGIC CONDITIONS TO LAND USE PLANNING

The proposed development will be rural-residential utilizing individual on-site wastewater treatment systems and water wells. Three rural residential lots are proposed. The lot sizes range from 5.0-acres to 9.1-acres. The existing house located on Lot 2 will remain. The new lots will be serviced by individual wells and on-site wastewater treatment systems. The existing geologic and engineering geologic conditions will impose minor constraints on development and construction. The geologic constraints on the site include potentially seasonal shallow groundwater and shallow bedrock, which can be satisfactorily mitigated through avoidance or proper engineering design and construction practices.

The upper granular soils encountered in the test borings on the site were encountered at dense to very dense states, and the sandstone was encountered at very dense states. Sandstone bedrock was encountered at 1 to 4 feet in the test borings. High allowable bearing capacities should be expected in areas of shallow bedrock. Difficult excavation of the very dense sandstone should be expected.

The sandstone encountered in the test borings is considered to have low expansion potential, however, highly expansive claystone and siltstone are commonly interbedded in the sandstone of the Dawson Formation. Mitigation of expansive soils if encountered will be required. Overexcavation and replacement with non-expansive soils at a minimum of 95% of its maximum Modified Proctor Dry Density, ASTM D-1557 is a suitable mitigation, which is common in the area. Overexcavation depths of 3 to 4 feet are typical from the expansive soils encountered in the area. Floor slabs on expansive soils should be expected to experience movement. Overexcavation and replacement has been successful in minimizing slab movements. These soils will not prohibit development.

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Minor drainages exist in the southwestern portion of proposed Lot 1 and southern portion of Lot 3. No water was observed flowing in the drainage, however, the potential for seasonal shallow groundwater exists in these areas during periods of high runoff. According to the development plan and lot size, these areas can be avoided by the structures. Structures should not block drainages. Grading should direct surface waters around structures and roadways to prevent areas of ponded water.

In summary, the granular soils will likely provide suitable support for shallow foundations. The geologic conditions encountered on site can be mitigated with avoidance or proper engineering and construction practices.

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 8), of the area of the site is not mapped with any potential aggregate resources. According to the *Atlas of Sand, Gravel and Quarry Aggregate Resources, Colorado Front Range Counties* distributed by the Colorado Geological Survey (Reference 9), the site is not mapped with any resources. According to the *Evaluation of Mineral and Mineral Fuel Potential* (Reference 10), the area of the site has been mapped as "little or no potential" for industrial minerals.

According to the *Evaluation of Mineral and Mineral Fuel Potential of El Paso County State Mineral Lands* (Reference 10), the site is mapped within the Denver Basin Coal Region. However, the area of the site has been mapped as "Poor" for coal resources. No active or inactive mines have been mapped in the area of the site. No metallic mineral resources have been mapped on the site (Reference 10).

The site has been mapped as "Fair" for oil and gas resources (Reference 10). No oil or gas fields have been discovered in the area of the site. The sedimentary rocks in the area may lack the geologic structure for trapping oil or gas; therefore, it may not be considered a significant resource. Hydraulic fracturing is a new method that is being used to extract oil and gas from rocks. It utilizes pressurized fluid to extract oil and gas from rocks that would not normally be productive. The area of the site has not been explored to determine if the rocks underlying the site would be commercially viable utilizing hydraulic fracturing. The practice of hydraulic fracturing has come under review due to concerns about environmental impacts, health and safety.

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

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palliative may be required to control dust. However, once construction has been completed and vegetation re-established, the potential for wind erosion should be considerably reduced.

With regard to water erosion, loosely compacted soils will be the most susceptible to water erosion, residually weathered soils 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.

CLOSURE

It is our opinion that the existing geologic engineering and geologic conditions will impose some minor 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. The proposed development and use are consistent with anticipated geologic and engineering geologic conditions.

It should be pointed out that because of the nature of data obtained by random sampling of such variable and non-homogeneous materials as soil and rock, it is important that we be informed of any differences observed between surface and subsurface conditions encountered in construction and those assumed in the body of this report. Individual investigations for new 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.

Ramses II Properties, LLC
Soil, Geology, and Geologic Hazard Study
Skyfall Subdivision
Parcel No. 52212-00-027
7985 Burgess Road
El Paso County, Colorado

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

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

Respectfully Submitted,

ENTECH ENGINEERING, INC.



Logan L. Langford, P.G.
Geologist



Kristen A. Andrew-Hoeser, P.G.
Senior Geologist

KAH

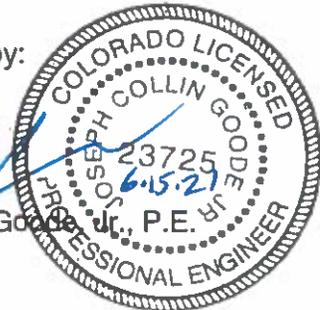
Encl.

Entech Job No. 210901
AAprojects/2021/210901 sg&ghs

Reviewed by:



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



Ramses II Properties, LLC
Soil, Geology, and Geologic Hazard Study
Skyfall Subdivision
Parcel No. 52212-00-027
7985 Burgess Road
El Paso County, Colorado

BIBLIOGRAPHY

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10. Keller, John W.; TerBest, Harry and Garrison, Rachel E. 2003. *Evaluation of Mineral and Mineral Fuel Potential of El Paso County State Mineral Lands Administered by the Colorado State Land Board*. Colorado Geological Survey. Open-File Report 03-07.

TABLE

Table 1: Summary Test Boring Results

Test Boring No.	Depth to Bedrock (ft.)	Depth to Groundwater (ft.)
1	4	>20
2	1	>15

FIGURES



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 505 ELKTON DRIVE
 COLORADO SPRINGS, CO 80907 (719) 531-5399

VICINITY MAP
 SKYFALL SUBDIVISION
 7985 BURGESS ROAD
 EL PASO COUNTY, CO.
 FOR: RAMSES II PROPERTIES, LLC

DRAWN:
 LLL

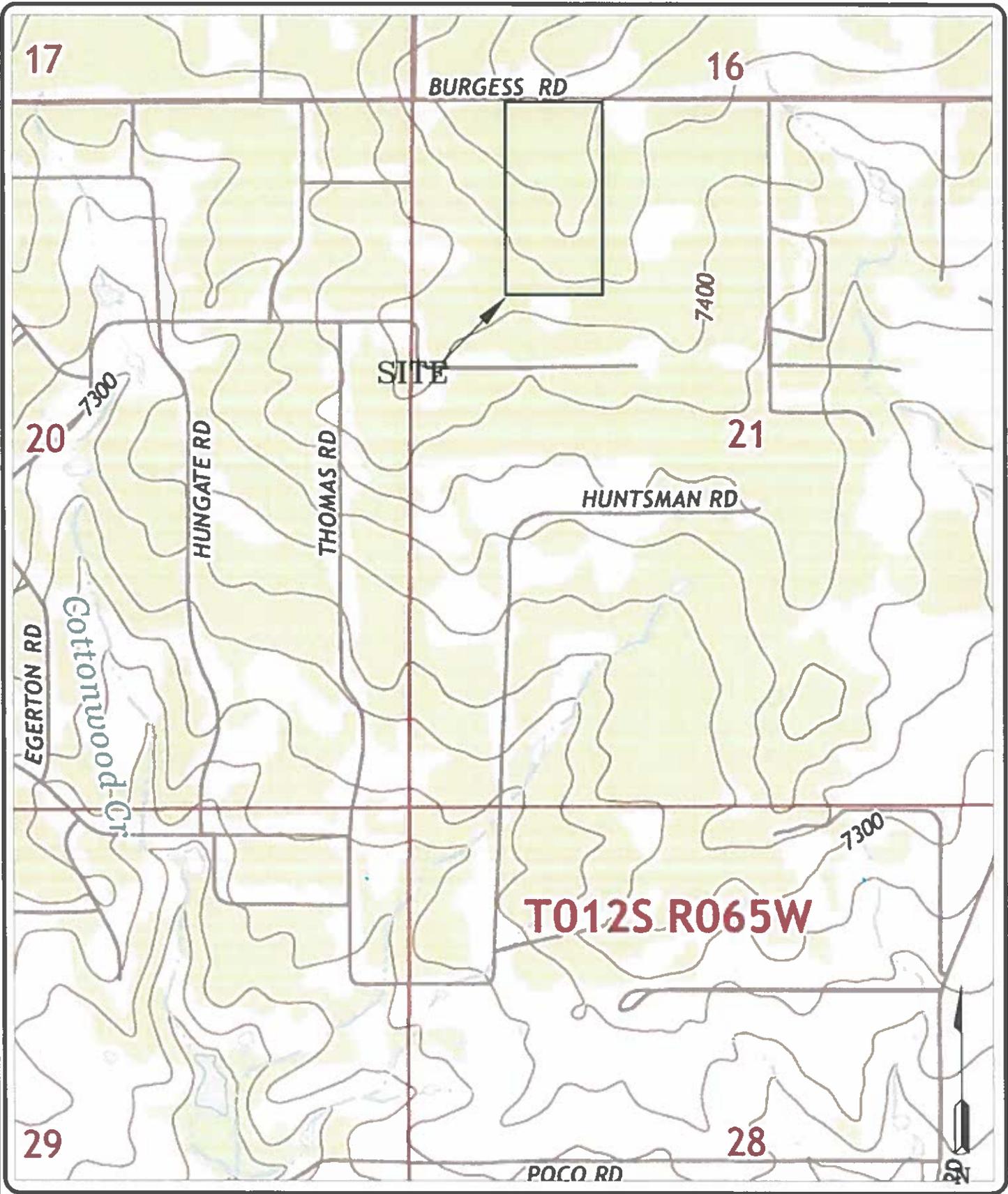
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 6/4/21

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DATE:

JOB NO.:
 210901

FIG NO.:
 1



ENTECH
ENGINEERING, INC.
555 ELKTON DRIVE
 COLDFRONT SPRINGS, CO. 80907 (719) 531-5399

USGS TOPOGRAPHY MAP
 SKYFALL SUBDIVISION
 7985 BURGESS ROAD
 EL PASO COUNTY, CO.
 FOR: RAMSES II PROPERTIES, LLC

DRAWN:
 LLL

DATE:
 6/4/21

CHECKED:

DATE:

JOB NO.:
 210901

FIG NO.:
 2

Burgess Rd



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502 ELKTON DRIVE
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SOIL SURVEY MAP
SKYFALL SUBDIVISION
7985 BURGESS ROAD
EL PASO COUNTY, CO.
FOR: RAMSES II PROPERTIES, LLC

DRAWN:
LLL

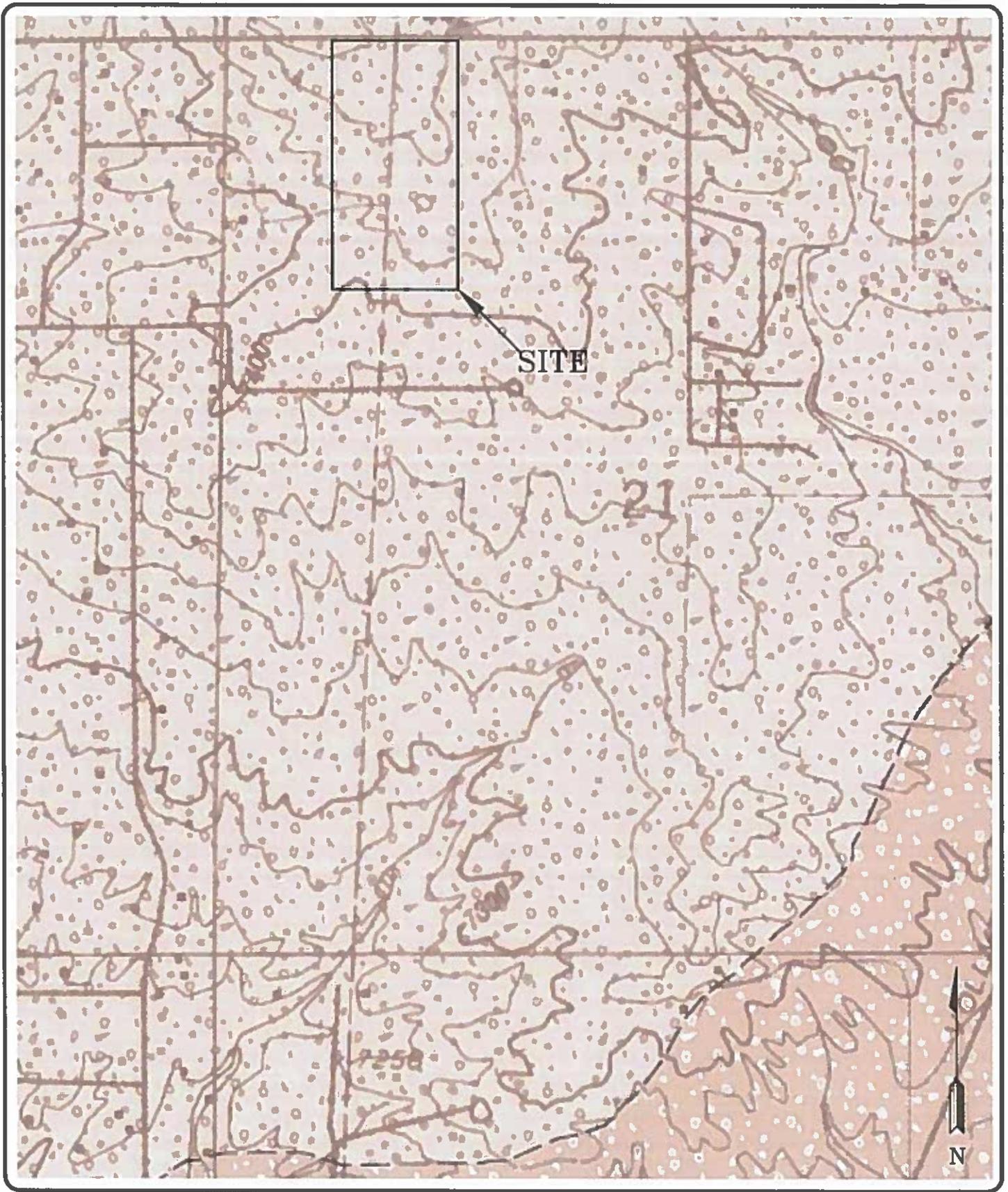
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210901

FIG NO:
4



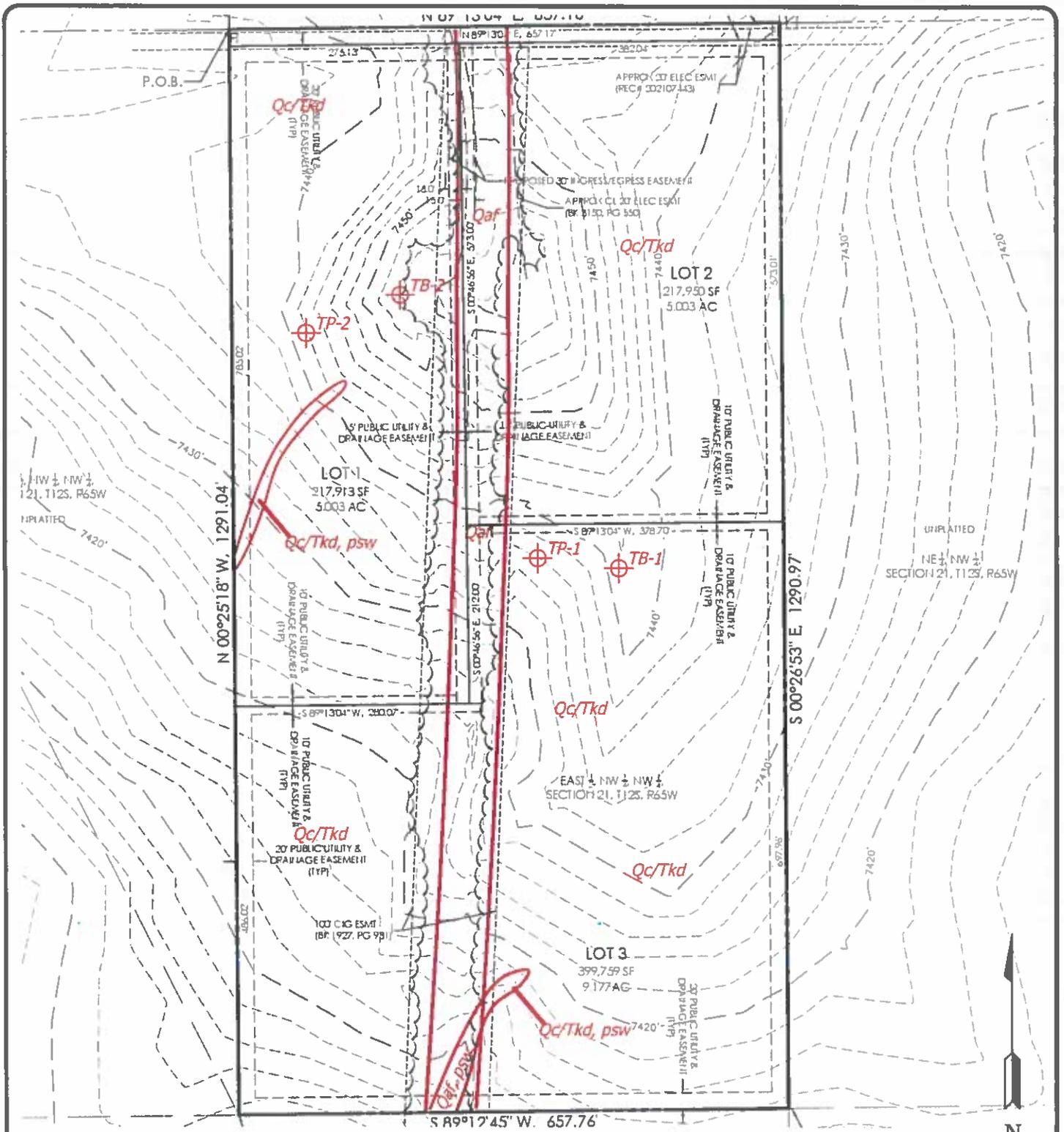

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FALCON NW QUADRANGLE GEOLOGIC MAP
SKYFALL SUBDIVISION
7985 BURGESS ROAD
EL PASO COUNTY, CO.
FOR: RAMSES II PROPERTIES, LLC

DRAWN: LLL	DATE: 6/4/21	CHECKED:	DATE:
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JOB NO.:
210901

FIG NO.:
5



Legend:

- Qaf - Artificial Fill of Holocene Age
man-made fill deposits associated with fill along the pipeline easement
- QcTKd - Colluvium of Quaternary Age overlying Dawson Formation of Tertiary to Cretaceous Age.
colluvial and residual soils overlying arkosic sandstone with interbedded fine-grained sandstone, siltstone and claystone
- psw - potentially shallow groundwater area

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263 ELKTON DRIVE
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GEOLOGY/ENGINEERING GEOLOGY MAP
SKYFALL SUBDIVISION
 7985 BURGESS ROAD
 EL PASO COUNTY, CO.
 FOR: RAMSES II PROPERTIES, LLC

DRAWN: LLL	DATE: 6/4/21	CHECKED:	DATE:
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JOB NO.:
210901

FIG NO.:
6



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303 ELKTON DRIVE
COLORADO SPRINGS, CO. 80907 (719) 531-2399

FEMA FLOODPLAIN MAP
SKYFALL SUBDIVISION
7985 BURGESS ROAD
EL PASO COUNTY, CO.
FOR: RAMSES II PROPERTIES, LLC

DRAWN:
LLL

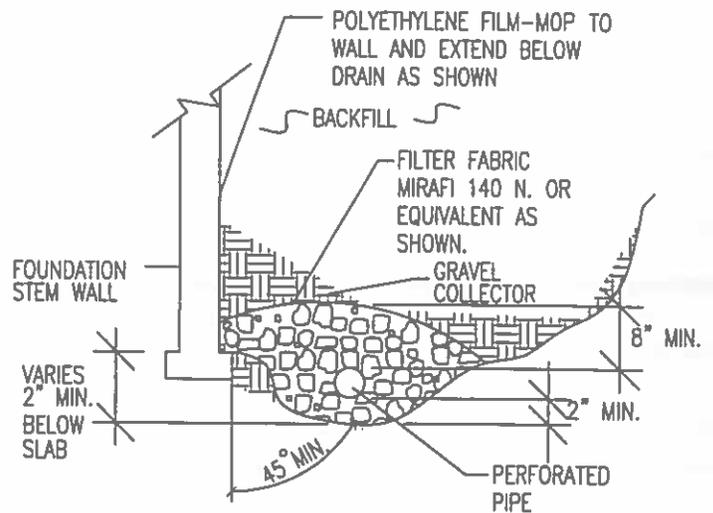
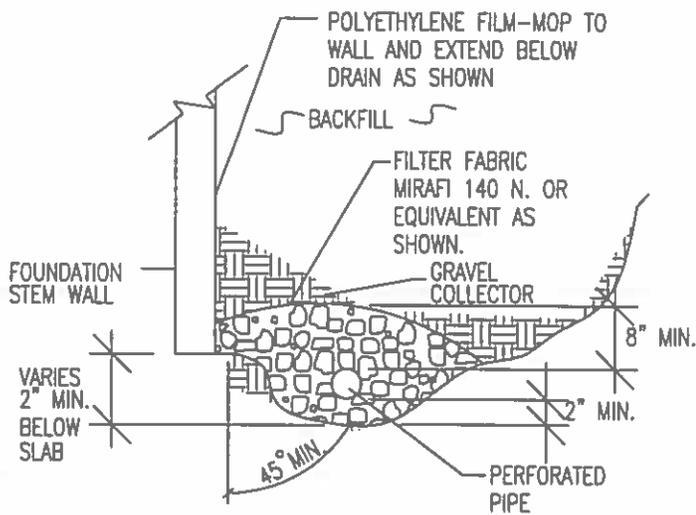
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JOB NO.:
210901

FIG NO.:
7



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 OUTFALL IS NOT AVAILABLE.



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PERIMETER DRAIN DETAIL

DRAWN:

DATE:

DESIGNED:

CHECKED:

DS

KAD

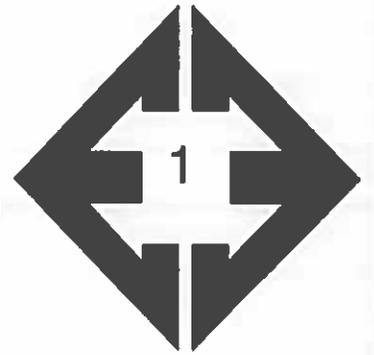
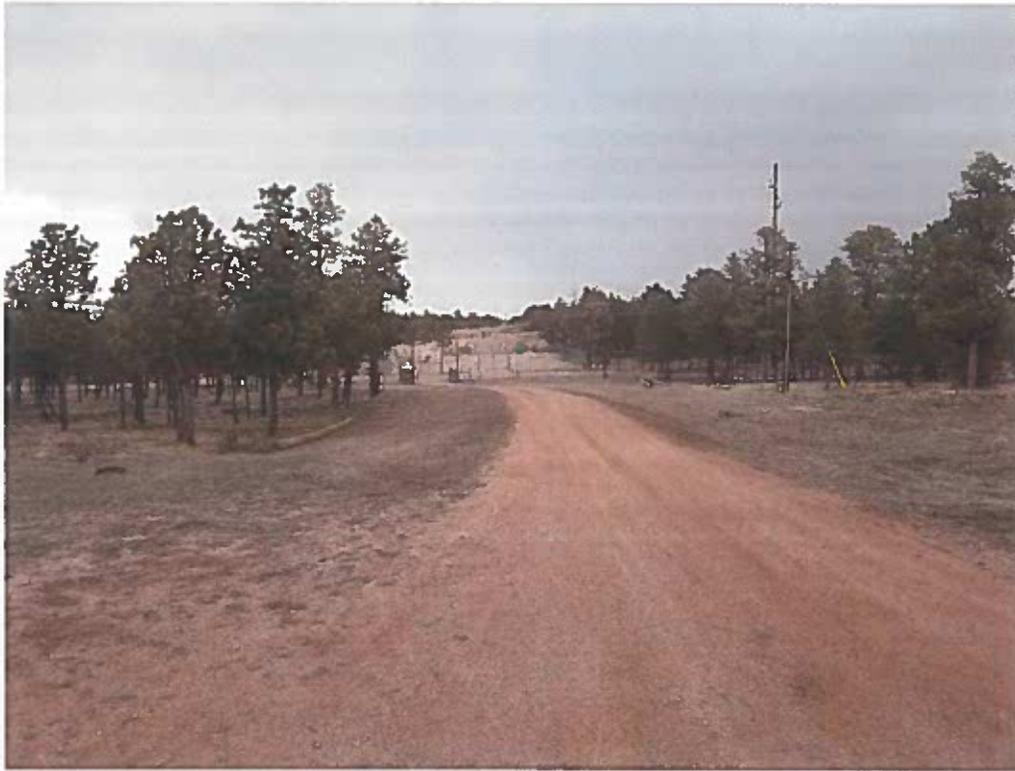
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FIG NO.:

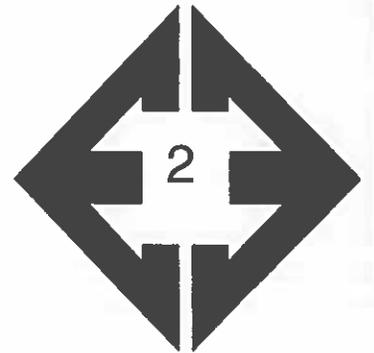
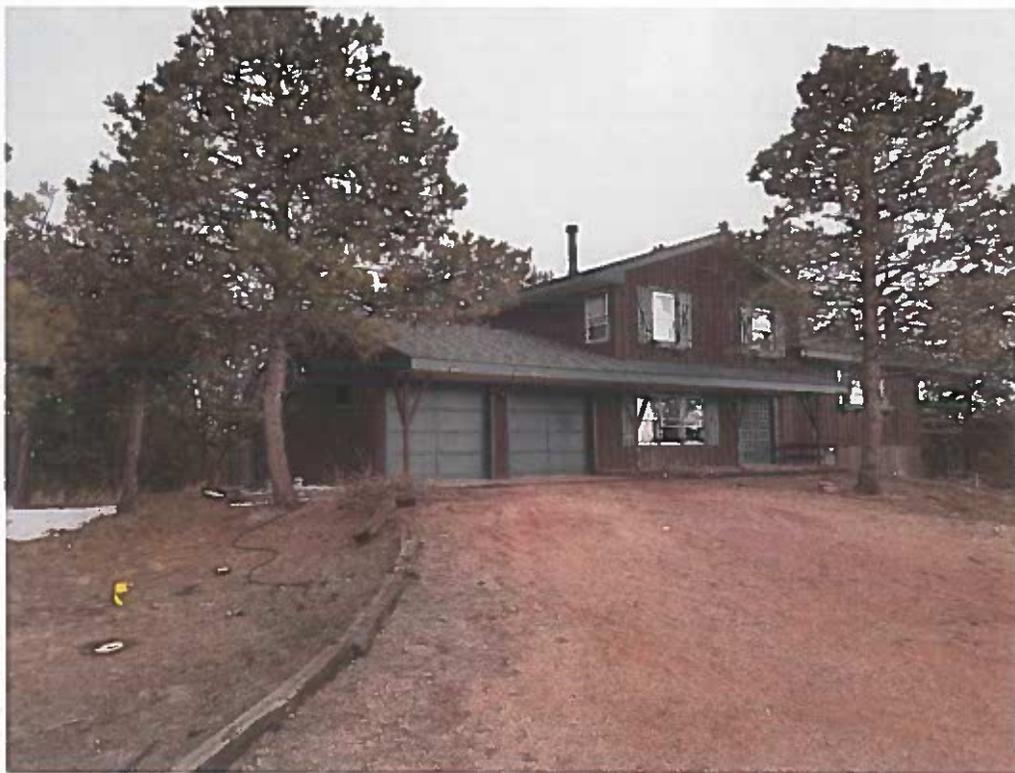
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APPENDIX A: Photographs



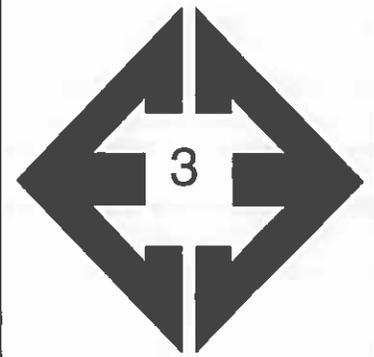
Looking north from the northern portion of the site.

April 22, 2021



Looking southeast from the northern portion of the site.

April 22, 2021



**Looking southwest
along drainage swale
in the southwestern
portion of Lot 2.**

April 22, 2021



**Looking north from the
west central portion of
the site.**

April 22, 2021



**Looking northwest
from the east central
portion of the site.**

April 22, 2021



**Looking northwest
along the pipeline
easement in the
central portion of the
site.**

April 22, 2021



Looking west from the southern portion of the site.

April 22, 2021



Looking north along pipeline easement in the southern portion of the site.

April 22, 2021

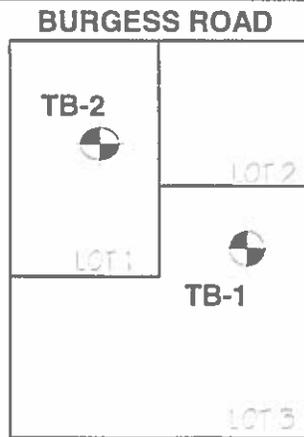
APPENDIX B: Test Boring & Test Pit Logs

TEST BORING NO. 1
 DATE DRILLED 4/29/2021
 Job # 210901

TEST BORING NO. 2
 DATE DRILLED 4/29/2021
 CLIENT RAMSES II PROPERTIES
 LOCATION 7985 BURGESS ROAD

REMARKS	Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type	REMARKS	Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
DRY TO 20', 4/29/21							DRY TO 15', 4/29/21						
6" TOPSOIL, SAND, VERY CLAYEY, FINE TO COARSE GRAINED, BROWN, MEDIUM DENSE, MOIST				13	14.0		6" TOPSOIL, SAND, CLAYEY, BROWN SANDSTONE, VERY SILTY, FINE GRAINED, TAN, VERY DENSE, MOIST				50	15.1	
SANDSTONE, SILTY, FINE TO COARSE GRAINED, TAN, VERY DENSE, MOIST	5			B	4.7		SANDSTONE, SILTY, FINE TO COARSE GRAINED, TAN TO BROWN, VERY DENSE, MOIST	5			11"	10.2	
											5"		
	10			50	7.8			10			3"	9.1	
				4"									
	15			50	5.9			15			50	9.3	
				2"							2"		
	20			B	3.5			20					

B - BOUNCE



LOCATIONS OF TEST BORINGS ARE APPROXIMATE



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TEST BORING LOG

DRAWN:	DATE:	CHECKED:	DATE:
		LLL	6/2/21

JOB NO.
210901

FIG NO
B-1

TEST PIT NO. 1
 DATE EXCAVATED 4/29/2021
 Job # 210901

TEST PIT NO. 2
 DATE EXCAVATED 4/29/2021
 CLIENT Ramses II Properties, LLC
 LOCATION 7985 Burgess Road

REMARKS	Depth (ft)	Symbol	Samples	Soil Structure Shape	Soil Structure Grade	USDA Soil Type	REMARKS	Depth (ft)	Symbol	Samples	Soil Structure Shape	Soil Structure Grade	USDA Soil Type
topsoil, sandy clay loam, brown, moist	1						topsoil, sandy clay loam, brown, moist	1					
sandy loam, Fine to coarse grained, pale brown, moist	2			gr	m	2	sandy clay, very fine to coarse grained, light brown, moist	2			ma		4A
sandy loam, sandstone fine to coarse grained pale brown, moist	3			ma		2A	sandy loam, fine to coarse grained, pale brown, moist	3			gr	s	3
	4							4					
	5							5					
	6							6					
	7							7					
	8							8					
	9							9					
	10							10					

Soil Structure Shape
 granular - gr
 platy - pl
 blocky - bl
 prismatic - pr
 single grain - sg
 massive - ma

Soil Structure Grade
 weak - w
 moderate - m
 strong - s
 loose - l



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TEST PIT LOG

DRAWN:
jhr

DATE
5/17/21

CHECKED:
LLL

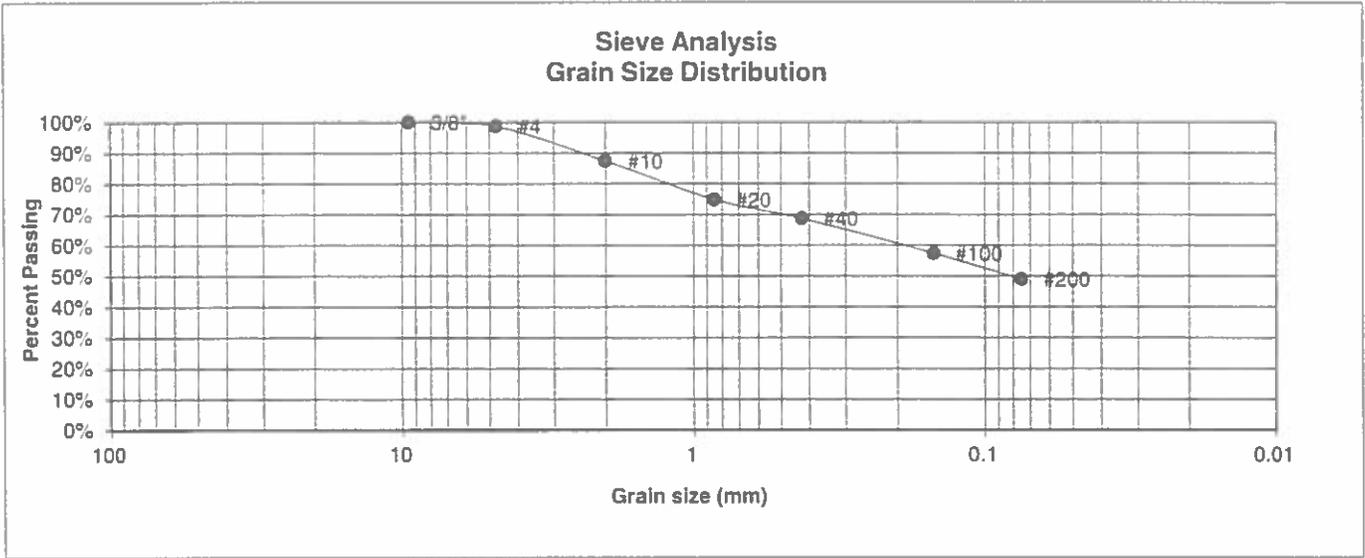
DATE
6/2/21

JOB NO:
210901

FIG NO
B-2

APPENDIX C: Laboratory Test Results

BORING NO.	1	UNIFIED CLASSIFICATION	SC	TEST BY	BL
DEPTH(ft)	2-3	AASHTO CLASSIFICATION		JOB NO.	210901
CLIENT	RAMSES II PROPERTIES				
PROJECT	7985 BURGESS ROAD				



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	100.0%
4	98.7%
10	87.4%
20	74.8%
40	68.7%
100	57.4%
200	49.0%

Atterberg
Limits
Plastic Limit
Liquid Limit
Plastic Index

Swell	
Moisture at start	13.2%
Moisture at finish	20.2%
Moisture increase	7.1%
Initial dry density (pcf)	100
Swell (psf)	670



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LABORATORY TEST
RESULTS

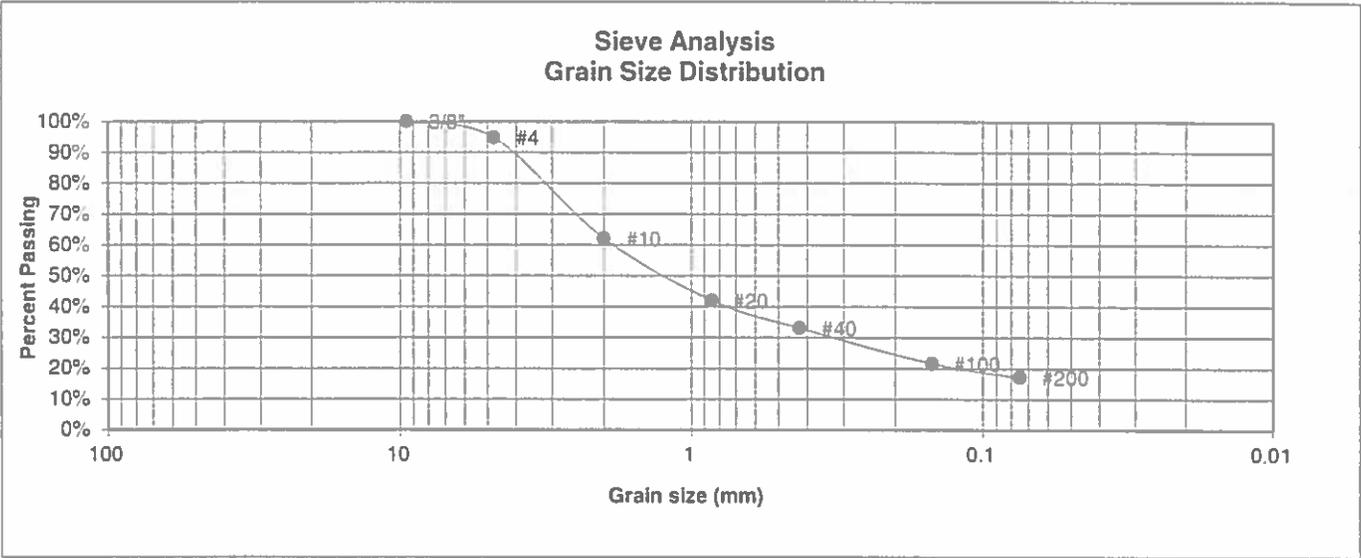
DRAWN	DATE	CHECKED	DATE
		LLL	6/2/21

JOB NO
210901

FIG NO.

C-1

BORING NO.	1	UNIFIED CLASSIFICATION	SM	TEST BY	BL
DEPTH(ft)	10	AASHTO CLASSIFICATION		JOB NO.	210901
CLIENT	RAMSES II PROPERTIES				
PROJECT	7985 BURGESS ROAD				



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	100.0%
4	94.8%
10	62.1%
20	42.0%
40	33.1%
100	21.6%
200	17.2%

Atterberg Limits
 Plastic Limit
 Liquid Limit
 Plastic Index

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



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505 ELKTON DRIVE
COLORADO SPRINGS, COLORADO 80907

**LABORATORY TEST
RESULTS**

DRAWN

DATE

CHECKED:
LLC

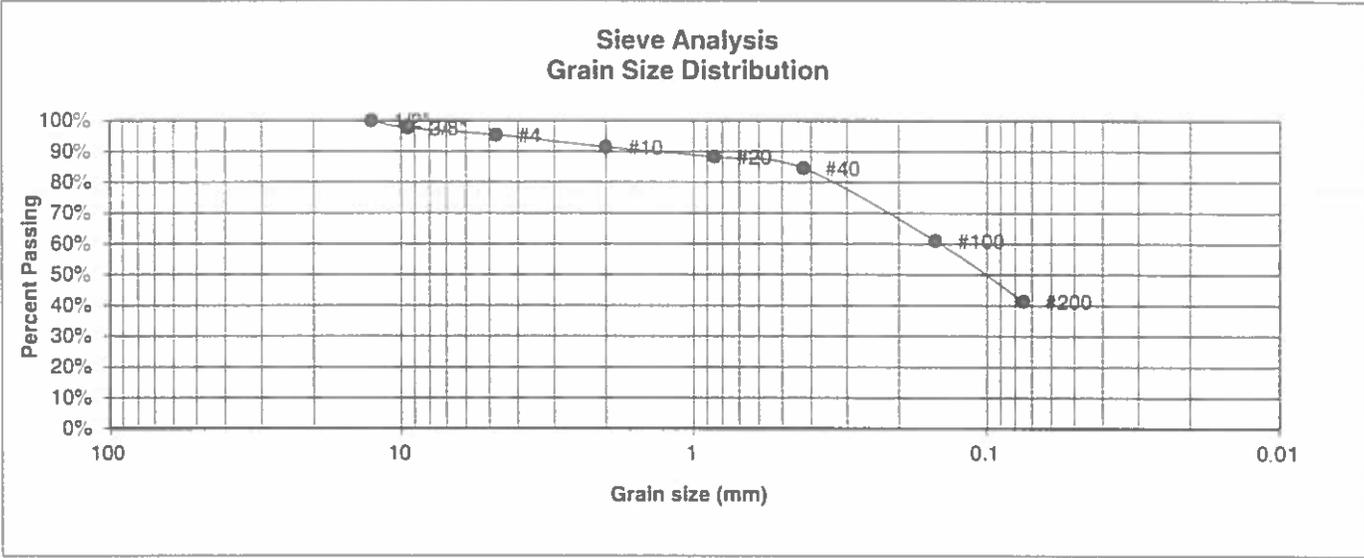
DATE
6/2/21

JOB NO.
210901

FIG NO.

L-2

BORING NO.	2	UNIFIED CLASSIFICATION	SM	TEST BY	BL
DEPTH(ft)	5	AASHTO CLASSIFICATION		JOB NO.	210901
CLIENT	RAMSES II PROPERTIES				
PROJECT	7985 BURGESS ROAD				



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	100.0%
3/8"	97.6%
4	95.3%
10	91.4%
20	88.3%
40	84.6%
100	61.0%
200	41.4%

Atterberg Limits
 Plastic Limit
 Liquid Limit
 Plastic Index

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



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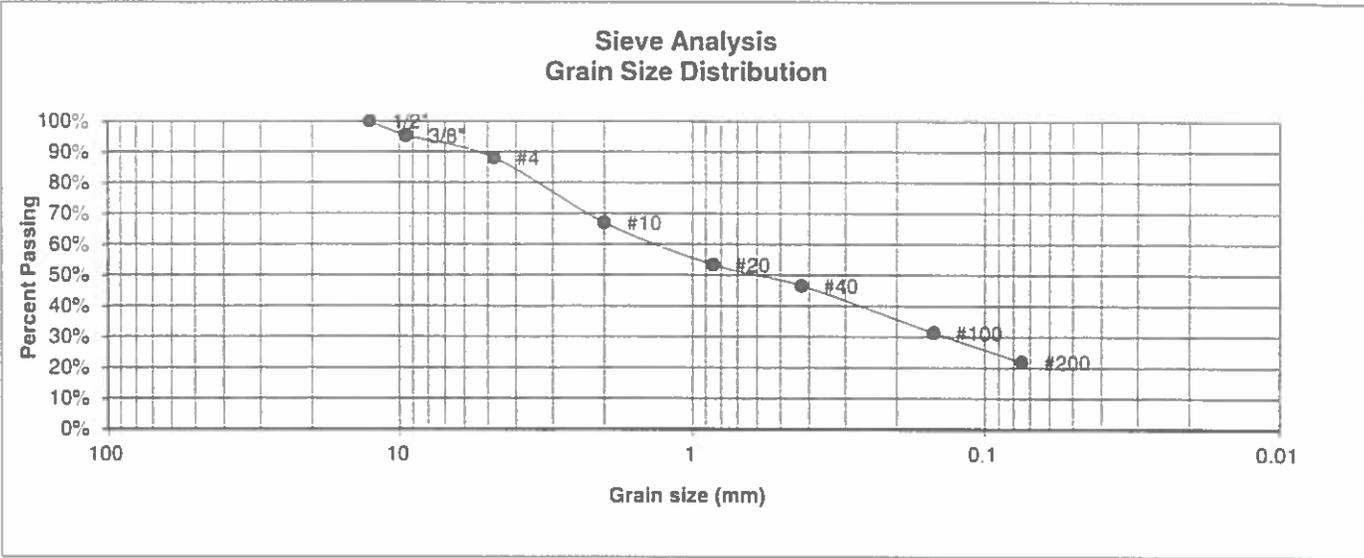
**LABORATORY TEST
RESULTS**

DRAWN:	DATE:	CHECKED:	DATE:
		LLL	6/2/21

JOB NO.
210901

FIG NO.
L-3

BORING NO.	TP-1	<u>UNIFIED CLASSIFICATION</u>	SC	<u>TEST BY</u>	BL
DEPTH(ft)	1	<u>AASHTO CLASSIFICATION</u>		<u>JOB NO.</u>	210901
CLIENT	RAMSES II PROPERTIES				
PROJECT	7985 BURGESS ROAD				



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	100.0%
3/8"	95.3%
4	88.1%
10	67.0%
20	53.4%
40	46.6%
100	31.3%
200	21.9%

Atterberg Limits
 Plastic Limit
 Liquid Limit
 Plastic Index

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



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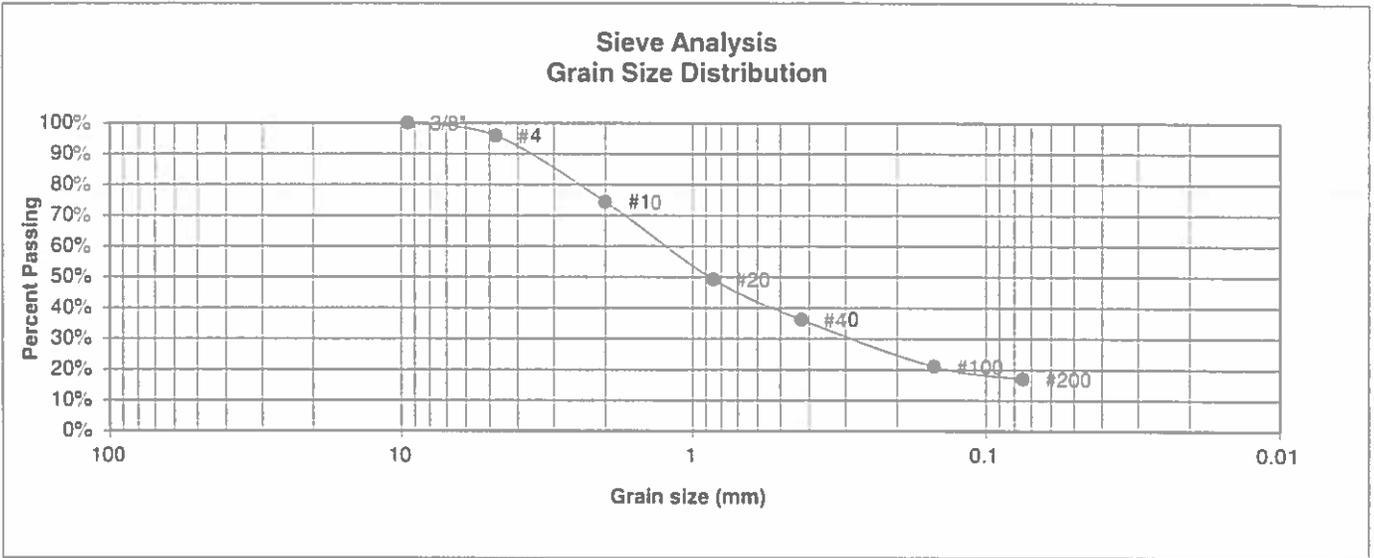
**LABORATORY TEST
RESULTS**

DRAWN	DATE	CHECKED LLL	DATE 6/2/21
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JOB NO
210901

FIG NO
C-4

BORING NO.	TP-1	UNIFIED CLASSIFICATION	SM	TEST BY	BL
DEPTH(ft)	2-3	AASHTO CLASSIFICATION		JOB NO.	210901
CLIENT	RAMSES II PROPERTIES				
PROJECT	7985 BURGESS ROAD				



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	100.0%
4	95.9%
10	74.4%
20	49.3%
40	36.2%
100	21.0%
200	17.0%

Atterberg Limits
 Plastic Limit
 Liquid Limit
 Plastic Index

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



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**LABORATORY TEST
RESULTS**

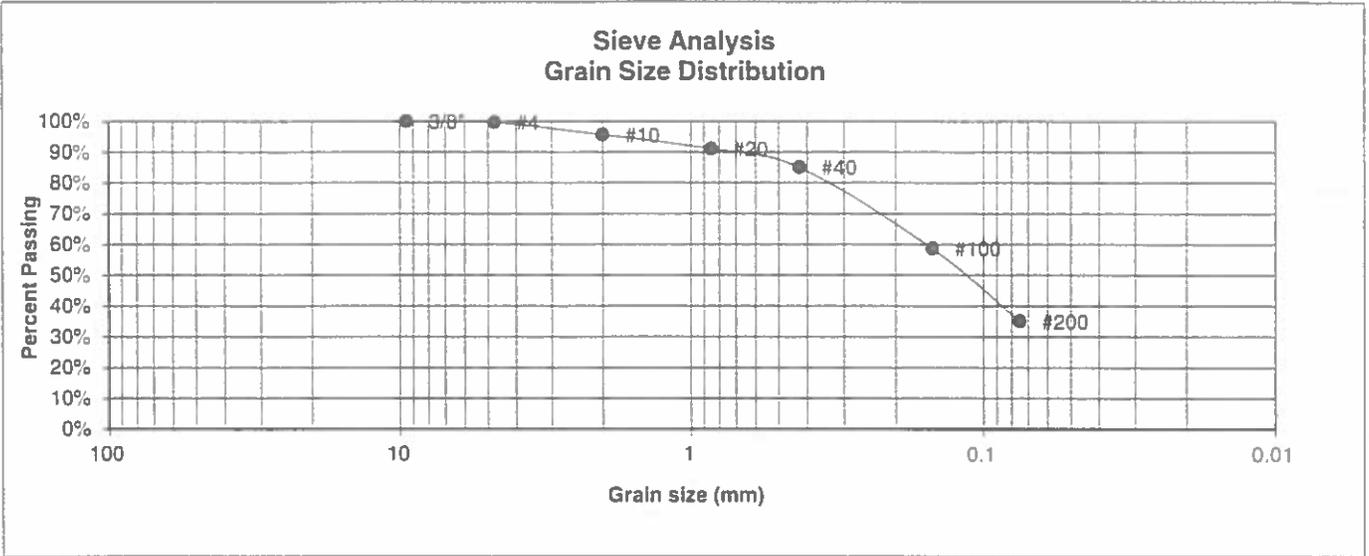
DRAWN:	DATE:	CHECKED: LLC	DATE: 6/2/21
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JOB NO.
210901

FIG NO.:

C-5

BORING NO.	TP-2	UNIFIED CLASSIFICATION	SC	TEST BY	BL
DEPTH(ft)	1	AASHTO CLASSIFICATION		JOB NO.	210901
CLIENT	RAMSES II PROPERTIES				
PROJECT	7985 BURGESS ROAD				



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	100.0%
4	99.7%
10	95.6%
20	91.1%
40	85.1%
100	58.7%
200	35.0%

Atterberg Limits
 Plastic Limit
 Liquid Limit
 Plastic Index

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



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**LABORATORY TEST
RESULTS**

DRAWN	DATE	CHECKED <i>LLL</i>	DATE <i>6/2/21</i>
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JOB NO
210901
 FIG NO
L-6

APPENDIX D: Soil Survey Descriptions

El Paso County Area, Colorado

41—Kettle gravelly loamy sand, 8 to 40 percent slopes

Map Unit Setting

National map unit symbol: 368h

Elevation: 7,000 to 7,700 feet

Farmland classification: Not prime farmland

Map Unit Composition

Kettle and similar soils: 85 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Kettle

Setting

Landform: Hills

Landform position (three-dimensional): Side slope

Down-slope shape: Linear

Across-slope shape: Linear

Parent material: Sandy alluvium derived from arkose

Typical profile

E - 0 to 16 inches: gravelly loamy sand

Bt - 16 to 40 inches: gravelly sandy loam

C - 40 to 60 inches: extremely gravelly loamy sand

Properties and qualities

Slope: 8 to 40 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Somewhat excessively drained

Runoff class: Medium

Capacity of the most limiting layer to transmit water (Ksat): High
(2.00 to 6.00 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Available water capacity: Low (about 3.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 7e

Hydrologic Soil Group: B

Hydric soil rating: No

Minor Components

Pleasant

Percent of map unit:

Landform: Depressions

Hydric soil rating: Yes

Other soils

Percent of map unit:

Hydric soil rating: No

Data Source Information

Soil Survey Area: El Paso County Area, Colorado

Survey Area Data: Version 18, Jun 5, 2020

El Paso County Area, Colorado

41—Kettle gravelly loamy sand, 8 to 40 percent slopes

Map Unit Setting

National map unit symbol: 368h

Elevation: 7,000 to 7,700 feet

Farmland classification: Not prime farmland

Map Unit Composition

Kettle and similar soils: 85 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Kettle

Setting

Landform: Hills

Landform position (three-dimensional): Side slope

Down-slope shape: Linear

Across-slope shape: Linear

Parent material: Sandy alluvium derived from arkose

Typical profile

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C - 40 to 60 inches: extremely gravelly loamy sand

Properties and qualities

Slope: 8 to 40 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Somewhat excessively drained

Runoff class: Medium

Capacity of the most limiting layer to transmit water (Ksat): High
(2.00 to 6.00 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Available water capacity: Low (about 3.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 7e

Hydrologic Soil Group: B

Hydric soil rating: No

Minor Components

Pleasant

Percent of map unit:

Landform: Depressions

Hydric soil rating: Yes

Other soils

Percent of map unit:

Hydric soil rating: No

Data Source Information

Soil Survey Area: El Paso County Area, Colorado

Survey Area Data: Version 18, Jun 5, 2020