

# **WATER RESOURCES & WASTEWATER REPORT**

**For**

**Saddlehorn Ranch Subdivision**

**April 2019  
REVISED: JULY 2019**



**CONSULTANTS, INC.**

# SADDLEHORN RANCH SUBDIVISION

## WATER RESOURCES & WASTEWATER REPORT

APRIL 2019  
**REVISED: JULY 2019**

Prepared for:

ROI Property Group, LLC  
2495 Rigdon Street  
Napa, CA 94558

Prepared by:

JDS-Hydro Consultants, Inc  
5540 Tech Center Dr, Suite 100  
Colorado Springs, CO 80919

## **Executive Summary:**

### **Water Resources and Wastewater Report Saddlehorn Ranch Subdivision REVISED: JULY 2019**

Development at the Saddlehorn Ranch Subdivision by ROI Property Group, LLC consists of 816.5 acres and 224 rural style lots, located southeast of the intersection of Judge Orr Road and Curtis Road, within Sections 3 and 10, Township 13 South, Range 64 West of the 6<sup>th</sup> Principal Meridian. Residential properties within the development will be provided water services through a central water system and wastewater services through individual on-site wastewater treatment systems (OWTS).

This report is a revision to the document submitted in April of 2019. Due to additional beneficial uses added to the community, water demands have increased.

It is expected that each rural residential home in the Saddlehorn Ranch will require an average of 0.67 annual acre-feet of water. This anticipated water demand is consistent with historic needs for nearby developments in Falcon, CO, as well as additional demands from livestock and irrigation that were not calculated in the original report.

Table 1 below summarizes the water available for consumptive use from the Arapahoe and Laramie-Fox Hills aquifers below Saddlehorn Ranch as well as annual demand estimations for this subdivision. The total supply takes into account the 300-year rule by El Paso County.

**Table 1: Water Supply and Demand Summary (REVISED)**

<b>LOTS</b>	<b>Total Supply (AF/Year)</b>	<b>Total Demand (AF/Year)</b>
224	198.16	150.08

Saddlehorn Ranch also has water rights in the Denver aquifer. However, this water is Not Non-Tributary (NNT) as opposed to the Non-Tributary (NT) water in the Arapahoe and LFH formations. Therefore, water from the Denver formation will not be used, and water from the Arapahoe and Laramie-Fox Hills formations are sufficient for the proposed development.

Wastewater projections are based on similar districts' historical use in this area. There are 224 residential units expected in the Saddlehorn Ranch Subdivision, which will all have on-site septic systems. Table 2 below summarizes the projected wastewater loads for this subdivision.

**Table 2: Projected Wastewater Loads Summary**

<b>LOTS</b>	<b>Unit Base Flow (GPD)</b>	<b>Average Daily Flow (GPD)</b>
224	172	38,528

## **TABLE OF CONTENTS**

### ***1.0 INTRODUCTION***

- 1.1 New Development Description

### ***2.0 PROJECTION OF WATER NEEDS***

- 2.1 Analysis of Water Demands  
Table 2-1: *Projected Water Demands*

### ***3.0 PROPOSED WATER RIGHTS AND SYSTEM FACILITIES***

- 3.1 Water Rights  
Table 3-1: *Summary of Available Legal Water Supply*
- 3.2 Source of Supply
- 3.3 Water Quality and Treatment
- 3.4 Water Storage
- 3.5 Fire Flow

### ***4.0 WASTEWATER AND WASTEWATER TREATMENT***

- 4.1 Wastewater Loads  
Table 4-1: *Projected Wastewater Loads*
- 4.2 On-Site Wastewater Treatment Systems

## **APPENDICES**

- Appendix A-* Overall Site Exhibit
- Appendix B-* Water Demands and Wastewater Loads
- Appendix C -* Overall Water Supply Inventory
- Appendix D -* Water Supply Information Summary
- Appendix E -* Water Rights Determinations
- Appendix F-* On-site Wastewater Treatment System Evaluation



## 1.0 INTRODUCTION

The purpose of this study is to provide a preliminary outline of the water resources and wastewater needs that would be necessary for Saddlehorn Ranch.

### 1.1 New Development Description:

Development at Saddlehorn Ranch consists of 816.5 acres and 224 proposed lots (see Overall Site Exhibit in **Appendix A**). The proposed lots are to be provided water via a central water system, and sewer services through individual on-site wastewater treatment systems (OWTS).

## 2.0 PROJECTION OF WATER NEEDS

### 2.1 Analysis of Water Demands:

Expected water demands are calculated in **Appendix B**. Table 2-1 below estimates the projected water demands for development at Saddlehorn Ranch. An annual demand of 0.67 acre-feet of water is assumed for each single family residence.

**Table 2-1: Projected Water Demands**

<b>Lots</b>	<b>Demand Per Lot (AF/Year)</b>	<b>Annual Demand (AF/Year)</b>	<b>Average Daily Demand (GPD)</b>	<b>Maximum Daily Demand (ADD x 2.65) (GPD)</b>	<b>Peak Hour Flow (ADD x 3.5) (GPM)</b>
224	0.67	150.08	133,982	355,053	326

## 3.0 PROPOSED WATER RIGHTS AND SYSTEM FACILITIES

### 3.1 Water Rights:

Water rights determinations were done by the Colorado Office of the State Engineer dated March 8, 2004 and are included in **Appendix E**. These rights included a much larger area of land than just Saddlehorn Ranch. As a result, a letter summarizing the status of water rights associated with a portion of the overall land is also included in **Appendix E**. Table 3-1 below summarizes the information from said water rights letter.

**Table 3-1: Summary of Available Legal Water Supply**

Formation	Annual Supply Per Acre* (Acre Feet)	Area (Acres)	Total Annual Supply * (Acre Feet)
Arapahoe	0.1303	816.5	106.39
Laramie-Fox Hills	0.1124		91.77
Total			198.16

\*300-Year Annual Supply

Beneficial uses of the water from the determinations include domestic, irrigation, commercial, industrial, recreation, and livestock watering.

### *3.2 Source of Supply:*

Domestic water demand will be met using two wells – one well in the Arapahoe aquifer, and the other well in the Laramie-Fox Hills aquifer.

These wells were drilled by a previous land owner around 2008, but they were never equipped with pumps.

In order to complete the wells, they will need a pump, motor, piping, and electrical power.

### *3.3 Water Quality and Treatment:*

The water in the wells was tested in January and May of 2019 based on the relative constituents listed in the National Primary Drinking Water Standards.

Testing results showed that no constituents were above primary drinking water standards, and only Total Dissolved Solids was above the secondary drinking water standards. Therefore, only disinfection of the water is needed prior to supplying water to residents in the system.

### *3.4 Water Storage:*

Central water storage will be provided by a 200,000-gallon (or larger) ground water storage tank. The tank will be comprised of concrete, bolted steel, or welded steel.

### *3.5 Fire Flow:*

#### Flow

According to the 2009 International Fire Code, systems that have structures up to 3,600 square feet and are comprised of certain building materials (such as those proposed in Saddlehorn Ranch), require a minimum fire-flow of 1,500 GPM. Structures between 3,601 square feet and 4,800 square feet require a minimum flow of 1,750 GPM. The flows continue to increase as the areas of the structures increase.

It is anticipated that structures in the subdivision will not have footprints larger than 3,600 square feet. Therefore, a required fire-flow of 1,500 GPM must be met.

#### Pressure

The Fire Code requires a residual pressure of 20 pounds per square inch (PSI). The residual pressure is defined as the pressure at the fire hydrant when the required fire-flow is being

released. The Falcon Fire Department (the authority having jurisdiction for Saddlehorn Ranch) mirrors this requirement.

Therefore, a minimum residual pressure of 20 PSI will be required at any hydrant in the system.

#### Duration

Per the International Fire Code, a 2-hour minimum fire-flow duration (for structures similar to those within Saddlehorn Ranch) is required. Using these values, the necessary storage volume would be 180,000 gallons (1,500 GPM x 120 minutes). A tank with additional capacity to offset maximum daily usage and contain a small amount of “buffer” storage will likely be constructed.

### **4.0 WASTEWATER AND WASTEWATER TREATMENT**

#### **4.1 Wastewater Loads**

Wastewater projections are based on similar districts’ historical use in this area. There are 224 residential units expected in Saddlehorn Ranch, which will all have on-site septic systems. **Appendix B** includes a complete breakdown of projected wastewater loads, summarized in Table 4-1 below. Average daily wastewater loads are expected to be approximately 172 gallons per day per single family residence, and maximum daily wastewater loads are expected to be approximately 210 gallons per day per single family residence.

**Table 4-1-Projected Wastewater Loads**

<b>Lots</b>	<b>Average Daily Flow (ADF) (GPD @ 172 GPD/LOT)</b>	<b>Maximum Daily Flow (MDF) (GPD @ 210 GPD/LOT)</b>
<b>224</b>	<b>38,528</b>	<b>47,040</b>

#### **4.2 On-Site Wastewater Treatment Systems (OWTS)**

The proposed 224 single family homes (minimum lot size of 2.5 acres) will be served by individual on-site wastewater treatment systems. The site was evaluated for on-site wastewater treatment systems by Entech Engineering, Inc. in early 2019. Four (4) test borings and forty (40) tactile test pits were performed on the site to verify soil conditions and suitability for OWTS.

Laboratory testing was also performed to classify and determine the soils engineering characteristics. Soils in the area are described as having moderate to very rapid percolation rates, with the majority of the soils being described with rapid permeabilities.

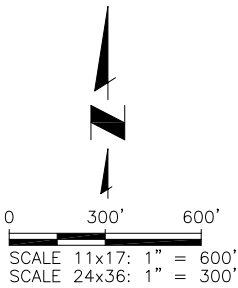
The Natural Resource Conservation Service (NRCS) has rated the soil suitability with respect to septic tank absorption fields, and the soils have been described as very limited due to seepage, bottom layer, and filtering capacity.

Based on the evaluation mentioned above, the site is suitable for individual on-site wastewater treatment systems. Contamination of surface and subsurface water resources should not occur provided the OWTS sites are evaluated and installed according to El Paso County and State Guidelines and properly maintained. Areas where shallow bedrock or groundwater is encountered may require designed systems. Additional investigation of individual lots would be required to identify areas that are suitable for the use of conventional systems.

The Soil, Geology, and Geologic Hazard, and Wastewater Study by Entech Engineering, Inc. dated April 29<sup>th</sup>, 2019 is included in ***Appendix F***.

# *Appendix A*





NO.	REVISIONS			
	DESCRIPTION	BY	APP.	DATE
	1			
	2			
	3			
	4			
	5			
	6			
	7			

Project No.: 311.01
Date: 04/25/19
Design: RMM
Drawn: RMM
Check: RMM

SHEET 1 OF 1

A

SADDLEHORN RANCH SUBDIVISION

ROI PROPERTIES GROUP

OVERALL SITE EXHIBIT

**JDS-HYDRO** CONSULTANTS, INC.  
5540 TECH CENTER DR., SUITE 100  
COLORADO SPRINGS, COLORADO 80919  
(719) 227-0072

DISCLAIMER: THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS. ANY ERRORS OR OMISSIONS SHALL BE REPORTED TO JDS-HYDRO CONSULTANTS, INC. JDS-HYDRO ASSUMES NO LIABILITY FOR UNAUTHORIZED CHANGES AND/OR REVISIONS MADE TO PLANS.



## *Appendix B*

**Appendix B**  
**Saddlehorn Ranch Subdivision**  
**Overall Water Demands and Wastewater Loads**

Use	SFE	Water Demands				Wastewater Loads			
		Unit Use (AF/Year)	Total Use (AF/Year)	Average Daily Flow (GPD)	Max Daily Use (@ 2.65x ADF) (GPD)	Peak Hour Flow (@ 3.5x ADF) (GPM)	Unit Base Flow (GPD)	Unit MDF (GPD)	Max Day Daily Flow (GPD)
Residential	224	0.67	150.08	133,982	355,053	326	172	210	47,040



## *Appendix C*

**Appendix C**  
**Saddlehorn Ranch Subdivision**  
**Overall Water Supply Inventory**

Land Formation/ Aquifer	Determination	Tributary Status	Acreage	Available Water per Acre 100-Year (AF/Acre)	Annual Allocation 100-Year (AF/Year)	Annual Allocation 300-Year (AF/Year)
<b>Currently Available On-Site Ground Water Legal Source</b>						
Arapahoe	458-BD	NT	816.5	0.3908	319.09	106.36
Laramie-Fox Hills	457-BD	NT	816.5	0.3373	275.41	91.80
Total Legal Supply					<b>594.49</b>	<b>198.16</b>

**Beneficial Uses**    Domestic  
                                  Irrigation  
                                  Commercial  
                                  Industrial  
                                  Recreation  
                                  Livestock Watering

## *Appendix D*

## WATER SUPPLY INFORMATION SUMMARY

Section 30-28-133,(d), C.R.S. requires that the applicant submit to the County, "Adequate evidence that a Water supply that is sufficient in terms of quantity, quality, and dependability will be available to ensure an adequate supply of water"

1. NAME OF DEVELOPMENT AS PROPOSED		<u>Saddlehorn Ranch</u>	
2. LAND USE ACTION		<u>Preliminary Plan</u>	
3. NAME OF EXISTING PARCEL AS RECORDED		<u>N/A</u>	
SUBDIVISION	<u>See Above</u>	FILING	<u>N/A</u>
BLOCK	<u>N/A</u>	Lot	<u>N/A</u>
4. TOTAL ACREAGE	<u>816.5</u>	5. NUMBER OF LOTS PROPOSED	<u>224</u>
PLAT MAPS ENCLOSED		<input type="checkbox"/> YES	<u>See Submittal</u>
6. PARCEL HISTORY - Please attach copies of deeds, plats, or other evidence or documentation. (In submittal package)			
A. Was parcel recorded with county prior to June 1, 1972? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO			
B. Has the parcel ever been part of a division of land action since June 1, 1972? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO			
If yes, describe the previous action			
7. LOCATION OF PARCEL - Include a map delineating the project area and tie to a section corner. (In submittal)			
1/4 OF 1/4 SECTION <u>3,10</u> TOWNSHIP <u>13</u>		<input type="checkbox"/> N <input checked="" type="checkbox"/> S	RANGE <u>64</u> <input type="checkbox"/> E <input checked="" type="checkbox"/> W
PRINCIPAL MERIDIAN:		<input checked="" type="checkbox"/> 6TH	<input type="checkbox"/> N.M. <input type="checkbox"/> UTE <input type="checkbox"/> COSTILLA
8. PLAT - Location of all wells on property must be plotted and permit numbers provided.			
Surveyors plat		<input type="checkbox"/> YES <input checked="" type="checkbox"/> NO	If not, scaled hand-drawn sketch <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO
9. ESTIMATED WATER REQUIREMENTS - Gallons per Day or Acre Foot per Year		10. WATER SUPPLY SOURCE	
HOUSEHOLD USE # * <u>224</u> of units <u>133,982</u> GPD <u>150.08</u> AF		<input checked="" type="checkbox"/> EXISTING <input checked="" type="checkbox"/> DEVELOPED <input type="checkbox"/> NEW WELLS	
COMMERCIAL USE # <u>0.0</u> Gr. Ac. <u>0</u> GPD <u>0.0</u> AF		WELLS SPRING <u>WELL PERMIT NUMBERS</u> <u>66938-F (Existing LFH)</u> <u>66937-F (Existing Arapahoe)</u>	
IRRIGATION # ** <u>      </u> acres <u>      </u> GPD <u>      </u> AF		<input type="checkbox"/> Alluvial <input type="checkbox"/> Upper Arapahoe <input type="checkbox"/> Upper Dawson <input checked="" type="checkbox"/> Lower Arapahoe <input type="checkbox"/> Lower Dawson <input checked="" type="checkbox"/> Laramie Fox Hills <input type="checkbox"/> Denver <input type="checkbox"/> Dakota <input type="checkbox"/> Other	
STOCK WATERING # <u>      </u> of head <u>      </u> GPD <u>      </u> AF		<input type="checkbox"/> MUNICIPAL	
OTHER <u>      </u> Multi-fam <u>      </u> GPD <u>      </u> AF		<input type="checkbox"/> ASSOCIATION	
TOTAL <u>      </u> <u>133,982</u> GPD <u>150.08</u> AF		<input type="checkbox"/> COMPANY	
* Based on 0.67 Acre-Foot/Unit/Year		<input checked="" type="checkbox"/> DISTRICT	
** Irrigation included in Residential Uses		NAME: TBD	
		LETTER OF COMMITMENT FOR SERVICE <input type="checkbox"/> YES <input type="checkbox"/> NO	
11. ENGINEER'S WATER SUPPLY REPORT		If yes, please forward with this form. (This may be required before our review is completed)	
<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO			
12. TYPE OF SEWAGE DISPOSAL SYSTEM <u>Individual On-site Wastewater Treatment Systems</u>			
<input checked="" type="checkbox"/> SEPTIC TANK/LEACH FIELD		<input type="checkbox"/> CENTRAL SYSTEM - DISTRICT NAME:	
<input type="checkbox"/> LAGOON		<input type="checkbox"/> VAULT - LOCATION SEWAGE HAULED TO:	
<input type="checkbox"/> ENGINEERED SYSTEM (Attach a copy of engineering design)		<input type="checkbox"/> OTHER:	

## *Appendix E*

# Porzak Browning & Bushong <sup>LLP</sup>

A t t o r n e y s • a t • L a w

2120 13th Street, Boulder, CO 80302

Glenn E. Porzak  
Steven J. Bushong  
Kristin H. Moseley  
Kevin J. Kinnear  
Karen L. Henderson

Corina A. Hach  
Cassidy L. Woodard

June 27, 2018

Michael F. Browning  
*Of Counsel*

303 443-6800 Tel.  
303 443-6864 Fax.  
www.pbblaw.com

Rob Fuller, CEO  
ROI Property Group, LLC  
Via Email: rob@roipropertygroup.com

Re: Water Rights/623.61 Acres in El Paso County, Colorado

Dear Mr. Fuller:

This letter will summarize the status of the water rights associated with approximately 624 acres of land located in El Paso County, Colorado (the "Land") currently owned by Andre Brandt, Roger Barrack, and Scott Smith ("Sellers") which you are interested in purchasing.

The Land and a great deal of other property in the area are located within the Upper Black Squirrel Designated Ground Water Basin (the "Designated Basin"). Designated Basins are areas, primarily in eastern Colorado, where there are few surface streams and the primary water supply is from wells. In the Designated Basin, the ground water consists primarily of shallow groundwater in the alluvium of Black Squirrel Creek and other small streams, and deeper groundwater in what are called the Denver Basin Aquifers. The Denver Basin Aquifers are water bearing formations that lie, like stacked plates, under the area and normally consist, from shallowest to deepest, of the Dawson, Denver, Arapahoe, and Laramie-Fox Hills formations.

The Denver Basin formations consist of sand and gravel formations laid down over geologic time into which water has seeped from various surface outcrop areas. This water is essentially non-renewable – once withdrawn it will not be replenished except over a geologic time scale. Most of the water in the Denver Basin aquifers is non-tributary (NT), meaning it has no significant hydrologic connection to any surface stream or alluvium. In some areas, however, the uppermost formation is somewhat connected to the surface alluvium. Such water is classified as "not non-tributary" (NNT). The Denver Basin roughly extends from Greeley on the north to Colorado Springs on the south, and from the Front Range foothills on the west to Limon on the east, but in some areas the upper formation(s) have been eroded away. Only the Denver, Arapahoe and Laramie-Fox Hills formations exist under the Land. The Denver formation under the Land is deemed to be NNT, while both the Arapahoe and Laramie-Fox Hills formations are NT.

The water in the Denver Basin formations is owned by the State, but has been allocated by statute to the overlying surface owner. By statute, no more than 1% of the water underlying a given parcel can, on average, be withdrawn in any given year. State policy was and is to try to make the resource last for at least one hundred years.

The Land was part of a larger 6,995 acre parcel owned in the early 2000's by the Norris C. Family Trust ("Norris"). To vest their rights to the Denver Basin water underlying their property, Norris applied for and was issued in 2004 Determinations by the Office of the State Engineer, Designated Basins Branch, setting forth the amount of Denver Basin water to which Norris was entitled. Copies of the 2004 Determinations are attached to this letter. The amount of water determined to be available were as follows -- all in acre feet (af). (One acre foot equals 325,851 gallons.)

#### 2004 DETERMINATIONS

<u>Aquifer</u>	<u>Determination No.</u>	<u>Total Entitlement</u>	<u>Average Annual</u>
Denver	459-BD	236,481 af	2,364 af
Arapahoe	458-BD	271,953 af	2,719 af
Laramie-Fox	457-BD	234,742 af	2,347 af

The Land consists of only 8.966% of the total land included in the Determinations. Based on a pro rata allocation by acreage of the amounts found in the 2004 Determinations, the Seller's would own the following amounts of water:

#### AMOUNTS AVAILABLE TO LAND OVER 100 YEARS

<u>Aquifer</u>	<u>Total Entitlement</u>	<u>Average Annual</u>	<u>Per Acre Per Year</u>
Denver	21,203 af	212.03 af	0.3398 af
Arapahoe	24,383 af	243.83 af	0.3908 af
Laramie-Fox	<u>21,047 af</u>	<u>210.47 af</u>	<u>0.3373 af</u>
TOTAL	66,633 af	666.33 af	1.0678 af

As noted above, in the vicinity of the Land, the Denver formation is considered NNT. As a result, a portion of the water withdraw from wells completed into the Denver formation must be put back into the alluvial aquifer to offset the small reductions that such withdrawals cause in the overlying alluvial aquifer. As a result, before well permits will be issued by the State Engineer for Denver aquifer wells, a replacement plan must be approved by the Office of the State Engineer. For this purpose, the Denver formation in the vicinity of the Land is divided into Area A and Area B. A map showing the portion of the Land in each area is attached hereto. Area A is the portion of the Land that is located more than one mile from the aquifer's point of contact with the alluvium. Area A is the portion of the Land that is located one mile or less from the aquifer's point of contact with the alluvium. By state statute, the replacement plan for Denver Area A must provide for the return of at least four percent (4%) of the water withdrawn to the alluvial aquifer, and the replacement plan for Denver Area B must provide for the return of the

actual depletions caused by well in Denver Area B. The State has a computer program to determine such actual depletions.

I would expect that the water supply for development of the Land would be provided by wells drilled into the Denver formation. The Denver formation is the shallowest formation, which reduces well drilling and pumping costs, and its water quality is normally good, requiring no more than chlorine treatment at the wellhead. Accordingly, you will need to file for and obtain State Engineer approval of a replacement plan for these wells. The amount of replacement water needed can normally be provided simply by dedicating the return flows from the septic/leach fields that would be developed on each lot. We recommend that you engage a qualified water engineer to prepare such replacement plan application and calculate the amounts of replacement water required.

You should be aware that although the State Engineer allows 1% of the water from Denver Basin formations to be withdrawn each year, which results in a planned 100 year water supply, El Paso County requires that any new subdivision show that it has a 300 year water supply available (the "300 Year Rule"). The 300 Year Rule was adopted pursuant to the County's land use regulatory authority, on the grounds that homes should have at least a 300 year supply of water.

Accordingly, the amounts per acre available to the Land shown in the table above, must be stretched out over 300 years to comply with the County's 300 Year Rule. Those amounts are shown below:

AMOUNTS AVAILABLE TO LAND UNDER 300 YEAR RULE

<u>Aquifer</u>	<u>Average Annual</u>	<u>Per Acre Per Year</u>	<u>Per Five Acre Lot</u>
Denver	70.677 af	0.1133 af	0.5663 af
Arapahoe	81.277 af	0.1303 af	0.6512 af
Laramie-Fox	<u>70.157 af</u>	<u>0.1124 af</u>	<u>0.5621 af</u>
TOTAL	22,211 af	0.3557 af	1.7796 af

Typical in-house water use for a family of 3.5 is approximately 0.4 acre feet year. As shown above, five acre lots would have sufficient water from the Denver aquifer to satisfy the County's 300 Year Rule. If additional outside irrigation water were desired, additional wells into the Arapahoe formation might be required. We recommend that you engage a qualified water engineer to confirm our calculations and assumed water requirements.

One complication is that the head of the State Engineer's Designated Water Ranch, Keith Vanderhorst, has orally confirmed to us that there was a math error in the 2004 Determination with respect to Denver Area B. That Determination found that the saturated thickness of Denver Area A under the Land was 200 feet, and that the saturated thickness of Denver Area B under the Land was 230 feet – 15% more. However, in calculating the amount of Denver Area B water to which Norris was entitled, the State Engineer's staff incorrectly used the lower saturated thickness of Denver Area A, thus understating the Land's entitlement from Denver Area B by 15%. If you purchase the Land, we recommend that you engage us to attempt to have the State




Engineer's Office correct this error. If corrected, the Land's total entitlement from the Denver aquifer would increase from 21,203 acre feet to 23,086 acre feet.

As we have discussed, the Sellers' title to the Denver Basin water underlying the Land was deemed by us not to be marketable when we reviewed this matter for a prior interested party. The larger 6,995 acre parcel had undergone several foreclosure actions since 2004 and was split into smaller parcels. The various deeds and decrees involved did not properly transfer title the Denver Basin water associated with the Land. As a result, the Sellers filed a quiet title action in the District Court in and for El Paso County as Civil Action 2018CV30037 (the "Quiet Title Action"). The Sellers' attorney reports that he will soon be filing an uncontested decree to quiet title to the amounts of water set forth above, which also allows for an adjustment upwards for Denver Area B if the State Engineer corrects the saturated thickness error discussed above. This would successfully resolve any title issues.

If you have any questions, please let me know. I would also be happy to assist you in preparing appropriate language concerning the above water rights in the Purchase and Sale Agreement if you proceed, as well as assisting you in preparing the closing documents, and contracts and deeds to your ultimate homebuyers, to properly describe and transfer the water rights.

Very truly yours,

A handwritten signature in blue ink, appearing to read "Mike", is written over the typed name "Michael F. Browning".

Michael F. Browning

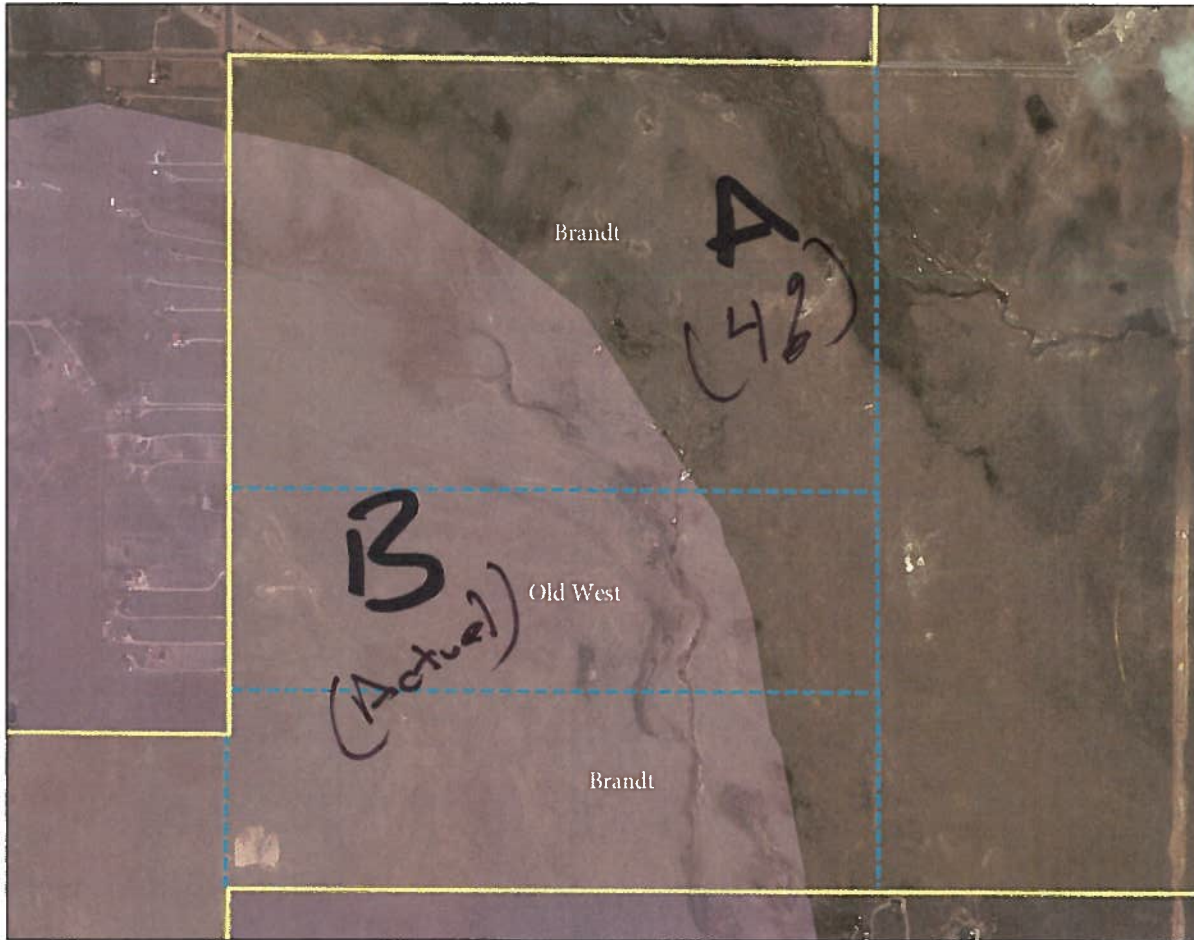
cc: Sandra Lehman



CDSS

Colorado's Decision Support Systems

## Actual Replacement Brandt



### Legend

-  NNT Actual Impact Area
-  County

### Location



### Notes

2,339 0 1,169 2,339 Feet

1: 14,032



This product is for informational purposes and may not have been prepared for, or be suitable for legal, engineering, or surveying purposes. Users of this information should review or consult the primary data and information sources to ascertain the usability of the information.

Date Prepared: 3/29/2018 12:07:38 PM

## WATER RIGHTS DEED

This Water Rights Deed, dated this \_\_\_\_ day of August, 2018, is from ANDRE BRANDT, ROGER BARRACK and SCOTT SMITH, individuals ("Grantors") to ROI PROPERTY GROUP, LLC, a California limited liability company ("Grantee") whose mailing address is 6 Dickerson Lane Napa, CA 94558.

For Ten Dollars and other good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, Grantors hereby sell, assign and convey to Grantee, and its successors and assigns forever, all of the following located in El Paso County, Colorado:

A. Water Rights. All of the following water and water rights, title to which was quieted in Grantors pursuant to the Order and Findings of Fact, Conclusions of Law, Order Quietening Title, Judgment and Decree entered in Case No. 2018CV30037 by the District Court in and for El Paso County, Colorado on July 2, 2018, which document was recorded in the real property records of El Paso County, Colorado on August 9, 2018 at Reception No. 218092294, to wit:

(i) 21,047 acre-feet of water in the Laramie-Fox Hills Aquifer (210.47 acre-feet per year over 100 years) from the total of 234,742 acre-feet from the Colorado Ground Water Commission's Findings and Order for Determination of Water Rights No. 457-BD dated March 3, 2004 and recorded in the real property records of El Paso County, Colorado at Reception No. 204053003;

(ii) 24,383 acre-feet of water in the Arapahoe Aquifer (243.83 acre-feet per year over 100 years) from the total of 271,953 acre-feet from the Colorado Ground Water Commission's Findings and Order for Determination of Water Rights No. 458-BD dated March 3, 2004 and recorded in the real property records of El Paso County, Colorado at Reception No. 204053004;

(iii) 21,203 acre-feet of water in the Denver Aquifer (212.03 acre-feet per year over 100 years) from the total of 236,481 acre-feet from the Colorado Ground Water Commission's Findings and Order for Determination of Water Rights No. 459-D dated March 3, 2004 and recorded in the real property records of El Paso County, Colorado at Reception No. 204053005; provided, however, that the 21,203 acre-feet of Denver water includes both Denver Aquifer Area A and Denver Aquifer Area B water as defined by the 459-BD Determination, and such 21,203 acre-feet shall be allocated between Denver Aquifer Area A and Denver Aquifer Area B based on the proportional amount of Denver Aquifer Area A and Denver Aquifer Area B underlying the property describe on Exhibit A attached hereto; and further provided that, if the Colorado Ground Water Commission amends the 459-BD Determination to correct an error in the original calculation of the water available in Denver Aquifer Area B, by issuing an amended Determination reflecting the correct saturated thickness of 230 feet for Area B resulting in a total of amount of water in the Denver Area B of 161,026 acre-feet, then the amount of water

conveyed hereby from the Denver Aquifer shall be commensurately increased not to exceed 23,086 acre feet.

B. Wells. All wells located on the property described on Exhibit A attached hereto, along with any and all wells permits, well casing, pumps, meters and any other equipment associated therewith, including but not limited to Well Permit Nos. 66938-F and 66937-F.

Grantors warrant title to the above.

Executed as of the date first set forth above.

[INDIVIDUAL SIGNATURE PAGES FOLLOW]

Roger Barrack  
Roger Barrack

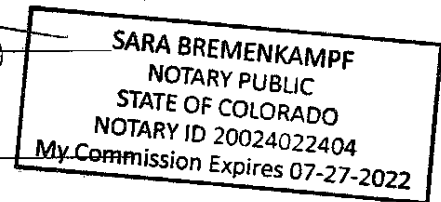
STATE OF COLORADO     )  
  ) ss.  
COUNTY OF EL PASO )

The foregoing instrument was acknowledged before me this 20<sup>th</sup> day of August, 2018 by Roger Barrack.

Witness my hand and official seal.

[Signature]  
Notary Public

My commission expires: \_\_\_\_\_



*Andre Brandt by Roger Barrack as attorney in fact*  
Andre Brandt by Roger Barrack as Attorney in Fact

STATE OF COLORADO     )  
  ) ss.  
COUNTY OF EL PASO)

The foregoing instrument was acknowledged before me this 30<sup>th</sup> day of August, 2018 by Roger Barrack as Attorney in Fact for Andre Brandt.

Witness my hand and official seal.

  
Notary Public

SARA BREMENKAMPF  
NOTARY PUBLIC  
STATE OF COLORADO  
NOTARY ID 20024022404  
My Commission Expires 07-27-2022


My commission expires: \_\_\_\_\_

  
\_\_\_\_\_  
Scott Smith

STATE OF COLORADO     )  
  ) ss.  
COUNTY OF EL PASO)

The foregoing instrument was acknowledged before me this 30<sup>th</sup> day of August, 2018 by  
Scott Smith.

Witness my hand and official seal.

  
\_\_\_\_\_  
Notary Public

<b>SARA BREMENKAMPF</b> NOTARY PUBLIC STATE OF COLORADO NOTARY ID 20024022404 My Commission Expires 07-27-2022
--

13Ca)

# STATE OF COLORADO

## OFFICE OF THE STATE ENGINEER

Division of Water Resources  
Department of Natural Resources

1313 Sherman Street, Room 818  
Denver, Colorado 80203  
Phone (303) 866-3581  
FAX (303) 866-3589  
www.water.state.co.us



Bill Owens  
Governor  
Greg E. Walker  
Executive Director  
Hal D. Simpson, P.E.  
State Engineer

March 8, 2004

**ROBERT NORRIS**  
ROBERT C NORRIS FAMILY TRUST  
970 SUMMER GAMES DRIVE  
COLO SPGS CO 80906

RECORDER NOTE: Legibility  
of writing, typing or printing  
UNSATISFACTORY in portions  
of this document when received.

RE: Determination of Water Right

Dear Mr. Norris:

Enclosed is a copy of the Colorado Ground Water Commission's Findings and Order for Determination of Water Right No. **458-BD**, for the allocation of ground water in the **Arapahoe** aquifer. This Findings and Order are the Commission's approval of your application for determination of rights to ground water in the above stated aquifer. This document contains important information about your water right and should be reviewed and retained for your records.

As indicated in the Order, a copy of this determination must be recorded by the applicant in the public records of the county – in which the overlying land is located – so that a title examination of the overlying land claimed in the application, or any part thereof, shall reveal this determination. An additional copy of the Findings and Order is enclosed for this purpose.

If you have any questions, please contact this office.

Sincerely,

Richard Cooper  
Physical Science Researcher Scientist  
Designated Basins Branch

Enclosure: a/s

cc: John Schwab – JPS Engineering (letter only)  
Purushottam Dass, PE – Stantec (letter only)  
Upper Black Squirrel Creek GWMD

Robert C. Balink El Paso Cty, CO  
04/02/2004 12:31  
Doc \$0.00 Page  
Reo \$125.00 1 of 25

**204053004**



**COLORADO GROUND WATER COMMISSION  
FINDINGS AND ORDER**

IN THE MATTER OF AN APPLICATION FOR DETERMINATION OF WATER RIGHT TO  
ALLOW THE WITHDRAWAL OF GROUND WATER IN THE UPPER BLACK SQUIRREL CREEK  
DESIGNATED GROUND WATER BASIN

---

APPLICANT: ROBERT C. NORRIS FAMILY TRUST

AQUIFER: ARAPAHOE

DETERMINATION NO.: 458-BD

---

In compliance with Section 37-90-107(7), C.R.S., and the Designated Basin Rules, 2 CCR 410-1, The Robert C. Norris Family Trust (hereinafter "applicant") submitted an application for determination of water right to allow the withdrawal of designated ground water from the Arapahoe Aquifer.

**FINDINGS**

1. The application was first filed by the applicant on February 18, 2003, and was received complete by the Colorado Ground Water Commission on May 30, 2003.
2. The applicant requests a determination of rights to designated ground water in the Arapahoe Aquifer (hereinafter "aquifer") underlying 6,955.31 acres, generally described as the SE1/4 of the NE1/4 and the E1/2 of the SE1/4 of Section 31 and the E1/2 of the NE1/4, the SW1/4 of the NE1/4, the S1/2 of the NW1/4, the SW1/4, and the W1/2 of the SE1/4 of Section 32, all in Township 12 South, Range 63 West of the 6<sup>th</sup> Principal Meridian; the E1/2, the E1/2 of the W1/2, and the SW1/4 of the SW1/4 of Section 35 and the SW1/4 of Section 36, all in Township 12 South, Range 64 West of the 6<sup>th</sup> Principal Meridian; land in the N1/2 and in the N1/2 of the S1/2 of Section 4, all of Section 5 excluding the NW1/4 of the NW1/4, all of Section 6 excluding the south 1460 feet of the east 1044 feet of the SE1/4, and all of Section 7 excluding the E1/2 of the SE1/4, and the N1/2 of Section 8, all in Township 13 South, Range 63 West of the 6<sup>th</sup> Principal Meridian; all of Sections 1, 2 and 3, the E1/2 and the SW1/4 of Section 9, the N1/2 of the N1/2 of Section 10, the N1/2 of the N1/2 of Section 11, and the E1/2, the E1/3 of the W1/2, and the W2/3 of the N1/2 of the NW1/4 of Section 12, all in Township 13 South, Range 64 West of the 6<sup>th</sup> Principal Meridian; all in El Paso County. According to a signed statement dated February 5, 2003, the applicant owns the 6,955.31 acres of land, as further described in said affidavit which is attached hereto as Exhibit A, and claims control of the ground water in the aquifer underlying this land area.
3. The proposed annual amount of ground water to be allocated and withdrawn from the aquifer for intended beneficial uses is the maximum allowable amount.
4. The above described land area overlying the ground water claimed by the applicant is located within the boundaries of the Upper Black Squirrel Creek Designated Ground Water Basin and in the Upper Black Squirrel Creek Ground Water Management District. The Colorado Ground Water Commission (hereinafter "Commission") has jurisdiction.

5. The applicant intends to apply the allocated ground water to the following beneficial uses: domestic, irrigation, commercial, industrial, recreation and livestock watering. The applicant's proposed place of use of the allocated ground water is the above described 6955.31 acre land area.
6. a. Pursuant to Section 37-90-107(7), C.R.S., and Rule 5.3 of the Designated Basin Rules, the Commission Staff ("Staff") reviewed the application. In a preliminary evaluation of the complete application, the Staff found that the claimed 6955.31 acre overlying land area consisted of six noncontiguous tracts of land designated as Areas A through F. For this reason, the amount of ground water in the aquifer and a maximum annual amount available for allocation were determined specifically for the aquifer underlying each of the six noncontiguous areas. These designated areas are generally described and the amounts of available allocation specific for each area, as determined by Staff, are indicated in the legal notice publication for the application attached hereto as Exhibit B.  
  
b. The six noncontiguous tracts are the result of county roads physically separating the overlying land area into six separate areas. This finding by Staff was based on previous claims by El Paso County that the right-of-way for all such county roads is considered to be the property of the county and not, simply, an easement subject to claims of ownership by surrounding property owners.
7. On July 24, 2003, in accordance with Rule 9.1 of the Designated Basin Rules, a letter was sent to the Upper Black Squirrel Creek Ground Water Management District requesting written recommendations concerning this application. No written recommendations from the district were received.
8. The Commission Staff has evaluated the application relying on the claims to control of the ground water in the aquifer made by the applicant.
9. In accordance with Sections 37-90-107(7) and 37-90-112, C.R.S., the application was published in The Gazette newspaper on August 7 & 14, 2003.
10. a. On September 15, 2003, an objection to the application was received from the applicant and assigned Case No. 03-GW-16. The applicant specifically objected to the Commission Staff's finding that the overlying land area consisted of six noncontiguous tracts and claimed that, in fact, the overlying land area consisted of one contiguous parcel. No other objection to the proposed determination of water right was received within the time limit set by statute.  
  
b. As an attachment to the objection, the applicant provided a copy of a letter from the Office of the El Paso County Surveyor, dated August 28, 2003. In this letter, Mr. Christopher Brewer, the County Surveyor, states that, after review of relevant property records, the existing county roads within the applicant's claimed overlying land area are not owned in fee by the county.  
  
c. By letter to the El Paso County Surveyor, dated September 16, 2003, the Staff responded to Mr. Brewer's above-described letter. Staff's letter was copied to the El Paso County Department of Planning, Department of Transportation, and Office of the County Attorney. The intent of this letter was to obtain any comments from interested governmental departments or agencies of El Paso County regarding the issue of ownership of county road right-of-ways and specifically the ownership of such right-of-ways dividing the applicant's overlying land area.

d. Since the mailing of the above Staff letter of September 16, 2003, the Staff has received no additional written correspondence from any governmental department or agency of El Paso County regarding the issue of ownership of county road right-of-ways. Based on the information provided by the Office of the El Paso County Surveyor, in the above-described letter of August 28, 2003, the staff revises the finding that the applicant's claimed overlying land area consists of six noncontiguous tracts. The preliminary findings, as published in the legal notice attached hereto as Exhibit B, are subject to final staff evaluation. Final staff evaluation of the application, therefore, finds that the applicant's claimed 6955.31 acre overlying land area is one contiguous area. The applicant was notified of the revised finding for this application by letter from the Staff dated December 31, 2003.

e. In a letter to the Commission Hearing Officer received on January 27, 2004, the applicant requested that its objection be withdrawn and that the application be returned to the Staff for further action. By Order of the Hearing Officer dated January 28, 2004, Case No. 03-GW-16 was dismissed and the application was remanded to Staff to take any administrative steps it deems necessary.

f. The above-described revised finding of the Commission is incorporated into these findings.

11. The quantity of water in the aquifer underlying the 6955.31 acres of land claimed by the applicant is 271,953 acre-feet. This determination was based on the following as specified in the Designated Basin Rules:

a. The average specific yield of the saturated permeable material of the aquifer underlying the land under consideration that could yield a sufficient quantity of water that may be extracted and applied to beneficial use is 17 percent.

b. The average thickness of the saturated permeable material of the aquifer underlying the land under consideration that could yield a sufficient quantity of water that may be extracted and applied to beneficial use is 230 feet.

12. At this time, there is no substantial artificial recharge that would affect the aquifer within a one hundred year period.

13. Pursuant to Section 37-90-107(7), C.R.S., and in accordance with the Designated Basin Rules, the Commission shall allocate ground water in the aquifer based on ownership of the overlying land and an aquifer life of one hundred years. Therefore, the maximum average annual amount of ground water in the aquifer that may be allocated for withdrawal pursuant to the data in the paragraphs above for the 6955.31 acres of overlying land claimed by the applicant is 2,720 acre-feet.

14. The ability of wells permitted to withdraw the authorized amount of water from this non-renewable aquifer may be less than the one hundred years upon which the amount of water in the aquifer is allocated, due to anticipated water level declines.

15. In accordance with Rule 5.3.6 of the Designated Basin Rules, it has been determined that withdrawal of ground water from the aquifer underlying the 6955.31 acres of land claimed by the applicant will not, within one hundred years, deplete the flow of a natural stream or its

alluvial aquifer at an annual rate greater than one-tenth of one percent of the annual rate of withdrawal and, therefore, the ground water is nontributary ground water as defined in Rule 4.2.19 of the Designated Basin Rules. No more than 98% of the amount of ground water withdrawn annually shall be consumed, as required by the Designated Basin Rules.

16. A review of the records in the Office of the State Engineer has disclosed that none of the water in the aquifer underlying the land claimed by the applicant has been previously allocated or permitted for withdrawal.
17. Pursuant to Section 37-90-107(7)(c)(III), C.R.S., an approved determination of water right shall be considered a final determination of the amount of ground water so determined; except that the Commission shall retain jurisdiction for subsequent adjustment of such amount to conform to the actual local aquifer characteristics from adequate information obtained from well drilling or test holes.
18. In accordance with Section 37-90-107(7), C.R.S., upon Commission approval of a determination of water right, well permits for wells to withdraw the authorized amount of water from the aquifer shall be available upon application, subject to the conditions of this determination and the Designated Basin Rules and subject to approval by the Commission.
19. In order to prevent unreasonable impairment to the existing water rights of others within the Upper Black Squirrel Creek Designated Ground Water Basin it is necessary to impose conditions on the determination of water right and proposed allocation of ground water. Under conditions as stated in the following Order, no unreasonable impairment of existing water rights will occur from approval of this determination of water right or from the issuance of well permits for wells to withdraw the authorized amount of allocated ground water from the aquifer.

#### ORDER

In accordance with Section 37-90-107(7), C.R.S., and the Designated Basin Rules, the Colorado Ground Water Commission orders that the application for determination of rights to designated ground water in the Arapahoe Aquifer underlying 6955.31 acres of land, generally described as the SE1/4 of the NE1/4 and the E1/2 of the SE1/4 of Section 31 and the E1/2 of the NE1/4, the SW1/4 of the NE1/4, the S1/2 of the NW1/4, the SW1/4, and the W1/2 of the SE1/4 of Section 32, all in Township 12 South, Range 63 West of the 6<sup>th</sup> Principal Meridian; the E1/2, the E1/2 of the W1/2, and the SW1/4 of the SW1/4 of Section 35 and the SW1/4 of Section 36, all in Township 12 South, Range 64 West of the 6<sup>th</sup> Principal Meridian; land in the N1/2 and in the N1/2 of the S1/2 of Section 4, all of Section 5 excluding the NW1/4 of the NW1/4, all of Section 6 excluding the south 1460 feet of the east 1044 feet of the SE1/4, and all of Section 7 excluding the E1/2 of the SE1/4, and the N1/2 of Section 8, all in Township 13 South, Range 63 West of the 6<sup>th</sup> Principal Meridian; all of Sections 1, 2 and 3, the E1/2 and the SW1/4 of Section 9, the N1/2 of the N1/2 of Section 10, the N1/2 of the N1/2 of Section 11, and the E1/2, the E1/3 of the W1/2, and the W2/3 of the N1/2 of the NW1/4 of Section 12, all in Township 13 South, Range 64 West of the 6<sup>th</sup> Principal Meridian, is approved subject to the following conditions:

20. The allocated average annual amount of ground water to be withdrawn from the aquifer shall not exceed 2,720 acre-feet. The allowed maximum annual amount of withdrawal may exceed the allowed average annual amount of withdrawal as long as the total volume of water withdrawn does not exceed the product of the number of years since the date of approval of this determination times the allowed average annual amount of withdrawal.

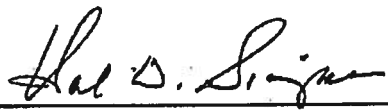


21. To conform to actual aquifer characteristics, the Commission may adjust the allocated average annual amount of ground water to be withdrawn from the aquifer based on analysis of geophysical logs or other site-specific data if such analysis indicates that the initial estimate of the volume of water in the aquifer was incorrect.
22. No more than 98% of the ground water withdrawn annually shall be consumed. The Commission may require well owners to demonstrate periodically that no more than 98% of the water withdrawn is being consumed.
23. The use of ground water from this allocation shall be limited to the following uses: domestic, irrigation, commercial, industrial, recreation and livestock watering. The place of use shall be limited to the above described 6955.31 acre overlying land area.
24. The applicant, or subsequent persons controlling this water right, shall record in the public records of the county - in which the claimed overlying land is located - notice of transfer of any portion of this water right to another within sixty days after the transfer, so that a title examination of the above described 6955.31 acre land area, or any part thereof, shall reveal the changes affecting this water right. Such notice shall consist of a signed and dated deed which indicates the determination number, the aquifer, a description of the above described land area, the annual amount of ground water (acre-feet) transferred, name of the recipient, and the date of transfer.
25. Subject to the above conditions, well permits for wells to withdraw the authorized annual amount of water from the aquifer shall be available upon application subject to approval by the Commission and the following conditions:
  - a. The wells shall be located on the above described 6955.31 acre overlying land area.
  - b. The wells must be constructed to withdraw water from only the Arapahoe Aquifer. Upon application for a well permit to construct such a well, the estimated top and base of the aquifer at the proposed well location will be determined by the Commission and indicated on the approved well permit. Plain non-perforated casing must be installed, grouted and sealed to prevent diversion of ground water from other aquifers and the movement of ground water between aquifers.
  - c. The entire depth of each well must be geophysically logged prior to installing the casing as set forth in Rule 9 of the Statewide Nontributary Ground Water Rules, 2 CCR 402-7.
  - d. Each well shall be constructed within 200 feet of the location specified on the approved well permit, but must be more than 600 feet from any existing large-capacity well completed in the same aquifer.
  - e. The wells may withdraw the allowed average annual amount of water from the aquifer together in any combination. The total combined annual withdrawal of the wells shall not exceed the allowed average annual amount described in this Order.
  - f. A totalizing flow meter or other Commission approved measuring device shall be installed on each well and maintained in good working order by the well owner. Annual diversion records shall be collected and maintained by the well owner and submitted to the Commission or the Upper Black Squirrel Creek Ground Water Management District upon their request.

g. The well owner shall mark the well in a conspicuous place with the permit number and the name of the aquifer. The well owner shall take necessary means and precautions to preserve these markings.

26. A copy of this Findings and Order shall be recorded by the applicant in the public records of the county – in which the claimed overlying land is located - so that a title examination of the above described 6955.31 acre overlying land area, or any part thereof, shall reveal the existence of this determination.

Dated this 3rd day of March, 2004.

  
\_\_\_\_\_  
Hal D. Simpson  
Executive Director  
Colorado Ground Water Commission

By: 

\_\_\_\_\_  
Suzanne M. Sellers, P.E.  
Designated Basins Chief

Prepared by: EBT & RAC

FIND-442

GWS 1  
06/09/00

EXHIBIT A

Page 1 of 16

STATE OF COLORADO  
OFFICE OF THE STATE ENGINEER  
DIVISION OF WATER RESOURCES  
1313 Sherman St. Room 821  
Denver, CO 80203  
(303) 866-3581 Fax (303) 866-3589

RECEIVED  
MAY 06 2003  
WATER RESOURCES  
STATE ENGINEER  
COLO.

NONTRIBUTARY GROUND WATER LANDOWNERSHIP STATEMENT

I (We) Robert G. Norris Family Trust  
(Name(s))

claim and say that I (we) am (are) the owner(s) of the following described property consisting of  
6,955.31 ~~7046.21~~ acres in the County of El Paso  
State of Colorado:

(Insert the property legal description)

*See attached legal description*

and, that the ground water sought to be withdrawn from the Arapahoe  
aquifer underlying the above-described land has not been conveyed to reserved to another, nor has  
consent been given to its withdrawal by another.

Further, I (we) claim and say that I (we) have read the statements made herein; know the contents  
hereof; and that the same are true to my (our) knowledge.

X Robert G. Norris 11/25/02  
Signature President Date  
X [Signature] 11/25/02  
Signature Date

.....  
INSTRUCTIONS:

Please type or print neatly in black ink. This form may be reproduced by photocopy or word  
processing means. See additional information on the reverse side.

# EXHIBIT A

Page 2 of 16

Our Order No. SC146856-4

RECEIVED

MAY 06 2003

WATER RESOURCES  
STATE ENGINEER  
COLO.

## LEGAL DESCRIPTION

### PARCEL A:

GOVERNMENT LOTS 1, 3, AND 4; THE SOUTH HALF OF THE NORTH HALF; AND THE NORTH HALF OF THE SOUTH HALF, SECTION 4, TOWNSHIP 13 SOUTH, RANGE 63 WEST OF THE 6TH PRINCIPAL MERIDIAN, COUNTY OF EL PASO, STATE OF COLORADO, LESS THAT PORTION CONVEYED BY DEED RECORDED IN BOOK 2315 AT PAGE 945.

ALL OF SECTION 5, TOWNSHIP 13 SOUTH, RANGE 63 WEST OF THE 6TH PRINCIPAL MERIDIAN, COUNTY OF EL PASO, STATE OF COLORADO, LESS AND EXCEPT GOVERNMENT LOT 4 OF SAID SECTION;

ALL OF SECTION 6, TOWNSHIP 13 SOUTH, RANGE 63 WEST OF THE 6TH P.M., COUNTY OF EL PASO, STATE OF COLORADO, EXCEPTING THEREFROM THE SOUTH 1460.00 FEET OF THE EAST 1044.28 FEET OF THE SOUTHEAST QUARTER, SECTION 6, TOWNSHIP 13 SOUTH, RANGE 63 WEST OF THE 6TH P.M., COUNTY OF EL PASO, STATE OF COLORADO.

ALL OF SECTION 7, TOWNSHIP 13 SOUTH, RANGE 63 WEST OF THE 6TH P.M., COUNTY OF EL PASO, STATE OF COLORADO, EXCEPTING THEREFROM THE EAST ONE-HALF OF THE SOUTHEAST QUARTER, SECTION 7, TOWNSHIP 13 SOUTH, RANGE 63 WEST OF THE 6TH P.M., COUNTY OF EL PASO, STATE OF COLORADO.

THE NORTH HALF OF SECTION 8, TOWNSHIP 13 SOUTH, RANGE 63 WEST OF THE 6TH P.M., COUNTY OF EL PASO, STATE OF COLORADO.

THE SOUTHEAST QUARTER OF THE NORTHEAST QUARTER AND THE EAST ONE-HALF OF THE SOUTHEAST QUARTER, SECTION 31, TOWNSHIP 12 SOUTH, RANGE 63 WEST OF THE 6TH P.M., COUNTY OF EL PASO, STATE OF COLORADO.

THE EAST ONE-HALF OF THE NORTHEAST QUARTER, THE SOUTHWEST QUARTER OF THE NORTHEAST QUARTER, THE SOUTH ONE-HALF OF THE NORTHWEST QUARTER, THE SOUTHWEST QUARTER AND THE WEST ONE-HALF OF THE SOUTHEAST QUARTER, SECTION 32, TOWNSHIP 12 SOUTH, RANGE 63 WEST OF THE 6TH P.M., COUNTY OF EL PASO, STATE OF COLORADO, EXCEPTING THEREFROM THOSE PORTIONS CONVEYED FOR CANAL PURPOSES IN DEEDS RECORDED IN BOOK 458 AT PAGES 176 AND 180.

ALL OF SECTION 1, TOWNSHIP 13 SOUTH, RANGE 64 WEST OF THE 6TH P.M., COUNTY OF EL PASO, STATE OF COLORADO.

ALL OF SECTION 2, TOWNSHIP 13 SOUTH, RANGE 64 WEST OF THE 6TH P.M., COUNTY OF EL PASO, STATE OF COLORADO.

ALL OF SECTION 3, TOWNSHIP 13 SOUTH, RANGE 64 WEST OF THE 6TH P.M., COUNTY OF EL PASO, STATE OF COLORADO.

THE EAST ONE-HALF AND THE SOUTHWEST QUARTER OF SECTION 9, TOWNSHIP 13 SOUTH, RANGE 64 WEST OF THE 6TH P.M., COUNTY OF EL PASO, STATE OF COLORADO.

THE NORTH ONE-HALF OF THE NORTH ONE-HALF OF SECTION 10, TOWNSHIP 13 SOUTH, RANGE 64 WEST OF THE 6TH P.M., COUNTY OF EL PASO, STATE OF COLORADO.



EXHIBIT A

Page 3 of 16

Our Order No. SC146856-4

LEGAL DESCRIPTION

THE NORTH ONE-HALF OF THE NORTH ONE-HALF OF SECTION 11, TOWNSHIP 13 SOUTH, RANGE 64 WEST OF THE 6TH P.M., COUNTY OF EL PASO, STATE OF COLORADO.

THE EAST ONE-HALF, THE EAST ONE-THIRD OF THE WEST ONE-HALF AND THE WEST TWO-THIRDS OF THE NORTH ONE-HALF OF THE NORTHWEST QUARTER OF SECTION 12, TOWNSHIP 13 SOUTH, RANGE 64 WEST OF THE 6TH P.M., COUNTY OF EL PASO, STATE OF COLORADO.

THE EAST ONE-HALF, THE EAST ONE-HALF OF THE WEST ONE-HALF AND THE SOUTHWEST QUARTER OF THE SOUTHWEST QUARTER OF SECTION 35, TOWNSHIP 12 SOUTH, RANGE 64 WEST OF THE 6TH P.M., COUNTY OF EL PASO, STATE OF COLORADO.

THE SOUTHWEST QUARTER OF SECTION 36, TOWNSHIP 12 SOUTH, RANGE 64 WEST OF THE 6TH P.M., COUNTY OF EL PASO, STATE OF COLORADO.

*Parcel B deleted*

RECEIVED

MAY 06 2003

WATER RESOURCES  
STATE ENGINEER  
COLO.

# El Paso County Parcel Information

MAY 06 2003

WATER RESOURCES  
STATE ENGINEER

File Name: PRE-02-141

Parcel Number: 4300000445, -444, -345, ETC

Parcel Address: 0 MURR RD

Parcel Owner: NORRIS ROBERT C & JANE W TRUSTEES

Parcel Owner2: NORRIS ROBERT C FAMILY TRUST

Parcel Owner3: C/O T-CROSS RANCHES

Owner Mailing Address: 970 SUMMER GAMES DR, COLORADO SPRINGS, CO, 80906

Zone Map No.: 323.31, 323.32,  
332.04 - 332.08, 424.35, 424.36,  
431.01 - 431.03, 431.10 - 431.12,  
432.09

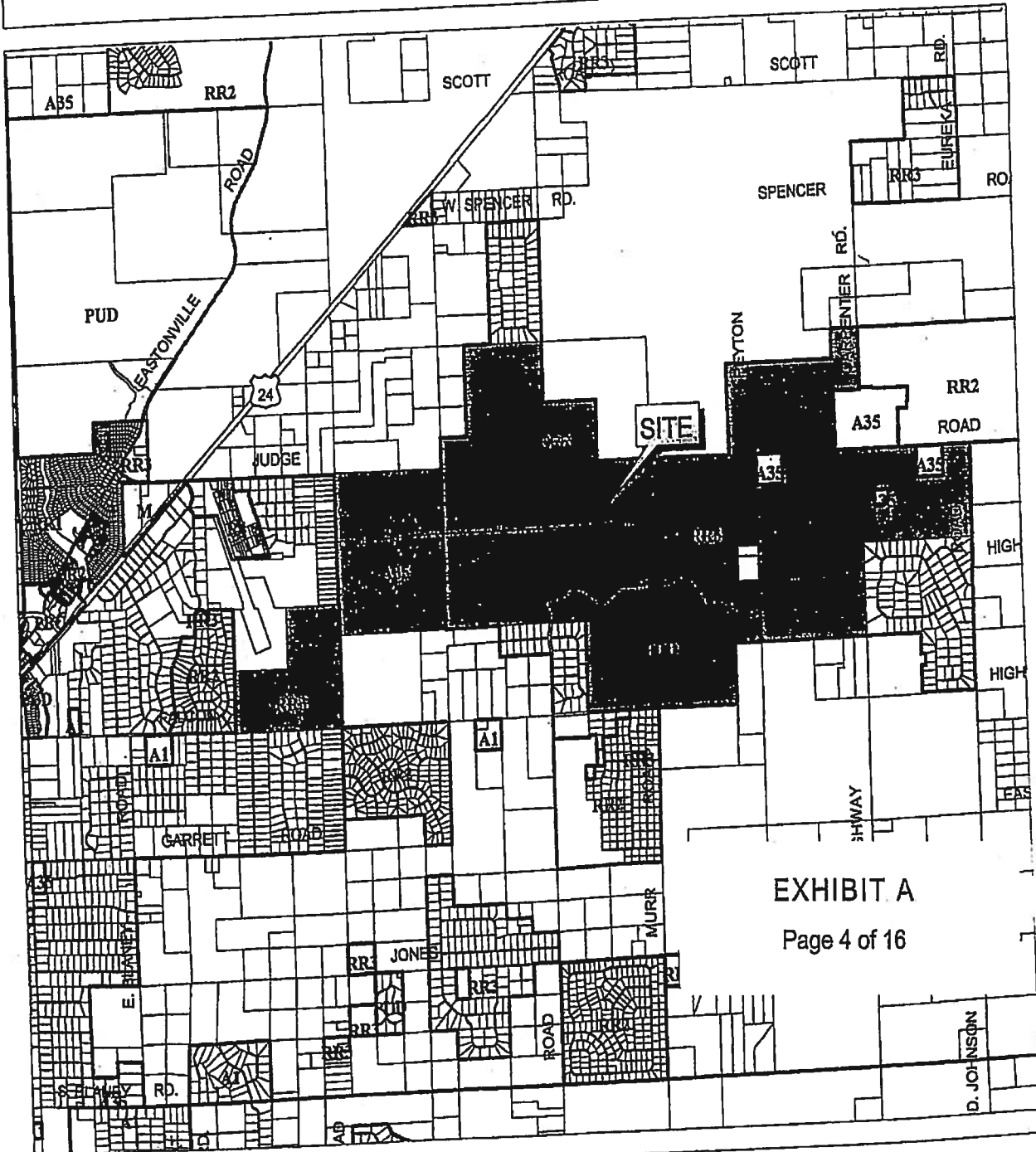


EXHIBIT A

Page 4 of 16



Please report any discrepancies to:  
El Paso County GIS/Mapping  
325 S. Cascade  
Colorado Springs, CO 80903  
(719)520-6523

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May 6, 2002

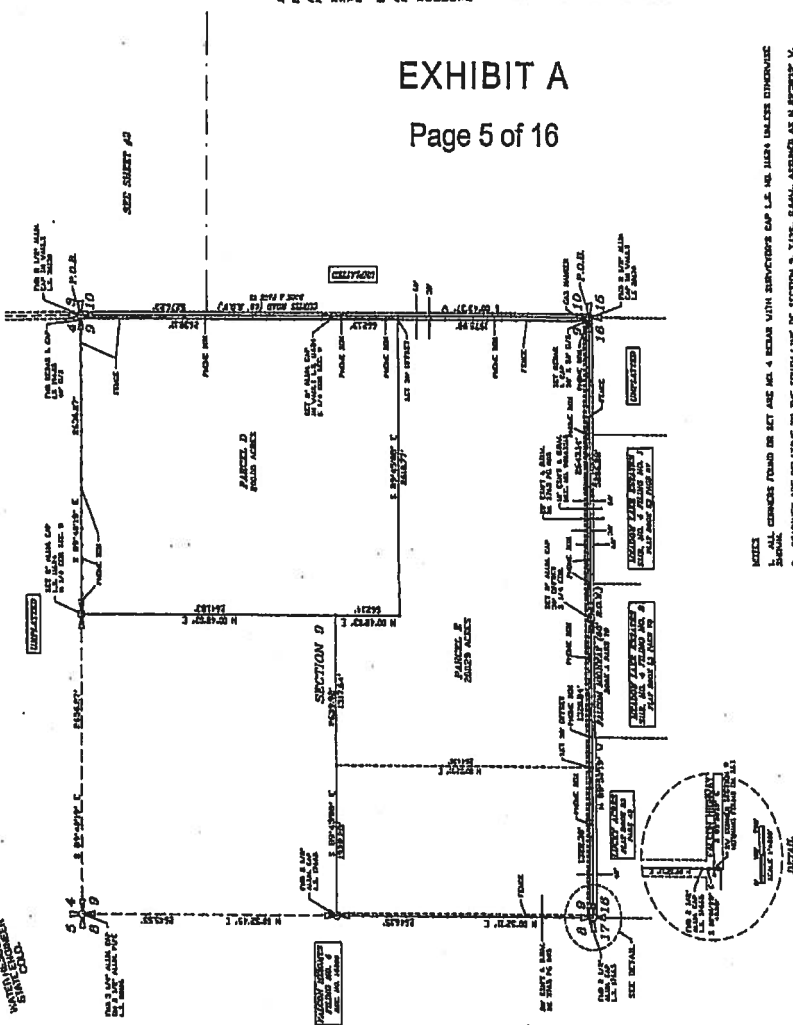


MAY 06 2003

WATER, WINE,  
FIAT COLD.

MAY 06 2003

**STATE ENGINEER  
COLD**



PARCEL 3  
PARCEL 4  
PARCEL 5  
PARCEL 6  
PARCEL 7  
PARCEL 8  
PARCEL 9  
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**CERTIFICATION**

I, THOMAS L. KEATING, THE UNDERSIGNED REGISTERED PROFESSIONAL LAND SURVEYOR IN THE STATE OF CALIFORNIA, DO HEREBY CERTIFY THAT ON FEBRUARY 17, 2008, A LAND SURVEY OF THE ABOVE DESCRIBED PARCELS OF LAND WAS MADE UNDER MY SUPERVISION AND DIRECTION AND THE MEASUREMENTS AS SHOWN ON THE ACCOMPANYING PLAN ARE CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF.

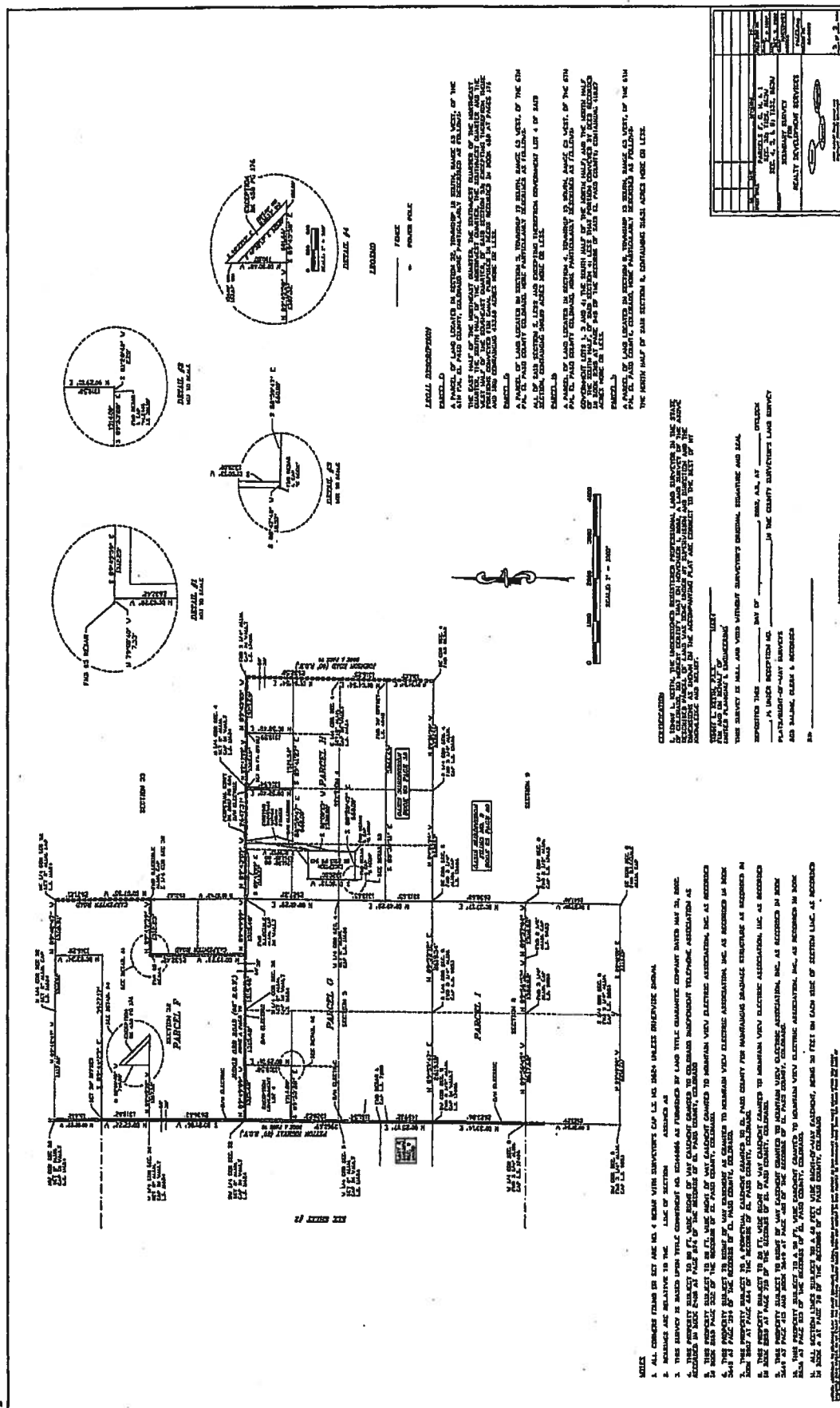
REPORTED THAT \_\_\_\_\_ OF \_\_\_\_\_, 2002, A.D., AT \_\_\_\_\_  
 PHONE \_\_\_\_\_, A. M. BECAME \_\_\_\_\_ OF LAND SURVEY PLATS/NIGHT-OF-JAY  
 SURVEYS AT PAGES \_\_\_\_\_, OF THE RECORDS OF EL PASO COUNTY, COLORADO  
 AND THAT THE FOLLOWING IS THEREIN

[illegible][illegible][illegible]

Page 6 of 16

STABLE ELDERBERRY  
COLO.

## Page 7 of 16



OCT 23 1969

BOOK 2315 PAGE 945

Folio for record the  
694900

HARRIET BEALS

**This Deed,** Made this 21st day of October In the year of our Lord  
one thousand nine hundred and sixty-nine between ROBERT C. MORRIS

of the County of El Paso and State of Colorado, of the first part, and FRED P. DUGAN,  
also known as FRED PAUL DUGAN  
and VIRGINIA A. DUGAN  
of the County of El Paso and State of Colorado, of the second part;

Witnesseth, That the said party of the first part, for and in consideration of the sum of  
One Dollar and other valuable consideration **DOCKING**  
to the said party of the first part in hand paid by the said parties of the second part, the receipt whereof is  
hereby confessed and acknowledged, has granted, bargained, sold and conveyed, and by these presents does  
grant, bargain, sell, convey and confirm unto the said parties of the second part, not in tenancy in common but in  
joint tenancy, the survivor of them, their assigns and the heirs and assigns of such survivor forever, all the following  
described lot or parcel of land, situate, lying and being in the County of El Paso and State  
of Colorado, to-wit:

That portion of the Northwest Quarter of Section 4, Township  
13 South, Range 63 West of the 6th P.M., El Paso County,  
described as follows: Commencing at the Northwest corner of  
said Section 4; thence Easterly on the Northerly line of said  
Section 4, 1168.27 feet; thence angle right 90° 43' 31" Southerly,  
1762.05 feet to the point of beginning of that tract of land  
herein described; thence continue Southerly on the last mentioned  
course, 1320.00 feet; thence angle right 90° 00' Westerly 660.00  
feet; thence angle right 90° 00' Northerly, 1320.00 feet; thence  
angle right 90° 00' Easterly, 660.00 feet to the point of  
beginning and containing 20.00 Acres, more or less.

STATE OF COLORADO

OCT 23 1969

\$ 20.00

EXHIBIT A

Page 8 of 16

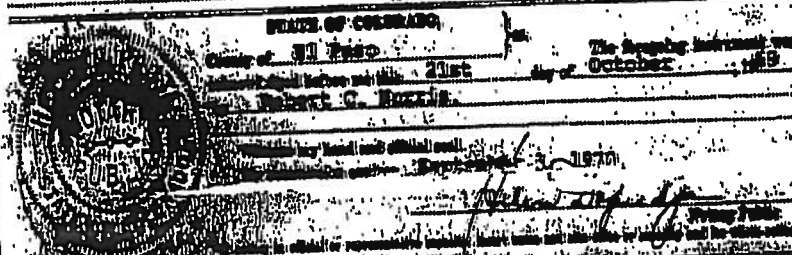
Together with all and singular the hereditaments and appurtenances thereto belonging, or in anywise apper-  
taining, and the reversion and reversions, remainder and remainders, rents, issues and profits thereof, and all the  
estate, right, title, interest, claim and demand whatsoever of the said party of the first part, either in law or  
equity, or in and to the above bargained premises, with the hereditaments and appurtenances.  
To Have and to Hold the said premises above bargained and described, with the appurtenances, unto the said  
parties of the second part, the survivor of them, their assigns and the heirs and assigns of such survivor forever.  
And the said party of the first part, for him self, his heirs, executors, and administrators, does  
covenant, grant, bargain and agree to and with the said parties of the second part, the survivor of them, their assigns  
and the heirs and assigns of such survivor, that at the time of the executing and delivery of these presents, the said  
well raised of the premises above conveyed, as of good, sure, perfect, absolute and indefeasible estate of inheritance,  
in law, in fee simple, and his a good right, full power and lawful authority to grant, bargain, sell and convey  
the same in manner and form aforesaid, and that the same are free and clear from all former and other grants,  
bargains, sales, liens, taxes, assessments and incumbrances of whatever kind or naturesoever.

and the above bargained premises in the quiet and peaceable possession of the said parties of the second part, the  
survivor of them, their assigns and the heirs and assigns of such survivor, against all and every person or persons  
lawfully claiming or to claim the whole or any part thereof, the said party of the first part shall and will  
WARRANT AND FOREVER DEFEND.

In Witness Whereof, The said party of the first part has hereunto set his hand  
and seal the day and year first above written.

Signed, Sealed and Delivered in the Presence of

ROBERT C. MORRIS



RECEIVED  
MAY 06 2003  
STATE ENGINEER  
COLO.

127'

# EXHIBIT A

Page 9 of 16

RECEIVED

MAY 06 2003

STATE ENGINEER  
COLO.

## LEGAL DESCRIPTION

GOVERNMENT LOT 1, SECTION 4, TOWNSHIP 13 SOUTH, RANGE 63 WEST, OF  
THE 6<sup>TH</sup> P.M., EL PASO COUNTY, COLORADO, MORE PARTICULARLY  
DESCRIBED AS FOLLOWS:

BEGINNING AT THE NORTHEAST CORNER OF SAID SECTION 4; THENCE  
S 01°04'54" W, ALONG THE EAST LINE OF SAID GOVERNMENT LOT 1, 1316.25  
FEET TO THE SOUTHEAST CORNER THEREOF; THENCE N 89°41'27" W,  
1321.34 FEET TO THE SOUTHWEST CORNER THEREOF; THENCE N 00°58'48"  
E, 1315.59 FEET TO THE NORTH LINE OF SAID SECTION 4; THENCE S  
89°43'05"E, ALONG SAID NORTH LINE, 1323.69 FEET TO THE POINT OF  
BEGINNING AND CONTAINING 39.95 ACRES MORE OR LESS.

EXHIBIT A

Page 10 of 16

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MAY 06 2003

WATER RESOURCES  
STATE ENGINEER  
COLO.

LEGAL DESCRIPTION

GOVERNMENT LOT 3, SECTION 4, TOWNSHIP 13 SOUTH, RANGE 63 WEST, OF  
THE 6<sup>TH</sup> P.M., EL PASO COUNTY, COLORADO, MORE PARTICULARLY  
DESCRIBED AS FOLLOWS:

BEGINNING AT THE NORTH ¼ CORNER OF SAID SECTION 4; THENCE  
S 00°52'40" W, ALONG THE EAST LINE OF SAID GOVERNMENT LOT 3, 1314.94  
FEET TO THE SOUTHEAST CORNER THEREOF; THENCE N 89°41'27" W,  
1321.35 FEET TO THE SOUTHWEST CORNER THEREOF; THENCE N 00°46'35"  
E, 1314.29 FEET TO THE NORTH LINE OF SAID SECTION 4; THENCE S  
89°43'05"E, ALONG SAID NORTH LINE, 1323.68 FEET TO THE POINT OF  
BEGINNING AND CONTAINING 39.91 ACRES MORE OR LESS.



# EXHIBIT A

Page 11 of 16

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MAY 06 2003

WALTER H. HARRIS  
STATE ENGINEER  
COLO.

## LEGAL DESCRIPTION

GOVERNMENT LOT 4, SECTION 4, TOWNSHIP 13 SOUTH, RANGE 63 WEST, OF THE 6<sup>TH</sup> P.M., EL PASO COUNTY, COLORADO, MORE PARTICULARLY DESCRIBED AS FOLLOWS:

BEGINNING AT THE NORTHWEST CORNER OF SAID SECTION 4; THENCE S 89°43'05" E, ALONG THE NORTH LINE OF SAID SECTION, 1323.69 FEET; THENCE S 00°46'35" W, 1314.29 FEET TO THE SOUTHEAST CORNER OF SAID GOVERNMENT LOT 4; THENCE N 89°41'27" W, 1321.35 FEET TO THE WEST LINE OF SAID SECTION 4; THENCE N 00°40'28"E, ALONG SAID WEST LINE, 1313.65 FEET TO THE POINT OF BEGINNING AND CONTAINING 39.89 ACRES MORE OR LESS.

South 69° 47' West, 90.8 feet to a point; thence  
 South 89° 22' West, 211.9 feet to a point; thence  
 North 88° 51' West, 54.7 feet to a point; thence  
 South 76° 51' West, 40.0 feet to a point on the west line of the East

half (E $\frac{1}{2}$ ) of the Southeast Quarter (SE $\frac{1}{4}$ ) of Section Thirty-three (33), Township and Range  
 aforesaid.

The Grantee shall permit the Grantor to make connection with said pipe line  
 with a three-quarter inch pipe, the water flowing through said three-quarter inch pipe  
 to be used by the Grantor for stock watering purposes.

Signed and delivered this 20th day of October, 1918.

Daniel Strobel.

EXHIBIT A

Page 12 of 16

State of Colorado )  
 ss.  
 County of El Paso )

On this day of 1918, before me, a notary public in and for said county  
 in the state aforesaid, appeared this day in person Daniel Strobel, who is personally  
 known to me to be the person whose name is subscribed to the foregoing instrument, and  
 acknowledged to me that he signed, sealed and delivered the said instrument of writing  
 as his free and voluntary act and deed for the uses and purposes therein set forth.

Witness my hand and official seal.

My commission expires

Notary Public.

Book 458

No. 264740

QUIT CLAIM DEED.

Quit Claim Deed

Charles F. Grotz, et al

to

John G. Morgan

Filed for Record 11:55 A.M. ( JOHN G. MORGAN, of the City and County of Denver and State  
 March 20, 1919. " ) of Colorado, of the second part;

E. A. Jackson, Recorder

( WITNESSETH, That the said parties of the first part,  
 for and in consideration of the sum of One Hundred and Ten  
 Dollars (\$110.00) to the said parties of the first part in

hand paid by the said party of the second part, the receipt whereof is hereby confessed  
 and acknowledged, have remised, released, sold, conveyed and QUIT-CLAIMED, and by these  
 presents do remise, release, sell, convey and QUIT-CLAIM unto the said party of the second  
 part, his heirs and assigns forever, all the right, title, interest, claim and demand  
 which the said parties of the first part have in and to the following described land, sit-  
 uate, lying and being in the County of El Paso and State of Colorado, to-wit:

A strip of land, for canal purposes, in Section Thirty-two (32) Township  
 Twelve (12), South, Range Sixty-three (63), West of the Sixth Principal Meridian, as

specifically shown on attached map, the exterior boundaries of which are described as follows, to-wit:

Beginning at a point 700 feet North of the Southwest corner of the Southeast quarter (SE $\frac{1}{4}$ ) of the Northwest quarter (NW $\frac{1}{4}$ ) of Section Thirty-two (32); thence South Forty degrees (40°) nine minutes (9'). East nine hundred and twenty-five (925) feet; thence East one hundred and thirty-five (135) feet; thence North Forty degrees (40°) nine minutes (9') West eleven hundred and twenty-five (1125) feet; thence South one hundred and fifty (150) feet, to the point of beginning.

Provided that if the party of the second part, his executors, administrators or assigns, shall abandon the use of this parcel of land for canal purposes or shall fail to operate, maintain and keep the canal in repair in compliance with all the laws of the State of Colorado and so as to prevent any injury to the property of the parties of the first part, then this deed shall become null and void and the title to said premises shall revert and become vested, without further action, in the parties of the first part, their heirs, executors, administrators and assigns. Provided further, the said John G. Morgan shall within thirty days after receiving notice respecting the same, construct and thereafter maintain across said ditch at such point as the first parties may designate, a good and substantial bridge sufficient for the passage of vehicles, including wagons and automobiles, and hauling of loads across the same, said bridge to be constructed and maintained at the expense of the said John G. Morgan, his heirs and assigns.

TO HAVE AND TO HOLD the same, together with all and singular the appurtenances and privileges thereunto belonging or in any wise thereunto appertaining, and all the estate, right, title, interest and claim whatsoever, of the said parties of the first part, either in law or equity, to the only proper use, benefit and behoof of the said party of the second part, his heirs and assigns forever, subject to the foregoing conditions.

IN WITNESS WHEREOF, The said parties of the first part have hereunto set their hands and seals the day and year first above written.

Charles F. Grotz

(SEAL)

William Grotz

(SEAL)

L.R. Stamp,  
\$ .50  
Canceled

State of Colorado )  
City and County of Denver ) ss.

I, Ernest L. Rhoads, a notary public in and for said City and County, in the State aforesaid, do hereby certify that CHARLES F. GROTZ and WILLIAM GROTZ, who are personally known to me to be the persons whose names are subscribed to the foregoing Deed, appeared before me this day in person and acknowledged that they signed, sealed and delivered the said instrument of writing as their free and voluntary act and deed for the uses and purposes therein set forth.

Given under my hand and Notarial seal this 15th day of March, A.D. 1919.

My commission expires July 23rd 1922.

Ernest L. Rhoads

Notary Public.



EXHIBIT A  
Page 13 of 16

Owned by Grotz Bros.  
Right of Way Map for  
J. E. Morgan. Overflow and  
Underflow Ditch.

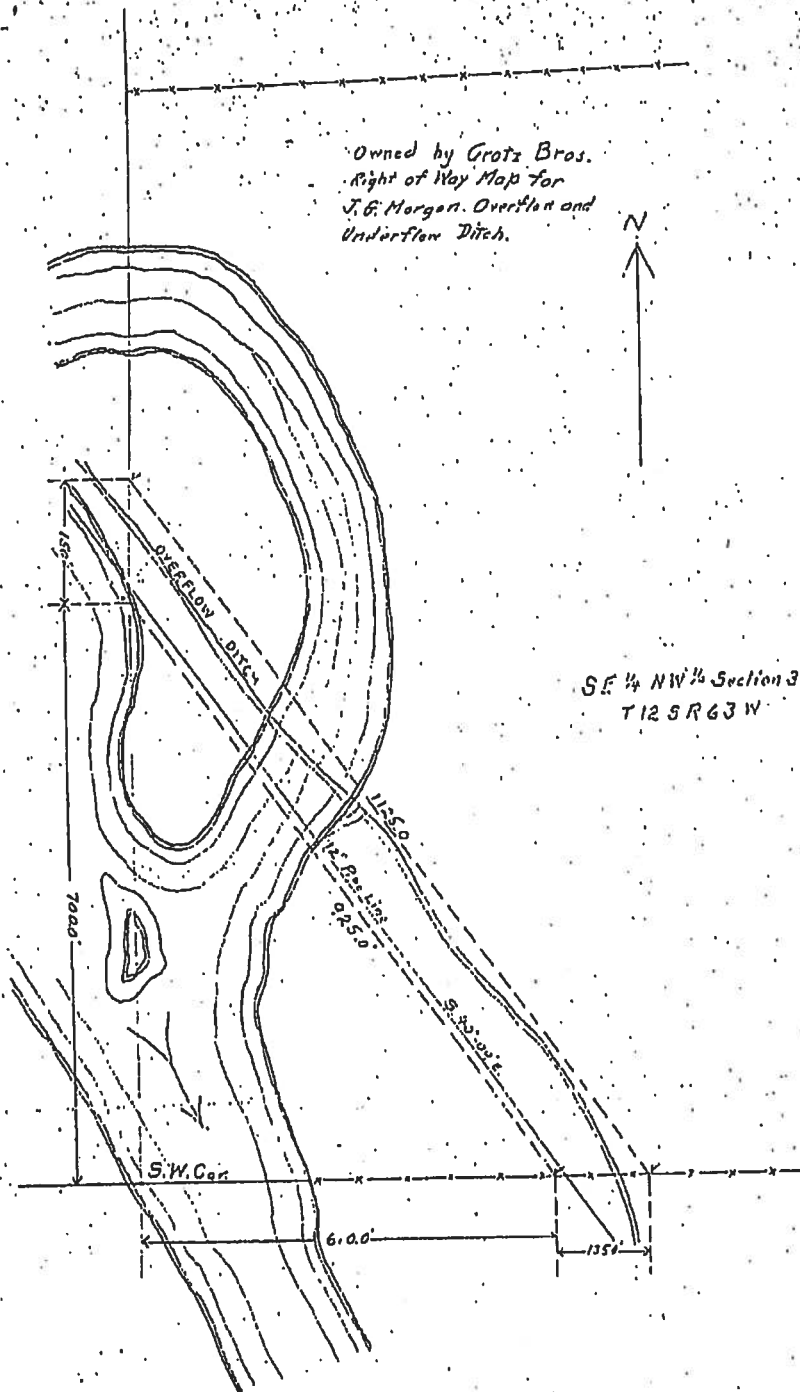
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MAY 06 2003

VICTOR H. HARRIS  
STATE ENGINEER  
COLO.

EXHIBIT A

Page 14 of 16



SE 1/4 NW 1/4 Section 32  
T12S R63W

No. 266238

Quit Claim Deed

Charles F. Grotz, et al

to

John G. Morgan

Filed for record 11:05 A.M.

April 25, 1919

E. A. Jackson, Recorder

## QUIT CLAIM DEED.

THIS DEED, Made this 31st day of January, in the year of our Lord one thousand nine hundred and nineteen; between CHARLES F. GROTZ and WILLIAM GROTZ, of the City and County of Denver and State of Colorado, of the first part, and JOHN G. MORGAN, of the City and County of Denver and State of Colorado, of the second part;

WITNESSETH, That the said parties of the first part, for and in consideration of the sum of One Hundred and Ten Dollars (\$110.00) to the said parties of the first part in hand paid by

the said party of the second part, the receipt whereof is hereby confessed and acknowledged, have remised, sold, conveyed and QUIT-CLAIMED, and by these presents do remise, release, sell convey and QUIT-CLAIM unto the said party of the second part, his heirs and assigns forever, all the right, title, interest, claim and demand which the said parties of the first part have in and to the following described land, situate, lying and being in the County of El Paso and State of Colorado, to-wit: A strip of land, for canal purposes, in Section Thirty-two (32) Township Twelve (12), South, Range Sixty-three (63), West of the Sixth Principal Meridian, as specifically shown on attached map, the exterior boundaries of which are described as follows, to-wit:

Beginning at a point 700 feet North of the Southwest corner of the Southeast quarter (SE $\frac{1}{4}$ ) of the Northwest quarter (NW $\frac{1}{4}$ ) of Section Thirty-two (32); thence South Forty degrees (40°) nine minutes (9') East nine hundred and twenty-five (925) feet; thence East one hundred and thirty-five (135) feet; thence North Forty degrees (40°) nine minutes (9') West eleven hundred and twenty-five (1125) feet; thence South one hundred and fifty (150) feet, to the point of beginning.

Provided that if the party of the second part, his executors, administrators or assigns shall abandon the use of this parcel of land for canal purposes or shall fail to operate, maintain and keep the canal in repair in compliance with all the laws of the State of Colorado and so as to prevent any injury to the property of the parties of the first part, then this deed shall become null and void and the title to said premises shall revert and become vested, without further action, in the parties of the first part, their heirs, executors, administrators and assigns. Provided further, the said John G. Morgan shall within thirty days after receiving notice respecting the same, construct and thereafter maintain across said ditch at such point as the first parties may designate, a good and substantial bridge sufficient for the passage of vehicles, including wagons and automobiles, and hauling of loads across the same, said bridge to be constructed and maintained at the expense of the said John G. Morgan, his heirs and assigns.

TO HAVE AND TO HOLD the same, together with all and singular the appurtenances and privileges thereunto belonging or in any wise thereunto appertaining, and all the estate, right, title, interest and claim whatsoever, of the said parties of the first part, either in law or equity, to the only proper use, benefit and behoof of the said party of the second part his heirs and assigns forever, subject to the foregoing conditions.

IN WITNESS WHEREOF, The said parties of the first part have hereunto set their hands and seals the day and year first above written.

Charles F. Grotz  
William Grotz

(Seal)  
(Seal)

State  
City

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MAY 6 2003  
STATE ENGINEER  
COLO

EXHIBIT A  
Page 15 of 16

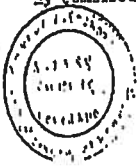
State of Colorado )  
City and County of Denver ) ss

I, Ernest L. Rhoads, a notary public in and for said City and County, in the State aforesaid, do hereby certify that CHARLES F. GROTZ and WILLIAM GROTZ, who are personally known to me to be the persons whose names are subscribed to the foregoing Deed, appeared before me this day in person and acknowledged that they signed, sealed and delivered the said instrument of writing as their free and voluntary act and deed for the uses and purposes therein set forth.

Given under my hand and notarial seal this 15th day of March, A.D. 1919.

My commission expires July 13rd 1922

Ernest L. Rhoads  
Notary Public



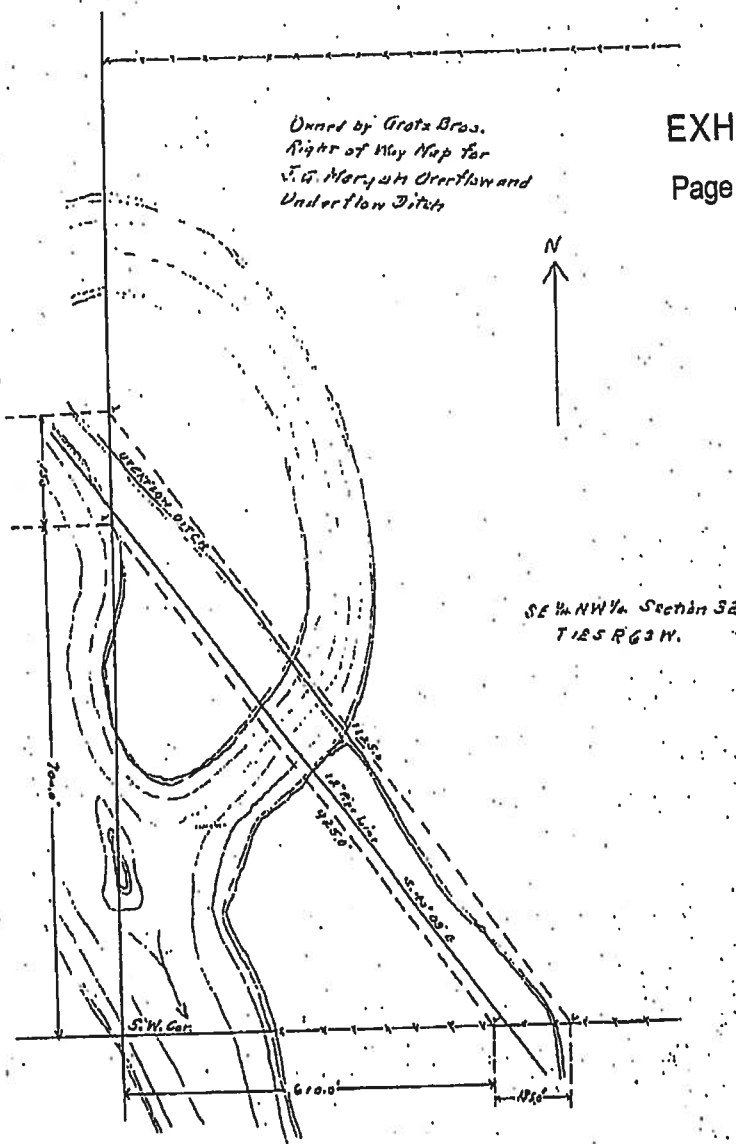
MAY 8 1920

WATER RIGHTS  
STATE ENGINEERS  
COLO.

Owned by Grotz Bros.  
Right of Way Map for  
J. G. Maryath Overflow and  
Underflow Ditch

EXHIBIT A

Page 16 of 16



SE 1/4 NW 1/4 Section 32  
T. 125 R. 63 N.

## EXHIBIT B

Page 1 of 2

Page 1 of 2

458-BD

### BEFORE THE COLORADO GROUND WATER COMMISSION

#### UPPER BLACK SQUIRREL CREEK DESIGNATED GROUND WATER BASIN AND UPPER BLACK SQUIRREL CREEK GROUND WATER MANAGEMENT DISTRICT -- EL PASO COUNTY

TAKE NOTICE that pursuant to Section 37-90-107(7), C.R.S., the Robert C. Norris Family Trust (hereinafter "applicant") has applied for determinations of water right to allow the appropriation of designated ground water from the Laramie-Fox Hills, Arapahoe and Denver aquifers underlying 6955.31 acres consisting of six noncontiguous tracts of land generally described as: Area A - 480.29 acres consisting of the E1/2 and SW1/4 of Section 9, Township 13 South, Range 64 West of the 6<sup>th</sup> P.M.; Area B - 676.09 acres consisting of the E1/2, the E1/2 of the W1/2, and the SW1/4 of the SW1/4 of Section 35 and the SW1/4 of Section 36, all in Township 12 South, Range 64 West of the 6<sup>th</sup> P.M.; Area C - 119.97 acres consisting of the SE1/4 of the NE1/4 and the E1/2 of the SE1/4 of Section 31, Township 12 South, Range 63 West of the 6<sup>th</sup> P.M.; Area D - 3915.69 acres consisting of all of Sections 1, 2 and 3, the N1/2 of the N1/2 of Section 10, the N1/2 of the N1/2 of Section 11, and the E1/2, the E1/3 of the W1/2, and the W2/3 of the N1/2 of the NW1/4 of Section 12, all in Township 13 South, Range 64 West, and all of Section 6 excluding the south 1460 feet of the east 1044 feet of the SE1/4, and all of Section 7 excluding the E1/2 of the SE1/4, all in Township 13 South, Range 63 West of the 6<sup>th</sup> P.M.; Area E - 433.6 acres consisting of the E1/2 of the NE1/4, the SW1/4 of the NE1/4, the S1/2 of the NW1/4, the SW1/4, and the W1/2 of the SE1/4 of Section 32, Township 12 South, Range 63 West of the 6<sup>th</sup> P.M.; Area F - 1329.67 acres consisting of land in the N1/2 and in the N1/2 of the S1/2 of Section 4, all of Section 5 excluding the NW1/4 of the NW1/4, and the N1/2 of Section 8, all in Township 13 South, Range 63 West of the 6<sup>th</sup> P.M. The applicant claims ownership of this land and control of the ground water in the above described aquifers under this property. The ground water appropriations from these aquifers will be used on the described property for the following beneficial uses: domestic, irrigation, commercial, industrial, recreation and livestock. The maximum allowable annual amount of ground water in each aquifer underlying the described property will be appropriated.

In accordance with Section 37-90-107(7), C.R.S., and the Designated Basin Rules, 2 CCR 410-1, the Colorado Ground Water Commission shall allocate ground water from the above described aquifers based on ownership of the overlying land and an aquifer life of one hundred years. A preliminary evaluation of the applications by the Commission Staff finds the annual amount of water available for appropriation from each of the described aquifers underlying the above described property to be as follows: Area A - 166 acre-feet for the Laramie-Fox Hills, 184 acre-feet for the Arapahoe, and 160 acre-feet for the Denver; Area B - 218 acre-feet for the Laramie-Fox Hills, 259 acre-feet for the Arapahoe, and 229 acre-feet for the Denver; Area C - 40.5 acre-feet for the Laramie-Fox Hills, 45.9 acre-feet for the Arapahoe, 20.2 acre-feet for the Denver not-nontributary 4% area, and 20.6 acre-feet for the Denver not-nontributary actual impact replacement area; Area D - 1292 acre-feet for the Laramie-Fox Hills, 1564 acre-feet for the Arapahoe, 702 acre-feet for the Denver not-nontributary 4% area, and 621.5 acre-feet for the Denver not-nontributary actual impact replacement area; Area E - 153 acre-feet for the Laramie-Fox Hills, 169 acre-feet for the Arapahoe, 6.9 acre-feet for the Denver not-nontributary 4% area, and 140 acre-feet for the Denver not-nontributary actual impact replacement area; Area F - 469 acre-feet for the Laramie-Fox Hills, 520 acre-feet for the Arapahoe, and 450 acre-feet for the Denver, subject to final staff evaluation. The estimated available annual acre-feet appropriation amount for each aquifer indicated above may be increased or decreased by the Commission to conform to the actual aquifer characteristics, based upon site specific data.

## EXHIBIT B

Page 2 of 2

458-BD

The amounts for the Denver aquifer represent a reduction in the initial annual amounts determined to be available to allow for the annual withdrawals from fifteen (15) small-capacity wells located on the described property areas, permit nos. 12874, 15570, 17023, 25641, 25642, 57271, 72096, 81669, 81670, 84434, 104413, 124092, 132587, 189756, 205140.

In accordance with Rule 5.3.6 of the Designated Basin Rules, the Commission Staff's preliminary evaluation of the applications finds the replacement water requirement status for the Laramie-Fox Hills and Arapahoe aquifers underlying the above described 6955.31 acre property to be nontributary. The replacement water status for the Denver aquifer is not-nontributary, more specifically described for each area as follows: Area A - actual impact replacement; Area B - 4% replacement; Area C - 4% replacement underlying 59.9 acres of the area and actual impact replacement underlying 60.47 acres of the area; Area D - 4% replacement underlying 2075 acres of the area and actual impact replacement underlying 1840.69 acres of the area; Area E - 4% replacement underlying 20.3 acres of the area and actual impact replacement underlying 413.3 acres of the area; Area F - actual impact replacement.

Upon Commission approval of these determinations of water right, well permits for wells to withdraw the allowed appropriation from a specific aquifer shall be available upon application, subject to the conditions of the determination and the Designated Basin Rules and subject to approval by the Commission. Such wells must be completed in the specified aquifer and located on the above described 6955.31 acre property. Well permits for wells to withdraw ground water from the Denver aquifer underlying the above described Area A, the 60.47 acre portion of Area C, the 1840.69 acre portion of Area D, the 413.3 acre portion of Area E, and Area F, would also be subject to the conditions of a replacement plan to be approved by the Commission.

Any person wishing to object to the approval of these determinations of water right must do so in writing, briefly stating the nature of the objection and indicating the above applicant, property description and the specific aquifers that are the subject of the objection. The objection must be accompanied by a \$10 fee and must be received by the Commission Staff, Colorado Ground Water Commission, 818 Centennial Building, 1313 Sherman Street, Denver, Colorado 80203, by September 15, 2003.



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b 13331

# STATE OF COLORADO

## OFFICE OF THE STATE ENGINEER

Division of Water Resources  
Department of Natural Resources

1313 Sherman Street, Room 818  
Denver, Colorado 80203  
Phone (303) 866-3581  
FAX (303) 866-3589

www.water.state.co.us



Bill Owens  
Governor

Greg E. Walcher  
Executive Director

Hal D. Simpson, P.E.  
State Engineer

March 8, 2004

ROBERT NORRIS  
ROBERT C NORRIS FAMILY TRUST  
970 SUMMER GAMES DRIVE  
COLO SPGS CO 80906

### RE: Determination of Water Right

Dear Mr. Norris:

Enclosed is a copy of the Colorado Ground Water Commission's Findings and Order for Determination of Water Right No. 457-BD, for the allocation of ground water in the Laramie-Fox Hills aquifer. This Findings and Order are the Commission's approval of your application for determination of rights to ground water in the above stated aquifer. This document contains important information about your water right and should be reviewed and retained for your records.

As indicated in the Order, a copy of this determination must be recorded by the applicant in the public records of the county – in which the overlying land is located – so that a title examination of the overlying land claimed in the application, or any part thereof, shall reveal this determination. An additional copy of the Findings and Order is enclosed for this purpose.

If you have any questions, please contact this office.

Sincerely,

Richard Cooper  
Physical Science Researcher Scientist  
Designated Basins Branch

RECORDER NOTE: Legibility  
of writing, typing or printing  
UNSATISFACTORY in portions  
of this document when received.

Enclosure: a/s

cc: John Schwab – JPS Engineering (letter only)  
Purushottam Dass, PE – Stanlec (letter only)  
Upper Black Squirrel Creek GWMD

Robert C. Balink El Paso Cty, CO

04/02/2004

12:31

204053003

Doc \$0.00

Page

Reo \$125.00 1 of 25



**COLORADO GROUND WATER COMMISSION  
FINDINGS AND ORDER**

IN THE MATTER OF AN APPLICATION FOR DETERMINATION OF WATER RIGHT TO  
ALLOW THE WITHDRAWAL OF GROUND WATER IN THE UPPER BLACK SQUIRREL CREEK  
DESIGNATED GROUND WATER BASIN

---

APPLICANT: ROBERT C. NORRIS FAMILY TRUST

AQUIFER: LARAMIE-FOX HILLS

DETERMINATION NO.: 457-BD

---

In compliance with Section 37-90-107(7), C.R.S., and the Designated Basin Rules, 2 CCR 410-1, The Robert C. Norris Family Trust (hereinafter "applicant") submitted an application for determination of water right to allow the withdrawal of designated ground water from the Laramie-Fox Hills Aquifer.

**FINDINGS**

1. The application was first filed by the applicant on February 18, 2003, and was received complete by the Colorado Ground Water Commission on May 30, 2003.
2. The applicant requests a determination of rights to designated ground water in the Laramie-Fox Hills Aquifer (hereinafter "aquifer") underlying 6,955.31 acres, generally described as the SE1/4 of the NE1/4 and the E1/2 of the SE1/4 of Section 31 and the E1/2 of the NE1/4, the SW1/4 of the NE1/4, the S1/2 of the NW1/4, the SW1/4, and the W1/2 of the SE1/4 of Section 32, all in Township 12 South, Range 63 West of the 6<sup>th</sup> Principal Meridian; the E1/2, the E1/2 of the W1/2, and the SW1/4 of the SW1/4 of Section 35 and the SW1/4 of Section 36, all in Township 12 South, Range 64 West of the 6<sup>th</sup> Principal Meridian; land in the N1/2 and in the N1/2 of the S1/2 of Section 4, all of Section 5 excluding the NW1/4 of the NW1/4, all of Section 6 excluding the south 1460 feet of the east 1044 feet of the SE1/4, and all of Section 7 excluding the E1/2 of the SE1/4, and the N1/2 of Section 8, all in Township 13 South, Range 63 West of the 6<sup>th</sup> Principal Meridian; all of Sections 1, 2 and 3, the E1/2 and the SW1/4 of Section 9, the N1/2 of the N1/2 of Section 10, the N1/2 of the N1/2 of Section 11, and the E1/2, the E1/3 of the W1/2, and the W2/3 of the N1/2 of the NW1/4 of Section 12, all in Township 13 South, Range 64 West of the 6<sup>th</sup> Principal Meridian; all in El Paso County. According to a signed statement dated February 5, 2003, the applicant owns the 6,955.31 acres of land, as further described in said affidavit which is attached hereto as Exhibit A, and claims control of the ground water in the aquifer underlying this land area.
3. The proposed annual amount of ground water to be allocated and withdrawn from the aquifer for intended beneficial uses is the maximum allowable amount.
4. The above described land area overlying the ground water claimed by the applicant is located within the boundaries of the Upper Black Squirrel Creek Designated Ground Water Basin and in the Upper Black Squirrel Creek Ground Water Management District. The Colorado Ground Water Commission (hereinafter "Commission") has jurisdiction.

5. The applicant intends to apply the allocated ground water to the following beneficial uses: domestic, irrigation, commercial, industrial, recreation and livestock watering. The applicant's proposed place of use of the allocated ground water is the above described 6955.31 acre land area.
6. a. Pursuant to Section 37-90-107(7), C.R.S., and Rule 5.3 of the Designated Basin Rules, the Commission Staff ("Staff") reviewed the application. In a preliminary evaluation of the complete application, the Staff found that the claimed 6955.31 acre overlying land area consisted of six noncontiguous tracts of land designated as Areas A through F. For this reason, the amount of ground water in the aquifer and a maximum annual amount available for allocation were determined specifically for the aquifer underlying each of the six noncontiguous areas. These designated areas are generally described and the amounts of available allocation specific for each area, as determined by Staff, are indicated in the legal notice publication for the application attached hereto as Exhibit B.  
  
b. The six noncontiguous tracts are the result of county roads physically separating the overlying land area into six separate areas. This finding by Staff was based on previous claims by El Paso County that the right-of-way for all such county roads is considered to be the property of the county and not, simply, an easement subject to claims of ownership by surrounding property owners.
7. On July 24, 2003, in accordance with Rule 9.1 of the Designated Basin Rules, a letter was sent to the Upper Black Squirrel Creek Ground Water Management District requesting written recommendations concerning this application. No written recommendations from the district were received.
8. The Commission Staff has evaluated the application relying on the claims to control of the ground water in the aquifer made by the applicant.
9. In accordance with Sections 37-90-107(7) and 37-90-112, C.R.S., the application was published in The Gazette newspaper on August 7 & 14, 2003.
10. a. On September 15, 2003, an objection to the application was received from the applicant and assigned Case No. 03-GW-16. The applicant specifically objected to the Commission Staff's finding that the overlying land area consisted of six noncontiguous tracts and claimed that, in fact, the overlying land area consisted of one contiguous parcel. No other objection to the proposed determination of water right was received within the time limit set by statute.  
  
b. As an attachment to the objection, the applicant provided a copy of a letter from the Office of the El Paso County Surveyor, dated August 28, 2003. In this letter, Mr. Christopher Brewer, the County Surveyor, states that, after review of relevant property records, the existing county roads within the applicant's claimed overlying land area are not owned in fee by the county.  
  
c. By letter to the El Paso County Surveyor, dated September 16, 2003, the Staff responded to Mr. Brewer's above-described letter. Staff's letter was copied to the El Paso County Department of Planning, Department of Transportation, and Office of the County Attorney. The intent of this letter was to obtain any comments from interested governmental departments or agencies of El Paso County regarding the issue of ownership of county road right-of-ways and specifically the ownership of such right-of-ways dividing the applicant's overlying land area.

- d. Since the mailing of the above Staff letter of September 16, 2003, the Staff has received no additional written correspondence from any governmental department or agency of El Paso County regarding the issue of ownership of county road right-of-ways. Based on the information provided by the Office of the El Paso County Surveyor, in the above-described letter of August 28, 2003, the staff revises the finding that the applicant's claimed overlying land area consists of six noncontiguous tracts. The preliminary findings, as published in the legal notice attached hereto as Exhibit B, are subject to final staff evaluation. Final staff evaluation of the application, therefore, finds that the applicant's claimed 6955.31 acre overlying land area is one contiguous area. The applicant was notified of the revised finding for this application by letter from the Staff dated December 31, 2003.
- e. In a letter to the Commission Hearing Officer received on January 27, 2004, the applicant requested that its objection be withdrawn and that the application be returned to the Staff for further action. By Order of the Hearing Officer dated January 28, 2004, Case No. 03-GW-16 was dismissed and the application was remanded to Staff to take any administrative steps it deems necessary.
- f. The above-described revised finding of the Commission is incorporated into these findings.
11. The quantity of water in the aquifer underlying the 6955.31 acres of land claimed by the applicant is 234,742 acre-feet. This determination was based on the following as specified in the Designated Basin Rules:
- a. The average specific yield of the saturated permeable material of the aquifer underlying the land under consideration that could yield a sufficient quantity of water that may be extracted and applied to beneficial use is 15 percent.
  - b. The average thickness of the saturated permeable material of the aquifer underlying the land under consideration that could yield a sufficient quantity of water that may be extracted and applied to beneficial use is 225 feet.
12. At this time, there is no substantial artificial recharge that would affect the aquifer within a one hundred year period.
13. Pursuant to Section 37-90-107(7), C.R.S., and in accordance with the Designated Basin Rules, the Commission shall allocate ground water in the aquifer based on ownership of the overlying land and an aquifer life of one hundred years. Therefore, the maximum average annual amount of ground water in the aquifer that may be allocated for withdrawal pursuant to the data in the paragraphs above for the 6955.31 acres of overlying land claimed by the applicant is 2347 acre-feet.
14. The ability of wells permitted to withdraw the authorized amount of water from this non-renewable aquifer may be less than the one hundred years upon which the amount of water in the aquifer is allocated, due to anticipated water level declines.
15. In accordance with Rule 5.3.6 of the Designated Basin Rules, it has been determined that withdrawal of ground water from the aquifer underlying the 6955.31 acres of land claimed by the applicant will not, within one hundred years, deplete the flow of a natural stream or its



alluvial aquifer at an annual rate greater than one-tenth of one percent of the annual rate of withdrawal and, therefore, the ground water is nontributary ground water as defined in Rule 4.2.19 of the Designated Basin Rules. No more than 98% of the amount of ground water withdrawn annually shall be consumed, as required by the Designated Basin Rules.

16. A review of the records in the Office of the State Engineer has disclosed that none of the water in the aquifer underlying the land claimed by the applicant has been previously allocated or permitted for withdrawal.
17. Pursuant to Section 37-90-107(7)(c)(III), C.R.S., an approved determination of water right shall be considered a final determination of the amount of ground water so determined; except that the Commission shall retain jurisdiction for subsequent adjustment of such amount to conform to the actual local aquifer characteristics from adequate information obtained from well drilling or test holes.
18. In accordance with Section 37-90-107(7), C.R.S., upon Commission approval of a determination of water right, well permits for wells to withdraw the authorized amount of water from the aquifer shall be available upon application, subject to the conditions of this determination and the Designated Basin Rules and subject to approval by the Commission.
19. In order to prevent unreasonable impairment to the existing water rights of others within the Upper Black Squirrel Creek Designated Ground Water Basin it is necessary to impose conditions on the determination of water right and proposed allocation of ground water. Under conditions as stated in the following Order, no unreasonable impairment of existing water rights will occur from approval of this determination of water right or from the issuance of well permits for wells to withdraw the authorized amount of allocated ground water from the aquifer.

#### ORDER

In accordance with Section 37-90-107(7), C.R.S., and the Designated Basin Rules, the Colorado Ground Water Commission orders that the application for determination of rights to designated ground water in the Laramie-Fox Hills Aquifer underlying 6955.31 acres of land, generally described as the SE1/4 of the NE1/4 and the E1/2 of the SE1/4 of Section 31 and the E1/2 of the NE1/4, the SW1/4 of the NE1/4, the S1/2 of the NW1/4, the SW1/4, and the W1/2 of the SE1/4 of Section 32, all in Township 12 South, Range 63 West of the 6<sup>th</sup> Principal Meridian; the E1/2, the E1/2 of the W1/2, and the SW1/4 of the SW1/4 of Section 35 and the SW1/4 of Section 36, all in Township 12 South, Range 64 West of the 6<sup>th</sup> Principal Meridian; land in the N1/2 and in the N1/2 of the S1/2 of Section 4, all of Section 5 excluding the NW1/4 of the NW1/4, all of Section 6 excluding the south 1460 feet of the east 1044 feet of the SE1/4, and all of Section 7 excluding the E1/2 of the SE1/4, and the N1/2 of Section 8, all in Township 13 South, Range 63 West of the 6<sup>th</sup> Principal Meridian; all of Sections 1, 2 and 3, the E1/2 and the SW1/4 of Section 9, the N1/2 of the N1/2 of Section 10, the N1/2 of the N1/2 of Section 11, and the E1/2, the E1/3 of the W1/2, and the W2/3 of the N1/2 of the NW1/4 of Section 12, all in Township 13 South, Range 64 West of the 6<sup>th</sup> Principal Meridian, is approved subject to the following conditions:

20. The allocated average annual amount of ground water to be withdrawn from the aquifer shall not exceed 2,347 acre-feet. The allowed maximum annual amount of withdrawal may exceed the allowed average annual amount of withdrawal as long as the total volume of water withdrawn does not exceed the product of the number of years since the date of approval of this determination times the allowed average annual amount of withdrawal.

21. To conform to actual aquifer characteristics, the Commission may adjust the allocated average annual amount of ground water to be withdrawn from the aquifer based on analysis of geophysical logs or other site-specific data if such analysis indicates that the initial estimate of the volume of water in the aquifer was incorrect.
22. No more than 98% of the ground water withdrawn annually shall be consumed. The Commission may require well owners to demonstrate periodically that no more than 98% of the water withdrawn is being consumed.
23. The use of ground water from this allocation shall be limited to the following uses: domestic, irrigation, commercial, industrial, recreation and livestock watering. The place of use shall be limited to the above described 6955.31 acre overlying land area.
24. The applicant, or subsequent persons controlling this water right, shall record in the public records of the county - in which the claimed overlying land is located - notice of transfer of any portion of this water right to another within sixty days after the transfer, so that a title examination of the above described 6955.31 acre land area, or any part thereof, shall reveal the changes affecting this water right. Such notice shall consist of a signed and dated deed which indicates the determination number, the aquifer, a description of the above described land area, the annual amount of ground water (acre-feet) transferred, name of the recipient, and the date of transfer.
25. Subject to the above conditions, well permits for wells to withdraw the authorized annual amount of water from the aquifer shall be available upon application subject to approval by the Commission and the following conditions:
  - a. The wells shall be located on the above described 6955.31 acre overlying land area.
  - b. The wells must be constructed to withdraw water from only the Laramie-Fox Hills Aquifer. Upon application for a well permit to construct such a well, the estimated top and base of the aquifer at the proposed well location will be determined by the Commission and indicated on the approved well permit. Plain non-perforated casing must be installed, grouted and sealed to prevent diversion of ground water from other aquifers and the movement of ground water between aquifers.
  - c. The entire depth of each well must be geophysically logged prior to installing the casing as set forth in Rule 9 of the Statewide Nontributary Ground Water Rules, 2 CCR 402-7.
  - d. Each well shall be constructed within 200 feet of the location specified on the approved well permit, but must be more than 600 feet from any existing large-capacity well completed in the same aquifer.
  - e. The wells may withdraw the allowed average annual amount of water from the aquifer together in any combination. The total combined annual withdrawal of the wells shall not exceed the allowed average annual amount described in this Order.
  - f. A totalizing flow meter or other Commission approved measuring device shall be installed on each well and maintained in good working order by the well owner. Annual diversion records shall be collected and maintained by the well owner and submitted to the Commission or the Upper Black Squirrel Creek Ground Water Management District upon their request.

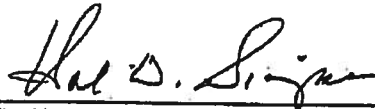
Applicant: Robert C. Norris Family Trust  
Aquifer: Laramie-Fox Hills  
Determination No.: 457-BD

Page 6

g. The well owner shall mark the well in a conspicuous place with the permit number and the name of the aquifer. The well owner shall take necessary means and precautions to preserve these markings.

26. A copy of this Findings and Order shall be recorded by the applicant in the public records of the county – in which the claimed overlying land is located - so that a title examination of the above described 6955.31 acre overlying land area, or any part thereof, shall reveal the existence of this determination.

Dated this 3rd day of March, 2004.



Hal D. Simpson  
Executive Director  
Colorado Ground Water Commission

By: 

Suzanne M. Sellers, P.E.  
Designated Basins Chief

Prepared by: EBT & RAC

FIND-71-04

FIND-441

EXHIBIT A

Page 1 of 16

GWS 1  
06/09/00

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MAY 06 2003

STATE OF COLORADO  
OFFICE OF THE STATE ENGINEER  
DIVISION OF WATER RESOURCES  
1313 Sherman St. Room 821  
Denver, CO 80203  
(303) 866-3581 Fax (303) 866-3589

FEB 18 2003

WATER RESOURCES  
STATE ENGINEER  
COLO.

RECEIVED

FEB 18 2003

WATER RESOURCES  
STATE ENGINEER  
COLO.

NONTRIBUTARY GROUND WATER LANDOWNERSHIP STATEMENT

I (We) Robert C. Morris Family Trust  
(Name(s))

claim and say that I (we) am (are) the owner(s) of the following described property consisting of  
6,955.31 ~~7046.21~~ acres in the County of El Paso  
State of Colorado:

(Insert the property legal description)

*See attached legal description*

and, that the ground water sought to be withdrawn from the Laramie Fox Hills  
aquifer underlying the above-described land has not been conveyed to reserved to another, nor has  
consent been given to its withdrawal by another.

Further, I (we) claim and say that I (we) have read the statements made herein; know the contents  
hereof; and that the same are true to my (our) knowledge.

Robert C. Morris 2/5/03  
Signature President Date  
James Morris 2/5/03  
Signature Date

INSTRUCTIONS:

Please type or print neatly in black ink. This form may be reproduced by photocopy or word  
processing means. See additional information on the reverse side.



# EXHIBIT A

Page 2 of 16

## LEGAL DESCRIPTION

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Our Order No. SC146856-4  
FEB 18 2003

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STATE ENGINEER  
COLO.

MAY 06 2003

STATE ENGINEER  
COLO.

### PARCEL A:

GOVERNMENT LOTS 1, 3, AND 4; THE SOUTH HALF OF THE NORTH HALF; AND THE NORTH HALF OF THE SOUTH HALF, SECTION 4, TOWNSHIP 13 SOUTH, RANGE 63 WEST OF THE 6TH PRINCIPAL MERIDIAN, COUNTY OF EL PASO, STATE OF COLORADO, LESS THAT PORTION CONVEYED BY DEED RECORDED IN BOOK 2315 AT PAGE 945.

ALL OF SECTION 5, TOWNSHIP 13 SOUTH, RANGE 63 WEST OF THE 6TH PRINCIPAL MERIDIAN, COUNTY OF EL PASO, STATE OF COLORADO, LESS AND EXCEPT GOVERNMENT LOT 4 OF SAID SECTION;

ALL OF SECTION 6, TOWNSHIP 13 SOUTH, RANGE 63 WEST OF THE 6TH P.M., COUNTY OF EL PASO, STATE OF COLORADO, EXCEPTING THEREFROM THE SOUTH 1460.00 FEET OF THE EAST 1044.28 FEET OF THE SOUTHEAST QUARTER, SECTION 6, TOWNSHIP 13 SOUTH, RANGE 63 WEST OF THE 6TH P.M., COUNTY OF EL PASO, STATE OF COLORADO.

ALL OF SECTION 7, TOWNSHIP 13 SOUTH, RANGE 63 WEST OF THE 6TH P.M., COUNTY OF EL PASO, STATE OF COLORADO, EXCEPTING THEREFROM THE EAST ONE-HALF OF THE SOUTHEAST QUARTER, SECTION 7, TOWNSHIP 13 SOUTH, RANGE 63 WEST OF THE 6TH P.M., COUNTY OF EL PASO, STATE OF COLORADO.

THE NORTH HALF OF SECTION 8, TOWNSHIP 13 SOUTH, RANGE 63 WEST OF THE 6TH P.M., COUNTY OF EL PASO, STATE OF COLORADO.

THE SOUTHEAST QUARTER OF THE NORTHEAST QUARTER AND THE EAST ONE-HALF OF THE SOUTHEAST QUARTER, SECTION 31, TOWNSHIP 12 SOUTH, RANGE 63 WEST OF THE 6TH P.M., COUNTY OF EL PASO, STATE OF COLORADO.

THE EAST ONE-HALF OF THE NORTHEAST QUARTER, THE SOUTHWEST QUARTER OF THE NORTHEAST QUARTER, THE SOUTH ONE-HALF OF THE NORTHWEST QUARTER, THE SOUTHWEST QUARTER AND THE WEST ONE-HALF OF THE SOUTHEAST QUARTER, SECTION 32, TOWNSHIP 12 SOUTH, RANGE 63 WEST OF THE 6TH P.M., COUNTY OF EL PASO, STATE OF COLORADO, EXCEPTING THEREFROM THOSE PORTIONS CONVEYED FOR CANAL PURPOSES IN DEEDS RECORDED IN BOOK 458 AT PAGES 176 AND 180.

ALL OF SECTION 1, TOWNSHIP 13 SOUTH, RANGE 64 WEST OF THE 6TH P.M., COUNTY OF EL PASO, STATE OF COLORADO.

ALL OF SECTION 2, TOWNSHIP 13 SOUTH, RANGE 64 WEST OF THE 6TH P.M., COUNTY OF EL PASO, STATE OF COLORADO.

ALL OF SECTION 3, TOWNSHIP 13 SOUTH, RANGE 64 WEST OF THE 6TH P.M., COUNTY OF EL PASO, STATE OF COLORADO.

THE EAST ONE-HALF AND THE SOUTHWEST QUARTER OF SECTION 9, TOWNSHIP 13 SOUTH, RANGE 64 WEST OF THE 6TH P.M., COUNTY OF EL PASO, STATE OF COLORADO.

THE NORTH ONE-HALF OF THE NORTH ONE-HALF OF SECTION 10, TOWNSHIP 13 SOUTH, RANGE 64 WEST OF THE 6TH P.M., COUNTY OF EL PASO, STATE OF COLORADO.

EXHIBIT A

Page 3 of 16

RECEIVED Order No. SC146856-4

LEGAL DESCRIPTION

FEB 18 2003

THE NORTH ONE-HALF OF THE NORTH ONE-HALF OF SECTION 11, TOWNSHIP 13 SOUTH, RANGE 64 WEST OF THE 6TH P.M., COUNTY OF EL PASO, STATE OF COLORADO.

THE EAST ONE-HALF, THE EAST ONE-THIRD OF THE WEST ONE-HALF AND THE WEST TWO-THIRDS OF THE NORTH ONE-HALF OF THE NORTHWEST QUARTER OF SECTION 12, TOWNSHIP 13 SOUTH, RANGE 64 WEST OF THE 6TH P.M., COUNTY OF EL PASO, STATE OF COLORADO.

THE EAST ONE-HALF, THE EAST ONE-HALF OF THE WEST ONE-HALF AND THE SOUTHWEST QUARTER OF THE SOUTHWEST QUARTER OF SECTION 35, TOWNSHIP 12 SOUTH, RANGE 64 WEST OF THE 6TH P.M., COUNTY OF EL PASO, STATE OF COLORADO.

THE SOUTHWEST QUARTER OF SECTION 36, TOWNSHIP 12 SOUTH, RANGE 64 WEST OF THE 6TH P.M., COUNTY OF EL PASO, STATE OF COLORADO.

*Parcel B deleted*

# El Paso County Parcel Information

Parcel Number: 4300000445, -444, -345, ETC

Parcel Address: 0 MURR RD

Parcel Owner: NORRIS ROBERT C & JANE W TRUSTEES

Parcel Owner2: NORRIS ROBERT C FAMILY TRUST

Parcel Owner3: C/O T-CROSS RANCHES

Owner Mailing Address: 970 SUMMER GAMES DR, COLORADO SPRINGS, CO, 80906

RECEIVED

FEB 18 2003

File Name: PRE-02-141

Zone Map No.: 323.31, 323.32,

332.04 - 332.08, 424.35, 424.36,

431.01 - 431.03, 431.10 - 431.12,

432.09

MAY 06 2003

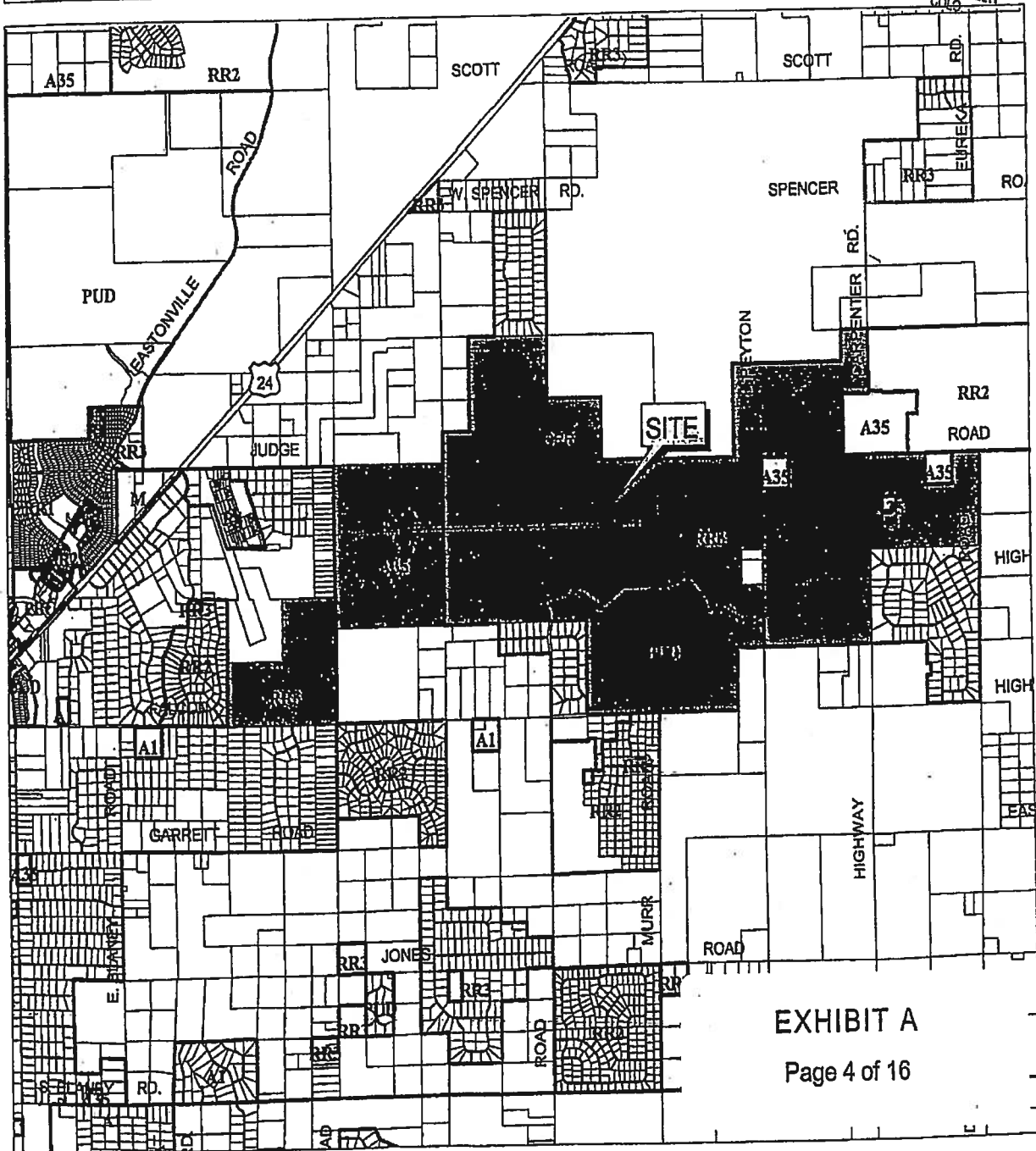


EXHIBIT A

Page 4 of 16



Please report any discrepancies to:  
El Paso County GIS/Mapping  
325 S. Cascade  
Colorado Springs, CO 80903  
(719)520-6523

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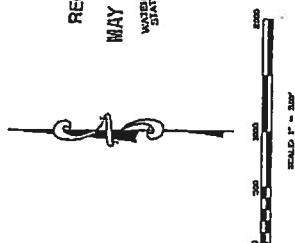
May 6, 2002





Page 6 of 16

RECEIVED  
MAY 06 2003  
WATER RESOURCES  
STATE ENGINEER  
C.D.O.



**PROSECUTOR**

A PARCEL OF LAND LOCATED IN SECTION 9, TOWNSHIP 13 NORTH, RANGE 64 WEST, OF THE 6TH P.M. EL PASO COUNTY, COLORADO, MORE PARTICULARLY DESCRIBED AS FOLLOWED:

**Answer: D**

[illegible]

## DECLARATION

1. THAT, BY ACTING THE UNDERSIGNED REGISTERED PROFESSIONAL LAND SURVEYOR IN THE STATE OF CALIFORNIA, DO HEREBY CERTIFY THAT ON SEPTEMBER 17, 1964, A LAND SURVEY OF THE ABOVE DESCRIBED PARCEL OF LAND WAS DONE UNDER MY SUPERVISION AND DIRECTION AND THE MEASUREMENTS AS SHOWN ON THE ACCOMPANYING PLAN ARE CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF.

THIS SURVEY IS NULL AND VOID WITHOUT SURVEYOR'S ORIGINAL SIGNATURE AND SEAL

EXPIRATION THIS \_\_\_\_\_ OF \_\_\_\_\_, 19\_\_\_\_, A.D., AT \_\_\_\_\_  
 CLOCK \_\_\_\_\_ A.M. IN ROOM \_\_\_\_\_ OF LAND SURVEY PLAT/RECORD-DEPT-JAN  
 SURVEYS AT PHOENIX \_\_\_\_\_ OF THE RECORDS OF CL. PAGO COUNTY, COLORADO  
 FOR VALUE, CLOCK & RECORDS

[illegible]

THEY ARE NOT FROM THE SAME CATEGORY OF SUBJECTS AS THE OTHERS. THEY ARE FROM THE SAME CATEGORY OF SUBJECTS AS THE OTHERS.

[illegible]

**CONCLUSIONS**

OCT 23 1969

BOOK 2315 PAGE 945

Filed for record the day of  
Description No. 694900

A. D. 1969 at 1:30

HARRIET BEALS

RECORDS

**This Deed,** Made this 21st day of October in the year of our Lord  
one thousand nine hundred and sixty-nine between ROBERT C. MORRIS

of the County of El Paso and State of Colorado, of the first part, and FRED P. DUGAN,  
also known as FRED PAUL DUGAN and VIRGINIA A. DUGAN  
of the County of El Paso and State of Colorado, of the second part;

Witnesseth, That the said party of the first part, for and in consideration of the sum of  
One Dollar and other valuable consideration ~~XXXXXX~~  
to the said party of the first part in hand paid by the said parties of the second part, the receipt whereof is  
hereby confessed and acknowledged, have granted, bargained, sold and conveyed, and by these presents do sell,  
grant, bargain, sell, convey and confirm unto the said parties of the second part, not in tenancy in common but in  
joint tenancy, the survivor of them, their assigns and the heirs and assigns of such survivor forever, all the following  
described lot of parcel of land, situate, lying and being in the County of El Paso and State  
of Colorado, to-wit:

That portion of the Northwest Quarter of Section 4, Township  
13 South, Range 63 West of the 6th P.M., El Paso County,  
described as follows: Commencing at the Northwest corner of  
said Section 4; thence Easterly on the Northerly line of said  
Section 4, 1168.27 feet; thence angle right 90° 43' 31" Southerly,  
1762.05 feet to the point of beginning of that tract of land  
herein described; thence continue Southerly on the last mentioned  
course, 1320.00 feet; thence angle right 90° 00' Westerly 660.00  
feet; thence angle right 90° 00' Northerly, 1320.00 feet; thence  
angle right 90° 00' Easterly, 660.00 feet to the point of  
beginning and containing 20.00 Acres, more or less.

STATE OF COLORADO

OCT 23 1969

S. 20.00

Together with all and singular the hereditaments and appurtenances thereto belonging, or in anywise apper-  
taining, and the reversion and reversions, remainder and remainders, rents, issues and profits thereof, and all the  
estate, right, title, interest, claim and demand whatsoever of the said party of the first part, either in law or  
equity, of, in and to the above bargained premises, with the hereditaments and appurtenances.

To Have and to Hold the said premises above bargained and described, with the appurtenances, unto the said  
parties of the second part, the survivor of them, their assigns and the heirs and assigns of such survivor forever.  
And the said party of the first part, for him self, his heirs, executors, and administrators, do give  
covenant, grant, bargain and agree to and with the said parties of the second part, the survivor of them, their assigns  
and the heirs and assigns of such survivor, that at the time of the conveying and delivery of these presents, he is  
well seized of the premises above conveyed, as of good, sure, perfect, absolute and indefeasible estate of inheritance,  
in law, in fee simple, and he is good right, full power and lawful authority to grant, bargain, sell and convey  
the same in manner and form aforesaid, and that the same are free and clear from all former and other grants,  
bargains, sales, liens, taxes, assessments and incumbrances of whatever kind or nature whatsoever.

and the above bargained premises in the quiet and peaceable possession of the said parties of the second part, the  
survivor of them, their assigns and the heirs and assigns of such survivor, against all and every person or persons  
lawfully claiming or to claim the whole or any part thereof, the said party of the first part shall and will  
WARRANT AND FOREVER DEFEND.

In Witness Whereof, The said party of the first part, his heirs, executors, and administrators, do hereunto set his hand  
and seal the day and year first above written.

Signed, Sealed and Delivered in the Presence of

ROBERT C. MORRIS



STATE OF COLORADO

County of El Paso

21st

day of

The foregoing instrument was  
October 1969

Signed Robert C. Morris

Notary Public

My Commission Expires

1970

Notary Public

My Commission Expires

1970

Notary Public

My Commission Expires

1970

Notary Public

My Commission Expires

1970

EXHIBIT A

Page 8 of 16

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Page 9 of 16

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MAY 06 2003

REGISTERED  
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## LEGAL DESCRIPTION

GOVERNMENT LOT 1, SECTION 4, TOWNSHIP 13 SOUTH, RANGE 63 WEST, OF  
THE 6<sup>TH</sup> P.M., EL PASO COUNTY, COLORADO, MORE PARTICULARLY  
DESCRIBED AS FOLLOWS:

BEGINNING AT THE NORTHEAST CORNER OF SAID SECTION 4; THENCE  
S 01°04'54" W, ALONG THE EAST LINE OF SAID GOVERNMENT LOT 1, 1316.25  
FEET TO THE SOUTHEAST CORNER THEREOF; THENCE N 89°41'27" W,  
1321.34 FEET TO THE SOUTHWEST CORNER THEREOF; THENCE N 00°58'48"  
E, 1315.59 FEET TO THE NORTH LINE OF SAID SECTION 4; THENCE S  
89°43'05"E, ALONG SAID NORTH LINE, 1323.69 FEET TO THE POINT OF  
BEGINNING AND CONTAINING 39.95 ACRES MORE OR LESS.



EXHIBIT A

Page 10 of 16

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WATER RESOURCES  
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COLO.

LEGAL DESCRIPTION

GOVERNMENT LOT 3, SECTION 4, TOWNSHIP 13 SOUTH, RANGE 63 WEST, OF  
THE 6<sup>TH</sup> P.M., EL PASO COUNTY, COLORADO, MORE PARTICULARLY  
DESCRIBED AS FOLLOWS:

BEGINNING AT THE NORTH ¼ CORNER OF SAID SECTION 4; THENCE  
S 00°52'40" W, ALONG THE EAST LINE OF SAID GOVERNMENT LOT 3, 1314.94  
FEET TO THE SOUTHEAST CORNER THEREOF; THENCE N 89°41'27" W,  
1321.35 FEET TO THE SOUTHWEST CORNER THEREOF; THENCE N 00°46'35"  
E, 1314.29 FEET TO THE NORTH LINE OF SAID SECTION 4; THENCE S  
89°43'05"E, ALONG SAID NORTH LINE, 1323.68 FEET TO THE POINT OF  
BEGINNING AND CONTAINING 39.91 ACRES MORE OR LESS.

# EXHIBIT A

Page 11 of 16

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## LEGAL DESCRIPTION

WHITE PAPER  
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COLO.

GOVERNMENT LOT 4, SECTION 4, TOWNSHIP 13 SOUTH, RANGE 63 WEST, OF  
THE 6<sup>TH</sup> P.M., EL PASO COUNTY, COLORADO, MORE PARTICULARLY  
DESCRIBED AS FOLLOWS:

BEGINNING AT THE NORTHWEST CORNER OF SAID SECTION 4; THENCE  
S 89°43'05" E, ALONG THE NORTH LINE OF SAID SECTION, 1323.69 FEET;  
THENCE S 00°46'35" W, 1314.29 FEET TO THE SOUTHEAST CORNER OF SAID  
GOVERNMENT LOT 4; THENCE N 89°41'27" W, 1321.35 FEET TO THE WEST  
LINE OF SAID SECTION 4; THENCE N 00°40'28" E, ALONG SAID WEST LINE,  
1313.65 FEET TO THE POINT OF BEGINNING AND CONTAINING 39.89 ACRES  
MORE OR LESS.

South 69° 47' West, 90.0 feet to a point; thence  
 South 89° 22' West, 211.9 feet to a point; thence  
 North 88° 51' West, 54.7 feet to a point; thence  
 South 76° 51' West, 40.0 feet to a point on the west line of the East

half (E½) of the Southeast Quarter (SE¼) of Section Thirty-three (33), Township and Range  
 aforesaid.

The Grantee shall permit the Grantor to make connection with said pipe line  
 with a three-quarter inch pipe, the water flowing through said three-quarter inch pipe  
 to be used by the Grantor for stock watering purposes.

Signed and delivered this 20th day of October, 1918.

Daniel Strobel.

State of Colorado )

ss.

County of El Paso )

On this day of 1918, before me, a notary public in and for said county  
 in the state aforesaid, appeared this day in person Daniel Strobel, who is personally  
 known to me to be the person whose name is subscribed to the foregoing instrument, and  
 acknowledged to me that he signed, sealed and delivered the said instrument of writing  
 as his free and voluntary act and deed for the uses and purposes therein set forth.

Witness my hand and official seal.

My commission expires

Notary Public.

EXHIBIT A

Page 12 of 16

Book 458

No. 264740

Quit Claim Deed

Charles F. Grotz, et al  
 to

John G. Morgan

Filed for Record 11:55 A.M.  
 March 20, 1919.

E. A. Jackson, Recorder

QUIT CLAIM DEED.

THIS DEED, Made this 31st day of January, in the year of  
 our Lord one thousand nine hundred and nineteen, between  
 CHARLES F. GROTZ and WILLIAM GROTZ, of the City and County  
 of Denver and State of Colorado, of the first part, and  
 JOHN G. MORGAN, of the City and County of Denver and State  
 of Colorado, of the second part;

WITNESSETH, That the said parties of the first part,  
 for and in consideration of the sum of One Hundred and Ten  
 Dollars (\$110.00) to the said parties of the first part in  
 hand paid by the said party of the second part, the receipt whereof is hereby confessed  
 and acknowledged, have remised, released, sold, conveyed and QUIT-CLAIMED, and by these  
 presents do remise, release, sell, convey and QUIT-CLAIM unto the said party of the second  
 part, his heirs and assigns forever, all the right, title, interest, claim and demand  
 which the said parties of the first part have in and to the following described land, sit-  
 uate, lying and being in the County of El Paso and State of Colorado, to-wit:

A strip of land, for canal purposes, in Section Thirty-two (32) Township  
 Twelve (12), South, Range Sixty-three (63), West of the Sixth Principal Meridian, as

specifically shown on attached map, the exterior boundaries of which are described as follows, to-wit:

Beginning at a point 700 feet North of the Southwest corner of the Southeast quarter (SE $\frac{1}{4}$ ) of the Northwest quarter (NW $\frac{1}{4}$ ) of Section Thirty-two (32); thence South Forty degrees (40°) nine minutes (9') East nine hundred and twenty-five (925) feet; thence East one hundred and thirty-five (135) feet; thence North Forty degrees (40°) nine minutes (9') West eleven hundred and twenty-five (1125) feet; thence South one hundred and fifty (150) feet, to the point of beginning.

Provided that if the party of the second part, his executors, administrators or assigns, shall abandon the use of this parcel of land for canal purposes or shall fail to operate, maintain and keep the canal in repair in compliance with all the laws of the State of Colorado and so as to prevent any injury to the property of the parties of the first part, then this deed shall become null and void and the title to said premises shall revert and become vested, without further action, in the parties of the first part, their heirs, executors, administrators and assigns. Provided further, the said John G. Morgan shall within thirty days after receiving notice respecting the same, construct and thereafter maintain across said ditch at such point as the first parties may designate, a good and substantial bridge sufficient for the passage of vehicles, including wagons and automobiles, and hauling of loads across the same, said bridge to be constructed and maintained at the expense of the said John G. Morgan, his heirs and assigns.

TO HAVE AND TO HOLD the same, together with all and singular the appurtenances and privileges thereunto belonging or in any wise thereunto appertaining, and all the estate, right, title, interest and claim whatsoever, of the said parties of the first part, either in law or equity, to the only proper use, benefit and behoof of the said party of the second part, his heirs and assigns forever, subject to the foregoing conditions.

IN WITNESS WHEREOF, The said parties of the first part have hereunto set their hands and seals the day and year first above written.

Charles F. Grotz

(SEAL)

William Grotz

(SEAL)

L.R. Stamp,  
\$ .50  
Canceled

State of Colorado )  
City and County of Denver ) ss.

I, Ernest L. Rhoads, a notary public in and for said City and County, in the State aforesaid, do hereby certify that CHARLES F. GROTZ and WILLIAM GROTZ, who are personally known to me to be the persons whose names are subscribed to the foregoing Deed, appeared before me this day in person and acknowledged that they signed, sealed and delivered the said instrument of writing as their free and voluntary act and deed for the uses and purposes therein set forth.

Given under my hand and Notarial seal this 15th day of March, A.D. 1919.

My commission expires July 23rd 1922.

Ernest L. Rhoads

Notary Public.



EXHIBIT A

Page 13 of 16

178

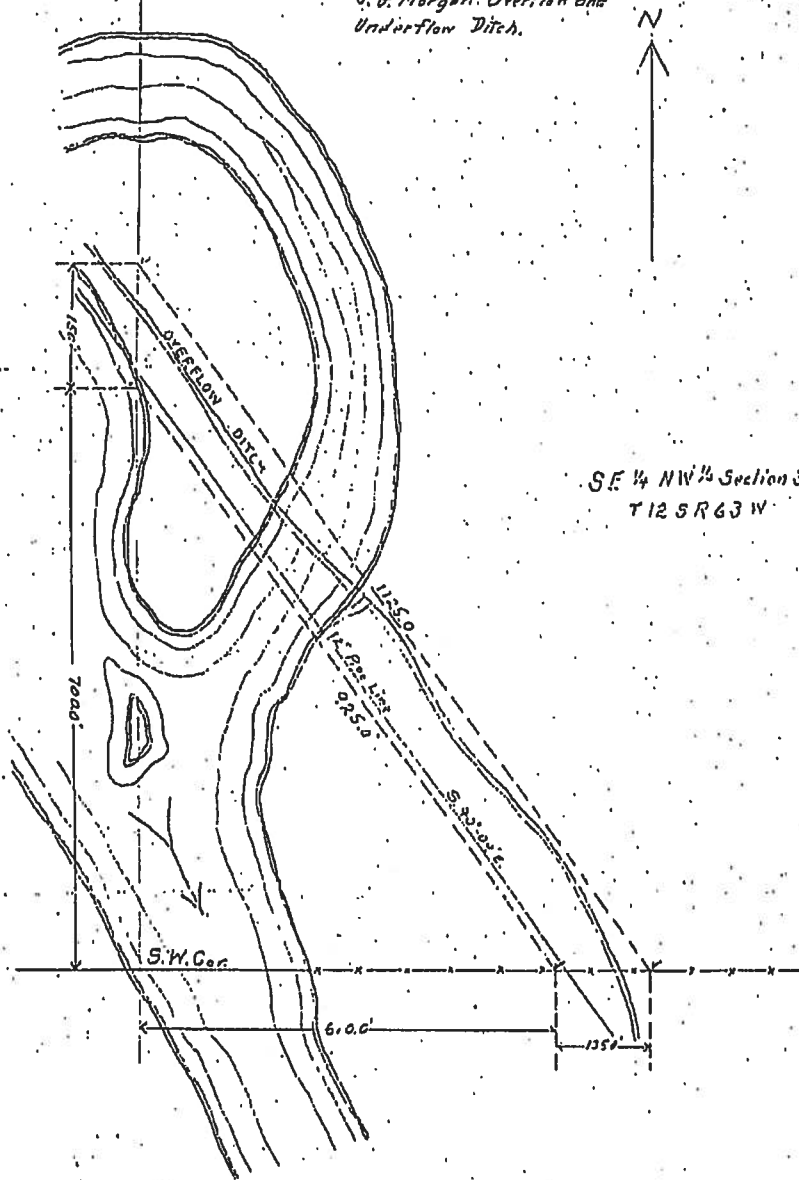
Owned by Grotz Bros.  
Right of Way Map for  
J. G. Morgan Overflow and  
Underflow Ditch.

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EXHIBIT A

Page 14 of 16



No. 266238

## QUIT CLAIM DEED.

Quit Claim Deed

Charles F. Grotz, et al

to

John G. Morgan

Filed for record 11:05 A.M.

April 25, 1919

E. A. Jackson, Recorder

THIS DEED, Made this 31st day of January, in the year of our Lord one thousand nine hundred and nineteen, between CHARLES F. GROTZ and WILLIAM GROTZ, of the City and County of Denver and State of Colorado, of the first part, and JOHN G. MORGAN, of the City and County of Denver and State of Colorado, of the second part;

WITNESSETH, That the said parties of the first part, for and in consideration of the sum of One Hundred and Ten Dollars (\$110.00) to the said parties of the first part in hand paid by

the said party of the second part, the receipt whereof is hereby confessed and acknowledged, have remise, sold, conveyed and QUIT-CLAIMED, and by these presents do remise, release, sell convey and QUIT-CLAIM unto the said party of the second part, his heirs and assigns forever, all the right, title, interest, claim and demand which the said parties of the first part have in and to the following described land, situate, lying and being in the County of El Paso and State of Colorado, to-wit: A strip of land, for canal purposes, in Section Thirty-two (32) Township Twelve (12), South, Range Sixty-three (63), West of the Sixth Principal Meridian, as specifically shown on attached map, the exterior boundaries of which are described as follows, to-wit:

Beginning at a point 700 feet North of the Southwest corner of the Southeast quarter (SE $\frac{1}{4}$ ) of the Northwest quarter (NW $\frac{1}{4}$ ) of Section Thirty-two (32); thence South Forty degrees (40°) nine minutes (9') East nine hundred and twenty-five (925) feet; thence East one hundred and thirty-five (135) feet; thence North Forty degrees (40°) nine minutes (9') West eleven hundred and twenty-five (1125) feet; thence South one hundred and fifty (150) feet, to the point of beginning.

Provided that if the party of the second part, his executors, administrators or assigns shall abandon the use of this parcel of land for canal purposes or shall fail to operate, maintain and keep the canal in repair in compliance with all the laws of the State of Colorado and so as to prevent any injury to the property of the parties of the first part, then this deed shall become null and void and the title to said premises shall revert and become vested, without further action, in the parties of the first part, their heirs, executors, administrators and assigns. Provided further, the said John G. Morgan shall within thirty days after receiving notice respecting the same, construct and thereafter maintain across said ditch at such point as the first parties may designate, a good and substantial bridge sufficient for the passage of vehicles; including wagons and automobiles, and hauling of loads across the same, said bridge to be constructed and maintained at the expense of the said John G. Morgan, his heirs and assigns.

TO HAVE AND TO HOLD the same, together with all and singular the appurtenances and privileges thereunto belonging or in any wise thereunto appertaining, and all the estate, right, title, interest and claim whatsoever, of the said parties of the first part, either in law or equity, to the only proper use, benefit and behoof of the said party of the second part his heirs and assigns forever, subject to the foregoing conditions.

IN WITNESS WHEREOF, The said parties of the first part have hereunto set their hands and seals the day and year first above written.

Charles F. Grotz

(Seal)

William Grotz

(Seal)

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EXHIBIT A

Page 15 of 16

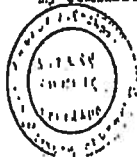
State of Colorado  
City and County of Denver) ss

I, Ernest L. Rhoads, a notary public in and for said City and County, in the State aforesaid, do hereby certify that CHARLES F. GROTE and WILLIAM GROTE, who are personally known to me to be the persons whose names are subscribed to the foregoing Deed, appeared before me this day in person and acknowledged that they signed, sealed and delivered the said instrument of writing as their free and voluntary act and deed for the uses and purposes therein set forth.

Given under my hand and notarial seal this 15th day of March, A.D. 1919.

My commission expires July 13rd 1922

Ernest L. Rhoads  
Notary Public



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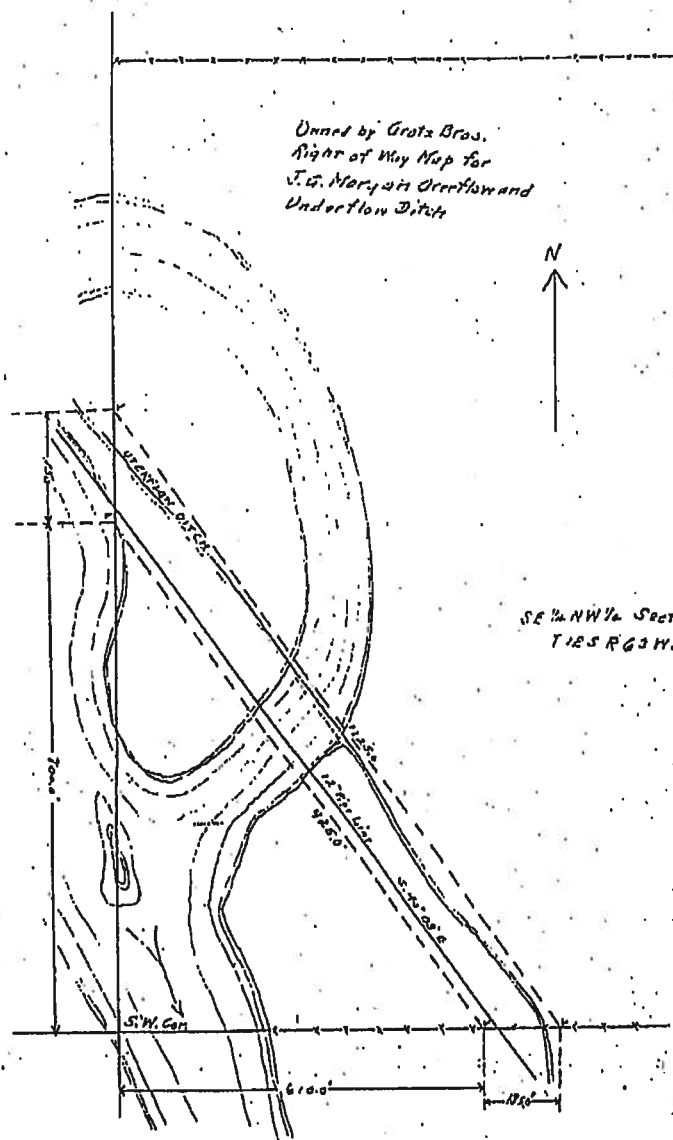


EXHIBIT A

Page 16 of 16

SE 1/4 NW 1/4 Section 32  
T15S R63W.

## EXHIBIT B

Page 1 of 2

Page 1 of 2

457-BD

### BEFORE THE COLORADO GROUND WATER COMMISSION

#### UPPER BLACK SQUIRREL CREEK DESIGNATED GROUND WATER BASIN AND UPPER BLACK SQUIRREL CREEK GROUND WATER MANAGEMENT DISTRICT - EL PASO COUNTY

TAKE NOTICE that pursuant to Section 37-90-107(7), C.R.S., the Robert C. Norris Family Trust (hereinafter "applicant") has applied for determinations of water right to allow the appropriation of designated ground water from the Laramie-Fox Hills, Arapahoe and Denver aquifers underlying 6955.31 acres consisting of six noncontiguous tracts of land generally described as: Area A - 480.29 acres consisting of the E1/2 and SW1/4 of Section 9, Township 13 South, Range 64 West of the 6<sup>th</sup> P.M.; Area B - 676.09 acres consisting of the E1/2, the E1/2 of the W1/2, and the SW1/4 of the SW1/4 of Section 35 and the SW1/4 of Section 36, all in Township 12 South, Range 64 West of the 6<sup>th</sup> P.M.; Area C - 119.97 acres consisting of the SE1/4 of the NE1/4 and the E1/2 of the SE1/4 of Section 31, Township 12 South, Range 63 West of the 6<sup>th</sup> P.M.; Area D - 3915.69 acres consisting of all of Sections 1, 2 and 3, the N1/2 of the N1/2 of Section 10, the N1/2 of the N1/2 of Section 11, and the E1/2, the E1/3 of the W1/2, and the W2/3 of the N1/2 of the NW1/4 of Section 12, all in Township 13 South, Range 64 West, and all of Section 6 excluding the south 1460 feet of the east 1044 feet of the SE1/4, and all of Section 7 excluding the E1/2 of the SE1/4, all in Township 13 South, Range 63 West of the 6<sup>th</sup> P.M.; Area E - 433.6 acres consisting of the E1/2 of the NE1/4, the SW1/4 of the NE1/4, the S1/2 of the NW1/4, the SW1/4, and the W1/2 of the SE1/4 of Section 32, Township 12 South, Range 63 West of the 6<sup>th</sup> P.M.; Area F - 1329.67 acres consisting of land in the N1/2 and in the N1/2 of the S1/2 of Section 4, all of Section 5 excluding the NW1/4 of the NW1/4, and the N1/2 of Section 8, all in Township 13 South, Range 63 West of the 6<sup>th</sup> P.M. The applicant claims ownership of this land and control of the ground water in the above described aquifers under this property. The ground water appropriations from these aquifers will be used on the described property for the following beneficial uses: domestic, irrigation, commercial, industrial, recreation and livestock. The maximum allowable annual amount of ground water in each aquifer underlying the described property will be appropriated.

In accordance with Section 37-90-107(7), C.R.S., and the Designated Basin Rules, 2 CCR 410-1, the Colorado Ground Water Commission shall allocate ground water from the above described aquifers based on ownership of the overlying land and an aquifer life of one hundred years. A preliminary evaluation of the applications by the Commission Staff finds the annual amount of water available for appropriation from each of the described aquifers underlying the above described property to be as follows: Area A - 166 acre-feet for the Laramie-Fox Hills, 184 acre-feet for the Arapahoe, and 160 acre-feet for the Denver; Area B - 218 acre-feet for the Laramie-Fox Hills, 259 acre-feet for the Arapahoe, and 229 acre-feet for the Denver; Area C - 40.5 acre-feet for the Laramie-Fox Hills, 45.9 acre-feet for the Arapahoe, 20.2 acre-feet for the Denver not-nontributary 4% area, and 20.6 acre-feet for the Denver not-nontributary actual impact replacement area; Area D - 1292 acre-feet for the Laramie-Fox Hills, 1564 acre-feet for the Arapahoe, 702 acre-feet for the Denver not-nontributary 4% area, and 621.5 acre-feet for the Denver not-nontributary actual impact replacement area; Area E - 153 acre-feet for the Laramie-Fox Hills, 169 acre-feet for the Arapahoe, 6.9 acre-feet for the Denver not-nontributary 4% area, and 140 acre-feet for the Denver not-nontributary actual impact replacement area; Area F - 469 acre-feet for the Laramie-Fox Hills, 520 acre-feet for the Arapahoe, and 450 acre-feet for the Denver, subject to final staff evaluation. The estimated available annual acre-feet appropriation amount for each aquifer indicated above may be increased or decreased by the Commission to conform to the actual aquifer characteristics, based upon site specific data.



## EXHIBIT B

Page 2 of 2

457-BD

The amounts for the Denver aquifer represent a reduction in the initial annual amounts determined to be available to allow for the annual withdrawals from fifteen (15) small-capacity wells located on the described property areas, permit nos. 12874, 15570, 17023, 25641, 25642, 57271, 72096, 81669, 81670, 84434, 104413, 124092, 132587, 189756, 205140.

In accordance with Rule 5.3.6 of the Designated Basin Rules, the Commission Staff's preliminary evaluation of the applications finds the replacement water requirement status for the Laramie-Fox Hills and Arapahoe aquifers underlying the above described 6955.31 acre property to be nontributary. The replacement water status for the Denver aquifer is not-nontributary, more specifically described for each area as follows: Area A - actual impact replacement; Area B - 4% replacement; Area C - 4% replacement underlying 59.9 acres of the area and actual impact replacement underlying 60.47 acres of the area; Area D - 4% replacement underlying 2075 acres of the area and actual impact replacement underlying 1840.69 acres of the area; Area E - 4% replacement underlying 20.3 acres of the area and actual impact replacement underlying 413.3 acres of the area; Area F - actual impact replacement.

Upon Commission approval of these determinations of water right, well permits for wells to withdraw the allowed appropriation from a specific aquifer shall be available upon application, subject to the conditions of the determination and the Designated Basin Rules and subject to approval by the Commission. Such wells must be completed in the specified aquifer and located on the above described 6955.31 acre property. Well permits for wells to withdraw ground water from the Denver aquifer underlying the above described Area A, the 60.47 acre portion of Area C, the 1840.69 acre portion of Area D, the 413.3 acre portion of Area E, and Area F, would also be subject to the conditions of a replacement plan to be approved by the Commission.

Any person wishing to object to the approval of these determinations of water right must do so in writing, briefly stating the nature of the objection and indicating the above applicant, property description and the specific aquifers that are the subject of the objection. The objection must be accompanied by a \$10 fee and must be received by the Commission Staff, Colorado Ground Water Commission, 818 Centennial Building, 1313 Sherman Street, Denver, Colorado 80203, by September 15, 2003.

## *Appendix F*



**ENTECH**  
ENGINEERING, INC.

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

**SOIL, GEOLOGY, GEOLOGIC HAZARD,  
AND WASTEWATER STUDY,  
SADDLEHORN RANCH SUBDIVISION  
EL PASO COUNTY, COLORADO**

Prepared for

**William Guman and Associates, LTD**  
731 North Weber Street, Suite 100  
Colorado Springs, Colorado 80903

Attn: William Guman

April 29, 2019

Respectfully Submitted,

ENTECH ENGINEERING, INC.

Logan L. Langford, P.G.  
Geologist

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

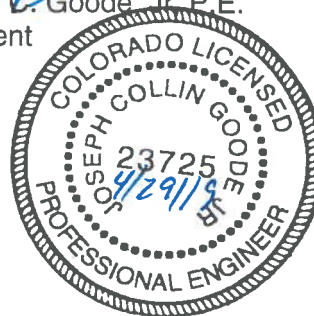
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Encl.

Entech Job No. 181823  
AAprojects/2018/181823 countysoil/geo/ww

Reviewed by:

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



## TABLE OF CONTENTS

1.0 SUMMARY.....	1
2.0 GENERAL SITE CONDITIONS AND PROJECT DESCRIPTION .....	2
3.0 SCOPE OF THE REPORT .....	2
4.0 FIELD INVESTIGATION .....	3
5.0 SOIL, GEOLOGY AND ENGINEERING GEOLOGY .....	3
5.1 General Geology.....	3
5.2 Soil Conservation Survey.....	4
5.3 Site Stratigraphy.....	5
5.4 Soil Conditions .....	6
5.5 Groundwater .....	8
6.0 ENGINEERING GEOLOGY – IDENTIFICATION AND MITIGATION OF GEOLOGIC HAZARDS.....	8
6.1 Relevance of Geologic Conditions to Land Use Planning .....	12
7.0 ON-SITE DISPOSAL OF WASTEWATER.....	13
8.0 ECONOMIC MINERAL RESOURCES.....	15
9.0 EROSION CONTROL .....	16
10.0 CLOSURE .....	17
BIBLIOGRAPHY.....	18

### TABLES

Table 1: Summary of Laboratory Test Results from Test Borings

Table 2: Summary of Laboratory Test Results from Test Pits

Table 3: Summary of Tactile Test Pits Results

### FIGURES

Figure 1: Vicinity Map

Figure 2: USGS Map

Figure 3: Site Plan/Testing Location Map

Figure 4: Soil Survey Map

Figure 5: Falcon Quadrangle Geology Map

Figure 6: Geology Map/Engineering Geology

Figure 7: Floodplain Map

Figure 8: Typical Perimeter Drain Details

Figure 9: Underslab Drainage Layer (Capillary Break)

Figure 10: Interceptor Drain Detail

Figure 11: Septic Suitability Map

APPENDIX A: Site Photographs

APPENDIX B: Test Boring Logs and Test Pit Logs

APPENDIX C: Laboratory Test Results

APPENDIX D: Soil Survey Descriptions

APPENDIX E: NRCS Septic Tank Absorption Field Soil Rating

## **1.0 SUMMARY**

### ***Project Location***

The project site lies in Section 3 and a portion of the N¼ of Section 10, Township 13 South, Range 64 West of the 6<sup>th</sup> Principal Meridian in El Paso County, Colorado. The site is located approximately 3 miles east of Falcon, Colorado, southeast of the intersection of Curtis Road and Judge Orr Road.

### ***Project Description***

Total acreage involved in the project is approximately 824 acres. The proposed site development consists of two hundred and twenty-five (225) single-family rural residential lots. The development will utilize municipal water and individual on-site wastewater treatment systems.

### ***Scope of Report***

This report presents the results of our geologic evaluation, treatment of engineering geologic hazard study and wastewater study for individual on-site wastewater 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, potentially expansive soils, hydrocompaction, loose/collapsible soils, floodplain, potentially seasonal shallow groundwater, seasonal shallow groundwater and areas of ponded water. 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 Section 3 and a portion of the N¼ of Section 10, Township 13 South, Range 64 West of the 6<sup>th</sup> Principal Meridian in El Paso County, Colorado. The site is located approximately 3 miles east of Falcon, Colorado, southeast of Curtis Road and Judge Orr Road. The location of the site is as shown on the Vicinity Map, Figure 1.

The topography of the site varies from very gradually to moderately sloping generally to the southeast and southwest. Three drainages bisect the site. Steeper slopes are located along portions of some of the drainages on the site. The drainages on site flow in a northeasterly direction through the central portion of the site. Water was observed in portions of the central drainage near the windmill and in the northwestern portion of the site at the time of this investigation. The site boundaries are indicated on the USGS Map, Figure 2. Previous land uses have included grazing and pasture land. The site contains primarily field grasses and weeds. Site photographs, taken December 6 and 7, 2018, and January 23, 2019, are included in Appendix A.

Total acreage involved in the proposed development is approximately 824 acres with two-hundred and twenty-five (225) single-family rural residential lots. The proposed residential lots range from approximately 2.5 to 4.2 acres. The majority of the lots are approximately 2.5 acres in size. The area will be serviced by municipal water and on-site wastewater treatment systems. The proposed Site Plan/Testing Location Map is presented in Figure 3.

## **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 on-site wastewater treatment systems in accordance with El Paso Land Development Code.

## **4.0 FIELD INVESTIGATION**

Our field investigation consisted of the preparation of a geologic map of any bedrock features and significant surficial deposits. The Natural Resource Conservation Service (NRCS) (previously the Soil Conservation Service (SCS)) survey data 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 Geology/Engineering Geology Map which identified pertinent geologic conditions affecting development. The field mapping was performed by personnel of Entech Engineering, Inc. on December 6 and 7, 2018, and January 23, 2019.

Four (4) test borings, and forty (40) tactile test pits were performed on the site to verify general soil conditions and the suitability of the site for the use of on-site wastewater treatment systems. The locations of the test borings, and test pits are indicated on the Site Plan/Testing 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, and Atterberg Limits, ASTM D-4318 for classification purposes. Volume change testing was performed on selected samples using the FHA Swell Test and Swell/Consolidation Test, ASTM D-4546, in order to evaluate the expansion/consolidation potential of the soils. Soluble sulfate testing was performed on selected samples to determine the corrosive characteristics of the soils on concrete placed below ground. Results of the laboratory testing are included in Appendix C. The Laboratory Test Results are summarized in Tables 1 and 2.

## **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 18 miles to the west is a major structural feature known as the Rampart Range

Fault. This fault marks the boundary between the Great Plains Physiographic Province and the Southern Rocky Mountain Province. The site exists within the southeastern edge of a large structural feature known as the Denver Basin. Bedrock in the area tends to be very gently dipping in a northwesterly direction (Reference 1). 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 man-made fill deposits, residual soils, eolian soils, and alluvial soils of the Quaternary Age. The residual soils are produced by the in-situ action of weathering of the bedrock on site. The alluvial soils were deposited by water in the major drainages on the site and as stream terrace deposits. The eolian soils were deposited by prevailing winds from the west and northwest. Man-made fill piles are located near the two water wells in the southwest corner of the site. The site's stratigraphy will be discussed in more detail in Section 5.3.

## **5.2 Soil Conservation Survey**

The Natural Resource Conservation Service (Reference 2), previously the Soil Conservation Service (Reference 3) has mapped four soil types on the site (Figure 4). In general, they vary from loam, loamy sands, and sandy loam. The soils are described as follows:

<u>Type</u>	<u>Description</u>
8	Blakeland Loamy Sand, 1-9% slopes
19	Columbine Gravelly Sandy Loam, 0 to 3% slopes
29	Fluvaquentic Haplaquolls, nearly level
83	Stapleton Sandy Loam, 3 to 8% slopes

Complete descriptions of each soil type are presented in Appendix D. The soils have generally been described to typically have moderate to very rapid permeabilities. The majority of the soils have rapid permeabilities. Limitations described for the soils include the hazard of flooding on Soil Type Nos. 19 and 29. Soil Type No. 29 is mapped in the floodplain zone that is designated as open space. Roads may need to be designed to minimize frost-heave potential. 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 slight to moderate erosion hazards.



### **5.3 Site Stratigraphy**

The Falcon Quadrangle Geology Map showing the site is presented in Figure 5 (Reference 4). The Geology Map prepared for the site is presented in Figure 6. Eight mappable units were identified on this site which are described as follows:

- Qaf      Recent Artificial Fill of Holocene Age:** These are man-made fill deposits associated with fill piles in the southwest corner of the site.
- Qpl      Playa Deposits of Holocene Age:** These are moderately consolidated clay, silt and sand formed by blowouts in the eolian sands that form seasonal ponds during wet seasons.
- Qal      Recent Alluvium – Post Piney Creek (Alluvium One) of Late Holocene Age:** These materials consist of water deposited sands located along some of the minor drainages across the site. The materials consist of silty to clayey sand and sandy clays.
- Qp      Piney Creek Alluvium (Alluvium Two) of Early Holocene Age:** These materials consist of low stream-terrace deposits above the current stream channels. The materials typically consist of silty to well graded sand.
- Qb      Broadway Alluvium (Alluvium Three) of Late Pleistocene Age:** These materials consist of middle steam terrace deposits. The materials typically consist of silty to clayey gravelly sands.
- Qes      Eolian Sand of Quaternary Age:** These deposits are fine to medium grained soil deposited on the site by the action of prevailing winds from the west and northwest. They typically occur as large dune deposits or narrow ridges. These soils are typically tan to brown in color and tend to have very uniform or well-sorted gradation. These materials tend to have a relatively high permeability and low density.
- Qsw      Sheetwash Deposits of Holocene to Late Pleistocene Age:** These materials consist of silty to clayey sands with some gravel. The material was deposited by the action of sheetwash.

**Qes/Tkd Sand Deposits of Quaternary Age overlying Dawson Formation of Tertiary to Cretaceous Age:** The Dawson Formation typically consists of arkosic sandstone with interbedded fine-grained sandstone, siltstone and claystone. Overlying this formation is a variable layer of eolian sand and residual soil, undifferentiated. The eolian sands were deposited by the action of the prevailing winds. The residual soils were derived from the in-situ weathering of the bedrock materials on-site. These soils consisted of silty to clayey sands, sandy clays and sandy silts.

The soils listed above were mapped from site-specific mapping, the *Geologic Map of the Falcon Quadrangle* distributed by the Colorado Geological Survey in 2012 (Reference 4), and the *Geologic Map of the Pueblo 1° x 2° Quadrangle*, distributed by the US Geological Survey in 1978 (Reference 5). The Test Pits and Test Borings were also used in evaluating the site and are included in Appendix B. The Geology Map prepared for the site is presented in Figure 6.

#### **5.4 Soil Conditions**

The soils encountered in the Test Borings and Test Pits can be grouped into four general soil and rock types. The soils were classified using the Unified Soil Classification System (USCS). The test pit soils were also classified using the USDA Textural Soil Classification.

Soil Type 1 is a well-graded sand, slightly silty to silty sand and clayey to very clayey sand (SW, SM-SW, SM, SC). This material was encountered in the test borings and in all of the test pits. The sand was encountered at the existing surface and extending to depths of 2 to 15 feet bgs and to the termination of Test Boring No. 1 (20 feet). These soils were encountered at loose to dense states and at dry to moist conditions. Samples tested had 2 to 44 percent of the soil size particles passing the No. 200 Sieve. Atterberg Limits Testing resulted in liquid limits of 25 to no value and plastic indexes of 11 to non-plastic. FHA Swell Testing on samples of the sand resulted in expansion pressures of 430 to 820 psf, indicating a low expansion potential. Sulfate testing resulted in less than 0.01 percent soluble sulfate by weight, indicating the sand exhibits negligible potential for below grade concrete degradation due to sulfate attack.

Soil Type 2 is a sandy clay (CL). This material was encountered in five of Test Pits with clay lenses in others. The clays were encountered at depths of 6 to 7 feet bgs and extended to the

termination of the test pits (7.5 to 8 feet). Very sandy clay lenses were encountered at shallower depths in Test Pit No. 4. The clays were encountered at firm consistencies and moist conditions. The samples tested had 56 to 93 percent of the soil size particles passing the No. 200 sieve. Atterberg Limits Testing resulted in liquid limits of 49 to 26 and plastic indexes of 31 to 12. FHA well Testing resulted in expansion pressures of 880 to 4420 psf, indicating low to very high expansion potential.

Soil Type 3 is a silty to clayey sandstone and very clayey sandstone (SM, SC). This material was encountered Test Boring Nos. 2 and 3, and in seven of the test pits. The sandstone was encountered at depths ranging from 2 to 16 feet bgs and extended to 5 feet or the termination of the boring and pits (5 to 20 feet). The sandstone was encountered at dense to very dense states and moist conditions. Samples tested had 13 to 45 percent of the soil sized particles passing the No. 200 sieve. Atterberg Limits Testing resulted in liquid limit of 29 to no value and plastic indexes of 13 to non-plastic. Highly expansive clayey sandstone and claystone are commonly interbedded in the sandstone in the area. Sulfate testing resulted in less than 0.01 percent soluble sulfate by weight, indicating the sandstone exhibits negligible potential for below grade concrete degradation due to sulfate attack.

Soil Type 4 is a sandy claystone and very sandy siltstone (CL, ML). This material was encountered Test Boring Nos. 2 and 4, and in five of the test pits at depths ranging from 2.5 to 15 feet bgs and extended to the termination of the boring or pit (4.5 to 20 feet). The claystone and siltstone were encountered at hard consistencies and moist conditions. Samples tested had 53 to 92 percent of the soil size particles passing the No. 200 sieve. Atterberg Limits Testing resulted in liquid limits of 47 to no value and plastic indexes of 23 to non-plastic. FHA Swell Testing resulted in expansion pressures of 450 to 3160 psf, indicating low to very high expansion potential. Swell/Consolidation Testing on a sample of the siltstone resulted in no volume change (0.0 percent), indicating a low expansion potential.

The Test Boring Logs and Test Pit Logs are presented in Appendix B. Laboratory Test Results are presented in Appendix C. The Laboratory Test Results are summarized in Tables 1 and 2.

### **5.5 Groundwater**

Groundwater was encountered in all of the test borings and in seven of the test pits at depths ranging from 6 to 13 feet with signs of seasonal water at 2.5 feet in Test Pit No. 4. Areas of seasonal and potentially seasonal shallow groundwater have been mapped in low-lying areas and in the drainages on-site. These areas are discussed in the following section. Fluctuation in groundwater conditions may occur due to variations in rainfall and other factors not readily apparent at this time. Isolated sand layers within the variable soil profile, sometimes only a few feet in thickness and width, can carry water in the subsurface. Additionally, perched water conditions can occur on this site where water can flow through permeable sands overlying less permeable bedrock. Builders and planners should be cognizant of the potential for the occurrence of such subsurface water features during construction on-site and deal with each individual problem as necessary at the time of construction.

## **6.0 ENGINEERING GEOLOGY – IDENTIFICATION AND MITIGATION OF GEOLOGIC HAZARDS**

As mentioned previously, detailed mapping has been performed on this site to produce an Geology/Engineering Geology Map (Figure 6). This map shows the location of various geologic conditions of which the developers should be cognizant during the planning, design and construction stages of the project. These hazards and the recommended mitigation techniques are as follows:

### **Artificial Fill**

These are man-made fill deposits associated with fill piles located in the southwest corner of the site. The fill piles are located near the two existing water wells.

**Mitigation:** The fill piles can easily be removed or regraded. Should any uncontrolled fill be encountered beneath foundations, removal and recompaction at 95% of its maximum Modified Proctor Dry Density, ASTM D-1557 will be required.

### Hydrocompaction

Areas in which hydrocompaction have been identified are acceptable as building sites. In areas identified for this hazard classification, however, we anticipate a potential for settlement upon saturation of these surficial soils. The low density, uniform grain sized, windblown sand deposits are particularly susceptible to this type of phenomenon.

Mitigation: The potential for settlement is directly related to saturation of the soils below the foundation areas. Therefore, good surface and subsurface drainage is extremely critical in these areas in order to minimize the potential for saturation of these soils. The ground surface around all permanent structures should be positively sloped away from the structure to all points, and water must not be allowed to stand or pond anywhere on the site. We recommend that the ground surface within 10 feet of the structures be sloped away with a minimum gradient of five percent. If this is not possible on the upslope side of the structures, then a well-defined swale should be created to intercept the surface water and carry it quickly and safely around and away from the structures. Roof drains should be made to discharge well away from the structures and into areas of positive drainage. Where several structures are involved, the overall drainage design should be such that water directed away from one structure is not directed against an adjacent building. Planting and watering in the immediate vicinity of the structures, as well as general lawn irrigation, should be minimized.

### Loose or Collapsible Soils

Loose soils were encountered in several of the test pits and one of the test borings. These soils are typically encountered in areas mapped as eolian sand deposits. Other areas of loose soils could be encountered across the site. Any loose or collapsible soils encountered beneath foundations or floor slabs will require mitigation.

Mitigation: Any loose or collapsible soils encountered beneath foundations or floor slabs should be overexcavated, moisture-conditioned and recompacted. The soils should be recompacted to 95 percent of the soils maximum Modified Proctor Dry Density ASTM D-1557 at  $\pm 2$  percent of optimum moisture content. The reconditioned soils on this site should be observed and tested to verify adequate compaction. Areas requiring recompaction should be determined after additional investigation of each building site and during the excavation observations.

### Expansive Soils

Expansive soils were encountered in two test borings drilled and several test pits excavated on-site. Expansive claystone is commonly encountered within the Dawson Formation. These occurrences are typically sporadic; therefore, none have been indicated on the maps. These expansive soils, if encountered beneath foundations, can cause differential movement in the structure foundation. These occurrences should be identified and mitigated on an individual basis.

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. Overexcavation depths of 3 to 5 feet should be anticipated where expansive soils are encountered. Another alternative in areas of highly expansive soils is the use of drilled pier foundation systems. Typical minimum pier depths are on the order of 25 feet or more and require penetration into the bedrock material a minimum of 4 to 6 feet, depending upon building loads. Floor slabs on expansive soils should be expected to experience movement. Overexcavation and replacement has been successful in minimizing slab movements. The use of structural floors should be considered for basement construction on highly expansive clays. Final recommendations should be determined after additional investigation of each building site.

### Floodplain and Drainage Areas

Portions of the site associated with the West Kiowa Creek drainage are mapped within a floodplain zone according to the FEMA Map Nos. 08041C0558G and 08041C0566G, dated December 7, 2018 (Figure 7, Reference 6). Areas of ponded water were observed in the central portion of the site near the windmill, and in the northwestern portion of the site adjacent to Curtis Road. The floodplain areas have been designated as open space and/or can be avoided by construction. Additionally, areas of seasonal and potentially seasonal shallow groundwater were observed across the site. In these areas, we would anticipate the potential for periodically high subsurface moisture conditions and frost heave potential. These are low-lying areas along the drainage in the southeastern portion of the site and in the low-lying areas and minor drainages across the site. These areas can likely be avoided or properly mitigated by development. Perched water conditions could be encountered across the entire site where water can flow within permeable

sand layers overlying impermeable bedrock. These areas should be identified on an individual basis at the time of construction. Where perched water conditions are encountered, the mitigation recommendations for seasonal and potentially seasonal shallow groundwater should be followed. The floodplain should be avoided by construction unless site-specific floodplain determination and drainage studies are performed. These areas are discussed below.

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

*Mitigation:* In these locations, foundations are subject to severe frost heave and should penetrate to a sufficient depths so as to prevent the formation of ice lenses beneath foundations. At this location and elevation, a foundation depth for frost protection of 30-inches is recommended. In areas where high subsurface moisture conditions are anticipated periodically, a subsurface perimeter drain will be necessary to help prevent the seepage of water into areas below grade. A typical perimeter drain detail is presented in Figure 8. Any grading in these areas should be done in a manner that directs surface flow around construction to avoid areas of ponded water. Areas of organic material will require removal prior to any fill placement. Unstable soil conditions should be expected in areas of shallow groundwater. Where foundations approach the groundwater level, stabilization of the excavations utilizing shot rock may be necessary. Underslab drains or capillary breaks, and interceptor drains may be necessary to prevent intrusion of water into areas below grade. Typical drain details are presented in Figures 9 and 10.

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

*fp – Floodplain:* Areas of the site have been mapped as floodplains according to the FEMA Map Nos. 08041C0558G and 08041C0566G (Figure 7, Reference 6). The physiographic floodplains

on site have been mapped on the Engineering Geology Map (Figure 6). The floodplain areas have been designated as open space and area to be avoided by development. Any area within the FEMA floodplain area will require approval of the Drainage Report. Finished floor levels must be a minimum of one foot above the floodplain level. Structures should not block drainages. Specific floodplain locations and drainage studies are beyond the scope of this report.

### ***6.1 Relevance of Geologic Conditions to Land Use Planning***

We understand that the development will be rural residential lots. It is our opinion that the existing geologic and engineering geologic conditions will impose some minor constraints on the proposed development and construction. The most significant problems affecting development will be those associated with the shallow groundwater areas on-site that can be avoided or properly mitigated during construction on each lot. Other hazards on site can be satisfactorily mitigated through proper engineering design and construction practices or avoidance.

The upper materials are typically at medium dense to dense states. Areas of loose soils were encountered that may require recompaction. The medium dense to dense granular soils encountered in the upper soil profiles of the test borings and test pits should provide good support for foundations. Loose soils, if encountered beneath foundations or slabs, will require removal and recompaction. Expansive soils, although sporadic, were encountered. Expansive clayey sandstone and claystone are common in the Dawson Formation, and may require mitigation. Foundations anticipated for the site are standard spread footings possibly in conjunction with overexcavation in areas of expansive soils or loose soils. Areas of artificial fill, if encountered beneath foundations will require penetration or recompaction. Areas containing arkosic sandstone will have high allowable bearing conditions. 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 seasonal and potentially seasonal shallow groundwater, ponded water, and floodplains exist on this site. The floodplains and areas of ponded water are to be avoided by development and preserved as open space in drainage easements. Finished floor levels must be a minimum of one foot above the floodplain level. Exact floodplain locations are beyond the scope of this



report. According to the site plan (Figure 6), some of the minor drainages can be avoided or filled which will mitigate the hazard.

Areas of perched groundwater may be encountered on this site. Permeable sands exist on the site that may carry water in the subsurface perched on less permeable bedrock. Groundwater was encountered at depths ranging from 12 to 14 feet in the test borings and at 6 to 7.5 feet in seven of the test pits with signs of seasonal water at 2.5 feet in Test Pit No. 40. Fluctuation in groundwater conditions may occur due to variations in rainfall, soil conditions and development of surrounding areas. Builders should be cognizant of the potential for the occurrence of subsurface water features during construction and deal with each individual problem as necessary at the time of construction. Subsurface drains may be necessary in some areas to prevent the intrusion of water below grade. Dewatering systems may be necessary in some areas where seepage and perched water occurs. Drain details are included in Figures 8 through 10. Unstable conditions should be expected where excavations approach the groundwater level. Stabilization using geofabric or shot rock may be necessary.

Areas of hydrocompaction have been identified on this site where there is the potential for settlement movements upon saturation of the surficial soils. Good surface and subsurface drainage is critical in these areas and the ground surface should be positively sloped away from structures at all points. Roof drains should be made to discharge well away from structures and planting and watering in the immediate vicinity of structures should be minimized.

In summary, development of the site can be achieved if the items discussed above are mitigated. These items can be mitigated through proper design and construction or by avoidance. Investigation on each lot is recommended prior to construction.

## **7.0 ON-SITE WASTEWATER TREATMENT**

The site was evaluated for individual and commercial on-site wastewater treatment systems in accordance with El Paso Land Development Code. Forty (40) tactile test pits were performed on the property. The test pits were located in potential locations of future systems. The approximate locations of the test pits are indicated on Figure 3, on the Geology/Engineering Geology Map,

Figure 6, and on the Septic Suitability Map, Figure 11. A table showing the results of the Tactile Test Pits is presented in Table 3. Test Pit Logs are included in Appendix B.

The Natural Resource Conservation Service (Reference 2), previously the Soil Conservation Service (Reference 3) has mapped the site with four soil descriptions. The Soil Survey Map (Reference 2) is presented in Figure 4, and the Soil Survey Descriptions are presented in Appendix D. The soils are described as having moderate to very rapid percolation rates. The majority of the soils have been described with rapid permeabilities. The Natural Resource Conservation Service (NRCS) has rated the soil suitability with respect to septic tank absorption fields. The soils in the area have been described as very limited due to seepage, bottom layer, and filtering capacity. These areas are typically associated with shallow groundwater, shallow bedrock, and unsuitable soils which require designed systems. Flooding and depth to saturation zone are limitations on Soil Type 29. The majority of the areas mapped with Soil Type 29 lie within the drainage areas and will be avoided by development. The map and descriptions for the NRCS Septic Tank Absorption Field Soil Rating are included in Appendix E.

Soils encountered in the tactile test pits consisted of loamy sand, sandy clay loam and sandy clay. Bedrock was encountered in the test pits at 2 to 6 feet bgs, which were excavated to 5 to 8 feet. Groundwater or signs of seasonally occurring groundwater were encountered at depths ranging from 3.5 to 7.5 in Test Pit Nos. 13, 28, 33, 36, 38 and 40. The limiting layers encountered in the test pits are the sandy loam (Soil Type 2), sandy clay loam (Soil Type 3A) and sandy claystone and sandstone (Soil Type 4A) which corresponds to LTAR values ranging from 0.80 to 0.15 gallons per day per square foot. Designed systems will be required where bedrock or groundwater are encountered at 6 feet bgs or shallower. Approximately half of the areas tested would require designed systems due to restrictive clay soils, shallow bedrock or shallow groundwater. Additional investigation of individual lots may identify areas where suitable for conventional systems could be used.

In summary, it is our opinion the site is suitable for individual on-site wastewater treatment systems (OWTS) and that contamination of surface and subsurface water resources should not occur provided the OWTS sites are evaluated and installed according to El Paso County and State Guidelines and properly maintained. Based on the testing performed as part of this investigation designed systems will likely be required for the majority of the lots. A Septic

Suitability Map is presented in Figure 11. Areas where OWTS sites are not recommended are also indicated on Figure 11. Individual soil testing is required on each lot prior to construction. Absorption fields must be located a minimum of 100 feet from any well, including those on adjacent properties. Absorption fields must also be located a minimum of 50 feet from any drainages, floodplains or ponded areas and 25 feet from dry gulches.

## **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 7), the area is mapped with upland deposits. According to the *Atlas of Sand, Gravel and Quarry Aggregate Resources, Colorado Front Range Counties* distributed by the Colorado Geological Survey (Reference 8), areas of the site are mapped with alluvial fan: sand deposits, upland deposits: sand and probable aggregate resource, and valley fill: probable aggregate resource. According to the *Evaluation of Mineral and Mineral Fuel Potential* (Reference 9), the area of the site has been mapped as "Good" for industrial minerals. However, considering the abundance of similar materials through the region and the close proximity to developed land, they would be considered to have little significance as an economic resource.

According to the *Evaluation of Mineral and Mineral Fuel Potential of El Paso County State Mineral Lands* (Reference 9), 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 9).

The site has been mapped as "Fair" for oil and gas resources (Reference 9). 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.

## **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 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.

## **10.0 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 is consistent with anticipated geologic and engineering geologic conditions.

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

**TABLE 1**  
**SUMMARY OF LABORATORY TEST RESULTS FROM TEST BORINGS**

CLIENT WILLIAM GUMAN  
PROJECT CURTIS AND JUDGE ORR  
JOB NO. 181823

SOIL TYPE	TEST BORING NO.	DEPTH (FT)	WATER (%)	DRY DENSITY (PCF)	PASSING NO. 200 SIEVE (%)	LIQUID LIMIT (%)	PLASTIC INDEX (%)	SULFATE (WT %)	FHA SWELL (PSF)	SWELL/CONSOL (%)	UNIFIED CLASSIFICATION	SOIL DESCRIPTION
1	1	2-3			12.0	NV	NP	<0.01			SM	SAND, SILTY
1	2	5			13.8						SM	SAND, SILTY
1	4	2-3			3.2						SW	SAND
3	3	10			12.9	NV	NP	<0.01			SM	SANDSTONE, SILTY
4	4	20	21.4	104.2	52.5	NV	NP	<0.01		0.0	ML	SILTSTONE, VERY SANDY



TABLE 2

## SUMMARY OF LABORATORY TEST RESULTS FROM TEST PITS

CLIENT GUMAN AND ASSOCIATES  
 PROJECT CURTIS RD AND JUGRE ORR RD  
 JOB NO. 181823

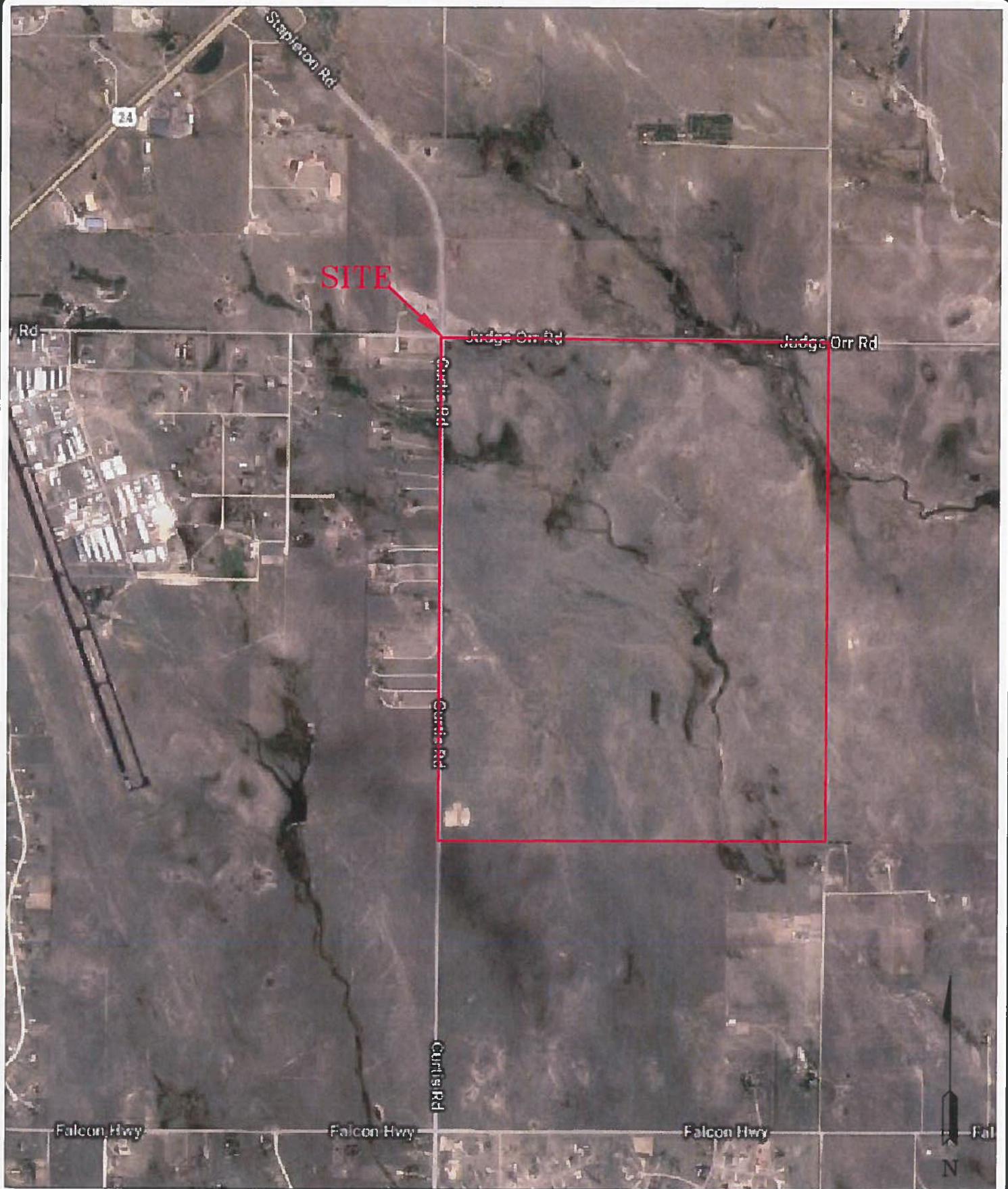
SOIL TYPE	TEST PIT NO.	DEPTH (FT)	WATER (%)	DRY DENSITY (PCF)	PASSING NO. 200 SIEVE (%)	LIQUID LIMIT (%)	PLASTIC INDEX (%)	SULFATE (WT %)	FHA SWELL (PSF)	SWELL/CONSOL (%)	UNIFIED CLASSIFICATION	SOIL DESCRIPTION
1	2	2-3			7.6						SM-SW	SAND, SLIGHTLY SILTY
1	3	5-6			9.8						SM-SW	SAND, SLIGHTLY SILTY
1	6	4-6			5.5						SM-SW	SAND, SLIGHTLY SILTY
1	9	2-3			26.5	24	9				SC	SAND, CLAYEY
1	11	5-6			10.4						SM-SW	SAND, SLIGHTLY SILTY
1	12	2-3			6.6						SM-SW	SAND, SLIGHTLY SILTY
1	13	5-6			30.3	25	11				SC	SAND, CLAYEY
1	15	2-3			27.5				820		SC	SAND, CLAYEY
1	18	5-6			1.6						SW	SAND
1	21	5-6			23.4						SC	SAND, CLAYEY
1	37	6-7			30.1	19	3		430		SM	SAND, SILTY
1	31	2-3			16.6						SM	SAND, SILTY
1	32	4-5			44.3						SC	SAND, VERY CLAYEY
1	33	2-3			4.3						SW	SAND
1	35	5-6			2.2						SW	SAND
1	36	2-3			8.2						SM-SW	SAND, SLIGHTLY SILTY
1	38	2-3			3.1						SW	SAND
1	39	5-6			12.4						SM	SAND, SILTY
2	1	7-8			70.3	49	31		1360		CL	CLAY, SANDY
2	4	2-3			56.4	26	12				CL	CLAY, VERY SANDY
2	5	7-8			69.6	32	19		880		CL	CLAY, SANDY
2	16	7-8			92.9				4420		CL	CLAY, SANDY
3	8	4-5			44.8	29	13				SC	SANDSTONE, VERY CLAYEY
3	10	5-6			16.6						SM	SANDSTONE, SILTY
3	17	5-6			12.6						SM	SANDSTONE, SILTY
3	34	5-6			16.9						SM	SANDSTONE, SILTY
3	40	5-6			13.9						SM	SANDSTONE, SILTY
4	7	6-7			91.8				2300		CL	CLAYSTONE, SANDY
4	14	4-5			76.1	47	23		3160		CL	CLAYSTONE, SANDY
4	23	5-6			57.0				450		CL	CLAYSTONE, VERY SANDY

**TABLE 3: SUMMARY OF TACTILE TEST PIT RESULTS**

Test Pit No.	USDA Soil Type	LTAR Value	Depth to Bedrock (ft)	Depth to Groundwater (ft)
TP-1	4A*	0.15	N/A	N/A
TP-2	1	0.8	N/A	N/A
TP-3	4A*	0.15	N/A	N/A
TP-4	3A*	0.3	N/A	N/A
TP-5	4A*	0.15	N/A	N/A
TP-6	2A	0.5	N/A	N/A
TP-7	4A*	0.15	2.5	N/A
TP-8	4A*	0.15	2.5	N/A
TP-9	3A*	0.3	N/A	N/A
TP-10	3A*	0.3	4	N/A
TP-11	1	0.8	N/A	N/A
TP-12	1	0.8	N/A	N/A
TP-13	4A*	0.15	N/A	6
TP-14	4A*	0.15	2.5	N/A
TP-15	4A*	0.15	2.5	N/A
TP-16	2A	0.5	N/A	N/A
TP-17	4A*	0.15	4	N/A
TP-18	2A	0.5	N/A	N/A
TP-19	2A	0.5	N/A	N/A
TP-20	2A	0.5	N/A	N/A
TP-21	2	0.6	N/A	N/A
TP-22	2A	0.5	N/A	N/A
TP-23	4A*	0.3	N/A	N/A
TP-24	2A	0.5	N/A	N/A
TP-25	1	0.8	N/A	N/A
TP-26	3A*	0.3	N/A	N/A
TP-27	2A	0.5	N/A	N/A
TP-28	2A	0.5	N/A	6.5
TP-29	2A	0.5	N/A	N/A
TP-30	4A*	0.15	N/A	6.5
TP-31	2A	0.5	N/A	N/A
TP-32	4A*	0.15	6	N/A
TP-33	2A	0.5	N/A	7.5
TP-34	3A*	0.3	4.5	N/A
TP-35	2A	0.5	N/A	N/A
TP-36	3A*	0.3	N/A	6
TP-37	3A*	0.3	N/A	N/A
TP-38	2A	0.5	N/A	6.5
TP-39	2A	0.5	N/A	N/A
TP-40	4A*	0.15	2.5	3.5

\*- CONDITIONS THAT REQUIRE AND ENGINEERED OWTS

## FIGURES



**ENTECH**  
ENGINEERING, INC.

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

VICINITY MAP  
CURTIS ROAD SUBDIVISION  
CURTIS ROAD AND JUDGE ORR ROAD  
EL PASO COUNTY, CO.  
FOR: WILLIAM GUMAN AND ASSOCIATES, LTD

DRAWN:  
LLL

DATE:  
2/11/19

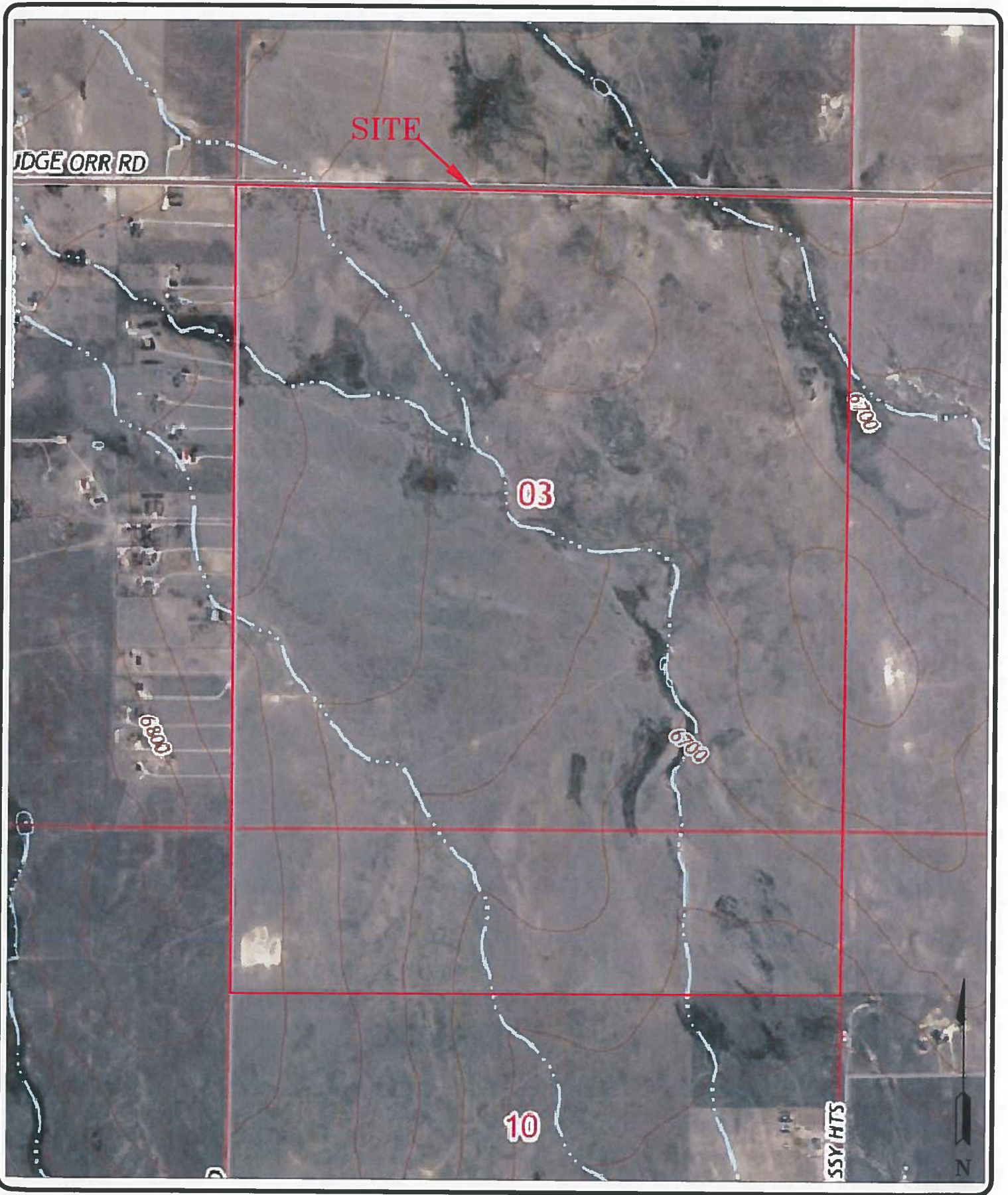
CHECKED:

DATE:

JOB NO.:  
181823

FIG NO.:  
1





**ENTECH**  
**ENGINEERING, INC.**

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

USGS MAP  
CURTIS ROAD SUBDIVISION  
CURTIS ROAD AND JUDGE ORR ROAD  
EL PASO COUNTY, CO.  
FOR: WILLIAM GUMAN AND ASSOCIATES, LTD

DRAWN:  
LLL

DATE:  
2/11/19

CHECKED:

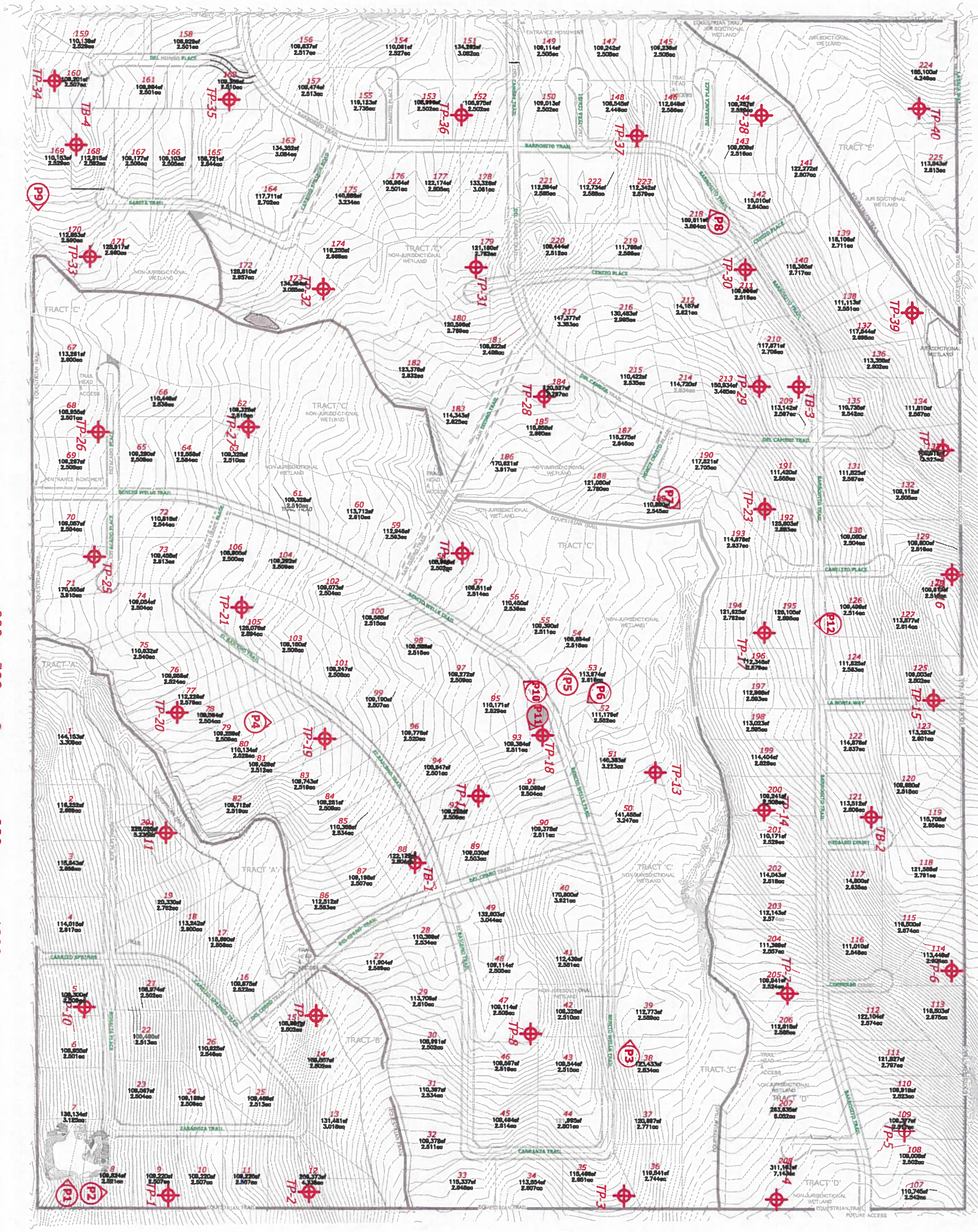
DATE:

JOB NO.:  
181823

FIG NO.:  
2




LEGEND  
TB- APPROXIMATE TEST BORING LOCATION AND NUMBER  
P2 - APPROXIMATE PHOTOGRAPH LOCATION AND NUMBER  
TP- APPROXIMATE TEST PIT LOCATION AND NUMBER



DATE	4/25/19
CHECKED	AS SHOWN
BY	10/10/23
3	10/10/23

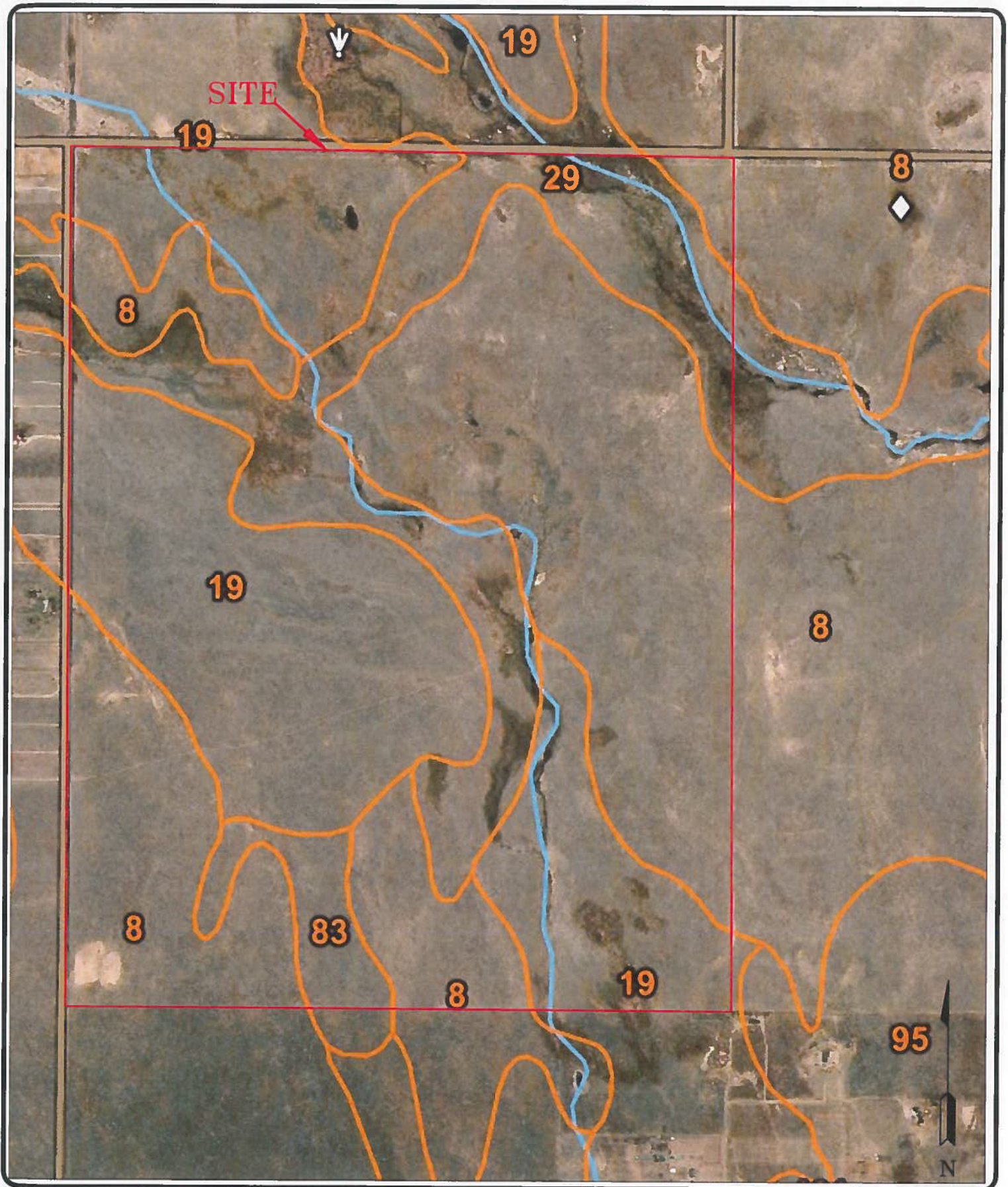
SITE PLAN/TEST BORING LOCATION MAP  
SADDLEHORN RANCH SUBDIVISION  
CURTIS ROAD AND JUDGE ORR ROAD  
EL PASO COUNTY, CO.  
FOR: WILLIAM GUMAN AND ASSOCIATES, LTD



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

REVISION	BY





**ENTECH**  
ENGINEERING, INC.

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

SOIL SURVEY MAP  
CURTIS ROAD SUBDIVISION  
CURTIS ROAD AND JUDGE ORR ROAD  
EL PASO COUNTY, CO.  
FOR: WILLIAM GUMAN AND ASSOCIATES, LTD

DRAWN:  
LLL

DATE:  
2/11/19

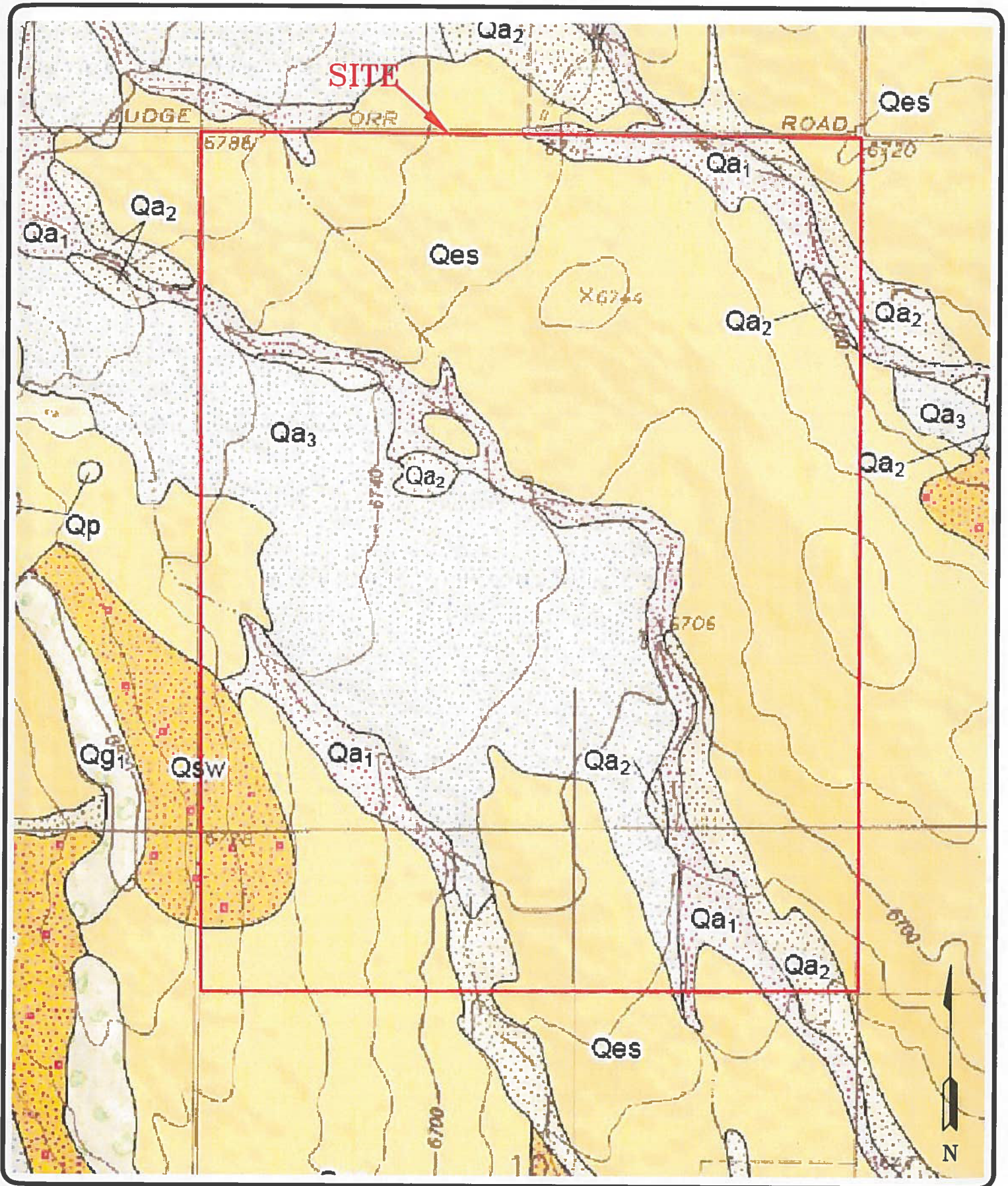
CHECKED:

DATE:

JOB NO.:  
181823

FIG NO.:  
4





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

FALCON QUADRANGLE GEOLOGIC MAP  
CURTIS ROAD SUBDIVISION  
CURTIS ROAD AND JUDGE ORR ROAD  
EL PASO COUNTY, CO.  
FOR: WILLIAM GUMAN AND ASSOCIATES, LTD

DRAWN:  
LLL

DATE:  
2/11/19

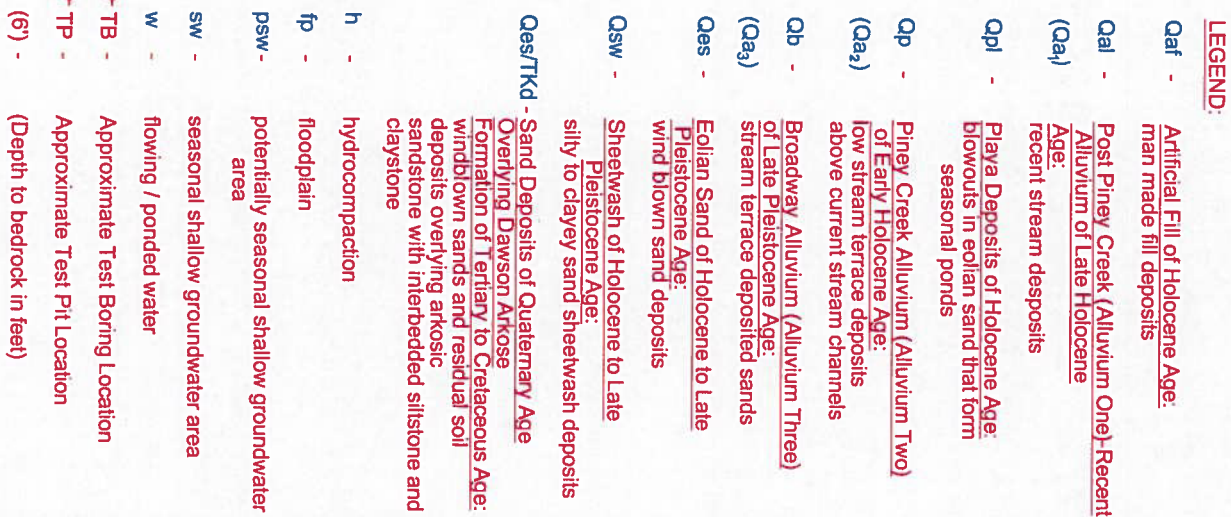
CHECKED:

DATE:

JOB NO.:  
181823

FIG NO.:  
5





REVISION	BY
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DATE	4/28/19
SCALE	AS SHOWN
JOB NO.	181823
FIGURE NO.	



LEGEND

SPECIAL FLOOD HAZARD AREAS SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

The 1% annual chance flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V, and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

ZONE A

No Base Flood Elevations determined.

ZONE AE

Base Flood Elevations determined.

ZONE AM

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 AR

Special Flood Hazard Area formerly protected from the 1% annual chance flood by a flood control system that was subsequently derelict. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.

ZONE A99

Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.

ZONE V

Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.

ZONE VE

Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream, plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

Areas of 0.2% annual chance flood: areas of 1% annual chance flood with average depth of less than 1 foot or with discharge area less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

Areas determined to be outside the 0.2% annual chance floodplain.

ZONE D

Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

OTHERWISE PROTECTED AREAS (OPAs)

OPAs are normally located within or adjacent to Special Flood Hazard Areas.

1% annual chance floodplain boundary

0.2% annual chance floodplain boundary

Floodway boundary

Zone D boundary

CBRS and OPA boundary

Boundary dividing Special Flood Hazard Area Zone and boundary dividing Special Flood Hazard Areas of different

Base Flood Elevations, flood depths or flood velocities.

River Flood Elevation line and value; elevation in feet.

Base Flood Elevation value where uniform within areas; elevation in feet.

Referenced to the National Geodetic Vertical Datum of 1929

Traverse line

Traverse line

Geographic coordinates referenced to the North American Datum of 1983 (NAD 83), Western Hemisphere

1000-meter Universal Transverse Mercator grid tick values, zone 4

5000-foot grid tick values, Hawaii State Plane coordinate system, zone 3 (FIPS ZONE 5103), Transverse Mercator projection

Barich mark (see explanation in Notes to Users section of this FRM, panel)

Coastal mile marker

MAP REPOSITORY

Refer to listing of Map Repositories on Map Index

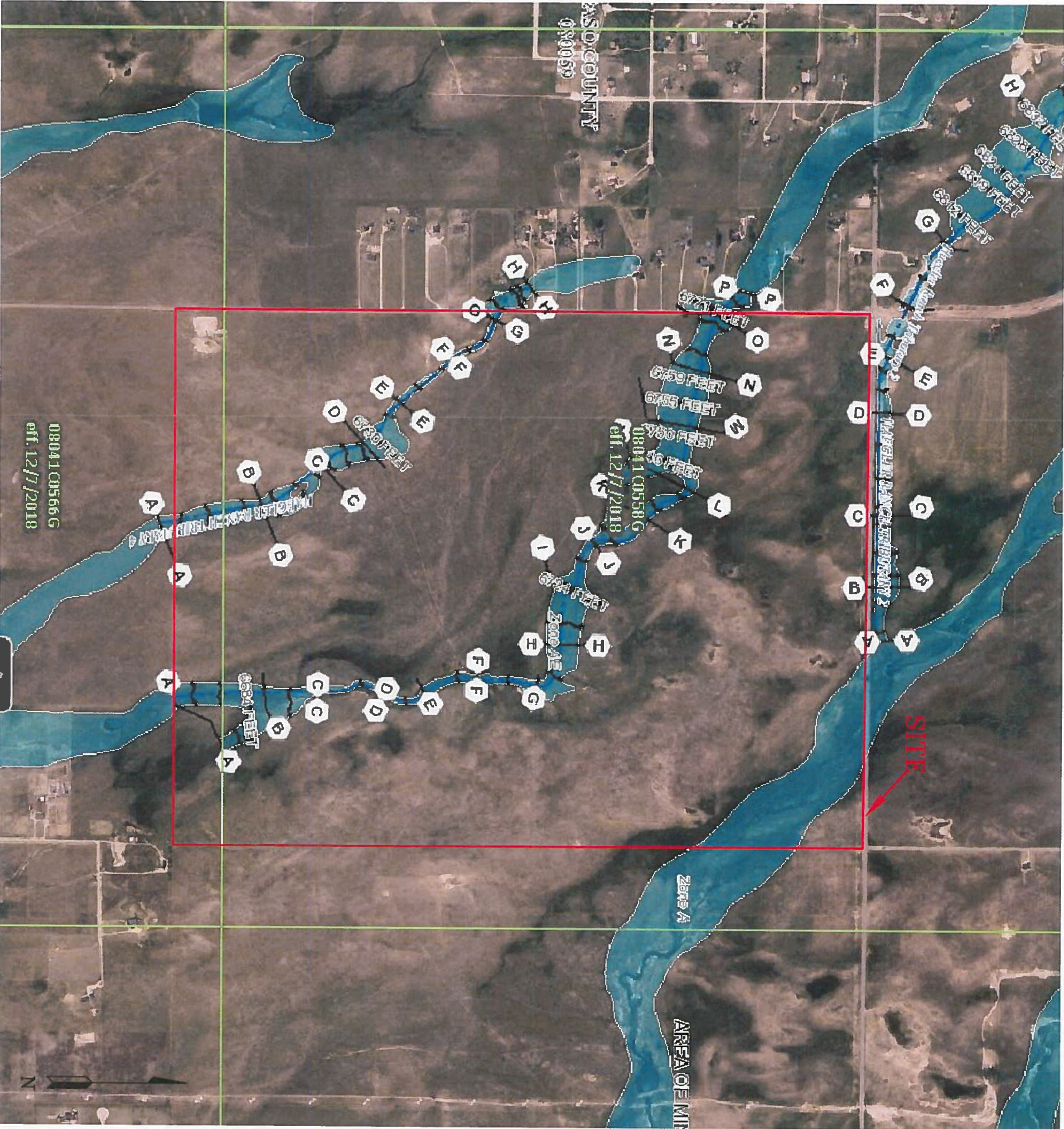
EFFECTIVE DATE OF COUNTDOWN

FLOOD INSURANCE RATE MAP

November 20, 2000

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL

September 30, 2004 - to change Special Flood Hazard Areas, to update map format, to reflect revised shoreline and to incorporate previously issued letters of Map Revision.



REVISION BY

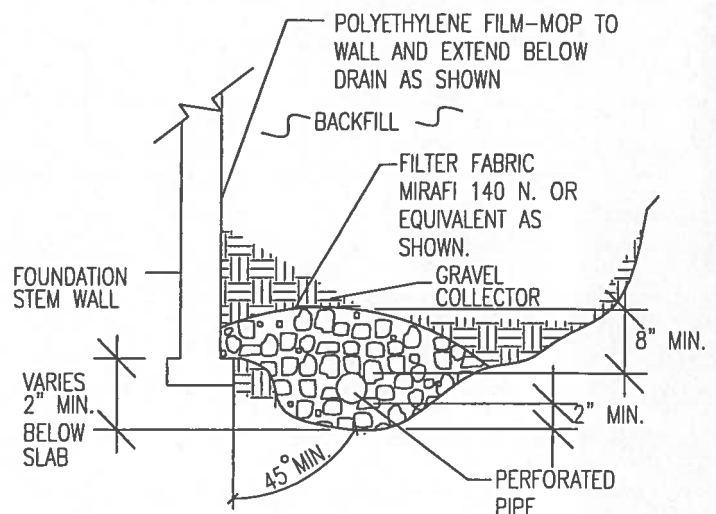
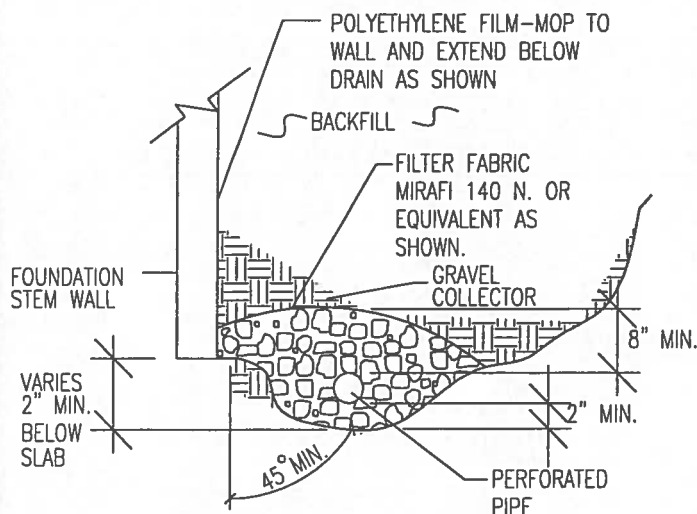

**ENTECH**  
ENGINEERING, INC.  
505 ELKTON DRIVE  
COLORADO SPRINGS, CO. 80907 (719) 531-5599



FLOODPLAIN MAP  
CURTIS ROAD SUBDIVISION  
CURTIS ROAD AND JUDGE ORR ROAD  
EL PASO COUNTY, CO.  
FOR: WILLIAM GUMAN AND ASSOCIATES, LTD

DATE	2/21/19
CHECKED	AS SHOWN
DATE	10/03/19
NAME	MADE





#### 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.



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

#### PERIMETER DRAIN DETAIL

DRAWN:

DATE:

4/20/19

DESIGNED:

DS

CHECKED:

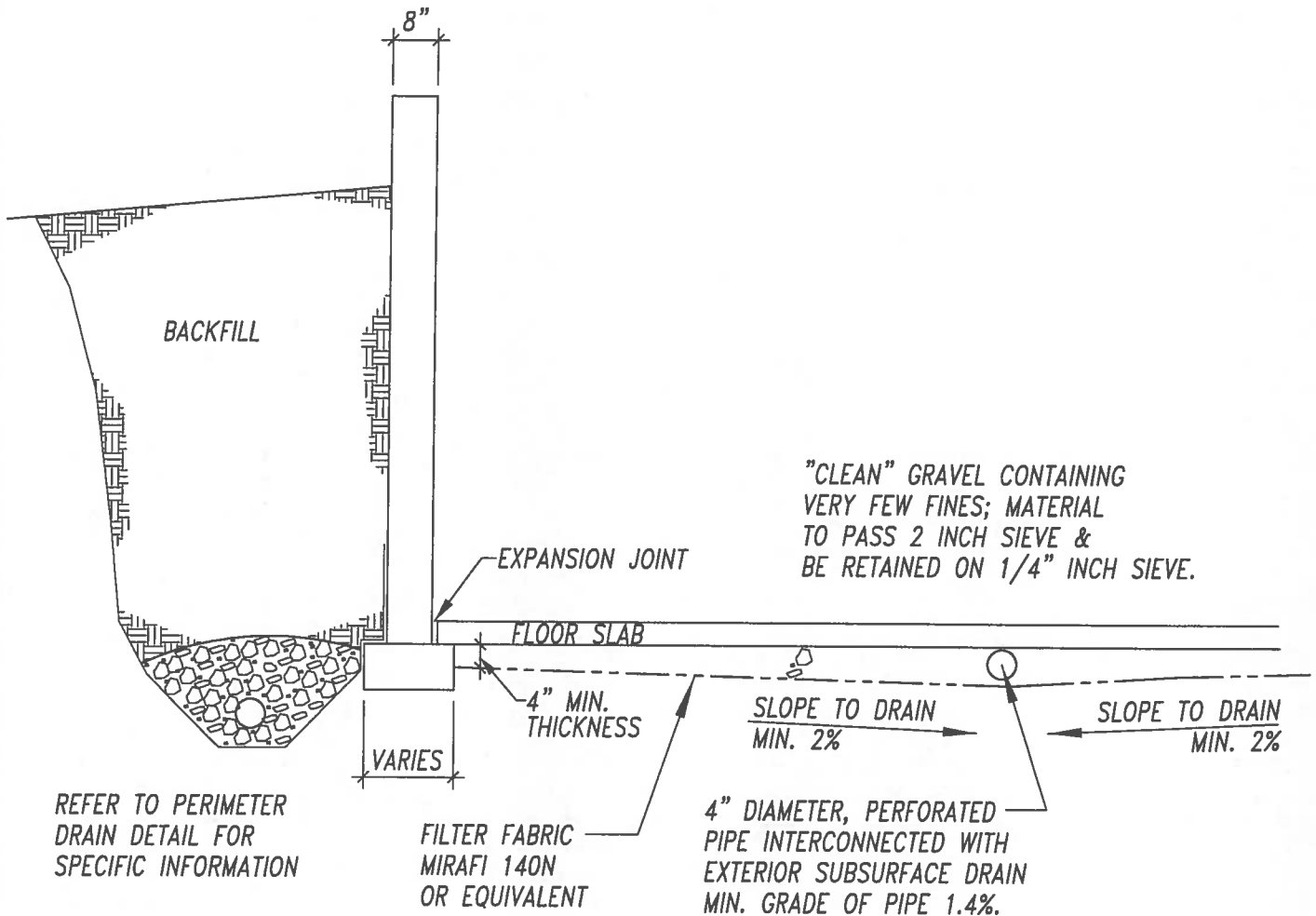
W

JOB NO.:

101823

FIG NO.:

8



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

TYP. UNDERSLAB DRAINAGE  
LAYER (CAPILLARY BREAK)

DRAWN:

DATE:

7/22/19

DESIGNED:

DS

CHECKED:

h

JOB NO.:

181823

FIG NO.:

9



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

## 10





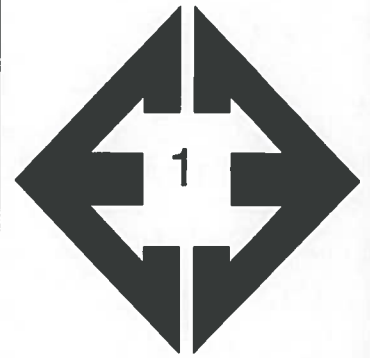
**ENTECH**  
**ENGINEERING, INC.**  
505 ELKTON DRIVE  
COLORADO SPRINGS, CO. 80907 (719) 531-5599

REVISION	BY
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DRAWN  
 I.T./JAG  
 CHECKED  
 DATE  
 4/29/19  
 SCALE  
 AS SHOWN  
 JOB NO.  
 161623  
 PICTURE NO.  
 11



## **APPENDIX A: Site Photographs**



**Looking north from the  
southwest corner of  
the site.**

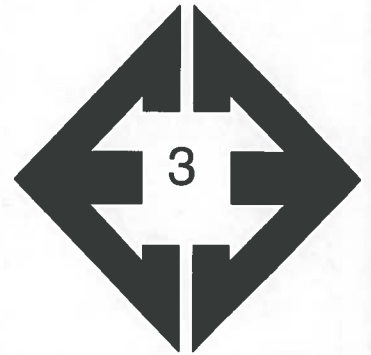
December 6, 2018



**Looking east from the  
southwest corner of  
the site.**

December 6, 2018





**Looking north along  
drainage in the  
southeastern portion  
of the site.**

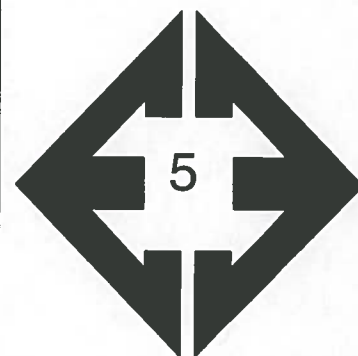
December 6, 2018



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

December 6, 2018





**Looking north along  
drainage in the east  
central of the site.**

December 6, 2018



**Looking southwest  
towards pond and  
windmill in the east  
central portion of the  
site.**

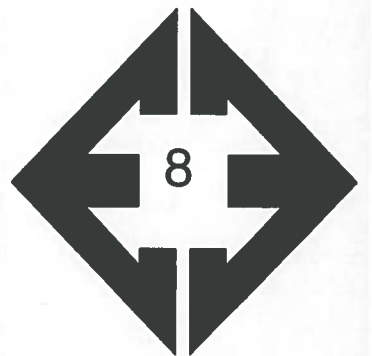
December 6, 2018





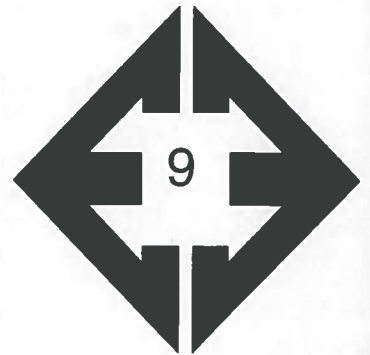
**Looking southeast  
from the northeastern  
portion of the site.**

December 7, 2018



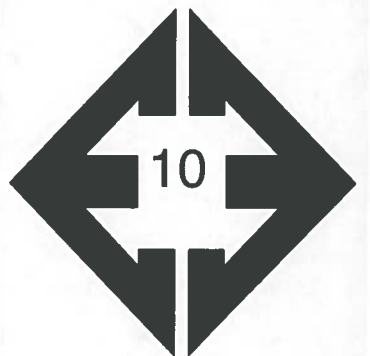
**Looking northwest  
from the northeastern  
portion of the site.**

December 7, 2018



**Looking south from  
the northwestern  
portion of the site.**

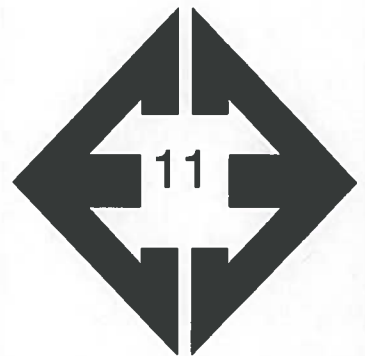
December 7, 2018



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

December 7, 2018





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

December 7, 2018



**Looking west from the  
eastern portion of the  
site.**

January 23, 2019

## **APPENDIX B: Test Pit Logs**

TEST BORING NO. 1  
 DATE DRILLED 4/2/2019  
 Job # 181823

TEST BORING NO. 2  
 DATE DRILLED 4/2/2019  
 CLIENT WILLIAM GUMAN  
 LOCATION CURTIS AND JUDGE ORR

REMARKS

WATER @ 12', 4/3/19

6" TOP SOIL, SAND, SILTY, FINE  
 TO COARSE GRAINED, TAN,  
 DENSE TO MEDIUM DENSE,  
 MOIST TO WET

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
5			37	2.9	1
5			13	5.8	1
10			15	19.7	1
15			38	10.4	1
20			41	7.6	1



REMARKS

WATER @ 13', 4/3/19

6" TOP SOIL, SAND, SILTY, FINE  
 TO COARSE GRAINED, TAN,  
 DENSE, MOIST TO WET

SILTSTONE, SANDY, BROWN,  
 HARD, WET

SANDSTONE, SILTY, FINE TO  
 COARSE GRAINED, BROWN,  
 VERY DENSE, WET

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
5			33	6.0	1
5			45	6.6	1
10			44	37.5	1
15			50	22.2	4
20			50	10.2	3
20			5"		



**ENTECH**  
**ENGINEERING, INC.**

505 ELKTON DRIVE  
 COLORADO SPRINGS, COLORADO 80907

TEST BORING LOG

DRAWN:

DATE:

CHECKED:

DATE:

LLL

4/12/19

JOB NO.:  
 181823

FIG NO.:

B-1

TEST BORING NO. 3  
 DATE DRILLED 4/2/2019  
 Job # 181823

TEST BORING NO. 4  
 DATE DRILLED 4/2/2019  
 CLIENT WILLIAM GUMAN  
 LOCATION CURTIS AND JUDGE ORR

REMARKS

WATER @ 12', 4/3/19

6" TOPSOIL, SAND, SILTY, FINE TO COARSE GRAINED, TAN, DENSE TO MEDIUM DENSE, MOIST TO WET

SANDSTONE, SILTY, FINE TO COARSE GRAINED, GRAY BROWN, VERY DENSE, WET



Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
5			44	7.3	1
			41	8.6	1
10			50 9"	11.8	3
15			50 8"	11.7	3
20			50 6"	14.8	3

REMARKS

WATER @ 14', 4/3/19

6" TOPSOIL, SAND, CLEAN TO SILTY, FINE TO COARSE GRAINED, TAN, LOOSE TO DENSE, MOIST

SILTSTONE, VERY SANDY, DARK GRAY, HARD, WET



Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
5			7	2.6	1
			10	2.3	1
10			30	4.0	1
15			32	9.6	1
20			50 4"	21.3	4



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**ENGINEERING, INC.**

505 ELKTON DRIVE  
 COLORADO SPRINGS, COLORADO 80907

TEST BORING LOG

DRAWN:

DATE:

CHECKED:

LLL

DATE:

4/12/19

JOB NO.:  
 181823

FIG NO.:

B-2



TEST PIT NO. 1  
DATE EXCAVATED 12/14/2018  
Job # 181823

TEST PIT NO. 2  
DATE EXCAVATED 12/14/2018  
CLIENT GUMAN AND ASSOCIATES, LTD  
LOCATION CURTIS ROAD AND JUDGE ORR 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, loamy sand, brown	1			sg		1	topsoil, loamy sand, brown	1			sg		1
loamy sand, fine to medium grained, tan	2						loamy sand, fine to medium grained, tan	2					
	3							3					
	4							4					
	5							5					
	6							6					
sandy clay, orangish brown	7			gr	w	4A		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



**ENTECH  
ENGINEERING, INC.**

505 ELKTON DRIVE  
COLORADO SPRINGS, COLORADO 80907

**TEST PIT LOG**

DRAWN:

DATE:

CHECKED:

LLL

DATE:

2/16/19

JOB NO.:

181823

FIG NO.:

B-3

TEST PIT NO. 3  
DATE EXCAVATED 12/14/2018  
Job # 181823

TEST PIT NO. 4  
DATE EXCAVATED 12/14/2018  
CLIENT GUMAN AND ASSOCIATES, LTD  
LOCATION CURTIS ROAD AND JUDGE ORR 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 loam, brown	1			gr	w	2A	topsoil sandy clay loam, brown	1			gr	w	3A
sandy loam, fine to medium grained, tan	2						sandy clay loam, brown	2					
	3						clay lenses	3			sg		1
	4						loamy sand, fine to coarse grained, tan	4					
	5							5					
sandy clay, gray brown	6			gr	m	4A		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



**ENTECH  
ENGINEERING, INC.**

505 ELKTON DRIVE  
COLORADO SPRINGS, COLORADO 80907

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DATE: 7/22/17

JOB NO.:

181823

FIG NO.:

B-4

TEST PIT NO. 5  
 DATE EXCAVATED 12/14/2018  
 Job # 181823

TEST PIT NO. 6  
 DATE EXCAVATED 12/14/2018  
 CLIENT GUMAN AND ASSOCIATES, LTD  
 LOCATION CURTIS ROAD AND JUDGE ORR 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 loam, brown	1			gr	w	2A	topsoil sandy loam, brown	1			gr	w	2A
sandy loam, fine to medium grained, light brown	2						sandy loam, fine to coarse grained, tan	2					
	3							3					
	4							4					
	5							5					
	6						loamy sandy, fine to medium grained, tan	6			sg		1
sandy clay, light brown	7			gr	w	4A		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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505 ELKTON DRIVE  
 COLORADO SPRINGS, COLORADO 80907

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DRAWN:

DATE:

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DATE:

LLL 2/16/19

JOB NO.:

181823

FIG NO.:

B-5

TEST PIT NO. 7  
 DATE EXCAVATED 12/14/2018  
 Job # 181823

TEST PIT NO. 8  
 DATE EXCAVATED 12/14/2018  
 CLIENT GUMAN AND ASSOCIATES, LTD  
 LOCATION CURTIS ROAD AND JUDGE ORR 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 loam, brown	1						topsoil sandy loam, brown	1					
sandy loam, fine to medium grained, tan	2			gr	w	2A	sandy loam, fine to medium grained, tan	2			gr	w	2A
weathered to formational sandy claystone, gray brown	3			ma		4A	weathered clayey sandstone, gray brown	3			ma		4A
	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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505 ELKTON DRIVE  
 COLORADO SPRINGS, COLORADO 80907

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DRAWN:

DATE:

CHECKED:

DATE:

LLL

2/16/19

JOB NO.:

181823

FIG NO.:

B-6

TEST PIT NO. 9  
DATE EXCAVATED 12/15/2018  
Job # 181823

TEST PIT NO. 10  
DATE EXCAVATED 12/15/2018  
CLIENT GUMAN AND ASSOCIATES, LTD  
LOCATION CURTIS ROAD AND JUDGE ORR 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 loam, brown	1						topsoil sandy loam, brown	1					
sandy clay loam, fine to coarse grained, light brown	2			gr	w	3A	gravelly sandy loam, fine to coarse grained, tan	2			gr	w	2A
	3							3					
sandy loam, fine to coarse grained, tan	4			gr	w	2A	weathered silty sandstone, fine to coarse grained, tan	4			ma		3A
	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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505 ELKTON DRIVE  
COLORADO SPRINGS, COLORADO 80907

**TEST PIT LOG**

DRAWN:

DATE:

CHECKED:

DATE:

LLL

2/16/19

JOB NO.:

181823

FIG NO.:

B-7

TEST PIT NO. 11  
 DATE EXCAVATED 12/15/2018  
 Job # 181823

TEST PIT NO. 12  
 DATE EXCAVATED 12/15/2018  
 CLIENT GUMAN AND ASSOCIATES, LTD  
 LOCATION CURTIS ROAD AND JUDGE ORR 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 loam, brown	1			sg		1	topsoil sandy loam, brown	1			sg		1
gravelly loamy sand, fine to coarse grained, tan	2						loamy sand, fine to coarse grained	2					
	3							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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505 ELKTON DRIVE  
 COLORADO SPRINGS, COLORADO 80907

**TEST PIT LOG**

DRAWN:

DATE:

CHECKED:  
 LLL

DATE:  
 2/16/19

JOB NO.:

181823

FIG NO.:

B-8

TEST PIT NO. 13  
 DATE EXCAVATED 12/15/2018  
 Job # 181823

TEST PIT NO. 14  
 DATE EXCAVATED 12/15/2018  
 CLIENT GUMAN AND ASSOCIATES, LTD  
 LOCATION CURTIS ROAD AND JUDGE ORR 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	1			gr	m	3	topsoil sandy loam, brown	1			gr	w	2A
sandy clay loam, fine to coarse grained, light brown	2						sandy loam, fine to coarse grained, tan	2					
	3						weathered to formational sandy claystone, gray brown	3			ma		4A
	4							4					
	5							5					
	6							6					
*-groundwater at 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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505 ELKTON DRIVE  
 COLORADO SPRINGS, COLORADO 80907

### TEST PIT LOG

DRAWN:

DATE:

CHECKED:  
 LLL

DATE:  
 2/16/19

JOB NO.:

181823

FIG NO.:

B-9

TEST PIT NO. 15  
 DATE EXCAVATED 12/15/2018  
 Job # 181823

TEST PIT NO. 16  
 DATE EXCAVATED 12/15/2018  
 CLIENT GUMAN AND ASSOCIATES, LTD  
 LOCATION CURTIS ROAD AND JUDGE ORR 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	1						topsoil sandy loam, brown	1					
sandy clay loam, fine to coarse grained	2			gr	w	3A	sandy loam, fine to medium grained, tan	2			gr	w	2A
formational sandy claystone, gray brown	3			ma		4A		3					
	4							4					
	5							5					
	6							6					
	7							7					
	8						sandy clay, light brown	8			gr	w	4A
	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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 COLORADO SPRINGS, COLORADO 80907

**TEST PIT LOG**

DRAWN:

DATE:

CHECKED:

DATE: 2/16/19

JOB NO.:

181823

FIG NO.:

B-10



TEST PIT NO. 17  
 DATE EXCAVATED 12/15/2018  
 Job # 181823

TEST PIT NO. 18  
 DATE EXCAVATED 12/15/2018  
 CLIENT GUMAN AND ASSOCIATES, LTD  
 LOCATION CURTIS ROAD AND JUDGE ORR 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 loam, brown	1			gr	w	2A	topsoil sandy loam, brown	1			gr	w	2A
sandy loam, fine to medium grained, tan	2						sandy loam, fine to medium grained, tan	2					
	3							3					
	4			ma		4A	gravelly loamy sand, fine to coarse grained, tan	4			sg		1
weathered to formational clayey sandstone, fine to medium grained, grayish tan	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:

DATE:

CHECKED:  
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DATE:  
 2/16/19

JOB NO.:  
 181823

FIG NO.:

B-11

TEST PIT NO. 19  
 DATE EXCAVATED 1/23/2019  
 Job # 181823

TEST PIT NO. 20  
 DATE EXCAVATED 1/23/2019  
 CLIENT GUMAN AND ASSOCIATES, LTD  
 LOCATION CURTIS ROAD AND JUDGE ORR 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 loamy sand, brown	1			sg		1	topsoil loamy sand, brown	1			gr	w	2A
loamy sand, fine to coarse grained, tan	2						loamy sand, fine to coarse grained, tan	2					
sandy loam, fine to coarse grained, tan	3			gr	w	2A	sand, fine to coarse grained, tan	3			sg		1
	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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 COLORADO SPRINGS, COLORADO 80907

**TEST PIT LOG**

DRAWN:

DATE:

CHECKED:

DATE:  
 2/16/19

JOB NO.:

181823

FIG NO.:

B-12

TEST PIT NO. 21  
 DATE EXCAVATED 1/23/2019  
 Job # 181823

TEST PIT NO. 22  
 DATE EXCAVATED 1/4/2019  
 CLIENT GUMAN AND ASSOCIATES, LTD  
 LOCATION CURTIS ROAD AND JUDGE ORR 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 loam, brown	1			gr	m	2	topsoil sandy loam, brown	1			sg		1
sandy loam, fine to medium grained, tan	2						loamy sand, fine to coarse grained, tan	2					
loamy sand to sand, fine to coarse grained, tan	3			sg		1		3					
	4							4					
	5							5					
	6						sandy loam, fine to coarse grained, tan	6			gr	w	2A
	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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DATE:

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DATE:

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2/16/19

JOB NO.:

181823

FIG NO.:

B-13

TEST PIT NO. 23  
 DATE EXCAVATED 1/4/2019  
 Job # 181823

TEST PIT NO. 24  
 DATE EXCAVATED 1/23/2019  
 CLIENT GUMAN AND ASSOCIATES, LTD  
 LOCATION CURTIS ROAD AND JUDGE ORR 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	1			gr	w	3A	topsoil sandy loam, brown	1			gr	w	2A
sandy clay loam, light brown	2			gr	w	3A	sandy loam, fine to coarse grained, tan	2			gr	w	2A
weathered silty sandstone, fine to coarse grained, grayish tan	3			ma		3A	loamy sand to sand, fine to coarse grained, tan	3			sg		1
	4							4					
	5							5					
weathered sandy claystone, gray brown	6			ma		4A		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:

DATE:

CHECKED:

DATE:

LLL

2/16/19

JOB NO.:

181823

FIG NO.:

B-14

TEST PIT NO. 25  
 DATE EXCAVATED 1/23/2019  
 Job # 181823

TEST PIT NO. 26  
 DATE EXCAVATED 1/23/2019  
 CLIENT GUMAN AND ASSOCIATES, LTD  
 LOCATION CURTIS ROAD AND JUDGE ORR 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 loamy sand, brown	1						topsoil loamy sand, brown	1					
loamy sand to sand, fine to medium grained, light brown	2			sg		1	loamy sand, fine to coarse grained, light brown	2			sg		1
	3						sandy clay loam, fine to coarse grained, light brown	3			gr	w	3A
	4						sand, fine to coarse grained	4			sg		1
	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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505 ELKTON DRIVE  
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**TEST PIT LOG**

DRAWN:

DATE:

CHECKED:

DATE:

LLL

2/16/19

JOB NO.:

181823

FIG NO.:

B-15

TEST PIT NO. 27  
 DATE EXCAVATED 1/23/2019  
 Job # 181823

TEST PIT NO. 28  
 DATE EXCAVATED 1/23/2019  
 CLIENT GUMAN AND ASSOCIATES, LTD  
 LOCATION CURTIS ROAD AND JUDGE ORR 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 loam, brown	1			gr	w	2A	topsoil sandy loam, brown	1			gr	w	2A
sandy loam, fine to coarse grained, light brown	2						sandy loam, fine to coarse grained, light brown	2					
loamy sand to sand, fine to coarse grained, tan	3			sg		1	sand, fine to coarse grained, tan	3			sg		1
	4							4					
	5						*-groundwater at 6.5'	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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505 ELKTON DRIVE  
 COLORADO SPRINGS, COLORADO 80907

**TEST PIT LOG**

DRAWN:

DATE:

CHECKED:

DATE: 2/16/19

JOB NO.:

181823

FIG NO.:

B-16

TEST PIT NO. 29  
 DATE EXCAVATED 1/23/2019  
 Job # 181823

TEST PIT NO. 30  
 DATE EXCAVATED 1/23/2019  
 CLIENT GUMAN AND ASSOCIATES, LTD  
 LOCATION CURTIS ROAD AND JUDGE ORR 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 loam, brown	1						topsoil sandy loam, brown	1					
sandy loam, fine to coarse grained, light brown	2			gr	w	2A	sandy loam, fine to coarse grained, light brown	2			gr	w	2A
loamy sand, fine to coarse grained, tan	3			sg		1	loamy sand, fine to coarse grained, tan	3			sg		1
	4						weathered clayey sandstone fine to coarse grained, grayish tan	4			ma		4A
	5							5					
	6							6					
	7						*-signs of seasonally occurring groundwater at 6.5'	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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505 ELKTON DRIVE  
 COLORADO SPRINGS, COLORADO 80907

**TEST PIT LOG**

DRAWN:

DATE:

CHECKED:

DATE:

LLL

2/16/19

JOB NO.:

181823

FIG NO.:

B-17

TEST PIT NO. 31  
 DATE EXCAVATED 1/4/2019  
 Job # 181823

TEST PIT NO. 32  
 DATE EXCAVATED 1/4/2019  
 CLIENT GUMAN AND ASSOCIATES, LTD  
 LOCATION CURTIS ROAD AND JUDGE ORR 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 loam, brown	1			gr	w	2A	topsoil sandy loam, brown	1			gr	w	2A
sandy loam, fine to coarse grained, ligh brown	2						sandy loam, fine to coarse grained, light brown	2					
loamy sand, fine to medium grained, tan	3			sg		1	sandy clay loam, gray brown	3			gr	w	3A
	4							4					
	5							5					
	6						weathered sandy claystone, gray brown	6			ma		4A
	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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505 ELKTON DRIVE  
 COLORADO SPRINGS, COLORADO 80907

**TEST PIT LOG**

DRAWN:

DATE:

CHECKED:

DATE:  
 2/16/19

JOB NO.:

181823

FIG NO.:

B-18



TEST PIT NO. 33  
 DATE EXCAVATED 1/4/2019  
 Job # 181823

TEST PIT NO. 34  
 DATE EXCAVATED 1/4/2019  
 CLIENT GUMAN AND ASSOCIATES, LTD  
 LOCATION CURTIS ROAD AND JUDGE ORR 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 loam, brown	1						topsoil sandy loam, brown	1					
sandy loam, fine to coarse grained, tan	2			gr	w	2A	sandy loam, fine to coarse grained, tan	2			gr	w	2A
gravelly loamy sand, tan	3			sg		1		3					
*-groundwater at 7.5'	4							4					
	5						weathered silty sandstone, fine to coarse grained, tan	5			ma		3A
	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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505 ELKTON DRIVE  
 COLORADO SPRINGS, COLORADO 80907

**TEST PIT LOG**

DRAWN:

DATE:

CHECKED:

DATE:

JOB NO.:

181823

FIG NO.:

B-19

TEST PIT NO. 35  
 DATE EXCAVATED 1/4/2019  
 Job # 181823

TEST PIT NO. 36  
 DATE EXCAVATED 1/4/2019  
 CLIENT GUMAN AND ASSOCIATES, LTD  
 LOCATION CURTIS ROAD AND JUDGE ORR ROAD

REMARKS

REMARKS	Depth (ft)	Symbol	Samples	Soil Structure Shape	Soil Structure Grade	USDA Soil Type
topsoil sandy loam, brown	1			gr	w	2A
sandy loam, fine to coarse grained, tan	2					
	3					
	4					
gravelly loamy sand, fine to coarse grained, tan	5			sg		1
	6					
	7					
	8					
	9					
	10					

REMARKS

REMARKS	Depth (ft)	Symbol	Samples	Soil Structure Shape	Soil Structure Grade	USDA Soil Type
topsoil sandy loam, brown	1					
sandy loam, fine to coarse grained, tan	2			gr	w	2A
	3					
	4					
	5					
sandy clay loam, gray	6			gr	w	3A
*-signs of seasonal occuring groundwater at 6'	7					
	8					
	9					
	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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505 ELKTON DRIVE  
 COLORADO SPRINGS, COLORADO 80907

TEST PIT LOG

DRAWN:

DATE:

CHECKED:

DATE:

LCL

2/16/19

JOB NO.:

181823

FIG NO.:

B-20

TEST PIT NO. 37  
 DATE EXCAVATED 1/4/2019  
 Job # 181823

TEST PIT NO. 38  
 DATE EXCAVATED 1/4/2019  
 CLIENT GUMAN AND ASSOCIATES, LTD  
 LOCATION CURTIS ROAD AND JUDGE ORR 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 loam, brown	1			sg		1	topsoil sandy loam, brown	1			gr	w	2A
loamy sand, fine to coarse grained, tan	2						sandy loam, fine to coarse grained, tan	2					
	3						loamy sand, fine to coarse grained, tan	3			sg		1
	4							4					
	5							5					
sandy clay loam, gray	6			gr	w	3A	sandy loam, fine to coarse grained, orangish tan	6			gr	w	2A
	7							7					
	8						*signs of seasonal occuring groundwater at 6.5'	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:

DATE:

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 LLL

DATE:  
 2/16/19

JOB NO.:

181823

FIG NO.:

13-21

TEST PIT NO. 39  
 DATE EXCAVATED 1/4/2019  
 Job # 181823

TEST PIT NO. 40  
 DATE EXCAVATED 1/4/2019  
 CLIENT GUMAN AND ASSOCIATES, LTD  
 LOCATION CURTIS ROAD AND JUDGE ORR 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 loam, brown	1	*					topsoil sandy loam, brown	1	*				
loamy sand, fine to coarse grained, tan	2			sg		1	sandy loam, fine to coarse grained, tan	2			gr	w	2A
	3						weathered to formational clayey sandstone, tan to orangish tan	3			ma		4A
	4							4					
sandy loam, fine to coarse grained, tan	5			gr	w	2A	*-signs of seasonal occuring groundwater at 3.5'	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:

DATE:

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DATE:  
 2/16/19

JOB NO.:

181823

FIG NO.:

B-22

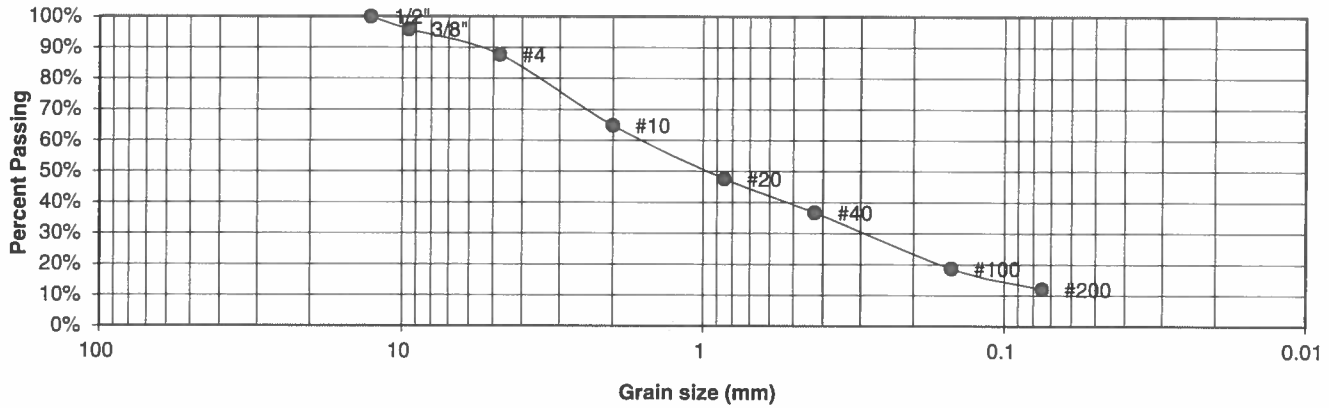
## **APPENDIX C: Laboratory Test Results**



UNIFIED CLASSIFICATION	SM
SOIL TYPE #	1
TEST BORING #	1
DEPTH (FT)	2-3

CLIENT	WILLIAM GUMAN
PROJECT	CURTIS AND JUDGE ORR
JOB NO.	181823
TEST BY	BL

### Sieve Analysis Grain Size Distribution



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	100.0%
3/8"	95.8%
4	87.7%
10	64.8%
20	47.7%
40	36.7%
100	18.7%
200	12.0%

Atterberg  
Limits

Plastic Limit	NP
Liquid Limit	NV
Plastic Index	NP

Swell

Moisture at start

Moisture at finish

Moisture increase

Initial dry density (pcf)

Swell (psf)



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### LABORATORY TEST RESULTS

DRAWN:

DATE:

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DATE:

LL

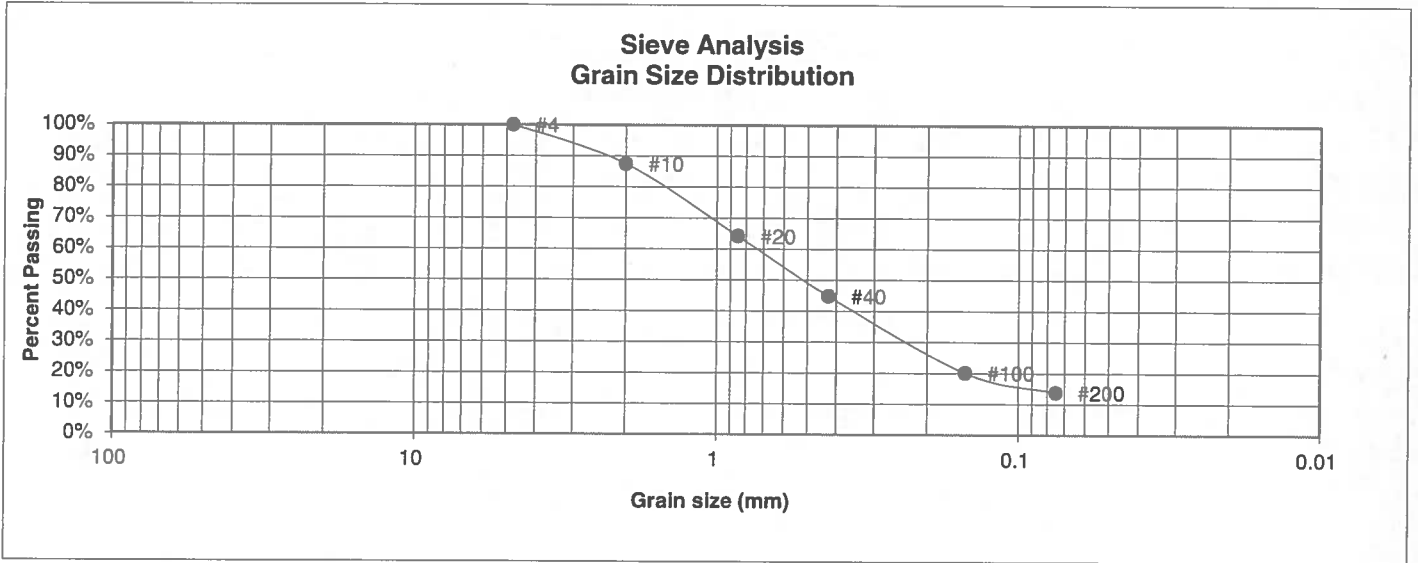
4/15/19

JOB NO.:  
181823

FIG NO.:

C-1

<u>UNIFIED CLASSIFICATION</u>	SM	<u>CLIENT</u>	WILLIAM GUMAN
<u>SOIL TYPE #</u>	1	<u>PROJECT</u>	CURTIS AND JUDGE ORR
<u>TEST BORING #</u>	2	<u>JOB NO.</u>	181823
<u>DEPTH (FT)</u>	5	<u>TEST BY</u>	BL



<u>U.S. Sieve #</u>	<u>Percent Finer</u>
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	
4	100.0%
10	87.5%
20	64.2%
40	44.8%
100	20.1%
200	13.8%

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

<u>DRAWN:</u>	<u>DATE:</u>	<u>CHECKED:</u>	<u>DATE:</u>
		LL	4/15/19

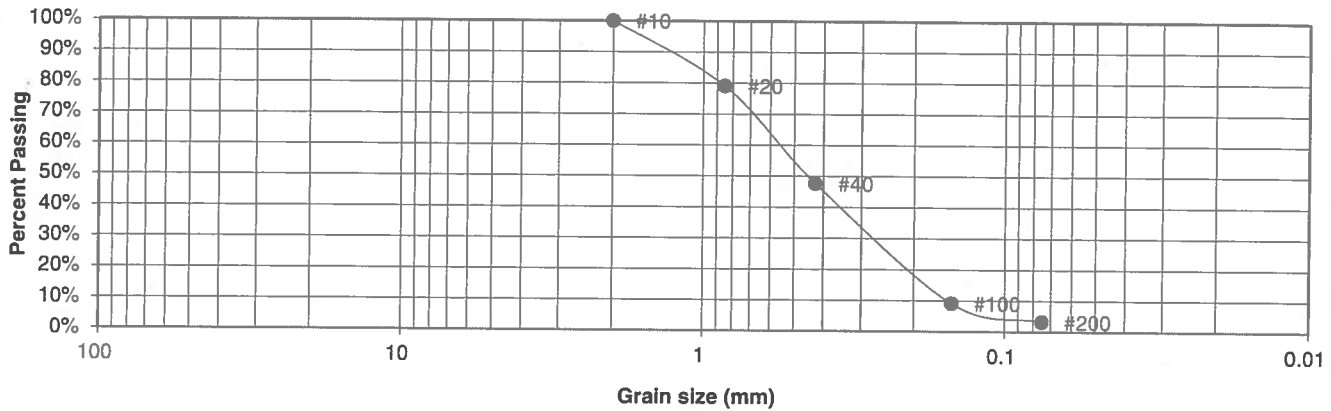
JOB NO.:  
181823

FIG NO.:

C-2

UNIFIED CLASSIFICATION	SW	CLIENT	WILLIAM GUMAN
SOIL TYPE #	1	PROJECT	CURTIS AND JUDGE ORR
TEST BORING #	4	JOB NO.	181823
DEPTH (FT)	2-3	TEST BY	BL

### Sieve Analysis Grain Size Distribution



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	
4	
10	100.0%
20	79.1%
40	47.7%
100	9.1%
200	3.2%

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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### LABORATORY TEST RESULTS

DRAWN:

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DATE:

LL

4/15/19

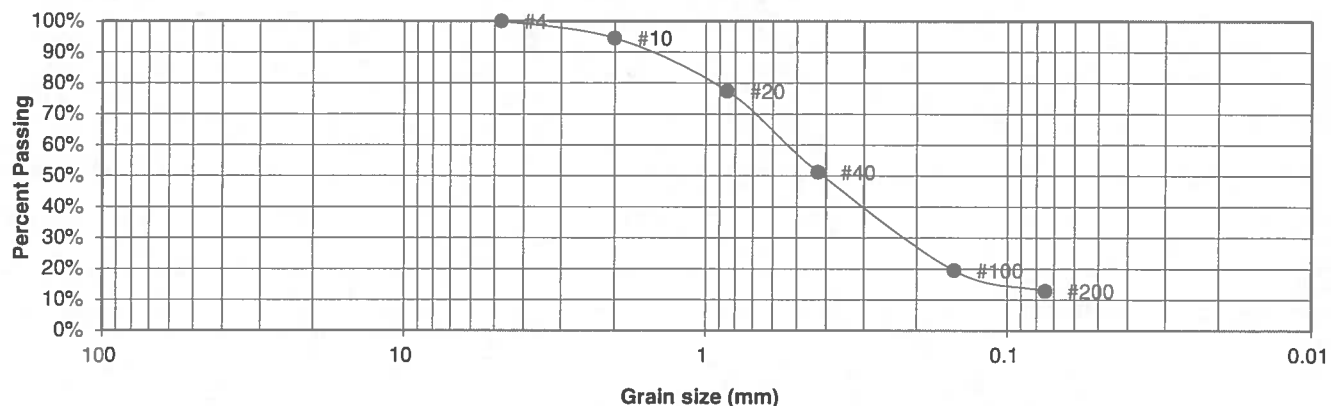
JOB NO.:  
181823

FIG NO.:

C-3

<u>UNIFIED CLASSIFICATION</u>	SM	<u>CLIENT</u>	WILLIAM GUMAN
<u>SOIL TYPE #</u>	3	<u>PROJECT</u>	CURTIS AND JUDGE ORR
<u>TEST BORING #</u>	3	<u>JOB NO.</u>	181823
<u>DEPTH (FT)</u>	10	<u>TEST BY</u>	BL

**Sieve Analysis  
Grain Size Distribution**



<u>U.S. Sieve #</u>	<u>Percent Finer</u>
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	
4	100.0%
10	94.5%
20	77.4%
40	51.2%
100	19.5%
200	12.9%

<u>Atterberg Limits</u>	
Plastic Limit	NP
Liquid Limit	NV
Plastic Index	NP

<u>Swell</u>
Moisture at start
Moisture at finish
Moisture increase
Initial dry density (pcf)
Swell (psf)



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**LABORATORY TEST  
RESULTS**

<u>DRAWN:</u>	<u>DATE:</u>	<u>CHECKED:</u>	<u>DATE:</u>
		LL	4/15/19

JOB NO.:  
181823

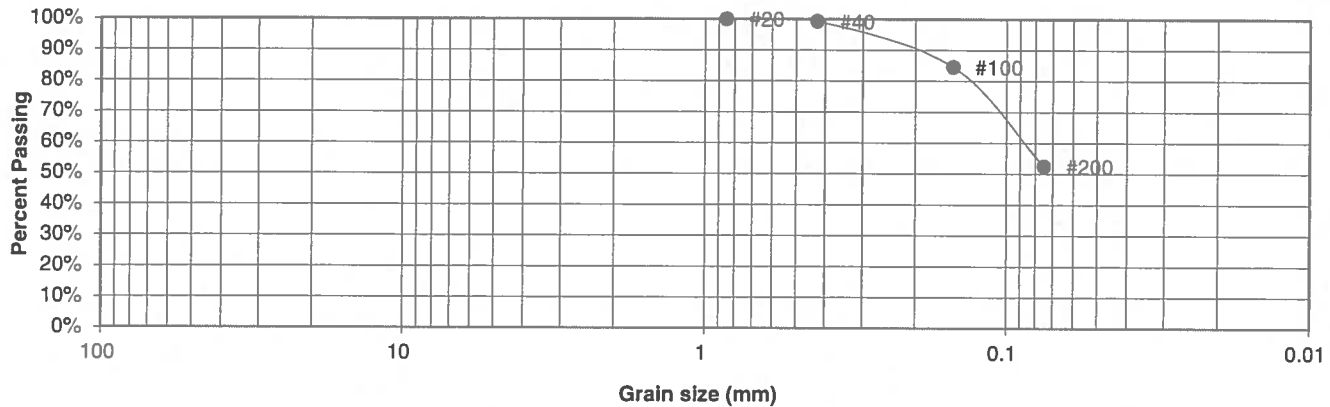
FIG NO.:

C-4

<u>UNIFIED CLASSIFICATION</u>	ML
<u>SOIL TYPE #</u>	3
<u>TEST BORING #</u>	4
<u>DEPTH (FT)</u>	20

<u>CLIENT</u>	WILLIAM GUMAN
<u>PROJECT</u>	CURTIS AND JUDGE ORR
<u>JOB NO.</u>	181823
<u>TEST BY</u>	BL

### Sieve Analysis Grain Size Distribution



<u>U.S. Sieve #</u>	<u>Percent Finer</u>
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	
4	
10	
20	100.0%
40	99.2%
100	84.5%
200	52.5%

<u>Atterberg Limits</u>	
Plastic Limit	NP
Liquid Limit	NV
Plastic Index	NP

<u>Swell</u>
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:
		LL	4/15/19

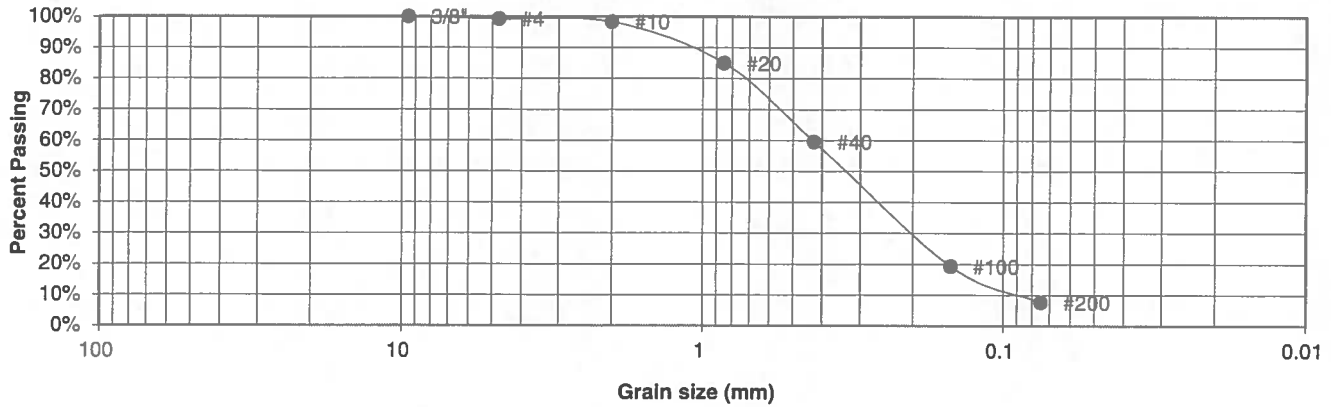
JOB NO.:  
181823

FIG NO.:

6-5

<b>UNIFIED CLASSIFICATION</b>	SM-SW	<b>CLIENT</b>	GUMAN AND ASSOCIATES
<b>SOIL TYPE #</b>	1	<b>PROJECT</b>	CURTIS RD AND JUGRE ORR RD
<b>TEST PIT #</b>	2	<b>JOB NO.</b>	181823
<b>DEPTH (FT)</b>	2-3	<b>TEST BY</b>	BL

### Sieve Analysis Grain Size Distribution



U.S.  
Sieve #

Percent  
Finer

Atterberg  
Limits  
Plastic Limit  
Liquid Limit  
Plastic Index

3"	
1 1/2"	
3/4"	
1/2"	
3/8"	100.0%
4	99.3%
10	98.3%
20	85.0%
40	59.6%
100	19.3%
200	7.6%

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:
		LL	4/15/19

JOB NO.:  
181823

FIG NO.:

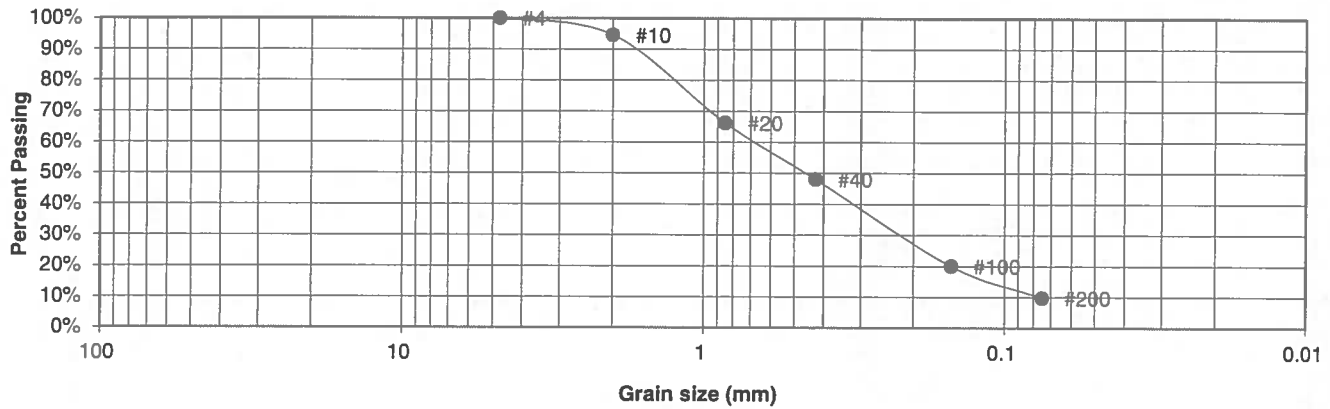
26



**UNIFIED CLASSIFICATION** SM-SW  
**SOIL TYPE #** 1  
**TEST PIT #** 3  
**DEPTH (FT)** 5-6

**CLIENT** GUMAN AND ASSOCIATES  
**PROJECT** CURTIS RD AND JUGRE ORR RD  
**JOB NO.** 181823  
**TEST BY** BL

### Sieve Analysis Grain Size Distribution



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	
4	100.0%
10	94.6%
20	66.2%
40	48.0%
100	20.0%
200	9.8%

**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:

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DATE:

LLC

4/15/19

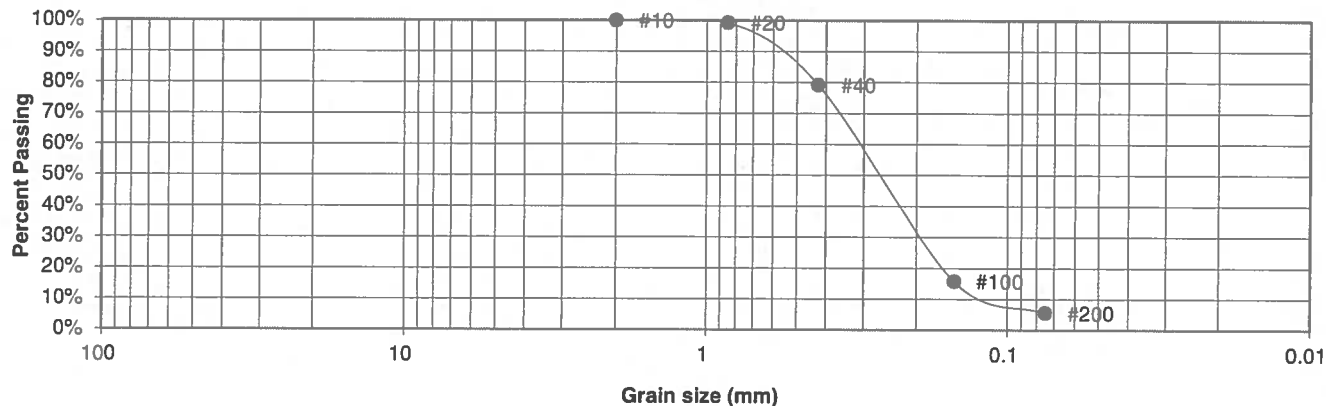
JOB NO.:  
 181823

FIG NO.:

C-7

<b>UNIFIED CLASSIFICATION</b>	SM-SW	<b>CLIENT</b>	GUMAN AND ASSOCIATES
<b>SOIL TYPE #</b>	1	<b>PROJECT</b>	CURTIS RD AND JUGRE ORR RD
<b>TEST PIT #</b>	6	<b>JOB NO.</b>	181823
<b>DEPTH (FT)</b>	4-6	<b>TEST BY</b>	BL

**Sieve Analysis  
Grain Size Distribution**



<u>U.S. Sieve #</u>	<u>Percent Finer</u>
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	
4	
10	100.0%
20	99.3%
40	79.1%
100	15.7%
200	5.5%

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

4/15/19

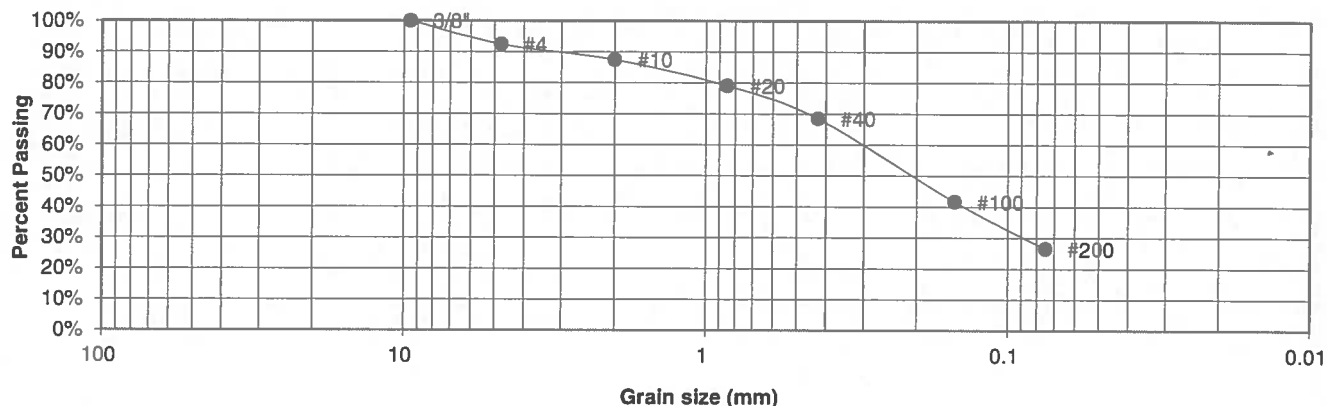
JOB NO.:  
181823

FIG NO.:

C-8

<b>UNIFIED CLASSIFICATION</b>	SC	<b>CLIENT</b>	GUMAN AND ASSOCIATES
<b>SOIL TYPE #</b>	1	<b>PROJECT</b>	CURTIS RD AND JUGRE ORR RD
<b>TEST PIT #</b>	9	<b>JOB NO.</b>	181823
<b>DEPTH (FT)</b>	2-3	<b>TEST BY</b>	BL

**Sieve Analysis  
Grain Size Distribution**



<u>U.S. Sieve #</u>	<u>Percent Finer</u>
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	100.0%
4	92.4%
10	87.4%
20	79.0%
40	68.4%
100	41.7%
200	26.5%

<u>Atterberg Limits</u>	
Plastic Limit	15
Liquid Limit	24
Plastic Index	9

<u>Swell</u>	
Moisture at start	
Moisture at finish	
Moisture increase	
Initial dry density (pcf)	
Swell (psf)	



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**LABORATORY TEST  
RESULTS**

DRAWN:

DATE:

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DATE:

LLL

4/15/19

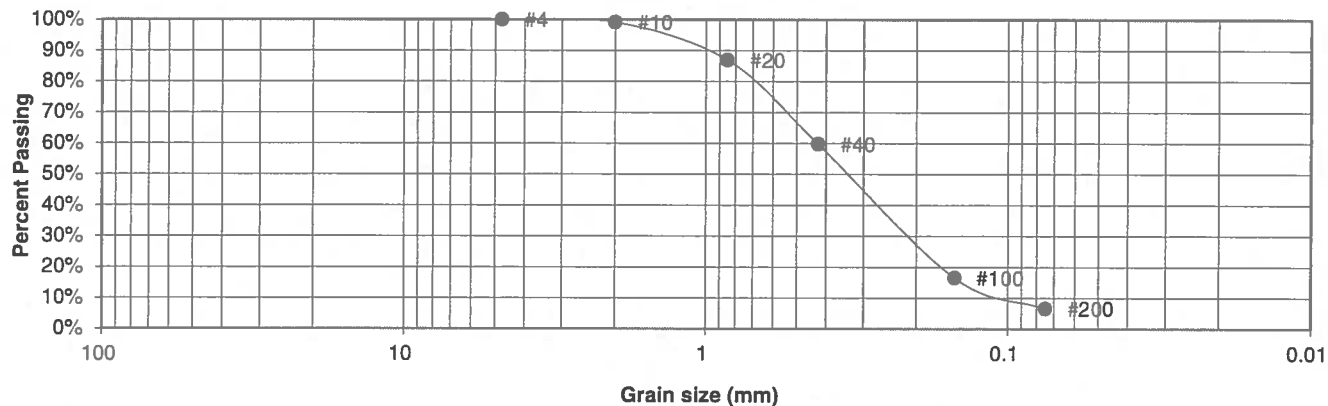
JOB NO.:  
181823

FIG NO.:

C-9

<u>UNIFIED CLASSIFICATION</u>	SM-SW	<u>CLIENT</u>	GUMAN AND ASSOCIATES
<u>SOIL TYPE #</u>	1	<u>PROJECT</u>	CURTIS RD AND JUGRE ORR RD
<u>TEST PIT #</u>	12	<u>JOB NO.</u>	181823
<u>DEPTH (FT)</u>	2-3	<u>TEST BY</u>	BL

**Sieve Analysis  
Grain Size Distribution**



U.S.  
Sieve #

Percent  
Finer

Atterberg  
Limits  
Plastic Limit  
Liquid Limit  
Plastic Index

3"  
1 1/2"  
3/4"  
1/2"  
3/8"  
4  
10  
20  
40  
100  
200

100.0%  
99.2%  
86.9%  
59.8%  
16.5%  
6.6%

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:

LL

4/15/19

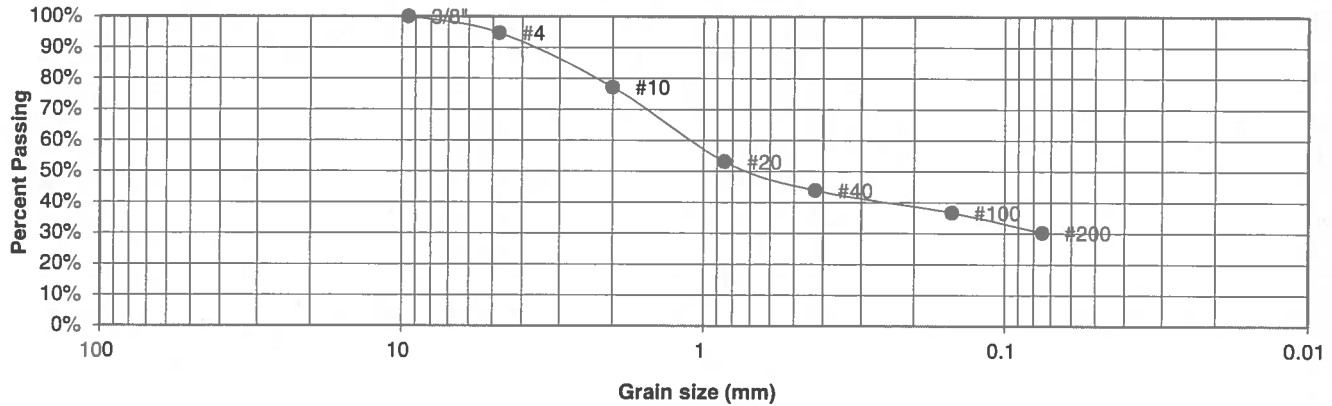
JOB NO.:  
181823

FIG NO.:

C-10

UNIFIED CLASSIFICATION	SC	CLIENT	GUMAN AND ASSOCIATES
SOIL TYPE #	1	PROJECT	CURTIS RD AND JUGRE ORR RD
TEST PIT #	13	JOB NO.	181823
DEPTH (FT)	5-6	TEST BY	BL

### Sieve Analysis Grain Size Distribution



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	100.0%
4	94.7%
10	77.2%
20	53.2%
40	43.9%
100	36.7%
200	30.3%

Atterberg Limits	
Plastic Limit	14
Liquid Limit	25
Plastic Index	11

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



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### LABORATORY TEST RESULTS

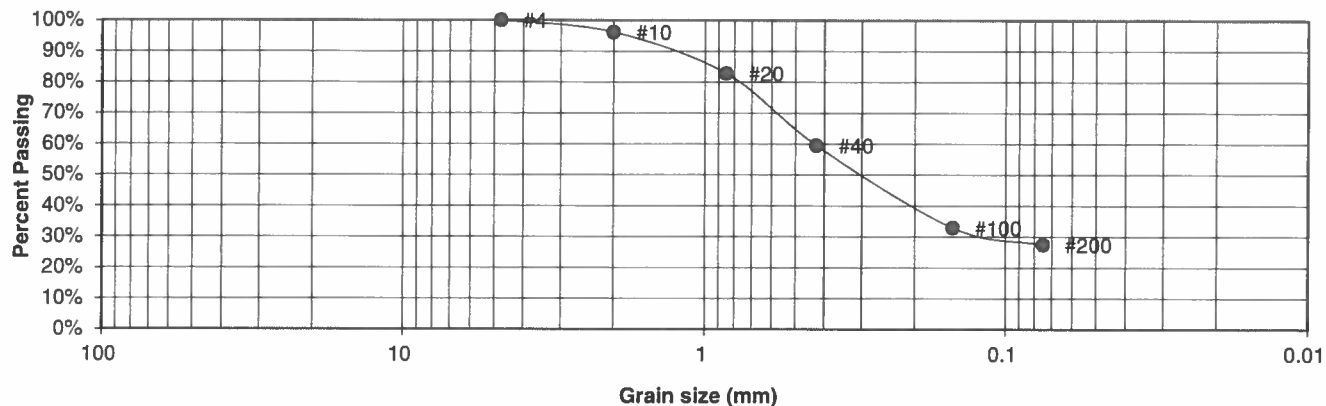
DRAWN:	DATE:	CHECKED:	DATE:
		LL	4/15/19

JOB NO.:  
181823

FIG NO.:  
C-11

UNIFIED CLASSIFICATION	SC	CLIENT	GUMAN AND ASSOCIATES
SOIL TYPE #	1	PROJECT	CURTIS RD AND JUGRE ORR RD
TEST PIT #	15	JOB NO.	181823
DEPTH (FT)	2-3	TEST BY	BL

### Sieve Analysis Grain Size Distribution



U.S.  
Sieve #

Percent  
Finer

Atterberg  
Limits  
Plastic Limit  
Liquid Limit  
Plastic Index

3"  
1 1/2"  
3/4"  
1/2"  
3/8"  
4  
10  
20  
40  
100  
200

100.0%  
96.2%  
82.8%  
59.6%  
32.9%  
27.5%

Swell  
Moisture at start 9.2%  
Moisture at finish 15.5%  
Moisture increase 6.3%  
Initial dry density (pcf) 112  
Swell (psf) 820



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### LABORATORY TEST RESULTS

DRAWN:

DATE:

CHECKED:

DATE:

LL

4/15/19

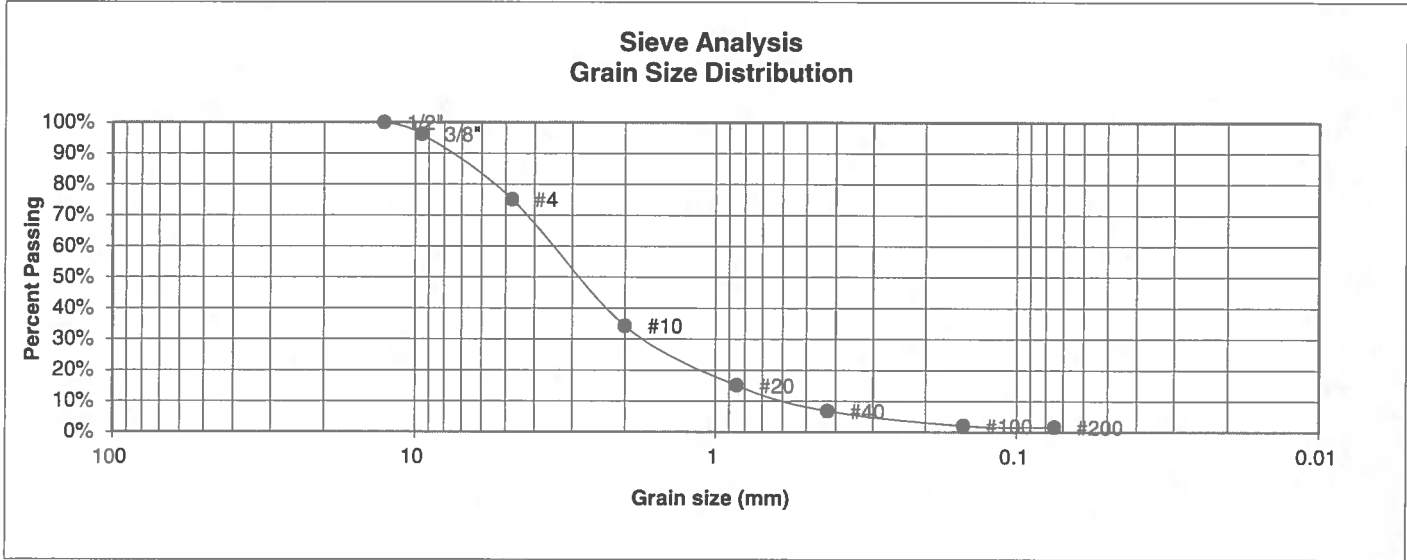
JOB NO.:  
181823

FIG NO.:

C-12



UNIFIED CLASSIFICATION	SW	CLIENT	GUMAN AND ASSOCIATES
SOIL TYPE #	1	PROJECT	CURTIS RD AND JUGRE ORR RD
TEST PIT #	18	JOB NO.	181823
DEPTH (FT)	5-6	TEST BY	BL



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	100.0%
3/8"	96.2%
4	75.1%
10	34.2%
20	15.1%
40	6.8%
100	2.1%
200	1.6%

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:

DATE:

LL

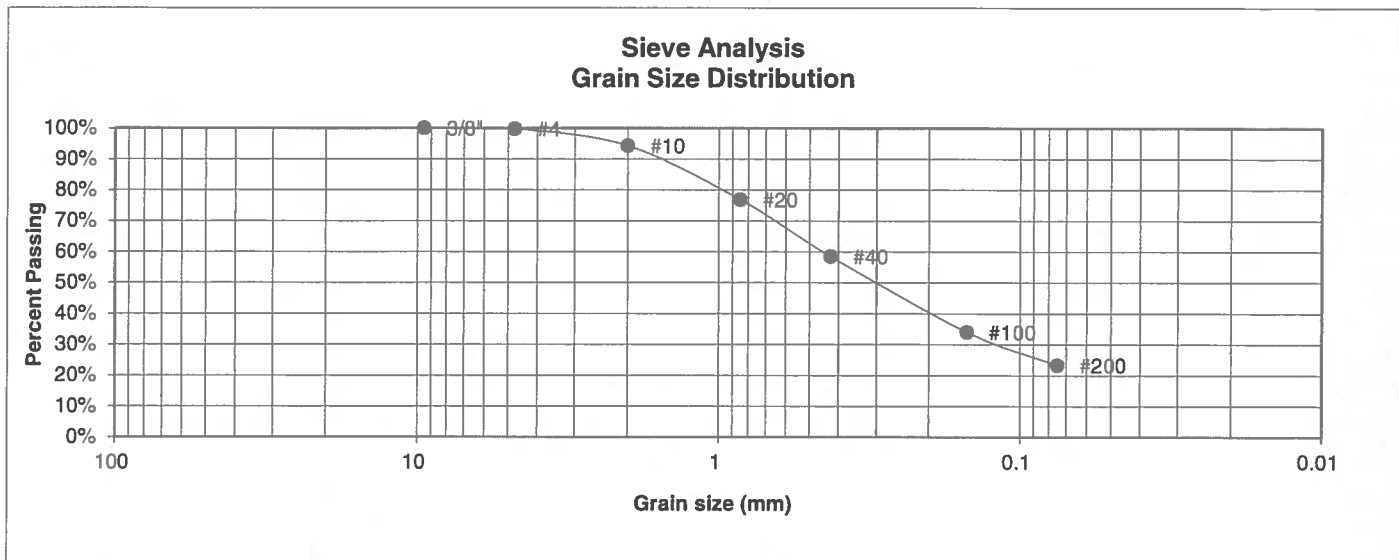
4/15/19

JOB NO.:  
181823

FIG NO.:

C-13

<u>UNIFIED CLASSIFICATION</u>	SC	<u>CLIENT</u>	GUMAN AND ASSOCIATES
<u>SOIL TYPE #</u>	1	<u>PROJECT</u>	CURTIS RD AND JUGRE ORR RD
<u>TEST PIT #</u>	21	<u>JOB NO.</u>	181823
<u>DEPTH (FT)</u>	5-6	<u>TEST BY</u>	BL



U.S.  
Sieve #

3"  
1 1/2"  
3/4"  
1/2"  
3/8"  
4  
10  
20  
40  
100  
200

Percent  
Finer

100.0%  
99.8%  
94.3%  
76.9%  
58.5%  
34.1%  
23.4%

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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505 ELKTON DRIVE  
COLORADO SPRINGS, COLORADO 80907

### LABORATORY TEST RESULTS

DRAWN:

DATE:

CHECKED:  
LLL

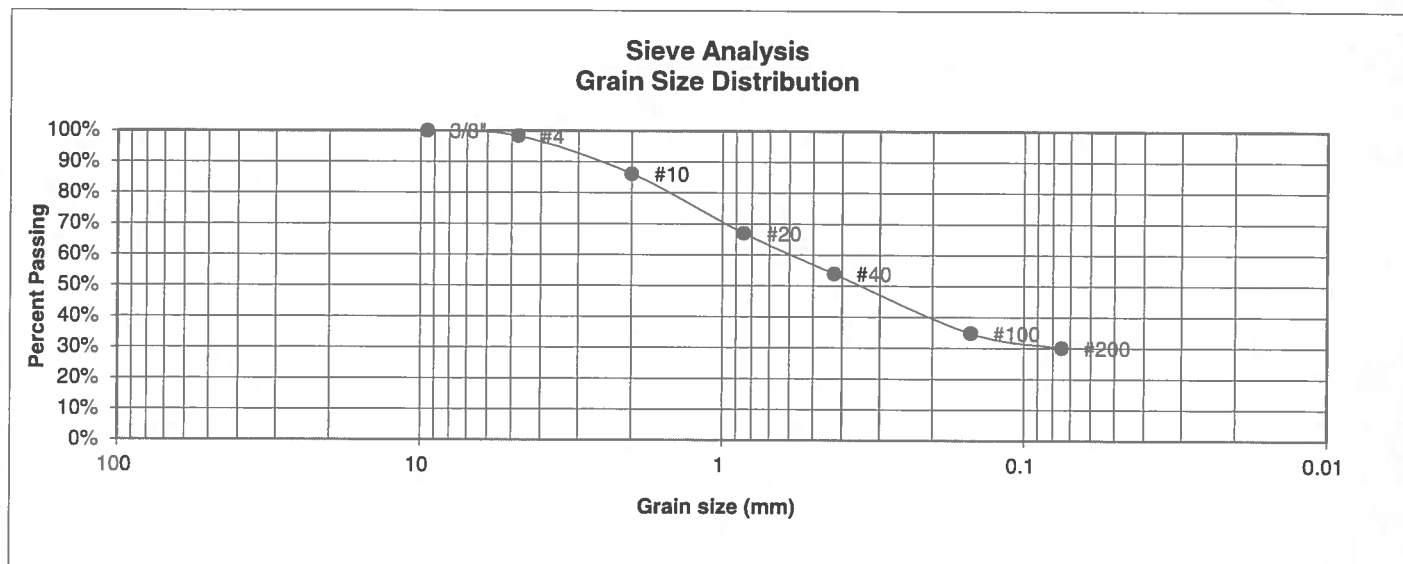
DATE:  
4/15/19

JOB NO.:  
181823

FIG NO.:

C-14

<u>UNIFIED CLASSIFICATION</u>	SM	<u>CLIENT</u>	GUMAN AND ASSOCIATES
<u>SOIL TYPE #</u>	1	<u>PROJECT</u>	CURTIS RD AND JUGRE ORR RD
<u>TEST PIT #</u>	37	<u>JOB NO.</u>	181823
<u>DEPTH (FT)</u>	6-7	<u>TEST BY</u>	BL



<u>U.S. Sieve #</u>	<u>Percent Finer</u>
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	100.0%
4	98.3%
10	86.2%
20	67.0%
40	53.9%
100	34.8%
200	30.1%

<u>Atterberg Limits</u>	
Plastic Limit	16
Liquid Limit	19
Plastic Index	3

<u>Swell</u>	
Moisture at start	6.5%
Moisture at finish	20.5%
Moisture increase	14.0%
Initial dry density (pcf)	100
Swell (psf)	430



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505 ELKTON DRIVE  
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### LABORATORY TEST RESULTS

DRAWN:

DATE:

CHECKED:

DATE:

LLL

4/15/19

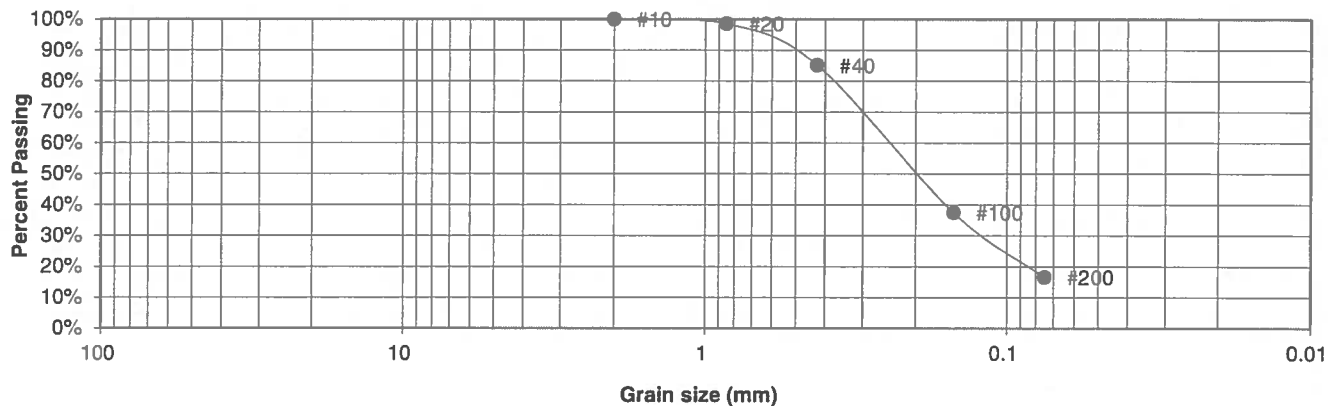
JOB NO.:  
181823

FIG NO.:

C-15

UNIFIED CLASSIFICATION	SM	CLIENT	GUMAN AND ASSOCIATES
SOIL TYPE #	1	PROJECT	CURTIS RD AND JUGRE ORR RD
TEST PIT #	31	JOB NO.	181823
DEPTH (FT)	2-3	TEST BY	BL

### Sieve Analysis Grain Size Distribution



U.S.  
Sieve #

3"  
1 1/2"  
3/4"  
1/2"  
3/8"  
4  
10  
20  
40  
100  
200

Percent  
Finer

100.0%  
98.6%  
85.1%  
37.4%  
16.6%

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

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DATE:

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4/15/19

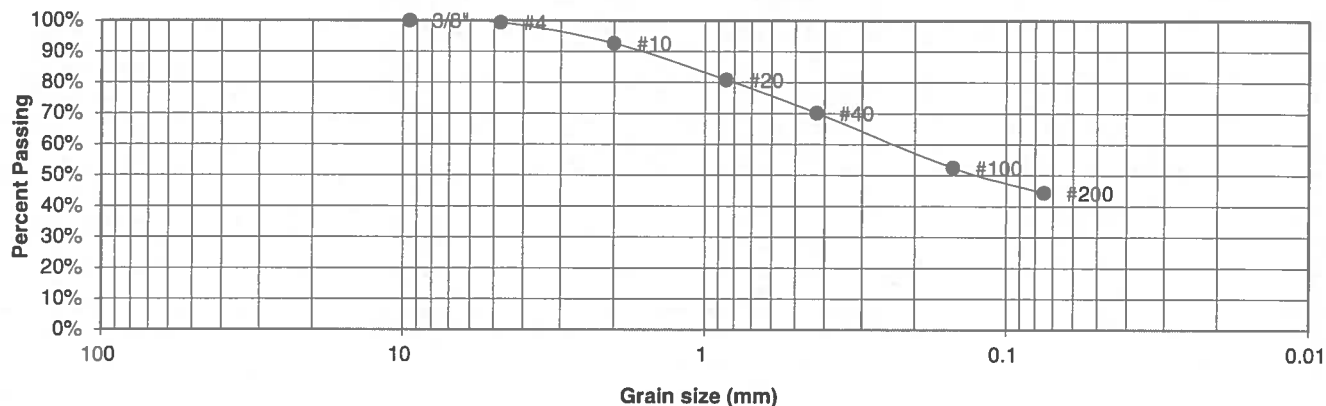
JOB NO.:  
181823

FIG NO.:

C-16

<u>UNIFIED CLASSIFICATION</u>	SC	<u>CLIENT</u>	GUMAN AND ASSOCIATES
<u>SOIL TYPE #</u>	1	<u>PROJECT</u>	CURTIS RD AND JUGRE ORR RD
<u>TEST PIT #</u>	32	<u>JOB NO.</u>	181823
<u>DEPTH (FT)</u>	4-5	<u>TEST BY</u>	BL

**Sieve Analysis  
Grain Size Distribution**



<u>U.S. Sieve #</u>	<u>Percent Finer</u>
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	100.0%
4	99.4%
10	92.6%
20	80.8%
40	70.2%
100	52.5%
200	44.3%

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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4/15/19

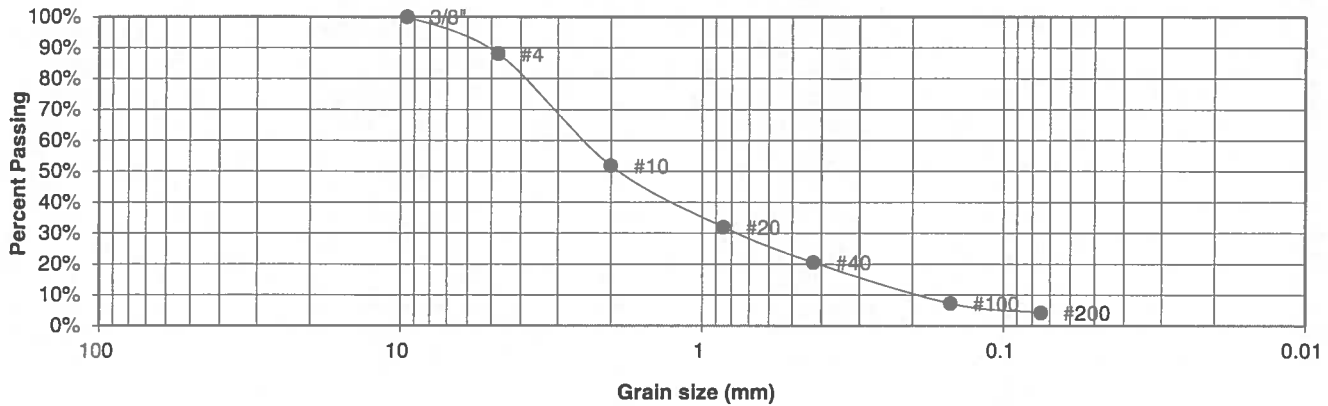
JOB NO.:  
181823

FIG NO.:

C-17

<u>UNIFIED CLASSIFICATION</u>	SW	<u>CLIENT</u>	GUMAN AND ASSOCIATES
<u>SOIL TYPE #</u>	1	<u>PROJECT</u>	CURTIS RD AND JUGRE ORR RD
<u>TEST PIT #</u>	33	<u>JOB NO.</u>	181823
<u>DEPTH (FT)</u>	2-3	<u>TEST BY</u>	BL

**Sieve Analysis  
Grain Size Distribution**



<u>U.S. Sieve #</u>	<u>Percent Finer</u>
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	100.0%
4	88.0%
10	51.8%
20	32.0%
40	20.5%
100	7.2%
200	4.3%

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**

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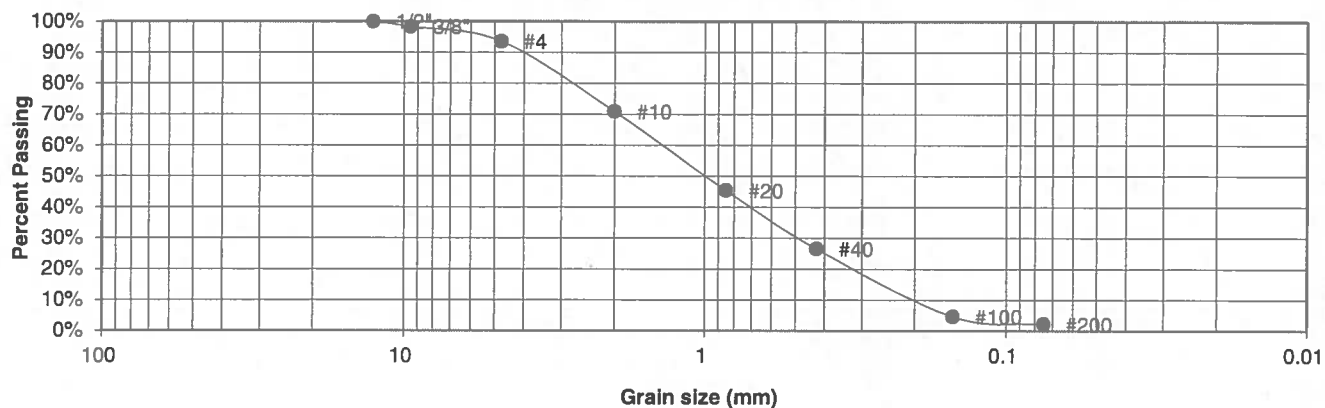
JOB NO.:  
181823

FIG NO.:  
C-18



<u>UNIFIED CLASSIFICATION</u>	SW	<u>CLIENT</u>	GUMAN AND ASSOCIATES
<u>SOIL TYPE #</u>	1	<u>PROJECT</u>	CURTIS RD AND JUGRE ORR RD
<u>TEST PIT #</u>	35	<u>JOB NO.</u>	181823
<u>DEPTH (FT)</u>	5-6	<u>TEST BY</u>	BL

**Sieve Analysis  
Grain Size Distribution**



<u>U.S. Sieve #</u>	<u>Percent Finer</u>
3"	
1 1/2"	
3/4"	
1/2"	100.0%
3/8"	98.3%
4	93.6%
10	70.9%
20	45.4%
40	26.5%
100	4.7%
200	2.2%

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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**LABORATORY TEST  
RESULTS**

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DATE:  
9/15/19

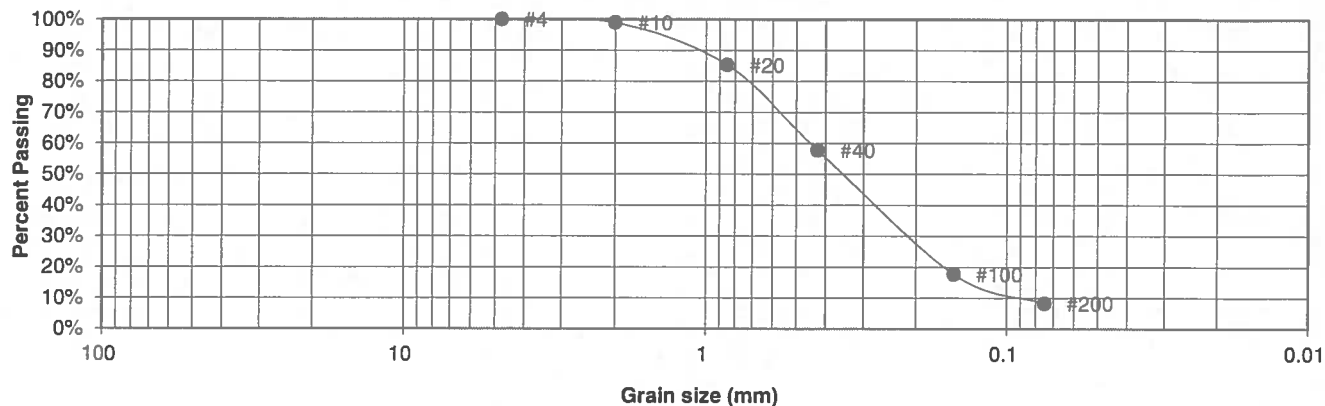
JOB NO.:  
181823

FIG NO.:

C-19

<u>UNIFIED CLASSIFICATION</u>	SM-SW	<u>CLIENT</u>	GUMAN AND ASSOCIATES
<u>SOIL TYPE #</u>	1	<u>PROJECT</u>	CURTIS RD AND JUGRE ORR RD
<u>TEST PIT #</u>	36	<u>JOB NO.</u>	181823
<u>DEPTH (FT)</u>	2-3	<u>TEST BY</u>	BL

**Sieve Analysis  
Grain Size Distribution**



U.S.  
Sieve #

Percent  
Finer

Atterberg  
Limits

Plastic Limit  
Liquid Limit  
Plastic Index

Swell

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

3"	
1 1/2"	
3/4"	
1/2"	
3/8"	
4	100.0%
10	98.9%
20	85.3%
40	57.8%
100	17.7%
200	8.2%



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**LABORATORY TEST  
RESULTS**

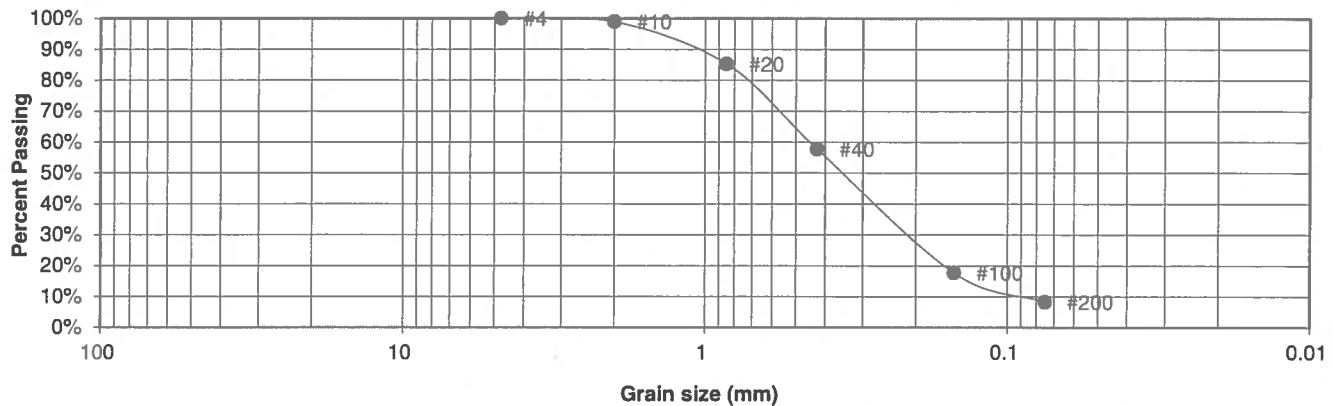
DRAWN:	DATE:	CHECKED:	DATE:
		LLL	4/15/19

JOB NO.:  
181823

FIG NO.:  
C-20

<u>UNIFIED CLASSIFICATION</u>	SM-SW	<u>CLIENT</u>	GUMAN AND ASSOCIATES
<u>SOIL TYPE #</u>	1	<u>PROJECT</u>	CURTIS RD AND JUGRE ORR RD
<u>TEST PIT #</u>	36	<u>JOB NO.</u>	181823
<u>DEPTH (FT)</u>	2-3	<u>TEST BY</u>	BL

**Sieve Analysis  
Grain Size Distribution**



U.S.  
Sieve #

3"  
1 1/2"  
3/4"  
1/2"  
3/8"

4	100.0%
10	98.9%
20	85.3%
40	57.8%
100	17.7%
200	8.2%

Percent  
Finer

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:

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LLL

DATE:

4/15/19

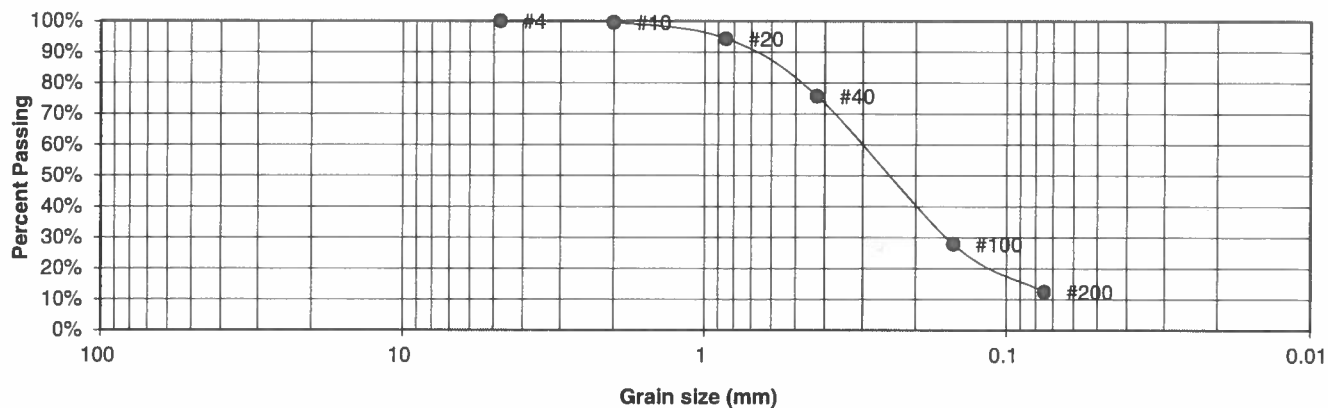
JOB NO.:  
181823

FIG NO.:

C-21

<u>UNIFIED CLASSIFICATION</u>	SM	<u>CLIENT</u>	GUMAN AND ASSOCIATES
<u>SOIL TYPE #</u>	1	<u>PROJECT</u>	CURTIS RD AND JUGRE ORR RD
<u>TEST PIT #</u>	39	<u>JOB NO.</u>	181823
<u>DEPTH (FT)</u>	5-6	<u>TEST BY</u>	BL

**Sieve Analysis  
Grain Size Distribution**



<u>U.S. Sieve #</u>	<u>Percent Finer</u>
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	
4	100.0%
10	99.6%
20	94.3%
40	75.8%
100	27.9%
200	12.4%

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**

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DATE:  
4/15/19

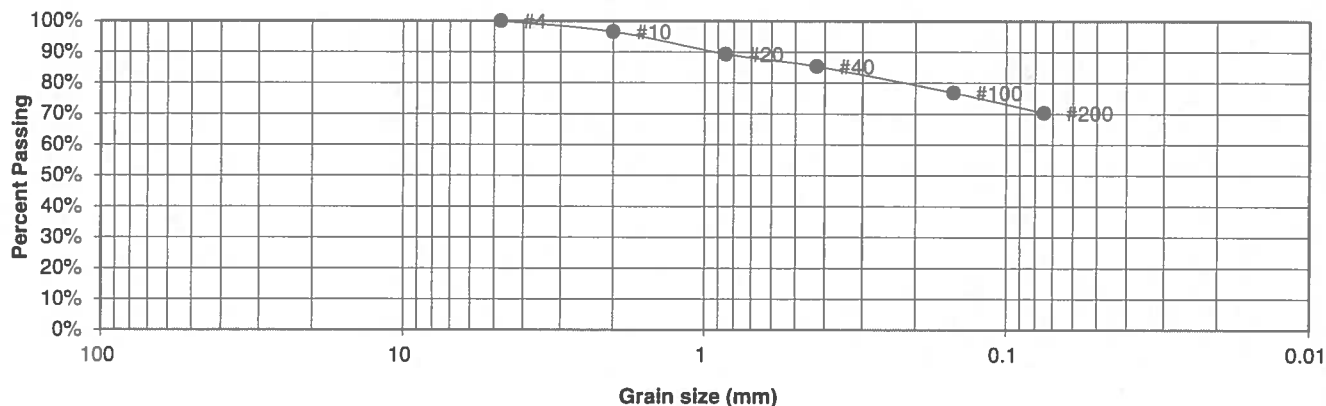
JOB NO.:  
181823

FIG NO.:

C-22

<b>UNIFIED CLASSIFICATION</b>	CL	<b>CLIENT</b>	GUMAN AND ASSOCIATES
<b>SOIL TYPE #</b>	2	<b>PROJECT</b>	CURTIS RD AND JUGRE ORR RD
<b>TEST PIT #</b>	1	<b>JOB NO.</b>	181823
<b>DEPTH (FT)</b>	7-8	<b>TEST BY</b>	BL

**Sieve Analysis  
Grain Size Distribution**



<u>U.S. Sieve #</u>	<u>Percent Finer</u>
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	
4	100.0%
10	96.6%
20	89.3%
40	85.4%
100	76.9%
200	70.3%

<u>Atterberg Limits</u>	
Plastic Limit	18
Liquid Limit	49
Plastic Index	31

<u>Swell</u>	
Moisture at start	11.4%
Moisture at finish	19.8%
Moisture increase	8.4%
Initial dry density (pcf)	99
Swell (psf)	1360



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**LABORATORY TEST  
RESULTS**

<b>DRAWN:</b>	<b>DATE:</b>	<b>CHECKED:</b>	<b>DATE:</b>
		LLC	4/15/19

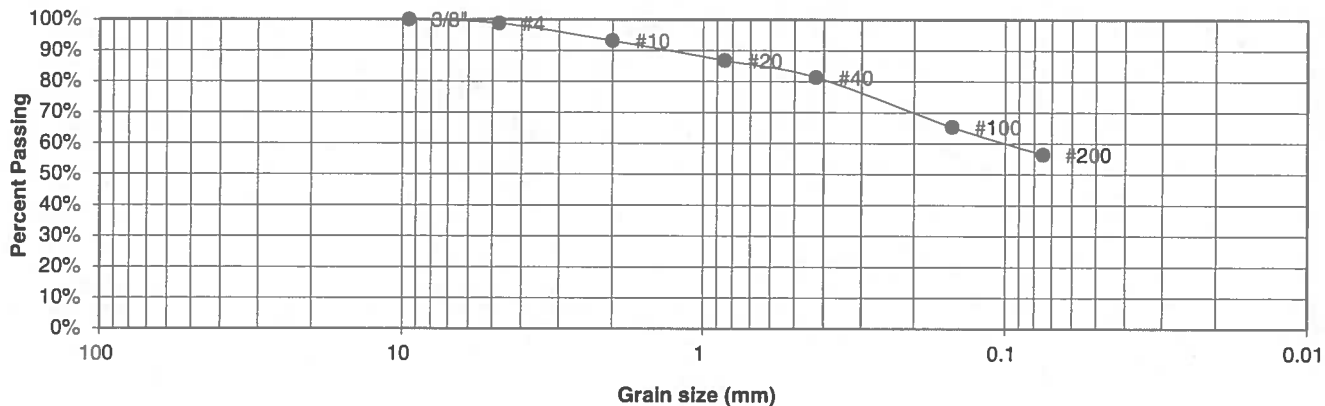
JOB NO.:  
181823

FIG NO.:

C-23

<u>UNIFIED CLASSIFICATION</u>	CL	<u>CLIENT</u>	GUMAN AND ASSOCIATES
<u>SOIL TYPE #</u>	2	<u>PROJECT</u>	CURTIS RD AND JUGRE ORR RD
<u>TEST PIT #</u>	4	<u>JOB NO.</u>	181823
<u>DEPTH (FT)</u>	2-3	<u>TEST BY</u>	BL

**Sieve Analysis  
Grain Size Distribution**



<u>U.S. Sieve #</u>	<u>Percent Finer</u>
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	100.0%
4	98.8%
10	93.1%
20	86.8%
40	81.4%
100	65.3%
200	56.4%

<u>Atterberg Limits</u>	
Plastic Limit	14
Liquid Limit	26
Plastic Index	12

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



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**LABORATORY TEST  
RESULTS**

<u>DRAWN:</u>	<u>DATE:</u>	<u>CHECKED:</u>	<u>DATE:</u>
		LLL	4/15/19

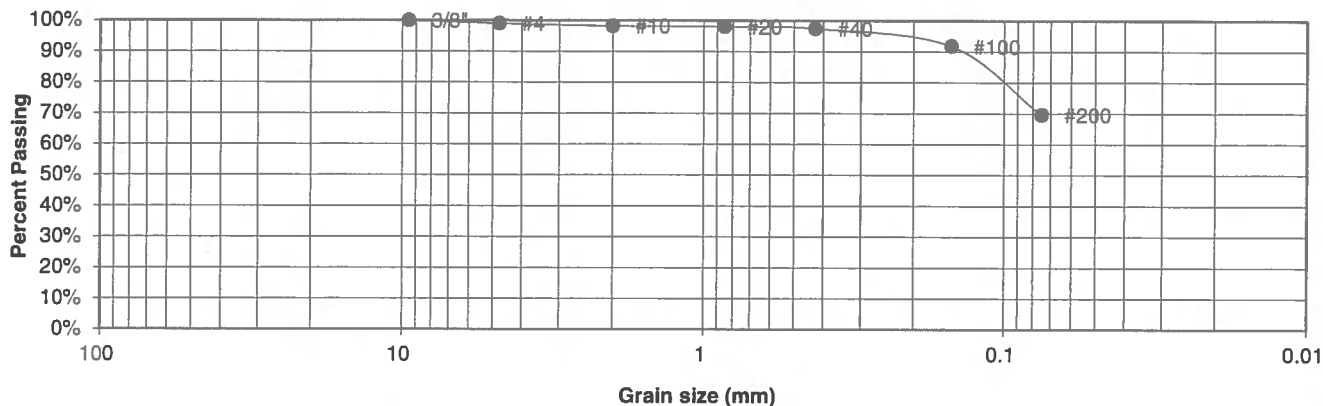
JOB NO.:  
181823

FIG NO.:  
C-24



<u>UNIFIED CLASSIFICATION</u>	CL	<u>CLIENT</u>	GUMAN AND ASSOCIATES
<u>SOIL TYPE #</u>	2	<u>PROJECT</u>	CURTIS RD AND JUGRE ORR RD
<u>TEST PIT #</u>	5	<u>JOB NO.</u>	181823
<u>DEPTH (FT)</u>	7-8	<u>TEST BY</u>	BL

**Sieve Analysis  
Grain Size Distribution**



<u>U.S. Sieve #</u>	<u>Percent Finer</u>
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	100.0%
4	99.1%
10	98.3%
20	98.1%
40	97.4%
100	91.8%
200	69.6%

<u>Atterberg Limits</u>	
Plastic Limit	13
Liquid Limit	32
Plastic Index	19

<u>Swell</u>	
Moisture at start	12.5%
Moisture at finish	20.6%
Moisture increase	8.1%
Initial dry density (pcf)	104
Swell (psf)	880



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**LABORATORY TEST  
RESULTS**

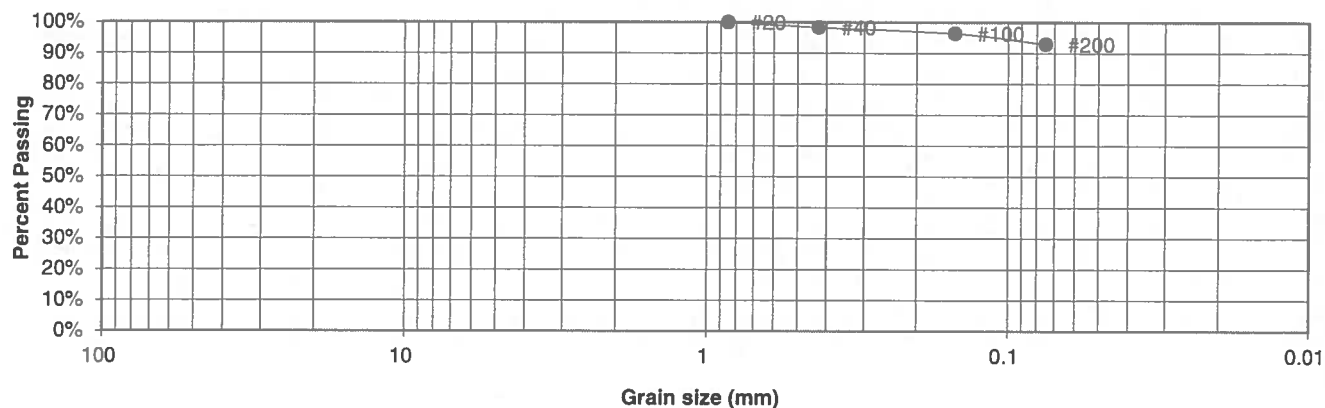
<u>DRAWN:</u>	<u>DATE:</u>	<u>CHECKED:</u>	<u>DATE:</u>
		LL	4/15/19

JOB NO.:  
181823

FIG NO.:  
C-25

UNIFIED CLASSIFICATION	CL	CLIENT	GUMAN AND ASSOCIATES
SOIL TYPE #	2	PROJECT	CURTIS RD AND JUGRE ORR RD
TEST PIT #	16	JOB NO.	181823
DEPTH (FT)	7-8	TEST BY	BL

### Sieve Analysis Grain Size Distribution



U.S.  
Sieve #

3"  
1 1/2"  
3/4"  
1/2"  
3/8"  
4  
10  
20  
40  
100  
200

Percent  
Finer

100.0%  
98.3%  
96.4%  
92.9%

Atterberg  
Limits  
Plastic Limit  
Liquid Limit  
Plastic Index

#### Swell

Moisture at start	17.8%
Moisture at finish	33.1%
Moisture increase	15.3%
Initial dry density (pcf)	92
Swell (psf)	4420



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DATE:

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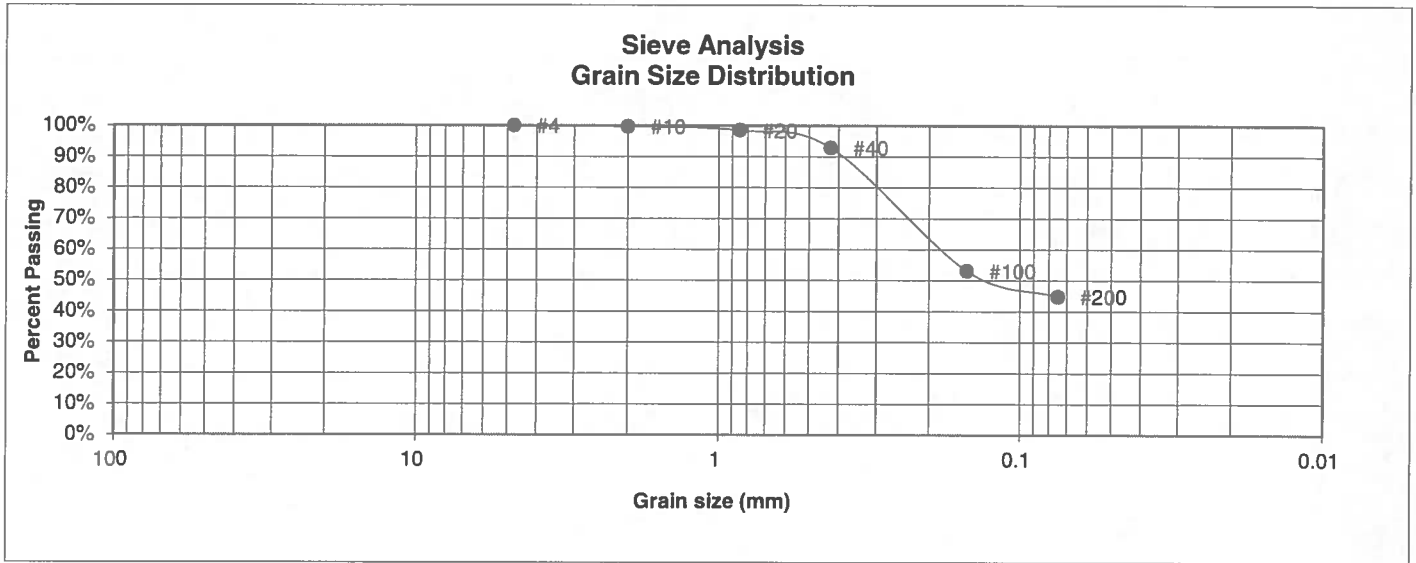
4/15/19

JOB NO.:  
181823

FIG NO.:

C-24

<u>UNIFIED CLASSIFICATION</u>	SC	<u>CLIENT</u>	GUMAN AND ASSOCIATES
<u>SOIL TYPE #</u>	3	<u>PROJECT</u>	CURTIS RD AND JUGRE ORR RD
<u>TEST PIT #</u>	8	<u>JOB NO.</u>	181823
<u>DEPTH (FT)</u>	4-5	<u>TEST BY</u>	BL



<u>U.S. Sieve #</u>	<u>Percent Finer</u>
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	
4	100.0%
10	99.7%
20	98.5%
40	92.9%
100	53.2%
200	44.8%

<u>Atterberg Limits</u>	
Plastic Limit	16
Liquid Limit	29
Plastic Index	13

<u>Swell</u>	
Moisture at start	
Moisture at finish	
Moisture increase	
Initial dry density (pcf)	
Swell (psf)	



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### LABORATORY TEST RESULTS

<u>DRAWN:</u>	<u>DATE:</u>	<u>CHECKED:</u>	<u>DATE:</u>
		LLL	6/15/19

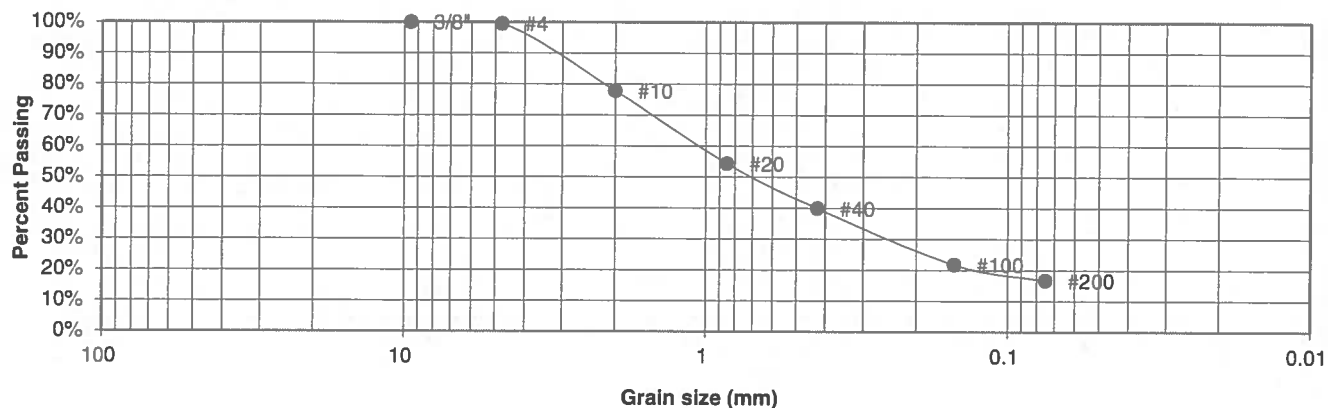
JOB NO.:  
181823

FIG NO.:

C-27

UNIFIED CLASSIFICATION	SM	CLIENT	GUMAN AND ASSOCIATES
SOIL TYPE #	3	PROJECT	CURTIS RD AND JUGRE ORR RD
TEST PIT #	10	JOB NO.	181823
DEPTH (FT)	5-6	TEST BY	BL

### Sieve Analysis Grain Size Distribution



U.S.  
Sieve #

Percent  
Finer

3"  
1 1/2"  
3/4"  
1/2"  
3/8"  
4  
10  
20  
40  
100  
200

100.0%  
99.5%  
77.8%  
54.4%  
39.9%  
21.8%  
16.6%

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:

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DATE:

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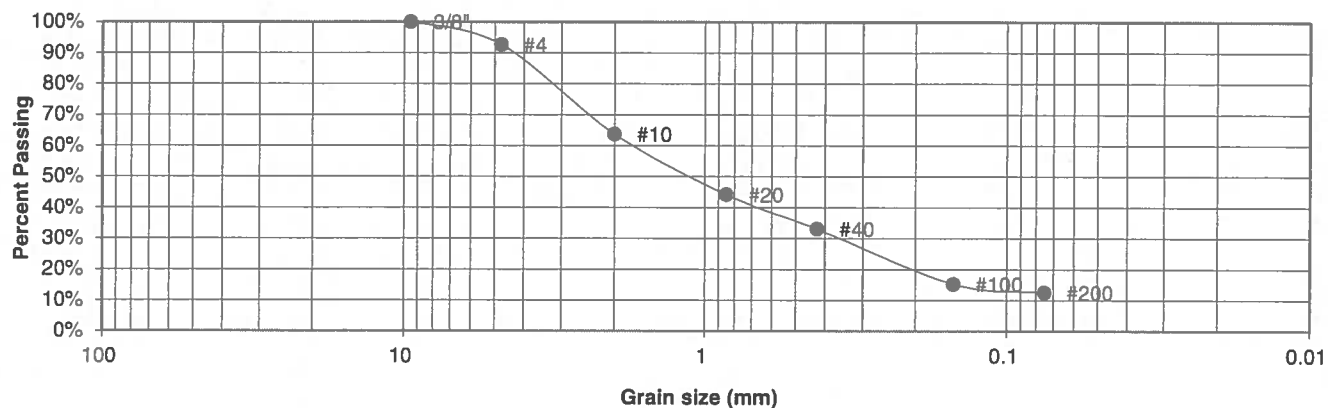
4/15/17

JOB NO.:  
181823

FIG NO.:  
C-28

UNIFIED CLASSIFICATION	SM	CLIENT	GUMAN AND ASSOCIATES
SOIL TYPE #	3	PROJECT	CURTIS RD AND JUGRE ORR RD
TEST PIT #	17	JOB NO.	181823
DEPTH (FT)	5-6	TEST BY	BL

### Sieve Analysis Grain Size Distribution



U.S.  
Sieve #

3"  
1 1/2"  
3/4"  
1/2"  
3/8"  
4  
10  
20  
40  
100  
200

Percent  
Finer

100.0%  
92.7%  
63.7%  
44.2%  
33.1%  
15.3%  
12.6%

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:  
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DATE:

4/15/19

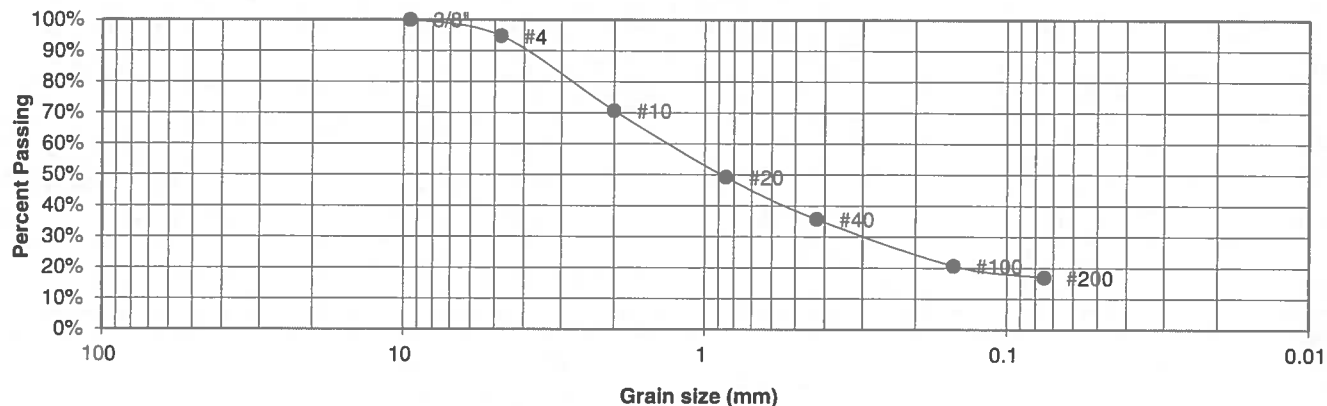
JOB NO.:  
181823

FIG NO.:

C-29

<u>UNIFIED CLASSIFICATION</u>	SM	<u>CLIENT</u>	GUMAN AND ASSOCIATES
<u>SOIL TYPE #</u>	3	<u>PROJECT</u>	CURTIS RD AND JUGRE ORR RD
<u>TEST PIT #</u>	34	<u>JOB NO.</u>	181823
<u>DEPTH (FT)</u>	5-6	<u>TEST BY</u>	BL

**Sieve Analysis  
Grain Size Distribution**



<u>U.S. Sieve #</u>	<u>Percent Finer</u>
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	100.0%
4	94.8%
10	70.7%
20	49.2%
40	35.7%
100	20.7%
200	16.9%

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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COLORADO SPRINGS, COLORADO 80907

**LABORATORY TEST  
RESULTS**

DRAWN:

DATE:

CHECKED:  
LLL

DATE:

4/15/19

JOB NO.:  
181823

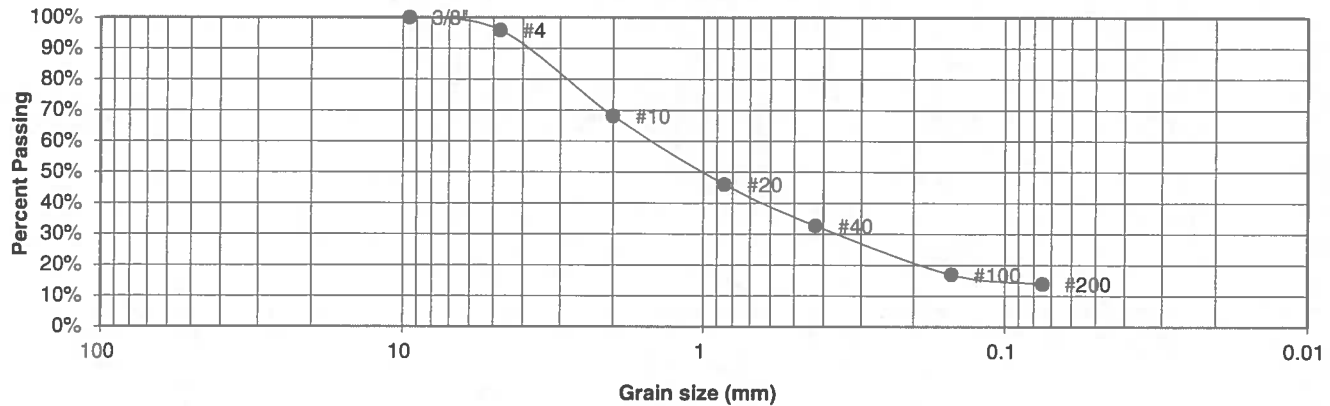
FIG NO.:

C-30



UNIFIED CLASSIFICATION	SM	CLIENT	GUMAN AND ASSOCIATES
SOIL TYPE #	3	PROJECT	CURTIS RD AND JUGRE ORR RD
TEST PIT #	40	JOB NO.	181823
DEPTH (FT)	5-6	TEST BY	BL

### Sieve Analysis Grain Size Distribution



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	100.0%
4	95.9%
10	68.2%
20	46.1%
40	32.7%
100	17.0%
200	13.9%

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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505 ELKTON DRIVE  
COLORADO SPRINGS, COLORADO 80907

### LABORATORY TEST RESULTS

DRAWN:

DATE:

CHECKED:

DATE:

LL

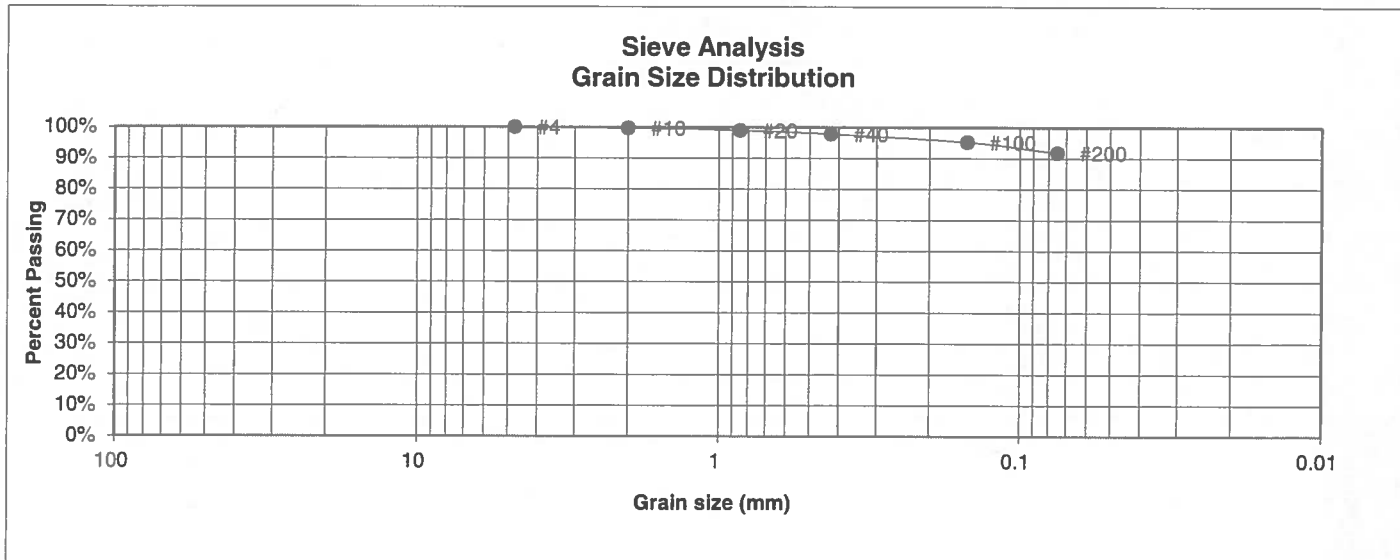
4/15/19

JOB NO.:  
181823

FIG NO.:

C-31

UNIFIED CLASSIFICATION	CL	CLIENT	GUMAN AND ASSOCIATES
SOIL TYPE #	4	PROJECT	CURTIS RD AND JUGRE ORR RD
TEST PIT #	7	JOB NO.	181823
DEPTH (FT)	6-7	TEST BY	BL



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	
4	100.0%
10	99.7%
20	99.0%
40	97.8%
100	95.2%
200	91.8%

Atterberg  
Limits  
Plastic Limit  
Liquid Limit  
Plastic Index

Swell	
Moisture at start	17.8%
Moisture at finish	27.8%
Moisture increase	10.0%
Initial dry density (pcf)	94
Swell (psf)	2300



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COLORADO SPRINGS, COLORADO 80907

### LABORATORY TEST RESULTS

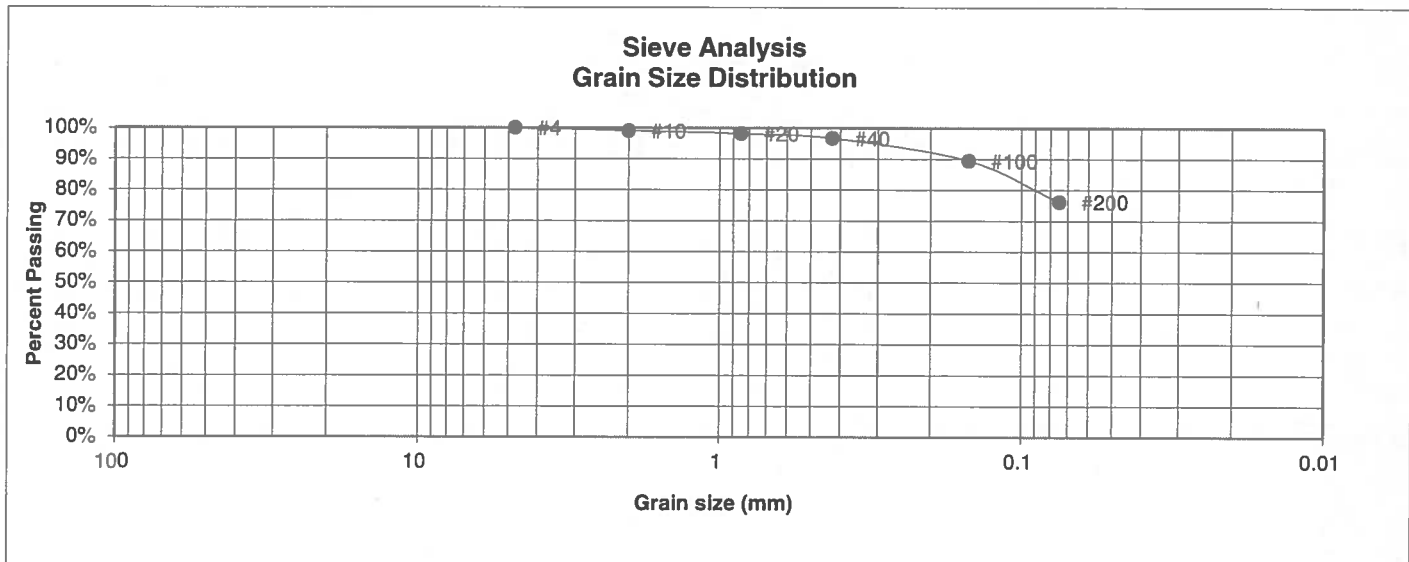
DRAWN:	DATE:	CHECKED:	DATE:
		ELL	4/15/19

JOB NO.:  
181823

FIG NO.:

C-32

UNIFIED CLASSIFICATION	CL	CLIENT	GUMAN AND ASSOCIATES
SOIL TYPE #	4	PROJECT	CURTIS RD AND JUGRE ORR RD
TEST PIT #	14	JOB NO.	181823
DEPTH (FT)	4-5	TEST BY	BL



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	
4	100.0%
10	99.1%
20	98.2%
40	96.7%
100	89.5%
200	76.1%

Atterberg Limits	
Plastic Limit	24
Liquid Limit	47
Plastic Index	23

Swell	
Moisture at start	15.5%
Moisture at finish	29.0%
Moisture increase	13.5%
Initial dry density (pcf)	95
Swell (psf)	3160



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### LABORATORY TEST RESULTS

DRAWN:

DATE:

CHECKED:  
LLL

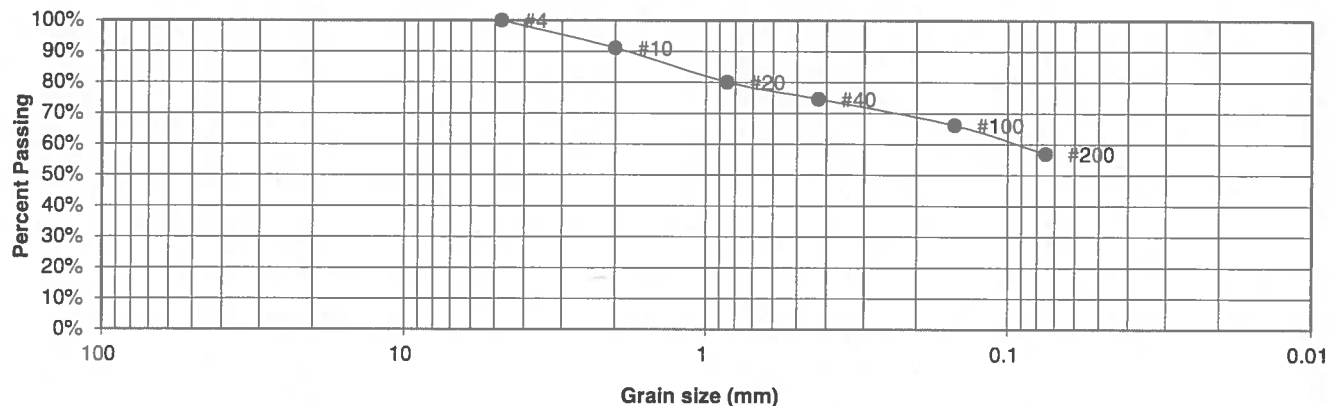
DATE:  
4/15/19

JOB NO.:  
181823

FIG NO.:  
C-33

<u>UNIFIED CLASSIFICATION</u>	CL	<u>CLIENT</u>	GUMAN AND ASSOCIATES
<u>SOIL TYPE #</u>	4	<u>PROJECT</u>	CURTIS RD AND JUGRE ORR RD
<u>TEST PIT #</u>	23	<u>JOB NO.</u>	181823
<u>DEPTH (FT)</u>	5-6	<u>TEST BY</u>	BL

**Sieve Analysis  
Grain Size Distribution**



U.S.  
Sieve #

Percent  
Finer

Atterberg  
Limits  
Plastic Limit  
Liquid Limit  
Plastic Index

3"  
1 1/2"  
3/4"  
1/2"  
3/8"  
4  
10  
20  
40  
100  
200

100.0%  
91.1%  
80.1%  
74.6%  
66.2%  
57.0%

Swell  
Moisture at start 10.0%  
Moisture at finish 16.1%  
Moisture increase 6.2%  
Initial dry density (pcf) 109  
Swell (psf) 450



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**LABORATORY TEST  
RESULTS**

DRAWN:

DATE:

CHECKED:  
LL

DATE:  
4/15/19

JOB NO.:  
181823

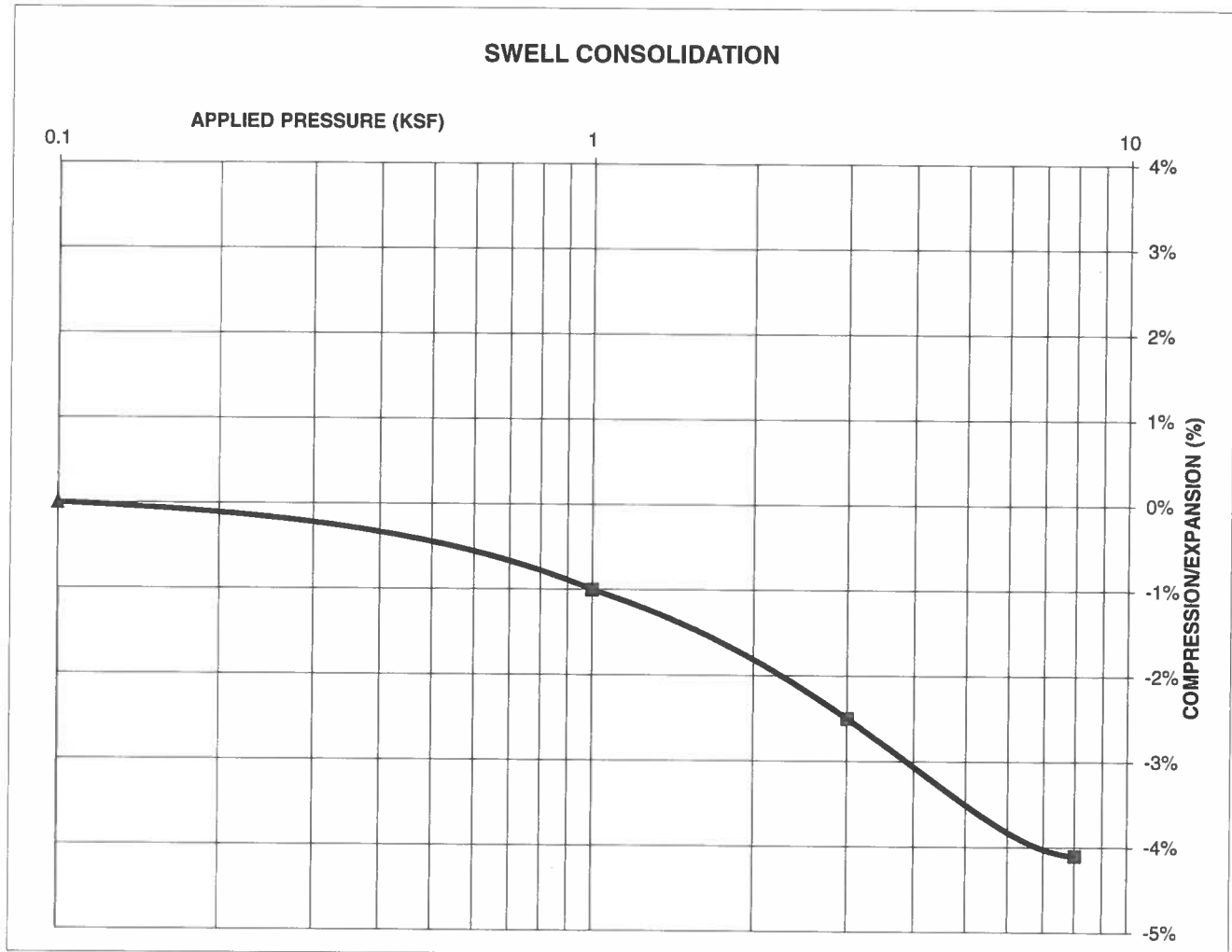
FIG NO.:

C-34

# **CONSOLIDATION TEST RESULTS**

TEST BORING #	4	DEPTH(ft)	20
DESCRIPTION	ML	SOIL TYPE	3
NATURAL UNIT DRY WEIGHT (PCF)	104		
NATURAL MOISTURE CONTENT	21.4%		
SWELL/CONSOLIDATION (%)	0.0%		

JOB NO. 181823  
 CLIENT WILLIAM GUMAN  
 PROJECT CURTIS AND JUDGE ORR



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## **SWELL CONSOLIDATION TEST RESULTS**

DRAWN:

DATE:

CHECKED:

DATE:

ELL

4/15/19

JOB NO.:  
 181823

FIG NO.:  
 C-35

CLIENT	WILLIAM GUMAN	JOB NO.	181823
PROJECT	CURTIS AND JUDGE ORR	DATE	4/11/2019
LOCATION	CURTIS AND JUDGE ORR	TEST BY	BL

[illegible]

QC BLANK PASS



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COLORADO SPRINGS, COLORADO 80907

## LABORATORY TEST SULFATE RESULTS

**DRAWN:**

DATE: \_\_\_\_\_

CHECKED:

DATE: \_\_\_\_\_

JOB NO.:  
181823

FIG NO.:

C-36



## **APPENDIX D: Soil Survey Descriptions**

8—Blakeland loamy sand, 1 to 9 percent slopes. This deep, somewhat excessively drained soil formed in alluvial and eolian material derived from arkosic sedimentary rock on uplands. The average annual precipitation is about 15 inches, the average annual air temperature is about 47 degrees F, and the average frost-free period is about 135 days.

Typically, the surface layer is dark grayish brown loamy sand about 11 inches thick. The substratum, to a depth of 27 inches, is brown loamy sand; it grades to pale brown sand that extends to a depth of 60 inches.

Included with this soil in mapping are small areas of Bresser sandy loam, 0 to 3 percent slopes; Bresser sandy loam, 3 to 5 percent slopes; Truckton sandy loam, 0 to 3 percent slopes; Truckton sandy loam, 3 to 9 percent slopes; and Stapleton sandy loam, 3 to 8 percent slopes. In some areas, mainly north of Colorado Springs in the Cottonwood Creek area, arkosic beds of sandstone and shale are at a depth of 0 to 40 inches.

Permeability of this Blakeland soil is rapid. Effective rooting depth is 60 inches or more. Available water capacity is low to moderate. Organic matter content of the surface layer is medium. Surface runoff is slow, the hazard of erosion is moderate, and the hazard of soil blowing is severe.

Most areas of this soil are used for range, homesites, and wildlife habitat.

Native vegetation is dominantly western wheatgrass, side-oats grama, and needleandthread. This soil is best suited to deep-rooted grasses.

Proper range management is necessary to prevent excessive removal of plant cover from the soil. Interseeding improves the existing vegetation. Deferment of grazing in spring increases plant vigor and soil stability. Proper location of livestock watering facilities helps to control grazing.

Windbreaks and environmental plantings are fairly well suited to this soil. Blowing sand and low available water capacity are the main limitations for the establishment of trees and shrubs. The soil is 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.

This soil is suited to wildlife habitat. It 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.

This soil has good potential for urban development. Soil blowing is a hazard if protective vegetation is removed. Special erosion control practices must be provided to minimize soil losses. Capability subclass VIe.



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### SCS SOIL DESCRIPTION

Drawn	Date	Checked	Date
		LLL	2/18/19

Job No.

181823

Fig. No.

0-1

19—Columbine gravelly sandy loam, 0 to 3 percent slopes. This deep, well drained to excessively drained soil formed in coarse textured material on alluvial terraces and fans and on flood plains. Elevation ranges from 6,500 to 7,300 feet. The average annual precipitation is about 15 inches, the average annual air temperature is about 47 degrees F, and the average frost-free period is about 135 days.

Typically, the surface layer is grayish brown gravelly sandy loam about 14 inches thick. The underlying material is light yellowish brown very gravelly loamy sand.

Included with this soil in mapping are small areas of Stapleton sandy loam, 3 to 8 percent slopes; Blendon sandy loam, 0 to 3 percent slopes; Louviers silty clay loam, 3 to 18 percent slopes; and Fluvaquent Haplaquolls, nearly level. In places the parent arkose beds of sandstone or shale are at a depth of 0 to 40 inches.

Permeability of this Columbine soil is very rapid. Effective rooting depth is 60 inches or more. Available water capacity is low to moderate. Surface runoff is slow, and the hazard of erosion is slight to moderate.

This soil is used mainly for grazing livestock and for wildlife habitat. It is also used for homesites.

Native vegetation is mainly western wheatgrass, side-oats grama, needleandthread, and little bluestem. The main shrub is true mountainmahogany.

Proper location of livestock watering facilities helps to control grazing.

Windbreaks and environmental plantings are fairly well suited to this soil. Blowing sand and low available water capacity are the principal limitations to the establishment of trees and shrubs. The soil is so loose that trees need to be planted in 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.

Rangeland wildlife, such as pronghorn antelope, cottontail, coyote, and scaled quail, is best adapted to life on this droughty soil. Forage production is typically loam, and proper livestock grazing management is necessary if wildlife and livestock share the range. Livestock watering developments are also important and are used by various wildlife species.

The main limitation of this soil for urban development is a hazard of flooding in some areas. Care must be taken when locating septic tank absorption fields because of possible pollution as a result of the very rapid permeability of this soil. Capability subclass VIe.



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# SCS SOIL DESCRIPTION

Drawn	Date	Checked	Date
		LL	2/18/17

Job No.

181823

Fig. No.

D-2

29—Fluvaquentic Haplaquolls, nearly level. These deep, poorly drained soils are in marshes, in swales, and on creek bottoms. The average annual precipitation is about 14 inches, and the average annual air temperature is about 47 degrees F.

Included with these soils in mapping are small areas of Ustic Torrfluvents, loamy; Blakeland loamy sand, 1 to 9 percent slopes; Columbine gravelly sandy loam, 0 to 3 percent slopes; and Ellicott loamy coarse sand, 0 to 5 percent slopes.

These soils are stratified. Typically, the surface layer is light gray to very dark gray loamy fine sand to gravelly loam 2 to 6 inches thick. The underlying material, 48 to 58 inches thick, is very pale brown to gray, stratified heavy sandy clay loam to sand and gravel. The lower part of some of the soils, at depths ranging from 18 to 48 inches, ranges from light blueish gray to greenish gray. The water table is usually at a depth of less than 48 inches, and it is on the surface during part of the year.

Permeability of these soils is moderate. Effective rooting depth is limited by the water table. Available water capacity is moderate. Surface runoff is slow, and the hazard of erosion is slight. At times overflow deposits a damaging amount of silt and sand in the lower lying areas.

These soils are in meadow. They are used for native hay or for grazing.

These soils are well suited to the production of native vegetation suitable for grazing. The vegetation is mainly switchgrass, indiangrass, sedges, rushes, prairie cordgrass, western wheatgrass, and bluegrass. Cattails and bulrushes commonly grow in the swampy areas.

Management of distribution of livestock and stocking rates is necessary on these soils to avoid abuse of the range. In large areas, fences should be used to control grazing.

Wetland wildlife can be attracted to these soils and the wetland habitat enhanced by several means. Shallow water developments can be created by digging or by blasting potholes to create open-water areas. Fencing to control livestock use is beneficial, and it allows wetland plants such as cattails, reed canarygrass, and rushes to grow. Control of unplanned burning and prevention of drainage that would remove water from the wetlands are also good practices. These shallow marsh areas are often especially important for winter cover if natural vegetation is allowed to grow.

These soils are severely limited for use as homesites. The main limitations are a high water table and a hazard of periodic flooding. Community sewerage systems are needed because the high water table prevents septic tank absorption fields from functioning properly. Roads must also be designed to prevent frost-heave damage. Capability subclass Vw.



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### SCS SOIL DESCRIPTION

Drawn	Date	Checked	Date
		LL	2/18/19

Job No.

181823

Fig. No.

D-3

83—Stapleton sandy loam, 3 to 8 percent slopes. This deep, noncalcareous, well drained soil formed in sandy alluvium derived from arkosic bedrock on uplands. Elevation ranges from 6,500 to 7,300 feet. The average annual precipitation is about 15 inches, the average annual air temperature is about 47 degrees F, and the average frost-free period is about 135 days.

Typically, the surface layer is grayish brown sandy loam about 11 inches thick. The subsoil is grayish brown gravelly sandy loam about 6 inches thick. The substratum extends to a depth of 60 inches or more. It is pale brown gravelly sandy loam in the upper part and grades to gravelly loamy sand in the lower part.

Included with this soil in mapping are small areas of Louviers silty clay loam, 3 to 18 percent slopes; Blakeland loamy sand, 1 to 9 percent slopes; Columbine gravelly sandy loam, 0 to 3 percent slopes; and Fluvaquentic Haplaquolls, nearly level. Also included are areas where arkose beds of sandstone and shale are at a depth of 0 to 40 inches. Included areas make up about 20 percent of the mapped acreage.

Permeability of this Stapleton soil is rapid. Effective rooting depth is 60 inches or more. Available water capacity is moderate. Surface runoff is slow, and the hazards of erosion and soil blowing are moderate.

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

Native vegetation is mainly western wheatgrass, side-ouls grama, needleandthread, and little bluestem. The predominant shrub on this soil is true mountainmahogany. Yucca occurs in some areas.

Deferred grazing late in summer and in fall improves the condition of the range. Properly locating livestock watering facilities helps to control grazing.

Windbreaks and environmental plantings are generally suited to this soil. Soil blowing is the principal limitation for 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 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 main limitation of this soil for urban use is frost-action potential. Special design of roads and streets is necessary to minimize frost heave damage. Special practices must be provided to minimize water erosion and soil blowing on construction sites where vegetation has been removed. Access roads must have adequate cut-slope grade and be provided with drains to control surface runoff. Capability subclass IVE.



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### SCS SOIL DESCRIPTION

Drawn	Date	Checked	Date
		LLL	2/18/19

Job No.

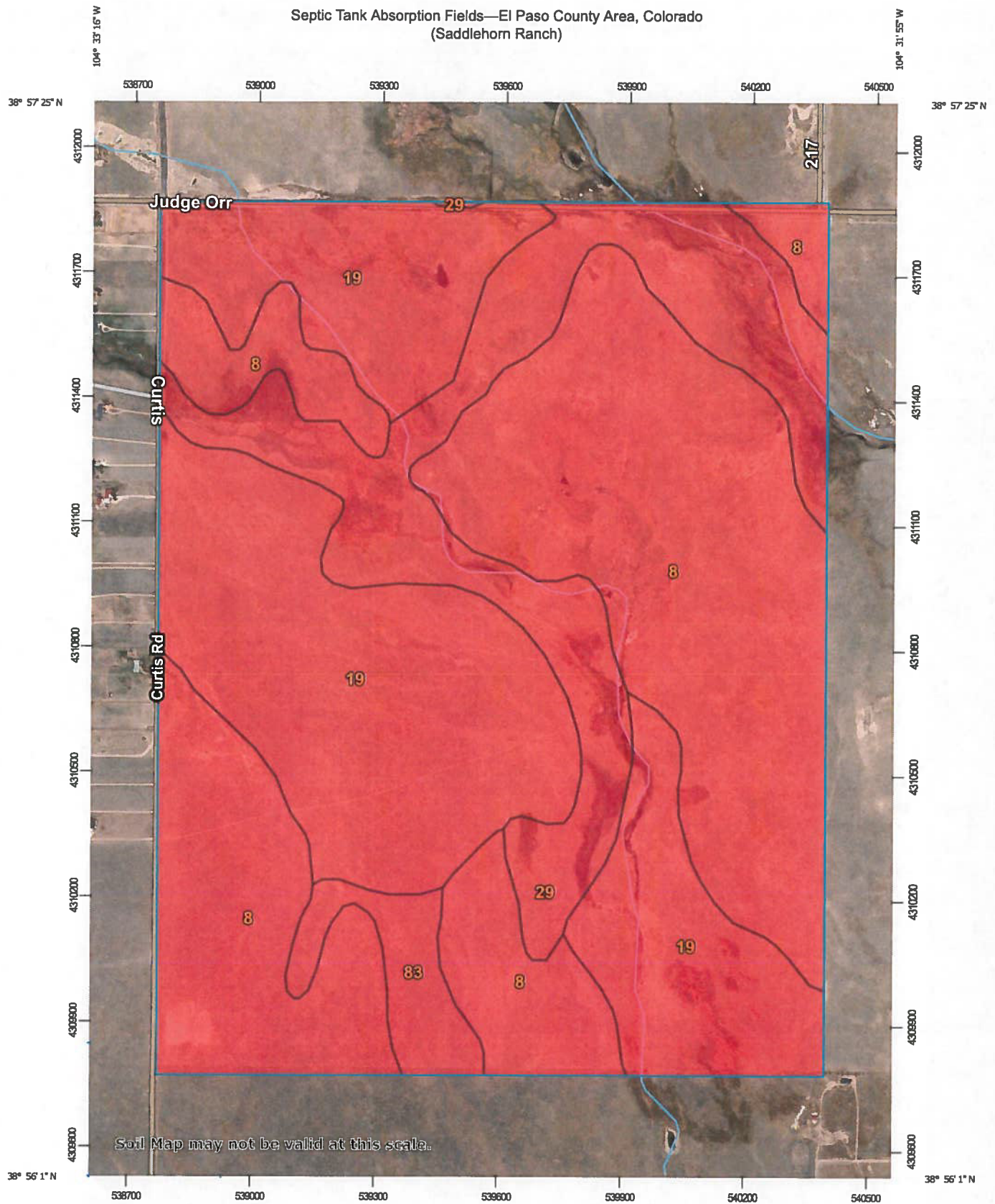
181823

Fig. No.

D-4

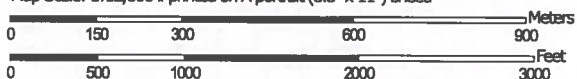
## **APPENDIX E: NRCS Septic Tank Absorption Field Soil Rating**

Septic Tank Absorption Fields—El Paso County Area, Colorado  
(Saddlehorn Ranch)



Soil Map may not be valid at this scale.

Map Scale: 1:12,600 if printed on A portrait (8.5" x 11") sheet.



Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 13N WGS84



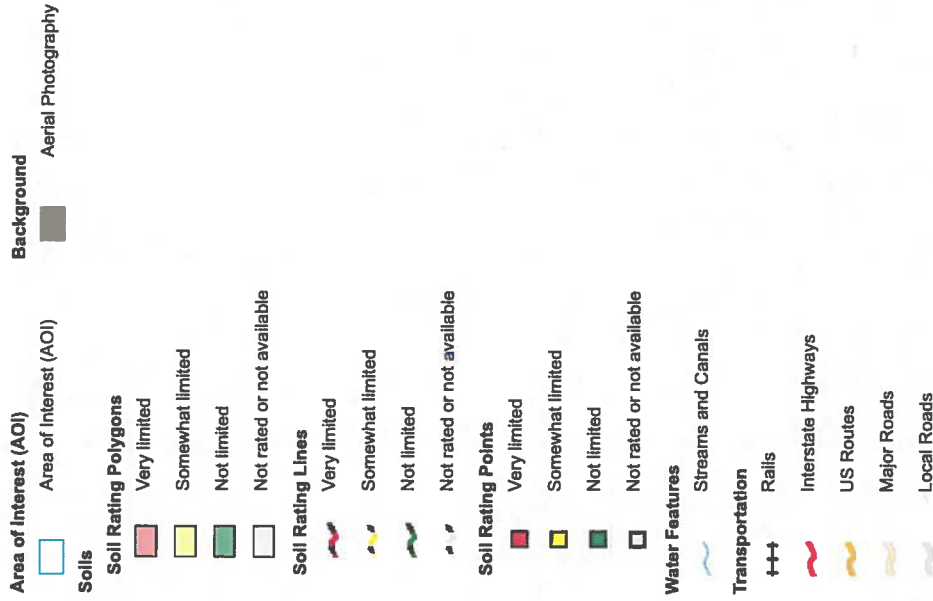
Natural Resources  
Conservation Service

Web Soil Survey  
National Cooperative Soil Survey

4/29/2019  
Page 1 of 5



## MAP LEGEND



## MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service  
 Web Soil Survey URL:  
 Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: El Paso County Area, Colorado  
 Survey Area Data: Version 16, Sep 10, 2018

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jun 7, 2016—Aug 17, 2017

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

## Septic Tank Absorption Fields

Map unit symbol	Map unit name	Rating	Component name (percent)	Rating reasons (numeric values)	Acres in AOI	Percent of AOI
8	Blakeland loamy sand, 1 to 9 percent slopes	Very limited	Blakeland (85%)	Seepage, bottom layer (1.00)	371.3	44.0%
				Filtering capacity (1.00)		
19	Columbine gravelly sandy loam, 0 to 3 percent slopes	Very limited	Columbine (85%)	Filtering capacity (1.00)	303.8	36.0%
				Seepage, bottom layer (1.00)		
29	Fluvaquentic Haplaquolls, nearly level	Very limited	Fluvaquentic Haplaquolls (85%)	Flooding (1.00)	144.6	17.1%
				Depth to saturated zone (1.00)		
				Seepage, bottom layer (1.00)		
83	Stapleton sandy loam, 3 to 8 percent slopes	Very limited	Stapleton (80%)	Filtering capacity (1.00)	24.6	2.9%
<b>Totals for Area of Interest</b>					<b>844.3</b>	<b>100.0%</b>

Rating	Acres in AOI	Percent of AOI
Very limited	844.3	100.0%
<b>Totals for Area of Interest</b>	<b>844.3</b>	<b>100.0%</b>

## Description

Septic tank absorption fields are areas in which effluent from a septic tank is distributed into the soil through subsurface tiles or perforated pipe. Only that part of the soil between depths of 24 and 60 inches is evaluated. The ratings are based on the soil properties that affect absorption of the effluent, construction and maintenance of the system, and public health. Saturated hydraulic conductivity (Ksat), depth to a water table, ponding, depth to bedrock or a cemented pan, and flooding affect absorption of the effluent. Stones and boulders, ice, and bedrock or a cemented pan interfere with installation. Subsidence interferes with installation and maintenance. Excessive slope may cause lateral seepage and surfacing of the effluent in downslope areas.

Some soils are underlain by loose sand and gravel or fractured bedrock at a depth of less than 4 feet below the distribution lines. In these soils the absorption field may not adequately filter the effluent, particularly when the system is new. As a result, the ground water may become contaminated.

The ratings are both verbal and numerical. Rating class terms indicate the extent to which the soils are limited by all of the soil features that affect the specified use. "Not limited" indicates that the soil has features that are very favorable for the specified use. Good performance and very low maintenance can be expected. "Somewhat limited" indicates that the soil has features that are moderately favorable for the specified use. The limitations can be overcome or minimized by special planning, design, or installation. Fair performance and moderate maintenance can be expected. "Very limited" indicates that the soil has one or more features that are unfavorable for the specified use. The limitations generally cannot be overcome without major soil reclamation, special design, or expensive installation procedures. Poor performance and high maintenance can be expected.

Numerical ratings indicate the severity of individual limitations. The ratings are shown as decimal fractions ranging from 0.01 to 1.00. They indicate gradations between the point at which a soil feature has the greatest negative impact on the use (1.00) and the point at which the soil feature is not a limitation (0.00).

The map unit components listed for each map unit in the accompanying Summary by Map Unit table in Web Soil Survey or the Aggregation Report in Soil Data Viewer are determined by the aggregation method chosen. An aggregated rating class is shown for each map unit. The components listed for each map unit are only those that have the same rating class as listed for the map unit. The percent composition of each component in a particular map unit is presented to help the user better understand the percentage of each map unit that has the rating presented.

Other components with different ratings may be present in each map unit. The ratings for all components, regardless of the map unit aggregated rating, can be viewed by generating the equivalent report from the Soil Reports tab in Web Soil Survey or from the Soil Data Mart site. Onsite investigation may be needed to validate these interpretations and to confirm the identity of the soil on a given site.

## Rating Options

*Aggregation Method: Dominant Condition*

*Component Percent Cutoff: None Specified*

*Tie-break Rule: Higher*



LEGEND:

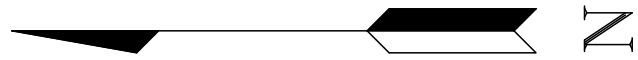


APPROXIMATE TEST BORING LOCATION AND NUMBER

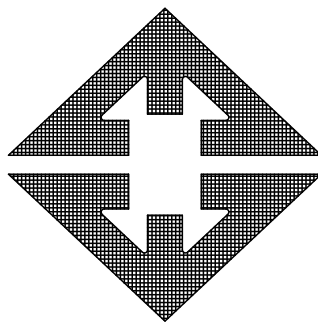


APPROXIMATE TEST PIT LOCATION AND NUMBER

(P2) - APPROXIMATE PHOTOGRAPH LOCATION AND NUMBER



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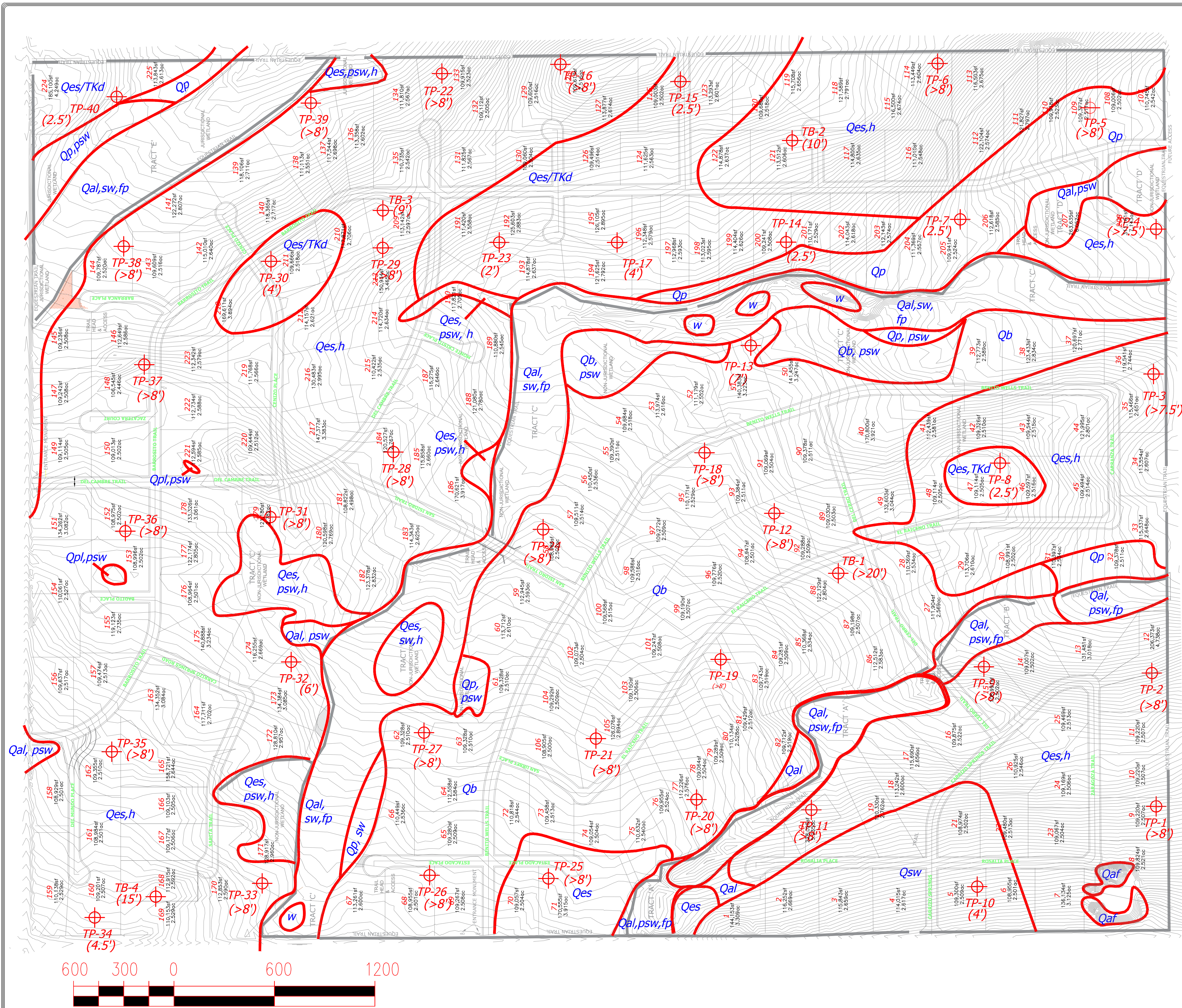
SITE PLAN/TEST BORING LOCATION MAP  
SADDLEHORN RANCH SUBDIVISION  
CURTIS ROAD AND JUDGE ORR ROAD  
EL PASO COUNTY, CO.  
FOR: WILLIAM GUMAN AND ASSOCIATES, LTD

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DATE  
4/29/19  
SCALE  
AS SHOWN  
JOB NO.  
181823  
FIGURE No.

3





LEGEND:

- Qaf - Artificial Fill of Holocene Age: man made fill deposits
- Qal - Post Piney Creek (Alluvium One)-Recent Alluvium of Late Holocene Age: recent stream desposits
- Qpl - Playa Deposits of Holocene Age: blowouts in eolian sand that form seasonal ponds
- Qp - Piney Creek Alluvium (Alluvium Two) of Early Holocene Age: low stream terrace deposits above current stream channels
- Qb - Broadway Alluvium (Alluvium Three) of Late Pleistocene Age: stream terrace deposited sands
- Qes - Eolian Sand of Holocene to Late Pleistocene Age: wind blown sand deposits
- Qsw - Sheetwash of Holocene to Late Pleistocene Age: silty to clayey sand sheetwash deposits
- Qes/TKd - Sand Deposits of Quaternary Age Overlying Dawson Arkose Formation of Tertiary to Cretaceous Age: windblown sands and residual soil deposits overlying arkosic sandstone with interbedded siltstone and claystone
- h - hydrocompaction
- fp - floodplain
- psw - potentially seasonal shallow groundwater area
- sw - seasonal shallow groundwater area
- w - flowing / ponded water
- TB - Approximate Test Boring Location
- TP - Approximate Test Pit Location
- (6') - (Depth to bedrock in feet)

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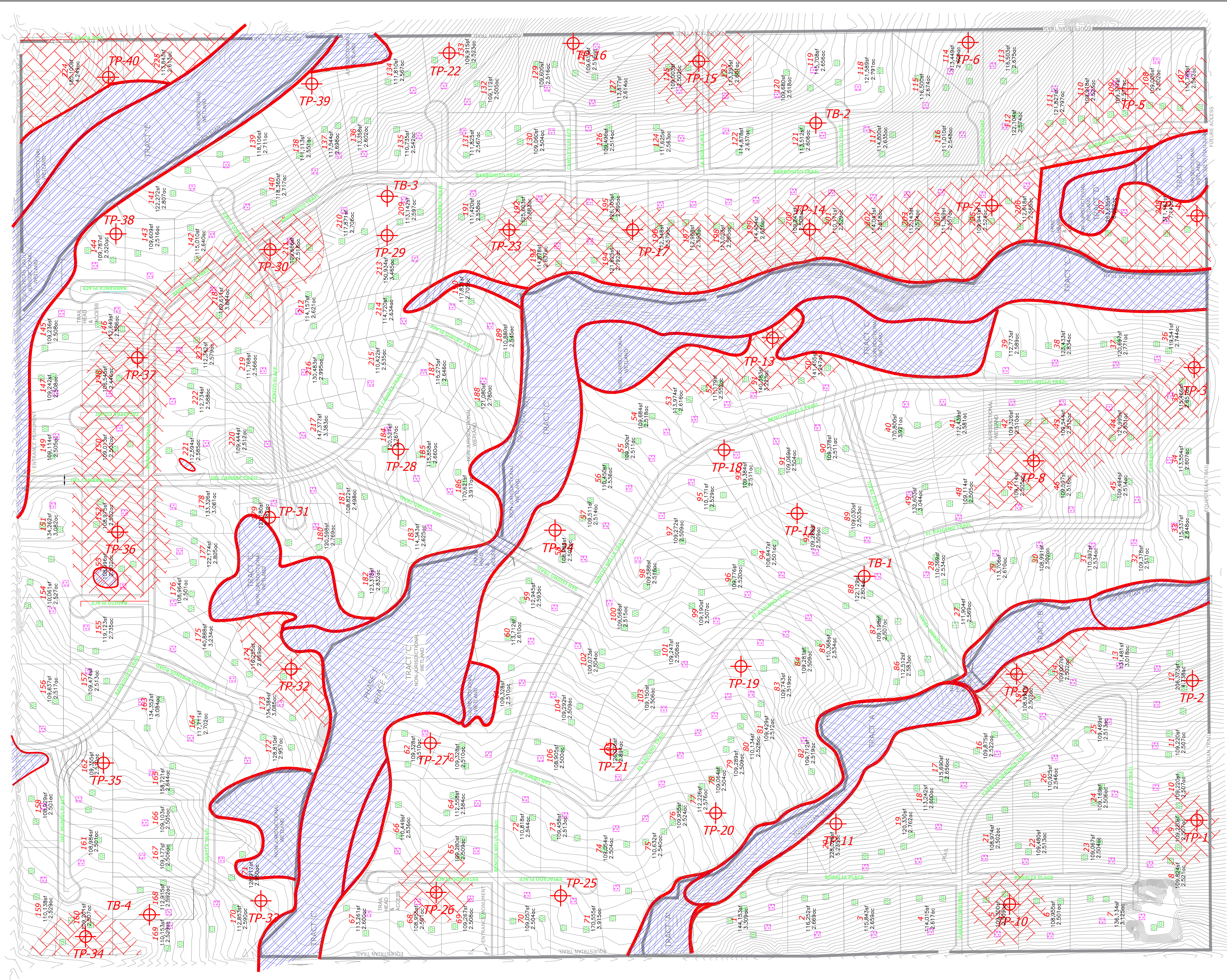
ENTECH  
ENGINEERING, INC.  
505 ELKTON DRIVE (719) 531-5599  
COLORADO SPRINGS, CO. 80907

GEOLOGY/ENGINEERING GEOLOGY MAP  
SADDLEHORN RANCH SUBDIVISION  
CURTIS ROAD AND JUDGE ORR ROAD  
EL PASO COUNTY, CO.  
FOR: WILLIAM GUMAN AND ASSOCIATES, LTD

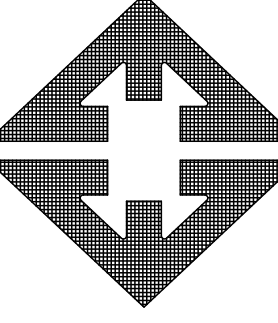
DRAWN LLL/JAG CHECKED
DATE 4/29/19
SCALE AS SHOWN
JOB NO. 181823
FIGURE No. 6



- APPROXIMATE LOCATION OF PERCOLATION TEST
- AREAS WHERE DESIGNED SYSTEMS ARE RECOMMENDED DUE TO UNSUITABLE SOILS, SHALLOW BEDROCK OR SHALLOW GROUNDWATER
- AREAS WHERE CONVENTIONAL SYSTEMS ARE NOT RECOMMENDED
- AREAS WHERE CONVENTIONAL SYSTEMS CAN BE USE UNLESS SHALLOW BEDROCK, SHALLOW GROUNDWATER OR UNSUITABLE SOILS ARE ENCOUNTERED REQUIRING DESIGNED SYSTEMS
- POSSIBLE HOUSE LOCATION
- TWO POSSIBLE OWTS (ON-SITE WASTEWATER TREATMENT SITES)
- APPROXIMATE TEST BORING LOCATIONS
- APPROXIMATE TEST PIT LOCATIONS



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COLORADO SPRINGS, CO. 80907

SEPTIC SUITABILITY MAP  
SADDLEHORN RANCH SUBDIVISION  
CURTIS ROAD AND JUDGE ORR ROAD  
EL PASO COUNTY, CO.  
FOR: WILLIAM GUMAN AND ASSOCIATES, LTD

DRAWN LLL/JAG CHECKED
DATE 4/29/19
SCALE AS SHOWN
JOB NO. 181823
FIGURE No. 11