



**ENTECH**  
ENGINEERING, INC.

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

September 9, 2022  
Revised May 22, 2023  
Revised April 22, 2024

Taher Nabulsi  
14384 Whispering Ridge Road  
San Diego, CA 92131

Re: OWTS – Wastewater Study  
10650 Black Forest Road  
Parcel No. 52190-00-101  
El Paso County, Colorado  
Entech Job No. 221371

Dear Mr. Nabulsi:

The project consists of subdividing 24.79-acres; four rural residential lots are proposed as part of the subdivision. The site is located northwest of the intersection of Black Forest Road and Old Ranch Road, in El Paso County, Colorado.

#### **GENERAL SITE CONDITIONS AND PROJECT DESCRIPTION**

The site is located in a portion of the SE¼ of Section 19 Township 12 South, Range 65 West of the 6<sup>th</sup> Principal Meridian in El Paso County, Colorado. The site is located immediately north of Colorado Springs city limits, at the northwest of the intersection of Black Forest Road and Old Ranch Road, in El Paso County, Colorado. The location of the site is as shown on the Vicinity Map, Figure 1.

The topography of the site is gradually to moderately sloping to the south with steeper slopes in the northern portion of the site. Several minor drainage swales are located across the property with a low-lying potentially seasonally shallow groundwater area in the southwest portion of the site and a pond in the southeastern portion of the site. Water was not observed in the pond or minor drainage swales at the time of this investigation. The site boundaries are indicated on the USGS Map, Figure 2. Previous land uses have included undeveloped and rural residential. The site contains field grasses, weeds, conifers, and shrubs. There are several existing structures located on the two northern lots. There is an existing septic field, two houses and several auxiliary structures located on Lot Nos. 3 and 4. The structures are currently vacant. There are several water spigots throughout the site. Site photographs taken June 23, 2022, are included in appendix A. Site mapping and test pit excavations were completed on June 23, 2022. Test Borings were drilled on June 22, 2022.

Total acreage involved in the proposed subdivision is 24.79-acres. Four rural residential lots are proposed. The site plan with proposed the proposed lot layout is shown in Figure 3. The proposed lot sizes range from 4.76-acres to 9.2-acres and will be access by a private drive. There are several structures currently occupying the northern two lots. These structures include an existing residence, a barn, corrals, a modular home and other accessory building structures. The proposed lots will be serviced by individual wells and on-site wastewater treatment systems.



## 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 with regards to on-site wastewater treatment systems (OWTS).

## FIELD INVESTIGATION

Our field investigation consisted of the preparation of a geologic map of bedrock features and significant surficial deposits. The Natural Resource Conservation Service (NRCS), previously the Soil Conservation Service (SCS) survey was also reviewed to evaluate the site. The position of mappable units within the subject property are shown on the Geologic Map. Our mapping procedures involved both field reconnaissance and measurements, and aerial photo reconnaissance and interpretation. The same mapping procedures have also been utilized to produce the Geology/Engineering Geology Map which identified pertinent geologic conditions affecting development. The field mapping was performed by personnel of Entech Engineering, Inc. on June 23, 2022.

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

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

## SOIL AND GEOLOGIC CONDITIONS

### Soil Survey

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

<u>Type</u>	<u>Description</u>
41	Kettle gravelly, loamy sand, 8 – 40% Slopes
71	Pring coarse sandy loam, 3 – 8% Slopes

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



### Soils

The soils encountered in the test pits consisted of sandy loam to gravelly sandy clay loam with underlying sandy clay in Test Boring No. 3. Bedrock was not encountered in the test pits, however was encountered at 7 feet in both test borings. The samples of sand tested had 9 to 20 percent of the soil size particles passing the No. 200 sieve. The samples of claystone tested had 64 to 71 percent of the soil size particles passing the No. 200 sieve.

The soils encountered in the test borings consisted of slightly silty to silty sand overlying sandy claystone. Bedrock was encountered at depths of 7 feet in the test borings. The upper sands were encountered at medium dense states and dry to moist conditions. The claystone was encountered at hard consistencies and moist to wet conditions. The samples of sand tested had 9 to 20 percent of the soil size particles passing the No. 200 sieve. The samples of claystone tested had 64 to 71 percent of the soil size particles passing the No. 200 sieve. The silty sand typically has low expansion potential. A Swell/Consolidation Test indicated a volume change of 0.1% which is in the low consolidation range for a sample of claystone from Test Boring No. 1 at a depth of 10 feet. Moderately to highly expansive claystone is known to be common in this area.

### Groundwater

Groundwater was not encountered in the test borings which were drilled to depths of 20 feet. Evidence of seasonally occurring ground water was noted in Test Pit No. 2. Bedrock was encountered in the test borings at approximately 7 feet below existing ground surface. Groundwater is not anticipated to affect shallow foundations on the majority of the site. An area of seasonal shallow groundwater has been mapped on the site and is discussed later in this report. Fluctuations in groundwater conditions may occur due to variations in rainfall or other factors not readily apparent at this time. Isolated sand layers within the soil profile can carry water in the subsurface. Contractors should be cognizant of the potential for the occurrence of subsurface water features during construction.

### Geology

Approximately 10.5 miles west of the site is a major structural feature known as the Rampart Range Fault. This fault marks the boundary between the Great Plains Physiographic Province and the Southern Rocky Mountain Province. The site exists within a large structural feature known as the Denver Basin. Bedrock in the area is typically gently dipping in a northerly direction (Reference 3). The bedrock underlying the site consists of the Dawson Formation of Tertiary to Cretaceous Age. The Dawson Formation typically consists of coarse-grained arkosic sandstone with interbedded layers of claystone or siltstone.

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

**Qaf Artificial Fill of Quaternary Age:** These are man-made fill deposits associated with earthen dam on-site.

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



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

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

### Drainage Areas

Several minor drainage swales are located across the property with a low-lying potentially seasonally shallow groundwater area in the southwest portion of the site and a pond in the southeastern portion of the site. Water was not observed in the pond or minor drainage swales at the time of this investigation. These areas are indicated in the Geology/Engineering Geology Map (Figure 6) and are discussed below. Due to the size of the proposed lots these areas can be avoided or redirected around proposed structures or proposed soil treatment areas. The anticipated building areas are not affected by these areas. The site does not lie within any floodplain zones according to the FEMA Map No. 08041CO527G dated December 7, 2018 (Figure 7, Reference 7). Exact locations of floodplain and specific drainage studies are beyond the scope of this report. Individual wastewater treatment systems must be located a minimum of 25 feet from dry gulches and 50 feet from water courses, drainage ponds or floodplains.

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

The Natural Resource Conservation Service (Reference 1), previously the Soil Conservation Service (Reference 2) has been mapped with three soil descriptions. The Soil Survey Map (Reference 1) is presented in Figure 4, and the Soil Survey Descriptions (Reference 2) are presented in Appendix C. The soils are described as having rapid percolation rates. An existing septic system is located on the northeast lot which will likely be abandoned. Records for the existing septic system are included in Appendix E.

Soils encountered in the tactile test pits consisted of sandy loam to gravelly sandy clay loam with underlying sandy clay in Test Boring No. 2. The limiting layers encountered in the test pits are the gravelly sandy clay loam, sandy clay loam, and sandy clay which corresponds with USDA Soil Types R-1, 3, and 4A, with an LTAR values of 0.35 to 0.15 gallons per day per square foot and the evidence of seasonally occurring groundwater encountered in Test Pit No. 2. Formational claystone was encountered at approximately 7 feet in the test borings. Bedrock was not encountered in the test pits. Hard formational claystone may be encountered near Test Pit No. 2 due to encountering clay soils at 7 feet.

Signs of seasonally occurring groundwater were observed in Test Pit No. 2 at 5 feet. Absorption fields must be maintained a minimum of 3 feet above groundwater, bedrock, or confining layers. Should groundwater or bedrock be encountered within 6 feet of the surface, designed systems will be required. Areas where conventional systems can be utilized may be determined with additional testing. Testing will be required on each lot to determine the site characteristics prior to construction.



On-site Wastewater Systems are to be designed on a per lot basis at the time of building permit. The systems are to meet County Chapter 8 OWTS criteria and State CDPHE criteria including any required mitigation to accommodate respective leach fields and infrastructure including, but not limited to earthwork grading, berming and diversion swale implementation, installation of secondary sand filters or any other higher treatment levels and dosing as required on a per lot basis and determined by test pit results and site topography. There are no identified geologic hazards on the site that are prohibitive to future OWTS design at this time

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 designed systems are anticipated for the majority of the lots, depending on soils encountered. The Septic Suitability Map is presented in Figure 8. Potential house locations, water wells, and two septic sites for the new lots are indicated on Figure 8. 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.

#### CLOSURE

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

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

Respectfully Submitted,

ENTECH ENGINEERING, INC.

A handwritten signature in blue ink, appearing to read "Logan L. Langford".

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

Reviewed by:



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

LLL/JG

Encl.

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## REFERENCES

1. Natural Resource Conservation Service, September 13, 2019. *Web Soil Survey*. United States Department Agriculture, <http://websoilsurvey.sc.egov.usda.gov/App/HomePage.htm>.
2. United States Department of Agriculture Soil Conservation Service. June 1981. *Soil Survey of El Paso County Area, Colorado*.
3. Scott, Glen R.; Taylor Richard B.; Epis, Rudy C; and Wobus, Reinhard A. 1978. *Geologic Structure Map of the Pueblo 1° x 2° Quadrangle, South-Central Colorado*. Sheet 2. U.S. Geologic Survey. Map I-1022, Sheet 2.
4. Madole, Richard F., 2003. *Geologic Map of the Falcon NW Quadrangle, El Paso County, Colorado*. Colorado Geological Survey. Open-File Report 03-08.
5. Trimble, Donald E. and Machette, Michael N. 1979. *Geologic Map of the Colorado Springs-Castle Rock Area, Front Range Urban Corridor, Colorado*. USGS, Map I-857-F.
6. Scott, Glen R.; Taylor Richard B.; Epis, Rudy C; and Wobus, Reinhard A. 1978. *Geologic Structure Map of the Pueblo 1° x 2° Quadrangle, South-Central Colorado*. Sheet 2. U.S. Geologic Survey. Map I-1022.
7. Federal Emergency Management Agency. December 7, 2018. *Flood Insurance Rate Maps for the City of Colorado Springs, Colorado*. Map Number 08041CO527G

## **TABLES**

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

CLIENT TAHER NABULSI  
PROJECT 10650 BLACK FOREST RD.  
JOB NO. 221371

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			8.9	NV	NP	0.00			SM-SW	SAND, SLIGHTLY SILTY
1	2	5			19.7						SM	SAND, SILTY
2	1	10	8.8	121.4						-0.1	CL	CLAYSTONE, SANDY
2	2	15			70.5	37	14	<0.01			CL	CLAYSTONE, SANDY

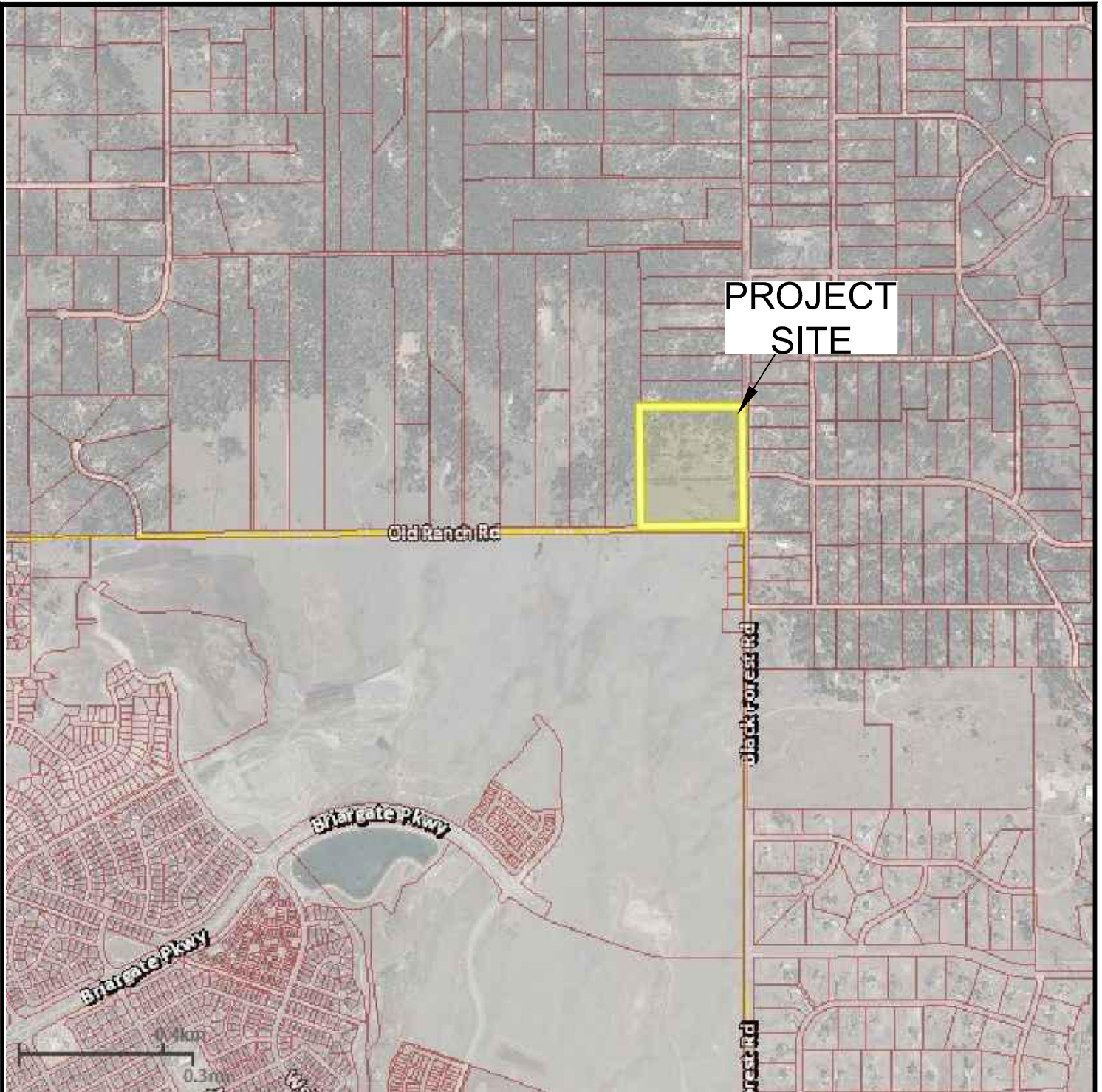


**Table 2: Summary Groundwater and Bedrock Results**

<b>Test Location No.</b>	<b>Depth to Bedrock (ft.)</b>	<b>Depth to Groundwater Evidence (ft.)</b>	<b>USDA Soil Type</b>	<b>LTAR Value</b>
TP-1	>8	>8	R-1*	0.15*
TP-2	>8	5*	2	0.6
TP-3	>8	>8	3	0.35
TB-1	7	>20	N/A	N/A
TB-2	7	>20	N/A	N/A

\*- Conditions that will require an engineered OWTS

## FIGURES

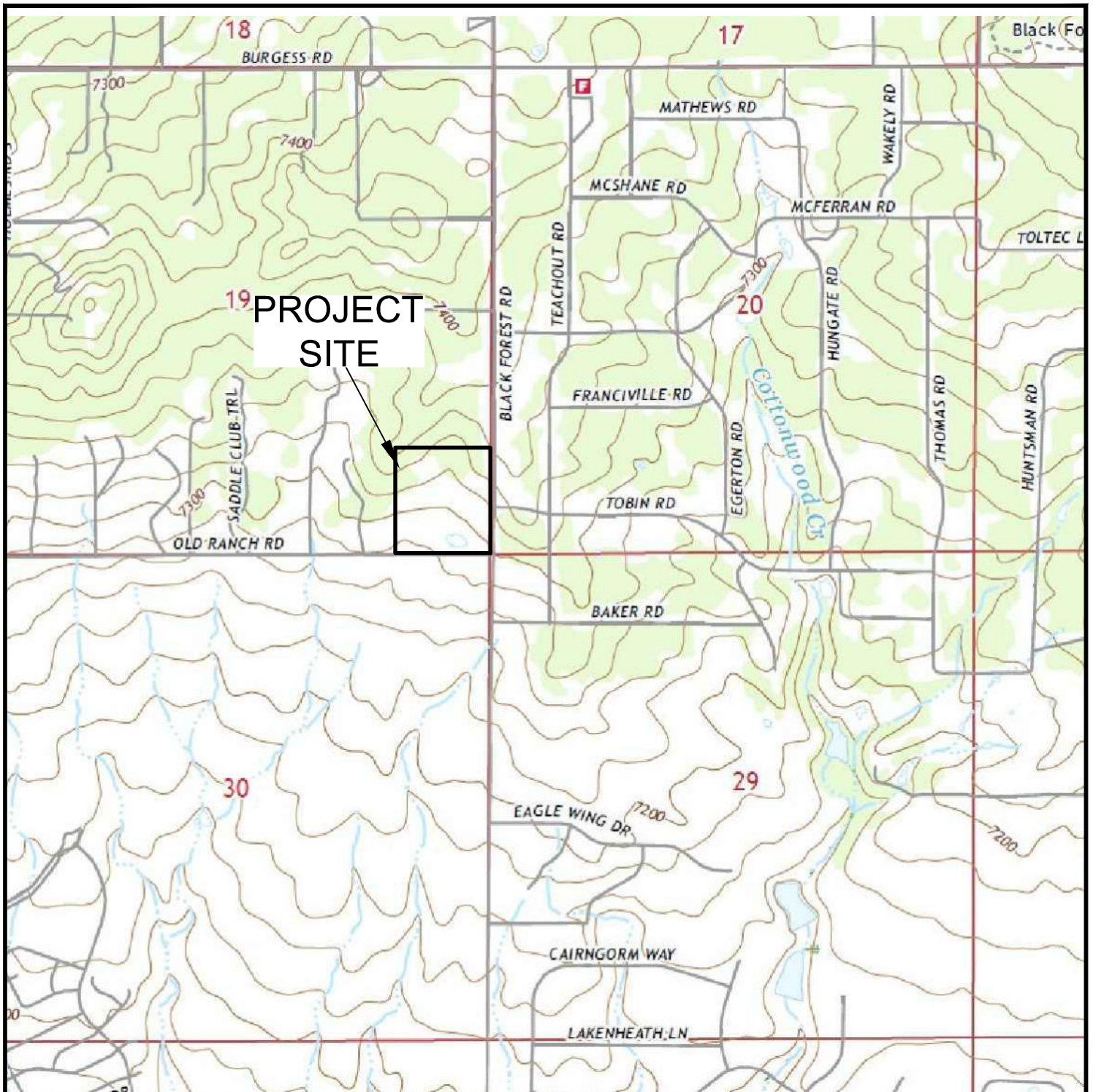


### VICINITY MAP

10650 BLACK FOREST ROAD  
TAHER NABULSI

JOB NO.  
221371

**FIG. 1**

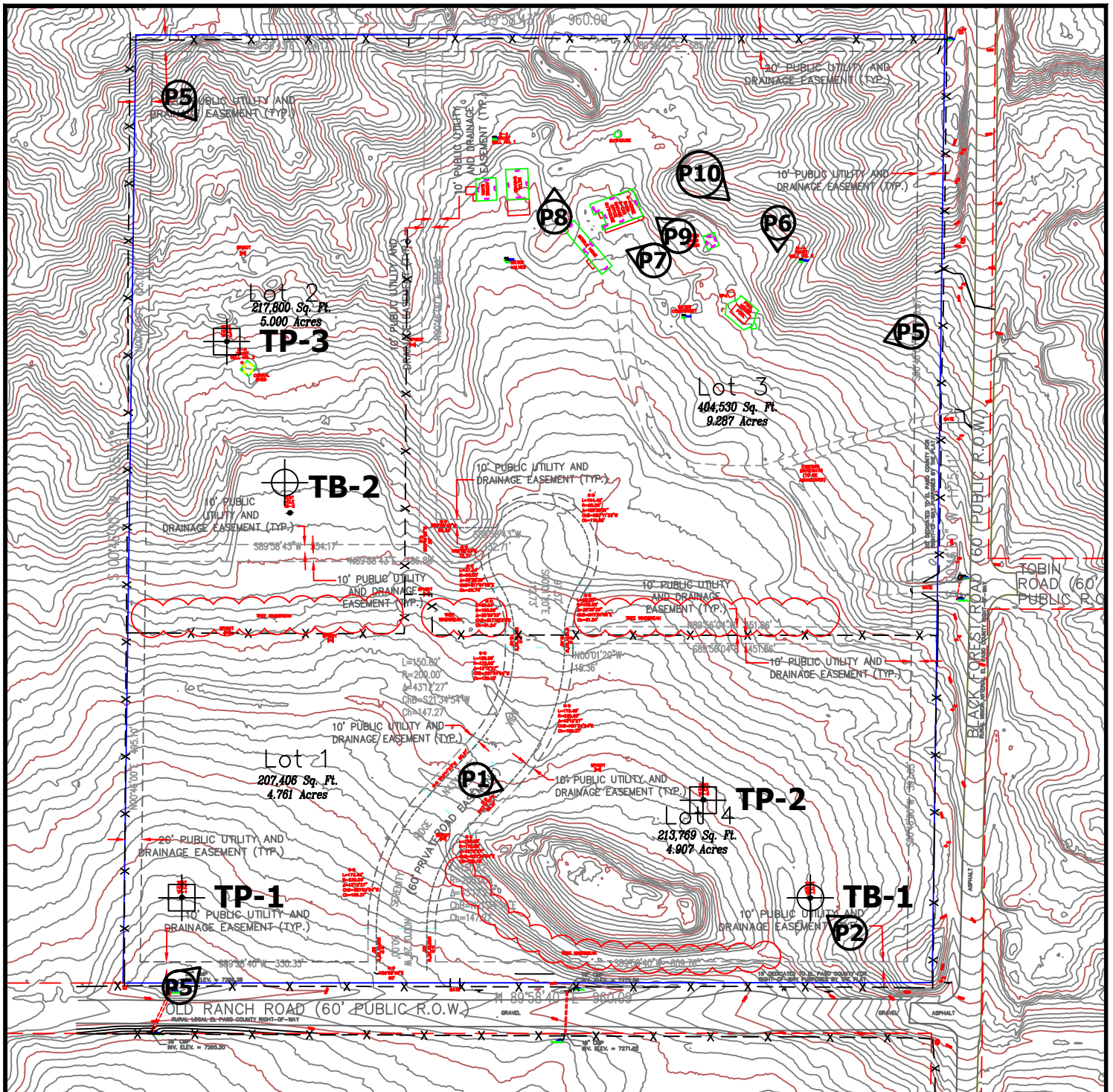





**USGS TOPOGRAPHY MAP**

10650 BLACK FOREST ROAD  
TAHER NABULSI

JOB NO.  
221371

**FIG. 2**



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



### SITE AND EXPLORATION PLAN

10650 BLACK FOREST ROAD  
TAHER NABULSI

JOB NO.  
221371

**FIG. 3**

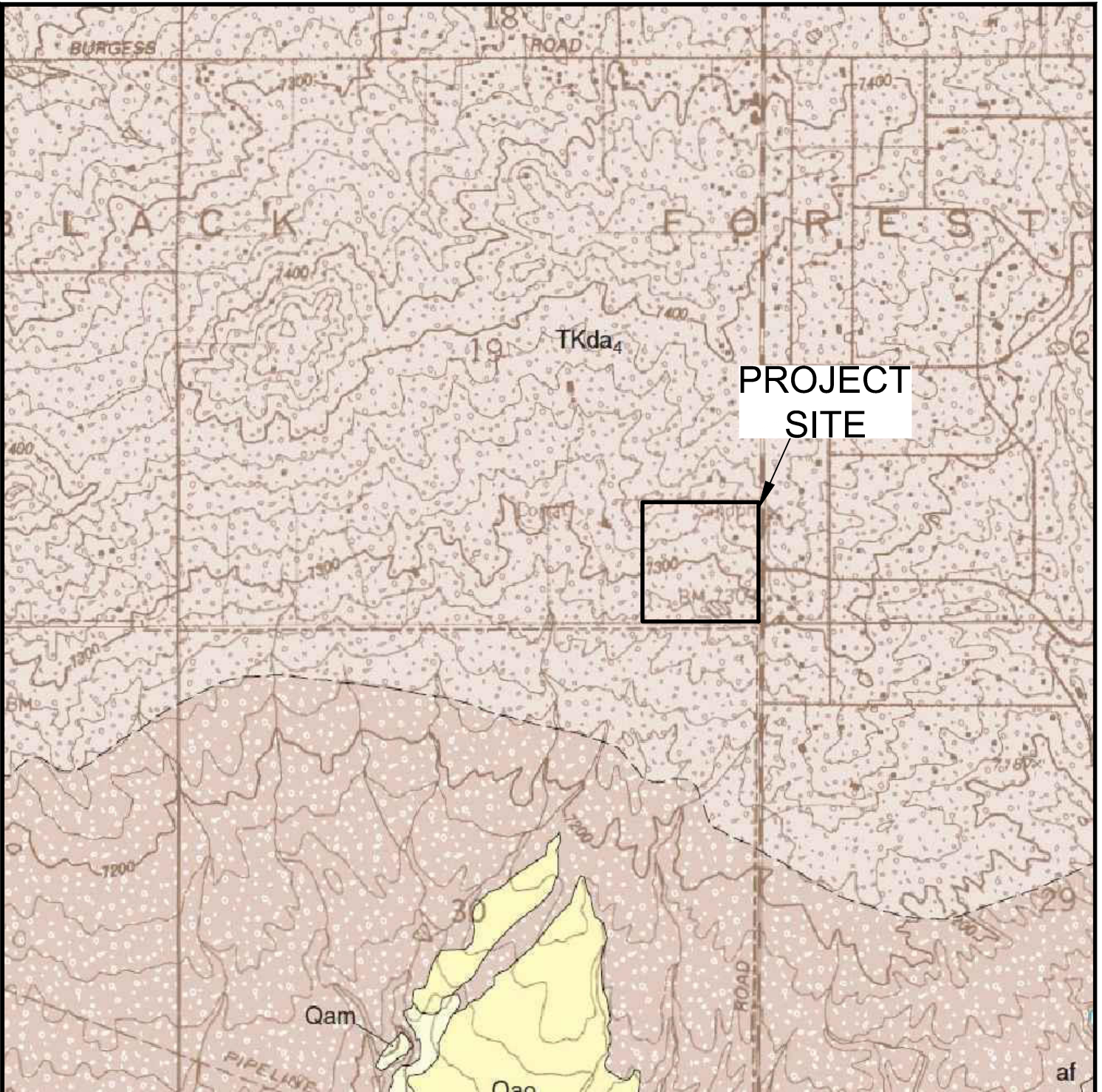


**SOIL SURVEY MAP**

10650 BLACK FOREST ROAD  
TAHER NABULSI

JOB NO.  
221371

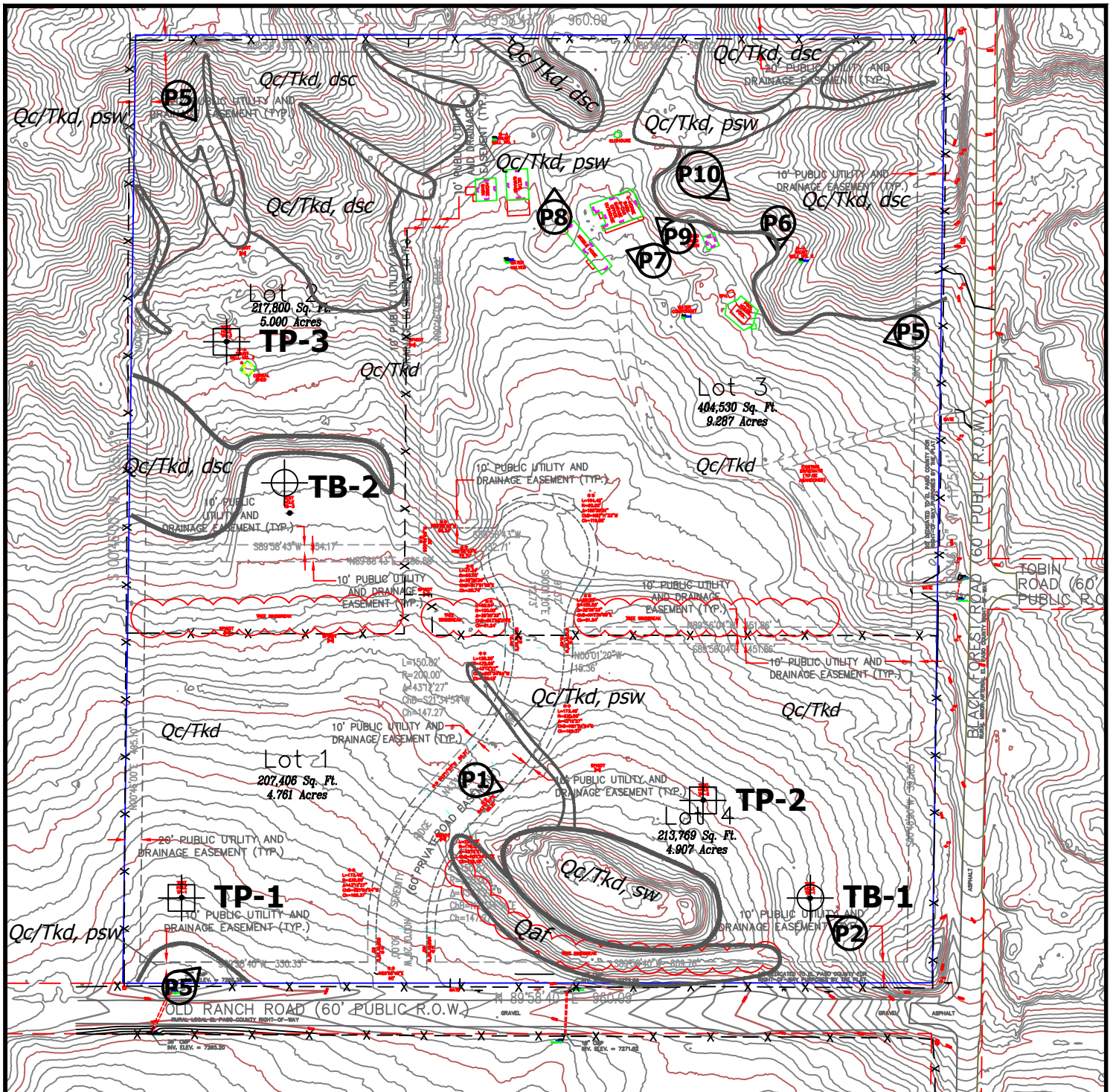
**FIG. 4**



**GEOLOGIC MAP OF THE FALCON  
NORTHWEST QUADRANGLE**  
10650 BLACK FOREST ROAD  
TAHER NABULSI

JOB NO.  
221371

**FIG. 5**



**Legend:**

Qaf - Artificially Man Made Fill of of Quaternary Age

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

dsc - down slope creep  
 sw - seasonal shallow groundwater area  
 psw - potentially seasonal wet



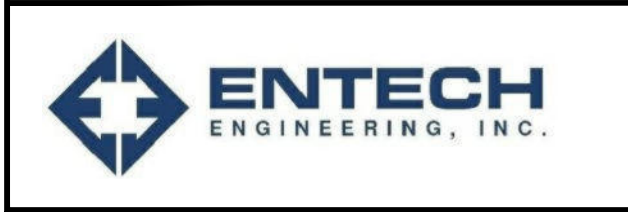
**GEOLOGY/ENGINEERING GEOLOGY MAP**

305 PINE OAKS ROAD  
 EL PASO COUNTY, CO  
 T-BONE CONSTRUCTION

JOB NO.  
 231440

**FIG. 6**



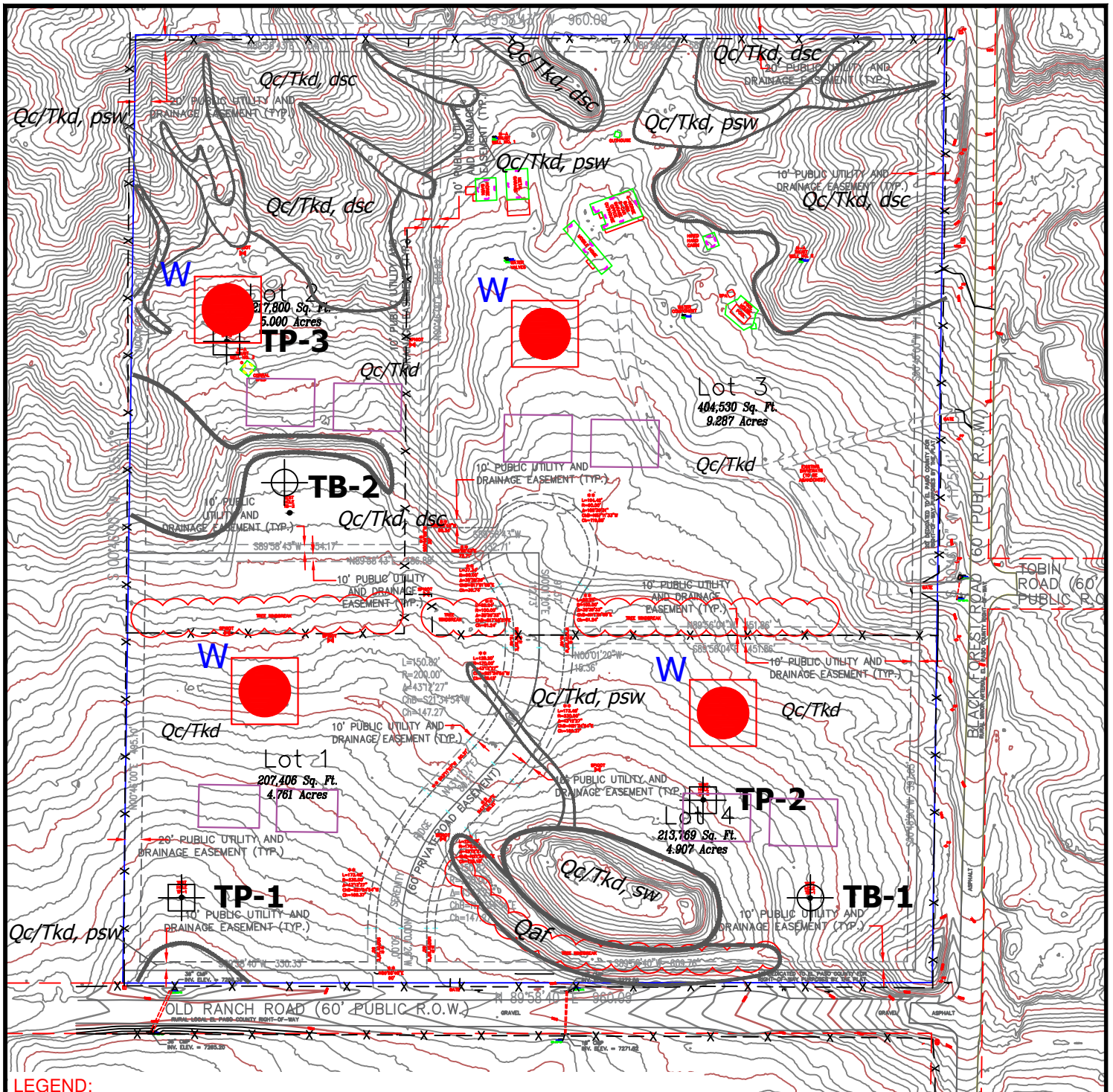


**FEMA FLOODPLAIN MAP**




10650 BLACK FOREST ROAD  
TAHER NABULSI

JOB NO.  
221371

**FIG. 7**



**LEGEND:**

-  - POTENTIAL HOUSE LOCATION
-  - POTENTIAL OWTS LOCATIONS
-  - POTENTIAL WATER WELL LOCATIONS
- SW & PSW AREAS ARE NOT SUITABLE FOR OWTS LOCATIONS



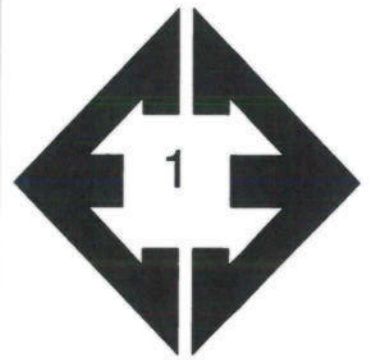
**OWTS SUITABILITY MAP**

10650 BLACK FOREST ROAD  
TAHER NABULSI

JOB NO.  
221371

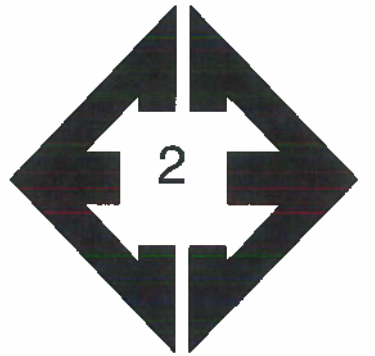
**FIG. 8**

## **APPENDIX A: Photographs**



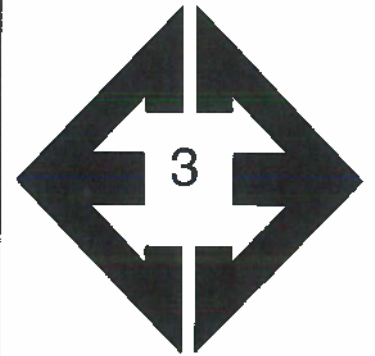
**Looking east from the northwest side of the pond.**

June 23, 2022



**Looking northwest from the southeast corner of the site.**

June 23, 2022



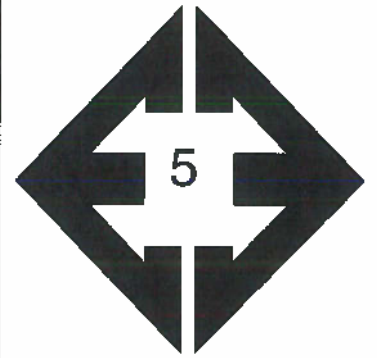
**Looking southeast  
from the northwest  
corner of the site.**

June 23, 2022



**Looking southwest  
from the central  
portion of the east  
property line of the  
site.**

June 23, 2022



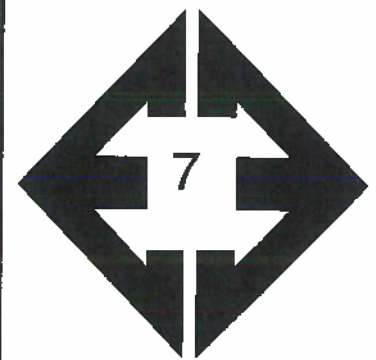
**Looking northeast  
from the southwest  
portion of the site**

June 23, 2022



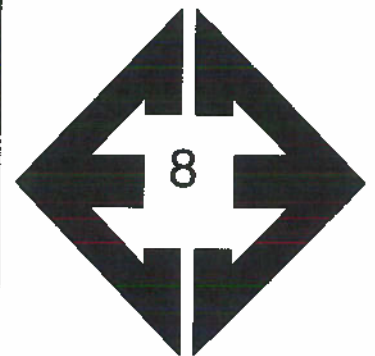
**Looking south at the  
existing residence  
from the northeast  
portion of the site.**

June 23, 2022



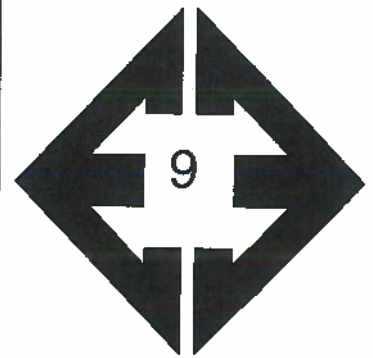
**Looking east at  
existing modular home  
from the center of the  
proposed Lot 1.**

June 23, 2022



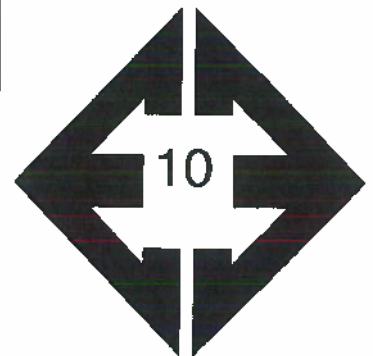
**Looking north at  
existing storage  
structures from the  
center of the proposed  
Lot 1.**

June 23, 2022



**Looking northwest at  
an existing structure  
from the center of the  
proposed Lot 1.**

June 23, 2022



**Looking northwest at  
an existing structure  
from the center of the  
proposed Lot 1.**

June 23, 2022



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

TEST BORING NO. 1  
 DATE DRILLED 6/22/2022  
 Job # 221371

TEST BORING NO. 2  
 DATE DRILLED 6/22/2022  
 CLIENT TAHER NABULSI  
 LOCATION 10650 BLACK FOREST RD.

REMARKS

REMARKS

DRY TO 20', 6/22/22

SAND, SLIGHTLY SILTY TO SILTY, FINE TO COARSE GRAINED, TAN, MEDIUM DENSE, DRY TO MOIST

CLAYSTONE, SANDY, GRAY BROWN, HARD, MOIST

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
5			10	2.1	1
5			17	11.3	1
10			50 7"	9.1	2
15			50 5"	8.5	2
20			50 5"	9.4	2

DRY TO 20', 6/22/22

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

CLAYSTONE, SANDY, GRAY BROWN, HARD, MOIST

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
5			17	6.2	1
5			10	10.6	1
10			50 9"	8.7	2
15			50 6"	12.5	2
20			50 5"	10.3	2



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505 ELKTON DRIVE  
 COLORADO SPRINGS, COLORADO 80907

TEST BORING LOG

DRAWN:

DATE:

CHECKED:  
 LLL

DATE:  
 7/18/22

JOB NO.:  
 221371

FIG NO.:

B-1

TEST PIT NO. 1  
 DATE EXCAVATED 6/23/2022  
 Job # 221371

TEST PIT NO. 2  
 DATE EXCAVATED 6/23/2022  
 CLIENT TAHER NABULSI  
 LOCATION 10650 BLACK FOREST 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
							redoxomphic features @ 5-feet						
topsoil, sandy clay loam, brown, moist	1						topsoil, sandy clay loam, brown, moist	1					
	2							2					
gravelly sandy clay loam, fine to very coarse grained, dark brown, moist	3			gr	m	R-1	sandy loam, fine to coarse grained, grayish brown, moist	3			gr	s	2
	4							4					
sandy loam, fine to coarse grained, grayish brown, moist	5			gr	s	2	sandy loam, fine to coarse grained, brown, moist	5			gr	m	2
	6							6					
	7							7					
	8						sandy clay, fine to medium grained, grayish brown, very moist	8			ma		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



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

505 ELKTON DRIVE  
 COLORADO SPRINGS, COLORADO 80907

TEST PIT LOG

DRAWN:  
jhr

DATE:  
6/30/22

CHECKED:  
JHR











DATE:  
7-15-22

JOB NO.:  
221371

FIG NO.:  
B-2

TEST PIT NO. 3  
 DATE EXCAVATED 6/23/2022  
 Job # 221371

CLIENT LOCATION TAHER NABULSI  
 10650 BLACK FOREST ROAD

REMARKS	Depth (ft)	Symbol	Samples	Soil Structure Shape	Soil Structure Grade	USDA Soil Type	REMARKS	Depth (ft)	Symbol	Samples	Soil Structure Shape	Soil Structure Grade	USDA Soil Type
topsoil, sandy clay loam, brown, moist	1							1					
sandy clay loam, fine to coarse grained, brown, moist	2							2					
	3							3					
	4			gr	s	3		4					
sandy loam, fine to coarse grained, brown, moist	5							5					
	6			gr	s	2		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

**TEST PIT LOG**

DRAWN:  
jhr

DATE:  
6/30/22

CHECKED:  
JHR

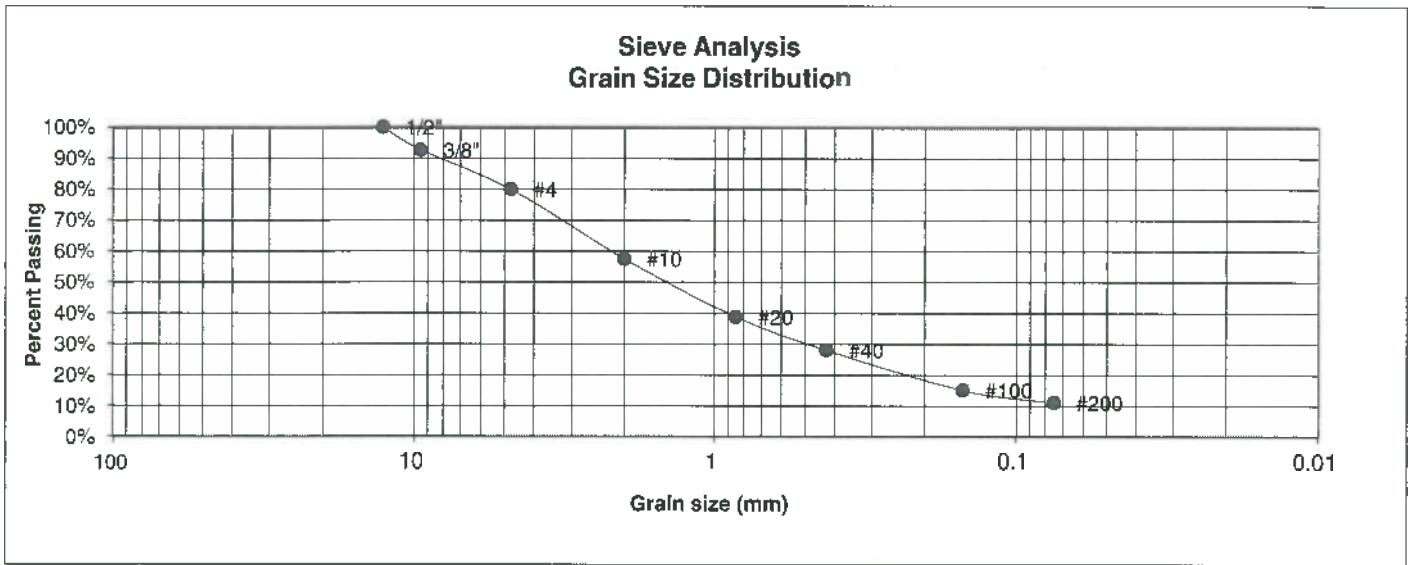
DATE:  
7-6-22

JOB NO.:  
221371

FIG NO.:  
B-3

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

<u>UNIFIED CLASSIFICATION</u>	SM-SW	<u>CLIENT</u>	TAHER NABULSI
<u>SOIL TYPE #</u>	1	<u>PROJECT</u>	10650 BLACK FOREST RD.
<u>TEST BORING #</u>	TP-1	<u>JOB NO.</u>	221371
<u>DEPTH (FT)</u>	3	<u>TEST BY</u>	BL



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	100.0%
3/8"	92.7%
4	79.9%
10	57.5%
20	38.8%
40	28.1%
100	15.1%
200	11.1%

Atterberg Limits  
 Plastic Limit  
 Liquid Limit  
 Plastic Index

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



**ENTECH  
ENGINEERING, INC.**

505 ELKTON DRIVE  
COLORADO SPRINGS, COLORADO 80907

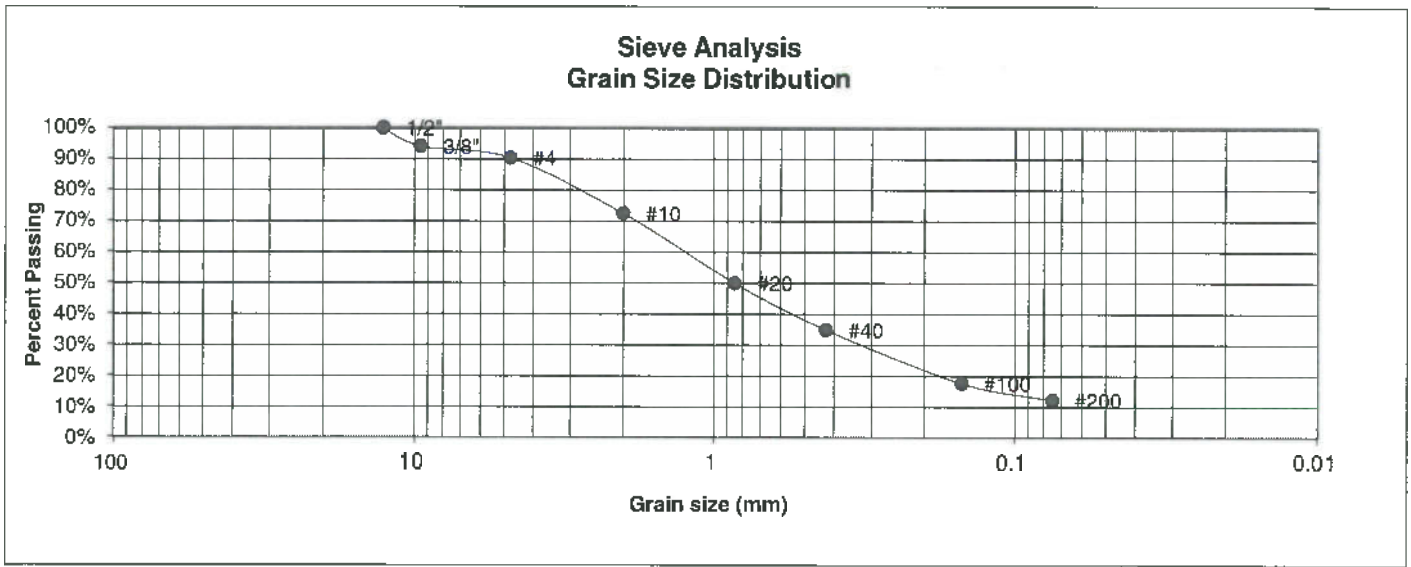
**LABORATORY TEST  
RESULTS**

DRAWN:	DATE:	CHECKED:	DATE:
		546	7-15-22

JOB NO.:  
221371

FIG NO.:  
C-1

<b>UNIFIED CLASSIFICATION</b>	SM	<b>CLIENT</b>	TAHER NABULSI
<b>SOIL TYPE #</b>	1	<b>PROJECT</b>	10650 BLACK FOREST RD.
<b>TEST BORING #</b>	TP-2	<b>JOB NO.</b>	221371
<b>DEPTH (FT)</b>	3.5	<b>TEST BY</b>	BL



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	100.0%
3/8"	94.1%
4	90.4%
10	72.5%
20	50.0%
40	34.9%
100	17.6%
200	12.2%

**Atterberg Limits**  
 Plastic Limit  
 Liquid Limit  
 Plastic Index

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



**ENTECH  
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505 ELKTON DRIVE  
COLORADO SPRINGS, COLORADO 80907

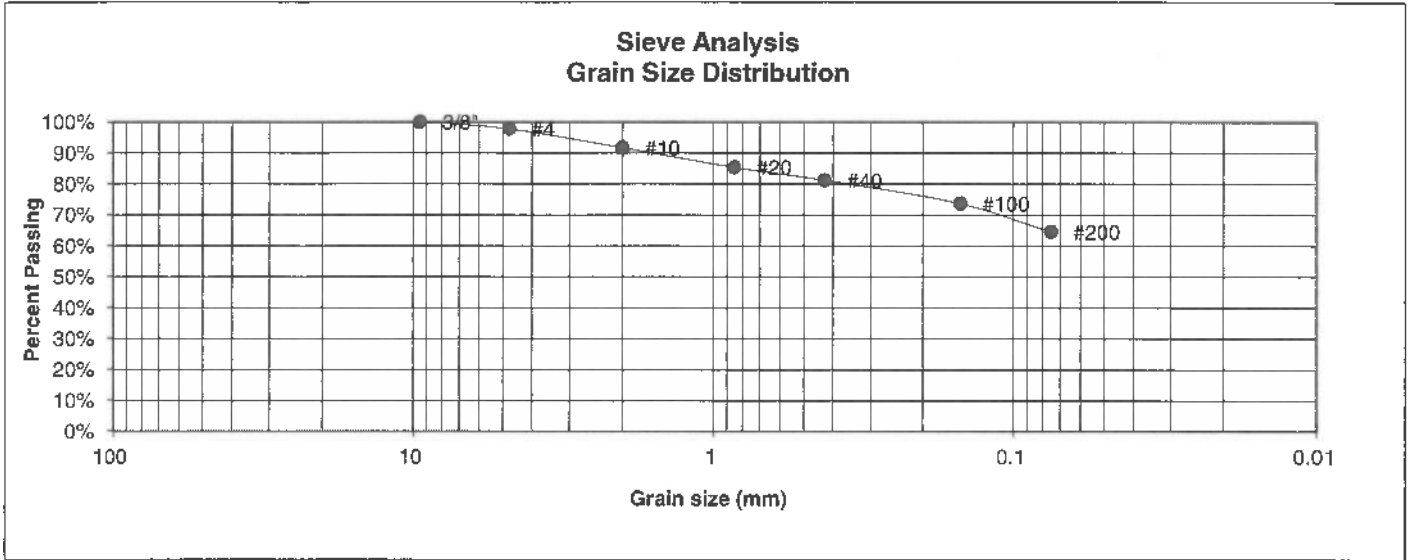
**LABORATORY TEST  
RESULTS**

DRAWN:	DATE:	CHECKED:	DATE:
		Jtk	7-15-22

JOB NO.:  
221371

FIG NO.:  
6-2

<b>UNIFIED CLASSIFICATION</b>	CL	<b>CLIENT</b>	TAHER NABULSI
<b>SOIL TYPE #</b>	2	<b>PROJECT</b>	10650 BLACK FOREST RD.
<b>TEST BORING #</b>	TP-2	<b>JOB NO.</b>	221371
<b>DEPTH (FT)</b>	7.5	<b>TEST BY</b>	BL



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	100.0%
4	97.8%
10	91.6%
20	85.3%
40	81.2%
100	73.7%
200	64.5%

**Atterberg Limits**  
 Plastic Limit  
 Liquid Limit  
 Plastic Index

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



**ENTECH  
ENGINEERING, INC.**

505 ELKTON DRIVE  
COLORADO SPRINGS, COLORADO 80907

**LABORATORY TEST  
RESULTS**

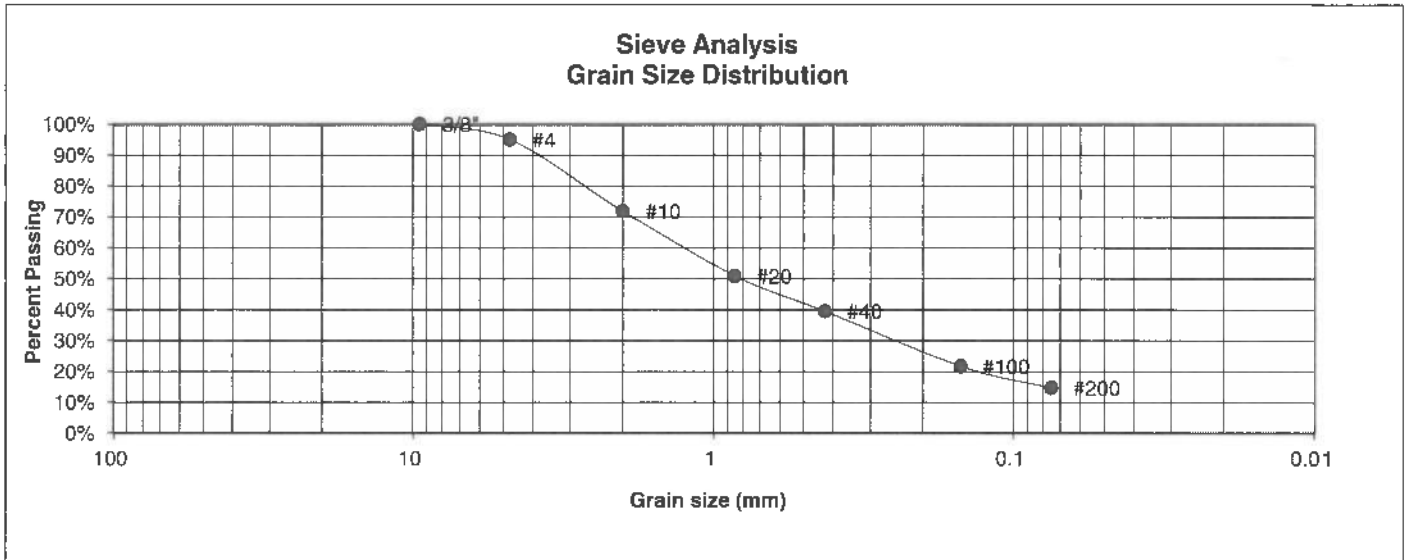
DRAWN:	DATE:	CHECKED:	DATE:
		JHL	7-15-21

JOB NO.:  
221371

FIG NO.:  
6-3



UNIFIED CLASSIFICATION	SM	CLIENT	TAHER NABULSI
SOIL TYPE #	1	PROJECT	10650 BLACK FOREST RD.
TEST BORING #	TP-3	JOB NO.	221371
DEPTH (FT)	5.5	TEST BY	BL



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	100.0%
4	95.1%
10	71.9%
20	51.0%
40	39.5%
100	21.7%
200	14.7%

**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

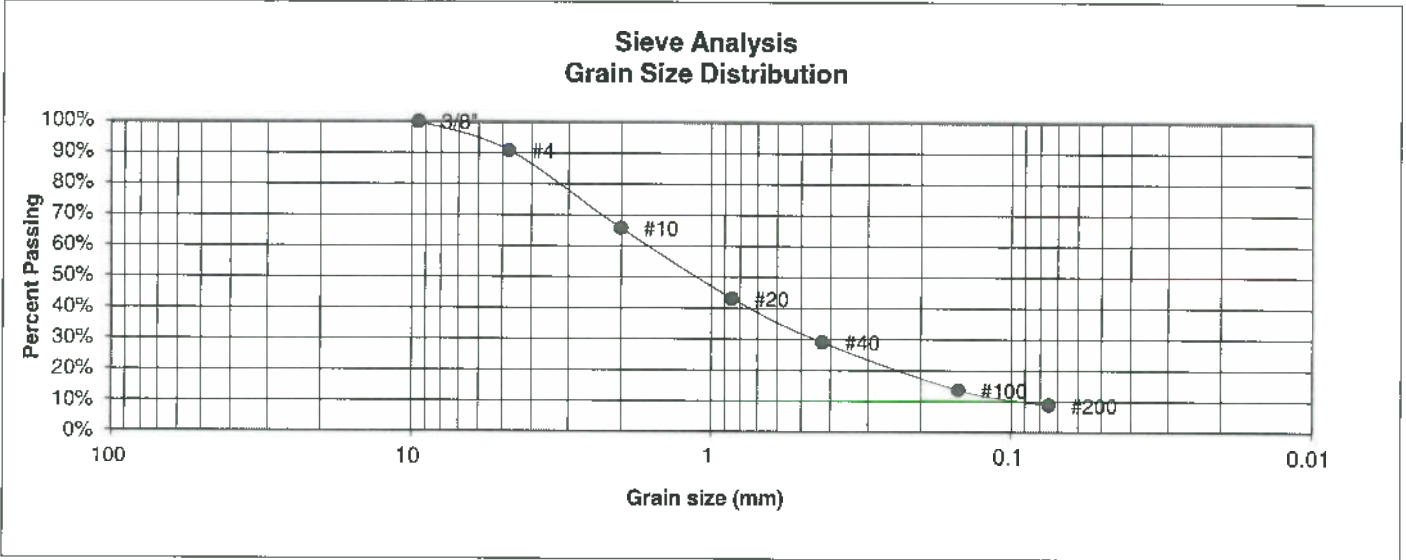
**LABORATORY TEST  
RESULTS**

DRAWN:	DATE:	CHECKED:	DATE:
		JHR	7-15-22

JOB NO.:  
221371

FIG NO.:  
C-4

<b>UNIFIED CLASSIFICATION</b>	SM-SW	<b>CLIENT</b>	TAHER NABULSI
<b>SOIL TYPE #</b>	1	<b>PROJECT</b>	10650 BLACK FOREST RD.
<b>TEST BORING #</b>	1	<b>JOB NO.</b>	221371
<b>DEPTH (FT)</b>	2-3	<b>TEST BY</b>	BL



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	100.0%
4	90.8%
10	65.7%
20	43.1%
40	29.0%
100	13.6%
200	8.9%

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)	



**ENTECH  
ENGINEERING, INC.**

505 ELKTON DRIVE  
COLORADO SPRINGS, COLORADO 80907

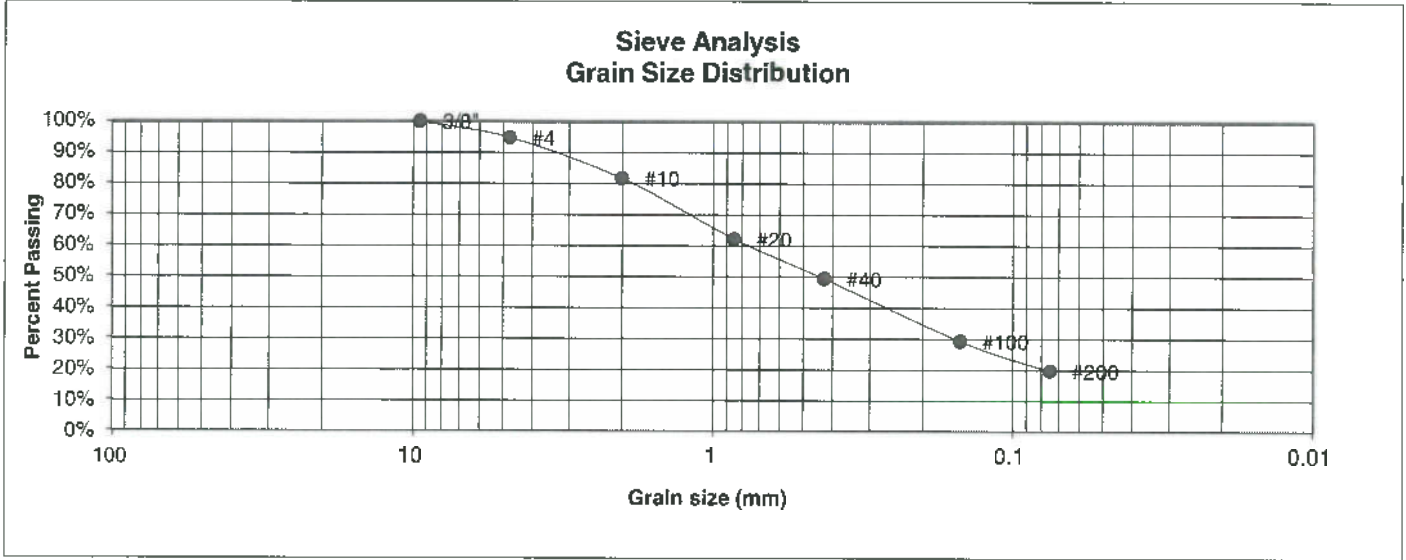
**LABORATORY TEST  
RESULTS**

DRAWN:	DATE:	CHECKED: JHR	DATE: 7-15-22
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JOB NO.:  
221371

FIG NO.:  
65

UNIFIED CLASSIFICATION	SM	CLIENT	TAHER NABULSI
SOIL TYPE #	1	PROJECT	10650 BLACK FOREST RD.
TEST BORING #	2	JOB NO.	221371
DEPTH (FT)	5	TEST BY	BL



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	100.0%
4	94.8%
10	81.8%
20	62.2%
40	49.4%
100	29.3%
200	19.7%

Atterberg  
Limits  
Plastic Limit  
Liquid Limit  
Plastic Index

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



**ENTECH  
ENGINEERING, INC.**

505 ELKTON DRIVE  
COLORADO SPRINGS, COLORADO 80907

### LABORATORY TEST RESULTS

DRAWN:

DATE:

CHECKED:  
JHR

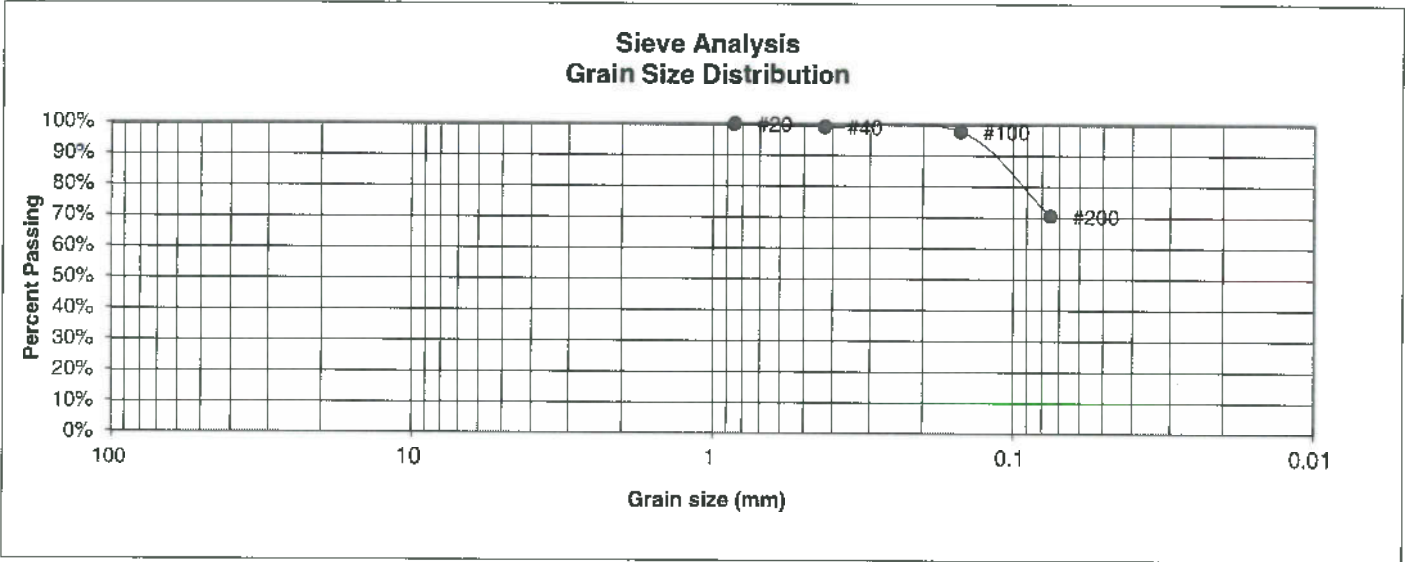
DATE:  
7-15-22

JOB NO.:  
221371

FIG NO.:

C-6

UNIFIED CLASSIFICATION	CL	CLIENT	TAHER NABULSI
SOIL TYPE #	2	PROJECT	10650 BLACK FOREST RD.
TEST BORING #	2	JOB NO.	221371
DEPTH (FT)	15	TEST BY	BL



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	
4	
10	
20	100.0%
40	99.1%
100	97.7%
200	70.5%

Atterberg Limits	
Plastic Limit	23
Liquid Limit	37
Plastic Index	14

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



**ENTECH  
ENGINEERING, INC.**

505 ELKTON DRIVE  
COLORADO SPRINGS, COLORADO 80907

**LABORATORY TEST  
RESULTS**

DRAWN:	DATE:	CHECKED: <i>JHK</i>	DATE: <i>2-15-22</i>
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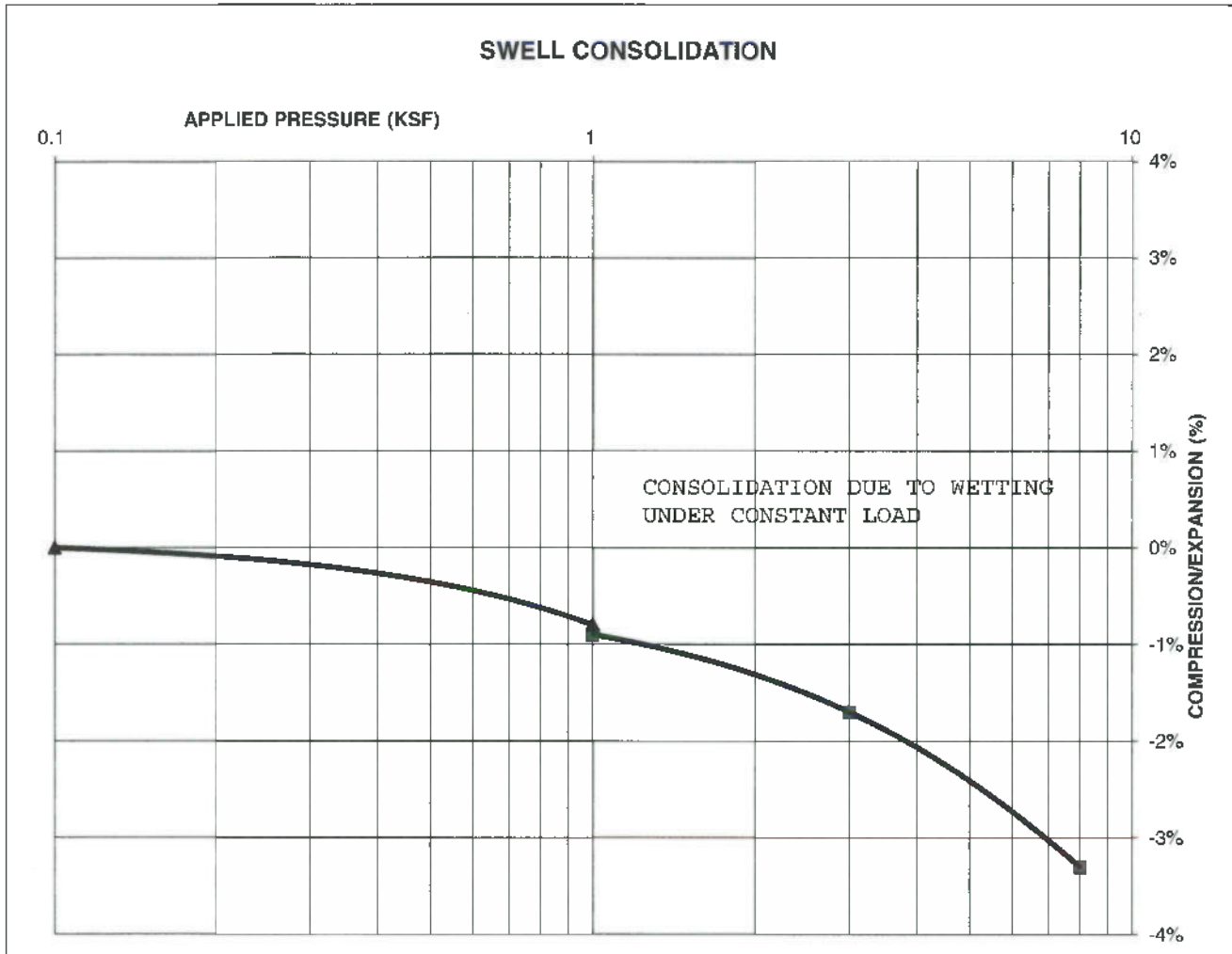
JOB NO.:  
221371

FIG NO.:  
*C-7*

**CONSOLIDATION TEST RESULTS**

TEST BORING #	1	DEPTH(ft)	10
DESCRIPTION	CL	SOIL TYPE	2
NATURAL UNIT DRY WEIGHT (PCF)			121
NATURAL MOISTURE CONTENT			8.8%
SWELL/CONSOLIDATION (%)			-0.1%

JOB NO. 221371  
 CLIENT TAHER NABULSI  
 PROJECT 10650 BLACK FOREST RD.



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

505 ELKTON DRIVE  
 COLORADO SPRINGS, COLORADO 80907

**SWELL CONSOLIDATION  
 TEST RESULTS**

DRAWN:

DATE:

CHECKED:

DATE:

*LLL*

*8/11/22*

JOB NO.:  
221371

FIG NO.:  
*C-8*

CLIENT	TAHER NABULSI	JOB NO.	221371
PROJECT	10650 BLACK FOREST RD.	DATE	6/27/2022
LOCATION	10650 BLACK FOREST RD.	TEST BY	BL

BORING NUMBER	DEPTH, (ft)	SOIL TYPE NUMBER	UNIFIED CLASSIFICATION	WATER SOLUBLE SULFATE, (wt%)
TB-1	2-3	1	SM-SW	0.00
TB-2	15	2	CL	<0.01

QC BLANK PASS



**ENTECH**  
**ENGINEERING, INC.**  
 505 ELKTON DRIVE  
 COLORADO SPRINGS, COLORADO 80907

**LABORATORY TEST  
 SULFATE RESULTS**

DRAWN:	DATE:	CHECKED: JHC	DATE: 7-16-22
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JOB NO.:  
221371

FIG NO.:  
C-9

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

## El Paso County Area, Colorado

### 40—Kettle gravelly loamy sand, 3 to 8 percent slopes

#### Map Unit Setting

*National map unit symbol:* 368g

*Elevation:* 7,000 to 7,700 feet

*Farmland classification:* Not prime farmland

#### Map Unit Composition

*Kettle and similar soils:* 85 percent

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

#### Description of Kettle

##### Setting

*Landform:* Hills

*Landform position (three-dimensional):* Side slope

*Down-slope shape:* Linear

*Across-slope shape:* Linear

*Parent material:* Sandy alluvium derived from arkose

##### Typical profile

*E - 0 to 16 inches:* gravelly loamy sand

*Bt - 16 to 40 inches:* gravelly sandy loam

*C - 40 to 60 inches:* extremely gravelly loamy sand

##### Properties and qualities

*Slope:* 3 to 8 percent

*Depth to restrictive feature:* More than 80 inches

*Drainage class:* Somewhat excessively drained

*Runoff class:* Low

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

*Depth to water table:* More than 80 inches

*Frequency of flooding:* None

*Frequency of ponding:* None

*Available water supply, 0 to 60 inches:* Low (about 3.4 inches)

##### Interpretive groups

*Land capability classification (irrigated):* None specified

*Land capability classification (nonirrigated):* 4e

*Hydrologic Soil Group:* B

*Ecological site:* F048AY908CO - Mixed Conifer

*Hydric soil rating:* No

#### Minor Components

##### Other soils

*Percent of map unit:*

*Hydric soil rating:* No

##### Pleasant

*Percent of map unit:*

*Landform:* Depressions

*Hydric soil rating:* Yes



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

### Map Unit Setting

*National map unit symbol:* 368h

*Elevation:* 7,000 to 7,700 feet

*Farmland classification:* Not prime farmland

### Map Unit Composition

*Kettle and similar soils:* 85 percent

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

### Description of Kettle

#### Setting

*Landform:* Hills

*Landform position (three-dimensional):* Side slope

*Down-slope shape:* Linear

*Across-slope shape:* Linear

*Parent material:* Sandy alluvium derived from arkose

#### Typical profile

*E - 0 to 16 inches:* gravelly loamy sand

*Bt - 16 to 40 inches:* gravelly sandy loam

*C - 40 to 60 inches:* extremely gravelly loamy sand

#### Properties and qualities

*Slope:* 8 to 40 percent

*Depth to restrictive feature:* More than 80 inches

*Drainage class:* Somewhat excessively drained

*Runoff class:* Medium

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

*Depth to water table:* More than 80 inches

*Frequency of flooding:* None

*Frequency of ponding:* None

*Available water supply, 0 to 60 inches:* Low (about 3.4 inches)

#### Interpretive groups

*Land capability classification (irrigated):* None specified

*Land capability classification (nonirrigated):* 7e

*Hydrologic Soil Group:* B

*Ecological site:* F048AY908CO - Mixed Conifer

*Hydric soil rating:* No

### Minor Components

#### Pleasant

*Percent of map unit:*

*Landform:* Depressions

*Hydric soil rating:* Yes

## Custom Soil Resource Report

### Other soils

*Percent of map unit:*  
*Hydric soil rating:* No

## 71—Pring coarse sandy loam, 3 to 8 percent slopes

### Map Unit Setting

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

### Map Unit Composition

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

### Description of Pring

#### Setting

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

#### Typical profile

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

#### Properties and qualities

*Slope:* 3 to 8 percent  
*Depth to restrictive feature:* More than 80 inches  
*Drainage class:* Well drained  
*Runoff class:* Low  
*Capacity of the most limiting layer to transmit water (Ksat):* High (2.00 to 6.00 in/hr)  
*Depth to water table:* More than 80 inches  
*Frequency of flooding:* None  
*Frequency of ponding:* None  
*Available water supply, 0 to 60 inches:* Low (about 6.0 inches)

#### Interpretive groups

*Land capability classification (irrigated):* None specified  
*Land capability classification (nonirrigated):* 3e  
*Hydrologic Soil Group:* B  
*Ecological site:* R048AY222CO - Loamy Park  
*Hydric soil rating:* No

### Minor Components

#### Pleasant

*Percent of map unit:*

## Custom Soil Resource Report

*Landform: Depressions*  
*Hydric soil rating: Yes*

### **Other soils**

*Percent of map unit:*  
*Hydric soil rating: No*

**APPENDIX E: El Paso County Health Department Septic Records**

566  
AP

EL PASO COUNTY HEALTH DEPARTMENT  
COLORADO SPRINGS, COLORADO  
SEWAGE DISPOSAL INSPECTION FORM

10/6  
P Unit # ~~5423~~ 5423  
DATE 10/6/78  
ENVIRONMENTALIST Krueger

APPROVAL:  
YES  NO

9310009959

ENVIRONMENTALIST

LOCATION (street number) 10650 Bk Forest Rd. OCCUPANT Bessie Ellison

LEGAL DESCRIPTION

TYPE OF CONSTRUCTION Existing Dwelling NO. OF BEDROOMS

SYSTEM INSTALLED BY Al Geiger

COMMERCIAL MFG. existing septic tank SIZE 900?

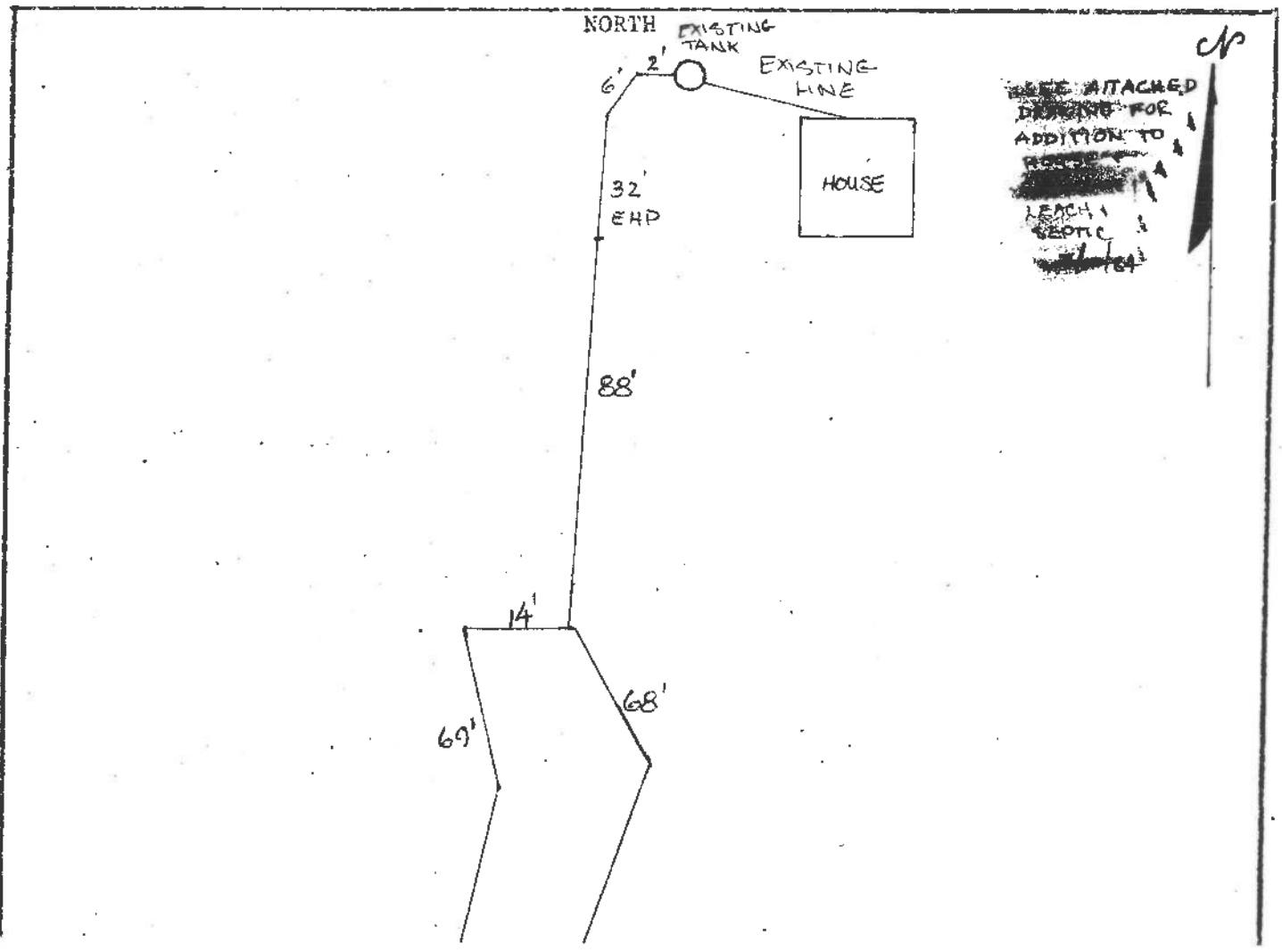
TYPE OF MATERIAL NO. COMPARTMENTS

WIDTH LENGTH DEPTH (total) LIQ. CAP

DISPOSAL FIELD: BED OR TRENCH DEPTH WIDTH 36" LENGTH 137' SQ. FT 401

DISTANCE BETWEEN LINES 14' ROCK yes DEPTH 12" UNDER 6" OVER 2"

LEACHING PITS (NO.) LINING MATERIAL CAPACITY SQ. FT.



Acres 2.24  
Water Supply Well

EL PASO COUNTY . CITY-COUNTY HEALTH DEPARTMENT  
501 North Foote Avenue . Colorado Springs, Colorado . 475-8240

Receipt # 1442

# PERMIT

Receipt No. 05423

TO CONSTRUCT, ALTER, REPAIR OR MODIFY AN INDIVIDUAL SEWAGE DISPOSAL SYSTEM

Issued To BESSIE ELLISON Date AUGUST 3, 1978

Address of Property 10,650 BLACK FOREST ROAD  
(Permit valid at this address only)

Builder - Contractor - Owner Address \_\_\_\_\_ Phone \_\_\_\_\_

Sewage-Disposal System work to be performed by HAMACHER Phone \_\_\_\_\_

This Permit is issued in accordance with Regulation XII and Article 2 of Chapter 66, Colorado Revised Statutes 1963, as amended by the addition of a new Section 66-2-16. (H.B. 1205, 7-1-65). PERMIT EXPIRES upon completion-installation of sewage-disposal system or at the end of six (6) months from date of issue - whichever occurs first - (unless work is in progress).

- This Permit does not denote approval of zoning and acreage requirements. -

Permit Fee February 3, 1979 \$50.00

CHARLES H. DOWDING, MD, PH  
Director, City-County Health Department  
Quane E. Jensen  
Environmentalist

Date of Expiration \_\_\_\_\_

NOTE: LEAVE ENTIRE SEWAGE-DISPOSAL SYSTEM UNCOVERED FOR FINAL INSPECTION.  
existing tank 24-HOUR ADVANCE NOTICE REQUIRED

Septic tank	<u>1250</u> gals.	Field	<u>125</u>	Feet of trench	<u>36"</u>	inches wide
<u>repair of leach</u>	OR.	Field	<u>188</u>	Feet of trench	<u>24</u>	inches wide
Seepage bed	_____ ft. long	_____ ft. wide.	Seepage pit	_____ sq. ft.	_____ diam.	_____ w/d

The Health Officer shall assume no responsibility in case of failure or inadequacy of a sewage-disposal system, beyond consulting in good faith with the property owner or representative. Free access to the property shall be authorized at reasonable times for the purpose of making such inspections as are necessary to determine compliance with requirements of this regulation.