

March 4, 2020
Revised December 10, 2020



ENTECH
ENGINEERING, INC.

505 ELKTON DRIVE
COLORADO SPRINGS, CO 80907
PHONE (719) 531-5599
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SMH Consultants
411 S. Tejon Street, Suite 1
Colorado Springs, CO 80903

Attn: Brett Louk

Re: OWTS – Wastewater Study
Sedona Sun Acres
13235 Vollmer Road
Parcel No. 52000-00-303
El Paso County, Colorado

Dear Mr. Louk:

GENERAL SITE CONDITIONS AND PROJECT DESCRIPTION

The site is located in a portion of the NW¼ of Section 10, Township 12 South, Range 65 West of the 6th Principal Meridian in El Paso County, Colorado. The site is located approximately 5 miles northeast of Colorado Springs city limits, southeast of Swan Road and Vollmer Road in El Paso County, Colorado. The location of the site is as shown on the Vicinity Map, Figure 1.

The topography of the site is gradually to moderately sloping to the south to south-southeast, and to the north. The Palmer Divide bisects the central portion of the site. The head of a minor drainage is located in the southern portion of the property. Water was not observed in the drainage at the time of this investigation. The site boundaries are indicated on the USGS Map, Figure 2. Previous land uses have included undeveloped and a rural residential. The southern portion of the site is located in the northeastern extent of the Black Forest burn scar. The site contains field grasses, weeds, kinnikinnick, and ponderosa pines in the western portion of the site and around the existing house located on Lot 1. Site photographs, taken January 24, 2020, are included in Appendix A.

Total acreage involved in the proposed subdivision is 37.7-acres. Three rural residential lots are proposed as part of the replat. The proposed lot sizes range from 9-acres to 19.2-acres. An existing house is located on Lot 1 which will remain. The new lots will be serviced by individual wells and on-site wastewater treatment systems. The Site Plan with the proposed replat is presented in Figure 3.

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).

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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 January 24, 2020.

Two test borings and two test pits were excavated on the site to determine general suitability for the use of on-site wastewater treatment systems and general soil characteristics for residential construction. The locations of the test pits are indicated on the Site Plan/Test Pit Location Map, Figure 3. The 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. Results of the laboratory testing are included in Appendix C. A Summary of Laboratory Test Results is presented in Table 1.

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 three soil types on the site. Complete descriptions of the soil types are presented in Appendix D. In general, the soils consist of sandy loam to gravelly loamy sand and sandy clay loam. The soils are described as follows:

<u>Type</u>	<u>Description</u>
26	Elbeth Sandy Loam, 8 – 15% Slopes
40	Kettle Gravelly Loamy Sand, 3 – 8% Slopes
68	Peyton-Pring Complex, 3 – 8% Slopes

The soils have been described to have moderate to 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 borings and test pits consisted of silty to slightly silty sand and sandy clay loam overlying weathered to formational clayey to silty sandstone. Bedrock was encountered at depths ranging from 3 to 7 feet. The upper sands were encountered at medium dense states and moderate moisture conditions, and the sandstone was encountered at very

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dense states and moderate moisture conditions. The samples of sand tested had approximately 8 to 25 percent of the soil size particles passing the No. 200 sieve. Atterberg Limits Testing resulted in the sand being non-plastic. The samples of sandstone tested had 17 to 23 percent of the soil size particles passing the No. 200 sieve. Atterberg Limits Testing on a sample of clayey sandstone resulted in a liquid limit of 41 and a plastic index of 20. FHA Swell Testing on a sample of the clayey sandstone resulted in an expansion pressure of 360 psf, which indicates a low expansion potential. Highly expansive claystone and siltstone lenses are commonly interbedded in the Dawson Formation.

Groundwater

Groundwater or signs of seasonally occurring water were not encountered in the test pits, which were excavated to 8 feet. Groundwater was not encountered in the test borings, which were drilled to 20 feet. It is anticipated groundwater will not affect shallow foundations on the majority of the site. Areas of potentially seasonal shallow groundwater have been mapped in the head of a minor drainage in the southern portion of the site that are discussed in the following sections. 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 13 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 Cretaceous Age. The Dawson Formation typically consists of coarse-grained arkosic sandstone with interbedded layers claystone or siltstone.

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

- Qau Alluvium, Undivided of Holocene and Pleistocene Age:** These are sheetwash and stream deposited alluvium that exists in the western portion of the site associated with alluvial-filled valley heads. These materials typically consist of silty to clayey sands and gravel.
- QTa Alluvium of Palmer Divide of Early Pleistocene or Pliocene Age:** These materials consist of water-deposited stream terrace deposits located along the Palmer Divide. They typically consist of silty to clayey sands with gravelly lenses and may contain areas of pebble and cobble lenses.

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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 Black Forest 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 and test pits were used in evaluating the site and is included in Appendix B. The Geology Map prepared for the site is presented in Figure 6.

Drainage Areas

The head of a minor drainage exists in the southern portion of the site (Lot 3) that flows in southeasterly direction. No water was observed flowing in the drainages at the time of the investigation. An area of potentially seasonal shallow groundwater has been mapped in the drainage (Figure 6).

In potentially seasonal shallow groundwater areas, we would anticipate the potential for periodically high subsurface moisture conditions and highly organic soils. Due to the potential for seasonal high groundwater conditions, on-site wastewater treatment systems are not recommended in these areas. Due to lot sizes, it is anticipated these areas can be avoided. The site does not lie within any floodplain zones according to the FEMA Map No. 08041CO320 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 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 D. The soils are described as having moderate to rapid percolation rates. The existing system on Lot 1 is a low pressure dosed system. Observations Of the leach area indicated that the system is operating properly. Records for the existing septic system located on Lot 1 are included in Appendix E.

Soils encountered in the tactile test pits consisted of gravelly sandy clay loam and gravelly sandy loam overlying weathered to formational silty sandstone. The limiting layers encountered in the test pit is the sandy clay loam and clayey sandstone, which corresponds with USDA Soil Types 3A and 4A with an LTAR values of 0.30 and 0.20 gallons per day per square foot. Weathered

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Sedona Sun Acres
13235 Vollmer Road
Parcel No. 52000-00-303
El Paso County, Colorado

bedrock was encountered at approximately 3 feet in the test pit on Lot 2. Signs of seasonally occurring groundwater were not observed in the test pits. Absorption fields must be maintained a minimum of 4 feet above groundwater or bedrock, or confining layer. Should groundwater or bedrock be encountered within 6 feet of the surface, designed systems will be required. Designed systems are anticipated for Lot 2, however, areas may be encountered on the lots where conventional systems would be suitable.

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 will be required for the new lot. The Septic Suitability Map is presented in Figure 8. Areas that should be avoided by septic systems are indicated on the septic suitability map. A possible house location, water well, and two septic sites for the new lots are indicated on Figure 8. **Individual soil testing is required for proposed construction 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.

CLOSURE

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

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

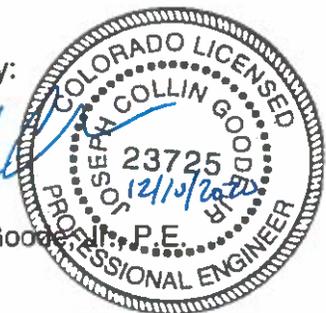
Respectfully Submitted,

ENTECH ENGINEERING, INC.

Logan L. Langford, P.G.
Geologist

Reviewed by:

Joseph C. Good
President



LLL/ao

Encl.

Entech Job No. 200160
AAprojects/2020/200160 wws

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OWTS – Wastewater Study
Sedona Sun Acres
13235 Vollmer Road
Parcel No. 52000-00-303
El Paso County, Colorado

BIBLIOGRAPHY

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. Thorson, Jon P., 2003. *Geologic Map of the Black Forest Quadrangle, El Paso County, Colorado*. Colorado Geological Survey. Open-File Report 03-6.
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 08041CO320G

TABLES

TABLE 1
SUMMARY OF LABORATORY TEST RESULTS

CLIENT SMH CONSULTANTS
PROJECT 13235 VOLLMER ROAD
JOB NO. 200160

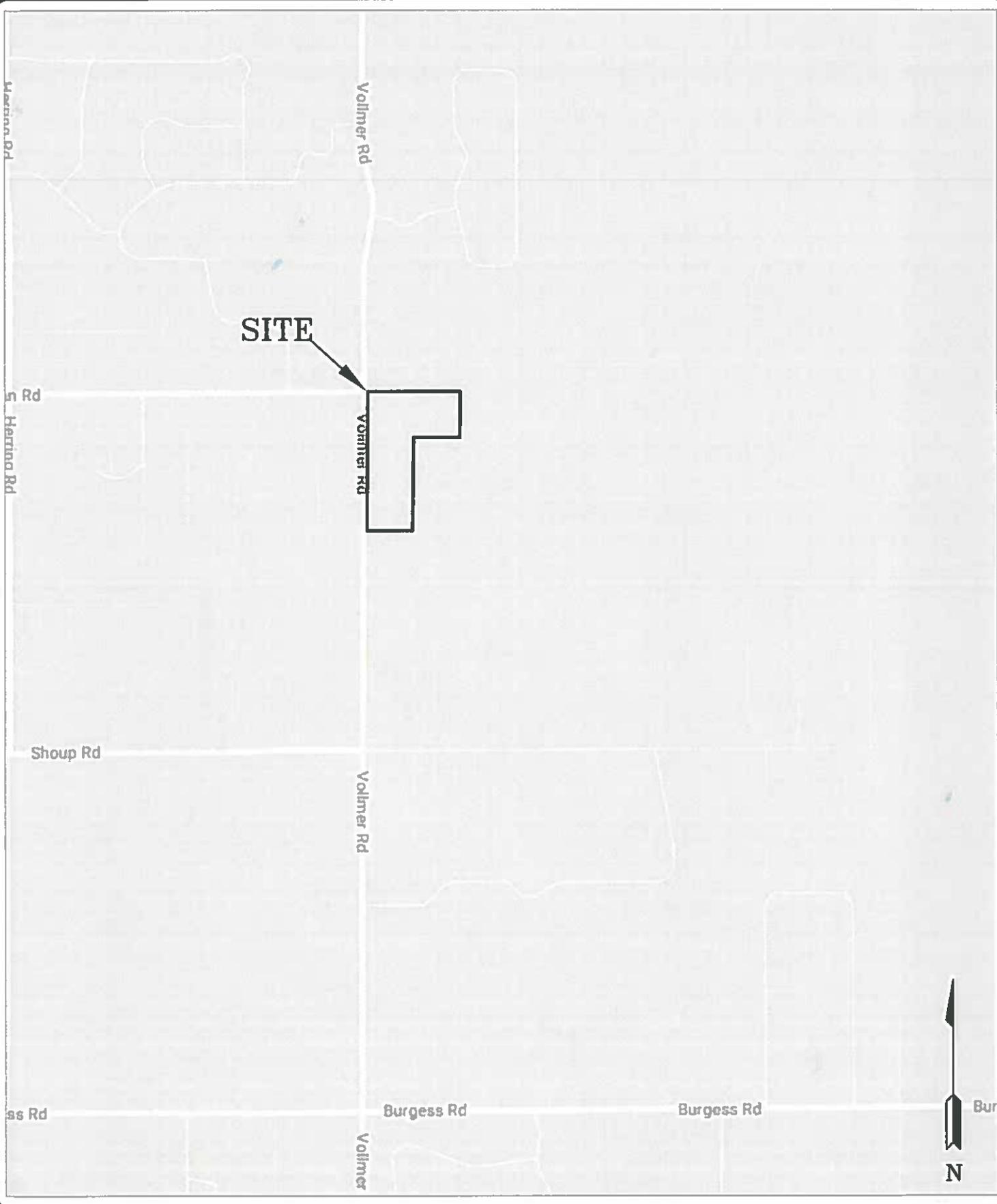
SOIL TYPE	TEST BORING NO.	DEPTH (FT)	WATER (%)	DRY DENSITY (PCF)	PASSING NO. 200 SIEVE (%)	LIQUID LIMIT (%)	PLASTIC INDEX (%)	SULFATE (WT %)	FHA SWELL (PSF)	SWELL/CONSOL (%)	UNIFIED CLASSIFICATION	SOIL DESCRIPTION
1	1	2-3			25.1						SM	SAND, SILTY
1	2	5			17.8	NV	NP				SM	SAND, SILTY
1	TP-2	5-6			8.0						SM-SW	SAND, SLIGHTLY SILTY
2	TP-1	6-7			16.5				360		SC	SANDSTONE, CLAYEY
2	1	15			23.0	41	20				SC	SANDSTONE, CLAYEY

Table 2: Summary Tactile Test Pit Results

Test Pit No.	USDA Soil Type	LTAR Value	Depth to Bedrock (ft.)	Depth to Seasonally Occurring Groundwater (ft.)
1	4A*	0.20*	3*	N/A
2	3A*	0.30*	N/A	N/A

*- Conditions that will require an engineered OWTS

FIGURES

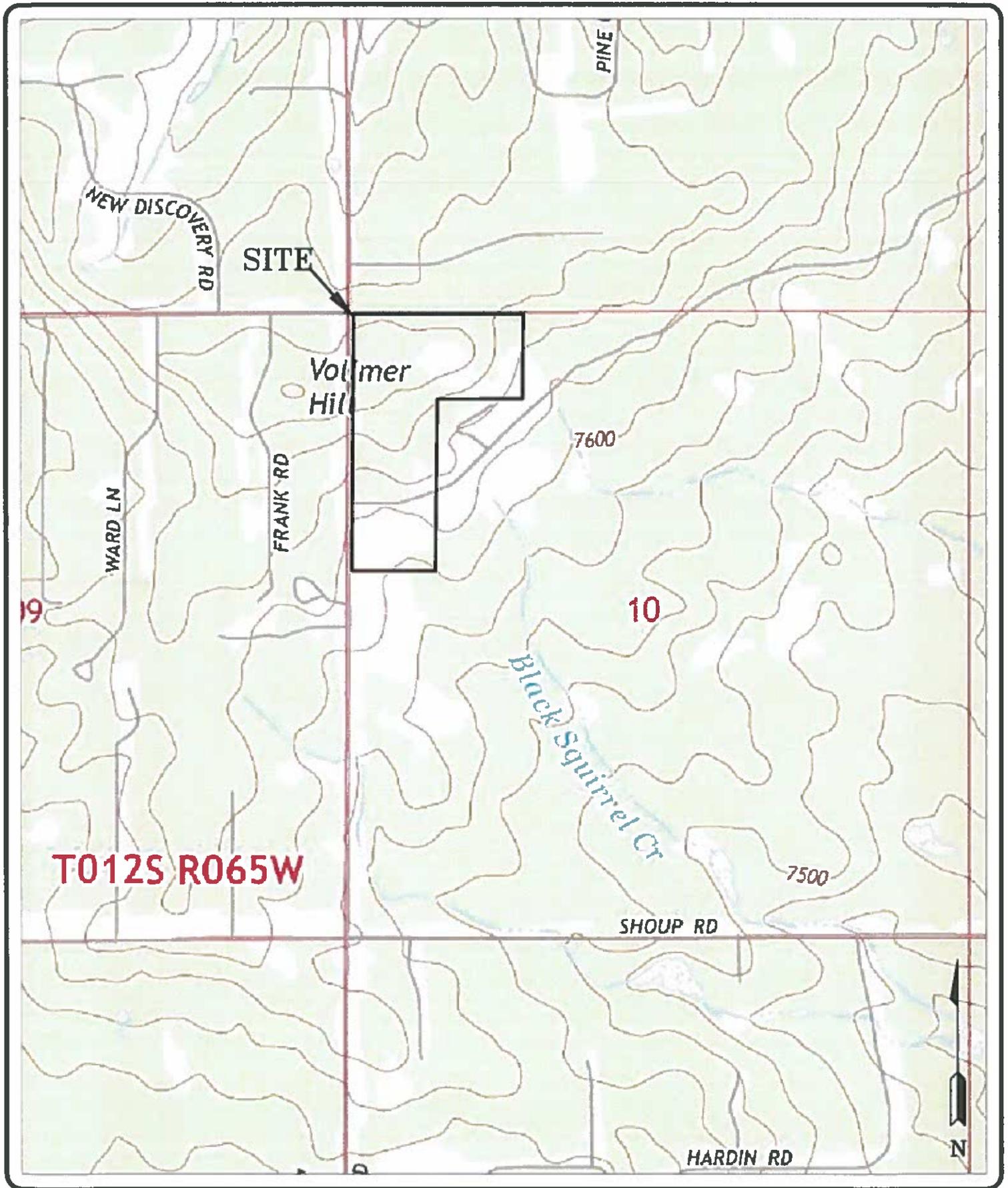


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VICINITY MAP
 SEDONA SUN ACRES
 13235 VOLLMER ROAD
 EL PASO COUNTY, CO.
 FOR: SMH CONSULTANTS

DRAWN: LLL	DATE: 12/10/20	CHECKED:	DATE:
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JOB NO.:
 200160
 FIG NO.:
 1



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USGS MAP
 SEDONA SUN ACRES
 13235 VOLLMER ROAD
 EL PASO COUNTY, CO.
 FOR: SMH CONSULTANTS

JOB NO.:
200160

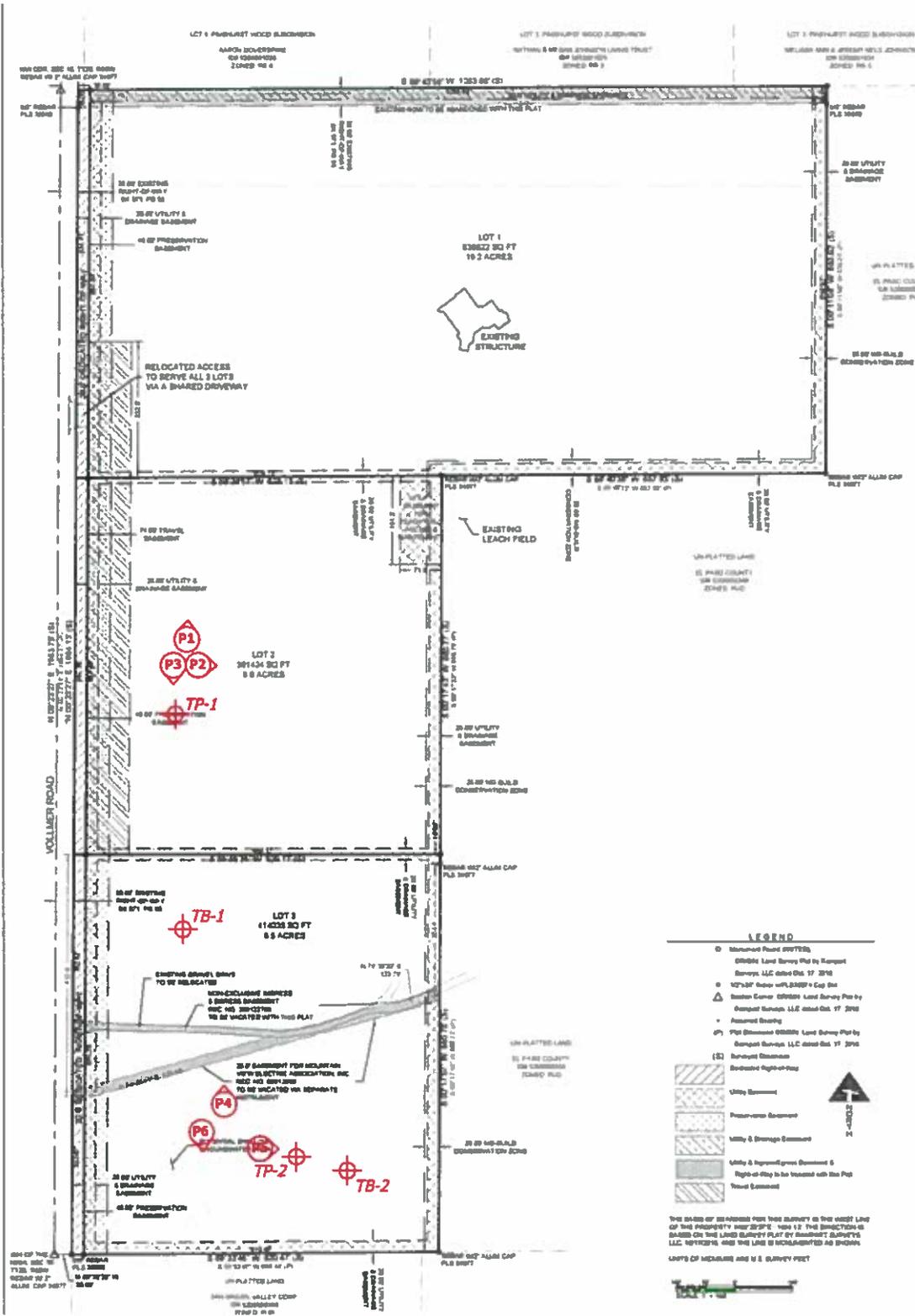
FIG NO.:
2

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DATE:
12/10/20

CHECKED:

DATE:



⊕ TP- APPROXIMATE TEST PIT LOCATION AND NUMBER
 ⊕ P2 - APPROXIMATE TEST PIT LOCATION AND NUMBER

SITE PLAN/TESTING LOCATION MAP
 SEDONA SUN ACRES
 12325 VOLLMER ROAD
 EL PASO COUNTY, CO.
 FOR: SMH CONSULTANTS

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JOB NO.:
200160

FIG NO.:
3

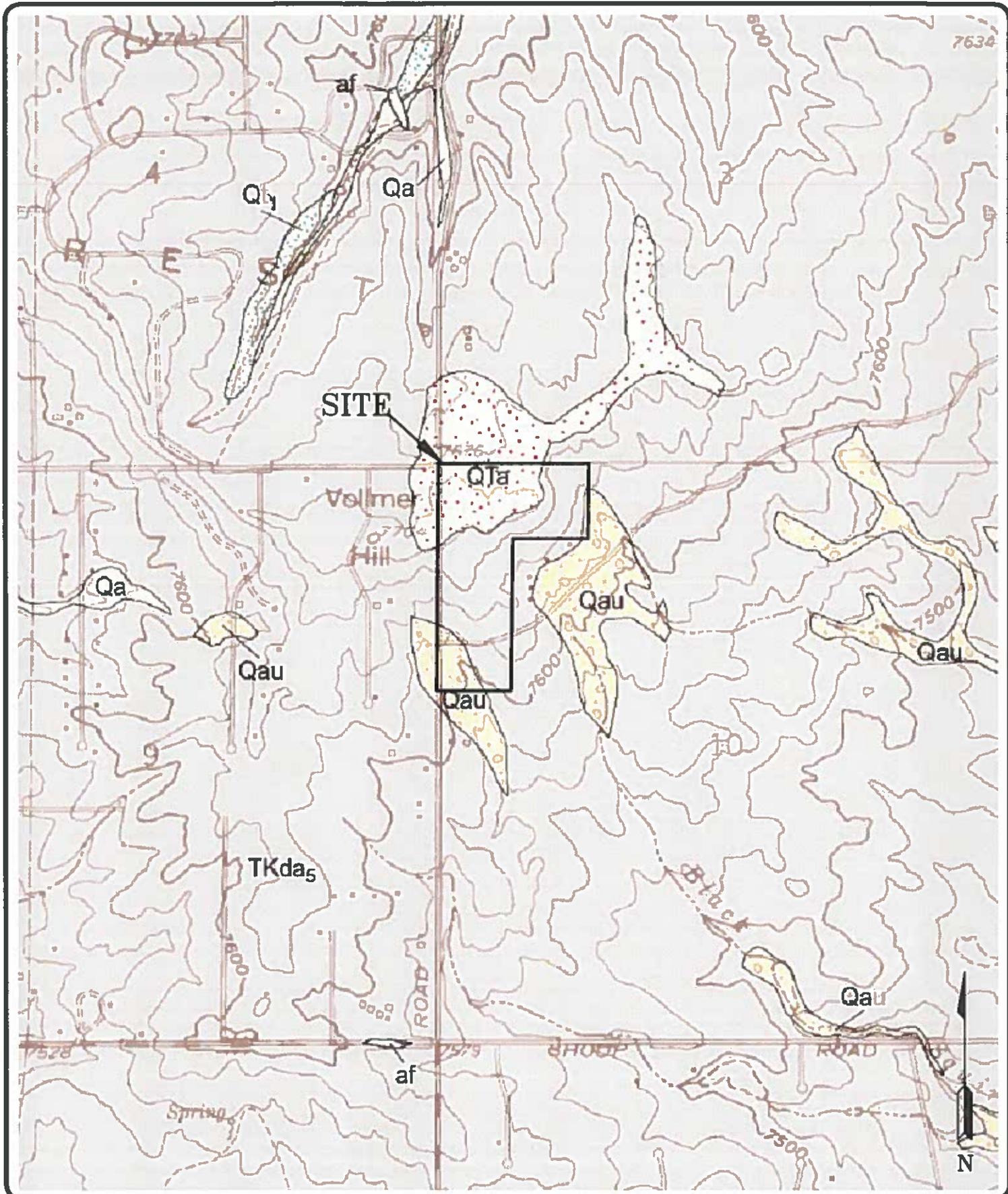


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SOIL SURVEY MAP
SEDONA SUN ACRES
13235 VOLLMER ROAD
EL PASO COUNTY, CO.
SMH CONSULTANTS

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JOB NO.:
200160
FIG NO.:
 4



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BLACK FOREST QUADRANGLE GEOLOGIC MAP
 SEDONA SUN ACRES
 13235 VOLLMER ROAD
 EL PASO COUNTY, CO.
 SMH CONSULTANTS

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 LLL

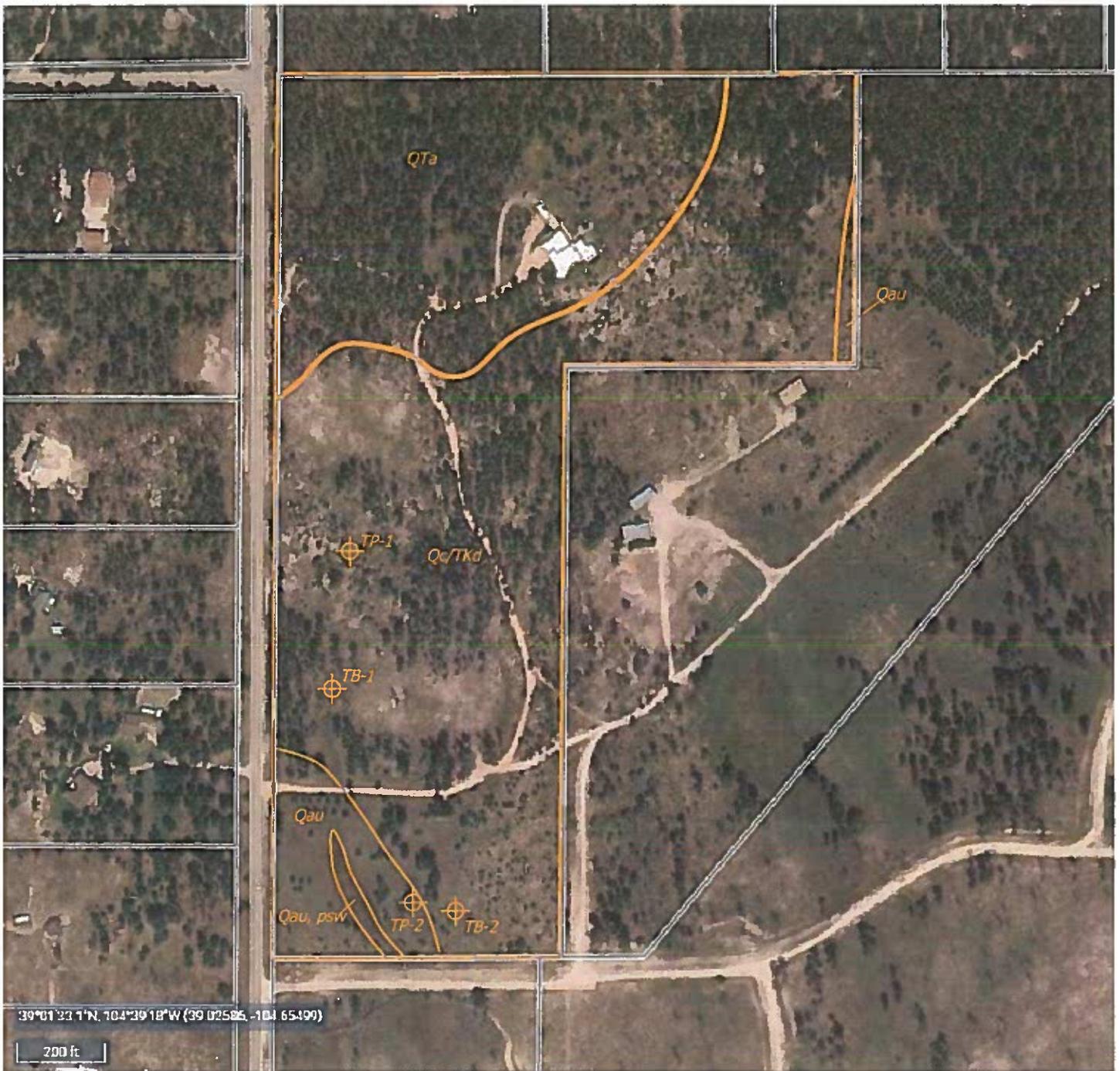
DATE:
 12/10/20

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DATE:

JOB NO.:
 200160

FIG NO.:
 5



Legend:

- Qau - Alluvium Undivided of Holocene and Pleistocene Age:
sheetwash and stream deposited alluvium associated with alluvial-filled valley heads
- QTa - Alluvium of Palmer Divide of Early Pleistocene or Pliocene Age:
stream terrace deposits located along the Palmer Divide
- QcTKd - Colluvium of Quaternary Age overlying Dawson Formation of Tertiary to Cretaceous Age:
colluvial and residual soils overlying arkosic sandstone with interbedded fine-grained sandstone, siltstone and claystone
- psw - potentially shallow groundwater area



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ENGINEERING GEOLOGY MAP
SEDONA SUN ACRES
13235 VOLLMER ROAD
EL PASO COUNTY, CO.
SMH CONSULTANTS

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12/10/20

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DATE:

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FIG NO.:
6



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FEMA FLOODPLAIN MAP
SEDONA SUN ACRES
13235 VOLLMER ROAD
EL PASO COUNTY, CO.
SMH CONSULTANTS

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 LLL

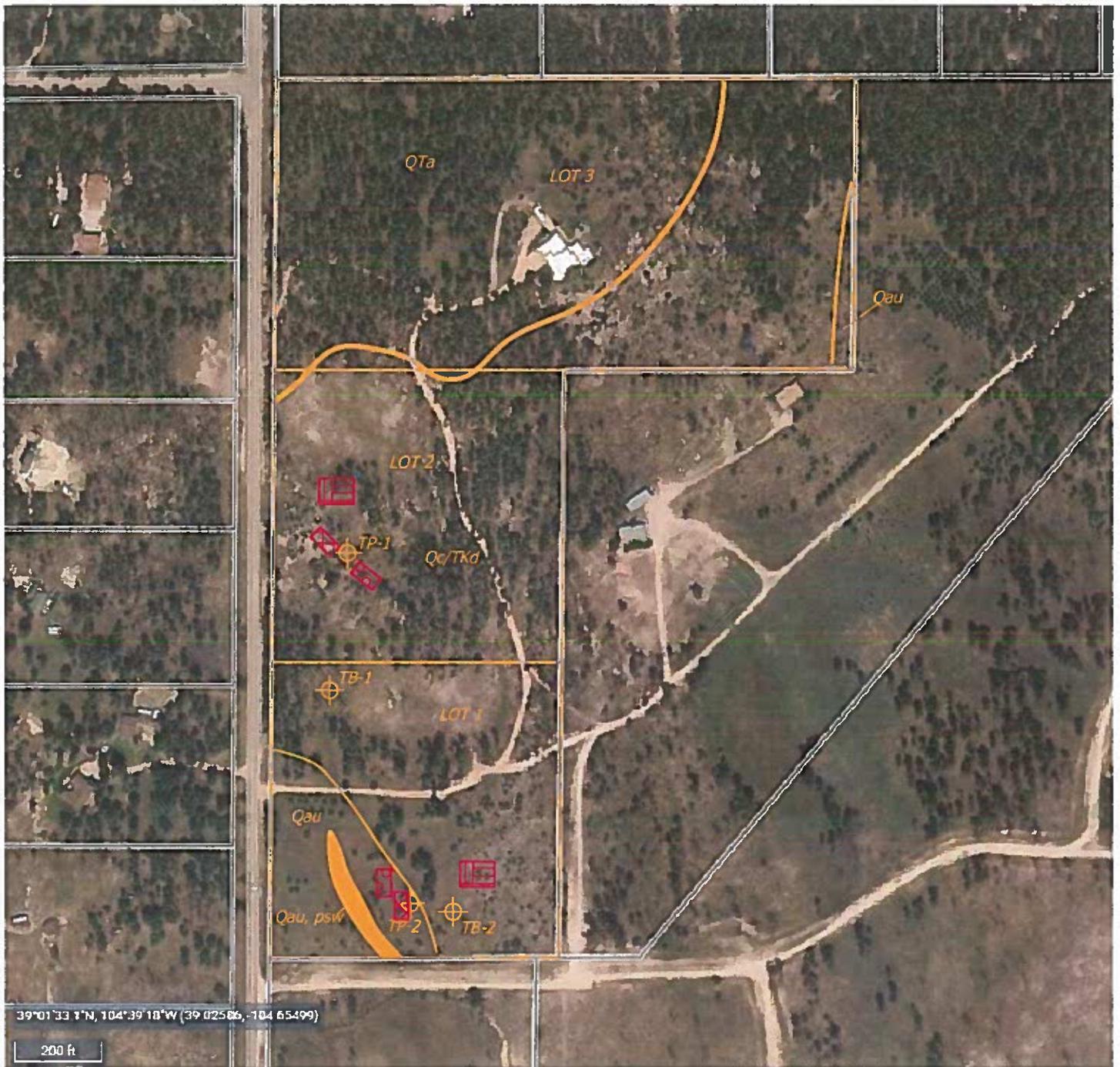
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DATE:

JOB NO.:
 200160

FIG NO.:
 7



39°01'33" N, 104°39'18" W (39 02586, -104 65499)

200 ft

LEGEND:

-  - POSSIBLE OWTS LOCATIONS
-  - POSSIBLE OWTS ALTERNATE LOCATIONS
-  - POSSIBLE HOUSE LOCATIONS
-  - AREAS WHERE OWTS ARE NOT RECOMMENDED

W * WATER WELLS MUST BE A MINIMUM OF 100 FT FROM OWTS ABSORPTION FIELDS



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SEPTIC SUITABILITY MAP
SEDONA SUN ACRES
13235 VOLLMER ROAD
EL PASO COUNTY, CO.
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JOB NO.:
200160

FIG NO.:
8

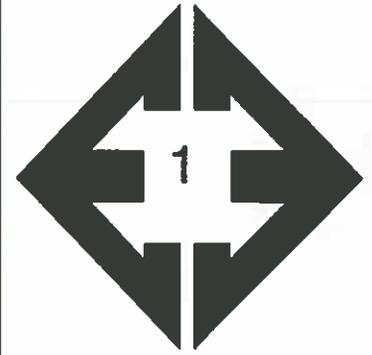
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12/10/2

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DATE:

APPENDIX A: Photographs



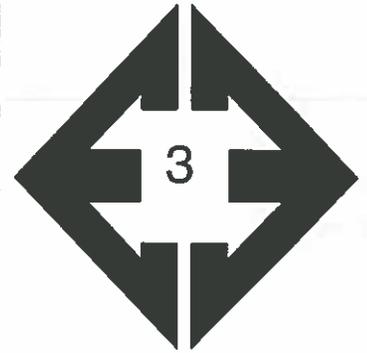
**Looking north towards
Lot 1 in the eastern
portion of the site.**

January 24, 2020



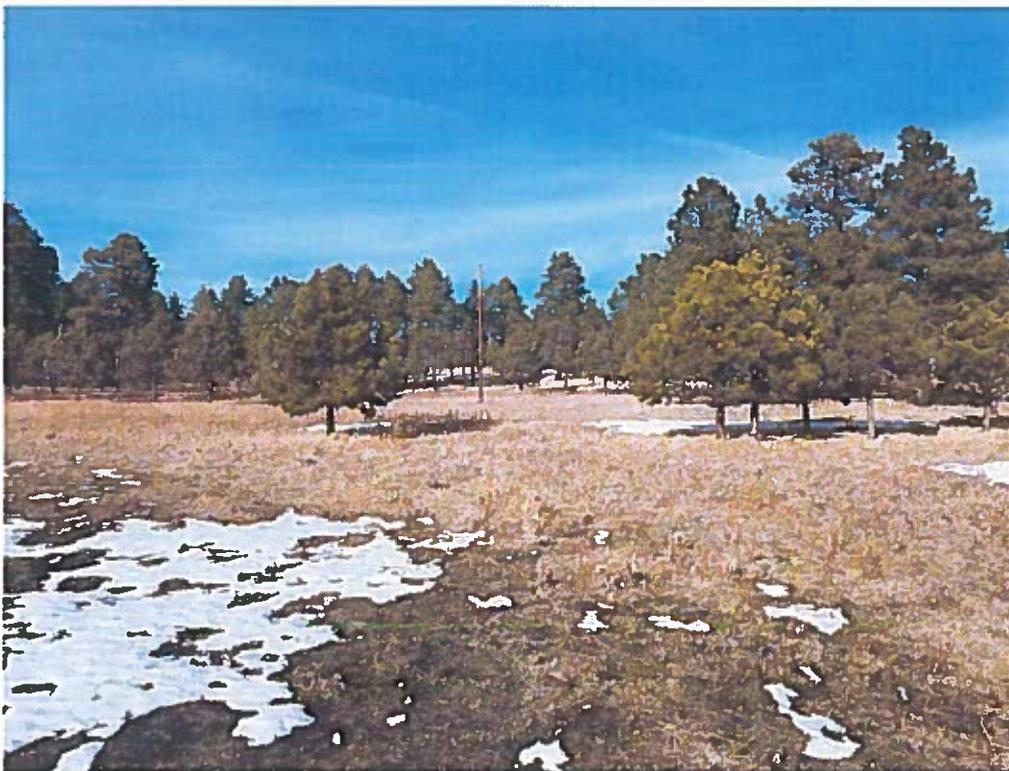
**Looking east from the
central portion of the
site.**

January 24, 2020



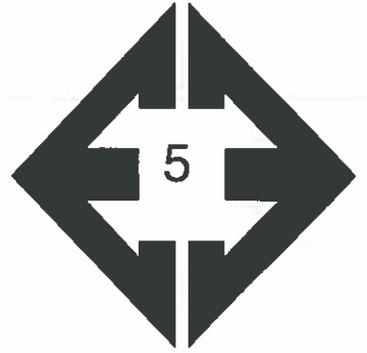
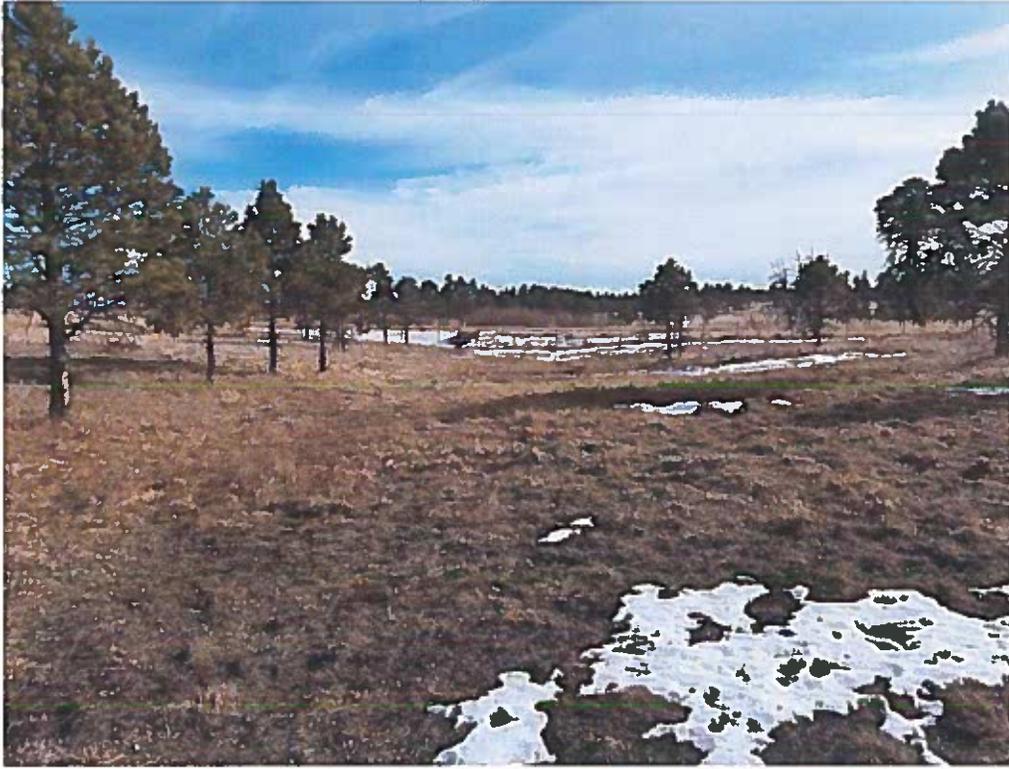
**Looking south from
the central portion of
the site.**

January 24, 2020



**Looking north from the
southern portion of the
site.**

January 24, 2020



Looking south along head of minor drainage in the southern portion of the site.

January 24, 2020



Looking east from the southern portion of site.

January 24, 2020

APPENDIX B: Test Boring and Test Pit Logs

TEST BORING NO. 1
 DATE DRILLED 2/4/2020
 Job # 200160

TEST BORING NO. 2
 DATE DRILLED 2/4/2020
 CLIENT SMH CONSULTANTS
 LOCATION 13235 VOLLMER ROAD

REMARKS	Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type	REMARKS	Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
DRY TO 20', 2/4/20							DRY TO 20', 2/4/20						
SAND, SILTY, FINE TO COARSE GRAINED, TAN, LOOSE TO MEDIUM DENSE, MOIST	0-5	[Symbol]		9	5.6	1	SAND, SILTY, FINE TO COARSE GRAINED, TAN, LOOSE TO DENSE, MOIST	0-5	[Symbol]		6	5.3	1
	5-10	[Symbol]		13	6.0	1		5-10	[Symbol]		30	8.3	1
SANDSTONE, CLAYEY, FINE TO COARSE GRAINED, VERY DENSE, MOIST	10-15	[Symbol]		<u>50</u> 5"	9.7	2	SANDSTONE, SILTY, FINE TO COARSE GRAINED, BROWN, VERY DENSE, MOIST	10-15	[Symbol]		<u>50</u> 5"	6.1	2
	15-20	[Symbol]		<u>50</u> 6"	11.1	2		15-20	[Symbol]		<u>50</u> 4"	6.1	2
	20-25	[Symbol]		<u>50</u> 6"	10.2	2		20-25	[Symbol]		<u>50</u> 6"	6.5	2



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TEST BORING LOG

DRAWN:	DATE:	CHECKED: <i>[Signature]</i>	DATE: 2/13/20
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JOB NO.
200160
FIG NO.
B-1

LOT NO. 3
 TEST PIT NO. 1
 DATE EXCAVATED 1/24/2020
 Job # 200160

LOT NO. 1
 TEST PIT NO. 2
 DATE EXCAVATED 1/24/2020
 CLIENT SMH CONSULTANTS
 LOCATION 13235 VOLLMER RD

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 weathered to formational silty sandstone, fine to coarse grained, tan	1			ma		3A	topsoil sandy loam, brown sand clay loam, fine to coarse grained, light brown	1			ma		3A
weathered to formational clayey sandstone, fine to coarse grained, tan	2			ma		4A		2					
	3							3					
	4						sandy loam, fine to coarse grained, tan	4			gr	w	2A
	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:

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2/10/20

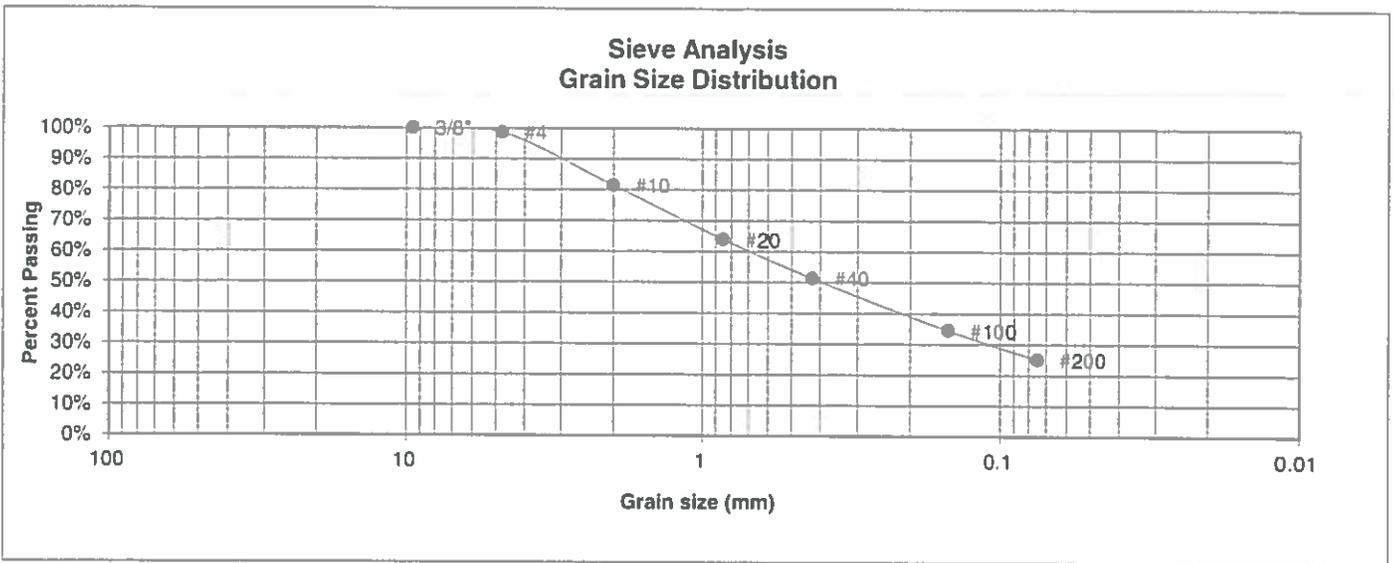
JOB NO :
 200160

FIG NO :
 B-2

APPENDIX C: Laboratory Test Results

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

CLIENT SMH CONSULTANTS
 PROJECT 13235 VOLLMER ROAD
 JOB NO. 200160
 TEST BY BL



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	100.0%
4	98.6%
10	81.4%
20	64.0%
40	51.3%
100	34.5%
200	25.1%

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
		<i>W</i>	2/10/20

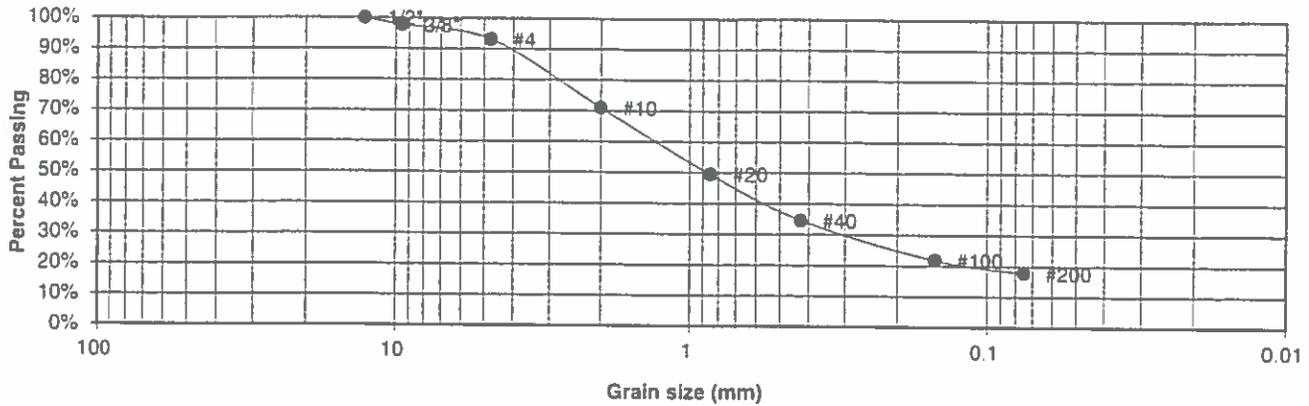
JOB NO.
200160

 FIG NO.
C-1

UNIFIED CLASSIFICATION SM
 SOIL TYPE # 1
 TEST BORING # 2
 DEPTH (FT) 5

CLIENT SMH CONSULTANTS
 PROJECT 13235 VOLLMER ROAD
 JOB NO. 200160
 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"	97.7%
4	93.1%
10	70.9%
20	49.5%
40	34.6%
100	21.9%
200	17.8%

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

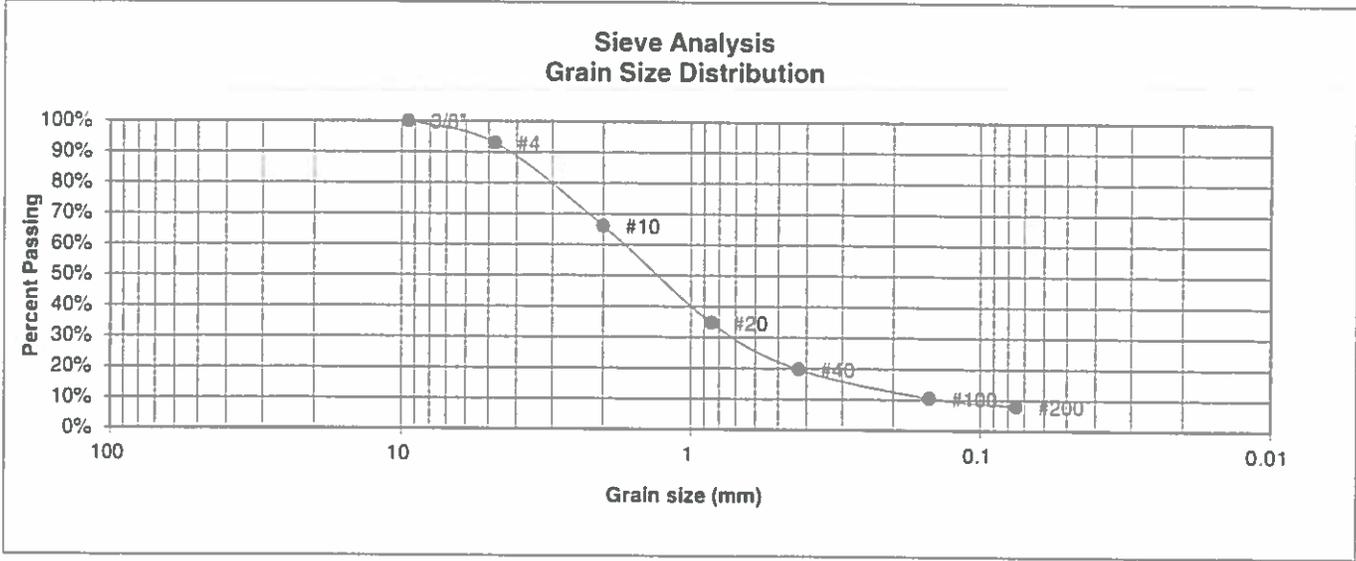
LABORATORY TEST
 RESULTS

DRAWN	DATE	CHECKED	DATE
		h	2/10/20

JOB NO.:
 200160

FIG NO.:
 C-2

BORING NO.	TP-2	UNIFIED CLASSIFICATION	SM-SW	TEST BY	BL
DEPTH(ft)	5-6	AASHTO CLASSIFICATION		JOB NO.	200160
CLIENT	SMH CONSULTANTS				
PROJECT	13235 VOLLMER ROAD				



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	100.0%
4	93.0%
10	66.1%
20	34.7%
40	19.7%
100	10.5%
200	8.0%

Atterberg Limits
 Plastic Limit
 Liquid Limit
 Plastic Index

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



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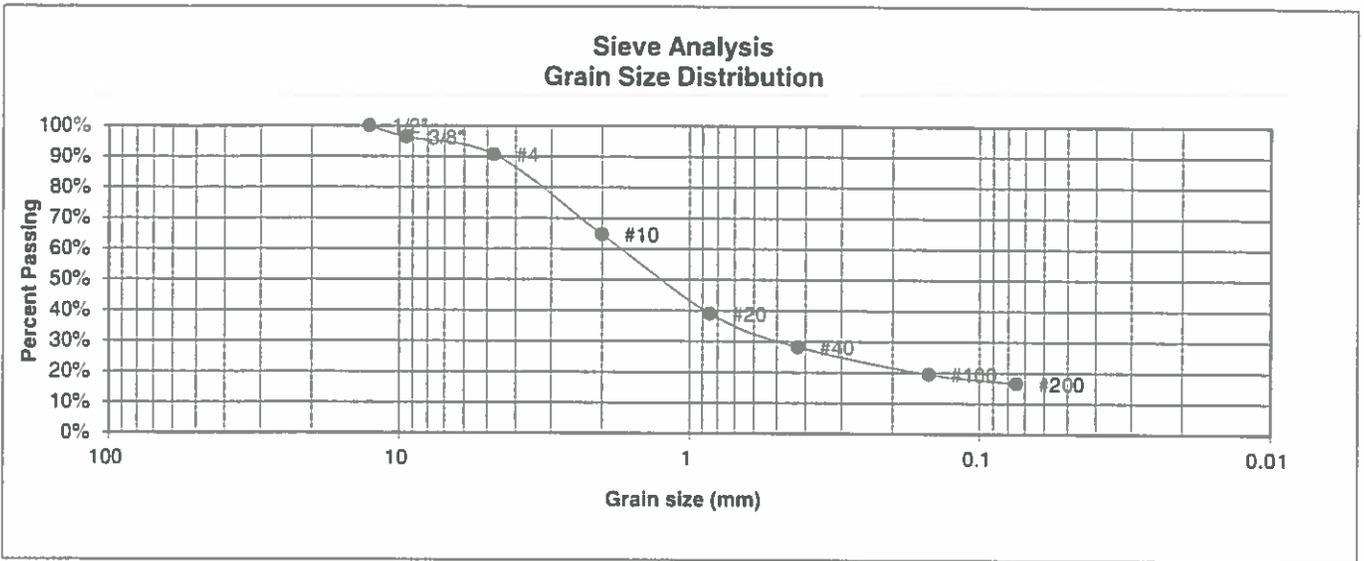
LABORATORY TEST RESULTS

DRAWN	DATE	CHECKED	DATE
		LLL	2/10/00

JOB NO.
200160

FIG NO.
C-3

BORING NO.	TP-1	UNIFIED CLASSIFICATION	SC	TEST BY	BL
DEPTH(ft)	6-7	AASHTO CLASSIFICATION		JOB NO.	200160
CLIENT	SMH CONSULTANTS				
PROJECT	13235 VOLLMER ROAD				



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	100.0%
3/8"	96.3%
4	90.7%
10	64.7%
20	39.0%
40	28.2%
100	19.5%
200	16.5%

Atterberg Limits
 Plastic Limit
 Liquid Limit
 Plastic Index

Swell
 Moisture at start 12.3%
 Moisture at finish 20.5%
 Moisture increase 8.2%
 Initial dry density (pcf) 99
 Swell (psf) 360



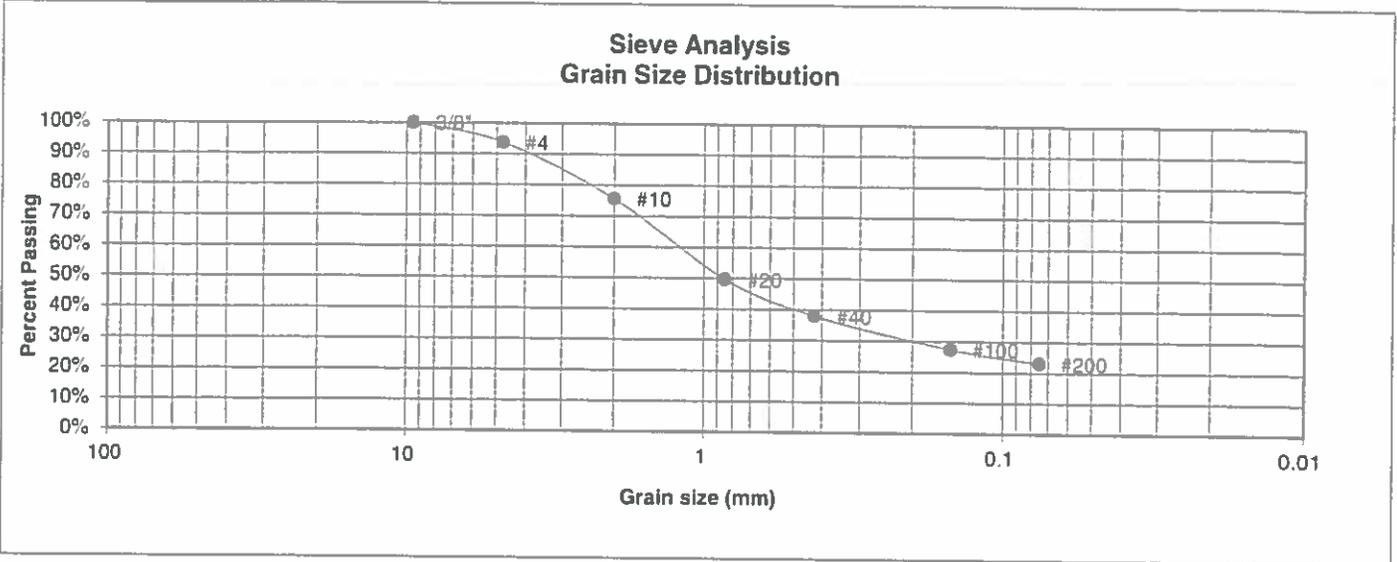
**ENTECH
ENGINEERING, INC.**
 505 ELKTON DRIVE
 COLORADO SPRINGS, COLORADO 80907

**LABORATORY TEST
RESULTS**

DRAWN:	DATE:	CHECKED: LLL	DATE: 2/12/20
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JOB NO.:
200160
FIG NO.:
C-4

UNIFIED CLASSIFICATION	SC	CLIENT	SMH CONSULTANTS
SOIL TYPE #	2	PROJECT	13235 VOLLMER ROAD
TEST BORING #	1	JOB NO.	200160
DEPTH (FT)	15	TEST BY	BL



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	100.0%
4	93.7%
10	75.6%
20	49.6%
40	37.9%
100	27.4%
200	23.0%

Atterberg Limits	
Plastic Limit	21
Liquid Limit	41
Plastic Index	20

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



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

**LABORATORY TEST
 RESULTS**

DRAWN:	DATE	CHECKED: <i>h</i>	DATE: <i>2/10/20</i>
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JOB NO.:
200160

FIG NO.:
C-5

APPENDIX D: Soil Survey Descriptions

El Paso County Area, Colorado

26—Elbeth sandy loam, 8 to 15 percent slopes

Map Unit Setting

National map unit symbol: 367y

Elevation: 7,300 to 7,600 feet

Farmland classification: Not prime farmland

Map Unit Composition

Elbeth and similar soils: 85 percent

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

Description of Elbeth

Setting

Landform: Hills

Landform position (three-dimensional): Side slope

Down-slope shape: Linear

Across-slope shape: Linear

Parent material: Alluvium derived from arkose

Typical profile

A - 0 to 3 inches: sandy loam

E - 3 to 23 inches: loamy sand

Bt - 23 to 68 inches: sandy clay loam

C - 68 to 74 inches: sandy clay loam

Properties and qualities

Slope: 8 to 15 percent

Depth to restrictive feature: More than 80 inches

Natural drainage class: Well drained

Runoff class: Medium

Capacity of the most limiting layer to transmit water (Ksat):

Moderately high (0.20 to 0.60 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Available water storage in profile: Moderate (about 7.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 4e

Hydrologic Soil Group: B

Hydric soil rating: No

Minor Components

Other soils

Percent of map unit:

Hydric soil rating: No

Pleasant

Percent of map unit:

Landform: Depressions

Hydric soil rating: Yes

Data Source Information

Soil Survey Area: El Paso County Area, Colorado

Survey Area Data: Version 17, Sep 13, 2019

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

Natural 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 storage in profile: Low (about 3.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 4e

Hydrologic Soil Group: B

Hydric soil rating: No

Minor Components

Pleasant

Percent of map unit:

Landform: Depressions

Hydric soil rating: Yes

Other soils

Percent of map unit:

Hydric soil rating: No

Data Source Information

Soil Survey Area: El Paso County Area, Colorado

Survey Area Data: Version 17, Sep 13, 2019

El Paso County Area, Colorado

68—Peyton-Pring complex, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: 369f

Elevation: 6,800 to 7,600 feet

Farmland classification: Not prime farmland

Map Unit Composition

Peyton and similar soils: 40 percent

Pring and similar soils: 30 percent

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

Description of Peyton

Setting

Landform: Hills

Landform position (three-dimensional): Side slope

Down-slope shape: Linear

Across-slope shape: Linear

Parent material: Arkosic alluvium derived from sedimentary rock
and/or arkosic residuum weathered from sedimentary rock

Typical profile

A - 0 to 12 inches: sandy loam

Bt - 12 to 25 inches: sandy clay loam

BC - 25 to 35 inches: sandy loam

C - 35 to 60 inches: sandy loam

Properties and qualities

Slope: 3 to 5 percent

Depth to restrictive feature: More than 80 inches

Natural drainage class: Well drained

Runoff class: Low

Capacity of the most limiting layer to transmit water (Ksat):

Moderately high (0.20 to 0.60 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Available water storage in profile: Moderate (about 7.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 4c

Hydrologic Soil Group: B

Ecological site: Sandy Divide (R049BY216CO)

Hydric soil rating: No

Description of Pring

Setting

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

Typical profile

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

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: More than 80 inches
Natural 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 storage in profile: Low (about 6.0 inches)

Interpretive groups

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

Minor Components

Other soils

Percent of map unit:
Hydric soil rating: No

Pleasant

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

Data Source Information

Soil Survey Area: El Paso County Area, Colorado
Survey Area Data: Version 17, Sep 13, 2019

APPENDIX E: El Paso County Health Department Septic Records

APPROVED: YES NO # 5200000303 ENVIRONMENTALIST J. Christensen

Address 13235 Vollmer Rd. Boca Owner Peter Spahn

Legal Description NW 1/4 of NW 1/4 of section 10, R45W of Tn 6 N PM
Residence , # of bedrooms 3; Commercial ; System Installer Slim Loop

SEPTIC TANK:
Commercial ; Noncommercial ; L , W , WD
Construction Material Concrete, capacity 2 x 1000 gallons.

DISPOSAL FIELD:

Rock Systems:

Trench: depth , width , total length , sq. feet

Bed: depth , length , width , sq. feet

Rock type , depth , under PVC , over PVC

Seepage Pits: # of pits , total # of rings , working depth(s)

size of pit(s) L X W, lining material , total sq. feet

Rockless Systems: Low-Pressure Dosing System

Chamber: Type , number of chambers , bed , trench

sq. ft./section , reduction allowed , sq. ft. required

total sq. ft. installed 4000, depth of installation 2'

Engineer Design or N, Designing Engineer Paul Bryant

Approval letter provided? or N 15 Jun. 2000

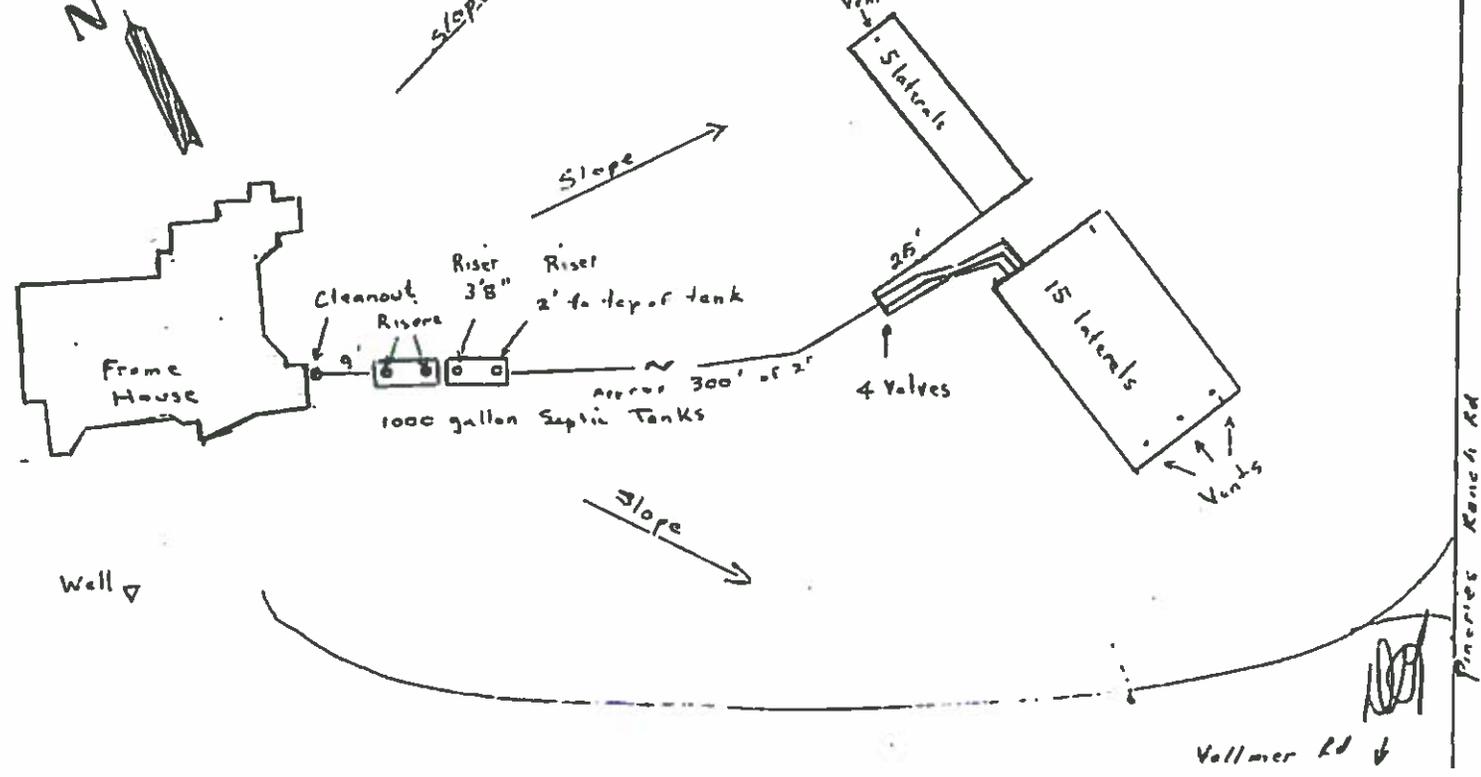
Well 50 feet from tank or N 100 feet from leach field or N

Well installed at time of septic system inspection or N Public Water

*Approval will be revoked if in the future the well is found to be within 50 feet of the septic tank and/or 100 feet of the disposal field.

NOTES: Pump & Alarm to be installed in 2nd Chamber of 2nd septic tank.

Field zones were covered-backfilled plus snow covered at time of inspection with exception of ends. 2" sch 40 line from septic tank outlet to valves. 1 1/2" laterals.



EL PASO COUNTY
DEPARTMENT OF HEALTH AND ENVIRONMENT
301 S Union Blvd, Colorado Springs, Colorado 719-578-3126



INDIVIDUAL SEWAGE DISPOSAL SYSTEM PERMIT

WATER SOURCE: WELL

PERMIT NUMBER: ON0000760

OWNER NAME: PETER SPAHN

DATE PERMITTED: 7/13/99

ADDRESS: 13251 VOLLMER RD

CITY, STATE, ZIP: COLORADO SPRINGS 80908

PHONE NUMBER: 7194952203

INSTALLED BY: LOOP, SLIM

This permit is issued in accordance with 25-10-107 Colorado Revised Statutes. PERMIT EXPIRES upon completion-installation of sewage-disposal system or at the end of twelve (12) months from date of issue- whichever occurs first-(unless work is in progress). This permit is revokable if all stated requirements are not met.

Sewage disposal system to be installed by an El Paso County Licensed System Contractor or the property owner.

THIS PERMIT DOES NOT DENOTE APPROVAL OF ZONING AND ACREAGE REQUIREMENTS.

PERMIT FEE (NON REFUNDABLE):

~~New Permit - \$300.00~~

ISDS Repair - \$ 50.00

Voided/Altered permit - \$ 25.00

DIRECTOR, EL PASO COUNTY DEPARTMENT OF HEALTH AND ENVIRONMENT

Janet Christensen 578-3141

ENVIRONMENTALIST / PHONE NUMBER

PERMIT EXPIRATION DATE:

Expires twelve months from date of issue

NOTE: LEAVE THE ENTIRE SEWAGE DISPOSAL SYSTEM UNCOVERED FOR FINAL INSPECTION, 48 HOUR ADVANCE NOTICE REQUIRED.

MINIMUM SEPTIC TANK SIZE: P. E DESIGN GALLONS

MINIMUM ABSORPTION AREA REQUIRED P. E. DESIGN SQ FT

PLANNING DEPARTMENT



ENUMERATION



FLOOD PLAIN



WASTEWATER



COMMENTS:

THIS SYSTEM MUST BE DESIGNED BY A COLORADO REGISTERED PROFESSIONAL ENGINEER DUE TO BEDROCK AT 3 FEET BELOW NATIVE GROUND SURFACE. THE SYSTEM MUST BE INSPECTED BY THE HEALTH DEPARTMENT PRIOR TO BACKFILL AND A LETTER OF APPROVAL BY THE ENGINEER MUST BE FURNISHED THIS OFFICE FOR FINAL APPROVAL OF SYSTEM.

The Health Office 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 time for the purpose of making such inspections as are necessary to determine compliance with requirements of this law.

13251 Vollmer Rd

#520000366

E. 12-15-99

Inspector

Janet

Record I.D. 760

ASAP PAID

EL PASO COUNTY ENVIRONMENTAL HEALTH SERVICES

301 South Union Boulevard • Colorado Springs, CO • 80910-3123 • (719) 578-3126

APPLICATION FOR A NEW REMODEL REPAIR OR ADDITION TO AN INDIVIDUAL SEWAGE DISPOSAL SYSTEM

Owner PETER R + KATHERINE F SPAHN Daytime Phone (719) 495-2203

Address of Property 13251 VOLLMER RD. City & Zip COLORADO SPRINGS, CO 80908

Legal Description NW 1/4 OF THE NW 1/4 OF SECTION 10, T12S R65W OF THE 6TH PM. 80908

Made in EL PASO COUNTY, CO Tax Schedule # 52000-00-119 Lot Size 40 Acres Septic Contractor GS EXCAVATION SIM LOOP

Inside City Limits No Yes-City Water Supply Well or Spring Cistern Public

Type of Building Frame Mobile Modular Other

Owner's MAILING Address 13251 VOLLMER RD. City, State & Zip COLORADO SPRINGS, CO 80908

MAIL PERMIT OR PICK UP PERMIT

MAXIMUM POTENTIAL BEDROOMS 3 PRS

Basement Y (N) Percolation Test Attached Y (N) Garbage Disposal Y (N) Clothes Washer Y (N)

I have supplied a plot plan as described on the back of this form. I acknowledge the completeness of the application is conditional upon such further mandatory and additional tests and reports as may be required by the Department to be made and furnished by an applicant for purposes of evaluating the application, and issuance of the permit is subject to such terms and conditions as deemed necessary to ensure compliance with rules and regulations adopted pursuant to C.R.S. 25-10-107 et. seq. I hereby certify all represented to be true and correct to the best of my knowledge and belief, and are designed to be relied on by the El Paso County Department of Health and Environment in evaluating the same for purposes of issuing the permit applied for herein. I further understand any falsification or misrepresentation may result in the denial of the application or revocation of any permit granted based upon said application and in legal action for perjury as provided by law.

OWNER'S SIGNATURE Peter R. Spath Katherine F. Spath Date 7/7/99

DEPARTMENT OF HEALTH USE ONLY

P.E. design Minimum Absorption Area P.E. design Minimum Tank Capacity Date of Site Inspection 07/08/99

REMARKS Perc test performed 12/98.

This system must be designed by a Colorado registered professional engineer due to bedrock at 3 ft. below native ground surface. The system must be inspected by the Health Dept. prior to backfill and a letter of approval by the engineer must be furnished this office for final approval of system.

EHS INSPECTOR Janet Christensen DATE 07/09/99 APPROVED DENIED

PERMIT # N00000760 FEE NO FEE DATE TO PLANNING DEPT 7/8/99 DATE TO WASTEWATER DISTRICT attached

1) We require a copy of your percolation (PERC) TEST with an original professional engineer's (PE) stamp and signature. :



A PLOT PLAN must be drawn (not to scale) on a 8 1/2 x 11 sheet of paper. The plot plan must include

- 1) a north bearing
- 2) property lines
- 3) property dimensions
- 4) all buildings (proposed or existing)
- 5) proposed septic system site
- 6) designated alternate septic system site
- 7) driveway (proposed or existing and name of adjoining street)

3) Initial any of the following features that apply to your property and include them on your plot plan.

- Well(s)
- Cistern
- Adjacent property well(s)
- Water line
- Subsoil drain

4) Initial any of the following that are within 100 feet of your proposed septic system and include on your plot plan.

- Spring(s)
- Pond(s)
- Dry Gulch(es)
- Lake(s)
- Stream(s)
- Natural drainage course(s)

5) PROPERTY ADDRESS OR LOT NUMBER MUST BE POSTED AND CLEARLY VISIBLE FROM ROAD. PERC HOLES MUST BE CLEARLY MARKED.

6) GIVE COMPLETE DIRECTIONS TO THE PROPERTY FROM A MAIN HIGHWAY

13251 JOLLMER RD PINERIES RANCH

