

Please add:
PCD File SF2521

March 13, 2023

GWH, LLC
6547 North Academy Boulevard, Suite 1009
Colorado Springs, CO 80918



ENTECH
ENGINEERING, INC.

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

Attn: Rocky Manning

Re: Wastewater Study
23218 Highway 94
Tax Schedule Nos. 34120-00-026
El Paso County, Colorado
Entech Job No. 230089

Dear Mr. Manning:

GENERAL SITE CONDITIONS AND PROJECT DESCRIPTION:

The site is located in the SW¼ of Section 12, Township 14 South, Range 63 West of the 6th Principal Meridian in El Paso County, Colorado. The site is located approximately 15 miles east of Colorado Springs, Colorado, east of Peyton Highway and Highway 94 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 generally gradually sloping to the southeast. Three dry drainages were observed on the site, in the southwest corner, the south-central portion and along the east portion of the site. The drainage swales trend in a south to southeasterly direction. Water was not observed in the drainages at the time of this investigation. The site boundaries are indicated on the USGS Map, Figure 2. Previous land uses have included residential, agricultural grazing and undeveloped land. The site contains primarily field grasses, weeds, and yucca with planted trees around the existing homes and the corral areas in the northwest portion of the site. Site photographs, taken February 1, 2023, are included in Appendix A.

Total acreage involved in the proposed subdivision is 60-acres. A new rural subdivision consisting of 10 lots is planned for this replat. The lots for this site are anticipated to be approximately 5 to 7-acres in size. The lots will be serviced by individual on-site wastewater treatment systems and water wells. The Site Plan is presented in Figure 3.

SCOPE OF THE REPORT

This site was found to be suitable for the proposed development, which will consist of rural, residential lots and associated site improvements. Areas were encountered where the geologic conditions will impose some constraints on development and land use. These include areas of floodplains, seasonally shallow groundwater, and potentially seasonal shallow groundwater areas. Based on the proposed development plan, it appears that these areas will have some impacts on the development. These conditions will be discussed in greater detail in the report.

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

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) (Reference 1), previously the Soil Conservation Service (SCS) survey was also reviewed to evaluate the site (Reference 2). The position of mappable units within the subject site are shown on the Geologic Map Figure, 6. Our mapping procedures involved both field reconnaissance and measurements, and aerial photo reconnaissance and interpretation. The field mapping was performed by personnel of Entech Engineering, Inc. on February 1, 2023.

Six (6) test borings were drilled and five (5) test pits were excavated on the site to determine general suitability of the soil characteristics for residential construction and on-site wastewater treatment systems. The locations of the test borings are indicated on the Site Plan/Test Boring Location Map, Figure 3. The Test Boring Logs are presented in Appendix B, and Laboratory Testing results 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 soils are presented in Appendix D. In general, the soils consist of loamy sand and sandy loam. The soils are described as follows:

Type	Description
19	Columbine Gravelly Sandy Loam, 0 – 3% Slopes
28	Ellicott loamy Coarse Sand, 0 – 5% Slopes

The Columbine Gravelly Sandy Loam has been described to have rapid permeabilities and the Ellicott Loamy Coarse Sand has been described to have very limited permeabilities. The soils are described as well suited for use as home sites. Possible hazards with soils erosion are present on the site. The erosion potential can be controlled with vegetation. The soils have been described to have moderate erosion hazards (Reference 2).

Soils

Two soil types were encountered in the test borings on the site. Soil Type 1: slightly silty to silty sand (SM, SM-SW) and Soil Type 2: sandy silt. Bedrock was not encountered in the test borings which were drilled to 20 feet bgs. Each soil type was classified in accordance with the Unified Soil Classification System (USCS) using the laboratory testing results.

Soil Type 1 classified as slightly silty to silty sand (SM, SM-SW). The sand was encountered in Test Boring Nos. 1 through 4 and 6 at the existing ground surface and at 3 feet below ground surface (bgs) extending to the termination of test borings (20 feet). Standard Penetration Testing

GWH, LLC
Wastewater Study
23218 Highway 94
Tax Schedule Nos. 34120-00-026
El Paso County, Colorado
Entech Job No. 230089

on the sand resulted in N-values of 7 to greater than 50 blows per foot (bpf) indicating loose to very dense states. The very high blow counts encountered in the test borings are due to gravel. The majority of the sands were encountered at medium dense to dense states. Water content and grain size testing resulted in approximately 1 to 18 percent water content with 5 to 19 percent of the soil size particles passing the No. 200 sieve. Atterberg limit test was performed on samples of the slightly silty to silty sand resulted in Liquid Limits of No-Value and Plastic Indexes of Non-Plastic. Sulfate testing resulted in less than 0.01 to 0.02 percent soluble sulfate by weight, indicating negligible to low potential for below grade concrete degradation due to sulfate attack.

Soil Type 2 classified as slightly sandy silt and sandy clay (ML, CL). The silt and clay were encountered in Test Boring No. 5 at the existing ground surface and extending to 3 feet bgs, and in all of the test pits at depths ranging from the existing surface to 7 feet and extending to depths ranging from 3 to 6 feet and to the termination of the test pits (8 feet). Standard Penetration Testing on the silt resulted in N-values of 17 bpf indicating stiff consistencies. Water content and grain size testing resulted in approximately 8 percent water content with 78 percent of the soil size particles passing the No. 200 sieve. The silt and clay soils are anticipated to be penetrated by the foundation excavation

Soils encountered in the test pits excavated by Entech Engineering, Inc. consisted of gravelly sandy loam to sandy loam overlying sandy clay in Test Pit Nos. 1 and 2, sandy clay to sandy clay loam overlying gravelly sandy loam to sandy loam in Test Pit Nos. 3 and 4, and sandy clay loam overlying gravelly sandy loam with underlying sandy clay. Bedrock was not encountered in the test pits. Signs of seasonally shallow groundwater were encountered in Test Pit Nos. 1, 2, 3, and 5 at depths ranging from 4 to 7 feet.

Groundwater

Groundwater was encountered in Test Boring Nos. 1, 3 and 4 at depths of 10 to 12 feet. It is anticipated that groundwater will affect construction of the OWTS to be installed. It should be noted that fluctuation in groundwater levels could change due to seasonal variations, changes in land runoff characteristics and future development of nearby areas. 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 during construction.

Floodplain

Portions of the site lie within a floodplain zone according to the FEMA Map Nos. 08041CO807G and 08041CO809G, dated March 17, 2018 (Figure 7, Reference 4). The approximate FEMA floodplain boundaries are also indicated on the Engineering Geology Map, Figure 6. The exact location of the floodplain will be required prior to development. **Exact locations of floodplain and specific drainage studies are beyond the scope of this report.** Absorption fields must also be located a minimum of 50 feet from any drainages, floodplains or ponded areas and 25 feet from dry gulches.

GWH, LLC
Wastewater Study
23218 Highway 94
Tax Schedule Nos. 34120-00-026
El Paso County, Colorado
Entech Job No. 230089

Seasonally High Groundwater Area:

Seasonally shallow groundwater areas were encountered throughout the site. OWTS installed in these areas should anticipated a shallow excavation depth or a mounded system.

Geology

Approximately 25½ miles west of the site is the southern extent of 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). Overlying the Dawson Formation are alluvial deposited sands and clays.

The geology of the site was evaluated using the *Geologic Map of Pueblo 1-degree x 2degrees' quadrangle, South-Central Colorado*, by Scott, G.R., et.al. in 1976, (Reference 3, Figure 5). The Geology Map for the site is presented in Figure 6. One mappable unit was identified on this site which is described as follows:

Q1 Louviers Alluvium of Pleistocene Age: These deposits are light brown silty sands which contain an abundance of gravels. They commonly occur as stream terrace deposits above the valley floors.

The soils listed above were mapped from site-specific mapping, the *Geologic map of the Pueblo 1-degree x 2-degrees' quadrangle, south-central Colorado* published by the U.S. Geologic Survey in 1976 (Reference 3). The test borings and test pits were used in evaluating the site and are included in Appendix B. The Geology Map prepared for the site is presented in Figure 6.

ON-SITE WASTEWATER TREATMENT

The Natural Resource Conservation Service (Reference 1), previously the Soil Conservation Service (Reference 2) has mapped this site with two soil descriptions. The Soil Survey Map (Reference 2) is presented in Figure 4, and the Soil Survey Descriptions (Reference 2) are presented in Appendix E. The soils are described as having rapid to limited percolation rates.

Soils encountered in the tactile test pits consisted of gravelly sandy loam, sandy loam, sandy clay loam, and sandy clay. The limiting layer encountered in the test pits is the gravelly sandy loam, sandy clay and sandy clay soils and evidence of seasonally shallow groundwater (redoximorphic features), which corresponds with USDA Soil Type R-1, 2, 3A and 4A with an LTAR values ranging from 0.60, 0.30, to 0.15 gallons per day per square foot for treatment level 1, respectively and 0.80 to 0.20 for treatment level 3. Redoximorphic features were observed in Test Pit Nos. 1, 2, 3, and 5 at depths ranging from 4 to 7 feet. Bedrock was not observed in the test pits. Absorption fields must be maintained a minimum of 4 feet above any groundwater, groundwater evidence, bedrock, or confining layers. Due to the gravelly soils, sandy clay loam, sandy clay, and redoximorphic features encountered on this site the majority of systems to be installed on this site will be engineer designed systems.

GWH, LLC
Wastewater Study
23218 Highway 94
Tax Schedule Nos. 34120-00-026
El Paso County, Colorado
Entech Job No. 230089

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, engineered designed systems will likely be required for the majority of the site. The Septic Suitability Map is presented in Figure 8. Site specific testing may locate areas where conventional systems could be used. Areas that should be avoided by septic systems are indicated on the septic suitability map.

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

It should be pointed out that because of the nature of data obtained by random sampling of such variable nonhomogeneous materials as soil and rock, it is important that we be informed of any differences observed between surface and subsurface conditions encountered in construction and those assumed in the body of this report. Any new construction considered on this site will require additional investigation. Construction and design personnel should be made familiar with the contents of this report. Specific construction and OWTS recommendations will be provided when investigations are completed for each building site prior to new construction.

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

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

Respectfully Submitted,

ENTECH ENGINEERING, INC.



Logan L. Langford, P.G.
Geologist

LLL/jhr

Encl.

AAprojects/2023/230089 wws

Reviewed by:



Joseph C. Goode, P.E.
President

GWH, LLC
Wastewater Study
23218 Highway 94
Tax Schedule Nos. 34120-00-026
El Paso County, Colorado
Entech Job No. 230089

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, G.R., Taylor R.B, Epis, R.C., and Wobus, R.A., 1976. Geologic map of the Pueblo 1-degree x 2-degrees' quadrangle, south-central Colorado. USGS, Map MF-775.
4. Federal Emergency Management Agency. December 7, 2018. *Flood Insurance Rate Maps for the City of Colorado Springs, Colorado*. Map Numbers 08041CO807G & 08041CO809G.

TABLES

TABLE 1
SUMMARY OF LABORATORY TEST RESULTS

CLIENT: GWH
PROJECT: 23218 HIGHWAY 94
JOB NO.: 230089

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			5.0	NV	NP	<0.01			SM-SW	SAND, SLIGHTLY SILTY
1	2	15			18.5						SM	SAND, SILTY
1	3	10			13.8	NV	NP	0.02			SM	SAND, SILTY
1	4	5			7.2						SM-SW	SAND, SLIGHTLY SILTY
1	6	10			11.0						SM-SW	SAND, SLIGHTLY SILTY
2	5	2-3			78.0						ML	SILT, SANDY

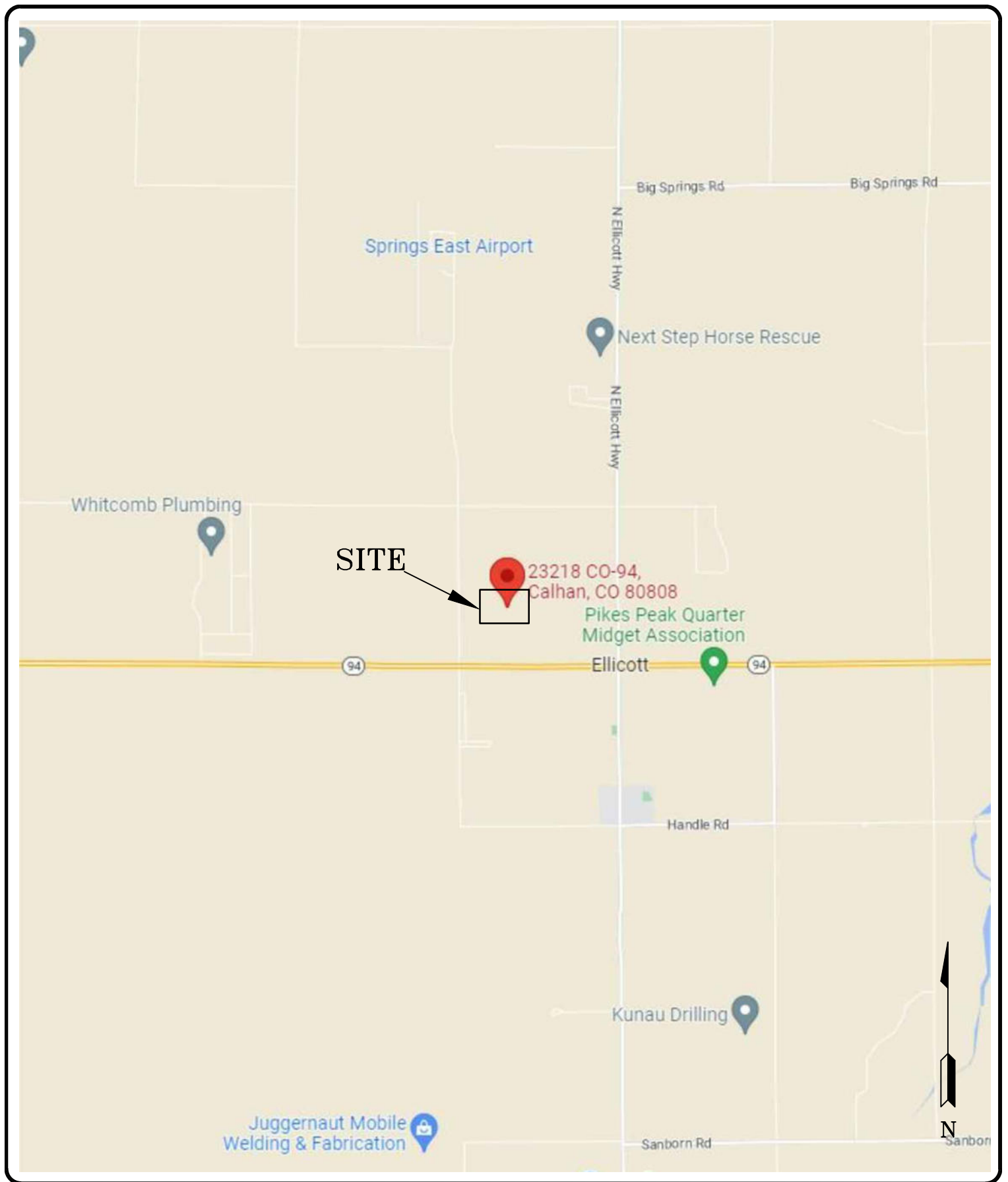
Table 2: Summary Tactile Test Pit Results

Test Pit No.	USDA Soil Type	LTAR Value	Depth to Bedrock (ft.)	Depth to Seasonally Occurring Groundwater (ft.)
1	R-1*	0.80^	N/A	6*
2	2	0.60	N/A	7
3	4A*	0.20^	N/A	5*
4	3A*	0.3A	N/A	N/A
5	3A*	0.35^	N/A	4

*- Conditions that will require an engineered OWTS

^ Treatment Level 3

FIGURES



ENTECH
ENGINEERING, INC.

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

VICINITY MAP
23218 HIGHWAY 94
EL PASO COUNTY, CO.
FOR: GWH

DRAWN:
JHR

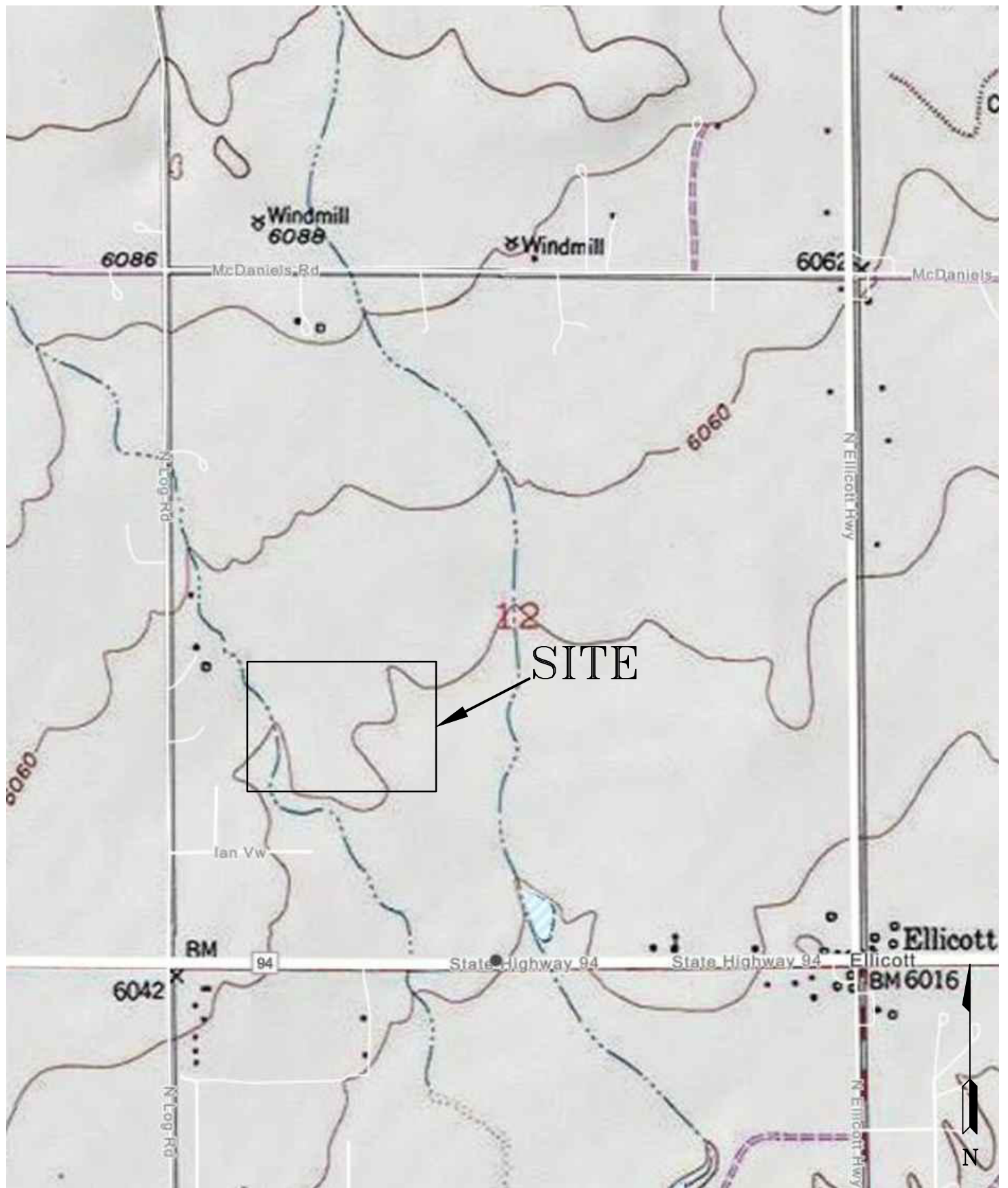
DATE:
2/9/23

CHECKED:

DATE:

JOB NO.:
230089

FIG NO.:
1



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

USGS MAP TOPOGRAPHY MAP
23218 HIGHWAY 94
EL PASO COUNTY, CO.
FOR: GWH

DRAWN:
JHR

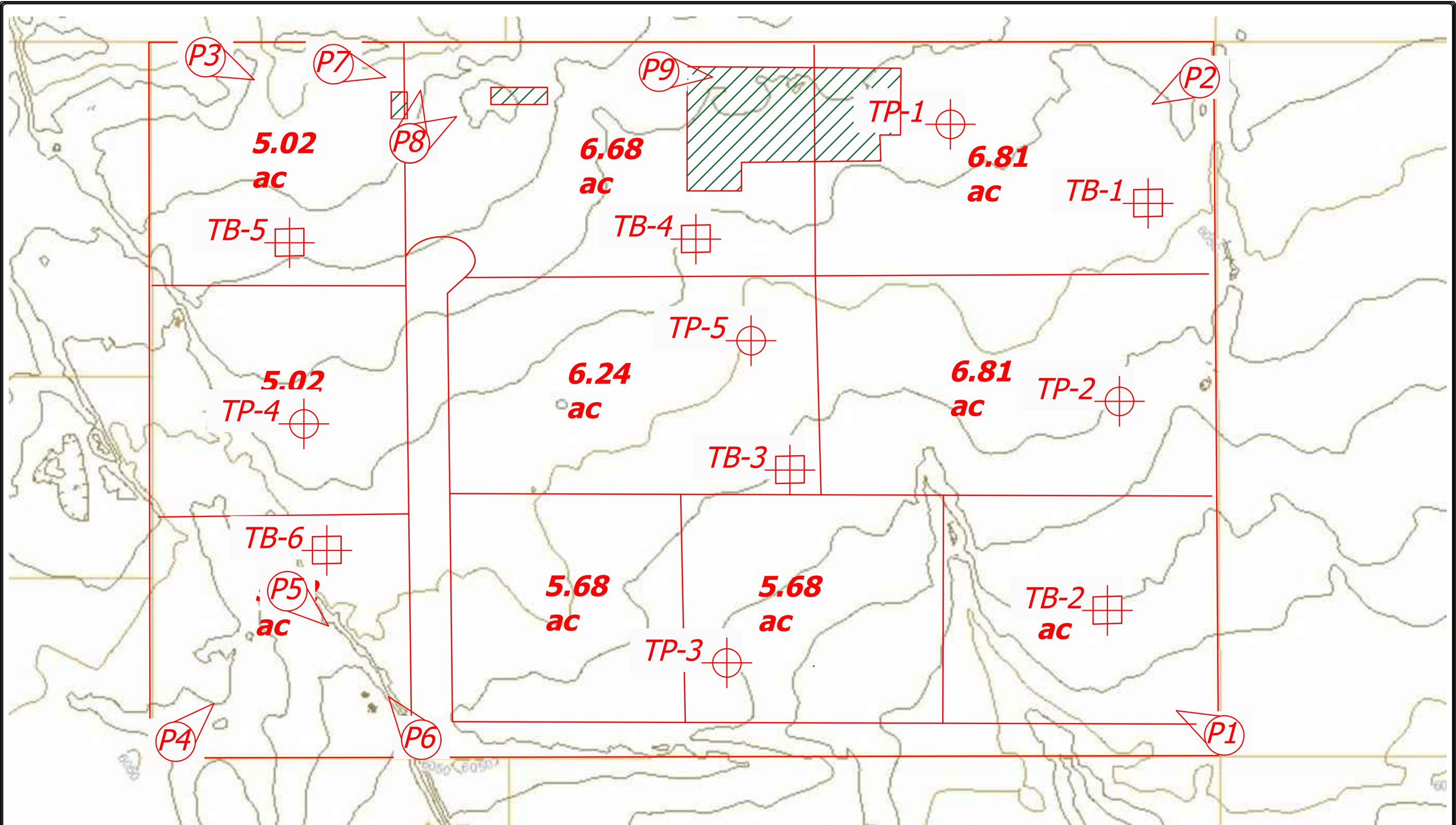
DATE:
2/9/23

CHECKED:





DATE:

JOB NO.:
230089

FIG NO.:
2



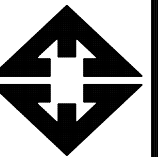
LEGEND:

-  - APPROXIMATE TEST PIT LOCATION
-  - APPROXIMATE TEST BORING LOCATION
-  - APPROXIMATE PHOTOGRAPH LOCATION AND DIRECTION
-  - Man Made- Structure



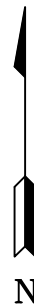
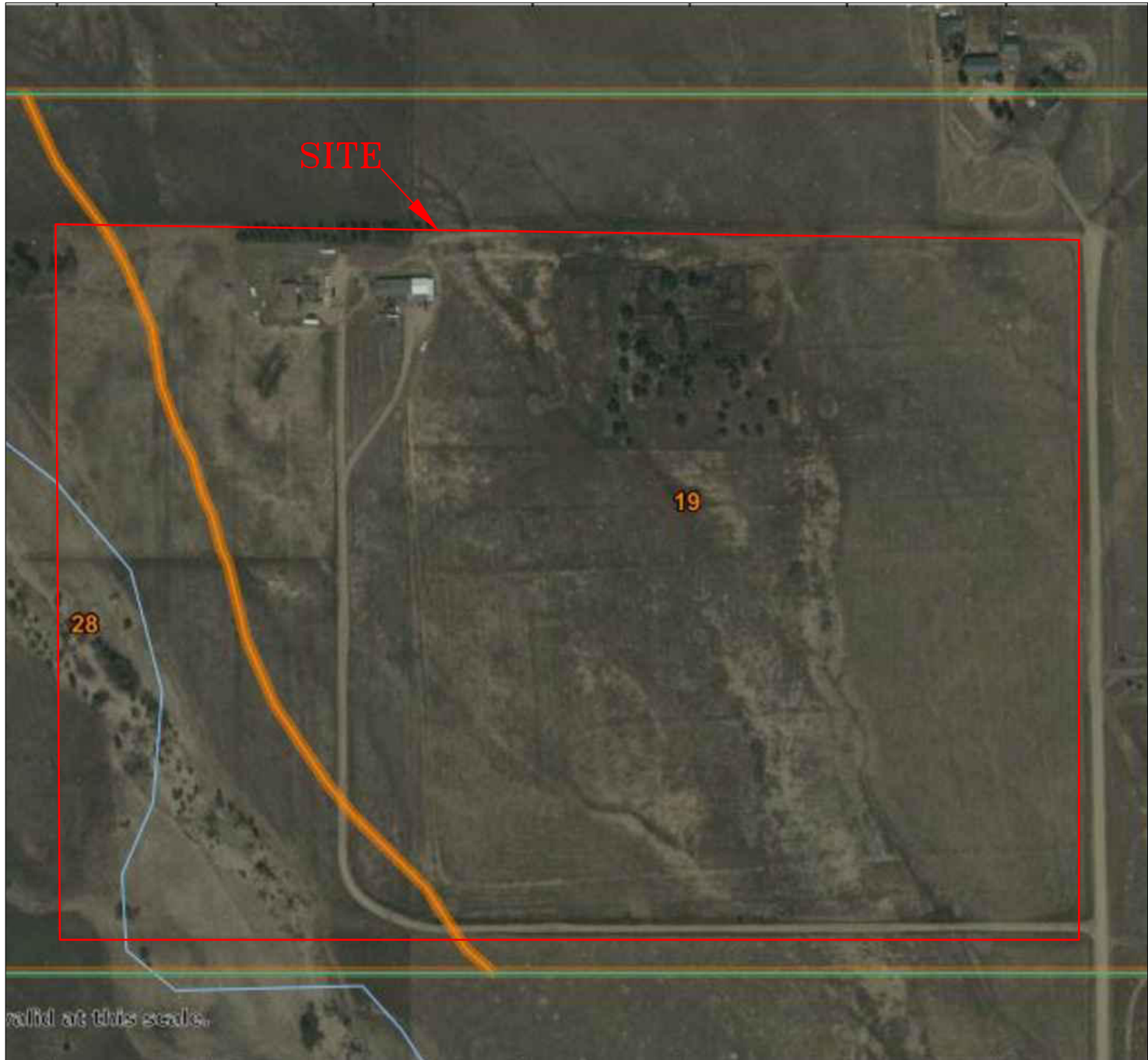
REVISION	BY

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



OWTS SUITABILITY MAP
23218 HIGHWAY 94
EL PASO COUNTY, CO.
FOR: GWH

DRAWN
JHR
CHECKED
LLI
DATE
2/9/23
SCALE
N.T.S.
JOB NO.
230089
FIGURE No.



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

SOIL SURVEY MAP
23218 HIGHWAY 94
EL PASO COUNTY, CO.
FOR: GWH

DRAWN:
JHR

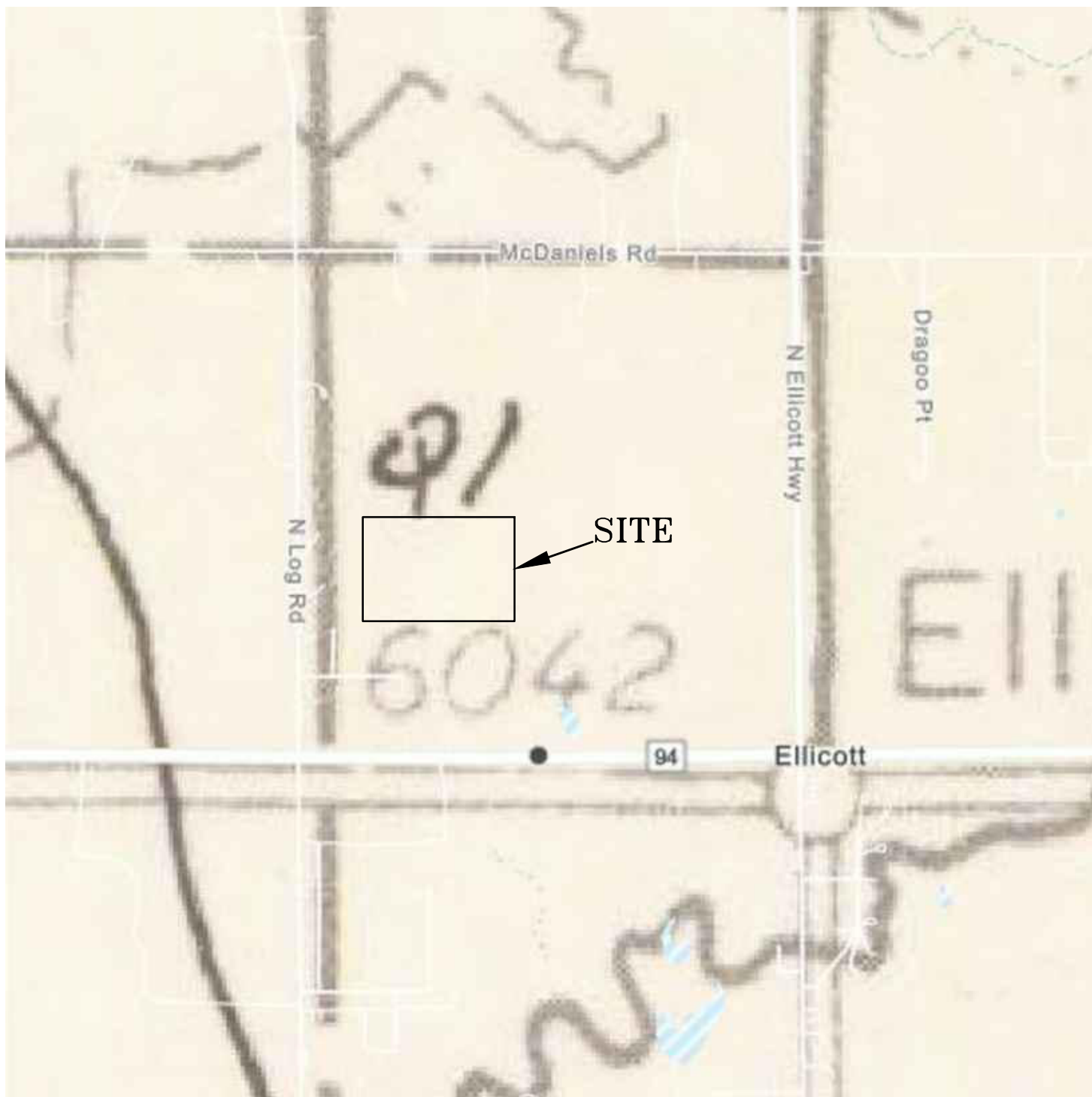
DATE:
2/9/23

CHECKED:

DATE:

JOB NO.:
230089

FIG NO.:
4



N



ENTECH
ENGINEERING, INC.

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

GEOLOGIC MAP OF THE PUEBLO 1° X 2° QUADRANGLE
23218 HIGHWAY 94
EL PASO COUNTY, CO.
FOR: GWH

DRAWN:
JHR

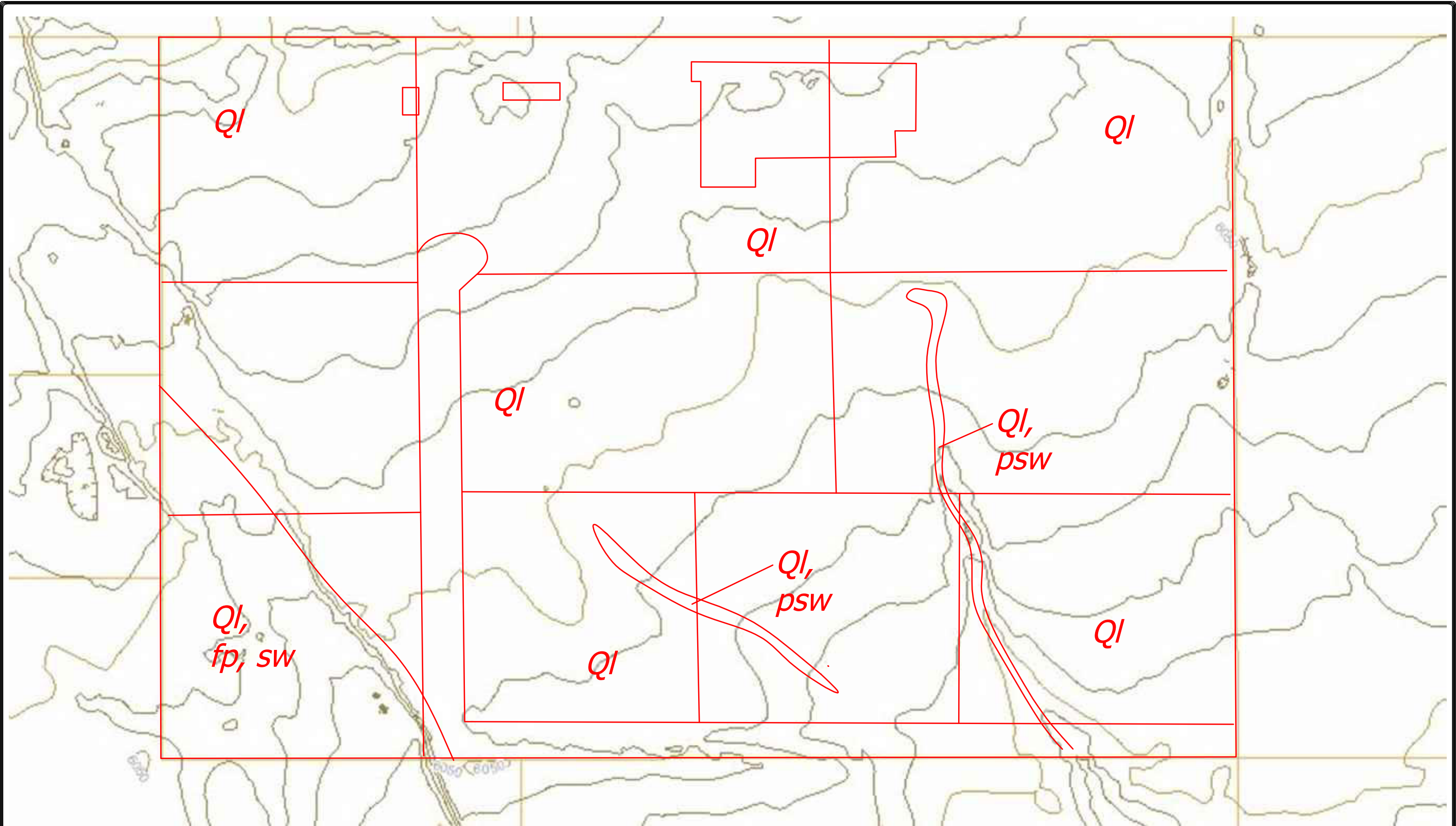
DATE:
2/9/23

CHECKED:

DATE:

JOB NO.:
230089

FIG NO.:
5



- Legend:
- QI - Louviers Alluvium of Pliestocene Age:
silty sand terrace deposits with abundance of gravels
 - psw - potentially seasonally wet area
 - fp - floodplain
 - sw - seasonally wet area

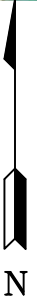


REVISION	BY

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

OWTS SUTABILITY MAP
23218 HIGHWAY 94
EL PASO COUNTY, CO.
FOR: GWH

DRAWN JHR
CHECKED LLL
DATE 2/9/23
SCALE N.T.S.
JOB NO. 230089
FIGURE No. 6



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

FEMA FLOODPLAIN MAP
23218 HIGHWAY 94
EL PASO COUNTY, CO.
FOR: GWH

DRAWN:
JHR

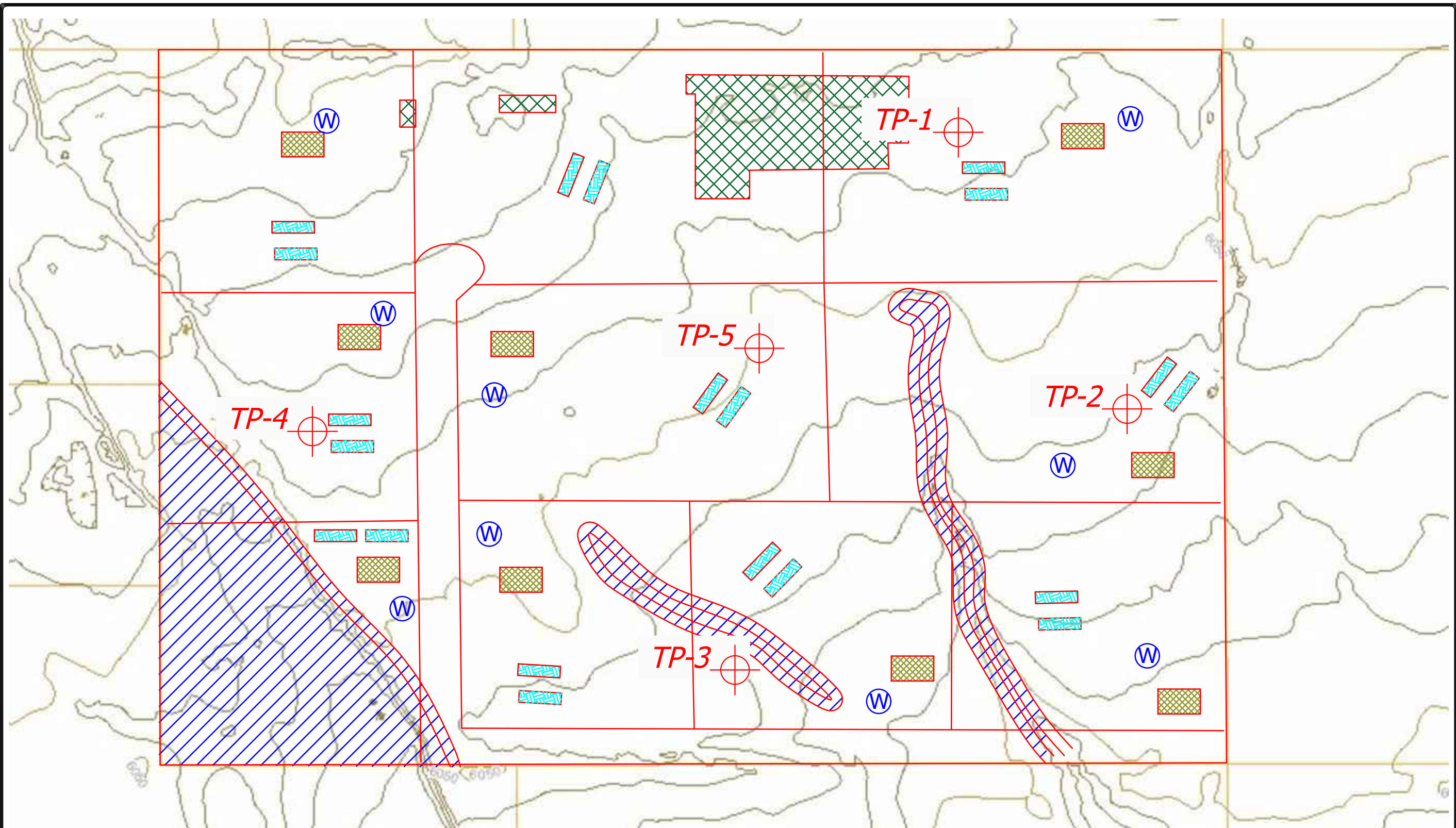
DATE:
2/9/23

CHECKED:




DATE:

JOB NO.:
230089

FIG NO.:
7



LEGEND:

- | | |
|---|--|
|  - EXISTING STRUCTURE | - PROPOSED HOME LOCATION |
|  - OWS ACCEPTABLE LOCATIONS | - PROPOSED PRIMARY AND SECONDARY OWS LOCATIONS |
|  - OWS ARE NOT RECOMMENDED IN AREAS OF POTENTIALLY SEASONAL SHALLOW GROUNDWATER (PSW) OR WITHIN THE NO-BUILD DRAINAGE EASEMENT | - PROPOSED WELL LOCATION |



REVISION	BY

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

OWTS SUTABILITY MAP
23218 HIGHWAY 94
EL PASO COUNTY, CO.
FOR: GWH

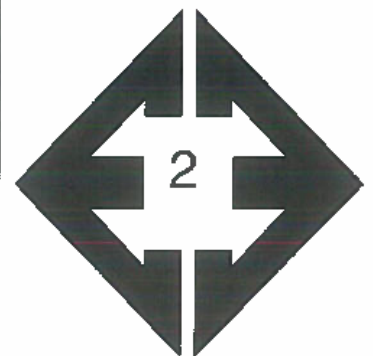
DRAWN JHR
CHECKED LLL
DATE 2/9/23
SCALE AS SHOWN
JOB NO. 230089
FIGURE No. 8

APPENDIX A: Photographs



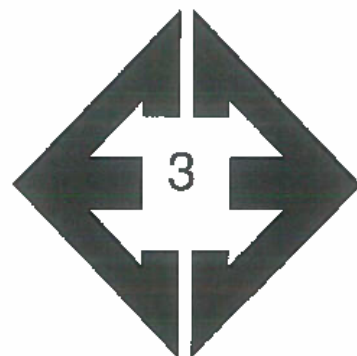
**Looking northwest
from the southeast
corner of the site.**

February 1, 2023



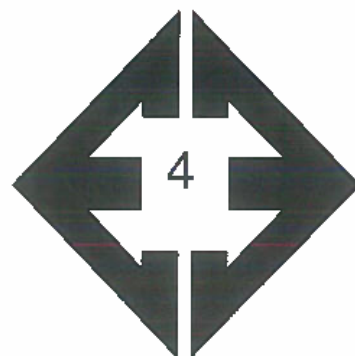
**Looking southwest
from the northeast
corner of the site.**

February 1, 2023



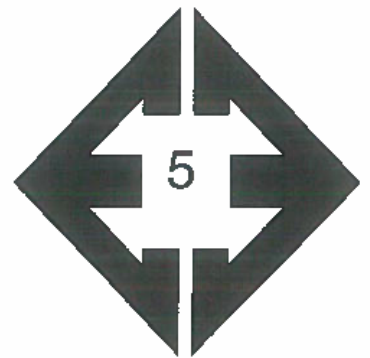
**Looking southeast
from the northwest
corner of the site.**

February 1, 2023



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

February 1, 2023



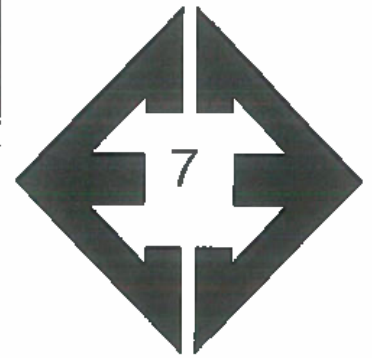
**Looking southeast
along dry drainage in
the southwest corner
of the site.**

February 1, 2023



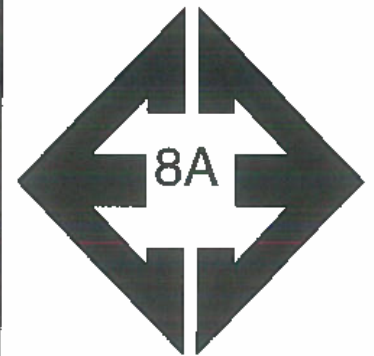
**Looking northwest
along dry drainage in
the southwest corner
of the site.**

February 1, 2023



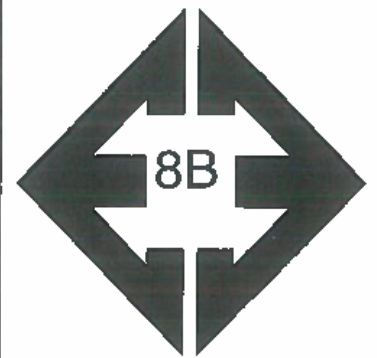
**Looking west-
southwest from the
northwest portion of
the site.**

February 1, 2023



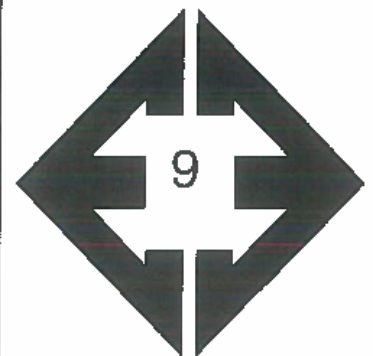
**Looking northeast at
existing home.**

February 1, 2023



**Looking northwest at
existing home.**

February 1, 2023



**Looking southeast at
corrals from the
central point of the
north property line.**

February 1, 2023

APPENDIX B: Test Pit Logs

TEST PIT NO. 1
DATE EXCAVATED 2/1/2023
Job # 230089

TEST PIT NO. 2
DATE EXCAVATED 2/1/2023
CLIENT GWH
LOCATION 23218 Highway 94

REMARKS	Depth (ft)	Symbol	Samples	Soil Structure Shape	Soil Structure Grade	USDA Soil Type
Redoximorphic Features @ 6'-0"						
topsoil, sandy clay loam, brown, moist	1					
gravelly sandy loam, fine to very coarse grained, brown, moist	2			gr	m	R-1
	3					
	4			gr	m	R-1
	5					
	6					
sandy clay, fine to medium grained, grayish brown, moist	7			ma		4A
	8					
	9					
	10					

REMARKS	Depth (ft)	Symbol	Samples	Soil Structure Shape	Soil Structure Grade	USDA Soil Type
Redoximorphic Features @ 7'-0"						
topsoil, sandy clay loam, brown, moist	1					
	2			gr	s	2
	3					
sandy loam, fine to coarse grained, brown, moist	4					
	5			gr	s	2
	6					
	7					
sandy clay, fine to medium grained, grayish brown, moist	8			ma		4A
	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



ENTECH
ENGINEERING, INC.

505 ELKTON DRIVE
COLORADO SPRINGS, COLORADO 80907

TEST PIT LOG

DRAWN:
Jhr

DATE:
2/8/23

CHECKED:
JHR

DATE:
2/8/23

JOB NO.:
230089

FIG NO.:

B-1

TEST PIT NO. 3
 DATE EXCAVATED 2/1/2023
 Job # 230089

TEST PIT NO. 4
 DATE EXCAVATED 2/1/2023
 CLIENT GWH
 LOCATION 23218 Highway 94

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
Redoximorphic Features @ 5'-0"													
topsoil, sandy clay loam, brown, moist	1			ma		4A	topsoil, sandy clay loam, brown, moist	1			ma		3A
sandy clay, fine to medium grained, grayish brown, moist	2						sandy clay loam, fine to coarse grained, dark brown, moist	2					
	3							3					
gravelly sandy loam, fine to very coarse grained, brown, moist	4			gr	s	R-1		4					
	5							5			ma		3A
	6							6					
	7			gr	s	R-1	sandy loam, fine to coarse coarse grained, brown, moist	7			gr	m	2
	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:
2/8/23

CHECKED:
JHR

DATE:
2/22/23

JOB NO.:
230089

FIG NO.:

B-2

TEST PIT NO. 5
 DATE EXCAVATED 2/1/2023
 Job # 230089

DATE EXCAVATED 2/1/2023
 CLIENT GWH
 LOCATION 23218 Highway 94

REMARKS

Redoximorphic
 Features @ 4'-0"

topsoil, sandy clay loam,
 brown, moist
 sandy clay loam, fine to
 coarse grained, brown, moist

gravelly sandy loam, fine
 to very coarse grained,
 brown, moist

sandy clay, fine to coarse
 grained, brown, moist

Depth (ft)	Symbol	Samples	Soil Structure Shape	Soil Structure Grade	USDA Soil Type
1			ma		3A
2					
3					
4			gr	s	R-1
5					
6					
7			ma		4A
8					
9					
10					

REMARKS

Depth (ft)	Symbol	Samples	Soil Structure Shape	Soil Structure Grade	USDA Soil Type
1					
2					
3					
4					
5					
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



**ENTECH
 ENGINEERING, INC.**

505 ELKTON DRIVE
 COLORADO SPRINGS, COLORADO 80907

TEST PIT LOG

DRAWN:
 jhr

DATE:
 2/8/23

CHECKED:
 JHR

DATE:
 2/22/23

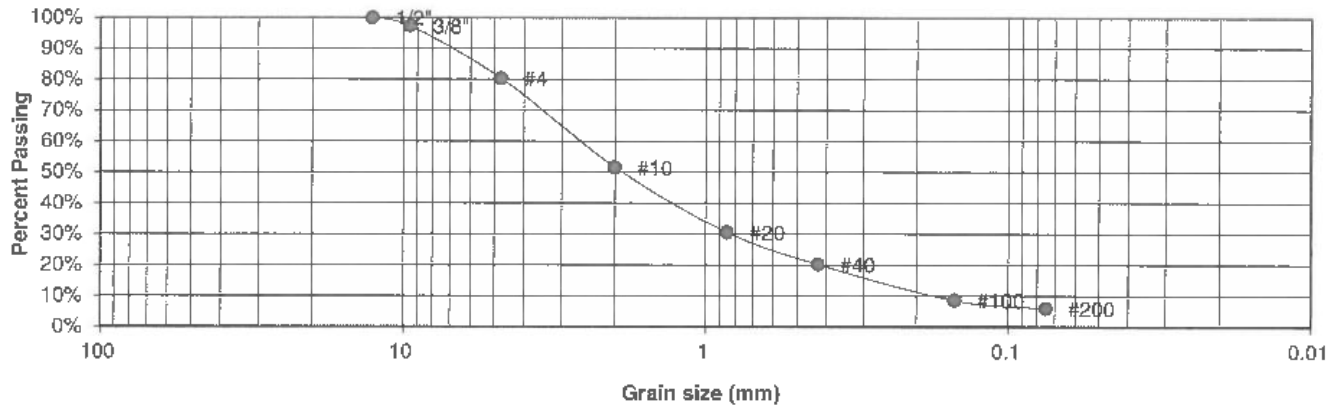
JOB NO.:
 230089

FIG NO.:
 B-3

APPENDIX C: Laboratory Test Results

UNIFIED CLASSIFICATION	SM-SW	CLIENT	GWH
SOIL TYPE #	1	PROJECT	23218 HIGHWAY 94
TEST BORING #	TP-1	JOB NO.	230089
DEPTH (FT)	2	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"	97.3%
4	80.3%
10	51.5%
20	30.5%
40	20.1%
100	8.6%
200	5.9%

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:

SHR

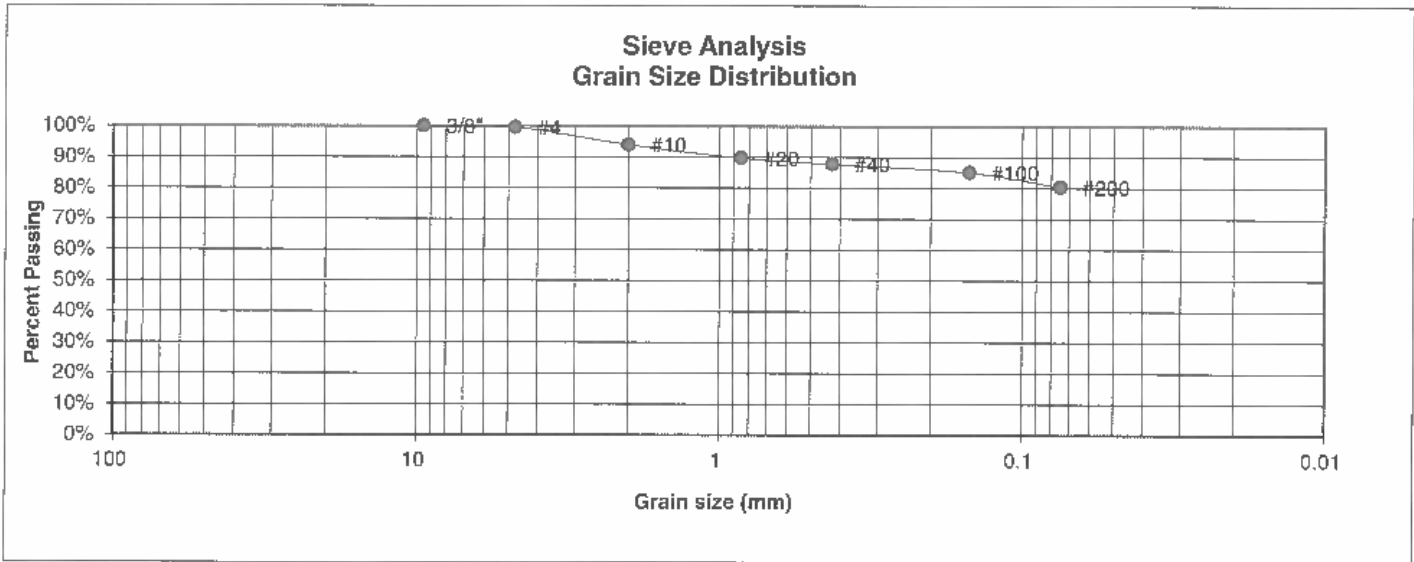
2/12/23

JOB NO.:
230089

FIG NO.:

C-1

UNIFIED CLASSIFICATION	ML	CLIENT	GWH
SOIL TYPE #	2	PROJECT	23218 HIGHWAY 94
TEST BORING #	TP-1	JOB NO.	230089
DEPTH (FT)	6.5	TEST BY	BL



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	100.0%
4	99.6%
10	94.0%
20	89.7%
40	87.8%
100	85.2%
200	80.4%

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:

JHR

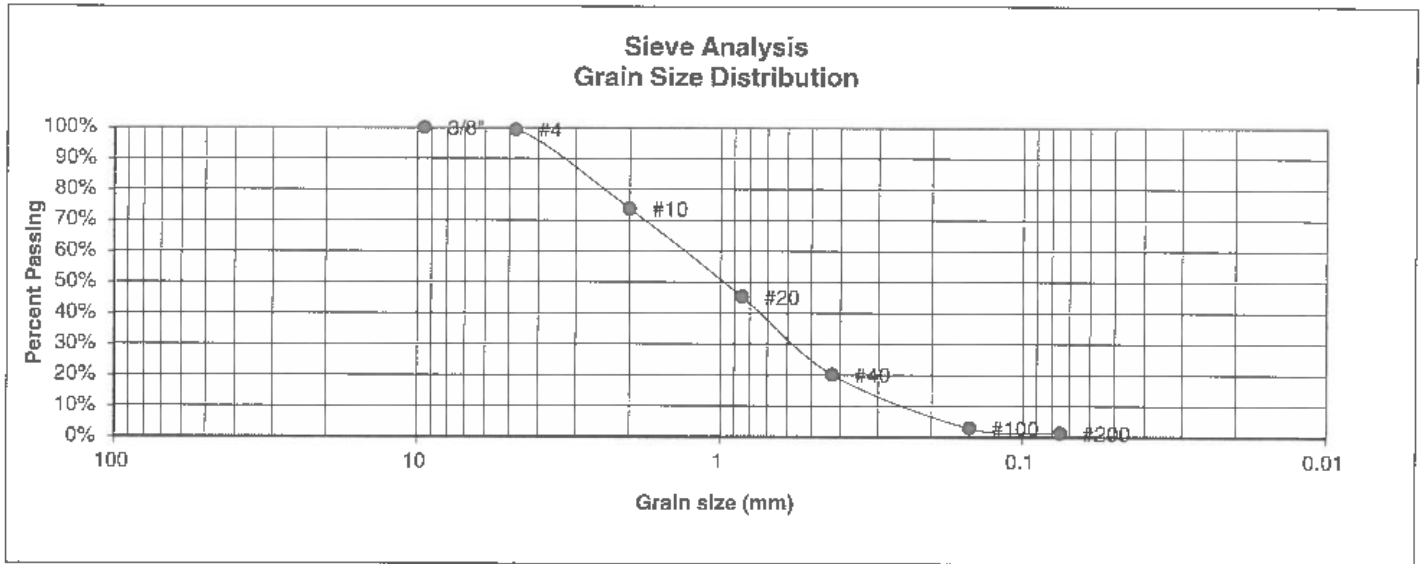
2/22/23

JOB NO.:
230089

FIG NO.:

C-2

UNIFIED CLASSIFICATION	SW	CLIENT	GWH
SOIL TYPE #	1	PROJECT	23218 HIGHWAY 94
TEST BORING #	TP-2	JOB NO.	230089
DEPTH (FT)	5	TEST BY	BL



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	100.0%
4	99.4%
10	73.7%
20	45.3%
40	20.1%
100	2.9%
200	1.3%

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

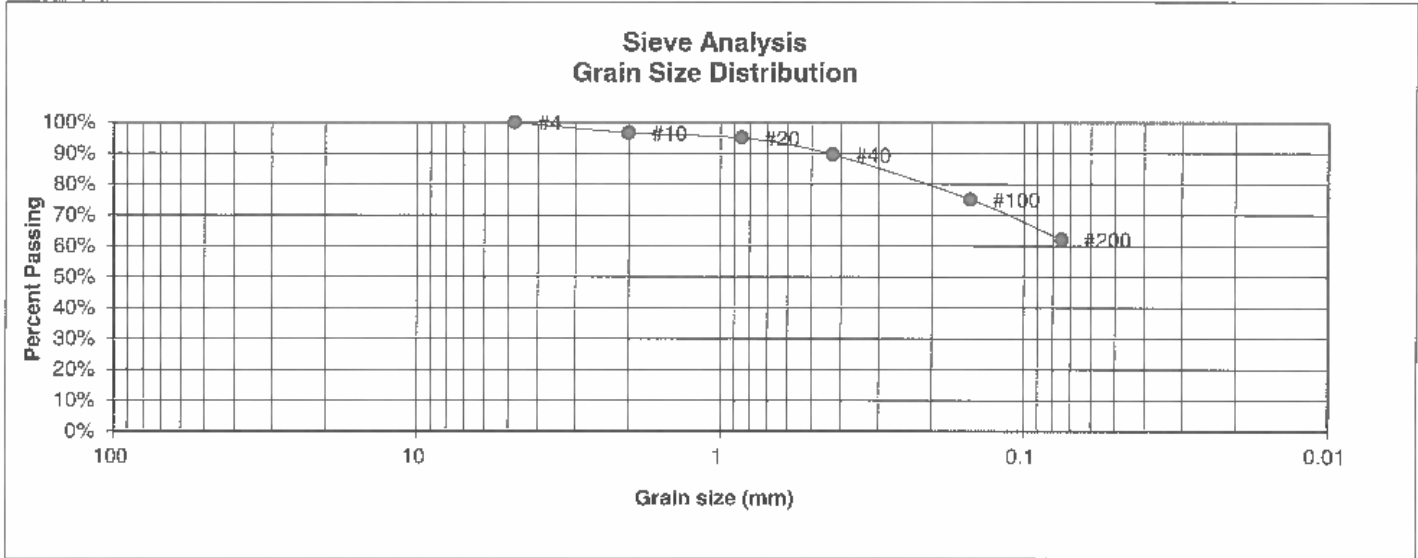
DRAWN:	DATE:	CHECKED: JF/2	DATE: 2/22/23
--------	-------	------------------	------------------

JOB NO.:
230089

FIG NO.:

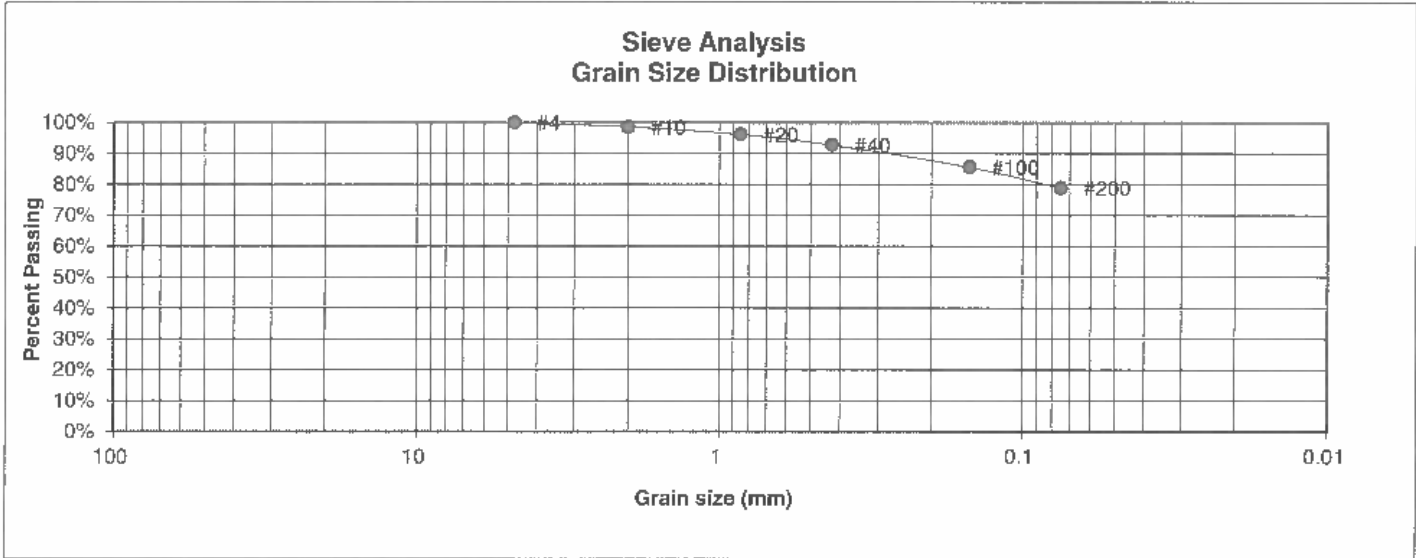
C-3

UNIFIED CLASSIFICATION	ML	CLIENT	GWH
SOIL TYPE #	2	PROJECT	23218 HIGHWAY 94
TEST BORING #	TB-2	JOB NO.	230089
DEPTH (FT)	7.5	TEST BY	BL



U.S. Sieve #	Percent Finer	Atterberg Limits
3"		Plastic Limit
1 1/2"		Liquid Limit
3/4"		Plastic Index
1/2"		
3/8"		
4	100.0%	<u>Swell</u>
10	96.6%	Moisture at start
20	95.0%	Moisture at finish
40	89.6%	Moisture increase
100	75.1%	Initial dry density (pcf)
200	62.1%	Swell (psf)

UNIFIED CLASSIFICATION	ML	CLIENT	GWH
SOIL TYPE #	2	PROJECT	23218 HIGHWAY 94
TEST BORING #	TP-3	JOB NO.	230089
DEPTH (FT)	1.5	TEST BY	BL



U.S. Sieve #	Percent Finer	Atterberg Limits
3"		Plastic Limit
1 1/2"		Liquid Limit
3/4"		Plastic Index
1/2"		
3/8"		
4	100.0%	<u>Swell</u>
10	98.6%	Moisture at start
20	96.1%	Moisture at finish
40	92.7%	Moisture increase
100	85.6%	Initial dry density (pcf)
200	78.8%	Swell (psf)



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

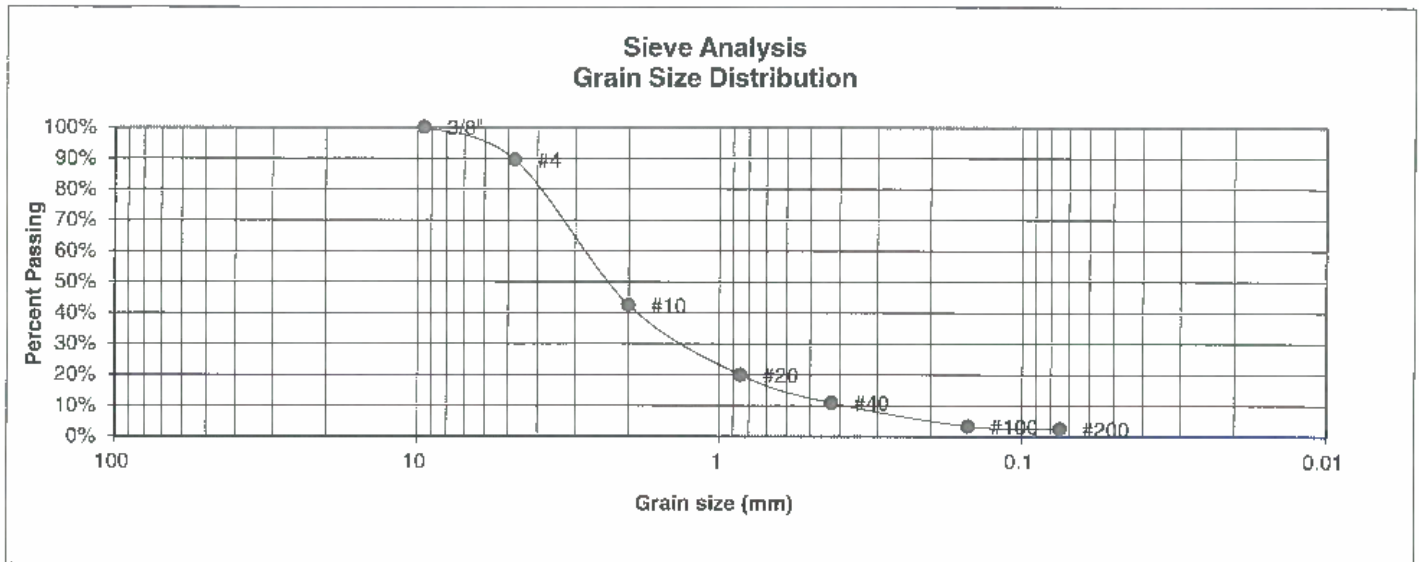
**LABORATORY TEST
RESULTS**

DRAWN:	DATE:	CHECKED: JWR	DATE: 2/22/23
--------	-------	-----------------	------------------

JOB NO.:
230089

FIG NO.:
C-5

UNIFIED CLASSIFICATION	SW	CLIENT	GWH
SOIL TYPE #	1	PROJECT	23218 HIGHWAY 94
TEST BORING #	TP-3	JOB NO.	230089
DEPTH (FT)	7	TEST BY	BL



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	100.0%
4	89.5%
10	42.5%
20	19.9%
40	10.9%
100	3.3%
200	2.5%

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:
JHR

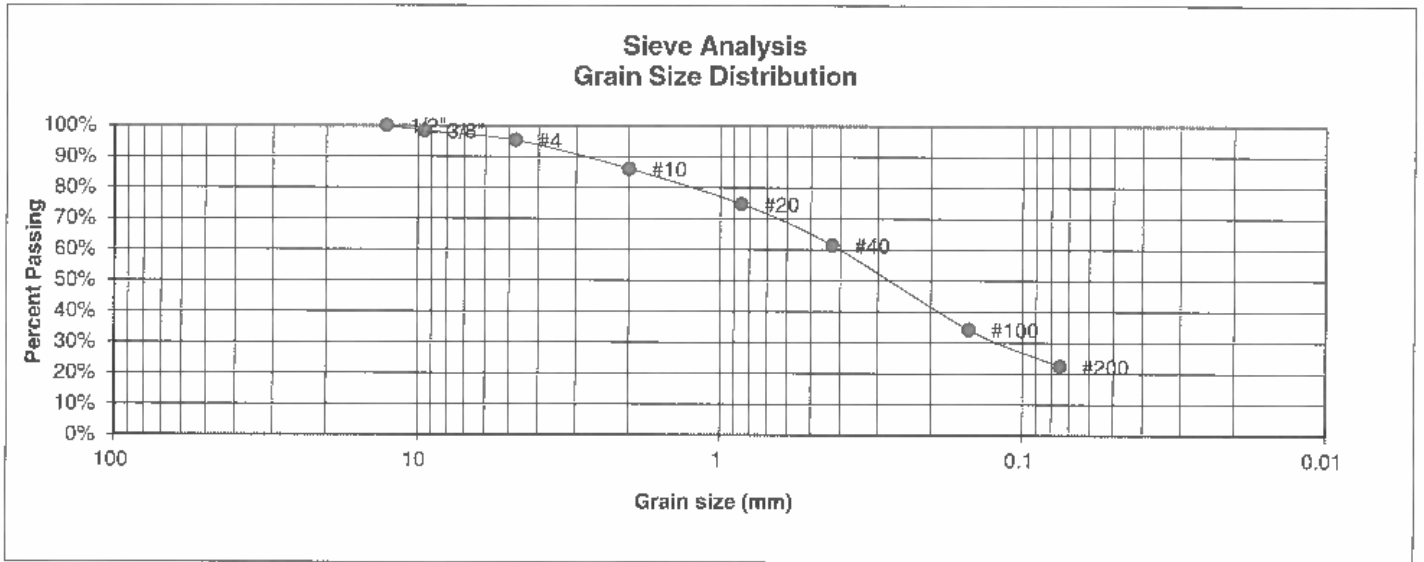
DATE:
2/22/23

JOB NO.:
230089

FIG NO.:

C-6

UNIFIED CLASSIFICATION	SM	CLIENT	GWH
SOIL TYPE #	1	PROJECT	23218 HIGHWAY 94
TEST BORING #	TP-4	JOB NO.	230089
DEPTH (FT)	3	TEST BY	BL



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	100.0%
3/8"	98.4%
4	95.2%
10	86.1%
20	74.7%
40	61.5%
100	34.2%
200	22.4%

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:

JWR

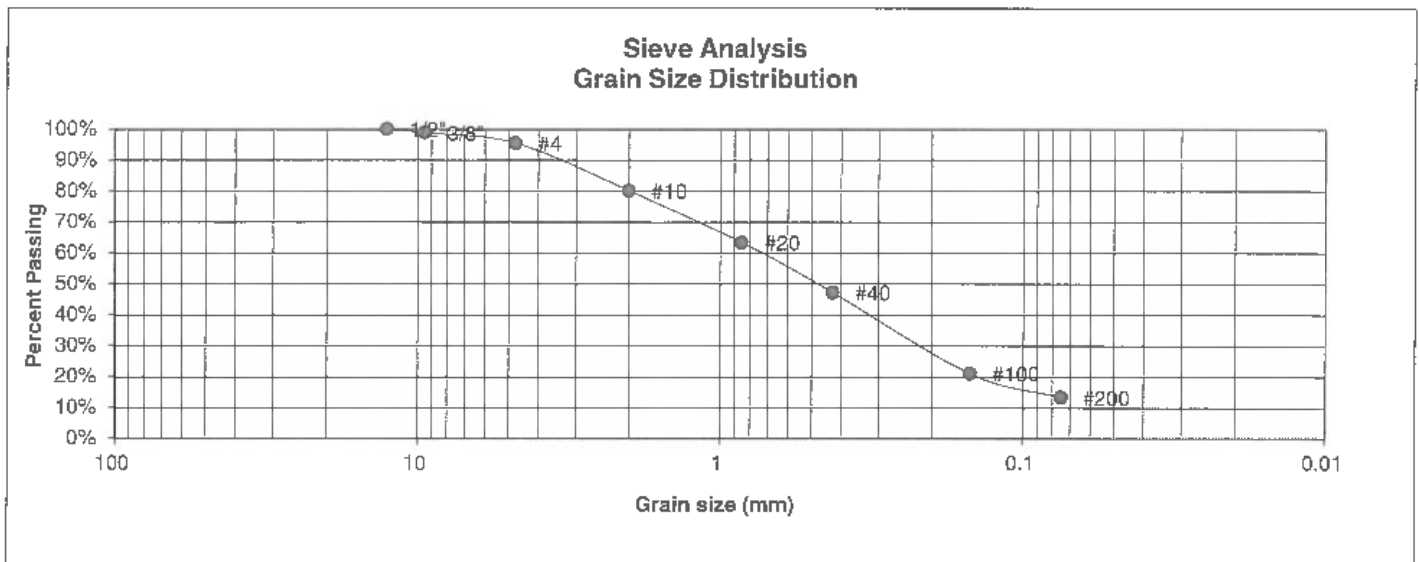
2/24/23

JOB NO.:
230089

FIG NO.:

C-7

<u>UNIFIED CLASSIFICATION</u>	SM	<u>CLIENT</u>	GWH
<u>SOIL TYPE #</u>	1	<u>PROJECT</u>	23218 HIGHWAY 94
<u>TEST BORING #</u>	TP-4	<u>JOB NO.</u>	230089
<u>DEPTH (FT)</u>	5.5	<u>TEST BY</u>	BL



<u>U.S. Sieve #</u>	<u>Percent Finer</u>
3"	
1 1/2"	
3/4"	
1/2"	100.0%
3/8"	98.8%
4	95.5%
10	80.1%
20	63.4%
40	47.2%
100	21.2%
200	13.4%

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:

JHR

2/22/23

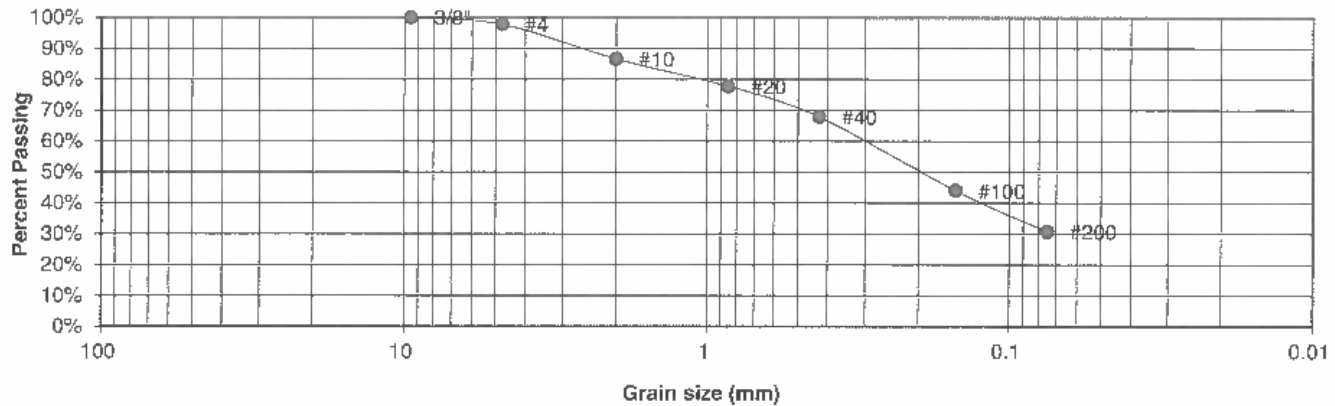
JOB NO.:
230089

FIG NO.:

C-8

UNIFIED CLASSIFICATION	SM	CLIENT	GWH
SOIL TYPE #	1	PROJECT	23218 HIGHWAY 94
TEST BORING #	TP-5	JOB NO.	230089
DEPTH (FT)	1.5	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	97.8%
10	86.5%
20	77.7%
40	67.8%
100	43.9%
200	30.7%

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:

DATE:

SHR

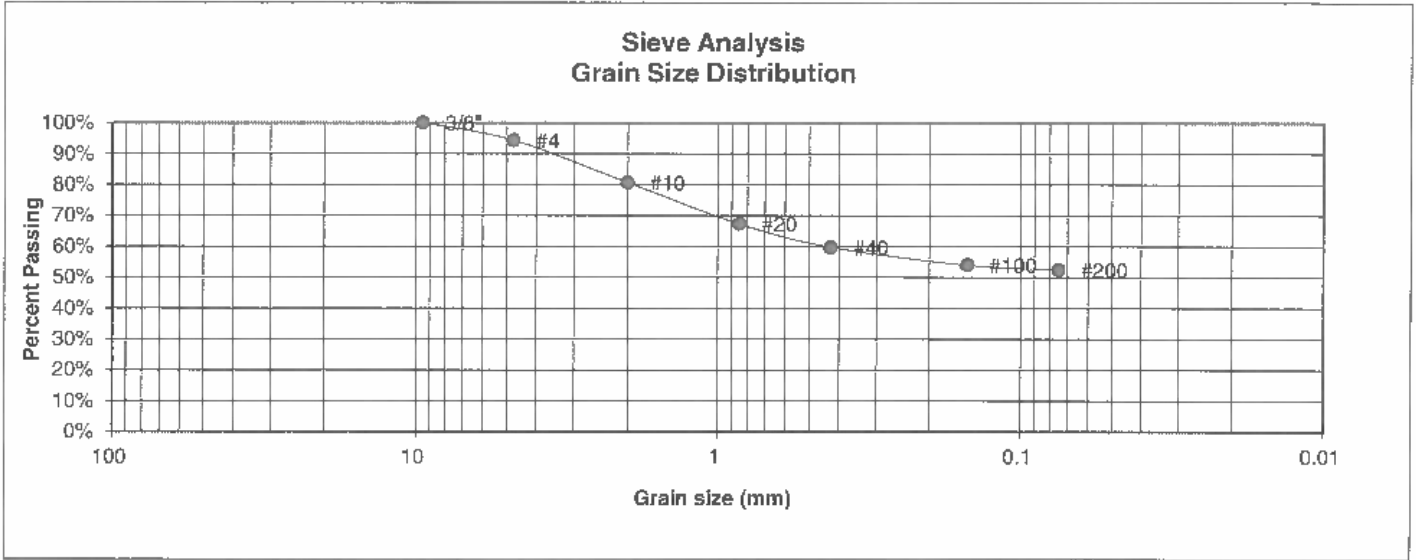
2/22/23

JOB NO.:
230089

FIG NO.:

C-9

UNIFIED CLASSIFICATION	ML	CLIENT	GWH
SOIL TYPE #	2	PROJECT	23218 HIGHWAY 94
TEST BORING #	TP-5	JOB NO.	230089
DEPTH (FT)	7	TEST BY	BL



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	100.0%
4	94.3%
10	80.6%
20	67.3%
40	59.7%
100	54.0%
200	52.5%

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:
		JHR	2/22/23

JOB NO.:
230089

FIG NO.:
C-10

APPENDIX D: Soil Survey Descriptions

El Paso County Area, Colorado

19—Columbine gravelly sandy loam, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: 367p
Elevation: 6,500 to 7,300 feet
Mean annual precipitation: 14 to 16 inches
Mean annual air temperature: 46 to 50 degrees F
Frost-free period: 125 to 145 days
Farmland classification: Not prime farmland

Map Unit Composition

Columbine and similar soils: 97 percent
Minor components: 3 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Columbine

Setting

Landform: Fans, fan terraces, flood plains
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium

Typical profile

A - 0 to 14 inches: gravelly sandy loam
C - 14 to 60 inches: very gravelly loamy sand

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): High to very high (5.95 to 19.98 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: Very low (about 2.5 inches)

Interpretive groups

Land capability classification (irrigated): 4e
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: A
Ecological site: R049XY214CO - Gravelly Foothill
Hydric soil rating: No

Minor Components

Fluvaquentic haplaquolls

Percent of map unit: 1 percent
Landform: Swales
Hydric soil rating: Yes

Custom Soil Resource Report

Other soils

Percent of map unit: 1 percent

Hydric soil rating: No

Pleasant

Percent of map unit: 1 percent

Landform: Depressions

Hydric soil rating: Yes

28—Ellicott loamy coarse sand, 0 to 5 percent slopes

Map Unit Setting

National map unit symbol: 3680

Elevation: 5,500 to 6,500 feet

Mean annual precipitation: 13 to 15 inches

Mean annual air temperature: 47 to 50 degrees F

Frost-free period: 125 to 145 days

Farmland classification: Not prime farmland

Map Unit Composition

Ellicott and similar soils: 97 percent

Minor components: 3 percent

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

Description of Ellicott

Setting

Landform: Stream terraces, flood plains

Landform position (three-dimensional): Tread

Down-slope shape: Linear

Across-slope shape: Linear

Parent material: Sandy alluvium

Typical profile

A - 0 to 4 inches: loamy coarse sand

C - 4 to 60 inches: stratified coarse sand to sandy loam

Properties and qualities

Slope: 0 to 5 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Somewhat excessively drained

Runoff class: Very low

Capacity of the most limiting layer to transmit water (Ksat): High to very high (5.95 to 19.98 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: NoneFrequent

Frequency of ponding: None

Available water supply, 0 to 60 inches: Low (about 4.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Custom Soil Resource Report

Land capability classification (nonirrigated): 7w

Hydrologic Soil Group: A

Ecological site: R069XY031CO - Sandy Bottomland

Other vegetative classification: SANDY BOTTOMLAND (069AY031CO)

Hydric soil rating: No

Minor Components

Fluvaquentic haplaquoll

Percent of map unit: 1 percent

Landform: Swales

Hydric soil rating: Yes

Other soils

Percent of map unit: 1 percent

Hydric soil rating: No

Pleasant

Percent of map unit: 1 percent

Landform: Depressions

Hydric soil rating: Yes

APPENDIX E: Existing Septic Records

EL PASO COUNTY DEPARTMENT OF HEALTH AND ENVIRONMENT
INDIVIDUAL SEWAGE DISPOSAL SYSTEM INSPECTION FORM

Permit # 3349
Date 10/31/01

APPROVED: YES ☒ NO ☐

ENVIRONMENTALIST Kurt Dahl

Address 23218 Hwy 94

Owner Marvel Saenz

Legal Description NE 1/4 of the SW 1/4 and E 1/2 of the NW of the SW 1/4 of Tract
Residence ☒ # of bedrooms 3; Commercial ☐; System Installer 282 25

SEPTIC TANK:

Commercial ☒; Noncommercial ☐ L , W , WD
Construction Material Prest Concrete, capacity 1500 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:

Chamber: Type biofilter 3, number of chambers 25, bed , trench
sq. ft./section 24, reduction allowed %, sq. ft. required 463
total sq. ft. installed 600, depth of installation 30"

Engineer Design Y or ☒ N, Designing Engineer

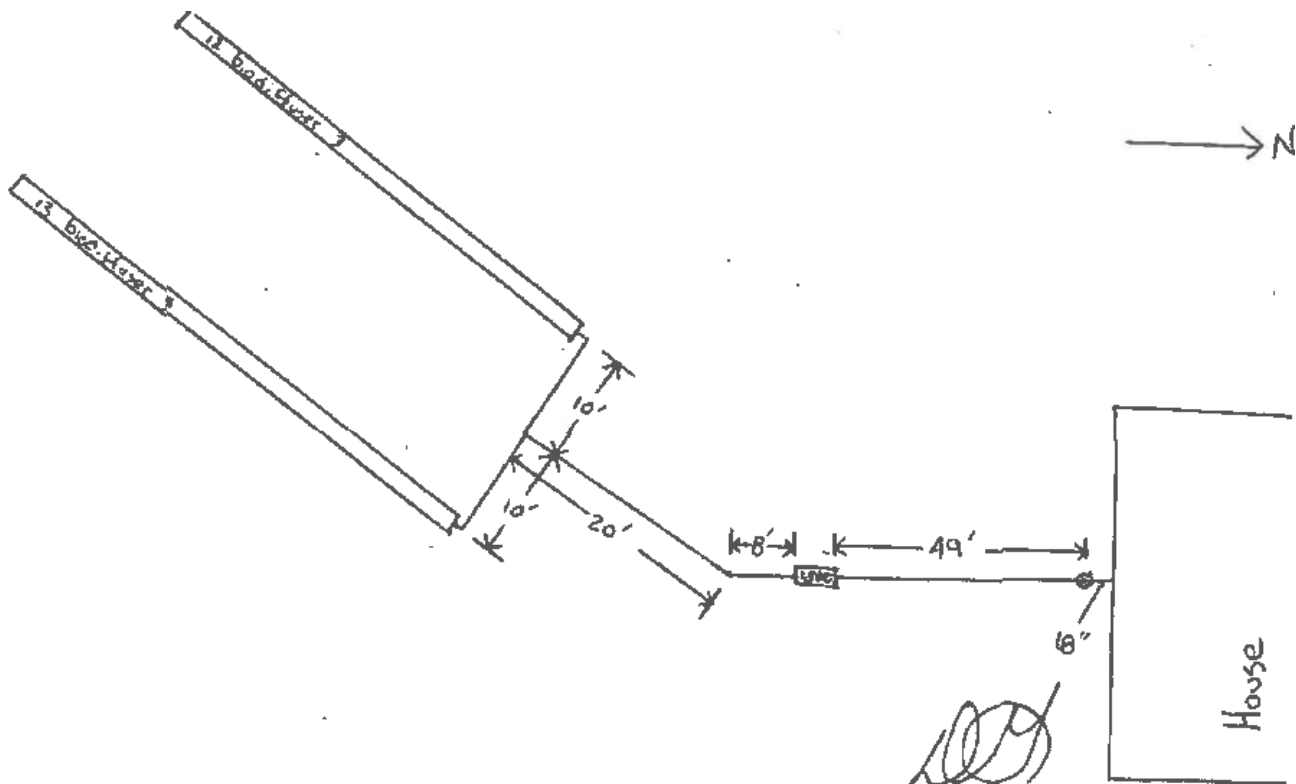
Approval letter provided? Y or ☒ N

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: All pipes are SDR 35



EL PASO COUNTY
DEPARTMENT OF HEALTH AND ENVIRONMENT
301 S Union Blvd, Colorado Springs, Colorado 719-578-3199

INDIVIDUAL SEWAGE DISPOSAL SYSTEM PERMIT

OWNER NAME: MANUEL SAENZ
ADDRESS: 23222 HWY 94
CITY, STATE, ZIP: ELLICOTT CO 80808
INSTALLED BY:

PERMIT NUMBER: ON0003349
DATE PERMITTED: 10/23/01
PHONE NUMBER: 3038415030

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). If both a building and an ISDS permit are issued for the same property and construction has not commenced prior to the expiration date of the building permit, the ISDS permit shall expire at the same time as the building permit. 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.

Jisha Dower

DIRECTOR, EL PASO COUNTY DEPARTMENT OF HEALTH AND ENVIRONMENT

PERMIT EXPIRATION DATE:
Expires twelve months from date of issue

Vincent Delle (719) 578-3289
ENVIRONMENTALIST / PHONE NUMBER

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

WATER SOURCE: WELL

MINIMUM SEPTIC TANK SIZE: 1,250 GALLONS MINIMUM ABSORPTION AREA REQUIRED 463 SQ FT

PLANNING DEPARTMENT ☒ ENUMERATION ☒ FLOOD PLAIN ☒ WASTEWATER ☒

COMMENTS:

MUST MEET MINIMUM SETBACK REQUIREMENTS OF THE CURRENT EL PASO COUNTY DEPARTMENT OF HEALTH AND ENVIRONMENT ISDS REGULATIONS. INSTALL SEPTIC SYSTEM AT SITE B PERCOLATION TEST, AT A DEPTH OF NO MORE THAN 48 INCHES. IF GROUND WATER IS ENCOUNTERED WHILE INSTALLING THE SYSTEM, CALL THE EL PASO COUNTY DEPARTMENT OF HEALTH AND ENVIRONMENT. ~~UPON COMPLETION OF THE SYSTEM, THE ENGINEER MUST PROVIDE AN APPROVAL LETTER. KHD~~

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.

FOR ADMINISTRATIVE USE ONLY

Permit Ready: 10-24-01 *Called* *AM* Mailed

Final Inspection Requested: BY: *Ed* Date Called In: 10/25/01

Phone # _____ Septic Site will be ready: 10/26/01

301
Inspector

Kurt Dahl - 0024

Record I.D. 3349

EL PASO COUNTY ENVIRONMENTAL HEALTH SERVICES

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

APPLICATION FOR AN ON-SITE TREATMENT SYSTEM:

☒ NEW ☐ REPAIR TANK ☐ REPAIR/ADD LEACH FIELD ☐ P.E. DESIGN

Owner Manuel L. Saenz Daytime Phone 303-841-5030
Address of Property 23335 Highway 94 Ellicott City & Zip Ellicott Co.
Legal Description Tracts N.E. 1/4 of the S.W. 1/4 and E 1/2 of the N.W. of the S.W. 1/4
Owner's MAILING Address 9644 Summit Ridge Pl. City, State & Zip Parker Co 801
Lot Size 60 acres Tax Schedule # 34120-00-025 Septic Contractor Hudson Septic
Type of Building: ☐ Frame ☐ Modular ☐ Mobile ☐ Commercial ☒ Manufactured ☐ Other
Water Supply: ☒ Well or Spring ☐ Cistern ☐ Public Inside City Limits: ☐ No ☐ Yes-City
☐ MAIL PERMIT OR ☒ PICK UP PERMIT ☐ THERE IS AN ADDITIONAL RESIDENCE ON THIS PROPERTY

MAXIMUM POTENTIAL BEDROOMS 8^{KHP} 3

Percolation Test Attached Y N

Garbage Disposal Y N

Basement 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 Manuel L. Saenz

Date 7/16/01

DEPARTMENT OF HEALTH USE ONLY

Eng Design 463 sq ft
Minimum Absorption Area

Eng Design 1,250 gal
Minimum Tank Capacity

8/21/01
Date of Site Inspection

REMARKS

OK
Final plan per engineer design corrected and dated July 12, 2001
Note that final septic tank is a 2250 gallon single compartment tank
Must meet minimum setback requirements of the current El Paso County Department of Health and Environment ISDS regulations. Install septic system at site B percolation test, at a depth of no more than 48". If groundwater is found encountered while installing the system, call the El Paso County Dept of Health and Environment. Upon completion of the system, the engineer must provide an approval letter.

EHS INSPECTOR Kurt Dahl

DATE 9/5/01

APPROVED

DENIED

FEE AS OF 8/1/00: NEW \$315 -

REPAIR TO LEACH FIELD \$150 -

REPAIR TO TANK OR LINE \$75 -

Resubmit
DATE TO PLANNING / WASTEWATER

7-17-01

8-31-01

10-17-01

- 1) We require an original of your **PERCOLATION (PERC) TEST** with an original professional engineer's (PE) stamp and signature as well as a plot of the percolation test holes.
- 2) **PROPERTY ADDRESS OR LOT NUMBER MUST BE POSTED AND CLEARLY VISIBLE FROM ROAD. PERC HOLES MUST BE CLEARLY MARKED.**
- 3) A **PLOT PLAN** must be drawn (not to scale) on an 8 1/2 x 11 sheet of paper. The plot plan must include:

1) a north bearing	4) all buildings (proposed or existing)	7) driveway (proposed or existing and name of adjoining street)
2) property lines	5) proposed septic system site	
3) property dimensions	6) alternate septic system site	
- 4) Initial any of the following features that apply to your property and **INCLUDE** them on your **PLOT PLAN**.

<input checked="" type="checkbox"/> Well(s)	<input type="checkbox"/> Adjacent property well(s)	<input type="checkbox"/> Subsoil drain
<input type="checkbox"/> Cistern	<input type="checkbox"/> Water line	
- 5) Initial any of the following that are within 100 feet of your proposed septic system and **INCLUDE** on your **PLOT PLAN**.

<input type="checkbox"/> Spring(s)	<input type="checkbox"/> Lake(s)
<input type="checkbox"/> Pond(s)	<input type="checkbox"/> Stream(s)
<input type="checkbox"/> Dry Gulch(es)	<input type="checkbox"/> Natural drainage course(s)

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

Hwy 94 E To Elliott LEFT ON DIET RD (private Rd) north 1/2 mile TO GATE (west side)

