



**ENTECH**  
ENGINEERING, INC.

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

June 28, 2023

Hodgen Settlers Ranch, LLC  
P.O. Box 1488  
Monument, CO 80132

Attn: Mark Davis

Re: Wastewater Study  
Settlers Ranch Filing No. 3  
Parcel Nos. 61230-04-048, 61240-05-001, 61240-05-003, & 61230-07-024  
El Paso County, Colorado  
Entech Job No. 230662

Dear Mr. Davis:

The project consists of subdividing approximately 75-acres; twenty-four (24) residential lots are proposed as part of the subdivision lot sizes range from 2.5 to 4.5 acres. The site is located northeast of the intersection of Timber Meadow Drive and Hodgen Road within the Settlers Ranch Subdivision, in the northern portion of El Paso County, Colorado.

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

The site is located within portions of the NE $\frac{1}{4}$  and SE $\frac{1}{4}$  of Section 23, and a portion of the NW $\frac{1}{4}$  of Section 24, Township 11 South, Range 66 West of the 6<sup>th</sup> Principal Meridian in the northern portion of El Paso County, Colorado. The site is located approximately 4 miles east of Monument, northeast of Timber Meadow Drive and Hodgen 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 northwest in the southern portion of the filing, and to the north and east in the northern portion of the filing. Several minor drainage swales are located across the filing. Areas of ponded or flowing water were not observed in the drainage swales at the time of this investigation. The site boundaries are indicated on the USGS Map, Figure 2. The site is currently undeveloped, Settlers Ranch Road is paved in the southern portion of the filing, and is partially graded with gravel road base in the northern portion of the filing. Adjacent properties consist of existing rural residential and agricultural. The site contains primarily field grasses and weeds with scattered areas of pine trees. Site photographs, taken May 1 and 18, 2023, are included in Appendix A.

Total acreage involved in the proposed subdivision is approximately 75-acres. Twenty-four rural residential lots are proposed with lot sizes range from 2.5 to 4.5-acres. The new lots will be serviced by individual water wells and on-site wastewater treatment systems. The Site Plan with the proposed replat is presented in Figures 3 and 3A.



## **LAND USE AND ENGINEERING GEOLOGY**

This site was found to be suitable for the proposed development. Areas were encountered where the geologic conditions will impose some constraints on development and land use. These include artificial fill, potentially expansive soils, potential seasonally shallow and seasonally shallow groundwater areas, and shallow bedrock. Based on the proposed development plan, it appears that these areas will have some minor impacts on the development. These conditions will be discussed in greater detail in the report.

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

## **SCOPE OF THE REPORT**

The scope of the report includes a general geologic analysis utilizing published geologic data, and soils and bedrock information obtained from the field investigation performed on the site. Detailed site-specific mapping was conducted to obtain general information in respect to major geographic and geologic features, geologic descriptions and their effects on the development of the property.

## **FIELD INVESTIGATION**

Our field investigation consisted of the preparation of a geologic map of any 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 May 1 and 18, 2023.

Six test pits were drilled on the site to determine general suitability for development and general soil characteristics. The locations of the test pits are indicated on the Site Plan/Testing Location Map, Figures 3 and 3A. The Test Pit Logs are presented in Appendix B. A Summary of Depth of Bedrock and Groundwater is presented in Table 1B.

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 1C. Results of this testing will be discussed later in this report.



## 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 soil consists of sandy loam to gravelly loamy sand. The soils are described as follows:

<u>Type</u>	<u>Description</u>
67	Peyton sandy loam, 5 – 9% Slopes
92	Tomah-Crowfoot loamy sands, 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 pits generally consisted of sand with silt, clayey sand, and sandy clay and clay with sand overlying silty sandstone and sandstone with silt. Bedrock was encountered in all of the test borings at depths ranging from the existing surface grade to 19 feet. The upper sands were encountered at medium dense to dense states and moderate moisture conditions, the clays were encountered at very stiff to hard consistencies and dry to moderate moisture conditions, and the sandstone was encountered at very dense states and moderate moisture conditions. The clays soils encountered in the borings exhibited low expansion potentials, however, moderate to highly expansive clays, claystone, and siltstone lenses are common in the area.

### Groundwater

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 potential seasonally shallow and seasonally shallow groundwater have been mapped in minor drainage swales 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 12 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. Two mappable units were identified on this site which are described as follows:

**Qaf Artificial Fill of Holocene Age:** These are man-made fill deposits associated with erosion berms located across the 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 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 Denver 1° x 2° Quadrangle*, distributed by the US Geological Survey in 1981 (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

Several minor drainage swales are located in the northwestern, northeastern, and southern portions of the site that have been mapped as potentially seasonal shallow groundwater and seasonal shallow groundwater. Water was not observed in the drainages at the time of this investigation. These areas are indicated in the Geology/Engineering Geology Map (Figure 6). The site does not lie within any floodplain zones according to the FEMA Map No. 08041CO305G dated December 7, 2018 (Figure 7, Reference 8). Exact locations of floodplain and specific drainage studies are beyond the scope of this report. Due to lot sizes, it is anticipated these areas can be avoided by on-site wastewater treatment systems. 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 two soil types. 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. Records for the existing septic system located on Lot 3 are included in Appendix E. This system is a





conventional gravel and trench system. The existing sewer line will need to be sleeved where the proposed roadway crosses the line on proposed Lot 3.

Soils encountered in the tactile test pits consisted of sandy loam, sandy clay loam, sandy clay, and weathered sandstone. The limiting layers encountered in the test pit is the sandy clay loam, sandy clay, and sandstone, which corresponds with USDA Soil Types 3A to 4A with an LTAR value of 0.30 to 0.20 gallons per day per square foot. Weathered bedrock was encountered at approximately 5 feet in Test Pit No. 5. 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 the lots, 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 lots. The Septic Suitability Map is presented in Figures 8 and 8A. A possible house location, water well, and two septic sites for the new lots are indicated on Figures 8 and 8A. 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 is our opinion that the existing geologic engineering and geologic conditions will impose some minor constraints on development and construction of the site. The majority of these conditions can be avoided by construction. Others can be mitigated through proper engineering design and construction practices. The proposed development and use are consistent with anticipated geologic and engineering geologic conditions.

It should be pointed out that because of the nature of data obtained by random sampling of such variable and non-homogeneous materials as soil and rock, it is important that we be informed of any differences observed between surface and subsurface conditions encountered in construction and those assumed in the body of this report. **Individual investigations for new building sites and on-site wastewater treatment systems will be required prior to construction.** Construction and design personnel should be made familiar with the contents of this report. Reporting such discrepancies to Entech Engineering, Inc. soon after they are discovered would be greatly appreciated and could possibly help avoid construction and development problems.

Hodgen Settlers Ranch, LLC  
Wastewater Study  
Settlers Ranch Filing No. 3  
El Paso County, Colorado  
Page 6



This report has been prepared for Hodgen Settlers Ranch, 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.

Reviewed by:

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

Logan L. Langford, P.G.  
Geologist

LLL

Encl.

Entech Job No. 230662  
AAprojects/2023/230662 wws



A handwritten signature in blue ink, appearing to read "Joseph C. Goode, Jr.".

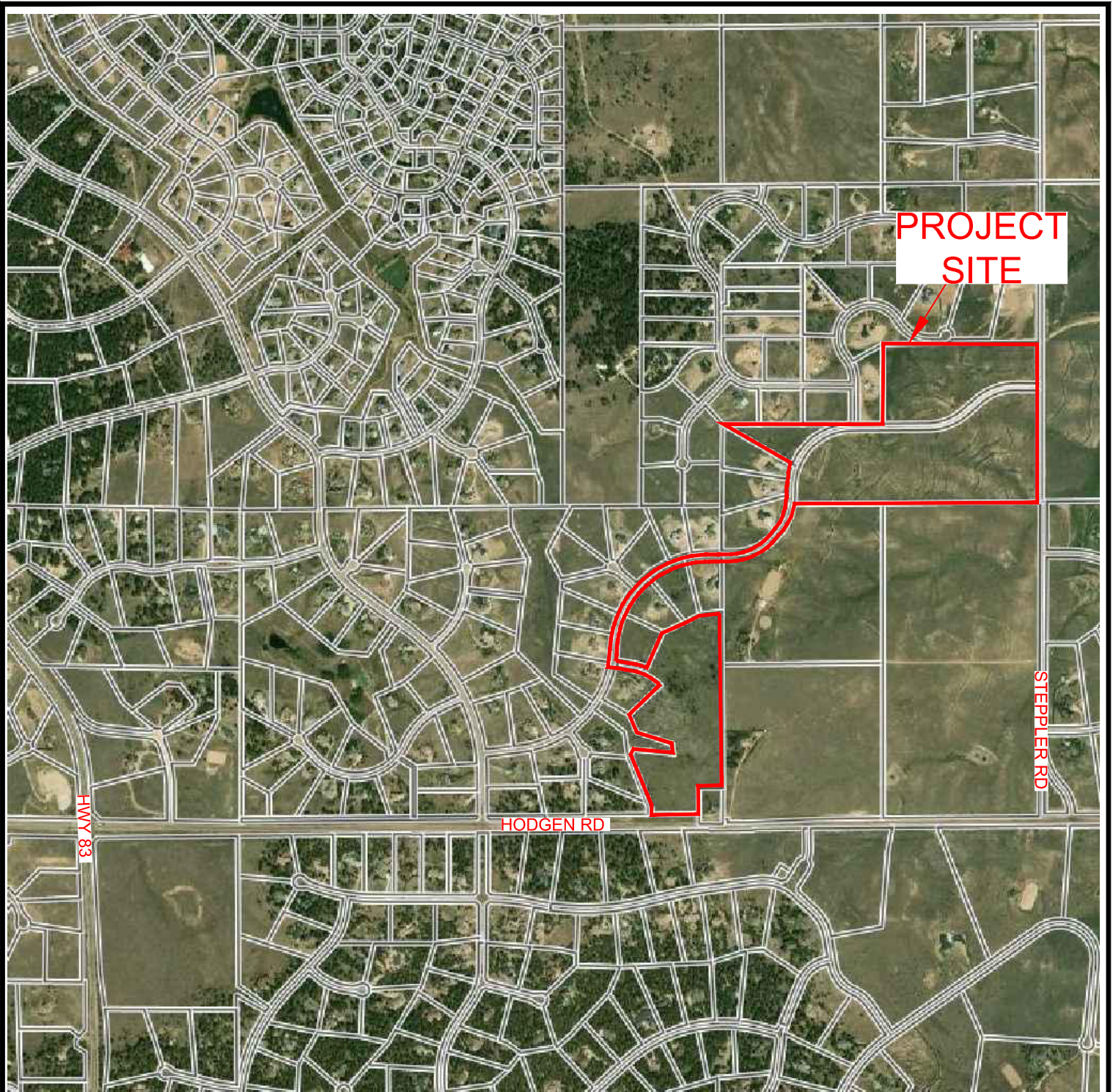
Joseph C. Goode, Jr., P.E.  
President

## BIBLIOGRAPHY

1. Natural Resource Conservation Service, *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. Bryant, Bruce; McGraw, Laura W.; and Wobus, Reinhard A. 1981. *Geologic Structure Map of the Denver 1° x 2° Quadrangle, North-Central Colorado*. Sheet 2. U.S. Geologic Survey. Map I-1163, 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. Bryant, Bruce; McGraw, Laura W.; and Wobus, Reinhard A. 1981. *Geologic Map of the Denver 1° x 2° Quadrangle, South-Central Colorado*. U.S. Geologic Survey. Map I-1163.
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9. Schwochow, S.D.; Shroba, R.R. and Wicklein, P.C. 1974. *Atlas of Sand, Gravel, and Quarry Aggregate Resources, Colorado Front Range Counties*. Colorado Geological Survey. Special Publication 5-B.
10. Keller, John W.; TerBest, Harry and Garrison, Rachel E. 2003. *Evaluation of Mineral and Mineral Fuel Potential of El Paso County State Mineral Lands Administered by the Colorado State Land Board*. Colorado Geological Survey. Open-File Report 03-07.

## FIGURES



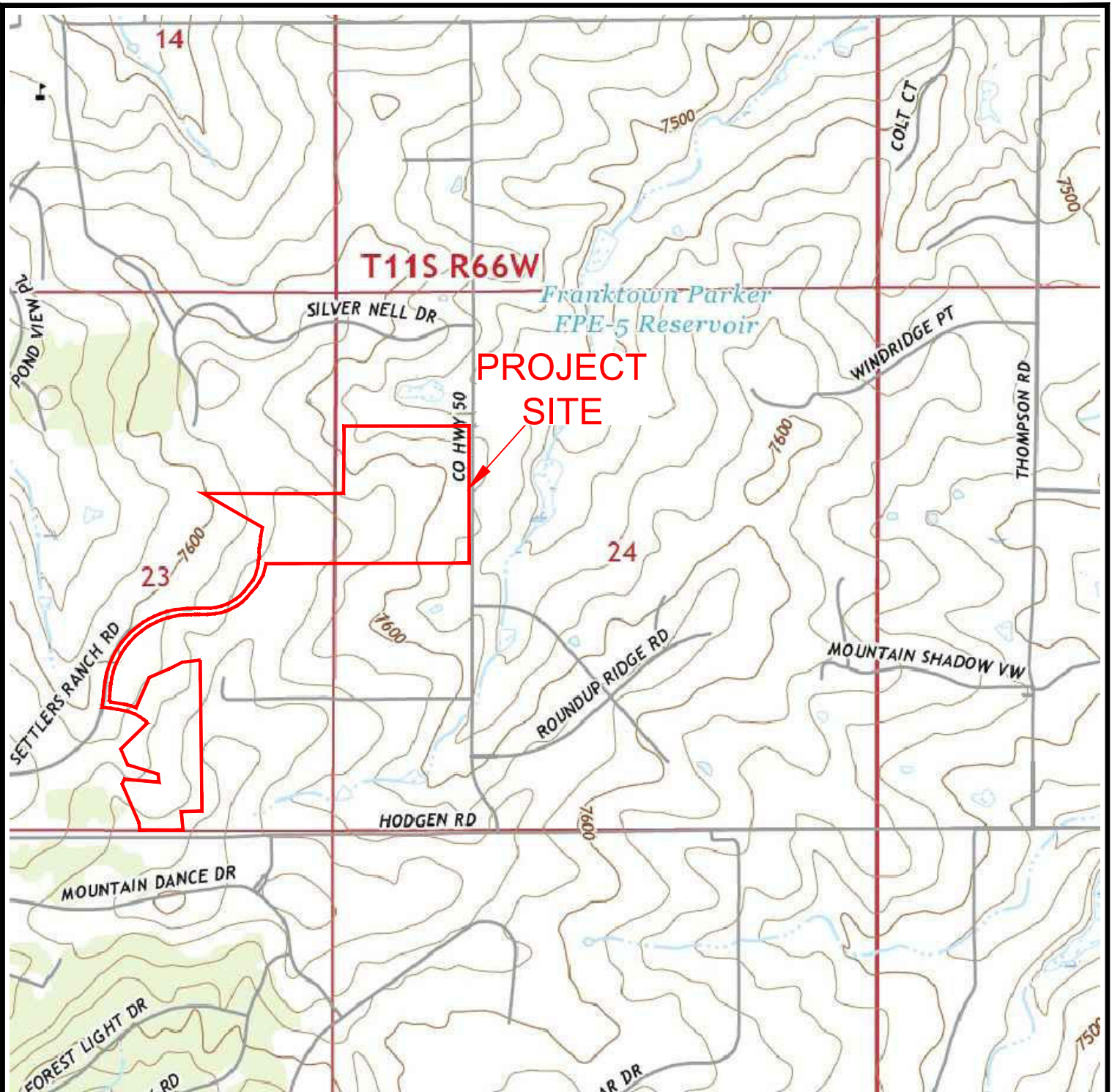


**VICINITY MAP**  
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**FIG. 1**



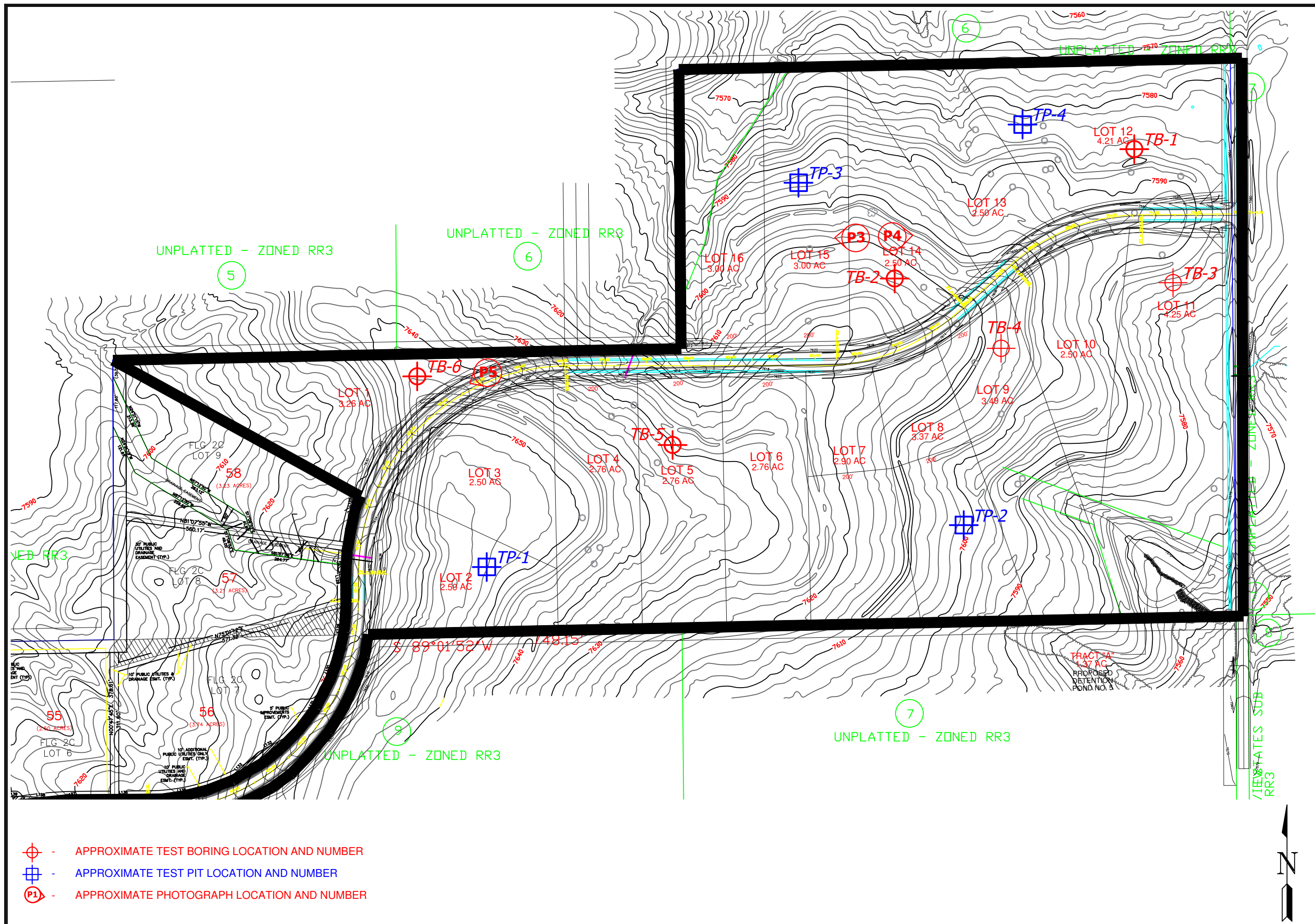


**USGS TOPOGRAPHY MAP**  
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FIG. 2



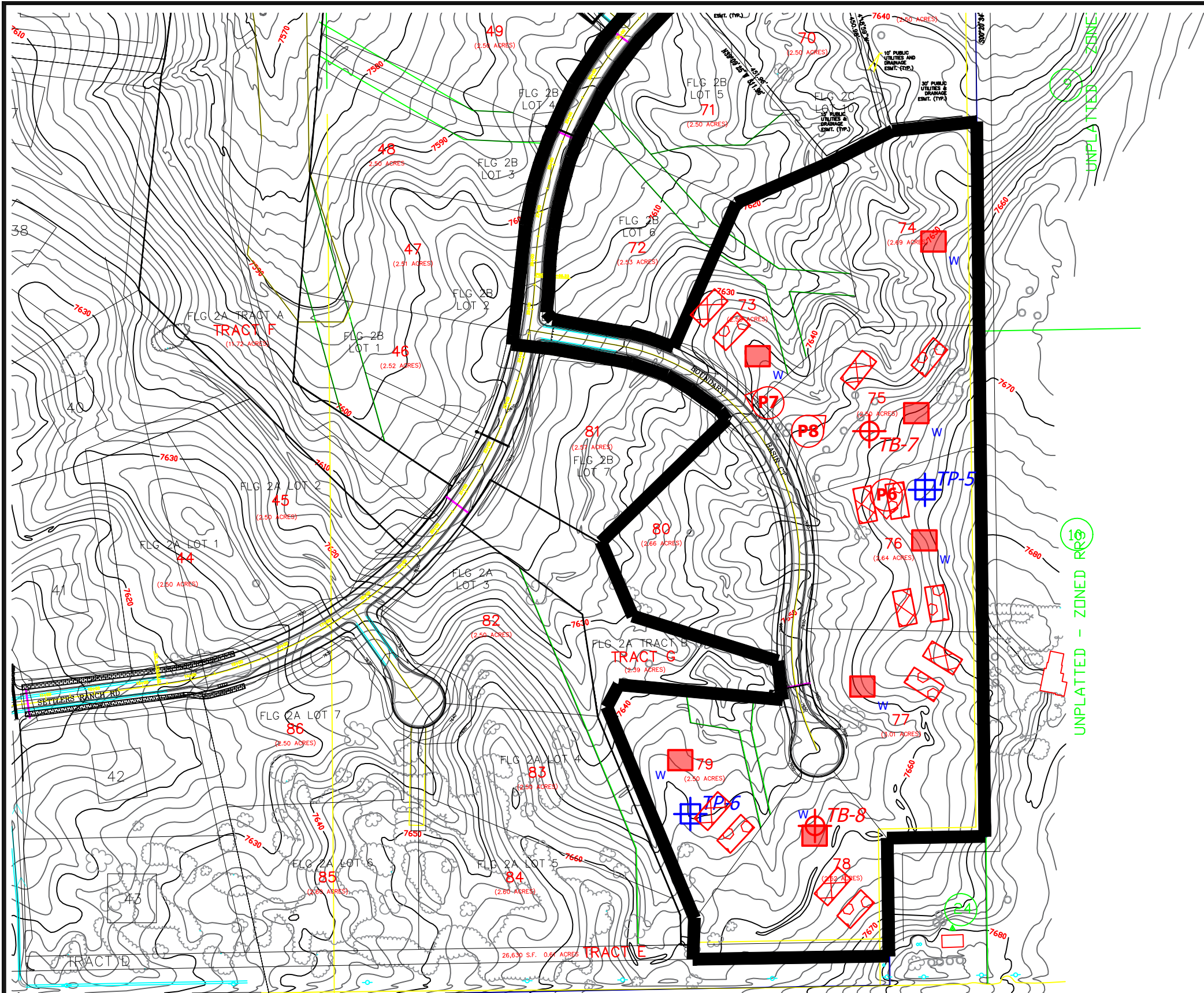
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**SITE PLAN/TESTING LOCATION MAP**  
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**FIG. 3**





- APPROXIMATE TEST BORING LOCATION AND NUMBER
- APPROXIMATE TEST PIT LOCATION AND NUMBER
- APPROXIMATE PHOTOGRAPH LOCATION AND NUMBER



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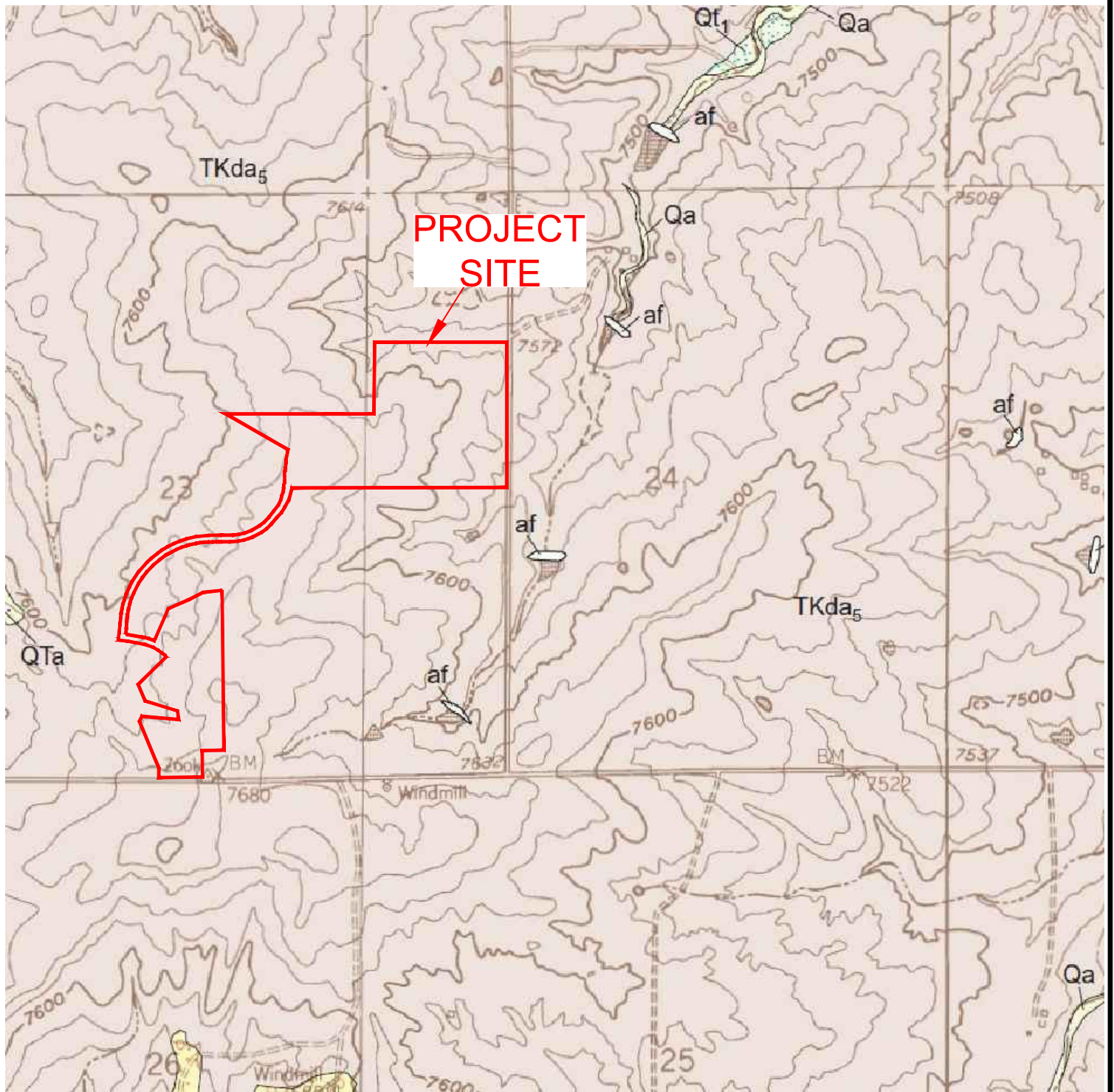


**SITE PLAN/TESTING LOCATION MAP**  
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**FIG. 3A**





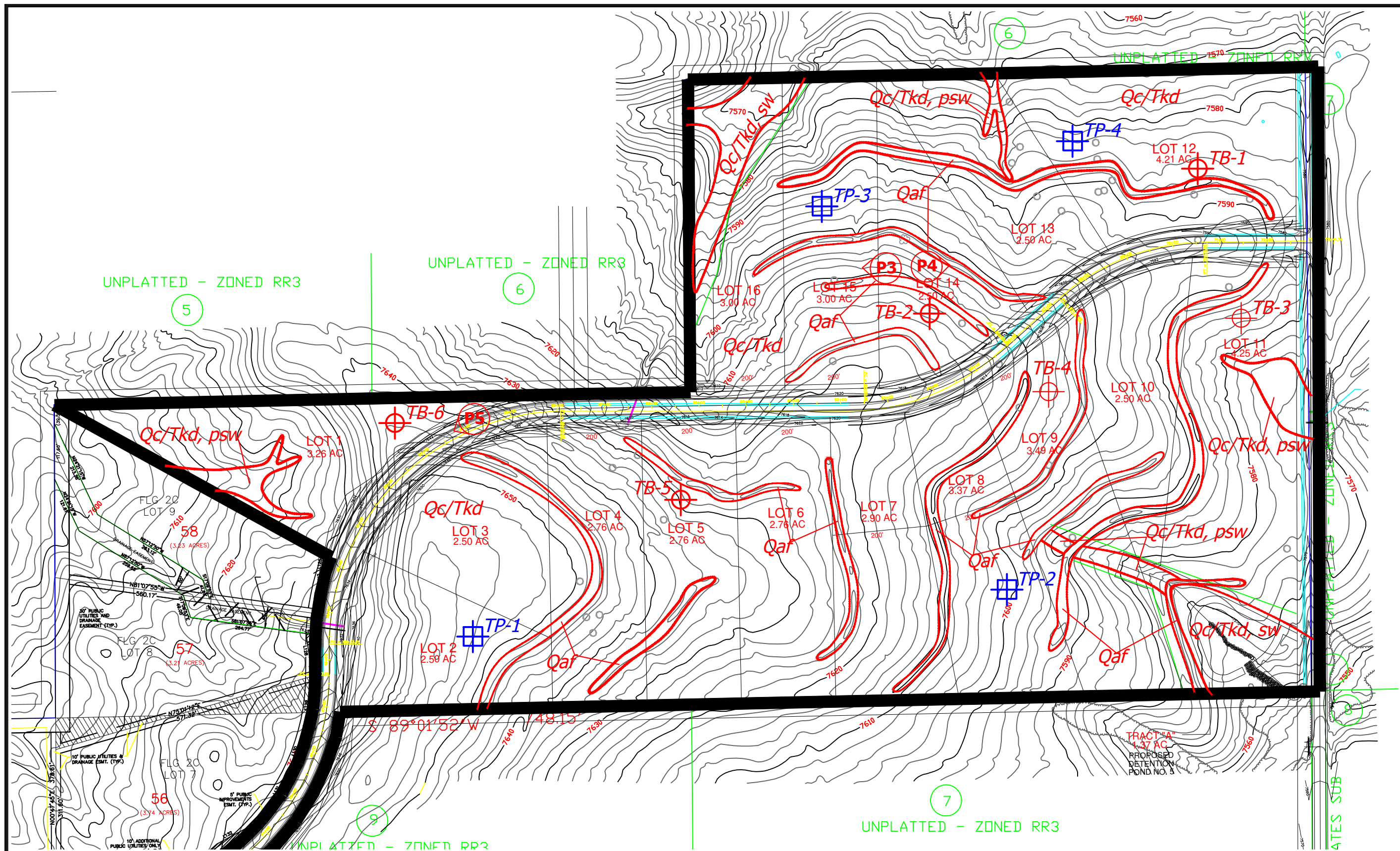


**BLACK FOREST QUADRANGLE  
GEOLOGIC MAP**  
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**FIG. 5**





**Legend:**  
Qaf - Artificial Fill of Holocene Age:  
man-made fill deposits associated with existing erosion berms  
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 seasonally shallow groundwater area  
sw - seasonally shallow groundwater area

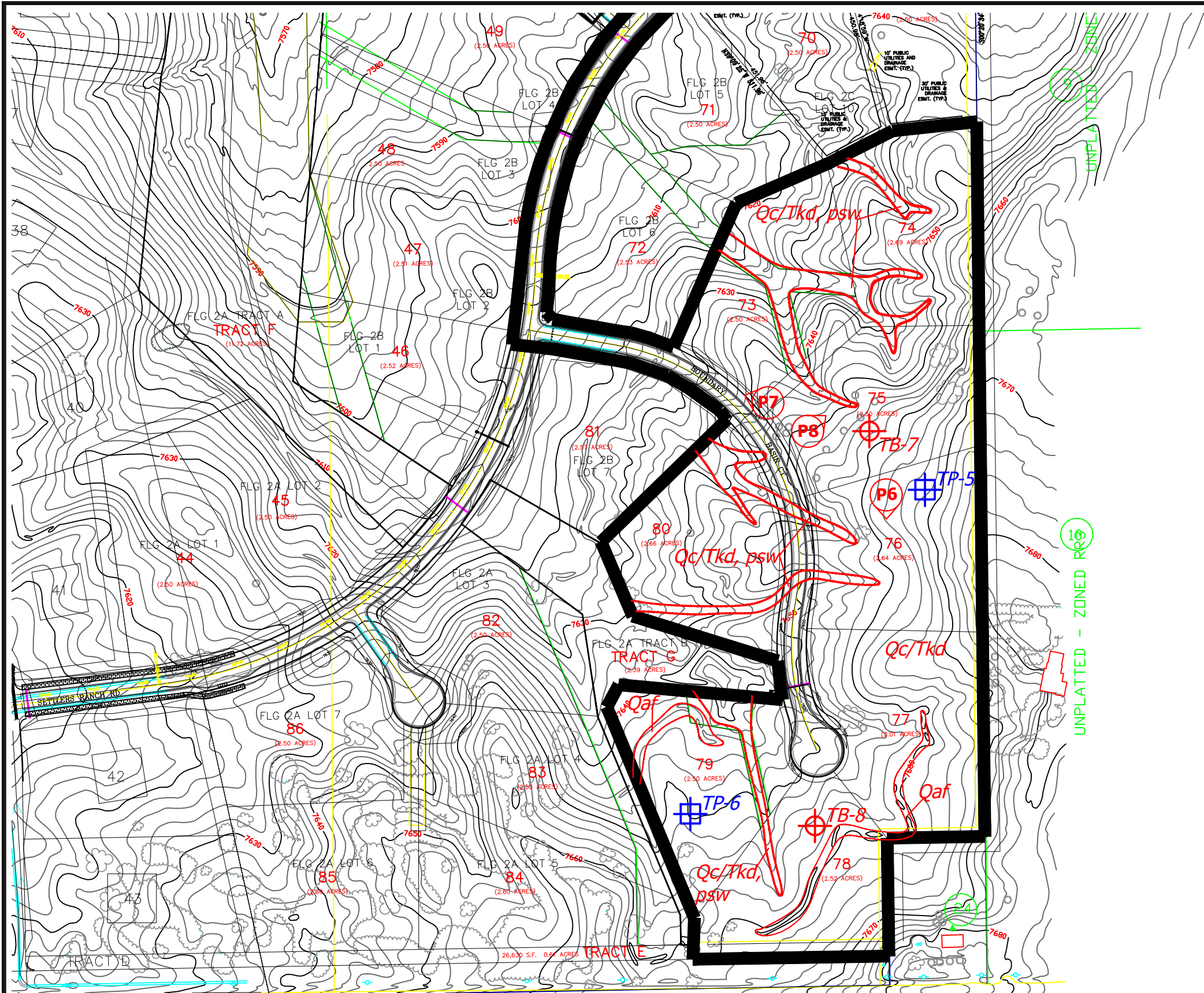
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**GEOLOGY/ENGINEERING MAP**  
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**FIG. 6**





**Legend:**  
Qaf - Artificial Fill of Holocene Age: man-made fill deposits associated with existing erosion berms  
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 seasonally shallow groundwater area  
sw - seasonally shallow groundwater area



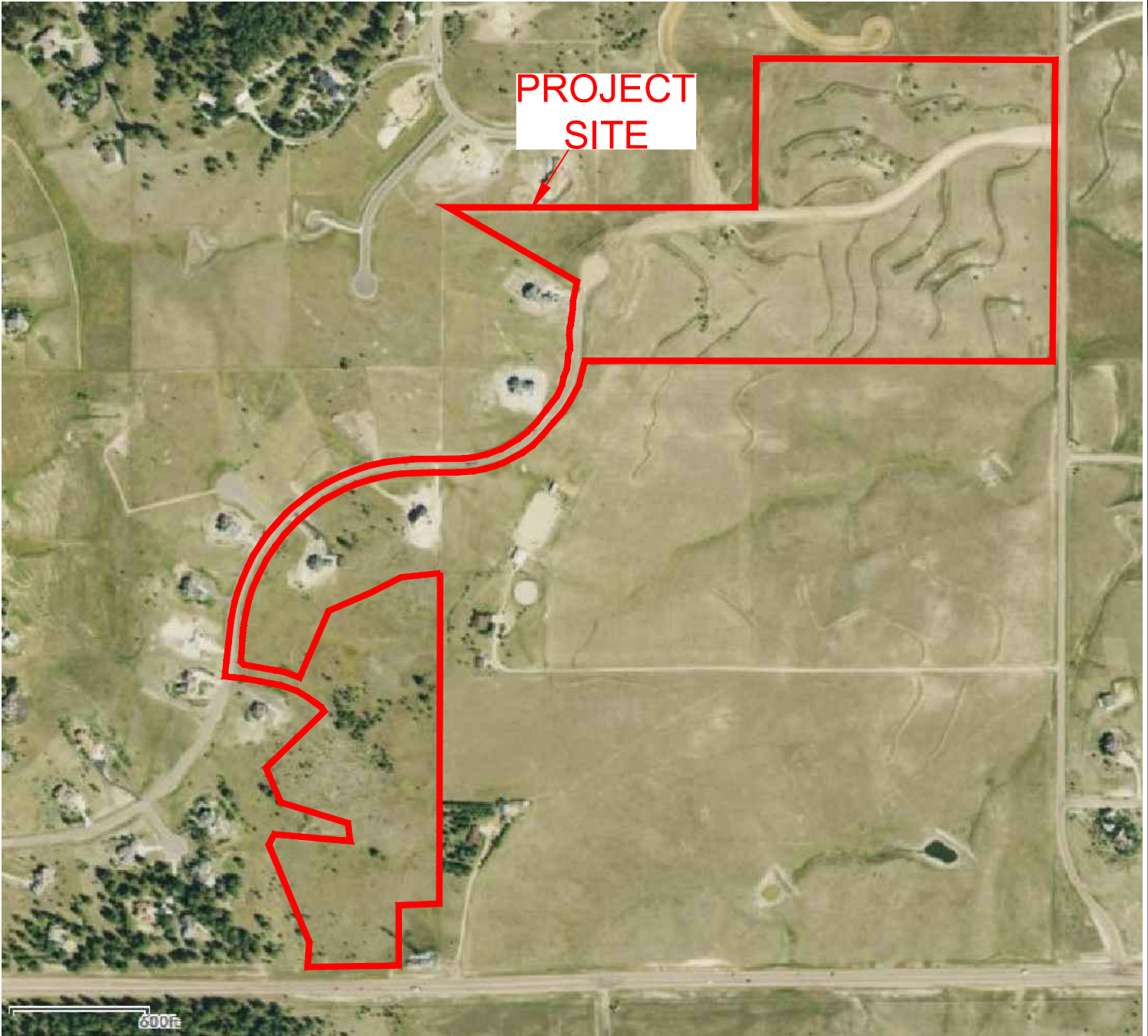
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**SITE PLAN/TESTING LOCATION MAP**  
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**FIG. 6A**





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**FEMA FLOODPLAIN MAP**  
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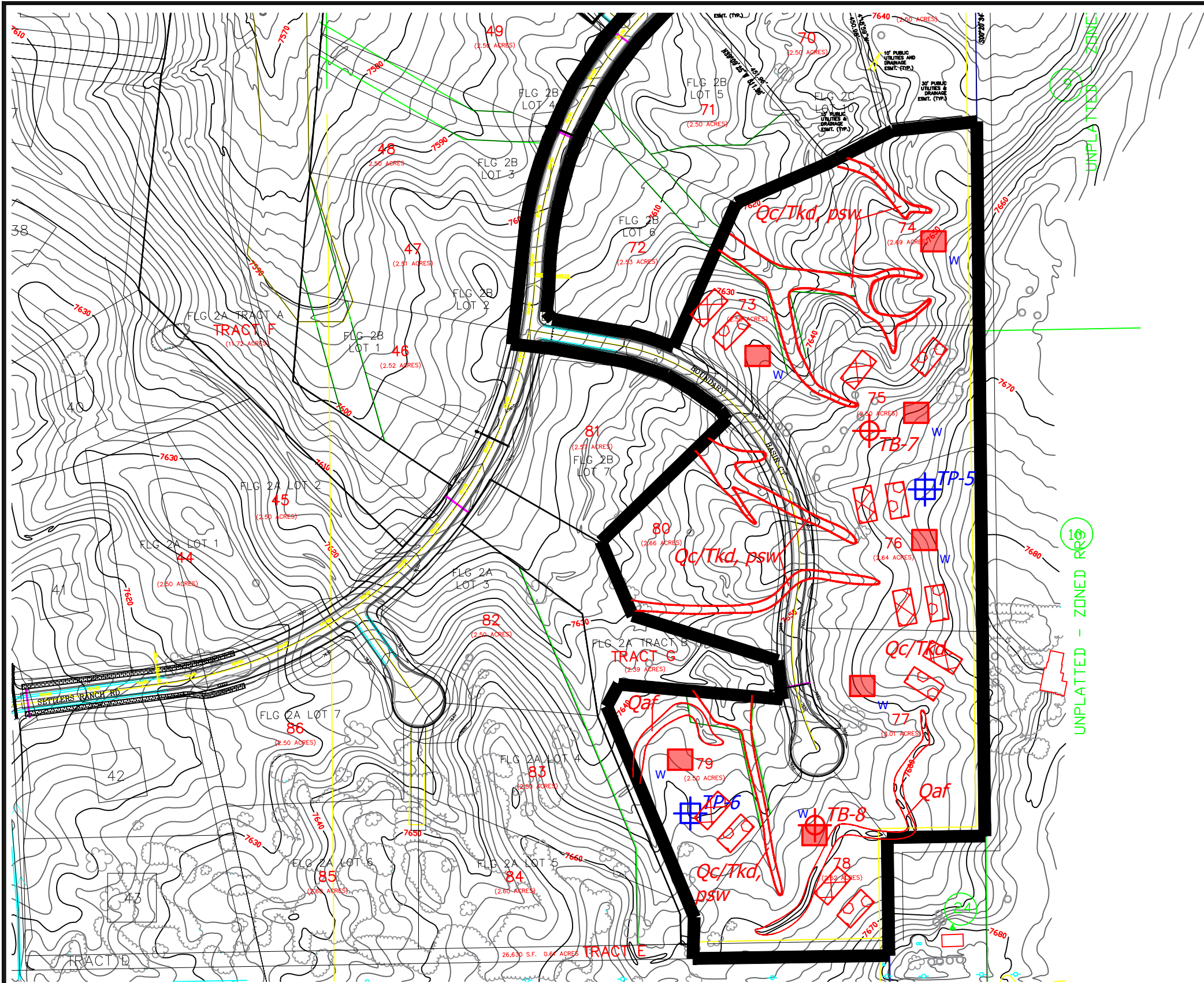
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**FIG. 7**










**LEGEND:**

- POSSIBLE OWTS LOCATIONS
- POSSIBLE OWTS ALTERNATE LOCATIONS
- POSSIBLE HOUSE LOCATIONS

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



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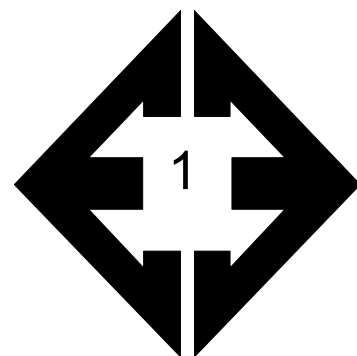
**OWTS SUITABILITY MAP**  
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**FIG. 8A**

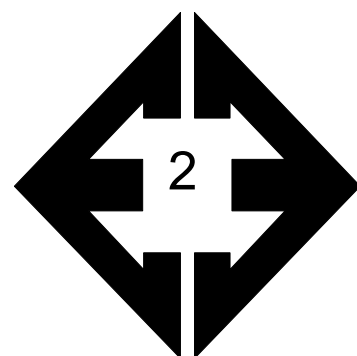
## **APPENDIX A: Photographs**





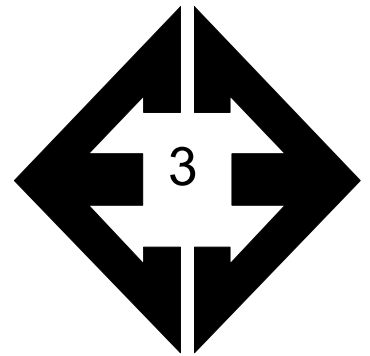
**Looking south from  
the northeastern  
portion of the site.**

May 1, 2023



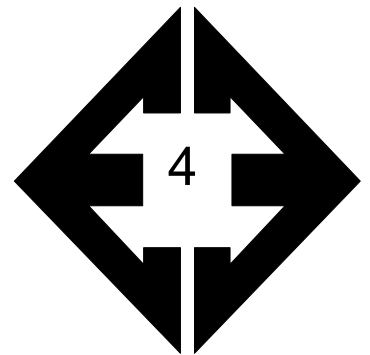
**Looking west from the  
northeastern portion of  
the site.**

May 1, 2023



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

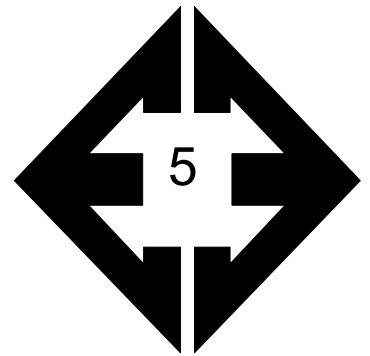
May 1, 2023



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

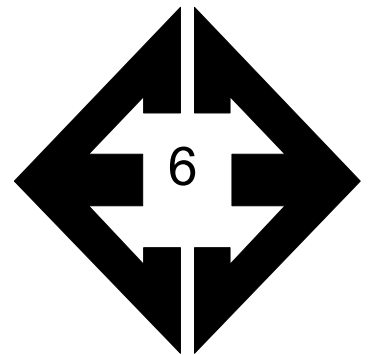
May 1, 2023





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

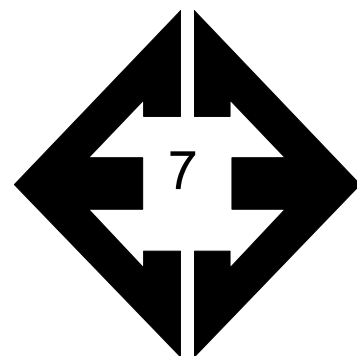
May 1, 2023



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

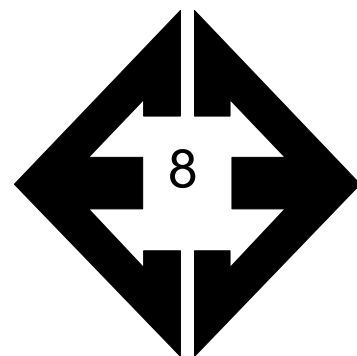
May 18, 2023





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

May 18, 2023



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

May 18, 2023

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


TEST PIT 1  
DATE EXCAVATED 5/4/2023  
REMARKS

REMARKS	Depth (ft)	Symbol	Samples	Soil Structure Shape	Soil Structure Grade	Soil Type
TOPSOIL, SANDY CLAY LOAM, DARK BROWN	1					
SANDY CLAY LOAM, FINE COARSE, LIGHT BROWN	2			bl	m	3
	3					
	4					
	5					
	6					
	7					
	8					
	9					
	10					

TEST PIT 2  
DATE EXCAVATED 5/4/2023  
REMARKS

REMARKS	Depth (ft)	Symbol	Samples	Soil Structure Shape	Soil Structure Grade	Soil Type
TOPSOIL, SANDY CLAY LOAM, DARK BROWN	1					
SANDY CLAY LOAM, FINE TO COARSE, LIGHT BROWN	2			bl	m	3
	3					
SANDY CLAY LOAM, FINE COARSE, LIGHT BROWN	4			bl	w	3A
	5					
	6					
	7					
SANDY CLAY, GRAY-BROWN	8			ma		4A
	9					
	10					

\*SIGNS OF SEASONALLY OCCURRING GW AT 7.5'



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



**TEST PIT LOGS**

SETTLERS RANCH FILING NO. 3  
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**FIG. B-1**

TEST PIT 3  
DATE EXCAVATED 5/4/2023  
REMARKS

REMARKS	Depth (ft)	Symbol	Samples	Soil Structure Shape	Soil Structure Grade	Soil Type
TOPSOIL, SANDY CLAY LOAM, DARK BROWN	1					
SANDY CLAY LOAM, FINE TO COARS LIGHT BROWN	2			bl	w	3A
	3					
	4					
SANDY LOAM, FINE TO COARSE, LIGHT BROWN	5			gr	w	2A
	6					
	7					
	8					
	9					
	10					

TEST PIT 4  
DATE EXCAVATED 5/4/2023  
REMARKS

REMARKS	Depth (ft)	Symbol	Samples	Soil Structure Shape	Soil Structure Grade	Soil Type
TOPSOIL, SANDY CLAY LOAM, DARK BROWN	1					
SANDY CLAY LOAM, FINE TO COARS LIGHT BROWN	2			bl	m	3
	3					
	4					
SANDY LOAM FINE TO COARSE, LIGHT BROWN	5			gr	w	2A
	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



**TEST PIT LOGS**

SETTLERS RANCH FILING NO. 3  
HODGEN SETTLERS RANCH, LLC

JOB NO.  
230662

**FIG. B-2**

TEST BORING 5  
DATE DRILLED 5/4/2023  
REMARKS

TEST BORING 6  
DATE DRILLED 5/4/2023  
REMARKS

REMARKS	Depth (ft)	Symbol	Samples	Soil Structure Shape	Soil Structure Grade	Soil Type	REMARKS	Depth (ft)	Symbol	Samples	Soil Structure Shape	Soil Structure Grade	Soil Type
TOPSOIL, SANDY LOAM, DARK BROWN	1						TOPSOIL, SANDY LOAM, DARK BROWN	1					
SANDY LOAM, FINE TO COARSE, LIGHT BROWN	2			gr	m	2	SANDY LOAM, FINE TO COARSE, LIGHT BROWN	2			gr	w	2A
	3			gr	w	2A		3					
	4							4					
SANDSTONE, SANDY CLAY LOAM, FINE TO COARSE, LIGHT BROWN	5			ma		3A		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



**TEST PIT LOGS**

SETTLERS RANCH FILING NO. 3  
HODGEN SETTLERS RANCH, LLC

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**FIG. B-3**



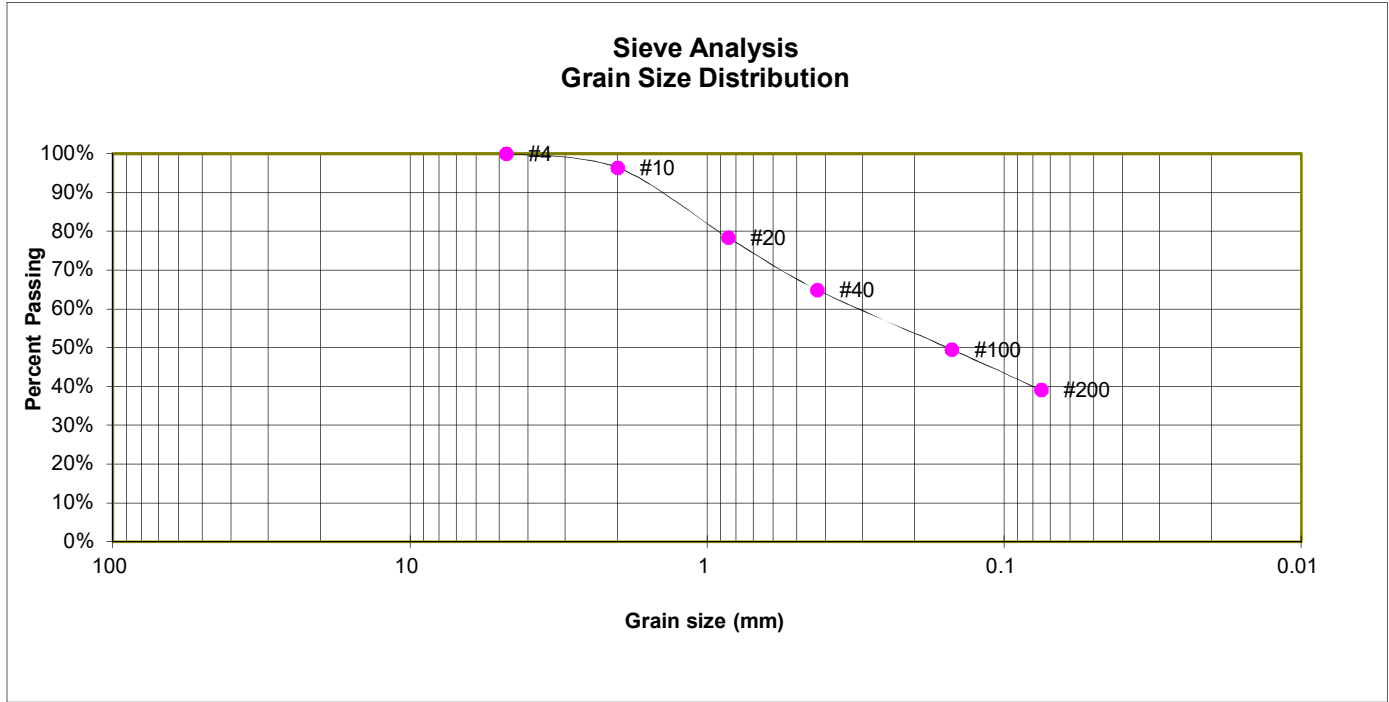
## **APPENDIX C: Laboratory Test Results**

**TABLE B-1**  
**SUMMARY OF TEST PIT RESULTS**

TEST PIT NO.	DEPTH TO BEDROCK (FT)	DEPTH TO GROUNDWATER EVIDENCE (FT)	SOIL DESCRIPTION	USDA SOIL TYPE	LTAR VALUE
TP-1	>8	>8	SANDY CLAY LOAM	3A*	0.3*
TP-2	>8	7.0	SANDY CLAY	4*	0.2*
TP-3	>8	>8	SANDY LOAM	2A	0.5
TP-4	>8	>8	SANDY LOAM	3A*	0.3*
TP-5	5*	>8	SANDY LOAM	3A*	0.3*
TP-6	>8	>8	SANDY LOAM	2A	0.5

\* - CONDITIONS REQUIRING AN ENGINEERED DESIGN

<u>TEST PIT</u>	TP-1	<u>SOIL DESCRIPTION</u>	SANDY CLAY LOAM
<u>DEPTH (FT)</u>	2.5	<u>USDA SOIL TYPE</u>	3



<u>U.S. Sieve #</u>	<u>Percent Finer</u>
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	
4	100.0%
10	96.4%
20	78.4%
40	64.9%
100	49.5%
200	39.1%



**ENTECH**  
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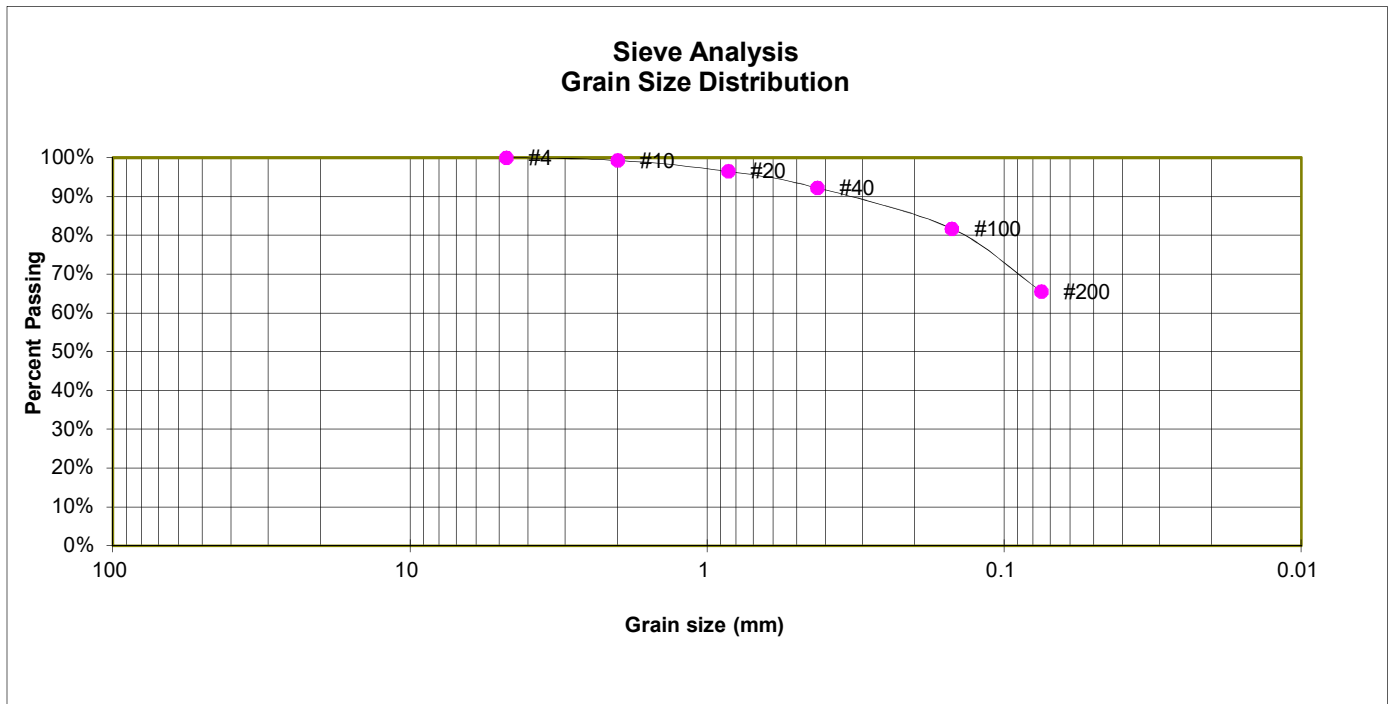
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**FIG. B-1**

<u>TEST PIT</u>	TP-2	<u>SOIL DESCRIPTION</u>	SANDY CLAY
<u>DEPTH (FT)</u>	4	<u>USDA SOIL TYPE</u>	4



<u>U.S. Sieve #</u>	<u>Percent Finer</u>
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	
4	100.0%
10	99.3%
20	96.5%
40	92.2%
100	81.7%
200	65.5%



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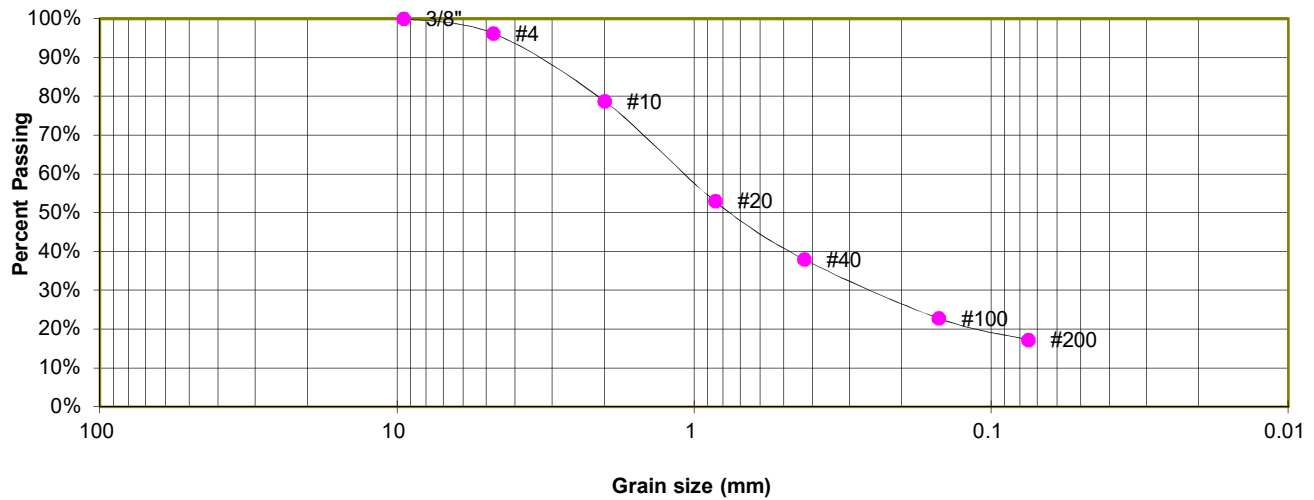
**FIG. B-2**



TEST PIT TP-3  
DEPTH (FT) 5

SOIL DESCRIPTION SANDY LOAM  
USDA SOIL TYPE 2

**Sieve Analysis  
Grain Size Distribution**



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	100.0%
4	96.2%
10	78.7%
20	52.9%
40	37.9%
100	22.8%
200	17.3%



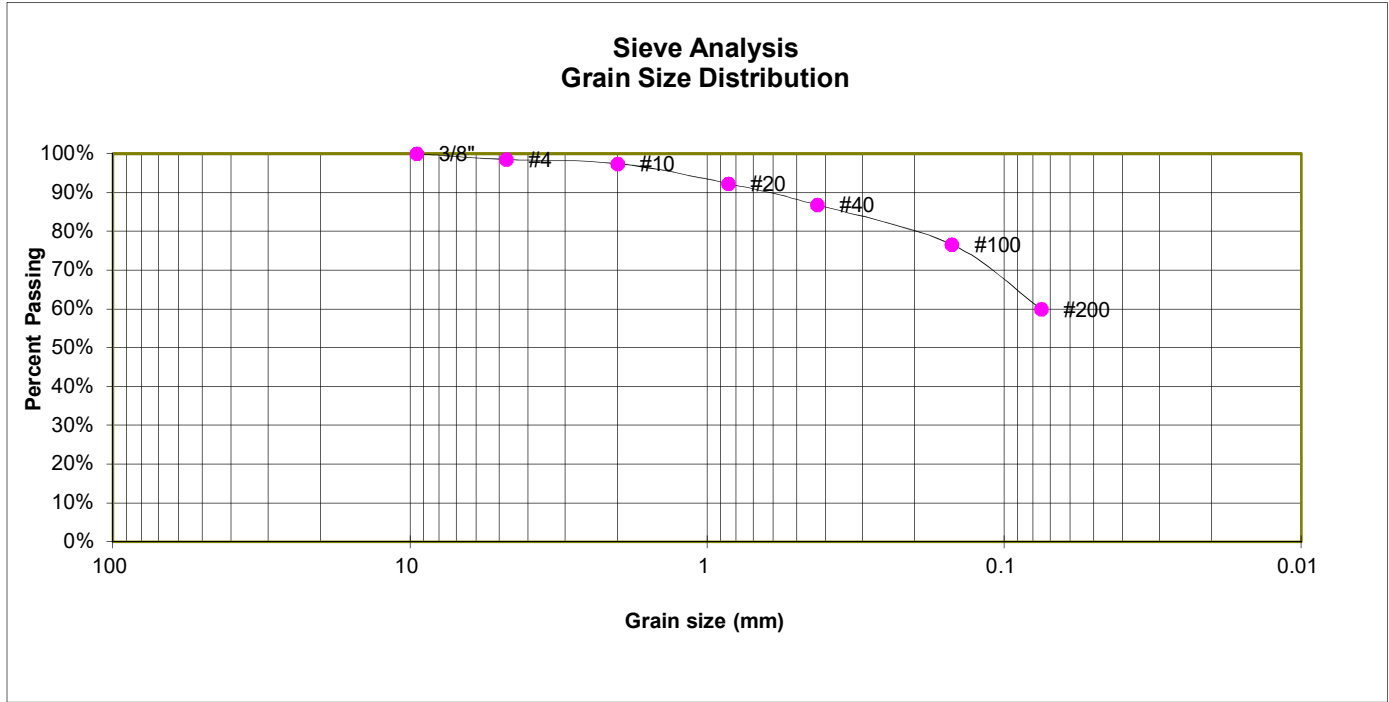
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**FIG. B-3**

<u>TEST PIT</u>	TP-4	<u>SOIL DESCRIPTION</u>	SANDY CLAY LOAM
<u>DEPTH (FT)</u>	3	<u>USDA SOIL TYPE</u>	3A



<u>U.S. Sieve #</u>	<u>Percent Finer</u>
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	100.0%
4	98.5%
10	97.4%
20	92.3%
40	86.8%
100	76.6%
200	59.9%



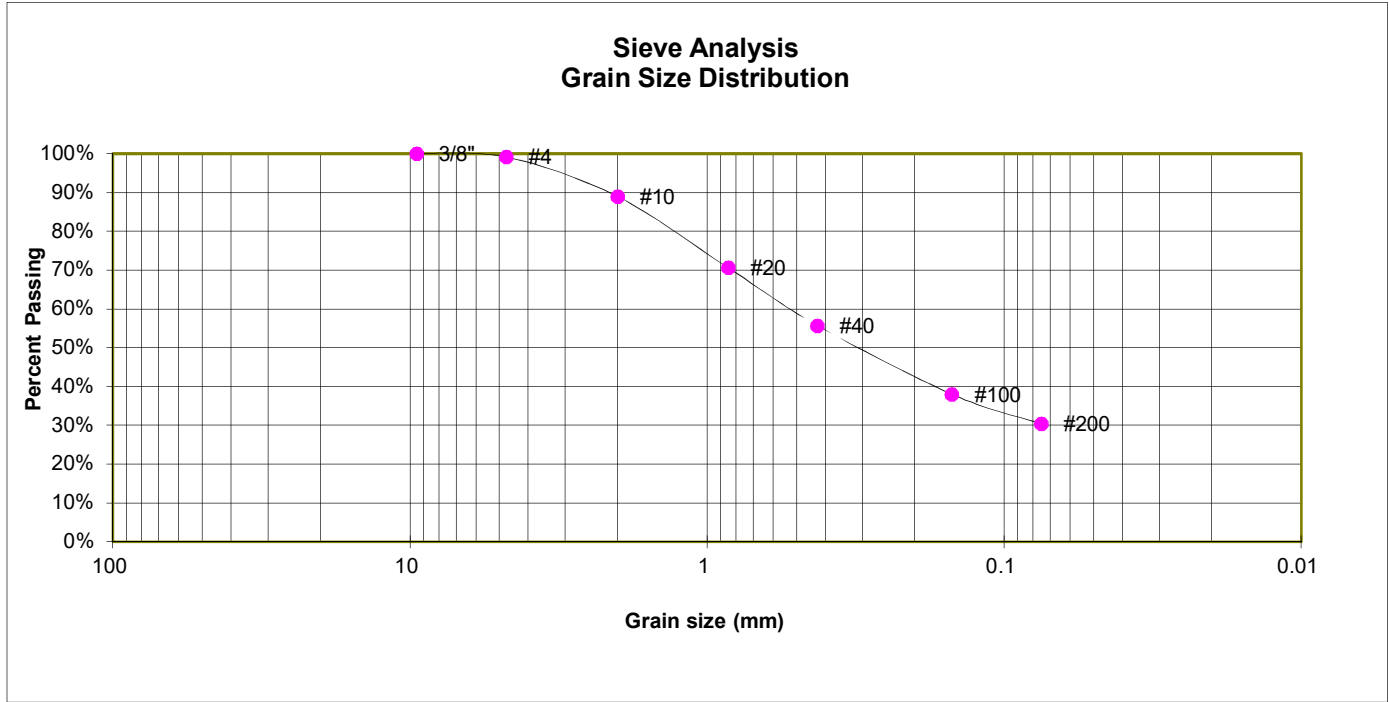
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**FIG. B-4**

<u>TEST PIT</u>	TP-5	<u>SOIL DESCRIPTION</u>	SANDY LOAM
<u>DEPTH (FT)</u>	5.5	<u>USDA SOIL TYPE</u>	2A



<u>U.S. Sieve #</u>	<u>Percent Finer</u>
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	100.0%
4	99.2%
10	89.0%
20	70.6%
40	55.7%
100	38.0%
200	30.3%



**LABORATORY TEST RESULTS**

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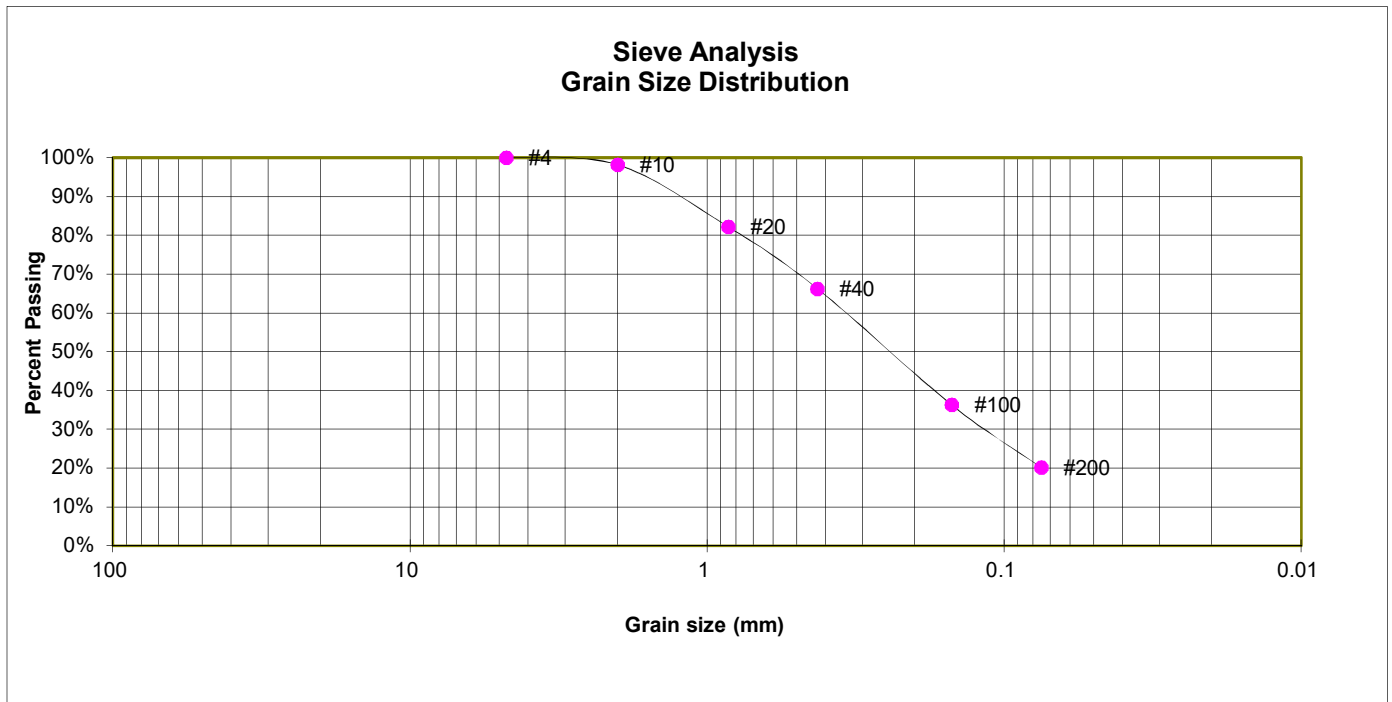
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**FIG. B-5**



TEST PIT TP-6  
 DEPTH (FT) 2  
 USDA SOIL TYF 2A

SOIL DESCRIPTION SANDY LOAM  
 USDA SOIL TYPE SM



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	
4	100.0%
10	98.2%
20	82.2%
40	66.2%
100	36.3%
200	20.1%



## LABORATORY TEST RESULTS

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**FIG. B-6**

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

## El Paso County Area, Colorado

### 67—Peyton sandy loam, 5 to 9 percent slopes

#### Map Unit Setting

*National map unit symbol:* 369d

*Elevation:* 6,800 to 7,600 feet

*Mean annual air temperature:* 43 to 45 degrees F

*Frost-free period:* 115 to 125 days

*Farmland classification:* Not prime farmland

#### Map Unit Composition

*Peyton and similar soils:* 85 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:* 5 to 9 percent

*Depth to restrictive feature:* More than 80 inches

*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 supply, 0 to 60 inches:* Moderate (about 7.3 inches)

##### Interpretive groups

*Land capability classification (irrigated):* None specified

*Land capability classification (nonirrigated):* 4e

*Hydrologic Soil Group:* B

*Ecological site:* R049XY216CO - Sandy Divide

*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 20, Sep 2, 2022

## El Paso County Area, Colorado

### 92—Tomah-Crowfoot loamy sands, 3 to 8 percent slopes

#### Map Unit Setting

*National map unit symbol:* 36b9

*Elevation:* 7,300 to 7,600 feet

*Farmland classification:* Not prime farmland

#### Map Unit Composition

*Tomah and similar soils:* 50 percent

*Crowfoot and similar soils:* 30 percent

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

#### Description of Tomah

##### Setting

*Landform:* Alluvial fans, hills

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

*Down-slope shape:* Linear

*Across-slope shape:* Linear

*Parent material:* Alluvium derived from arkose and/or residuum weathered from arkose

##### Typical profile

*A - 0 to 10 inches:* loamy sand

*E - 10 to 22 inches:* coarse sand

*Bt - 22 to 48 inches:* stratified coarse sand to sandy clay loam

*C - 48 to 60 inches:* coarse sand

##### Properties and qualities

*Slope:* 3 to 8 percent

*Depth to restrictive feature:* More than 80 inches

*Drainage class:* Well drained

*Runoff class:* Medium

*Capacity of the most limiting layer to transmit water*

*(Ksat):* Moderately high to high (0.60 to 2.00 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 4.6 inches)

##### Interpretive groups

*Land capability classification (irrigated):* None specified

*Land capability classification (nonirrigated):* 4e

*Hydrologic Soil Group:* B

*Ecological site:* R049XY216CO - Sandy Divide

*Hydric soil rating:* No

## Description of Crowfoot

### Setting

*Landform:* Hills, alluvial fans  
*Landform position (three-dimensional):* Side slope, crest  
*Down-slope shape:* Linear  
*Across-slope shape:* Linear  
*Parent material:* Alluvium

### Typical profile

*A - 0 to 12 inches:* loamy sand  
*E - 12 to 23 inches:* sand  
*Bt - 23 to 36 inches:* sandy clay loam  
*C - 36 to 60 inches:* coarse sand

### Properties and qualities

*Slope:* 3 to 8 percent  
*Depth to restrictive feature:* More than 80 inches  
*Drainage class:* Well drained  
*Runoff class:* Medium  
*Capacity of the most limiting layer to transmit water (Ksat):* Moderately high to high (0.60 to 2.00 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 4.7 inches)

### Interpretive groups

*Land capability classification (irrigated):* None specified  
*Land capability classification (nonirrigated):* 4e  
*Hydrologic Soil Group:* B  
*Ecological site:* R049XY216CO - Sandy Divide  
*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 20, Sep 2, 2022