



ENTECH
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**WASTEWATER STUDY
FLYING HORSE NORTH, FILING NO. 5
EL PASO COUNTY, COLORADO**

Prepared for:

Flying Horse North, LLC
2138 Flying Horse Club Drive
Colorado Springs, Colorado 80921

Attn: Drew Balsick

September 11, 2024

Respectfully Submitted,

ENTECH ENGINEERING, INC.

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

Reviewed by:



Digitally signed by Joseph C. Goode Jr.
Date: 10/02/24

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

LLL

PCD No.

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1 SUMMARY

Project Location

The site consists of portions of the NW¼ of Section 31, Township 11 South, Range 65 West of the 6th Principal Meridian in El Paso County, Colorado. The site is located approximately 3½ miles northeast of Colorado Springs, Colorado.

Project Description

Flying Horse North Filing No. 5 Subdivision is approximately 110 acres with twenty-one (21) lots and other associated site improvements proposed for the filing. The proposed development is to consist of approximately 2.5 to 5-acre single-family residential lots. The development will be serviced by individual water wells and on-site wastewater systems (OWTS).

Scope of Report

This report presents the results of our geologic evaluation and treatment of engineering geologic hazard study for the use of onsite wastewater treatment systems (OWTS).

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 minor constraints on development and land use. These include areas of seasonal and potentially seasonal shallow groundwater areas, artificial fill, expansive soils, and potential for elevated radon levels. Based on the proposed development plan, it appears that these areas will have some impact on the development. These conditions will be discussed in greater detail in the report.

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

2 GENERAL SITE CONDITIONS AND PROJECT DESCRIPTION

The site consists of portions of the NW¼ of Section 31, Township 11 South, Range 65 West of the 6th Principal Meridian in El Paso County, Colorado. The site is located approximately 3½ miles northeast of Colorado Springs, Colorado, at the Stagecoach Road and west of Flying Horse North Country Club. The location of the site is as shown on the Vicinity Map, Figure 1.

The topography of the site varies from gently to moderately sloping generally to the east and north with some steeper slopes along the drainages in portions of the site. Palmer Divide is located to the west of Filing No. 5. The drainages on site generally flow in a northerly direction through the site. Water was not observed in any of the drainages within Filing No. 5 at the time of our site investigation. The existing retention pond is located along the northwest side of Filing No. 5. The site contains primarily field grasses and weeds in with areas of scattered ponderosa pine trees in the northern portion of the site along Old Stagecoach Road. Site photographs are included in Appendix A. The locations and directions of the photographs are indicated in Figure 3.

Flying Horse North Filing No. 5 Subdivision is approximately 110 acres with twenty-one (21) lots proposed for the filing and other associated site improvements. The proposed development is to consist of approximately 2.5 to 5-acre single-family residential lots. Grading is expected to be primarily associated with the construction of roads. The Site and Exploration Plan is presented in Figure 3.

3 SCOPE OF THE REPORT

The scope of the report will include 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.

4 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 air photo reconnaissance and interpretation. The same mapping procedures have also been utilized to produce the

Engineering Geology Map which identified pertinent geologic conditions affecting development. The field mapping was initially performed by personnel of Entech Engineering, Inc. (Entech) on November 21 and December 2, 2014. Field mapping was updated by Entech on October 31 and November 3, 2017 (References 1 and 2). The previously completed Sketch Plan for Flying Horse North and Flying Horse North Filing No. 4 were also used in the preparation of this report (References 3 and 4). The site was revisited and additional mapping completed in September of 2024. Recent site photographs are included in Appendix App.

Five (5) test borings were drilled and four (4) test pits excavated across the site as part of this study to determine the soils classification and engineering characteristics. The borings were drilled to depths of 20 feet using a truck-mounted, continuous flight auger drilling rig supplied and operated by Entech, and the test pits were excavated to depths ranging from 4.5 to 8 feet.

Four (4) test borings (TB-18, TB-20, TB-22, and TB-25) from previous Flying Horse North investigations were used in the in preparing this report (Reference 3). The location of the previous Test Borings indicated on the Site and Exploration Plan, Figure 3.

Laboratory testing was performed on some of the soils to classify and determine the soils engineering characteristics. Laboratory tests included moisture content testing, ASTM D-2216, tests included grain-size analysis ASTM D-422, Atterberg Limits ASTM D-4318, volume change testing using Swell/Consolidation test. Sulfate testing was performed on select samples to evaluate potential for below grade concrete degradation due to sulfate attack. Results of the laboratory testing are included in Appendix C. A Summary of Laboratory Test Results is presented in Table C-1. Previous Laboratory Testing Summary and Test Boring are included in Appendix D.

5 SOIL, GEOLOGY, AND ENGINEERING GEOLOGY

5.1 General Geology

Physiographically, the site lies in the western portion of the Great Plains Physiographic Province. Approximately 10 miles to the west is a major structural feature known as the Rampart Range Fault. This fault marks the boundary between the Great Plains Physiographic Province and the Southern Rocky Mountain Province. The site exists within the southeastern edge of a large structural feature known as the Denver Basin. Bedrock in the area tends to be very gently dipping in a northerly direction (Reference 5). The rocks in the area of the site are sedimentary in nature, and typically Tertiary to Cretaceous in age. The bedrock underlying the site consists of the

Dawson Arkose Formation. Overlying this formation are unconsolidated deposits of residual, colluvial, man-made, and alluvial soils of the Quaternary Age. The residual soils are produced by the in-situ action of weathering of the bedrock on site. Some colluvial soils exist which are deposited by gravity and sheetwash. The alluvial soils were deposited by water in the drainages on site. Man-made soils exist as earthen dams and erosion berms. The site’s stratigraphy will be discussed in more detail in Section 5.3.

5.2 Soil Conservation Survey

The Natural Resource Conservation Service (Reference 6), previously the Soil Conservation Service (Reference 7) has mapped one soil type within Filing No. 5 (Figure 4). In general, the soils classify as sandy loam and sandy clay loam. The soils are described as follows:

Type	Description
68	Peyton-Pring complex, 3 to 8% slopes

Complete description of the soil type is presented in Appendix E. The soils have generally been described to have moderate to rapid permeabilities. Limitations on development include limited ability to support a load, shrink swell potential, slopes and frost action potential. Possible hazards with soil erosion are present on the site. The erosion potential can be controlled with vegetation. The majority of the soils have been described to have moderate erosion hazards.

5.3 Site Stratigraphy

The Black Forest Quadrangle Geology Map showing the site is presented in Figure 5 (Reference 8). The Geology Map prepared for the site is presented in Figure 6. Three mappable units were identified on this site which are described as follows:

Qaf Artificial Fill of Holocene Age: These are man placed fill deposits associated with erosion berms, earthen dams on-site, and stockpiles of fill. Additionally, temporary stockpiles were observed on the site. Other areas of fill may exist on the site other than those mapped due to on-going construction.

Qal Recent Alluvium of Quaternary Age: These are recent stream deposits associated with the drainages on-site. These materials generally consist of silty to clayey sands and may contain clay lenses. Highly organic soils may be encountered in some of these areas.

Tkd Dawson Formation of Tertiary to Cretaceous Age: The Dawson formation typically consists of arkosic sandstone with interbedded fine-grained sandstone, siltstone and claystone. Overlying this formation is a variable layer of residual soil. The residual soils were derived from the in-situ weathering of the bedrock materials on-site. These soils consisted of silty to clayey sands and sandy clays. Areas of colluvial soils may exist on some of the slopes on site. These materials are derived from the bedrock materials and have been re-deposited by the action of sheetwash and gravity.

The bedrock underlying the site consists of the Dawson Formation of Tertiary to Cretaceous Age. The Dawson Formation typically consists of arkosic sandstone with interbedded fine-grained sandstone, siltstone and claystone. Overlying this formation are variable layers of man placed fill deposits, alluvial deposits, and residual soil. The residual soils were derived from the in-situ weathering of the bedrock materials on-site. These soils consisted of silty to clayey sands and sandy clays.

The soils listed above were mapped from site-specific mapping, the *Geologic Map of the Black Forest Quadrangle* distributed by the Colorado Geological Survey in 2003 (References 8), the *Geologic Map of the Colorado Springs-Castle Rock Area*, distributed by the US Geological Survey in 1979 (Reference 9), and the *Geologic Map of the Denver 1⁰ x 2⁰ Quadrangle*, distributed by the US Geological Survey in 1981 (Reference 10). The Test Borings and Test Pit Logs used in evaluating the site and are included in Appendix B. The Geology Map prepared for the site is presented in Figure 6.

5.4 Groundwater

Groundwater was not encountered in any of the test borings within Filing No. 5 which were drilled to 20 feet. Areas potentially seasonal shallow groundwater have been mapped in the drainages and low-lying areas on the site. These areas are discussed in the following section. Fluctuation in groundwater conditions may occur due to variations in rainfall and other factors not readily apparent at this time. It should be noted that in the sandy materials on-site, some groundwater conditions might be encountered due to the variability in the soil profile. Isolated sand and gravel layers within the soils, sometimes only a few feet in thickness and width, can carry water in the subsurface. Groundwater may also flow on top of the underlying bedrock. Builders and planners should be cognizant of the potential for the occurrence of such subsurface water features during construction on-site and deal with each individual problem as necessary at the time of construction.

Groundwater and Drainage Areas – Constraint

Drainages are located in the southeast and northern portions of Filing No. 4, and several minor drainages are located across the site that generally flow in northerly directions. None of the drainages on the site have been mapped within floodplain zones according to the FEMA Map No. 08041CO315G, (Figure 7, Reference 12). Areas where potentially seasonal shallow groundwater have been indicated on the site geology/engineering geology map, Figure 6. Lots adjacent to the drainages may experience higher groundwater levels during peak flows. Finished floor levels must be a minimum of one floor above any floodplain level. **Exact floodplain locations and drainage studies are beyond the scope of this report.**

Groundwater was not encountered in any of the test borings within Filing No. 5 which were drilled to 20 feet. Areas of potential seasonally shallow groundwater were observed on the site and are further discussed below. Buildings should maintain a minimum separation of 3 feet between the lowest foundation grade and the maximum anticipated groundwater level. Subsurface perimeter drains are recommended for structures with useable below grade space, and additional drains may be required in building areas close drainages to help prevent the intrusion of water into areas below grade. Typical drain details are presented in Figures 9 – 12. Shallow groundwater areas can be mitigated with the installation of drains. Typical drain options/details are presented in Figures 8 through 11. These areas are discussed as follows:

6 ON-SITE WASTEWATER TREATMENT

The site was evaluated for individual on-site wastewater treatment systems in accordance with El Paso Land Development Code. Four (4) tactile test pits were excavated across the Filing No. 5. The test pits were located in potential locations of future systems. The approximate locations of the Test Pits are indicated on Figure 3, and on the Septic Suitability Map, Figure 8. Test Pit Logs are included in Appendix B, and Laboratory Test Results in Appendix C. Previous Laboratory Testing Summary and Test Pit Logs are included in Appendix D.

The Natural Resource Conservation Service (Reference 6), previously the Soil Conservation Service (Reference 7) has been mapped with two soil descriptions. The Soil Survey Map (Reference 6) is presented in Figure 4, and the Soil Survey Descriptions are presented in Appendix E. The soils are described as having slow to rapid percolation rates. The majority of the soils have been described with moderate permeabilities.

Soils encountered in the tactile test pits consisted of sandy clay loam, gravelly sandy clay loam and sandy clay. Signs of seasonal occurring groundwater were not observed in the test pits. The limiting layers encountered in the test pits are sandy clay loam (Soil Types 3 and 3A), sandy clay Soil Type 4 and 4A. The soil types correspond to LTAR values ranging from 0.35 to 0.15 gallons per day per square foot.

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

In summary, it is our opinion the site is suitable for individual on-site wastewater treatment systems (OWTS) and that contamination of surface and subsurface water resources should not occur provided the OWTS sites are evaluated and installed accordance to El Paso County and State Guidelines and properly maintained. Based on the testing performed as part of this investigation designed systems will likely be required for the majority of the lots. A Septic Suitability Map is presented in Figure 8. OWTS sites should not be located within defined drainages. Individual soil testing is required on the lots 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.

7 CLOSURE

It is our opinion that the existing geologic engineering and geologic conditions will impose some constraints on development and construction of the site. The majority of these conditions 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 building sites will be required prior to construction. Construction and design personnel should be made familiar with the contents of this report. Reporting such discrepancies to Entech Engineering, Inc. soon after they are discovered would be greatly appreciated and could possibly help avoid construction and development problems.

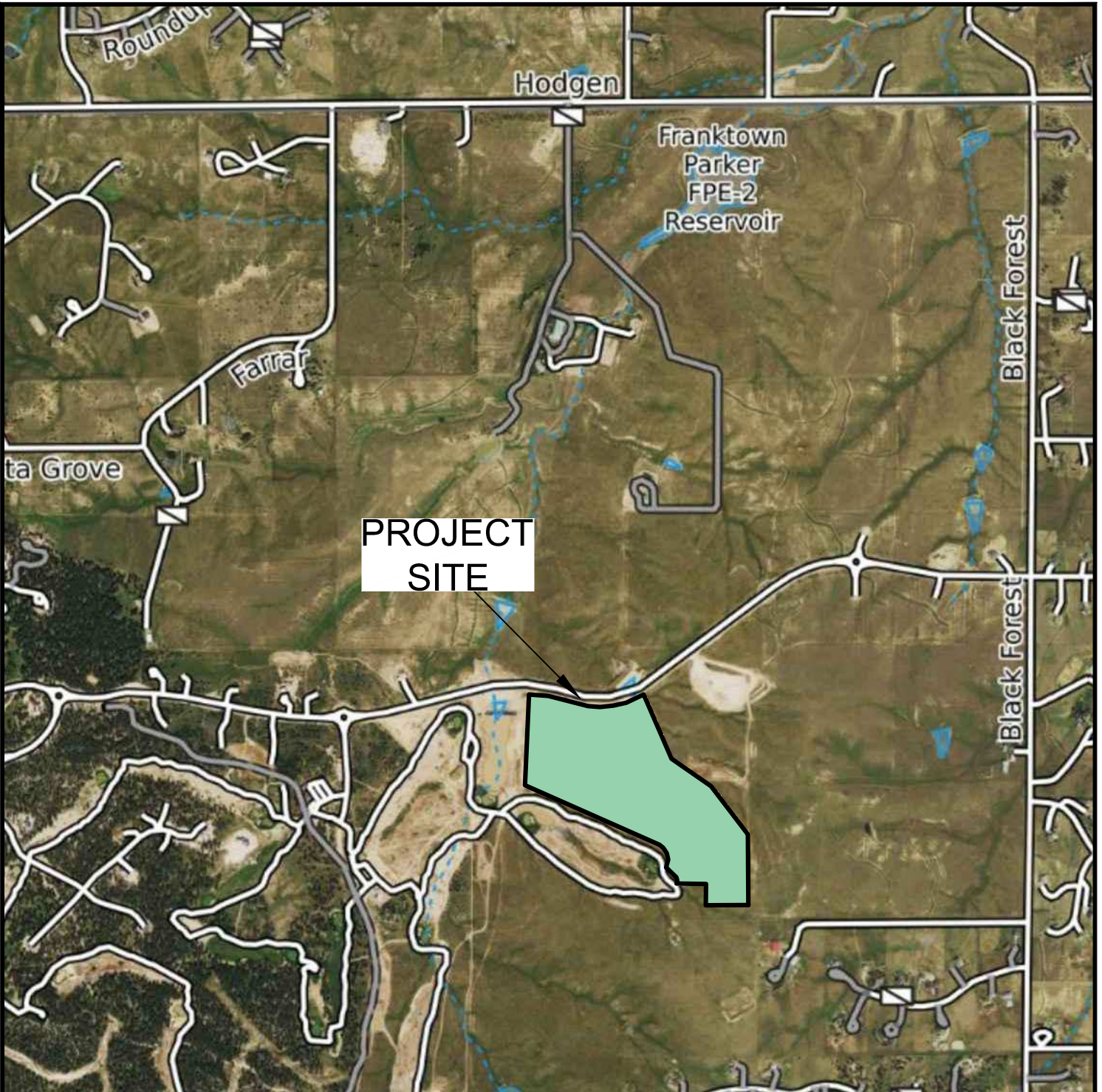
This report has been prepared for Flying Horse North, LLC for application to the proposed project in accordance with generally accepted geologic soil and engineering practices. No other warranty expressed or implied is made.

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.

8 REFERENCES

1. Entech Engineering, Inc., February 26, 2015. *Soil, Geology, Geologic Hazard, and Wastewater Study, Shamrock Ranch, El Paso County, Colorado*. Entech Job No. 141588
2. Entech Engineering, Inc., February 22, 2016. *Soil, Geology, Geologic Hazard, and Wastewater Study, Flying Horse North, PUD Submittal, El Paso County, Colorado*. Entech Job No. 160118.
3. Entech Engineering, Inc., revised date April 11, 2024. *Soil, Geology, Geologic Hazard, and Wastewater Study, Flying Horse North, Sketch Plan, El Paso County, Colorado*. Entech Job No. 220404.
4. Entech Engineering, Inc., date September 11, 2024. *Soils and Geology Study, Flying Horse North Filing No. 4, El Paso County, Colorado*. Entech Job No. 241421.
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6. Natural Resource Conservation Service, June 20, 2007. *Web Soil Survey*. United States Department Agriculture, <http://web soil survey.nrcs.usda.gov>.
7. United States Department of Agriculture Soil Conservation Service. June 1981. *Soil Survey of El Paso County Area, Colorado*.
8. Thorson, Jon P. 2003. *Geologic Map of the Black Forest Quadrangle, El Paso County, Colorado*. Colorado Geological Survey. Open-File Report 03-6.
9. 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.
10. Bryant, Bruce; McGrew, Laura W. and Wobus, Reinhard A. 1981. *Geologic Map of the Denver 1° x 2° Quadrangle, North-Central Colorado*. U.S. Geologic Survey. Map 1-1163.
11. Hart, Stephen S. 1974. *Potentially Swelling Soil and Rock in the Front Range Urban Corridor, Colorado*. Colorado Springs-Castle Rock Map. Colorado Geological Survey. Environmental Geology 7.
12. Federal Emergency Management Agency. December 7, 2018. *Flood Insurance Rate Maps for the City of Colorado Springs, Colorado*. Map Number 08041CO315G.
13. U.S. Fish & Wildlife Service. *National Wetlands Inventory*. Department of the Interior, fws.gov/wetlands/data/Mapper.html.

FIGURES

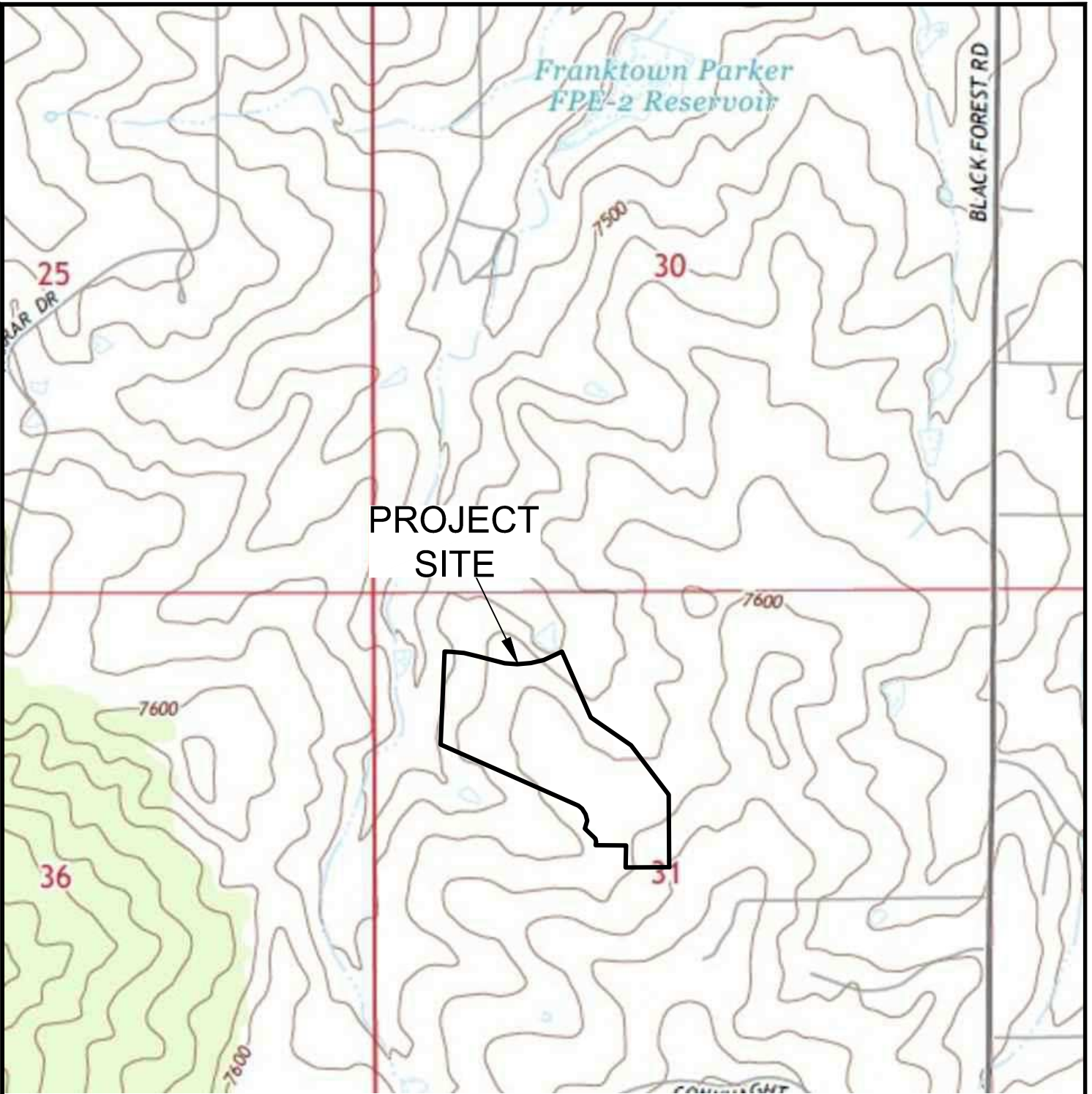


VICINITY MAP

FLYING HORSE NORTH, FILING NO. 5
FLYING HORSE NORTH, LLC

JOB NO.
241421

FIG. 1

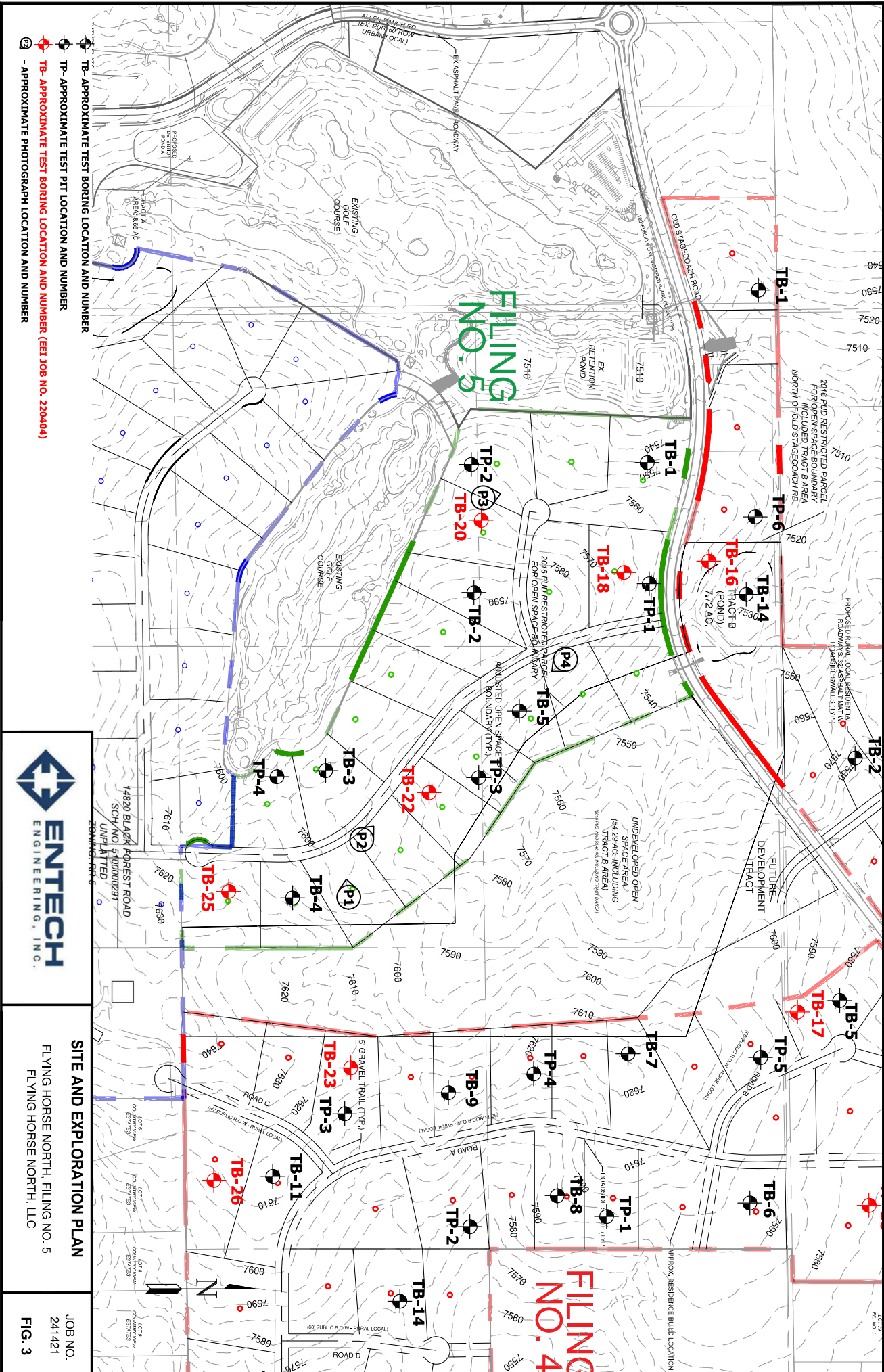


USGS TOPOGRAPHY MAP

FLYING HORSE NORTH, FILING NO. 5
FLYING HORSE NORTH, LLC

JOB NO.
241421

FIG. 2

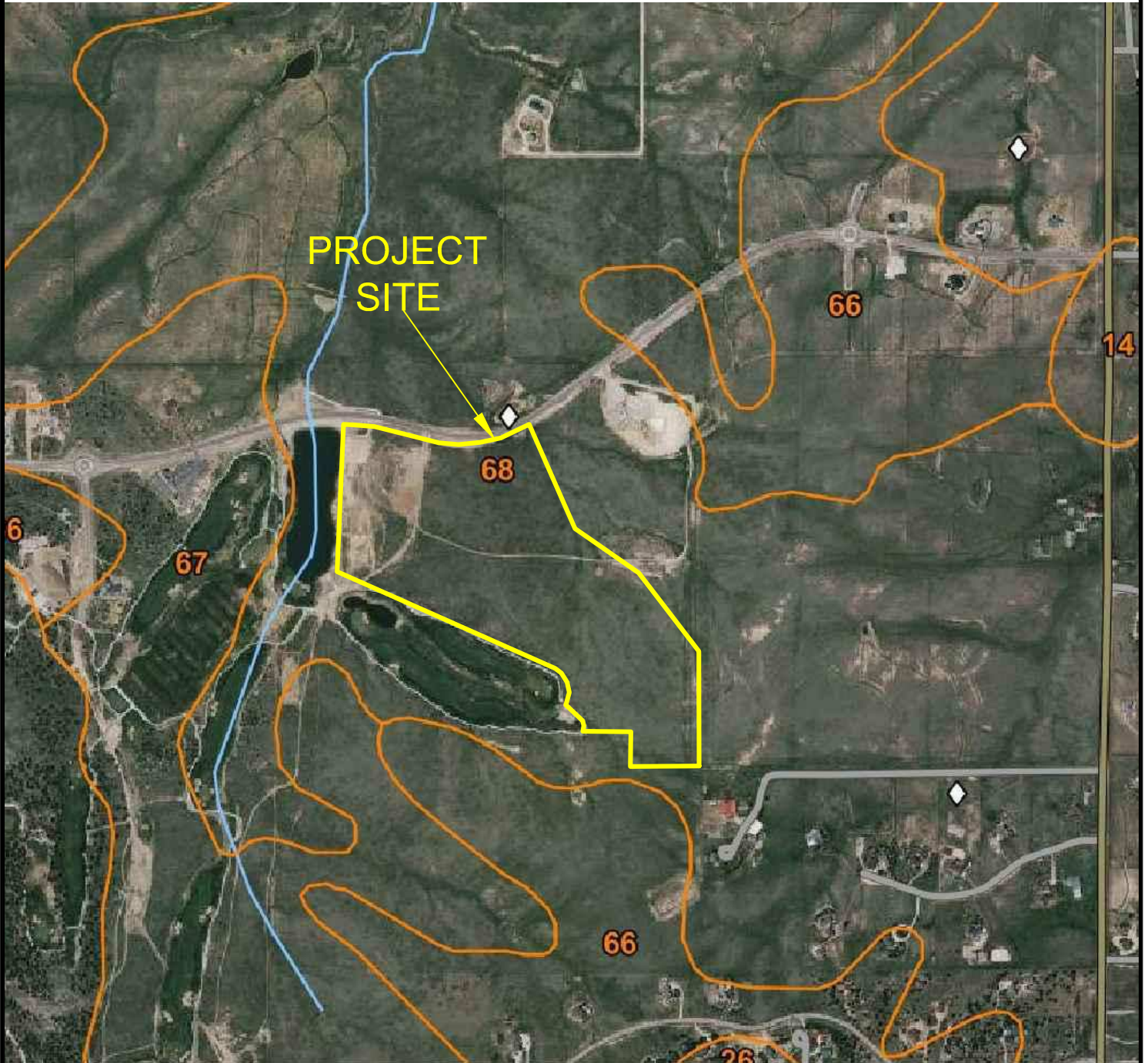


- TP - APPROXIMATE TEST PIT LOCATION AND NUMBER
- TB - APPROXIMATE TEST BORING LOCATION AND NUMBER
- TB - APPROXIMATE TEST BORING LOCATION AND NUMBER (EEI JOB NO. 220404)
- - APPROXIMATE PHOTOGRAPH LOCATION AND NUMBER



SITE AND EXPLORATION PLAN
FLYING HORSE NORTH, FILING NO. 5
FLYING HORSE NORTH, LLC

JOB NO.
241421
FIG. 3

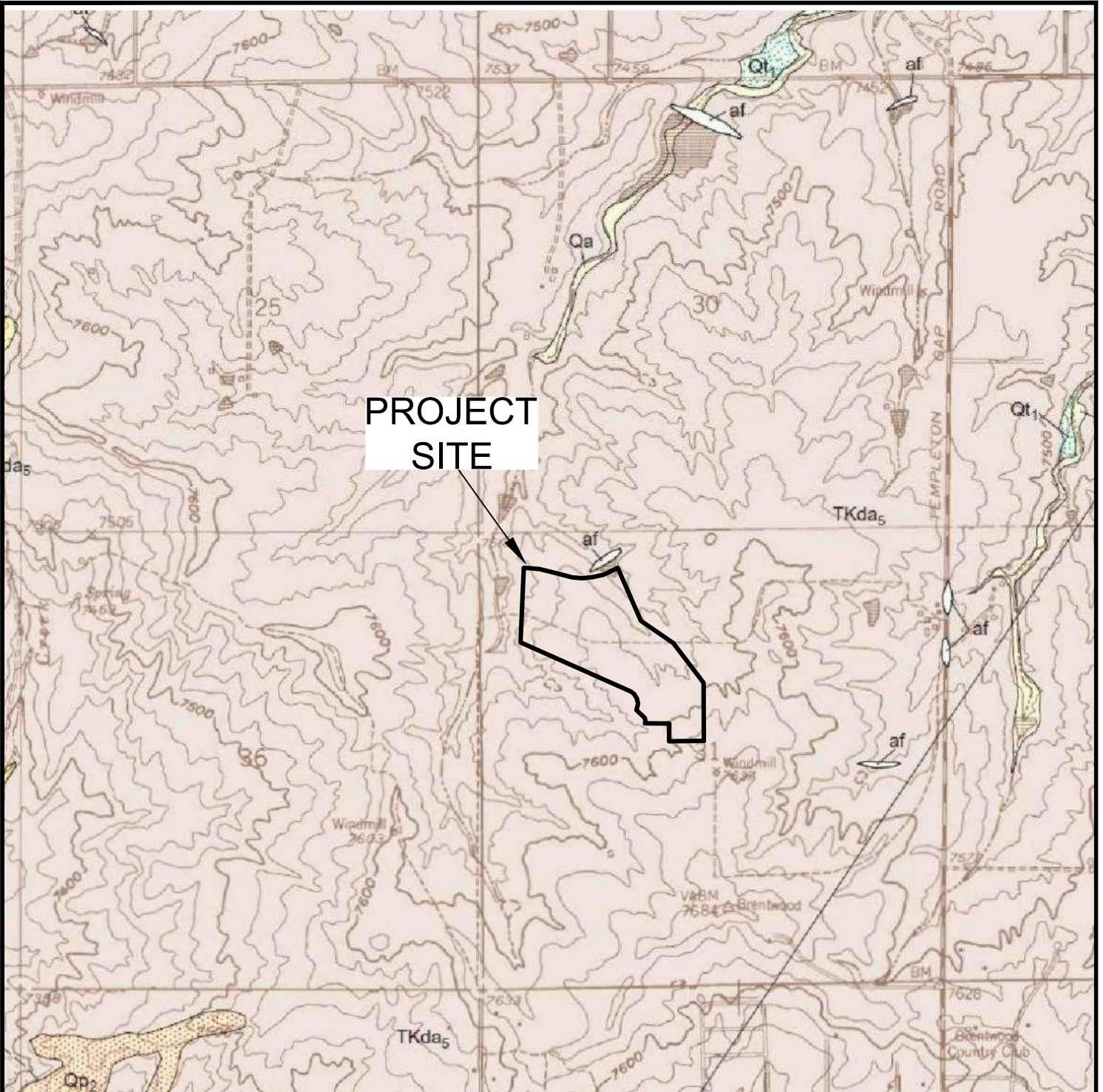


SOIL SURVEY MAP

FLYING HORSE NORTH, FILING NO. 5
FLYING HORSE NORTH, LLC

JOB NO.
241421

FIG. 4



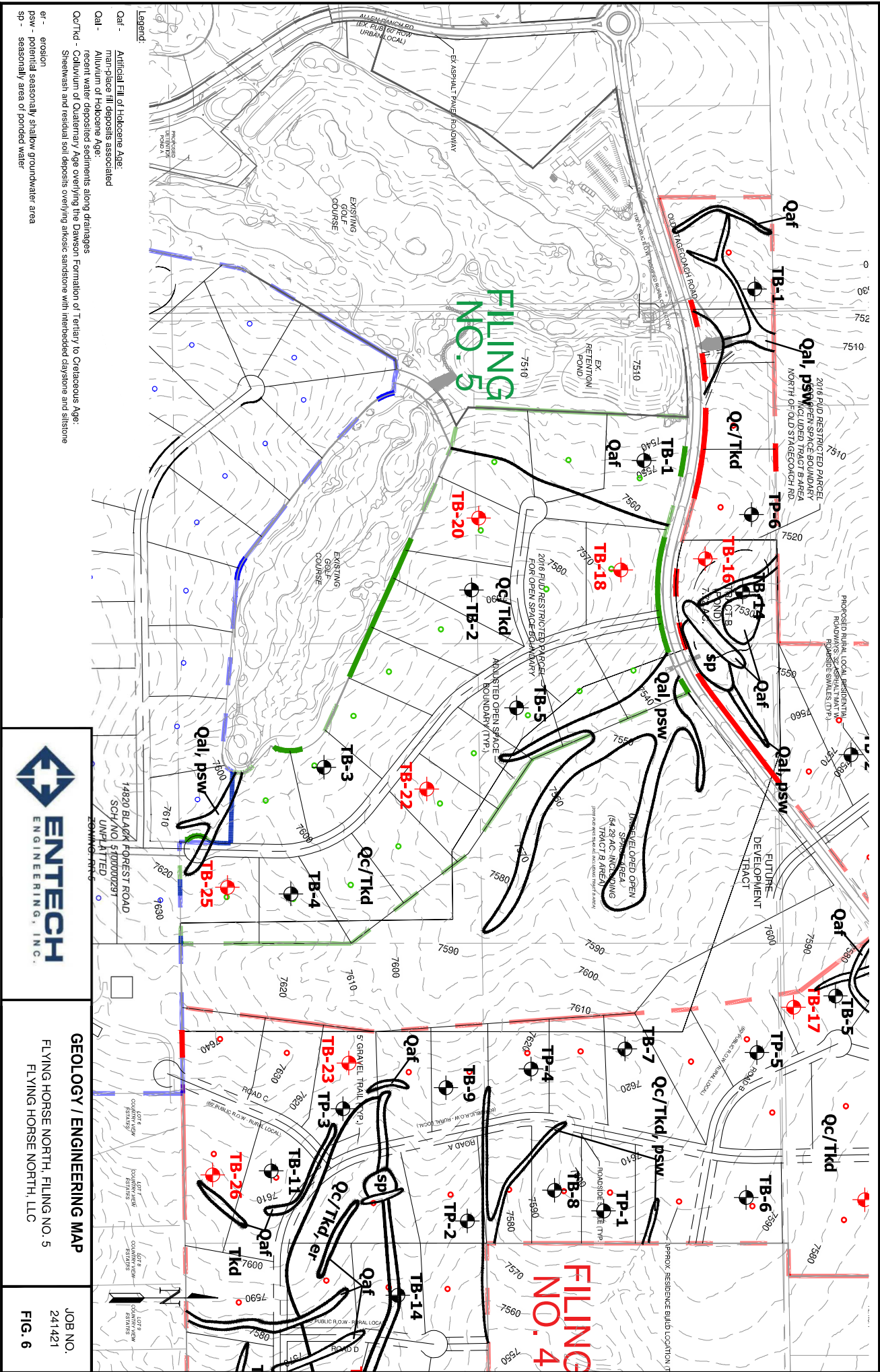
**PROJECT
SITE**



**GEOLOGIC MAP OF THE
BLACK FOREST QUADRANGLE**
FLYING HORSE NORTH, FILING NO. 5
FLYING HORSE NORTH, LLC

JOB NO.
241421

FIG. 5



GEOLOGY / ENGINEERING MAP

FLYING HORSE NORTH, FILING NO. 5
FLYING HORSE NORTH, LLC

JOB NO.
241421

FIG. 6

Legend:

- Qaf - Artificial Fill of Holocene Age;
- psW - man-made fill deposits associated with Alluvium of Holocene Age;
- Qc/Tkd - recent water deposited sediments along drainages
- sp - Colluvium of Quaternary Age overlying the Dawson Formation of Tertiary to Cretaceous Age. Sheetwash and residual soil deposits overlying arkosic sandstone with interbedded claystones and siltstone
- er - erosion
- psw - potential seasonally shallow groundwater area
- sp - seasonally area of ponded water

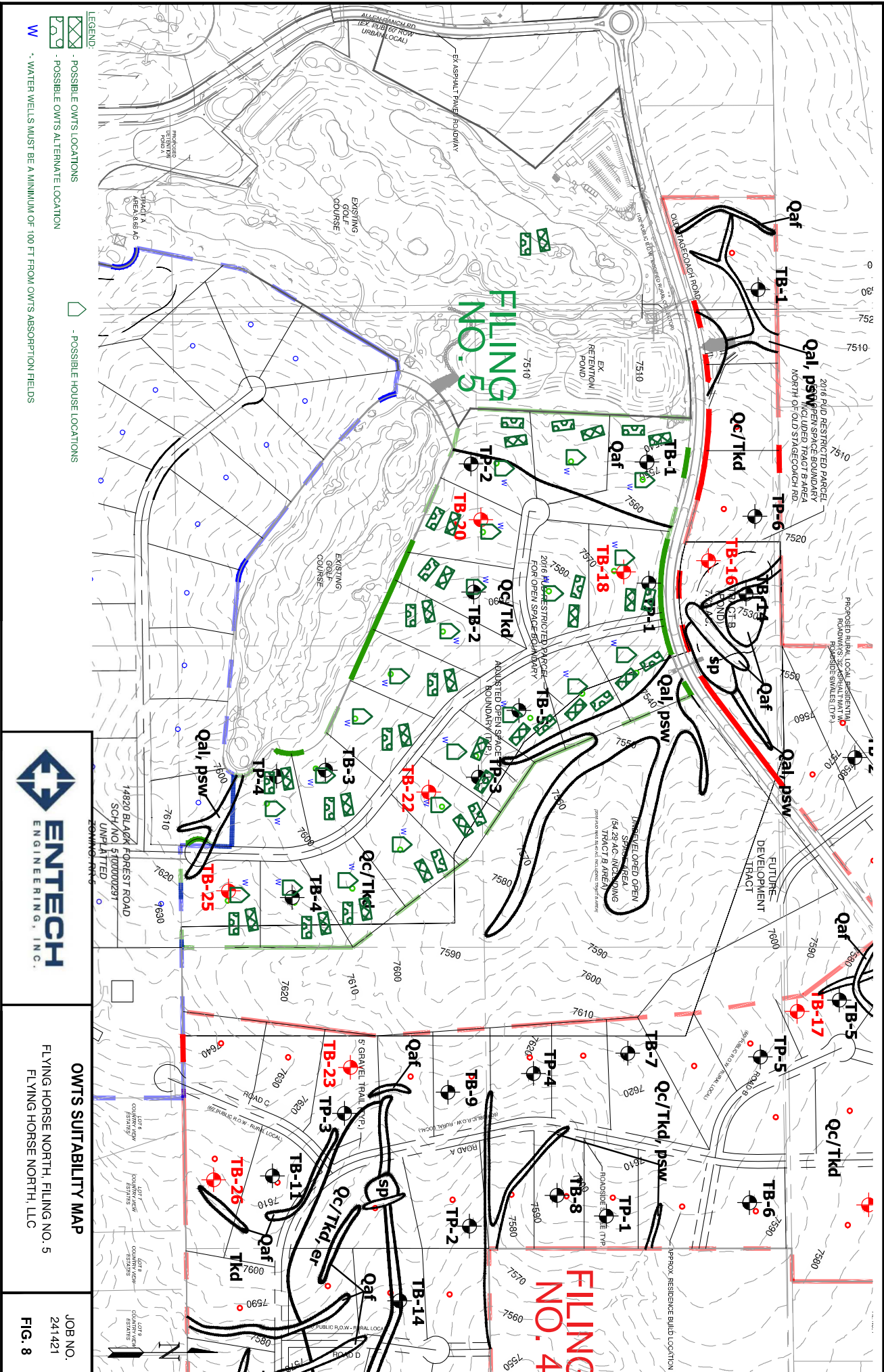


FEMA FLOODPLAIN MAP

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FLYING HORSE NORTH, LLC

JOB NO.
241421

FIG. 7

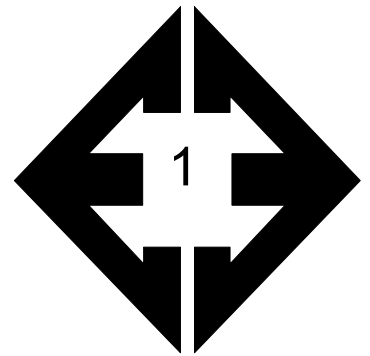


OWT SUITABILITY MAP
FLYING HORSE NORTH, FILING NO. 5
FLYING HORSE NORTH, LLC

JOB NO. 241421
FIG. 8

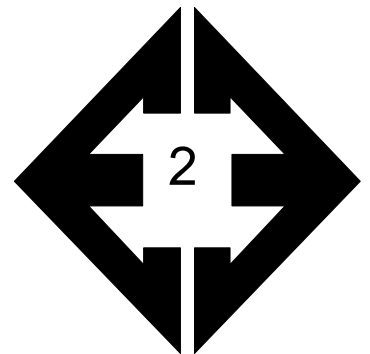


APPENDIX A: Site Photographs



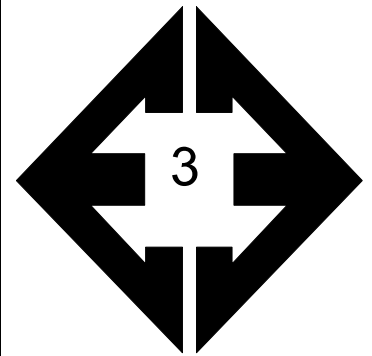
Looking west from the southeastern portion of the site.

September 19, 2024



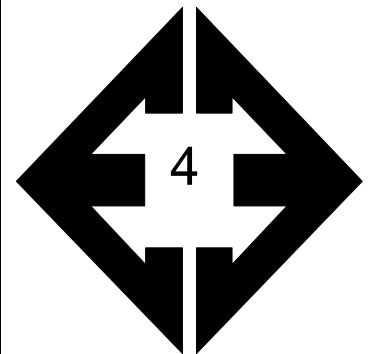
Looking northwest from the southeastern portion of the site.

September 19, 2024



Looking north from the western portion of the site.

September 19, 2024



Looking southeast from the northeastern portion of the site.

September 19, 2024



APPENDIX B: Test Boring and Test Pit Logs

TABLE B-1
DEPTH TO GROUNDWATER, BEDROCK, & FILL

TEST BORING	DEPTH TO GROUNDWATER (ft.)	DEPTH TO BEDROCK (ft.)	DEPTH TO FILL (ft.)
1	>20	>20	4
2	>20	16	0
3	>20	>20	0
4	>20	7	0
5	>20	>20	0

TEST BORING 1
DATE DRILLED 9/18/2024

TEST BORING 2
DATE DRILLED 9/18/2024

REMARKS

REMARKS

DRY TO 20', 9/19/24

DRY TO 20', 9/19/24

FILL 0-4', SAND, CLAYEY, BROWN, MEDIUM DENSE, MOIST

SAND, SILTY, LIGHT BROWN to TAN, MEDIUM DENSE to DENSE, MOIST to DRY

SAND, SILTY, BROWN to TAN, MEDIUM DENSE to DENSE, MOIST

SANDSTONE, EXTREMELY WEAK, TAN, WEATHERED (SAND, SILTY, VERY DENSE, MOIST)

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type	Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
0-4						0-4					
5			11	5.5	1	5			14	7.5	2
5			14	3.5	2	5			20	7.7	2
10			17	3.6	2	10			13	5.0	2
15			12	4.7	2	15			39	2.6	2
20			30	17.4	2	20			50	4.1	4
									10"		



TEST BORING LOGS
FLYING HORSE NORTH, FILING NO. 5
FLYING HORSE NORTH, LLC

JOB NO.
241421

FIG. B-1

TEST BORING 3
 DATE DRILLED 9/18/2024

TEST BORING 4
 DATE DRILLED 9/18/2024

REMARKS

REMARKS

DRY TO 20', 9/19/24

DRY TO 20', 9/19/24

SAND, SILTY, LIGHT BROWN to
 TAN, MEDIUM DENSE to DENSE,
 MOIST

SAND, SILTY, LIGHT BROWN,
 MEDIUM DENSE, MOIST

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
			29	4.2	2
5			38	6.7	2
10			16	6.9	2
15			18	10.8	2
20			37	11.8	2

SANDSTONE, VERY WEAK, TAN,
 MODERATELY WEATHERED
 (SAND, SILTY, VERY DENSE,
 MOIST)

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
				6.7	2
5				11.0	2
10			<u>50</u> 4"	6.0	4
15			<u>50</u> 9"	7.7	4
20			<u>50</u> 9"	9.3	4



TEST BORING LOGS
 FLYING HORSE NORTH, FILING NO. 5
 FLYING HORSE NORTH, LLC

JOB NO.
 241421

FIG. B-2



TEST BORING 5
 DATE DRILLED 9/18/2024

REMARKS

DRY TO 20', 9/19/24

CLAY, SLIGHTLY SANDY, BROWN
 to TAN, VERY STIFF, MOIST

SAND, SILTY, TAN, MEDIUM
 DENSE, MOIST

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
5			16	6.1	3
			15	6.5	3
10			21	3.6	2
15			16	4.2	2
20			36	7.5	2



TEST BORING LOGS
 FLYING HORSE NORTH, FILING NO. 5
 FLYING HORSE NORTH, LLC

JOB NO.
 241421

FIG. B-3

TEST PIT 1
DATE EXCAVATED 9/20/2024

TEST PIT 2
DATE EXCAVATED 9/20/2024

REMARKS

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 clay loam, brown, moist	1						topsoil, sandy clay loam, brown, moist	1					
sandy clay, fine to medium grained, brown, moist	2			bl	m	4	sandy clay, fine to medium grained, brown, moist	2			ma	sl	4A
	3						sandy clay loam, fine to medium grained, brown, moist,	3			ma	sl	3
	4							4					
sandy clay, fine to medium grained, brown, moist	5			ma	sl	4A		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
structureless - sl



TEST PIT LOGS

FLYING HORSE NORTH FILING NO. 5
FLYING HORSE DEVELOPMENT

JOB NO.
241421

FIG. B-4

TEST PIT 3
 DATE EXCAVATED 9/20/2024

TEST PIT 4
 DATE EXCAVATED 9/20/2024

REMARKS

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 clay loam, brown, moist	1						topsoil, sandy clay loam, brown, moist	1					
sandy clay, fine to medium grained, dark brown, moist	2			bl	m	4	sandy clay, fine to medium grained, brown, moist	2			bl	m	4
	3							3					
	4						sandy clay, fine to medium grained, brown, moist, R1	4			ma	sl	4
sandy clay, fine to medium grained, brown, moist	5			bl	s	4A		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
- structureless - sl



TEST PIT LOGS

FLYING HORSE NORTH FILING NO. 5
 FLYING HORSE DEVELOPMENT

JOB NO.
 241421

FIG. B-5

APPENDIX C: Laboratory Testing Results

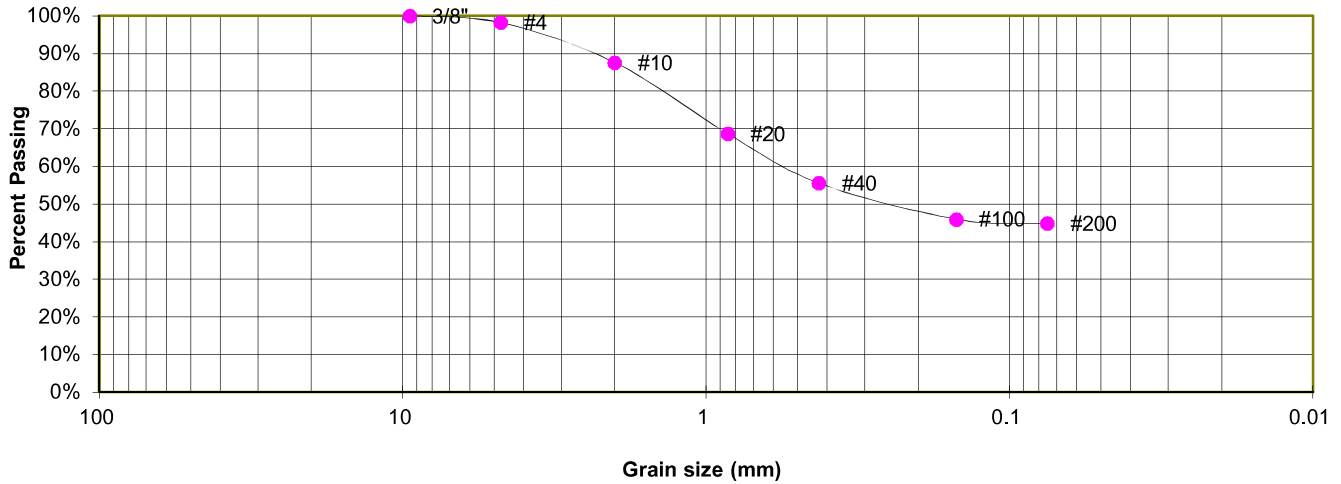
**TABLE C-1
SUMMARY OF LABORATORY TEST RESULTS**

SOIL TYPE	TEST BORING NO.	DEPTH (FT)	PASSING NO. 200 SIEVE (%)	LIQUID LIMIT	PLASTIC LIMIT	PLASTIC INDEX	SULFATE (WT %)	USCS	SOIL DESCRIPTION
1	1	5	44.8				#DIV/0!	SC	SAND, CLAYEY SAND, SILTY
2	3	5	19.5					SM	SAND, SILTY
3	5	2-3	99.1				#DIV/0!	CL	CLAY, SLIGHTLY SANDY SANDSTONE (SAND, SILTY)
4	2	20	14.9	NV	NP	NP	#DIV/0!	SM	SANDSTONE (SAND, SILTY)
4	4	10	41.2					SM	SANDSTONE (SAND, SILTY)

TEST BORING 1
DEPTH (FT) 5

SOIL DESCRIPTION SAND, CLAYEY
SOIL TYPE 1

Sieve Analysis Grain Size Distribution



GRAIN SIZE ANALYSIS

U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	100.0%
4	98.2%
10	87.6%
20	68.7%
40	55.6%
100	46.0%
200	44.8%

SOIL CLASSIFICATION

USCS CLASSIFICATION: SC



LABORATORY TEST RESULTS

FLYING HORSE NORTH, FILING NO. 5
FLYING HORSE NORTH, LLC

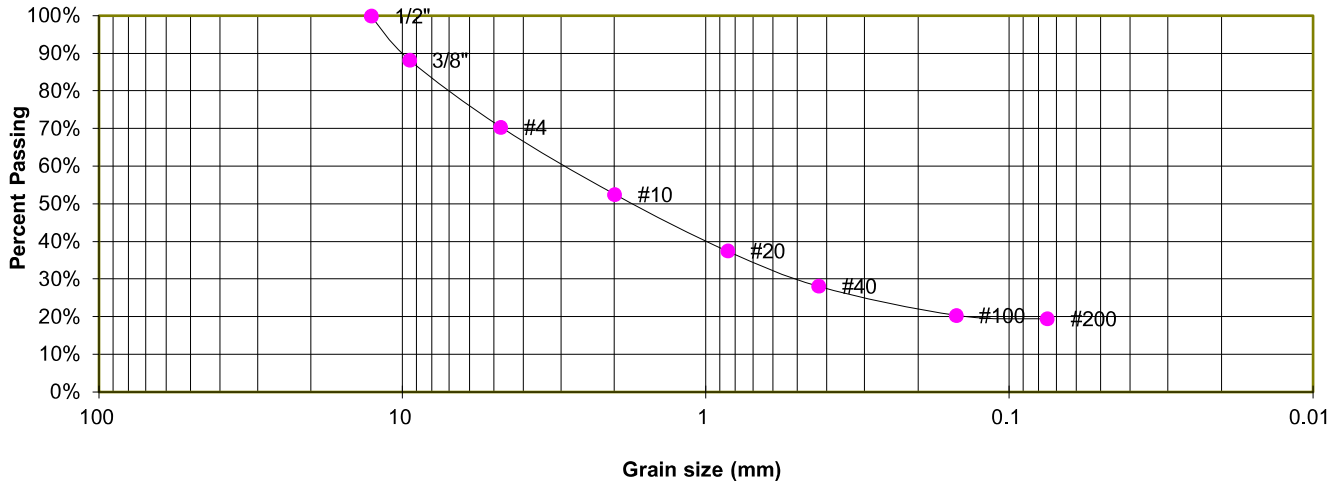
JOB NO.
241421

FIG. C-1

TEST BORING 3
DEPTH (FT) 5

SOIL DESCRIPTION SAND, SILTY
SOIL TYPE 2

Sieve Analysis Grain Size Distribution



GRAIN SIZE ANALYSIS

U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	100.0%
3/8"	88.3%
4	70.4%
10	52.5%
20	37.5%
40	28.1%
100	20.4%
200	19.5%

SOIL CLASSIFICATION

USCS CLASSIFICATION: SM



LABORATORY TEST RESULTS

FLYING HORSE NORTH, FILING NO. 5
FLYING HORSE NORTH, LLC

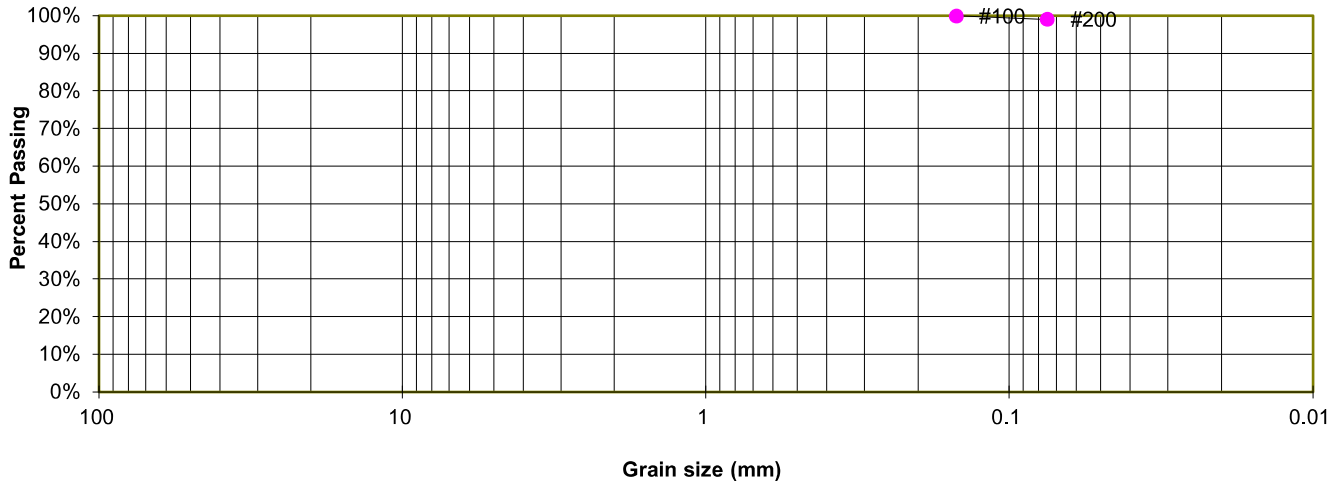
JOB NO.
241421

FIG. C-2

TEST BORING 5
DEPTH (FT) 2-3

SOIL DESCRIPTION CLAY, SLIGHTLY SANDY
SOIL TYPE 3

**Sieve Analysis
Grain Size Distribution**



GRAIN SIZE ANALYSIS

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

SOIL CLASSIFICATION

USCS CLASSIFICATION: CL



LABORATORY TEST RESULTS

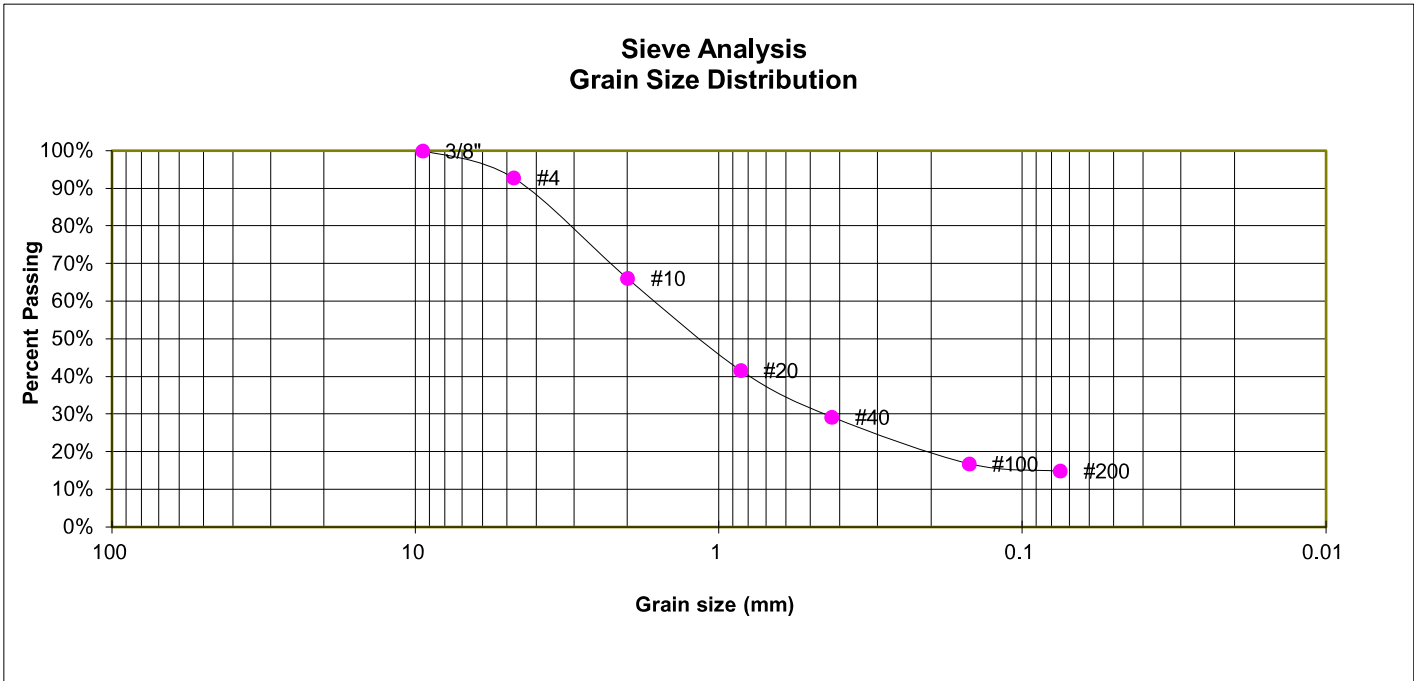
FLYING HORSE NORTH, FILING NO. 5
FLYING HORSE NORTH, LLC

JOB NO.
241421

FIG. C-3

TEST BORING 2
 DEPTH (FT) 20

SOIL DESCRIPTION SANDSTONE (SAND, SILTY)
 SOIL TYPE 4



GRAIN SIZE ANALYSIS

U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	100.0%
4	92.8%
10	66.1%
20	41.7%
40	29.3%
100	16.8%
200	14.9%

ATTERBERG LIMITS

Plastic Limit	NP
Liquid Limit	NV
Plastic Index	NP

SOIL CLASSIFICATION

USCS CLASSIFICATION: SM



LABORATORY TEST RESULTS

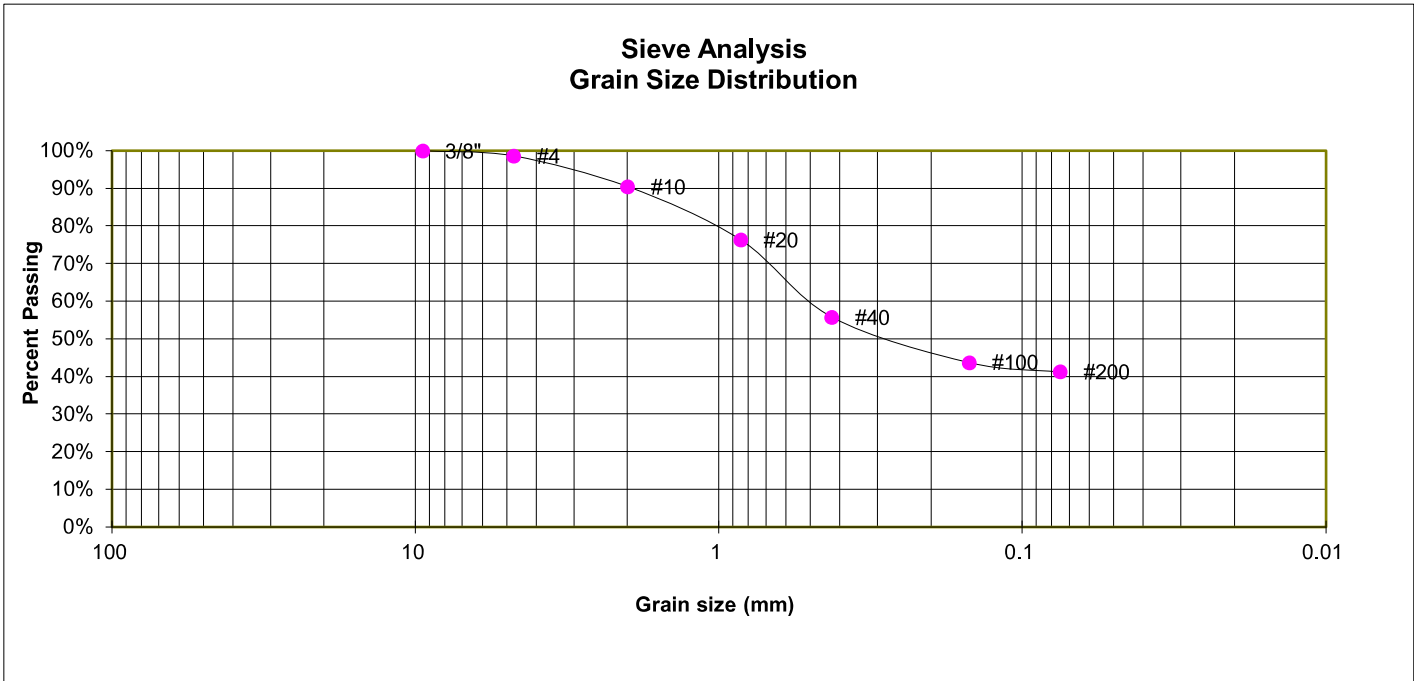
FLYING HORSE NORTH, FILING NO. 5
 FLYING HORSE NORTH, LLC

JOB NO.
 241421

FIG. C-4

TEST BORING 4
 DEPTH (FT) 10

SOIL DESCRIPTION SANDSTONE (SAND, SILTY)
 SOIL TYPE 4



GRAIN SIZE ANALYSIS

U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	100.0%
4	98.6%
10	90.5%
20	76.4%
40	55.8%
100	43.8%
200	41.2%

SOIL CLASSIFICATION

USCS CLASSIFICATION: SM



LABORATORY TEST RESULTS

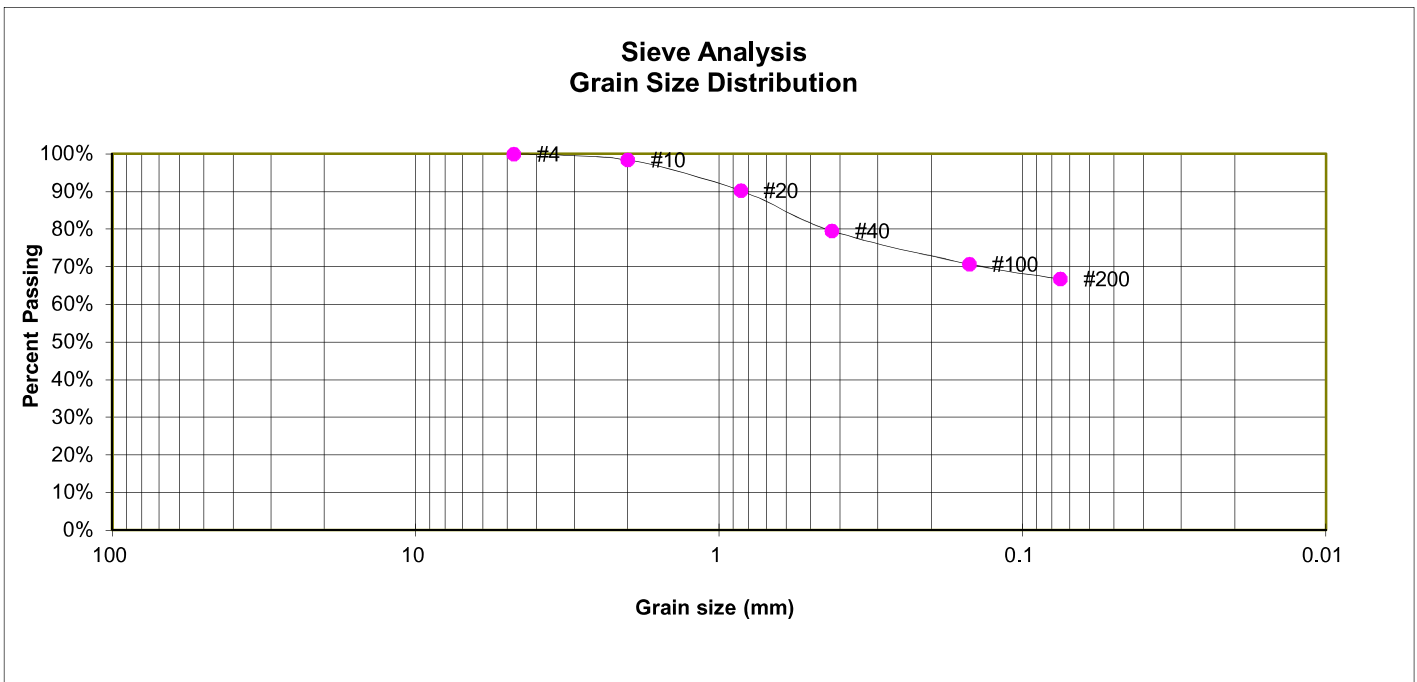
FLYING HORSE NORTH, FILING NO. 5
 FLYING HORSE NORTH, LLC

JOB NO.
 241421

FIG. C-5

TEST BORING TP-1
DEPTH (FT) 2

SOIL DESCRIPTION CLAY, SANDY



GRAIN SIZE ANALYSIS

U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	
4	100.0%
10	98.4%
20	90.2%
40	79.5%
100	70.7%
200	66.7%

SOIL CLASSIFICATION

USCS CLASSIFICATION: CL



LABORATORY TEST RESULTS

FLYING HORSE NORTH, FILING NO. 5
FLYING HORSE NORTH, LLC

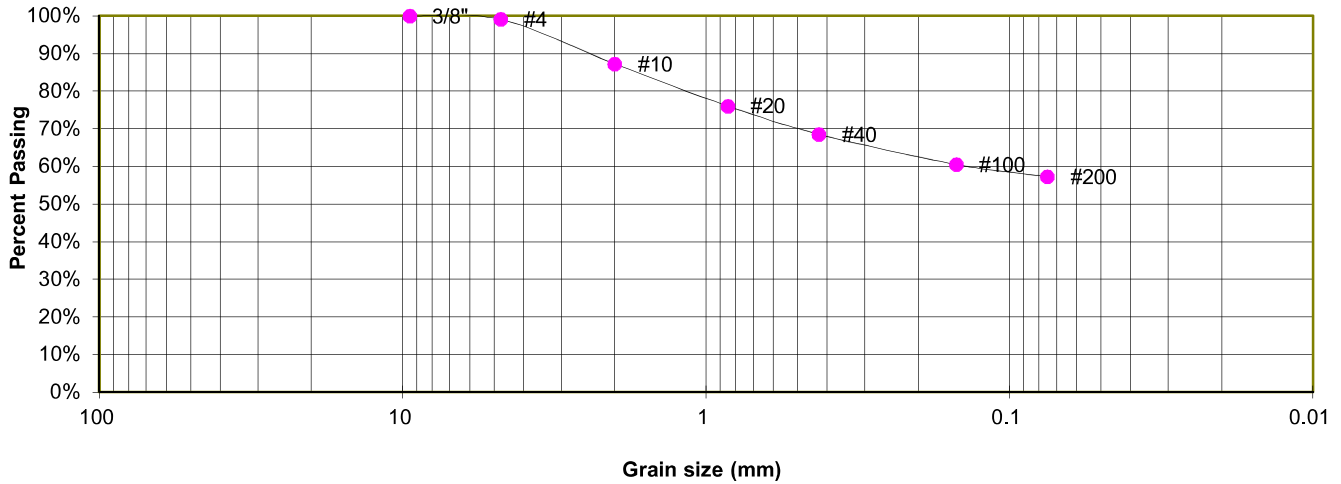
JOB NO.
241421

FIG. C-6

TEST BORING TP-2
 DEPTH (FT) 2

SOIL DESCRIPTION CLAY, SANDY

**Sieve Analysis
 Grain Size Distribution**



GRAIN SIZE ANALYSIS

U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	100.0%
4	99.1%
10	87.2%
20	76.1%
40	68.6%
100	60.5%
200	57.3%

SOIL CLASSIFICATION

USCS CLASSIFICATION: CL



LABORATORY TEST RESULTS

FLYING HORSE NORTH, FILING NO. 5
 FLYING HORSE NORTH, LLC

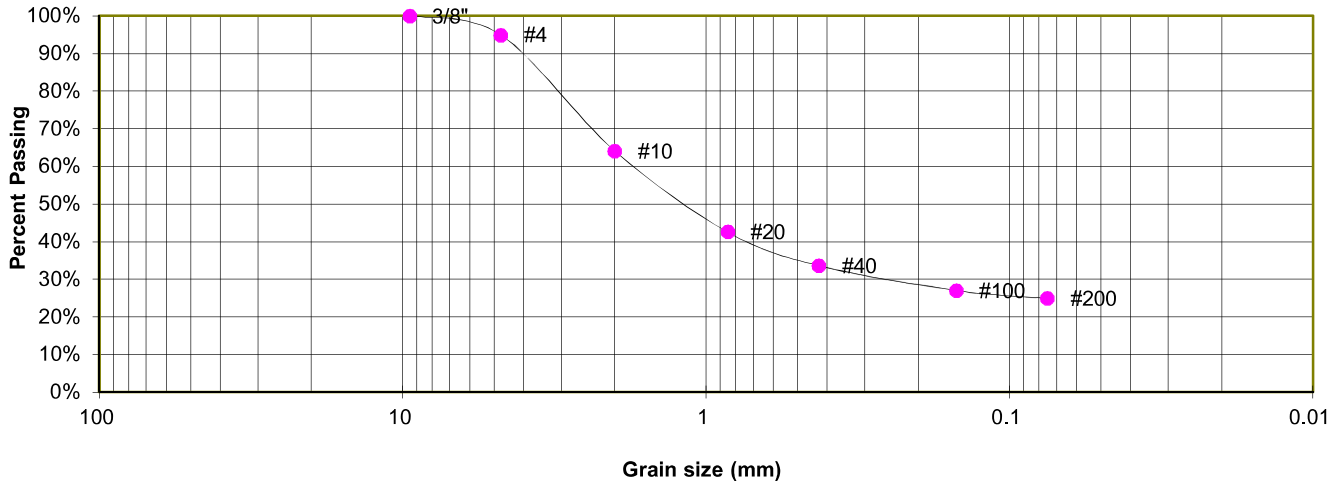
JOB NO.
 241421

FIG. C-7

TEST BORING TP-2
DEPTH (FT) 3.5

SOIL DESCRIPTION SAND, CLAYEY

Sieve Analysis Grain Size Distribution



GRAIN SIZE ANALYSIS

U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	100.0%
4	95.0%
10	64.1%
20	42.6%
40	33.7%
100	27.0%
200	25.0%

SOIL CLASSIFICATION

USCS CLASSIFICATION: SC



LABORATORY TEST RESULTS

FLYING HORSE NORTH, FILING NO. 5
FLYING HORSE NORTH, LLC

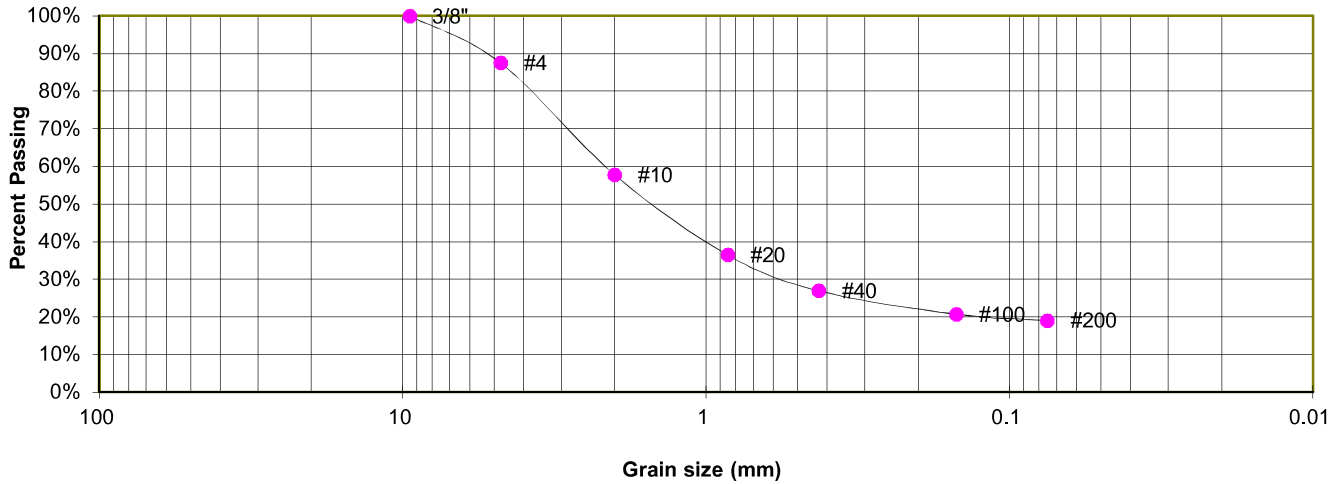
JOB NO.
241421

FIG. C-7

TEST BORING TP-4
DEPTH (FT) 4

SOIL DESCRIPTION SAND, SILTY

**Sieve Analysis
Grain Size Distribution**



GRAIN SIZE ANALYSIS

U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	100.0%
4	87.5%
10	57.8%
20	36.5%
40	26.9%
100	20.7%
200	19.1%

SOIL CLASSIFICATION

USCS CLASSIFICATION: SM



LABORATORY TEST RESULTS

FLYING HORSE NORTH, FILING NO. 5
FLYING HORSE NORTH, LLC

JOB NO.
241421

FIG. C-8



**APPENDIX D: EEI Laboratory Testing Summary and
Test Boring Logs Job No. 220404**

TEST BORING 17
DATE DRILLED 12/28/2023

TEST BORING 18
DATE DRILLED 1/3/2024

REMARKS

REMARKS

DRY TO 20', 12/28/23

DRY TO 20', 1/3/24

6" TOPSOIL
CLAY, SANDY, BROWN, VERY STIFF, MOIST

SILT, SANDY, BROWN, MEDIUM STIFF, MOIST

CLAY, SANDY, BROWN, VERY STIFF, MOIST

SAND, SILTY, TAN, DENSE, MOIST

SANDSTONE, VERY WEAK, OLIVE, HIGHLY WEATHERED (SAND, SILTY, VERY DENSE, MOIST)

SAND, SILTY, TAN, MEDIUM DENSE, MOIST

SAND, SILTY, TAN, DENSE, MOIST (SANDSTONE, WEAK, RESIDUAL SOIL)

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type	Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
0-6"	[Diagonal Hatching]					0-6"	[Diagonal Hatching]				
6-11"	[Diagonal Hatching]		19	8.0	2	6-11"	[Diagonal Hatching]		23	6.5	1
11-16"	[Vertical Lines]		5	8.6	2	11-16"	[Vertical Lines]		17	13.8	1
16-20"	[Diagonal Hatching]		22	3.8	2	16-20"	[Diagonal Hatching]		27	12.5	1
20-25"	[Vertical Lines]		44	3.9	1	20-25"	[Vertical Lines]		47	8.9	1
25-30"	[Vertical Lines]		50	4.4	4	25-30"	[Vertical Lines]		49	11.1	1
			10"								



TEST BORING LOGS
FLYING HORSE NORTH SKETCH PLAN
FLYING HORSE DEVELOPMENT

JOB NO.
220404

FIG. B-9

TEST BORING 19
 DATE DRILLED 1/3/2024

TEST BORING 20
 DATE DRILLED 1/3/2024

REMARKS

REMARKS

DRY TO 20', 1/3/24

DRY TO 20', 1/3/24

SAND, SILTY, TAN, MEDIUM
 DENSE, MOIST

CLAY, SANDY, TAN, STIFF, MOIST

CLAY, SANDY, TAN, STIFF, MOIST

SAND, SILTY, BROWN, MEDIUM
 DENSE to DENSE, MOIST

SAND, SILTY, TAN, DENSE to
 DENSE, MOIST (SANDSTONE,
 WEAK, RESIDUAL SOIL)

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
0					
5			20	6.7	1
5			26	8.6	1
10			15	13.6	2
15			45	7.5	1
20			50	8.1	1

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
0					
5			7	9.7	2
5			9	14.7	2
10			16	5.3	1
15			34	4.3	1
20			15	11.7	1



TEST BORING LOGS
 FLYING HORSE NORTH SKETCH PLAN
 FLYING HORSE DEVELOPMENT

JOB NO.
 220404

FIG. B-10

TEST BORING 21
 DATE DRILLED 1/9/2024

TEST BORING 22
 DATE DRILLED 1/9/2024

REMARKS

REMARKS

DRY TO 20', 1/9/24

DRY TO 20', 1/9/24

SAND, SILTY, BROWN to TAN,
 MEDIUM DENSE to DENSE,
 MOIST

SAND, CLAYEY, LIGHT BROWN,
 LOOSE, MOIST

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
5			11	6.7	1
5			27	4.4	1
10			11	7.8	1
15			36	11.5	1
20			50	8.9	3
			11"		

SANDSTONE, VERY WEAK, OLIVE,
 HIGHLY WEATHERED (SAND,
 SILTY, VERY DENSE, MOIST)

CLAY, WITH SAND, STIFF, MOIST

SAND, SILTY, TAN, DENSE, MOIST

SANDSTONE, VERY WEAK, OLIVE,
 HIGHLY WEATHERED (SAND,
 SILTY, VERY DENSE, MOIST)

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
5			8	9.4	1
5			10	14.2	2
10			11	10.3	2
15			44	4.7	1
20			50	3.2	4
			9"		



TEST BORING LOGS
 FLYING HORSE NORTH SKETCH PLAN
 FLYING HORSE DEVELOPMENT

JOB NO.
 220404

FIG. B-11

TEST BORING 25
 DATE DRILLED 1/9/2024

TEST BORING 26
 DATE DRILLED 1/9/2024

REMARKS

REMARKS

DRY TO 20', 1/9/24

DRY TO 20', 1/9/24

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
0 - 6"	Diagonal lines		21	6.2	2
6" - 5'	Diagonal lines		19	16.4	2
5' - 10'	Dotted pattern		50 8"	8.1	3
10' - 15'	Dotted pattern		50 9"	10.0	3
15' - 20'	Dotted pattern		50 10"	8.9	3

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
0 - 5'	Diagonal lines		12	13.0	1
5' - 10'	Diagonal lines		12	6.2	1
10' - 15'	Dotted pattern		23	7.7	1
15' - 20'	Dotted pattern		50 11"	6.8	1
20' - 25'	Dotted pattern		41	12.6	1

6" TOPSOIL
 CLAY, WITH SAND, BROWN to OLIVE, VERY STIFF, MOIST

SANDSTONE, VERY WEAK, TAN to OLIVE, HIGHLY WEATHERED (SAND, CLAYEY, VERY DENSE, MOIST)

SAND, CLAYEY, BROWN, MEDIUM DENSE, MOIST

SAND, SILTY, BROWN to TAN, MEDIUM DENSE, MOIST

SAND, SILTY, TAN, DENSE to VERY DENSE, MOIST (SANDSTONE, WEAK, RESIDUAL SOIL)



TEST BORING LOGS
 FLYING HORSE NORTH SKETCH PLAN
 FLYING HORSE DEVELOPMENT

JOB NO.
 220404
FIG. B-13

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

SOIL TYPE	TEST BORING NO.	DEPTH (FT)	WATER (%)	DRY DENSITY (PCF)	PASSING NO. 200 SIEVE (%)	LIQUID LIMIT	PLASTIC LIMIT	PLASTIC INDEX	SULFATE (WT %)	FHA SWELL (PSF)	SWELL/ CONSOL (%)	USCS	SOIL DESCRIPTION
1	18	15			14.8					270		SM	SAND, SILTY
2	20	2-3			64.6							CL	CLAY, SANDY
2	22	5			77.2							CL	CLAY, WITH SAND
2	25	5	16.8	111.3	71.2						-0.3	CL	CLAY, WITH SAND

APPENDIX E: Soil Survey Descriptions

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

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

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 4c

Hydrologic Soil Group: B

Ecological site: R049XY216CO - Sandy Divide

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

Drainage class: Well drained

Runoff class: Low

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

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Available water supply, 0 to 60 inches: Low (about 6.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 3e

Hydrologic Soil Group: B

Ecological site: R048AY222CO - Loamy Park

Hydric soil rating: No

Minor Components

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 21, Aug 24, 2023