



ENTECH
ENGINEERING, INC.

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September 22, 2021
Revised June 22, 2023

Vertex Consulting
455 East Pikes Peak Avenue, Suite 101
Colorado Springs, Colorado 80903

Attn: Nina Ruiz

Re: Wastewater Study
Joyful View Subdivision
Joyful View & Peyton Highway
Schedule Nos. 33000-00-466 & 33000-00-467
El Paso County, Colorado

PCD File # SF-22-31

Dear Ms. Ruiz:

The project consists of subdividing 70.19-acres; nine (9) residential lots are proposed as part of the subdivision. southeast of Joyful View and Peyton Highway in El Paso County, Colorado. The report was revised to address El Paso County review comments and update site maps with the latest plat.

GENERAL SITE CONDITIONS AND PROJECT DESCRIPTION

The site is located in a portion SW¼ of Section 33, Township 13 South, Range 63 West of the 6th Principal Meridian in El Paso County, Colorado. The site is located approximately 8¾ miles southeast of Falcon, Colorado, southeast of Joyful View and Peyton Highway 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 sloping to the southeast with moderate slopes the along the drainage in the southeastern portion of the site. A drainage is located along the southern side of the site and a minor drainage swales are located in the northern and central portions of the site. The drainage flows in a 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 agricultural grazing and undeveloped land. The site contains primarily field grasses, weeds, yucca and cacti. Site photographs, taken February 23, 2021, are included in Appendix A.

Total acreage involved in the proposed subdivision is 70.19-acres. Nine residential lots are proposed as part of the replat. The proposed lot sizes of 5.1 to 18.6-acres. The lots will be serviced by individual water wells and on-site wastewater treatment systems. The Site Plan is presented in Figure 3.

SCOPE OF THE REPORT

The scope of the report will include the following:

A general geologic analysis utilizing published geologic data. Detailed site-specific mapping will be conducted to obtain general information in respect to major geographic and geologic features,

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geologic descriptions and their effects on the development of the property with regards to on-site wastewater treatment systems.

PREVIOUS INVESTIGATIONS:

The site was previously investigated by Kumar and Associates, Inc., with the results presented in the *Geology and Soils Report*, dated June 6, 2017 (Reference 1, Appendix B). Subsurface soils information from the report was used in preparing this Soil, Geology, and Geologic Hazard Evaluation. Five test borings were drilled across the site. The Test Boring Logs, and Lab Summary from the Kumar investigation are included in Appendix B.

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 2), previously the Soil Conservation Service (SCS) survey was also reviewed to evaluate the site (Reference 3). 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 23, 2021.

Three 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 pits are indicated on the Site Plan/Test Boring Location Map, Figure 3. The Test Pit Logs are presented in Appendix C, and Laboratory Testing results are included in Appendix D.

SOIL AND GEOLOGIC CONDITIONS:

Soil Survey

The Natural Resource Conservation Service (NRCS) (Reference 2, Figure 4), previously the Soil Conservation Service (Reference 3) has mapped three soil types on the site. Complete descriptions of the soils are presented in Appendix E. In general, the soils consist of sandy loam. The soils are described as follows:

<u>Type</u>	<u>Description</u>
8	Blakeland Loamy San, 1 – 9% Slopes
10	Blendon Sandy Loam, 0 – 3% Slopes
97	Truckton Sandy Loam, 3 – 9% Slopes

The soils have been described to have moderate to rapid 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).

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Soils

Two soil types and one bedrock type were encountered in the test borings drilled by Kumar and Associates, Inc., on March 15, 2010 for the Geology and Soils Report (Reference 1, Appendix B): Type 1: clayey sand to sandy clay (SC, CL), Type 2: silty sand to well-graded sand with silt (SM, SW-SM), Type 3: medium to hard occasionally clayey sandstone. Bedrock was encountered at 12 to 13 feet bgs in test borings 3 and 5. Each soil and bedrock type were classified in accordance with the Unified Soil Classification System (USCS) using the laboratory testing results and the observations made during drilling.

Soils encountered in the test pits excavated by Entech Engineering, Inc. consisted of silty to clayey sand and sandy clay. Bedrock was not encountered in the test pits which were excavated to depths of 8 feet.

Groundwater

Groundwater was not encountered in the test pits or observed in the drainages at the time of our site investigation. 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.

Drainage Areas/Floodplains

A drainage is located along the southern side of the site and minor drainage swales are located in the northern and central portions of the site. The drainage flow in a southeasterly direction, and water was not observed in the drainages at the time of this investigation. The drainages have been mapped as potentially seasonal shallow groundwater areas. These areas are indicated in the Geology/Engineering Geology Map (Figure 6) and are discussed below. Due to the size of the proposed lots these areas can be avoided or redirected around proposed structures or proposed soil treatment areas. The proposed building areas are not affected by these areas.

The southern portion of the site lies within a mapped floodplain zone according to the FEMA Map No. 08041CO805G dated December 7, 2018 (Figure 7, Reference 7). The floodplains area located in no-build area and will be avoided by future development on the lots. Finished floor levels must be a minimum of one foot above the floodplain level. Exact locations of floodplain and specific drainage studies are beyond the scope of this report.

Geology

Approximately 22 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 4). Overlying the Dawson Formation are deposits of man-made fill soils and alluvial deposited sands and clays.

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The geology of the site was evaluated using the *Geologic Map of Pueblo 1-degree x 2-degrees' quadrangle, South-Central Colorado*, by Scott, G.R., et.al. in 1976, (Reference 4). The Geology Map for the site is presented in Figure 6. Three mappable units were identified on this site which is described as follows:

- Qaf Artificial Fill of Holocene Age:** These consist of man-made fill deposits associated with the erosion berm along the drainage in the southeastern portion of the site.
- Qes Eolian Sands of Quaternary Age:** These are wind-blown sands deposited by the action of prevailing winds. The materials typically consist of silty sands and may contain sandy silt layers.
- Qp Piney Creek Alluvium of Quaternary Age:** This material is a water-deposited alluvium, typically classified as a silty to well-graded sand, brown to dark brown in color and of moderate density. The Piney Creek Alluvium can sometimes be very highly stratified containing thin layers of very silty and clayey soil.

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 4). The 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 2), previously the Soil Conservation Service (Reference 3) has been mapped with three soil descriptions. The Soil Survey Map (Reference 3) is presented in Figure 4, and the Soil Survey Descriptions (Reference 3) are presented in Appendix E. The soils are described as having moderate to rapid percolation rates.

Soils encountered in the tactile test pits consisted of sandy clay loam, overlying clay to sandy clay with underlying sandy loam. The limiting layer encountered in the test pits is the clay to sandy clay soils, which corresponds with USDA Soil Type 4 with an LTAR value of 0.20 gallons per day per square foot. Signs of bedrock and seasonally occurring bedrock were not observed in the test pits but are common in this area of study. Absorption fields must be maintained a minimum of 4 feet above any groundwater, groundwater evidence, bedrock, or confining layers. Should groundwater or bedrock be encountered within 6 feet of the surface, designed systems will be required. Designed systems are anticipated for the majority of the lots in this subdivision, however, areas may be encountered on the lot 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 would likely be required for the majority of the lots, some lots may be suitable for conventional systems provided shallow bedrock, restrictive clay soils, groundwater evidence or groundwater

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are not encountered in the soil treatment areas. The Septic Suitability Map is presented in Figure 8. Possible house locations with water wells, and two septic sites for the lots are indicated on Figure 8. 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 foundation recommendations will be provided when investigations are completed at each building site prior to new construction.

This report has been prepared for Vertex Consulting 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:

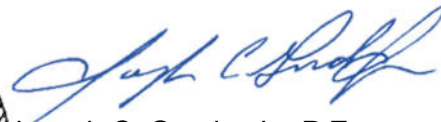


Logan L. Langford, P.G.
Geologist

LLL/jhr

Encl.

Entech Job No. 210182
AAprojects/2021/210182 wws



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

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Wastewater Study
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BIBLIOGRAPHY

1. Kumar and Associates, Inc., dated April 19, 2010. *Geology and Soils Report, Grandview Vicinity of Joyful View and N. Peyton Highway, El Paso County, Colorado.*
2. Natural Resource Conservation Service, September 13, 2019. *Web Soil Survey.* United States Department Agriculture, <http://websoilsurvey.sc.egov.usda.gov/App/HomePage.htm>.
3. United States Department of Agriculture Soil Conservation Service. June 1981. *Soil Survey of El Paso County Area, Colorado.*
4. 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.
5. Federal Emergency Management Agency. December 7, 2018. *Flood Insurance Rate Maps for the City of Colorado Springs, Colorado.* Map Number 08041CO805G.
6. El Paso County Planning Development. December 1995. *El Paso County Aggregate Resource Evaluation Maps.*
7. 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.
8. 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



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VICINITY MAP
JOYFUL VIEW & PEYTON HIGHWAY
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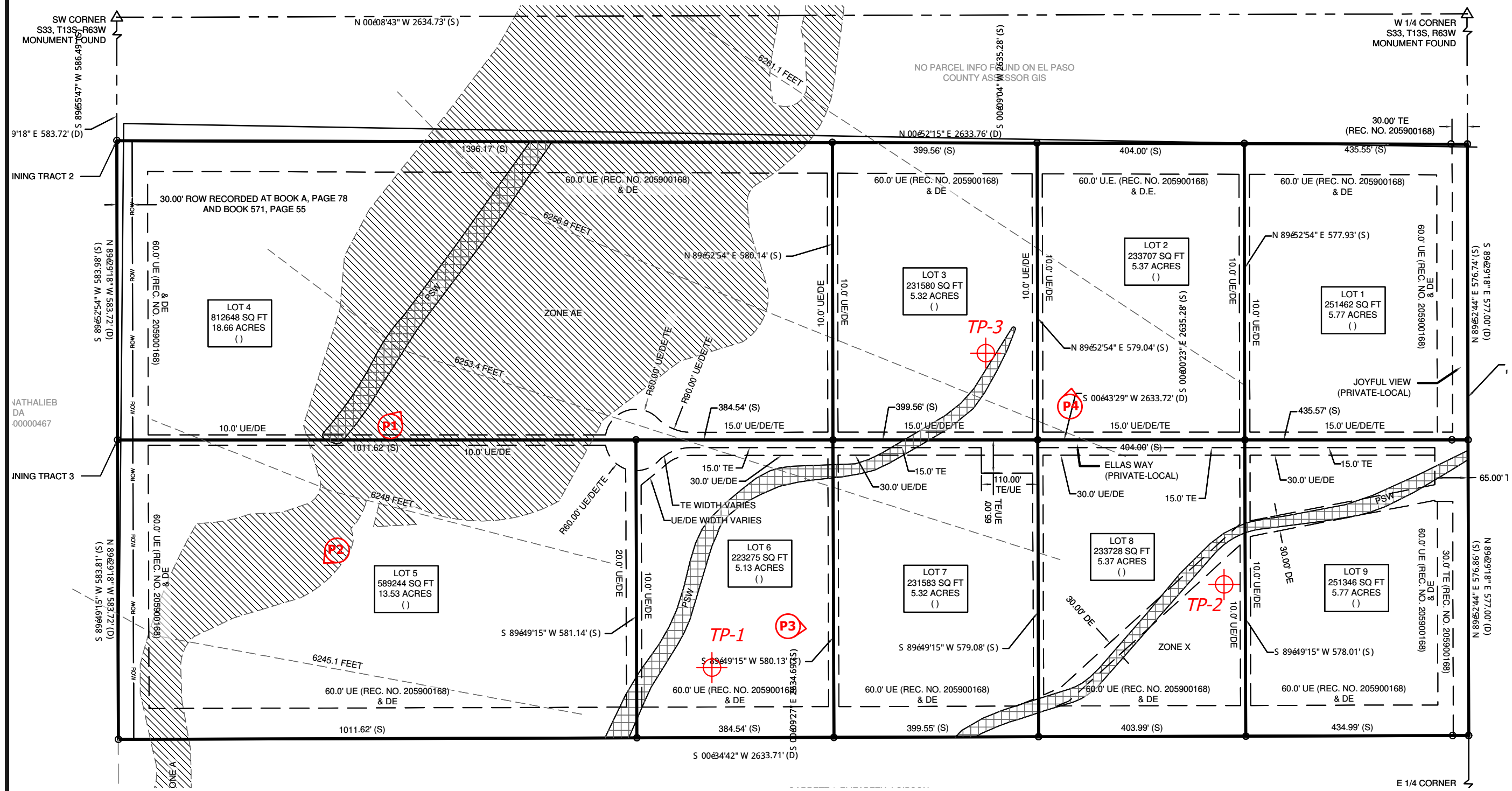
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FIG. 1



JOYFUL VIEW SUBDIVISION

A PART OF SECTION 33, TOWNSHIP 13 SOUTH, RANGE 63 WEST OF THE
SIXTH PRINCIPAL MERIDIAN, COUNTY OF EL PASO, STATE OF COLORADO



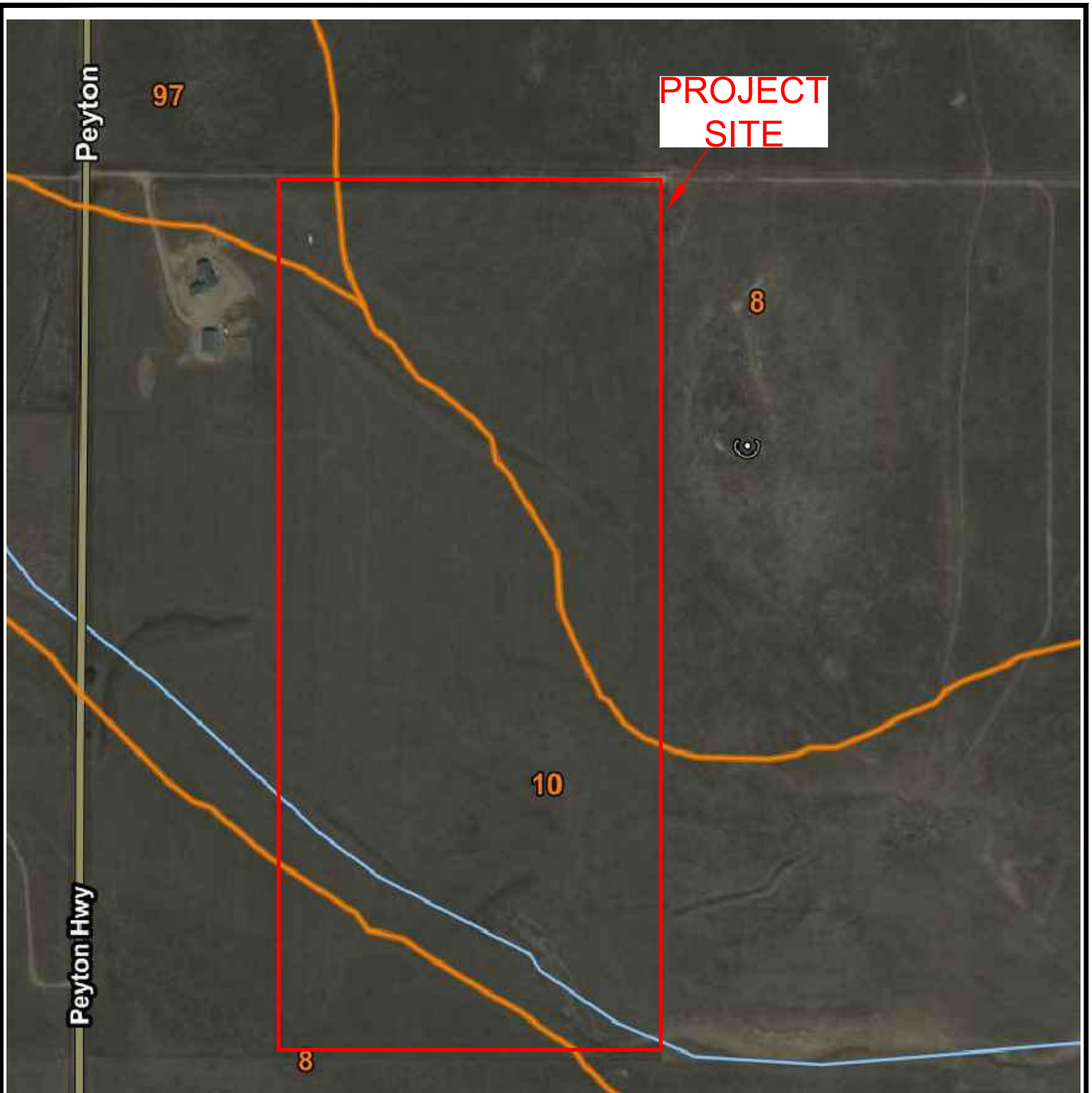
⊕ - APPROXIMATE TEST BORING LOCATION AND NUMBER
P1 - APPROXIMATE PHOTOGRAPH LOCATION AND NUMBER

REVISION	BY



SITE PLANT/TESTING LOCATION MAP
JOYFUL VIEW & PEYTON HIGHWAY
VERTEX CONSULTING

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FIG. 3

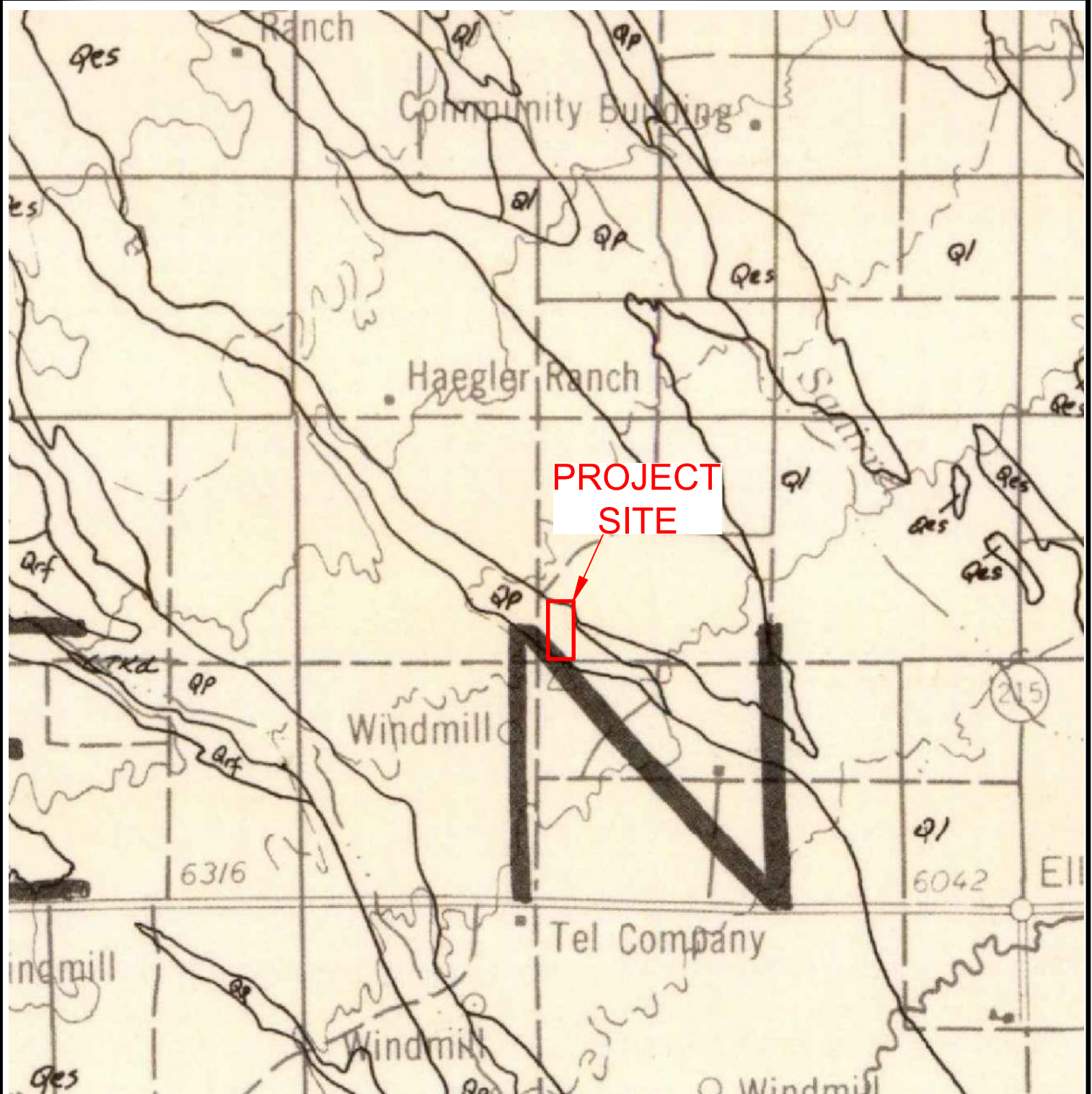


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SOIL SURVEY MAP
JOYFUL VIEW & PEYTON HIGHWAY
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FIG. 4



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FALCON QUADRANGLE GEOLOGIC MAP
JOYFUL VIEW & PEYTON HIGHWAY
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FIG. 5

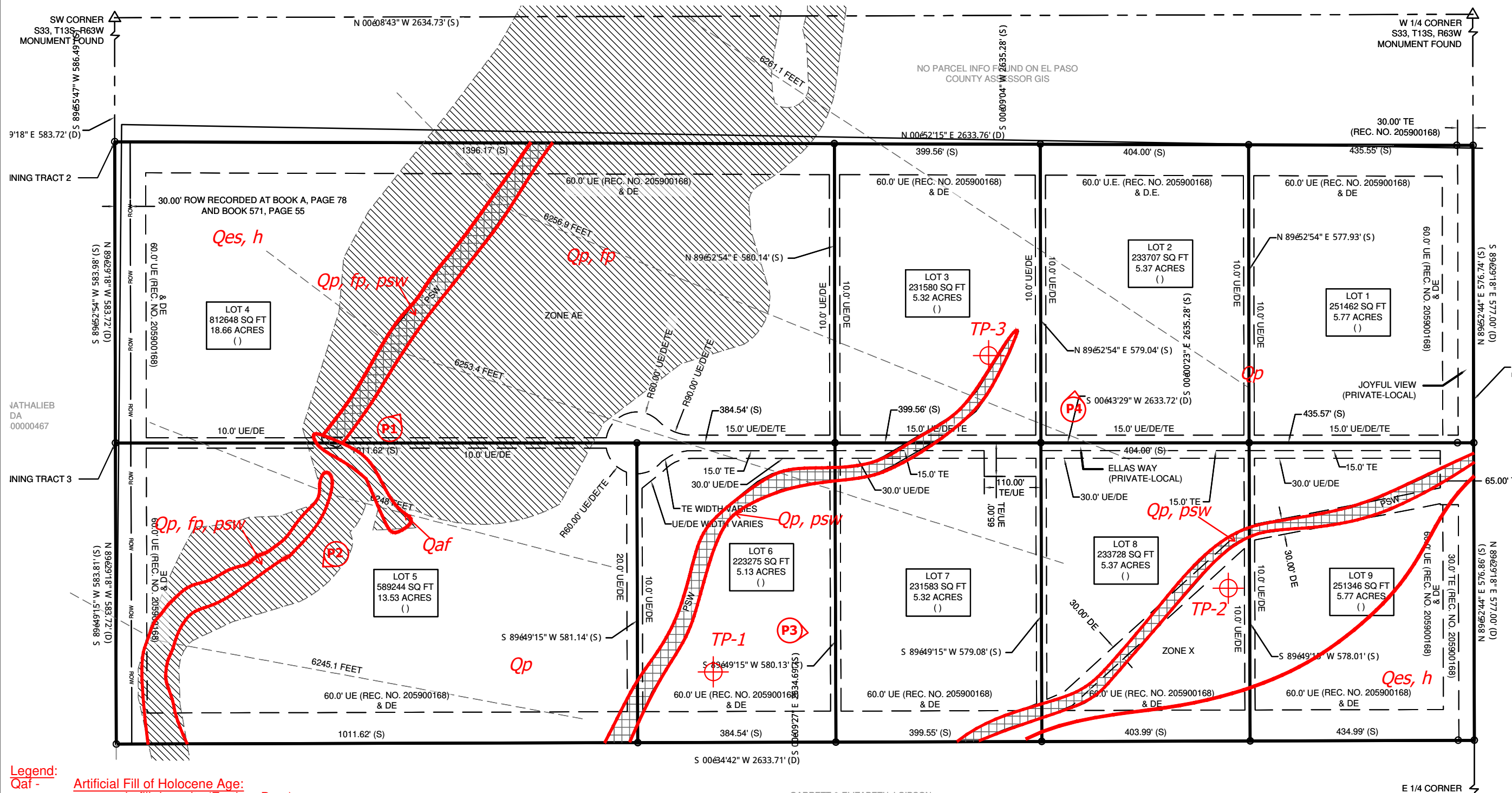
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SIXTH PRINCIPAL MERIDIAN, COUNTY OF EL PASO, STATE OF COLORADO

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**GEOLOGY/ENGINEERING
GEOLOGY MAP**
JOYFUL VIEW & PEYTON HIGHWAY
VERTEX CONSULTING

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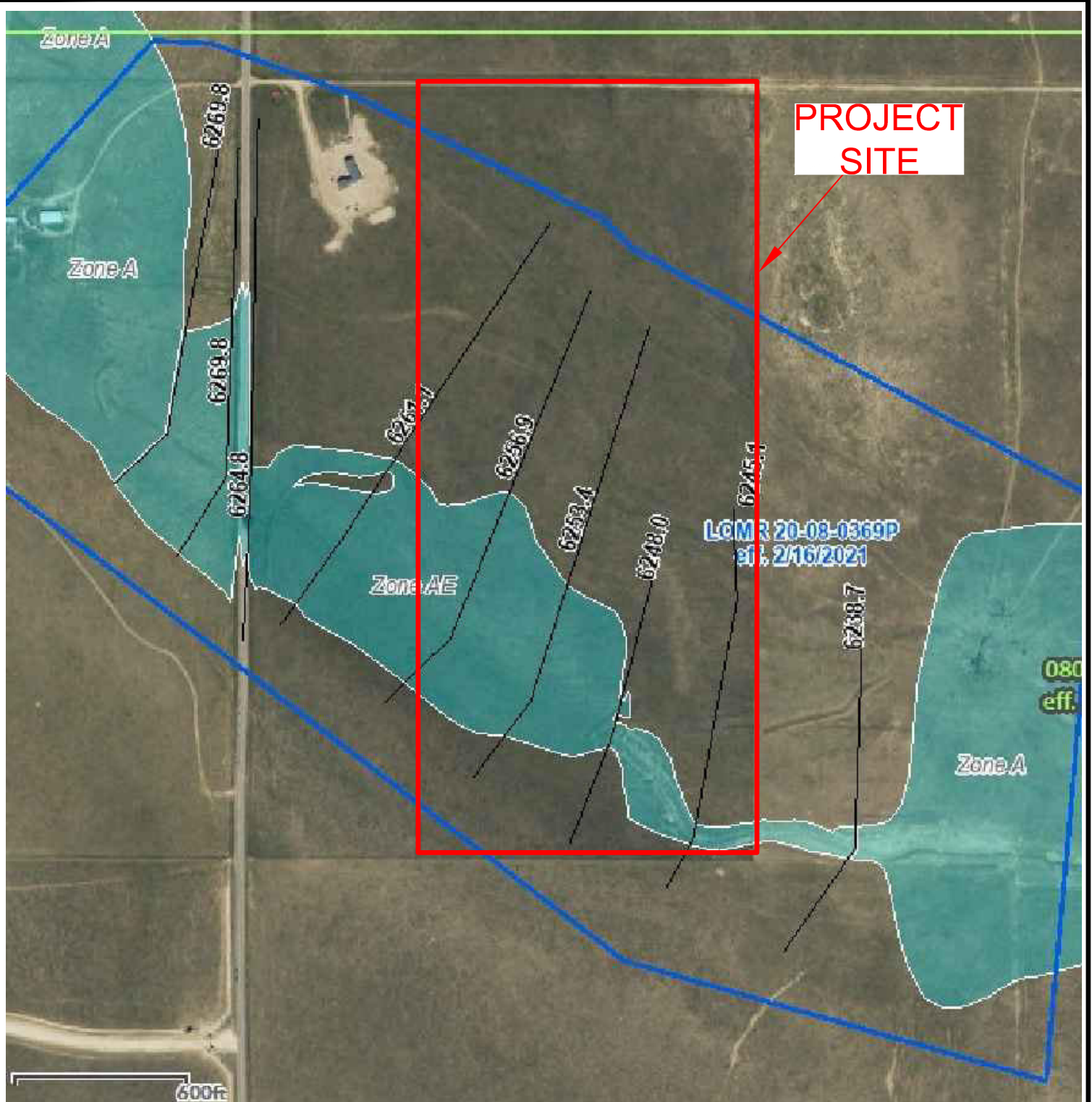
FIG. 6



Legend:

Qaf -	<u>Artificial Fill of Holocene Age:</u> man-made fill deposits (Earthen Dam)
Qp -	<u>Piney Creek Alluvium of Quaternary Age:</u> water deposited sands and clays
Qes -	<u>Eolian Sands of Quaternary Age:</u> wind blown sediments
psw -	potentially seasonally wet
fp -	floodplain
h -	hydrocompactive soil





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FEMA FLOODPLAIN MAP
JOYFUL VIEW & PEYTON HIGHWAY
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FIG. 7

A PART OF SECTION 33, TOWNSHIP 13 SOUTH, RANGE 63 WEST OF THE
SIXTH PRINCIPAL MERIDIAN, COUNTY OF EL PASO, STATE OF COLORADO

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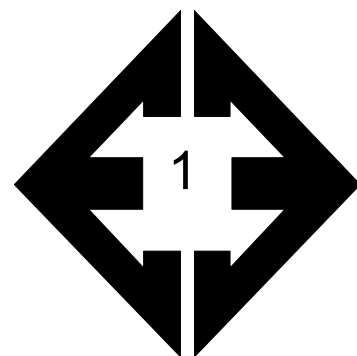
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[illegible]

-  - POSSIBLE OWTS LOCATIONS
-  - POSSIBLE OWTS ALTERNATE LOCATIONS
-  - POSSIBLE HOUSE LOCATIONS
- OWTS ARE NOT RECOMMENDED IN AREAS OF POTENTIALLY SHALLOW GROUNDWATER (PSW) OR FLOODPLAINS (FP)
-  - POTENTIAL WATER WELL LOCATION

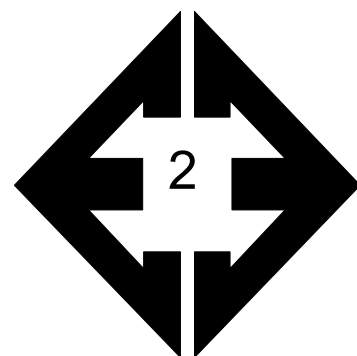


APPENDIX A: Site Photographs



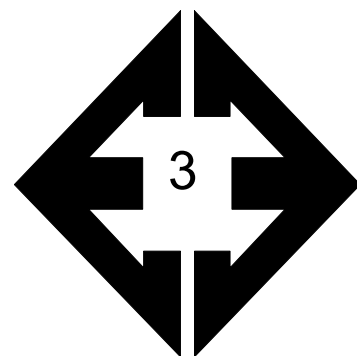
**Looking northwest
along drainage in the
southeastern portion
of the site.**

February 23, 2021



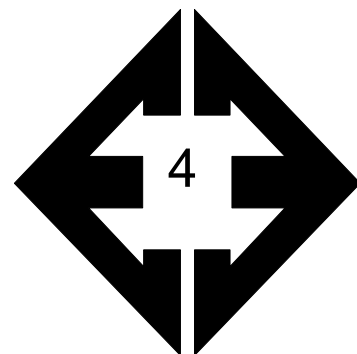
**Looking southeast
along drainage in the
southeastern portion
of the site.**

February 23, 2021



**Looking north from the
eastern side of the
site.**

February 23, 2021



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

February 23, 2021

**APPENDIX B: Kumar and Associates, Inc. Geology and Soils
Report Test Borings & Lab Summary, dated April 19, 2010**

Kumar & Associates, Inc.

TABLE I

SUMMARY OF LABORATORY TEST RESULTS

Project No.: 10-2-118

Project Name: Grandview Properties

Date Sampled: 3/15/2010

Date Received: 3/16/2010

SAMPLE LOCATION		DATE TESTED	NATURAL MOISTURE CONTENT (%)	NATURAL DRY DENSITY (pcf)	GRADATION		PERCENT PASSING NO. 200 SIEVE	ATTERBERG LIMITS		SOIL OR BEDROCK TYPE (Unified Soil Classification)
BORING	DEPTH (ft)				GRAVEL (%)	SAND (%)		LIQUID LIMIT	PLASTICITY INDEX	
1	4	3/16/10	7.0	108.0			58	36	20	Sandy lean clay (CL)
2	2	3/16/10	5.4	117.9			43	27	13	Clayey sand (SC)
3	9	3/16/10	1.6	121.9	5	89	6		NP	Well-graded sand with silt (SW-SM)
4	0 - 5	3/18/10			0	87	13		NP	Silty Sand (SM)
	4	3/16/10	2.5	105.8						Silty Sand (SM)
5	14	3/16/10	4.9	121.6	3	83	14	24	8	Sandstone

Kumar & Associates, Inc.
TABLE II
PERCOLATION TEST RESULTS

Project No. 10-2-118

Page 1 of 4

BORING NO./ LOCATION	PERC. HOLE	HOLE DEPTH (in.)	INTERVAL (min.)	WATER DEPTH (in.)	DROP IN WATER LEVEL (in.)	PERC. RATE (min./in.)
1 38° 52' 27.69" N 104° 27' 36.50" W	A	37		14 13/16		
			30	9 8/16	5 5/16	
			30	8 7/16	1 1/16	
			30	8 1/16	6/16	
			60	6 11/16	1 6/16	
				Bailed to 6		
			45	5 9/16	7/16	103
			60	5 1/16	8/16	120
			60	4 8/16	9/16	107
						Weighted Avg. 110
	B	45		14 6/16		
			30	12 1/16	2 5/16	
			30	11 9/16	8/16	
			30	10 8/16	1 1/16	
			60	9 8/16	1	
				Bailed to 6		
			45	5 11/16	5/16	144
			60	5 3/16	8/16	120
			60	4 9/16	10/16	96
						Weighted Avg. 115
	C	46		19 12/16		
			30	15 2/16	4 10/16	
			30	11 7/16	3 11/16	
			30	11 3/16	4/16	
			60	10 10/16	9/16	
				Bailed to 6		
			45	5 13/16	3/16	240
			60	5 7/16	6/16	160
			60	5 2/16	5/16	192
			30	4 15/16	3/16	160
						Weighted Avg. 184

Kumar & Associates, Inc.
TABLE II
PERCOLATION TEST RESULTS

Project No. 10-2-118

Page 2 of 4

BORING NO./ LOCATION	PERC. HOLE	HOLE DEPTH (in.)	INTERVAL (min.)	WATER DEPTH	DROP IN WATER LEVEL (in.)	PERC. RATE (min./in.)
2 38° 52' 19.85" N 104° 27' 22.50" W	A	44		14 1/16		
			15	10 1/16	4	
			30	10	1/16	
			30	9 11/16	5/16	
			30	9	11/16	
			60	8 10/16	6/16	
				Bailed to 6		
			30	5 13/16	3/16	160
			60	5 9/16	4/16	240
			60	5 2/16	7/16	138
			60	4 8/16	10/16	96
						Weighted Avg. 140
	B	40		14 4/16		
			15	10 11/16	3 9/16	
			30	9 11/16	1	
			30	9 10/16	1/16	
			30	9 8/16	2/16	
			60	8 11/16	13/16	
				Bailed to 6		
			30	5 12/16	4/16	160
			60	5 9/16	3/16	320
			60	5 5/16	4/16	240
			60	4 11/16	10/16	96
						Weighted Avg. 160
	C	47		14 3/16		
			15	11 8/16	2 11/16	
			30	11 7/16	1/16	
			30	11 5/16	2/16	
			30	11 3/16	2/16	
			60	10 13/16	6/16	
				Bailed to 6		
			30	5 13/16	3/16	160
			60	5 10/16	3/16	320
			60	5 6/16	4/16	240
			60	5	6/16	160
						Weighted Avg. 210

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TABLE II
PERCOLATION TEST RESULTS

Project No. 10-2-118

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BORING NO./ LOCATION	PERC. HOLE	HOLE DEPTH (in.)	INTERVAL (min.)	WATER DEPTH (in.)	DROP IN WATER LEVEL (in.)	PERC. RATE (min./in.)
<p style="text-align: center;">3 38° 52' 16.73" N 104° 27' 30.88" W</p>	A	41		14 8/16		
			30	13 12/16	12/16	
			30	12 9/16	1 3/16	
			60	12	9/16	
			35	11 11/16	5/16	
				Bailed to 6		
			60	5 10/16	6/16	160
			60	5 3/16	7/16	138
			20	4 15/16	4/16	80
						Weighted Avg. 132
	B	43		14 3/16		
			30	12	2 3/16	
			30	11 9/16	7/16	
			60	11 7/16	2/16	
			35	11 5/16	2/16	
				Bailed to 6		
			60	5 9/16	7/16	138
			60	4 13/16	12/16	80
			20	4 10/16	3/16	107
						Weighted Avg. 102
	C	48		15 1/16		
			30	12 7/16	2 10/16	
			30	11 12/16	11/16	
			60	9 8/16	2 4/16	
			35	8 4/16	1 4/16	
				Bailed to 6		
			60	5 11/16	5/16	192
			60	3 9/16	2 2/16	28
			20	2 13/16	12/16	27
						Weighted Avg. 44

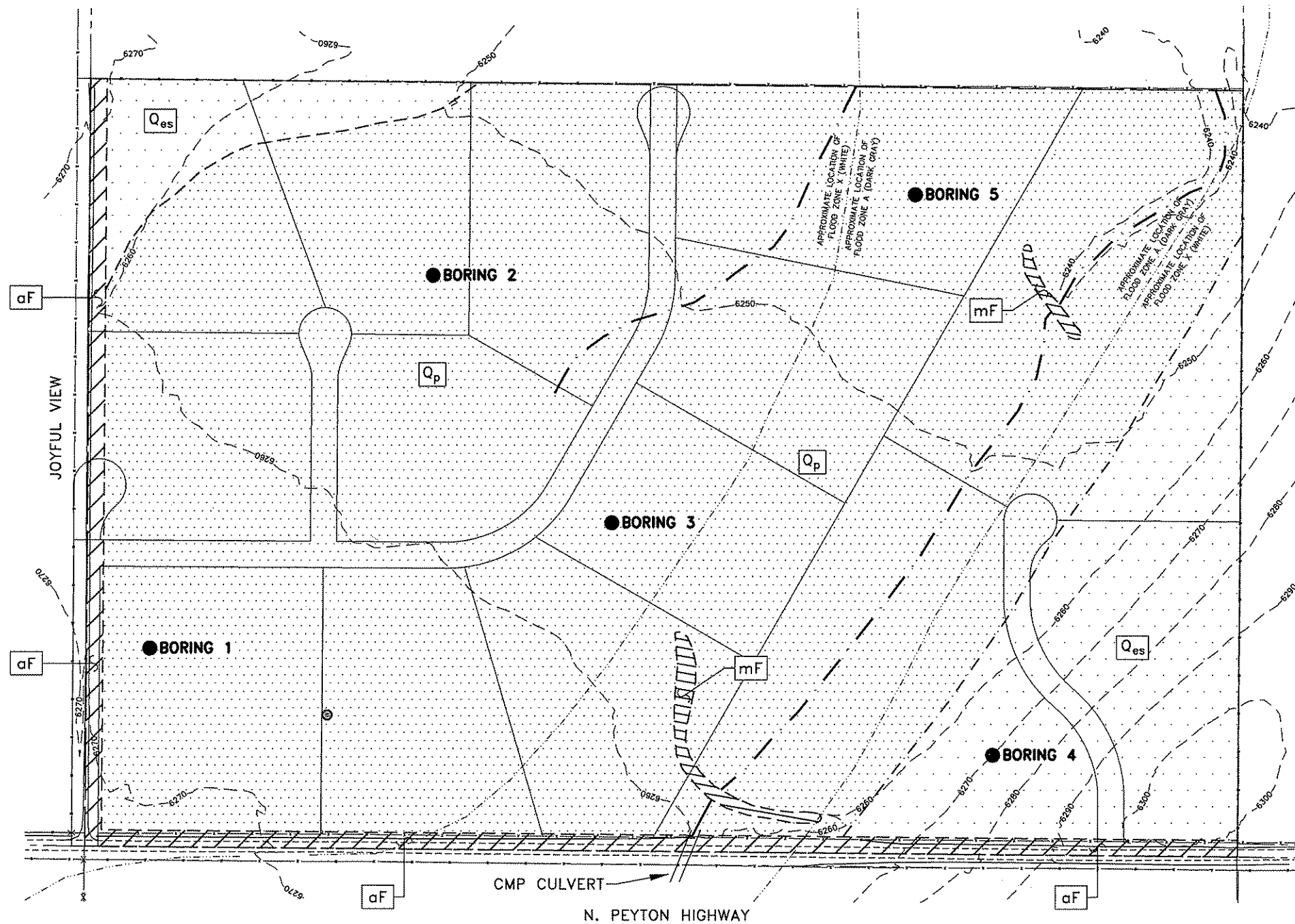
Kumar & Associates, Inc.

TABLE II
PERCOLATION TEST RESULTS

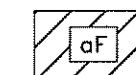
Project No. 10-2-118

Page 4 of 4

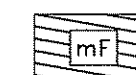
BORING NO./ LOCATION	PERC. HOLE	HOLE DEPTH (in.)	INTERVAL (min.)	WATER DEPTH (in.)	DROP IN WATER LEVEL (in.)	PERC. RATE (min./in.)
4 38° 52' 07.97" N 104° 27' 39.78" W	A	48		19		
			15	11 12/16	7 4/16	
			15	11 10/16	2/16	
			15	10 1/16	1 9/16	
			15	9	1 1/16	
			15	8 2/16	14/16	
			15	7 10/16	8/16	
			30	6 1/16	1 9/16	
			30	5 6/16	11/16	44
			15	4 15/16	7/16	35
			15	3 12/16	1 3/16	13
			15	3 5/16	7/16	35
			15	2 3/16	1 2/16	13
			15	2 2/16	1/16	240
			15	2	2/16	120
						Weighted Avg. 30
	B	46		15 4/16		
			15	9 7/16	5 13/16	
			15	7 14/16	1 9/16	
			15	7 10/16	4/16	
			30	6 10/16	1	
			15	6 4/16	6/16	
			30	5 14/16	6/16	
			30	5 13/16	1/16	480
			15	5 8/16	5/16	48
			15	4 9/16	15/16	16
			15	4 7/16	2/16	120
			30	4 5/16	2/16	240
			15	4 4/16	1/16	240
						Weighted Avg. 74
	C	47		18 2/16		
			15	12 5/16	5 13/16	
			15	11 8/16	13/16	
			15	10 4/16	1 4/16	
			15	9 10/16	10/16	
			15	8 8/16	1 2/16	
			15	7 7/16	1 1/16	
			30	5 10/16	1 13/16	
			30	4 8/16	1 2/16	27
			15	4	8/16	30
			15	3 13/16	3/16	80
			15	3 6/16	7/16	35
			15	3 1/16	5/16	48
			15	2 14/16	3/16	80
			15	2 11/16	3/16	80
						Weighted Avg. 41



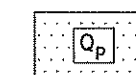
LEGEND:



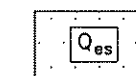
ARTIFICIAL FILL ASSOCIATED WITH GRADING FOR N. PAYTON HIGHWAY AND JOYFUL VIEW.



MANPLACED FILL. REWORKED NATIVE SOILS PLACED IN APPARENT EROSION CONTROL SWALE/BERMS.



PINEY CREEK ALLUVIUM (HOLOCENE), INTERBEDDED SILTY SAND, CLAYEY SAND AND SANDY LEAN CLAY ALLUVIAL DEPOSITS.



EOLIAN (WINDBLOWN) DEPOSITS, (HOLOCENE TO LATE PLEISTOCENE), FINE TO COARSE WINDBLOWN SAND AND SILT.

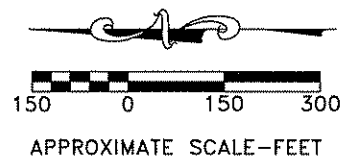
--- APPROXIMATE GEOLOGIC UNIT BOUNDARY

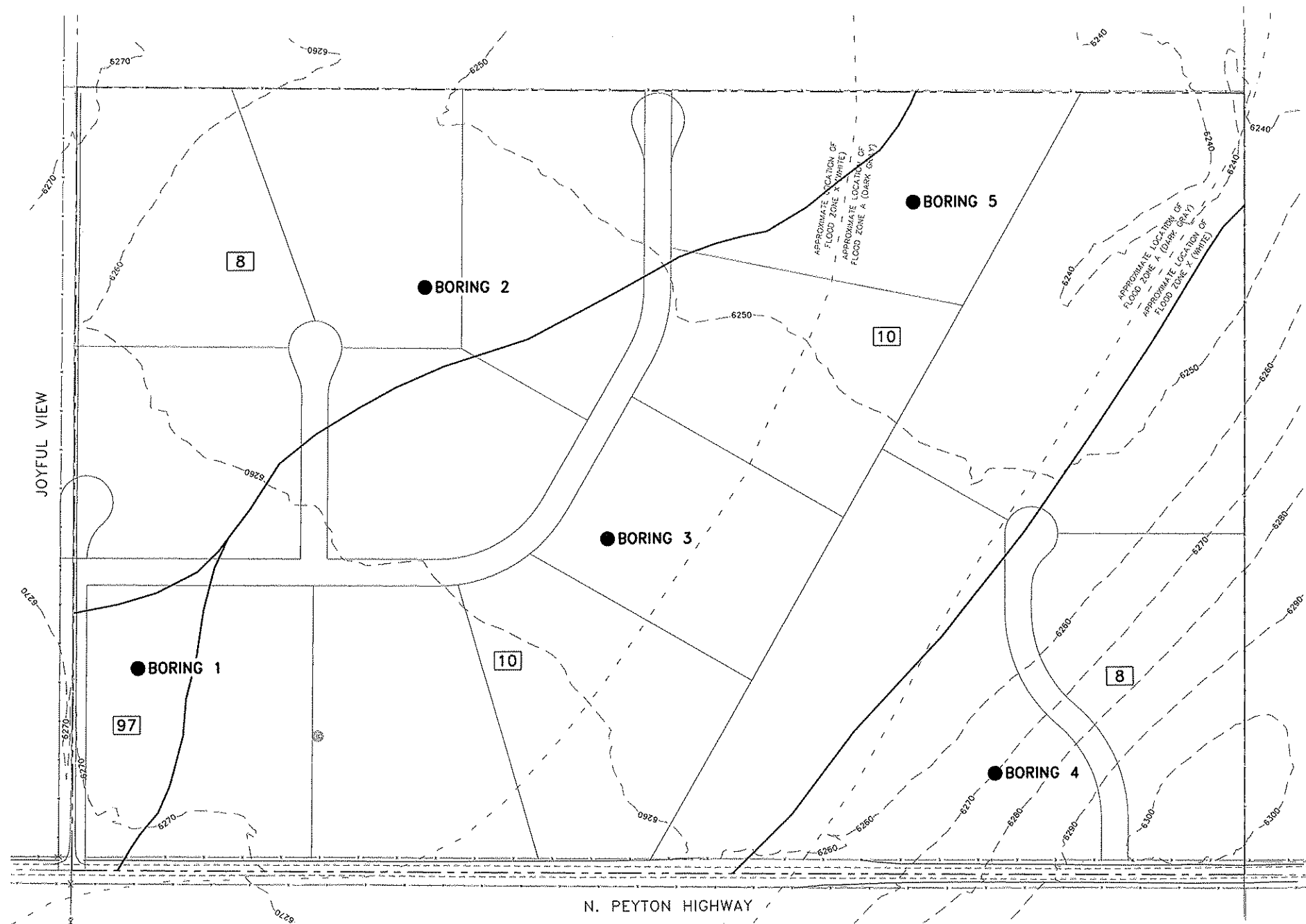
— APPROXIMATE MIDDLE OF SHALLOW, POORLY DEFINED EPHEMERAL CREEKS. CREEK IS ERODED AND BETTER DEFINED AT SOUTHEAST CORNER OF SITE.

● **BORING 1** EXPLORATORY BORING (PROFILE HOLE). THREE PERCOLATION TEST HOLES WERE DRILLED ADJACENT TO BORINGS 1-4 IN A TRIANGULAR PATTERN.

NOTES:

1. BASE MAP, TOPOGRAPHY AND FLOODPLAIN BOUNDARIES PROVIDED BY LDC, INC.
2. GEOLOGIC MAP BASED ON OUR INTERPRETATION OF PREVIOUS MAPPING BY SCOTT, TAYLOR, EPIS AND WOBUS (1978) AND OUR OBSERVATIONS OF THE GEOLOGIC CONDITIONS DURING THE SITE RECONNAISSANCE.



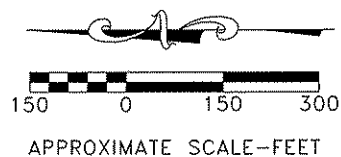


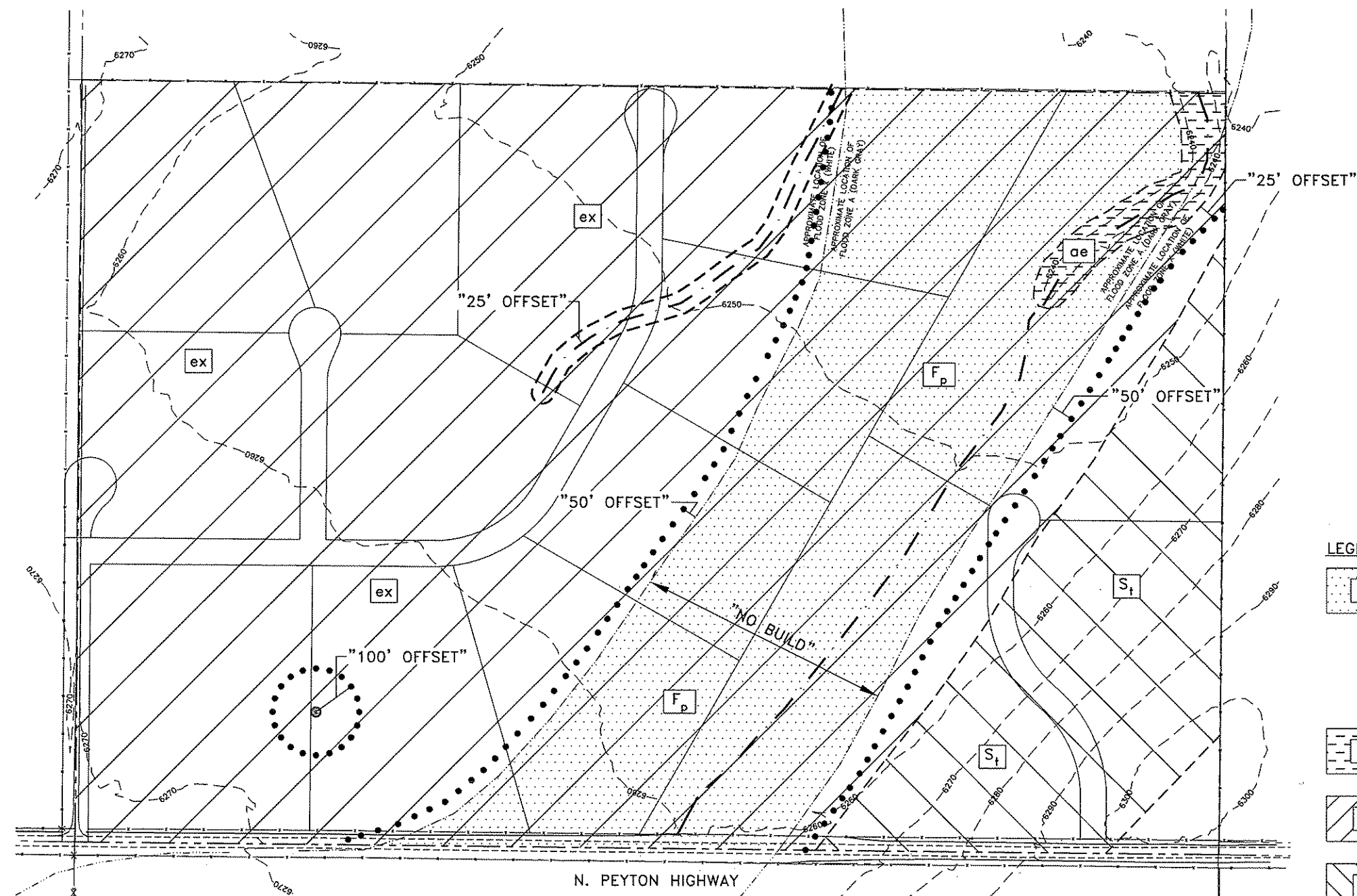
SOIL CONSERVATION SERVICE SOIL UNITS

- 8** BLAKELAND LOAMY SAND, 1% TO 9% SLOPES. SOIL FORMED IN ALLUVIAL OR EOLIAN DEPOSITS ON UPLANDS.
- 10** BLENDON SANDY LOAM, 0% TO 3% SLOPES. SOIL FORMED IN SANDY ARKOSIC ALLUVIUM.
- 97** TRUCKTON SANDY LOAM, 3% TO 9% SLOPES. SOIL FORMED IN ALLUVIUM OR RESIDIUM DERIVED FROM ARKOSIC SEDIMENTARY ROCK ON UPLANDS.
- BORING 4** ● EXPLORATORY BORING (PROFILE HOLE). THREE PERCOLATION TEST HOLES WERE DRILLED ADJACENT TO BORINGS 1-4 IN A TRIANGULAR PATTERN.
- APPROXIMATE CONTACT BETWEEN SOIL UNITS.

NOTES:

1. BASE MAP, TOPOGRAPHY AND FLOODPLAIN BOUNDARIES PROVIDED BY LDC, INC.
2. SOIL UNIT BOUNDARIES ARE APPROXIMATE AND ARE BASED ON OUR INTERPRETATION OF THE SOIL UNITS PRESENTED ON PLATE 19 OF THE UNITED STATES DEPARTMENT OF AGRICULTURE (1981), SOIL CONSERVATION SERVICE MAP.





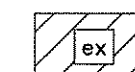
LEGEND:



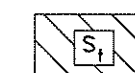
100-YEAR FLOODPLAIN AND ARE PRONE TO EROSION OR SEDIMENTATION. SHOULD BE CONSIDERED A NO BUILD AREA UNLESS ADDITIONAL STUDY DETERMINES THIS AREA IS OUTSIDE OF THE 100-YEAR FLOODPLAIN OR METHODS TO MITIGATE FLOOD, EROSION AND SEDIMENTATION HAZARDS ARE PROVIDED. THE FLOODPLAIN IS CONSIDERED A WATER COURSE FOR PURPOSE OF ABSORPTION FIELDS.



ACCELERATED EROSION. AREA OF ACCELERATED EROSION ASSOCIATED WITH THE HEADWARD ERODING GULLY.



EXPANSIVE SOILS. SOILS WITH A MODERATE SWELL POTENTIAL MAY BE PRESENT, TYPICALLY IN THE UPPER SEVERAL FEET OF THE SOIL PROFILE.



MODERATELY STEEP SLOPES. THIS ZONE WILL LIKELY REQUIRE THE USE OF SERIAL DISTRIBUTION SYSTEMS FOR THE ABSORPTION FIELDS.

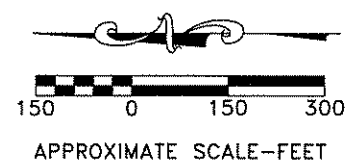
--- APPROXIMATE UNIT BOUNDARY.

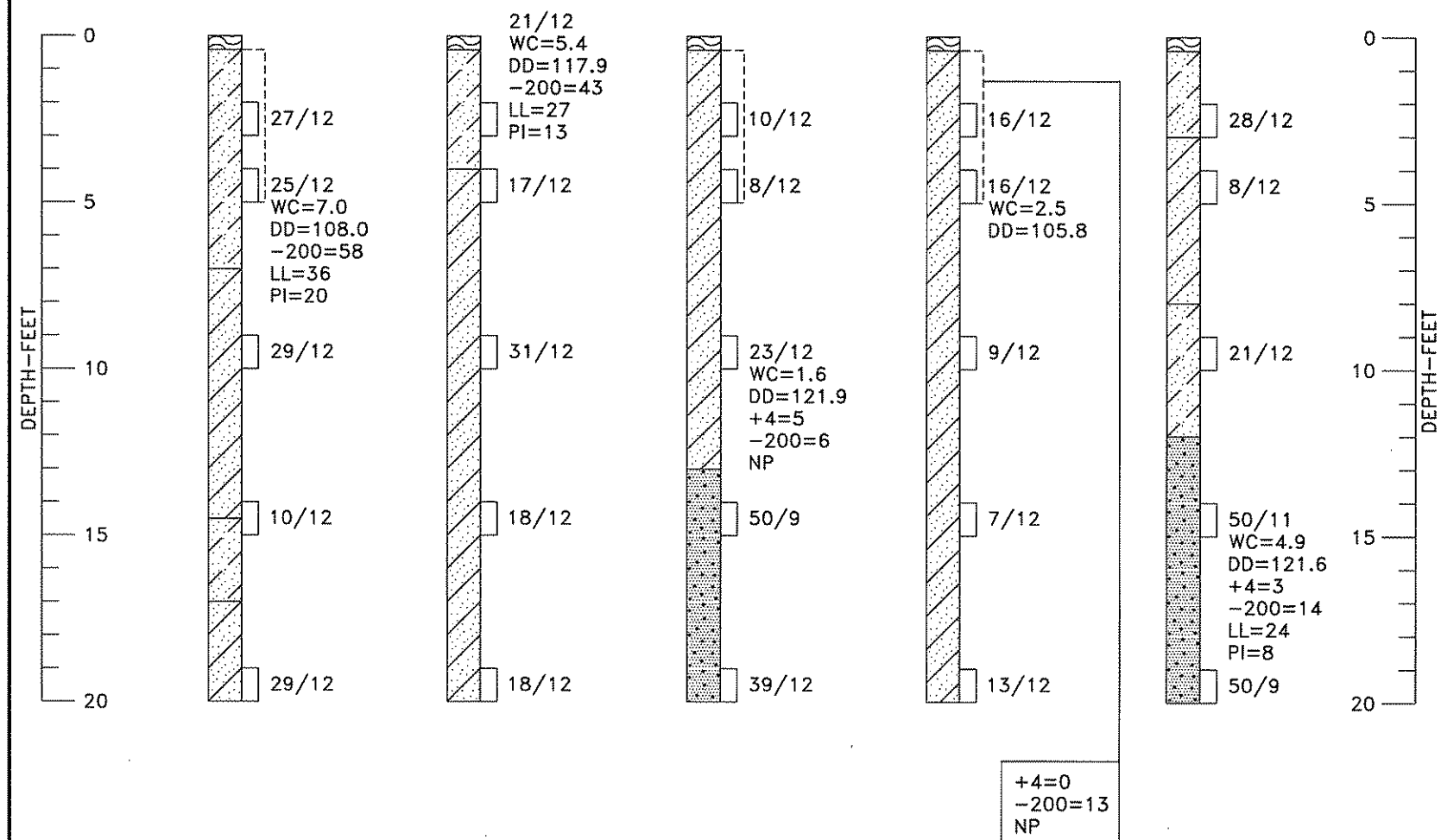
..... MINIMUM OFFSET BOUNDARY FOR ABSORPTION FIELDS BASE ON TABLE IN SECTION 8.5 OF THE EL PASO COUNTY ONSITE WASTEWATER SEWAGE REGULATIONS.

— EPHMERAL CREEKS. CONSIDERED A DRY GULCH FOR PURPOSE OF ABSORPTION FIELDS. VICINITY OF EPHMERAL CREEKS PRONE TO SEDIMENTATION AND/OR EROSION.

NOTES:

1. BASE MAP, TOPOGRAPHY AND FLOODPLAIN BOUNDARIES PROVIDED BY LDC, INC.
2. GEOLOGIC HAZARDS ARE BASED ON OUR INTERPRATATION OF THE SURFACE AND SUBSURFACE CONDITIONS AND THE PROVIDED LIMITS OF THE 100-YEAR FLOODPLAIN.





LEGEND

- TOPSOIL.
- CLAYEY SAND (SC), OCCASIONAL THIN LAYERS OR LENSES OF SANDY LEAN CLAY (CL), OCCASIONALLY POROUS, STIFF TO VERY STIFF, DRY TO SLIGHTLY MOIST, BROWN.
- SILTY SAND (SM) AND WELL-GRADED SAND WITH SILT (SW-SM), LOOSE TO DENSE, DRY TO SLIGHTLY MOIST, LIGHT BROWN TO BROWN.
- SANDSTONE, MEDIUM HARD TO HARD, OCCASIONALLY CLAYEY, NON CEMENTED, SLIGHTLY MOIST, GRAYISH BROWN, OCCASIONAL IRON STAINING.
- DRIVE SAMPLE, 2-INCH I.D. CALIFORNIA LINER SAMPLE.
- 27/12 DRIVE SAMPLE BLOW COUNT. INDICATES THAT 27 BLOWS OF A 140-POUND HAMMER FALLING 30 INCHES WERE REQUIRED TO DRIVE THE SAMPLER 12 INCHES.
- DISTURBED BULK SAMPLE.

LABORATORY TEST RESULTS

WC = WATER CONTENT (%) (ASTM D 2216);
DD = DRY DENSITY (pcf) (ASTM D 2216);
+4 = PERCENTAGE RETAINED ON NO. 4 SIEVE (ASTM D 422);
-200 = PERCENTAGE PASSING NO. 200 SIEVE (ASTM D 1140);
LL = LIQUID LIMIT (ASTM D 4318);
PI = PLASTICITY INDEX (ASTM D 4318);
NP = NON-PLASTIC (ASTM D 4318).

NOTES

1. THE EXPLORATORY BORINGS WERE DRILLED ON MARCH 15, 2010 WITH A 4-INCH DIAMETER CONTINUOUS FLIGHT POWER AUGER.
2. THE LOCATIONS OF THE EXPLORATORY BORINGS WERE MEASURED APPROXIMATELY BY PACING FROM FEATURES SHOWN ON THE SITE PLAN PROVIDED AND SHOULD BE CONSIDERED ACCURATE ONLY TO THE DEGREE IMPLIED BY THE METHOD USED. A HAND HELD GARMIN ETRAX LEGEND GPS WAS USED TO RECORD THE LONGITUDE AND LATITUDE FOR EACH BORING. POSITION BASED ON THE WGS-84 (NAD27) DATUM.
3. THE ELEVATIONS OF THE EXPLORATORY BORINGS WERE NOT MEASURED AND THE LOGS OF THE EXPLORATORY BORINGS ARE PLOTTED TO DEPTH.
4. THE LINES BETWEEN MATERIALS SHOWN ON THE EXPLORATORY BORING LOGS REPRESENT THE APPROXIMATE BOUNDARIES BETWEEN MATERIAL TYPES AND THE TRANSITIONS MAY BE GRADUAL.
5. GROUND WATER WAS NOT ENCOUNTERED IN THE BORINGS AT THE TIME OF DRILLING OR WHEN CHECKED 9 DAYS LATER. FLUCTUATIONS IN THE WATER LEVEL MAY OCCUR WITH TIME.

APPENDIX C: Test Pit Logs

TEST BORING 1
DATE DRILLED 2/23/2021
REMARKS

TEST BORING 2
DATE DRILLED 2/23/2021
REMARKS

REMARKS	Depth (ft)	Symbol	Samples	Soil Structure Shape	Soil Structure Grade	USDA Soil Type	REMARKS	Depth (ft)	Symbol	Samples	Soil Structure Shape	Soil Structure Grade	USDA Soil Type
TOPSOIL, SANDY CLAY LOAM, BROWN, MOIST	1						TOPSOIL, SANDY CLAY LOAM, BROWN, MOIST	1					
SANDY CLAY LOAM, FINE TO COARSE GRAINED, DARK BROWN, MOIST	2			ma		3A	SANDY CLAY LOAM, FINE TO COARSE GRAINED, LIGHT BROWN, MOIST	2					
SANDY CLAY, FINE TO COARSE GRAINED, DARK BROWN, MOIST	3			bl	m	2	CLAY, FINE TO MEDIUM GRAINED, BROWN, MOIST	3			gr	m	3
	4						SANDY LOAM, FINE TO COARSE GRAINED, TAN, MOIST	4			bl	s	4
SANDY LAM, FINE TO COARSE GRAINED, BROWN, M OIST	5							5			gr	w	2
	6			gr	m	2		6					
	7							7					
	8							8					
	9							9					
	10							10					

Soil Structure Shape

granular - gr
platy - pl
blocky - bl
prismatic - pr
single grain - sg
massive - ma

Soil Structure Grade

weak - w
moderate - m
strong - s
loose - l



TEST BORING LOGS
JOYFUL VIEW & PEYTON HIGHWAY
VERTEX CONSULTING

JOB NO.
210182

FIG. C-1

TEST BORING 3
DATE DRILLED 2/23/2021
REMARKS

	Depth (ft)	Symbol	Samples	Soil Structure Shape	Soil Structure Grade	USDA Soil Type
TOPSOIL GRAVELLY SANDY CLAY LOAM, BROWN	1					
SANDY CLAY LOAM, FINE TO COARSE GRAINED, BROWN,	2			bl	m	3
CLAY, FINE TO MEDIUM GRAINED, BROWN, MOIST	3					
	4			bl	m	4
SANDY LOAM, FINE TO COARSE GRAINED, TAN, MOIST	5					
	6			ma		2a
	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 BORING LOGS

JOYFUL VIEW & PEYTON HIGHWAY
VERTEX CONSULTING

JOB NO.
210182

FIG. C-2

APPENDIX D: Laboratory Testing Results



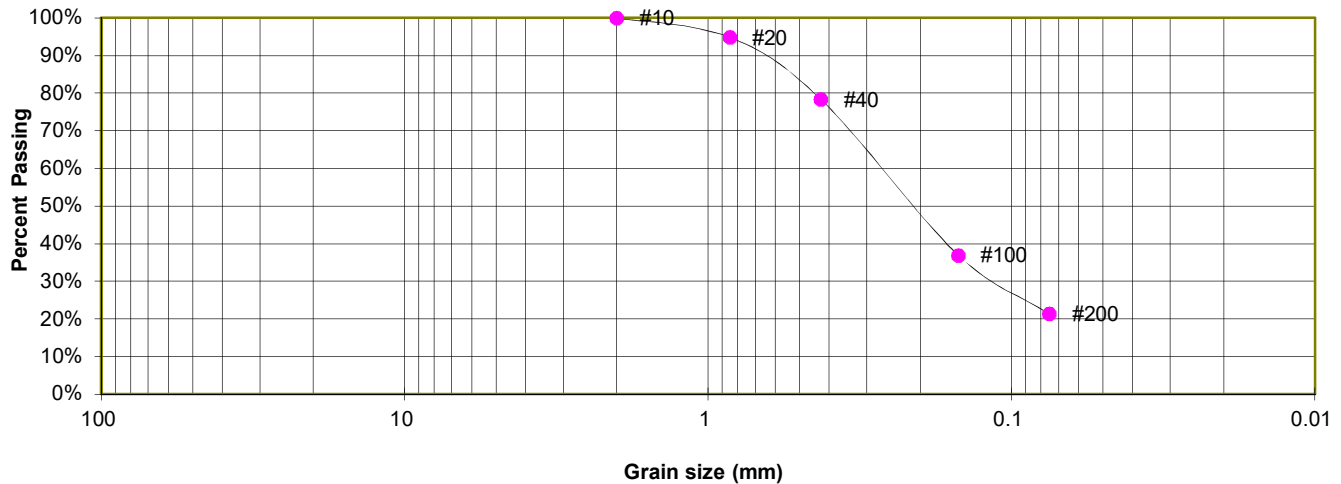
TABLE D-1
SUMMARY OF LABORATORY TEST RESULTS

[illegible]

TEST BORING TP-1
DEPTH (FT) 14"

SOIL DESCRIPTION SAND, SILTY

**Sieve Analysis
Grain Size Distribution**



GRAIN SIZE ANALYSIS

U.S. Sieve #	Percent
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	
4	
10	100.0%
20	94.9%
40	78.4%
100	37.0%
200	21.4%

SOIL CLASSIFICATION

USCS CLASSIFICATION:



LABORATORY TEST RESULTS

JOYFUL VIEW & PEYTON HIGHWAY
VERTEX CONSULTING

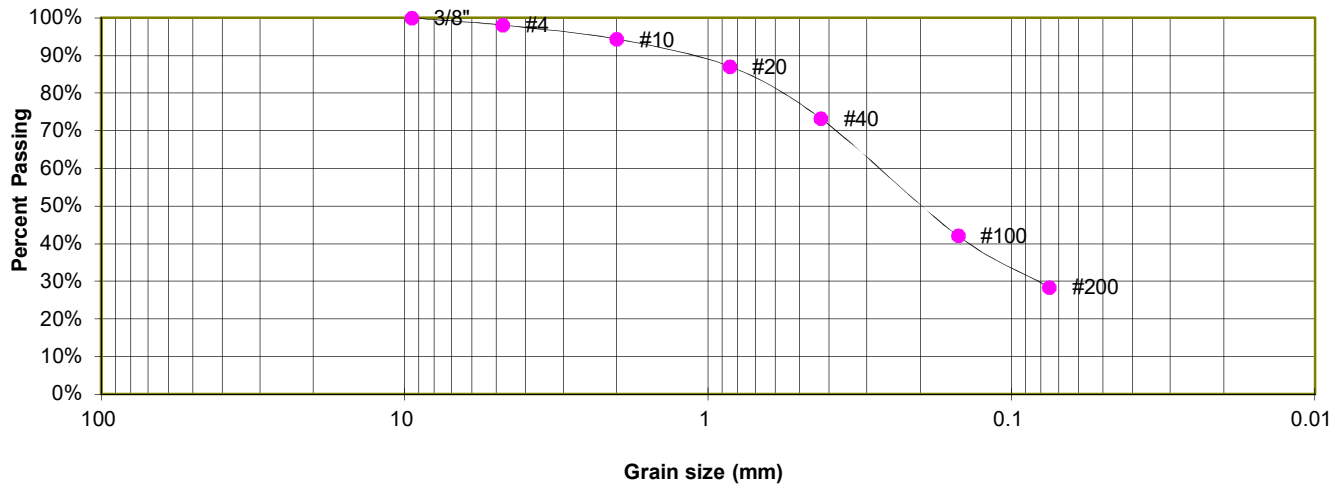
JOB NO.
210182

FIG. D-1

TEST BORING TP-1
DEPTH (FT) 30"

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	98.1%
10	94.3%
20	87.1%
40	73.2%
100	42.1%
200	28.4%

SOIL CLASSIFICATION

USCS CLASSIFICATION: SM



LABORATORY TEST RESULTS

JOYFUL VIEW & PEYTON HIGHWAY
VERTEX CONSULTING

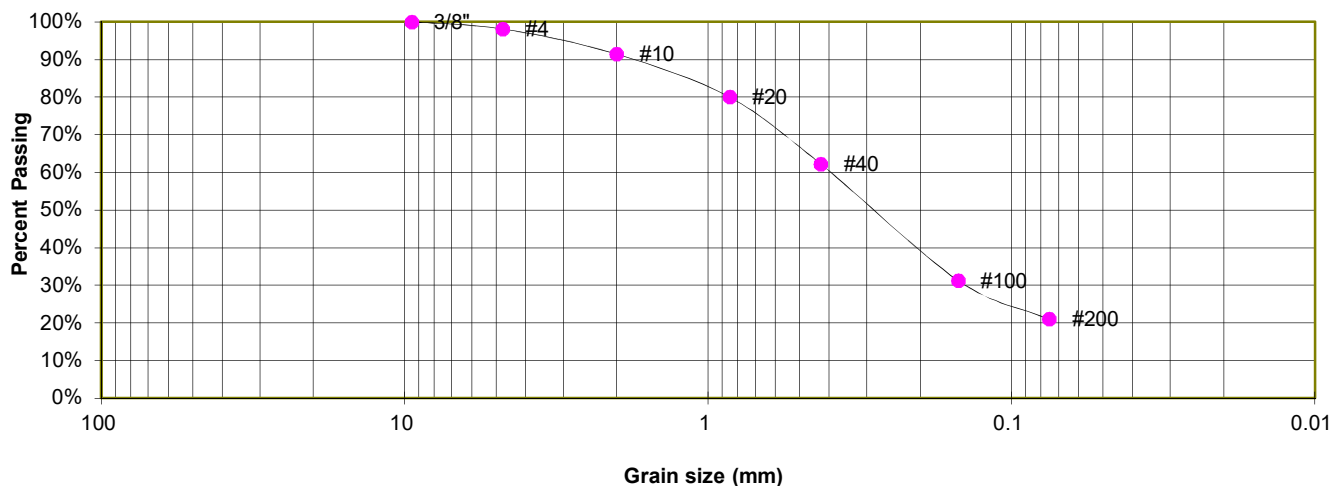
JOB NO.
210182

FIG. D-2

TEST BORING TP-1
DEPTH (FT) 72"

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	98.1%
10	91.5%
20	80.0%
40	62.2%
100	31.3%
200	21.0%

SOIL CLASSIFICATION

USCS CLASSIFICATION: SM



LABORATORY TEST RESULTS

JOYFUL VIEW & PEYTON HIGHWAY
VERTEX CONSULTING

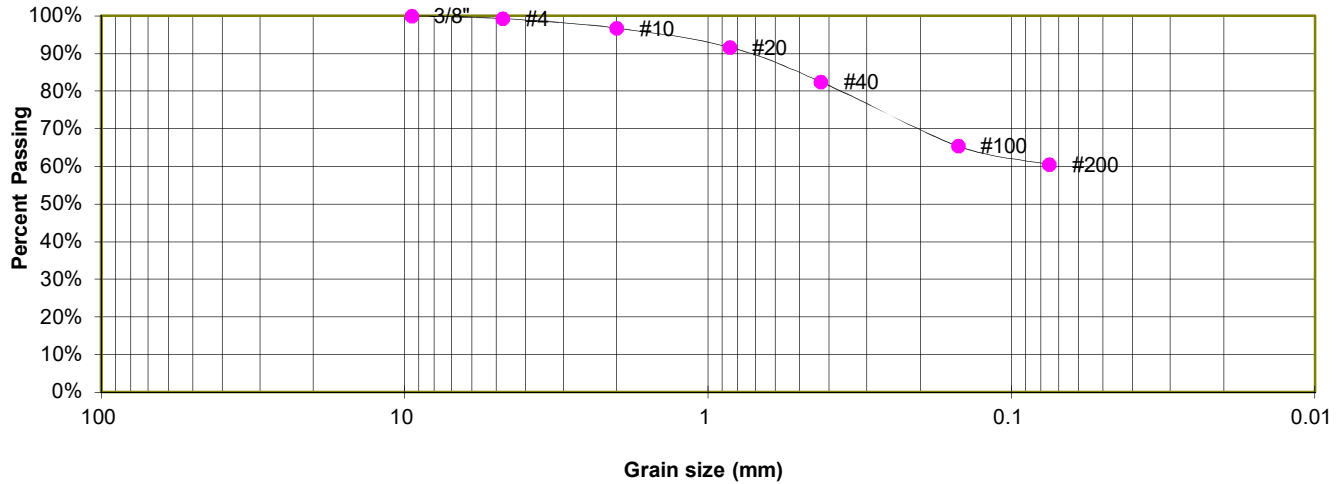
JOB NO.
210182

FIG. D-3

TEST BORING TP-2
DEPTH (FT) 3-4

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	99.3%
10	96.8%
20	91.7%
40	82.5%
100	65.4%
200	60.5%

SOIL CLASSIFICATION

USCS CLASSIFICATION: CL



LABORATORY TEST RESULTS

JOYFUL VIEW & PEYTON HIGHWAY
VERTEX CONSULTING

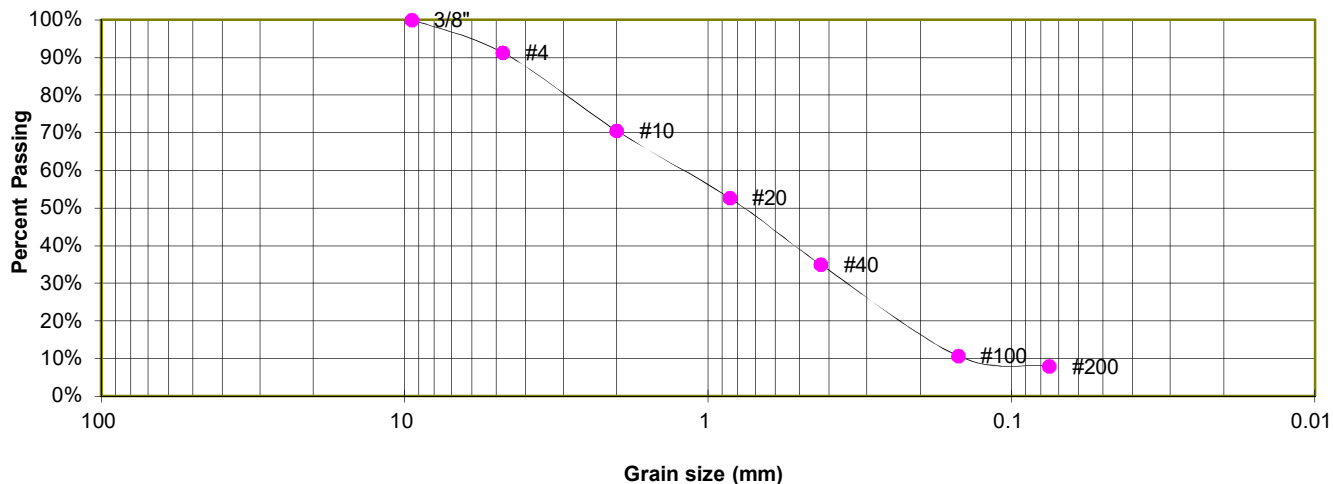
JOB NO.
210182

FIG. D-4

TEST BORING TP-2
DEPTH (FT) 5-6

SOIL DESCRIPTION SAND, WITH SILT

**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	91.3%
10	70.5%
20	52.7%
40	35.0%
100	10.7%
200	7.9%

SOIL CLASSIFICATION

USCS CLASSIFICATION: SM-SW



LABORATORY TEST RESULTS

JOYFUL VIEW & PEYTON HIGHWAY
VERTEX CONSULTING

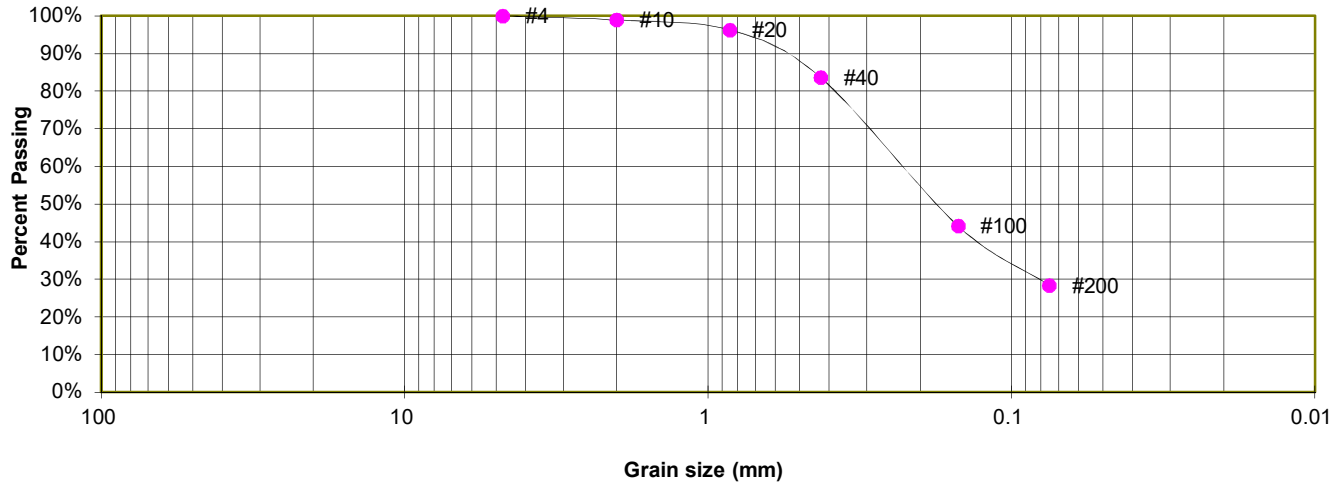
JOB NO.
210182

FIG. D-5

TEST BORING TP-3
DEPTH (FT) 24-30"

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"	
4	100.0%
10	98.9%
20	96.3%
40	83.6%
100	44.2%
200	28.4%

SOIL CLASSIFICATION

USCS CLASSIFICATION:



LABORATORY TEST RESULTS

JOYFUL VIEW & PEYTON HIGHWAY
VERTEX CONSULTING

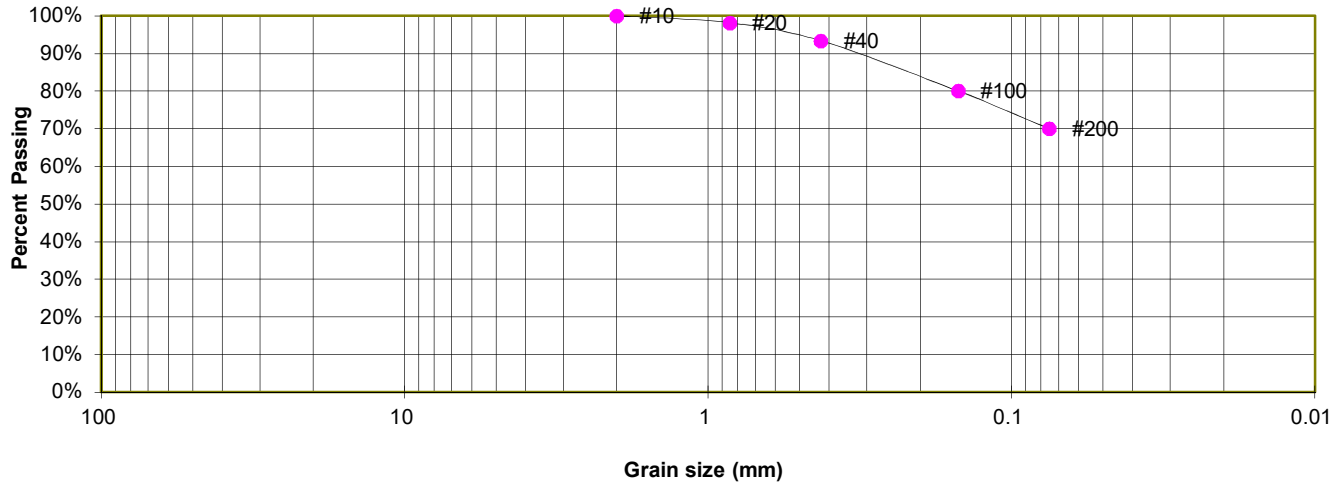
JOB NO.
210182

FIG. D-6

TEST BORING TP-3
DEPTH (FT) 4-4.5

SOIL DESCRIPTION CLAY, WITH SAND

**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	100.0%
20	98.2%
40	93.4%
100	80.1%
200	70.1%

SOIL CLASSIFICATION

USCS CLASSIFICATION: CL



LABORATORY TEST RESULTS

JOYFUL VIEW & PEYTON HIGHWAY
VERTEX CONSULTING

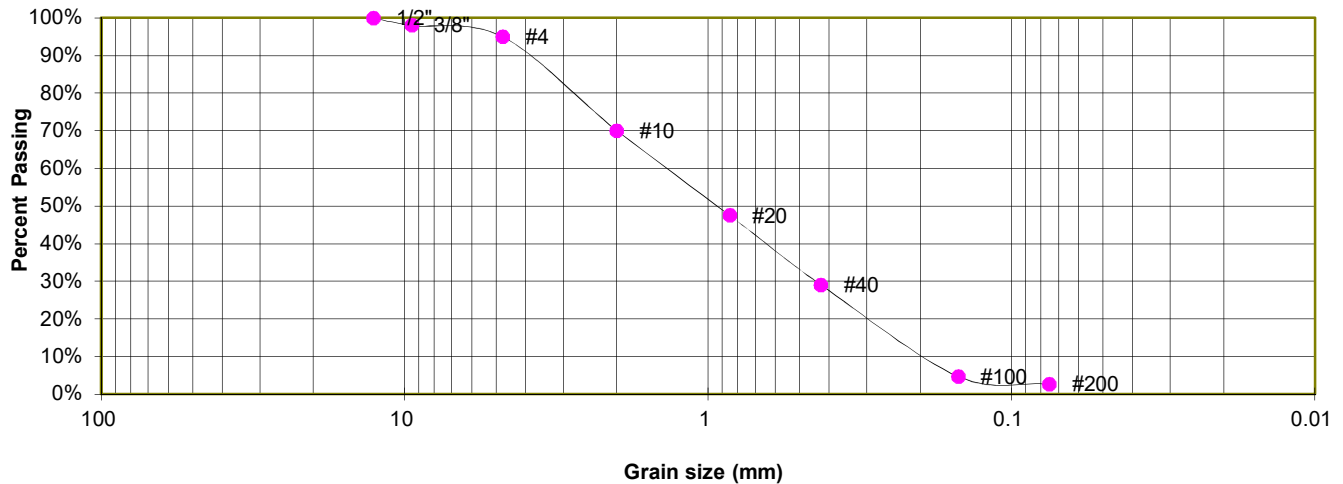
JOB NO.
210182

FIG. D-7

TEST BORING TP-3
DEPTH (FT) 6-7

SOIL DESCRIPTION SAND, SLIGHTLY SILTY

**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"	98.0%
4	95.0%
10	70.1%
20	47.6%
40	29.1%
100	4.7%
200	2.7%

SOIL CLASSIFICATION

USCS CLASSIFICATION: SW



LABORATORY TEST RESULTS

JOYFUL VIEW & PEYTON HIGHWAY
VERTEX CONSULTING

JOB NO.
210182

FIG. D-8

APPENDIX E: Soil Survey Descriptions