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Materials Testing
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Job No. 187749

June 24, 2022
Revised July 21, 2023

William Guman & Associates, Ltd
731 North Weber Street, Ste 10
Colorado Springs, CO 80903

Re: Wastewater Study
Winslow Drive
Estates at Cathedral Pines
El Paso County, Colorado

Ref: *Proposed Development Plan*, provided by William Guman & Associates, Ltd, dated October 6, 2021.

Dear Mr. Guman:

As requested, personnel of RMG – Rocky Mountain Group has performed a preliminary investigation and site reconnaissance at the above referenced address. It is our understanding the parcel included in this study is:

- EPC Schedule No. 6200000411: addressed as Winslow Drive, consisting of approximately 35 acres zoned PUD RR-5.

Project Description

The site consists of approximately 35 acres of undeveloped land. It is our understanding the existing 35-acre parcel is to be subdivided into a total of eight new lots, each with a single-family residence. Each new lot is to be serviced by an on-site wastewater treatment system (OWTS) and an individual domestic water supply well. The site is to be accessed from Winslow Drive. A site Vicinity Map and Proposed Lot Layout Map is included as Figure 1 and 2.

This letter is to provide information for the on-site wastewater report per the On-Site Wastewater Treatment Systems (OWTS) Regulations of the El Paso County Board of Health pursuant to Chapter 8.

The following are also excluded from the scope of this report including (but not limited to) foundation recommendations, site grading/surface drainage recommendations, subsurface drainage recommendations, geologic, natural and environmental hazards such as landslides, unstable slopes, seismicity, snow avalanches, water flooding, corrosive soils, erosion, radon, wild fire protection, hazardous waste and natural resources.

Previous Studies and Field Investigation

Reports of previous geotechnical engineering/geologic investigations for this site were available for our review and are listed below:

1. *Geologic Hazards Evaluation and Wastewater Report, Parcel West of Winslow Drive North of Darr Drive, El Paso County, Colorado*, prepared by CTL Thompson, Project No. CS17101-105, dated May 2, 2008.
2. *Soils and Geology Study, Winslow Drive, Estates at Cathedral Pines*, prepared by RMG – Rocky Mountain Group, Job No. 187749, dated May 10, 2022.

SITE CONDITIONS

Personnel of RMG performed a reconnaissance visit on March 21, 2022 and March 15, 2023. The purpose of the reconnaissance visit was to evaluate the site surface characteristics including landscape position, topography, vegetation, natural and cultural features, and current and historic land uses. Four 8-foot deep test pits were observed on March 31, 2022 and two test borings were performed on March 26, 2023. The test pit locations are presented on the Test Pit/Boring Location Map, Figure 3.

Based on our two site reconnaissance's in March 2022 and 2023 and the USGS 2019 topographic map of the Black Forest Quadrangle, the site generally slopes down from east to west with an elevation difference of approximately 52 feet across the site. There are three minor drainages that cross the site, from east to the west, as well as numerous smaller drainage swales that flow into the minor drainages. The drainages generally have moderately-defined channels and the majority of storm runoff is anticipated to be in the form of sheet flows along the lower portions of the drainage swales. The drainages discharge into Black Squirrel Creek approximately ¼- to ½-mile west of the site. The water levels in the drainage channel areas are anticipated to vary dependent upon local precipitation events. The water levels in the drainage channel areas are anticipated to vary dependent upon local precipitation events.

The following conditions were observed with regard to the 35-acre parcel:

- No wells currently exist on the existing 35-acre site;
- No runoff or irrigation features anticipated to cause deleterious effects to treatment systems on the site were observed;
- No major waterways exist on the property. The entire site lies outside the designated floodway or floodplain;
- Minor waterways do exist on the property, but the entire site lies outside of designated floodways and floodplains;
- Slopes greater than 20 percent do exist on the site; and
- Significant man-made cuts do not exist on the site.

Treatment Areas

Treatment areas at a minimum must achieve the following:

- The treatment areas must be 4 feet above groundwater or bedrock as defined by the Definitions 8.3.4 of the Regulations of the El Paso County Board of Health, Chapter 8, *OWTS Regulations*, effective July 7, 2018;
- Prior to construction of an OWTS, an OWTS design prepared per *the Regulations of the El Paso County Board of Health, Chapter 8, OWTS Regulations* will need to be completed. A scaled site plan and engineered design will also be required prior to obtaining a building permit;
- Comply with any physical setback requirements of Table 7-1 of the El Paso County Department of Health and Environment (EPCDHE);
- Treatment areas are to be located a minimum 100 feet from any well (existing or proposed), including those located on adjacent properties per Table 7-2 per the EPCDHE;
- Treatment areas must also be located a minimum 50 feet from any spring, lake, water course, irrigation ditch, stream or wetland, and 25 feet from dry gulches;
- Other setbacks include the treatment area to be located a minimum 10 feet from property lines, cut banks and fill areas (from the crest);
- The new lots shall be laid out to ensure that the proposed OWTS does not fall within any restricted areas, (e.g. utility easements, right of ways). Based on the test pit observations, each lot has a minimum of two locations for the OWTS.

Contamination of surface and subsurface water resources should not occur if the treatment areas are evaluated and installed according to El Paso County Health Department and State Guidelines in conjunction with proper maintenance.

It is our opinion that if the EPCDHE physical setback requirements are met for each lot, there are no restrictions on the placement of the individual On-site Wastewater Treatment Systems.

Soil and groundwater conditions at the site are suitable for individual treatment systems. It should be noted, if LTAR values of less than 0.35 (or soil types 3A to 5) or greater than 0.80 (soil type 0) are encountered at the time of the site specific OWTS evaluation an, "engineered system" will be required.

Additionally, if limiting layers are encountered at approximately 6 to 7 feet below the existing ground surface, the maximum depth of the OWTS components may be limited to less than 4 feet below the existing ground surface, or mounded systems may be required.

DOCUMENT REVIEW

RMG has reviewed the *Proposed Development Plan* (provided by William Guman & Associates, Ltd.) and identified the soil conditions anticipated to be encountered during construction of the proposed OWTS for the Estates at Cathedral Pines Subdivision, based on our site observations and a review of documented Natural Resource Conservation Service – NRCS Web Soil Survey data provided by websoilsurvey.nrcs.usda.gov. The Web Soil Survey descriptions are presented below.

A review of FEMA Map No. 08041C0315G, effective December 7, 2018 indicates that the proposed treatment areas are not located within an identified floodplain.

SOIL EVALUATION

Personnel of RMG performed a soil evaluation to include four 8-foot deep test pits, on March 31, 2022 (Test Pit TP-1 through TP-4), utilizing the visual and tactile method for the evaluation of the site soils. The test pits were excavated in areas that appeared most likely to be used for residential construction. The Test Pit Logs are presented in Figures 4 and 5. A Septic Suitability Map is presented in Figure 6.

The soil conditions as indicated by the NRCS data are anticipated to consist of:

- Kettle gravelly loamy sand with 8 to 40 percent slopes. Properties of the gravelly loamy sand include somewhat excessively drained soils, depth of the water table is anticipated to be greater than 80 inches, runoff is anticipated to be medium, frequency of flooding and/or ponding is anticipated to be none, and landforms include hills.

The USDA Soil Survey Map is presented in Figure 7.

Neither groundwater nor bedrock (limiting layers) were encountered in the RMG test pits. However, groundwater was encountered in our test boring TB-2 at 5 feet and bedrock was encountered at depths of 3 and 6 feet in our test borings. TB-2 was located near a drainage to verify the depth of groundwater, this area has been mapped as *psw – potentially seasonally wet* and should be avoided when placing the OWTS for each lot. This area is shown on the Septic Suitability Map, Figure 6.

CTL encountered sandstone bedrock at 1-foot in both their test holes, groundwater was not encountered in their borings at the time of drilling (2008) or when water levels were checked three days after the completion of drilling.

An OWTS is proposed for each new lot and should conform to the recommendations of a future OWTS site evaluation, performed in accordance with the applicable health department codes prior to construction. This report may require additional test pits in the vicinity of the proposed treatment field. A minimum separation of 4 feet shall be maintained from groundwater and/or bedrock to the infiltrative surface.

Redoximorphic features indicating the fluctuation of groundwater or higher ground water levels were not observed in the test pits.

CONCLUSIONS

In summary, it is our opinion the site is suitable for individual on-site wastewater treatment systems within the cited limitations. There are no foreseeable or stated construction related issues or land use changes proposed at this time.

Soil and groundwater conditions at the site are suitable for individual treatment systems, if proper engineering is utilized. It should be noted that the LTAR values stated above are for the test pit locations performed for this report only. The LTAR values may change throughout the site. If an LTAR value of less than 0.35 (or soil types 3A to 5) or greater than 0.80 (soil type 0) are encountered at the time of the site specific OWTS evaluation, an "engineered system" will be required.

Due to the depth of bedrock and potential for seasonal groundwater encountered in our test borings, ***engineered systems should be anticipated for the majority of the lots within this subdivision due to the groundwater and bedrock conditions encountered.***

Additionally, based on the depths of limiting layers (bedrock) encountered in the lot-specific investigations, the maximum depth of the OWTS components may be limited or mound systems (above surface) may be required.

LIMITATIONS

The information provided in this report is based upon the subsurface conditions observed in the test pit excavations and accepted engineering procedures. The subsurface conditions encountered in the excavation for the treatment area may vary from those encountered in the test pit excavations. Therefore, depth to limiting or restrictive conditions, bedrock, and groundwater may be different from the results reported in this letter. The proposed residences and OWTS should be located outside of the existing potentially seasonally wet minor drainage channel features that exist on the property.

Individual wastewater treatment systems are proposed for each new lot. Additional OWTS site evaluations for the proposed lots will need to be performed in accordance with the applicable health department codes prior to construction.

I hope this provides the information you have requested. Should you have questions, please feel free to contact our office.

Cordially,

Reviewed by,

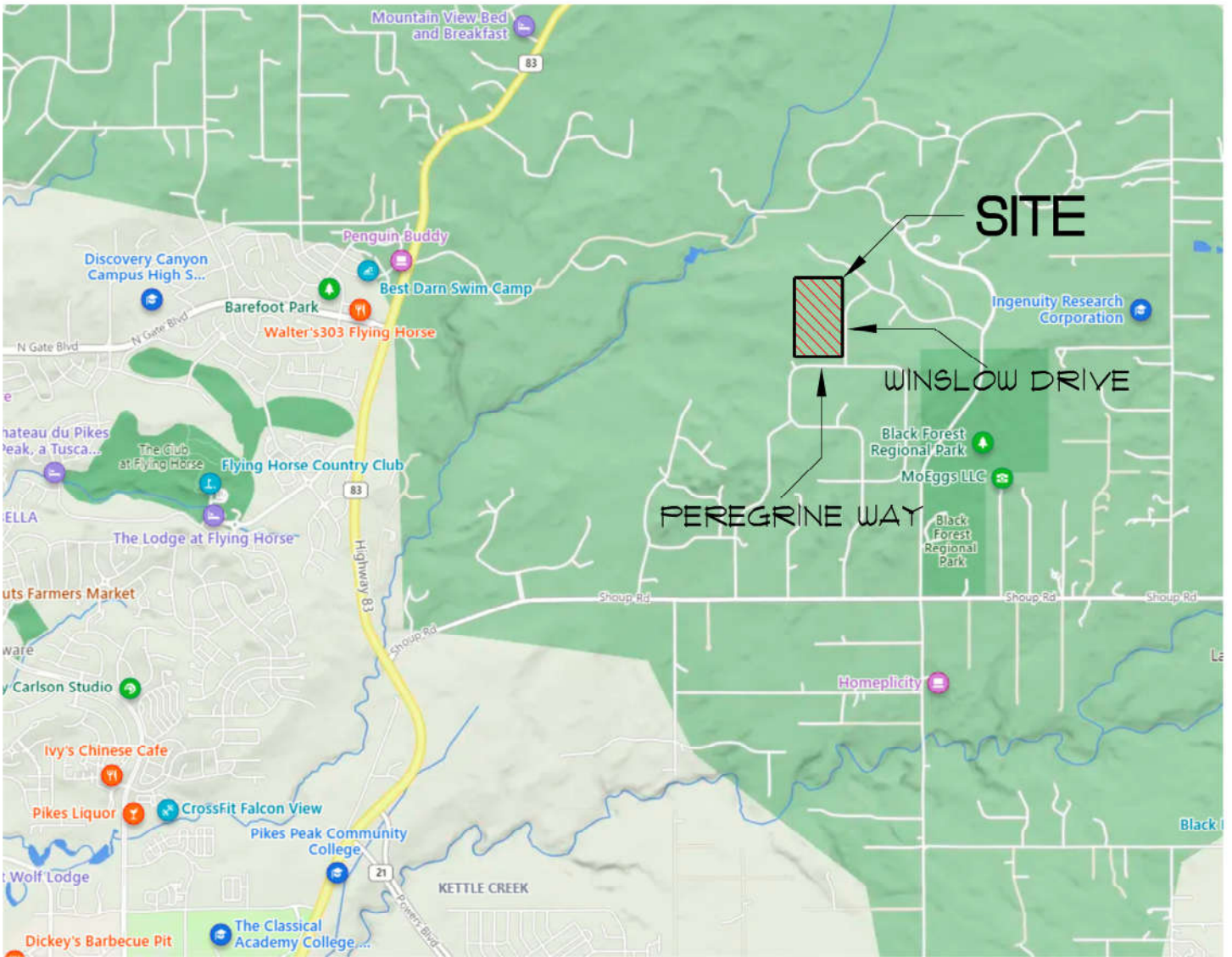
RMG – Rocky Mountain Group

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Kelli Zigler
Project Geologist

Tony Munger, P.E.
Geotechnical Project Manager





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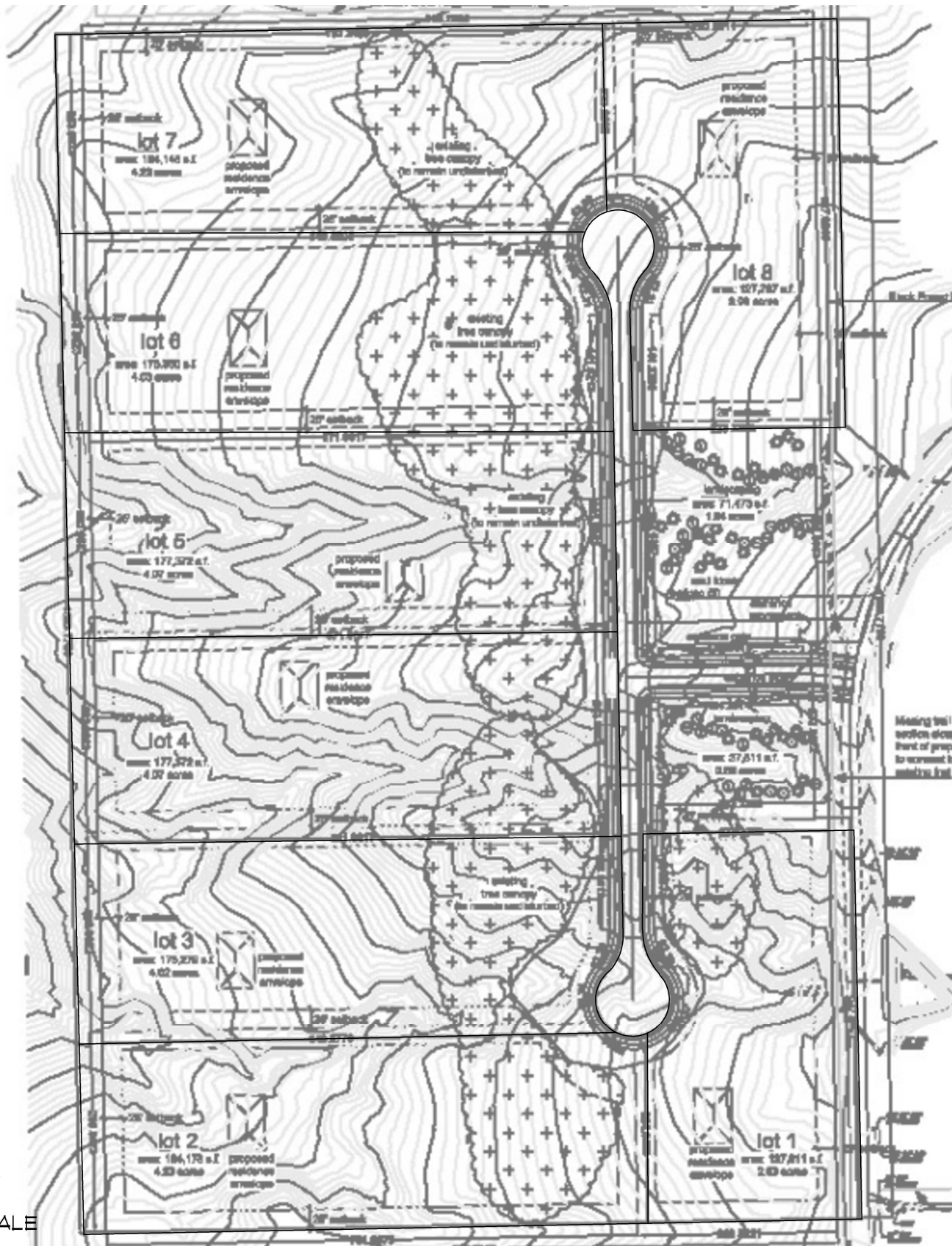
SITE VICINITY MAP

ESTATES AT CATHEDRAL PINES
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FIG No. 1

DATE 6-24-2022



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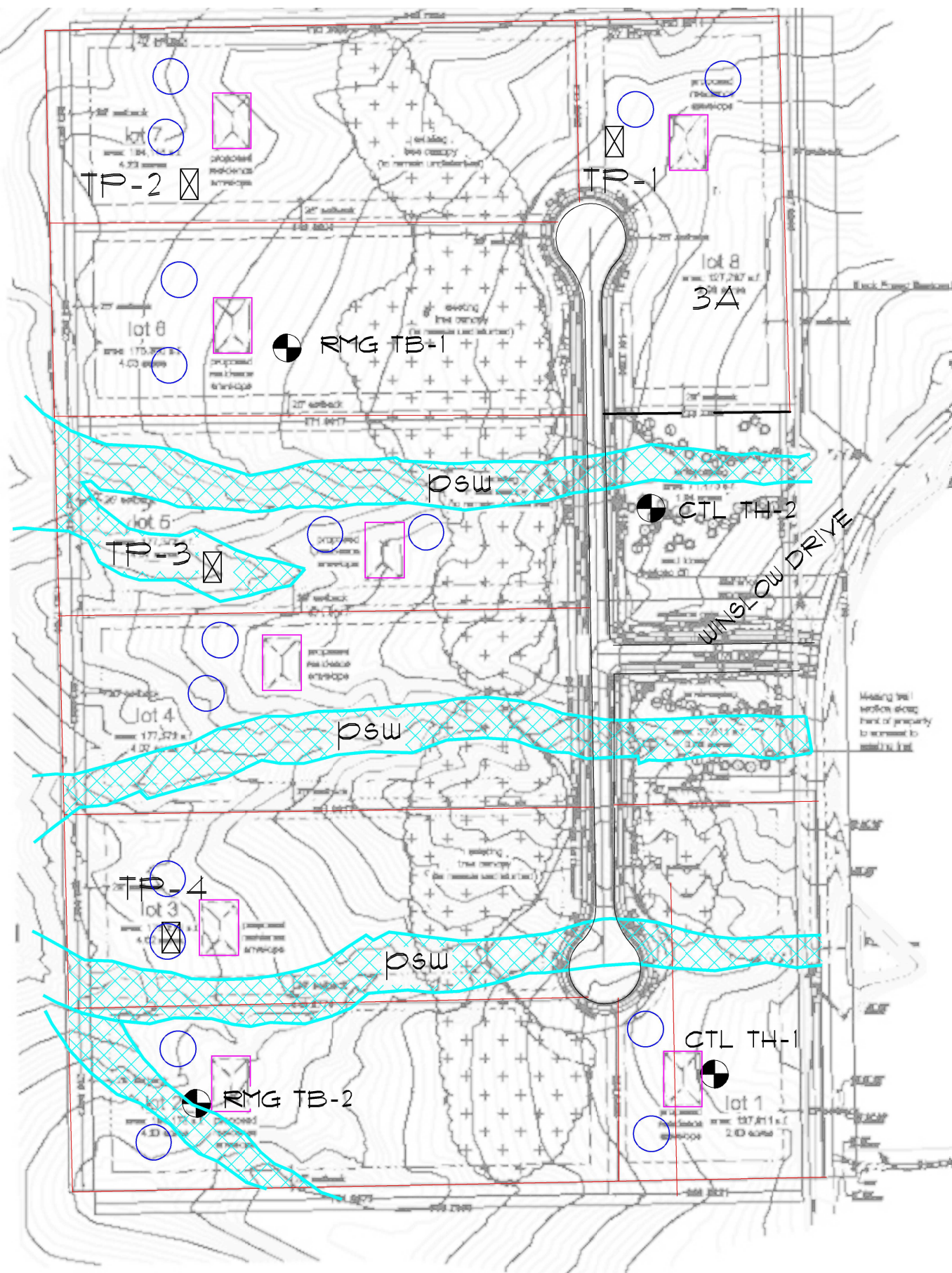
PROPOSED LOT LAYOUT






WINSLOW DRIVE
ESTATES AT CATHEDRAL PINES
EL PASO COUNTY, COLORADO
WILLIAM GUMAN AND ASSOCIATES, LTD

JOB No. 187749

FIG No. 2

DATE 6-24-2022
REV 7-21-2023



-  DENOTES APPROXIMATE LOCATION OF FUTURE RESIDENCE
-  DENOTES APPROXIMATE LOCATION OF ONSITE WASTEWATER TREATMENT SYSTEMS (OWTS). THE SELECTED LOCATIONS ARE FOR ILLUSTRATION ONLY. IF ALL SETBACK REQUIREMENTS ARE MET FOR EACH LOT, THERE ARE NO RESTRICTIONS ON THE PLACEMENT OF THE INDIVIDUAL OWTS.
- psw - Potentially Seasonally Wet area. Should be avoided with proper placement of residence and OWTS
-  DENOTES APPROXIMATE LOCATION OF TEST PITS OBSERVED BY RMG FOR THIS STUDY
-  DENOTES APPROXIMATE LOCATION OF TEST HOLES PERFORMED BY CTL THOMPSON, PROJECT NO. CS17101-105 DATED MAY 2, 2008
-  DENOTES APPROXIMATE LOCATION OF TEST BORINGS PERFORMED BY RMG FOR THIS STUDY


REFERENCE
NOT TO SCALE

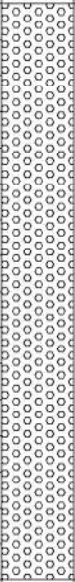
WINSLOW DRIVE
ESTATES AT CATHEDRAL PINES


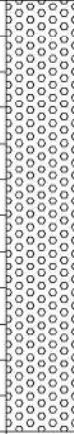
EL PASO COUNTY, COLORADO
WILLIAM GUMAN AND ASSOCIATES, LTD

ENGINEER:	TFM
DRAWN BY:	NM
CHECKED BY:	TFM
ISSUED:	12-6-2022
REVISED:	6-21-2023

TEST PIT/BORING
LOCATION PLAN

SHEET No.
FIG-3

TEST PIT TP-1			
DATE OBSERVED: 3/31/22			
SOIL DESCRIPTION	DEPTH (FT)	SYMBOL	SOIL TYPE
0 - 8.0 FT SANDY CLAY LOAM (STRONG)	2ft 4ft 6ft 8ft		3

TEST PIT TP-2			
DATE OBSERVED: 3/31/22			
SOIL DESCRIPTION	DEPTH (FT)	SYMBOL	SOIL TYPE
0 - 2.0 FT CLAY LOAM (STRONG)	2ft		3
2.0 - 8.0 FT SANDY CLAY LOAM (MODERATE)	2ft 4ft 6ft 8ft		3

SOIL DESCRIPTIONS



CLAY LOAM



SANDY CLAY LOAM

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TEST PIT LOGS



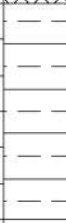
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ESTATES AT CATHEDRAL PINES
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FIG No. 4

DATE 6-24-2022

TEST PIT TP-3			
DATE OBSERVED: 3/31/22			
SOIL DESCRIPTION	DEPTH (FT)	SYMBOL	SOIL TYPE
0 - 8.0 FT CLAY LOAM (MODERATE)	2ft 4ft 6ft 8ft		3

TEST PIT TP-4			
DATE OBSERVED: 3/31/22			
SOIL DESCRIPTION	DEPTH (FT)	SYMBOL	SOIL TYPE
0 - 1.5 FT SILTY CLAY LOAM (STRONG)			4
1.5 - 5.5 FT CLAY (MODERATE)	2ft 4ft		4
5.5 FT - 8.0 FT SAND (STRUCTURELESS)	6ft 8ft		1

SOIL DESCRIPTIONS



CLAY LOAM



SAND



SILTY CLAY LOAM



CLAY

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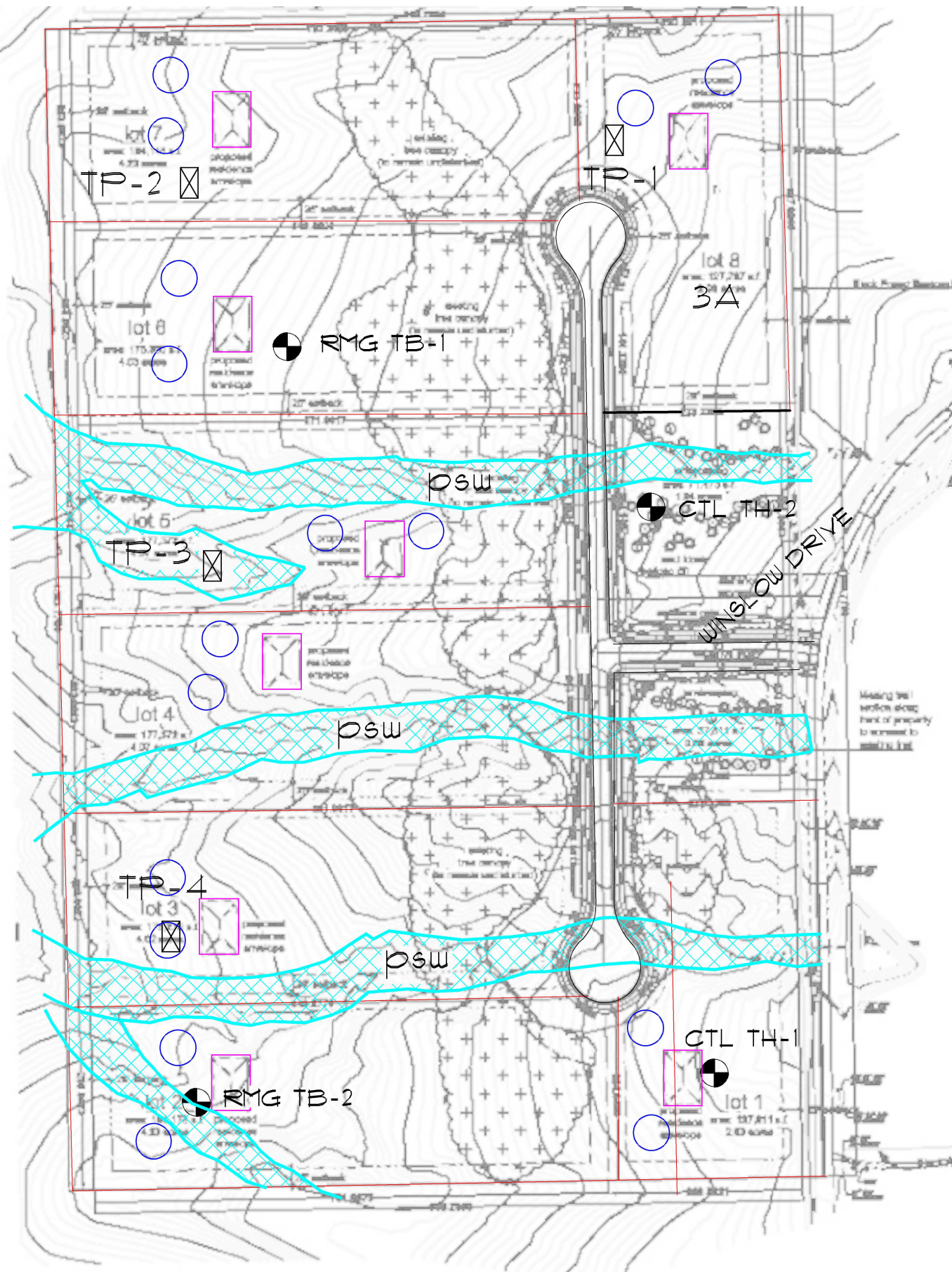
TEST PIT LOGS






WINSLOW DRIVE
ESTATES AT CATHEDRAL PINES
EL PASO COUNTY, COLORADO
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FIG No. 5

DATE 6-24-2022



-  DENOTES APPROXIMATE LOCATION OF FUTURE RESIDENCE
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REFERENCE
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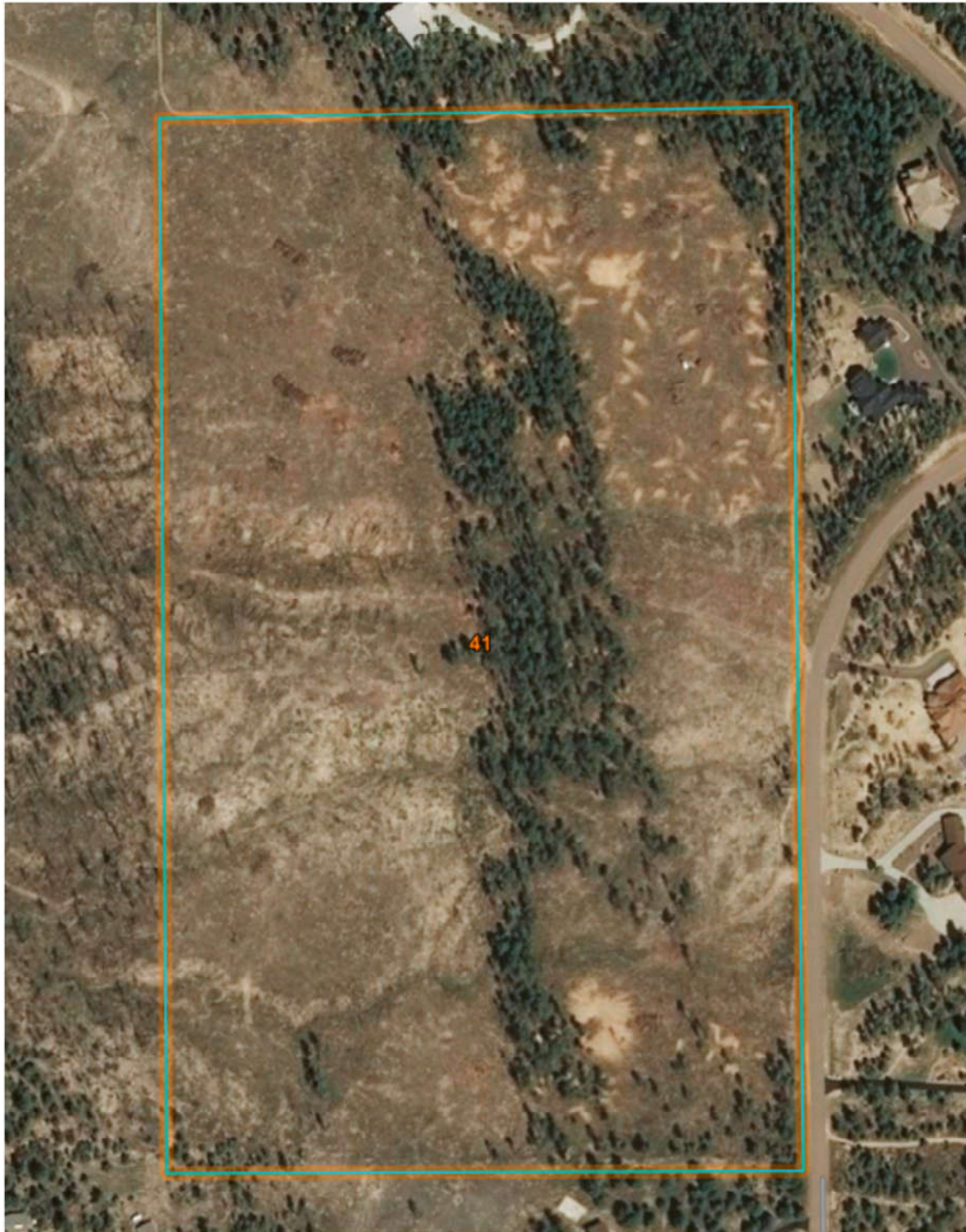
WINSLOW DRIVE
ESTATES AT CATHEDRAL PINES

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ISSUED:	12-6-2022
REVISED:	6-21-2023

SEPTIC
SUITABILITY

SHEET No.
FIG-6



41 - Kettle gravelly loamy sand, 8 to 40 percent slopes

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USDA SOIL SURVEY MAP

WINSLOW DRIVE
ESTATES AT CATHEDRAL PINES
EL PASO COUNTY, COLORADO
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FIG No. 7

DATE 6-24-2022
REV 7-21-2023