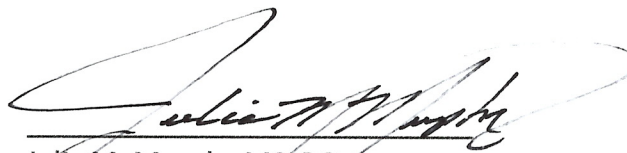


Soils and Geology  
Report  
For  
Warner Subdivision  
17350 W. Goshawk Road  
Colorado Springs, Colorado 80908  
April 16, 2021



Julia M. Murphy MS, PG  
Principal, Professional Geologist



Groundwater Investigations LLC  
11590 Black Forest Road Ste 15  
Colorado Springs, CO 80908  
(719) 338-1805

The following presents the Soils and Geology Evaluation for the Warner 's ("Applicants") 40 Acre parcel zoned RR-5 located in the Northeast  $\frac{1}{4}$  of the Northwest  $\frac{1}{4}$  of Section 23, Township 11 South, Range 65 West, of the 6th P.M. ("Property"). The Property is situated within the Kiowa Bijou Designated Groundwater Basin having the address 17350 W. Goshawk Road, Colorado Springs Colorado, 80908, in El Paso County. (Figure 1).

## **1.0 Summary of the Proposed Subdivision**

The 40 acre property will be subdivided to create a four-lot minor subdivision. Lots 1 and 2 are vacant and will be 5-acres each; Lot 3 has an existing home with a well (Permit 95869) completed into the Dawson aquifer and an individual non-evaporative septic system and leach field and will be 19.96 acres; and Lot 4 is vacant and will be 10.0 acres. The water supply for Lots 1, 2 and 4 will also be from individual wells, and wastewater will be treated by individual non-evaporative septic systems (Figure 2).

## **GEOLOGY and HYDROLOGY**

The Project Site is located within the Black Forest Quadrangle near the southeastern portion of the Denver Basin, a geologic structural depression (Thorson 2003a, b). This asymmetrical structural basin is shallow-dipping toward the northeast. The uppermost materials are that of the Dawson Formation deposited during the early to possibly middle Eocene. Historically, braided streams eastwardly carried and deposited gravel, sand, silt and clays derived from weathered Precambrian Pike Peak Granite from the uplifted areas to the west.

Facies Unit 5 (TKda5) is the uppermost facies of the Dawson Formation and is mapped over the Project Site (Figure 3). Facies Unit 5 is described as generally permeable, well drained, with good foundation characteristics.

The Property is situated at the headwaters of the Kiowa-Bijou Basin. The topographic relief is about 3 percent across the Property. Drainage direction varies across the property and is generally to the northeast and southeast.

## SOILS - NRCS

The National Resource Conservation Service (NRCS) identified one soil type, Elbeth Sandy Loam.

Type	Description	Percent Coverage
25	Elbeth Sandy Loam , 3 to 8 percent slopes	97
26	Elbeth Sandy Loam, 8 to 15 percent slopes	0.3

Attachment 1 provides a complete description of the soils. All proposed buildable land is located within the area identified as Elbeth Sandy Loam and less than a 30% slope. The drainage class is described as well drained and in Hydrologic Soil Group B which is defined as having a moderate infiltration rate and moderately fine to course textures. Runoff potential is medium. Soils are derived from the Dawson formation which include arkosic sands with interbedded clays (Attachment 1).

## FIELD INVESTIGATIONS

Three profile test pits were excavated to a maximum depth of 8 feet below ground surface to evaluate suitability for onsite wastewater treatment systems. Reportedly, groundwater was not encountered in the test pits and limiting layers were encountered on Lot 1 at a depth of 7 feet and on Lot 4, at a depth of 5 feet (RMG 2020). Soils encountered include sandy clay, sandy loam, and sand (Attachment 2).

## GEOLOGIC HAZARDS

The Project Site was evaluated for geologic hazards that may impact development. Hazards identified in the El Paso County Land Development Code including: Mining, wildfire, polluted water, landfills, fill areas in buildable areas, contamination; airports and major utility facilities, and landslides were not identified on the Project Site. The National Flood Hazard map delineated the Property and surrounding area an “area of Minimal Flood Hazard” (FEMA 2018).



## **Erosion**

The surface topography across the Project site is predominately flat aside from the hill in the southeast portion of the Property. On June 11, 2013 the Black Forest fire significantly changed the landscape across the Project site. Once covered with mature ponderosa pines with a canopy covering a significant area of the property, the fire reduced the canopy and trees on the west side of the property on proposed lots 1 and 2. Pine needles, vegetation, and other organic material that once covered the forest floor is no longer present and standing dead trees have been partially removed. Unimpeded rainfall and snow melt will likely result in surface erosion of the weathered Dawson sandstone.

## **Hydrocompaction and Expansive Soils**

Site specific sampling results did not indicate expansive soils within profile pits excavated to evaluate suitability for OWTS design. However, soils at Lots 1, 2 and 4 will need to be investigated by deeper borings prior to initiating foundation groundwork and again upon completion of the foundation excavation and prior to the placement of any framework. Over-excavation and replacement with structural fill, sub-excavation and replacement with on-site moisture-conditioned soils, and/or the use of a geogrid reinforced fill are typical methods to remedy issues with expansive soils as well as loose hydrocompactive soils.

## **Groundwater and Surface Water**

Groundwater was not encountered during excavation of the 3 profile pits. However, there is a for periodic high moisture conditions. Soils samples collected and evaluated in 2017 by Geoquest LLC reportedly indicated redoximorphic features indicating the fluctuation of groundwater or higher ground water levels occurred between 36 to 40 inches below the surface. Additional investigations will be needed by a certified geotechnical engineer in the areas where foundations are planned to design appropriate subdrain systems.





## **Seismic**

Structural Engineers Association of California's and California's Office of Statewide Health Planning and Development developed an open-source web interface that uses the USGS web services to retrieve the seismic design data and presents it in a report format. Approximately 16 miles to the west of the Property is Ute Pass Fault. The fault is not active in recent times but earthquakes within the area have occurred as recent as 2007.

## **MINERAL RESOURCES**

The Project Site is not included in the maps of aggregate deposits or known mineral resources. Colorado Geological Mineral Resources Derivative Map indicates a low potential to contain economically viable mineral resources.

## **CONCLUSION**

The Project Site is compatible with the proposed development of low density single-family rural residential lots. Geologic hazards were not identified at the Project Site that would inhibit the proposed expansion of rural residential use. Soil samples collected on site were for the use in evaluating the suitability for individual onsite wastewater treatment systems and only penetrated the upper 8 feet. Additional borings will be needed on each vacant lot for design of the foundation, subsurface drainage, etc.

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RMG Job No. 173099 Wastewater Study Warner 4-lot Minor Subdivision October 15, 2020

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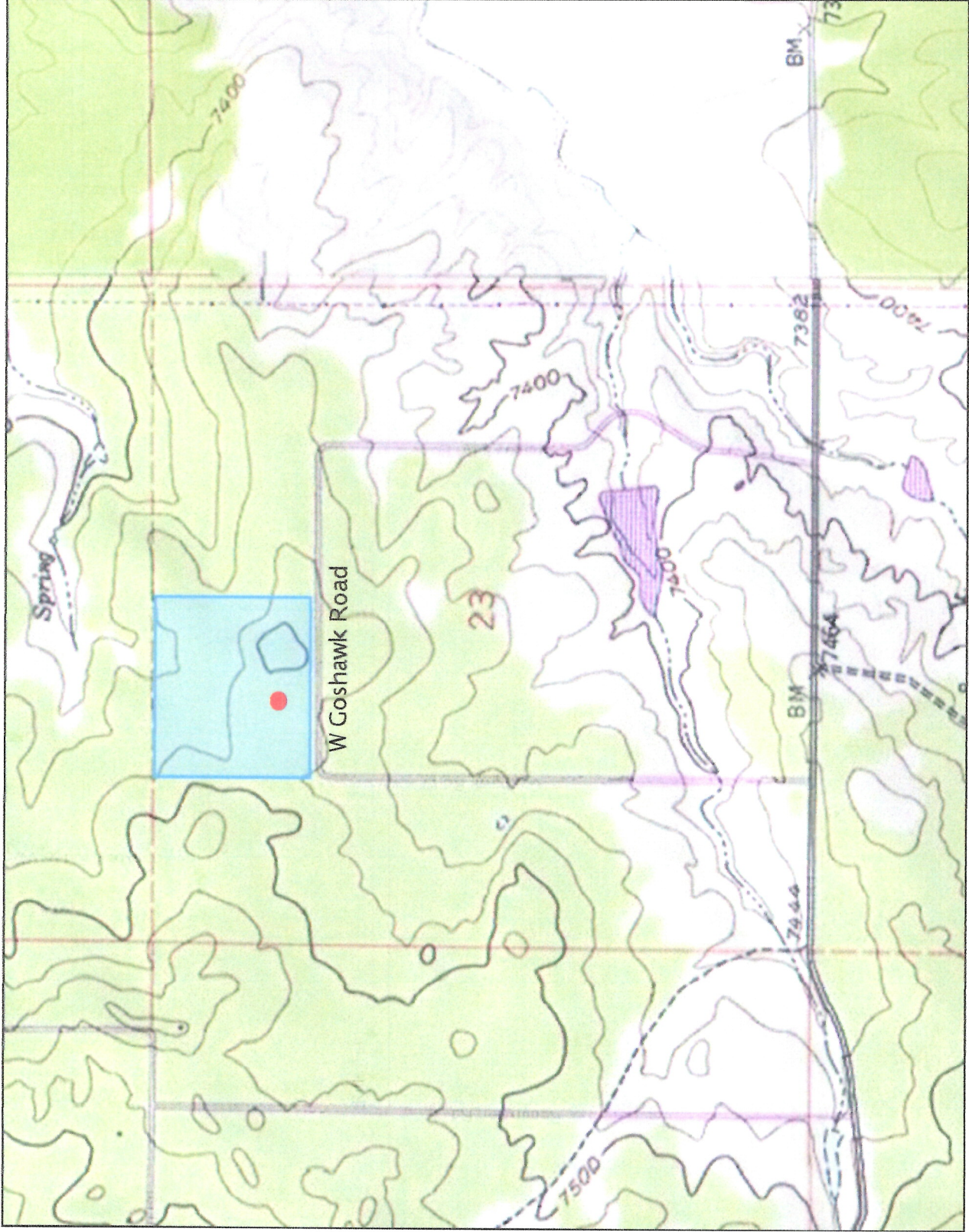
Thorson, Jon P., 2003a. *Geologic Map of the Black Forest Quadrangle, El Paso County, Colorado*. Colorado Geological Survey Open -File Report 03-06. Map Scale 1:24,000.

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Colorado Active Water Level Network.

<https://earthquake.usgs.gov/hazards/designmaps/>; [SEAO/OSHPD Seismic Design Maps Tool](#)



# Warner Subdivision



**Legend**

- County
- Well Location

**Location**

**Notes**

NE4 NW4 S23 T11S R65W

**FIGURE 1**

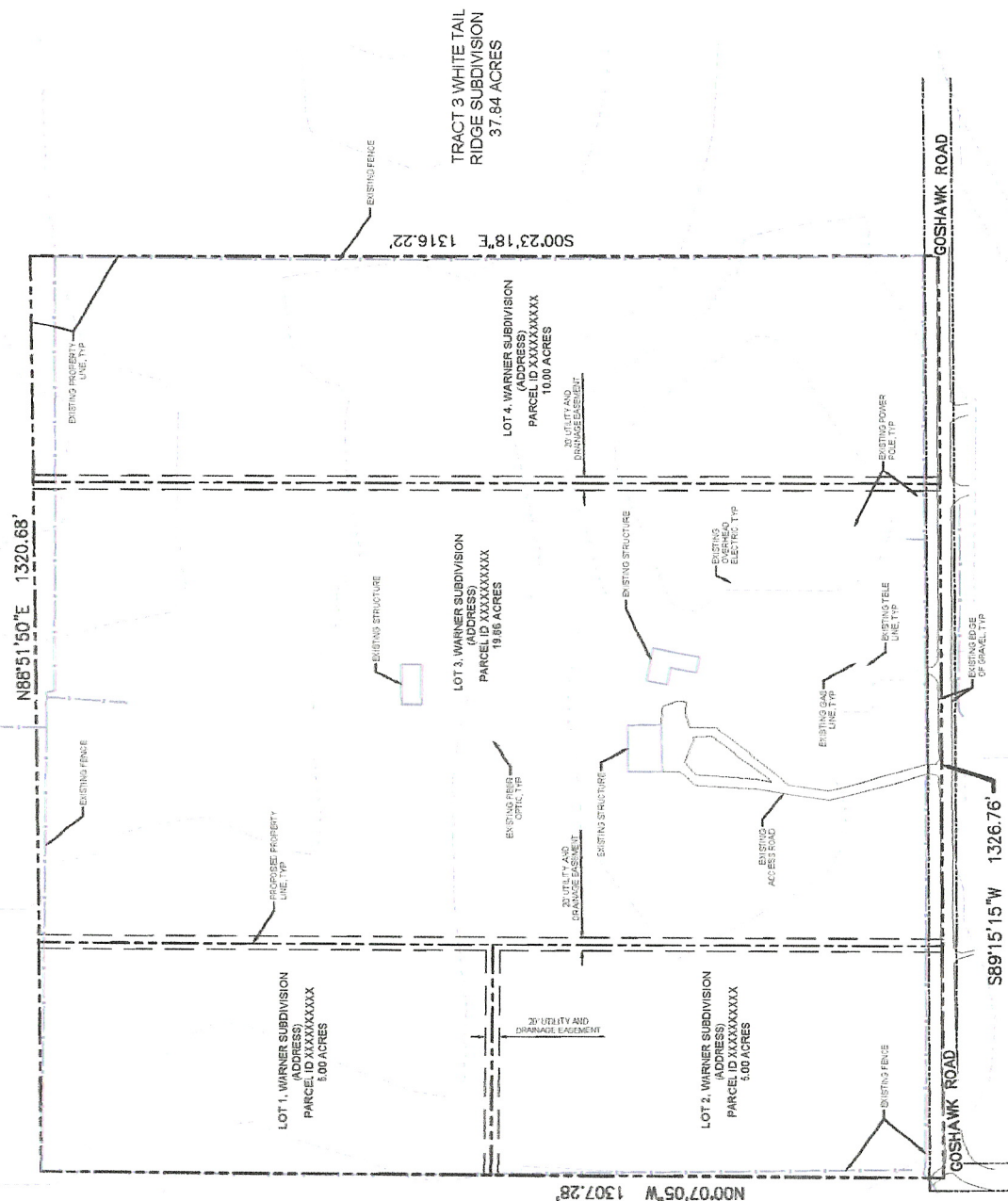


FIGURE 2

**WARNER 4-LOT SUBDIVISION**

## SITE DEVELOPMENT PLANS

17350 GOSHAWK RD. COLORADO SPRINGS, CO 80908



**GRAPHIC SCALE**

0' 40' 80' 160' 240'

Scale 1"=80'

[illegible]

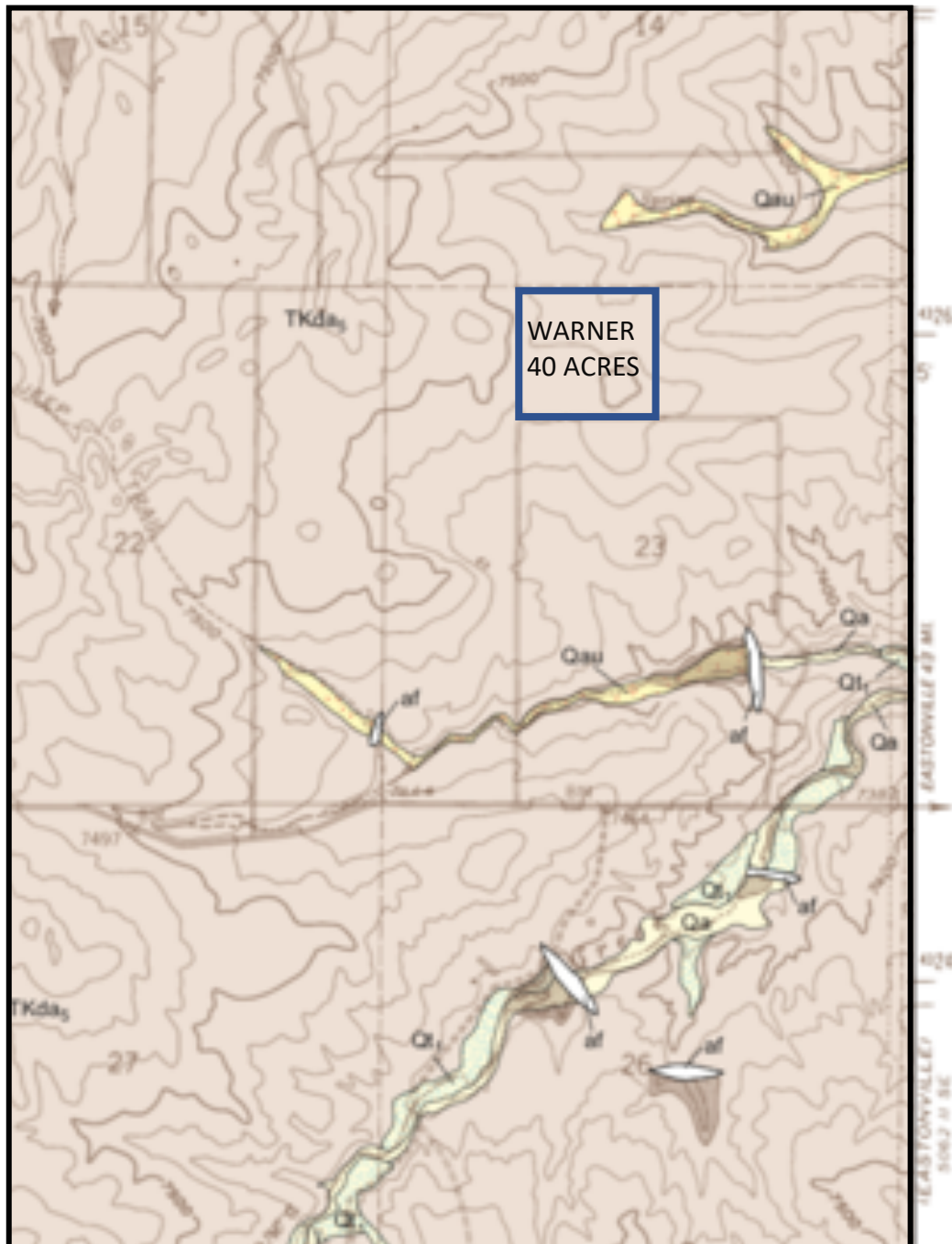
**FORSGREN**  
*Associates Inc.*  
550 Inverness Drive East, Suite 112, Englewood, CO 80112  
Tel: 720.314.5884 FAX: 720.000.0000

PROJECT NO.	04-10-00000
OWNER	C BURBA
DESIGNED	C BURBA
APPROVED	C BURBA
DRAWN	J MOORE

**OWNER**  
**BRIAN WARNER**  
COLORADO SPRINGS, CO

4-LOT MINOR SUBDIVISION

SHEET NO. **C-01**  
 DATE: 06/10/2020  
 PAGE NO. 1 OF 1



Black Forest Quadrangle -Thorson OF-30-6  
NE1/4 NW1/4 T11S R65W

FIGURE 3  
GEOLOGY MAP

## ATTACHMENT 1



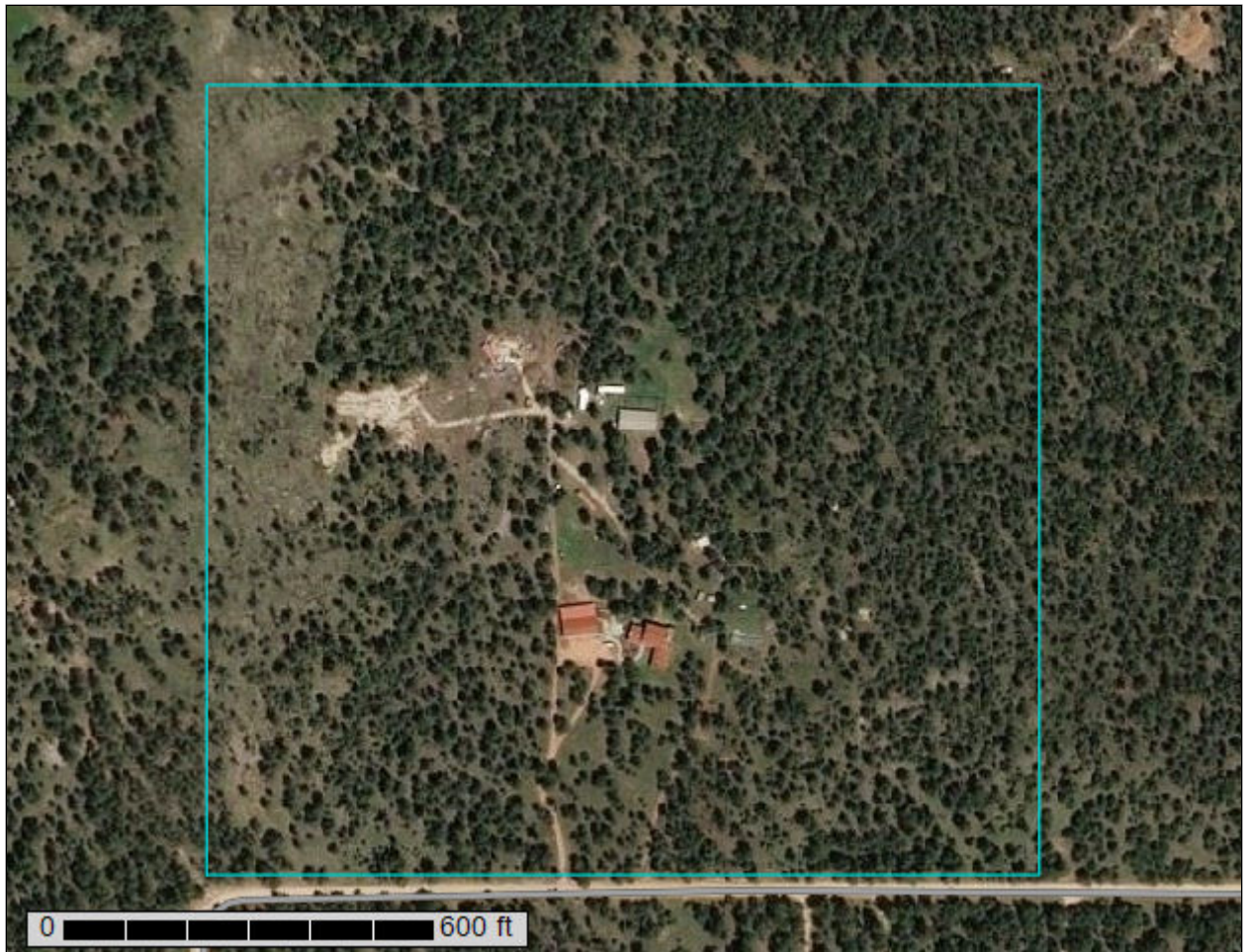
United States  
Department of  
Agriculture

**NRCS**

Natural  
Resources  
Conservation  
Service

A product of the National  
Cooperative Soil Survey,  
a joint effort of the United  
States Department of  
Agriculture and other  
Federal agencies, State  
agencies including the  
Agricultural Experiment  
Stations, and local  
participants

# Custom Soil Resource Report for **El Paso County Area, Colorado**



April 7, 2020



# Preface

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Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (<http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/>) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (<https://offices.sc.egov.usda.gov/locator/app?agency=nrcs>) or your NRCS State Soil Scientist ([http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2\\_053951](http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951)).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

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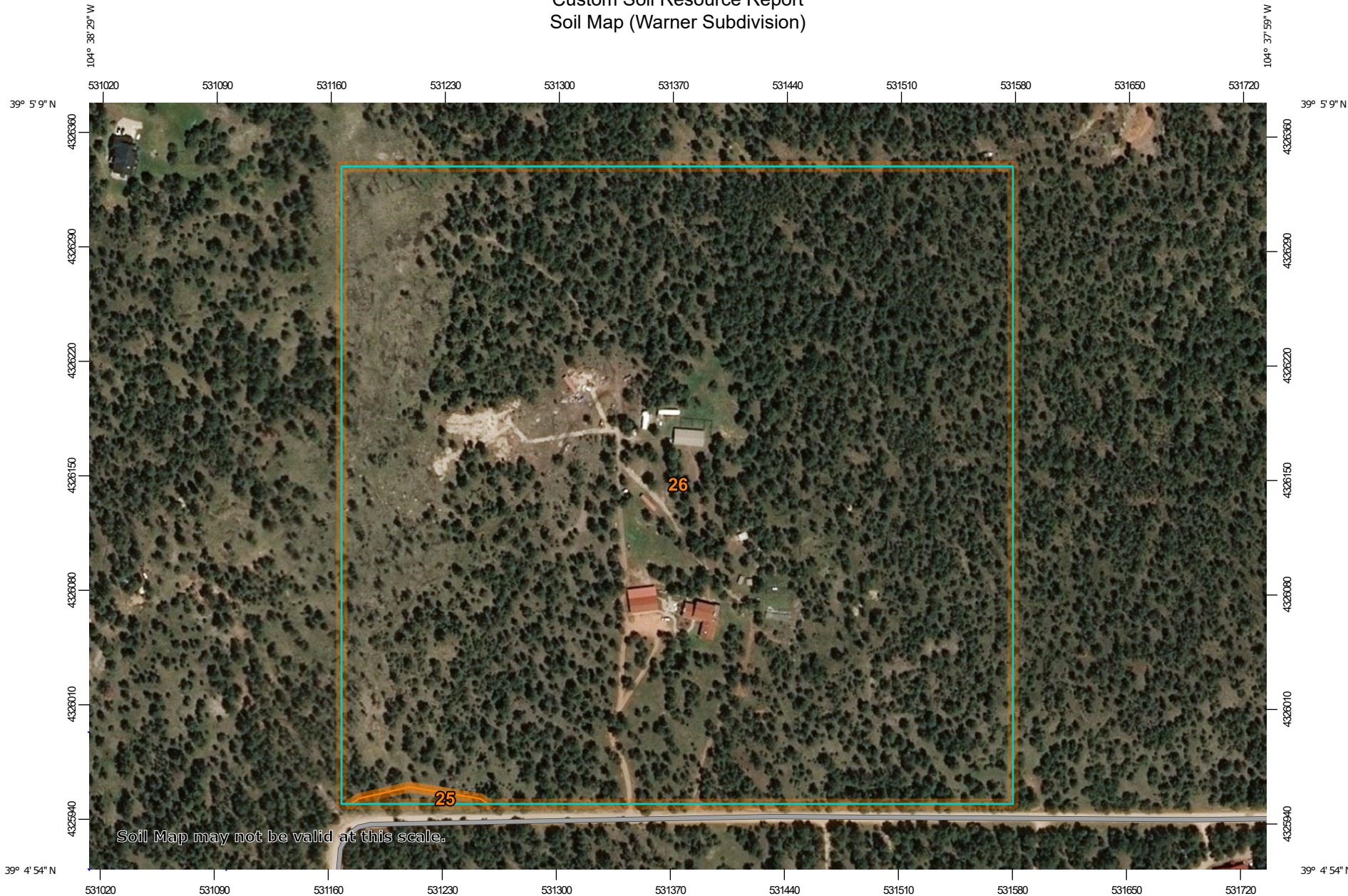


# Soil Map

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The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report  
Soil Map (Warner Subdivision)



Soil Map may not be valid at this scale.



Map Scale: 1:3,300 if printed on A landscape (11" x 8.5") sheet.

Meters				
0	45	90	180	270

Feet				
0	150	300	600	900

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 13N WGS84

# Custom Soil Resource Report

## MAP LEGEND

### Area of Interest (AOI)

 Area of Interest (AOI)

### Soils

 Soil Map Unit Polygons

 Soil Map Unit Lines

 Soil Map Unit Points

### Special Point Features

 Blowout

 Borrow Pit

 Clay Spot

 Closed Depression

 Gravel Pit

 Gravelly Spot

 Landfill

 Lava Flow

 Marsh or swamp

 Mine or Quarry

 Miscellaneous Water

 Perennial Water

 Rock Outcrop

 Saline Spot

 Sandy Spot

 Severely Eroded Spot

 Sinkhole

 Slide or Slip

 Sodic Spot

 Spoil Area

 Stony Spot

 Very Stony Spot

 Wet Spot

 Other

 Special Line Features

### Water Features

 Streams and Canals

### Transportation

 Rails

 Interstate Highways

 US Routes

 Major Roads

 Local Roads

### Background

 Aerial Photography

## MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service  
Web Soil Survey URL:  
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: El Paso County Area, Colorado  
Survey Area Data: Version 17, Sep 13, 2019

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Sep 8, 2018—May 26, 2019

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.



## Map Unit Legend (Warner Subdivision)

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
25 Elbeth sandy loam, 3 to 8 percent slopes	0.1 0.3%	26 Elbeth sandy loam, 8 to 15 percent slopes	39.7 99.7%
<b>Totals for Area of Interest</b>		<b>39.9</b>	<b>100.0%</b>

## Map Unit Descriptions (Warner Subdivision)

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The

## Custom Soil Resource Report

delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

## El Paso County Area, Colorado

### 25—Elbeth sandy loam, 3 to 8 percent slopes

#### Map Unit Setting

*National map unit symbol:* 367x

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

*Farmland classification:* Not prime farmland

#### Map Unit Composition

*Elbeth and similar soils:* 85 percent

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

#### Description of Elbeth

##### Setting

*Landform:* Hills

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

*Down-slope shape:* Linear

*Across-slope shape:* Linear

*Parent material:* Alluvium derived from arkose

##### Typical profile

*A - 0 to 3 inches:* sandy loam

*E - 3 to 23 inches:* loamy sand

*Bt - 23 to 68 inches:* sandy clay loam

*C - 68 to 74 inches:* sandy clay loam

##### Properties and qualities

*Slope:* 3 to 8 percent

*Depth to restrictive feature:* More than 80 inches

*Natural drainage class:* Well drained

*Runoff class:* Medium

*Capacity of the most limiting layer to transmit water (Ksat):* Moderately high (0.20 to 0.60 in/hr)

*Depth to water table:* More than 80 inches

*Frequency of flooding:* None

*Frequency of ponding:* None

*Available water storage in profile:* Moderate (about 7.1 inches)

##### Interpretive groups

*Land capability classification (irrigated):* None specified

*Land capability classification (nonirrigated):* 4e

*Hydrologic Soil Group:* B

*Hydric soil rating:* No

#### Minor Components

##### Other soils

*Percent of map unit:*

*Hydric soil rating:* No

## 26—Elbeth sandy loam, 8 to 15 percent slopes

### Map Unit Setting

*National map unit symbol:* 367y  
*Elevation:* 7,300 to 7,600 feet  
*Farmland classification:* Not prime farmland

### Map Unit Composition

*Elbeth and similar soils:* 85 percent  
*Estimates are based on observations, descriptions, and transects of the mapunit.*

### Description of Elbeth

#### Setting

*Landform:* Hills  
*Landform position (three-dimensional):* Side slope  
*Down-slope shape:* Linear  
*Across-slope shape:* Linear  
*Parent material:* Alluvium derived from arkose

#### Typical profile

*A - 0 to 3 inches:* sandy loam  
*E - 3 to 23 inches:* loamy sand  
*Bt - 23 to 68 inches:* sandy clay loam  
*C - 68 to 74 inches:* sandy clay loam

#### Properties and qualities

*Slope:* 8 to 15 percent  
*Depth to restrictive feature:* More than 80 inches  
*Natural drainage class:* Well drained  
*Runoff class:* Medium  
*Capacity of the most limiting layer to transmit water (Ksat):* Moderately high (0.20 to 0.60 in/hr)  
*Depth to water table:* More than 80 inches  
*Frequency of flooding:* None  
*Frequency of ponding:* None  
*Available water storage in profile:* Moderate (about 7.1 inches)

#### Interpretive groups

*Land capability classification (irrigated):* None specified  
*Land capability classification (nonirrigated):* 4e  
*Hydrologic Soil Group:* B  
*Hydric soil rating:* No

### Minor Components

#### Other soils

*Percent of map unit:*  
*Hydric soil rating:* No

## Custom Soil Resource Report

### **Pleasant**

*Percent of map unit:*

*Landform:* Depressions

*Hydric soil rating:* Yes



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## ATTACHMENT 2

Architecture  
Structural  
Geotechnical



Materials Testing  
Forensic  
Civil/Planning

**ROCKY MOUNTAIN GROUP  
EMPLOYEE OWNED**

Job No. 173099

October 15, 2020

Brian Warner  
17350 W. Goshawk Rd  
El Paso County, CO 80908

Re: Wastewater Study  
Warner 4-lot Minor Subdivision  
Goshawk Rd  
El Paso County, Colorado

Ref: *Development Plan*, prepared by Forsgren Associates, Inc., Project No. 04-18-0026, last dated June 1, 2020.

Dear Mr. Warner:

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

- EPC Schedule No. 5123000037, currently addressed as 17350 Goshawk Road and is zoned *RR-5 - Residential Rural*.

It is our understanding the 40-acre parcel is to be subdivided into four lots of approximately 5.00 to 19.86 acres each. An existing single-family residence with a septic and well are to remain on Lot 3. The proposed site development is to consist of one single family residence with a well and an on-site wastewater treatment system on the remaining three lots. The Proposed Lot Layout (Figure 1) presents the general boundaries of our investigation.

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

The following are 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 reviewed in conjunction with this site were available for our review and are listed below:

1. *Soils Report, 17350 Goshawk Road, El Paso County, Colorado*, prepared by Geoquest, LLC, Job #17-0410, dated June 8, 2017.

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303.688.9475

**Northern Office:**  
Evans, CO 80620  
970.330.1071

**Fort Collins:** 970.616.4364  
**Monument:** 719.488.2145  
**Woodland Park:** 719.687.6077

2. *Profile Pit Evaluation, 17350 Goshawk Road, El Paso County, Colorado*, prepared by Geoquest, LLC, Job #17-0410, dated June 8, 2017.

The findings, conclusions and recommendations contained in this reports were considered during the preparation of this report.

## SITE CONDITIONS

Personnel of RMG performed a reconnaissance visit on September 24, 2020. The purpose of the reconnaissance visit was to evaluate the site surface characteristics including topography, vegetation, natural and cultural features, and current and historic land uses. Three 8-foot deep test pits were performed across the site, during our reconnaissance visit. The Test Pit Locations are presented in Figure 2.

The site surface characteristics were observed to consist of low lying grasses and weeds across the entire site. No deciduous trees are located on the property.

The following conditions were observed with regard to the 40-acre parcel:

- A well currently **does** exist on the 40-acre site.
- Runoff and irrigation features do not exist on the property.
- The entire site lies outside of areas designated as 100-year and 500-year floodway or floodplain.
- Slopes greater than 20 percent **do not** 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 (EPCHDE);
- 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 EPCHDE;
- 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, dry gulches, cut banks and fill areas (from the crest).
- Each new lot shall be laid out to insure that a minimum of 2 sites are appropriate for an OWTS and do not fall within any restricted areas, (e.g. utility easements, right of ways). Based on the test pit observations performed, each new lot has a minimum of two locations for the OWTS, as presented on the OWTS Suitability Map, Figure 3.

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.

## DOCUMENT REVIEW

RMG has reviewed the above referenced site plan and identified the soil conditions anticipated to be encountered during construction of the proposed OWTS, which included a review of documented Natural Resource Conservation Service - NRCS data provided by [websoilsurvey.nrcs.usda.gov](http://websoilsurvey.nrcs.usda.gov). The results of our review are presented below. A review of FEMA Map No. 08041C0310G, 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 three 8-foot deep test pits on September 24, 2020 (Test Pits TP-1, TP-2 and TP-3), 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 U.S. Soil Conservation Service along with USDA has identified the soils on the property as:

- 26 – Elbeth sandy loam, 8 to 15 percent slopes. Elbeth sandy loam was mapped by the USDA to encompass the majority of the site. Properties of the Elbeth sandy loam include, well-drained soil, depth of the water table is anticipated to be greater than 80 inches, runoff is anticipated to be low, frequency of flooding and ponding is none, and landforms are depressions. The hydrologic soil group of the unit is B. The USDA Soil Survey Map is presented in Figure 4.

Groundwater was not encountered in the test pits observed by RMG. However, bedrock/ limiting layers were encountered in TP-2 at a depth of 7 feet and in TP-3 at a depth of 5 feet.

An OWTS is proposed for each proposed new lot and should conform to the recommendations presented in an 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 bedrock to the infiltrative surface.

Redoximorphic features indicating the fluctuation of groundwater or higher ground water levels were not observed in the test pits observed by RMG. However, evidence of groundwater was observed by Geoquest, LLC as stated in their Profile Pit Evaluation letter, referenced above. Redoximorphic features were observed between 36 to 40 inches below the surface. The Test Pit Logs are presented in Figures 5 and 6.

## CONCLUSIONS

In summary, it is our opinion the site is suitable for individual on-site wastewater treatment systems within the cited limitations. Due to encountering bedrock/limiting layers and the potential for redoximorphic features, it is anticipated the OWTS for each lot will need to be designed by a Colorado Licensed Engineering. There are no foreseeable or stated construction related issues or land use changes proposed at this time. The proposed new lots are each anticipated to be suitable for an individual OWTS.



## 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.

Additional test pits will be required if the treatment areas are not located in the locations assumed for the purpose of this report. If an OWTS is proposed for 17350 Goshawk Road, an additional OWTS site evaluation 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,

RMG – Rocky Mountain Group

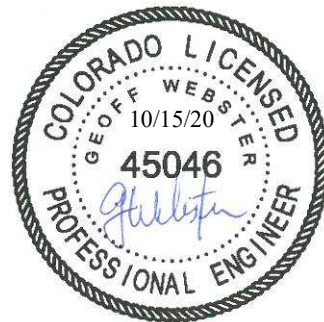


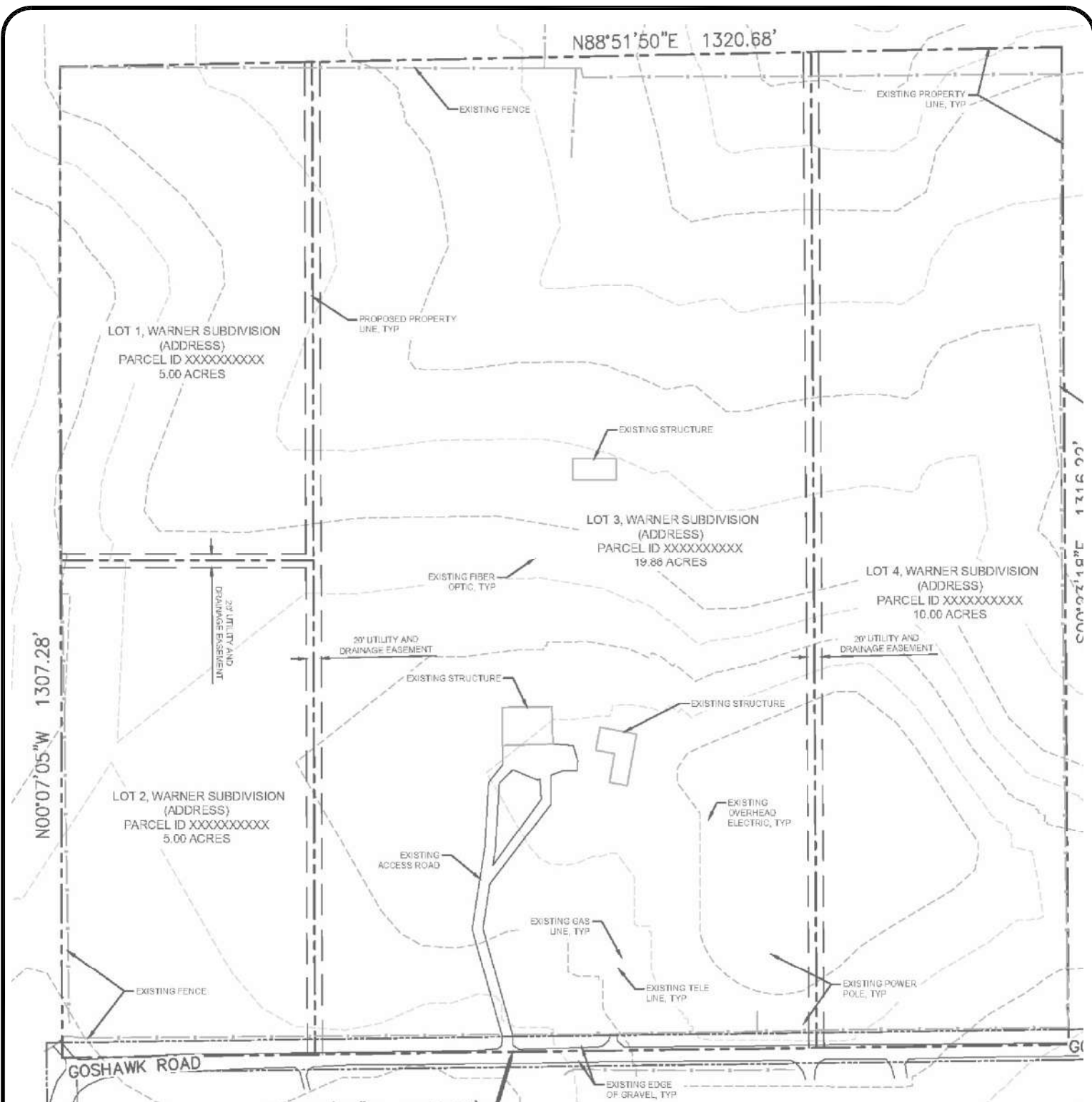
Kelli Zigler  
Project Geologist

Reviewed by,

RMG – Rocky Mountain Group

Geoff Webster, P.E.  
Sr. Geotechnical Project Engineer





NOT TO SCALE  
Base map provided by Forsgren Associates, Inc.



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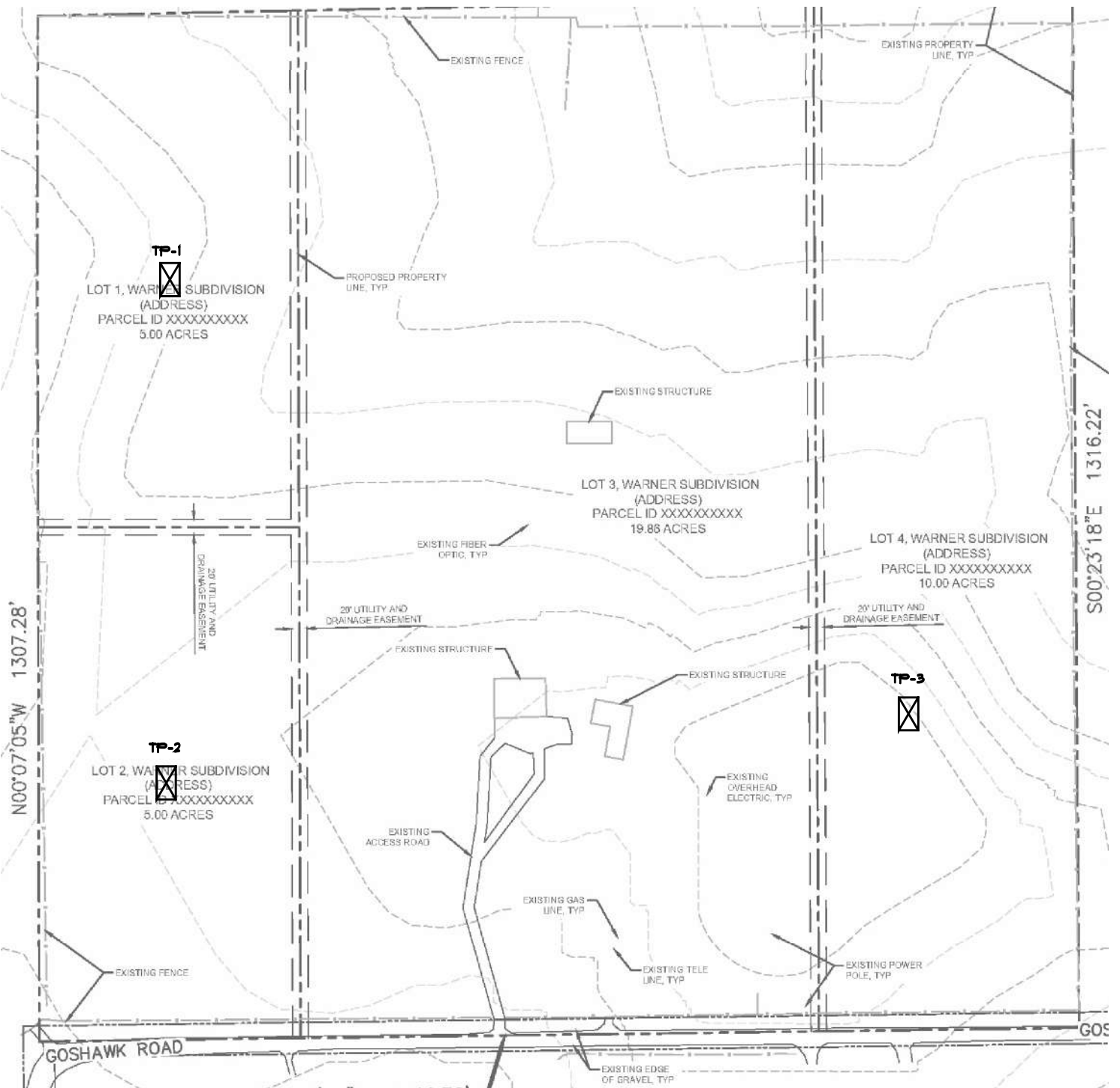
## PROPOSED LOT LAYOUT

WARNER 4-LOT SUBDIVISION  
GOSHAWK ROAD  
EL PASO COUNTY, CO  
BRIAN WARNER

JOB No. 173099

FIG No. 1

DATE 10-14-2020



NOT TO SCALE



DENOTES ANTICIPATED LOCATION OF HOUSE



DENOTES ANTICIPATED LOCATION(S) OF OWTS



ROCKY MOUNTAIN GROUP

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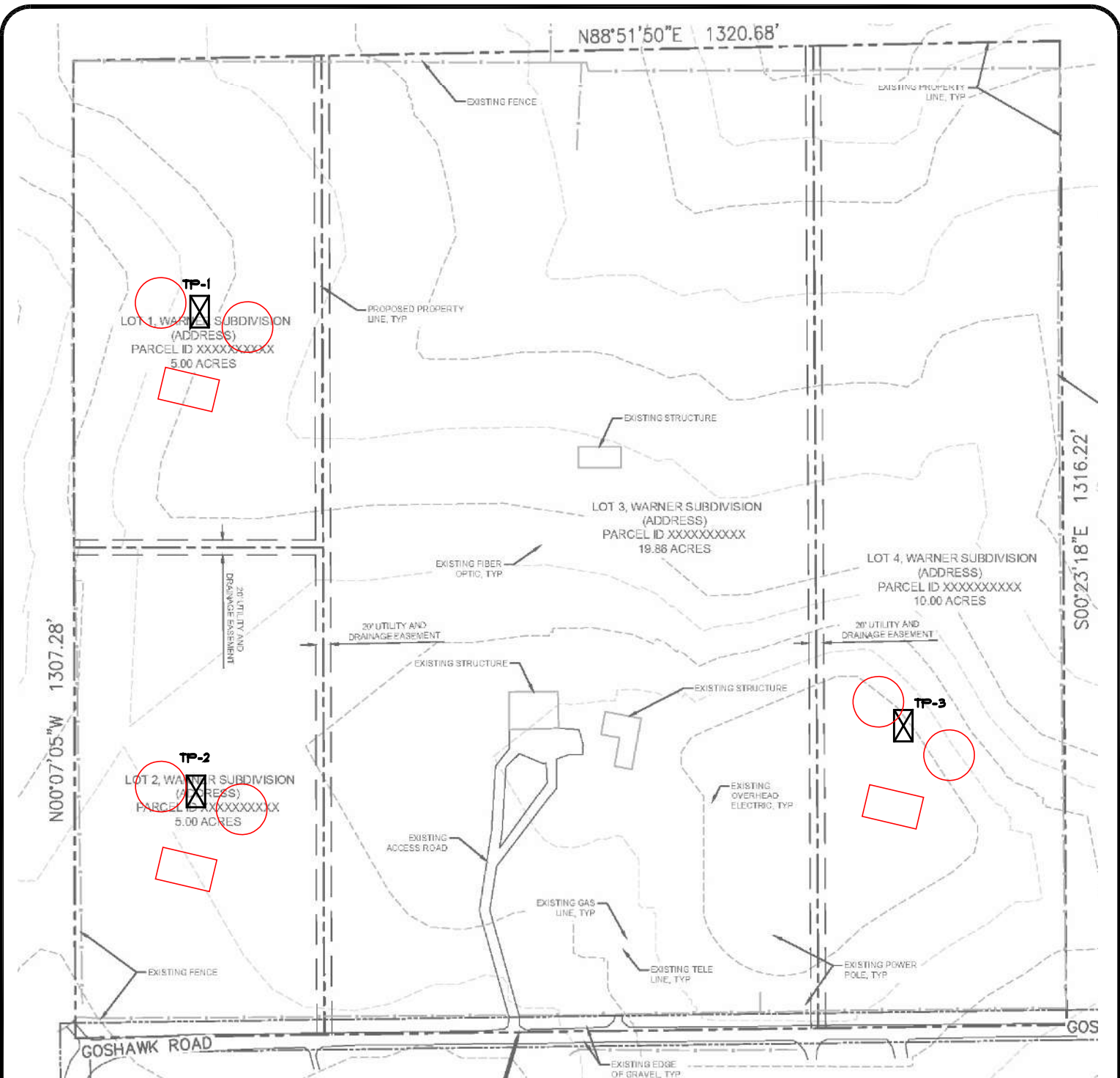
## OWTS SUITABILITY MAP

WARNER 4-LOT SUBDIVISION  
GOSHAWK ROAD  
EL PASO COUNTY, CO  
BRIAN WARNER

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FIG No. 2

DATE 10-14-2020



NOT TO SCALE



DENOTES ANTICIPATED LOCATION OF HOUSE



DENOTES ANTICIPATED LOCATION(S) OF OWTS



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## OWTS SUITABILITY MAP

WARNER 4-LOT SUBDIVISION  
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EL PASO COUNTY, CO  
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FIG No. 3

DATE 10-14-2020





## 71—Pring coarse sandy loam, 3 to 8 percent slopes

### Map Unit Setting

National map unit symbol: 369k

Elevation: 6,800 to 7,600 feet

Farmland classification: Not prime farmland

### Map Unit Composition

Pring and similar soils: 85 percent

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

### 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)  
(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 capacity: 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

Hydric soil rating: No

### Minor Components

#### Pleasant

Percent of map unit:

Landform: Depressions

Hydric soil rating: Yes



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## USDA SOIL SURVEY MAP

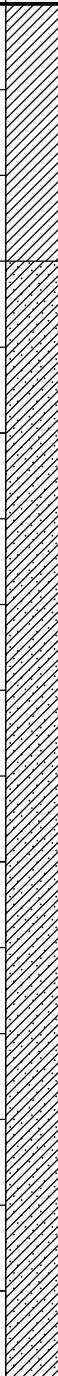
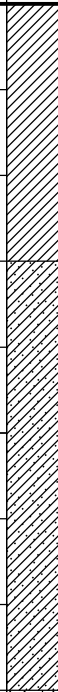

WARNER 4-LOT SUBDIVISION  
GOSHAWK ROAD  
EL PASO COUNTY, CO  
BRIAN WARNER

JOB No. 173099

FIG No. 4

DATE 10-14-2020



TEST PIT No.: <b>TP-1</b> DATE DRILLED: 9/24/20 REMARKS: NO GROUNDWATER ON 9/24/20	DEPTH (FT)	SYMBOL	SAMPLES	WATER CONTENT %	SOIL TYPE		TEST PIT No.: <b>TP-2</b> DATE DRILLED: 9/24/20 REMARKS: NO GROUNDWATER ON 9/24/20	DEPTH (FT)	SYMBOL	SAMPLES	WATER CONTENT %	SOIL TYPE	
USDA Soil Texture: Sandy Loam USDA Soil Type: 2 USD Structure Shape: Moderate USDA Structure Grade: Strong							USDA Soil Texture: Sandy Loam USDA Soil Type: 2 USD Structure Shape: Granular USDA Structure Grade: Strong						
USDA Soil Texture: Sandy Clay USDA Soil Type: 4 USD Structure Shape: Blocky USDA Structure Grade: Moderate	2.5						USDA Soil Texture: Sandy Clay USDA Soil Type: 4 USD Structure Shape: Blocky USDA Structure Grade: Moderate	2.5					
	5.0						USDA Soil Texture: Sand USDA Soil Type: R-0 USD Structure Shape: Single-Grain USDA Structure Grade: Structureless	5.0					
	7.5						Limiting Layer at 7 feet - 44% > 2mm	7.5					

ROCKY MOUNTAIN GROUP

Architectural  
Structural  
Forensics



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SOUTHERN COLORADO, DENVER METRO, NORTHERN COLORADO

Geotechnical  
Materials Testing  
Civil, Planning

## TEST PIT LOGS

JOB No. 173099

FIGURE No. 5

DATE 10/15/20

TEST PIT No.: <b>TP-3</b> DATE DRILLED: 9/24/20 REMARKS: NO GROUNDWATER ON 9/24/20	DEPTH (FT)	SYMBOL	SAMPLES	WATER CONTENT %	SOIL TYPE	
USDA Soil Texture: Sandy Laom USDA Soil Type: 2 USD Structure Shape: Blocky USDA Structure Grade: Moderate						
USDA Soil Texture: Sandy Clay USDA Soil Type: 4 USD Structure Shape: Blocky USDA Structure Grade: Moderate	2.5					
USDA Soil Texture: Sandy Clay USDA Soil Type: R-1 USD Structure Shape: Granular USDA Structure Grade: Moderate	5.0					
Limiting Layer at 5 feet - 45% > 2mm						
	7.5					

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Architectural  
Structural  
Forensics



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Geotechnical  
Materials Testing  
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## TEST PIT LOGS

JOB No. 173099

FIGURE No. 6

DATE 10/15/20