ENTECH
ENGINEERING, INC.
505 ELKTON DRIVE
COLORADO SPRINGS, CO 80907
PHONE (719) 531-5599

SOILS AND GEOLOGY STUDY
HOMELAND ACRES
PARCEL NO. 56040-00-044
8180 KANE ROAD
EL PASO COUNTY, COLORADO

Prepared for:
PA Koscielski
31 North Tejon Street, Suite 500
Colorado Springs, Colorado 80903

Attn: PA Koscielski

June 14, 2024

Respectfully Submitted,

ENTECH ENGINEERING, INC.

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

Reviewed by:

COLORADO LICENSED
JOSEPH COLLIN GOODE
23725
PROFESSIONAL ENGINEER

Digitally signed by Joseph C. Goode Jr.
Date: 06/14/24

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

LLL/JG

Table of Contents

1 SUMMARY

Project Location

The project site is in a portion of the NW¼ of Section 4, Township 16 South, Range 65 West of the 6th Principal Meridian in El Paso County, Colorado. The 57.49-acre site is located northwest of the intersection of Kane Road and Link Road in El Paso County, Colorado.

Project Description

The Home Land Acres subdivision will consist of one 10.43-acre lot, and a 47.06-acre tract indicated as Tract A. No new construction is planned at this time. The existing residence located on proposed Lot 1 is serviced by an existing water well and septic system.

Scope of Report

This report presents the results of our geologic evaluation and recommended treatment/mitigation of engineering geologic hazards. This report presents the results of our geologic reconnaissance, a review of available maps, aerial photographs, and our conclusions with respect to the impacts of the geologic conditions on the proposed development.

Land Use and Engineering Geology

This site was found to be suitable for development if constraints are mitigated when new construction is completed. Geologic conditions, including artificial fill, potentially expansive soils, hydrocompaction, seasonal shallow groundwater and shallow water areas, will impose some constraints on development and land use. These conditions will be discussed in greater detail in the report.

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

2 GENERAL SITE CONDITIONS AND PROJECT DESCRIPTION

The project site is in a portion of NW¼ of Section 4, Township 16 South, Range 65 West of the 6th Principal Meridian in El Paso County, Colorado. The 57.49-acre site is located northwest of the intersection of Kane Road and Link Road in El Paso County, Colorado. The location of the site is as shown on the Vicinity Map (Figure 1).

The topography of the site is gradually sloping to the west-northwest and east along a ridge in the central portion of the site. There is a drainage located in the eastern portion of the site that flows in a northwesterly direction. Water was observed in portions of the drainage. The site boundaries are indicated on the USGS Map (Figure 2). Past land use consist of agricultural land and or undeveloped land, and site vegetation primarily consists of field grasses, scattered areas of elm trees, weeds, sage brush, cacti, and yuccas. Site photographs taken on June 3, 2024, are included in Appendix A.

The site is currently zoned as A-5 (Agricultural), and CAD-O (Commercial Airport Overlay District) (Reference 1). The proposed site is currently developed with a farm house with several out buildings on proposed Lot 1, and Tract A is undeveloped. Surrounding properties consist of Watchmen Road and existing residential development to the north; Link Road and residential development to the east; Kane Road and rural agricultural properties to the south; residential and a school to the west. The Site Plan is presented in Figure 3.

3 SCOPE OF THE REPORT

The scope of the report includes a general geologic analysis utilizing published geologic data. Detailed site-specific mapping was conducted to obtain general information with respect to major geographic and geologic features, geologic descriptions, and their effects on the future development of the property.

4 FIELD INVESTIGATION

Our field investigation consisted of the preparation of a geologic map of any bedrock features and significant surficial deposits. The Natural Resource Conservation Service (NRCS), previously the Soil Conservation Service (SCS), survey was also reviewed to evaluate the site. The position of mappable units within the subject property is shown on the Geologic Map. Our mapping procedures involved both field reconnaissance and measurements and air photo reconnaissance and interpretation. The same mapping procedures have also been utilized to produce the Engineering Geology Map which identified pertinent geologic conditions affecting development. The field mapping was performed by personnel of Entech Engineering, Inc. (Entech) on June 3, 2024.

5 SOIL, GEOLOGY, AND ENGINEERING GEOLOGY

5.1 General Geology

The site lies in the western portion of the Great Plains Physiographic Province. Approximately 9 miles to the west is a major structural feature known as the Ute Pass Fault. This fault marks the boundary between the Great Plains Physiographic Province and the Southern Rocky Mountain Province. The site exists within the southeastern edge of a large structural feature known as the Denver Basin. Bedrock in the area tends to be very gently dipping in a northeasterly direction (Reference 3). The rocks in the area of the site are sedimentary in nature and typically Upper Cretaceous in age. The bedrock underlying the site consists of the Pierre Shale Formation. Overlying this formation are unconsolidated deposits of eolian deposits and artificial fill. The site's stratigraphy will be discussed in more detail in Section 5.3.

5.2 Soil Conservation Survey

The Natural Resource Conservation Service (Reference 3), previously the Soil Conservation Service (Reference 4), has mapped four soil types on the site (Figure 4). In general, the soils classify as sand, sandy loam, and loamy soils that are associated with floodplain and stream terrace landforms. The soils are described as follows:

Soil Type	Description
2	Ascalon sandy loam, 1 – 3% slopes
3	Ascalon sandy loam, 3 – 9% slopes
101	Ustic Torrifluvents, loamy
102	Valent sand, 1 – 12% slopes

Complete descriptions of each soil type are presented in Appendix B. The soils have generally been described to have moderate permeabilities. Possible hazards with soil erosion are present on the site. The erosion potential can be controlled with vegetation. The soils have been described as having moderate erosion hazards.

5.3 Site Stratigraphy

The Geologic Map of the Fountain Quadrangle showing the site location is presented in Figure 6 (Reference 5). The Geology Map prepared for the site is presented in Figure 7. The mappable units identified on this site are described as follows:

Qaf **Artificial Fill Holocene Age:** These are recent man-place fill deposits associated with fill placement and fill piles on-site, pond embankment east of the existing house on Lot 1, drainage improvements in the southeastern portion of the property, and the existing gas pipeline that bisects the site from the southwestern side to the northeastern side of the property.

Qes **Eolian Sand of Quaternary Age:** These deposits are fine to medium grained soil deposited on the site by the action of the prevailing winds from the west and northwest. They typically occur as large dune deposits or narrow ridges. These soil types are typically tan to brown in color and tend to have very uniform or well-sorted gradation. These materials tend to have a relatively high permeability and low density.

The bedrock underlying the site consists of the Pierre Shale Formation of Upper Cretaceous Age. The Pierre Shale Formation typically consists of claystone and shale. Overlying this formation are eolian and alluvial deposits consisting of sandy to silty clays and clayey to silty sands. Bedrock was encountered in the water well at approximately 85 feet below the existing surface grade reported on the *Well Construction and Yield Estimate Report* (Reference 6, Appendix C).

The soils listed above were mapped from site-specific mapping, the *Geologic Map of the Fountain Quadrangle* distributed by the Colorado Geological Survey in 2017 (Reference 5), the *Reconnaissance Geologic Map of Colorado Springs and Vicinity*, distributed by the USGS in 1973 (Reference 7), the *Geologic Map of the Colorado Springs-Castle Rock Area, Front Range Urban Corridor,* distributed by the USGS in 1979 (Reference 8), and the *Geologic Map of the Pueblo 1^0 x 2^0 Quadrangle*, distributed by the US Geological Survey in 1978 (Reference 7). The Geology/Engineering Geology Map prepared for the site is presented in Figure 6.

5.4 Groundwater

Groundwater was encountered in water well boring at 55 feet (Reference 6). Groundwater was also observed in portions of the drainage located in the eastern portion of the site. Fluctuation in groundwater conditions may occur due to variations in rainfall and other factors not readily apparent at this time. It should be noted that in the sandy materials on-site, some groundwater conditions might be encountered due to the variability in the soil profile. Isolated sand and gravel layers within the soils, sometimes only a few feet in thickness and width, can carry water in the subsurface. Groundwater may also flow on top of the underlying bedrock.

6 ENGINEERING GEOLOGY – IDENTIFICATION AND MITIGATION OF GEOLOGIC HAZARDS

Detailed mapping has been performed on this site to produce a Geology/Engineering Geology Map (Figure 6). This map shows the location of various geologic conditions the developers should consider during the planning, design, and construction stages of the project. These constraints/hazards and the recommended mitigation techniques are as follows:

Artificial Fill – Constraint

These are recent man-place fill deposits associated with fill placement and fill piles on-site, pond embankment east of the existing house on Lot 1, drainage improvements in the southeastern portion of the property, and the existing gas pipeline that bisects the site from the southwestern side to the northeastern side of the property. Any uncontrolled or undocumented fill encountered beneath foundations will require mitigation.

Mitigation: Any uncontrolled fill encountered beneath foundations will require removal and recompaction at a minimum of 95% of its maximum Modified Procter Dry Density, ASTM D-1557 or penetration to native soils.

Expansive Soils – Constraints

The site is mapped in areas windblown sand or silt and high swell potential according to the *Map of Potentially Swelling Soil and Rock in the Front Range Urban Corridor* by Hart, 1974 (Reference 9). Expansive soils, if encountered, can cause differential movement in the structure foundation if not properly mitigated. Mitigation for expansive soils is not anticipated for the site.

Mitigation: Expansive soils encountered beneath the foundations will require mitigation. To reduce the potential for swell-related movement, if claystone is encountered the foundation subgrade should be overexcavated 4 to 6 feet below foundation components. Suitable site soils or imported granular fill may be used to replace the site overexcavated materials. The granular fill should be compacted to 95% of its maximum Modified Proctor Dry Density ASTM D1557. Final recommendations should be determined after additional investigation of site once development plans are available.

Hydrocompaction – Constraint

Areas in which this hazard has been identified are acceptable as building sites. However, in areas identified for this hazard classification, we anticipate a potential for settlement movements upon saturation of these surficial soils. The low density, uniform grain sized, windblown sand deposits

are particularly susceptible to this type of phenomenon and have been identified on Figure 6. The potential for hydrocompaction can also exist in areas mapped as Eolian sand (Qes).

Mitigation: The potential for settlement movement is directly related to saturation of the soils below the foundation areas. Therefore, good surface and subsurface drainage is extremely critical in these areas in order to minimize the potential for saturation of these soils. The ground surface around all permanent structures should be positively sloped away from the structure to all points, and water must not be allowed to stand or pond anywhere on the site. We recommend that the ground surface within 10 feet of the structures be sloped away with a minimum gradient of ten percent. If this is not possible on the upslope side of the structures, then a well-defined swale should be created to intercept the surface water and carry it quickly and safely around and away from the structures. Roof drains should be made to discharge well away from the structures and into areas of positive drainage. Where several structures are involved, the overall drainage design should be such that water directed away from one structure is not directed against an adjacent building. Planting and watering in the immediate vicinity of the structures, as well as general lawn irrigation, should be minimized.

Groundwater and Floodplain Areas

The site is not mapped within floodplain zones according to the FEMA Map No. 08041CO958G, (Figure 8, Reference 11). There is a drainage located in the eastern portion of the site that flows in a northwesterly direction. Water was observed in portions of the drainage. Groundwater was encountered at 55 feet in the water well boring (Reference 6). Groundwater is not expected to affect the construction of the shallow foundations. It should be noted that some groundwater conditions might be encountered during development due to the variability in the soil profile. Isolated sand and gravel layers within the soils, sometimes only a few feet in thickness and width, can carry water in the subsurface. Final recommendations should be determined after additional investigation of site once development plans are available.

Seasonally Shallow Groundwater Area – Constraint

The areas identified with this constraint are the dry pond on proposed Lot 1 east of the existing residence, and the drainage in the eastern portion of the site. In these areas, high subsurface moisture condition, frost heave potential and highly organic soils may exist, particularly on a seasonal basis.

Mitigation: These areas lie within drainages and in many areas can be avoided by development. In areas where development is desired, overlot grading may mitigate the drainages. All organic material, soft or wet soils should be removed prior to any filling. The same mitigation

recommendations for potentially high groundwater areas as discussed previously should be followed in these areas of seasonally high groundwater. In some areas, it may be necessary to dewater the excavation. Any grading should be done in a manner that directs surface flow around construction to avoid areas of ponded water. Structures should not block drainages, but swales should be created to intercept surface runoff and carry it safely around and away from structures. Additional investigation will be necessary to determine the water depth and its effect on development once development plans are available.

Faults

The closest fault is the Ute Pass Fault located approximately 9 miles to the west. No faults are mapped on the site itself. Previously Colorado was mapped entirely within Seismic Zone 1, a very low seismic risk. According to a report by the Colorado Geological Survey by Robert M. Kirkman and William P. Rogers, Bulletin 43 (1981) (Reference 12), this area should be designated for Zone 2 due to more recent data on the potential for movement in this area and any resultant earthquakes.

Radon – Hazard

Radon is a colorless, tasteless radioactive gas with a United States Environmental Protection Agency (EPA) specified action level of 4.0 picocuries per liter (pCi/L) of air. Radon gas has a very short half-life of 3.8 days. Radon levels for the area have been reported by the Colorado Geologic Survey in the open-file, Report No. 91-4 (Reference 13). Average Radon levels 3.88 pCi/L have been measured in the 80817-area code. The following is a table of radon levels in this area.

Average Radon Levels for the 80817 Zip Code	
0 < 4 pCi/L	50.00%
4 < 10 pCi/L	50.00%
10 < 20 pCi/L	0.00%
> 20 pCi/L	0.00%

Mitigation:

The potential for high radon levels is present for the site. Build-up of radon gas can usually be mitigated by providing increased ventilation of basement, crawlspace, and sealing joints. Specific requirements for mitigation should be based on site-specific testing.

6.1 Relevance of Geologic Conditions to Land Use Planning

We understand that the project currently consists of subdividing the parcel into two lots. No new construction is proposed at this time. It is our opinion that the existing geologic and engineering geologic conditions will impose some minor constraints on the future development. The most significant problems affecting development will be those associated with the artificial fill, potentially expansive soils, hydrocompaction, seasonal shallow groundwater and shallow water areas that can be satisfactorily mitigated through proper engineering design and construction practices.

Subsurface soil conditions encountered in the water well boring drilled on the site consisted of sand and clay, overlying clay, sand and gravel with underlying shale bedrock. Bedrock was encountered in the boring at 85 feet. The upper site soils are associated with eolian sands overlying alluvial deposits. Expansive clays or soft soils encountered beneath foundations will require mitigation which may include overexcavation. Overexcavation on the order of 4 to 5 feet and replacement with non-expansive soils at 95% of Modified Proctor Dry Density, ASTM D1557 is a suitable mitigation. Overexcavation, moisture conditioning, and recompaction of the clay soils at 95% of Standard Modified Proctor Dry Density, ASTM D-698 can also be considered to mitigate the clay. Floor slabs on expansive soils should be expected to experience movement. Overexcavation and replacement have been successful in minimizing slab movements. The use of structural floors should be considered for basement construction on highly expansive clays. **Final recommendations should be determined after development plans are available and additional investigation is completed.**

Eolian sand with the potential for hydrocompaction have been identified across the site. Areas in which this constraint have been identified are acceptable as building sites. However, in areas identified for this hazard classification, we anticipate a potential for settlement movements upon saturation of these surficial soils. The low density, uniform grain sized, windblown sand deposits are particularly susceptible to this type of phenomenon and have been identified on Figure 6. The potential for hydrocompaction can also exist in areas mapped as Eolian sand (Qes).

Areas of seasonal shallow groundwater have been identified on Figure 6. The areas identified with this constraint are the dry pond on proposed Lot 1 east of the existing residence, and the drainage in the eastern portion of the site. In these areas, high subsurface moisture condition, frost heave potential and highly organic soils may exist, particularly on a seasonal basis. It should be noted that shallow groundwater conditions might be encountered due to the variability in the soil profile. Isolated sand and gravel layers within the soils, sometimes only a few feet in thickness and width, can carry water in the subsurface.

7 ECONOMIC MINERAL RESOURCES

According to the *El Paso County Aggregate Resource Evaluation Map* (Reference 13), the area is not mapped with any aggregate deposits. According to the *Atlas of Sand, Gravel and Quarry Aggregate Resources, Colorado Front Range Counties* distributed by the Colorado Geological Survey (Reference 14), areas of the site are not mapped with any resources. According to the *Evaluation of Mineral and Mineral Fuel Potential* (Reference 16), the area of the site has been mapped as “Good” for industrial minerals. However, considering the clayey silty nature of the soils, they would be considered to have little significance as an economic resource.

According to *the Evaluation of Mineral and Mineral Fuel Potential of El Paso County State Mineral Lands* (Reference 16), the site is mapped within the Denver Basin Coal Region. However, the area of the site has been mapped as “Poor” for coal resources. No active or inactive mines have been mapped in the area of the site. No metallic mineral resources have been mapped on-site (Reference 16).

The site has been mapped as “Fair” for oil and gas resources (Reference 16). No oil or gas fields have been discovered in the area of the site. The sedimentary rocks in the area may lack the geologic structure for trapping oil or gas; therefore, it may not be considered a significant resource. Hydraulic fracturing is a new method that is being used to extract oil and gas from rocks. It utilizes pressurized fluid to extract oil and gas from rocks that would not normally be productive. The area of the site has not been explored to determine if the rocks underlying the site would be commercially viable utilizing hydraulic fracturing. The practice of hydraulic fracturing has come under review due to concerns about environmental impacts, health, and safety.

8 EROSION CONTROL

The soil types observed on the site are mildly to highly susceptible to wind erosion and moderately to highly susceptible to water erosion. A minor wind erosion and dust problem may be created for a short time during and immediately after construction. Should the problem be considered severe enough during this time, watering of the cut areas or the use of chemical palliative may be required to control dust. However, once construction has been completed and vegetation re-established, the potential for wind erosion should be considerably reduced.

With regard to water erosion, loosely compacted soils will be the most susceptible to water erosion whereas residually weathered soils become increasingly less susceptible to water erosion. For the typical soils observed on-site, allowable velocities or unvegetated and unlined earth channels would be on the order of 3 to 4 feet/second depending upon the sediment load carried by the water. Permissible velocities may be increased through the use of vegetation to something on the order of 4 to 7 feet/second depending upon the type of vegetation established. Should the anticipated velocities exceed these values, some form of channel lining material may be required to reduce erosion potential. These might consist of some of the synthetic channel lining materials on the market or conventional riprap. In cases where ditch-lining materials are still insufficient to control erosion, small check dams or sediment traps may be required. The check dams will serve to reduce flow velocities as well as provide small traps for containing sediment. The determination of the amount, location, and placement of ditch linings, check dams, and of special erosion control features should be performed by or in conjunction with the drainage engineer who is more familiar with the flow quantities and velocities.

Cut and fill slope areas will be subjected primarily to sheetwash and rill erosion. Unchecked rill erosion can eventually lead to concentrated flows of water and gully erosion. The best means to combat this type of erosion is the adequate re-vegetation of cut and fill slopes wherever possible. Cut and fill slopes having gradients more than three (3) horizontal to one (1) vertical become increasingly more difficult to revegetate successfully. Therefore, recommendations pertaining to the vegetation of the cut and fill slopes may require input from a qualified landscape architect and/or the Soil Conservation Service.

9 CLOSURE

It is our opinion that the existing geologic engineering and geologic conditions will impose some constraints on development and construction of the site. The majority of these conditions can be mitigated through proper engineering design and construction practices. The project and use are consistent with anticipated geologic and engineering geologic conditions.

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

This report has been prepared for PA Koscielski 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 require. Should you require additional information, please do not hesitate to contact Entech Engineering, Inc.

10 REFERENCES

1. El Paso County, Colorado. Land Development Code, enacted November 15, 2022. https://library.municode.com/co/el_paso_county/codes/land_development_code?nodeId=CH3GEZODI

2. Scott, Glen R.; Taylor, Richard B.; Epis, Rudy C. and Wobus, Reinhard A. 1978. *Geologic Structure Map of the Pueblo 1x2 Quadrangle, South-Central Colorado.* U.S. Geologic Survey Map 1-1022.

3. Natural Resource Conservation Service. Version 21, August 24, 2023. *Web Soil Survey.* United States Department of Agriculture. http://websoilsurvey.sc.egov.usda.gov

4. United States Department of Agriculture Soil Conservation Service. June 1981. *Soil Survey of El Paso County Area, Colorado.*

5. White, J.L., Lindsey, K.O., Morgan, M.L., and Mahan, S.A. 2017. *Geologic Map of the Fountain Quadrangle, El Paso County, Colorado*. Colorado Geological Survey. Open-File Report 17-05.

6. Colorado Division of Water Resources. *Well Construction and Yield Estimate Report, 8180 Kane Rd, Fountain, Colorado, dated April 5, 2022.*

7. Scott, Glen R. and Wobus, Reinhard A. 1973. *Reconnaissance Geologic Map of Colorado Springs and Vicinity, Colorado*. U.S. Geological Survey. Map MF-482.

8. Trimble, Donald E. and Machette. Michael N., 1979. *Geologic Map of the Colorado Springs-Castle Rock Area, Front Range Urban Corridor, Colorado.* U.S. Geological Survey. Map I-847-F.

9. Hart, Stephen S. 1974. *Potentially Swelling Soil and Rock in the Front Range Urban Corridor, Colorado*. Colorado Springs-Castle Rock Map. Colorado Geological Survey. Environmental Geology 7.

10. Dames and Moore. 1985. *Colorado Springs Subsidence Investigation*. State of Colorado, Division of Mined Land Reclamation.

11. Federal Emergency Management Agency, December 7, 2018. *Flood Insurance Rate Maps for the City of Colorado Springs, Colorado*. Map Number 08041CO958G.

12. Kirkman, Robert M. and Rogers, William P., 1981. *Earthquake Potential in Colorado Springs, Colorado*. Geologic Survey. Bulletin 43.

13. Colorado Geological Survey. 1991. *Results of the 1987-88 EPA Supported Radon Study in Colorado.* Open-file Report 91-4. Colorado Geological Survey. 1991. *Results of the 1987-88 EPA Supported Radon Study in Colorado*. Open-file Report 91-4.

14. El Paso County Planning Development. December 1995. *El Paso County Aggregate Resource Evaluation Maps.*

15. 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.

16. 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

N

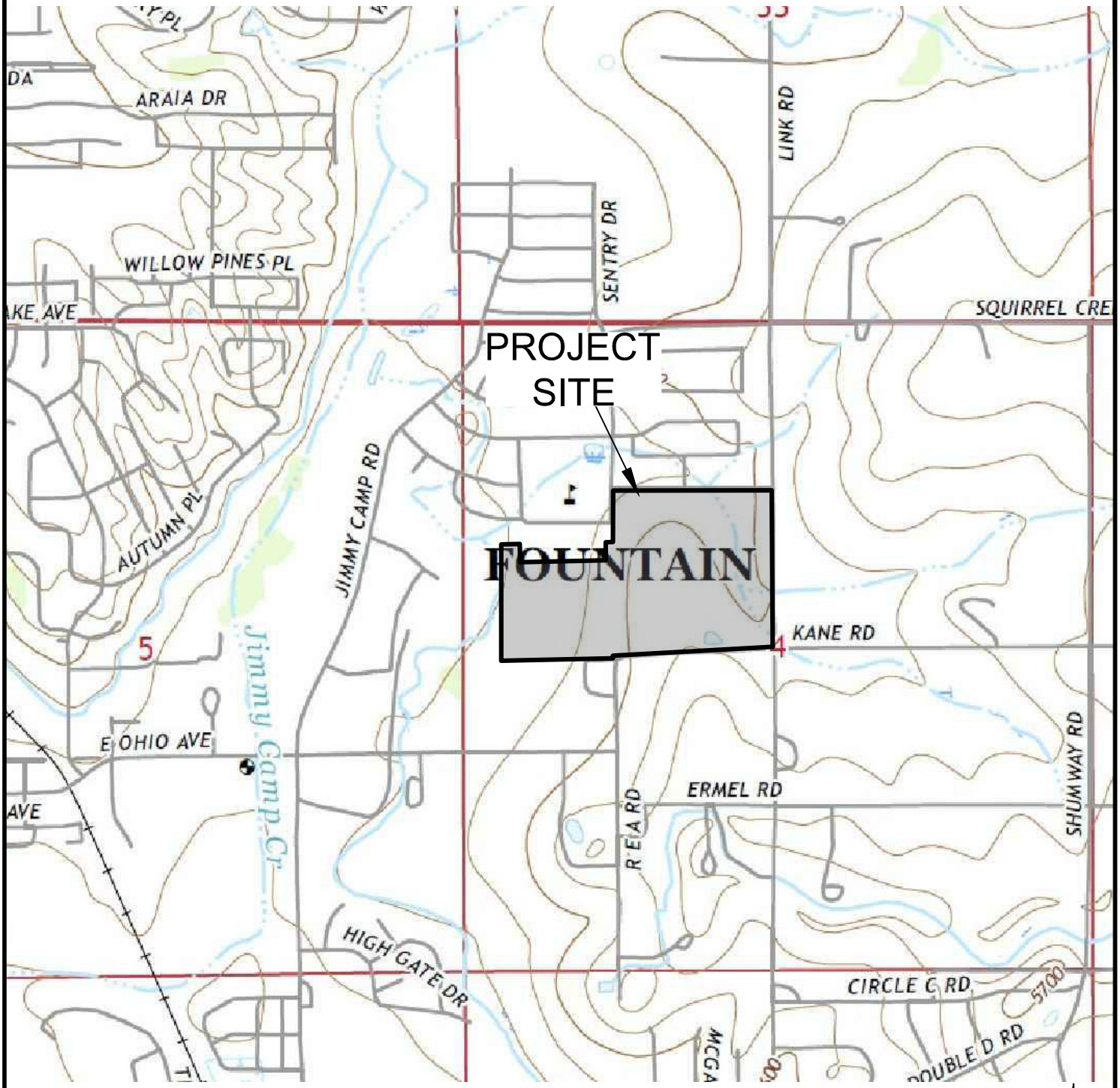
ENTECH ENGINEERING, INC.

VICINITY MAP

HOME LAND ACRES
PA KOSCIELSKI

JOB NO.
240943

FIG. 1



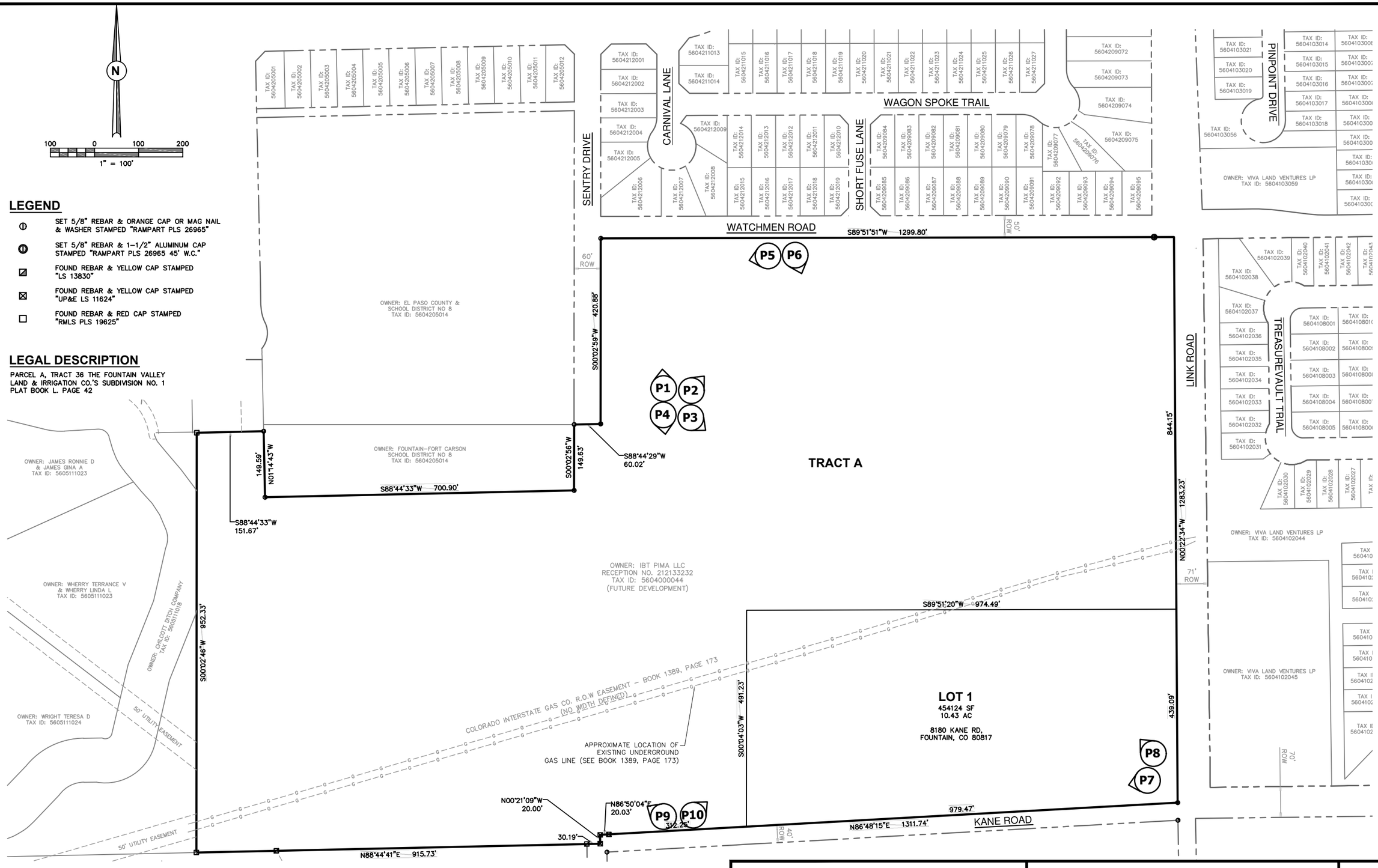
ENTECH ENGINEERING, INC.

USGS TOPOGRAPHY MAP

HOME LAND ACRES
PA KOSCIELSKI

JOB NO.
240943

FIG. 2



P2 - APPROXIMATE PHOTOGRAPH LOCATION AND DIRECTION

ENTECH ENGINEERING, INC.

SITE PLAN

HOME LAND ACRES
PA KOSCIELSKI

JOB NO. 240943

FIG. 3

N

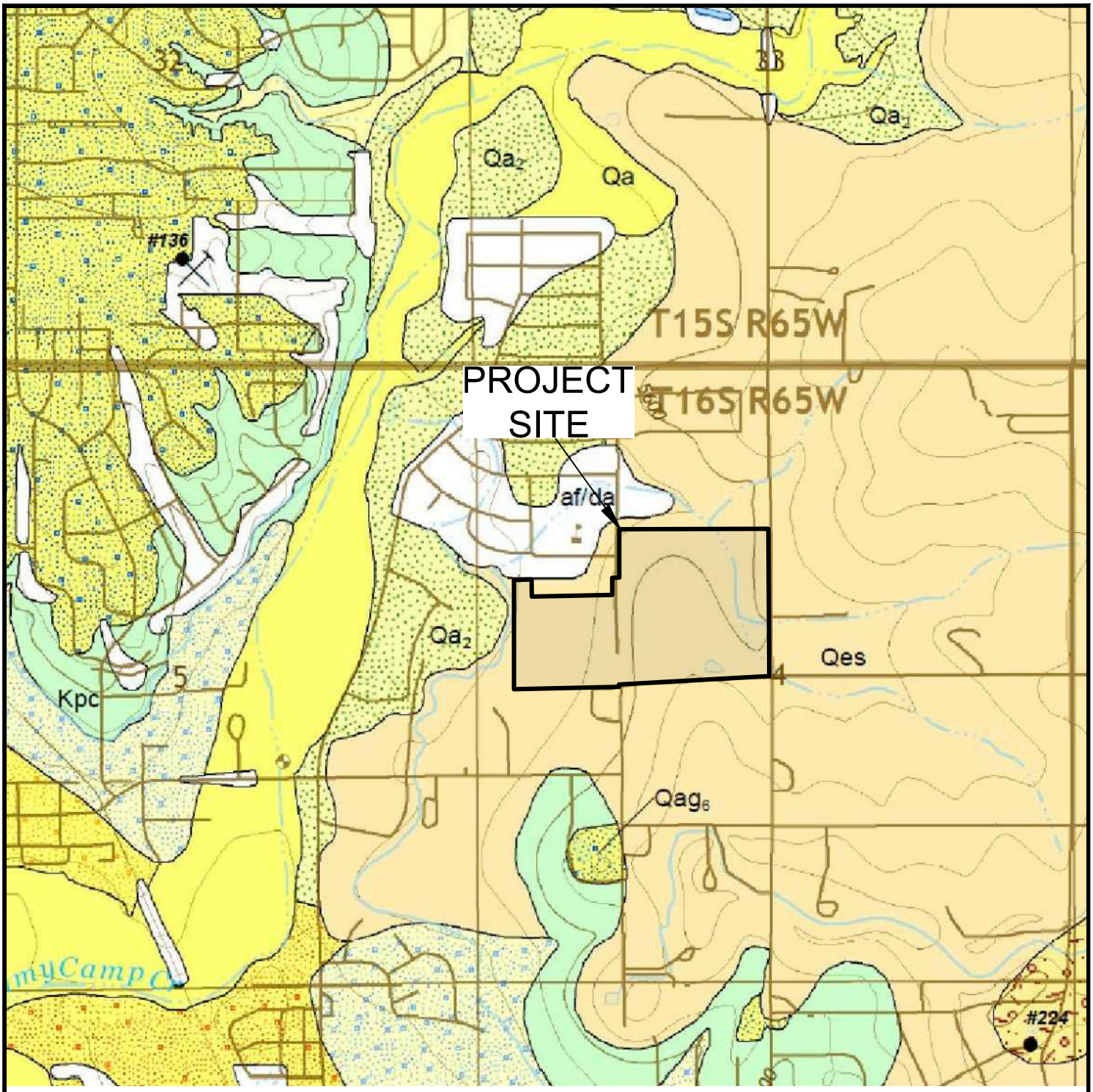
ENTECH ENGINEERING, INC.

SOIL SURVEY MAP

HOME LAND ACRES
PA KOSCIELSKI

JOB NO.
240943

FIG. 4



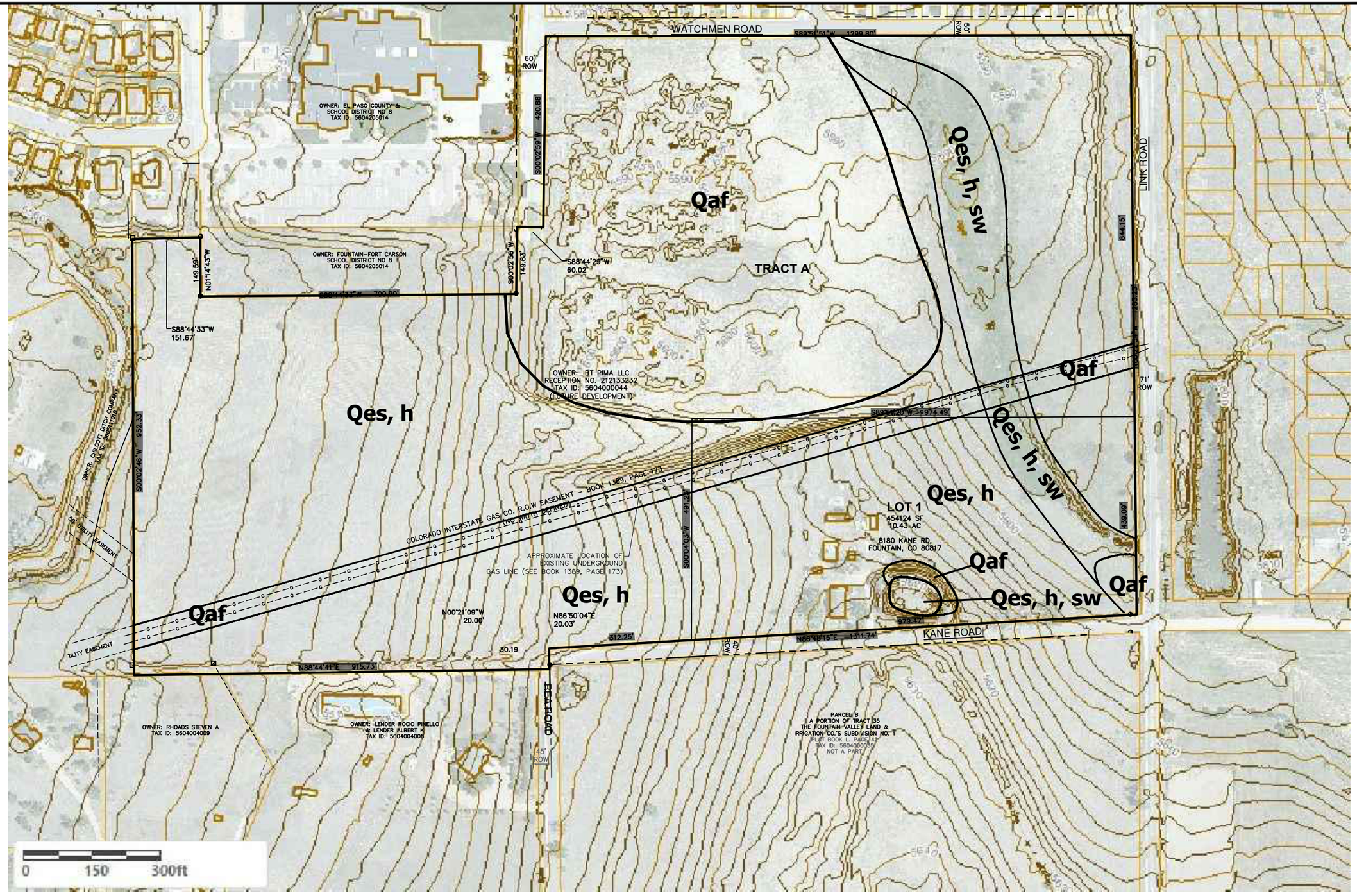
ENTECH ENGINEERING, INC.

GEOLOGIC MAP OF THE FOUNTAIN QUADRANGLE

HOME LAND ACRES
PA KOSCIELSKI

JOB NO. 240943

FIG. 5



Legend:

Qaf - Artificial Fill of Holocene Age:
man-place fill deposits associated with fill stockpiles, pond embankment, and drainage improvements in the southeastern portion of the site

Qv - Eolian sand of Holocene Age:
well to moderately sorted wind blown sand deposits

h - hydrocompaction

sw - seasonally shallow groundwater area

ENTECH ENGINEERING, INC.

GEOLOGY / ENGINEERING MAP

HOME LAND ACRES
PA KOSCIELSKI

JOB NO.
240943

FIG. 6

N

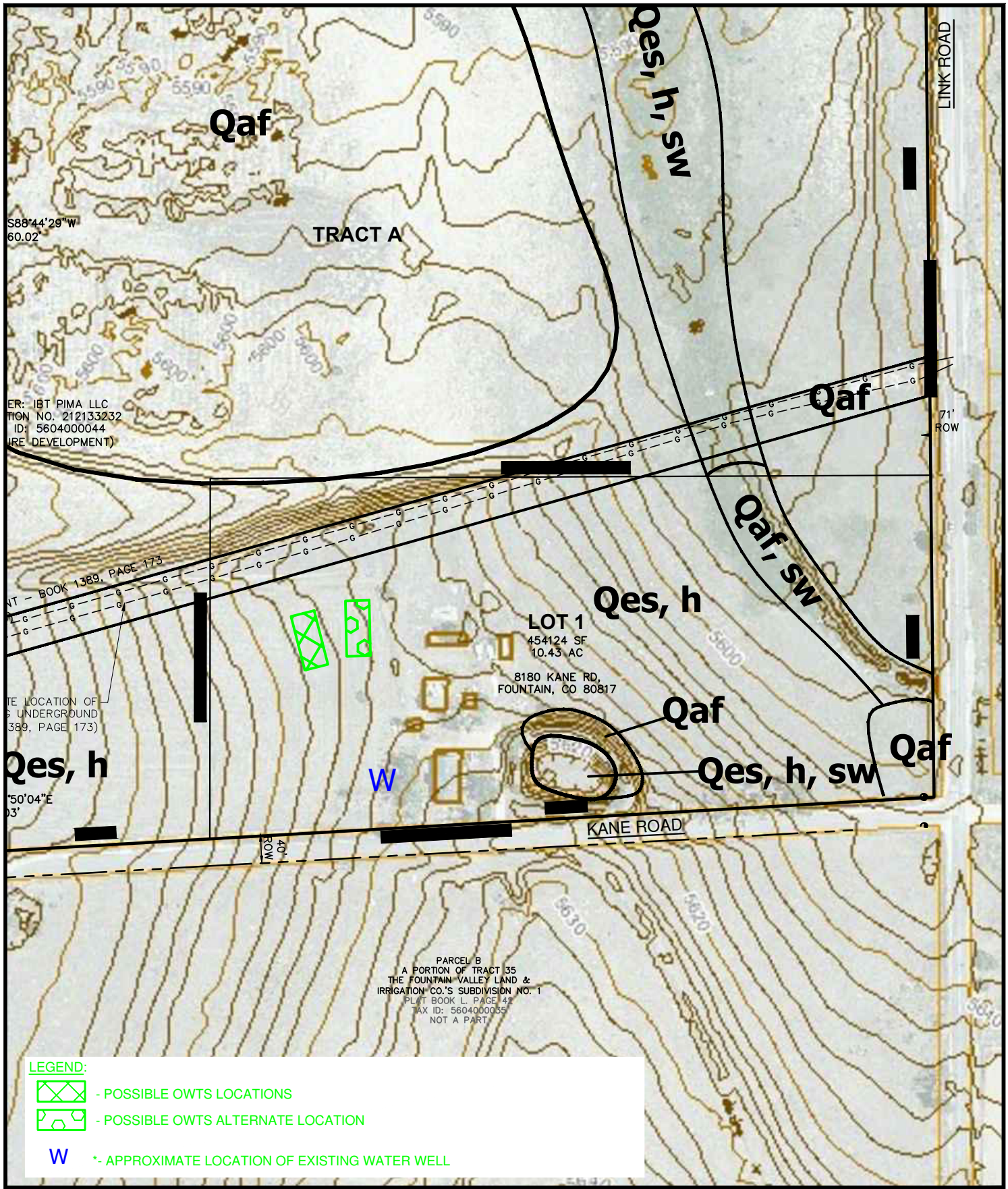
ENTECH ENGINEERING, INC.

FEMA FLOODPLAIN MAP

HOME LAND ACRES
PA KOSCIELSKI

JOB NO.
240943

FIG. 7



ENTECH ENGINEERING, INC.

OWTS SUITABILITY MAP

HOME LAND ACRES
PA KOSCIELSKI

JOB NO.
240943

FIG. 8

APPENDIX A: Site Photographs

1

Looking north from the western side of the site.

June 3, 2024

2

Looking northeast from the western side of the site.

June 3, 2024

Job No. 240943

3

Looking southeast from the western side of the site.

June 3, 2024

4

Looking south from the western corner of the site.

June 3, 2024

Job No. 240943

5

Looking west from the northern side of the site.

June 3, 2024

6

Looking south from the northern side of the site.

June 3, 2024

Job No. 240943

7

Looking west from the southeastern side of the site.

June 3, 2024

8

Looking northwest from the southeastern side of the site.

June 3, 2024

Job No. 240943

9

Looking west from the southwestern side of the site.

June 3, 2024

10

Looking east from the southwestern portion of the site.

June 3, 2024

Job No. 240943

APPENDIX B: USDA Soil Survey Descriptions

El Paso County Area, Colorado

2—Ascalon sandy loam, 1 to 3 percent slopes

Map Unit Setting

National map unit symbol: 367q
Elevation: 5,500 to 6,500 feet
Mean annual precipitation: 14 to 16 inches
Mean annual air temperature: 47 to 50 degrees F
Frost-free period: 130 to 150 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Ascalon and similar soils: 98 percent
Minor components: 2 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Ascalon

Setting

Landform: Flats
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Mixed alluvium and/or eolian deposits

Typical profile

A - 0 to 8 inches: sandy loam
Bt - 8 to 21 inches: sandy clay loam
BC - 21 to 27 inches: sandy loam
Ck1 - 27 to 48 inches: sandy loam
Ck2 - 48 to 60 inches: loamy sand

Properties and qualities

Slope: 1 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 10 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Moderate (about 7.1 inches)

Interpretive groups

Land capability classification (irrigated): 3e

Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: B
Ecological site: R069XY026CO - Sandy Plains
Other vegetative classification: SANDY PLAINS (069BY026CO)
Hydric soil rating: No

Minor Components

Other soils
Percent of map unit: 1 percent
Hydric soil rating: No

Pleasant
Percent of map unit: 1 percent
Landform: Depressions
Hydric soil rating: Yes

Data Source Information

Soil Survey Area: El Paso County Area, Colorado
Survey Area Data: Version 21, Aug 24, 2023

El Paso County Area, Colorado

3—Ascalon sandy loam, 3 to 9 percent slopes

Map Unit Setting

National map unit symbol: 2tlny
Elevation: 3,870 to 5,960 feet
Mean annual precipitation: 13 to 18 inches
Mean annual air temperature: 46 to 54 degrees F
Frost-free period: 95 to 155 days
Farmland classification: Not prime farmland

Map Unit Composition

Ascalon and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Ascalon

Setting

Landform: Interfluves
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Wind-reworked alluvium and/or calcareous sandy eolian deposits

Typical profile

Ap - 0 to 6 inches: sandy loam
Bt1 - 6 to 12 inches: sandy clay loam
Bt2 - 12 to 19 inches: sandy clay loam
Bk1 - 19 to 35 inches: fine sandy loam
Bk2 - 35 to 80 inches: fine sandy loam

Properties and qualities

Slope: 3 to 9 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 5.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 10 percent
Maximum salinity: Nonsaline (0.1 to 1.9 mmhos/cm)
Sodium adsorption ratio, maximum: 1.0
Available water supply, 0 to 60 inches: Moderate (about 7.1 inches)

Interpretive groups

Land capability classification (irrigated): 6e
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: B
Ecological site: R067BY024CO - Sandy Plains
Hydric soil rating: No

Minor Components

Olnest

Percent of map unit: 10 percent
Landform: Interfluves
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: R067BY024CO - Sandy Plains
Hydric soil rating: No

Vona

Percent of map unit: 5 percent
Landform: Interfluves
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: R067BY024CO - Sandy Plains
Hydric soil rating: No

Data Source Information

Soil Survey Area: El Paso County Area, Colorado
Survey Area Data: Version 21, Aug 24, 2023

El Paso County Area, Colorado

101—Ustic Torrifluvents, loamy

Map Unit Setting

National map unit symbol: 3673
Elevation: 5,500 to 7,000 feet
Mean annual precipitation: 13 to 16 inches
Mean annual air temperature: 47 to 52 degrees F
Frost-free period: 125 to 155 days
Farmland classification: Not prime farmland

Map Unit Composition

Ustic torrifluvents and similar soils: 95 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Ustic Torrifluvents

Setting

Landform: Flood plains, stream terraces
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Sandy, clayey, stratified loamy

Typical profile

A - 0 to 6 inches: variable
C - 6 to 60 inches: stratified loamy sand to clay loam

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.20 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 10 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Moderate (about 8.6 inches)

Interpretive groups

Land capability classification (irrigated): 2e
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: B
Ecological site: R069XY037CO - Saline Overflow
Other vegetative classification: OVERFLOW (069BY036CO)

Hydric soil rating: No

Minor Components

Other soils

Percent of map unit: 4 percent
Hydric soil rating: No

Pleasant

Percent of map unit: 1 percent
Landform: Depressions
Hydric soil rating: Yes

Data Source Information

Soil Survey Area: El Paso County Area, Colorado
Survey Area Data: Version 21, Aug 24, 2023

El Paso County Area, Colorado

102—Valent sand, 1 to 12 percent slopes, dry

Map Unit Setting

National map unit symbol: 2rgs5
Elevation: 4,000 to 6,200 feet
Mean annual precipitation: 10 to 14 inches
Mean annual air temperature: 50 to 54 degrees F
Frost-free period: 130 to 170 days
Farmland classification: Not prime farmland

Map Unit Composition

Valent, dry, and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Valent, Dry

Setting

Landform: Dunes
Parent material: Eolian sands

Typical profile

A - 0 to 6 inches: sand
AC - 6 to 21 inches: sand
C1 - 21 to 36 inches: sand
C2 - 36 to 79 inches: sand

Properties and qualities

Slope: 1 to 12 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Excessively drained
Capacity of the most limiting layer to transmit water (Ksat): Very high (19.99 to 42.51 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline (0.1 to 0.2 mmhos/cm)
Sodium adsorption ratio, maximum: 0.1
Available water supply, 0 to 60 inches: Very low (about 2.4 inches)

Interpretive groups

Land capability classification (irrigated): 6e
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: A
Ecological site: R069XY019CO - Deep Sand
Forage suitability group: Not Suited (G069XW000CO)
Other vegetative classification: Not Suited (G069XW000CO)
Hydric soil rating: No

Minor Components

Vonid

Percent of map unit: 10 percent
Landform: Sand sheets
Ecological site: R069XY026CO - Sandy Plains
Other vegetative classification: Not Suited (G069XW000CO), Sandy Plains (069XY026CO_1)
Hydric soil rating: No

Olney

Percent of map unit: 5 percent
Landform: Sand sheets
Ecological site: R069XY026CO - Sandy Plains
Other vegetative classification: Not Suited (G069XW000CO), Sandy Plains (069XY026CO_1)
Hydric soil rating: No

Data Source Information

Soil Survey Area: El Paso County Area, Colorado
Survey Area Data: Version 21, Aug 24, 2023

APPENDIX C: Colorado Division of Water Resources, Well Construction and Yield Estimate Report

Form No. GW-31 02,2017

WELL CONSTRUCTION AND YIELD ESTIMATE REPORT

State of Colorado, Office of the State Engineer
1313 Sherman St. Room 821, Denver, CO 80203 303.866.3581
www.water.state.co.us and dwrpermitsonline@state.co.us

For Office Use Only

1. **Well Permit Number:** 326135 **Receipt Number:** 10019140
2. **Owner's Well Designation:** ROAMING
3. **Well Owner Name:** INTEGRITY BANK & TRUST
4. **well Location Street Address:** 8180 KANE RD FOUNTAIN 80817
5. **GPS Well Location:** Zone 13 Easting 528153 Northing 4282064 County EL PASO - 0206
6. **Legal Well Location:** SE 1/4 NW 1/4 Sec. 4 Twp 16S Range 65W
   Distances from Section Lines ft. from Section Line and ft. from section line
   Subdivision: Lot: Block: Filing (Unit:)
7. **Ground Surface Elevation:** Feet **Date Completed:** 4/4/2022 **Drilling Method:** Rotary Mud
8. **Completed Aquifer Name:** ALLIVIUM **Total Depth:** 100 Feet **Depth Completed:** 100 Feet
9. **Notification:** Was Notification Required Prior to Construction? No Date Notification Given:
10. **Aquifer Type:** Type III (Unconsolidated/alluvial)

11. Geologic Log:

Depth	Type	Grain Size	Color	Water Loc.
0 - 1	Topsoil			
1 - 36	Sand & Clay			
36 - 55	Clay			
55 - 72	Sand & Gravel			
72 - 85	Clay			
85 - 100	Shale			

12. Hole Diameter (in.)

	From (Ft)	To (ft)
9	0	20
6.5	20	100

13. Plain Casing

OD (in)	Kind	Wall Size (in)	From (ft)	To (ft)
7	Steel	.188	+1	20
4.5	PVC	.237	15	55
4.5	PVC	.237	95	100

Perforated Casing **Screen Slot Size** 0.03

OD (in)	Kind	Wall Size (in)	From (ft)	To (ft)
4.5	PVC	.237	55	95

14. Filter Pack
Material: Gravel
Size: COARSE#1
Interval: 20 - 100

15. Packer Placement:
Material:
Depth:

16. Grouting Record

Material	Amount	Density	Interval	Placement
Cement	3SCKS	18GAL	5 - 20	Poured

Remarks

17. Disinfection: Type HTH Amt. Used 1 CUP

18. Well Yield Estimate Data:
Well Yield Estimate Method: Aired & Bailed Pumping Level 90
Static Level: 55 Estimated Production Rate 15
Date/Time measured: 4/4/2022 2:00 pm Estimate Length (hrs) 4

Remarks

19. I have read the statements made herein and know the contents thereof, and they are true to my knowledge. This document is signed (or name entered if filing online) and certified in accordance with Rule 17.4 of the Water Well Construction Rules, 2 CCR 402 2. The filing of a document that contains false statements is a violation of section 37 91 108(1)(e), C.R.S., and is punishable by fines up to $1000 and/or revocation of the contracting license. If filing online the State Engineer considers the entry of the licensed contractor's name to be compliance with Rule 17.4.

Company Name:	Email:	Phone:	License Number
Hamacher Well Works, Inc	info@hamacherwellworksinc.com	(719) 541-2460	71

Mailing Address: 31800 Hwy 24, P.O. Box 86 Simla, CO 80835

Sign: Alan Hamacher **Print Name and Title:** ALAN Hamacher **Date:** 4/5/2022