Update to provide additional borings per ECM Appendix C Section C.3.3.B.

Only three borings were performed on the 49 acre development. There should be a minimum of 5 borings.

Also the boring depth does not meet criteria in ECM Appendix C Section C.3.3.D

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B. Frequency of Borings.

The following represent the minimum number of borings that are required based on a typical improvements project. The number of borings may be increased based on the geotechnical engineer's recommendations or at the request of the ECM Administrator.

- A minimum of 2 borings for each project with public improvements shall be performed.
- A minimum 1 boring for each SCS (NRCS) soil type within a development shall be performed.
- A minimum of 1 boring shall be performed for each 10 acres of development up to 100 acres. One additional boring shall be performed for every 25 acres of development above the 100 acres.

C. Borings for Structures.

The boring frequency for transportation structures shall satisfy AASHTO Bridge Design requirements and CDOT Materials Testing requirements.

D. Depth of Borings.

Borings shall be performed to a minimum depth of 20 feet. In areas where the cut depths are expected to exceed 8 feet, borings shall be extended to a minimum of 15 feet below proposed finished grade. Borings shall extend deeper if needed to determine if bedrock or high groundwater levels are design concerns. Samples for structures shall be taken to a minimum depth of 10 feet below the footing elevation. Additional depth may be required for piers or piles.

It should be noted that boring depths will ultimately be determined by the geotechnical engineer based on site conditions. However, when depths different than those presented is performed, documentation as to the difference must be presented in the submitted report.

Review ECM Appendix C for report guidelines and update the geotechnical report accordingly.

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Goode, Jr., P.E.
President

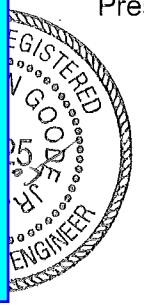

TABLE OF CONTENTS

1.0 SUMMARY

Project Location

The project lies in a portion of the NE $^1/_4$ Section 4, Township 14 South, Range 64 West of the 6th Principal Meridian in El Paso County, Colorado. The site is located at the southwest corner of Curtis and Davis Roads, approximately 5 miles southeast of Falcon, Colorado.

Project Description

Total acreage involved in the project is approximately 49 acres. The proposed site development consists of 8 single-family rural residential lots. The development will utilize individual wells and sewage treatment systems.

Scope of Report

This report presents the results of our geologic investigation, treatment of engineering geologic hazard study and wastewater study for individual sewage treatment systems.

Land Use and Engineering Geology

This site was found to be suitable for the proposed development. Areas were encountered where the geologic conditions will impose some constraints on development and land use. These include areas of artificial fill, potentially seasonal shallow groundwater areas, loose or collapsible soils, hydrocompaction, and possible expansive soils. Based on the proposed development plan, it appears that these areas will have some impact on the development. These conditions will be discussed in greater detail in the report.

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

2.0 GENERAL SITE CONDITIONS AND PROJECT DESCRIPTION

The site is located in a portion of the NE $^1/_4$ Section 4, Township 14 South, Range 64 West of the 6th Principal Meridian in El Paso County, Colorado. The site is located approximately 5 miles southeast of Falcon, Colorado, at the southwest corner of Davis Road and Curtis Road. The approximate location of the site is as shown on the Vicinity Map, Figure 1.

The topography of the site is gently to moderately sloping. The site boundaries are indicated on the USGS Map, Figure 2. Previous land uses have included grazing and pasture land. Several trailers and outbuildings exist along the northern portion of this site. The site contains primarily low grasses. Low areas with internal drainage exist on the site. No major drainages were observed on this site. Site Photographs are included in Appendix A. The locations and directions of the photographs are indicated on Figure 3.

Total acreage involved in the proposed development is approximately 49 acres. A total of 8 rural single-family lots are proposed. The area will be serviced by individual wells and sewage treatment systems. The Development Plan is shown on, Figure 3.

A Soil, Geology and Wastewater Study was performed for a property east of the project site by Entech Engineering, Inc. revise date, May 13, 2002 (Reference 1). This report was used in evaluating the site.

3.0 SCOPE OF THE REPORT

The scope of the report will include the following:

- A general geologic analysis utilizing published geologic data. Detailed site-specific mapping will be conducted to obtain general information in respect to major geographic and geologic features, geologic descriptions and their effects on the development of the property.

- The site will be evaluated for individual sewage treatment systems in accordance with El Paso Land Development Code.

4.0 FIELD INVESTIGATION

Our field investigation on this site consisted of the preparation of a geologic map of any bedrock features and significant surficial deposits. The Soil Conservation Service (SCS) survey was also reviewed to evaluate the site. The position of mappable units within the subject property are shown on the Geologic Map. Our mapping procedures involved both field reconnaissance and measurements and air photo reconnaissance and interpretation. The same mapping procedures have also been utilized to produce the Engineering Geology Map which identified pertinent geologic conditions affecting development. The field reconnaissance was performed by personnel of Entech Engineering, Inc. on July 20, 2005.

In addition, 3 percolation tests were performed on the site to determine the general suitability of the site for the use of individual wastewater treatment systems. The locations of the percolation tests are shown on the Development Plan/Percolation Test Locations, Figure 3. Results of this testing will be discussed later in this report.

Laboratory testing was also performed on some of the soils to classify and determine the soils engineering characteristics. Laboratory tests include moisture content, ASTM D-2216 grain-size analysis, ASTM D-422, and Atterberg Limits, ASTM D-4318. Results of the laboratory testing are included in Appendix B.

5.0 SOIL, GEOLOGY AND ENGINEERING GEOLOGY

5.1 General Geology

Physiographically, the site lies in the western portion of the Great Plains Physiographic Province. Approximately 20 miles to the west is a major structural feature known as the Rampart Range Fault. This fault marks the boundary between the Great Plains Physiographic Province and the Southern Rocky Mountain Province. The site exists within the southern edge of a large structural feature known as the Denver Basin. Bedrock in the area tends to be very gently dipping in a northerly direction. The rocks in the area of the site are sedimentary in nature, and typically Tertiary to Upper Cretaceous in age. The bedrock underlying the site

consists of the Dawson Arkose Formation. Overlying this formation are unconsolidated deposits of man-made fill and Eolian sand deposits of the Quaternary Age. The Eolian sands were deposited by wind in the form of low ridges or dunes. The site's stratigraphy will be discussed in more detail in Section 5.3.

5.2 Soil Conservation Service

The Soil Conservation Service has mapped one soil type on the site (Figure 4)(Reference 2). In general, the soils consist of sandy loam and loamy sand. The soils are described as follows:

Type	Description
97	Truckton sandy loam, 3-9% slopes

Complete descriptions of the soil type are presented in Figure 5. The soils have generally been described to have moderately rapid permeabilities. The main limitation for these soils is frost action potential. Roads and streets may require special designs. Possible hazards with soil erosion are present on the site. The erosion potential can be controlled with vegetation. The majority of the soils have been described to have moderate erosion hazards.

5.3 Site Stratigraphy

The Colorado Geology Map showing the site is presented in Figure 6 (Reference 3). The Geology Map prepared for the site is presented in Figure 7. Two mappable units were identified on this site which are identified as follows:

- **Qaf** **Artificial Fill of Quaternary Age:** These man-made fill deposits are associated with erosion berms on the site.
- **Qes** **Eolian Sand of Quaternary Age:** These are wind blown fine grained sands that were deposited by the action of the prevailing winds from the west and northwest. They typically occur as large dune deposits or narrow ridges. The soils are typically tan to brown and have a uniform gradation. The materials tend to have a high permeability and low density.

The bedrock underlying the site is the Dawson Formation of Tertiary to Cretaceous Age. The Dawson Formation typically consists of arkosic sandstone interbedded with fine sandstone, siltstone and claystone or shale. Typically, it is buff to light brown and light gray in color. Bedrock was not encountered in any of the profile holes which were drilled to 10 feet.

The soils listed above were mapped from the *Geologic Map of the Pueblo 1x2 Quadrangle, South-Central Colorado*, distributed by the USGS in 1978 (Reference 3) and site-specific mapping. The profile holes drilled by Entech Engineering, Inc. were also used in evaluating the site. The Geology Map prepared for the site is presented in Figure 7.

5.4 Soil Conditions

The soils encountered in the profile holes of the percolation tests consisted of silty sands (SM) and sandy clays (CL). These soils were encountered at loose to medium dense states and moist conditions. Bedrock was not encountered in any of the profile holes which were drilled to 10 feet. The test boring logs from the profile holes are presented in Appendix B. The Laboratory Test Results are also included in Appendix B.

5.5 Groundwater

Groundwater was not encountered in any of the profile holes of the percolation tests which were drilled to 10 feet. Areas of potentially seasonal shallow groundwater have been mapped on the site and are discussed in the following section.

Fluctuation in groundwater conditions may occur due to variations in rainfall and other factors not readily apparent at this time. It should be noted that in the sandy materials on site, some groundwater conditions might be encountered due to the variability in the soil profile. Isolated sand and gravel layers within the soils, sometimes only a few feet in thickness and width, can carry water in the subsurface. Groundwater may also flow on top of the underlying bedrock or clay lenses. Builders and planners should be cognizant of the potential for the occurrence of such subsurface water features during construction on-site and deal with each individual problem as necessary at the time of construction.

6.0 ENGINEERING GEOLOGY – IDENTIFICATION AND MITIGATION OF GEOLOGIC HAZARDS

As mentioned previously, detailed mapping has been performed on this site to produce an Engineering Geology Map (Figure 7). This map shows the location of various geologic conditions of which the developers should be cognizant during the planning, design and construction stages of the project. These hazards and the recommended mitigation techniques are as follows:

psw *Potentially Seasonal High Groundwater Area*

In these areas, we would anticipate the potential for periodically high subsurface moisture conditions. The areas of internal drainage are mapped as having the potential for seasonal shallow groundwater on a seasonal basis. These areas appear to be associated with older blowout features and surrounded by older sand dune ridges. Should construction be necessary in portions of these areas the following precautions should be taken. No areas of the site have been mapped in any floodplain zones, according to FEMA Map No. 08041CO800F (Reference 4, Figure 8).

Mitigation: In these locations, foundation in areas subject to severe frost heave potential should penetrate to a sufficient depth so as to discourage the formation of ice lenses beneath foundations. At this location and elevation, a foundation depth for frost protection of 30 inches is recommended. In areas where high subsurface moisture conditions are anticipated periodically, a subsurface perimeter drain will be necessary to help prevent the seepage of water into areas located below grade. Typical drain details are presented in Figure 9. Any grading in these areas should be done in a manner that directs surface flow around construction to avoid areas of ponded water. Areas of organic material will require removal before any filling is done. Specific recommendations should be made after additional investigation of each building site. The groundwater level may be at sufficient depth not to affect construction.

af *Artificial Fill*

These are areas of man-made fill associated with erosion berms on site.

Mitigation: The small erosion berms could be penetrated by foundations. Should any uncontrolled fill be encountered beneath foundations, removal and recompaction at a minimum of 90% of its maximum Modified Proctor Dry Density, ASTM D-1557 will be required.

h *Hydrocompaction:* 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.

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.

c *Collapsible Soils:* Some of the soils encountered in the profile holes indicated collapsible characteristics such as pinholes and low density. These areas are very sporadic, therefore, none have been indicated on the maps. The potential for collapsible soils exists anywhere on the site.

Mitigation: Should collapsible soils be encountered beneath foundations, removal and recompaction of the upper 2 to 4 feet with thorough moisture conditioning at a minimum of 90% of it maximum Modified Proctor Dry Density, ASTM D-1557 will be necessary. If very loose conditions are encountered at foundation grade, recompaction of the upper 2

feet of soil may also be recommended. Specific recommendations should be made after additional investigation of each building site.

ex *Expansive Soils*

The site is mapped within an area of windblown sand or silt. This mapping generally has low swell potential, but the upper 6 to 12 inches may locally have moderate swell potential. Minor areas of expansive clays were encountered n the subsurface soils in one of the test borings drilled on-site. These soils are sporadic; therefore, none have been indicated on the map. These clays can cause differential movement in the structure foundations These occurrences should be identified and dealt with on an individual basis.

Mitigation: Mitigation of expansive soils on this site will require special foundation design. Overexcavation of the expansive material encountered beneath foundations and replacement with non-expansive material encountered beneath foundations and replacement with non-expansive soils at a minimum of 90% of its maximum Modified Proctor Dry Density STM D-1557 is a suitable mitigation which is common in the area. Floor slabs on expansive soils should be expected to experience movement. Overexcavation and replacement has been successful in minimizing slab movements. Final recommendations should be determined after additional investigation of each building site.

6.1 Relevance of Geologic Conditions to Land Use Planning

As mentioned earlier in this report, we understand that the development will be rural single-family residential lots. It is our opinion that the existing geologic and engineering geologic conditions will impose some minor constraints on the proposed development and construction. The most significant problem affecting development will be that of hydrocompaction and potentially seasonal shallow groundwater which may be satisfactorily mitigated through proper engineering design and construction practices.

The upper soils are typically at loose to moderately dense states. Foundations anticipated for the site are standard spread footings. Areas of collapsible or loose soils may be encountered that require removal and recompaction. The soils should be thoroughly moisture conditioned and compacted at a minimum of 90% of it maximum Modified Proctor Dry Density, ASTM D-1557. Any uncontrolled fill encountered beneath foundations will also require recompaction.

Typically the soils in the area are non-expansive, however, lenses of clay can be encountered in the subsurface. Clay soils, which are typically expansive, were encountered in one of the profile holes. If expansive soils are encountered beneath foundations, mitigation may be necessary. Overexcavation of the expansive soil and replacement with non-expansive structural fill compacted at a minimum of 90% of its maximum Modified Proctor Dry Density, ASTM D-1557 is a typical mitigation used in the area. The need for mitigation should be determined on an individual basis at the time of construction. These soils will not prohibit development.

Areas of hydrocompaction exist on the site where there is the potential for settlement movements upon saturation of surficial soils. Good surface and subsurface drainage is critical and the ground surface at all points. Roof drains should be made to discharge well away from structures and planting and watering in the immediate vicinity of structures should be avoided.

Areas of potentially seasonal shallow groundwater were encountered on site. These are areas of internal drainage. Drains may be necessary to help prevent the intrusion of water into areas below grade. Groundwater was not encountered in any of the profile holes which were drilled to 10 feet. Profile Hole No. 2 was drilled in a low area. Further investigation is recommended on an individual lot basis prior to construction. The water table may be a sufficient depth to not affect construction.

Several trailers, outbuildings, septic systems and wells currently exist on the site. It is our understanding they area to be removed prior to construction. All foundation components and septic fields should be completely removed prior to construction.

In summary, development of the site can be achieved if the items mentioned above are mitigated. These items can be mitigated through proper design and construction.

7.0 ON-SITE DISPOSAL OF WASTEWATER

The site was evaluated for individual sewage treatment systems in accordance with El Paso Land Development Code. Three (3) percolation tests were performed on the property. Percolation tests may not be located in the exact areas of proposed systems. The approximate location of the percolation tests is shown in Figure 3 on the Geology Map, Figure 7. Table 1 presents a Summary of Percolation Test Results. The specific test results are presented in Appendix C of this report.

The Soil Conservation Service soil map and soil descriptions are presented in Figures 4 and 5. The site has been mapped with one soil description. The soils are described as having moderately rapid percolation rates.

The individual percolation test results ranged from 18 minutes per inch to 54 minutes per inch. The average percolation rate for all of the tests is 33 minutes per inch. All of the percolation rates are suitable for individual sewage treatment systems. Standard penetration testing, ASTM D-1586, was performed in each profile hole to evaluate the density of the soil and the presence of bedrock. Bedrock was not encountered in any of the profile holes which were drilled to 10 feet.

Leach fields must be maintained a minimum of 4 feet above groundwater. Groundwater was not encountered in any of the profile holes of the percolation tests. Groundwater encountered within 6 feet of the surface may require shallow leaching fields or designed systems.

All of the percolation rates measured for the tests were found to be in the range which is acceptable for conventional systems using absorption trenches or absorption beds for the disposal of sewage effluent into the subsurface. El Paso County guidelines require designed systems for percolation rates exceed 60 minutes per inch. Due to the size of the building lots, it is anticipated that suitable areas will be available where conventional systems may be utilized on the lots.

8.0 ECONOMIC MINERAL RESOURCES

Some of the sandy materials on-site could be considered a low grade sand resource according to the El Paso County Aggregate Resource Evaluation Map (Reference 5). The area is mapped as upland deposits. Considering the silty nature of these materials and abundance of similar materials through the region, they would be considered to have little significance as an economic resource.

9.0 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 reestablished, 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, residually weathered soils and weathered bedrock materials become increasingly less susceptible to water erosion. For typical soils observed on this site, allowable velocities for unvegetated and unlined earth channels for the soils on this site would be on the order of2 to 3 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 the 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, where possible, the adequate re-vegetation of cut and fill slopes. 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 Natural Resource Conservation Service (previously the Soil Conservation Service).

10.0 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 avoided by construction. The proposed development and use is 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 nonhomogeneous materials as soil and rock, it is important that we be informed of any differences observed between surface and subsurface conditions encountered in construction and those assumed in the body of this report. Individual investigations for building sites and septic systems will be required prior to construction. Construction and design personnel should be made familiar with the contents of this report. Reporting such discrepancies to Entech Engineering, Inc. soon after they are discovered would be greatly appreciated and could possibly help avoid construction and development problems.

This report has been prepared for the United Planning and Engineering, Inc. for application to the proposed project in accordance with generally accepted geologic soil and engineering practices. No other warranty expressed or implied is made.

We trust that this report has provided you with all the information that you required. Should you require additional information, please do not hesitate to contact Entech Engineering, Inc.

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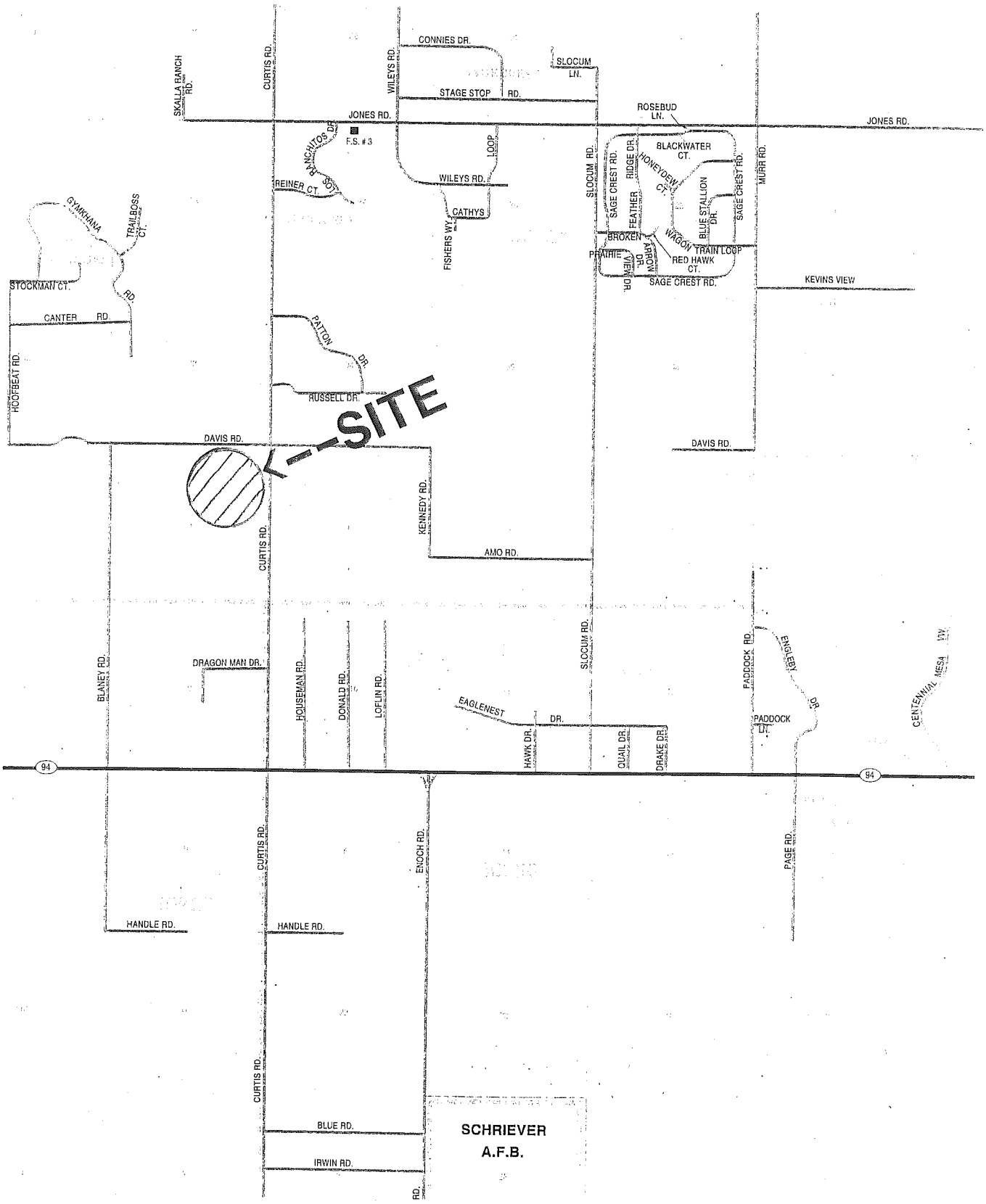
TABLES

Table 1- Summary of Percolation Test Results

Percolation Test No.	Percolation Rate (min/inch)	Depth to Groundwater (ft)	Depth to Bedrock (ft)
1	18	>10	>10
2	28	>10	>10
3	54	>10	>10

FIGURES



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VICINITY MAP
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FIG NO.: 1

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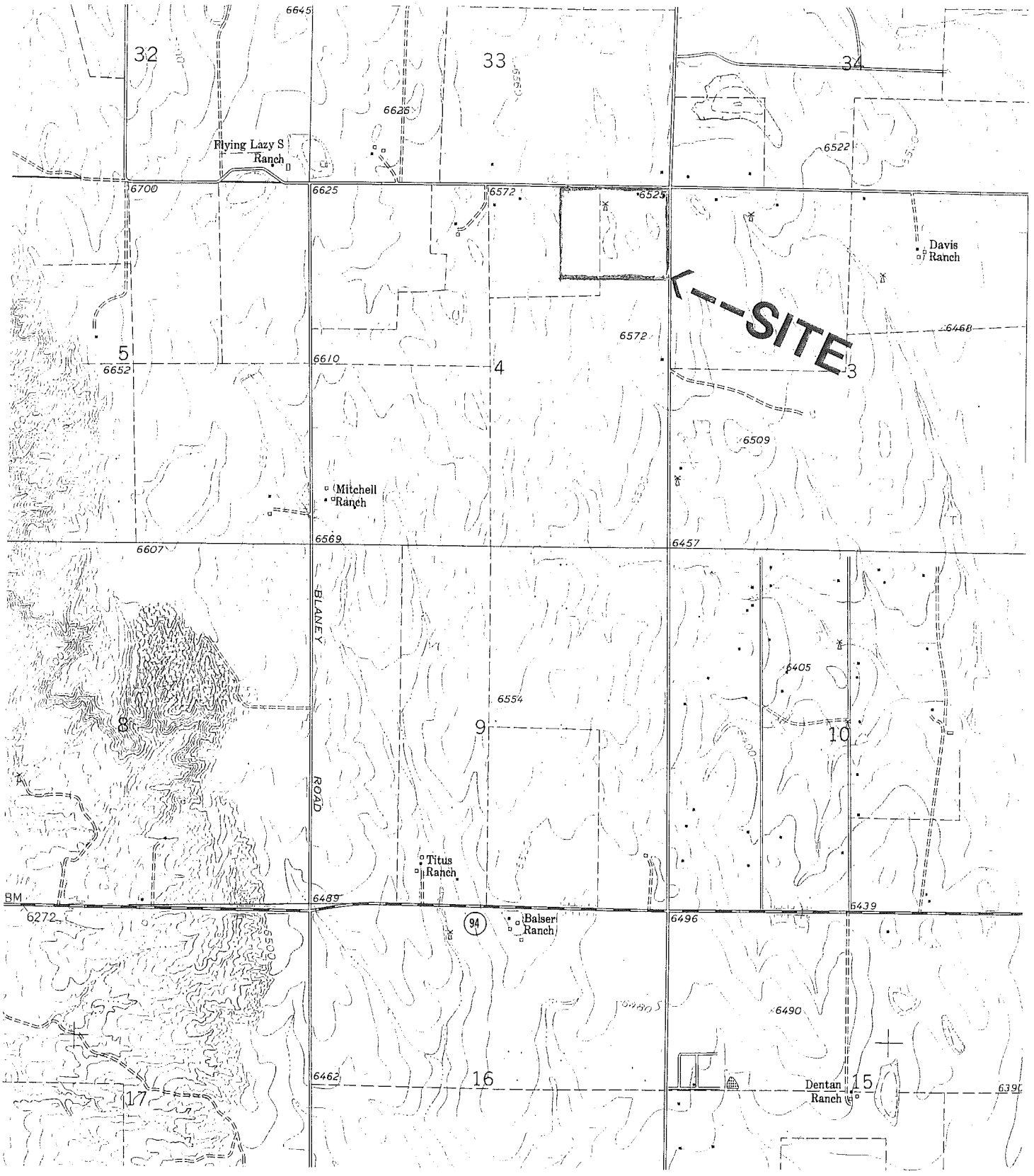

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USGS MAP
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COLORADO SPRINGS, CO.
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FIG NO.: 2

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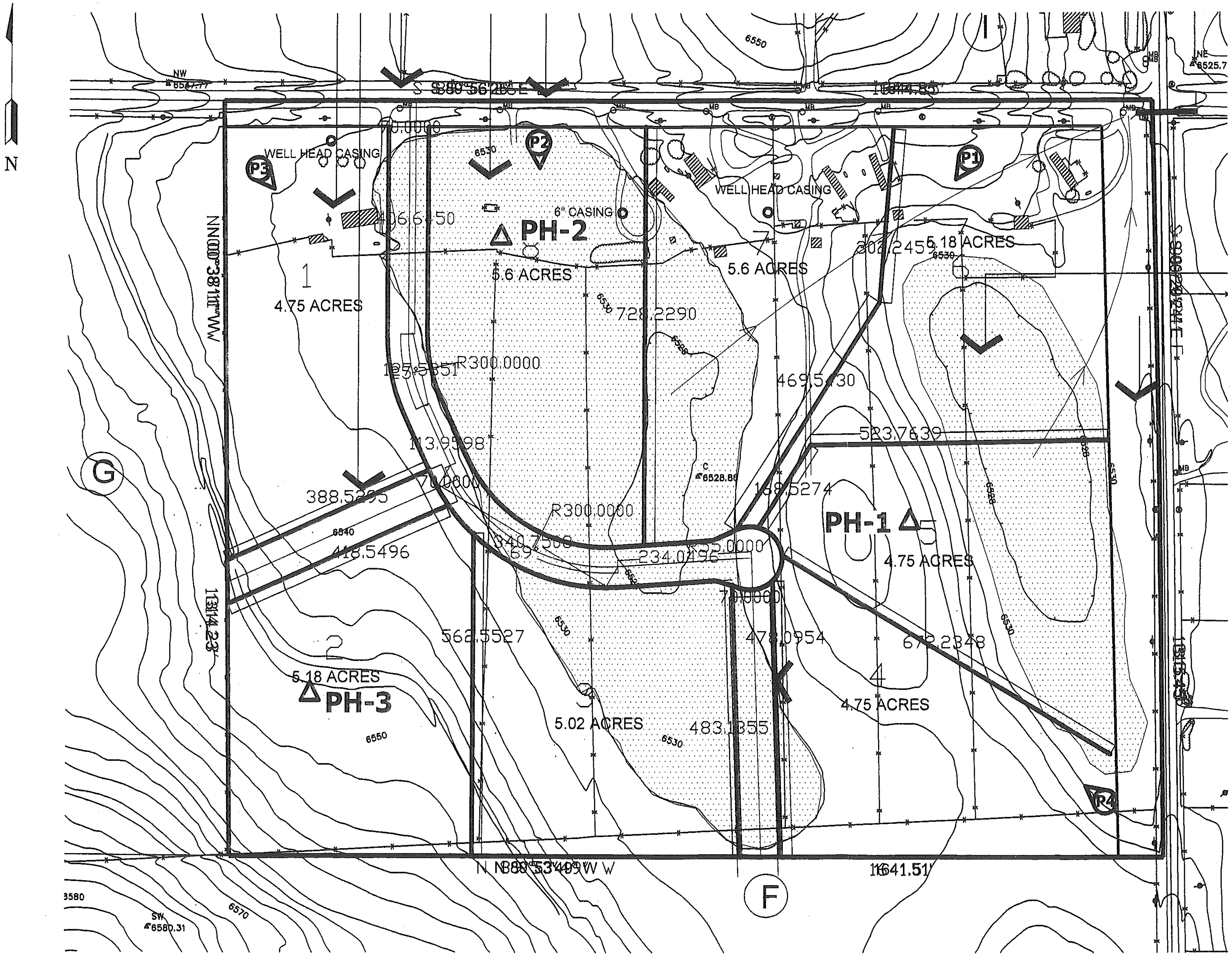

LEGEND

Δ P1 - approximate location of percolation test

(P3) - approximate photograph location, direction and number.

REVISION	BY

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DEVELOPMENT PLAN/ PERCOLATION TEST LOCATION PLAN
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EL PASO COUNTY, COLORADO
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FIGURE No. 3

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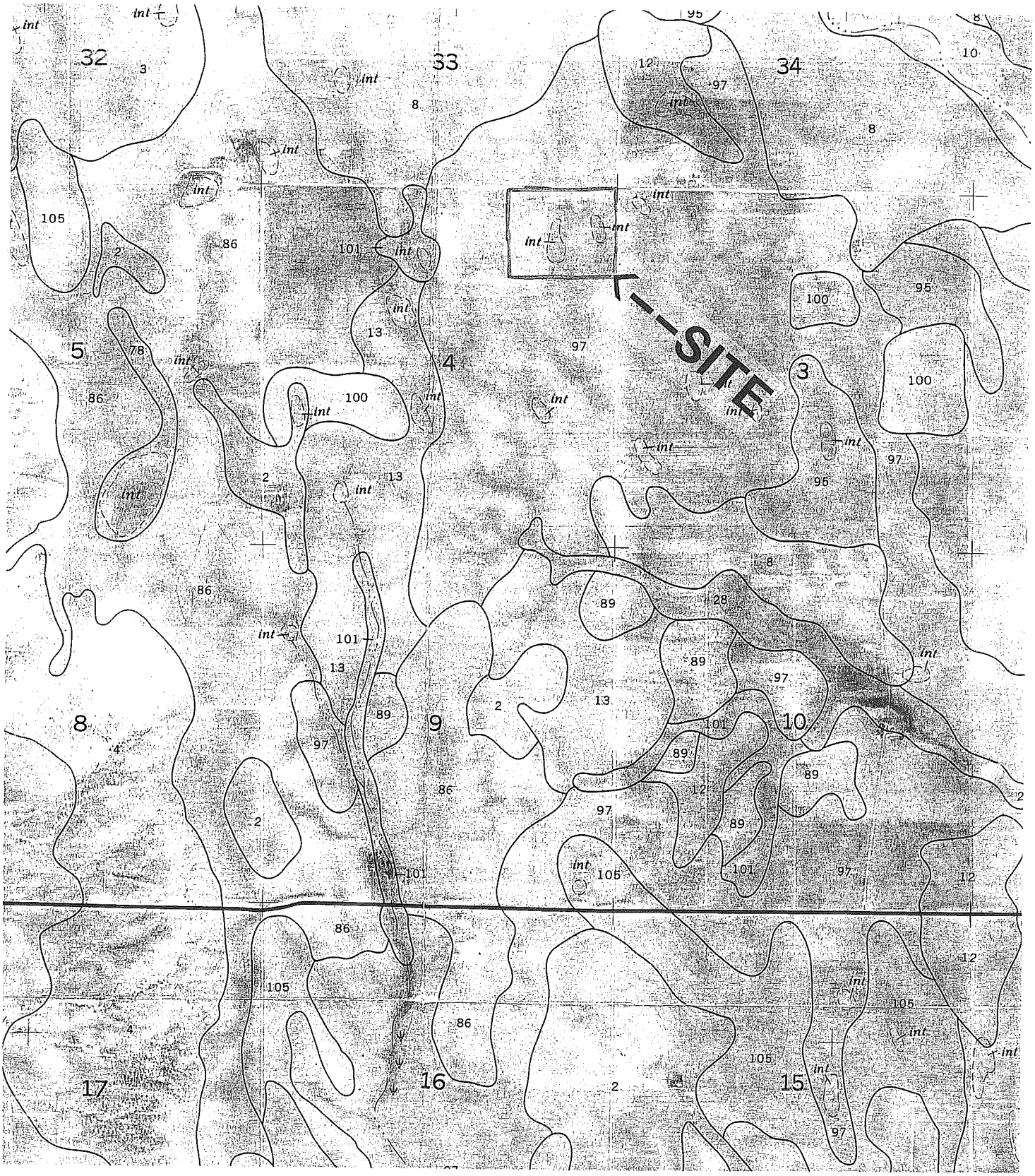

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SCS MAP
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COLORADO SPRINGS, CO.
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FIG NO.: 4

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97—Truckton sandy loam, 3 to 9 percent slopes. This deep, well drained soil formed in alluvium and residuum derived from arkosic sedimentary rock on uplands. Elevation ranges from 6,000 to 7,000 feet. The average annual precipitation is about 15 inches, the average annual air temperature is about 47 degrees F, and the average frost-free period is about 135 days.

Typically, the surface layer is grayish brown sandy loam about 5 inches thick. The next layer is dark grayish brown sandy loam about 3 inches thick. The subsoil is brown sandy loam about 16 inches thick. The substratum is light yellowish brown coarse sandy loam to a depth of 60 inches or more.

Included with this soil in mapping are small areas of Blakeland loamy sand, 1 to 9 percent slopes; Bresser sandy loam, 3 to 5 percent slopes; and Truckton sandy loam, 0 to 3 percent slopes. Also included are small areas of soils that have arkosic sandstone or shale at a depth of less than 40 inches.

Permeability of this Truckton soil is moderately rapid. Effective rooting depth is 60 inches or more. Available water capacity is moderate. Surface runoff is slow to medium, and the hazards of erosion and soil blowing are moderate.

More than half of this soil is used as rangeland, for wildlife habitat, and as homesites. The rest, consisting of the less sloping areas, is used for wheat and sorghum. Rangeland or pastureland is the most suitable use because the permanent plant cover protects the soil.

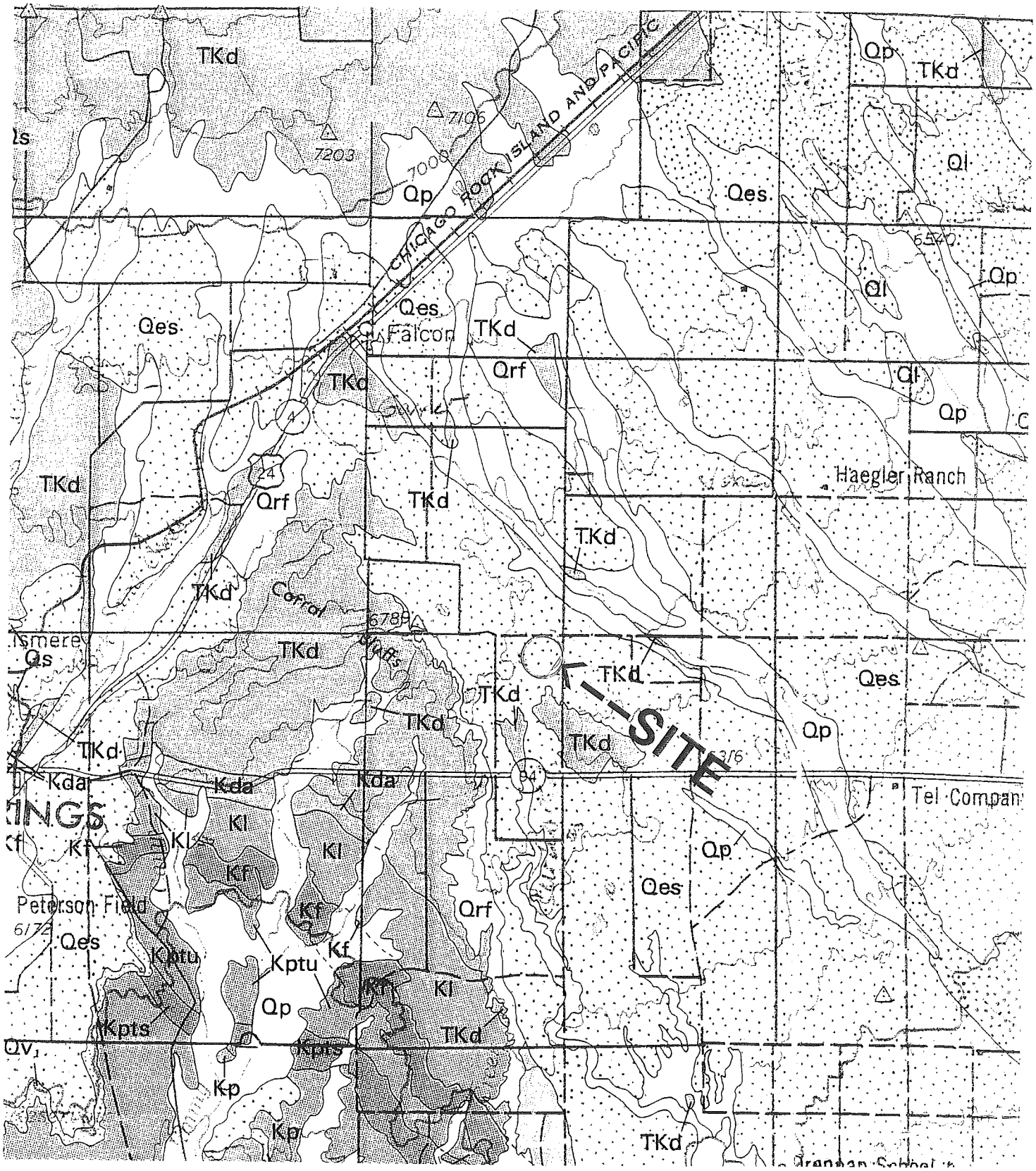
This soil is well suited to the production of native vegetation suitable for grazing. Native vegetation is mainly cool- and warm-season grasses such as western wheatgrass, side-oats grama, and needleandthread.

Proper range management is needed to prevent excessive removal of the plant cover from this soil. Interseeding improves the existing vegetation. Deferment of grazing in spring increases plant vigor and soil stability. Properly locating livestock watering facilities helps to control grazing.

Windbreaks and environmental plantings generally are well suited to this soil. Soil blowing is the main limitation to the establishment of trees and shrubs. This limitation can be overcome by cultivating only in the tree rows and leaving a strip of vegetation between the rows. Supplemental irrigation may be needed when planting and during dry periods. Trees that are best suited and have good survival are Rocky Mountain juniper, eastern redcedar, ponderosa pine, Siberian elm, Russian-olive, and hackberry. Shrubs that are best suited are skunkbush sumac, lilac, and Siberian peashrub.

This soil is suited to wildlife habitat. It is best suited to habitat for openland and rangeland wildlife. In cropland areas, habitat favorable for ring-necked pheasant, mourning dove, and many nongame species can be developed by establishing areas for nesting and escape cover. For pheasant, undisturbed nesting cover is vital and should be provided for in plans for habitat development. Rangeland wildlife, such as pronghorn antelope, can be encouraged by developing livestock watering facilities, properly managing livestock grazing, and reseeding range where needed.

The main limitation of this soil for construction is frost-action potential. Special designs for roads are needed to overcome this limitation. Because of the sandy nature of the soil, practices must be provided to minimize surface runoff and thus keep erosion to a minimum. Access roads must have adequate cut-slope grade and be provided with drains to control surface runoff. Capability subclasses VIe, nonirrigated, and IVe, irrigated.



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COLORADO GEOLOGY MAP
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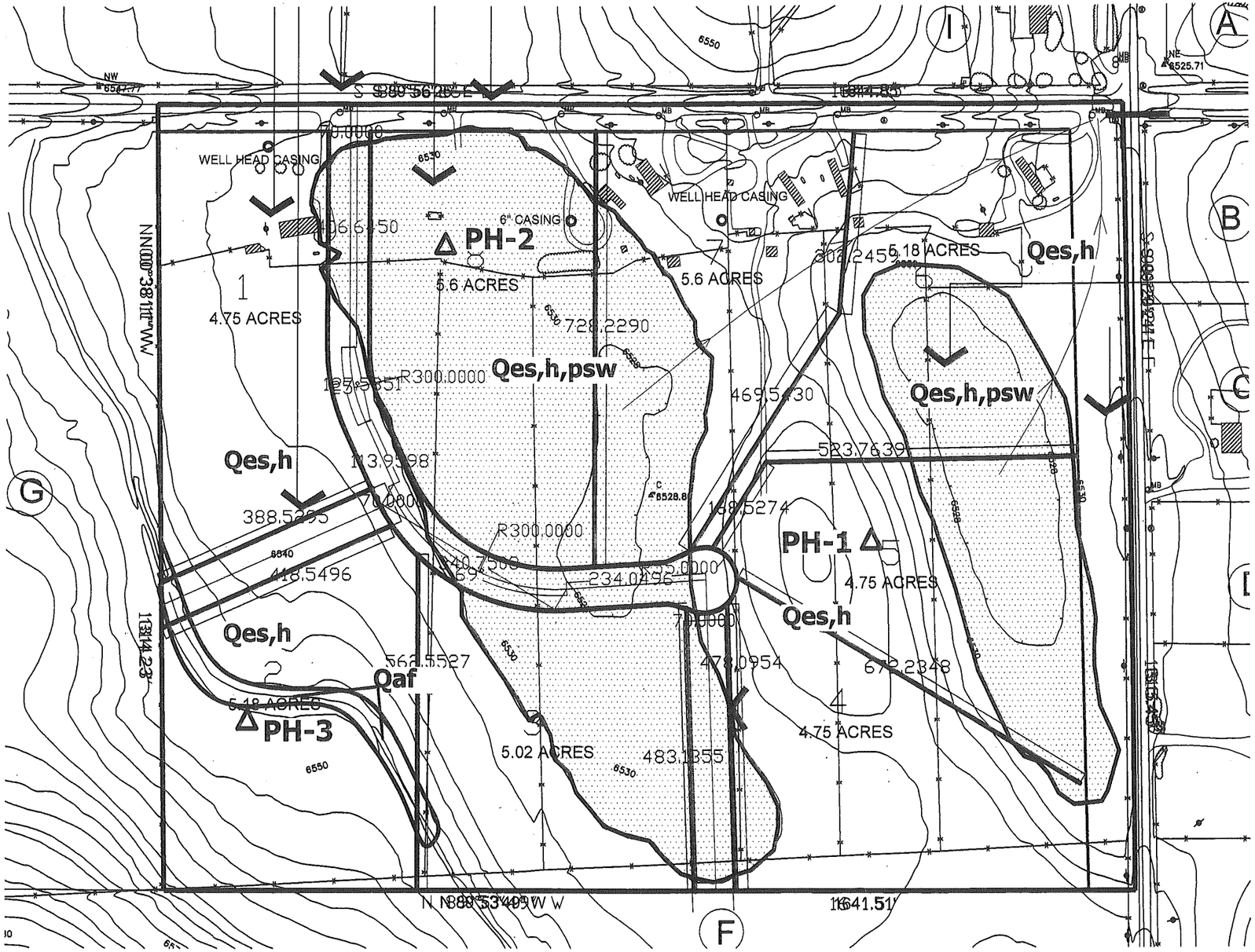
JOB NO.: 42455

FIG NO.: 6

M:\2005\GEOHAZ MAPS\42455\DAVIS RD. AND CURTIS RD\ RPT SET\(TO 1).dwg, 7/19/2005 4:22:03 PM, 1:1



LEGEND

Qaf - Artificial Fill of Quaternary Age:
Man made fill deposits.

Qes - Eolian Sand of Quaternary Age:
Wind blown sand deposits.

h - hydrocompaction

psw - potentially seasonal shallow groundwater

Δ PI - approximate location of percolation test

REVISION	BY

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COLORADO SPRINGS, CO. 80907
(719) 531-5599

GEOLOGY/ ENGINEERING GEOLOGY PLAN
CIRTUS RD. & DAVIS RD.
EL PASO COUNTY, COLORADO
FOR: UPE

DRAWN	M. WELLS
CHECKED	
DATE	7/22/05
SCALE	1" = 200'
JOB NO.	42455
FIGURE No.	7

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LEGEND

SPECIAL FLOOD HAZARD AREAS INUNDATED BY 100-YEAR FLOOD

ZONE A No base flood elevations determined.

ZONE AE Base flood elevations determined.

ZONE AH Flood depths of 1 to 3 feet (usually areas of ponding); base flood elevations determined.

ZONE AO Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.

ZONE A99 To be protected from 100-year flood by Federal flood protection system under construction; no base elevations determined.

ZONE V Coastal flood with velocity hazard (wave action); no base flood elevations determined.

ZONE VE Coastal flood with velocity hazard (wave action); base flood elevations determined.

FLOODWAY AREAS IN ZONE AE

OTHER FLOOD AREAS

ZONE X Areas of 500-year flood; areas of 100-year flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 100-year flood.

OTHER AREAS

ZONE X Areas determined to be outside 500-year floodplain.

ZONE D Areas in which flood hazards are undetermined.

UNDEVELOPED COASTAL BARRIERS

Identified 1983 | Identified 1990 | Otherwise Protected Areas

Coastal barrier areas are normally located within or adjacent to Special Flood Hazard Areas.

Flood Boundary

Floodway Boundary

Zone D Boundary

Boundary Dividing Special Flood Hazard Zones, and Boundary Dividing Areas of Different Coastal Base Flood Elevations Within Special Flood Hazard Zones.

513 — Base Flood Elevation Line; Elevation in Feet. See Map Index for Elevation Datum.

D — D — Cross Section Line

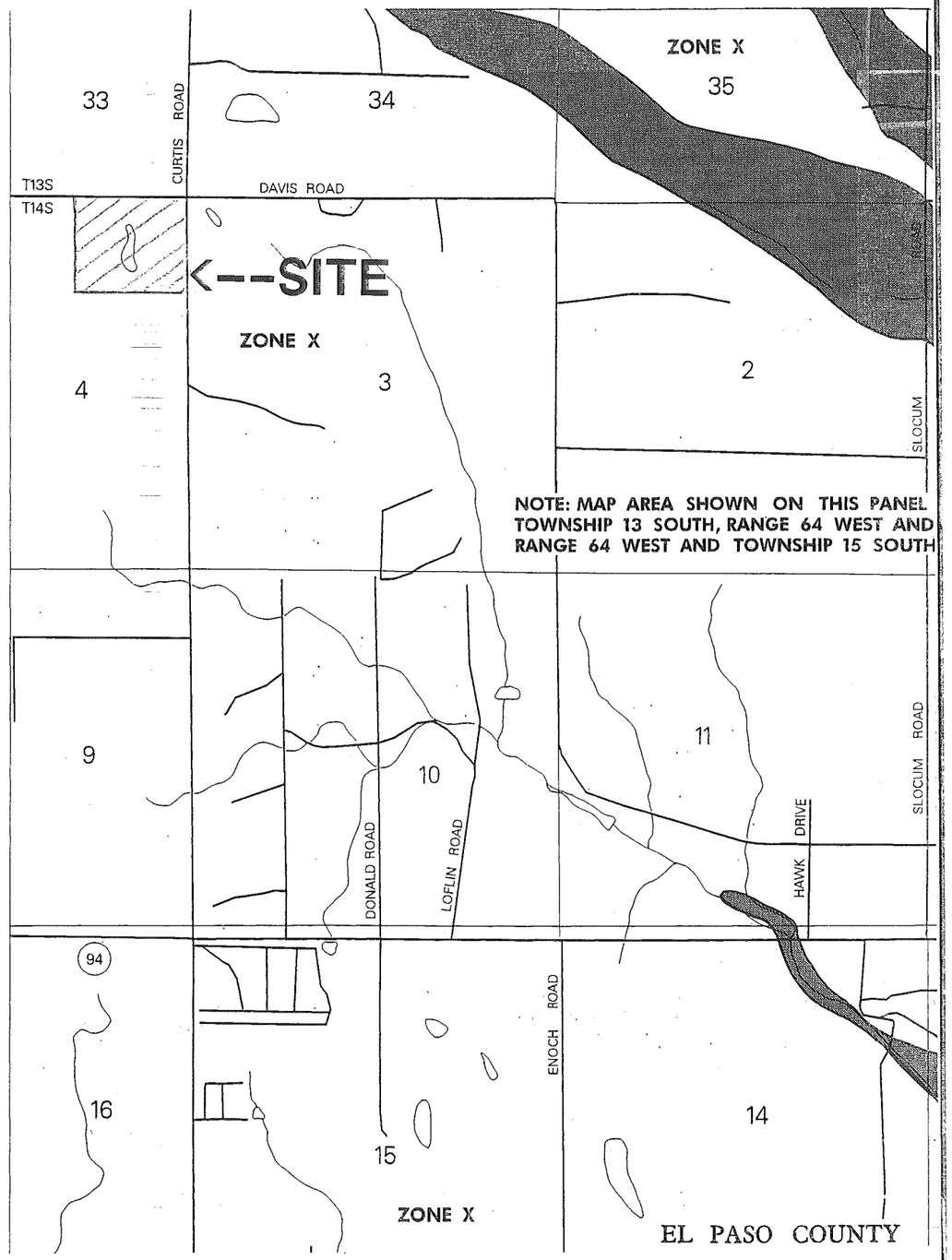
(EL 987) — Base Flood Elevation in Feet Where Uniform Within Zone. See Map Index for Elevation Datum.

RM7 × — Elevation Reference Mark

● M2 — River Mile

97°07'30", 32°22'30" — Horizontal Coordinates Based on North American Datum of 1927 (NAD 27) Projection.

MAP NUMBER 08041C0780



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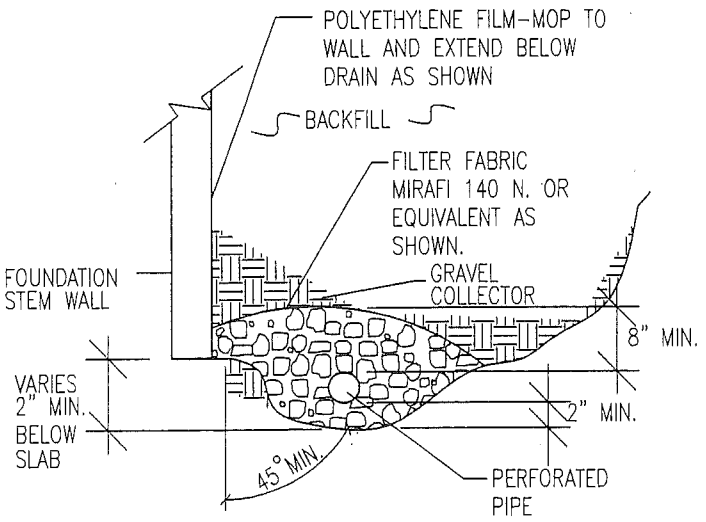
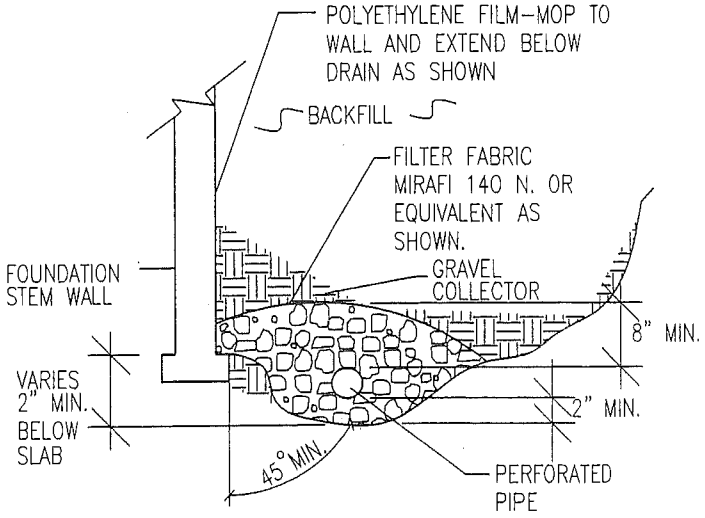
(719) 531-5599

FLOODPLAIN MAP
DAVIS RD. & CURTIS RD.
COLORADO SPRINGS, CO.
FOR: U.P.E.

DRAWN	R.OLSON
CHECKED	
DATE	19JUL05
SCALE	AS SHOWN
JOB NO.	42455
FIGURE No.	3

M:\2005\GEOHAZ MAPS\42455\DAVIS RD. AND CURTIS RD) RPT SET(1 TO 1).dwg, 7/19/2005 4:21:57 PM, 1:1





NOTES:

–GRAVEL SIZE IS RELATED TO DIAMETER OF PIPE PERFORATIONS–85% GRAVEL GREATER THAN 2x PERFORATION DIAMETER.

–PIPE DIAMETER DEPENDS UPON EXPECTED SEEPAGE. 4–INCH DIAMETER IS MOST OFTEN USED.

–ALL PIPE SHALL BE PERFORATED PLASTIC. THE DISCHARGE PORTION OF THE PIPE SHOULD BE NON–PERFORATED PIPE.

–FLEXIBLE PIPE MAY BE USED UP TO 8 FEET IN DEPTH, IF SUCH PIPE IS DESIGNED TO WITHSTAND THE PRESSURES. RIGID PLASTIC PIPE WOULD OTHERWISE BE REQUIRED.

–MINIMUM GRADE FOR DRAIN PIPE TO BE 1% OR 3 INCHES OF FALL IN 25 FEET.

–DRAIN TO BE PROVIDED WITH A FREE GRAVITY OUTFALL, IF POSSIBLE. A SUMP AND PUMP MAY BE USED IF GRAVITY OUT FALL IS NOT AVAILABLE.

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PERIMETER DRAIN DETAIL

DRAWN:	DATE:	DESIGNED:	CHECKED:
R.J. OLSON	7/22/05		

JOB NO.: 42455
FIG NO.: 9

M:\1e_Detail Book\Drains\SSI Exterior Perimeter drain.dwg, 6/14/2005 11:03:28 AM, 1:48

APPENDIX A: Site Photographs

1

From northeast portion of site, looking southwest.

2

From north central portion of site, looking south.

3

From northwest corner of site, looking southeast.

4

From southeast corner of site, looking northwest.

APPENDIX B: Test Boring Logs and Laboratory Test Results

PERC HOLE NO. 1
DATE DRILLED 6/27/2005
Job # 42455

REMARKS

DRY TO 10', 6/27/05

SAND, SILTY, FINE TO MEDIUM GRAINED, BROWN, MEDIUM DENSE, MOIST

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
5			15	4.3	1
10			17	4.8	1
15					
20					

PERC HOLE NO. 2
DATE DRILLED 6/27/2005
CLIENT UNITED PLANNING
LOCATION DAVIS RD. & CUTIS RD.

REMARKS

DRY TO 10', 6/27/05

SAND, SILTY, FINE TO MEDIUM GRAINED, BROWN, MEDIUM DENSE, MOIST

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
5			15	3.5	1
10			15	8.8	1
15					
20					

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PERCOLATION HOLE LOG

DRAWN:	DATE:	CHECKED:	DATE:
		KAH	7/11/05

JOB NO.: 42455
FIG NO.: B-1

PERC HOLE NO.	3	PERC HOLE NO.	
DATE DRILLED	6/27/2005	DATE DRILLED	
Job #	42455	CLIENT	UNITED PLANNING
		LOCATION	DAVIS RD. & CUTIS RD.

REMARKS

DRY TO 10', 6/27/05

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
					2
5			8	7.7	1
10			6	7.6	1
15					
20					

CLAY, SANDY, DARK BROWN

SAND, SILTY, FINE TO MEDIUM GRAINED, BROWN, LOOSE, MOIST

SAND, SLIGHTLY SILTY, FINE TO MEDIUM GRAINED, BROWN, LOOSE, MOIST

REMARKS

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
5					
10					
15					
20					

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PERCOLATION HOLE LOG

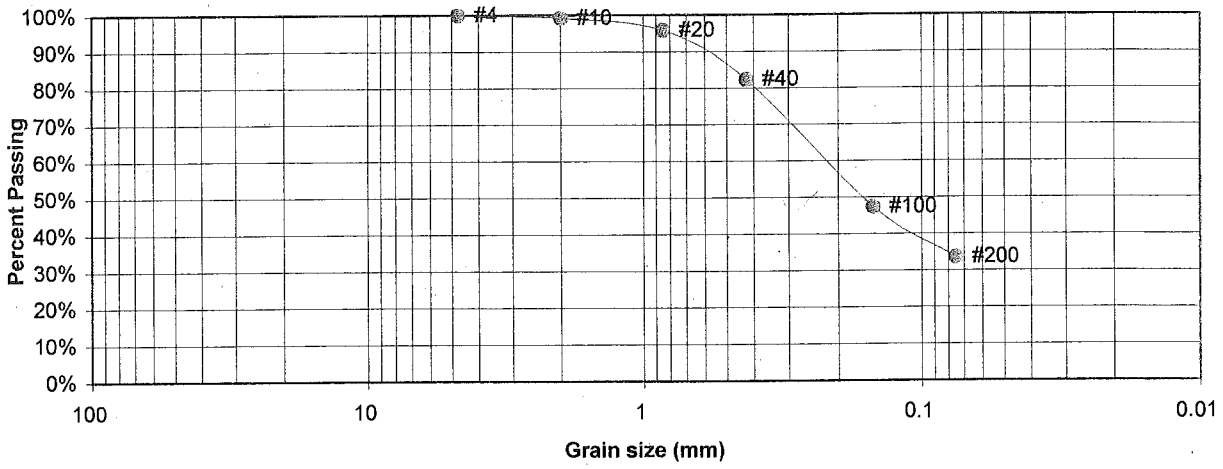
DRAWN:	DATE:	CHECKED:	DATE:
		KLH	7/11/05

JOB NO.: 42455

FIG NO.: B-2

UNIFIED CLASSIFICATION	SM	CLIENT	UNITED PLANNING AND ENGINEERING
SOIL TYPE #	1	PROJECT	DAVIS RD. & CURTIS RD.
PROFILE HOLE #	PH-2	JOB NO.	42455
DEPTH	5'	TEST BY	DG

Sieve Analysis
Grain Size Distribution



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	
4	100.0%
10	99.2%
20	95.9%
40	82.3%
100	47.3%
200	33.6%

Atterberg Limits	
Plastic Limit	19
Liquid Limit	22
Plastic Index	3

Swell	
Moisture at start	
Moisture at finish	
Moisture increase	
Initial dry density (pcf)	
Swell (psf)	

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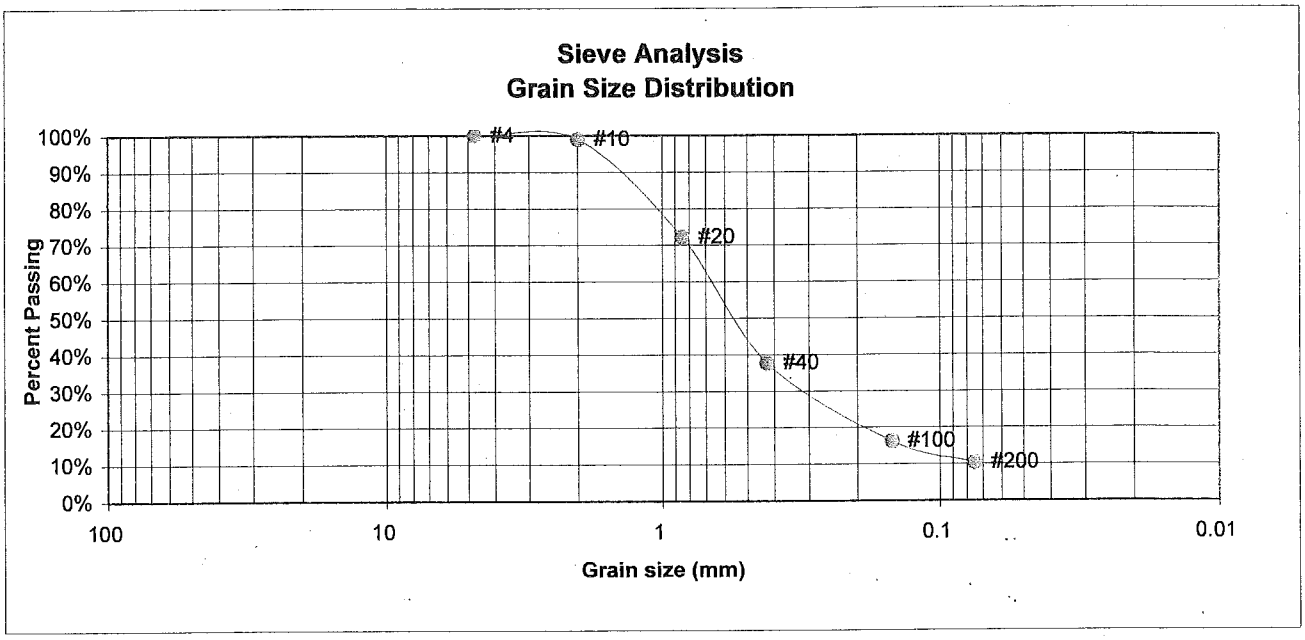
LABORATORY TEST RESULTS

DRAWN:	DATE:	CHECKED:	DATE:
		KLM	7/11/05

JOB NO.: 42455
FIG NO.: B-3

UNIFIED CLASSIFICATION	SM-SW	CLIENT	UNITED PLANNING & ENGINEERING
SOIL TYPE #	1	PROJECT	DAVIS ROAD & CURTIS ROAD
PROFILE HOLE #	PH-3	JOB NO.	42455
DEPTH	10'	TEST BY	DG



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	
4	100.0%
10	99.0%
20	72.2%
40	37.7%
100	16.3%
200	10.4%

Atterberg Limits
Plastic Limit
Liquid Limit
Plastic Index

Swell
Moisture at start
Moisture at finish
Moisture increase
Initial dry density (pcf)
Swell (psf)

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LABORATORY TEST RESULTS

DRAWN:	DATE:	CHECKED:	DATE:
		[illegible]	7/11/05

JOB NO.: 42455
FIG NO.: B-4

APPENDIX C: Percolation Test Results

Client: United Planning and Engineering Job Number: 42455
Test Location: Davis Road & Curtis Road, 49 Acre Site

PERCOLATION HOLES-TEST NO. 1

Date Holes Prepared: 6/27/2005 Date Hole Completed: 6/28/2005

Hole No. 1
Depth: 32"

Trial	Time (min.)	Water Level Change (in.)
1	10	1/8
2	10	1/8
3	10	7/8

Perc Rate (min./in.): 27

Hole No. 2
Depth: 37"

Trial	Time (min.)	Water Level Change (in.)
1	10	1
2	10	1 1/8
3	10	7/8

Perc Rate (min./in.): 10

Hole No. 3
Depth: 31"

Trial	Time (min.)	Water Level Change (in.)
1	10	5/8
2	10	3/4
3	10	5/8

Perc Rate (min./in.): 15

Average Perc Rate (min./in.) 18

PROFILE HOLE

Date Profile Hole Completed: 6/27/2005

Depth	Visual Classification
0-10'	Sand, silty, brown, fine grained

Remarks

No Bedrock
No Groundwater

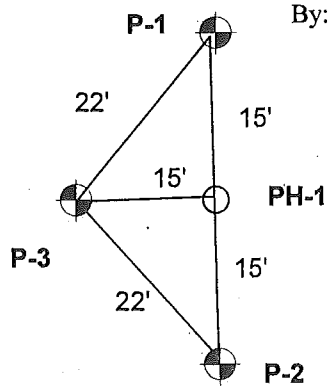
15 Blows / ft. @ 4'
17 Blows / ft. @ 9'

Required Area of Absorption Field: 0.85 Sq. Ft./gpd sewage volume
Required Area of Absorption Field: 192 Sq. Ft./bedroom
Required Area of Absorption Field: 307 Sq. Ft./bedroom with garbage disposal and washing machine
Remarks:

Observer: Blake Leonard By:

N

N.T.S.



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PERCOLATION TEST RESULTS

DRAWN:	DATE:	CHECKED:	DATE:
		MAK	7/11/05

JOB NO.: 42455
FIG NO.: C-1

Client: United Planning and Engineering Job Number: 42455
Test Location: Davis Road & Curtis Road, 49 Acre Site

PERCOLATION HOLES-TEST NO. 1

Date Holes Prepared: 6/27/2005 Date Hole Completed: 6/28/2005

Hole No. 1
Depth: 35"

Trial	Time (min.)	Water Level Change (in.)
1	10	0
2	10	7/16
3	10	1/8

Perc Rate (min./in.): 53

Hole No. 2
Depth: 27"

Trial	Time (min.)	Water Level Change (in.)
1	10	7/8
2	10	5/8
3	10	9/16

Perc Rate (min./in.): 15

Hole No. 3
Depth: 29"

Trial	Time (min.)	Water Level Change (in.)
1	10	5/8
2	10	7/8
3	10	7/16

Perc Rate (min./in.): 15

Average Perc Rate (min./in.) 28

PROFILE HOLE

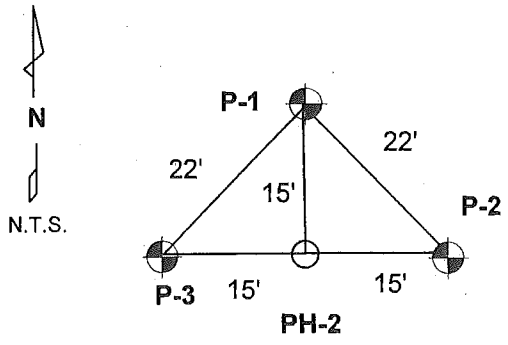
Date Profile Hole Completed: 6/27/2005

Depth	Visual Classification	Remarks
0-10'	Sand, silty, brown, fine grained	No Bedrock No Groundwater

15 Blows / ft. @ 4'
15 Blows / ft. @ 9'

Required Area of Absorption Field: 1.06 Sq. Ft./gpd sewage volume
Required Area of Absorption Field: 238 Sq. Ft./bedroom
Required Area of Absorption Field: 381 Sq. Ft./bedroom with garbage disposal and washing machine
Remarks:

Observer: Paul Espanoza By:



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PERCOLATION TEST RESULTS

DRAWN:	DATE:	CHECKED:	DATE:
		KAK	7/11/05

JOB NO.: 42455
FIG NO.: C-2

Client: United Planning and Engineering Job Number: 42455
Test Location: Davis Road & Curtis Road, 49 Acre Site

PERCOLATION HOLES-TEST NO. 1

Date Holes Prepared: 6/27/2005 Date Hole Completed: 6/28/2005

Hole No. 1
Depth: 30"

Trial	Time (min.)	Water Level Change (in.)
1	10	11/16
2	10	5/16
3	10	1/4

Perc Rate (min./in.): 24

Hole No. 2
Depth: 30"

Trial	Time (min.)	Water Level Change (in.)
1	10	1/4
2	10	3/16
3	10	0

Perc Rate (min./in.): 69

Hole No. 3
Depth: 32"

Trial	Time (min.)	Water Level Change (in.)
1	10	7/16
2	10	0
3	10	0

Perc Rate (min./in.): 69

Average Perc Rate (min./in.) 54

PROFILE HOLE

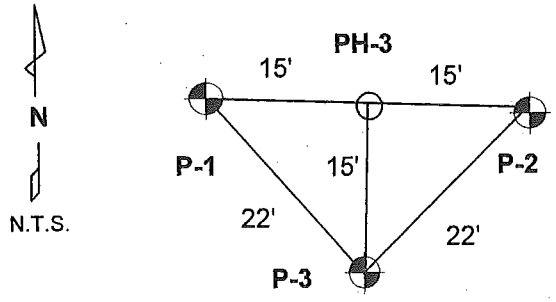
Date Profile Hole Completed: 6/27/2005

Depth	Visual Classification	Remarks
0-2'	Clay, sandy, dark brown	
2-10'	Sand, silty to slightly silty, brown, fine to medium grained	No Bedrock No Groundwater

8 Blows / ft. @ 4'
6 Blows / ft. @ 9'

Required Area of Absorption Field: 1.47 Sq. Ft./gpd sewage volume
Required Area of Absorption Field: 331 Sq. Ft./bedroom
Required Area of Absorption Field: 529 Sq. Ft./bedroom with garbage disposal and washing machine
Remarks:

Observer: Paul Espanoza By:



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PERCOLATION TEST RESULTS

DRAWN:	DATE:	CHECKED:	DATE:
		BHA	7/11/05

JOB NO.: 42455
FIG NO.: C-3