ENTECH
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SOILS AND GEOLOGY STUDY
TOWNHOMES AT WESTERN
721 WESTERN DRIVE
LOT 1, CIMARRON SOUTHEAST FILING NO. 2C
EL PASO COUNTY, COLORADO

Prepared for:
J. Elliott Construction Company
12218 Crystal Downs Road
Peyton, Colorado 80831

Attn: Jordon Guinane

April 24, 2024

Respectfully Submitted,

ENTECH ENGINEERING, INC.

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

Reviewed by:

Digitally signed by Austin Nossokoff
Date: 04/24/24

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1 SUMMARY

Project Location

The project site is in a portion of the SE¼ of Section 7, Township 13 South, Range 65 West of the 6th Principal Meridian in El Paso County, Colorado. The 7.12-acre site is located east of the intersection of Hathaway Drive and Western Drive in El Paso County, Colorado.

Project Description

The Townhomes at Western multi-family development will consist of eleven four-plexes, and four duplexes, retaining walls, detention pond, and other associated site improvements. The development will be serviced by Cherokee Water and Sanitation District.

Scope of Report

This report presents the results of our geologic evaluation and recommended treatment/mitigation of engineering geologic constraints and 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 the proposed development if constraints are mitigated. Geologic conditions, including uncontrolled fill, 100-year floodplain, hydrocompaction, and potentially unstable slopes, will impose some constraints on development and land use. Based on the proposed development plan, it appears that these conditions/areas will impact the development. These conditions will be discussed in greater detail in the report. 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 the SE¼ of Section 7, Township 13 South, Range 65 West of the 6th Principal Meridian in El Paso County, Colorado. The 7.12-acre site is located east of the intersection of Hathaway Drive and Western Drive in El Paso County, Colorado. The location of the site is as shown on the Vicinity Map (Figure 1).

The topography of the site consists of gradual to steep slopes to the southwest. The steep slopes are located along the northern portion of the site. There were no drainages or areas of water observed on the site. East Fork of Sand Creek that flows in a southwesterly direction is located east of the site. The site boundaries are indicated on the USGS Map (Figure 2). The site is undeveloped and vegetation primarily consists of field grasses, weeds, cacti, and yuccas. Site photographs taken on March 1, 2024, are included in Appendix A. Fill is present on the site adjacent to Western Drive.

The site is currently zoned as RM-30 CAD-0 (Reference 1). The site is currently undeveloped, with existing commercial and residential development to the north, south and west, and golf course to the east. The Townhomes at Western multi-family development will consist of eleven four-plexes, and four duplexes, retaining walls, detention pond, and other associated site improvements. The preliminary grading plan indicates the steep slopes along Western Drive will be regraded, with retaining walls up to 4 feet in height, cuts up to approximately 6 feet for the detention pond and minor cuts/fills for the proposed lots (Figures 3 and 6).

3 SCOPE OF THE REPORT

The scope of the report includes a general geologic analysis utilizing published geologic data. Detailed site-specific mapping will be conducted to obtain general information with respect to major geographic and geologic features, geologic descriptions, and their effects on the 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 March 12, 2024.

The site was previously investigated by Entech, Preliminary Subsurface Soil Investigation, dated July 17, 2023 (Reference 2, Appendix D). Test borings logs from the previous site investigation, designated TB-1 through TB-4, and Laboratory Testing Results are presented in Appendix D (Reference 2).

Four test borings, designated TB-1.1 through TB-4.1, were drilled on March 18, 2024, as part of the investigation to determine general soil and bedrock profiles and characteristics. The borings were drilled to depths of 20 to 50 feet below ground surface (bgs). The locations of the test borings are indicated on the Site and Exploration Plan (Figure 3). Laboratory testing was also performed on some of the soils to classify and determine the engineering characteristics of the soils. Laboratory tests included grain-size analysis ASTM D422, Atterberg Limits ASTM D4318, and volume change testing using the Swell/Consolidation test. Sulfate testing was performed on select samples to evaluate the potential for below-grade concrete degradation due to sulfate attack. The Test Boring Logs and Laboratory Testing Results are presented in Appendices B and C. Results of this testing will be discussed later in this report.

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 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 southeastern edge of a large structural feature known as the Denver Basin. Bedrock in the area tends to be gently dipping in a northeasterly direction (Reference 2). The bedrock in the area of the site is sedimentary in nature and typically Cretaceous in age. The bedrock underlying the site consists of the Dawson Formation of Tertiary to Cretaceous Age. Overlying this formation are unconsolidated man placed fill, and eolian sand deposits. 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 two soil types on the site (Figure 4). In general, the soil classifies as stratified loamy sand soils. The soils are described as follows:

Soil Type	Description
8	Blakeland, loamy Sand, 1-9% slopes
28	Ellicott, loamy coarse sand, 0-5% slopes

Complete descriptions of each soil type are presented in Appendix E. 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 Elsmere Quadrangle showing the site location is presented in Figure 5 (Reference 5). The Geology Map prepared for the site is presented in Figure 6. These mappable units were identified on this site which are described as follows:

Qaf **Artificial fill of Holocene Age:** These are man placed fill deposits located on the site. These materials typically consist of silty sands and were encountered in the test borings extending to approximate depths of 3 to 14 feet.

Qes_1 **Younger Eolian Deposits of early Holocene and late? Pleistocene 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 Dawson Formation of Tertiary to Cretaceous Age. The Dawson Formation typically consists of arkosic sandstone with interbedded claystone and siltstone. Overlying this formation are man-placed fill and eolian sand deposits. The soils

consisted of sand with silt and silty sand with gravel. Bedrock was not encountered in the borings which were drilled to depths of 20 to 35 feet.

The soils listed above were mapped from site-specific mapping, the *Geologic Map of the Elsmere Quadrangle* distributed by the Colorado Geological Survey in 2002 (Reference 5), the *Reconnaissance Geologic Map of Colorado Springs and Vicinity*, distributed by the USGS in 1973 (Reference 6), the *Geologic Map of the Colorado Springs-Castle Rock Area, Front Range Urban Corridor,* distributed by the USGS in 1979 (Reference 7), and the *Geologic Map of the Pueblo 1^0 x 2^0 Quadrangle*, distributed by the US Geological Survey in 1978 (Reference 4). The test borings were also used in evaluating the site and are included in Appendices B, C, and D. The Geology/Engineering Geology Map prepared for the site is presented in Figure 6.

5.4 Soil Conditions

The soils encountered in the test borings can be grouped into two general soil types. The soils were classified using the Unified Soil Classification System (USCS).

Soil Type 1 classified as silty sand fill (SM). The loose to medium dense sand was encountered in TB-1 and TB-3 at the ground surface and extended to depths of 3 to 12 feet below ground surface (bgs), respectively. The sand fill is anticipated to exhibit a low expansion potential.

Soil Type 2 classified as native sand with silt, silty sand, and silty sand with gravel (SW-SM, SM). The loose to medium sand was encountered in all of the test borings at depths ranging from the ground surface to 3 to 12 feet bgs and extended to the depths explored (20 to 35 feet) bgs. The native sand is also anticipated to exhibit a low expansion potential.

The Test Boring Logs are presented in Appendix B. The Test Boring Logs and Laboratory Testing Results are presented in Appendices B and C.

5.5 Groundwater

Groundwater was encountered in two of the test borings at 12.5 feet (TB-3.1) to 30 feet (TB-1). The remaining borings were dry. 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 which was greater than 35 feet. Builders and planners should be cognizant of the potential for the occurrence of such subsurface water features during construction on-site and deal with individual conditions as necessary at the time of construction.

6 ENGINEERING GEOLOGY – IDENTIFICATION AND MITIGATION OF GEOLOGIC HAZARDS

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 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

Fill was observed on the site and in the test borings. The fill is associate with a recent stock pile in the central portion of the site and fill that has been placed along Western Drive in the northern portion of the site. Fill was encountered to depths ranging from 3 to 14 feet in the northern portion of the site.

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 D1557 or penetration to native soils.

Hydrocompaction and Collapsible Soils – Constraint

Areas in which hydrocompaction have been mapped across the site mapped as Eolian Sands of Quaternary Age (Qes). In areas identified for this hazard classification, however, 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 five 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.

Should loose collapsible soils be encountered beneath foundations, removal and recompaction of the upper 2 to 3 feet with thorough moisture conditioning at 95% of its maximum Modified Proctor Dry Density, ASTM D1557 will be necessary. Specific recommendations should be made after additional investigation of each building site.

Landslide Hazard and Slope Stability – Hazard

The site is mapped is not mapped in any area susceptible to landslides or past landslide deposits according to the *Map of Potential Areas of Landslide Susceptibility in Colorado Springs* by White and Wait, 2003, distributed by The Colorado Geological Survey (Reference 10, Figure 6). The northern portion of the site has been mapped with potentially unstable slopes (Figure 6), and is further discussed below. Slope stability analysis has been conducted on these slopes and is discussed in the following sections.

Potentially Unstable Slope Areas – Constraint

Based on site observations potentially unstable slopes have been mapped in the northern portion of the site (Figure 6). The potentially unstable slopes are located along the area of fill adjacent to Western Drive. The proposed development plan indicates the slopes will be regrading with the proposed site grading. Uncontrolled fill encountered in this area must be fully removed prior to placement of new grading fill.

Mitigation:

The potentially unstable slopes are located within an area that will be regrading during the site development. The uncontrolled fill should be completely removed prior to placement of any new fill. Tie walls and buttresses are recommended for the structures adjacent to the moderately sloping areas to stiffen the foundation system. Any construction, cuts or terracing on the potentially unstable slopes should be avoided unless analyzed for the global slope stability. Areas of ponded water should be avoided and water should be directed off the site in a non-erosive manner to prevent saturation of subsurface materials. The use of xeriscape landscaping utilizing native plantings is recommended to reduce the need for irrigation.

Slope Stability Analysis

Slope Stability Analysis was conducted utilizing the GSTABL7 computer program. The sections analyzed are shown on the Slope Section Map, Figure 7. Slope stability analysis results are included in Appendix F. Soil strength values used for the program were as follows:

Exhibit 1: Soil Strength Design Parameters

Design Parameter	Fill	Sand
Soil Density, pcf	115	115
Angle of Internal Friction, degrees	30	30
Cohesion, psf	0	0

Note: Slope stability analysis was conducted utilizing the GSTABL7 (2-dimensional, limit equilibrium program) w/ Stedwin user interface. Soil descriptions shown on the cross-sections correlate to soil labels (in black/green for surface boundary lines) below soil boundary lines. Soil boundary lines are labeled above the line (in red). Piezometric surfaces associated with soil types are labeled upgradient of the associated surface. Additional information on the analysis may be found in the GStabl7 with Stedwin program manual.

Soil strength values were based on similar soils in the area. Factors of safety were calculated by the Modified Bishop Method for Circular Failure Surfaces. The slope profile was constructed with the soil types encountered in the test borings from the subsurface soil investigation. Groundwater levels were evaluated in accordance with levels that may be anticipated in the area. Factors of safety of 1.8 and 3.3 were obtained for the sections through the proposed sections and buildings on this site. A factor of safety of 1.5 is recommended for critical structures, such as residential buildings.

Groundwater and Floodplain Areas – Hazard

No drainages or areas of water were observed on the site. East Fork of Sand Creek is located just south of the site. A small portion of the northeastern portion of the site is mapped within a 100-year floodplain zone according to the FEMA Map No. 08041CO754G, (Figure 8, Reference 10).

It is our understanding that the site is well above the floodplain elevation Groundwater was encountered in two of the test borings at 12.5 to 30 feet. The remaining borings were dry. Groundwater is not expected to affect the construction of the shallow foundations or excavation of the detention pond. 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. Perimeter drains are recommended for any structures with usable space below grade. Additionally, typical drain details that may be used are shown in Figures 9 through 11. Finished floor levels must be one foot above the floodplain level. Exact floodplain locations and drainage studies are beyond the scope of this report.

Faults – Hazard

The closest fault is the Rampart Range 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 11), 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 levels for the area have been reported by the Colorado Geologic Survey in the open file, Report No. 91-4 (Reference 12). Average Radon levels for the 80915 zip code are presented in the table below:

Zip Code	Average Radon Levels
80815	2.15 pCi/l

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

The Townhomes at Western multi-family development will consist of eleven four-plexes, and four duplexes, retaining walls, detention pond, and other associated site improvements. It is our opinion that the existing geologic and engineering geologic conditions will impose some constraints on the proposed development and construction. The most significant problems affecting development will be those associated with the artificial fill, floodplain, hydrocompaction, and potentially unstable slopes that can be satisfactorily mitigated through proper engineering design and construction practices.

Subsurface soil conditions encountered in the test borings drilled for the planned development consisted of clayey to silty sand fill overlying silty sand and sand with silt and gravel. Bedrock was not encountered in the borings which were drilled to depths of 20 to 35 feet. The sands were at loose to medium dense states. Overexcavation of the low density sands on the order of 2 to 3 feet, moisture conditioning and recompaction of the soils at 95% of Modified Proctor Dry Density, ASTM D1557 is a common mitigation. **Final recommendations should be determined after additional investigation of each building site.**

Based on site observations potentially unstable slopes have been mapped in the northern portion of the site (Figure 6). The potentially unstable slopes are located along the area of fill adjacent to Western Drive. The proposed development plan indicates the slopes will be regrading with the proposed site grading. Uncontrolled fill encountered in this area must be fully removed prior to placement of new grading fill. The potentially unstable slopes are located within an area that will be regrading during the site development. The uncontrolled fill should be completely removed prior to placement of any new fill. Tie walls and buttresses are recommended for the structures adjacent to the moderately sloping areas to stiffen the foundation system. Any construction, cuts or terracing on the potentially unstable slopes should be avoided unless analyzed for the global slope stability. Areas of ponded water should be avoided and water should be directed off the site in a non-erosive manner to prevent saturation of subsurface materials. The use of xeriscape landscaping utilizing native plantings is recommended to reduce the need for irrigation.

No drainages or areas of water were observed on the site. East Fork of Sand Creek is located just south of the site. A small portion of the northeastern portion of the site is mapped within a 100-year floodplain zone according to the FEMA Map No. 08041CO754G, (Figure 8, Reference 10). It is our understanding that the site is well above the floodplain elevation Groundwater was encountered in two of the test borings at 12.5 to 30 feet. The remaining borings were dry. Groundwater is not expected to affect the construction of the shallow foundations or excavation of the detention pond.

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 15), 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 15), 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 15).

The site has been mapped as “Fair” for oil and gas resources (Reference 15). 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 ROADWAY, EMBANKMENT, AND STORMWATER FACILITY CONSTRUCTION RECOMMENDATIONS

In general, the site soils are suitable for the proposed roadways and embankments. Groundwater is not expected to be encountered on the site based on the preliminary grading plan. If excavations encroach on the groundwater level, unstable soil conditions may be encountered. Excavation of saturated soils will be difficult with rubber-tired equipment. Stabilization using shot rock or geogrids may be necessary.

Any areas to receive fill should have all topsoil, organic material, or debris removed. Prior to fill placement, Entech should observe the subgrade. Fill must be properly benched and compacted to minimize potentially unstable conditions in slope areas. Fill slopes should be 3:1 or flatter. The subgrade should be scarified and moisture conditioned to 0 to +4% of its optimum moisture content, compacted to a minimum of 95% of its maximum Standard Proctor Dry Density, ASTM D698 (cohesive soils) and within 2% of optimum moisture content, and compacted to a minimum of 95% of its maximum Modified Proctor Dry Density, ASTM D-1557 (non-cohesive soils) prior to placing new fill. Areas receiving fill may require stabilization with rock or fabric if shallow groundwater conditions are encountered.

New fill should be placed in thin lifts not to exceed 6 inches after compaction while maintaining at least 95% of its maximum Standard Proctor Dry Density, ASTM D698 (cohesive soils) or at least 95% of its maximum Modified Proctor Dry Density, ASTM D1557 (non-cohesive). These materials should be placed at a moisture content conducive to compaction, usually 0 to ±2% of Proctor optimum moisture content. The placement and compaction of fill should be observed and tested by Entech during construction. Entech should approve any import materials prior to placing or hauling them to the site. Additional investigation will be required for pavement designs once roadway grading is completed and utilities are installed.

10 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 proposed development 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 J. Elliott Construction Company 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.

11 REFERENCES

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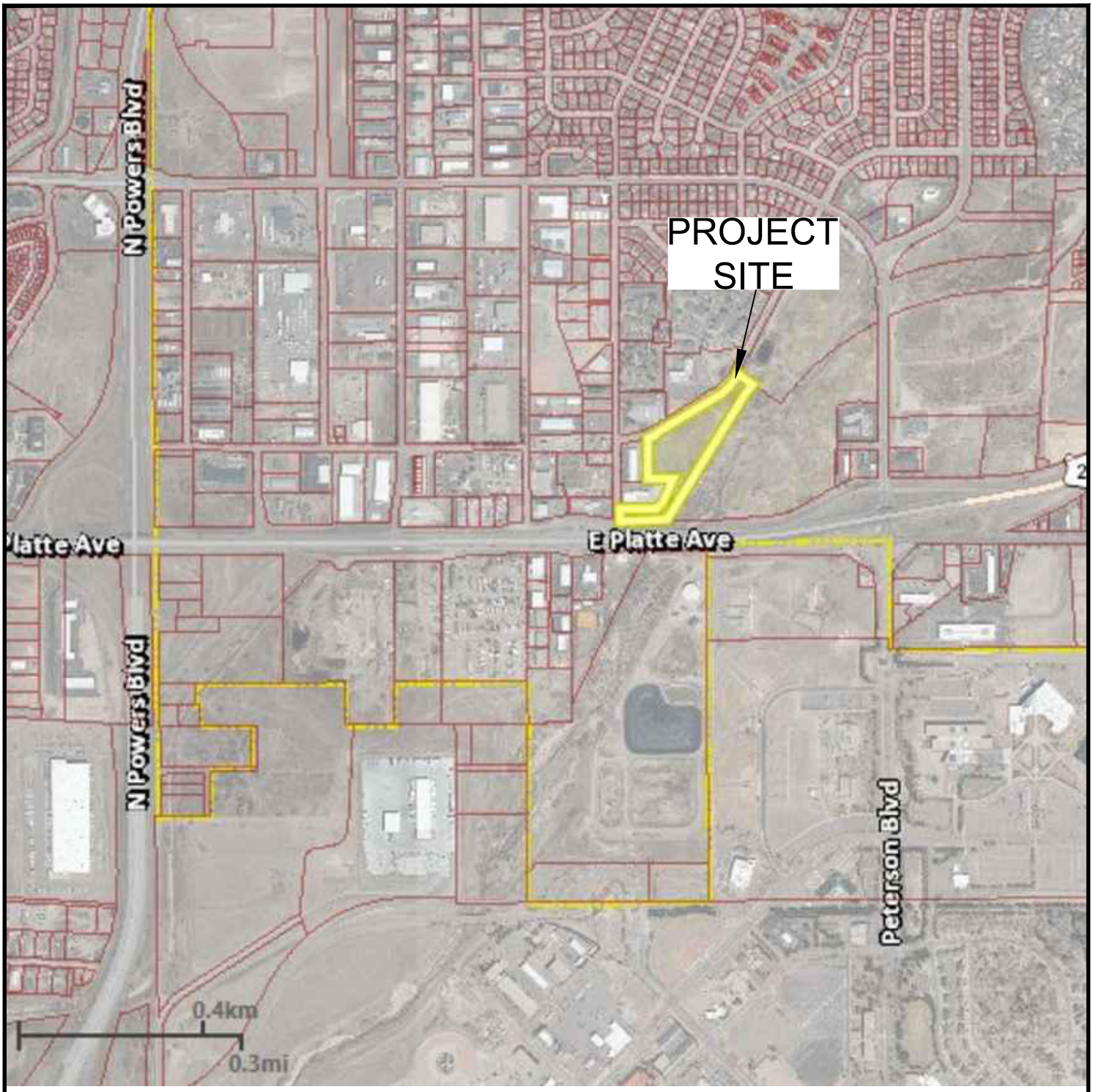
FIGURES



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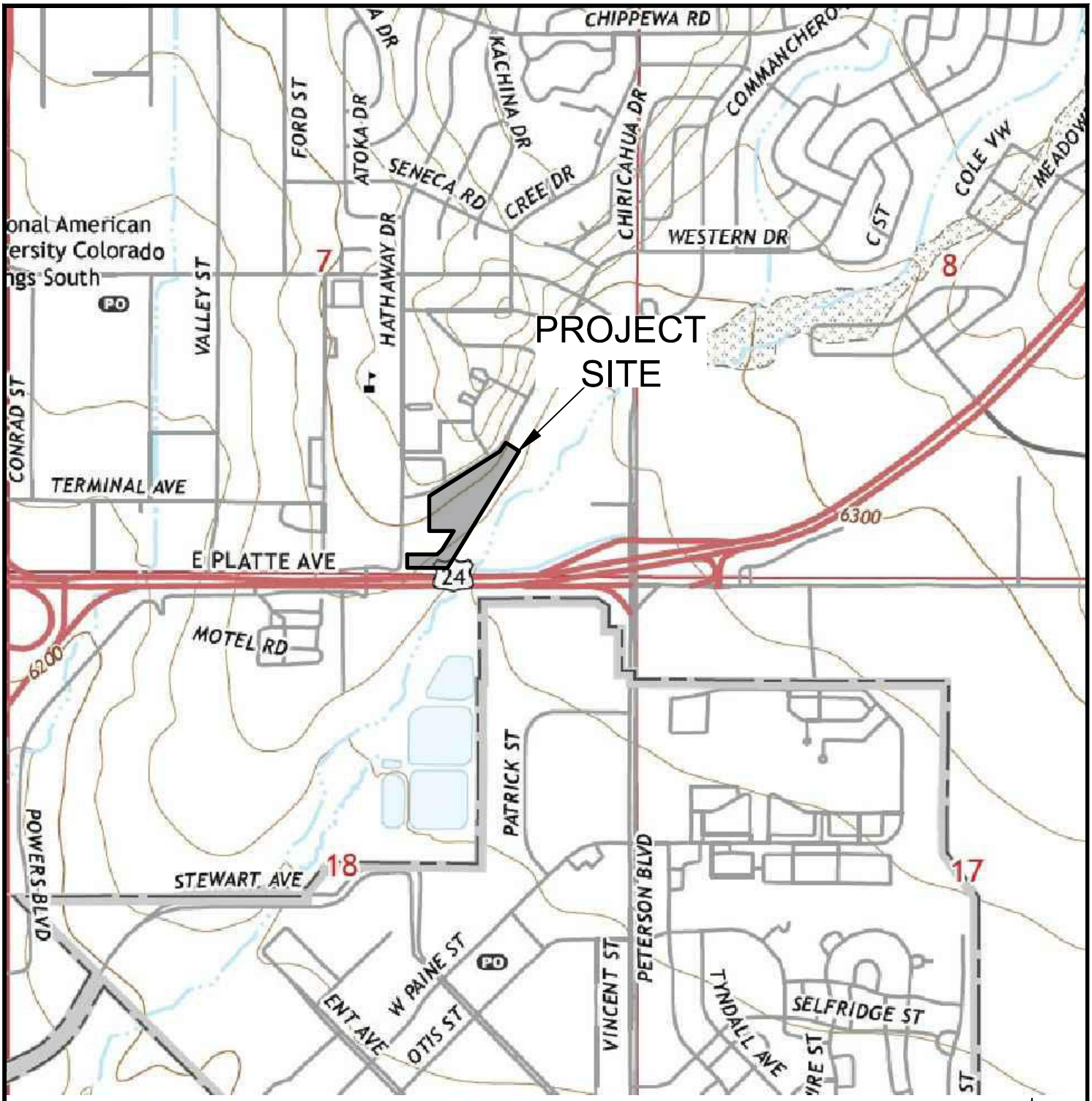
ENTECH ENGINEERING, INC.

VICINITY MAP

TOWNHOMES AT WESTERN
J. ELLIOTT CONSTRUCTION COMPANY

JOB NO.
230963

FIG. 1



ENTECH ENGINEERING, INC.

USGS TOPOGRAPHY MAP

TOWNHOMES AT WESTERN
J. ELLIOTT CONSTRUCTION COMPANY

JOB NO.
230963

FIG. 2

540-74-07038
VILLAGE EAST APARTMENTS CS LP
UNPLATTED
ZONING: R-4 CAD-O
MULTI UNIT (9 & UP)

540-74-07047
FREEDOM SPRINGS LLC
LOT 2 WESTERN HILLS
SUBDIV. FIL. NO. 2
ZONING: R-4 CAD-O
COUNTY

GREAT WESTERN DRIVE

WESTERN DRIVE

540-74-00086
HAA PROPERTIES LLC

UNPLATTED
ZONING: M CAD-O
MANUFACTURING
PROCESSING

72.5'

1' WCTY SERVICE

540-74-00091
625 HATHAWAY LLC
UNPLATTED

ZONING: RM-30 CAD-O
MULTI UNIT (9 & UP)

TB-1
TB-1.1
TB-2
TB-2.1
TB-3
TB-3.1
TB-4.1

P1
P2

DOCUMENTED BASE FLOOD ELEVATION (BFE) LOCATED OUTSIDE OF PROPERTY BASED ON ACTUAL TOPOGRAPHIC DATA.

100 YR FLOODPLAIN (ELEVATION CERTIFICATE REQUIRED FOR ALL STRUCTURES LOCATED IN SHOWN FLOODPLAIN)

BFE - 6272

- APPROXIMATE TEST BORING LOCATION AND NUMBER

- APPROXIMATE PHOTOGRAPH LOCATION AND NUMBER

ENTECH ENGINEERING, INC.

SITE AND EXPLORATION PLAN

TOWNHOMES AT WESTERN
J. ELLIOTT CONSTRUCTION COMPANY

JOB NO.
230963

FIG. 3

N

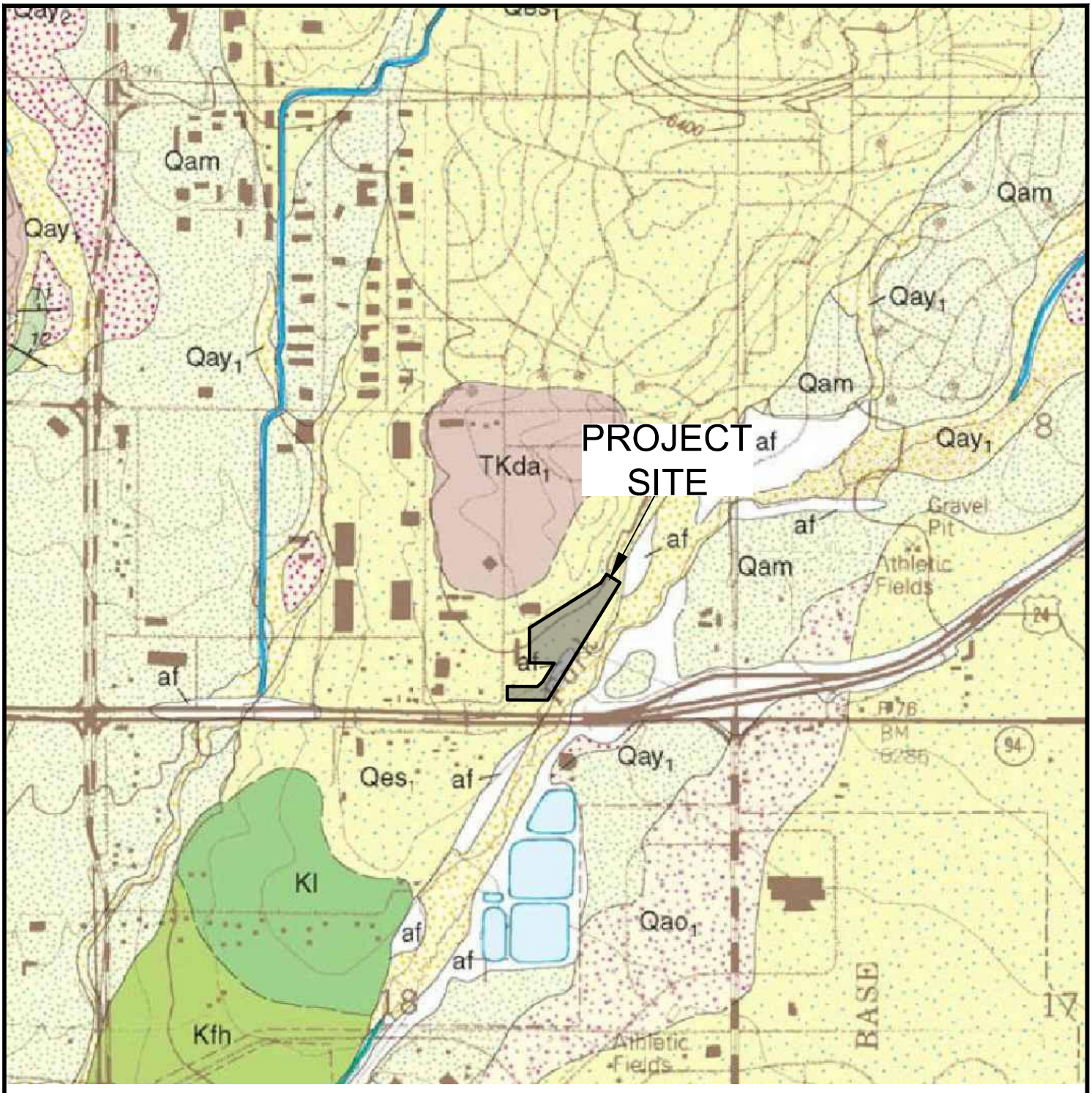
ENTECH
ENGINEERING, INC.

SOIL SURVEY MAP

TOWNHOMES AT WESTERN
J. ELLIOTT CONSTRUCTION COMPANY

JOB NO.
230963

FIG. 4



ENTECH ENGINEERING, INC.

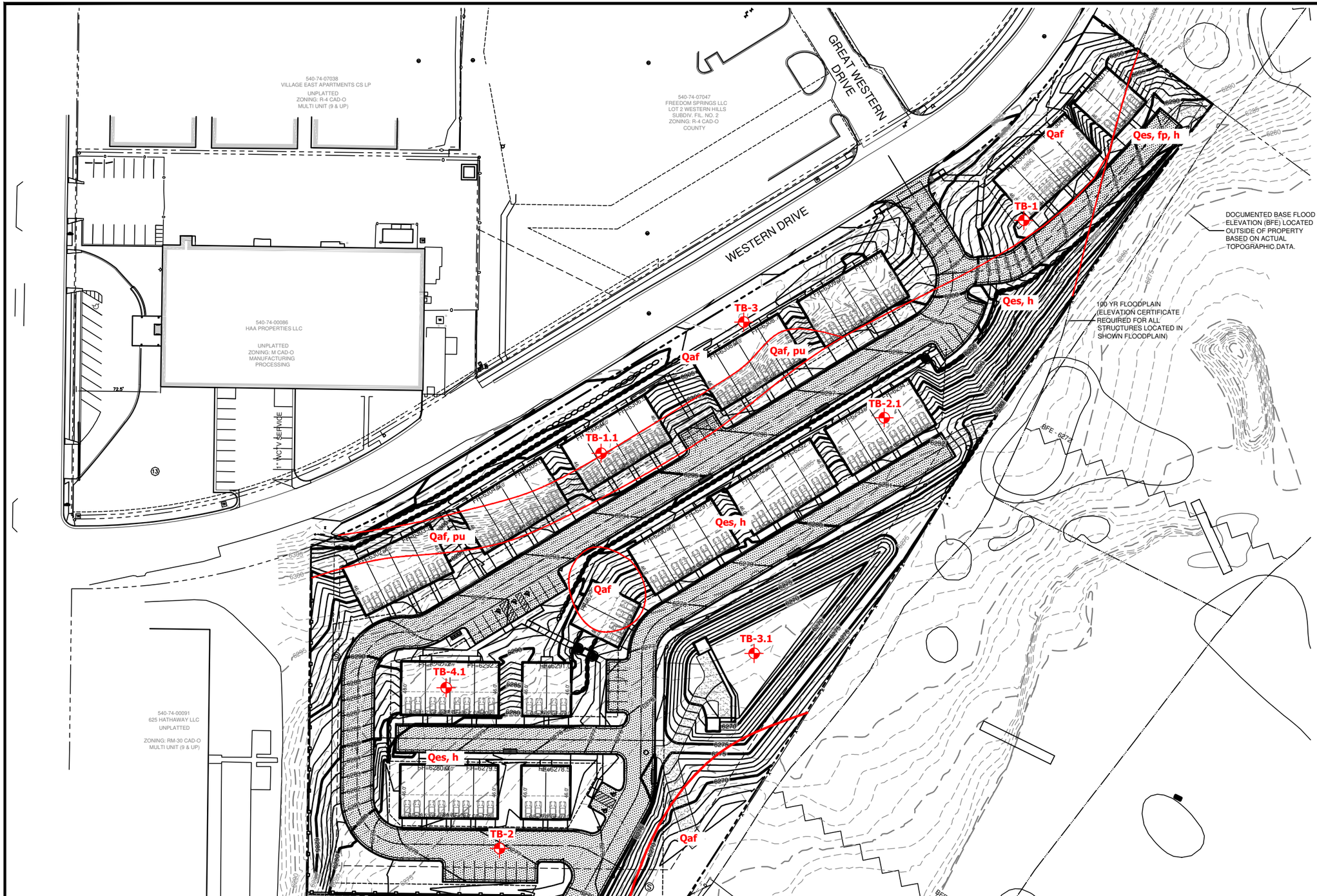
GEOLOGIC MAP OF THE ELSMERE QUADRANGLE

TOWHOMES AT WESTERN

J. ELLIOTT CONSTRUCTION COMPANY

JOB NO. 230963

FIG. 5



Legend:

Qaf - Artificial Fill of Holoece Age:
man placed fill deposits

Qes_1 - Younger Eolian Sand of middle and early Holocene and late? Pleistocene Age:
younger wind blown sand deposits

fp - floodplain
h - hydrocompaction
pu - potentially unstable slope

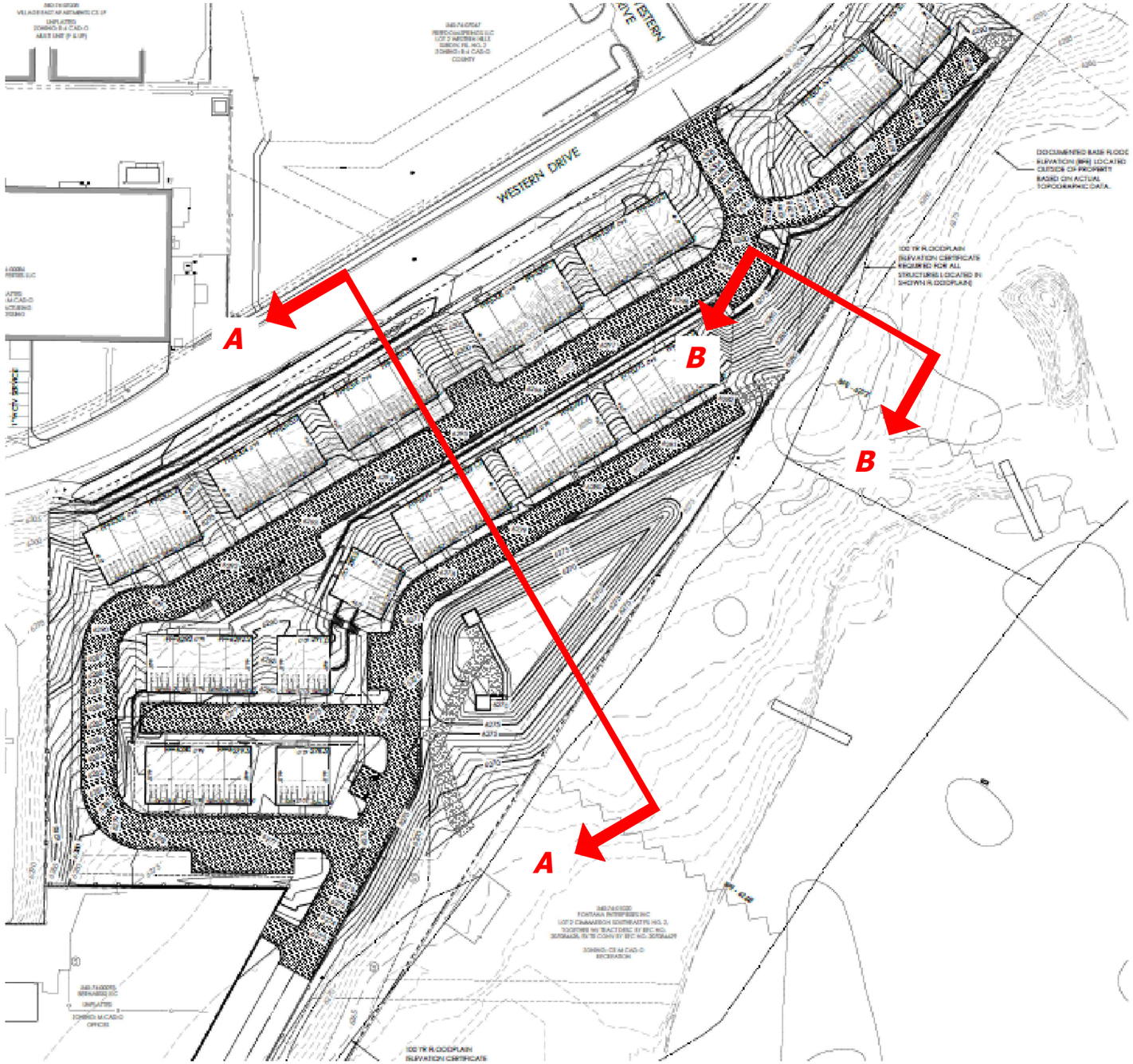
ENTECH ENGINEERING, INC.

GEOLOGY / ENGINEERING MAP

ADDRESS
CITY
CLIENT

JOB NO.
231532

FIG. 5



SLOPE SECTION MAP
N.T.S.

LEGEND

SLOPE STABILITY SECTION

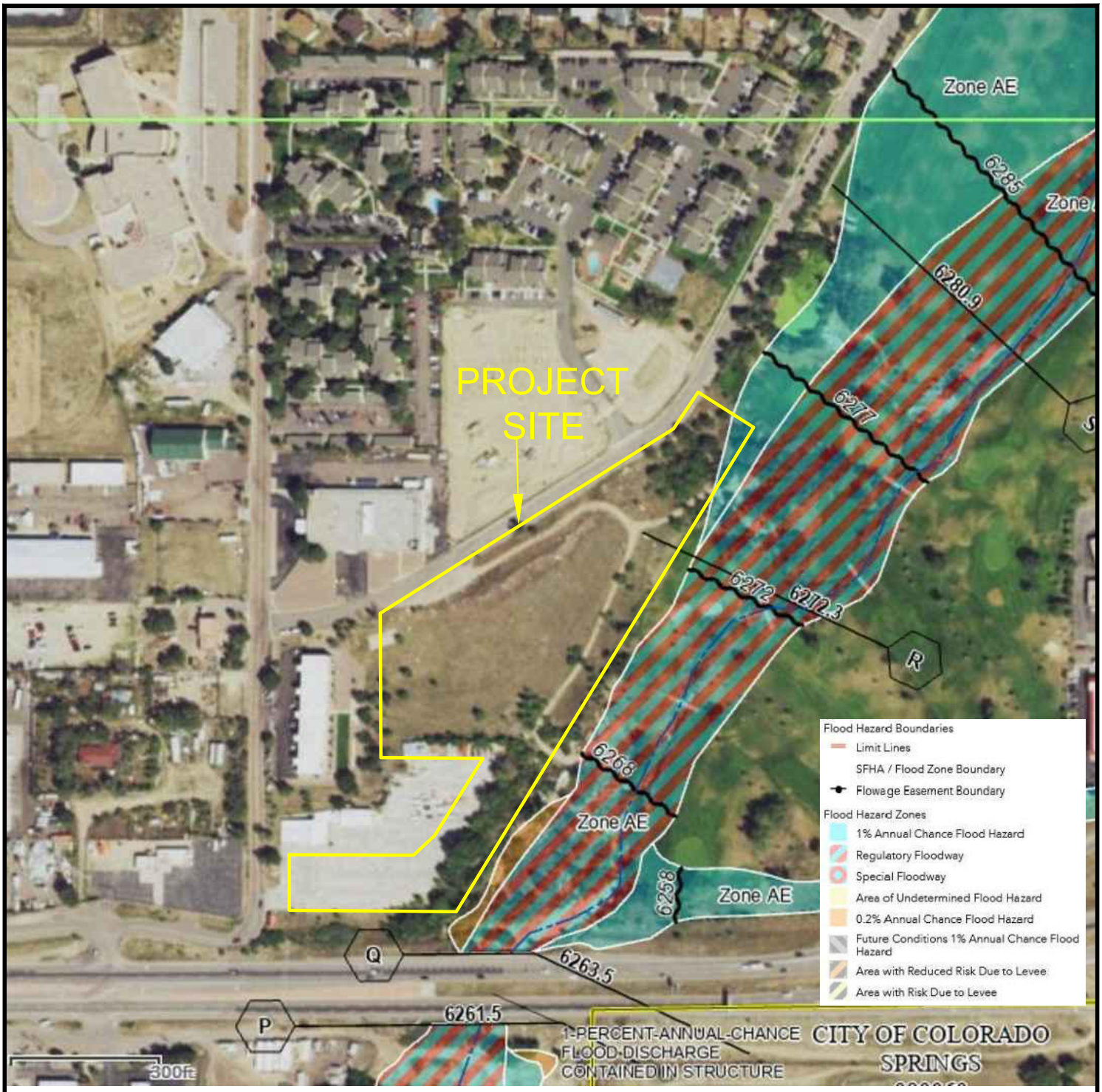
Revisions:

No.	Description	By	Date

ENTECH ENGINEERING, INC.

SLOPE SECTION MAP
721 WESTERN DRIVE
COLORADO SPRINGS, CO
J. ELLIOTT CONSTRUCTION CO.

DRAWN BY:	AMN
DESIGNED BY:	AMN
CHECKED BY:	AMN
DATE:	04/24/2024
SCALE:	AS SHOWN
JOB NO.:	240224
SHEET NO.:	7



N

ENTECH ENGINEERING, INC.

FEMA FLOODPLAIN MAP

TOWNHOMES AT WESTERN
J. ELLIOTT CONSTRUCTION COMPANY

JOB NO.
230963

FIG. 8

APPENDIX A: Site Photographs

1

Looking southwest from the northwestern side of the site.

March 12, 2024

2

Looking southeast from the northwest side of the site.

March 12, 2024

Job No. 230963

3

Looking southwest from the northeastern side of the site.

March 12, 2024

4

Looking west from the northeastern side of the site.

March 12, 2024

Job No. 230963

APPENDIX B: Test Boring Logs

TEST BORING 1
DATE DRILLED 3/18/2024

REMARKS

DRY TO 19', 3/19/24

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
FILL 0-14', SAND, CLAYEY, BROWN to DARK BROWN, MEDIUM DENSE to LOOSE, MOIST			11	5.9	1
5			5	9.5	1
10			7	10.1	1
SAND, SILTY, BROWN, LOOSE to DENSE, MOIST 15			7	6.5	2
20			30	7.1	2

TEST BORING 2
DATE DRILLED 3/18/2024

REMARKS

DRY TO 17.5', 3/19/24

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
SAND, SILTY, DARK BROWN to BROWN, LOOSE to MEDIUM			9	9.6	2
5			8	8.2	2
10			7	4.9	2
15			8	4.0	2
20			28	7.0	2

ENTECH ENGINEERING, INC.

TEST BORING LOGS

721 WESTERN DRIVE
J. ELLIOTT CONSTRUCTION

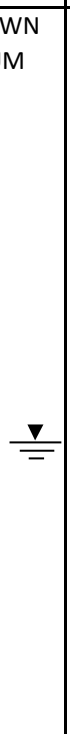
JOB NO. 230963

FIG. A-1

TEST BORING 3
DATE DRILLED 3/18/2024

REMARKS

WATER @ 12.5', 3/19/24

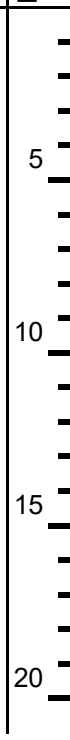


Symbol	Samples	Blows per foot	Watercontent %	Soil Type
SAND, WITH SILT, DARK BROWN to BROWN, LOOSE to MEDIUM DENSE, MOIST				
		7	6.5	2
		6	5.3	2
		7	4.2	2
		29	9.1	2
		11	13.5	2

TEST BORING 4
DATE DRILLED 3/18/2024

REMARKS

DRY TO 20', 3/19/24



Symbol	Samples	Blows per foot	Watercontent %	Soil Type
SAND, WITH SILT, DARK BROWN to BROWN, LOOSE to MEDIUM DENSE, MOIST				
		4	3.2	2
		9	3.6	2
		9	6.0	2
		9	4.8	2
		14	5.1	2

ENTECH ENGINEERING, INC.

TEST BORING LOGS

721 WESTERN DRIVE
J. ELLIOTT CONSTRUCTION

JOB NO. 230963

FIG. A-2

APPENDIX C: Laboratory Test Results

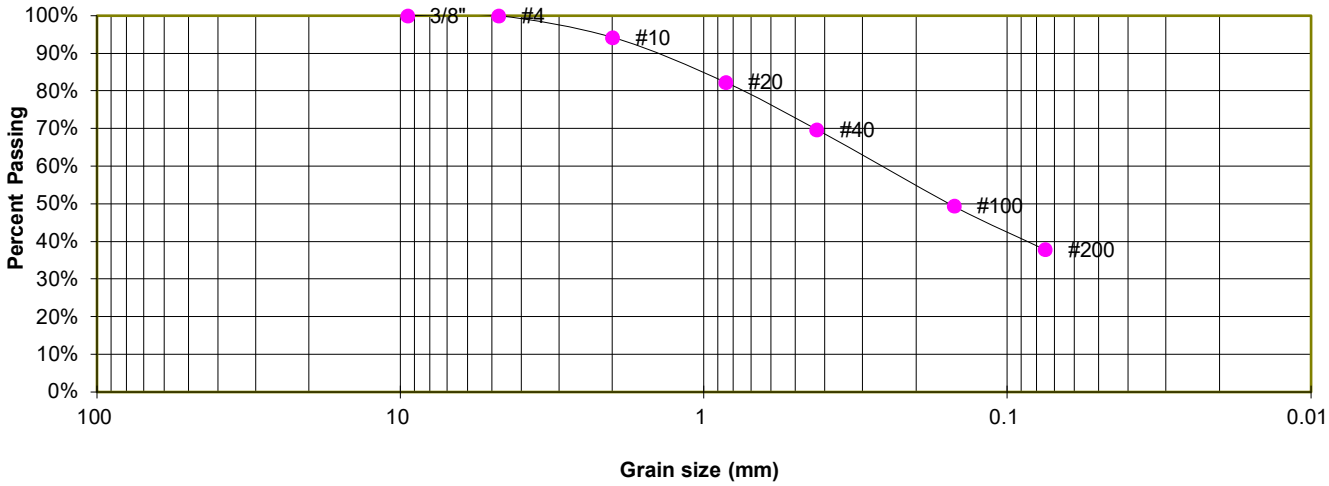
ENTECH ENGINEERING, INC.

TABLE B-1
SUMMARY OF LABORATORY TEST RESULTS

SOIL TYPE	TEST BORING NO.	DEPTH (FT)	WATER (%)	DRY DENSITY (PCF)	PASSING NO. 200 SIEVE (%)	LIQUID LIMIT	PLASTIC LIMIT	PLASTIC INDEX	SULFATE (WT %)	SWELL/ CONSOL (%)	USCS	SOIL DESCRIPTION
1	1	10	12.4	114.3	37.9	41	23	18	<0.01	-0.1	SC	FILL, SAND, CLAYEY
2	2	5			14.3	NV	NP	NP	0.03		SM	SAND, SILTY
2	3	15			9.5						SW-SM	SAND, WITH SILT
2	4	2-3			10.8						sw-sm	SAND, WITH SILT

Project: 721 Western Drive
Client: J. Elliott Construction
Job No: 230963

TEST BORING	1	SOIL DESCRIPTION	FILL, SAND, CLAYEY
DEPTH (FT)	10	SOIL TYPE	1



GRAIN SIZE ANALYSIS

U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	100.0%
4	100.0%
10	94.3%
20	82.4%
40	69.8%
100	49.4%
200	37.9%

ATTERBERG LIMITS

Plastic Limit	23
Liquid Limit	41
Plastic Index	18

SOIL CLASSIFICATION

USCS CLASSIFICATION: SC

ENTECH ENGINEERING, INC.

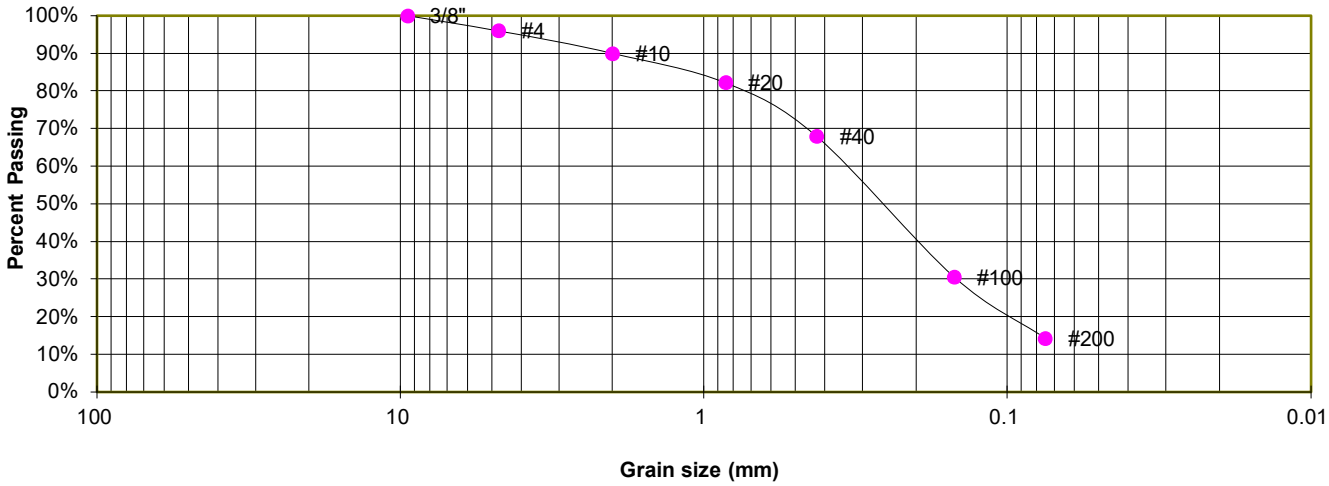
LABORATORY TEST RESULTS

721 WESTERN DRIVE
J. ELLIOTT CONSTRUCTION

JOB NO. 230963

FIG. B-1

TEST BORING	2	SOIL DESCRIPTION	SAND, SILTY
DEPTH (FT)	5	SOIL TYPE	2



GRAIN SIZE ANALYSIS

U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	100.0%
4	96.0%
10	90.0%
20	82.2%
40	68.0%
100	30.6%
200	14.3%

ATTERBERG LIMITS

Plastic Limit	NP
Liquid Limit	NV
Plastic Index	NP

SOIL CLASSIFICATION

USCS CLASSIFICATION: SM

ENTECH ENGINEERING, INC.

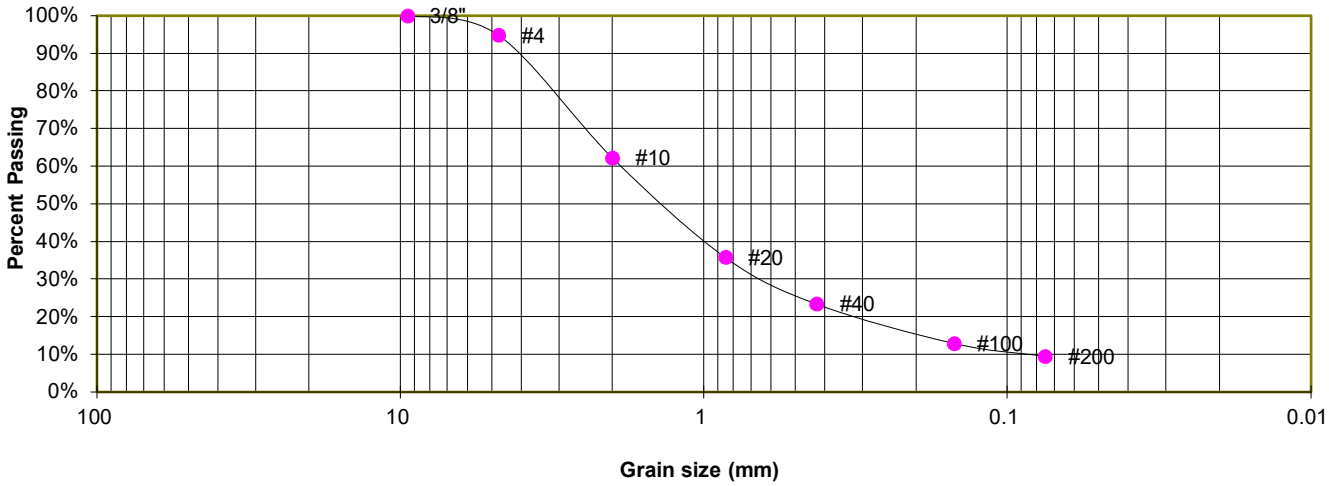
LABORATORY TEST RESULTS

721 WESTERN DRIVE
J. ELLIOTT CONSTRUCTION

JOB NO. 230963

FIG. B-2

TEST BORING	3	SOIL DESCRIPTION	SAND, WITH SILT
DEPTH (FT)	15	SOIL TYPE	2



GRAIN SIZE ANALYSIS

U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	100.0%
4	94.9%
10	62.2%
20	35.8%
40	23.4%
100	12.9%
200	9.5%

SOIL CLASSIFICATION

USCS CLASSIFICATION: SW-SM

ENTECH ENGINEERING, INC.

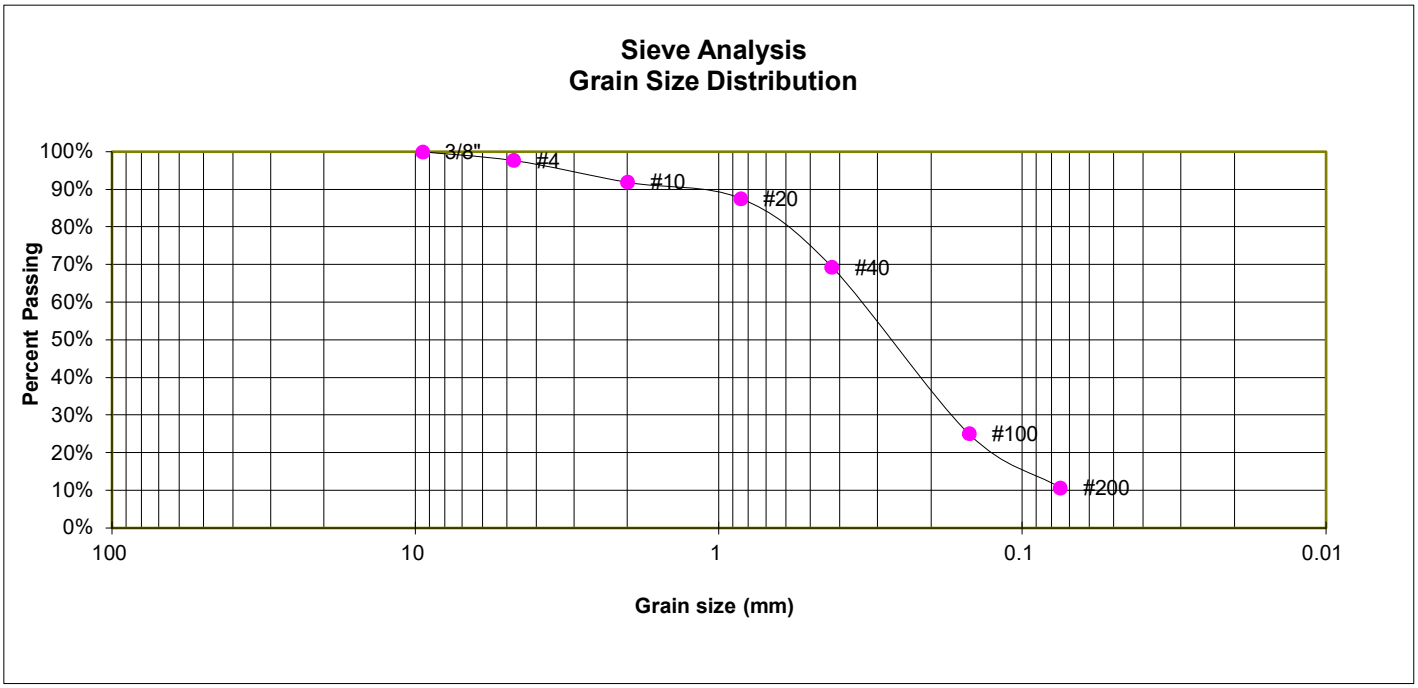
LABORATORY TEST RESULTS

721 WESTERN DRIVE
J. ELLIOTT CONSTRUCTION

JOB NO. 230963

FIG. B-3

TEST BORING	4	SOIL DESCRIPTION	SAND, WITH SILT
DEPTH (FT)	2-3	SOIL TYPE	2



GRAIN SIZE ANALYSIS

U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	100.0%
4	97.7%
10	92.0%
20	87.6%
40	69.4%
100	25.1%
200	10.8%

SOIL CLASSIFICATION

USCS CLASSIFICATION: sw-sm

ENTECH ENGINEERING, INC.

LABORATORY TEST RESULTS

721 WESTERN DRIVE
J. ELLIOTT CONSTRUCTION

JOB NO. 230963

FIG. B-4

TEST BORING	1	SOIL DESCRIPTION	FILL, SAND, CLAYEY
DEPTH (FT)	10	SOIL TYPE	1

SWELL/COLLAPSE TEST RESULTS

NATURAL UNIT DRY WEIGHT (PCF): 114
NATURAL MOISTURE CONTENT: 12.4%
SWELL/COLLAPSE (%): -0.1%

ENTECH ENGINEERING, INC.

SWELL TEST RESULTS

721 WESTERN DRIVE
J. ELLIOTT CONSTRUCTION

JOB NO. 230963

FIG. B-5

APPENDIX D: EEI, Preliminary Subsurface Soil Investigation, Entech Job No. 230963

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

July 18, 2023

J. Elliot Construction Company
12218 Crystal Downs Road
El Paso County, CO 80831

Attn: Jordon Guinane

Re: Preliminary Subsurface Soils Investigation
721 Western Drive
Lot 1, Cimarron Southeast, Filing No. 2C
Colorado Springs, Colorado
Entech Job No. 230963

Dear Mr. Guinane:

As requested, personnel of Entech Engineering, Inc. (Entech) performed a Preliminary Subsurface Soil Investigation at the above referenced site. The purpose of this preliminary study was to evaluate the site for future residential development. This letter presents the results of our soils investigation, laboratory tests, and preliminary recommendations for construction.

Further subsurface investigation will be necessary to provide final recommendations for the project.

SITE AND PROJECT DESCRIPTION

The project is to consist of a vacant parcel divided into residential lots on 7.12 acres. The site is located north of E. Platte Avenue, east of Hathaway Drive, and southeast of Western Drive, in southeast Colorado Springs, Colorado. The site is indicated on the Vicinity Map, Figure 1. The site is bordered by the Sand Creek Golf Course to the southeast, apartments to the west, and industrial and residential neighborhoods to the north. The general slope of the parcel is southeast from Western Drive towards Sand Creek. Vegetation consists of field grasses and weeds with some scattered trees.

FIELD INVESTIGATION AND LABORATORY TESTING:

The subsurface conditions on this site were investigated by drilling three exploratory test borings, designated TB-1 through TB-3, spaced across the site. The borings were drilled to depths of 20 to 35 feet on June 21 and 23, 2023 The approximate locations of the test borings are indicated on the Test Boring Location Map, Figure 2. Results of the Standard Penetration Tests are shown on the Test Boring Logs. The Test Boring Logs are presented in Appendix A. Moisture Content, ASTM D-2216, was obtained in the laboratory for the recovered samples. Grain-Size Analysis, ASTM D-422, and determination of Atterberg Limits, ASTM D-4318, were performed on samples for the purposes of classification. Laboratory test results are presented in Appendix B and summarized in Table B-1.

SOIL AND GROUNDWATER CONDITIONS:

Two primary soil types were observed during drilling which consisted of Type 1: silty sand fill (SM) and Type 2: native silty sand (SM). Each soil type was classified in accordance with the Unified Soil Classification System (USCS) using the laboratory testing results and the observations made during drilling.

Soil Type 1 classified as silty sand fill (SM). The loose to medium dense sand was encountered in TB-1 and TB-3 at the ground surface and extended to depths of 3 to 12 feet below ground surface (bgs), respectively. The sand fill is anticipated to exhibit a low expansion potential.

Soil Type 2 classified as native silty sand (SM). The loose to dense sand was encountered in all of the test borings at depths ranging from the ground surface to 3 to 12 feet bgs and extended to the depths explored (20 to 35 feet) bgs. The native sand is also anticipated to exhibit a low expansion potential.

Groundwater was encountered in the TB-3 at a depth of 30 feet subsequent to drilling.

PRELIMINARY DEVELOPMENT CONSIDERATIONS AND RECOMMENDATIONS:

Subsurface soil conditions encountered in the test borings consisted of loose silty sand fill over native silty sand. Bedrock was not encountered in the test borings.

Loose sands were encountered throughout the project site at varying depths. Loose soils will require mitigation where encountered. Fill was encountered in TB-1 and TB-3 to depths of 3 to 12 feet, respectively. The fill will require removal and recompaction or complete penetration. Additionally, deleterious materials were observed on the site including concrete rubble, garbage, and vegetative slash piles. While these materials were not encountered in our subsurface explorations, it is unclear if any deleterious debris is buried elsewhere on the site.

We anticipate that shallow foundations will be feasible for recompacted site soils, or imported structural fill. Shallow foundations should have a minimum 30-inches frost protection. Subsurface perimeter drains are typically required for useable space located below grade.

Very steep slopes are present along Western Drive. Steep slopes will require slope stability analyses during final design. It is anticipated that these slopes will be reduced during site grading.

Groundwater was encountered at a depth of 30 feet in TB-3, and will likely not affect the construction of shallow foundations proposed for this site. Development of this and adjacent properties as well as seasonal precipitation changes in runoff may affect groundwater elevations.

PRELIMINARY CONCRETE RECOMMENDATIONS:

Sulfate solubility testing was conducted on soil samples recovered from the test borings to evaluate the potential for sulfate attack on concrete placed at or below surface grade. Test results indicate less than 0.01 percent soluble sulfate (by weight), refer to Appendix B. These tests results indicate that the sulfate component of the site soils present negligible exposure threats to concrete degradation.

SITE GRADING:

Any areas to receive fill should have all topsoil, organic material or debris removed. Fill must be properly benched and compacted to minimize potentially unstable conditions in slope areas. Completed slopes should be 3H:1V (horizontal to vertical) or flatter if constructed without geosynthetic reinforcements. Flatter slopes may be necessary if ground water is present. Grading that approaches the water table will encounter unstable conditions. The surface to receive fill should be scarified a minimum 8 inches, and moisture conditioned to within ±2% of optimum moisture content and compacted to a minimum of 95% of its maximum Modified Proctor Dry Density, ASTM D-1557, prior to placing new fill.

New fill should be placed in thin lifts not to exceed 6 inches after compaction while maintaining at least 95% of its maximum Modified Proctor Dry Density, ASTM D-1557. These materials should be placed at a moisture content conducive to compaction, usually ±2% of Proctor optimum moisture content. The placement and compaction of fill should be observed and tested by Entech during construction. Entech should approve any import materials prior to hauling them to the site.

ADDITIONAL SUBSURFACE SOIL INVESTIGATIONS:

Additional subsurface soil investigation is required when development plans are finalized, grading and building elevations are determined, and overlot grading is completed in order to provide final recommendations.

CLOSURE:

The Preliminary Subsurface Investigation, geotechnical evaluation and recommendations presented in this report are intended for use by J. Elliott Construction company with application to the proposed residential sites. The borings were located to provide preliminary recommendations, variations in site subsurface conditions not indicated on the borings should be anticipated. Additional subsurface investigation and testing is recommended to further evaluate the site as plans are developed. Additional investigations will also be required as part of the development approval process.

In conducting the Preliminary Subsurface Investigation, laboratory testing, engineering evaluation and reporting, Entech Engineering, Inc. endeavored to work in accordance with generally accepted professional geotechnical and geologic practices and principles consistent with the level of care and skill ordinarily exercised by members of the geotechnical profession currently practicing in same locality and under similar conditions. No other warranty, expressed or implied is made.

If there are any questions regarding the information provided herein or if Entech can be of further assistance, please do not hesitate to contact us.

Respectfully Submitted,

ENTECH ENGINEERING, INC.

Stuart Wood
Geologist

Encl.
SW:JCG/

Reviewed by:

COLORADO LICENSED
JOSEPH C GOODE III
52381
PROFESSIONAL ENGINEER

Digitally signed by Joseph C Goode III
Date: 2023.07.18 16:51:49 -06'00'

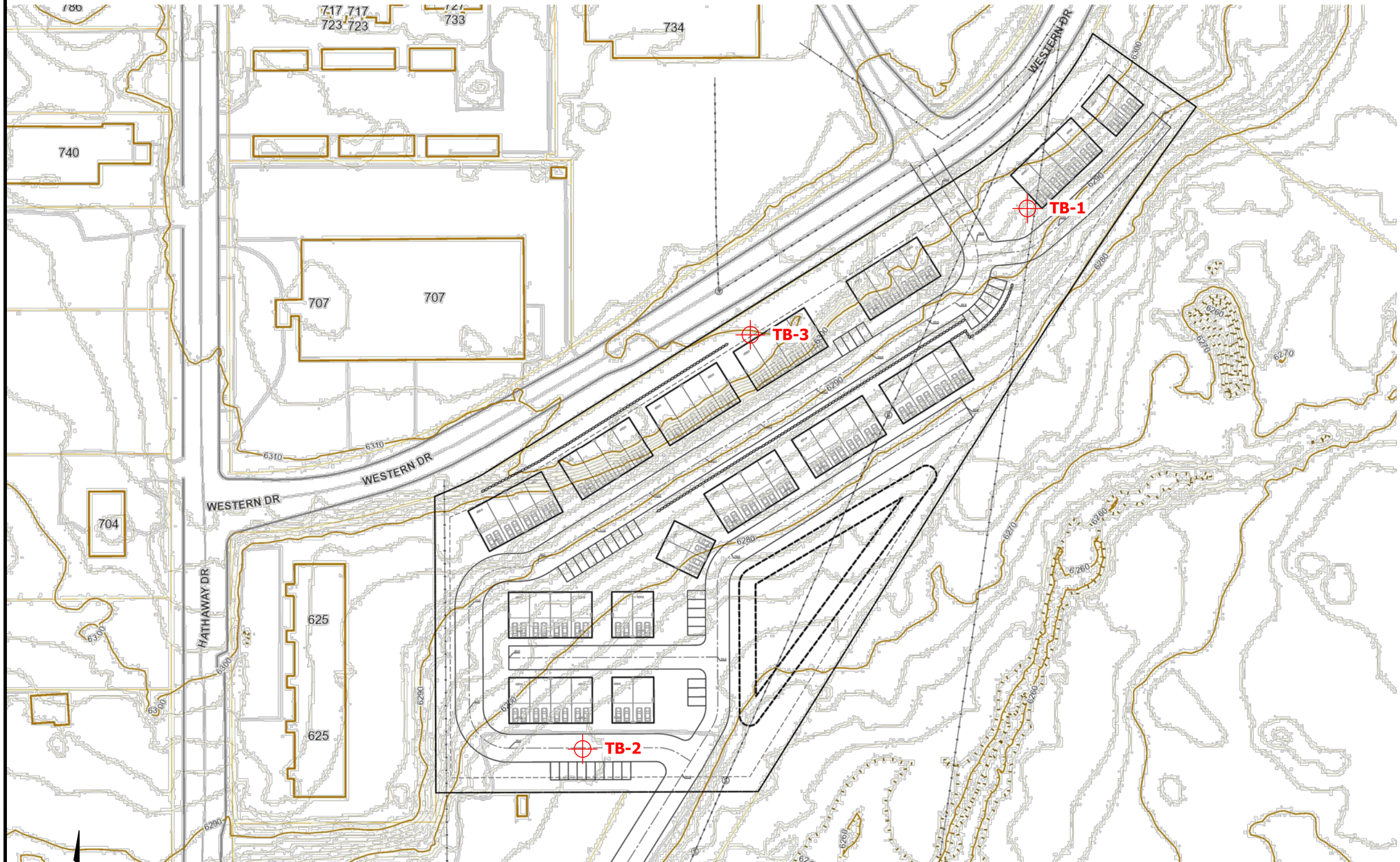
Joseph C. Goode III, P.E.
Project Engineer

ENTECH ENGINEERING, INC.

VICINITY MAP
721 WESTERN DRIVE
J. ELLIOTT CONSTRUCTION CO.

JOB NO.
230963

FIG. 1



N

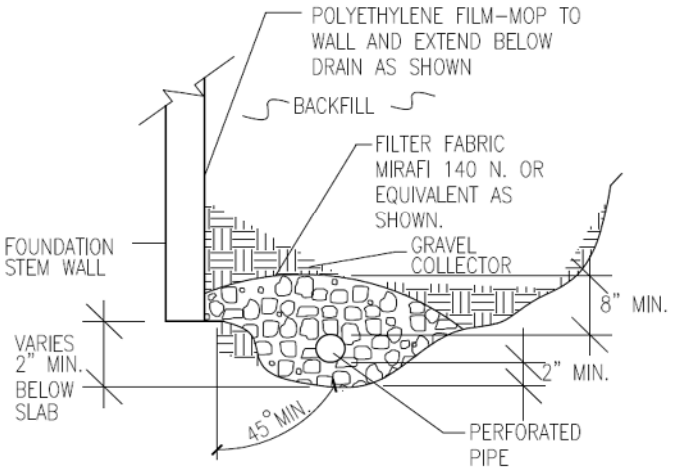
TB- APPROXIMATE TEST BORING LOCATION AND NUMBER

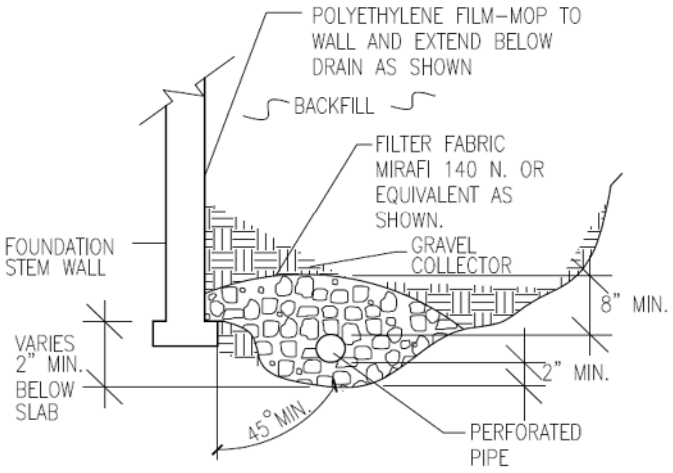
ENTECH ENGINEERING, INC.

TEST BORING LOCATION MAP
721 WESTERN DRIVE
J. ELLIOTT CONSTRUCTION CO.

JOB NO.
230963

FIG. 2





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.

ENTECH ENGINEERING, INC.

PERIMETER DRAIN DETAIL

721 WESTERN DRIVE
J. ELLIOTT CONST.

JOB NO. 230963

FIG. 3

APPENDIX A: Test Boring Logs

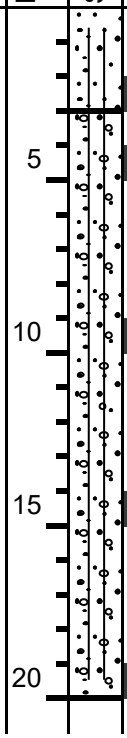
TEST BORING 1
DATE DRILLED 6/21/2023

REMARKS

DRY TO 20', 6/21/23

FILL 0-3', SAND, SILTY, BROWN, MEDIUM DENSE, MOIST

SAND, SILTY, SLIGHTLY GRAVELLY, BROWN to TAN, MEDIUM DENSE to LOOSE, MOIST



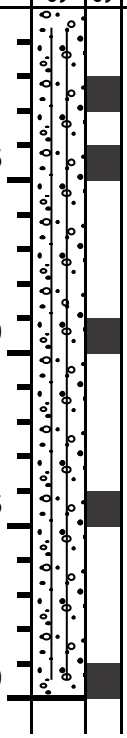
Depth (ft)	Blows per foot	Watercontent %	Soil Type
	14	8.8	1
5	10	6.4	1
10	8	7.9	1
15	7	9.6	1
20	14	4.4	1

TEST BORING 2
DATE DRILLED 6/21/2023

REMARKS

DRY TO 20', 6/21/23

SAND, SILTY, SLIGHTLY GRAVELLY, BROWN to TAN, VERY LOOSE to MEDIUM DENSE, MOIST



Depth (ft)	Blows per foot	Watercontent %	Soil Type
	3	7.1	1
5	8	7.4	1
10	7	7.8	1
15	11	3.8	1
20	26	8.7	1

ENTECH ENGINEERING, INC.

TEST BORING LOGS

721 WESTERN DRIVE
J. ELLIOTT CONST.

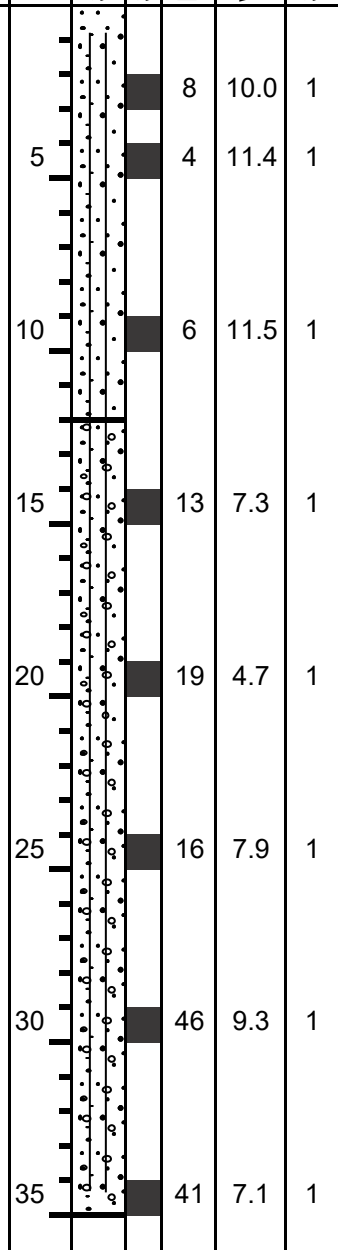
JOB NO. 230963

FIG. A-1

TEST BORING 3
DATE DRILLED 6/23/2023

REMARKS

WATER @ 30', 6/23/23



ENTECH ENGINEERING, INC.

TEST BORING LOGS

721 WESTERN DRIVE
J. ELLIOTT CONST.

JOB NO. 230963

FIG. A-2

APPENDIX B: Laboratory Test Results

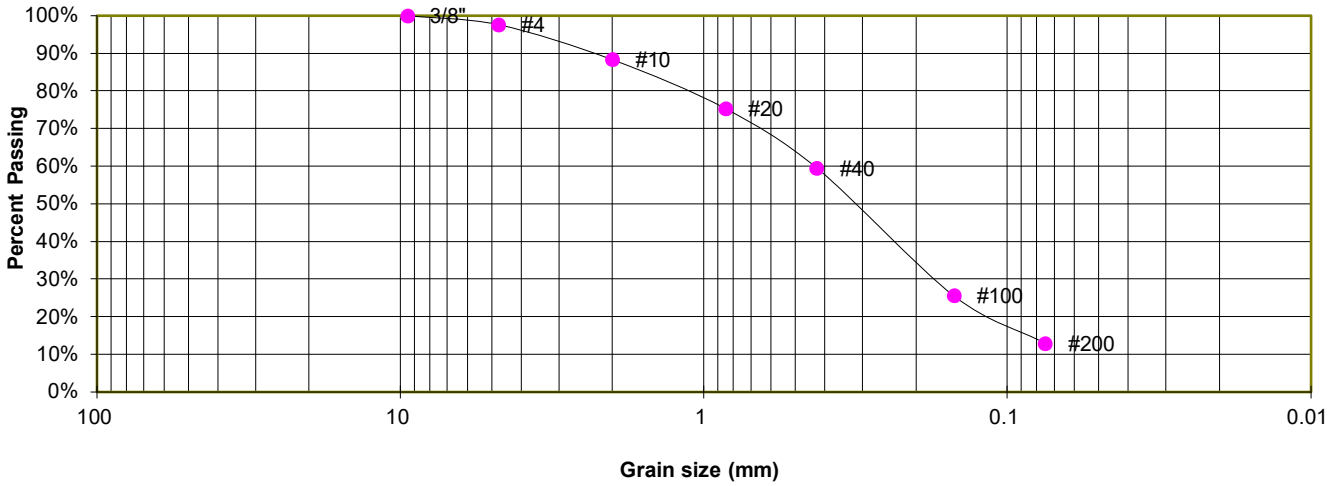
ENTECH ENGINEERING, INC.

TABLE B-1
SUMMARY OF LABORATORY TEST RESULTS

SOIL TYPE	TEST BORING NO.	DEPTH (FT)	WATER (%)	DRY DENSITY (PCF)	PASSING NO. 200 SIEVE (%)	LIQUID LIMIT	PLASTIC LIMIT	PLASTIC INDEX	SULFATE (WT %)	FHA SWELL (PSF)	SWELL/ CONSOL (%)	USCS	SOIL DESCRIPTION
1	1	5			12.9	NV	NP	NP	<0.01			SM	SAND, SILTY
1	2	10			12.6							SM	SAND, SILTY
1	3	20			15.6							SM	SAND, SILTY

Project: 721 Western Drive
Client: J. Elliott COnstruction
Job No: 230963

TEST BORING	1	SOIL DESCRIPTION	SAND, SILTY
DEPTH (FT)	5	SOIL TYPE	1



GRAIN SIZE ANALYSIS

U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	100.0%
4	97.6%
10	88.4%
20	75.3%
40	59.5%
100	25.6%
200	12.9%

ATTERBERG LIMITS

Plastic Limit	NP
Liquid Limit	NV
Plastic Index	NP

SOIL CLASSIFICATION

USCS CLASSIFICATION: SM

ENTECH ENGINEERING, INC.

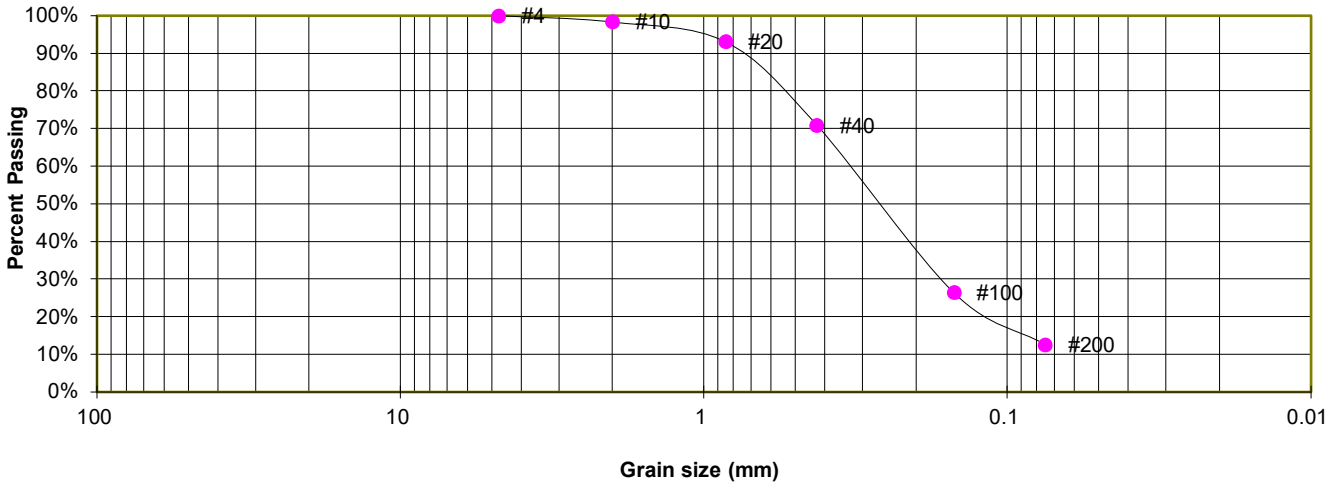
LABORATORY TEST RESULTS

721 WESTERN DRIVE
J. ELLIOTT CONST.

JOB NO. 230963

FIG. B-1

TEST BORING	2	SOIL DESCRIPTION	SAND, SILTY
DEPTH (FT)	10	SOIL TYPE	1



GRAIN SIZE ANALYSIS

U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	
4	100.0%
10	98.4%
20	93.2%
40	70.9%
100	26.5%
200	12.6%

SOIL CLASSIFICATION

USCS CLASSIFICATION: SM

ENTECH ENGINEERING, INC.

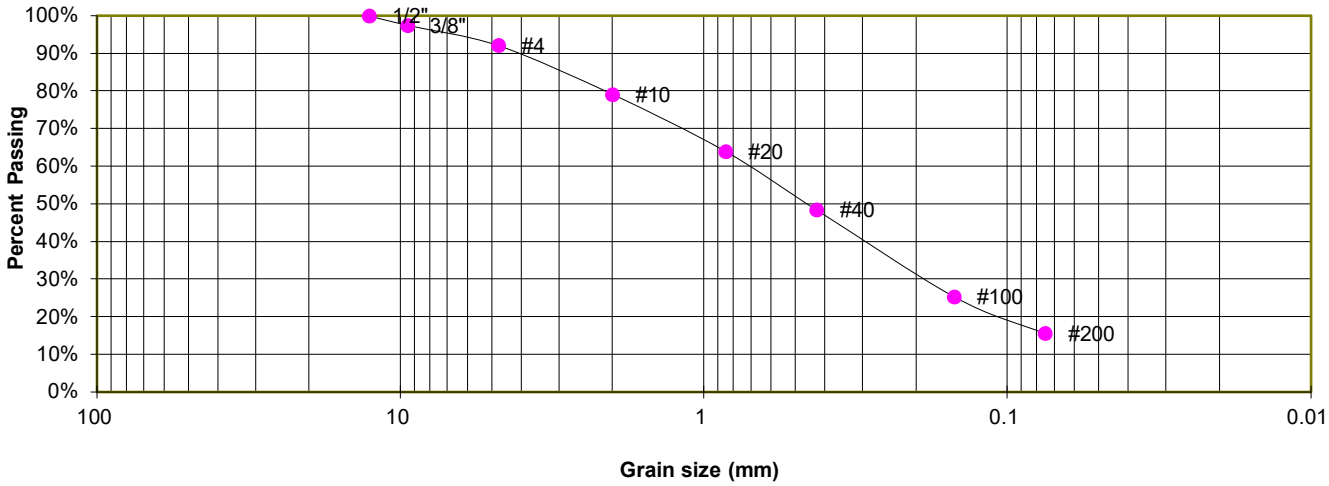
LABORATORY TEST RESULTS

721 WESTERN DRIVE
J. ELLIOTT CONST.

JOB NO. 230963

FIG. B-2

TEST BORING	3	SOIL DESCRIPTION	SAND, SILTY
DEPTH (FT)	20	SOIL TYPE	1



GRAIN SIZE ANALYSIS

U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	100.0%
3/8"	97.5%
4	92.1%
10	79.1%
20	63.9%
40	48.4%
100	25.3%
200	15.6%

SOIL CLASSIFICATION

USCS CLASSIFICATION: SM

ENTECH ENGINEERING, INC.

LABORATORY TEST RESULTS

721 WESTERN DRIVE
J. ELLIOTT CONST.

JOB NO. 230963

FIG. B-3

APPENDIX E: USDA Soil Survey Descriptions

El Paso County Area, Colorado

8—Blakeland loamy sand, 1 to 9 percent slopes

Map Unit Setting

National map unit symbol: 369v
Elevation: 4,600 to 5,800 feet
Mean annual precipitation: 14 to 16 inches
Mean annual air temperature: 46 to 48 degrees F
Frost-free period: 125 to 145 days
Farmland classification: Not prime farmland

Map Unit Composition

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

Description of Blakeland

Setting

Landform: Hills, flats
Landform position (three-dimensional): Side slope, talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium derived from sedimentary rock and/or eolian deposits derived from sedimentary rock

Typical profile

A - 0 to 11 inches: loamy sand
AC - 11 to 27 inches: loamy sand
C - 27 to 60 inches: sand

Properties and qualities

Slope: 1 to 9 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat excessively drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): High to very high (5.95 to 19.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 5 percent
Available water supply, 0 to 60 inches: Low (about 4.5 inches)

Interpretive groups

Land capability classification (irrigated): 3e
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: A
Ecological site: R049XB210CO - Sandy Foothill
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

28—Ellicott loamy coarse sand, 0 to 5 percent slopes

Map Unit Setting

National map unit symbol: 3680
Elevation: 5,500 to 6,500 feet
Mean annual precipitation: 13 to 15 inches
Mean annual air temperature: 47 to 50 degrees F
Frost-free period: 125 to 145 days
Farmland classification: Not prime farmland

Map Unit Composition

Ellicott and similar soils: 97 percent
Minor components: 3 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Ellicott

Setting

Landform: Flood plains, stream terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Sandy alluvium

Typical profile

A - 0 to 4 inches: loamy coarse sand
C - 4 to 60 inches: stratified coarse sand to sandy loam

Properties and qualities

Slope: 0 to 5 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat excessively drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): High to very high (5.95 to 19.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: Frequent
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 4.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7w
Hydrologic Soil Group: A
Ecological site: R069XY031CO - Sandy Bottomland
Other vegetative classification: SANDY BOTTOMLAND (069AY031CO)
Hydric soil rating: No

Minor Components

Fluvaquentic haplaquoll
Percent of map unit: 1 percent
Landform: Swales
Hydric soil rating: Yes

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

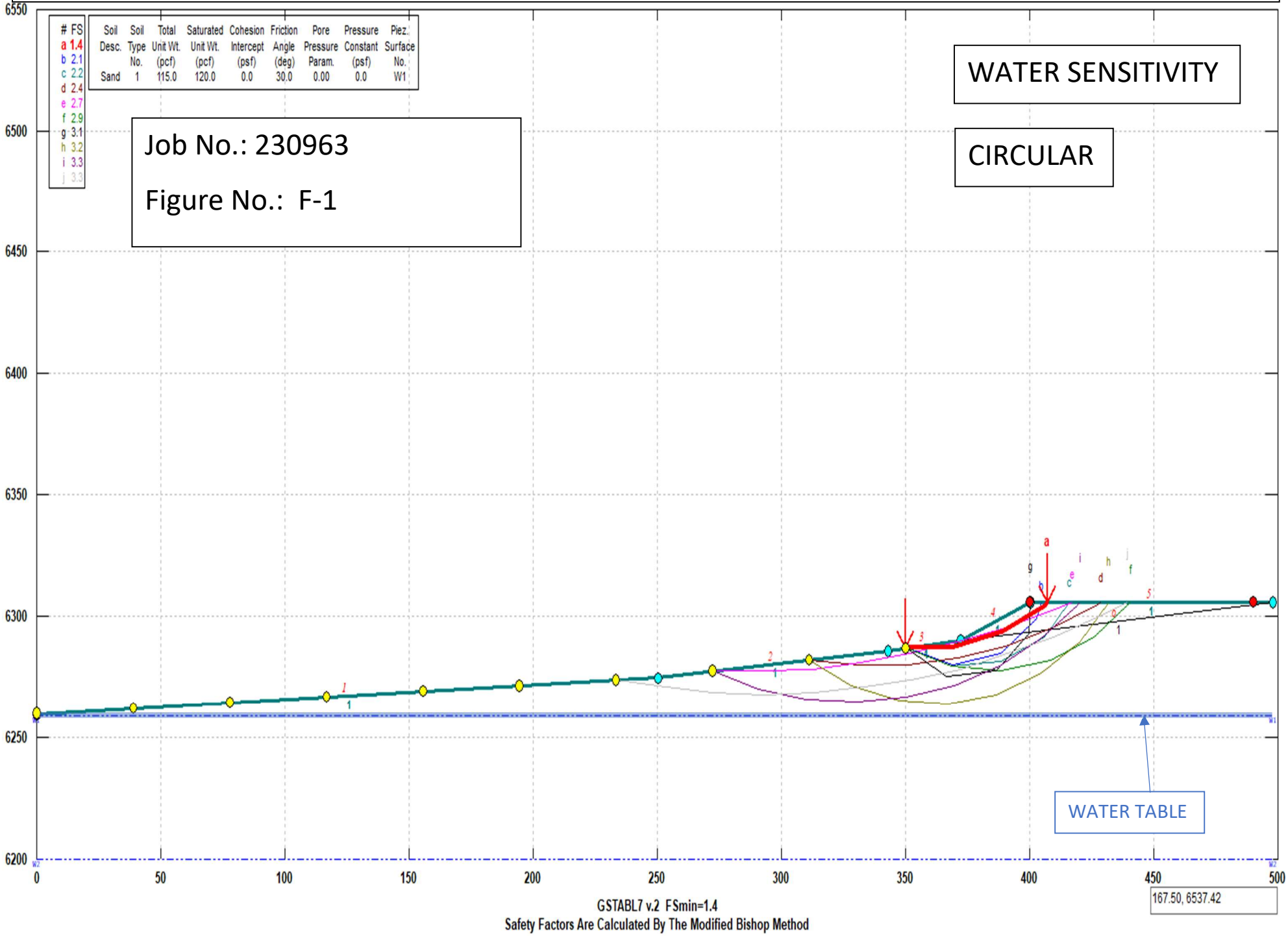
Pleasant
Percent of map unit: 1 percent
Landform: Depressions
Hydric soil rating: Yes

Data Source Information

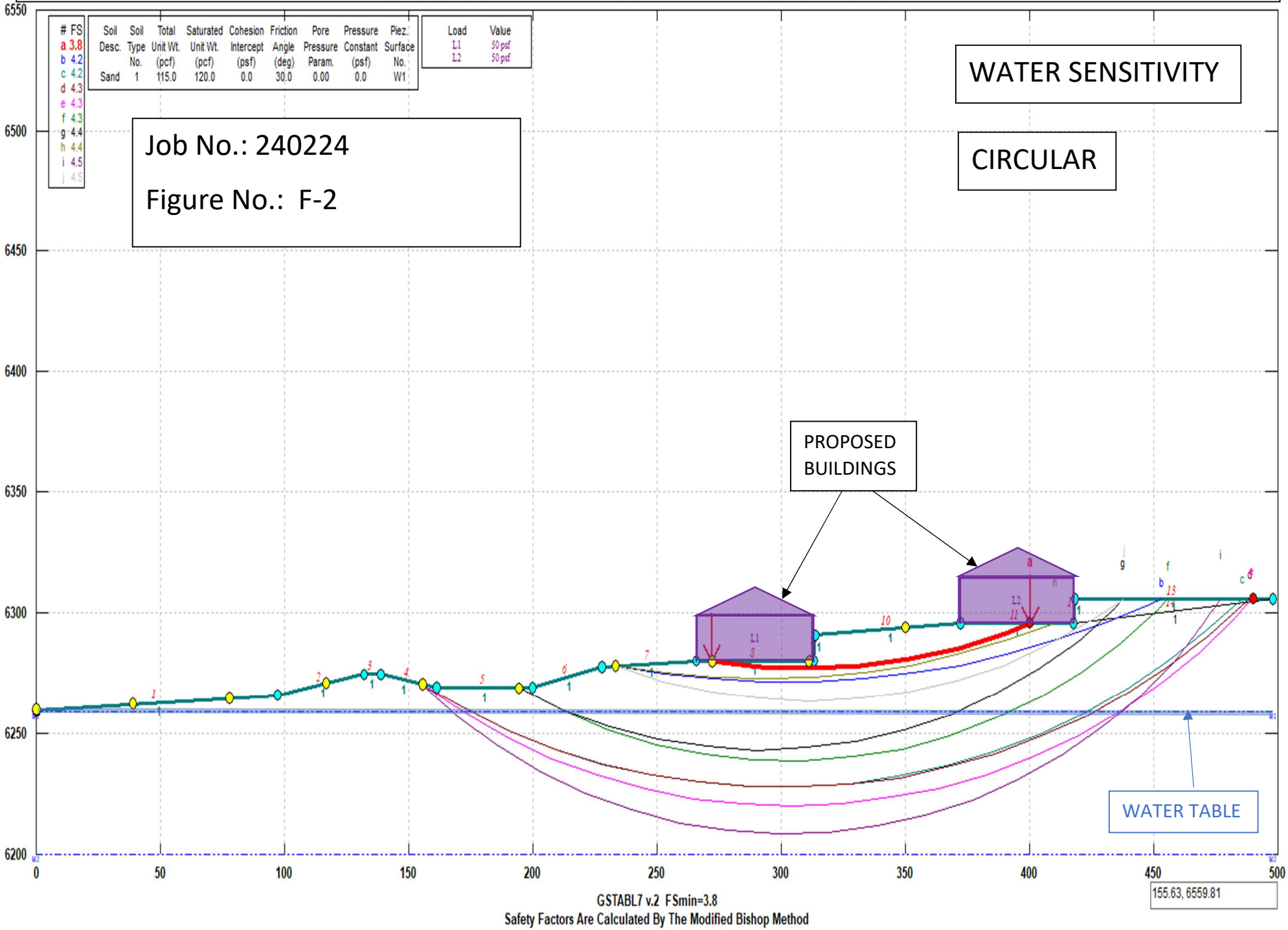
Soil Survey Area: El Paso County Area, Colorado
Survey Area Data: Version 21, Aug 24, 2023

APPENDIX F: Slope Stability Analysis

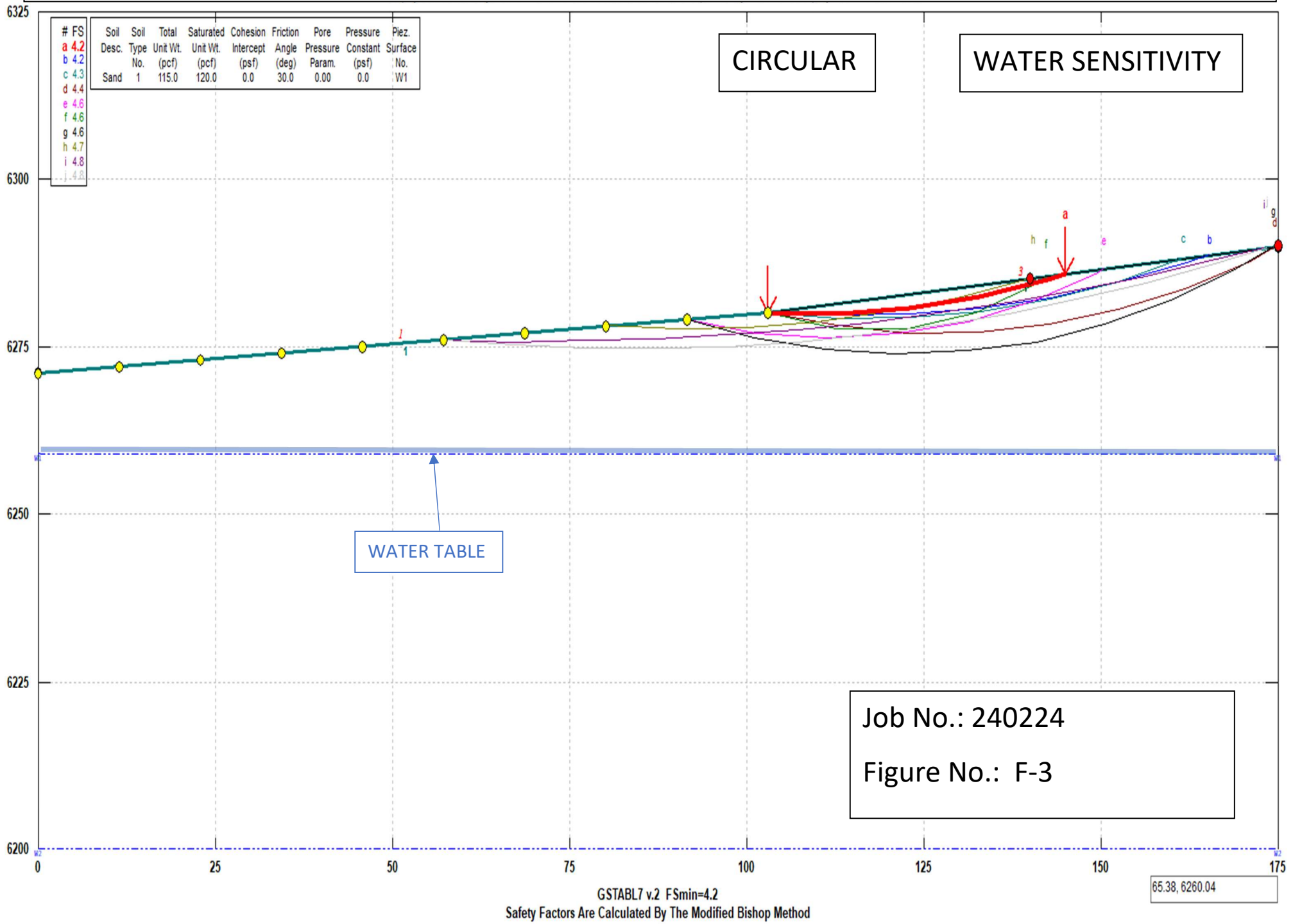
J. ELLIOTT CONSTRUCTION– 721 WESTERN DRIVE – AA - EXISTING



J. ELLIOTT CONSTRUCTION– 721 WESTERN DRIVE – AA - PROPOSED



J. ELLIOTT CONSTRUCTION– 721 WESTERN DRIVE – BB - EXISTING



Job No.: 240224

Figure No.: F-3

J. ELLIOTT CONSTRUCTION– 721 WESTERN DRIVE – BB - PROPOSED