

Southmoor Project - Land Analysis Narrative

Per City of Fountain requirements this application is to provide the following:

Mapped and written information identifying the extent of and impact upon the property's natural features and environmental constraints that addresses proposed mitigating measures including:

1. *Geologic and hazards evaluation*
2. *Soils report*
3. *Wildlife report*
4. *Wetlands report*
5. *Wildfire hazard*
6. *Other applicable features (topography, flood hazard/floodplain)*

GEOLOGIC AND HAZARDS EVALUATION

The site is suitable for a Geologic Hazard Waiver as it does not exhibit any of the following characteristics:

- Slopes (existing or proposed) exceeding 33% or which are unstable or potentially unstable
- History of underground mining or subsidence activity
- History of landfill, uncontrolled or undocumented fill activity

The conditions of the site were investigated by Entech for the *Preliminary Subsurface Soil Investigation* and the *Infiltration Rates (Percolation Testing Method)* reports completed in June of 2022. The site does lie within a 500-year floodplain zone according to FEMA Map No. 08041C0951G. Groundwater was encountered in one test boring TB-2 at a depth of 15.5 feet.

There are no identified geologic hazards on the site. Any grading modifications should direct surface flows around the structures.

For details please see the Geologic Hazard Waiver Request memo by Entech dated February 15, 2024.

SOILS

For details please see the preliminary report completed by Entech dated June 29, 2022. In summary the following items are noteworthy:

- Three soil and rock types were encountered, soils consisted of Type 1: very clayey sand, clean sand, and silty to slightly silty sand (SC, SW, SM, SM-SW), and Type 2: sandy silt and sandy clay (ML, CL).
- Depth to groundwater was measured in each of the borings at the conclusion and subsequent to drilling. Groundwater was encountered in Test Boring No. 2 at 15.5 feet, groundwater was not encountered in the remaining test borings which were drilled to depths of 20 feet.
- It is anticipated groundwater should not affect construction on the site, however, further testing may be needed.
- Expansive soils were encountered in the borings, however, are sporadic.

A USGS Soils Map is included in Appendix C. The Entech Subsurface Soils Investigation Report is included with the submittal of the ODP Application.

WILDLIFE

No significant wildlife has been seen on the property, a detailed wildlife report has not been completed at this time. It has been determined that one is not required as the State DNR GIS website shows no

evidence of potential wildlife habitats. Please refer to Appendix D for Colorado Department of Natural Resources Environmental GIS maps.

WETLANDS

There are no wetlands on the site. Please refer to Appendix D for Colorado Department of Natural Resources Environmental GIS maps.

WILDFIRE

There are no significant wildlife concerns on this site. Please refer to Appendix C for Colorado Department of Natural Resources and El Paso County GIS maps.

TOPOGRAPHY

The topography of the site varies but is generally flat gradually sloping to the southeast at an average grade of 2% with maximum slopes of 5% at the property boundary to the southeast.

HYDROLIC FEATURES/FLOOD HAZARD/FLOODPLAIN

There is not flood hazard or floodplain on the property. Please refer to Appendix B for the FEMA Floodplain Map of this area.

EXISTING VEGETATION

Vegetation consists of field grasses and weeds, with scattered trees in portions of the site. There does not appear to be any quality existing trees on the site.

APPENDIX ITEMS

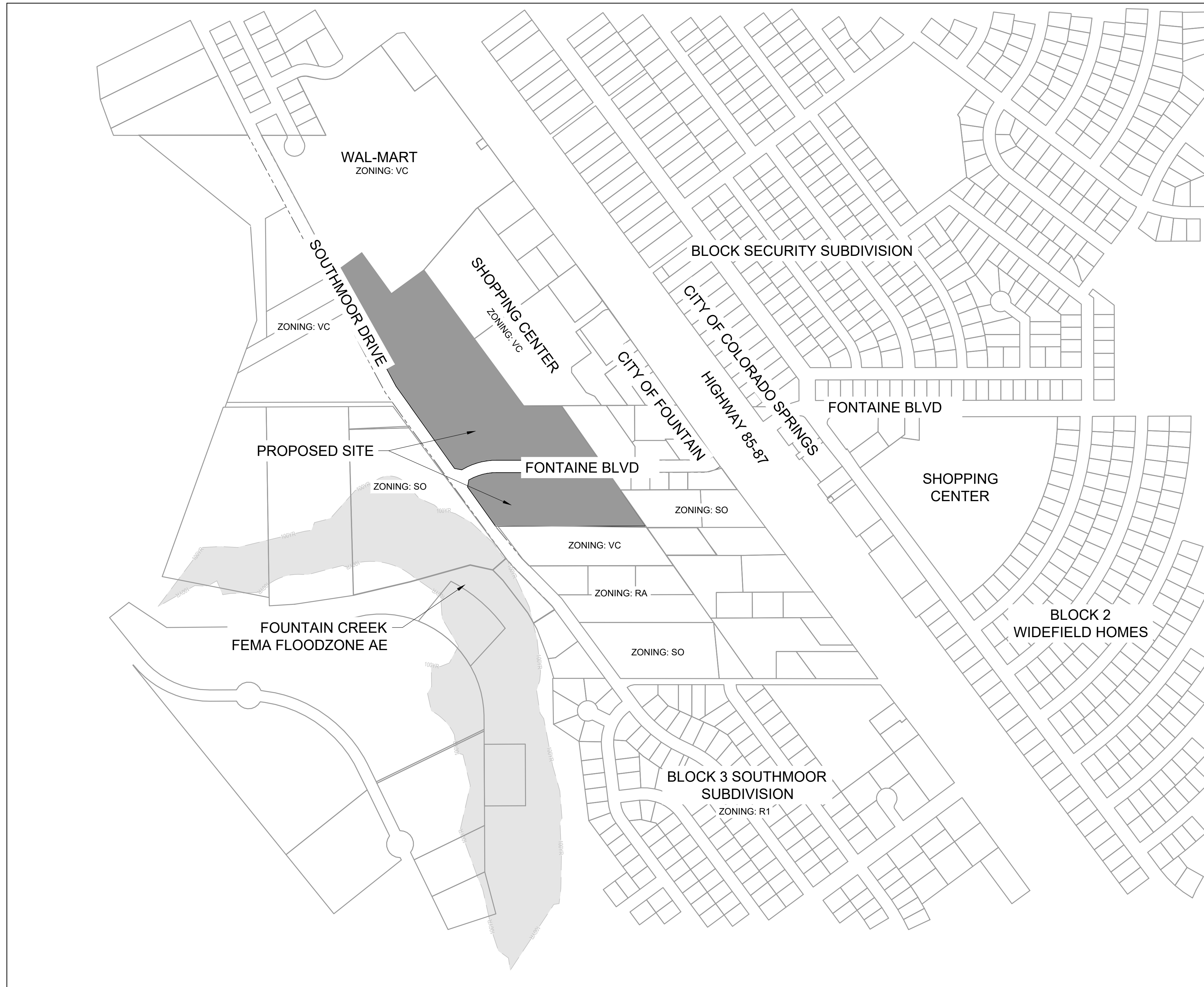
- Appendix A – Vicinity Map
- Appendix B – FEMA Floodplain Map
- Appendix C – USGS Soils Map
- Appendix D – Colorado Department of Natural Resources and El Paso County Maps
- Appendix E – Geologic Hazard Waiver Memo by Entech
- Appendix F – Subsurface Soils Investigation Report by Entech
- Appendix G – Land Analysis Map

APPENDIX A - VICINITY MAP

SOUTHMOOR RIDGE

VICINITY MAP

A TRACT OF LAND LOCATED IN A PORTION OF THE NORTH HALF OF THE NORTHWEST QUARTER OF SECTION 24, AND IN A PORTION OF THE SOUTH HALF OF THE SOUTHWEST QUARTER OF SECTION 13, ALL IN TOWNSHIP 15 SOUTH, RANGE 66 WEST OF THE 6TH P.M., COUNTY OF EL PASO, STATE OF COLORADO



VICINITY MAP
SCALE: 1"=1,000'

LYON, RICHELIE, 2/12/2024, 2:12 PM

HR GREEN - Xref: xc-dgn; xgt-1-d01_24x36; xc-uti; xv-row-3146; xc-row; xv-dgn-3146; rwy_tpcals; xv-uti-3146; Legend_ODP; Vicinity_Map

DRAWN BY: DLH JOB DATE: 2/12/2024
 APPROVED: RDL JOB NUMBER: 2303146
 CAD DATE: 1/5/2024
 CAD FILE: J:\2023\2303146\CAD\Drawings\Civility_Map\Vicinity-Map_2303146

BAR IS ONE INCH ON OFFICIAL DRAWINGS.
 0 1" IF NOT ONE INCH, ADJUST SCALE ACCORDINGLY.

NO.	DATE	BY	REVISION DESCRIPTION



HR GREEN - COLORADO SPRINGS
 7222 COMMERCE CENTER DR. SUITE 220
 COLORADO SPRINGS CO 80919
 PHONE: 719.622.6222
 FAX: 844.273.1057

SOUTHMOOR RIDGE
 DHN DEVELOPMENT INC.
 FOUNTAIN, COLORADO



CONCEPT PLAN & OVERALL DEVELOPMENT PLAN
 VICINITY MAP

APPENDIX B - FEMA FLOODPLAIN MAP

NOTES TO USERS

This map is for use in administering the National Flood Insurance Program. It does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size. The community map repository should be consulted for possible updated or additional flood hazard information.

To obtain more detailed information in areas where Base Flood Elevations (BFEs) and/or floodways have been determined, users are encouraged to consult the Flood Profiles and Floodway Data and/or Summary of Stillwater Elevations tables contained within the Flood Insurance Study (FIS) report that accompanies this FIRM. Users should be aware that BFEs shown on the FIRM represent rounded whole-foot elevations. These BFEs are intended for flood insurance rating purposes only and should not be used as the sole source of flood elevation information. Accordingly, flood elevation data presented in the FIS report should be utilized in conjunction with the FIRM for purposes of construction and/or floodplain management.

Coastal Base Flood Elevations shown on this map apply only landward of 0.0' North American Vertical Datum of 1988 (NAVD88). Users of this FIRM should be aware that coastal flood elevations are also provided in the Summary of Stillwater Elevations table in the Flood Insurance Study report for this jurisdiction. Elevations shown in the Summary of Stillwater Elevations table should be used for construction and/or floodplain management purposes when they are higher than the elevations shown on this FIRM.

Boundaries of the floodways were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the National Flood Insurance Program. Floodway widths and other pertinent floodway data are provided in the Flood Insurance Study report for this jurisdiction.

Certain areas not in Special Flood Hazard Areas may be protected by flood control structures. Refer to section 2.4 "Flood Protection Measures" of the Flood Insurance Study report for information on flood control structures for this jurisdiction.

The projection used in the preparation of this map was Universal Transverse Mercator (UTM) zone 13. The horizontal datum was NAD83, GRS80 spheroid. Differences in datum, spheroid, projection or UTM zones zones used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of this FIRM.

Flood elevations on this map are referenced to the North American Vertical Datum of 1988 (NAVD88). These flood elevations must be compared to structure and ground elevations referenced to the same vertical datum. For information regarding conversion between the National Geodetic Vertical Datum of 1929 and the North American Vertical Datum of 1988, visit the National Geodetic Survey website at <http://www.ngs.noaa.gov> or contact the National Geodetic Survey at the following address:

NGS Information Services
NOAA, NIMS12
National Geodetic Survey
SSMC-3, #9202
1315 East-West Highway
Silver Spring, MD 20910-3282

To obtain current elevation, description, and/or location information for bench marks shown on this map, please contact the Information Services Branch of the National Geodetic Survey at (301) 713-3242 or visit its website at <http://www.ngs.noaa.gov>.

Base Map information shown on this FIRM was provided in digital format by El Paso County, Colorado State Utilities, City of Fountain, Bureau of Land Management, National Oceanic and Atmospheric Administration, United States Geological Survey, and Anderson Consulting Engineers, Inc. These data are current as of 2006.

This map reflects more detailed and up-to-date stream channel configurations and floodplain delineations than those shown on the previous FIRM for this jurisdiction. The floodplains and floodways that were transferred from the previous FIRM may have been adjusted to conform to these new stream channel configurations. As a result, the Flood Profiles and Floodway Data tables in the Flood Insurance Study Report (which contains authoritative hydraulic data) may reflect stream channel distances that differ from what is shown on this map. The profile baselines depicted on this map represent the hydraulic modeling baselines that match the flood profiles and Floodway Data Tables if applicable, in the FIS report. As a result, the profile baselines may deviate significantly from the new base map channel representation and may appear outside of the floodplain.

Corporate limits shown on this map are based on the best data available at the time of publication. Because changes due to annexations or de-annexations may have occurred after this map was published, map users should contact appropriate community officials to verify current corporate limit locations.

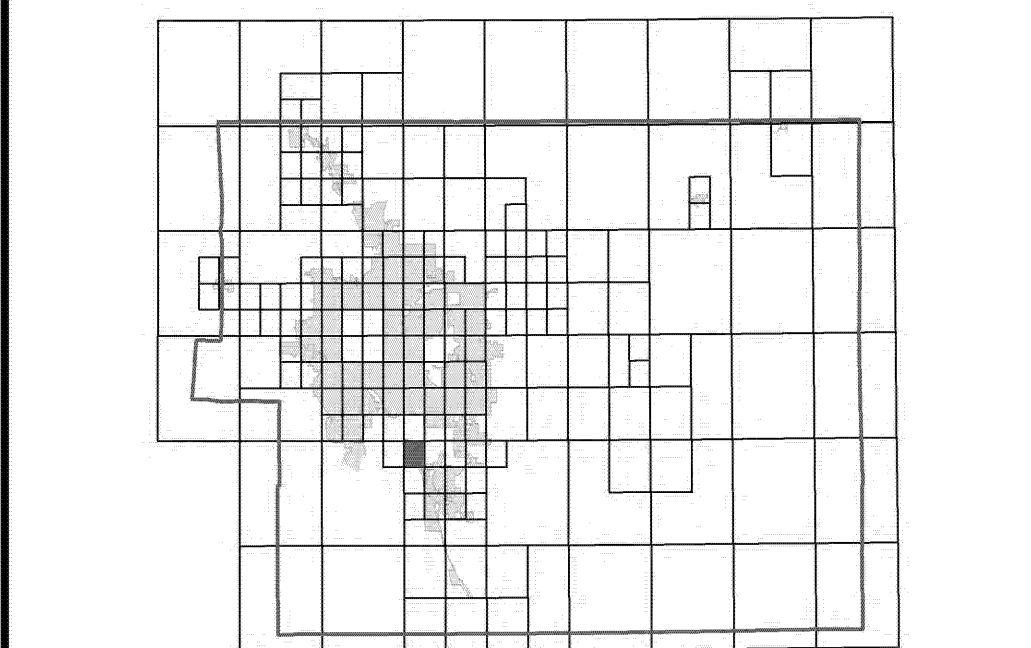
Please refer to the separately printed Map Index for an overview map of the county showing the layout of map panels; community map repository addresses; and a Listing of Communities table containing National Flood Insurance Program dates for each community as well as a listing of the panels on which each community is located.

Contact FEMA Map Service Center (MSC) via the FEMA Map Information eXchange (FIMX) 1-877-336-2627 for information on available products associated with this FIRM. Available products may include previously issued Letters of Map Change, a Flood Insurance Study Report, and/or digital versions of this map. The MSC may also be reached by Fax at 1-800-358-9620 and its website at <http://www.msc.fema.gov>.

If you have questions about this map or questions concerning the National Flood Insurance Program in general, please call 1-877-FEMA MAP (1-877-336-2627) or visit the FEMA website at <http://www.fema.gov/business/nfp>.

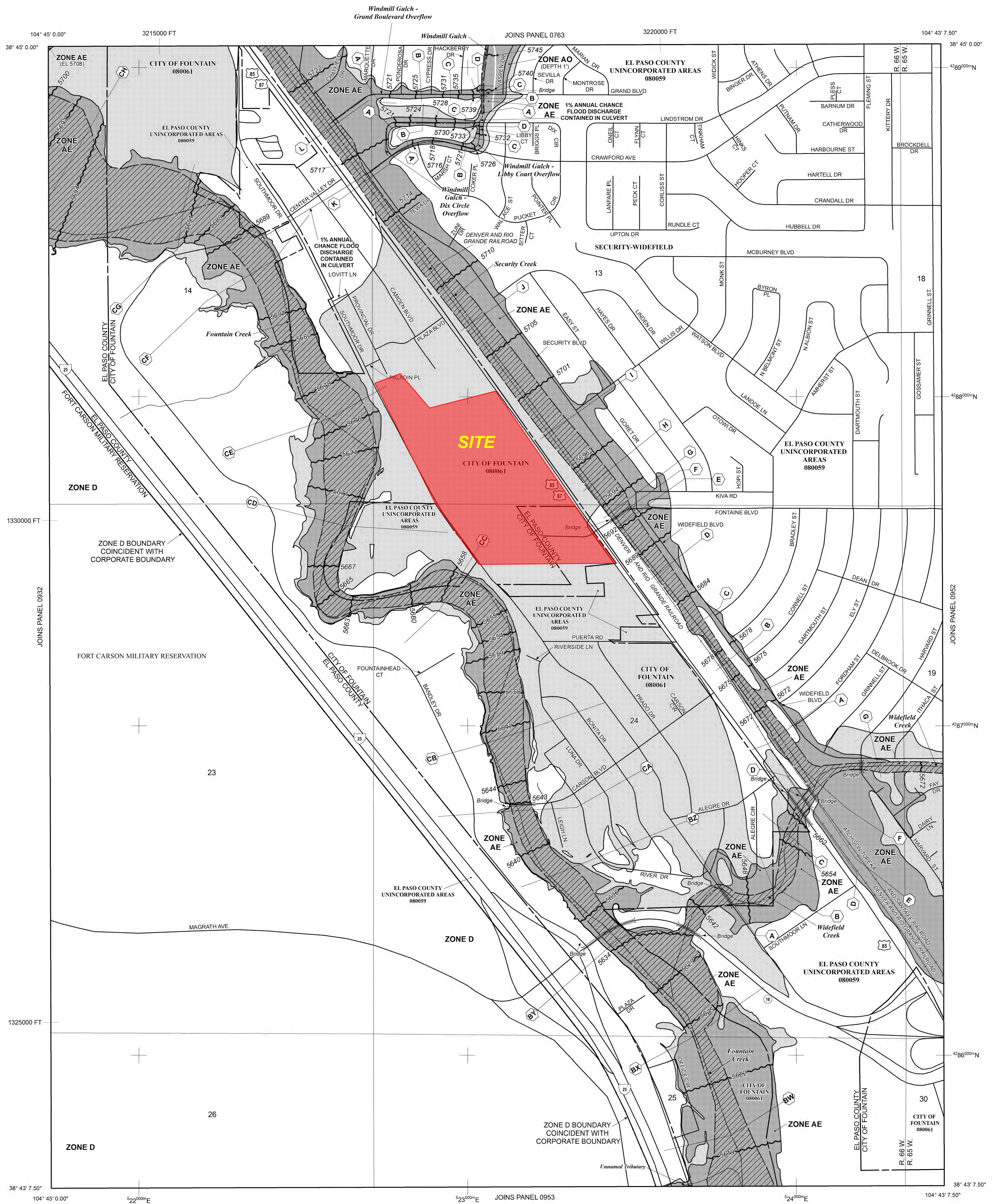
El Paso County Vertical Datum Offset Table	
Flooding Source	Vertical Datum Offset (ft)
REFER TO SECTION 3.3 OF THE EL PASO COUNTY FLOOD INSURANCE STUDY FOR STREAM BY STREAM VERTICAL DATUM CONVERSION INFORMATION	

Panel Location Map



This Digital Flood Insurance Rate Map (DFIRM) was produced through a Cooperating Technical Partner (CTP) agreement between the State of Colorado Water Conservation Board (CWCB) and the Federal Emergency Management Agency (FEMA).

Additional Flood Hazard information and resources are available from local communities and the Colorado Water Conservation Board.



NOTE: MAP AREA SHOWN ON THIS PANEL IS LOCATED WITHIN TOWNSHIP 15 SOUTH, RANGE 65 WEST, AND TOWNSHIP 15 SOUTH, RANGE 66 WEST.

LEGEND

- SPECIAL FLOOD HAZARD AREAS (SFHAs) SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD
- The 1% annual chance flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equalled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V, and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.
- ZONE A** No Base Flood Elevations determined. Base Flood Elevations determined.
- ZONE AE** Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.
- ZONE AH** 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 AO** Special Flood Hazard Area Formerly protected from the 1% annual chance flood by a flood control system that was subsequently decommissioned. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.
- ZONE AR** Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.
- ZONE A99** Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.
- ZONE V** Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.
- ZONE VE** Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.
- FLOODWAY AREAS IN ZONE AE
- The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.
- OTHER FLOOD AREAS**
- ZONE X** Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot, or with drainage areas less than 1 square mile, and areas protected by levees from 1% annual chance flood.
- OTHER AREAS**
- ZONE D** Areas determined to be outside the 0.2% annual chance floodplain. Areas in which flood hazards are undetermined, but possible.
- COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS
- OTHERWISE PROTECTED AREAS (OPAs)
- CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.
- Floodplain boundary
- Floodway boundary
- Zone D boundary
- CBRS and OPA boundary
- Boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities.
- Base Flood Elevation line and value; elevation in feet* (EL 987)
- Base Flood Elevation value where uniform within zone; elevation in feet*
- * Referenced to the North American Vertical Datum of 1988 (NAVD 88)
- Cross section line
- Transsect line
- Geographic coordinates referenced to the North American Datum of 1983 (NAD 83)
- 1000-meter Universal Transverse Mercator grid ticks, zone 13
- 5000-foot grid ticks; Colorado State Plane coordinate system, central zone (FIPSZONE 0902), Lambert Conformal Conic Projection
- Bench mark (see explanation in Notes to Users section of this FIRM panel)
- River Mile
- MAP REPOSITORIES**
Refer to Map Repository list on Map Index
- EFFECTIVE DATE OF COUNTYWIDE FLOOD INSURANCE RATE MAP**
MARCH 17, 1997
- EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL**
DECEMBER 7, 2018 - to update corporate limits, to change Base Flood Elevations and Special Flood Hazard Areas, to update map format, to add roads and road names, and to incorporate previously issued Letters of Map Revision.
- For community map revision history prior to countywide mapping, refer to the Community Map History Table located in the Flood Insurance Study report for this jurisdiction.
- To determine if flood insurance is available in this community, contact your insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

PANEL 0951G

FIRM

FLOOD INSURANCE RATE MAP

EL PASO COUNTY, COLORADO AND INCORPORATED AREAS

PANEL 951 OF 1300

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:	COMMUNITY	NUMBER	PANEL	SUFFIX
	EL PASO COUNTY	08009	0951	G
	FOUNTAIN, CITY OF	08061	0951	G

Notice to User: The Map Number shown below should be used when placing map orders. The Community Number shown above should be used on insurance applications for the subject community.

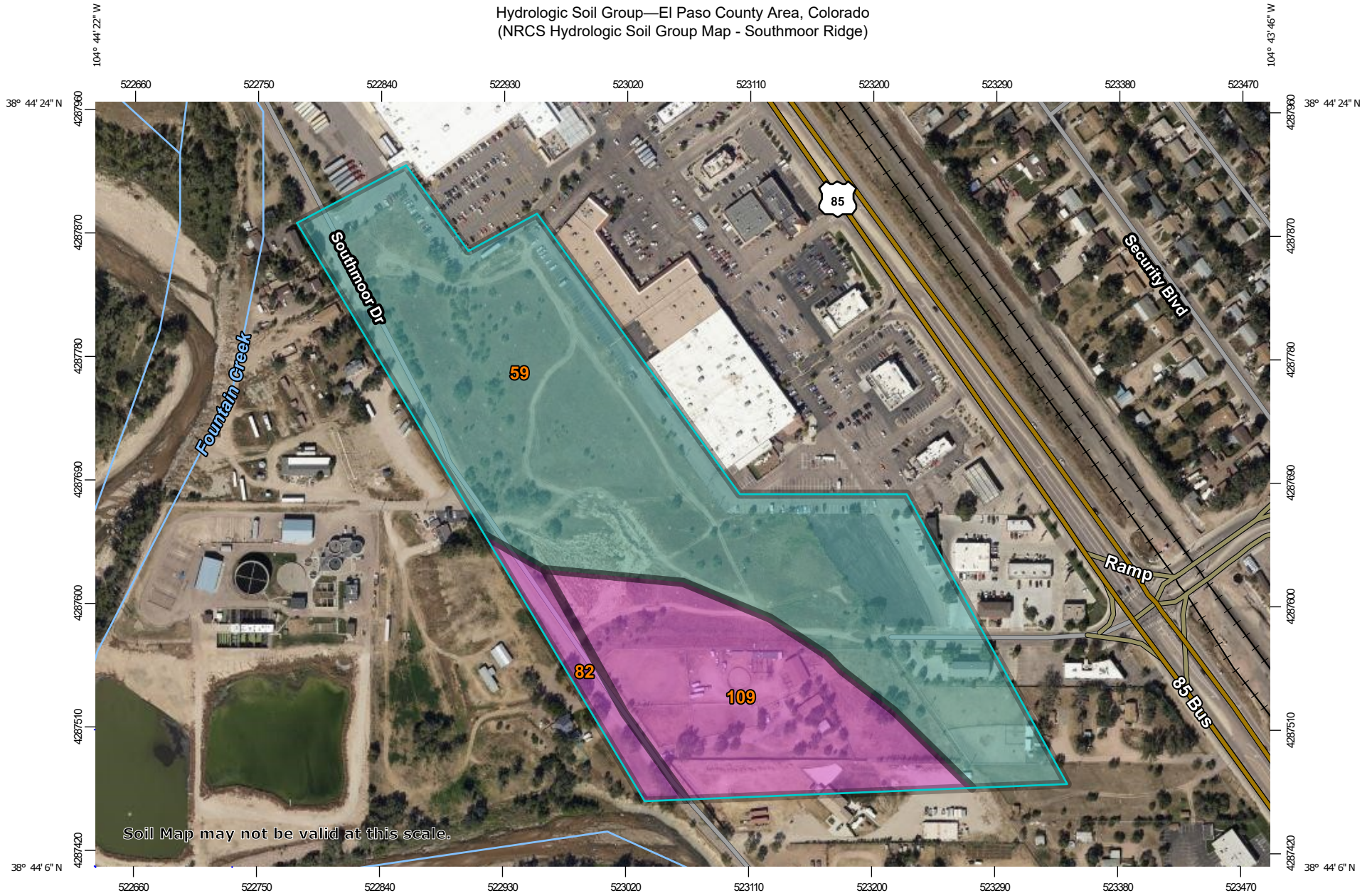
MAP NUMBER
08041C0951G

MAP REVISED
DECEMBER 7, 2018

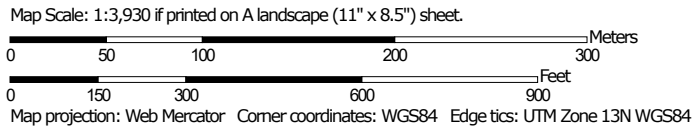
Federal Emergency Management Agency

APPENDIX C - USGS SOILS MAP

Hydrologic Soil Group—El Paso County Area, Colorado
(NRCS Hydrologic Soil Group Map - Southmoor Ridge)



Soil Map may not be valid at this scale.



MAP LEGEND

Area of Interest (AOI)









 Area of Interest (AOI)

Soils

Soil Rating Polygons





 A
 A/D
 B
 B/D
 C
 C/D
 D
 Not rated or not available

Soil Rating Lines


 A
 A/D
 B
 B/D
 C
 C/D
 D
 Not rated or not available

Soil Rating Points






 A
 A/D
 B
 B/D

 C
 C/D
 D
 Not rated or not available

Water Features

 Streams and Canals

Transportation

 Rails
 Interstate Highways
 US Routes
 Major Roads
 Local Roads

Background

 Aerial Photography

MAP INFORMATION

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

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

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

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

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

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

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

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

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

Date(s) aerial images were photographed: Aug 14, 2018—Sep 23, 2018

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

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
59	Nunn clay loam, 0 to 3 percent slopes	C	19.1	70.2%
82	Schamber-Razor complex, 8 to 50 percent slopes	A	1.2	4.4%
109	Yoder gravelly sandy loam, 1 to 8 percent slopes	A	6.9	25.3%
Totals for Area of Interest			27.3	100.0%

Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

APPENDIX D - COLORADO DNR AND COUNTY MAPS

Find address or place



Legend

River Basins

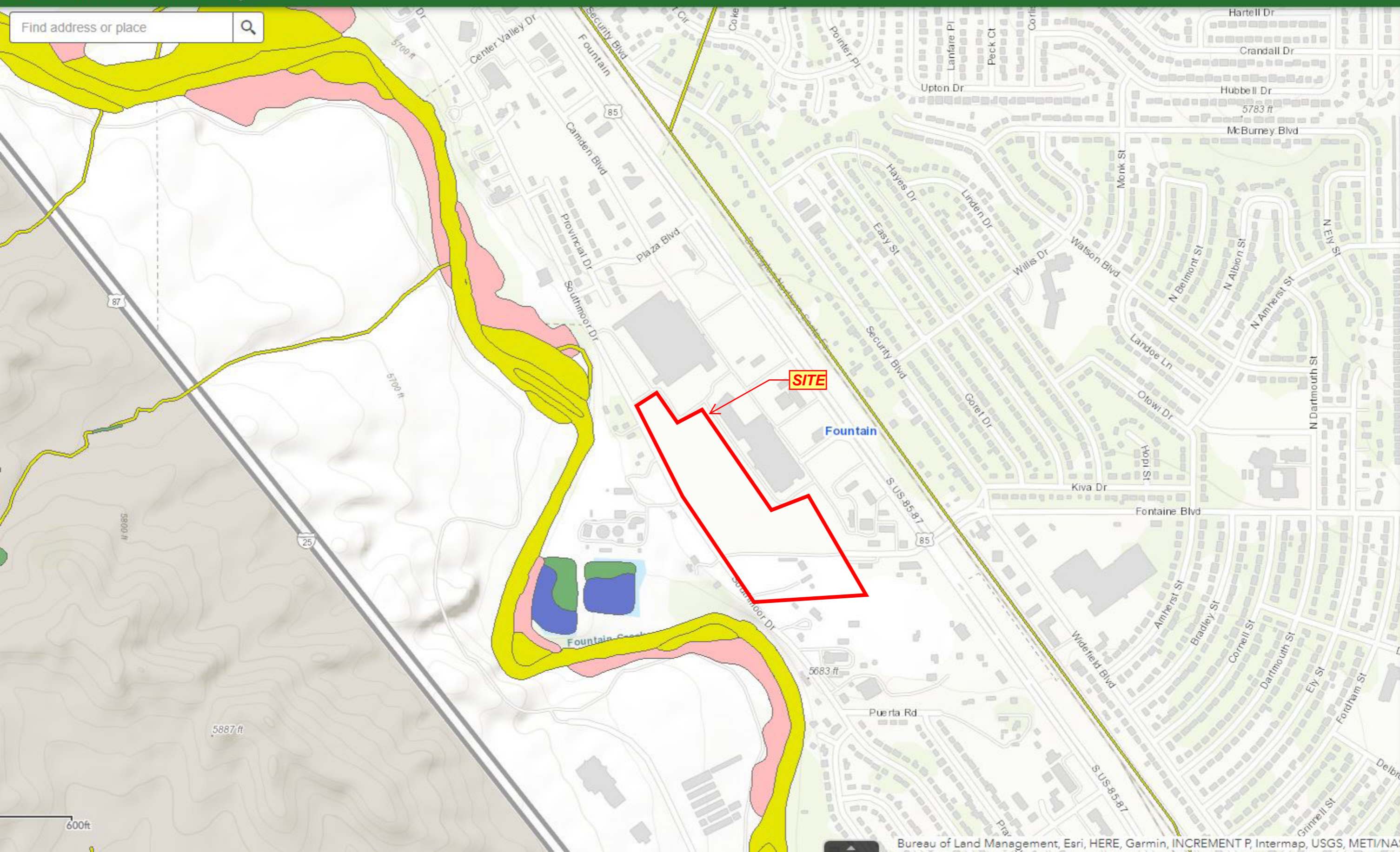
- River Basins
 - Major River Basins
 - Major River Basin Boundary
 - River Subbasins
 - River Subbasin Boundary

Counties

- Counties
 - County Boundary

Wetland Mapping

- Colorado Wetlands
 - Emergent
 - Forested
 - Pond
 - Lake
 - Other
 - Riparian
 - Rivers & Streams
 - Shrub-Scrub
- Colorado Wetlands Greyscale
 - Wetland



600ft

APPENDIX E - GEOLOGIC HAZARD WAIVER MEMO



ENTECH
ENGINEERING, INC.

505 ELKTON DRIVE
COLORADO SPRINGS, CO 80907
PHONE (719) 531-5599

February 15, 2024

DHN Development
2335 Coralbell Grove, Unit 101
Colorado Springs, Colorado 80910

Attn: Bryan Kniep

Re: Geologic Hazard Waiver Request
Southmoor Ridge
Parcel Nos. 65133-14-015, 65133-00-021,
65242-00-052, and 65242-00-053
Southmoor Drive and Fontaine Boulevard
Fountain, Colorado
Entech Job No. 240217

Dear Mr. Kniep:

This letter is to request a waiver from the Geologic Hazard Study for the above referenced project. The project is to consist of single family (townhomes) and multi-family residential development. The site is currently zoned as PUD (Planned Unit Development) according to City of Fountain Planning and Zoning (Reference 1).

The site is located in a portion of the SW $\frac{1}{4}$ of Section 13 the NW $\frac{1}{4}$ of Section 24, Township 15 South, Range 66 West, in the northwestern portion of Fountain, Colorado. The location of the site is shown on the Vicinity Map, Figure 1, and the USGS Topography Map, Figure 2. The proposed Development Plan is shown on Figure 3. The geology of the site was evaluated using the following investigations completed by Entech Engineering, Inc. (Entech) *Preliminary Subsurface Soil Investigation* (Reference 2, Appendix B) and *Infiltration Rates (Percolation Testing Method)* (Reference 3, Appendix C), the *Geologic Map of the Fountain Quadrangle* completed by Colorado Geological Survey 2017 (Reference 4, Figure 4). Site photographs taken February 13, 2024, are included in Appendix A.

In our opinion, the site is suitable for a Geologic Hazard Waiver as it does not exhibit any of the following characteristics:

- Slopes (existing or proposed) exceeding 33% or which are unstable or potentially unstable.
- History of underground mining or subsidence activity.
- History of a landfill, uncontrolled or undocumented fill activity.

The conditions on the site were investigated by Entech *Preliminary Subsurface Soil Investigation*, (Reference 2, Appendix B), and *Infiltration Rates (Percolation Testing Method)* (Reference 3, Appendix C). These investigations consisted of drilling fourteen shallow test borings on the site. The test borings were drilled to depths of 10 to 20 feet below the existing surface grade. Soils encountered in the test borings consisted of very clayey sand (SC), gravelly clean to silty sand (SW, SM-SW), sandy silt (ML), and sandy clay (CL) overlying weathered claystone and shale bedrock (CL, ML). Bedrock was encountered in four of the borings a depths ranging from 13 to 19 feet below the existing surface grade. Groundwater was encountered in one test boring TB-2 at a depth of 15.5 feet, the remaining borings were dry.

DHN Development
Geologic Hazard Waiver Request
Southmoor Ridge
Parcel Nos. 65133-14-015, 65133-00-021,
65242-00-052, and 65242-00-053
Southmoor Drive and Fontaine Boulevard
Fountain Colorado, Colorado
Page 2



The site soils are associated with the Alluvial gravel five (Qag₅) of lower Pleistocene Age (Reference 4, Figure 4). Overlying the Alluvial gravel five are areas of fill associated with past stockpiling and dumping on the property. Bedrock underlying the site consists of the Pierre Shale Formation of Upper Cretaceous Age. The claystone and shale associated with the Pierre Shale Formation are typically expansive. Additional geotechnical investigation of the site will be required once development plans are finalized to provide foundation recommendations.

No areas of unstable or potentially unstable slopes were observed on the site. The site slopes are gradually sloping to the southeast. The site is not located in any area of past underground mining or subsidence activity (References 5 and 6).

The site does lie within a 500-year floodplain zone according to the FEMA Map No. 08041CO951G (Reference 7). Groundwater was encountered in one test boring TB-2 at a depth of 15.5 feet (Reference 2, Appendix B). Any grading modifications should direct surface flows around the structures. Drainage studies are beyond the scope of this report.

We trust that this has provided you with the information required regarding a Geologic Hazard Waiver, a copy of Geologic Hazard Waiver form is attached with this letter. If you have any questions or need additional information, please do not hesitate to contact us.

Respectfully Submitted,

ENTECH ENGINEERING, INC.

Reviewed by:

A handwritten signature in blue ink, appearing to read 'Logan L. Langford'.

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



A handwritten signature in blue ink, appearing to read 'Joseph C. Goode Jr.'.

Joseph C
Goode Jr.

Digitally signed by
Joseph C Goode Jr.
Date: 2024.02.15
09:50:28 -07'00'

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

Encl.

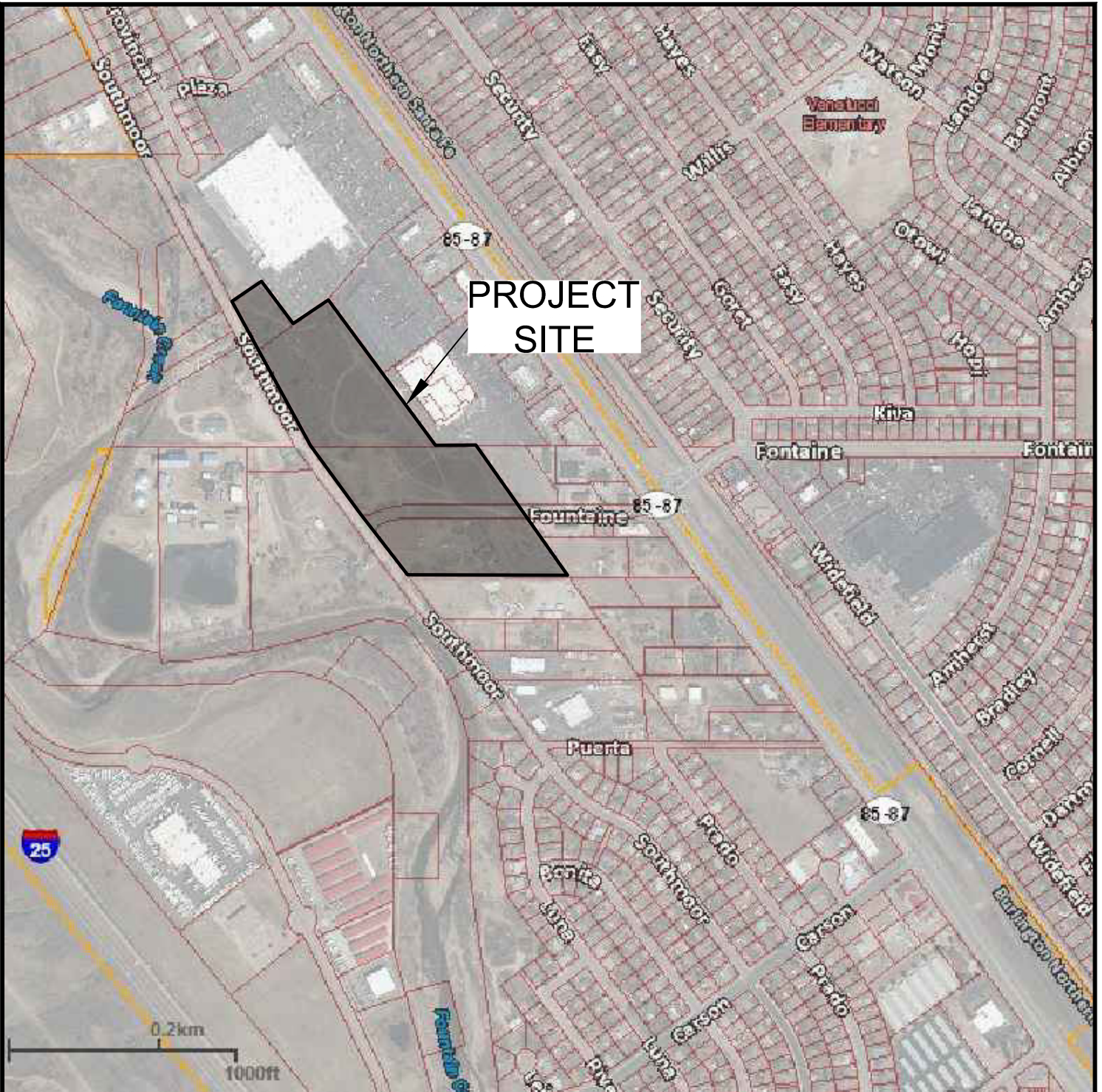
LLL

F:\AA Projects\2024\240217-DHN Dev-Southmoor Ridge-Gehoaz\09-Reports\240217 geo waiver.docx

REFERENCES

1. City of Fountain, Colorado, updated April 2023. *Fountain Planning & Map*. <https://fountainco.maps.arcgis.com/apps/webappviewer/index.html?id=16d6981f04904cb3b48b24e7f90f9c6b>
2. Entech Engineering, Inc., dated June 29, 2022. *Preliminary Subsurface Soil Investigation, Southmoor Properties, Fountain, Colorado*. Entech Job No. 221305.
3. Entech Engineering, Inc., dated October 26, 2022. *Infiltration Rates (Percolation Test Method), Southmoor Drive, Parcel Nos. 6513314015, 6513300021, 6524200052, and 6524200053, Fountain, Colorado*. Entech Job No. 222077.
4. White, Jonathan L., Lindsey, Kassandra O., Morgan, Matthew L., and Mahan, Shannon A., 2017. *Geologic Map of the Fountain Quadrangle, El Paso County, Colorado*. Colorado Geological Survey. Open-File Report 17-05.
5. Amuedo and Ivey. *Inactive Mine Reclamation Program, Extent of Mining Map*. Colorado Department of Natural Resources.
6. Dames and Moore. 1985. *Colorado Springs Subsidence Investigation*. State of Colorado, Division of Mined Land Reclamation.
7. Federal Emergency Management Agency. December 7, 2018. *Flood Insurance Rate Maps for the City of Colorado Springs, Colorado*. Map Number 08041CO951G.

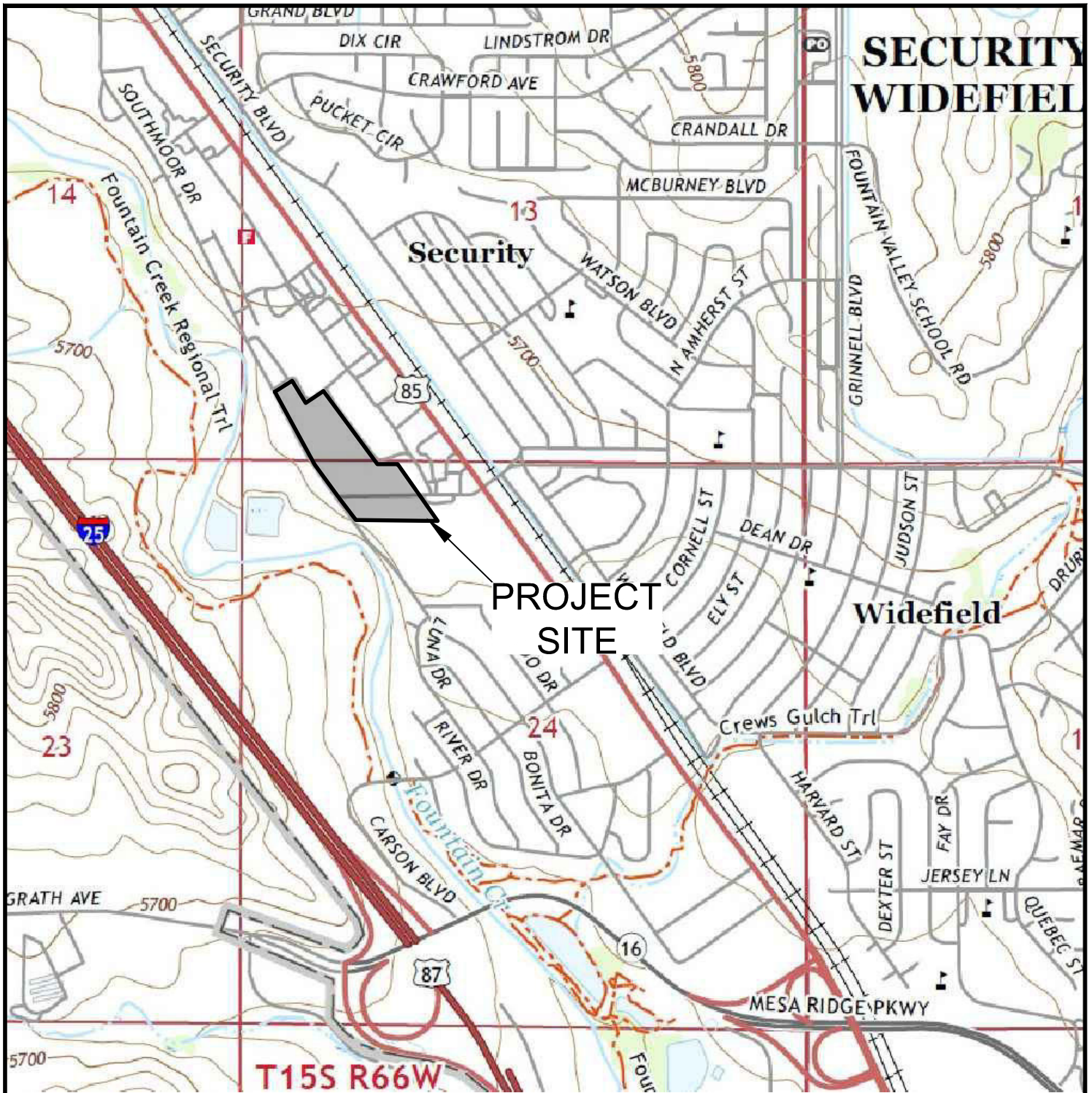
FIGURES



VICINITY MAP
 SOUTHMOOR RIDGE
 FOUNTAIN, COLORADO
 DHN DEVELOPMENT

JOB NO.
 240217

FIG. 1



**SECURITY
WIDEFIELD**

**PROJECT
SITE**

Widefield

T15S R66W



USGS TOPOGRAPHY MAP

SOUTHMOOR RIDGE
FOUNTAIN, COLORADO
DHN DEVELOPMENT

JOB NO.
240217

FIG. 2

SOUTHMOOR RIDGE

OVERALL DEVELOPMENT PLAN

A SUBDIVISION LOCATED IN THE NORTH HALF OF THE NORTHWEST QUARTER OF SECTION 24, AND THE SOUTHWEST QUARTER OF THREE SOUTHWEST QUARTER OF SECTION 13, TOWNSHIP 15 SOUTH, RANGE 66 WEST OF THE SIXTH P.M. IN THE CITY OF FOUNTAIN, EL PASO COUNTY, COLORADO



89 PS REQ.
108 PS REQ.
130 PS REQ.
9 PS REQ.
337 PS REQ.

254 PS
54 PS
338 PS PROVIDED

14 PS REQ.
55 PS REQ.
69 PS REQ.
140 PS REQ.

35 PS
65 PS
34 PS
8 PS
146 PS

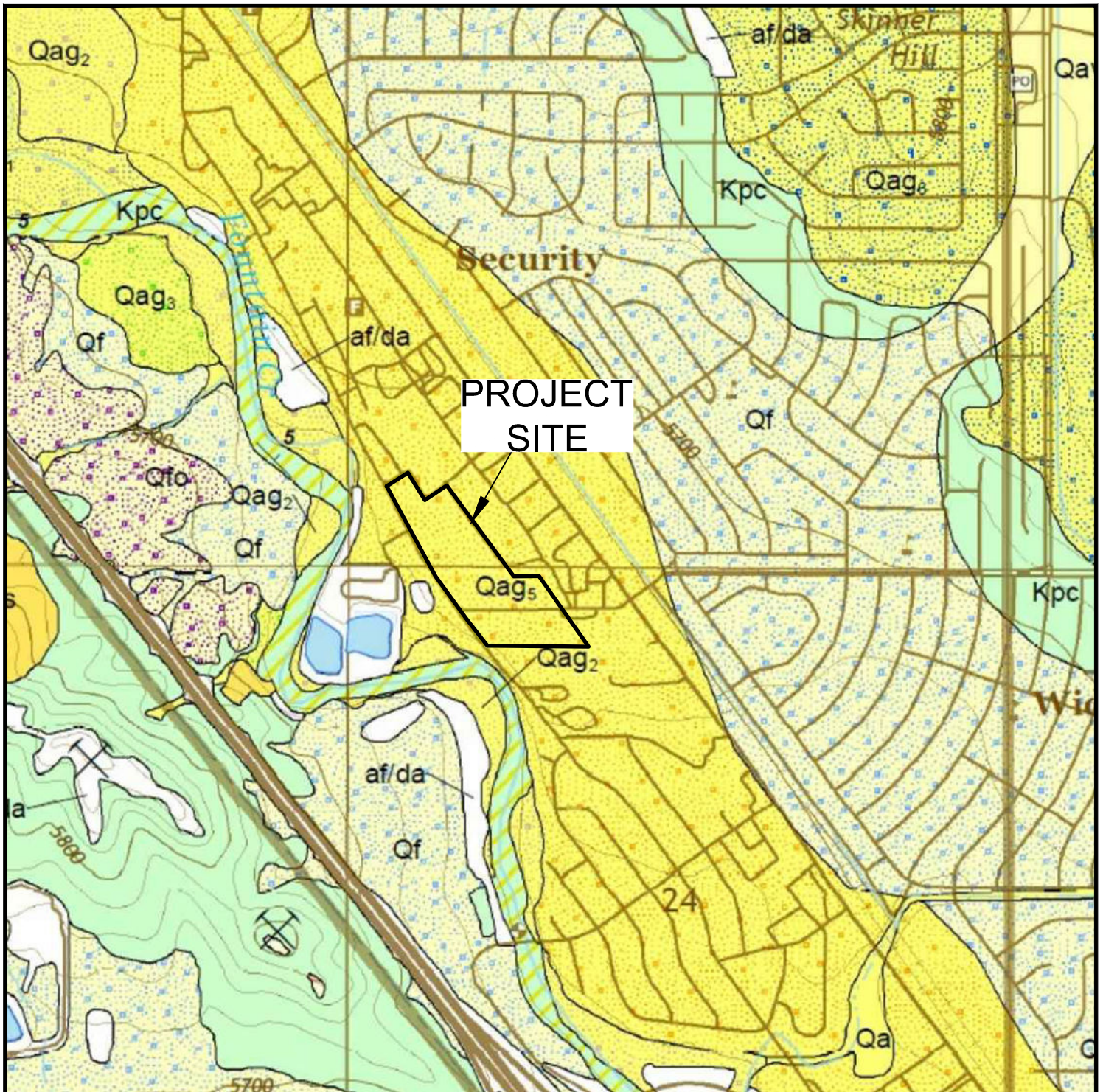


DEVELOPMENT PLAN

SOUTHMOOR RIDGE
FOUNTAIN, COLORADO
DHN DEVELOPMENT

JOB NO.
240217

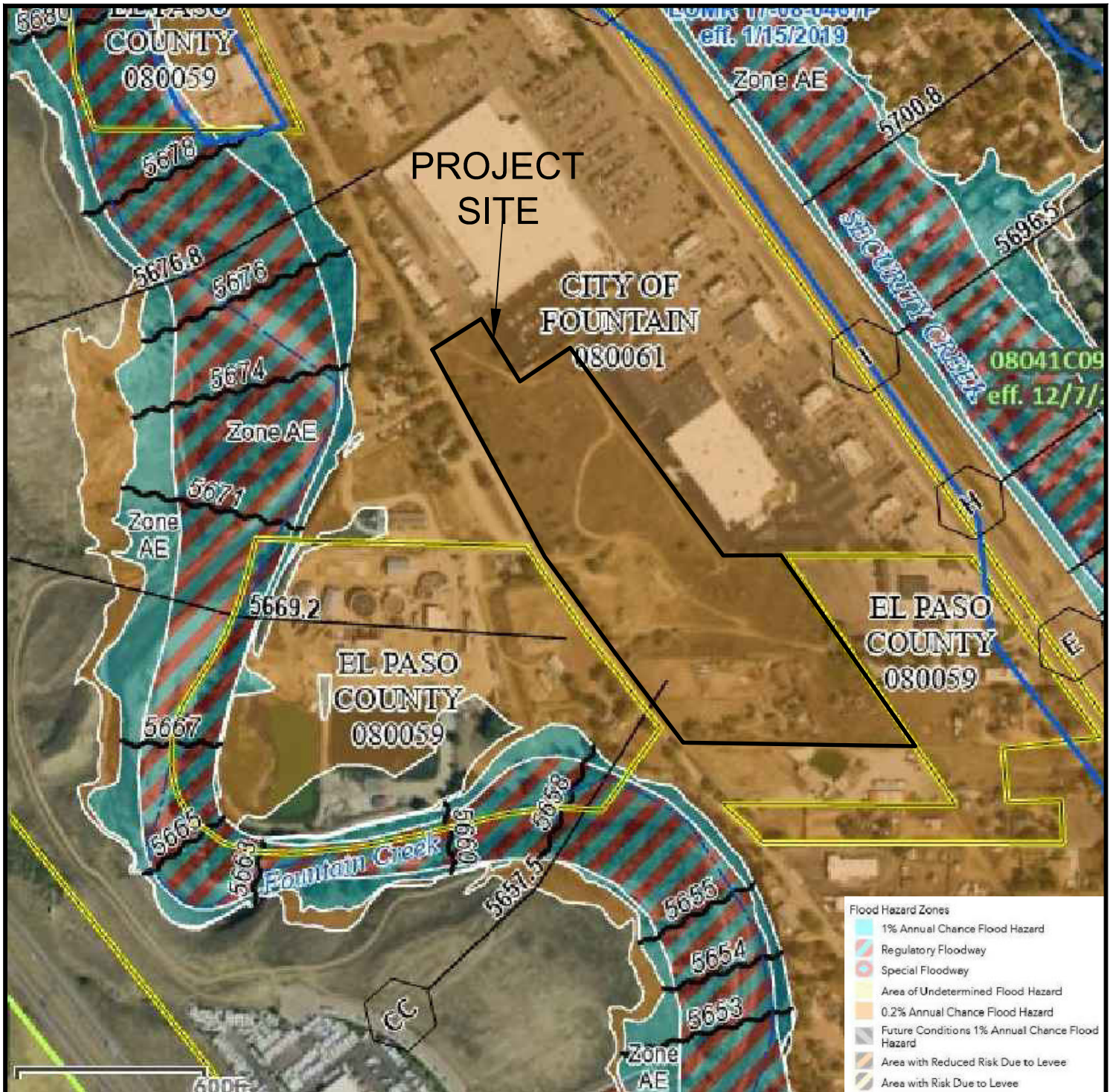
FIG. 3



**GEOLOGIC MAP OF THE
FOUNTAIN QUADRANGLE**
SOUTHMOOR DRIVE
FOUNTAIN, COLORADO
DHN DEVELOPMENT

JOB NO.
240217

FIG. 4



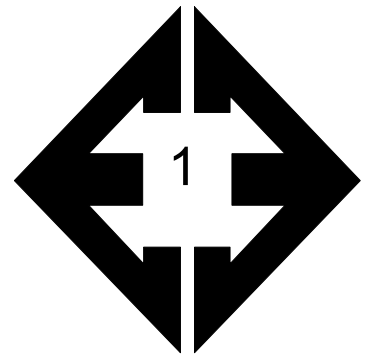
FEMA FLOODPLAIN MAP

SOUTHMOOR RIDGE
FOUNTAIN, COLORADO
DHN DEVELOPMENT

JOB NO.
240217

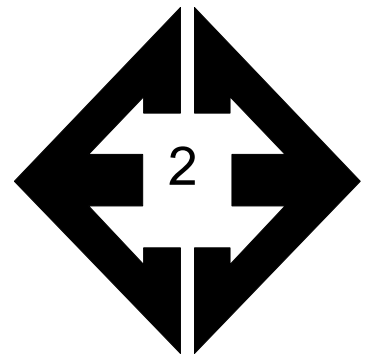
FIG. 5

APPENDIX A: Site Photographs



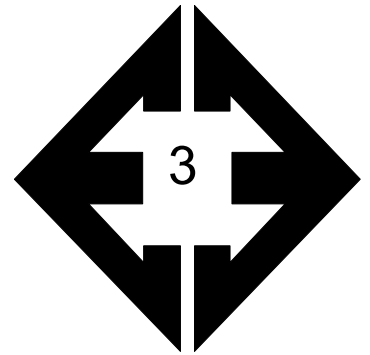
**Looking northwest
from eastern side of
the site.**

February 13, 2024



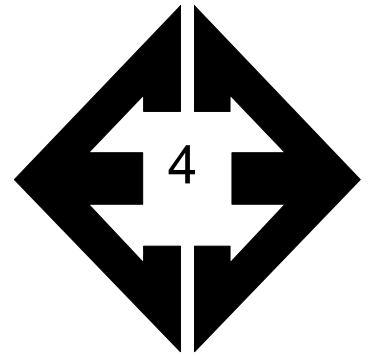
**Looking southeast
from the western side
of site.**

February 13, 2024



**Looking north from
western side of the
site.**

February 13, 2024



**Looking south from
the northern side of
site.**

February 13, 2024



**APPENDIX B: EEI, Preliminary Subsurface Soil
Investigation, Job No. 221305**



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ENGINEERING, INC.

505 ELKTON DRIVE
COLORADO SPRINGS, CO 80907
PHONE (719) 531-5599
FAX (719) 531-5238

June 29, 2022

Front Row Properties
1378 Promontory Bluff View
Colorado Springs, CO 80921

Attn: Ron Waldthausen

Re: Preliminary Subsurface Soil Investigation
Southmoor Properties
Fountain, Colorado

Dear Mr. Waldthausen:

As requested, personnel of Entech Engineering, Inc. have drilled twelve test borings to evaluate the site soil conditions for the anticipated development. This letter presents the results of our soils investigation, laboratory testing, and preliminary foundation recommendations.

SITE CONDITIONS:

The site development has not been determined and will likely consist of commercial and/or residential development with associated site improvements. Adjacent properties consist of commercial shopping center to the north and east, and a mix of rural residential and commercial properties to the west. The location of the site is shown in the vicinity map, Figure, 1. The site is gradually sloping to the southeast. At the time of our site investigation stables and out buildings were located in the southern portion of the site, and the remaining portion of the site was undeveloped. Vegetation consists of field grasses and weeds, with scattered trees in portions of the site, and fill piles were observed in the western portion of the site.

FIELD INVESTIGATION AND LABORATORY TESTING PROGRAM:

Subsurface conditions on the site were explored by drilling twelve test borings across the site. The test borings were drilled at the approximate locations shown on the Site Map/Test Boring Location Map, Figure 2. The borings were drilled to approximately 20 feet below the existing ground surface (bgs). The drilling was performed using a truck-mounted, continuous flight auger-drilling rig supplied and operated by Entech. Boring logs descriptive of the subsurface conditions encountered during drilling are presented in Appendix A. At the conclusion of drilling, observations for groundwater levels were made in the open boreholes.

Soil samples were obtained from the borings utilizing the Standard Penetration Test (ASTM D-1586) using 2-inch O.D. split-barrel and California samplers. Results of the Standard Penetration Test (SPT) are included on the boring logs in terms of N-values expressed in blows per foot (bpf). Soil samples recovered from the borings were visually classified and recorded on the boring logs. The soil classifications were later verified utilizing laboratory testing and grouped by soil type. The soil type numbers are included on the boring logs and in the provided chart. It should be understood that the soil descriptions shown on the boring logs may vary between boring location and sample depth. It should also be noted that the lines of stratigraphic separation shown on the boring logs represent approximate boundaries between soil types and the actual stratigraphic transitions may be more gradual and vary with location.

Moisture content testing (ASTM D-2216) was performed on the samples recovered from the borings, and the results are shown on the boring logs. Grain-Size Analysis Testing (ASTM D-422) was performed on selected samples to assist in classifying the materials encountered in the borings. Volume change testing was performed on selected samples using Swell/Consolidation (ASTM D-4546) tests in order to evaluate potential expansion/compression characteristics of the soil. Sulfate testing was performed on selected samples to evaluate potential for below grade concrete degradation due to sulfate attack. The Laboratory Testing Results are summarized on Table 1 and are presented in Appendix B.

SUBSURFACE CONDITIONS:

Three soil and rock types were encountered during drilling. The soils consisted of Type 1: very clayey sand, clean sand, and silty to slightly silty sand (SC, SW, SM, SM-SW), Type 2: sandy silt and sandy clay (ML, CL). The soils were classified using the Unified Soil Classification System (USCS).

Soil Type 1 classified as very clayey sand, clean sand, and silty to slightly silty sand (SC, SW, SM, SM-SW). The sand was encountered in all test borings from the existing ground surface to depths of 13 to 18 feet bgs, and to the termination of Test Boring Nos. 6, and 8 – 10 (20 feet). Standard Penetration Testing resulted in SPT N-values of 2 to 41 bpf, indicating very loose to dense states. The majority of the sands were encountered at medium dense states. Moisture contents of 1 to 9 percent were measured, indicating dry to moist conditions. Grain size testing resulted in 5 to 49 percent of the soil passing the No. 200 sieve. Atterberg Limits Testing on a sample of the very clayey sand resulted in a liquid limit of 26 and plastic index of 10. Sulfate testing on a sample of very clayey sand resulted in less than 0.1 percent sulfate by weight, indicating a low potential for below grade concrete degradation.

Soil Type 2 is classified as sandy silt and sandy clay (ML, CL). The silt and clay were encountered in five the test borings at depths of 13 to 19 feet bgs, extending to depths ranging from 17 to 19 feet, and the termination of Test Boring Nos. 4, 5, and 12 (20 feet bgs). Standard Penetration Testing resulted in an SPT N-value of 19 to 45 bpf, indicating stiff to very stiff consistencies. Moisture contents of 11 to 22 percent were measured, indicating moist conditions. Grain size testing resulted in 70 to 99 percent of the soil passing the No. 200 sieve. Atterberg Limits Testing resulted in a liquid limit of 49 and a plastic index of 21. Swell/Consolidation Testing resulted in volume changes of 0.7 to 1.7 percent, indicating a low to moderate expansion potential. Sulfate testing on the clay resulted in less than 0.1 percent sulfate by weight, indicating a low potential for below grade concrete degradation.

Soil Type 3 is classified as claystone and shale (CL, ML). The claystone and shale were encountered in four the test borings at depths of 13 to 19 feet bgs, extending to the termination of the test borings (20 feet bgs). Standard Penetration Testing resulted in an SPT N-value of 28 to greater than 50 bpf, indicating stiff to hard consistencies. Moisture contents of 13 to 17 percent were measured, indicating moist conditions. Grain size testing resulted in 88 to 97 percent of the soil passing the No. 200 sieve. Atterberg Limits Testing on the shale resulted in liquid limits of 40 and 44 and plastic indexes of 14 to 16. Swell/Consolidation Testing resulted in a volume change of 0.8 percent, indicating a low expansion potential. Sulfate testing on the shale resulted in 0.00 to 0.02 percent sulfate by weight, indicating a low potential for below grade concrete degradation.

Depth to groundwater was measured in each of the borings at the conclusion and subsequent to drilling. Groundwater was encountered in Test Boring No. 2 at 15.5 feet, groundwater was not

encountered in the remaining test borings were which drilled to depths of 20 feet bgs. It is anticipated groundwater will not affect construction on the site. Development of this site and adjacent properties, as well as seasonal precipitation changes, and changes in runoff may affect groundwater elevations.

GEOTECHNICAL EVALUATION AND RECOMMENDATIONS:

The following discussion is based on the subsurface conditions encountered in the borings drilled for the planned development. If subsurface conditions different from those described herein are encountered during construction or if the project elements change from those described, Entech Engineering, Inc. should be notified so that the evaluation and recommendations presented can be reviewed and revised if necessary.

The site is to be developed with commercial and/or residential structures and associated site improvements. Very loose to loose soils were encountered in several of the borings in the upper profile. Fill piles were observed on the site, however, fill was not encountered in the testing borings. If uncontrolled fill is encountered beneath foundations mitigation will be required. Loose soils or uncontrolled fill encountered within the building areas must be completely removed and recompacted. To provide a uniform bearing pad, at a minimum, it is recommended that the loose soils be penetrated or moisture-conditioned, and recompacted below the building(s). Prior to placing the structural fill, the subgrade should be scarified, moisture-conditioned, and compacted. Fill placed in building areas should be compacted according to the "Structural Fill" paragraph. Preliminary design considerations are discussed in the following sections. Additional subsurface soil investigation is recommended once development plans are prepared. The extent of overexcavation/recompaction will be determined at the time of the open excavation observations.

Expansive soils were encountered in the borings, however, are sporadic. Should expansive soils be encountered beneath the foundations, mitigation will be necessary. Mitigation of expansive soils will require overexcavation and replacement with non-expansive soils at 95% of its maximum Modified Proctor Dry Density, ASTM 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.

PRELIMINARY FOUNDATION RECOMMENDATIONS:

Shallow spread footing/stemwall foundation systems in conjunction with overexcavation/fill mitigation is anticipated for any structures to be built on this site. An allowable bearing pressure of 2000 pounds per square foot (psf) are anticipated for the site soils. Exterior footings should extend to a minimum of 30 inches for frost protection. Recommendations should be made after additional investigation and completion of the grading plans. Density testing of the reconditioned soil or structural fill placed on this site should be performed by a qualified individual.

Foundation walls retaining soils should be designed to resist lateral pressures generated by the soils. An equivalent hydrostatic fluid pressure (in the active state) of 45 pcf is recommended for the site soils. It should be noted that this value applies to level backfill conditions. Pressures may increase depending on the conditions adjacent to the walls. Surcharge loading if any, should be considered in wall designs. Equivalent fluid pressures for sloping conditions should be determined on an individual basis.

FOUNDATION EXCAVATION OBSERVATION:

The open foundation excavations should be observed by a representative of Entech Engineering, Inc. prior to construction of the foundation in order to verify that no anomalies are present, materials at the proper design bearing capacity have been encountered, and no soft or loose areas or debris are present in the excavation. Loose areas that require removal and or recompaction should be identified during site observations.

CONCRETE:

Type II cement is recommended for all concrete on this site. Concrete should not be placed on frozen or wet ground. Care should be taken to prevent the accumulation and ponding of water in the footing excavation prior to the placement of concrete. If standing water is present in the excavation, it should be removed from the excavation by pumping it away from the building area. Concrete placed during cold temperatures must be kept from freezing, which may require covering the concrete with insulated blankets and heating it.

FLOOR SLABS:

Floor slabs placed on loose soils should be expected to experience movement. The uncontrolled fill must be mitigated below slabs. Floor slabs on grade, if any should be separated from structural portions of the building, unless they are designed as part of the foundation system. Backfill placed below floor slabs should be compacted to a minimum of 95% of its maximum Modified Proctor Dry Density, ASTM D-1557.

SITE SEISMIC CLASSIFICATION

Based on the subsurface conditions encountered at the site and in accordance with Section 1613 of the 2015 International Building Code (IBC), the site meets the conditions of a Site Class E.

SURFACE AND SUBSURFACE DRAINAGE:

Positive surface drainage must be maintained around the structure to minimize infiltration of surface water. A minimum gradient of 5 percent in the first 10 feet adjacent to foundations is recommended. A minimum gradient of 2 percent is recommended for paved areas. All grades should be directed away from the structure. All downspouts should be extended to discharge well beyond the backfill zone of the structure.

A subsurface drain is recommended around portions of the structure which will have useable space located below the finished ground surface. A perimeter drain will not be required for slab on grade construction if the slab is above exterior grade. Typical drain details are included with this letter.

STRUCTURAL FILL:

Areas to receive structural fill should have all topsoil, organic material or debris removed. Fill must be properly benched. Prior to placing new fill, the surface should be scarified and moisture conditioned to within ± 2 percent of its optimum moisture content and compacted to 95 percent of its maximum Modified Proctor Dry Density (ASTM D-1557) or to 95 percent of the soils maximum Standard Proctor Dry Density, ASTM D-698 at or above optimum moisture content. New fill should be placed in lifts not to exceed 6 inches after compaction while maintaining the above noted compaction requirements. Fill should be placed at a moisture

Front Row Properties
Preliminary Subsurface Soil Investigation
Southmoor Properties
Fountain, Colorado

content conducive to compaction. The placement and compaction of fill should be observed and tested by Entech. Any imported soils should be approved by Entech prior to being hauled to the site. The on-site soils may be used as structural fill pending approval by Entech.

UTILITIES:

Backfill placed in utility trenches should be compacted to a minimum of 95 percent of its maximum Modified Proctor Dry Density (ASTM D-1557). Utility backfill should be placed in lifts having a compacted thickness of six inches or less and a moisture content conducive to adequate compaction, usually ± 2 percent of its optimum Proctor moisture content. Mechanical methods should be used in placement of backfill; however, heavy equipment should be kept away from foundation walls. No water flooding techniques of any type should be used in compaction of backfill on the site.

Trench backfilling should be performed in accordance with City of Fountain specifications. Excavating should be performed in accordance with OSHA guidelines.

CLOSING:

The test borings were located to provide preliminary geotechnical information; variations in subsurface conditions may be encountered. In the event that the project scope changes, the conclusions and recommendations in this report should not be considered valid unless the changes are reviewed and the conclusions of this report are verified in writing or, if necessary, modified. Additional investigation will be required on the site as development/grading plans are prepared.

This report has been prepared for Front Row Properties for application to the proposed project in accordance with generally accepted soil and foundation engineering practices. No other warranty expressed or implied is made.

Respectfully Submitted,

ENTECH ENGINEERING, INC.



Logan L. Langford, P.G.
Geologist
LLL

Encl.

Entech Job No. 221305
AA projects\2022\221305-pssi



Reviewed by:



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

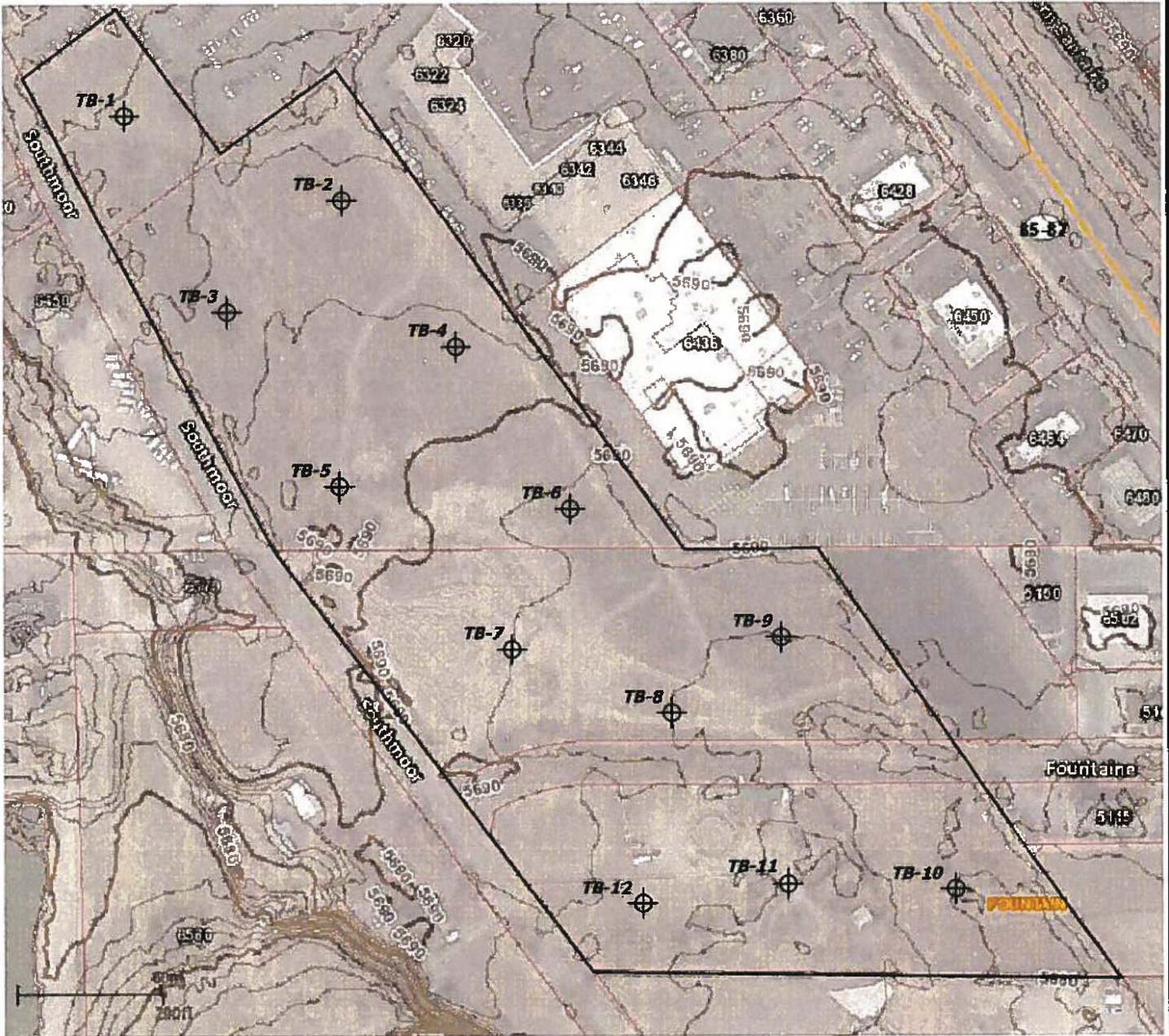
TABLE

TABLE 1
SUMMARY OF LABORATORY TEST RESULTS

CLIENT FRONT ROW PROPERTIES
PROJECT SOUTHMOOR DRIVE
JOB NO. 221305

SOIL TYPE	TEST BORING NO.	DEPTH (FT)	WATER (%)	DRY DENSITY (PCF)	PASSING NO. 200 SIEVE (%)	LIQUID LIMIT (%)	PLASTIC INDEX (%)	SULFATE (WT %)	FHA SWELL (PSF)	SWELL/CONSOL (%)	UNIFIED CLASSIFICATION	SOIL DESCRIPTION
1	1	2-3			43.9	26	10	<0.01			SC	SAND, VERY CLAYEY
1	4	5			4.7						SW	SAND
1	6	5			5.1						SM-SW	SAND, SLIGHTLY SILTY
1	8	2-3			10.2						SM-SW	SAND, SLIGHTLY SILTY
1	9	2-3			49.1						SC	SAND, VERY CLAYEY
1	10	5			24.2						SM	SAND, SILTY
1	11	10			22.4						SM	SAND, SILTY
2	5	15	14.9	100.0	97.4	49	21	<0.01		1.7	ML	SILT, SANDY
2	7	15	21.9	97.7	98.5					1.3	CL	CLAY, SANDY
2	12	20	23.4	89.5	70.2					0.7	CL	CLAY, SANDY
3	2	15	15.1	97.5	97.0	44	16	0.00		0.8	ML	SHALE
3	3	20			88.2	40	14	0.02			ML	SHALE

FIGURES



TB- APPROXIMATE TEST BORING LOCATION AND NUMBER



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 COLORADO SPRINGS, CO 80907 (719) 531-9599

SITE MAP/TEST BORING LOCATION MAP
SOUTHMOOR DRIVE PROPERTIES
FOUNTAIN, COLORADO
FOR: FRONT ROW PROPERTIES

DRAWN:
 LLL

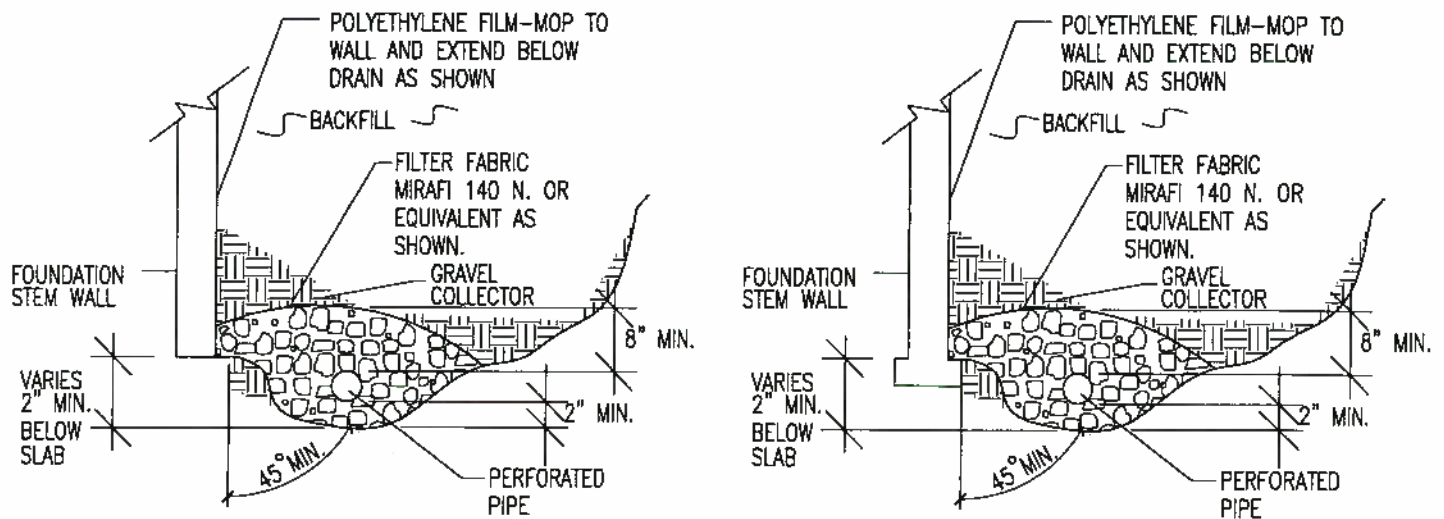
DATE:
 6/28/22

CHECKED:

DATE:

JOB NO:
 221305

FIG NO:
 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 OUTFALL IS NOT AVAILABLE.



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

PERIMETER DRAIN DETAIL

DRAWN:

DATE:

DESIGNER:

CHECKED:

JOB NO.:

221305

FIG NO.:

3

APPENDIX A: Test Boring Logs

TEST BORING NO. 1
 DATE DRILLED 6/7/2022
 Job # 221305

TEST BORING NO. 2
 DATE DRILLED 6/7/2022
 CLIENT FRONT ROW PROPERTIES
 LOCATION SOUTHMOOR DRIVE

REMARKS	Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type	REMARKS	Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
DRY TO 18.5', 6/9/22							WATER @ 15.5', 6/9/22						
SAND, VERY CLAYEY, FINE TO COARSE GRAINED, BROWN, MEDIUM DENSE, MOIST	5			24	3.8	1	SAND, GRAVELLY, SILTY, FINE TO COARSE GRAINED, BROWN, MEDIUM DENSE TO LOOSE, MOIST	5			25	5.0	1
SAND, GRAVELLY, SILTY, FINE TO COARSE GRAINED, BROWN, MEDIUM DENSE TO DENSE, MOIST TO DRY	5			15	3.1	1		5			8	2.3	1
	10			33	1.3	1		10			11	1.6	1
CLAYSTONE, SANDY, DARK GRAY, HARD, MOIST	15			50	12.9	3	SHALE, GRAY BROWN, VERY STIFF TO HARD, MOIST	15			44	14.0	3
	20			50	13.4	3		20			50	13.8	3
				5"							9"		



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 505 ELKTON DRIVE
 COLORADO SPRINGS, COLORADO 80907

TEST BORING LOG

DRAWN: DATE: CHECKED: *LLL* DATE: *6/27/22*

JOB NO.: 221305

FIG NO.: A-1

TEST BORING NO. 3
 DATE DRILLED 6/7/2022
 Job # 221305

TEST BORING NO. 4
 DATE DRILLED 6/7/2022
 CLIENT FRONT ROW PROPERTIES
 LOCATION SOUTHMOOR DRIVE

REMARKS

DRY TO 18.5', 6/9/22

SAND, GRAVELLY, SILTY, FINE TO COARSE GRAINED, BROWN TO TAN, MEDIUM DENSE TO DENSE, DRY

CLAY, SANDY, GRAY BROWN, STIFF, MOIST

WEATHERED SHALE, GRAY BROWN, STIFF, MOIST

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
13			13	0.9	1
41			41	0.8	1
14			14	2.4	1
20			20	10.7	2
28			28	17.3	3

REMARKS

DRY TO 19', 6/9/22

SAND, GRAVELLY, CLEAN TO SILTY, FINE TO COARSE GRAINED, TAN, DENSE TO MEDIUM DENSE, DRY TO MOIST

CLAY, SANDY, GRAY BROWN, VERY STIFF, MOIST

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
32			32	1.7	1
27			27	2.3	1
15			15	2.7	1
19			19	3.2	1
33			33	10.9	2



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 COLORADO SPRINGS, COLORADO 80907

TEST BORING LOG

DRAWN:	DATE:	CHECKED:	DATE:
		LLL	6/27/22

JOB NO.:
 221305

FIG NO.:
 A- 2

TEST BORING NO. 5
 DATE DRILLED 6/7/2022
 Job # 221305

TEST BORING NO. 6
 DATE DRILLED 6/7/2022
 CLIENT FRONT ROW PROPERTIES
 LOCATION SOUTHMOOR DRIVE

REMARKS

DRY TO 19', 6/9/22

SAND, GRAVELLY, SILTY, FINE TO COARSE GRAINED, TAN, LOOSE TO DENSE, DRY

SILT, SANDY, DARK GRAY, VERY STIFF TO STIFF, MOIST

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
5			7	1.0	1
5			8	1.5	1
10			33	1.7	1
15			45	13.8	2
20			23	12.1	2

REMARKS

DRY TO 18', 6/9/22

SAND, GRAVELLY, SLIGHTLY SILTY, FINE TO COARSE GRAINED, TAN, LOOSE TO MEDIUM DENSE, DRY TO MOIST

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
5			4	1.2	1
5			14	1.2	1
10			2	7.3	1
15			26	3.0	1
20			9	2.9	1



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505 ELKTON DRIVE
 COLORADO SPRINGS, COLORADO 80907

TEST BORING LOG

DRAWN:	DATE:	CHECKED:	DATE:
		LLL	6/27/22

JOB NO:
221305

FIG NO:
A-3

TEST BORING NO. 7
 DATE DRILLED 6/7/2022
 Job # 221305

TEST BORING NO. 8
 DATE DRILLED 6/7/2022
 CLIENT FRONT ROW PROPERTIES
 LOCATION SOUTHMOOR DRIVE

REMARKS	Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
DRY TO 18.5', 6/9/22						
SAND, GRAVELLY, SILTY, FINE TO COARSE GRAINED, TAN, LOOSE TO DENSE, DRY	5			23	0.9	1
	5			24	1.5	1
	10			22	1.9	1
CLAY, SANDY, TAN, STIFF, MOIST	15			28	22.1	2
CLAYSTONE, SANDY, GRAY BROWN, HARD, MOIST	20			50	17.3	3
				8"		

REMARKS	Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
DRY TO 15.5', 6/9/22						
SAND, GRAVELLY, SLIGHTLY SILTY, FINE TO COARSE GRAINED, TAN, MEDIUM DENSE, MOIST	5			15	6.0	1
	5			14	5.6	1
	10			20	3.1	1
	15			28	4.3	1
	20			12	8.5	1



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 COLORADO SPRINGS, COLORADO 80907

TEST BORING LOG

DRAWN:	DATE:	CHECKED:	DATE:
		LLL	6/27/22

JOB NO.:
 221305

FIG NO.:
 A-4

TEST BORING NO. 9
 DATE DRILLED 6/8/2022
 Job # 221305

TEST BORING NO. 10
 DATE DRILLED 6/8/2022
 CLIENT FRONT ROW PROPERTIES
 LOCATION SOUTHMOOR DRIVE

REMARKS

DRY TO 20', 6/9/22

SAND, VERY CLAYEY, FINE
 GRAINED, BROWN, MEDIUM
 DENSE, MOIST

SAND, GRAVELLY, SILTY, FINE
 TO COARSE GRAINED, BROWN,
 MEDIUM DENSE, DRY TO MOIST

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
5			17	5.8	1
5			19	6.1	1
10			14	1.6	1
15			27	4.1	1
20			28	4.5	1

REMARKS

DRY TO 20', 6/8/22

SAND, GRAVELLY, SILTY, FINE
 TO COARSE GRAINED, BROWN,
 MEDIUM DENSE TO DENSE,
 MOIST TO DRY

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
5			24	8.7	1
5			17	2.8	1
10			32	2.1	1
15			35	7.3	1
20			36	6.3	1



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505 ELKTON DRIVE
 COLORADO SPRINGS, COLORADO 80907

TEST BORING LOG

DRAWN:	DATE:	CHECKED:	DATE:
		LLL	6/28/22

JOB NO.:
 221305

FIG NO.:
 A- 5

TEST BORING NO. 11
 DATE DRILLED 6/8/2022
 Job # 221305

TEST BORING NO. 12
 DATE DRILLED 6/8/2022
 CLIENT FRONT ROW PROPERTIES
 LOCATION SOUTHMOOR DRIVE

REMARKS

DRY TO 20', 6/8/22

2" ASPHALT, SAND, GRAVELLY,
 SILTY, FINE TO COARSE GRAINED,
 TAN, DENSE TO MEDIUM DENSE,
 DRY

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
5			30	1.2	1
			28	1.1	1
10			29	1.8	1
15			30	2.4	1
20			13	1.9	1

REMARKS

DRY TO 20', 6/8/22

SAND, GRAVELLY, SILTY, FINE
 TO COARSE GRAINED, BROWN,
 MEDIUM DENSE TO DENSE,
 MOIST TO DRY

CLAY, SANDY, BROWN, STIFF,
 MOIST

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
5			10	1.3	1
			21	1.4	1
10			32	3.4	1
15			27	2.1	1
20			19	12.0	2



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505 ELKTON DRIVE
 COLORADO SPRINGS, COLORADO 80907

TEST BORING LOG

DRAWN:

DATE:

CHECKED:

DATE:

LLC

6/27/22

JOB NO:
 221305

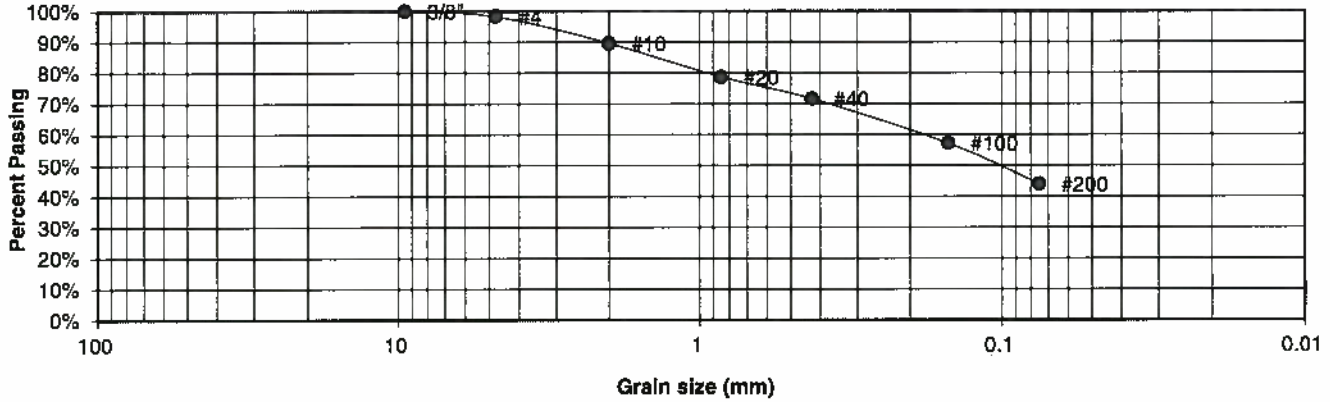
FIG NO:
 A-6

APPENDIX B: Laboratory Test Results

UNIFIED CLASSIFICATION SC
 SOIL TYPE # 1
 TEST BORING # 1
 DEPTH (FT) 2-3

CLIENT FRONT ROW PROPERTIES
 PROJECT SOUTHMOOR DRIVE
 JOB NO. 221305
 TEST BY BL

**Sieve Analysis
 Grain Size Distribution**



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	100.0%
4	98.3%
10	89.6%
20	78.7%
40	71.6%
100	57.2%
200	43.9%

Atterberg Limits	
Plastic Limit	16
Liquid Limit	26
Plastic Index	10

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



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**LABORATORY TEST
 RESULTS**

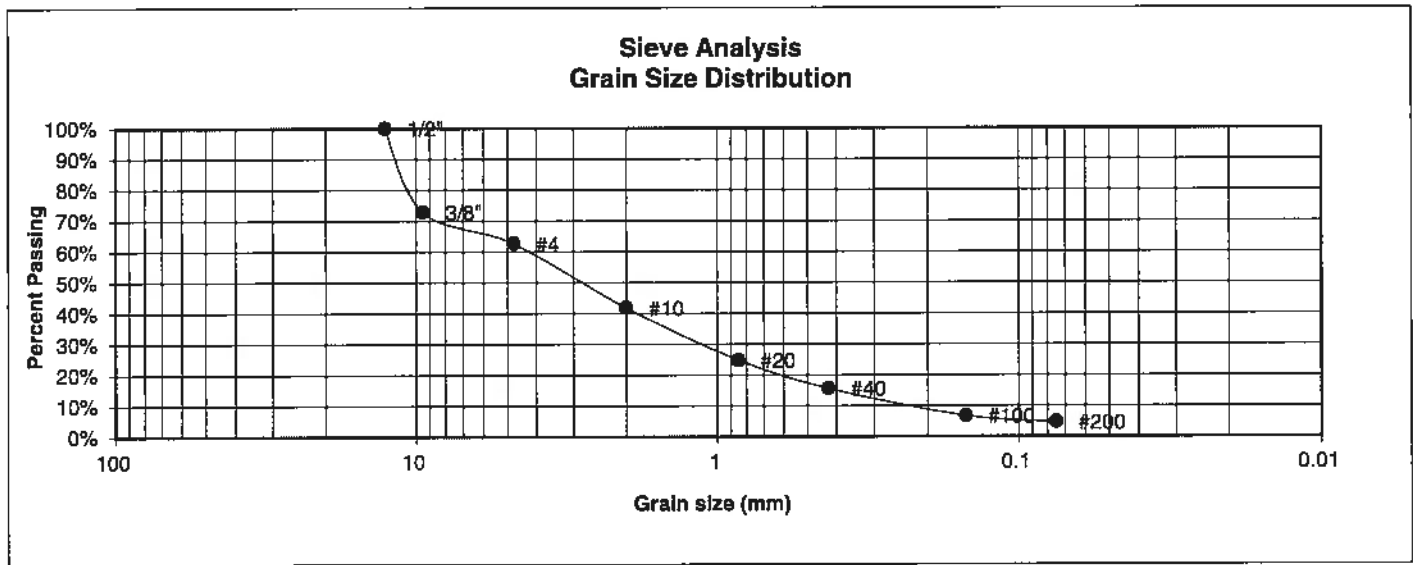
DRAWN:	DATE:	CHECKED:	DATE:
		LLL	6/27/22

JOB NO.:
 221305

FIG NO.:

B-1

<u>UNIFIED CLASSIFICATION</u>	SW	<u>CLIENT</u>	FRONT ROW PROPERTIES
<u>SOIL TYPE #</u>	1	<u>PROJECT</u>	SOUTHMOOR DRIVE
<u>TEST BORING #</u>	4	<u>JOB NO.</u>	221305
<u>DEPTH (FT)</u>	5	<u>TEST BY</u>	BL



<u>U.S. Sieve #</u>	<u>Percent Finer</u>
3"	
1 1/2"	
3/4"	
1/2"	100.0%
3/8"	72.8%
4	62.6%
10	41.8%
20	24.8%
40	15.6%
100	6.7%
200	4.7%

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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505 ELKTON DRIVE
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**LABORATORY TEST
 RESULTS**

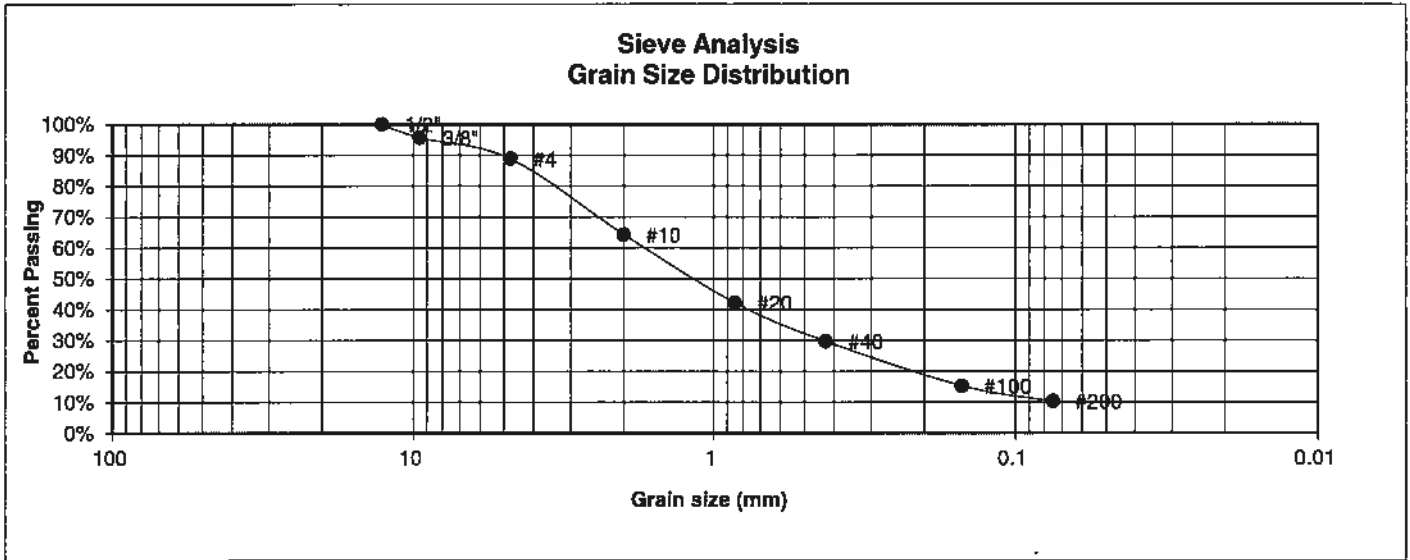
<u>DRAWN:</u>	<u>DATE:</u>	<u>CHECKED:</u> LLL	<u>DATE:</u> 6/27/22
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JOB NO.:
221305

FIG NO.:

B-Z

<u>UNIFIED CLASSIFICATION</u>	SM-SW	<u>CLIENT</u>	FRONT ROW PROPERTIES
<u>SOIL TYPE #</u>	1	<u>PROJECT</u>	SOUTHMOOR DRIVE
<u>TEST BORING #</u>	8	<u>JOB NO.</u>	221305
<u>DEPTH (FT)</u>	2-3	<u>TEST BY</u>	BL



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	100.0%
3/8"	95.5%
4	88.8%
10	64.3%
20	42.2%
40	29.7%
100	15.3%
200	10.2%

- 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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 505 ELKTON DRIVE
 COLORADO SPRINGS, COLORADO 80907

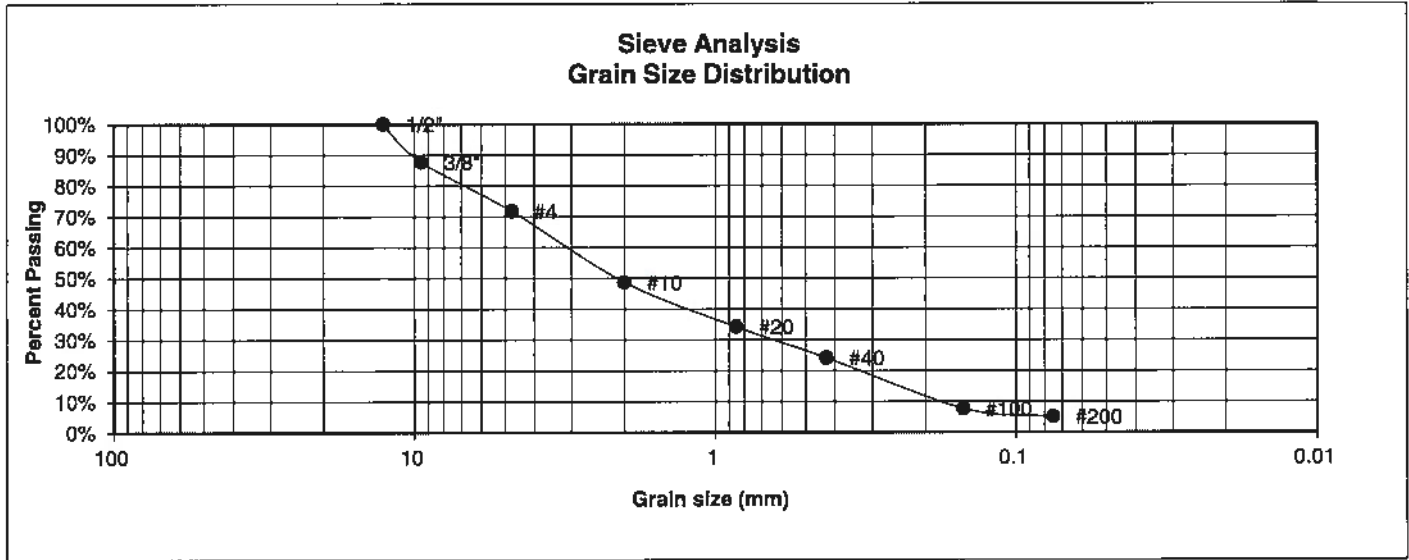
**LABORATORY TEST
RESULTS**

DRAWN:	DATE:	CHECKED: <i>LLL</i>	DATE: <i>6/27/22</i>
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JOB NO.:
221305

FIG NO.:
B-3

<u>UNIFIED CLASSIFICATION</u>	SM-SW	<u>CLIENT</u>	FRONT ROW PROPERTIES
<u>SOIL TYPE #</u>	1	<u>PROJECT</u>	SOUTHMOOR DRIVE
<u>TEST BORING #</u>	6	<u>JOB NO.</u>	221305
<u>DEPTH (FT)</u>	5	<u>TEST BY</u>	BL



<u>U.S. Sieve #</u>	<u>Percent Finer</u>
3"	
1 1/2"	
3/4"	
1/2"	100.0%
3/8"	87.7%
4	71.8%
10	48.6%
20	34.2%
40	24.1%
100	7.7%
200	5.1%

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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505 ELKTON DRIVE
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**LABORATORY TEST
RESULTS**

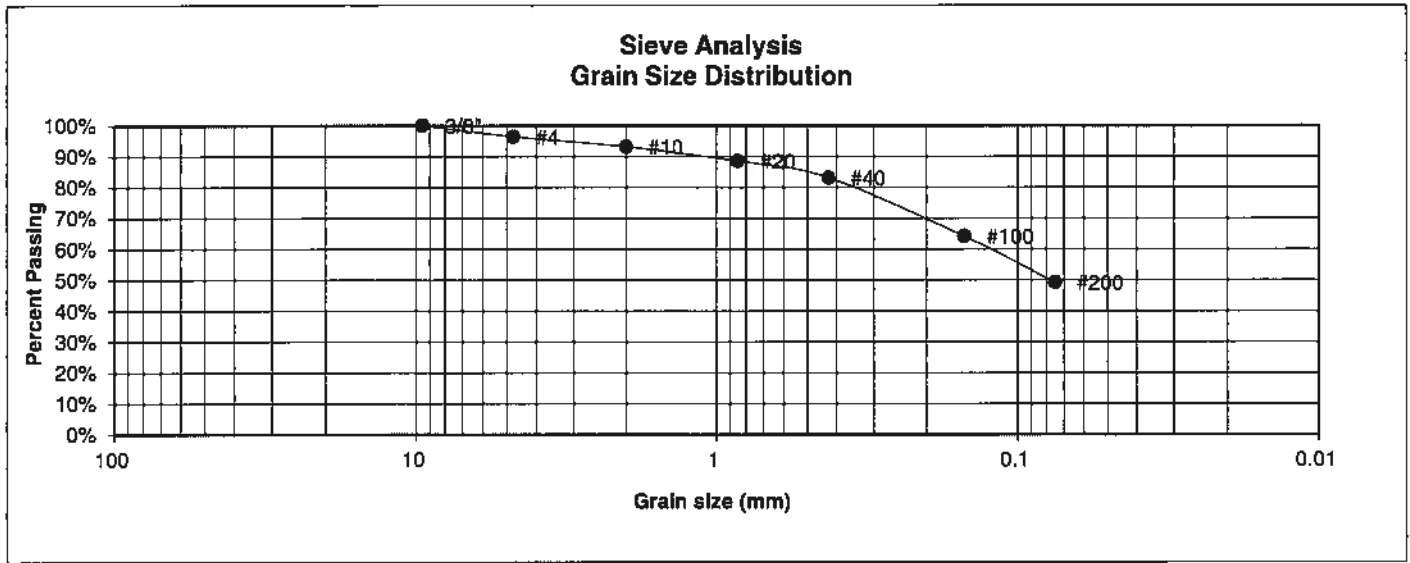
<u>DRAWN:</u>	<u>DATE:</u>	<u>CHECKED:</u> LLL	<u>DATE:</u> 6/27/22
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JOB NO.:
221305

FIG NO.:

B-4

<u>UNIFIED CLASSIFICATION</u>	SC	<u>CLIENT</u>	FRONT ROW PROPERTIES
<u>SOIL TYPE #</u>	1	<u>PROJECT</u>	SOUTHMOOR DRIVE
<u>TEST BORING #</u>	9	<u>JOB NO.</u>	221305
<u>DEPTH (FT)</u>	2-3	<u>TEST BY</u>	BL



<u>U.S. Sieve #</u>	<u>Percent Finer</u>
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	100.0%
4	96.4%
10	93.2%
20	88.5%
40	83.1%
100	64.2%
200	49.1%

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:
LLL

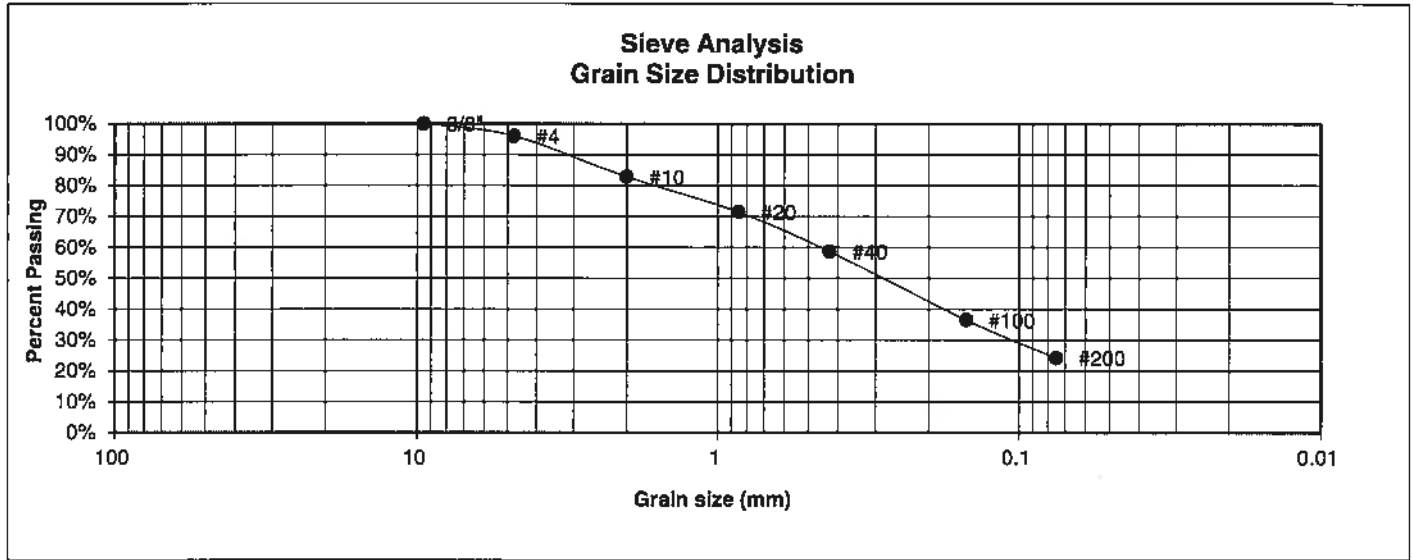
DATE:
6/27/22

JOB NO.:
221305

FIG NO.:

B-5

<u>UNIFIED CLASSIFICATION</u>	SM	<u>CLIENT</u>	FRONT ROW PROPERTIES
<u>SOIL TYPE #</u>	1	<u>PROJECT</u>	SOUTHMOOR DRIVE
<u>TEST BORING #</u>	10	<u>JOB NO.</u>	221305
<u>DEPTH (FT)</u>	5	<u>TEST BY</u>	BL



<u>U.S. Sieve #</u>	<u>Percent Finer</u>
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	100.0%
4	96.0%
10	82.8%
20	71.4%
40	58.6%
100	36.5%
200	24.2%

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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 505 ELKTON DRIVE
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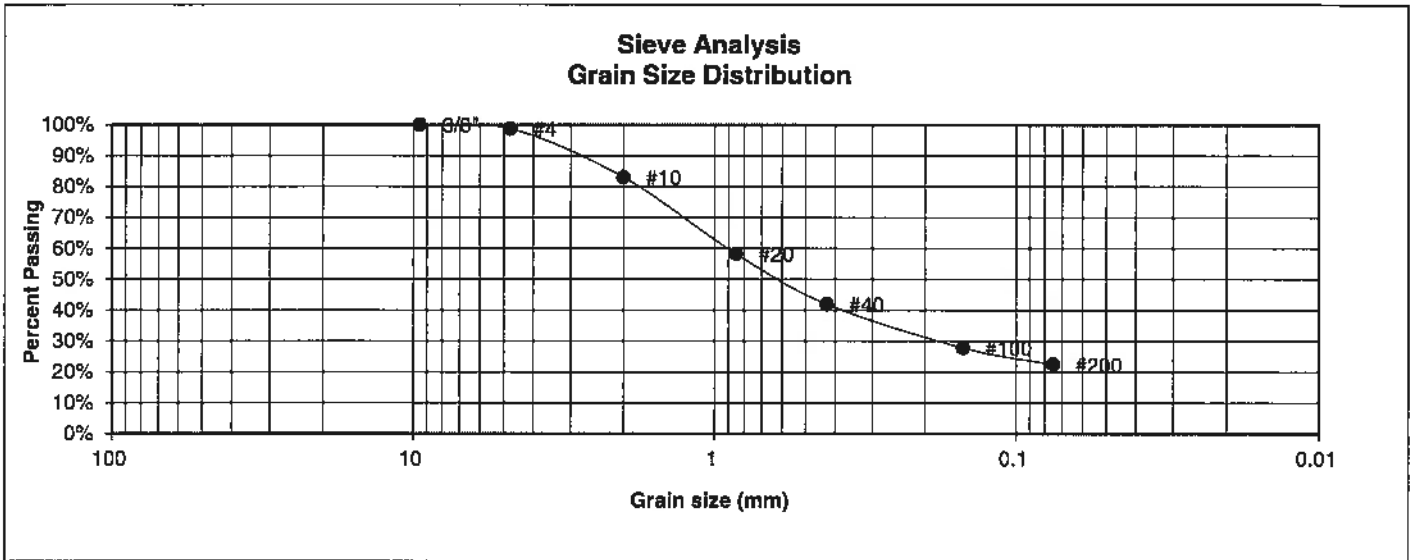
**LABORATORY TEST
RESULTS**

<u>DRAWN:</u>	<u>DATE:</u>	<u>CHECKED:</u> LLL	<u>DATE:</u> 6/27/22
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JOB NO.:
221305

FIG NO.:
B-4

<u>UNIFIED CLASSIFICATION</u>	SM	<u>CLIENT</u>	FRONT ROW PROPERTIES
<u>SOIL TYPE #</u>	1	<u>PROJECT</u>	SOUTHMOOR DRIVE
<u>TEST BORING #</u>	11	<u>JOB NO.</u>	221305
<u>DEPTH (FT)</u>	10	<u>TEST BY</u>	BL



<u>U.S. Sieve #</u>	<u>Percent Finer</u>
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	100.0%
4	98.7%
10	83.0%
20	58.2%
40	41.9%
100	27.8%
200	22.4%

- 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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 505 ELKTON DRIVE
 COLORADO SPRINGS, COLORADO 80907

LABORATORY TEST RESULTS

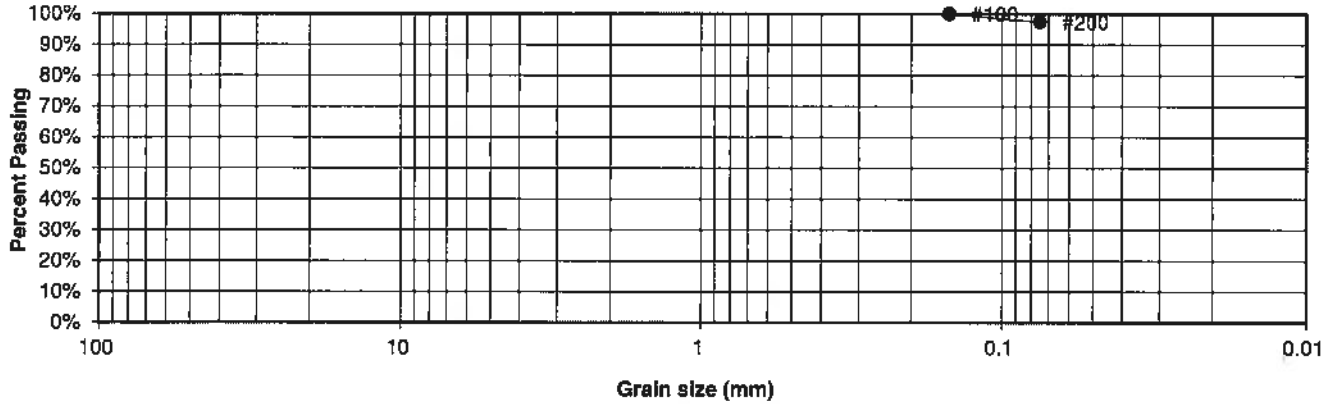
<u>DRAWN:</u>	<u>DATE:</u>	<u>CHECKED:</u> LLL	<u>DATE:</u> 6/27/22
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JOB NO.:
221305

FIG NO.:
B-7

<u>UNIFIED CLASSIFICATION</u>	ML	<u>CLIENT</u>	FRONT ROW PROPERTIES
<u>SOIL TYPE #</u>	2	<u>PROJECT</u>	SOUTHMOOR DRIVE
<u>TEST BORING #</u>	5	<u>JOB NO.</u>	221305
<u>DEPTH (FT)</u>	15	<u>TEST BY</u>	BL

**Sieve Analysis
Grain Size Distribution**



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	
4	
10	
20	
40	
100	100.0%
200	97.4%

<u>Atterberg Limits</u>	
Plastic Limit	28
Liquid Limit	49
Plastic Index	21

<u>Swell</u>	
Moisture at start	
Moisture at finish	
Moisture increase	
Initial dry density (pcf)	
Swell (psf)	



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**LABORATORY TEST
RESULTS**

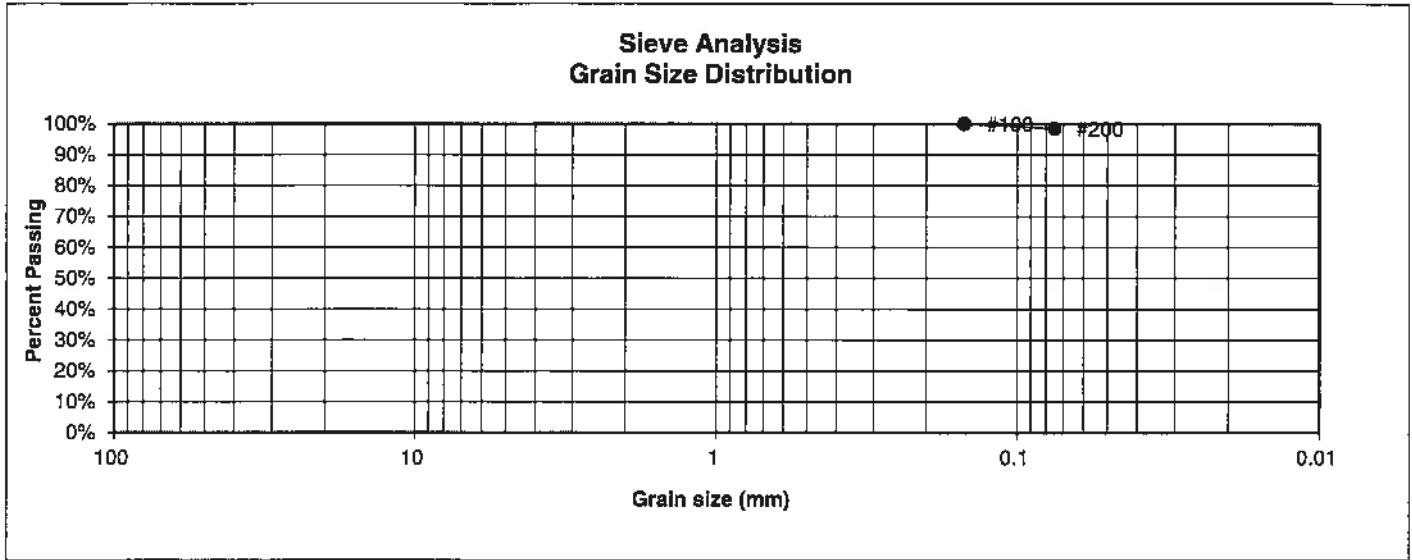
DRAWN:	DATE:	CHECKED: LLL	DATE: 6/27/22
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JOB NO.:
221305

FIG NO.:

B-8

<u>UNIFIED CLASSIFICATION</u>	CL	<u>CLIENT</u>	FRONT ROW PROPERTIES
<u>SOIL TYPE #</u>	2	<u>PROJECT</u>	SOUTHMOOR DRIVE
<u>TEST BORING #</u>	7	<u>JOB NO.</u>	221305
<u>DEPTH (FT)</u>	15	<u>TEST BY</u>	BL



<u>U.S. Sieve #</u>	<u>Percent Finer</u>
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	
4	
10	
20	
40	
100	100.0%
200	98.5%

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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COLORADO SPRINGS, COLORADO 80907

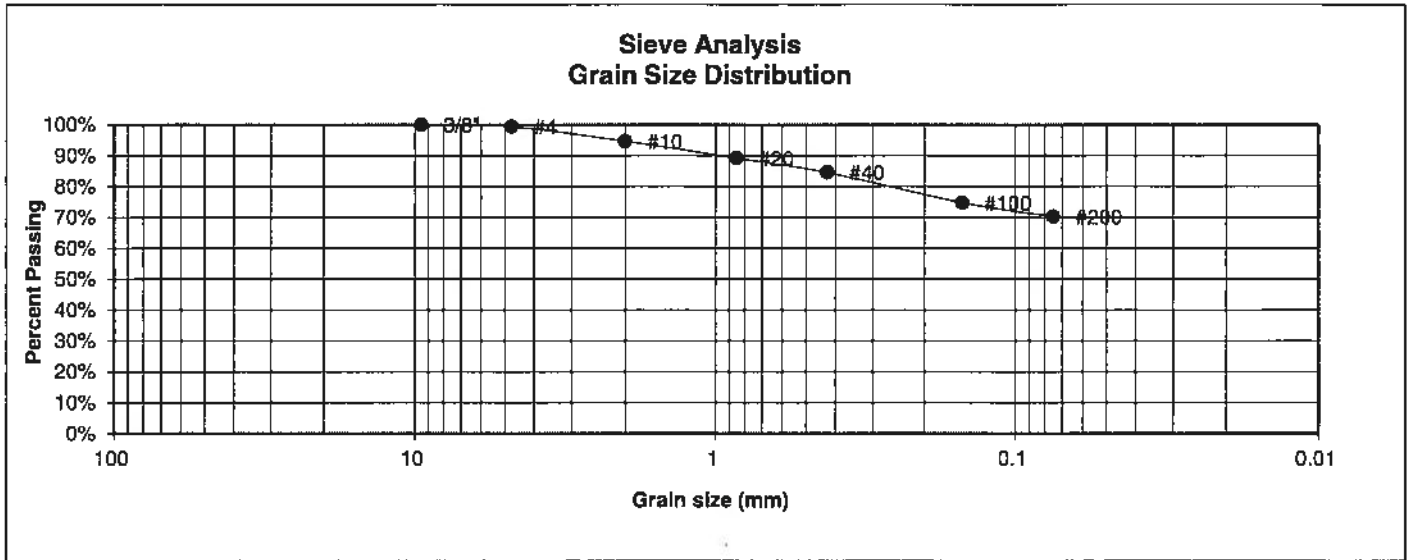
**LABORATORY TEST
RESULTS**

<u>DRAWN:</u>	<u>DATE:</u>	<u>CHECKED:</u> LLL	<u>DATE:</u> 6/27/22
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JOB NO.:
221305

FIG NO.:
B-9

<u>UNIFIED CLASSIFICATION</u>	CL	<u>CLIENT</u>	FRONT ROW PROPERTIES
<u>SOIL TYPE #</u>	2	<u>PROJECT</u>	SOUTHMOOR DRIVE
<u>TEST BORING #</u>	12	<u>JOB NO.</u>	221305
<u>DEPTH (FT)</u>	20	<u>TEST BY</u>	BL



<u>U.S. Sieve #</u>	<u>Percent Finer</u>
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	100.0%
4	99.4%
10	94.7%
20	89.2%
40	84.5%
100	74.7%
200	70.2%

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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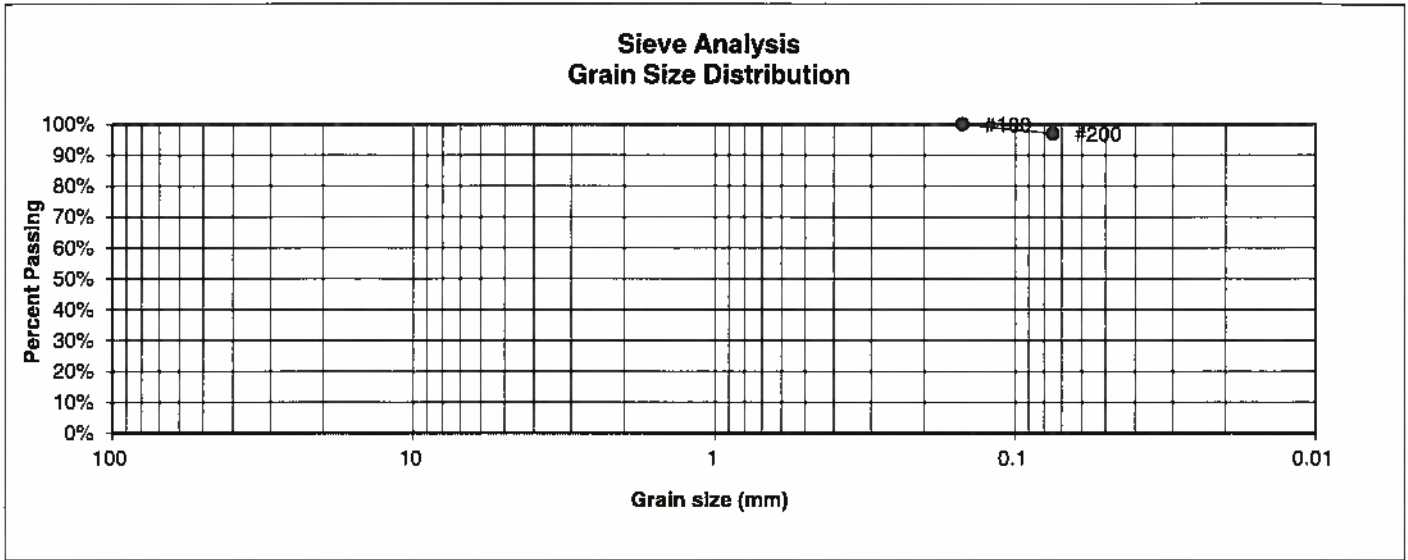
**LABORATORY TEST
 RESULTS**

<u>DRAWN:</u>	<u>DATE:</u>	<u>CHECKED:</u> L.L.L.	<u>DATE:</u> 6/27/22
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JOB NO.:
221305

FIG NO.:
B-10

UNIFIED CLASSIFICATION	ML	CLIENT	FRONT ROW PROPERTIES
SOIL TYPE #	3	PROJECT	SOUTHMOOR DRIVE
TEST BORING #	2	JOB NO.	221305
DEPTH (FT)	15	TEST BY	BL



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	
4	
10	
20	
40	
100	100.0%
200	97.0%

Atterberg Limits	
Plastic Limit	28
Liquid Limit	44
Plastic Index	16

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



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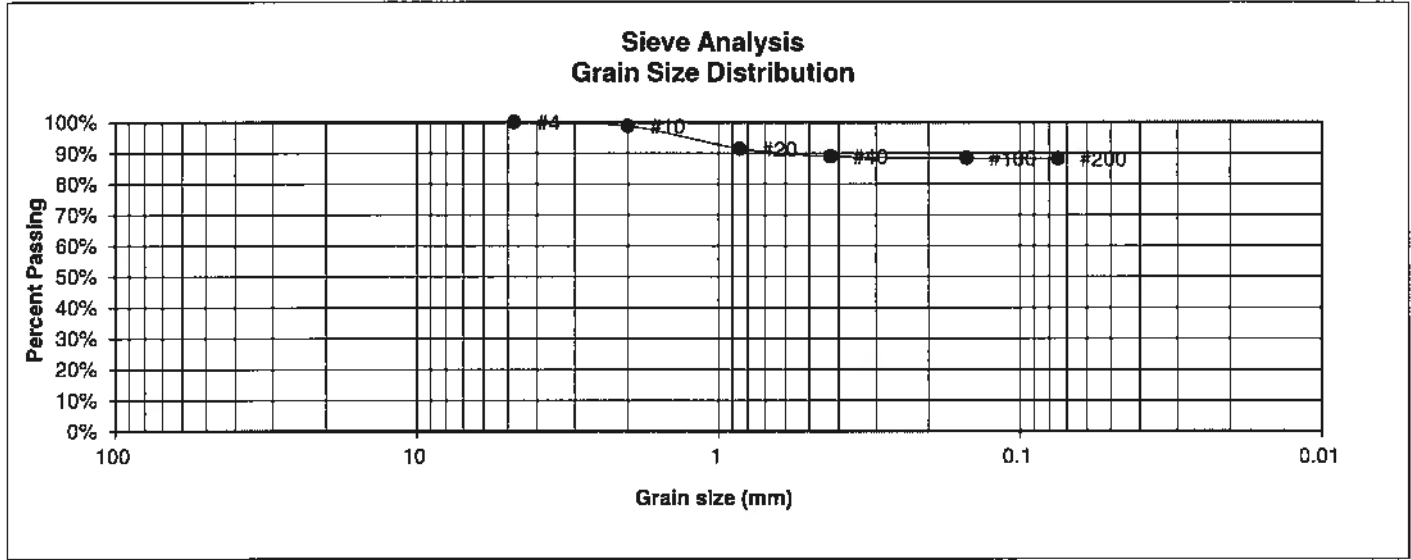
**LABORATORY TEST
RESULTS**

DRAWN:	DATE:	CHECKED:	DATE:
		LLL	6/27/22

JOB NO.:
221305

FIG NO.:
B-11

UNIFIED CLASSIFICATION	ML	CLIENT	FRONT ROW PROPERTIES
SOIL TYPE #	3	PROJECT	SOUTHMOOR DRIVE
TEST BORING #	3	JOB NO.	221305
DEPTH (FT)	20	TEST BY	BL



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	
4	100.0%
10	98.8%
20	91.4%
40	88.9%
100	88.3%
200	88.2%

Atterberg Limits	
Plastic Limit	26
Liquid Limit	40
Plastic Index	14

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



**ENTECH
ENGINEERING, INC.**
505 ELKTON DRIVE
COLORADO SPRINGS, COLORADO 80907

**LABORATORY TEST
RESULTS**

DRAWN:	DATE:	CHECKED: LLL	DATE: 6/27/22
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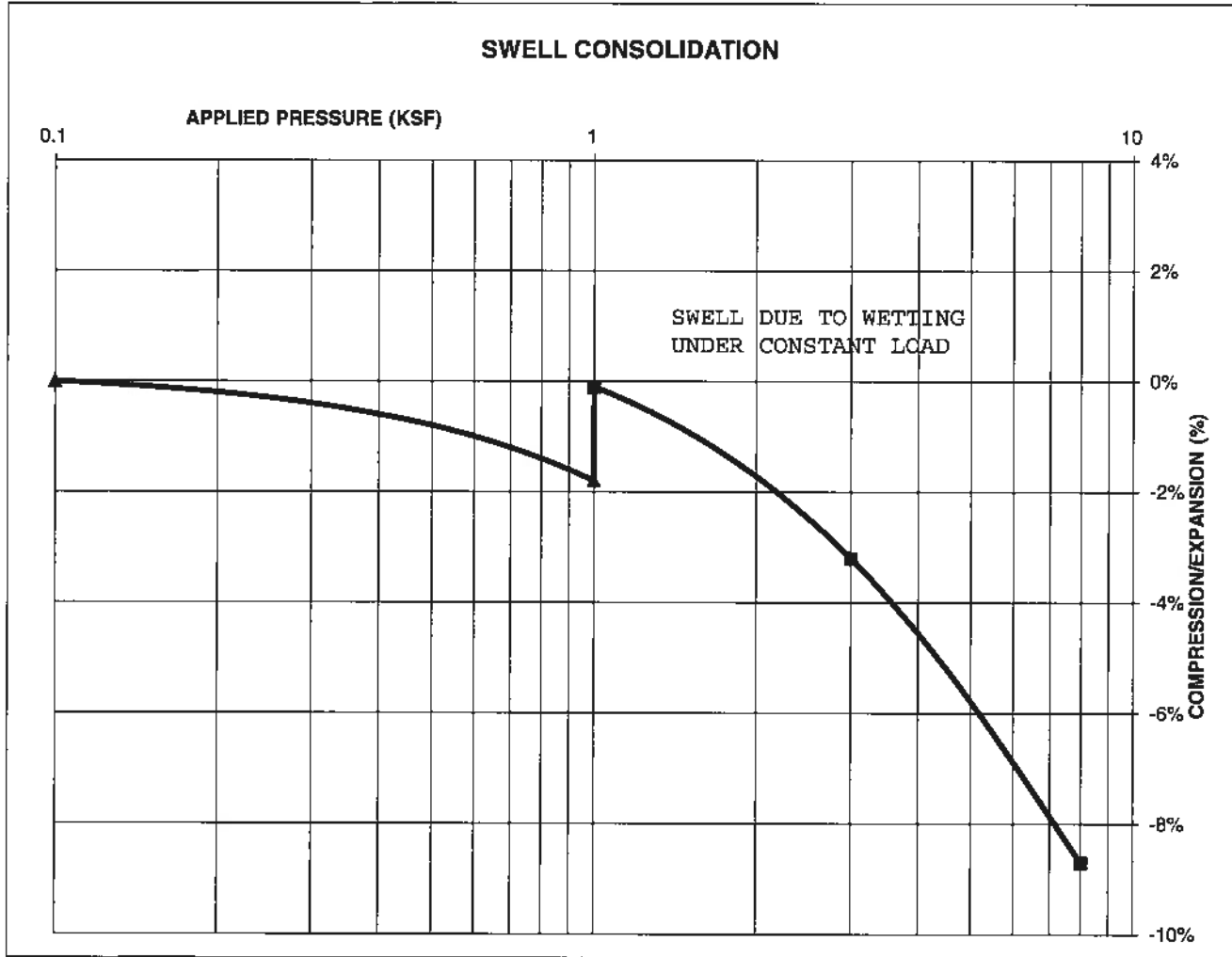
JOB NO.:
221305

FIG NO.:
B-12

CONSOLIDATION TEST RESULTS

TEST BORING #	5	DEPTH(ft)	15
DESCRIPTION	ML	SOIL TYPE	2
NATURAL UNIT DRY WEIGHT (PCF)			100
NATURAL MOISTURE CONTENT			14.9%
SWELL/CONSOLIDATION (%)			1.7%

JOB NO. 221305
 CLIENT FRONT ROW PROPERTIES
 PROJECT SOUTHMOOR DRIVE



ENTECH
ENGINEERING, INC.

505 ELKTON DRIVE
 COLORADO SPRINGS, COLORADO 80907

SWELL CONSOLIDATION
 TEST RESULTS

DRAWN:

DATE:

CHECKED:

DATE:

LLL

6/27/22

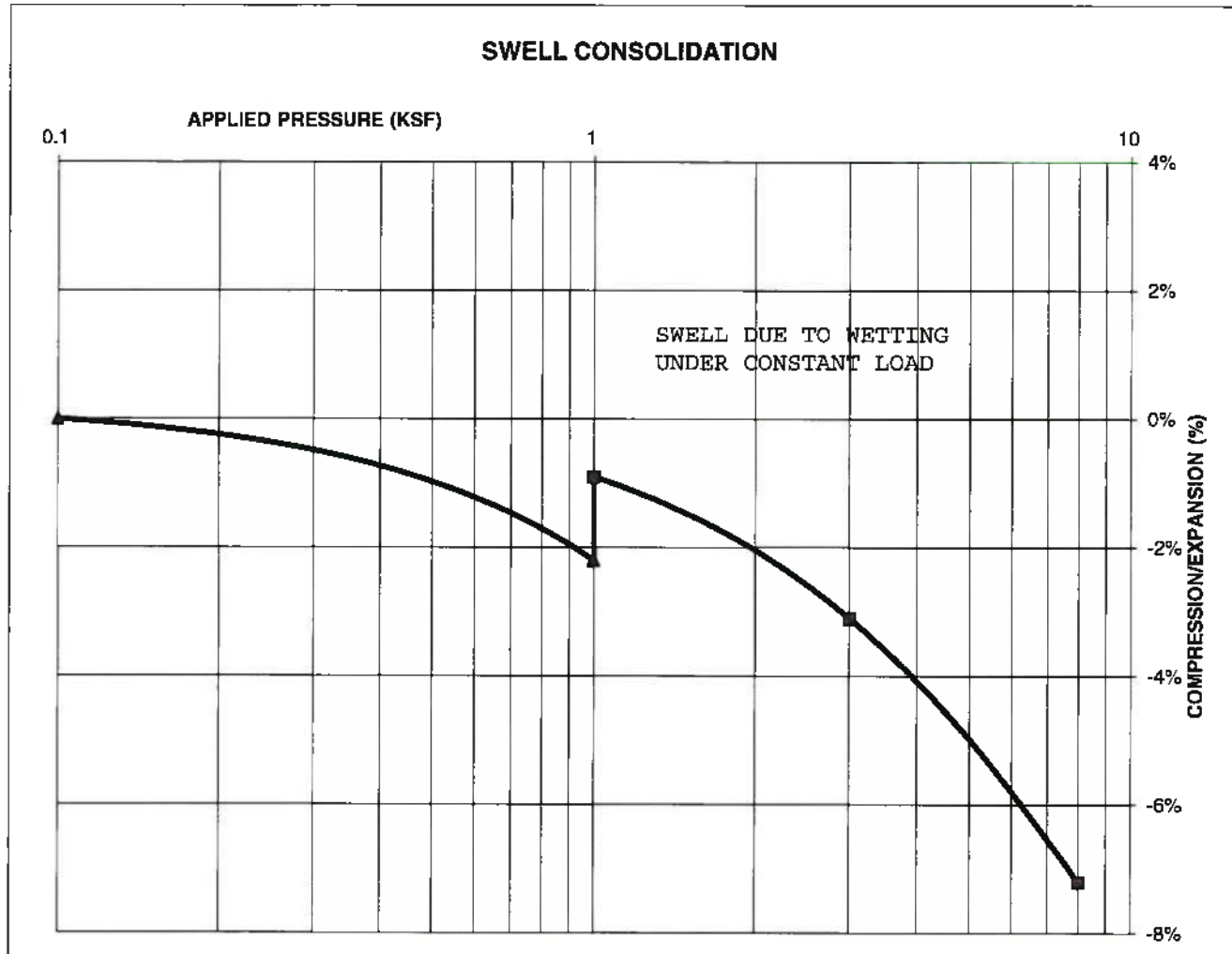
JOB NO:
 221305

FIG NO:
 B-13

CONSOLIDATION TEST RESULTS

TEST BORING #	7	DEPTH(ft)	15
DESCRIPTION	CL	SOIL TYPE	2
NATURAL UNIT DRY WEIGHT (PCF)	98		
NATURAL MOISTURE CONTENT	21.9%		
SWELL/CONSOLIDATION (%)	1.3%		

JOB NO. 221305
 CLIENT FRONT ROW PROPERTIES
 PROJECT SOUTHMOOR DRIVE



**ENTECH
 ENGINEERING, INC.**

505 ELKTON DRIVE
 COLORADO SPRINGS, COLORADO 80907

**SWELL CONSOLIDATION
 TEST RESULTS**

DRAWN:	DATE:	CHECKED: LLL	DATE: 6/27/22
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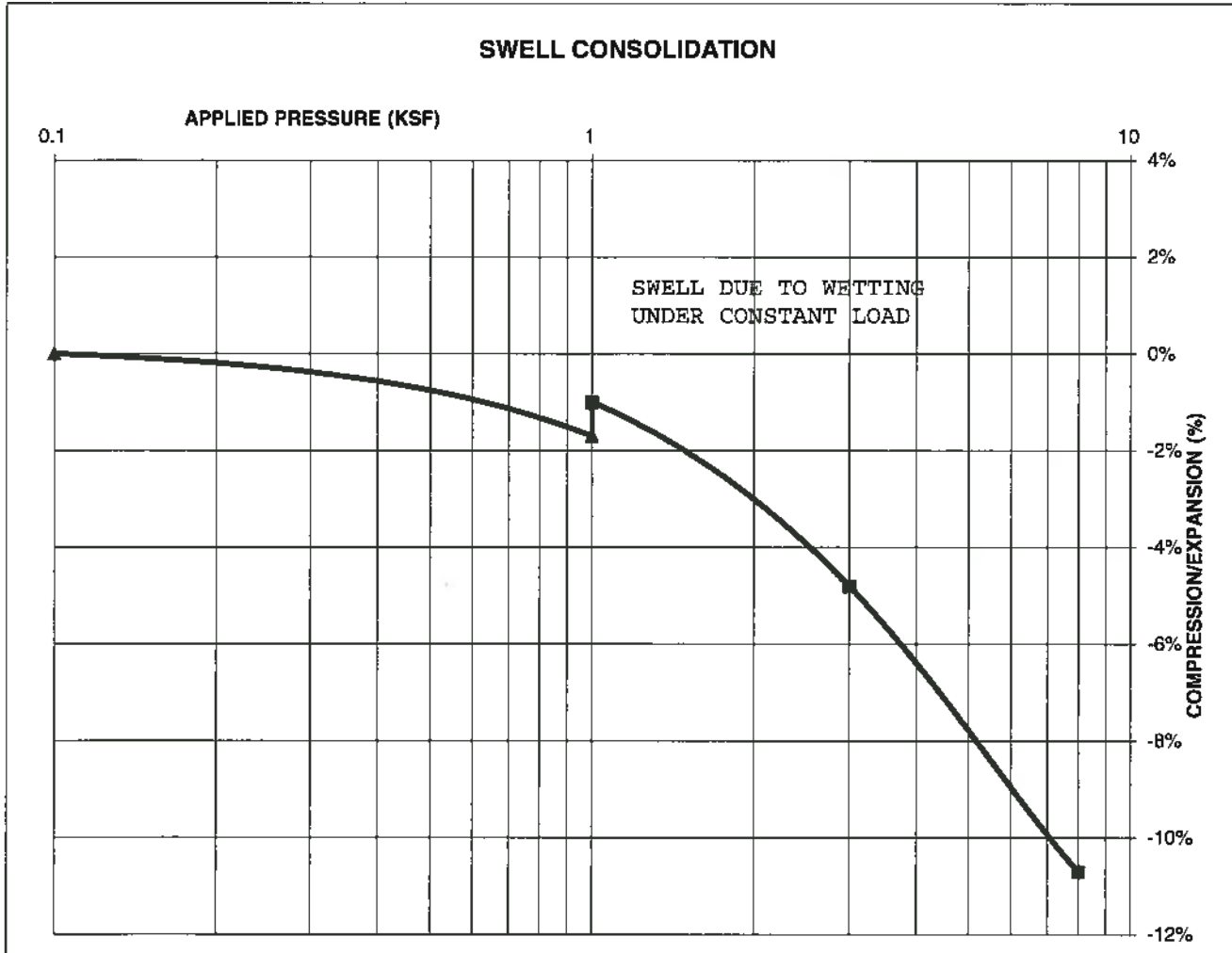
JOB NO.:
221305

FIG NO.:
B-14

CONSOLIDATION TEST RESULTS

TEST BORING #	12	DEPTH(ft)	20
DESCRIPTION	CL	SOIL TYPE	2
NATURAL UNIT DRY WEIGHT (PCF)			89
NATURAL MOISTURE CONTENT			23.4%
SWELL/CONSOLIDATION (%)			0.7%

JOB NO. 221305
 CLIENT FRONT ROW PROPERTIES
 PROJECT SOUTHMOOR DRIVE



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ENGINEERING, INC.

505 ELKTON DRIVE
 COLORADO SPRINGS, COLORADO 80907

**SWELL CONSOLIDATION
 TEST RESULTS**

DRAWN:

DATE:

CHECKED: *LLL*

DATE: *6/27/22*

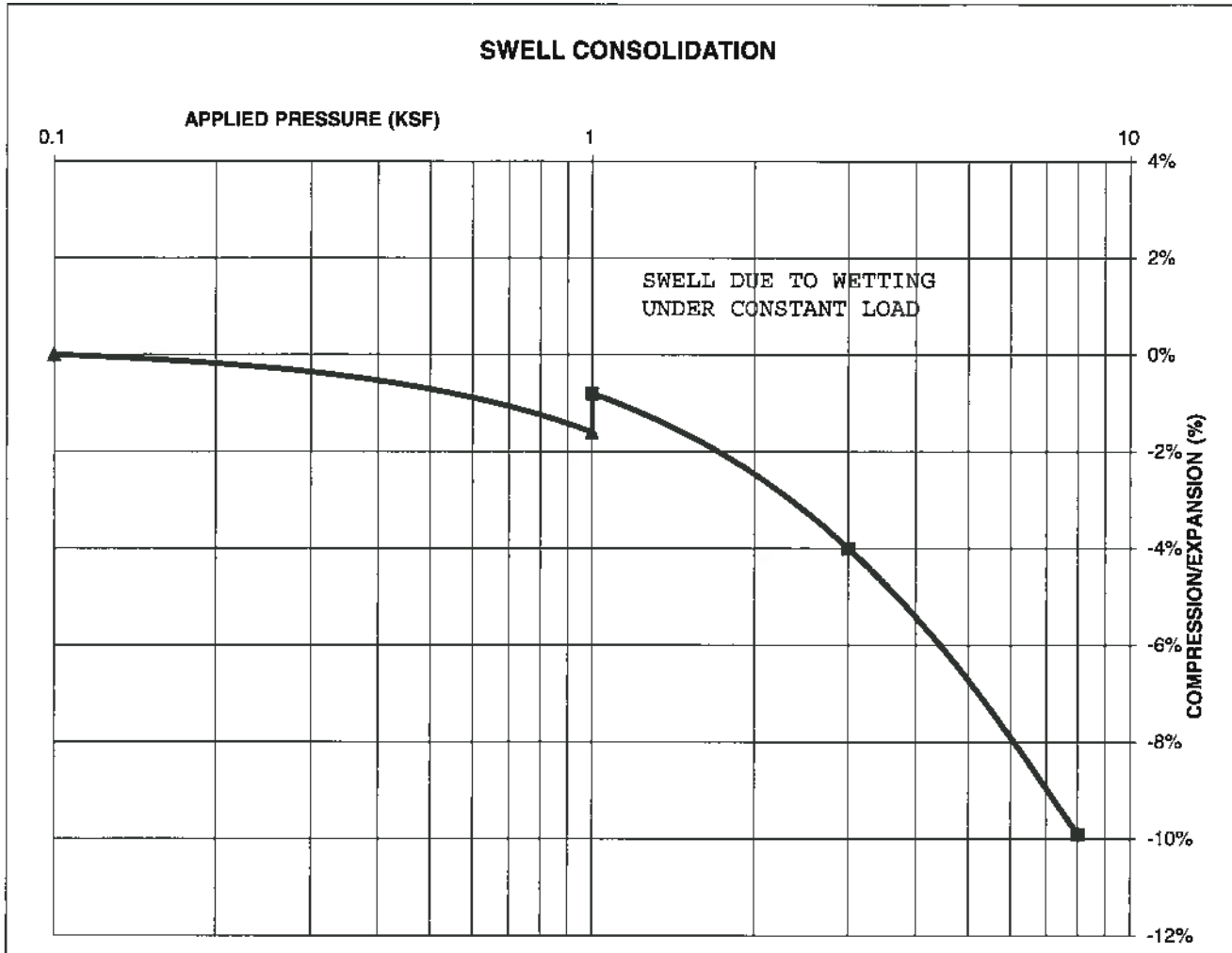
JOB NO.:
 221305

FIG NO.:
B-15

CONSOLIDATION TEST RESULTS

TEST BORING #	2	DEPTH(ft)	15
DESCRIPTION	ML	SOIL TYPE	3
NATURAL UNIT DRY WEIGHT (PCF)			98
NATURAL MOISTURE CONTENT			15.1%
SWELL/CONSOLIDATION (%)			0.8%

JOB NO. 221305
 CLIENT FRONT ROW PROPERTIES
 PROJECT SOUTHMOOR DRIVE



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ENGINEERING, INC.

505 ELKTON DRIVE
 COLORADO SPRINGS, COLORADO 80907

**SWELL CONSOLIDATION
 TEST RESULTS**

DRAWN:

DATE:

CHECKED:
LLL

DATE:

6/27/22

JOB NO.:
 221305

FIG NO.:
B-16



**APPENDIX C: EEI, Infiltration Rates (Percolation
Test Method), Job No. 222077**



ENTECH
ENGINEERING, INC.

505 ELKTON DRIVE
COLORADO SPRINGS, CO 80907
PHONE (719) 531-5599
FAX (719) 531-5238

October 26, 2022

Front Row Properties
1378 Promontory Bluff View
Colorado Springs, CO 80921

Attn: Ron Waldthausen

Re: Infiltration Rates (Percolation Test Method)
Southmoor Drive
Parcel Nos. 6513314015, 6513300021, 6524200052, and 6524200053
Fountain, Colorado

Dear Mr. Waldthausen:

As requested, personnel of Entech Engineering, Inc. have performed percolation testing at the above referenced site to evaluate the site soils to determine the infiltration rate for the proposed detention pond.

The testing was performed on October 21, 2022. The site vicinity map is shown in Figure 1 and the test locations are shown in Figure 2. The Test Boring Logs, Percolation Test results, Infiltration Rates, and Laboratory Test results are shown in Figures 3 through 11. Soils encountered in the profile and percolation hole consisted of silty to very silty sand. Bedrock and groundwater were not encountered in the profile holes, which was drilled to 10 feet.

The percolation rates were 4 minutes/inch for P1, 3 minutes/inch for P2, and 4 minutes/inch for P3. The percolation rates correspond to adjusted average Infiltration Rate of 1.95 inches/hour for pond 1, 3.31 inches/hour for pond 2, and 2.15 inches/hour for pond 3.

We trust that this has provided you with the information you required. If you have any questions or need additional information, please do not hesitate to contact us.

Respectfully Submitted,

ENTECH ENGINEERING, INC.

Logan L. Langford, P.G.
Geologist

LLL/jr

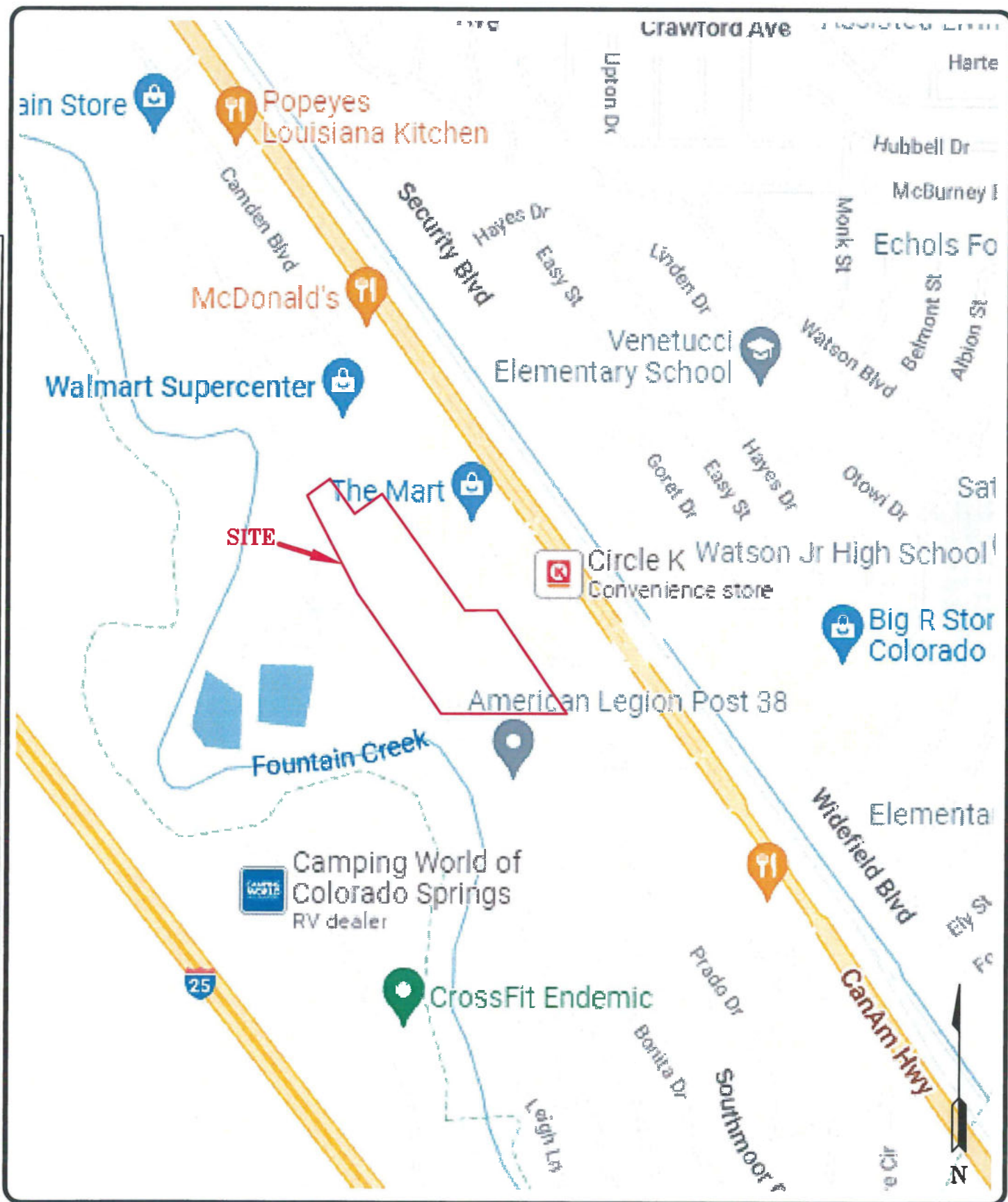
Encl.

Entech Job No. 222077
AAprojects/2022/222077 Infiltration Rate



Reviewed by:

Austin M. Nossokoff, P.E.
Project Engineer



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

**VICINITY MAP
 SOUTHMOOR DRIVE
 FOUNTAIN, CO
 FOR: FRONT ROW PROPERTIES**

DRAWN:
 JHR

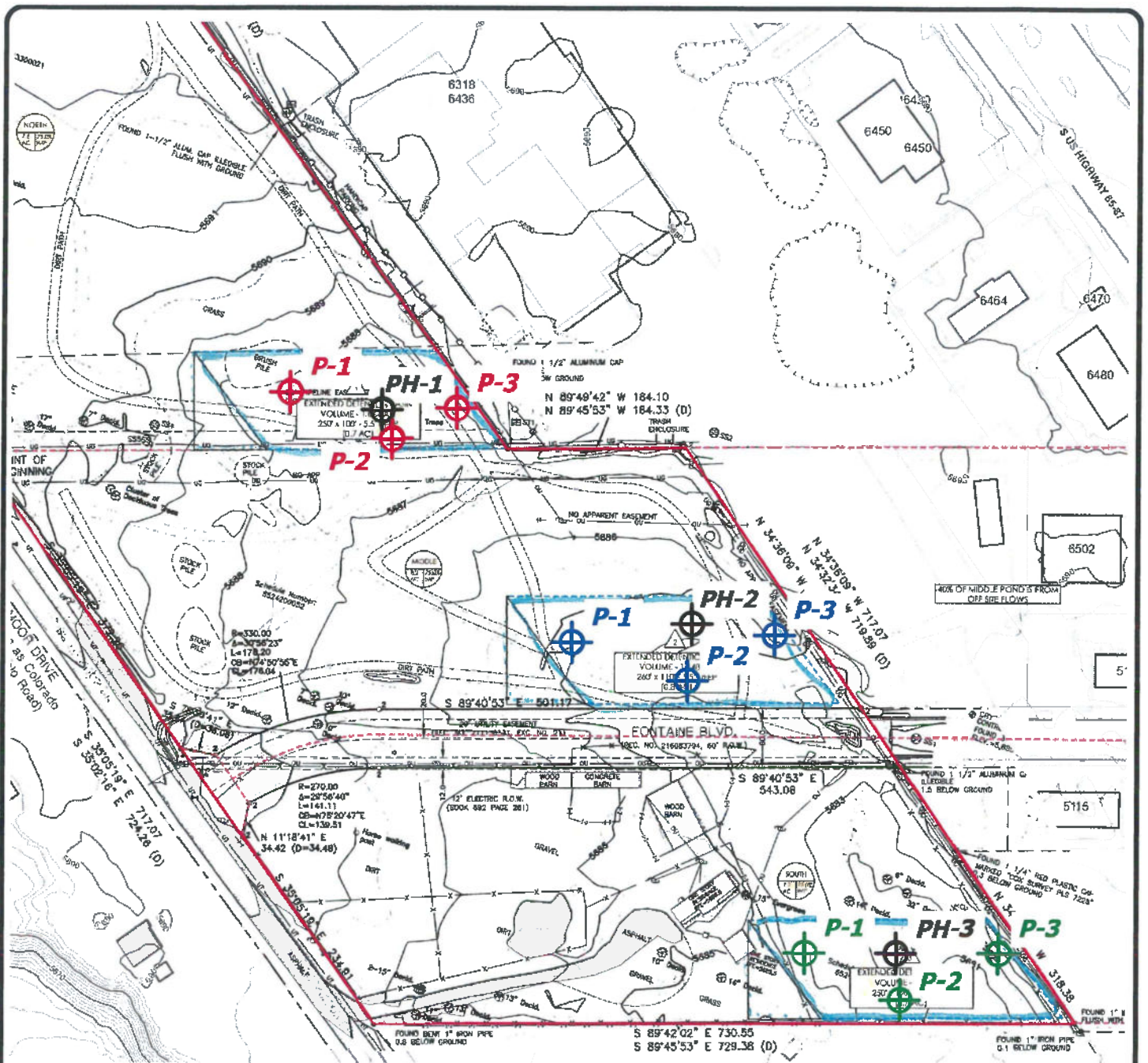
DATE:
 10/21/22





CHECKED:
 LLL

DATE:

JOB NO.:
 222077

FIG NO.:
 1



-  **PH- APPROXIMATE PROFILE HOLE LOCATION AND NUMBER**
-  **P- APPROXIMATE PERCOLATION HOLE LOCATION AND NUMBER (POND 1)**
-  **P- APPROXIMATE PERCOLATION HOLE LOCATION AND NUMBER (POND 2)**
-  **P- APPROXIMATE PERCOLATION HOLE LOCATION AND NUMBER (POND 3)**




ENTECH
ENGINEERING, INC.
305 ELKTON DRIVE
COLORADO SPRINGS, CO 80907 (719) 531-5999

SITE PLAN/PERCOLATION HOLE LOCATION MAP			
SOUTHMOOR DRIVE			
FOUNTAIN, COLORADO			
FOR: FRONT ROW PROPERTIES			
DRAWN: JHR	DATE: 10/21/22	CHECKED: LLL	DATE:

JOB NO.: 222077
FIG NO.: 2

TEST BORING NO. 1
 DATE DRILLED 10/19/2022
 Job # 222077

TEST BORING NO. 2
 DATE DRILLED 10/19/2022
 CLIENT FRONT ROW PROPERTIES
 LOCATION SOUTHMOOR DRIVE

REMARKS

REMARKS

DRY TO 10', 10/19/22

DRY TO 10', 10/19/22

SAND, SILTY, FINE TO COARSE
 GRAINED, TAN, MEDIUM DENSE,
 MOIST TO DRY

SAND, VERY SILTY, FINE TO
 MEDIUM GRAINED, TAN, MEDIUM
 DENSE TO DENSE, MOIST

* - BULK SAMPLE TAKEN

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type	Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
5			23	3.5		5			24	6.7	
5			26	1.3		5			12	4.4	
10			*	1.4		10			30	4.6	
15						15					
20						20					



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505 ELKTON DRIVE
 COLORADO SPRINGS, COLORADO 80907

TEST BORING LOG

DRAWN:

DATE:

CHECKED:

DATE:

JHR

10-21-22

JOB NO.:
 222077

FIG NO.:

3

TEST BORING NO. 3
 DATE DRILLED 10/19/2022
 Job # 222077

TEST BORING NO.
 DATE DRILLED
 CLIENT
 LOCATION FRONT ROW PROPERTIES
 SOUTHMOOR DRIVE

REMARKS

REMARKS

DRY TO 10', 10/19/22

SAND, VERY SILTY, FINE TO
 MEDIUM GRAINED, TAN, MEDIUM
 DENSE, MOIST TO DRY

* - BULK SAMPLE TAKEN

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type	Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
5			20	6.0		5					
5			15	3.0		5					
10			*	1.9		10					
15						15					
20						20					



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TEST BORING LOG

DRAWN:

DATE:

CHECKED:

DATE:

JHR

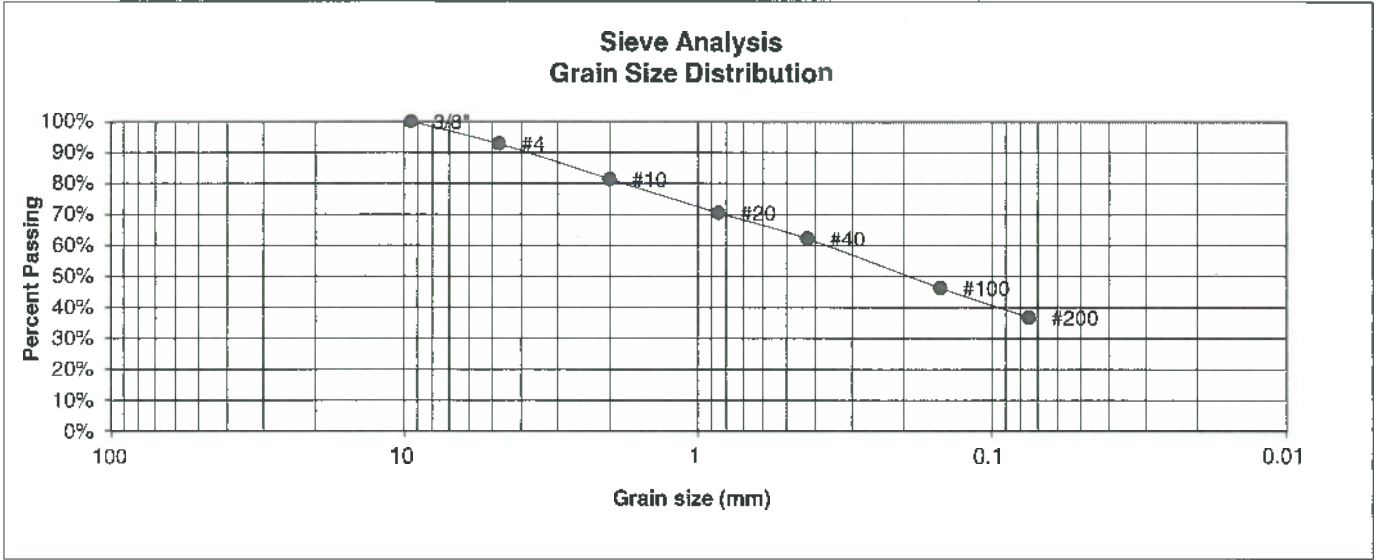
10-21-22

JOB NO.:
 222077

FIG NO.:

4

BORING NO.	PH-1	UNIFIED CLASSIFICATION	SM	TEST BY	BL
DEPTH(ft)	2-3	AASHTO CLASSIFICATION		JOB NO.	222077
CLIENT	FRONT ROW PROPERTIES				
PROJECT	SOUTHMOOR DRIVE				



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	100.0%
4	92.8%
10	81.3%
20	70.5%
40	62.2%
100	46.3%
200	36.7%

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:

JHR

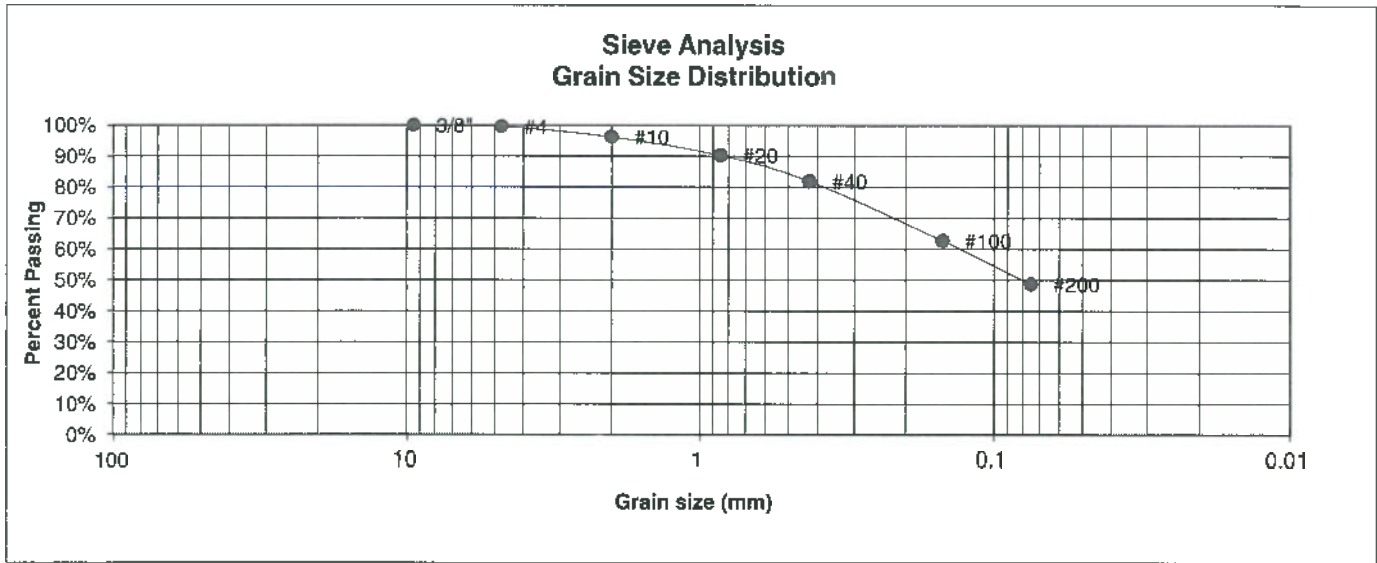
10-24-22

JOB NO.:

FIG NO.:

5

BORING NO.	PH-2	UNIFIED CLASSIFICATION	SM	TEST BY	BL
DEPTH(ft)	2-3	AASHTO CLASSIFICATION		JOB NO.	222077
CLIENT	FRONT ROW PROPERTIES				
PROJECT	SOUTHMOOR DRIVE				



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	100.0%
4	99.5%
10	96.2%
20	90.3%
40	81.9%
100	62.7%
200	48.6%

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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505 ELKTON DRIVE
COLORADO SPRINGS, COLORADO 80907

LABORATORY TEST RESULTS

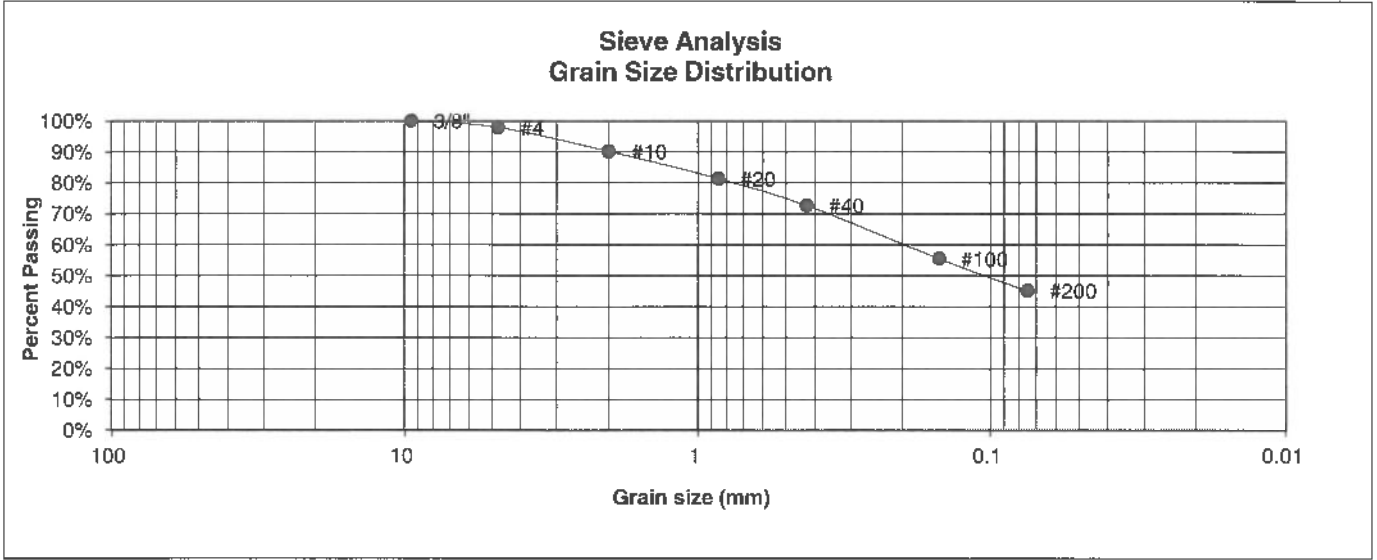
DRAWN:	DATE:	CHECKED:	DATE:
		JHR	10-21-22

JOB NO.:

FIG NO.:

6

BORING NO.	PH-3	UNIFIED CLASSIFICATION	SM	TEST BY	BL
DEPTH(ft)	2-3	AASHTO CLASSIFICATION		JOB NO.	222077
CLIENT	FRONT ROW PROPERTIES				
PROJECT	SOUTHMOOR DRIVE				



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	100.0%
4	97.8%
10	90.1%
20	81.3%
40	72.6%
100	55.5%
200	45.1%

- 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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505 ELKTON DRIVE
COLORADO SPRINGS, COLORADO 80907

LABORATORY TEST RESULTS

DRAWN:	DATE:	CHECKED:	DATE:
		JMR	10-21-22

JOB NO.:

FIG NO.:

7

Client: Front Row Properties
Test Location: Southmoor Drive

Job Number: 222077

PERCOLATION HOLES #1

Date Holes Prepared: 10/19/2022

Date Hole Completed: 10/20/2022

Hole No. 1

Depth: 59"

Hole No. 2

Depth: 61"

Hole No. 3

Depth: 70"

<u>Trial</u>	<u>Time (min.)</u>	<u>Water Level Change (in.)</u>	<u>Trial</u>	<u>Time (min.)</u>	<u>Water Level Change (in.)</u>	<u>Trial</u>	<u>Time (min.)</u>	<u>Water Level Change (in.)</u>
1	5	1	1	5	2	1	5	1
2	5	2	2	5	2	2	5	1
3	5	1	3	5	2	3	5	1

Perc Rate (min./in.): 4

Perc Rate (min./in.): 2.5

Perc Rate (min./in.): 5

Average Perc Rate (min./in.) 4

PROFILE HOLE

Date Profile Hole Completed: 10/19/2022

Depth

0-10'

Visual Classification

Sand, silty, fine to coarse grained, tan

Remarks

No Bedrock
No Groundwater

23 Blows / ft. @ 2'

26 Blows / ft. @ 4'

Remarks:

GPS Coordinates: 38° 73.74694' N, -104° 73.4822' W

Observer: N. Schletzbaum

By:



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505 ELKTON DRIVE
COLORADO SPRINGS, COLORADO 80907

PERCOLATION TEST RESULTS

DRAWN:

DATE:

CHECKED: JHR

DATE: 10/21/22

JOB NO.:

222077

FIG NO.:

8

Client: Front Row Properties
Test Location: Southmoor Drive

Job Number: 222077

PERCOLATION HOLES #2

Date Holes Prepared: 10/19/2022

Date Hole Completed: 10/20/2022

Hole No. 4
Depth:

Hole No. 5
Depth:

Hole No. 6
Depth:

<u>Trial</u>	<u>Time (min.)</u>	<u>Water Level Change (in.)</u>	<u>Trial</u>	<u>Time (min.)</u>	<u>Water Level Change (in.)</u>	<u>Trial</u>	<u>Time (min.)</u>	<u>Water Level Change (in.)</u>
1	5	1 1/2	1	5	0	1	5	3
2	5	1/2	2	5	0	2	5	2
3	5	1	3	5	1	3	5	2

Perc Rate (min./in.): 3 1/2

Perc Rate (min./in.): 2

Perc Rate (min./in.): 2

Average Perc Rate (min./in.) 3

PROFILE HOLE

Date Profile Hole Completed: 10/19/2022

Depth Visual Classification
0-10' Sand, very silty, fine to coarse grained, tan

Remarks
No Bedrock
No Groundwater

24 Blows / ft. @ 2'
12 Blows / ft. @ 4'
30 Blows / ft. @ 9'

Remarks:

GPS Coordinates: 38° 73.76873' N, -104° 73.3695' W

Observer: N. Schletzbaum

By:



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ENGINEERING, INC.

505 ELKTON DRIVE
COLORADO SPRINGS, COLORADO 80907

PERCOLATION TEST RESULTS

DRAWN:

DATE:

CHECKED:

DATE:

JHR

10-22-22

JOB NO.:

FIG NO.:

9

Client: Front Row Properties
Test Location: Southmoor Drive

Job Number: 222077

PERCOLATION HOLES #3

Date Holes Prepared: 10/19/2022

Date Hole Completed: 10/20/2022

Hole No. 7
Depth:

Hole No. 8
Depth:

Hole No. 9
Depth:

<u>Trial</u>	<u>Time (min.)</u>	<u>Water Level Change (in.)</u>	<u>Trial</u>	<u>Time (min.)</u>	<u>Water Level Change (in.)</u>	<u>Trial</u>	<u>Time (min.)</u>	<u>Water Level Change (in.)</u>
1	5	1	1	5	2	1	5	2
2	5	1	2	5	1	2	5	1
3	5	1	3	5	1	3	5	2

Perc Rate (min./in.): 5

Perc Rate (min./in.): 4

Perc Rate (min./in.): 3

Average Perc Rate (min./in.) 4

PROFILE HOLE

Date Profile Hole Completed: 10/19/2022

Depth
0-10'

Visual Classification
Sand, very silty, fine to coarse grained, tan

Remarks

No Bedrock
No Groundwater

20 Blows / ft. @ 2'
15 Blows / ft. @ 4'

Remarks:

GPS Coordinates: 38° 73.59461' N, -104° 73.2943' W

Observer: N. Schletzbaum

By:



ENTECH
ENGINEERING, INC.

505 ELKTON DRIVE
COLORADO SPRINGS, COLORADO 80907

PERCOLATION TEST RESULTS

DRAWN:

DATE:

CHECKED:
JHR

DATE:
10-21-22

JOB NO.:

FIG NO.:

10

Infiltration Rate (I) = Percolation Rate (P) / Reduction Factor(Rf)
 $I = P/R_f$

CLIENT FRONT ROW PROPERTIES
PROJECT SOUTHMOOR DRIVE
JOB NO. 222077

$$R_f = [(2d_1 - \Delta d) / \text{dia}] + 1$$

d_1 = initial water depth (in.)

Δd = final water level drop (in.)

dia = diameter of the percolation hole (in.)

Test No. P1 (PH-1)

Perc Rate= 15 in/hr
dia = 8

P1

d_1 = 36.0
 Δd = 1.0
 R_f = 9.9

I = 1.519 in/hr

(PH-1) I AVG= 1.954 in/hr

Test No. P2 (PH-1)

Perc Rate= 24 in/hr
dia = 8

P2

d_1 = 26.0
 Δd = 2.0
 R_f = 7.3

I = 3.310 in/hr

Test No. P3 (PH-1)

Perc Rate= 12 in/hr
dia = 8

P3

d_1 = 43.0
 Δd = 1.0
 R_f = 11.6

I = 1.032 in/hr

Test No. P1 (PH-2)

Perc Rate= 17.14 in/hr
dia = 8

P1

d_1 = 32.0
 Δd = 1.0
 R_f = 8.9

I = 1.932 in/hr

(PH-2) I AVG= 3.313 in/hr

Test No. P2 (PH-2)

Perc Rate= 30.00 in/hr
dia = 8

P2

d_1 = 19.0
 Δd = 0.0
 R_f = 5.8

I = 5.217 in/hr

Test No. P3 (PH-2)

Perc Rate= 30 in/hr
dia = 8

P3

d_1 = 40.0
 Δd = 2.0
 R_f = 10.8

I = 2.791 in/hr

Test No. P1 (PH-3)

Perc Rate= 12.00 in/hr
dia = 8

P1

d_1 = 21.0
 Δd = 1.0
 R_f = 6.1

I = 1.959 in/hr

(PH-3) I AVG= 2.149 in/hr

Test No. P2 (PH-3)

Perc Rate= 15.00 in/hr
dia = 8

P2

d_1 = 39.0
 Δd = 1.0
 R_f = 10.6

I = 1.412 in/hr

Test No. P3 (PH-3)

Perc Rate= 20 in/hr
dia = 8

P3

d_1 = 23.0
 Δd = 2.0
 R_f = 6.5

I = 3.077 in/hr



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505 ELKTON DRIVE
COLORADO SPRINGS, COLORADO 80907

INFILTRATION TEST RESULTS

DRAWN:

DATE:

CHECKED:
JHL

DATE:
10-26-22

JOB NO.:

FIG NO.:

11

APPENDIX E - SUBSURFACE SOILS INVESTIGATION REPORT



ENTECH
ENGINEERING, INC.

505 ELKTON DRIVE
COLORADO SPRINGS, CO 80907
PHONE (719) 531-5599
FAX (719) 531-5238

June 29, 2022

Front Row Properties
1378 Promontory Bluff View
Colorado Springs, CO 80921

Attn: Ron Waldthausen

Re: Preliminary Subsurface Soil Investigation
Southmoor Properties
Fountain, Colorado

Dear Mr. Waldthausen:

As requested, personnel of Entech Engineering, Inc. have drilled twelve test borings to evaluate the site soil conditions for the anticipated development. This letter presents the results of our soils investigation, laboratory testing, and preliminary foundation recommendations.

SITE CONDITIONS:

The site development has not been determined and will likely consist of commercial and/or residential development with associated site improvements. Adjacent properties consist of commercial shopping center to the north and east, and a mix of rural residential and commercial properties to the west. The location of the site is shown in the vicinity map, Figure, 1. The site is gradually sloping to the southeast. At the time of our site investigation stables and out buildings were located in the southern portion of the site, and the remaining portion of the site was undeveloped. Vegetation consists of field grasses and weeds, with scattered trees in portions of the site, and fill piles were observed in the western portion of the site.

FIELD INVESTIGATION AND LABORATORY TESTING PROGRAM:

Subsurface conditions on the site were explored by drilling twelve test borings across the site. The test borings were drilled at the approximate locations shown on the Site Map/Test Boring Location Map, Figure 2. The borings were drilled to approximately 20 feet below the existing ground surface (bgs). The drilling was performed using a truck-mounted, continuous flight auger-drilling rig supplied and operated by Entech. Boring logs descriptive of the subsurface conditions encountered during drilling are presented in Appendix A. At the conclusion of drilling, observations for groundwater levels were made in the open boreholes.

Soil samples were obtained from the borings utilizing the Standard Penetration Test (ASTM D-1586) using 2-inch O.D. split-barrel and California samplers. Results of the Standard Penetration Test (SPT) are included on the boring logs in terms of N-values expressed in blows per foot (bpf). Soil samples recovered from the borings were visually classified and recorded on the boring logs. The soil classifications were later verified utilizing laboratory testing and grouped by soil type. The soil type numbers are included on the boring logs and in the provided chart. It should be understood that the soil descriptions shown on the boring logs may vary between boring location and sample depth. It should also be noted that the lines of stratigraphic separation shown on the boring logs represent approximate boundaries between soil types and the actual stratigraphic transitions may be more gradual and vary with location.

Moisture content testing (ASTM D-2216) was performed on the samples recovered from the borings, and the results are shown on the boring logs. Grain-Size Analysis Testing (ASTM D-422) was performed on selected samples to assist in classifying the materials encountered in the borings. Volume change testing was performed on selected samples using Swell/Consolidation (ASTM D-4546) tests in order to evaluate potential expansion/compression characteristics of the soil. Sulfate testing was performed on selected samples to evaluate potential for below grade concrete degradation due to sulfate attack. The Laboratory Testing Results are summarized on Table 1 and are presented in Appendix B.

SUBSURFACE CONDITIONS:

Three soil and rock types were encountered during drilling. The soils consisted of Type 1: very clayey sand, clean sand, and silty to slightly silty sand (SC, SW, SM, SM-SW), Type 2: sandy silt and sandy clay (ML, CL). The soils were classified using the Unified Soil Classification System (USCS).

Soil Type 1 classified as very clayey sand, clean sand, and silty to slightly silty sand (SC, SW, SM, SM-SW). The sand was encountered in all test borings from the existing ground surface to depths of 13 to 18 feet bgs, and to the termination of Test Boring Nos. 6, and 8 – 10 (20 feet). Standard Penetration Testing resulted in SPT N-values of 2 to 41 bpf, indicating very loose to dense states. The majority of the sands were encountered at medium dense states. Moisture contents of 1 to 9 percent were measured, indicating dry to moist conditions. Grain size testing resulted in 5 to 49 percent of the soil passing the No. 200 sieve. Atterberg Limits Testing on a sample of the very clayey sand resulted in a liquid limit of 26 and plastic index of 10. Sulfate testing on a sample of very clayey sand resulted in less than 0.1 percent sulfate by weight, indicating a low potential for below grade concrete degradation.

Soil Type 2 is classified as sandy silt and sandy clay (ML, CL). The silt and clay were encountered in five the test borings at depths of 13 to 19 feet bgs, extending to depths ranging from 17 to 19 feet, and the termination of Test Boring Nos. 4, 5, and 12 (20 feet bgs). Standard Penetration Testing resulted in an SPT N-value of 19 to 45 bpf, indicating stiff to very stiff consistencies. Moisture contents of 11 to 22 percent were measured, indicating moist conditions. Grain size testing resulted in 70 to 99 percent of the soil passing the No. 200 sieve. Atterberg Limits Testing resulted in a liquid limit of 49 and a plastic index of 21. Swell/Consolidation Testing resulted in volume changes of 0.7 to 1.7 percent, indicating a low to moderate expansion potential. Sulfate testing on the clay resulted in less than 0.1 percent sulfate by weight, indicating a low potential for below grade concrete degradation.

Soil Type 3 is classified as claystone and shale (CL, ML). The claystone and shale were encountered in four the test borings at depths of 13 to 19 feet bgs, extending to the termination of the test borings (20 feet bgs). Standard Penetration Testing resulted in an SPT N-value of 28 to greater than 50 bpf, indicating stiff to hard consistencies. Moisture contents of 13 to 17 percent were measured, indicating moist conditions. Grain size testing resulted in 88 to 97 percent of the soil passing the No. 200 sieve. Atterberg Limits Testing on the shale resulted in liquid limits of 40 and 44 and plastic indexes of 14 to 16. Swell/Consolidation Testing resulted in a volume change of 0.8 percent, indicating a low expansion potential. Sulfate testing on the shale resulted in 0.00 to 0.02 percent sulfate by weight, indicating a low potential for below grade concrete degradation.

Depth to groundwater was measured in each of the borings at the conclusion and subsequent to drilling. Groundwater was encountered in Test Boring No. 2 at 15.5 feet, groundwater was not

encountered in the remaining test borings were which drilled to depths of 20 feet bgs. It is anticipated groundwater will not affect construction on the site. Development of this site and adjacent properties, as well as seasonal precipitation changes, and changes in runoff may affect groundwater elevations.

GEOTECHNICAL EVALUATION AND RECOMMENDATIONS:

The following discussion is based on the subsurface conditions encountered in the borings drilled for the planned development. If subsurface conditions different from those described herein are encountered during construction or if the project elements change from those described, Entech Engineering, Inc. should be notified so that the evaluation and recommendations presented can be reviewed and revised if necessary.

The site is to be developed with commercial and/or residential structures and associated site improvements. Very loose to loose soils were encountered in several of the borings in the upper profile. Fill piles were observed on the site, however, fill was not encountered in the testing borings. If uncontrolled fill is encountered beneath foundations mitigation will be required. Loose soils or uncontrolled fill encountered within the building areas must be completely removed and recompacted. To provide a uniform bearing pad, at a minimum, it is recommended that the loose soils be penetrated or moisture-conditioned, and recompacted below the building(s). Prior to placing the structural fill, the subgrade should be scarified, moisture-conditioned, and compacted. Fill placed in building areas should be compacted according to the "Structural Fill" paragraph. Preliminary design considerations are discussed in the following sections. Additional subsurface soil investigation is recommended once development plans are prepared. The extent of overexcavation/recompaction will be determined at the time of the open excavation observations.

Expansive soils were encountered in the borings, however, are sporadic. Should expansive soils be encountered beneath the foundations, mitigation will be necessary. Mitigation of expansive soils will require overexcavation and replacement with non-expansive soils at 95% of its maximum Modified Proctor Dry Density, ASTM 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.

PRELIMINARY FOUNDATION RECOMMENDATIONS:

Shallow spread footing/stemwall foundation systems in conjunction with overexcavation/fill mitigation is anticipated for any structures to be built on this site. An allowable bearing pressure of 2000 pounds per square foot (psf) are anticipated for the site soils. Exterior footings should extend to a minimum of 30 inches for frost protection. Recommendations should be made after additional investigation and completion of the grading plans. Density testing of the reconditioned soil or structural fill placed on this site should be performed by a qualified individual.

Foundation walls retaining soils should be designed to resist lateral pressures generated by the soils. An equivalent hydrostatic fluid pressure (in the active state) of 45 pcf is recommended for the site soils. It should be noted that this value applies to level backfill conditions. Pressures may increase depending on the conditions adjacent to the walls. Surcharge loading if any, should be considered in wall designs. Equivalent fluid pressures for sloping conditions should be determined on an individual basis.

FOUNDATION EXCAVATION OBSERVATION:

The open foundation excavations should be observed by a representative of Entech Engineering, Inc. prior to construction of the foundation in order to verify that no anomalies are present, materials at the proper design bearing capacity have been encountered, and no soft or loose areas or debris are present in the excavation. Loose areas that require removal and or recompaction should be identified during site observations.

CONCRETE:

Type II cement is recommended for all concrete on this site. Concrete should not be placed on frozen or wet ground. Care should be taken to prevent the accumulation and ponding of water in the footing excavation prior to the placement of concrete. If standing water is present in the excavation, it should be removed from the excavation by pumping it away from the building area. Concrete placed during cold temperatures must be kept from freezing, which may require covering the concrete with insulated blankets and heating it.

FLOOR SLABS:

Floor slabs placed on loose soils should be expected to experience movement. The uncontrolled fill must be mitigated below slabs. Floor slabs on grade, if any should be separated from structural portions of the building, unless they are designed as part of the foundation system. Backfill placed below floor slabs should be compacted to a minimum of 95% of its maximum Modified Proctor Dry Density, ASTM D-1557.

SITE SEISMIC CLASSIFICATION

Based on the subsurface conditions encountered at the site and in accordance with Section 1613 of the 2015 International Building Code (IBC), the site meets the conditions of a Site Class E.

SURFACE AND SUBSURFACE DRAINAGE:

Positive surface drainage must be maintained around the structure to minimize infiltration of surface water. A minimum gradient of 5 percent in the first 10 feet adjacent to foundations is recommended. A minimum gradient of 2 percent is recommended for paved areas. All grades should be directed away from the structure. All downspouts should be extended to discharge well beyond the backfill zone of the structure.

A subsurface drain is recommended around portions of the structure which will have useable space located below the finished ground surface. A perimeter drain will not be required for slab on grade construction if the slab is above exterior grade. Typical drain details are included with this letter.

STRUCTURAL FILL:

Areas to receive structural fill should have all topsoil, organic material or debris removed. Fill must be properly benched. Prior to placing new fill, the surface should be scarified and moisture conditioned to within ± 2 percent of its optimum moisture content and compacted to 95 percent of its maximum Modified Proctor Dry Density (ASTM D-1557) or to 95 percent of the soils maximum Standard Proctor Dry Density, ASTM D-698 at or above optimum moisture content. New fill should be placed in lifts not to exceed 6 inches after compaction while maintaining the above noted compaction requirements. Fill should be placed at a moisture

Front Row Properties
Preliminary Subsurface Soil Investigation
Southmoor Properties
Fountain, Colorado

content conducive to compaction. The placement and compaction of fill should be observed and tested by Entech. Any imported soils should be approved by Entech prior to being hauled to the site. The on-site soils may be used as structural fill pending approval by Entech.

UTILITIES:

Backfill placed in utility trenches should be compacted to a minimum of 95 percent of its maximum Modified Proctor Dry Density (ASTM D-1557). Utility backfill should be placed in lifts having a compacted thickness of six inches or less and a moisture content conducive to adequate compaction, usually ± 2 percent of its optimum Proctor moisture content. Mechanical methods should be used in placement of backfill; however, heavy equipment should be kept away from foundation walls. No water flooding techniques of any type should be used in compaction of backfill on the site.

Trench backfilling should be performed in accordance with City of Fountain specifications. Excavating should be performed in accordance with OSHA guidelines.

CLOSING:

The test borings were located to provide preliminary geotechnical information; variations in subsurface conditions may be encountered. In the event that the project scope changes, the conclusions and recommendations in this report should not be considered valid unless the changes are reviewed and the conclusions of this report are verified in writing or, if necessary, modified. Additional investigation will be required on the site as development/grading plans are prepared.

This report has been prepared for Front Row Properties for application to the proposed project in accordance with generally accepted soil and foundation engineering practices. No other warranty expressed or implied is made.

Respectfully Submitted,

ENTECH ENGINEERING, INC.



Logan L. Langford, P.G.
Geologist
LLL

Encl.

Entech Job No. 221305
AA projects\2022\221305-pssi



Reviewed by:



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

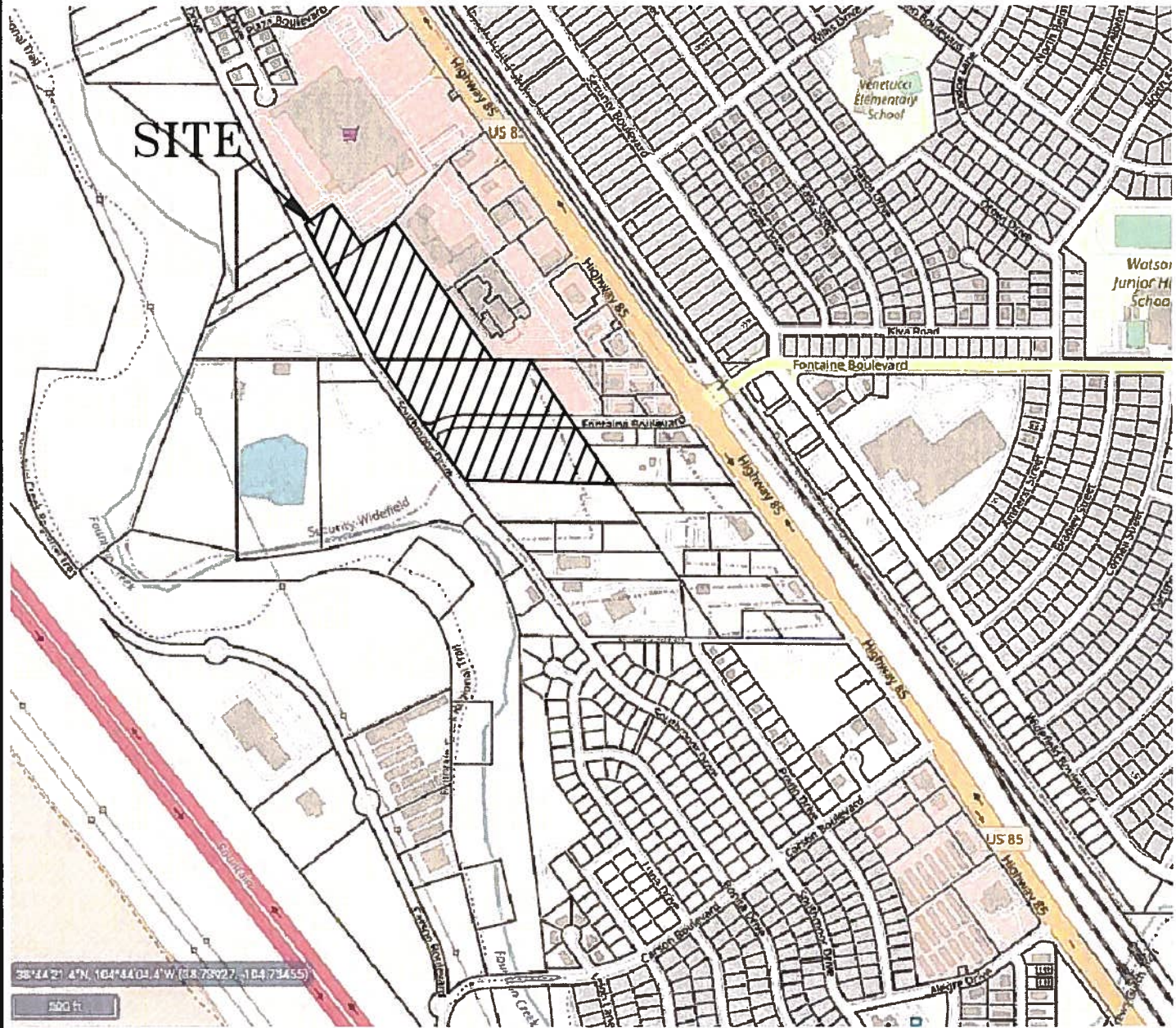
TABLE

TABLE 1
SUMMARY OF LABORATORY TEST RESULTS

CLIENT FRONT ROW PROPERTIES
PROJECT SOUTHMOOR DRIVE
JOB NO. 221305

SOIL TYPE	TEST BORING NO.	DEPTH (FT)	WATER (%)	DRY DENSITY (PCF)	PASSING NO. 200 SIEVE (%)	LIQUID LIMIT (%)	PLASTIC INDEX (%)	SULFATE (WT %)	FHA SWELL (PSF)	SWELL/CONSOL (%)	UNIFIED CLASSIFICATION	SOIL DESCRIPTION
1	1	2-3			43.9	26	10	<0.01			SC	SAND, VERY CLAYEY
1	4	5			4.7						SW	SAND
1	6	5			5.1						SM-SW	SAND, SLIGHTLY SILTY
1	8	2-3			10.2						SM-SW	SAND, SLIGHTLY SILTY
1	9	2-3			49.1						SC	SAND, VERY CLAYEY
1	10	5			24.2						SM	SAND, SILTY
1	11	10			22.4						SM	SAND, SILTY
2	5	15	14.9	100.0	97.4	49	21	<0.01		1.7	ML	SILT, SANDY
2	7	15	21.9	97.7	98.5					1.3	CL	CLAY, SANDY
2	12	20	23.4	89.5	70.2					0.7	CL	CLAY, SANDY
3	2	15	15.1	97.5	97.0	44	16	0.00		0.8	ML	SHALE
3	3	20			88.2	40	14	0.02			ML	SHALE

FIGURES



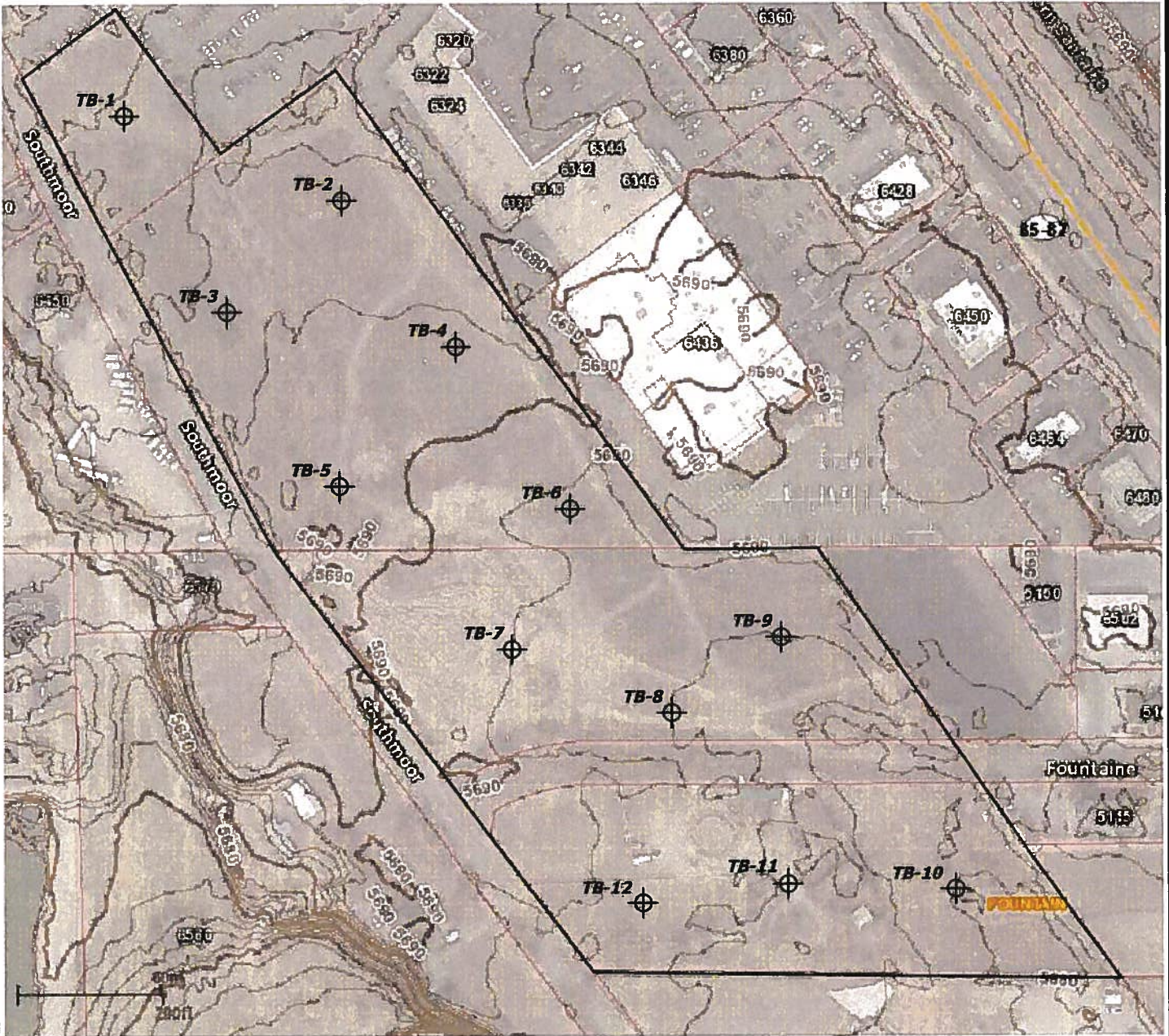
ENTECH
ENGINEERING, INC.
505 ELKTON DRIVE
COLORADO SPRINGS, CO. 80907 (719) 531-3999

VICINITY MAP
SOUTHMOOR DRIVE PROPERTIES
FOUNTAIN, COLORADO
FOR: FRONT ROW PROPERTIES

DRAWN: LLL	DATE: 6/28/22	CHECKED:	DATE:
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JOB NO.:
221305

FIG NO.:
1



TB- APPROXIMATE TEST BORING LOCATION AND NUMBER



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

SITE MAP/TEST BORING LOCATION MAP
SOUTHMOOR DRIVE PROPERTIES
FOUNTAIN, COLORADO
FOR: FRONT ROW PROPERTIES

DRAWN:
 LLL

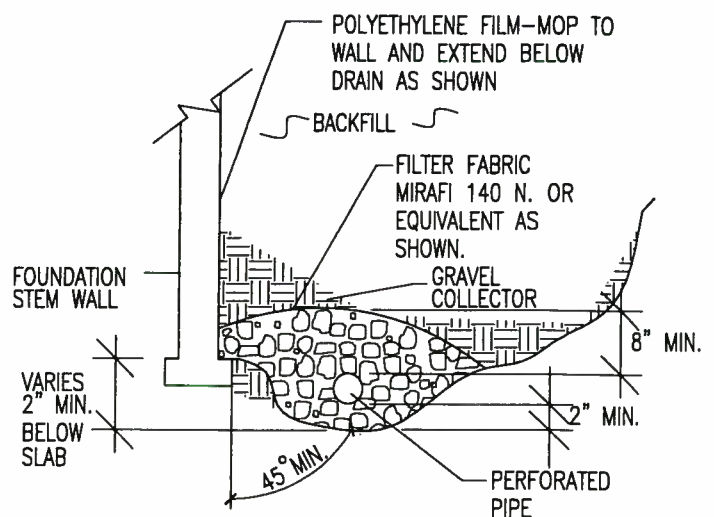
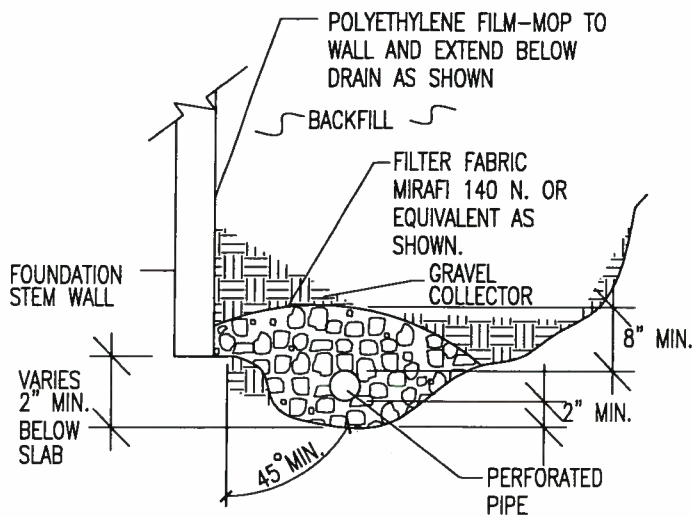
DATE:
 6/28/22

CHECKED:

DATE:

JOB NO:
 221305

FIG NO:
 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 OUTFALL IS NOT AVAILABLE.



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PERIMETER DRAIN DETAIL

DRAWN:

DATE:

DESIGNED:

CHECKED:

JOB NO.:

221305

FIG NO.:

3

APPENDIX A: Test Boring Logs

TEST BORING NO. 1
 DATE DRILLED 6/7/2022
 Job # 221305

TEST BORING NO. 2
 DATE DRILLED 6/7/2022
 CLIENT FRONT ROW PROPERTIES
 LOCATION SOUTHMOOR DRIVE

REMARKS	Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type	REMARKS	Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
DRY TO 18.5', 6/9/22							WATER @ 15.5', 6/9/22						
SAND, VERY CLAYEY, FINE TO COARSE GRAINED, BROWN, MEDIUM DENSE, MOIST	5		24	3.8	1		SAND, GRAVELLY, SILTY, FINE TO COARSE GRAINED, BROWN, MEDIUM DENSE TO LOOSE, MOIST	5		25	5.0	1	
SAND, GRAVELLY, SILTY, FINE TO COARSE GRAINED, BROWN, MEDIUM DENSE TO DENSE, MOIST TO DRY	5		15	3.1	1			5		8	2.3	1	
	10		33	1.3	1			10		11	1.6	1	
CLAYSTONE, SANDY, DARK GRAY, HARD, MOIST	15		50 10"	12.9	3		SHALE, GRAY BROWN, VERY STIFF TO HARD, MOIST	15		44	14.0	3	
	20		50 5"	13.4	3			20		50 9"	13.8	3	



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TEST BORING LOG

DRAWN:	DATE:	CHECKED:	DATE:
		LLL	6/27/22

JOB NO.:
 221305

FIG NO.:
 A- 1

TEST BORING NO. 3
 DATE DRILLED 6/7/2022
 Job # 221305

TEST BORING NO. 4
 DATE DRILLED 6/7/2022
 CLIENT FRONT ROW PROPERTIES
 LOCATION SOUTHMOOR DRIVE

REMARKS	Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type	REMARKS	Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
DRY TO 18.5', 6/9/22							DRY TO 19', 6/9/22						
SAND, GRAVELLY, SILTY, FINE TO COARSE GRAINED, BROWN TO TAN, MEDIUM DENSE TO DENSE, DRY	5		13	0.9	1		SAND, GRAVELLY, CLEAN TO SILTY, FINE TO COARSE GRAINED, TAN, DENSE TO MEDIUM DENSE, DRY TO MOIST	5		32	1.7	1	
	5		41	0.8	1			5		27	2.3	1	
	10		14	2.4	1			10		15	2.7	1	
CLAY, SANDY, GRAY BROWN, STIFF, MOIST	15		20	10.7	2			15		19	3.2	1	
WEATHERED SHALE, GRAY BROWN, STIFF, MOIST	20		28	17.3	3		CLAY, SANDY, GRAY BROWN, VERY STIFF, MOIST	20		33	10.9	2	



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TEST BORING LOG

DRAWN:	DATE:	CHECKED:	DATE:
		LLL	6/27/22

JOB NO.:
 221305

FIG NO.:
 A- 2

TEST BORING NO. 5
 DATE DRILLED 6/7/2022
 Job # 221305

TEST BORING NO. 6
 DATE DRILLED 6/7/2022
 CLIENT FRONT ROW PROPERTIES
 LOCATION SOUTHMOOR DRIVE

REMARKS	Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
DRY TO 19', 6/9/22						
SAND, GRAVELLY, SILTY, FINE TO COARSE GRAINED, TAN, LOOSE TO DENSE, DRY	5			7	1.0	1
	5			8	1.5	1
	10			33	1.7	1
SILT, SANDY, DARK GRAY, VERY STIFF TO STIFF, MOIST	15			45	13.8	2
	20			23	12.1	2

REMARKS	Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
DRY TO 18', 6/9/22						
SAND, GRAVELLY, SLIGHTLY SILTY, FINE TO COARSE GRAINED, TAN, LOOSE TO MEDIUM DENSE, DRY TO MOIST	5			4	1.2	1
	5			14	1.2	1
	10			2	7.3	1
	15			26	3.0	1
	20			9	2.9	1



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TEST BORING LOG

DRAWN:	DATE:	CHECKED:	DATE:
		LLL	6/27/22

JOB NO.:
 221305

FIG NO.:
 A- 3

TEST BORING NO. 7
 DATE DRILLED 6/7/2022
 Job # 221305

TEST BORING NO. 8
 DATE DRILLED 6/7/2022
 CLIENT FRONT ROW PROPERTIES
 LOCATION SOUTHMOOR DRIVE

REMARKS	Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type	REMARKS	Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
DRY TO 18.5', 6/9/22							DRY TO 15.5', 6/9/22						
SAND, GRAVELLY, SILTY, FINE TO COARSE GRAINED, TAN, LOOSE TO DENSE, DRY							SAND, GRAVELLY, SLIGHTLY SILTY, FINE TO COARSE GRAINED, TAN, MEDIUM DENSE, MOIST						
	5			23	0.9	1		5		15	6.0	1	
				24	1.5	1				14	5.6	1	
	10			22	1.9	1		10		20	3.1	1	
CLAY, SANDY, TAN, STIFF, MOIST	15			28	22.1	2		15		28	4.3	1	
CLAYSTONE, SANDY, GRAY BROWN, HARD, MOIST	20			50	17.3	3		20		12	8.5	1	
				8"									



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TEST BORING LOG

DRAWN:	DATE:	CHECKED:	DATE:
		LLL	6/27/22

JOB NO.:
 221305

FIG NO.:
 A-4

TEST BORING NO. 9
 DATE DRILLED 6/8/2022
 Job # 221305

TEST BORING NO. 10
 DATE DRILLED 6/8/2022
 CLIENT FRONT ROW PROPERTIES
 LOCATION SOUTHMOOR DRIVE

REMARKS

DRY TO 20', 6/9/22

SAND, VERY CLAYEY, FINE
 GRAINED, BROWN, MEDIUM
 DENSE, MOIST

SAND, GRAVELLY, SILTY, FINE
 TO COARSE GRAINED, BROWN,
 MEDIUM DENSE, DRY TO MOIST

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
5			17	5.8	1
5			19	6.1	1
10			14	1.6	1
15			27	4.1	1
20			28	4.5	1

REMARKS

DRY TO 20', 6/8/22

SAND, GRAVELLY, SILTY, FINE
 TO COARSE GRAINED, BROWN,
 MEDIUM DENSE TO DENSE,
 MOIST TO DRY

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
5			24	8.7	1
5			17	2.8	1
10			32	2.1	1
15			35	7.3	1
20			36	6.3	1



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TEST BORING LOG

DRAWN:	DATE:	CHECKED:	DATE:
		LLL	6/28/22

JOB NO.:
 221305

FIG NO.:
 A- 5

TEST BORING NO. 11
 DATE DRILLED 6/8/2022
 Job # 221305

TEST BORING NO. 12
 DATE DRILLED 6/8/2022
 CLIENT FRONT ROW PROPERTIES
 LOCATION SOUTHMOOR DRIVE

REMARKS

DRY TO 20', 6/8/22

2" ASPHALT, SAND, GRAVELLY,
 SILTY, FINE TO COARSE GRAINED,
 TAN, DENSE TO MEDIUM DENSE,
 DRY

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
5			30	1.2	1
5			28	1.1	1
10			29	1.8	1
15			30	2.4	1
20			13	1.9	1

REMARKS

DRY TO 20', 6/8/22

SAND, GRAVELLY, SILTY, FINE
 TO COARSE GRAINED, BROWN,
 MEDIUM DENSE TO DENSE,
 MOIST TO DRY

CLAY, SANDY, BROWN, STIFF,
 MOIST

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
5			10	1.3	1
5			21	1.4	1
10			32	3.4	1
15			27	2.1	1
20			19	12.0	2



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TEST BORING LOG

DRAWN:

DATE:

CHECKED:

DATE:

LLC

6/27/22

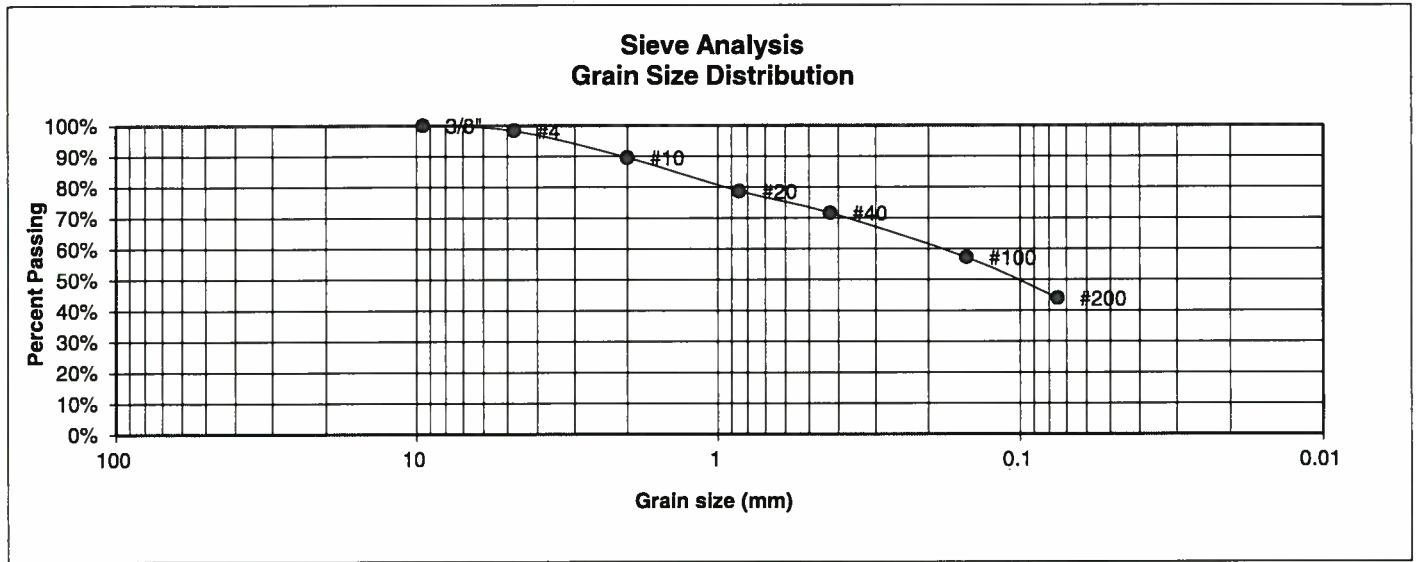
JOB NO.:
 221305

FIG NO.:
 A- 6

APPENDIX B: Laboratory Test Results

UNIFIED CLASSIFICATION SC
SOIL TYPE # 1
TEST BORING # 1
DEPTH (FT) 2-3

CLIENT FRONT ROW PROPERTIES
PROJECT SOUTHMOOR DRIVE
JOB NO. 221305
TEST BY BL



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	100.0%
4	98.3%
10	89.6%
20	78.7%
40	71.6%
100	57.2%
200	43.9%

Atterberg Limits	
Plastic Limit	16
Liquid Limit	26
Plastic Index	10

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



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**LABORATORY TEST
RESULTS**

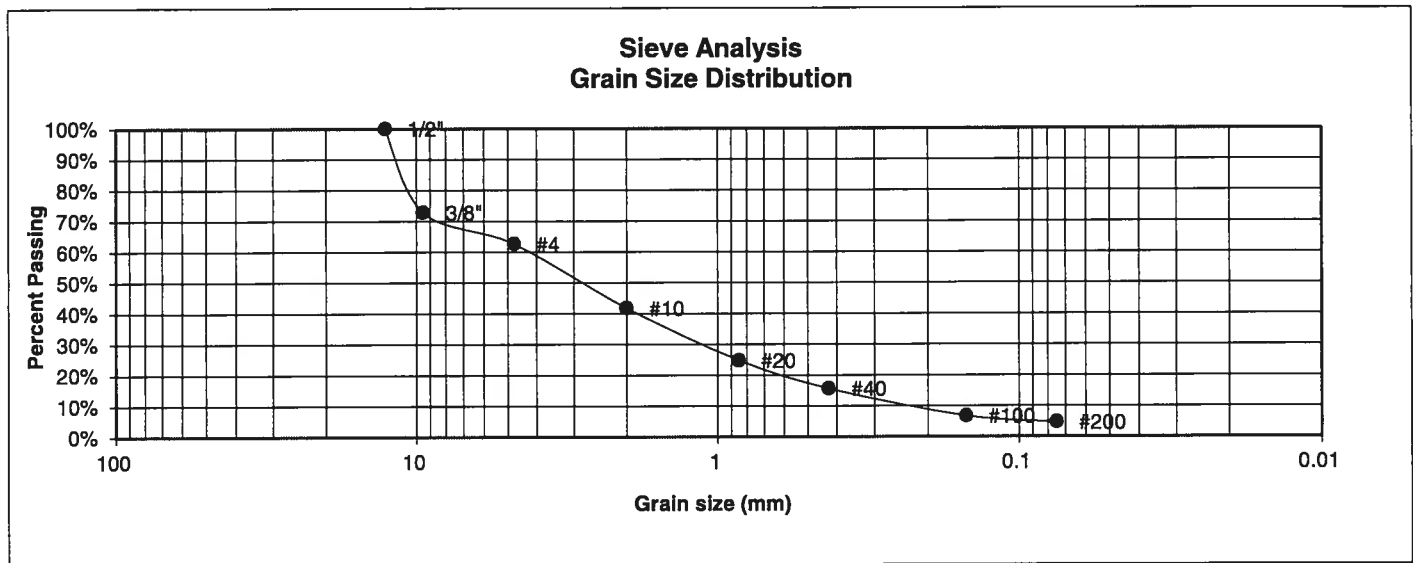
DRAWN:	DATE:	CHECKED:	DATE:
		LLL	6/27/22

JOB NO.:
221305

FIG NO.:

B-1

<u>UNIFIED CLASSIFICATION</u>	SW	<u>CLIENT</u>	FRONT ROW PROPERTIES
<u>SOIL TYPE #</u>	1	<u>PROJECT</u>	SOUTHMOOR DRIVE
<u>TEST BORING #</u>	4	<u>JOB NO.</u>	221305
<u>DEPTH (FT)</u>	5	<u>TEST BY</u>	BL



<u>U.S. Sieve #</u>	<u>Percent Finer</u>
3"	
1 1/2"	
3/4"	
1/2"	100.0%
3/8"	72.8%
4	62.6%
10	41.8%
20	24.8%
40	15.6%
100	6.7%
200	4.7%

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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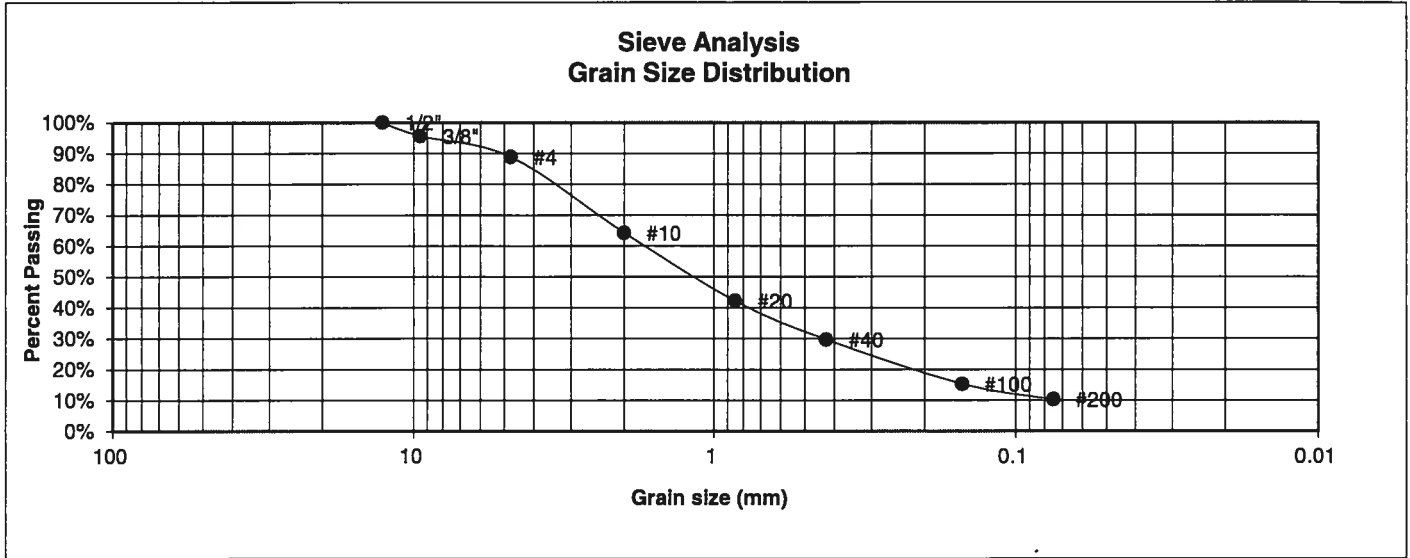
LABORATORY TEST RESULTS

DRAWN:	DATE:	CHECKED: LLL	DATE: 6/27/22
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JOB NO.:
221305

FIG NO.:
B-Z

<u>UNIFIED CLASSIFICATION</u>	SM-SW	<u>CLIENT</u>	FRONT ROW PROPERTIES
<u>SOIL TYPE #</u>	1	<u>PROJECT</u>	SOUTHMOOR DRIVE
<u>TEST BORING #</u>	8	<u>JOB NO.</u>	221305
<u>DEPTH (FT)</u>	2-3	<u>TEST BY</u>	BL



<u>U.S. Sieve #</u>	<u>Percent Finer</u>
3"	
1 1/2"	
3/4"	
1/2"	100.0%
3/8"	95.5%
4	88.8%
10	64.3%
20	42.2%
40	29.7%
100	15.3%
200	10.2%

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**

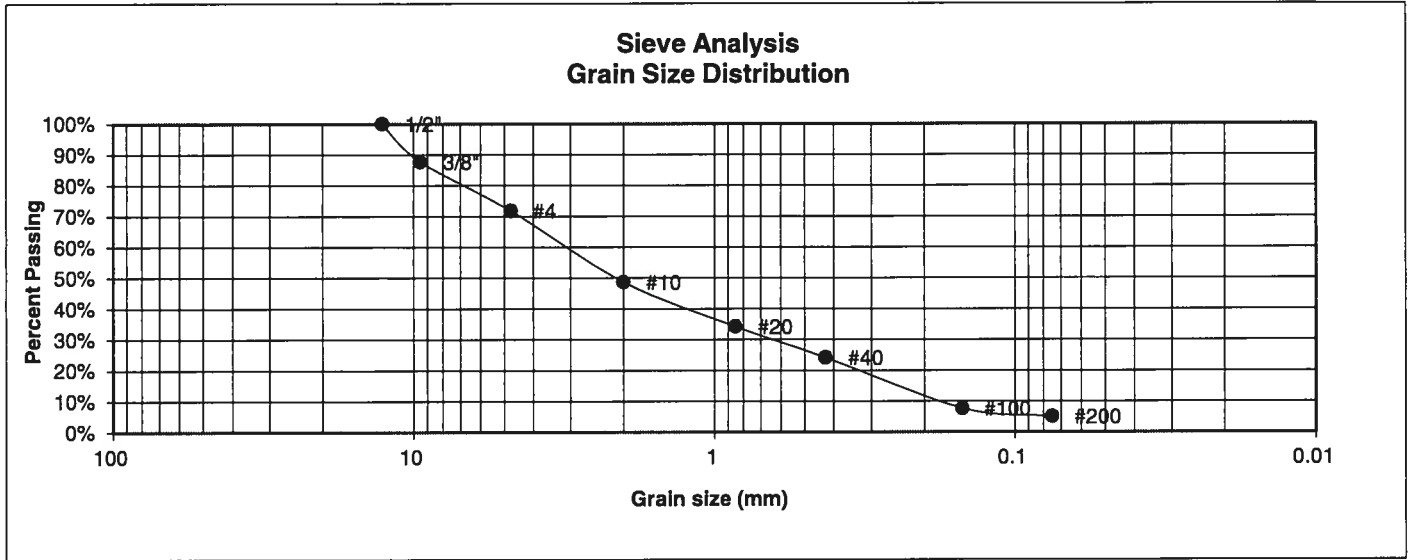
<u>DRAWN:</u>	<u>DATE:</u>	<u>CHECKED:</u> LLL	<u>DATE:</u> 6/27/22
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JOB NO.:
221305

FIG NO.:

B-3

<u>UNIFIED CLASSIFICATION</u>	SM-SW	<u>CLIENT</u>	FRONT ROW PROPERTIES
<u>SOIL TYPE #</u>	1	<u>PROJECT</u>	SOUTHMOOR DRIVE
<u>TEST BORING #</u>	6	<u>JOB NO.</u>	221305
<u>DEPTH (FT)</u>	5	<u>TEST BY</u>	BL



<u>U.S. Sieve #</u>	<u>Percent Finer</u>
3"	
1 1/2"	
3/4"	
1/2"	100.0%
3/8"	87.7%
4	71.8%
10	48.6%
20	34.2%
40	24.1%
100	7.7%
200	5.1%

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**

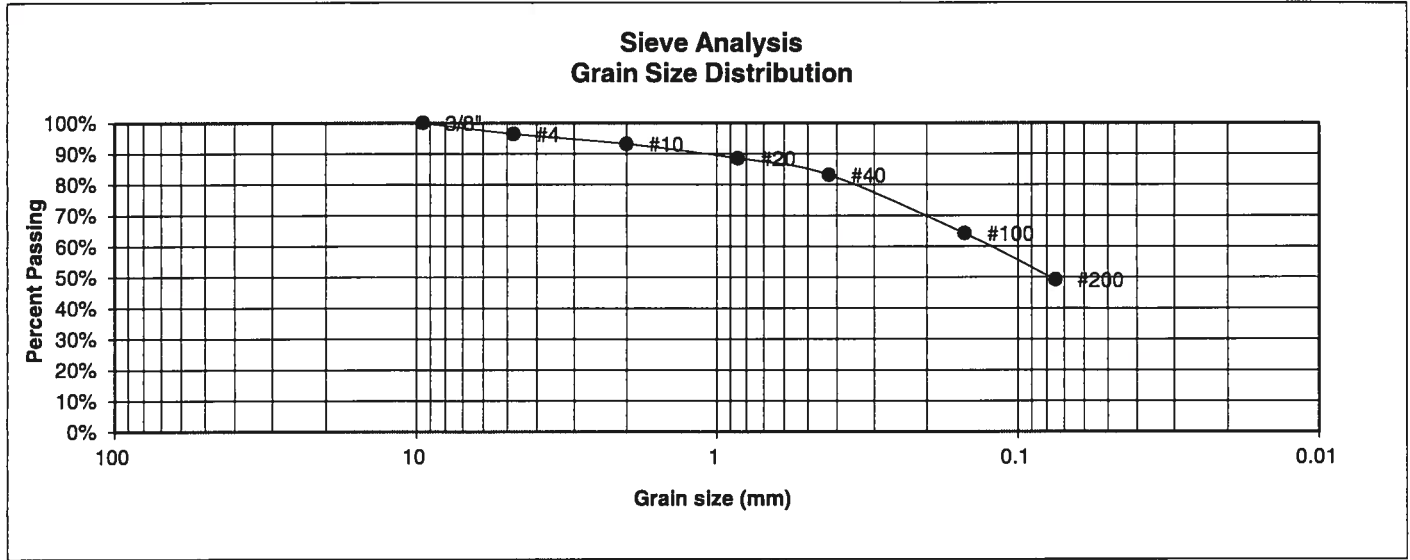
<u>DRAWN:</u>	<u>DATE:</u>	<u>CHECKED:</u> LLL	<u>DATE:</u> 6/27/22
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JOB NO.:
221305

FIG NO.:

B-4

<u>UNIFIED CLASSIFICATION</u>	SC	<u>CLIENT</u>	FRONT ROW PROPERTIES
<u>SOIL TYPE #</u>	1	<u>PROJECT</u>	SOUTHMOOR DRIVE
<u>TEST BORING #</u>	9	<u>JOB NO.</u>	221305
<u>DEPTH (FT)</u>	2-3	<u>TEST BY</u>	BL



<u>U.S. Sieve #</u>	<u>Percent Finer</u>
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	100.0%
4	96.4%
10	93.2%
20	88.5%
40	83.1%
100	64.2%
200	49.1%

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:
LLL

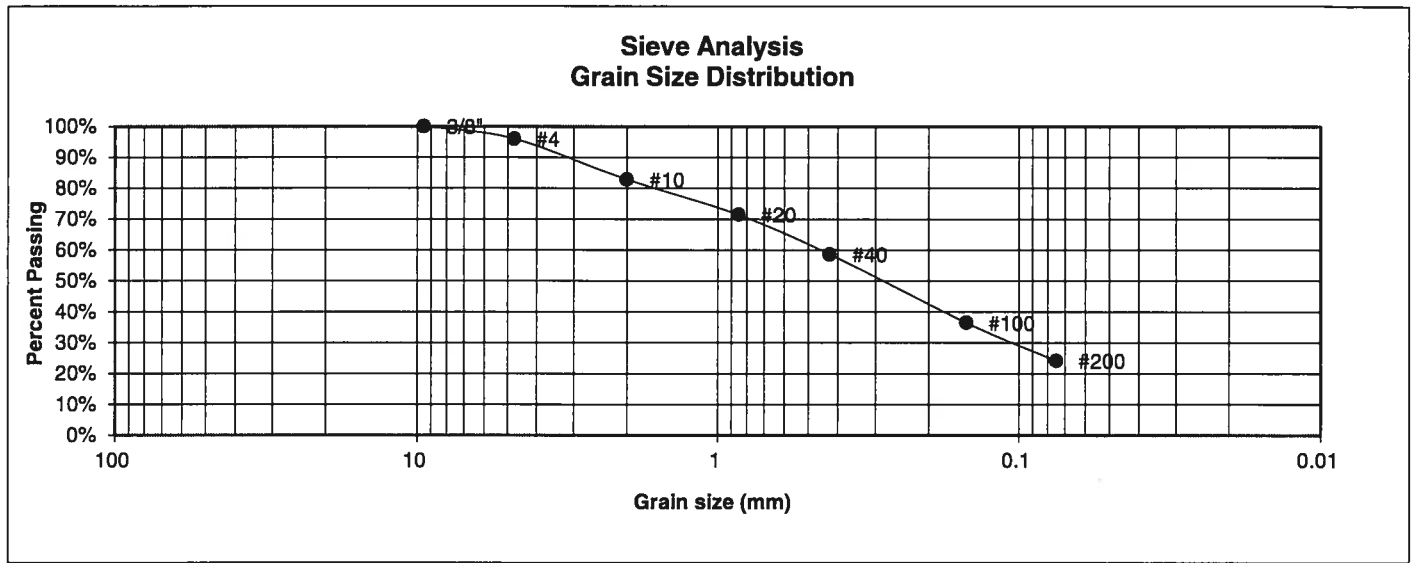
DATE:
6/27/22

JOB NO.:
221305

FIG NO.:

B-5

<u>UNIFIED CLASSIFICATION</u>	SM	<u>CLIENT</u>	FRONT ROW PROPERTIES
<u>SOIL TYPE #</u>	1	<u>PROJECT</u>	SOUTHMOOR DRIVE
<u>TEST BORING #</u>	10	<u>JOB NO.</u>	221305
<u>DEPTH (FT)</u>	5	<u>TEST BY</u>	BL



<u>U.S. Sieve #</u>	<u>Percent Finer</u>
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	100.0%
4	96.0%
10	82.8%
20	71.4%
40	58.6%
100	36.5%
200	24.2%

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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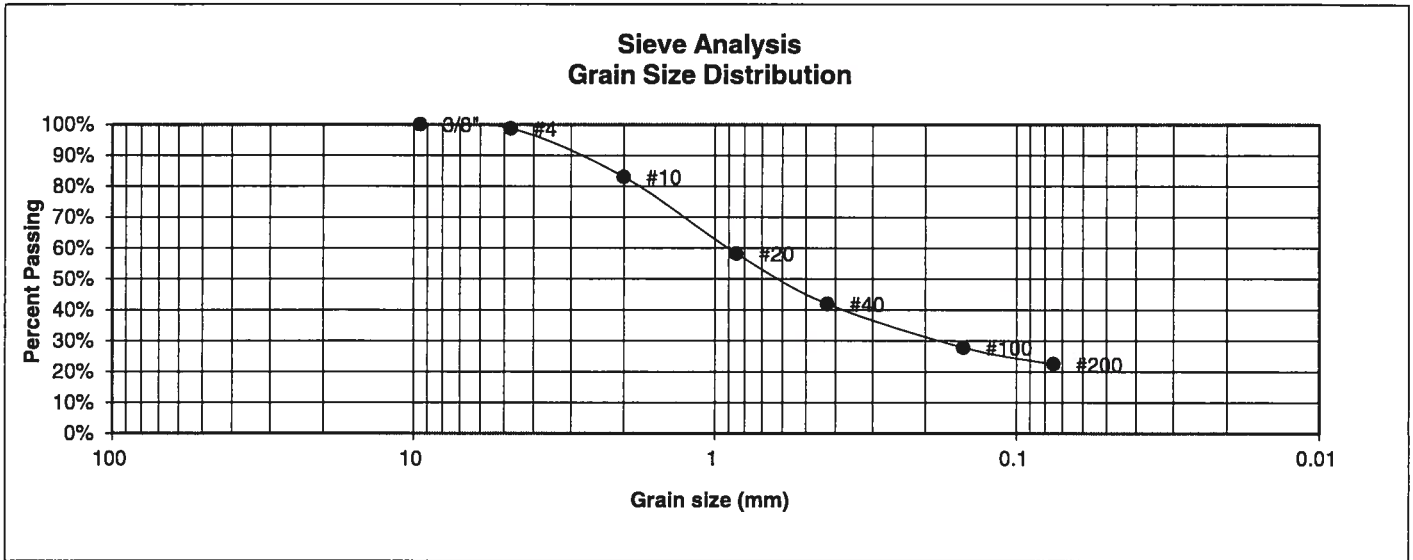
**LABORATORY TEST
 RESULTS**

<u>DRAWN:</u>	<u>DATE:</u>	<u>CHECKED:</u> LLC	<u>DATE:</u> 6/27/22
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JOB NO.:
221305

FIG NO.:
B-4

<u>UNIFIED CLASSIFICATION</u>	SM	<u>CLIENT</u>	FRONT ROW PROPERTIES
<u>SOIL TYPE #</u>	1	<u>PROJECT</u>	SOUTHMOOR DRIVE
<u>TEST BORING #</u>	11	<u>JOB NO.</u>	221305
<u>DEPTH (FT)</u>	10	<u>TEST BY</u>	BL



<u>U.S. Sieve #</u>	<u>Percent Finer</u>
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	100.0%
4	98.7%
10	83.0%
20	58.2%
40	41.9%
100	27.8%
200	22.4%

- 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**

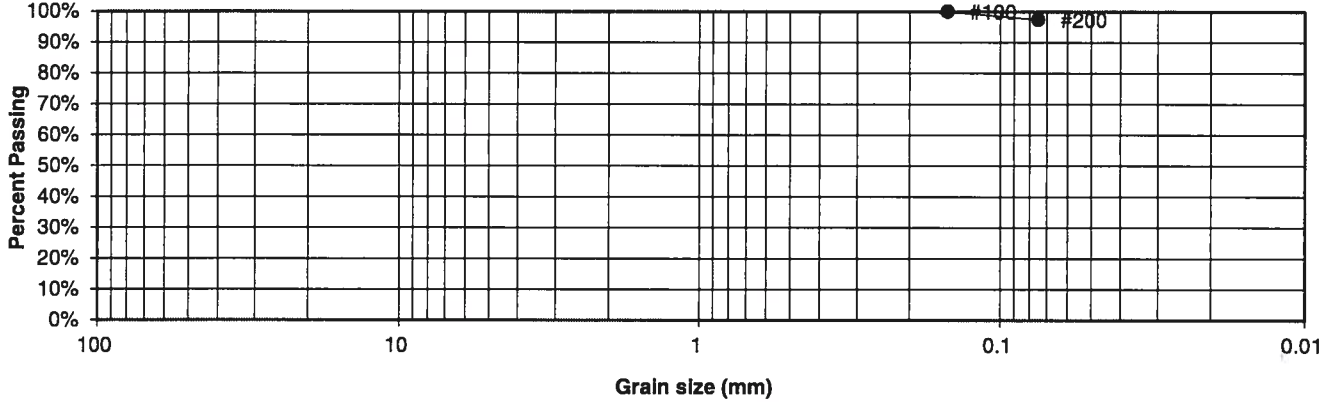
<u>DRAWN:</u>	<u>DATE:</u>	<u>CHECKED:</u> LLL	<u>DATE:</u> 6/27/22
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JOB NO.:
221305

FIG NO.:
B-7

<u>UNIFIED CLASSIFICATION</u>	ML	<u>CLIENT</u>	FRONT ROW PROPERTIES
<u>SOIL TYPE #</u>	2	<u>PROJECT</u>	SOUTHMOOR DRIVE
<u>TEST BORING #</u>	5	<u>JOB NO.</u>	221305
<u>DEPTH (FT)</u>	15	<u>TEST BY</u>	BL

**Sieve Analysis
Grain Size Distribution**



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	
4	
10	
20	
40	
100	100.0%
200	97.4%

<u>Atterberg Limits</u>	
Plastic Limit	28
Liquid Limit	49
Plastic Index	21

<u>Swell</u>	
Moisture at start	
Moisture at finish	
Moisture increase	
Initial dry density (pcf)	
Swell (psf)	



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**LABORATORY TEST
RESULTS**

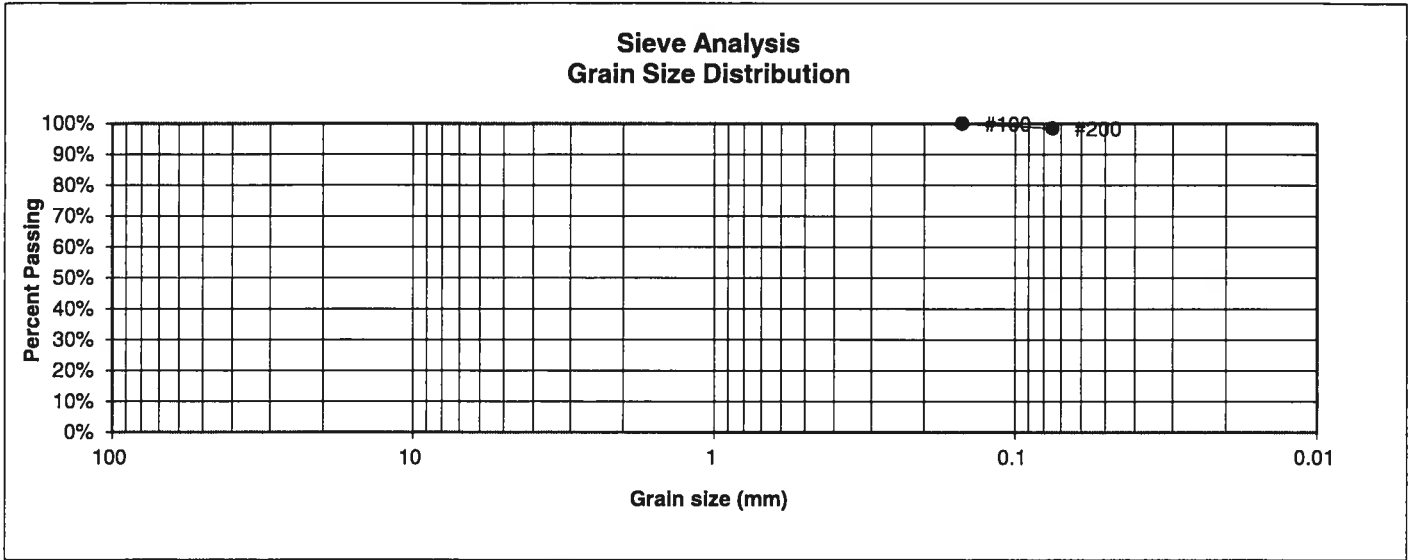
DRAWN:	DATE:	CHECKED:	DATE:
		LLL	6/27/22

JOB NO.:
221305

FIG NO.:

B-8

<u>UNIFIED CLASSIFICATION</u>	CL	<u>CLIENT</u>	FRONT ROW PROPERTIES
<u>SOIL TYPE #</u>	2	<u>PROJECT</u>	SOUTHMOOR DRIVE
<u>TEST BORING #</u>	7	<u>JOB NO.</u>	221305
<u>DEPTH (FT)</u>	15	<u>TEST BY</u>	BL



<u>U.S. Sieve #</u>	<u>Percent Finer</u>	<u>Atterberg Limits</u>
3"		Plastic Limit
1 1/2"		Liquid Limit
3/4"		Plastic Index
1/2"		
3/8"		<u>Swell</u>
4		Moisture at start
10		Moisture at finish
20		Moisture increase
40		Initial dry density (pcf)
100	100.0%	Swell (psf)
200	98.5%	



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ENGINEERING, INC.**
505 ELKTON DRIVE
COLORADO SPRINGS, COLORADO 80907

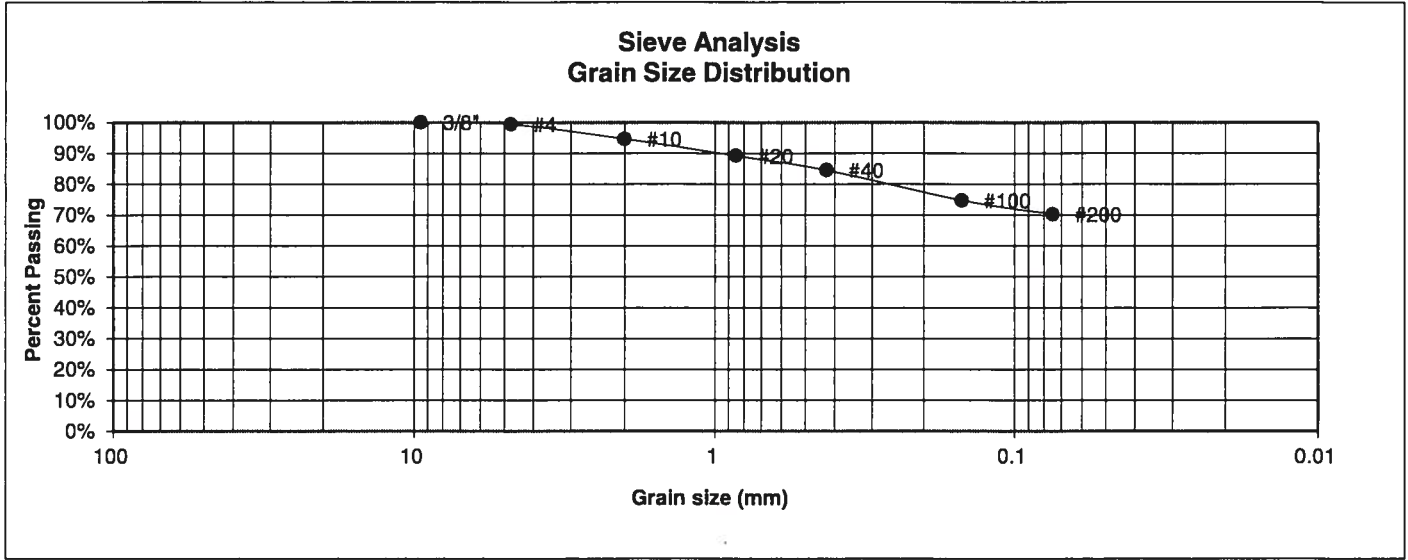
**LABORATORY TEST
RESULTS**

DRAWN:	DATE:	CHECKED: <i>LLL</i>	DATE: <i>6/27/22</i>
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JOB NO.:
221305

FIG NO.:
B-9

<u>UNIFIED CLASSIFICATION</u>	CL	<u>CLIENT</u>	FRONT ROW PROPERTIES
<u>SOIL TYPE #</u>	2	<u>PROJECT</u>	SOUTHMOOR DRIVE
<u>TEST BORING #</u>	12	<u>JOB NO.</u>	221305
<u>DEPTH (FT)</u>	20	<u>TEST BY</u>	BL



<u>U.S. Sieve #</u>	<u>Percent Finer</u>
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	100.0%
4	99.4%
10	94.7%
20	89.2%
40	84.5%
100	74.7%
200	70.2%

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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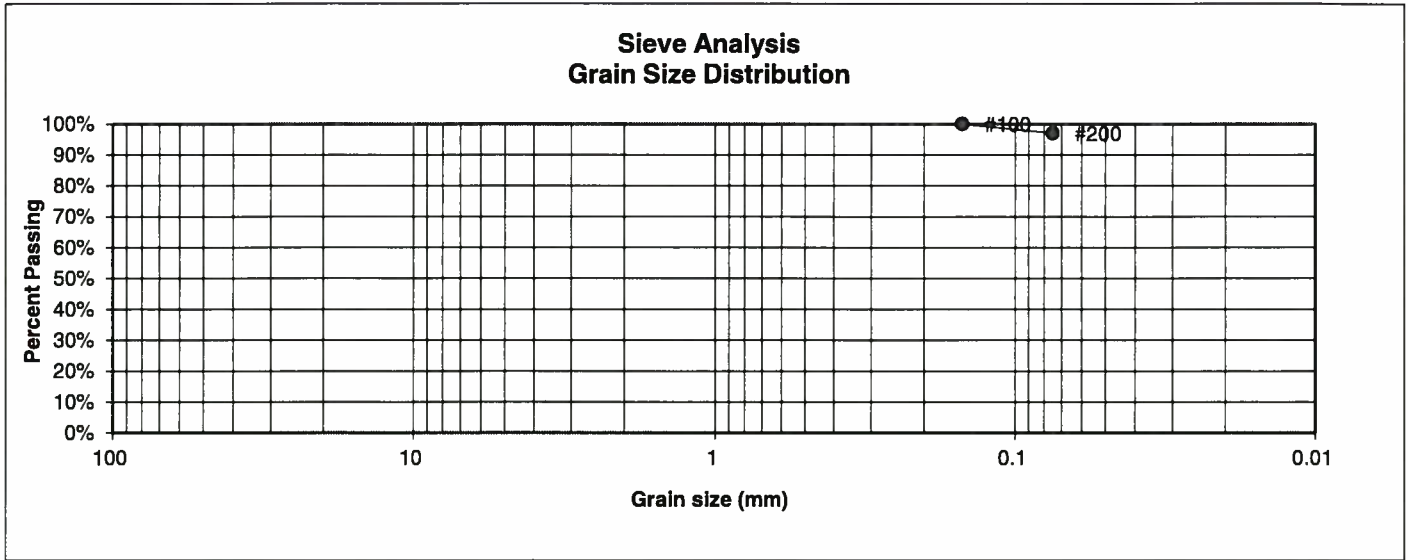
**LABORATORY TEST
RESULTS**

<u>DRAWN:</u>	<u>DATE:</u>	<u>CHECKED:</u> LL	<u>DATE:</u> 6/27/22
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JOB NO.:
221305

FIG NO.:
B-10

UNIFIED CLASSIFICATION	ML	CLIENT	FRONT ROW PROPERTIES
SOIL TYPE #	3	PROJECT	SOUTHMOOR DRIVE
TEST BORING #	2	JOB NO.	221305
DEPTH (FT)	15	TEST BY	BL



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	
4	
10	
20	
40	
100	100.0%
200	97.0%

Atterberg Limits	
Plastic Limit	28
Liquid Limit	44
Plastic Index	16

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



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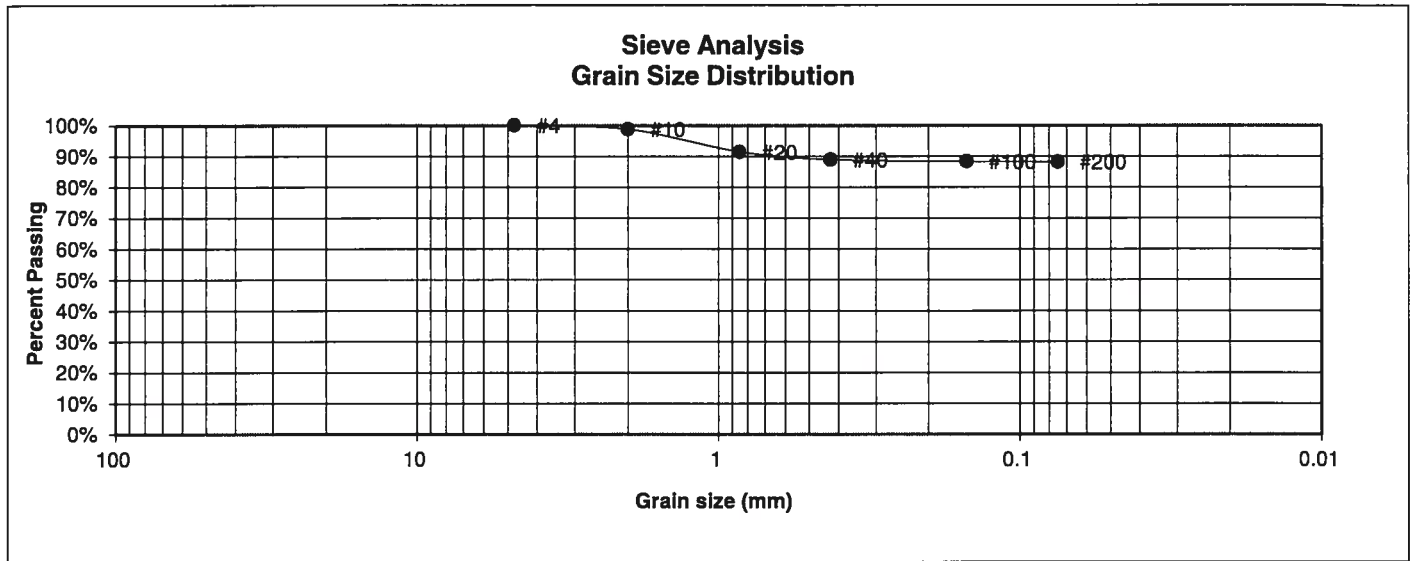
**LABORATORY TEST
RESULTS**

DRAWN:	DATE:	CHECKED:	DATE:
		LLL	6/27/22

JOB NO.:
221305

FIG NO.:
B-11

<u>UNIFIED CLASSIFICATION</u>	ML	<u>CLIENT</u>	FRONT ROW PROPERTIES
<u>SOIL TYPE #</u>	3	<u>PROJECT</u>	SOUTHMOOR DRIVE
<u>TEST BORING #</u>	3	<u>JOB NO.</u>	221305
<u>DEPTH (FT)</u>	20	<u>TEST BY</u>	BL



<u>U.S. Sieve #</u>	<u>Percent Finer</u>
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	
4	100.0%
10	98.8%
20	91.4%
40	88.9%
100	88.3%
200	88.2%

<u>Atterberg Limits</u>	
Plastic Limit	26
Liquid Limit	40
Plastic Index	14

<u>Swell</u>	
Moisture at start	
Moisture at finish	
Moisture increase	
Initial dry density (pcf)	
Swell (psf)	



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505 ELKTON DRIVE
COLORADO SPRINGS, COLORADO 80907

**LABORATORY TEST
RESULTS**

<u>DRAWN:</u>	<u>DATE:</u>	<u>CHECKED:</u> LLL	<u>DATE:</u> 6/27/22
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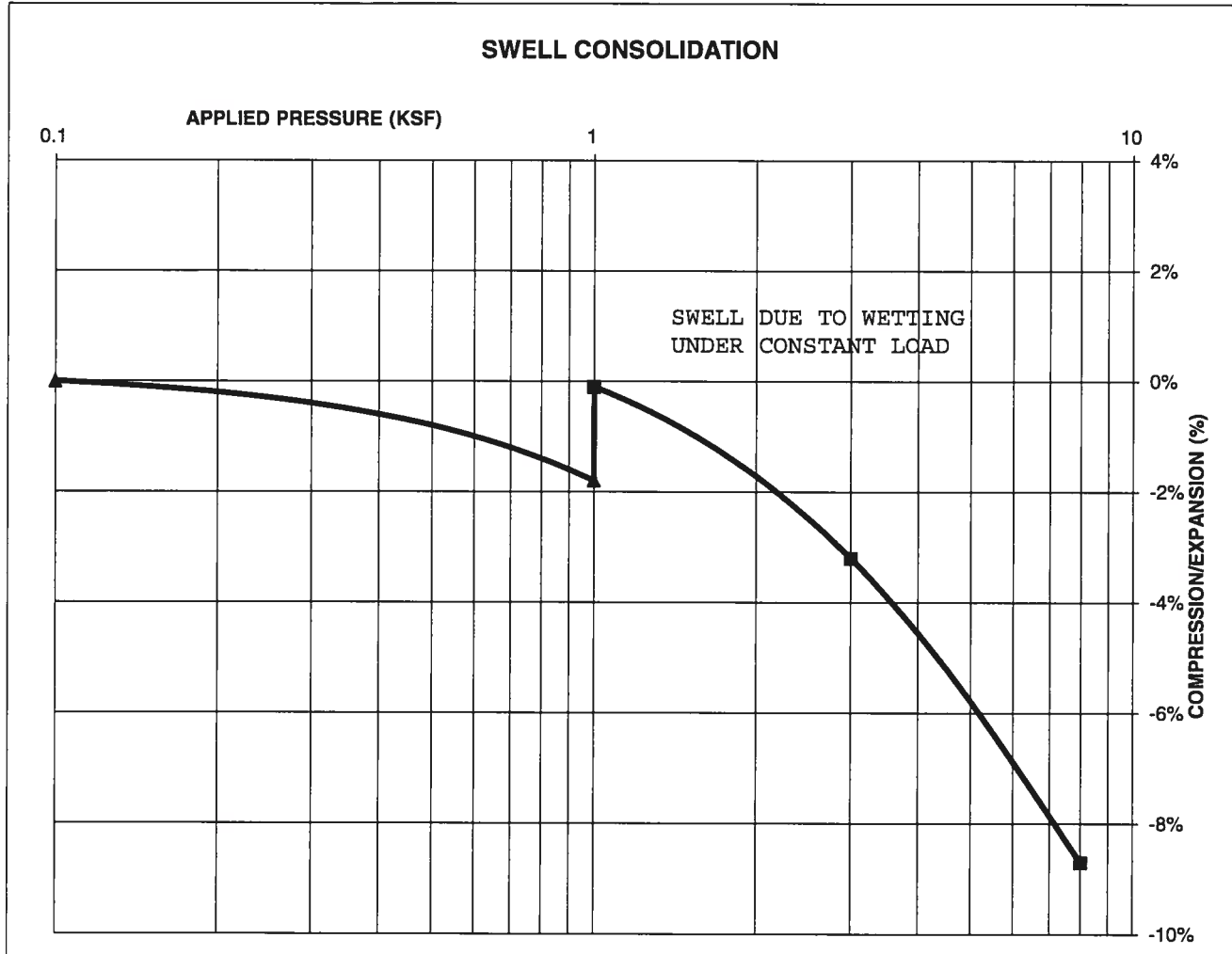
JOB NO.:
221305

FIG NO.:
B-12

CONSOLIDATION TEST RESULTS

TEST BORING #	5	DEPTH(ft)	15
DESCRIPTION	ML	SOIL TYPE	2
NATURAL UNIT DRY WEIGHT (PCF)			100
NATURAL MOISTURE CONTENT			14.9%
SWELL/CONSOLIDATION (%)			1.7%

JOB NO. 221305
 CLIENT FRONT ROW PROPERTIES
 PROJECT SOUTHMOOR DRIVE



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505 ELKTON DRIVE
 COLORADO SPRINGS, COLORADO 80907

SWELL CONSOLIDATION
 TEST RESULTS

DRAWN:

DATE:

CHECKED:

DATE:

LLL

6/27/22

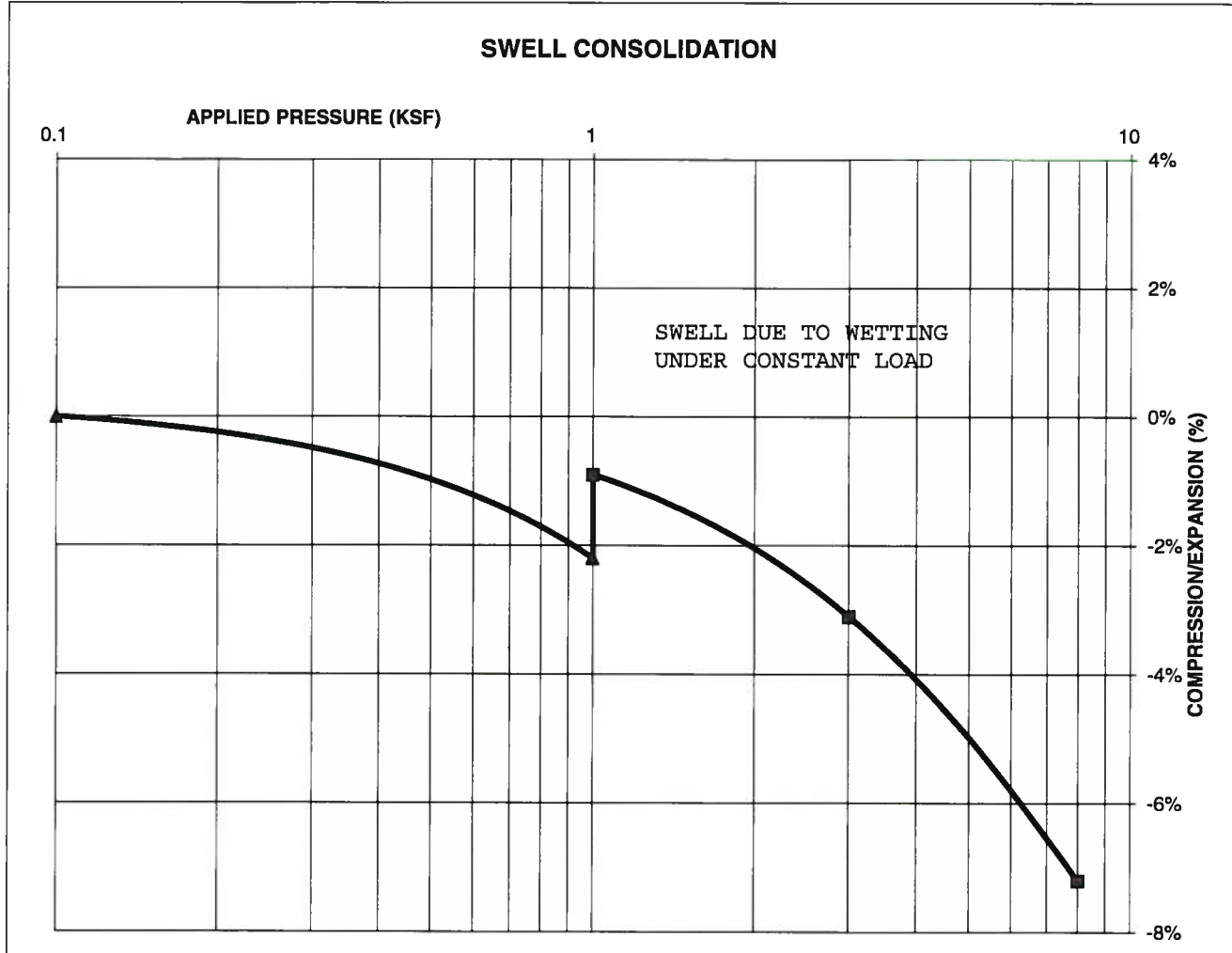
JOB NO:
 221305

FIG NO:
 B-13

CONSOLIDATION TEST RESULTS

TEST BORING #	7	DEPTH(ft)	15
DESCRIPTION	CL	SOIL TYPE	2
NATURAL UNIT DRY WEIGHT (PCF)	98		
NATURAL MOISTURE CONTENT	21.9%		
SWELL/CONSOLIDATION (%)	1.3%		

JOB NO. 221305
 CLIENT FRONT ROW PROPERTIES
 PROJECT SOUTHMOOR DRIVE



ENTECH
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505 ELKTON DRIVE
 COLORADO SPRINGS, COLORADO 80907

SWELL CONSOLIDATION
 TEST RESULTS

DRAWN:

DATE:

CHECKED:

DATE:

LLL

6/27/22

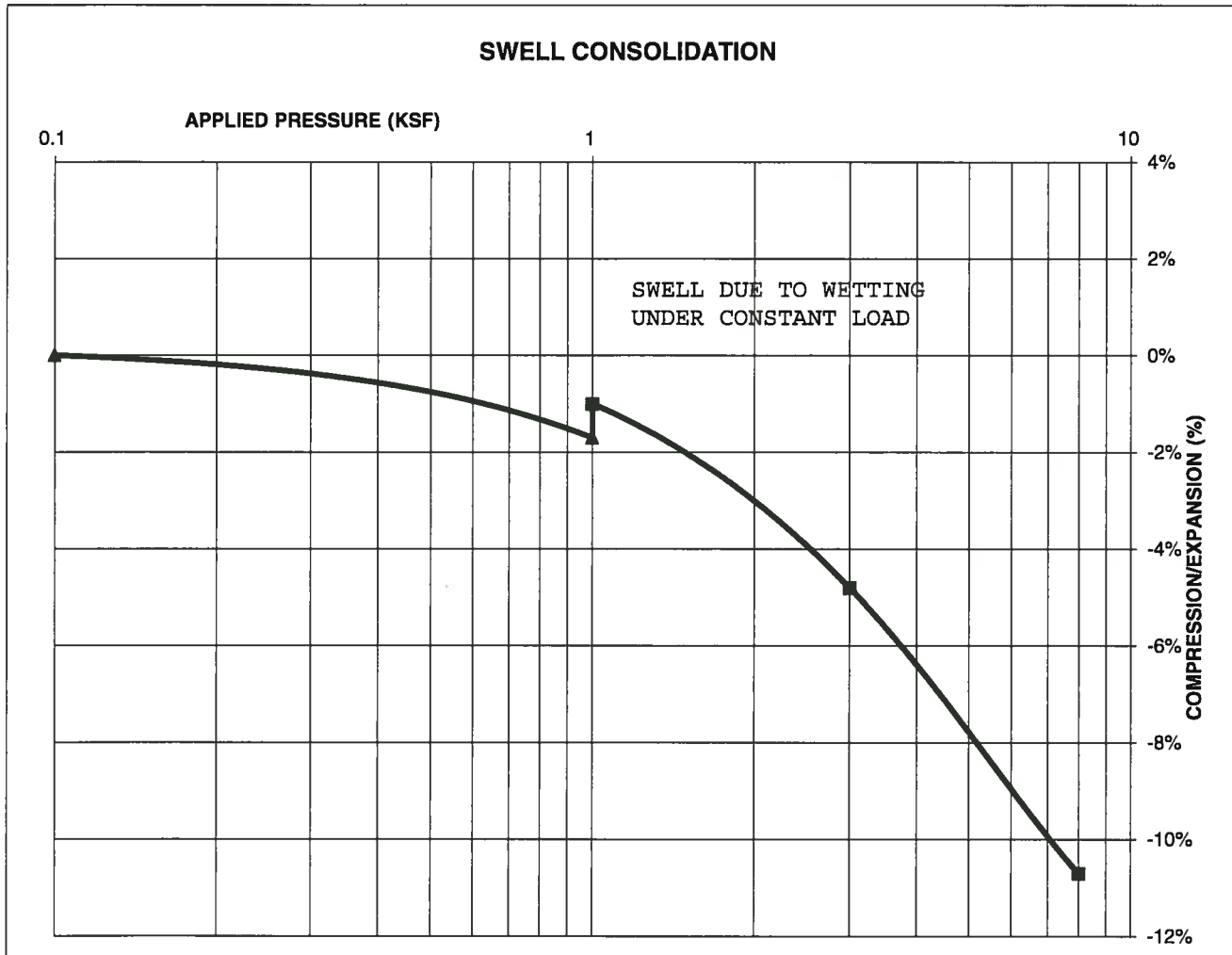
JOB NO.:
 221305

FIG NO.:
 B-14

CONSOLIDATION TEST RESULTS

TEST BORING #	12	DEPTH(ft)	20
DESCRIPTION	CL	SOIL TYPE	2
NATURAL UNIT DRY WEIGHT (PCF)	89		
NATURAL MOISTURE CONTENT	23.4%		
SWELL/CONSOLIDATION (%)	0.7%		

JOB NO. 221305
 CLIENT FRONT ROW PROPERTIES
 PROJECT SOUTHMOOR DRIVE



ENTECH
ENGINEERING, INC.

505 ELKTON DRIVE
 COLORADO SPRINGS, COLORADO 80907

**SWELL CONSOLIDATION
 TEST RESULTS**

DRAWN:

DATE:

CHECKED:
LLL

DATE:
6/27/22

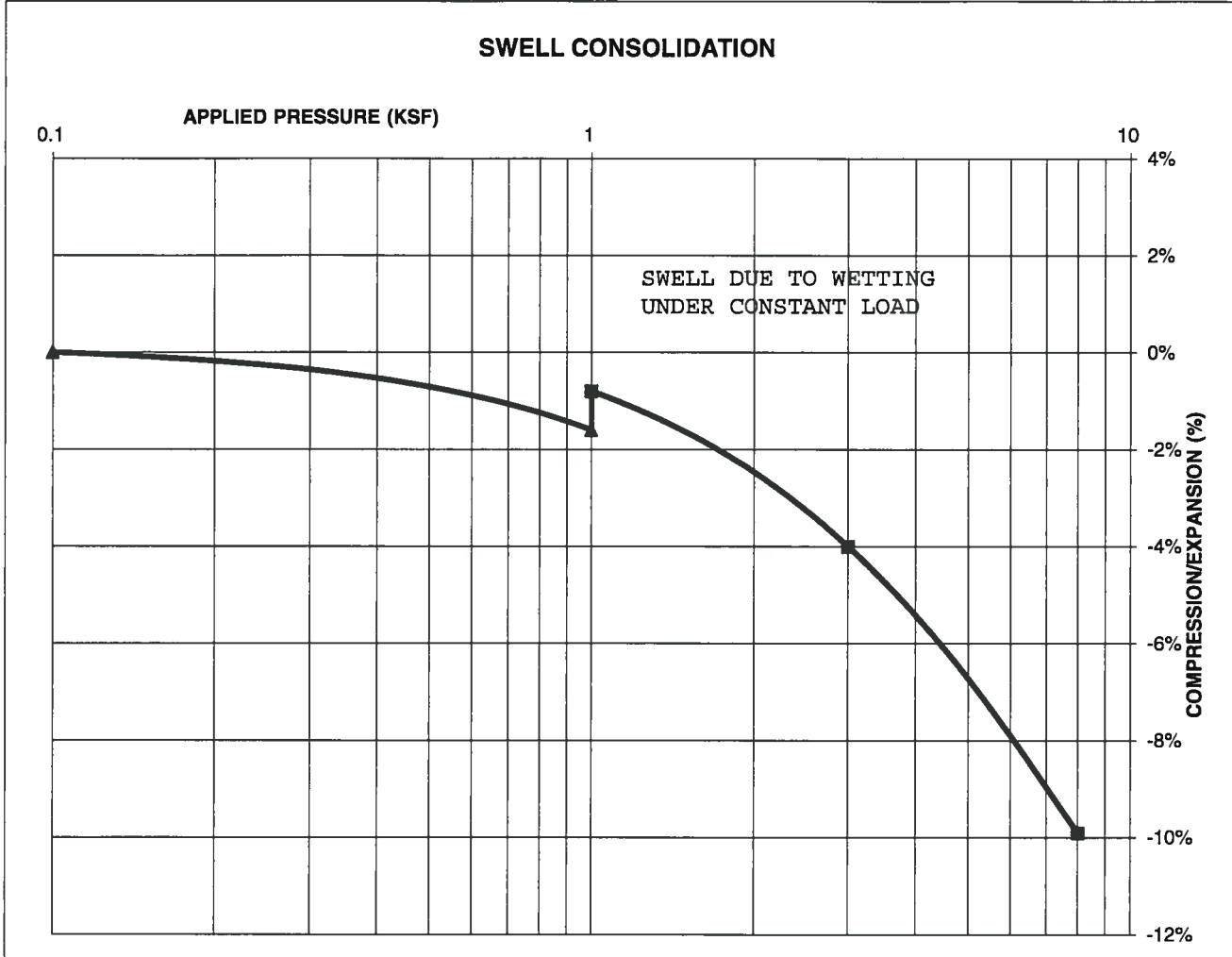
JOB NO.:
 221305

FIG NO.:
B-15

CONSOLIDATION TEST RESULTS

TEST BORING #	2	DEPTH(ft)	15
DESCRIPTION	ML	SOIL TYPE	3
NATURAL UNIT DRY WEIGHT (PCF)			98
NATURAL MOISTURE CONTENT			15.1%
SWELL/CONSOLIDATION (%)			0.8%

JOB NO. 221305
 CLIENT FRONT ROW PROPERTIES
 PROJECT SOUTHMOOR DRIVE



ENTECH
ENGINEERING, INC.

505 ELKTON DRIVE
 COLORADO SPRINGS, COLORADO 80907

**SWELL CONSOLIDATION
 TEST RESULTS**

DRAWN:

DATE:

CHECKED:
LLL

DATE:

6/27/22

JOB NO.:
 221305

FIG NO.:
B-16



ENTECH
ENGINEERING, INC.

505 ELKTON DRIVE
COLORADO SPRINGS, CO 80907
PHONE (719) 531-5599
FAX (719) 531-5238

October 26, 2022

Front Row Properties
1378 Promontory Bluff View
Colorado Springs, CO 80921

Attn: Ron Waldthausen

Re: Infiltration Rates (Percolation Test Method)
Southmoor Drive
Parcel Nos. 6513314015, 6513300021, 6524200052, and 6524200053
Fountain, Colorado

Dear Mr. Waldthausen:

As requested, personnel of Entech Engineering, Inc. have performed percolation testing at the above referenced site to evaluate the site soils to determine the infiltration rate for the proposed detention pond.

The testing was performed on October 21, 2022. The site vicinity map is shown in Figure 1 and the test locations are shown in Figure 2. The Test Boring Logs, Percolation Test results, Infiltration Rates, and Laboratory Test results are shown in Figures 3 through 11. Soils encountered in the profile and percolation hole consisted of silty to very silty sand. Bedrock and groundwater were not encountered in the profile holes, which was drilled to 10 feet.

The percolation rates were 4 minutes/inch for P1, 3 minutes/inch for P2, and 4 minutes/inch for P3. The percolation rates correspond to adjusted average Infiltration Rate of 1.95 inches/hour for pond 1, 3.31 inches/hour for pond 2, and 2.15 inches/hour for pond 3.

We trust that this has provided you with the information you required. If you have any questions or need additional information, please do not hesitate to contact us.

Respectfully Submitted,

ENTECH ENGINEERING, INC.

Logan L. Langford, P.G.
Geologist

LLL/jr

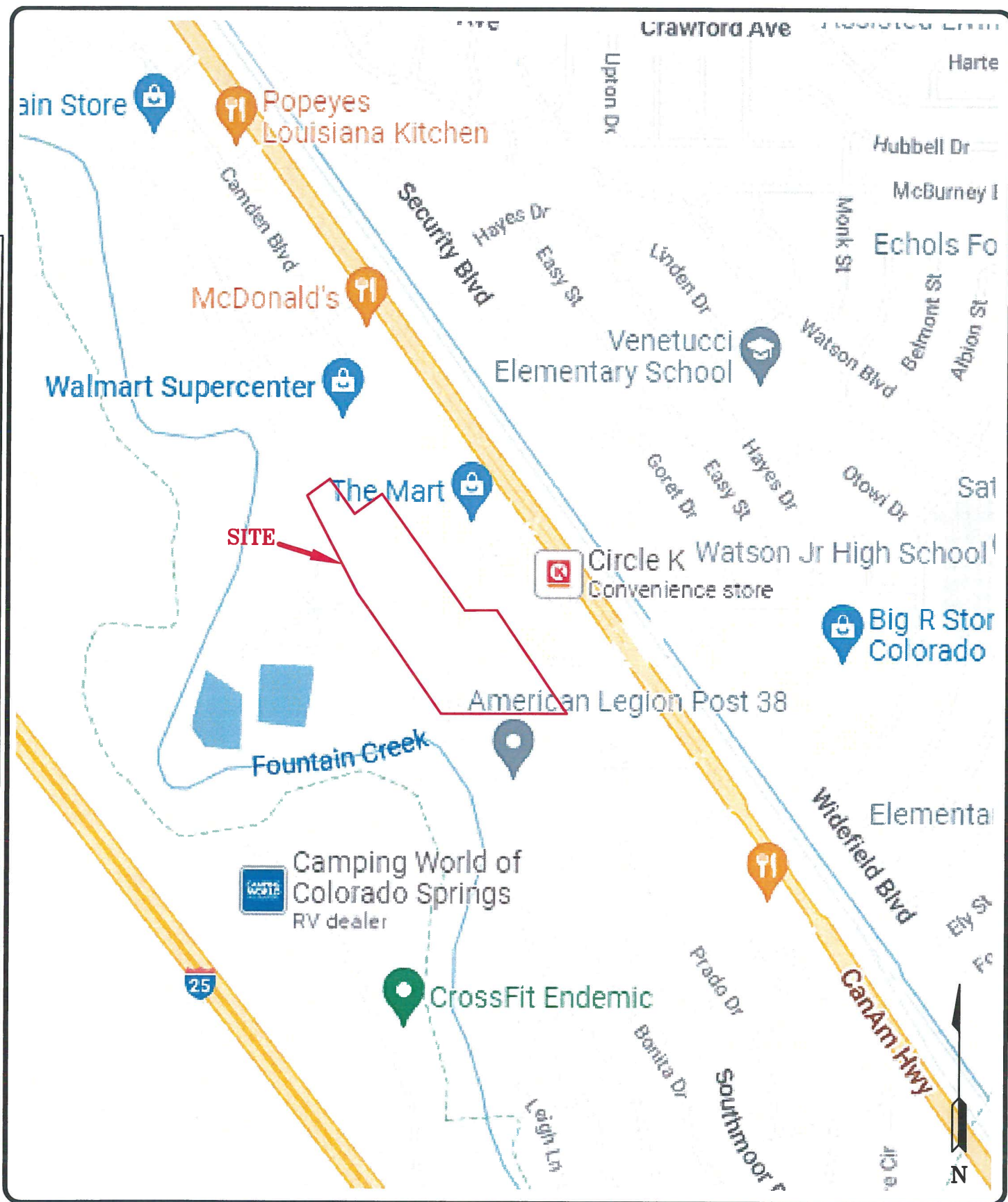
Encl.

Entech Job No. 222077
AAprojects/2022/222077 Infiltration Rate



Reviewed by:

Austin M. Nossokoff, P.E.
Project Engineer



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

VICINITY MAP
SOUTHMOOR DRIVE
FOUNTAIN, CO
FOR: FRONT ROW PROPERTIES

DRAWN:
JHR

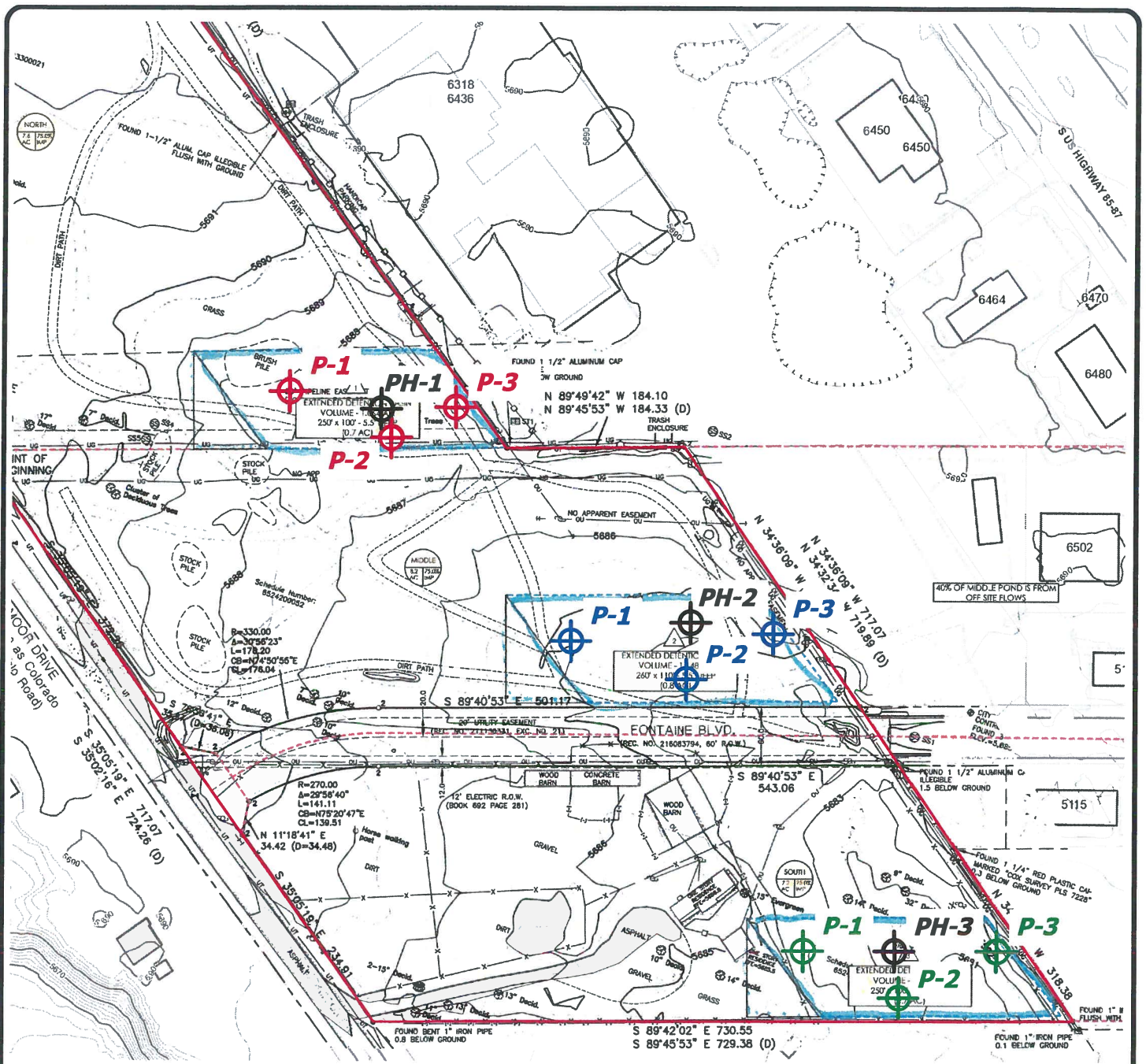
DATE:
10/21/22





CHECKED:
LLL


DATE:

JOB NO.:
222077

FIG NO.:
1



-  **PH- APPROXIMATE PROFILE HOLE LOCATION AND NUMBER**
-  **P- APPROXIMATE PERCOLATION HOLE LOCATION AND NUMBER (POND 1)**
-  **P- APPROXIMATE PERCOLATION HOLE LOCATION AND NUMBER (POND 2)**
-  **P- APPROXIMATE PERCOLATION HOLE LOCATION AND NUMBER (POND 3)**

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505 ELKTON DRIVE
COLORADO SPRINGS, CO. 80907 (719) 531-5399

SITE PLAN/PERCOLATION HOLE LOCATION MAP
SOUTHMOOR DRIVE
FOUNTAIN, COLORADO
FOR: FRONT ROW PROPERTIES

DRAWN: JHR	DATE: 10/21/22	CHECKED: LLL	DATE:
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JOB NO.:
222077

FIG NO.:
2

TEST BORING NO. 1
 DATE DRILLED 10/19/2022
 Job # 222077

TEST BORING NO. 2
 DATE DRILLED 10/19/2022
 CLIENT FRONT ROW PROPERTIES
 LOCATION SOUTHMOOR DRIVE

REMARKS

REMARKS

DRY TO 10', 10/19/22

DRY TO 10', 10/19/22

SAND, SILTY, FINE TO COARSE
 GRAINED, TAN, MEDIUM DENSE,
 MOIST TO DRY

SAND, VERY SILTY, FINE TO
 MEDIUM GRAINED, TAN, MEDIUM
 DENSE TO DENSE, MOIST

* - BULK SAMPLE TAKEN

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type	Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
5			23	3.5		5			24	6.7	
5			26	1.3		5			12	4.4	
10			*	1.4		10			30	4.6	
15						15					
20						20					



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505 ELKTON DRIVE
 COLORADO SPRINGS, COLORADO 80907

TEST BORING LOG

DRAWN:

DATE:

CHECKED:
JHR

DATE:
 10-21-22

JOB NO.:
 222077

FIG NO.:

3

TEST BORING NO. 3
 DATE DRILLED 10/19/2022
 Job # 222077

TEST BORING NO.
 DATE DRILLED
 CLIENT FRONT ROW PROPERTIES
 LOCATION SOUTHMOOR DRIVE

REMARKS

REMARKS

DRY TO 10', 10/19/22

SAND, VERY SILTY, FINE TO
 MEDIUM GRAINED, TAN, MEDIUM
 DENSE, MOIST TO DRY

* - BULK SAMPLE TAKEN

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type	Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
5			20	6.0		5					
10			*	1.9		10					



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505 ELKTON DRIVE
 COLORADO SPRINGS, COLORADO 80907

TEST BORING LOG

DRAWN:

DATE:

CHECKED:

DATE:

JHR

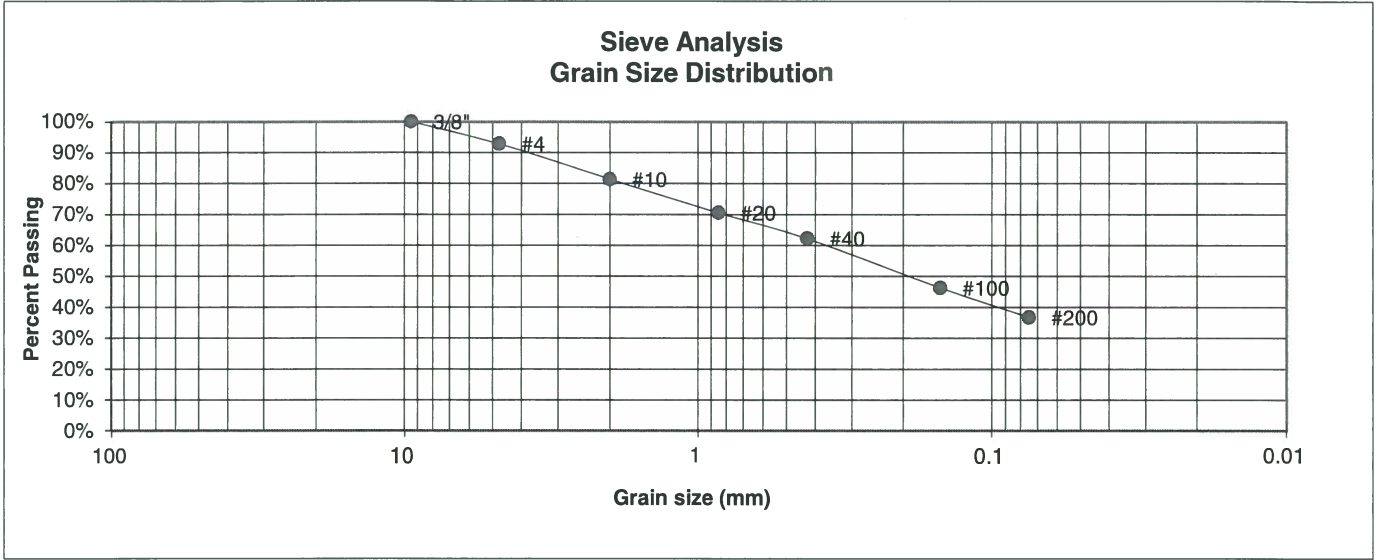
10-21-22

JOB NO.:
 222077

FIG NO.:

4

BORING NO.	PH-1	UNIFIED CLASSIFICATION	SM	TEST BY	BL
DEPTH(ft)	2-3	AASHTO CLASSIFICATION		JOB NO.	222077
CLIENT	FRONT ROW PROPERTIES				
PROJECT	SOUTHMOOR DRIVE				



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	100.0%
4	92.8%
10	81.3%
20	70.5%
40	62.2%
100	46.3%
200	36.7%

- Atterberg Limits
- Plastic Limit
 - Liquid Limit
 - Plastic Index
- Swell
- Moisture at start
 - Moisture at finish
 - Moisture increase
 - Initial dry density (pcf)
 - Swell (psf)



ENTECH ENGINEERING, INC.
505 ELKTON DRIVE
COLORADO SPRINGS, COLORADO 80907

LABORATORY TEST RESULTS

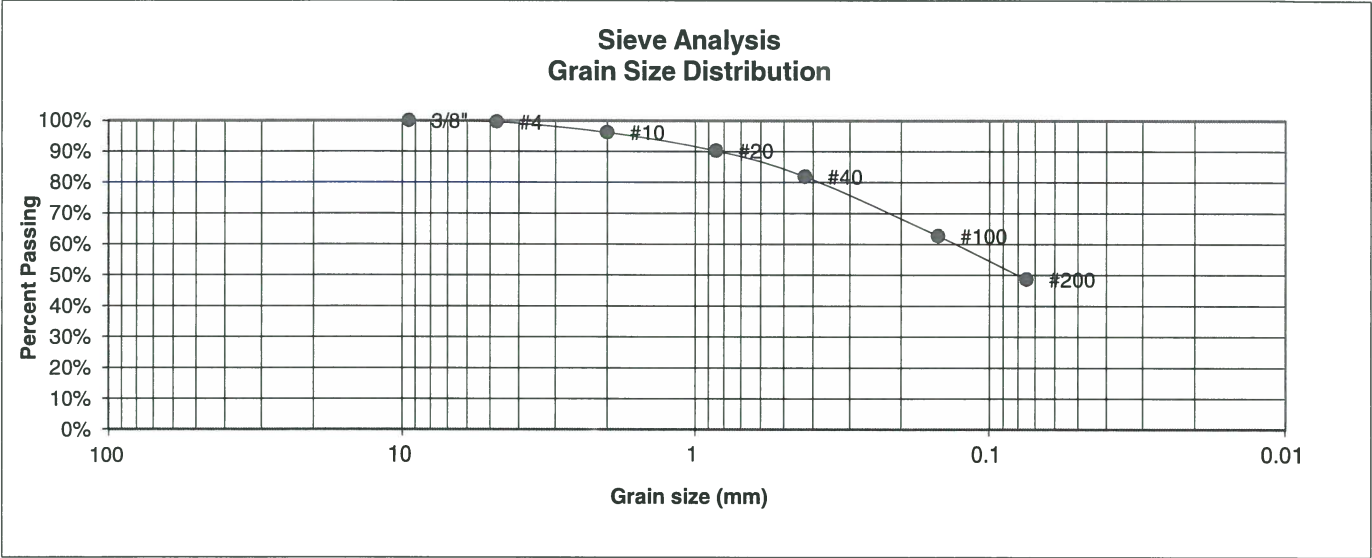
DRAWN:	DATE:	CHECKED:	DATE:
		JHR	10-27-22

JOB NO.:

FIG NO.:

5

BORING NO.	PH-2	<u>UNIFIED CLASSIFICATION</u>	SM	<u>TEST BY</u>	BL
DEPTH(ft)	2-3	<u>AASHTO CLASSIFICATION</u>		<u>JOB NO.</u>	222077
<u>CLIENT</u>	FRONT ROW PROPERTIES				
<u>PROJECT</u>	SOUTHMOOR DRIVE				



<u>U.S. Sieve #</u>	<u>Percent Finer</u>
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	100.0%
4	99.5%
10	96.2%
20	90.3%
40	81.9%
100	62.7%
200	48.6%

Atterberg Limits
 Plastic Limit
 Liquid Limit
 Plastic Index

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



**ENTECH
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505 ELKTON DRIVE
COLORADO SPRINGS, COLORADO 80907

**LABORATORY TEST
RESULTS**

DRAWN:

DATE:

CHECKED:

DATE:

JHR

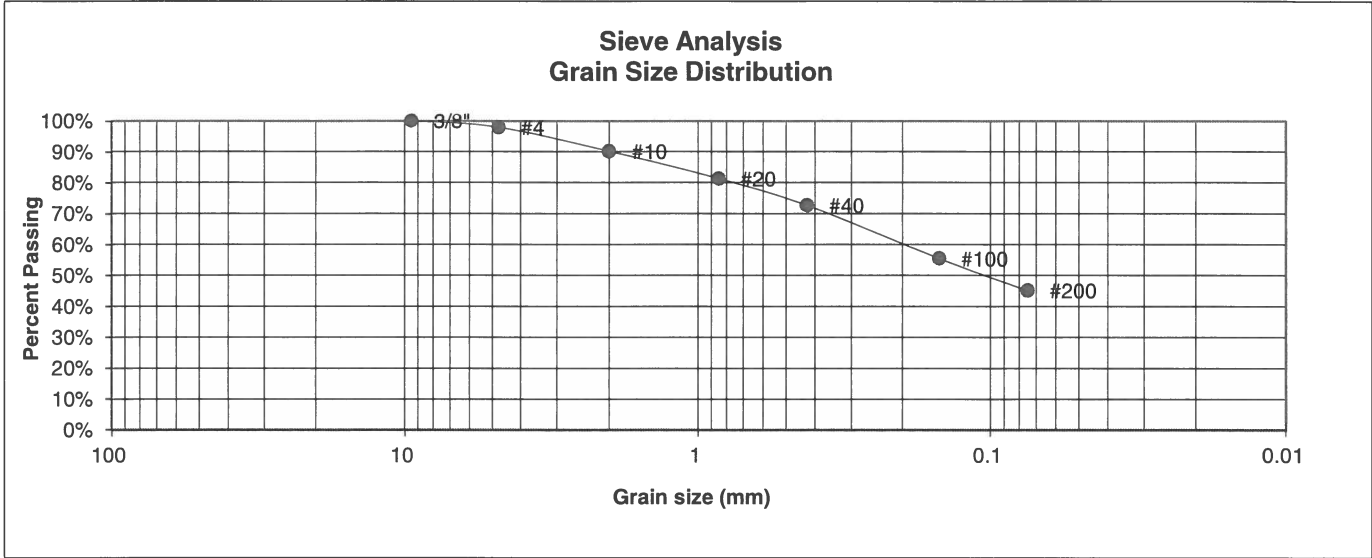
10-21-22

JOB NO.:

FIG NO.:

6

BORING NO.	PH-3	<u>UNIFIED CLASSIFICATION</u>	SM	<u>TEST BY</u>	BL
DEPTH(ft)	2-3	<u>AASHTO CLASSIFICATION</u>		<u>JOB NO.</u>	222077
CLIENT	FRONT ROW PROPERTIES				
PROJECT	SOUTHMOOR DRIVE				



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	100.0%
4	97.8%
10	90.1%
20	81.3%
40	72.6%
100	55.5%
200	45.1%

Atterberg
Limits
Plastic Limit
Liquid Limit
Plastic Index

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



**ENTECH
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505 ELKTON DRIVE
COLORADO SPRINGS, COLORADO 80907

**LABORATORY TEST
RESULTS**

DRAWN:

DATE:

CHECKED:

DATE:

JHR

10-21-22

JOB NO.:

FIG NO.:

7

Client: Front Row Properties
Test Location: Southmoor Drive

Job Number: 222077

PERCOLATION HOLES #1

Date Holes Prepared: 10/19/2022

Date Hole Completed: 10/20/2022

Hole No. 1

Depth: 59"

Hole No. 2

Depth: 61"

Hole No. 3

Depth: 70"

<u>Trial</u>	<u>Time (min.)</u>	<u>Water Level Change (in.)</u>	<u>Trial</u>	<u>Time (min.)</u>	<u>Water Level Change (in.)</u>	<u>Trial</u>	<u>Time (min.)</u>	<u>Water Level Change (in.)</u>
1	5	1	1	5	2	1	5	1
2	5	2	2	5	2	2	5	1
3	5	1	3	5	2	3	5	1

Perc Rate (min./in.): 4

Perc Rate (min./in.): 2.5

Perc Rate (min./in.): 5

Average Perc Rate (min./in.) 4

PROFILE HOLE

Date Profile Hole Completed: 10/19/2022

Depth

0-10'

Visual Classification

Sand, silty, fine to coarse grained, tan

Remarks

No Bedrock
No Groundwater

23 Blows / ft. @ 2'

26 Blows / ft. @ 4'

Remarks:

GPS Coordinates: 38° 73.74694' N, -104° 73.4822' W

Observer: N. Schletzbaum

By:



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505 ELKTON DRIVE
COLORADO SPRINGS, COLORADO 80907

PERCOLATION TEST RESULTS

DRAWN:

DATE:

CHECKED:
JHR

DATE:
10/21/22

JOB NO.:

222077

FIG NO.:

8

Client: Front Row Properties
Test Location: Southmoor Drive

Job Number: 222077

PERCOLATION HOLES #2

Date Holes Prepared: 10/19/2022

Date Hole Completed: 10/20/2022

Hole No. 4
Depth:

Hole No. 5
Depth:

Hole No. 6
Depth:

<u>Trial</u>	<u>Time (min.)</u>	<u>Water Level Change (in.)</u>	<u>Trial</u>	<u>Time (min.)</u>	<u>Water Level Change (in.)</u>	<u>Trial</u>	<u>Time (min.)</u>	<u>Water Level Change (in.)</u>
1	5	1 1/2	1	5	0	1	5	3
2	5	1/2	2	5	0	2	5	2
3	5	1	3	5	1	3	5	2

Perc Rate (min./in.): 3 1/2

Perc Rate (min./in.): 2

Perc Rate (min./in.): 2

Average Perc Rate (min./in.) 3

PROFILE HOLE

Date Profile Hole Completed: 10/19/2022

Depth Visual Classification
0-10' Sand, very silty, fine to coarse grained, tan

Remarks

No Bedrock
No Groundwater

24 Blows / ft. @ 2'
12 Blows / ft. @ 4'
30 Blows / ft. @ 9'

Remarks:

GPS Coordinates: 38° 73.76873' N, -104° 73.3695' W

Observer: N. Schletzbaum

By:



ENTECH
ENGINEERING, INC.

505 ELKTON DRIVE
COLORADO SPRINGS, COLORADO 80907

PERCOLATION TEST RESULTS

DRAWN:

DATE:

CHECKED:

DATE:

JHR

10-22-22

JOB NO.:

FIG NO.:

9

Client: Front Row Properties
Test Location: Southmoor Drive

Job Number: 222077

PERCOLATION HOLES #3

Date Holes Prepared: 10/19/2022

Date Hole Completed: 10/20/2022

Hole No. 7
Depth:

Hole No. 8
Depth:

Hole No. 9
Depth:

<u>Trial</u>	<u>Time (min.)</u>	<u>Water Level Change (in.)</u>	<u>Trial</u>	<u>Time (min.)</u>	<u>Water Level Change (in.)</u>	<u>Trial</u>	<u>Time (min.)</u>	<u>Water Level Change (in.)</u>
1	5	1	1	5	2	1	5	2
2	5	1	2	5	1	2	5	1
3	5	1	3	5	1	3	5	2

Perc Rate (min./in.): 5

Perc Rate (min./in.): 4

Perc Rate (min./in.): 3

Average Perc Rate (min./in.) 4

PROFILE HOLE

Date Profile Hole Completed: 10/19/2022

Depth
0-10'

Visual Classification
Sand, very silty, fine to coarse grained, tan

Remarks

No Bedrock
No Groundwater

20 Blows / ft. @ 2'
15 Blows / ft. @ 4'

Remarks:

GPS Coordinates: 38° 73.59461' N, -104° 73.2943' W

Observer: N. Schletzbaum

By:



ENTECH
ENGINEERING, INC.

505 ELKTON DRIVE
COLORADO SPRINGS, COLORADO 80907

PERCOLATION TEST RESULTS

DRAWN:

DATE:

CHECKED:
JHR

DATE:
10-21-22

JOB NO.:

FIG NO.:

10

Infiltration Rate (I) = Percolation Rate (P)/ Reduction Factor(Rf)
I=P/Rf

CLIENT FRONT ROW PROPERTIES
PROJECT SOUTHMOOR DRIVE
JOB NO. 222077

$$R_f = [(2d_1 - \Delta d) / \text{dia}] + 1$$

d_1 = initial water depth (in.)

Δd = final water level drop (in.)

dia = diameter of the percolation hole (in.)

Test No. P1 (PH-1)

Perc Rate= 15 in/hr
dia = 8

P1

d_1 = 36.0
 Δd = 1.0
 R_f = 9.9

I = 1.519 in/hr

(PH-1) I AVG= 1.954 in/hr

Test No. P2 (PH-1)

Perc Rate= 24 in/hr
dia = 8

P2

d_1 = 26.0
 Δd = 2.0
 R_f = 7.3

I = 3.310 in/hr

Test No. P3 (PH-1)

Perc Rate= 12 in/hr
dia = 8

P3

d_1 = 43.0
 Δd = 1.0
 R_f = 11.6

I = 1.032 in/hr

Test No. P1 (PH-2)

Perc Rate= 17.14 in/hr
dia = 8

P1

d_1 = 32.0
 Δd = 1.0
 R_f = 8.9

I = 1.932 in/hr

(PH-2) I AVG= 3.313 in/hr

Test No. P2 (PH-2)

Perc Rate= 30.00 in/hr
dia = 8

P2

d_1 = 19.0
 Δd = 0.0
 R_f = 5.8

I = 5.217 in/hr

Test No. P3 (PH-2)

Perc Rate= 30 in/hr
dia = 8

P3

d_1 = 40.0
 Δd = 2.0
 R_f = 10.8

I = 2.791 in/hr

Test No. P1 (PH-3)

Perc Rate= 12.00 in/hr
dia = 8

P1

d_1 = 21.0
 Δd = 1.0
 R_f = 6.1

I = 1.959 in/hr

(PH-3) I AVG= 2.149 in/hr

Test No. P2 (PH-3)

Perc Rate= 15.00 in/hr
dia = 8

P2

d_1 = 39.0
 Δd = 1.0
 R_f = 10.6

I = 1.412 in/hr

Test No. P3 (PH-3)

Perc Rate= 20 in/hr
dia = 8

P3

d_1 = 23.0
 Δd = 2.0
 R_f = 6.5

I = 3.077 in/hr



ENTECH
ENGINEERING, INC.

505 ELKTON DRIVE
COLORADO SPRINGS, COLORADO 80907

INFILTRATION TEST RESULTS

DRAWN:

DATE:

CHECKED:
JHL

DATE:
10-26-22

JOB NO.:

FIG NO.:

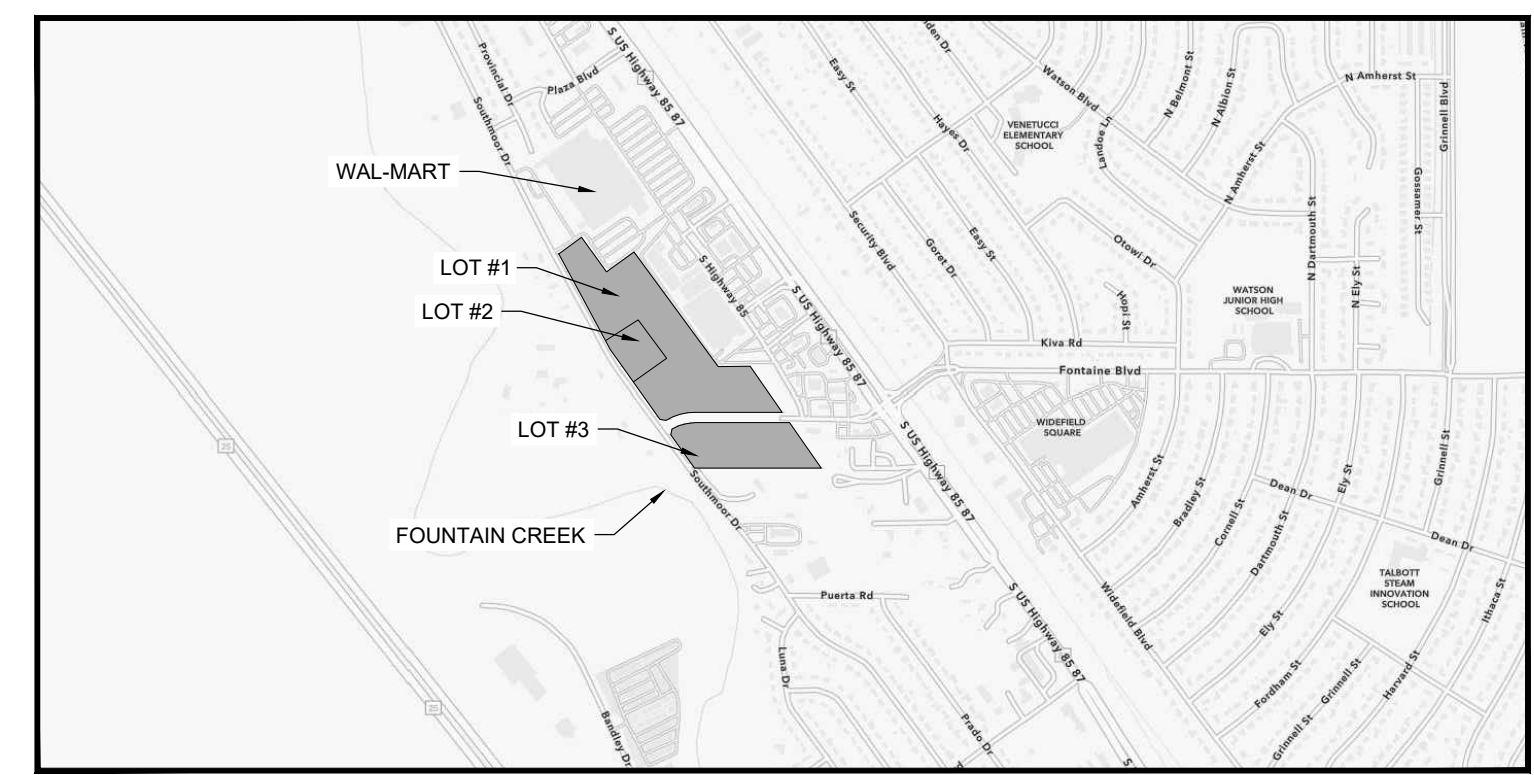
11

APPENDIX G - LAND ANALYSIS MAP

SOUTHMOOR RIDGE

LAND SUITABILITY MAP

A TRACT OF LAND LOCATED IN A PORTION OF THE NORTH HALF OF THE NORTHWEST QUARTER OF SECTION 24, AND IN A PORTION OF THE SOUTH HALF OF THE SOUTHWEST QUARTER OF SECTION 13, ALL IN TOWNSHIP 15 SOUTH, RANGE 66 WEST OF THE 6TH P.M., COUNTY OF EL PASO, STATE OF COLORADO



VICINITY MAP (SCALE: 1"=1,000')

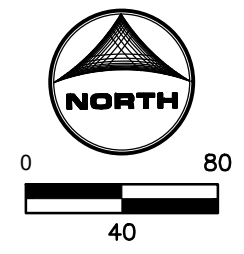
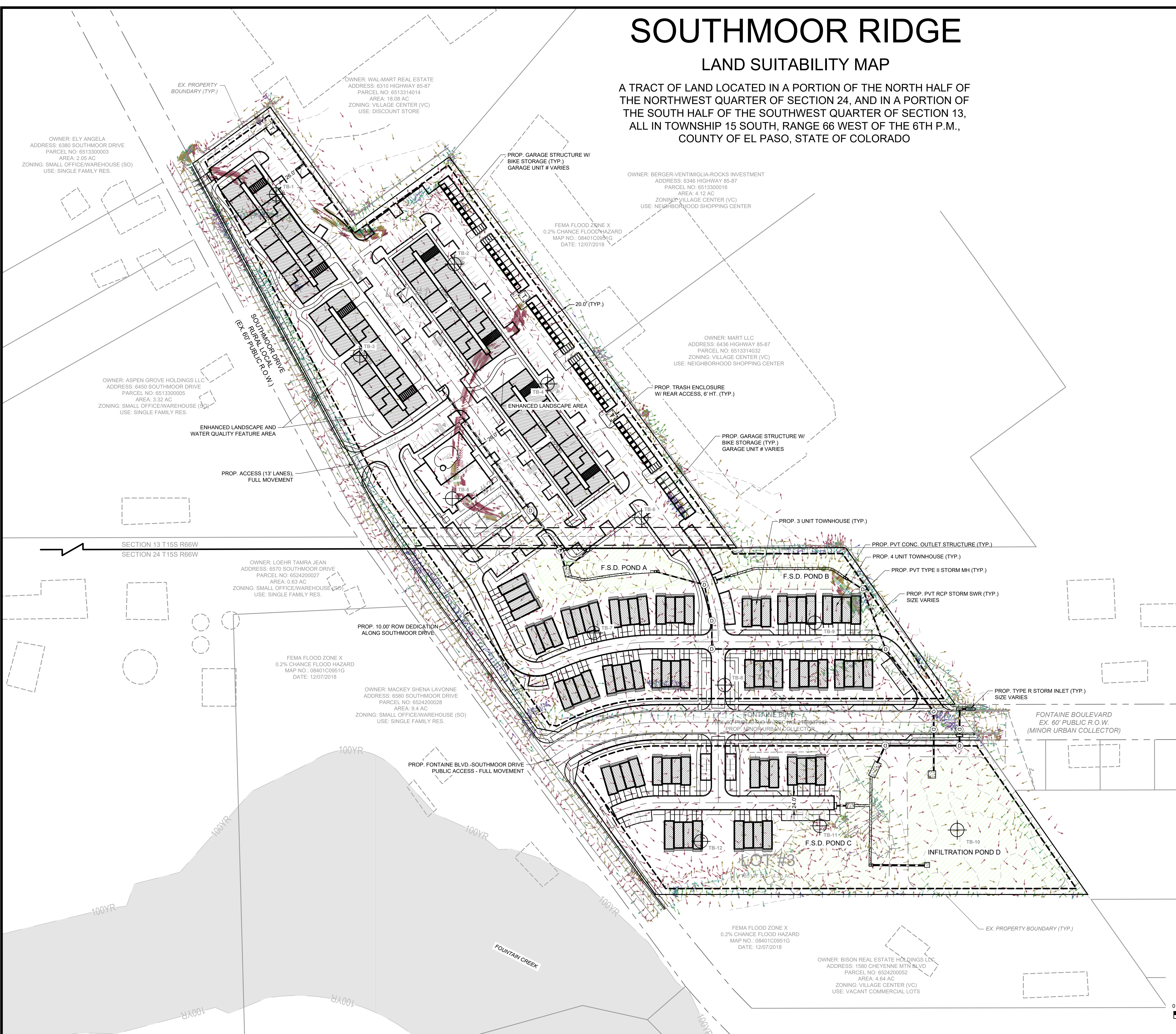
- GENERAL NOTES:**
- THE ENTIRE PROPOSED SITE IS LOCATED WITHIN FEMA IDENTIFIED FLOODZONE X, WITH A 2% CHANCE FLOOD HAZARD, AS PER MAP NO. 08401C0951G, DATED DECEMBER 7, 2018.
 - THERE ARE NO GEOLOGICAL HAZARDS IDENTIFIED WITHIN THE PROPOSED SITE. THE GEOTECHNICAL TEST BORINGS REPORTED LOOSE AND EXPANSIVE SOILS IN SOME TEST BORINGS, WHICH WILL REQUIRE MITIGATION WITHIN BUILD AREAS - TO BE VERIFIED DURING CONSTRUCTION. ADDITIONAL SUBSURFACE SOIL INVESTIGATION IS RECOMMENDED ONCE DEVELOPMENT PLANS ARE PREPARED.
 - VERY LOOSE SOILS WERE ENCOUNTERED IN SEVERAL OF THE BORINGS IN THE UPPER PROFILE. AREAS WITH LOOSE OR UNCONTROLLED FILL THAT ARE LOCATED WITHIN BUILD AREAS WILL BE REQUIRED TO BE COMPLETED REMOVED AND RECOMPACTED. IT IS RECOMMENDED THAT LOOSE SOILS BE PENETRATED OR MOISTURE CONDITIONED AND RECOMPACTED UNDERNEATH BUILDINGS.
 - EXPANSIVE SOILS WERE ENCOUNTERED SPORADICALLY IN TEST BORINGS. SHOULD EXPANSIVE SOILS BE ENCOUNTERED BENEATH FOUNDATIONS, MITIGATION BY WAY OF OVEREXCAVATION AND REPLACEMENT WITH NON-EXPANSIVE SOILS, AS RECOMMENDED BY THE GEOTECHNICAL REPORT, WILL BE NECESSARY.
 - THREE SOIL AND ROCK TYPES WERE ENCOUNTERED DURING TEST BORING.
 - TYPE 1: VERY CLAYEY SAND, CLEAN SAND, AND SILTY TO SLIGHTLY SILTY SAND.
 - TYPE 2: SANDY SILT AND SANDY CLAY.
 - TYPE 3: CLAYSTONE AND SHALE.
 - RESULTS OF TEST BORING TB-10 ARE REPORTED HERE AS THE PROPOSED INFILTRATION POND IS TO BE CONSTRUCTED IN THE AREA OF TB-10. GEOTECH REMARKS OF THE TEST BORING REPORT DRY CONDITIONS DOWN TO A DEPTH OF 20'. THE SOIL COMPOSITION IS TYPE 1 AND DESCRIBED AS SAND AND SILTY.
 - AREAS DEDICATED TO PRIVATE SPACE ARE TO BE OWNED AND MAINTAINED BY THE OWNERS OF THE PROPERTY.
 - THERE ARE NO KNOWN NO-BUILD AREAS SUCH AS PRESERVATION EASEMENTS, WILDLIFE HABITAT AREAS, WETLANDS, OR RIPARIAN AREAS WITHIN THE SITE.

LINWORK LEGEND

	EXISTING	PROPOSED
MATCH LINE	---	---
PROPERTY LINE	---	---
RIGHT OF WAY	---	---
CENTERLINE	---	---
CURB & GUTTER	---	---
U.G. ELECTRIC	---	---
OVERHEAD ELEC.	---	---
GAS MAIN	---	---
SANITARY SEWER	---	---
WATER MAIN	---	---
STORM DRAIN	---	---
100-YR FLOODPLAIN	---	---
DETENTION AREA	---	---
INDEX CONTOUR	---	---
INTER. CONTOUR	---	---
PERCENT GRADE	---	---
SLOPE DIRECTION	---	---
TEST-BORE LOCATIONS	---	---

Slope Arrows Table

Number	Minimum Slope	Maximum Slope	Color
1	0.00%	2.00%	Red
2	2.00%	5.00%	Orange
3	5.00%	10.00%	Yellow
4	10.00%	25.00%	Green
5	25.00%	33.00%	Blue
6	33.00%	100.00%	Purple

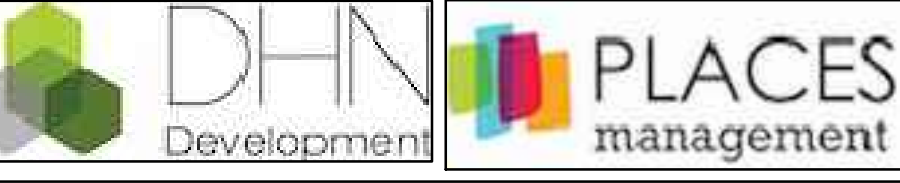


DRAWN BY: DLH JOB DATE: 2/13/2024 BAR IS ONE INCH ON OFFICIAL DRAWINGS.
 APPROVED: RDL JOB NUMBER: 2303146
 CAD DATE: 1/5/2024
 CAD FILE: J:\2023\2303146\CAD\DWG\CILand_SuitabilityLand_Suitability_2303146

NO.	DATE	BY	REVISION DESCRIPTION

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 DHN DEVELOPMENT INC.
 FOUNTAIN, COLORADO



HR GREEN Xref: xc-dgn; xgt-1-dh01_24x36; xc-uti; xc-rov; xc-dgn-3146; xv-rov-3146; Legend_LandSuitability; xv-survey-ex
 HERGER, DANIEL, 2/13/2024, 10:15 AM