



PARK COUNTY, COLORADO
RESOLUTION NO. 009

A RESOLUTION GRANTING A SPECIAL DEVELOPMENT PERMIT WITH CONDITIONS
FOR CAMP IdRaHaJe WASTEWATER TREATMENT PLANT

WHEREAS, the Board of County Commissioners of Park County, Colorado ("Board of County Commissioners"), pursuant to C.R.S. § 24-65.1-101 et seq., has designated municipal and industrial water projects, site selection and construction of major new domestic water and sewage treatment systems and major extensions of existing domestic water and sewage treatment systems matters of state interest; and

WHEREAS, the Board of County Commissioners has adopted guidelines for the regulation of these designated matters of state interest, known as Park County Regulations for Special Development Projects Designated as Matters of State Interest ("Special Development Regulations"); and

WHEREAS, Mike DeBoer, Executive Director ("Applicant") has applied for a Special Development Permit for Camp IdRaHaJe Wastewater Treatment Plant Project (the "Project"); and

WHEREAS, a public hearing was held on March 21, 2023 in Fairplay, Colorado to consider the permit application for the Project, at which the Board of County Commissioners considered testimony, received evidence and deliberated; and

WHEREAS, all applicable notice and public hearing requirements have been followed.

NOW, THEREFORE, BE IT RESOLVED BY THE BOARD OF COUNTY COMMISSIONERS OF PARK COUNTY, COLORADO:

Section 1. Findings. The Board of County Commissioners hereby finds the following:

- 1.1 With the specific conditions of approval as set forth in Section 2 of this Resolution, the Project will satisfy the Approval Standards and Criteria in Chapter 3, Article 1 of the Special Development Regulations; and
- 1.2 The Applicant has consented to the conditions of approval as set forth in Section 2 of this Resolution.

Section 2. Permit Approval. The Board of County Commissioners hereby approves the Special Development Permit for the Project, subject to the following conditions:

1. The Applicant shall comply with the recommendations in the March 17, 2022 geotechnical analysis performed by Colorado Geoscience & Design Inc. in the construction of the wastewater treatment facility, which analysis is attached hereto as Exhibit A.

2. The Applicant shall obtain applicable CDPHE approvals including permits for domestic wastewater discharge, stormwater discharge during construction, construction de-watering. Non-compliance with the terms of any of these permits and approvals is a violation of the Park County 1041 permit and subject to any enforcement or penalties therein.
3. The Applicant shall obtain Park County site plan approval that includes specific consideration on the adequacy of the design for the proposed WWTP addressing visual impacts at this location.
4. The Applicant shall obtain Park County site plan approval that includes their written construction erosion and sediment control plan, stormwater management plan and traffic control plan at this location.
5. Prior to any site disturbance, the Applicant will apply for and receive a Park County excavation permit and building permit for any applicable buildings or structures.
6. If odors from the wastewater treatment facility become a concern, as determined by Park County, a mitigation contingency plan will be developed and initiated within 30 days and completed within 90 days from the determination of a problem by Park County. If the said contingency plan does not eliminate the odor problem a revised contingency plan must be submitted and implemented in order to be in compliance with this conditional approval.
7. Noise levels shall not exceed 50 dBA at a distance of 10 feet from the building in which the small horse power blowers, pumps and any backup generators are housed.
8. Construction noise shall be mitigated by construction times, Monday through Friday from 7:30 a.m. until 5:30 p.m. No construction activity will occur weekends from Friday at 5:30 p.m. until Monday morning at 7:30 a.m. An exception would be if any emergency repairs are needed to be performed.
9. Habitat protection shall include minimized vegetation clearance bird; nest survey will be conducted if construction is taking place during nesting season.
10. The Camp's wastewater treatment facility shall be constructed in a manner that minimizes the spread of noxious weeds. Construction activity shall be conducted in a manner that strictly limits the spread of these noxious weeds and shall be accomplished according to the following practices:
 - a. Soil containing noxious weeds or noxious weed seed shall not be removed from or introduced to the construction site.
 - b. Construction activity shall not disturb noxious weeds while they bear mature seed heads.

- c. All earth moving equipment shall be washed clean at a controlled location prior to being moved onto the property.
- d. All seed, soil, and mulch imported onto the property shall be free from weed seeds.
- e. All excavations, placement of fill soil or other ground disturbance shall be revegetated with the seed mix approved by Park County within 14 days of the completion of grading in order to establish desirable vegetative cover and discourage the growth of weeds.

It shall be the responsibility of the Applicant to regularly inspect the property and identify the introduction of noxious weeds. If noxious weeds appear, the Camp will take action to eliminate the invasive weeds and prevent the spread of weeds. Examples of methods to accomplish this include:

- a. Excavated soil containing noxious weeds or noxious weed seed shall not be removed from or introduced to the site.
 - b. Ongoing weed control shall consist of digging out or spraying individual weeds. Spraying or digging shall occur as needed to prevent the spread of weeds.
 - c. Noxious weeds shall not disturb while they bear mature seed heads.
11. All land surface areas disturbed by construction activity must be reseeded and mulched with a seed mix acceptable to Park County. More specifically, in order to be in compliance with this conditional approval, reseeded shall occur within 14 days after completion of any construction activity and shall be maintained or reseeded by the Applicant until the seeded area has reached at least 70% of the vegetative density.

Section 3. Permit Conditions. All conditions in this Resolution are necessary to and shall be incorporated by reference into the Special Development Permit for the Project.

Section 4. Violation. Any violation of this Permit shall be subject to the enforcement and penalty provisions of the Regulations.

Moved, seconded, and passed this 4th day of April, 2023.

PARK COUNTY BOARD OF COUNTY COMMISSIONERS



Amy Mitchell, Chairperson

COMMISSIONER MITCHELL: YEA NAY

COMMISSIONER ELSNER: YEA NAY

COMMISSIONER WISSEL: YEA NAY

ATTEST:

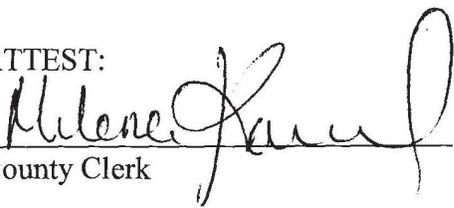

County Clerk

EXHIBIT A
Geotechnical Analysis

800657

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6 of 35

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R\$0.00 D\$0.00

Milena Kassel
Park County



Geoscience & Design, Inc.

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**Camp IdRaHaJe
P O Box 360
Bailey, CO 80421**

SUBSURFACE INVESTIGATION

OF

**571 COUNTY ROAD 43
PARK COUNTY, COLORADO**

**REPORT NO. 21-717
March 17, 2022**



NOT VALID WITHOUT
ORIGINAL SIGNATURE

GEOTECHNICAL

STRUCTURAL

CIVIL

ENGINEERS

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GENERAL

This report presents the results of data obtained during the subsurface investigation at **571 COUNTY ROAD 43, PARK COUNTY, COLORADO**. This investigation was made to determine the type of foundation required, allowable bearing capacity, and groundwater conditions encountered at the time of the field investigation.

SITE CONDITIONS

At the present time, the site is vacant. It is our understanding a wastewater treatment plant consisting of 3 to 5 precast concrete tanks approximately 7' wide, 12' long, and 12' deep is planned for the site. The proposed foundation system will consist of precast concrete tanks or pads. We anticipate the estimated foundation loads to range from 770 to 1050 pounds per sq. ft. minimum at each tank to its supporting base bearing area.

Note: The final design loads shall be based on the full system loads when selecting a foundation support system by the design engineer-of-record

The general topography of the site slopes approximately 3% to the north. The vegetation at the site consists of native trees, grass, and weeds. The weather was cool and sunny at the time of the investigation.

If the type of construction changes from that specified above, please contact this office for additional recommendations and/or requirements.

FIELD AND LABORATORY INVESTIGATION

Three (3) exploratory test holes were drilled on March 2, 2022, at the site shown on the Location Map, Figure 1. The test holes were drilled with a four-inch (4") diameter auger advanced with a CME-45 soil exploration drill rig.

At specific intervals, the drilling tools were removed from the test holes and soil samples were obtained with a two-inch (2") diameter spoon sampling tube. The depths at which soil samples were taken and a description of the soil encountered are shown on the Log of Test Holes, Figure 2, and the Summary of Laboratory Testing, Table 1.

All soil samples were carefully observed in the field during the drilling operation. These samples were classified in the laboratory through visual observation and laboratory testing to determine the pertinent properties. The natural moisture content, dry density and Atterberg Limits were obtained from relatively undisturbed drive samples of typical soils. Swell-consolidation tests were performed on typical soil samples see Figure 3. These tests indicate the behavior of the soil upon various loadings in a wetted condition.

Groundwater was encountered at a depth of 8 feet in B3 at the time of the field investigation. When checked later, groundwater was measured at a depth of 10 feet in B1, 9 feet in B2 and 6.5 feet in B3; the boreholes caved to 11 feet, 10 feet and 7 feet in B1 through B3, respectively. The groundwater in the bore holes when checked later, may have been due to the recent snowstorms. These observations represent the groundwater conditions at the time of drilling or measurement and may not be indicative of the conditions at other times. Groundwater levels can be expected to fluctuate with varying seasonal weather conditions and if the sites use irrigation for lawns.

Site soil conditions encountered may appear different from the test borings as presented in this report. **An excavation observation is required and must be performed by a representative of this office to verify existing soil conditions, and the proposed design bearing pressure.** The excavation observation must be performed only after the entire building footprint has been excavated to the bottom of bearing elevation. In addition, it may be necessary to revise our foundation recommendations based upon results of the excavation.

Failure to follow the observation requirements noted herein may jeopardize the success of this construction project and Colorado Geoscience and Design Inc. shall be absolved from any and all responsibility for any damages arising from the failure to obtain proper site observations.

If an individual or contractor performs an open-hole or site observation or disregards the foundation recommendations cited herein, other than those provided by Colorado Geoscience and Design, Inc.'s, or that which has been approved by the local building officials, that individual or contractor will assume all liability for using this subsurface investigation and its relevant construction recommendations.

FOUNDATION RECOMMENDATIONS

Based on our evaluation of the subsurface conditions, we recommend the proposed Water treatment tank be founded on continuous concrete footing system. A professional engineer should use the following design criteria to design the foundations.

1. The footings system (including pads) shall be designed a maximum soil bearing pressure of 1,500 pounds per square foot (DL+LL). The entire foundation shall bear on the sand and gravel (gneiss and schist) or raising up the foundation bearing base level due to the groundwater elevation.
2. No footing or pad shall bear upon topsoil or soils that contain organic material. All loose and disturbed soil shall be removed before pouring the concrete for the footings or bearing pads.
3. All continuous footing systems shall be designed for the maximum design loads for

all concrete tank systems. We recommend footings be reinforced to bridge isolated soft areas up to 10 feet. Exterior footing systems should be provided with at least 3 feet of soil cover for frost protection, or per county codes.

- 4. The foundation or tank walls shall be designed for an active horizontal pressure based on an equivalent fluid density of 62.4 pounds per cubic foot plus any applicable surcharge or hydrostatic loads.
- 5. In place structural settlements are very difficult to predict with any reasonable accuracy, due to the large number of variable geotechnical parameters involved. However, based upon the currently available methods of settlement prediction, it is estimated that total structural settlement will be on the order of 1½" and differential structural settlement will be on the order of ¾".

CRITERIA FOR SLAB-ON-GRADE CONSTRUCTION

Virtually all concrete slabs undergo some type of movement. Concrete slabs placed on soils comprised of medium dense or dense granular material or comprised of soft or stiff clays with swell potential less than 1% under a 1000 lb surcharge is considered unlikely to sustain intolerable movement by standard engineering practice.

Cracking of slabs-on-grade is difficult to control and should be expected to occur with time. Cracking may be the result of many factors such as concrete shrinkage and daily and seasonal variability in temperature and humidity and not necessarily the result of soil movement.

Further, cracks and movement of slabs-on-grade can be transmitted through rigid floor coverings such as ceramic tile. Performance expectations should be taken into consideration in the selection of floor slab coverings.

If floor coverings or coatings less permeable than the concrete slab are used, or if moisture is a concern, we recommend a vapor retarder be placed beneath the slab. Flooring installation should be consistent with the flooring manufacturer's recommendations for subsoil and slab construction and moisture testing prior to installation.

A change in water content in soils is a major contributor to slab movement. Colorado Geoscience and Design recommends that steps be taken to reduce the possibility of intolerable concrete slab movement due to changes in water content. Properly landscaped yards, drainage from the foundation walls, and the installation of perimeter and/or under slab drainage systems are ways to mitigate changes in the water content of the indigenous soils (**See "Surface Drainage"**).

A slab performance risk evaluation was conducted in general compliance with industry guidelines for the local area. The risk assessment of a site for potential movement is not absolute; rather, it represents a judgment based upon the data available and our

experience in the area. Movement of foundations and concrete flat work will occur over time in low to very high-risk areas as the soil moisture content increases. On low and moderate rated sites, slab movements of up to 3 inches across the slab with cracking of up to ¼ inch in width and/or differential movement are not unusual. The damage generally increases as the risk assessment increases and as the depth of wetting increases. It must be understood, however, that assessing risk is an opinion, and the prediction of heave is not an exact science. Therefore, it may be possible that heave less than or in excess of what is described herein may be experienced. This risk should be communicated to the subsequent homebuyer. We recommend the owner or prospective buyer review "A Guide to Swelling Soils for Colorado Homebuyers and Homeowners," which is a special publication produced (SP43) by the Colorado Geological Survey to assist homeowners in reducing damage caused by swelling soils.

Swell Potential Chart

Slab Performance Risk Category	Representative Percent Swell (1,000 psf Surcharge)
Low	0 to <2
Moderate	2 to <4
High	4 to <6
Very High	≥ 6

Note: the representative percent swell values presented are not necessarily measured values; rather, they are a judgment of the swell of the soil and bedrock profile likely to influence slab performance.

The swell potential of the indigenous soils for the residence at this site meets the criteria for low risk of slab-on-grade movement. Concrete slabs may be used for exterior surface (sidewalks, patios, and aprons) placed on the native soil. Furthermore, intolerable movement of any slab on grade may occur at the site as a result of future factors beyond the control of Colorado Geoscience and Design, Inc.

If the owner/builder accepts the risk of slab-on-grade movement and chooses a slab-on-grade floor, the following steps shall be part of the concrete slab design:

- Any soil disturbed during construction shall be compacted by use of a vibratory plate in the case of loose granular soils or wheel rolled by heavy equipment in the case of soft clay or silt soils prior to placement of the concrete slab.
- The soil should be kept moist but not wet during the compaction process as well as immediately prior to the placement of the concrete slab directly onto the soil. Steps shall be taken to ensure that subsurface moisture beneath the concrete slab remains constant during the construction process.
- The concrete slab shall be structurally isolated from all foundations and shall be isolated from penetrations by suitable expansion material not less than ½" thick. The floating concrete slab shall be completely isolated from all utility lines.
- Control joints shall be provided in the concrete slab. These control joints must be saw cut or tooled to a minimum of one third of the thickness of the slab. No portion

of the concrete slab will have an area greater than neither 100 square feet nor a maximum dimension of 12'-0" in any direction without a control joint.

LATERAL EARTH PRESSURE

For soils above any free water surface, recommended equivalent fluid pressures for restrained elements are:

- At rest:

Cohesive soil backfill (on-site clay)	81 psf/ft
Cohesionless soil backfill (on-site sand)	81 psf/ft
Gneiss and Schist (bedrock material)	81 psf/ft

- Active:

Cohesive soil backfill (on-site clay)	62.4 psf/ft
Cohesionless soil backfill (on-site sand)	62.4 psf/ft
Gneiss and Schist (bedrock material)	45 psf/ft

- Passive:

Cohesive soil backfill (on-site clay)	225 psf/ft
Cohesionless soil backfill (on-site sand)	300 psf/ft
Gneiss and Schist (bedrock material)	335 psf/ft

The lateral earth pressures herein are not applicable for submerged or saturated soils and do not take into consideration the presence of surcharge loads on the ground surface behind the structures such as sloping ground surface or vehicle loads or the presence of hydrostatic pressure on the retaining structures. Any surcharge loads should be added to the above values. To reduce the potential for developing hydrostatic pressure, all structures should be provided with a subsurface drainage system.

Coefficient of sliding friction

- Sand 0.30
- Clay 0.20
- Gneiss and Schist 0.40

MISCELLANEOUS CONSTRUCTION DESIGN RECOMMENDATIONS

Atterberg Limits

Atterberg Limit tests were conducted on 3 samples, biotitic gneiss and schist with fines sampled in B1 at 8 feet and B2 at 4 feet, and the stiff sandy clay sampled in B3 at 3 feet. The biotitic gneiss and schist with fines in B1 at 8 feet is non-viscous and non-plastic with a Unified Soil Classification System (USCS) classification of SP/SM, the biotitic gneiss and schist with fines in B2 at 4 feet has a liquid limit of 27 and is non-

The depths at which soil samples were taken and a description of the soils encountered is shown on the Logs of the Test Holes, Figures 2, 3 and 4. The results of the Atterberg Limits are listed in Figure 4 and Figure 5. Results of the laboratory testing program are summarized in the Summary of Laboratory Testing, Table 1.

Soluble Sulfate / Concrete Recommendations

Soluble sulfate tests were conducted on the three sample, B1 at 3 feet, B3 at 3 feet, and B3 at 8 feet. The water-soluble sulfate content in the samples were 2 mg/L or parts per million (ppm) and 8 mg/l and 11 mg/l, respectively. This concentration of sulfate is considered negligible. **However, we recommend the use of Type II or Type IV Portland cement at this site.** The structural engineer shall determine the 28-day strength of the concrete.

Seismic Design Category

The seismic classification of the soil at the site is B in accordance with tables of the latest edition of the adapted Park County building code.

Soil pH (See Attached Report from SGS AccuLab)

See Appendix A

Resistivity (See Attached report from Kumar and Associates)

See Appendix B

PLACEMENT OF FOUNDATION FILL

Expansive soil with a swell potential of 2% or greater is not suitable for backfill material adjacent to the foundation backfill or for retaining walls. Any soil disturbed or imported material adjacent to the foundation walls shall be re-compacted to a minimum of 90% of Standard Proctor Density, ASTM D-698. Compaction of each lift adjacent to walls should be accomplished with hand-operated tampers or other lightweight compactors. Over compaction may cause excessive lateral earth pressure, which could result in wall movement. No water flooding techniques should be used in the compaction of backfill.

SUBSURFACE DRAINAGE

The installation of an exterior foundation perimeter drainage system is required for any habitable space below grade level. See Perimeter Drain Detail 1, for a suggested method of installing this system. The perimeter drain shall discharge at a daylight location a minimum of 15-feet away from the home. The daylight end shall have a screened end section to prevent rodents from entering the drain. Alternatively, the perimeter drain may discharge into a sump pit with a sump pump. If a sump pit is used, homeowners should perform routine observations of the sump pump system to make sure it remains in good working order. Failure to install and failure of a sump pump

system can cause serious foundation problems. **Water accumulation around foundation elements is the major cause of foundation stress, therefore proper installation of the perimeter drain is very important.**

SURFACE DRAINAGE

The backfill soil around the foundations should be moistened and well-compacted in 12-inch maximum lifts with hand operated mechanical compaction equipment to prevent future settling. Controlled puddling of the backfill soils is not allowed.

Site grading is critical. A simple means of reducing moisture change to prevent water infiltration into the soil is to slope the ground away from the foundation. For proper drainage, a slope of 10% (1' in 10') away from the foundations in all directions is required. This slope must be maintained for a minimum distance of 10'-0".

The property owner should inspect the area around the foundation regularly particularly after rainstorms to determine if proper drainage away from the structure has been maintained. The owners are advised to immediately fill in any settled area near the foundations to eliminate containment of water.

Sprinkler heads and emitters should not be located or spray within 5 feet of the foundation or backfill zones. Plantings near the foundations should not trap surface runoff. Furthermore, sidewalks or low-water consumption groundcover are recommended to further reduce the risk of water infiltration near the foundation walls. All pressurized irrigation lines and valve boxes should be located at least 10 feet from the foundation or patio slabs.

Similarly, infiltration basins are not recommended adjacent to or upgrade of adjacent structures. If detention is required by statute, infiltration basins should be located down gradient and at least 30 feet from foundations.

Changes in site grading by landscapers or property owners can have damaging effects on foundations and concrete slabs-on-grade. It is the property owner's responsibility to control water and maintain the site to prevent infiltration near foundations. Additionally, it is the property owner's responsibility to maintain downspouts and buried sprinkler system conduits.

FOUNDATION EXCAVATION

Precautions should be taken in deep excavations for safety of workers and to protect nearby structures. The sides of the temporary excavations should be sloped or benched per OSHA excavation requirements. Spoils from the excavation should not be placed within 2 feet of the excavation sidewalls and the excavation should not be subject to excess vibration wetting or drying. It is the owner/contractor responsibility to be familiar with the OSHA Safety and Health Standards for the Construction Industry,

29 CFR Part 1926, or the appropriate foundation chapters of the International Building Code prior to construction.

UTILITIES

We anticipate the sanitary sewer lines to be placed in the fine-grained silty sand or the stiff sandy clay soils and possibly in the biotitic gneiss and schist. Differential movement associated with these types of soils should be considered with respect to pipe, bedding, and pipe connections.

The Civil Engineer designing buried utilities should consider local practices for sites underlain by these types of soils. **The utility designer should be familiar with the Park County Land Development Regulations.**

GENERAL INFORMATION

Based on this subsurface investigation, the proposed foundations appear to be technically feasible to be constructed at the proposed site. The structures should be designed for construction in the direct vicinity of the boring location. If the proposed locations change, additional borings will be required to assess the soil conditions at the new location.

Permitting work will be required to obtain any local and state approval, and design work will need to be performed by a qualified professional engineer to bring this project into final design, and subsequent construction.

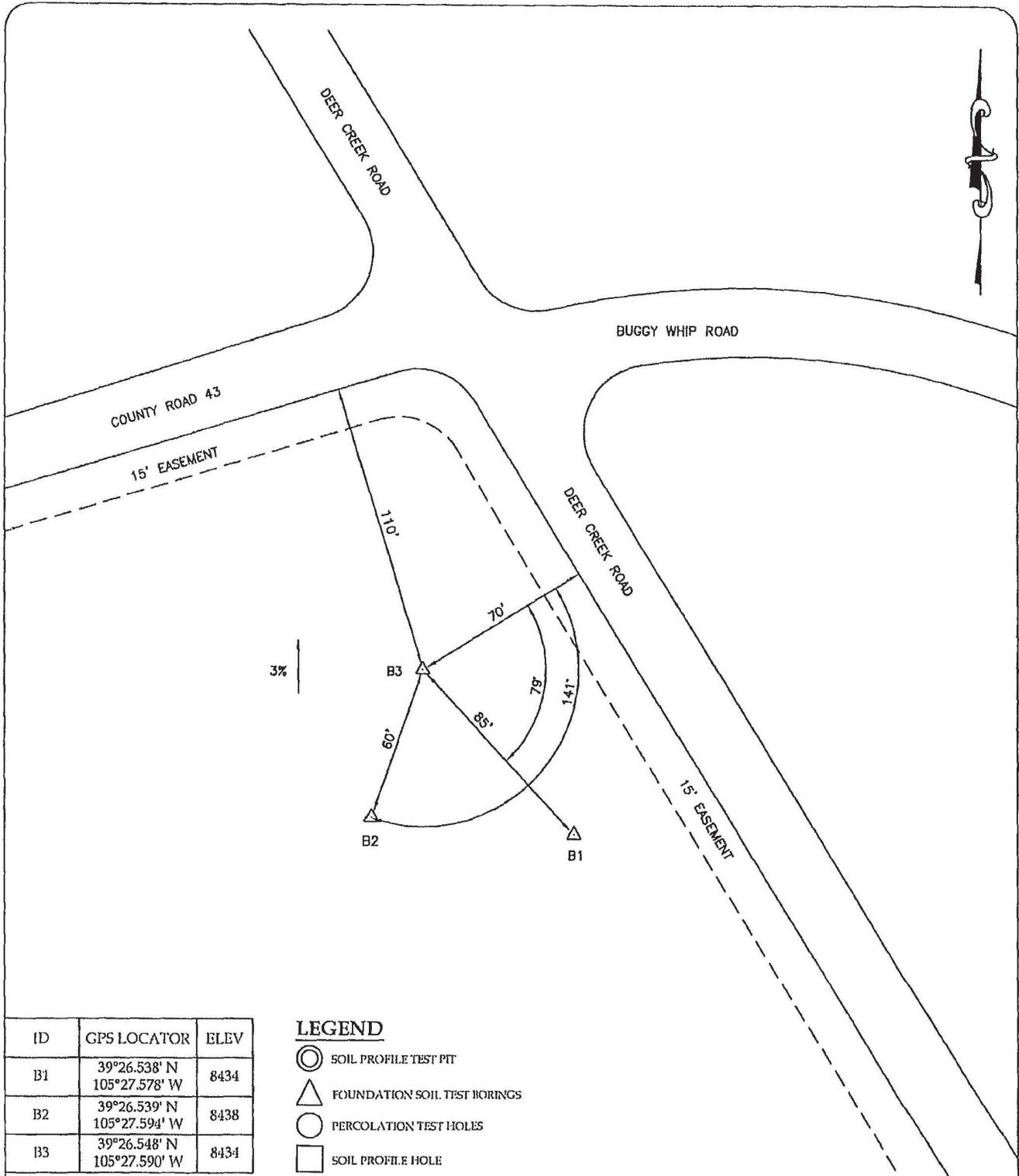
A qualified contractor experienced with similar projects should carry out the construction of this project. The construction process should be carefully observed and documented to ensure the construction is performed in accordance with the design drawings and technical specifications.

In any soil investigation it is necessary to assume that the subsurface soil conditions do not vary greatly from the conditions encountered in our field and laboratory testing. Our experience has been that at times soil conditions do change and variations do occur and may become apparent at the time of excavation for the foundation system.

The work contained herein was performed by, or under the direct supervision of a licensed Professional Engineer in the State of Colorado. Professional judgments and evaluations are presented based on information gathered during the drilling operations, conversations with the owner and/or contractor, and on experience with similar projects. The performance of the project is not guaranteed in any manner, only that the engineering work and judgments rendered meet the standard of care of the engineering profession. The engineering services performed are within the limits set by the Client, with the usual thoroughness and competence of the engineering profession. No other representation, expressed or implied, is included or intended.

If this subsurface investigation is 4 years or older, Colorado Geoscience and Design, Inc. shall review the recommendations cited in this report to ensure all applicable codes are current and comply with the current state and county regulations.

The parties specifically agree that Colorado Geoscience and Design, Inc. has not been retained nor will they render an opinion concerning any environmental issues, hazardous waste or any other known or unknown conditions that may be present on this site, since this is not in the scope of this report.



ID	GPS LOCATOR	ELEV
B1	39°26.538' N 105°27.578' W	8434
B2	39°26.539' N 105°27.594' W	8438
B3	39°26.548' N 105°27.590' W	8434

- LEGEND**
- SOIL PROFILE TEST PIT
 - FOUNDATION SOIL TEST BORINGS
 - PERCOLATION TEST HOLES
 - SOIL PROFILE HOLE



SITE MAP

ALL LOCATIONS SHOWN ARE BASED ON SPECIFIC INFORMATION FURNISHED BY OTHERS OR ESTIMATES MADE IN THE FIELD BY COLORADO GEOSCIENCE PERSONNEL. THE LOCATIONS, DISTANCES, DIRECTIONS, ETC. ARE NOT THE RESULT OF A PROPERTY SURVEY BUT ARE APPROXIMATIONS AND ARE NOT WARRANTED TO BE EXACT. IT IS THE OWNER/BUILDER'S RESPONSIBILITY TO DEFINE PROPERTY BOUNDARIES AND ENSURE ALL ON-SITE IMPROVEMENTS ARE LOCATED WITHIN THE PLATTED SITE AND OUT OF INAPPROPRIATE EASEMENTS. ALL DISTANCES ARE TO BE VERIFIED PRIOR TO EXCAVATION.

CAMP
IdRaHaJe

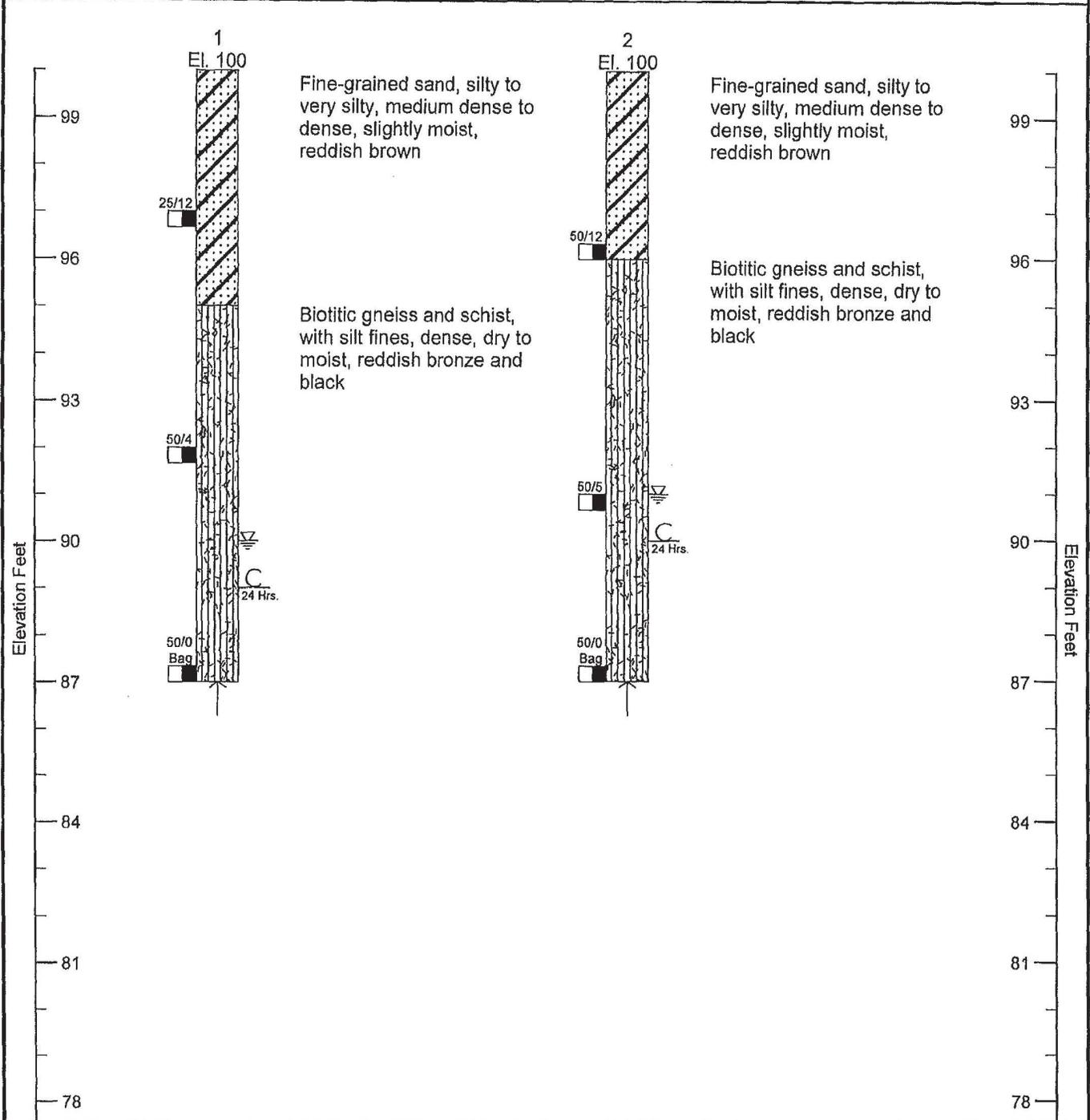
SITE LOCATION
571 COUNTY ROAD 43
PARK COUNTY
COLORADO

SCALE
1" = 50'

JOB NO.
21-717

FIG. 1

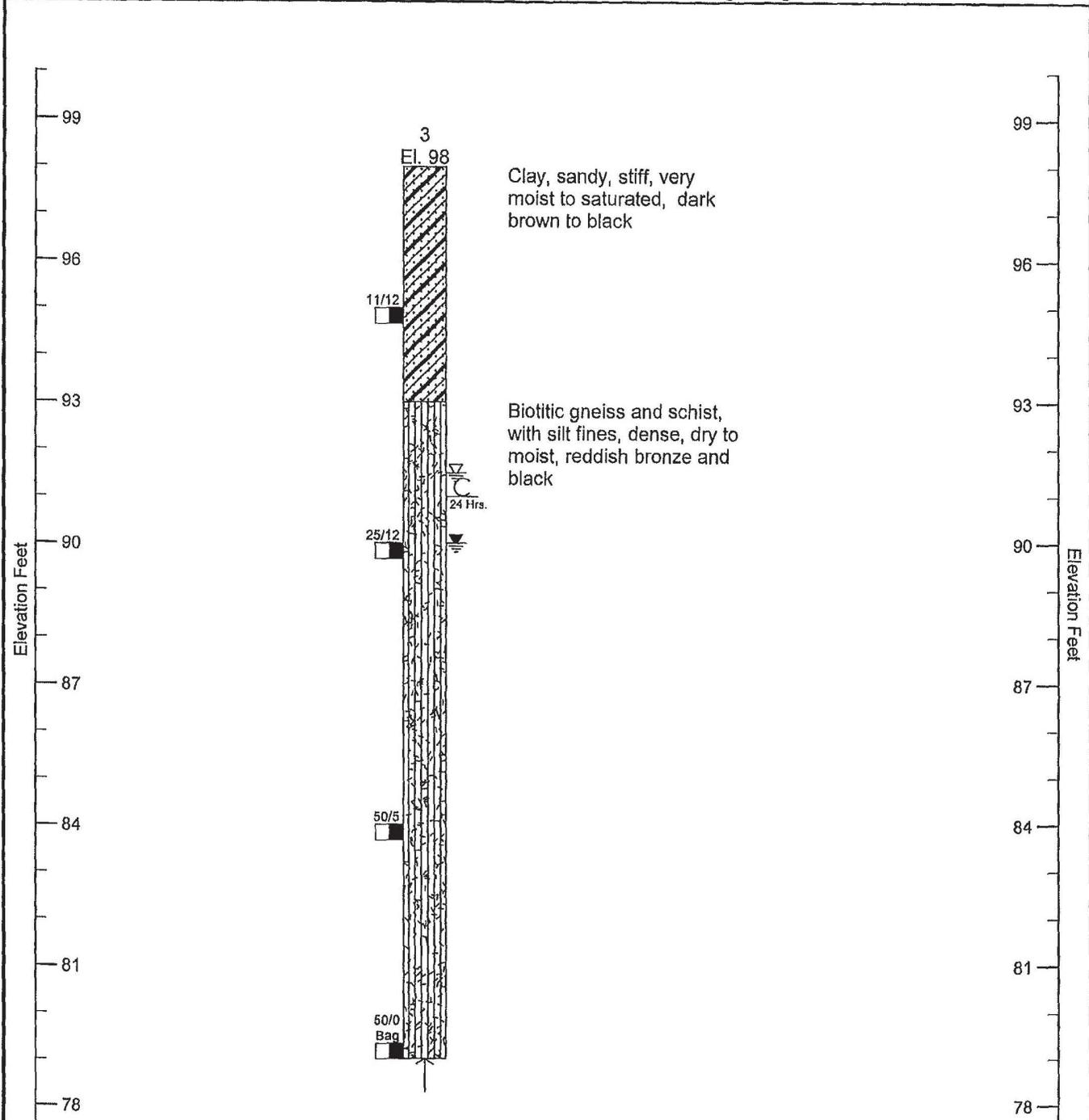
Log of Test Holes	PROJECT: <u>Subsurface Investigation</u> JOB NO: <u>21-717</u>
	CLIENT: <u>Camp IdRaHaJe</u>
LOCATION: <u>571 County Road 43, Park County, Colorado</u>	
DRILLING METHOD: <u>4" Continuous Flight Auger</u>	



<p>Notes:</p> <p>1. x/y indicates that "x" number of blows of a 140-pound hammer falling 30 inches are required to drive a 2-inch diameter sampler "y" number of inches.</p> <p>2. Indicates depth at which soil samples were taken.</p>	<p>Where Applicable---</p> <p>a. Indicates ground water encountered during the drilling operation.</p> <p>b. Indicates ground water encountered after 24 hours.</p> <p>c. Indicates auger refusal.</p> <p>d. Indicates caving.</p>
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Figure 2

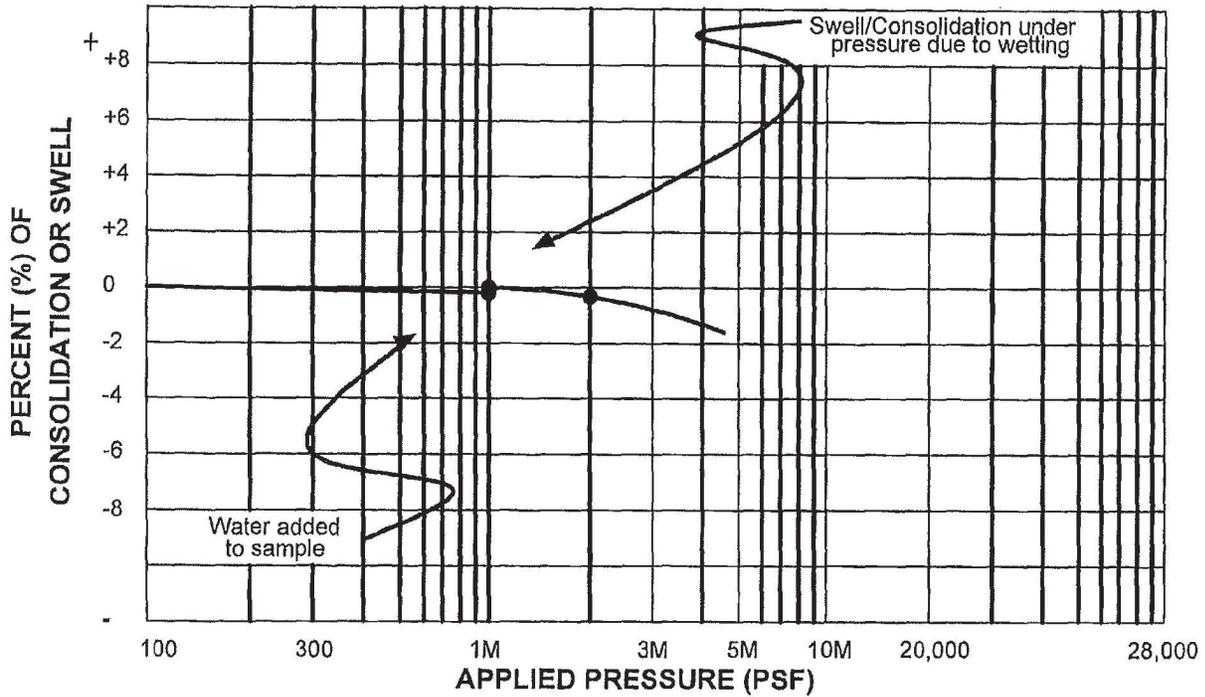
Log of Test Holes	PROJECT: <u>Subsurface Investigation</u> JOB NO: <u>21-717</u>
	CLIENT: <u>Camp IdRaHaJe</u>
LOCATION: <u>571 County Road 43, Park County, Colorado</u>	
DRILLING METHOD: <u>4" Continuous Flight Auger</u>	



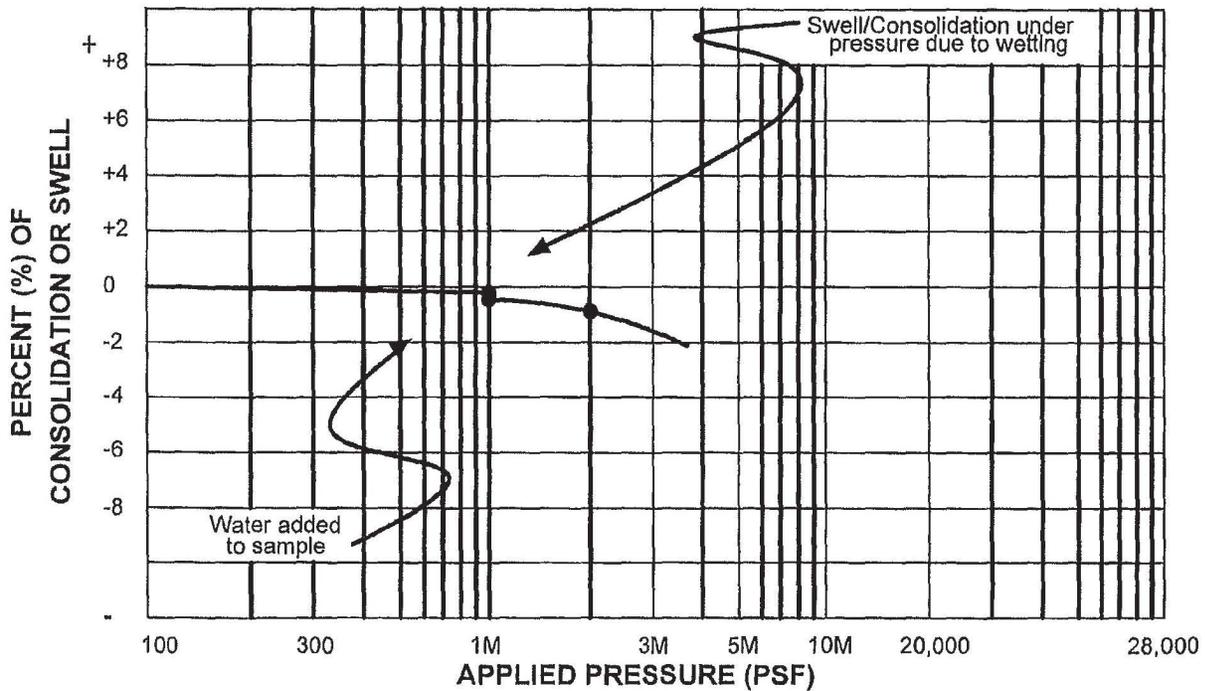
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Figure 2

SWELL - CONSOLIDATION TESTS

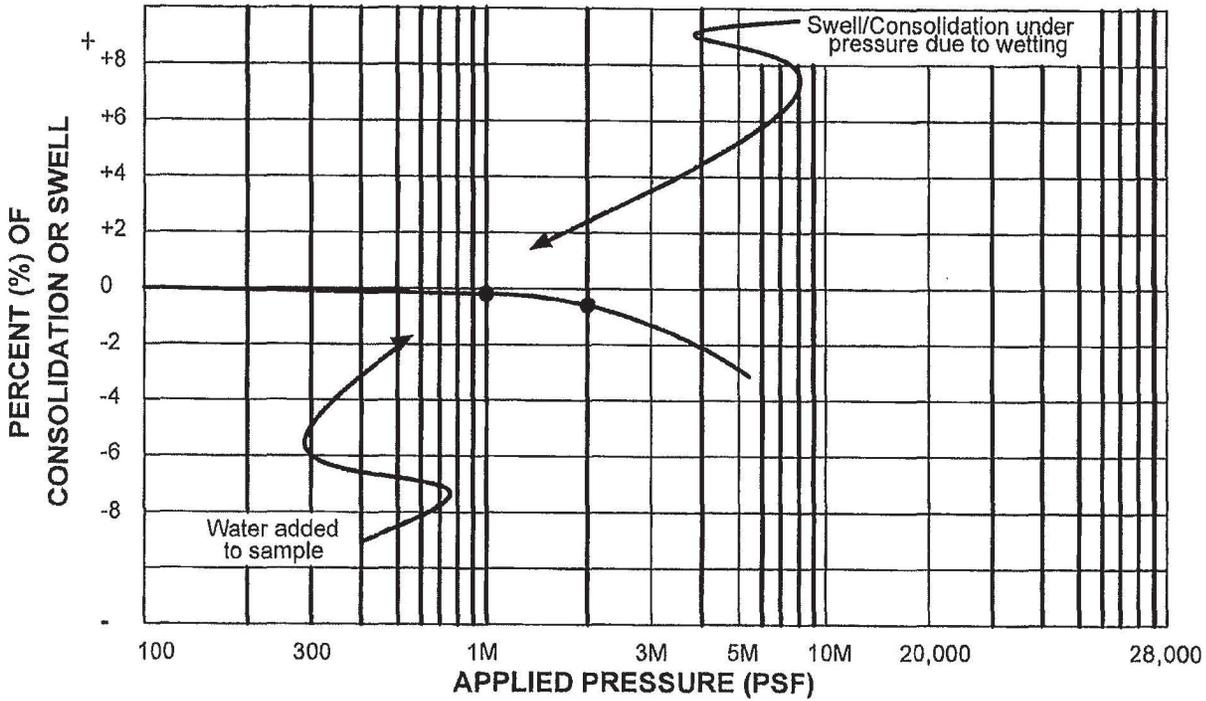


Test Hole No. 1 Depth 3' Soil Description: Fine-grained sand, silty to very silty, medium dense to dense, slightly moist, reddish brown

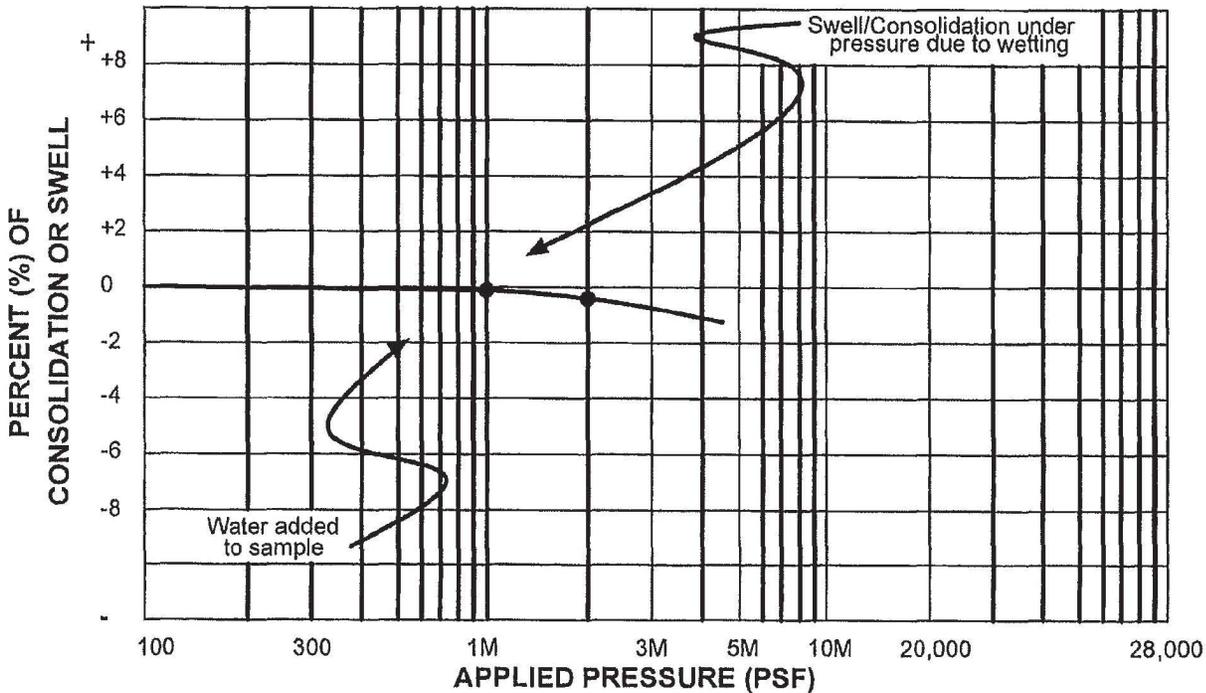


Test Hole No. 1 Depth 8' Soil Description: Biotitic gneiss and schist, with silt fines, dense, dry to moist, reddish bronze and black

SWELL - CONSOLIDATION TESTS

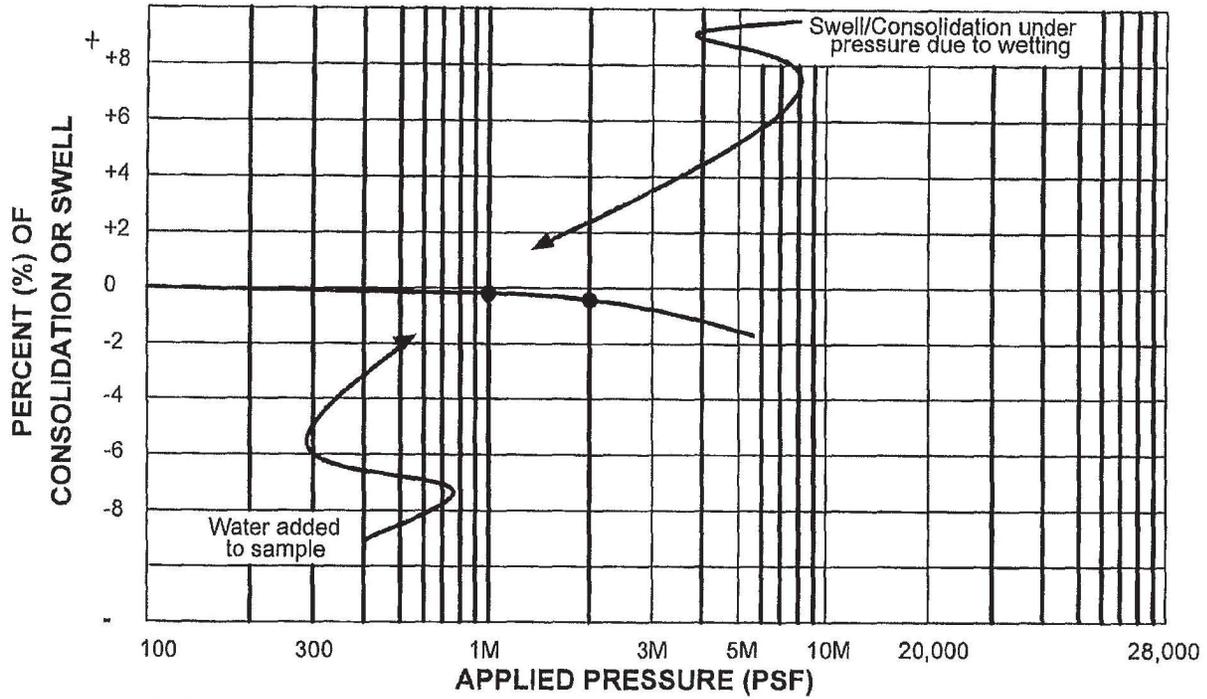


Test Hole No. 2 Depth 4' Soil Description: Fine-grained sand, silty to very silty, medium dense to dense, slightly moist, reddish brown

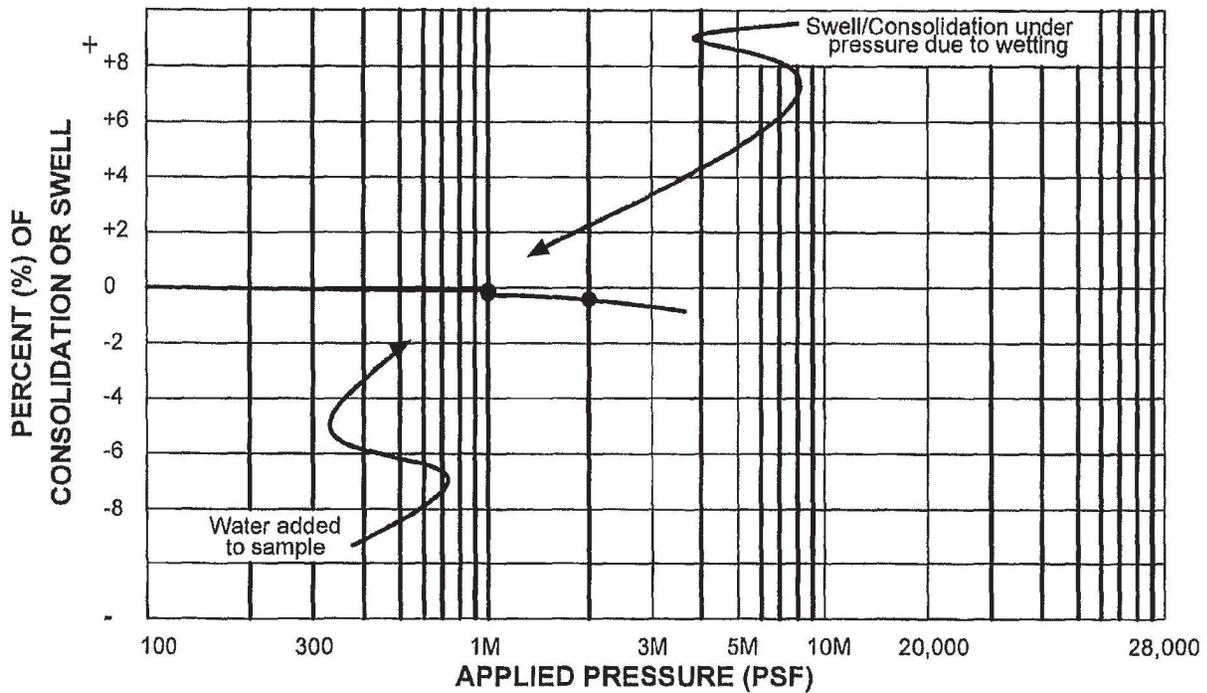


Test Hole No. 2 Depth 9' Soil Description: Biotitic gneiss and schist, with silt fines, dense, dry to moist, reddish bronze and black

SWELL - CONSOLIDATION TESTS

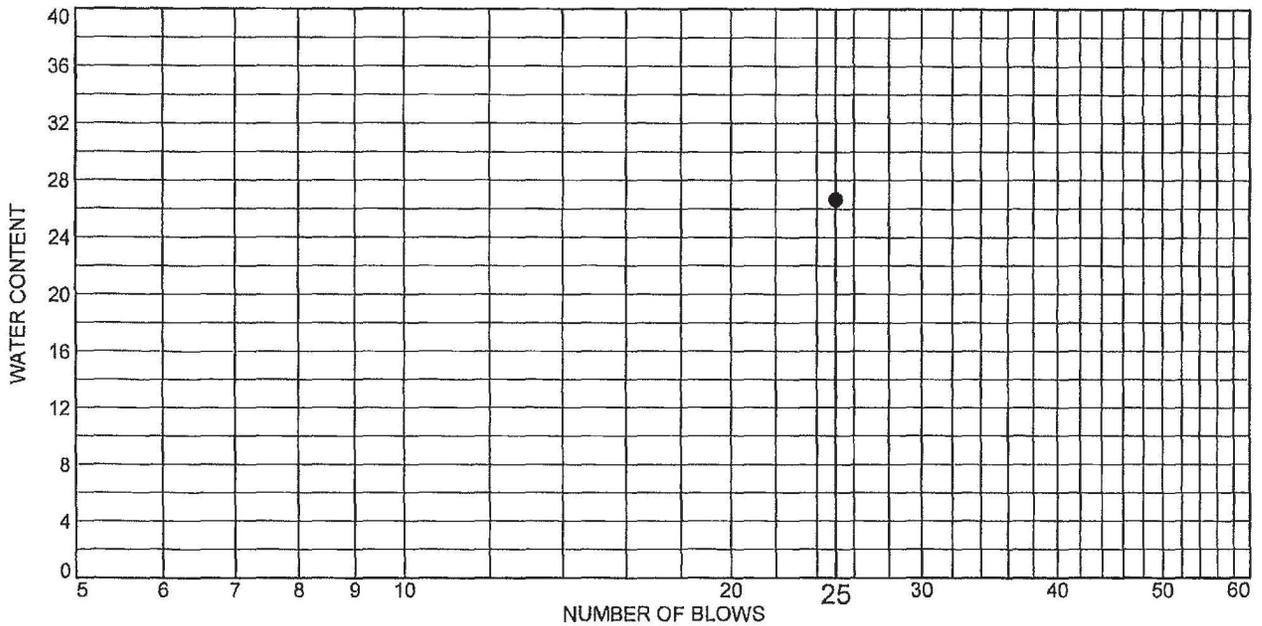
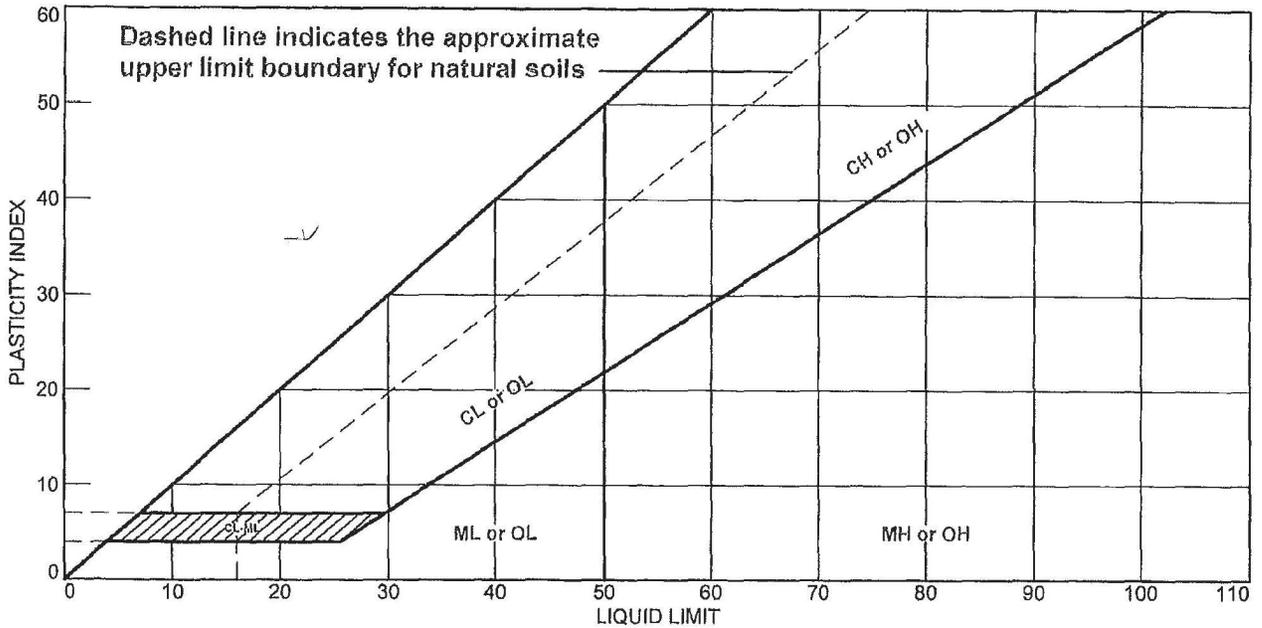


Test Hole No. 3 Depth 3' Soil Description: Clay, sandy, stiff, very moist to saturated, dark brown to black



Test Hole No. 3 Depth 8' Soil Description: Biotitic gneiss and schist, with silt fines, dense, dry to moist, reddish bronze and black

LIQUID AND PLASTIC LIMITS TEST REPORT



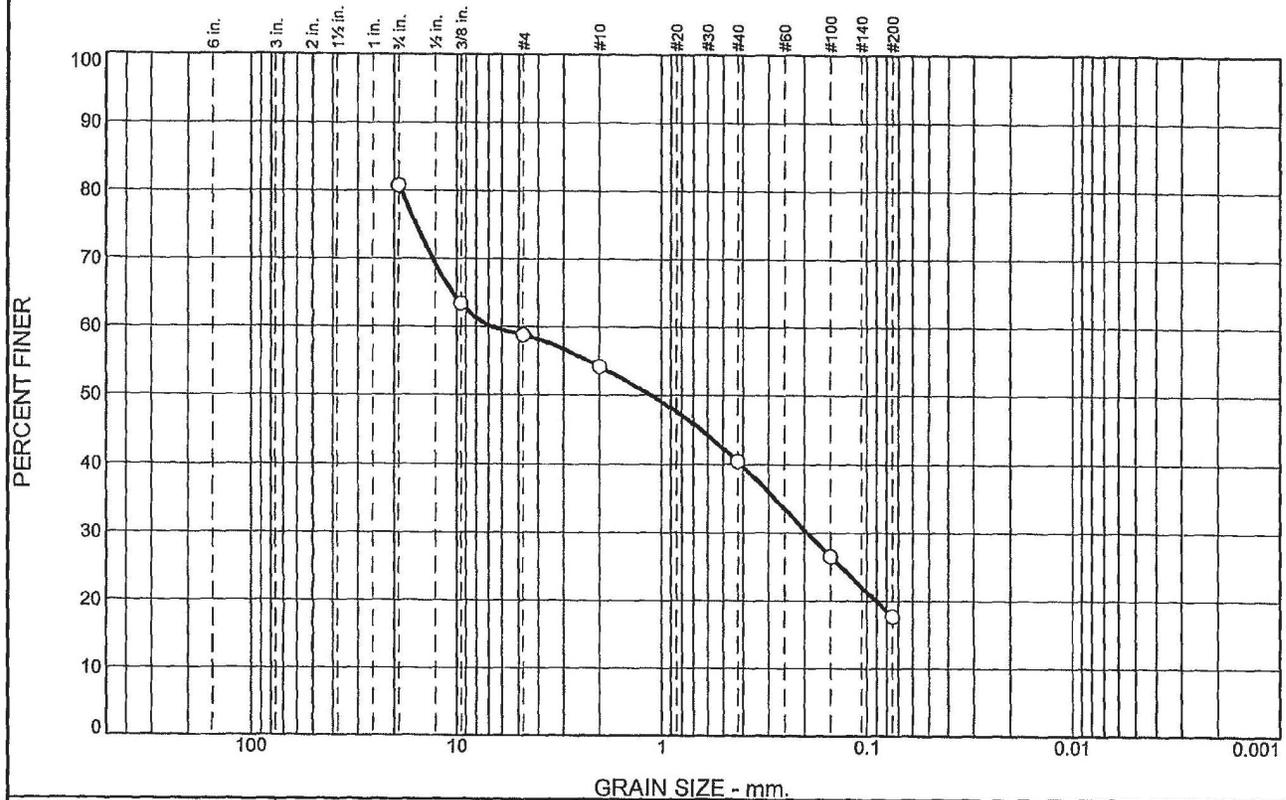
MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
• Biotitic gneiss and schist, with silt fines, dense, dry to moist, reddish bronze and black	27	NP	NP	40.4	17.7	GM

Project No. 21-717 Client: Camp IdRaHaJe
 Project: Subsurface Investigation
 Source of Sample: 2 Depth: 4

Remarks:

COLORADO GEOSCIENCE AND DESIGN, INC.

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
		22.0	4.6	13.8	22.7	17.7	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/4	80.8		
3/8	63.4		
#4	58.8		
#10	54.2		
#40	40.4		
#100	26.6		
#200	17.7		

Soil Description
Biotitic gneiss and schist, with silt fines, dense, dry to moist, reddish bronze and black

Atterberg Limits
 PL= NP LL= 27 PI= NP

Coefficients
 D₉₀= D₈₅= D₆₀= 6.6829
 D₅₀= 1.1232 D₃₀= 0.1930 D₁₅=
 D₁₀= C_u= C_c=

Classification
 USCS= GM AASHTO= A-1-b

Remarks

* (no specification provided)

Source of Sample: 2

Depth: 4

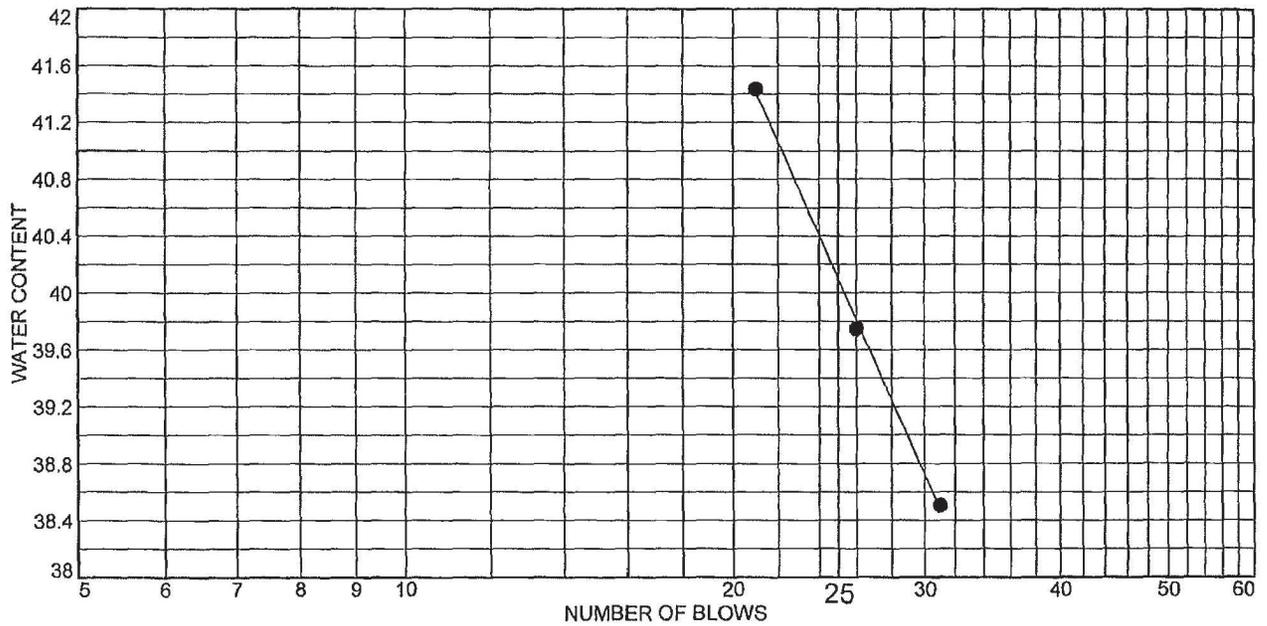
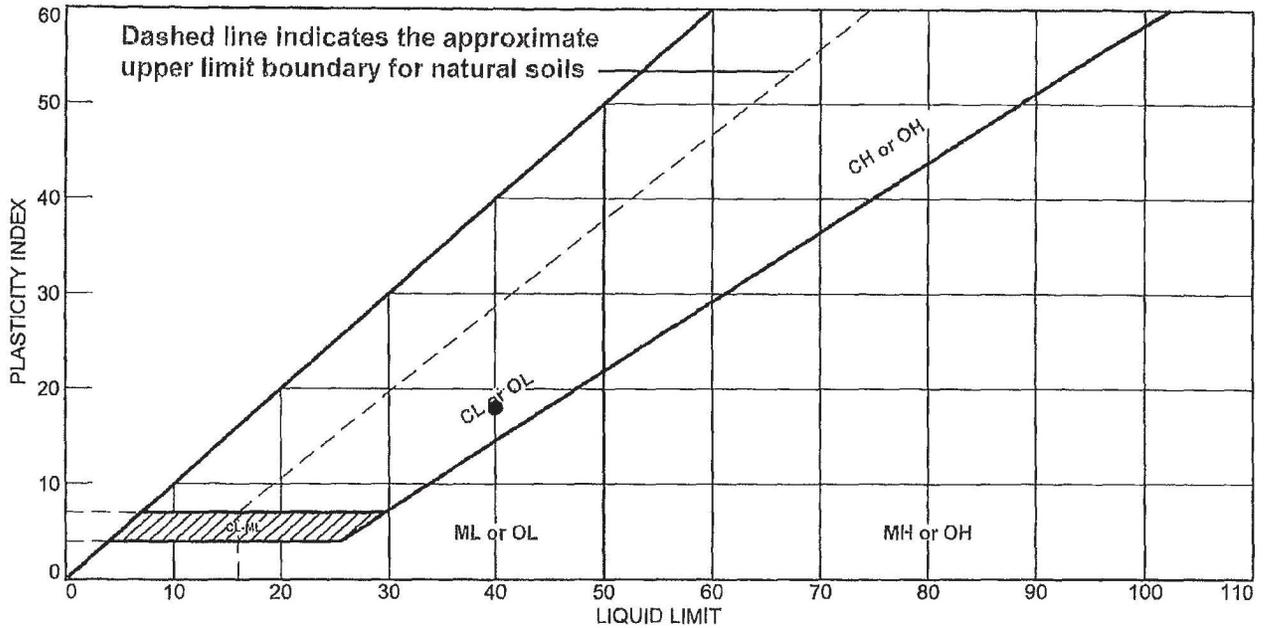
Date: 3-185-22

COLORADO GEOSCIENCE AND DESIGN, INC.	Client: Camp IdRaHaJe
	Project: Subsurface Investigation
	Project No: 21-717
	Figure 5

Tested By: AF

Checked By: MK

LIQUID AND PLASTIC LIMITS TEST REPORT



MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
● Clay, sandy, stiff, very moist to saturated, dark brown to black	40	22	18	75.4	55.1	CL

Project No. 21-717 Client: Camp IdRaHaJe
 Project: Subsurface Investigation
 Source of Sample: 3 Depth: 3

Remarks:

COLORADO GEOSCIENCE AND DESIGN, INC.

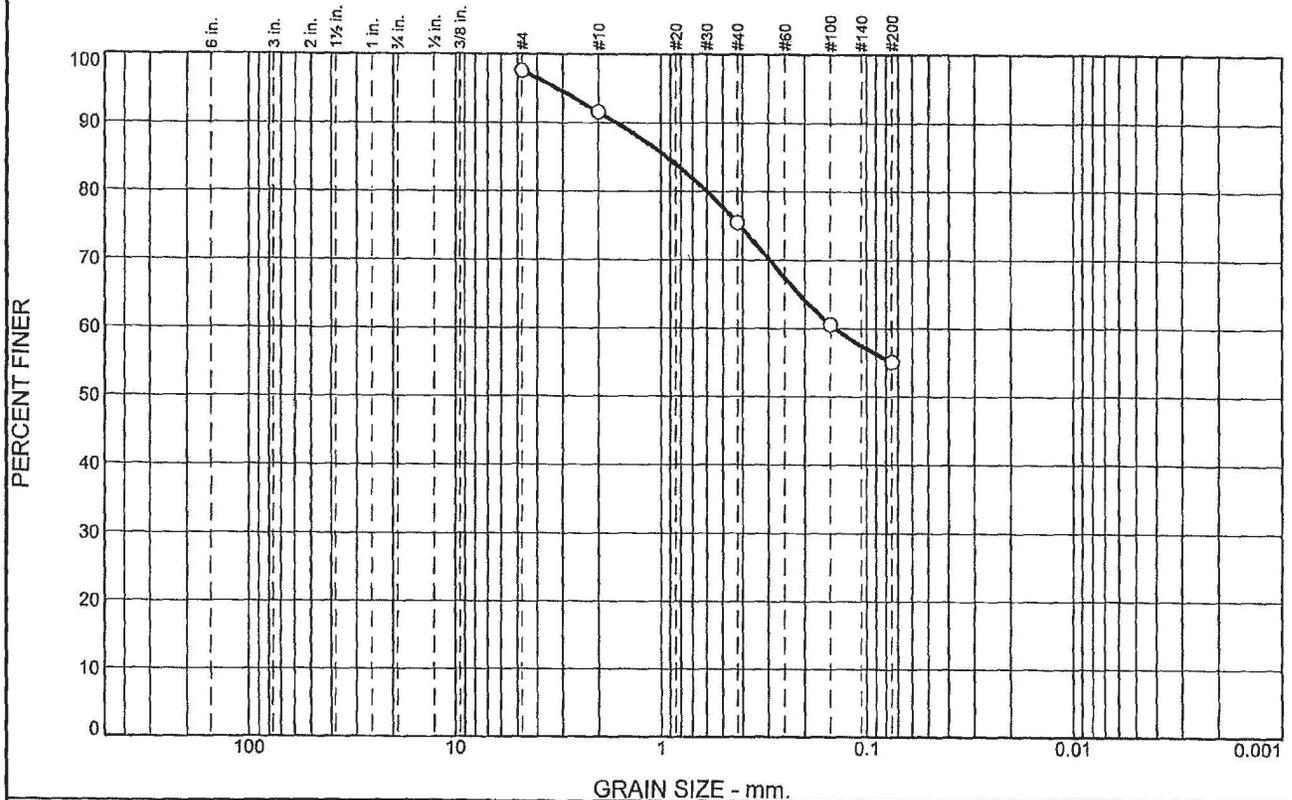
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26 of 35

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R\$0.00 D\$0.00

Milena Kassel
Park County

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
			6.0	16.2	20.3	55.1	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	97.6		
#10	91.6		
#40	75.4		
#100	60.6		
#200	55.1		

Soil Description

Clay, sandy, stiff, very moist to saturated, dark brown to black

Atterberg Limits

PL= 22 LL= 40 PI= 18

Coefficients

D₉₀= 1.6310 D₈₅= 0.9382 D₆₀= 0.1420
D₅₀= D₃₀= D₁₅=
D₁₀= C_u= C_c=

Classification

USCS= CL AASHTO= A-6(7)

Remarks

* (no specification provided)

Source of Sample: 3

Depth: 3

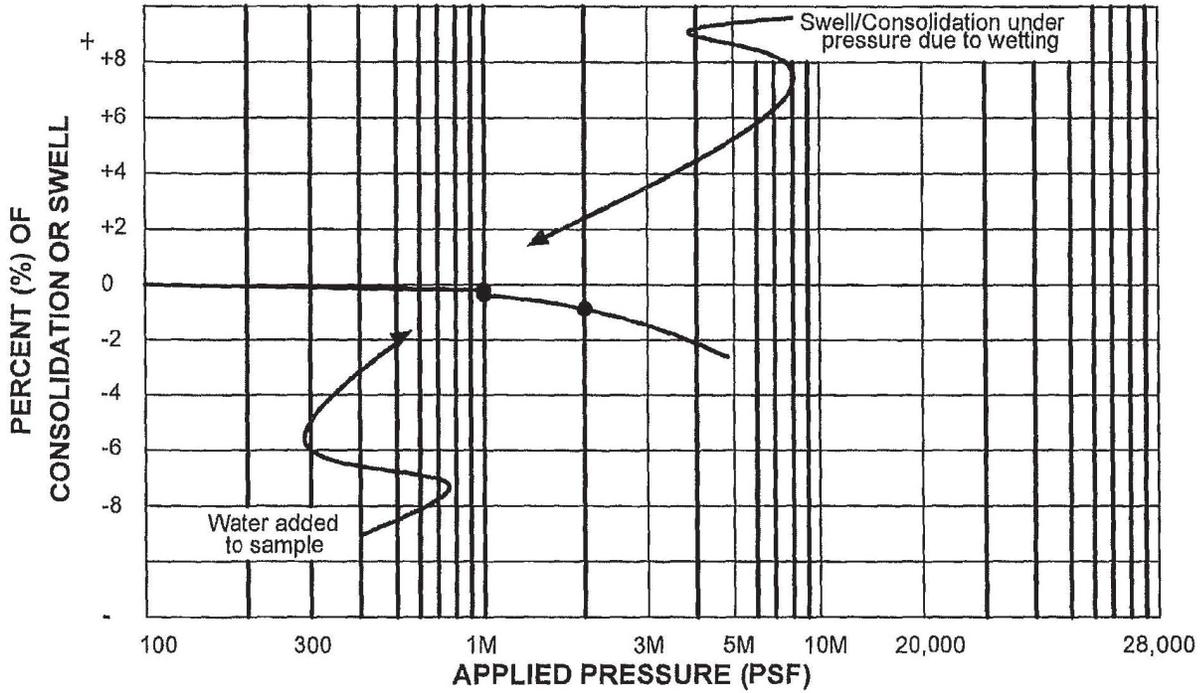
Date: 3/18/22

<p>COLORADO GEOSCIENCE AND DESIGN, INC.</p>	<p>Client: Camp IdRaHaJe Project: Subsurface Investigation Project No: 21-717</p>
	<p>Figure 5</p>

Tested By: BT

Checked By: MK

SWELL - CONSOLIDATION TESTS



Test Hole No. 3 Depth 14' Soil Description: Biotitic gneiss and schist, with silt fines, dense, dry to moist, reddish bronze and black

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28 of 35

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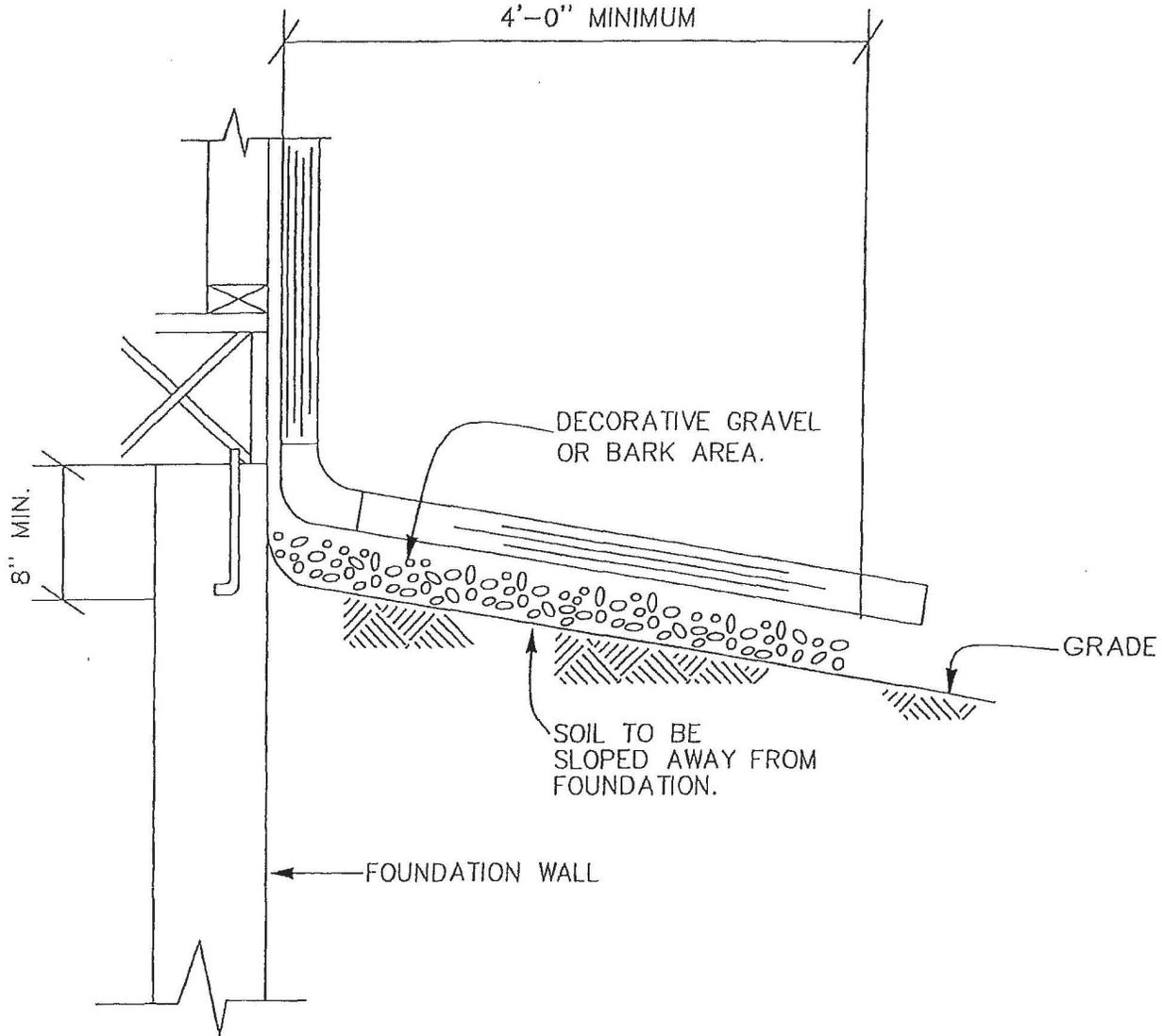
Milena Kassel
Park County

Address: 571 County Road 43
Park County, Colorado

Job Number:
21-717

Hole No.	Depth (feet)	Moisture Content %	Gradation			140 # Hammer Blows	Relative Swell/ Consolidation %	Dry Density pcf	Soil Description
			Gravel %	Sand %	Passing #200 sieve %				
1	3	7	2	74	24	25/12	0.0	120	Fine-grained sand, silty to very silty, medium dense to dense, slightly moist, reddish brown
1	8	5	9	65	26	50/4	-0.1	122	Biotitic gneiss and schist, with silt fines, dense, dry to moist, reddish bronze and black
1	13	3	15	67	18	50/0 Bag	Loose	—	Biotitic gneiss and schist, with silt fines, dense, dry to moist, reddish bronze and black
2	4	7	41	41	18	50/12	0.0	121	Fine-grained sand, silty to very silty, medium dense to dense, slightly moist, reddish brown
2	9	5	15	72	13	50/5	0.0	122	Biotitic gneiss and schist, with silt fines, dense, dry to moist, reddish bronze and black
2	13	3	12	68	20	50/0 Bag	Loose	—	Biotitic gneiss and schist, with silt fines, dense, dry to moist, reddish bronze and black
3	3	20	0	33	67	11/12	0.0	107	Clay, sandy, stiff, very moist to saturated, dark brown to black
3	8	11	14	76	10	26/12	0.0	116	Biotitic gneiss and schist, with silt fines, dense, dry to moist, reddish bronze and black
3	14	2	17	68	15	50/5	-0.1	113	Biotitic gneiss and schist, with silt fines, dense, dry to moist, reddish bronze and black
3	19	29	6	75	19	50/0 Muddy	Loose	—	Biotitic gneiss and schist, with silt fines, dense, dry to moist, reddish bronze and black

FOUNDATION GRADING DETAIL



NOTE:

1. PROVIDE A MINIMUM SLOPE OF 6" IN THE FIRST 10'-0" FROM HOUSE (10%).
2. DOWNSPOUTS AND EXTENSIONS SHOULD EXTENDED 5'-0" BEYOND THE FOUNDATION.

APPENDIX

Important Information About the Report

The data collected by Colorado Geoscience & Design, Inc. during this investigation was used to provide geotechnical information and recommendations regarding subsurface conditions on the site investigated, the effect of those conditions on the proposed construction, and the foundation type for the named client. The stratification lines indicated on the boring log are approximate, and subsurface conditions encountered may differ from those presented herein. This uncertainty cannot be eliminated because of the many variabilities associated with geology. For example, material and engineering characteristics of soil and bedrock may change more gradually or more quickly than indicated in this report, and the actual engineering properties of non-sampled soil or rock may differ from interpretations made based on boring logs. Quantitative conclusions regarding the performance of geotechnical structures prior to construction are not possible because of the complexity of subsurface conditions. Rather, engineering judgments and experience are used to estimate likely geotechnical performance and provide the necessary recommendations for design and construction. Put another way, we cannot be sure about what is not visible, so the collected data and our training and experience are used to develop predictions and recommendations. There are no guarantees or warranties implied or expressed.

The owner and/or client must understand that uncertainties are associated with geotechnical engineering, and they, the owner and/or client, must determine the level of risk they are willing to accept for the proposed construction. The risks can be reduced, but not eliminated, through more detailed investigation, which costs more money and takes more time, and through any appropriate construction which might be recommended as a result of that more detailed investigation. To reduce the level of uncertainty, this report was prepared only for the referenced client and for the proposed construction indicated in the report. Unless authorized by Colorado Geoscience & Design, Inc. in writing, the owner will assume additional geotechnical risk if this report is used for any construction that differs from that indicated in the report. Our firm should be consulted well before changes in the proposed construction occur, such as the nature, size, configuration, orientation, or location of any improvements. Additionally, the knowledge and experience of local geotechnical practices is continually expanding and it must be understood the presented recommendations were made according to the standard of practice at the time of report issuance. If the construction occurs one or more years after issuance of the report, the owner and/or client should contact our firm to determine if additional investigation or revised recommendations would be advisable.

Geotechnical practice in the Denver Region must consider the risk associated with expansive soils and bedrock. Geotechnical practice in the Denver area uses a relative scale to evaluate swelling potentials. As stated in the Subsurface Investigation, when the sample is wetted under a surcharge pressure (loading) of 1000 pounds per square foot (PSF), the measured amount of swell is classified as low, moderate, high, or very high.

Table 1 presents the relative classification criteria for the percentage of expansion relative to the initial sample height, at the indicated surcharge pressure.

Swell Potential Chart

SWELL POTENTIAL AT 1,000 LBS.	CLASSIFICATION
0 to ½%	Non-expansive/Very low
½ to 1½%	Low
1½ to 3½%	Moderate
3½ to 6%	High
6 to 8%	Very High
Greater than 8%	Critical

The swell potential classifications are based on the percentage of swell for samples placed on swell/consolidation machines under a surcharge of 1000 pounds per square foot.

The relative swell classification can be correlated to potential slab damage as follows:

Low - minor slab cracking, minor differential movement, and heave

Moderate - lab cracking and differential movement, partial framing void and furnace plenum closure.

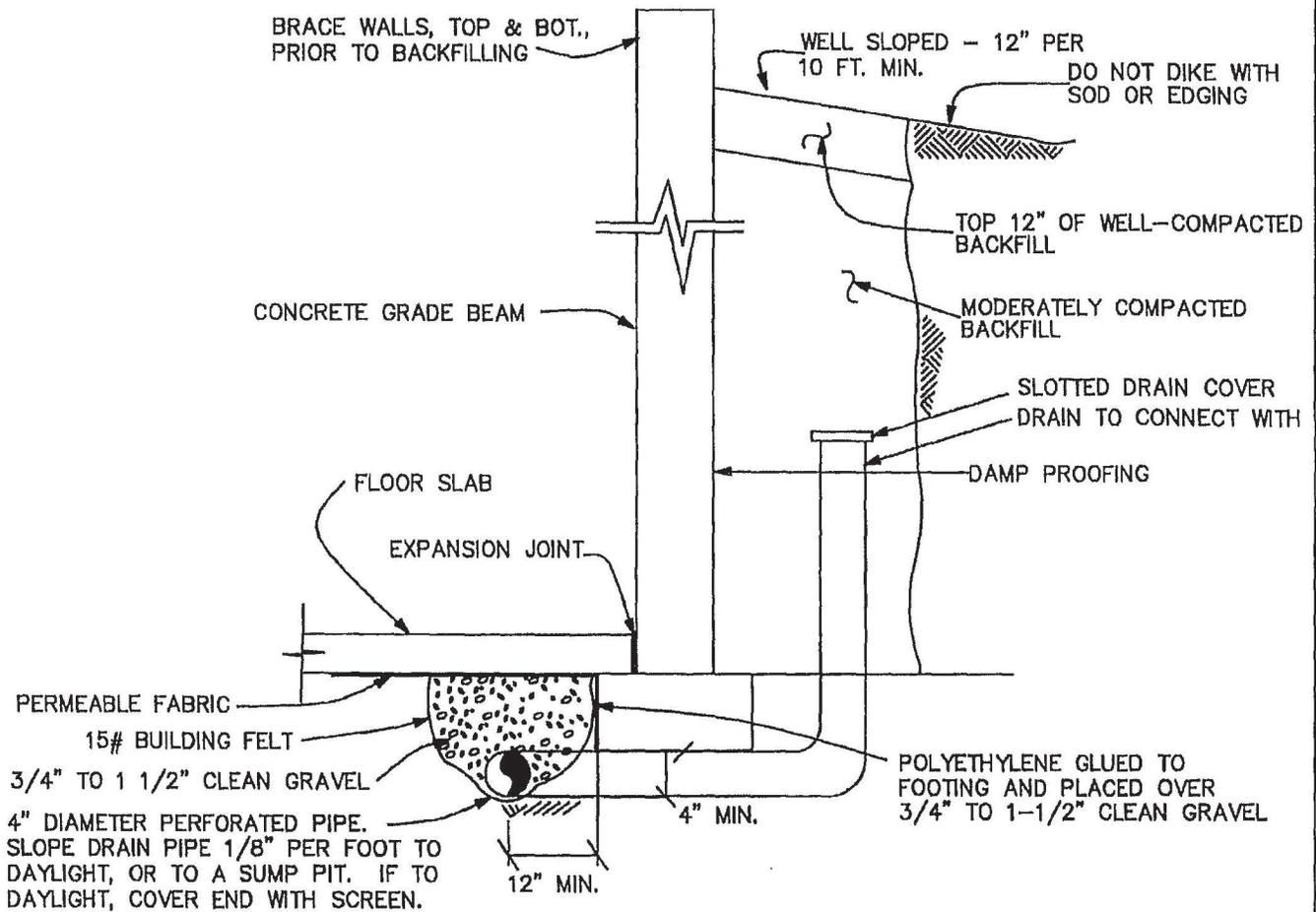
High to Very High - large slab cracking and differential movement, closed voids, closed furnace plenum, and possible pipe rupture.

These effects are based on monitoring and observation by several firms in the Denver metropolitan area and are not limited to the relative swell classification. More or less damage can occur in all classifications because of the uncertainty associated with subsurface conditions and geotechnical engineering.

It is important to note that measured swell or soil expansion is not the only geotechnical criteria for the type of floor and foundation recommendations. Additional criteria considered include:

- Soil and bedrock type and variability
- Stratigraphy
- Groundwater depth and anticipated post-construction moisture conditions.
- Surface water drainage and features
- Post-construction landscaping and irrigation
- Construction details and proposed use
- Local experience

Post-construction landscaping and owner maintenance will greatly affect structures on expansive soils and bedrock. Typically, irrigated landscaping increases the soil moisture content above the pre-constructed water content. Slabs, pavements, and structures significantly reduce evaporation of the soil moisture. Therefore, post-construction heave and resulting damage to buildings and other improvements are likely to occur on sites with expansive soils because of the high probability that subsurface moisture content will increase as the property and surrounding area is developed. Poor owner maintenance, such as negative slopes adjacent to foundation walls and irrigated landscaping adjacent to the foundation, also will significantly increase the risk of damage from expansive soil and bedrock. The property owner, and anyone he or she plans to sell the property to, must understand the risks associated with construction in an expansive soil area and also must assume responsibility for maintenance of the structure. The owner and prospective purchaser also should review "*A Guide to Swelling Soils for Colorado Homebuyers and Homeowners*," which is a special publication (SP 43) produced by the Colorado Geological Survey to assist homeowners in reducing damage caused by swelling soils.



BACKFILL AROUND THE FOUNDATION SHOULD BE MOISTENED AND COMPACTED AND THE FINAL GRADE SHOULD BE WELL SLOPED TO PRECLUDE PONDING OF RAINFALL, IRRIGATION WATER, AND SNOW MELT ADJACENT TO FOUNDATION WALLS.

CAUTION:

DO NOT DIKE OR IMPEDE THE FLOW OF WATER AWAY FROM FOUNDATION WALLS WITH SOD, EDGING OR DECORATIVE GRAVEL AND POLYETHYLENE. DOWNSPOUTS AND SILL COCKS SHOULD DISCHARGE INTO SPLICE BLOCKS OR LONG EXTENSIONS.

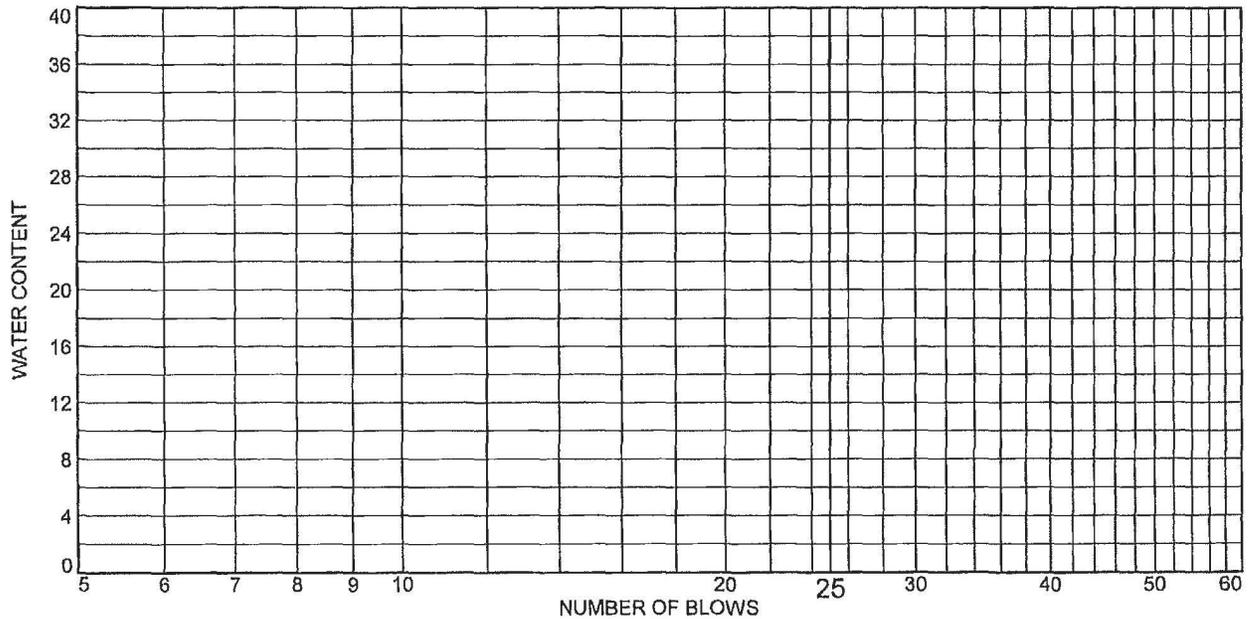
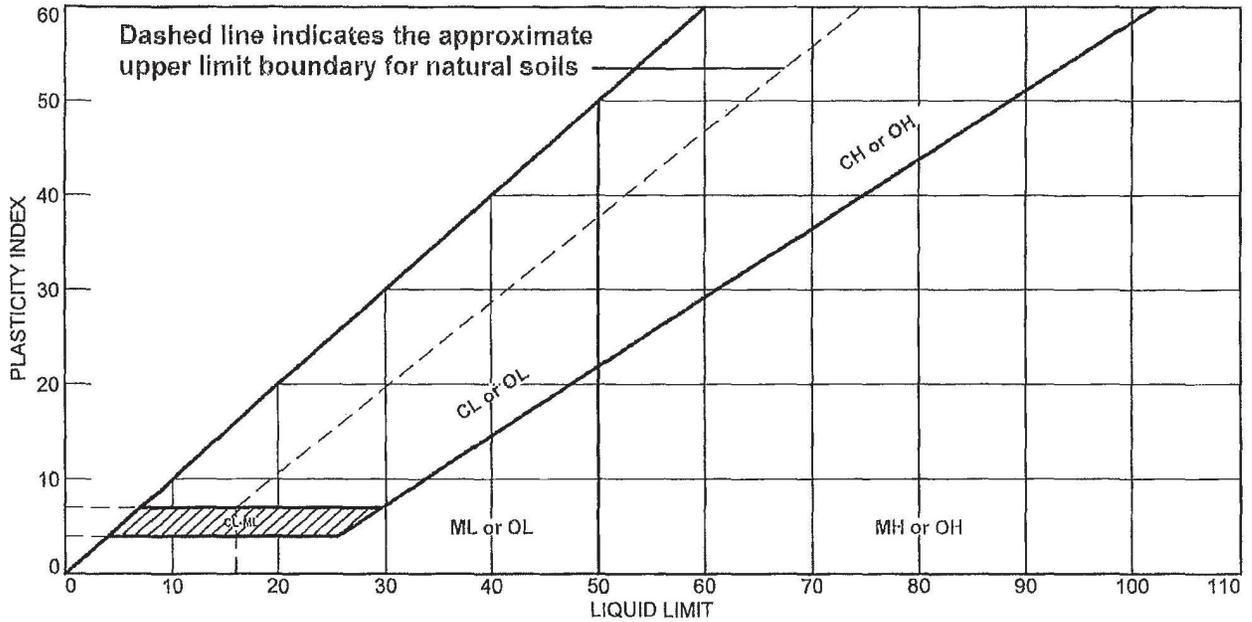
INTERIOR DRAIN SYSTEM BELOW GRADE
AND BACKFILL DETAILS
(FOR FOOTING FOUNDATION)



Colorado
Geoscience & Design, Inc.
P.O. BOX 66, FRANKTOWN, CO. 80116
PHONE # (303) 688-3150

SECTION
SCALE: NTS

LIQUID AND PLASTIC LIMITS TEST REPORT



MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
• Biotitic gneiss and schist, with silt fines, dense, dry to moist, reddish bronze and black	NV	NP	NP	29.9	10.7	SP-SM

Project No. 21-717 Client: Camp IdRaHale

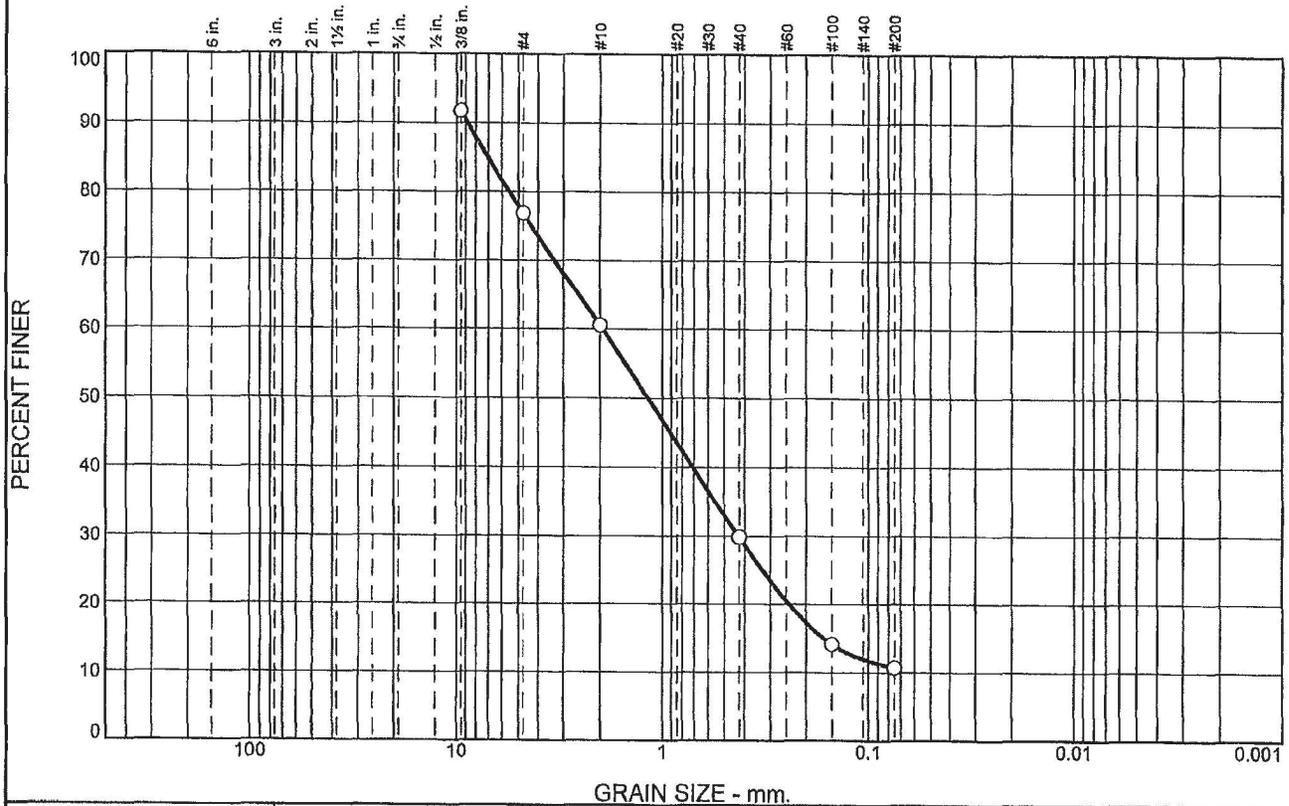
Project: Subsurface Investigation

Source of Sample: 1 Depth: 8

Remarks:

COLORADO GEOSCIENCE AND DESIGN, INC.

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
			16.4	30.6	19.2		10.7

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/8	91.7		
#4	76.9		
#10	60.5		
#40	29.9		
#100	14.2		
#200	10.7		

Soil Description
Biotitic gneiss and schist, with silt fines, dense, dry to moist, reddish bronze and black

Atterberg Limits
 PL= NP LL= NV PI= NP

Coefficients
 D₉₀= 8.8035 D₈₅= 7.0045 D₆₀= 1.9443
 D₅₀= 1.1690 D₃₀= 0.4282 D₁₅= 0.1640
 D₁₀= C_u= C_c=

Classification
 USCS= SP-SM AASHTO= A-1-b

Remarks

* (no specification provided)

Source of Sample: I

Depth: 8

Date: 3/15/22

COLORADO GEOSCIENCE AND DESIGN, INC.

Client: Camp IdRaHaJe
Project: Subsurface Investigation

Project No: 21-717

Figure 5

Tested By: BT

Checked By: MK