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BIDDERS BULLETIN

PROJECT: Holyoke Community Childcare Initiative

Holyoke, Colorado

BULLETIN NUMBER

BB-3

ISSUED BY:

Brian Jensen

PROJECT #: 21-1139

DATE ISSUED: March 15th, 2024

This bulletin is issued by the Architect to all known bidders before receipt of proposals, for the purpose of explaining, interpreting, or modifying the original plans and specifications. When enumerated by the bidder upon the proposal sheet, the information or instructions given hereon will be equally binding upon all parties as if included in the original plans and specifications.
BIDDER MUST ENTER THE NUMBER OF THIS BULLETIN ON HIS PROPOSAL SHEET

GENERAL INFORMATION

BB-3, ITEM #1; General & Misc. Items

*Gypsum board wall finish: Provide level 4 throughout the building.

*Attached is the Geotech report. All dirt work, paving, paving base, etc. shall be completed and installed per requirements laid out via the Geotech report.

*Provide base bid gravel parking lot with 22'x28' concrete paving at ADA parking stalls.

*Provide alternate price to pave entire parking lot

*Bidding contractor is to provide paving, base, dirt work and grading for the cul-de-sac scope shown on civil drawings. This scope of work shall be a separate line item on the final bid as this scope of work will be split with the adjoining landowner(s) so a price needs to be broke out in order to split up the cost for reimbursements to the owner.

*The owner is to furnish the dirt by the truck load to the site. ALL removal, compactions, lifts, final grading, etc. shall be the responsibility of the biding contractor.

*Cul-de-sac and parking lot paving requirements: 6" thick, 4500 PSI strength with 3lbs of ultrafine fiber/ cubic yard

*Joint connection of new paving to existing shall be doweled with 18" #6 rebar at 24" o.c. epoxied into the existing.

THE FOLLOWING ITEMS ARE APPLICABLE TO THE SPECIFICATIONS

BB-3, ITEM #2; Substitutions

The following products and manufacturers will be considered approved equal for the products in which they are listed below. However, this does not relieve the supplier from providing equipment as specified, and if equipment is submitted which does not meet the intent of the specifications, it will in fact be rejected.

*SINAK VECT-R - Section 071605; 2.1
*SINAK VC-5 – Section 033000 2.8 A, B
*SINAK LithoHard – Section 033000 2.7 A
*SINAK LithiumCure 2000 – Section 033000 2.8 A, B

END OF BB-3

GEOTECHNICAL ENGINEERING REPORT
HOLYOKE COMMUNITY CHILDCARE INITIATIVE
SOUTH OF E JOHNSON STREET AND EAST OF S WORLEY AVENUE
HOLYOKE, COLORADO
EEC PROJECT NO. 3232025

Prepared by:

Earth Engineering Consultants, LLC
2400 East Bijou Avenue, Suite B
Fort Morgan, Colorado 80701

January 25, 2024

EARTH ENGINEERING CONSULTANTS, LLC

Re: Geotechnical Engineering Report
Holyoke Community Childcare Initiative
South of E Johnson Street and East of S Worley Avenue
Holyoke, Colorado
EEC Project No. 3232025

Enclosed, herewith, are the results of the subsurface exploration completed by Earth Engineering Consultants, LLC (EEC) for the referenced project. For this exploration, five (5) test borings were advanced to depths of approximately 5 to 30 feet below existing site grades. This subsurface exploration was carried out in general accordance with our proposal dated December 13, 2023.

In summary, the subsurface conditions encountered in the test borings generally consisted of lean clay with varying amounts of sand to clayey sand which extended to the depths explored, approximately 5 to 30 feet below site grades. The clay soils were generally stiff to very stiff and exhibited low to moderate swell potential. The clayey sand was generally medium dense to dense with depth. Groundwater was not encountered at the time of drilling.

Based on the low to moderate swell potential of the near surface clay soils, an over excavation and replacement procedure is recommended in the building area to develop suitable foundation and floor slab support. Similarly, an over excavation and replacement procedure is recommended in pavement and exterior flatwork areas. Following over excavation and replacement, in our opinion, the building could be supported on conventional spread footings. Floor slabs, flatwork, and pavements could be supported on the replaced soils. Geotechnical

2400 EAST BIJOU AVENUE, SUITE B
FORT MORGAN, COLORADO 80701
(970) 867-1224 FAX (970)-663-0282
www.earth-engineering.com

recommendations concerning design and construction of the proposed building and associated pavements are provided within the attached report.

We appreciate the opportunity to be of service to you on this project. If you have any questions concerning the enclosed report, or if we can be of further service to you in any other way, please do not hesitate to contact us.

Very truly yours,
Earth Engineering Consultants, LLC

Jacob J. Silverman, P.E.
Senior Geotechnical Engineer

Reviewed by: Ethan P. Wiechert, P.E.
Senior Geotechnical Engineer

GEOTECHNICAL ENGINEERING REPORT
HOLYOKE COMMUNITY CHILDCARE INITIATIVE
SOUTH OF E JOHNSON STREET AND EAST OF S WORLEY AVENUE
HOLYOKE, COLORADO
EEC PROJECT NO. 3232025

January 25, 2024

INTRODUCTION

The geotechnical subsurface exploration for the proposed Holyoke Community Childcare Initiative project in Holyoke, Colorado has been completed. To develop subsurface information in the proposed development, five (5) test borings were drilled to depths of approximately 5 to 30 feet below existing site grades. A diagram indicating the approximate boring locations is included with this report.

We understand the proposed project involves construction of an approximate 11,200 square-foot childcare facility along with associated on-site improvements. The building is expected to be a single-story, wood-frame building constructed as slab-on-grade (no basement). Foundation loads for the planned building are expected to be light with continuous wall loads less than 3 kips per foot and individual column loads less than 15 kips. Floor loads would be relatively light. The associated site improvements include pavements generally west of the proposed building, gravel drives and trash enclosure north of the building, and playground areas generally north, east, and south of the building. We anticipate site roadways would be utilized by low volumes of passenger vehicles with areas designated for low volumes of heavier truck traffic. Small grade changes are expected to develop site grades for the proposed improvements.

The purpose of this report is to describe the subsurface conditions encountered in the test borings, analyze, and evaluate the field and laboratory test data and provide geotechnical recommendations concerning design and construction of foundations and floor slabs, and support of flatwork and pavements. Recommended pavement sections are also included for on-site pavements.

EXPLORATION AND TESTING PROCEDURES

The test boring locations were selected and established in the field by Earth Engineering Consultants, LLC (EEC) personnel by pacing and estimating angles from identifiable site features. The approximate locations of the borings are shown on the attached *Boring Location Diagram*. The boring locations should be considered accurate only to the degree implied by the methods used to make the field measurements.

The test boring locations were advanced using a truck mounted, CME-55 drill rig equipped with a hydraulic head employed in drilling and sampling operations. The boreholes were advanced using 4-inch nominal diameter continuous flight augers. Samples of the subsurface materials encountered in the borings were obtained using split-barrel and California barrel sampling procedures in general accordance with ASTM Specifications D1586 and D3550, respectively.

In the split-barrel and California barrel sampling procedures, standard sampling spoons are advanced into the ground by means of a 140-pound hammer falling a distance of 30 inches. The number of blows required to advance the split-barrel and California barrel samplers is recorded and is used to estimate the in-situ relative density of cohesionless soils and, to a lesser degree of accuracy, the consistency of cohesive soils. In the California barrel sampling procedure, relatively intact samples are obtained in removable brass liners. All samples obtained in the field were sealed and returned to our laboratory for further examination, classification, and testing.

Laboratory moisture content tests were completed on each of the recovered samples with unconfined compressive strength of intact samples estimated using a calibrated hand penetrometer. Atterberg limits and washed sieve analysis tests were completed on select samples to evaluate the quantity and plasticity of fines in the subgrades. Swell/consolidation tests were performed on select samples to evaluate the potential for the subgrade materials to change volume with variation of moisture content and load. Select samples were tested for water soluble sulfate content to estimate the potential for sulfate attack on site concrete. Additional laboratory testing included standard Proctor tests on proposed import materials provided by Mike Smith Construction Inc. personnel. Results of the outlined tests are indicated herein and/or on the attached boring logs and summary sheets.

As part of the testing program, all samples obtained in the field were examined in the laboratory and classified in general accordance with the attached General Notes and the Unified Soil Classification System, based on the soil's texture and plasticity. The estimated group symbol for the Unified Soil Classification System is indicated on the boring logs and a brief description of that classification system is included with this report.

SITE AND SUBSURFACE CONDITIONS

The proposed childcare facility is planned for construction south of E Johnson Street, east of S Worley Avenue, and generally southwest of the existing First Baptist Church at 1000 E Johnson Street in Holyoke, Colorado. Surficial sparse vegetation and topsoil were observed in the

improvement areas. The ground surface in this area is relatively flat and level with an approximate 2-foot depression beginning at the approximate eastern third of the proposed building and extending east. Site photos taken at the time of our drilling operations are included with this report.

EEC field personnel were on site during drilling to evaluate the subsurface conditions encountered and direct the drilling activities. Field logs prepared by EEC site personnel were based on visual and tactual observation of disturbed samples and auger cuttings. The final boring logs included with this report may contain modifications to the field logs based on results of laboratory testing and evaluation. Based on results of the field borings and laboratory testing, subsurface conditions can be generalized as follows.

From the ground surface, approximately 0 to 6 inches of topsoil and vegetation were encountered. The topsoil/vegetation were underlain by brown to reddish brown moderately plastic clay to clayey sand with depth which extended to the depths explored, approximately 5 to 30 feet below existing ground surface.

The clay soils were relatively dry, stiff to very stiff, and exhibited low to moderate potential to swell with increases in moisture content at current moisture and density conditions. The underlying clayey sand soils were generally medium dense to dense.

The stratification boundaries indicated on the boring logs represent the approximate location of changes in soil types; in-situ, the transition of materials may be gradual and indistinct.

Groundwater

Observations were made while drilling and after completion of the borings to detect the presence and depth to hydrostatic groundwater. At the time of drilling, no free water was observed in the completed test borings. The borings were backfilled upon completion of the drilling operations; therefore, subsequent groundwater measurements were not obtained.

Fluctuations in groundwater levels can occur over time depending on variations in hydrologic conditions and other conditions not apparent at the time of this report. Long-term monitoring of water levels in cased wells, which are sealed from the influence of surface water, would be required to accurately evaluate fluctuations in groundwater levels over time. We have typically noted deepest groundwater levels in late winter and shallowest groundwater levels in mid to late summer.

Import Materials

EEC personnel performed standard Proctor (ASTM Specification D698) testing on two (2) samples of proposed import materials that were delivered to the project site in 5-gallon buckets prior to our field exploration. For the samples, soil classification, Atterberg limits and wash sieve analysis tests were performed, as well as standard Proctor (ASTM Specification D698) density tests. The results of the soil classification and standard Proctor density testing on the provided samples during our subsurface exploration are included in Table 1 and on the attached summary sheets.

TABLE 1 - Summary of Laboratory Compaction Characteristics and Classification of Soils

Sample ID	Standard Proctor Density		Soil Classification			
	Optimum Moisture Content, %	Maximum Dry Density, PCF	Liquid Limit	Plastic Index	% (-) No. 200 Sieve	Description
A	13.7	116.2	22	4	35.9	Clayey/Silty Sand (SC-SM)
B	9.2	125.2	21	6	27.4	Clayey/Silty Sand with Gravel (SC-SM)

ANALYSIS AND RECOMMENDATIONS

General

The near surface subgrades exhibited potential to swell when wetted at current moisture and density conditions. Site improvements supported on the expansive clay soils would be at risk for heaving if those soils were to become wetted after construction. Therefore, to reduce the risk of heaving of site improvements, we recommend removing a zone of soils below improvement areas and replacing those soils with approved low volume change materials.

The recommendations outlined below are provided to develop suitable support capacity for foundations and reduce the potential for post-construction heaving of site improvements. Those recommendations are provided to reduce the risk of post construction movement of the site improvements; however, that risk cannot be eliminated.

Site Preparation

Prior to placement of any fill and/or improvements, any topsoil and vegetation should be removed from the planned improvement areas. After stripping and completing all cuts and prior to placement of any fill and/or site improvements, we recommend over excavating a zone of the near surface soils from the entire building area (foundations and floor slabs), pavement, and exterior flatwork (sidewalks and curb-and-gutters) areas and any areas where a reduction in movement is desired. In the building area, the over excavation should extend to a depth of at least 5 feet below existing grade or 2 feet below foundation footings, whichever results in the greater over excavation depth. In pavement and exterior flatwork areas, the over excavation should extend to a depth of 3 feet below site grades. That over excavation should be carried out prior to placement of any fill and after completion of any cuts. The over excavation should extend laterally 8 inches for every 12 inches of over excavation depth beyond the edges of building, pavement, and flatwork areas. Care should be taken during construction to see that the expansive soils have been removed as recommended; additional over excavation may be necessary. The depth and extent of the expansive soils can best be observed during the excavation process. In pavement and exterior flatwork areas, the over excavation depth could be reduced if the owner accepts the potential for heaving of pavements and exterior flatwork. If the outlined movement is accepted, over excavation below pavement and exterior flatwork could be reduced to 2 feet, which would leave the potential for approximately 2 inches of heave.

After completing the over excavations, the exposed soils should be scarified to a depth of 9 inches, adjusted in moisture content and compacted to at least 95% of the material's maximum dry density as determined by ASTM Specification D698, the standard Proctor procedure. The clay to clayey sand soils should be adjusted to within ±2% of standard Proctor optimum moisture content.

Fill soils to develop the building and flatwork elevations should consist of approved low volume change materials which are free from organic matter and debris. The site clay to clayey sand soils, similar materials, or the proposed import materials identified as material A and B included with this report could be used. Fill soils should be placed in loose lifts not to exceed 9 inches thick, adjusted in moisture content and compacted as recommended for the scarified soils. Care will be needed to maintain the recommended moisture content prior to and during construction of overlying improvements.

Care should be taken after preparation of the subgrades to avoid disturbing the subgrade materials. Positive drainage should be developed away from the structures and pavements to avoid wetting of subgrade materials. Subgrade materials becoming wet subsequent to construction of the site improvements can result in unacceptable performance.

Footing Foundations

It is our opinion that the proposed lightly loaded structure could be supported on spread footing foundations bearing on a zone of over excavated and replaced with moisture conditioned and properly compacted low volume change materials as recommended in the section *Site Preparation*. For design of footing foundations bearing on properly placed low volume change fill, we recommend using a net allowable total load soil bearing pressure not to exceed 2,000 pound per square foot. The net bearing pressure refers to the pressure at foundation bearing level in excess of the minimum surrounding overburden pressure. Total loads should include full dead and live loads.

Exterior foundations and foundations in unheated areas should extend below the frost line as indicated by the building code for the project locality. We recommend formed continuous footings have a minimum width of 12 inches and isolated column foundations have a minimum width of 24 inches.

No unusual problems are anticipated in completing the excavations required for construction of the footing foundations. Care should be taken during construction to avoid disturbing the foundation bearing materials. Materials which are loosened or disturbed by the construction activities or materials which become dry and desiccated or wet and softened should be removed and replaced or reworked in place prior to placement of foundation concrete.

We estimate the long-term movement of footing foundations designed and constructed as outlined above would be 1 inch or less.

Floor Slabs

Floor slab subgrades should be prepared as outlined in the section titled *Site Preparation*. For floor slabs supported on over excavated backfill consisting of clay to clayey sand fill, a subgrade modulus of 100 pci could be used.

Care should be taken after development of the floor slab subgrades to prevent disturbance of the in-place materials. Subgrade soils which are loosened or disturbed by construction activities or soils which become wet and softened or dry and desiccated should be removed and replaced or reworked in place prior to placement of the overlying floor slabs.

Additional floor slab design and construction recommendations are as follows:

- Interior partition walls should be separated from floor slabs to allow for independent movement. A minimum 3-inch void space should be constructed above, or below non-bearing partition walls placed on the floor slab. Special framing details should be provided at door jambs and frames within partition walls to avoid potential distortion. Partition walls should be isolated from suspended ceilings.
- Positive separations and/or isolation joints should be provided between slabs and all foundations, columns, and utility lines to allow for independent movement.
- Control joints should be provided in slabs to control the location and extent of cracking.
- Interior trench backfill placed beneath slabs should be compacted in a similar manner as previously described in the section *Site Preparation.*
- Floor slabs should not be constructed on frozen subgrade.
- Other design and construction considerations as outlined in the ACI Design Manual should be followed.

Floor slabs should be constructed on an appropriate capillary break and/or vapor barrier to prevent moisture vapor emission through the floor slab. A vapor barrier mechanism would generally consist of at least 6 inches of free-draining crushed aggregate (such as ASTM C33 size No. 67 rock) compacted to at least 70% of the material's relative density, overlain by an appropriately sized vapor barrier installed according to the manufacture's recommendations. Depending on the type of floor covering and adhesive used, those material manufacturers may require that specific subgrade, capillary break, and/or vapor barrier requirements be met; therefore, we recommend the project architect and/or material manufacturers be consulted with for specific under slab requirements.

Care should be taken after development of the floor slab subgrades to prevent disturbance of the in-place materials. Subgrade soils which are loosened or disturbed by construction activities or soils which become wet and softened or dry and desiccated should be removed and replaced or reworked in place prior to placement of the overlying slabs.

Seismic

The site soil conditions generally consist of clay with varying amounts of sand to clayey sand which extended to the depths explored of approximately 30 feet. For those site conditions, the International Building Code indicates a Seismic Site Classification of D. Drilling to a greater depth could reveal a different site classification.

Lateral Earth Pressures

Provided below are recommended soil parameters of the site soils for determination of lateral earth pressures. The soil parameters outlined in Table 2 were obtained from general observation of the site soils and are based on the results of both field and laboratory testing completed. Those values should be field verified prior to construction.

Table 2. Lateral earth pressure parameters.

Material	Wet Unit Weight, γ_{wet} (lb/ft^3)	Friction Angle, ϕ	K_a	K_p	K_o
Clay	130	20	0.49	2.04	0.65

The parameters provided in Table 2 should be adjusted for saturated and/or buoyant conditions, as appropriate. Observation during construction is recommended to address variability in retained soils; additional soil parameters may be necessary depending on the variability of the soil conditions. The outlined soil parameters do not include a factor of safety.

Pavements

Pavement subgrades should be prepared as outlined in the section *Site Preparation*. We anticipate the on-site pavements would include areas designated for low volumes of lightweight automobiles (Light Duty) and areas of low volumes of trucks (Heavy Duty). An equivalent daily load application (EDLA) value of 5 was assumed for Light Duty areas, and an EDLA of 15 was assumed for Heavy Duty areas. Based on the subsurface conditions encountered at the site, an assumed R-value of 5 was used in design of the pavement sections.

Proof rolling and recompacting the subgrade is recommended immediately prior to placement of the aggregate road base section. Soft or weak areas delineated by the proofrolling operations should be

reworked or stabilized in-place to achieve the appropriate subgrade support.

Note that the clay soils were relatively dry at time of our exploration and could require substantial increases in moisture content to adjust within the recommended moisture content range. At the elevated moisture contents, those clay soils are likely to exhibit instability and require stabilization prior to surfacing in the pavement areas. In our opinion, stabilization could be accomplished by incorporating 13% Class C fly ash or 4% Portland cement into the top 12 inches of the subgrades. After blending, the subgrades should be adjusted to within ±2% of optimum moisture content and compacted to at least 95% of the material's maximum dry density as determined in accordance with the standard Proctor procedure. Compaction of the subgrades should be completed within two hours after initial blending.

Recommended minimum pavement sections for on-site pavements are provided below in Table 3. Hot mix asphalt (HMA) sections may show rutting/distress in truck loading and drive areas; therefore, concrete pavements should be considered in those areas. The recommended pavement sections are considered minimum; thus, periodic maintenance should be expected.

Table 3. Recommended minimum on-site pavement sections for estimated traffic loads.

Design Information	On-Site Light Duty	On-Site Heavy Duty
EDLA	5	15
Reliability (%)	75	80
Resilient Modulus (psi)	3025	3025
Serviceability Loss (psi)	2.5	2.2
Design Structure Number	2.48	3.05
Option 1: Composite HMA		
HMA	4"	5"
Aggregate Base	7"	8"
Option 2: PCC (Non-reinforced)	5"	6″

We recommend aggregate base meet CDOT Class 5 or Class 6 aggregate base. Aggregate base should be adjusted in moisture content and compacted to achieve a minimum of 95% of standard Proctor maximum dry density.

Asphalt pavements should be graded as S or SX and prepared with 75 gyrations using a Superpave gyratory compactor in accordance with CDOT standards. Grading SX is recommended for surface course of the pavement. The asphalt mix should consist of PG 58-28 or PG 64-22 asphalt binder; however, if the mix contains reclaimed asphalt pavement (RAP) material, we recommend using PG 58-28 binder. The hot mix asphalt should be compacted to achieve 92 to 96% of the mix's

theoretical maximum specific gravity (Rice Value).

Portland cement concrete should be an approved exterior pavement mix with a minimum 28-day compressive strength of 4,500 psi and should be air entrained. Wire mesh or fiber could be considered to reduce shrinkage cracking.

Longitudinal and transverse joints should be provided as needed in concrete pavements for expansion/contraction and isolation. The location and extent of joints should be based upon the final pavement geometry. Sawed joints should be cut in general accordance with ACI recommendations. All joints should be sealed to prevent entry of foreign material and dowelled where necessary for load transfer.

Corrosion Potential for Site Concrete

Results of water-soluble sulfate testing on select samples of the site soil indicate sulfate (SO_4) contents of approximately 0.02%. ACI 318, Section 4.2 indicates the site soils have a low risk of sulfate attack on Portland cement concrete. ACI 318 indicates site concrete be designed with a sulfate exposure of S0; however, we recommend using an exposure of S1.

Other Considerations

Positive drainage should be developed away from the structures and pavement areas with a minimum slope of 1 inch per foot for the first 10 feet away from the improvements in landscape areas. Care should be taken in planning of landscaping adjacent to the buildings to avoid features which would pond water adjacent to the foundations or stemwalls. Placement of plants which require irrigation systems or could result in fluctuations of the moisture content of the subgrade material should be avoided adjacent to site improvements. Irrigation systems should not be placed within 5 feet of the perimeter of the buildings and parking areas. Spray heads should be designed not to spray water on or immediately adjacent to the structures or site pavements. Roof drains should be designed to discharge at least 5 feet away from the structures and away from the pavement areas.

The individual contractor(s) should be made responsible for designing and constructing stable, temporary excavations as required to maintain stability of both the excavation sides and bottom. All

excavations should be sloped or shored in the interest of safety following local and federal regulations, including current OSHA excavation and trench safety standards.

GENERAL COMMENTS

The analysis and recommendations presented in this report are based upon the data obtained from the test borings performed at the indicated locations and from any other information discussed in this report. This report does not reflect any variations which may occur between borings or across the site. The nature and extent of such variations may not become evident until construction. If variations appear evident, it will be necessary to re-evaluate the recommendations of this report.

It is recommended that the geotechnical engineer be retained to review the plans and specifications so comments can be made regarding the interpretation and implementation of our geotechnical recommendations in the design and specifications. It is further recommended that the geotechnical engineer be retained for testing and observations during earthwork phases to help determine that the design requirements are fulfilled.

This report has been prepared for the exclusive use of Mike Smith Construction Inc. for the specific application to the project discussed and has been prepared in accordance with generally accepted geotechnical engineering practices. No warranty, express or implied, is made. In the event that any changes in the nature, design, or location of the project as outlined in this report are planned, the conclusions and recommendations contained in this report shall not be considered valid unless the changes are reviewed, and the conclusions of this report are modified or verified in writing by the geotechnical engineer.

DRILLING AND EXPLORATION

DRILLING & SAMPLING SYMBOLS:

SS: Split Spoon - 13/8" I.D., 2" O.D., unless otherwise noted
ST: Thin-Walled Tube - 2" O.D., unless otherwise noted
R: Ring Barrel Sampler - 2.42" I.D., 3" O.D. unless otherwise noted
PA: Power Auger
HA: Hand Auger
DB: Diamond Bit = 4", N, B
AS: Auger Sample
HS: Hollow Stem Auger
PS: Piston Sample
WS: Wash Sample
FT: Fish Tail Bit
RB: Rock Bit
BS: Bulk Sample
PM: Pressure Meter
WB: Wash Bore

Standard "N" Penetration: Blows per foot of a 140 pound hammer falling 30 inches on a 2-inch O.D. split spoon, except where noted.

WATER LEVEL MEASUREMENT SYMBOLS:

WL : Water Level
WCI: Wet Cave in
DCI: Dry Cave in
AB : After Boring
WS : While Sampling
WD : While Drilling
BCR: Before Casing Removal
ACR: After Casting Removal

Water levels indicated on the boring logs are the levels measured in the borings at the time indicated. In pervious soils, the indicated levels may reflect the location of ground water. In low permeability soils, the accurate determination of ground water levels is not possible with only short term observations.

DESCRIPTIVE SOIL CLASSIFICATION

Soil Classification is based on the Unified Soil Classification system and the ASTM Designations D-2488. Coarse Grained Soils have move than 50% of their dry weight retained on a #200 sieve; they are described as: boulders, cobbles, gravel or sand. Fine Grained Soils have less than 50% of their dry weight retained on a #200 sieve; they are described as : clays, if they are plastic, and silts if they are slightly plastic or non-plastic. Major constituents may be added as modifiers and minor constituents may be added according to the relative proportions based on grain size. In addition to gradation, coarse grained soils are defined on the basis of their relative in-place density and fine grained soils on the basis of their consistency. Example: Lean clay with sand, trace gravel, stiff (CL); silty sand, trace gravel, medium dense (SM).

CONSISTENCY OF FINE-GRAINED SOILS

Unconfined Compressive Strength, Qu, psf	Consistency
< 500	Very Soft
500 - 1,000	Soft
1,001 - 2,000	Medium
2,001 - 4,000	Stiff
4,001 - 8,000	Very Stiff
8,001 - 16,000	Very Hard

RELATIVE DENSITY OF COARSE-GRAINED SOILS:

N-Blows/ft	Relative Density
0-3	Very Loose
4-9	Loose
10-29	Medium Dense
30-49	Dense
50-80	Very Dense
80 +	Extremely Dense

PHYSICAL PROPERTIES OF BEDROCK

DEGREE OF WEATHERING:

Slight	Slight decomposition of parent material on joints. May be color change.
Moderate	Some decomposition and color change throughout.
High	Rock highly decomposed, may be extremely broken.

HARDNESS AND DEGREE OF CEMENTATION:

Limestone and Dolomite:

Hard	Difficult to scratch with knife.
Moderately Hard	Can be scratched easily with knife.
Hard	Cannot be scratched with fingernail.
Soft	Can be scratched with fingernail.

Shale, Siltstone and Claystone:

Hard	Can be scratched easily with knife, cannot be scratched with fingernail.
Moderately Hard	Can be scratched with fingernail.
Soft	Can be easily dented but not molded with fingers.

Sandstone and Conglomerate:

Well Cemented	Capable of scratching a knife blade.
Cemented	Can be scratched with knife.
Poorly Cemented	Can be broken apart easily with fingers.

UNIFIED SOIL CLASSIFICATION SYSTEM

Criteria for Assigning Group Symbols and Group Names Using Laboratory Tests					Soil Classification: Group Symbol	Soil Classification: Group Name
Coarse - Grained Soils more than 50% retained on No. 200 sieve	Gravels more than 50% of coarse fraction retained on No. 4 sieve	Clean Gravels Less than 5% fines	Cu≥4 and 1<Cc≤3[E]		GW	Well-graded gravel [F]
			Cu<4 and/or 1>Cc>3[E]		GP	Poorly-graded gravel [F]
		Gravels with Fines more than 12% fines	Fines classify as ML or MH		GM	Silty gravel [G,H]
			Fines Classify as CL or CH		GC	Clayey Gravel [F,G,H]
	Sands 50% or more coarse fraction passes No. 4 sieve	Clean Sands Less than 5% fines	Cu≥6 and 1<Cc≤3[E]		SW	Well-graded sand [I]
			Cu<6 and/or 1>Cc>3[E]		SP	Poorly-graded sand [I]
		Sands with Fines more than 12% fines	Fines classify as ML or MH		SM	Silty sand [G,H,I]
			Fines classify as CL or CH		SC	Clayey sand [G,H,I]
Fine-Grained Soils 50% or more passes the No. 200 sieve	Silts and Clays Liquid Limit less than 50	inorganic	PI>7 and plots on or above "A" Line		CL	Lean clay [K,L,M]
			PI<4 or plots below "A" Line		ML	Silt [K,L,M]
		organic	Liquid Limit - oven dried / Liquid Limit - not dried	<0.75	OL	Organic clay [K,L,M,N] / Organic silt [K,L,M,O]
	Silts and Clays Liquid Limit 50 or more	inorganic	PI plots on or above "A" Line		CH	Fat clay [K,L,M]
			PI plots below "A" Line		MH	Elastic Silt [K,L,M]
		organic	Liquid Limit - oven dried / Liquid Limit - not dried	<0.75	OH	Organic clay [K,L,M,P] / Organic silt [K,L,M,O]
Highly organic soils		Primarily organic matter, dark in color, and organic odor			PT	Peat

[A]Based on the material passing the 3-in. (75-mm) sieve

[B]If field sample contained cobbles or boulders, or both, add "with cobbles or boulders, or both" to group name.

[C]Gravels with 5 to 12% fines required dual symbols:
GW-GM well graded gravel with silt
GW-GC well-graded gravel with clay
GP-GM poorly-graded gravel with silt
GP-GC poorly-graded gravel with clay

[D]Sands with 5 to 12% fines require dual symbols:
SW-SM well-graded sand with silt
SW-SC well-graded sand with clay
SP-SM poorly graded sand with silt
SP-SC poorly graded sand with clay

[E]$Cu=D_{60}/D_{10}$ $Cc=\frac{(D_{30})^2}{D_{10} \times D_{60}}$

[F]If soil contains ≥15% sand, add "with sand" to

[G]If fines classify as CL-ML, use dual symbol GC-CM, or SC-SM.

[H]If fines are organic, add "with organic fines" to group name

[I]If soil contains >15% gravel, add "with gravel" to group name

[J]If Atterberg limits plots shaded area, soil is a CL-ML, Silty clay

[K]if soil contains 15 to 29% plus No. 200, add "with sand" or "with gravel", whichever is predominant.

[L]If soil contains ≥ 30% plus No. 200 predominantly sand, add "sandy" to group name.

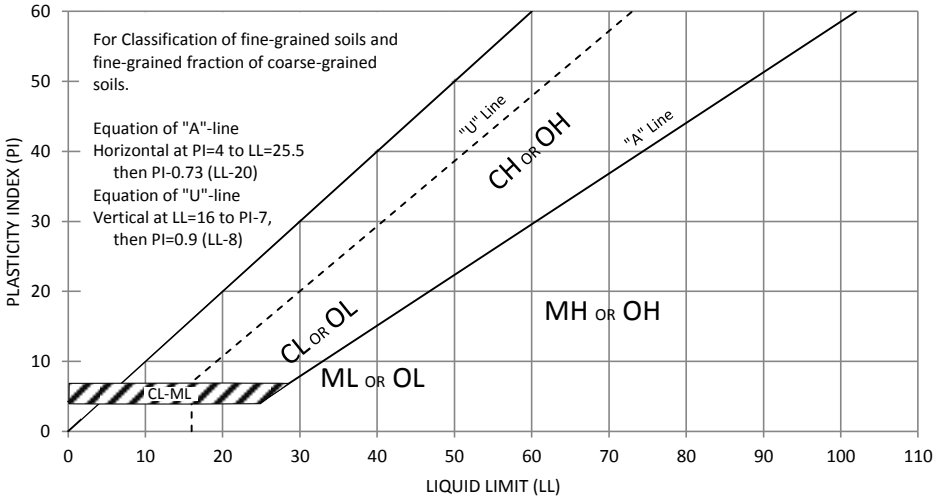
[M]If soil contains ≥30% plus No. 200 predominantly gravel, add "gravelly" to group name.

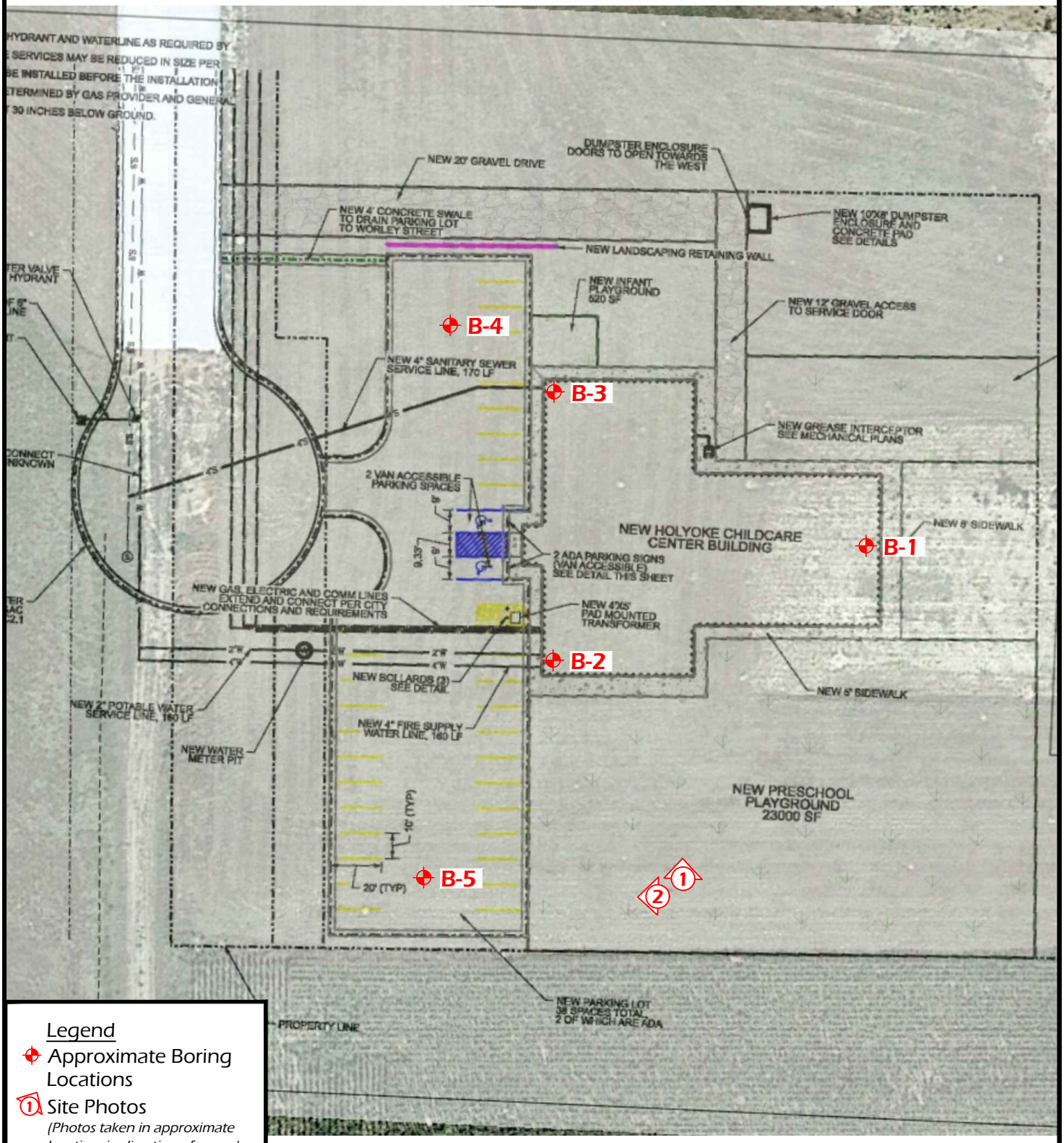
[N]PI≥4 and plots on or above "A" line.

[O]PI≤4 or plots below "A" line.

[P]PI plots on or above "A" line.

[Q]PI plots below "A" line.





Legend

- Approximate Boring Locations
- Site Photos

(Photos taken in approximate location, in direction of arrow)

North
Not to Scale

Boring Location Diagram
Holyoke Community Childcare Initiative
Holyoke, Colorado
EEC Project #: 3232025 Date: January 2024

PHOTO # 1

PHOTO # 2

HOLYOKE CHILD CARE INITIATIVE
HOLYOKE, COLORADO
EEC PROJECT NO. 3232025
JANUARY 2024

HOLYOKE COMMUNITY CHILDCARE INITIATIVE
HOLYOKE, COLORADO

PROJECT NO: 3232025	**LOG OF BORING B-1**	**DATE: JANUARY 2024**	
RIG TYPE: CME55	*SHEET 1 OF 1*	**WATER DEPTH**	
FOREMAN: DG	**START DATE** 1/11/2024	**WHILE DRILLING**	**None**
AUGER TYPE: 4" CFA	**FINISH DATE** 1/11/2024		
SPT HAMMER: AUTOMATIC	**SURFACE ELEV** N/A		

SOIL DESCRIPTION	TYPE	D (FEET)	N (BLOWS/FT)	QU (PSF)	MC (%)	DD (PCF)	A-LIMITS LL	A-LIMITS PI	-200 (%)	SWELL PRESSURE	SWELL % @ 500 PSF
SPARSE VEGETATION		1									
SANDY LEAN CLAY (CL)		2									
brown											
medium stiff to very stiff											% @ 150 PSF
with calcareous deposits	CS	3	**15**	**1000**	**9.2**	**110.1**	**30**	**17**	**55.2**	**700 PSF**	**2.1%**
		4									
			Water-Soluble Sulfates (SO_4) = 0.02% of soil by weight								
	SS	**5**	**8**	**4000**	**13.1**						
		6									
		7									
		8									
		9									
	CS	**10**	**17**	**7000**	**14.7**	**115.8**			**56.4**	**<500 PSF**	**None**
		11									
		12									
		13									
		14									
reddish brown	SS	**15**	**13**	**6500**	**16.5**						
		16									
		17									
		18									
		19									
	CS	**20**	**24**	**3500**	**12.7**	**119.1**					
		21									
		22									
		23									
		24									
	SS	**25**	**24**	**7000**	**25.6**						
BOTTOM OF BORING DEPTH 25.5'											

Earth Engineering Consultants, LLC

HOLYOKE COMMUNITY CHILDCARE INITIATIVE
HOLYOKE, COLORADO

PROJECT NO: 3232025	**LOG OF BORING B-2**	**DATE: JANUARY 2024**	
RIG TYPE: CME55	*SHEET 1 OF 2*	**WATER DEPTH**	
FOREMAN: DG	**START DATE** 1/11/2024	**WHILE DRILLING**	**None**
AUGER TYPE: 4" CFA	**FINISH DATE** 1/11/2024		
SPT HAMMER: AUTOMATIC	**SURFACE ELEV** N/A		

SOIL DESCRIPTION	TYPE	D (FEET)	N (BLOWS/FT)	QU (PSF)	MC (%)	DD (PCF)	A-LIMITS LL	A-LIMITS PI	-200 (%)	SWELL PRESSURE	SWELL % @ 500 PSF
SPARSE VEGETATION		1									
LEAN CLAY with SAND (CL)		2									
brown		3									
very stiff		4									
	CS	**5**	**23**	**9000+**	**12.2**	**112.3**	**30**	**15**	**79.7**	**3000 PSF**	**2.4%**
		6									
		7									
		8									
		9									
	SS	**10**	**30**	**5000**	**20.7**						
		11									
		12									
		13									
CLAYEY SAND (SC)		14									
reddish brown											
medium dense to dense	CS	**15**	**29**	**9000+**	**10.6**	**118.1**	**29**	**17**	**35.6**		
		16									
		17									
		18									
		19									
brown	SS	**20**	**26**	**3500**	**7.9**						
		21									
		22									
		23									
		24									
	CS	**25**	**38**	**3000**	**8.4**	**111.2**					

Continued on Sheet 2 of 2

HOLYOKE COMMUNITY CHILDCARE INITIATIVE
HOLYOKE, COLORADO

PROJECT NO: 3232025	**LOG OF BORING B-2**	**DATE: JANUARY 2024**	
RIG TYPE: CME55	*SHEET 2 OF 2*	**WATER DEPTH**	
FOREMAN: DG	**START DATE** 1/11/2024	**WHILE DRILLING**	**None**
AUGER TYPE: 4" CFA	**FINISH DATE** 1/11/2024		
SPT HAMMER: AUTOMATIC	**SURFACE ELEV** N/A		

SOIL DESCRIPTION	TYPE	D (FEET)	N (BLOWS/FT	QU (PSF)	MC (%)	DD (PCF)	A-LIMITS LL	A-LIMITS PI	-200 (%)	SWELL PRESSURE	SWELL % @ 500 PSF
Continued from Sheet 1 of 2		26									
CLAYEY SAND (SC)		27									
brown											
medium dense to dense		28									
		29									
	SS	**30**	**31**	**3000**	**13.0**						
BOTTOM OF BORING DEPTH 30.5'		31									
		32									
		33									
		34									
		35									
		36									
		37									
		38									
		39									
		40									
		41									
		42									
		43									
		44									
		45									
		46									
		47									
		48									
		49									
		50									

HOLYOKE COMMUNITY CHILDCARE INITIATIVE
HOLYOKE, COLORADO

PROJECT NO: 3232025	**LOG OF BORING B-3**	**DATE: JANUARY 2024**	
RIG TYPE: CME55	*SHEET 1 OF 1*	**WATER DEPTH**	
FOREMAN: DG	**START DATE** 1/11/2024	**WHILE DRILLING**	**None**
AUGER TYPE: 4" CFA	**FINISH DATE** 1/11/2024		
SPT HAMMER: AUTOMATIC	**SURFACE ELEV** N/A		

SOIL DESCRIPTION	TYPE	D (FEET)	N (BLOWS/FT)	QU (PSF)	MC (%)	DD (PCF)	A-LIMITS LL	A-LIMITS PI	-200 (%)	SWELL PRESSURE	SWELL % @ 500 PSF
SPARSE VEGETATION		1									
SANDY LEAN CLAY (CL)		2									
brown											
stiff to very stiff			**Water-Soluble Sulfates (SO_4) = 0.02% of soil by weight**								% @ 150 PSF
with calcareous deposits	CS	3	**14**	**9000+**	**11.7**	**102.2**				**1800 PSF**	**4.8%**
		4									
	CS	**5**	**13**	**9000+**	**11.0**	**112.7**	**24**	**11**	**72.2**	**<500 PSF**	**None**
		6									
		7									
		8									
		9									
	SS	**10**	**38**	**1500**	**5.5**						
		11									
		12									
		13									
		14									
	CS	**15**	**47**	**9000+**	**8.1**	**130.4**					
		16									
		17									
		18									
		19									
	SS	**20**	**25**	**2500**	**15.8**						
		21									
		22									
		23									
		24									
	CS	**25**	**31**	**4500**	**7.5**	**113.3**					
BOTTOM OF BORING DEPTH 25'											

Earth Engineering Consultants, LLC

HOLYOKE COMMUNITY CHILDCARE INITIATIVE
HOLYOKE, COLORADO

PROJECT NO: 3232025	**LOG OF BORING B-4**	**DATE: JANUARY 2024**	
RIG TYPE: CME55	*SHEET 1 OF 1*	**WATER DEPTH**	
FOREMAN: DG	**START DATE** 1/11/2024	**WHILE DRILLING**	**None**
AUGER TYPE: 4" CFA	**FINISH DATE** 1/11/2024		
SPT HAMMER: AUTOMATIC	**SURFACE ELEV** N/A		

SOIL DESCRIPTION	TYPE	D (FEET)	N (BLOWS/FT)	QU (PSF)	MC (%)	DD (PCF)	A-LIMITS LL	A-LIMITS PI	-200 (%)	SWELL PRESSURE	SWELL % @ 500 PSF
SPARSE VEGETATION AND TOPSOIL		1									
LEAN CLAY with SAND / SANDY LEAN CLAY (CL)		2									
brown											
stiff to very stiff											
	CS	3	**14**	**4500**	**16.4**	**99.7**					
		4									
	SS	**5**	**16**	**5000**	**6.8**						
BOTTOM OF BORING DEPTH 5.5'		6									
		7									
		8									
		9									
		10									
		11									
		12									
		13									
		14									
		15									
		16									
		17									
		18									
		19									
		20									
		21									
		22									
		23									
		24									
		25									

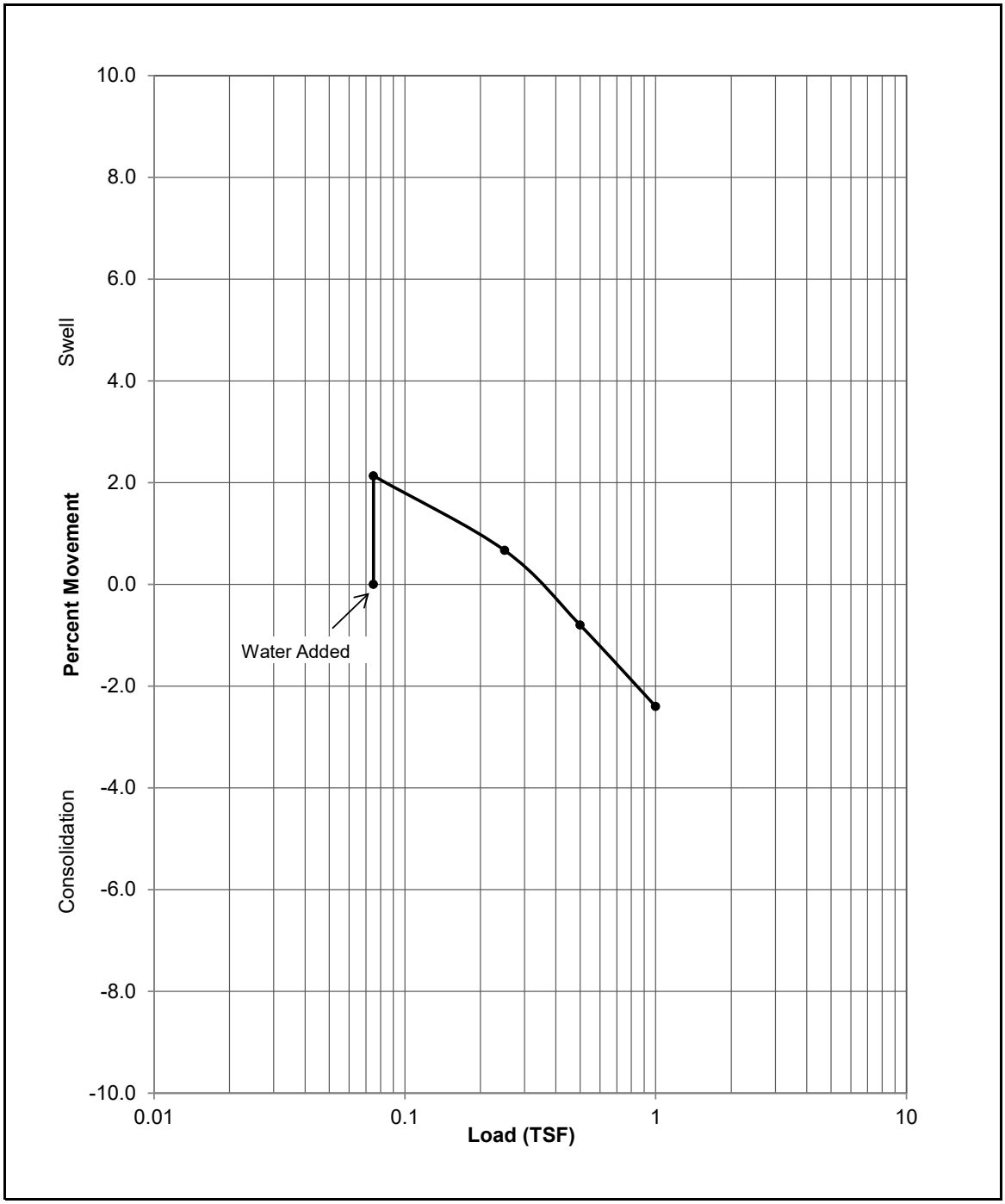
HOLYOKE COMMUNITY CHILDCARE INITIATIVE
HOLYOKE, COLORADO

PROJECT NO: 3232025	**LOG OF BORING B-5**	**DATE: JANUARY 2024**	
RIG TYPE: CME55	*SHEET 1 OF 1*	**WATER DEPTH**	
FOREMAN: DG	**START DATE** 1/11/2024	**WHILE DRILLING**	**None**
AUGER TYPE: 4" CFA	**FINISH DATE** 1/11/2024		
SPT HAMMER: AUTOMATIC	**SURFACE ELEV** N/A		

SOIL DESCRIPTION	TYPE	D (FEET)	N (BLOWS/FT)	QU (PSF)	MC (%)	DD (PCF)	A-LIMITS LL	A-LIMITS PI	-200 (%)	SWELL PRESSURE	SWELL % @ 500 PSF
SPARSE VEGETATION		1									
LEAN CLAY with SAND (CL)		2									
brown											
very stiff											% @ 150 PSF
	CS	3	**18**	**9000+**	**11.4**	**95.4**	**37**	**19**	**81.8**	**1500 PSF**	**5.1%**
		4									
	SS	**5**	**18**	**6000**	**7.3**						
BOTTOM OF BORING DEPTH 5.5'		6									
		7									
		8									
		9									
		10									
		11									
		12									
		13									
		14									
		15									
		16									
		17									
		18									
		19									
		20									
		21									
		22									
		23									
		24									
		25									

SWELL / CONSOLIDATION TEST RESULTS

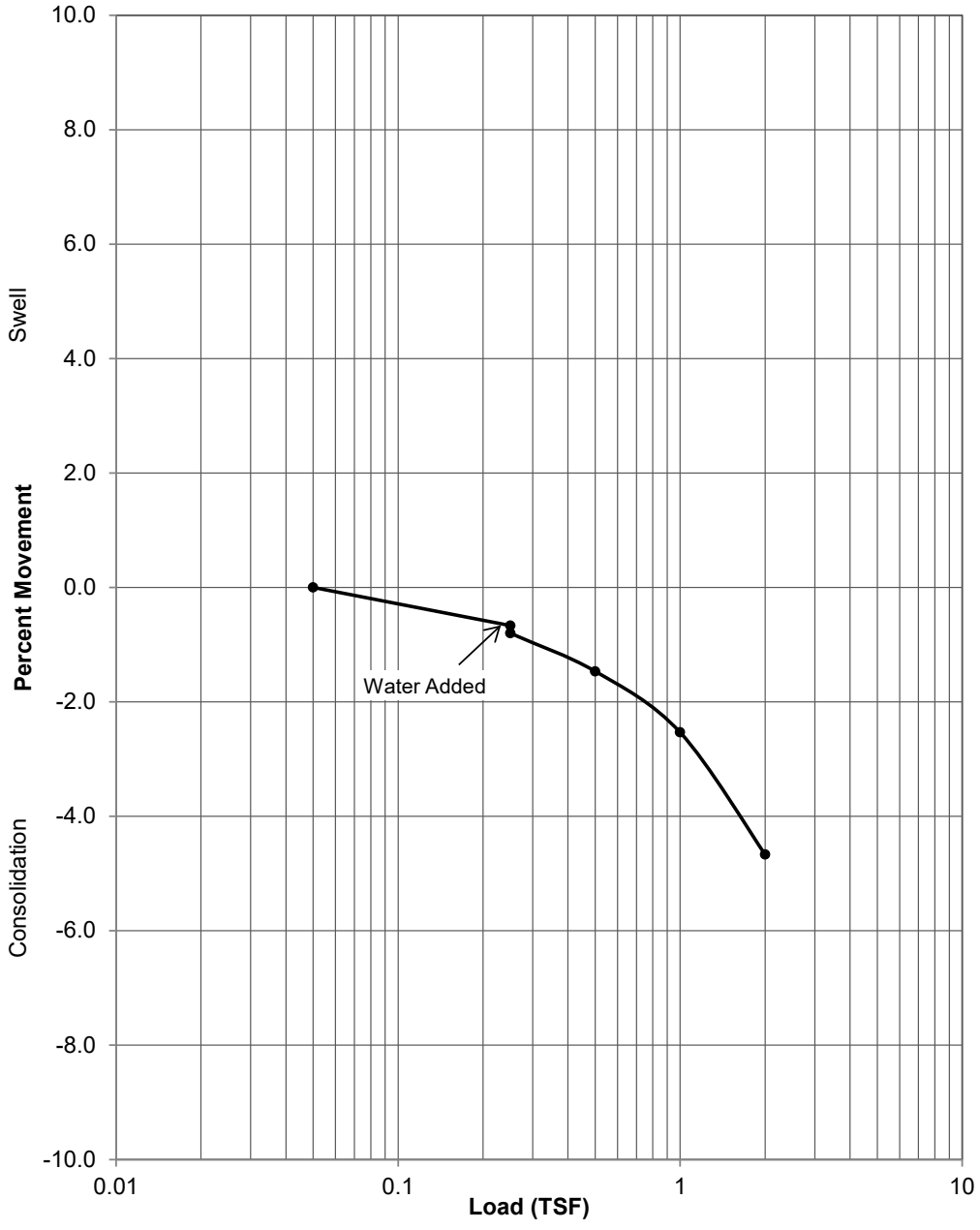
Material Description:	Brown Sandy Lean Clay (CL)	
Sample Location:	Boring 1, Sample 1, Depth 2'	
Liquid Limit: 30	Plasticity Index: 17	% Passing #200: 55.2%
Beginning Moisture: 9.2%	Dry Density: 108.8 pcf	Ending Moisture: 17.4%
Swell Pressure: 700 psf	% Swell @ 150: 2.1%	



Project: Holyoke Community Childcare Initiative
Location: Holyoke, Colorado
Project #: 3232025
Date: January 2024

SWELL / CONSOLIDATION TEST RESULTS

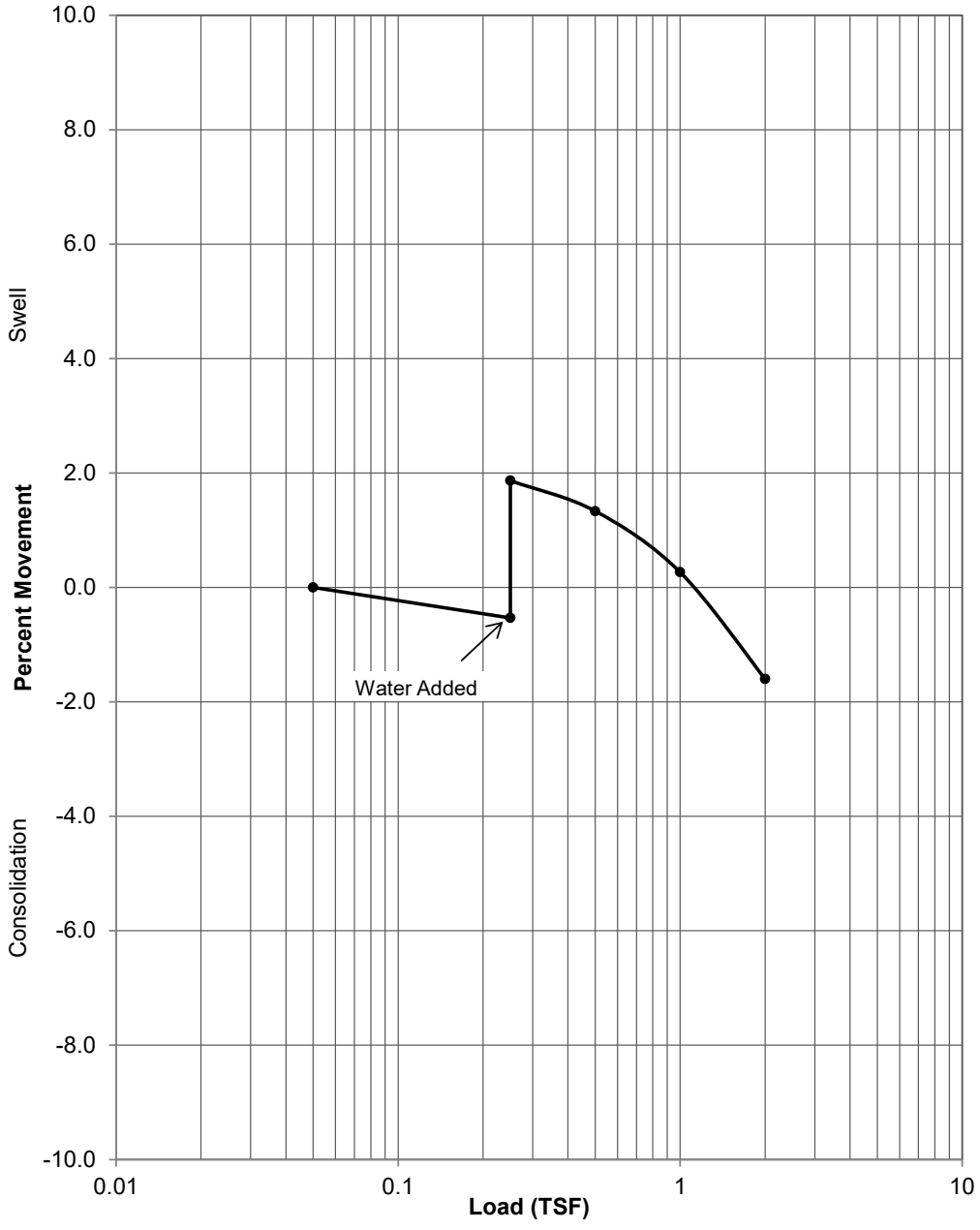
Material Description:	Brown Sandy Lean Clay (CL)	
Sample Location:	Boring 1, Sample 3, Depth 9'	
Liquid Limit: - -	Plasticity Index: - -	% Passing #200: 56.4%
Beginning Moisture: 14.7%	Dry Density: 110.8 pcf	Ending Moisture: 15.3%
Swell Pressure: <500 psf	% Swell @ 500:	None



Project: Holyoke Community Childcare Initiative
Location: Holyoke, Colorado
Project #: 3232025
Date: January 2024

SWELL / CONSOLIDATION TEST RESULTS

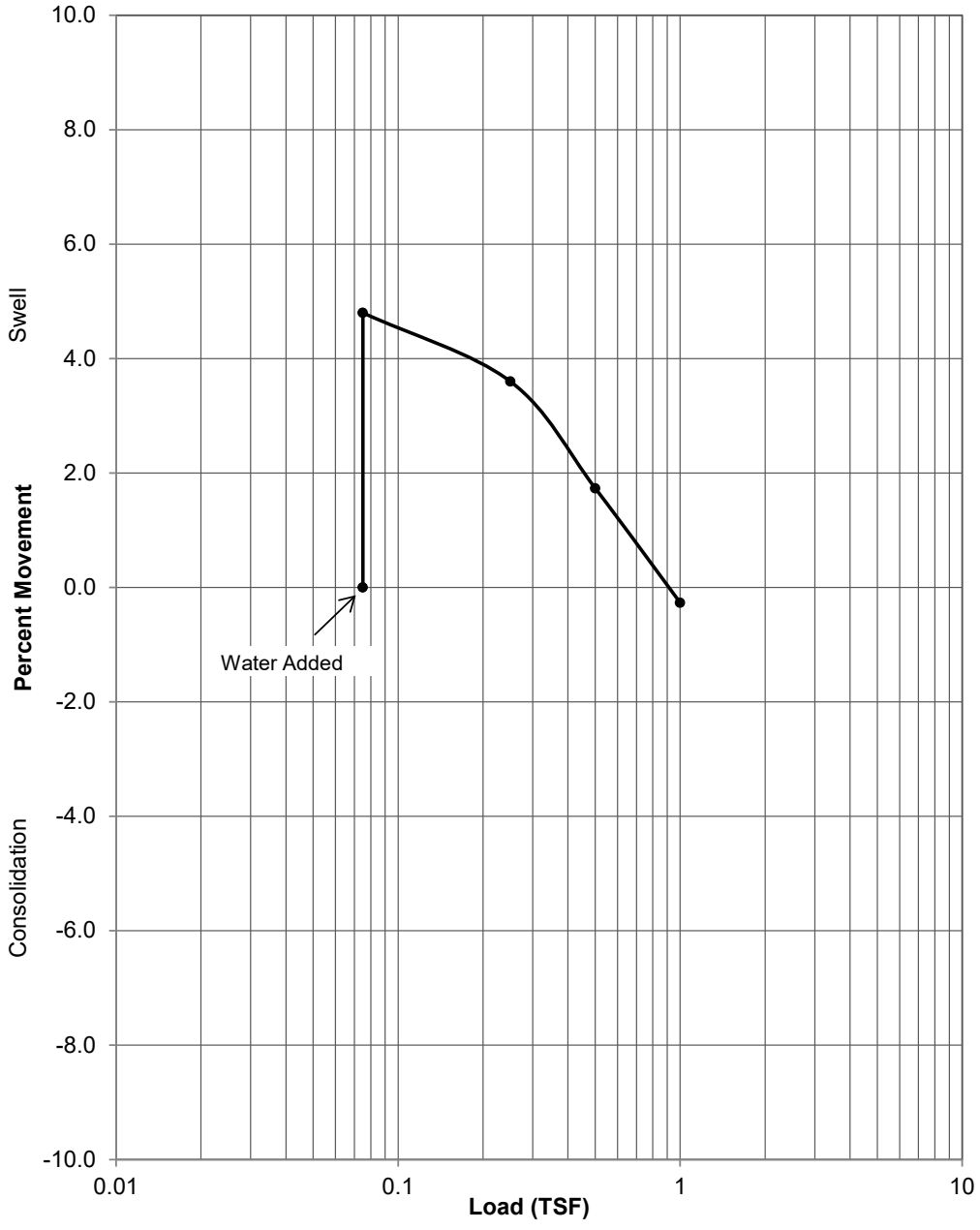
Material Description:	Brown Lean Clay with Sand (CL)	
Sample Location:	Boring 2, Sample 1, Depth 4'	
Liquid Limit: 30	Plasticity Index: 15	% Passing #200: 79.7%
Beginning Moisture: 12.4%	Dry Density: 109.7 pcf	Ending Moisture: 20.7%
Swell Pressure: 3000 psf	% Swell @ 500: 2.4%	



Project: Holyoke Community Childcare Initiative
Location: Holyoke, Colorado
Project #: 3232025
Date: January 2024

SWELL / CONSOLIDATION TEST RESULTS

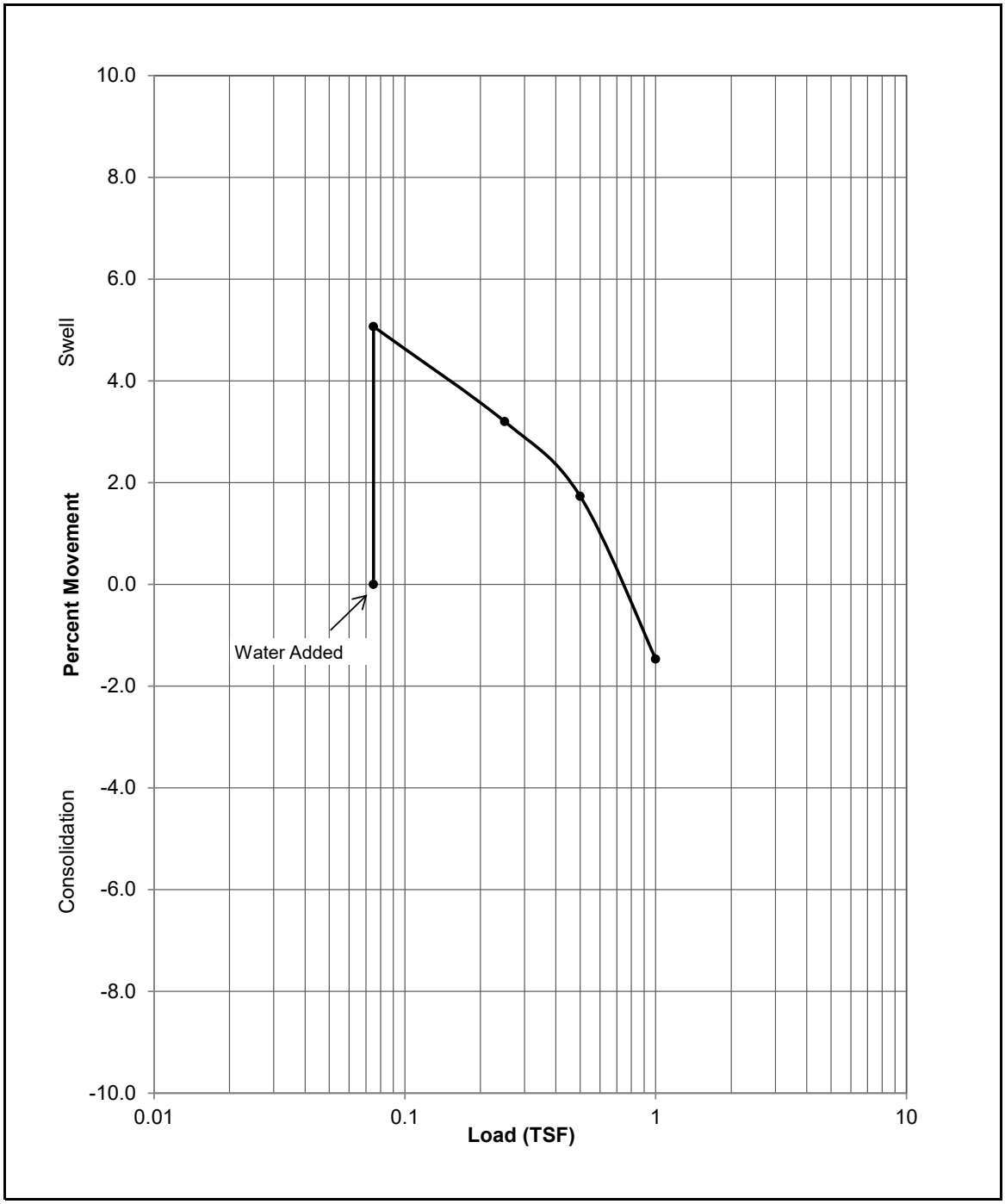
Material Description:	Brown Sandy Lean Clay (CL)	
Sample Location:	Boring 3, Sample 1, Depth 2'	
Liquid Limit: - -	Plasticity Index: - -	% Passing #200: - -
Beginning Moisture: 11.7%	Dry Density: 101.5 pcf	Ending Moisture: 26.7%
Swell Pressure: 1800 psf	% Swell @ 150: 4.8%	



Project: Holyoke Community Childcare Initiative
Location: Holyoke, Colorado
Project #: 3232025
Date: January 2024

SWELL / CONSOLIDATION TEST RESULTS

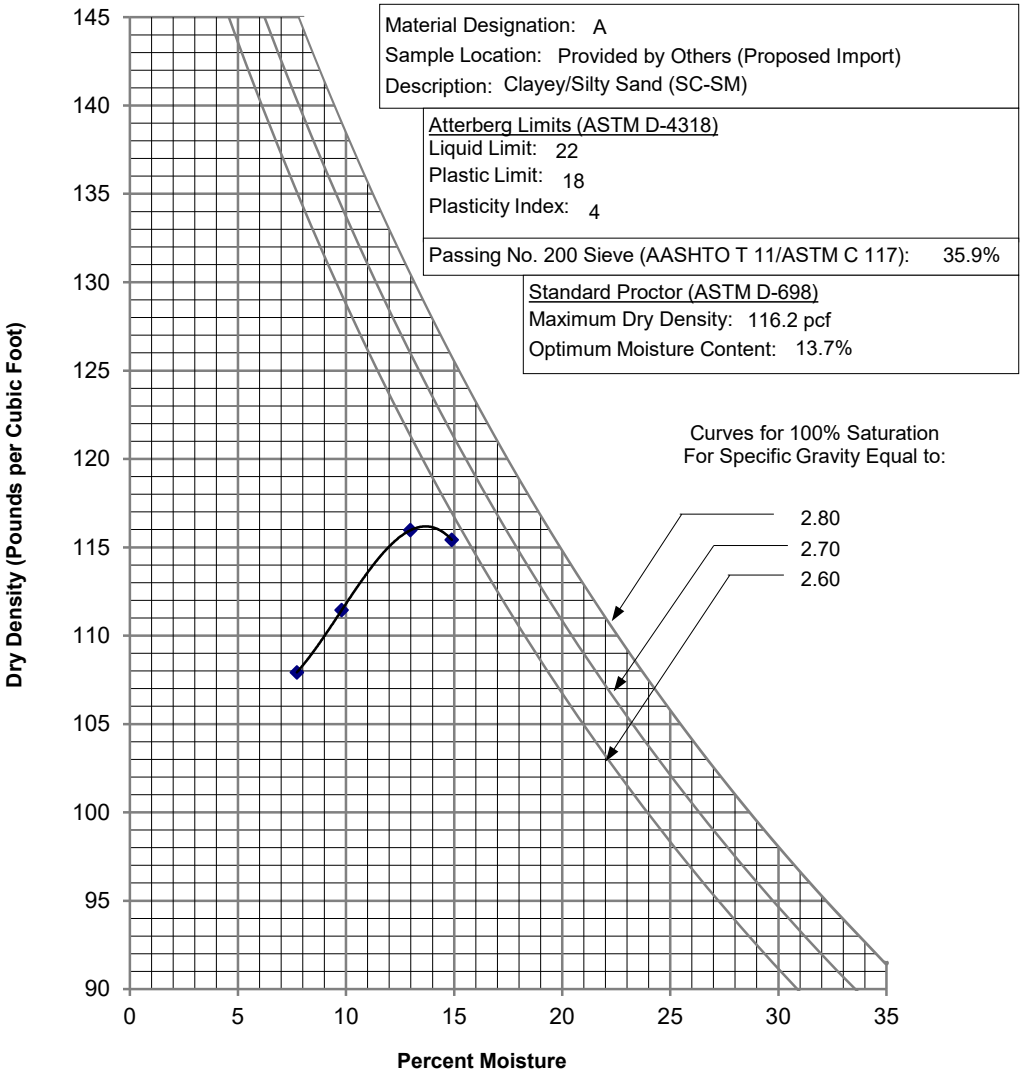
Material Description:	Brown Lean Clay with Sand (CL)		
Sample Location:	Boring 5, Sample 1, Depth 2'		
Liquid Limit: 37	Plasticity Index: 19	% Passing #200: 81.8%	
Beginning Moisture: 11.4%	Dry Density: 91 pcf	Ending Moisture: 28.2%	
Swell Pressure: 1500 psf	% Swell @ 150: 5.1%		



Project: Holyoke Community Childcare Initiative
Location: Holyoke, Colorado
Project #: 3232025
Date: January 2024

EARTH ENGINEERING CONSULTANTS, LLC

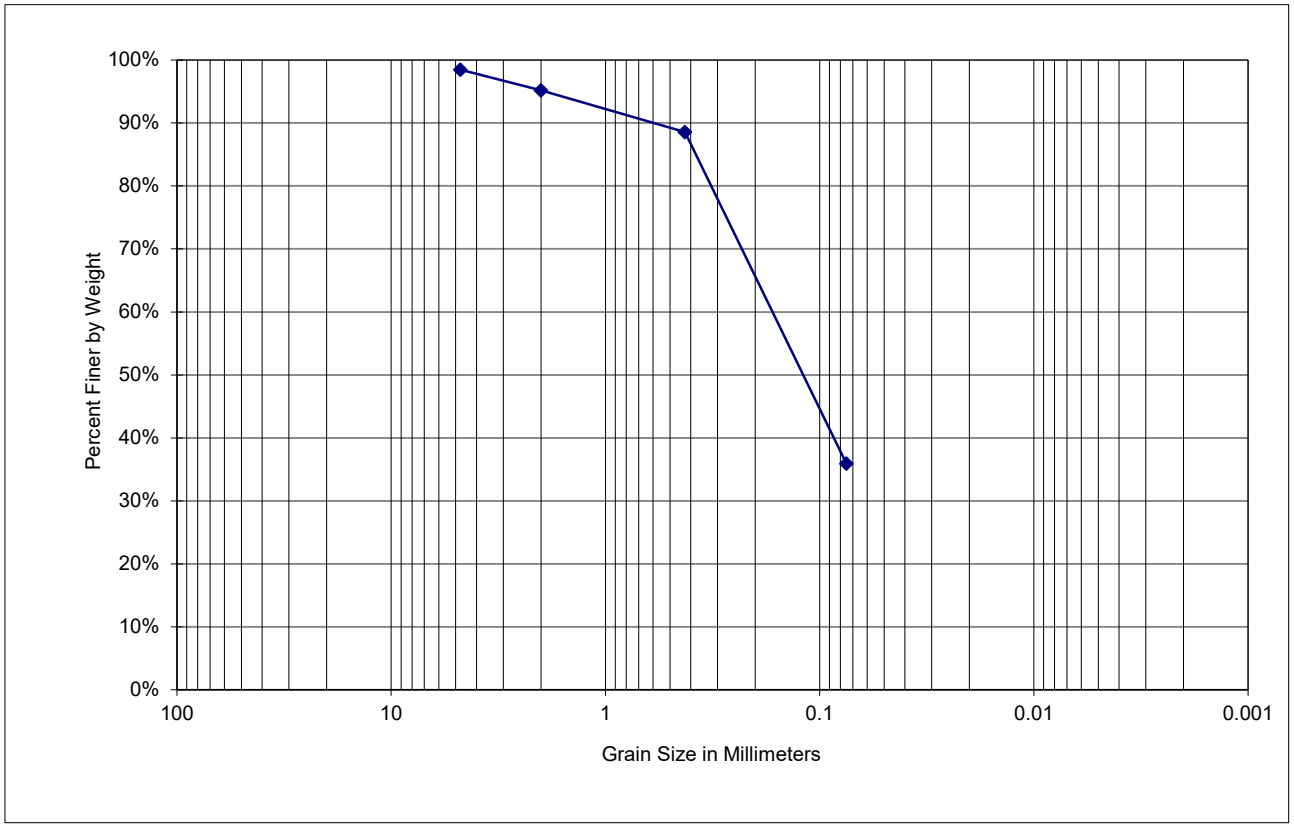
SUMMARY OF LABORATORY CLASSIFICATION/MOISTURE-DENSITY RELATIONSHIP



Project: Holyoke Community Childcare Initiative
Holyoke, Colorado
Project No: 3232025
Date January 2024

EARTH ENGINEERING CONSULTANTS, LLC

SUMMARY OF LABORATORY CLASSIFICATION / MOISTURE-DENSITY RELATIONSHIP



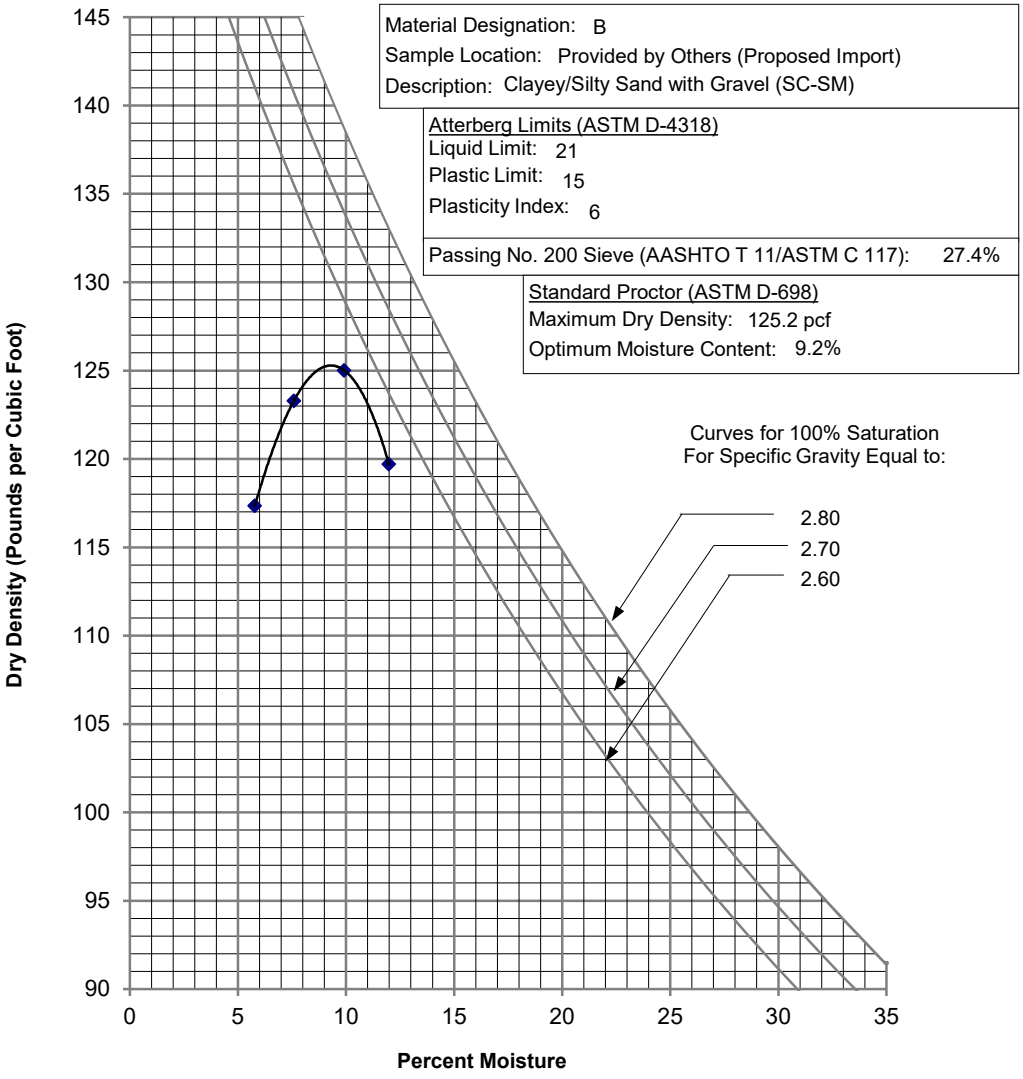
Sieve Size	Percent Passing
No. 4	98%
No. 10	95%
No. 40	89%
No. 200	35.9%

Material Designation: A
Sample Location: Provided by Others (Proposed Import)
Material Description: Clayey/Silty Sand (SC-SM)

Project: Holyoke Community Childcare Initiative
Holyoke, Colorado
Project No: 3232025
Date January 2024

EARTH ENGINEERING CONSULTANTS, LLC

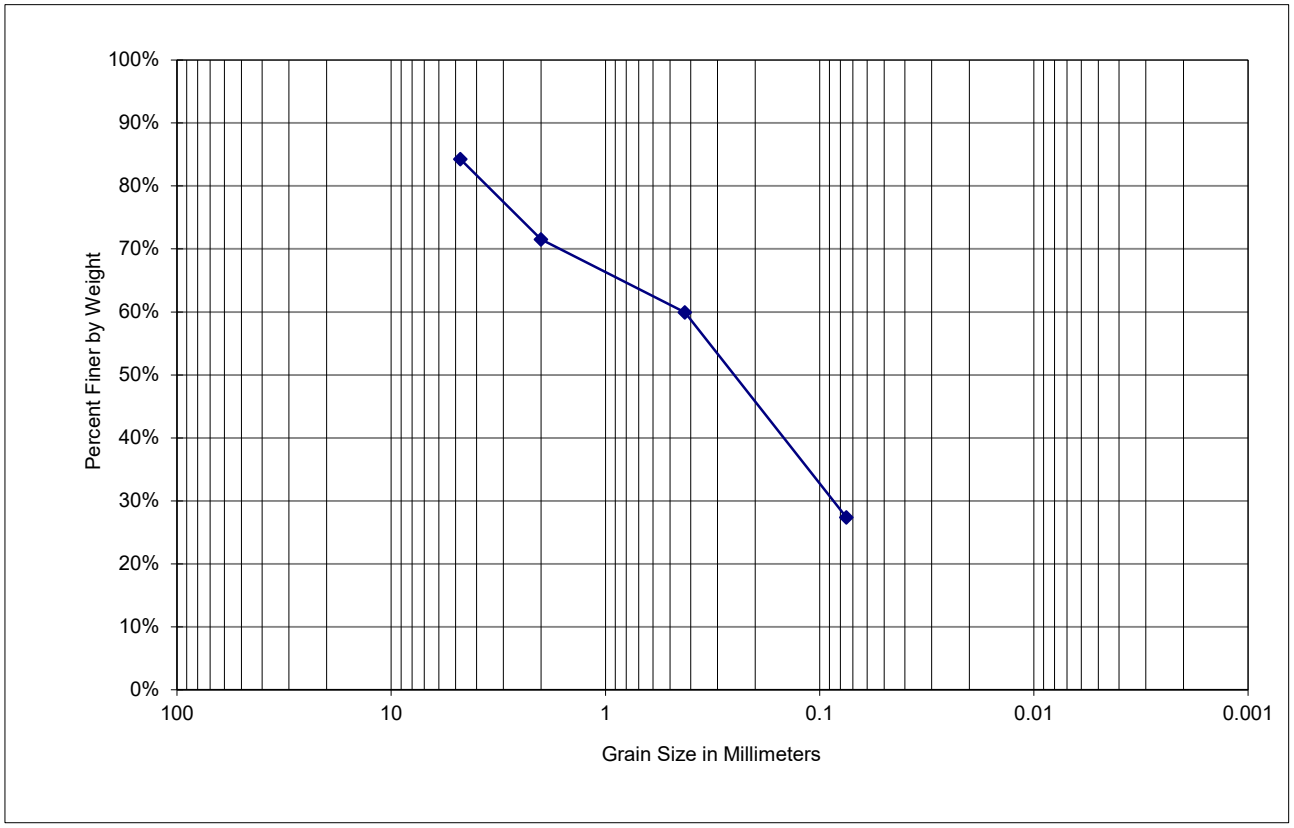
SUMMARY OF LABORATORY CLASSIFICATION/MOISTURE-DENSITY RELATIONSHIP



Project: Holyoke Community Childcare Initiative
Holyoke, Colorado
Project No: 3232025
Date January 2024

EARTH ENGINEERING CONSULTANTS, LLC

SUMMARY OF LABORATORY CLASSIFICATION / MOISTURE-DENSITY RELATIONSHIP



Sieve Size	Percent Passing
No. 4	84%
No. 10	72%
No. 40	60%
No. 200	27.4%

Material Designation: B
Sample Location: Provided by Others (Proposed Import)
Material Description: Clayey/Silty Sand with Gravel (SC-SM)

Project: Holyoke Community Childcare Initiative
Holyoke, Colorado
Project No: 3232025
Date January 2024