24 September 2024

A BETTER SOIL SOLUTION

SOILS REPORT

FOR

CASCO CONSTRUCTION

JOB #24-0360

Tract B, Filing #6,
702 Quebec Street,
El Paso County,
Colorado

Sincerely,

Charles E. Milligan, P.E.

COLORADO LICENSED
CHARLES E. MILLIGAN
34608
25th SEP 2024
PROFESSIONAL ENGINEER

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INTRODUCTION

The owners must be made aware of the contents of this report. If there are any questions or concerns regarding the information in this report, please call A Better Soil Solution, Inc. It is the responsibility of the contractor on this project to make subsequent homeowners aware of the contents of this report. This is to ensure that the recommendations and requirements of the report, especially regarding the surface drainage, are acknowledged and followed. This report is prepared for **Casco Construction, builder, on Tract B, Filing #6, 702 Quebec Street, El Paso County, Colorado.** This report is prepared with the understanding that a detached structure is planned for this site. The site does have existing structures.

CONCLUSIONS

If the bottom of the excavation becomes unstable, the use of 1' to 2' of 4" to 8" ballast rock will be required.

A satisfactory foundation for this structure is a properly designed shallow foundation system consisting of foundation components resting directly on over-excavated and replaced materials. This over-excavation and replaced materials scheme is necessary due to the expansive on-site material. This over-excavation and replaced materials scheme will reduce, but not eliminate the potential for movement with moisture fluctuations in the unstable subgrade soils. Since those materials will remain in-place beneath the fill, a potential remains that moisture changes in these deeper unstable materials will cause some movement in the overlying fill and structure. **Vertical slab movement of up to three inches should be expected of soils of moderate expansion potential and for compacted structural fill after the removal of the expansive soils. In some cases, vertical movement may exceed this range. If movement and associated damage to basement floors and finishes cannot be tolerated, a structural floor system shall be installed.**

This material has a swell potential of approximately **3.69% expansion potential with a dead load of 7,300 pounds per square foot (ASTM D-4546). The over-excavated area shall extend to a minimum depth of 4 feet below the bottom of the foundation elevation and 4 feet laterally from the location of the foundation walls.** The material to be compacted in the excavation shall meet or exceed CDOT Class 5 or Class 6 Road Base per CDOT 2022 Standard Specifications Table 703-2. This material shall be compacted to a minimum of 95% of its Modified Proctor density (ASTM D-1557). Modified Proctor testing will be required on a sample of the replacement material to be used for this over-excavation scheme. The compressibility of the over-excavated and replaced material shall be taken to be low. **A maximum allowable bearing capacity for the over-excavated and replaced material is a presumptive value of 1,500 pounds per square foot.** This bearing capacity is calculated with a safety factor of three. The type of foundation configuration used depends on the building loads applied. The depth of foundation elements shall be determined by the foundation engineer but should be at least as deep as the minimum depth required by the governing building authority.

The laboratory testing revealed that the on-site soil is Low Plasticity Clay (U.S.C.S. Classification Symbol CL). The native CL is not suitable and shall not be used as backfill material around the perimeter of the foundation. Foundation components should bear on soils of similar bearing capacity. Foundation components bearing on dissimilar soils should be avoided. The owners shall be made aware that movement will definitely occur if surface or subsurface water is allowed to collect around the foundation or in the over-excavated area.

GENERAL

The investigation was made to reveal important characteristics of the soils and of the site influencing the foundation design. Also evaluated during the investigation were subsurface conditions which affect the depth of the foundation and subsequent loading design, such as ground water levels, soil types, and other factors which affect the bearing capacity of the soils. Design loadings are based on soils characteristics and represent the maximum permissible loads for these conditions. The bearing capacity is calculated with a safety factor of three.

LATERAL EARTH PRESSURES

Based on the soil characteristics, the native CL material is not suitable and shall not be used as backfill material around the perimeter of the foundation. For imported backfill material, we recommend using a clean non-cohesive granular soil with a maximum equivalent fluid pressure in the active state of 45 pounds pcf. The above recommendations do not include a factor of safety or allowances for surcharge loads. The above recommended values do not include hydrostatic pressures as they are based on level, drained conditions.

FIELD AND LABORATORY INVESTIGATION

Two exploratory holes were drilled on September 13, 2024, at the locations shown on the enclosed site map. The location of these test holes was determined by Casco Construction. The test holes were drilled with a 4-inch diameter auger. At intervals anticipated to be the foundation depths, and as determined by the soils conditions, the drill tools were removed, and samples were taken by the use of a 2.5 inch "split barrel" sampler connected to a 140-pound drop-hammer. This hammer is dropped 30 inches to drive the penetration sampler into the soil (ASTM D-1586). The depths and descriptions of the materials encountered in each test boring at which the samples were taken are shown on the enclosed log sheets. All samples were classified both in the field and in the laboratory to evaluate the physical and mechanical properties of the materials encountered.

TOPOGRAPHY

The topography of this site is that of an incline sloping down towards the west at 3%.

WEATHER

The weather at the time of the soil examination consisted of clear skies with warm temperatures.

DESIGN AND CONSTRUCTION CONSIDERATIONS

Slabs-on-grade may move and crack. Vertical slab movement of up to three inches should be expected for soils of moderate expansion potential and for compacted structural fill after removal of the expansive soils. In some cases, vertical movement may exceed this range. If movement and associated damage to basement floors and finishes cannot be tolerated, a structural floor system shall be installed. The native materials encountered during the exploratory testing are not suitable for the support of residential construction. If compaction is not performed, settlement may occur causing cracking of foundation walls and floors. Personnel of A Better Soil Solution, Inc shall inspect the base of the over-excavation prior to any placement of any fill materials. All backfill material and over excavated and replaced material shall be properly tested by A Better Soil Solution, Inc at the time of installation of said material. Soil located beneath concrete walls shall be compacted to at least 95% Modified Proctor density (ASTM D-1557). Soil located beneath concrete slabs shall be compacted to at least 85% Modified Proctor density. Special care is to be taken to re-compact the material above utility lines to a minimum of 85% Modified Proctor density. During construction, conditions that could cause settlement shall be eliminated. Interior non-bearing partition walls shall be constructed such that they do not transmit floor slab movement to the roof or overlying floor. The gap or void (1.5-inch min.) installed in these non-bearing partitions may require re-construction over the life of the structure to re-establish the gap or void to allow for vertical slab movement. Stairwells, doorways, and sheeted walls should be designed for this movement.

The following are general recommendations of on-grade slabs:

1. Slabs shall be placed on a minimum of three feet of road base material and be tested to meet Modified Proctor density of 85%. All loose or soft spots shall be thoroughly excavated and replaced with non-expansive soil. Up to 3 inches of movement of the slabs and exterior concrete can be expected.

2. Slabs shall be separated from all foundation walls, load bearing members, and utility lines.

3. At intervals not to exceed 12 feet in each direction, provide control joints to reduce problems with shrinkage and curling as recommended by the American Concrete Institute (ACI 360R-10). Moisten the ground beneath the slab prior to the placement of concrete.

4. All concrete placed must be cured properly as recommended by the American Concrete Institute (ACI 360R-10). Separate load bearing members from slabs, as discussed above. Care must be exercised to prevent excess moisture from entering the soil under the structure, both during and after construction.

5. Due to the exposure of exterior concrete to variations in moisture fluctuations, heaving and cracking of exterior slabs-on-grade should be expected. Placement of at least 3 feet of non-expansive fill beneath the slabs can help to reduce the impact of differential movement and cracking but may not eliminate movement. Exterior concrete shall slope away from the structure a minimum of 2% grade.

6. **The CL has been tested for its expansion and/or consolidation potential. This material has a 3.69% expansion potential with a dead load of 7,300 pounds per square foot.** Basement slabs, garage slabs, and all concrete floor slabs, exert a very low dead-load pressure on the soil. Since this soil contains a moderate amount of swell/consolidation potential, slabs will crack and heave or settle if excess water is allowed to penetrate the subgrade. For example, column openings to pads below the placed slab, if exposed to precipitation during construction, will conduct water to the subgrade, possibly causing it to expand/consolidate. Also, if the slab is placed with concrete too wet, expansion/consolidation may occur. We recommend 3,000 psi concrete placed at a maximum slump of 4 inches.

RECOMMENDATION REMARKS

The recommendations provided in this report are based upon the observed soil parameters, anticipated foundation loads and accepted engineering procedures. The recommendations are intended to minimize differential movement resulting from the heaving of expansive soil or from the settlement induced by the application of loads. **It must be recognized that the foundation will undergo some movement on all soil types.** In addition, concrete floor slabs will move vertically, therefore, adherence to those recommendations which isolate floor slabs from columns, walls, partitions or other structural components is extremely important, if damage to the superstructure is to be minimized. Any subsequent owners should be apprised of the soil conditions and advised to maintain good practice in the future with regard to surface and subsurface drainage and partition framing, drywall and finish work above floor slabs.

A Better Soil Solution, Inc does not assure that the contractor and/or homeowner will comply with the recommendations provided in this report. A Better Soil Solution, Inc provides recommendations only and does not supervise, direct or control the implementation of the recommendations.

Failure to follow the recommendation provided by A Better Soil Solution, Inc and follow observation requirements may jeopardize the construction project and A Better Soil Solution, Inc shall be absolved from any and all responsibility for any damages arising from the failure to obtain proper site observation and follow recommendations.

COLD TEMPERATURE CONSIDERATIONS

1. Concrete shall not be placed upon wet or frozen soil.

2. Concrete shall be protected from freezing until it has been allowed to cure for at least 7 days after placement in forms.

3. Snow or other frozen water shall not be allowed in the forms during placement of concrete.

4. Concrete shall be cured in forms for at least 72 hours.

5. Concrete shall be vibrated or rodded in forms to avoid segregation and cold joints.

6. The site shall be kept well drained at all times. Ponding of water should be avoided in the excavation area.

SURFACE DRAINAGE

After construction of foundation walls, the backfill material shall be well compacted to 80% Modified Proctor density, to reduce future settlement. Any areas that settle after construction shall be filled to eliminate ponding of water adjacent to the foundation walls. **The finished grade shall have a positive slope away from the structure with an initial slope of 6 inch in the first 10 feet.** If a 10 foot zone is not possible on the upslope side of the structure, then a well-defined swale should be created a minimum of 5 feet from the foundation and sloped parallel with the wall at a 2% grade to intercept the surface water and carry it around and away from the structure. Homeowners shall maintain the surface grading and drainage installed by the builder to prevent water from being directed in the wrong direction. All downspouts shall have extensions that will remove runoff to the outside of the backfilled areas. Shrubs and plants requiring minimal watering shall be established in this area. Irrigated grass shall not be located within 5 feet of the foundation. Sprinklers shall not discharge water within 5 feet of the foundation. Irrigation should be limited to the minimum amount sufficient to maintain vegetation. Application of more water will increase the likelihood of floor slab and foundation movement.

All exterior grading and location of downspouts and their performance shall be inspected by A Better Soil Solution, Inc. **The native CL material is not suitable and shall not be used as backfill material around the perimeter of the foundation.** If on-site soils are not suitable for the backfill, the backfill material shall consist of clean non-cohesive granular soils or road base material as described previously. Imported material is to be approved by A Better Soil Solution, Inc prior to placement. **We recommend imported granular backfill with a maximum equivalent fluid pressure of the soil in the active state of 45 pounds per cubic foot**. It is the responsibility of the contractor to schedule all inspections**.**

SUBSURFACE DRAINAGE

Perimeter drains are required around all walls of the habitable or usable area portion of the structure that are below finished grade including all common wall(s) adjacent to the basement and crawlspaces. Slab on grade and walkout areas need not be drained unless specified at the time of the Open Hole Observation. The final determination of the necessity for perimeter drains will be made at the time of the Open Hole Observation. An Exterior Drain Detail is provided in this report. Drains should daylight away from the structure or discharge to a sump pump. Areas with a recommended drain may still experience moisture problems if unusual conditions are present in the future.

REINFORCING

The concrete foundation walls shall be properly reinforced as per the specific design for this foundation by a **Colorado Registered Professional Engineer. Exact requirements are a function of the design of the structure. Questions concerning the specific design requirements shall be referred to the design engineer.**

FOOTING DESIGN

The design for footings, pads, and/or piers for this structure is determined by applying the dead load and full live load to the foundation walls.

CONSTRUCTION DETAILS

It is necessary with any soils investigation to assume that the materials from the test holes are representative of the materials in the area. On occasion variations in the subsurface materials do occur, therefore, should such variations become apparent during construction, the owner is advised to contact this office for a determination as to whether these variations will affect the design of the structure's foundation. If anomalies are observed during the excavation for the structure, this office should be contacted to determine whether this may adversely affect the design.

MINIMUM MATERIALS SPECIFICATIONS

1. Minimum materials specifications of the concrete, reinforcing, etc., shall be determined by the Professional Foundation Design Engineer.

2. Compact beneath foundation walls a minimum of 95% Modified Proctor density to prevent settlement.

3. Compact all backfill material located around the perimeter of the foundation to 80% Modified Proctor density.

4. Concrete shall be vibrated or rodded in forms to avoid segregation and cold joints.

5. The site shall be kept well drained at all times.

OPEN HOLE OBSERVATION (added cost)

If anyone other than A Better Soil Solution, Inc performs the Open Hole Observation and/or compaction testing, that person/company assumes liability for the soils, and any possible changes to the foundation design.

The owner, or a representative of the construction company shall contact **A Better Soil Solution, Inc** a minimum of **24 hours** prior to excavating for the foundation. An Open Hole Observation must be performed on each individual structure prior to the placement of concrete, and preferably prior to the placement of forms in the excavated area. **The failure to request or obtain an Open Hole Observation prior to the placement of foundation components may result in this Soils Report being declared null and void.** This is to ensure that soft areas, anomalies, etc., are not present in the foundation region. At the time of the open hole observation the **foundation type recommendations, maximum allowable bearing capacity may be revised** according to soil conditions found at that time. If revisions are made to the Soils Report due to the soil conditions of the excavation, **the Foundation Design Engineer must be notified of all revisions.**

COMPACTION TESTING (added cost)

A Better Soil Solution, Inc shall perform compaction testing on the replaced material. Soil shall be compacted in maximum 6-inch lifts. Testing shall be performed at intervals not to exceed 24 inches (or as required by the design engineer). Modified Proctor Density must be provided to A Better Soil Solution, Inc prior to compaction testing, see below.

The owner, or a representative of the construction, shall contact A Better Soil Solution, Inc a **minimum of 24 hours prior to the time the compaction test is requested. The failure to properly compact and/or obtain proper compaction testing may result in this Soils Report being declared null and void.**

MODIFIED PROCTOR DENSITY TESTING (added cost)

A Modified Proctor Density test must be provided to A Better Soil Solution, Inc prior to compaction testing. If a Proctor cannot be provided, a Modified Proctor Density test must be completed prior to compaction testing. Two 5-gallon valid samples of the soil to be used, must be provided for testing, at least 2 weeks prior to the placement and compaction of the material.

The failure to provide this data may result in this Soils Report being declared null and void.

FINAL OBSERVATIONS (added cost)

The owner, or a representative of the construction company, shall contact A Better Soil Solution, Inc at the time final grading and landscaping procedures are completed. This is to ensure that sprinkler systems are not installed adjacent to the structure and that only shrubs or plants that require minimal watering are established in this area. All exterior grading as well as the location of downspouts and their performance shall be inspected by A Better Soil Solution, Inc. Any additional landscaping or grading changes performed by subsequent contractors and/or owners shall be inspected and approved. It is the responsible of the contractor and/or owner to schedule all these inspections at the appropriate times. **The failure to obtain this inspection may result in this Soils Report being declared null and void.**

LIMITATIONS

This report is issued based on the understanding that the owner or his representative will bring the information, data, and recommendations contained in this report to the attention of the project engineer and architect, in order that they may be incorporated into the plans for the structure. It is also the owner's responsibility to ensure that all contractors and sub-contractors carry out these recommendations during the construction phase.

This report was prepared in accordance with generally accepted professional geotechnical/engineering methods. However, A Better Soil Solution, Inc makes no other warranty, express or implied, as to the findings, data, specifications, or professional advice rendered hereunder. **Due to circumstances outside of A Better Soil Solution, Inc's control, including improper construction, failure to follow recommendations, and unforeseen events, the Limits of Liability extend only to fees rendered for the professional services provided.**

This report is considered valid as of the present date. The owner acknowledges, however, that changes in the conditions of the property might occur with the passage of time, such as those caused by natural effects or man-made changes, both on this land and on abutting properties. Further, changes in acceptable tolerances or standards might arise as the result of new legislative actions, new engineering advances, or the broadening of geotechnical knowledge. Thus, certain developments beyond our control may invalidate this report, in whole or in part.

This report and its recommendations do not apply to any other site than the one described herein and are predicated on the assumption that the soil conditions do not deviate from those described. In the event that any variations or undesirable conditions should be detected during the construction phase or if the proposed construction varies from that planned as of this report date, the owner shall immediately notify A Better Soil Solution, Inc in order that supplemental recommendations can be provided, if so required.

This report excludes possible environmental issues, geologic hazards, flooding, or any other natural or man-made hazards that affect this site. These are outside the scope of work, for this report.

APPENDIX

Solid Stem Auger (STA) Log TH-1

Project Info.
Project : 702 Quebec St
Client : Casco Construction
Location : Fountain, CO
Job No. : 24-0360

Borehole Info.
Depth: 20 (ft)
GWL: - (ft)
Drill Date: 9/13/24
Logged By: NB+JH
Elevation: 5668 ft
Latitude: 38.724358
Longitude: -104.712607
Method: Solid Stem Auger

Company Info.
A Better Soil Solution

Depth (ft)	GWL (ft)	Sample Type	Field Tests (* SPT)	USCS / AASHTO	Symbol	Lithology Description	Depth (ft)	Dry Density (pcf)	w (%)	Particle Analysis Test: Gravel (%)	Sand (%)	Fines (%)	Atterberg Limits: LL (%)	PL (%)	PI (%)	Remarks & Comments
0						**Topsoil**	0									
1–3						**Low Plasticity Clay** *Fine-Coarse Grained, Moderate Density, Low-Moderate Moisture Content, Moderate-High Clay Content, Low Plasticity, Pale Brown in Color*	1–3										
4		U	* 24	CL A-6(6)			4	95.3	4.4	7.5	41.8	50.7	29.2	10	19.2	
5–8							5–8									
9		U	* 25	CL A-6(6)			9	97.5	5.6	3.2	44.3	52.5	29.2	10	19.2	
10–13							10–13									
14		U	* 30	CL A-6(15)			14	92.1	10.8		16.2	83.8	35.1	15.5	19.6	
15–19							15–19									
20						End of Log @ 20 (ft)	20									

Sample Types
- ● Disturbed
- + Undisturbed
- □ Shelby / U4
- ■ Core Cutter
- SPT Sample
- Water Sample
- ▽ Groundwater Level

Abreviations
- LL : Liquid Limit
- PL : Plastic Limit
- PI : Plastic Index
- NPI : None PI
- w : Moisture Content

Solid Stem Auger (STA) Log TH-2

Project Info.
Project : 702 Quebec St
Client : Casco Construction
Location : Fountain, CO
Job No. : 24-0360

Borehole Info.
Depth: 20 (ft)
GWL: - (ft)
Drill Date: 9/13/24
Logged By: NB+JH
Elevation: 5668 ft
Latitude: 38.724187
Longitude: -104.712588
Method: Solid Stem Auger

Company Info.
A Better Soil Solution

Depth (ft)	GWL (ft)	Sample Type	Field Tests (* SPT)	USCS / AASHTO	Symbol	Lithology Description	Depth (ft)	Dry Density (pcf)	w (%)	Particle Analysis Test: Gravel (%)	Sand (%)	Fines (%)	Atterberg Limits: LL (%)	PL (%)	PI (%)	Remarks & Comments
0						**Topsoil**	0									
1						**Low Plasticity Clay** *Fine-Coarse Grained, Low-Moderate Density, Moderate-High Moisture Content, High Clay Content, Low Plasticity, Pale Brown in Color*	1										
2							2									
3							3									
4		U	* 15	CL A-6(9)			4	85.6	9.1	0.4	32	67.6	29.4	11.9	17.5	
5							5									
6							6									
7							7									
8							8									
9		U	* 18	CL A-6(8)			9	93.4	8.9		24.5	75.5	26.4	11.8	14.6	
10							10									
11							11									
12							12									
13							13									
14		U	* 28	CL A-6(16)			14	100	21.1		9	91	35.1	15.5	19.6	
15							15									
16							16									
17							17									
18							18									
19							19									
20						End of Log @ 20 (ft)	20									

Sample Types
- Disturbed
- Undisturbed
- Shelby / U4
- Core Cutter
- SPT Sample
- Water Sample
- Groundwater Level

Abreviations
- LL : Liquid Limit
- PL : Plastic Limit
- PI : Plastic Index
- NPI : None PI
- w : Moisture Content

Site Map

Project:	702 Quebec St
Client:	Casco Construction
Job No.:	24-0360
Location:	Fountain, CO

A Better Soil Solution

Coordinates

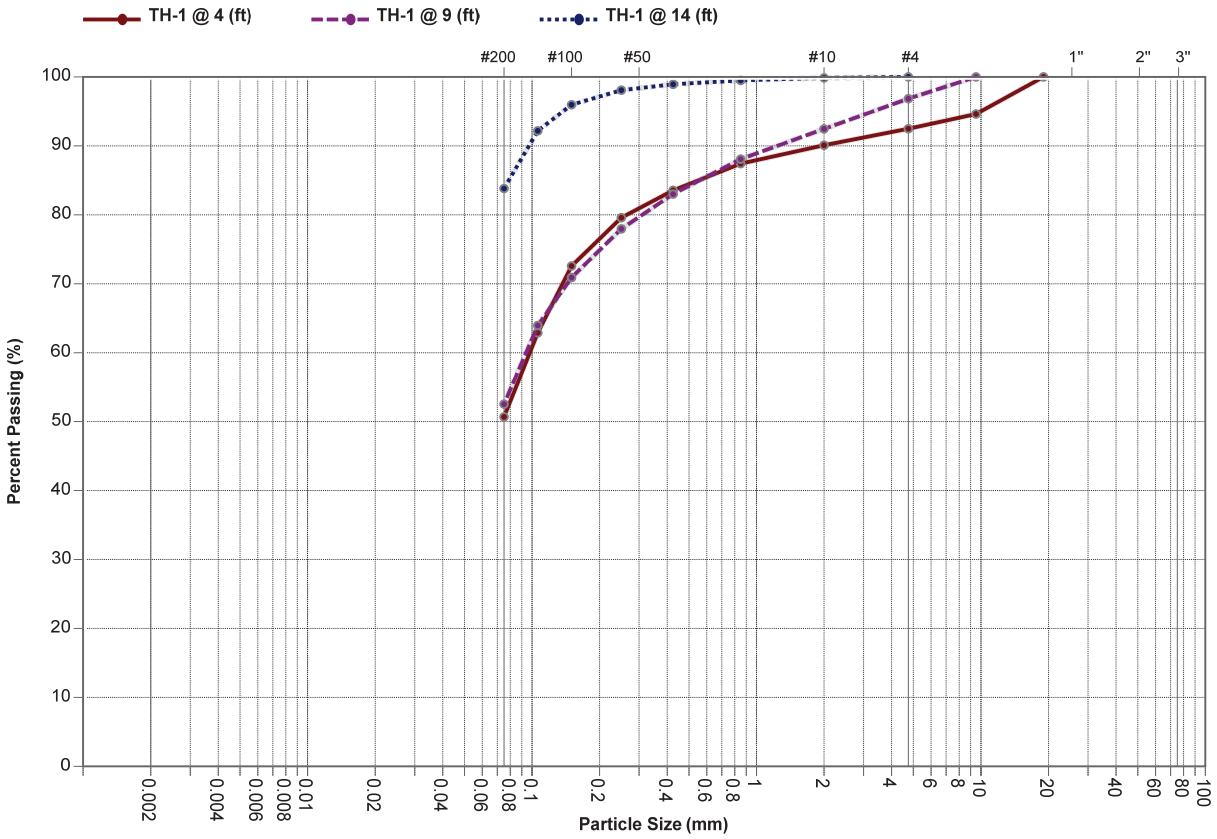
Bore Hole	Latitude	Longitude
TH-1	38.724358	-104.712607
TH-2	38.724187	-104.712588

Particle Analysis Test

Project : 702 Quebec St
Client : Casco Construction
Job No.: 24-0360
Location : Fountain, CO

A Better Soil Solution

ASTM D6913



Particle Distribution (%)

Clay	Silt	Sand	Gravel	Cobbl
50.7		41.8	7.5	-
52.5		44.3	3.2	-
83.8		16.2	-	-

Classification

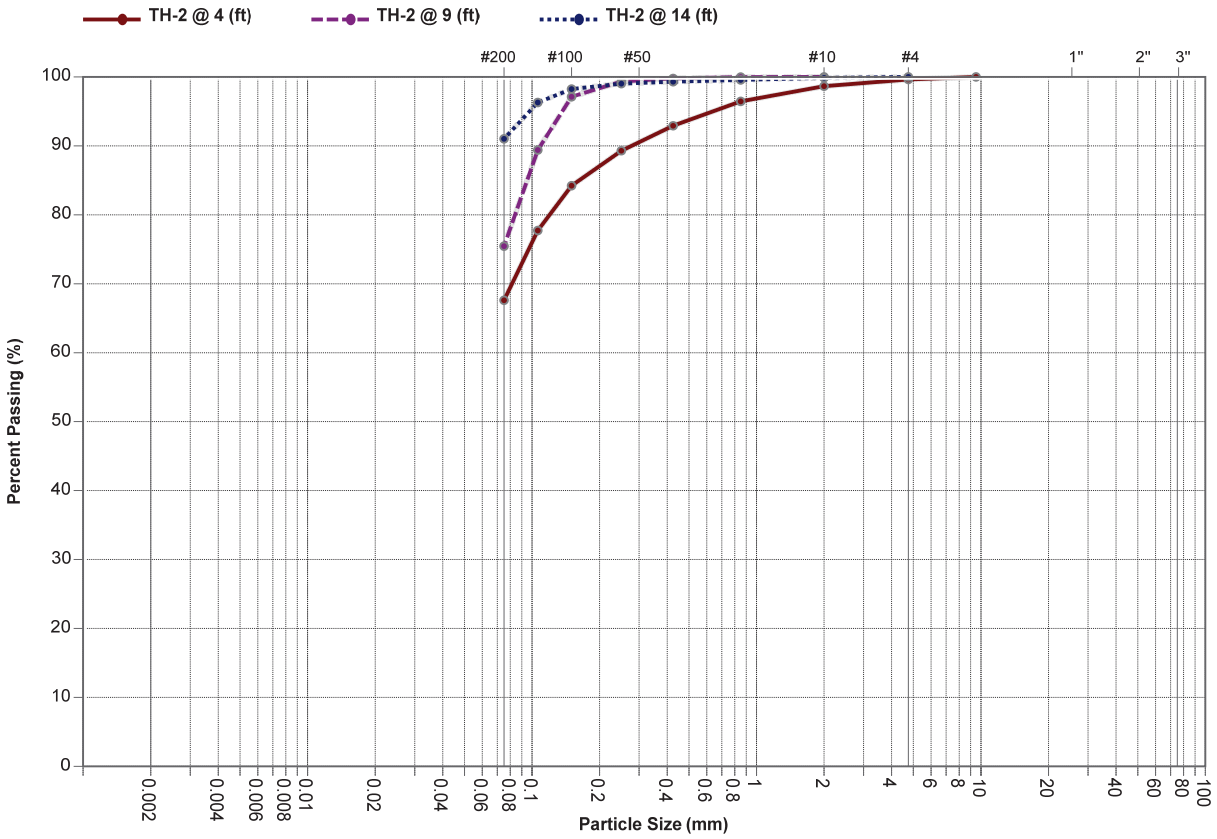
Borehole	Sample Depth (ft)	D10 (mm)	D30 (mm)	D50 (mm)	D60 (mm)	Cc	Cu	LL (%)	PI (%)	Disp. (%)	USCS	AASHTO
TH-1	4	-	-	-	0.098	-	-	29.2	19.2	N/A	CL	A-6(6)
TH-1	9	-	-	-	0.094	-	-	29.2	19.2	N/A	CL	A-6(6)
TH-1	14	-	-	-	-	-	-	35.1	19.6	N/A	CL	A-6(15)

Particle Analysis Test

Project : 702 Quebec St
Client : Casco Construction
Job No.: 24-0360
Location : Fountain, CO

A Better Soil Solution

ASTM D6913



Particle Distribution (%)

Clay	Silt	Sand	Gravel	Cobbl
67.6		32	0.4	-
75.5		24.5	-	-
91		9	-	-

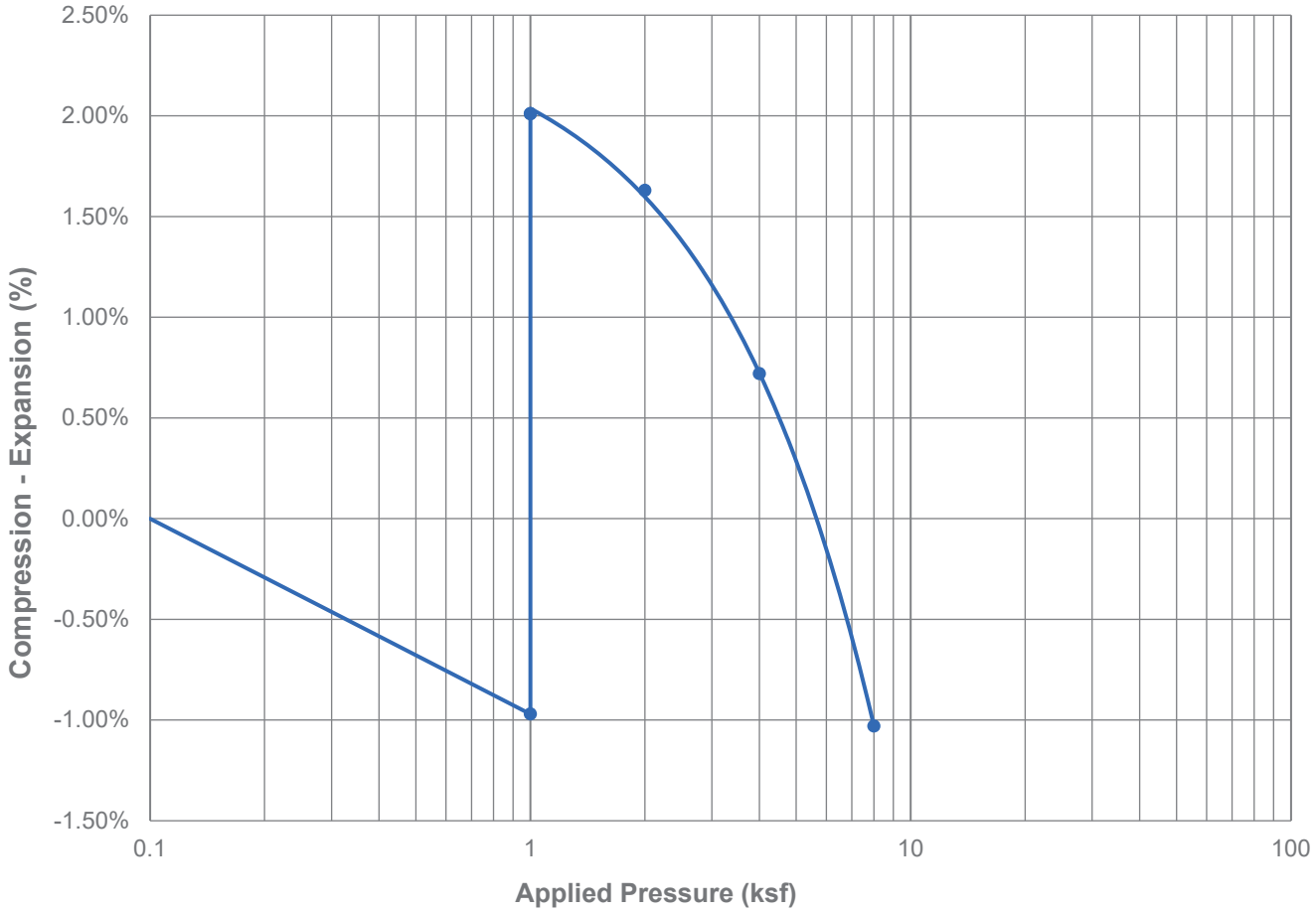
Classification

Borehole	Sample Depth (ft)	D10 (mm)	D30 (mm)	D50 (mm)	D60 (mm)	Cc	Cu	LL (%)	PI (%)	Disp. (%)	USCS	AASHTO
TH-2	4	-	-	-	-	-	-	29.4	17.5	N/A	CL	A-6(9)
TH-2	9	-	-	-	-	-	-	26.4	14.6	N/A	CL	A-6(8)
TH-2	14	-	-	-	-	-	-	35.1	19.6	N/A	CL	A-6(16)

Swell-Consolidation Test

Project:	702 Quebec St	Borehole:	TH-1
Client:	Casco Construction	Sample Depth:	9 Ft
Job No.:	24-0360	Classification:	CL
Location:	Fountain, CO		

A Better Soil Solution



Values

Applied Load (lbs)	Displacement (in)
0	0.0000
1,000	-0.0097
Add Water	0.0201
2,000	0.0163
4,000	0.0072
8,000	-0.0103

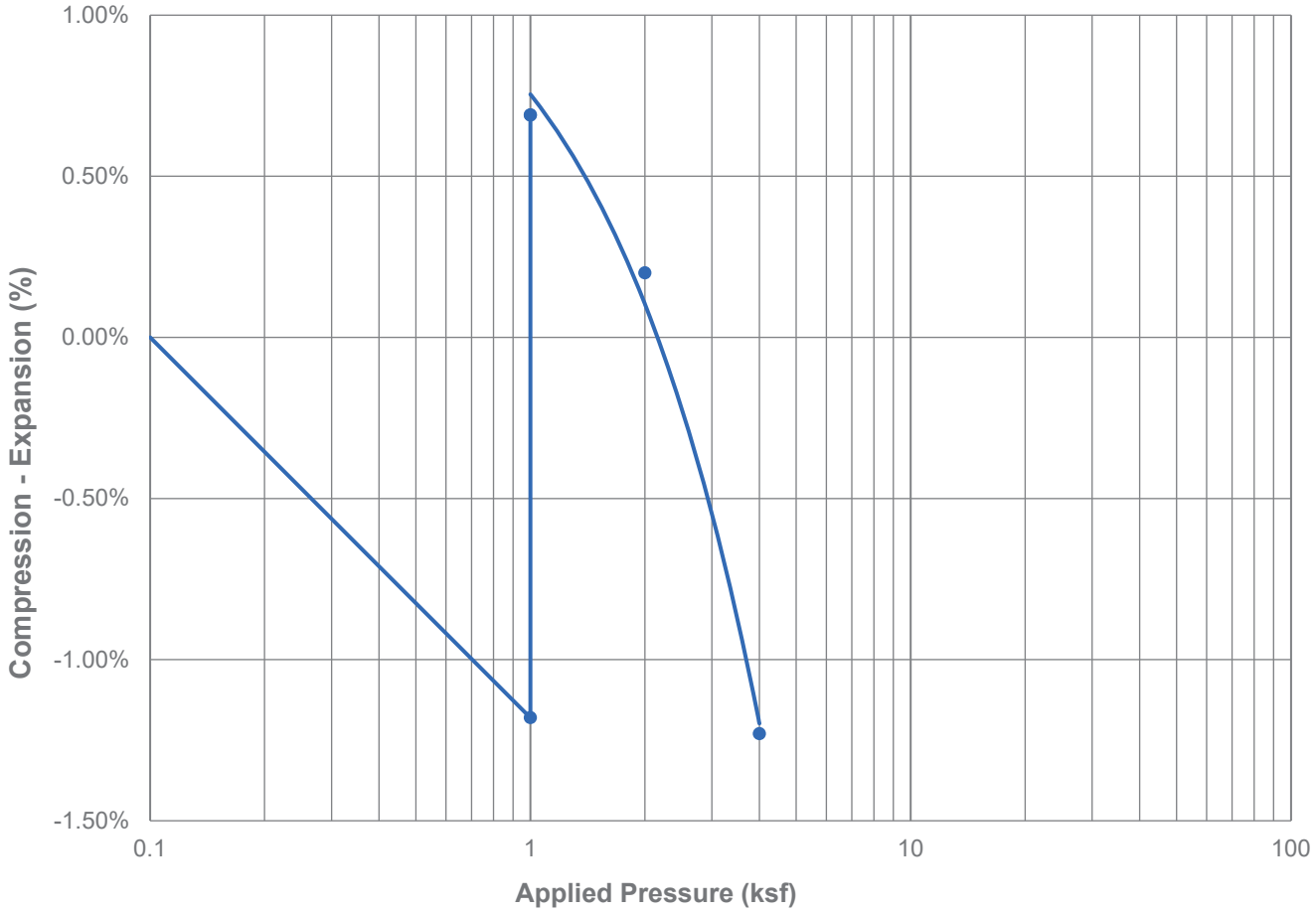
Sample Info

Native Moisture:	5.57%
Post-Test Moisture:	18.55%
Expansion Potential:	2.98%
Deadload (psf):	7,900

Swell-Consolidation Test

Project:	702 Quebec St	Borehole:	TH-2
Client:	Casco Construction	Sample Depth:	4 Ft
Job No.:	24-0360	Classification:	CL
Location:	Fountain, CO		

A Better Soil Solution



Values

Applied Load (lbs)	Displacement (in)
0	0.0000
1,000	-0.0118
Add Water	0.0069
2,000	0.0020
4,000	-0.0123

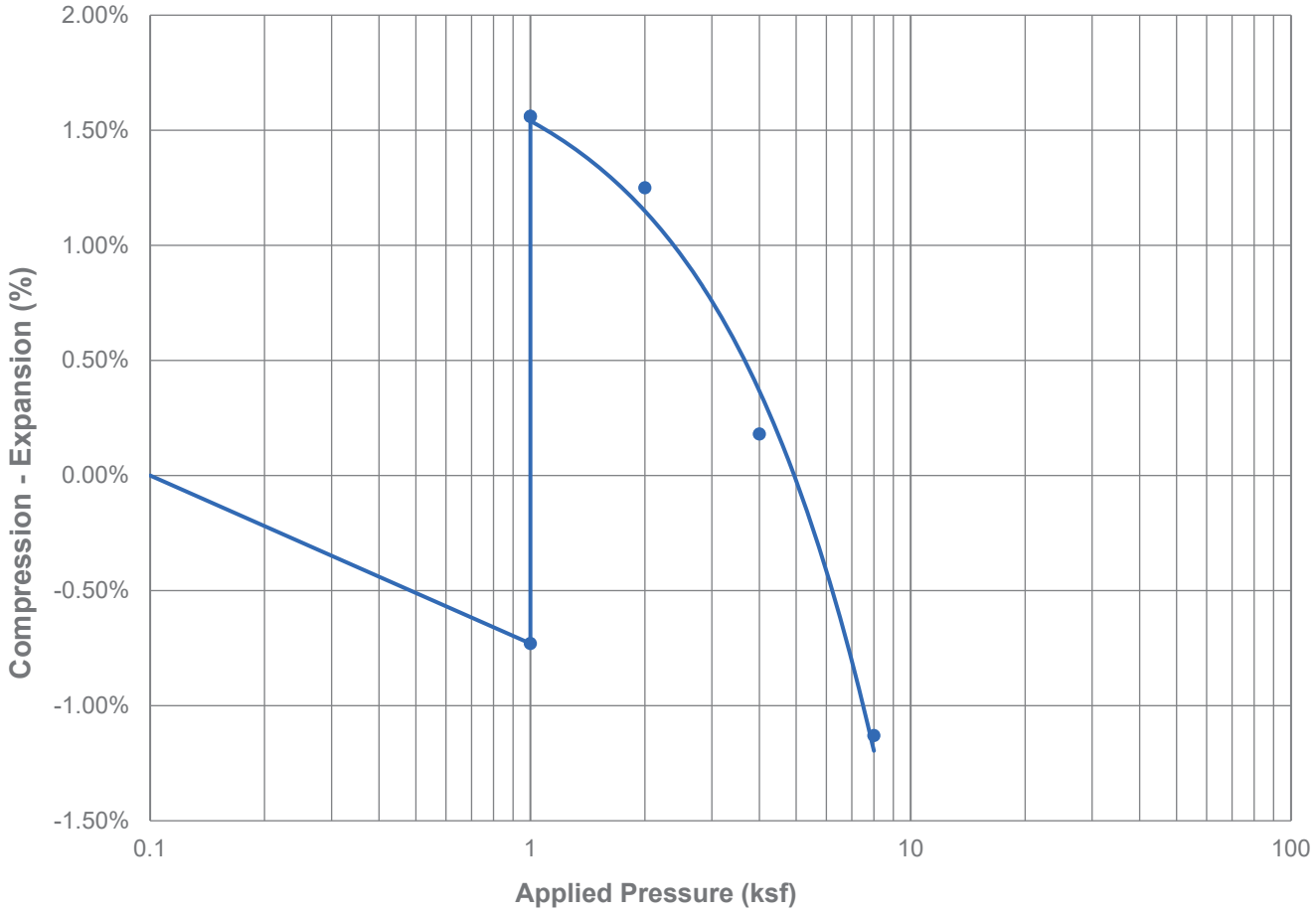
Sample Info

Native Moisture:	9.15%
Post-Test Moisture:	17.70%
Expansion Potential:	1.87%
Deadload (psf):	4,000

Swell-Consolidation Test

Project:	702 Quebec St	Borehole:	TH-2
Client:	Casco Construction	Sample Depth:	9 Ft
Job No.:	24-0360	Classification:	CL
Location:	Fountain, CO		

A Better Soil Solution



Values

Applied Load (lbs)	Displacement (in)
0	0.0000
1,000	-0.0073
Add Water	0.0156
2,000	0.0125
4,000	0.0018
8,000	-0.0113

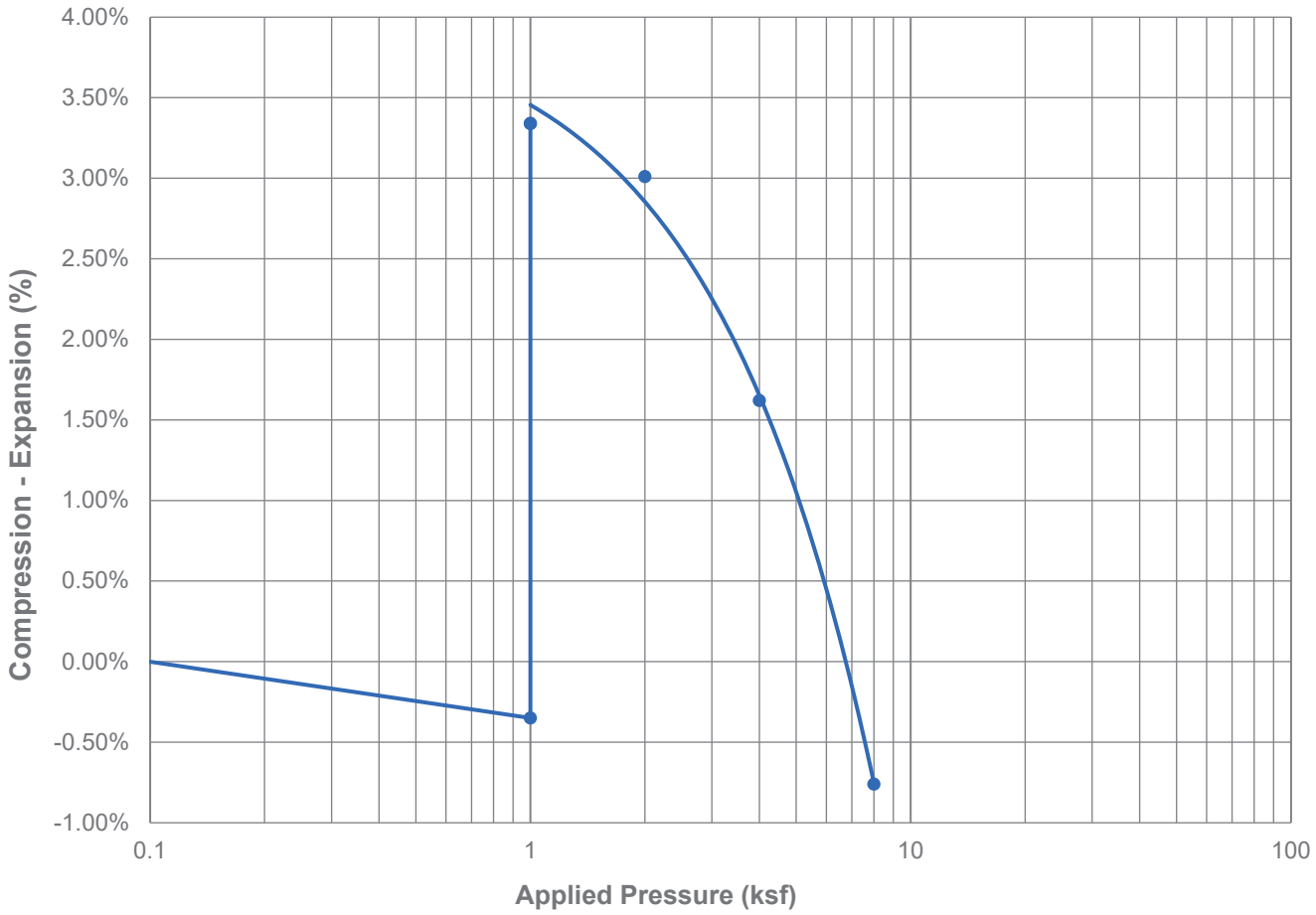
Sample Info

Native Moisture:	8.93%
Post-Test Moisture:	19.38%
Expansion Potential:	2.29%
Deadload (psf):	6,800

Swell-Consolidation Test

Project:	702 Quebec St	Borehole:	TH-2
Client:	Casco Construction	Sample Depth:	14 Ft
Job No.:	24-0360	Classification:	CL
Location:	Fountain, CO		

A Better Soil Solution



Values

Applied Load (lbs)	Displacement (in)
0	0.0000
1,000	-0.0035
Add Water	0.0334
2,000	0.0301
4,000	0.0162
8,000	-0.0076

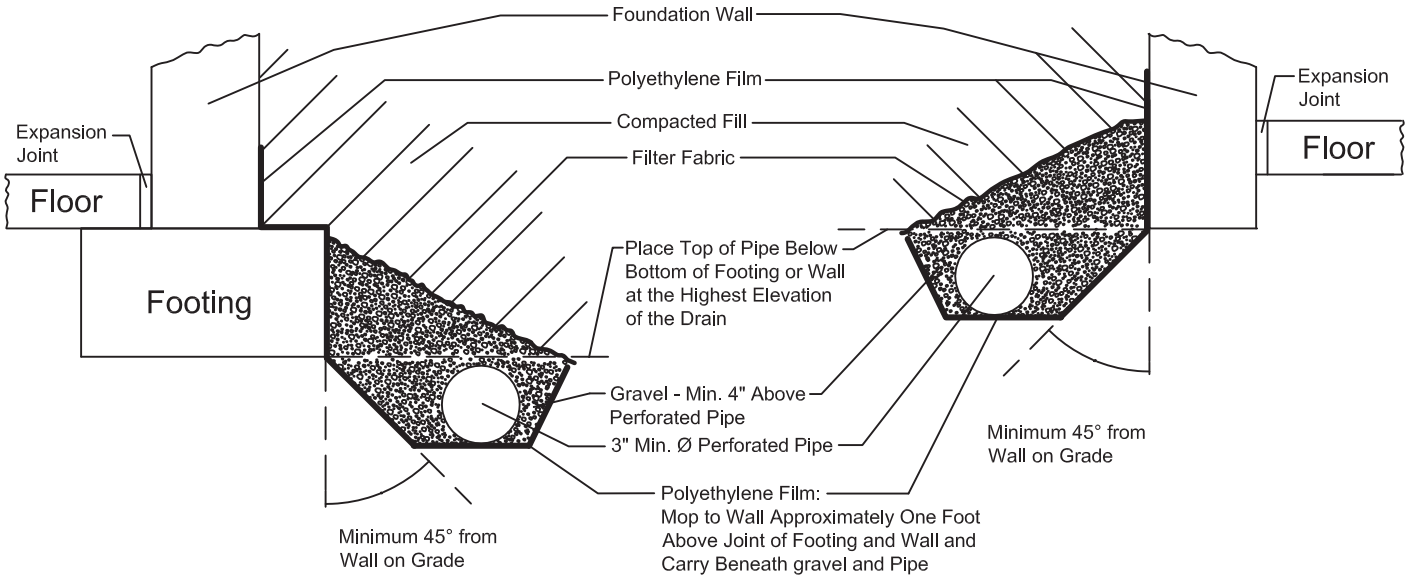
Sample Info

Native Moisture:	21.13%
Post-Test Moisture:	19.84%
Expansion Potential:	3.69%
Deadload (psf):	7,300

Exterior Drain Detail

SPREAD FOOTING TYPE

WALL ON GRADE TYPE



1. Gravel to be Not More Than 1-1/2" and Not Less Than 1/2" Diameter.

2. Perforated Pipe Diameter Varies With Expected Seepage. 3"Ø and 4"Ø are Most Common. ABS and PVC are Most Common Materials for Pipe.

3. Pipe to be Laid out in a Minimum Slope of 1" in 10'.

4. Gravity Outfall is Desired if Possible. Portion of Pipe in Area Not Drained Shall be Non-Perforated. Daylight Must be Maintained Clear of Debris in Order to Function Properly.

5. If Gravity Outfall is Not Possible, Provide a Sump With Operational Pump. Pump May Not Connect to Any Sanitary or Storm Sewer.

6. Soil Backfill Should be Compacted to at Least 80% of the Modified Proctor Denisty in the Upper Three Feet of Fill.

7. Filter Fabric to be Mirafi 140s or Approved Equivalent. Roofing Felt and Sheet Plastic are Not Acceptable.

8. Drain Pipe Shall be Laid Below Protected Area, as Shown in The Detail Above.

9. Mop Polyethylene Film to Wall Approximately One Foot Above Joint of Footing and Wall and Carry Beneath Gravel and Pipe.

10. The Polyethylene Film Shall be Continued to the Edge of the Excavation.