NorthWest Colorado Consultants, Inc.
Geotechnical / Environmental Engineering • Materials Testing

July 27, 2022

FV Basecamp, LLC
c/o May Riegler Properties
Gaby Riegler
2201 Wisconsin Ave., Suite 200
Washington DC 20007

Job Number: 20-11961

Subject: Geotechnical Recommendations, Steamboat Basecamp Townhomes, 1901 Curve Plaza, Steamboat Springs, Colorado.

Gaby,

As requested, NWCC, Inc. (NWCC) has completed this Geotechnical Recommendations report for the Steamboat Basecamp Townhomes to be constructed at 1901 Curve Plaza in Steamboat Springs, Colorado. NWCC previously completed a Supplemental Subsurface Investigation and Geotechnical Recommendations report for Lots 1 and 2 of the Worldwest Subdivision under this job number and dated March 15, 2021.

Proposed Construction: Based on our discussions with the client and structural engineer, as well as a review of the plans provided, NWCC understands the Steamboat Basecamp Townhomes will be constructed in the southeast portion of the property.

The new Steamboat Basecamp Townhomes will consist of a six townhome buildings with three to seven units in each building. Each building will consist of a four-story wood framed structure with a lower level concrete slab floor. The lower level floor will consist of either a structural floor over a void or a concrete slab-on-grade floor system placed near or slightly above the existing ground surface.

An outdoor covered pole barn will be constructed in the northeast corner of the property. The pole barn will consist of a timber framed post and beam structure with a concrete slab floor system. A one-story wood framed restaurant building with a concrete slab floor system will be constructed southwest of the pole barn structure.

Subsurface Conditions: Thirteen test pits were excavated on July 12, 2022 in the area of the proposed townhome buildings, outdoor covered pole barn and restaurant building. A site plan showing the location of the recently excavated test pits is presented in Figure #1. The building corners had not been staked at the time of excavation of the test pits and the locations were determined by pacing from the existing building and foundations under construction for the Steamboat Basecamp Apartments project. The locations of several test pits were surveyed at the time of excavation; however, the survey data was not available at the time of this report.

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The subsurface conditions encountered in the test pits were variable and generally consisted of variable layers of fill and topsoil materials overlying natural clays and natural sands and gravels. Graphic logs of the exploratory test pits are presented in Figures #2 and #3. The associated Legend and Notes are presented in Figure #4.

Sand and gravel fill materials were encountered at the ground surface in test pits 4, 5, 12 and 13 and ranged from 6 to 12 inches in thickness. A thin layer of topsoil and organic fill materials was encountered at the ground surface in test pits 1, 2, 3, 6, 7, 8, 9, 10 and 11. The topsoil and organic fill materials were 3 to 6 inches in thickness. Clay fill materials were encountered below the topsoil and organic fill materials or sand and gravel fill materials in all of the test pits with the exception of test pits 4 and 5. The clay fill materials were sandy with occasional gravels and debris, low to highly plastic, medium stiff to soft, moist and brown in color.

A layer of natural topsoil and organic materials was encountered below the sand and gravel fill materials in test pits 4 and 5 and the layer ranged from approximately 4 to 12 inches in thickness.

Natural clays were encountered below the fill materials and natural topsoil and organic materials in all of the test pits at depths ranging from 1 to 6 feet bgs. The natural clays extended to depths ranging from 2½ to 13 feet below the existing ground surface (bgs). The natural clays were typically 1 to 2 feet in thickness in the southeast portion of the site near Townhome Buildings 2, 3, 4, 5 and 6. The natural clays were typically 4 to 9 feet in thickness in the northeast and east-central portion of the site near Townhome Building 1 and the pole barn and restaurant buildings. The natural clays were slightly sandy to sandy, moderately to highly plastic, stiff, moist and brown in color. Swell-consolidation tests conducted on samples of the natural clays from the previous investigations indicate the clays will exhibit a moderate to high swell potential when wetted under a constant load.

Natural sands and gravels were encountered below the natural clays in all of the test pits. The natural sands and gravels were encountered at depths of 2½ to 3½ feet below the existing ground surface in test pits 1 through 7 in the southeast portion of the site near Townhome Buildings 2 through 6. The natural sands and gravels were encountered at depths of 11 to 13 feet bgs in the area of Townhome Building 1, and 9 to 10 feet bgs in the area of the pole barn and the restaurant. The natural sands and gravels were silty to slightly clayey, fine to coarse grained with cobbles and small boulders, very low to non-plastic, dense, moist and brown to gray in color.

NWCC recommends a **Site Class C** designation be used in structural design calculations in accordance with Table 20.3-1 in Chapter 20 of ASCE 7.

Groundwater was not encountered in the test pits at the time of excavation.

<u>Foundation Recommendations</u>: Based on a review of the previous reports and the subsurface conditions encountered in the test pits recently excavated at the site, NWCC anticipates that the natural sands and gravels will be encountered from 2 to 5 feet bgs in the area of Townhome Buildings 2 through 6. NWCC anticipates the natural sands and gravels will be encountered at a depth of 11 to 13 feet bgs in the area of Townhome Building 1, and 9 to 10 feet bgs in the area of the pole barn and restaurant building.

Due to the highly variable depth of the existing fill materials and the swell potential of the natural clays, NWCC believes the most economically feasible building foundation system, for the buildings where the natural sands and gravels are situated within 5 to 6 feet of the existing ground surface, will consist of footings placed on the natural sands and gravels or on properly compacted structural fill materials placed over the natural sands and gravels after all of the existing fill materials and underlying topsoil and organic materials, and natural clays are removed. Due to the moderate to high swell potential of the clays, NWCC recommends the clays be removed from beneath all of the footings.

NWCC recommends the footings placed on the natural sands and gravels or on properly compacted, structural fill materials placed over the natural sands and gravels be designed using a maximum allowable soil bearing pressure of 3,000 psf. NWCC recommends structural fill materials placed under the footings consist of a non-expansive granular soil approved by this office. Footings placed on the natural sands and gravels or on non-expansive granular fill placed over the natural sands and gravels will not require a minimum dead load.

Structural fill materials should be uniformly placed in 6 to 8 inch loose lifts and compacted to at least 100 percent of the maximum standard Proctor density, within 2 percent of the optimum moisture content as determined by ASTM D-698. Structural fill materials should extend out from the edge of the footings on a 1(horizontal) to 1(vertical) or flatter slope. The footings should be placed on a maximum of 6 feet of structural fill materials that have been tested and approved by NWCC.

NWCC recommends a modulus of subgrade reaction of 200 pounds per cubic inch may be used for the natural sands and gravels or granular fill materials in the design of the foundations. The allowable bearing capacity of 3,000 psf recommended for the footings may be increased by 1/3 for transient loads.

Alternate Foundation Recommendations: In areas where the removal of all of the existing fill materials and natural clays is not economically feasible (> 6 feet), an alternative deep foundation system for the buildings should be utilized. Alternate deep foundation systems would consist of drilled footings, helical screw piles, micropiles or rammed aggregate piers (RAP) advanced into the natural sands and gravels. High capacity helical or micropiles or pile groups with pile caps will most likely be required for the buildings due to anticipated loadings.

The deep foundation systems will place the bottom of the foundations in a zone of relatively stable bearing soils and eliminate the risk of foundation movement from swell and/or consolidation of the existing fill materials and natural clays.

Drilled Footings: Drilled footings, utilizing larger diameter drilled piers (24 inches or larger), constructed on the natural sands and gravels can be designed using an allowable end bearing pressure of 4,000 psf. Each drilled footing can support an individual column or grade beams supported by a series of piers. The drilled footings should penetrate a minimum of 12 inches into the natural sands and gravels. Any loose materials should be removed and the bearing soils approved by NWCC, prior to placement of concrete.

Helical Screw Piles: Utilizing a helical screw pile foundation, each column is supported on a single or group of screw piles and the structures are founded on grade beams or pier caps that are supported by a series of piles. Load applied to the piles is transmitted to the natural sands and gravels through the end bearing pressure at the helices of the screw pile. Foundation movement should be less than ½-inch if the following design and construction conditions are observed.

The helical screw pile foundation system should be designed by a qualified engineer, using industry standards and be installed by a licensed/certified installer. If pile groups are required, we recommend a minimum pile spacing of 3 times the largest helix to achieve the maximum capacity of each individual pile. Lateral loads should be resisted using battered piles or tiebacks or through passive soil pressures against foundation walls or grade beams.

We strongly recommend that at least two test piles be advanced at each building site so that the torque versus depth relationships can be established and the proper shaft and helix size and type can be determined. In addition, load testing of the helical screw piles is strongly recommended to verify the design capacity of the piles. Difficult installation may be encountered due to the presence of cobbles and boulders in the fill materials.

A representative of this office should observe the test piles/load test and helical screw pile installations.

NWCC also recommends the following:

- Minimum 6-inch diameter helix;
- Minimum installation torque of 4,000 ft-lbs;
- Upper helix must penetrate minimum of 2 feet into natural sands and gravels;
- Full-time installation observation by a qualified special inspector;
- Review of the Contractor's quality control plan regarding instrumentation calibration and testing, materials QC, and pile installation procedures.

Micropiles: Utilizing a micropile foundation, loads are supported by a group of piles and the structures are founded on grade beams or pier caps. Load applied to the piles is transmitted to the natural sands and gravels through the end bearing pressure at the pile tip. NWCC recommends the micropiles extend a minimum of 5 feet into the natural sands and gravels. Foundation movement should be less than ½-inch if the following design and construction conditions are observed.

Micropile foundation elements are typically designed as proprietary foundation systems. If a micropile foundation system is selected, NWCC should be contacted to coordinate with the micropile contractor/design team during foundation design.

We strongly recommend that at least three test piles be advanced at each building site so that load testing of the micro piles can be conducted to verify the design capacity of the piles. Difficult installation should be anticipated due to the presence of cobbles and boulders. A representative of this office should observe the test piles/load test and micropile installations.

Rammed Aggregate Piers: An alternative deep foundation system would consist of rammed aggregate piers (RAP). The rammed aggregate piers are typically constructed to bridge poor bearing soils, such as the existing fill materials and natural clays encountered at this site, extending down to a suitable bearing layer, the underlying natural sands and gravels. A RAP foundation system should develop an end bearing pressure of at least 4,000 psf for aggregate piers founded in the sand and gravels. A RAP foundation system has the advantage of not only supporting shallow foundation elements, but also supporting floor slab areas and improving the engineering characteristics of the existing fill materials and native soils between the piers, thus decreasing the potential for floor slab movement.

RAP foundation elements are designed as proprietary foundation systems. If a RAP foundation system is selected, NWCC should be contacted to coordinate with the RAP contractor/design team during foundation design.

Concrete Slab-on-Grade Floor Systems: NWCC understands the lower level of each Townhome Building will be constructed with concrete slab floor systems placed near the existing grades.

The natural clays or sands and gravels, excluding any existing fill materials and topsoil and organic materials, are capable of supporting slab-on-grade construction. However, floor slabs present a very difficult problem where swelling materials are present near floor slab elevation because sufficient dead load cannot be imposed on them to resist the uplift pressure generated when the materials are wetted and expand. Based on the moisture-volume change characteristics of the natural clays encountered at this site, NWCC believes slab-on-grade construction may be used, provided the risk of distress resulting from slab movement is recognized and special design precautions are followed.

If slab movement is not tolerable, all of the clays must be removed under the concrete slab-on-grade floor systems. In areas where the natural sands and gravels are deeper and the removal of all of the existing fill materials and natural clays is not economically feasible, structural floors constructed over crawlspace areas or void form materials should be used.

The following measures must be taken to reduce damage, which could result from movement should the underslab clays be subjected to moisture changes.

1) Floor slabs must be separated from all bearing walls; columns and their foundation support with a positive slip joint. NWCC recommends the use of ½-inch thick cellotex or impregnated felt.

2) Interior non-bearing partition walls resting on the floor slabs must be provided with a slip joint, preferably at the bottom, so in the event, the floor slab moves this movement is not transmitted to the upper structure. This detail is also important for wallboard and doorframes and is shown in

Figure #6. This detail can be omitted if all of the clays are removed from beneath the floor slabs and replaced with non-expansive fill materials.

3) A minimum 6-inch gravel layer must be provided beneath all floor slabs to act as a capillary break and to help distribute pressures. Prior to placing the gravel, excavation should be shaped so that if water does get under the slab, it will flow to the low point of the excavation. In addition, all existing fill materials and topsoil and organic materials should be removed prior to placement of the underslab gravels or new granular fill materials. If the removal of all of the existing fill materials and topsoil and organics and replacing with granular fill materials is not economically feasible, we recommend the lower levels be constructed on structural floor systems over crawlspace areas or void form materials.

4) Floor slabs must be provided with control joints placed a maximum of 10 to 12 feet on center in each direction, depending on slab configurations, to help control shrinkage cracking. Locations of the joints should be carefully checked to assure that natural, unavoidable cracking will be controlled. Depth of the control joints should be a minimum of ¼ the thickness of the slab.

5) Underslab soils must be kept as close as possible to their in-situ moisture content. Excessive wetting or drying of these soils prior to placement of floor slab could result in differential movement after slabs are constructed.

6) If fills are required to bring underslab areas to the desired grade, the fill should consist of non-expansive, granular materials. Fill should be uniformly placed and compacted in 6 to 8-inch lifts to at least 95% of the maximum standard Proctor density at or near the optimum moisture content, as determined by ASTM D-698.

Following the above precautions and recommendations will not prevent floor slab movement in the event the clays beneath the floor slabs undergo moisture changes. However, they should reduce the amount of damage if such movement occurs. The only way to eliminate the risk of all floor slab movement is to construct a structural floor over a well-vented crawlspace or void form materials, or remove all of the expansive clays and replace them with non-expansive granular fill materials.

Foundation Walls and Retaining Structures: Foundation walls and retaining structures, which are laterally supported and can be expected to undergo only a moderate amount of deflection, may be designed for a lateral earth pressure computed on the basis of an equivalent fluid unit weight of 45 pcf for imported, free draining granular backfill, 50 pcf for the natural sands and gravels and 55 pcf for on-site clay soils.

Cantilevered retaining structures at the site can be expected to deflect sufficiently to mobilize full active earth pressure condition. Therefore, cantilevered structures may be designed for a lateral earth pressure computed on the basis of an equivalent fluid unit weight of 35 pcf for imported, free draining granular backfill, 40 pcf for the natural sands and gravels and 45 pcf for on-site clay soils.

Foundation walls and retaining structures should be designed for appropriate hydrostatic and surcharge pressures such as adjacent buildings, traffic and construction materials. An upward sloping backfill and/or natural slope will also significantly increase earth pressures on foundation walls and retaining structures and the structural engineer should carefully evaluate these additional lateral loads when designing foundation and retaining walls.

Lateral resistance of retaining wall foundations placed on undisturbed natural soils at the site will be a combination of sliding resistance of the footings on the foundation materials and passive pressure against the sides of footings. Sliding friction can be taken as 0.4 times the vertical dead load. Passive pressure against the sides of the footing can be calculated using an equivalent fluid pressure of 250 pcf. Fill placed against the sides of footings to resist lateral loads should be compacted to at least 100% of the maximum standard Proctor density and near the optimum moisture content.

NWCC recommends imported granular soils for backfilling foundation walls and retaining structures because their use results in lower lateral earth pressures. Imported granular materials should be placed to within 2 to 3 feet of the ground surface. Imported granular soils should be free draining and have less than 7 percent passing the No. 200 sieve. Granular soils placed behind foundation and retaining walls should be sloped from the base of the wall at an angle of at least 45 degrees from the vertical. The upper 2 to 3 feet of fill should be a relatively impervious soil or pavement structure to prevent surface water infiltration into the backfill.

Wall backfill should be carefully placed in uniform lifts and compacted to at least 95 percent of the maximum standard Proctor density and near the optimum moisture content. Care should be taken not to overcompact backfill since this could cause excessive lateral pressure on the walls. Some settlement of deep foundation wall backfill materials will occur even if materials are placed correctly.

Underdrain Systems: If the proposed buildings are constructed with roof drainage systems and the perimeter of the buildings are not subjected to roof runoff, it is NWCC's opinion that perimeter drainage systems will not be required around the buildings.

If roof drainage systems are not placed on the buildings NWCC recommends shallow perimeter drainage systems be installed around each of the exterior building perimeters to direct the roof runoff away from the buildings. This runoff can infiltrate the structures at the foundation level. This water can be one of the primary causes of differential foundation and slab movement.

The shallow drainage systems, if constructed, should be located around each of the building perimeters and be placed and at least 12 inches below interior slab or crawl space grades and a minimum of 24 inches below final grades to provide frost protection. Ideally, the drainage systems should be centered along roof drip-line locations. In locations where roof drip-lines are not present, the drainage systems may be located within 24 inches of foundation walls. Drains should be insulated using 2-inches of rigid polystyrene insulation board in locations higher than 48 inches below final grade to provide protection against freezing.

Perimeter drainage system piping should be constructed using perforated PVC pipe that meets or exceeds ASTM D-3034/SDR 35 requirements to provide satisfactory long-term function and rapid runoff of water.

The holes in the drainpipes should be oriented down between 4 o'clock and 8 o'clock to promote rapid runoff of the water. The drainpipes should be covered with at least 12 inches of free draining gravel and be protected from contamination by a geotextile filter fabric covering of Mirafi 140N subsurface drainage fabric or an equivalent product. The drainpipes should have a minimum slope of 1 percent and be daylighted at positive outfalls that are protected from freezing. If the drainpipes cannot be daylighted, the drains should be led to sumps where the water can be pumped. Multiple daylights or sumps are recommended for the proposed structures. A typical shallow perimeter/underdrain detail is shown in Figure #7.

Caution should be taken when backfilling so as not to damage or disturb the installed drains. NWCC recommends the drainage piping include cleanouts provided at minimum 100-foot intervals, be protected against intrusion by animals at the outfalls and be tested prior to backfilling. NWCC should be retained to provide periodic observations of underdrain construction to verify installations have been accomplished in general accordance with these recommendations. Flow testing of the systems is also highly recommended.

Surface Drainage: Proper surface drainage at this site is of paramount importance for minimizing infiltration of surface drainage into wall backfill and bearing soils, which could result in increased wall pressures, differential foundation, and slab movement. The following drainage precautions should be observed during construction and at all times after the structures have been completed:

1) Ground surface surrounding structures should be sloped (minimum of 1.0 inch per foot) to drain away from structures in all directions to a minimum of 10 feet. Ponding must be avoided. If necessary, raising the top of foundation walls to achieve a better surface grade is advisable.

2) Non-structural backfill placed around structures should be compacted to at least 95% of the maximum standard Proctor density at or near the optimum moisture content to minimize future settlement of the fill. Backfill should be placed immediately after the braced foundation walls are able to structurally support the fill. Puddling or sluicing must be avoided.

3) Top 2 to 3 feet of soil placed within 10 feet of foundations should be impervious in nature to minimize infiltration of surface water into wall backfill.

4) Roof downspouts and drains should discharge well beyond the limits of all backfill. Roof overhangs, which project two to three feet beyond foundation walls, should be considered if gutters are not used.

5) Landscaping, which requires excessive watering and lawn sprinkler heads, should be located a minimum of 10 feet from the foundation walls of the structures or any permanent, unretained cuts. Additionally, large piles of man-made or natural snow should be removed prior to melting within 10 feet of the foundation walls of the structures or any permanent, unretained cuts.

6) Plastic membranes should not be used to cover the ground surface adjacent to foundation walls.

Pavement Section Recommendations: Pavement section recommendations presented below are based on anticipated soil conditions, assumed traffic loadings indicated below, pavement design procedures presented in the AASHTO Guide for Design of Pavement Structures, and our experience with similar sites and conditions in this part of Steamboat Springs. AASHTO pavement design procedures have been adopted and are used by the Colorado Department of Transportation (CDOT). NWCC has assumed the proposed pavement areas will be subjected to automobiles with occasional delivery trucks and with regular trash truck service.

Based on the results of the field and laboratory investigations and our understanding of the proposed construction, it appears the materials to be encountered at proposed pavement subgrade elevations will most likely consist of existing fill materials or natural clays. We have assumed the subgrade materials will consist of compacted clay fill materials or natural clays that generally classified as CL soils in accordance with the USCS, which is the worst-case scenario. NWCC recommends the pavement areas subjected to both truck and automobile traffic, such as at the entrances and roadways through the facility be constructed with a minimum of 4 inches of hot mix asphalt (HMA) overlying a minimum of 4 inches of CDOT class 6 aggregate base course (ABC) and a minimum of 8 inches of subbase aggregates (Pit Run). The pavement areas subjected to automobiles only, such as the parking stalls, can be paved with a minimum of 3 inches of HMS, 4 inches of CDOT class 6 aggregate base course (ABC), and a minimum of 6 inches of subbase aggregates (subbase).

NWCC recommends the areas subjected to heavy truck turning movements, such as the pads in front of the trash dumpsters or loading docks be paved with a rigid pavement section consisting of at least 8 inches of Portland cement concrete (PCC). Sidewalks and outdoor patio areas can be constructed with a minimum of 4 inches of PCC.

NWCC recommends the asphalt pavement material (HMA) consist of an approved "Superpave" mix designed by a qualified, registered engineer. The mix design should be designed using the SX gradation, mixed with PG 58-28 oil or other performance graded asphaltic materials with 75 gyrations. To reduce rutting of the pavement surface in areas where tight turning radius are anticipated, a polymer modified binder (higher grade asphalt cement) can be used. NWCC recommends that PG 64-28 or higher quality binder/cement be used in the top mat of asphalt if rutting of the asphalt is a concern.

The mix should be produced and placed by a qualified contractor and should be compacted to between 92 and 96 percent of the maximum theoretical (Rice) density or at least 92 percent of the maximum Rice density. Quality control activities should be conducted on paving materials at the time of placement.

Base course materials (ABC) should consist of a well-graded aggregate base course material that meets CDOT Class 6 ABC grading and durability requirements and the subbase should consist of well-graded aggregate materials that meet CDOT Class 2 ABC grading and durability requirements.

ABC and subbase materials should be uniformly placed and compacted in 4 to 6-inch loose lifts to at least 95 % of the maximum modified Proctor density and within +/- 2 % of the optimum moisture content as determined by ASTM D1557.

Concrete pavement materials shall be based on a mix design established by a qualified engineer. Concrete should have a minimum 28-day compressive strength of 4,500 psi, be air-entrained with approximately 6 percent air, and have a maximum water/cement ratio of 0.42. Concrete should have a maximum slump of 4 inches and should contain control joints no greater than 10 to 12 feet on center, depending on slab configurations. The depth of the control joints should be at least ¼ of the slab thickness.

Prior to placement of subbase materials for pavement areas or exterior concrete slabs, NWCC recommends that all of the existing fill materials and any debris be removed, and the exposed subgrade materials be moisture conditioned and compacted. Prior to placement of the subgrade fill materials the natural clays should be scarified and recompacted to a depth of 8 inches. The scarified natural clays and subgrade materials should be compacted in 6 to 8 inch lifts to at least 95 % of the maximum standard Proctor density and within +/- 2 % of the optimum moisture content as determined by ASTM D698. The finished subgrade surface, after recompaction, should also be sloped at least 1 percent to avoid ponding and to reduce the potential for wetting and expansion of the subgrade soils. The finished subgrade surface should be proof rolled with a loaded tandem dump truck or loaded water truck and any areas deflecting or rutting should be removed and or stabilized prior to placing the subbase aggregates.

The collection and diversion of surface and subsurface drainage away from the paved areas and exterior concrete slabs is extremely important to the satisfactory performance of these elements. The design of the surface and subsurface drainage features should be carefully considered to remove all water from paved areas and sidewalks/patio areas to prevent ponding of water on and adjacent to these areas.

Limitations: The recommendations provided in this report are based on the subsurface conditions encountered at this site and our understanding of the proposed construction. We believe that this information gives a high degree of reliability for anticipating the behavior of the proposed structures; however, our recommendations are professional opinions and cannot control nature, nor can they assure the soils profiles beneath those or adjacent to those observed. No warranties expressed or implied are given on the content of this report.

Expansive soils were encountered at this site. These soils are not prone to volume changes at their natural moisture content but can consolidate or swell with changes in moisture and loading. The behavior of expansive soils is not fully understood. The swell and/or consolidation potential of any particular site can change erratically both in lateral and vertical extent. Moisture changes also occur erratically, resulting in conditions, which cannot always be predicted. The recommendations presented in this report are based on the current state of the art for foundations and floor slabs on swelling/consolidating soils. The owner should be aware that there is a risk in construction on these types of soils. Performance of the structures will depend on following the recommendations and in proper maintenance after construction is complete. As water is the main cause for volume change in the soils, it is necessary that the changes in moisture content be kept to a minimum; therefore, positive surface drainage should be maintained away from the structures. Any distress noted in the structures should be brought to the attention of this office.

This report is based on the investigation at the described site and on the specific anticipated construction as stated herein. If either of these conditions is changed, the results would also most likely change. Therefore, NWCC strongly recommends that our firm be contacted prior to finalizing the construction plans so that we can verify that our recommendations are being properly incorporated into the construction plans. Man-made or natural changes in the conditions of a property can also occur over a period of time. In addition, changes in requirements due to state of the art knowledge and/or legislation do from time to time occur. As a result, the findings of this report may become invalid due to these changes. Therefore, this report is subject to review and not considered valid after a period of 3 years or if conditions as stated above are altered.

It is the responsibility of the owner or his representative to ensure information in this report is incorporated into the plans and/or specifications and construction of the project. It is advisable that a contractor familiar with construction details typically used to dealing with the local subsoils and climatic conditions be retained to build the structures.

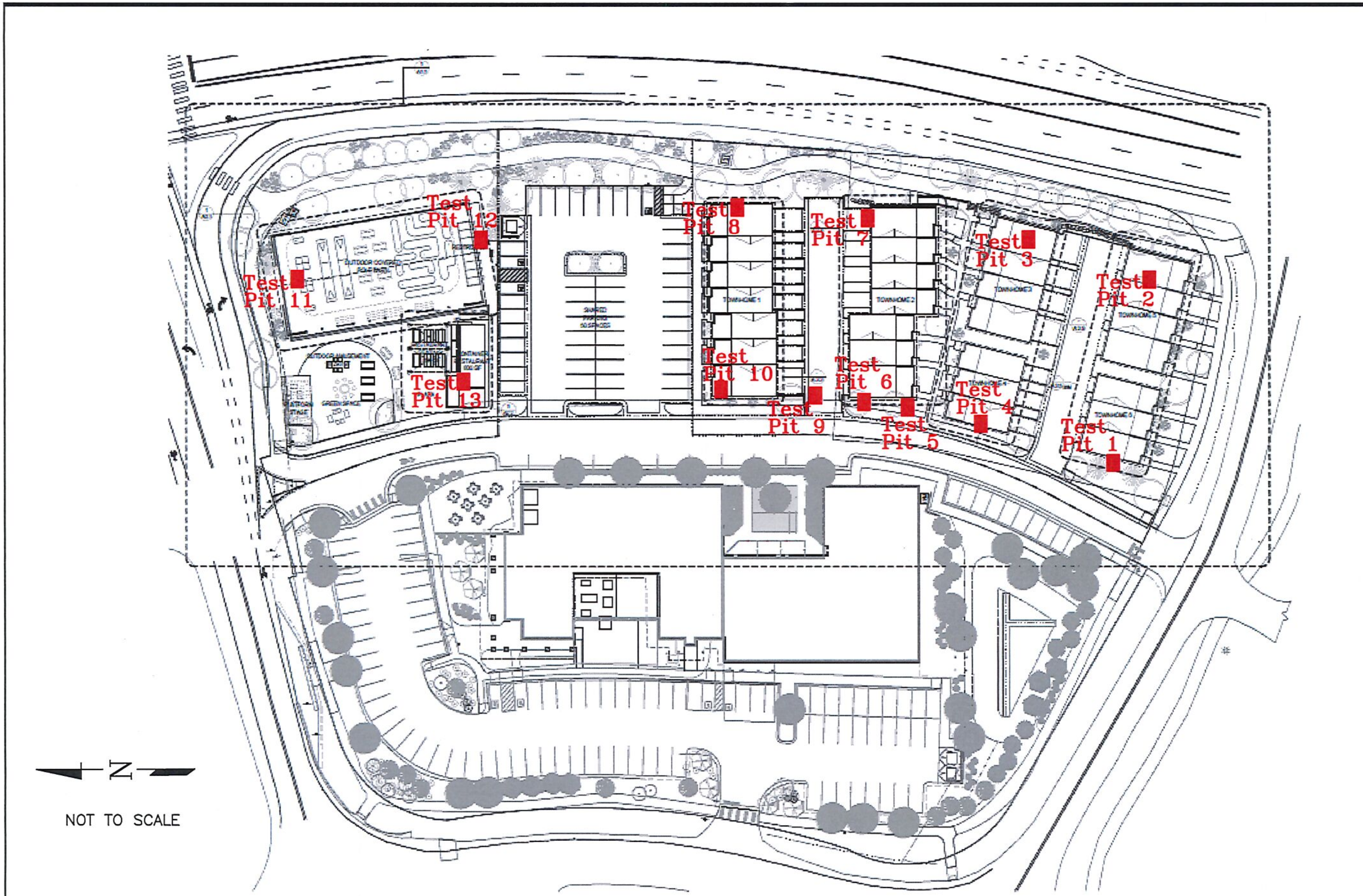
If you have any questions regarding this report or if we may be of further service, please do not hesitate to contact us.

Sincerely,
NWCC, INC.,

Timothy S. Travis, P.E.
Senior Project Engineer

COLORADO LICENSED BRIAN D. LEN 25750 PROFESSIONAL ENGINEER

Reviewed by Brian D. Len, P.E.
Principal Engineer



Title: LOCATION OF TEST PITS	Date: 7/13/2022
Job Name: Steamboat Basecamp Townhomes	Job No. 20-11961
LOCATION: 1901 Curve Plaza, Steamboat Springs, Colorado	Figure #1

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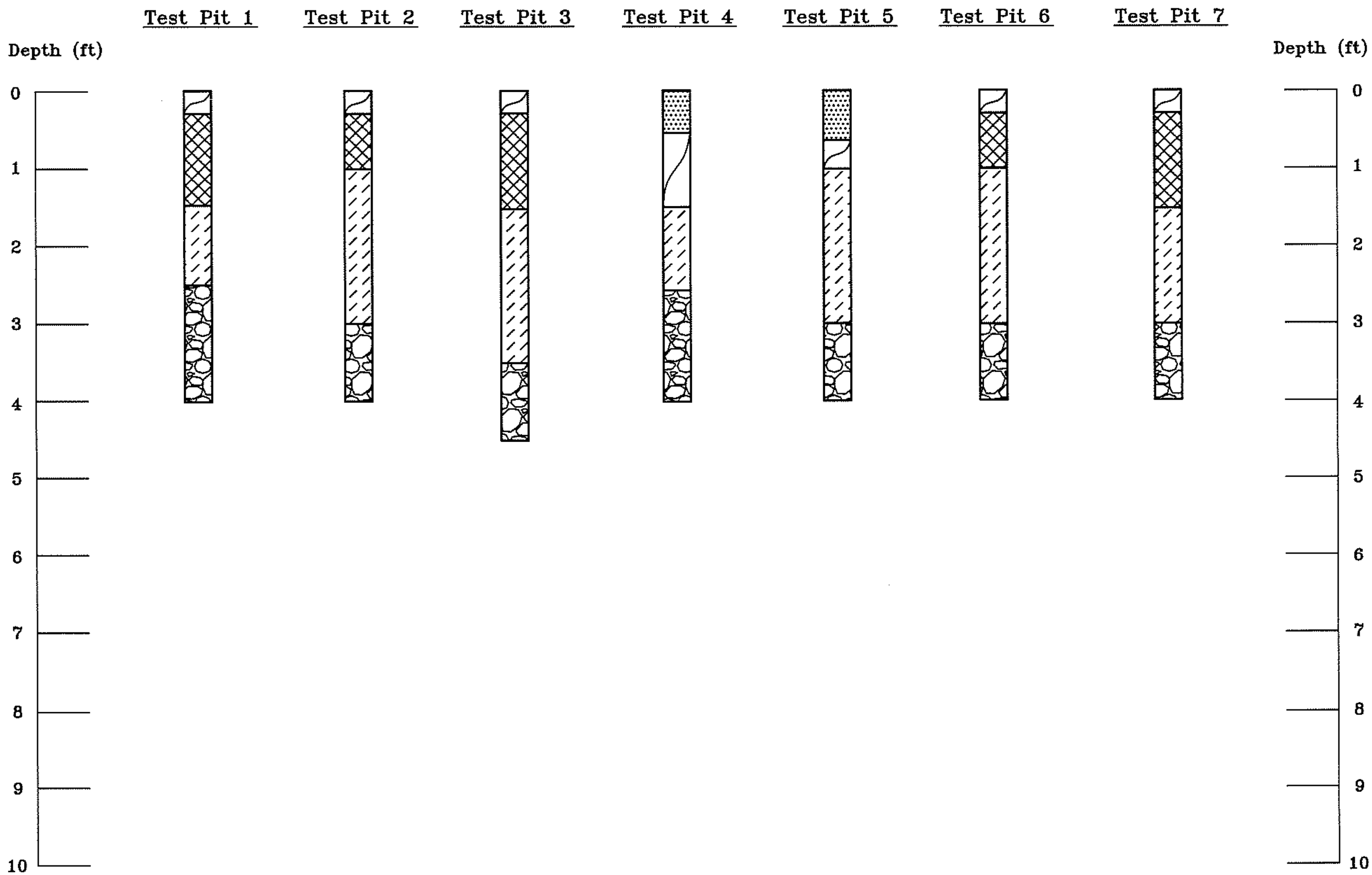

Title: LOGS OF EXPLORATORY TEST PITS

Job Name: Steamboat Basecamp Townhomes

LOCATION: 1901 Curve Plaza, Steamboat Springs, Colorado

Date: 7/13/2022

Job No. 20-11961

Figure #2

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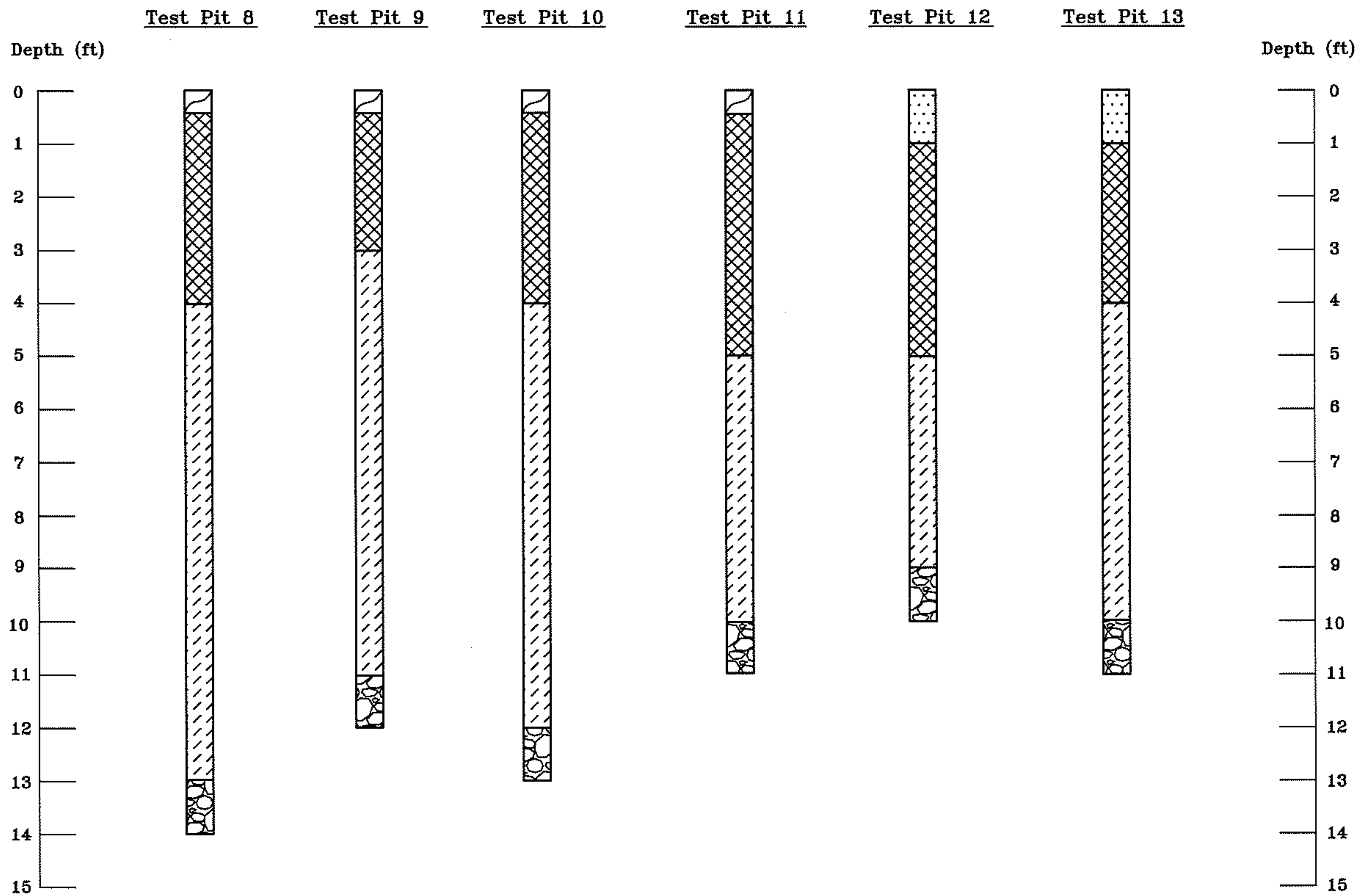

Title: LOGS OF EXPLORATORY TEST PITS		Date: 7/13/2022	
Job Name: Steamboat Basecamp Townhomes		Job No. 20-11961	
LOCATION: 1901 Curve Plaza, Steamboat Springs, Colorado		Figure #3	

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Steamboat Springs, Colorado 80487

LEGEND:

SAND AND GRAVEL FILL: Silty to clayey, low to non-plastic, loose to medium dense, slightly moist and brown in color.

Topsoil and organics.

CLAY FILL: Sandy with occasional gravels and debris, low to highly plastic, medium stiff to soft, moist and brown in color.

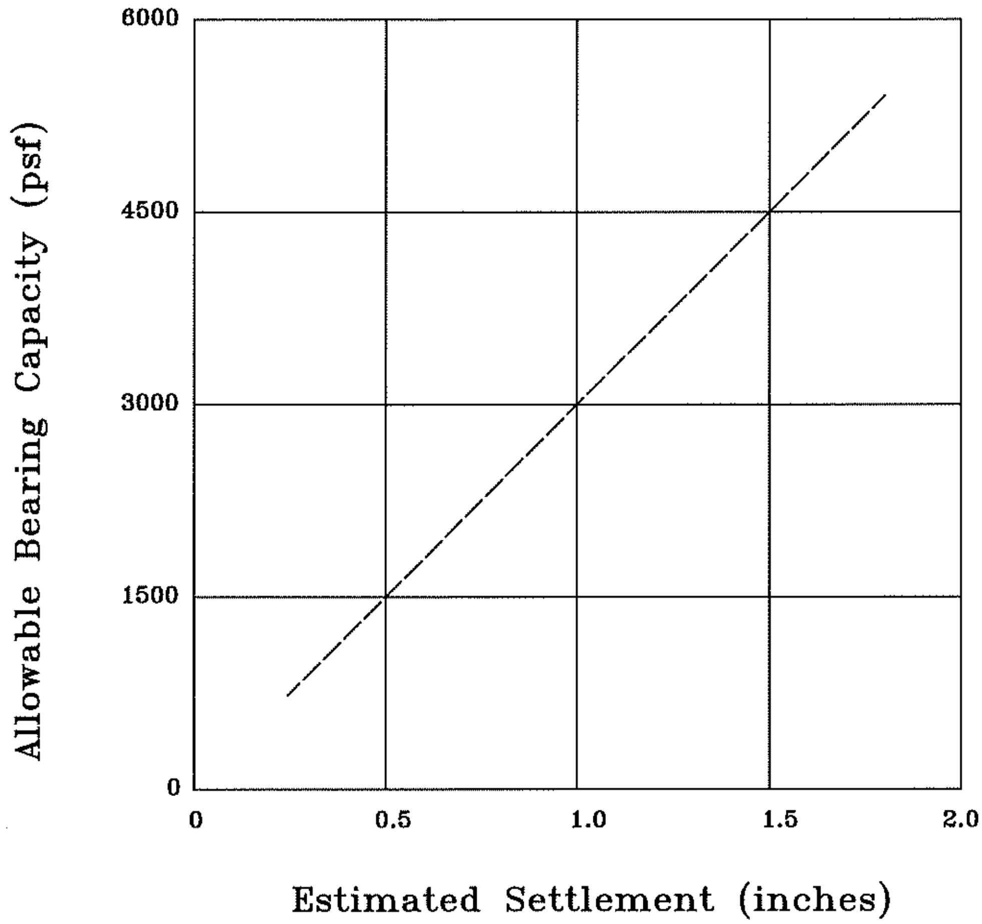
CLAY: Slightly sandy to sandy, moderately to highly plastic, stiff, moist and brown in color.

SANDS AND GRAVELS: Silty to slightly clayey, fine to coarse grained with cobbles and small boulders, very low to non-plastic, dense, moist and brown to gray in color.

NOTES:

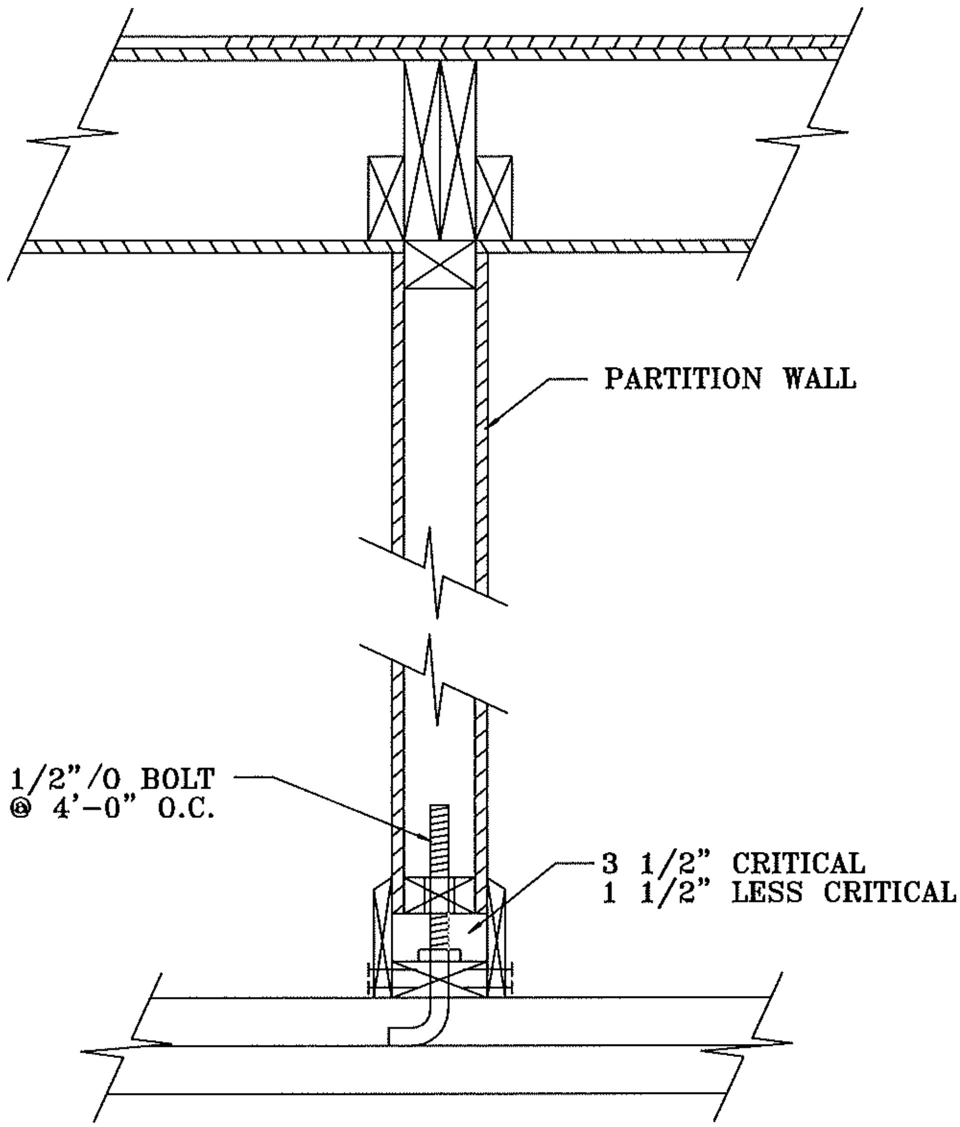
1) Test Pits were excavated on July 12, 2022 with a Trackhoe,
2) Locations of the test pits were determined in the field by pacing from the existing structure.
3) Elevations of the test pits were not measured and logs are drawn to the depths investigated.
4) The lines between materials shown on the logs represent the approximate boundaries between material types and transitions may be gradual.

Title: LEGEND AND NOTES	Date: 7/15/2022	North West Colorado Consultants, Inc.
Job Name: Steamboat Basecamp Townhomes	Job No. 20-11961	Geotechnical / Environmental Engineering · Materials Testing
Location: 1901 Curve Plaza, Steamboat Springs, Colorado	Figure #4	(970)879-7888 · Fax (970)879-7891 2580 Copper Ridge Drive Steamboat Springs, Colorado 80487



Note: These values are based on footing widths of 1 to 4 feet. If the footing width is to be greater than 4 feet in width, then we should be notified to re-evaluate these recommendations.

Title: BEARING CAPACITY CHART	**Date:** 7/18/2022	North West Colorado Consultants, Inc.
Job Name: Steamboat Basecamp Townhomes	**Job No.** 20-11961	Geotechnical / Environmental Engineering - Materials Testing
Location: 1901 Curve Plaza, Steamboat Springs, Colorado	**Figure** #5	(970)879-7888 - Fax (970)879-7891 2580 Copper Ridge Drive Steamboat Springs, Colorado 80487



Title: HUNG PARTITION WALL DETAIL	Date: 7/15/2022
Job Name: Steamboat Basecamp Townhomes	Job No. 20-11961
Location: 1901 Curve Plaza, Steamboat Springs, Colorado	Figure #6

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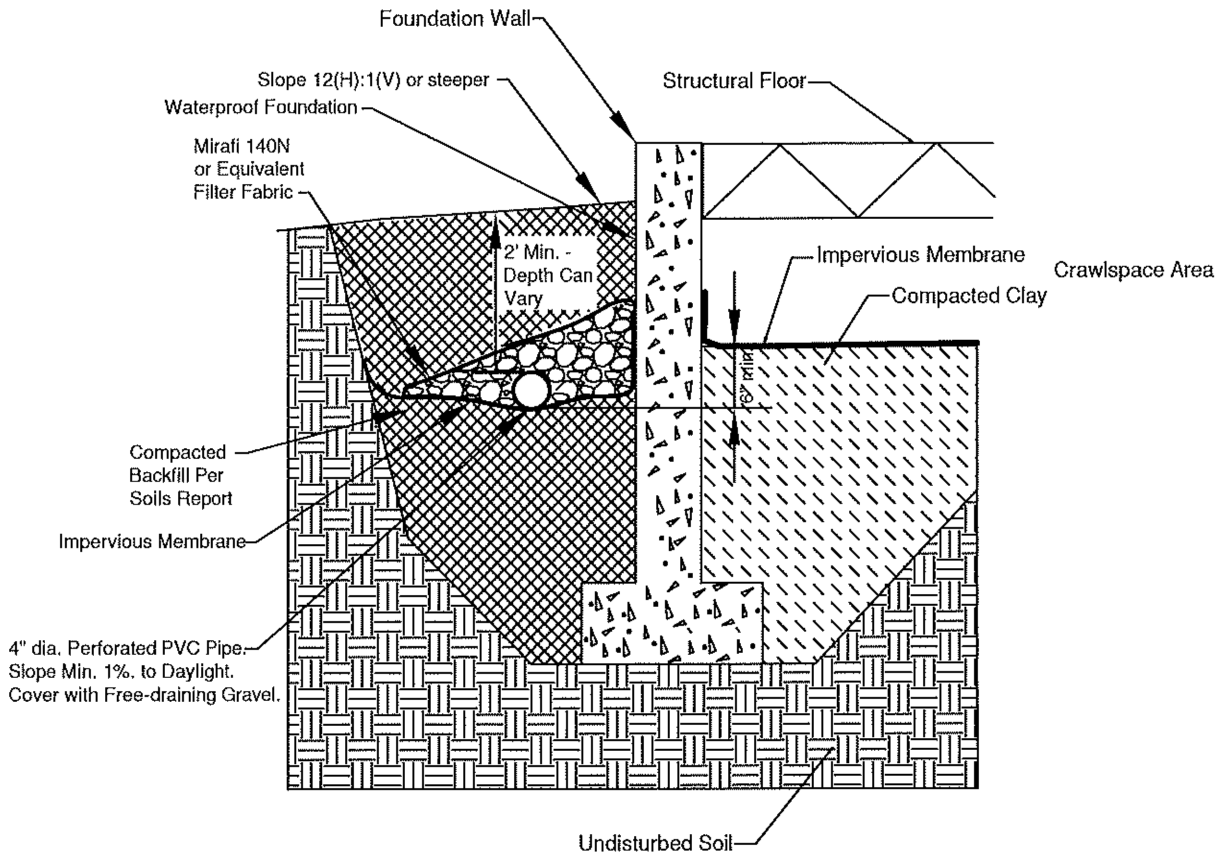
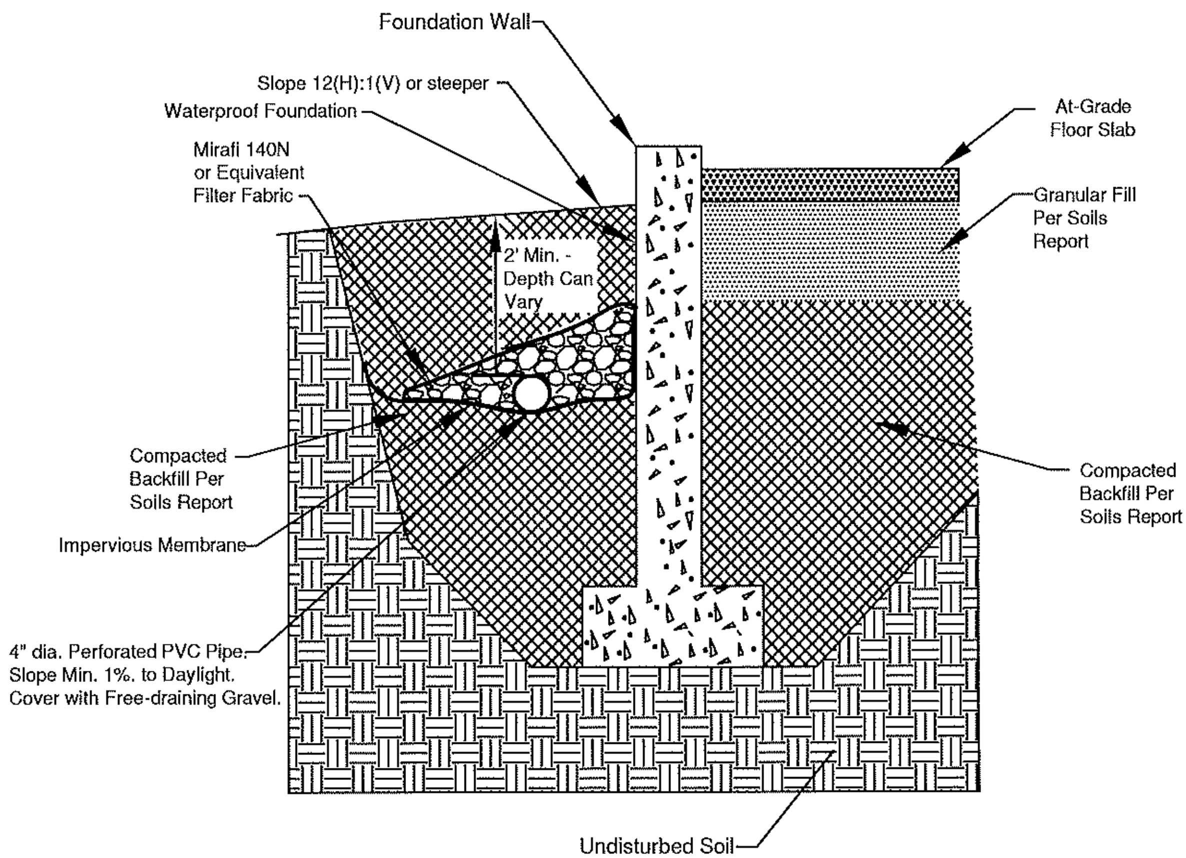
2580 Copper Ridge Drive
Steamboat Springs, Colorado 80487

Crawlspace



Slab-on-Grade



Title: PERIMETER/UNDERDRAIN DETAIL	**Date:** 7/18/2022	North West Colorado Consultants, Inc.
Job Name: Steamboat Basecamp Townhomes	**Job No.** 20-11961	Geotechnical / Environmental Engineering · Materials Testing
Location: 1901 Curve Plaza, Steamboat Springs, Colorado	**Figure** #7	(970)879-7888 · Fax (970)879-7891 2580 Copper Ridge Drive Steamboat Springs, Colorado 80487