NorthWest Colorado Consultants, Inc.

Geotechnical / Environmental Engineering • Materials Testing

December 17, 2024

2400 Ski Trail Lane LP
Steve Rumsey
4317 Marsh Ridge Road
Carrollton, TX 75010

Job Number: 24-13444

Subject: Subsoil and Foundation Investigation, Proposed Bear Claw Duplex, 2400 Ski Trail Lane, Steamboat Springs, Colorado.

Steve,

This report presents the results of the Subsoil and Foundation Investigation for the proposed Bear Claw Duplex to be constructed at 2400 Ski Trial Lane and within Lot 11A of the Bear Claw Estates Subdivision in Steamboat Springs, Colorado. The approximate location of the project site is shown in Figure #1.

NWCC, Inc.'s (NWCC) scope of work included obtaining data from cursory observations made at the site, logging of two test holes, sampling of the probable foundation soils and laboratory testing of the samples obtained. This report presents recommendations for economically feasible and safe type foundations, as well as allowable soil pressures and other design and construction considerations that are advisable, but not necessarily routine to quality design and building practices.

Proposed Construction: NWCC assumes the proposed duplex will consist of a three-story wood-framed structure constructed over walkout levels with upper level garages. NWCC assumes the lower levels of the duplex will be constructed with concrete slab-on-grade floor system placed approximately 2 feet above to 20 feet below the existing ground surface (bgs).

For design purposes, NWCC has assumed that building loads will be light to moderate typical of this type of residential construction. If loadings or conditions are significantly different from those above, NWCC should be notified to reevaluate recommendations in this report.

Site Conditions: The subject property is located on the west side of Ski Trail Lane in the Bear Claw Estates Subdivision in Steamboat Springs, Colorado. The site was vacant at the time of our investigation. An access road cut was located in the middle of the lot going east to the west side of the property. Vegetation consists of sparse grasses and weeds with a couple of tress.

The topography of the site is variable and generally slopes moderately to steeply down to the south, with the exception of the slope along the access road. A maximum elevation difference of approximately 15 to 20 feet exists across the proposed building site.

Subsurface Conditions: To investigate the subsurface conditions at the site, two test holes were advanced with a CME 55 truck drill rig using 4-inch diameter continuous flight power augers on November 7, 2024. A site plan showing the approximate test hole locations is presented in Figure #2.

Subsurface conditions encountered were variable and generally consisted of a layer of fill materials overlying natural sandstone-claystone bedrock to the maximum depth investigated, 25 feet bgs. Graphic logs of the exploratory test holes along with associated Legend and Notes are presented in Figure #3.

Fill materials consisting of clays and sands were encountered at the ground surface and were approximately 12 feet in thickness in Test Hole 1, and 10 feet in thickness in Test Hole 2. The fill materials consisted of sands and clays that were low to moderately plastic, fine to coarse grained with occasional gravels and organic materials, stiff to very stiff, slightly moist and light brown to brown in color. A sample of the fill materials classified as a SC soil in accordance with the Unified Soil Classification System (USCS).

Sandstone-claystone bedrock was encountered below the fill materials in both test holes and extended to the maximum depth investigated, 25 feet bgs. The sandstone-claystone bedrock was of the Brown Park Formation and low to moderately plastic, fine to coarse grained with occasional gravels, hard to very hard, calcareous, slight moist to moist and light brown to brown in color. Samples of the sandstone-claystone classified as a SC-CL and SM soils in accordance with the USCS.

Swell-consolidation tests conducted on samples of the fill materials and sandstone-claystone bedrock indicate the materials tested will exhibit low to moderate swell potential when wetted under a constant load. The swell-consolidation test results are presented in Figures #4 to #6, and all the other laboratory test results are summarized in the attached Table 1.

Based on anticipated geologic site conditions, 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 7-10.

Groundwater was not encountered at the time of drilling. Groundwater was encountered in Test Hole 1 at a depth of 21 feet bgs, 39 days after the drilling was completed. Groundwater conditions at the site can be expected to fluctuate with seasonal changes in precipitation and runoff.

Foundation Recommendations: Based on the subsurface conditions encountered in the test holes, the results of the field and laboratory investigations and our understanding of the proposed construction, NWCC believes an economically feasible and safe type of foundation system is straight-shaft skin friction/end bearing piers drilled into the sandstone-claystone bedrock. Foundation movement should be within tolerable limits if the following design and construction precautions are observed.

1) A minimum pier diameter of 12 inches, a minimum pier length of 20 feet and a minimum bedrock penetration of 6 feet are recommended. A maximum pier length to diameter ratio of 25 is also recommended.

2) Piers should be designed using allowable skin friction value of 3,000 psf for the portion of the pier penetrating the sandstone-claystone bedrock. The pier penetration in the fill materials should be neglected in skin-friction calculations. A drill rig of sufficient size, type and operating condition should be used so the bottom of the piers can be cleaned out properly and minimum length requirements can be met. If the bottom of piers are properly cleaned and approved by an engineer from this office, then an allowable end bearing pressure of 40,000 psf for the bedrock may be used in the design of the piers

3) Piers should be reinforced their full length with at least one #5 reinforcing rod for each 16 inches of pier perimeter.

4) Piers should be properly cleaned and dewatered prior to steel and concrete placement. Due to the presence of groundwater seepage, casing and dewatering equipment may be required to reduce water infiltration and caving in the piers constructed at this site. The concrete should not be placed in more than 3 inches of water unless the tremie and/or pump methods are used to place the concrete.

5) A 4-inch void should be provided beneath grade beams to prevent expansive soils and bedrock materials from exerting uplift forces on grade beams and to concentrate pier loadings. A void should also be provided beneath necessary pier caps.

6) A representative of NWCC must observe the pier drilling operations.

Alternate Deep Foundation Recommendations: An alternative type of deep foundation system, which would reduce the risk of foundation movement associated with the expansive soils and bedrock materials would consist of helical screw piles advanced into the natural sandstone-claystone bedrock materials. The helical screw pile foundations will place the bottom of the foundations in a zone of relatively stable moisture content and reduce the risk of foundation movement from expansive soils and bedrock materials.

Foundation movement should be less than ½-inch if the following design and construction conditions are observed. The following recommendations have been included for foundation design purposes.

A 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 by the use of 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 the site and observed by NWCC 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. 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 pile depth of 8 feet from ground surface to upper helix;
- Minimum installation torque of 4,000 ft-lbs;
- 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.

Alternate Foundation Recommendations: If the owner is willing to accept the risks associated with placing the shallow foundations on expansive soil and bedrock materials, an alternative foundation system would consist of spread or continuous footings placed directly on the sandstone-claystone bedrock found below the existing fill materials or on a maximum of 5 feet of properly compacted structural fill materials placed over the sandstone-claystone bedrock. The depth of the existing fill materials may not make this alternative feasible.

The design and construction details presented below should be observed if a shallow foundation system is opted for. The precautions and recommendations itemized below will not prevent movement of the foundations if the underlying bedrock materials become wetted and swell. However, they should reduce the amount of differential movement beneath the foundation system. Differential movements on the order of 1 to 2 inches could still occur if the soils undergo moisture changes. The owner and any future owners must be willing to accept the risk of foundation movement associated with placing shallow foundations on expansive soils.

1) Footings placed on the sandstone-claystone bedrock or properly compacted structural fill materials should be designed using an allowable soil bearing pressure of 3,000 psf.

Footings should also be designed using a minimum dead load pressure of at least 1,000 psf.

2) Footings or pad sizes should be computed using the above soil pressures and placed on the sandstone-claystone bedrock encountered below the existing fill materials or on a maximum of 5 feet of structural fill materials placed over the sandstone-claystone bedrock.

3) Any existing fill materials and/or topsoil and organic materials found beneath the footings when excavations are opened should be removed and footings extended down to the sandstone-claystone bedrock prior to structural fill or concrete placement. Footings may have to be narrow or interrupted to maintain the minimum dead load. Foundation design should be closely checked to assure that it distributes loads per the allowable pressures given. Any fill materials placed beneath the footings should be a non-expansive granular soil approved by NWCC prior to placement. The fill materials placed under the footings should be uniformly placed and compacted in 6 to 8 inch loose lifts and compacted to at least 100% of the maximum standard Proctor density and within 2% of the optimum moisture content determined in accordance with ASTM D-698. The structural fill materials should extend out from the edge of the footings on a 1(horizontal) to 1(vertical) or flatter slope. As noted above, NWCC recommends a maximum of 5 feet of structural fill be placed under the footings.

4) Foundation walls should be designed and reinforced to span an unsupported distance of 10 feet or the length between pads, whichever is greater.

5) Footings or pads should be placed well enough below final backfill grades to protect them from frost heave. Forty-eight (48) inches is typical for this location considering normal snow cover and other winter factors.

6) Based on experience, NWCC estimates total settlement for footings and pads designed and constructed as discussed in this section will be approximately 1 inch. Additional bearing capacity values along with the associated settlements are presented in Figure #7.

7) Care should be taken when excavating the foundations to avoid disturbing the supporting materials. Hand excavation or careful backhoe soil removal may be required in excavating the last few inches.

8) NWCC must be retained by the client to observe the foundation excavations when they are near completion to identify bearing soils and confirm the recommendations in this report and test the fill materials for compaction.

Floor Slabs: NWCC has assumed the lower levels of the duplex will be constructed utilizing concrete slab-on-grade floor systems. The on-site soils are capable of supporting slab-on-grade construction. However, floor slabs present a very difficult problem where expansive 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 soils and bedrock materials encountered at this site, we recommend that structural floor systems over well-ventilated crawlspaces or void form be used in the proposed duplex. If the client elects to construct concrete slab-on-grade floor systems, we recommend that the following special design and construction precautions be followed so that the amount of movement in the floor slabs can be reduced, if the soils or bedrock become wetted.

1) Floor slabs must be separated from all bearing walls, columns and their foundation supports 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 #8.

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 topsoil and organic materials should be removed prior to placement of the underslab gravels or new structural fill materials.

4) Floor slabs must be provided with control joints placed a maximum of 10 to 12 feet on center in each direction 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) It has been NWCC's experience that the risk of floor slab movement can be reduced by removing at least 3 feet of the expansive materials and replacing them with a well compacted, non-expansive fill. If this is done or 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 soils or bedrock materials beneath the floor slabs undergo moisture changes. However, they should reduce the amount of damage if such movement occurs. As noted previously, 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.

If the anticipated floor slab movement is not acceptable, the owner should consider implementation of a structural floor system over a well-vented crawl space or void form materials.

Underdrain System: Any floor levels or crawl space areas constructed below the existing or finished ground surfaces should be protected by underdrain systems to help reduce the problems associated with surface and subsurface drainage during high runoff periods.

Localized perched water or runoff can infiltrate the lower levels of the structure at the foundation levels. This water can be one of the primary causes of differential foundation and slab movement, especially where expansive soils and bedrock materials are encountered. Excessive moisture in crawl space areas or lower levels can also lead to rotting and mildewing of wooden structural members and the formation of mold and mold spores. Formation of mold and mold spores could have detrimental effects on the air quality in these areas, which in turn can lead to potential adverse health effects.

Drains should be located around the entire perimeter of the lower levels and be placed at least 12 inches below any floor slab or crawl space levels and at least 6 inches below the foundation voids and bottom of the foundation walls. NWCC recommends the use of perforated PVC pipe for the drainpipe, which meets or exceeds ASTM D-3034/SDR 35 requirements, to minimize potential for pipe crushing during backfill operations. Holes in the drainpipe should be oriented down between 4 o'clock and 8 o'clock to promote rapid runoff of water. Drainpipe should be surrounded with at least 12 inches of free draining gravel and should be protected from contamination by a filter covering of Mirafi 140N subsurface drainage fabric or an equivalent product. Drains should have a minimum slope of 1/8 inch per foot and be daylighted at positive outfalls protected from freezing, or be led to sumps from which water can be pumped. The use of interior laterals, multiple daylights or sumps may be required for the proposed structure. Caution should be taken when backfilling so as not to damage or disturb the installed underdrain. NWCC recommends the drainage system include a cleanout every 100 feet, be protected against intrusion by animals at outfalls and be tested prior to backfilling. NWCC also recommends the client retain our firm to observe the underdrain systems during construction to verify they are being installed in accordance with recommendations provided in this report and observe a flow test prior to backfilling the system.

In addition, NWCC recommends an impervious barrier be constructed to keep water from infiltrating through the voided areas and/or under the foundation walls or footings. Barrier should be constructed of an impervious material, which is approved by this office and placed below the perimeter drain and up against the sides of the foundation walls. A typical perimeter/underdrain detail is shown in Figure #9.

It should be noted that the underdrain system outlined above will not be required if the slab-on-grade floor system is placed above the finished or existing ground surface.

However, to enhance site drainage and improve foundation and interior slab-on-grade performance, NWCC recommends a shallow perimeter drainage system be installed around the building perimeter and beneath the roof driplines. NWCC can provide additional details for this type of system if requested.

Placement of an impervious membrane and/or properly compacted clays in crawlspace areas to a point at least 12 inches above the top of the foundation voids or bottom of the foundation walls should help reduce the moisture problems in these areas.

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 and 55 pcf for on-site soils and bedrock materials.

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 and 45 pcf for on-site soils and bedrock materials.

NWCC recommends the equivalent fluid pressures provided for the on-site soils and bedrock materials be used in the design of the structures due to a severe shortage of free-draining granular materials in the Yampa Valley.

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.

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 5 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.

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 in order 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.

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

Site Grading: Slopes on which the proposed structures are proposed could become unstable as a result of the proposed construction. Design and construction considerations must be addressed to avoid and/or limit the potential for slope instability at the site. Although a detailed slope stability analysis is beyond the scope of this report, some general guidelines are provided below for initial planning and design. Our office should review the construction plans as they are being prepared so that we can verify that our recommendations are being properly incorporated into the plans.

1) Slopes greater than 25 percent should be avoided whenever possible for construction of the building structures.

2) Temporary cuts for foundation construction should be constructed to OSHA standards for temporary excavations. Permanent, unretained cuts for driveways or building sites should be kept as shallow as possible and should not exceed a 3(Horizontal) to 1(Vertical) configuration for the topsoil and organic materials, and a 2(Horizontal) to 1(Vertical) configuration for the on-site soils and bedrock materials. We recommend these cuts be limited to 10 feet in height unless competent bedrock is encountered. The risk of slope instability will be significantly increased if groundwater seepage is encountered in the cuts. NWCC office should be notified immediately to evaluate the site if seepage is encountered or deeper cuts are planned and assess whether additional investigations and/or stabilization measures are warranted.

3) Excavating during periods of low runoff at the site can reduce potential slope instability during excavation. Excavations should not be attempted during the spring or early summer when seasonal runoff and groundwater levels are typically high.

4) Fills up to 15 feet in height can be constructed at the site and should be constructed to a 2(Horizontal) to 1(Vertical) or flatter configuration. The fill areas should be prepared by stripping any existing fill materials and topsoil and organics, scarification and compaction to at least 95% of the maximum standard Proctor density and within 2% of optimum moisture content as determined by ASTM D698.

   The fills should be properly benched/keyed into the hillsides after any topsoil and organic materials or silts and clays have been removed. The fill materials should consist of the on-site soils (exclusive of topsoil, organics or silts) and be uniformly placed and compacted in 6 to 8 inch loose lifts to the minimum density value and moisture content range indicated above.

5) Proper surface drainage features should be provided around all permanent cuts and fills and steep natural slopes to direct surface runoff away from these areas. Cuts, fills and other stripped areas should be protected against erosion by revegetation or other methods. Areas of concentrated drainage should be avoided and may require the use of riprap for erosion control. NWCC recommends that a maximum of 4 inches of topsoil be placed

over the new cut and fill slopes. It should be noted that the newly placed topsoil materials may slough/slide off the slopes during the spring runoff seasons until the root zone in the vegetated cover establishes.

6) A qualified engineer experienced in this area should prepare site grading and drainage plans. The contractor must provide a construction sequencing plan for excavation, wall construction and bracing and backfilling for the steeper and more sensitive portions of the site prior to starting the excavations or construction.

Limitations: The recommendations provided in this report are based on the soils and bedrock materials encountered at this site and neighboring sites, and NWCC's understanding of the proposed construction. NWCC believes this information gives a high degree of reliability for anticipating behavior of the proposed structures; however, NWCC's recommendations are professional opinions and cannot control nature, nor can they assure the soil and bedrock profiles beneath those or adjacent to those observed. No warranties expressed or implied are given on the content of this report.

Expansive soils and bedrock were encountered at this site. These soils/bedrock are stable at their natural moisture content but can shrink or swell with changes in moisture. The behavior of expansive soils/bedrock is not fully understood. The swell 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.

Recommendations presented in this report are based on the current state of the art for foundations and floor slabs on expansive soils/bedrock. As noted previously, the owner and any future owners must be made aware there is a risk in construction on these types of soil/bedrock.

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 and bedrock materials, it is necessary that the changes in moisture content be kept to a minimum. This requires judicious irrigation and providing positive surface drainage away from the structures. Any distress noted in the structures should be brought to the attention of NWCC.

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 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

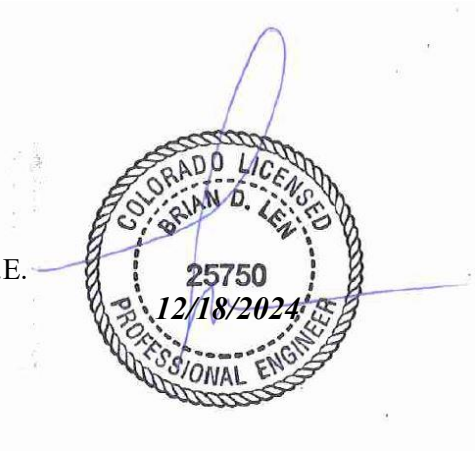
changes. Therefore, this report is subject to review and not considered valid after a period of 3 years or if conditions as stated above are altered.

It is the responsibility of the owner and any future owners or his representative to ensure that the 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 NWCC may be of further service, please do not hesitate to contact us.

Sincerely,
NWCC, INC.

Enrique M. Lopez
Project Engineer



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

cc: Sara Fox – Fox Construction
Brian Adams – Apex Architecture

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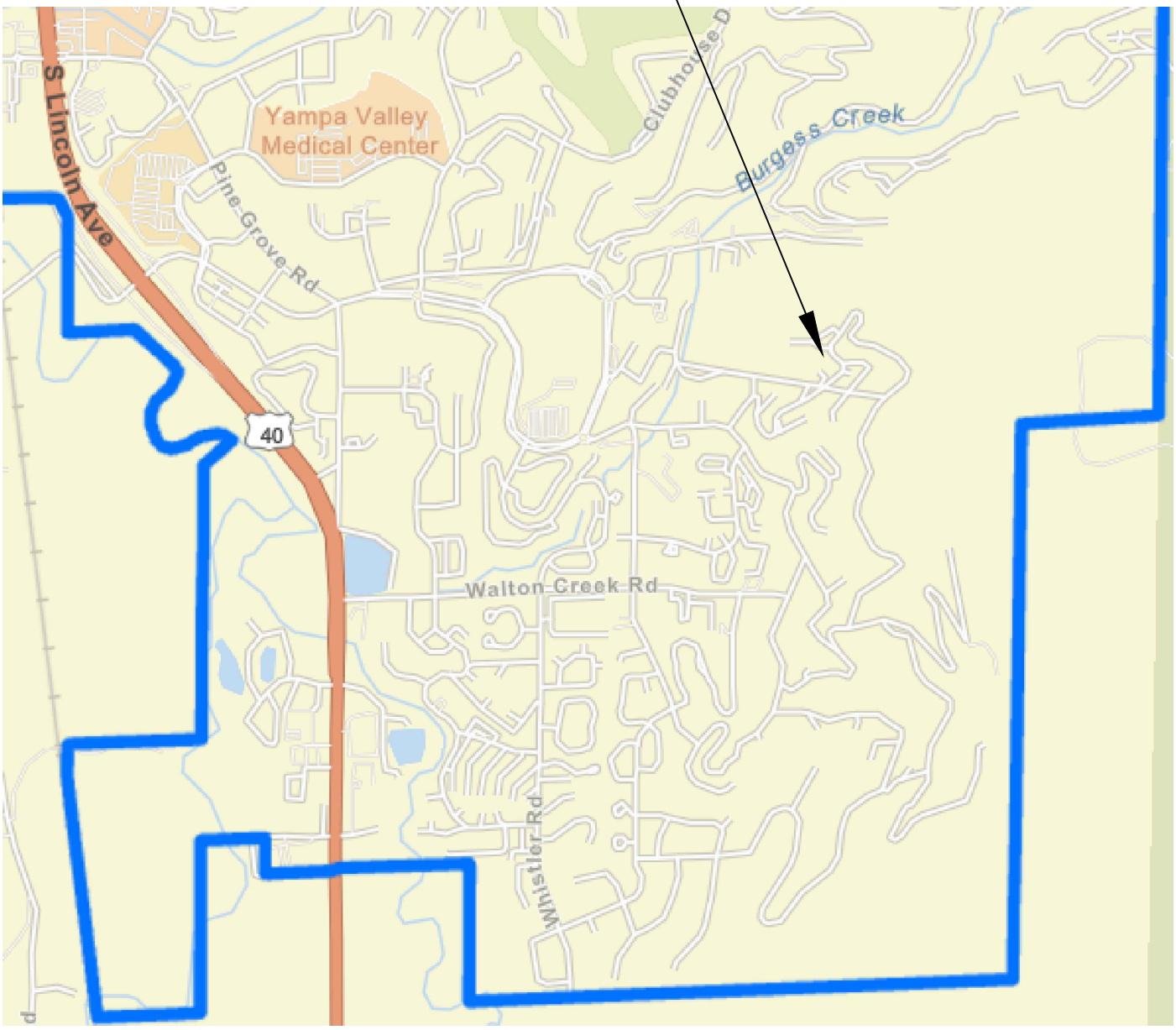
NOT TO SCALE

PROJECT SITE



Title: VICINITY MAP		**Date:** 12/16/24	NWCC North West Colorado Consultants, Inc. Geotechnical / Environmental Engineering • Materials Testing
Job Name: Proposed Bear Claw Duplex		**Job No.** 24-13444	(970)879-7888 • Fax (970)879-7891 2580 Copper Ridge Drive Steamboat Springs, Colorado 80487
Location: Lot 11A, Bear Claw Estates, Steamboat Springs, CO		**Figure** #1	

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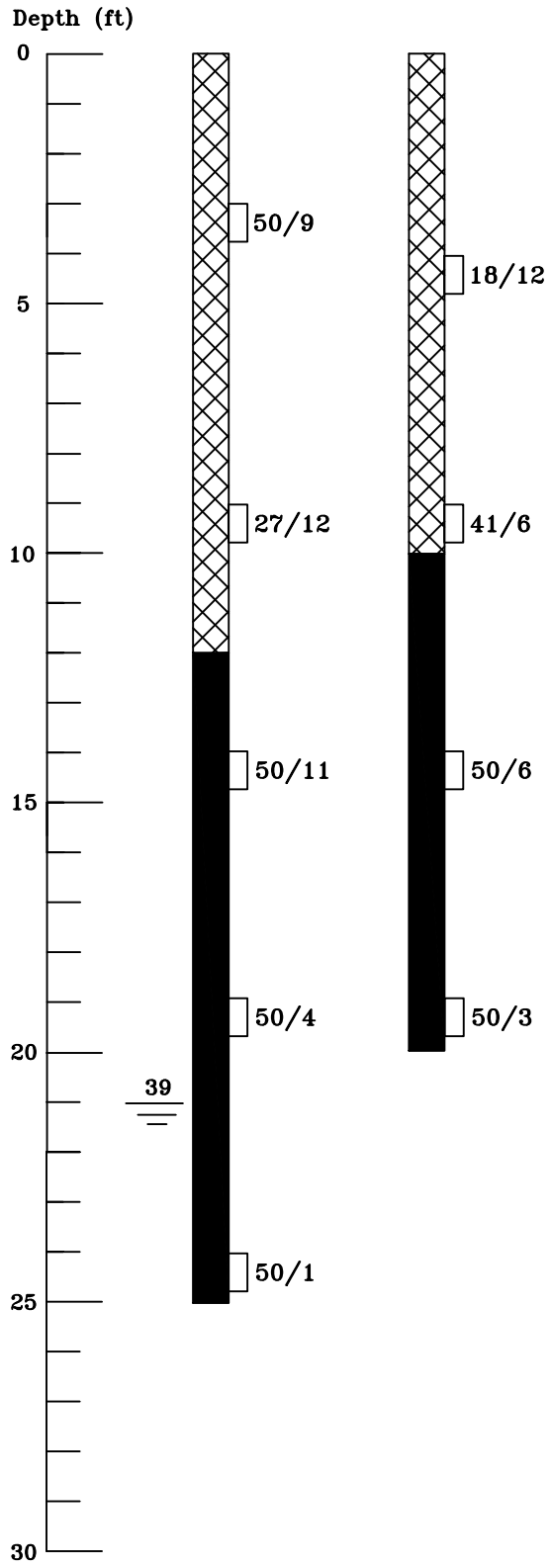
NOT TO SCALE

Title: SITE PLAN–LOCATION OF TEST HOLES		**Date:** 12/16/24	NWCC North West Colorado Consultants, Inc. Geotechnical / Environmental Engineering • Materials Testing
Job Name: Proposed Bear Claw Duplex		**Job No.** 24-13444	(970)879-7888 • Fax (970)879-7891 2580 Copper Ridge Drive Steamboat Springs, Colorado 80487
Location: Lot 11A, Bear Claw Estates, Steamboat Springs, CO		**Figure** #2	



LEGEND:

FILL: Clays and sands, low to moderately plastic, fine to coarse grained with occasional gravels and organic materials, stiff to very stiff, slightly moist and light brown to brown.

SANDSTONE–CLAYSTONE BEDROCK: Browns Park Formation, low to moderately plastic, fine to coarse grained with occasional gravels, hard to very hard, calcareous, slightly moist to moist and light brown to brown.

Drive Sample–2–inch I.D. California Liner Sampler.

50/9 Drive Sample Blow Count, indicates 50 blows of a 140–pound hammer falling 30 inches were required to drive the sampler 9 inches.

39 Indicates depth at which groundwater was encountered 39 days after drilling.

NOTES:

1) Test holes were drilled on November 7, 2024 with a CME 55 truck drill rig using 4–inch diameter continuous flight power augers.

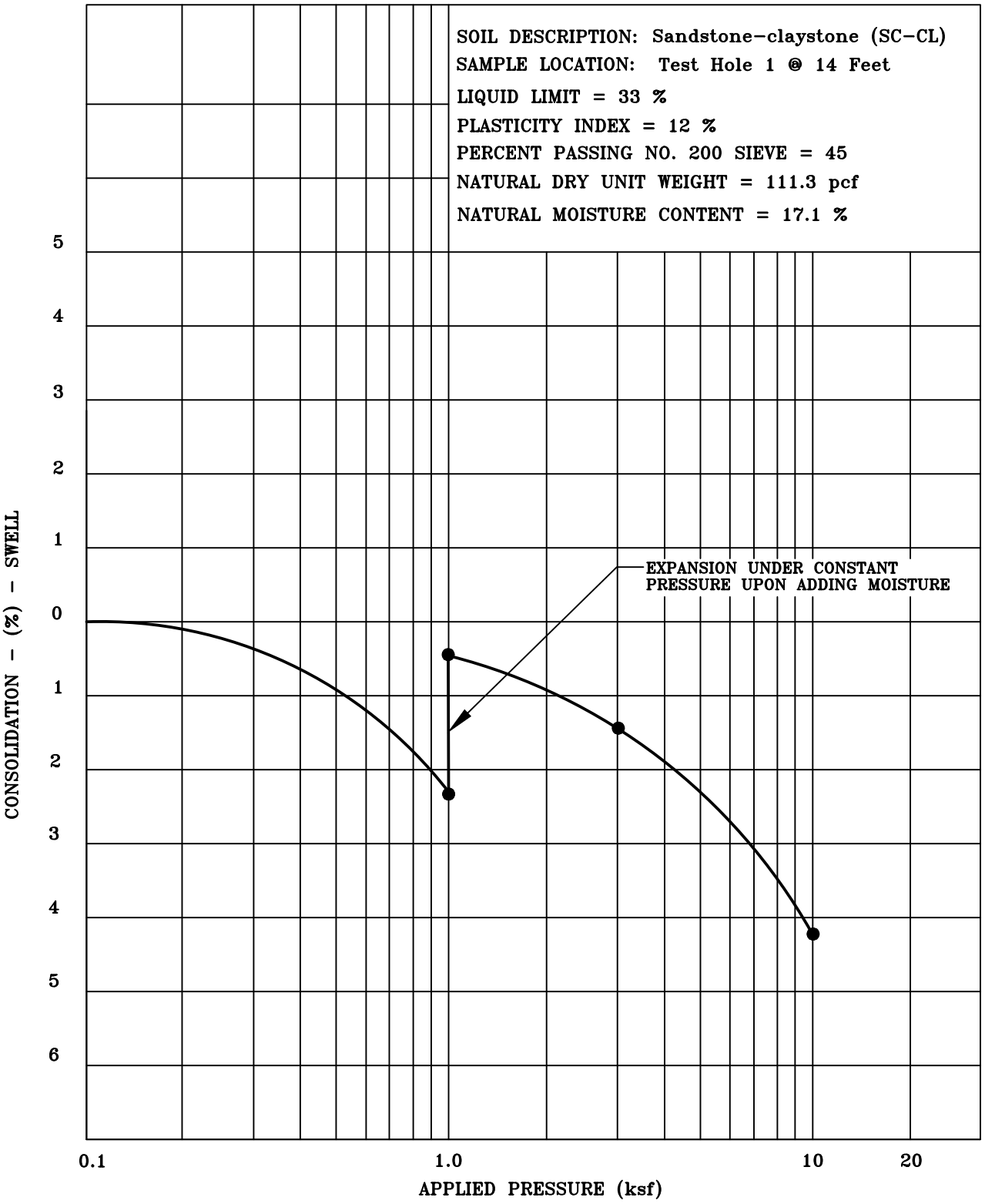
2) The location of the test holes were determined in the field by pacing from topographic features at the site.

3) The elevation of the test holes were not determined and the logs are drawn to the depth investigated.

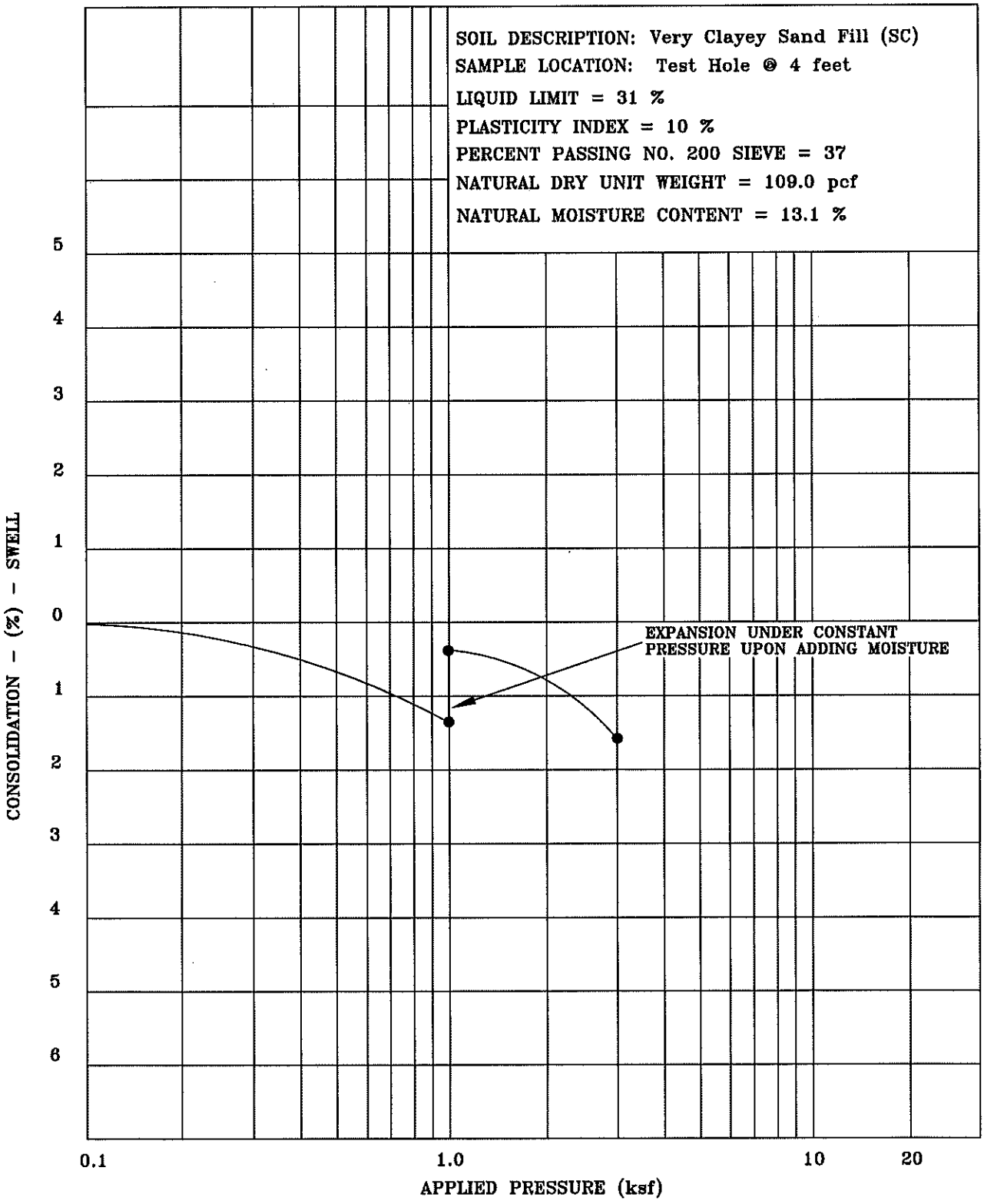
4) The lines between materials shown on the test hole logs represent the approximate boundaries between material types and transitions may be gradual.

5) The water level readings shown on the logs was made at the time and under the conditions indicated. Fluctuations in the water levels will occur with time.

Title: LOGS, LEGEND AND NOTES	Date: 12/16/24	NWCC North West Colorado Consultants, Inc. Geotechnical / Environmental Engineering • Materials Testing
Job Name: Proposed Bear Claw Duplex	Job No. 24–13444	(970)879-7888 • Fax (970)879-7891 2580 Copper Ridge Drive Steamboat Springs, Colorado 80487
Location: Lot 11A, Bear Claw Estates, Steamboat Springs, CO	Figure #3	



Title: SWELL-CONSOLIDATION TEST RESULTS		Date: 12/16/24	NWCC Northwest Colorado Consultants, Inc. Geotechnical / Environmental Engineering • Materials Testing
Job Name: Proposed Bear Claw Duplex		Job No. 24-13444	(970)879-7888 • Fax (970)879-7891 2580 Copper Ridge Drive Steamboat Springs, Colorado 80487
Location: Lot 11A, Bear Claw Estates, Steamboat Springs, CO		Figure #4	



Title: SWELL–CONSOLIDATION TEST RESULTS		Date: 12/16/24
Job Name: Proposed Bear Claw Duplex		Job No. 24-13444
Location: Lot 11A, Bear Claw Estates, Steamboat Springs, CO		Figure #5

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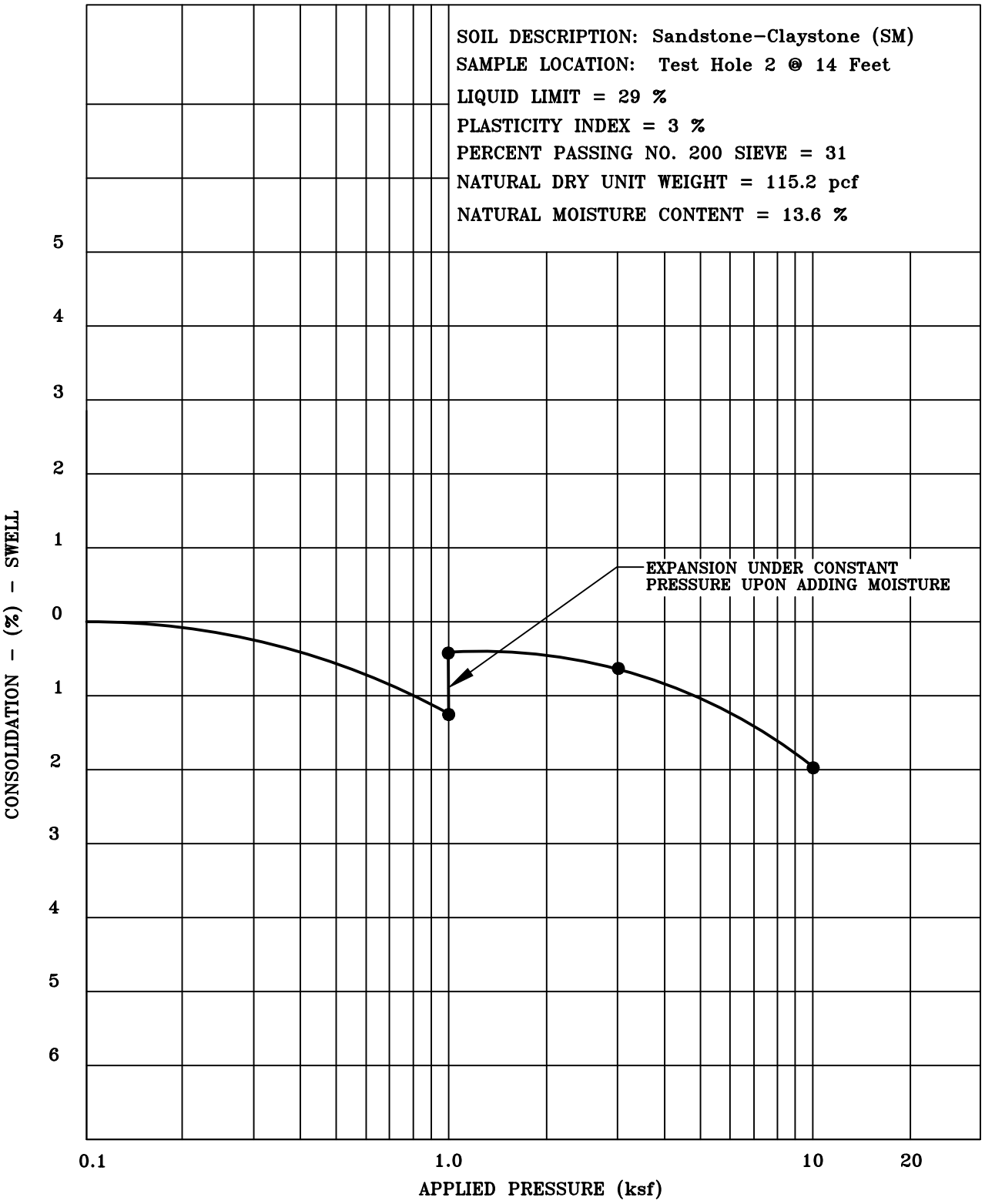

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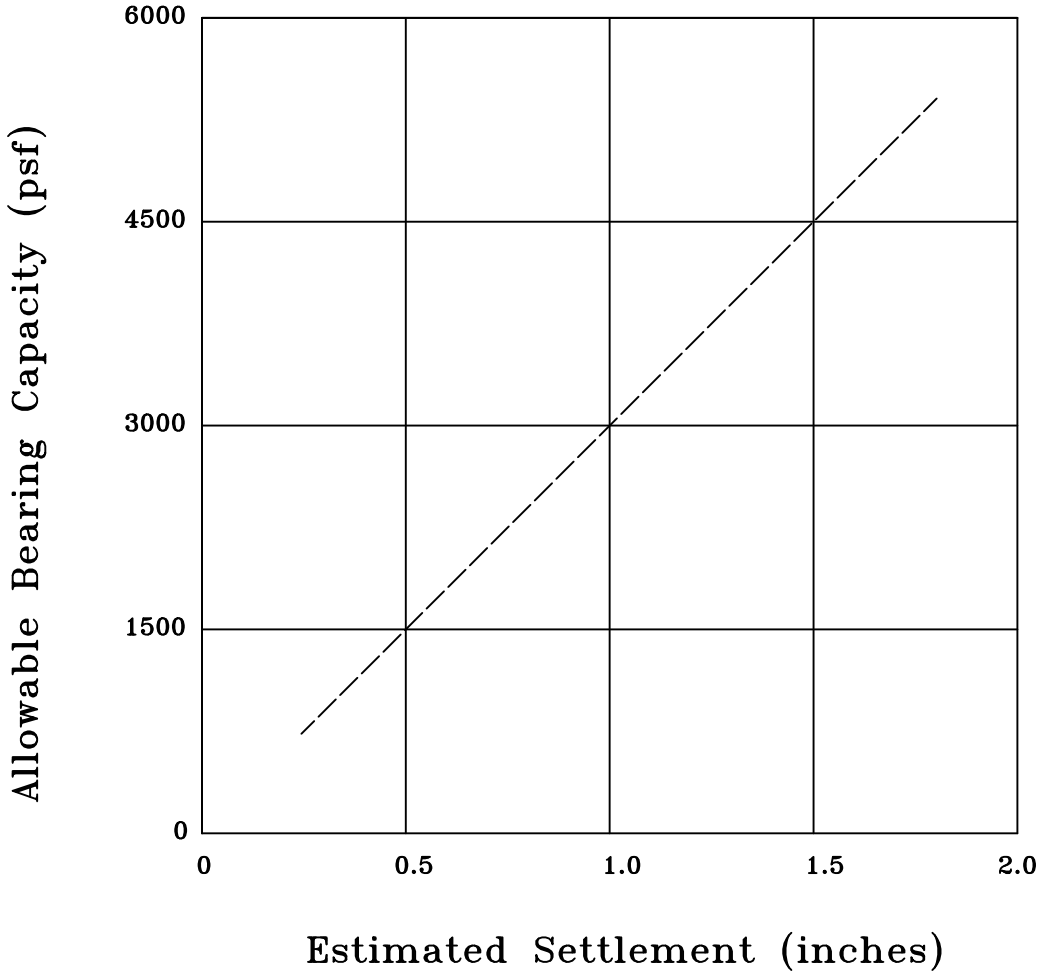
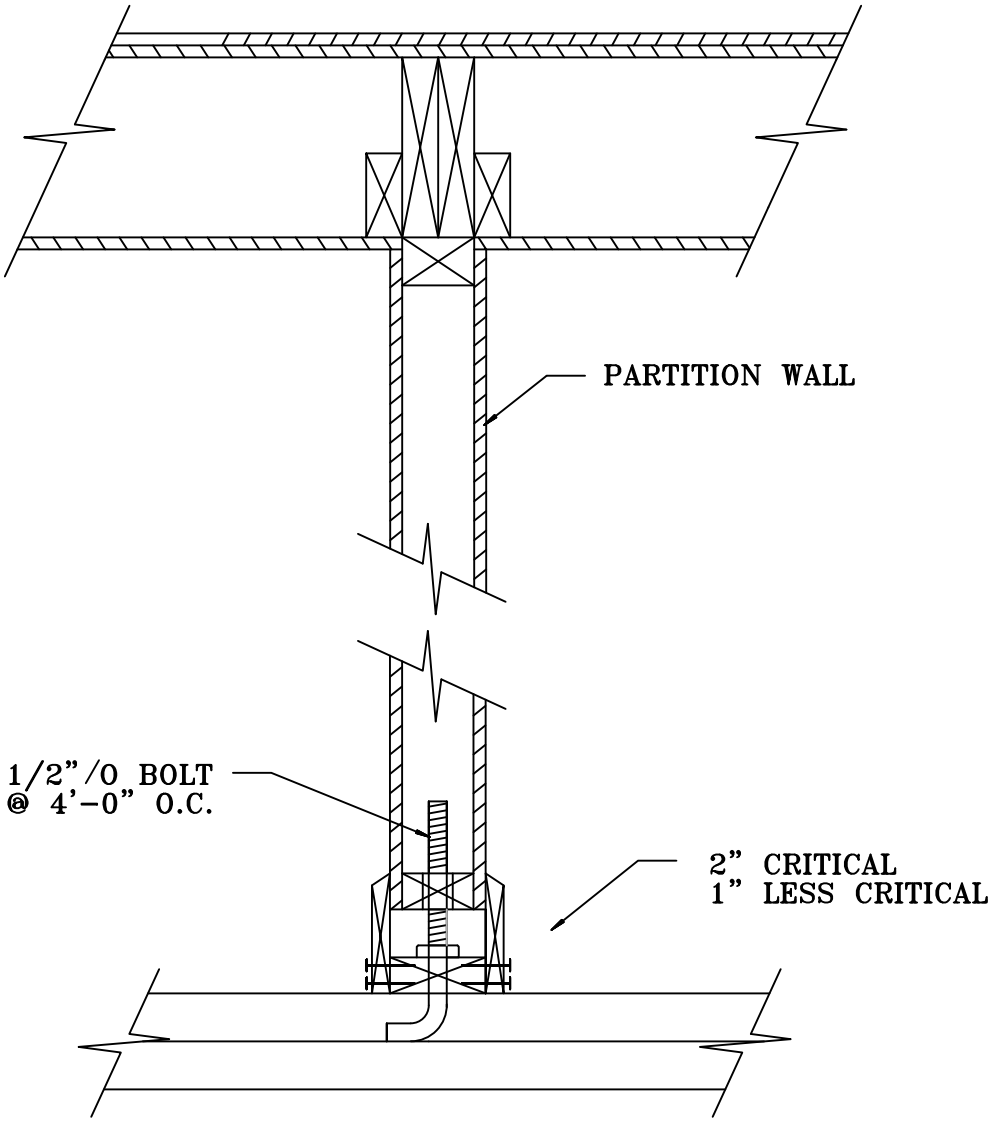
Job Name: Proposed Bear Claw Duplex		Job No. 24-13444	(970)879-7888 • Fax (970)879-7891 2580 Copper Ridge Drive Steamboat Springs, Colorado 80487
Location: Lot 11A, Bear Claw Estates, Steamboat Springs, CO		Figure #6	

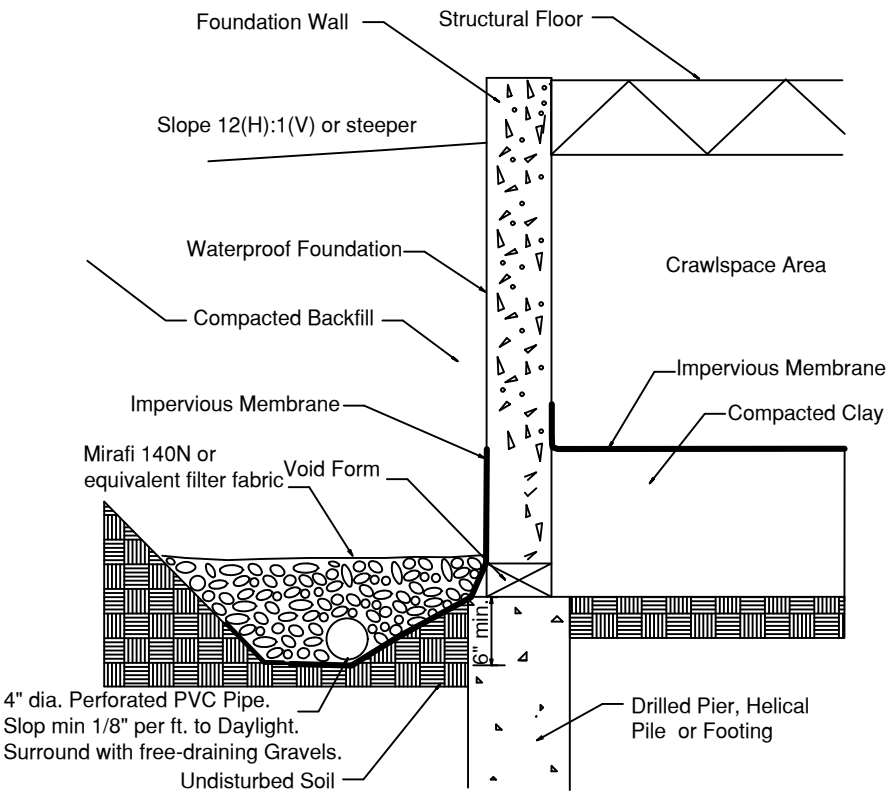


Note: These values are based on footing widths of 1 to 4 feet. If the footing width is to be greater than 4 feet in width, then we should be notified to re-evaluate these recommendations.

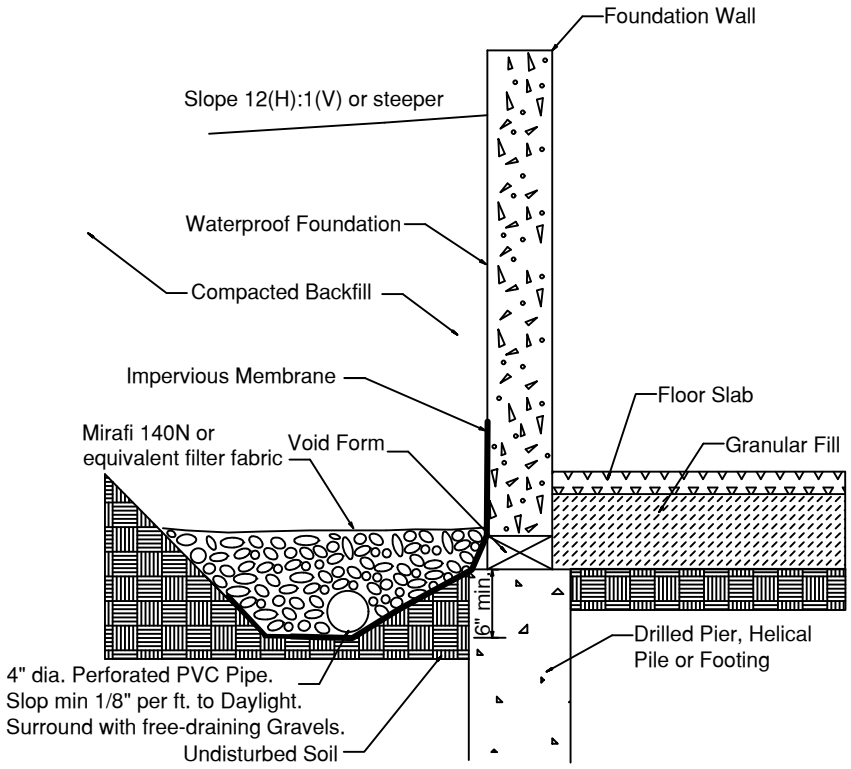
Title: BEARING CAPACITY CHART		Date: 12/16/24	NWCC North West Colorado Consultants, Inc. Geotechnical / Environmental Engineering • Materials Testing
Job Name:	Proposed Bear Claw Duplex	Job No. 24-13444	(970)879-7888 • Fax (970)879-7891 2580 Copper Ridge Drive Steamboat Springs, Colorado 80487
Location:	Lot 11A, Bear Claw Estates, Steamboat Springs, CO	Figure #7	



Title: HUNG PARTITION WALL DETAIL		**Date:** 12/16/24	NWCC North West Colorado Consultants, Inc. Geotechnical / Environmental Engineering • Materials Testing
Job Name: Proposed Bear Claw Duplex		**Job No.** 24-13444	(970)879-7888 • Fax (970)879-7891 2580 Copper Ridge Drive Steamboat Springs, Colorado 80487
Location: Lot 11A, Bear Claw Estates, Steamboat Springs, CO		**Figure** #8	



Crawlspace Area



Lower Level with
Floor Slab

Title: PERIMETER/UNDERDRAIN DETAIL		**Date:** 12/16/24	NWCC North West Colorado Consultants Inc Geotechnical / Environmental Engineering • Materials Testing (970)879-7888 • Fax (970)879-7891 2580 Copper Ridge Drive Steamboat Springs, Colorado 80487
Job Name: Proposed Bear Claw Duplex		**Job No.** 24-13444	
Location: Lot 11A, Bear Claw Estates, Steamboat Springs, CO		**Figure** #9	

NWCC, Inc.

TABLE 1

SUMMARY OF LABORATORY TEST RESULTS

SAMPLE LOCATION		NATURAL MOISTURE CONTENT (%)	NATURAL DRY DENSITY (pcf)	ATTERBERG LIMITS		GRADATION		PERCENT PASSING No. 200 SIEVE	UNCONFINED COMPRESSIVE STRENGTH (psf)	SOIL or BEDROCK DESCRIPTION	UNIFIED SOIL CLASS.
TEST HOLE	DEPTH (feet)			LIQUID LIMIT (%)	PLASTICITY INDEX (%)	GRAVEL (%)	SAND (%)				
1	14	17.1	111.3	33	12	3	52	45		Sandstone–Claystone	SC–CL
2	4	13.1	109.0	31	10	6	57	37		Very Clayey Sand Fill	SC
2	14	13.6	115.2	29	3	5	64	31		Sandstone–Claystone	SM

JOB NUMBER: 24–13444