NWCC

NorthWest Colorado Consultants, Inc.

Geotechnical / Environmental Engineering • Materials Testing

Reviewed for Code Compliance

07/19/2022

January 29, 2018

New West Builders
Mark Arnold
P.O. Box 775896
Steamboat Springs, CO 80477

Job Number: 17-10957

Subject: Subsoil and Foundation Investigation, Proposed Blandford Residence, Homestead B8, Marabou Subdivision, Filing 1, Routt County, Colorado.

Dear Mark,

This report presents the results of the Subsoil and Foundation Investigation (SFI) for the proposed Blandford Residence to be constructed within Homestead B8 of the Marabou Subdivision, Filing 1 in Routt County, 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 four test pits, 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 understands, based on conversations with the client and architect, the proposed residence will consist of a two-story wood-framed structure constructed over a full-depth basement and with an attached garage. NWCC has also assumed that the lower levels of the residence and garage will be constructed utilizing concrete slab-on-grade floor systems placed from 0 to 7 feet below the existing ground surface.

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 proposed building site is located east-southeast of River Drum Trail in Filing 1 of the Marabou Subdivision in Routt County, Colorado. The site was vacant at the time of our investigation and the vegetation consists of grasses, weeds, scattered sagebrush and deciduous brush.

Topography of the site is variable and generally slopes moderately to strongly down to the west-southwest on the order of 10 to 15 percent. A maximum elevation difference of approximately 6 to 10 feet appears to exist across the proposed building site.

Subsurface Conditions: To investigate the subsurface conditions at the site, four test pits were advanced at the site on November 15, 2017. A site plan showing existing features along with the approximate test pit locations is presented in Figure #2.

Subsurface conditions encountered were variable and generally consisted of a layer of topsoil and organic materials overlying natural sands and gravels and claystone bedrock or natural clays to the maximum depth investigated, 8½ feet beneath existing ground surface (bgs). Graphic logs of the exploratory test pits, along with associated Legend and Notes, are presented in Figure #3.

A layer of topsoil and organic materials was encountered at the ground surface all of the test pits and was approximately 18 to 36 inches in thickness. Natural sands and gravels were encountered below the topsoil and organic in test pit 1 and extended to a depth of 4½ feet bgs. The sands and gravels were clayey, fine to coarse grained, low plastic, dense, slightly moist to moist and brown in color.

Natural clays were encountered below the topsoil and organic materials in test pits 2, 3 and 4 and extended to a depth of 8 feet bgs in each test pit. The clays consisted of highly weathered bedrock materials which were slightly sandy, fine-grained, moderately to highly plastic, stiff to very stiff, moist and brown in color. A sample of the natural clays classified as a CL-CH soil in accordance with the Unified Soil Classification System (USCS).

Claystone bedrock was encountered below the sands and gravels in test pit 1 and extended to the maximum depth investigated. The claystone bedrock was slightly sandy, fine-grained, moderately to highly plastic, weathered to medium hard, slightly moist to moist and brown to gray in color. A sample of the claystone bedrock classified as a CL-CH soil in accordance with the USCS.

Swell-consolidation tests conducted on samples of the natural clays and claystone bedrock indicate materials tested will exhibit a moderate swell potential when wetted under a constant load. The swell-consolidation test results are presented in Figures #4 and #5, and all other laboratory test results are summarized in the attached Table 1.

Groundwater was not encountered in the test pits at the time of excavation. It should be noted that the 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 pits, 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 underlying clays. Foundation movement (< ½ inch) should be within tolerable limits if the following design and construction precautions are observed.

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

2) Piers should be designed using an allowable skin friction value of 900 psf for the portion of the pier in the natural clays and 3,000 psf for the portion of the pier penetrating the claystone bedrock. NWCC recommends the upper 5 feet of penetration be neglected in the skin friction calculations. A drill rig of sufficient size, type and operating condition should be used so bottom of the piers can be cleaned out properly and minimum length requirements can be met. If bottom of piers are properly cleaned and approved by an engineer from this office, then an allowable end bearing pressure of 30,000 psf for the claystone bedrock may be used in the design.

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. If groundwater is encountered, 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 of pump method are used.

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

6) We strongly recommend that at least one test hole or test pier be drilled at the building site prior to starting the pier drilling operations. The test holes/piers should be drilled to evaluate the deeper subsoil/bedrock conditions and verify the recommendations given above.

7) A representative of NWCC must observe the test hole and pier drilling operations.

Alternate Foundation Recommendations: If the owner is aware of the risks associated with placing shallow foundations on expansive soils and can tolerate and/or design for differential movements that could result if the natural clays or claystone bedrock materials become wetted and swell, the structure may be supported by spread footings founded on undisturbed natural sands and gravels, clays or claystone bedrock.

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 underlying clays or claystone bedrock become wetted and swell. However, they should reduce amount of differential movement beneath the foundation system. **Differential movements on the**

order of 1 to 3 inches could still occur if clays undergo moisture changes. The owner must be advised of and willing to accept the risk of foundation movement associated with placing shallow foundations on expansive soils.

1) Footings placed on the natural sands and gravels, clays or claystone bedrock should be designed using an allowable soil bearing pressure of 3,500 psf. The footings should also be designed using a minimum dead load pressure of at least 1,200 psf.

2) Footings or pad sizes should be computed using the above soil pressures and placed on the natural sands and gravels, clays or claystone bedrock encountered below the topsoil and organic materials.

3) Any topsoil and organic materials or soft and loose natural soils found beneath the footings when excavations are opened should be removed and footings extended down to competent natural soils or bedrock materials prior to 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.

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 #6.

7) 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.

Floor Slabs: We have assumed the lower levels of the residence and garage will be constructed utilizing a concrete slab-on-grade floor systems. The on-site soils and bedrock materials, with the exception of the 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 clays and claystone bedrock encountered at this site, we recommend that structural floor systems over well-ventilated crawlspaces or void form be used in the proposed residence. 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 clays or claystone bedrock materials 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 #7.

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 of the 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 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 clays or claystone bedrock beneath the floor slabs undergo moisture changes. However, they should reduce the amount of damage if such movement occurs. As noted above, the only way to eliminate the risk of all floor slab movement is to construct a structural floor 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 and the foundations 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, when expansive soils are encountered. Excessive moisture in crawl space areas or lower level 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 entire perimeter of the lower levels and be placed and 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 or footings. 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 will likely 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 that 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 footings and/or foundation walls. 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 #8.

Placement of and impervious membrane and/or properly compacted clays in crawl space areas to the top of the footings or 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 60 pcf for on-site 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 50 pcf for on-site materials.

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.

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 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 ground surface adjacent to foundation walls.

Site Grading: The slopes on which the proposed structures and driveway 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. Additional recommendations and/or investigations may be warranted to provide additional information for the design and construction of temporary or permanent shoring and slope stabilization structures. Slope reinforcement should be designed and constructed by engineers and contractors experienced in earth retention systems.

1) Slopes greater than 25 percent should be avoided whenever possible for construction of permanent roads, structures and On-site Wastewater Treatment Systems (OWTS).

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 2(Horizontal) to 1(Vertical) configuration. We recommend these cuts be limited to 10 feet in height or less unless stable 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 determine if 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 natural hillsides after the existing fill materials, natural topsoil and organic materials, 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.

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 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 soils profiles beneath those or adjacent to those observed. No warranties expressed or implied are given on the content of this report.

Swelling soils and bedrock materials were encountered at this site. These materials are stable at their natural moisture content but can shrink or swell with changes in moisture. The behavior of swelling soils and bedrock materials 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 swelling soils/bedrock materials. As noted previously, the owner must be made aware there is a risk in construction on these types of soil/bedrock materials. Performance of the structure 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. 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 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 or his representative to insure that the information in this report is incorporated into the plans and/or specifications and construction of the project.

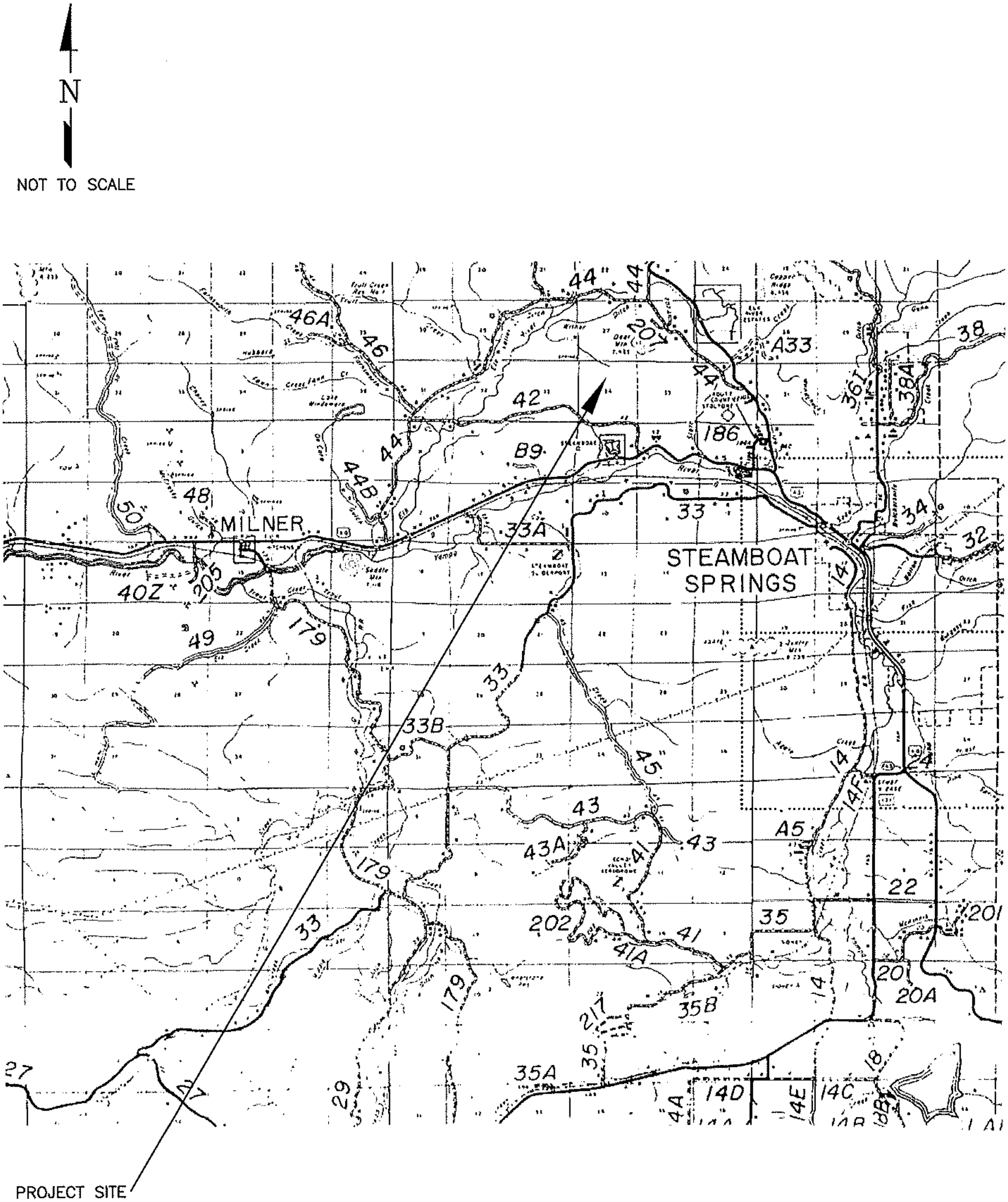
If you have any questions regarding this report or if NWCC may be of further service, please do not hesitate to contact us.

Sincerely,
NWCC, INC.

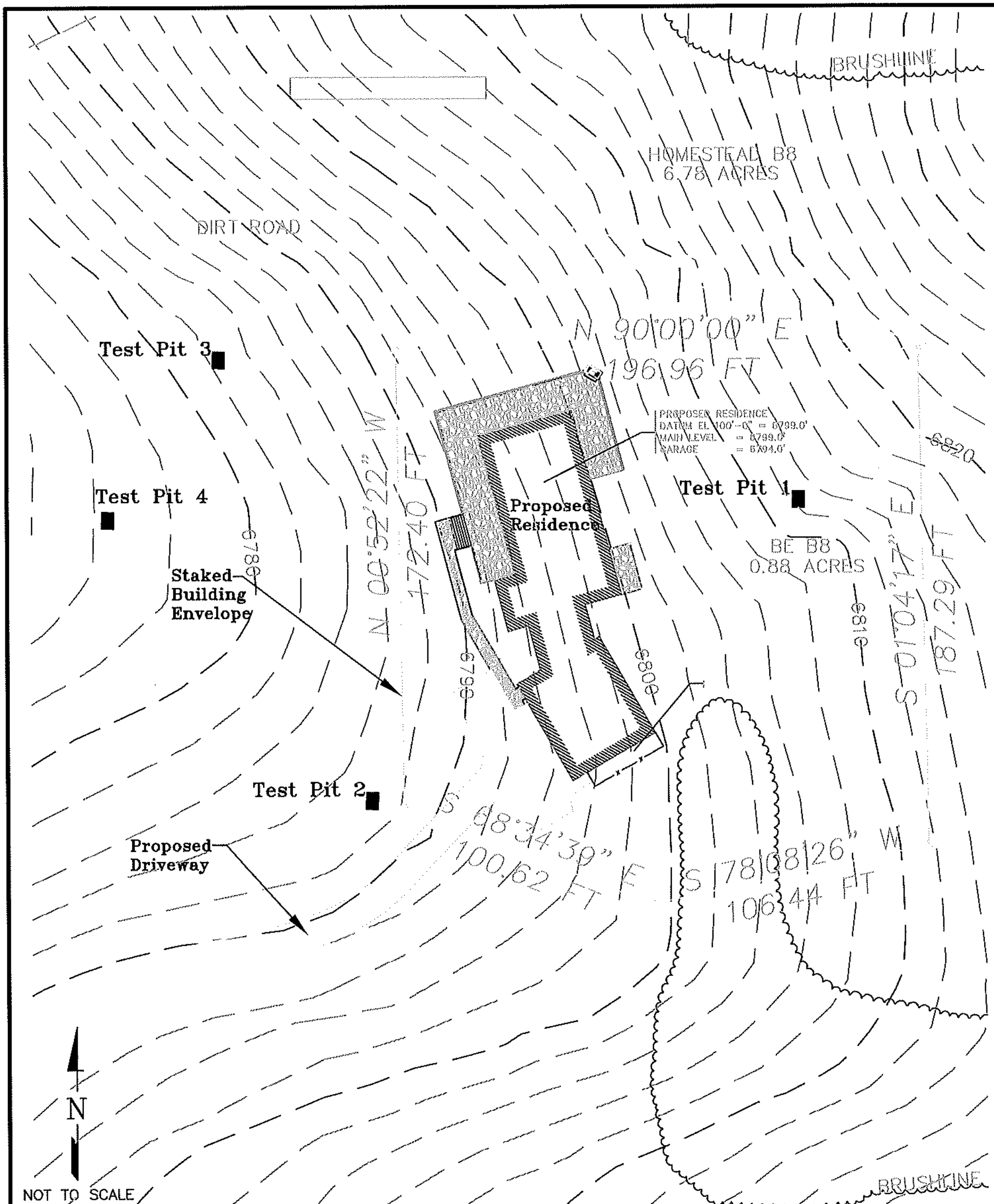
Timothy S. Travis, P.E.
Senior Project Engineer

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

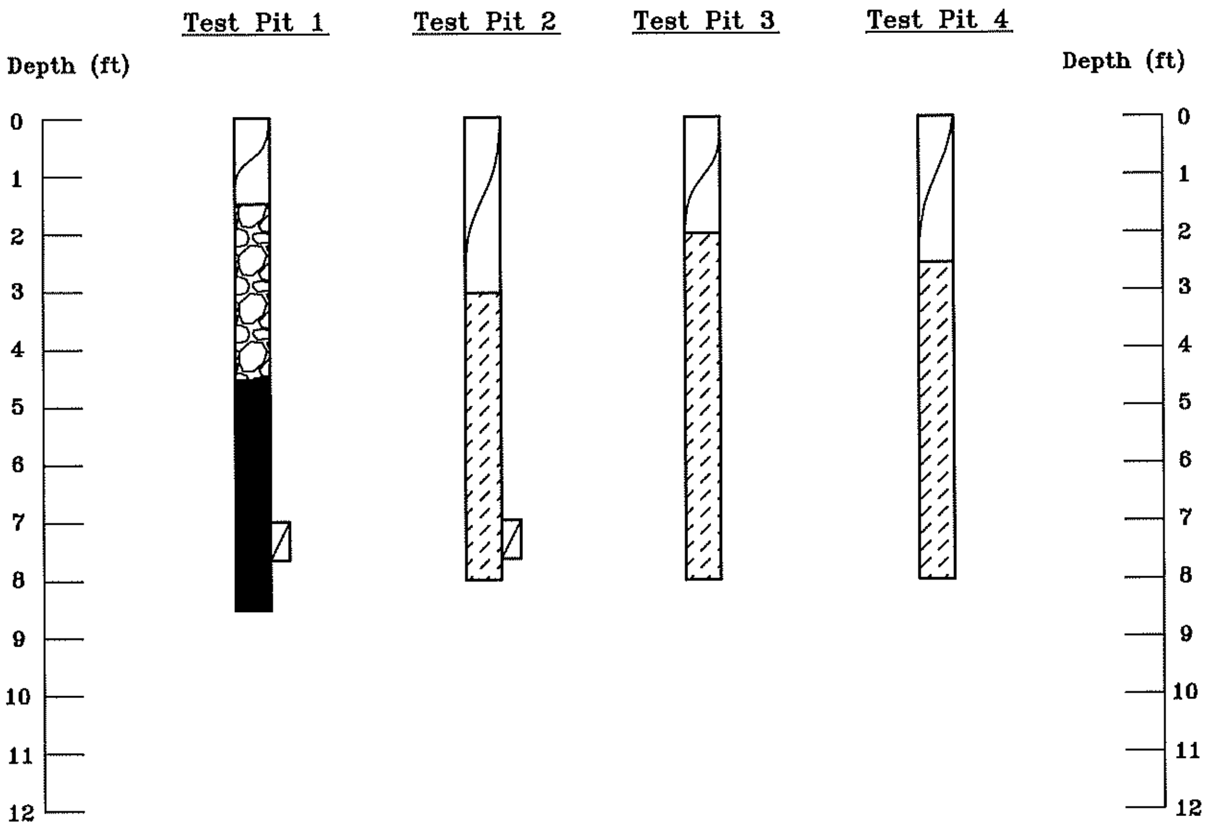
COLORADO LICENSED
BRIAN D. LEN
25750
1/31/18
PROFESSIONAL ENGINEER



Title: VICINITY MAP	Date: 1/24/18	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 Blandford Residence	Job No. 17-10957	
Location: Homestead B8, Marabou Sub., Fil. 1, Routt Cnty, CO	Figure #1	



Title: SITE PLAN–LOCATION OF TEST PITS	Date: 1/24/18	North West Colorado Consultants, Inc.
Job Name: Proposed Blandford Residence	Job No. 17-10957	Geotechnical / Environmental Engineering · Materials Testing
Location: Homestead B8, Marabou Sub., Fil.1, Routt County, CO	Figure #2	(970)879-7888 · Fax (970)879-7891 2580 Copper Ridge Drive Steamboat Springs, Colorado 80487



LEGEND:

TOPSOIL AND ORGANICS.

SANDS AND GRAVELS: Clayey, fine to coarse grained, low plastic, dense, slightly moist to moist and brown in color.

CLAYS: Slightly sandy, fine-grained, moderately to highly plastic, stiff to very stiff, moist and brown in color.

CLAYSTONE BEDROCK: Slightly sandy, fine-grained, moderately to highly plastic, weathered to medium hard, slightly moist to moist and brown to gray in color.

Hand Drive Sample-California Liner.

NOTES:

1) Test pits were excavated on November 15, 2017 with a Cat backhoe.

2) Test pit locations were determined by pacing from the staked building envelope corners.

3) Elevations of the test pits were not measured and the logs are drawn to the depths investigated.

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

Title: LOGS, LEGEND AND NOTES	Date: 1/24/18
Job Name: Proposed Blandford Residence	Job No. 17-10957
Location: Homestead B8, Marabou Sub., Fil.1, Routt County, CO	Figure #3

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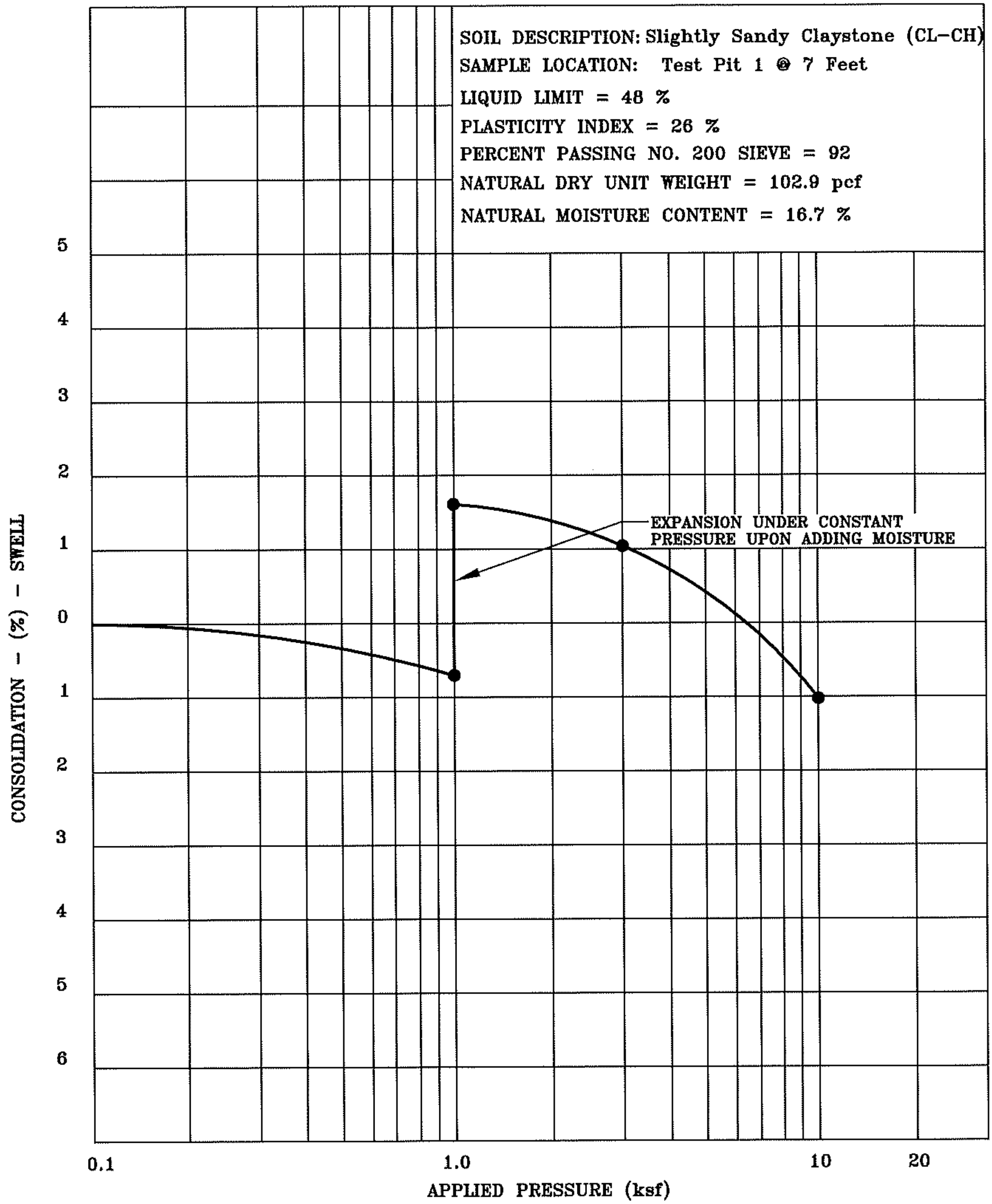
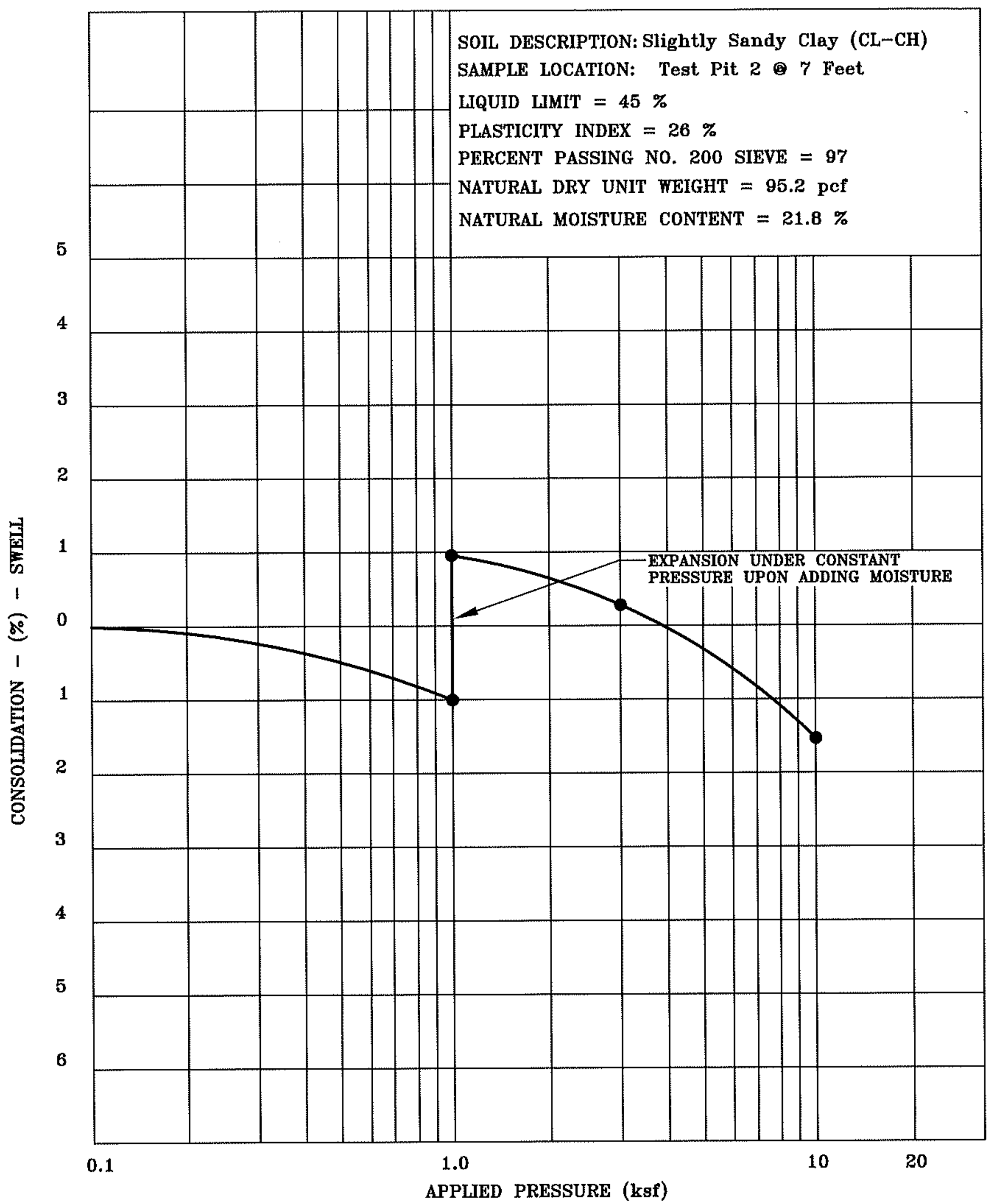
(970)879-7888 - Fax (970)879-7891
2580 Copper Ridge Drive
Steamboat Springs, Colorado 80487



Title: SWELL–CONSOLIDATION TEST RESULTS		Date: 1/24/18	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 Blandford Residence		Job No. 17-10957	
Location: Homestead B8, Marabou Sub., Fil.1, Routt County, CO		Figure #4	



Title: SWELL–CONSOLIDATION TEST RESULTS

Date: 1/24/18

Job Name: Proposed Blandford Residence

Job No. 17–10957

Location: Homestead B8, Marabou Sub., Fil.1, Routt County, CO

Figure #5

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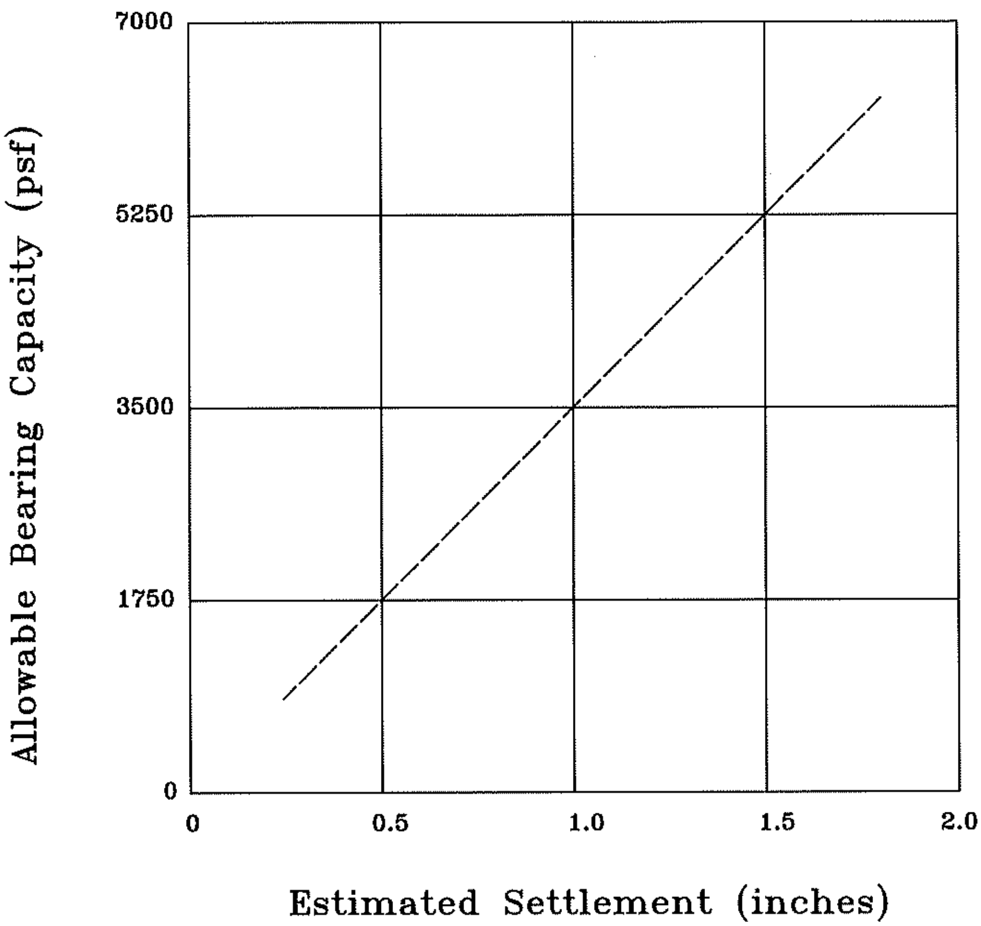
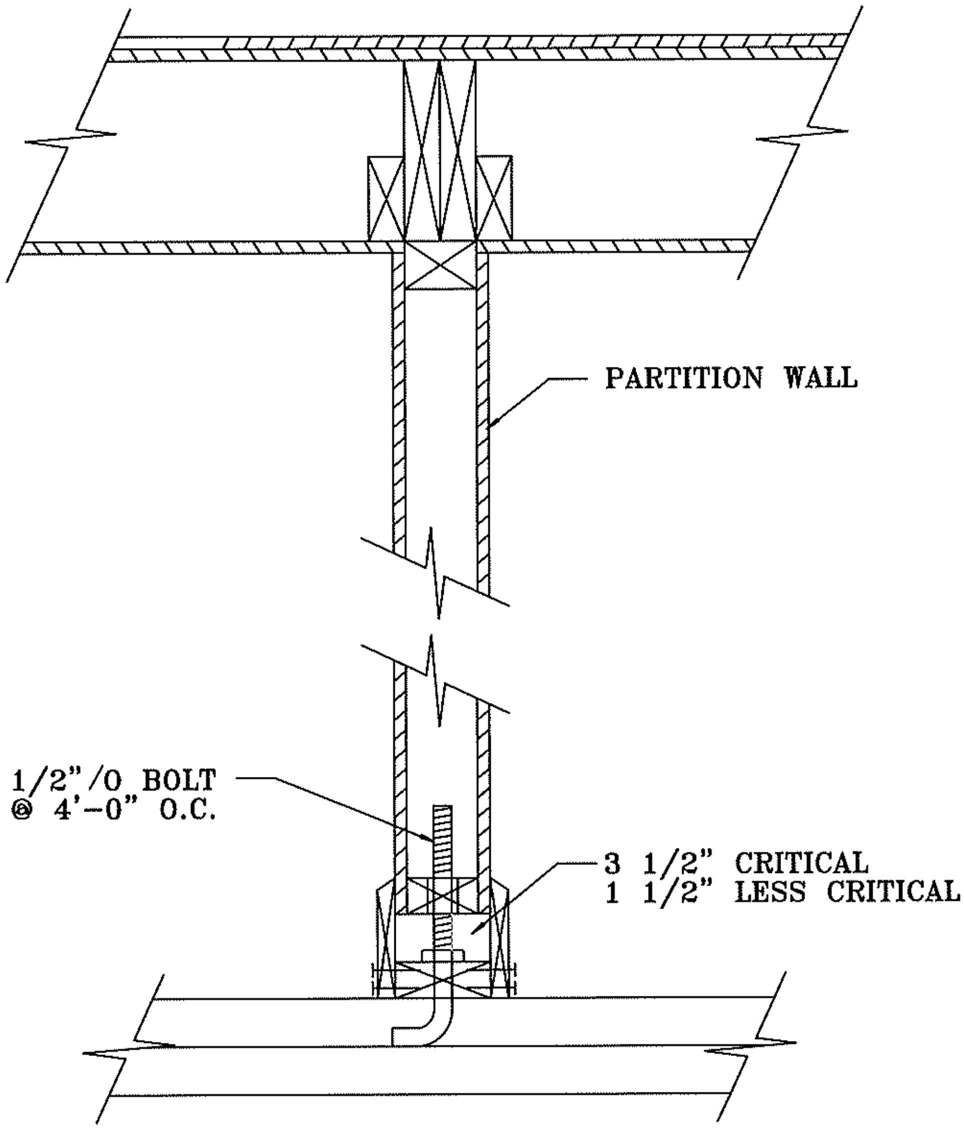
2580 Copper Ridge Drive
Steamboat Springs, Colorado 80487



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: 1/24/18	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 Blandford Residence	Job No. 17-10957	
Location: Homestead B8, Marabou Sub., Fil.1, Routt County, CO	Figure #6	



Title: HUNG PARTITION WALL DETAIL	Date: 1/24/18
Job Name: Proposed Blandford Residence	Job No. 17-10957
Location: Homestead B8, Marabou Sub., Fil.1, Routt County, CO	Figure #7

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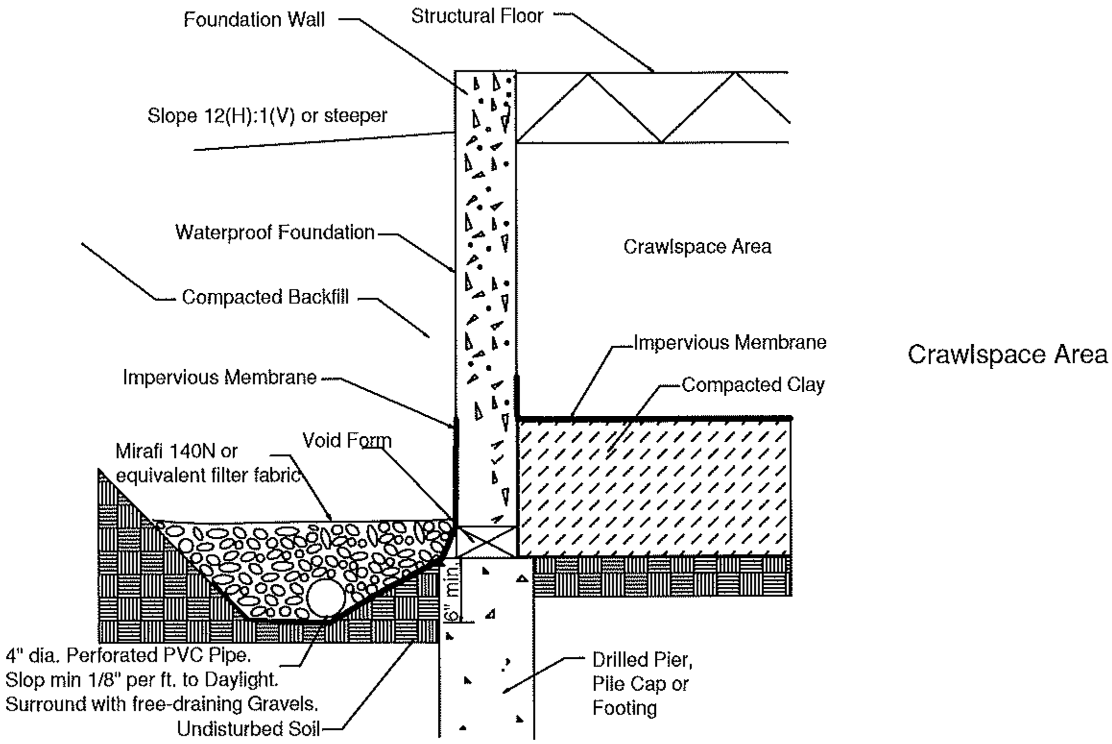
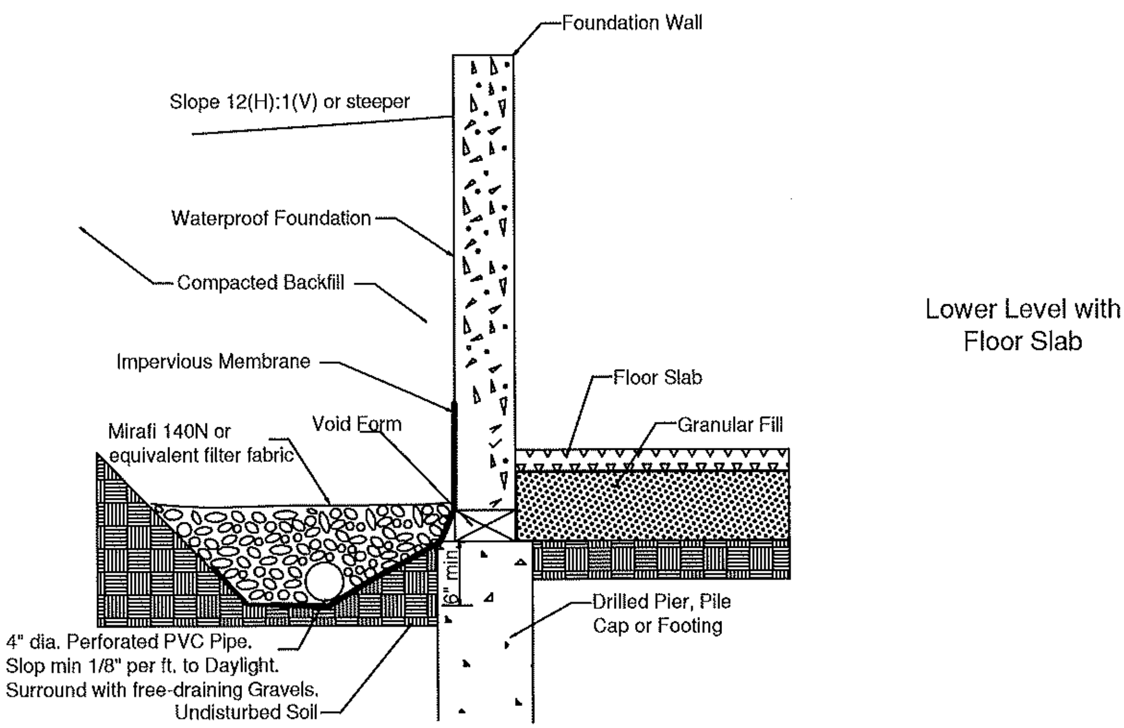
2580 Copper Ridge Drive
Steamboat Springs, Colorado 80487





Title: PERIMETER/UNDERDRAIN DETAIL	Date: 1/24/18	North West Colorado Consultants, Inc.
Job Name: Proposed Blandford Residence	Job No. 17-10957	Geotechnical / Environmental Engineering - Materials Testing
Location: Homestead B8, Marabou Sub., Fil.1, Routt County, CO	Figure #8	(970)879-7888 - Fax (970)879-7891 2580 Copper Ridge Drive Steamboat Springs, Colorado 80487

NWCC, Inc.

TABLE 1

SUMMARY OF LABORATORY TEST RESULTS

SAMPLE LOCATION		NATURAL MOISTURE CONTENT	NATURAL DRY DENSITY	ATTERBERG LIMITS		GRADATION		PERCENT PASSING No. 200 SIEVE	UNCONFINED COMPRESSIVE STRENGTH (psf)	SOIL or BEDROCK DESCRIPTION	UNIFIED SOIL CLASS.
TEST PIT	DEPTH (feet)	(%)	(pcf)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	GRAVEL (%)	SAND (%)				
1	7	16.7	102.9	48	26	0	8	92		Slightly Sandy Claystone	CL–CH
2	7	21.8	95.2	45	26	0	3	97		Slightly Sandy Clay	CL–CH

JOB NUMBER: 17–10957