



July 17, 2006

Wharton Development Group
P.O. Box 772707
Steamboat Springs, CO 80477

Attn: Paul Franklin

Job Number: 06-7128

Subject: Subsoil and Foundation
Investigation Review, Site Grading &
Pavement Recommendations, 5th & Yampa
Project, Lots 10-12, Block 27, Original
Town of Steamboat Springs, Colorado.

Ladies and Gentlemen:

As requested, NWCC, Inc. has reviewed the original Subsoil and Foundation Investigation report previously prepared for the proposed development of Lots 11 & 12 in Block 27 of the Original Town of Steamboat Springs, Colorado, which was prepared under our job number 02-5421 and dated November 26, 2002. It is our understanding that the Geotechnical & Preliminary Hydrocarbon Investigation report will be used in the design of the foundations for the proposed 5th & Yampa Project, which will be constructed in the above reference lots, as well as Lot 10, located to the west. This review has been completed in accordance with our recommendations outlined in the Limitations section of the previously prepared report. Also included in this report are recommendations for the site grading and pavement structures for the site.

Proposed Construction: It is our understanding, based on our conversations with the architect that the client proposes to construct a mixed residential and retail structure at the site. We have assumed that the structure will consist of a one to two-story wood or steel framed structure placed over a full-depth walkout lower level. We have also assumed that the lower level of the structure will be constructed with a concrete slab-on-grade floor system placed near the existing ground surface. In addition a lower level-parking garage will be constructed at the site.

Foundation Recommendations: Based on our review of the Geotechnical Investigation report previously completed by our firm for this site, we do not believe that modifications to the recommendations for the construction of the foundations, floor slabs, foundation and retaining walls and surface drainage will be required at this time for the design and construction of the proposed development. Our previous investigation did not include Lot 10; therefore, at a minimum, NWCC, Inc. must be retained by the client to observe the foundation excavations to verify the soil conditions and confirm the recommendations made in the original Geotechnical Investigation report.

Based on the proposed construction, we recommend that the Underdrain System recommendations outlined in the original Geotechnical Investigation be replaced with the following:

Underdrain System: The lower levels of the proposed building structure should be protected by perimeter/underdrain systems to help reduce the problems associated with surface drainage during high runoff periods and the groundwater table. Ideally, the concrete slabs in the lower levels of the structures and parking garage should be placed a minimum of 2 feet above the seasonal high groundwater level. However, based on our understanding of the proposed construction and the depth to groundwater at the site, it does not appear that placing the lower level above the groundwater table will be feasible.

The underdrains should be located around the entire perimeter of the buildings and be placed at least 2 feet below the lower floor slab elevation. In addition, the placement of at least two feet of free draining gravels and lateral drainpipes under the floor slabs will need to be installed. The actual spacing, depth and size of the lateral drains should be determined after the building excavations have been completed and the amount of groundwater seepage/flow can be determined.

We recommend the use of perforated PVC pipe for the drainpipes, which meets ASTM D-3034/SDR 35 requirements, to minimize the potential for crushing the pipe during backfill operations. The drainpipe should be surrounded by at least 12 inches of free draining gravel. The holes in the drain tile should be oriented down between 4 o'clock and 8 o'clock to promote rapid runoff of the water. The drain tile system should be protected from contamination by a filter covering of Mirafi 140N subsurface drainage fabric or an equivalent product. The drain should have a minimum slope of 1/8 inch per foot and be led to sump pits from which the water can be pumped. Three or more sump pumps and pits should be considered for the proposed structure. Caution should be taken when backfilling these areas so as not to damage or disturb the installed underdrain. We recommend the drainage system include at least one cleanout for every 100 lineal feet of pipe, be protected against intrusion by animals at the outfall and be tested prior to backfilling. A typical perimeter/underdrain detail is shown in Figure #1.

Site Grading Recommendations: All of the fill materials placed beneath the floor slabs, pavement areas or underground utilities should be uniformly placed and compacted to at least 95 percent of the maximum standard Proctor density and within 2 percent of the optimum moisture content as determined in accordance with ASTM D698/AASHTO T99. The fill materials placed in these areas should not contain boulders, topsoil, organics or other deleterious substances. The fill materials placed in the landscaped areas should be compacted to at least 92 percent of the maximum standard Proctor density. The materials not suitable for use under the building and pavement areas should be placed in the bottom of the fills in landscaped areas, where some settlement can be tolerated.

Site grading should be carefully planned to provide positive surface drainage away from all building and pavement areas. The building and pavement areas should be placed as high as possible on the site so that positive drainage away from these structures can be provided. Surface diversion features should be provided around parking areas to prevent surface runoff from flowing across the paved surfaces.

We recommend that unretained cuts in the natural overburden soils not exceed a 2(H) to 1(V) configuration. Steeper cuts for the construction of the foundation walls may require shoring or bracing. Where fills are required, we recommend that the fill slopes not exceed 2 (H) to 1 (V) configuration if they are properly compacted and drained. Positive surface drainage should be provided around all permanent cut and fill slopes to direct surface drainage away from the slope faces. All cut and fill slopes and other disturbed areas should be protected against erosion by revegetation or other methods.

Pavement Section Recommendations: Based on the subsurface conditions encountered across the site during the previous investigation, our understanding of the proposed traffic loadings, and our experience with similar projects, we recommend that the smaller parking areas, which are subjected primarily to low volume automobile traffic, be paved with a composite section consisting of 3 inches of asphalt, 4 inches of base course gravels and a minimum of 6 inches of subbase (pit run) sands and gravels.

We recommend that the roadways that are subjected to higher volumes of both automobile and truck traffic, such as the entrance roadways and alley, be paved with a composite section consisting of 4 inches of asphalt, 6 inches of base course gravels and a minimum of 8 inches of subbase (pit run) gravels.

The asphalt pavement should consist of a hot bituminous plant mix meeting the job mix formula established by a qualified engineer, which also meets Colorado Department of Transportation (CDOT) specifications. The base course materials should consist of a well-graded aggregate base course material, which meets CDOT Class 6 grading and durability requirements. The subbase (pit run) sands and gravels should be a well-graded sand and gravel that meets the CDOT Class 2 grading and durability requirements.

In lieu of the flexible pavement sections outlined above, the automobile parking areas can be paved with a minimum of 5 inches of Portland cement concrete and the truck and automobile traffic areas may be paved with a minimum of 6 inches of Portland cement concrete. Trash dumpster pads, loading dock areas and other areas where truck turning movements are concentrated should be paved with at least 8 inches of Portland cement concrete. If a snowmelt system is placed in the concrete pavement then the concrete sections given above will need to be increased by at least 1 inch. All of the concrete pavement should be sawed or formed to provide joints to $\frac{1}{4}$ depth of the slab at a maximum distance of 12 feet on centers.

Subgrade Preparation: We recommend that the pavement areas be prepared by scarifying, moisture conditioning and re-compacting the exposed soils to provide uniform support for the pavements and help control differential movement. We recommend that the pavement subgrade areas be scarified to a depth of at least 8 inches; the exposed materials be moisture conditioned by bringing the scarified soils to within +/- 2 percent of the optimum moisture content; and then recompact the properly moisture treated soils to at least 95% of the maximum standard Proctor density determined in accordance with ASTM D698/AASHTO T99. After the subgrade soils have been properly moisture treated and recompacted, the subgrade should be proof rolled with a heavily loaded pneumatic tired vehicle and any areas which deform excessively under the wheel loads should be removed and replaced or stabilized prior to paving operations. All of the topsoil and organic materials must be removed from beneath the pavement areas. Areas of soft clays or silts may be encountered near subgrade elevations in some areas. Removal and replacement of these materials may be required and should be evaluated at the time of construction. The fill materials placed in the roadways should be uniformly placed and compacted in 6 to 8 inch loose lifts to at least 95 percent of the maximum standard Proctor density and within +/- 2 percent of the optimum moisture content determined in accordance with ASTM D1557/AASHTO T180.

Drainage: The collection and diversion of surface and subsurface drainage away from paved areas is extremely important to satisfactory performance of the pavements. Surface and subsurface drainage at the site may contribute to premature pavement distress. Runoff at the site is capable of entering the subgrade soils and base course

aggregates beneath the pavement, which causes them to lose strength and fail or deflect. Therefore, this water should be diverted away from the pavement structure.

Limitations: The recommendations given in this report are based on the soils exposed at this site during our previous investigation, the assumed traffic loadings and our experience with similar projects. We believe that this information gives a high degree of reliability for anticipating the behavior of the proposed building and pavement 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 of the accuracy of these recommendations beyond the limits of the obtained data is herein expressed or implied.

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 were changed, the results would also most likely change. 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.

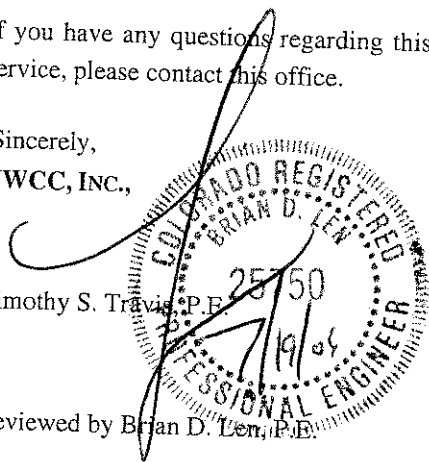
It is the responsibility of the owner or his representative to insure that the information in this report and our previous report are incorporated into the plans and/or specifications and construction of the project. It is advisable that a contractor familiar with construction details typically used for the local subsoil and climatic conditions be retained to build the building and pavement structures.

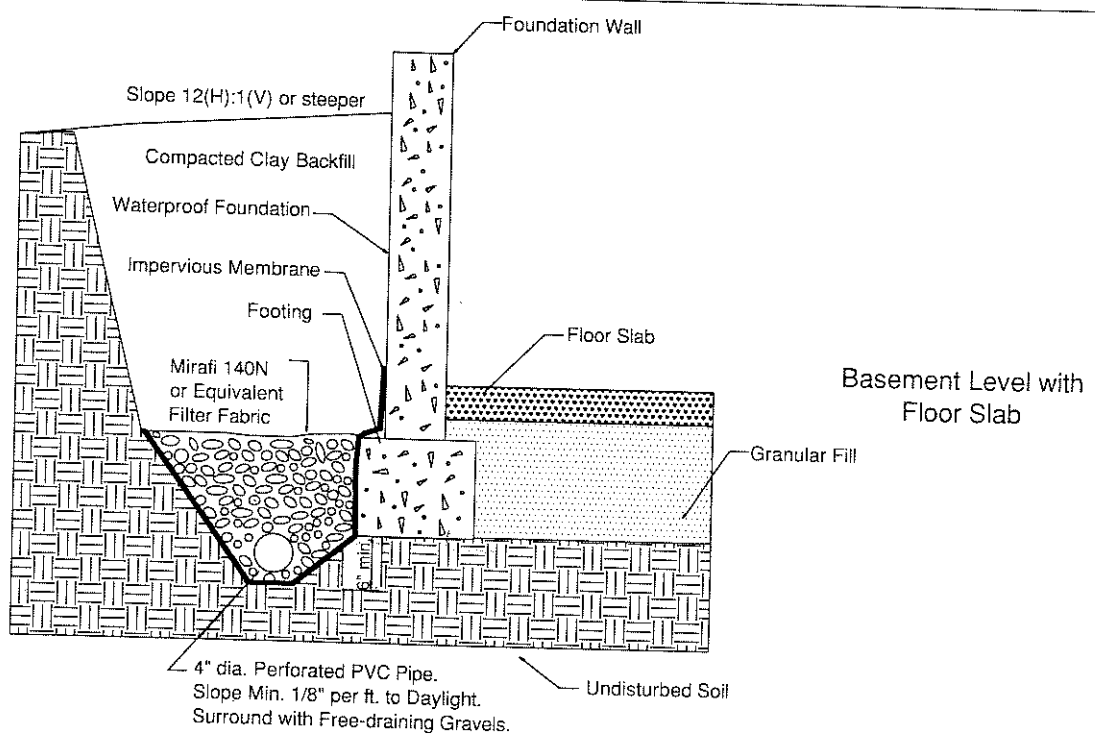
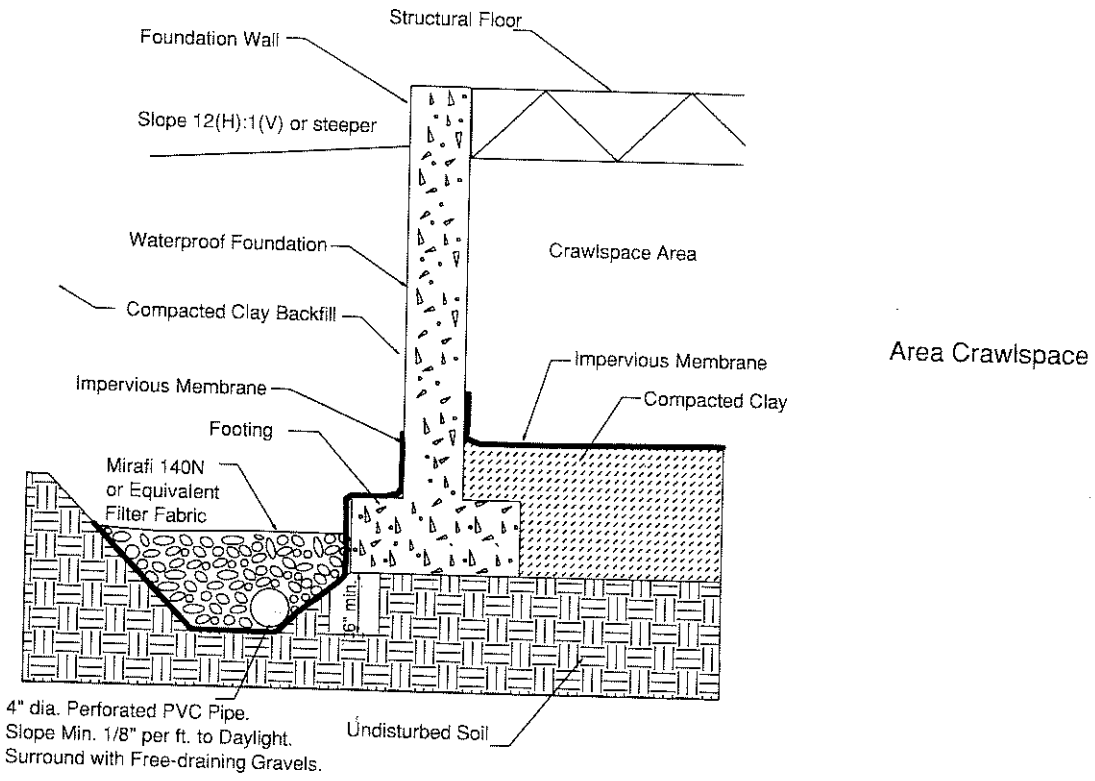
If you have any questions regarding this report, our observations or recommendations or if we may be of further service, please contact this office.

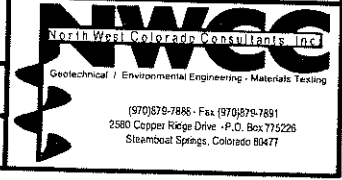
Sincerely,
NWCC, INC.,

Timothy S. Travis, P.E.

Reviewed by Brian D. Lee, P.E.





Title: PERIMETER/UNDERDRAIN DETAIL	Date: 7/12/06	
Job Name: 5th & Yampa Project	Job No.: 06-7128	
Location: Lots 10-12, Blk 27, Orig. Town of Steamboat Springs	Figure: #1	