



June 8, 2021

Overland Property Group, LLC
Matt Gilliam
5345 W. 151st Terrace
Leawood, Kansas 66224

Job Number: 20-11831

Subject: Supplemental Subsoil and
Foundation Investigation, Anglers Four
Hundred Apartments, 400 Anglers Drive,
Steamboat Springs, Colorado.

Matt,

This report presents the results of the Supplemental Subsoil and Foundation Investigation (SSFI) for the Anglers Four Hundred Apartments to be constructed at 400 Anglers Drive in Steamboat Springs, Colorado. NWCC previously prepared an SSFI and Subsoil and Foundation Investigation for the subject property under our job numbers 20-11831 dated December 16, 2020, and 03-5824 and dated January 12, 2004. We also prepared a Subsurface Investigation and Subsoil and Foundation Investigation Update for the subject property under our job number 08-7936 and dated April 11, 2008.

The approximate location of the project site is shown in Figure #1.

NWCC, Inc. (NWCC) scope of our work included obtaining data from recent observations made at the site, our review of the previously completed reports, and the recent logging of three additional 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 the proposed construction will consist of two residential apartment buildings (Buildings A and C) along with a common community building (Building B) situated between the two apartment buildings. Building B will be a single-story structure, whereas Buildings A and C will both be four-story structures. NWCC understands the lower levels of the buildings will be constructed with concrete slab-on-grade floor systems placed a few feet above the existing site grade. Based on our review of the conceptual drawings, it appears that the first-floor level of Building C, which is located at the east half of the property, will be constructed at the second-floor level of Building A.

It also appears that internal roadways, parking areas, and trash dumpster pads will be situated to the north of the proposed buildings.

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

Subsurface Conditions: To investigate the subsurface conditions at the site, three additional test pits were advanced at the site on June 1, 2021, with a Yanmar Vio 45 trackhoe. The approximate test pit locations are shown in Figure #2. It should be noted that NWCC had previously advanced ten test pits and five test holes at the project site during the previous investigations.

The subsurface conditions encountered were variable and generally consisted of a layer of fill materials overlying natural sands and gravels or natural clays overlaying natural sands and gravels to the maximum depth investigated, 4 ½ to 5 feet below the existing ground surface (bgs). Graphic logs of the recently excavated exploratory test pits, along with the associated Legend and Notes, are presented in Figure #3. It should be noted that the subsurface conditions encountered during our previous investigations, were similar to the conditions recently observed on June 1, 2021.

In Test Pits 1 and 3, a layer of fill materials was encountered at the ground surface and extended to depths ranging from approximately 20 to 30 inches bgs. The fill materials were underlain by natural sands and gravels extending to the maximum depths explored approximately 4 ½ to 5 feet bgs, respectively.

In Test Pit 2, a layer of fill materials was encountered at the ground surface and was approximately 18 inches in thickness. The fill materials were underlain by natural clays extending to approximately 3 ½ feet bgs. The clays were underlain by natural sands and gravels consistent with those found in Test Pit 1 and Test Pit 3.

The fill materials were highly variable and generally consisted of clays, sands, and gravels that were non to moderately plastic, fine to coarse-grained with cobbles and occasional boulders, stiff to medium dense, moist, and brown to dark brown in color.

The natural sands and gravels varied from silty to clayey, low to non-plastic, fine to coarse-grained with cobbles and boulders, medium dense, slightly moist to wet, and light brown to brown in color.

The natural clays were sandy to very sandy, low to moderately plastic, fine to coarse-grained with gravels, stiff, moist to wet, and reddish-brown in color. A sample of the natural clays classified as a CL soil in accordance with the USCS.

Swell-consolidation testing was not conducted on the clays due to difficulty obtaining an undisturbed sample, laboratory test results are summarized in the attached Table 1.

Groundwater was encountered at a depth of approximately 4 feet and 3 inches bgs (approximate Elevation 6772.53 feet MSL) in Test Pit 3 at the time of excavation. The seasonal high groundwater table is likely between 3 and 6 feet bgs in the location of Test Pit 3. It should be noted that the groundwater conditions at the site can be expected to fluctuate with changes in precipitation and runoff. It should be noted that the

groundwater was encountered in all of the test pits advanced in March 2008 at depths ranging from 4 to 6 feet bgs, and at elevations ranging from 6,770 to 6,776 feet MSL.

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.

Previous Recommendations: Based on our review of the original SSFI report (NWCC, 2021) and our June 1, 2021, observations and classification testing, the design and construction of the foundations should use the recommendations outlined in the original SSFI report.

NWCC understands based on discussions with the Architect of Record, Chris Gillam, with Jones Gillam Renz the following:

- 1) Any existing fill materials, topsoil, and organic materials, natural clays, or loose and soft natural soils encountered within the foundation excavations, will be removed and the excavations extended to competent natural sands and gravels.
- 2) All precipitation falling on the roof will be collected and routed through the storm drains.
- 3) Lower levels will consist of slab on grade floor systems placed directly on non-expansive sands and gravels or on properly placed structural fill placed directly on non-expansive sands and gravels.

As a result, modifications to the recommendations for foundation, foundation and retaining walls, and surface drainage will not be required at this time for the design and construction of the proposed structures.

However, NWCC has provided additional Floor Slab and Under Drain recommendations, as noted below.

Additional Floor Slab Recommendations: As referenced above NWCC understands that all natural clays will be removed and the floor slabs will be placed on non-expansive natural sand and gravels or on fill materials placed directly on non-expansive sands and gravels.

NWCC understands the lower levels of the proposed buildings will be constructed with concrete slab-on-grade floor systems, placed from a few feet above the existing ground surface. The natural soils, exclusive of any topsoil and organic materials, are capable of supporting lightly to moderately loaded slab-on-grade construction. The floor slabs should be provided with control joints placed a maximum of 10 to 12 feet on center in each direction, depending on slab configuration, to help control shrinkage cracking. The location of the joints should be carefully checked to assure that the natural, unavoidable cracking will be controlled. The depth of the control joints should be a minimum of $\frac{1}{4}$ the thickness of the slab.

Any fill materials placed beneath the floor slabs should be a non-expansive granular soil approved by NWCC prior to placement. The fill should be placed in 6 to 8 inch loose lifts and be compacted to at least 95% of the maximum standard Proctor density and within 2% of the optimum moisture content. The on-

site sands and gravels should be suitable for use as fill materials beneath the floor slabs after the soils are properly moisture conditioned. The existing fill materials could be reused beneath the floor slabs after the soils are properly moisture conditioned. However, the natural clay materials are **not** suitable for use as fill materials and should be separated when removed from the building foot-print. Additionally, we recommend that all of the topsoil and organic materials and any existing fill materials encountered, be removed from underneath the floor slabs prior to concrete or fill placement.

NWCC recommends that any level constructed below the existing ground surface be constructed a minimum of 2 feet above the seasonal high groundwater table.

Omission of Underdrain System Recommendations: As outlined above NWCC understands all precipitation falling on the roof will be collected and routed through the storm drains. If all precipitation falling on the roof is collected and routed through the storm drains then the Under Drain recommendation section outlined in our SSFI (NWCC, 2020) will not be required.

Limitations: The recommendations provided in this report are based on the subsurface conditions encountered at this site and NWCC's 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 stable at their natural moisture content but can shrink 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 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. 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 this office.

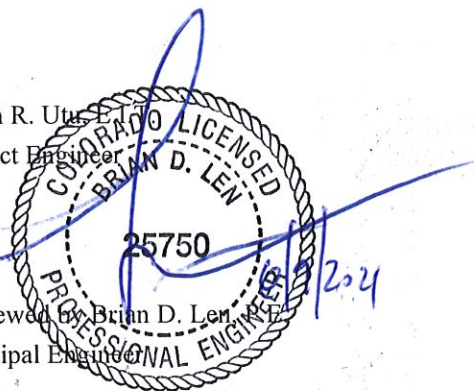
This report is based on the investigation at the described site and on the specific anticipated construction as stated herein. If either of these conditions is changed, the results would also most likely change. Therefore, NWCC strongly recommends that our firm be contacted prior to finalizing the construction 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 their representative to ensure 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 we may be of further service, please do not hesitate to contact us.

Sincerely,
NWCC, INC.

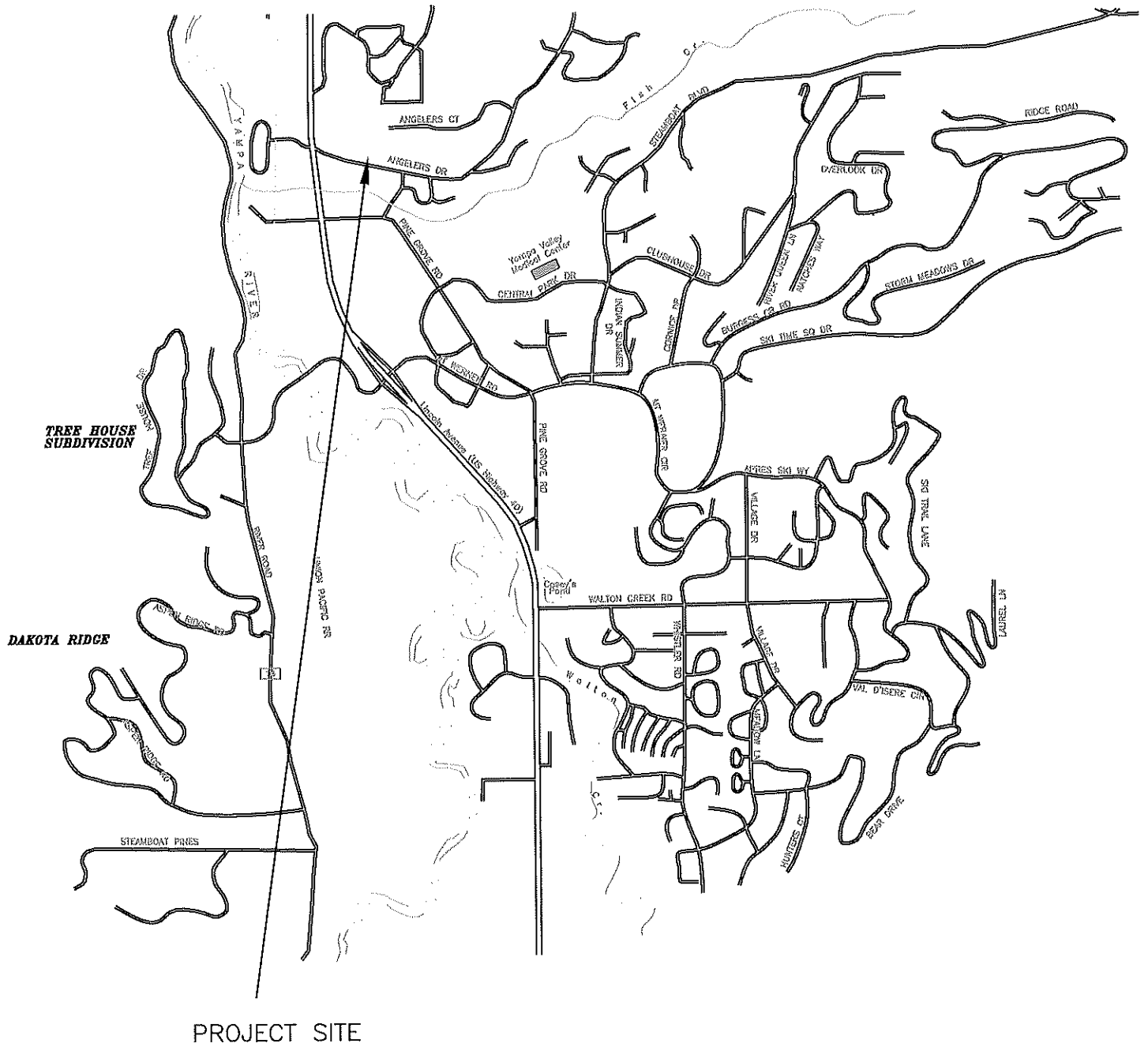
Bjorn R. Utter
Project Engineer




Reviewed by Brian D. Len
Principal Engineer



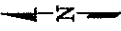
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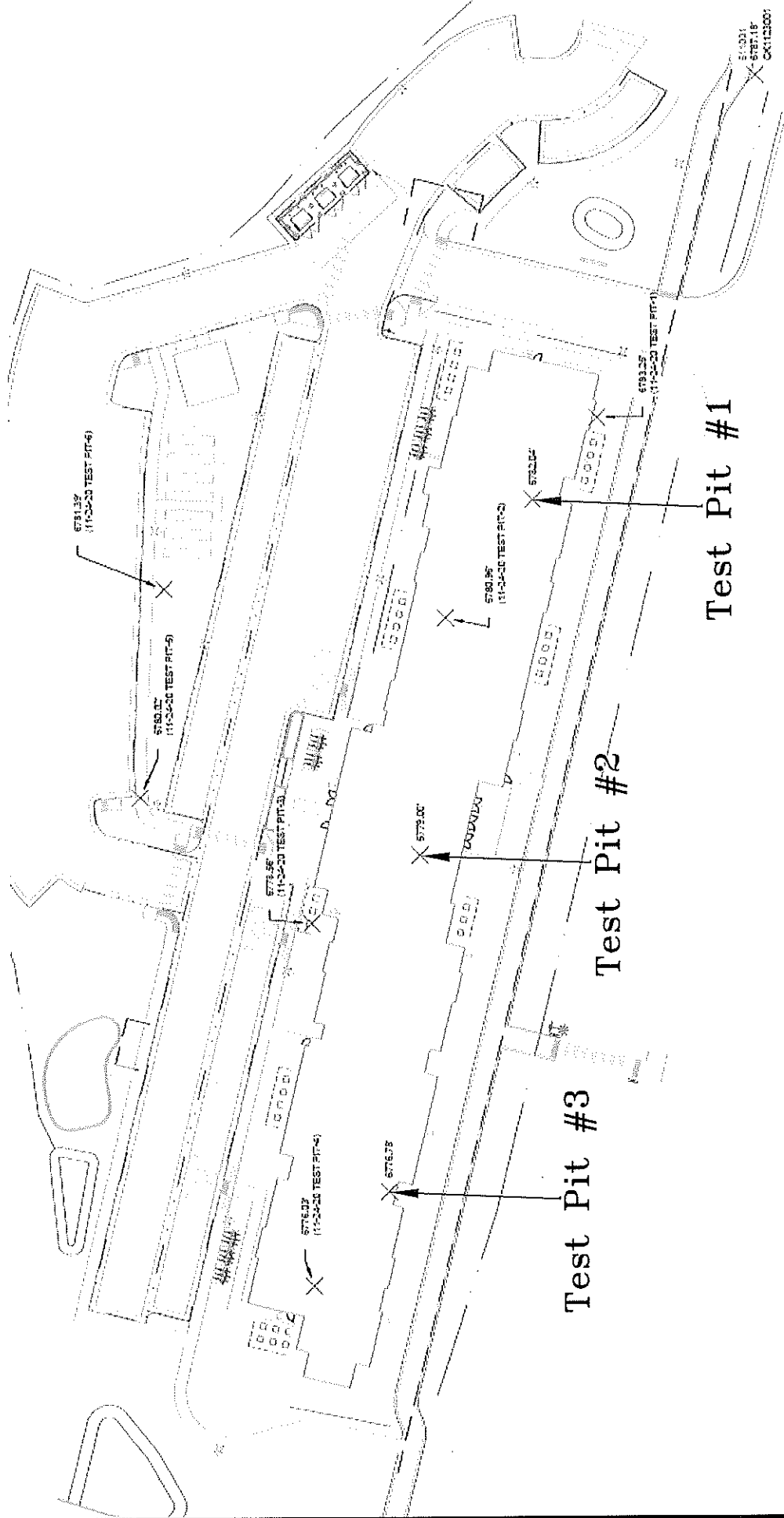
PROJECT SITE

Title: VICINITY MAP	Date: 6/7/2021	
Job Name: Anglers Four Hundred Apartments	Job No. 20-11831	
Location: 400 Anglers Drive, Steamboat Springs, Colorado	Figure #1	

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



NOT TO SCALE



NWCC
North West Colorado Consultants, Inc.
Geotechnical / Environmental Engineering - Materials Testing
(970) 875-7888 - Fax (970) 875-7891
2550 Copper Ridge Drive
Steamboat Springs, Colorado 80487

Date:	6/7/2021
Job No.	20-11831
Figure	#2

Title:	SITE PLAN - TEST PIT LOCATIONS
Job Name:	Anglers Four Hundred Apartments
LOCATION:	400 Anglers Drive, Steamboat Springs, Colorado

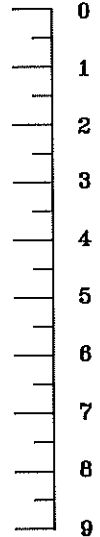
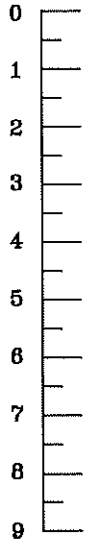
Test Hole 1
Elevation: 6782.04'

Test Hole 2
Elevation: 6779.00'

Test Hole 3
Elevation: 6,776.78'

Depth (ft)

Depth (ft)



LEGEND:



FILL: CLAYS, SANDS & GRAVELS: Non to moderately plastic, fine to coarse-grained with cobbles and occasional boulders, stiff to medium dense, moist, brown to dark brown.



SANDS & GRAVELS: Silty to clayey, low to non-plastic, fine to coarse grained with cobbles and boulders, medium dense, slightly moist to wet, and light brown to brown.



CLAYS: Sandy to very sandy, low to moderately plastic, fine to coarse-grained with gravels, stiff, moist to wet and reddish brown.



Small Disturbed Sample.



Indicates Depth To Groundwater at time of test pit excavation.

NOTES:

- 1) Test pits were excavated on June 1, 2021, with a Yanmar Vio 45 trackhoe.
- 2) Test pit locations were determined by stakes placed by Landmark Consultants, Inc.
- 3) Test pit elevations were determined by Landmark Consultants, Inc.
- 4) The lines between materials shown on the test pit logs represent the approximate boundaries between material types and transitions may be gradual.
- 5) The water level reading shown on the logs were taken at the time of excavation. Fluctuations in the water levels will occur with time and runoff conditions.

Title: LOGS, LEGEND AND NOTES

Date: 6/7/2021

Job Name: Four Hundred Anglers Apartments

Job No. 20-11831

Location: 400 Anglers Drive, Steamboat Springs, Colorado

Figure #3

NWCC, Inc.

TABLE 1

SUMMARY OF LABORATORY TEST RESULTS

SAMPLE LOCATION	TEST PIT	DEPTH (feet)	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.
					LIQUID LIMIT (%)	PLASTICITY INDEX (%)	GRAVEL (%)	SAND (%)				
2		2 1/2	17.4		34	18	9	39	52		Very Sandy Clay	CL