State of Utah

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Lt. Governor

Department of Administrative Services
KIMBERLY K. HOOD
Executive Director

Division of Facilities Construction and Management
ERIC R. THOLEN
Director

Addendum No. 1

Date:	February 1, 2016
To:	Contractors
From:	Brian Bales – Project Manager, DFCM
Reference:	Carbon County District and Juvenile Court Complex Administrative Office of the Courts DFCM Project No. 15346150
Subject:	**Addendum No. 1**

Pages	Addendum Cover Sheet	2	pages
	CM/GC Fee Schedule	3	pages
	Site Map	1	page
	Geotechnical Report	45	pages
	Total	51	pages

Note: This Addendum shall be included as part of the Contract Documents. Items in this Addendum apply to all drawings and specification sections whether referenced or not involving the portion of the work added, deleted, modified, or otherwise addressed in the Addendum. Acknowledge receipt of this Addendum in the space provided on the Bid Form. Failure to do so may subject the Bidder to Disqualification.

1.1 SCHEDULE: There are no project schedule changes.

1.2 GENERAL ITEMS:

1.2.1 A) Revised FLCC: $11,500,000 for building plus $ 150,000 for demolition of existing building. Total revised FLCC is $ 11,650,000.

B) Construction Schedule: It is anticipated that the project will begin September 1st with a minimum 16 month construction period. There is not a mandatory completion date which allows for some flexibility for the start date, other than demolition and construction should be observable before November 1, 2016.

C) Preconstruction services: The new CM/GC fee schedule is hereby modified for preconstruction services fees. Preconstruction services fees will be capped at $40,000. The CM/GC fee schedule will be used for all other fees.

D) The new CM/GC process does not consider cost as a component of the selection process therefor the points will be reduced by 20 for a total of 260 possible points. The cost proposal advertised with the RFP does not need to be submitted.

E) Plan approval will be provided by DFCM , Inspections will be provided by Carbon County.

F) This project will not utilize the DFCM High Performance Building design goals or the LEED Building process. It will include energy saving design elements which will be observed during construction and tested by ATI to verify compliance to design.

G) Commissioning may be included in the scope on a limited basis depending on final design.

H) Geotechnical report attached.

I) Approximate property boundaries map attached.

1.2.2 This project will utilize the new CM/GC Fee Schedule (attached). The selection criteria has be revised to exclude cost.

1.2.3 Bid Bond is no longer required.

1.2.4 Per the new CM/GC Fee Schedule/Policy Contingency will be 1% of the FLCC instead of 2%.

Exhibit A

16-Jul-15

CM/GC Fee Schedule

Project FLCC maximum:	A Pre-const. Fee	B Construction Management Fee % of FLCC	C Cost of Staff Fee % of FLCC	D Basic General Conditions % of FLCC	E Total Fee B-D % of FLCC	F Self performed work%
$1,000,000	$10,000	10.0%	6.5%	6.0%	22.50%	7.0%
$2,500,000	$12,500	8.0%	6.0%	4.5%	18.50%	7.0%
$5,000,000	$25,000	5.0%	5.0%	3.0%	13.00%	7.0%
$10,000,000	$40,000	3.5%	4.0%	1.5%	9.00%	7.0%
$20,000,000	$70,000	3.0%	4.0%	1.5%	8.50%	7.0%
$30,000,000	$90,000	2.9%	3.5%	1.5%	7.90%	7.0%
$50,000,000	$125,000	2.8%	3.5%	1.5%	7.80%	7.0%
$75,000,000	$187,500	2.8%	3.0%	1.5%	7.25%	7.0%
$100,000,000	$250,000	2.7%	3.0%	1.5%	7.20%	7.0%
$150,000,000	$300,000	2.6%	3.0%	1.5%	7.10%	7.0%

Management Fee, Staff Fee and Basic General Conditions could increase on Projects under $10,000,000 due to complexity and schedule duration

Each CM/GC is eligible to earn a Customer Satisfaction Incentive (CSI). The eligible incentive is established by DFCM holding at risk 20% of the Management Fee with a maximum cap of $100,000. The at risk portion of the fee is then increased up to $100,000 as defined here in.

Example:
Determining the Fee: FLCC of $15,000,000 x 3.0% = $450,000

Determining the maximum CSI: $450,000 x 20% = $90,000 held at risk and increased by a maximum of $90,000 for a total maximum possible CSI of $180,000

Each period the DFCM will evaluate the performance of the CM/GC based on the evaluation criteria. DFCM reserves the right to request any additional information required to complete this evaluation. Each period the CM/GC and the DFCM Management will meet to determine the amount of the CSI earned. After this meeting the DFCM will tabulate the period score to determine the amount of incentive earned for that period. After the CSI is determined for the period the CM/GC may immediately bill for the incentive earned in the period

Example:
$180,000 Eligible Incentive divided by five periods = $36,000 per period

Evaluation Criteria:
Budget/Change Management (20 points)
Schedule Management (20 points)
Preconstruction/ Quality Management (20 points)

Exhibit A

Responsiveness and Collaboration (20 points)
Procurement/ Safety and Site Management (20 points)
Total Points Possible 100

Period CSI Payment Determination:
At Risk Portion of CSI: a score of 80% or higher will receive 100% of the at risk portion, scores below 80% will lose the at risk portion for that period
Incentive Portion of CSI:
Scores from 80-100 % will earn an equal % of the Period Incentive (85% score = 85% incentive)
Scores below 80% will not earn any incentive for that that period

Re-earning of lost CSI: The CM/GC may “re-earn” a lost payment for the duration of one period following the previous period's loss of CSI. This is demonstrated by an increase in performance evaluation score from the previous month. The amount of fee "re-earned" will be equal to the difference of the fee earned this period and the fee earned the previous period.

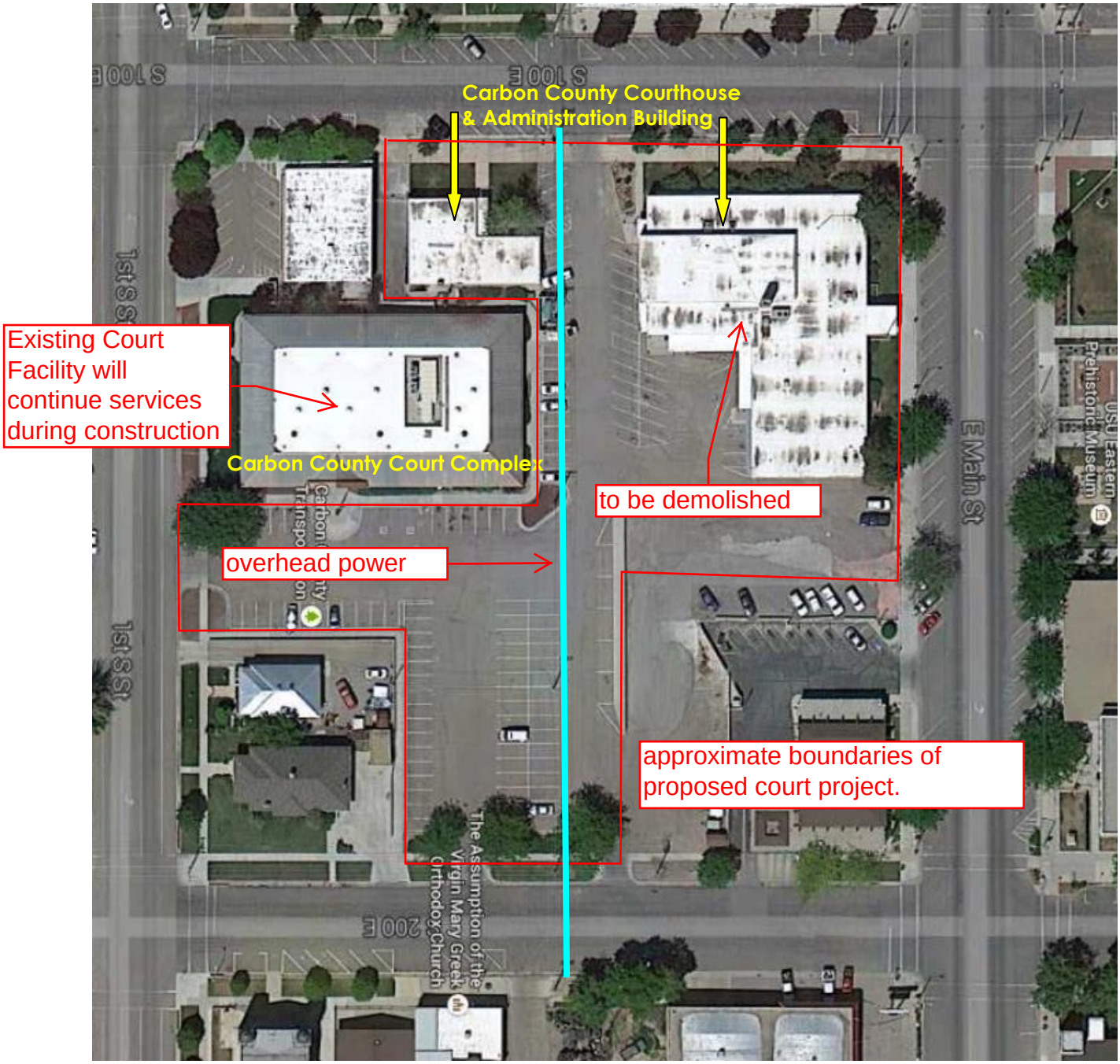
Basic General Conditions

Office Trailer
Storage Trailer
Conex/Van Storage 20'
Project Sign
Mobilization/ Demobilization
Security Equipment or Video Monitoring (Basic Security)
Telephone Service per line
Cell Phones per Person
DSL Line
BIM 360 (iPads, equipment)
BIM 360 (Software, fees, ets)
Computer/Software/Network/Email/License/Server/Maintenance
Copier/Fax/Scanner
Office Furnishings
Office Supplies
Primavera Schedule Software
Prolog Manager Software
Project Collaboration Sotware Website (Unifier,etc.)
Chemical Toilets
Banners
Water Cooler & Water
Water/Thermos/Ice/Cups
Jobsite Radio Communications
Progress Clean-Up
Safety Training
Safety Awards

Exhibit A

Safety & Productivity Incentives
First Aid/Safety Supply
Bulletin Board & Safety Signs/all Safety Supplies
Drug Testing
PPE (personal safety equipment)
Fire Extinguishers
Small Tools
Pick-Up Truck
Pick-up/Equip Gas, Oil, & Repairs
Submittals Expressage/Shipping
Progress Photos
As-Built Drawings & O&M manuals
Electronic Contract Document Storage
Punchlist Administration
LEED Management

Preconstruction serivces to include three bid packages. A fee of $10,000 will be added for each additional bid package above the three included bid packages


Carbon County Courthouse
& Administration Building
Existing Court Facility will continue services during construction
Carbon County Court Complex
to be demolished
overhead power
approximate boundaries of proposed court project.
S 100 E
1st S St
E Main St
200 E
The Assumption of the Virgin Mary Greek Orthodox Church
USU Eastern Prehistoric Museum

SITE MAP

GEOTECHNICAL INVESTIGATION

CARBON DISTRICT & JUVENILE COURTS COMPLEX

ADMINISTRATIVE OFFICE OF THE COURTS

Price, Utah

Prepared for:
State of Utah DFCM

January 2016

RB&G ENGINEERING, INC.

201501-036

RB&G
ENGINEERING, INC.

January 6, 2016

Brian Bales, PMP
State of Utah
DFCM Project Manager
4110 State Office Building
Salt Lake City, UT 84114

Re: Carbon District and Juvenile Courts Complex
Administrative Office of the Courts

Dear Mr. Bales:

A Geotechnical Investigation has been completed for the proposed Carbon District and Juvenile Courts Complex Administrative Office of the Courts in Price, Utah. The results of this study are summarized in the report transmitted herewith.

We appreciate the opportunity of providing this service for you. If there are any questions relating to the information contained herein, please call.

Sincerely,

RB&G ENGINEERING, INC.

REGISTERED PROFESSIONAL ENGINEER
NO.162291
BRADFORD E. PRICE
1/6/16
STATE OF UTAH

Bradford E. Price, P.E., President

bep/jal

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GEOTECHNICAL INVESTIGATION

Carbon District & Juvenile Courts Complex

Administrative Office of the Courts

Price, Utah

Prepared for:
State of Utah DFCM

January 2016

RB&G ENGINEERING, INC.

TABLE OF CONTENTS

1 INTRODUCTION 1
2 GEOLOGICAL AND EXISTING SITE CONDITIONS 2
3 FIELD AND LABORATORY TESTING PROCEDURES 3
4 SUBSURFACE SOIL AND WATER CONDITIONS 4
4.1 CONTAMINATION 5
5 FOUNDATION CONSIDERATIONS AND RECOMMENDATIONS 5
5.1 FOUNDATION TYPES AND BEARING CAPACITIES 5
5.1.1 Spread Footings on Compacted Fill 6
5.1.2 Deep Foundations 7
5.2 SEISMIC CONSIDERATIONS 9
5.3 LATERAL EARTH PRESSURES 10
5.4 FLOOR SLABS 11
6 SITE PREPARATION AND COMPACTED FILL REQUIREMENTS 12
7 WATER DETENTION STRUCTURES 13
8 FLEXIBLE PAVEMENT DESIGN 13
9 LIMITATIONS 15

FIGURES

VICINITY MAP ..... FIGURE 1
SITE PLAN & TEST HOLE LOCATIONS ..... FIGURE 2

APPENDIX

UNIFIED SOIL CLASSIFICATION SYSTEM
BORING LOGS (2015)
TABLE 1 – SUMMARY OF TEST DATA
CONSOLIDATION TESTS
BORING LOGS (2008)

RB&G ENGINEERING, INC.

GEOTECHNICAL INVESTIGATION

CARBON DISTRICT & JUVENILE COURTS COMPLEX

ADMINISTRATIVE OFFICE OF THE COURTS

PRICE, UTAH

1 INTRODUCTION

This report outlines the results of a geotechnical investigation performed for the proposed Carbon District and Juvenile Courts Complex Administrative Office of the Courts in Price, Utah.

RB&G Engineering performed a geotechnical investigation for a proposed Administration Complex to replace the existing structure in 2008. Six borings were drilled, with two of the borings extending to a depth of about 50 feet, and the remaining four to a depth of 15 feet. The two deep borings were drilled adjacent to the existing building on the north and south sides. The subsurface profile consisted predominantly of sandy lean clay to a depth of 38 to 40 feet, transitioning from weathered shale to competent shale from 40 to 45 feet. The near surface lean clay was typically in a firm to stiff condition with occasional soft layers, becoming softer with depth. The static groundwater was measured at a depth of about 22 feet below the ground surface in August 2008.

We understand that the existing Courthouse building, which includes a basement beneath a portion of this structure, will be demolished to make room for the new court building covering a footprint of approximately the same size. We also understand that the new building will have 2-stories above ground with a basement to be located under a portion of the new facility, and that the bottom of the basement footings are expected to be about 12 feet deep. The new basement is planned to provide underground parking, holding cells and equipment rooms. In addition, we understand that consideration is being given to constructing an underground storm water detention facility southwest of the building site.

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The purpose of this investigation was to determine the characteristics of the subsurface material to a sufficient depth throughout the new building and detention sites so that satisfactory substructures can be designed to support the proposed facility.

The information contained in the report is discussed under the following headings: Geological and Existing Site Conditions, Field and Laboratory Testing Procedures, Subsurface Soil and Water Conditions, Foundation Considerations and Recommendations, Site Preparation and Compacted Fill Requirements, and Flexible Pavement Design.

2 GEOLOGICAL AND EXISTING SITE CONDITIONS

The natural deposits in the Price area typically consist of alluvial silt and sand, underlain by clay and weathered shale, transitioning into more competent bedrock associated with the Mancos Formation. Experience has shown that the residual clay soils and weathered Mancos Shale in the area are often moisture sensitive and experience significant volume change upon wetting and drying.

The site is located within 25 miles of 3 potentially active fault zones. These are the (1) Pleasant Valley Fault Zone, (2) Joes Valley Fault Zone and (3) Price River Area Faults. The Pleasant Valley Fault Zone is the nearest, located approximately 18 miles northwest of the site. The Pleasant Valley and Joes Valley Fault Zones are capable of generating earthquakes with a magnitude of 7.0-7.5.

The topography throughout the area slopes gently downward in a southwesterly direction toward the Price River. There is approximately 4 feet elevation difference across the proposed building footprint.

The existing County Courthouse presently occupies most of the proposed building footprint, with asphalt parking and sidewalks adjacent to the structure. Landscaping consists of lawn grass, trees and shrubs along the north and west sides of the existing building. Areas for the proposed underground detention basins are presently covered with asphalt pavement.

Structures in this general area are typically supported using spread footings on compacted fill or deep foundations extending into the competent shale bedrock. It appears that the existing County

Courthouse building is supported on spread footings (likely underlain by compacted structural fill). Foundation performance appears to be satisfactory, in that no significant cracking was observed in foundation walls.

No major water conveyance facilities or other water bodies exist in the immediate vicinity, which would influence the groundwater level at this site. Other than the information provided above, no conditions appear to exist at this site which would adversely affect foundation performance.

3 FIELD AND LABORATORY TESTING PROCEDURES

The subsurface investigation was performed using a CME 55 rotary drill rig with a tri-cone rock bit and NW casing to advance the boring and water as the drilling fluid. During the subsurface investigation, sampling was performed at one- to five-foot intervals throughout the depth investigated. Both disturbed and undisturbed samples were obtained during the field investigations. Disturbed samples were obtained by driving a 2-inch split spoon sampling tube through a distance of 18 inches using a 140-pound weight dropped from a height of 30 inches. The number of blows required to drive the sampling spoon through each 6 inches of penetration is shown on the boring logs. The sum of the last two blow counts, which represents the number of blows to drive the sampling spoon through 12 inches, is defined as the standard penetration value. The standard penetration value, corrected for overburden and hammer energy, provides a good indication of the in-place density of sandy material; however, it only provides an indication of the relative stiffness of the cohesive material, since the penetration resistance of materials of this type is a function of the moisture content.

It will be noted that it was not possible to drive the sampling spoon through the full 18 inches at some sampling locations. Where the sampling tube could not be driven through the full 18 inches, the number of blows to drive the spoon through a given depth of penetration is shown on the boring logs.

Undisturbed samples were obtained at select locations by pushing a thin-walled sampling tube into the subsurface material using the hydraulic pressure on the drill rig. The location at which the undisturbed samples were obtained is shown on the boring logs.

Miniature vane shear tests, which provide an indication of the undrained shearing strength of cohesive materials, were performed on samples of the clay soil during the field investigations. The results of these tests are shown on the boring logs as the torvane value in tsf.

Each sample obtained in the field was classified in the laboratory according to the Unified Soil Classification System. The symbol designating the soil type according to this system, is presented on the boring logs. A description of the Unified Soil Classification System is presented in the appendix, and the meaning of the various symbols, shown on the logs, can be obtained from this figure.

Laboratory tests performed during this investigation to define the characteristics of the subsurface material throughout the proposed site included in-place dry unit weight, natural moisture content, Atterberg Limits, mechanical analyses, unconfined compressive strength, and consolidation tests. Testing was performed following procedures outlined in the American Society for Testing and Materials (ASTM) standards.

4 SUBSURFACE SOIL AND WATER CONDITIONS

The characteristics of the subsurface material were evaluated by reviewing the 2008 boring logs and drilling five additional borings to depths of about 55 feet at the location shown in Figure 2.

The boring numbers each include the prefix “08” or “15” on the site plan and boring logs to indicate the year drilling was completed. The logs for the borings are presented in the appendix, and it will be observed that the subsurface profile consists predominantly of lean clay and sandy lean clay with occasional layers of sandy silt and silty sand extending to the mudstone bedrock. The highly weathered mudstone was encountered at depths varying from 38 to 45 feet below the existing ground surface. The mudstone becomes more competent with depth. About 5 feet of very highly weathered mudstone/stiff clay overlies the more competent mudstone.

Groundwater was measured at depths of between 23.5 and 27.3 feet in the borings near the building footprint and at 33.5 to 36.3 feet in the detention area borings. These measurements were taken during December 2015. In April 2008, one groundwater reading taken at least 24 hours after drilling on the north side of the existing courthouse showed a groundwater level at 22.5 feet.

The results of classification, density and moisture tests are presented on the boring logs, and the results of all laboratory, with exception of the consolidation, tests are summarized in Table 1, Summary of Test Data in the appendix. It will be noted from Table 1 that the clayey soils had liquid limits ranging from 21 to 40 and plasticity indices varying from 5 to 19, classifying as lean clay. The unconfined compressive strength of clay samples tested varied from 720 to 2751 psf. The unconfined compressive strength of the mudstone samples tested ranged from 130 to 1150 psi (18,720 to 165,600 psf). The silt layers tested were non-plastic with 59 to 73% passing the No. 200 sieve. The silty sand layers were also non-plastic with between 23 and 49% passing the No. 200 sieve.

The compressibility characteristics of the subsurface material were evaluated by performing three consolidation tests, and the results of these tests are also presented in the appendix. During performance of the consolidation tests, each sample was permitted to absorb water at the beginning of the test to determine the effect of moisture on the compressibility characteristics of these materials. Expansive soils always experience an increase in void ratio on absorbing water. It will be observed from these tests that no increase in the void ratio occurred as the sample absorbed moisture. The samples had moderate compressibility characteristics for load intensities greater than 0.5 to 0.8 tsf.

4.1 CONTAMINATION

Borings 15-1 and 15-2 are located adjacent to 100 East, as shown in Figure 2. Samples obtained in Boring 15-1 between 18 and 28 feet, and in Boring 15-2 between 22 and 32 feet had a strong hydrocarbon odor. This odor was not present in samples obtained from the other borings. It is recommended that the source of this contamination be determined, if possible, and that investigations be performed to determine if remedial action is needed to comply with current regulatory standards.

5 FOUNDATION CONSIDERATIONS AND RECOMMENDATIONS

5.1 FOUNDATION TYPES AND BEARING CAPACITIES

The magnitude of the structural loads are not known as of the preparation of this report; however, it has been assumed that the column loads will not likely exceed 250 kips and that wall

loads will not likely exceed 8 klf. It is assumed that the first floor elevation will be within 1 to 2 feet of the existing ground surface.

If the above assumptions are not correct, it is requested that we be notified to determine if modifications to the recommendations provided in this report are needed. Assuming the assumptions are correct, it is our opinion that supporting the structure using spread footings on compacted fill will be the most efficient foundation type.

5.1.1 Spread Footings on Compacted Fill

We recommend that all exterior foundations be located at a depth below finished grade sufficient to provide frost protection, which is about 2.5 feet in this area, and that interior footings be located at least 1 foot below floor level. If this action is taken, it is apparent from the boring logs that footings located within 15 feet of the existing ground surface will be located predominantly on the soft to stiff lean clay and sandy lean clay, with the zone of significant stress extending into the non-plastic sandy silt and silty sand layers at some locations.

The allowable soil bearing capacity of the soft layers of lean clay encountered at some locations throughout the site is typically in the order of 1000 psf. It has been our experience that foundations supported directly on clay soils with low bearing capacities often exhibit poor foundation performance associated with creep settlement. It is recommended that no footings be placed directly on this material. Boring 08-2 encountered very soft clay between 5 and 10 feet, and Boring 08-6 encountered fill in the upper 4 feet. All loose non structural fill should be removed from beneath the building area.

We recommend that footing areas be over-excavated to a depth of at least 3 feet below the base of the footing. The width of the excavation should extend at least 2 feet beyond the footing perimeter. If soft conditions are encountered at the base of the footing excavations, it may to necessary to stabilize the subgrade prior to structural fill placement.

We recommend that structural fill be relatively well-graded sandy gravel with a maximum size of 3 inches and with between 5 and 20% passing a No. 200 sieve. The fill should be placed in 8 inch lifts and compacted to an in-place density equal to at least 95% of the maximum density as determined by ASTM D 1557.

To ensure that compaction requirements are met, each lift should be tested, with testing performed at 50 foot intervals along continuous footing lines and at each spot footing. Testing should be performed in accordance with ASTM D 6938 (nuclear method), or ASTM D 1556 (sand cone method).

Provided that the foundation recommendations outlined above are complied with, foundations can be designed using the allowable bearing capacities shown in the following table:

Footing Width (ft)	Allowable Bearing Capacity (psf)	
	Continuous Footings*	Spot Footings*
2	2500	N/A
3	2000	4000
4	1750	3050
5	1600	2550
6	1500	2250
8	N/A	1900
12	N/A	1550
14	N/A	1475

*Assumes 3 feet of compacted fill will exist beneath footings.

If the foundations for the proposed facility are designed in accordance with the recommendations outlined above, the maximum settlement of any footing should not exceed one inch and differential settlement throughout the structure should not exceed 0.5 inch, which should be satisfactory for the proposed facility.

It is generally recognized that the tolerable differential settlement for steel and concrete structures is about 0.002 times the column spacing. This criterion is tantamount to a differential settlement of about 0.5 inch for column spacings of 20 feet and 0.7 inch for column spacings of 30 feet. Since it is not anticipated that the column spacing for this structure will be less than 20 feet, a differential settlement of 0.5 inch should be satisfactory for the proposed facility.

5.1.2 Deep Foundations

If the final structural loads are significantly greater than assumed, it may be necessary to support the structure using deep foundations. Deep foundations should extend at least 5 feet into the competent mudstone bedrock. Deep foundation options considered during preparation of this report include drilled shafts (caissons), micropiles and driven piles.

Drilled Shafts

This would require the shafts extending to depths of between 45 and 50 feet. The allowable bearing capacity, assuming only end bearing for this foundation type using a design strength for the mudstone of 1000 psi and a factor of safety of 3.0, is shown in the following table:

Caissons

Base Diameter (feet)	Allowable Capacity (kips)
2.0	150
2.5	235
3.0	339

Since the caissons are designed based on end bearing, all loose material should be cleaned from the base. It is recommended that the borings be cased through the soft clay layers and that the soils engineer be present during placement to verify that the foundations extend through the weathered mudstone and into competent mudstone. Concrete should be placed using tremie techniques.

Micropiles

Micropiles are an alternate to caissons (drilled shafts) where relatively small loads are anticipated. Micropiles should be installed by an experienced micropile specialty contractor, and are typically designed by an experienced micropile designer retained by that specialty contractor. For this project, we recommend that the micropiles be designed to carry all loads by adhesion of the micropile grout body against the mudstone bedrock. The micropiles should either be sleeved through the soil above the rock to isolate the piles from potential down drag movement, or designed to have sufficient strength in the structural pile section and sufficient adhesion in the mudstone to resist both the structural loads and the potential drag loads that could be induced by the overburden. For the purposes of preliminary design by the project architect and structural engineer, an estimated ultimate adhesion of 7 psi is recommended for the overburden soil, and an estimated ultimate adhesion of 50 psi is recommended for the portion of the pile bonded in the mudstone. The actual values may vary significantly from these estimates, and there is a likelihood that substantially greater adhesion will be developed in the rock. The actual micropile capacities should be determined by pre-production load tests of sacrificial micropiles. We recommend a minimum of one pre-production load test be performed if the number of piles is not greater than 50, and a minimum of two pre-

production test piles if the number of piles is greater than 50. Proof testing to at least 1.3 times the design load should be conducted on approximately 5 percent of the production piles.

If the final micropile design is verified using a testing program as described above and consistent with established practices (FHWA publication FHWA-NHI-05-039 is recommended as a design and construction standard), a factor of safety of 2.0 may be used for the design loads.

It is recommended that the micropiles extend at least 10 feet into the shale bedrock which was encountered at depths varying from 45 to 50 feet below the existing ground surface. Based on the estimated adhesion values recommended in the paragraph above, the ultimate geotechnical capacity of 8-inch diameter micropiles bonded to 10 feet of bedrock would be in the order of 150 kips, and would support design loads in the range of 75 kips. If the upper portions of the piles extending through the overburden are not sleeved or otherwise isolated from the soil, an unfactored drag load should be added to the structural loads.

Driven Piles

Driven HP section piles are an alternate to caissons (drilled shafts). Driven piles should be installed by an experienced pile driving contractor and designed by an experienced pile designer retained by that contractor. For this project, we recommend that the piles be designed to carry all loads by adhesion and end bearing of the pile within the mudstone bedrock. The piles should be designed to have sufficient strength in the structural pile section and sufficient adhesion and end bearing in the mudstone to resist both the structural loads and the potential drag loads that could be induced by the overburden.

Potential impacts of noise and vibration should be considered before selecting driven piles as a foundation option. Allowable capacities can be provided if the design team desires to pursue this option.

5.2 SEISMIC CONSIDERATIONS

The site is classified as Site Class C, as per Section 1613 of the 2009 and 2012 International Building Code and Chapter 20 of ASCE 7-10. The site is located at latitude 39.599° North and

longitude 110.809° West. The Site Class C risk-targeted spectral acceleration values for use with these publications are tabulated below:

Design and MCE_R ground motion values in g.

Period	Design	MCE_R
PGA (0 sec)	n/a	0.253
0.2 sec SA	0.343	0.514
1.0 sec SA	0.145	0.217

The allowable soil bearing pressure indicated above may be increased by one-third where seismic forces are involved in the structural loads. If the frictional resistance of the footings and floor slabs are used to resist seismic forces, we recommend a coefficient of friction of 0.40 be used to calculate these forces. See Section 5.3 below for recommendations related to resistance provided by passive earth pressures.

Since the static groundwater level is below 20 feet and the soils below this level are predominately sandy lean clay and mudstone, problems associated with liquefaction during a seismic event are unlikely at this site, and no special mitigation of the foundation soils is required.

5.3 LATERAL EARTH PRESSURES

It is anticipated that earth-retaining structures will be required for the proposed facility. Where earth-retaining structures are required, and if backfilling is performed using granular material, and if the backfill behind the wall is horizontal, we recommend that the earth pressures be calculated using the following equation, along with the earth pressure coefficient outlined below:

$$P = \tfrac{1}{2}\, \gamma\, K\, H^2$$

Where
P = total lateral force on wall, plf
K = earth pressure coefficient
γ = unit weight of soil (125 pcf)
H = height of retained soil against wall

The earth pressure coefficient used in designing the walls will depend upon whether the wall is free to move during backfilling operations, or whether the wall is restrained during backfilling. If the wall is free to move during backfilling operations and the backfill material is granular soil, we recommend an active earth pressure coefficient of 0.30 be used in the above equation to calculate the lateral earth pressures. If the walls are restrained from any movement during

backfilling and the backfill material is granular soil, we recommend an at-rest earth pressure coefficient of 0.45 be used to calculate the lateral earth pressure. We recommend a passive earth pressure coefficient of 3.0 be used where the granular soil is used to restrain lateral movement.

The additional active earth pressure due to ground acceleration equal to two thirds of the MCE may be estimated using a coefficient of 0.08. The seismic ground motion will reduce the available passive resistance. This reduction may be accounted for as an earth pressure acting in the direction opposite the passive resistance, and computed using a coefficient of 0.25. These coefficients were estimated using the Mononobe-Okabe equation, assuming that the horizontal pseudostatic coefficient is equal to 80 percent of the peak ground acceleration so that permanent displacements will be minimized. The pressure diagrams for these forces may be roughly approximated as triangles, such that the resultant forces of the seismic components act at heights of approximately H/3 above the base of the wall.

For basement walls which are restrained at top and bottom, it is recommended that at-rest lateral earth pressures with appropriate factors of safety be used for design under non-seismic conditions, and that the active static plus dynamic pressures be assumed for seismic conditions.

It should be recognized that the pressures calculated by the above equation are earth pressures only and do not include hydrostatic pressures. Perched water may be encountered in granular or non-plastic silt layers above the static groundwater level. Where hydrostatic pressures may exist behind a retaining structure, we recommend either the wall be designed to resist hydrostatic pressure, or that a drainage system be placed behind the wall to prevent the development of hydrostatic pressures.

5.4 FLOOR SLABS

We recommend that one foot of imported granular fill and a free-draining granular layer be placed beneath all floor slabs. The free-draining granular layer should be at least 4 inches thick and should have a maximum size less than 1 inch and not more than 5% passing a 200 sieve. The free-draining material should be densified using at least 4 passes of a smooth drum 5-ton vibratory roller or equivalent. If the above specifications are followed, the granular layer will prevent the accumulation of moisture beneath the floor slab and will also serve adequately as a base beneath the floor slabs. Where moisture sensitive flooring, such as tile flooring systems, is planned, it is recommended that a vapor retarder/barrier be placed directly beneath the concrete

floor, in lieu of the free-draining granular layer. It is recommended that the vapor barrier conform to ASTM E 1745 Class A requirements. A subgrade modulus of 150 pci can be used for design.

6 SITE PREPARATION AND COMPACTED FILL REQUIREMENTS

As indicated above, the vegetative cover throughout the building site consists of lawn grass, bushes and trees. We recommend that the bush and tree roots be grubbed and the upper 6 inches of soil be stripped from areas beneath the footprint to remove the excess organic matter in the upper portion of the soil profile. We recommend that asphalt pavement beneath the footprint be removed and that all concrete and loose fill also be removed following demolition.

Excavation slopes less than 20 feet deep should be cut at 1 horizontal to 1 vertical or flatter. If site conditions do not allow cutting slopes at 1:1, shoring should be used. If soft conditions exist at the base of excavations, stabilization may be required prior to fill placement. Heavy equipment should not traverse directly on the clay soil. To prevent rutting, granular fill should be placed where heavy equipment is required to work on the clay soils. Stabilization techniques are dependent upon the conditions encountered and construction methods. An additional 1-foot of granular subbase plus a geotextile fabric may be required if soft conditions exist at the subgrade level such that compaction of the initial lift of structural fill is not feasible.

We recommend that imported fill used to establish final grade throughout the site and as wall excavation backfill consist of granular soil having a maximum size of 4 inches with less than 30% passing a No. 200 sieve. We recommend that the material passing a No. 200 sieve have a plasticity index less than 6. The fill should be compacted to an in-place density equal to at least 92% of the maximum density as determined by ASTM D 1557. Structural fill beneath foundations should meet requirements outlined in Section 5.1.

Grading around the structure should be performed in such a manner that all surface water will flow freely from the area and that no ponding will occur adjacent to the structure which will permit deep percolation into the foundation area. Roof drains should extend well beyond the building lines to prevent seepage into the foundation soils. Sprinkler heads located adjacent to the building should be directed away from the structure to prevent the percolation of water into the foundation zone.

7 WATER DETENTION STRUCTURES

Borings 15-4 and 15-5 were drilled in the general areas where below ground detention structures are being considered. It will be observed from the boring logs that the soil profile in each boring consists predominately of lean clay and sandy lean clay extending to depths of between 30 and 35 feet. Layers of silty sand, sandy clay, clayey sand and gravel were encountered from 30 feet to the mudstone at about 41 feet in Boring 15-4 and from 35 feet to the mudstone at 45 feet in Boring 5. Foundation recommendations provided in Section 5 for the court complex are applicable to these locations also.

In place permeability tests were performed at 5 to 10 foot intervals in these two borings and the results are shown in feet/year on the boring logs. It will be observed that the clayey layers had low permeability rates, typically less than 20 feet/year (0.66 in/day). The layers in the 10 feet above the mudstone had higher rates, with Boring 15-4 between 35 and 40 feet showing a rate of 500 feet/year (16 in/day) and Boring 15-5 between 35 and 45 feet showing rates between 1,300 and 2,100 feet/year (43 and 69 in/day).

8 FLEXIBLE PAVEMENT DESIGN

In providing recommendations for flexible pavement design for driveways and parking areas, an equivalent single axle load (ESAL) of 20,000 has been used. This value is comparable to 600 passenger cars and light trucks per day and about 10 single axle heavy trucks per month over a design life of 20 years. If traffic loading is significantly different than what has been assumed, it is requested that we be notified so that appropriate modifications can be made in pavement design. The flexible pavement thickness has been determined using the AASHTO Structural Number Procedure. The following additional assumptions have been made in determining the flexible pavement thickness:

Design E-18's	= 20,000
Reliability	= 85%
Overall Deviation	= 0.45
Resilient Modulus	= 4,500 psi
Initial Serviceability	= 4.2
Terminal Serviceability	= 2.0

The results of the analysis indicates that a flexible pavement consisting of 3 inches of an asphalt surface course plus 6 inches of untreated granular base over 12 inches of granular fill will be adequate to support the contemplated traffic. In performing the analysis, it has been assumed that the natural material will have a CBR value of at least 3. The fine grained native soils are susceptible to frost heave if they become wet during freezing conditions. Since the groundwater level is at a substantial depth below the surface, saturation of the near surface native soils would be from surface water. Providing good drainage and sealing surface cracks in the pavement as they develop will reduce the risk of frost heave. If it is desired to minimize the risk, we recommend that the 12 inches of granular fill be non-frost susceptible soil (minus 3 inch sandy gravel with less than 8% non-plastic fines). The granular fill should be compacted to an in-place density equal to at least 92% of the maximum laboratory density as determined by ASTM D 1557.

The flexible pavement design indicated above is adequate to support the traffic distribution as indicated. It should be recognized, however, that if construction is performed during periods when the subsurface material throughout the site is in a wet condition, the subsurface material will not be capable of supporting the wheel loads associated with construction equipment. As a consequence of this condition, the pavement cannot be constructed as designed. It is recommended, therefore, that the pavement for the development be constructed during the summer months when the surface moisture content is at a minimum. If the pavement must be constructed during periods when the surface moisture is high, it may be necessary to stabilize the subgrade prior to construction of the pavement section. Stabilization techniques are dependent upon the conditions encountered and construction methods. Placement of a geotextile fabric such as Mirafi 500 X or equal may be needed beneath the 1-foot of granular subbase if wet conditions exist at the subgrade level such that compaction of the subgrade is not feasible.

All base material should be densified to an in-place unit weight equal to 95% of the maximum laboratory density indicated above and all untreated granular base should conform to Utah Department of Transportation Specifications. Mineral aggregates used in the asphalt surface course should conform to Section 02741 of the standard specifications of the Utah State Department of Transportation. Mixing, placing, and densification of all asphalt materials should also conform to UDOT standards.

9 LIMITATIONS

The conclusions and recommendations presented in this report are based upon the results of the field and laboratory tests which, in our opinion, define the characteristics of the subsurface material throughout the site in a satisfactory manner. It should be recognized that soil materials are inherently heterogeneous and that conditions may exist throughout this site which could not be defined during this investigation. Since the bearing capacity for foundation design is dependent upon adequate compaction of imported fill, it is requested that testing of the fill be performed under the direct supervision of the soils engineer.

It is recommended that a soils engineer observe the foundation excavations prior to placement of footings. If, during construction, conditions are encountered which appear to be different than those presented in this report, it is requested that we be advised in order that appropriate action may be taken.

The information contained in this report is provided for the specific location and purpose of the client named herein and is not intended or suitable for reuse by any other person or entity whether for the specified use, or for any other use. Any such unauthorized reuse, by any other party is at that party's sole risk and RB&G Engineering, Inc. does not accept any liability or responsibility for its use.

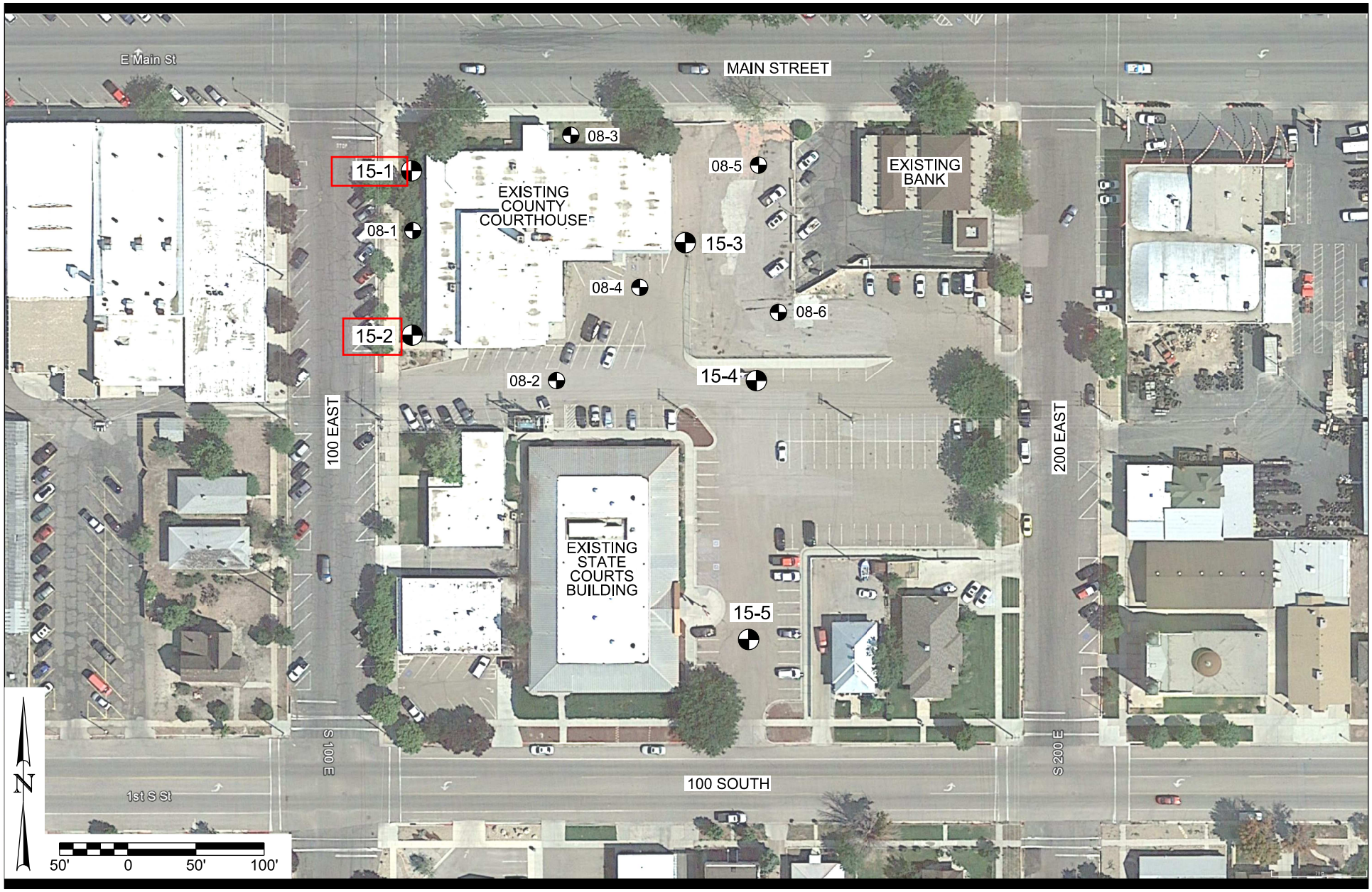
FIGURES

RB&G ENGINEERING, INC.

Figure 1 VICINITY MAP

Carbon District & Juvenile Courts Complex Administrative Office of the Courts

Price, Carbon County, Utah



RB&G ENGINEERING, INC.

Figure 2 SITE PLAN & TEST HOLE LOCATIONS

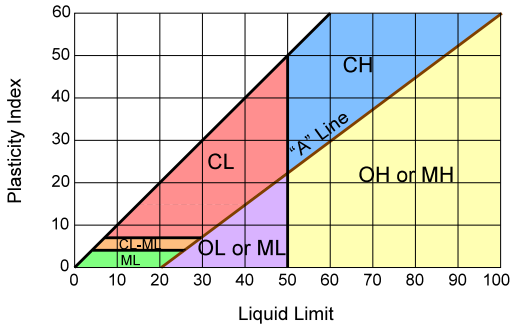
Carbon District & Juvenile Courts Complex Administrative Office of the Courts

Price, Carbon County, Utah

APPENDIX

Unified Soil Classification System

Major Divisions			Group Symbols		Typical Names	Laboratory Classification Criteria		
COARSE-GRAINED SOILS *more than half of material is larger than No. 200 sieve*	**Gravels** *more than half of coarse fraction is larger than No. 4 sieve size*	**Clean Gravels** *little or no fines*	**GW**		Well graded gravels, gravel-sand mixtures, little or no fines	*For laboratory classification of coarse-grained soils* Determine percentage of gravel and sand from grain-size curve. Depending on percentage of fines (*fraction smaller than No. 200 sieve size*), coarse-grained soils are classified as follows: **Less than 5%** GW, GP, SW, SP **More than 12%** GM, GC, SM, SC **5% to 12%** Borderline cases requiring use of dual symbols**	$C_u = \frac{D_{60}}{D_{10}}$ $C_c = \frac{(D_{30})^2}{D_{10} \times D_{60}}$	Greater than 4 Between 1 and 3
			GP		Poorly graded gravels, gravel-sand mixtures, little or no fines		Not meeting all gradation requirements for GW	
		Gravels With Fines *appreciable amount of fines*	**GM***	**d**	Silty gravels, poorly graded gravel-sand-silt mixtures		Atterberg limits below "A" line, or PI less than 4	Above "A" line with PI between 4 and 7 are borderline cases requiring uses of dual symbols
				u				
			GC		Clayey gravels, poorly graded gravel-sand-clay mixtures		Atterberg limits above "A" line, or PI greater	
	Sands *more than half of coarse fraction is smaller than No. 4 sieve size*	**Clean Sands** *little or no fines*	**SW**		Well graded sands, gravelly sands, little or no fines		$C_u = \frac{D_{60}}{D_{10}}$ $C_c = \frac{(D_{30})^2}{D_{10} \times D_{60}}$	Greater than 6 Between 1 and 3
			SP		Poorly graded sands, gravelly sands, little or no fines		Not meeting all gradation requirements for SW	
		Sands with Fines *appreciable amount of fines*	**SM***	**d**	Silty sands, poorly graded sand-silt mixtures		Atterberg limits below "A" line, or PI less than 4	Above "A" line with PI between 4 and 7 are borderline cases requiring uses of dual symbols
				u				
			SC		Clayey sands, poorly graded sand-clay mixtures		Atterberg limits above "A" line, or PI greater	
FINE-GRAINED SOILS *more than half of material is smaller than No. 200 sieve*	**Silts and Clays** *liquid limit is less than 50*		**ML**		Inorganic silts and very fine sands, rock flour, silty or clayey fine sands or clayey silts with slight plasticity	*For laboratory classification of fine-grained soils*		
			CL		Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays			
			OL		Organic silts and organic silt-clays of low plasticity			
	Silts and Clays *liquid limit is greater than 50*		**MH**		Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts			
			CH		Inorganic clays of high plasticity, fat clays			
			OH		Organic clays of medium to high plasticity, organic silts			
HIGHLY ORGANIC SOILS			**Pt**		Peat and other highly organic soils			



Plasticity Chart

*Division of GM and SM groups into subdivisions of d and u for roads and airfields only. Subdivision is based on Atterberg limits; suffix d used when liquid limit is 28 or less and the PI is 6 or less, the suffix u used when liquid limit is greater than 28.

***Borderline classification*: Soils possessing characteristics of two groups are designated by combinations of group symbols. (For example GW-GC, well graded gravel-sand mixture with clay biner.)

DRILL HOLE LOG

BORING NO. 15-1

SHEET 1 OF 2

PROJECT: CARBON DISTRICT & JUVENILE COURTS COMPLEX
CLIENT: STATE OF UTAH D.F.C.M.
LOCATION: N:10,043 E:19,917 / LAT:N 39°35'57.49110", LONG:W 110°48'32.38584"
DRILLING METHOD: 08-CME-55 / N. W. CASING TO 30', N.Q. CORE
DRILLER: T. KERN
DEPTH TO WATER - INITIAL: ▽ N.M. **AFTER 24 HOURS:** ▼ 23.5'

PROJECT NUMBER: 201501.036
DATE STARTED: 12/18/15
DATE COMPLETED: 12/18/15
GROUND ELEVATION: 5565.8'
LOGGED BY: M. HANSEN, J. BOONE

Elev. (ft)	Depth (ft)	Lithology	Sample Type	Sample Rec. (in)	Sample See Legend	USCS (AASHTO)	Material Description	Dry Density (pcf)	Moisture Content (%)	Atter. Liquid Limit	Atter. Plast. Index	Gradation Gravel (%)	Gradation Sand (%)	Gradation Silt/Clay (%)	Other Tests
5565				14	10,14,15,(66)	CL	gray-brown, dry, hard SANDY LEAN CLAY								
5560	5			10	6,5,5,(23) *T 0.20*	CL-ML	gray-brown, dry to slightly moist, soft SILTY CLAY								
5555	10			9	Pushed *T 0.49*	CL	gray-brown, slightly moist, stiff SANDY LEAN CLAY some organics	106.5	13.1	25	8				UC 2751 psf
				9	Pushed	CL	gray-brown, slightly moist, stiff	108.7	15.8	28	12				CT UC 2512 psf
5550	15			9	Pushed	ML	gray-brown, slightly moist SILT W/SAND		15.9		NP	0	27	73	
				14	4,4,4,(11)	ML ML	brown, very moist gray, very moist SANDY SILT hydrocarbon odor								
5545	20			15	1,2,3,(6)	CL-ML	brown, wet SILTY CLAY sand lenses, hydrocarbon odor								
				14	*T 0.11* 6,9,9,(21)	CL-ML SM	gray-brown, wet, soft gray, wet, med. dense								
5540	25			10	6,8,8,(18)	SM	gray, wet, med. dense SILTY SAND W/GRAVEL strong hydrocarbon odor		12.0		NP	30	47	23	
							SANDY LEAN CLAY TO CLAYEY SAND								

DH_LOG_V8-2014-1 CARBONCOURTS.GPJ US EVAL.GDT 1/5/16

RB&G ENGINEERING, INC.

LEGEND:

- 2" OD Split Spoon (SPT)
- 2.5" OD Split Spoon
- 3" OD Split Spoon

Split Spoon Sample: 2,3,2,(6) ← Blow Count per 6" / $(N_1)_{60}$ Value; *T 0.45* ← Torvane (tsf); *PP 2.0* ← Pocket Penetrometer (tsf); With Liners

Thin-Walled Tube Sample: Pushed; *T 0.45* ← Torvane (tsf); *PP 2.0* ← Pocket Penetrometer (tsf)

OTHER TESTS
UC = Unconfined Compression
CT = Consolidation
DS = Direct Shear
UU = Unconsolidated, Undrained
CU = Consolidated, Undrained
Chem. = pH, Resistivity, Sulfate, Chloride
Hyd. = Hydrometer

DRILL HOLE LOG

BORING NO. 15-1

PROJECT: CARBON DISTRICT & JUVENILE COURTS COMPLEX
CLIENT: STATE OF UTAH D.F.C.M.
LOCATION: N:10,043 E:19,917 / LAT:N 39°35'57.49110", LONG:W 110°48'32.38584"
DRILLING METHOD: 08-CME-55 / N. W. CASING TO 30', N.Q. CORE
DRILLER: T. KERN
DEPTH TO WATER - INITIAL: ▽ N.M. **AFTER 24 HOURS:** ▼ 23.5'

PROJECT NUMBER: 201501.036
DATE STARTED: 12/18/15
DATE COMPLETED: 12/18/15
GROUND ELEVATION: 5565.8'
LOGGED BY: M. HANSEN, J. BOONE

Elev. (ft)	Depth (ft)	Lithology	Sample Type	Sample Rec. (in)	Sample See Legend	Sample USCS (AASHTO)	Material Description	Dry Density (pcf)	Moisture Content (%)	Atter. Liquid Limit	Atter. Plast. Index	Gradation Gravel (%)	Gradation Sand (%)	Gradation Silt/Clay (%)	Other Tests
5535				12	Pushed *T 0.15*	CL/SC	brown, wet, soft — SANDY LEAN CLAY TO CLAYEY SAND								
5530	35			12	7,5,7,(13) *T 0.26*	CL	brown, wet, firm — SANDY LEAN CLAY W/GRAVEL								
5525	40			6	9,11,12,(23)	CL/GC	brown, moist — MUDSTONE very highly weathered, sandstone layers		15.3	38	15	37	20	43	
5520	45			5	50/4"	-	dk. gray, moist — MUDSTONE weathered, more competent w/depth								
5515	50			52	Core *100,84*	-	dk. gray, moist	141.8	6.5						UC 730 psi
5510	55						BOH								

DH_LOG_V8-2014-1_CARBONCOURTS.GPJ US EVAL.GDT 1/5/16

RB&G ENGINEERING, INC.

LEGEND:

- 2" OD Split Spoon (SPT)
- 2.5" OD Split Spoon
- 3" OD Split Spoon

Split Spoon Sample: 2,3,2,(6) — Blow Count per 6"; $(N_1)_{60}$ Value; *T 0.45* — Torvane (tsf); *PP 2.0* — Pocket Penetrometer (tsf); With Liners

Thin-Walled Tube Sample: Pushed; *T 0.45* — Torvane (tsf); *PP 2.0* — Pocket Penetrometer (tsf)

OTHER TESTS
UC = Unconfined Compression
CT = Consolidation
DS = Direct Shear
UU = Unconsolidated, Undrained
CU = Consolidated, Undrained
Chem. = pH, Resistivity, Sulfate, Chloride
Hyd. = Hydrometer

DRILL HOLE LOG

BORING NO. 15-2

PROJECT: CARBON DISTRICT & JUVENILE COURTS COMPLEX
CLIENT: STATE OF UTAH D.F.C.M.
LOCATION: N:9,928 E:19,926 / LAT:N 39°35'56.35660", LONG:W 110°48'32.27681"
DRILLING METHOD: 08-CME-55 / N. W. CASING TO 35', N.Q. CORE
DRILLER: T. KERN
DEPTH TO WATER - INITIAL: ▽ N.M. **AFTER 24 HOURS:** ▼ 27.0'

PROJECT NUMBER: 201501.036
DATE STARTED: 12/16/15
DATE COMPLETED: 12/17/15
GROUND ELEVATION: 5563.9'
LOGGED BY: M. HANSEN, J. BOONE

Elev. (ft)	Depth (ft)	Lithology	Sample Type	Sample Rec. (in)	Sample See Legend	Sample USCS (AASHTO)	Material Description	Dry Density (pcf)	Moisture Content (%)	Atter. Liquid Limit	Atter. Plast. Index	Gradation Gravel (%)	Gradation Sand (%)	Gradation Silt/Clay (%)	Other Tests
			■	12	5,10,13,(52)	CL	gray-brown, slightly moist SANDY LEAN CLAY								
5560	5		■	13	6,5,6,(25) *T 0.22*	CL	gray-brown, moist, soft SANDY LEAN CLAY silty sand lenses								
5555	10		■	13	3,4,5,(15) *T 0.25*	CL	gray-brown, moist, firm								
5550	15		⊠	12	Pushed	CL	brown, moist SANDY LEAN CLAY		12.4	25	8				
			⊠	9	Pushed	ML	brown, moist SANDY SILT slightly plastic								
5545			■	10	4,5,5,(13)	ML	brown, moist, med. dense								
	20		⊠	13	Pushed *T 0.18*	ML	brown, moist, soft SANDY SILT	111.7	13.6		NP	0	41	59	CT UC 565 psf
5540			■	12	2,3,4,(8)	SM	brown to gray, very moist, loose SILTY SAND trace gravels, strong hydrocarbon odor								
	25		⊠	13	Pushed	SM	gray, wet								
			■	12	10,9,13,(24)	SM	gray, wet, med. dense								
5535							SANDY LEAN CLAY hydrocarbon odor, decreasing w/depth								

DH_LOG_V8-2014-1 CARBONCOURTS.GPJ US EVAL.GDT 1/5/16

RB&G ENGINEERING, INC.

LEGEND:

- ■ 2" OD Split Spoon (SPT)
- ⊠ 2.5" OD Split Spoon
- ■ 3" OD Split Spoon

Split Spoon Sample: 2,3,2,(6) ← Blow Count per 6" / $(N_1)_{60}$ Value; *T 0.45* ← Torvane (tsf); *PP 2.0* ← Pocket Penetrometer (tsf); With Liners

Thin-Walled Tube Sample: Pushed; *T 0.45* ← Torvane (tsf); *PP 2.0* ← Pocket Penetrometer (tsf)

OTHER TESTS
UC = Unconfined Compression
CT = Consolidation
DS = Direct Shear
UU = Unconsolidated, Undrained
CU = Consolidated, Undrained
Chem. = pH, Resistivity, Sulfate, Chloride
Hyd. = Hydrometer

DRILL HOLE LOG

BORING NO. 15-2

PROJECT: CARBON DISTRICT & JUVENILE COURTS COMPLEX
CLIENT: STATE OF UTAH D.F.C.M.
LOCATION: N:9,928 E:19,926 / LAT:N 39°35'56.35660", LONG:W 110°48'32.27681"
DRILLING METHOD: 08-CME-55 / N. W. CASING TO 35', N.Q. CORE
DRILLER: T. KERN
DEPTH TO WATER - INITIAL: ▽ N.M. **AFTER 24 HOURS:** ▼ 27.0'

PROJECT NUMBER: 201501.036
DATE STARTED: 12/16/15
DATE COMPLETED: 12/17/15
GROUND ELEVATION: 5563.9'
LOGGED BY: M. HANSEN, J. BOONE

Elev. (ft)	Depth (ft)	Lithology	Sample Type	Sample Rec. (in)	Sample See Legend	Sample USCS (AASHTO)	Material Description		Dry Density (pcf)	Moisture Content (%)	Atter. Liquid Limit	Atter. Plast. Index	Gradation Gravel (%)	Gradation Sand (%)	Gradation Silt/Clay (%)	Other Tests
				15	2,3,3,(6) *T 0.19*	CL	brown, wet, soft									
5530	35			17	Pushed *T 0.18*	CL	gray, wet, soft	SANDY LEAN CLAY hydrocarbon odor, decreasing w/depth								
5525	40			14	10,13,31,(43)	-	brown to gray, moist, very soft rock	MUDSTONE very highly weathered								
				31	Core *90,36*	CL CL	brown-gray, moist, soft rock	MUDSTONE highly weathered	101.7 121.8	18.0 17.6	40 37	19 16				CT UC 130 psi
5520	45			56	Core *94,72*	-	gray, moist, soft rock									
5515	50							MUDSTONE weathered, gypsum stringers, more competent w/depth	132.2	10.5						UC 1150 psi
5510				64	Core *106,80*	-	gray, moist, soft rock									
	55							BOH								
5505																

DH_LOG_V8-2014-1 CARBONCOURTS.GPJ US EVAL.GDT 1/5/16

RB&G ENGINEERING, INC.

LEGEND:

- 2" OD Split Spoon (SPT)
- 2.5" OD Split Spoon
- 3" OD Split Spoon

Split Spoon Sample: 2,3,2,(6) — Blow Count per 6"; $(N_1)_{60}$ Value; *T 0.45* — Torvane (tsf); *PP 2.0* — Pocket Penetrometer (tsf); With Liners

Thin-Walled Tube Sample: Pushed; *T 0.45* — Torvane (tsf); *PP 2.0* — Pocket Penetrometer (tsf)

OTHER TESTS
UC = Unconfined Compression
CT = Consolidation
DS = Direct Shear
UU = Unconsolidated, Undrained
CU = Consolidated, Undrained
Chem. = pH, Resistivity, Sulfate, Chloride
Hyd. = Hydrometer

DRILL HOLE LOG

BORING NO. 15-3

PROJECT: CARBON DISTRICT & JUVENILE COURTS COMPLEX
CLIENT: STATE OF UTAH D.F.C.M.
LOCATION: N:9,995 E:20,117 / LAT:N 39°35'57.01230", LONG:W 110°48'29.83437"
DRILLING METHOD: 08-CME-55 / N. W. CASING TO 45'
DRILLER: T. KERN
DEPTH TO WATER - INITIAL: ▽ N.M. **AFTER 24 HOURS:** ▼ 27.3'

PROJECT NUMBER: 201501.036
DATE STARTED: 12/16/15
DATE COMPLETED: 12/17/15
GROUND ELEVATION: 5567.7'
LOGGED BY: M. HANSEN, J. BOONE

Elev. (ft)	Depth (ft)	Lithology	Sample Type	Sample Rec. (in)	Sample See Legend	USCS (AASHTO)	Material Description		Dry Density (pcf)	Moisture Content (%)	Atter. Liquid Limit	Atter. Plast. Index	Gradation Gravel (%)	Gradation Sand (%)	Gradation Silt/Clay (%)	Other Tests
						GP-GM	brown, moist	2" ASPHALT / GRAVEL W/SILT & SAND								
				16	15,9,5,(32)	CL	dk. gray-brown, moist	SANDY LEAN CLAY trace gravels								
5565																
	5			9	1,2,4,(14) *T 0.24*	CL	gray-brown, moist, soft	LEAN CLAY W/SAND silt lenses								
5560																
	10			11	Pushed *T 0.25*	CL-ML	gray-brown, moist, firm	SANDY SILTY CLAY silty sand & silt lenses								
5555				10	Pushed *T 0.25*	CL-ML	brown, moist, firm		110.4	14.3	21	5				UC 1140 psf
	15															
				10	Pushed	SM	brown, moist	SILTY SAND		12.7		NP	9	42	49	
5550																
	20			10	5,6,3,(11)	SC-SM	brown, moist, & wet, med. dense	SILTY CLAYEY SAND W/GRAVEL								
5545				9	2,5,5,(12) *T 0.18*	CL	brown, moist, & wet, soft	SANDY LEAN CLAY sand & silt lenses								
	25			7	0/12",3,(3) *T 0.10*	CL-ML	lt. gray-brown, wet, very soft									
5540								SANDY SILTY CLAY								

DH_LOG_V8-2014-1 CARBONCOURTS.GPJ US EVAL.GDT 1/5/16

RB&G ENGINEERING, INC.

LEGEND:

- 2" OD Split Spoon (SPT)
- 2.5" OD Split Spoon
- 3" OD Split Spoon

Split Spoon Sample: 2,3,2,(6) ← Blow Count per 6" / $(N_1)_{60}$ Value; *T 0.45* ← Torvane (tsf); *PP 2.0* ← Pocket Penetrometer (tsf); With Liners

Thin-Walled Tube Sample: Pushed; *T 0.45* ← Torvane (tsf); *PP 2.0* ← Pocket Penetrometer (tsf)

OTHER TESTS
UC = Unconfined Compression
CT = Consolidation
DS = Direct Shear
UU = Unconsolidated, Undrained
CU = Consolidated, Undrained
Chem. = pH, Resistivity, Sulfate, Chloride
Hyd. = Hydrometer

DRILL HOLE LOG

BORING NO. 15-3

PROJECT: CARBON DISTRICT & JUVENILE COURTS COMPLEX
CLIENT: STATE OF UTAH D.F.C.M.
LOCATION: N:9,995 E:20,117 / LAT:N 39°35'57.01230", LONG:W 110°48'29.83437"
DRILLING METHOD: 08-CME-55 / N. W. CASING TO 45'
DRILLER: T. KERN
DEPTH TO WATER - INITIAL: ▽ N.M. **AFTER 24 HOURS:** ▼ 27.3'

PROJECT NUMBER: 201501.036
DATE STARTED: 12/16/15
DATE COMPLETED: 12/17/15
GROUND ELEVATION: 5567.7'
LOGGED BY: M. HANSEN, J. BOONE

Elev. (ft)	Depth (ft)	Lithology	Sample Type	Sample Rec. (in)	Sample See Legend	Sample USCS (AASHTO)	Material Description	Dry Density (pcf)	Moisture Content (%)	Atter. Liquid Limit	Atter. Plast. Index	Gradation Gravel (%)	Gradation Sand (%)	Gradation Silt/Clay (%)	Other Tests
				14	Pushed T 0.22	CL-ML	lt. gray-brown, wet, soft								
5535															
							SANDY SILTY CLAY								
	35			14	2,4,5,(9) T 0.12	CL-ML	lt. brown, wet, soft								
5530															
	40			14	21,38,33,(69)	-	gray-brown, wet & moist								
							SANDSTONE/SILTSTONE W/GRAVEL very highly weathered								
5525															
	45			3	50/3"	-	dk. gray, wet & moist								
5520															
							MUDSTONE weathered, more competent w/depth								
	50			2	50/2"	-	dk. gray, wet & moist								
5515															
	55			2	50/2"	-	dk. gray, wet & moist								
							BOH								
5510															

DH_LOG_V8-2014-1 CARBONCOURTS.GPJ US EVAL.GDT 1/5/16

RB&G ENGINEERING, INC.

LEGEND:

- 2" OD Split Spoon (SPT)
- 2.5" OD Split Spoon
- 3" OD Split Spoon

Split Spoon Sample: 2,3,2,(6) ← Blow Count per 6"; $(N_1)_{60}$ Value; T 0.45 ← Torvane (tsf); PP 2.0 ← Pocket Penetrometer (tsf); With Liners

Thin-Walled Tube Sample: Pushed; T 0.45 ← Torvane (tsf); PP 2.0 ← Pocket Penetrometer (tsf)

OTHER TESTS
UC = Unconfined Compression
CT = Consolidation
DS = Direct Shear
UU = Unconsolidated, Undrained
CU = Consolidated, Undrained
Chem. = pH, Resistivity, Sulfate, Chloride
Hyd. = Hydrometer

DRILL HOLE LOG

BORING NO. 15-4

SHEET 1 OF 2

PROJECT: CARBON DISTRICT & JUVENILE COURTS COMPLEX
CLIENT: STATE OF UTAH D.F.C.M.
LOCATION: N:9,899 E:20,163 / LAT:N 39°35'56.06742", LONG:W 110°48'29.24948"
DRILLING METHOD: 08-CME-55 / N. W. CASING TO 35'
DRILLER: T. KERN
DEPTH TO WATER - INITIAL: ▽ 33.5' **AFTER 24 HOURS:** ▼ N.M.

PROJECT NUMBER: 201501.036
DATE STARTED: 12/21/15
DATE COMPLETED: 12/21/15
GROUND ELEVATION: 5566.6'
LOGGED BY: M. HANSEN, J. BOONE

Elev. (ft)	Depth (ft)	Lithology	Sample Type	Sample Rec. (in)	Sample See Legend	Sample USCS (AASHTO)	Material Description		Permeability (ft/yr)	Dry Density (pcf)	Moisture Content (%)	Atter. Liquid Limit	Atter. Plast. Index	Gradation Gravel (%)	Gradation Sand (%)	Gradation Silt/Clay (%)	Other Tests
							2" ASPHALT										
5565				10	5,4,2,(14)	GM	brown, moist, very loose	SILTY GRAVEL W/SAND									
									260								
	5			10	2,2,2,(9) *T 0.22*	CL	lt. brown, moist, soft	SANDY LEAN CLAY			17.3	27	11				
5560									5.2								
	10			10	2,4,4,(14) *T 0.25*	CL	lt. brown, moist to very moist, soft to firm	LEAN CLAY									
5555									7.3								
	15			11	3,4,5,(13) *T 0.19*	CL	lt. brown, moist, soft										
5550									7.4								
	20			11	3,5,6,(14) *T 0.55*	CL	lt. brown, moist, stiff	SANDY LEAN CLAY sand lenses			16.1	26	10				
5545									3.1								
	25			12	2,6,8,(16) *T 0.28*	CL	lt. brown, moist & wet, firm										
5540									310								
								SANDY LEAN CLAY gravel layer									

DH_LOG_V8-2014-1 CARBONCOURTS.GPJ US EVAL.GDT 1/5/16

RB&G ENGINEERING, INC.

LEGEND:

2" OD Split Spoon (SPT)
2.5" OD Split Spoon
3" OD Split Spoon

Split Spoon Sample
Thin-Walled Tube Sample

2,3,2,(6) ← Blow Count per 6" / $(N_1)_{60}$ Value
T 0.45 ← Torvane (tsf)
PP 2.0 ← Pocket Penetrometer (tsf)
With Liners
Pushed
T 0.45 ← Torvane (tsf)
PP 2.0 ← Pocket Penetrometer (tsf)

OTHER TESTS
UC = Unconfined Compression
CT = Consolidation
DS = Direct Shear
UU = Unconsolidated, Undrained
CU = Consolidated, Undrained
Chem. = pH, Resistivity, Sulfate, Chloride
Hyd. = Hydrometer

DRILL HOLE LOG

BORING NO. 15-4

PROJECT: CARBON DISTRICT & JUVENILE COURTS COMPLEX
CLIENT: STATE OF UTAH D.F.C.M.
LOCATION: N:9,899 E:20,163 / LAT:N 39°35'56.06742", LONG:W 110°48'29.24948"
DRILLING METHOD: 08-CME-55 / N. W. CASING TO 35'
DRILLER: T. KERN
DEPTH TO WATER - INITIAL: ▽ 33.5' **AFTER 24 HOURS:** ▼ N.M.

PROJECT NUMBER: 201501.036
DATE STARTED: 12/21/15
DATE COMPLETED: 12/21/15
GROUND ELEVATION: 5566.6'
LOGGED BY: M. HANSEN, J. BOONE

Elev. (ft)	Depth (ft)	Lithology	Sample Type	Sample Rec. (in)	Sample See Legend	USCS (AASHTO)	Material Description	Permeability (ft/yr)	Dry Density (pcf)	Moisture Content (%)	Atter. Liquid Limit	Atter. Plast. Index	Gradation Gravel (%)	Gradation Sand (%)	Gradation Silt/Clay (%)	Other Tests
						CL	lt. brown, moist & wet, soft									
5535			■	13	4,7,12,(19) *T 0.19*	SM	lt. brown, moist & wet, med. dense — SILTY SAND trace gravels	38		14.9		NP	13	41	46	
	35		■	13	3,6,9,(14) *T 0.18*	CL,SC	lt. brown, moist & wet, soft/med. dense — INTERBEDDED SANDY LEAN CLAY & CLAYEY SAND W/GRAVEL LAYERS	500								
5530																
	40			1	50/1"	GP	yellow-brown, moist, very dense — GRAVEL & COBBLES	8.1								
5525																
	45		■	4	50/4"	-	dk. gray, dry	3.7								
5520							MUDSTONE very highly weathered, more competent w/depth	2.2								
	50		■	4	50/4"	-	dk. gray, dry									
5515																
	55		■	2	50/2"	-	dk. gray, dry									
							BOH									
5510																

DH_LOG_V8-2014-1 CARBONCOURTS.GPJ US EVAL.GDT 1/5/16

RB&G ENGINEERING, INC.

LEGEND:

- ■ 2" OD Split Spoon (SPT)
- ■ 2.5" OD Split Spoon
- ■ 3" OD Split Spoon

Split Spoon Sample: 2,3,2,(6) — Blow Count per 6" / $(N_1)_{60}$ Value; *T 0.45* — Torvane (tsf); *PP 2.0* — Pocket Penetrometer (tsf); With Liners

Thin-Walled Tube Sample: Pushed; *T 0.45* — Torvane (tsf); *PP 2.0* — Pocket Penetrometer (tsf)

OTHER TESTS
UC = Unconfined Compression
CT = Consolidation
DS = Direct Shear
UU = Unconsolidated, Undrained
CU = Consolidated, Undrained
Chem. = pH, Resistivity, Sulfate, Chloride
Hyd. = Hydrometer

DRILL HOLE LOG

BORING NO. 15-5

PROJECT: CARBON DISTRICT & JUVENILE COURTS COMPLEX
CLIENT: STATE OF UTAH D.F.C.M.
LOCATION: N:9,713 E:20,155 / LAT:N 39°35'54.23456", LONG:W 110°48'29.35383"
DRILLING METHOD: 08-CME-55 / N. W. CASING TO 40'
DRILLER: T. KERN
DEPTH TO WATER - INITIAL: ▽ N.M. **AFTER 24 HOURS:** ▼ 36.3'

PROJECT NUMBER: 201501.036
DATE STARTED: 12/16/15
DATE COMPLETED: 12/17/15
GROUND ELEVATION: 5564.0'
LOGGED BY: M. HANSEN, J. BOONE

Elev. (ft)	Depth (ft)	Lithology	Sample Type	Sample Rec. (in)	Sample See Legend	Sample USCS (AASHTO)	Material Description	Permeability (ft/yr)	Dry Density (pcf)	Moisture Content (%)	Atter. Liquid Limit	Atter. Plast. Index	Gradation Gravel (%)	Gradation Sand (%)	Gradation Silt/Clay (%)	Other Tests
							NOT SAMPLED	610								
5560																
	5		■	8	2,1,2,(7) *T 0.19*	CL	gray-brown, moist, soft SANDY LEAN CLAY	14								
5555																
	10		■	10	2,3,4,(12) *T 0.18*	CL	gray-brown, wet, soft			29.2	29	12				
5550							LEAN CLAY	5.1								
	15		■	13	4,6,7,(18) *T 0.19*	CL	brown, moist, soft									
5545																
	20		■	14	4,6,6,(15)	ML	brown, moist, med. dense SANDY SILT									
5540																
	25		■	12	4,5,9,(16) *T 0.18*	CL-ML	brown, moist, soft SILTY CLAY	9.5		18.9	22	6				
5535							SILTY CLAY silt lenses									

LEGEND:

- ■ 2" OD Split Spoon (SPT)
- ▼ 2.5" OD Split Spoon
- ■ 3" OD Split Spoon

Split Spoon Sample: 2,3,2,(6) ← Blow Count per 6" / $(N_1)_{60}$ Value; *T 0.45* ← Torvane (tsf); *PP 2.0* ← Pocket Penetrometer (tsf); With Liners

Thin-Walled Tube Sample: Pushed; *T 0.45* ← Torvane (tsf); *PP 2.0* ← Pocket Penetrometer (tsf)

OTHER TESTS
UC = Unconfined Compression
CT = Consolidation
DS = Direct Shear
UU = Unconsolidated, Undrained
CU = Consolidated, Undrained
Chem. = pH, Resistivity, Sulfate, Chloride
Hyd. = Hydrometer

RB&G ENGINEERING, INC.

DRILL HOLE LOG

BORING NO. 15-5

PROJECT: CARBON DISTRICT & JUVENILE COURTS COMPLEX
CLIENT: STATE OF UTAH D.F.C.M.
LOCATION: N:9,713 E:20,155 / LAT:N 39°35'54.23456", LONG:W 110°48'29.35383"
DRILLING METHOD: 08-CME-55 / N. W. CASING TO 40'
DRILLER: T. KERN
DEPTH TO WATER - INITIAL: ▽ N.M. **AFTER 24 HOURS:** ▼ 36.3'

PROJECT NUMBER: 201501.036
DATE STARTED: 12/16/15
DATE COMPLETED: 12/17/15
GROUND ELEVATION: 5564.0'
LOGGED BY: M. HANSEN, J. BOONE

Elev. (ft)	Depth (ft)	Lithology	Sample Type	Sample Rec. (in)	Sample See Legend	USCS (AASHTO)	Material Description	Permeability (ft/yr)	Dry Density (pcf)	Moisture Content (%)	Atter. Liquid Limit	Atter. Plast. Index	Gradation Gravel (%)	Gradation Sand (%)	Gradation Silt/Clay (%)	Other Tests
				12	3,5,5,(10) *T 0.21*	CL-ML	brown, moist, soft SILTY CLAY silt lenses									
5530																
	35			16	3,9,8,(16) *T 0.22*	GM	brown, wet SILTY GRAVEL W/SAND	780								
						CL	brown, moist, soft SANDY LEAN CLAY some gravels	1,300								
5525																
	40			17	8,7,4,(10) *T 0.15*	SC	brown, wet CLAYEY SAND W/GRAVEL									
						CL-ML	brown, moist, soft SILTY CLAY	2,100								
5520																
	45			18	6,20,25,(40)	CL	brown, wet & moist MUDSTONE very highly weathered			16.7	25	9	12	35	53	
								670								
5515																
	50			4	50/4"	-	dk. gray, moist MUDSTONE weathered, more competent w/depth									
								3.7								
5510																
	55			2	50/2"	-	dk. gray, moist BOH									
5505																

DH_LOG_V8-2014-1_CARBONCOURTS.GPJ US EVAL.GDT 1/5/16

RB&G ENGINEERING, INC.

LEGEND:

- 2" OD Split Spoon (SPT)
- 2.5" OD Split Spoon
- 3" OD Split Spoon

Split Spoon Sample
- 2,3,2,(6) ← Blow Count per 6" $(N_1)_{60}$ Value
- *T 0.45* ← Torvane (tsf)
- *PP 2.0* ← Pocket Penetrometer (tsf)
- With Liners

Thin-Walled Tube Sample
- Pushed
- *T 0.45* ← Torvane (tsf)
- *PP 2.0* ← Pocket Penetrometer (tsf)

OTHER TESTS
UC = Unconfined Compression
CT = Consolidation
DS = Direct Shear
UU = Unconsolidated, Undrained
CU = Consolidated, Undrained
Chem. = pH, Resistivity, Sulfate, Chloride
Hyd. = Hydrometer

RB&G ENGINEERING, INC.

Table 1

SUMMARY OF TEST DATA

PROJECT LOCATION: Carbon District & Juvenile Courts Complex, Carbon County, UT

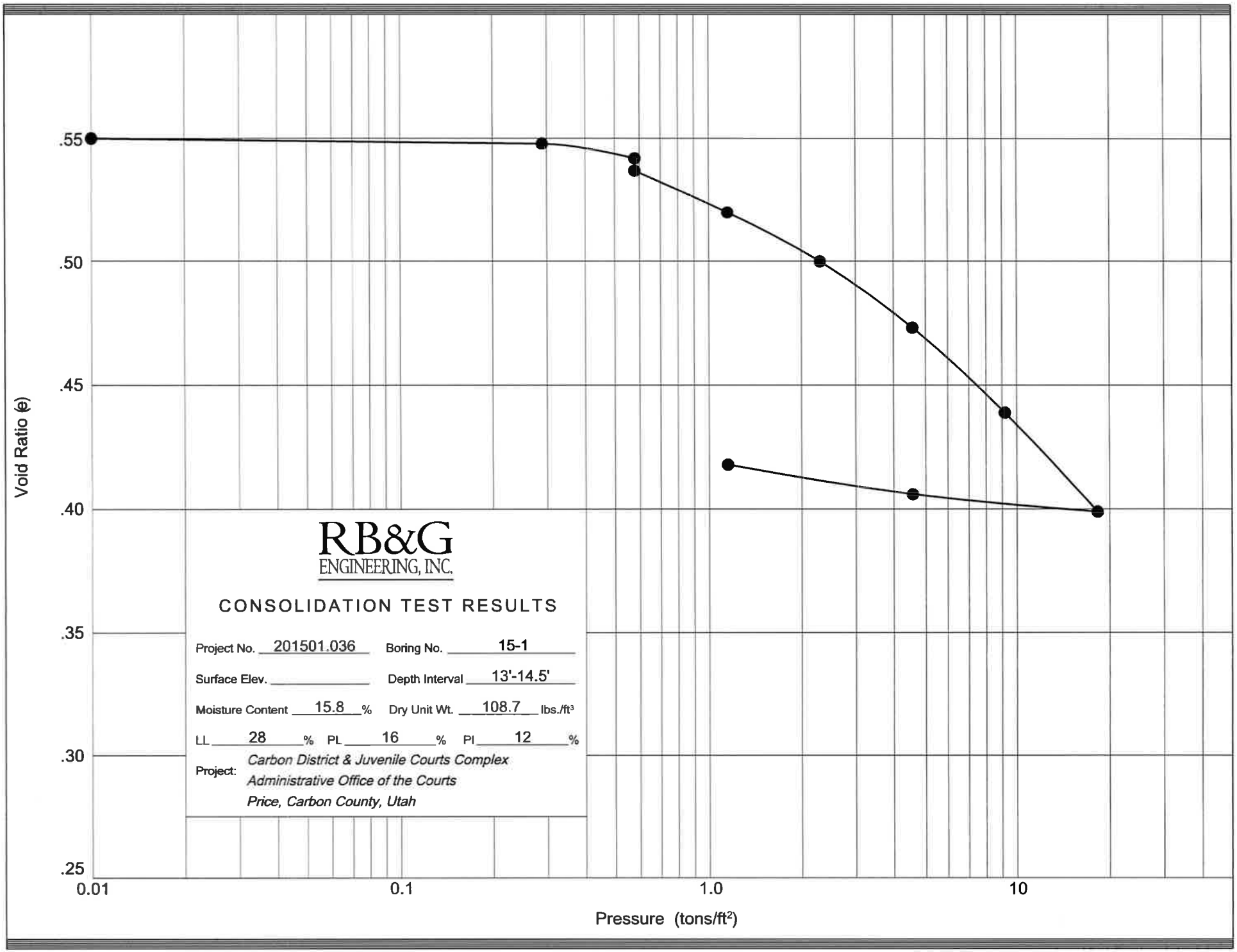
PROJECT NO.: 201501-036

FEATURE: Foundations

HOLE NO.	DEPTH BELOW GROUND SURFACE (ft)	IN-PLACE		UNCONFINED COMPRESSIVE STRENGTH	ATTERBERG LIMITS			MECHANICAL ANALYSIS			OTHER TESTS	UNIFIED SOIL CLASSIFICATION SYSTEM
		DRY UNIT WEIGHT (pcf)	MOISTURE (%)		LIQUID LIMIT (%)	PLASTIC LIMIT (%)	PLASTICITY INDEX (%)	PERCENT GRAVEL	PERCENT SAND	PERCENT SILT & CLAY		
15-1	10-11.5	106.5	13.1	2751 psf	25	17	8					CL
	13-14.5	108.7	15.8	2512 psf	28	16	12				consolidation	CL
	16-17.5		15.9				NP	0	27	73		ML
	25-26.5		12.0				NP	30	47	23		SM
	40-41.5		15.3		33	18	15	37	20	43		GC
	53.3-54		6.5	730 psi								
15-2	13-14		12.4		25	17	8					CL
	19-20.5	111.7	13.6	565 psf			NP	0	41	59	consolidation	ML
	41.5-42.5	101.7	18.0		40	21	19				consolidation	CL
	43-43.5	121.8	17.2	130 psi	37	21	16					CL
	48.6-49.6	132.2	10.5	1150 psi								
15-3	13-14.5	110.4	14.3	1140 psf	21	16	5					CL-ML
	16-17.5		12.7				NP	9	42	49		SM
15-4	5-6.5		17.3	880 psf*	27	16	11					CL
	20-21.5		16.1	2200 psf*	26	16	10					CL
	30.5-31.5		14.9				NP	13	41	46		SM
15-5	10-11.5		29.2	720 psf*	29	17	12					CL
	30-31.5		18.9	840 psf*	22	16	6					CL-ML
	45-46.5		16.7		25	16	9	12	35	53		CL

*Torvane value used to estimate unconfined compressive strength.

NP=Non-Plastic



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CONSOLIDATION TEST RESULTS

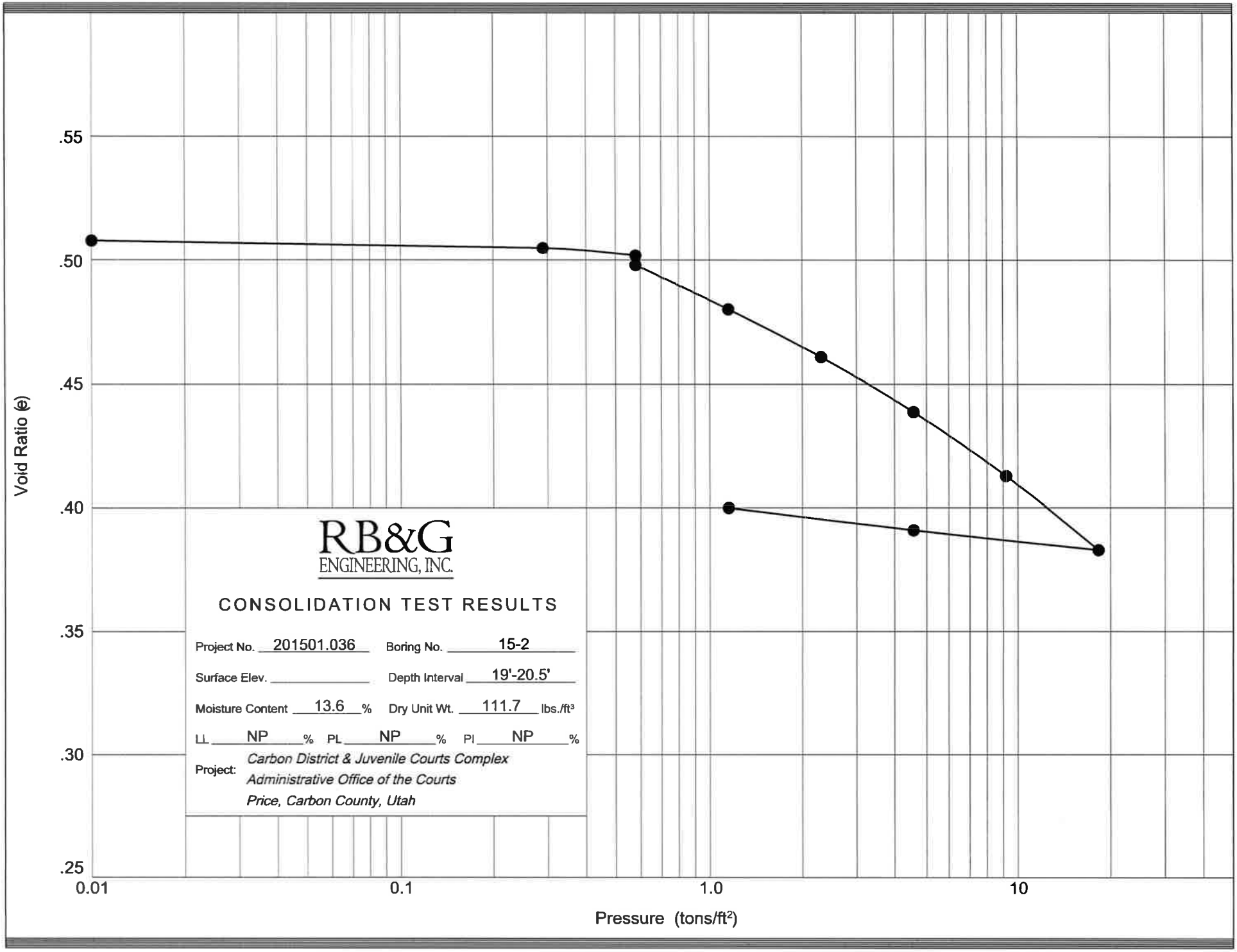
Project No. 201501.036 Boring No. 15-1

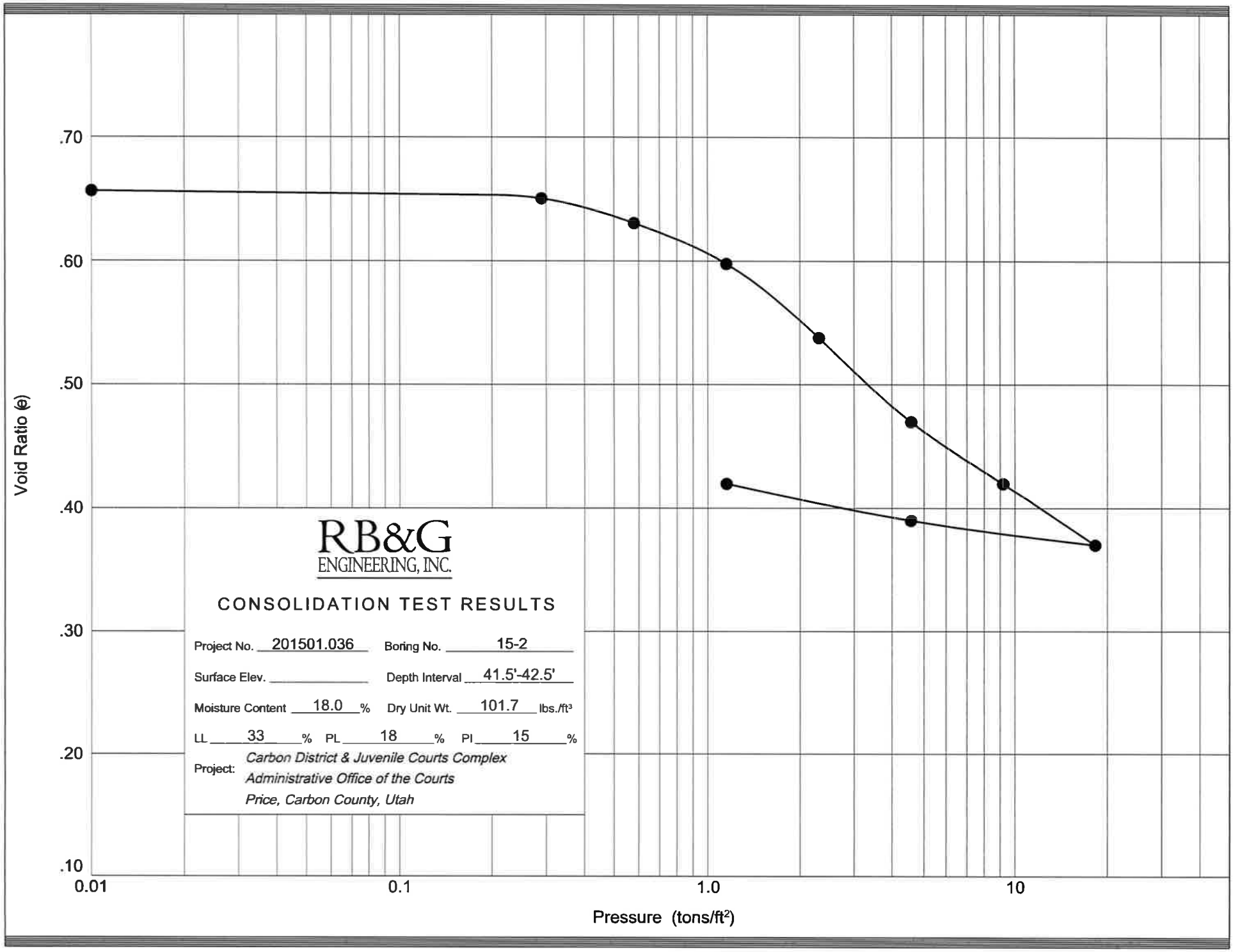
Surface Elev. _____ Depth Interval 13'-14.5'

Moisture Content 15.8 % Dry Unit Wt. 108.7 lbs./ft³

LL 28 % PL 16 % PI 12 %

Project: *Carbon District & Juvenile Courts Complex*
Administrative Office of the Courts
Price, Carbon County, Utah


.55
.50
.45
.40
.35
.30
.25
Void Ratio (e)
0.01
0.1
1.0
10
Pressure (tons/ft²)
RB&G
ENGINEERING, INC.
CONSOLIDATION TEST RESULTS
Project No. 201501.036
Boring No. 15-2
Surface Elev.
Depth Interval 19'-20.5'
Moisture Content 13.6 %
Dry Unit Wt. 111.7 lbs./ft³
LL NP %
PL NP %
PI NP %
Project: Carbon District & Juvenile Courts Complex
Administrative Office of the Courts
Price, Carbon County, Utah


.70
.60
.50
.40
.30
.20
.10
Void Ratio (e)
0.01
0.1
1.0
10
Pressure (tons/ft²)
RB&G
ENGINEERING, INC.
CONSOLIDATION TEST RESULTS
Project No. 201501.036
Boring No. 15-2
Surface Elev.
Depth Interval 41.5'-42.5'
Moisture Content 18.0 %
Dry Unit Wt. 101.7 lbs./ft³
LL 33 % PL 18 % PI 15 %
Project: Carbon District & Juvenile Courts Complex
Administrative Office of the Courts
Price, Carbon County, Utah

2008 Boring Logs

DRILL HOLE LOG

BORING NO. 08-1

SHEET 1 OF 1

PROJECT: CARBON COUNTY ADMINISTRATION BUILDING - SITE A
CLIENT: CARBON COUNTY
LOCATION: SEE SITE PLAN
DRILLING METHOD: 96-CME-55 / N.W. CASING WITH WATER AS DRILLING FLUID
DRILLER: L. HILER
DEPTH TO WATER - INITIAL: ▽ 5.8' * **AFTER 24 HOURS:** ▼ BELOW 15.0'

PROJECT NUMBER: 200801.038
DATE STARTED: 8/27/08
DATE COMPLETED: 8/27/08
GROUND ELEVATION: NOT MEASURED
LOGGED BY: J. PRICE, J. BOONE

Elev. (ft)	Depth (ft)	Lithology	Sample Type	Sample Rec. (in)	Sample See Legend	Sample USCS (AASHTO)	Material Description	Dry Density (pcf)	Moisture Content (%)	Atter. Liquid Limit	Atter. Plast. Index	Gradation Gravel (%)	Gradation Sand (%)	Gradation Silt/Clay (%)	Other Tests
				14	2,5,7,(24) *0.60*	CL	brown, moist, stiff — SANDY LEAN CLAY W/ORGANICS								
						CL	brown, moist, stiff								
				12	0,1,2,(6) *0.30*	CL-1	brown, moist, firm		20.2	23	8				
	5														
▽				9	2,3,3,(12) *0.55*	CL-1	brown, moist, stiff — SANDY LEAN CLAY silt lenses		14.7	24	10				
	10			8	2,3,3,(10) *0.58*	CL	brown, moist, stiff								
				10	2,2,2,(6) *0.20*	CL	brown, moist, soft								
	15			10	1,3,2,(7) *0.18*	CL-ML	brown, moist, soft — SANDY SILTY CLAY silt lenses								

* = Likely Drill Water

DH_LOGV1 CARBONCOADMINA.GPJ US EVAL.GDT 10/22/08

RB&G ENGINEERING, INC.

LEGEND:

DISTURBED SAMPLE: 2,3,2,(6) ← Blow Count per 6"; ← $(N_1)_{60}$ Value; *0.45* ← Torvane (tsf)

UNDISTURBED SAMPLE: PUSHED; *0.45* ← Torvane (tsf)

OTHER TESTS
UC = Unconfined Compression
CT = Consolidation
DS = Direct Shear
TS = Triaxial Shear
HYD = Hydrometer

DRILL HOLE LOG

BORING NO. 08-2

SHEET 1 OF 1

PROJECT: CARBON COUNTY ADMINISTRATION BUILDING - SITE A
CLIENT: CARBON COUNTY
LOCATION: SEE SITE PLAN
DRILLING METHOD: 96-CME-55 / N.W. CASING WITH WATER AS DRILLING FLUID
DRILLER: L. HILER
DEPTH TO WATER - INITIAL: ▽ 34.2' * **AFTER 24 HOURS:** ▼ N.M.

PROJECT NUMBER: 200801.038
DATE STARTED: 8/27/08
DATE COMPLETED: 8/27/08
GROUND ELEVATION: NOT MEASURED
LOGGED BY: J. PRICE, J. BOONE

Elev. (ft)	Depth (ft)	Lithology	Sample Type	Sample Rec. (in)	Sample See Legend	Sample USCS (AASHTO)	Material Description	Dry Density (pcf)	Moisture Content (%)	Atter. Liquid Limit	Atter. Plast. Index	Gradation Gravel (%)	Gradation Sand (%)	Gradation Silt/Clay (%)	Other Tests
				6	7,3,1,(8)	GM	brown, moist, very loose; 4" ASPHALT; SILTY GRAVEL W/SAND (ROAD BASE)								
				2	0/16",1/2",(2)	CL	brown, moist, soft; SANDY LEAN CLAY W/GRAVEL casing fell from 5' to 7.5'								
	5			2	0/18",(0)	CL	brown, moist, very soft								
	10			5	0,1,1,(3)	CL-ML	brown, moist, soft		13.9	21	6				
	15			6	0/18",(0) 0.30	CL-ML	brown, moist, firm; SANDY SILTY CLAY W/GRAVEL casing fell from 23' to 25'								
	20														
	25			2	0/18",(0)	CL-ML	brown, moist, very soft								
	30			7	0/18",(0)	CL-ML	brown, moist, soft; SANDY SILTY CLAY		17.4	20	4				
▽	35			19	1/22",(1)	CL-ML	brown, very moist, very soft								
	40			7	44,50/2",(42)	CL-2	gray, moist, very stiff; SHALE (LEAN CLAY) weathered to competent w/depth		15.7	34	16				
	45			5	100/5",(81)	CL	gray, moist, hard								

DH_LOGV1_CARBONCOADMINA.GPJ US EVAL.GDT 10/22/08

RB&G ENGINEERING, INC.

LEGEND:

DISTURBED SAMPLE — 2,3,2,(6) ← Blow Count per 6"; $(N_1)_{60}$ Value; 0.45 ← Torvane (tsf)

UNDISTURBED SAMPLE — PUSHED; 0.45 ← Torvane (tsf)

OTHER TESTS
UC = Unconfined Compression
CT = Consolidation
DS = Direct Shear
TS = Triaxial Shear
HYD = Hydrometer

DRILL HOLE LOG

BORING NO. 08-3

SHEET 1 OF 1

PROJECT: CARBON COUNTY ADMINISTRATION BUILDING - SITE A
CLIENT: CARBON COUNTY
LOCATION: SEE SITE PLAN
DRILLING METHOD: 96-CME-55 / N.W. CASING WITH WATER AS DRILLING FLUID
DRILLER: L. HILER
DEPTH TO WATER - INITIAL: ▽ 6.9' * **AFTER 24 HOURS:** ▼ 22.5'

PROJECT NUMBER: 200801.038
DATE STARTED: 8/26/08
DATE COMPLETED: 8/28/08
GROUND ELEVATION: NOT MEASURED
LOGGED BY: J. PRICE, J. BOONE

Elev. (ft)	Depth (ft)	Lithology	Sample Type	Sample Rec. (in)	Sample See Legend	Sample USCS (AASHTO)	Material Description		Dry Density (pcf)	Moisture Content (%)	Atter. Liquid Limit	Atter. Plast. Index	Gradation Gravel (%)	Gradation Sand (%)	Gradation Silt/Clay (%)	Other Tests
				13	1,3,4,(14) 0.62	CL CL	dk. brown, moist, stiff dk. brown, moist, stiff	SANDY LEAN CLAY W/ORGANICS								
	5			16	Pushed 0.29	CL-2	dk. brown, moist, firm		97.6	22.2	30	15				CT UC
▽				12	Pushed 0.99+	CL-2	dk. brown, moist, stiff	SANDY LEAN CLAY silt lenses	109.3	16.5	32	16				UC
	10			10	Pushed 0.50	CL-1	brown, moist, firm to stiff		110.5	14	26	11				CT
				16	2,2,3,(7) 0.45	CL	brown, moist, firm									
	15			14	2,3,2,(7) 0.23	CL-ML	brown, moist, soft	SANDY SILTY CLAY silt lenses								
	20			10	7,7,10,(21)	CL-ML	gray, very moist, stiff	SANDY SILTY CLAY W/GRAVEL								
▼	25			4	5,3,3,(8)	SM	gray, wet, loose	SILTY SAND W/GRAVEL								
	30			18	0/18",(0) 0.13	CL-ML	brown, very moist, soft	SANDY SILTY CLAY								
	35			18	2,3,3,(6) 0.10	CL-ML	brown, very moist, very soft									
	40			15	14,15,22,(33) 0.99+	CL	brown, moist, stiff	WEATHERED SHALE (LEAN CLAY W/GRAVEL) more competent w/depth								
	45			6	70/6",(64)	CL CL	brown, moist, very stiff gray, moist, hard	COMPETENT SHALE (LEAN CLAY)								
				0	50/2",(44)	-	no recovery									

* = Likely Drill Water

DH_LOGV1 CARBONCOADMINA.GPJ US EVAL.GDT 10/22/08

RB&G ENGINEERING, INC.

LEGEND:

DISTURBED SAMPLE: 2,3,2,(6) ← Blow Count per 6"; ← $(N_1)_{60}$ Value; 0.45 ← Torvane (tsf)

UNDISTURBED SAMPLE: PUSHED 0.45 ← Torvane (tsf)

OTHER TESTS
UC = Unconfined Compression
CT = Consolidation
DS = Direct Shear
TS = Triaxial Shear
HYD = Hydrometer

DRILL HOLE LOG

BORING NO. 08-4

SHEET 1 OF 1

PROJECT: CARBON COUNTY ADMINISTRATION BUILDING - SITE A
CLIENT: CARBON COUNTY
LOCATION: SEE SITE PLAN
DRILLING METHOD: 96-CME-55 / N.W. CASING WITH WATER AS DRILLING FLUID
DRILLER: L. HILER
DEPTH TO WATER - INITIAL: ▽ 11.3' * **AFTER 24 HOURS:** ▼ BELOW 15.0'

PROJECT NUMBER: 200801.038
DATE STARTED: 8/27/08
DATE COMPLETED: 8/27/08
GROUND ELEVATION: NOT MEASURED
LOGGED BY: J. PRICE, J. BOONE

Elev. (ft)	Depth (ft)	Lithology	Sample Type	Sample Rec. (in)	Sample See Legend	Sample USCS (AASHTO)	Material Description	Dry Density (pcf)	Moisture Content (%)	Atter. Liquid Limit	Atter. Plast. Index	Gradation Gravel (%)	Gradation Sand (%)	Gradation Silt/Clay (%)	Other Tests
							4" ASPHALT								
				3	9,5,5,(20)	GM	brown, moist, loose — SILTY GRAVEL W/SAND (ROAD BASE)								
				0	6,7,8,(30)	-	no recovery								
	5			5	4,2,2,(9) *0.30*	CL-2	brown, moist, firm		13.9	31	15				
							SANDY LEAN CLAY silt lenses								
				11	Pushed *0.40*	CL-1	brown, moist, firm	105	16.9	27	11				CT UC
	10														
▽				15	1,2,4,(9) *0.28*	CL	brown, moist, firm								
							SANDY SILTY CLAY								
	15			12	1,2,4,(8) *0.22*	CL-ML	brown, moist, soft								

* = Likely Drill Water

DH_LOGV1 CARBONCOADMINA.GPJ US EVAL.GDT 10/22/08

RB&G ENGINEERING, INC.

LEGEND:

DISTURBED SAMPLE: 2,3,2,(6) ← Blow Count per 6"; $(N_1)_{60}$ Value; *0.45* ← Torvane (tsf)

UNDISTURBED SAMPLE: PUSHED *0.45* ← Torvane (tsf)

OTHER TESTS
UC = Unconfined Compression
CT = Consolidation
DS = Direct Shear
TS = Triaxial Shear
HYD = Hydrometer

DRILL HOLE LOG

BORING NO. 08-5

SHEET 1 OF 1

PROJECT: CARBON COUNTY ADMINISTRATION BUILDING - SITE A
CLIENT: CARBON COUNTY
LOCATION: SEE SITE PLAN
DRILLING METHOD: 96-CME-55 / N.W. CASING WITH WATER AS DRILLING FLUID
DRILLER: L. HILER
DEPTH TO WATER - INITIAL: ▽ 6.0' * **AFTER 24 HOURS:** ▼ N.M.

PROJECT NUMBER: 200801.038
DATE STARTED: 8/27/08
DATE COMPLETED: 8/27/08
GROUND ELEVATION: NOT MEASURED
LOGGED BY: J. PRICE, J. BOONE

Elev. (ft)	Depth (ft)	Lithology	Sample Type	Sample Rec. (in)	Sample See Legend	Sample USCS (AASHTO)	Material Description	Dry Density (pcf)	Moisture Content (%)	Atter. Liquid Limit	Atter. Plast. Index	Gradation Gravel (%)	Gradation Sand (%)	Gradation Silt/Clay (%)	Other Tests
							5" CONCRETE								
				5	3,3,3,(12) *0.55*	CL	brown, moist, stiff								
				7	Pushed *0.50*	CL-1	brown, moist, firm to stiff	100.4	13.7	24	9				CT
	5														
▽				7	Pushed *0.45*	CL-1	brown, moist, firm	106.9	15.3	25	11				CT
							SANDY LEAN CLAY silt lenses								
	10			13	2,2,2,(7) *0.60*	CL	brown, moist, stiff								
				3	2,3,3,(9) *0.31*	CL	brown, moist, firm								
	15			12	2,4,4,(11) *0.27*	CL	brown, moist, firm								

* = Likely Drill Water

DH_LOGV1 CARBONCOADMINA.GPJ US EVAL.GDT 10/22/08

RB&G ENGINEERING, INC.

LEGEND:

DISTURBED SAMPLE: 2,3,2,(6) *0.45* — Blow Count per 6" / $(N_1)_{60}$ Value / Torvane (tsf)

UNDISTURBED SAMPLE: PUSHED *0.45* — Torvane (tsf)

OTHER TESTS
UC = Unconfined Compression
CT = Consolidation
DS = Direct Shear
TS = Triaxial Shear
HYD = Hydrometer

DRILL HOLE LOG

BORING NO. 08-6

SHEET 1 OF 1

PROJECT: CARBON COUNTY ADMINISTRATION BUILDING - SITE A
CLIENT: CARBON COUNTY
LOCATION: SEE SITE PLAN
DRILLING METHOD: 96-CME-55 / N.W. CASING WITH WATER AS DRILLING FLUID
DRILLER: L. HILER
DEPTH TO WATER - INITIAL: ▽ 7.6' * **AFTER 24 HOURS:** ▼ N.M.

PROJECT NUMBER: 200801.038
DATE STARTED: 8/27/08
DATE COMPLETED: 8/27/08
GROUND ELEVATION: NOT MEASURED
LOGGED BY: J. PRICE, J. BOONE

Elev. (ft)	Depth (ft)	Lithology	Sample Type	Sample Rec. (in)	Sample See Legend	Sample USCS (AASHTO)	Material Description	Dry Density (pcf)	Moisture Content (%)	Atter. Liquid Limit	Atter. Plast. Index	Gradation Gravel (%)	Gradation Sand (%)	Gradation Silt/Clay (%)	Other Tests
							4" ASPHALT								
							2" CONCRETE								
				2	17,6,4,(20) *0.45*	CL	brown, moist, firm — SANDY LEAN CLAY								
						-	black — COAL PIECES (fill)								
				10	1,3,3,(13) *0.38*	CL	brown, moist, firm								
	5														
				6	2,1,2,(6) *0.38*	CL	brown, moist, firm								
▽															
	10			13	0,1,2,(5) *0.24*	CL	brown, moist, soft — SANDY LEAN CLAY silt lenses								
				12	1,2,3,(8) *0.34*	CL	brown, moist, firm								
	15			13	2,3,3,(9) *0.35*	CL	brown, moist, firm								

* = Likely Drill Water

DH_LOGV1 CARBONCOADMINA.GPJ US EVAL.GDT 10/22/08

RB&G ENGINEERING, INC.

LEGEND:

DISTURBED SAMPLE — 2,3,2,(6) ← Blow Count per 6"; $(N_1)_{60}$ Value; *0.45* ← Torvane (tsf)

UNDISTURBED SAMPLE — PUSHED; *0.45* ← Torvane (tsf)

OTHER TESTS
UC = Unconfined Compression
CT = Consolidation
DS = Direct Shear
TS = Triaxial Shear
HYD = Hydrometer