PURCHASING DEPARTMENT

TWELVE EAST 4TH AVENUE, SUITE 106 • ROME, GEORGIA 30161
PHONE: 706.291.5118 • FAX: 706.290.6099 • www.romefloyd.com

Date: 4/6/16
To: To Whom It May Concern

Request for Quote: 16-0420 Helical Piles for Everett Springs Bridge

Floyd County is requesting quotes to install Helical Piles for Everett Springs Bridge.

All quotes will be submitted on the attached quote sheet. Additional information may be submitted with quote. Quotes are to include all costs including shipping, delivery and installation. Quotes submitted will be FOB Destination (Rome Ga. 30161).

Submissions **must include** a completed E-Verify Form (Contract Affidavit and Agreement).This form is provided in this RFQ. Companies that do not provide this will not be considered.

Quotes are due no later than **2pm 20 April**. Quotes may be submitted by Email, Fax, US Mail or hand delivered to this office. Fax 706 290-6099 – Email: Graye@floydcountyga.org
Quotes are to remain valid for a period of 30 days from the date of quote. Awards may be for all or part of what is submitted

Questions will be submitted in writing no later than 15 April at 5pm. Attention Everett Gray Fax 706 290-6099 or Email: Graye@floydcountyga.org

Typically award notification will be by email. Tabulations will be posted to the Floyd County Website and the Georgia Procurement Registry in approximately 24hrs after the due date/time.

Payment Options, Invoicing, and Terms and Conditions

If payment is made by check, Floyd County will pay invoice(s) within 30 days of receipt of a valid invoice. Supplier may be required to send a current W-9 prior to have a Purchase Order issued. The Issued Purchase Order will serve to initiate the order when payment is going to be made by check.
If payment is made by credit card this information will be provided at the time of order, however, the successful suppliers must agree that no charge will be run until such time as the products have shipped or the service has been provided. A paid receipt or paid invoice will be provided to the card bearer. Floyd County is Tax Exempt.

BOARD OF COMMISSIONERS
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GARRY FRICKS, VICE-CHAIRMAN
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ADMINISTRATION
NANCY LAM, CPPB, CPPO, *PURCHASING DIRECTOR*
EVERETT GRAY, CPPB, *PURCHASING AGENT*

Floyd County Georgia
RFQ 16-0420
Helical Piles for Everett Springs Bridge
Quote Due not later than 2pm 20 April 2016

Scope of Work

General: Floyd County is accepting quotes for installation of Helical Piles for installation of a 24' span x 24' wide precast concrete modular bridge as supplied by Forterra Precast.

Site Location: at Everett Springs Road in Floyd County, Georgia for Floyd County Government.

The bridge will be installed on precast concrete end bents, each requiring 5 piles, for a total of 10 installed piles. Soil borings and geotechnical report for the site indicate that a depth of 25' for each pile should be adequate. The specifications for the bridge require that piles shall have 24 ton design loading.

Contractor Will:

- Provide all Material, Labor, Equipment and Supplies at Contractors expense.
- Follow OSHA Safety Standard and Regulations at all times
- Complete and return Contractor Affidavit (AKA E-Verify) with quote submission–See attached
- Obtain any County or State permit required
- Furnishing all necessary engineering and design services, supervision, labor, tools, materials, and equipment to perform all work necessary to install and test the HELICAL PILE FOUNDATIONS, Install a helical pile foundation that will develop the load capacities as required by the bridge manufacturer.
- Load test to verify helical pile foundation capacity and deflection in accordance with bridge manufacturer's requirements for HS 20-44 loading.
- Provide timeline for completion of the work from Notice to Proceed.

Additional Information: Geotechnical Report for the site is attached. The contractor shall coordinate with the Geotechnical Engineer and Bridge Manufacturer to ensure the finished piles meet bridge manufacturer's requirements for loading, corrosion resistance, and product life.

Cost of each pile as outlined in this quote shall include adjustment to final grade, and construction of attachment/bearing surface in accordance with bridge manufacturer's requirements.

Floyd County Will:

- Provide easements necessary for access and performance of the work.
- Perform site grading necessary for performance of the work.
- Provide construction staking and benchmarks for pile locations.

Floyd County Georgia
RFQ 16-0420
Helical Piles for Everett Springs Bridge
Quote Due not later than 2pm 20 April 2016

QUOTE PAGE

We the undersigned, agree to provide, install and test Helical Piles at the Everett Springs Bridge site in accordance with the specifications, scope of work, terms and conditions issued for the same.

Mobilization – Lump Sum $_____

Engineering and Testing – Lump Sum $_____

Cost of Each Pile Each $_____ x10 $_____
(Based on 25' depth and bridge mfg.'s loading requirements)

TOTAL $_____

Per foot cost for additional depth of piles if necessary Per Foot $_____

Soonest Date Start Project_____ Estimated Completion _____ Calendar Days

Contractor Information

Contact Person:_____ (Print or Type Name)

Telephone Number(s):__P_____F_____C_____

Email Address_____

Company Name _____

Billing Address _____

Signature _____Date _____

Provide proof of insurance: **Successful bidder** will be required to furnish a Certificate of Liability insurance in an amount not less than Five Hundred Thousand Dollars ($500,000.00) per occurrence to protect the County throughout the life of the contract against **"ALL RISKS"**. Coverage to include but not limited to General Liability: Comprehensive Form Premises/Operations, Products/Completed Operations, Broad Form Property Damage, Personal Injury, and Automobile/Vehicle Liability. Worker's compensation and Employer's Liability are to be statutory amounts. On all contracts for vehicle repair of any kind, the successful shall provide at least Five Hundred Thousand Dollars ($500,000.00) of Garage Liability insurance in addition to the insurance stated above.

Contractor Affidavit under O.C.G.A. § 13-10-91(b)(1)

By executing this affidavit, the undersigned contractor verifies its compliance with O.C.G.A. § 13-10-91, stating affirmatively that the individual, firm or corporation which is engaged in the physical performance of services on behalf of Floyd County Georgia has registered with, is authorized to use and uses the federal work authorization program commonly known as E-Verify, or any subsequent replacement program, in accordance with the applicable provisions and deadlines established in O.C.G.A. § 13-10-91. Furthermore, the undersigned contractor will continue to use the federal work authorization program throughout the contract period and the undersigned contractor will contract for the physical performance of services in satisfaction of such contract only with subcontractors who present an affidavit to the contractor with the information required by O.C.G.A. § 13-10-91(b). Contractor hereby attests that its federal work authorization user identification number and date of authorization are as follows:

_____
Federal Work Authorization User Identification Number

_____
Date of Authorization

_____ _____
Name of Contractor

_____
Address of Contractor

_____
Name of Project

_____FLOYD COUNTY GEORGIA_____
Name of Public Employer

I hereby declare under penalty of perjury that the foregoing is true and correct.
Executed on _____, ____ in 201__ in _____(city), _____(state).

_____
Signature of Authorized Officer or Agent

_____
Printed Name and Title of Authorized Officer or Agent

SUBSCRIBED AND SWORN BEFORE ME
ON THIS THE _____DAY OF_____, 201__.

_____
NOTARY PUBLIC
My Commission Expires: _____ (Notary Seal or Stamp Required)

REPORT OF GEOTECHNICAL EXPLORATION

EVERETT SPRINGS ROAD BRIDGE OVER JOHNS CREEK TRIBUTARY

ARMUCHEE, GEORGIA

FOR

FLOYD COUNTY GOVERNMENT

MARCH 7, 2016

ECS PROJECT NO. 10:8879

ECS SOUTHEAST, LLC
"Setting the Standard for Service"
Geotechnical • Construction Materials • Environmental • Facilities

March 7, 2016

Mr. Bruce Ivey
Floyd County Government
12E 4th Avenue
Rome, GA 30161

Reference: Report of Geotechnical Exploration
Everett Springs Road Bridge over Johns Creek Tributary
Everett Springs Road
Armuchee, Georgia

ECS Project No. 10:8879

Dear Mr. Ivey:

ECS Southeast, LLC (ECS) is pleased to submit our report of geotechnical exploration for the above referenced project. The attached report presents an introduction to the proposed project, results of our exploration, subsurface conditions, and our recommendations. The work was completed in general accordance with ECS Proposal No. 10:11820 as authorized by Mr. Jamie McCord with Floyd County Government on January 13, 2016. Issuance of the report was delayed while anticipated loading conditions were calculated by others.

We appreciate the opportunity of working with you on this project and look forward to our continued association. Should you have questions regarding our findings or need additional consultations, please do not hesitate to contact our office at (770) 590-1971.

Respectfully,

ECS SOUTHEAST, LLC represented by:

Dana Causby, P.E.
Senior Geotechnical Engineer
GA Registration No. 27858

GEORGIA REGISTERED No. 27858 PROFESSIONAL ENGINEER DANA R. CAUSBY 3/7/16

Jay Hornsby, P.G.
Geotechnical Department Manager
GA Registration No. 1978

REPORT OF GEOTECHNICAL EXPLORATION
EVERETT SPRINGS ROAD BRIDGE OVER JOHNS CREEK TRIBUTARY
ROME, GEORGIA

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INTRODUCTION

General

This report presents the results of a geotechnical exploration for the Everett Springs Road Bridge over Johns Creek in Armuchee, Floyd County, Georgia. Work was performed in general accordance with ECS Proposal No. 10:11820 as authorized by Mr. Jamie McCord with Floyd County Government on January 13, 2016. Issuance of the report was delayed while anticipated loading conditions were calculated by others.

Project Information

This section is based on information provided and our site reconnaissance. The site is located along Everett Springs Road, approximately 6.5 miles north of S.R. 156 in northern Floyd County, Georgia. This tributary and existing bridge are located approximately 325 feet to the west of Johns Creek. A Site Location Diagram is included in the Appendix as Figure 1.

We understand the existing bridge was likely constructed in late 1950s or early 1960s, with construction consisting of a steel beams and a concrete deck supported by concrete wing-walls abutments with shallow foundations. The current bridge has a span of 16 feet and has a depth of 4.5 feet from bottom of beams to the stream bed. The west abutment was partially scoured and undermined during recent heavy rains and flooding and the bridge deck settled approximately 10 inches at the west abutment. The depth/elevations of the existing bridge footings were not available. By visual observation, it appeared that the bottom of the west wing wall footing was about 3 feet below the steam elevation. A temporary single-lane bridge was installed until a new bridge is constructed.

The proposed project consists of the construction of a new bridge or arched culvert over the creek. The following three replacement bridge options that are being considered are described below:

Option #1 – Aluminum Arch/Box Culvert with Open Bottom with Continuous Shallow Foundations

This will be an aluminum arch with dimensions of 24’ long and a 23’ 8” span. Installation will include aluminum headwall/wingwalls, guardrails, and a minimum of 2 feet of soil cover. The provided dead load weight of this structure is 4.2 kips. We understand that shallow foundations are preferred for this bridge option.

Option #2 – Precast Concrete Arch Culvert with Continuous Shallow Foundations

This will be a precast concrete arch with dimensions of 24’ long and a 24” span. Installation will include precast concrete headwall/wingwalls, guardrails, and a minimum of

2 feet of soil cover. The provided dead load weight of this structure is 105 kips. We understand that shallow foundations are also preferred for this bridge option.

Option #3 – Precast Modular Bridge

This is a precast component modular bridge with dimensions of 24' long and a 24" span. The provided dead load weight of this structure is 146 kips. Foundation options include either precast concrete end bents on piles, or on a cast-in-place abutment on continuous shallow foundations.

We understand that the maximum live loads for each of these structures will be about 103 kips. Based on the provided dead weights, soil cover and live load, we estimate that the loading conditions along the each abutment/footing will be about 8 kips, 10.5 kips and 7 kips at Options #1, #2 and #3, respectively. These loading conditions should be confirmed by the respective design engineers for each of the three Bridge Options. ECS should be contacted if the actual loading conditions along the abutments are significantly higher than estimates listed above, and give the opportunity to review and revise our calculations and recommendations if necessary.

The existing surface elevations at the bridge were not available at the time of this report. But we understand the proposed elevations (FFE) will be similar to the existing grades. No significant grade changes are expected at this site. We also note that a hydrology study has not been performed and that the scour line was not available at the time of this report.

The attached Boring Location Plan (Figure 2) presents the general aerial view and conditions of the site at the time of this report. If any of the information presented is incorrect or has changed, please advise ECS so that we may re-evaluate our recommendations in the light of changes in the present project concept.

Purposes of Exploration

The purposes of this exploration were to explore the soil and groundwater conditions at the site and to develop engineering recommendations to guide design and construction of the proposed project.

We accomplished the purposes of the study by:

1. Reviewing the available publications concerning local geology of the site and performing a general site reconnaissance.

2. Drilling borings to explore the subsurface soil and groundwater conditions.

3. Performing laboratory tests on selected representative soil samples from the borings to evaluate pertinent engineering properties.

4. Evaluating the field and laboratory data to develop appropriate engineering recommendations.

FIELD EXPLORATION AND LABORATORY TESTING

Subsurface Exploration

To explore the subsurface conditions at this site, a total of 2 soil test borings were performed in the proposed development area. Boring B-1 was performed about 3 feet west of the west abutment and Boring B-2 was performed about east of the west abutment.

Boring locations were determined in the field by our representative who measured distances and estimated right angles from existing site features. As these methods are not precise, the boring locations shown on the attached Boring Location Plan (Figure 2) should be considered approximate.

The soil test borings were performed with an ATV mounted drill rig, which utilized hollow stem augers to advance the boreholes. No water or drilling fluid was introduced during the process. Representative soil samples were obtained by means of the split-barrel sampling procedure in general accordance with ASTM Specification D-1586 with an automatic drive hammer. In this procedure, a 2-inch O.D., split-barrel sampler is driven into the soil a distance of 18 inches by a 140-pound hammer falling 30 inches. The number of blows required to drive the sampler through a 12-inch interval is termed the Standard Penetration Test (SPT) N-value and is indicated for each sample on the boring logs. This value can be used as a qualitative indication of the in-place relative density of cohesionless soils. In a less reliable way, it also indicates the consistency of cohesive soils.

The drill crew and an ECS representative prepared a field log of the soils encountered in the borings. After recovery, each sample was removed from the sampler and visually classified by the field crew and ECS representative. Representative portions of each sample were then sealed and brought to our laboratory in Marietta, Georgia for further visual examination and laboratory testing by ECS.

Laboratory Testing Program

Representative soil samples were selected and tested in our laboratory to check visual classifications and to determine pertinent engineering properties. The laboratory testing program included visual classifications of soil samples as well as gradation analysis, Atterberg limits, and natural moisture content testing on selected soil samples.

A geotechnical engineer/geologist classified each soil sample on the basis of texture and plasticity in accordance with the Unified Soil Classification System. The group symbols for each soil type are indicated in parentheses followed by the soil descriptions on the boring logs.

The geotechnical engineer/geologist grouped the various soil types into the major zones noted on the boring logs. The stratification lines designating the interfaces between earth materials on the boring logs and profiles are approximate; in-situ, the transitions may be gradual.

The soil samples will be retained in our laboratory for a period of 60 days, after which, they will be discarded unless other instructions are received as to their disposition.

SUBSURFACE CONDITIONS

Regional Geology

The site is located within the Valley and Ridge Physiographic Province of Georgia. This province is characterized by linear ridges and valley. According to the Geologic Map of Georgia (1976), the underlying bedrock is classified as the Floyd Shale formation, which consists of sandstones and shales. In this area, residual soils have developed by the in place chemical and physical weathering of the parent bedrock. A typical soil profile in this area consists of a thin layer of clayey or sandy silt near the ground surface, where the weathering is more advanced, and transitions to more granular, less weathered soil with depth. The density of the soils generally increases with depth as a result of the reduced extent of the weathering process. Frequently, a transitional stratum is found between the soil and parent rock. This material is known as partially weathered rock and is locally defined as residual material exhibiting standard penetration resistances in excess of 100 blows per foot. These materials are ultimately underlain by relatively unweathered bedrock.

Based on the online Soil Survey of Floyd and Polk Counties, Georgia, as prepared by the US Department of Agriculture Soil Conservation Service, a summary of the predominant soil types (within the upper 5 feet below original grade) at the site and their characteristics is included in the following table:

Soil Type	Constituents	Parent Material	Seasonal High Water Table (inches)
Chewacla silt loam (Ck)	Silt Loams	Alluvium	6 to 18
Toccoa fine sandy loam (Tk)	Fine Sandy Loam	Alluvium	30 to 60 inches

Soil Conditions

Data from the soil test borings is included in the Appendix. The subsurface conditions discussed in the following paragraphs and those shown on the boring logs represent an estimate of the subsurface conditions based on interpretation of the boring data using normally

accepted geotechnical engineering judgments. We note that the transition between different soil strata is usually less distinct than those shown on the boring logs.

Surface Materials

The top of the temporary bridge was approximately 9 inches above the roadway and former bridge deck elevation. A layer of Graded Aggregate Base and #89 stone had been placed at each end of the temporary bridge to accommodate the grade changes. Approximately 1 inch of #89 stone and 8 inches of GAB were encountered in each boring. Approximately 5 inches of asphalt for the existing roadway were encountered beneath the GAB layer at each boring. Some variation in thicknesses should be expected across the site.

Fill Materials

Fill may be any material that has been transported and deposited by man. Undocumented fill is considered any man placed materials with no moisture-density records from the time it was originally placed. Materials described as undocumented fill were encountered in Borings B-1 and B-2 to depths of approximately 5.5 to 7 feet below the existing ground surface. The fill material generally consisted of stiff sandy lean Clay with Gravel and/or medium dense clayey Sand with Gravel. Standard Penetration resistances (N-Values) ranged from 11 to 25 blows per foot (bpf). While no unsuitable materials were visually observed in the soil samples recovered, some unsuitable materials may exist in the undocumented fill and remain undetected within the general area of the east and west abutments, but beyond the two borings performed.

Alluvial Soils

Alluvium is a material that has been transported and deposited by flowing water. As previously indicated, the soils at the site were mapped as alluvial soils by the online Soil Survey. Alluvial soils consisting of medium dense clayey Gravel with sand, dense well-graded Gravel with Sand and Sand with silt and gravel (possible alluvium) were encountered beneath the existing fill soils in Borings B-1 and B-2, respectively. The location of these soils is typically in the saturated zone below the water table. The alluvial material was generally encountered starting at depths of 5.5 to 7 feet below existing grade and extended to depths of 9.5 to 12 feet below existing grade. N-Values ranged from 13 to 24bpf.

Residual Soils

Residual soil, formed by in-place weathering of the parent rock, was encountered in the borings below the alluvial soils. The residual soil was generally described as stiff to very stiff sandy lean Clay (CL) and/or medium dense clayey Sand (SC). N-Values ranged

from 12 to 38 bpf. Boring B-1 was terminated within the residual soil at a depth of 65 feet.

Partially Weathered Rock

Partially weathered rock (PWR) is a transitional material between soil and rock, which retains the relic structure of the rock and exhibits Standard Penetration resistances greater than 100, but still can be penetrated by the power auger. PWR was found beneath the residual soil in Boring B-2 at a depth starting from 23 feet below the existing ground surface. The PWR was typically described as very hard sandy Silt.

Auger Refusal Materials

Refusal is a designation applied to any material which cannot be further penetrated by the power auger and is normally indicative of a very hard or very dense material, such as boulders, rock lenses, or the upper surface of bedrock. Auger refusal was reported in Boring B-2 at a depth of 25 feet below the existing ground surface.

Groundwater Conditions

Groundwater seepage was observed in the open bore holes of Borings B-1 and B-2 at a depth of 7 feet below existing grade during our fieldwork activities. Observations for groundwater were made during sampling and upon completion of the drilling operations at each boring location. In auger drilling operations, the groundwater position can often be determined by observing water flowing into or out of the boreholes. Furthermore, visual observation of the soil samples retrieved during the auger drilling exploration can often be used in evaluating the groundwater conditions.

ANALYSIS AND RECOMMENDATIONS

Design Implications of Undocumented Fill and Alluvial Soils

As previously noted, existing undocumented fill materials (5.5 to 7 feet) and alluvial soils (up to 9.5 to 12 feet) were encountered in the borings performed. Visual examination of the fill and alluvial soil samples did not show evidence of extraneous or unsuitable materials, such as organics and debris. However, the presence and depth of materials presents a problem in quantifying the risk that unsuitable inclusions or low consistency soils may exist beneath within the proposed new bridge/culvert foundation footprints. Therefore, the underlying soils within the top 10 to 12 feet appear <u>unsuitable</u> for support of the proposed bridge on conventional shallow spread foundations.

We understand that shallow foundations are preferred by the owner, particularly for Bridge/Culvert Options #1 and #2. In general, if shallow foundations are ultimately used for any

of the selected bridge option, we recommend that bearing elevations not be placed within the fill or alluvial soils. Consequently, the shallow foundations should be placed at depths of at least 10 to 12 feet below existing roadway elevations, at the west and east abutments, respectively. However, this recommended minimum foundation depth is primarily associated with potential settlements associated with the fill and alluvial soils. These recommended foundation bearing depths are not associated with potential scour.

Design Implications of Future Scour

Scour is the result of the erosive action of flowing water, excavating and carrying away material from the bed and banks of streams and from around the piers and abutments of bridges. Bridge foundations must be designed to withstand the effects of scour without failing for the worst case conditions resulting from floods.

Due to the larger 24-foot span, the new foundations will be located approximately 4 feet farther away from the stream banks and the existing foundations. Shallow foundations would be expected to bear on either stiff sandy clays (B-1) or medium dense clayey sands (B-2).

As evidence of the recent bridge failure, these materials are potentially susceptible to scour. The backfill around the foundations may also be susceptible to scour. Rip-rap or concrete would likely be required as scour protection. As noted, a scour line was not available at the time of this study. To better understand the potential for future scour and to determine the need for scour protection and/or if deep foundations are warranted, we recommend that a scour analysis be performed for the new bridge design in accordance with the Federal Highway Administration (FHWA) document entitled “Evaluating Scour at Bridges, Fourth Edition” (HEC-18).

Foundation Alternatives – Shallow Foundations

We understand that shallow foundations consisting of continuous strip footings are generally preferred for this project, particularly with Bridge Options #1 and #2. The residual soils that are present beneath the existing fill and alluvial soils, beginning at about 8 to 10 feet below existing grades, are generally suitable to provide adequate bearing capacity and foundation support. We recommend the use of hand augers, Dynamic Cone Penetration (DCP) testing and possibly test pit excavations to delineate any unsuitable material present at foundation bearing depths/elevations. Any unsuitable materials will have to be over-excavated if found during construction. Any over-excavation should extend laterally down and away from the actual footing dimensions at a 1H:1V slope so that the suitable structural backfill is within the footing’s zone-of-influence. Close quality assurance observation by ECS is required for this activity.

Assuming the hand auger borings and additional test pits confirm the undocumented fill and alluvial soils on this site have been removed and that it is relatively uniform and similar to conditions found in the borings (no significant inclusions of unsuitable material), shallow spread foundations on the residual soils (beneath the fill and alluvial) may be designed for a net allowable soil bearing pressure of 2,500 psf.

To reduce the risk of foundation bearing failure and excessive settlement due to local shear or "punching" action, we recommend that continuous footings have a minimum width of 1.5 feet and that isolated column footings have a minimum lateral dimension of 3 feet. In addition, footings should be placed at a depth to provide adequate bearing capacity. For this site, we recommend footing bottoms be placed at a minimum depth of 1.5 feet below finished grade.

Settlement of individual footings, designed in accordance with recommendations presented in this report, is expected to be within tolerable limits for new construction. For footings placed on residual soils constructed in accordance with the requirements outlined in this report, maximum total settlement is expected to be less 1/2 inch or less. Maximum differential settlement between the two abutments is expected to be half the total settlement.

The above settlement values are based on our engineering experience with similar soil conditions and the anticipated structural loading, and are to guide the structural engineer with his design. To minimize difficulties during the foundation installation phase, it is critical that ECS be retained to observe the foundation bearing surfaces (confirm the recommended bearing pressures and lack of unsuitable material during construction).

Foundation Alternatives - Helical Piles

Deep foundations are listed as one possible foundation type for Bridge Option #3 - Precast Modular Bridge. Several deep foundations systems are technically feasible for this project, including H-piles (which are common for GDOT related projects) and helical piles. Since this is not a GDOT affiliated project, in our opinion, helical piles are likely to be the most economical and efficient deep foundation for the Precast Modular Bridge Option #3.

We also note that in consideration of the recent scouring and bridge failure, the use of helical piles for Bridge Options #1 and #2 could be used not only as the primary foundation support system, but also as a precautionary measure to support the new bridge in the event of future scour of soils from beneath the foundations. Please refer to the Scour Protection section of this report for additional information.

<u>Helical Piles</u> - A helical pile system generally consists of one or more helix plates, attached to a shaft. The helix anchor is installed by applying torque to the shaft and screwing it into the soil. The amount of torque required to screw the plate into place can be loosely correlated to the allowable load for the pile system. Several of the appealing attributes of helical pile systems for this project are they do not require the mobilization of large and costly equipment for installation and groundwater does not adversely affect installation. Due to variable soil conditions, field

adjustment of pile locations under foundations may be needed. If penetration of piles through dense layers becomes difficult, some pre-augering or local trench excavating with small backhoe may be needed to help penetrate piles in deeper layers. Any excavated material should be backfilled once the installation of pile system is completed.

Several proprietary helical pile systems are available in this area, including Chance®, Cantsink®, Atlas® and Ram Jack®. The specialty foundation contractors below can assist in design and provide cost estimates. Local distributors and contacts are:

- Cary Hannon (770-723-9887) of Foundation Technologies, Inc. for Chance® Anchor Foundation & Construction Products
- Ron Keener (770-740-0400) of Atlas Piers of Atlanta, Inc.
- Andrew Carter (678-280-7453) of Cantsink of Atlanta
- Kent Walker (404-496-3328) of Ram Jack of Marietta

Depending on the size and configuration of the helical pile, a typical capacity of 10 to 25 tons per pile is expected. The following provides two types of Atlas Pier helical piles with typical 25 ton allowable capacities:

<u>Helical-Piles</u>
SS 1.75(Square Shaft) = 25 Tons
RS 3500.300 (Round Shaft) = 25 Tons

From the test borings, we recommend that helical pile systems penetrate to depths of 25 feet (below existing grades) to the competent bearing materials at the west abutment, and similarly to depths of about 25 feet to refusal materials at the east abutment. Assuming the bottom of footings/foundations will be about 10 feet below existing road elevations, the actually pile lengths will be about 15 feet below anticipated bottom of foundation elevations. Depending on the depth of the helical pile system, special consideration should be given to rigidity of the shaft to ensure that buckling is not an issue. Post grouting of the pile could be used for increased capacities. Most proprietary systems have means of reinforcing the upper shaft to combat buckling and increase lateral resistance.

We recommend one or more of the above Specialty Foundation Contractors be contacted to provide the best design for their specific product. At the appropriate time, ECS would be pleased to review any submittals for consistency with our design intent.

Soil Parameters

Advanced soil laboratory testing was not performed for this project. However, based on local experience and the site specific borings, the following soil parameters have been estimated for sandy or silty soils (SM, ML) for use in the design of footings and/or below grade walls:

- Coefficient of Earth Pressure “At Rest” (K_o) = 0.53

- Coefficient of Active Earth Pressure (Ka) = 0.36
- Coefficient of Passive Earth Pressure (Kp) = 2.77
- Moist Unit Weight of Soil = 120 pcf
- Angle of Internal Friction (ϕ) = 28 degrees
- Sliding Friction Resistance (concrete on soil) 0.45 x N *
  *Where N is the vertical force component of the foundation system per linear foot.

Slopes

Our exploration did not include an analysis of slope stability for any temporary or permanent condition. However, within construction areas, we recommend temporary cut slopes without seepage be no steeper than 1.5H:1V and permanent cut or fill slopes without seepage be no steeper than 2H:1V for construction to 20 foot heights in the existing site soils. Slopes exceeding 20 feet in height or subject to seepage should be evaluated in more detail. In building and pavement areas, minimum top of slope setbacks of 10 feet and 5 feet are recommended, respectively.

During construction, temporary slopes should be regularly evaluated for signs of movement, seepage, or an unsafe condition. Soil slopes should be covered for protection from rain, and surface runoff condition. Stormwater runoff should be diverted away from the slopes. For erosion protection, a protective cover of grass or other vegetation should be established on permanent soil slopes as soon as possible.

We recommend the use of 24 inches of Type I riprap and filter fabric as protection of the new embankments.

CONSTRUCTION RECOMMENDATIONS

Subgrade Preparation

The subgrade preparation should consist of stripping vegetation, asphalt, rootmat, topsoil, and any other soft or unsuitable material from the new bridge abutment areas. We recommend the earthwork clearing be extended to a minimum of 10 feet beyond the bridge abutments wherever practical. Stripping limits should be extended laterally an additional 1 foot for each foot of fill required at any location.

After stripping to the desired grade, and prior to fill placement, it is critical the stripped surface be evaluated by an engineer from ECS. As needed, additional backhoe test pits or additional hand augers with Dynamic Cone Penetrometer (DCP) testing can be used to delineate any unsuitable material observed. **Where unacceptable materials are encountered, they must be evaluated by ECS and may require remedial measures. Remedial options include undercutting and replacement with soil/rock, recompaction, partial over-excavation with geogrid placement, or drying.**

Groundwater Control

Groundwater was observed in Borings B-1 and B-2 at depths of about 7 feet below the ground surface. These depths correspond to approximately the same as the water level in the creek at the time of our field exploration. The groundwater level at this site will fluctuate with the water level in the creek and will likely be higher during wet periods.

Based on the recommended depth of the new foundations, groundwater will be encountered during construction of the new bridge foundations and abutments. Proper groundwater control measures will be required to construct the proposed bridge. Groundwater control measures may consist of sump pits and pumps within the foundation excavations, constructing cofferdams, and diverting the water around the area until the new bridge has been constructed.

Where groundwater is encountered in the bridge foundation excavations, a series of sump pits and pumps can be installed prior to and maintained during the excavation. The sumps and pumps should be used to remove the water from the excavation and to temporarily lower the water level until the concrete has been installed. Electric pumps equipped with an automatic shut off and capable of operating 24 hours a day are recommended.

Fill Placement

The preparation of fill subgrades as well as proposed building subgrades should be observed on a full-time basis by a representative of ECS to document that any unsuitable materials have been removed and that the subgrade is suitable for support of the proposed construction and/or fills.

Fill materials should consist of an approved material free of organic matter and debris, with rocks less than 6 inches and a Liquid Limit less than 40 and a Plasticity Index less than 20. Unacceptable fill materials include topsoil, organic materials, lightweight material with a maximum dry density less than 95 pcf, and highly plastic silts and clays. Unsuitable materials removed during grading operations should be either stockpiled for later use in landscaped areas, or placed in approved disposal areas either on site or off site.

In general, the existing clayey sands at the east and west abutments appear generally suitable for re-use as structural fill if they are free from deleterious materials, such as organics and debris. However, t*he existing fill and alluvial materials that are predominately clay are of marginal quality (moisture sensitive) and may prove to be difficult to re-use as structural fill.* If possible, we recommend these materials not be reused as structural fill in structural areas. Depending on the rainfall and existing moisture conditions at the time of construction, the clay materials at the site could become unworkable. Existing and off-site fill materials should be tested by ECS prior to use as structural fill.

The expanded footprint of the proposed bridge abutment areas should be well defined including the limits of the fill zones at the time of fill placement. Grade control should be maintained

throughout the fill placement operations. Fill operations should be observed on a full-time basis by a qualified soil technician from ECS to determine that minimum compaction requirements are being met. A minimum of one compaction test per 2,500 square foot area should be tested in every one foot compacted lift placed. The elevation and location of the tests should be clearly identified and recorded at the time of fill placement.

Fill materials should be placed in lifts not exceeding 8 inches in loose thickness and moisture conditioned to within +/- 3 percent of the optimum moisture content to facilitate proper compaction. Controlled fill soils should be compacted to a minimum of 95 percent of the maximum dry density obtained in accordance with ASTM Specification D-698, Standard Proctor Method.

The upper one foot of soil supporting structures, pavements, slabs-on-grade, sidewalks, should be “firm and unyielding” and any new fill compacted to a minimum of 98 percent of the maximum dry density obtained in accordance with ASTM Specification D-698, Standard Proctor Method.

Additional Considerations

Exposure to the environment may weaken the soils at the footing bearing level if the foundation excavations remain open for too long a time. Therefore, foundation concrete should be placed the same day that excavations are dug. If surface water intrusion or exposure softens the bearing soils, the softened soils must be removed from the foundation excavation bottom immediately prior to placement of concrete. If the excavation must remain open overnight, or if rainfall becomes imminent while the bearing soils are exposed, we recommend that the foundations be covered or otherwise protected.

Positive site drainage should be maintained during earthwork operations, which should help maintain the integrity of the soil. Placement of fill on the near surface soils, which have become saturated, could be very difficult. When wet, these soils will degrade quickly with disturbance from contractor operations and will be extremely difficult to stabilize for fill placement.

Where unacceptable materials are encountered, they must be evaluated and may need to be undercut and replaced or improved by recompaction. On a previously filled site, the contractor must be especially alert for the possible existence of poor soil conditions that may become apparent during construction.

The surface of the site should be kept properly graded in order to enhance drainage of the surface water away from the proposed structure areas during the construction phase. We recommend that an attempt be made to enhance the natural drainage without interrupting its pattern.

The surficial soils contain fines, which are considered moderately erodible. Erosion and sedimentation shall be controlled in accordance with Best Management Practices and current

County and State NPDES requirements. At the appropriate time, we would be pleased to provide a proposal for conducting construction materials testing and NPDES services.

ADDITIONAL STUDY

As mentioned, we recommend that a scour study be performed to determine the general location of the scour line prior to final design and construction.

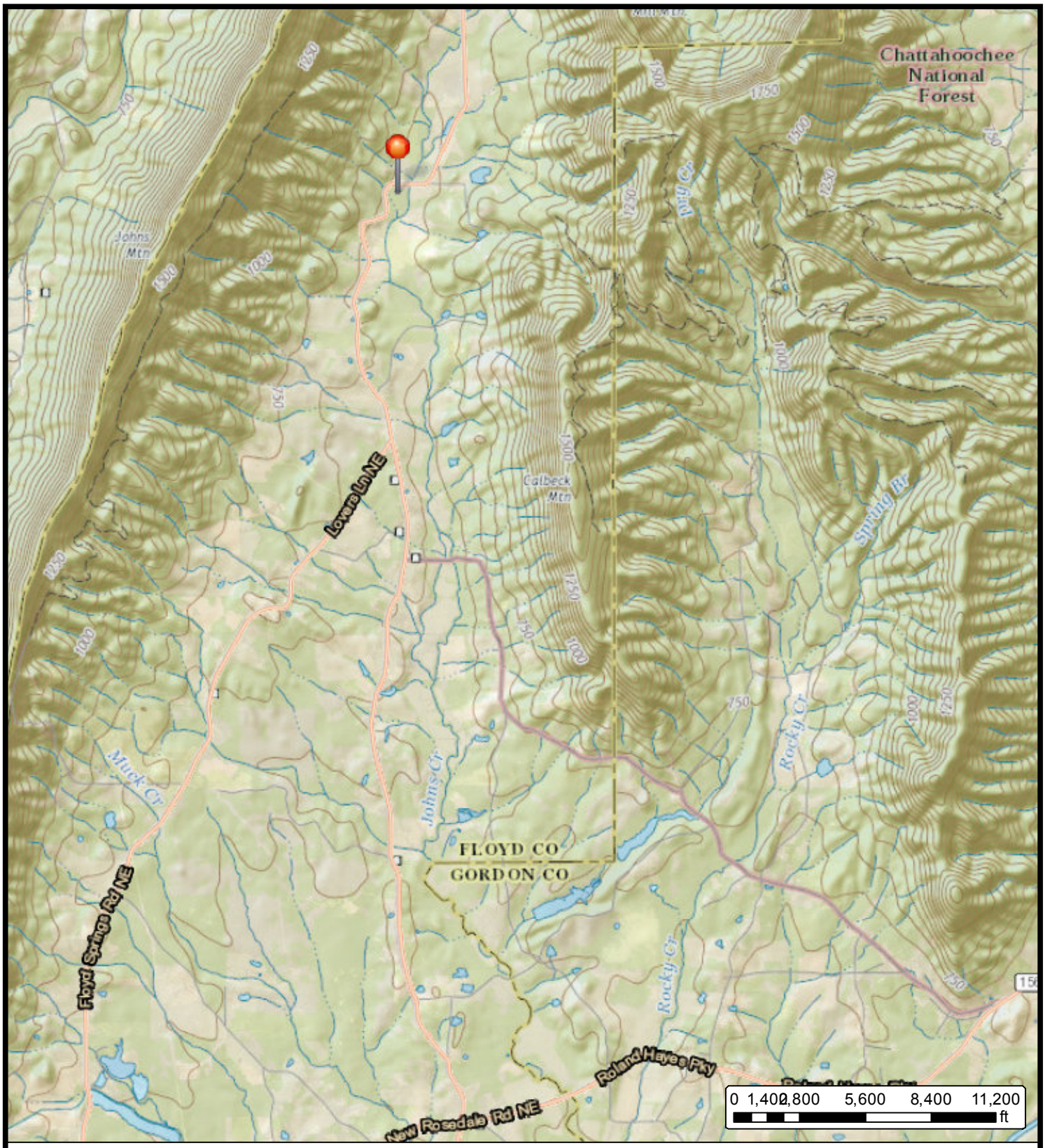
CLOSING

This report has been prepared in accordance with generally accepted geotechnical engineering practice. No warranty is expressed or implied. The evaluations and recommendations presented in this report are based on the available project information, as well as on the results of the exploration. ECS should be given the opportunity to review the final drawings and site plans for this project to determine if changes to the recommendations outlined in this report are needed.

Because undocumented fill is present on this site, the Owner must assess the relative risk that unacceptable material could have been buried in the proposed development area which was not detected in the widely spaced borings. It is critical that ECS be retained to perform foundation testing, proofrolling, and test pits on this site. If ECS is not retained for this extension of the field exploration, we can not be responsible for the performance of the foundations or site improvements. We would be pleased to provide an estimated cost for these services at the appropriate time.

This report is provided for the exclusive use of Floyd County Government and their project specific design team. This report is not intended to be used or relied upon in connection with other projects or by other third parties. ECS disclaims liability for any such third party use or reliance without express written permission.

Appendix I



Service Layer Credits: USGS The National Map: National Boundaries Dataset, 3D Elevation	Scale: 1 " = 5,747 '	Date: 3/2/2016

SITE LOCATION DIAGRAM

ECS SOUTHEAST LLC
1281 KENNESTONE CIRCLE NE
SUITE 200
MARIETTA GA 30066

N
W E
S

ECS PROJECT NO. 10:8879
EVERETT SPRINGS ROAD
BRIDGE OVER JOHNS
CREEK

FIGURE NO.
1

LEGEND

Approximate Boring Location

B-X Boring Designation

Graphic Scale 1"=20'

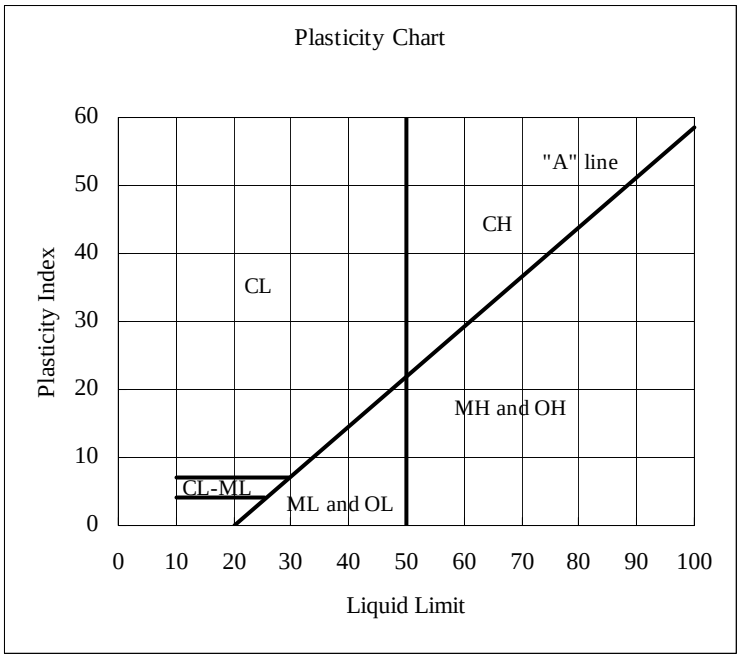
20 10 0 5 10 15 20

ECS	JOB NO.	10:8879	REVISIONS	FIGURE NAME: BORING LOCATION PLAN	PROJECT: Everett Springs Road Bridge over Johns Creek Tributary	FIGURE NO.: 2
	SCALE	1"=10'				
	DRAWN	DRC		REFERENCE: Google Maps	PREPARED FOR: Floyd County Government	
	APPR. BY	KJH				
	DATE	3/2016				

Appendix II

UNIFIED SOIL CLASSIFICATION SYSTEM (ASTM D 2487)

Major Divisions			Group Symbols		Typical Names	Laboratory Classification Criteria		
Coarse-grained soils (More than half of material is larger than No. 200 Sieve size)	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	Determine percentages of sand and gravel 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 percent GW, GP, SW, SP; More than 12 percent GM, GC, SM, SC; 5 to 12 percent Borderline cases requiring dual symbols [b]	$C_u = D_{60}/D_{10}$ greater than 4 $C_c = (D_{30})^2/(D_{10} x D_{60})$ 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[a]	d	Silty gravels, gravel-sand mixtures		Atterberg limits below "A" line or P.I. less than 4	Above "A" line with P.I. between 4 and 7 are borderline cases requiring use of dual symbols
				u				
			GC		Clayey gravels, gravel-sand-clay mixtures		Atterberg limits below "A" line or P.I. less than 7	
	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		$C_u = D_{60}/D_{10}$ greater than 6 $C_c = (D_{30})^2/(D_{10} x D_{60})$ 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[a]	d	Silty sands, sand-silt mixtures		Atterberg limits above "A" line or P.I. less than 4	Limits plotting in CL-ML zone with P.I. between 4 and 7 are borderline cases requiring use of dual symbols
				u				
			SC		Clayey sands, sand-clay mixtures		Atterberg limits above "A" line with P.I. greater than 7	
Fine-grained soils (More than half material is smaller than No. 200 Sieve)	Silts and clays (Liquid limit less than 50)		ML		Inorganic silts and very fine sands, rock flour, silty or clayey fine sands, or clayey silts with slight plasticity			
			CL		Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays			
			OL		Organic silts and organic silty clays of low plasticity			
	Silts and clays (Liquid limit 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			



[a] Division of GM and SM groups into subdivisions of d and u are for roads and airfields only. Subdivision is based on Atterberg limits; suffix d used when L.L. is 28 or less and the P.I. is 6 or less; the suffix u used when L.L. is greater than 28.

[b] Borderline classifications, used for soils possessing characteristics of two groups, are designated by combinations of group symbols. For example: GW-GC,well-graded gravel-sand mixture with clay binder. (From Table 2.16 - Winterkorn and Fang, 1975)

REFERENCE NOTES FOR BORING LOGS

I. Drilling Sampling Symbols

SS	Split Spoon Sampler	ST	Shelby Tube Sampler
RC	Rock Core, NX, BX, AX	PM	Pressuremeter
DC	Dutch Cone Penetrometer	RD	Rock Bit Drilling
BS	Bulk Sample of Cuttings	PA	Power Auger (no sample)
HSA	Hollow Stem Auger	WS	Wash sample
REC	Rock Sample Recovery %	RQD	Rock Quality Designation %

II. Correlation of Penetration Resistances to Soil Properties

Standard Penetration (blows/ft) refers to the blows per foot of a 140 lb. hammer falling 30 inches on a 2-inch OD split-spoon sampler, as specified in ASTM D 1586. The blow count is commonly referred to as the N-value.

A. Non-Cohesive Soils (Silt, Sand, Gravel and Combinations)

Density		*Relative Properties*	
Under 4 blows/ft	Very Loose	Adjective Form	12% to 49%
5 to 10 blows/ft	Loose	With	5% to 12%
11 to 30 blows/ft	Medium Dense		
31 to 50 blows/ft	Dense		
Over 51 blows/ft	Very Dense		

Particle Size Identification		
Boulders		8 inches or larger
Cobbles		3 to 8 inches
Gravel	Coarse	1 to 3 inches
	Medium	½ to 1 inch
	Fine	¼ to ½ inch
Sand	Coarse	2.00 mm to ¼ inch (dia. of lead pencil)
	Medium	0.42 to 2.00 mm (dia. of broom straw)
	Fine	0.074 to 0.42 mm (dia. of human hair)
Silt and Clay		0.0 to 0.074 mm (particles cannot be seen)

B. Cohesive Soils (Clay, Silt, and Combinations)

Blows/ft	*Consistency*	*Unconfined Comp. Strength Q_p (tsf)*	*Degree of Plasticity*	*Plasticity Index*
Under 2	Very Soft	Under 0.25	None to slight	0 – 4
3 to 4	Soft	0.25-0.49	Slight	5 – 7
5 to 8	Medium Stiff	0.50-0.99	Medium	8 – 22
9 to 15	Stiff	1.00-1.99	High to Very High	Over 22
16 to 30	Very Stiff	2.00-3.00		
31 to 50	Hard	4.00–8.00		
Over 51	Very Hard	Over 8.00		

III. Water Level Measurement Symbols

WL	Water Level	BCR	Before Casing Removal	DCI	Dry Cave-In
WS	While Sampling	ACR	After Casing Removal	WCI	Wet Cave-In
WD	While Drilling	▽	Est. Groundwater Level	▼	Est. Seasonal High GWT

The water levels are those levels actually measured in the borehole at the times indicated by the symbol. The measurements are relatively reliable when augering, without adding fluids, in a granular soil. In clay and plastic silts, the accurate determination of water levels may require several days for the water level to stabilize. In such cases, additional methods of measurement are generally applied.

CLIENT	JOB #	BORING #	SHEET
Floyd County Government	10:8879	B-1	1 OF 3

PROJECT NAME: Everett Springs Road Bridge over Johns Creek Tributary

ARCHITECT-ENGINEER:

SITE LOCATION: Everett Springs Road

NORTHING | EASTING | STATION

CALIBRATED PENETROMETER TONS/FT^2

ROCK QUALITY DESIGNATION & RECOVERY
RQD% – — – REC% ———

PLASTIC LIMIT% | WATER CONTENT% | LIQUID LIMIT%

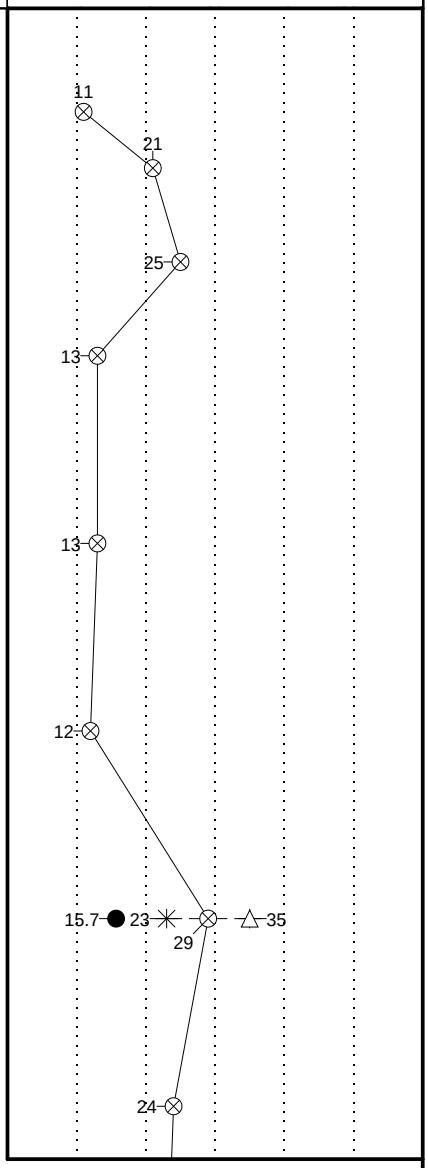
STANDARD PENETRATION BLOWS/FT

DESCRIPTION OF MATERIAL — ENGLISH UNITS

BOTTOM OF CASING | LOSS OF CIRCULATION

SURFACE ELEVATION

DEPTH (FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL	BLOWS/6"
0					#89 Stone Depth [1"]	
					GAB Depth [8"]	
					Asphalt Depth [5"]	
	S-1	SS	18	18	(CL FILL) SANDY LEAN CLAY WITH GRAVEL, Contains Rock Fragments, Orange to Brown, Moist to Wet, Stiff	4 3 8
	S-2	SS	18	18	(SC FILL) CLAYEY SAND WITH GRAVEL, Red to Gray to Brown, Wet, Medium Dense	9 4 17
5						
	S-3	SS	18	18		10 11 14
					(GC) ALLUVIAL CLAYEY GRAVEL WITH SAND, Gray to Brown, Wet to Saturated, Medium Dense	
	S-4	SS	18	18		11 6 7
10					(CL) SANDY LEAN CLAY, Contains Rock Fragments, Gray to Brown, Wet, Stiff	
	S-5	SS	18	18		4 6 7
15						
	S-6	SS	18	18		3 5 7
20						
					(CL) SANDY LEAN CLAY, Gray to Brown, Moist to Wet, Very Stiff	
	S-7	SS	18	18		6 9 20
25						
	S-8	SS	18	18		6 7 17
30						



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THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL.

WL 7' WS ☐ WD ☒	BORING STARTED 01/27/16	CAVE IN DEPTH
WL(BCR) WL(ACR)	BORING COMPLETED 01/27/16	HAMMER TYPE Automatic
WL	RIG 550 ATV FOREMAN J.M.	DRILLING METHOD HSA

CLIENT	JOB #	BORING #	SHEET
Floyd County Government	10:8879	B-1	2 OF 3

PROJECT NAME: Everett Springs Road Bridge over Johns Creek Tributary

ARCHITECT-ENGINEER:

SITE LOCATION: Everett Springs Road

NORTHING | EASTING | STATION

CALIBRATED PENETROMETER TONS/FT^2

ROCK QUALITY DESIGNATION & RECOVERY
RQD% – — – REC% ———

PLASTIC LIMIT% | WATER CONTENT% | LIQUID LIMIT%

STANDARD PENETRATION BLOWS/FT

DESCRIPTION OF MATERIAL — ENGLISH UNITS

BOTTOM OF CASING | LOSS OF CIRCULATION

SURFACE ELEVATION

DEPTH (FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL	WATER LEVELS	ELEVATION (FT)	BLOWS/6"	STANDARD PENETRATION BLOWS/FT
					(CL) SANDY LEAN CLAY, Gray to Brown, Moist to Wet, Very Stiff				
35	S-9	SS	18	18				6 9 14	23
40	S-10	SS	18	18				6 8 18	26
					(CL) SANDY LEAN CLAY, Contains Rock Fragments, Gray to Brown, Moist to Wet, Very Stiff to Hard				
45	S-11	SS	18	18				6 10 17	27
50	S-12	SS	18	18				6 9 12	21
55	S-13	SS	18	18				6 9 15	24
60	S-14	SS	18	18				11 13 20	33

CONTINUED ON NEXT PAGE.

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL.

WL 7' WS ☐ WD ☒	BORING STARTED 01/27/16	CAVE IN DEPTH
WL(BCR) WL(ACR)	BORING COMPLETED 01/27/16	HAMMER TYPE Automatic
WL	RIG 550 ATV FOREMAN J.M.	DRILLING METHOD HSA

CLIENT	JOB #	BORING #	SHEET
Floyd County Government	10:8879	B-1	3 OF 3

PROJECT NAME: Everett Springs Road Bridge over Johns Creek Tributary

ARCHITECT-ENGINEER:

SITE LOCATION: Everett Springs Road

NORTHING | EASTING | STATION

CALIBRATED PENETROMETER TONS/FT^2

ROCK QUALITY DESIGNATION & RECOVERY
RQD% – — – REC% ———

PLASTIC LIMIT% | WATER CONTENT% | LIQUID LIMIT%

STANDARD PENETRATION BLOWS/FT

DESCRIPTION OF MATERIAL — ENGLISH UNITS

BOTTOM OF CASING | LOSS OF CIRCULATION

SURFACE ELEVATION

DEPTH (FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL	WATER LEVELS	ELEVATION (FT)	BLOWS/6"
					(CL) SANDY LEAN CLAY, Contains Rock Fragments, Gray to Brown, Moist to Wet, Very Stiff to Hard			
	S-15	SS	18	18				6 16 22
65					END OF BORING @ 65'			
70								
75								
80								
85								
90								

38

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL.

WL 7' WS ☐ WD ☒	BORING STARTED 01/27/16	CAVE IN DEPTH
WL(BCR) WL(ACR)	BORING COMPLETED 01/27/16	HAMMER TYPE Automatic
WL	RIG 550 ATV FOREMAN J.M.	DRILLING METHOD HSA

CLIENT	JOB #	BORING #	SHEET
Floyd County Government	10:8879	B-2	1 OF 1

PROJECT NAME: Everett Springs Road Bridge over Johns Creek Tributary

ARCHITECT-ENGINEER:

SITE LOCATION: Everett Springs Road

NORTHING | EASTING | STATION

CALIBRATED PENETROMETER TONS/FT^2

ROCK QUALITY DESIGNATION & RECOVERY
RQD% – — – REC% ———

PLASTIC LIMIT% | WATER CONTENT% | LIQUID LIMIT%

STANDARD PENETRATION BLOWS/FT

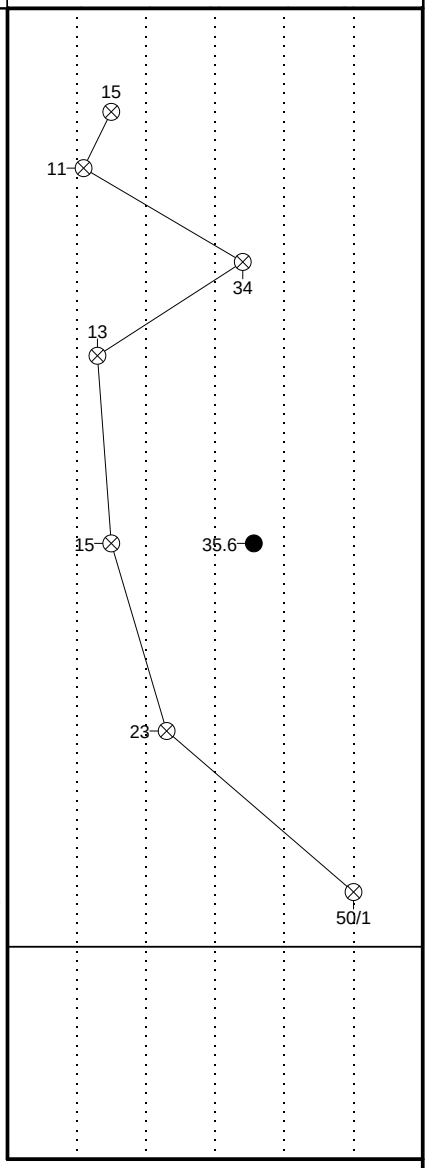
DESCRIPTION OF MATERIAL — ENGLISH UNITS

BOTTOM OF CASING | LOSS OF CIRCULATION

SURFACE ELEVATION

DEPTH (FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL	BLOWS/6"
0					#89 Stone Depth [1"]	
					GAB Depth [8"]	
					Asphalt Depth [5"]	
	S-1	SS	18	18	(CL FILL) SANDY LEAN CLAY WITH GRAVEL, Orange to Brown, Moist to Wet, Stiff	9 7 8
	S-2	SS	18	18		2 5 6
5						
	S-3	SS	18	18	(GW) ALLUVIAL WELL-GRADED GRAVEL WITH SAND, Red to Brown, Wet to Saturated, Dense	13 14 20
	S-4	SS	18	18	(SP-SM) POSSIBLE ALLUVIAL SAND WITH SILT AND GRAVEL, Brown, Saturated, Medium Dense	8 7 6
10						
					(SC) CLAYEY SAND, Gray to Brown, Wet to Saturated, Medium Dense	
	S-5	SS	18	18		4 5 10
15						
	S-6	SS	18	18		8 13 10
20						
	S-7	SS	1	1	(ML PWR) PARTIALLY WEATHERED ROCK SAMPLED AS SANDY SILT, Dark Gray to Black, Moist, Very Hard	50/1
25					AUGER REFUSAL @ 25'	
30						

WATER LEVELS | ELEVATION (FT)



THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL.

WL 7' WS ☐ WD ☒	BORING STARTED 01/27/16	CAVE IN DEPTH
WL(BCR) WL(ACR)	BORING COMPLETED 01/27/16	HAMMER TYPE Automatic
WL	RIG 550 ATV FOREMAN J.M.	DRILLING METHOD HSA

Laboratory Testing Summary

Sample Source	Sample Number	Depth (feet)	MC[1] (%)	Soil Type[2]	Atterberg Limits[3]			Percent Passing No. 200 Sieve[4]	Moisture - Density (Corr.)[5]		CBR Value[6]	Other
					LL	PL	PI		Maximum Density (pcf)	Optimum Moisture (%)		
B-1												
	S-7	23.50 - 25.00	15.7	CL	35	23	12	56.4				
B-2												
	S-5	13.50 - 15.00	35.6	SC				42.0				

Notes: 1. ASTM D 2216, 2. ASTM D 2487, 3. ASTM D 4318, 4. ASTM D 1140, 5. See test reports for test method, 6. See test reports for test method

Definitions: MC: Moisture Content, Soil Type: USCS (Unified Soil Classification System), LL: Liquid Limit, PL: Plastic Limit, PI: Plasticity Index, CBR: California Bearing Ratio, OC: Organic Content (ASTM D 2974)

Project No. 10:8879

Project Name: Everett Springs Road Bridge over Johns Creek Tributary

Printed On: Wednesday, March 02, 2016

ECS SOUTHEAST, LLC
1281 Kennestone Circle, NE, Suite 200
Marietta, GA 30066
Phone: (770) 590-1971
Fax: (770) 590-1975

Appendix III

Important Information About Your

Geotechnical Engineering Report

Subsurface problems are a principal cause of construction delays, cost overruns, claims, and disputes

The following information is provided to help you manage your risks.

Geotechnical Services Are Performed for Specific Purposes, Persons, and Projects

Geotechnical engineers structure their services to meet the specific needs of their clients. A geotechnical engineering study conducted for a civil engineer may not fulfill the needs of a construction contractor or even another civil engineer. Because each geotechnical engineering study is unique, each geotechnical engineering report is unique, prepared *solely* for the client. No one except you should rely on your geotechnical engineering report without first conferring with the geotechnical engineer who prepared it. *And no one - not even you* - should apply the report for any purpose or project except the one originally contemplated.

Read the Full Report

Serious problems have occurred because those relying on a geotechnical engineering report did not read it all. Do not rely on an executive summary. Do not read selected elements only.

A Geotechnical Engineering Report Is Based on A Unique Set of Project-Specific Factors

Geotechnical engineers consider a number of unique, project-specific factors when establishing the scope of a study. Typical factors include: the client's goals, objectives, and risk management preferences; the general nature of the structure involved, its size, and configuration; the location of the structure on the site; and other planned or existing site improvements, such as access roads, parking lots, and underground utilities. Unless the geotechnical engineer who conducted the study specifically indicates otherwise, do not rely on a geotechnical engineering report that was:

- not prepared for you,
- not prepared for your project,
- not prepared for the specific site explored, or
- completed before important project changes were made.

Typical changes that can erode the reliability of an existing geotechnical engineering report include those that affect:

- the function of the proposed structure, as when it's changed from a parking garage to an office building, or from alight industrial plant to a refrigerated warehouse,
- elevation, configuration, location, orientation, or weight of the proposed structure,
- composition of the design team, or
- project ownership.

As a general rule, *always* inform your geotechnical engineer of project changes - even minor ones - and request an assessment of their impact. *Geotechnical engineers cannot accept responsibility or liability for problems that occur because their reports do not consider developments of which they were not informed.*

Subsurface Conditions Can Change

A geotechnical engineering report is based on conditions that existed at the time the study was performed. *Do not rely on a geotechnical engineering report* whose adequacy may have been affected by: the passage of time; by man-made events, such as construction on or adjacent to the site; or by natural events, such as floods, earthquakes, or groundwater fluctuations. *Always* contact the geotechnical engineer before applying the report to determine if it is still reliable. A minor amount of additional testing or analysis could prevent major problems.

Most Geotechnical Findings Are Professional Opinions

Site exploration identifies subsurface conditions only at those points where subsurface tests are conducted or samples are taken. Geotechnical engineers review field and laboratory data and then apply their professional judgment to render an opinion about subsurface conditions throughout the site. Actual subsurface conditions may differ-sometimes significantly from those indicated in your report. Retaining the geotechnical engineer who developed your report to provide construction observation is the most effective method of managing the risks associated with unanticipated conditions.

A Report's Recommendations Are *Not* Final

Do not overrely on the construction recommendations included in your report. *Those recommendations are not final*, because geotechnical engineers develop them principally from judgment and opinion. Geotechnical engineers can finalize their recommendations only by observing actual

subsurface conditions revealed during construction. The geotechnical engineer who developed your report cannot assume responsibility or liability for the report's recommendations if that engineer does not perform construction observation.

A Geotechnical Engineering Report Is Subject to Misinterpretation

Other design team members' misinterpretation of geotechnical engineering reports has resulted in costly problems. Lower that risk by having your geotechnical engineer confer with appropriate members of the design team after submitting the report. Also retain your geotechnical engineer to review pertinent elements of the design team's plans and specifications. Contractors can also misinterpret a geotechnical engineering report. Reduce that risk by having your geotechnical engineer participate in prebid and preconstruction conferences, and by providing construction observation.

Do Not Redraw the Engineer's Logs

Geotechnical engineers prepare final boring and testing logs based upon their interpretation of field logs and laboratory data. To prevent errors or omissions, the logs included in a geotechnical engineering report should *never* be redrawn for inclusion in architectural or other design drawings. Only photographic or electronic reproduction is acceptable, *but recognize that separating logs from the report can elevate risk.*

Give Contractors a Complete Report and Guidance

Some owners and design professionals mistakenly believe they can make contractors liable for unanticipated subsurface conditions by limiting what they provide for bid preparation. To help prevent costly problems, give contractors the complete geotechnical engineering report, *but* preface it with a clearly written letter of transmittal. In that letter, advise contractors that the report was not prepared for purposes of bid development and that the report's accuracy is limited; encourage them to confer with the geotechnical engineer who prepared the report (a modest fee may be required) and/or to conduct additional study to obtain the specific types of information they need or prefer. A prebid conference can also be valuable. *Be sure contractors have sufficient time* to perform additional study. Only then might you be in a position to give contractors the best information available to you, while requiring them to at least share some of the financial responsibilities stemming from unanticipated conditions.

Read Responsibility Provisions Closely

Some clients, design professionals, and contractors do not recognize that geotechnical engineering is far less exact than other engineering disciplines. This lack of understanding has created unrealistic expectations that have led to disappointments, claims, and disputes. To help reduce the risk of such outcomes, geotechnical engineers commonly include a variety of explanatory provisions in their reports. Sometimes labeled "limitations" many of these provisions indicate where geotechnical engineers' responsibilities begin and end, to help others recognize their own responsibilities and risks. *Read these provisions closely.* Ask questions. Your geotechnical engineer should respond fully and frankly.

Geoenvironmental Concerns Are Not Covered

The equipment, techniques, and personnel used to perform a *geoenvironmental* study differ significantly from those used to perform a *geotechnical* study. For that reason, a geotechnical engineering report does not usually relate any geoenvironmental findings, conclusions, or recommendations; e.g., about the likelihood of encountering underground storage tanks or regulated contaminants. *Unanticipated environmental problems have led to numerous project failures.* If you have not yet obtained your own geoenvironmental information, ask your geotechnical consultant for risk management guidance. *Do not rely on an environmental report prepared for someone else.*

Obtain Professional Assistance To Deal with Mold

Diverse strategies can be applied during building design, construction, operation, and maintenance to prevent significant amounts of mold from growing on indoor surfaces. To be effective, all such strategies should be devised for the express purpose of mold prevention, integrated into a comprehensive plan, and executed with diligent oversight by a professional mold prevention consultant. Because just a small amount of water or moisture can lead to the development of severe mold infestations, a number of mold prevention strategies focus on keeping building surfaces dry. While groundwater, water infiltration, and similar issues may have been addressed as part of the geotechnical engineering study whose findings are conveyed in-this report, the geotechnical engineer in charge of this project is not a mold prevention consultant; ***none of the services performed in connection with the geotechnical engineer's study were designed or conducted for the purpose of mold prevention. Proper implementation of the recommendations conveyed in this report will not of itself be sufficient to prevent mold from growing in or on the structure involved.***

Rely on Your ASFE-Member Geotechnical Engineer For Additional Assistance

Membership in ASFE/The Best People on Earth exposes geotechnical engineers to a wide array of risk management techniques that can be of genuine benefit for everyone involved with a construction project. Confer with your ASFE-member geotechnical engineer for more information.

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