ADDENDUM No. 1

South Chickamauga Greenway Connector Project

Contract Number: T-15-032

Chattanooga Department of Transportation

The following is the Schedule for this project:

Request for Information: All questions for this project should be submitted to the city's purchasing department by **4:00 PM** on **Friday, September 20, 2019**.
Addenda: All questions will be answered in addenda no later than **4:00 PM** on **Tuesday, September 24, 2019**.
Bid Opening: All Bids ***MUST*** be received by the city's purchasing department located at 101 East 11th Street Chattanooga, TN 37402 no later than **2:00 PM** on **Tuesday, October 1, 2019** in the Purchasing Conference Room.

Comment 1:
When submitting your sealed bid to Purchasing, you **MUST** include Form 00201, Contractor's ID on the outside of the envelope. See the form below. NO bid will be opened without this form completed on the outside of the bid package envelope.

Comment 2:
Attached you will find the Geotechnical Services Report for this project.

Question 1:
I received the bid docs, thank you! I have a quick question on the Caine Lane Greenway bid – I can't find a bid form itemization sheet in the spec book. There is a form that has pricing already listed on it and it's divided out by federal funds and local match. But I don't see a form that we fill out for the bid with the line items. Am I missing something? Thanks for your help!
Answer 1:
Please bid schedule below.

Question 2:
Is the Pre-Solicitation meeting mandatory? Where will it be located?
Answer 2:
The Pre-Bid Meeting was not mandatory, but suggested. It was Tuesday, **September 9, 2019** at **9:00 am**. If you were not able to attend please feel free to contact Debbie Talley for any questions or comments you may have.

Question 3:
Request clarification of language in the "Notice to Contractors" paragraph 2:
"Proposal Contracts (?) will be issued until the time set for opening bids."
"....before biddable proposals (?) will be furnished."

Answer 3:
All prospective bidders are to be TDOT (Tennessee Department of Transportation) pre-qualified. In addition, before opening the bids we have to make sure the bidders have not been removed from the pre-qualification list.
Bid Proposals can be issued up to the date and time of the bid opening because we may have a bidder that comes in at the last minute to place a bid. That is fine as long as their bonding company is there to sign the bid bond as well.
If you are not currently prequalified with TDOT, you MUST complete the process as soon as possible by going to this link: https://www.tn.gov/tdot/tdot-construction-division/construction-contractor-prequalification.html.

Question 4:
Is national DBE/ WBE certification recognized for % participation?
Answer 4:
You must be TDOT pre-qualified and TNUCP Certified in order to work as a DBE on the project. You have to be qualified through the DBE Offices of TDOT. If you are not already certified, there are forms to complete and it is a great idea to get that done as soon as possible by going to this link: https://www.transportation.gov/civil-rights/disadvantaged-business-enterprise/ready-apply. See application below.

Below are questions / comments from the Pre-Bid Meeting:

Question 5:
Do you have a laydown area for the RCC?
Answer 5:
There is a parcel of land that had a house on it near the Youngstown trailhead. The land was purchased and donated to the City of Chattanooga, and the house was torn down. The contractor is welcome to use this area if they wish.

Question 6:
Who did the road (trail) compactment previously?
Answer 6:
Stein and Robert Smith 2000 Square Feet of RCC and 2000 Square Feet of Boardwalk

Question 7:
Can you give me information about the wooden piles?
Answer 7:
Please see Section 02851 that is part of this addendum.

Question 8:
Are there any wet lands?
Answer 8:
No, but there are some stream conveyances, wet weather conveyances.

Question 9:
We are not working at all in the waterway, right?
Answer 9:
That is correct.

Question 10:
Are we cutting the top of that hill?
Answer 10:
Yes, for ADA slope compliance on the boardwalk. For reference, it is the highest point in the cross section drawings on Page 8B.

Question 11:
Should the cleared logs, trees, and bushes be disposed of offsite.
Answer 11:
Yes, they must be disposed of offsite. Dirt and rocks may be distributed along the land.

Question 12:
Where are we allowed to do staging?
Answer 12:
Construction staging may take place on the Adams' track at the contractors choosing. The Adams tract is on the Youngstown Road side of the project.

Question 13:
Is there Field Flagging done already?
Answer 13:
Barge staked it 2.5 years ago so do not rely on these.

Question 14:
You mentioned Bat Trees. Are they noted on the plans?
Answer 14:
Natural Resource Assessment Report which includes the Bath Habitat Trees is provided for reference.

Question 15:
Who will be the CEI on this project?
Answer 15:
Arcadis will be the CEI on this project.

Question 16:
Do our subs have to be TDOT PreQualified?
Answer 16:
Construction subs do not. The prime contractor does.

Question 17:
What is the DBE goal for this project?
Answer 17:
DBE is 10% participation for this project.

Question 18:
How long does it take to get TDOT DBE approved?
Answer 18:

The question has been asked to TDOT and the response is that it is unknown, so please start the process now. You must be TDOT pre-qualified and TNUCP Certified in order to work as a DBE on the project. You have to be qualified through the DBE Offices of TDOT. If you are not already certified, there are forms to complete and it is a great idea to get that done as soon as possible by going to this link: https://www.transportation.gov/civil-rights/disadvantaged-business-enterprise/ready-apply.
Contact TDOT at TDOT.DBE.Program@tn.gov to get more information. The application has been added to this addendum for your convenience.

Question 19:
Plans call for powder coated handrails. Is that correct?
Answer 19:
Pedestrian Guide Rail: The Wire Mesh shall **not** be black powder coated.
The Wire Mesh for the boardwalk section shown on Sheet 2b shall be 6 Gauge Galvanized Wire Hog Fence with 4x4 square mesh pattern. Pedestrian Railing on the boardwalk is paid for under the boardwalk line item.

Question 20:
Is there any risk of the City of Chattanooga property (Adams Land) being sold?
Answer 20:
No, not before the projects are completed.

Question 21:
What type of wood is to be used for the boardwalk?
Answer 21:
Please see Section 02851 that is part of this addendum.

Question 22:
What is the sealant requirement for the boardwalk?
Answer 22:
The following clarification is offered: Specification 02851 Section 2.1.L does include the requirement for sealing the boardwalk.

Question 23:
What are the asphalt requirements?
Answer 23:
Specification 02510 for Asphalt is not required for this project. Asphalt will be installed in accordance with TDOT Specifications. Specification 02511 Roller Compacted Concrete has been inserted in place of 02510.

SECTION 00201

CONTRACTOR'S IDENTIFICATION

This form shall be attached to the sealed envelope containing the Bid.

BIDDER:

Name: _____

_____

Address: _____

_____

_____

SEALED BID PROPOSAL FOR :

_____

_____

_____

BID OPENING DATE AND TIME:

_____

LOCATION:

City Hall, Purchasing Department
101 E. 11th Street
Suite G13
Chattanooga, TN 37402

Elecrtical Subcontractor: _____

HVAC Subcontractor: _____

Plumming Subcontractor: _____

Masonry Subcontractor: _____

CITY OF CHATTANOOGA
Purchasing Department
101 E. 11th Street, Suite G13
Chattanooga, Tennessee 37402

SECTION 02511

ROLLER COMPACTED CONCRETE

PART 1. GENERAL

1.1 Description. Roller-Compacted Concrete (RCC) shall consist of aggregate, Portland cement, possibly other supplementary cementing materials (fly ash, slag and silica fume) and water. RCC shall be proportioned, mixed, placed, compacted and cured in accordance with these specifications; and conform to the lines, grades, thickness, and typical cross sections shown in the Plans or otherwise established by the Engineer.

1.2 Caveat. This specification is intended to serve as a guide for normal RCC pavement construction. Most projects have features or requirements that should be incorporated in the project documents.

PART 2. REFERENCED DOCUMENTS

C 31 Practice for Making and Curing Concrete Test Specimens in the Field
C 33 Specification for Concrete Aggregates
C 39 Test Method for Compressive Strength of Cylindrical Concrete Specimens
C 42 Test Method for Obtaining and Testing Drilled Cores and Sawed Beams of Concrete
C 78 Test Method for Flexural Strength of Concrete (Using Simple Beam with Third-Point Loading)
C 150 Specification for Portland Cement
C 171 Specification for Sheet Materials for Curing Concrete
C 309 Specification for Liquid Membrane-Forming Compounds for Curing Concrete
C 494 Specification for Chemical Admixtures for Concrete
C 496 Test Method for Splitting Tensile Strength of Cylindrical Concrete Specimens
C 595 Specification for Blended Hydraulic Cements
C 618 Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use as a Mineral Admixture in Concrete
C 989 Specification for Ground Granulated Blast-Furnace Slag for Use in Concrete and Mortars
C 1040 Test Methods for Density of Unhardened and Hardened Concrete In Place by Nuclear Methods
C 1157 Performance Specification for Hydraulic Cement
C 1176 Practice for Making Roller-Compacted Concrete in Cylinder Molds Using a Vibrating Table
C 1240 Specification for Use of Silica Fume as a Mineral Admixture in Hydraulic-Cement Concrete, Mortar and Grout
C 1435 Practice for Molding Roller-Compacted Concrete in Cylinder Molds Using a Vibrating Hammer
D 977 Specification for Emulsified Asphalt

D 1557 Test Methods for laboratory Compaction Characteristics of Soil Using Modified Effort.

PART 3. SUBMITTALS

3.1 Submittal Requirements. The Contractor shall submit the following to the Engineer at least 30 days before start of any production of RCC pavement:

3.1.1 Construction schedule for all RCC related operations.
3.1.2 Paving procedures describing direction of paving operations, paving widths, planned longitudinal and transverse cold joints, and curing methods and patterns.
3.1.3 Certification for aggregate source, quality and sizing as required by the specification.
3.1.4 Certification for Portland Cement and supplementary cementitious materials as required by the specification.
3.1.5 Manufacturers data and specifications including capacities for equipment to be used in mixing, hauling, placing and compacting RCC.
3.1.6 Layout of plant location showing mixing plant, cement and aggregate storage, and water supply.
3.1.7 Proposed RCC Mix Design. If the proposed mix design is developed by the Contractor or there is a suggested change to the mix design, it must be submitted to the Engineer for approval at least four weeks prior to RCC construction. This mix design shall include details on aggregate gradation, cementitious materials, admixtures (if used), compressive and/or flexural strengths, and required moisture and density to be achieved.
3.1.8 Mock-up – provide 25’ mock up of proposed trail section for A/E and Owner approval prior to any additional installation.

PART 4. MATERIALS

4.1 General. All materials to be used for RCC pavement construction shall be approved by the Engineer based on laboratory tests or certifications of representative materials which will be used in the actual construction.

4.2 Portland Cement. Cement shall comply with the latest specifications for Portland cement (ASTM C 150 and ASTM C 1157), or blended hydraulic cements (ASTM C 595 and ASTM C 1157)

4.3 Aggregates. Unless otherwise approved in writing by the Engineer, the quality of aggregates shall conform to ASTM C 33. The plasticity index of the aggregate shall not exceed five. Aggregates may be obtained from a single source or borrow pit, or may be a blend of coarse and fine aggregate. The aggregate shall be well-graded without gradation gaps and conform to the following gradation or as approved by the Engineer:

Sieve Size	Percent passing by weight
1" (25 mm)	100

3/4" (19 mm)		90-100
1/2" (12.5 mm)	70-90	
3/8" (9.5 mm)		60-85
No. 4 (4.75 mm)		40-60
No. 16 (1.18 mm)		20-40
No. 100 (150 µm)		8-18
No. 200 (75 µm)		2-8

4.4 Mineral Admixtures. Mineral admixtures shall conform to the requirements of ASTM C 618 (flyash), ASTM C 989 (slag) and ASTM C 1240 (silica fume). Unless specifically directed by the Engineer, total mineral admixture content including the content in blended cements shall not exceed the weight of Portland cement in the RCC mix.

4.5 Chemical Admixtures. Chemical admixtures including water-reducing and retarding admixtures shall conform to ASTM C 494 and must be approved by the Engineer prior to use.

4.6 Water. Water shall be clean, clear and free of acids, salts, alkalis or organic materials that may be injurious to the quality of the concrete. Non-potable water may be considered as a source for part or all of the water, providing the mix design indicates proof that the use of such water will not have any deleterious effect on the strength and durability properties of the RCC.

4.7 Curing Compound. Concrete curing compounds shall conform to ASTM C 309 or ASTM D 977.

PART 5. EQUIPMENT

5.1 General. All necessary equipment shall be on hand and approved by the Engineer before work will be permitted. Roller-compacted concrete shall be constructed with any combination of equipment that will produce a completed pavement meeting the requirements for mixing, transporting, placing, compacting, finishing, and curing as provided in this specification.

5.2 Mixing Plant.

5.2.1 Location of Plant. The mixing plant shall be located within a 30 minute haul time from the RCC placement. With prior testing and Engineer's approval, a set retarding admixture may be used to extend the haul time.

5.2.2 Plant Capacity. The plant shall be capable of producing an RCC mixture in the proportions defined by the final approved mix design and within the specified tolerances. The capacity of the plant shall be sufficient to produce a uniform mixture at a rate compatible with the placement equipment. The volume of RCC material in the mixing chamber shall not be more than the rated capacity for dry concrete mixtures. Multiple plants shall be supplied if a single plant can not provide an uninterrupted supply of RCC to the paver(s) during peak paving operations.

5.2.3 Pugmill Plant. A pugmill plant shall be a central plant with a twin shaft pugmill mixer, capable of batch or continuous mixing, equipped with synchronized metering devices and feeders to maintain the correct proportions of aggregate, cement, mineral admixture and water. Other pugmill plant requirements are as follows:

5.2.3.1 Aggregate Storage. If previously blended aggregate is furnished, storage may be in a stockpile from which it is fed directly to a conveyor feeding the mixer. If aggregate is furnished in two or more size groups, aggregate separation must be provided at the stockpiles.

5.2.3.2 Aggregate bins shall have a feed rate controlled by a variable speed belt, or an operable gate calibrated to accurately deliver any specified quantity of material. If two or more aggregate size stockpile sources are used, the feed rate from each bin shall be readily adjustable to change aggregate proportions, when required. Feed rate controls must maintain the established proportions of aggregate from each stockpile bin when the combined aggregate delivery is increased or decreased.

5.2.3.3 Plant Scales. Plant scales for any weigh box or hopper shall be either of beam or springless-dial type, and be sensitive to 0.5 percent of the maximum load required. Beam-type scales shall have a separate beam for each aggregate size, with a single telltale actuated for each beam, and a tare beam for balancing hopper. Belt scales shall be of an approved design. Standard test weights accurate to plus or minus 0.1 percent shall be provided for checking plant scales.

5.2.3.4 Cement and Mineral Admixture Material Storage. Separate and independent storage silos shall be used for portland cement and mineral admixture. Each silo must be clearly identified to avoid confusion during silo loadings. If the Contractor chooses to preblend the cementitious material he must employ blending equipment acceptable to the Engineer and demonstrate, with a testing plan, the ability to successfully produce a uniform blended material meeting the mix design requirements. Testing of the preblended cementitious material shall be done on a daily basis to assure both uniformity and proper quantities.

5.2.3.5 Cement and Mineral Admixture Feed Unit. Satisfactory means of dispensing portland cement and mineral admixture, volumetrically or by weight, shall be provided to assure a uniform and accurate quantity of cementitious material enters the mixer.

5.2.3.6 Water Control Unit. Required amount of water for the approved mix shall be measured by weight or volume. The unit shall be equipped with an accurate metering device. The water flow shall be controlled by a meter, valve or other approved regulating device to maintain uniform moisture content in the mixture.

5.2.3.7 Surge Hopper. For continuous operating pugmills, a surge hopper attached to the end of the final discharge belt shall be provided to temporarily hold the RCC discharge to allow the plant to operate continuously.

5.2.4 Rotary Central-Mix Drum Plant. A rotary drum batch mixer shall be capable of producing a homogeneous mixture, uniform in color and having all coarse

aggregate coated with cementitious paste. The mixer shall be equipped with batching equipment to meet the following requirements:

5.2.4.1 The amounts of cement, mineral admixture and aggregate entering into each batch of RCC shall be measured by direct weighing equipment. Weighing equipment shall be readily adjustable to compensate for the moisture content of the aggregate or for changing the proportionate batch weights, and shall include a visible dial or equally suitable device which will accurately register the scale load from zero to full capacity. The cement and mineral admixture may be weighed separately or cumulatively in the same hopper on the same scale, provided the cement is weighed first.

5.2.4.2 Bulk cement and mineral admixture weigh hoppers shall be equipped with vibrators to operate automatically and continuously while weighing hoppers are being dumped. The weigh hopper shall have sufficient capacity to hold not less than 10 percent in excess of the cementitious material required for one batch.

5.2.4.3 The amount of water entering each batch of RCC shall be measured by weight or volume. The equipment shall be capable of measuring the water to within a tolerance of plus or minus one percent and shall be equipped with an accurate gauge or dial measuring device. During batching, water shall be admitted to the mixer only through the water measuring device and then only at time of charging.

5.2.4.4 Drum mixers shall be equipped with an accurate clock or timing device, capable of being locked, for visibly indicating the time of mixing after all the materials, including the water, are in the mixer.

5.2.5 Alternative Mixing Equipment. Other types of batching and mixing equipment and configurations including dry batch plants and concrete truck mixers may be used with the approval of the Engineer. The Contractor must demonstrate that the mixing equipment has the ability to produce a consistent, well-blended, non-segregated RCC mix satisfying the minimum capacity requirements of Section 5.2.2 and within the tolerance limits as specified in Section 6.3.2.

5.3 Paver.

5.3.1 RCC shall be placed with a high-density or conventional asphalt type paver subject to approval by the Engineer. The paver shall be capable of placing RCC to a minimum of 85% of the maximum wet density in accordance with ASTM D 1557 or equivalent test method. The paver shall be of suitable weight and stability to spread and finish the RCC material, without segregation, to the required thickness, smoothness, surface texture, cross-section and grade.

5.3.2 Alternative Paving Equipment. Any alternative paving equipment such as graders and dozers must be approved by the Engineer prior to use. The equipment shall be capable of producing a finished product that results in

a smooth, continuous surface without segregation, excessive tearing, or rock pockets.

5.4 Compactors.

5.4.1 Self-propelled steel drum vibratory rollers having a minimum static weight of 10 tons (9.07 metric tons) shall be used for primary compaction. For final compaction either a steel drum roller, operated in a static mode, or a pneumatic-tire roller shall be utilized.

5.4.2 Walk-behind vibratory rollers or plate tampers shall be used for compacting areas inaccessible to the large rollers.

5.5 Haul Trucks. Trucks for hauling the RCC material from the plant to the paver shall have covers available to protect the material from rain or excessive evaporation. The number of trucks shall be sufficient to ensure adequate and continuous supply of RCC material to the paver.

5.6 Water Trucks. At least one water truck, or other similar equipment, shall be on-site and available for use throughout the paving and curing process. Such equipment shall be capable of evenly applying a fine spray of water to the surface of the RCC without damaging the final surface.

5.7 Inspection of Equipment. Before start-up, the Contractor‘s equipment shall be carefully inspected. Should any of the equipment fail to operate properly, no work shall proceed until the deficiencies are corrected.

5.8 Access for Inspection and Calibration. The Engineer shall have access at all times to any plant, equipment or machinery to be used on this project in order to check calibration, scales, controls or operating adjustments.

PART 6. CONSTRUCTION REQUIREMENTS

6.1 Preparation of Subgrade/Subbase.2 before RCC processing begins, the area to be paved shall be graded and shaped to the lines and grades as shown in the Plans or as directed by the Engineer. During this process any unsuitable soil or material shall be removed and replaced with acceptable material. The subgrade shall be uniformly compacted to a minimum of 95% of the maximum dry density in accordance with ASTM D 1557. The Contractor shall check for any soft or yielding subgrade areas by proof rolling with a loaded dump truck or pneumatic-tire roller over the entire area to be paved. All soft or yielding subgrade areas shall be corrected and made stable before RCC construction begins. If a subbase is shown on the Plans, it shall be uniformly compacted to a minimum of 95% of the maximum dry density in accordance with ASTM D 1557 or other method approved by the Engineer.

6.2 Test Section (Optional).

6.2.1 At least 30 days before the start of paving operations, the Contractor shall construct a test section using the trial mix design. This test pavement will allow the Engineer to evaluate the strength of the RCC material, methods of

construction, curing process and surface conditions of the completed test pavement. The test section shall be at least 50 feet (15 meters) long and a minimum of two paver widths wide. It shall be located in a non-critical area or as indicated on the Plans. The test pavement will be constructed over an extended period to demonstrate the construction of cold joints in both a longitudinal and transverse direction, as well as fresh joint construction.

6.2.2 The equipment, materials and techniques used to construct the test section shall be that which will be used to construct the main RCC pavement.

6.2.3 During construction of the test section the Contractor will establish an optimum rolling pattern and procedure for obtaining a density of not less than 95% of the maximum wet density in accordance with ASTM D 1557 or equivalent test method. In addition, the Contractor must also demonstrate the ability to achieve a smooth, hard, uniform surface free of excessive tears, ridges, spalls and loose material.

6.2.4 Strength Testing

6.2.4.1 Field Cast Specimens (Optional Test). Specimens shall be prepared in accordance with ASTM D 1557, ASTM C 1435, or ASTM C 1176. Cure and transport specimens to the laboratory in accordance with ASTM C 31. Specimens shall be tested for splitting tensile strength (ASTM C 496) and compressive strength (ASTM C 39) at 7, 14, and 28 days of age.

6.2.4.2 Cores. The test section shall be cured at least 5 days prior to extracting cores for testing. The cores shall be obtained in accordance with ASTM C 42. The cores will be tested for splitting tensile strength (ASTM C 496) and compressive strength (ASTM C 39) at 7, 14 and 28 days of age. All coring, cutting and testing of the test section shall be paid for by the Owner.

6.3 Mixing Process.

6.3.1 General. Except for minor variations in moisture content, the same mixture proportions shall be used for the entire project, unless otherwise stated in the project documents. The water content shall be varied by the Contractor, as necessary, to provide a consistency that is most conducive to effective placement and compaction. If during mixing there is a change in the type or source of cementitious materials, or aggregates, the mixing must be suspended, and a new mix design shall be developed.

6.3.2 Mixture Ingredient Tolerances. The mixing plant must receive the quantities of individual ingredients to within the following tolerances:

Material Variation in % by Weight
Cementitious materials +/- 2.0
Water +/- 3.0
Aggregates +/- 4.0

6.3.3 Mixing time will be that which will assure complete and uniform mixing of all ingredients. For drum mixers and dry batch facilities, the time of mixing shall be determined from uniformity test results.

6.3.4 All material must be discharged before recharging. The mixing chamber and mixer blade surfaces must be kept free of hardened RCC or other buildups. Mixer blades shall be checked routinely for wear and replaced if wear is sufficient to cause inadequate mixing.

6.3.5 Plant Calibration. Prior to commencement of RCC production, the Contractor shall carry out a complete and comprehensive calibration of the plant in accordance with the manufacturer's recommended practice. All scales, containers and other items necessary to complete the calibration shall be provided by the Contractor. After completion of the initial calibration, the plant shall be recalibrated as directed by the Engineer.

6.3.6 Daily Reports. The Contractor shall supply daily plant records of production and quantities of materials used that day to the Engineer.

6.4 Transportation. The transportation of the RCC pavement material from the plant to the areas to be paved shall be in dump trucks fitted and equipped, when necessary, with retractable protective covers for protection from rain or excessive evaporation. The trucks shall be dumped clean with no buildup or hanging of RCC material. For paver placed RCC, the dump trucks shall deposit the RCC material directly into the hopper of the paver or into a secondary material distribution system which deposits the material into the paver hopper. Dump truck delivery must be scheduled so that RCC material is spread and compacted within the specified time limits.

6.5 Placing.

6.5.1 Condition of the Subgrade/Subbase. Prior to RCC placement, the surface of the subgrade/subbase shall be clean and free of foreign material, ponded water and frost prior to the placement of the RCC pavement mixture. The subgrade/subbase must be uniformly moist at the time of RCC placement. If sprinkling of water is required to remoisten certain areas, the method of sprinkling shall not be such that it forms mud or pools of free-standing water. Prior to placement of RCC, the subgrade/subbase shall be checked for proper density and soft or yielding areas and these areas shall be corrected as specified in Section 6.1.

6.5.2 Paver Requirements. RCC shall be placed with an approved paver as specified in Section 5.3 and shall meet the following requirements:

6.5.2.1 The quantity of RCC material in the paver shall not be allowed to approach empty between loads. The material shall be maintained above the auger shaft at all times during paving.

6.5.2.2 The paver shall operate in a manner that will prevent segregation and produce a smooth continuous surface without tearing, pulling or shoving. The spread of the RCC shall be limited to a length that can be compacted and finished within the appropriate time limit under the prevailing air temperature, wind, and climatic conditions.

6.5.2.3 The paver shall proceed in a steady, continuous operation with minimal starts and stops. Paver speed during placement operations shall not exceed the speed necessary to ensure that minimum density requirements as specified in Section 5.3.1 are met and surface distress is minimized.

6.5.2.4 The surface of the RCC pavement once it leaves the paver shall be smooth, uniform and continuous without excessive tears, ridges or aggregate segregation.

6.5.3 Lift Thickness. Lift thickness of compacted RCC pavement shall be as indicated on the Plans. If RCC pavements are to be constructed in a thickness greater than

10 inches (250 mm), the use of two lifts shall be utilized. No lift shall be less than 4 inches (100 mm).

6.5.4 Adjacent Lane Placement. Adjacent paving lanes shall be placed within 60 minutes. If more than 60 minutes elapses between placement of adjacent lanes, the vertical joint must be considered a cold joint and shall be prepared in accordance with Section 6.8.2. At the Engineer's discretion, this time may be increased or decreased depending on the use of set retarding admixtures or the ambient weather conditions of temperature, wind, and humidity.

6.5.5 Multiple Lift Placement. For multiple lift placement, the total pavement thickness shall be as shown on the Plans, and the Contractor shall submit his method of placement and lift thickness as part of a paving plan subject to approval by the Engineer. In multiple lift construction, the second lift must be placed within 60 minutes of the completion of the first lift. If more than 60 minutes has elapsed, the interface between the first and second lifts shall be considered a cold joint and shall be prepared in accordance with Section 6.8.3.1. At the discretion of the Engineer, this time may be increased or decreased depending on the use of set retarding admixtures or the ambient weather conditions of temperature, wind and humidity.

6.5.6 Hand Spreading. Broadcasting or fanning the RCC material across areas being compacted will not be permitted. Such additions of material may only be done immediately behind the paver and before any compaction has taken place. Any segregated coarse aggregate shall be removed from the surface before rolling.

6.5.7 Segregation. If segregation occurs in the RCC during paving operations the spreading shall cease until the cause is determined and corrected.

6.5.8 RCC placement shall be done in a pattern so that the curing water from the previous placements will not pose a runoff problem on the fresh RCC surface or on the subbase layer.

6.5.9 Paving Inaccessible Areas. Areas inaccessible to either paver or roller may be placed by hand and compacted with equipment specified in Section 5.4.2. Compaction of these areas must satisfy minimum density requirements as specified in Section 6.7.7. An alternate and preferred method for paving inaccessible areas is to use cast-inplace, air-entrained concrete with a minimum compressive strength of 4000 psi (27 MPa) or as specified by the Engineer. In areas that may be subjected to high load transfer, the Engineer may require the cast-in-place concrete to be doweled into the RCC.

6.5.10 Placement of RCC with graders, dozers or other alternative paving equipment as specified in Section 5.3.2 shall meet the requirements of paver placed RCC where applicable.

6.6 Weather Conditions.

6.6.1 Cold Weather Precautions. RCC material shall not be placed on any surface containing frost or frozen material or when the air temperature is below 40°F (4°C), except when the air temperature is at least 35°F (2°C) and rising. When the air temperature is expected to fall below 40°F (4°C), the Contractor must present to the Engineer a detailed proposal for protecting the RCC pavement. This proposal must be accepted by the Engineer before paving operations may be resumed. A sufficient supply of protective material such as insulating blankets, plastic sheeting, straw, burlap or other suitable material shall be provided by the

Contractor at his expense. The methods and materials used shall be such that a minimum temperature of 40°F (4°C) at the pavement surface will be maintained for a minimum of five days. Approval of the Contractor‘s proposal for frost protection shall not relieve the Contractor of the responsibility for the quality and strength of the RCC placed during cold weather. Any RCC that freezes shall be removed and replaced at the Contractors expense.

6.6.2 Hot Weather Precautions. During periods of hot weather or windy conditions, special precautions shall be taken to minimize moisture loss due to evaporation. Under conditions of excessive surface evaporation due to a combination of air temperature, relative humidity, concrete temperature and wind conditions, the Contractor must present to the Engineer a detailed proposal for minimizing moisture loss and protecting the RCC. Precautions may include cooling of aggregate stockpiles by use of a water spray, protective covers on dump trucks, temporary wind breaks to reduce wind effect, cooling of concrete mix water, and decreasing the allowable time between mixing and final compaction.

6.6.3 Rain Limitations. No placement of RCC pavement shall be done while it is raining hard enough to be detrimental to the finished product. Placement may continue during light rain or mists provided the surface of the RCC pavement is not washed-out or damaged due to tracking or pickup by dump trucks or rollers. Dump truck covers must be used during these periods. The Engineer will be the sole judge as to when placement must be stopped due to rain.

6.7 Compaction.

6.7.1 Compaction shall begin immediately behind the placement process and shall be completed within 60 minutes of the start of plant mixing. The time may be increased or decreased at the discretion of the Engineer depending on use of set retarding admixtures or ambient weather conditions of temperature, wind and humidity.

6.7.2 Rolling. The Contractor shall determine the sequence and number of passes by vibratory and non-vibratory rolling to obtain the minimum specified density and surface finish. Rollers shall only be operated in the vibratory mode while moving. Pneumatic-tire rollers may be used during final compaction to knead and seal the surface.

6.7.3 Rolling Longitudinal and Transverse Joints. The roller shall not operate within 12 in. (300 mm) of the edge of a freshly placed lane until the adjacent lane is placed. Then both edges of the two lanes shall be rolled together within the allowable time. If a cold joint is planned, the complete lane shall be rolled and cold joint procedures, as specified in Section 6.8.2 shall be followed.

6.7.4 Longitudinal joints shall be given additional rolling as necessary to produce the specified density for the full depth of the lift and a tight smooth transition occurs across the joint. Any uneven marks left during the vibrating rolling shall be smoothed out by non-vibrating or rubber tire rolling. The surface shall be rolled until a relatively smooth, flat surface, reasonably free of tearing and cracking is obtained.

6.7.5 Speed of the rollers shall be slow enough at all times to avoid displacement of the RCC pavement. Displacement of the surface resulting from reversing or turning action of the roller shall be corrected immediately.

6.7.6 Areas inaccessible to large rollers shall be treated as specified in Section 6.5.9.

6.7.7 Density Requirements. In-place field density tests shall be performed in accordance with ASTM C 1040, direct transmission, as soon as possible, but no later than 30 minutes after completion of rolling. Only wet density shall be used for evaluation. The required density shall be not less than 95% of the maximum wet density obtained by ASTM D 1557 or equivalent test method based on a moving average of five consecutive tests with no test below 92% or other method as specified by the Engineer.

6.8 Joints.

6.8.1 Fresh Vertical Joints. A vertical joint shall be considered a fresh joint when an adjacent RCC lane is placed within 60 minutes of placing the previous lane, with the time adjusted depending on use of retarders or ambient conditions. Fresh joints do not require special treatment.

6.8.2 Cold Vertical Joints. Any planned or unplanned construction joints that do not qualify as fresh joints shall be considered cold joints and shall be treated as follows:

6.8.2.1 Longitudinal and Transverse Cold Joints. Formed joints that do not meet the minimum density requirements of Section 6.7.7 and all unformed joints shall be cut vertically for the full depth. The vertical cut shall be at least 6 in (150 mm) from the exposed edge. Cold joints cut within two hours of placement may be cut with an approved wheel cutter, motor grader or other approved method provided that no significant edge raveling occurs. Cold joints cut after two hours of placement shall be saw cut 1/4 to 1/3 depth of the RCC pavement with the rest removed by hand or mechanical equipment. Any modification or substitution of the saw cutting procedure must be demonstrated to and accepted by the Engineer. All excess material from the joint cutting shall be removed.

6.8.2.2 Prior to placing fresh RCC mixture against a compacted cold vertical joint, the joint shall be thoroughly cleaned of any loose or foreign material. The vertical joint face shall be wetted and in a moist condition immediately prior to placement of the adjacent lane.

6.8.3 Fresh Horizontal Joints. For multi-layer construction a horizontal joint shall be considered a fresh joint when a subsequent RCC lift is placed within 60 minutes of placement of the previous lift. This time may be adjusted at the discretion of the Engineer depending on use of retarders or ambient weather conditions. Fresh joints do not require special treatment other than cleaning the surface of all loose material and moistening the surface prior to placement of the subsequent lift.

6.8.3.1 Horizontal Cold Lift Joints. For horizontal cold joints the surface of the lift shall be kept continuously moist and cleaned of all loose material prior to placement of the subsequent lift. The Engineer may require other action such as use of a cement slurry or mortar grout between lifts. If supplementary bonding materials are used, they shall be applied immediately prior to placement of the subsequent lift.

6.8.3.2 RCC Pavement Joints at Structures. The joints between RCC pavement and concrete structures shall be treated as cold vertical joints.

6.8.4 Control Joints. Control joints may be constructed in the RCC pavement to induce cracking at pre-selected locations. Joint locations shall be shown on the Plans or as directed by the Engineer. Control joints every 30' for 8' walkway. Early entry saws should be utilized as soon as possible behind the rolling operation and set to manufacturer's recommendations. Conventionally cut control joints shall be saw cut to 1/4 depth of the compacted RCC pavement. Joints shall be saw cut as soon as those operations will not result in significant raveling or other damage to the RCC pavement.

6.9.1 Surface Smoothness. The finished surface of the RCC pavement, when tested with a 10 foot (3 meter) straight edge or crown surface template, shall not vary from the straight edge or template by more than 3/8 inch (10 mm) at any one point. When the surface smoothness is outside the specified surface tolerance the Contractor shall grind the surface to within the tolerance by use of selfpropelled diamond grinders. Milling of the final surface is not acceptable, unless it is for the removal of the pavement.

6.9.2 Thickness. The thickness of the RCC pavement shall not deviate from that shown on the plans or as directed by the Engineer by more than minus 1/2 inch (12.5 mm). Pavement of insufficient thickness shall be removed and replaced the full depth. No skin patches shall be accepted.

6.9.3 When surface irregularities are outside the tolerances cited above, the contractor shall grind the surface to meet the tolerance at no additional cost to the Owner.

6.10 Curing. Immediately after final rolling and compaction testing, the surface of the RCC pavement shall be kept continuously moist for 7 days or until an approved curing method is applied.

6.10.1 Water Cure.Water cure shall be applied by water trucks equipped with misting spray nozzles, soaking hoses, sprinkler system or other means that will assure a uniform moist condition to the RCC. Application of this moisture must be done in a manner that will not wash out or damage the surface of the finished RCC pavement.

6.10.2 Curing Compound. The specified membrane curing compound shall be applied in two separate applications at right angles to one another, with the first coat being allowed to become tacky before the second is applied. This application must ensure a uniform void-free membrane across the entire RCC pavement. If the application rate is found to be excessive or insufficient, the Contractor, with approval of the Engineer, can decrease or increase the application rate to a level which achieves a void-free surface without ponding.

6.10.3 Sheet Materials. Curing paper, plastic and other sheet materials for curing RCC shall conform to ASTM C 171. The coverings shall be held securely in place and weighted to maintain a close contact with the RCC surface throughout the entire curing period. The edges of adjoining sheets shall be overlapped and held in place with sand bags, planking, pressure adhesive tape, or other Engineer-approved method.

6.11 Traffic. The Contractor shall protect the RCC from vehicular traffic during the curing period. Completed portions of the RCC pavement may be opened to traffic after seven days or as approved by the Engineer.

6.12 Maintenance. The Contractor shall maintain the RCC pavement in good condition until all work is completed and accepted. Such maintenance shall be performed by the Contractor at his own expense.

END OF SECTION 02511

June 24, 2016

Barge Waggoner Sumner & Cannon, Inc.
1110 Market Street, Suite 200
Chattanooga, TN 37402

Attention: Mr. Ben Nemec

Reference: **Natural Resources Assessment**
South Chickamauga Creek Greenway Phase 2-Segment 1
Faith Road to Youngstown Road
Chattanooga, Tennessee
S&ME Project No. 4181-16-015 P001

Dear Mr. Nemec:

S&ME, Inc. (S&ME) is pleased to submit this report of natural resources services including jurisdictional waters and protected species assessments for the above referenced project in Chattanooga, Tennessee. The work was conducted in general conformance with the scope of services outlined in S&ME Proposal No. 41-1600167, dated February 24, 2016, and authorized with your subconsultant agreement on March 22, 2016.

❖ Project Information

This project, which is referred to as Phase 2, will provide the final trail connection to complete the South Chickamauga Creek Greenway. Phase 2 is divided into two segments designated Segments 1 and 2 based on funding sources and associated project proponents. The combined segments are approximately 1.5 miles in length and, based on preliminary information, about one-third of the total length will be boardwalk and the remainder will be an at-grade walkway.

Segment 1 will begin at the current greenway terminus at Faith Road and continue to Youngstown Road and is the focus of this report; the results of our assessment of Segment 2 are reported under separate cover. This segment will be partially-funded through the Transportation Alternatives Program (TAP) and, as such, will be subject to the National Environmental Policy Act of 1969 (NEPA). The attachments to this report include several figures and photographs depicting the location and conditions within Segment 1.

S&ME was requested to conduct a jurisdictional waters determination and protected species assessment of the proposed trail alignment and potential construction staging areas. S&ME was requested to evaluate the forested areas to identify whether trees with suitable habitat for the Indiana and northern long-eared (NLE) bats are present. The centerline of the proposed trail was flagged in the field by Barge Waggoner Sumner & Cannon, Inc. (BWSC) prior to S&ME's assessment. In addition, a data file depicting the proposed alignment and review corridor including potential staging and access areas was provided to S&ME by BWSC. Based on the provided location information, the width of the area assessed in the field by S&ME ranged from about 60 feet to 200 feet (see Figures 2 – 2B).

❖ Methodology

Jurisdictional Waters

Jurisdictional waters of the U.S., including wetlands, are defined by 33 CFR Part 328.3 and are protected by Section 404 of the Clean Water Act (33 USC 1344), which is administered and enforced by the U.S. Army Corps of Engineers (USACE). The Tennessee Department of Environment and Conservation-Division of Water Resources (TDEC-DWR) has jurisdiction over waters of the state. Potential wetlands were assessed following the Routine On-Site Determination Method as defined in the Corps of Engineers 1987 Wetlands Delineation Manual and Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Eastern Mountains and Piedmont Region. This technique uses a multi-parameter approach, which requires positive evidence of three criteria: hydrophytic vegetation, hydric soils, and wetland hydrology. Areas exhibiting all three wetland characteristics, as well as surface waters, are considered jurisdictional.

We evaluated drainage features according to the TDEC Guidance for Making Hydrologic Determinations, Version 1.4. The procedures outlined in this guidance are intended to be applied to drainage features that could be considered either a wet-weather conveyance (WWC) or a stream. A score of less than 19 indicates the feature meets the definition of a wet-weather conveyance and a score of 19 or greater indicates the feature is a stream. Typically, features considered to be a stream by TDEC would be considered an intermittent or perennial stream by the USACE.

Our assessment for the possible occurrence of jurisdictional waters, including wetlands, within the project area consisted of a field reconnaissance employing the USACE and TDEC-DWR methodology referenced above.

Protected Species

Existing federal- and state-listed species information and site habitat information was reviewed online to determine the likely occurrence of rare, threatened, or endangered species within the proposed project area. The lists of protected state and federal listed species is included in the attachments and summarized in Table 2. Our assessment for the possible occurrence of protected species or their habitats within the project area consisted of pedestrian transects through the project review area. S&ME assessed the trees within the project review area for potential summer roosting habitat of protected forest-dwelling bats in accordance with the United States Fish and Wildlife Service (USFWS) guidance; live or dead trees with cracks, crevices, or loose or exfoliating bark with a diameter at breast height (DBH) greater than three inches are considered by the USFWS to be potential roosting habitat for the Indiana and NLE bats.

❖ Results of Jurisdictional Waters Assessment

S&ME conducted a site assessment for potential jurisdictional waters on June 3, 2016. In the seven days preceding the site assessment, according to https://www.wunderground.com/history/airport/KCHA/2016/, no measurable rainfall was recorded for the site vicinity.

No areas of wetlands were identified within the project corridor during our assessment. Six drainage features were encountered and evaluated. Figures 2 – 2B depict the locations of these features. A summary of these is presented in the table below.

Table 1 – Summary of Drainage Features Evaluated

Label	TDEC Score	Feature Type TDEC / USACE	Photo #	Comments
S1	9	WWC / Ephemeral Stream	1	Connects to South Chickamauga Creek
S2	4	WWC / Upland Drainage	5	Doesn't connect to South Chickamauga Creek
S3	4.5	WWC / Upland Drainage	6	No connection to S. Chickamauga Creek; feature composed of two parallel channels (A&B) separated by a berm
S4	10.5	WWC / Upland Drainage	7	Doesn't connect to South Chickamauga Creek
S5	4	WWC / Upland Drainage	8	Doesn't connect to South Chickamauga Creek
S6	21	Stream / Intermittent Stream	9	Connects to South Chickamauga Creek

The photographs and completed TDEC Hydrologic Determination Field Data Sheets for each of these features are included in the attachments.

❖ Results of Protected Species Assessment

The project area is forested and contains mature trees with a relatively dense understory of Chinese privet (*Ligustrum sinense*), wild rose (*Rosa carolina*), blackberry (*Rubus sp.*), and Japanese honeysuckle (*Lonicera japonica*). The trees within the area included: American sycamore (*Platanus occidentalis),* red maple *(Acer rubrum),* shagbark hickory (*Carya ovata*), willow oak (*Quercus phellos*), white oak (*Q. alba*), hackberry (*Celtis occidentalis*), eastern red cedar (*Juniperus virginiana*), and sweetgum (*Liquidambar styraciflua*).

Species Evaluation

Existing federal- and state-listed species information and site habitat information was reviewed to determine the likely occurrence of rare, threatened, or endangered species within the proposed project area. The USFWS Information for Planning and Conservation (IPaC) tool was accessed from their website and utilized to determine the list of federally-protected species that may occur within the project review area. The state-listed species presented below are those identified as being associated with properties located within the Lower South Chickamauga Creek watershed, which includes the proposed project area. Copies of the IPaC and state-listed species are included in the attachments. The IPaC report indicates that no critical habitat has been reported as occurring within the proposed project area. As included in the attached lists and as listed in Table 2 below, several protected species are listed within the vicinity of the project site. Information regarding the listed species is provided following Table 2.

Table 2-Federal and State Protected Species List

Common Name	Scientific Name	Species Type	Protection Status
Snail darter	*Percina tanasi*	Fish	Federal and State Threatened
Large flowered skullcap	*Scutellaria montana*	Plant	Federal and State Threatened
Small-whorled pogonia	*Isotria medeoloides*	Plant	Federal Threatened
Virginia spirea	*Spiraea virginiana*	Plant	Federal Threatened
Yellow honeysuckle	*Lonicera flava*	Plant	State Threatened
Narrow-leaved trillium	*Trillium lancifolium*	Plant	State Threatened
Southern nodding-trillium	*Trillium rugelli*	Plant	State Threatened
Gray bat	*Myotis grisescens*	Mammal	Federal Endangered
Indiana bat	*Myotis sodalis*	Mammal	Federal Endangered
Northern long-eared bat	*Myotis septentrionalis*	Mammal	Federal Threatened
Backman's sparrow	*Aimophila aestivalis*	Bird	State Endangered
Chickamauga crayfish	*Cambarus extraneus*	Invertebrate	State Threatened

The sharp-shinned hawk (*Accipiter striatus*), least bittern (*Ixobrychus exilis*), southeastern shrew (*Sorex longirostris*), and king rail (*Rallis elegans*) are listed as "Deemed in need of management" by the TDEC-Natural Heritage Inventory Program (NHIP) as potentially occurring in the project site watershed. These species are not listed as state or federally protected.

Aquatic Species

Snail darter

The snail darter is a small fish (two to three inches in length) in the perch family that is typically found in sand and gravel shoals with no silt and with moderate to strong currents. The intermittent stream within the project area does not provide suitable habitat for this species due its substrate and flow regime.

Chickamauga crayfish

The Chickamauga crayfish is a state-threatened species that is known to occur within the South Chickamauga Creek basin. This species occurs in shallow, moderately-flowing streams with gravel/cobble substrates and, like other stream-dwelling crayfish, is typically found during the day hiding under large rocks or leaf litter. They are opportunistic feeders that emerge at night and enter the stream channel to feed. One stream (depicted as S-6 in Figures 2 and 2B) is located within the project review area that, when flowing, could potentially provide habitat for this crayfish. Based on our understanding that the greenway trail will completely span this stream and not result in an impact, the project will have no effect on this species.

Plants

Large-flowered skullcap

The large-flowered skullcap has been a designated protected species since 1986. It was downgraded by the USFWS from endangered to threatened in 2002. The perennial herb is a member of the mint family. Its preferred habitat is well-drained, slightly acidic slopes in ravine and stream bottom forests within the Ridge and Valley and Cumberland Plateau provinces of North Georgia and southeastern Tennessee. The plants typically occur in colluvial soils, which are loose soils that have accumulated at the base of cliffs or slopes. In this region, the plant is in bloom for approximately three weeks in May. The inflorescence of the entire group of skullcaps is easily recognized by the two-lobed calyx, with a "cap" just above the base of the upper lobe. Suitable habitat for this species was not observed within the project site. Furthermore, no individuals of this species were observed during the assessment.

Small-whorled pogonia

This perennial is approximately four to 10 inches tall with a terminating whorl of five to six light green, slightly pointed elliptical leaves. Flowering, which is not always annual, occurs from mid-May to mid-June and lasts for less than a week. This species prefers acidic soils, in dry to mesic second-growth, deciduous or deciduous-coniferous forests, with a light to moderate leaf litter, an open herbaceous layer with moderate to light shrub layer, and relatively open canopy. Suitable habitat was not observed within the project area.

Virginia spirea

This shrubby plant is two to 10 feet tall and has upright arching stems. It bears cream-colored flowers on branched and flat-topped axes in June and July. It spreads clonally and forms dense clumps, which spread in rock crevices and around boulders. It occurs along rocky, flood-scoured riverbanks and thickets in gorges and canyons. Flood scouring is essential to the plant's survival eliminating taller woody competitors.

Although the project area parallels South Chickamauga Creek, the rocky habitat typical of this species does not occur. The project area does not included thickets within gorges or canyons. Neither the in-house research nor the site survey identified populations, individuals, or habitat of this species within the project area.

Yellow honeysuckle

This twining, deciduous woody vine has tubular yellow flowers in whorls at the ends of stems that appear in April to May. Round, fleshy, orange to red berries appear in late summer. The vine is typically five to 6.5 feet long. The preferred habitat is upland, rocky forests or rock bluffs, or in rocky ground along streams. It occurs in thin soils in the vicinity of sandstones and granite that may contribute to the slight acidification of the soil. Neither the in-house research nor the site survey identified populations, individuals, or habitat of this species within the proposed project area.

Narrow-leaved trillium

The narrow-leafed trillium, also known as the lance-leafed wake robin, has narrow grey-green, heavily speckled foliage. The stems are purple below and green above and a liver-colored flower blooms from late winter to early spring (February to March). This trillium occurs on wooded slopes and bluffs in bottomland forests. Although the project area contains wooded slopes, bottomland forest habitat is not present. Several areas of bluffs occur beyond the project review area. Neither the in-house research nor the site survey identified narrow-leaved trillium populations, individuals, or habitat of this species within the proposed project area.

Southern nodding trillium

Southern nodding trillium is a perennial herb with an erect stem that terminates in a whorl of three leaves and a solitary pale yellow or cream flower. It flowers in early spring and produces a berry-like fruit capsule that matures in the early to mid-summer. It occurs in rich woodlands and forest over calcareous rocks, in areas that are moist, but well-drained. It prefers areas dominated by closed or nearly-closed canopy of mesophytic trees (e.g., black walnut, chinkapin oak, white ash). The wooded habitat within the project review area could provide habitat for this plant species although it lacks areas that would provide moist, well-drained conditions. Only limited portions of the review area contain forest over calcareous rocks. No individuals of this species were observed during the site assessment.

Birds

Bachman's sparrow

The Bachman's sparrow is 5.5 inches long with a conical bill and pale lower mandible. The crown is brown and the face is pale with a brown streak extending behind the eye. This sparrow has a gray back, a long brown tail, and wings with brown streaks. It is a shy and secretive bird that builds its nest on the ground in clumps of grass or at the bases of bushes.

Within the project area, the clumps of grass typically preferred for nesting are absent. Although many areas within the understory contain shrubs, they would not be expected to provide suitable nesting habitat for this sparrow. Neither the in-house research nor the site survey located Bachman's sparrow populations, individuals, or habitat within the project area.

Mammals

Gray bat

The gray bat is the largest member of *Myotis* weighing between seven and 16 grams and is distinguished from other bats by its dark gray fur on their back. After the gray bat molts in July or August, the dark gray fur often bleaches to a chestnut brown or russet. Additionally, the bat's wing membrane connects to its ankle instead of at the toe as in other species of *Myotis*. The gray bat lives in caves year-round with rare exceptions. During the winter, the gray bat hibernates in deep vertical caves and in summer they roost in caves that are typically scattered along rivers in limestone karst areas, feeding on flying aquatic and terrestrial insects. Females give birth to a single pup in late May or early June.

Based on our observations and data review, no caves exist within the project vicinity. It is unlikely that the gray bat occurs within the proposed project site.

Indiana Bat and Northern Long-Eared Bat

The Indiana bat is a small bat with a wingspan of about nine to 11 inches and fur that is dark-brown to black. The NLE bat is a medium-sized bat with a wingspan of about nine to 10 inches and fur that is medium to dark brown on the back and tawny to pale-brown on the underside.

During winter, these bats hibernate in humid caves or other similar structures (e.g., abandoned mines) that provide stable temperatures between 32° F and 50° F. After hibernation, they migrate to their summer habitat in wooded areas where they usually roost under the loose tree bark of dead or dying trees. During summer, males roost alone or in small groups, while females roost in larger groups of up to 100 bats or more. They also forage in or along the edges of forested areas.

Based on S&ME's previous experience and current USFWS guidance, the USFWS considers live or dead trees with cracks, crevices, or loose or exfoliating bark with a diameter at breast height (DBH) greater than three inches to be potential roosting habitat for the Indiana and NLE bats. Twenty-one potential summer roosting habitat trees were observed within the project review area. Figures 2 – 2B depict the approximate locations of these potential summer roosting habitat trees. The project team will be using this information to determine the final trail alignment with the intent of avoiding the removal of these 21 trees.

❖ Conclusions and Recommendations

S&ME conducted a jurisdictional waters assessment within the project review area and identified four WWCs/upland drainages, one WWC/ephemeral stream, and one stream/intermittent stream. All stream determinations are preliminary until verified by the USACE and TDEC-DWR and should be used for planning purposes only until the verification is complete. If any of these features are proposed to be impacted by the project, additional coordination in the form of permit approvals from the USACE and TDEC-DWR will be needed.

The results of the protected species assessment indicate that potential habitat for the Chickamauga crayfish and the Indiana and NLE bats is present within the project review area. Based on the outcome of the trail design, if any of the trees will require removal or if the intermittent stream (S6) will be impacted, additional coordination will be required with the USFWS and/or TWRA.

S&ME appreciates the opportunity to provide services for this project. If you have any questions, please call.

Sincerely,

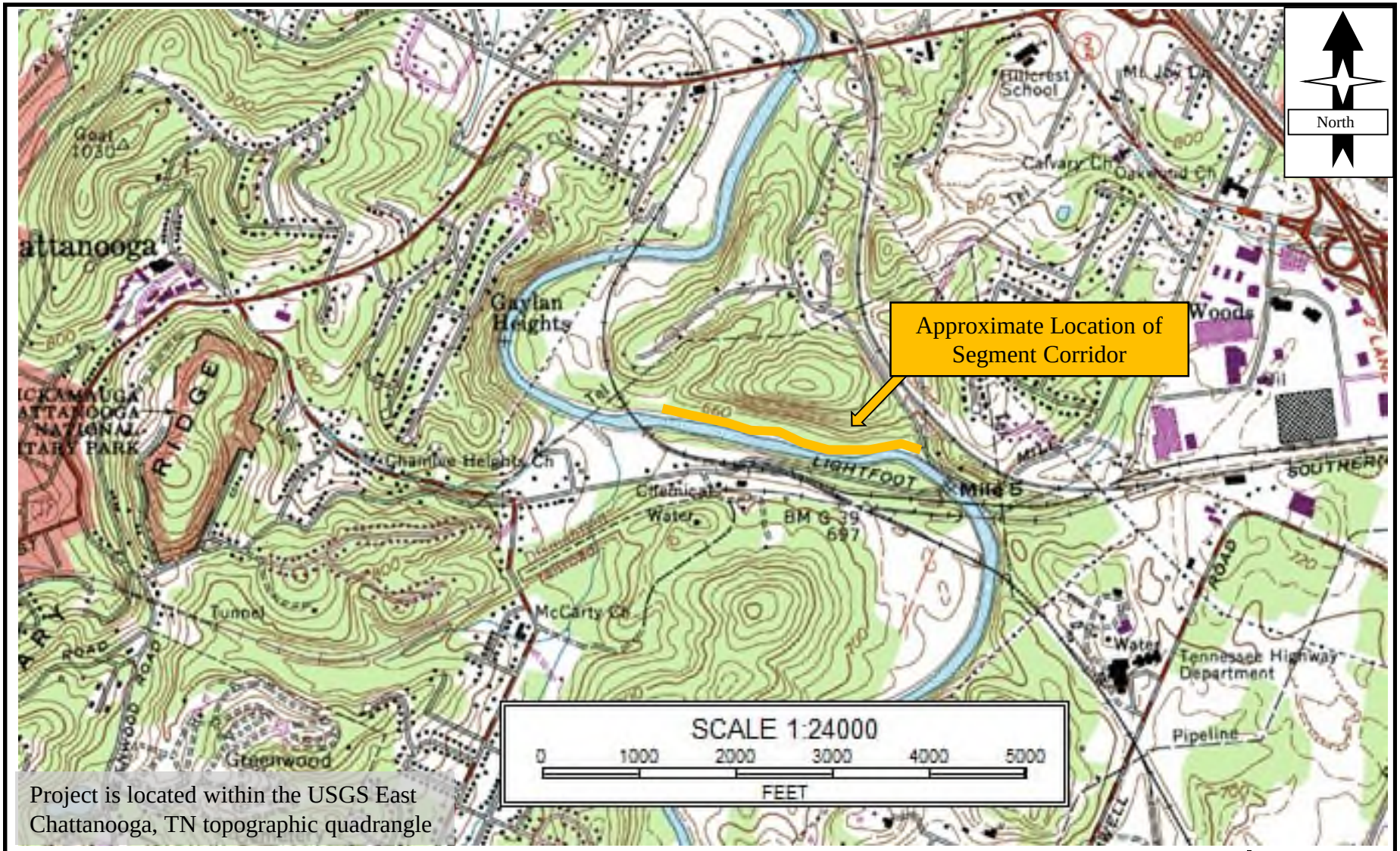
S&ME, Inc.

Kristy Smedley, QHP
Senior Scientist

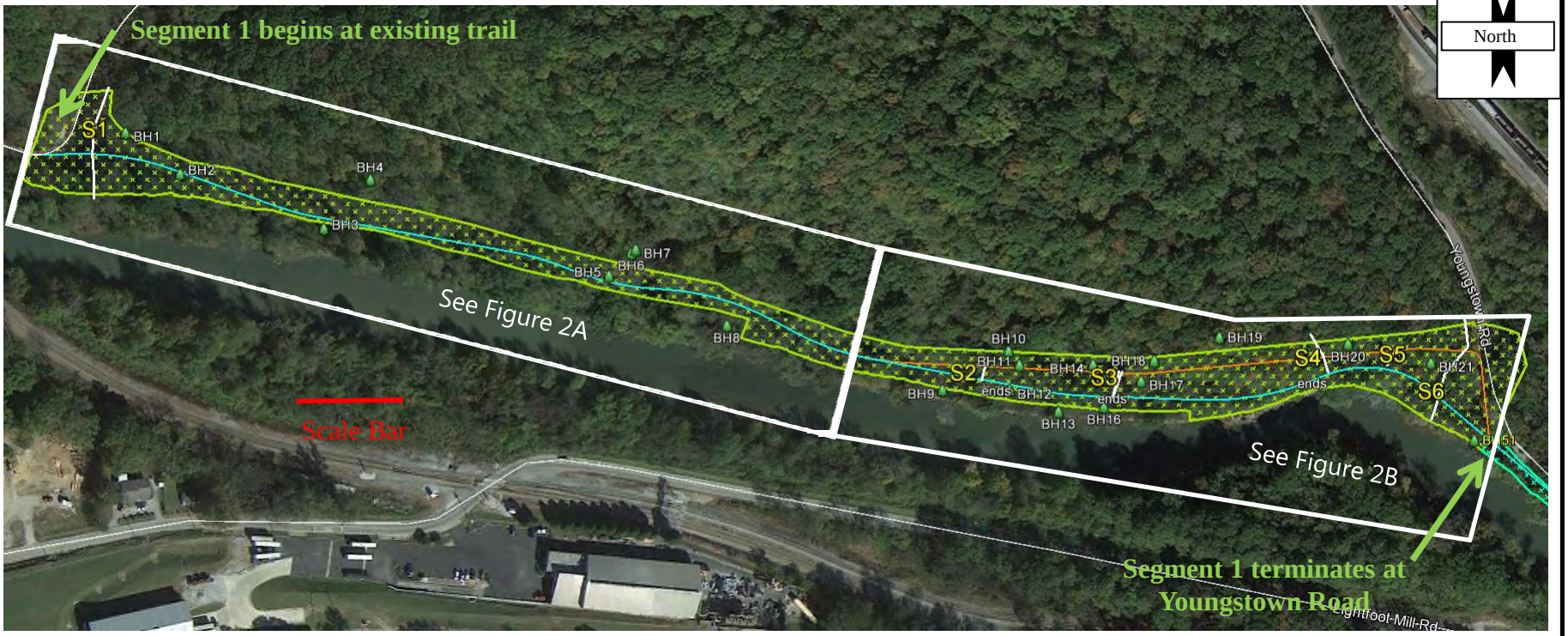
Elizabeth M. Porter
Senior Reviewer

Attachments: Figures
Photographs
TDEC Hydrologic Determination Forms
USFWS and TDEC-NHIP Protected Species Lists

Attachments



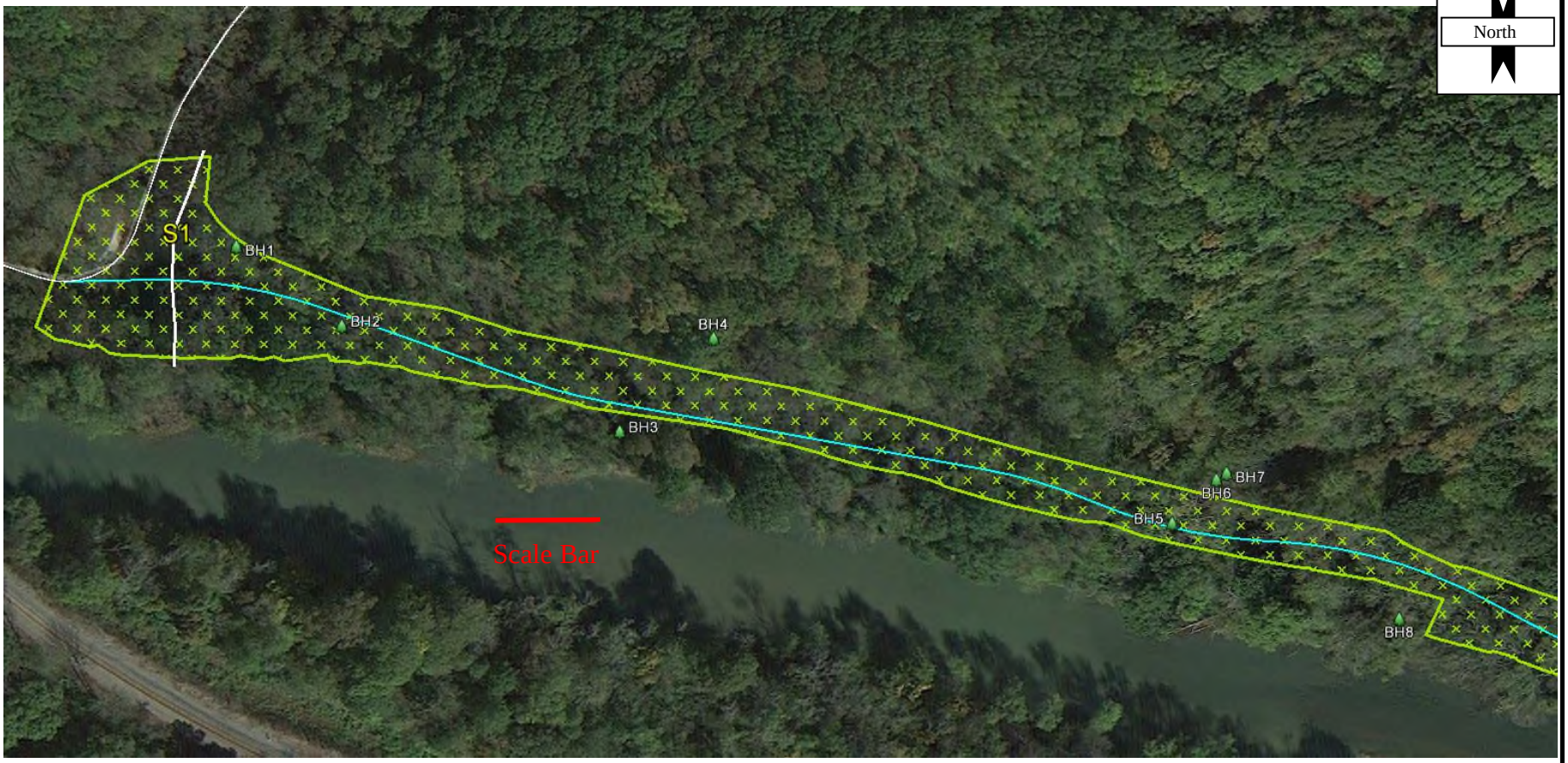
Scale: as shown	S&ME	**Site Location Plan** Segment 1 – South Chickamauga Creek Greenway Faith Hill Trail to Youngstown Road Chattanooga, Hamilton County, Tennessee	**Figure 1**
Checked By: EMP			
Date: 6/10/2016		Project 4181-16-015 P001	



S# = Identified Streams, WWC, and/or Drainage Features

BH # =Potential Bat Habitat Tree

Scale bar approximately 200 feet	S&ME	**Overview of Findings** Segment 1 – South Chickamauga Creek Greenway Faith Hill Trail to Youngstown Road Chattanooga, Hamilton County, Tennessee	**Figure 2**
Checked By: KLS			
Date: 6/10/2016		Project 4181-16-015 P001	



BH # =Potential Bat Habitat Tree

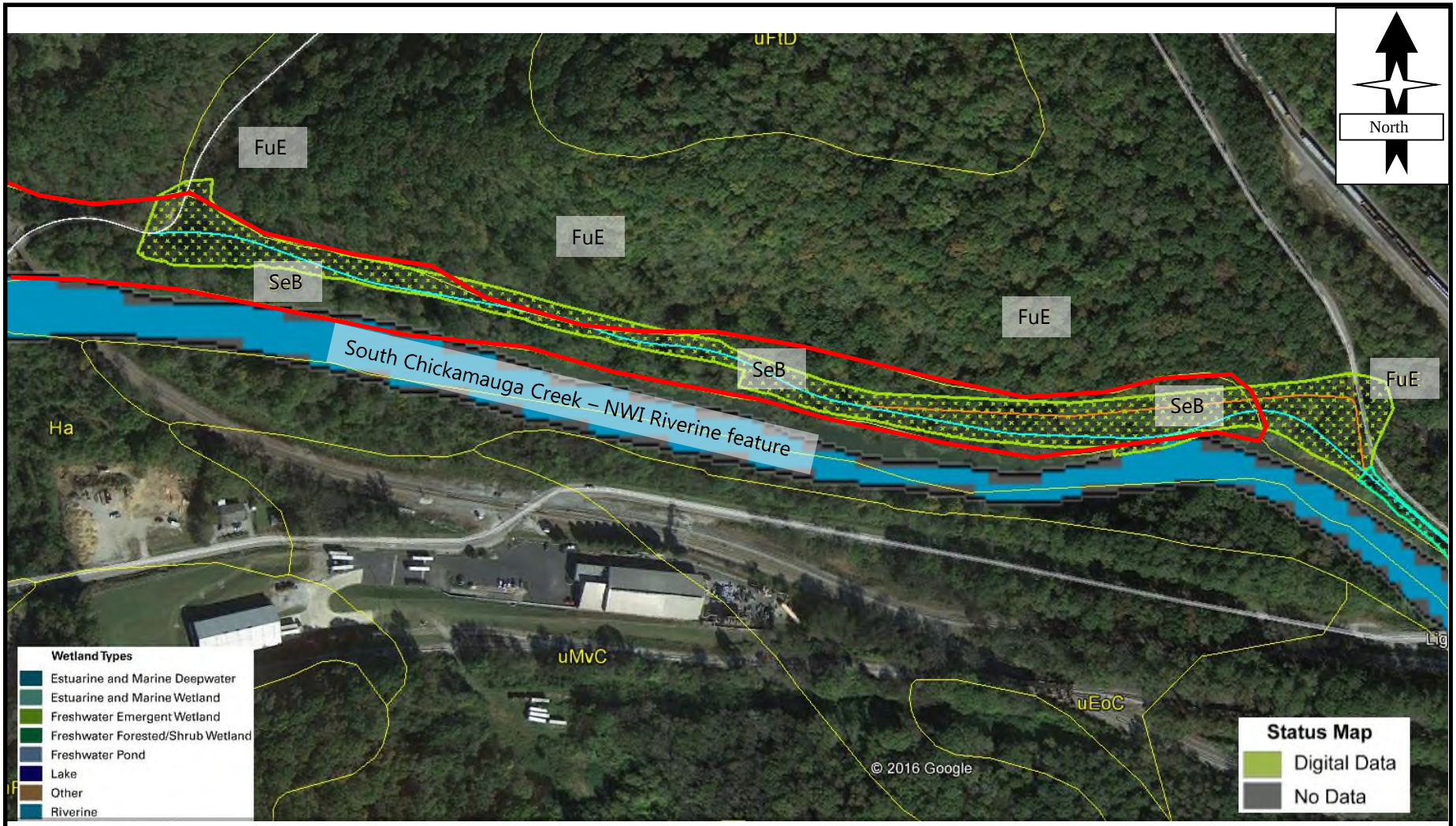
S1 = Ephemeral Stream/WWC extending entire width project area

Scale Bar – approx. 200 feet	S&ME	**Overview of Findings** Segment 1 – South Chickamauga Creek Greenway Faith Hill Trail to Youngstown Road Chattanooga, Hamilton County, Tennessee	**Figure 2A**
Checked By: KLS			
Date: 6/10/2016		Project 4181-16-015 P001	

BH # = Potential Bat Habitat Tree

S2, S3, S4, & S5= TDEC WWC's / USACE Upland Drainages
S6 = TDEC Stream / USACE Intermittent Stream

Scale Bar – approx. 100 feet	S&ME	**Overview of Findings** Segment 1 – South Chickamauga Creek Greenway Faith Hill Trail to Youngstown Road Chattanooga, Hamilton County, Tennessee	**Figure 2B**
Checked By: KLS			
Date: 6/10/2016		Project 4181-16-015 P001	



SeB = Sequatchie Loam, 2 to 7% slopes
FuE = Fullerton cherty silt loam, 25 to 40% slopes

Scale: not determined	S&ME	**Soil and NWI Exhibit** Segment 1 – South Chickamauga Creek Greenway Faith Hill Trail to Youngstown Road Chattanooga, Hamilton County, Tennessee	**Figure 3**
Checked By: EMP			
Date: 6/10/2016		Project 4181-16-015 P001	

Date: 6/3/2016

Photographer: KLS

1	**Location / Orientation**	S1, looking south and downstream
	Remarks	View of WWC / Ephemeral Stream labeled S1.

Date: 6/3/2016

Photographer: KLS

2	**Location / Orientation**	In the western portion, facing east
	Remarks	Typical view of proposed trail corridor

Date: 6/3/2016

Photographer: KLS

3	**Location / Orientation**	Potential bat habitat designated BH-5
	Remarks	View of typical snag observed within reviewed corridor

Date: 6/3/2016

Photographer: KLS

4	**Location / Orientation**	Potential bat habitat designated BH-8
	Remarks	View of a large shagbark hickory observed within reviewed corridor.

Date: 6/3/2016

Photographer: KLS

5	**Location / Orientation**	S2, looking northeast and upstream
	Remarks	View of WWC / Upland Drainage feature labeled S2.

Date: 6/3/2016

Photographer: KLS

6	**Location / Orientation**	S3, looking northeast and upstream
	Remarks	View of WWC / Upland Drainage feature labeled S3 (A&B).

Date: 6/3/2016

Photographer: KLS

7	**Location / Orientation**	S4, looking northwest and upstream
	Remarks	View of WWC / Upland Drainage feature labeled S4.

Date: 6/3/2016

Photographer: KLS

8	**Location / Orientation**	S5, looking northeast and upstream
	Remarks	View of WWC / Upland Drainage feature labeled S5.

Date: 6/3/2016

Photographer: KLS

9	**Location / Orientation**	S6, looking north/northeast and upstream
	Remarks	View of TDEC Stream / USACE Intermittent Stream labeled S6.

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.4

County: Hamilton	Named Waterbody: Unnamed	Date/Time: 6/3/2016; 10:20 am
Assessors/Affiliation: Kristy Smedley and Barry Burnette of S&ME, Inc.		Project ID : S-1
Site Name/Description: South Chickamauga Greenway- Segment 1		
Site Location: Faith Road to Youngstown Road, Chattanooga, TN 37416		
USGS quad: East Chattanooga, TN	HUC (12 digit): 060200010905	Lat/Long: 35.070542°, -85.222958°
Previous Rainfall (7-days) : none		
Precipitation this Season vs. Normal : very wet wet average **(dry)** drought unknown Source of recent & seasonal precip data :		
Watershed Size :	Photos **(Y)** or N (circle) Number : 1	
Soil Type(s) / Geology: Sequatchie loam, 2 to 7% slopes (SeB) / Knox Group (OCk) Source: NRCS Web Soil survey and Google Earth USGS Geologic Overlay		
Surrounding Land Use: Residential, Railroad l		
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes) : Severe Moderate Slight **(Absent)**		

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge	X	WWC
2. Defined bed and bank absent, dominated by upland vegetation / grass	X	WWC
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions	X	WWC
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall	X	WWC
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase	X	Stream
6. Presence of fish (except *Gambusia*)	X	Stream
7. Presence of naturally occurring ground water table connection	X	Stream
8. Flowing water in channel and 7 days since last precipitation in local watershed	X	Stream
9. Evidence watercourse has been used as a supply of drinking water	X	Stream

NOTE : If any Primary Indicators 1-9 = "Yes", then STOP; absent directly contradictory evidence, determination is complete.

In the absence of a primary indicator, or other definitive evidence, complete the secondary indicator table on page 2 of this sheet, and provide score below.

Guidance for the interpretation and scoring of both the primary & secondary indicators is provided in *TDEC-WPC Guidance For Making Hydrologic Determinations, Version 1.4*

Overall Hydrologic Determination = WWC

Secondary Indicator Score (if applicable) = 9

Justification / Notes :

Secondary Field Indicator Evaluation

A. Geomorphology (Subtotal = 6.5)	**Absent**	**Weak**	**Moderate**	**Strong**
1. Continuous bed and bank	0	1	2	3
2. Sinuous channel	0	1	2	3
3. In-channel structure: riffle-pool sequences	0	1	2	3
4. Sorting of soil textures or other substrate	0	1	2	3
5. Active/relic floodplain	0	1	2	3
6. Depositional bars or benches	0	1	2	
7. Braided channel	0	1	2	3
8. Recent alluvial deposits	0	0.5	1	1.5
9. Natural levees	0	1	2	3
10. Headcuts	0	1	2	3
11. Grade controls	0	0.5	1	1.5
12. Natural valley or drainageway	0	0.5	1	1.5
13. At least second order channel on existing USGS or NRCS map	No = 0		Yes = 3	

B. Hydrology (Subtotal = 0)	**Absent**	**Weak**	**Moderate**	**Strong**
14. Subsurface flow/discharge into channel	0	1	2	3
15. Water in channel and >48 hours since sig. rain	0	1	2	3
16. Leaf litter in channel (January – September)	1.5	1	0.5	0
17. Sediment on plants or on debris	0	0.5	1	1.5
18. Organic debris lines or piles (wrack lines)	0	0.5	1	1.5
19. Hydric soils in stream bed or sides of channel	No = 0		Yes = 1.5	

C. Biology (Subtotal = 2.5)	**Absent**	**Weak**	**Moderate**	**Strong**
20. Fibrous roots in channel [1]	3	2	1	0
21. Rooted plants in channel [1]	3	2	1	0
22. Crayfish in stream (exclude in floodplain)	0	0.5	1	1.5
23. Bivalves/mussels	0	1	2	3
24. Amphibians	0	0.5	1	1.5
25. Macrobenthos (record type & abundance)	0	1	2	3
26. Filamentous algae; periphyton	0	1	2	3
27. Iron oxidizing bacteria/fungus	0	0.5	1	1.5
28.Wetland plants in channel [2]	0	0.5	1	2

[1] Focus is on the presence of upland plants. [2] Focus is on the presence of aquatic or wetland plants.

Total Points = 9

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

Notes :

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.4

County: Hamilton	Named Waterbody: Unnamed	Date/Time: 6/3/2016; 12:05 pm
Assessors/Affiliation: Kristy Smedley and Barry Burnette of S&ME, Inc.		Project ID : S-2
Site Name/Description: South Chickamauga Greenway- Segment 1		
Site Location: Faith Road to Youngstown Road, Chattanooga, TN 37416		
USGS quad: East Chattanooga, TN	HUC (12 digit): 060200010905	Lat/Long: 35.069295°, -85.217310°
Previous Rainfall (7-days) : none		
Precipitation this Season vs. Normal : very wet wet average **dry** drought unknown Source of recent & seasonal precip data :		
Watershed Size :	Photos: **Y** or N (circle) Number: 5	
Soil Type(s) / Geology: Sequatchie loam, 2 to 7% slopes (SeB) / Knox Group (OCk) Source: NRCS Web Soil survey and Google Earth USGS Geologic Overlay		
Surrounding Land Use: Residential, Railroad		
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes) : Severe Moderate Slight **Absent**		

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge	X	WWC
2. Defined bed and bank absent, dominated by upland vegetation / grass	X	WWC
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions	X	WWC
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall	X	WWC
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase	X	Stream
6. Presence of fish (except *Gambusia*)	X	Stream
7. Presence of naturally occurring ground water table connection	X	Stream
8. Flowing water in channel and 7 days since last precipitation in local watershed	X	Stream
9. Evidence watercourse has been used as a supply of drinking water	X	Stream

NOTE : If any Primary Indicators 1-9 = "Yes", then STOP; absent directly contradictory evidence, determination is complete.

In the absence of a primary indicator, or other definitive evidence, complete the secondary indicator table on page 2 of this sheet, and provide score below.

Guidance for the interpretation and scoring of both the primary & secondary indicators is provided in *TDEC-WPC Guidance For Making Hydrologic Determinations, Version 1.4*

Overall Hydrologic Determination = WWC

Secondary Indicator Score (if applicable) = 4

Justification / Notes :

Secondary Field Indicator Evaluation

A. Geomorphology (Subtotal = 1.5)	**Absent**	**Weak**	**Moderate**	**Strong**
1. Continuous bed and bank	0	1	2	3
2. Sinuous channel	0	1	2	3
3. In-channel structure: riffle-pool sequences	0	1	2	3
4. Sorting of soil textures or other substrate	0	1	2	3
5. Active/relic floodplain	0	1	2	3
6. Depositional bars or benches	0	1	2	
7. Braided channel	0	1	2	3
8. Recent alluvial deposits	0	0.5	1	1.5
9. Natural levees	0	1	2	3
10. Headcuts	0	1	2	3
11. Grade controls	0	0.5	1	1.5
12. Natural valley or drainageway	0	0.5	1	1.5
13. At least second order channel on existing USGS or NRCS map	No = 0		Yes = 3	

B. Hydrology (Subtotal = 0)	**Absent**	**Weak**	**Moderate**	**Strong**
14. Subsurface flow/discharge into channel	0	1	2	3
15. Water in channel and >48 hours since sig. rain	0	1	2	3
16. Leaf litter in channel (January – September)	1.5	1	0.5	0
17. Sediment on plants or on debris	0	0.5	1	1.5
18. Organic debris lines or piles (wrack lines)	0	0.5	1	1.5
19. Hydric soils in stream bed or sides of channel	No = 0		Yes = 1.5	

C. Biology (Subtotal = 2.5)	**Absent**	**Weak**	**Moderate**	**Strong**
20. Fibrous roots in channel [1]	3	2	1	0
21. Rooted plants in channel [1]	3	2	1	0
22. Crayfish in stream (exclude in floodplain)	0	0.5	1	1.5
23. Bivalves/mussels	0	1	2	3
24. Amphibians	0	0.5	1	1.5
25. Macrobenthos (record type & abundance)	0	1	2	3
26. Filamentous algae; periphyton	0	1	2	3
27. Iron oxidizing bacteria/fungus	0	0.5	1	1.5
28.Wetland plants in channel [2]	0	0.5	1	2

[1] Focus is on the presence of upland plants. [2] Focus is on the presence of aquatic or wetland plants.

Total Points = 4

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

Notes :

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.4

County: Hamilton	Named Waterbody: Unnamed	Date/Time: 6/3/2016; 12:50 pm
Assessors/Affiliation: Kristy Smedley and Barry Burnette of S&ME, Inc.		Project ID : S-3
Site Name/Description: South Chickamauga Greenway- Segment 1		
Site Location: Faith Road to Youngstown Road, Chattanooga, TN 37416		
USGS quad: East Chattanooga, TN	HUC (12 digit): 060200010905	Lat/Long: 35.069210°, -85.216479°
Previous Rainfall (7-days) : none		
Precipitation this Season vs. Normal : very wet wet average **dry** drought unknown Source of recent & seasonal precip data :		
Watershed Size :	Photos **Y** or N (circle) Number: 6	
Soil Type(s) / Geology: Sequatchie loam, 2 to 7% slopes (SeB) / Knox Group (OCk) Source: NRCS Web Soil survey and Google Earth USGS Geologic Overlay		
Surrounding Land Use: Residential, Railroad		
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes) : Severe Moderate Slight **Absent**		

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge	X	WWC
2. Defined bed and bank absent, dominated by upland vegetation / grass	X	WWC
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions	X	WWC
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall	X	WWC
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase	X	Stream
6. Presence of fish (except *Gambusia*)	X	Stream
7. Presence of naturally occurring ground water table connection	X	Stream
8. Flowing water in channel and 7 days since last precipitation in local watershed	X	Stream
9. Evidence watercourse has been used as a supply of drinking water	X	Stream

NOTE : If any Primary Indicators 1-9 = "Yes", then STOP; absent directly contradictory evidence, determination is complete.

In the absence of a primary indicator, or other definitive evidence, complete the secondary indicator table on page 2 of this sheet, and provide score below.

Guidance for the interpretation and scoring of both the primary & secondary indicators is provided in *TDEC-WPC Guidance For Making Hydrologic Determinations, Version 1.4*

Overall Hydrologic Determination = WWC

Secondary Indicator Score (if applicable) = 4.5

Justification / Notes :

Secondary Field Indicator Evaluation

A. Geomorphology (Subtotal = 2)	**Absent**	**Weak**	**Moderate**	**Strong**
1. Continuous bed and bank	0	1	2	3
2. Sinuous channel	0	1	2	3
3. In-channel structure: riffle-pool sequences	0	1	2	3
4. Sorting of soil textures or other substrate	0	1	2	3
5. Active/relic floodplain	0	1	2	3
6. Depositional bars or benches	0	1	2	
7. Braided channel	0	1	2	3
8. Recent alluvial deposits	0	0.5	1	1.5
9. Natural levees	0	1	2	3
10. Headcuts	0	1	2	3
11. Grade controls	0	0.5	1	1.5
12. Natural valley or drainageway	0	0.5	1	1.5
13. At least second order channel on existing USGS or NRCS map	No = 0		Yes = 3	

B. Hydrology (Subtotal = 0)	**Absent**	**Weak**	**Moderate**	**Strong**
14. Subsurface flow/discharge into channel	0	1	2	3
15. Water in channel and >48 hours since sig. rain	0	1	2	3
16. Leaf litter in channel (January – September)	1.5	1	0.5	0
17. Sediment on plants or on debris	0	0.5	1	1.5
18. Organic debris lines or piles (wrack lines)	0	0.5	1	1.5
19. Hydric soils in stream bed or sides of channel	No = 0		Yes = 1.5	

C. Biology (Subtotal = 2.5)	**Absent**	**Weak**	**Moderate**	**Strong**
20. Fibrous roots in channel [1]	3	2	1	0
21. Rooted plants in channel [1]	3	2	1	0
22. Crayfish in stream (exclude in floodplain)	0	0.5	1	1.5
23. Bivalves/mussels	0	1	2	3
24. Amphibians	0	0.5	1	1.5
25. Macrobenthos (record type & abundance)	0	1	2	3
26. Filamentous algae; periphyton	0	1	2	3
27. Iron oxidizing bacteria/fungus	0	0.5	1	1.5
28.Wetland plants in channel [2]	0	0.5	1	2

[1] Focus is on the presence of upland plants. [2] Focus is on the presence of aquatic or wetland plants.

Total Points = 4.5

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

Notes :

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.4

County: Hamilton	Named Waterbody: Unnamed	Date/Time: 6/3/2016; 1:25 pm
Assessors/Affiliation: Kristy Smedley and Barry Burnette of S&ME, Inc.		Project ID : S-4
Site Name/Description: South Chickamauga Greenway- Segment 1		
Site Location: Faith Road to Youngstown Road, Chattanooga, TN 37416		
USGS quad: East Chattanooga, TN	HUC (12 digit): 060200010905	Lat/Long: 35.069393°, -85.215191°
Previous Rainfall (7-days) : none		
Precipitation this Season vs. Normal : very wet wet average **dry** drought unknown Source of recent & seasonal precip data :		
Watershed Size :	Photos: **Y** or N (circle) Number: 7	
Soil Type(s) / Geology: Sequatchie loam, 2 to 7% slopes (SeB) / Knox Group (OCk) Source: NRCS Web Soil survey and Google Earth USGS Geologic Overlay		
Surrounding Land Use: Residential, Railroad		
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes) : Severe Moderate Slight **Absent**		

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge	X	WWC
2. Defined bed and bank absent, dominated by upland vegetation / grass	X	WWC
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions	X	WWC
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall	X	WWC
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase	X	Stream
6. Presence of fish (except *Gambusia*)	X	Stream
7. Presence of naturally occurring ground water table connection	X	Stream
8. Flowing water in channel and 7 days since last precipitation in local watershed	X	Stream
9. Evidence watercourse has been used as a supply of drinking water	X	Stream

NOTE : If any Primary Indicators 1-9 = "Yes", then STOP; absent directly contradictory evidence, determination is complete.

In the absence of a primary indicator, or other definitive evidence, complete the secondary indicator table on page 2 of this sheet, and provide score below.

Guidance for the interpretation and scoring of both the primary & secondary indicators is provided in *TDEC-WPC Guidance For Making Hydrologic Determinations, Version 1.4*

Overall Hydrologic Determination = WWC

Secondary Indicator Score (if applicable) = 10.5

Justification / Notes :

Secondary Field Indicator Evaluation

A. Geomorphology (Subtotal = 8.5)	**Absent**	**Weak**	**Moderate**	**Strong**
1. Continuous bed and bank	0	1	(2)	3
2. Sinuous channel	0	(1)	2	3
3. In-channel structure: riffle-pool sequences	0	(1)	2	3
4. Sorting of soil textures or other substrate	0	1	(2)	3
5. Active/relic floodplain	(0)	1	2	3
6. Depositional bars or benches	(0)	1	2	
7. Braided channel	(0)	1	2	3
8. Recent alluvial deposits	(0)	0.5	1	1.5
9. Natural levees	(0)	1	2	3
10. Headcuts	(0)	1	2	3
11. Grade controls	0	0.5	(1)	1.5
12. Natural valley or drainageway	0	0.5	1	(1.5)
13. At least second order channel on existing USGS or NRCS map	No = (0)		Yes = 3	

B. Hydrology (Subtotal = 0.5)	**Absent**	**Weak**	**Moderate**	**Strong**
14. Subsurface flow/discharge into channel	(0)	1	2	3
15. Water in channel and >48 hours since sig. rain	(0)	1	2	3
16. Leaf litter in channel (January – September)	1.5	1	0.5	(0)
17. Sediment on plants or on debris	(0)	0.5	1	1.5
18. Organic debris lines or piles (wrack lines)	0	(0.5)	1	1.5
19. Hydric soils in stream bed or sides of channel	No = (0)		Yes = 1.5	

C. Biology (Subtotal = 1.5)	**Absent**	**Weak**	**Moderate**	**Strong**
20. Fibrous roots in channel [1]	3	2	1	(0)
21. Rooted plants in channel [1]	3	2	(1)	0
22. Crayfish in stream (exclude in floodplain)	(0)	0.5	1	1.5
23. Bivalves/mussels	(0)	1	2	3
24. Amphibians	(0)	0.5	1	1.5
25. Macrobenthos (record type & abundance)	(0)	1	2	3
26. Filamentous algae; periphyton	(0)	1	2	3
27. Iron oxidizing bacteria/fungus	(0)	0.5	1	1.5
28.Wetland plants in channel [2]	0	(0.5)	1	2

[1] Focus is on the presence of upland plants. [2] Focus is on the presence of aquatic or wetland plants.

Total Points = 10.5

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

Notes :

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.4

County: Hamilton	Named Waterbody: Unnamed	Date/Time: 6/3/2016; 1:35 pm
Assessors/Affiliation: Kristy Smedley and Barry Burnette of S&ME, Inc.		Project ID : S-5
Site Name/Description: South Chickamauga Greenway- Segment 1		
Site Location: Faith Road to Youngstown Road, Chattanooga, TN 37416		
USGS quad: East Chattanooga, TN	HUC (12 digit): 060200010905	Lat/Long: 35.069358°, -85.214737°
Previous Rainfall (7-days) : none		
Precipitation this Season vs. Normal : very wet wet average **dry** drought unknown Source of recent & seasonal precip data :		
Watershed Size :	Photos: Y or N (circle) Number: 8	
Soil Type(s) / Geology: Fullerton cherty silt loam, 25% to 40% slopes (FuE) / Knox Group (OCk) Source: NRCS Web Soil survey and Google Earth USGS Geologic Overlay		
Surrounding Land Use: Residential, Railroad		
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes) : Severe Moderate Slight **Absent**		

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge	X	WWC
2. Defined bed and bank absent, dominated by upland vegetation / grass	X	WWC
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions	X	WWC
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall	X	WWC
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase	X	Stream
6. Presence of fish (except *Gambusia*)	X	Stream
7. Presence of naturally occurring ground water table connection	X	Stream
8. Flowing water in channel and 7 days since last precipitation in local watershed	X	Stream
9. Evidence watercourse has been used as a supply of drinking water	X	Stream

NOTE : If any Primary Indicators 1-9 = "Yes", then STOP; absent directly contradictory evidence, determination is complete.

In the absence of a primary indicator, or other definitive evidence, complete the secondary indicator table on page 2 of this sheet, and provide score below.

Guidance for the interpretation and scoring of both the primary & secondary indicators is provided in *TDEC-WPC Guidance For Making Hydrologic Determinations, Version 1.4*

Overall Hydrologic Determination = WWC

Secondary Indicator Score (if applicable) = 4

Justification / Notes :

Secondary Field Indicator Evaluation

A. Geomorphology (Subtotal = 1.5)	**Absent**	**Weak**	**Moderate**	**Strong**
1. Continuous bed and bank	0	1	2	3
2. Sinuous channel	0	1	2	3
3. In-channel structure: riffle-pool sequences	0	1	2	3
4. Sorting of soil textures or other substrate	0	1	2	3
5. Active/relic floodplain	0	1	2	3
6. Depositional bars or benches	0	1	2	
7. Braided channel	0	1	2	3
8. Recent alluvial deposits	0	0.5	1	1.5
9. Natural levees	0	1	2	3
10. Headcuts	0	1	2	3
11. Grade controls	0	0.5	1	1.5
12. Natural valley or drainageway	0	0.5	1	1.5
13. At least second order channel on existing USGS or NRCS map	No = 0		Yes = 3	

B. Hydrology (Subtotal = 0)	**Absent**	**Weak**	**Moderate**	**Strong**
14. Subsurface flow/discharge into channel	0	1	2	3
15. Water in channel and >48 hours since sig. rain	0	1	2	3
16. Leaf litter in channel (January – September)	1.5	1	0.5	0
17. Sediment on plants or on debris	0	0.5	1	1.5
18. Organic debris lines or piles (wrack lines)	0	0.5	1	1.5
19. Hydric soils in stream bed or sides of channel	No = 0		Yes = 1.5	

C. Biology (Subtotal = 2.5)	**Absent**	**Weak**	**Moderate**	**Strong**
20. Fibrous roots in channel [1]	3	2	1	0
21. Rooted plants in channel [1]	3	2	1	0
22. Crayfish in stream (exclude in floodplain)	0	0.5	1	1.5
23. Bivalves/mussels	0	1	2	3
24. Amphibians	0	0.5	1	1.5
25. Macrobenthos (record type & abundance)	0	1	2	3
26. Filamentous algae; periphyton	0	1	2	3
27. Iron oxidizing bacteria/fungus	0	0.5	1	1.5
28.Wetland plants in channel [2]	0	0.5	1	2

[1] Focus is on the presence of upland plants. [2] Focus is on the presence of aquatic or wetland plants.

Total Points = 4

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

Notes :

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.4

County: Hamilton	Named Waterbody: Unnamed	Date/Time: 6/3/2016; 1:50 pm
Assessors/Affiliation: Kristy Smedley and Barry Burnette of S&ME, Inc.		Project ID : S-6
Site Name/Description: South Chickamauga Greenway- Segment 1		
Site Location: Faith Road to Youngstown Road, Chattanooga, TN 37416		
USGS quad: East Chattanooga, TN	HUC (12 digit): 060200010905	Lat/Long: 35.069121°, -85.214420°
Previous Rainfall (7-days) : none		
Precipitation this Season vs. Normal : very wet wet average **dry** drought unknown Source of recent & seasonal precip data :		
Watershed Size :	Photos **Y** or N (circle) Number: 9	
Soil Type(s) / Geology: Fullerton cherty silt loam, 25% to 40% slopes (FuE) / Knox Group (OCk) Source: NRCS Web Soil survey and Google Earth USGS Geologic Overlay		
Surrounding Land Use: Residential, Railroad		
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes) : Severe Moderate Slight **Absent**		

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge	X	WWC
2. Defined bed and bank absent, dominated by upland vegetation / grass	X	WWC
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions	X	WWC
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall	X	WWC
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase	X	Stream
6. Presence of fish (except *Gambusia*)	X	Stream
7. Presence of naturally occurring ground water table connection	X	Stream
8. Flowing water in channel and 7 days since last precipitation in local watershed	X	Stream
9. Evidence watercourse has been used as a supply of drinking water	X	Stream

NOTE : If any Primary Indicators 1-9 = "Yes", then STOP; absent directly contradictory evidence, determination is complete.

In the absence of a primary indicator, or other definitive evidence, complete the secondary indicator table on page 2 of this sheet, and provide score below.

Guidance for the interpretation and scoring of both the primary & secondary indicators is provided in *TDEC-WPC Guidance For Making Hydrologic Determinations, Version 1.4*

Overall Hydrologic Determination = Stream

Secondary Indicator Score (if applicable) = 21

Justification / Notes :

Secondary Field Indicator Evaluation

A. Geomorphology (Subtotal = 12)	**Absent**	**Weak**	**Moderate**	**Strong**
1. Continuous bed and bank	0	1	2	3
2. Sinuous channel	0	1	2	3
3. In-channel structure: riffle-pool sequences	0	1	2	3
4. Sorting of soil textures or other substrate	0	1	2	3
5. Active/relic floodplain	0	1	2	3
6. Depositional bars or benches	0	1	1.5	2
7. Braided channel	0	1	2	3
8. Recent alluvial deposits	0	0.5	1	1.5
9. Natural levees	0	1	2	3
10. Headcuts	0	1	2	3
11. Grade controls	0	0.5	1	1.5
12. Natural valley or drainageway	0	0.5	1	1.5
13. At least second order channel on existing USGS or NRCS map	No = 0		Yes = 3	

B. Hydrology (Subtotal = 3)	**Absent**	**Weak**	**Moderate**	**Strong**
14. Subsurface flow/discharge into channel	0	1	2	3
15. Water in channel and >48 hours since sig. rain	0	1	2	3
16. Leaf litter in channel (January – September)	1.5	1	0.5	0
17. Sediment on plants or on debris	0	0.5	1	1.5
18. Organic debris lines or piles (wrack lines)	0	0.5	1	1.5
19. Hydric soils in stream bed or sides of channel	No = 0		Yes = 1.5	

C. Biology (Subtotal = 6)	**Absent**	**Weak**	**Moderate**	**Strong**
20. Fibrous roots in channel [1]	3	2	1	0
21. Rooted plants in channel [1]	3	2	1	0
22. Crayfish in stream (exclude in floodplain)	0	0.5	1	1.5
23. Bivalves/mussels	0	1	2	3
24. Amphibians	0	0.5	1	1.5
25. Macrobenthos (record type & abundance)	0	1	2	3
26. Filamentous algae; periphyton	0	1	2	3
27. Iron oxidizing bacteria/fungus	0	0.5	1	1.5
28.Wetland plants in channel [2]	0	0.5	1	2

[1] Focus is on the presence of upland plants. [2] Focus is on the presence of aquatic or wetland plants.

Total Points = 21

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

Notes :

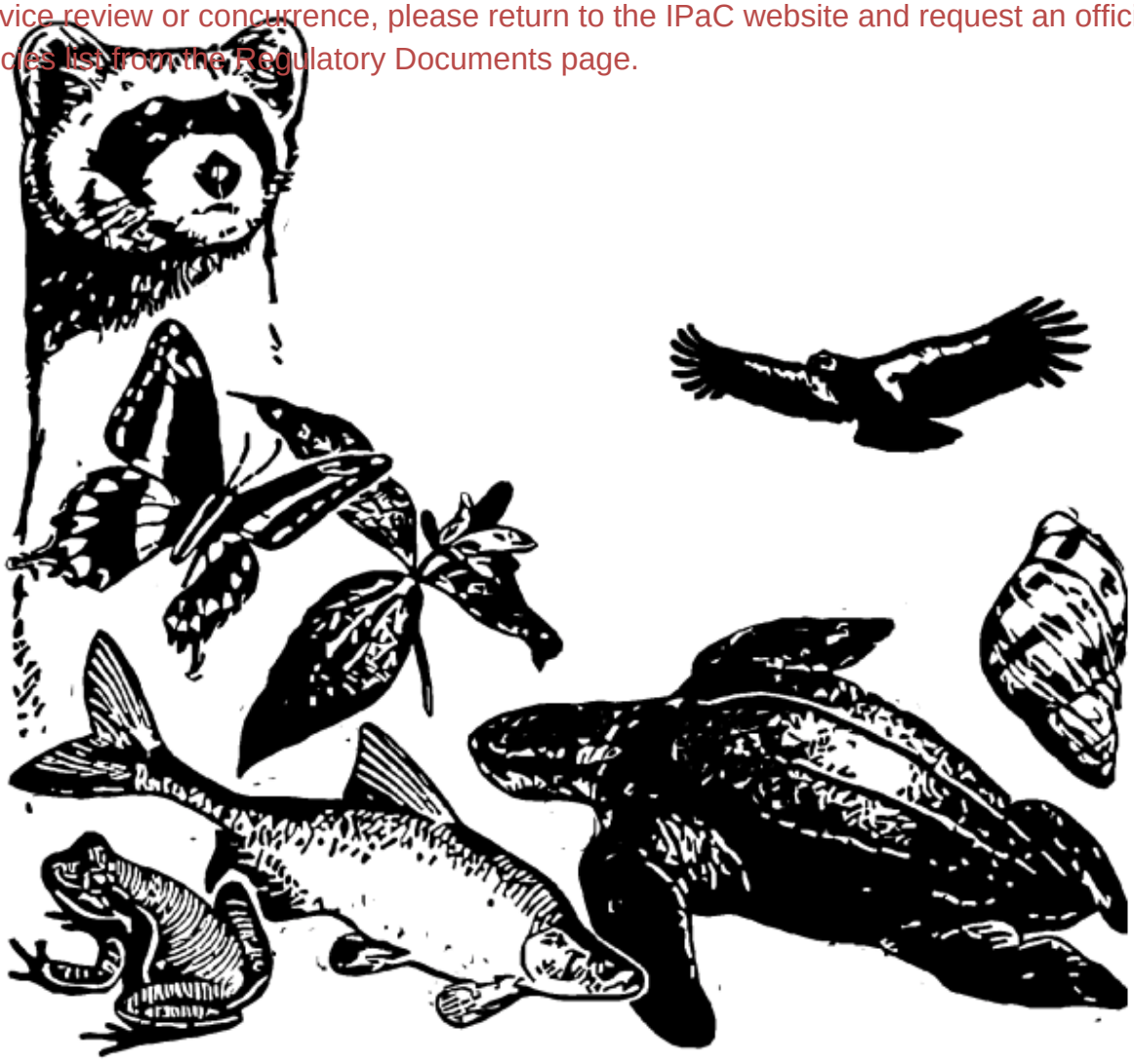
U.S. Fish & Wildlife Service

Segment 1 - South Chickamauga Creek Greenway

IPaC Trust Resources Report

Generated June 21, 2016 03:21 PM MDT, IPaC v3.0.7

This report is for informational purposes only and should not be used for planning or analyzing project level impacts. For project reviews that require U.S. Fish & Wildlife Service review or concurrence, please return to the IPaC website and request an official species list from the Regulatory Documents page.



IPaC - Information for Planning and Conservation (https://ecos.fws.gov/ipac/): A project planning tool to help streamline the U.S. Fish & Wildlife Service environmental review process.

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U.S. Fish & Wildlife Service

IPaC Trust Resources Report

NAME

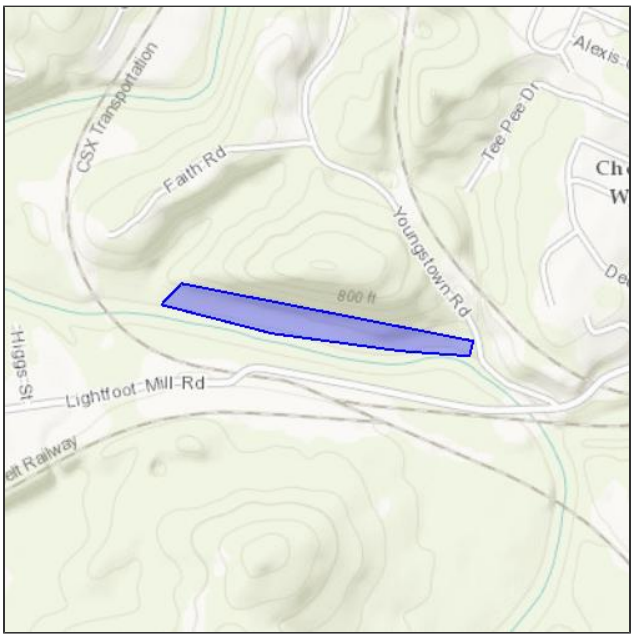
Segement 1 - South Chickamauga Creek Greenway

LOCATION

Hamilton County, Tennessee

IPAC LINK

https://ecos.fws.gov/ipac/project/26F7F-6YF2N-ANLGB-Z65AA-J655QI



U.S. Fish & Wildlife Service Contact Information

Trust resources in this location are managed by:

Tennessee Ecological Services Field Office
446 Neal Street
Cookeville, TN 38501-4027
(931) 528-6481

Endangered Species

Proposed, candidate, threatened, and endangered species are managed by the Endangered Species Program of the U.S. Fish & Wildlife Service.

This USFWS trust resource report is for informational purposes only and should not be used for planning or analyzing project level impacts.

For project evaluations that require USFWS concurrence/review, please return to the IPaC website and request an official species list from the Regulatory Documents section.

Section 7 of the Endangered Species Act **requires** Federal agencies to "request of the Secretary information whether any species which is listed or proposed to be listed may be present in the area of such proposed action" for any project that is conducted, permitted, funded, or licensed by any Federal agency.

A letter from the local office and a species list which fulfills this requirement can only be obtained by requesting an official species list either from the Regulatory Documents section in IPaC or from the local field office directly.

The list of species below are those that may occur or could potentially be affected by activities in this location:

Fishes

Snail Darter Percina tanasi — Threatened

CRITICAL HABITAT

No critical habitat has been designated for this species.

http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=E010

Flowering Plants

Large-flowered Skullcap Scutellaria montana — Threatened

CRITICAL HABITAT

No critical habitat has been designated for this species.

http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=Q2IA

Small Whorled Pogonia Isotria medeoloides — Threatened

CRITICAL HABITAT

No critical habitat has been designated for this species.

http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=Q1XL

Virginia Spiraea Spiraea virginiana — Threatened

CRITICAL HABITAT

No critical habitat has been designated for this species.

http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=Q2R1

Mammals

Gray Bat Myotis grisescens — Endangered

CRITICAL HABITAT

No critical habitat has been designated for this species.

http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=A04J

Indiana Bat Myotis sodalis — Endangered

CRITICAL HABITAT

No critical habitat has been designated for this species.

http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=A000

Northern Long-eared Bat Myotis septentrionalis — Threatened

CRITICAL HABITAT

No critical habitat has been designated for this species.

http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=A0JE

Critical Habitats

There are no critical habitats in this location

Migratory Birds

Birds are protected by the Migratory Bird Treaty Act and the Bald and Golden Eagle Protection Act.

Any activity that results in the take of migratory birds or eagles is prohibited unless authorized by the U.S. Fish & Wildlife Service.[1] There are no provisions for allowing the take of migratory birds that are unintentionally killed or injured.

Any person or organization who plans or conducts activities that may result in the take of migratory birds is responsible for complying with the appropriate regulations and implementing appropriate conservation measures.

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1. 50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)

Additional information can be found using the following links:

- Birds of Conservation Concern
  http://www.fws.gov/birds/management/managed-species/birds-of-conservation-concern.php
- Conservation measures for birds
  http://www.fws.gov/birds/management/project-assessment-tools-and-guidance/conservation-measures.php
- Year-round bird occurrence data
  http://www.birdscanada.org/birdmon/default/datasummaries.jsp

The following species of migratory birds could potentially be affected by activities in this location:

Bald Eagle Haliaeetus leucocephalus — Bird of conservation concern
Year-round
http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B008

Black-billed Cuckoo Coccyzus erythropthalmus — Bird of conservation concern
Season: Breeding
http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0HI

Blue-winged Warbler Vermivora pinus — Bird of conservation concern
Season: Breeding

Fox Sparrow Passerella iliaca — Bird of conservation concern
Season: Wintering

Kentucky Warbler Oporornis formosus — Bird of conservation concern
Season: Breeding

Loggerhead Shrike Lanius ludovicianus — Bird of conservation concern
Year-round
http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0FY

Louisiana Waterthrush Parkesia motacilla — Bird of conservation concern
Season: Breeding

Peregrine Falcon Falco peregrinus — Bird of conservation concern
Season: Breeding
http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0FU

Prairie Warbler Dendroica discolor — Bird of conservation concern
Season: Breeding

Prothonotary Warbler Protonotaria citrea — Bird of conservation concern
Season: Breeding

Red-headed Woodpecker Melanerpes erythrocephalus — Bird of conservation concern
Year-round

Rusty Blackbird Euphagus carolinus — Bird of conservation concern
Season: Wintering

Short-eared Owl Asio flammeus — Bird of conservation concern
Season: Wintering
http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0HD

Willow Flycatcher Empidonax traillii — Bird of conservation concern
Season: Breeding
http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0F6

Wood Thrush Hylocichla mustelina — Bird of conservation concern
Season: Breeding

Worm Eating Warbler Helmitheros vermivorum — Bird of conservation concern
Season: Breeding

Wildlife refuges and fish hatcheries

There are no refuges or fish hatcheries in this location

Wetlands in the National Wetlands Inventory

Impacts to NWI wetlands and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal statutes.

For more information please contact the Regulatory Program of the local U.S. Army Corps of Engineers District.

DATA LIMITATIONS

The Service's objective of mapping wetlands and deepwater habitats is to produce reconnaissance level information on the location, type and size of these resources. The maps are prepared from the analysis of high altitude imagery. Wetlands are identified based on vegetation, visible hydrology and geography. A margin of error is inherent in the use of imagery; thus, detailed on-the-ground inspection of any particular site may result in revision of the wetland boundaries or classification established through image analysis.

The accuracy of image interpretation depends on the quality of the imagery, the experience of the image analysts, the amount and quality of the collateral data and the amount of ground truth verification work conducted. Metadata should be consulted to determine the date of the source imagery used and any mapping problems.

Wetlands or other mapped features may have changed since the date of the imagery or field work. There may be occasional differences in polygon boundaries or classifications between the information depicted on the map and the actual conditions on site.

DATA EXCLUSIONS

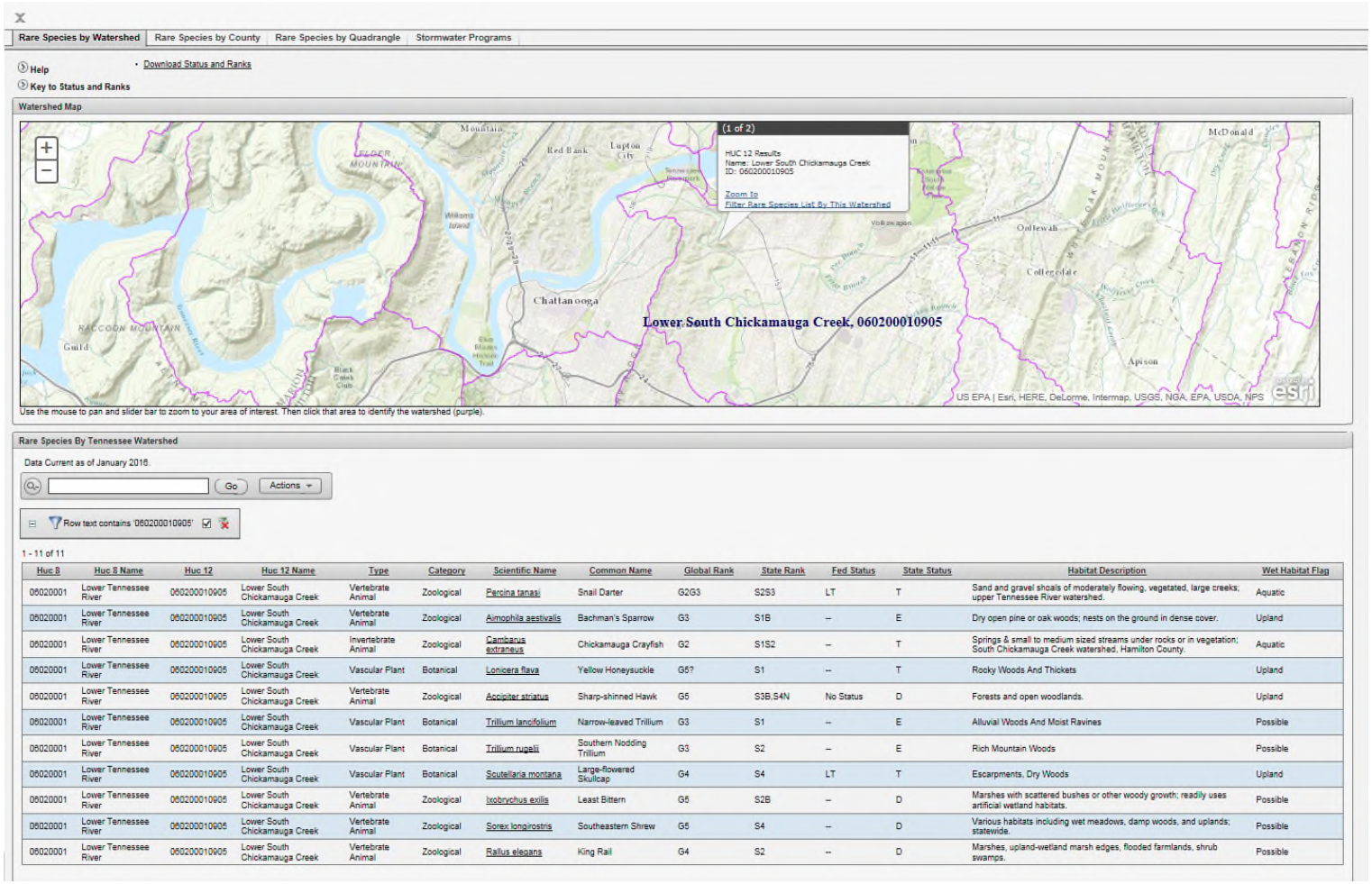
Certain wetland habitats are excluded from the National mapping program because of the limitations of aerial imagery as the primary data source used to detect wetlands. These habitats include seagrasses or submerged aquatic vegetation that are found in the intertidal and subtidal zones of estuaries and nearshore coastal waters. Some deepwater reef communities (coral or tuberficid worm reefs) have also been excluded from the inventory. These habitats, because of their depth, go undetected by aerial imagery.

DATA PRECAUTIONS

Federal, state, and local regulatory agencies with jurisdiction over wetlands may define and describe wetlands in a different manner than that used in this inventory. There is no attempt, in either the design or products of this inventory, to define the limits of proprietary jurisdiction of any Federal, state, or local government or to establish the geographical scope of the regulatory programs of government agencies. Persons intending to engage in activities involving modifications within or adjacent to wetland areas should seek the advice of appropriate federal, state, or local agencies concerning specified agency regulatory programs and proprietary jurisdictions that may affect such activities.

There are no wetlands in this location

STATE-LISTED PROTECTED SPECIES FOR LOWER SOUTH CHICKAMAUGA CREEK WATERSHED
S&ME PROJECT 4181-16-015
JUNE 2016



Huc 8	Huc 8 Name	Huc 12	Huc 12 Name	Type	Category	Scientific Name	Common Name	Global Rank	State Rank	Fed Status	State Status	Habitat Description	Wet Habitat Flag
06020001	Lower Tennessee River	060200010905	Lower South Chickamauga Creek	Vertebrate Animal	Zoological	Percina tanasi	Snail Darter	G2G3	S2S3	LT	T	Sand and gravel shoals of moderately flowing, vegetated, large creeks; upper Tennessee River watershed.	Aquatic
06020001	Lower Tennessee River	060200010905	Lower South Chickamauga Creek	Vertebrate Animal	Zoological	Aimophila aestivalis	Bachman's Sparrow	G3	S1B	--	E	Dry open pine or oak woods; nests on the ground in dense cover.	Upland
06020001	Lower Tennessee River	060200010905	Lower South Chickamauga Creek	Invertebrate Animal	Zoological	Cambarus extraneus	Chickamauga Crayfish	G2	S1S2	--	T	Springs & small to medium sized streams under rocks or in vegetation; South Chickamauga Creek watershed, Hamilton County.	Aquatic
06020001	Lower Tennessee River	060200010905	Lower South Chickamauga Creek	Vascular Plant	Botanical	Lonicera flava	Yellow Honeysuckle	G5?	S1	--	T	Rocky Woods And Thickets	Upland
06020001	Lower Tennessee River	060200010905	Lower South Chickamauga Creek	Vertebrate Animal	Zoological	Accipiter striatus	Sharp-shinned Hawk	G5	S3B,S4N	No Status	D	Forests and open woodlands.	Upland
06020001	Lower Tennessee River	060200010905	Lower South Chickamauga Creek	Vascular Plant	Botanical	Trillium lancifolium	Narrow-leaved Trillium	G3	S1	--	E	Alluvial Woods And Moist Ravines	Possible
06020001	Lower Tennessee River	060200010905	Lower South Chickamauga Creek	Vascular Plant	Botanical	Trillium rugelii	Southern Nodding Trillium	G3	S2	--	E	Rich Mountain Woods	Possible
06020001	Lower Tennessee River	060200010905	Lower South Chickamauga Creek	Vascular Plant	Botanical	Scutellaria montana	Large-flowered Skullcap	G4	S4	LT	T	Escarpments, Dry Woods	Upland
06020001	Lower Tennessee River	060200010905	Lower South Chickamauga Creek	Vertebrate Animal	Zoological	Ixobrychus exilis	Least Bittern	G5	S2B	--	D	Marshes with scattered bushes or other woody growth; readily uses artificial wetland habitats.	Possible
06020001	Lower Tennessee River	060200010905	Lower South Chickamauga Creek	Vertebrate Animal	Zoological	Sorex longirostris	Southeastern Shrew	G5	S4	--	D	Various habitats including wet meadows, damp woods, and uplands; statewide.	Possible
06020001	Lower Tennessee River	060200010905	Lower South Chickamauga Creek	Vertebrate Animal	Zoological	Rallus elegans	King Rail	G4	S2	--	D	Marshes, upland-wetland marsh edges, flooded farmlands, shrub swamps.	Possible

OMB APPROVAL NO:
2105-0510
Expiration Date: 10/31/2021

Appendix F

UNIFORM CERTIFICATION APPLICATION

DISADVANTAGED BUSINESS ENTERPRISE (DBE) / AIRPORT CONCESSION DISADVANTAGED BUSINESS ENTERPRISE (ACDBE) 49 C.F.R. Parts 23 and 26

Roadmap for Applicants

1. Should I apply?

You may be eligible to participate in the DBE/ACDBE program if:

- The firm is a for-profit business that performs or seeks to perform transportation related work (or a concession activity) for a recipient of Federal Transit Administration, Federal Highway Administration, or Federal Aviation Administration funds.
- The firm is at least 51% owned by a socially and economically disadvantaged individual(s) who also controls it.
- The firm's disadvantaged owners are U.S. citizens or lawfully admitted permanent residents of the U.S.
- The firm meets the Small Business Administration's size standard and does not exceed $23.98 million in gross annual receipts for DBE ($56.42 million for ACDBEs). (Other size standards apply for ACDBE that are banks/financial institutions, car rental companies, pay telephone firms, and automobile dealers.)

2. How do I apply?

First time applicants for DBE certification must complete and submit this certification application and related material to the certifying agency in your home state and participate in an on-site interview conducted by that agency. The attached document checklist can help you locate the items you need to submit to the agency with your completed application. If you fail to submit the required documents, your application may be delayed and/or denied. Firms already certified as a DBE do not have to complete this form, but may be asked by certifying agencies outside of your home state to provide a copy of your initial application form, supporting documents, and any other information you submitted to your home state to obtain certification or to any other state related to your certification.

3. Where can I send my application? [INSERT UCP PARTICIPATING MEMBER CONTACT INFORMATION]

4. Who will contact me about my application and what are the eligibility standards? A transportation agency in your state that performs certification functions will contact you. The agency is a member of a statewide Unified Certification Program (UCP), which is required by the U.S. Department of Transportation. The UCP is a one-stop certification program that eliminates the need for your firm to obtain certification from multiple certifying agencies within your state. The UCP is responsible for certifying firms and maintaining a database of certified DBEs and ACDBEs, pursuant to the eligibility standards found in 49 C.F.R. Parts 23 and 26.

5. Where can I find more information?

U.S. DOT—https://www.transportation.gov/civil-rights (This site provides useful links to the rules and regulations governing the DBE/ACDBE program, questions and answers, and other pertinent information)

SBA—Small Business Size Standards matched to the North American Industry Classification System (NAICS): http://www.census.gov/eos/www/naics/ and http://www.sba.gov/content/table-small-business-size-standards.

In collecting the information requested by this form, the Department of Transportation (Department) complies with the provisions of the Federal Freedom of Information and Privacy Acts (5 U.S.C. 552 and 552a). The Privacy Act provides comprehensive protections for your personal information. This includes how information is collected, used, disclosed, stored, and discarded. Your information will not be disclosed to third parties without your consent. The information collected will be used solely to determine your firm's eligibility to participate in the Department's Disadvantaged Business Enterprise Program as defined in 49 C.F.R. §26.5 and the Airport Concession Disadvantaged Business Enterprise Program as defined in 49 C.F.R. §23.3. You may review DOT's complete Privacy Act Statement in the Federal Register published on April 11, 2000 (65 FR 19477).

Under 49 C.F.R. §26.107, dated February 2, 1999 and January 28, 2011, if at any time, the Department or a recipient has reason to believe that any person or firm has willfully and knowingly provided incorrect information or made false statements, the Department may initiate suspension or debarment proceedings against the person or firm under 2 C.F.R. Parts 180 and 1200, No procurement Suspension and Department, take enforcement action under 49 C.F.R. Part 31, Program Fraud and Civil Remedies, and/or refer the matter to the Department of Justice for criminal prosecution under 18 U.S.C. 1001, which prohibits false statements in Federal programs.

INSTRUCTIONS FOR COMPLETING THE DISADVANTAGED BUSINESS ENTERPRISE (DBE) AIRPORT CONCESSIONS DISADVANTAGED BUSINESS ENTERPRISE (ACDBE) UNIFORM CERTIFICATION APPLICATION

NOTE: All participating firms must be for-profit enterprises. If your firm is not for profit, then you do NOT qualify for the DBE/ACDBE program and should not complete this application. If you require additional space for any question in this application, please attach additional sheets or copies as needed, taking care to indicate on each attached sheet/copy the section and number of this application to which it refers.

Section 1: CERTIFICATION INFORMATION

A. Basic Contact Information

(1) Enter the contact name and title of the person completing this application and the person who will serve as your firm's contact for this application.
(2) Enter the legal name of your firm, as indicated in your firm's Articles of Incorporation or charter.
(3) Enter the primary phone number of your firm.
(4) Enter a secondary phone number, if any.
(5) Enter your firm's fax number, if any.
(6) Enter the contact person's email address.
(7) Enter your firm's website addresses, if any.
(8) Enter the street address of the firm where its offices are physically located (not a P.O. Box).
(9) Enter the mailing address of your firm, if it is different from your firm's street address.

B. Prior/Other Certifications and Applications

(10) Check the appropriate box indicating whether your firm is currently certified in the DBE/ACDBE programs, and provide the name of the certifying agency that certified your firm. List the dates of any site visits conducted by your home state and any other states or UCP members. Also provide the names of state/UCP members that conducted the review.
(11) Indicate whether your firm or any firms owned by the persons listed has ever been denied certification as a DBE/ACDBE, 8(a), or Small Disadvantaged Business (SDB) firm, or state and local MBE/WBE firm. Indicate if the firm has ever been decertified from one of these programs. Indicate if the application was withdrawn or whether the firm was debarred, suspended, or otherwise had its bidding privileges denied or restricted by any state or local agency, or Federal entity. If your answer is yes, identify the name of the agency, and explain fully the nature of the action in the space provided. Indicate if you have ever appealed this decision to the Department and if so, attach a copy of USDOT's final agency decision(s).

Section 2: GENERAL INFORMATION

A. Business profile:

(1) Give a concise description of the firm's primary activities, the product(s) or services the company provides, or type of construction. If your company offers more than one product/service, list primary product or service first (attach additional sheets if necessary). This description may be used in our UCP online directory if you are certified as a DBE.
(2) If you know the appropriate NAICS Code for the line(s) of work you identified in your business profile, enter the codes in the space provided.
(3) State the date on which your firm was established as stated in your firm's Articles of Incorporation or charter.
(4) State the date each person became a firm owner.
(5) Check the appropriate box describing the manner in which you and each other owner acquired ownership of your firm. If you checked "Other," explain in the space provided.
(6) Check the appropriate box that indicates whether your firm is "for profit." **If you checked "No," then you do NOT qualify for the DBE/ACDBE program** and should not complete this application. All participating firms must be for-profit enterprises. Provide the Federal Tax ID number as stated on your firm's Federal tax return.
(7) Check the appropriate box that describes the type of legal business structure of your firm, as indicated in your firm's Articles of Incorporation or similar document. If you checked "Other," briefly explain in the space provided.
(8) Indicate in the spaces provided how many employees your firm has, specifying the number of employees who work on a full-time, part-time, and seasonal basis. Attach a list of employees, their job titles, and dates of employment, to your application.
(9) Specify the firm's gross receipts for each of the past three years, as stated in your firm's filed Federal tax returns. You must submit complete copies of the firm's Federal tax returns for each year. If there are any affiliates or subsidiaries of the applicant firm or owners, you must provide these firms' gross receipts and submit complete copies of these firm(s) Federal tax returns. Affiliation is defined in 49 C.F.R. §26.5 and 13 C.F.R. Part 121.

B. Relationships and Dealings with Other Businesses

(1) Check the appropriate box that indicates whether your firm is co-located at any of its business locations, or whether your firm shares a telephone number(s), a post office box, any office space, a yard, warehouse, other facilities, any equipment, financing, or any office staff and/or employees with any other business, organization or entity of any kind. If you answered "Yes," then specify the name of the other firm(s) and fully explain the nature of your relationship with these other businesses by identifying the business or person with whom you have any formal, informal, written, or oral

agreement. Provide an explanation of any items shared with other firms in the space provided.

(2) Check the appropriate box indicating whether any other firm currently has or had an ownership interest in your firm at present or at any time in the past. If you checked yes, please explain.

(3) Check the appropriate box that indicates whether at present or at any time in the past your firm:

(a) ever existed under different ownership, a different type of ownership, or a different name;

(b) existed as a subsidiary of any other firm;

(c) existed as a partnership in which one or more of the partners are/were other firms;

(d) owned any percentage of any other firm; and

(e) had any subsidiaries of its own.

(f) served as a subcontractor with another firm constituting more than 25% of your firm's receipts.

If you answered "Yes" to any of the questions in (3)(a-f), you may be asked to explain the arrangement in detail.

Section 3: MAJORITY OWNER INFORMATION

Identify all individuals or holding companies with any ownership interest in your firm, providing the information requested below (if your firm has more than one owner, provide completed copies of this section for each owner):

A. Identify the majority owner of the firm holding 51% or more ownership interest

(1) Enter the full name of the owner.

(2) Enter his/her title or position within your firm.

(3) Give his/her home phone number.

(4) Enter his/her home (street) address.

(5) Indicate this owner's gender.

(6) Identify the owner's ethnic group membership. If you checked "Other," specify this owner's ethnic group/identity not otherwise listed.

(7) Check the appropriate box to indicate whether this owner is a U.S. citizen or a lawfully admitted permanent resident. If this owner is neither a U.S. citizen nor a lawfully admitted permanent resident of the U.S., then this owner is NOT eligible for certification as a DBE owner.

(8) Enter the number of years during which this owner has been an owner of your firm.

(9) Indicate the percentage of the total ownership this person holds and the date acquired, including (if appropriate), the class of stock owned.

(10) Indicate the dollar value of this owner's initial investment to acquire an ownership interest in your firm, broken down by cash, real estate, equipment, and/or other investment. Describe how you acquired your business and attach documentation substantiating this investment.

B. Additional Owner Information

(1) Describe the familial relationship of this owner to each other owner of your firm and employees.

(2) Indicate whether this owner performs a management or supervisory function for any other business. If you checked "Yes," state the name of the other business and this owner's function/title held in that business.

(3) (a) Check the appropriate box that indicates whether this owner owns or works for any other firm(s) that has any relationship with your firm. If you checked "Yes," identify the name of the other business, the nature of the business relationship, and the owner's function at the firm.

(b) If the owner works for any other firm, non-profit organization, or is engaged in any other activity more than 10 hours per week, please identify this activity.

(4) (a) Provide the personal net worth of the owner applying for certification in the space provided. Complete and attach the accompanying "Personal Net Worth Statement for DBE/ACDBE Program Eligibility" with your application. Note, complete this section and accompanying statement only for each owner applying for DBE qualification (i.e., for each owner claiming to be socially and economically disadvantaged).

(b) Check the appropriate box that indicates whether any trust has been created for the benefit of the disadvantaged owner(s). If you answered "Yes," you may be asked to provide a copy of the trust instrument.

(5) Check the appropriate to indicate whether any of your immediate family members, managers, or employees, own, manage, or are associated with another company. Immediate family member is defined in 49 C.F.R. §26.5. If you answered "Yes," provide the name of each person, your relationship to them, the name of the company, the type of business, and whether they own or manage the company.

Section 4: CONTROL

A. Identify the firm's Officers and Board of Directors

(1) In the space provided, state the name, title, date of appointment, ethnicity, and gender of each officer.

(2) In the space provided, state the name, title, date of appointment, ethnicity, and gender of each individual serving on your firm's Board of Directors.

(3) Check the appropriate box to indicate whether any of your firm's officers and/or directors listed above performs a management or supervisory function for any other business. If you answered "Yes," identify each person by name, his/her title, the name of the other business in which s/he is involved, and his/her function performed in that other business.

(4) Check the appropriate box that indicates whether any of your firm's officers and/or directors listed above own or work for any other firm(s) that has a relationship with your firm. (e.g., ownership interest, shared office space, financial investments, equipment leases, personnel sharing, etc.) If you answered "Yes," identify the name of the firm, the individual's name, and the nature of his/her business relationship with that other firm.

B. Duties of Owners, Officers, Directors, Managers and Key Personnel

(1), (2) Specify the roles of the majority and minority owners, directors, officers, and managers, and key personnel who are responsible for the functions listed for the firm. Submit résumés for each owner and non-owner identified below. State the name of the individual, title, race

and gender and percentage ownership if any. Circle the frequency of each person's involvement as follows: "always, frequently, seldom, or never" in each area.

Indicate whether any of the persons listed in this section perform a management or supervisory function for any other business. Identify the person, business, and their title/function. Identify if any of the persons listed above own or work for any other firm(s) that has a relationship with this firm (e.g. ownership interest, shared office space, financial investment, equipment, leases, personnel sharing, etc.) If you answered "Yes," describe the nature of his/her business relationship with that other firm.

C. Inventory: Indicate firm inventory in these categories:

(1) Equipment and Vehicles
State the make and model, and current dollar value of each piece of equipment and motor vehicle held and/or used by your firm. Indicate whether each piece is either owned or leased by your firm or owner, whether it is used as collateral, and where this item is stored.

(2) Office Space
State the street address of each office space held and/or used by your firm. Indicate whether your firm or owner owns or leases the office space and the current dollar value of that property or its lease.

(3) Storage Space
State the street address of each storage space held and/or used by your firm. Indicate whether your firm or owner owns or leases the storage space and the current dollar value of that property or its lease. Provide a signed lease agreement for each property.

D. Does your firm rely on any other firm for management functions or employee payroll?

Check the appropriate box that indicates whether your firm relies on any other firm for management functions or for employee payroll. If you answered "Yes," you may be asked to explain the nature of that reliance and the extent to which the other firm carries out such functions.

E. Financial / Banking Information

State the name, City and State of your firm's bank. Identify the persons able to sign checks on this account. Provide bank authorization and signature cards.

Bonding Information. State your firm's bonding limits both aggregate and project limits.

F. Sources, amounts, and purposes of money loaned to your firm, including the names of persons or firms guaranteeing the loan.

State the name and address of each source, the name of person securing the loan, original dollar amount and the current balance of each loan, and the purpose for which each loan was made to your firm. Provide copies of signed loan agreements and security agreements

G. Contributions or transfers of assets to/from your firm and to/from any of its owners or another individual over the past two years:

Indicate in the spaces provided, the type of contribution or asset that was transferred, its current dollar value, the person or firm from whom it was transferred, the person or firm to whom it was transferred, the relationship between the two persons and/or firms, and the date of the transfer.

H. Current licenses/permits held by any owner or employee of your firm.

List the name of each person in your firm who holds a professional license or permit, the type of permit or license, the expiration date of the permit or license, and issuing State of the license or permit. Attach copies of licenses, license renewal forms, permits, and haul authority forms.

I. Largest contracts completed by your firm in the past three years, if any.

List the name of each owner or contractor for each contract, the name and location of the projects under each contract, the type of work performed on each contract, and the dollar value of each contract.

J. Largest active jobs on which your firm is currently working.
For each active job listed, state the name of the prime contractor and the project number, the location, the type of work performed, the project start date, the anticipated completion date, and the dollar value of the contract.

Section 5: AIRPORT CONCESSION (ACDBE) APPLICANTS

Complete the entries in this section if you are applying for ACDBE certification. Indicate in Section A if you operate a concession at the airport, and/or supply a good or service to an airport concessionaire. Indicate in Section B whether the applicant firm owns or operates any off-airport locations, providing the type of business, lease information, address/location, and annual gross receipts generated. Provide similar information in section C for any airport concession locations the firm currently owns or operates. If the applicant firm has any affiliates, provide the requested information in Section D. Indicate whether the ACDBE firm is participating in any joint ventures, and if so, include the original and any amended joint venture agreements.

AFFIDAVIT & SIGNATURE

The Affidavit of Certification must accompany your application. Carefully read the attached affidavit in its entirety. Fill in the required information for each blank space, and sign and date the affidavit in the presence of a Notary Public, who must then notarize the form.

Section 1: CERTIFICATION INFORMATION

A. Basic Contact Information I am applying for certification as ☐DBE ☐ACDBE

(1) Contact person and Title: _____ _____

(2) Legal name of firm: _____ _____

(3) Phone #: (___) _____ - _____ **(4) Other Phone #:** (____) _____ - _____ **(5) Fax #:** (____) _____ - _____

(6) E-mail: _____ **(7) Firm Websites:** _____

(8) Street address of firm *(No P.O. Box)*: _____ **City:** _____ **County/Parish:** _____ **State:** _____ **Zip**: _____ - ____

(9) Mailing address of firm (*if different*): _____ **City:** _____ **County/Parish:** _____ **State:** _____ **Zip:** _____ - ____

B. Prior/Other Certifications and Applications

(10) Is your firm currently certified for any of the following U.S. DOT programs?
❑ DBE ❑ ACDBE Names of certifying agencies: _____

⊗ If you are certified in your home state as a DBE/ACDBE, you do not have to complete this application for other states. Ask your state UCP about the interstate certification process.

List the dates of any site visits conducted by your home state and any other states or UCP members:

Date ___/ ___/___ State/UCP Member: _____ Date ___/ ___/___ State/UCP Member: _____

(11) Indicate whether the firm or any persons listed in this application have ever been:

(a) Denied certification or decertified as a DBE, ACDBE, 8(a), SDB, MBE/WBE firm? ❑ Yes ❑No
(b) Withdrawn an application for these programs, or debarred or suspended or otherwise had bidding privileges denied or restricted by any state or local agency, or Federal entity? ❑ Yes ❑ No

If yes, explain the nature of the action. *(If you appealed the decision to DOT or another agency, attach a copy of the decision)*
_____
_____

Section 2: GENERAL INFORMATION

A. Business Profile: (1) Give a concise description of the firm's primary activities and the product(s) or service(s) it provides. If your company offers more than one product/service, list the primary product or service first. Please use additional paper if necessary. This description may be used in our database and the UCP online directory if you are certified as a DBE or ACDBE.
_____
_____
_____
_____

(2) Applicable NAICS Codes for this line of work include: _____ _____ _____ _____ _____ _____

(3) This firm was established on ___/____/____ **(4) I/We have owned this firm since:** ____/____/____

(5) **Method of acquisition** *(Check all that apply)*:

❑ Started new business ❑ Bought existing business❑ Inherited business ❑ Gifted
❑ Merger or consolidation ❑ Other *(explain)* _____

(6) **Is your firm "for profit"?** ❑Yes
Federal Tax ID#
_____

No→ ⊗ **STOP!** If your firm is NOT for-profit, then you do NOT qualify for this program and should not fill out this application.

(7) Type of Legal Business Structure: *(check all that apply)*:

❑ Sole Proprietorship
❑ Limited Liability Partnership
❑ Partnership❑Corporation
❑ Limited Liability Company❑ Other, Describe _____

(8) Number of employees: Full-time _____Part-time _____Seasonal _____Total _____
(Provide a list of employees, their job titles, and dates of employment, to your application).

(9) Specify the firm's gross receipts for the last 3 years. *(Submit complete copies of the firm's Federal tax returns for each year. If there are affiliates or subsidiaries of the applicant firm or owners, you must submit complete copies of these firms' Federal tax returns).*

Year _____ Gross Receipts of Applicant Firm $ _____ Gross Receipts of Affiliate Firms $_____
Year _____ Gross Receipts of Applicant Firm $_____Gross Receipts of Affiliate Firms $_____
Year _____ Gross Receipts of Applicant Firm $ _____ Gross Receipts of Affiliate Firms $_____

B. Relationships and Dealings with Other Businesses

(1) Is your firm co-located at any of its business locations, or does it share a telephone number, P.O. Box, office or storage space, yard, warehouse, facilities, equipment, inventory, financing, office staff, and/or employees with any other business, organization, or entity? ❑ Yes ❑ No

If Yes, explain the nature of your relationship with these other businesses by identifying the business or person with whom you have any formal, informal, written, or oral agreement. Also detail the items shared

_____
_____
_____
_____
_____
_____
_____
_____
_____

(2) Has any other firm had an ownership interest in your firm at present or at any time in the past?
❑ Yes ❑ No If Yes, explain_____

(3) At present, or at any time in the past, has your firm:

(a) Ever existed under different ownership, a different type of ownership, or a different name? ❑ Yes ❑ No
(b) Existed as a subsidiary of any other firm? ❑ Yes ❑ No
(c) Existed as a partnership in which one or more of the partners are/were other firms? ❑ Yes ❑ No
(d) Owned any percentage of any other firm? ❑ Yes ❑ No
(e) Had any subsidiaries? ❑ Yes ❑ No
(f) Served as a subcontractor with another firm constituting more than 25% of your firm's receipts? ❑ Yes ❑ No

(If you answered "Yes" to any of the questions in (2) and/or (3)(a)-(f), you may be asked to provide further details and explain whether the arrangement continues).

Section 3: MAJORITY OWNER INFORMATION

A. Identify the majority owner of the firm holding 51% or more ownership interest.

(1) Full Name: _____

(2) Title: _____

(3) Home Phone #: ( ) _____ - _____

(4) Home Address (*Street and Number*): _____

City: _____

State: _____

Zip: _____ - _____

(5) Gender: ❑ Male ❑ Female

(6) Ethnic group membership *(Check all that apply)*:

❑ Black
❑ Hispanic
❑ Asian Pacific
❑ Native American
❑ Subcontinent Asian
❑ Other (*specify*) _____

(7) U.S. Citizenship: ❑ U.S. Citizen
❑ Lawfully Admitted Permanent Resident

(8) Number of years as owner: _____

(9) Percentage owned: _____%

Class of stock owned: _____ Date acquired _____

(10) Initial investment to acquire ownership interest in firm:

Type	Dollar Value
Cash	$ _____
Real Estate	$_____
Equipment	$_____
Other	$_____

Describe how you acquired your business:
❑ Started business myself.
❑ It was a gift from: _____
❑ I bought it from: _____
❑ I inherited it from: _____
❑ Other _____
(Attach documentation substantiating your investment)

B. Additional Owner Information

(1) Describe familial relationship to other owners and employees:

_____
_____
_____

(2) Does this owner perform a management or supervisory function for any other business? ❑ Yes ❑ No
If Yes, identify: Name of Business: _____ Function/Title: _____

(3)(a) Does this owner own or work for any other firm(s) that has a relationship with this firm? (*e.g., ownership interest, shared office space, financial investments, equipment, leases, personnel sharing, etc.*) ❑ Yes ❑ No
Identify the name of the business, and the nature of the relationship, and the owner's function at the firm:

_____
_____

(b) Does this owner work for any other firm, non-profit organization, or engage in any other activity more than 10 hours per week? If yes, identify this activity: _____

(4)(a) What is the personal net worth of this disadvantaged owner applying for certification? $_____

(b)Has any trust been created for the benefit of this disadvantaged owner(s)? ❑ Yes ❑ No
(If Yes, you may be asked to provide a copy of the trust instrument).

(5) Do any of your immediate family members, managers, or employees own, manage, or are associated with another company? ❑ Yes ❑ No If Yes, provide their name, relationship, company, type of business, and indicate whether they own or manage the company: *(Please attach extra sheets, if needed)*: _____

_____

Section 3: OWNER INFORMATION, Cont'd.

A. Identify all individuals, firms, or holding companies that hold LESS THAN 51% ownership interest in the firm (*Attach separate sheets for each additional owner)*

(1) Full Name: _____

(2) Title: _____

(3) Home Phone #: ( ) _____ - _____

(4) Home Address (*Street and Number)*: _____

City: _____

State: _____

Zip: _____ - _____

(5) Gender: ❑ Male ❑ Female

(6) Ethnic group membership *(Check all that apply)*

❑ Black
❑ Hispanic
❑ Asian Pacific
❑ Native American
❑ Subcontinent Asian
❑ Other (*specify*) _____

(7) U.S. Citizenship:
❑ U.S. Citizen
❑ Lawfully Admitted Permanent Resident

(8) Number of years as owner: _____
(9) Percentage owned: _____ %
Class of stock owned: _____ Date acquired _____

(10) Initial investment to acquire ownership interest in firm:

Type	Dollar Value
Cash	$ _____
Real Estate	$_____
Equipment	$ _____
Other	$ _____

Describe how you acquired your business:
❑ Started business myself.
❑ It was a gift from: _____
❑ I bought it from: _____
❑ I inherited it from: _____
❑ Other _____
(Attach documentation substantiating your investment)

B. Additional Owner Information

(1) Describe familial relationship to other owners and employees:
_____
_____
_____

(2) Does this owner perform a management or supervisory function for any other business? ❑ Yes ❑ No
If Yes, identify: Name of Business: _____ Function/Title: _____

(3)(a) Does this owner own or work for any other firm(s) that has a relationship with this firm? (*e.g., ownership interest, shared office space, financial investments, equipment, leases, personnel sharing, etc.*) ❑ Yes ❑ No
Identify the name of the business, and the nature of the relationship, and the owner's function at the firm:
_____

(b) Does this owner work for any other firm, non-profit organization, or is engaged in any other activity more than 10 hours per week? If yes, identify this activity: _____

(4)(a) What is the personal net worth of this disadvantaged owner applying for certification? $_____

(b) Has any trust been created for the benefit of this disadvantaged owner(s)? ❑ Yes ❑ No
(If Yes, you may be asked to provide a copy of the trust instrument).

(5) Do any of your immediate family members, managers, or employees own, manage, or are associated with another company? ❑ Yes ❑ No If Yes, provide their name, relationship, company, type of business, and indicate whether they own or manage: *(Please attach extra sheets, if needed)*: _____
_____

Section 4: CONTROL

A. Identify your firm's Officers and Board of Directors *(If additional space is required, attach a separate sheet)*:

	Name	Title	Date Appointed	Ethnicity	Gender
(1) Officers of the Company	(a)				
	(b)				
	(c)				
	(d)				
(2) Board of Directors	(a)				
	(b)				
	(c)				
	(d)				

(3) Do any of the persons listed above perform a management or supervisory function for any other business?
❑ Yes ❑ No If Yes, identify for each:

Person: _____ Title: _____
Business: _____ Function: _____

Person: _____ Title: _____
Business: _____ Function: _____

(4) Do any of the persons listed in section A above own or work for any other firm(s) that has a relationship with this firm? (*e.g., ownership interest, shared office space, financial investments, equipment, leases, personnel sharing, etc.*)
❑ Yes ❑ No
If Yes, identify for each:

Firm Name: _____ Person: _____
Nature of Business Relationship: _____

B. Duties of Owners, Officers, Directors, Managers, and Key Personnel
1. Complete for all Owners who are responsible for the following functions of the firm *(Attach separate sheets as needed).*

A= Always **F = Frequently**	**S = Seldom** **N = Never**	Majority Owner (51% or more) Name: _____ Title: _____ Percent Owned: _____				Minority Owner (49% or less) Name: _____ Title: _____ Percent Owned: _____			
Sets policy for company direction/scope of operations		A ❑	F ❑	S ❑	N ❑	A ❑	F ❑	S ❑	N ❑
Bidding and estimating		A ❑	F ❑	S ❑	N ❑	A ❑	F ❑	S ❑	N ❑
Major purchasing decisions		A ❑	F ❑	S ❑	N ❑	A ❑	F ❑	S ❑	N ❑
Marketing and sales		A ❑	F ❑	S ❑	N ❑	A ❑	F ❑	S ❑	N ❑
Supervises field operations		A ❑	F ❑	S ❑	N ❑	A ❑	F ❑	S ❑	N ❑
Attend bid opening and lettings		A ❑	F ❑	S ❑	N ❑	A ❑	F ❑	S ❑	N ❑
Perform office management (billing, accounts receivable/payable, etc.)		A ❑	F ❑	S ❑	N ❑	A ❑	F ❑	S ❑	N ❑
Hires and fires management staff		A ❑	F ❑	S ❑	N ❑	A ❑	F ❑	S ❑	N ❑
Hire and fire field staff or crew		A ❑	F ❑	S ❑	N ❑	A ❑	F ❑	S ❑	N ❑
Designates profits spending or investment		A ❑	F ❑	S ❑	N ❑	A ❑	F ❑	S ❑	N ❑
Obligates business by contract/credit		A ❑	F ❑	S ❑	N ❑	A ❑	F ❑	S ❑	N ❑
Purchase equipment		A ❑	F ❑	S ❑	N ❑	A ❑	F ❑	S ❑	N ❑
Signs business checks		A ❑	F ❑	S ❑	N ❑	A ❑	F ❑	S ❑	N ❑

2. Complete for all Officers, Directors, Managers, and Key Personnel who are responsible for the following functions of the firm. *(Attach separate sheets as needed).*

A= Always S = Seldom **F = Frequently N = Never**	Officer/Director/Manager/Key Personnel Name: _____ Title: _____ Race and Gender:_____ Percent Owned: _____				Officer/Director/Manager/ Key Personnel Name: _____ Title: _____ Race and Gender:_____ Percent Owned: _____			
Sets policy for company direction/scope of operations	A ☐	F ☐	S ☐	N ☐	A ☐	F ☐	S ☐	N ☐
Bidding and estimating	A ☐	F ☐	S ☐	N ☐	A ☐	F ☐	S ☐	N ☐
Major purchasing decisions	A ☐	F ☐	S ☐	N ☐	A ☐	F ☐	S ☐	N ☐
Marketing and sales	A ☐	F ☐	S ☐	N ☐	A ☐	F ☐	S ☐	N ☐
Supervises field operations	A ☐	F ☐	S ☐	N ☐	A ☐	F ☐	S ☐	N ☐
Attend bid opening and lettings	A ☐	F ☐	S ☐	N ☐	A ☐	F ☐	S ☐	N ☐
Perform office management (billing, accounts receivable/payable, etc.)	A ☐	F ☐	S ☐	N ☐	A ☐	F ☐	S ☐	N ☐
Hires and fires management staff	A ☐	F ☐	S ☐	N ☐	A ☐	F ☐	S ☐	N ☐
Hire and fire field staff or crew	A ☐	F ☐	S ☐	N ☐	A ☐	F ☐	S ☐	N ☐
Designates profits spending or investment	A ☐	F ☐	S ☐	N ☐	A ☐	F ☐	S ☐	N ☐
Obligates business by contract/credit	A ☐	F ☐	S ☐	N ☐	A ☐	F ☐	S ☐	N ☐
Purchase equipment	A ☐	F ☐	S ☐	N ☐	A ☐	F ☐	S ☐	N ☐
Signs business checks	A ☐	F ☐	S ☐	N ☐	A ☐	F ☐	S ☐	N ☐

Do any of the persons listed in B1 or B2 perform a management or supervisory function for any other business? If Yes, identify the person, the business, and their title/function:

Do any of the persons listed above own or work for any other firm(s) that has a relationship with this firm? (*e.g., ownership interest, shared office space, financial investments, equipment, leases, personnel sharing, etc.*) If Yes, describe the nature of the business relationship:_____
_____

C. Inventory: Indicate your firm's inventory in the following categories *(Please attach additional sheets if needed):*=

1. Equipment and Vehicles

Make and Model	**Current Value**	**Owned or Leased by Firm or Owner?**	**Used as collateral?**	**Where is item stored?**
1.				
2.				
3.				
4.				
5.				
6.				
7.				
8.				
9.				

2. Office Space

Street Address	**Owned or Leased by Firm or Owner?**	**Current Value of Property or Lease**

3. Storage Space *(Provide signed lease agreements for the properties listed)*

Street Address	Owned or Leased by Firm or Owner?	Current Value of Property or Lease

D. Does your firm rely on any other firm for management functions or employee payroll? ❑ Yes ❑ No

E. Financial/Banking Information *(Provide bank authorization and signature cards)*

Name of bank: _____ City and State: _____
The following individuals are able to sign checks on this account: _____

Name of bank: _____ City and State: _____
The following individuals are able to sign checks on this account: _____

Bonding Information: If you have bonding capacity, identify the firm's bonding aggregate and project limits:
Aggregate limit $ _____ Project limit $ _____

F. Identify all sources, amounts, and purposes of money loaned to your firm including from financial institutions. Identify whether you the owner and any other person or firm loaned money to the applicant DBE/ACDBE. Include the names of any persons or firms guaranteeing the loan, if other than the listed owner. (*Provide copies of signed loan agreements and security agreements).*

	Name of Source	Address of Source	Name of Person Guaranteeing the Loan	Original Amount	Current Balance	Purpose of Loan
1.						
2.						
3.						

G. List all contributions or transfers of assets to/from your firm and to/from any of its owners or another individual over the past two years (*Attach additional sheets if needed*):

	Contribution/Asset	Dollar Value	From Whom Transferred	To Whom Transferred	Relationship	Date of Transfer
1.						
2.						
3.						

H. List current licenses/permits held by any owner and/or employee of your firm
(*e.g. contractor, engineer, architect, etc.)(Attach additional sheets if needed)*:

	Name of License/Permit Holder	Type of License/Permit	Expiration Date	State
1.				
2.				
3.				

I. List the three largest contracts completed by your firm in the past three years, if any:

Name of Owner/Contractor	Name/Location of Project	Type of Work Performed	Dollar Value of Contract
1.			
2.			
3.			

J. List the three largest active jobs on which your firm is currently working:

Name of Prime Contractor and Project Number	Location of Project	Type of Work	Project Start Date	Anticipated Completion Date	Dollar Value of Contract
1.					
2.					
3.					

Additional Information:

SECTION 5 - AIRPORT CONCESSION

(ACDBE APPLICANTS ONLY)

A. **I am applying for ACDBE certification to:** *(check all that apply)*

☐ **Operate a concession at an airport** ☐ **Supply a good or service to an airport concessionaire**

B. Does the applicant firm own/operate any off-airport locations? ☐ Yes ☐ No *If Yes,* identify *the following*

Type of Business (e.g., F&B, News & Gift, Retail, Duty Free, Advertising, etc.)	**Lease Term** (years)	**Lease Start Date**	**Address / Location**	**Annual Gross Receipts Generated**

C. Does the applicant firm currently own/operate any <u>airport</u> concession locations? ☐ Yes ☐ No *If Yes, supply the following information:*

Airport Name	**Concession Type** (e.g., F&B, News & Gift, Retail, Duty Free, Advertising, etc.)	**Number of Leases**	**Number of Locations**	**Annual Gross Receipts Generated**	**Lease Type** *(e.g. Direct Lease, Subcontract Management Agreement, etc. enter all that apply to the leases listed)*

D. Does the applicant firm have any affiliates? ☐ Yes ☐ No *If Yes, provide the following information concerning any locations owned/operated by affiliate firms.*

Airport Name	**Concession Type** (e.g., F&B, News & Gift, Retail, Duty Free, Advertising, etc.)	**Number of Leases**	**Number of Locations**	**Annual Gross Receipts Generated**	**Lease Type** *(e.g. Direct Lease, Subcontract Management Agreement, etc. enter all that apply to the leases listed)*

E. Is the ACDBE applicant firm a participant in any joint ventures? ☐ Yes ☐ No *If Yes, attach all original and any amended Joint Venture Agreements and any amendments to the agreements.*

AFFIDAVIT OF CERTIFICATION

This form must be signed and notarized for <u>each</u> owner upon which disadvantaged status is relied.

A MATERIAL OR FALSE STATEMENT OR OMISSION MADE IN CONNECTION WITH THIS APPLICATION IS SUFFICIENT CAUSE FOR DENIAL OF CERTIFICATION, REVOCATION OF A PRIOR APPROVAL, INITIATION OF SUSPENSION OR DEBARMENT PROCEEDINGS, AND MAY SUBJECT THE PERSON AND/OR ENTITY MAKING THE FALSE STATEMENT TO ANY AND ALL CIVIL AND CRIMINAL PENALTIES AVAILABLE PURSUANT TO APPLICABLE FEDERAL AND STATE LAW.

I _____ (full name printed), swear or affirm under penalty of law that I am _____(title) of the applicant firm _____ and that I have read and understood all of the questions in this application and that all of the foregoing information and statements submitted in this application and its attachments and supporting documents are true and correct to the best of my knowledge, and that all responses to the questions are full and complete, omitting no material information. The responses include all material information necessary to fully and accurately identify and explain the operations, capabilities and pertinent history of the named firm as well as the ownership, control, and affiliations thereof.

I recognize that the information submitted in this application is for the purpose of inducing certification approval by a government agency. I understand that a government agency may, by means it deems appropriate, determine the accuracy and truth of the statements in the application, and I authorize such agency to contact any entity named in the application, and the named firm's bonding companies, banking institutions, credit agencies, contractors, clients, and other certifying agencies for the purpose of verifying the information supplied and determining the named firm's eligibility.

I agree to submit to government audit, examination and review of books, records, documents and files, in whatever form they exist, of the named firm and its affiliates, inspection of its places(s) of business and equipment, and to permit interviews of its principals, agents, and employees. I understand that refusal to permit such inquiries shall be grounds for denial of certification.

If awarded a contract, subcontract, concession lease or sublease, I agree to promptly and directly provide the prime contractor, if any, and the Department, recipient agency, or federal funding agency on an ongoing basis, current, complete and accurate information regarding (1) work performed on the project; (2) payments; and (3) proposed changes, if any, to the foregoing arrangements.

I agree to provide written notice to the recipient agency or Unified Certification Program of any material change in the information contained in the original application within 30 calendar days of such change (e.g., ownership changes, address/telephone number, personal net worth exceeding $1.32 million, etc.).

I acknowledge and agree that any misrepresentations in this application or in records pertaining to a contract or subcontract will be grounds for terminating any contract or subcontract which may be awarded; denial or revocation of certification; suspension and debarment; and for initiating action under federal and/or state law concerning false statement, fraud or other applicable offenses.

I certify that I am a socially and economically disadvantaged individual who is an owner of the above-referenced firm seeking certification as a Disadvantaged Business Enterprise or Airport Concession Disadvantaged Business Enterprise. In support of my application, I certify that I am a member of one or more of the following groups, and that I have held myself out as a member of the group(s): (Check all that apply):

❑ Female ❑ Black American ❑ Hispanic American
❑ Native American ❑ Asian-Pacific American
❑ Subcontinent Asian American ❑ Other (specify)
_____

I certify that I am socially disadvantaged because I have been subjected to racial or ethnic prejudice or cultural bias, or have suffered the effects of discrimination, because of my identity as a member of one or more of the groups identified above, without regard to my individual qualities.

I further certify that my personal net worth does not exceed $1.32 million, and that I am economically disadvantaged because my ability to compete in the free enterprise system has been impaired due to diminished capital and credit opportunities as compared to others in the same or similar line of business who are not socially and economically disadvantaged.

I declare under penalty of perjury that the information provided in this application and supporting documents is true and correct.

Signature _____ _____
(DBE/ACDBE Applicant) (Date)

<u>NOTARY CERTIFICATE</u>

UNIFORM CERTIFICATION APPLICATION
SUPPORTING DOCUMENTS CHECKLIST

In order to complete your application for DBE or ACDBE certification, you must attach copies of all of the following REQUIRED documents. A failure to supply any information requested by the UCP may result in your firm denied DBE/ACDBE certification.

Required Documents for All Applicants

 Résumés (that include places of employment with corresponding dates), for all owners, officers, and key personnel of the applicant firm
 Personal Net Worth Statement for each socially and economically disadvantaged owners who the applicant firm relies upon to satisfy the Regulation's 51% ownership requirement.
 Personal Federal tax returns for the past 3 years, if applicable, for each disadvantaged owner
 Federal tax returns (and requests for extensions) filed by the firm and its affiliates with related schedules, for the past 3 years.
 Documented proof of contributions used to acquire ownership for each owner (*e.g., both sides of cancelled checks*)
 Signed loan and security agreements, and bonding forms
 List of equipment and/or vehicles owned and leased including VIN numbers, copy of titles, proof of ownership, insurance cards for each vehicle.
 Title(s), registration certificate(s), and U.S. DOT numbers for each truck owned or operated by your firm
 Licenses, license renewal forms, permits, and haul authority forms
 Descriptions of all real estate (including office/storage space, etc.) owned/leased by your firm and documented proof of ownership/signed leases
 Documented proof of any transfers of assets to/from your firm and/or to/from any of its owners over the past 2 years
 DBE/ACDBE and SBA 8(a), SDB, MBE/WBE certifications, denials, and/or decertification's, if applicable; and any U.S. DOT appeal decisions on these actions.
 Bank authorization and signatory cards
 Schedule of salaries (or other remuneration) paid to all officers, managers, owners, and/or directors of the firm
 List of all employees, job titles, and dates of employment.
 Proof of warehouse/storage facility ownership or lease arrangements

Partnership or Joint Venture

 Original and any amended Partnership or Joint Venture Agreements

Corporation or LLC

 Official Articles of Incorporation (*signed by the state official*)
 Both sides of all corporate stock certificates and your firm's stock transfer ledger
 Shareholders' Agreement(s)
 Minutes of all stockholders and board of director's meetings
 Corporate by-laws and any amendments
 Corporate bank resolution and bank signature cards
 Official Certificate of Formation and Operating Agreement with any amendments (for LLCs)

Optional Documents to Be Provided on Request

The certifying agency to which you are applying may require the submission of the following documents. If requested to provide these document, you must supply them with your application or at the on-site visit.

 Proof of citizenship
 Insurance agreements for each truck owned or operated by your firm
 Audited financial statements (if available)
 Trust agreements held by any owner claiming disadvantaged status
 Year-end balance sheets and income statements for the past 3 years (*or life of firm, if less than three years*)

Suppliers

 List of product lines carried and list of distribution equipment owned and/or leased

SECTION 02851

TIMBER BOARDWALK SPECIFICATIONS

PART 1. GENERAL

1.1 Description of Work:

A. #1 Boardwalks: 10’ wide pile supported timber boardwalk.

1.2 Requirements:

A. Awarded boardwalk supplier, at the time of design and engineering, shall provide shop drawings with engineering calculations to verify structural integrity, sizing, verification and loading capacity of design(s). A professional engineer licensed in the state of Tennessee will seal all drawings and calculations to support sizing of structural components and required load handling, and wind load.

B. Boardwalk supplier will provide a 3-year structural warranty with maintenance requirements.

C. Boardwalk supplier will clean up each work site daily.

PART 2. MATERIALS

2.1 Minimum Material Requirements

A. Loading Requirements

1. Pile-supported timber Boardwalks shall be designed for a minimum uniform live load of 5-Ton GVW (Gross Vehicle Weight) or 85 pounds per square foot live load. Boardwalks should be designed with appropriate dead load and maximum deflection of L/500 for live load.

B. Lumber and Treatments

1. All lumber shall be Southern Yellow Pine and shall be graded under the Southern Pine Inspection Bureau (SPIB) rules.
2. All treatments must meet or exceed the standards for treated wood set by the AWPA (American Wood Preservers Organization).
3. All pile foundations and superstructure shall be treated with CCA (Chromated Copper Arsenate) water based treatment to .80 retention or greater. Superstructure can use ACQ (Alkaline Copper Quartenary) or MCQ (Micronized Copper Quartenary).
4. All field cuts & drilled holes in lumber or glulams shall be treated in the

field with oil-based ready to use Copper Napthenate (Wolman Green Woodlife Copper Care or Copper Care Wood preservatives Tenino Copper Napthenate or equal) in accordance with AWPA specification M4.

C. Treatment (Chromium Copper Arsenate type C) – When CCA is specified on the plans, it shall be Type C in accordance with the American Wood Preservers Association (AWPA) standard P5-90 and A2-88. All lumber and timbers shall be pressure impregnated under AWPA standards C1-90, C2-90, C14-90, and C18-90 where applicable. Piling shall be pressure impregnated under AWPA standards C1-90, C3-90, C14-90 and C18-90 where applicable. Where practical, lumber and timbers shall be kiln dried after treatment to a 19% or less moisture content.

1. Lumber and Timber minimum retention and penetration:

Application	Retention (LB. Oxide/Cu/Ft.)	Penetration
Above ground	.40	2.5" or 85% of Sapwood
Soil contact	.60	2.5" or 85% of Sapwood
Fresh water	.60	2.5" or 85% of Sapwood

2. Piling minimum retention and penetration:

Application	Retention (LB. Oxide/Cu/Ft.)	Penetration
Land	.60	3.0" or 90% of Sapwood
Fresh Water	.80	3.5" or 90% of Sapwood

D. Glue Laminated Beams (Glulams) - Minimum Specifications:

Material:	Southern Yellow Pine
Treatment:	Type C Pentachlorophenol or CCA
Retention:	.60 lb./cubic foot
Adhesive:	Waterborne adhesive; laminated after treatment
Appearance:	Industrial Grade

Material:	Douglas Fir
Treatment:	Type A Pentachlorophenol
Retention:	.60 lb./cubic foot
Adhesive:	Waterproof Phenolic Resin; laminated before treatment
Appearance:	Industrial Grade

*Glulam girders shall have a standard camber radius between 800’ and 1200’ unless otherwise specified on the drawings.

E. Wood Decking

1. Structural decking shall be 3” x 8” heavy timber #1 grade Southern

Yellow Pine (minimum). Decking to be attached with stainless steel screws.

F. Timber Pilings

1. All pilings for timber abutment shall meet the requirements as set forth by the American Society for Testing and Materials (ASTM) under the provisions of D25 (latest edition), standard specifications for round timber piles. Final size and number of piles to be designed based on the soils and hydraulic report. Tonnage requirements of piling to be developed & designed by Boardwalk supplier.
2. Hand auguring and/or water jetting are not permitted for piling installation on this project without the express written consent of the engineer or owner.
3. All Boardwalk pilings shall be driven. Boardwalk suppliers/ Boardwalk installers' structural engineer shall approve all required depths and any piles not driven to required depth. A minimum capacity per pile is to be established by the Boardwalk suppliers/ Boardwalk installers' structural engineer.
4. Splicing of piling is permitted if the proper bearing is not obtained with 10' of piling in the ground. Piling may be spliced and continued to be driven to obtain proper bearing. Boardwalk supplier to provide engineered splicing detail & calculations.
5. If pilings encounter premature refusal, then predrilling of the hole is permitted. After hole is predrilled, piling to be set in hole and driven/seated to obtain proper bearing. The Boardwalk suppliers/ Boardwalk installers' engineer to provide calculations on the depth/bearing of piling required. Information on the drilling process, any backfill requirements, etc to be detailed by Boardwalk supplier for project engineer's approval.
6. If pilings encounter premature refusal, then concrete footers will be permitted. The Boardwalk suppliers/ Boardwalk installers' engineer to provide engineered drawings & calculations for the concrete footer.

G. Cross Bracing/X-Bracing

1. Cross bracing and/or x-bracing may be required, depending on the height of Boardwalk and the depth of the piling per bent.
2. If required, the Boardwalk suppliers/ Boardwalk installers' engineer shall supply an engineered design for the cross bracing/x-bracing to be approved by the engineer.

H. Abutment

1. Timber abutments are to be utilized for this project. Boardwalk supplier will provide specifications/design for the abutments.
2. Each pile supported boardwalk shall have a standard abutment configuration at each end, minimally consisting of 1 board buried with a 3' total height. Abutments are to have wingwalls that are to extend a minimum 5' beyond each side of the Boardwalk end at a 45º angle. The

abutments will minimally consist of an 8” timber butt piling with minimum 3x12 horizontal boards, and will be secured with 3/4” diameter (minimum) A307 hot dipped galvanized hex bolts through both the horizontal and pile. Boardwalk supplier to provide engineered drawings of abutments for approval by the project engineer

3. Mirafi® 500X woven filter fabric, or better, to be applied behind abutment walls

I. Pedestrian Guiderail

1. A minimum 42" high black wire mesh pedestrian guide rail with timber posts and rails as specified on sheet 2B shall be installed and be designed to withstand a lateral force of 50 PLF, applied at the top of the rail. Boardwalk suppliers/ Boardwalk installers’ engineer to provide structural calculations for guiderail loading and components.
2. All exposed edges of the guiderail cap shall be routered with a .75” bit.
3. Owner’s civil engineer to advise of any applicable codes and ADA (Americans with Disabilities Act) requirements.

J. Backfill of Abutments

1. Backfill material shall be a clean, well-draining granular soil that allows water to drain readily. Hand compaction techniques shall be utilized during backfill placement.

K. Project Submittals Required of Boardwalk Contractor

1. Wood preservative treatment certification from the treating facility will be provided.
2. Engineering specifications, engineered calculations, and engineered construction shop drawings shall be provided detailing, verifying and/or sizing each individual component. The above must contain an embossed seal by a professional engineer who is registered in the state of Tennessee.
3. Specifications for pile-driving equipment and methods, including hammer calculations verifying capacity to drive the piling to required tonnage and criteria for verification of pile capacity.

L. Sealant

1. Boardwalk supplier shall apply a 3-step UV protectant sealant package to all visible surfaces of the curb, rails, posts, pedestrian deck (if applicable) and outside stringers. This application shall include supply of all materials and labor - complete. The three-step process must include:
   a. Step 1: Pressure washing and prep of the parts to be sealed, including.
   b. Step 2: Application of 1 coat of primer/base coat.

c. Step 3: Application of two coats of the finish coat (sealant) in owner's choice of colors.

2. Application must be in accordance with all manufacturer recommendations, including, but not limited to:
   a. Boardwalk supplier must install materials in accordance with all safety and weather conditions required by manufacturer or as modified by applicable rules and regulations of local, state and federal authorities having jurisdiction. Product should not be installed if it is raining or snowing or if such conditions appear to be imminent. Minimal application temperature of 50 degrees F required, with surface temperature of no more than 90 degrees F. Consult Material Safety Data Sheets created by manufacturer of product for complete handling recommendations.
   b. Product shall be applied to horizontal surfaces with a roller or painter pad; product shall be applied to vertical surfaces with a roller or paint pad or sprayer if desired. Overspray must be eliminated to the extent possible.
   c. Boardwalk supplier must condition the specified product as recommended by the manufacturer.
   d. Boardwalk supplier shall prepare surface as recommended by manufacturer which should include thoroughly pressure washing the surfaces to be treated. New wood surfaces have a mill glaze that prevents maximum penetration of the sealant; therefore, even newly installed Boardwalks will require this prep step.
   e. Boardwalk supplier shall cleanup work site daily and upon completion of project, including proper disposal of all materials.
3. Materials must meet the following criteria in order to be accepted for this project:
   a. A professional, premium quality UV sealant must be used. Sealants primarily marketed and/or designed for homeowners (such as Thompson's Water Seal™, Cabot™, or Olympic™ products) will not be accepted.
   b. Sealant must be pigmented. Clear sealants will not be accepted for this project. Water repellents alone will not be accepted for this project.
   c. The multi-step sealant system must be climate specific and recommended for the climate in which it will be applied.
   d. Manufacturer must provide a written warranty against defect of materials for a minimum of six (6) months, beginning with date of substantial completion of the project.
   e. Acrylic wood finish (sealant) must meet or exceed the following performance criteria:
      100% acrylic
      Weight/gallon 8.59lb / gallon or better
      Flash point greater than 200 degrees F

VOC: 240 g/L or better

f. Base Coat must meet or exceed the following performance criteria:
Oil/acrylic Blend
Weight/gallon 8.52lb / gallon or better
Flash point greater than 200 degrees F
VOC: 200 g/L or better

PART 3. EXECUTION

3.1 Due to the topography and natural resources on much of the proposed boardwalk and Boardwalk alignment, a top down construction method will be required. Construction will begin with the equipment located in such a manner as to facilitate the placement of the first two sets of pilings and the first section of boardwalk deck will be completed. For the subsequent sections all material will be delivered to the area of construction via the completed portions of boardwalk and without the material or the equipment used to deliver the material coming in contact with the ground. All sections of boardwalk will be constructed in accordance with the plans and specifications. Each section of boardwalk will be constructed in this manner to assure that no materials or equipment come in contact with the ground. All material, equipment and manpower for the construction of the boardwalk will be transported to the construction area by utilizing the previously constructed sections of boardwalk. When the boardwalk is complete the only evidence of the construction process should be the boardwalk itself and footprints.

3.2 Piles will be driven to the depth specified by the engineer or to refusal whichever comes first. No piles will be augured or jetted without the express written consent of the engineer or owner.

3.3 In the event that the terrain requires various footing types the engineer will determine the footing type to be utilized at the various locations.

END OF SECTION 02851

Report of Geotechnical Services
South Chickamauga Greenway
Phase II, Segment 1
Chattanooga, Tennessee
S&ME Project No. 1281-16-030, Ph. 1

Prepared for:
Barge, Waggoner, Sumner & Cannon, Inc.
1110 Market Street, Suite 200
Chattanooga, Tennessee 37402

Prepared by:
S&ME, Inc.
4291 Highway 58
Chattanooga, TN 37416

May 10, 2017

S&ME

May 10, 2017

Barge, Waggoner, Sumner & Cannon, Inc.
1110 Market Street, Suite 200
Chattanooga, Tennessee 37402

Attention: Mr. Ben Nemec, PE

Reference: Report of Geotechnical Services
South Chickamauga Greenway – Phase II, Segment 1
Chattanooga, Tennessee
S&ME Project No. 1281-16-030, Ph. 1

Dear Mr. Nemec:

This report presents the results of the geotechnical exploration for the South Chickamauga Greenway – Phase II, Segment 1 site in Chattanooga, Tennessee. Our work was performed in general accordance with S&ME Proposal No. 41-1600167, dated February 24, 2016.

This report describes our understanding of the project, presents the results of the field exploration and laboratory testing, and discusses our conclusions and recommendations. S&ME appreciates this opportunity to be of service to you. Please call if you have questions concerning this report or any of our services.

Sincerely,

S&ME, Inc.

Jonathan M. Smolen, PE
Project Engineer

JONATHAN MICHAEL SMOLEN
REGISTERED ENGINEER
AGRICULTURE
COMMERCE
NO. 00110146
STATE OF TENNESSEE

James P. McGirl, PE
Principal Engineer

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Executive Summary

This summary is presented for the convenience of the reader. The full report text should be studied and understood before preparing an estimation of quantities or preparing designs based on this report, as it contains important information and recommendations that are not included in this brief summary.

1. The limited geotechnical exploration included a site reconnaissance and hand auguring with dynamic cone penetrometer testing of 11 borings. A member of our professional staff logged the soil conditions encountered in the hand auger borings and collected soil samples from select borings and depths for subsequent laboratory testing.

2. Natural moisture content, Atterberg limits and wash #200 sieve tests were performed on representative samples to aid our soil classification and to evaluate the relative volume change potential of on-site soils.

3. Alluvial soils were encountered from the ground surface in three of the hand auger borings to auger refusal or boring termination. The alluvial soils encountered at the site were typically composed of firm to stiff, orange brown sandy clay. Residual soils were encountered from the ground surface in the remaining 8 hand auger borings to auger refusal. The residual soils encountered at the site were typically composed of firm to stiff, orange-brown silty clay with chert.

4. Hand auger refusal was encountered in each of the borings except B-2 and B-3 at depths ranging from about 2 ½ feet to about 5 ½ feet below the existing ground surface. Each of the hand auger refusals except B-1 occurred on chert. Borings B-2 and B-3 were terminated at a depth of about 8 ½ feet, the maximum practical depth attainable with hand tools.

5. Groundwater was not encountered in the hand auger borings at the time of excavation. We do not expect groundwater will present significant site development problems.

6. The site is adaptable for the proposed support of the boardwalk using timber piles. Further, due to the abundance of chert in the residual soils, augured pilot holes will be required to allow for pile installation.

7. After completion of stripping in areas to receive fill, and once grade is achieved in cut areas, the subgrade soils for the at-grade sections of the greenway should be evaluated by proofrolling. The purpose of proofrolling is to locate pockets of soft or unstable soils. Proofrolling should be observed by our geotechnical engineer.

1.0 Introduction

S&ME, Inc. has completed the geotechnical exploration at the South Chickamauga Greenway – Phase II, Segment 1 site in Chattanooga, Tennessee. Our work was performed in general accordance with S&ME Proposal No. Proposal No. 41-1600167, dated February 24, 2016. Our services were authorized by Mr. Russell Moorehead of Barge Waggoner Sumner and Cannon on March 22, 2016.

The purpose of our work was to explore the subsurface soil conditions and groundwater level, provide feasible shallow foundation recommendations, applicable earthwork recommendations, and pavement thickness recommendations. This report describes our understanding of the project, presents the results of the field exploration and laboratory testing, and discusses our conclusions and recommendations relative to the above considerations.

A Site Location Plan and Boring Location Plan are included in Appendix I. A discussion of the field investigative procedures, a legend of soil classification and symbols, and the Hand Auger Boring Records are included in Appendix II. Appendix III contains a discussion of the laboratory testing procedures and the laboratory test results. Appendix IV contains a document titled "Important Information About Your Geotechnical Engineering Report".

2.0 Project and Site Description

Project information was provided by Mr. Nemec in the form of a document titled First Addended Request for Proposal for Engineering Services for Trail and Bridge Design for South Chickamauga Creek Greenway from Faith Road Trailhead to Youngstown Road and Youngstown Road to Cromwell Hills Housing Authority, dated January 14, 2016. Mr. Nemec has also provided us a with the South Chickamauga Greenway Youngstown Road Connector, 75% review project drawings, dated 12-2-2016 with proposed boring locations superimposed.

2.1 Project Description

The South Chickamauga Creek Greenway, Phase II, Segment 1 project consists of the installation of a boardwalk and at-grade trail that will begin at the current greenway terminus at Faith Road and continue along the South Chickamauga Creek to Youngstown Road. Stationing referenced in the report is based on the provided Proposed Profile drawings. The trail will be an at-grade walkway from the Faith Road terminus to station 24+72.83. The boardwalk section extends from station 24+72.83 to station 40+52.52. The at-grade portion will be roller compacted concrete (RCC). The boardwalk will be heavy timber construction supported on driven wooden piles.

2.2 Site Description

From the Faith Road terminus at station 10+00 to about station 30+60 the greenway runs along a relatively level, low lying area within or just along the outside edge of the floodplain for the South Chickamauga Creek. The existing ground surface elevation along this section of the proposed greenway ranges from about 651 feet to 658 feet. The area has moderately spaced young to mature trees and moderate underbrush.

From about station 30+60 to where segment one connects to segment 2 at station 40+52.52, the greenway runs along a topographically rugged and relatively steep section along the creek. The section is wooded with moderately spaced young to mature trees and moderate amounts of underbrush. The existing ground elevation along this section of the greenway ranges from about 656 feet to 694 feet.

3.0 Regional Geology

Chattanooga, Tennessee is located in the Valley and Ridge Physiographic Province. Elongated ridges that trend in a northeast-southwest direction characterize this province. The ridges are typically formed on highly resistant sandstones and shales, while the valleys and rolling hills are formed on less resistant limestone, dolomite, and shales.

Based on our review of the Geologic Map of the East Chattanooga Quadrangle, dated 1989, the project site is underlain by the Chapultepec Dolomite formation. The Chapultepec consists of light- to medium dark-gray, thin- to very thick-bedded, fine- to very coarse-grained dolomite. The Chapultepec formation is part of the Knox Group. Residual soils derived from the Knox Group are typically red-brown to yellow-brown clays with locally heavy amounts of chert fragments. The strata of the Knox formations weather to form an overburden typically in excess of 40 feet thick.

Carbonate bedrock such as the strata underlying this site, is of great geologic age and has been subject to solution weathering over geologic time. Rainwater falling onto the surface and percolating downward through the soil and into cracks and fissures gradually dissolves the rock, producing insoluble impurities such as chert and clay. Since carbonate bedrock varies greatly in its resistance to weathering, the soil/bedrock contact may be extremely irregular. More soluble bedrock develops a thicker soil cover and a more irregular bedrock surface with pinnacles and slots, and less soluble bedrock usually develops a thinner soil cover and a less irregular soil-bedrock surface.

These large variations in bedrock depth are greatly enhanced by the presence of fractures, bedding planes, and faults, which provide an increased opportunity for a greater influx of percolating water. The weaknesses may form clay-filled cavities or enlarge into caves and may be connected by a network of passageways. If a cave forms close to the bedrock surface, its roof may collapse and the overlying soils may erode into the cave. Once the weight of the overlying soil exceeds the soil's arching strength, the soil collapses and an open hole or depression may appear at the ground surface. Such a feature is termed a sinkhole.

There is always some risk associated with developing any site underlain by carbonate bedrock. We have reviewed the USGS quadrangle map for this area. The map does not show a pattern of closed depressions. Further, we did not observe open holes or other signs of sinkhole conditions during our site reconnaissance or in the hand auger borings. We also observed successful development in the surrounding area. Therefore, we believe the risk of sinkhole formation does not present a significant obstacle to the development of this project.

4.0 Subsurface Conditions

4.1 Field Exploration Procedures

The procedures used by S&ME, Inc. for field sampling and testing are in general accordance with ASTM procedures and established engineering practice in the State of Tennessee. Appendix II contains brief descriptions of the procedures used in this exploration.

S&ME conducted a site reconnaissance along the full length of the greenway segment and a limited subsurface exploration along the proposed boardwalk portions of the greenway segment. We hand augured 11 borings on about 50 to 250 foot centers along the boardwalk portions of the trail segment. Members of our professional staff established the hand auger boring locations in the field utilizing a hand held GPS unit (Trimble GeoExplorer 2008 Series – GeoXT) with the Boring Location Plan georeferenced onto the visual display. Boring elevations were obtained by superimposing boring locations onto the provided topographic site plan and interpolating between contours. Therefore, both the hand auger boring locations shown on Figure 2 – Boring Location Plan in Appendix I, and the elevations shown on the Hand Auger Boring Records in Appendix II, should be considered approximate.

A member of our professional staff logged the conditions encountered during hand auger excavation and visually classify the soils observed in accordance with the Unified Soil Classification System (USCS) guidelines. Dynamic Cone Penetrometer (DCP) testing was conducted in each of the borings. The soil consistency was estimated based on the difficulty of excavation and Dynamic Cone Penetrometer testing. We also collected soil samples from select hand auger borings and depths for subsequent laboratory testing. Upon boring completion, we noted the groundwater depth if present and the hand auger borings were then backfilled with the excavated material. The resulting soil descriptions are shown on the Hand Auger Boring Records in Appendix II. A general description of the subsurface conditions encountered at the hand auger boring locations are provided in the following report sections.

4.2 Soil Stratification

The results of our field testing program are summarized in the following paragraphs, and are shown on the Test Boring Records in Appendix II. These records present our interpretation of the subsurface conditions at specific boring locations at the time of our exploration. The stratification lines represent the approximate boundary between soil types. The actual transitions may be more gradual than implied.

ALLUVIUM

Alluvial soils were encountered in hand auger borings B-1, B-2, and B-3 from the ground surface to hand auger refusal or boring termination depths. Alluvial soil is soil that has been transported to its present location by flowing water. The alluvial soils encountered at the site were typically composed of orange-brown sandy clay. The DCP test values in the alluvial soil ranged from 2 ½ to 12 blows per test increment, indicating soft to stiff soil consistencies. However, most of the alluvial soil fell in the firm to stiff consistency ranges.

RESIDUUM

Residual soils were encountered from the ground surface in each of the hand auger borings except B-1, B-2, and B-3 to auger refusal depths. Residual soil forms from the in-place weathering of the underlying bedrock. The residual soils encountered at the site were typically composed of orange-brown silty clay with chert. The DCP test values in the fill ranged from 5 to 23 ½ blows per test increment, indicating firm to very stiff soil consistencies.

HAND AUGER REFUSAL

Hand auger refusal was encountered in each of the borings except B-2 and B-3 at depths ranging from about 2 ½ feet to about 5 ½ feet below the existing ground surface. Hand auger refusal within the residuum occurred on chert. Borings B-2 and B-3 were terminated at a depth of approximately 8 ½ feet.

4.3 Water Levels

Groundwater was not observed in the hand auger borings. We backfilled the boreholes shortly after completion due to safety concerns. Therefore delayed groundwater level measurements were not obtained. It should be noted that groundwater levels can fluctuate with seasonal, climatic, and environmental changes as well as fluctuation with the water elevation in South Chickamauga Creek. Further, groundwater may be encountered within the reach of our hand auger borings at some future time.

5.0 Laboratory Testing

Laboratory tests were performed on representative split-spoon samples obtained during the field exploration phase of this project. We conducted moisture content, Atterberg limits, and wash #200 sieve tests on representative samples to aid our soil classification and to evaluate the relative volume change potential of on-site soils. The resulting soil descriptions are shown on the Hand Auger Boring Records in Appendix II. The laboratory test results and a brief description of the laboratory test procedures are presented in Appendix III.

6.0 Assessment

On the basis of this geotechnical exploration, we conclude that timber piles are suitable for support of the proposed boardwalk. However, due to the cherty nature of the residual soils encountered in the hand auger borings, augured pilot holes will be required prior to installing the piles beginning around station 30+60. Based on the conditions encountered in the hand auger borings, the piles can likely be driven in place in the section of the boardwalk before station 30+60.

After completion of stripping in areas to receive fill, and once grade is achieved in cut areas, the subgrade soils for the at-grade sections of the greenway should be evaluated by proofrolling. The purpose of proofrolling is to locate pockets of soft or unstable soils. Proofrolling should be observed by our geotechnical engineer.

7.0 Design Recommendations

7.1 Limitations of Report

This report has been prepared in accordance with generally accepted geotechnical engineering practice for specific application to this project. The conclusions and recommendations contained in this report are based on applicable standards of our practice in this geographic area at the time this report was prepared. No other warranty, expressed or implied, is made.

The analyses and recommendations submitted herein are based, in part, on the data obtained from the limited subsurface exploration. The nature and the extent of variations between the widely-spaced hand auger borings will not become evident until the time of construction. If variations appear evident, then we will re-evaluate the recommendations of this report. In the event any changes in the nature, overall design, or boardwalk elevations, grades, structural loads, or location of the boardwalk or at grade trail areas are planned, the conclusions and recommendations contained in this report will not be considered valid unless the changes are reviewed and the conclusions verified or modified in writing.

We recommend S&ME be provided the opportunity to review the final design plans and specifications in order that our recommendations are properly interpreted and implemented. The recommendations in this report are contingent on S&ME, Inc.'s observation and monitoring of grading and construction activities.

7.2 Foundations

TIMBER PILES

Based on the subsurface data and our experience, we conclude that timber pile foundations are a suitable foundation for support of the proposed boardwalk. However, due to the cherty nature of the residual soils encountered in the hand auger borings, augured pilot holes will be required prior to installing the piles supporting the boardwalk past station 30+60. Based on the conditions encountered in the hand auger borings, the piles supporting the section of the boardwalk before station 30+60 can likely be driven in without pilot holes. Further, we recommend each timber pile have a steel driving shoe to protect the pile tip during installation.

We recommend the piles be designed using a maximum allowable end bearing pressure of 4 ksf. For calculation of side friction and uplift resistance, we recommend an adhesion value of 500 psf be used. However, side friction should be disregarded to a depth equal to two times the pile diameter when calculating uplift capacities and omitted altogether when calculating the pile's compressive load capacity.

Material parameters for lateral load analysis and design of piles to support the boardwalk are provided in Table 7-1. The parameters provided in Table 7-1 represent a generalized stratigraphic profile based on the material encountered in the hand auger borings and the underlying mapped geology. The recommended ε50 and subgrade modulus parameters are based on the criteria furnished in the L-Pile software user's manual and the laboratory and field test results.

Table 7-1: Lateral Resistance Parameters Piles

Geomaterial	Total Unit Weight γ (pcf)	Effective Unit Weight γ (pcf)	Soil Strain Parameter E50	Soil Modulus Parameter K (pci)	Undrained Shear Strength (psf)	Internal Friction Angle (degrees)
Firm to Stiff Clay	120	120	0.007	500	1,500	-
Loose to Firm Sand	120	120	-	50	0	30

7.3 Groundwater

Based on the test boring results, we do not expect that groundwater will present significant site development problems.

8.0 Construction Considerations

8.1 Site Preparation

STRIPPING

Topsoil, vegetation, roots, and other organic material should be stripped from the construction area for the at-grade section of the greenway and disposed of off-site. Topsoil was not encountered in the hand auger borings. However, organics and roots were encountered in the upper portions of the hand auger borings and we expect topsoil may be encountered in unexplored areas, particularly in drainage features.

GENERAL

After completion of stripping in areas to receive fill, and once grade is achieved in cut areas, we recommend proofrolling the exposed surface of the subgrade soils. The purpose of proofrolling is to locate pockets of soft or unstable soils. Proofrolling should be performed using a fully loaded dump truck or other heavy equipment approved by our geotechnical engineer.

An engineer from S&ME should be present to observe the proofrolling operations and to provide recommendations should unstable soils be encountered. Unstable materials supporting the at grade sections of the trail should generally be undercut to stable materials or a maximum of 2 feet below planned grade, at which time our geotechnical engineer should evaluate options other than additional undercutting (e.g. bridging). Backfill should consist of compacted soil as described in Section 8.2 of this report. After proofrolling and prior to placing fill on the site, the upper surface soils should be scarified and properly compacted.

Subgrade repair can be expected to be more extensive if grading operations are performed during wet periods of the year. The onsite soils are moisture sensitive and will be softened by rubber-tired construction traffic when wet. Once areas that need remediation have been repaired, the site may be brought to grade with structural fill. Depending on climatic conditions and the speed of contractor activities during the grading phase of this project, proofrolling may be required on multiple occasions.

8.2 Fill Placement

MATERIALS

Fill soils should consist of low to moderately plastic clay or silt with a plasticity index of less than thirty (PI<30) and a standard Proctor maximum dry density greater than 95 pounds per cubic foot. The fill should contain no rock fragments larger than 4 inches in any dimension, and no organic matter.

Soil fill operations should not begin until representative samples of proposed fill soils are collected and tested. The test results will be used to assess whether the proposed fill material meets the previously discussed plasticity and density criteria, and for quality control during grading. Please allow at least 3 to 5 days for testing before the fill operations begin.

COMPACTION

Fill should be placed in thin lifts with a maximum loose thickness of 8 inches, then compacted to 95 percent of the standard Proctor maximum dry density, with a moisture content within 3 percent of the optimum moisture content, depending on the shape of the Proctor curve. Wetting or drying of these soils may be required, depending on the time of year site grading is performed. We recommend the top one foot below grade supported slabs, and the top 2 feet beneath pavements be compacted to 100 percent standard Proctor compaction. The edge of the compacted fill should extend at least 10 feet beyond the outside building edge, and at least 5 feet beyond the outside edge of pavements before sloping. A representative of S&ME should test the density and moisture content of each lift before placing additional lifts.

In confined areas such as utility trenches, portable compaction equipment and thin lifts of 3 to 4 inches may be required to achieve specified degrees of compaction.

We recommend that fill placements be observed by one of S&ME's qualified soils technicians on a full time basis. Frequent fill density and moisture tests should be performed to evaluate that the specified degree of compaction is being achieved. However, the actual testing frequency should be determined by the geotechnical engineer based on the type of soil being placed, the equipment being used, and the time of year the fill is being placed. More frequent testing should be performed in confined areas. Any areas that do not meet the compaction specification should be re-compacted to achieve compliance.

8.3 Drainage and Runoff Concerns

In the Tennessee Valley Region, frequent and sometimes substantial rainfalls occur from November through May. These rainy months can greatly influence the cost and schedule of construction projects, particularly earthwork and work in confined excavations. The clay soils present at the site will be difficult to work in periods of wet weather. Construction traffic repeatedly crossing exposed wet soil subgrades can damage the subgrades to the point that over-excavation may be required.

The contractor should be prepared to provide adequate methods to control the infiltration of surface water into open excavations. We recommend subgrades be sufficiently sloped to provide rapid drainage. Water that collects in excavations should be removed as soon as possible to prevent softening the subgrade soils.

Maintenance of the exposed subgrade surface will be important to achieve moisture control and to prevent softening of the surface soils due to rainwater infiltration. We recommend keeping the ground surface free from depressions or ruts that would hold water, and sealing the surface using rubber tired equipment to reduce water infiltration.

9.0 Follow-Up Services

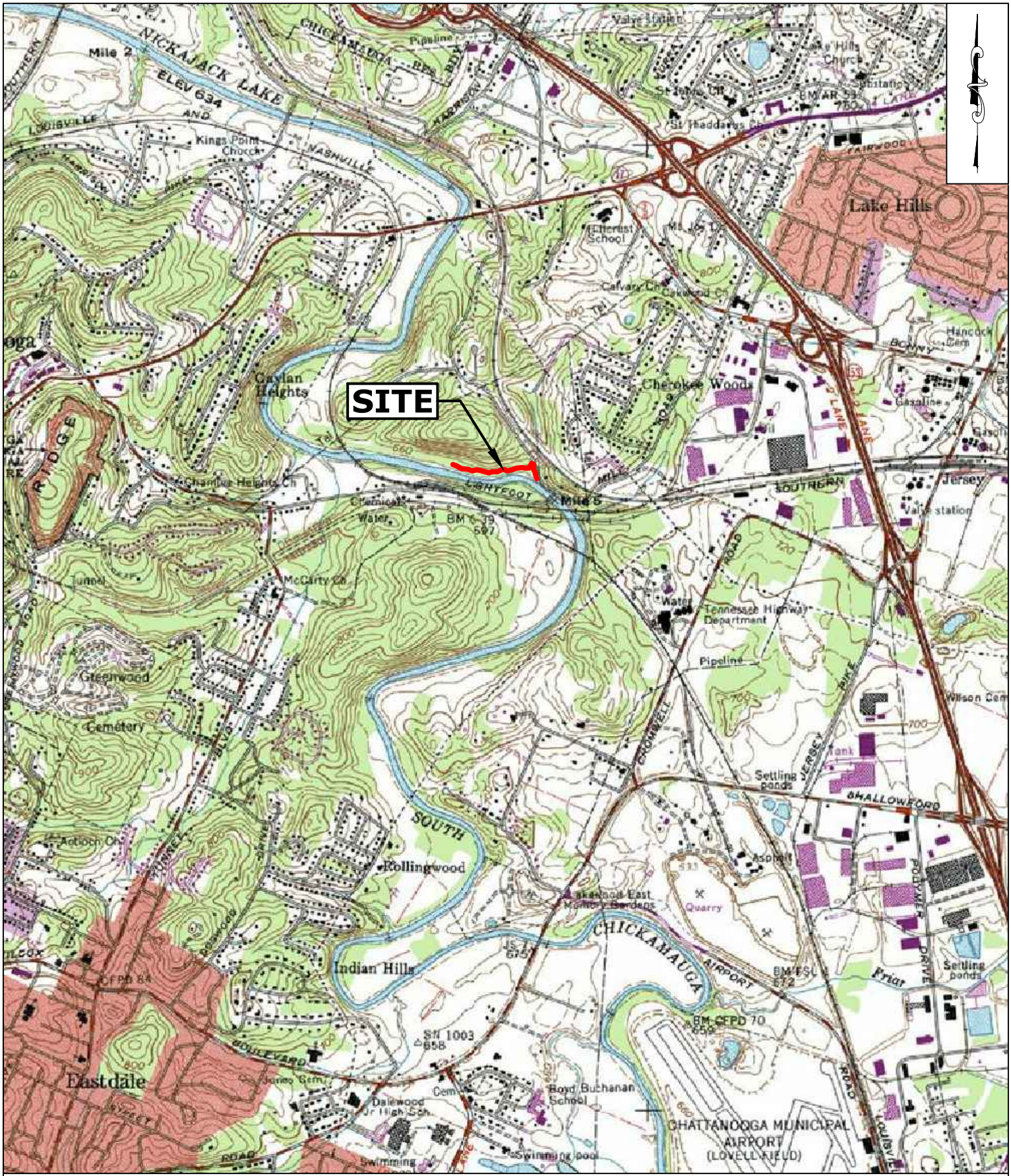
Our services should not end with the submission of this geotechnical report. S&ME should be kept involved throughout the design and construction process to maintain continuity and to determine if our recommendations are properly interpreted and implemented. To achieve this, we should review project plans and specifications with the designers to see that our recommendations are fully incorporated and have not been misinterpreted. We also should be retained by the owner to monitor and test the site preparation and foundation construction.

S&ME's familiarity with the site and foundation recommendations makes us a valuable part of your construction quality assurance team. S&ME recommends that we be retained by the owner on a full time basis to observe earthwork and foundation construction. Our personnel are uniquely qualified to recognize unanticipated ground conditions and can offer responsive remedial recommendations should these unanticipated conditions occur.

Appendix I

Figure 1 - Site Location Plan

Figures 2 - Boring Location Plan



SOURCE: USGS 7.5 Minute Topographic Map -- EAST CHATTANOOGA, TENNESSEE (1976)
DRAWING FOR ILLUSTRATION PURPOSES ONLY

S&ME

SITE LOCATION PLAN

SOUTH CHICKAMAUGA GREENWAY-PHASE II, SEGMENT 1
CHATTANOOGA, TENNESSEE

JOB NUMBER:	1281-16-030 PH.1	**APPROXIMATE SCALE:**	1"=2,000'
DRAWN BY:	JLN	**CHECKED BY:**	JMS
DATE:	5/10/2017	**FIGURE:**	1

NOTES:
- DRAWING FOR ILLUSTRATIVE PURPOSES ONLY
- BASE DRAWING PREPARED BY BWSC

LEGEND:
- APPROXIMATE BORING LOCATION

BEGIN BOARDWALK SEGMENT 1

B-1

B-2

B-3

SEGMENT 1

B-4

B-5

B-6

B-7

B-8

B-9

B-10

B-11

YOUNGSTOWN RD

END SEGMENT 1
BEGIN SEGMENT 2

S. CHICKAMAUGA CREEK

LIGHTFOOT MILL RD

VERTICAL SCALE:	N/A
DRAWN BY:	JLN
CHECKED BY:	JMS
HORIZONTAL SCALE:	1"=100'
PROJECT NO.	1281-16-030 PH.1
DATE:	5/10/2017

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BORING LOCATION PLAN

SOUTH CHICKAMAUGA GREENWAY-PHASE II, SEGMENT 1
CHATTANOOGA, TENNESSEE

FIGURE NO.

2

Appendix II

Field Exploration Procedures

Test Boring Record Legend

Hand Auger Boring Records

HAND AUGERING WITH DYNAMIC CONE PENETROMETER TESTING

The borings were advanced using hand auger drilling techniques. Soil samples were obtained from the auger bucket. At regular intervals, Dynamic Cone Penetrometer (DCP) tests are performed. The test is performed using a DCP. The DCP consists of a 1-1/2 inch diameter cone point attached to E-size drilling rods. The point is advanced by dropping a 15-pound weight on the rod from a height of 20 inches. The test is conducted in three intervals – the first at 2 inches and the second and third at 1-3/4 inches. The number of blows required to advance the penetrometer through each interval is recorded. The DCP blow count is the average of the second and third intervals. The DCP blow count is correlated to the consistency of the soil and can help in determining the strength properties of the in-situ soils.

TEST BORING/PIT RECORD LEGEND

FINE AND COARSE GRAINED SOIL INFORMATION

COARSE GRAINED SOILS (SANDS & GRAVELS)

N	Relative Density
0-4	Very Loose
5-10	Loose
11-20	Firm
21-30	Very Firm
31-50	Dense
Over 50	Very Dense

FINE GRAINED SOILS (SILTS & CLAYS)

N	Consistency	Qu, KSF Estimated
0-1	Very Soft	0-0.5
2-4	Soft	0.5-1
5-8	Firm	1-2
9-15	Stiff	2-4
16-30	Very Stiff	4-8
Over 31	Hard	8+

PARTICLE SIZE

Boulders	Greater than 300 mm (12 in)
Cobbles	75 mm to 300 mm (3 to 12 in)
Gravel	4.74 mm to 75 mm (3/16 to 3 in)
Coarse Sand	2 mm to 4.75 mm
Medium Sand	0.425 mm to 2 mm
Fine Sand	0.075 mm to 0.425 mm
Silts & Clays	Less than 0.075 mm

The **STANDARD PENETRATION TEST** as defined by ASTM D 1586 is a method to obtain a disturbed soil sample for examination and testing and to obtain relative density and consistency information. A standard 1.4-inch I.D./2-inch O.D. split-barrel sampler is driven three 6-inch increments with a 140 lb. hammer falling 30 inches. The hammer can either be of a trip, free-fall design, or actuated by a rope and cathead. The blow counts required to drive the sampler the final two increments are added together and designate the N-value defined in the above tables.

ROCK PROPERTIES

ROCK QUALITY DESIGNATION (RQD)

Percent RQD	Quality
0-25	Very Poor
25-50	Poor
50-75	Fair
75-90	Good
90-100	Excellent

ROCK HARDNESS

Very Hard:	Rock can be broken by heavy hammer blows
Hard:	Rock cannot be broken by thumb pressure, but can be broken by moderate hammer blows.
Moderately Hard:	Small pieces can be broken off along sharp edges by considerable hard thumb pressure; can be broken with light hammer blows.
Soft:	Rock is coherent but breaks very easily with thumb pressure at sharp edges and crumbles with firm hand pressure.
Very Soft:	Rock disintegrates or easily compresses when touched; can be hard to very hard soil.

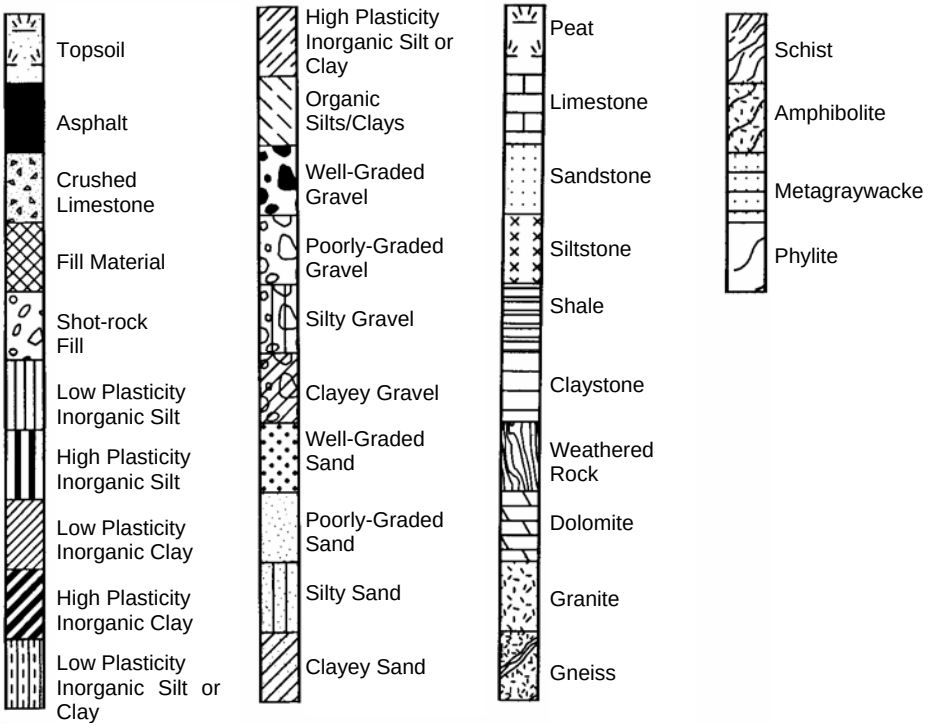
$$\text{RQD} = \frac{\text{Sum of 4 in. and longer Rock Pieces Recovered}}{\text{Length of Core Run}} \times 100 = \frac{43\ \text{RQD}}{\text{NQ}}$$

$$\text{Recovery} = \frac{\text{Length of Rock Core Recovered}}{\text{Length of Core Run}} \times 100 = \frac{\text{NQ}}{63\ \text{REC}}$$

Core Diameter	Inches
BQ	1-7/16
NQ	1-7/8
HQ	2-1/2

SYMBOLS

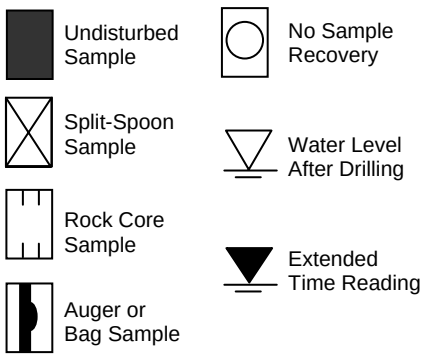
KEY TO MATERIAL TYPES



SOIL PROPERTY SYMBOLS

N:	Standard Penetration, BPF
M:	Moisture Content, %
LL:	Liquid Limit, %
PI:	Plasticity Index, %
Qp:	Pocket Penetrometer Value, TSF
Qu:	Unconfined Compressive Strength Estimated Qu, TSF
γ_D:	Dry Unit Weight, PCF
F:	Fines Content

SAMPLING SYMBOLS



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4291 Highway 58
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HAND AUGER BORING RECORD

BORING NO: **B-1**

PROJECT: South Chickamauga Greenway - Phase II, Segment 1		**JOB NO:** 1281-16-030, Ph. 1
PROJECT LOCATION: Chattanooga, Tennessee		
ELEVATION: 654	BORING STARTED: 3/2/17	BORING COMPLETED: 3/2/2017
GROUNDWATER: Dry upon completion	AUGER TYPE: Hand Auger	**SHEET** 1 **OF** 1
REMARKS:		

G	ELEV. (FT.)	DEPTH (FT.)	MATERIAL DESCRIPTION	L	S	R	SAMPLE DEPTH (FT.)	DYNAMIC CONE PENETRATION BLOWS			DCP AVERAGE VALUE
	654.0	0	SANDY CLAY (CL), orange-brown, firm to stiff - ALLUVIUM								
		1					1	5	7	7	7
		2					2	11	14	10	12
		3									
	650.5		*Hand-auger refusal at 3.5 feet, boring terminated*								
		4									
		5									
		6									
		7									
		8									
		9									
		10									

HAND AUGER BORING RECORD SEGMENT 1 - HAND AUGERS.GPJ 2016.GDT 5/10/17

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HAND AUGER BORING RECORD

BORING NO: **B-2**

PROJECT: South Chickamauga Greenway - Phase II, Segment 1		**JOB NO:** 1281-16-030, Ph. 1
PROJECT LOCATION: Chattanooga, Tennessee		
ELEVATION: 653	BORING STARTED: 3/2/17	BORING COMPLETED: 3/2/2017
GROUNDWATER: Dry upon completion	AUGER TYPE: Hand Auger	**SHEET** 1 **OF** 1
REMARKS:		

G	ELEV. (FT.)	DEPTH (FT.)	MATERIAL DESCRIPTION	L	S	R	SAMPLE DEPTH (FT.)	DYNAMIC CONE PENETRATION BLOWS			DCP AVERAGE VALUE
	653.0	0	SANDY CLAY (CL), orange-brown, firm to stiff - ALLUVIUM								
		1					1	3	5	5	5
		2					2	5	6	7	6.5
		3					3	6	7	8	7.5
		4					4	9	11	11	11
		5					5	9	11	11	11
		6					6	7	7	8	7.5
		7					7	6	6	8	7
		8					8	6	7	7	7
	644.5		*Hand Auger terminated at 8.5 feet*								
		9									
		10									

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HAND AUGER BORING RECORD

BORING NO: **B-3**

PROJECT: South Chickamauga Greenway - Phase II, Segment 1		**JOB NO:** 1281-16-030, Ph. 1
PROJECT LOCATION: Chattanooga, Tennessee		
ELEVATION: 659	BORING STARTED: 3/2/17	BORING COMPLETED: 3/2/2017
GROUNDWATER: Dry upon completion	AUGER TYPE: Hand Auger	**SHEET** 1 **OF** 1

REMARKS:

G	ELEV. (FT.)	DEPTH (FT.)	MATERIAL DESCRIPTION	L	S	R	SAMPLE DEPTH (FT.)	DYNAMIC CONE PENETRATION BLOWS			DCP AVERAGE VALUE
	659.0	0	SANDY CLAY (CL) with organics, orange-brown, firm to stiff - ALLUVIUM								
		1					1	3	4	5	4.5
		2					2	4	6	6	6
		3					3	8	10	11	10.5
		4					4	7	9	11	10
		5					5	11	12	12	12
		6					6	6	7	7	7
	652.5		6.5' SANDY CLAY (CL), orange-brown, soft to firm - ALLUVIUM								
		7					7	5	2	3	2.5
		8					8	4	5	5	5
	650.5		*Hand Auger terminated at 8.5 feet*								
		9									
		10									

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HAND AUGER BORING RECORD

BORING NO: **B-4**

PROJECT: South Chickamauga Greenway - Phase II, Segment 1		**JOB NO:** 1281-16-030, Ph. 1
PROJECT LOCATION: Chattanooga, Tennessee		
ELEVATION: 675	BORING STARTED: 3/2/17	BORING COMPLETED: 3/2/2017
GROUNDWATER: Dry upon completion	AUGER TYPE: Hand Auger	**SHEET** 1 **OF** 1

REMARKS:

G	ELEV. (FT.)	DEPTH (FT.)	MATERIAL DESCRIPTION	L	S	R	SAMPLE DEPTH (FT.)	DYNAMIC CONE PENETRATION BLOWS			DCP AVERAGE VALUE
	675.0	0	SILTY CLAY (CL) with chert, light brown, very moist, firm - RESIDUUM								
		1					1	5	5	7	6
		2					2	8	6	6	6
	672.5	2.5'	SILTY CLAY (CL) with chert, orange-brown, stiff - RESIDUUM								
		3					3	8	8	14	11
		4									
	670.5		*Hand-auger refusal at 4.5 feet, boring terminated*								
		5									
		6									
		7									
		8									
		9									
		10									

HAND AUGER BORING RECORD SEGMENT 1 - HAND AUGERS.GPJ 2016.GDT 5/10/17

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HAND AUGER BORING RECORD

BORING NO: **B-5**

PROJECT: South Chickamauga Greenway - Phase II, Segment 1		**JOB NO:** 1281-16-030, Ph. 1
PROJECT LOCATION: Chattanooga, Tennessee		
ELEVATION: 686	BORING STARTED: 3/2/17	BORING COMPLETED: 3/2/2017
GROUNDWATER: Dry upon completion	AUGER TYPE: Hand Auger	**SHEET** 1 **OF** 1
REMARKS:		

G	ELEV. (FT.)	DEPTH (FT.)	MATERIAL DESCRIPTION	L	S	R	SAMPLE DEPTH (FT.)	DYNAMIC CONE PENETRATION BLOWS			DCP AVERAGE VALUE
	686.0	0	SILTY CLAY (CL) with chert, light brown, very moist, stiff - RESIDUUM								
		1					1	15	15	13	14
		2									
	683.5		*Hand-auger refusal at 2.5 feet, boring terminated*								
		3									
		4									
		5									
		6									
		7									
		8									
		9									
		10									

HAND AUGER BORING RECORD SEGMENT 1 - HAND AUGERS.GPJ 2016.GDT 5/10/17

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HAND AUGER BORING RECORD

BORING NO: **B-6**

PROJECT: South Chickamauga Greenway - Phase II, Segment 1		**JOB NO:** 1281-16-030, Ph. 1
PROJECT LOCATION: Chattanooga, Tennessee		
ELEVATION: 690	BORING STARTED: 3/2/17	BORING COMPLETED: 3/2/2017
GROUNDWATER: Dry upon completion	AUGER TYPE: Hand Auger	**SHEET** 1 **OF** 1

REMARKS:

G	ELEV. (FT.)	DEPTH (FT.)	MATERIAL DESCRIPTION	L	S	R	SAMPLE DEPTH (FT.)	DYNAMIC CONE PENETRATION BLOWS			DCP AVERAGE VALUE
	690.0	0	SILTY CLAY (CL) with organics and trace chert, light brown and orange-brown, very moist, stiff - RESIDUUM								
		1					1	9	9	12	10.5
		2					2	12	12	13	12.5
	687.5	2.5'	SILTY CLAY (CL) with chert, orange-brown, very stiff - RESIDUUM								
		3					3	21	22	22	22
		4					4	22	22	25	23.5
		5									
	684.5		*Hand-auger refusal at 5.5 feet, boring terminated*								
		6									
		7									
		8									
		9									
		10									

HAND AUGER BORING RECORD SEGMENT 1 - HAND AUGERS.GPJ 2016.GDT 5/10/17

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HAND AUGER BORING RECORD

BORING NO: **B-7**

PROJECT: South Chickamauga Greenway - Phase II, Segment 1		**JOB NO:** 1281-16-030, Ph. 1
PROJECT LOCATION: Chattanooga, Tennessee		
ELEVATION: 680	BORING STARTED: 3/2/17	BORING COMPLETED: 3/2/2017
GROUNDWATER: Dry upon completion	AUGER TYPE: Hand Auger	**SHEET** 1 **OF** 1
REMARKS:		

G	ELEV. (FT.)	DEPTH (FT.)	MATERIAL DESCRIPTION	L	S	R	SAMPLE DEPTH (FT.)	DYNAMIC CONE PENETRATION BLOWS			DCP AVERAGE VALUE
	680.0	0	SILTY SAND (SM) with chert, light brown, very moist, loose to firm - RESIDUUM								
		1					1	7	5	5	5
		2					2	7	9	14	11.5
		3									
	676.5		*Hand-auger refusal at 3.5 feet, boring terminated*								
		4									
		5									
		6									
		7									
		8									
		9									
		10									

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HAND AUGER BORING RECORD

BORING NO: **B-8**

PROJECT: South Chickamauga Greenway - Phase II, Segment 1		**JOB NO:** 1281-16-030, Ph. 1
PROJECT LOCATION: Chattanooga, Tennessee		
ELEVATION: 676	BORING STARTED: 3/2/17	BORING COMPLETED: 3/2/2017
GROUNDWATER: Dry upon completion	AUGER TYPE: Hand Auger	**SHEET** 1 **OF** 1

REMARKS:

G	ELEV. (FT.)	DEPTH (FT.)	MATERIAL DESCRIPTION	L	S	R	SAMPLE DEPTH (FT.)	DYNAMIC CONE PENETRATION BLOWS			DCP AVERAGE VALUE
	676.0	0	SILTY CLAY (CL) with organics and trace chert rocks, orange-brown, firm - RESIDUUM								
		1					1	7	7	7	7
		2					2	7	7	8	7.5
	673.5	2.5'	SILTY CLAY (CL) with abundant chert, orange-brown, stiff - RESIDUUM								
		3					3	18	11	13	12
		4									
	671.5		*Hand-auger refusal at 4.5 feet, boring terminated*								
		5									
		6									
		7									
		8									
		9									
		10									

HAND AUGER BORING RECORD SEGMENT 1 - HAND AUGERS.GPJ 2016.GDT 5/10/17

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HAND AUGER BORING RECORD

BORING NO: **B-9**

PROJECT: South Chickamauga Greenway - Phase II, Segment 1		**JOB NO:** 1281-16-030, Ph. 1
PROJECT LOCATION: Chattanooga, Tennessee		
ELEVATION: 667	BORING STARTED: 3/2/17	BORING COMPLETED: 3/2/2017
GROUNDWATER: Dry upon completion	AUGER TYPE: Hand Auger	**SHEET** 1 **OF** 1

REMARKS:

G	ELEV. (FT.)	DEPTH (FT.)	MATERIAL DESCRIPTION	L	S	R	SAMPLE DEPTH (FT.)	DYNAMIC CONE PENETRATION BLOWS			DCP AVERAGE VALUE
	667.0	0	SILTY CLAY (CL) with chert, orange-brown, stiff - RESIDUUM								
		1					1	9	11	13	12
		2					2	15	13	15	14
		3									
	663.5		*Hand-auger refusal at 3.5 feet, boring terminated*								
		4									
		5									
		6									
		7									
		8									
		9									
		10									

HAND AUGER BORING RECORD SEGMENT 1 - HAND AUGERS.GPJ 2016.GDT 5/10/17

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HAND AUGER BORING RECORD

BORING NO: **B-10**

PROJECT: South Chickamauga Greenway - Phase II, Segment 1		**JOB NO:** 1281-16-030, Ph. 1
PROJECT LOCATION: Chattanooga, Tennessee		
ELEVATION: 666	BORING STARTED: 3/2/17	BORING COMPLETED: 3/2/2017
GROUNDWATER: Dry upon completion	AUGER TYPE: Hand Auger	**SHEET** 1 **OF** 1
REMARKS:		

G	ELEV. (FT.)	DEPTH (FT.)	MATERIAL DESCRIPTION	L	S	R	SAMPLE DEPTH (FT.)	DYNAMIC CONE PENETRATION BLOWS			DCP AVERAGE VALUE
	666.0	0	SILTY CLAY (CL) with organics, brown, very stiff - RESIDUUM								
		1					1	17	19	22	20.5
	664.5	1.5'	SILTY CLAY (CL) with chert, orange-brown, very stiff - RESIDUUM								
		2					2	22	22	21	21.5
		3									
	662.5		*Hand-auger refusal at 3.5 feet, boring terminated*								
		4									
		5									
		6									
		7									
		8									
		9									
		10									

HAND AUGER BORING RECORD SEGMENT 1 - HAND AUGERS.GPJ 2016.GDT 5/10/17

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HAND AUGER BORING RECORD

BORING NO: **B-11**

PROJECT: South Chickamauga Greenway - Phase II, Segment 1		**JOB NO:** 1281-16-030, Ph. 1
PROJECT LOCATION: Chattanooga, Tennessee		
ELEVATION: 661	BORING STARTED: 3/2/17	BORING COMPLETED: 3/2/2017
GROUNDWATER: Dry upon completion	AUGER TYPE: Hand Auger	**SHEET** 1 **OF** 1
REMARKS:		

G	ELEV. (FT.)	DEPTH (FT.)	MATERIAL DESCRIPTION	L	S	R	SAMPLE DEPTH (FT.)	DYNAMIC CONE PENETRATION BLOWS			DCP AVERAGE VALUE
	661.0	0	SILTY CLAY (CH) with organics, brown, firm - RESIDUUM								
		1					1	5	5	5	5
		2					2	6	6	6	6
	658.5	2.5'	SILTY CLAY (CH) with chert, orange-brown, stiff - RESIDUUM								
		3					3	10	9	9	9
		4					4	6	8	10	9
		5									
	655.5		*Hand-auger refusal at 5.5 feet, boring terminated*								
		6									
		7									
		8									
		9									
		10									

HAND AUGER BORING RECORD SEGMENT 1 - HAND AUGERS.GPJ 2016.GDT 5/10/17

Appendix III

Laboratory Test Procedures

Laboratory Test Results

NATURAL MOISTURE
ASTM D 2216, EM 1110-2-1906

The moisture content of soils is an indicator of various physical properties, including strength and compressibility. Selected samples obtained during exploratory drilling were taken from their sealed containers. Each sample was weighed and then placed in an oven heated to 110oC + 5o. The sample remained in the oven until the free moisture had evaporated. The dried sample was removed from the oven, allowed to cool, and re-weighed. The moisture content was computed by dividing the weight of evaporated water by the weight of the dry sample. The results, expressed as a percent, are shown on the attached Laboratory Test Results Summary.

ATTERBERG LIMITS DETERMINATION
ASTM D 4318/AASHTO T89/T90

Representative samples were subjected to Atterberg limits testing to determine the soil's plasticity characteristics. The plasticity index (PI) is the range of moisture content over which the soil deforms as a plastic material. The liquid limit (LL) marks the transition from the plastic state to the liquid state. The plastic limit (PL) marks the transition from the plastic state to the solid state.

To determine the liquid limit, a soil specimen is wetted until it is in a viscous fluid state. A portion of this soil is then placed in a brass cup of standardized dimensions, and a groove made through the middle of the soil specimen with a grooving tool of standardized dimensions. The cup is attached to a cam that lifts the cup 10 mm, and then allows the cup to fall and strike a rubber base of standardized hardness. The cam is rotated at about 2 drops per second until the two halves of the soil specimen come in contact at the bottom of the groove along a distance of 13 mm. The number of blows required to make this degree of contact is recorded, and a portion of the specimen is subjected to a moisture content determination. Additional water is added to the remainder of the specimen, and the grooving process and cam action process repeated. This testing sequence is repeated until the soil flows as a heavy viscous fluid. The number of blows vs. moisture content is then plotted on semi-logarithmic graph paper, and the moisture content corresponding to 25 blows is designated the liquid limit.

The plastic limit is the lowest moisture content at which the soil is sufficiently plastic to be manually rolled into threads 3 mm in diameter. It is determined by taking a pat of soil remaining from the liquid limit test, and repeatedly rolling, kneading, and air drying the specimen until the soil breaks into threads about 3 mm in diameter and 3 to 10 mm long. The moisture content of these soil threads is then determined, and is designated the plastic limit. The results of these tests are presented on the Laboratory Test Results Summary.

GRAIN SIZE TEST PROCEDURES
ASTM D 1140

The clay and silt content of granular soils affects their physical properties such as strength, compressibility, and permeability. Selected granular soil (sand and gravel) samples were tested to determine the percent, by weight, of soil particles finer than the No. 200 sieve (silt and clay sized particles). Soil particles finer than 75 microns were flushed through a No. 200 sieve using water. The coarse materials retained on the No. 200 sieve were dried to obtain their dry weight. The dry weight of materials retained on the No. 200 sieve was compared to the dry weight of the total test specimen. The difference in weight, expressed as a percentage of the pre-wash weight, is designate as the percentage of "fines" (silt and clay particles). The results are plotted on the Grain Size Distribution Test Reports.

South Chickamauga Greenway – Phase II, Segment 1

Chattanooga, Tennessee

S&ME Project No. 1281-16-030, Ph. 1

Laboratory Test Results Summary

Boring Number	Sample Type	Sample Depth (ft)	Moisture Content (%)	ATTERBERG LIMITS			Percent Passing #200 Sieve
				Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	
B-7	Grab	1-2	14.0	NP	NP	NP	40.5
B-10	Grab	2-3	22.1	36	20	16	79.1
B-11	Grab	2-3	24.4	59	24	35	-

Grab – Sample collected in Conjunction with Hand Auger Excavation (1 to 2 lbs.)

Sieve Analysis of Soils

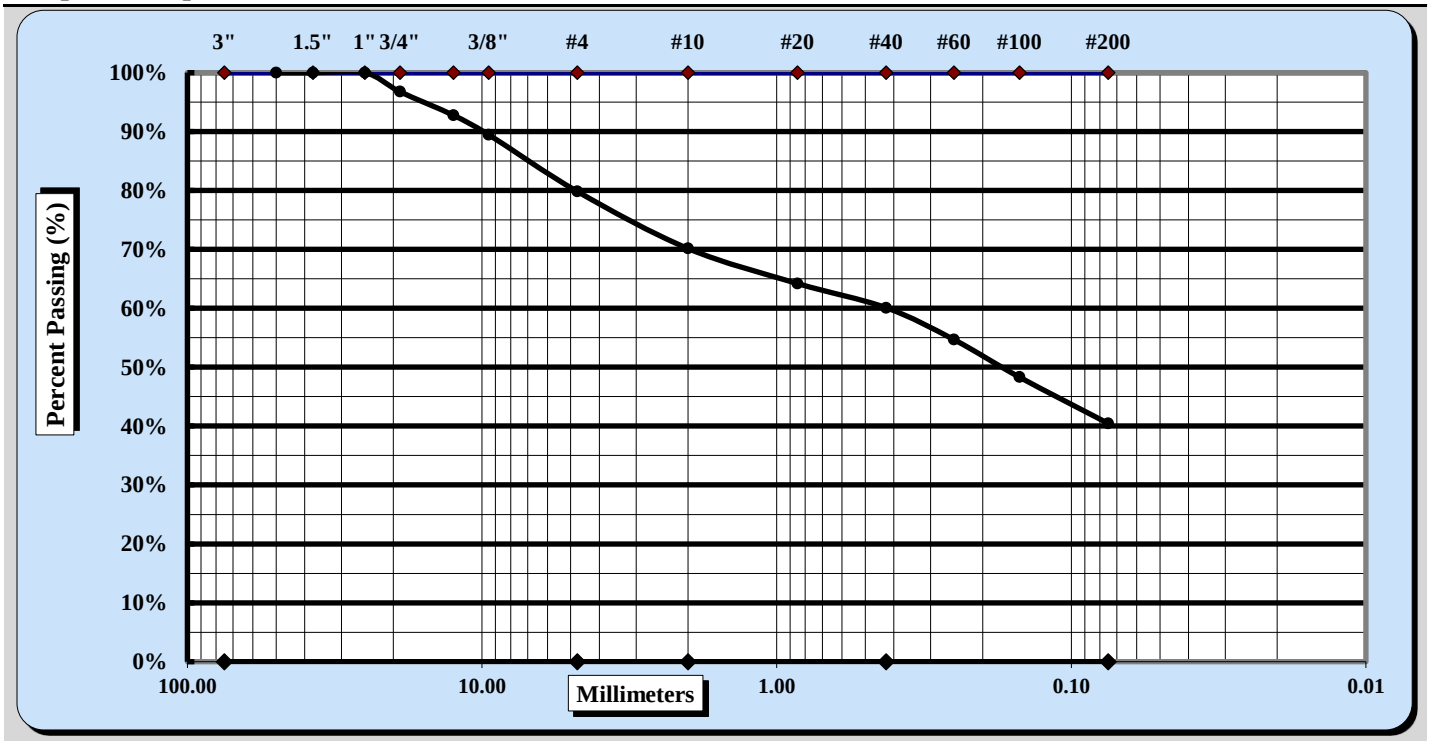
ASTM D 422

Quality Assurance

S&ME, Inc. - Chattanooga, 4291 Highway 58, Suite 101, Chattanooga, TN

Project #:	**1281-16-030** **Log:17-085**	Report Date:	4/12/2017
Project Name:	South Chickamauga Creek Greenway-Ph. II, Seg. 1	Test Date(s):	4/11/2017
Client Name:	Barge Waggoner Sumner & Cannon		
Client Address:	1110 Market Street, Suite 200 Chattanooga, TN 37402		
Sample Id. B-7	Type: ML	Sample Date:	
Location: On-site	Sample:	Elevation:	1'

Sample Description:



Cobbles	< 300 mm (12") and > 75 mm (3")	Fine Sand	< 0.425 mm and > 0.075 mm (#200)
Gravel	< 75 mm and > 4.75 mm (#4)	Silt	< 0.075 and > 0.005 mm
Coarse Sand	< 4.75 mm and >2.00 mm (#10)	Clay	< 0.005 mm
Medium Sand	< 2.00 mm and > 0.425 mm (#40)	Colloids	< 0.001 mm

Maximum Particle Size				Coarse Sand	9.7%	Fine Sand	19.6%
Gravel	20.2%			Medium Sand	10.1%	Silt & Clay	40.5%
Liquid Limit	19			Plastic Limit	18	Plastic Index	1
Specific Gravity	2.852	Cc =	0.003	Cu =	8.636	Moisture Content	
Coarse Sand	9.7%			Medium Sand	10.1%	Fine Sand	19.6%

Description of Sand & Gravel Particles: Rounded ☐ Angular ☐
Hard & Durable ☐ Soft ☐ Weathered & Friable ☐

Notes / Deviations / References:

Jonathan M. Smolen, PE — *Technical Responsibility*
_____ — *Signature*
Geotechnical Group Leader — *Position*
5/10/2017 — *Date*

Sieve Analysis of Soils

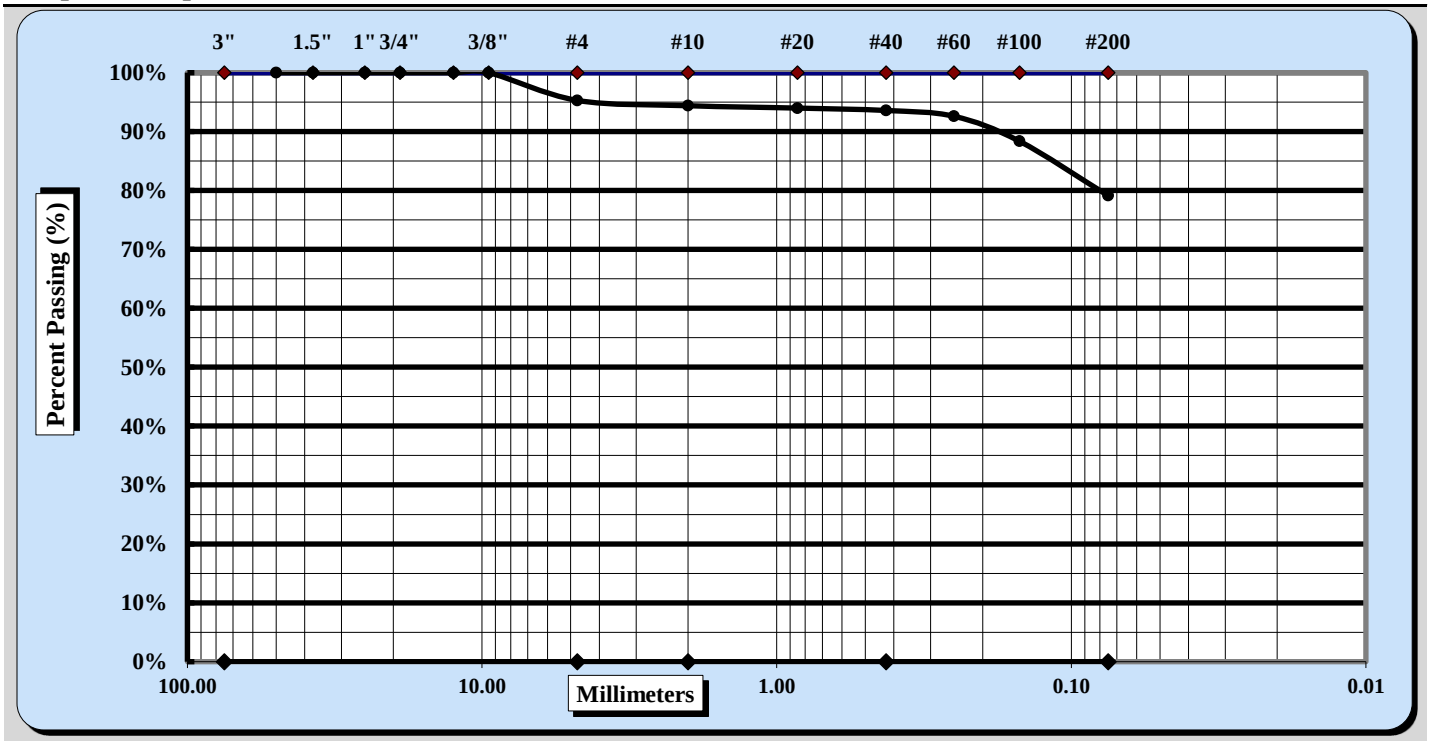
ASTM D 422

Quality Assurance

S&ME, Inc. - Chattanooga, 4291 Highway 58, Suite 101, Chattanooga, TN

Project #:	**1281-16-030 PH 002**	**Log:17-085**	Report Date:	4/12/2017
Project Name:	South Chickamauga Creek Greenway-Ph. II, Seg. 1		Test Date(s):	4/11/2017
Client Name:	Barge Waggoner Sumner & Cannon, Inc.			
Client Address:	1110 Market Street, Suite 200 Chattanooga, TN 37402			
Sample Id.	B-10	Type: CL	Sample Date:	
Location:	On-site	Sample:	Elevation:	8'

Sample Description:



Cobbles	< 300 mm (12") and > 75 mm (3")	Fine Sand	< 0.425 mm and > 0.075 mm (#200)
Gravel	< 75 mm and > 4.75 mm (#4)	Silt	< 0.075 and > 0.005 mm
Coarse Sand	< 4.75 mm and >2.00 mm (#10)	Clay	< 0.005 mm
Medium Sand	< 2.00 mm and > 0.425 mm (#40)	Colloids	< 0.001 mm

Maximum Particle Size				Coarse Sand	0.9%	Fine Sand	14.5%
Gravel	4.7%			Medium Sand	0.8%	Silt & Clay	79.1%
Liquid Limit	36			Plastic Limit	20	Plastic Index	16
Specific Gravity	2.852	**Cc =**	**0.003**	**Cu =**	**8.636**	Moisture Content	
Coarse Sand	0.9%			Medium Sand	0.8%	Fine Sand	14.5%

Description of Sand & Gravel Particles: Rounded ☐ Angular ☐

Hard & Durable ☐ Soft ☐ Weathered & Friable ☐

Notes / Deviations / References:

Jonathan M. Smolen, PE — *Technical Responsibility*

_____ — *Signature*

Geotechnical Group Leader — *Position*

5/10/2017 — *Date*

Appendix IV

Important Information About Your Geotechnical Engineering Report

Important Information About Your Geotechnical Engineering Report

Variations in subsurface conditions can be a principal cause of construction delays, cost overruns and claims. The following information is provided to assist you in understanding and managing the risk of these variations.

Geotechnical Findings Are Professional Opinions

Geotechnical engineers cannot specify material properties as other design engineers do. Geotechnical material properties have a far broader range on a given site than any manufactured construction material, and some geotechnical material properties may change over time because of exposure to air and water, or human activity.

Site exploration identifies subsurface conditions at the time of exploration and only at the points where subsurface tests are performed or samples obtained. Geotechnical engineers review field and laboratory data and then apply their judgment to render professional opinions about site subsurface conditions. Their recommendations rely upon these professional opinions. Variations in the vertical and lateral extent of subsurface materials may be encountered during construction that significantly impact construction schedules, methods and material volumes. While higher levels of subsurface exploration can mitigate the risk of encountering unanticipated subsurface conditions, no level of subsurface exploration can eliminate this risk.

Scope of Geotechnical Services

Professional geotechnical engineering judgment is required to develop a geotechnical exploration scope to obtain information necessary to support design and construction. A number of unique project factors are considered in developing the scope of geotechnical services, such as the exploration objective; the location, type, size and weight of the proposed structure; proposed site grades and improvements; the construction schedule and sequence; and the site geology.

Geotechnical engineers apply their experience with construction methods, subsurface conditions and exploration methods to develop the exploration scope. The scope of each exploration is unique based on available project and site information. Incomplete project information or constraints on the scope of exploration increases the risk of variations in subsurface conditions not being identified and addressed in the geotechnical report.

Services Are Performed for Specific Projects

Because the scope of each geotechnical exploration is unique, each geotechnical report is unique. Subsurface conditions are explored and recommendations are made for a specific project. Subsurface information and recommendations may not be adequate for other uses. Changes in a proposed structure location, foundation loads, grades, schedule, etc. may require additional geotechnical exploration, analyses, and consultation. The geotechnical engineer should be consulted to determine if additional services are required in response to changes in proposed construction, location, loads, grades, schedule, etc.

Geo-Environmental Issues

The equipment, techniques, and personnel used to perform a geo-environmental study differ significantly from those used for a geotechnical exploration. Indications of environmental contamination may be encountered incidental to performance of a geotechnical exploration but go unrecognized. Determination of the presence, type or extent of environmental contamination is beyond the scope of a geotechnical exploration.

Geotechnical Recommendations Are Not Final

Recommendations are developed based on the geotechnical engineer's understanding of the proposed construction and professional opinion of site subsurface conditions. Observations and tests must be performed during construction to confirm subsurface conditions exposed by construction excavations are consistent with those assumed in development of recommendations. It is advisable to retain the geotechnical engineer that performed the exploration and developed the geotechnical recommendations to conduct tests and observations during construction. This may reduce the risk that variations in subsurface conditions will not be addressed as recommended in the geotechnical report.