Consulting Geotechnical Engineers
Environmental Science
Construction Management & Inspection
Construction Materials Testing
Hydrogeology/Groundwater Monitoring
Earth Instrumentation Services

CCG

5871 New Peachtree Road
Doraville, GA 30340-1084
Phone: 770/457-9776
Fax: 770/457-9964

Chattahoochee Consulting Group, Inc.

April 13, 2015
Project Number: 2191.001.15

Path Foundation
P.O. Box 14327
Atlanta, Georgia 30324

Attention: Mr. Jonathan McCaig

Re: Geotechnical Evaluation
Olde Town Conyers Trail
Phase E Creek Crossings
Conyers, Georgia

Gentlemen:

We have completed our subsurface exploration and are providing our recommendations, together with the results of our field testing and our conclusions based on them. This work was authorized by Mr. Jonathan McCaig.

If you should have any questions concerning this information, please feel free to call. It has been a pleasure working with you and we look forward to being of continued service to Path Foundation.

Sincerely,

CHATTAHOOCHEE CONSULTING GROUP, INC.

William T. Sheppard
Project Engineer

Consulting Geotechnical Engineers
Environmental Science
Construction Management & Inspection
Construction Materials Testing
Hydrogeology/Groundwater Monitoring
Earth Instrumentation Services

CCG

5871 New Peachtree Road
Doraville, GA 30340-1084
Phone: 770/457-9776
Fax: 770/457-9964

Chattahoochee Consulting Group, Inc.

REPORT OF SUBSURFACE EXPLORATION OLDE TOWN CONYERS TRAIL PHASE E CREEK CROSSINGS

CONYERS, GEORGIA

Prepared for:

THE PATH FOUNDATION
P.O. BOX 14327
ATLANTA, GEORGIA 30324

April 13, 2015

Prepared by:

Chattahoochee Consulting Group, Inc.,
5871 New Peachtree Road
Doraville, Georgia 30340

Project 2191.001.15

CONTENTS

REPORT OF
SUBSURFACE EXPLORATION

OLDE TOWN CONYERS TRAIL
PHASE E CREEK CROSSINGS

Conyers, Georgia

The findings of this exploration are presented below, together with the analyses and conclusions based on them. The field and exploratory procedures are discussed in the Appendix.

PROJECT CONSIDERATIONS

1. Scope of Work - The purpose of this exploration was to determine the subsurface conditions at the proposed pedestrian bridge crossings. The composition and consistencies of the existing overburden soils were explored, as well as the depth to rock at each of the proposed abutments. Appropriate recommendations are made in this report for the preliminary foundation designs.

2. Description of Project - Information for this project was provided by Mr. Jonathan McCaig of The Path Foundation. We understand from Mr. McCaig that two pedestrian bridge crossings are proposed to span the Boar Tusk Branch creek; one crossing (Bonner Park Crossing) will be located near the parking lot of Bonner Park and the second crossing, the Rockdale County Elementary School Crossing, will be located near the Pine Street Elementary school. The proposed bridge crossings will span approximately 40 to 45 linear feet over the existing creek channel. The proposed bridge abutment foundations are anticipated to bear on either shallow foundations or deep foundations dependent upon the soil conditions encountered. Typical foundation loads for the anticipated bridges will be in the range of 75 to 100 kips.

3. Limitations - The analyses and recommendations presented in this report are based on the preceding project information, as well as on the result of the exploration. While it is not likely that conditions will differ greatly from those observed in the boring, it is always possible that variations can occur between or away from the borehole locations. If it becomes apparent during construction that soil conditions differing significantly from those discussed in Paragraph (5) are being encountered, this office should be notified at once so that their effects can be determined and any remedial measures necessary be prescribed. Also, should the nature of the project change to a major degree, these recommendations may have to be re-evaluated. All testing was performed in general compliance with ASTM guidelines.

SITE CONDITIONS

4. Site Description - The project site is located on a small creek, approximately 1/2 mile north of Pine Log Road, where the creek crosses under Rowland Road near Bonner Park. Two proposed bridge crossings will span the Boar Tusk Branch creek; the Bonner Park crossing is located adjacent to the western soccer field at Bonner Park and the Rockdale School crossing will span the creek near the Pine Street Elementary school, approximately 1/4 mile east of the park crossing. The bridge crossings will each replace existing wooden pedestrian bridge crossings and will have a span of approximately 40 to 45 linear feet.

The site is located in the Southern Piedmont Physiographic Province of Georgia. This Province is characterized as a broad, gently sloping plateau that decreases in total relief toward the Coastal Plain Province. The Piedmont is intricately dissected by a generally dendritic stream pattern. The topography is generally moderate but commonly is steeper near rivers and large creeks.

According to mapping by the Georgia Geologic Survey (GGS), the basement rocks that occur in the vicinity of the subject site belong to the Lithonia Gneiss Formation of the larger Atlanta Group and consist predominantly of gneisses. The weathering characteristics of the saprolitic soils encountered on the site were consistent with the mapping of the GGS. Overlying these areas are residual or in-place soils that have formed as a result of weathering. This weathering is a function of several factors such as mineral composition of the parent rock and degree of natural fracturing. As a result, these residual soils frequently are highly variable in consistency or relatively density. Also, they often contain lenses of highly to partially weathered rock of variable sizes, which occur at different depths. Residual soils that retain characteristics of the parent rocks, such as color and texture, are known as saprolites. Soils which have been deposited in-place by water are known as alluvium. These are the types of soils which are typically found near creeks and rivers. Recently deposited alluvial soils are potentially compressible and may contain layers of organic matter.

5. Soil Conditions – Four borings were made for this project; two for each crossing. Borings B-1 and B-2 were performed on the north and south sides of the Boar Tusk Branch creek for the Bonner Park crossing and borings B-3 and B-4 were performed on the east and west sides of the creek for the Rockdale School crossing. The borings were located by our field engineer and were performed with an all-terrain mounted drill rig. Generally, the soil conditions encountered can be described as shown on the following page:

Crossing One - Bonner Park Crossing

Stratum	Depth to Top of Stratum (feet)	Stratum Thickness (feet)	Description
I	0	3 to 4	FILL: Sandy SILT, firm, red, brown, trace mica, clay, dry, very low plastic
II	3 to 4	4 to 5	SAND, loose, gray, brown, trace silt, clay, moist to wet, non-plastic: ALLUVIAL
III	8	5	Coarse SAND, firm, gray, some rock, wet, non-plastic: ALLUVIAL
IV	13	4	Sandy SILT, firm, brown, white, black, trace mica, moist, non-plastic, mottled: SAPROLITE
V	17	1 to 3*	PARTIALLY WEATHERED ROCK

*Stratum thickness determined by auger refusal on apparent competent rock at a depths of 18 and 20 feet below the existing ground surface.

A notable exception was encountered at boring B-2, located on the north side of the proposed crossing where a stratum of topsoil was present from approximately 3 to 4 feet below the existing grades.

Crossing Two – Rockdale School Crossing

Stratum	Depth to Top of Stratum (feet)	Stratum Thickness (feet)	Description
I	0	5 to 6	SAND & SILT, soft, gray, brown, trace clay, moist to wet, low to non-plastic: ALLUVIAL
II	5 to 6	16 to 18	SAND & SILT, firm to stiff, yellow, brown, white, some to trace mica, trace rock, wet, non-plastic, mottled, banded: SAPROLITE
III	21 to 24	11 to 19*	SAND, firm, tan, white, some silt, trace mica, rock, wet, non-plastic, mottled: SAPROLITE

*Stratum thickness not determined, the borings were terminated in Stratum III at depths of 35 to 40 feet below the existing grades.

For more precise details of the soil conditions encountered at each borehole, please refer to the individual boring logs in the Appendix.

6. Groundwater - The borings were dry augured their full depth in an attempt to locate groundwater levels. Groundwater was encountered in borings B-1 and B-2, located at the Bonner Park crossing, at depths of approximately 7 to 8 feet below the existing ground surface at the time of drilling. These borings collapsed after completion of the drilling to depths of approximately 9 to 10 feet below the existing grades.

Groundwater was encountered in borings B-3 and B-4, performed for the Rockdale School crossing near the high school, at depths of approximately 6 to 8 feet at the time of drilling. These borings collapsed after completion of the drilling to depths of approximately 9 to 11 feet below the existing grades.

The groundwater levels at both crossings will be directly affected by the adjacent creek level. Groundwater levels are subject to seasonal and climatic fluctuations and can change significantly with time. The borings were backfilled with soils from the drilling operations following measurements for groundwater.

SEISMIC DESIGN PARAMETERS

7. Site Class - Based on the boring data, the recommended Site Class for Seismic Considerations is "D". This classification is based on parameters outlined in the International Building Code and the limited boring data collected in conjunction with this subsurface exploration performed in April 2015. It should be noted that borings B-1 and B-2 refused on apparent competent rock at depths ranging from 18 to 20 feet below existing grades. This classification is based on parameters outlined in the International Building Code and the boring data collected during this subsurface exploration. Alternatively, a seismic survey of the site may be performed to determine the site specific seismic parameters for design.

FOUNDATION RECOMMENDATIONS

8. General - Shallow foundations will adequately support the proposed bridge abutments at both the Bonner Park and Rockdale School crossings, provided that the footings are extended through the soft surficial fill and alluvial soils to bear within the underlying firm alluvial sands and saprolitic soils. Estimated settlements for the abutments supported on shallow foundations is approximately 1.5 inches for both crossings. We recommend that shallow foundations bear in either the firm alluvial Sands or underlying saprolitic soils encountered at depths of approximately 5 to 8 feet below the existing grades in order to limit the potential for excessive settlement. The recommended bearing depths at each boring are tabulated on the following page:

Boring No.	Recommended Bearing Depth (feet below existing grades)	Depth of Groundwater (feet below existing grades)
B-1	8	7
B-2	8	8
B-3	6	8
B-4	5	6

Based on the boring data, we anticipate that groundwater will impact the installation of the shallow foundations at both crossings. Dewatering and the placement of #57 or #4 stone may be required in order to maintain a stable footing excavation. Due to the potential for undermining the footings from scour, we recommend that no more than 12 to 18 inches of rock be placed in the bottom of the footing excavations for dewatering purposes. An allowable soil bearing pressure of 1500 pounds per square foot (psf) may be utilized in the design of the abutment footings for both crossings.

9. Bearing Capacity - Shallow foundations supporting the proposed bridge abutments should bear in the firm alluvial sands and underlying firm saprolitic soils, at minimum depths of 5 to 8 feet below existing grades. Based on the boring data, the abutments may be designed for an allowable soil bearing pressure of 1500 pounds per square foot. These are net values, in which the weights of backfill and concrete below grade have already been considered. It should be noted that the depth mentioned above is only a guide, as the actual depth to the recommended bearing material governs. Estimated settlements for foundations placed as outlined herein is discussed in Paragraph (10).

10. Passive Pressures - The pressures available to resist horizontal thrusts are moderate. The recommended allowable passive pressure for design is 155 pounds per square foot, per foot of depth, from 2 to 10 feet; nothing should be considered for passive resistance above 2 feet in the event that erosion occurs. This allowable pressure is based on assumed soil parameters from the Standard Penetration test data and the soil classifications and includes a factor of safety of 3.5. The allowable coefficient of friction along the base of the foundation may be taken as 0.40 based on shallow foundations which have been undercut to firm soils and backfilled with crushed stone.

11. Settlement - We estimate total settlements for the abutments bearing on shallow foundations will be approximately 1.5 inches for the abutments at both the Bonner Park and Rockdale School crossings. This estimate is based on a design foundation load of 100 kips and is estimated using assumed elastic soils properties based on the SPT data, using the Westergaard Influence method. The majority of the estimated settlement should develop during construction and initial loading. Post construction settlements for the abutment footings will be on the order of 0.5 inch.

12. Retaining Wall Design Parameters - No information is available regarding specific retaining wall design; however, soil retaining structures may be required in

conjunction with the construction of the bridge abutments. Free standing retaining walls or wing walls may be designed for an "active" lateral earth pressure condition. Assuming a soil wet unit weight of 120 pcf, an angle of internal friction of 30° and level backfill geometry, we recommend the following earth pressure values for design:

Equivalent Fluid Pressure (Active) = 40 psf per foot of wall height*
Equivalent Fluid Pressure (Passive) = 300 psf per foot of wall height*
Coefficient of Sliding – 0.30
* These values do not include a safety factor.

Proper design and performance of retaining walls depend on properly compacted backfill soils and adequate drainage. We recommend that backfill soils be compacted to a minimum of 95% of the maximum Standard Proctor dry density (ASTM D-698). Also, weep holes or footing drains with proper filtration should be installed. It should be noted that if significant fill will be placed on the approach to the abutments that settlement of the alluvial soils above the values outlined in Paragraph 10 may occur.

13. Geotechnical Quality Control - We recommend that the following quality control measures be implemented in an effort to avoid unforeseen project costs or delays:

1. Chattahoochee Consulting Group should review all final construction plans to ensure that the geotechnical recommendations are properly implemented.

2. Evaluation of foundation excavations immediately prior to foundation concrete placement to verify allowable soil bearing pressures.

3. Permanent fill slopes (if required) should not exceed 2(H):1(V).

4. Embankment fill (if required) should be placed in 6 to 8 inch thick loose lifts and compacted to a minimum of 95% of the appropriate maximum Standard Proctor dry density (ASTM D 698).

14. Consultation - Often, during the final design and/or construction, questions can arise which are not covered specifically in the report. These can normally be handled by a brief call or conference with the designers; please feel free to call.

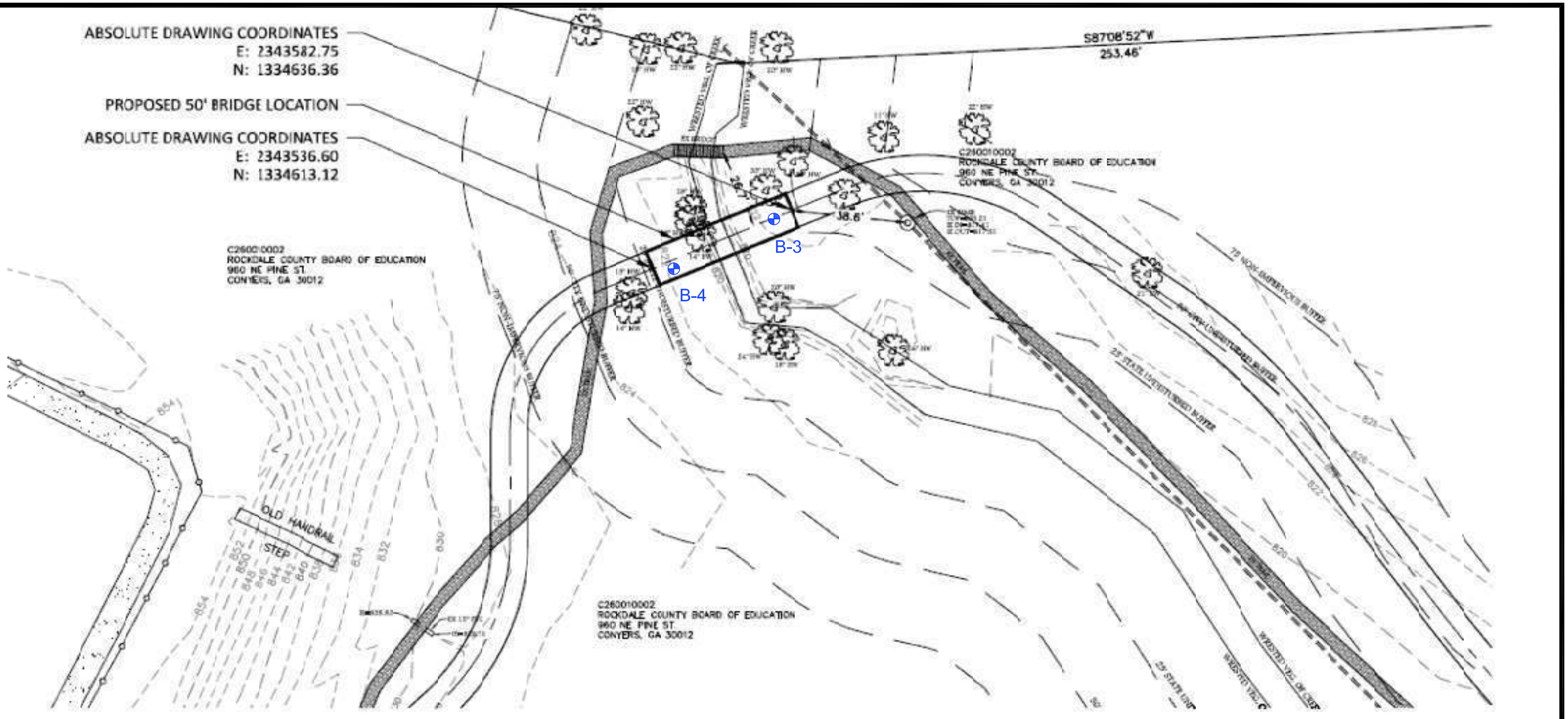
N

CCG

NOT-TO-SCALE

FIGURE NO. 1

PATH FOUNDATION
BONNER PARK CROSSING
BORING LOCATION PLAN



ROCKDALE SCHOOL CROSSING

Olde Town Convers Trail-Phase E

LEGEND

B-2 SPT BORING LOCATION

CCG

DATE: 4/9/15
DWN.: WTS
APPR.:
REVIS.:
PROJECT NO.: 2191.001.15

FIGURE NO. 2
PATH FOUNDATION
OLDE TOWN CONYERS TRAIL

BORING LOCATION PLAN

APPENDIX A

FIELD PROCEDURES

FIELD EXPLORATION

General. Four borings were performed in both the eastern abutment footprints and the western abutment footprints for this evaluation. All borings were made with an all-terrain mounted, rotary-type drilling equipment on April 7, 2015. The exploration program consisted of approximately 113 linear feet of SPT borings.

Sampling Procedures. In these soil materials, Standard Penetration Tests were performed; these provide a measure of the in-situ characteristics of the soil and secure a disturbed sample. In this test, a 2 inch OD, 1.37 inch ID heavy-walled "split tube" sampler is driven into the undisturbed soil at the bottom of the borehole with a drop hammer weighing 140 pounds and having a stroke of 30 inches. It is first seated 6 inches, then driven two additional 6 inch increments. The "Penetration Resistance", called N, is the number of such blows required to drive the spoon the final 12 inches. It is recorded on the boring logs in the following manner:

(13-12-11)

where the figures in parentheses indicate the number of blows required for each 6 inch increment.

APPENDIX B

BORING LOGS

CCG

LOG of BORING

Project Name:	**Olde Town Conyers Phase E-Bonner Park Crossing**	Project No.:	**2191.001.15**
Client:	**Path Foundation**	Boring No.:	**B-1 (South Side)**
Location:	**Conyers, Georgia**	Date:	**4/7/2015**

Elevation	Description	Depth	Samples				Drilling Observations
GS	Topsoil: 0"	(feet)	No.	Type	Blows/6"	Recov.	Auger Boring
	FILL: Sandy SILT, firm, red, brown, trace mica, clay, dry, very low plastic		1	SS	3-4-4		Groundwater was present at a depth of 7 feet at the time of drilling.
	SAND, loose, gray, brown, trace silt, clay, moist to wet, non-plastic: ALLUVIAL	5.0	2	SS	3-3-3		
			3	SS	w.o.h.-2-2		Boring caved in to a depth of 10 feet after the completion of drilling.
	Coarse SAND, firm, gray, some rock, wet, non-plastic: ALLUVIAL	10.0	4	SS	3-5-3		Note: Boring refused on apparent competent rock at a depth of 20 feet below the existing ground surface.
	Sandy SILT, firm, brown, white, black, trace mica, moist, non-plastic, mottled: SAPROLITE	15.0	5	SS	17-18-7		
	Patially Weathered Rock	20.0	6	SS	50/4"		
	Auger Refusal @ 20'	25.0					
		30.0					
		35.0					
		40.0					
		45.0					
		50.0					

LEGEND

SPT= Standard Penetration Test
SS = Split-Spoon (sample)
UDS= Undisturbed Sample
GS= Ground Surface
PWR=Partially Weathered Rock
HWR=Highly Weathered Rock
WOH=Weight of Hammer

CCG

LOG of BORING

Project Name:	**Olde Town Conyers Phase E-Bonner Park Crossing**	Project No.:	**2191.001.15**
Client:	**Path Foundation**	Boring No.:	**B-2 (North Side)**
Location:	**Conyers, Georgia**	Date:	**4/7/2015**

Elevation	Description	Depth	Samples				Drilling Observations
GS	Topsoil: 0"	(feet)	No.	Type	Blows/6"	Recov.	Auger Boring
	FILL: Sandy SILT, firm, red, brown, trace mica, clay, dry, very low plastic		1	SS	2-3-3		Groundwater was present at a depth of 8 feet at the time of drilling.
	TOPSOIL						
	SAND, loose, gray, brown, trace silt, clay, moist to wet, non-plastic: ALLUVIAL	5.0	2	SS	2-3-3		Boring caved in to a depth of 9.2 feet after the completion of drilling.
			3	SS	w.o.h.-3-3		
	Coarse SAND, firm, gray, some rock, wet, non-plastic: ALLUVIAL	10.0	4	SS	10-12-14		Note: Boring refused on apparent competent rock at a depth of 18 feet below the existing ground surface.
	Sandy SILT, firm, brown, white, black, trace mica, moist, non-plastic, mottled: SAPROLITE	15.0	5	SS	3-3-5		
	Auger Refusal @ 18'	20.0					
		25.0					
		30.0					
		35.0					
		40.0					
		45.0					
		50.0					

LEGEND

SPT= Standard Penetration Test
SS = Split-Spoon (sample)
UDS= Undisturbed Sample
GS= Ground Surface
PWR=Partially Weathered Rock
HWR=Highly Weathered Rock
WOH=Weight of Hammer

CCG

LOG of BORING

Project Name:	**Olde Town Conyers Trail-Rockdale School Crossing**	Project No.:	**2191.001.15**
Client:	**Path Foundation**	Boring No.:	**B-3 (East Side)**
Location:	**Conyers, Georgia**	Date:	**4/7/2015**

Elevation	Description	Depth	Samples				Drilling Observations
GS	Topsoil: 6"	(feet)	No.	Type	Blows/6"	Recov.	Auger Boring
	Sandy SILT, soft, brown, trace mica, clay, moist, low plastic: ALLUVIAL		1	SS	1-1-3		Groundwater was present at a depth of 8 feet at the time of drilling.
	SAND, loose, tan/brown, trace silt, wet, non-plastic: ALLUVIAL	5.0	2	SS	3-3-7		Boring caved in to a depth of 11 feet after the completion of drilling.
	SAND & SILT, frim to stiff, brown, white, black, trace mica, rock, moist to wet, non-plastic, banded: SAPROLITE		3	SS	3-2-3		
		10.0	4	SS	3-3-6		
		15.0	5	SS	3-3-4		
		20.0	6	SS	5-6-8		
		25.0	7	SS	8-10-12		
	SAND, firm to very dense, black, some mica, silt, wet, non-plastic: SAPROLITE	30.0	8	SS	8-15-50/5"		
		35.0	9	SS	13-15-15		
	Boring Terminated @ 35'	40.0					
		45.0					
		50.0					

LEGEND
SPT= Standard Penetration Test
SS = Split-Spoon (sample)
UDS= Undisturbed Sample
GS= Ground Surface
PWR=Partially Weathered Rock
HWR=Highly Weathered Rock
WOH=Weight of Hammer

CCG

LOG of BORING

Project Name:	**Olde Town Conyers Trail-Rockdale School Crossing**	Project No.:	**2191.001.15**
Client:	**Path Foundation**	Boring No.:	**B-4 (West Side)**
Location:	**Conyers, Georgia**	Date:	**4/7/2015**

Elevation	Description	Depth	Samples			Drilling Observations
GS	Topsoil: 4"	(feet)	No.	Type	Blows/6" Recov.	Auger Boring
	SAND, loose, tan, black, trace silt, moist, non-plastic: ALLUVIAL		1	SS	1-2-3	Groundwater was present at a depth of 6 feet at the time of drilling.
	SILT, soft, gray, brown, trace clay, wet, low plastic: ALLUVIAL	5.0	2	SS	2-2-1	
			3	SS	2-2-2	Boring caved in to a depth of 8.9 feet after the completion of drilling.
	Micaceous Sandy SILT, soft to firm, brown, black, moist, non-plastic, mottled: SAPROLITE	10.0	4	SS	w.o.h.-3-3	
	SAND & SILT, firm, yellow, brown, white, some to trace mica, trace rock, wet, mottled: SAPROLITE	15.0	5	SS	2-2-3	
		20.0	6	SS	2-3-4	
	SAND, firm, tan, white, some silt, trace mica, rock, wet, non-plastic, mottled: SAPROLITE	25.0	7	SS	4-7-9	
		30.0	8	SS	5-6-9	
		35.0	9	SS	8-12-14	
		40.0	10	SS	7-7-7	
	Boring Terminated @ 40'	45.0				
		50.0				

LEGEND
SPT= Standard Penetration Test
SS = Split-Spoon (sample)
UDS= Undisturbed Sample
GS= Ground Surface
PWR=Partially Weathered Rock
HWR=Highly Weathered Rock
WOH=Weight of Hammer