

REFERENCE: 35135-07

PROJECT: N/A

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
DIVISION OF HIGHWAYS  
GEOTECHNICAL ENGINEERING UNIT

**ROADWAY  
SUBSURFACE INVESTIGATION**

COUNTY GASTON  
PROJECT DESCRIPTION NC HWY 16 PIPE CULVERT  
FAILURE

CONTENTS

SHEET NO.	DESCRIPTION
1	TITLE SHEET
2	LEGEND (SOIL & ROCK)
3-4	SITE PLANS
5-II	BORELOGS AND DIRECT PUSH LOGS

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	35135-07	1	11

CAUTION NOTICE

THE SUBSURFACE INFORMATION AND THE SUBSURFACE INVESTIGATION ON WHICH IT IS BASED WERE MADE FOR THE PURPOSE OF STUDY, PLANNING AND DESIGN, AND NOT FOR CONSTRUCTION OR PAY PURPOSES. THE VARIOUS FIELD BORING LOGS, ROCK CORES AND SOIL TEST DATA AVAILABLE MAY BE REVIEWED OR INSPECTED IN RALEIGH BY CONTACTING THE N.C. DEPARTMENT OF TRANSPORTATION, GEOTECHNICAL ENGINEERING UNIT AT (919) 707-6850. THE SUBSURFACE PLANS AND REPORTS, FIELD BORING LOGS, ROCK CORES AND SOIL TEST DATA ARE NOT PART OF THE CONTRACT.

GENERAL SOIL AND ROCK STRATA DESCRIPTIONS AND INDICATED BOUNDARIES ARE BASED ON A GEOTECHNICAL INTERPRETATION OF ALL AVAILABLE SUBSURFACE DATA AND MAY NOT NECESSARILY REFLECT THE ACTUAL SUBSURFACE CONDITIONS BETWEEN BORINGS OR BETWEEN SAMPLED STRATA WITHIN THE BOREHOLE. THE LABORATORY SAMPLE DATA AND THE IN SITU (ON-PLACE) TEST DATA CAN BE RELIED ON ONLY TO THE DEGREE OF RELIABILITY INHERENT IN THE STANDARD TEST METHOD. THE OBSERVED WATER LEVELS OR SOIL MOISTURE CONDITIONS INDICATED IN THE SUBSURFACE INVESTIGATIONS ARE AS RECORDED AT THE TIME OF THE INVESTIGATION. THESE WATER LEVELS OR SOIL MOISTURE CONDITIONS MAY VARY CONSIDERABLY WITH TIME ACCORDING TO CLIMATIC CONDITIONS INCLUDING TEMPERATURES, PRECIPITATION AND WIND, AS WELL AS OTHER NON-CLIMATIC FACTORS.

THE BIDDER OR CONTRACTOR IS CAUTIONED THAT DETAILS SHOWN ON THE SUBSURFACE PLANS ARE PRELIMINARY ONLY AND IN MANY CASES THE FINAL DESIGN DETAILS ARE DIFFERENT. FOR BIDDING AND CONSTRUCTION PURPOSES, REFER TO THE CONSTRUCTION PLANS AND DOCUMENTS FOR FINAL DESIGN INFORMATION ON THIS PROJECT. THE DEPARTMENT DOES NOT WARRANT OR GUARANTEE THE SUFFICIENCY OR ACCURACY OF THE INVESTIGATION MADE, NOR THE INTERPRETATIONS MADE, OR OPINION OF THE DEPARTMENT AS TO THE TYPE OF MATERIALS AND CONDITIONS TO BE ENCOUNTERED. THE BIDDER OR CONTRACTOR IS CAUTIONED TO MAKE SUCH INDEPENDENT SUBSURFACE INVESTIGATIONS AS HE DEEMS NECESSARY TO SATISFY HIMSELF AS TO CONDITIONS TO BE ENCOUNTERED ON THE PROJECT. THE CONTRACTOR SHALL HAVE NO CLAIM FOR ADDITIONAL COMPENSATION OR FOR AN EXTENSION OF TIME FOR ANY REASON RESULTING FROM THE ACTUAL CONDITIONS ENCOUNTERED AT THE SITE DIFFERING FROM THOSE INDICATED IN THE SUBSURFACE INFORMATION.

- NOTES:
1. THE INFORMATION CONTAINED HEREIN IS NOT IMPLIED OR GUARANTEED BY THE N.C. DEPARTMENT OF TRANSPORTATION AS ACCURATE NOR IS IT CONSIDERED PART OF THE PLANS, SPECIFICATIONS OR CONTRACT FOR THE PROJECT.
  2. BY HAVING REQUESTED THIS INFORMATION, THE CONTRACTOR SPECIFICALLY WAIVES ANY CLAIMS FOR INCREASED COMPENSATION OR EXTENSION OF TIME BASED ON DIFFERENCES BETWEEN THE CONDITIONS INDICATED HEREIN AND THE ACTUAL CONDITIONS AT THE PROJECT SITE.

PERSONNEL  
 GEOLOGIC EXPLORATION  
M. BREWER  
C. BUKOVITZ

INVESTIGATED BY ECS CAROLINAS, LLP  
 DRAWN BY M. BREWER, P.E.  
 CHECKED BY M. WALKO, P.E.  
 SUBMITTED BY ECS CAROLINAS, LLP  
 DATE OCTOBER 2016

Prepared in the Office of:



P. Matthew Brewer 10-14-16  
 SIGNATURE DATE

DOCUMENT NOT CONSIDERED FINAL  
UNLESS ALL SIGNATURES COMPLETED

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT
SUBSURFACE INVESTIGATION
SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

SOIL DESCRIPTION
SOIL IS CONSIDERED UNCONSOLIDATED, SEMI-CONSOLIDATED, OR WEATHERED EARTH MATERIALS THAT CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER AND YIELD LESS THAN 100 BLOWS PER FOOT...

GRADATION
WELL GRADED - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE.
UNIFORMLY GRADED - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE.

ROCK DESCRIPTION
HARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT REFUSAL IF TESTED, AN INFERRED ROCK LINE INDICATES THE LEVEL AT WHICH NON-COASTAL PLAIN MATERIAL WOULD YIELD SPT REFUSAL...

TERMS AND DEFINITIONS
ALLUVIUM (ALLUV.) - SOILS THAT HAVE BEEN TRANSPORTED BY WATER.
AQUIFER - A WATER BEARING FORMATION OR STRATA.
ARENACEOUS - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND.

SOIL LEGEND AND AASHTO CLASSIFICATION
GENERAL CLASS. GRANULAR MATERIALS (<= 35% PASSING #200) SILT-CLAY MATERIALS (> 35% PASSING #200) ORGANIC MATERIALS

MINERALOGICAL COMPOSITION
MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHEN THEY ARE CONSIDERED OF SIGNIFICANCE.

COMPRESSIONIBILITY
SLIGHTLY COMPRESSIBLE LL < 31
MODERATELY COMPRESSIBLE LL = 31 - 50
HIGHLY COMPRESSIBLE LL > 50

PERCENTAGE OF MATERIAL
ORGANIC MATERIAL GRANULAR SOILS SILT - CLAY SOILS OTHER MATERIAL
TRACE OF ORGANIC MATTER 2 - 3% 3 - 5% TRACE 1 - 10%

GROUND WATER
WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING
STATIC WATER LEVEL AFTER 24 HOURS
PERCHED WATER, SATURATED ZONE, OR WATER BEARING STRATA

WEATHERING
FRESH ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING, ROCK RINGS UNDER HAMMER IF CRYSTALLINE.
VERY SLIGHT (V SLI) ROCK GENERALLY FRESH, JOINTS STAINED, SOME JOINTS MAY SHOW THIN CLAY COATINGS IF OPEN...

CONSISTENCY OR DENSENESS
PRIMARY SOIL TYPE COMPACTNESS OR CONSISTENCY RANGE OF STANDARD PENETRATION RESISTANCE (N-VALUE) RANGE OF UNCONFINED COMPRESSIVE STRENGTH (TONS/FT^2)

MISCELLANEOUS SYMBOLS
ROADWAY EMBANKMENT (RE) WITH SOIL DESCRIPTION
SOIL SYMBOL
ARTIFICIAL FILL (AF) OTHER THAN ROADWAY EMBANKMENT

ROCK HARDNESS
VERY HARD CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK, BREAKING OF HAND SPECIMENS REQUIRES SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK.

TEXTURE OR GRAIN SIZE
U.S. STD. SIEVE SIZE OPENING (MM) 4 10 40 60 200 270
BOULDER (BLDR.) COBBLE (COB.) GRAVEL (GR.) COARSE SAND (CSE. SD.) FINE SAND (F SD.) SILT (SL.) CLAY (CL.)

RECOMMENDATION SYMBOLS
UNDERCUT UNCLASSIFIED EXCAVATION - UNSUITABLE WASTE UNCLASSIFIED EXCAVATION - ACCEPTABLE, BUT NOT TO BE USED IN THE TOP 3 FEET OF EMBANKMENT OR BACKFILL

ABBREVIATIONS
AR - AUGER REFUSAL BT - BORING TERMINATED CL - CLAY CPT - CONE PENETRATION TEST

SOIL MOISTURE - CORRELATION OF TERMS
SOIL MOISTURE SCALE (ATTERBERG LIMITS) FIELD MOISTURE DESCRIPTION GUIDE FOR FIELD MOISTURE DESCRIPTION

EQUIPMENT USED ON SUBJECT PROJECT
DRILL UNITS: CME-45C CME-55 CME-550 VANE SHEAR TEST PORTABLE HOIST
ADVANCING TOOLS: CLAY BITS 6" CONTINUOUS FLIGHT AUGER 6" HOLLOW AUGERS HARD FACED FINGER BITS TUNG-CARBIDE INSERTS CASING w/ ADVANCER TRICONE \*STEEL TEETH TRICONE \*TUNG-CARB. CORE BIT DIRECT PUSH

FRACTURE SPACING BEDDING
TERM SPACING TERM THICKNESS
VERY WIDE MORE THAN 10 FEET VERY THICKLY BEDDED 4 FEET

PLASTICITY
NON PLASTIC SLIGHTLY PLASTIC MODERATELY PLASTIC HIGHLY PLASTIC
PLASTICITY INDEX (PI) DRY STRENGTH VERY LOW SLIGHT MEDIUM HIGH

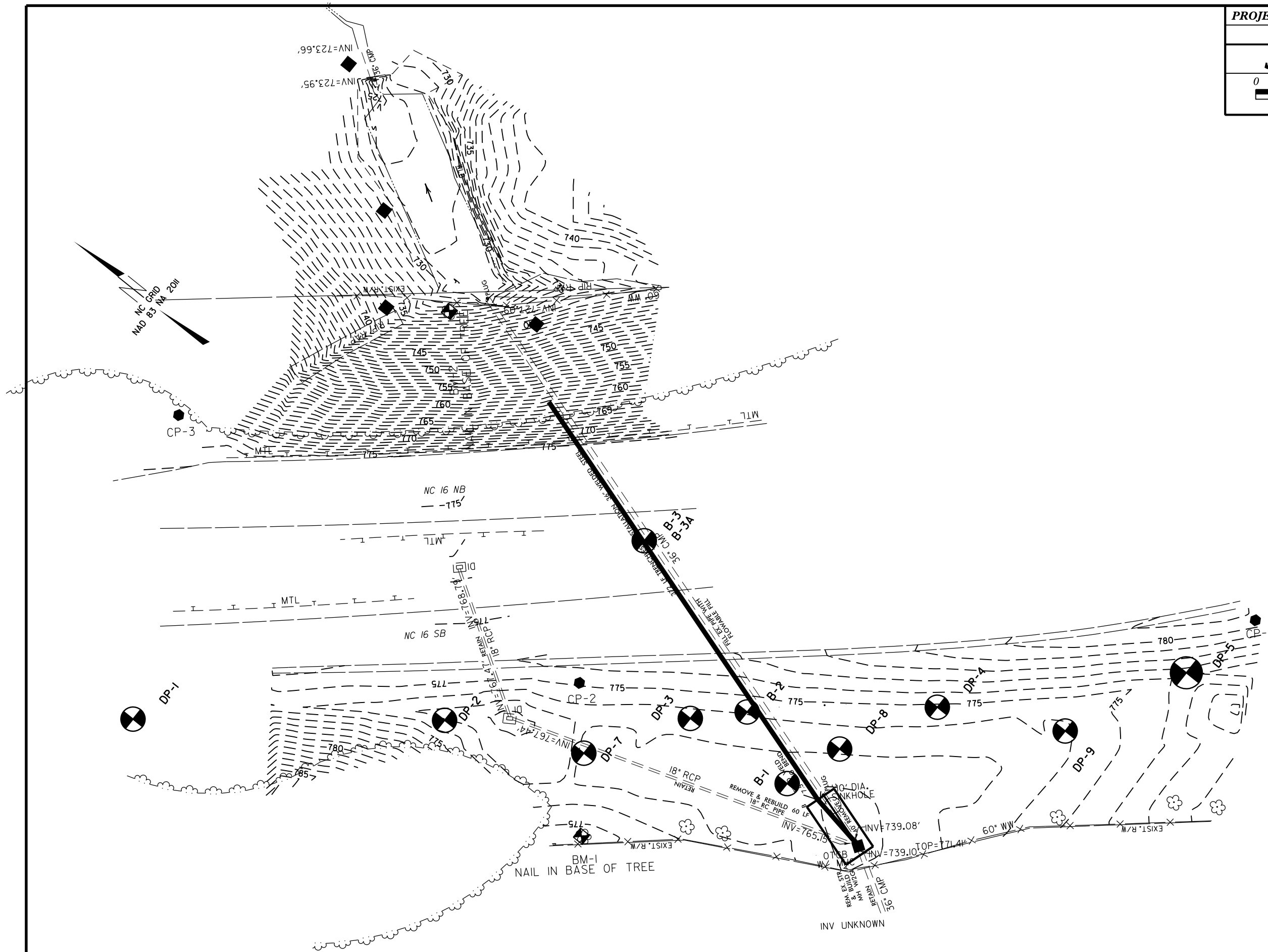
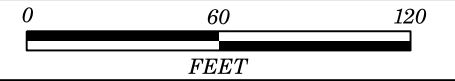
COLOR
DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-BROWN). MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.

INDURATION
FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.
FRIABLE RUBBING WITH FINGER FREES NUMEROUS GRAINS; GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE.

BENCH MARK:
ELEVATION: FEET
NOTES:
BORING LOCATION INFORMATION PROVIDED BY VAUGHN & MELTON



# SITE PLAN



# GEOTECHNICAL BORING REPORT

## BORE LOG

WBS 31535-07		TIP N/A		COUNTY GASTON		GEOLOGIST C. Bukovitz										
SITE DESCRIPTION NC-16 Pipe Culvert Failure							GROUND WTR (ft)									
BORING NO. B-1		STATION N/A		OFFSET N/A		ALIGNMENT N/A										
COLLAR ELEV. 772.3 ft		TOTAL DEPTH 41.0 ft		NORTHING 600,409		EASTING 1,402,341										
DRILL RIG/HAMMER EFF./DATE GEO366 Diedrich D50 87% 11/07/2015		DRILL METHOD H.S. Augers		HAMMER TYPE Automatic												
DRILLER J. Messick		START DATE 08/12/16		COMP. DATE 08/12/16		SURFACE WATER DEPTH N/A										
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG MOI	SOIL AND ROCK DESCRIPTION	DEPTH (ft)		
			0.5ft	0.5ft	0.5ft	0	25	50	75	100						
775																
	771.3	1.0	9	8	6											
770	768.8	3.5	7	5	7											
	766.3	6.0	3	5	7											
765	763.8	8.5	5	4	3											
	758.8	13.5	6	5	5											
755	753.8	18.5	2	2	2											
	748.8	23.5	2	2	2											
745	743.8	28.5	1	1	1											
	738.8	33.5														
735	733.8	38.5														
	731.3	41.0														

WBS 31535-07		TIP N/A		COUNTY GASTON		GEOLOGIST C. Bukovitz										
SITE DESCRIPTION NC-16 Pipe Culvert Failure							GROUND WTR (ft)									
BORING NO. B-2		STATION N/A		OFFSET N/A		ALIGNMENT N/A										
COLLAR ELEV. 774.1 ft		TOTAL DEPTH 40.9 ft		NORTHING 600,456		EASTING 1,402,360										
DRILL RIG/HAMMER EFF./DATE GEO366 Diedrich D50 87% 11/07/2015		DRILL METHOD H.S. Augers		HAMMER TYPE Automatic												
DRILLER J. Messick		START DATE 08/12/16		COMP. DATE 08/12/16		SURFACE WATER DEPTH N/A										
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG MOI	SOIL AND ROCK DESCRIPTION	DEPTH (ft)		
			0.5ft	0.5ft	0.5ft	0	25	50	75	100						
775																
	773.1	1.0	9	8	9											
770	770.6	3.5	7	4	7											
	768.1	6.0	4	6	5											
765	765.6	8.5	5	4	5											
	760.6	13.5	6	4	7											
755	755.6	18.5	5	8	5											
	750.6	23.5	4	4	7											
745	745.6	28.5	7	9	6											
	740.6	33.5	3	3	9											
735	735.6	38.5	12	20	80/0.3											
	733.2	40.9														

NCDOT BORE DOUBLE 11810 - BORING LOGS.GPJ NC\_DOT.GDT 10/13/16

# GEOTECHNICAL BORING REPORT

## BORE LOG

WBS 31535-07		TIP N/A		COUNTY GASTON		GEOLOGIST C. Bukovitz											
SITE DESCRIPTION NC-16 Pipe Culvert Failure							GROUND WTR (ft)										
BORING NO. B-3		STATION N/A		OFFSET N/A		ALIGNMENT N/A											
COLLAR ELEV. 776.0 ft		TOTAL DEPTH 16.8 ft		NORTHING 600,572		EASTING 1,402,403											
DRILL RIG/HAMMER EFF./DATE GEO366 Diedrich D50 87% 11/07/2015			DRILL METHOD H.S. Augers		HAMMER TYPE Automatic												
DRILLER J. Messick		START DATE 08/15/16		COMP. DATE 08/15/16		SURFACE WATER DEPTH N/A											
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)		
			0.5ft	0.5ft	0.5ft	0	25	50	75	100							
780																	
775	775.0	1.0	8	11	10									M	GROUND SURFACE	0.0	
	772.5	3.5	10	5	7									M	ROADWAY EMBANKMENT Medium Dense and Loose, Red-Tan-Gray, Silty Fine to Coarse SAND (A-2-4), with trace clay and some gravel		
770	770.0	6.0	4	4	5									M			
	767.5	8.5	5	4	4									M			
765	762.5	13.5	4	6	14									M			
760	760.7	15.3	11	15	10									M			
																Boring Terminated at Elevation 759.2 ft In Roadway Embankment (Boulder Fill)	16.8

WBS 31535-07		TIP N/A		COUNTY GASTON		GEOLOGIST C. Bukovitz											
SITE DESCRIPTION NC-16 Pipe Culvert Failure							GROUND WTR (ft)										
BORING NO. B-3A		STATION N/A		OFFSET N/A		ALIGNMENT N/A											
COLLAR ELEV. 776.0 ft		TOTAL DEPTH 20.0 ft		NORTHING 600,572		EASTING 1,402,403											
DRILL RIG/HAMMER EFF./DATE GEO366 Diedrich D50 87% 11/07/2015			DRILL METHOD H.S. Augers		HAMMER TYPE Automatic												
DRILLER J. Messick		START DATE 08/15/16		COMP. DATE 08/15/16		SURFACE WATER DEPTH N/A											
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)		
			0.5ft	0.5ft	0.5ft	0	25	50	75	100							
780																	
775	775.0	1.0	8	10	11									M	GROUND SURFACE	0.0	
	772.5	3.5	13	8	8									M	ROADWAY EMBANKMENT Loose to Dense, Tan-Gray-White-Red, Silty Fine to Coarse SAND (A-2-4), with trace clay and gravel		
770	770.0	6.0	4	4	5									M			
	767.5	8.5	8	5	4									M			
765	762.5	13.5	4	4	5									M			
760	757.5	18.5	54	22	18									M			
																Boring Terminated at Elevation 756.0 ft In Roadway Embankment (Boulder Fill)	20.0

NCDOT BORE DOUBLE 11810 - BORING LOGS.GPJ NC\_DOT.GDT 10/13/16

# GEOTECHNICAL BORING REPORT BORE LOG

WBS 31535-07	TIP N/A	COUNTY GASTON	GEOLOGIST C. Bukovitz
SITE DESCRIPTION NC-16 Pipe Culvert Failure			GROUND WTR (ft)
BORING NO. DP-1	STATION N/A	OFFSET N/A	ALIGNMENT N/A
COLLAR ELEV. 778.0 ft	TOTAL DEPTH 2.0 ft	NORTHING 600,750	EASTING 1,402,119
DRILL RIG/HAMMER EFF./DATE GEO7822 Geoprobe 7822DT 90% 02/05/2016	DRILL METHOD CPT / DPT	HAMMER TYPE Automatic	
DRILLER J. Messick	START DATE 08/12/16	COMP. DATE 08/12/16	SURFACE WATER DEPTH N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	L O G MOI	SOIL AND ROCK DESCRIPTION ELEV. (ft) DEPTH (ft)				
			0.5ft	0.5ft	0.5ft	0	25	50	75	100							
780																	
														778.0			GROUND SURFACE 0.0
														776.0			RESIDUAL Red-Brown, Fine Sandy SILT (A-4) Boring Terminated at Elevation 776.0 ft In Residual Sandy SILT (A-4) 2.0

WBS 31535-07	TIP N/A	COUNTY GASTON	GEOLOGIST C. Bukovitz
SITE DESCRIPTION NC-16 Pipe Culvert Failure			GROUND WTR (ft)
BORING NO. DP-2	STATION N/A	OFFSET N/A	ALIGNMENT N/A
COLLAR ELEV. 773.1 ft	TOTAL DEPTH 3.9 ft	NORTHING 600,599	EASTING 1,402,239
DRILL RIG/HAMMER EFF./DATE GEO7822 Geoprobe 7822DT 90% 02/05/2016	DRILL METHOD CPT / DPT	HAMMER TYPE Automatic	
DRILLER J. Messick	START DATE 08/12/16	COMP. DATE 08/12/16	SURFACE WATER DEPTH N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	L O G MOI	SOIL AND ROCK DESCRIPTION ELEV. (ft) DEPTH (ft)				
			0.5ft	0.5ft	0.5ft	0	25	50	75	100							
775																	
														773.1			GROUND SURFACE 0.0
														770.2			RESIDUAL Red-brown, Fine Sandy SILT (A-4) 2.9
														769.2			Gray, Silty Fine to Coarse SAND (A-2-4) Boring Terminated at Elevation 769.2 ft In Residual Silty SAND (A-2-4) 3.9

# GEOTECHNICAL BORING REPORT

## BORE LOG

WBS 31535-07		TIP N/A		COUNTY GASTON		GEOLOGIST C. Bukovitz								
SITE DESCRIPTION NC-16 Pipe Culvert Failure							GROUND WTR (ft)							
BORING NO. DP-3		STATION N/A		OFFSET N/A		ALIGNMENT N/A								
COLLAR ELEV. 773.5 ft		TOTAL DEPTH 15.0 ft		NORTHING 600,481		EASTING 1,402,335								
DRILL RIG/HAMMER EFF./DATE GEO7822 Geoprobe 7822DT 90% 02/05/2016		DRILL METHOD CPT / DPT		HAMMER TYPE Automatic										
DRILLER J. Messick		START DATE 08/12/16		COMP. DATE 08/12/16		SURFACE WATER DEPTH N/A								
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100				ELEV. (ft)
775														GROUND SURFACE 0.0
												M		773.5 772.8 ARTIFICIAL FILL Gray, Fine Sandy SILT (A-4). Flyash sampled as Gray, Silty Fine to Coarse SAND (A-2-4).
770												M		
765												M		764.7 ROADWAY EMBANKMENT Gray-Brown, Silty CLAY (A-7-5). 8.8
760												M		758.5 15.0 Boring Terminated at Elevation 758.5 ft In Roadway Embankment Silty CLAY (A-7-5)

WBS 31535-07		TIP N/A		COUNTY GASTON		GEOLOGIST C. Bukovitz								
SITE DESCRIPTION NC-16 Pipe Culvert Failure							GROUND WTR (ft)							
BORING NO. DP-4		STATION N/A		OFFSET N/A		ALIGNMENT N/A								
COLLAR ELEV. 774.5 ft		TOTAL DEPTH 18.5 ft		NORTHING 600,366		EASTING 1,402,436								
DRILL RIG/HAMMER EFF./DATE GEO7822 Geoprobe 7822DT 90% 02/05/2016		DRILL METHOD CPT / DPT		HAMMER TYPE Automatic										
DRILLER J. Messick		START DATE 08/12/16		COMP. DATE 08/12/16		SURFACE WATER DEPTH N/A								
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100				ELEV. (ft)
775														GROUND SURFACE 0.0
												M		774.5 773.5 ARTIFICIAL FILL Red-Brown, Fine Sandy SILT (A-4), with trace organics. Flyash sampled as Gray, Silty Fine to Coarse SAND (A-2-4).
770												M		
765												M		764.9 ROADWAY EMBANKMENT Red, Fine Sandy, Silty CLAY (A-7-5). 9.6
760												M		758.5 16.0 Gray-Red-Brown, Silty Fine SAND (A-2-4).
												M		756.0 18.5 Boring Terminated at Elevation 756.0 ft In Roadway Embankment Silty SAND (A-2-4)

NCDOT BORE DOUBLE 11810 - BORING LOGS.GPJ NC\_DOT.GDT 10/13/16



# GEOTECHNICAL BORING REPORT

## BORE LOG

WBS 31535-07		TIP N/A		COUNTY GASTON		GEOLOGIST C. Bukovitz									
SITE DESCRIPTION NC-16 Pipe Culvert Failure							GROUND WTR (ft)								
BORING NO. DP-5		STATION N/A		OFFSET N/A		ALIGNMENT N/A									
COLLAR ELEV. 776.5 ft		TOTAL DEPTH 5.0 ft		NORTHING 600,259		EASTING 1,402,549									
DRILL RIG/HAMMER EFF./DATE GEO7822 Geoprobe 7822DT 90% 02/05/2016			DRILL METHOD CPT / DPT		HAMMER TYPE Automatic										
DRILLER J. Messick		START DATE 08/12/16		COMP. DATE 08/12/16		SURFACE WATER DEPTH N/A									
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG MOI	SOIL AND ROCK DESCRIPTION	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100					
780															
														776.5	0.0
775												M			
														771.5	5.0

WBS 31535-07		TIP N/A		COUNTY GASTON		GEOLOGIST C. Bukovitz									
SITE DESCRIPTION NC-16 Pipe Culvert Failure							GROUND WTR (ft)								
BORING NO. DP-6		STATION N/A		OFFSET N/A		ALIGNMENT N/A									
COLLAR ELEV. 778.2 ft		TOTAL DEPTH 5.0 ft		NORTHING 600,139		EASTING 1,402,660									
DRILL RIG/HAMMER EFF./DATE GEO7822 Geoprobe 7822DT 90% 02/05/2016			DRILL METHOD CPT / DPT		HAMMER TYPE Automatic										
DRILLER J. Messick		START DATE 08/12/16		COMP. DATE 08/12/16		SURFACE WATER DEPTH N/A									
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG MOI	SOIL AND ROCK DESCRIPTION	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100					
780															
														778.2	0.0
775												M			
														773.2	5.0

NCDOT BORE DOUBLE 11810 - BORING LOGS.GPJ NC\_DOT.GDT 10/13/16

# GEOTECHNICAL BORING REPORT BORE LOG

WBS 31535-07		TIP N/A		COUNTY GASTON		GEOLOGIST C. Bukovitz										
SITE DESCRIPTION NC-16 Pipe Culvert Failure							GROUND WTR (ft)									
BORING NO. DP-7		STATION N/A		OFFSET N/A		ALIGNMENT N/A										
COLLAR ELEV. 772.9 ft		TOTAL DEPTH 13.0 ft		NORTHING 600,519		EASTING 1,402,277										
DRILL RIG/HAMMER EFF./DATE GEO7822 Geoprobe 7822DT 90% 02/05/2016		DRILL METHOD CPT / DPT		HAMMER TYPE Automatic												
DRILLER J. Messick		START DATE 08/12/16		COMP. DATE 08/12/16		SURFACE WATER DEPTH N/A										
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100						
775															772.9	0.0
770													M	ARTIFICIAL FILL Flyash sampled as Gray, Silty Fine to Coarse SAND (A-2-4)		
765													M			
760													M	ROADWAY EMBANKMENT Red, Fine Sandy SILT (A-4)	10.3	
													M	RESIDUAL Gray-Brown, Silty Fine SAND (A-2-4)	12.3	
													M	Boring Terminated at Elevation 759.9 ft In Residual Silty SAND (A-2-4)	13.0	

WBS 31535-07		TIP N/A		COUNTY GASTON		GEOLOGIST C. Bukovitz										
SITE DESCRIPTION NC-16 Pipe Culvert Failure							GROUND WTR (ft)									
BORING NO. DP-8		STATION N/A		OFFSET N/A		ALIGNMENT N/A										
COLLAR ELEV. 773.2 ft		TOTAL DEPTH 15.0 ft		NORTHING 600,397		EASTING 1,402,378										
DRILL RIG/HAMMER EFF./DATE GEO7822 Geoprobe 7822DT 90% 02/05/2016		DRILL METHOD CPT / DPT		HAMMER TYPE Automatic												
DRILLER J. Messick		START DATE 08/12/16		COMP. DATE 08/12/16		SURFACE WATER DEPTH N/A										
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100						
775															773.2	0.0
770													M	ARTIFICIAL FILL Flyash sampled as Gray, Silty Fine to Coarse SAND (A-2-4)		
765													M			
760																
															758.2	15.0
															Boring Terminated at Elevation 758.2 ft In Artificial Fill Flyash (A-2-4)	

NCDOT BORE DOUBLE 11810 - BORING LOGS.GPJ NC\_DOT.GDT 10/13/16

# GEOTECHNICAL BORING REPORT

## BORE LOG

WBS 31535-07		TIP N/A		COUNTY GASTON		GEOLOGIST C. Bukovitz										
SITE DESCRIPTION NC-16 Pipe Culvert Failure							GROUND WTR (ft)									
BORING NO. DP-9		STATION N/A		OFFSET N/A		ALIGNMENT N/A										
COLLAR ELEV. 773.8 ft		TOTAL DEPTH 20.0 ft		NORTHING 600,295		EASTING 1,402,474										
DRILL RIG/HAMMER EFF./DATE GE07822 Geoprobe 7822DT 90% 02/05/2016				DRILL METHOD CPT / DPT		HAMMER TYPE Automatic										
DRILLER J. Messick		START DATE 08/12/16		COMP. DATE 08/12/16		SURFACE WATER DEPTH N/A										
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION			
			0.5ft	0.5ft	0.5ft	0	25	50	75	100			ELEV. (ft)	DEPTH (ft)		
775														773.8	0.0	GROUND SURFACE
												M		773.2	0.8	ARTIFICIAL FILL Brown, Silty Fine to Coarse SAND (A-2-4), with trace organics. Flyash sampled as Gray, Silty Fine to Coarse SAND (A-2-4)
770																
765												M				
760																
												M		759.3	14.5	ROADWAY EMBANKMENT
												M		757.6	16.2	Brown-Gray, Fine Sandy SILT (A-4)
755												M		753.8	20.0	RESIDUAL Gray-Orange, Fine Sandy, Silty CLAY (A-7-5)
																Boring Terminated at Elevation 753.8 ft In Residual Silty CLAY (A-7-5)

NCDOT BORE DOUBLE 11810 - BORING LOGS.GPJ NC\_DOT.GDT 10/13/16