

PROJECT: 52100.1.STR03TIB ID: P-5201

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

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	P-5201	1	21

CONTENTS

SHEET	DESCRIPTION
1	TITLE SHEET
2	LEGEND
3	SITE PLAN
4	PROFILE
5-7	CROSS SECTIONS
8-21	BORE LOGS, CORE LOGS, and CORE PHOTOS

STRUCTURE SUBSURFACE INVESTIGATION

PROJ. REFERENCE NO. 52100.1.STR03TIB (P-5201) F.A. PROJ. N/A
 COUNTY WAKE
 PROJECT DESCRIPTION MORRISVILLE PARKWAY (SR 3060)
GRADE SEPARATION UNDER NS/NCRR RAILROAD FROM WEST
OF CRABTREE CROSSINGS PKWY TO EAST OF BRISTOL CR DR
 SITE DESCRIPTION BRIDGE ON NS/NCRR (-MI-) OVER RELOCATED
MORRISVILLE PARKWAY (-L-)

CAUTION NOTICE

THE SUBSURFACE INFORMATION AND THE SUBSURFACE INVESTIGATION ON WHICH IT IS BASED WERE MADE FOR THE PURPOSES OF STUDY, PLANNING, AND DESIGN AND NOT FOR CONSTRUCTION OR FOR PROPOSED CONSTRUCTION. THE LARGE FIELD BORING LOGS, CORE LOGS, AND SOIL TEST DATA AVAILABLE MAY BE NEARLY OR COMPLETELY UNAVAILABLE TO THE DEPARTMENT OF TRANSPORTATION, ENGINEERING UNIT AT ANY TIME, WHETHER THE SUBSURFACE PLAN AND REPORT, FOR THE FIELD BORING LOGS, CORE LOGS, OR SOIL TEST DATA ARE PART OF THE CONTRACT.

GENERAL TYPE AND SOIL STRATA DESCRIPTIONS AND INDICATED BOUNDARIES ARE BASED ON A VISUAL INSPECTION OF AVAILABLE BORING DATA AND MAY NOT NECESSARILY REFLECT THE ACTUAL SUBSURFACE CONDITIONS BETWEEN BORDERS OR BETWEEN STRATA WITHIN THE BOREHOLE. THE LABORATORY SAMPLE DATA AND THE IN SITU UNSATURATED TEST DATA ARE LIMITED TO THE DEGREE OF RELIABILITY INHERENT IN THE STANDARD TEST METHODS. THE OBSERVED WATER LEVELS OR SOIL MOISTURE CAPACITIES INDICATED IN THE SUBSURFACE INVESTIGATIONS ARE AS RECORDED AT THE END OF THE INVESTIGATION. THESE WATER LEVELS OR SOIL MOISTURE CAPACITIES MAY VARY CONSIDERABLY WITH THE OCCURRENCE OF LOCAL CONDITIONS INCLUDING TEMPERATURES, PRECIPITATION, AND WIND, AS WELL AS OTHER NATURAL 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 ACCURACY OR ADEQUACY OF THE INVESTIGATION MADE FOR THE INTERPRETATION MADE OR OPINION OF THE DEPARTMENT AS TO THE TYPE OF MATERIAL 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 THIS PROJECT. THE CONTRACTOR SHALL HAVE NO CLAIM FOR ADDITIONAL COMPENSATION OR FOR AN EXTENSION OF THE PERIOD BECAUSE OF THE ACTUAL CONDITIONS ENCOUNTERED AT THE SITE DIFFERING FROM THOSE INDICATED IN THE SUBSURFACE INFORMATION.

PERSONNEL

B. WORLEY, PG

B. SMITH

L. GONZALEZ-CASTILLO

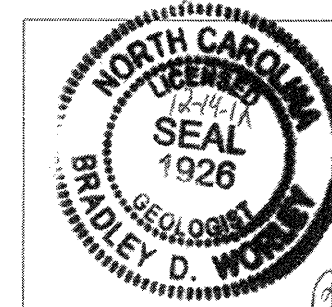
C. HUSKETH

INVESTIGATED BY B. WORLEY, PG

CHECKED BY D. DEWEY, PE

SUBMITTED BY Summit Design and Engineering

DATE DECEMBER, 2012



Bradley D. Worley

DRAWN BY: B. WORLEY, PG

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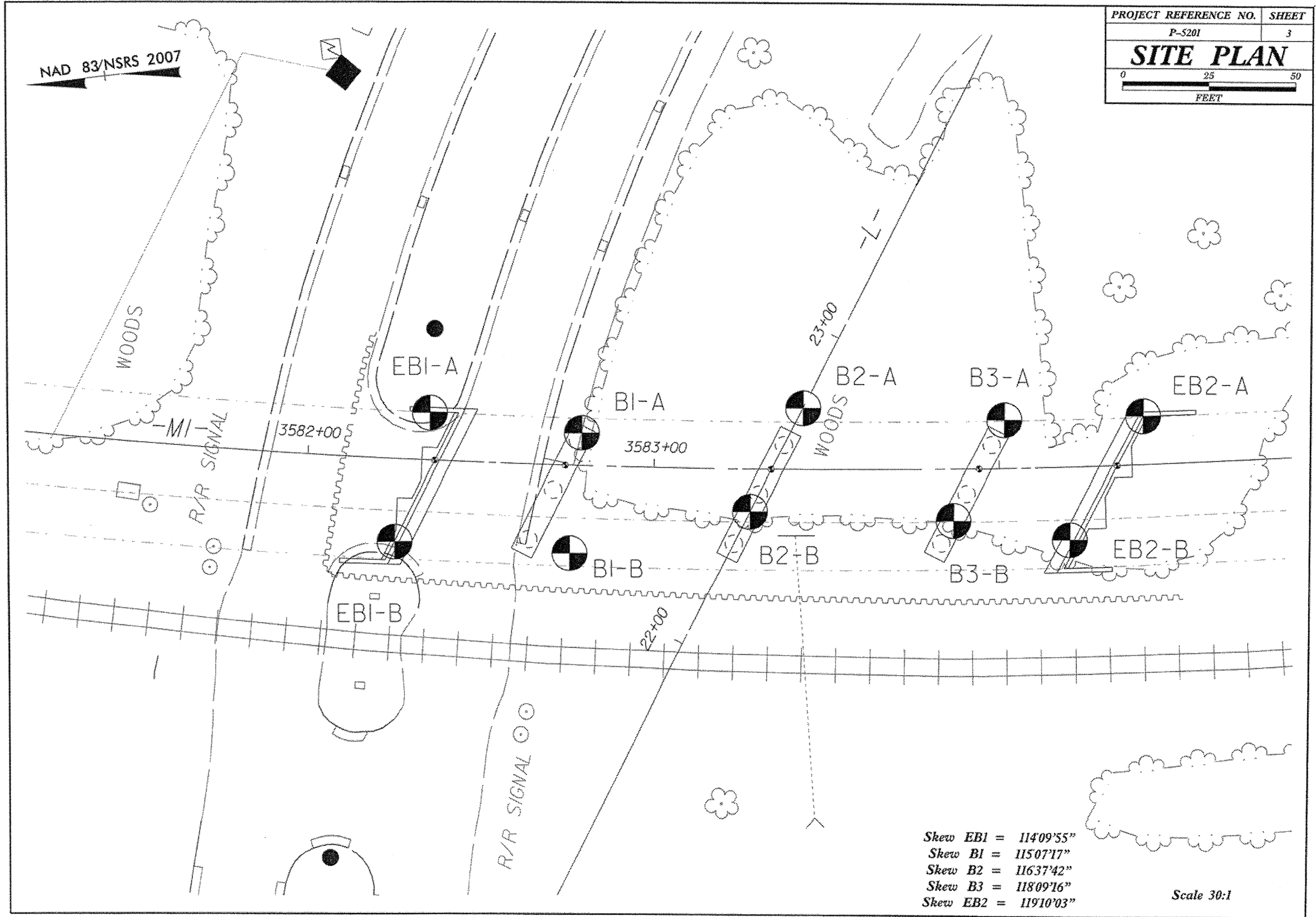
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NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT

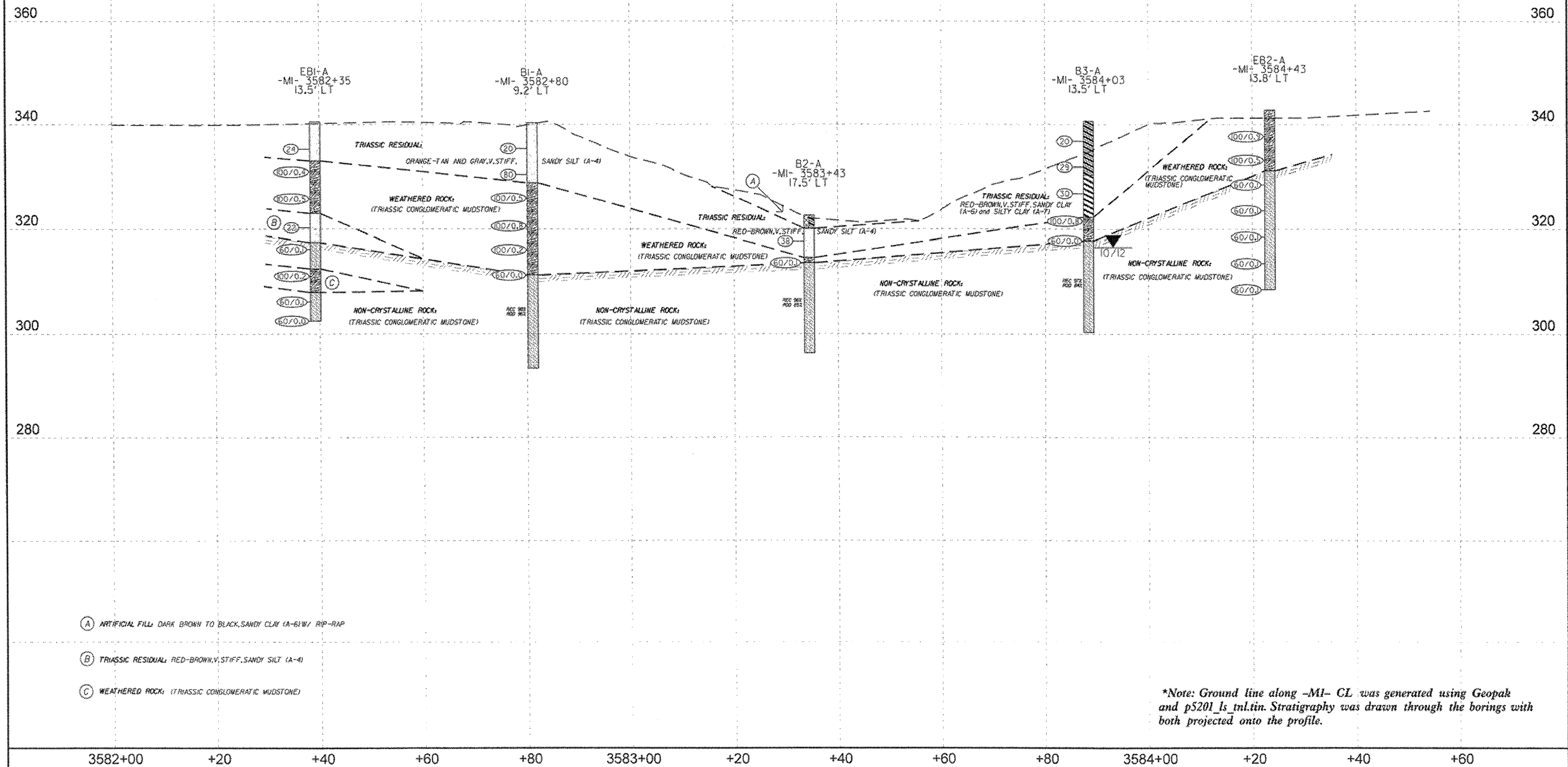
SUBSURFACE INVESTIGATION

SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

Table with multiple columns: SOIL DESCRIPTION, GRADATION, ROCK DESCRIPTION, TERMS AND DEFINITIONS, SOIL LEGEND AND AASHTO CLASSIFICATION, MINERALOGICAL COMPOSITION, COMPRESSIBILITY, PERCENTAGE OF MATERIAL, GROUND WATER, MISCELLANEOUS SYMBOLS, ABBREVIATIONS, EQUIPMENT USED ON SUBJECT PROJECT, FRACTURE SPACING, BEDDING, INDURATION, PLASTICITY, and COLOR.

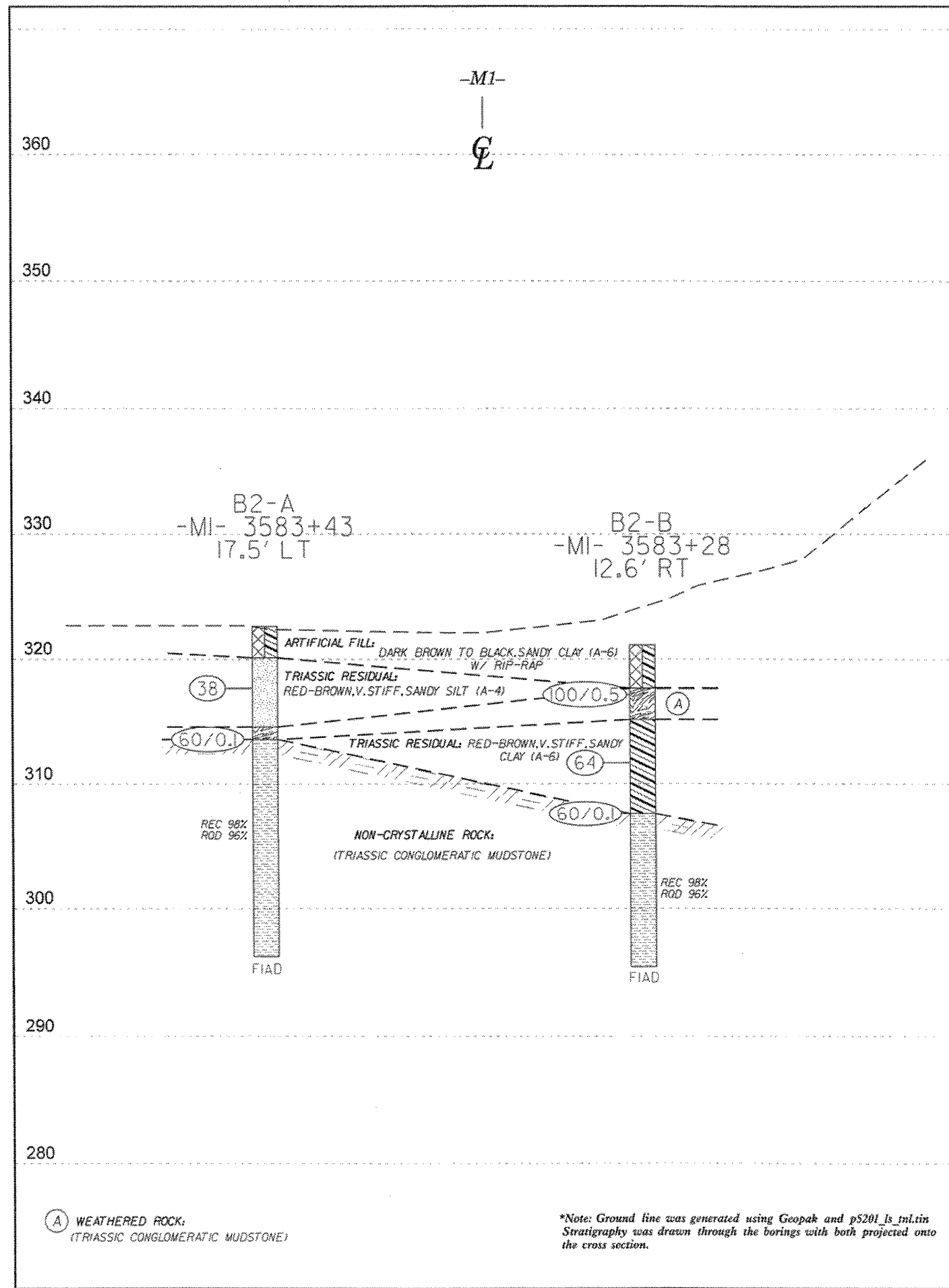


	PROJECT REFERENCE NO.	SHEET
	P-5201	4
PROFILE along -MI- EXIST		

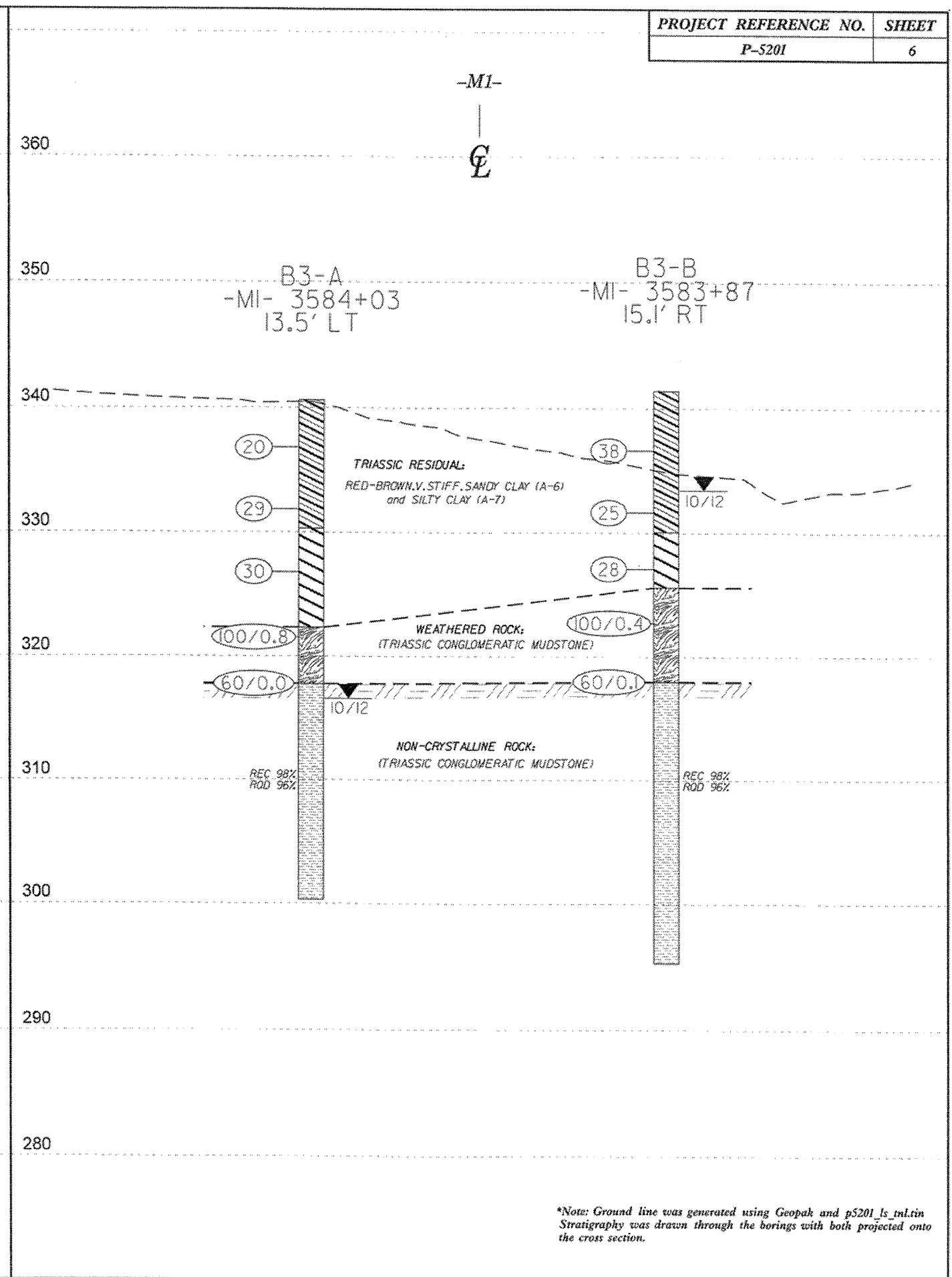


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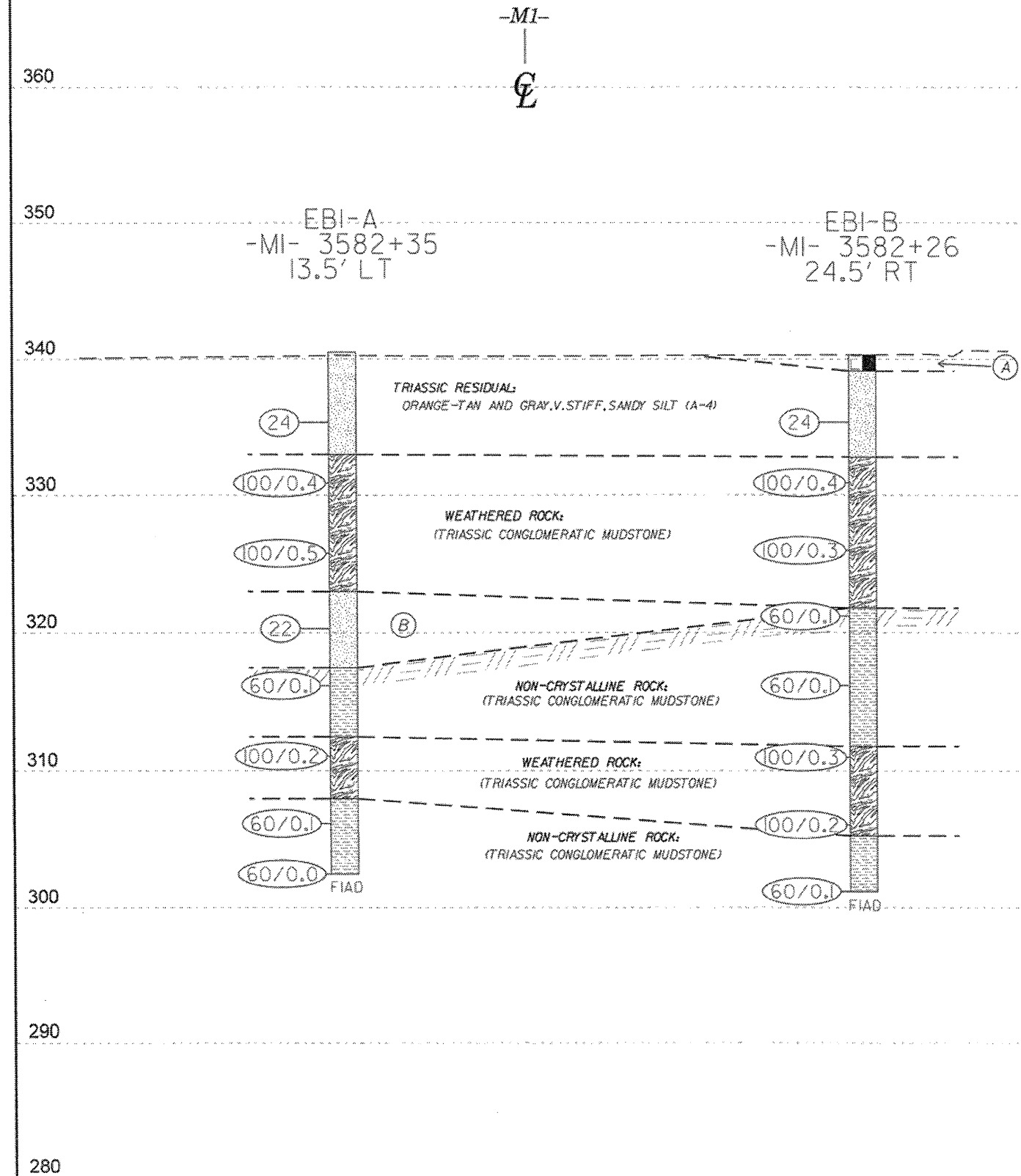
PROJECT REFERENCE NO.	SHEET
P-5201	6



HORIZ. SCALE 0 10 20 (FEET) VE = 1:1

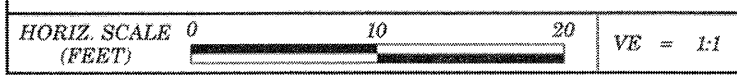


HORIZ. SCALE 0 10 20 (FEET) VE = 1:1

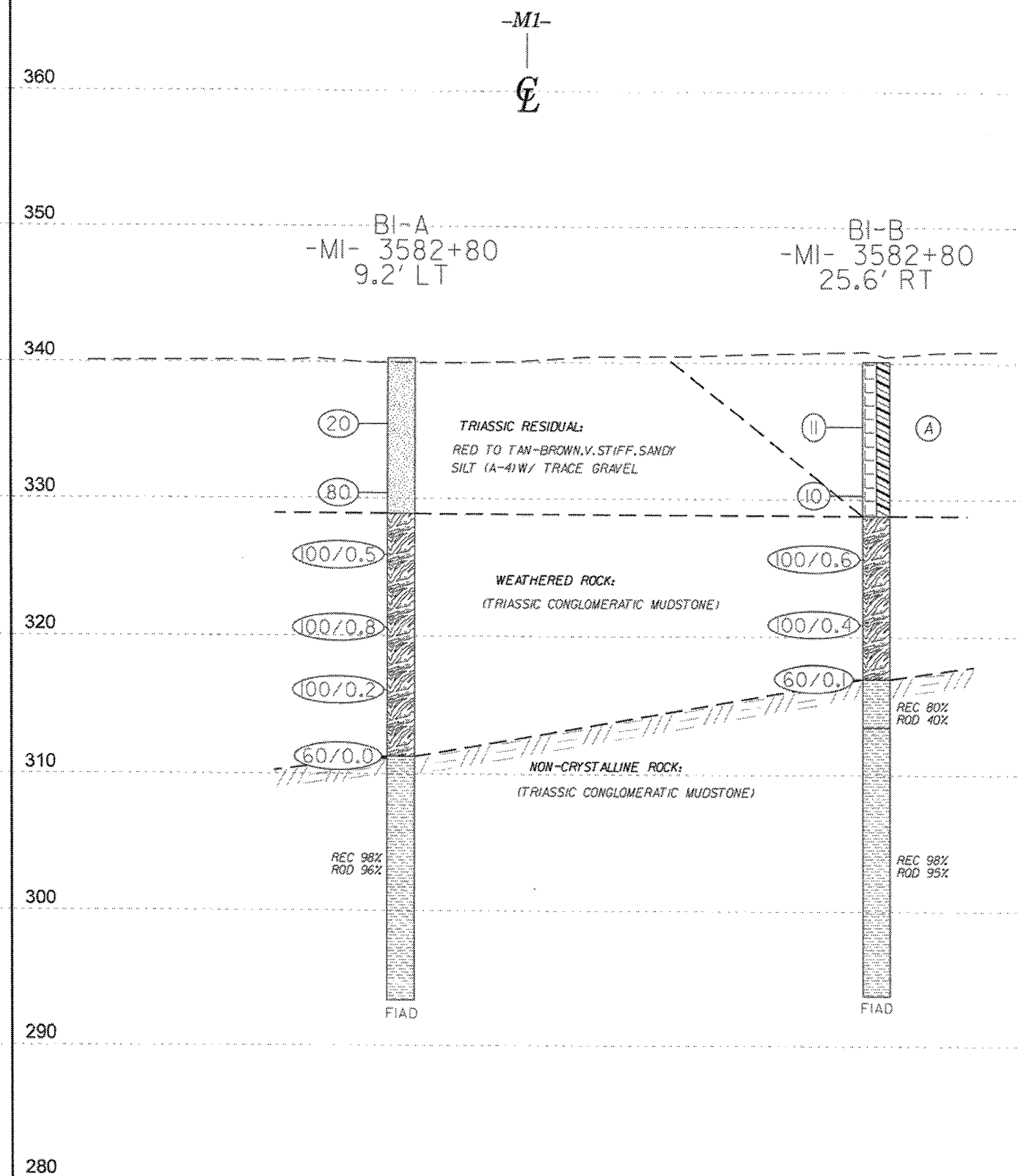


- (A) ROADWAY EMBANKMENT:
PAVEMENT AND GRAVEL
- (B) TRIASSIC RESIDUAL:
RED-BROWN, V. STIFF, SANDY SILT (A-4)

*Note: Ground line was generated using Geopak and p5201 Is_mlt.in
Stratigraphy was drawn through the borings with both projected onto
the cross section.

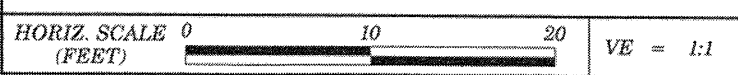


End Bent 1 CROSS SECTION

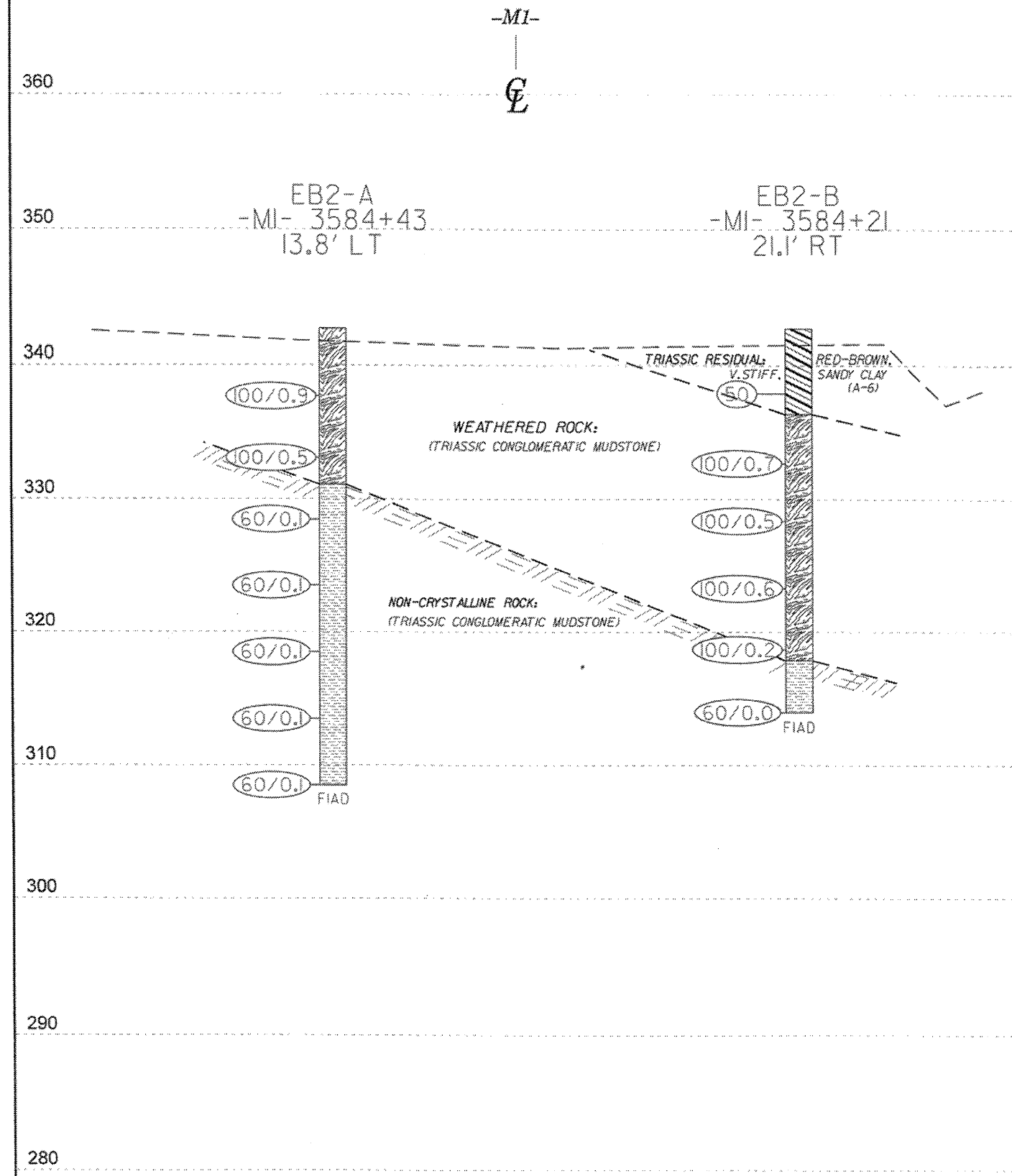


- (A) ROADWAY EMBANKMENT:
RED TO ORANGE-BROWN, STIFF, SANDY CLAY (A-6)
WITH LITTLE GRAVEL

*Note: Ground line was generated using Geopak and p5201 Is_mlt.in
Stratigraphy was drawn through the borings with both projected onto
the cross section.



Bent 1 CROSS SECTION



*Note: Ground line was generated using Geopak and p5201 Is.tbl.tin
Stratigraphy was drawn through the borings with both projected onto
the cross section.



VE = 1:1

End Bent 2 CROSS SECTION

NCDOT GEOTECHNICAL ENGINEERING UNIT BORELOG REPORT

WBS 52100.1.STR03TIB	TIP P-5201	COUNTY WAKE	GEOLOGIST Brad Worley
SITE DESCRIPTION Morrisville Parkway Grade Separation			GROUND WTR (ft)
BORING NO. EB1-A	STATION 3582+35	OFFSET 14 ft LT	ALIGNMENT -M1-
COLLAR ELEV. 340.5 ft	TOTAL DEPTH 38.0 ft	NORTHING 750,158	EASTING 2,051,929
DRILL RIG/HAMMER EFF./DATE SUM3359 CME-450 87% 07/22/2011		DRILL METHOD H.S. Augers	HAMMER TYPE Automatic
DRILLER Luis Gonzalez	START DATE 10/24/12	COMP. DATE 10/24/12	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				
345														
340													GROUND SURFACE	0.0
335	336.3	4.2	8	12	12							D	TRIASSIC RESIDUAL orange-tan to gray-tan, mottled, SANDY SILT with some clay (A-4)	
330	331.3	9.2	100/0.4										WEATHERED ROCK (Triassic Conglomeratic Mudstone)	7.5
325	326.3	14.2	100/0.5											
320	321.3	19.2	9	7	15							D	TRIASSIC RESIDUAL red-brown, SANDY SILT with some clay (A-4)	17.5
315	316.3	24.2	60/0.1										NON-CRYSTALLINE ROCK (Triassic Conglomeratic Mudstone)	23.0
310	311.3	29.2	100/0.2										WEATHERED ROCK (Triassic Conglomeratic Mudstone)	28.0
305	306.3	34.2	60/0.1										NON-CRYSTALLINE ROCK (Triassic Conglomeratic Mudstone)	32.5
	302.5	38.0	60/0.0										Boring Terminated by Auger Refusal at Elevation 302.5 ft in Non-Crystalline Rock (Triassic Conglomeratic Mudstone) Drilled in median of Morrisville Parkway	38.0

NCDOT GEOTECHNICAL ENGINEERING UNIT BORELOG REPORT

WBS 52100.1.STR03TIB	TIP P-5201	COUNTY WAKE	GEOLOGIST Brad Worley
SITE DESCRIPTION Morrisville Parkway Grade Separation			GROUND WTR (ft)
BORING NO. EB1-B	STATION 3582+26	OFFSET 25 ft RT	ALIGNMENT -M1-
COLLAR ELEV. 340.3 ft	TOTAL DEPTH 39.1 ft	NORTHING 750,173	EASTING 2,051,893
DRILL RIG/HAMMER EFF./DATE SUM3359 CME-450 87% 07/22/2011		DRILL METHOD H.S. Augers	HAMMER TYPE Automatic
DRILLER Luis Gonzalez	START DATE 10/24/12	COMP. DATE 10/24/12	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				
345														
340													GROUND SURFACE	0.0
335	336.3	4.0	10	12	12							D	ROADWAY EMBANKMENT pavement and gravel TRIASSIC RESIDUAL orange-tan and gray, SANDY SILT with some clay (A-4)	1.2
330	331.3	9.0	100/0.4										WEATHERED ROCK (Triassic Conglomeratic Mudstone)	7.5
325	326.3	14.0	100/0.3											
320	321.3	19.0	60/0.1										NON-CRYSTALLINE ROCK (Triassic Conglomeratic Mudstone)	18.5
315	316.3	24.0	60/0.1											
310	311.3	29.0	100/0.3										WEATHERED ROCK (Triassic Conglomeratic Mudstone)	28.5
305	306.3	34.0	100/0.2										NON-CRYSTALLINE ROCK (Triassic Conglomeratic Mudstone)	35.0
	301.3	39.0	60/0.1										Boring Terminated with Standard Penetration Test Refusal at Elevation 301.2 ft in Non-Crystalline Rock (Triassic Conglomeratic Mudstone)	39.1

NCDOT GEOTECHNICAL ENGINEERING UNIT BORELOG REPORT

Table containing bore log data for WBS 52100.1.STR03TIB, TIP P-5201, COUNTY WAKE. Includes columns for ELEV, DRIVE ELEV, DEPTH, BLOW COUNT, SOIL AND ROCK DESCRIPTION, and SAMP. NO. Stratigraphy includes Ground Surface, Triassic Residual, Weathered Rock, and Non-Crystalline Rock.

NCDOT BORE SINGLE P-5201 MORRISVILLE PARKWAY-BRIDGEBORINGS.GPJ NC_DOT.GDT 11/15/12

NCDOT GEOTECHNICAL ENGINEERING UNIT CORE BORING REPORT

Table containing core boring data for WBS 52100.1.STR03TIB, TIP P-5201, COUNTY WAKE. Includes columns for ELEV, RUN ELEV, DEPTH, RUN RATE, DRILL RATE, REC, RQD, SAMP. NO., STRATA, and DESCRIPTION AND REMARKS. Stratigraphy includes Non-Crystalline Rock (Triassic Conglomeratic Mudstone).

NCDOT CORE SINGLE P-5201 MORRISVILLE PARKWAY-BRIDGEBORINGS.GPJ NC_DOT.GDT 11/15/12

CORE PHOTOGRAPHS

B1-A
BOXES 1 & 2: 29.0 - 46.9 FEET



CORE PHOTOGRAPHS

B1-B

BOXES 1, 2, & 3: 23.1 - 46.3 FEET



NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 52100.1.STR03TIB		TIP P-5201		COUNTY WAKE		GEOLOGIST Brett Smith										
SITE DESCRIPTION Morrisville Parkway Grade Separation						GROUND WTR (ft)										
BORING NO. B2-A		STATION 3583+43		OFFSET 18 ft LT		ALIGNMENT -M1-										
COLLAR ELEV. 322.6 ft		TOTAL DEPTH 26.3 ft		NORTHING 750,051		EASTING 2,051,918										
DRILL RIG/HAMMER EFF./DATE SUM3359 CME-450 87% 07/22/2011		DRILL METHOD Core Boring		HAMMER TYPE Automatic												
DRILLER Craig Husketh		START DATE 10/16/12		COMP. DATE 10/16/12		SURFACE WATER DEPTH N/A										
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT				BLOWS PER FOOT				SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)		
			0.5ft	0.5ft	0.5ft	0	25	50	75	100						
325														322.6	GROUND SURFACE	0.0
														320.1	ARTIFICIAL FILL dark brown to black, SANDY CLAY and rip rap with little organics (A-6)	2.5
320	318.7	3.9	5	9	29									314.6	TRIASSIC RESIDUAL red-brown, SANDY SILT (A-4)	8.0
315	313.7	8.9												313.6	WEATHERED ROCK (Triassic Conglomeratic Mudstone)	9.0
310															NON-CRYSTALLINE ROCK (Triassic Conglomeratic Mudstone)	
305																
300																
														296.3	Boring Terminated at Elevation 296.3 ft in Non-Crystalline Rock (Triassic Conglomeratic Mudstone)	26.3
															Boring located 4ft above proposed grade of Morrisville Parkway. Drilling became harder at 8 feet, this was interpreted as the top of WR. Some perched water encountered around 3-3.5 feet.	

NCDOT BORE SINGLE P-5201 MORRISVILLE PARKWAY-BRIDGEBORINGS.GPJ NC_DOT.GDT 11/15/12

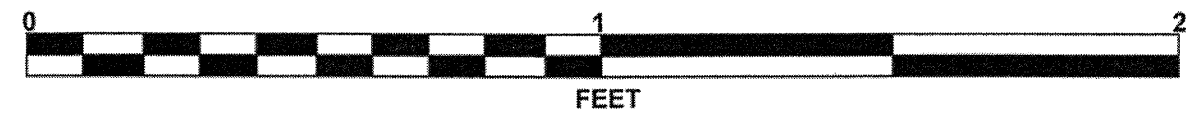
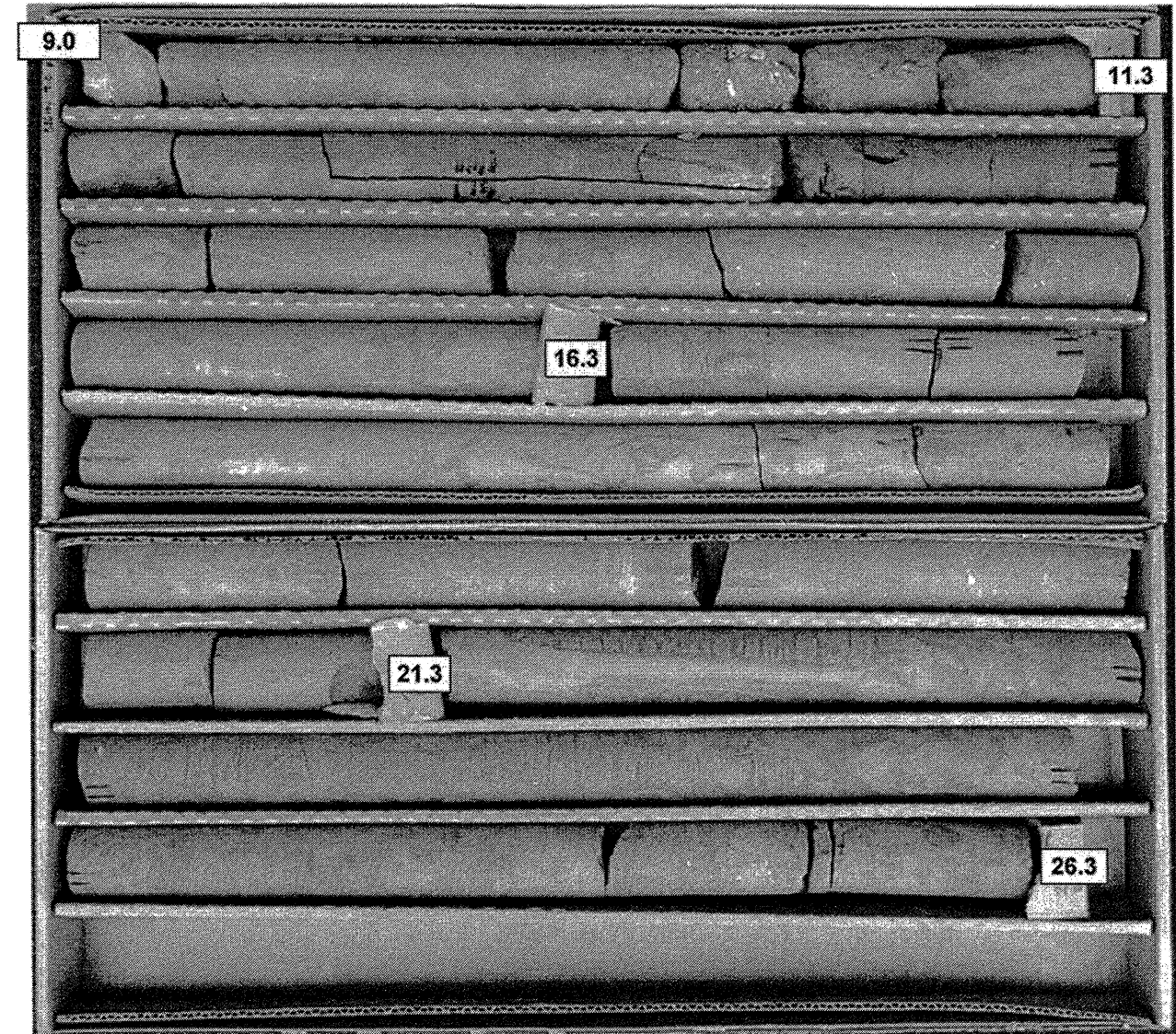
NCDOT GEOTECHNICAL ENGINEERING UNIT
CORE BORING REPORT

WBS 52100.1.STR03TIB		TIP P-5201		COUNTY WAKE		GEOLOGIST Brett Smith						
SITE DESCRIPTION Morrisville Parkway Grade Separation						GROUND WTR (ft)						
BORING NO. B2-A		STATION 3583+43		OFFSET 18 ft LT		ALIGNMENT -M1-						
COLLAR ELEV. 322.6 ft		TOTAL DEPTH 26.3 ft		NORTHING 750,051		EASTING 2,051,918						
DRILL RIG/HAMMER EFF./DATE SUM3359 CME-450 87% 07/22/2011		DRILL METHOD Core Boring		HAMMER TYPE Automatic								
DRILLER Craig Husketh		START DATE 10/16/12		COMP. DATE 10/16/12		SURFACE WATER DEPTH N/A						
ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/R)	RUN		STRATA		SAMP. NO.	LOG	DESCRIPTION AND REMARKS	DEPTH (ft)
					REC (%)	ROD (%)	REC (%)	ROD (%)				
313.6											Begin Coring @ 9.0 ft	
	313.6	9.0	2.3	2:42/1.0	(1.9)	(0.9)	(16.6)	(14.7)			NON-CRYSTALLINE ROCK	9.0
	311.3	11.3	5.0	4:01/1.3	83%	39%	96%	85%			red-brown, slight to moderately weathered, moderate to medium hardness, moderately close to close fracture spacing, moderately indurated. TRIASSIC CONGLOMERATIC MUDSTONE, gradational contacts between mudstone and conglomeratic mudstone with some arenaceous zones.	
	306.3	16.3	5.0	2:39/1.0	(4.8)	(4.3)						
				2:55/1.0	96%	86%						
				1:39/1.0								
				1:29/1.0								
				2:23/1.0								
				3:51/1.0	(5.0)	(4.7)						
				3:53/1.0	100%	94%						
				3:16/1.0								
				2:43/1.0								
				2:49/1.0								
				3:00/1.0	(4.9)	(4.8)						
				2:25/1.0	98%	95%						
				2:30/1.0								
				2:51/1.0								
				3:07/1.0								
											Boring Terminated at Elevation 296.3 ft in Non-Crystalline Rock (Triassic Conglomeratic Mudstone)	26.3
											Boring located 4ft above proposed grade of Morrisville Parkway. Drilling became harder at 8 feet, this was interpreted as the top of WR. Some perched water encountered around 3-3.5 feet.	

NCDOT CORE SINGLE P-5201 MORRISVILLE PARKWAY-BRIDGEBORINGS.GPJ NC_DOT.GDT 11/15/12

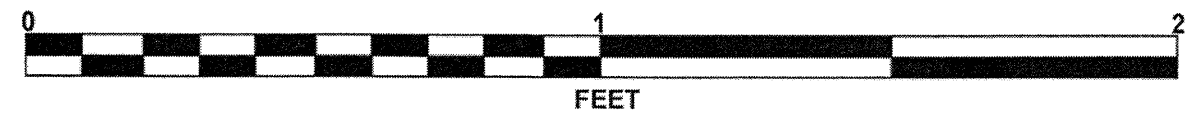
CORE PHOTOGRAPHS

B2-A
BOXES 1 & 2: 9.0 - 26.3 FEET



CORE PHOTOGRAPHS

B2-B BOXES 1 & 2: 13.5 - 25.6 FEET



NCDOT GEOTECHNICAL ENGINEERING UNIT BORELOG REPORT

WBS 52100.1.STR03TIB		TIP P-5201		COUNTY WAKE		GEOLOGIST Brett Smith									
SITE DESCRIPTION Morrisville Parkway Grade Separation							GROUND WTR (ft)								
BORING NO. B3-A		STATION 3584+03		OFFSET 14 ft LT		ALIGNMENT -M1-									
COLLAR ELEV. 340.6 ft		TOTAL DEPTH 40.3 ft		NORTHING 749,993		EASTING 2,051,908									
DRILL RIG/HAMMER EFF./DATE SUM3359 CME-450 87% 07/22/2011		DRILL METHOD Core Boring		HAMMER TYPE Automatic											
DRILLER Luis Gonzalez		START DATE 10/11/12		COMP. DATE 10/11/12		SURFACE WATER DEPTH N/A									
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100					
345															
340														GROUND SURFACE	0.0
		337.8	2.8	3	9	11								TRIASSIC RESIDUAL red-brown, SANDY CLAY with little gravel (A-6)	
335															
		332.8	7.8	8	12	17									
330															
		327.8	12.8	11	13	17								red-brown, SILTY CLAY with trace sand (A-7)	10.3
325															
		322.8	17.8	8	20	80/0.3								WEATHERED ROCK (Triassic Conglomeratic Mudstone)	18.3
320															
		317.8	22.8	60/0.0										NON-CRYSTALLINE ROCK (Triassic Conglomeratic Mudstone)	22.8
315															
310															
305															
														Boring Terminated at Elevation 300.3 ft in Non-Crystalline Rock (Triassic Conglomeratic Mudstone)	40.3
														Boring offset due to access issues, located 21 ft above proposed grade of Morrisville Parkway.	

NCDOT BORE SINGLE P-5201 MORRISVILLE PARKWAY-BRIDGEBORINGS.GPJ NC_DOT.GDT 11/15/12

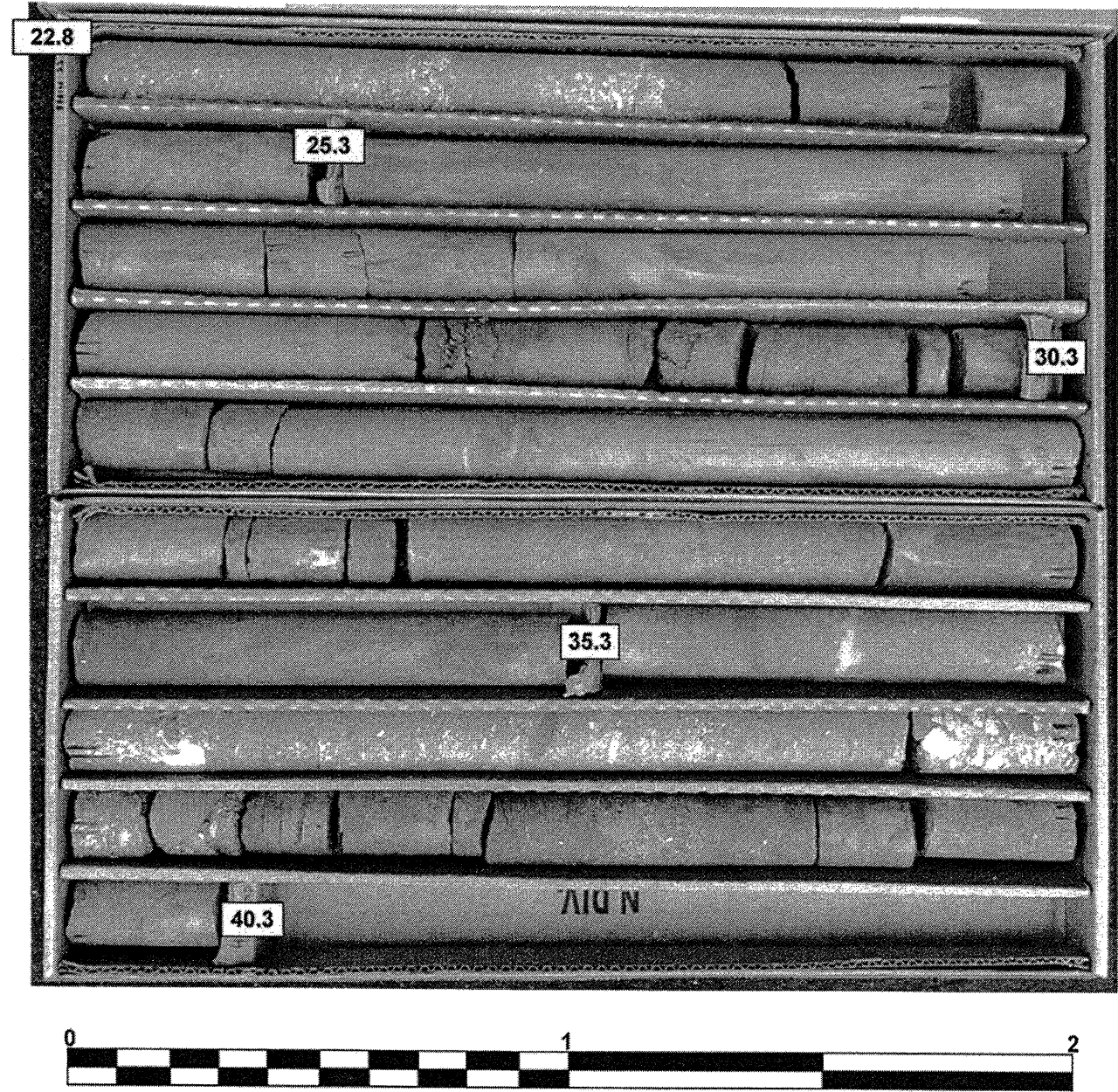
NCDOT GEOTECHNICAL ENGINEERING UNIT CORE BORING REPORT

WBS 52100.1.STR03TIB		TIP P-5201		COUNTY WAKE		GEOLOGIST Brett Smith						
SITE DESCRIPTION Morrisville Parkway Grade Separation							GROUND WTR (ft)					
BORING NO. B3-A		STATION 3584+03		OFFSET 14 ft LT		ALIGNMENT -M1-						
COLLAR ELEV. 340.6 ft		TOTAL DEPTH 40.3 ft		NORTHING 749,993		EASTING 2,051,908						
DRILL RIG/HAMMER EFF./DATE SUM3359 CME-450 87% 07/22/2011		DRILL METHOD Core Boring		HAMMER TYPE Automatic								
DRILLER Luis Gonzalez		START DATE 10/11/12		COMP. DATE 10/11/12		SURFACE WATER DEPTH N/A						
ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN		SAMP. NO.	STRATA		LOG	DESCRIPTION AND REMARKS	DEPTH (ft)
					REC (%)	ROD (%)		REC (%)	ROD (%)			
317.8												
	317.8	22.8	2.5	N=60/0.0 2:33/1.0 4:13/1.5	(2.3) 92%	(2.3) 92%		(17.0) 97%	(14.7) 84%		Begin Coring @ 22.8 ft	22.8
315											NON-CRYSTALLINE ROCK	
	315.3	25.3	5.0	2:33/1.0 2:02/1.0 1:55/1.0 1:46/1.0 2:19/1.0	(4.9) 98%	(4.2) 84%					red-brown, slight to moderately weathered, moderate to medium hardness, moderately close fracture spacing, moderately indurated. TRIASSIC CONGLOMERATIC MUDSTONE. numerous gradational changes from arenaceous and conglomeratic zones to more argillaceous zones.	
310												
	310.3	30.3	5.0	2:18/1.0 1:43/1.0 2:20/1.0 2:12/1.0 1:34/1.0	(4.8) 96%	(4.0) 80%						
305												
	305.3	35.3	5.0	1:45/1.0 2:14/1.0 1:44/1.0 2:41/1.0 3:15/1.0	(5.0) 100%	(4.2) 84%						
	300.3	40.3									Boring Terminated at Elevation 300.3 ft in Non-Crystalline Rock (Triassic Conglomeratic Mudstone)	40.3
											Boring offset due to access issues, located 21 ft above proposed grade of Morrisville Parkway.	

NCDOT BORE SINGLE P-5201 MORRISVILLE PARKWAY-BRIDGEBORINGS.GPJ NC_DOT.GDT 11/15/12

CORE PHOTOGRAPHS

B3-A
BOXES 1 & 2: 22.8 - 40.3 FEET



NCDOT GEOTECHNICAL ENGINEERING UNIT BORELOG REPORT

WBS 52100.1.STR03TIB		TIP P-5201		COUNTY WAKE		GEOLOGIST Brett Smith									
SITE DESCRIPTION Morrisville Parkway Grade Separation							GROUND WTR (ft)								
BORING NO. B3-B		STATION 3583+87		OFFSET 15 ft RT		ALIGNMENT -M1-									
COLLAR ELEV. 341.4 ft		TOTAL DEPTH 46.0 ft		NORTHING 750,011		EASTING 2,051,881									
DRILL RIG/HAMMER EFF./DATE SUM3359 CME-450 87% 07/22/2011		DRILL METHOD Core Boring		HAMMER TYPE Automatic											
DRILLER Luis Gonzalez		START DATE 10/15/12		COMP. DATE 10/15/12		SURFACE WATER DEPTH N/A									
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	L O G	SOIL AND ROCK DESCRIPTION	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100					
345															
340														341.4	0.0
		337.6	3.8	12	22	16									
335															
		332.6	8.8	13	12	13									
330														330.1	11.3
		328.1	13.3	11	13	15									
325														325.6	15.8
		323.1	18.3	100/0.4											
320															
		318.1	23.3	60/0.1										318.0	23.4
315															
310															
305															
300															
														295.4	46.0
Boring Terminated at Elevation 295.4 ft in Non-Crystalline Rock (Triassic Conglomeratic Mudstone)															
Boring offset due to access issues. Located 21ft above proposed grade for Morrisville Parkway. Switched to mud-rotary after sample at 8.8ft, this changed the sampling interval by 0.5ft.															

NCDOT CORE SINGLE P-5201 MORRISVILLE PARKWAY-BRIDGEBORINGS.GPJ NC_DOT_GDT_11/15/12

NCDOT GEOTECHNICAL ENGINEERING UNIT CORE BORING REPORT

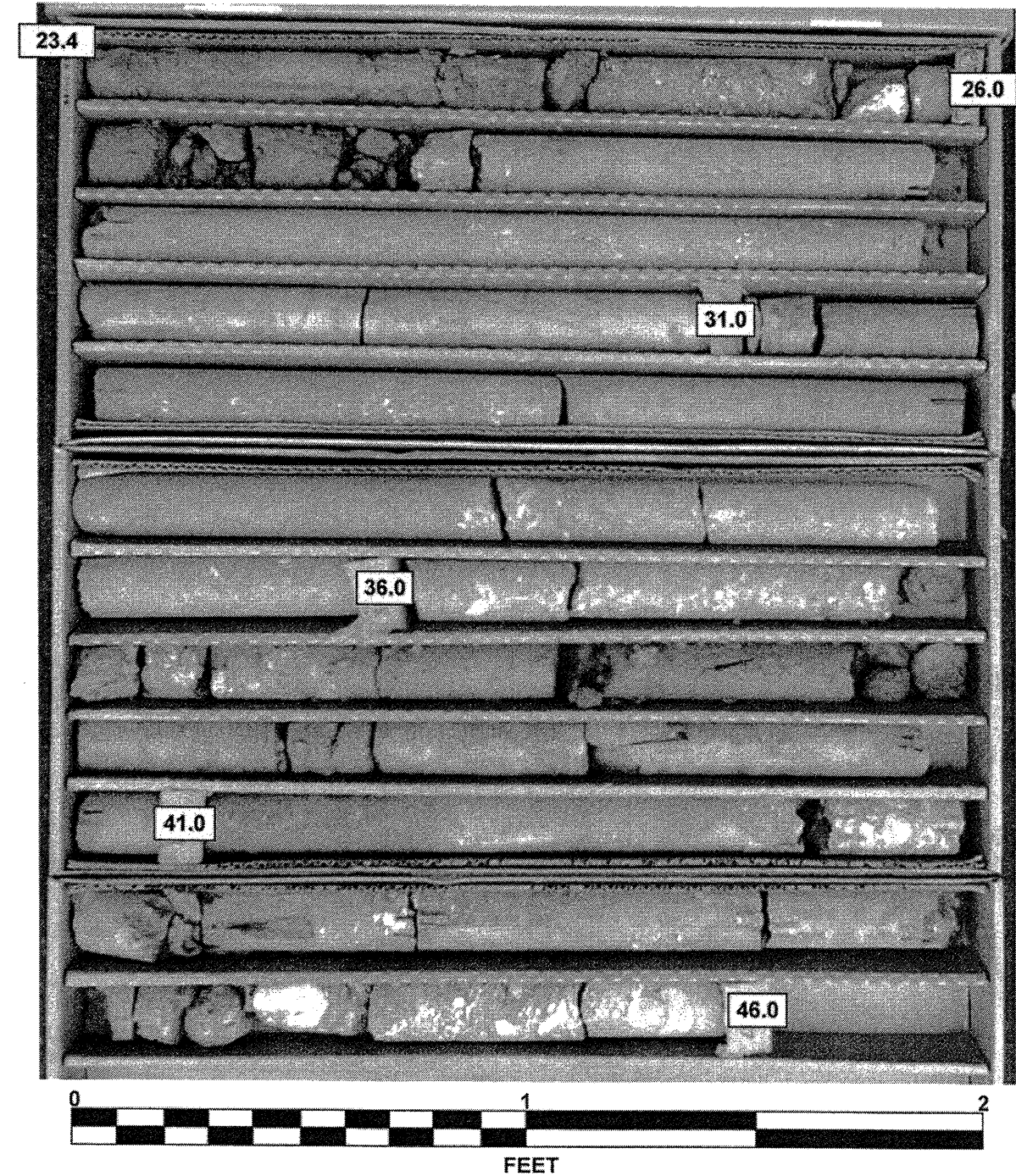
WBS 52100.1.STR03TIB		TIP P-5201		COUNTY WAKE		GEOLOGIST Brett Smith						
SITE DESCRIPTION Morrisville Parkway Grade Separation							GROUND WTR (ft)					
BORING NO. B3-B		STATION 3583+87		OFFSET 15 ft RT		ALIGNMENT -M1-						
COLLAR ELEV. 341.4 ft		TOTAL DEPTH 46.0 ft		NORTHING 750,011		EASTING 2,051,881						
DRILL RIG/HAMMER EFF./DATE SUM3359 CME-450 87% 07/22/2011		DRILL METHOD Core Boring		HAMMER TYPE Automatic								
DRILLER Luis Gonzalez		START DATE 10/15/12		COMP. DATE 10/15/12		SURFACE WATER DEPTH N/A						
ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN		SAMP. NO.	STRATA		L O G	DESCRIPTION AND REMARKS	DEPTH (ft)
					REC. (%)	RQD (%)		REC. (%)	RQD (%)			
318												
	318.0	23.4	2.6	2:09/1.0	(1.9)	(1.2)		(21.4)	(18.6)		318.0	23.4
315												
	315.4	25.0	5.0	1:52/1.0	(4.9)	(4.1)						
				1:30/1.0	96%	82%						
				1:51/1.0								
				2:03/1.0								
				2:22/1.0								
310												
	310.4	31.0	5.0	2:08/1.0	(4.9)	(4.9)						
				1:14/1.0	98%	96%						
				1:45/1.0								
				1:37/1.0								
305												
	305.4	36.0	5.0	1:47/1.0	(4.9)	(4.2)						
				1:35/1.0	98%	84%						
				1:35/1.0								
				2:21/1.0								
300												
	300.4	41.0	5.0	2:40/1.0	(4.8)	(4.2)						
				1:46/1.0	96%	84%						
				1:27/1.0								
				1:40/1.0								
				1:36/1.0								
				1:58/1.0								
	295.4	46.0									295.4	46.0
Boring Terminated at Elevation 295.4 ft in Non-Crystalline Rock (Triassic Conglomeratic Mudstone)												
Boring offset due to access issues. Located 21ft above proposed grade for Morrisville Parkway. Switched to mud-rotary after sample at 8.8ft, this changed the sampling interval by 0.5ft.												

NCDOT CORE SINGLE P-5201 MORRISVILLE PARKWAY-BRIDGEBORINGS.GPJ NC_DOT_GDT_11/15/12

CORE PHOTOGRAPHS

B3-B

BOXES 1, 2, & 3: 23.4 - 46.0 FEET



NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 52100.1.STR03TIB		TIP P-5201		COUNTY WAKE		GEOLOGIST Brett Smith									
SITE DESCRIPTION Morrisville Parkway Grade Separation							GROUND WTR (ft)								
BORING NO. EB2-A		STATION 3584+43		OFFSET 14 ft LT		ALIGNMENT -M1-									
COLLAR ELEV. 342.7 ft		TOTAL DEPTH 34.2 ft		NORTHING 749,953		EASTING 2,051,905									
DRILL RIG/HAMMER EFF./DATE SUM3359 CME-450 87% 07/22/2011		DRILL METHOD Mud Rotary		HAMMER TYPE Automatic											
DRILLER Craig Husketh		START DATE 09/07/12		COMP. DATE 09/07/12		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	
345													342.7	GROUND SURFACE	0.0
340	338.6	4.1	35	65/0.4						100/0.9				WEATHERED ROCK (Triassic Conglomeratic Mudstone)	
335	333.6	9.1	80	20/0.0						100/0.5					
330	328.6	14.1		60/0.1						60/0.1			331.1	NON-CRYSTALLINE ROCK (Triassic Conglomeratic Mudstone)	11.6
325	323.6	19.1		60/0.1						60/0.1					
320	318.6	24.1		60/0.1						60/0.1					
315	313.6	29.1		60/0.1						60/0.1					
310	308.6	34.1		60/0.1						60/0.1			308.5	Boring Terminated with Standard Penetration Test Refusal at Elevation 308.5 ft in Non-Crystalline Rock (Triassic Conglomeratic Mudstone)	34.2
<p>Drilling was hard at the immediate ground surface, interpreted as the top of WR. Able to slowly advance tricone through NCR.</p>															

NCDOT BORE SINGLE P-5201 MORRISVILLE PARKWAY BRIDGEBORINGS.GPJ NC_DOT.GDT 11/15/12

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 52100.1.STR03TIB		TIP P-5201		COUNTY WAKE		GEOLOGIST Brett Smith									
SITE DESCRIPTION Morrisville Parkway Grade Separation							GROUND WTR (ft)								
BORING NO. EB2-B		STATION 3584+21		OFFSET 21 ft RT		ALIGNMENT -M1-									
COLLAR ELEV. 342.7 ft		TOTAL DEPTH 28.7 ft		NORTHING 749,978		EASTING 2,051,872									
DRILL RIG/HAMMER EFF./DATE SUM3359 CME-450 87% 07/22/2011		DRILL METHOD H.S. Augers		HAMMER TYPE Automatic											
DRILLER Luis Gonzalez		START DATE 10/11/12		COMP. DATE 10/11/12		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	
345													342.7	GROUND SURFACE	0.0
340	338.9	3.8	17	22	28					50				TRIASSIC RESIDUAL red-brown, SANDY CLAY with trace gravel (A-6)	
335	333.9	8.8	28	64	36/0.2					100/0.7			336.4	WEATHERED ROCK (Triassic Conglomeratic Mudstone)	6.3
330	328.9	13.8			100/0.5					100/0.5					
325	323.9	18.8	80	20/0.1						100/0.6					
320	318.9	23.8			100/0.2					100/0.2					
315	314.0	28.7			60/0.0					60/0.0			317.9	NON-CRYSTALLINE ROCK (Triassic Conglomeratic Mudstone)	24.8
<p>Boring Terminated with Standard Penetration Test Refusal at Elevation 314.0 ft in Non-Crystalline Rock (Triassic Conglomeratic Mudstone)</p> <p>Boring located 22 ft above proposed grade of Morrisville Parkway. Very hard drilling began around 24.8 ft, this was interpreted as the top of NCR. Possibly encountered groundwater near the termination of the boring.</p>															

NCDOT BORE SINGLE P-5201 MORRISVILLE PARKWAY BRIDGEBORINGS.GPJ NC_DOT.GDT 11/15/12