CONTRACT: C203093

ID: R-2246B

NOTE: SEE SHEET 2A FOR PLAN SHEET LAYOUT AT TIME OF INVESTIGATION

CONTENTS

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

ROADWAY SUBSURFACE INVESTIGATION

PROJ. REFERENCE NO. *34408.1.1 (R-2246B)* F.A. PROJ. *STP-(0005)46*

COUNTY *CABARRUS*

PROJECT DESCRIPTION *GEORGE LILES PARKWAY FROM SOUTH OF SR 1304 (ROBERTA ROAD) TO SR 1431 (WEDDINGTON ROAD)*

INVENTORY

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-2246B	1	65

STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION
34408.1.1	STP-0005(46)	PE
34408.2.6	STP-0005(684)	R/W & UTIL
34408.3.5	STP-1304(13)	CONST.

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) 250-4088. NEITHER THE SUBSURFACE PLANS AND REPORTS, NOR THE FIELD BORING LOGS, ROCK CORES, OR SOIL TEST DATA ARE PART OF THE CONTRACT.

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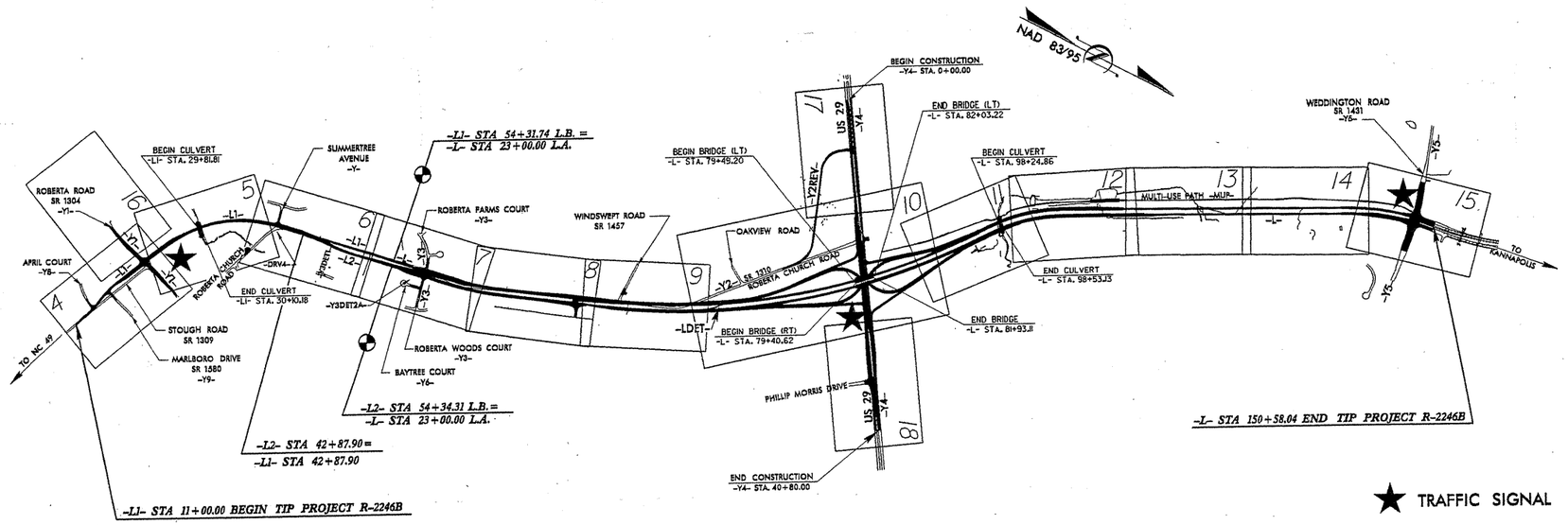

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DATE *APRIL 2011*

NORTH CAROLINA LICENSED SEAL 11045 GEOLOGIST CLINTON B. LITTLE

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NOTE - 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.

PROJECT REFERENCE NO.	SHEET NO.
34408.1.1 (R-2246B)	2

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 TO BE THE 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 ACCORDING TO STANDARD PENETRATION TEST (AASHTO T206, ASTM D-1586). SOIL CLASSIFICATION IS BASED ON THE AASHTO SYSTEM. BASIC DESCRIPTIONS GENERALLY SHALL INCLUDE: CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. EXAMPLE:

VERY STIFF, GRAY, SILTY CLAY, MOIST WITH INTERBEDDED FINE SAND LAYERS, HIGHLY PLASTIC, A-7-6

SOIL LEGEND AND AASHTO CLASSIFICATION

GENERAL CLASS.	GRANULAR MATERIALS (≤ 35% PASSING #200)							SILT-CLAY MATERIALS (> 35% PASSING #200)				ORGANIC MATERIALS		
GROUP CLASS.	A-1		A-3	A-2				A-4	A-5	A-6	A-7	A-1, A-2 A-3	A-4, A-5 A-6, A-7	
	A-1-a	A-1-b		A-2-4	A-2-5	A-2-6	A-2-7				A-7-5 A-7-6			
SYMBOL														
% PASSING #10	50 MX											GRANULAR SOILS	SILT-CLAY SOILS	MUCK, PEAT
#40	30 MX	50 MX	51 MN											
#200	15 MX	25 MX	10 MX	35 MX	35 MX	35 MX	35 MX	36 MN	36 MN	36 MN	36 MN			
LIQUID LIMIT	6 MX		NP	40 MX	41 MN	40 MX	41 MN	40 MX	41 MN	40 MX	41 MN	SOILS WITH LITTLE OR MODERATE AMOUNTS OF ORGANIC MATTER		HIGHLY ORGANIC SOILS
PLASTIC INDEX				10 MX	10 MX	11 MN	11 MN	10 MX	10 MX	11 MN	11 MN			
GROUP INDEX	0		0	0		4 MX		8 MX	12 MX	16 MX	No MX			
USUAL TYPES OF MAJOR MATERIALS	STONE FRAGS. GRAVEL, AND SAND		FINE SAND	SILTY OR CLAYEY GRAVEL AND SAND				SILTY SOILS		CLAYEY SOILS				
GEN. RATING AS A SUBGRADE	EXCELLENT TO GOOD							FAIR TO POOR				FAIR TO POOR	POOR	UNSUITABLE

PI OF A-7-5 SUBGROUP IS ≤ LL - 30 ; PI OF A-7-6 SUBGROUP IS > LL - 30

CONSISTENCY OR DENSENESS

PRIMARY SOIL TYPE	COMPACTNESS OR CONSISTENCY	RANGE OF STANDARD PENETRATION RESISTENCE (N-VALUE)	RANGE OF UNCONFINED COMPRESSIVE STRENGTH (TONS/FT²)
GENERALLY GRANULAR MATERIAL (NON-COHESIVE)	VERY LOOSE	<4	N/A
	LOOSE	4 TO 10	
	MEDIUM DENSE	10 TO 30	
	DENSE	30 TO 50	
	VERY DENSE	>50	
GENERALLY SILT-CLAY MATERIAL (COHESIVE)	VERY SOFT	<2	<0.25
	SOFT	2 TO 4	0.25 TO 0.50
	MEDIUM STIFF	4 TO 8	0.5 TO 1.0
	STIFF	8 TO 15	1 TO 2
	VERY STIFF	15 TO 30	2 TO 4
	HARD	>30	>4

TEXTURE OR GRAIN SIZE

U.S. STD. SIEVE SIZE	4	10	40	60	200	270
OPENING (MM)	4.76	2.00	0.42	0.25	0.075	0.053

BOULDER (BLDR.)	COBBLE (COB.)	GRAVEL (GR.)	COARSE SAND (CSE. SD.)	FINE SAND (F SD.)	SILT (SL.)	CLAY (CL.)

GRAIN SIZE	MM	305	75	2.0	0.25	0.05	0.005
	IN.	12	3				

SOIL MOISTURE - CORRELATION OF TERMS

SOIL MOISTURE SCALE (ATTERBERG LIMITS)	FIELD MOISTURE DESCRIPTION	GUIDE FOR FIELD MOISTURE DESCRIPTION
	- SATURATED - (SAT.)	USUALLY LIQUID; VERY WET, USUALLY FROM BELOW THE GROUNDWATER TABLE
LL — LIQUID LIMIT		
PLASTIC RANGE (PI)	- WET - (W)	SEMISOLID; REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE
PL — PLASTIC LIMIT		
OM — OPTIMUM MOISTURE	- MOIST - (M)	SOLID; AT OR NEAR OPTIMUM MOISTURE
SL — SHRINKAGE LIMIT		
	- DRY - (D)	REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE

PLASTICITY

	PLASTICITY INDEX (PI)	DRY STRENGTH
NONPLASTIC	0-5	VERY LOW
LOW PLASTICITY	6-15	SLIGHT
MED. PLASTICITY	16-25	MEDIUM
HIGH PLASTICITY	26 OR MORE	HIGH

COLOR

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

GRADATION

WELL GRADED - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE.
UNIFORM - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE. (ALSO POORLY GRADED)
GAP-GRADED - INDICATES A MIXTURE OF UNIFORM PARTICLES OF TWO OR MORE SIZES.

ANGULARITY OF GRAINS

THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS: ANGULAR, SUBANGULAR, SUBROUNDED, OR ROUNDED.

MINERALOGICAL COMPOSITION

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

COMPRESSIBILITY

SLIGHTLY COMPRESSIBLE	LIQUID LIMIT LESS THAN 31
MODERATELY COMPRESSIBLE	LIQUID LIMIT EQUAL TO 31-50
HIGHLY COMPRESSIBLE	LIQUID LIMIT GREATER THAN 50

PERCENTAGE OF MATERIAL

ORGANIC MATERIAL	GRANULAR SOILS	SILT - CLAY SOILS	OTHER MATERIAL	
TRACE OF ORGANIC MATTER	2 - 3%	3 - 5%	TRACE	1 - 10%
LITTLE ORGANIC MATTER	3 - 5%	5 - 12%	LITTLE	10 - 20%
MODERATELY ORGANIC	5 - 10%	12 - 20%	SOME	20 - 35%
HIGHLY ORGANIC	>10%	>20%	HIGHLY	35% AND ABOVE

GROUND WATER

- WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING
- STATIC WATER LEVEL AFTER 24 HOURS
- PW — PERCHED WATER, SATURATED ZONE, OR WATER BEARING STRATA
- SPRING OR SEEP

MISCELLANEOUS SYMBOLS

- ROADWAY EMBANKMENT (RE) WITH SOIL DESCRIPTION
- SOIL SYMBOL
- ARTIFICIAL FILL (AF) OTHER THAN ROADWAY EMBANKMENT
- INFERRED SOIL BOUNDARY
- INFERRED ROCK LINE
- ALLUVIAL SOIL BOUNDARY
- 25/025 — DIP & DIP DIRECTION OF ROCK STRUCTURES
- SPT / DPT DMT / VST PMT — TEST BORING
- AUGER BORING
- CORE BORING
- MW — MONITORING WELL
- PIEZOMETER INSTALLATION
- SLOPE INDICATOR INSTALLATION
- CONE PENETROMETER TEST
- SOUNDING ROD
- TEST BORING W/ CORE
- SPT N-VALUE
- REF — SPT REFUSAL

ABBREVIATIONS

AR - AUGER REFUSAL	MED. - MEDIUM	VST - VANE SHEAR TEST
BT - BORING TERMINATED	MICA. - MICACEOUS	WEA. - WEATHERED
CL. - CLAY	MOD. - MODERATELY	γ - UNIT WEIGHT
CPT - CONE PENETRATION TEST	NP - NON PLASTIC	γ_d - DRY UNIT WEIGHT
CSE. - COARSE	ORG. - ORGANIC	
DMT - DILATOMETER TEST	PMT - PRESSUREMETER TEST	SAMPLE ABBREVIATIONS
DPT - DYNAMIC PENETRATION TEST	SAP. - SAPROLITIC	S - BULK
e - VOID RATIO	SD. - SAND, SANDY	SS - SPLIT SPOON
F - FINE	SL. - SILT, SILTY	ST - SHELBY TUBE
FOSS. - FOSSILIFEROUS	SLI. - SLIGHTLY	RS - ROCK
FRAC. - FRACTURED, FRACTURES	TCR - TRICONE REFUSAL	RT - RECOMPACTED TRIAXIAL
FRAGS. - FRAGMENTS	w - MOISTURE CONTENT	CBR - CALIFORNIA BEARING RATIO
HI. - HIGHLY	V - VERY	

EQUIPMENT USED ON SUBJECT PROJECT

DRILL UNITS:
- [ ] MOBILE B-___
- [ ] BK-51
- [ ] CME-45C
- [X] CME-550
- [ ] PORTABLE HOIST
- [ ] _____
- [ ] _____

ADVANCING TOOLS:
- [ ] CLAY BITS
- [ ] 6" CONTINUOUS FLIGHT AUGER
- [X] 8" HOLLOW AUGERS
- [ ] HARD FACED FINGER BITS
- [X] TUNG.-CARBIDE INSERTS
- [ ] CASING [ ] W/ ADVANCER
- [ ] TRICONE _____" STEEL TEETH
- [ ] TRICONE _____" TUNG.-CARB.
- [ ] CORE BIT
- [ ] _____

HAMMER TYPE:
- [X] AUTOMATIC [ ] MANUAL

CORE SIZE:
- [ ] -B_____
- [ ] -N_____
- [ ] -H_____

HAND TOOLS:
- [ ] POST HOLE DIGGER
- [ ] HAND AUGER
- [ ] SOUNDING ROD
- [ ] VANE SHEAR TEST
- [ ] _____

ROCK DESCRIPTION

HARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT IF TESTED, WOULD YIELD SPT REFUSAL. AN INFERRED ROCK LINE INDICATES THE LEVEL AT WHICH NON-COASTAL PLAIN MATERIAL WOULD YIELD SPT REFUSAL. SPT REFUSAL IS PENETRATION BY A SPLIT SPOON SAMPLER EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS. IN NON-COASTAL PLAIN MATERIAL, THE TRANSITION BETWEEN SOIL AND ROCK IS OFTEN REPRESENTED BY A ZONE OF WEATHERED ROCK.
ROCK MATERIALS ARE TYPICALLY DIVIDED AS FOLLOWS:

WEATHERED ROCK (WR)	NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT N VALUES > 100 BLOWS PER FOOT IF TESTED.
CRYSTALLINE ROCK (CR)	FINE TO COARSE GRAIN IGNEOUS AND METAMORPHIC ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES GRANITE, GNEISS, GABBRO, SCHIST, ETC.
NON-CRYSTALLINE ROCK (NCR)	FINE TO COARSE GRAIN METAMORPHIC AND NON-COASTAL PLAIN SEDIMENTARY ROCK THAT WOULD YEILD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES PHYLLITE, SLATE, SANDSTONE, ETC.
COASTAL PLAIN SEDIMENTARY ROCK (CP)	COASTAL PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD SPT REFUSAL. ROCK TYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED SHELL BEDS, ETC.

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, CRYSTALS ON A BROKEN SPECIMEN FACE SHINE BRIGHTLY. ROCK RINGS UNDER HAMMER BLOWS IF OF A CRYSTALLINE NATURE.
SLIGHT (SLI.)	ROCK GENERALLY FRESH, JOINTS STAINED AND DISCOLORATION EXTENDS INTO ROCK UP TO 1 INCH. OPEN JOINTS MAY CONTAIN CLAY. IN GRANITOID ROCKS SOME OCCASIONAL FELDSPAR CRYSTALS ARE DULL AND DISCOLORED. CRYSTALLINE ROCKS RING UNDER HAMMER BLOWS.
MODERATE (MOD.)	SIGNIFICANT PORTIONS OF ROCK SHOW DISCOLORATION AND WEATHERING EFFECTS. IN GRANITOID ROCKS, MOST FELDSPARS ARE DULL AND DISCOLORED, SOME SHOW CLAY. ROCK HAS DULL SOUND UNDER HAMMER BLOWS AND SHOWS SIGNIFICANT LOSS OF STRENGTH AS COMPARED WITH FRESH ROCK.
MODERATELY SEVERE (MOD. SEV.)	ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. IN GRANITOID ROCKS, ALL FELDSPARS DULL AND DISCOLORED AND A MAJORITY SHOW KAOLINIZATION. ROCK SHOWS SEVERE LOSS OF STRENGTH AND CAN BE EXCAVATED WITH A GEOLOGIST'S PICK. ROCK GIVES 'CLUNK' SOUND WHEN STRUCK. *IF TESTED, WOULD YIELD SPT REFUSAL*
SEVERE (SEV.)	ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC CLEAR AND EVIDENT BUT REDUCED IN STRENGTH TO STRONG SOIL. IN GRANITOID ROCKS ALL FELDSPARS ARE KAOLINIZED TO SOME EXTENT. SOME FRAGMENTS OF STRONG ROCK USUALLY REMAIN. *IF TESTED, YIELDS SPT N VALUES > 100 BPF*
VERY SEVERE (V SEV.)	ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC ELEMENTS ARE DISCERNIBLE BUT THE MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROCK REMAINING. SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE SUCH THAT ONLY MINOR VESTIGES OF THE ORIGINAL ROCK FABRIC REMAIN. *IF TESTED, YIELDS SPT N VALUES < 100 BPF*
COMPLETE	ROCK REDUCED TO SOIL. ROCK FABRIC NOT DISCERNIBLE, OR DISCERNIBLE ONLY IN SMALL AND SCATTERED CONCENTRATIONS. QUARTZ MAY BE PRESENT AS DIKES OR STRINGERS. SAPROLITE IS ALSO AN EXAMPLE.

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.
HARD	CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED TO DETACH HAND SPECIMEN.
MODERATELY HARD	CAN BE SCRATCHED BY KNIFE OR PICK. GOUGES OR GROOVES TO 0.25 INCHES DEEP CAN BE EXCAVATED BY HARD BLOW OF A GEOLOGIST'S PICK. HAND SPECIMENS CAN BE DETACHED BY MODERATE BLOWS.
MEDIUM HARD	CAN BE GROOVED OR GOUGED 0.05 INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT. CAN BE EXCAVATED IN SMALL CHIPS TO PEICES 1 INCH MAXIMUM SIZE BY HARD BLOWS OF THE POINT OF A GEOLOGIST'S PICK.
SOFT	CAN BE GROVED OR GOUGED READILY BY KNIFE OR PICK. CAN BE EXCAVATED IN FRAGMENTS FROM CHIPS TO SEVERAL INCHES IN SIZE BY MODERATE BLOWS OF A PICK POINT. SMALL, THIN PIECES CAN BE BROKEN BY FINGER PRESSURE.
VERY SOFT	CAN BE CARVED WITH KNIFE. CAN BE EXCAVATED READILY WITH POINT OF PICK. PIECES 1 INCH OR MORE IN THICKNESS CAN BE BROKEN BY FINGER PRESSURE. CAN BE SCRATCHED READILY BY FINGERNAIL.

FRACTURE SPACING

TERM	SPACING
VERY WIDE	MORE THAN 10 FEET
WIDE	3 TO 10 FEET
MODERATELY CLOSE	1 TO 3 FEET
CLOSE	0.16 TO 1 FEET
VERY CLOSE	LESS THAN 0.16 FEET

BEDDING

TERM	THICKNESS
VERY THICKLY BEDDED	> 4 FEET
THICKLY BEDDED	1.5 - 4 FEET
THINLY BEDDED	0.16 - 1.5 FEET
VERY THINLY BEDDED	0.03 - 0.16 FEET
THICKLY LAMINATED	0.008 - 0.03 FEET
THINLY LAMINATED	< 0.008 FEET

INDURATION

FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF THE MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.

FRIABLE	RUBBING WITH FINGER FREES NUMEROUS GRAINS; GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE.
MODERATELY INDURATED	GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE; BREAKS EASILY WHEN HIT WITH HAMMER.
INDURATED	GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE; DIFFICULT TO BREAK WITH HAMMER.
EXTREMELY INDURATED	SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE; SAMPLE BREAKS ACROSS GRAINS.

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.

ARGILLACEOUS - APPLIED TO ALL ROCKS OR SUBSTANCES COMPOSED OF CLAY MINERALS, OR HAVING A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION, AS SHALE, SLATE, ETC.

ARTESIAN - GROUND WATER THAT IS UNDER SUFFICIENT PRESSURE TO RISE ABOVE THE LEVEL AT WHICH IT IS ENCOUNTERED, BUT WHICH DOES NOT NECESSARILY RISE TO OR ABOVE THE GROUND SURFACE.

CALCAREOUS (CALC.) - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE.

COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE.

CORE RECOVERY (REC.) - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED BY TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.

DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS MASSIVE ROCK.

DIP - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL.

DIP DIRECTION (DIP AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH.

FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE.

FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES.

FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLODGED FROM PARENT MATERIAL.

FLOOD PLAIN (FP) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM.

FORMATION (FM.) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE FIELD.

JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED.

LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO ITS LATERAL EXTENT.

LENS - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS.

MOTTLED (MOT.) - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS. MOTTLING IN SOILS USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE.

PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN INTERVENING IMPERVIOUS STRATUM.

RESIDUAL (RES.) SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK.

ROCK QUALITY DESIGNATION (RQD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.

SAPROLITE (SAP.) - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK.

SILL - AN INTRUSIVE BODY OF IGNEOUS ROCK OF APPROXIMATELY UNIFORM THICKNESS AND RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT, THAT HAS BEEN EMPLACED PARALLEL TO THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS.

SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE.

STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT) - NUMBER OF BLOWS (N OR BPF) OF A 140 LB. HAMMER FALLING 30 INCHES REQUIRED TO PRODUCE A PENETRATION OF 1 FOOT INTO SOIL WITH A 2 INCH OUTSIDE DIAMETER SPLIT SPOON SAMPLER. SPT REFUSAL IS PENETRATION EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS.

STRATA CORE RECOVERY (SREC.) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE.

STRATA ROCK QUALITY DESIGNATION (SRQD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS WITHIN A STRATUM EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE.

TOPSOIL (TS.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.

BENCH MARK:

ELEVATION: FT.

NOTES:
PROFILE STRATIGRAPHY THRU BORINGS.

THE BORINGS BETWEEN STATIONS 140+00 -L- TO 148+00 -L- ARE FROM THE METRIC PROJECT R-2246C. THESE BORINGS WERE LOCATED AT THE BEGINNING OF THE R-2246C METRIC PROJECT AND FALL AT THE END OF THE R-2246B ENGLISH PROJECT.

THE GEOPAK ACTIVE CHAIN COMMAND WAS USED TO OBTAIN THE STATION AND OFFSET FOR EACH BORING AFTER THEY WERE REFERENCED AND COPIED INTO THE R2246B_GEO_gtm_CABARRUS.dgn ENGLISH FILE.

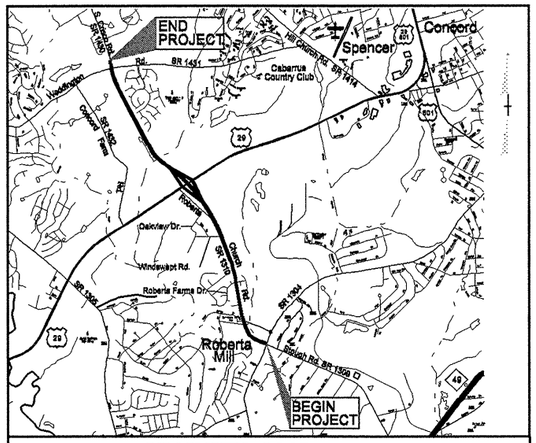
REVISED 09/23/09

09/08/99

TIP PROJECT: R-2246B

CONTRACT:

See Sheet 1-A For Index of Sheets



VICINITY MAP

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

CABARRUS COUNTY

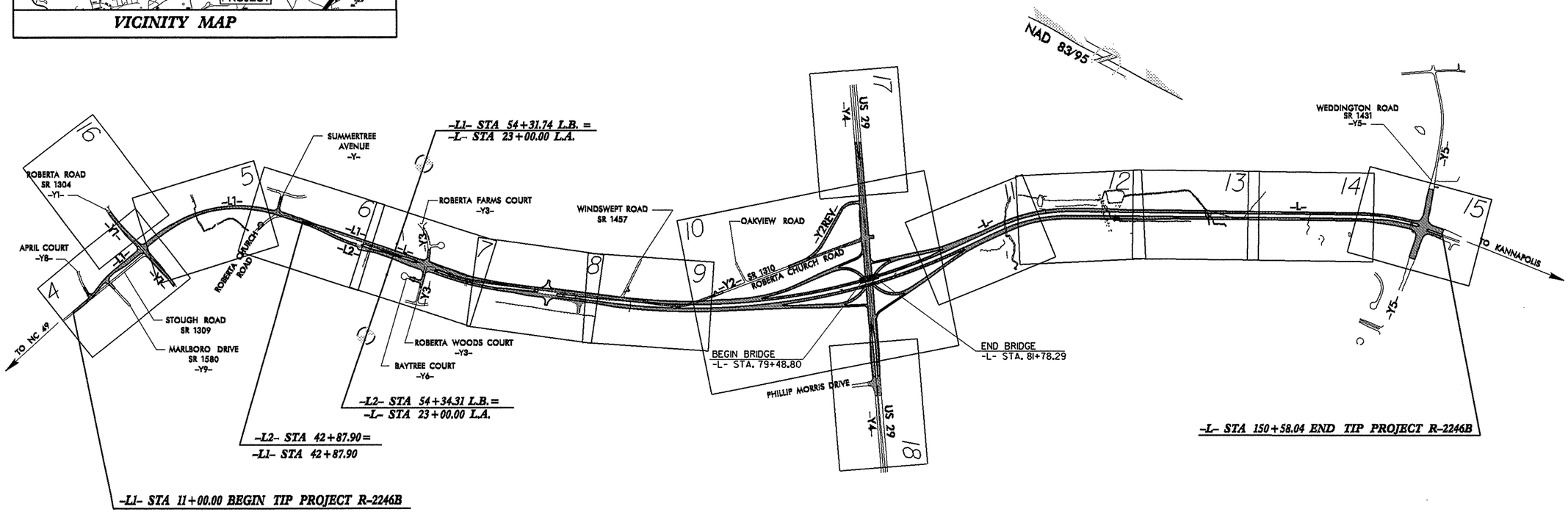
LOCATION: GEORGE LILES PARKWAY FROM SOUTH OF SR 1304 (ROBERTA ROAD) TO SR 1431 (WEDDINGTON ROAD)

TYPE OF WORK: GRADING, PAVING, DRAINAGE AND STRUCTURES

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-2246B	2A	

STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION
344408.1.1	STP-(0005)46	PE

STATEWIDE PROJECT



INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

NOTE: THIS IS A PARTIAL CONTROLLED ACCESS PROJECT WITH ACCESS BEING LIMITED TO POINTS AS SHOWN ON THE PLANS

GRAPHIC SCALES

50 25 0 50 100
PLANS

50 25 0 50 100
PROFILE (HORIZONTAL)

10 5 0 10 20
PROFILE (VERTICAL)

DESIGN DATA

ADT 2008 = 18,600
ADT 2035 = 42,000
DHV = 55 %
D = 10 %
T = 5 % *
V = 60 MPH
* TTST 1% DUAL 4%

FUNCTIONAL CLASSIFICATION
URBAN ARTERIAL

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT R-2246B = 3.193 MILES

LENGTH STRUCTURE TIP PROJECT R-2246B = 0.043 MILES

TOTAL LENGTH TIP PROJECT R-2246B = 3.237 MILES

Prepared In the Office of:
DIVISION OF HIGHWAYS
1000 Birch Ridge Dr., Raleigh NC, 27610

2006 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:
APRIL 15, 2011

LETTING DATE:
APRIL 16, 2013

G.E. BREW, PE
PROJECT ENGINEER

I.T. YOUNIS
PROJECT DESIGN ENGINEER

HYDRAULICS ENGINEER

SIGNATURE: *P.E.*

ROADWAY DESIGN ENGINEER

SIGNATURE: *P.E.*

DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA

STATE HIGHWAY DESIGN ENGINEER *P.E.*

09-AUG-2010 09:34
D:\Projects\R2246B_GEO_RDWY_CABARRUS\CADD_GEOTECH\PlanProf\R2246b_GEO_rdy_tsh_Inv_002A.dgn
jmcclure AT GEH24047

Earthwork Balance Sheet

Volumes in Cubic Yards

PROJECT: R-2246B COUNTY: Cabarrus DATE: 12/4/2012 COMPILED BY: KDA/TY SHEET 3 OF SHEETS

STATION	STATION	EXCAVATION (CUBIC YARDS)					EMBANKMENT (CUBIC YARDS)				BORROW (CU. YDS.)	WASTE (CUBIC YARDS)			
		TOTAL UNCLASS.	ROCK	UNDERCUT	UNSUIT. UNCLASS.	SUITABLE UNCLASS.	TOTAL	ROCK	EARTH	EMBANK. +20%		ROCK	SUITABLE	UNSUIT.	TOTAL
SUMMARY 1															
LEFT SIDE															
-L1- 10+50 LT.	22+00 LT.	288				288	11,831		11,831	14,197	13,909				
-Y8- 12+00	13+00	59				59	37		37	44			15		15
-Y1- 10+50	15+50	1,040				1,040	825		825	990			50		50
RIGHT SIDE															
-L1- 10+50 RT.	22+00 RT.	1,097				1,097	475		475	570			527		527
-Y9- 10+50	11+50	104				104	71		71	85			19		19
-Y1- 17+00	22+00	1,672				1,672	239		239	287			1,385		1,385
	SUBTOTAL	4,260				4,260	13,478		13,478	16,174	13,909		1,996		1,996
SUMMARY 2															
-L1- 22+00	38+50	30,705				30,705	25,620		25,620	30,744	39				
	SUBTOTAL	30,705				30,705	25,620		25,620	30,744	39				
SUMMARY 3															
LEFT SIDE															
-L1- 38+50 LT.	54+31.74 LT.	2,759				2,759	489		489	587			2,172		2,172
-Y- 10+00	12+00	12				12	283		283	340	328				
RIGHT SIDE															
-L1- 38+50 RT.	54+31.74 RT.	7,363				7,363	9,914		9,914	11,897	4,534				
-Y3DET1- 9+50.00	13+25.00	211				211	180		180	216	5				
-Y3DET2- 9+75.00	12+00.00	178				178	16		16	19			159		159
-DR4- 10+50.00	12+00.00	34				34	284		284	341	307				
	SUBTOTAL	10,557				10,557	11,166		11,166	13,399	5,173		2,331		2,331
SUMMARY 4															
LEFT SIDE															
-L- 23+00 LT.	42+00 LT.	9,824		2,348	3,346	6,478	4,035		4,035	4,842			1,636	5,694	7,330
-Y3- 11+00	12+00	24				24							24		24
RIGHT SIDE															
-L- 23+00 RT.	42+00 RT.	18,557		3,497	68	18,489	11,592		11,592	13,910			4,579	3,565	8,144
-Y3- 14+00	16+25	31				31	761		761	913	882				
-Y6- 10+25	11+50	35				35	6		6	7			28		28
	SUBTOTAL	28,471		5,845	3,414	25,057	16,394		16,394	19,673	882		6,266	9,259	15,525
SUMMARY 5															
-L- 42+00 LT.	61+50 LT.	113		1,919		113	27,853		27,853	33,424	33,311			1,919	1,919
-L- 42+00 RT.	61+50 RT.	5,917		2,459		5,917	50,189		50,189	60,227	54,310			2,459	2,459
	SUBTOTAL	6,030		4,378		6,030	78,042		78,042	93,650	87,620			4,378	4,378
SUMMARY 6															
-L- 61+50	79+50	52				52	103,443		103,443	124,132	124,080				
-RPB- (64+50 -L-)	(73+00 -L-)	4,050				4,050	1,926		1,926	2,311			1,739		1,739
-RPB- 18+50	25+50	15,443				15,443							15,443		15,443
-SPURB- 13+19.55	14+14.02	788				788	11		11	13			775		775
-RPC- (67+50 -L-)	(79+00 -L-)	3,421				3,421	13,223		13,223	15,868	12,447				

STATION	STATION	EXCAVATION (CUBIC YARDS)					EMBANKMENT (CUBIC YARDS)				BORROW (CU. YDS.)	WASTE (CUBIC YARDS)			
		TOTAL UNCLASS.	ROCK	UNDERCUT	UNSUIT. UNCLASS.	SUITABLE UNCLASS.	TOTAL	ROCK	EARTH	EMBANK. +20%		ROCK	SUITABLE	UNSUIT.	TOTAL
-SPURC-12+50.88	14+20.59	2,184				2,184							2,184		2,184
-Y2REV- 12+50	30+50	697				697	8,040		8,040	9,648	8,951				
-Y4- 0+00 RT.	40+00 RT.	11,230				11,230	1,648		1,648	1,978			9,252		9,252
-LDET- 61+50.00	64+00.00	45				45	105		105	126	81				
	SUBTOTAL	37,910				37,910	128,396		128,396	154,075	145,558		29,393		29,393
SUMMARY 7															
-L- 82+00 (EB)	111+50	7,043				7,043	178,353		178,353	214,024	206,981				
-RPA- (82+00 -L-)	(93+50.00 -L-)	348				348	27,519		27,519	33,023	32,675				
-SPURA- 12+92.07	13+75.13	72				72	225		225	270	198				
-RPD-(86+00 -L-)	(95+50 -L-)	106				106	42,734		42,734	51,281	51,175				
-RPD- 19+00	24+50	1,918				1,918	12,025		12,025	14,430	12,512				
SPURD- 13+60.71	15+00	931				931	943		943	1,132	201				
-Y4- 0+00 LT.	40+00 LT.	4,943				4,943	3,495		3,495	4,194			749		749
-MUP- (84+00 -L-)	(109+21.22-L-)	670				670	5,841		5,841	7,009	6,339				
	SUBTOTAL	16,031				16,031	271,135		271,135	325,362	310,080		749		749
SUMMARY 8															
-L- 111+50	133+50	14,602				14,602	36,099		36,099	43,319	28,717				
-MUP- (112+74.46 -L-)	(133+50 -L-)	16				16	8,871		8,871	10,645	10,629				
	SUBTOTAL	14,618				14,618	44,970		44,970	53,964	39,346				
SUMMARY 9															
-L- 133+50	155+50	24,158				24,158	17,139		17,139	20,567			3,591		3,591
-Y5- 14+00	17+50	127				127	291		291	349	222				
-Y5- 20+00	23+00	51				51	126		126	151	100				
-MUP- (133+50 -L-)	(147+50 -L-)	276				276	4,207		4,207	5,048	4,772				
	SUBTOTAL	24,612				24,612	21,763		21,763	26,116	5,095		3,591		3,591
TOTAL		173,194		10,223	3,414	169,780	610,964		610,964	733,157	607,703		44,326	13,637	57,963
ESTIMATED SHOULDER MATERIAL							27,298		27,298	32,758	32,758				
LOSS DUE TO CLEARING & GRUBBING		-9,738									9,738				
SELECT GRANULAR MATERIAL IN LIEU OF BORROW									-34,900	-41,880	-41,880				
WASTE IN LIEU OF BORROW											-44,326		-44,326		-44,326
PROJECT TOTAL		163,456		10,223	3,414	169,780	638,262		603,362	724,035	563,992			13,637	13,637
ADDITIONAL EST. UNDERCUT				10,000					10,000	12,000	12,000			10,000	10,000
EST. 5% TO REPLACE TOP SOIL ON BORROW PIT											28,800				
GRAND TOTAL		163,456		20,223	3,414	169,780	638,262		613,362	736,035	604,792			23,637	23,637
SAY		**164,000**		**20,400**							**605,000**				23,637

PAVEMENT STRUCTURE VOLUME = 20,850 C.Y.

CLASS IV SUBGRADE STABILIZATION = 9,500 TONS
GEOTEXTILE FOR SOIL STABILIZATION = 30,600 SY
ESTIMATED SHALLOW UNDERCUT = 5,000 CY
GEOTEXTILE FOR PAVEMENT STABILIZATION = 36,500 SY
SELECT GRANULAR MATERIAL = 34,900 CY
EST. DRAINAGE DITCH EXCAVATION = 2433 CY

NOTE: EARTHWORK QUANTITIES ARE CALCULATED BY THE ROADWAY DESIGN UNIT. THESE EARTHWORK QUANTITIES ARE BASED IN PART ON SUBSURFACE DATA PROVIDED BY THE GEOTECHNICAL ENGINEERING UNIT.

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

BEVERLY EAVES PERDUE
GOVERNOR

EUGENE A. CONTI, JR.
SECRETARY

STATE PROJECT: 34408.1.1 (R-2246B)

FEDERAL PROJECT: STP-(0005)46

COUNTY: CABARRUS

PROJECT DESCRIPTION: GEORGE LILES PARKWAY FROM SOUTH OF SR 1304 (ROBERTA ROAD) TO SR1431 (WEDDINGTON ROAD)

SUBJECT: GEOTECHNICAL REPORT – Inventory

PROJECT DESCRIPTION

This project widens a two lane SR road to a four lane divided road while mostly following the existing grade. The cut sections are generally not deep, and the greatest embankment is an overpass in the interchange with US 29. Several geologic issues may complicate construction: The PI of the surface soil can be greater than 45, and weathered rock is as close as 2' below surface. For a thorough understanding of the dirt work, the cross section files are best. Cut or fill lines, shown on the plans, may only involve excavation for the ditches, and apparent embankments shown on the centerline profiles may reflect raising the median to the lane elevation, (-Y4-).

The following alignments were investigated:

Line	Station			Length (feet)
-L1-	11+00.00	to	54+31.74	4,331.74
-L-	23+00.00	to	150+58.04	12,758.04
-L2-	42+87.90	to	54+34.31	1,146.41
-Y1-	10+00.00	to	22+14.39	1,214.39
-Y-	10+00.00	to	12+39.36	239.36
-Y3-	10+00.00	to	15+50.00	550.00
-Y2REV-	25+00.00	to	38+41.77	1,341.77
-Y4-	4+00.00	to	33+50.00	2,950.00
-Y5	14+00.00	to	22+50.00	850.00
-Y6-	10+00.00	to	12+19.32	219.32
-Y8-	12+00.00	to	13+44.80	144.80
-Y9-	10+00.00	to	12+00.00	200.00
-RPA-	10+00.99	to	27+03.56	1,703.56
-SPURA-	10+00.00	to	14+73.90	473.90
-RPB-	10+00.00	to	28+27.36	1,827.36
-SPURB-	10+00.00	to	16+69.92	669.92
-RPC-	10+00.00	to	29+16.56	1,916.56
SPURC-	10+00.00	to	15+08.76	508.76
-RPD-	10+00.00	to	27+62.21	1,762.21
-SPURD-	10+00.00	to	17+08.53	708.53

Items of Special Geotechnical Interest

1. HIGHLY PLASTIC SOIL

   SAMPLING SHOWED THE UPPER 2' TO 3' OF RESIDUAL CAN HAVE PI, (PLASTICITY INDEX), VALUES GREATER THAN 45 PARTICULARLY FROM –L- 32+00 TO –L- 48+00, AND IN THE AREA NEAR US 29 or places where a soil layer of less than 3' is over weathered rock.

2. GROUNDWATER

   GROUNDWATER COULD BE ENCOUNTERED IN THE RIGHT SIDE DITCH AT -L-140+00 TO -L-146+00.

3. HARD ROCK

   DRILLING INDICATED ROCK WILL OCCUR above or WITHIN 5' of centerline grade AT –L1 25+75, -L1-52+75, -L-101+00,–L- 142+25 and, -Y2REV- 30+00, but it should be stressed rock could and probably will exist outside of these locations.

4. WELLS

   A WELL APPEARS ON THE PLANS AT –RPB-17+87, 41LFT. MOST OF THE PROJECT IS SERVED BY WATERLINES RATHER THAN WELLS.

Physiography and Geology

Physiography

Physiography is physical shape of the land without reference to origin, and is described by elevation, change in elevation, and characteristic prominent physical features.

Regional

This area is between the Catawba River to the southwest and the Yadkin River to the northeast, and drains southeast to the Yadkin River by way of Coddle Creek and then the Rocky River. The streams of this region are long and wandering, often second order[1] with little flow volume, and possessing short tributaries. The topography surrounding the project features a roughly horseshoe-shaped circumferential ridge about 5 miles across with an elevation of 750' on the north east sides, and is a little lower on the west, 695' and open to the south. The basin floor elevation is around 600' except where it is crossed by streams. A ridge that divides the basin in two has about 100' of elevation change in 3/5 of a mile from creek to ridge, while in an equal distance along the creek, a change of 12 feet in elevation was measured. Even with this sharp difference in elevation gradient the ridges are broad and the streams meander in flat bottomed valleys.

Project

The project is between Coddle Creek and Wolf Meadow Branch, almost completely within the Coddle Creek drainage. The beginning of the project, (the southern end), is near Coddle creek, and the road follows an inter-stream divide, parallel to Coddle Creek. The -L- alignment begins at elevation 560 near Wolf Meadows Branch, climbs to elevation 605 at Roberta Church road, drops to cross a Coddle Creek tributary flowing at elevation 560, then climbs to the inter-stream divide, elevation 630. The -L- alignment follows the inter-stream divide and crosses U.S. 29 which is at elevation 630, then drops to cross an unnamed Coddle Creek tributary at elevation 590 before climbing to the end of the project at elevation 665.

Geology

Patterns of outcrop lithology displayed on the 1985 Geologic Map of North Carolina resolve into bands consistent in a northeast – southwest direction, with abrupt change in a northwest - southeast direction. The bands are referred to as belts, as in Carolina Slate Belt, and commonly the rock within a belt is thought to share a similar history of formation. This project is within the dominantly igneous Charlotte belt more particularly, the Concord Plutonic suite. The map shows a nearly circular outcrop designated as DOgb (Gabbro), surrounded by Dss, (Syenite), both thought to originate from a common molten rock reservoir at depth. The complex gives evidence of having crystallized 15 km below ground, requiring considerable material to have been eroded over the last 400 million years.

The mineralogy of the Concord Pluton was not altered much by the metamorphic events that created schist and gneiss in the surrounding area. The gabbro in the floor of the basin is expressed as groups of large, dark colored boulders, sometimes with exfoliation fractures, that emerge out of a thin dark gray poorly drained clayey soil of little relief. The syenite underlies the arcuate ridges that surround the basin, expressed as red clayey soil, rather than the gray of the gabbro in the center of the basin.

Soil Properties

The geotechnical soil investigation is concerned with the location and distribution of the various soil types that will be encountered in the project. The geotechnical description first identifies soil as residual, (weathered in place), alluvial, (transported by water), or embankment, (placed after transport by human activity). After this, the AASHTO identification system further divides the soil into categories that are used to predict the performance of the soil as an engineering material.

Examination of the soil relationships in the test borings found that the soil column can be categorized as one of two types. One type, more prevalent in the beginning of the project, has A-7 at the surface, followed by A-4 then maybe A-2, and finally weathered rock, all occurring over 15' or so. The second type, especially typical of the US 29, (Y-4) interchange is prevalent in the second half of the project. Generally there is again A-7 at the surface, often with high PI, (plasticity index), soil at the top of the section. Of the first drive samples, Not only were 86% A-6 or A-7, 54% had PI values above 35, and 40% of the first drive samples with PI values at or above 45. At about 4', the depth of the second drive, none of the samples had PI values in the "not acceptable" range, (PI=35 or above).

Rock Properties

Rock on a project like this is indicated at auger refusal or SPT refusal, so we know where the rock starts but we do not sample it. The rock on this project was found at 10' or greater depth, below finished grade, often below substantial embankment fill, except at: -L1- 25+50, (at grade), –L- 140+00, (5' below grade) and –L- 142+00 (3' above grade).

Weathered Rock

There is a category of material not so hard to be impenetrable, but still harder than soil. Weathered rock returns a Standard Penetration Test value, "N" of greater than 100 blows on the sampler results in a foot or less of penetration. Weathered rock was commonly found within 5' of finished grade, often under "stiff, or softer", highly plastic clayey residual soil. This transition from soil to weathered rock is abrupt, and can be expected to be irregular possibly with residual boulders. The profiles portray these relationships.

Groundwater

Groundwater is water that resides in the otherwise vacant pores in the subsurface will freely drain, (given open space to drain into), that tends to a configuration with a roughly planar upper limit, the "water table". Above the water table, the soil may be wet, but some air filled space exists. On this project, neither the surface clayey soil, nor the igneous bedrock has open pore space. There is an occurrence of groundwater in A-4 silty soil from –L- 122+50 to 125+00, and in residual sandy soil from –L-129+00 to 131+00. From –L- 139+00 to 146+00 there also is groundwater associated with A-2, A-4, or weathered rock, and excavation for the drainage ditch intercepts the water table.

[1] A second order stream is fed by tributaries that originate from springheads. A third order stream is fed by second order streams, etc.

Geotechnical Descriptive Analysis

Using the information generated from the investigation, the borings, the soil samples, the plans profiles and cross sections a description of the project follows. The project is subdivided into segments for purposes of discussion. The break in this project at station –L- 60+00, is a change in the subsurface and the design. Up to Station –L-60+00, the roadway grade will be built very near land surface and weathered rock is more than 6' below surface. Beyond that station, weathered rock is often within 3' of the surface, the soil is very clayey and plastic, and construction is mostly on embankment, especially the interchange at highway 29.

Segment 1

Segment 1 covers the project from the beginning including -L1-, –L2-and then on –L- up to -L- 60+00, including several short –Y- lines. The project follows SR 1309, Stough Road, then Roberta Church Road, SR 1310, more or less, though of course they are straightened, widened, and flattened. The residual soil is clayey and highly plastic at the surface, but shifts to moderate plasticity within 3' of the surface and granular soil deeper.

Physical Description

The alignments of segment 1 are listed below, and a description of each alignment follows that.

Line	Station		Station	Length (feet)
-L1-	11+00.00	to	54+31.74	4,331.74
-L-	23+00.00	to	150+58.04	12,758.04
-L2-	42+87.90	to	54+34.31	1,146.41
-Y1-	10+00.00	to	22+14.39	1,214.39
-Y-	10+00.00	to	12+39.36	239.36
-Y3-	10+00.00	to	15+50.00	550.00
-Y6-	10+00.00	to	12+19.32	219.32
-Y8-	12+00.00	to	13+44.80	144.80
-Y9-	10+00.00	to	12+00.00	200.00
-L1-	**11+00.00**	**to**	**54+31.74**	**4,331.74**

-L1- begins at station 11+00, elevation 560 on Stough road, (SR 1309), and after a driveway improvement of April Court, (-Y8-), station –L1- 13+31, left side, it veers off the existing Stough Road. Another driveway improvement is at station –L1- 16+50, on the right, Marlboro Drive, (–Y9), and then –L1- runs parallel to Stough Road on the left side as a two lane road. The road tops out at elevation 604 at the intersection with Roberta Road, SR 1304, station 22+00. The –L1- alignment continues straight on new ground, widening into a 4 lane road. From 22+00 to 27+00 the road is in cut and may encounter rock. The new alignment descends at a 2.7% grade to cross an unnamed stream, 28' above water level, and bottoms out at station 33+50, elevation 580'. From there, the alignment is near grade with a little cut in the ditches, and climbs at 3.2% grade, to a driveway improvement on the left, Summertree ave, (-Y-), and joins the existing Roberta Church Road, (SR1310), at station 40+00, and continues to the top at station –L1- 47+00, elevation 613. The road descends to station 54+31, elevation 608, the end of –L1-.

-L2- 42+87.90 to 54+34.31 1,146.41

-L2- starts at –L1-42+87.9 at the beginning of widening for a 4 lane divided portion of the roadway. The island is pierced by a U-turn from the left hand lane to the right hand lane. The -L2- alignment ends at station 54.34.74, which is also the end of alignment -L1-, and the beginning of alignment -L- at station 23+00.

-L- 23+00.00 to 150+58.04 12,758.04

-L- begins at station 23+00, elevation 608 and follows Roberta Church Road on grade, expanding the current road to a 4 lane divided roadway, widening left and right, running essentially level, up to station 32+50, elevation 608. At –L- 27+08, the median limits access from northbound –L- to Roberta Farms Court, (Y3-), and access to Roberta Woods Court, (Y3-), from southbound –L-. The left turn access from –Y3- to –L- at this intersection is removed. (A similar controlled access intersection will be built at –L- 41+50.) From station 32+50, elevation 607, the road climbs at 3% to flatten out at 46+00 and elevation 642 before the top at station 47+50 elevation 643. The widening will take a berm on the left from 29+00 to 32+00, and part of a berm on the right from 32+00 to 48+00, From station 48+00 to the end of the segment at 60+00 the road will be on a low embankment and runs nearly level, descending slightly to the end at elevation 632.

-Y1- 10+00.00 to 22+14.39 1,214.39

-Y1-, Roberta Road, (SR 1304), starts at –Y1-10+00 at elevation 585, climbs to station 11+50, elevation 590, then runs nearly level to station –Y1-13+50, elevation 592 then climbs steadily to station 20+50, elevation 615, before breaking over the top and descending to the end at 22+00, elevation 612. There is a little inflection at 16+25 where –L1- crosses. The existing road is modified and widened to 4 lanes at the intersection with –L1. Most of the widening is on the right side and is built on embankment.

Significant Cuts and Fills

The initial cuts and fills smooth out the ridge followed by Stough Road as the new alignment straightens out the jog in the road from Stough to Roberta to Roberta Church road, while crossing a tributary to Coddle Creek. Except for the berm on the right side from 32+00 to 48 +00 most of the work is in the ditches.

Alignment	From	to	cut or fill	depth	Notes
-L1-	11+00	16+00	cut	2'	1.) cut from ditches 2.) PI ≤ 25
-L1-	13+00	22+00	fill	3' to 10'	
-L1-	22+00	27+00	cut	max 15'	1.) Rock at grade 2.) PI 48 at surface
-L1-	27+00	32+00	fill	max 22'	1.) Stream crossing
-L1-	32+00	34+00	cut	max 7'	1.) In ditches 2.) WR[2] near grade PI ≤ 25
-L1-	34+00	39+00	fill	max 4'	
-L1-	39+00	46+00	cut	max 6'	1. In ditches 2.) WR near grade
-L1-	39+00	46+00	fill	max 2'	1.) Over existing pave 2.) Add lane on left.
-L1- &-L-	46+00	–L- 29+00	fill	max 4.4	1.) Lft lane @ grade, Rtln & med. On fill
-L1-&-L-	46+00	–L- 29+00	cut	max 2'	1.) In left ditch 2. A-6, A-7 PI≤ 25

[2] WR = weathered rock

-L-	29+00	32+00	cut	max 7'	1.) Ditch &Berm on left 2.) Ditch on rt.
-L-	32+00	48+00	cut	max 17'	1.) Ditch on lft 2.)Berm on rt
-L-	48+00	60+00	fill	max 16'	1.) both lanes and median built on fill.
-Y1-	11+00	16+00	cut	max 5'	1.) first 50' Lft & Rt, then 2.) lft side only

Geology

Rock

As mentioned in the Geology statement at the beginning, the project is within the Concord Plutonic suite which contains syenite, gabbro and small pegmatite veins, all igneous intrusive rock. The sole occurrence of rock at grade on this segment is at –L1-25+50.

Soil

Alluvial Soil: There is one small occurrence of alluvial soil restricted to the unnamed tributary to Coddle Creek, at –L1-29+71.

Residual Soil: The residual soil, the product of weathering the gabbro or syenite rock of the area seems to fall into one of two types. One type is A-7 over A-4 or A-2 over weathered rock, with a maximum column length of 20'. The other soil section is A-7 over weathered rock, often less than 10' thick. The 4 samples, all A-7, from station –L1- 23+00, taken at 0', 3', 8', and 13', illustrate the first type of soil and the change in characteristics with depth. Sample SS-4 has a PI of 61, followed by SS-5 with a PI of 33, then SS-6 with a PI of 21, and finally SS-7 at 13' with a PI of 17. Only the initial sample would be problematic. This particular boring is unusual with medium stiff soil at the last sample.

Artificial Fill: The cut on the right side of –L- from –L- 32+75 to –L-48+00 falls on a berm that was identified as artificial fill. Our borings found this soil to be typical of the local soils which vary from A-2 to A-7. No deleterious material such as boulders or areas of organic material was found in the berm.

Groundwater

Groundwater was recorded only associated with the -L1-stream crossing mentioned above, and at a single station –L-57+00, near the end of the segment.

Segment 2

Segment 2 begins at –L- 60+00 and includes all work to the end of the project including the interchange at US 29. The soil on this second half of the project is thinner, and, near the US 29 interchange, highly plastic. It is mostly of no significance though because; segment 2 is built almost completely on embankment.

Physical Description

The alignments covered by this segment are listed below. The descriptions of each alignment follow the list of alignments. The alignments will be discussed in the same order as on the list.

Line	Station	Length (feet)		
-L-	23+00.00	to	150+58.04	12,758.04
-Y2REV-	25+00.00	to	38+41.77	1,341.77
-Y4-	4+00.00	to	33+50.00	2,950.00
-Y5	14+00.00	to	22+50.00	850.00
-RPA-	10+00.99	to	27+03.56	1,703.56
-SPURA-	10+00.00	to	14+73.90	473.90
-RPB-	10+00.00	to	28+27.36	1,827.36
-SPURB-	10+00.00	to	16+69.92	669.92
-RPC-	10+00.00	to	29+16.56	1,916.56
SPURC-	10+00.00	to	15+08.76	508.76
-RPD-	10+00.00	to	27+62.21	1,762.21
-SPURD-	10+00.00	to	17+08.53	708.53
-L-	**23+00.00**	**to**	**150+58.04**	**12,758.04**

The portion of -L1- in this segment continues the 4 lane divided road of Segment 1. It begins at station 60+00, elevation 632, departs the Roberta Road right of way to the right, and runs nearly level to station 67+00, elevation 628. At station –L- 67+00 the roadway climbs at a 2.8% grade to station 76+00 elevation 650, where the grade decreases, reaching the top of the embankment, and crossing above –Y4-, (US 29) at station 80+25, elevation 654. The roadway descends at increasing grade until at station 85+00, elevation 647, a smooth 4% grade commences and continues to 95+00, elevation 609. From station 95+00 the grade flattens until at station 100+00, elevation 599 the road starts to climb again and rolls into a 1.77% grade up to station 119+00, elevation 630. Within that reach, from 99+50 to 110+50, the road is in a sweeping curve to the right. The super elevation banking is formed by dropping the right side in cut, and the left is raised in embankment fill. At 119+00, the grade decreases to 1.19%, which is maintained to station 143+00 and elevation 658 where it rolls over the top of the hill at station 144+00, elevation 658. The road then descends to the end of the alignment at station 150+50 and elevation 650.

-Y2REV- 25+00.00 to 38+41.77 1,341.77

-Y2REV- provides access to the remnant of Roberta Road between –L- 61+00 and –Y4-, (US 29), and includes a new connection with –Y4- 500' southwest of the original intersection. The alignment begins on the existing pavement of Roberta Road at station 26+00 elevation 628', and soon veers left off the existing road and drops at a grade of 2.6% until it flattens out at station 37+00, elevation 610, slightly before meeting –Y4-, (US 29).

-Y4- 4+00.00 to 33+50.00 2,950.00

The work on –Y4-, (US 29) is done at the existing grade and reworks the existing roadway. The profile is on the centerline in the median, and appears to show a gain in elevation for the roadway, but it is only the median that will be filled to the existing lane level. The alignment climbs throughout, begins at 5+50, elevation 607 and climbs at 0.9% grade to station 14+00, elevation 614', where the grade increases to 2.1% which is carried to station 22+00, elevation 628, where the grade has decreased to .5% which exists to the end of construction at station 33+50 and elevation 636'.

-Y5 14+00.00 to 22+50.00 850.00

The work on –Y5-, (SR 1431), consists of paving, grading the ditches and connection to –L-, and completes improvements to the intersection that were begun as part of the previous improvement to George Lyles Blvd, (possibly R-2246C). The alignment begins at station 14+00, elevation 640, climbs to the intersection with –L- at 18+50, elevation 653, and ends at station 22+50, elevation 655.

-RPA- 10+00.99 to 27+03.56 1,703.56
Ramp A provides access from southbound –L- to -SPURA- and to eastbound US 29. It begins at station -RPA- 10+00 adjacent to –L- 95+22. The stationing increases to the southeast, in opposition to -L- with stationing increasing to the northwest. From station 10+00, elevation 613, the ramp follows the grade of –L- and rises at a 3.6% grade to station 16+50, elevation 630, then descends at 1.18% grade to station 23, elevation 624 where it joins –Y4-,(US 29). It is on fill throughout.

-SPURA- 10+00.00 to 14+73.90 473.90
-SPURA- 10+00, elevation 629, is roughly contiguous with –RPA 19+40, and as the ramp curves to the left, the spur descends at .95 % to station 13+50, elevation 626, then level to –Y4-, (US 29) to end at station 14+73, elevation 626.

-RPB- 10+00.00 to 28+27.36 1,827.36
Ramp B provides access from –SPURB- and westbound US 29 to southbound –L -. It begins at -RPA- station 10+00 adjacent to –L- 64+41. The stationing increases to the northwest, in agreement with –L-. From station 10+00, elevation 628, the ramp is within 5' of land surface and runs nearly level to station 25+00, elevation 624 before it climbs to station 26+50, elevation 628 where it joins –Y4-,(US 29). The excavation for the ditches are near or below the weathered rock – soil boundary.

-SPURB- 10+00.00 to 16+69.92 669.92
-SPURB- 10+00, elevation 625, is roughly contiguous with –RPB 21+23. As the ramp curves to the right, the spur runs straight while descending slightly to station 15+00, elevation 622, before curving to merge with –Y4- at the end; –SPURB- station 16+69, elevation 620. SPURB may encounter weathered rock in the ditches.

-RPC- 10+00.00 to 29+16.56 1,916.56
Ramp C provides access from northbound –L- to -SPURC- and to westbound US 29. It begins at station -RPA- 10+00 adjacent to –L- 64+00. The stationing increases to the northwest, in agreement with -L. From station 13+00, elevation 628, the ramp follows the grade of –L- and rises at a 3.6% grade to station 16+50, elevation 630, then descends at 1.18% grade to station 23, elevation 624 where it joins –Y4-,(US 29).

SPURC- 10+00.00 to 15+08.76 508.76
-SPURC- 10+00, elevation 635, is roughly contiguous with –RPC 21+40. As the ramp curves to the left, the spur runs straight while descending slightly to station 13+50, elevation 630, before running flat to the intersection with –Y4- at 15+08, the end.

-RPD- 10+00.00 to 27+62.21 1,762.21
Ramp D provides access to northbound –L- from-SPURD- and eastbound US 29. It begins at station -RPD- 10+00 adjacent to –L- 94+47. The stationing increases to the southeast, in opposition to –L- where stations increasing to the northwest. From station 10+00, elevation 606, the ramp follows the grade of –L- and rises at a 4.26% grade to station 16+50, elevation 629, then runs almost flat to station 26+00, elevation 628' where it joins –Y4-,(US 29).

-SPURD- 10+00.00 to 17+08.53 708.53
The beginning of -SPURD- is at 10+00, elevation 635, and roughly contiguous with –RPD 20+00. As the ramp curves to the right, the spur runs straight while descending slightly to station 14+00, elevation 630, before rising slightly to the intersection with –Y4- at 17+08, elevation 631, the end.

Cuts and Fills

Most of this segment is on embankment fill. The exceptions are the ramps and SPURS especially in the ditches, and especially where US 29 is joined. The curve in –L- 100+50 to –L- 111+50 generates cut for a ditch and super-elevation on the right that comes close to rock. The embankments for the US 29 interchange are nearly 30' thick but the foundation soil of the area is neither wet nor soft.

Alignment		From	to	cut or fill	depth	Notes
-L-	60+00	79+50	fill	0 to 27'	1.) Approach for bridge over US 29	
-L-	81+50	96+00	fill	28' to 8'	1.) Approach for bridge over US 29	
-L-	96+00	99+50	fill	8'-12'-0	1.) Approach for creek crossing	
-L-	99+50	110+00	fill	up to 7'	1.) fill left, curve super-elevation	
-L-	100+50	111+50	cut	up to 7'	1.) cut right for ditch	2.) PI ≤ 25, & WR[3]
-L-	110+00	129+00	fill	up to 6'	1.) roadway on shallow embankment.	
-L-	129+00	133+50	cut	up to 11'	1.) Material mapped as artificial fill.	
-L-	133+50	140+50	fill	up to 5'	1.) roadway on shallow embankment.	
-L-	140+50	146+25	cut	up to 13'	1.) Right ditch	2.) Rock and WR
-L-	146+25	151+00	none	none	1.) Graded in previous project.	
-Y2REV-	26+50	34+00	cut	2' max	1.) Cut for ditches	
-Y2REV-	33+00	37+50	both	6' max	1.) Paved Lanes on fill	
-RPA-	10+00	23+00	fill	16' max	1.)	
-SPURA	10+00	14+00	fill	9' max	1.)	
-RPB-	10+00	25+50	cut	8' max	1.) Ditches and lane	2.)top of WR.
-SPURB-	10+00	14+00	cut	3' max	1.) Cut for ditches.	2.) top of WR
-RPC-	10+00	22+00	fill	6' max		
-RPC-	22+00	26+00	cut	6' max	1.) Cut for ditches and lanes.	
-SPURC-	12+50	14+50	cut	6' max	1.) Cut for ditches and lanes.	
-RPD-	10+00	25+50	fill	20' max		
-SPURD-	10+00	16+50	fill	10' max		

[3] WR = Weathered Rock

Geology

Rock

Rock is closer to the surface in the area of Segment 2, than in Segment 1, but in most places it is buried under embankment fill so does not present a problem. There are two exceptions: 1.) The right side ditch on –L100+50 to –L-111+50 comes within 5' of rock and, 2.) the segment from –L- 140+00 to –L- 146+00 where weathered rock is near the ditch elevation and rock was found at –L- 140+16, -L-140+82, -L-142+13 and-L-145+50 above or within 5' of grade.

Soil

As mentioned in residual soil, the product of weathering the gabbro or syenite rock of the area seems to fall into one of two types. One type is A-7 over A-4 or A-2 over weathered rock, with a maximum column length of 20'. The other soil section is A-7 over weathered rock, often less than 10' thick. The thin clay soil over rock is one of the typical characteristics of segment 2. As mentioned above, only the very top of this soil column is excessively plastic, and generally the cut sections of this segment are limited to the ditches. There is one small occurrence of silty sandy clayey alluvial soil restricted to the unnamed tributary to Coddle Creek, at –L-97+50 to –L- 99+00, scheduled to be 10' below finished grade.

Groundwater

Groundwater was recorded near the ditch elevation from –L- 140+00 to –L- 146+00.

Noise Walls

An investigation was completed and separate report submitted concerning the foundation conditions at the location of the Noise Wall that is portrayed on the plans from –L- 110+08 to -L-139+58.

Respectfully Submitted

Roger Q Callaway

PROJECT REFERENCE NO.	SHEET NO.
R-2246B	4
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

FOR PROFILE OF -L1- SEE SHEET 19
FOR PROFILE OF -Y1- SEE SHEET 27
FOR PROFILE OF -Y8- SEE SHEET 30
FOR PROFILE OF -Y9- SEE SHEET 30

REVISIONS

8/17/99

14-SEP-2010 13:30
D:\XP Projects\R2246B_GEO_RDWY_CABARRUS\CADD_GEOTECH\PlanProf\R2246B_GEO_inv_004.dgn
jmcclure

NAD 83

-Y8-
PI Sta 12+00.79
Δ = 19° 49' 55.0" (LT)
D = 7° 32' 20.1"
L = 263.06'
T = 132.86'
R = 760.00'
e = EXIST.

THOMAS MAYFIELD III AND AMY MAYFIELD
DB 3667 PG 63
PB 17 PG 32

LITTLE PROPERTIES OF MIDLAND,LLC
DB 8471 PG 224
PB 17 PG 32

BRENDA B. ST CLAIR
DB 1280 PG 205
PB 17 PG 32

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DB 2303 PG 215

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DB 310 PG 38
PB 17 PG 32

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DB 3513 PG 46
PB 17 PG 32

CYNTHIA DAWN WAGONER
DB 1064 PG 305
PB 17 PG 32

DENNIS T. COOK
DB 779 PG 143
PB 17 PG 32

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DB 2744 PG 1
PB 17 PG 32

FULLER, LESTER S.
DB 2679 PG 135
DB 3746 PG 3
DB 6655 PG 300

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DB 4987 PG 202
DB 5780 PG 323
DB 3789 PG 263
DB 3982 PG 253

BRASWELL, SHARON C.
DB 6177 PG 98
DB 5609 PG 20

BLACKWELDER, JOHN A.
DB 5702, PG 79
DB 841 PG 207

BLACKWELDER, MAXIE C.
DB 623 PG 86
DB 623 PG 88
DB 5747 PG 289

HELMS, JUDY
DB 5701 PG 370
DB 956 PG 321
DB 5642 PG 219

COCHRAN, JR., L.M.
DB 325 PG 223
DB 5609 PG 22

HELMS, MATTHEW LEE
DB 8246 PG 73
DB 5609 PG 22

DONALD AND SHIRLEY CAIN
DB 809 PG 406
PB 17 PG 40

DANIEL AND SUSAN GOLDEN
DB 603 PG 484
PB 17 PG 40

BRENDA WOODS
DB 1999 PG 32
PB 17 PG 40

TONI DREW
DB 2771 PG 158
PB 17 PG 40

SANDRA HANCOCK
DB 4804 PG 98
PB 17 PG 40

SANDERS, ANTHONY A.
DB 8295 PG 147
PB 17 PG 40

SMITH, KYLE ARTHUR
DB 623 PG 721
PB 17 PG 40

NEWTON, ROGER DALE
DB 8371 PG 256
DB 4851 PG 319
DB 8538 PG 24
DB 8538 PG 22
DB 1034 PG 109
DB 915 PG 375
PB 17 PG 40

DONALD AND CAROL PETERSON
DB 3645 PG 308
PB 17 PG 40

ALVAREZ, VENTURA MARTINEZ
DB 5691 PG 26
DB 7441 PG 315
PB 17 PG 40

-L1-
PI Sta 13+76.34
Δ = 15° 41' 05.4" (LT)
D = 5° 43' 46.5"
L = 273.75'
T = 137.74'
R = 1,000.00'
e = SEE PLANS

PI Sta 16+47.18
Δ = 15° 21' 24.4" (RT)
D = 5° 43' 46.5"
L = 268.03'
T = 134.82'
R = 1,000.00'
e = SEE PLANS

-Y1-
PI Sta 12+09.29
Δ = 9° 17' 14.2" (LT)
D = 3° 10' 59.2"
L = 291.77'
T = 146.20'
R = 1,800.00'
e = SEE PLANS

PI Sta 15+14.51
Δ = 3° 10' 29.0" (RT)
D = 1° 54' 35.5"
L = 166.23'
T = 83.14'
R = 3,000.00'
e = SEE PLANS

PI Sta 18+00.99
Δ = 1° 23' 01.7" (LT)
D = 1° 01' 39.8"
L = 134.65'
T = 67.33'
R = 5,575.00'
e = SEE PLANS

PI Sta 20+96.11
Δ = 7° 24' 24.5" (RT)
D = 6° 01' 52.1"
L = 122.81'
T = 61.49'
R = 950.00'
e = SEE PLANS

ROBERTA RD SR 1304
9,100 / 14,200
3,100 / 4,300 -Y1-
4,000 / 7,600
STOUGH RD SR 1309 — 14,100 / 21,800 -L1- -L1- 18,000 / 33,200 — GEORGE LILES PKWY
2,100 / 3,400
5,100 / 11,500 -Y1-
9,200 / 17,200
ROBERTA RD SR 1304
ADT 2008 / ADT 2035

SEE SHEET 16
MATCH LINE -Y1- STA. 14+00.00

MATCH LINE -L1- STA. 24+00.00 SEE SHEET 5

-L1- BEGIN TIP PROJECT R-2246B
-L1- STA. 11+00.00

-L1- PC Sta. 12+38.61
-L1- PT Sta. 17+80.38
-L1- POC 16+54.31
-L1- PRC Sta. 15+12.36
-L1- POT 10+00.00=
-Y9- POT 10+00.00=
-Y8- POT Sta. 10+00.00
-Y8- PC Sta. 10+67.93
-Y8- PT Sta. 13+30.99
-Y8- POT Sta. 13+44.80=
-L1- POC Sta. 13+77.05
-Y9- POT 14+25.89
-Y1- PC Sta. 14+31.37
-Y1- PT Sta. 15+97.60
-Y1- POT Sta. 16+25.12=
-L1- POT Sta. 22+16.20
-L1- TS Sta. 23+11.
-Y1- PC 20+34.62
-Y1- PT 21+57.43
-Y1- POT 22+14.39
-Y1- PC Sta. 17+33.66
-Y1- PT Sta. 18+68.31
END CONSTRUCTION -Y9- POT STA. 12+00.00
END CONSTRUCTION -Y1- POT 22+00.00

BL-100
BL-101
BL-111
BY1304A-109

BM #18 ELEV. 559.72
BM #17 ELEV. 581.77
BM #15 ELEV. 610.33

N 66°32'39.2" W
N 66°53'20.2" W
N 42°59'56.8" E
N 18°48'00.0" E
N 23°05'16" E
N 18°50'02" E
N 23°01'54" E

WELL
HTR
ISFD
DK
SHED
CABIN
2SBKD
STEPS
CONC
GRAVEL
WOODS
BLOCK FOUNDATION
LANDSCAPING AROUND CABIN
WD DECK
BRICK SPRING BOX
TOP=583.54'

PROJECT REFERENCE NO.	SHEET NO.
R-2246B	5
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

FOR PROFILE OF -L1- SEE SHEETS 19 & 20

REVISIONS 8/17/99

NAD 83

TOWER PLACE, LLC.
DB 2565 PG 170

TOWER PLACE, LLC.
DB 2565 PG 170

CASCADES, LLC,
DB 6662 PG 280

STEINFURTH, CHARLES ROBE
DB 6174 PG 3
PB 29 PG 18

HINES, KENNETH D.
DB 2465 PG 320
PB 29 PG 17

HALVERSON, GEORGE R.
DB 4842 PG 45
PB 29 PG 16

COCHRAN, JEFFERY ALLAN
DB 1752 PG 345

FULLER, LESTER S.
DB 2679 PG 135
DB 3746 PG 3
DB 5655 PG 300

BRASWELL, SHARON C.
DB 6177 PG 198
DB 5609 PG 20

BLACKWELDER, JOHN A.
DB 5702 PG 79
DB 841 PG 207

BLACKWELDER, MARGIE C.
DB 8210 PG 2

BLACKWELDER, MAXIE C.
DB 623 PG 86
DB 623 PG 88
DB 5747 PG 289

COCHRAN, JR., L.M.
DB 325 PG 223
DB 5609 PG 22

HELMS, JUDY C.
DB 5701 PG 370
DB 956 PG 321
DB 5642 PG 219

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
PB 30 PG 97
DB 6220 PG 158

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

MATCH LINE -L1- STA. 24+00.00 SEE SHEET 4

MATCH LINE -L1- STA. 37+00.00 SEE SHEET 6

-L1-

PIs Sta 25+28.64	PI Sta 32+75.41	PIs Sta 39+55.00
θs = 6° 06' 36.2"	Δ = 45° 22' 24.1" (RT)	θs = 6° 06' 36.2"
Ls = 325.68'	D = 3° 45' 07.8"	Ls = 325.68'
LT = 217.25'	L = 1,209.25'	LT = 217.25'
ST = 108.68'	T = 638.34'	ST = 108.68'
	R = 1,527.00'	
	e = SEE PLANS	

PROJECT REFERENCE NO.	SHEET NO.
R-2246B	6
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

FOR PROFILE OF -L1- SEE SHEET 20
FOR PROFILE OF -L2- SEE SHEET 21
FOR PROFILE OF -Y- SEE SHEET 27

8/17/99

REVISIONS

-Y- POT 10+00.00
BY2A-110
BEGIN CONST. -Y- POT 10+50
BM #1
ELEV. = 589.51'
NAD 83
271.18' COR-COR N10°05'48"W
271.10' COR-COR N10°04'33"W
166.17' COR-COR N20°18'02"E
34.83' COR-COR N79°19'53"W
47.10' COR-COR N10°31'33"W
200.10' COR-COR N10°31'33"W
47.30' COR-COR N10°31'33"W
113.70' COR-COR N08°25'33"W
BL-9
LEWIS J. KEE & WF. BRENDA G. KEE DB 405 PG 360
BILLY J. CORZINE JR. DB 7690 PG 103 PB 27 PG 44
SHEILA H. HUDSON DB 7467 PG 104 PB 27 PG 44
EARL T. ROBERTS DB 497 PG 240
KATHY R. LINEBERRY & AMANDA J. LINEBERRY DB 2585 PG 102
LLOYD JACKSON BURRIS & WF. RUTH BURRIS DB 300 PG 36
BERTRAM C. AND DONNA A. DANSEREAU DB 6267 PG 249
PAUL R. POPLIN, JR. & WF. MARY PRINETTE POPLIN DB 345 PG 144
ATKINSON, DOLORES M. PB 29 PG 17 DB 1765 PG 348
MYRTLE, STEPHEN A. DB 5622 PG 57 PB 29 PG 17
KING, ALLAN A. DB 2964 PG 282 PB 29 PG 17
LORIL HALL DB 8378 PG 82 PB 27 PG 44
DAVID AND KATHY BURNETT DB 6505 PG 156 PB 27 PG 44
ALLEN A. AND CAROL A. KING DB 2999 PG 231 PB 27 PG 44
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION DB 6269 PG 155 PB 27 PG 44
-LI-POT Sta. 42+87.90
-L2-PC Sta. 42+87.90= (O/S 12' RT.)
-LI-PINC Sta. 47+67.97
r2246b 03-04
MATCH LINE -L1- STA. 37+00.00 SEE SHEET 5
MATCH LINE -L1- STA 51+00.00 SEE SHEET 7
-LI-CS Sta. 38+46.32
-LI-ST Sta. 41+72.00
-L2-PRC Sta. 46+04.46
-L2-PT Sta. 49+21.02
-Y- POT 12+39.36= -LI-POS 39+63.37
BEGIN CONST. -EL- POT 10+25
CONCORD POINTE LIMITED PARTNERSHIP DB 1519 PG 299
STEVEN D. RICKARD DB 6392 PG 233
NORTH CAROLINA DEPARTMENT OF TRANSPOTATION DB 6220 PG 150
KING CORPORATION OF CHARLOTTE, INC DB 2001PG 100
SAYKHAM INTHANONH & WF. PHOUMMY INTHANONH DB 1282 PG 223 DB 1694 PG 101
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION DB 5231PG 26
SUMMER TREE AVE
1,600 / 1,600
800 / 800
800 / 800
18,600 / 33,500
16,700 / 33,700
-LI-
GEORGE LILES PKWY
ADT 2008
ADT 2035

-LI-

Pls Sta 25+28.64	Pl Sta 32+75.41	Pls Sta 39+55.00
es = 6°06'36.2"	Δ = 45°22'24.1" (RT)	es = 6°06'36.2"
Ls = 325.68'	D = 3°45'07.8"	Ls = 325.68'
LT = 217.25'	L = 1,209.25'	LT = 217.25'
ST = 108.68'	T = 638.34'	ST = 108.68'
	R = 1,527.00'	
	e = SEE PLANS	

-L2-

Pl Sta 44+46.51	Pl Sta 47+63.07
Δ = 9°04'07.4" (RT)	Δ = 9°04'07.4" (LT)
D = 2°51'53.2"	D = 2°51'53.2"
L = 316.56'	L = 316.56'
T = 158.61'	T = 158.61'
R = 2,000.00'	R = 2,000.00'
e = SEE PLANS	e = SEE PLANS

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R2246B_GEO_RDWY_CABARRUS\CADD_GEOTECH\PlanProf\R2246B_GEO_inv_006.dgn

PROJECT REFERENCE NO.	SHEET NO.
R-2246B	7
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

FOR PROFILE OF -L1- SEE SHEET 20
FOR PROFILE OF -L2- SEE SHEET 21
FOR PROFILE OF -L- SEE SHEET 22
FOR PROFILE OF -Y3- SEE SHEET 27

REVISIONS

8/17/99

NAD 83

-Y3-
PI Sta 11+16.35
Δ = 27° 48' 28.3" (RT)
D = 12° 11' 26.1"
L = 228.11'
T = 116.35'
R = 470.00'
e = SEE PLANS

-Y3- PC 10+00.00

-Y3- PT 12+28.11

BY-11

BM #3
ELEV. = 605.88'

ALLIDA LANE
DB 1642 PG 186
MB 25 PG 49

KEITH TALBERT & WF. JOYCE M. SECCO
DB 1672 PG 239
MB 25 PG 49

TONY L. JOHNSON
DB 3408 PG 197
MB 32 PG 109

DANIEL J. AND SHANNON D. BAKER
DB 3492 PG 77
MB 32 PG 109

MICHAEL S. AND JAMIE L. SHUMAN
DB 7958 PG 263
MB 32 PG 109

PAUL R. POPLIN & WF. MARY PRUDETTE POPLIN
DB 345 PG 144

RILEY G. HONEYCUTT & WF. JUANITA B. HONEYCUTT
DB 301 PG 243

ROBERT WAYNE BENFIELD
DB 1366 PG 351

BILLY H. LEFLER & WF. ANNIE B. LEFLER
DB 368 PG 287

ALEJANDRINO RAMOS DAVILA
DB 8393 PG 37

SAMUEL III AND BONITA COCHRAN
DB 7278 PG 295
MB 25 PG 49

THOMAS F. AND CATHERINE L. CLEARY
DB 827 PG 170
MB 25 PG 49

NANCYANN LAINER AND BRIAN T. BOWMAN
DB 7390 PG 152
MB 25 PG 49

JOHN A. MICHETTI & WF. JAN E. MICHETTI
DB 953 PG 82
MB 25 PG 49

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DB 2980 PG 4

ROBERTA FARMS PROPERTY OWNERS' ASSOCIATION, INC.
DB 982 PG 26 MB 25 PG 49

BEGIN CONST.
POC 11+00

-Y3- POT 12+91.47 =
-L- POT 27+08.88

-U-POT Sta. 54+31.74 LB. =
-L-POT 23+00.00 L.A.
(O/S 35.00' LT)

MATCH LINE -L1- STA. 51+00.00 SEE SHEET 6

MATCH LINE -L- STA. 33+70.00 SEE SHEET 8

N 9°16'43.7" W

ROCK OUTCROP (BOULDER?)

RANDALL L. CULLER & WF. ELIZABETH J. CULLER
DB 525 PG 533

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DB 2536 PG 82

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DB 6220 PG 160

GEORGE F. AND GLENDLYN M. MERNIKER
DB 5246 PG 54

S 9°17'54.6" E -Y6-

-L2-PT Sta. 54+34.31 LB. =
-L-POT 23+00.00 L.A.
(O/S 35.00' RT)

-Y6-POT Sta. 12+19.32

-Y6-POT Sta. 10+00.00=
-Y3-POT Sta. 14+84.51

ALICE L. MALLORY
DB 5719 PG 153

MARIA T. HOLMAN
DB 6916 PG 205

JOHN D. AND MARINDA C. WING
DB 4538 PG 97

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DB 6220 PG 162

-L-TS Sta. 28+49.45

-L-SC Sta. 30+49.45

JAMI D. RODGERS
DB 4730 PG 59

WAYNE WHALEY, JR.
DB 4730 PG 1

SUSAN M. AND KENNETH R. BAKER
DB 4712 PG 1

PHILLIP MORRIS INCORPORATED
DB 790 PG 388

-Y3-POT 15+77.36

BL-85

BL-12

BY-86

-L-
PIs Sta 29+82.79
Θs = 1° 31' 40.4"
Ls = 200.00'
LT = 133.34'
ST = 66.67'

ROBERTA FARMS CT

GEORGE LILES PKWY	16,700 / 33,700	-Y3- 1,300 / 2,600	17,000 / 34,500
		300 / 1,300	1,200 / 1,800
		300 / 900	400 / 700
		-Y3- 500 / 1,000	

ADT 2008 / ADT 2035

ROBERTA WOODS CT

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mmcintyre

PROJECT REFERENCE NO.	SHEET NO.
R-2246B	8
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

FOR PROFILE OF -L- SEE SHEET 22

REVISIONS 8/17/99

MATCH LINE -L- STA. 33+70.00 SEE SHEET 7

MATCH LINE -L- STA. 47+00.00 SEE SHEET 9

NAD 83

BM #4
ELEV. = 622.41'

J.H. SIMPSON, JR. &
WF. YETTEVA R. SIMPSON
DB 193 PG 300
DB 171PG 146
DB 218 PG 166

GORDON E. AND
ANN B. MONROE
DB 3341PG 166
MB 32 PG 109

JUNE ALYSON WHITLEY
DB 1011PG 51

SAMUEL WAYNE PAGE
DB 798 PG 444

LAURI A. DANSEREAU
DB 3439 PG 262

NORTH CAROLINA
DEPARTMENT
OF TRANSPORTATION
DB 2980 PG 4

THOMAS JOHN MACK &
WF. VIVIAN LEE MACK
DB 1778 PG 345

PHILLIP MORRIS, INCORPORATED
DB 492 PG 694
MB 16 PG 71

BRENDA COCHRAN DELLI
HUS. CLYDE DELLINGER, JR.
DB 541PG 259

PHILLIP MORRIS INCORPORATED
DB 790 PG 388

BL-13

BL-14

-L-CS Sta. 36+01.67

-L-ST Sta. 38+01.67

SR 1310 ROBERTA CHURCH RD. (PVMT)

CHORD

CITY OF MONROE GENERAL PUBLIC UTILITY EASEMENT

12" COATED STEEL

1 1/2" PL CONDUIT FOR FUTURE USE

1500' EVEN LANE

4' P.S.

2' P.S.

5' R

20' R

100' R

50' R

150' TAPER

90.00'

N 20°46'18.8"W

740.46' EP-REBAR
N47°56'49"W

1448.16' CONCMON-COR
N83°55'21"W

TOP = 608.20'
C.L. INV = 595.65'

TOP = 607.70'
C.L. INV = 596.35'

TOP = 607.65'
C.L. INV = 597.50'

TOP = 606.53'
C.L. INV = 598.08'

-L-

PI Sta 33+26.06	PIs Sta 36+68.34
Δ = 8° 26' 14.3" (LT)	Θs = 1° 31' 40.4"
D = 1° 31' 40.4"	Ls = 200.00'
L = 552.22'	LT = 133.34'
T = 276.61'	ST = 66.67'
R = 3,750.00'	
e = SEE PLANS	

PHILLIP MORRIS USA, INC
DB 493 PG 26
DB 538 PG 81
DB 538 PG 79
MB 16 PG 71

5" MONOLITHIC CONC. ISLAND

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mwhite

8/17/99

REVISIONS

PROJECT REFERENCE NO.	SHEET NO.
R-2246B	9
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

FOR PROFILE OF -L- SEE SHEETS 22 & 23

-L-
PI Sta 71+90.40
Δ = 32° 43' 41.7" (LT)
D = 0° 44' 56.3"
L = 4,369.80'
T = 2,246.31'
R = 7,650.00'
e = SEE PLANS

NAD 83

BM #5
ELEV. = 619.30'

BRENDA COCHRAN DELLINGER &
HUS. CLYDE DELLINGER, JR.
DB 541 PG 259

HOWARD E. FURR &
WF. RITA SHOE FURR
DB 341 PG 107

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
DB 2343 PG 89

J. DWIGHT MORRISON, III
DB 1979 PG 307
DB 1979 PG 309

BILL J. CORZINE
DB 1702 PG 325

BILL AND
LINDA CORZINE
DB 4454 PG 117

PHILLIP MORRIS, INCORPORATED
DB 493 PG 22
MB 16 PG 75

PHILLIP MORRIS USA, INC
DB 493 PG 26
DB 538 PG 81
DB 538 PG 79
MB 16 PG 71

BYI-16

-L-PC Sta. 49+44.08

+44.08
115' LT

MATCH LINE -L- STA. 47+00.00 SEE SHEET 8

MATCH LINE -L- STA. 60+50.00 SEE SHEET 10

SR 1310 ROBERT A CHURCH RD 23'BST

SR 1457 WINDSORTOWN RD 20'BST

1500' FULL LANE

GRAU-350

CAT-1

300' TAPER

+44.08
120' RT

N 20° 46' 18.8" W

280.34' COR-REBAR
N20°29'17"W

145.14' REBAR-COR
N20°53'37"W

99.33' COR-COR
N21°11'04"W

93.77' COR-
N48°36'05"

85.80' EOR-COR
N48°36'08"W

210.50' REBAR-COR
S41°07'47"W

N 20°54'25" W
109.56'

S 69°30'47" E
145.52'

S 69°30'47" E
145.52'

S 51°29'57" E
38.55'

0.62' REBAR-R/W

0.63' REBAR-R/W

37.24' R/W-EIP

EIP
N60°40'45"W

47.58' EIP-COR
N47°20'24"E

NCGS MON "72 JAS 1966"

BL-17

BL-24

12" COATED STEEL
1 1/2" PL CONDUIT FOR FUTURE USE

12" COATED STEEL
W/STEEL CONDUIT FOR FUTURE USE

TOP = 607.78'
C.L. INV = 599.18'
36" RCRC
TOP = 606.04'
INV UNOBTAINABLE

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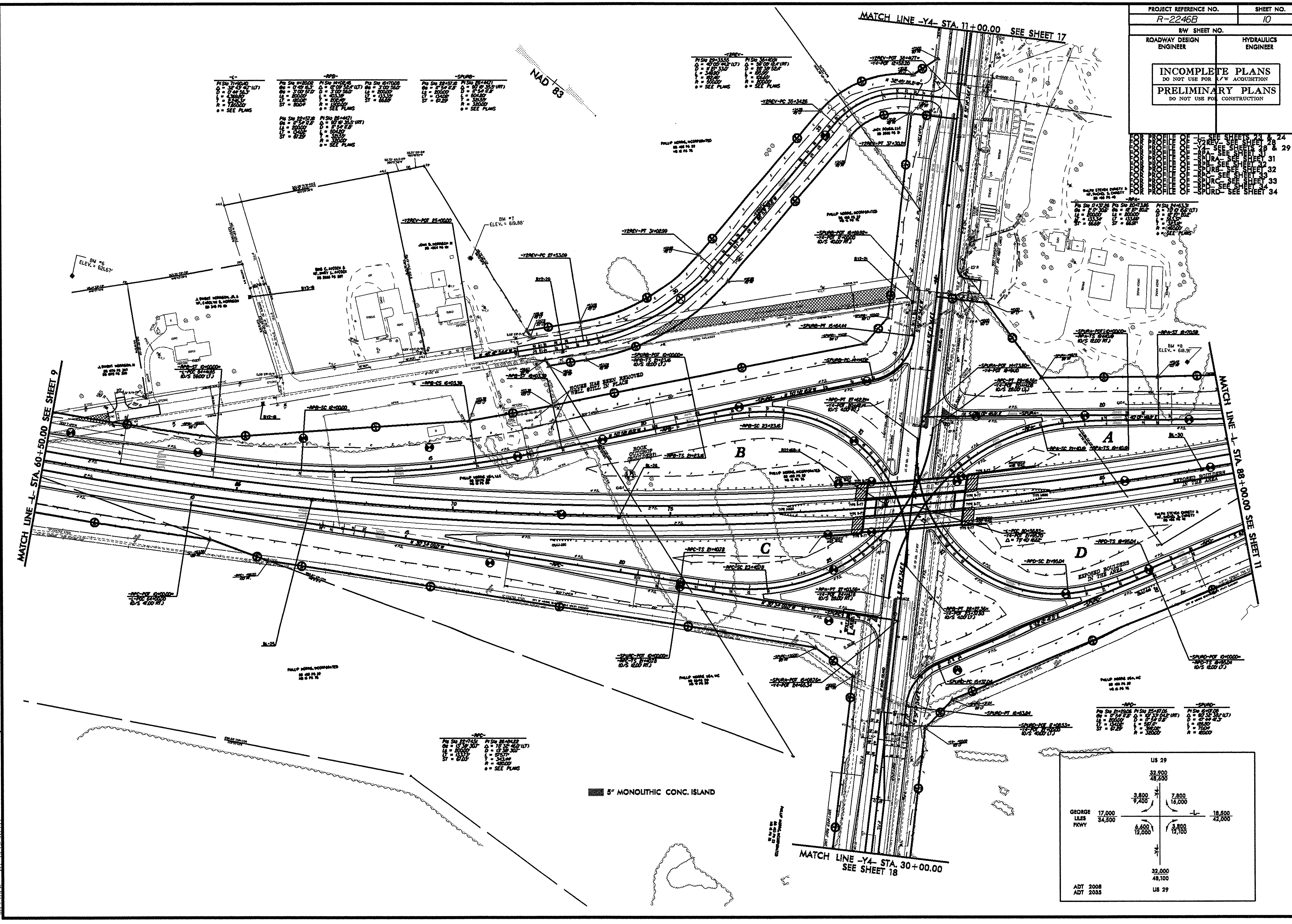
mwallace

PROJECT REFERENCE NO.	SHEET NO.
R-2246B	10
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

FOR PROFILE OF -L- SEE SHEETS 23 & 24
FOR PROFILE OF -Y2REV- SEE SHEET 28
FOR PROFILE OF -Y4- SEE SHEETS 28 & 29
FOR PROFILE OF -RPA- SEE SHEET 31
FOR PROFILE OF -SPURA- SEE SHEET 31
FOR PROFILE OF -RPB- SEE SHEET 32
FOR PROFILE OF -SPURB- SEE SHEET 32
FOR PROFILE OF -RPC- SEE SHEET 33
FOR PROFILE OF -SPURC- SEE SHEET 33
FOR PROFILE OF -RPD- SEE SHEET 34
FOR PROFILE OF -SPURD- SEE SHEET 34



5" MONOLITHIC CONC. ISLAND

REVISIONS

8/17/99

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PROJECT REFERENCE NO.	SHEET NO.
R-2246B	11
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

FOR PROFILE OF -L- SEE SHEET 24
FOR PROFILE OF -RPA- SEE SHEET 31
FOR PROFILE OF -RPD- SEE SHEET 34

REVISIONS 8/17/99

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mwallace

-RPA-
PI Sta 15+66.23
Δ = 4° 47' 10.4" (RT)
D = 2° 17' 30.6"
L = 208.84'
T = 104.48'
R = 2,500.00'
e = SEE PLANS

Pls Sta 13+95.09
Θs = 2° 17' 30.6"
Ls = 200.00'
LT = 133.34'
ST = 66.68'

-L-
PI Sta 71+90.40
Δ = 32° 43' 41.7" (LT)
D = 0° 44' 56.3"
L = 4,369.80'
T = 2,246.31'
R = 7,650.00'

Pls Sta 97+53.97
Θs = 4° 00' 38.5"
Ls = 280.00'
LT = 186.71'
ST = 93.38'

PI Sta 101+63.11
Δ = 17° 56' 54.9" (RT)
D = 2° 51' 53.2"
L = 626.52'
T = 315.85'
R = 2,000.00'

-RPD-
Pls Sta 13+70.83
Θs = 2° 51' 53.2"
Ls = 200.00'
LT = 133.35'
ST = 66.68'

PI Sta 12+52.08
Δ = 2° 59' 00.6" (LT)
D = 2° 51' 53.2"
L = 104.14'
T = 52.08'
R = 2,000.00'

Pls Sta 11+33.35
Θs = 2° 51' 53.2"
Ls = 200.00'
LT = 133.35'
ST = 66.68'

NAD 83

RALPH STEVEN CHRISTY & WF. RACHEL S. CHRISTY
DB 466 PG 48

MUGHO, LLC
DB 5692 PG 271

PHILLIP MORRIS USA, INC
DB 493 PG 22
MB 16 PG 75

PHILLIP MORRIS USA, INC
DB 193 PG 22
MB 16 PG 75

BM #9
ELEV. = 599.99'

T-45
(ELEV = 587.78')

T-44
(ELEV = 588.13')

T-42
(ELEV = 590.06')

T-43
(ELEV = 590.90')

-RPA-SC 14+61.75
-RPA-CS 16+70.59
-RPA-TS 12+61.75
-RPA-POT 10+00.00=
-L-POT 95+22.90
BL-31
-L-PT 93+13.88
-RPA- +00.00
70' RT
+00.00
110' LT
+70.59
100' RT
+61.75
100' RT
+67.26
130' RT
+47.26
120' RT
+04.14
100' LT
-L-SC 98+47.26
-L-TS 95+67.26
-RPD-SC 12+00.00
-RPD-CS 13+04.14
-RPD-ST 15+04.14
-RPD-ST 10+00.00=
-L-POT 95+47.33
BL-32
-T-(ELEV = 589.04')

S 49° 30' 01.4" E
53° 30' 00.5" W
S 77° 49' 04.8" W
N 39° 19' 09.6" E
151.74'
143.01'
360.23' COR-EIP
N70°44'55"W
360.25' EIP-COR
N70°44'55"W
653.76' EIP-COR
N34°05'14"W
431.20'
418.80'

MATCH LINE -L- STA. 88+00.00 SEE SHEET 10

MATCH LINE -L- STA. 100+50.00 SEE SHEET 12

RESIDUAL
ALLUVIUM
EXPOSED ROCK IN CREEK
EXPOSED BOULDERS IN THE AREA
GRAU-350
CA7-1
CA7
CHORD
15' TAPER
300' TAPER
11/2" PL CONDUIT FOR FUTURE USE
12" COATED STEEL
CITY OF MONROE GENERAL PUBLIC UTILITY EASEMENT
GAS MARKER
EIP
EOP
POB
POC
12" PVC
SSBW
355BW
555BW

PROJECT REFERENCE NO.	SHEET NO.
R-2246B	12
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

FOR PROFILE OF -L- SEE SHEETS 24 & 25

REVISIONS

8/17/99

-L-
PI Sta 101+63.11
Δ = 17° 56' 54.9" (RT)
D = 2° 51' 53.2"
L = 626.52'
T = 315.85'
R = 2,000.00'

PIs Sta 105+67.16
θs = 4° 00' 38.5"
Ls = 280.00'
LT = 186.71'
ST = 93.38'

NAD 83

MATCH LINE -L- STA. 100+50.00 SEE SHEET 11

MATCH LINE -L- STA. 114+00.00 SEE SHEET 13

CUT OF CONCRETE ENTRANCE PAD 36' WIDE
EXISTING 12" PVC

CLARENCE S. LITTLE & WF. LILLIAN M. LITTLE
DB 238 PG 267

PROPST BROS. DISTS., INC.
DB 698 PG 36

POND

BL-34

+74.28
110' LT

+53.78
110' LT

CHORD
N29°01'40"W

1500' FULL LANE

GRAU 350

PROPOSED FENCE

MTL GATE

300' TAPER

CENTEX INTERNATIONAL, INC.
DB 1916 PG 209 DB 1038 PG 233
DB 1712 PG 79 MB 31 PG 9

405.98'

105

110

2' P.S.

4' P.S.

22.5° HORIZ. CURVE

BEGIN NOISE WALL
-L- STA. 110+08.44

N 27° 31' 48.5" W

PROP. SINGLE FACE CONCRETE BARRIER

JOHN K. DURHAM & WF. SHARON O. DURHAM
DB 2248 PG 205
MB 31 PG 10

PATRICK M. SHANNON & WF. DEBORAH J. SHANNON
DB 2224 PG 333
MB 31 PG 10

PROPOSED NOISE WALL

55.52' COR-COR
N21°29'28"W

126.93' COR-COR N27°29'28"W

72" BLK. WALL

REBAR

+91.83
96.00' RT

+91.83
120' RT

52.52' REBAR-REBAR
N36°57'37"E

BRART C. AND HANSA B. PATEL
DB 3007 PG 250
MB 31 PG 10

FOUAD AND MARY ANN ABOU-SAMRA
DB 3760 PG 193
DB 83 REBAR-REBAR
N55°50'55"E

N01°39'23"W
101.67' REBAR-COR

95.46' REBAR-COR
N63°08'17"W

69.99' REBAR-REBAR
N36°51'43"E

120.00' REBAR-COR
N63°08'17"W

70.04' REBAR-REBAR
N36°52'10"E

CHARLES W. JR. AND JOYCE L. THOMPSON
DB 3742 PG 160
MB 31 PG 10

DAVID P. HUNTER & WF. JODY K. HUNTER

N70°28'34"E
439.81'

N70°28'34"E
118.95' COR-COR

2SFD

2SBKFD

CONC

36" CONC

Rx 50'

8" PVC

BM #10
ELEV. = 617.04'

-L-CS 104+73.78

-L-ST 107+53.78

+73.76
120' RT

+53.76
120' RT

1½" PL CONDUIT FOR FUTURE USE

12" COATED STEEL

GAS MARKER

PHILLIP MORRIS USA, INC
DB 493 PG 22
MB 16 PG 75

MARY HELEN GARRISON DALTON
DB 5667 PG 360
MB 4 PG 2

BL-33

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mgallaze

PROJECT REFERENCE NO.	SHEET NO.
R-2246B	13
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

FOR PROFILE OF -L- SEE SHEET 25

8/17/99

REVISIONS

NAD 83

BM #11
ELEV. = 619.03'

PROPST BROS. DISTS., INC.
DB 698 PG 36

BL-35

BL-36

+00.00
110' LT

12" COATED STEEL

1030.37' RIP-RAP

11/2" PL CONDUIT FOR FUTURE USE

N26°58'01"W

48"WW&SSBW

STONE

CENTEX INTERNATIONAL, INC.
DB 1916 PG 209
DB 1712 PG 79

DB 1038 PG 233
MB 31PG 9

4' P.S.

2' P.S.

RESIDUAL

ALLUVIUM

ARTIFICIAL FILL

PROP. SINGLE FACE CONCRETE BARRIER

PROPOSED NOISE WALL

N 27° 31' 48.5" W

126.92' STONE-AXLE

MISKEY S. AND
JENNIFER T. COOKE
DB 2623 PG 177
MB 26 PG 98

PROPST BROS. DISTS., INC.
DB 698 PG 36

BL-37

WELL

TOM AND
SHANNON HAPEMAN
DB 7463 PG 59
MB 31PG 10

LEE R. AND
KARIE A. ANDERSON
DB 8383 PG 291
MB 31PG 10

300' TAPER

ANDREW E. MCGUIRE &
WF. MELISSA L. MCGUIRE
DB 2629 PG 38
MB 31PG 10

JOHN S. WATSON &
WF. TAMARA S. WATSON
DB 2610 PG 72
MB 31PG 10

DAVID P. HUNTER
DB 3529 PG 144
MB 31PG 10

FABIO F. AND
MARTHA BOLOGNA
DB 7262 PG 159
MB 31PG 10

SCOTT A. AND
SUZANNE M. BOGART
DB 3013 PG 231
MB 31PG 10

EDWARD W. MORRIS &
WF. DEBRA MORRIS
DB 2625 PG 82
MB 31PG 10

RICHARD WOODLAND JR. &
WF. JOELLE V. WOODLAND
DB 2315 PG 321
MB 31PG 9

KAREN B. MASTEN
DB 2264 PG 91
MB 31PG 9

JEFFERY S. AND
PAMELA A. CAUDLE
DB 3938 PG 130
MB 31PG 10

KEVIN M. AND
JULIE L. BUCK
DB 3870 PG 107
MB 31PG 9

E. RICHARD J. AND
SENAIT F. HURLEY
DB 8362 PG 76
MB 31PG 9

DORIS O'NEAL
DB 2282 PG 9
MB 31PG 9

STEPHEN H. AND
KRISTINE A. TOST
DB 6845 PG 192
MB 31PG 9

MARK AND
FRANCES H. CATON
DB 6990 PG 23
MB 31PG 9

DAVID AND
JENNIFER BRYANT
DB 5967 PG 256
MB 35 PG 56

ROBERT J. AND
MICHELLE A. TAUTKUS
DB 2829 PG 70
MB 35 PG 56

CHRISTY SIMMONS
DB 4757 PG 108
MB 31PG 9

JOANN H. MULLINAX
JEFFREY G. MULLINAX
DB 2207 PG 243
MB 26 PG 98

DAVID L. DIETZ
DB 5367 PG 320
MB 26 PG 98

CHARLES A. AND
KATHRYN C. HELVEY
DB 5419 PG 190
MB 26 PG 98

KEVIN JARED GATES &
WF. LISA MARIE GATES
DB 1819 PG 281
MB 26 PG 98

EUGENE L. PRESTON &
WF. JOYCE L. PRESTON
DB 2029 PG 265
MB 26 PG 98

MATCH LINE -L- STA. 114+00.00 SEE SHEET 12

MATCH LINE -L- STA. 128+00.00 SEE SHEET 14

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mmcclure

PROJECT REFERENCE NO.	SHEET NO.
R-2246B	14
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

FOR PROFILE OF -L- SEE SHEETS 25 & 26

8/17/99

REVISIONS

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mcclure

-L-
PIs Sta 140+68.62
Θs = 2°08'54.9"
Ls = 196.85'
LT = 131.24'
ST = 65.63'

PI Sta 145+00.05
Δ = 15°52'10.2" (RT)
D = 2°10'58.7"
L = 726.97'
T = 365.83'
R = 2624.67'

NAD 83

BM #12
ELEV. = 639.59'

MATCH LINE -L- STA. 128+00.00 SEE SHEET 13

MATCH LINE -L- STA. 141+00.00 SEE SHEET 15

RESIDUAL

ARTIFICIAL FILL

PROPOSED NOISE WALL

PROP. SINGLE FACE CONCRETE BARRIER

END NOISE WALL -L- STA. 139+58.23

-L-TS 139+37.38

BL-1

BL-2

BL-38

BL-39

SHEFFEILD MANOR HOMEOWNERS ASSOCIATION OF CONCORD, INC
DB 6972 PG 183

JANE ELIZABETH MOSS
DB 1043 PG #
DB 3849 PG 216

ARLIS W. BARBER & WF. ALLISON J. BARBER
DB 2193 PG 272
MB 26 PG 97

CENTEX INTERNATIONAL, INC.
DB 1915 PG 209
DB 1702 PG 79
DB 1958 PG 233

RICHARD L. AND CAROLYN A. CONLEY
DB 1064 PG 074
MB 26 PG 97

TIMOTHY D. GARD & WF. PATRICIA E. GARD
DB 2038 PG 200
MB 26 PG 97

BILLY W. AND KRISTINA J. STOOTS
DB 6700 PG 105
MB 26 PG 97

MICHAEL T. SMITH & WF. THERESA H. SMITH
DB 1245 PG 327
MB 26 PG 97

DANIEL H. STUEBE & WF. DEBORAH D. STUEBE
DB 2618 PG 245
MB 26 PG 97

PETER W. AND TSUNG-YU NING
DB 3696 PG 206
MB 26 PG 97

JOHN O. CAMARA & WF. JANET A. CAMARA
DB 1255 PG 337
MB 26 PG 97

BRYANT W. AND SUSAN J. FRAZIER
DB 3358 PG 270
MB 30 PG 80

DENNIS W. DEAL & WF. PATRICIA S. DEAL
DB 1665 PG 281
MB 26 PG 97

JOHN F. LEWIS & WF. SUSAN L. LEWIS
DB 1333 PG 272
MB 26 PG 97

KATHLEEN BURNS
DB 2525 PG 36
MB 26 PG 98

DECEMBER S. BEAN
DB 5320 PG 123
MB 26 PG 97

ALICE G. GRISDALE
DB 6578 PG 286
MB 26 PG 97

ROBERT E. BYRNE & WF. ROSEANNE V. BYRNE
DB 2244 PG 203
MB 26 PG 97

DAVID R. MICHAUD & WF. LISA M. MICHAUD
DB 1899 PG 202
MB 26 PG 97

PETER W. NING & WF. TSUNG-YU NING
DB 5482 PG 73
MB 26 PG 97

JOSEPH R. AND PATRICIA O. HAWKINS
DB 4079 PG 235
MB 26 PG 97

MATTHEW B. & TRACI A. McBEE
DB 2058 PG 309
MB 30 PG 80

JANE ELIZABETH MOSS
DB 1043 PG #
DB 3849 PG 216

PROJECT REFERENCE NO.	SHEET NO.
R-2246B	15
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

FOR PROFILE OF -L- SEE SHEET 26
FOR PROFILE OF -Y5- SEE SHEET 30

8/17/99

REVISIONS

5" MONOLITHIC CONC. ISLAND

NAD 83

-Y5- POT STA 14+00.00
BEGIN CONSTRUCTION

MATCH EXIST

N 71° 11' 03.0" E 255.58'

-Y5-
PI Sta 17+05.99
Δ = 10° 11' 23.2" (RT)
D = 4° 03' 48.7"
L = 250.76'
T = 125.71'
R = 1,410.00'

MHRA, LLC
DB 6188 PG 302

-Y5-PC Sta. 15+80.28

JANE ELIZABETH MOSS
DB 1043 PG A
DB 3849 PG 216

-Y5- PT 18+31.04

-Y5- POT 18+62.40=
-L- POC 148+28.77

JOHN D. MORRISON III
DB 2290 PG 107

-L-CS Sta. 148+61.19

COBLE FAMILY FARM LTD
DB 1777 PG 273

END TIP PROJECT R-2246B
-L- STA. 150+58.04

MATCH LINE -L- STA. 141+00.00 SEE SHEET 14

-L-SC 141+34.23

BL-27

BL-28

-L-
PIs Sta 149+26.82
θ s = 2° 08' 54.9"
Ls = 196.85'
LT = 131.24'
ST = 65.63'

-Y5-PC Sta. 22+56.15

-Y5- PC STA 22+50.00
END CONSTRUCTION

JANE ELIZABETH MOSS
DB 1043 PG B
DB 3849 PG 216

JMS POPLAR, LLC
DB 7987 PG 46

BL-81

COBLE FAMILY FARM LTD
DB 3029 PG 174

-Y5-
PI Sta 24+18.52
Δ = 4° 01' 13.0" (RT)
D = 1° 14' 18.8"
L = 324.59'
T = 162.36'
R = 4,625.98'

-L- ST Sta. 150+58.04

-L-POT Sta. 152+30.85

NEED TO AVOID THIS POWER POLE PER GREG SEALY 5/25/10

N 7° 21' 48.5" W

S 19° 46' 03" W 360.00'

N 13° 53' 52" E 400.69'

N 07° 01' 39" E 244.34'

N 06° 57' 04" E 406.

WEDDINGTON RD
SR 1431

GEORGE LILES PKWY	18,500 / 42,000	-L-	18,000 / 44,000

10,800 / 20,600 (-Y5-)
2,800 / 7,900 (-Y5-)
2,400 / 5,100
2,500 / 3,800 (-Y5-)
2,400 / 8,600
10,500 / 20,000 (-Y5-)

ADT 2008
ADT 2035

WEDDINGTON RD
SR 1431

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mcline AT 16H 24M 47

PROJECT REFERENCE NO.	SHEET NO.
R-2246B	16
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

FOR PROFILE OF -Y1- SEE SHEET 27

REVISIONS

8/17/99

NAD 83

-Y1-
PI Sta 12+09.29
Δ = 9°11'14.2" (LT)
D = 3°10'59.2"
L = 291.77'
T = 146.20'
R = 1,800.00'
e = SEE PLANS

-Y1-PC Sta. 10+63.08

-Y1-POT Sta. 10+00.00

-Y1-PT Sta. 13+54.85

BEGIN CONSTRUCTION
-Y1- POT 10+50.00

BY1304A-112

BY1304A-108

MATCH LINE -Y1- STA. 14+00.00 SEE SHEET 4

TOWER PLACE, LLC.
DB 2565 PG 170

MANNING, STEVEN V. & WIFE, DEBRA G.
DB 4184 PG 853
PB 19 PG 59

PLANT, JOHN A. III
DB 3391 PG 59
PB 19 PG 59

MELTON, KELLY H.
DB 2921 PG 29
PB 19 PG 59

BRASWELL, JR., FRANK H.
DB 1746 PG 280
DB 4138 PG 225
DB 4138 PG 223
DB 4138 PG 225
PB 19 PG 59

TOWNSEND, RAYMOND F.
DB 1490 PG 30
PB 19 PG 59

MILLER, CHARLES RICHARD
DB 1731 PG 346
PB 19 PG 59

WALL, RANDY L.
DB 8654 PG 001

REYNOLDS, JENU BOGER
DB 1202 PG 107
PB 17 PG 52

DENNIS T. COOK

BM #14
ELEV. 587.58'

14-SEP-2000 14:12
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mwatkins

PROJECT REFERENCE NO.	SHEET NO.
R-2246B	17
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

FOR PROFILE OF -Y4- SEE SHEET 28

REVISIONS

8/17/99

EIP

NAD 83

N 55°33'15" E
229.67'

N 32°45'44" W
339.69'

MUGHO, LLC
DB 5770 PG 004

-Y4-POT Sta. 4+00.00

24" RCP

15" RCP

18" RCP

POND

GR

15" RCA

15" RCP

100' TAPER

EXISTING R/W

12" PVC SSF

3' BST

4' P.S.

5" MONO ISLAND

36" WW ISBW

15" RCP

12" PVC

US 29 SBL 24' BST

US 29 NBL 24' BST

48" WW

BEGIN CONSTRUCTION
-Y4- STA.5+50.00

JACK ROUSH, LLC
DB 3089 PG 21

MATCH LINE -Y4- STA. 11+00.00 SEE SHEET 10

5" MONOLITHIC CONC. ISLAND

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Includes AF_GEH240347

PROJECT REFERENCE NO.	SHEET NO.
R-2246B	18
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

FOR PROFILE OF -Y4- SEE SHEET 29

REVISIONS 8/17/99

MATCH LINE -Y4- STA. 30+00.00 SEE SHEET 10

PHILLIP MORRIS USA, INC
DB 493 PG 22
MB 16 PG 75

NAD 83

+75.00 90' LT
250' TRANSITION LEFT AND RIGHT LANES
+25.00 60' LT
END CONSTRUCTION -Y4- STA. 33+50.00
52"WD RAIL&ISBW
EXISTING R/W
4' P.S.
SIG LT
12" PVC SSFM AATUR
60"WD RAIL
RW MON
-Y4-
35
40
US 29 SBL 36' BST
US 29 NBL 24' BST
18" RCP
2' P.S.
+25.00 60' RT
16" DIP WM
EOS
TRAFFIC CONTROL HANDHOLE
60"WD RAIL&2S ELEC W
+25.80 90' RT
200' FUEL LANE
WD GATE
12"WTL
PHILLIP MORRIS DR BST
BY4-29
N72°22'05"E 502.43'SPK

PHILLIP MORRIS, INCORPORATED
DB 493 PG 37
MB 16 PG 69

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mgoliver

5/28/99

PROJECT REFERENCE NO.	SHEET NO.
R-2246B	19
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

-L1-

PI = 12+75.00
EL = 564.75'
VC = 325'
K = 73

PI = 16+25.00
EL = 587.30'
VC = 350'
K = 126

PI = 21+90.00
EL = 608.05'
VC = 540'
K = 84

PI = 34+00.00
EL = 575.07'
VC = 825'
K = 137

APRIL COURT 20'BST

ROBERTA RD. (SR 1304) WIDTH VARIES BST

EXISTING STOUGH RD (SR 1309) 20' BST

11+50 -L1- 50.0 LT.

14+50 -L1- 40.0 LT.

17+50 -L1- CL

20+50 -L1- CL

23+00 -L1- 40.0 RT.

25+75 -L1- 25.0 RT.

26+25 -L1- 100.0 RT.

28+25 -L1- 20.0 LT.

29+20 -L1- 20.0 RT.

32+25 -L1- 75.0 RT.

33+50 -L1- 40.0 LT.

(+)3.6726%
(+)6.4429%
(+)1.9943%
(-)12.7256%
(+)3.2875%

SS-1
SS-2
SS-3
SS-4
SS-5
SS-6
SS-7
SS-8
SS-9
SS-10
SS-11
SS-12
SS-13
SS-14
SS-15
SS-16
SS-17
SS-18
SS-19
SS-148
SS-149
SS-150
SS-151

ARTIFICIAL FILL
BRN MED. STIFF MOIST SILTY SANDY CLAY (A-7) W/GRAVEL

EXISTING STOUGH RD (SR 1309) 20' BST
ROADWAY EMBANKMENT (FILL) OVER RESIDUAL

RESIDUAL
BRN STIFF TO V. STIFF MOIST MED. PLASTIC SILTY SANDY CLAY (A-7-6) TO LOW PLASTIC SILTY SANDY CLAY (A-6)

BT DRY (7/19/10)
CRYSTALLINE ROCK

GRAY-OLIVE-TAN MED. DENSE WET MED. PLASTIC SILTY CLAYEY SAND (A-2-6)

RESIDUAL
BRN STIFF MOIST SILTY SANDY CLAY (A-7)

OLIVE-TAN & OLIVE MED. DENSE TO V. DENSE MOIST SILTY CLAYEY SAND (A-2-4)

BT NM (7/19/10)
WEATHERED ROCK (OLIVE SEV. WEATH. CRYSTALLINE ROCK)

RESIDUAL

ARTIFICIAL FILL
GRAVEL (DRIVEWAY)

WEATHERED ROCK (SEV. WEATHERED CRYSTALLINE ROCK)

BT DRY (7/19/10)
CRYSTALLINE ROCK

RESIDUAL
OLIVE STIFF MOIST MED. PLASTIC SILTY SANDY CLAY (A-7-6)

RESIDUAL
OLIVE MED. DENSE DRY TO MOIST SILTY SAND (A-2-4)

BT DRY (6/15/10)

RESIDUAL
TAN TO OLIVE-TAN SOFT TO V. STIFF MOIST TO WET HIGH TO MED. PLASTIC SILTY CLAY & SANDY SILTY CLAY (A-7-6, A-7-5)

BT DRY (6/15/10)

RESIDUAL

AR DRY (6/15/10)

WEATHERED ROCK (SEV. WEATHERED CRYSTALLINE ROCK)

BT DRY (6/15/10)

RESIDUAL
RED-BRN TO OLIVE MED. STIFF TO STIFF MOIST HIGH TO LOW PLASTIC SILTY CLAY (A-7-5) & SANDY SILTY CLAY (A-7-6, A-6)

TAN TO OLIVE-TAN STIFF TO MED. STIFF MOIST HIGH TO MED. PLASTIC SANDY SILTY CLAY (A-7-5) & SILTY SANDY CLAY (A-7-6)

OLIVE MED. STIFF MOIST CLAYEY SANDY SILT (A-4)

BT DRY (6/16/10)

ARTIFICIAL FILL
RED-BRN STIFF MOIST SANDY SILTY CLAY (A-7)

RESIDUAL

ALLUVIUM

RESIDUAL
OLIVE-WHITE & BLACK (SALT & PEPPER) DENSE WET SILTY SAND (A-2-4)

BT DRY (6/16/10)

RESIDUAL
RED-BRN MED. STIFF TO STIFF MOIST MED. PLASTIC SILTY SANDY CLAY (A-7-6, A-6))

OLIVE-TAN MED. DENSE TO V. DENSE MOIST SILTY SAND (A-2-4)

BT DRY (6/17/10)

RESIDUAL
BRN STIFF DRY LOW PLASTIC SILTY SANDY CLAY (A-7-5)

WEATHERED ROCK (OLIVE- DRY- SEV. WEATH. CRYSTALLINE ROCK)

BT DRY (6/16/10)

BORING DESCRIPTIONS
(A) BOULDERS (ARTIFICIAL FILL)
(B) GRAY SOFT WET SANDY SILTY CLAY (A-7) (ARTIFICIAL FILL)

PROJECT REFERENCE NO.	SHEET NO.
R-2246B	20
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

5/28/99

PI = 42+00.00
EL = 601.37'
VC = 160'
K = 263

PI = 47+10.00
EL = 615.03'
VC = 365'
K = 84

SS-24
MS-24
SS-25

45+00 -L1-
50.0 RT.

SS-22
MS-22
SS-23

42+00 -L1-
50.0 RT.

SS-20
SS-21

39+00 -L1-
CL

36+00 -L1-
25.0 LT.

SUMMERTREE AVE SW
(SR 3810) 23° BST

EXISTING ROBERTA CHURCH RD (SR 1310)

(+)3.2875%

(+)2.6784%

(-)11.6455%

RESIDUAL
RED-BRN. MED. STIFF TO STIFF
MOIST MED. PLASTIC
SILTY SANDY CLAY (A-7-6)

RESIDUAL
RED-BRN. MED. STIFF- TO- STIFF-
MOIST SILTY SANDY CLAY (A-7)

RESIDUAL
RED-BRN STIFF
MOIST MED. PLASTIC
SILTY SANDY CLAY (A-7-6)

RESIDUAL
TAN MED. STIFF
MOIST HIGH PLASTIC
SANDY SILTY CLAY (A-7-5)

ROADWAY EMBANKMENT (FILL)
OVER RESIDUAL

EXISTING ROBERTA CHURCH RD (SR 1310)
ROADWAY EMBANKMENT (FILL)
OVER RESIDUAL

OLIVE-TAN DENSE DRY
SILTY SAND (A-2-4)

WEATHERED ROCK
(OLIVE-TAN SEV. WEATH.
CRYSTALLINE ROCK)

RED-BRN. MED. DENSE
MOIST SILTY SAND (A-2-4)

WEATHERED ROCK
(SEV. WEATHERED
CRYSTALLINE ROCK)

OLIVE-TAN MED. DENSE
MOIST SILTY SAND (A-2-4)

WEATHERED ROCK
(OLIVE-TAN SEV. WEATH.
CRYSTALLINE ROCK)

AR
NM
(6/17/10)
CR

BT
DRY
(6/17/10)

-L1-

640 630 620 610 600 590 580 570 560 550

36+00 37+00 38+00 39+00 40+00 41+00 42+00 43+00 44+00 45+00 46+00 47+00 48+00 49+00

PI = 50+40.00
EL = 609.60'
VC = 160'
K = 138

PI = 53+50.00
EL = 608.09'
VC = 160'
K = 185

SS-26
MS-26
SS-27
SS-28

49+50 -L1-
50.0 RT.

52+75 -L1-
75.0 RT.

53+00 -L1-
75.0 RT.

608.39

(-)11.6455%

(-)10.4870%

(+)10.3790%

ROADWAY EMBANKMENT (FILL) OVER RESIDUAL

RESIDUAL
TAN MED. STIFF
MOIST MED. PLASTIC
SILTY SANDY CLAY (A-7-6)

TAN MED. DENSE
MOIST TO WET
SILTY SAND (A-2-4)

RESIDUAL
WEATHERED ROCK
(SEV. WEATHERED
CRYSTALLINE ROCK)

RESIDUAL
TAN TO TAN-BRN
MED. STIFF MOIST
SILTY SANDY CLAY (A-7)

WEATHERED ROCK
(OLIVE SEV. WEATH.
CRYSTALLINE ROCK)

(NOTE: ROCK OUTCROP AT STA. 52+50 -L1- 75.0 RT.)

650 640 630 620 610 600 590 580 570 560

50+00 51+00 52+00 53+00 54+00

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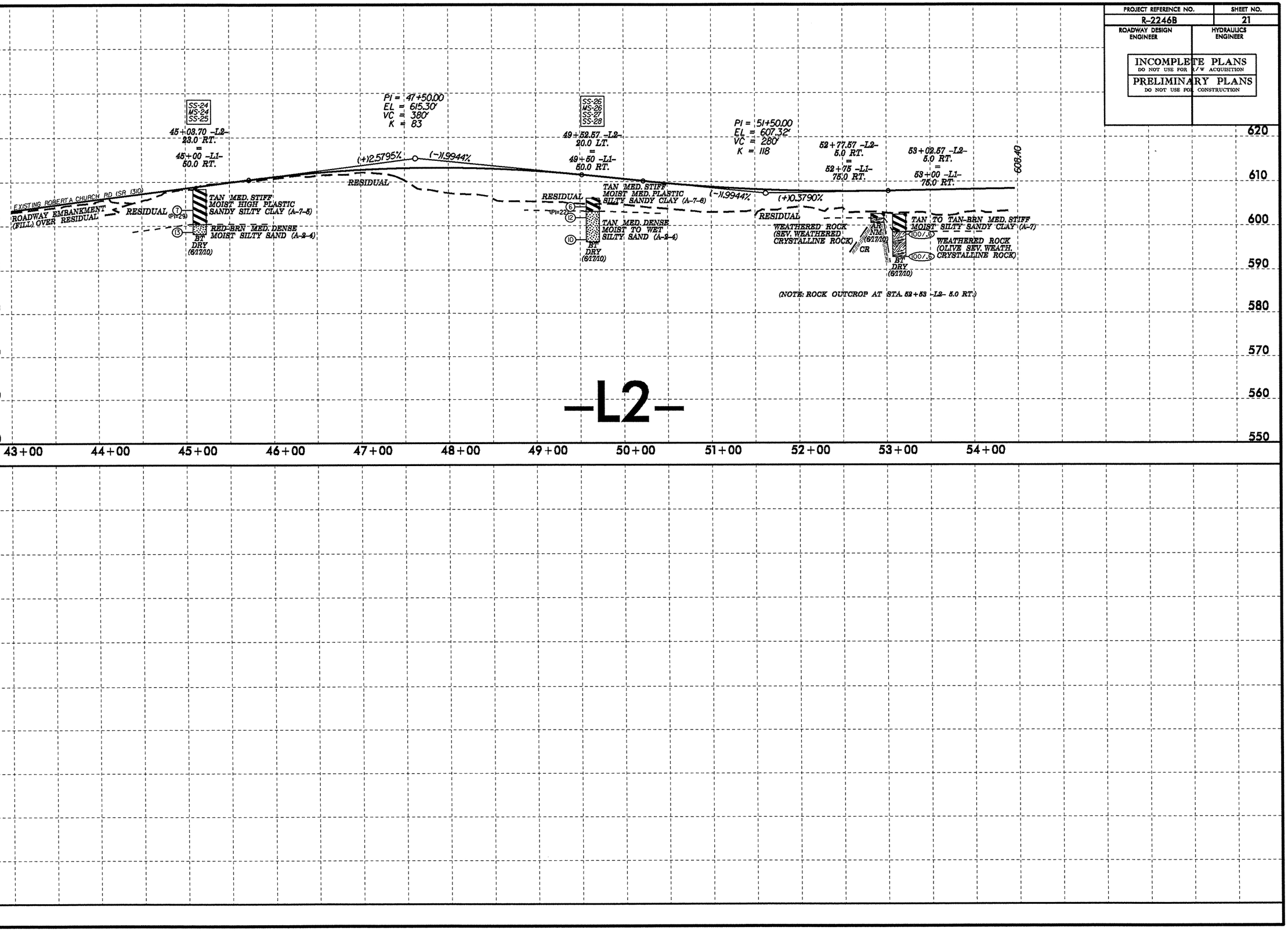
Imagelink at (EMPTY)

5/28/99

PROJECT REFERENCE NO.	SHEET NO.
R-2246B	21
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



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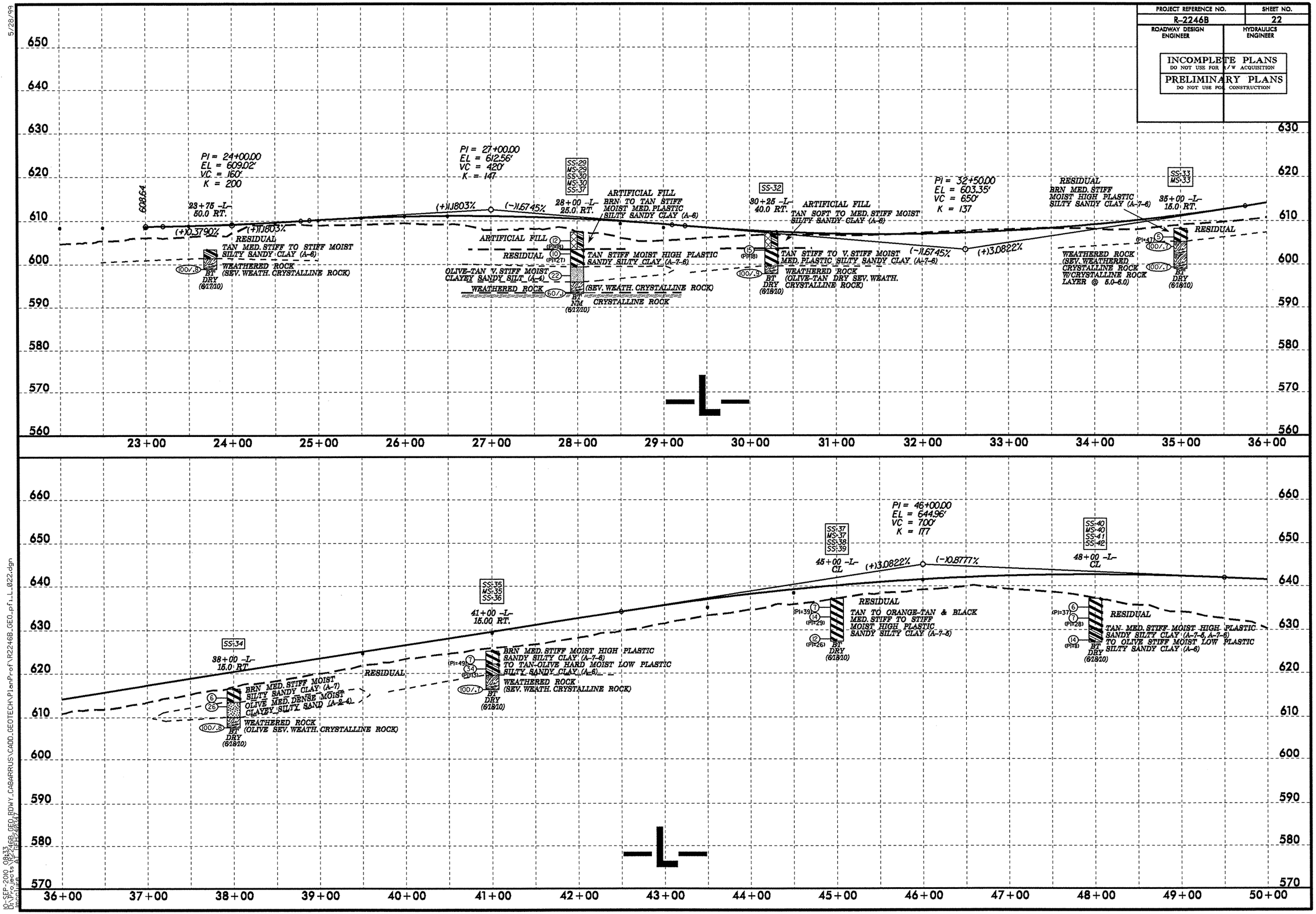
Imagelink AT_GEH24047

5/28/99

PROJECT REFERENCE NO.	SHEET NO.
R-2246B	22
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



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mcclure

5/28/99

PROJECT REFERENCE NO.	SHEET NO.
R-2246B	23

ROADWAY DESIGN ENGINEER | HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

SS-43
MS-43
SS-44
SS-45
51+00 -L-
CL
RESIDUAL
BRN MED. STIFF MOIST HIGH PLASTIC SILTY SANDY CLAY (A-7-6) TO BRN V. STIFF MOIST MED. PLASTIC SILTY SANDY CLAY (A-6)
PI=53
PI=17
7
17
21
BT
DRY
(6/18/10)
OLIVE MED. DENSE MOIST SILTY SAND (A-2-4)

SS-46
54+00 -L-
60.0 RT.
RESIDUAL
TAN-BRN STIFF MOIST SILTY SANDY CLAY (A-7)
9
34
AR
CRYSTALLINE ROCK DRY
(6/18/10)
OLIVE HARD MOIST CLAYEY SANDY SILT (A-4)

SS-47
57+00 -L-
50.0 RT.
ARTIFICIAL FILL
BRN MED. STIFF MOIST SANDY SILTY CLAY (A-7) W/GRAVEL (ROAD BED)
54
100/.6
BT
RESIDUAL
OLIVE DENSE TO V. DENSE MOIST SILTY SAND (A-2-4)
08/10
WEATHERED ROCK (SEV. WEATH. CRYSTALLINE ROCK W/CRYSTALLINE ROCK LAYER @ 8.0)

61+00 -L-
75.0 LT.
RESIDUAL
TAN LOOSE MOIST SILTY SAND (A-3)
WEATHERED ROCK (SEV. WEATH. CRYSTALLINE ROCK)
RESIDUAL
100/.6
100/.5
AR
NM
(6/18/10)
CRYSTALLINE ROCK

SS-48
64+00 -L-
75.0 LT.
RESIDUAL
TAN STIFF TO HARD MOIST CLAYEY SANDY SILT (A-4)
RESIDUAL
66
100/.8
BT
DRY
(6/18/10)
WEATHERED ROCK (SEV. WEATHERED CRYSTALLINE ROCK)

670 660 650 640 630 620 610 600 590 580
50+00 51+00 52+00 53+00 54+00 55+00 56+00 57+00 58+00 59+00 60+00 61+00 62+00 63+00 64+00

SS-48
64+00 -L-
75.0 LT.
RESIDUAL
TAN STIFF TO HARD MOIST CLAYEY SANDY SILT (A-4)
RESIDUAL
66
100/.8
BT
DRY
(6/18/10)
WEATHERED ROCK (SEV. WEATHERED CRYSTALLINE ROCK)

SS-49
MS-49
SS-50
66+40 -L-
137.0 LT.
=
12+00 -RPB-
75.0 LT.
(PI=45)
17
100/.8
100/.7
100/.4
BT
DRY
(6/18/10)
WEATHERED ROCK (BRN DRY SEV. WEATH. CRYSTALLINE ROCK)

PI = 67+75.00
EL = 625.87'
VC = 510'
K = 137
RESIDUAL
BRN STIFF MOIST HIGH PLASTIC SILTY SANDY CLAY (A-7-6)
(-)0.8777%
(+)2.8504%
RESIDUAL

SS-51
MS-51
SS-52
SS-53
SS-54
69+36 -L-
141.0 LT.
=
15+00 -RPB-
50.0 LT.
(PI=49)
10
63
37
59
BT
DRY
(6/21/10)
TAN HARD DRY SANDY SILT (A-4) W/SEV. WEATHERED CRYSTALLINE ROCK SEAM @ 7.0
OLIVE-TAN V. DENSE DRY SILTY SAND (A-2-4)

SS-65
MS-65
70+90 -L-
117.0 RT.
=
17+00 -RPC-
25.0 RT.
71+43 -L-
130.0 LT.
=
17+00 -RPB-
CL
RESIDUAL
BRN STIFF TO HARD MOIST HIGH PLASTIC SILTY SANDY CLAY (A-7-6)
RESIDUAL
(PI=48)
43
100/.8
100/.6
100/.4
BT
DRY
(6/23/10)
WEATHERED ROCK (OLIVE SEV. WEATHERED CRYSTALLINE ROCK)
RESIDUAL
OLIVE-TAN MED. DENSE MOIST CLAYEY SILTY SAND (A-2)

SS-67
MS-67
72+60 -L-
CL
(PI=55)
14
100/.8
100/.3
BT
DRY
(6/23/10)
WEATHERED ROCK (SEV. WEATHERED CRYSTALLINE ROCK)

SS-55
MS-55
SS-56
73+42 -L-
174.0 LT.
=
19+00 -RPB-
CL
(P)=32
11
49
100/.8
100/.1
BT
DRY
(6/22/10)
RESIDUAL
OLIVE HARD MOIST CLAYEY SANDY SILT (A-4)
WEATHERED ROCK (SEV. WEATHERED CRYSTALLINE ROCK)

SS-66
MS-66
75+22 -L-
165.0 RT.
=
10+00 -SPURC-
10.0 LT.
BRN V. STIFF MOIST SILTY SANDY CLAY (A-7)
RESIDUAL
100/.1
100/.8
BT
DRY
(6/23/10)
WEATHERED ROCK (OLIVE SEV. WEATHERED CRYSTALLINE ROCK)

670 660 650 640 630 620 610 600 590 580
64+00 65+00 66+00 67+00 68+00 69+00 70+00 71+00 72+00 73+00 74+00 75+00 76+00 77+00 78+00

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5/28/99

PROJECT REFERENCE NO.	SHEET NO.
R-2246B	24
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

PI = 80+25.00
EL = 661.50'
VC = 925'
K = 158

(+)2.8504%

(-)3.0112%

PI = 86+50.00
EL = 642.68'
VC = 300'
K = -303

(-)3.0112%

(-)4.0000%

SS-61
MS-61

78+60 -L-
55.0 RT.

78+90 -L-
60.0 LT.

SS-60

79+60 -L-
55.00 RT.

SS-58
MS-58
SS-59

79+68 -L-
60.00 LT.

US 29 NBL 24' BST

US 29 SBL 24' BST

SS-68
SS-69

81+75 -L-
55.0 LT.

81+65 -L-
45.0 LT.

RESIDUAL
BRN STIFF MOIST HIGH PLASTIC SILTY SANDY CLAY (A-7-6)

RESIDUAL
BRN & OLIVE V. STIFF MOIST HIGH PLASTIC SILTY SANDY CLAY (A-7-6)

SS-72

85+50 -L-
CL

SS-76

87+50 -L-
CL

SS-80
SS-81

89+21 -L-
91.0 LT.
=
16+00 -RPA-
CL

SS-78
MS-78
SS-79

90+53 -L-
101.0 RT.
=
15+00 -RPD-
CL

RESIDUAL
OLIVE V. STIFF MOIST CLAYEY SANDY SILT (A-6)

RESIDUAL
BRN MED. STIFF MOIST SILTY SANDY CLAY (A-7)

RESIDUAL
BRN V. STIFF MOIST HIGH PLASTIC SILTY SANDY CLAY (A-7-6)

RESIDUAL
BRN MED. STIFF MOIST SANDY SILT (A-4)

RESIDUAL

WEATHERED ROCK (OLIVE SEV. WEATH. CRYSTALLINE ROCK)

WEATHERED ROCK (SEV. WEATHERED CRYSTALLINE ROCK)

WEATHERED ROCK (OLIVE SEV. WEATH. CRYSTALLINE ROCK)

CRYSTALLINE ROCK

SEV. WEATH. CRYSTALLINE ROCK LAYER @ 3.8

OLIVE MED. DENSE WET SILTY SAND (A-2-4)

OLIVE MED. DENSE TO DENSE MOIST SILTY SAND (A-2-4)

BORING DESCRIPTIONS

(A) BRN MED. STIFF TO V. STIFF MOIST HIGH PLASTIC SILTY SANDY CLAY (A-7-6) (RESIDUAL)

(B) OLIVE MED. STIFF TO V. STIFF DRY TO MOIST CLAYEY SANDY SILT (A-4) (RESIDUAL)

(C) WEATHERED ROCK (OLIVE SEV. WEATHERED CRYSTALLINE ROCK)

(NOTE: BOULDER OUTCROPS IN THE AREA)

92+23 -L-
67.0 LT.
=
13+00 -RPA-
CL

SS-82
MS-82
SS-83

94+60 -L-
25.0 LT.

OLIVE STIFF MOIST CLAYEY SANDY SILT (A-4)

BRN STIFF MOIST SILTY SANDY CLAY (A-7)

RESIDUAL

WEATHERED ROCK (OLIVE SEV. WEATHERED CRYSTALLINE ROCK W/CRYSTALLINE ROCK LAYER @ 6.0)

BRN STIFF MOIST MED. PLASTIC SILTY SANDY CLAY (A-7-6)

OLIVE HARD DRY SANDY SILT (A-4)

WEATHERED ROCK (SEV. WEATH. CRYSTALLINE ROCK)

DRY CRYSTALLINE ROCK

(NOTE: BOULDERS IN THE AREA)

PI = 98+75.00
EL = 593.68'
VC = 800'
K = 139

(+)1.7735%

SS-84
SS-85

98+00 -L-
90.0 LT.

ALLUVIUM
BRN & GRAY STIFF MOIST MED. PLASTIC SILTY SANDY CLAY (A-6)

ALLUVIUM
TAN-BRN MED. DENSE MOIST CLAYEY SILTY SAND (A-2)

CRYSTALLINE ROCK

WEATHERED ROCK (SEV. WEATHERED CRYSTALLINE ROCK)

SS-86

101+00 -L-
90.0 RT.

RESIDUAL
BRN STIFF MOIST SANDY SILTY CLAY (A-7)

OLIVE MED. DENSE TO DENSE MOIST SILTY SAND (A-2-4)

CRYSTALLINE ROCK

WEATHERED ROCK (SEV. WEATHERED CRYSTALLINE ROCK)

SS-87

103+25 -L-
CL

RESIDUAL
BRN MED. STIFF MOIST SANDY SILTY CLAY (A-7) W/COBBLE @ 1.0)

OLIVE MED. DENSE MOIST SILTY SAND (A-2-4)

WEATHERED ROCK (SEV. WEATH. CRYSTALLINE ROCK)

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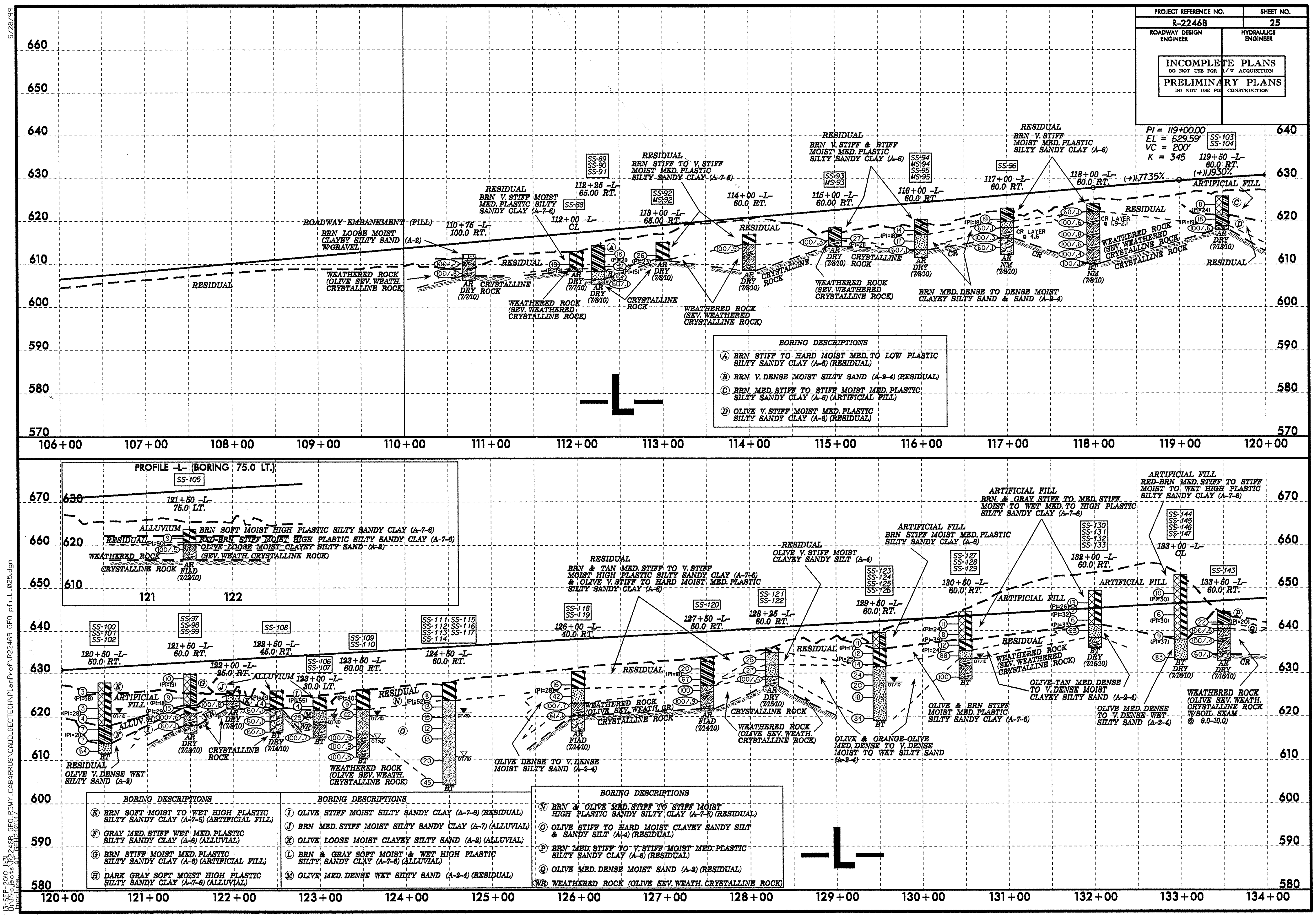
PROJECT REFERENCE NO. R-2246B
SHEET NO. 25
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
5/28/99
PI = 119+00.00
EL = 629.59'
VC = 200'
K = 345
(+)1.7735%
(+)1.1930%
ROADWAY EMBANKMENT (FILL)
BRN LOOSE MOIST CLAYEY SILTY SAND (A-2) W/GRAVEL
110+75 -L- 100.0 RT.
RESIDUAL
WEATHERED ROCK (OLIVE SEV. WEATH. CRYSTALLINE ROCK)
AR DRY (7/7/10)
CRYSTALLINE ROCK
RESIDUAL
BRN V. STIFF MOIST MED. PLASTIC SILTY SANDY CLAY (A-7-6)
SS-88
112+00 -L- CL
SS-89
SS-90
SS-91
112+25 -L- 65.00 RT.
WEATHERED ROCK (SEV. WEATHERED CRYSTALLINE ROCK)
RESIDUAL
BRN STIFF TO V. STIFF MOIST MED. PLASTIC SILTY SANDY CLAY (A-7-6)
SS-92
MS-92
113+00 -L- 65.00 RT.
AR DRY (7/8/10)
114+00 -L- 60.0 RT.
RESIDUAL
SS-93
MS-93
115+00 -L- 60.00 RT.
RESIDUAL
BRN V. STIFF & STIFF MOIST MED. PLASTIC SILTY SANDY CLAY (A-6)
SS-94
MS-94
SS-95
MS-95
116+00 -L- 60.0 RT.
SS-96
117+00 -L- 60.0 RT.
CR LAYER @ 4.6
AR NM (7/8/10)
BRN MED. DENSE TO DENSE MOIST CLAYEY SILTY SAND & SAND (A-2-4)
RESIDUAL
BRN V. STIFF MOIST MED. PLASTIC SILTY SANDY CLAY (A-6)
118+00 -L- 60.0 RT.
CR LAYER @ 1.9-2.1
BT NM (7/8/10)
WEATHERED ROCK (SEV. WEATHERED CRYSTALLINE ROCK)
CRYSTALLINE ROCK
SS-103
SS-104
119+50 -L- 60.0 RT.
ARTIFICIAL FILL
AR DRY (7/13/10)
BORING DESCRIPTIONS
(A) BRN STIFF TO HARD MOIST MED. TO LOW PLASTIC SILTY SANDY CLAY (A-6) (RESIDUAL)
(B) BRN V. DENSE MOIST SILTY SAND (A-2-4) (RESIDUAL)
(C) BRN MED. STIFF TO STIFF MOIST MED. PLASTIC SILTY SANDY CLAY (A-6) (ARTIFICIAL FILL)
(D) OLIVE V. STIFF MOIST MED. PLASTIC SILTY SANDY CLAY (A-6) (RESIDUAL)
-L-
106+00
107+00
108+00
109+00
110+00
111+00
112+00
113+00
114+00
115+00
116+00
117+00
118+00
119+00
120+00
PROFILE -L- (BORING 75.0 LT.)
SS-105
121+50 -L- 75.0 LT.
ALLUVIUM
BRN SOFT MOIST HIGH PLASTIC SILTY SANDY CLAY (A-7-6)
RESIDUAL
RED-BRN STIFF MOIST HIGH PLASTIC SILTY SANDY CLAY (A-7-6)
OLIVE LOOSE MOIST CLAYEY SILTY SAND (A-2)
WEATHERED ROCK
(SEV. WEATH. CRYSTALLINE ROCK)
CRYSTALLINE ROCK
AR FIAD (7/12/10)
121
122
SS-100
SS-101
SS-102
120+50 -L- 50.0 RT.
ARTIFICIAL FILL
ALLUV.
RESIDUAL
OLIVE V. DENSE WET SILTY SAND (A-2)
SS-97
SS-98
SS-99
121+50 -L- 60.0 RT.
AR DRY (7/13/10)
122+00 -L- 25.0 RT.
ALLUVIUM
SS-108
122+50 -L- 45.0 RT.
AR DRY (7/8/10)
CRYSTALLINE ROCK
BT DRY (7/14/10)
SS-106
SS-107
123+00 -L- 30.0 LT.
SS-109
SS-110
123+50 -L- 60.00 RT.
RESIDUAL
WEATHERED ROCK (OLIVE SEV. WEATH. CRYSTALLINE ROCK)
SS-111
SS-112
SS-113
SS-114
SS-115
SS-116
SS-117
124+50 -L- 60.0 RT.
SS-118
SS-119
126+00 -L- 40.0 RT.
RESIDUAL
BRN & TAN MED. STIFF TO V. STIFF MOIST HIGH PLASTIC SILTY SANDY CLAY (A-7-6) & OLIVE V. STIFF TO HARD MOIST MED. PLASTIC SILTY SANDY CLAY (A-6)
WEATHERED ROCK (OLIVE SEV. WEATH. CR)
CRYSTALLINE ROCK
AR FIAD (7/14/10)
OLIVE DENSE TO V. DENSE MOIST SILTY SAND (A-2-4)
SS-120
127+50 -L- 50.0 RT.
AR FIAD (7/14/10)
SS-121
SS-122
128+25 -L- 60.0 RT.
AR DRY (7/15/10)
CRYSTALLINE ROCK
WEATHERED ROCK (OLIVE SEV. WEATH. CRYSTALLINE ROCK)
RESIDUAL
OLIVE V. STIFF MOIST CLAYEY SANDY SILT (A-4)
SS-123
SS-124
SS-125
SS-126
129+50 -L- 60.0 RT.
OLIVE & ORANGE-OLIVE MED. DENSE TO V. DENSE MOIST TO WET SILTY SAND (A-2-4)
ARTIFICIAL FILL
BRN STIFF MOIST MED. PLASTIC SILTY SANDY CLAY (A-6)
SS-127
SS-128
SS-129
130+50 -L- 60.0 RT.
OLIVE & BRN STIFF MOIST MED. PLASTIC SILTY SANDY CLAY (A-7-6)
ARTIFICIAL FILL
BRN & GRAY STIFF TO MED. STIFF MOIST TO WET MED. TO HIGH PLASTIC SILTY SANDY CLAY (A-7-6)
RESIDUAL
WEATHERED ROCK (SEV. WEATHERED CRYSTALLINE ROCK)
OLIVE-TAN MED. DENSE TO V. DENSE MOIST CLAYEY SILTY SAND (A-2-4)
SS-130
SS-131
SS-132
SS-133
132+00 -L- 60.0 RT.
ARTIFICIAL FILL
BT DRY (7/16/10)
OLIVE MED. DENSE TO V. DENSE WET SILTY SAND (A-2-4)
ARTIFICIAL FILL
RED-BRN MED. STIFF TO STIFF MOIST TO WET HIGH PLASTIC SILTY SANDY CLAY (A-7-6)
SS-144
SS-145
SS-146
SS-147
133+00 -L- CL
BT DRY (7/16/10)
SS-143
133+50 -L- 60.0 RT.
AR DRY (7/16/10)
CR
WEATHERED ROCK (OLIVE SEV. WEATH. CRYSTALLINE ROCK W/SOIL SEAM @ 9.0-10.0)
BORING DESCRIPTIONS
(E) BRN SOFT MOIST TO WET HIGH PLASTIC SILTY SANDY CLAY (A-7-6) (ARTIFICIAL FILL)
(F) GRAY MED. STIFF WET MED. PLASTIC SILTY SANDY CLAY (A-6) (ALLUVIAL)
(G) BRN STIFF MOIST MED. PLASTIC SILTY SANDY CLAY (A-6) (ARTIFICIAL FILL)
(H) DARK GRAY SOFT MOIST HIGH PLASTIC SILTY SANDY CLAY (A-7-6) (ALLUVIAL)
BORING DESCRIPTIONS
(I) OLIVE STIFF MOIST SILTY SANDY CLAY (A-7-6) (RESIDUAL)
(J) BRN MED. STIFF MOIST SILTY SANDY CLAY (A-7) (ALLUVIAL)
(K) OLIVE LOOSE MOIST CLAYEY SILTY SAND (A-2) (ALLUVIAL)
(L) BRN & GRAY SOFT MOIST & WET HIGH PLASTIC SILTY SANDY CLAY (A-7-6) (ALLUVIAL)
(M) OLIVE MED. DENSE WET SILTY SAND (A-2-4) (RESIDUAL)
BORING DESCRIPTIONS
(N) BRN & OLIVE MED. STIFF TO STIFF MOIST HIGH PLASTIC SANDY SILTY CLAY (A-7-6) (RESIDUAL)
(O) OLIVE STIFF TO HARD MOIST CLAYEY SANDY SILT & SANDY SILT (A-4) (RESIDUAL)
(P) BRN MED. STIFF TO V. STIFF MOIST MED. PLASTIC SILTY SANDY CLAY (A-6) (RESIDUAL)
(Q) OLIVE MED. DENSE MOIST SAND (A-2) (RESIDUAL)
(WR) WEATHERED ROCK (OLIVE SEV. WEATH. CRYSTALLINE ROCK)
-L-
120+00
121+00
122+00
123+00
124+00
125+00
126+00
127+00
128+00
129+00
130+00
131+00
132+00
133+00
134+00
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PROJECT REFERENCE NO.	SHEET NO.
R-2246B	26
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

PI = 143+90.00
EL = 659.30'
VC = 400'
K = 155

RESIDUAL
BRN SOFT TO MED. STIFF MOIST HIGH PLASTIC SILTY SANDY CLAY (A-7-6) TO GRAY HARD MOIST LOW PLASTIC SILTY SANDY CLAY (A-6)

S-141 SS-142
135+00 -L- 60.0' RT.

RESIDUAL
BRN STIFF TO V. STIFF MOIST HIGH PLASTIC SILTY SANDY CLAY (A-7-6)

SS-139 SS-140
136+60 -L- 60.0' RT.

RESIDUAL
BRN MED. STIFF TO STIFF MOIST LOW PLASTIC SILTY SANDY CLAY (A-6) TO TAN STIFF MOIST MED. PLASTIC SILTY SANDY CLAY (A-7-6)

S-136 SS-137 SS-138
138+00 -L- 60.0' RT.

RESIDUAL
BRN STIFF MOIST SILTY SANDY CLAY (A-7)

SS-134 SS-135
139+50 -L- 60.0' RT.

RESIDUAL
RED-BRN MED STIFF MOIST MED. PLASTIC SILTY SANDY CLAY (A-7-6)

S-24 MS-24
140+16 -L- 65.6 RT.

RESIDUAL
RED-BRN MED. STIFF MOIST HIGH PLASTIC SILTY SANDY CLAY (A-7-6) TO OLIVE HARD MOIST LOW PLASTIC SILTY SANDY CLAY (A-6)

S-16 MS-16 S-17 MS-17 S-18
141+48 -L- 65.6 RT.

RESIDUAL
BRN MED. STIFF MOIST SANDY SILTY CLAY (A-7-6)

S-25
142+13 -L- CL

S-26
142+79 -L- 65.6 LT.

RESIDUAL
RED-BRN MED. STIFF MOIST SANDY SILTY CLAY (A-7)

143+44 -L- 65.6 RT.

RESIDUAL
RED-BRN & BRN MED. STIFF MOIST HIGH PLASTIC SILTY SANDY CLAY (A-7-6)

S-23 MS-23
144+76 -L- CL

S-19 MS-19 S-20
145+41 -L- 65.6 RT.

146+07 -L- 65.6 RT.

RESIDUAL
RED-BRN MED. STIFF MOIST HIGH PLASTIC SILTY SANDY CLAY (A-7-6)

S-21 MS-21 SS-22
147+38 -L- 65.6 RT.

1.930% (-) 1.395%

W/ SEV. WEATH. CR LAYERS

WEATHERED ROCK (OLIVE SEV. WEATH. CRYSTALLINE ROCK)

CRYSTALLINE ROCK

WEATHERED ROCK (OLIVE MOIST SEV. WEATH. CRYSTALLINE ROCK)

OLIVE & TAN MED. DENSE TO DENSE MOIST SILTY SAND (A-2-4)

OLIVE STIFF TO HARD MOIST TO DRY CLAYEY SANDY SILT & SANDY SILT (A-4)

CR LAYER @ 14.3'

BORINGS FROM R-2246C (CONVERTED FROM METRIC)

BORING DESCRIPTIONS

- (WR) WEATHERED ROCK. (OLIVE SEV. WEATH. CRYSTALLINE ROCK)
- (A) OLIVE-TAN MED. STIFF MOIST SANDY SILT (A-5) (RESIDUAL)
- (B) BRN STIFF MOIST SANDY CLAY SILT (A-4) (RESIDUAL)
- (C) OLIVE-TAN DENSE MOIST SILTY SAND (A-2) (RESIDUAL)
- (D) OLIVE DENSE TO V. DENSE DRY SILTY SAND (A-2-4) (RESIDUAL)
- (E) TAN V. STIFF TO HARD MOIST CLAYEY SANDY SILT (A-4) (RESIDUAL)

-L- STA. 148+28.77 =
-Y5- STA. 18+62.40

650.09

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5/28/99

PROJECT REFERENCE NO.	SHEET NO.
R-2246B	27
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

-L1- STA. 22+16.20 =
-Y1- STA. 16+25.12

PI = 11+50.00
EL = 590.70'
VC = 125'
K = 30

PI = 12+50.00
EL = 591.53'
VC = 75'
K = 225

PI = 14+25.00
EL = 592.40'
VC = 270'
K = 49

PI = 17+25.00
EL = 606.91'
VC = 100'
K = 40

PI = 18+85.00
EL = 610.05'
VC = 120'
K = 71

PI = 20+50.00
EL = 616.07'
VC = 130'
K = 24

585.74
603.58
603.69
613.36

SS-4
SS-5
SS-6
SS-7

18+71 -Y1-
81.0 LT.
=
23+00 -L1-
40.0 RT.

(+)4.9600%
(+)0.8300%
(+)0.4971%
(+)0.4971%
(+)5.9725%
(+)4.4495%
(+)11.9625%
(+)11.9625%
(+)3.6485%
(+)3.6485%
(-)11.8067%

EXISTING ROBERTA RD (SR 1304)
ROADWAY EMBANKMENT (FILL)
OVER RESIDUAL

RESIDUAL
TAN TO OLIVE-TAN SOFT TO V. STIFF MOIST TO WET HIGH TO MED. PLASTIC SILTY CLAY & SANDY SILTY CLAY (A-7-6, A-7-5)

(4) (PI=61)
(17) (PI=33)
(9) (PI=20)
(4) (PI=17)

BT DRY (6/15/10)

-Y1-

PI = 11+95.00
EL = 594.52'
VC = 40'

PI = 11+00.00
EL = 590.49'
VC = 60'

594.20
589.84

SS-20
SS-21

12+39 -Y-
63.0 RT.
=
39+00 -L1-
CL

CEDAR SPRINGS DR SW (SR 3801) 23' BST
ROBERTA CHURCH RD (SR 1310)

(+)1.3000%
(+)4.2421%
(-)0.9889%

EXISTING SUMMERTREE AVE SW (SR 3810) 23' BST
ROADWAY EMBANKMENT (FILL)
OVER RESIDUAL

RESIDUAL
RED-BRN MED. STIFF TO STIFF MOIST MED. PLASTIC SILTY SANDY CLAY (A-7-6)

OLIVE-TAN MED. DENSE MOIST SILTY SAND (A-2-4)

WEATHERED ROCK (OLIVE-TAN -SEV. WEATH. CRYSTALLINE ROCK)

(8) (PI=23)
100/.3
100/.3
BT DRY (6/7/10)

-Y-

PI = 11+60.00
EL = 609.90'
VC = 100'
K = 46

PI = 14+00.00
EL = 606.33'
VC = 120'
K = 21

PI = 15+00.00
EL = 593.90'
VC = 80'
K = 8

608.21
610.44
610.41
592.51

SS-29
SS-28
SS-30
SS-31
SS-32
SS-33
SS-34
SS-35
SS-36
SS-37

13+23 -Y3-
89.0 LT.
=
28+00 -L-
25.0 RT.

SR 1310 ROBERTA CHURCH RD 21' BST
BAYTREE CT 23' BST

(+)2.8167%
(+)0.6397%
(-)6.6375%
(-)12.4339%
(-)12.4339%
(-)12.7800%

EXISTING ROBERTA FARMS CT 23' BST
ROADWAY EMBANKMENT (FILL)
OVER RESIDUAL

EXISTING ROBERTA WOODS CT

RESIDUAL
TAN STIFF MOIST HIGH PLASTIC SANDY SILTY CLAY (A-7-6)

OLIVE-TAN V. STIFF MOIST CLAYEY SANDY SILT (A-4)

WEATHERED ROCK (SEV. WEATHERED CRYSTALLINE ROCK)
CRYSTALLINE ROCK

(12) (PI=38)
(10) (PI=27)
22
100/.1

BT NM (6/17/10)

ARTIFICIAL FILL, BRN TO TAN STIFF MOIST MED. PLASTIC SILTY SANDY CLAY (A-6)

-Y3-

10-SEP-2010 09:34
D:\Projects\R2246B_GEO_RDWY_CABARRUS\CADD_GEOTECH\PlanProf\R2246B_GEO_pf1_Y1-Y-Y3_027.dgn
Imagelink AT 6352640447

5/28/99

PROJECT REFERENCE NO.	SHEET NO.
R-2246B	28
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

-Y2REV-

627.76

EXISTING SR 1310 ROBERTA CHURCH RD 24'BST

ROADWAY EMBANKMENT (FILL) OVER RESIDUAL

(-)0.5167%

PI = 29+00.00
EL = 626.21'
VC = 300'
K = 142

(-)2.6314%

30+00 -Y2REV- CL

RESIDUAL

BRN STIFF MOIST SILTY SANDY CLAY (A-7)

RESIDUAL

AR CRYSTALLINE ROCK ATM (6/23/10)

WEATHERED ROCK (SEV. WEATH. CRYSTALLINE ROCK)

(-)2.6314%

PI = 32+50.00
EL = 611.00'
VC = 200'
K = 187

(-)1.5622%

RESIDUAL

35+00 -Y2REV- CL

RESIDUAL

BRN STIFF MOIST SILTY SANDY CLAY (A-7)

WEATHERED ROCK (OLIVE-TAN DRY, SEV. WEATH. CRYSTALLINE ROCK)

100/.4

60/.1

CRYSTALLINE ROCK

BT ATM (6/23/10)

(-)1.5622%

(-)2.2166%

RESIDUAL

PI = 37+00.00
EL = 609.97'
VC = 150'
K = 40

612.33

EXISTING US 29 SBL

25+00 26+00 27+00 28+00 29+00 30+00 31+00 32+00 33+00 34+00 35+00 36+00 37+00 38+00

650 640 630 620 610 600 590 580 570 560

-Y4-

606.50

EXISTING US 29

ROADWAY EMBANKMENT (FILL) OVER RESIDUAL

(+)0.9293%

PI = 14+00.00
EL = 614.40'
VC = 480'
K = 398

(+)2.1351%

EXISTING US 29

ROADWAY EMBANKMENT (FILL) OVER RESIDUAL

4+00 5+00 6+00 7+00 8+00 9+00 10+00 11+00 12+00 13+00 14+00 15+00 16+00 17+00 18+00

660 650 640 630 620 610 600 590 580 570

10-SEP-2010 09:36
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mcclure
AT 6/23/2047

PROJECT REFERENCE NO.	SHEET NO.
R-2246B	29
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

PI = 20+75.00
EL = 628.8'
VC = 800'
K = 494

PI = 31+50.00
EL = 634.37'
VC = 250'
K = 3041

RESIDUAL
BRN & OLIVE V. STIFF MOIST HIGH PLASTIC SILTY SANDY CLAY (A-7-6)

SS-57
MS-57

19+24 -Y4- 136.0 RT. = 14+00 -SPURB- CL

19+75 -Y4- 123.0 LT. = 13+50 -SPURA- CL

20+65 -Y4- 149.0 RT. = 25+00 -RPB- CL

21+30 -Y4- 96.0 LT. = 81+65 -L- 45.0 LT.

(+)2.35%

(+)0.51%

EXISTING US 29

CRYSTALLINE ROCK

WEATHERED ROCK (OLIVE DRY SEV. WEATH. CRYSTALLINE ROCK)

AR DRY (6/22/10)

CR

BT NM (6/25/10)

CRYSTALLINE ROCK

SS-60

22+68 -Y4- 85.0 RT. = 79+60 -L- 55.0 RT.

RESIDUAL
BRN MED. STIFF TO STIFF MOIST SANDY SILTY CLAY & SILTY SANDY CLAY (A-7)

23+66 -Y4- 162.0 RT. = 25+00 -RPC- CL

RESIDUAL
OLIVE STIFF MOIST CLAYEY SANDY SILT (A-4)

OLIVE STIFF TO V. STIFF MOIST CLAYEY SANDY SILT (A-4)

SS-62
MS-62
SS-63
SS-64

24+84 -Y4- 160.0 RT. = 13+50 -SPURC- 25.0 RT.

25+59 -Y4- 148.0 LT. = 15+00 -SPURD- 30.0 LT.

RESIDUAL
BRN V. STIFF MOIST HIGH PLASTIC SANDY SILTY CLAY (A-7-6)

BRN HARD MOIST SANDY SILT (A-4) TO CLAYEY SANDY SILT (A-5)

BT DRY (6/22/10)

RESIDUAL BRN STIFF MOIST SILTY SANDY CLAY (A-7)

OLIVE STIFF TO HARD MOIST TO DRY CLAYEY SANDY SILT (A-4)

WEATHERED ROCK (OLIVE DRY SEV. WEATH. CRYSTALLINE ROCK)

EXISTING US 29
ROADWAY EMBANKMENT (FILL) OVER RESIDUAL

(+)0.51%

(+)0.43%

BORING DESCRIPTIONS

(A) BRN STIFF MOIST SILTY SANDY CLAY (A-7) (RESIDUAL)

(B) OLIVE-TAN MED. DENSE MOIST CLAYEY SILTY SAND (A-2) (RESIDUAL)

(WR) WEATHERED ROCK (OLIVE SEV. WEATH. CRYSTALLINE ROCK)

-Y4-

636.11

EXISTING US 29
ROADWAY EMBANKMENT (FILL) OVER RESIDUAL

-Y4-

5/28/99

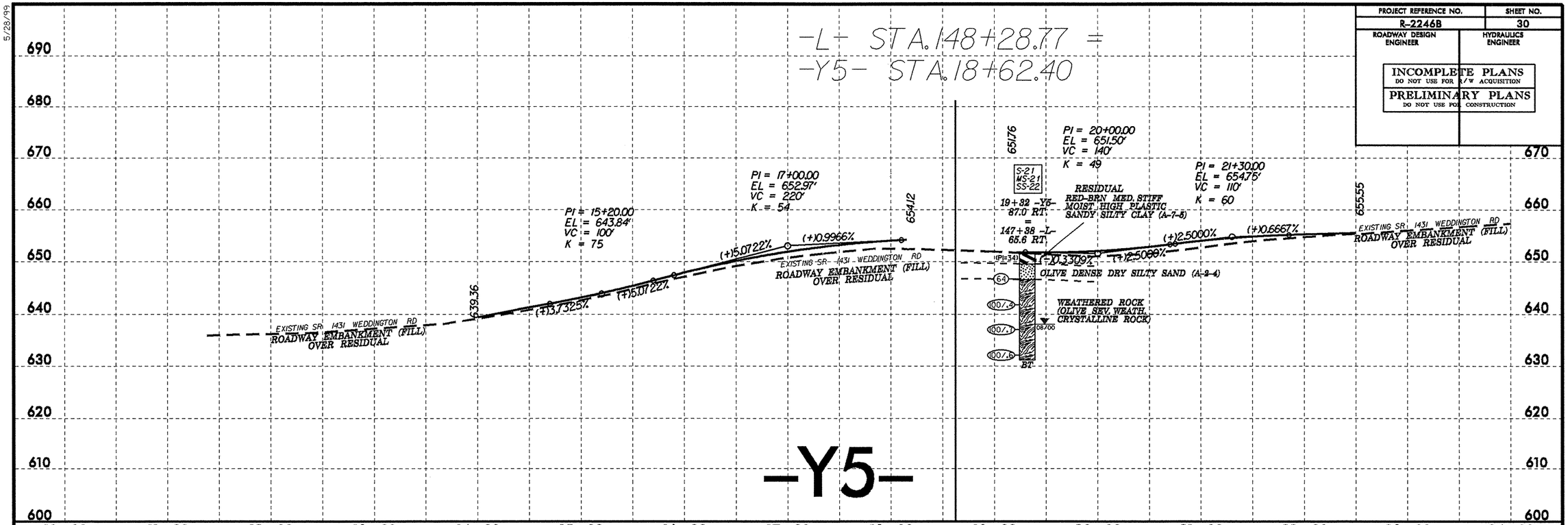
PROJECT REFERENCE NO.	SHEET NO.
R-2246B	30

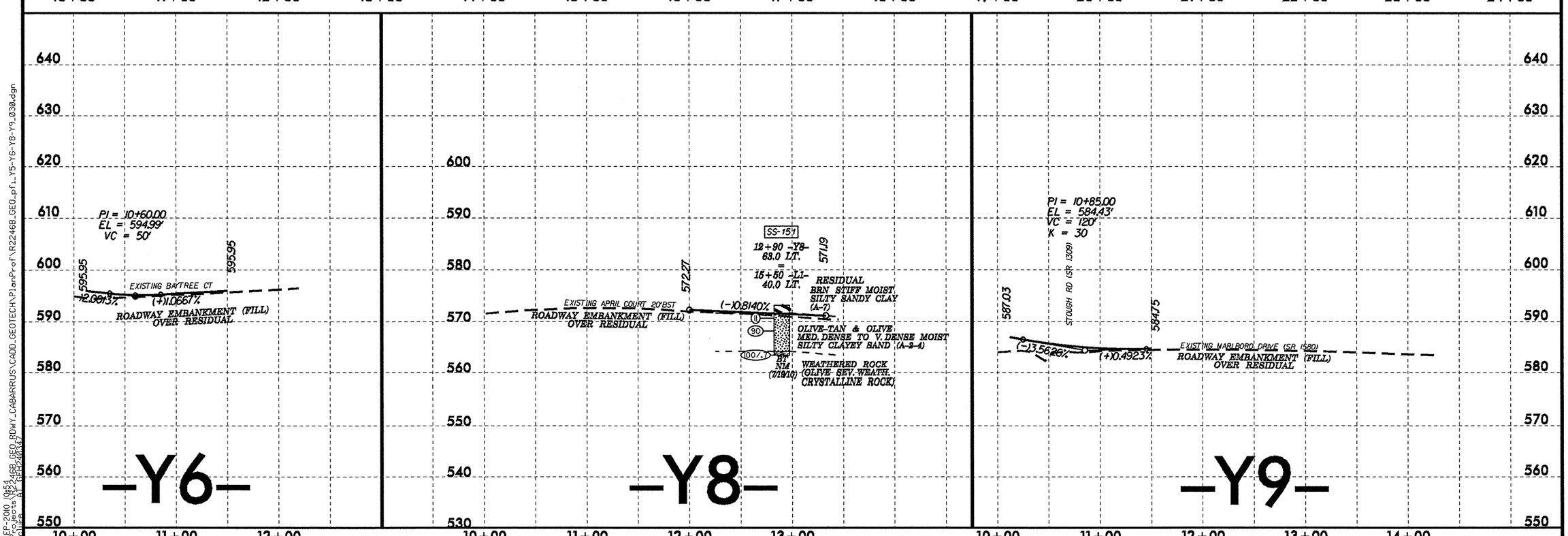
ROADWAY DESIGN ENGINEER | HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

-L- STA. 148+28.77 =
-Y5- STA. 18+62.40





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Microstation GEOPAK (or SS4)

5/28/99

PROJECT REFERENCE NO.	SHEET NO.
R-2246B	31
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

-RPA- 19+40.190=
-SPURA- 10+00.00

PI = 16+50.00
EL = 631.44'
VC = 315'
K = 65

PI = 23+00.00
EL = 623.73'
VC = 200'
K = 5.3

(+)3.6665%
(-)1.1862%
(-)1.1862%
(+)2.5824%

613.90

SS-82
MS-82
SS-83
10+71 -RPA-
27.0 -LT.
=
94+50 -L-
25.0 LT.
RESIDUAL
BRN STIFF MOIST MED. PLASTIC SILTY SANDY CLAY (A-7-6)
OLIVE HARD DRY SANDY SILT (A-4)
WEATHERED ROCK (SEV. WEATH. CRYSTALLINE ROCK)
BT DRY CRYSTALLINE ROCK (7/1/10)
(PI=24)
11
30
60/.1

13+00 -RPA-
CL
RESIDUAL
BRN MED. STIFF TO STIFF MOIST SILTY SANDY CLAY (A-7)
RESIDUAL
OLIVE STIFF MOIST CLAYEY SANDY SILT (A-4)
14
100/.1
100/.6
WEATHERED ROCK (OLIVE SEV. WEATH. CRYSTALLINE ROCK W/CRYSTALLINE ROCK LAYER @ 6.0)
BT DRY (6/30/10)

SS-80
SS-81
16+00 -RPA-
CL
OLIVE V. STIFF MOIST CLAYEY SANDY SILT (A-4)
OLIVE MED. DENSE WET SILTY SAND (A-2-4)
26
16
BT DRY (6/30/10)

(NOTE: BOULDERS IN THE AREA)

SS-74
MS-74
SS-75
18+00 -RPA-
CL
RESIDUAL
BRN MED. STIFF TO V. STIFF MOIST HIGH PLASTIC SILTY SANDY CLAY (A-7-6)
RESIDUAL
OLIVE HARD DRY SANDY SILT (A-4)
(PI=30)
19
52
80
BT DRY (6/27/10)

SS-73
MS-73
20+40 -RPA-
14.0 RT.
=
11+00 -SPURA-
CL
RESIDUAL
BRN STIFF MOIST SILTY SANDY CLAY (A-7)
RESIDUAL
OLIVE-TAN MED. DENSE MOIST CLAYEY SILTY SAND (A-2)
(PI=18)
16
100/.2
W/CRYSTALLINE ROCK LAYER @ 5.5-6.5)
61/.1
BT DRY (6/27/10)
CRYSTALLINE ROCK

RESIDUAL
WEATHERED ROCK (SEV. WEATHERED CRYSTALLINE ROCK

SS-68
SS-69
RESIDUAL
BRN. STIFF MOIST HIGH PLASTIC SILTY SANDY CLAY (A-7-6)
22+63 -RPA-
77.0 RT.
=
13+50 -SPURA-
CL
23+65 -RPA-
18.0 LT.
=
81+75 -L-
55.0 LT.
CRYSTALLINE ROCK
AR DRY (6/23/10)
(PI=14)
9
100/.5
60/.1
CR LAYER @ 10.0
100/.5
CR
AR DRY (6/28/10)
WEATHERED ROCK (OLIVE SEV. WEATH. CRYSTALLINE ROCK)

-RPA-

SS-60
25+77 -RPA-
77.0 RT.
=
79+60 -L-
55.0 RT.
RESIDUAL
BRN MED. STIFF TO STIFF MOIST SANDY SILTY CLAY & SILTY SANDY CLAY (A-7)
26+66 -RPA-
136.0 RT.
=
25+00 -RPC-
CL
RESIDUAL
OLIVE STIFF MOIST CLAYEY SANDY SILT (A-4)
627.61
EXISTING US 29
EXISTING HS
ROADWAY EMBANKMENT (FILL) OVER RESIDUAL
RESIDUAL
100/.4
100/.9
100/.3
15
WEATHERED ROCK (OLIVE SEV. WEATH. CRYSTALLINE ROCK)
AR DRY (6/22/10)
CRYSTALLINE ROCK (6/22/10)
WEATHERED ROCK (OLIVE SEV. WEATH. CRYSTALLINE ROCK)
OLIVE STIFF TO V. STIFF MOIST CLAYEY SANDY SILT (A-4)

-SPURA-

628.00
RESIDUAL
BRN MED. STIFF TO V. STIFF MOIST HIGH PLASTIC SILTY SANDY CLAY (A-7-6)
SS-73
MS-73
11+00 -SPURA-
CL
RESIDUAL
(PI=18)
16
100/.2
W/CRYSTALLINE ROCK LAYER @ 5.5-6.5)
61/.1
BT DRY (6/27/10)
RESIDUAL
WEATHERED ROCK (SEV. WEATH. CRYSTALLINE ROCK)
CRYSTALLINE ROCK
PI = 13+25.00
EL = 624.90'
VC = 180'
625.13
ROADWAY EMBANKMENT (FILL) OVER RESIDUAL
OLIVE-TAN MED. DENSE MOIST CLAYEY SILTY SAND (A-2)
13+50 -SPURA-
CL
EXISTING US 29
(-)0.9538%
(+)0.2115%
RESIDUAL
100/.4
AR DRY (6/29/10)

-SPURA-

10+00 11+00 12+00 13+00 14+00 15+00 16+00 17+00 18+00 19+00 20+00 21+00 22+00 23+00 24+00

24+00 25+00 26+00 27+00 10+00 11+00 12+00 13+00 14+00

670 660 650 640 630 620 610 600 590 580 570

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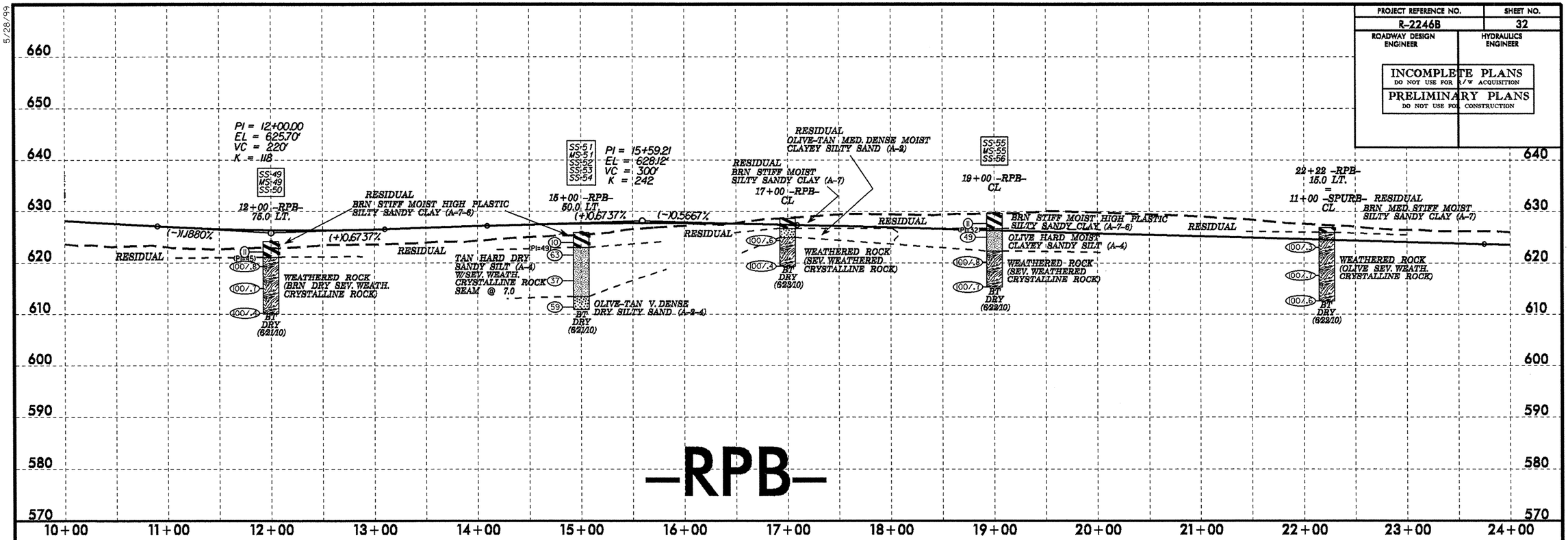
mcguire AT GSH240147

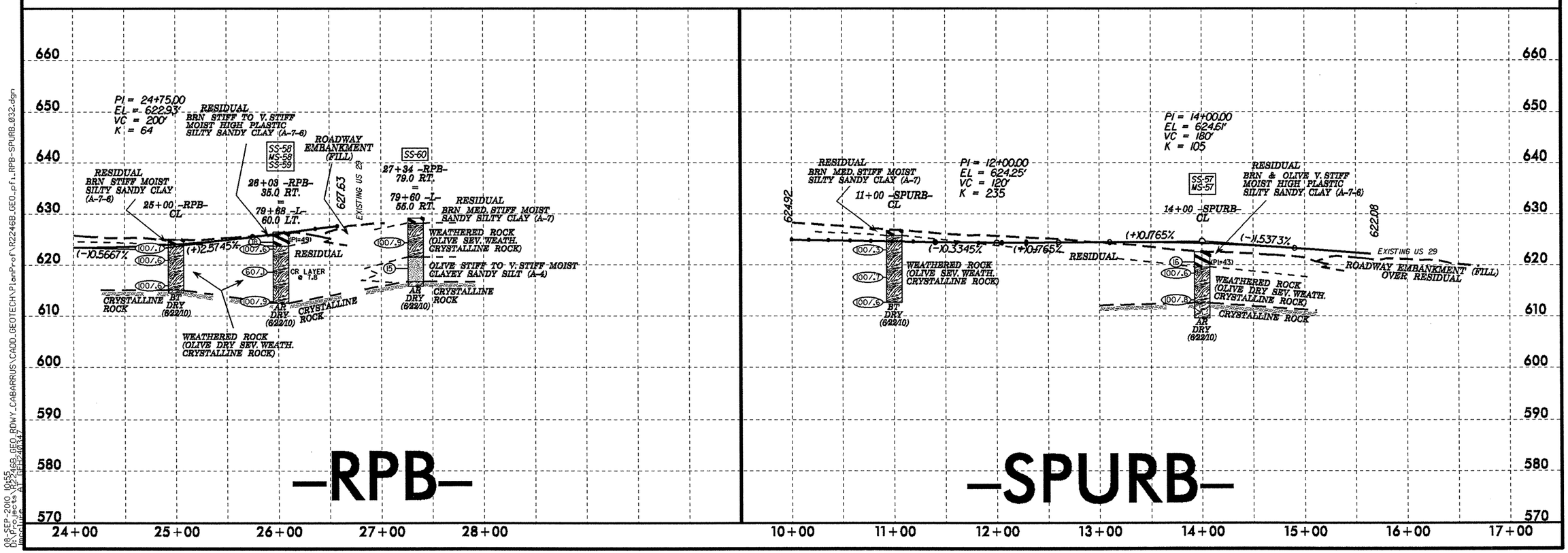
5/28/99

PROJECT REFERENCE NO.	SHEET NO.
R-2246B	32
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION





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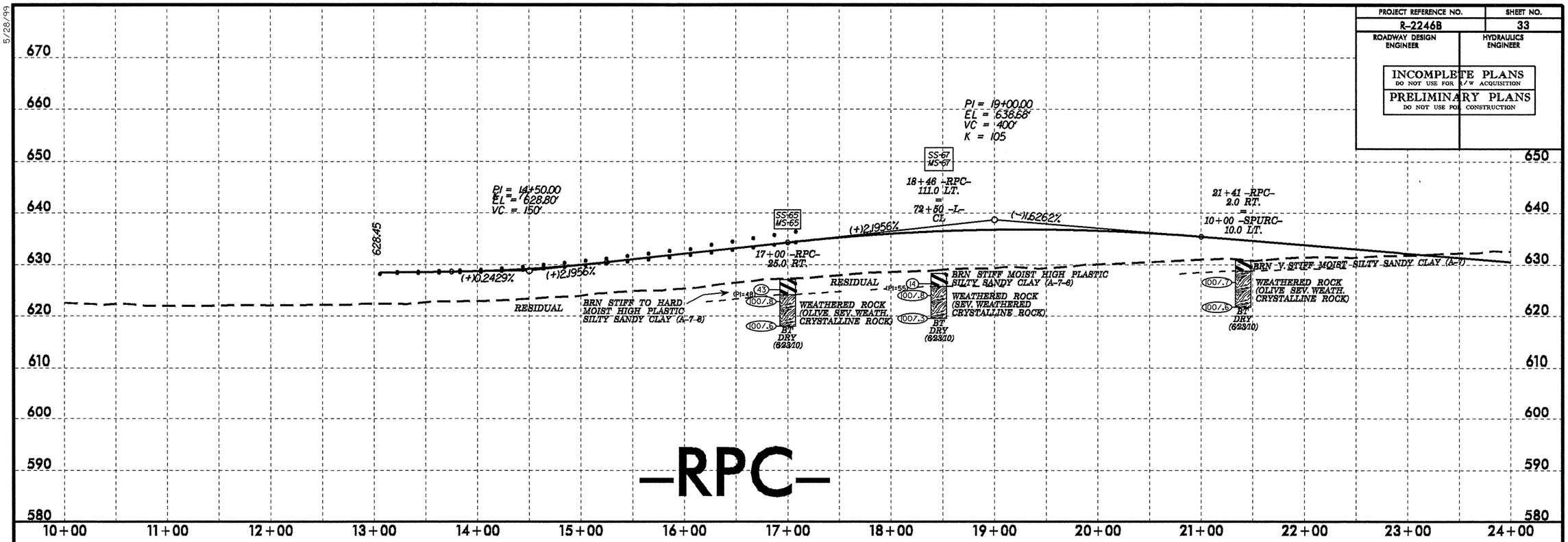
jmcclure

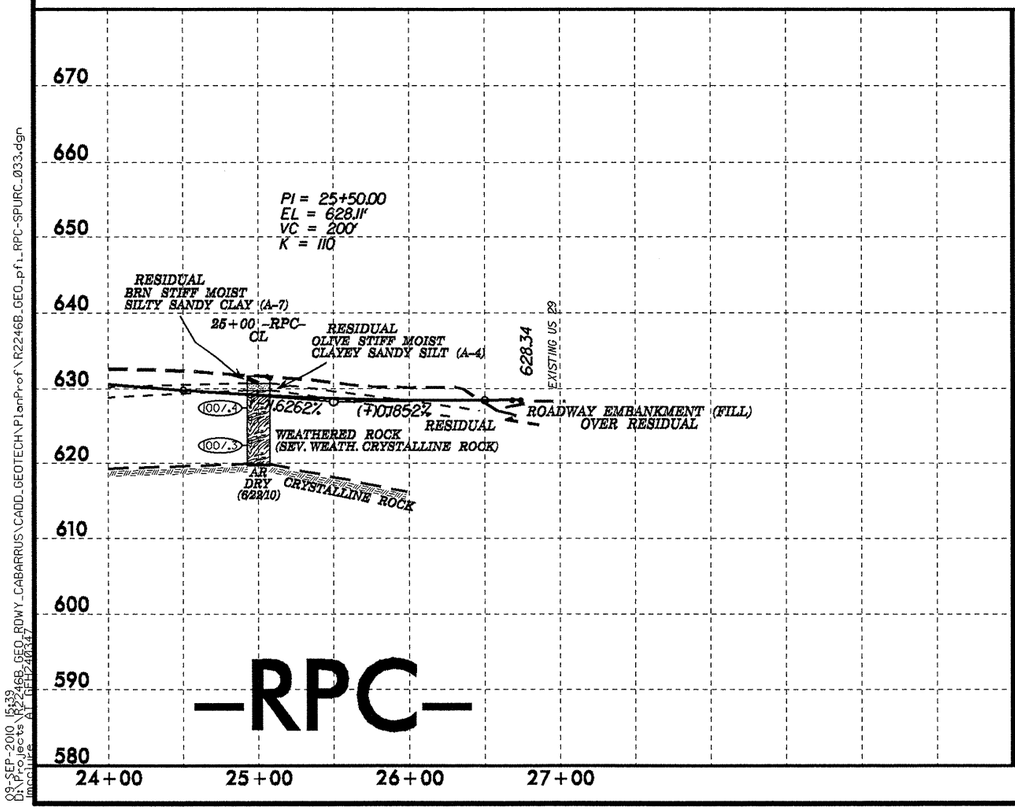
5/28/99

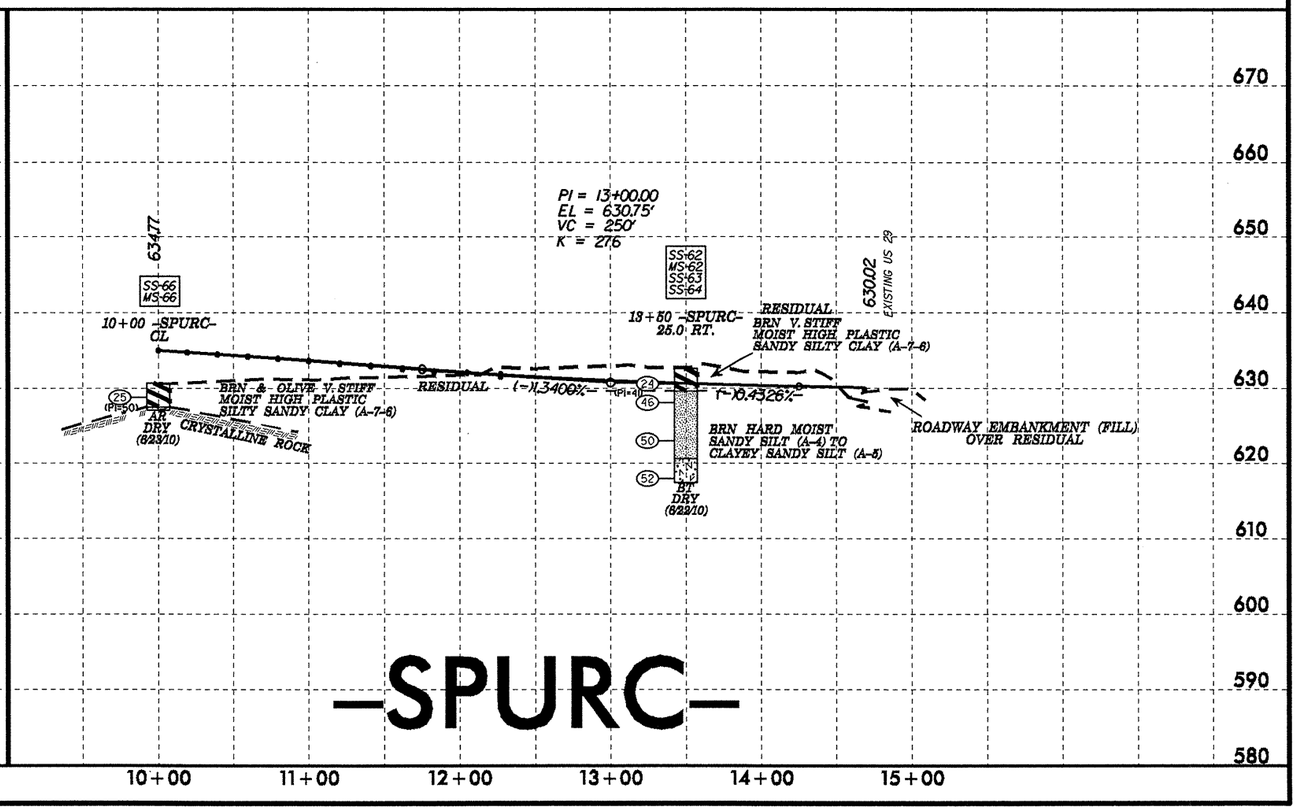
PROJECT REFERENCE NO.	SHEET NO.
R-2246B	33
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION





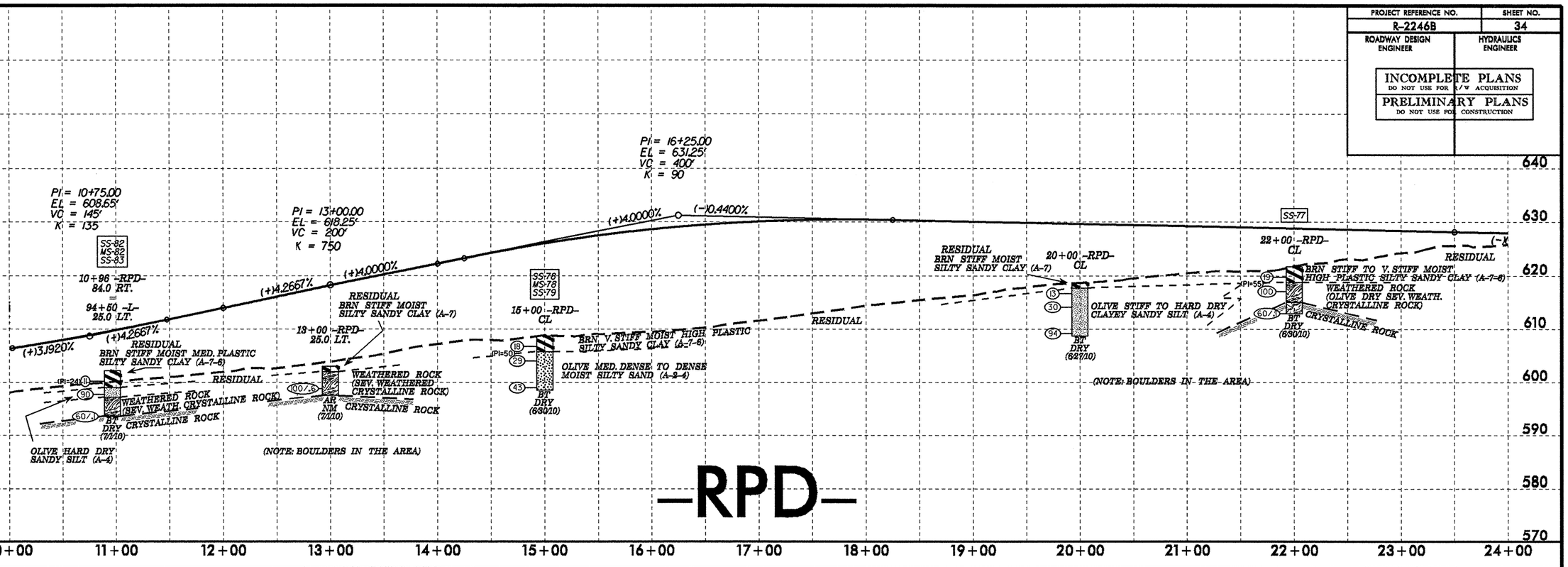


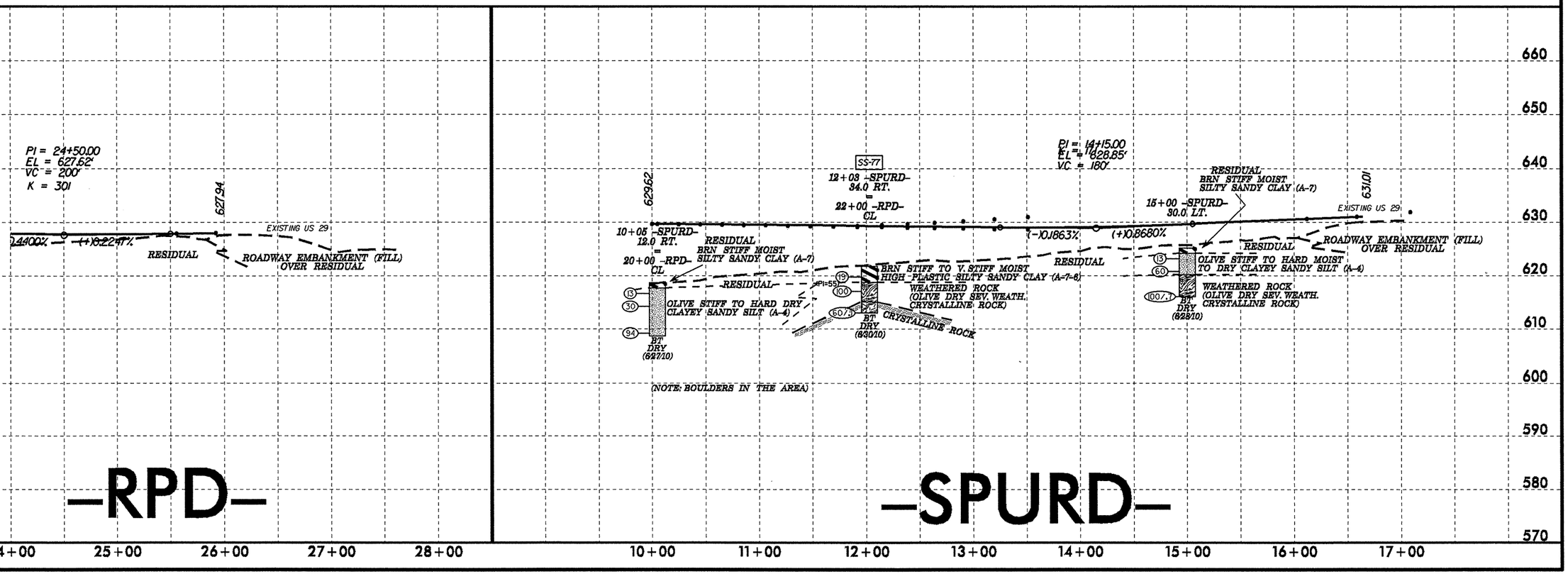
5/28/99

PROJECT REFERENCE NO.	SHEET NO.
R-2246B	34
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION





8/23/99

PROJ. REFERENCE NO.	SHEET NO.
R-2246B	35

0 5 10

290 280 270 260 250 240 230 220 210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10

640 630 620 610 600 590

SR 1310
ROBERT A. CHURCH RD.
2 WAY BST

2:1 6:1 0.040 0.040 4.05:1

607.93
D.P. 60

603.06
RESIDUAL
BRN MED. STIFF MOIST HIGH PLASTIC SILTY SANDY CLAY (A-7-6)

33+00.00

640 630 620 610 600 590

SR 1310
ROBERT A. CHURCH RD.
2 WAY BST

2:1 6:1 0.040 0.040 4:1

607.62
D.P.

602.60
RESIDUAL
BRN MED. STIFF MOIST HIGH PLASTIC SILTY SANDY CLAY (A-7-6)

32+50.00

290 280 270 260 250 240 230 220 210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10

—L—

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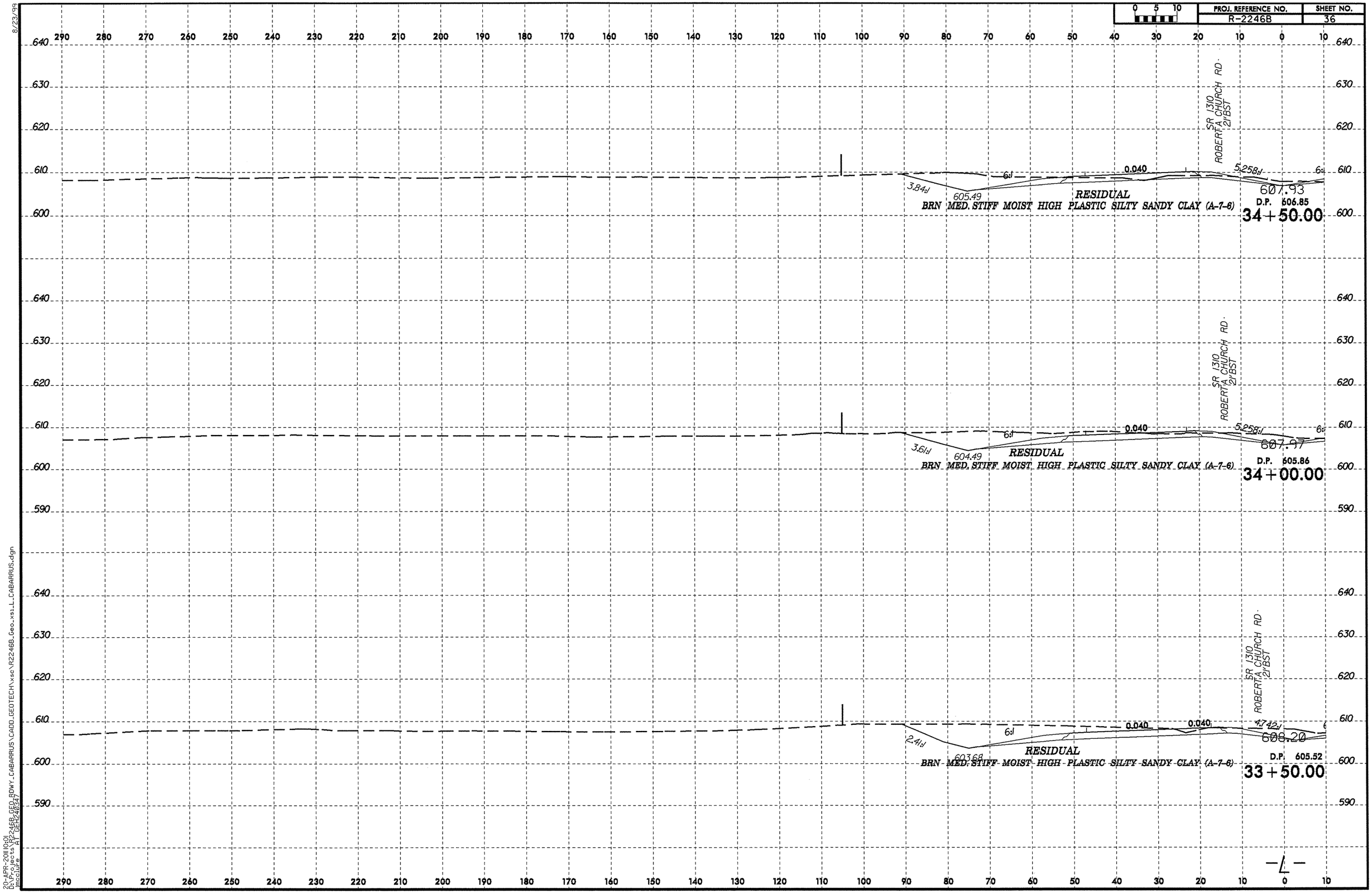
mcclure
AT GEH240347

8/23/99

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	R-2246B	36



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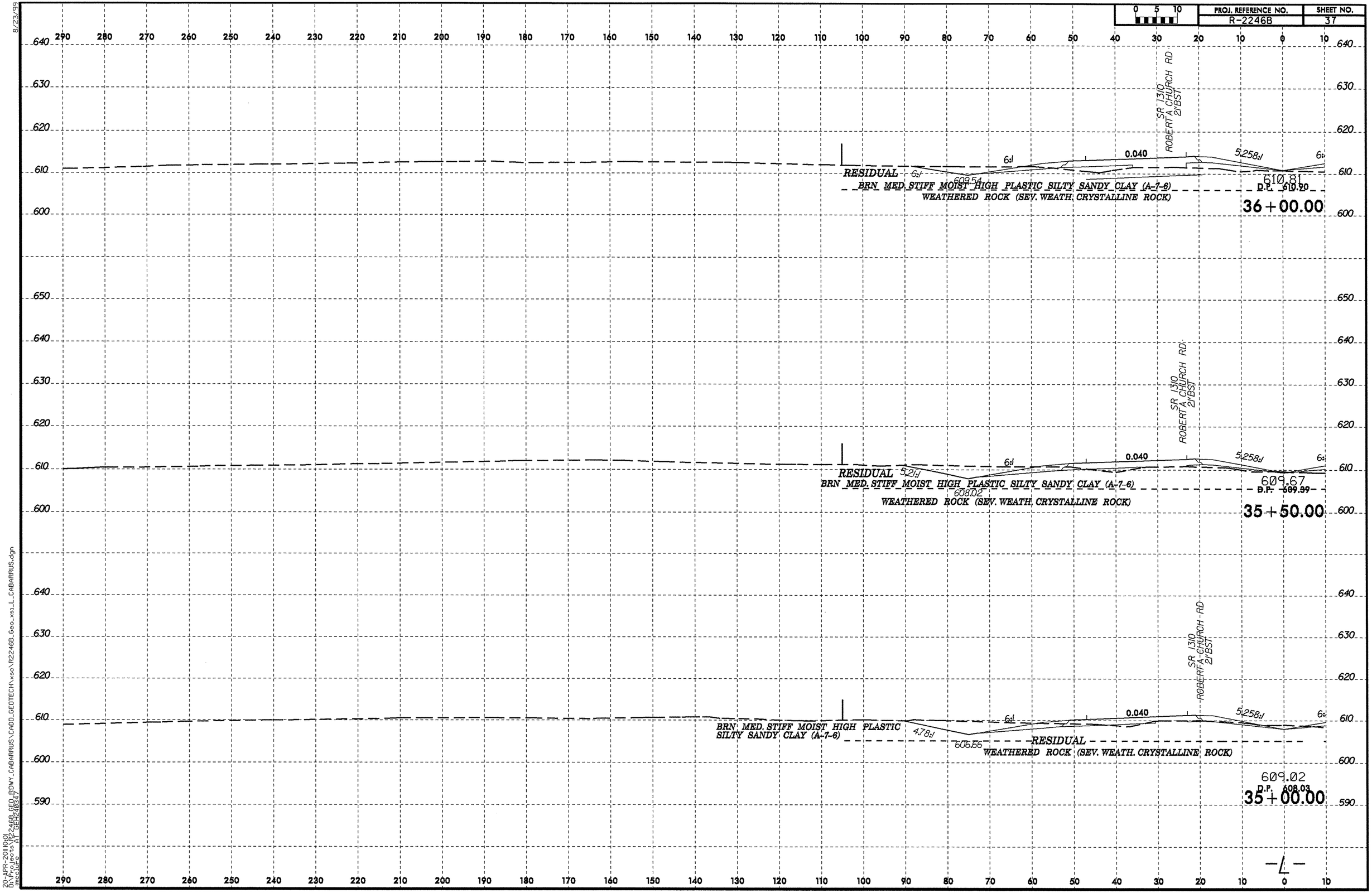
mmclure AT GEH240347

8/23/99

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	R-2246B	37



-4-

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lmcclure
AT GEH24047

8/23/99

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	R-2246B	38

290 280 270 260 250 240 230 220 210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10

650 640 630 620 610 600

SR 1310
ROBERTA CHURCH RD
2/BST

6:1 0.020 4.755:1 6:1

RESIDUAL 6:1

613.17 613.42

BRN MED. STIFF MOIST HIGH PLASTIC SILTY SANDY CLAY (A-7-6) D.P. 614.77

WEATHERED ROCK (SEV. WEATH. CRYSTALLINE ROCK)

37+00.00

SR 1310
ROBERTA CHURCH RD
2/BST

6:1 0.030 4.927:1 6:1

RESIDUAL 6:1

611.35 611.78

BRN MED. STIFF MOIST HIGH PLASTIC SILTY SANDY CLAY (A-7-6) D.P. 612.79

WEATHERED ROCK (SEV. WEATH. CRYSTALLINE ROCK)

36+50.00

290 280 270 260 250 240 230 220 210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10

-L-

20-APR-2011 10:01
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mmclure
AT GEH240347

8/23/99

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	R-2246B	39

290 280 270 260 250 240 230 220 210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10

650 640 630 620 610 600

SR 1310
ROBERTA CHURCH RD.
2 / BST

RESIDUAL
BRN MED. STIFF MOIST HIGH PLASTIC SILTY SANDY CLAY (A-7-6)
WEATHERED ROCK (SEV. WEATH. CRYSTALLINE ROCK)

6:1 | 4.59:1 | 616.26 | 6:1 | 0.020 | 5.582:1 | 6:1 | 616.91

D.P. 618.37

38+00.00

SR 1310
ROBERTA CHURCH RD.
2 / BST

RESIDUAL
BRN MED. STIFF MOIST HIGH PLASTIC SILTY SANDY CLAY (A-7-6)
WEATHERED ROCK (SEV. WEATH. CRYSTALLINE ROCK)

6:1 | 6:1 | 614.72 | 6:1 | 0.020 | 5.086:1 | 6:1 | 615.16

D.P. 616.57

37+50.00

290 280 270 260 250 240 230 220 210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10

20-APR-2011 10:02
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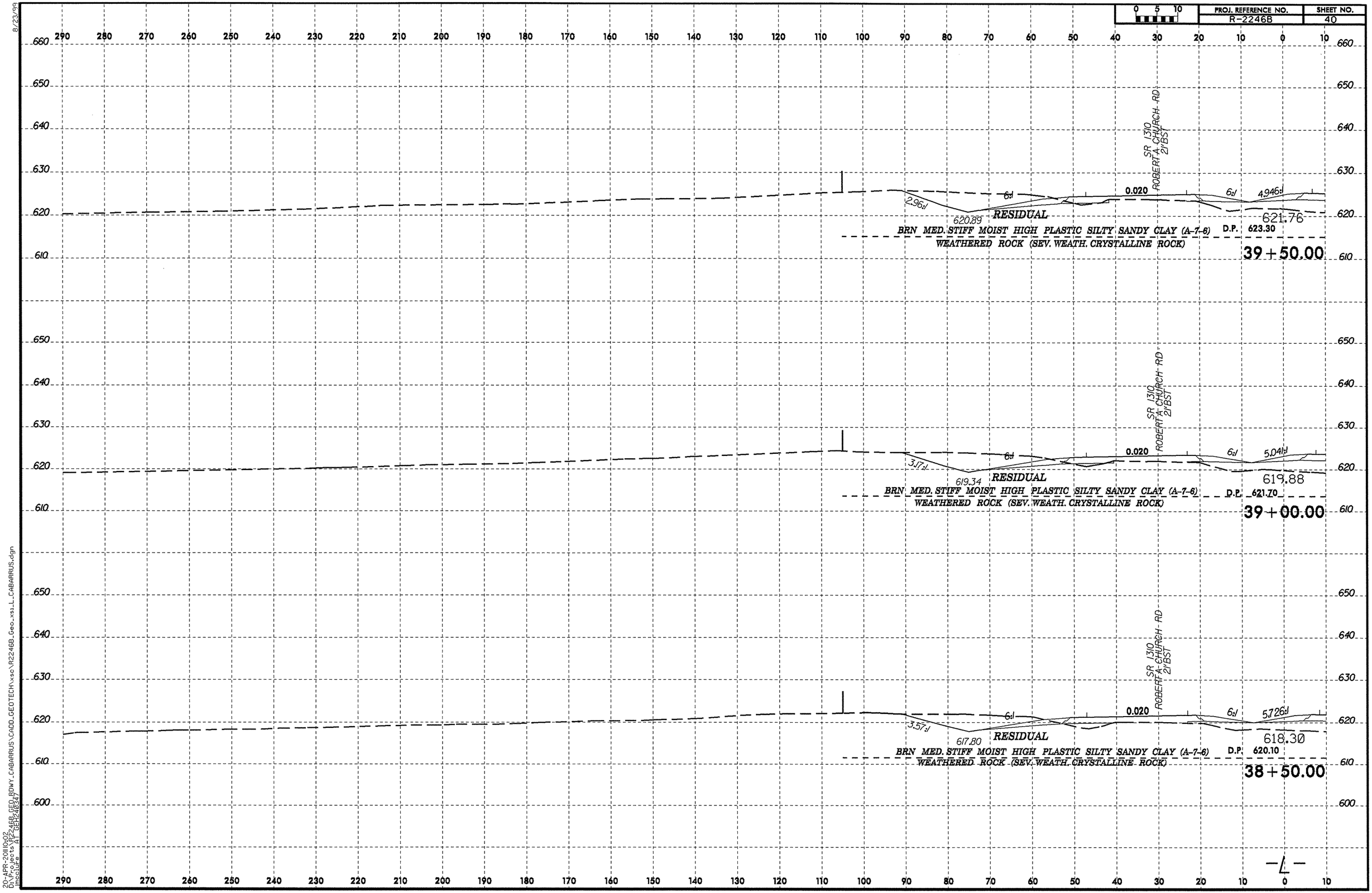
mcclure
ATGEH246347

8/23/99

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	R-2246B	40



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mcclure AT GEH240347

8/23/99

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	R-2246B	41

290 280 270 260 250 240 230 220 210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10

660 650 640 630 620 610

SR 1310
ROBERT A. CHURCH RD.
2 LBST

2.56:1 6:1 0.020 6:1 4.782:1

BRN TO TAN-OLIVE MED. STIFF TO HARD MOIST HIGH TO LOW PLASTIC SANDY SILTY CLAY (A-7-6) & SILTY SANDY CLAY (A-6)

623.97 RESIDUAL

D.P. 626.51

624.46

WEATHERED ROCK (SEV. WEATH. CRYSTALLINE ROCK)

40+50.00

SR 1310
ROBERT A. CHURCH RD.
2 LBST

2.19:1 6:1 0.020 6:1 4.866:1

BRN TO TAN-OLIVE MED. STIFF TO HARD MOIST HIGH TO LOW PLASTIC SANDY SILTY CLAY (A-7-6) & SILTY SANDY CLAY (A-6)

622.43 RESIDUAL

623.30

D.P. 624.91

WEATHERED ROCK (SEV. WEATH. CRYSTALLINE ROCK)

40+00.00

—L—

20-APR-2011 10:02
D:\Projects\R2246B_GEO_RDWY_CABARRUS\CADD_GEOTECH\xsc\R2246B_Geo_xsi_L_CABARRUS.dgn
mcclure
AT GEH240347

8/23/99

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	R-2246B	42

290 280 270 260 250 240 230 220 210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10

660 650 640 630 620 610

SR 1310
ROBERTA CHURCH RD
21'BST

0.020 0.020 0.0

6:1

4.26:1

627.05

RESIDUAL

BRN TO TAN-OLIVE MED. STIFF TO HARD MOIST HIGH TO LOW PLASTIC SANDY SILTY CLAY (A-7-6) & SILTY SANDY CLAY (A-6)

WEATHERED ROCK (SEV. WEATH. CRYSTALLINE ROCK)

626.65

41+50.00

660 650 640 630 620 610

SR 1310
ROBERTA CHURCH RD
21'BST

0.020 0.020 0

6:1

2.2:1

625.51

RESIDUAL

BRN TO TAN-OLIVE MED. STIFF TO HARD MOIST HIGH TO LOW PLASTIC SANDY SILTY CLAY (A-7-6) & SILTY SANDY CLAY (A-6)

WEATHERED ROCK (SEV. WEATH. CRYSTALLINE ROCK)

625.81

41+00.00

290 280 270 260 250 240 230 220 210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10

20-APR-2011 09:02
D:\Projects\R2246B_GEO_RDWY_CABARRUS\CADD_GEOTECH\xsc\R2246B_Geo_xs1_L_CABARRUS.dgn
mcclure
AT 0EH240347

8/23/99

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	R-2246B	43

290 280 270 260 250 240 230 220 210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10

670 660 650 640 630 620 610

SR 1310
ROBERTA CHURCH RD
21'BST

6:1

0.020 0.020 0

630J3

629.70

RESIDUAL
BRN TO TAN-OLIVE MED. STIFF TO HARD MOIST HIGH TO LOW PLASTIC SANDY SILTY CLAY (A-7-6) & SILTY SANDY CLAY (A-6)
WEATHERED ROCK (SEV. WEATH. CRYSTALLINE ROCK)

42+50.00

SR 1310
ROBERTA CHURCH RD
21'BST

DRIVE

0.020 0.020 0

628.14

RESIDUAL
BRN TO TAN-OLIVE MED. STIFF TO HARD MOIST HIGH TO LOW PLASTIC SANDY SILTY CLAY (A-7-6) & SILTY SANDY CLAY (A-6)
WEATHERED ROCK (SEV. WEATH. CRYSTALLINE ROCK)

42+00.00

290 280 270 260 250 240 230 220 210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10

20-APR-2011 09:03
D:\Projects\R2246B_GEO_RDWY_CABARRUS\CADD_GEOTECH\xsec\R2246B_Geo_xs_L_CABARRUS.dgn
lmeclure
AT 6EH240347

8/23/99

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	R-2246B	44

290 280 270 260 250 240 230 220 210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10

670 660 650 640 630 620

SR 1310
ROBERTA CHURCH RD
2'BST

6:1 0.020 0.020 0.020 4.79:1

RESIDUAL TAN TO ORANGE-TAN & BLACK MED. STIFF TO STIFF MOIST HIGH PLASTIC SANDY SILTY CLAY (A-7-5)

633.25 D

WEATHERED ROCK (SEV. WEATH. CRYSTALLINE ROCK)

43+50.00

SR 1310
ROBERTA CHURCH RD
2'BST

6:1 0.020 0.020 0.020 0

RESIDUAL BRN TO TAN-OLIVE MED. STIFF TO HARD MOIST HIGH TO LOW PLASTIC SANDY SILTY CLAY (A-7-6) & SILTY SANDY CLAY (A-6)

631.45

WEATHERED ROCK (SEV. WEATH. CRYSTALLINE ROCK)

43+00.00

-L-

290 280 270 260 250 240 230 220 210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10

20-APR-2011 10:03
D:\Projects\R2246B_GEO_RDWY_CABARRUS\CADD_GEOTECH\xsc\R2246B_Geo_xsL_CABARRUS.dgn
lmcclure AT GEH240347

8/23/99

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	R-2246B	45

290 280 270 260 250 240 230 220 210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10

670 660 650 640 630 620

SR 1310
ROBERTA CHURCH RD
2 PBST

6:1

0.020 0.020 0.020 4.939%

D.P.

RESIDUAL — TAN TO ORANGE-TAN & BLACK
MED. STIFF TO STIFF MOIST HIGH PLASTIC
SANDY SILTY CLAY (A-7-5)

635.78

WEATHERED ROCK (SEV. WEATH. CRYSTALLINE ROCK)

44+50.00

SR 1310
ROBERTA CHURCH RD
2 PBST

6:1

0.020 0.020 0.020 4.870%

D.P.

RESIDUAL — TAN TO ORANGE-TAN & BLACK
MED. STIFF TO STIFF MOIST HIGH PLASTIC
SANDY SILTY CLAY (A-7-5)

634.55

WEATHERED ROCK (SEV. WEATH. CRYSTALLINE ROCK)

44+00.00

-L-

290 280 270 260 250 240 230 220 210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10

20-APR-2011 10:03
D:\Projects\R2246B_GEO_RDWY_CABARRUS\CADD_GEOTECH\xsec\R2246B_Geo_xs_L_CABARRUS.dgn
mcclure
AT 08124034.7

8/23/99

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	R-2246B	46

290 280 270 260 250 240 230 220 210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10

670 660 650 640 630 620 610

SR 1310
ROBERTA CHURCH RD.
2I BST

6:1 0.020 0.020 0.020 5.068:1

636.59 RESIDUAL

TAN TO ORANGE-TAN & BLACK
MED. STIFF TO STIFF
MOIST HIGH PLASTIC
SANDY SILTY CLAY (A-7-5)

638.25
D.P. 63

45+50.00

SS-37
MS-37
SS-38
SS-39

45+00 -L-
CL
ELEV. 637.1

6:1 0.020 0.020 0.020 5.005:1

635.83 RESIDUAL

TAN TO ORANGE-TAN & BLACK
MED. STIFF TO STIFF
MOIST HIGH PLASTIC
SANDY SILTY CLAY (A-7-5)

D.P. 63
(7) (PI=39)
(14) (PI=29)
(12) (PI=26)
BT
DRY
(6/8/10)

637.14
45+00.00

-L-

20-APR-2011 09:04
D:\Projects\R2246B_GEO_RDWY_CABARRUS\CADD_GEOTECH\xsc\R2246B_Geo_xsc_L_CABARRUS.dgn
mcclure
AT GEH240347

8/23/99

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	R-2246B	47

290 280 270 260 250 240 230 220 210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10

670 660 650 640 630 620

SR 1310
ROBERTA CHURCH RD.
2 LBST

6:1 0.020 0.020 0.020 5:1 86.1

637.70

639.89

D.P. 640

RESIDUAL

TAN TO ORANGE-TAN & BLACK
MED. STIFF TO STIFF
MOIST HIGH PLASTIC
SANDY SILTY CLAY (A-7-5)

46+50.00

SR 1310
ROBERTA CHURCH RD.
2 LBST

6:1 0.020 0.020 0.020 5:1 28.1

637.22

639.13

D.P. 639

RESIDUAL

TAN TO ORANGE-TAN & BLACK
MED. STIFF TO STIFF
MOIST HIGH PLASTIC
SANDY SILTY CLAY (A-7-5)

46+00.00

290 280 270 260 250 240 230 220 210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10

-L-

20-APR-2011 10:04
D:\Projects\R2246B_GEO_RDWY_CABARRUS\CADD_GEOTECH\xsc\R2246B_Geo_xs1_L_CABARRUS.dgn
imcclure AT GEH240347

8/23/99

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	R-2246B	48

290 280 270 260 250 240 230 220 210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10

670 660 650 640 630 620

SR 1310
ROBERTA CHURCH RD.
2/LBST

5.95:1 | 0.020 | 0.020 | 0.020 | 5.295:1

D.P. 640

638.49

RESIDUAL

TAN TO OLIVE MED. STIFF TO STIFF
MOIST HIGH TO LOW PLASTIC
SANDY SILTY CLAY (A-7-5, A-7-6)
& SILTY SANDY CLAY (A-6)

47+50.00

SR 1310
ROBERTA CHURCH RD.
2/LBST

6:1 | 0.020 | 0.020 | 0.020 | 5.242:1

639.17

D.P. 640

RESIDUAL

TAN TO OLIVE MED. STIFF TO STIFF
MOIST HIGH TO LOW PLASTIC
SANDY SILTY CLAY (A-7-5, A-7-6)
& SILTY SANDY CLAY (A-6)

47+00.00

-L-

20-APR-2011 10:04
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lmcclure AT GEH240834

8/23/99

PROJ. REFERENCE NO.	SHEET NO.
R-2246B	49

0 5 10

290 280 270 260 250 240 230 220 210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10

670 660 650 640 630 620

SR 1310
ROBERTA CHURCH RD

SS-40
MS-40
SS-41
SS-42

48+00 -L-
CL
ELEV. 637.1

4.3%

0.020 0.020 0.020

5.534%

6%

D.P. 640.3

6 (PI=37) 6 3 7 (PI=28) 14 (PI=11)

RESIDUAL

TAN TO OLIVE MED. STIFF TO STIFF MOIST HIGH TO LOW PLASTIC SANDY SILTY CLAY (A-7-5, A-7-6) & SILTY SANDY CLAY (A-6)

BT DRY (6/8/10)

48+00.00

-L-

20-APR-2011\04
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mcclure AT GEH246347

8/23/99

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	R-2246B	50

10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150 160 170 180 190 200 210 220 230 240 250 260 270 280 290

640 630 620 610 600 590

SR 1310
ROBERT A CHURCH RD
2 LBST

4.05:1 6:1 0.040 6:1

607.93

D.P. 605.42

RESIDUAL

BRN MED. STIFF MOIST HIGH PLASTIC SILTY SANDY CLAY (A-7-6)

605.06

5.29:1

ARTIFICIAL FILL

BRN & TAN-BRN TO BRN-BLACK-GRAY & BRN-BLACK MED. STIFF TO V. STIFF MOIST SILTY SANDY CLAY (A-7 & A-6)

ARTIFICIAL FILL

TAN-ORANGE-YELLOW V. STIFF MOIST SILTY SANDY CLAY (A-7)

RESIDUAL

33+00.00

SR 1310
ROBERT A CHURCH RD
2 LBST

4:1 6:1 0.040 6:1

607.62

D.P. 605.41

BRN MED. STIFF MOIST HIGH PLASTIC SILTY SANDY CLAY (A-7-6)

RESIDUAL

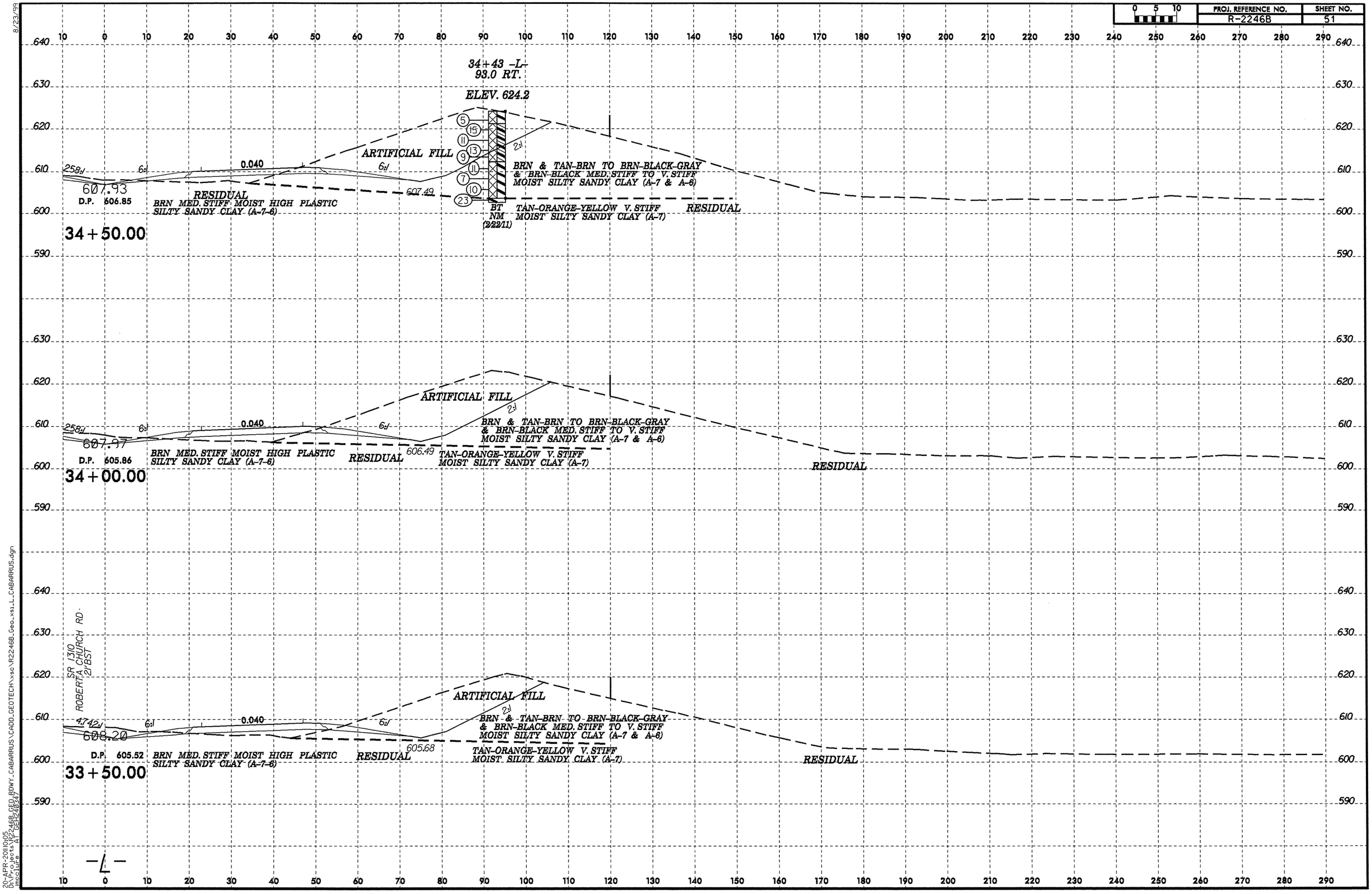
NO ARTIFICIAL FILL

RESIDUAL

32+50.00

-L-

20-APR-2011 10:04
D:\Projects\R2246B_GEO_RDWY_CABARRUS\CADD_GEOTECH\xsc\R2246B_Geo_xs1_L_CABARRUS.dgn
mcclure
AT GEI 240347


34+43 -L-
93.0 RT.
ELEV. 624.2
ARTIFICIAL FILL
2:1
6:1
0.040
BRN & TAN-BRN TO BRN-BLACK-GRAY
& BRN-BLACK MED. STIFF TO V. STIFF
MOIST SILTY SANDY CLAY (A-7 & A-6)
5
15
11
13
9
11
7
10
23
BT
NM
(2/22/11)
TAN-ORANGE-YELLOW V. STIFF
MOIST SILTY SANDY CLAY (A-7)
RESIDUAL
258:1
607.93
D.P. 606.85
607.49
RESIDUAL
BRN MED. STIFF MOIST HIGH PLASTIC
SILTY SANDY CLAY (A-7-6)
34+50.00
606.49
D.P. 605.86
607.97
34+00.00
4.742:1
608.20
D.P. 605.52
605.68
33+50.00
SR 1310
ROBERTA CHURCH RD.
21' BST
-L-

8/23/99

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	R-2246B	52

10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150 160 170 180 190 200 210 220 230 240 250 260 270 280 290

630 620 610 600

ARTIFICIAL FILL

BRN-ORANGE & BRN-GRAY TO BLUE-GRAY & BLUE-GRAY-BRN MED. STIFF TO V. STIFF MOIST MED. TO HIGH PLASTIC SILTY SANDY CLAY (A-7-6 & A-6)

2:1

258:1 6:1 0.040 6:1 6H:5V

610.81

D.P. 610.90

BRN & BLUE-GRAY-BRN MED. STIFF TO V. STIFF MOIST HIGH PLASTIC SILTY SANDY CLAY (A-7-6)

WEATHERED ROCK (SEV. WEATH. CRYSTALLINE ROCK)

RESIDUAL

36+00.00

630 620 610 600

ARTIFICIAL FILL

BRN & TAN-BRN TO BRN-BLACK-GRAY & BRN-BLACK MED. STIFF TO V. STIFF MOIST SILTY SANDY CLAY (A-7 & A-6)

2:1

258:1 6:1 0.040 6:1 6H:5V 610.02

609.67

D.P. 609.39

BRN MED. STIFF MOIST HIGH PLASTIC SILTY SANDY CLAY (A-7-6)

WEATHERED ROCK (SEV. WEATH. CRYSTALLINE ROCK)

RESIDUAL

35+50.00

640 630 620 610 600 590

SS-33
MS-33

35+00 -L-
15.0 RT.

ELEV. 608.2

ARTIFICIAL FILL

BRN & TAN-BRN TO BRN-BLACK-GRAY & BRN-BLACK MED. STIFF TO V. STIFF MOIST SILTY SANDY CLAY (A-7 & A-6)

2:1

258:1 6:1 0.040 6:1 608.66

(PI=47) (5)

1007.0

1007.1

BT
DRY
(6/18/10)

BRN MED. STIFF MOIST HIGH PLASTIC SILTY SANDY CLAY (A-7-6)

RESIDUAL

WEATHERED ROCK
(SEV. WEATH. CRYSTALLINE ROCK
W/CRYSTALLINE ROCK LAYER @ 5.0-6.0)

609.02

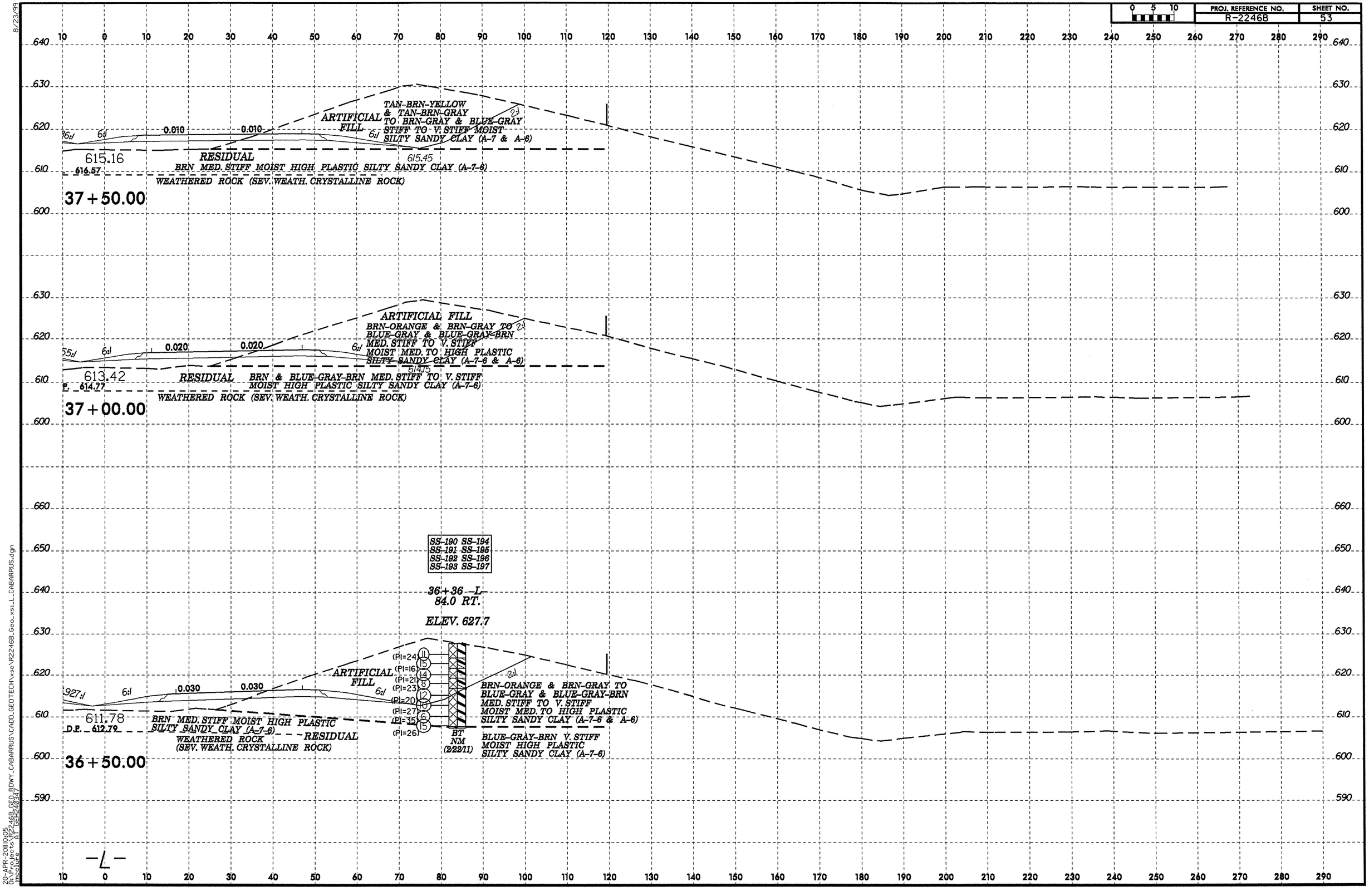
D.P. 608.03

35+00.00

-L-

10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150 160 170 180 190 200 210 220 230 240 250 260 270 280 290

20-APR-2011 04:05
D:\Projects\R2246B_GEO_RDWY_CABARRUS\CADD_GEOTECH\xsc\R2246B_Geo_xs_LL_CABARRUS.dgn
imcclure
PT GEN240347



8/23/99

20-APR-2011 10:05
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mcclure AT GEH240347

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	R-2246B	54

10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150 160 170 180 190 200 210 220 230 240 250 260 270 280 290

640 630 620 610 600 650 640 630 620 610 600

5.04:1 | 0.020 | 0.020 | 0.020 | 6:1 | 2:1

619.88

621.70

TAN-BRN-YELLOW & TAN-BRN-GRAY TO BRN-GRAY & BLUE-GRAY STIFF TO V. STIFF MOIST SILTY SANDY CLAY (A-7 & A-6)

ARTIFICIAL FILL

619.20

BRN MED. STIFF MOIST HIGH PLASTIC SILTY SANDY CLAY (A-7-6)

RESIDUAL

WEATHERED ROCK (SEV. WEATH. CRYSTALLINE ROCK)

39+00.00

38+40 -L- 76.0 RT.

ELEV. 631.7

5.72:1 | 0.010 | 0.010 | 0.010 | 6:1 | 2:1

618.30

620.10

ARTIFICIAL FILL

(10) (11) (13) (16) (14) (14) (15) 100/.8

TAN-BRN-YELLOW & TAN-BRN-GRAY TO BRN-GRAY & BLUE-GRAY STIFF TO V. STIFF MOIST SILTY SANDY CLAY (A-7 & A-6)

612.02

BLUE-GRAY HARD MOIST SILTY SANDY CLAY (A-7)

BRN MED. STIFF MOIST HIGH PLASTIC SILTY SANDY CLAY (A-7-6)

RESIDUAL

WEATHERED ROCK (SEV. WEATH. CRYSTALLINE ROCK)

BT NM (2/22/11)

WEATHERED ROCK (SEV. WEATH. CRYSTALLINE ROCK)

38+50.00

SS-34

38+00 -L- 15.0 RT.

ELEV. 616.5

2:1 | 6:1 | 0.000 | 0.000 | 6:1 | 2:1

616.91

618.37

(6) (26) 100/.8

ARTIFICIAL FILL

TAN-BRN-YELLOW & TAN-BRN-GRAY TO BRN-GRAY & BLUE-GRAY STIFF TO V. STIFF MOIST SILTY SANDY CLAY (A-7 & A-6)

616.75

BRN MED. STIFF MOIST SILTY SANDY CLAY (A-7)

RESIDUAL

OLIVE MED. DENSE MOIST CLAYEY SILTY SAND (A-2-4)

WEATHERED ROCK (OLIVE SEV. WEATH. CRYSTALLINE ROCK)

BT DRY (6/18/10)

38+00.00

-L-

8/23/99

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	R-2246B	55

10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150 160 170 180 190 200 210 220 230 240 250 260 270 280 290

660 650 640 630 620 610 600

40+17 -L-
67.0 RT.

ELEV. 637.1

RESIDUAL
BRN TO TAN-OLIVE
MED. STIFF TO HARD
MOIST HIGH TO LOW PLASTIC
SANDY SILTY CLAY (A-7-6)
& SILTY SANDY CLAY (A-6)

4.866%

0.020 0.020 0.020

623.30

624.91

RESIDUAL

WEATHERED ROCK
(SEV. WEATH. CRYSTALLINE ROCK)

17 14 15 14 12 14 9 28

ARTIFICIAL FILL

TAN-BRN & DARK BRN
TO BLACK & BRN-GRAY
V. STIFF TO STIFF MOIST
SILTY SANDY CLAY (A-7 & A-6)

2:1

622.19

BT
NM
(2/22/11)

TAN-YELLOW V. STIFF MOIST
SILTY SANDY CLAY (A-7)

40+00.00

4.946%

0.020 0.020 0.020

621.76

623.30

BRN MED. STIFF
MOIST HIGH PLASTIC
SILTY SANDY CLAY (A-7-6)

RESIDUAL

WEATHERED ROCK
(SEV. WEATH. CRYSTALLINE ROCK)

ARTIFICIAL FILL

TAN-BRN & DARK BRN
TO BLACK & BRN-GRAY
V. STIFF TO STIFF MOIST
SILTY SANDY CLAY (A-7 & A-6)

6:1 2:1

620.65

39+50.00

-L-

20-APR-2011 10:06
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mcclure
AT GEH24047

8/23/99

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	R-2246B	56

10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150 160 170 180 190 200 210 220 230 240 250 260 270 280 290

660 650 640 630 620 610 600

SS-35
MS-35
SS-36

41+00 -L-
15.0 RT
ELEV. 625.1

RESIDUAL
BRN TO TAN-OLIVE
MED. STIFF TO HARD
MOIST HIGH TO LOW PLASTIC
SANDY SILTY CLAY (A-7-6)
& SILTY SANDY CLAY (A-6)

TAN-BRN & DARK BRN
TO BLACK & BRN-GRAY
V. STIFF TO STIFF MOIST
SILTY SANDY CLAY (A-7 & A-6)

0 0.020 0.020 0.020 6:1 2.86:1

ARTIFICIAL FILL

625.27

625.81

(PI=49) 7
34
(PI=13)
100/.1

RESIDUAL

RESIDUAL

WEATHERED ROCK
(SEV. WEATH. CRYSTALLINE ROCK)

BT
DRY
(6/18/10)

41+00.00

RESIDUAL
BRN TO TAN-OLIVE
MED. STIFF TO HARD
MOIST HIGH TO LOW PLASTIC
SANDY SILTY CLAY (A-7-6)
& SILTY SANDY CLAY (A-6)

TAN-BRN & DARK BRN
TO BLACK & BRN-GRAY
V. STIFF TO STIFF MOIST
SILTY SANDY CLAY (A-7 & A-6)

4.782:1 0.020 0.020 0.020 6:1 2.20:1

26.5

624.46

ARTIFICIAL FILL

623.73

RESIDUAL

WEATHERED ROCK
(SEV. WEATH. CRYSTALLINE ROCK)

40+50.00

-L-

10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150 160 170 180 190 200 210 220 230 240 250 260 270 280 290

20-APR-2011 10:07
D:\Projects\R2246B_GEO_RDWY_CABARRUS\CADD_GEOTECH\xs\R2246B_Geo_xs1_L_CABARRUS.dgn
mcclure
AT GEH240347

8/23/99

PROJ. REFERENCE NO.	SHEET NO.
R-2246B	57

0 5 10

10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150 160 170 180 190 200 210 220 230 240 250 260 270 280 290

670 660 650 640 630 620 610 600

SS-168 SS-172
SS-169 SS-173
SS-170 SS-174
SS-171

42+25 -L-
61.0 RT.
ELEV. 641.5

ARTIFICIAL FILL
BLACK-TAN & TAN-BRN TO BRN-BLACK-GREEN
MED. STIFF TO V. STIFF MOIST MED. PLASTIC
SILTY SANDY CLAY (A-7-6 & A-6)

(PI=23) 8
(PI=21) 15
(PI=22) 19
(PI=19) 15
(PI=21) 15
(PI=25) 11
(PI=36) 14

0.020 0.020

628.14

DRIVE ARTIFICIAL FILL

RESIDUAL
WEATHERED ROCK
(SEV. WEATH. CRYSTALLINE ROCK)

BT TAN-ORANGE STIFF MOIST HIGH PLASTIC
NM SILTY SANDY CLAY (A-7-6)
(2/22/11)

42+00.00

RESIDUAL
BRN TO TAN-OLIVE
MED. STIFF TO HARD
MOIST HIGH TO LOW PLASTIC
SANDY SILTY CLAY (A-7-6)
& SILTY SANDY CLAY (A-6)

0.020 0.020

626.65

ARTIFICIAL FILL
6:1 TAN-BRN & DARK BRN
TO BLACK & BRN-GRAY
V. STIFF TO STIFF MOIST
SILTY SANDY CLAY (A-7 & A-6)
627.05

2:1

RESIDUAL
WEATHERED ROCK
(SEV. WEATH. CRYSTALLINE ROCK)

41+50.00

-L-

20-APR-2011 10:07
D:\Projects\R2246B_GEO_BDWY_CABARRUS\CADD_GEOTECH\xsc\R2246B_Geo_xs1_L_CABARRUS.dgn
mcclure
PT GEF240547

8/23/99

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	R-2246B	58

10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150 160 170 180 190 200 210 220 230 240 250 260 270 280 290

660 650 640 630 620 610 600

ARTIFICIAL FILL
BLACK-TAN & TAN-BRN TO BRN-BLACK-GREEN
MED. STIFF TO V. STIFF MOIST MED. PLASTIC
SILTY SANDY CLAY (A-7-6 & A-6)

ARTIFICIAL FILL

0 0.020 0.020

6:1

4.13:1

631.45

631.60

RESIDUAL

TAN-ORANGE STIFF MOIST HIGH PLASTIC SILTY SANDY CLAY (A-7-6)

WEATHERED ROCK
(SEV. WEATH. CRYSTALLINE ROCK)

43+00.00

660 650 640 630 620 610 600

ARTIFICIAL FILL
BLACK-TAN & TAN-BRN TO BRN-BLACK-GREEN
MED. STIFF TO V. STIFF MOIST MED. PLASTIC
SILTY SANDY CLAY (A-7-6 & A-6)

ARTIFICIAL FILL

0 0.020 0.020

6:1

2.87:1

629.70

630.13

RESIDUAL

TAN-ORANGE STIFF MOIST HIGH PLASTIC SILTY SANDY CLAY (A-7-6)

WEATHERED ROCK
(SEV. WEATH. CRYSTALLINE ROCK)

42+50.00

660 650 640 630 620 610 600

—L—

10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150 160 170 180 190 200 210 220 230 240 250 260 270 280 290

20-APR-2011 10:07
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jmcclure
AT&T GEN240347

8/23/99

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	R-2246B	59

10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150 160 170 180 190 200 210 220 230 240 250 260 270 280 290

660 650 640 630 620 610 600

44+00.00

RESIDUAL
TAN TO ORANGE-TAN & BLACK
MED. STIFF TO STIFF
MOIST HIGH PLASTIC
SANDY SILTY CLAY (A-7-5)
& SILTY SANDY CLAY (A-7-6)

ARTIFICIAL FILL
RED-ORANGE TO BRN-TAN &
BRN-BLACK TO BLACK-GRAY-GREEN
MED. STIFF MOIST SILTY SANDY CLAY (A-7-6 & A-6)

4.870:1 6:1 0.020 *ARTIFICIAL FILL* 6:1 6:1

634.55 D.P. 636.60 634.12

RESIDUAL

WEATHERED ROCK
(SEV. WEATH. CRYSTALLINE ROCK)

660 650 640 630 620 610 600

43+50.00

RESIDUAL
TAN TO ORANGE-TAN & BLACK
MED. STIFF TO STIFF
MOIST HIGH PLASTIC
SANDY SILTY CLAY (A-7-5)
& SILTY SANDY CLAY (A-7-6)

ARTIFICIAL FILL
RED-ORANGE TO BRN-TAN &
BRN-BLACK TO BLACK-GRAY-GREEN
MED. STIFF MOIST SILTY SANDY CLAY (A-7-6 & A-6)

4.797:1 6:1 0.020 *ARTIFICIAL FILL* 6:1 6:1

633.25 D.P. 635.47 632.93

RESIDUAL

WEATHERED ROCK
(SEV. WEATH. CRYSTALLINE ROCK)

10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150 160 170 180 190 200 210 220 230 240 250 260 270 280 290

20-APR-2011 10:08
D:\Projects\R2246B_GEO_RDWY_CABARRUS\CADD_GEOTECH\xsc\R2246B_Geo_xs1_L_CABARRUS.dgn
mcclure AT GEN240547

8/23/99

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	R-2246B	60

10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150 160 170 180 190 200 210 220 230 240 250 260 270 280 290

670 660 650 640 630 620 610 600

SS-37
MS-37
SS-38
SS-39

45+00 -L-
CL

ELEV. 637.1

5.005:1 6:1 0.020 6:1

D.P. 638.44

(7) (PI=39) (14) (PI=29)
(12) (PI=26)

BT
DRY
(6/18/10)

637.14

ARTIFICIAL FILL
RED-ORANGE TO BRN-TAN &
BRN-BLACK TO BLACK-GRAY-GREEN
MED. STIFF MOIST SILTY SANDY CLAY (A-7 & A-6)

ARTIFICIAL FILL

636.07

6:1

RESIDUAL
TAN TO ORANGE-TAN & BLACK
MED. STIFF TO STIFF
MOIST HIGH PLASTIC
SANDY SILTY CLAY (A-7-5)

TAN-BRN V. STIFF MOIST
SILTY SANDY CLAY (A-7)

45+00.00

44+35 -L-
55.0 RT.

ELEV. 644.6

RESIDUAL
TAN TO ORANGE-TAN & BLACK
MED. STIFF TO STIFF
MOIST HIGH PLASTIC
SANDY SILTY CLAY (A-7-5)

ARTIFICIAL FILL
RED-ORANGE TO BRN-TAN &
BRN-BLACK TO BLACK-GRAY-GREEN
MED. STIFF MOIST SILTY SANDY CLAY (A-7 & A-6)

4.939:1 6:1 0.020 6:1

635.17

635.78 D.P. 637.59

(7) (13) (14) (8) (8) (21)

ARTIFICIAL FILL

RESIDUAL

BT
NM
(2/22/11)

TAN-BRN V. STIFF MOIST
SILTY SANDY CLAY (A-7)

WEATHERED ROCK
(SEV. WEATH. CRYSTALLINE ROCK)

44+50.00

-L-

10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150 160 170 180 190 200 210 220 230 240 250 260 270 280 290

670 660 650 640 630 620 610 600

20-APR-2011 10:08
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ImcoUser
AT GEI2460347

8/23/99

PROJ. REFERENCE NO.	SHEET NO.
R-2246B	61

0 5 10

10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150 160 170 180 190 200 210 220 230 240 250 260 270 280 290

670 660 650 640 630 620 610 600

46+14 -L-
60.0 RT.
ELEV. 645.5

ARTIFICIAL FILL
BRN & TAN-YELLOW TO BLACK
& TAN-YELLOW-ORANGE
MED. STIFF TO V. STIFF
MOIST SILTY SANDY CLAY (A-7)
W/MICA @ 3.9

5.128:1 6:1 0.020 6:1 6:1

639.13

D.P. 639.72

ARTIFICIAL FILL

637.46

RESIDUAL
TAN TO ORANGE-TAN & BLACK
MED. STIFF TO STIFF
MOIST HIGH PLASTIC
SANDY SILTY CLAY (A-7-5)

5 27 18 12 13 11

BT NM (2/22/11)

TAN-YELLOW-ORANGE STIFF
MOIST SILTY SANDY CLAY (A-7)

46+00.00

BRN & TAN-YELLOW TO BLACK
& TAN-YELLOW-ORANGE
MED. STIFF TO V. STIFF
MOIST SILTY SANDY CLAY (A-7)

5.068:1 6:1 0.020 6:1 6:1

638.25

D.P. 639.15

ARTIFICIAL FILL 636.83

RESIDUAL
TAN TO ORANGE-TAN & BLACK
MED. STIFF TO STIFF
MOIST HIGH PLASTIC
SANDY SILTY CLAY (A-7-5)

TAN-YELLOW-ORANGE STIFF
MOIST SILTY SANDY CLAY (A-7)

45+50.00

-L-

20-APR-2011 10:08
D:\Projects\R2246B_GEO_RDWY_CABARRUS\CADD_GEOTECH\xsc\R2246B_Geo_xs_L_CABARRUS.dgn
mcclure
AT GEI 2246347

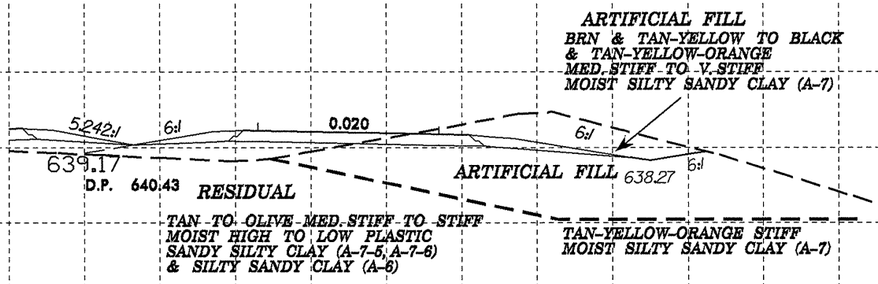
8/23/99

PROJ. REFERENCE NO.	SHEET NO.
R-2246B	62

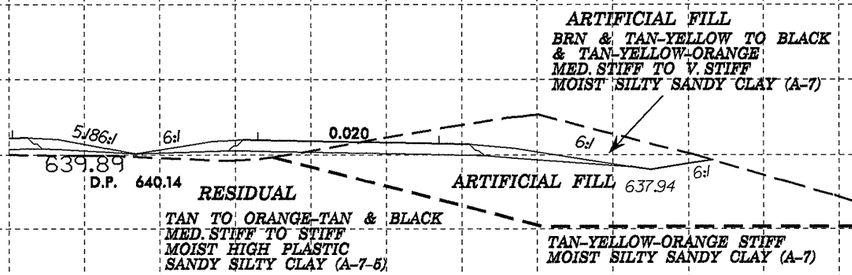
0 5 10

10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150 160 170 180 190 200 210 220 230 240 250 260 270 280 290

660 650 640 630 620 610 600



47+00.00



46+50.00

—L—

20-APR-2011 10:09
D:\Projects\R2246B_GEO_RDWY_CABARRUS\CADD_GEOTECH\xsc\R2246B_Geo_xsLL_CABARRUS.dgn
lmcclure
AT GEH240347

8/23/99

PROJ. REFERENCE NO.	SHEET NO.
R-2246B	63

0 5 10

10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150 160 170 180 190 200 210 220 230 240 250 260 270 280 290

670 660 650 640 630 620 610 600

SS-40
MS-40
SS-41
SS-42

48+00 -L-
CL
ELEV. 637.1

5.534:1 6:1 0.020 0.020 6:1

D.P. 640.35

(PI=37) (PI=28) (PI=11)

RESIDUAL

TAN TO OLIVE MED. STIFF TO STIFF
MOIST HIGH TO LOW PLASTIC
SANDY SILTY CLAY (A-7-5, A-7-6)
& SILTY SANDY CLAY (A-6)

BT
DRY
(6/18/10)

48+24 -L-
65.0 RT.
ELEV. 640.9

ARTIFICIAL FILL
BRN & TAN-YELLOW TO
BLACK & TAN-YELLOW-ORANGE
MED. STIFF TO V. STIFF MOIST
SILTY SANDY CLAY (A-7)

638.45

ARTIFICIAL FILL

RESIDUAL
TAN-YELLOW-ORANGE V. STIFF
MOIST SILTY SANDY CLAY (A-7)

BT
NM
(2/22/11)

48+00.00

ARTIFICIAL FILL
BRN & TAN-YELLOW TO BLACK
& TAN-YELLOW-ORANGE
MED. STIFF TO V. STIFF
MOIST SILTY SANDY CLAY (A-7)

5.295:1 6:1 0.020 0.020 6:1

D.P. 640.57
638.49

ARTIFICIAL FILL 638.43

RESIDUAL
TAN TO OLIVE MED. STIFF TO STIFF
MOIST HIGH TO LOW PLASTIC
SANDY SILTY CLAY (A-7-5, A-7-6)
& SILTY SANDY CLAY (A-6)

TAN-YELLOW-ORANGE STIFF
MOIST SILTY SANDY CLAY (A-7)

47+50.00

-L-

20-APR-2011 09:09
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microstation

10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150 160 170 180 190 200 210 220 230 240 250 260 270 280 290

SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT C.SAND	F.SAND	SILT	CLAY	% PASSING (SIEVES) 10	40	200	% MOISTURE	% ORGANIC	Line or Boring ID
SS-1	CL	20+50	0.1-1.6	A-7-6(11)	43	25	20.2	27.3	17.8	34.7	98	85	56	-	-	LI
SS-2	CL	20+50	3.3-4.8	A-2-4(0)	24	NP	41.4	36.7	13.7	8.2	95	70	25	-	-	LI
SS-3	CL	20+50	8.8-10.3	A-2-4(0)	24	NP	34.5	45.5	15.9	4.1	99	80	26	-	-	LI
SS-4	40 RT	23+00	0.0-1.5	A-7-5(66)	91	61	2.9	5.1	20.6	71.4	100	98	93	-	-	LI
SS-5	40 RT	23+00	3.1-4.6	A-7-6(29)	58	33	2.2	19.6	31.2	46.9	97	96	82	-	-	LI
SS-6	40 RT	23+00	8.1-9.6	A-7-5(20)	52	21	2.7	24.9	39.8	32.7	100	99	83	-	-	LI
SS-7	40 RT	23+00	13.1-14.6	A-7-5(14)	48	17	5.9	28.2	37.3	28.6	100	98	76	-	-	LI
SS-8	25 RT	25+75	4.0-5.5	A-7-6(19)	55	29	11.2	19.2	28.8	40.8	89	82	67	-	-	LI
SS-9	100 RT	26+25	1.0-2.5	A-7-5(52)	78	48	2.9	5.9	23.9	67.3	100	98	93	-	-	LI
SS-10	100 RT	26+25	4.7-6.2	A-7-6(30)	56	30	1.6	12.7	34.7	51.0	100	100	90	-	-	LI
SS-11	100 RT	26+25	9.7-11.2	A-6(8)	38	13	9.6	29.0	32.9	28.6	100	96	69	-	-	LI
SS-12	20 LT	28+25	3.8-5.3	A-7-5(26)	59	28	5.7	18.0	31.4	44.9	100	97	82	-	-	LI
SS-13	20 LT	28+25	8.8-10.3	A-7-6(7)	41	17	20.4	31.6	27.6	20.4	100	87	56	-	-	LI
SS-14	20 LT	28+25	13.8-15.3	A-4(0)	35	3	25.7	38.4	25.7	10.2	100	83	44	-	-	LI
SS-15	20 RT	29+20	8.8-10.3	A-2-4(0)	25	NP	25.5	49.6	22.9	2.0	100	89	35	-	-	LI
SS-16	40 LT	33+50	4.0-5.5	A-7-5(3)	46	12	28.8	30.2	24.7	16.3	98	83	46	-	-	LI
SS-17	75 RT	32+25	1.0-2.5	A-7-6(11)	43	19	13.5	25.5	22.2	38.8	100	94	66	-	-	LI
SS-18	75 RT	32+25	4.0-5.5	A-6(8)	40	19	15.5	36.7	23.3	24.5	100	94	55	-	-	LI
SS-19	75 RT	32+25	9.0-10.5	A-2-4(0)	22	NP	30.6	52.0	13.3	4.1	100	88	24	-	-	LI
SS-20	CL	39+00	1.0-2.5	A-7-6(11)	41	23	8.0	36.7	20.6	34.7	100	97	61	-	-	LI
SS-21	CL	39+00	4.0-5.5	A-2-4(0)	24	NP	23.1	54.9	18.0	4.1	100	94	29	-	-	LI
MS-22	50 RT	42+00	1.0-2.5											25.6	-	LI
SS-22	50 RT	42+00	1.0-2.5	A-7-6(13)	47	25	13.1	31.4	18.8	36.7	100	95	61	-	-	LI
SS-23	50 RT	42+00	3.5-5.0	A-2-4(0)	25	NP	34.5	43.3	14.1	8.2	100	81	28	-	-	LI
MS-24	50 RT	45+00	3.8-5.3											35.9	-	LI
SS-24	50 RT	45+00	3.8-5.3	A-7-5(24)	59	29	10.6	17.3	33.3	38.8	100	94	77	-	-	LI
SS-25	50 RT	45+00	8.8-10.3	A-2-4(0)	27	NP	33.3	44.5	16.1	6.1	98	79	28	-	-	LI
MS-26	50 RT	49+50	1.0-2.5											27.9	-	LI
SS-26	50 RT	49+50	1.0-2.5	A-7-6(13)	51	22	18.3	23.4	23.5	34.7	100	88	63	-	-	LI
SS-27	50 RT	49+50	3.4-4.9	A-2-4(0)	38	NP	43.3	32.7	15.9	8.2	91	62	27	-	-	LI
SS-28	50 RT	49+50	8.4-9.9	A-2-4(0)	30	NP	38.6	40.0	15.3	6.1	100	77	28	-	-	LI
SS-29	25 RT	28+00	1.0-2.5	A-6(6)	36	18	20.4	30.0	21.0	28.6	94	82	51	-	-	L
MS-30	25 RT	28+00	4.0-5.5											37.9	-	L
SS-30	25 RT	28+00	4.0-5.5	A-7-6(21)	52	27	5.5	23.7	25.9	44.9	100	98	76	-	-	L
SS-31	25 RT	28+00	9.0-10.5	A-4(0)	29	NP	15.7	52.0	22.0	10.2	100	95	37	-	-	L
SS-32	40 RT	30+25	4.0-5.5	A-7-6(11)	44	18	9.5	32.0	32.2	26.3	100	97	65	-	-	L
MS-33	15 RT	35+00	1.0-2.5											37.2	-	L
SS-33	15 RT	35+00	1.0-2.5	A-7-6(36)	65	47	5.5	23.7	17.8	53.1	100	98	76	-	-	L
SS-34	15 RT	38+00	3.0-4.5	A-2-4(0)	28	2	35.5	36.7	19.6	8.2	98	76	33	-	-	L
MS-35	15 RT	41+00	1.0-2.5											31.7	-	L
SS-35	15 RT	41+00	1.0-2.5	A-7-6(49)	73	49	4.9	9.8	22.0	63.3	100	97	89	-	-	L
SS-36	15 RT	41+00	3.1-4.6	A-6(4)	37	13	18.4	40.0	29.4	12.2	100	93	49	-	-	L
MS-37	CL	45+00	1.0-2.5											39.4	-	L
SS-37	CL	45+00	1.0-2.5	A-7-5(43)	74	39	2.4	8.0	18.2	71.4	100	99	91	-	-	L
SS-38	CL	45+00	3.2-4.7	A-7-5(31)	64	29	2.7	12.2	30.0	55.1	100	99	88	-	-	L
SS-39	CL	45+00	8.2-9.7	A-7-5(24)	56	26	4.1	16.3	30.6	49.0	100	99	83	-	-	L
MS-40	CL	48+00	1.0-2.5											33.0	-	L
SS-40	CL	48+00	1.0-2.5	A-7-5(35)	68	37	5.1	12.2	23.5	59.2	100	98	83	-	-	L
SS-41	CL	48+00	3.5-5.0	A-7-6(23)	56	28	5.5	21.0	24.5	49.0	100	99	78	-	-	L
SS-42	CL	48+00	8.5-10.0	A-6(5)	33	11	9.2	41.0	31.4	18.4	100	97	60	-	-	L
MS-43	CL	51+00	1.0-2.5											33.1	-	L
SS-43	CL	51+00	1.0-2.5	A-7-6(39)	75	53	10.0	19.2	15.7	55.1	99	93	73	-	-	L
SS-44	CL	51+00	3.6-5.1	A-6(4)	39	17	18.8	44.1	20.8	16.3	100	95	44	-	-	L
SS-45	CL	51+00	8.6-10.1	A-2-4(0)	29	2	38.0	41.2	16.7	4.1	100	81	28	-	-	L
SS-46	50 RT	54+00	3.0-4.5	A-4(0)	30	6	20.8	42.9	22.0	14.3	100	92	44	-	-	L
SS-47	50 RT	57+00	3.5-5.0	A-2-4(0)	25	NP	35.5	45.1	11.2	8.2	100	81	26	-	-	L
SS-48	75 LT	64+00	3.6-5.1	A-4(0)	30	5	25.9	40.2	21.6	12.2	99	87	40	-	-	L
MS-49	75 LT	12+00	1.0-2.5											29.6	-	RPB
SS-49	75 LT	12+00	1.0-2.5	A-7-6(32)	63	45	10.8	20.6	19.6	49.0	100	92	73	-	-	RPB
SS-50	75 LT	12+00	3.4-4.9	A-2-4(0)	20	2	37.3	35.1	17.3	10.2	93	71	32	-	-	RPB
MS-51	50 LT	15+00	1.0-2.5											32.3	-	RPB
SS-51	50 LT	15+00	1.0-2.5	A-7-6(37)	74	49	11.0	18.2	15.7	55.1	100	93	74	-	-	RPB
SS-52	50 LT	15+00	3.4-4.9	A-4(0)	25	1	25.3	45.7	20.8	8.2	100	91	36	-	-	RPB
SS-53	50 LT	15+00	8.4-9.9	A-4(0)	33	NP	20.0	49.4	22.4	8.2	100	95	37	-	-	RPB
SS-54	50 LT	15+00	13.4-14.9	A-2-4(0)	25	NP	41.2	40.6	14.1	4.1	100	79	24	-	-	RPB
MS-55	CL	19+00	1.0-2.0											23.6	-	RPB
SS-55	CL	19+00	1.5-2.5	A-7-6(16)	51	32	13.5	32.3	15.8	38.4	100	96	60	-	-	RPB
SS-56	CL	19+00	4.2-5.2	A-4(1)	29	10	15.8	47.3	18.8	18.2	100	97	45	-	-	RPB
MS-57	CL	14+00	1.0-2.0											31.5	-	SPURB
SS-57	CL	14+00	1.5-2.5	A-7-6(34)	70	43	10.1	17.8	13.5	58.6	99	93	75	-	-	SPURB
MS-58	60 LT	79+68	1.5-2.5											32.9	-	L
SS-58	60 LT	79+68	1.5-2.5	A-7-6(39)	73	49	10.5	15.8	11.1	62.6	99	92	76	-	-	L
SS-59	60 LT	79+68	3.3-4.3	A-4(0)	18	1	25.3	39.2	21.4	14.1	91	78	39	-	-	L
SS-60	55 RT	79+60	9.4-10.4	A-4(0)	32	3	19.8	46.7	23.4	10.1	99	90	44	-	-	L
MS-61	55 RT	78+60	1.5-2.5				0.0	0.0	0.0	0.0		0	0	-	-	L

SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT C.SAND	F.SAND	SILT	CLAY	% PASSING (SIEVES) 10	40	200	% MOISTURE	% ORGANIC	Line or Boring ID
SS-61	55 RT	78+60	1.5-2.5	A-7-6(29)	62	43	10.7	23.4	13.3	52.5	100	95	70	-	-	L
MS-62	25 RT	13+50	1.5-2.5											33.5	-	SPURC
SS-62	25 RT	13+50	1.5-2.5	A-7-6(36)	64	41	4.8	16.8	21.8	56.6	99	97	82	-	-	SPURC
SS-63	25 RT	13+50	4.1-5.1	A-4(0)	27	2	16.8	54.3	20.8	8.1	100	97	39	-	-	SPURC
SS-64	25 RT	13+50	14.1-15.1	A-5(5)	41	10	9.5	37.8	32.5	20.2	99	96	60	-	-	SPURC
MS-65	25 RT	17+00	1.5-2.5											26.7	-	RPC
SS-65	25 RT	17+00	1.5-2.5	A-7-6(37)	72	48	6.3	27.5	11.7	54.5	100	97	75	-	-	RPC
MS-66	CL	10+00	1.5-2.5											28.8	-	SPURC
SS-66	CL	10+00	1.5-2.5	A-7-6(35)	68	50	8.3	23.6	13.5	54.5	99	95	72	-	-	SPURC
MS-67	CL	72+50	1.5-2.5											50.5	-	L
SS-67	CL	72+50	1.5-2.5	A-7-6(51)	81	55	4.2	14.7	12.3	68.7	100	98	84	-	-	L
SS-68	55 LT	81+75	1.0-2.5	A-7-6(43)	74	54	9.1	17.5	14.5	58.9	100	95	77	-	-	L
SS-69	55 LT	81+75	4.0-5.5	A-4(0)	18	1	25.0	43.5	19.4	12.2	100	89	39	-	-	L
SS-72	CL	85+50	1.0-2.5	A-7-6(28)	68	46	17.3	21.5	12.5	48.7	100	89	65	-	-	L
MS-73	CL	11+00	1.0-2.5											26.9	-	SPURA
SS-73	CL	11+00	1.0-2.5	A-7-6(33)	71	48	13.2	20.9	13.1	52.8	100	92	70	-	-	SPURA
MS-74	CL	18+00	1.0-2.5											25.0	-	RPA
SS-74	CL	18+00	1.0-2.5	A-7-6(18)	50	30	15.2	23.1	19.0	42.6	100	91	66	-	-	RPA
SS-75	CL	18+00	3.6-5.1	A-4(0)	26	NP	24.4	47.3	20.2	8.1	100	90	37	-	-	RPA
SS-76	CL	87+50	1.0-2.5	A-4(0)	23	NP	22.5	49.7	19.6	8.1	100	89	38	-	-	L
SS-77	CL	22+00	1.0-2.5	A-7-6(42)	75	55	8.7	19.1	13.3	58.9	99	93	75	-	-	RPD
MS-78	CL	15+00	1.0-2.5											33.5	-	RPD
SS-78	CL	15+00	1.0-2.5	A-7-6(37)	70	50	9.7	20.5	10.9	58.9	99	94	73	-	-	RPD
SS-79	CL	15+00	3.7-5.2	A-2-4(0)	28	4	34.3	44.3	13.3	8.1	96	80	28	-	-	RPD
SS-80	CL	16+00	3.8-5.3	A-4(0)	37	9	31.5	36.8	21.6	10.2	98	77	38	-	-	RPA
SS-81	CL	16+00	8.8-10.3	A-2-4(0)	27	NP	27.0	50.6	18.4	4.1	100	88	30	-	-	RPA
MS-82	25 LT	94+50	1.0-2.5											20.3	-	L
SS-82	25 LT	94+50	1.0-2.5	A-7-6(9)	42	24	22.9	28.0	14.5	34.5	99	85	53	-	-	L
SS-83	25 LT	94+50	3.5-5.0	A-4(0)	24	NP	28.4	42.8	24.7	4.1	95	82	36	-	-	L
SS-84	90 LT	98+00	0.0-1.5	A-6(12)	36	19	4.9	28.2	26.3	40.6	100	98	73	-	-	L
SS-85	90 LT	98+00	3.5-4.5	A-6(5)	34	19	13.8	42.2	15.5	28.4	95	90	48	-	-	L
SS-86	90 RT	101+00	1.5-2.5	A-2-4(0)	23	NP	40.4	40.4	13.1	6.1	95	76	23	-	-	L
SS-87	CL	103+25	3.8-4.8	A-2-4(0)	27	5	32.9	41.0	18.0	8.1	100	82	32	-	-	L
SS-88	CL	112+00	2.5-3.5	A-7-6(12)	43	19	10.3	27.5	23.8	38.4	100	95	68	-	-	L
SS-89	65 RT	112+25	1.5-2.5	A-6(7)	38	21	23.0	29.9	18.8	28.3	99	83	52	-	-	L
SS-90	65 RT	112+25	4.3-5.3	A-6(3)	32	15	14.9	47.1	17.8	20.2	100	96	45	-	-	L
SS-91	65 RT	112+25	6.8-7.8	A-2-4(0)	22	NP	37.6	41.8	12.5	8.1	98	79	27	-	-	L
MS-92	65 RT	113+00	2.6-3.6											23.6	-	L
SS-92	65 RT	113+00	2.6-3.6	A-7-6(9)	41	23	18.8	33.7	17.2	30.3	99	90	53	-	-	L
MS-93	60 RT	115+00	2.0-3.0											17.7	-	L
SS-93	60 RT	115+00	2.0-3.0	A-6(10)	39	21	17.2	26.1	18.4	38.4	99	89	61	-	-	L
MS-94	60 RT	116+00	2.0-3.0											22.7	-	L
SS-94	60 RT	116+00	2.0-3.0	A-6(7)	36	18	18.4	30.3	19.0	32.3	98	87	56	-	-	L
MS-95	60 RT	116+00	4.5-5.5											20.3	-	L
SS-95	60 RT	116+00	4.5-5.5	A-2-4(0)	26	5	27.1	44.0	16.8	12.1	99	87	35	-	-	L
SS-96	60 RT	117+00	2.1-3.1	A-6(6)	35	18	14.1	38.8	18.8	28.3	100	95	53	-	-	L
SS-97	60 RT	121+50	0.5-1.5	A-6(4)	36	19	27.1	35.2	15.6	22.2	97	83	42	-	-	L
SS-98	60 RT	121+50	4.7-5.7	A-6(4)	34	18	20.8	37.2	17.8	24.2	97	88	46	-	-	L
SS-99	60 RT	121+50	7.0-8.2	A-7-6(15)	52	29	17.2	29.3	15.2	38.4	100	92	59	-	-	L
SS-100	50 RT	120+50	1.5-2.5	A-7-6(45)	80	56	10.1	15.6	15.8	58.6	99	93	77	-	-	L
SS-101	50 RT	120+50	5.2-6.2	A-7-6(9)	43	28	23.6	33.1	12.9	30.3	100	89	48	-	-	L
SS-102	50 RT	120+50	10.2-11.2	A-6(5)	36	21	26.9	35.4	15.6	22.2	98	85	43	-	-	L
SS-103	60 RT	119+50	1.5-2.5	A-6(9)	40	24	20.6	29.9	15.2	34.3	99	89	54	-	-	L
SS-104	60 RT	119+50	5.0-6.0	A-6(5)	36	19	21.8	39.0	19.0	20.2	99	89	46	-	-	L
SS-105	75 LT	121+50	1.0-2.5	A-7-6(31)	70	50	15.2	23.6	11.9	49.3	100	93	66	-	-	L
SS-106	30 LT	123+00	1.0-2.5	A-7-6(35)	70	55	14.0	20.9	11.7	53.4	98	89	68	-	-	L
SS-107	30 LT	123+00	3.7-5.2	A-2-4(0)	25	NP	41.5	43.5	10.9	4.1	94	73	20	-	-	L
SS-108	45 RT	122+50	1.9-3.4	A-7-6(40)	77	49	9.4	17.2	9.7	63.7	100	94	77	-	-	L
SS-109	60 RT	123+50	2.2-3.7	A-7-6(31)	60	40	6.6	23.4	20.7	49.3	100	97	77	-	-	L
SS-110	60 RT	123+50	4.7-6.2	A-4(0)	26	NP	25.7	48.3	22.0	4.1	100	91	37	-	-	L
SS-111	60 RT	124+50	2.0-3.5	A-7-6(47)	81	52	7.8	14.8	22.0	55.4	100	96	82	-	-	L
SS-112	60 RT	124+50	4.5-6.0	A-4(4)	39	7	9.7	39.0	34.9	16.4	100	97	62	-	-	L
SS-113	60 RT	124+50	7.0-8.5	A-4(0)	33	3	17.0	48.0	26.7	8.2	100	94	46	-	-	L
SS-114	60 RT	124+50	9.5-11.0	A-4(0)	33	NP	19.3	51.5	23.0	6.2	100	92	40	-	-	L
SS-115	60 RT	124+50	12.0-13.5	A-4(0)	33	NP	16.8	44.4	30.6	8.2	100	93	49	-	-	L
SS-116	60 RT	124+50	17.0-18.5	A-4(0)	27	2	20.7	42.3	28.7	8.2	100	90	47	-	-	L
SS-117	60 RT	124+50	22.0-23.5	A-4(0)	30	NP	32.2	35.3	26.3	6.2	95	77	38	-	-	L
SS-118	40 RT	126+00	2.2-3.7	A-7-6(8)	45	28	23.4	36.8	13.1	26.7	100	89	45	-	-	L
SS-119	40 RT	126+00	4.7-6.2	A-2-4(0)	26	NP	39.2	44.1	10.6	6.1	99	78	23	-	-	L
SS-120	50 RT	127+50	1.8-3.3	A-6(2)	34	18	33.9	34.9	14.9	16.3	96	77	36	-	-	L
SS-121	60 RT	128+25	1.8-3.5	A-4(0)	31	5	26.9	43.9	19.0	10.2	100	89	37	-	-	L
SS-122	60 RT	128+25	4.3-5.8	A-2-4(0)	28	NP	36.7	45.5	15.7	2.0	99	80	24	-	-	L
SS-123	60 RT	129+50	1.5-3.0	A-6(4)	37	17	31.4	21.0	23.1	24.5	85	64	44	-	-	L
SS-124	60 RT	129+50	4.0-5.5	A-7-6(14)	54	25	10.6	37.6	29.4	22.4	100	95	62	-	-	L
SS-125	60 RT	129+50	9.0-10.5	A-2-4(0)	40	NP	38.6	40.2	19.2	2.0	98	76	27	-	-	L

SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT C.SAND	F.SAND	SILT	CLAY	% PASSING (SIEVES) 10	40	200	% MOISTURE	% ORGANIC	Line or Boring ID
SS-126	60 RT	129+50	14.0-15.5	A-2-4(0)	31	NP	33.5	48.2	16.3	2.0	94	78	25	-	-	L
SS-127	60 RT	130+50	1.8-3.3	A-7-6(10)	45	24	18.4	25.9	21.0	34.7	92	81	56	-	-	L
SS-128	60 RT	130+50	4.3-5.8	A-7-6(23)	58	39	12.9	27.3	16.9	42.9	99	93	65	-	-	L
SS-129	60 RT	130+50	6.8-8.3	A-7-6(14)	46	24	17.1	22.7	19.4	40.8	99	87	64	-	-	L
SS-130	60 RT	132+00	1.9-3.4	A-7-6(11)	45	26	19.8	26.3	19.2	34.7	95	83	56	-	-	L
SS-131	60 RT	132+00	3.4-4.9	A-7-6(19)	56	32	16.4	24.8	15.6	43.1	100	91	64	-	-	L
SS-132	60 RT	132+00	5.9-7.4	A-7-6(21)	54	33	14.2	22.4	16.2	47.2	100	92	68	-	-	L
SS-133	60 RT	132+00	8.4-9.9	A-2-4(0)	26	5	23.4	51.3	12.9	12.3	100	92	33	-	-	L
SS-134	60 RT	139+50	1.0-2.5	A-4(0)	30	7	21.4	48.0	20.3	10.3	100	94	40	-	-	L
SS-135	60 RT	139+50	9.7-11.2	A-4(0)	29	4	23.4	48.3	22.2	6.2	100	92	37	-	-	L
S-136	60 RT	138+00	0.0-1.5	A-6(4)	33	15	31.0	21.4	18.9	28.7	95	71	50	-	-	L
SS-137	60 RT	138+00	2.0-3.5	A-7-6(12)	47	22	16.6	25.5	16.8	41.1	98	88	61	-	-	L
SS-138	60 RT	138+00	4.5-6.0	A-2-4(0)	24	NP	34.9	46.4	10.5	8.2	100	86	25	-	-	L
SS-139	60 RT	136+50	1.7-3.2	A-7-6(17)	54	32	18.5	23.6	16.8	41.1	98	86	61	-	-	L
SS-140	60 RT	136+50	4.2-5.7	A-2-4(0)	27	3	34.1	42.5	15.2	8.2	100	84	29	-	-	L
S-141	60 RT	135+00	0.0-1.5	A-7-6(32)	65	44	14.4	15.2	17.0	53.4	99	88	73	-	-	L
SS-142	60 RT	135+00	1.7-3.2	A-6(1)	31	14	29.0	40.5	10.1	20.5	99	85	37	-	-	L
SS-143	60 RT	133+50	1.5-3.0	A-6(6)	38	20	22.2	34.9	14.2	28.7	98	84	49	-	-	L
SS-144	CL	133+00	3.3-4.8	A-7-6(14)	48	30	23.0	23.2	14.8	39.0	97	81	57	-	-	L
SS-145	CL	133+00	8.3-9.8	A-7-6(19)	54	30	17.7	18.5	18.7	45.2	99	88	67	-	-	L
SS-146	CL	133+00	13.3-14.8	A-7-6(25)	59	37	9.4	26.1	13.1	51.3	100	96	70	-	-	L
SS-147	CL	133+00	18.3-19.8	A-2-4(0)	28	3	28.3	48.9	14.6	8.2	100	91	30	-	-	L
SS-148	50 LT	11+50	1.5-3.0	A-7-6(9)	43	21	22.4	24.2	16.4	37.0	96	82	56	-	-	L1
SS-149	50 LT	11+50	4.2-5.7	A-6(2)	32	15	31.0	34.9	15.6	18.5	97	81	38	-	-	L1
SS-150	50 LT	11+50	8.2-9.7	A-2-6(1)	33	17	34.9	34.9	13.8	16.4	93	73	33	-	-	L1
SS-151	40 LT	14+50	1.5-3.0	A-2-4(0)	27	9	40.2	33.7	11.7	14.4	100	82	31	-	-	L1
SS-168	61 RT	42+25	2.0-3.0	A-7-6(10)	42	23	21.9	26.8	16.8	34.5	100	86	56			L
SS-169	61 RT	42+25	4.3-5.3	A-6(6)	39	21	22.9	36.5	14.2	26.4	100	91	46			L
SS-170	61 RT	42+25	7.0-8.0	A-7-6(10)	41	22	17.4	26.0	20.1	36.5	94	84	58			L
SS-171	61 RT	42+25	9.3-10.3	A-6(8)	39	19	18.1	29.4	18.1	34.5	98	88	57			L
SS-172	61 RT	42+25	12.0-13.0	A-6(10)	39	21	15.6	28.4	17.4	38.5	99	90	61			L
SS-173	61 RT	42+25	14.3-15.3	A-7-6(13)	48	25	10.8	34.3	16.4	38.5	100	96	61			L
SS-174	61 RT	42+25	17.0-18.0	A-7-6(22)	55	36	16.6	21.5	17.2	44.6	100	92	67			L
SS-190	84 RT	36+36	2.1-3.1	A-7-6(9)	41	24	21.1	31.4	17.0	30.4	99	88	52			L
SS-191	84 RT	36+36	4.3-5.3	A-6(6)	34	16	21.7	30.0	21.9	26.4	99	86	54			L
SS-192	84 RT	36+36	7.1-8.1	A-7-6(10)	43	21	15.4	30.6	19.5	34.5	100	92	60			L
SS-193	84 RT	36+36	9.3-10.3	A-6(8)	39	23	18.5	33.9	19.3	28.4	99	90	52			L
SS-194	84 RT	36+36	12.1-13.1	A-7-6(9)	41	20	16.8	30.0	18.7	34.5	98	89	58			L
SS-195	84 RT	36+36	14.3-15.3	A-7-6(11)	45	27	19.1	26.8	15.6	38.5	94	83	55			L
SS-196	84 RT	36+36	17.1-18.1	A-7-6(18)	57	35	17.4	26.0	14.0	42.6	99	89	60			L
SS-197	84 RT	36+36	19.3-20.3	A-7-6(15)	50	26	17.0	23.3	21.1	38.5	98	87	63			L
THE FOLLOWING SAMPLES WERE TAKEN FROM PROJECT R-2246C (METRIC).																
THE BORINGS WERE PLACED IN THE ENGLISH PROJECT R-2246B, WHERE THE STATION & OFFSET WAS OBTAINED.																
THE STATION AND OFFSET ARE ROUNDED TO THE NEAREST FOOT.																
THE SAMPLE DEPTHS ARE A DIRECT METRIC TO ENGLISH CONVERSION ROUNDED TO THE NEAREST TENTH OF A FOOT.																
S-16	66 RT	141+48	0.0-3.3	A-7-5(30)	67	37	9.6	14.4	17.8	58.2	97	91	76	33.1	-	L
SS-17	66 RT	141+48	3.8-5.3	A-6(2)	28	11	27.9	33.1	21	18.1	98	83	44	16.0	-	L
SS-18	66 RT	141+48	8.8-10.3	A-2-4(0)	22	6	33.1	38.9	18	10	100	83	32	-	-	L
S-19	66 RT	145+41	0.0-2.0	A-7-6(21)	56	29	5.8	28.5	19.6	46.1	100	96	71	28.9	-	L
SS-20	66 RT	145+41	3.5-5.0	A-2-4(0)	20	NP	22.5	53.4	20.2	4	100	90	31	-	-	L
S-21	66 RT	147+38	0.0-2.0	A-7-5(30)	68	34	8.6	16	17.2	58.2	100	95	78	29.0	-	L
SS-22	66 RT	147+38	3.8-5.3	A-2-4(0)	22	NP	43	35.2	14.7	7	92	66	24	-	-	L
S-23	CL	144+76	0.0-2.0	A-7-6(17)	51	32	14.6	27.9	17.4	40.1	100	91	62	21.0	-	L
S-24	66 RT	140+16	0.0-4.3	A-7-5(18)	53	23	10	16	21.8	52.2	97	90	75	27.3	-	L
S-25	CL	142+13	0.0-2.3	A-7-5(21)	52	22	5	12.6	18.2	64.2	99	96	84	-	-	L
S-26	66 LT	142+79	0.0-2.0	A-4(5)	31	10	13.6	23.9	22.4	40.1	100	94	66	27.8	-	L

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	34408.1.1	1	11

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

INFILTRATION BASIN SUBSURFACE INVESTIGATION

PROJ. REFERENCE NO. 34408.1.1 (R-2246B) F.A. PROJ. STP-(0005)46

COUNTY CABARRUS

PROJECT DESCRIPTION GEORGE W. LILES PARKWAY FROM SR 1304 (ROBERTA RD) TO SR 1431 (WEDDINGTON RD)

ID: R-2246B

PROJECT: 34408.1.1

CONTENTS

CAUTION NOTICE

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DATE 02/26/10

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SEAL

SIGNATURE

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PROJECT REFERENCE NO.	SHEET NO.
34408.1.1	2

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 TO BE THE 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 ACCORDING TO STANDARD PENETRATION TEST (AASHTO T206, ASTM D-1586). SOIL CLASSIFICATION IS BASED ON THE AASHTO SYSTEM. BASIC DESCRIPTIONS GENERALLY SHALL INCLUDE: CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. EXAMPLE:

VERY STIFF, GRAY, SILTY CLAY, MOIST WITH INTERBEDDED FINE SAND LAYERS, HIGHLY PLASTIC, A-7-6

SOIL LEGEND AND AASHTO CLASSIFICATION

GENERAL CLASS.	GRANULAR MATERIALS (≤ 35% PASSING #200)							SILT-CLAY MATERIALS (> 35% PASSING #200)				ORGANIC MATERIALS		
GROUP CLASS.	A-1		A-3	A-2				A-4	A-5	A-6	A-7	A-1, A-2 A-3	A-4, A-5 A-6, A-7	
	A-1-a	A-1-b		A-2-4	A-2-5	A-2-6	A-2-7				A-7-5 A-7-6			
SYMBOL														
% PASSING #10	50 MX											GRANULAR SOILS	SILT-CLAY SOILS	MUCK, PEAT
#40	30 MX	50 MX	51 MN											
#200	15 MX	25 MX	10 MX	35 MX	35 MX	35 MX	35 MX	36 MN	36 MN	36 MN	36 MN			
LIQUID LIMIT	6 MX		NP	40 MX	41 MN	40 MX	41 MN	40 MX	41 MN	40 MX	41 MN	SOILS WITH LITTLE OR MODERATE AMOUNTS OF ORGANIC MATTER		HIGHLY ORGANIC SOILS
PLASTIC INDEX				10 MX	10 MX	11 MN	11 MN	10 MX	10 MX	11 MN	11 MN			
GROUP INDEX	0		0	0		4 MX		8 MX	12 MX	16 MX	No MX			
USUAL TYPES OF MAJOR MATERIALS	STONE FRAGS. GRAVEL, AND SAND		FINE SAND	SILTY OR CLAYEY GRAVEL AND SAND				SILTY SOILS		CLAYEY SOILS				
GEN. RATING AS A SUBGRADE	EXCELLENT TO GOOD							FAIR TO POOR				FAIR TO POOR	POOR	UNSUITABLE

PI OF A-7-5 SUBGROUP IS ≤ LL - 30 ; PI OF A-7-6 SUBGROUP IS> LL - 30

CONSISTENCY OR DENSENESS

PRIMARY SOIL TYPE	COMPACTNESS OR CONSISTENCY	RANGE OF STANDARD PENETRATION RESISTENCE (N-VALUE)	RANGE OF UNCONFINED COMPRESSIVE STRENGTH (TONS/FT2)
GENERALLY GRANULAR MATERIAL (NON-COHESIVE)	VERY LOOSE LOOSE MEDIUM DENSE DENSE VERY DENSE	<4 4 TO 10 10 TO 30 30 TO 50 >50	N/A
GENERALLY SILT-CLAY MATERIAL (COHESIVE)	VERY SOFT SOFT MEDIUM STIFF STIFF VERY STIFF HARD	<2 2 TO 4 4 TO 8 8 TO 15 15 TO 30 >30	<0.25 0.25 TO 0.50 0.5 TO 1.0 1 TO 2 2 TO 4 >4

TEXTURE OR GRAIN SIZE

U.S. STD. SIEVE SIZE	4	10	40	60	200	270
OPENING (MM)	4.76	2.00	0.42	0.25	0.075	0.053

BOULDER (BLDR.)	COBBLE (COB.)	GRAVEL (GR.)	COARSE SAND (CSE. SD.)	FINE SAND (F SD.)	SILT (SL.)	CLAY (CL.)

GRAIN SIZE	MM	305	75	2.0	0.25	0.05	0.005
	IN.	12	3				

SOIL MOISTURE - CORRELATION OF TERMS

SOIL MOISTURE SCALE (ATTERBERG LIMITS)	FIELD MOISTURE DESCRIPTION	GUIDE FOR FIELD MOISTURE DESCRIPTION
	- SATURATED - (SAT.)	USUALLY LIQUID; VERY WET, USUALLY FROM BELOW THE GROUND WATER TABLE
LL — LIQUID LIMIT (PLASTIC RANGE (PI))	- WET - (W)	SEMISOLID; REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE
PL — PLASTIC LIMIT	- MOIST - (M)	SOLID; AT OR NEAR OPTIMUM MOISTURE
OM — OPTIMUM MOISTURE SL — SHRINKAGE LIMIT	- DRY - (D)	REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE

PLASTICITY

	PLASTICITY INDEX (PI)	DRY STRENGTH
NONPLASTIC	0-5	VERY LOW
LOW PLASTICITY	6-15	SLIGHT
MED. PLASTICITY	16-25	MEDIUM
HIGH PLASTICITY	26 OR MORE	HIGH

COLOR

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

GRADATION

WELL GRADED - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE.
UNIFORM - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE. (ALSO POORLY GRADED)
GAP-GRADED - INDICATES A MIXTURE OF UNIFORM PARTICLES OF TWO OR MORE SIZES.

ANGULARITY OF GRAINS

THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS: ANGULAR, SUBANGULAR, SUBROUNDED, OR ROUNDED.

MINERALOGICAL COMPOSITION

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

COMPRESSIBILITY

SLIGHTLY COMPRESSIBLE	LIQUID LIMIT LESS THAN 31
MODERATELY COMPRESSIBLE	LIQUID LIMIT EQUAL TO 31-50
HIGHLY COMPRESSIBLE	LIQUID LIMIT GREATER THAN 50

PERCENTAGE OF MATERIAL

ORGANIC MATERIAL	GRANULAR SOILS	SILT - CLAY SOILS
TRACE OF ORGANIC MATTER	2 - 3%	3 - 5%
LITTLE ORGANIC MATTER	3 - 5%	5 - 12%
MODERATELY ORGANIC	5 - 10%	12 - 20%
HIGHLY ORGANIC	>10%	>20%

OTHER MATERIAL	
TRACE	1 - 10%
LITTLE	10 - 20%
SOME	20 - 35%
HIGHLY	35% AND ABOVE

GROUND WATER

- WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING
- STATIC WATER LEVEL AFTER 24 HOURS
- PW — PERCHED WATER, SATURATED ZONE, OR WATER BEARING STRATA
- SPRING OR SEEP

MISCELLANEOUS SYMBOLS

- ROADWAY EMBANKMENT (RE) WITH SOIL DESCRIPTION
- SOIL SYMBOL
- ARTIFICIAL FILL (AF) OTHER THAN ROADWAY EMBANKMENT
- INFERRED SOIL BOUNDARY
- INFERRED ROCK LINE
- ALLUVIAL SOIL BOUNDARY
- 25/025 — DIP & DIP DIRECTION OF ROCK STRUCTURES
- SPT, OPT, DMT, VST, PMT — TEST BORING
- AUGER BORING
- CORE BORING
- MW — MONITORING WELL
- PIEZOMETER INSTALLATION
- SLOPE INDICATOR INSTALLATION
- CONE PENETROMETER TEST
- SOUNDING ROD
- TEST BORING W/ CORE
- SPT N-VALUE
- REF — SPT REFUSAL

ABBREVIATIONS

AR - AUGER REFUSAL
BT - BORING TERMINATED
CL. - CLAY
CPT - CONE PENETRATION TEST
CSE. - COARSE
DMT - DILATOMETER TEST
DPT - DYNAMIC PENETRATION TEST
e - VOID RATIO
F - FINE
FOSS. - FOSSILIFEROUS
FRAC. - FRACTURED, FRACTURES
FRAGS. - FRAGMENTS
HI. - HIGHLY
MED. - MEDIUM
MICA. - MICACEOUS
MOD. - MODERATELY
NP - NON PLASTIC
ORG. - ORGANIC
PMT - PRESSUREMETER TEST
SAP. - SAPROLITIC
SD. - SAND, SANDY
SL. - SILT, SILTY
SLI. - SLIGHTLY
TCR - TRICONE REFUSAL
w - MOISTURE CONTENT
V - VERY
VST - VANE SHEAR TEST
WEA. - WEATHERED
γ - UNIT WEIGHT
γ_d - DRY UNIT WEIGHT

SAMPLE ABBREVIATIONS
S - BULK
SS - SPLIT SPOON
ST - SHELBY TUBE
RS - ROCK
RT - RECOMPACTED TRIAXIAL
CBR - CALIFORNIA BEARING RATIO

EQUIPMENT USED ON SUBJECT PROJECT

DRILL UNITS:
- _ MOBILE B- _
- _ BK-51
- _ CME-45C
- _ CME-550
- _ PORTABLE HOIST
- _ _____
- _ _____

ADVANCING TOOLS:
- _ CLAY BITS
- _ 6" CONTINUOUS FLIGHT AUGER
- _ 8" HOLLOW AUGERS
- _ HARD FACED FINGER BITS
- _ TUNG.-CARBIDE INSERTS
- _ CASING _ W/ ADVANCER
- _ TRICONE _____" STEEL TEETH
- _ TRICONE _____" TUNG.-CARB.
- _ CORE BIT
- _ _____

HAMMER TYPE:
- _ AUTOMATIC _ MANUAL

CORE SIZE:
- _ -B _____
- _ -N _____
- _ -H _____

HAND TOOLS:
- _ POST HOLE DIGGER
- X HAND AUGER
- _ SOUNDING ROD
- _ VANE SHEAR TEST
- _ _____

ROCK DESCRIPTION

HARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT IF TESTED, WOULD YIELD SPT REFUSAL. AN INFERRED ROCK LINE INDICATES THE LEVEL AT WHICH NON-COASTAL PLAIN MATERIAL WOULD YIELD SPT REFUSAL. SPT REFUSAL IS PENETRATION BY A SPLIT SPOON SAMPLER EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS. IN NON-COASTAL PLAIN MATERIAL, THE TRANSITION BETWEEN SOIL AND ROCK IS OFTEN REPRESENTED BY A ZONE OF WEATHERED ROCK.
ROCK MATERIALS ARE TYPICALLY DIVIDED AS FOLLOWS:

WEATHERED ROCK (WR)	NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT N VALUES > 100 BLOWS PER FOOT IF TESTED.
CRYSTALLINE ROCK (CR)	FINE TO COARSE GRAIN IGNEOUS AND METAMORPHIC ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES GRANITE, GNEISS, GABBRO, SCHIST, ETC.
NON-CRYSTALLINE ROCK (NCR)	FINE TO COARSE GRAIN METAMORPHIC AND NON-COASTAL PLAIN SEDIMENTARY ROCK THAT WOULD YEILD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES PHYLLITE, SLATE, SANDSTONE, ETC.
COASTAL PLAIN SEDIMENTARY ROCK (CP)	COASTAL PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD SPT REFUSAL. ROCK TYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED SHELL BEDS, ETC.

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, CRYSTALS ON A BROKEN SPECIMEN FACE SHINE BRIGHTLY. ROCK RINGS UNDER HAMMER BLOWS IF OF A CRYSTALLINE NATURE.
SLIGHT (SLI.)	ROCK GENERALLY FRESH, JOINTS STAINED AND DISCOLORATION EXTENDS INTO ROCK UP TO 1 INCH. OPEN JOINTS MAY CONTAIN CLAY. IN GRANITOID ROCKS SOME OCCASIONAL FELDSPAR CRYSTALS ARE DULL AND DISCOLORED. CRYSTALLINE ROCKS RING UNDER HAMMER BLOWS.
MODERATE (MOD.)	SIGNIFICANT PORTIONS OF ROCK SHOW DISCOLORATION AND WEATHERING EFFECTS. IN GRANITOID ROCKS, MOST FELDSPARS ARE DULL AND DISCOLORED, SOME SHOW CLAY. ROCK HAS DULL SOUND UNDER HAMMER BLOWS AND SHOWS SIGNIFICANT LOSS OF STRENGTH AS COMPARED WITH FRESH ROCK.
MODERATELY SEVERE (MOD. SEV.)	ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. IN GRANITOID ROCKS, ALL FELDSPARS DULL AND DISCOLORED AND A MAJORITY SHOW KAOLINIZATION. ROCK SHOWS SEVERE LOSS OF STRENGTH AND CAN BE EXCAVATED WITH A GEOLOGIST'S PICK. ROCK GIVES 'CLUNK' SOUND WHEN STRUCK. *IF TESTED, WOULD YIELD SPT REFUSAL*
SEVERE (SEV.)	ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC CLEAR AND EVIDENT BUT REDUCED IN STRENGTH TO STRONG SOIL. IN GRANITOID ROCKS ALL FELDSPARS ARE KAOLINIZED TO SOME EXTENT. SOME FRAGMENTS OF STRONG ROCK USUALLY REMAIN. *IF TESTED, YIELDS SPT N VALUES > 100 BPF*
VERY SEVERE (V SEV.)	ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC ELEMENTS ARE DISCERNIBLE BUT THE MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROCK REMAINING. SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE SUCH THAT ONLY MINOR VESTIGES OF THE ORIGINAL ROCK FABRIC REMAIN. *IF TESTED, YIELDS SPT N VALUES < 100 BPF*
COMPLETE	ROCK REDUCED TO SOIL. ROCK FABRIC NOT DISCERNIBLE, OR DISCERNIBLE ONLY IN SMALL AND SCATTERED CONCENTRATIONS. QUARTZ MAY BE PRESENT AS DIKES OR STRINGERS. SAPROLITE IS ALSO AN EXAMPLE.

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.
HARD	CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED TO DETACH HAND SPECIMEN.
MODERATELY HARD	CAN BE SCRATCHED BY KNIFE OR PICK. GOUGES OR GROOVES TO 0.25 INCHES DEEP CAN BE EXCAVATED BY HARD BLOW OF A GEOLOGIST'S PICK. HAND SPECIMENS CAN BE DETACHED BY MODERATE BLOWS.
MEDIUM HARD	CAN BE GROOVED OR GOUGED 0.05 INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT. CAN BE EXCAVATED IN SMALL CHIPS TO PEICES 1 INCH MAXIMUM SIZE BY HARD BLOWS OF THE POINT OF A GEOLOGIST'S PICK.
SOFT	CAN BE GROVED OR GOUGED READILY BY KNIFE OR PICK. CAN BE EXCAVATED IN FRAGMENTS FROM CHIPS TO SEVERAL INCHES IN SIZE BY MODERATE BLOWS OF A PICK POINT. SMALL, THIN PIECES CAN BE BROKEN BY FINGER PRESSURE.
VERY SOFT	CAN BE CARVED WITH KNIFE. CAN BE EXCAVATED READILY WITH POINT OF PICK. PIECES 1 INCH OR MORE IN THICKNESS CAN BE BROKEN BY FINGER PRESSURE. CAN BE SCRATCHED READILY BY FINGERNAIL.

FRACTURE SPACING

TERM	SPACING
VERY WIDE	MORE THAN 10 FEET
WIDE	3 TO 10 FEET
MODERATELY CLOSE	1 TO 3 FEET
CLOSE	0.16 TO 1 FEET
VERY CLOSE	LESS THAN 0.16 FEET

BEDDING

TERM	THICKNESS
VERY THICKLY BEDDED	> 4 FEET
THICKLY BEDDED	1.5 - 4 FEET
THINLY BEDDED	0.16 - 1.5 FEET
VERY THINLY BEDDED	0.03 - 0.16 FEET
THICKLY LAMINATED	0.008 - 0.03 FEET
THINLY LAMINATED	< 0.008 FEET

INDURATION

FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF THE MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.

FRIABLE	RUBBING WITH FINGER FREES NUMEROUS GRAINS; GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE.
MODERATELY INDURATED	GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE; BREAKS EASILY WHEN HIT WITH HAMMER.
INDURATED	GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE; DIFFICULT TO BREAK WITH HAMMER.
EXTREMELY INDURATED	SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE; SAMPLE BREAKS ACROSS GRAINS.

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.

ARGILLACEOUS - APPLIED TO ALL ROCKS OR SUBSTANCES COMPOSED OF CLAY MINERALS, OR HAVING A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION, AS SHALE, SLATE, ETC.

ARTESIAN - GROUND WATER THAT IS UNDER SUFFICIENT PRESSURE TO RISE ABOVE THE LEVEL AT WHICH IT IS ENCOUNTERED, BUT WHICH DOES NOT NECESSARILY RISE TO OR ABOVE THE GROUND SURFACE.

CALCAREOUS (CALC.) - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE.

COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE.

CORE RECOVERY (REC.) - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED BY TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.

DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS MASSIVE ROCK.

DIP - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL.

DIP DIRECTION (DIP AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH.

FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE.

FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES.

FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLODGED FROM PARENT MATERIAL.

FLOOD PLAIN (FP) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM.

FORMATION (FM.) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE FIELD.

JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED.

LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO ITS LATERAL EXTENT.

LENS - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS.

MOTTLED (MOT.) - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS. MOTTLING IN SOILS USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE.

PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN INTERVENING IMPERVIOUS STRATUM.

RESIDUAL (RES.) SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK.

ROCK QUALITY DESIGNATION (RQD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.

SAPROLITE (SAP.) - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK.

SILL - AN INTRUSIVE BODY OF IGNEOUS ROCK OF APPROXIMATELY UNIFORM THICKNESS AND RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT, THAT HAS BEEN EMPLACED PARALLEL TO THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS.

SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE.

STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT) - NUMBER OF BLOWS (N OR BPF) OF A 140 LB. HAMMER FALLING 30 INCHES REQUIRED TO PRODUCE A PENETRATION OF 1 FOOT INTO SOIL WITH A 2 INCH OUTSIDE DIAMETER SPLIT SPOON SAMPLER. SPT REFUSAL IS PENETRATION EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS.

STRATA CORE RECOVERY (SREC.) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE.

STRATA ROCK QUALITY DESIGNATION (SRQD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS WITHIN A STRATUM EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE.

TOPSOIL (TS.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.

BENCH MARK: BENCHMARK SITES 1 & 2: BL-26, 85+12.19 ELEVATION: 630.25 FT
BENCHMARK SITE 3: BL-30, 98+59.40 ELEVATION: 615.06 FT
_ ELEVATION: _ FT.

NOTES:

NCDOT PROJECT NO.: 34408.1.1
TIP NO.: R-2246B
FEDERAL AID NO.: STP-(0005)46
COUNTY: CABARRUS
DESCRIPTION: George W. Liles Parkway from SR 1304 (Roberta Rd.) to SR 1431 (Weddington Rd.)
SUBJECT: Constant Head Permeameter Testing

Project Description

The purpose of this subsurface investigation was to evaluate 3 locations, identified by the NCDOT, at the project study area for the George W. Liles Parkway. Our understanding of this project comes from conversations with NCDOT Geotechnical Engineering Unit personnel; and from documents and drawings provided by the Geotechnical Engineering Unit including a Request for Proposal dated January 28, 2010 and electronic files on the NCDOT ftp site.

The project study area includes pastures/fields and forested areas located southwest of Concord in Cabarrus County, North Carolina. The locations evaluated are within the future George W. Liles Parkway that extends from SR 1304 (Roberta Rd.) to SR 1431 (Weddington Rd.).

Methodology

MACTEC conducted a subsurface investigation to determine depth to seasonal high water table (SHWT), apparent water table (if present), and *in-situ* saturated hydraulic conductivity. A MACTEC soil scientist advanced three hand auger borings to depths ranging from 40 to 60 inches below ground surface (BGS) where possible. Representative soil samples were collected at approximately 1-foot intervals or where significant changes in soil texture were observed. The soil samples were described in the field and placed in sealed containers for transportation to and testing in MACTEC's laboratory. Infiltration testing with a constant head permeameter was conducted adjacent to the hand-auger boring locations. The infiltration tests were conducted at approximately 12-18 and 28-36 inches BGS, as specified by the NCDOT, and in general accordance with ASTM D 5216 procedures.

MACTEC identified the test boring locations in the field utilizing non-survey grade sub-meter Global Positioning System (GPS) equipment using northing/easting coordinates provided by NCDOT. GPS (horizontal) and conventional level surveys (vertical) were performed to obtain northing, easting, and ground surface elevations of the test boring locations. The boring locations are shown on the Boring Location Plan (DWG 1) and listed in the following table.

Table 1. Hand Auger and Permeameter Test Locations

Location	Northing	Easting	Elevation (ft)	Alignment, Station, Offset
Site 1	598,102	1,509,416	628.6	-RPB- Sta. 22+91, 106' RT
Site 2	598,127	1,509,626	632.4	-RPC- Sta. 22+17, 122' LT
Site 3	598,765	1,509,142	621.8	-RPD- Sta. 21+83, 103' RT

Representative soil samples were tested to determine the soil index properties and to verify field classification. Three soil samples (S-1 to S-3) were tested for grain size distribution (including hydrometer), Atterberg limits, natural moisture content, and AASHTO classification. Laboratory testing was performed in accordance with applicable ASTM/AASHTO/NCDOT specifications. The results of the laboratory testing are included with this report.

Physiography and Geology

The project study area includes areas that are generally flat within pastures/fields and forested areas located near the intersection of SR 1304 (Roberta Road) and US 29, and is located within the Piedmont Physiographic Province in western Cabarrus County, NC. The 1985 Geologic Map of North Carolina, compiled by the N.C. Geological Survey, indicates that the project study area is within the Charlotte and Milton Belts and is underlain by gabro of the Concord plutonic suite.

The soils encountered in the three hand-auger borings were mostly cohesive, consisting of brown to reddish-brown silty, sandy clay (A-7-6), underlain by brown, silty sand (A-2-4).

Infiltration Tests

Infiltration tests were performed at Site 1 though Site 3 using a Guelph Permeameter (GP). The infiltration tests were conducted in the unsaturated material above the apparent water table on February 11 and 12, 2010. These tests were conducted at soil depths of approximately 18 inches and 30 inches BGS. A detailed soil profile description was completed for each test location and is included with this report.

The *in-situ* field saturated hydraulic conductivity (K_{fs}) values are calculated based on field measurements using the Glover Equation. Infiltration was not observed at Sites 1 through 3 within one to two hours of commencing the infiltration tests; therefore, K_{fs} could not be calculated. The soil present at the test depth at these locations included highly plastic clay to sandy clay textures and massive sand saprolite material. These soils were beyond the capability of the GP to measure the infiltration rate. Table 2 summarizes the infiltration rate measurements for each location and includes: location; depth and horizon; hydraulic conductivity test method used; and conductivity measurement at each location.

Table 2. *In-situ* Saturated Hydraulic Conductivity Measurements

Site Number	Depth/Horizon (inches BGS)	Result	
		gpd/ft^2	in/hr
Site 1	18/Bt	NIO	NIO
Site 1	30/C	NIO	NIO
Site 2	15/Bt	NIO	NIO
Site 2	28/C	NIO	NIO
Site 3	18/Bt	NIO	NIO
Site 3	32/C	NIO	NIO

Note: NIO = No Infiltration Observed

Groundwater

The hand-auger borings were terminated at 40, 60, and 44 inches BGS due to rock and solid saprolite at Sites 1, 2, and 3 respectively. Apparent water tables were not observed within the boring holes above the depths of termination at the time of the site visit. Seasonal high water table (SHWT) depths were estimated based on soil characteristics through identification of low chroma redoximorphic features (mottles). The low chroma mottles suggest past conditions of saturation and reducing soil conditions. Evidence of a possible perched SHWT was observed at depths ranging from 10 to 26 inches BGS as indicated in Table 3.

Table 3. Seasonal High Water Table (SHWT) Estimates on February 11-12, 2010.

Site Number	Elevation of Ground Surface (feet)	SHWT Depth (inches BGS)	Apparent Water Table Depth (inches BGS)
Site 1	628.6	10-20 (perched)	>40
Site 2	632.4	12-18 (perched)	>60
Site 3	621.8	22-26 (perched)	>44

Closure

MACTEC provided these services in accordance with our Proposal No. 10-RAIL-062 dated February 2, 2010. The information contained in this report represents field conditions as observed on February 11 and 12, 2010. Our services were performed under the Terms of the Agreement made and entered into on June 29, 2009 by and between the NCDOT and MACTEC.

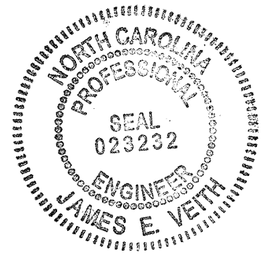
We are available to discuss our findings with you and to provide additional studies or services necessary to complete the project. We appreciate the opportunity to assist you on this project and look forward to serving as your geotechnical consultant on future projects.

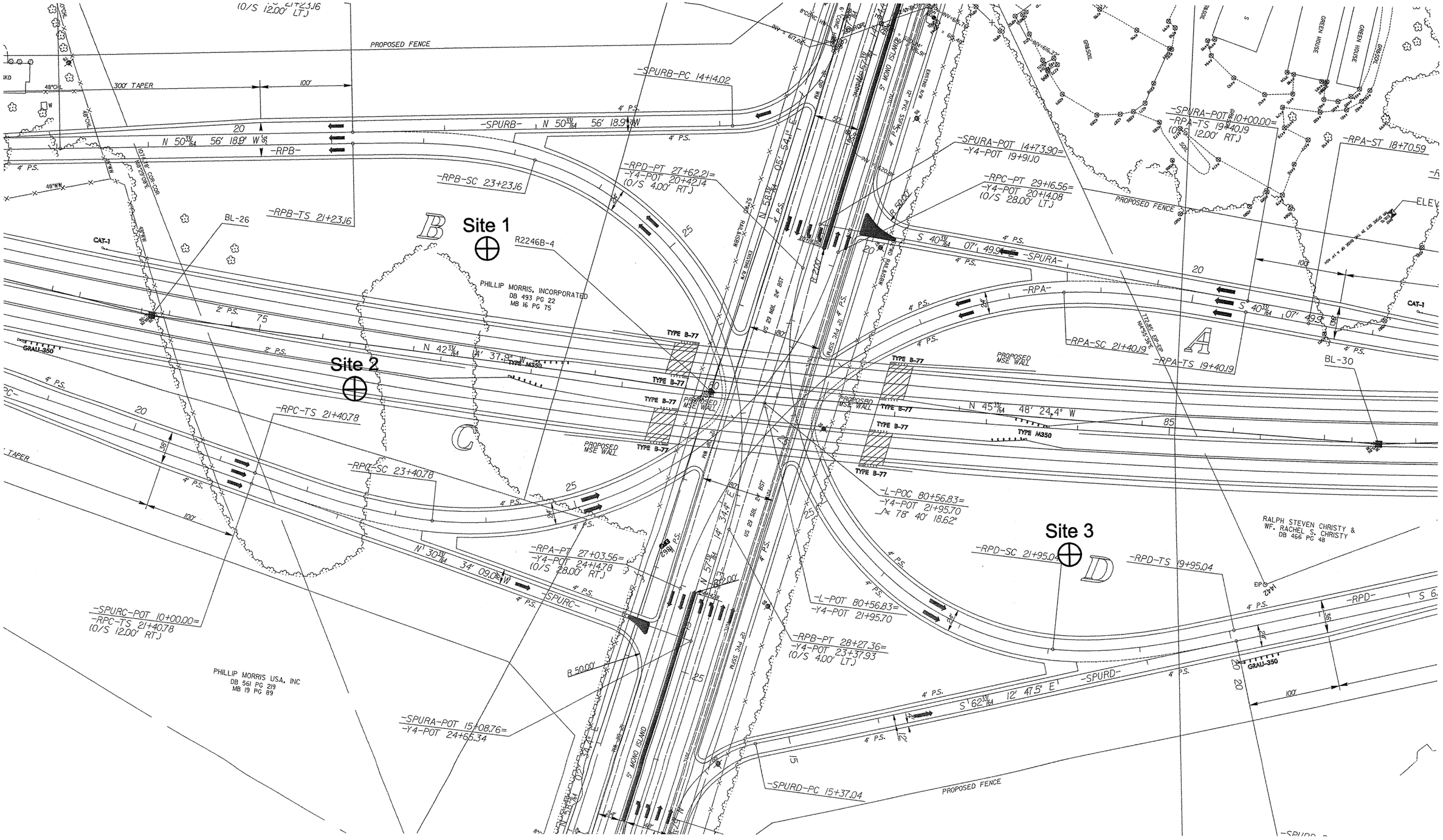
Very truly yours,

MACTEC Engineering and Consulting, Inc.

Joseph W. Witherspoon, LSS
Senior Scientist
Registered, North Carolina 1246

James E. Veith, P.E.
Principal Geotechnical Engineer
Registered, North Carolina 23232





BORING LOCATION PLAN

GEORGE W. LILES PARKWAY FROM SR 1304 (ROBERTA RD)
TO SR 1431 (WEDDINGTON RD)
NCDOT PROJECT NO. 34408.1.1 (R-2246B)
F.A. No. STP-(0005)46
CABARRUS COUNTY, NORTH CAROLINA

MACTEC ENGINEERING AND CONSULTING, INC.
RALEIGH, NORTH CAROLINA

REVISIONS	DRAWN: R.R.	DATE: 02/26/10
	DFT CHECK: W.B.D.	JOB : 6468-10-0026
	ENG CHECK: J.E.V.	DWG: 1

Guelph Permeameter Field Data Sheet

Standard Procedure for Permeameter Readings and Calculations

Job Name: George W. Liles Parkway from SR 1304 (Roberta Rd) to SR 1431 (Weddington Rd)
Job Number: 34408.1.1 (R-2246B)
Location ID: Site 1 Alignment, Station, Offset: -RPB- Sta. 22+91, 106' RT
Date: 02/11/10
Field Personnel: J. Witherspoon
Well Hole Depth, (inches): 18
Field Notes: Clay
Combined Reservoirs X, (cm^2) 35.22 Horizon: Bt
Inner Reservoir Y, (cm^2): 2.15 SHWT: 10-20" BGS (Perched)
Reservoir Constant: 35.22 cm^2
Note: In standardized procedure the radius of the well hole is always 3.0 cm.

1st set of readings with height of water in well (H_1) set at 5 cm.

Reading Number	Time	Time Interval (min)	Water Level in Reservoir (cm)	Water Level Change (cm)	Rate of Water Level Change, R_1 (cm/min)
0	11:50:00	0.0	38.3	0.0	
1	12:00:00	10.0	38.0	-0.3	
2	12:10:00	10.0	38.6	0.6	
3	12:20:00	10.0	39.4	0.8	
4	12:30:00	10.0	43.1	0.7	
5	12:40:00	10.0	43.3	0.2	
6	12:50:00	10.0	43.6	0.3	
7	1:00:00	10.0	44.1	0.5	
8	1:10:00	10.0	43.9	-0.2	
9					
10	NO INFILTRATION				
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					

2nd set of readings with height of water in well (H_2) set at 10 cm.

Reading Number	Time	Time Interval (h:m:s)	Water Level in Reservoir (cm)	Water Level Change (cm)	Rate of Water Level Change, R_2 (cm/min)
0					
1					
2					
3					
4					
5					
6					
7					
8					
9					
10	NO INFILTRATION				
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					

For the first set of readings $R_{1\text{-bar}}$ = $R_{1\text{-bar}}$ / 60 = 0.0E+00 cm/sec
For the second set of readings $R_{2\text{-bar}}$ = $R_{2\text{-bar}}$ / 60 = 0.0E+00 cm/sec

K_{fs} = [(0.0041)*(Res. Const)*($R_{2\text{-bar}}$)] - [(0.0054)*(Res. Const)*($R_{1\text{-bar}}$)] ***cm/sec***
where,
K_{fs} = field sat'd hydraulic conductivity

Calculated K_{fs}:		
K_{fs} =	0.0E+00	*cm/sec*
K_{fs} =	0.00	in/hr
K_{fs} =	0.00	$g/d/ft^2$

Prepared By: JWW 2-26-10
Checked By: WBD 2-26-10

Guelph Permeameter Field Data Sheet

Standard Procedure for Permeameter Readings and Calculations

SHEET 5

Job Name: George W. Liles Parkway from SR 1304 (Roberta Rd) to SR 1431 (Weddington Rd)
Job Number: 34408.1.1 (R-2246B)
Location ID: Site 1 Alignment, Station, Offset: -RPB- Sta. 22+91, 106' RT
Date: 02/11/10
Field Personnel: J. Witherspoon

Well Hole Depth, (inches): 30
Field Notes: Sand

Combined Reservoirs X, (cm^2) 35.22 Horizon: C
Inner Reservoir Y, (cm^2): 2.15 SHWT: 10-20" BGS (Perched)
Reservoir Constant: 35.22 cm^2
Note: In standardized procedure the radius of the well hole is always 3.0 cm.

1st set of readings with height of water in well (H_1) set at 5 cm.

Reading Number	Time	Time Interval (min)	Water Level in Reservoir (cm)	Water Level Change (cm)	Rate of Water Level Change, R_1 (cm/min)
0	2:02:00	0.0	21.9	0.0	
1	2:07:00	5.0	22.0	0.1	
2	2:12:00	5.0	22.0	0.0	
3	2:27:00	15.0	22.0	0.0	
4	2:32:00	5.0	22.0	0.0	
5	2:52:00	20.0	22.0	0.0	
6	3:02:00	10.0	22.0	0.0	
7					
8					
9					
10	NO INFILTRATION				
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					

2nd set of readings with height of water in well (H_2) set at 10 cm.

Reading Number	Time	Time Interval (h:m:s)	Water Level in Reservoir (cm)	Water Level Change (cm)	Rate of Water Level Change, R_2 (cm/min)
0					
1					
2					
3					
4					
5					
6					
7					
8					
9					
10	NO INFILTRATION				
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					

For the first set of readings $R_{1\text{-bar}}$ = $R_{1\text{-bar}}$ / 60 = 0.0E+00 cm/sec
For the second set of readings $R_{2\text{-bar}}$ = $R_{2\text{-bar}}$ / 60 = 0.0E+00 cm/sec

K_{fs} = [(0.0041)*(Res. Const)*($R_{2\text{-bar}}$)] - [(0.0054)*(Res. Const)*($R_{1\text{-bar}}$)] ***cm/sec***
where,
K_{fs} = field sat'd hydraulic conductivity

Calculated K_{fs}:		
K_{fs} =	0.0E+00	*cm/sec*
K_{fs} =	0.00	in/hr
K_{fs} =	0.00	$g/d/ft^2$

Prepared By: JWW 2-26-10
Checked By: WBD 2-26-10

Guelph Permeameter Field Data Sheet

Standard Procedure for Permeameter Readings and Calculations

Job Name: George W. Liles Parkway from SR 1304 (Roberta Rd) to SR 1431 (Weddington Rd)
Job Number: 34408.1.1 (R-2246B)
Location ID: Site 2 Alignment, Station, Offset: -RPC- Sta. 22+17, 122' LT
Date: 02/11/10
Field Personnel: J. Witherspoon
Well Hole Depth, (inches): 15
Field Notes: Clay
Combined Reservoirs X, (cm^2): 35.22 Horizon: Bt
Inner Reservoir Y, (cm^2): 2.15 SHWT: 12-18" BGS (Perched)
Reservoir Constant: 2.15 cm^2
Note: In standardized procedure the radius of the well hole is always 3.0 cm.

1st set of readings with height of water in well (H_1) set at 5 cm.

Reading Number	Time	Time Interval, (min)	Water Level in Reservoir, (cm)	Water Level Change, (cm)	Rate of Water Level Change, R_1, (cm/min)
0	3:15:00	0.0	38.3	0.0	
1	3:20:00	5.0	38.3	0.0	
2	3:25:00	5.0	38.3	0.0	
3	3:35:00	10.0	38.3	0.0	
4	3:45:00	10.0	38.3	0.0	
5	3:55:00	10.0	38.3	0.0	
6	4:05:00	10.0	38.3	0.0	
7	4:35:00	30.0	38.3	0.0	
8					
9					
10		NO INFILTRATION			
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					

2nd set of readings with height of water in well (H_2) set at 10 cm.

Reading Number	Time	Time Interval, (h:m:s)	Water Level in Reservoir, (cm)	Water Level Change, (cm)	Rate of Water Level Change, R_2, (cm/min)
0					
1					
2					
3					
4					
5					
6					
7					
8					
9					
10		NO INFILTRATION			
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					

For the first set of readings $R_{1\text{-bar}}$ = $R_{1\text{-bar}}$ / 60 = 0.0E+00 cm/sec
For the second set of readings $R_{2\text{-bar}}$ = $R_{2\text{-bar}}$ / 60 = 0.0E+00 cm/sec

K_{fs} = [(0.0041)*(Res. Const)*($R_{2\text{-bar}}$)] - [(0.0054)*(Res. Const)*($R_{1\text{-bar}}$)] ***cm/sec***
where,
K_{fs} = field sat'd hydraulic conductivity

Calculated K_{fs}:		
K_{fs} =	0.0E+00	*cm/sec*
K_{fs} =	0.00	in/hr
K_{fs} =	0.00	$g/d/ft^2$

Prepared By: SWW 2-26-10
Checked By: WBD 2-26-10

Guelph Permeameter Field Data Sheet

Standard Procedure for Permeameter Readings and Calculations

SHEET 6

Job Name: George W. Liles Parkway from SR 1304 (Roberta Rd) to SR 1431 (Weddington Rd)
Job Number: 34408.1.1 (R-2246B)

Location ID: Site 2 Alignment, Station, Offset: -RPC- Sta. 22+17, 122' LT

Date: 02/11/10
Field Personnel: J. Witherspoon

Well Hole Depth, (inches): 28
Field Notes: Loamy Sand

Combined Reservoirs X, (cm^2): 35.22

Horizon: C

Inner Reservoir Y, (cm^2): 2.15

SHWT: 12-18" BGS (Perched)

Reservoir Constant: 2.15 cm^2
Note: In standardized procedure the radius of the well hole is always 3.0 cm.

1st set of readings with height of water in well (H_1) set at 5 cm.

Reading Number	Time	Time Interval, (min)	Water Level in Reservoir, (cm)	Water Level Change, (cm)	Rate of Water Level Change, R_1, (cm/min)
0	4:50:00	0.0	19.7	0.0	
1	5:00:00	10.0	19.7	0.0	
2	5:10:00	10.0	19.7	0.0	
3	5:20:00	10.0	19.7	0.0	
4	5:40:00	20.0	19.7	0.0	
5	5:50:00	10.0	19.7	0.0	
6					
7					
8					
9					
10		NO INFILTRATION			
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					

2nd set of readings with height of water in well (H_2) set at 10 cm.

Reading Number	Time	Time Interval, (h:m:s)	Water Level in Reservoir, (cm)	Water Level Change, (cm)	Rate of Water Level Change, R_2, (cm/min)
0					
1					
2					
3					
4					
5					
6					
7					
8					
9					
10		NO INFILTRATION			
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					

For the first set of readings $R_{1\text{-bar}}$ = $R_{1\text{-bar}}$ / 60 = 0.0E+00 cm/sec
For the second set of readings $R_{2\text{-bar}}$ = $R_{2\text{-bar}}$ / 60 = 0.0E+00 cm/sec

K_{fs} = [(0.0041)*(Res. Const)*($R_{2\text{-bar}}$)] - [(0.0054)*(Res. Const)*($R_{1\text{-bar}}$)] ***cm/sec***
where,
K_{fs} = field sat'd hydraulic conductivity

Calculated K_{fs}:		
K_{fs} =	0.0E+00	*cm/sec*
K_{fs} =	0.00	in/hr
K_{fs} =	0.00	$g/d/ft^2$

Prepared By: SWW 2-26-10
Checked By: WBD 2-26-10

Guelph Permeameter Field Data Sheet

Standard Procedure for Permeameter Readings and Calculations

Job Name: George W. Liles Parkway from SR 1304 (Roberta Rd) to SR 1431 (Weddington Rd)
Job Number: 34408.1.1 (R-2246B)
Location ID: Site 3 Alignment, Station, Offset: -RPD- Sta. 21+83, 103' RT
Date: 02/12/10
Field Personnel: J. Witherspoon
Well Hole Depth, (inches): 18
Field Notes: Clay
Combined Reservoirs X, (cm^2) 35.22 Horizon: Bt
Inner Reservoir Y, (cm^2): 2.15 SHWT: 22-26" BGS (Perched)
Reservoir Constant: 35.22 cm^2
Note: In standardized procedure the radius of the well hole is always 3.0 cm.

1st set of readings with height of water in well (H_1) set at 5 cm.

Reading Number	Time	Time Interval, (min)	Water Level in Reservoir, (cm)	Water Level Change, (cm)	Rate of Water Level Change, R_1, (cm/min)
0	9:50:00	0.0	28.7	0.0	
1	10:00:00	10.0	28.7	0.0	
2	10:10:00	10.0	28.7	0.0	
3	10:30:00	20.0	28.7	0.0	
4	10:40:00	10.0	28.7	0.0	
5	10:50:00	10.0	28.7	0.0	
6	11:00:00	10.0	28.7	0.0	
7					
8					
9					
10		NO INFILTRATION			
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					

2nd set of readings with height of water in well (H_2) set at 10 cm.

Reading Number	Time	Time Interval, (h:m:s)	Water Level in Reservoir, (cm)	Water Level Change, (cm)	Rate of Water Level Change, R_2, (cm/min)
0					
1					
2					
3					
4					
5					
6					
7					
8					
9					
10		NO INFILTRATION			
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					

For the first set of readings $R_{1\text{-bar}}$ = $R_{1\text{-bar}}$ / 60 = 0.0E+00 cm/sec
For the second set of readings $R_{2\text{-bar}}$ = $R_{2\text{-bar}}$ / 60 = 0.0E+00 cm/sec

K_{fs} = [(0.0041)*(Res. Const)*($R_{2\text{-bar}}$)] - [(0.0054)*(Res. Const)*($R_{1\text{-bar}}$)] ***cm/sec***
where,
K_{fs} = field sat'd hydraulic conductivity

Calculated K_{fs}:		
K_{fs} =	0.0E+00	*cm/sec*
K_{fs} =	0.00	in/hr
K_{fs} =	0.00	g/d/ft^2

Prepared By: JWW 2-26-10
Checked By: WGD 2-26-10

Guelph Permeameter Field Data Sheet

Standard Procedure for Permeameter Readings and Calculations

SHEET 7

Job Name: George W. Liles Parkway from SR 1304 (Roberta Rd) to SR 1431 (Weddington Rd)
Job Number: 34408.1.1 (R-2246B)
Location ID: Site 3 Alignment, Station, Offset: -RPD- Sta. 21+83, 103' RT
Date: 02/12/10
Field Personnel: J. Witherspoon
Well Hole Depth, (inches): 32
Field Notes: Sandy Loam
Combined Reservoirs X, (cm^2) 35.22 Horizon: C
Inner Reservoir Y, (cm^2): 2.15 SHWT: 22-26" BGS (Perched)
Reservoir Constant: 35.22 cm^2
Note: In standardized procedure the radius of the well hole is always 3.0 cm.

1st set of readings with height of water in well (H_1) set at 5 cm.

Reading Number	Time	Time Interval, (min)	Water Level in Reservoir, (cm)	Water Level Change, (cm)	Rate of Water Level Change, R_1, (cm/min)
0	11:10:00	0.0	24.9	0.0	
1	11:30:00	20.0	24.9	0.0	
2	11:40:00	10.0	24.9	0.0	
3	12:00:00	20.0	24.9	0.0	
4	12:30:00	30.0	24.9	0.0	
5	12:40:00	10.0	24.9	0.0	
6					
7					
8					
9					
10		NO INFILTRATION			
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					

2nd set of readings with height of water in well (H_2) set at 10 cm.

Reading Number	Time	Time Interval, (h:m:s)	Water Level in Reservoir, (cm)	Water Level Change, (cm)	Rate of Water Level Change, R_2, (cm/min)
0					
1					
2					
3					
4					
5					
6					
7					
8					
9					
10		NO INFILTRATION			
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					

For the first set of readings $R_{1\text{-bar}}$ = $R_{1\text{-bar}}$ / 60 = 0.0E+00 cm/sec
For the second set of readings $R_{2\text{-bar}}$ = $R_{2\text{-bar}}$ / 60 = 0.0E+00 cm/sec

K_{fs} = [(0.0041)*(Res. Const)*($R_{2\text{-bar}}$)] - [(0.0054)*(Res. Const)*($R_{1\text{-bar}}$)] ***cm/sec***
where,
K_{fs} = field sat'd hydraulic conductivity

Calculated K_{fs}:		
K_{fs} =	0.0E+00	*cm/sec*
K_{fs} =	0.00	in/hr
K_{fs} =	0.00	g/d/ft^2

Prepared By: JWW 2-26-10
Checked By: WGD 2-26-10

MACTEC Engineering and Consulting, Inc.

Soil Profile Description

Client: NCDOT
Project Name: George W. Liles Parkway from SR 1304 (Roberta Rd) to SR 1431 (Weddington Rd)
Project Number: 34408.1.1 (R-2246B)

Date: 11 February 2010
Location: Southeast quadrant of intersection of Roberta Road and Concord Parkway
County: Cabarrus State: North Carolina
Northing: 598,102 US ft Easting: 1,509,416 US ft
Elevation: 628.6 ft
Alignment, Station, Offset: -RPB- Sta. 22+91, 106' RT

Site/Boring Location #: Site 1
Vegetation: Pasture

Seasonal High Water Table: Perched at 10-20 inches
Apparent Water Table: >40 inches
Slope: 0-2%

Boring Termination Depth: 40 inches at rock

Horizon	Depth (in)	Matrix Color	Mottle(s) Color	Texture	Structure	Consistence (moist)	Notes
A	0-5	7.5YR 3/4		CL	1fsbk	friable	
Bt1	5-10	7.5YR 4/6	7.5YR 5/8	CL	1mabk	firm	
Bt2	10-20	5YR 4/6	10YR 4/2	C	massive	firm	
C	20-40*	10YR 4/4	10YR 5/8	S	massive	friable	Saprolite wth clay chunks

*Auger refusal at 40" BGS due to rock

Notes: Sample S-1 at 10"-20" Reddish brown, silty, sandy CLAY A-7-6 (32)

Evidence of a perched water table was observed from 10 – 20 inches BGS.

Soil Textures: CL = Clay loam; C = Clay; S = Sand

Soil Structure: 1fsbk = weak, fine, subangular blocky; 1mabk = weak, medium angular blocky

Prepared By: JWW 2-26-10

Checked By: WTO 2-26-10

MACTEC Engineering and Consulting, Inc.

Soil Profile Description

Client: NCDOT
Project Name: George W. Liles Parkway from SR 1304 (Roberta Rd) to SR 1431 (Weddington Rd)
Project Number: 34408.1.1 (R-2246B)

Date: 11 February 2010
Location: Southeast quadrant of intersection of Roberta Road and Concord Parkway
County: Cabarrus State: North Carolina

Northing: 598,127 US ft Easting: 1,509,626 US ft
Elevation: 632.4 ft
Alignment, Station, Offset: -RPC- Sta. 22+17, 122' LT

Site/Boring Location #: Site 2
Vegetation: Pasture

Seasonal High Water Table: Perched at 12-18 inches
Apparent Water Table: >60 inches
Slope: 0-2-%

Boring Termination Depth: 60 inches at solid saprolite

Horizon	Depth (in)	Matrix Color	Mottle(s) Color	Texture	Structure	Consistence (moist)	Notes
A	0-6	10YR 3/3		L	1fsbk	friable	
Bt1	6-12	7.5YR 4/6	7.5YR 5/8	C	1mabk	firm	
Bt2	12-18	7.5YR 4/6	10YR 4/2	C	massive	firm	
C	18-60*	10YR 4/4	10YR 5/8 2.5Y 2.5/1	LS with SL chunks	massive	friable	

*Auger refusal at 60" BGS due to solid saprolite

Notes: Sample S-2 at 18"-60" Brown, silty, SAND A-2-4 (0)

Evidence of a perched water table was observed from 12 – 18 inches BGS.

Soil Textures: L = Loam; C = Clay; LS = Loamy Sand; SL = Sandy Loam

Soil Structure: 1fsbk = weak, fine, subangular blocky; 1mabk = weak, medium angular blocky

Prepared By: JWW 2-26-10

Checked By: WTO 2-26-10

Soil Profile Description

Client: NCDOT
Project Name: George W. Liles Parkway from SR 1304 (Roberta Rd) to SR 1431 (Weddington Rd)
Project Number: 34408.1.1 (R-2246B)

Date: 12 February 2010
Location: North of the intersection of Roberta Road and Concord Parkway
County: Cabarrus State: North Carolina

Northing: 598,765 US ft Easting: 1,509,142 US ft
Elevation: 621.8 ft
Alignment, Station, Offset: -RPD- Sta. 21+83, 103' RT

Site/Boring Location #: Site 3
Vegetation: Forested

Seasonal High Water Table: Perched at 22-26 inches
Apparent Water Table: >44 inches
Slope: 0-2%

Boring Termination Depth: 44 inches at solid saprolite

Horizon	Depth (in)	Matrix Color	Mottle(s) Color	Texture	Structure	Consistence (moist)	Notes
A	0-5	5YR 5/3		L	1fsbk	friable	
Bt1	5-10	5YR 4/4		CL	1msbk	friable	
Bt2	10-22	10R 4/6	7.5YR 5/8	C	1mabk	firm	
Bt3	22-26	7.5YR 4/6	10YR 3/2	C	massive	firm	
C	26-44*	10YR 4/6	5YR 4/6 5YR 4/2	SL	massive	friable	

*Auger refusal at 44" BGS due to solid saprolite

Notes: Sample S-3 at 22"-26" Brown, silty, sandy CLAY A-7-6 (43)

Evidence of a perched water table was observed from 22-26 inches BGS.

Soil Textures: L = Loam; CL – Clay loam; C = Clay; SL = Sandy loam

Soil Structure: 1fsbk = weak, fine, subangular blocky; 1msbk = weak, medium, subangular blocky; 1mabk = weak, medium angular blocky

Prepared By: JWW 2-26-10

Checked By: WGO 2-26-10

MACTEC

MACTEC ENGINEERING AND CONSULTING, INC.
3301 ATLANTIC AVENUE
RALEIGH, NORTH CAROLINA 27604

N.C.D.O.T./AASHTO CLASSIFICATIONS

REPORT ON SAMPLES OF: SOILS FOR QUALITY

MACTEC PROJECT NAME/ NUMBER: George W. Liles Parkway from SR 1304 (Roberta Rd.) to SR 1431 (Weddington Rd.)

NCDOT PROJ. NO.: 34408.1.1 (R-2246B) COUNTY: Cabarrus OWNER: N.C.D.O.T.

DATE SAMPLED: February 2010 RECEIVED: 2/12/2010 REPORTED BY: MACTEC

SAMPLED FROM: Sites 1, 2 and 3 MACTEC PROJ. NO.: 6468-10-0026

SUBMITTED BY: MACTEC ENGINEERING AND CONSULTING, INC.

1992 STANDARD SPECIFICATIONS

TEST RESULTS

Lab Sample No.		S-1	S-2	S-3			
Retained No. 4 Sieve	(%)	0.0	0.0	0.0			
Passing No. 10 Sieve	(%)	100.0	99.9	100.0			
Passing No. 40 Sieve	(%)	96.6	71.8	96.9			
Passing No. 200 Sieve	(%)	68.8	10.8	75.6			

MINUS 2.00mm FRACTION

SOIL MORTAR - 100%							
Coarse Sand	(%)	8.2	54.7	8.2			
Fine Sand	(%)	28.0	39.4	19.3			
Silt	(%)	31.9	0.5	9.6			
Clay	(%)	31.9	5.4	62.9			

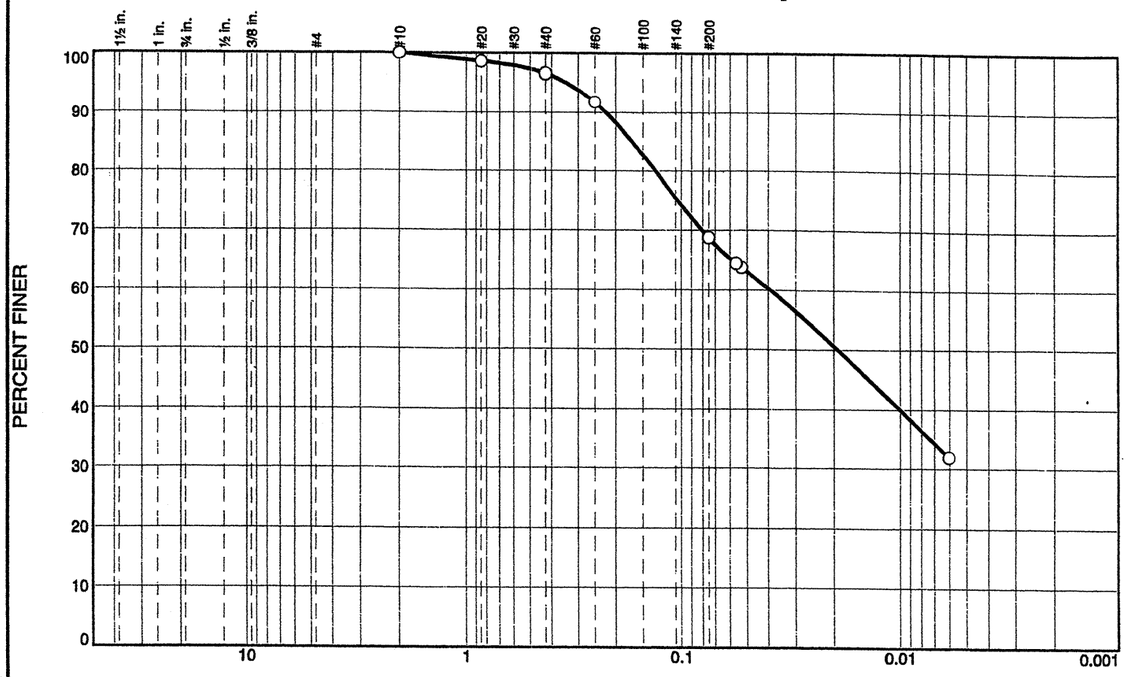
Moisture Content	(%)	41.9	11.4	44.8			
Liquid Limit, L.L.		71	NV	82			
Plasticity Index, P.I.		47	NP	53			
AASHTO Classification		A-7-6(32)	A-2-4(0)	A-7-6(43)			
Organic Content	(%)	ND	ND	ND			

Boring No.		Site 1	Site 2	Site 3			
Station		22+91	22+17	21+83			
Offset		±106 ft RT	±122 ft LT	±103 ft RT			
Alignment		-RPB-	-RPC-	-RPD-			
Depth (IN)	From	10.0	18.0	22.0			
	to	20.0	60.0	26.0			

REMARKS: ND=Not Determined, NP=Non-Plastic, NV=No Value

Tested By Chana Savanapridi; Cert. No. 104-03-0705 CS 2/23/10
Signature

Particle Size Distribution Report



SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#10	100.0		
#20	98.6		
#40	96.6		
#60	91.8		
#200	68.8		
#270	63.8		

* (no specification provided)

Material Description
Reddish Brown CLAY with Sand

Atterberg Limits
PL= 24 LL= 71 PI= 47

Coefficients
D_{90}= 0.2208 D_{85}= 0.1674 D_{60}= 0.0391
D_{50}= 0.0191 D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification
USCS= CH AASHTO= A-7-6(32)

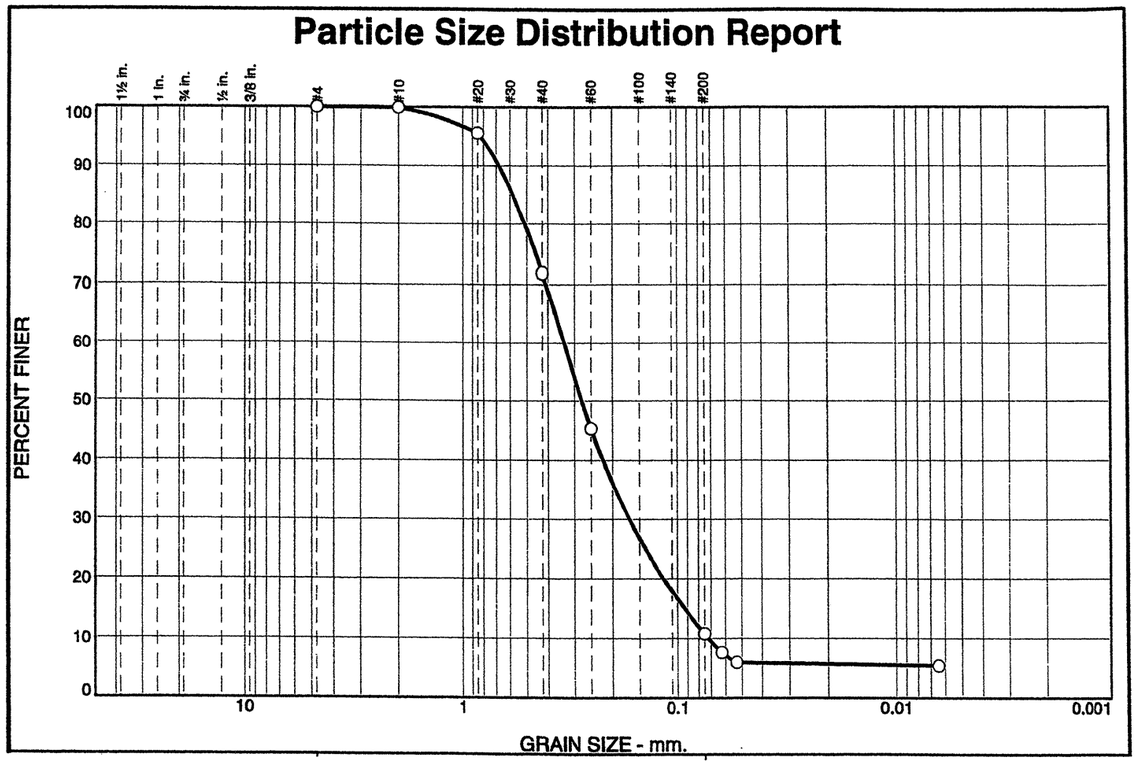
Remarks
Specific Gravity is assumed

Source of Sample: Site 1 **Depth:** 10.0-20.0"
Sample Number: S-1 **Date:** 2/12/10

MACTEC Engineering and Consulting, Inc.	Client: NC DEPARTMENT OF TRANSPORTATION
Raleigh, North Carolina	Project: George W. Lyles Pkwy (from SR1304 to SR1431)
	Project No: 6468100026 Figure

Tested By: CS (Cert# 104-03-0705) **Checked By:** MDC (Lab Manager) MDC 2/16/10

Particle Size Distribution Report



SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	100.0		
#10	99.9		
#20	95.6		
#40	71.8		
#60	45.3		
#200	10.8		
#270	5.9		

* (no specification provided)

Material Description

Olive Brown Silty SAND with grass roots

Atterberg Limits

PL= NP LL= NV PI= NP

Coefficients

D_{90}= 0.6766 D_{85}= 0.5815 D_{60}= 0.3361
D_{50}= 0.2758 D_{30}= 0.1673 D_{15}= 0.0924
D_{10}= 0.0718 C_u= 4.68 C_c= 1.16

Classification

USCS= SP-SM AASHTO= A-2-4(0)

Remarks

Atterburg Limits = Spatula Method as Per NCDOT Procedures
Specific Gravity is assumed

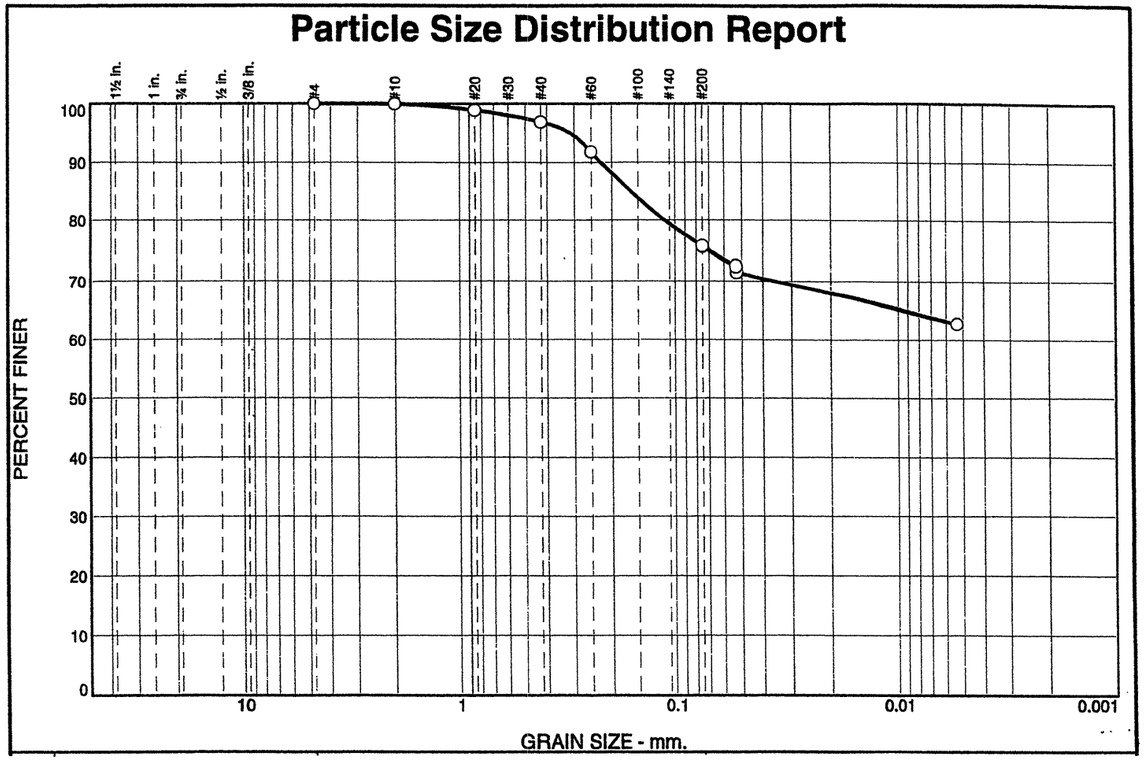
Source of Sample: Site 2 **Depth:** 18.0-60.0"
Sample Number: S-2

Date: 2/12/10

MACTEC Engineering and Consulting, Inc.	**Client:** NC DEPARTMENT OF TRANSPORTATION
	Project: George W. Lyles Pkwy (from SR1304 to SR1431)
Raleigh, North Carolina	**Project No:** 6468100026 **Figure**

Tested By: CS (Cert# 104-03-0705) **Checked By:** MDC (Lab Manager) 2/16/10

Particle Size Distribution Report



SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	100.0		
#10	100.0		
#20	98.9		
#40	96.9		
#60	91.8		
#200	75.6		
#270	72.5		

* (no specification provided)

Material Description

Yellowish Brown CLAY with SAND

Atterberg Limits

PL= 29 LL= 82 PI= 53

Coefficients

D_{90}= 0.2242 D_{85}= 0.1620 D_{60}=
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= CH AASHTO= A-7-6(43)

Remarks

Specifc Gravity is assumed

Source of Sample: Site 3 **Depth:** 22.0-26.0"
Sample Number: S-3

Date: 2/12/10

MACTEC Engineering and Consulting, Inc.	**Client:** NC DEPARTMENT OF TRANSPORTATION
	Project: George W. Lyles Pkwy (from SR1304 to SR1431)
Raleigh, North Carolina	**Project No:** 6468100026 **Figure**

Tested By: CS (Cert# 104-03-0705) **Checked By:** MDC (Lab Manager) 2/16/10