STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	40057.1.1 (B-4955)	1	15

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

STRUCTURE SUBSURFACE INVESTIGATION

PROJ. REFERENCE NO. *40057.1.1 (B-4955)* F.A. PROJ. *BRSTP-1113(6)*

COUNTY *ALAMANCE*

PROJECT DESCRIPTION *BRIDGE #162 ON SR 1113 (KIMESVILLE RD.) OVER SOUTH PRONG STINKING QUARTER CREEK*

SITE DESCRIPTION *BRIDGE #162 ON SR 1113 (KIMESVILLE RD.) OVER SOUTH PRONG STINKING QUARTER CREEK*

ID: B-4955

PROJECT: 40057.1.1

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PERSONNEL

J. K. STICKNEY

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INVESTIGATED BY *C. A. YOUNGBLOOD*

CHECKED BY *B. D. WORLEY*

SUBMITTED BY *K. B. MILLER*

DATE *FEBRUARY 2011*

NORTH CAROLINA LICENSED SEAL 1959 GEOLOGIST CHERYL A. YOUNGBLOOD

2/22/11

DRAWN BY: *C. E. BURRIS*

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PROJECT REFERENCE NO.	SHEET NO.
40057.1.1 (B-4955)	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 ($TONS/FT^2$)
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 GROUND WATER 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 / CPT / 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
- [X] CME-550
- [ ] PORTABLE HOIST
- [ ] _____
- [ ] _____

ADVANCING TOOLS:
- [ ] CLAY BITS
- [ ] 6" CONTINUOUS FLIGHT AUGER
- [ ] 8" HOLLOW AUGERS
- [ ] HARD FACED FINGER BITS
- [ ] TUNG.-CARBIDE INSERTS
- [X] CASING [X] W/ ADVANCER
- [ ] TRICONE _____" STEEL TEETH
- [X] TRICONE 2 15/16 TUNG.-CARB.
- [X] CORE BIT
- [ ] _____

HAMMER TYPE:
- [X] AUTOMATIC [ ] MANUAL

CORE SIZE:
- [ ] -B-____
- [X] -N- NXBWL
- [ ] -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: BL-4 STA. 13+94.54 -L- 13.74 LT
N 807278.3101
E 1843044.0256 ELEVATION: 554.14 FT.

NOTES:
CAR = CASING ADVANCER REFUSAL

REVISED 09/23/09

PROJECT REFERENCE NO.	SHEET
40057.1.1 (B-4955)	3

SITE PLAN

0 50 100

FEET

PROPOSED SKEW ANGLE: 75°

BM#2
-BL- STATION 41+05.00
210' LEFT
ELEV. 542.02'

-BL-4

NAD 83/NSRS 2007 NC GRID

WOODS

12

15

+43.33
31.92'

+01.04
36.50'

+46.10
31.82'

EXISTING R/W

N 3° 03' 27.0" E

N 5° 56' 48.5" E

N 6° 00' 50.4" E

EBI-A

EBI-B

BRIDGE #162
WD & STEEL

BI-A

BI-B

EB2-A

EB2-B

-L-

SR 1113 KIMESVILLE ROAD 20' BST

TO KIMESVILLE

TO BURLINGTON

60.00'

STINKING QUARTER CREEK

10' SOIL RD.

DATUM DESCRIPTION

THE LOCALIZED COORDINATE SYSTEM DEVELOPED FOR THIS PROJECT IS BASED ON THE STATE PLANE COORDINATES ESTABLISHED BY NCDOT FOR MONUMENT "B4955-2"
WITH NAD 83/NSRS 2007 STATE PLANE GRID COORDINATES OF
NORTHING: 804454.161(ft) EASTING: 1842774.784(ft)
ELEVATION: 640.66(ft)
THE AVERAGE COMBINED GRID FACTOR USED ON THIS PROJECT (GROUND TO GRID) IS: 0.9999228472
THE N.C. LAMBERT GRID BEARING AND
LOCALIZED HORIZONTAL GROUND DISTANCE FROM
"B4955-2" TO -L- STATION IS

ALL LINEAR DIMENSIONS ARE LOCALIZED HORIZONTAL DISTANCES
VERTICAL DATUM USED IS NAVD 88

0	50	100
FEET		

PROJECT REFERENCE NO.	SHEET
40057.1.1 (B-4955)	4

Profile 7ft left of -L-
Bridge No. 162 on -L- (Sta. 14+43.5)
VE=5:1

-L-

570
560
550
540
530
520
510
500
490

12+00 13+00 14+00 15+00 16+00 17+00

SS-6
SS-7
SS-8
EB1-A
13+81 -L-
6.6 LT

PROPOSED GRADE
7FT LT OF -L-

SS-3
SS-4
SS-5
EB2-A
15+02 -L-
7.0 LT

EXISTING GROUND

ASPHALT & SELECT MATERIALS

ASPHALT & SELECT MATERIALS

ROADWAY EMBANKMENT
RED & BROWN, MOIST, SOFT, SILTY, SANDY CLAY (A-7-6)

SS-1
SS-2
B1-A
14+50 -L-
6.5 LT

ROADWAY EMBANKMENT
RED & ORANGE, MOIST, MEDIUM STIFF, SILTY SANDY CLAY (A-7-6)

11/10

11/10

11/03/2010

ALLUVIAL, BROWN & GRAY, ALLUVIAL GRAY, SAT., LOOSE, SILTY, SAND W/ GRAVEL (A-2-4) & COARSE SAND (A-1-b)

M. TO SAT.,

V. SOFT TO STIFF, SANDY SILT (A-4) & SILTY CLAY (A-7-6)

RESIDUAL, WHITE & ORANGE, M. TO SAT.,

DENSE, CLAYEY, SILTY, SAND (A-2-4)

WEATHERED ROCK (QUARTZ DIORITE)

WEATHERED ROCK (QUARTZ DIORITE)

CAR

BT

BT

REC. = 100%
RQD. = 61%

REC. = 100%
RQD. = 0%

REC. = 100%
RQD. = 94%

CRYSTALLINE ROCK (QUARTZ DIORITE)

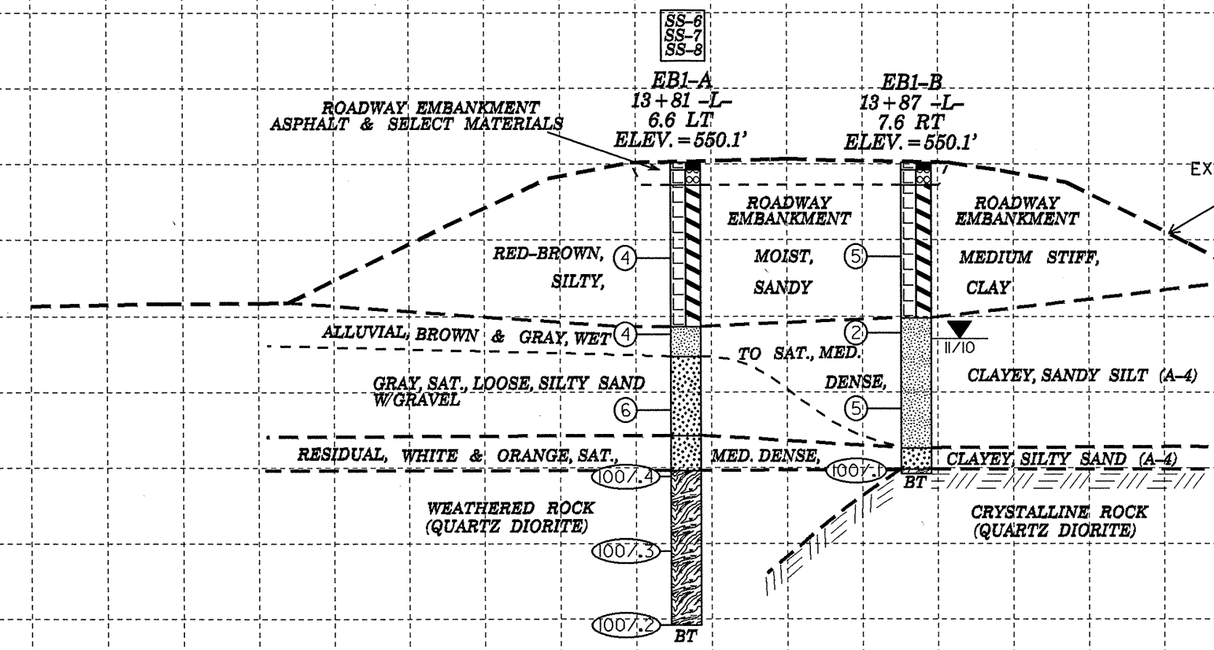
REC. = 24%
RQD. = 0%

REC. = 89%
RQD. = 86%

PROJECT REFERENCE NO.	SHEET
40057.1.1 (B-4955)	5
SECTION THROUGH EB-1 STA. 13+82.27 -L- SKEW = 75°00'00"	

0 10 20
FEET

-L-



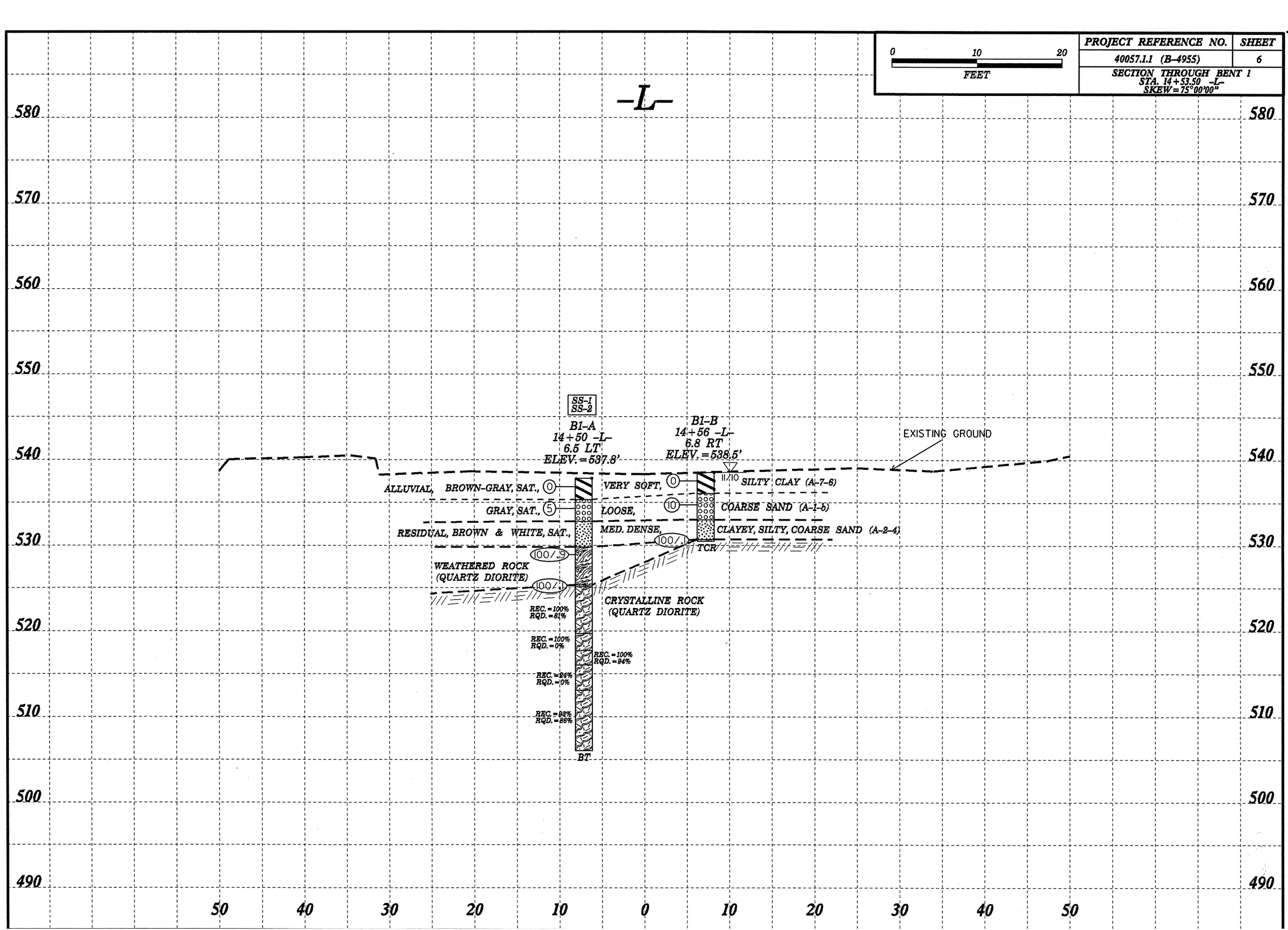
580 570 560 550 540 530 520 510 500 490

50 40 30 20 10 0 10 20 30 40 50

0	10	20
FEET		

PROJECT REFERENCE NO.	SHEET
40057.1.1 (B-4955)	6

SECTION THROUGH BENT 1
STA. 14+53.50 -L-
SKEW=75°00'00"



PROJECT REFERENCE NO.	SHEET
40057.1.1 (B-4955)	7
SECTION THROUGH END BENT 2 STA. 15+04.73 -L- SKEW = 75°00'00"	

0 10 20
FEET

-L-

SS-3
SS-4
SS-5

EB2-A
15+02 -L-
7.0 LT
ELEV. = 551.4'

EB2-B
15+07 -L-
6.4 RT
ELEV. = 551.4'

ROADWAY EMBANKMENT
ASPHALT & SELECT MATERIALS

EXISTING GROUND

ROADWAY EMBANKMENT
RED-ORANGE, (7) MOIST, (6) MED. STIFF,
CLAYEY, SANDY SILT (A-4)

(6) (8)
11/10 ALLUVIAL 11/10
BROWN, MOIST, MED. STIFF TO
(9) SILT (A-4) (9)
STIFF, CLAYEY, SANDY

(35) RESIDUAL (23)
WHITE-ORANGE, MOIST, DENSE, CLAYEY, SILTY SAND (A-2-4)

Remove Box

WEATHERED ROCK (100/.) CAR (100) CAR WEATHERED ROCK (QUARTZ DIORITE)
Quartz Diorite

CRYSTALLINE ROCK
(QUARTZ DIORITE)

580 570 560 550 540 530 520 510 500 490

50 40 30 20 10 0 10 20 30 40 50

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 40057.1.1	**TIP** B-4955	**COUNTY** ALAMANCE	**GEOLOGIST** Stickney, J. K.	
SITE DESCRIPTION Bridge No. 162 on SR 1113 (Kimesville Rd.) over S. prong Stinking Quarter Creek				**GROUND WTR (ft)**
BORING NO. EB1-A	**STATION** 13+81	**OFFSET** 7 ft LT	**ALIGNMENT** -L-	**0 HR.** Dry
COLLAR ELEV. 550.1 ft	**TOTAL DEPTH** 30.5 ft	**NORTHING** 807,264	**EASTING** 1,843,050	**24 HR.** N/A
DRILL RIG/HAMMER EFF./DATE HFO0072 CME-550 89% 09/02/2009		**DRILL METHOD** NW Casing w/ SPT	**HAMMER TYPE** Automatic	
DRILLER Smith, M. L.	**START DATE** 11/02/10	**COMP. DATE** 11/02/10	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
555											
550										550.1 GROUND SURFACE	0.0
										549.6	0.5
										ROADWAY EMBANKMENT 548.6 ASPHALT	1.5
										SELECT MATERIALS
545	544.8	5.3	3	2	2	4	SS-6	M		RED, BROWN SILTY SANDY CLAY	
540	539.8	10.3	2	2	2	4	SS-7	W		539.3 **ALLUVIAL**	10.8
										537.3 BROWN, GRAY CLAYEY SANDY SILT	12.8
535	534.8	15.3	2	2	4	6	SS-8	Sat.		GRAY SILTY SAND W/ GRAVEL	
530	529.8	20.3	100/.4			100/.4				532.1 **RESIDUAL**	18.0
										529.8 WHITE, ORANGE CLAYEY SILTY SAND	20.3
525	524.8	25.3	100/.3			100/.3				**WEATHERED ROCK** (QUARTZ DIORITE)	
520	519.8	30.3	100/.2			100/.2				519.6 Boring Terminated at Elevation 519.6 ft in weathered rock (Quartz diorite)	30.5

WBS 40057.1.1	**TIP** B-4955	**COUNTY** ALAMANCE	**GEOLOGIST** Stickney, J. K.	
SITE DESCRIPTION Bridge No. 162 on SR 1113 (Kimesville Rd.) over S. prong Stinking Quarter Creek				**GROUND WTR (ft)**
BORING NO. EB1-B	**STATION** 13+87	**OFFSET** 8 ft RT	**ALIGNMENT** -L-	**0 HR.** 9.7
COLLAR ELEV. 550.1 ft	**TOTAL DEPTH** 20.5 ft	**NORTHING** 807,269	**EASTING** 1,843,064	**24 HR.** 11.6
DRILL RIG/HAMMER EFF./DATE HFO0072 CME-550 89% 09/02/2009		**DRILL METHOD** NW Casing w/ SPT	**HAMMER TYPE** Automatic	
DRILLER Smith, M. L.	**START DATE** 11/02/10	**COMP. DATE** 11/02/10	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
555										
550										550.1 GROUND SURFACE 0.0
										549.6 0.5
										ROADWAY EMBANKMENT 548.6 ASPHALT 1.5
										SELECT MATERIALS
545	544.9	5.2	2	3	2	5		M		RED, BROWN SILTY SANDY CLAY
540	539.9	10.2	3	1	1	2				539.9 10.2
										ALLUVIAL BROWN, GRAY CLAYEY SANDY SILT
535	534.9	15.2	1	2	3	5		Sat.		
530	529.9	20.2	100/.1			100/.1				531.3 18.8
										529.9 **RESIDUAL** 20.2
										529.6 WHITE & ORANGE CLAYEY SILTY SAND 20.5
										CRYSTALLINE ROCK (QUARTZ DIORITE)
										Boring Terminated at Elevation 529.6 ft in crystalline rock (Quartz Diorite)

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 40057.1.1	**TIP** B-4955	**COUNTY** ALAMANCE	**GEOLOGIST** Stickney, J. K.	
SITE DESCRIPTION Bridge No. 162 on SR 1113 (Kimesville Rd.) over S. prong Stinking Quarter Creek				**GROUND WTR (ft)**
BORING NO. B1-A	**STATION** 14+50	**OFFSET** 7 ft LT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 537.8 ft	**TOTAL DEPTH** 31.8 ft	**NORTHING** 807,333	**EASTING** 1,843,057	**24 HR.** N/A
DRILL RIG/HAMMER EFF./DATE HFO0072 CME-550 89% 09/02/2009		**DRILL METHOD** NW Casing W/SPT & Core	**HAMMER TYPE** Automatic	
DRILLER Smith, M. L.	**START DATE** 11/01/10	**COMP. DATE** 11/01/10	**SURFACE WATER DEPTH** 0.3ft	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
540											
	537.8	0.0	WOH	WOH	WOH	0	SS-1	Sat.		WATER SURFACE (11/01/10)	
										537.8	0.0
										ALLUVIAL	
535	535.3	2.5	4	2	3	5				BROWN, GRAY SILTY CLAY	
							SS-2	Sat.		535.3	2.5
										GRAY COARSE SAND	
										532.8	5.0
										RESIDUAL	
530	530.3	7.5	19	32	68/.4					BROWN, WHITE CLAYEY SILTY COARSE SAND	
										529.8	8.0
						100/.9				WEATHERED ROCK (QUARTZ DIORITE)	
										525.3	12.5
525	525.3	12.5	100/.1			100/.1				CRYSTALLINE ROCK (QUARTZ DIORITE)	
							RS-1			525.1	12.7
										(QUARTZ DIORITE)	
520										519.7	18.1
										(QUARTZ DIORITE)	
										517.7	20.1
										(QUARTZ DIORITE)	
515										516.0	21.8
										(QUARTZ DIORITE)	
										513.1	24.7
510										(QUARTZ DIORITE)	
										506.0	31.8
										Boring Terminated at Elevation 506.0 ft in crystalline rock (Quartz Diorite)	

NCDOT BORE DOUBLE B4955_GEO_BRDG162_ALAMANCE.GPJ NC_DOT.GDT 2/24/11

NCDOT GEOTECHNICAL ENGINEERING UNIT
CORE BORING REPORT

WBS 40057.1.1	**TIP** B-4955	**COUNTY** ALAMANCE	**GEOLOGIST** Stickney, J. K.	
SITE DESCRIPTION Bridge No. 162 on SR 1113 (Kimesville Rd.) over S. prong Stinking Quarter Creek				**GROUND WTR (ft)**
BORING NO. B1-A	**STATION** 14+50	**OFFSET** 7 ft LT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 537.8 ft	**TOTAL DEPTH** 31.8 ft	**NORTHING** 807,333	**EASTING** 1,843,057	**24 HR.** N/A
DRILL RIG/HAMMER EFF./DATE HFO0072 CME-550 89% 09/02/2009		**DRILL METHOD** NW Casing W/SPT & Core	**HAMMER TYPE** Automatic	
DRILLER Smith, M. L.	**START DATE** 11/01/10	**COMP. DATE** 11/01/10	**SURFACE WATER DEPTH** 0.3ft	
CORE SIZE NXBWL	**TOTAL RUN** 19.1 ft			

ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN REC. (ft) %	RUN RQD (ft) %	SAMP. NO.	STRATA REC. (ft) %	STRATA RQD (ft) %	LOG	DESCRIPTION AND REMARKS ELEV. (ft)	DEPTH (ft)
525											Begin Coring @ 12.7 ft	
	525.1	12.7	4.1	3.66/1.1 3.50/1.0 3.31/1.0 3.45/1.0	(4.1) 100%	(3.2) 78%		(5.4) 100%	(4.4) 81%		525.1 VERY SLIGHTLY WEATHERED, HARD, MODERATELY CLOSE TO V. CLOSELY FRACTURED, WHITE, GRAY & BLACK QUARTZ DIORITE	12.7
	521.0	16.8					RS-1				R1=7, R2=17, R3=10, R4=12, R5=7. RMR=53	
520			5.0	2.07/1.0 1.93/1.0 2.30/1.0 2.10/1.0 1.11/1.0	(5.0) 100%	(2.9) 58%					ROCK TYPE = E 519.7	18.1
								(2.0) 100%	(0.0) 0%		MODERATELY SEVERELY WEATHERED, MEDIUM HARD, V. CLOSELY FRACTURED, WHITE, GRAY, BROWN & BLACK QUARTZ DIORITE 517.7	20.1
	516.0	21.8						(1.7) 100%	(1.6) 94%		VERY SLIGHTLY WEATHERED, HARD, CLOSELY FRACTURED, WHITE, GRAY & BLACK, QUARTZ DIORITE 516.0	21.8
515			5.0	1.04/1.0 1.23/1.0 1.50/1.0 2.00/1.0 2.09/1.0	(3.3) 66%	(2.8) 56%		(0.7) 24%	(0.0) 0%		MODERATELY TO SEVERELY WEATHERED, MODERATELY HARD TO SOFT, CLOSE TO VERY CLOSELY FRACTURED, WHITE, GRAY, BROWN & BLACK, QUARTZ DIORITE 513.1	24.7
	511.0	26.8						(6.6) 93%	(6.1) 86%		VERY SLIGHTLY WEATHERED, HARD, MODERATELY CLOSE TO VERY CLOSELY FRACTURED, WHITE, GRAY & BLACK, QUARTZ DIORITE	
510			5.0	2.10/1.0 3.22/1.0 3.32/1.0 3.17/1.0 3.01/1.0	(4.5) 90%	(4.0) 80%						
	506.0	31.8									506.0 Boring Terminated at Elevation 506.0 ft in crystalline rock (Quartz Diorite)	31.8

NCDOT CORE DOUBLE B4955_GEO_BRDG162_ALAMANCE.GPJ NC_DOT.GDT 2/24/11

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 40057.1.1	**TIP** B-4955	**COUNTY** ALAMANCE	**GEOLOGIST** Stickney, J. K.
SITE DESCRIPTION Bridge No. 162 on SR 1113 (Kimesville Rd.) over S. prong Stinking Quarter Creek			**GROUND WTR (ft)**
BORING NO. B1-B	**STATION** 14+56	**OFFSET** 7 ft RT	**ALIGNMENT** -L-	**0 HR.** 0.0 Caved
COLLAR ELEV. 538.5 ft	**TOTAL DEPTH** 8.0 ft	**NORTHING** 807,337	**EASTING** 1,843,071	**24 HR.** N/A
DRILL RIG/HAMMER EFF./DATE HFO0072 CME-550 89% 09/02/2009		**DRILL METHOD** NW Casing w/ SPT	**HAMMER TYPE** Automatic
DRILLER Smith, M. L.	**START DATE** 11/01/10	**COMP. DATE** 11/01/10	**SURFACE WATER DEPTH** 0.3ft

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
										ELEV. (ft) DEPTH (ft)
540										
	538.5	0.0	WOH	WOH	WOH	0				538.5 WATER SURFACE (11/01/10) 0.0
								Sat.		ALLUVIAL
535	535.7	2.8	3	4	6	10				536.0 BROWN, GRAY SILTY CLAY 2.5
								Sat.		GRAY COARSE SAND
										533.0 5.5
	530.7	7.8	100/.1			100/.1				RESIDUAL
										530.7 BROWN, WHITE CLAYEY SILTY COARSE SAND 7.8
										530.5 8.0
										CRYSTALLINE ROCK (QUARTZ DIORITE)
										Boring Terminated with Tri-Cone Roller Refusal at Elevation 530.5 ft in crystalline rock (Quartz Diorite)

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 40057.1.1	**TIP** B-4955	**COUNTY** ALAMANCE	**GEOLOGIST** Stickney, J. K.	
SITE DESCRIPTION Bridge No. 162 on SR 1113 (Kimesville Rd.) over S. prong Stinking Quarter Creek				**GROUND WTR (ft)**
BORING NO. EB2-A	**STATION** 15+02	**OFFSET** 7 ft LT	**ALIGNMENT** -L-	**0 HR.** 10.6
COLLAR ELEV. 551.4 ft	**TOTAL DEPTH** 25.9 ft	**NORTHING** 807,384	**EASTING** 1,843,062	**24 HR.** 12.3
DRILL RIG/HAMMER EFF./DATE HFO0072 CME-550 89% 09/02/2009		**DRILL METHOD** NW Casing w/ SPT	**HAMMER TYPE** Automatic	
DRILLER Smith, M. L.	**START DATE** 11/02/10	**COMP. DATE** 11/02/10	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
										551.4	0.0
										GROUND SURFACE	
										550.9	0.5
										ROADWAY EMBANKMENT	
										ASPHALT	
										549.9	1.5
										SELECT MATERIALS	
										RED, ORANGE CLAYEY SANDY SILT	
	546.3	5.1	3	3	4	7	SS-3	M			
										541.3	10.1
										ALLUVIAL	
			1	2	4	6	SS-4			BROWN, TAN CLAYEY SANDY SILT	
	536.3	15.1				9		M			
			3	3	6	35	SS-5	M			
										530.8	20.6
										RESIDUAL	
										WHITE, ORANGE CLAYEY SILTY SAND	
										526.6	24.8
	526.3	25.1								526.4	25.0
			100/.1			100/.1				**WEATHERED ROCK**	
										(QUARTZ DIORITE)	
										525.5	25.9
										CRYSTALLINE ROCK	
										(QUARTZ DIORITE)	

Boring Terminated with Casing Advancer Refusal at Elevation 525.5 ft in crystalline rock (Quartz Diorite)

WBS 40057.1.1	**TIP** B-4955	**COUNTY** ALAMANCE	**GEOLOGIST** Stickney, J. K.	
SITE DESCRIPTION Bridge No. 162 on SR 1113 (Kimesville Rd.) over S. prong Stinking Quarter Creek				**GROUND WTR (ft)**
BORING NO. EB2-B	**STATION** 15+07	**OFFSET** 6 ft RT	**ALIGNMENT** -L-	**0 HR.** 11.0
COLLAR ELEV. 551.4 ft	**TOTAL DEPTH** 27.0 ft	**NORTHING** 807,388	**EASTING** 1,843,076	**24 HR.** 12.4
DRILL RIG/HAMMER EFF./DATE HFO0072 CME-550 89% 09/02/2009		**DRILL METHOD** NW Casing w/ SPT	**HAMMER TYPE** Automatic	
DRILLER Smith, M. L.	**START DATE** 11/02/10	**COMP. DATE** 11/02/10	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
										551.4	0.0
										GROUND SURFACE	
										550.9	0.5
										ROADWAY EMBANKMENT	
										PAVEMENT	
										549.9	1.5
										SELECT MATERIALS	
										RED, ORANGE CLAYEY SANDY SILT	
	546.3	5.1	2	2	4	6		M			
										541.3	10.1
										ALLUVIAL	
			2	3	5	8				BROWN, TAN CLAYEY SANDY SILT	
	536.3	15.1				9					
			3	4	5						
						23		M			
			8	8	15						
										526.7	24.7
	526.3	25.1								**WEATHERED ROCK**	
			79	21/.5		100		D		(QUARTZ DIORITE)	
										524.4	27.0

Boring Terminated with Casing Advancer Refusal at Elevation 524.4 ft on crystalline rock Quartz Diorite)

PROJECT: 40057.1.1 (B-4955)
COUNTY: ALAMANCE
SITE DESCRIPTION: BRIDGE NO. 162 ON SR 1113 (KIMESVILLE RD.) OVER SOUTH PRONG STINKING QUARTER CREEK

SOIL SAMPLE RESULTS

SAMPLE NO.	*OFFSET*	*STATION*	*DEPTH INTERVAL*	*AASHTO CLASS*	*N*	*L.L.*	*P.I.*	*% BY WEIGHT C. SAND*	*F. SAND*	*SILT*	*CLAY*	*% PASSING SIEVES 10*	*40*	*200*	*% MOISTURE*	*% ORGANIC*	*UNIT WT. (d)*	*VOID RATIO*
		EB1-A																
SS-6	6.6 LT	13+81	5.3-6.8	A-7-6(10)	4	47	24	26.5	13.9	19.2	40.4	87	69	54				
SS-7	6.6 LT	13+81	10.3-11.8	A-4(0)	4	23	5	27.7	31.1	23.0	18.2	98	87	44				
SS-8	6.6 LT	13+81	15.3-16.8	A-2-4(0)	6	20	NP	39.6	42.2	12.1	6.1	92	69	21				
		B1-A																
SS-1	6.5 LT	14+50	0.5-1.5	A-7-6(15)	0	41	17	5.5	13.9	44.2	36.4	98	95	83				
SS-2	6.5 LT	14+50	3.0-4.0	A-1-b(0)	5	28	5	67.5	14.5	9.9	8.1	80	36	16				
		EB2-A																
SS-3	7.0 LT	15+02	5.1-6.6	A-4(2)	7	30	10	30.5	18.2	25.1	26.3	89	68	50				
SS-4	7.0 LT	15+02	10.1-11.6	A-4(3)	6	26	9	11.3	34.3	26.1	28.3	100	95	62				
SS-5	7.0 LT	15+02	20.6-21.6	A-2-4(0)	35	27	3	49.5	28.5	13.9	8.1	86	56	23				

ROCK SAMPLE RESULTS

SAMPLE NO.	*OFFSET*	*STATION*	*DEPTH INTERVAL*	*RQD*	*UNIT WT* lbf/ft3	Q (ksf)	E @ 40% (MPsi)	*DIAMETER* in	*AREA* in2	*SPECIMEN* HT (in)	*H/D RATIO*
		B1-A									
RS-1 Top	6.5 LT.	14+50	15.2-16.3	81%	167.2	2026.08	3.68	1.868	2.7406	4.07	2.18
RS-1 Bottom	6.5 LT.	14+50	15.2-16.3	81%	166.5	2286.72	3.2	1.868	2.7406	3.98	2.13

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
GEOTECHNICAL ENGINEERING UNIT

FIELD SCOUR REPORT

WBS: 40057.1.1 TIP: B-4955 COUNTY: Alamance

DESCRIPTION(1): Bridge No. 162 on SR 1113 (Kimesville Rd.) Over South Prong Stinking Quarter Creek

EXISTING BRIDGE

Information from: Field Inspection X Microfilm ____ (reel ____ pos: ____)
Other (explain) ____

Bridge No.: 162 Length: 80.7 Total Bents: 3 Bents in Channel: 2 Bents in Floodplain: 3
Foundation Type: Concrete Abutments, Timber Pile, Timber Deck on Steel Girders

EVIDENCE OF SCOUR(2)

Abutments or End Bent Slopes: Not Evident

Interior Bents: Some erosion at corners of footing

Channel Bed: Not Evident

Channel Bank: Some undercutting, trees lean toward channel

EXISTING SCOUR PROTECTION

Type(3): None observed

Extent(4): N/A

Effectiveness(5): N/A

Obstructions(6): N/A

DESIGN INFORMATION

Channel Bed Material(7): Silt, Sand, and Gravel

Channel Bank Material(8): Silt and Sand

Channel Bank Cover(9): Mature trees, grass, and shrubs

Floodplain Width(10): 400 Feet +/-

Floodplain Cover(11): Mature trees, grass, and shrubs

Stream is(12): Aggrading X Degrading ____ Static ____

Channel Migration Tendency(13): Moderate

Observations and Other Comments: Active beaver site

DESIGN SCOUR ELEVATIONS(14) Feet X Meters ____

BENTS										
B1	B2	B3	B4							
529.8										

Comparison of DSE to Hydraulics Unit theoretical scour:
Hydraulics Unit did not supply a theoretical scour until the geotechnical investigation was complete and GASE was calculated for this project.

SOIL ANALYSIS RESULTS FROM CHANNEL BED AND BANK MATERIAL

Bed or Bank	Bed						
Sample No.	SS-1						
Retained #4							
Passed #10	98						
Passed #40	95						
Passed #200	83						
Coarse Sand	5.5						
Fine Sand	13.9						
Silt	44.2						
Clay	36.4						
LL	41						
PI	17						
AASHTO	A-7-6(15)						
Station	14+50						
Offset	6.5 LT						
Depth	0.5 - 1.5						

Form GEU-017e Revised 7/26/2007

Reported by: Cheryl A. Youngblood Date: 12/11/2011

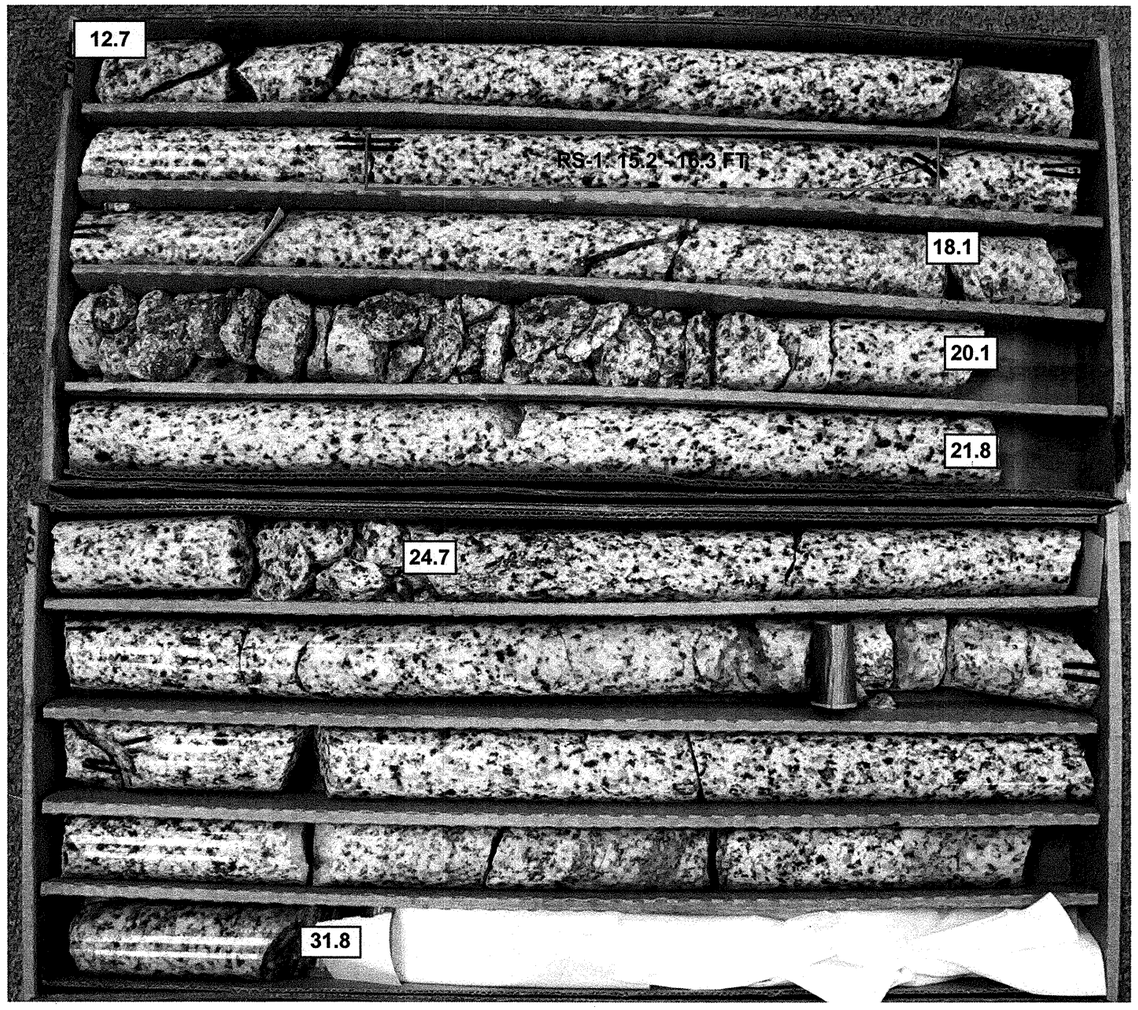
INSTRUCTIONS

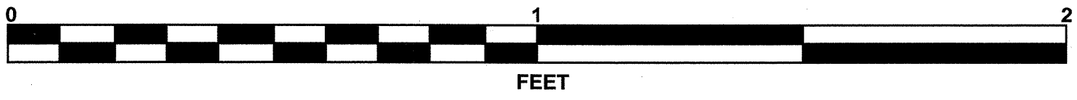
1 Describe the specific site's location, including route number and body of water crossed.
2 Note scour evidence at existing end bents or abutments (e.g. undermining, sloughing, degradations).
3 Note existing scour protection (e.g. rip rap).
4 Describe extent of existing scour protection.
5 Describe whether or not the scour protection appears to be working.
6 Note obstructions such as dams, fallen trees, debris at bents, etc.
7 Describe the channel bed material based on observation and/or samples. Include any lab results with report.
8 Describe the channel bank material based on observation and/or samples. Include any lab results with report.
9 Describe the material covering the banks (e.g. grass, trees, rip rap, none).
10 Determine the approximate floodplain width from field observation or a topographic map.
11 Describe the material covering the floodplain (e.g. grass, trees, crops).
12 Use professional judgement to specify if the stream is degrading, aggrading, or static.
13 Describe potential and direction of the stream to migrate laterally during the bridge's life (approx. 100 years).
14 Give the design scour elevation (DSE) expected over the life of the bridge (approx. 100 years). This elevation can be given as a range across the site, or for each bent. Discuss the relationship between the Hydraulics Unit theoritical scour and the DSE. If the DSE is dependent on scour counter measures, explain (e.g. rip rap armoring on slopes). The DSE is based on the erodability of materials, giving consideration to the influence of joints, foliation, bedding characteristics, % core recovery, % RQD, differential weathering, shear strength, observations at existing structures, other tests deemed appropriate, and overall geologic conditions at the site.

CORE PHOTOGRAPHS

B1-A

BOXES 1 & 2: 12.7 - 31.8 FEET





SITE PHOTOGRAPH

Bridge No. 162 on SR 1113 (Kimesville Rd.) Over South Prong Stinking Quarter Creek