

PROJECT: 17BP.4.R.83 REFERENCE: 410083

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

| STATE | STATE PROJECT REFERENCE NO. | SHEET NO. | TOTAL SHEETS |
|-------|-----------------------------|-----------|--------------|
| N.C. | 410083 | 1 | 12 |

STRUCTURE
SUBSURFACE INVESTIGATION

COUNTY HALIFAX
PROJECT DESCRIPTION BRIDGE NO. 83 ON -L-
(SR 1600) OVER QUANKEY CREEK AT STA. 15+22

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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 1919 707-6850. THE SUBSURFACE PLANS AND REPORTS, FIELD BORING LOGS, ROCK CORES AND SOIL TEST DATA ARE NOT PART OF THE CONTRACT.

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

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

NOTES:

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

PERSONNEL

P. V. MEDFORD

D. G. PINTER

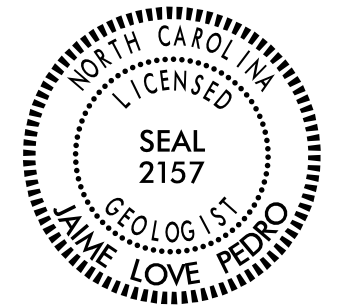
INVESTIGATED BY N. T. ROBERSON

DRAWN BY J. L. PEDRO

CHECKED BY N. T. ROBERSON

SUBMITTED BY N. T. ROBERSON

DATE SEPTEMBER 2017



DocuSigned by:

Jaime Love Pedro 11/6/2017

B93571039B SIGNATURE

DATE

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

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

Table with multiple columns and rows containing technical data, definitions, and symbols. Columns include SOIL DESCRIPTION, GRADATION, ROCK DESCRIPTION, TERMS AND DEFINITIONS, SOIL LEGEND AND AASHTO CLASSIFICATION, ANGULARITY OF GRAINS, MINERALOGICAL COMPOSITION, COMPRESSIBILITY, PERCENTAGE OF MATERIAL, GROUND WATER, MISCELLANEOUS SYMBOLS, RECOMMENDATION SYMBOLS, ABBREVIATIONS, EQUIPMENT USED ON SUBJECT PROJECT, FRACTURE SPACING, BEDDING, INDURATION, and PLASTICITY. Includes various tables for soil classification, moisture correlation, and plasticity.

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT

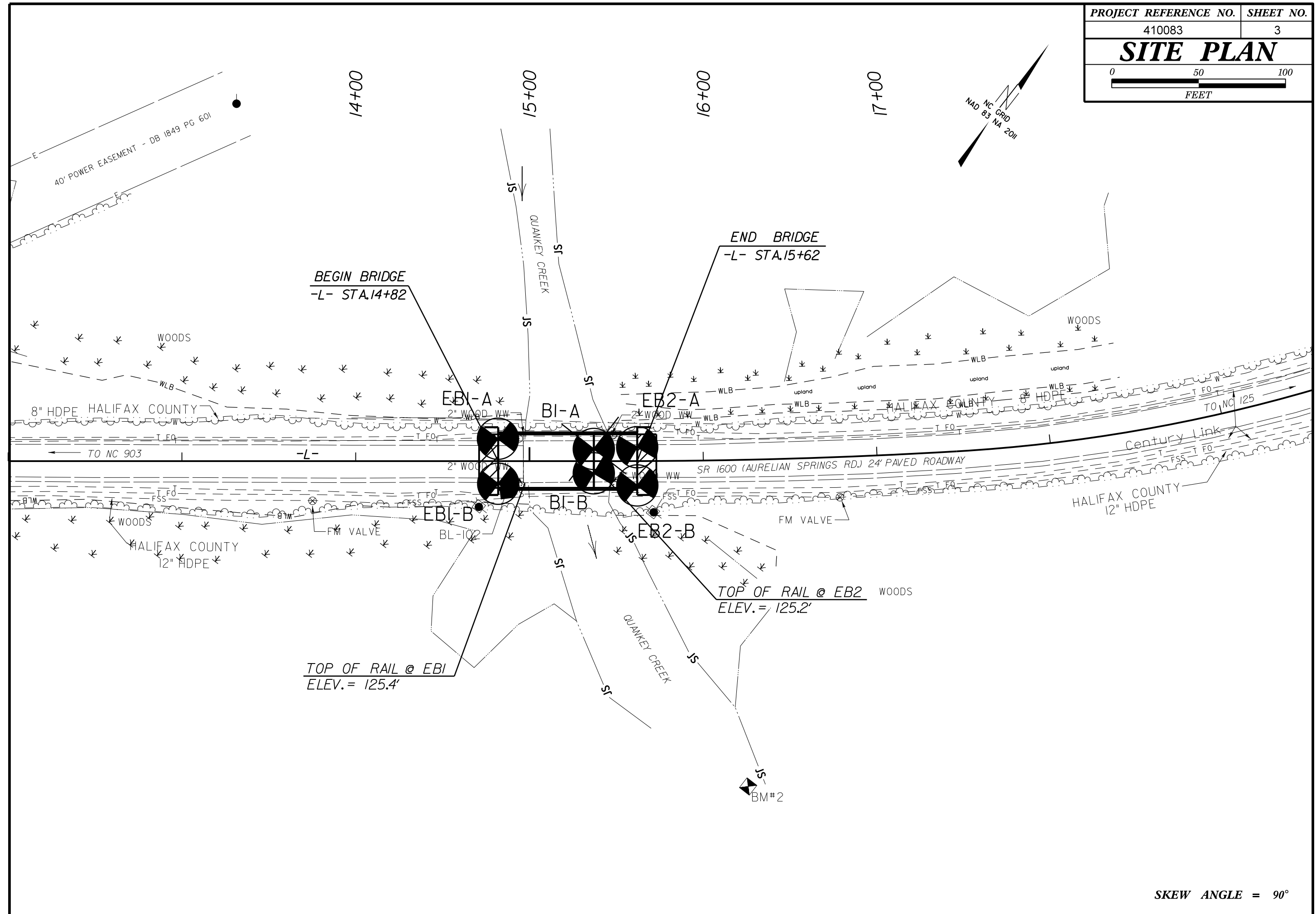
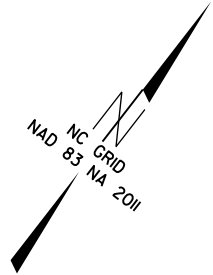
SUBSURFACE INVESTIGATION

SUPPLEMENTAL LEGEND, GEOLOGICAL STRENGTH INDEX (GSI) TABLES
FROM AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS

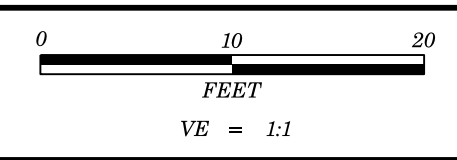
AASHTO LRFD Figure 10.4.6.4-1 — Determination of GSI for Jointed Rock Mass (Marinos and Hoek, 2000)

AASHTO LRFD Figure 10.4.6.4-2 — Determination of GSI for Tectonically Deformed Heterogeneous Rock Masses (Marinos and Hoek, 2000)

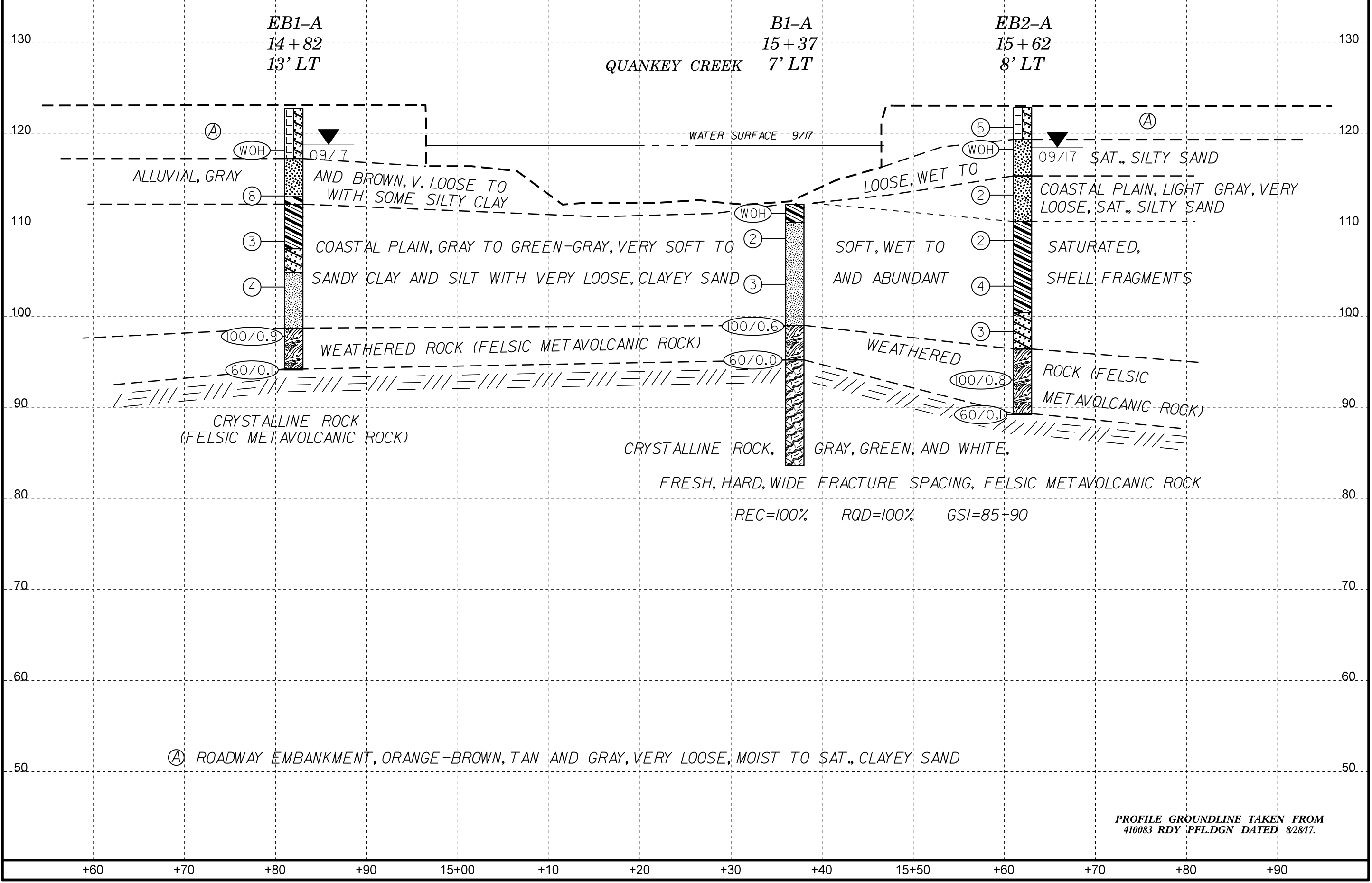
| <p>GEOLOGICAL STRENGTH INDEX (GSI) FOR JOINTED ROCKS (Hoek and Marinos, 2000)</p> <p>From the lithology, structure and surface conditions of the discontinuities, estimate the average value of GSI. Do not try to be too precise. Quoting a range from 33 to 37 is more realistic than stating that GSI = 35. Note that the table does not apply to structurally controlled failures. Where weak planar structural planes are present in an unfavorable orientation with respect to the excavation face, these will dominate the rock mass behaviour. The shear strength of surfaces in rocks that are prone to deterioration as a result of changes in moisture content will be reduced if water is present. When working with rocks in the fair to very poor categories, a shift to the right may be made for wet conditions. Water pressure is dealt with by effective stress analysis.</p> <p>STRUCTURE</p> | <p>SURFACE CONDITIONS</p> <p>VERY GOOD Very rough, fresh unweathered surfaces</p> <p>GOOD Rough, slightly weathered, iron stained surfaces</p> <p>FAIR Smooth, moderately weathered and altered surfaces</p> <p>POOR Slickensided, highly weathered surfaces with compact coatings or fillings or angular fragments</p> <p>VERY POOR Slickensided, highly weathered surfaces with soft clay coatings or fillings</p> <p>DECREASING SURFACE QUALITY →</p> | | | | | <p>GSI FOR HETEROGENEOUS ROCK MASSES SUCH AS FLYSCH (Marinos, P and Hoek E., 2000)</p> <p>From a description of the lithology, structure and surface conditions (particularly of the bedding planes), choose a box in the chart. Locate the position in the box that corresponds to the condition of the discontinuities and estimate the average value of GSI from the contours. Do not attempt to be too precise. Quoting a range from 33 to 37 is more realistic than giving GSI = 35. Note that the Hoek-Brown criterion does not apply to structurally controlled failures. Where unfavourably oriented continuous weak planar discontinuities are present, these will dominate the behaviour of the rock mass. The strength of some rock masses is reduced by the presence of groundwater and this can be allowed for by a slight shift to the right in the columns for fair, poor and very poor conditions. Water pressure does not change the value of GSI and it is dealt with by using effective stress analysis.</p> <p>COMPOSITION AND STRUCTURE</p> | <p>SURFACE CONDITIONS OF DISCONTINUITIES (Predominantly bedding planes)</p> <p>VERY GOOD - Very Rough, fresh unweathered surfaces</p> <p>GOOD - Rough, slightly weathered surfaces</p> <p>FAIR - Smooth, moderately weathered and altered surfaces</p> <p>POOR - Very smooth, occasionally slickensided surfaces with compact coatings or fillings with angular fragments</p> <p>VERY POOR - Very smooth, slickensided or highly weathered surfaces with soft clay coatings or fillings</p> | | | | | | | | |
|--|---|----|----|----|----|--|--|----|----|-----|-----|-----|-----|-----|-----|
| <p>DECREASING INTERLOCKING OF ROCK PIECES</p> <p>↓</p> <p>INTACT OR MASSIVE - intact rock specimens or massive in situ rock with few widely spaced discontinuities</p> <p>BLOCKY - well interlocked undisturbed rock mass consisting of cubical blocks formed by three intersecting discontinuity sets</p> <p>VERY BLOCKY - interlocked, partially disturbed mass with multi-faceted angular blocks formed by 4 or more joint sets</p> <p>BLOCKY/DISTURBED/SEAMY - folded with angular blocks formed by many intersecting discontinuity sets. Persistence of bedding planes or schistosity</p> <p>DISINTEGRATED - poorly interlocked, heavily broken rock mass with mixture of angular and rounded rock pieces</p> <p>LAMINATED/SHEARED - Lack of blockiness due to close spacing of weak schistosity or shear planes</p> | 90 | 80 | 70 | 60 | 50 | 40 | 30 | 20 | 10 | N/A | N/A | N/A | N/A | N/A | N/A |
| | 70 | 60 | 50 | 40 | 30 | 20 | 10 | 0 | 0 | A | B | C | D | E | F |
| | 60 | 50 | 40 | 30 | 20 | 10 | 0 | 0 | 0 | G | H | I | J | K | L |
| | 50 | 40 | 30 | 20 | 10 | 0 | 0 | 0 | 0 | M | N | O | P | Q | R |
| | 40 | 30 | 20 | 10 | 0 | 0 | 0 | 0 | 0 | S | T | U | V | W | X |
| | 30 | 20 | 10 | 0 | 0 | 0 | 0 | 0 | 0 | Y | Z | AA | AB | AC | AD |
| | 20 | 10 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | AE | AF | AG | AH | AI | AJ |
| | 10 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | AK | AL | AM | AN | AO | AP |
| | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | AQ | AR | AS | AT | AU | AV |



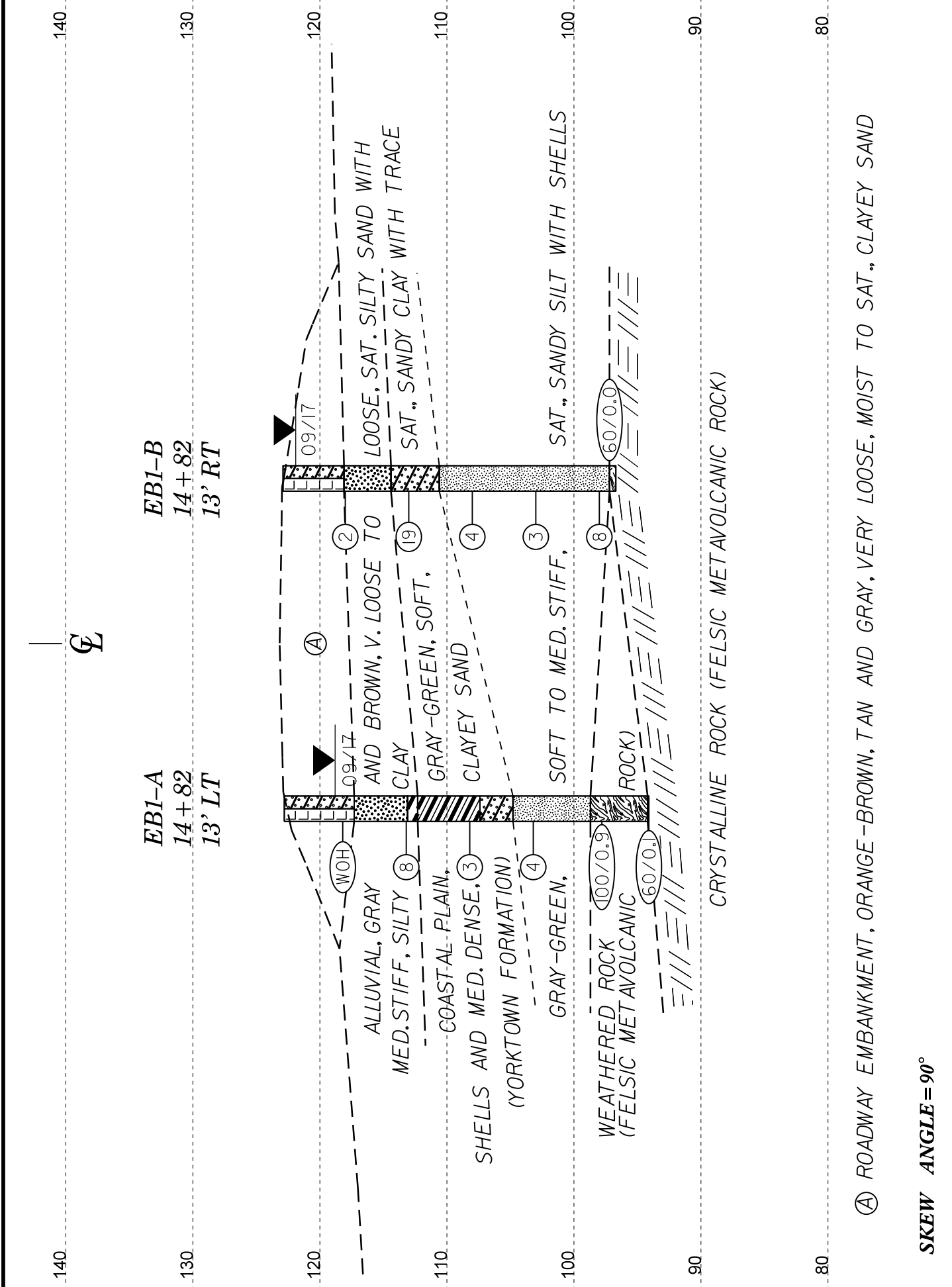
SKREW ANGLE = 90°



| PROJECT REFERENCE NO. | SHEET NO. |
|--|-----------|
| 410083 | 4 |
| FENCE DIAGRAM OF BORINGS PROJECTED ALONG -L- PROFILE AT CENTERLINE | |



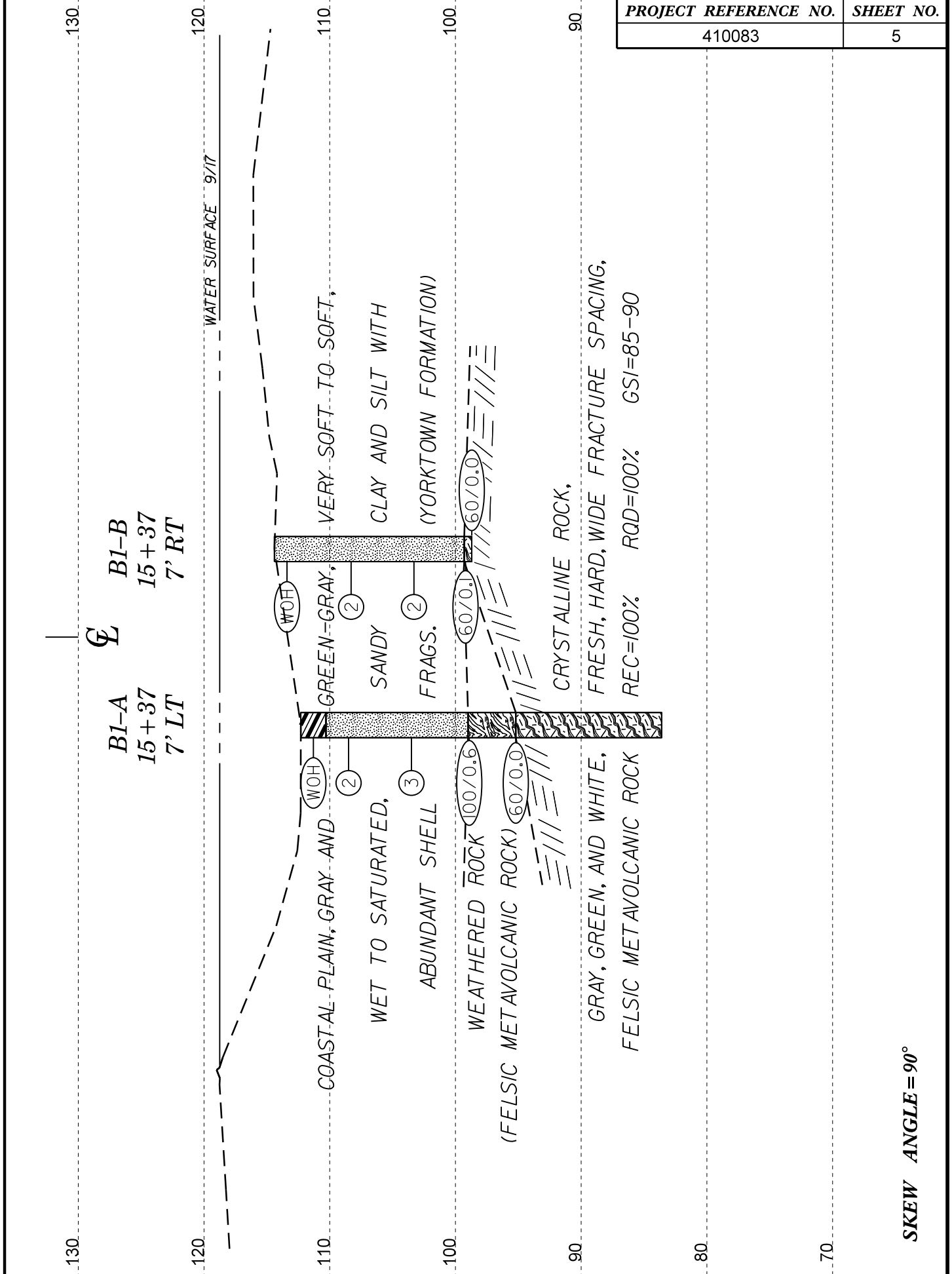
PROFILE GROUNDLINE TAKEN FROM
410083 RDY PFLDGN DATED 8/28/17.



HORIZ. SCALE 0 10 20 (FEET)

VE = 1:1

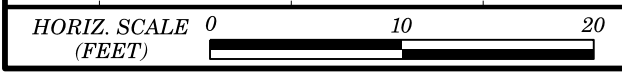
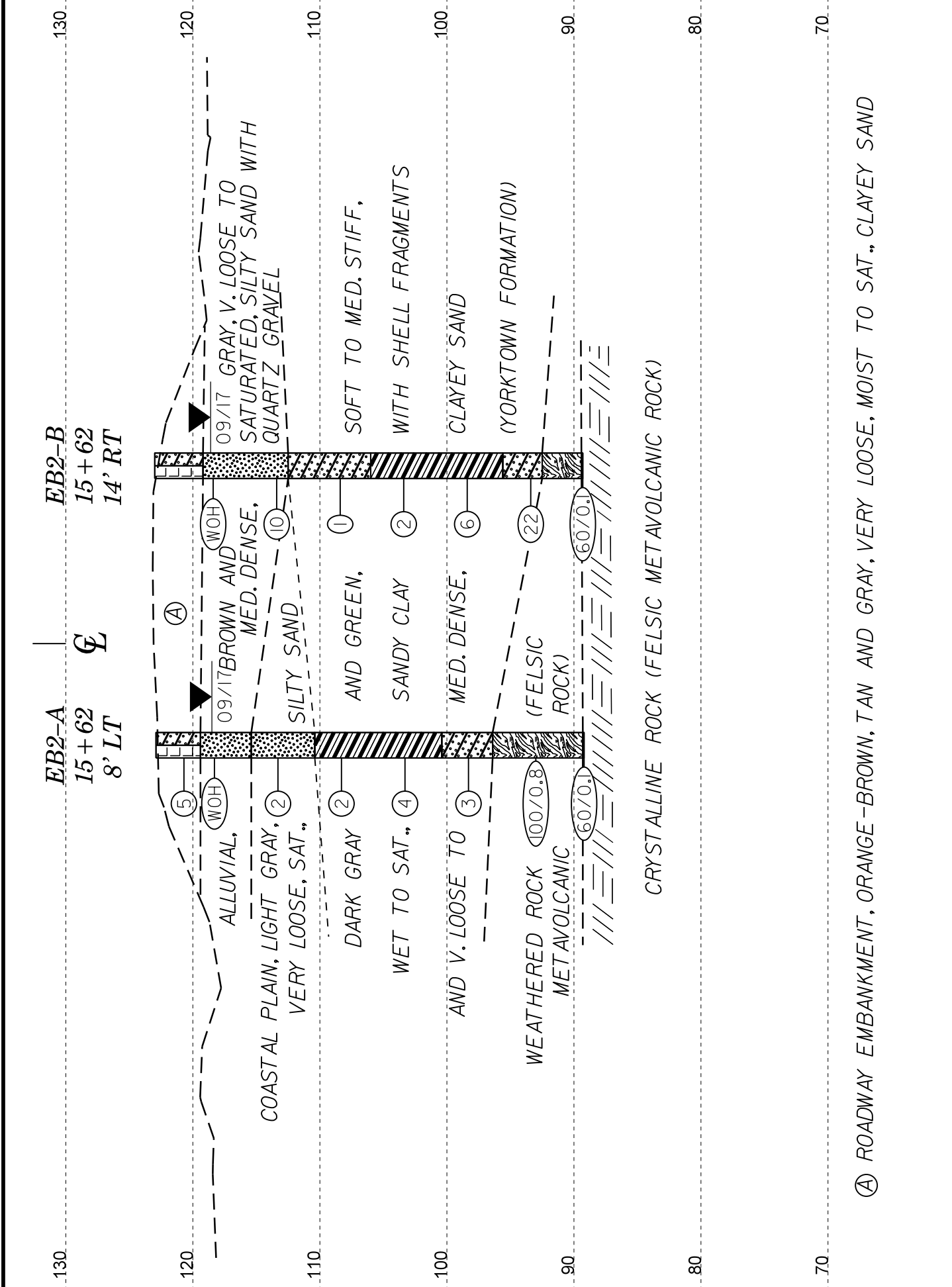
CROSS SECTION THROUGH EBI



HORIZ. SCALE 0 10 20 (FEET)

VE = 1:1

CROSS SECTION THROUGH BI



VE = 1:1

CROSS SECTION THROUGH EB2

Ⓐ ROADWAY EMBANKMENT, ORANGE-BROWN, TAN AND GRAY, VERY LOOSE, MOIST TO SAT., CLAYEY SAND

GEOTECHNICAL BORING REPORT

BORE LOG

| WBS 17BP.4.R.83 | | TIP 410083 | | COUNTY HALIFAX | | GEOLOGIST Roberson, N. T. | | | | | | | | | | |
|--|-----------------|------------------------------------|------------|-----------------------|--------|---------------------------|-----------------|----|----|-----|-----------|-----|---------------------------|------------|--|------|
| SITE DESCRIPTION BRIDGE NO. 83 ON -L- (SR 1600) OVER QUANKEY CREEK | | | | | | | GROUND WTR (ft) | | | | | | | | | |
| BORING NO. EB1-A | | STATION 14+82 | | OFFSET 13 ft LT | | ALIGNMENT -L- | | | | | | | | | | |
| COLLAR ELEV. 122.8 ft | | TOTAL DEPTH 28.7 ft | | NORTHING 953,627 | | EASTING 2,395,547 | | | | | | | | | | |
| DRILL RIG/HAMMER EFF./DATE RFO0074 CME-55 90% 07/12/2016 | | DRILL METHOD NW Casing w/ Advancer | | HAMMER TYPE Automatic | | | | | | | | | | | | |
| DRILLER Pinter, D. G. | | START DATE 09/07/17 | | COMP. DATE 09/07/17 | | SURFACE WATER DEPTH N/A | | | | | | | | | | |
| ELEV (ft) | DRIVE ELEV (ft) | DEPTH (ft) | BLOW COUNT | | | BLOWS PER FOOT | | | | | SAMP. NO. | LOG | SOIL AND ROCK DESCRIPTION | DEPTH (ft) | | |
| | | | 0.5ft | 0.5ft | 0.5ft | 0 | 25 | 50 | 75 | 100 | | | | | | |
| 125 | | | | | | | | | | | | | | 122.8 | GROUND SURFACE | 0.0 |
| 120 | 119.2 | 3.6 | | | | | | | | | | | | 117.3 | ROADWAY EMBANKMENT ORANGE-BROWN, CLAYEY SAND | 5.5 |
| 115 | 114.2 | 8.6 | 1 | 3 | 5 | | | | | | | | | 113.1 | ALLUVIAL LIGHT GRAY, SILTY SAND | 9.7 |
| 110 | 109.2 | 13.6 | 1 | 1 | 2 | | | | | | | | | 112.3 | DARK GRAY, SILTY CLAY WITH SOME WEATHERED FRAGMENTS | 10.5 |
| 105 | 104.2 | 18.6 | 1 | 2 | 2 | | | | | | | | | 107.4 | COASTAL PLAIN DARK GRAY, SANDY CLAY WITH TRACE SHELL FRAGMENTS (YORKTOWN FORMATION) | 15.4 |
| 100 | 99.2 | 23.6 | 3 | 2 | 98/0.4 | | | | | | | | | 104.8 | GRAY-GREEN, CLAYEY SAND WITH SOME SHELL FRAGMENTS | 18.0 |
| 95 | 94.2 | 28.6 | | | | | | | | | | | | 98.7 | DARK GRAY-GREEN, SANDY SILT WITH SOME SHELL FRAGMENTS | 24.1 |
| | | | | | | | | | | | | | | 94.2 | WEATHERED ROCK (FELSIC METAVOLCANIC ROCK) | 28.6 |
| | | | | | | | | | | | | | | 94.1 | CRYSTALLINE ROCK (FELSIC METAVOLCANIC ROCK) | 28.7 |

| WBS 17BP.4.R.83 | | TIP 410083 | | COUNTY HALIFAX | | GEOLOGIST Roberson, N. T. | | | | | | | | | | |
|--|-----------------|------------------------------------|------------|-----------------------|-------|---------------------------|-----------------|----|----|-----|-----------|-----|---------------------------|------------|---|------|
| SITE DESCRIPTION BRIDGE NO. 83 ON -L- (SR 1600) OVER QUANKEY CREEK | | | | | | | GROUND WTR (ft) | | | | | | | | | |
| BORING NO. EB1-B | | STATION 14+82 | | OFFSET 13 ft RT | | ALIGNMENT -L- | | | | | | | | | | |
| COLLAR ELEV. 122.9 ft | | TOTAL DEPTH 26.2 ft | | NORTHING 953,607 | | EASTING 2,395,563 | | | | | | | | | | |
| DRILL RIG/HAMMER EFF./DATE RFO0074 CME-55 90% 07/12/2016 | | DRILL METHOD NW Casing w/ Advancer | | HAMMER TYPE Automatic | | | | | | | | | | | | |
| DRILLER Pinter, D. G. | | START DATE 09/06/17 | | COMP. DATE 09/06/17 | | SURFACE WATER DEPTH N/A | | | | | | | | | | |
| ELEV (ft) | DRIVE ELEV (ft) | DEPTH (ft) | BLOW COUNT | | | BLOWS PER FOOT | | | | | SAMP. NO. | LOG | SOIL AND ROCK DESCRIPTION | DEPTH (ft) | | |
| | | | 0.5ft | 0.5ft | 0.5ft | 0 | 25 | 50 | 75 | 100 | | | | | | |
| 125 | | | | | | | | | | | | | | 122.9 | GROUND SURFACE | 0.0 |
| 120 | 119.0 | 3.9 | | | | | | | | | | | | 118.1 | ROADWAY EMBANKMENT GRAY-TAN, CLAYEY SAND WITH TRACE ORGANICS | 4.8 |
| 115 | 114.0 | 8.9 | 1 | 1 | 1 | | | | | | | | | 114.4 | ALLUVIAL GRAY-BROWN, SILTY SAND WITH SOME COARSE SAND AND GRAVEL | 8.5 |
| 110 | 109.0 | 13.9 | WOH | 2 | 2 | | | | | | | | | 110.6 | COASTAL PLAIN GREEN-GRAY, CLAYEY SAND WITH SOME QUARTZ GRAVEL AND SHELLS (YORKTOWN FORMATION) | 12.3 |
| 105 | 104.0 | 18.9 | 1 | 1 | 2 | | | | | | | | | 104.8 | GRAY-GREEN, SANDY SILT WITH ABUNDANT SHELLS | 18.0 |
| 100 | 99.0 | 23.9 | 3 | 3 | 5 | | | | | | | | | 98.7 | | 24.1 |
| | 97.2 | 25.7 | | | | | | | | | | | | 96.7 | WEATHERED ROCK (FELSIC METAVOLCANIC ROCK) | 25.7 |
| | | | | | | | | | | | | | | 94.1 | CRYSTALLINE ROCK (FELSIC METAVOLCANIC ROCK) | 26.2 |

NCDOT BORE DOUBLE 410083_GEO_BH.GPJ NC_DOT.GDT 9/26/17

GEOTECHNICAL BORING REPORT BORE LOG

GEOTECHNICAL BORING REPORT CORE LOG

| WBS 17BP.4.R.83 | | TIP 410083 | | COUNTY HALIFAX | | GEOLOGIST Roberson, N. T. | | | | | | | | | | |
|--|-----------------|---------------------|------------|-------------------------------------|--------|---------------------------|-----------------|----|----|-----|-----------|-----|---------------------------|------------|------------|---|
| SITE DESCRIPTION BRIDGE NO. 83 ON -L- (SR 1600) OVER QUANKEY CREEK | | | | | | | GROUND WTR (ft) | | | | | | | | | |
| BORING NO. B1-A | | STATION 15+37 | | OFFSET 7 ft LT | | ALIGNMENT -L- | | | | | | | | | | |
| COLLAR ELEV. 112.3 ft | | TOTAL DEPTH 28.7 ft | | NORTHING 953,656 | | EASTING 2,395,594 | | | | | | | | | | |
| DRILL RIG/HAMMER EFF./DATE RFO0074 CME-55 90% 07/12/2016 | | | | DRILL METHOD NW Casing W/SPT & Core | | HAMMER TYPE Automatic | | | | | | | | | | |
| DRILLER Pinter, D. G. | | START DATE 09/07/17 | | COMP. DATE 09/07/17 | | SURFACE WATER DEPTH 6.3ft | | | | | | | | | | |
| ELEV (ft) | DRIVE ELEV (ft) | DEPTH (ft) | BLOW COUNT | | | BLOWS PER FOOT | | | | | SAMP. NO. | LOG | SOIL AND ROCK DESCRIPTION | ELEV. (ft) | DEPTH (ft) | |
| | | | 0.5ft | 0.5ft | 0.5ft | 0 | 25 | 50 | 75 | 100 | | | | | | WATER SURFACE (09/07/17) |
| 115 | | | | | | | | | | | | | | | | |
| | 112.3 | 0.0 | WOH | WOH | WOH | | | | | | | | | 112.3 | 0.0 | |
| 110 | 109.5 | 2.8 | | 1 | 1 | | | | | | | | Sat. | 110.3 | 2.0 | COASTAL PLAIN GRAY-GREEN, SANDY CLAY WITH TRACE WOOD AND SHELLS (YORKTOWN FORMATION) |
| | 104.5 | 7.8 | | 1 | 2 | 1 | | | | | | | Sat. | | | GRAY-GREEN, SANDY SILT WITH ABUNDANT SHELLS |
| 105 | 104.5 | 7.8 | | 1 | 2 | 1 | | | | | | | Sat. | | | |
| 100 | 99.5 | 12.8 | | 15 | 85/0.1 | | | | | | | | | 99.0 | 13.3 | WEATHERED ROCK (FELSIC METAVOLCANIC ROCK) |
| 95 | 95.2 | 17.1 | | 60/0.0 | | | | | | | | | | 95.2 | 17.1 | CRYSTALLINE ROCK GRAY, GREEN, AND WHITE, FRESH, HARD, WIDE FRACTURE SPACING, FELSIC METAVOLCANIC ROCK REC=100% RQD=100% GSI=85-90 |
| 90 | | | | | | | | | | | | | | | | |
| 85 | | | | | | | | | | | | | | 83.6 | 28.7 | Boring Terminated at Elevation 83.6 ft IN CRYSTALLINE ROCK (FELSIC METAVOLCANIC ROCK) |

NCDOT BORE DOUBLE 410083_GEO_BH.GPJ NC_DOT.GDT 10/2/17

| WBS 17BP.4.R.83 | | TIP 410083 | | COUNTY HALIFAX | | GEOLOGIST Roberson, N. T. | | | | | |
|--|---------------|---------------------|----------|--|----------|---------------------------|-----------------|---------|-----|-------------------------|--|
| SITE DESCRIPTION BRIDGE NO. 83 ON -L- (SR 1600) OVER QUANKEY CREEK | | | | | | | GROUND WTR (ft) | | | | |
| BORING NO. B1-A | | STATION 15+37 | | OFFSET 7 ft LT | | ALIGNMENT -L- | | | | | |
| COLLAR ELEV. 112.3 ft | | TOTAL DEPTH 28.7 ft | | NORTHING 953,656 | | EASTING 2,395,594 | | | | | |
| DRILL RIG/HAMMER EFF./DATE RFO0074 CME-55 90% 07/12/2016 | | | | DRILL METHOD NW Casing W/SPT & Core | | HAMMER TYPE Automatic | | | | | |
| DRILLER Pinter, D. G. | | START DATE 09/07/17 | | COMP. DATE 09/07/17 | | SURFACE WATER DEPTH 6.3ft | | | | | |
| CORE SIZE NXWL | | TOTAL RUN | | 11.6 ft | | | | | | | |
| ELEV (ft) | RUN ELEV (ft) | DEPTH (ft) | RUN (ft) | DRILL RATE (Min/ft) | RUN | | STRATA | | LOG | DESCRIPTION AND REMARKS | DEPTH (ft) |
| | | | | | REC. (%) | RQD (%) | REC. (%) | RQD (%) | | | |
| | 95.2 | 17.1 | 1.6 | N=60/0.0 1:26/0.6 1:17/1.0 | (1.6) | (1.6) | (11.6) | (11.6) | | | Begin Coring @ 17.1 ft |
| | 93.6 | 18.7 | 5.0 | 1:17/1.0 1:17/1.0 1:04/1.0 1:13/1.0 1:18/1.0 1:42/1.0 | 100% | 100% | 100% | 100% | | | CRYSTALLINE ROCK GRAY, GREEN, AND WHITE, FRESH, HARD, WIDE FRACTURE SPACING, FELSIC METAVOLCANIC ROCK GSI=85-90 |
| 90 | | 23.7 | | | | | | | | | |
| | 88.6 | 23.7 | 5.0 | 1:37/1.0 1:29/1.0 1:27/1.0 1:34/1.0 1:32/1.0 | (5.0) | (5.0) | | | | | |
| 85 | | 28.7 | | | | | | | | | |
| | 83.6 | 28.7 | | | | | | | | | Boring Terminated at Elevation 83.6 ft IN CRYSTALLINE ROCK (FELSIC METAVOLCANIC ROCK) |

NCDOT CORE DOUBLE 410083_GEO_BH.GPJ NC_DOT.GDT 10/2/17

GEOTECHNICAL BORING REPORT

BORE LOG

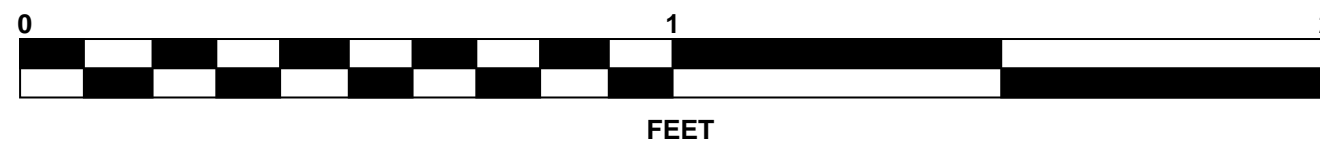
| WBS 17BP.4.R.83 | | TIP 410083 | | COUNTY HALIFAX | | GEOLOGIST Roberson, N. T. | | | | | | | | | | | | |
|--|-----------------|------------------------------------|------------|-----------------------|--------|---------------------------|-----------------|----|----|-----|-----------|-----|---------------------------|------------|-------|--|------|--|
| SITE DESCRIPTION BRIDGE NO. 83 ON -L- (SR 1600) OVER QUANKEY CREEK | | | | | | | GROUND WTR (ft) | | | | | | | | | | | |
| BORING NO. EB2-A | | STATION 15+62 | | OFFSET 8 ft LT | | ALIGNMENT -L- | | | | | | | | | | | | |
| COLLAR ELEV. 122.9 ft | | TOTAL DEPTH 33.7 ft | | NORTHING 953,672 | | EASTING 2,395,613 | | | | | | | | | | | | |
| DRILL RIG/HAMMER EFF./DATE RFO0074 CME-55 90% 07/12/2016 | | DRILL METHOD NW Casing w/ Advancer | | HAMMER TYPE Automatic | | | | | | | | | | | | | | |
| DRILLER Pinter, D. G. | | START DATE 09/07/17 | | COMP. DATE 09/07/17 | | SURFACE WATER DEPTH N/A | | | | | | | | | | | | |
| ELEV (ft) | DRIVE ELEV (ft) | DEPTH (ft) | BLOW COUNT | | | BLOWS PER FOOT | | | | | SAMP. NO. | LOG | SOIL AND ROCK DESCRIPTION | DEPTH (ft) | | | | |
| | | | 0.5ft | 0.5ft | 0.5ft | 0 | 25 | 50 | 75 | 100 | | | | | | | | |
| 125 | | | | | | | | | | | | | | | 122.9 | GROUND SURFACE | 0.0 | |
| | 121.7 | 1.2 | 5 | 3 | 2 | | | | | | | | | | 119.4 | ROADWAY EMBANKMENT ORANGE, TAN, AND BROWN, CLAYEY SAND | 3.5 | |
| 120 | 119.3 | 3.6 | WOH | WOH | WOH | | | | | | | | | | 115.4 | ALLUVIAL GRAY-BROWN, SILTY SAND WITH SOME QUARTZ PEA GRAVEL | 7.5 | |
| 115 | 114.3 | 8.6 | 2 | 1 | 1 | | | | | | | | | | 110.4 | COASTAL PLAIN LIGHT GRAY, SILTY SAND WITH SOME QUARTZ GRAVEL (YORKTOWN FORMATION) | 12.5 | |
| 110 | 109.3 | 13.6 | WOH | 1 | 1 | | | | | | | | | | 100.4 | COASTAL PLAIN DARK GRAY, SANDY CLAY WITH ABUNDANT SHELL FRAGMENTS | 22.5 | |
| 105 | 104.3 | 18.6 | 1 | 2 | 2 | | | | | | | | | | 96.4 | WEATHERED ROCK (FELSIC METAVOLCANIC ROCK) | 26.5 | |
| 100 | 99.3 | 23.6 | 3 | 2 | 1 | | | | | | | | | | 89.3 | CRYSTALLINE ROCK (FELSIC METAVOLCANIC ROCK) | 33.6 | |
| 95 | 94.3 | 28.6 | 11 | 20 | 80/0.3 | | | | | | | | | | 89.2 | CRYSTALLINE ROCK (FELSIC METAVOLCANIC ROCK) | 33.7 | |
| 90 | 89.3 | 33.6 | 60/0.1 | | | | | | | | | | | | 89.2 | CRYSTALLINE ROCK (FELSIC METAVOLCANIC ROCK) | 33.7 | |
| | | | | | | | | | | | | | | | | | | |

| WBS 17BP.4.R.83 | | TIP 410083 | | COUNTY HALIFAX | | GEOLOGIST Roberson, N. T. | | | | | | | | | | | | |
|--|-----------------|------------------------------------|------------|-----------------------|-------|---------------------------|-----------------|----|----|-----|-----------|-----|---------------------------|------------|-------|--|------|--|
| SITE DESCRIPTION BRIDGE NO. 83 ON -L- (SR 1600) OVER QUANKEY CREEK | | | | | | | GROUND WTR (ft) | | | | | | | | | | | |
| BORING NO. EB2-B | | STATION 15+62 | | OFFSET 14 ft RT | | ALIGNMENT -L- | | | | | | | | | | | | |
| COLLAR ELEV. 123.0 ft | | TOTAL DEPTH 33.7 ft | | NORTHING 953,655 | | EASTING 2,395,627 | | | | | | | | | | | | |
| DRILL RIG/HAMMER EFF./DATE RFO0074 CME-55 90% 07/12/2016 | | DRILL METHOD NW Casing w/ Advancer | | HAMMER TYPE Automatic | | | | | | | | | | | | | | |
| DRILLER Pinter, D. G. | | START DATE 09/06/17 | | COMP. DATE 09/06/17 | | SURFACE WATER DEPTH N/A | | | | | | | | | | | | |
| ELEV (ft) | DRIVE ELEV (ft) | DEPTH (ft) | BLOW COUNT | | | BLOWS PER FOOT | | | | | SAMP. NO. | LOG | SOIL AND ROCK DESCRIPTION | DEPTH (ft) | | | | |
| | | | 0.5ft | 0.5ft | 0.5ft | 0 | 25 | 50 | 75 | 100 | | | | | | | | |
| 125 | | | | | | | | | | | | | | | 123.0 | GROUND SURFACE | 0.0 | |
| | | | | | | | | | | | | | | | 119.2 | ROADWAY EMBANKMENT GRAY-BROWN, CLAYEY SAND | 3.8 | |
| 120 | 119.4 | 3.6 | WOH | WOH | WOH | | | | | | | | | | 112.5 | ALLUVIAL TAN-BROWN, SILTY SAND WITH QUARTZ PEA GRAVEL | 10.5 | |
| 115 | 114.4 | 8.6 | 6 | 5 | 5 | | | | | | | | | | 106.0 | COASTAL PLAIN DARK GRAY-GREEN, CLAYEY SAND WITH SOME SHELL FRAGMENTS (YORKTOWN FORMATION) | 17.0 | |
| 110 | 109.4 | 13.6 | WOH | WOH | 1 | | | | | | | | | | 95.6 | WEATHERED ROCK (FELSIC METAVOLCANIC ROCK) | 27.4 | |
| 105 | 104.4 | 18.6 | 1 | 1 | 1 | | | | | | | | | | 92.5 | WEATHERED ROCK (FELSIC METAVOLCANIC ROCK) | 30.5 | |
| 100 | 99.4 | 23.6 | 3 | 3 | 3 | | | | | | | | | | 89.4 | CRYSTALLINE ROCK (FELSIC METAVOLCANIC ROCK) | 33.6 | |
| 95 | 94.4 | 28.6 | 4 | 7 | 15 | | | | | | | | | | 89.3 | CRYSTALLINE ROCK (FELSIC METAVOLCANIC ROCK) | 33.7 | |
| 90 | 89.4 | 33.6 | 60/0.1 | | | | | | | | | | | | 89.3 | CRYSTALLINE ROCK (FELSIC METAVOLCANIC ROCK) | 33.7 | |
| | | | | | | | | | | | | | | | | | | |

NCDOT BORE DOUBLE 410083_GEO_BH.GPJ NC_DOT.GDT 9/26/17

CORE PHOTOGRAPHS

B1-A BOXES 1 & 2: 17.1 - 28.7 FEET



SITE PHOTOGRAPH

Bridge No. 83 on -L- (SR 1600) over Quankey Creek



Looking East towards End Bent 2