

REFERENCE: U-2579AB

PROJECT: 34839

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

STRUCTURE
SUBSURFACE INVESTIGATION

COUNTY FORSYTH
PROJECT DESCRIPTION WINSTON-SALEM BELTWAY
FROM US 421/I-40 BUS TO I-40

SITE DESCRIPTION BRIDGE NO. 722 ON SR 2632
(SEdge GARDEN ROAD) OVER WINSTON-SALEM
NORTHERN BELTWAY

| STATE | STATE PROJECT REFERENCE NO. | SHEET NO. | TOTAL SHEETS |
|-------|-----------------------------|-----------|--------------|
| N.C. | U-2579AB | 1 | 12 |

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 T07-6850. 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.M. WEAVER

C.R. PASTRANA

RED DOG DRILLING

INVESTIGATED BY ESP Associates, Inc.

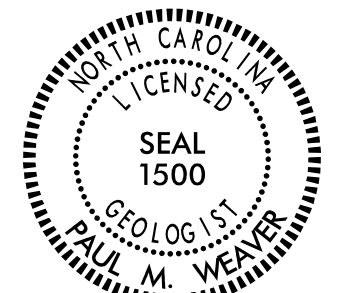
DRAWN BY C.R. PASTRANA

CHECKED BY P.M. WEAVER

SUBMITTED BY ESP Associates, Inc.

DATE MAY 2019

 **ESP ASSOCIATES, INC.**
7011 ALBERT PICK RD
SUITE E
GREENSBORO, NC 27409
FIRM # C-0587
WWW.ESPASSOCIATES.COM



Signature: Paul M. Weaver

Date: 8/27/2019

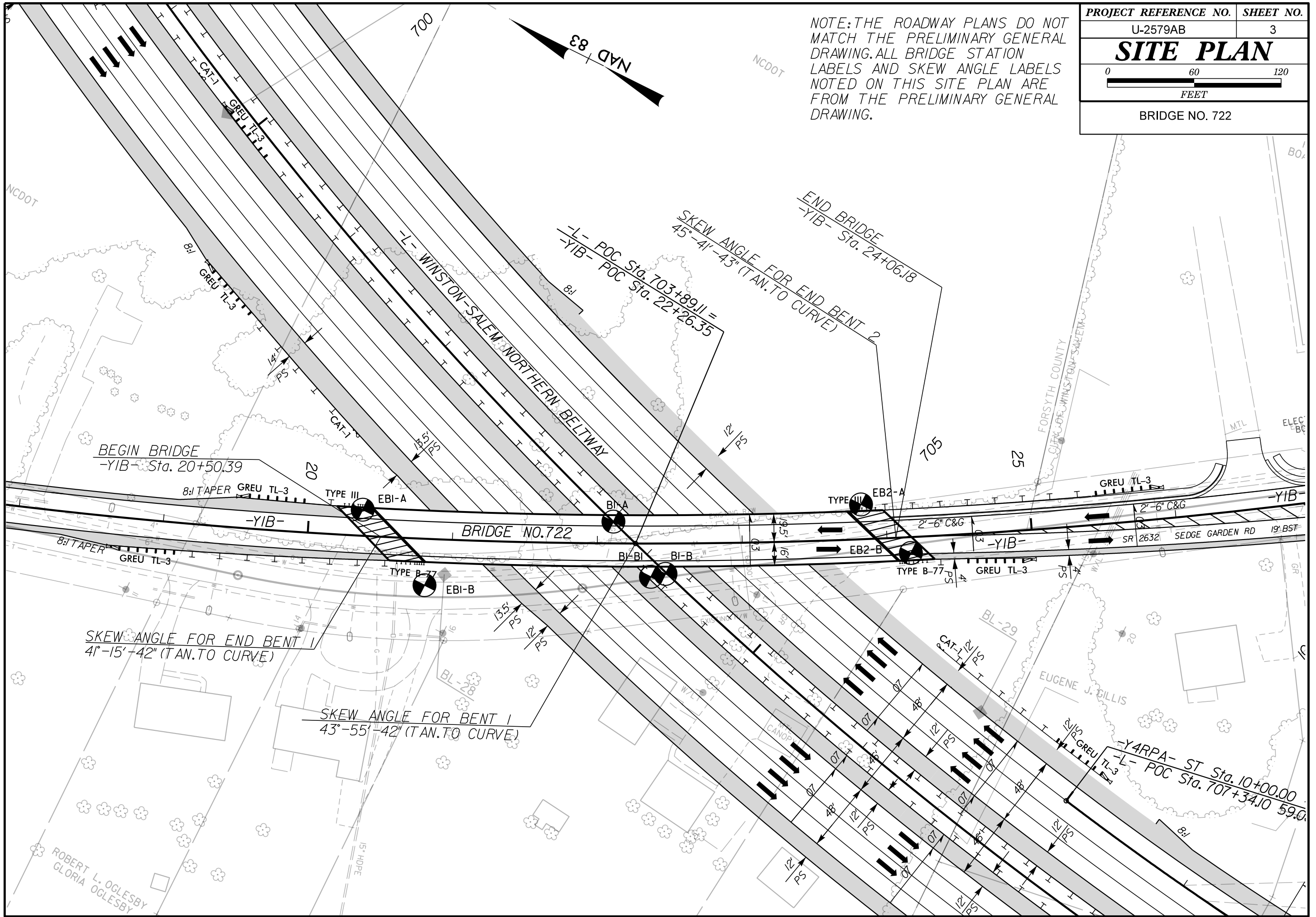
SIGNATURE DATE

**DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED**

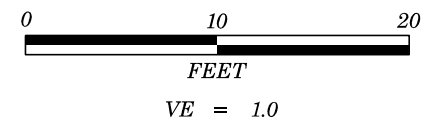
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT
SUBSURFACE INVESTIGATION
SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

Table with 4 main columns: SOIL DESCRIPTION, GRADATION, ROCK DESCRIPTION, and TERMS AND DEFINITIONS. It contains detailed technical specifications, legends, and definitions for geotechnical engineering.

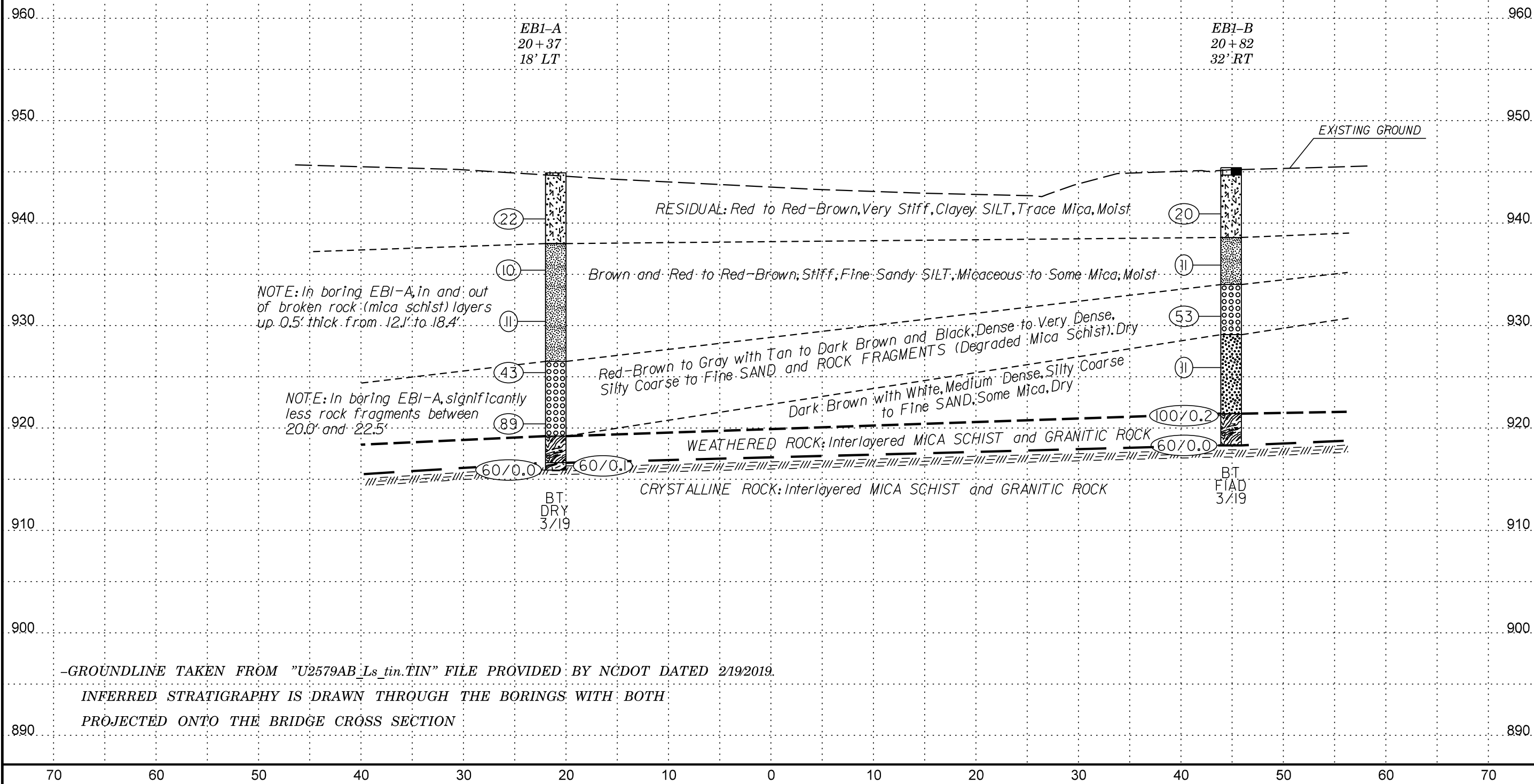
NOTE: THE ROADWAY PLANS DO NOT MATCH THE PRELIMINARY GENERAL DRAWING. ALL BRIDGE STATION LABELS AND SKEW ANGLE LABELS NOTED ON THIS SITE PLAN ARE FROM THE PRELIMINARY GENERAL DRAWING.



-Y1B- STA. 20+50.39

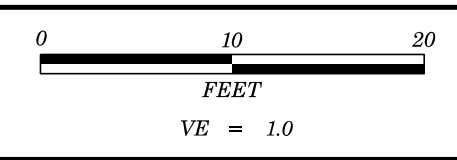


| PROJECT REFERENCE NO. | SHEET NO. |
|------------------------------------------------------------------|-----------|
| U-2579AB | 4 |
| SECTION THROUGH END BENT 1 SKEW = 41°-15'-42" (TAN. TO CURVE) | |

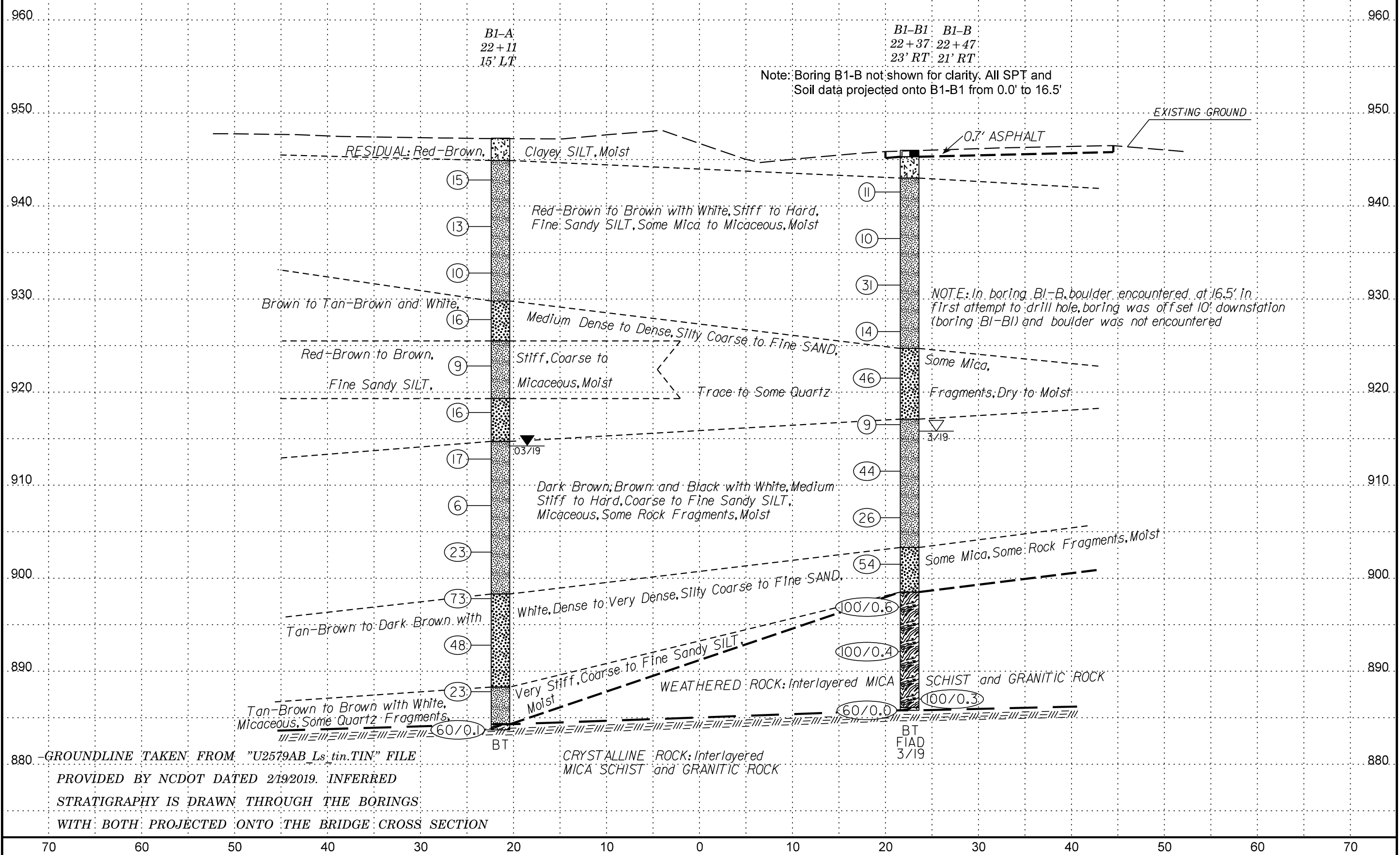


-GROUNDLINE TAKEN FROM "U2579AB_Ls tin.TIN" FILE PROVIDED BY NCDOT DATED 2/19/2019.
 INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH
 PROJECTED ONTO THE BRIDGE CROSS SECTION

-Y1B- STA. 22+26.35

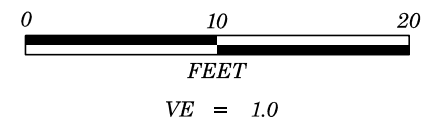


| | |
|--------------------------------------------------------------|------------------|
| PROJECT REFERENCE NO. | SHEET NO. |
| U-2579AB | 5 |
| SECTION THROUGH BENT 1 SKEW = 43°-55'-42" (TAN. TO CURVE) | |

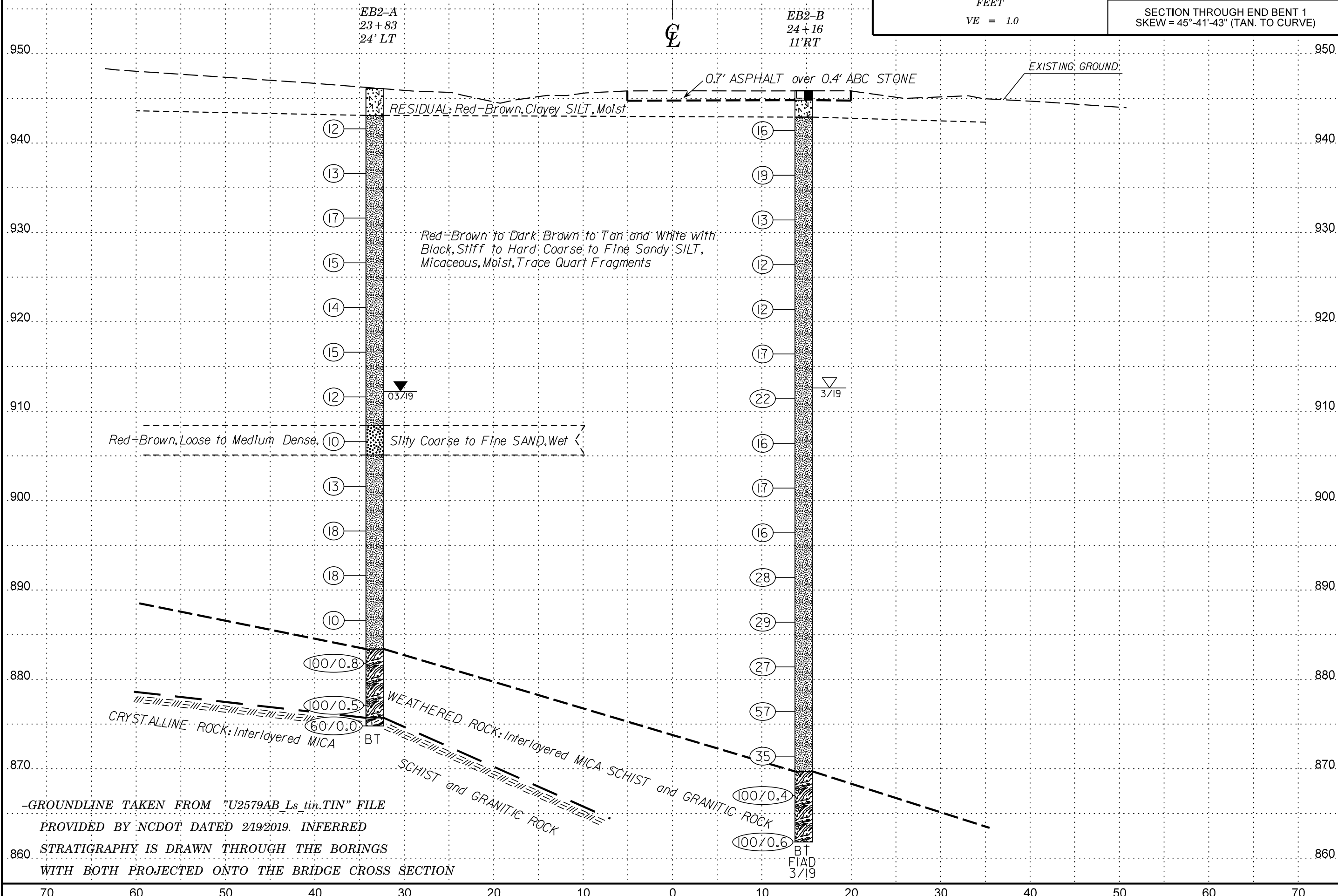


GROUNDLINE TAKEN FROM "U2579AB Ls tin.TIN" FILE
 PROVIDED BY NCDOT DATED 2/19/2019. INFERRED
 STRATIGRAPHY IS DRAWN THROUGH THE BORINGS
 WITH BOTH PROJECTED ONTO THE BRIDGE CROSS SECTION

-Y1B- STA. 24+06.18



| PROJECT REFERENCE NO. | SHEET NO. |
|------------------------------------------------------------------|-----------|
| U-2579AB | 6 |
| SECTION THROUGH END BENT 1 SKEW = 45°-41'-43" (TAN. TO CURVE) | |



-GROUNDLINE TAKEN FROM "U2579AB Ls tin.TIN" FILE
PROVIDED BY NCDOT DATED 2/19/2019. INFERRED
STRATIGRAPHY IS DRAWN THROUGH THE BORINGS
WITH BOTH PROJECTED ONTO THE BRIDGE CROSS SECTION

GEOTECHNICAL BORING REPORT

BORE LOG

| WBS 34839.1.8 | | TIP U-2579AB | | COUNTY FORSYTH | | GEOLOGIST Weaver, P.M. | | | | | | | | | | |
|----------------------------------------------------------------------------------------------------|-----------------|---------------------|------------|--------------------------|-------|-------------------------|-----------------|----|----|-----|-----------|-----|---------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|-----|
| SITE DESCRIPTION Bridge No. 722 on SR 2632 (Sedge Garden Road) over Winston-Salem Northern Beltway | | | | | | | GROUND WTR (ft) | | | | | | | | | |
| BORING NO. EB1-A | | STATION 20+37 | | OFFSET 18 ft LT | | ALIGNMENT -Y1B- | | | | | | | | | | |
| COLLAR ELEV. 944.9 ft | | TOTAL DEPTH 29.0 ft | | NORTHING 856,526 | | EASTING 1,663,703 | | | | | | | | | | |
| DRILL RIG/HAMMER EFF./DATE RD285584 CME-45C 84% 03/18/2019 | | | | DRILL METHOD H.S. Augers | | HAMMER TYPE Automatic | | | | | | | | | | |
| DRILLER Seiler, M. | | START DATE 03/26/19 | | COMP. DATE 03/26/19 | | 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 | | | | | | |
| 945 | | | | | | | | | | | | | | 944.9 | GROUND SURFACE | 0.0 |
| 940 | 941.4 | 3.5 | 8 | 10 | 12 | | | | | | | | M | RESIDUAL Red, Clayey SILT, Trace Mica | | |
| 935 | 936.4 | 8.5 | 4 | 5 | 5 | | | | | | | | M | Brown and Red, Fine Sandy SILT, Micaceous Note: In and out of broken rock (mica schist) layers up to 0.5' thick from 12.1' to 18.4' | 6.9 | |
| 930 | 931.4 | 13.5 | 15 | 8 | 3 | | | | | | | | M | | | |
| 925 | 926.4 | 18.5 | 16 | 25 | 18 | | | | | | | | D | Red-Brown to Gray with Tan, Silty Coarse to Fine SAND and Rock Fragments, Some Mica Note: Significantly less rock fragments between 20' and 22.5' | 18.4 | |
| 920 | 921.4 | 23.5 | 18 | 61 | 28 | | | | | | | | D | | 25.7 | |
| | 916.4 | 28.5 | | | | | | | | | | | | WEATHERED ROCK Interlayered MICA SCHIST and GRANITIC ROCK | 28.3 | |
| | 915.9 | 29.0 | 60/0.1 | | | | | | | | | | | CRYSTALLINE ROCK Interlayered MICA SCHIST and GRANITIC ROCK | 29.0 | |
| | | | 60/0.0 | | | | | | | | | | | Boring Terminated with Standard Penetration Test Refusal at Elevation 915.9 ft on Crystalline Rock: Interlayered MICA SCHIST and GRANITIC ROCK | | |

| WBS 34839.1.8 | | TIP U-2579AB | | COUNTY FORSYTH | | GEOLOGIST Pastrana, C.R. | | | | | | | | | | |
|----------------------------------------------------------------------------------------------------|-----------------|---------------------|------------|--------------------------|-------|--------------------------|-----------------|----|----|-----|-----------|-----|---------------------------|------------------------------------------------------------------------------------------------------------------------------------------------|----------------|-----|
| SITE DESCRIPTION Bridge No. 722 on SR 2632 (Sedge Garden Road) over Winston-Salem Northern Beltway | | | | | | | GROUND WTR (ft) | | | | | | | | | |
| BORING NO. EB1-B | | STATION 20+82 | | OFFSET 32 ft RT | | ALIGNMENT -Y1B- | | | | | | | | | | |
| COLLAR ELEV. 945.4 ft | | TOTAL DEPTH 27.1 ft | | NORTHING 856,465 | | EASTING 1,663,676 | | | | | | | | | | |
| DRILL RIG/HAMMER EFF./DATE RD285584 CME-45C 84% 03/18/2019 | | | | DRILL METHOD H.S. Augers | | HAMMER TYPE Automatic | | | | | | | | | | |
| DRILLER Seiler, M. | | START DATE 03/27/19 | | COMP. DATE 03/27/19 | | 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 | | | | | | |
| 950 | | | | | | | | | | | | | | 945.4 | GROUND SURFACE | 0.0 |
| 945 | 944.7 | 0.7 | | | | | | | | | | | M | ROADWAY EMBANKMENT 0.7' ASPHALT RESIDUAL Red-Brown, Clayey SILT, Trace Mica | 0.7 | |
| 940 | 941.9 | 3.5 | 5 | 8 | 12 | | | | | | | | M | | 6.8 | |
| 935 | 936.9 | 8.5 | 2 | 4 | 7 | | | | | | | | M | Red-Brown, Fine Sandy SILT, Some Mica | 6.8 | |
| 930 | 931.9 | 13.5 | 5 | 23 | 30 | | | | | | | | D | Dark Brown and Black, Silty Fine to Coarse SAND and Rock Fragments (Degraded Mica Schist) | 11.4 | |
| 925 | 926.9 | 18.5 | 4 | 5 | 6 | | | | | | | | D | Dark Brown with White, Silty Coarse to Fine SAND, Some Mica | 16.3 | |
| 920 | 921.9 | 23.5 | 15 | 100/0.2 | | | | | | | | | D | | 24.0 | |
| | 918.3 | 27.1 | 60/0.0 | | | | | | | | | | | WEATHERED ROCK Interlayered MICA SCHIST and GRANITIC ROCK | 27.1 | |
| | | | 60/0.0 | | | | | | | | | | | Boring Terminated with Standard Penetration Test Refusal at Elevation 918.3 ft on Crystalline Rock: Interlayered MICA SCHIST and GRANITIC ROCK | | |

NCDOT BORE DOUBLE U2579AB_GEO_BRDG33072GINT LOGS.GPJ NC_DOT_GDT 5/13/19

GEOTECHNICAL BORING REPORT

BORE LOG

| | | | | | | | |
|----------------------------------------------------------------------------------------------------|--|---------------------|--|--------------------------|--|--------------------------|-----------------|
| WBS 34839.1.8 | | TIP U-2579AB | | COUNTY FORSYTH | | GEOLOGIST Pastrana, C.R. | |
| SITE DESCRIPTION Bridge No. 722 on SR 2632 (Sedge Garden Road) over Winston-Salem Northern Beltway | | | | | | | GROUND WTR (ft) |
| BORING NO. B1-A | | STATION 22+11 | | OFFSET 15 ft LT | | ALIGNMENT -Y1B- | |
| COLLAR ELEV. 947.3 ft | | TOTAL DEPTH 63.6 ft | | NORTHING 856,368 | | EASTING 1,663,773 | |
| DRILL RIG/HAMMER EFF./DATE RD285584 CME-45C 84% 03/18/2019 | | | | DRILL METHOD H.S. Augers | | HAMMER TYPE Automatic | |
| DRILLER Seiler, M. | | START DATE 03/26/19 | | COMP. DATE 03/26/19 | | SURFACE WATER DEPTH N/A | |

| ELEV (ft) | DRIVE ELEV (ft) | DEPTH (ft) | BLOW COUNT | | | BLOWS PER FOOT | | | | | SAMP. NO. | LOG MOI | LOG G | SOIL AND ROCK DESCRIPTION | ELEV. (ft) | DEPTH (ft) | |
|-----------|-----------------|------------|------------|-------|-------|----------------|----|----|----|-----|-----------|---------|-------|---------------------------|------------|--------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------|
| | | | 0.5ft | 0.5ft | 0.5ft | 0 | 25 | 50 | 75 | 100 | | | | | | | |
| 950 | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | 947.3 | 0.0 | GROUND SURFACE |
| | | | | | | | | | | | | | | | 944.9 | 2.4 | RESIDUAL Red-Brown, Clayey SILT, Moist |
| 945 | 943.8 | 3.5 | 4 | 6 | 9 | | | | | | | | M | | | | Red-Brown to Brown, Fine Sandy SILT, Some Mica to Micaceous |
| 940 | 938.8 | 8.5 | 4 | 6 | 7 | | | | | | | | M | | | | |
| 935 | 933.8 | 13.5 | 4 | 5 | 5 | | | | | | | | M | | | | |
| 930 | 928.8 | 18.5 | 7 | 10 | 6 | | | | | | | | D | | 929.8 | 17.5 | Brown, Silty Coarse to Fine SAND, Some Mica |
| 925 | 923.8 | 23.5 | 3 | 4 | 5 | | | | | | | | D | | 925.5 | 21.8 | Red-Brown to Brown, Coarse to Fine Sandy SILT, Micaceous |
| 920 | 918.8 | 28.5 | 7 | 7 | 9 | | | | | | | | M | | 919.3 | 28.0 | Tan-Brown and White, Silty Coarse to Fine SAND, Some Mica, Trace Quartz Fragments |
| 915 | 913.8 | 33.5 | 4 | 7 | 10 | | | | | | | | M | | 914.7 | 32.8 | Dark Brown to Brown and Black with White, Coarse to Fine Sandy SILT, Miceous |
| 910 | 908.8 | 38.5 | 2 | 2 | 4 | | | | | | | | M | | | | |
| 905 | 903.8 | 43.5 | 8 | 9 | 14 | | | | | | | | M | | | | |
| 900 | 898.8 | 48.5 | 20 | 26 | 47 | | | | | | | | M | | 898.3 | 49.0 | Tan-Brown and White, Silty Coarse to Fine SAND, Some Mica |
| 895 | 893.8 | 53.5 | 17 | 21 | 27 | | | | | | | | M | | | | |
| 890 | 888.8 | 58.5 | 25 | 10 | 13 | | | | | | | | M | | 888.3 | 59.0 | Tan-Brown to Brown with White, Coarse to Fine Sandy SILT, Micaceous, Some Quartz Fragments |
| 885 | 883.8 | 63.5 | | | | | | | | | | | | 884.3 | 63.0 | CRYSTALLINE ROCK | |
| | | | 60/0.1 | | | | | | | | | | | 883.7 | 63.6 | Interlayered MICA SCHIST and GRANITIC ROCK | |
| | | | | | | | | | | | | | | | | | Boring Terminated with Standard Penetration Test Refusal at Elevation 883.7 ft in Crystalline Rock: Interlayered MICA SCHIST and GRANITIC ROCK |

NCDOT BORE DOUBLE U2579AB_GEO_BRDG330722GINT LOGS.GPJ NC_DOT_GDT 5/13/19

| | | | | | | | |
|----------------------------------------------------------------------------------------------------|--|---------------------|--|--------------------------|--|--------------------------|-----------------|
| WBS 34839.1.8 | | TIP U-2579AB | | COUNTY FORSYTH | | GEOLOGIST Pastrana, C.R. | |
| SITE DESCRIPTION Bridge No. 722 on SR 2632 (Sedge Garden Road) over Winston-Salem Northern Beltway | | | | | | | GROUND WTR (ft) |
| BORING NO. B1-B | | STATION 22+47 | | OFFSET 21 ft RT | | ALIGNMENT -Y1B- | |
| COLLAR ELEV. 946.0 ft | | TOTAL DEPTH 16.5 ft | | NORTHING 856,320 | | EASTING 1,663,757 | |
| DRILL RIG/HAMMER EFF./DATE RD285584 CME-45C 84% 03/18/2019 | | | | DRILL METHOD H.S. Augers | | HAMMER TYPE Automatic | |
| DRILLER Seiler, M. | | START DATE 03/27/19 | | COMP. DATE 03/27/19 | | SURFACE WATER DEPTH N/A | |

| ELEV (ft) | DRIVE ELEV (ft) | DEPTH (ft) | BLOW COUNT | | | BLOWS PER FOOT | | | | | SAMP. NO. | LOG MOI | LOG G | SOIL AND ROCK DESCRIPTION | ELEV. (ft) | DEPTH (ft) | |
|-----------|-----------------|------------|------------|-------|-------|----------------|----|----|----|-----|-----------|---------|-------|---------------------------|------------|------------|--------------------------------------------------------------------------------------------------------------|
| | | | 0.5ft | 0.5ft | 0.5ft | 0 | 25 | 50 | 75 | 100 | | | | | | | |
| 950 | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | 946.0 | 0.0 | GROUND SURFACE |
| | | | | | | | | | | | | | | | 945.3 | 0.7 | ROADWAY EMBANKMENT 0.7' ASPHALT |
| 945 | 942.5 | 3.5 | 4 | 5 | 6 | | | | | | | | M | | 943.0 | 3.0 | RESIDUAL Red-Brown, Clayey SILT, Moist |
| 940 | 937.5 | 8.5 | 3 | 5 | 5 | | | | | | | | M | | | | Red-Brown to Brown with White, Fine Sandy SILT, Some Mica to Micaceous Note: Boulder encountered at 16.5' |
| 935 | 932.5 | 13.5 | 4 | 12 | 19 | | | | | | | | M | | | | |
| 930 | | | | | | | | | | | | | | | 929.5 | 16.5 | Boring Terminated by Auger Refusal at Elevation 929.5 ft On Boulder |
| | | | | | | | | | | | | | | | | | Note: Offset boring 10' and Drilled B1-B1 |

GEOTECHNICAL BORING REPORT

BORE LOG

| | | | |
|-----------------------------------------------------------------------------------------------------------|----------------------------|---------------------------------|---------------------------------|
| WBS 34839.1.8 | TIP U-2579AB | COUNTY FORSYTH | GEOLOGIST Pastrana, C.R. |
| SITE DESCRIPTION Bridge No. 722 on SR 2632 (Sedge Garden Road) over Winston-Salem Northern Beltway | | | GROUND WTR (ft) |
| BORING NO. B1-B1 | STATION 22+37 | OFFSET 23 ft RT | ALIGNMENT -Y1B- |
| COLLAR ELEV. 946.0 ft | TOTAL DEPTH 60.2 ft | NORTHING 856,328 | EASTING 1,663,751 |
| DRILL RIG/HAMMER EFF./DATE RD285584 CME-45C 84% 03/18/2019 | | DRILL METHOD H.S. Augers | HAMMER TYPE Automatic |
| DRILLER Seiler, M. | START DATE 03/27/19 | COMP. DATE 03/27/19 | SURFACE WATER DEPTH N/A |

| ELEV (ft) | DRIVE ELEV (ft) | DEPTH (ft) | BLOW COUNT | | | BLOWS PER FOOT | | | | | SAMP. NO. | LOG | SOIL AND ROCK DESCRIPTION | | | |
|-----------|-----------------|------------|------------|--------|-------|----------------|----|----|----|-----|-----------|-----|---------------------------|------------|------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | | | 0.5ft | 0.5ft | 0.5ft | 0 | 25 | 50 | 75 | 100 | | | ELEV. (ft) | DEPTH (ft) | | |
| 950 | | | | | | | | | | | | | | | | |
| 945 | | | | | | | | | | | | | | 946.0 | 0.0 | GROUND SURFACE |
| | | | | | | | | | | | | | | 945.3 | 0.7 | ROADWAY EMBANKMENT 0.7' ASPHALT |
| | | | | | | | | | | | | | | 943.0 | 3.0 | RESIDUAL Red-Brown, Clayey SILT, Moist Red-Brown to Brown with White, Fine Sandy SILT, Some Mica to Micaceous Note: Boulder encountered at 16.5' in first attempt to drill hole. Boring was offset 10' and boulder was not encountered. |
| 940 | 942.5 | 3.5 | 4 | 5 | 6 | 1 | | | | | | | M | | | |
| | 937.5 | 8.5 | 3 | 5 | 5 | 10 | | | | | | | M | | | |
| 935 | 932.5 | 13.5 | 4 | 12 | 19 | | | | | | | | M | | | |
| 930 | 927.5 | 18.5 | 6 | 7 | 7 | | | | | | | | M | | | |
| 925 | 922.5 | 23.5 | 28 | 29 | 17 | | | | | | | | D | 924.7 | 21.3 | White with Tan-Brown, Silty Coarse to Fine SAND, Some Quartz Fragments |
| 920 | 917.5 | 28.5 | 3 | 4 | 5 | | | | | | | | | 917.1 | 28.9 | Brown to Dark Brown with White, Fine Sandy SILT, Micaceous, Some Rock Fragments |
| 915 | 912.5 | 33.5 | 11 | 27 | 17 | | | | | | | | M | | | |
| 910 | 907.5 | 38.5 | 12 | 13 | 13 | | | | | | | | M | | | |
| 905 | 902.5 | 43.5 | 21 | 35 | 19 | | | | | | | | M | 903.3 | 42.7 | Dark Brown to Tan-Brown with White, Silty Coarse to Fine SAND, Some Rock Fragments |
| 900 | 897.5 | 48.5 | 53 | 47/0.1 | | | | | | | | | | 898.5 | 47.5 | WEATHERED ROCK Interlayered MICA SCHIST and GRANITIC ROCK |
| 895 | 892.5 | 53.5 | 100/0.4 | | | | | | | | | | | | | |
| 890 | 887.5 | 58.5 | 100/0.3 | | | | | | | | | | | 886.1 | 59.9 | CRYSTALLINE ROCK Interlayered MICA SCHIST and GRANITIC ROCK |
| | 885.8 | 60.2 | 60/0.0 | | | | | | | | | | | 885.8 | 60.2 | Boring Terminated with Standard Penetration Test Refusal at Elevation 885.8 ft in Crystalline Rock: Interlayered MICA SCHIST and GRANITIC ROCK |

NCDOT BORE DOUBLE U2579AB_GEO_BRD330722GINT LOGS.GPJ NC_DOT_GDT 5/13/19

GEOTECHNICAL BORING REPORT

BORE LOG

| WBS 34839.1.8 | | TIP U-2579AB | | COUNTY FORSYTH | | GEOLOGIST Pastrana, C.R. | | | | | | | | | |
|----------------------------------------------------------------------------------------------------|-----------------|---------------------|--------------------------|---------------------|-----------------------|--------------------------|-----------------|----|----|-----|-----------|-----|---------------------------|------------|--|
| SITE DESCRIPTION Bridge No. 722 on SR 2632 (Sedge Garden Road) over Winston-Salem Northern Beltway | | | | | | | GROUND WTR (ft) | | | | | | | | |
| BORING NO. EB2-B | | STATION 24+16 | | OFFSET 11 ft RT | | ALIGNMENT -Y1B- | | | | | | | | | |
| COLLAR ELEV. 945.9 ft | | TOTAL DEPTH 84.1 ft | | NORTHING 856,175 | | EASTING 1,663,845 | | | | | | | | | |
| DRILL RIG/HAMMER EFF./DATE RD285584 CME-45C 84% 03/18/2019 | | | DRILL METHOD H.S. Augers | | HAMMER TYPE Automatic | | | | | | | | | | |
| DRILLER Seiler, M. | | START DATE 03/27/19 | | COMP. DATE 03/27/19 | | 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 | | | | | |
| 950 | | | | | | | | | | | | | | | |
| 945 | | | | | | | | | | | | | | | |
| 942.4 | 942.4 | 3.5 | 4 | 8 | 8 | | | | | | | | | | |
| 940 | | | | | | | | | | | | | | | |
| 937.4 | | 8.5 | 5 | 8 | 11 | | | | | | | | | | |
| 935 | | | | | | | | | | | | | | | |
| 932.4 | | 13.5 | 4 | 6 | 7 | | | | | | | | | | |
| 930 | | | | | | | | | | | | | | | |
| 927.4 | | 18.5 | 4 | 5 | 7 | | | | | | | | | | |
| 925 | | | | | | | | | | | | | | | |
| 922.4 | | 23.5 | 3 | 5 | 7 | | | | | | | | | | |
| 920 | | | | | | | | | | | | | | | |
| 917.4 | | 28.5 | 4 | 7 | 10 | | | | | | | | | | |
| 915 | | | | | | | | | | | | | | | |
| 912.4 | | 33.5 | 5 | 9 | 13 | | | | | | | | | | |
| 910 | | | | | | | | | | | | | | | |
| 907.4 | | 38.5 | 4 | 6 | 10 | | | | | | | | | | |
| 905 | | | | | | | | | | | | | | | |
| 902.4 | | 43.5 | 5 | 7 | 10 | | | | | | | | | | |
| 900 | | | | | | | | | | | | | | | |
| 897.4 | | 48.5 | 6 | 6 | 10 | | | | | | | | | | |
| 895 | | | | | | | | | | | | | | | |
| 892.4 | | 53.5 | 8 | 13 | 15 | | | | | | | | | | |
| 890 | | | | | | | | | | | | | | | |
| 887.4 | | 58.5 | 8 | 12 | 17 | | | | | | | | | | |
| 885 | | | | | | | | | | | | | | | |
| 882.4 | | 63.5 | 12 | 13 | 14 | | | | | | | | | | |
| 880 | | | | | | | | | | | | | | | |
| 877.4 | | 68.5 | 18 | 25 | 32 | | | | | | | | | | |
| 875 | | | | | | | | | | | | | | | |
| 872.4 | | 73.5 | 10 | 13 | 22 | | | | | | | | | | |
| 870 | | | | | | | | | | | | | | | |

| WBS 34839.1.8 | | TIP U-2579AB | | COUNTY FORSYTH | | GEOLOGIST Pastrana, C.R. | | | | | | | | | |
|----------------------------------------------------------------------------------------------------|-----------------|---------------------|--------------------------|---------------------|-----------------------|--------------------------|-----------------|----|----|-----|-----------|-----|---------------------------|------------|--|
| SITE DESCRIPTION Bridge No. 722 on SR 2632 (Sedge Garden Road) over Winston-Salem Northern Beltway | | | | | | | GROUND WTR (ft) | | | | | | | | |
| BORING NO. EB2-B | | STATION 24+16 | | OFFSET 11 ft RT | | ALIGNMENT -Y1B- | | | | | | | | | |
| COLLAR ELEV. 945.9 ft | | TOTAL DEPTH 84.1 ft | | NORTHING 856,175 | | EASTING 1,663,845 | | | | | | | | | |
| DRILL RIG/HAMMER EFF./DATE RD285584 CME-45C 84% 03/18/2019 | | | DRILL METHOD H.S. Augers | | HAMMER TYPE Automatic | | | | | | | | | | |
| DRILLER Seiler, M. | | START DATE 03/27/19 | | COMP. DATE 03/27/19 | | 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 | | | | | |
| 870 | | | | | | | | | | | | | | | |
| 865 | | | | | | | | | | | | | | | |
| 867.4 | 867.4 | 78.5 | 100 | 0.4 | | | | | | | | | | | |
| 865 | | | | | | | | | | | | | | | |
| 862.4 | 862.4 | 83.5 | 53 | 47 | 0.1 | | | | | | | | | | |
| 860 | | | | | | | | | | | | | | | |
| 861.8 | | | | | | | | | | | | | | | |

NCDOT BORE DOUBLE U2579AB_GEO_BRDG330722GINT LOGS.GPJ NC_DOT_GDT 5/13/19

945.9 GROUND SURFACE 0.0
 944.8 ROADWAY EMBANKMENT 1.1
 0.7' ASPHALT over 0.4' ABC STONE
 942.9 RESIDUAL 3.0
 Red-Brown, Clayey SILT, Moist
 Red-Brown to Dark Brown with White and
 Black, Coarse to Fine Sandy SILT,
 Micaceous, Trace Quartz Fragments

Match Line

869.7 WEATHERED ROCK 76.2
 Intelayered MICA SCHIST and GRANITIC
 ROCK
 861.8 Boring Terminated at Elevation 861.8 ft in
 Weathered Rock: Interlayered MICA
 SCHIST and GRANITIC ROCK 84.1

SITE PHOTOGRAPHS

Bridge No. 722 on SR 2632 (-Y1B- Sedge Garden Road) over -L- (Winston-Salem Northern Beltway)

View Along End Bent 1 Looking Left to Right



View Along Bent 1 Looking Left to Right



View Along End Bent 2 Looking Left to Right



View Along -Y1B- Downstation to Upstation



REFERENCE: U-2579AB

PROJECT: 34839

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

STRUCTURE
SUBSURFACE INVESTIGATION

COUNTY FORSYTH
PROJECT DESCRIPTION WINSTON-SALEM BELTWAY
FROM US 421/I-40 BUS TO I-40

SITE DESCRIPTION BRIDGE NO. 724 ON -Y15REV-
(I-40 BYPASS) OVER -L- (WINSTON SALEM
BELTWAY)

CONTENTS

| SHEET NO. | DESCRIPTION |
|-----------|--------------------------------------------|
| 1 | TITLE SHEET |
| 2 | LEGEND (SOIL & ROCK) |
| 2A | SUPPLEMENTAL LEGEND (GSI) |
| 3 | SITE PLAN |
| 4-6 | CROSS SECTIONS |
| 7-20 | BORE LOGS, CORE LOGS, AND CORE PHOTOGRAPHS |
| 21 | SOIL TEST RESULTS |
| 22 | SITE PHOTOGRAPHS |

| STATE | STATE PROJECT REFERENCE NO. | SHEET NO. | TOTAL SHEETS |
|-------|-----------------------------|-----------|--------------|
| N.C. | U-2579AB | 1 | 22 |

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 T07-6850. 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:

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- 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.M. WEAVER

C.R. PASTRANA

RED DOG DRILLING

INVESTIGATED BY ESP Associates, Inc.

DRAWN BY C.R. PASTRANA

CHECKED BY P.M. WEAVER

SUBMITTED BY ESP Associates, Inc.

DATE MAY 2019

 **ESP**
ESP ASSOCIATES, INC.
7011 ALBERT PICK RD
SUITE E
GREENSBORO, NC 27409
FIRM # C-0587
WWW.ESPASSOCIATES.COM



Signature of Paul M. Weaver

01847D373965407
6/27/2019

SIGNATURE

DATE

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

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

| SOIL DESCRIPTION | | | | | | | | | | GRADATION | | | | | | | | | | ROCK DESCRIPTION | | | | | | | | | | TERMS AND DEFINITIONS | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| <p>SOIL IS CONSIDERED UNCONSOLIDATED, SEMI-CONSOLIDATED, OR WEATHERED EARTH MATERIALS THAT CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER AND YIELD LESS THAN 100 BLOWS PER FOOT ACCORDING TO THE STANDARD PENETRATION TEST (AASHTO T 208, ASTM D1586). SOIL CLASSIFICATION IS BASED ON THE AASHTO SYSTEM. BASIC DESCRIPTIONS GENERALLY INCLUDE THE FOLLOWING: CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. FOR EXAMPLE, <i>VERY STIFF, GRAY, SILTY CLAY, MOIST WITH INTERBEDDED FINE SAND LAYERS, HIGHLY PLASTIC, A-7-6</i></p> | | | | | | | | | | <p>WELL GRADED - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE. UNIFORMLY GRADED - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE. GAP-GRADED - INDICATES A MIXTURE OF UNIFORM PARTICLE SIZES OF TWO OR MORE SIZES.</p> | | | | | | | | | | <p>HARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT REFUSAL IF TESTED, AN INFERRED ROCK LINE INDICATES THE LEVEL AT WHICH NON-COASTAL PLAIN MATERIAL WOULD YIELD SPT REFUSAL. 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:</p> | | | | | | | | | | <p>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, SUCH 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 DISLOGGED 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 (ROD) - 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 (SROD) - 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.</p> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <p style="text-align: center;">SOIL LEGEND AND AASHTO CLASSIFICATION</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th rowspan="2">GENERAL CLASS.</th> <th colspan="5">GRANULAR MATERIALS (≤ 35% PASSING #200)</th> <th colspan="5">SILT-CLAY MATERIALS (> 35% PASSING #200)</th> <th colspan="5">ORGANIC MATERIALS</th> </tr> <tr> <th>A-1</th> <th>A-1-b</th> <th>A-2</th> <th>A-2-4</th> <th>A-2-5</th> <th>A-2-6</th> <th>A-2-7</th> <th>A-4</th> <th>A-5</th> <th>A-6</th> <th>A-7</th> <th>A-1, A-2</th> <th>A-3</th> <th>A-4, A-5</th> <th>A-6, A-7</th> </tr> <tr> <th>GROUP CLASS.</th> <td>A-1-a</td> <td>A-1-b</td> <td>A-2-4</td> <td>A-2-5</td> <td>A-2-6</td> <td>A-2-7</td> <td>A-4</td> <td>A-5</td> <td>A-6</td> <td>A-7</td> <td>A-1, A-2</td> <td>A-3</td> <td>A-4, A-5</td> <td>A-6, A-7</td> <td></td> </tr> <tr> <th>SYMBOL</th> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <th>% PASSING #10 #40 #200</th> <td>50 MX 30 MX 15 MX</td> <td>50 MX 25 MX</td> <td>51 MN 35 MX 35 MX</td> <td>40 MX 41 MN 10 MX</td> <td>40 MX 41 MN 11 MN</td> <td>40 MX 41 MN 11 MN</td> <td>40 MX 41 MN 11 MN</td> <td>36 MN 36 MN</td> <td>36 MN 36 MN</td> <td>36 MN 36 MN</td> <td>36 MN 36 MN</td> <td>GRANULAR SOILS</td> <td>SILT-CLAY SOILS</td> <td>MUCK, PEAT</td> <td></td> </tr> <tr> <th>MATERIAL PASSING #40 LL PI</th> <td>-</td> <td>-</td> <td>40 MX 41 MN NP</td> <td>40 MX 41 MN 10 MX</td> <td>40 MX 41 MN 11 MN</td> <td>40 MX 41 MN 11 MN</td> <td>40 MX 41 MN 11 MN</td> <td>40 MX 41 MN 11 MN</td> <td>40 MX 41 MN 11 MN</td> <td>40 MX 41 MN 11 MN</td> <td>40 MX 41 MN 11 MN</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <th>GROUP INDEX</th> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>1 MX</td> <td>0 MX</td> <td>0 MX</td> <td>0 MX</td> <td>0 MX</td> <td>0 MX</td> <td>0 MX</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <th>USUAL TYPES OF MAJOR MATERIALS</th> <td>STONE FRAGS. GRAVEL, AND SAND</td> <td>FINE SAND</td> <td>SILTY OR CLAYEY GRAVEL AND SAND</td> <td>SILTY SOILS</td> <td>CLAYEY SOILS</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <th>GEN. RATING AS SUBGRADE</th> <td colspan="5">EXCELLENT TO GOOD</td> <td colspan="5">FAIR TO POOR</td> <td>FAIR TO POOR</td> <td>POOR</td> <td>UNSATURABLE</td> </tr> <tr> <td colspan="10">PI OF A-7-5 SUBGROUP IS ≤ LL - 30; PI OF A-7-6 SUBGROUP IS > LL - 30</td> <td colspan="10"></td> </tr> </table> | | | | | | | | | | GENERAL CLASS. | GRANULAR MATERIALS (≤ 35% PASSING #200) | | | | | SILT-CLAY MATERIALS (> 35% PASSING #200) | | | | | ORGANIC MATERIALS | | | | | A-1 | A-1-b | A-2 | A-2-4 | A-2-5 | A-2-6 | A-2-7 | A-4 | A-5 | A-6 | A-7 | A-1, A-2 | A-3 | A-4, A-5 | A-6, A-7 | GROUP CLASS. | A-1-a | A-1-b | A-2-4 | A-2-5 | A-2-6 | A-2-7 | A-4 | A-5 | A-6 | A-7 | A-1, A-2 | A-3 | A-4, A-5 | A-6, A-7 | | SYMBOL | | | | | | | | | | | | | | | | % PASSING #10 #40 #200 | 50 MX 30 MX 15 MX | 50 MX 25 MX | 51 MN 35 MX 35 MX | 40 MX 41 MN 10 MX | 40 MX 41 MN 11 MN | 40 MX 41 MN 11 MN | 40 MX 41 MN 11 MN | 36 MN 36 MN | 36 MN 36 MN | 36 MN 36 MN | 36 MN 36 MN | GRANULAR SOILS | SILT-CLAY SOILS | MUCK, PEAT | | MATERIAL PASSING #40 LL PI | - | - | 40 MX 41 MN NP | 40 MX 41 MN 10 MX | 40 MX 41 MN 11 MN | 40 MX 41 MN 11 MN | 40 MX 41 MN 11 MN | 40 MX 41 MN 11 MN | 40 MX 41 MN 11 MN | 40 MX 41 MN 11 MN | 40 MX 41 MN 11 MN | | | | | GROUP INDEX | 0 | 0 | 0 | 0 | 1 MX | 0 MX | 0 MX | 0 MX | 0 MX | 0 MX | 0 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 SUBGRADE | EXCELLENT TO GOOD | | | | | FAIR TO POOR | | | | | FAIR TO POOR | POOR | UNSATURABLE | PI OF A-7-5 SUBGROUP IS ≤ LL - 30; PI OF A-7-6 SUBGROUP IS > LL - 30 | | | | | | | | | | | | | | | | | | | | <p style="text-align: center;">MINERALOGICAL COMPOSITION</p> <p>MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHEN THEY ARE CONSIDERED OF SIGNIFICANCE.</p> | | | | | | | | | | <p style="text-align: center;">WEATHERING</p> <p>FRESH: ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING. ROCK RINGS UNDER HAMMER IF CRYSTALLINE.</p> <p>VERY SLIGHT (IV SL.): 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.</p> <p>SLIGHT (SL.): 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.</p> <p>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.</p> <p>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. <i>IF TESTED, WOULD YIELD SPT REFUSAL</i></p> <p>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. <i>IF TESTED, WOULD YIELD SPT N VALUES > 100 BPF</i></p> <p>VERY SEVERE (IV SEV.): ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC ELEMENTS ARE DISCERNIBLE BUT MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROCK REMAINING. SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE THAT ONLY MINOR VESTIGES OF ORIGINAL ROCK FABRIC REMAIN. <i>IF TESTED, WOULD YIELD SPT N VALUES < 100 BPF</i></p> <p>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.</p> | | | | | | | | | |
| GENERAL CLASS. | GRANULAR MATERIALS (≤ 35% PASSING #200) | | | | | SILT-CLAY MATERIALS (> 35% PASSING #200) | | | | | ORGANIC MATERIALS | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | A-1 | A-1-b | A-2 | A-2-4 | A-2-5 | A-2-6 | A-2-7 | A-4 | A-5 | A-6 | A-7 | A-1, A-2 | A-3 | A-4, A-5 | A-6, A-7 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| GROUP CLASS. | A-1-a | A-1-b | A-2-4 | A-2-5 | A-2-6 | A-2-7 | A-4 | A-5 | A-6 | A-7 | A-1, A-2 | A-3 | A-4, A-5 | A-6, A-7 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SYMBOL | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| % PASSING #10 #40 #200 | 50 MX 30 MX 15 MX | 50 MX 25 MX | 51 MN 35 MX 35 MX | 40 MX 41 MN 10 MX | 40 MX 41 MN 11 MN | 40 MX 41 MN 11 MN | 40 MX 41 MN 11 MN | 36 MN 36 MN | 36 MN 36 MN | 36 MN 36 MN | 36 MN 36 MN | GRANULAR SOILS | SILT-CLAY SOILS | MUCK, PEAT | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| MATERIAL PASSING #40 LL PI | - | - | 40 MX 41 MN NP | 40 MX 41 MN 10 MX | 40 MX 41 MN 11 MN | 40 MX 41 MN 11 MN | 40 MX 41 MN 11 MN | 40 MX 41 MN 11 MN | 40 MX 41 MN 11 MN | 40 MX 41 MN 11 MN | 40 MX 41 MN 11 MN | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| GROUP INDEX | 0 | 0 | 0 | 0 | 1 MX | 0 MX | 0 MX | 0 MX | 0 MX | 0 MX | 0 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 SUBGRADE | EXCELLENT TO GOOD | | | | | FAIR TO POOR | | | | | FAIR TO POOR | POOR | UNSATURABLE | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| PI OF A-7-5 SUBGROUP IS ≤ LL - 30; PI OF A-7-6 SUBGROUP IS > LL - 30 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <p style="text-align: center;">CONSISTENCY OR DENSENESS</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th>PRIMARY SOIL TYPE</th> <th>COMPACTNESS OR CONSISTENCY</th> <th>RANGE OF STANDARD PENETRATION RESISTANCE (N-VALUE)</th> <th>RANGE OF UNCONFINED COMPRESSIVE STRENGTH (TONS/FT²)</th> </tr> <tr> <td>GENERALLY GRANULAR MATERIAL (NON-COHESSIVE)</td> <td>VERY LOOSE LOOSE MEDIUM DENSE DENSE VERY DENSE</td> <td>< 4 4 TO 10 10 TO 30 30 TO 50 > 50</td> <td>N/A</td> </tr> <tr> <td>GENERALLY SILT-CLAY MATERIAL (COHESIVE)</td> <td>VERY SOFT SOFT MEDIUM STIFF STIFF VERY STIFF HARD</td> <td>< 2 2 TO 4 4 TO 8 8 TO 15 15 TO 30 > 30</td> <td>< 0.25 0.25 TO 0.5 0.5 TO 1.0 1 TO 2 2 TO 4 > 4</td> </tr> </table> | | | | | | | | | | PRIMARY SOIL TYPE | COMPACTNESS OR CONSISTENCY | RANGE OF STANDARD PENETRATION RESISTANCE (N-VALUE) | RANGE OF UNCONFINED COMPRESSIVE STRENGTH (TONS/FT ²) | GENERALLY GRANULAR MATERIAL (NON-COHESSIVE) | 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 0.5 0.5 TO 1.0 1 TO 2 2 TO 4 > 4 | <p style="text-align: center;">GROUND WATER</p> <p> WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING</p> <p> STATIC WATER LEVEL AFTER 24 HOURS</p> <p> PERCHED WATER, SATURATED ZONE, OR WATER BEARING STRATA</p> <p> SPRING OR SEEP</p> | | | | | | | | | | <p style="text-align: center;">MISCELLANEOUS SYMBOLS</p> <p> ROADWAY EMBANKMENT (RE) WITH SOIL DESCRIPTION</p> <p> SOIL SYMBOL</p> <p> ARTIFICIAL FILL (AF) OTHER THAN ROADWAY EMBANKMENT</p> <p> INFERRED SOIL BOUNDARY</p> <p> INFERRED ROCK LINE</p> <p> ALLUVIAL SOIL BOUNDARY</p> <p> DIP & DIP DIRECTION OF ROCK STRUCTURES</p> <p> SPT TEST BORING</p> <p> AUGER BORING</p> <p> CORE BORING</p> <p> MONITORING WELL</p> <p> PIEZOMETER INSTALLATION</p> <p> SLOPE INDICATOR INSTALLATION</p> <p> CONE PENETROMETER TEST</p> <p> SOUNDING ROD</p> <p> TEST BORING WITH CORE</p> <p> SPT N-VALUE</p> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| PRIMARY SOIL TYPE | COMPACTNESS OR CONSISTENCY | RANGE OF STANDARD PENETRATION RESISTANCE (N-VALUE) | RANGE OF UNCONFINED COMPRESSIVE STRENGTH (TONS/FT ²) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| GENERALLY GRANULAR MATERIAL (NON-COHESSIVE) | 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 0.5 0.5 TO 1.0 1 TO 2 2 TO 4 > 4 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <p style="text-align: center;">TEXTURE OR GRAIN SIZE</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th>U.S. STD. SIEVE SIZE OPENING (MM)</th> <td>4</td> <td>10</td> <td>40</td> <td>60</td> <td>200</td> <td>270</td> </tr> <tr> <td></td> <td>4.75</td> <td>2.00</td> <td>0.42</td> <td>0.25</td> <td>0.075</td> <td>0.053</td> </tr> <tr> <th>BOULDER (BLDR.)</th> <th>COBBLE (COB.)</th> <th>GRAVEL (GR.)</th> <th>COARSE SAND (CSE. SD.)</th> <th>FINE SAND (F SD.)</th> <th>SILT (SL.)</th> <th>CLAY (CL.)</th> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <th>GRAIN SIZE</th> <td>MM 305</td> <td>75</td> <td>2.0</td> <td>0.25</td> <td>0.05</td> <td>0.005</td> </tr> <tr> <td></td> <td>IN. 12</td> <td>3</td> <td></td> <td></td> <td></td> <td></td> </tr> </table> | | | | | | | | | | U.S. STD. SIEVE SIZE OPENING (MM) | 4 | 10 | 40 | 60 | 200 | 270 | | 4.75 | 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 | | | | | <p style="text-align: center;">RECOMMENDATION SYMBOLS</p> <p> UNDERCUT</p> <p> SHALLOW UNDERCUT</p> <p> UNCLASSIFIED EXCAVATION - UNSUITABLE WASTE</p> <p> UNCLASSIFIED EXCAVATION - ACCEPTABLE DEGRADABLE ROCK</p> <p> UNCLASSIFIED EXCAVATION - ACCEPTABLE, BUT NOT TO BE USED IN THE TOP 3 FEET OF EMBANKMENT OR BACKFILL</p> | | | | | | | | | | <p style="text-align: center;">ROCK HARDNESS</p> <p>VERY HARD: CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK. BREAKING OF HAND SPECIMENS REQUIRES SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK.</p> <p>HARD: CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED TO DETACH HAND SPECIMEN.</p> <p>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.</p> <p>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 PIECES 1 INCH MAXIMUM SIZE BY HARD BLOWS OF THE POINT OF A GEOLOGIST'S PICK.</p> <p>SOFT: CAN BE GROOVED 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.</p> <p>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 FINGER NAIL.</p> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| U.S. STD. SIEVE SIZE OPENING (MM) | 4 | 10 | 40 | 60 | 200 | 270 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 4.75 | 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.) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| GRAIN SIZE | MM 305 | 75 | 2.0 | 0.25 | 0.05 | 0.005 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | IN. 12 | 3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <p style="text-align: center;">SOIL MOISTURE - CORRELATION OF TERMS</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th>SOIL MOISTURE SCALE (ATTERBERG LIMITS)</th> <th>FIELD MOISTURE DESCRIPTION</th> <th>GUIDE FOR FIELD MOISTURE DESCRIPTION</th> </tr> <tr> <td>LL - LIQUID LIMIT</td> <td>- SATURATED - (SAT.)</td> <td>USUALLY LIQUID; VERY WET, USUALLY FROM BELOW THE GROUND WATER TABLE</td> </tr> <tr> <td>PL - PLASTIC LIMIT</td> <td>- WET - (W)</td> <td>SEMISOLID; REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE</td> </tr> <tr> <td>OM - OPTIMUM MOISTURE</td> <td>- MOIST - (M)</td> <td>SOLID; AT OR NEAR OPTIMUM MOISTURE</td> </tr> <tr> <td>SL - SHRINKAGE LIMIT</td> <td>- DRY - (D)</td> <td>REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE</td> </tr> </table> | | | | | | | | | | SOIL MOISTURE SCALE (ATTERBERG LIMITS) | FIELD MOISTURE DESCRIPTION | GUIDE FOR FIELD MOISTURE DESCRIPTION | LL - LIQUID LIMIT | - SATURATED - (SAT.) | USUALLY LIQUID; VERY WET, USUALLY FROM BELOW THE GROUND WATER TABLE | PL - PLASTIC LIMIT | - WET - (W) | SEMISOLID; REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE | OM - OPTIMUM MOISTURE | - MOIST - (M) | SOLID; AT OR NEAR OPTIMUM MOISTURE | SL - SHRINKAGE LIMIT | - DRY - (D) | REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE | <p style="text-align: center;">ABBREVIATIONS</p> <p>AR - AUGER REFUSAL BT - BORING TERMINATED CL - CLAY CPT - COARSE PENETRATION TEST CSE - COARSE DMT - DILATOMETER TEST DPT - DYNAMIC PENETRATION TEST e - VOID RATIO F - FINE FOSS. - FOSSILIFEROUS FRAC. - FRACTURED, FRACTURES FRAGS. - FRAGMENTS HL - HIGHLY</p> <p>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</p> <p>VST - VANE SHEAR TEST WEA. - WEATHERED % - UNIT WEIGHT %g - DRY UNIT WEIGHT</p> <p style="text-align: center;">SAMPLE ABBREVIATIONS</p> <p>S - BULK SS - SPLIT SPOON ST - SHELBY TUBE RS - ROCK RT - RECOMPACTED TRIAXIAL CBR - CALIFORNIA BEARING RATIO</p> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SOIL MOISTURE SCALE (ATTERBERG LIMITS) | FIELD MOISTURE DESCRIPTION | GUIDE FOR FIELD MOISTURE DESCRIPTION | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| LL - LIQUID LIMIT | - SATURATED - (SAT.) | USUALLY LIQUID; VERY WET, USUALLY FROM BELOW THE GROUND WATER TABLE | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| OM - OPTIMUM MOISTURE | - MOIST - (M) | SOLID; AT OR NEAR OPTIMUM MOISTURE | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SL - SHRINKAGE LIMIT | - DRY - (D) | REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <p style="text-align: center;">PLASTICITY</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th rowspan="2">NON PLASTIC SLIGHTLY PLASTIC MODERATELY PLASTIC HIGHLY PLASTIC</th> <th colspan="2">PLASTICITY INDEX (PI)</th> <th rowspan="2">DRY STRENGTH</th> </tr> <tr> <td>0-5</td> <td>6-15</td> <td>VERY LOW SLIGHT MEDIUM HIGH</td> </tr> <tr> <td></td> <td>16-25</td> <td>26 OR MORE</td> <td></td> </tr> </table> | | | | | | | | | | NON PLASTIC SLIGHTLY PLASTIC MODERATELY PLASTIC HIGHLY PLASTIC | PLASTICITY INDEX (PI) | | DRY STRENGTH | 0-5 | 6-15 | VERY LOW SLIGHT MEDIUM HIGH | | 16-25 | 26 OR MORE | | <p style="text-align: center;">EQUIPMENT USED ON SUBJECT PROJECT</p> <p>DRILL UNITS: <input checked="" type="checkbox"/> CME-45C <input type="checkbox"/> CME-55 <input type="checkbox"/> CME-550 <input type="checkbox"/> VANE SHEAR TEST <input type="checkbox"/> PORTABLE HOIST</p> <p>ADVANCING TOOLS: <input type="checkbox"/> CLAY BITS <input type="checkbox"/> 6" CONTINUOUS FLIGHT AUGER <input checked="" type="checkbox"/> 8" HOLLOW AUGERS <input type="checkbox"/> HARD FACED FINGER BITS <input type="checkbox"/> TUNG-CARBIDE INSERTS <input checked="" type="checkbox"/> CASING <input type="checkbox"/> W/ ADVANCER <input type="checkbox"/> TRICONE * STEEL TEETH <input type="checkbox"/> TRICONE * TUNG-CARB. <input type="checkbox"/> CORE BIT</p> <p>HAMMER TYPE: <input checked="" type="checkbox"/> AUTOMATIC <input type="checkbox"/> MANUAL</p> <p>CORE SIZE: <input type="checkbox"/> -B <input type="checkbox"/> -H <input type="checkbox"/> -N Q</p> <p>HAND TOOLS: <input type="checkbox"/> POST HOLE DIGGER <input type="checkbox"/> HAND AUGER <input type="checkbox"/> SOUNDING ROD <input type="checkbox"/> VANE SHEAR TEST</p> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| NON PLASTIC SLIGHTLY PLASTIC MODERATELY PLASTIC HIGHLY PLASTIC | PLASTICITY INDEX (PI) | | DRY STRENGTH | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 0-5 | 6-15 | | VERY LOW SLIGHT MEDIUM HIGH | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 16-25 | 26 OR MORE | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <p style="text-align: center;">COLOR</p> <p>DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-BROWN). MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.</p> | | | | | | | | | | <p style="text-align: center;">FRACATURE SPACING</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th>TERM</th> <th>SPACING</th> </tr> <tr> <td>VERY WIDE</td> <td>MORE THAN 10 FEET</td> </tr> <tr> <td>WIDE</td> <td>3 TO 10 FEET</td> </tr> <tr> <td>MODERATELY CLOSE</td> <td>1 TO 3 FEET</td> </tr> <tr> <td>CLOSE</td> <td>0.16 TO 1 FOOT</td> </tr> <tr> <td>VERY CLOSE</td> <td>LESS THAN 0.16 FEET</td> </tr> </table> | | | | | | | | | | TERM | SPACING | VERY WIDE | MORE THAN 10 FEET | WIDE | 3 TO 10 FEET | MODERATELY CLOSE | 1 TO 3 FEET | CLOSE | 0.16 TO 1 FOOT | VERY CLOSE | LESS THAN 0.16 FEET | <p style="text-align: center;">BEDDING</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th>TERM</th> <th>THICKNESS</th> </tr> <tr> <td>VERY THICKLY BEDDED</td> <td>4 FEET</td> </tr> <tr> <td>THICKLY BEDDED</td> <td>1.5 - 4 FEET</td> </tr> <tr> <td>THINLY BEDDED</td> <td>0.16 - 1.5 FEET</td> </tr> <tr> <td>VERY THINLY BEDDED</td> <td>0.03 - 0.16 FEET</td> </tr> <tr> <td>THICKLY LAMINATED</td> <td>0.008 - 0.03 FEET</td> </tr> <tr> <td>THINLY LAMINATED</td> <td>< 0.008 FEET</td> </tr> </table> | | | | | | | | | | 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 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| TERM | SPACING | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| WIDE | 3 TO 10 FEET | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| MODERATELY CLOSE | 1 TO 3 FEET | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| CLOSE | 0.16 TO 1 FOOT | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| VERY CLOSE | LESS THAN 0.16 FEET | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| 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 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <p style="text-align: center;">INDURATION</p> <p>FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.</p> <p>FRIABLE: RUBBING WITH FINGER FREES NUMEROUS GRAINS; GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE.</p> <p>MODERATELY INDURATED: GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE; BREAKS EASILY WHEN HIT WITH HAMMER.</p> <p>INDURATED: GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE; DIFFICULT TO BREAK WITH HAMMER.</p> <p>EXTREMELY INDURATED: SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE; SAMPLE BREAKS ACROSS GRAINS.</p> | | | | | | | | | | <p style="text-align: center;">NOTES:</p> <p>FIAD= FILLED IN AFTER DRILLING</p> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <p style="text-align: center;">BENCH MARK: BL-48; N 848,016.4680 E 1,663,910.4720</p> | | | | | | | | | | <p style="text-align: center;">ELEVATION: 894.60 FEET</p> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

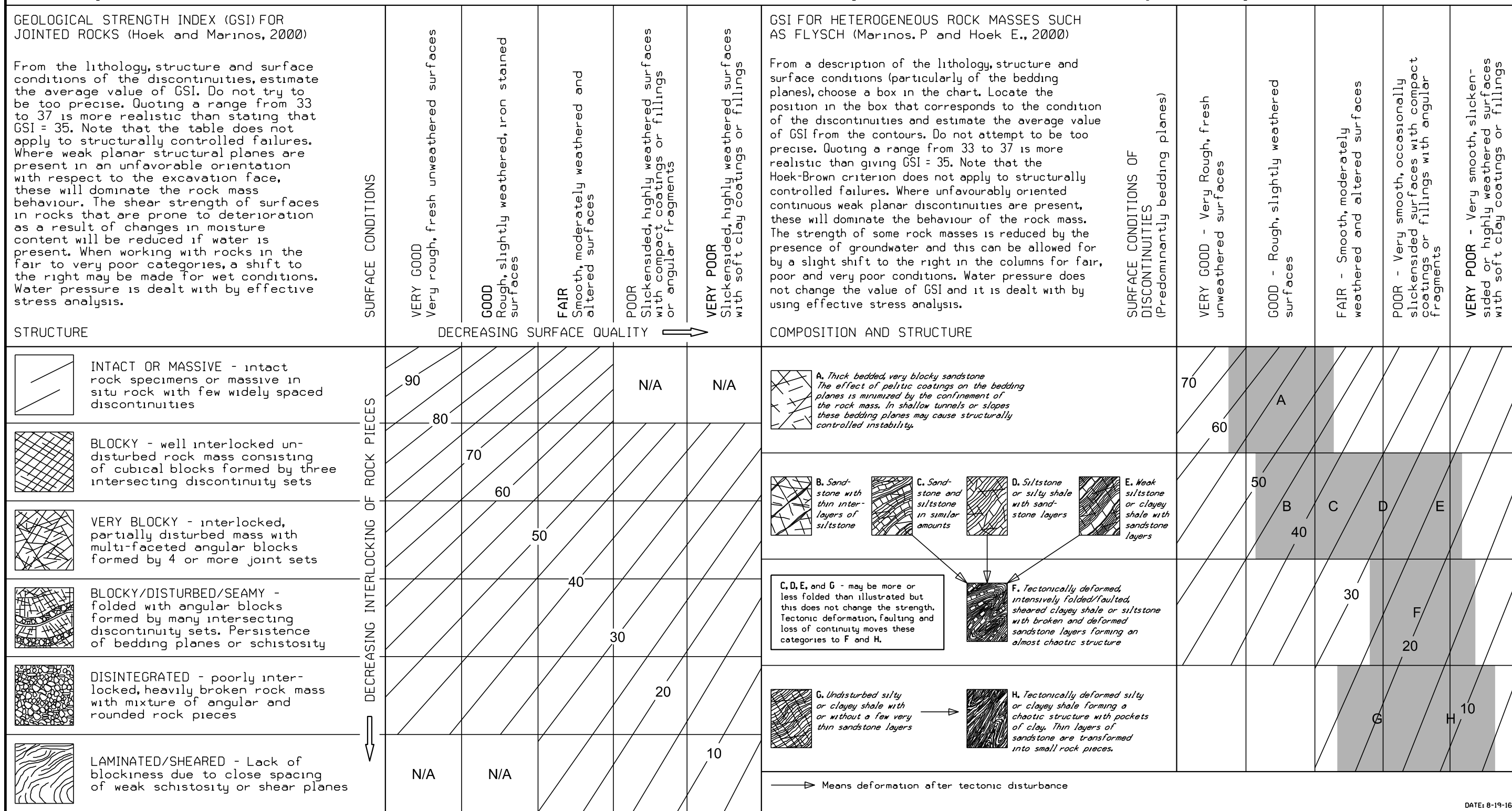
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT

SUBSURFACE INVESTIGATION

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

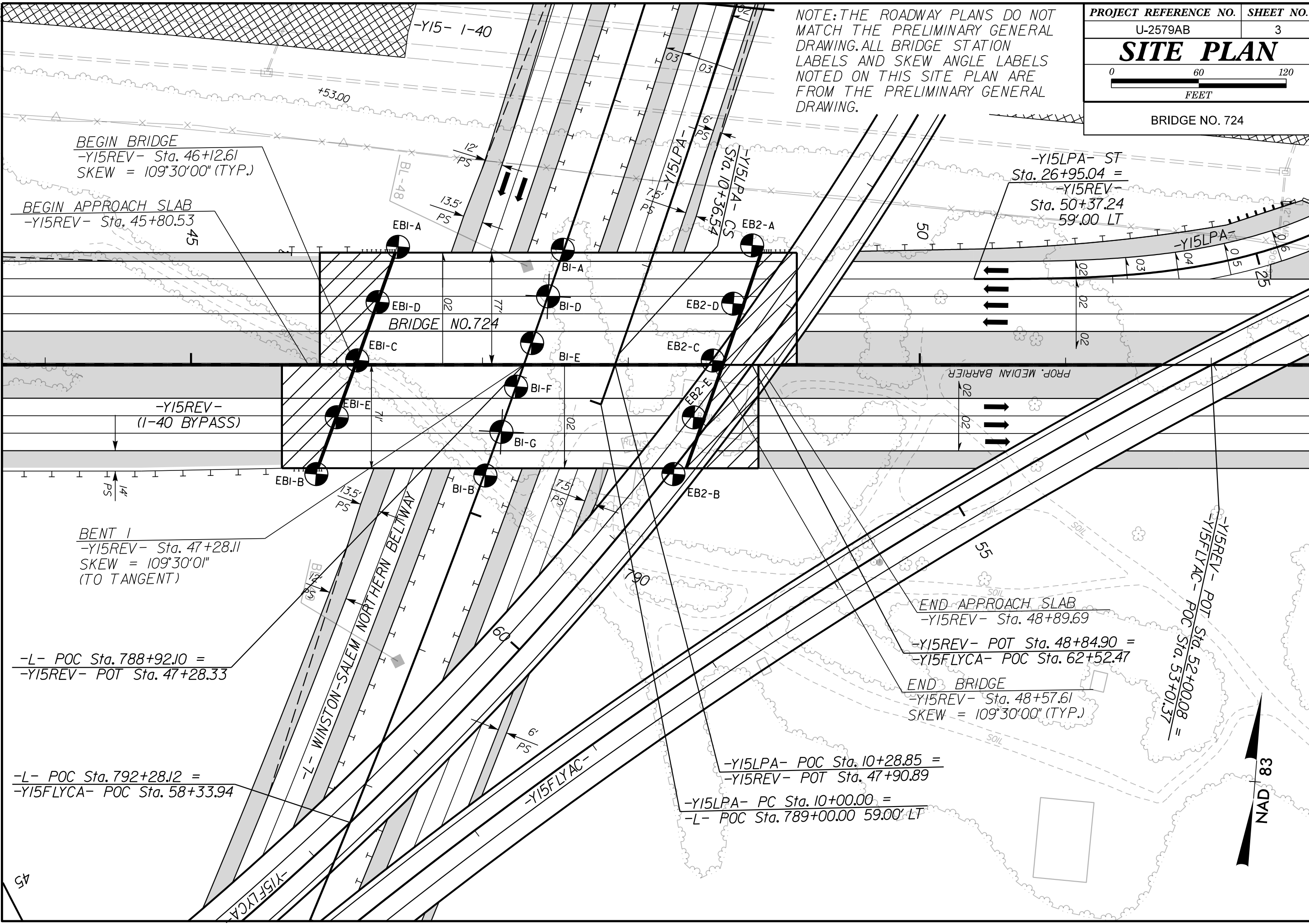
AASHTO LRFD Figure 10.4.6.4-1 — Determination of GSI for Jointed Rock Mass (Marinos and Hoek, 2000)

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



| | |
|-----------------------|-----------|
| PROJECT REFERENCE NO. | SHEET NO. |
| U-2579AB | 3 |
| SITE PLAN | |
| | |
| BRIDGE NO. 724 | |

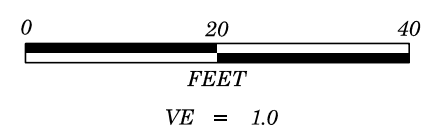
NOTE: THE ROADWAY PLANS DO NOT MATCH THE PRELIMINARY GENERAL DRAWING. ALL BRIDGE STATION LABELS AND SKEW ANGLE LABELS NOTED ON THIS SITE PLAN ARE FROM THE PRELIMINARY GENERAL DRAWING.



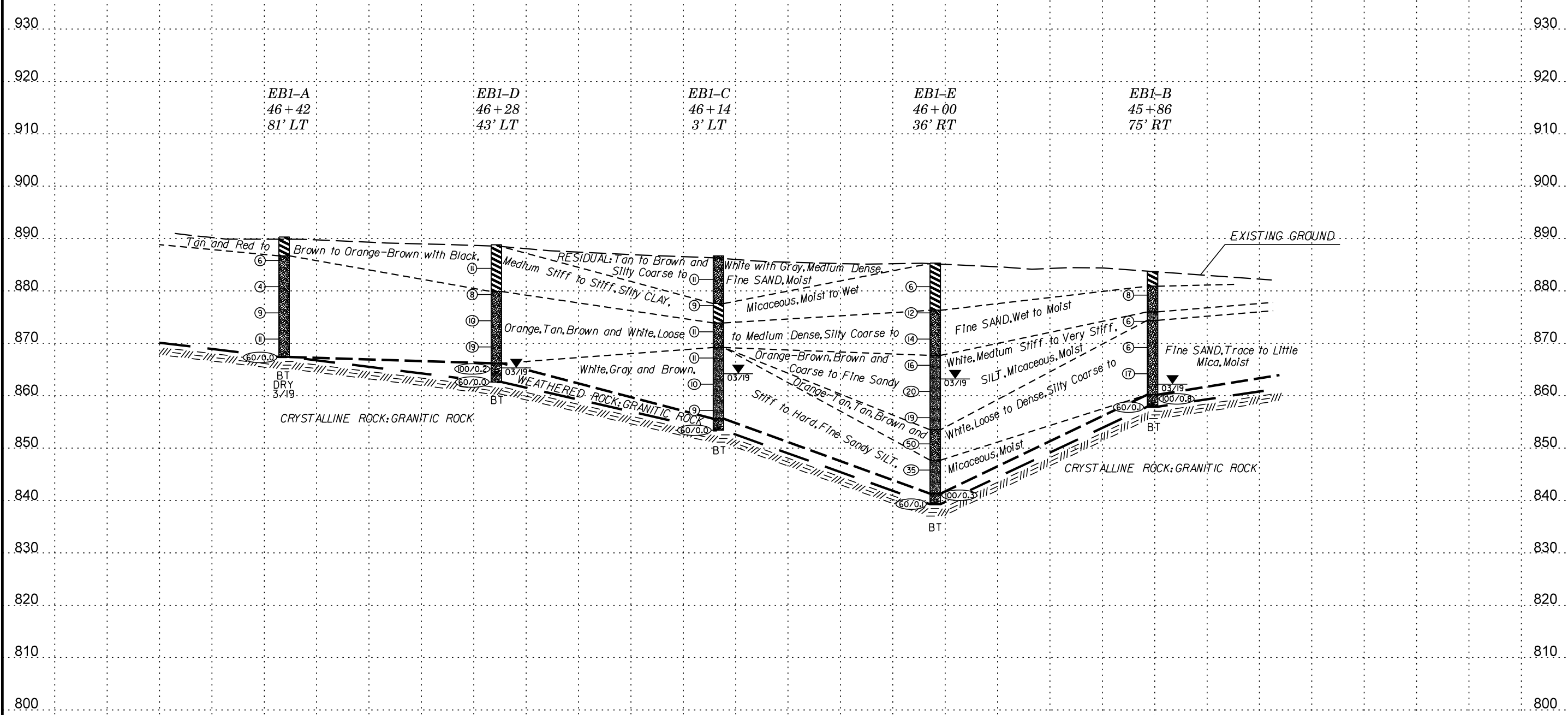
45

NAD 83

-Y15REV- STA. 46+12.61



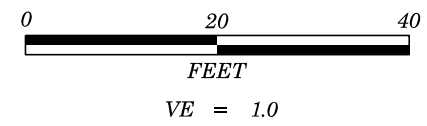
| PROJECT REFERENCE NO. | SHEET NO. |
|--------------------------------------------------------------|-----------|
| U-5979AB | 4 |
| SECTION THROUGH END BENT 1 SKEW ANGLE = 109°30'00" (TYP.) | |



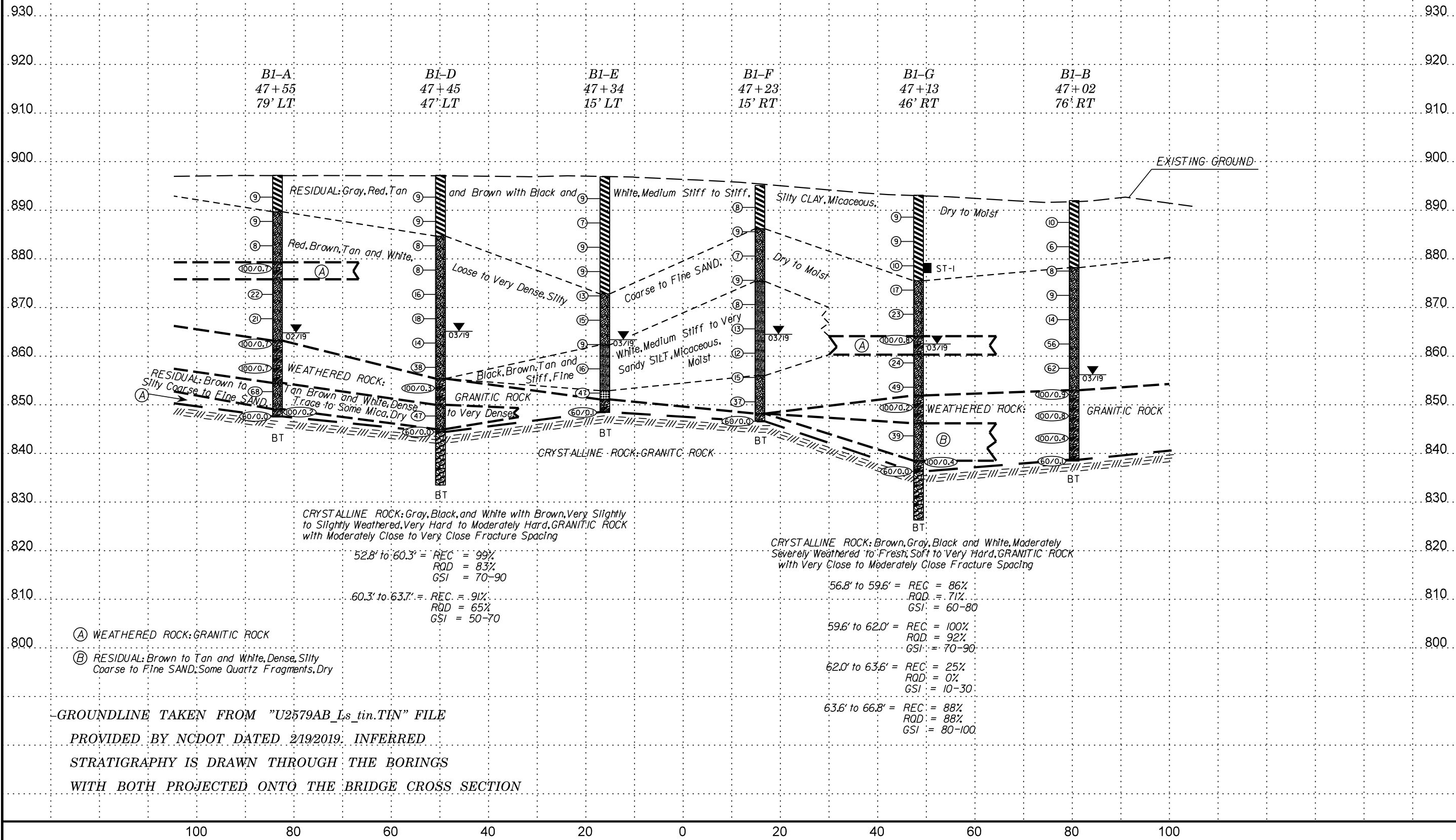
-GROUNDLINE TAKEN FROM "U2579AB_Ls_tin.TIN" FILE
 PROVIDED BY NCDOT DATED 2/19/2019, INFERRED
 STRATIGRAPHY IS DRAWN THROUGH THE BORINGS
 WITH BOTH PROJECTED ONTO THE BRIDGE CROSS SECTION

100 80 60 40 20 0 20 40 60 80 100

-Y15REV- STA. 47+28.11

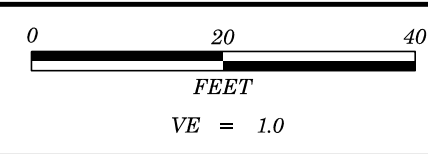


| | |
|-------------------------------------------------------------------|-----------|
| PROJECT REFERENCE NO. | SHEET NO. |
| U-5979AB | 5 |
| SECTION THROUGH BENT 1 SKEW ANGLE = 109°30'01" (TO TANGENT) | |

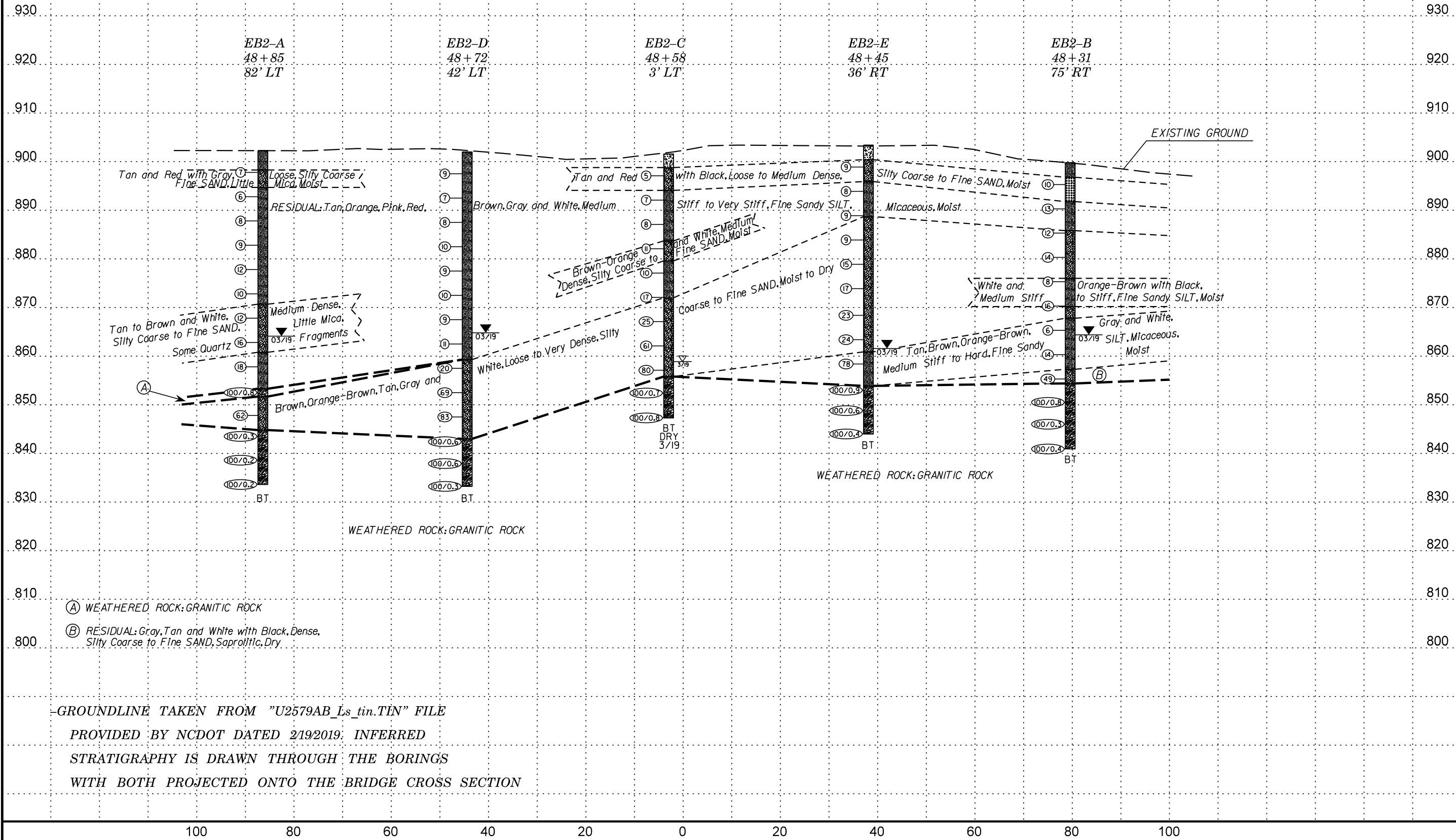


-GROUNDLINE TAKEN FROM "U2579AB_Ls_tin.TIN" FILE
 PROVIDED BY NCDOT DATED 2/19/2019. INFERRED
 STRATIGRAPHY IS DRAWN THROUGH THE BORINGS
 WITH BOTH PROJECTED ONTO THE BRIDGE CROSS SECTION

-Y15REV- STA. 48+57.61



| | |
|--------------------------------------------------------------|-----------|
| PROJECT REFERENCE NO. | SHEET NO. |
| U-5979AB | 6 |
| SECTION THROUGH END BENT 2 SKEW ANGLE = 109°30'00" (TYP.) | |



- (A) WEATHERED ROCK: GRANITIC ROCK
- (B) RESIDUAL: Gray, Tan and White with Black, Dense, Silty Coarse to Fine SAND, Saprottic, Dry

-GROUNDLINE TAKEN FROM "U2579AB_Ls_tin.TIN" FILE
 PROVIDED BY NCDOT DATED 2/19/2019; INFERRED
 STRATIGRAPHY IS DRAWN THROUGH THE BORINGS
 WITH BOTH PROJECTED ONTO THE BRIDGE CROSS SECTION

GEOTECHNICAL BORING REPORT

BORE LOG

| WBS 34839.1.8 | | TIP U-2579AB | | COUNTY FORSYTH | | GEOLOGIST Weaver, P.M. | | | | | | | | | |
|--------------------------------------------------------------------------------------------|-----------------|---------------------|--------------------------|---------------------|-----------------------|-------------------------|-----------------|----|----|-----|-----------|-----|---------------------------|------------|------|
| SITE DESCRIPTION Bridge No. 724 on -Y15REV- (I-40 Bypass) over -L- (Winston-Salem Beltway) | | | | | | | GROUND WTR (ft) | | | | | | | | |
| BORING NO. EB1-A | | STATION 46+42 | | OFFSET 81 ft LT | | ALIGNMENT -Y15REV- | | | | | | | | | |
| COLLAR ELEV. 890.3 ft | | TOTAL DEPTH 23.0 ft | | NORTHING 848,023 | | EASTING 1,663,821 | | | | | | | | | |
| DRILL RIG/HAMMER EFF./DATE RD285584 CME-45C 84% 03/18/2019 | | | DRILL METHOD H.S. Augers | | HAMMER TYPE Automatic | | | | | | | | | | |
| DRILLER Seiler, M. | | START DATE 03/18/19 | | COMP. DATE 03/18/19 | | 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 | | | | | |
| 895 | | | | | | | | | | | | | | | |
| 890 | | | | | | | | | | | | | | 890.3 | 0.0 |
| | | | | | | | | | | | | | | | |
| 885 | 886.8 | 3.5 | 2 | 3 | 3 | | | | | | | | W | 886.7 | 3.6 |
| | | | | | | | | | | | | | | | |
| 880 | 881.8 | 8.5 | 3 | 2 | 2 | | | | | | | | M | | |
| | | | | | | | | | | | | | | | |
| 875 | 876.8 | 13.5 | 5 | 5 | 4 | | | | | | | | M | | |
| | | | | | | | | | | | | | | | |
| 870 | 871.8 | 18.5 | 5 | 5 | 6 | | | | | | | | M | | |
| | | | | | | | | | | | | | | | |
| | 867.3 | 23.0 | 60/0.0 | | | | | | | | | | | 867.4 | 22.9 |
| | | | | | | | | | | | | | | 867.3 | 23.0 |
| | | | | | | | | | | | | | | | |

| WBS 34839.1.8 | | TIP U-2579AB | | COUNTY FORSYTH | | GEOLOGIST Weaver, P.M. | | | | | | | | | |
|--------------------------------------------------------------------------------------------|-----------------|---------------------|--------------------------|---------------------|-----------------------|-------------------------|-----------------|----|----|-----|-----------|-----|---------------------------|------------|------|
| SITE DESCRIPTION Bridge No. 724 on -Y15REV- (I-40 Bypass) over -L- (Winston-Salem Beltway) | | | | | | | GROUND WTR (ft) | | | | | | | | |
| BORING NO. EB1-D | | STATION 46+28 | | OFFSET 43 ft LT | | ALIGNMENT -Y15REV- | | | | | | | | | |
| COLLAR ELEV. 888.8 ft | | TOTAL DEPTH 26.2 ft | | NORTHING 847,984 | | EASTING 1,663,810 | | | | | | | | | |
| DRILL RIG/HAMMER EFF./DATE RD285584 CME-45C 84% 03/18/2019 | | | DRILL METHOD H.S. Augers | | HAMMER TYPE Automatic | | | | | | | | | | |
| DRILLER Seiler, M. | | START DATE 03/18/19 | | COMP. DATE 03/18/19 | | 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 | | | | | |
| 890 | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | 888.8 | 0.0 |
| | | | | | | | | | | | | | | | |
| 885 | 885.3 | 3.5 | 3 | 5 | 6 | | | | | | | | M | | |
| | | | | | | | | | | | | | | | |
| 880 | 880.3 | 8.5 | 3 | 4 | 4 | | | | | | | | M | 879.9 | 8.9 |
| | | | | | | | | | | | | | | | |
| 875 | 875.3 | 13.5 | 5 | 5 | 5 | | | | | | | | M | | |
| | | | | | | | | | | | | | | | |
| 870 | 870.3 | 18.5 | 7 | 9 | 10 | | | | | | | | D | | |
| | | | | | | | | | | | | | | | |
| 865 | 865.3 | 23.5 | 100/0.2 | | | | | | | | | | | 866.2 | 22.6 |
| | | | | | | | | | | | | | | | |
| | 862.6 | 26.2 | 60/0.0 | | | | | | | | | | | 862.6 | 26.2 |
| | | | | | | | | | | | | | | | |

NCDOT BORE DOUBLE U2579AB_BRIDGE330724_GINT LOGS.GPJ NC_DOT_GDT 5/13/19

GEOTECHNICAL BORING REPORT

BORE LOG

| WBS 34839.1.8 | | TIP U-2579AB | | COUNTY FORSYTH | | GEOLOGIST Weaver, P.M. | | | | | | | | | |
|--------------------------------------------------------------------------------------------|-----------------|---------------------|------------|--------------------------|-------|-------------------------|-----------------|----|----|-----|-----------|---------|---------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| SITE DESCRIPTION Bridge No. 724 on -Y15REV- (I-40 Bypass) over -L- (Winston-Salem Beltway) | | | | | | | GROUND WTR (ft) | | | | | | | | |
| BORING NO. EB1-C | | STATION 46+14 | | OFFSET 3 ft LT | | ALIGNMENT -Y15REV- | | | | | | | | | |
| COLLAR ELEV. 886.7 ft | | TOTAL DEPTH 33.3 ft | | NORTHING 847,943 | | EASTING 1,663,799 | | | | | | | | | |
| DRILL RIG/HAMMER EFF./DATE RD285584 CME-45C 84% 03/18/2019 | | | | DRILL METHOD H.S. Augers | | HAMMER TYPE Automatic | | | | | | | | | |
| DRILLER Seiler, M. | | START DATE 03/18/19 | | COMP. DATE 03/18/19 | | SURFACE WATER DEPTH N/A | | | | | | | | | |
| ELEV (ft) | DRIVE ELEV (ft) | DEPTH (ft) | BLOW COUNT | | | BLOWS PER FOOT | | | | | SAMP. NO. | LOG MOI | SOIL AND ROCK DESCRIPTION | DEPTH (ft) | |
| | | | 0.5ft | 0.5ft | 0.5ft | 0 | 25 | 50 | 75 | 100 | | | | | |
| 890 | | | | | | | | | | | | | | | |
| 885 | 883.2 | 3.5 | 3 | 6 | 5 | | | | | | | | M | 886.7 GROUND SURFACE 0.0 RESIDUAL Tan to Brown and White with Gray, Silty Coarse to Fine SAND | |
| 880 | 878.2 | 8.5 | 4 | 5 | 4 | | | | | | | | M | 877.6 Tan and Brown, Silty CLAY, Micaceous 9.1 | |
| 875 | 873.2 | 13.5 | 4 | 5 | 6 | | | | | | | | M | 873.9 Tan, Brown and White with Gray, Silty Coarse to Fine SAND, Trace Quartz Fragments 12.8 | |
| 870 | 868.2 | 18.5 | 3 | 6 | 5 | | | | | | | | M | 869.2 White, Gray and Brown, Fine Sandy SILT, Micaceous 17.5 | |
| 865 | 863.2 | 23.5 | 4 | 4 | 6 | | | | | | | | M | | |
| 860 | 858.2 | 28.5 | 3 | 3 | 6 | | | | | | | | M | | |
| 855 | 853.4 | 33.3 | | | | | | | | | | | M | 855.6 WEATHERED ROCK GRANITIC ROCK 31.1 853.4 Boring Terminated with Standard Penetration Test Refusal at Elevation 853.4 ft on Crystalline Rock: GRANITIC ROCK 33.3 | |

| WBS 34839.1.8 | | TIP U-2579AB | | COUNTY FORSYTH | | GEOLOGIST Weaver, P.M. | | | | | | | | | |
|--------------------------------------------------------------------------------------------|-----------------|---------------------|------------|--------------------------|-------|-------------------------|-----------------|----|----|-----|-----------|---------|---------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| SITE DESCRIPTION Bridge No. 724 on -Y15REV- (I-40 Bypass) over -L- (Winston-Salem Beltway) | | | | | | | GROUND WTR (ft) | | | | | | | | |
| BORING NO. EB1-E | | STATION 46+00 | | OFFSET 36 ft RT | | ALIGNMENT -Y15REV- | | | | | | | | | |
| COLLAR ELEV. 885.3 ft | | TOTAL DEPTH 46.0 ft | | NORTHING 847,903 | | EASTING 1,663,789 | | | | | | | | | |
| DRILL RIG/HAMMER EFF./DATE RD285584 CME-45C 84% 03/18/2019 | | | | DRILL METHOD H.S. Augers | | HAMMER TYPE Automatic | | | | | | | | | |
| DRILLER Seiler, M. | | START DATE 03/18/19 | | COMP. DATE 03/18/19 | | SURFACE WATER DEPTH N/A | | | | | | | | | |
| ELEV (ft) | DRIVE ELEV (ft) | DEPTH (ft) | BLOW COUNT | | | BLOWS PER FOOT | | | | | SAMP. NO. | LOG MOI | SOIL AND ROCK DESCRIPTION | DEPTH (ft) | |
| | | | 0.5ft | 0.5ft | 0.5ft | 0 | 25 | 50 | 75 | 100 | | | | | |
| 890 | | | | | | | | | | | | | | | |
| 885 | 881.8 | 3.5 | 2 | 3 | 3 | | | | | | | | M | 885.3 GROUND SURFACE 0.0 RESIDUAL Orange-Brown to Tan with Black, Silty CLAY, Micaceous | |
| 880 | 876.8 | 8.5 | 4 | 6 | 6 | | | | | | | | M | 876.3 Brown, Tan and White, Silty Coarse to Fine SAND, Little Quartz Fragments 9.0 | |
| 875 | 871.8 | 13.5 | 7 | 7 | 7 | | | | | | | | M | | |
| 870 | 866.8 | 18.5 | 6 | 8 | 8 | | | | | | | | M | 867.7 Brown and White, Coarse to Fine Sandy SILT, Micaceous, Saprolitic in Sample at 28.5' 17.6 | |
| 865 | 861.8 | 23.5 | 6 | 7 | 13 | | | | | | | | M | | |
| 860 | 856.8 | 28.5 | 6 | 8 | 11 | | | | | | | | M | 853.5 Tan and White, Silty Coarse to Fine SAND, Trace Mica, Saprolitic 31.8 | |
| 855 | 851.8 | 33.5 | 18 | 22 | 28 | | | | | | | | M | 847.7 Brown and White, Fine Sandy SILT, Micaceous, Saprolitic 37.6 | |
| 850 | 846.8 | 38.5 | 16 | 18 | 17 | | | | | | | | M | | |
| 845 | 841.8 | 43.5 | 17 | 100/0.3 | | | | | | | | | M | 841.3 WEATHERED ROCK GRANITIC ROCK 44.0 | |
| 840 | 839.4 | 45.9 | | | | | | | | | | | M | 839.4 WEATHERED ROCK GRANITIC ROCK 45.9 839.3 CRYSTALLINE ROCK GRANITIC ROCK 46.0 Boring Terminated with Standard Penetration Test Refusal at Elevation 839.3 ft in Crystalline Rock: GRANITIC ROCK | |

NCDOT BORE DOUBLE U2579AB_BRDGE330724_GINT LOGS.GPJ NC_DOT_GDT 5/13/19

GEOTECHNICAL BORING REPORT

BORE LOG

| WBS 34839.1.8 | | TIP U-2579AB | | COUNTY FORSYTH | | GEOLOGIST Weaver, P.M. | | | | | | | | | | |
|--------------------------------------------------------------------------------------------|-----------------|---------------------|------------|--------------------------|-------|-------------------------|-----------------|----|----|-----|-----------|-----|---------------------------|------------|------|-------------------------------------------------------------------------------------------------------------------|
| SITE DESCRIPTION Bridge No. 724 on -Y15REV- (I-40 Bypass) over -L- (Winston-Salem Beltway) | | | | | | | GROUND WTR (ft) | | | | | | | | | |
| BORING NO. EB1-B | | STATION 45+86 | | OFFSET 75 ft RT | | ALIGNMENT -Y15REV- | | | | | | | | | | |
| COLLAR ELEV. 883.7 ft | | TOTAL DEPTH 25.9 ft | | NORTHING 847,863 | | EASTING 1,663,778 | | | | | | | | | | |
| DRILL RIG/HAMMER EFF./DATE RD285584 CME-45C 84% 03/18/2019 | | | | DRILL METHOD H.S. Augers | | HAMMER TYPE Automatic | | | | | | | | | | |
| DRILLER Seiler, M. | | START DATE 03/18/19 | | COMP. DATE 03/18/19 | | SURFACE WATER DEPTH N/A | | | | | | | | | | |
| ELEV (ft) | DRIVE ELEV (ft) | DEPTH (ft) | BLOW COUNT | | | BLOWS PER FOOT | | | | | SAMP. NO. | LOG | SOIL AND ROCK DESCRIPTION | | | |
| | | | 0.5ft | 0.5ft | 0.5ft | 0 | 25 | 50 | 75 | 100 | | | ELEV. (ft) | DEPTH (ft) | | |
| 885 | | | | | | | | | | | | | | 883.7 | 0.0 | GROUND SURFACE |
| | | | | | | | | | | | | | | 880.9 | 2.8 | RESIDUAL Tan and Red, Silty CLAY, Moist |
| 880 | 880.2 | 3.5 | 3 | 4 | 4 | | | | | | | M | | | | Orange, Tan and White, Silty Coarse to Fine SAND, Little Mica |
| | | | | | | | | | | | | | | 876.0 | 7.7 | Orange-Brown and Brown, Fine Sandy SILT, Micaceous |
| 875 | 875.2 | 8.5 | 3 | 3 | 3 | | | | | | | M | | 874.4 | 9.3 | Orange-Tan, Brown and White, Silty Coarse to Fine SAND, Trace to Little Mica |
| | | | | | | | | | | | | | | | | |
| 870 | 870.2 | 13.5 | 3 | 3 | 3 | | | | | | | M | | | | |
| | | | | | | | | | | | | | | | | |
| 865 | 865.2 | 18.5 | 5 | 10 | 7 | | | | | | | M | | | | |
| | | | | | | | | | | | | | | | | |
| 860 | 860.2 | 23.5 | 30 | 70/0.3 | | | | | | | | M | | 860.2 | 23.5 | WEATHERED ROCK GRANITIC ROCK |
| | | | | | | | | | | | | | | 857.9 | 25.8 | CRYSTALLINE ROCK GRANITIC ROCK |
| | 857.9 | 25.8 | 60/0.1 | | | | | | | | | | | 857.8 | 25.9 | CRYSTALLINE ROCK GRANITIC ROCK |
| | | | | | | | | | | | | | | | | Boring Terminated with Standard Penetration Test Refusal at Elevation 857.8 ft in Crystalline Rock: GRANITIC ROCK |

NCDOT BORE DOUBLE U2579AB_BRDGE330724_GINT LOGS.GPJ NC_DOT_GDT 5/13/19

GEOTECHNICAL BORING REPORT

BORE LOG

| | | | |
|--------------------------------------------------------------------------------------------|---------------------|--------------------------|----------------------------------|
| WBS 34839.1.8 | TIP U-2579AB | COUNTY FORSYTH | GEOLOGIST Pastrana, C.R. |
| SITE DESCRIPTION Bridge No. 724 on -Y15REV- (I-40 Bypass) over -L- (Winston-Salem Beltway) | | | GROUND WTR (ft) |
| BORING NO. B1-A | STATION 47+55 | OFFSET 79 ft LT | ALIGNMENT -Y15REV- 0 HR. Dry |
| COLLAR ELEV. 897.2 ft | TOTAL DEPTH 49.6 ft | NORTHING 848,030 | EASTING 1,663,934 24 HR. 32.4 |
| DRILL RIG/HAMMER EFF./DATE RD285584 CME-45C 84% 03/18/2019 | | DRILL METHOD H.S. Augers | HAMMER TYPE Automatic |
| DRILLER Seiler, M. | START DATE 03/20/19 | COMP. DATE 03/20/19 | SURFACE WATER DEPTH N/A |

| ELEV (ft) | DRIVE ELEV (ft) | DEPTH (ft) | BLOW COUNT | | | BLOWS PER FOOT | | | | | SAMP. NO. | LOG | SOIL AND ROCK DESCRIPTION | | | |
|-----------|-----------------|------------|------------|--------|--------|----------------|----|----|---------|-----|-----------|-----|---------------------------|------------|------|-------------------------------------------------------------------------------------------------------------------|
| | | | 0.5ft | 0.5ft | 0.5ft | 0 | 25 | 50 | 75 | 100 | | | ELEV. (ft) | DEPTH (ft) | | |
| 900 | | | | | | | | | | | | | | 897.2 | 0.0 | GROUND SURFACE |
| 895 | 893.7 | 3.5 | 3 | 4 | 5 | | | | | | | M | | 889.7 | 7.5 | RESIDUAL Red-Brown to Tan-Brown to Brown, Silty CLAY, Micaceous |
| 890 | 888.7 | 8.5 | 4 | 4 | 5 | | | | | | | D | | | | Tan-Brown, Silty Coarse to Fine SAND |
| 885 | 883.7 | 13.5 | 5 | 4 | 4 | | | | | | | D | | | | |
| 880 | 878.7 | 18.5 | 44 | 56/0.2 | | | | | 100/0.7 | | | | | 879.3 | 17.9 | WEATHERED ROCK GRANITIC ROCK |
| 875 | 873.7 | 23.5 | 17 | 12 | 10 | | | | | | | D | | 875.8 | 21.4 | TRIASSIC RESIDUAL Tan, Brown and White, Silty Coarse to Fine SAND, Trace Mica |
| 870 | 868.7 | 28.5 | 5 | 10 | 11 | | | | | | | D | | | | |
| 865 | 863.7 | 33.5 | 39 | 55 | 45/0.2 | | | | 100/0.7 | | | | | 863.2 | 34.0 | WEATHERED ROCK GRANITIC ROCK |
| 860 | 858.7 | 38.5 | 36 | 62 | 38/0.2 | | | | 100/0.7 | | | | | | | |
| 855 | 853.7 | 43.5 | 25 | 31 | 37 | | | | | | | D | | 854.5 | 42.7 | TRIASSIC RESIDUAL White and Brown, Silty Coarse to Fine SAND, Trace Mica |
| 850 | 848.7 | 48.5 | | | | | | | | | | | | 849.1 | 48.1 | WEATHERED ROCK GRANITIC ROCK |
| | 847.6 | 49.6 | 100/0.2 | | | | | | 60/0.0 | | | | | 847.6 | 49.6 | WEATHERED ROCK GRANITIC ROCK |
| | | | 60/0.0 | | | | | | | | | | | | | Boring Terminated with Standard Penetration Test Refusal at Elevation 847.6 ft on Crystalline Rock: GRANITIC ROCK |

NCDOT BORE DOUBLE U2579AB_BRDGE330724_GINT LOGS.GPJ NC_DOT_GDT 5/13/19

GEOTECHNICAL BORING REPORT BORE LOG

SHEET 11

| WBS 34839.1.8 | | TIP U-2579AB | | COUNTY FORSYTH | | GEOLOGIST Pastrana, C.R. | | | | | | | | |
|--------------------------------------------------------------------------------------------|-----------------|--------------------------|------------|-----------------------|-------|--------------------------|----|----|----|-----------|---------|-------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|
| SITE DESCRIPTION Bridge No. 724 on -Y15REV- (I-40 Bypass) over -L- (Winston-Salem Beltway) | | | | | | GROUND WTR (ft) | | | | | | | | |
| BORING NO. B1-D | | STATION 47+45 | | OFFSET 47 ft LT | | ALIGNMENT -Y15REV- | | | | | | | | |
| COLLAR ELEV. 897.2 ft | | TOTAL DEPTH 63.7 ft | | NORTHING 847,997 | | EASTING 1,663,927 | | | | | | | | |
| DRILL RIG/HAMMER EFF./DATE RD285584 CME-45C 84% 03/18/2019 | | DRILL METHOD H.S. Augers | | HAMMER TYPE Automatic | | | | | | | | | | |
| DRILLER Seiler, M. | | START DATE 03/20/19 | | COMP. DATE 03/21/19 | | SURFACE WATER DEPTH N/A | | | | | | | | |
| ELEV (ft) | DRIVE ELEV (ft) | DEPTH (ft) | BLOW COUNT | | | BLOWS PER FOOT | | | | SAMP. NO. | LOG MOI | L O G | SOIL AND ROCK DESCRIPTION | DEPTH (ft) |
| | | | 0.5ft | 0.5ft | 0.5ft | 0 | 25 | 50 | 75 | | | | | |
| 900 | | | | | | | | | | | | | 897.2 | 0.0 |
| | | | | | | | | | | | | | GROUND SURFACE | |
| 895 | 893.7 | 3.5 | 4 | 4 | 5 | | | | | | | M | RESIDUAL Red-Brown to Tan-Brown and Red, Silty CLAY, Micaceous, Some Rock Fragments | |
| 890 | 888.7 | 8.5 | 5 | 4 | 5 | | | | | | | D | | |
| 885 | 883.7 | 13.5 | 5 | 4 | 4 | | | | | | | D | 884.7 | 12.5 |
| 880 | 878.7 | 18.5 | 4 | 4 | 4 | | | | | | | D | Tan-Brown and White, Silty Coarse to Fine SAND, Trace Mica | |
| 875 | 873.7 | 23.5 | 6 | 7 | 9 | | | | | | | D | | |
| 870 | 868.7 | 28.5 | 6 | 9 | 9 | | | | | | | M | | |
| 865 | 863.7 | 33.5 | 4 | 6 | 8 | | | | | | | M | | |
| 860 | 858.7 | 38.5 | 8 | 15 | 23 | | | | | | | M | | |
| 855 | 853.7 | 43.5 | 100/0.3 | | | | | | | | | | 855.4 | 41.8 |
| | | | | | | | | | | | | | WEATHERED ROCK GRANITIC ROCK | |
| 850 | 848.7 | 48.5 | 40 | 28 | 19 | | | | | | | D | 850.0 | 47.2 |
| | | | | | | | | | | | | | RESIDUAL Brown to Tan-Brown with White, Silty Coarse to Fine SAND, Some Mica | |
| 845 | 844.4 | 52.8 | 60/0.0 | | | | | | | | | | 845.0 | 52.2 |
| | | | | | | | | | | | | | 844.4 | 52.8 |
| | | | | | | | | | | | | | WEATHERED ROCK GRANITIC ROCK | |
| 840 | | | | | | | | | | | | | 836.9 | 60.3 |
| | | | | | | | | | | | | | CRYSTALLINE ROCK Gray, Black and White, Very Slightly Weathered, Hard to Very Hard, GRANITIC ROCK with Close to Moderately Close Fracture Spacing REC=99% RQD=83% GSI=70-90 | |
| 835 | | | | | | | | | | | | | 833.5 | 63.7 |
| | | | | | | | | | | | | | White with Gray and Brown, Slightly Weathered, Moderately Hard to Hard, GRANITIC ROCK with Very Close to Close Fracture Spacing REC=91% RQD=65% GSI=50-70 Boring Terminated at Elevation 833.5 ft in Crystalline Rock: GRANITIC ROCK | |

NCDOT BORE SINGLE U2579AB_BRIDGE330724_GINT LOGS.GPJ NC_DOT.GDT 5/13/19

GEOTECHNICAL BORING REPORT CORE LOG

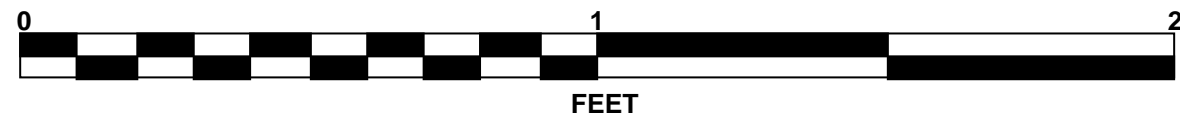
SHEET 11

| WBS 34839.1.8 | | TIP U-2579AB | | COUNTY FORSYTH | | GEOLOGIST Pastrana, C.R. | | | | | | |
|--------------------------------------------------------------------------------------------|---------------|--------------------------|----------|----------------------------------------------------------|----------------|--------------------------|-----------|-------------------|--------------|-------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|
| SITE DESCRIPTION Bridge No. 724 on -Y15REV- (I-40 Bypass) over -L- (Winston-Salem Beltway) | | | | | | GROUND WTR (ft) | | | | | | |
| BORING NO. B1-D | | STATION 47+45 | | OFFSET 47 ft LT | | ALIGNMENT -Y15REV- | | | | | | |
| COLLAR ELEV. 897.2 ft | | TOTAL DEPTH 63.7 ft | | NORTHING 847,997 | | EASTING 1,663,927 | | | | | | |
| DRILL RIG/HAMMER EFF./DATE RD285584 CME-45C 84% 03/18/2019 | | DRILL METHOD H.S. Augers | | HAMMER TYPE Automatic | | | | | | | | |
| DRILLER Seiler, M. | | START DATE 03/20/19 | | COMP. DATE 03/21/19 | | SURFACE WATER DEPTH N/A | | | | | | |
| CORE SIZE NQ | | TOTAL RUN 10.9 ft | | | | | | | | | | |
| ELEV (ft) | RUN ELEV (ft) | DEPTH (ft) | RUN (ft) | DRILL RATE (Min/ft) | RUN REC (ft) % | RQD (ft) % | SAMP. NO. | STRATA REC (ft) % | RQD (ft) % | L O G | DESCRIPTION AND REMARKS | DEPTH (ft) |
| 844.4 | 844.4 | 52.8 | 3.9 | 1:48/1.0 1:33/1.0 2:01/1.0 1:20/0.9 | (3.8) 97% | (3.0) 77% | | (7.4) 99% | (6.2) 83% | | Begin Coring @ 52.8 ft | 52.8 |
| 840 | 840.5 | 56.7 | 5.0 | 1:43/1.0 1:16/1.0 1:25/1.0 1:34/1.0 1:39/1.0 | (5.0) 100% | (4.4) 88% | | | | | Gray, Black and White, Very Slightly Weathered, Hard to Very Hard, GRANITIC ROCK with Close to Moderately Close Fracture Spacing Some foliation at 30 degrees to 80 degrees Three areas <0.16' thick with very close fracture spacing Isolated iron staining of fracture faces GSI=70-90 | 60.3 |
| 835 | 835.5 | 61.7 | 2.0 | 2:08/1.0 1:27/1.0 | (1.7) 85% | (1.0) 50% | | (3.1) 91% | (2.2) 65% | | White with Gray and Brown, Slightly Weathered, Moderately Hard to Hard, GRANITIC ROCK with Very Close to Close Fracture Spacing Iron staining and micaceous silt on fracture faces Core loss occurred at end of run GSI=50-70 | 63.7 |
| | 833.5 | 63.7 | | | | | | | | | Boring Terminated at Elevation 833.5 ft in Crystalline Rock: GRANITIC ROCK | |

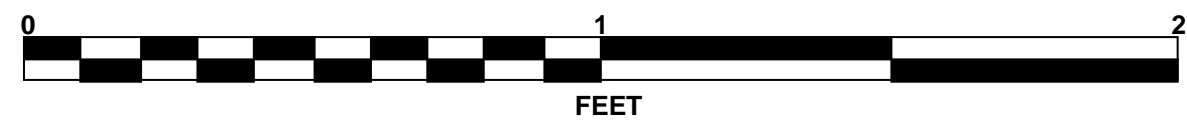
NCDOT BORE SINGLE U2579AB_BRIDGE330724_GINT LOGS.GPJ NC_DOT.GDT 5/13/19

CORE PHOTOGRAPHS

B1-D
BOX 1: 52.8 - 61.7 FEET



B1-D
BOX 2: 61.7 - 63.7 FEET



GEOTECHNICAL BORING REPORT

BORE LOG

| | | | | | | | |
|--------------------------------------------------------------------------------------------|--|---------------------|--|--------------------------|--|-------------------------|-----------------|
| WBS 34839.1.8 | | TIP U-2579AB | | COUNTY FORSYTH | | GEOLOGIST Weaver, P.M. | |
| SITE DESCRIPTION Bridge No. 724 on -Y15REV- (I-40 Bypass) over -L- (Winston-Salem Beltway) | | | | | | | GROUND WTR (ft) |
| BORING NO. B1-E | | STATION 47+34 | | OFFSET 15 ft LT | | ALIGNMENT -Y15REV- | |
| COLLAR ELEV. 896.9 ft | | TOTAL DEPTH 48.5 ft | | NORTHING 847,964 | | EASTING 1,663,918 | |
| DRILL RIG/HAMMER EFF./DATE RD285584 CME-45C 84% 03/18/2019 | | | | DRILL METHOD H.S. Augers | | HAMMER TYPE Automatic | |
| DRILLER Seiler, M. | | START DATE 03/19/19 | | COMP. DATE 03/19/19 | | 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 | | | | | |
| 900 | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | |
| 895 | | | | | | | | | | | | | | | |
| | 893.4 | 3.5 | | 4 | 4 | 5 | | | | | | | | | |
| 890 | | | | | | | | | | | | | | | |
| | 888.4 | 8.5 | | 3 | 3 | 4 | | | | | | | | | |
| 885 | | | | | | | | | | | | | | | |
| | 883.4 | 13.5 | | 4 | 5 | 4 | | | | | | | | | |
| 880 | | | | | | | | | | | | | | | |
| | 878.4 | 18.5 | | 3 | 4 | 5 | | | | | | | | | |
| 875 | | | | | | | | | | | | | | | |
| | 873.4 | 23.5 | | 4 | 6 | 7 | | | | | | | | | |
| 870 | | | | | | | | | | | | | | | |
| | 868.4 | 28.5 | | 4 | 7 | 8 | | | | | | | | | |
| 865 | | | | | | | | | | | | | | | |
| | 863.4 | 33.5 | | 3 | 4 | 5 | | | | | | | | | |
| 860 | | | | | | | | | | | | | | | |
| | 858.4 | 38.5 | | 5 | 8 | 8 | | | | | | | | | |
| 855 | | | | | | | | | | | | | | | |
| | 853.4 | 43.5 | | 9 | 18 | 29 | | | | | | | | | |
| 850 | | | | | | | | | | | | | | | |
| | 848.5 | 48.4 | | 60/0.1 | | | | | | | | | | | 60/0.1 |

| | | | | | | | |
|--------------------------------------------------------------------------------------------|--|---------------------|--|--------------------------|--|-------------------------|-----------------|
| WBS 34839.1.8 | | TIP U-2579AB | | COUNTY FORSYTH | | GEOLOGIST Weaver, P.M. | |
| SITE DESCRIPTION Bridge No. 724 on -Y15REV- (I-40 Bypass) over -L- (Winston-Salem Beltway) | | | | | | | GROUND WTR (ft) |
| BORING NO. B1-F | | STATION 47+23 | | OFFSET 15 ft RT | | ALIGNMENT -Y15REV- | |
| COLLAR ELEV. 895.1 ft | | TOTAL DEPTH 48.5 ft | | NORTHING 847,933 | | EASTING 1,663,910 | |
| DRILL RIG/HAMMER EFF./DATE RD285584 CME-45C 84% 03/18/2019 | | | | DRILL METHOD H.S. Augers | | HAMMER TYPE Automatic | |
| DRILLER Seiler, M. | | START DATE 03/19/19 | | COMP. DATE 03/19/19 | | 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 | | | | | |
| 900 | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | |
| 895 | | | | | | | | | | | | | | | |
| | 891.6 | 3.5 | | 4 | 4 | 4 | | | | | | | | | |
| 890 | | | | | | | | | | | | | | | |
| | 886.6 | 8.5 | | 5 | 5 | 4 | | | | | | | | | |
| 885 | | | | | | | | | | | | | | | |
| | 881.6 | 13.5 | | 4 | 3 | 4 | | | | | | | | | |
| 880 | | | | | | | | | | | | | | | |
| | 876.6 | 18.5 | | 4 | 5 | 4 | | | | | | | | | |
| 875 | | | | | | | | | | | | | | | |
| | 871.6 | 23.5 | | 3 | 4 | 4 | | | | | | | | | |
| 870 | | | | | | | | | | | | | | | |
| | 866.6 | 28.5 | | 3 | 6 | 7 | | | | | | | | | |
| 865 | | | | | | | | | | | | | | | |
| | 861.6 | 33.5 | | 3 | 5 | 7 | | | | | | | | | |
| 860 | | | | | | | | | | | | | | | |
| | 856.6 | 38.5 | | 6 | 7 | 8 | | | | | | | | | |
| 855 | | | | | | | | | | | | | | | |
| | 851.6 | 43.5 | | 7 | 13 | 24 | | | | | | | | | |
| 850 | | | | | | | | | | | | | | | |
| | 846.6 | 48.5 | | 60/0.0 | | | | | | | | | | | 60/0.0 |

NCDOT BORE DOUBLE U2579AB_BRDGE330724_GINT LOGS.GPJ NC_DOT_GDT 5/13/19

GEOTECHNICAL BORING REPORT

BORE LOG

| | | | |
|---------------------------------------------------------------------------------------------------|----------------------------|---------------------------------|--------------------------------|
| WBS 34839.1.8 | TIP U-2579AB | COUNTY FORSYTH | GEOLOGIST Weaver, P.M. |
| SITE DESCRIPTION Bridge No. 724 on -Y15REV- (I-40 Bypass) over -L- (Winston-Salem Beltway) | | | GROUND WTR (ft) |
| BORING NO. B1-G | STATION 47+13 | OFFSET 46 ft RT | ALIGNMENT -Y15REV- |
| COLLAR ELEV. 893.1 ft | TOTAL DEPTH 66.8 ft | NORTHING 847,902 | EASTING 1,663,902 |
| DRILL RIG/HAMMER EFF./DATE RD285584 CME-45C 84% 03/18/2019 | | DRILL METHOD H.S. Augers | HAMMER TYPE Automatic |
| DRILLER Seiler, M. | START DATE 03/19/19 | COMP. DATE 03/21/19 | SURFACE WATER DEPTH N/A |

| | | | |
|---------------------------------------------------------------------------------------------------|----------------------------|---------------------------------|--------------------------------|
| WBS 34839.1.8 | TIP U-2579AB | COUNTY FORSYTH | GEOLOGIST Weaver, P.M. |
| SITE DESCRIPTION Bridge No. 724 on -Y15REV- (I-40 Bypass) over -L- (Winston-Salem Beltway) | | | GROUND WTR (ft) |
| BORING NO. B1-G | STATION 47+13 | OFFSET 46 ft RT | ALIGNMENT -Y15REV- |
| COLLAR ELEV. 893.1 ft | TOTAL DEPTH 66.8 ft | NORTHING 847,902 | EASTING 1,663,902 |
| DRILL RIG/HAMMER EFF./DATE RD285584 CME-45C 84% 03/18/2019 | | DRILL METHOD H.S. Augers | HAMMER TYPE Automatic |
| DRILLER Seiler, M. | START DATE 03/19/19 | COMP. DATE 03/21/19 | SURFACE WATER DEPTH N/A |

| ELEV (ft) | DRIVE ELEV (ft) | DEPTH (ft) | BLOW COUNT | | | BLOWS PER FOOT | | | | | SAMP. NO. | LOG MOI | LOG | SOIL AND ROCK DESCRIPTION | ELEV. (ft) | DEPTH (ft) |
|-----------|-----------------|------------|------------|-------|---------|----------------|----|----|----|-----|-----------|---------|-----|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|------------|
| | | | 0.5ft | 0.5ft | 0.5ft | 0 | 25 | 50 | 75 | 100 | | | | | | |
| 895 | | | | | | | | | | | | | | | 893.1 | 0.0 |
| 890 | 889.6 | 3.5 | 4 | 4 | 5 | | | | | | | | | RESIDUAL Gray, Tan, Red to Brown and White, Silty CLAY, Micaceous | | |
| 885 | 884.6 | 8.5 | 4 | 4 | 5 | | | | | | | | | | | |
| 880 | 879.6 | 13.5 | 4 | 4 | 6 | | | | | | | | | | | |
| 875 | 874.6 | 18.5 | 7 | 8 | 9 | | | | | | | | | | | |
| 870 | 869.6 | 23.5 | 6 | 10 | 13 | | | | | | | | | | | |
| 865 | 864.6 | 28.5 | 26 | 54 | 46/0.3 | | | | | | | | | WEATHERED ROCK GRANITIC ROCK | 864.1 | 29.0 |
| 860 | 859.6 | 33.5 | 15 | 14 | 10 | | | | | | | | | RESIDUAL Brown to Tan and White with Gray, Silty Coarse to Fine SAND, Some Quartz Fragments | 860.3 | 32.8 |
| 855 | 854.6 | 38.5 | 15 | 14 | 35 | | | | | | | | | WEATHERED ROCK GRANITIC ROCK | 851.9 | 41.2 |
| 850 | 849.6 | 43.5 | 100/0.2 | | | | | | | | | | | RESIDUAL Brown to Tan and White, Silty Coarse to Fine SAND, Some Quartz Fragments | 846.2 | 46.9 |
| 845 | 844.6 | 48.5 | 17 | 22 | 17 | | | | | | | | | WEATHERED ROCK GRANITIC ROCK | 838.5 | 54.6 |
| 840 | 839.6 | 53.5 | 11 | 15 | 100/0.4 | | | | | | | | | CRYSTALLINE ROCK Gray, Black and White, Moderately Severely to Moderately Weathered, Soft to Medium Hard, GRANITIC ROCK with Very Close to Close Fracture Spacing REC=86% RQD=71% GSI=60-80 | 836.3 | 56.8 |
| 835 | 836.3 | 56.8 | 60/0.0 | | | | | | | | | | | White with Gray and Brown, Slightly to Very Slightly Weathered, Hard to Very Hard, GRANITIC ROCK with Close to Moderately Close Fracture Spacing REC=100% RQD=92% GSI=70-90 | 833.5 | 59.6 |
| | | | | | | | | | | | | | | White, Brown, Black and Gray, Moderately Severely to Moderately Weathered, Soft to Medium Hard, GRANITIC ROCK with Very Close Fracture Spacing REC=25% RQD=0% GSI=10-30 | 831.1 | 62.0 |
| | | | | | | | | | | | | | | Gray, Black and White, Very Slightly Weathered to Fresh, Hard to Very Hard, GRANITIC ROCK with Moderately Close | 829.5 | 63.6 |
| | | | | | | | | | | | | | | | 826.3 | 66.8 |

| ELEV (ft) | DRIVE ELEV (ft) | DEPTH (ft) | BLOW COUNT | | | BLOWS PER FOOT | | | | | SAMP. NO. | LOG MOI | LOG | SOIL AND ROCK DESCRIPTION | ELEV. (ft) | DEPTH (ft) |
|-----------|-----------------|------------|------------|-------|-------|----------------|----|----|----|-----|-----------|---------|-----|------------------------------------------------------------------------------------------------------------------------------|------------|------------|
| | | | 0.5ft | 0.5ft | 0.5ft | 0 | 25 | 50 | 75 | 100 | | | | | | |
| 815 | | | | | | | | | | | | | | Match Line | | |
| | | | | | | | | | | | | | | Fracture Spacing REC=88% RQD=88% GSI=80-100 Boring Terminated at Elevation 826.3 ft in Crystalline Rock: GRANITIC ROCK | | |
| | | | | | | | | | | | | | | Other Samples: ST-1 (14.0 - 16.0) | | |

NCDOT BORE DOUBLE U2579AB_BRIDGE330724_GINT LOGS.GPJ_NC_DOT_GDT 5/13/19

GEOTECHNICAL BORING REPORT

CORE LOG

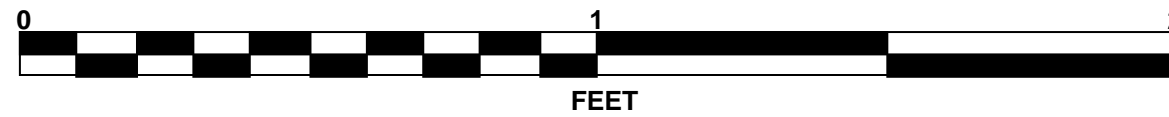
| WBS 34839.1.8 | | TIP U-2579AB | | COUNTY FORSYTH | | GEOLOGIST Weaver, P.M. | | | | | |
|--------------------------------------------------------------------------------------------|---------------|---------------------|----------|----------------------------------------------------------|--------------|-------------------------|-----------------|--------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------|--------------|
| SITE DESCRIPTION Bridge No. 724 on -Y15REV- (I-40 Bypass) over -L- (Winston-Salem Beltway) | | | | | | | GROUND WTR (ft) | | | | |
| BORING NO. B1-G | | STATION 47+13 | | OFFSET 46 ft RT | | ALIGNMENT -Y15REV- | | | | | |
| COLLAR ELEV. 893.1 ft | | TOTAL DEPTH 66.8 ft | | NORTHING 847,902 | | EASTING 1,663,902 | | | | | |
| DRILL RIG/HAMMER EFF./DATE RD285584 CME-45C 84% 03/18/2019 | | | | DRILL METHOD H.S. Augers | | HAMMER TYPE Automatic | | | | | |
| DRILLER Seiler, M. | | START DATE 03/19/19 | | COMP. DATE 03/21/19 | | SURFACE WATER DEPTH N/A | | | | | |
| CORE SIZE NQ | | TOTAL RUN 10.0 ft | | | | | | | | | |
| ELEV (ft) | RUN ELEV (ft) | DEPTH (ft) | RUN (ft) | DRILL RATE (Min/ft) | RUN | | STRATA | | LOG | DESCRIPTION AND REMARKS | DEPTH (ft) |
| | | | | | REC. (ft) % | RQD (ft) % | REC. (ft) % | RQD (ft) % | | | |
| 836.3 | | | | | | | | | | Begin Coring @ 56.8 ft | |
| 835 | 836.3 | 56.8 | 5.0 | 1:34/1.0 1:00/1.0 1:45/1.0 1:21/1.0 1:17/1.0 | (4.6) 92% | (4.2) 84% | (2.4) 86% | (2.0) 71% | CRYSTALLINE ROCK | Gray, Black and White, Moderately Severely to Moderately Weathered, Soft to Medium Hard, GRANITIC ROCK with Very Close to Close Fracture Spacing | 56.8 59.6 |
| 830 | 831.3 | 61.8 | 5.0 | 0:55/1.0 0:38/1.0 1:36/1.0 1:45/1.0 2:37/1.0 | (3.4) 68% | (2.8) 56% | (2.4) 100% | (2.2) 92% | Isolated foliation at 10 degrees to 30 degrees Some mica silt on fracture faces GSI=60-80 | | 62.0 63.6 |
| | 826.3 | 66.8 | | | | | (0.4) 25% | (0.0) 0% | White with Gray and Brown, Slightly to Very Slightly Weathered, Hard to Very Hard, GRANITIC ROCK with Close to Moderately Close Fracture Spacing No foliation GSI=70-90 | | 66.8 |
| | | | | | | | (2.8) 88% | (2.8) 88% | White, Brown, Black and Gray, Moderately Severely to Moderately Weathered, Soft to Medium Hard, GRANITIC ROCK with Very Close Fracture Spacing GSI=10-30 | | |
| | | | | | | | | | Gray, Black and White, Very Slightly Weathered to Fresh, Hard to Very Hard, GRANITIC ROCK with Moderately Close Fracture Spacing One fracture at 10 degrees Isolated foliateion at 10 degrees to 30 degrees Note: Bottom 0.4' of core not retrieved GSI=80-100 | | |
| | | | | | | | | | Boring Terminated at Elevation 826.3 ft in Crystalline Rock: GRANITIC ROCK | | |
| | | | | | | | | | Other Samples: ST-1 (14.0 - 16.0) | | |

NCDOT CORE DOUBLE U2579AB_BRDGE330724_GINT LOGS.GPJ NC_DOT_GDT 5/13/19

CORE PHOTOGRAPHS

B1-G

BOX 1: 56.8 - 66.8 FEET



GEOTECHNICAL BORING REPORT

BORE LOG

| | | | |
|--------------------------------------------------------------------------------------------|---------------------|--------------------------|----------------------------------|
| WBS 34839.1.8 | TIP U-2579AB | COUNTY FORSYTH | GEOLOGIST Weaver, P.M. |
| SITE DESCRIPTION Bridge No. 724 on -Y15REV- (I-40 Bypass) over -L- (Winston-Salem Beltway) | | | GROUND WTR (ft) |
| BORING NO. B1-B | STATION 47+02 | OFFSET 76 ft RT | ALIGNMENT -Y15REV- 0 HR. 33.2 |
| COLLAR ELEV. 892.0 ft | TOTAL DEPTH 53.6 ft | NORTHING 847,871 | EASTING 1,663,894 24 HR. 35.8 |
| DRILL RIG/HAMMER EFF./DATE RD285584 CME-45C 84% 03/18/2019 | | DRILL METHOD H.S. Augers | HAMMER TYPE Automatic |
| DRILLER Seiler, M. | START DATE 03/13/19 | COMP. DATE 03/13/19 | SURFACE WATER DEPTH N/A |

| ELEV (ft) | DRIVE ELEV (ft) | DEPTH (ft) | BLOW COUNT | | | BLOWS PER FOOT | | | | | SAMP. NO. | LOG | SOIL AND ROCK DESCRIPTION | | | |
|-----------|-----------------|------------|------------|--------|--------|----------------|----|----|----|---------|-----------|-----|---------------------------|----------------|--------------|--------------------------------------------------------------------------------------------------------------------------------------------------------|
| | | | 0.5ft | 0.5ft | 0.5ft | 0 | 25 | 50 | 75 | 100 | | | ELEV. (ft) | DEPTH (ft) | | |
| 895 | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | 892.0 | 0.0 | GROUND SURFACE |
| 890 | 888.5 | 3.5 | 3 | 4 | 6 | 10 | | | | | | M | | | | RESIDUAL Tan and Red-Brown, Silty CLAY, Micaceous |
| 885 | 883.5 | 8.5 | 3 | 3 | 3 | 6 | | | | | | M | | | | |
| 880 | 878.5 | 13.5 | 3 | 4 | 4 | 9 | | | | | | M | | 878.2 | 13.8 | Brown to Tan and White, Silty Coarse to Fine SAND, Some to Little Quartz Fragments, Little to Trace Mica |
| 875 | 873.5 | 18.5 | 5 | 5 | 4 | 9 | | | | | | M | | | | |
| 870 | 868.5 | 23.5 | 11 | 8 | 6 | 14 | | | | | | D | | | | |
| 865 | 863.5 | 28.5 | 20 | 28 | 28 | 56 | | | | | | D | | | | |
| 860 | 858.5 | 33.5 | 16 | 29 | 33 | 62 | | | | | | | | | | |
| 855 | 853.5 | 38.5 | 32 | 41 | 59/0.4 | | | | | | | | | 853.0 | 39.0 | WEATHERED ROCK GRANITIC ROCK |
| 850 | 848.5 | 43.5 | 25 | 75/0.3 | | | | | | 100/0.9 | | | | | | |
| 845 | 843.5 | 48.5 | 100/0.4 | | | | | | | 100/0.8 | | | | | | |
| 840 | 838.5 | 53.5 | 60/0.1 | | | | | | | 60/0.1 | | | | 838.7 838.4 | 53.3 53.6 | CRYSTALLINE ROCK GRANITIC ROCK Boring Terminated with Standard Penetration Test Refusal at Elevation 838.4 ft in Crystalline Rock: GRANITIC ROCK |

NCDOT BORE DOUBLE U2579AB_BRDGE330724_GINT LOGS.GPJ NC_DOT_GDT 5/13/19

GEOTECHNICAL BORING REPORT

BORE LOG

| WBS | | TIP | | COUNTY | | GEOLOGIST | |
|---------------------------------------------------------------------------|-------------|------------|------------|---------------------|--|--------------|-----------------|
| 34839.1.8 | | U-2579AB | | FORSYTH | | Weaver, P.M. | |
| SITE DESCRIPTION | | | | | | | GROUND WTR (ft) |
| Bridge No. 724 on -Y15REV- (I-40 Bypass) over -L- (Winston-Salem Beltway) | | | | | | | |
| BORING NO. | STATION | OFFSET | ALIGNMENT | | | | 0 HR. |
| EB2-A | 48+85 | 82 ft LT | -Y15REV- | | | | 43.1 |
| COLLAR ELEV. | TOTAL DEPTH | NORTHING | EASTING | | | | 24 HR. |
| 902.3 ft | 68.7 ft | 848,043 | 1,664,063 | | | | 38.2 |
| DRILL RIG/HAMMER EFF./DATE | | | | DRILL METHOD | | HAMMER TYPE | |
| RD285584 CME-45C 84% 03/18/2019 | | | | H.S. Augers | | Automatic | |
| DRILLER | | START DATE | COMP. DATE | SURFACE WATER DEPTH | | | |
| Seiler, M. | | 03/14/19 | 03/15/19 | 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 | | | | | |
| 905 | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | 902.3 GROUND SURFACE 0.0 |
| | | | | | | | | | | | | | | | RESIDUAL Red with Tan, Fine Sandy SILT, Wet |
| 900 | 898.8 | 3.5 | 3 | 3 | 4 | | | | | | | | M | 898.3 4.0 | Tan and Red with Gray, Silty Coarse to Fine SAND, Little Mica |
| 895 | 893.8 | 8.5 | 2 | 3 | 3 | | | | | | | | M | 894.7 7.6 | Tan, Red-Brown to Orange-Brown to Red-Orange to Brown and White with Black, Fine Sandy SILT, Micaceous |
| 890 | 888.8 | 13.5 | 3 | 3 | 5 | | | | | | | | M | | |
| 885 | 883.8 | 18.5 | 3 | 4 | 5 | | | | | | | | M | | |
| 880 | 878.8 | 23.5 | 3 | 5 | 7 | | | | | | | | M | | |
| 875 | 873.8 | 28.5 | 3 | 4 | 6 | | | | | | | | M | | |
| 870 | 868.8 | 33.5 | 7 | 5 | 7 | | | | | | | | M | 870.7 31.6 | Tan to Brown and White, Silty Coarse to Fine SAND, Little Mica, Some Quartz Fragments in Sample at 38.5 Feet |
| 865 | 863.8 | 38.5 | 4 | 7 | 9 | | | | | | | | M | | |
| 860 | 858.8 | 43.5 | 5 | 7 | 11 | | | | | | | | M | 860.8 41.5 | Orange-Brown, Brown and White, Fine Sandy SILT, Micaceous |
| 855 | 853.8 | 48.5 | 25 | 45 | 55/0.3 | | | | | | | | M | 853.3 49.0 | |
| 850 | 848.8 | 53.5 | 16 | 28 | 34 | | | | | | | | D | 851.7 50.6 | WEATHERED ROCK GRANITIC ROCK RESIDUAL Brown, Tan and White, Silty Coarse to Fine SAND |
| 845 | 843.8 | 58.5 | 100/0.3 | | | | | | | | | | | 844.8 57.5 | WEATHERED ROCK GRANITIC ROCK Note: Thin crystalline rock layers throughout |
| 840 | 838.8 | 63.5 | 100/0.2 | | | | | | | | | | | | |
| 835 | 833.8 | 68.5 | 100/0.2 | | | | | | | | | | | 833.6 68.7 | Boring Terminated at Elevation 833.6 ft in Weathered Rock: GRANITIC ROCK |

NCDOT BORE DOUBLE U2579AB_BRIDGE330724_GINT LOGS.GPJ_NC_DOT.GDT 5/13/19

| WBS | | TIP | | COUNTY | | GEOLOGIST | |
|---------------------------------------------------------------------------|-------------|------------|------------|---------------------|--|--------------|-----------------|
| 34839.1.8 | | U-2579AB | | FORSYTH | | Weaver, P.M. | |
| SITE DESCRIPTION | | | | | | | GROUND WTR (ft) |
| Bridge No. 724 on -Y15REV- (I-40 Bypass) over -L- (Winston-Salem Beltway) | | | | | | | |
| BORING NO. | STATION | OFFSET | ALIGNMENT | | | | 0 HR. |
| EB2-D | 48+72 | 42 ft LT | -Y15REV- | | | | 41.4 |
| COLLAR ELEV. | TOTAL DEPTH | NORTHING | EASTING | | | | 24 HR. |
| 902.0 ft | 68.8 ft | 848,002 | 1,664,054 | | | | 37.2 |
| DRILL RIG/HAMMER EFF./DATE | | | | DRILL METHOD | | HAMMER TYPE | |
| RD285584 CME-45C 84% 03/18/2019 | | | | H.S. Augers | | Automatic | |
| DRILLER | | START DATE | COMP. DATE | SURFACE WATER DEPTH | | | |
| Seiler, M. | | 03/14/19 | 03/14/19 | 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 | | | | | |
| 905 | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | 902.0 GROUND SURFACE 0.0 |
| | | | | | | | | | | | | | | | RESIDUAL Red to Pink, Black, Orange-Red, Red-Brown and White, Fine Sandy SILT, Micaceous to Little Mica |
| 900 | 898.5 | 3.5 | 3 | 4 | 5 | | | | | | | | M | | |
| 895 | 893.5 | 8.5 | 2 | 3 | 4 | | | | | | | | M | | |
| 890 | 888.5 | 13.5 | 2 | 4 | 4 | | | | | | | | M | | |
| 885 | 883.5 | 18.5 | 4 | 5 | 5 | | | | | | | | M | | |
| 880 | 878.5 | 23.5 | 3 | 4 | 5 | | | | | | | | M | | |
| 875 | 873.5 | 28.5 | 3 | 4 | 6 | | | | | | | | M | | |
| 870 | 868.5 | 33.5 | 3 | 4 | 5 | | | | | | | | M | | |
| 865 | 863.5 | 38.5 | 3 | 4 | 7 | | | | | | | | M | | |
| 860 | 858.5 | 43.5 | 6 | 10 | 10 | | | | | | | | M | 859.3 42.7 | Brown to Tan and White, Silty Coarse to Fine SAND, Little to No Mica, Trace Quartz Fragments |
| 855 | 853.5 | 48.5 | 19 | 29 | 40 | | | | | | | | M | | |
| 850 | 848.5 | 53.5 | 17 | 31 | 52 | | | | | | | | M | | |
| 845 | 843.5 | 58.5 | 27 | 64 | 36/0.1 | | | | | | | | M | 843.0 59.0 | WEATHERED ROCK GRANITIC ROCK |
| 840 | 838.5 | 63.5 | 70 | 30/0.1 | | | | | | | | | | | |
| 835 | 833.5 | 68.5 | 100/0.3 | | | | | | | | | | | 833.2 68.8 | Boring Terminated at Elevation 833.2 ft in Weathered Rock: GRANITIC ROCK |

GEOTECHNICAL BORING REPORT

BORE LOG

| | | | |
|---------------------------------------------------------------------------------------------------|----------------------------|---------------------------------|-----------------------------------------|
| WBS 34839.1.8 | TIP U-2579AB | COUNTY FORSYTH | GEOLOGIST Weaver, P.M. |
| SITE DESCRIPTION Bridge No. 724 on -Y15REV- (I-40 Bypass) over -L- (Winston-Salem Beltway) | | | GROUND WTR (ft) |
| BORING NO. EB2-C | STATION 48+58 | OFFSET 3 ft LT | ALIGNMENT -Y15REV- 0 HR. 42.7 |
| COLLAR ELEV. 901.6 ft | TOTAL DEPTH 54.3 ft | NORTHING 847,962 | EASTING 1,664,043 24 HR. Dry |
| DRILL RIG/HAMMER EFF./DATE RD285584 CME-45C 84% 03/18/2019 | | DRILL METHOD H.S. Augers | HAMMER TYPE Automatic |
| DRILLER Seiler, M. | START DATE 03/14/19 | COMP. DATE 03/14/19 | SURFACE WATER DEPTH N/A |

| ELEV (ft) | DRIVE ELEV (ft) | DEPTH (ft) | BLOW COUNT | | | BLOWS PER FOOT | | | | | SAMP. NO. | LOG MOI | SOIL AND ROCK DESCRIPTION | DEPTH (ft) |
|-----------|-----------------|------------|------------|--------|-------|----------------|----|----|----|-----|-----------|---------|---------------------------------------------------------------------------------------------------------------------------|------------|
| | | | 0.5ft | 0.5ft | 0.5ft | 0 | 25 | 50 | 75 | 100 | | | | |
| 905 | | | | | | | | | | | | | GROUND SURFACE | 0.0 |
| 900 | 898.1 | 3.5 | 3 | 2 | 3 | | | | | | | M | RESIDUAL Tan and Red, Clayey SILT, Moist | 2.8 |
| 895 | 893.1 | 8.5 | 3 | 3 | 4 | | | | | | | M | Tan and Red, Silty Coarse to Fine SAND | 7.5 |
| 890 | 888.1 | 13.5 | 3 | 4 | 4 | | | | | | | M | Tan and Brown, Fine Sandy SILT, Micaceous | 17.9 |
| 885 | 883.1 | 18.5 | 6 | 6 | 5 | | | | | | | M | Brown-Orange and White with Gray, Silty Coarse to Fine SAND | 22.0 |
| 880 | 878.1 | 23.5 | 6 | 5 | 5 | | | | | | | M | Gray-Brown and White, Fine Sandy SILT, Micaceous | 29.6 |
| 875 | 873.1 | 28.5 | 5 | 8 | 9 | | | | | | | M | Tan to Brown, Gray and White, Silty Coarse to Fine SAND, Micaceous, Trace Quartz Fragments in Sample at 38.5', Saprolitic | 45.8 |
| 870 | 868.1 | 33.5 | 7 | 12 | 13 | | | | | | | M | | |
| 865 | 863.1 | 38.5 | 16 | 26 | 35 | | | | | | | D | | |
| 860 | 858.1 | 43.5 | 19 | 32 | 48 | | | | | | | M | | |
| 855 | 853.1 | 48.5 | 43 | 57/0.2 | | | | | | | | | WEATHERED ROCK GRANITIC ROCK | 49.5 |
| 850 | 848.1 | 53.5 | 53 | 47/0.3 | | | | | | | | | Boring Terminated at Elevation 847.3 ft in Weathered Rock: GRANITIC ROCK | 54.3 |

| | | | |
|---------------------------------------------------------------------------------------------------|----------------------------|---------------------------------|-----------------------------------------|
| WBS 34839.1.8 | TIP U-2579AB | COUNTY FORSYTH | GEOLOGIST Weaver, P.M. |
| SITE DESCRIPTION Bridge No. 724 on -Y15REV- (I-40 Bypass) over -L- (Winston-Salem Beltway) | | | GROUND WTR (ft) |
| BORING NO. EB2-E | STATION 48+45 | OFFSET 36 ft RT | ALIGNMENT -Y15REV- 0 HR. 36.0 |
| COLLAR ELEV. 903.4 ft | TOTAL DEPTH 59.4 ft | NORTHING 847,922 | EASTING 1,664,033 24 HR. 41.8 |
| DRILL RIG/HAMMER EFF./DATE RD285584 CME-45C 84% 03/18/2019 | | DRILL METHOD H.S. Augers | HAMMER TYPE Automatic |
| DRILLER Seiler, M. | START DATE 03/13/19 | COMP. DATE 03/13/19 | SURFACE WATER DEPTH N/A |

| ELEV (ft) | DRIVE ELEV (ft) | DEPTH (ft) | BLOW COUNT | | | BLOWS PER FOOT | | | | | SAMP. NO. | LOG MOI | SOIL AND ROCK DESCRIPTION | DEPTH (ft) |
|-----------|-----------------|------------|------------|--------|--------|----------------|----|----|----|-----|-----------|---------|---------------------------------------------------------------------------------------------------------------|------------|
| | | | 0.5ft | 0.5ft | 0.5ft | 0 | 25 | 50 | 75 | 100 | | | | |
| 905 | | | | | | | | | | | | | GROUND SURFACE | 0.0 |
| 900 | 899.9 | 3.5 | 4 | 4 | 5 | | | | | | | M | RESIDUAL Red, Clayey SILT, Moist | 3.0 |
| 895 | 894.9 | 8.5 | 3 | 3 | 5 | | | | | | | M | Tan and Red, Silty Coarse to Fine SAND, Micaceous | 7.5 |
| 890 | 889.9 | 13.5 | 2 | 3 | 6 | | | | | | | M | Tan and Red, Fine Sandy SILT, Micaceous | 14.7 |
| 885 | 884.9 | 18.5 | 4 | 4 | 5 | | | | | | | M | Tan, Brown and White with Gray, Silty Coarse to Fine SAND, Some to Trace Mica, Trace to Some Quartz Fragments | 23.5 |
| 880 | 879.9 | 23.5 | 6 | 7 | 8 | | | | | | | D | | 29.6 |
| 875 | 874.9 | 28.5 | 9 | 8 | 9 | | | | | | | D | | 42.5 |
| 870 | 869.4 | 34.0 | 10 | 12 | 11 | | | | | | | D | | 45.8 |
| 865 | 864.4 | 39.0 | 10 | 12 | 12 | | | | | | | D | | 49.5 |
| 860 | 859.4 | 44.0 | 21 | 29 | 49 | | | | | | | M | Tan to Brown with White, Fine Sandy Silt, Micaceous, Saprolitic | 49.5 |
| 855 | 854.4 | 49.0 | 19 | 39 | 61/0.4 | | | | | | | | WEATHERED ROCK GRANITIC ROCK Note: Thin layers of crystalline rock throughout | 49.5 |
| 850 | 849.4 | 54.0 | 90 | 10/0.1 | | | | | | | | | Boring Terminated at Elevation 844.0 ft in Weathered Rock: GRANITIC ROCK | 59.4 |
| 845 | 844.4 | 59.0 | 100/0.4 | | | | | | | | | | | |

NCDOT BORE DOUBLE U2579AB_BRDGE330724_GINT LOGS.GPJ NC_DOT.GDT 5/13/19

GEOTECHNICAL BORING REPORT

BORE LOG

| WBS 34839.1.8 | | TIP U-2579AB | | COUNTY FORSYTH | | GEOLOGIST Weaver, P.M. | | | | | | | | | | |
|--------------------------------------------------------------------------------------------|-----------------|---------------------|------------|--------------------------|-------|-------------------------|-----------------|----|----|-----|-----------|-----|---------------------------|------------|------------------------------------------------------------------------------------------|------|
| SITE DESCRIPTION Bridge No. 724 on -Y15REV- (I-40 Bypass) over -L- (Winston-Salem Beltway) | | | | | | | GROUND WTR (ft) | | | | | | | | | |
| BORING NO. EB2-B | | STATION 48+31 | | OFFSET 75 ft RT | | ALIGNMENT -Y15REV- | | | | | | | | | | |
| COLLAR ELEV. 899.8 ft | | TOTAL DEPTH 58.9 ft | | NORTHING 847,882 | | EASTING 1,664,022 | | | | | | | | | | |
| DRILL RIG/HAMMER EFF./DATE RD285584 CME-45C 84% 03/18/2019 | | | | DRILL METHOD H.S. Augers | | HAMMER TYPE Automatic | | | | | | | | | | |
| DRILLER Seiler, M. | | START DATE 03/15/19 | | COMP. DATE 03/15/19 | | SURFACE WATER DEPTH N/A | | | | | | | | | | |
| ELEV (ft) | DRIVE ELEV (ft) | DEPTH (ft) | BLOW COUNT | | | BLOWS PER FOOT | | | | | SAMP. NO. | LOG | SOIL AND ROCK DESCRIPTION | | | |
| | | | 0.5ft | 0.5ft | 0.5ft | 0 | 25 | 50 | 75 | 100 | | | ELEV. (ft) | DEPTH (ft) | | |
| 900 | | | | | | | | | | | | | | 899.8 | GROUND SURFACE | 0.0 |
| | | | | | | | | | | | | | | | RESIDUAL Red, Fine Sandy SILT, Moist | |
| 895 | 896.3 | 3.5 | 3 | 5 | 5 | | | | | | | | M | 896.8 | Tan and Red with Black, Silty Fine SAND, Little Mica | 3.0 |
| 890 | 891.3 | 8.5 | 4 | 6 | 7 | | | | | | | | M | 891.8 | White, Brown and Tan, Fine Sandy SILT, Micaceous | 8.0 |
| 885 | 886.3 | 13.5 | 4 | 6 | 6 | | | | | | | | D | 885.8 | Tan, Brown and White, Silty Coarse to Fine SAND, Little to Trace Mica | 14.0 |
| 880 | 881.3 | 18.5 | 4 | 6 | 8 | | | | | | | | D | | | |
| 875 | 876.3 | 23.5 | 3 | 4 | 4 | | | | | | | | M | 876.0 | White and Orange-Brown with Black, Fine Sandy SILT | 23.8 |
| 870 | 871.3 | 28.5 | 3 | 4 | 12 | | | | | | | | D | 870.2 | White and Orange-Brown, Silty Coarse to Fine SAND | 29.6 |
| 865 | 866.3 | 33.5 | 2 | 3 | 3 | | | | | | | | | 867.8 | White, Dark Gray, Tan, and Orange-Brown to Brown, Fine Sandy SILT, Micaceous, Saprolitic | 32.0 |
| 860 | 861.3 | 38.5 | 8 | 5 | 9 | | | | | | | | M | | | |
| 855 | 856.3 | 43.5 | 15 | 19 | 30 | | | | | | | | D | 857.3 | Gray, Tan and White with Black, Silty Coarse to Fine SAND, Saprolitic | 42.5 |
| 850 | 851.3 | 48.5 | 50 | 50/0.3 | | | | | | | | | | 854.4 | WEATHERED ROCK GRANITIC ROCK | 45.4 |
| | | | | | | | | | | | | | | | | |
| 845 | 846.3 | 53.5 | 100/0.3 | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | |
| | 841.3 | 58.5 | 100/0.4 | | | | | | | | | | | 840.9 | Boring Terminated at Elevation 840.9 ft in Weathered Rock: GRANITIC ROCK | 58.9 |

NCDOT BORE DOUBLE U2579AB_BRIDGE330724_GINT LOGS.GPJ NC_DOT_GDT 5/13/19

SOILS LABORATORY TESTS RESULTS

WBS NO.: 34839.1.8

TIP NO.: U-2579AB

COUNTY: Forsyth

SITE DESCRIPTION: Bridge No. 724 on -Y1REV- (I-40 Bypass) over -L- (Winston-Salem Beltway)

| BORING NO. | SAMPLE NO. | BORING LOCATION | DEPTH INTERVAL (FT) | AASHTO CLASS | N | L.L | P.I. | % BY WEIGHT | | | | % PASSING SIEVES | | | % MOISTURE | UNIT WT (pcf) |
|------------|------------|-----------------------------|---------------------|--------------|-----|-----|------|-------------|---------|------|------|------------------|----|-----|------------|---------------|
| | | | | | | | | CSE. SAND | F. SAND | SILT | CLAY | 10 | 40 | 200 | | |
| B1-G | ST-1 | -Y15REV- STA. 47+13, 46' RT | 14.0-16.0 | A-7-5 (4) | N/A | 51 | 13 | 31 | 27 | 22 | 20 | 100 | 78 | 47 | 23 | 68.3 |

Signed: 

NCDOT Certification No. 129-04-0411

SITE PHOTOGRAPHS

Bridge No. 724 on -Y15REV- (I-40 Bypass) over -L- (Winston-Salem Beltway)

View of Along End Bent 1 Looking Left to Right



View Along Bent 1 Looking Left to Right



View of Along End Bent 2 Looking Left to Right

