

REFERENCE: U-2579AB

PROJECT: 34839

**CONTENTS**

<u>SHEET NO.</u>	<u>DESCRIPTION</u>
1	TITLE SHEET
2	LEGEND (SOIL & ROCK)
3	SITE PLAN
4	CROSS SECTION
5-6	BORING LOGS

**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 CULVERT ON FUTURE I-74 AT -L-  
STA. 792+88 OVER UNNAMED TRIBUTARY TO  
FIDDLERS CREEK

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	U-2579AB	1	6

**CAUTION NOTICE**

THE SUBSURFACE INFORMATION AND THE SUBSURFACE INVESTIGATION ON WHICH IT IS BASED WERE MADE FOR THE PURPOSE OF STUDY, PLANNING AND DESIGN, AND NOT FOR CONSTRUCTION OR PAY PURPOSES. THE VARIOUS FIELD BORING LOGS, ROCK CORES AND SOIL TEST DATA AVAILABLE MAY BE REVIEWED OR INSPECTED IN RALEIGH BY CONTACTING THE N. C. DEPARTMENT OF TRANSPORTATION, GEOTECHNICAL ENGINEERING UNIT AT (919) 707-6850. THE SUBSURFACE PLANS AND REPORTS, FIELD BORING LOGS, ROCK CORES AND SOIL TEST DATA ARE NOT PART OF THE CONTRACT.

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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.

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  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

J.K. STICKNEY

C.L. SMITH

B.E. FOSTER

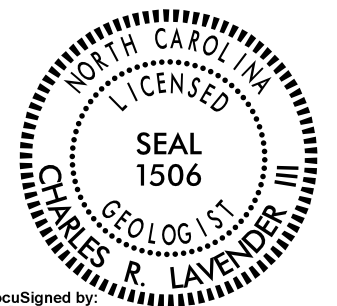
INVESTIGATED BY C.R. LAVENDER, III

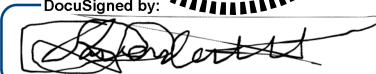
DRAWN BY J.E. BEVERLY 

CHECKED BY K.B. MILLER

SUBMITTED BY K.B. MILLER 

DATE NOVEMBER 2020



DocuSigned by:  


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11/25/2020

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

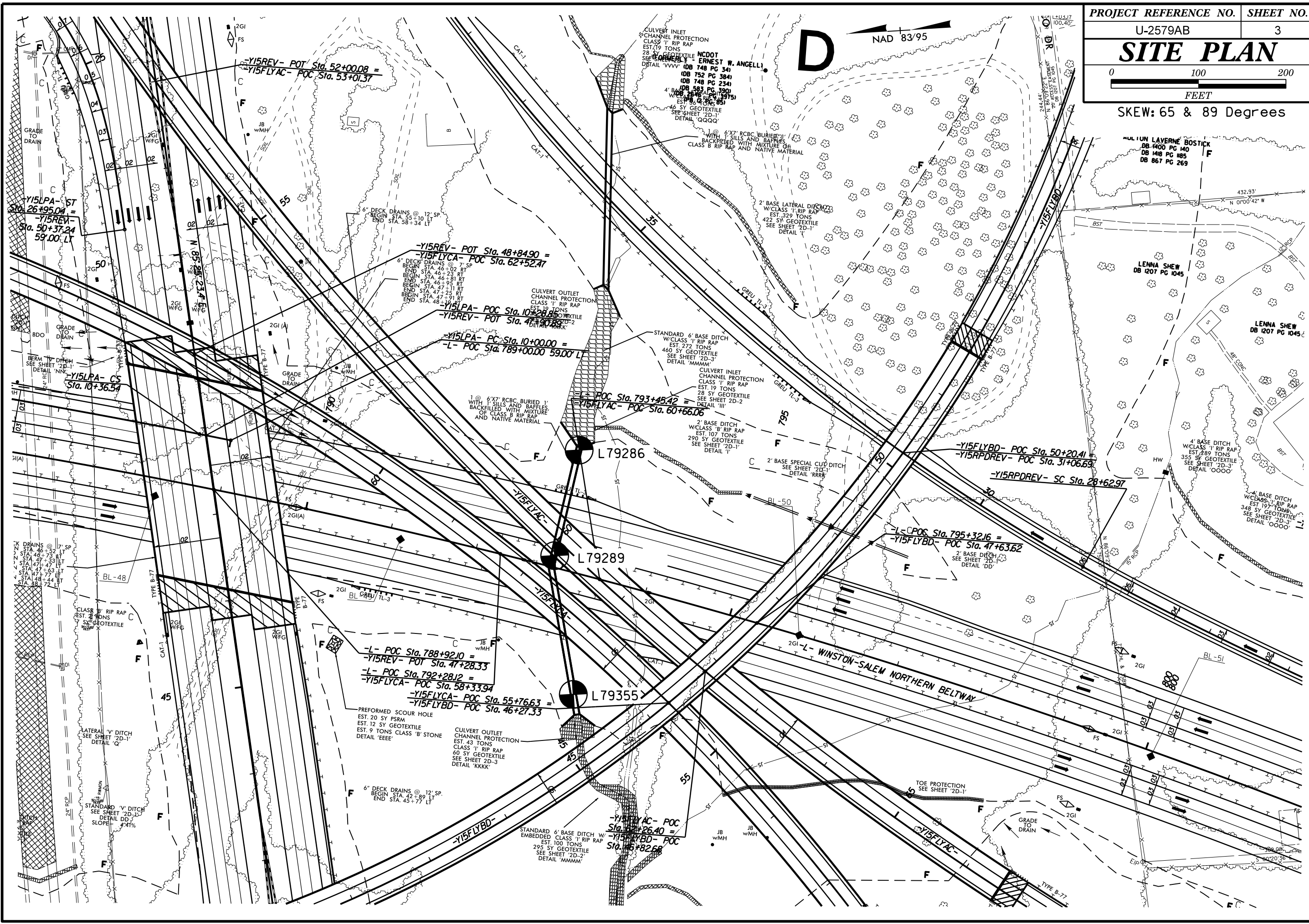
Table with 4 main columns: SOIL DESCRIPTION, GRADATION, ROCK DESCRIPTION, and TERMS AND DEFINITIONS. It contains detailed technical specifications, classification tables, and symbols for geotechnical engineering.

# SITE PLAN

0 100 200

FEET

SKEW: 65 & 89 Degrees



CULVERT INLET CHANNEL PROTECTION CLASS 'I' RIP RAP EST. 19 TONS SEE SHEET 2D-1 DETAIL 'VVVV'

-Y15REV- POT Sta. 48+84.90 =  
-Y15LYCA- POC Sta. 62+52.47  
6" DECK DRAINS @ 12' SP. BEGIN STA. 46+02 RT END STA. 46+95 RT BEGIN STA. 47+11 RT END STA. 47+91 RT END STA. 48+38 RT

-Y15LPA- POC Sta. 10+00.00 =  
-L- POC Sta. 789+00.00 59.00' LT

-L- POC Sta. 793+45.42 =  
-Y15LYAC- POC Sta. 60+66.06

-Y15FLYBD- POC Sta. 50+20.41 =  
-Y15RDPREV- POC Sta. 31+06.69

-Y15RDPREV- SC Sta. 28+62.97

-L- CPOC Sta. 795+32.16 =  
-Y15FLYBD- POC Sta. 47+63.62

-L- POC Sta. 788+92.10 =  
-Y15REV- POT Sta. 47+28.33  
-L- POC Sta. 792+28.12 =  
-Y15FLYCA- POC Sta. 58+33.94  
-Y15FLYCA- POC Sta. 55+76.63 =  
-Y15FLYBD- POC Sta. 46+27.33

-Y15FLYAC- POC Sta. 47+26.40 =  
-Y15FLYBD- POC Sta. 46+82.68

PREFORMED SCOUR HOLE EST. 20 SY PSRM EST. 12 SY GEOTEXTILE EST. 9 TONS CLASS 'B' STONE DETAIL 'EEEE'

CULVERT OUTLET CHANNEL PROTECTION EST. 43 TONS CLASS 'I' RIP RAP 60 SY GEOTEXTILE SEE SHEET 2D-3 DETAIL 'KKKK'

6" DECK DRAINS @ 12' SP. BEGIN STA. 42+89 LT END STA. 45+77 LT

STANDARD 6' BASE DITCH W/ EMBEDDED CLASS 'I' RIP RAP EST. 100 TONS 295 SY GEOTEXTILE SEE SHEET 2D-2 DETAIL 'MMMM'

4" BASE DITCH W/ CLASS 'I' RIP RAP EST. 289 TONS 355 SY GEOTEXTILE SEE SHEET 2D-3 DETAIL 'OOOO'

4" BASE DITCH W/ CLASS 'I' RIP RAP EST. 197 TONS 348 SY GEOTEXTILE SEE SHEET 2D-3 DETAIL 'OOOO'

6" DECK DRAINS @ 12' SP. BEGIN STA. 46+52 LT END STA. 46+73 LT BEGIN STA. 47+11 LT END STA. 47+91 LT BEGIN STA. 48+38 LT END STA. 48+72 LT

CLASS 'B' RIP RAP EST. 2 TONS 7 SY GEOTEXTILE SEE SHEET 2D-1 DETAIL 'QQQQ'

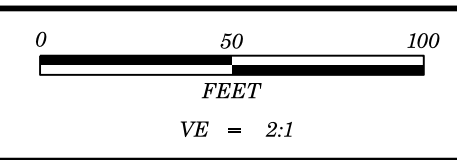
LATERAL 'V' DITCH SEE SHEET 2D-1 DETAIL 'Q'

STANDARD 'V' DITCH SEE SHEET 2D-1 DETAIL 'DD' SLOPE 4:1%

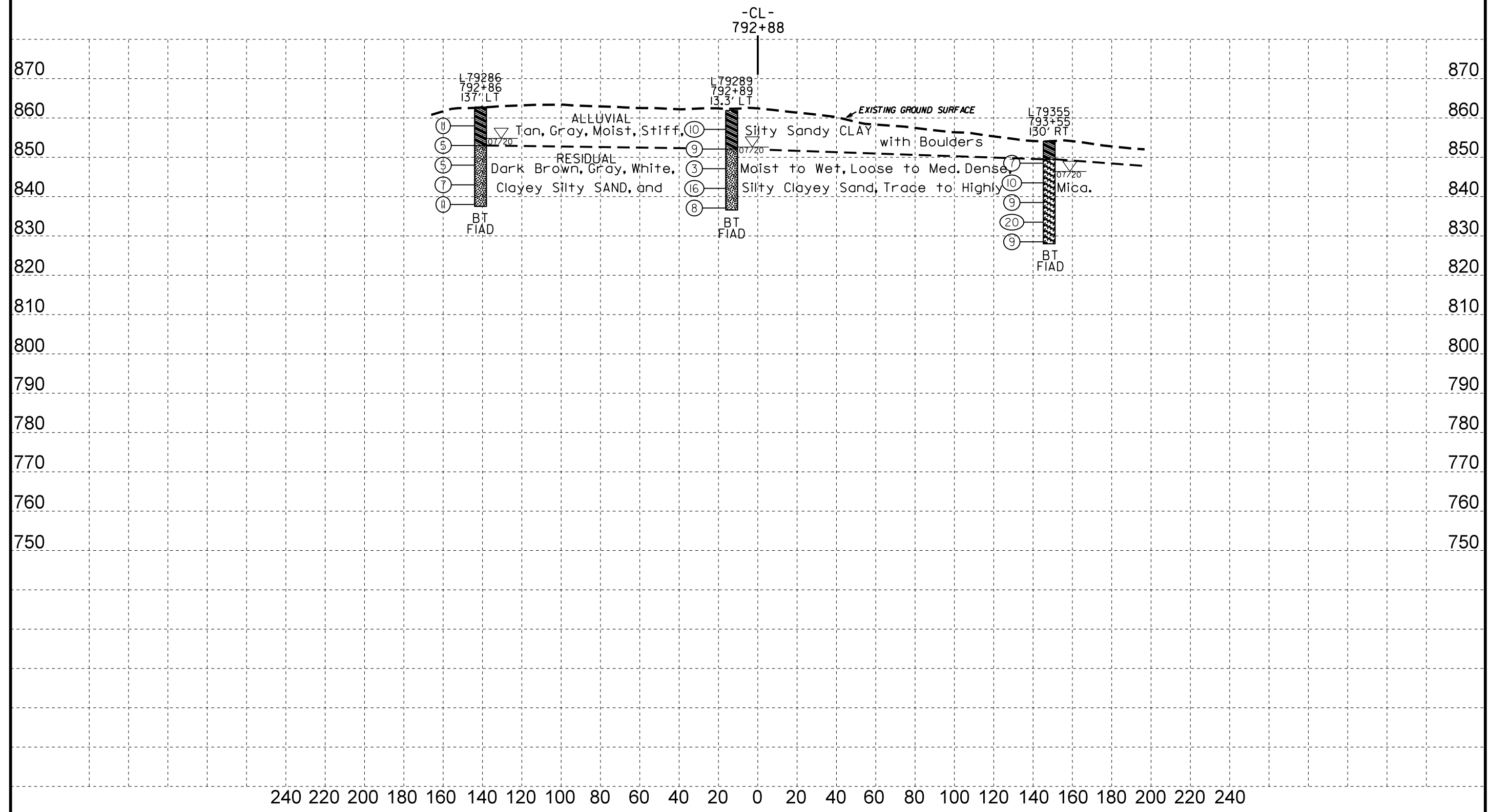
TOE PROTECTION SEE SHEET 2D-1

GRADE TO DRAIN

TYPE B-77



<b>PROJECT REFERENCE NO.</b>	<b>SHEET NO.</b>
U-2579AB	4
<b>SECTION ALONG CULVERT -CL- AT STA 792+88 -L-, SKEW: 65 &amp; 89 DEGREES</b>	







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**STRUCTURE**  
**SUBSURFACE INVESTIGATION**

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

SITE DESCRIPTION CULVERT ON -YISFLYCA- AT  
STA. 43+68 OVER UNNAMED TRIBUTARY TO  
FIDDLERS CREEK

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PERSONNEL

J.K. STICKNEY

C.L. SMITH

B.E. FOSTER

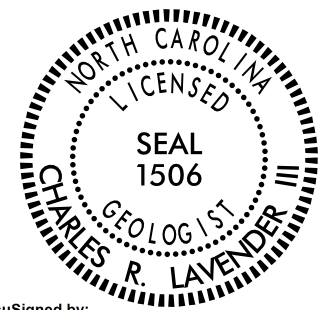
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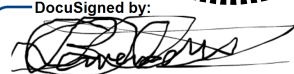
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CHECKED BY K.B. MILLER

SUBMITTED BY K.B. MILLER

DATE FEBRUARY 2021



DocuSigned by:  


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2/17/2021

SIGNATURE

DATE

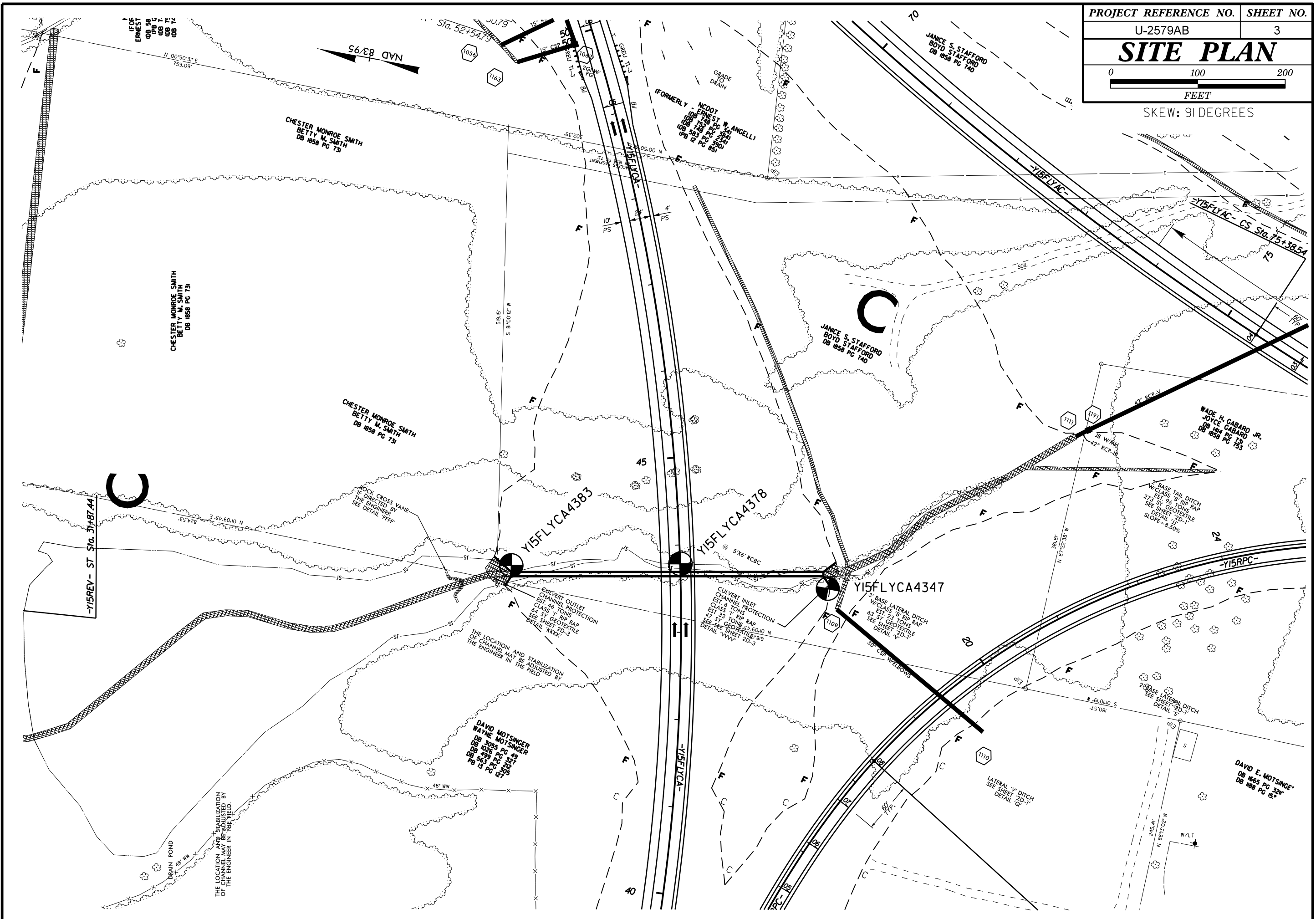
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Table with 4 main columns: SOIL DESCRIPTION, GRADATION, ROCK DESCRIPTION, and TERMS AND DEFINITIONS. It contains detailed technical specifications, classification tables, and symbols for geotechnical engineering.



SKEW: 91 DEGREES



1 POF  
ERNEST  
DB 58  
PB 1  
DB 7  
DB 7  
DB 74

CHESTER MONROE SMITH  
BETTY M. SMITH  
DB 1858 PG 731

CHESTER MONROE SMITH  
BETTY M. SMITH  
DB 1858 PG 731

CHESTER MONROE SMITH  
BETTY M. SMITH  
DB 1858 PG 731

JANICE S. STAFFORD  
BOYD STAFFORD  
DB 1858 PG 140

JANICE S. STAFFORD  
BOYD STAFFORD  
DB 1858 PG 140

WADE H. GABARD JR.  
JOYCE GABARD  
DB 1858 PG 153

DAVID MOTSINGER  
WAYNE MOTSINGER  
DB 3025 PG 49  
DB 1028 PG 327  
DB 499 PG 205  
DB 563 PG 205  
PB 13 PG 27

DAVID E. MOTSINGER  
DB 1665 PG 327  
DB 188 PG 157

THE LOCATION AND STABILIZATION  
OF CHANNEL MAY BE ADJUSTED BY  
THE ENGINEER IN THE FIELD.

CULVERT OUTLET  
CHANNEL PROTECTION  
EST. 6 TONS  
CLASS 1" RIP RAP  
64 SY GEOTEXTILE  
SEE SHEET 2D-3  
DETAIL 'KKKK'

CULVERT INLET  
CHANNEL PROTECTION  
EST. 6 TONS  
CLASS 1" RIP RAP  
47 SY GEOTEXTILE  
SEE SHEET 2D-3  
DETAIL 'VVVV'

3' BASE LATERAL DITCH  
W/ CLASS 8" RIP RAP  
EST. 23 TONS  
69 SY GEOTEXTILE  
SEE SHEET 2D-1  
DETAIL 'VVVV'

2' BASE TAIL DITCH  
W/ CLASS 8" RIP RAP  
EST. 95 TONS  
273 SY GEOTEXTILE  
SEE SHEET 2D-1  
DETAIL 'JJJJ'  
SLOPE = 8.50%

2' BASE LATERAL DITCH  
SEE SHEET 2D-1  
DETAIL 'S'

LATERAL 'V' DITCH  
SEE SHEET 2D-1  
DETAIL 'Q'

-Y15REV- ST Sta. 3+87.44

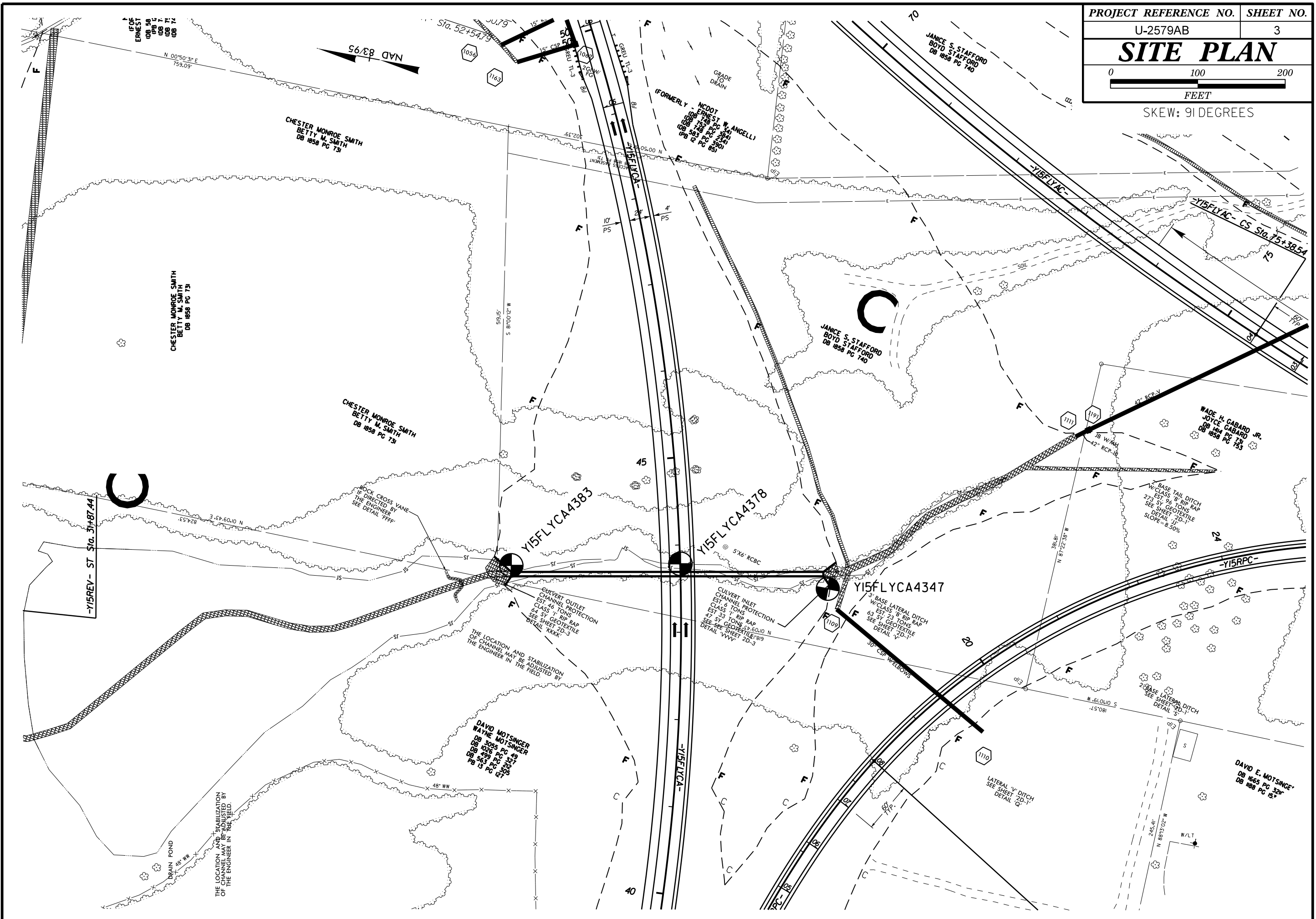
Y15FLYCA4383

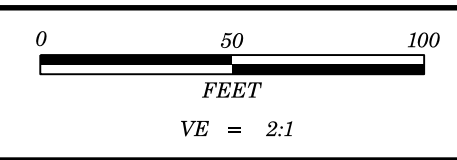
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Y15FLYCA4347

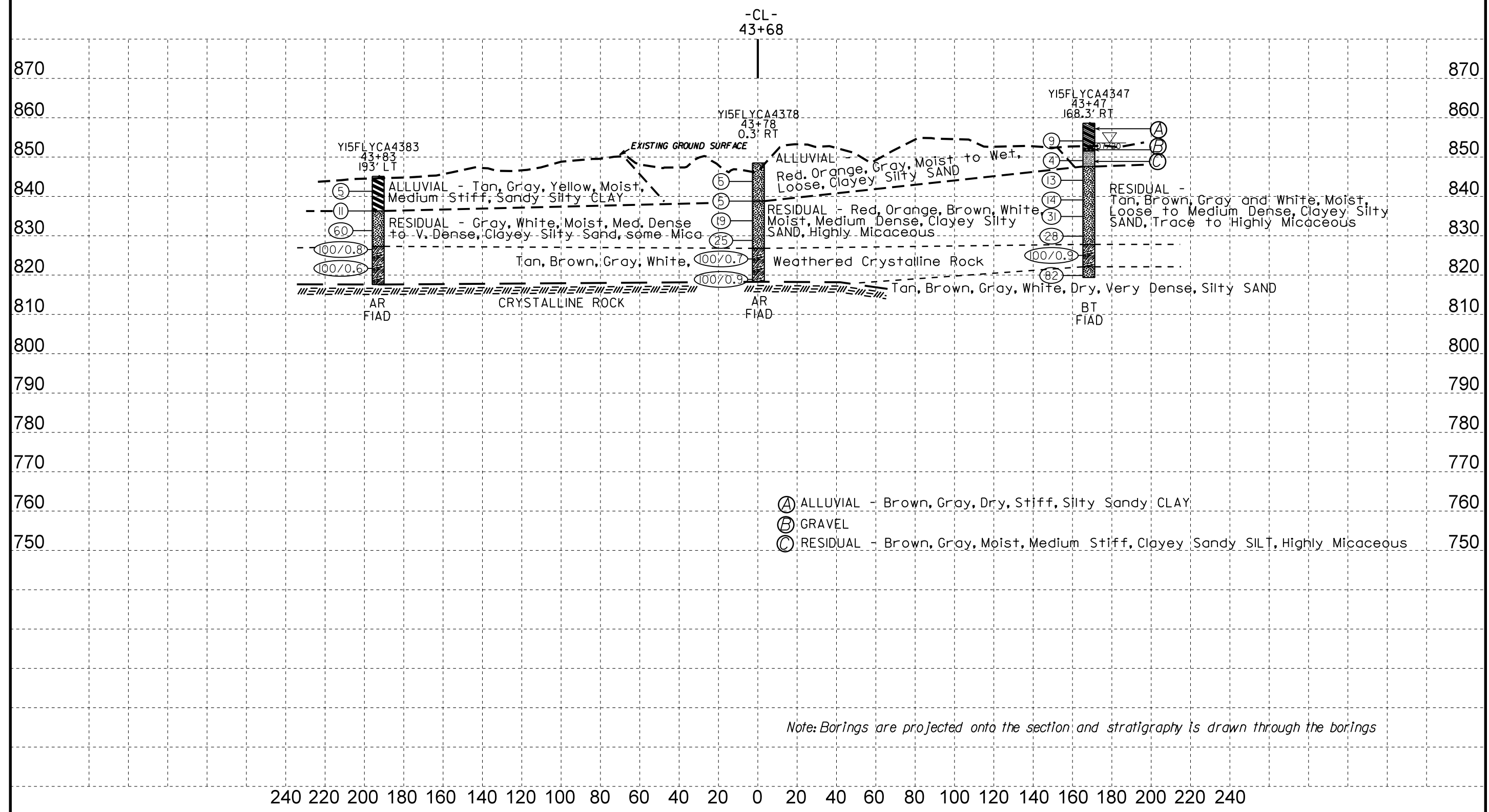
-Y15RPC-

-Y15FLYCA-





<b>PROJECT REFERENCE NO.</b>	<b>SHEET NO.</b>
U-2579AB	4
<b>SECTION ALONG CULVERT -CL- AT STA 43+68 -Y15FLYCA-, SKEW: 91 DEGREES</b>	



# GEOTECHNICAL BORING REPORT

## BORE LOG

WBS 34839.1.8		TIP U-2579AB		COUNTY FORSYTH		GEOLOGIST Stickney, J. K.										
SITE DESCRIPTION CULVERT ON -Y15FLYCA- AT STA. 43+68 OVER UNNAMED TRIBUTARY TO FIDDLER'S CREEK							GROUND WTR (ft)									
BORING NO. Y15FLYCA4347		STATION 43+47		OFFSET 168 ft RT		ALIGNMENT Y15FLYCA										
COLLAR ELEV. 858.6 ft		TOTAL DEPTH 39.2 ft		NORTHING 846,735		EASTING 1,662,584										
DRILL RIG/HAMMER EFF./DATE HFC0072 CME-550X 89% 12/16/2019				DRILL METHOD H.S. Augers		HAMMER TYPE Automatic										
DRILLER Smith, C. L.		START DATE 07/27/20		COMP. DATE 07/27/20		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						
860														858.6	0.0	GROUND SURFACE
																ALLUVIAL Brown, Gray, Dry, Stiff, Silty SANDY CLAY
855	855.1	3.5	3	4	5											
850	850.1	8.5	2	2	2											
845	845.1	13.5	3	4	9											
840	840.1	18.5	2	4	10											
835	835.9	22.7	9	11	20											
830	830.9	27.7	12	14	14											
825	825.9	32.7	56	44/0.4												
820	820.9	37.7	33	42	40											

WBS 34839.1.8		TIP U-2579AB		COUNTY FORSYTH		GEOLOGIST Stickney, J. K.										
SITE DESCRIPTION CULVERT ON -Y15FLYCA- AT STA. 43+68 OVER UNNAMED TRIBUTARY TO FIDDLER'S CREEK							GROUND WTR (ft)									
BORING NO. Y15FLYCA4378		STATION 43+78		OFFSET 0 ft RT		ALIGNMENT Y15FLYCA										
COLLAR ELEV. 848.5 ft		TOTAL DEPTH 30.2 ft		NORTHING 846,906		EASTING 1,662,582										
DRILL RIG/HAMMER EFF./DATE HFC0072 CME-550X 89% 12/16/2019				DRILL METHOD H.S. Augers		HAMMER TYPE Automatic										
DRILLER Smith, C. L.		START DATE 01/28/21		COMP. DATE 01/28/21		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						
850														848.5	0.0	GROUND SURFACE
																ALLUVIAL Red, Orange, Gray, Moist to Wet, Loose, Clayey Silty SAND
845	844.8	3.7	2	3	2											
840	839.8	8.7	2	2	3											
835	834.8	13.7	4	9	10											
830	829.8	18.7	12	13	12											
825	824.8	23.7	56	44/0.2												
820	819.8	28.7	43	57/0.4												

NCDOT BORE DOUBLE U-2579AB\_GEO\_CULVERT\_FORSYTH\_43+68-Y15FLYCA-GPJ\_NC\_DOT.GDT 2/11/21

# GEOTECHNICAL BORING REPORT

## BORE LOG

<b>WBS</b> 34839.1.8		<b>TIP</b> U-2579AB		<b>COUNTY</b> FORSYTH		<b>GEOLOGIST</b> Stickney, J. K.									
<b>SITE DESCRIPTION</b> CULVERT ON -Y15FLYCA- AT STA. 43+68 OVER UNNAMED TRIBUTARY TO FIDDLER'S CREEK							<b>GROUND WTR (ft)</b>								
<b>BORING NO.</b> Y15FLYCA4383		<b>STATION</b> 43+83		<b>OFFSET</b> 193 ft LT		<b>ALIGNMENT</b> Y15FLYCA									
<b>COLLAR ELEV.</b> 845.1 ft		<b>TOTAL DEPTH</b> 27.5 ft		<b>NORTHING</b> 847,096		<b>EASTING</b> 166,254									
<b>DRILL RIG/HAMMER EFF./DATE</b> HFC0072 CME-550X 89% 12/16/2019				<b>DRILL METHOD</b> H.S. Augers		<b>HAMMER TYPE</b> Automatic									
<b>DRILLER</b> Smith, C. L.		<b>START DATE</b> 01/28/21		<b>COMP. DATE</b> 01/28/21		<b>SURFACE WATER DEPTH</b> 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)	
850															
845														845.1	0.0
840	842.3	2.8	1	2	3	5						M			
835	837.3	7.8	3	4	7	11						M		836.3	8.8
830	832.3	12.8	9	19	41	60						M			
825	827.3	17.8	40	60/0.3		100/0.8								827.3	17.8
820	822.3	22.8	67	33/0.1		100/0.6									
														817.6	27.5
Boring Terminated by Auger Refusal at Elevation 817.6 ft on Crystalline Rock															

NCDOT BORE DOUBLE U-2579AB\_GEO\_CULVERT\_FORSYTH\_43+68-Y15FLYCA-GPJ\_NC\_DOT.GDT 2/11/21

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 GEOTECHNICAL ENGINEERING UNIT

**STRUCTURE**  
**SUBSURFACE INVESTIGATION**

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

SITE DESCRIPTION CULVERT ON -Y15REV- AT  
STA. 30+13 OVER UNNAMED TRIBUTARY TO  
FIDDLER'S CREEK

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  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

J.K. STICKNEY

C.L. SMITH

B.E. FOSTER

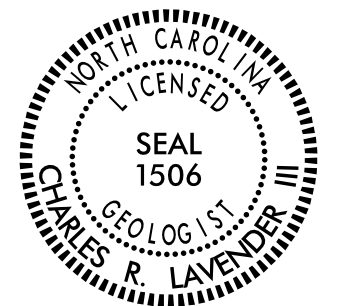
INVESTIGATED BY C.R. LAVENDER, III

DRAWN BY J.E. BEVERLY <sup>DS</sup> JEB

CHECKED BY K.B. MILLER

SUBMITTED BY K.B. MILLER <sup>DS</sup> KBM

DATE FEBRUARY 2021



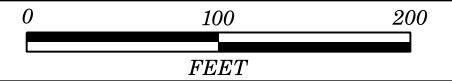
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 UNLESS ALL SIGNATURES COMPLETED**

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, classification charts, and symbols for geotechnical engineering.

# SITE PLAN



CULVERT SKEW: 74 DEGREES

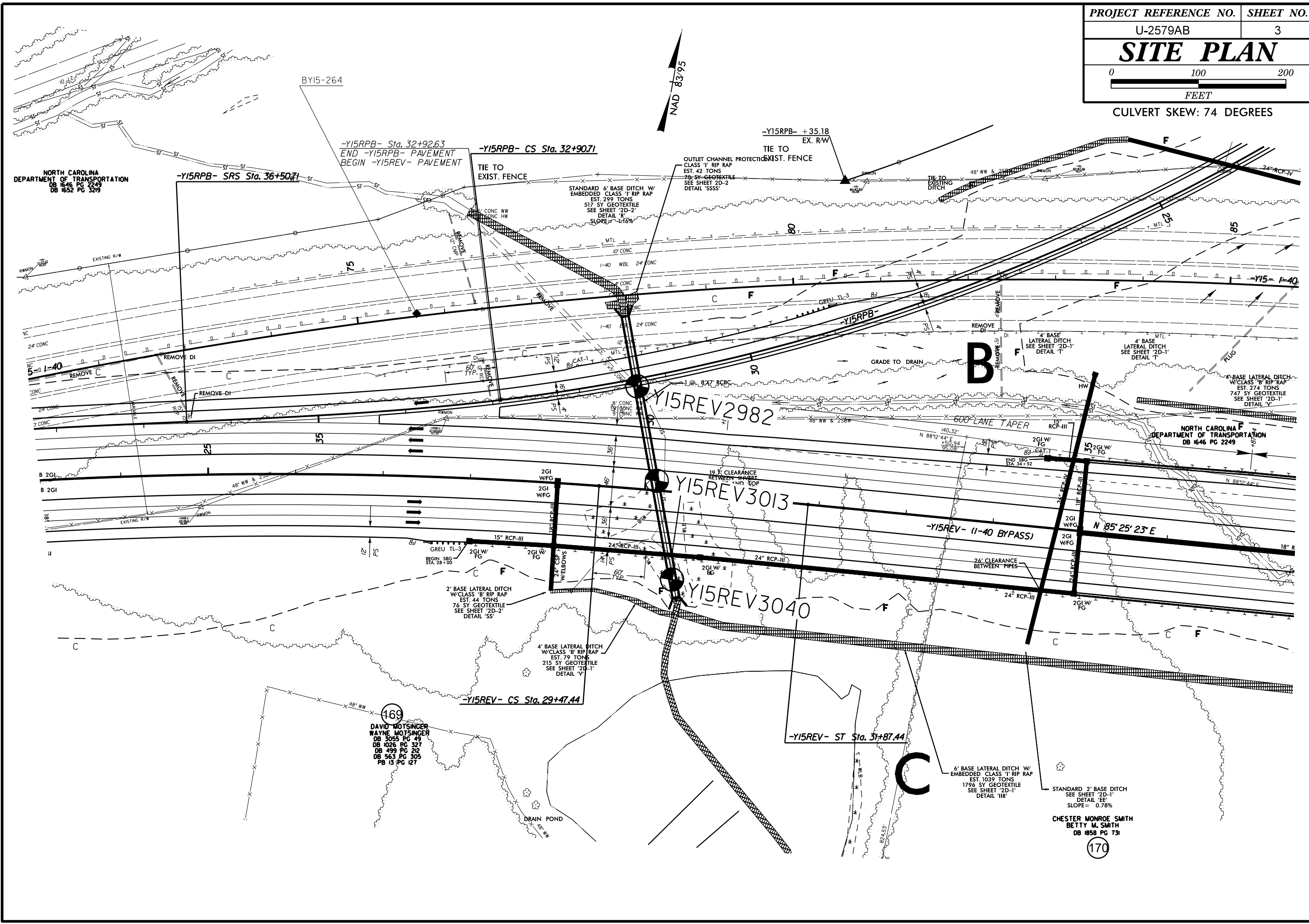
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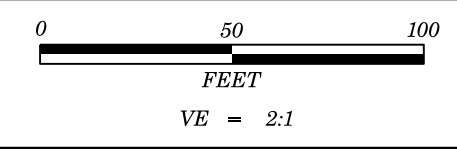
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169  
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WAYNE MOTSINGER  
DB 3055 PG 49  
DB 1026 PG 327  
DB 499 PG 20  
DB 563 PG 305  
PB 13 PG 127

CHESTER MONROE SMITH  
BETTY M. SMITH  
DB 1858 PG 731

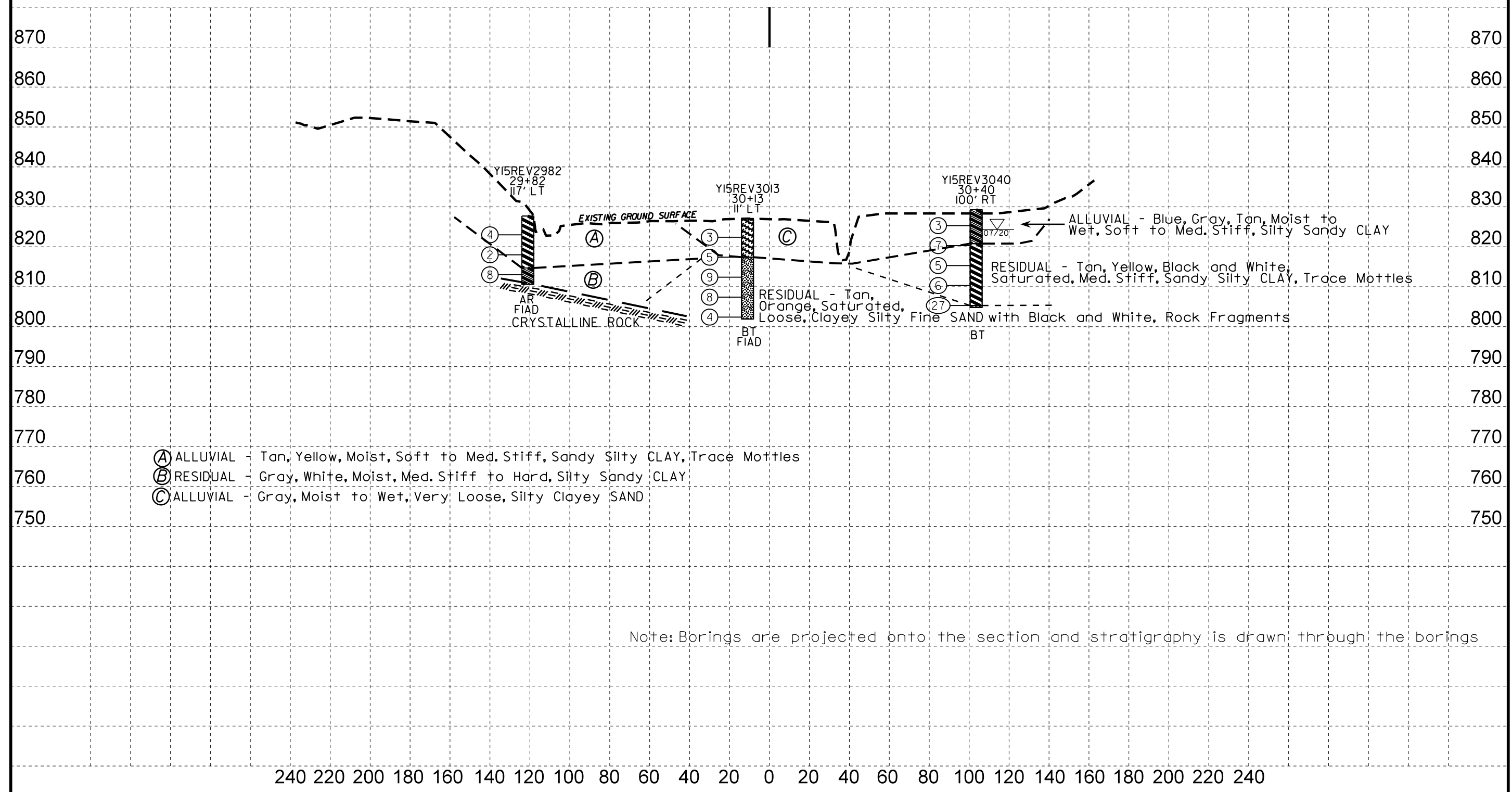
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<b>PROJECT REFERENCE NO.</b>	<b>SHEET NO.</b>
U-2579AB	4
<b>SECTION ALONG CULVERT -CL- AT STA 30+13 -Y15REV-, SKEW: 74 DEGREES</b>	

-CL-  
30+13



Note: Borings are projected onto the section and stratigraphy is drawn through the borings





# GEOTECHNICAL BORING REPORT

## BORE LOG

WBS 34839.1.8		TIP U-2579AB		COUNTY FORSYTH		GEOLOGIST Stickney, J. K.										
SITE DESCRIPTION Culvert on I-40 Bypass at -Y15REV- Sta. 30+13 over Trib to Fiddler's Creek							GROUND WTR (ft)									
BORING NO. Y15REV3040		STATION 30+40		OFFSET 100 ft RT		ALIGNMENT -Y15REV-										
COLLAR ELEV. 829.3 ft		TOTAL DEPTH 24.5 ft		NORTHING 847,713		EASTING 1,662,240										
DRILL RIG/HAMMER EFF./DATE HFC0072 CME-550X 89% 12/16/2019				DRILL METHOD H.S. Augers		HAMMER TYPE Automatic										
DRILLER Smith, C. L.		START DATE 07/21/20		COMP. DATE 07/21/20		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)		
830														829.3	0.0	GROUND SURFACE
825	826.3	3.0	1	2	1											<b>ALLUVIAL</b> Blue, Gray, Tan, Moist to Wet, Soft to Med. Stiff, Silty Sandy CLAY
820	821.3	8.0	2	4	3									820.8	8.5	<b>RESIDUAL</b> Tan, Yellow, Black and White, Saturated, Med. Stiff, Sandy Silty CLAY, Trace Mottles
815	816.3	13.0	1	2	3											
810	811.3	18.0	2	3	3											
805	806.3	23.0	1	11	16									805.3	24.0	Black and White, Rock Fragments
														804.8	24.5	Boring Terminated at Elevation 804.8 ft in RESIDUAL ROCK FRAGMENTS

NCDOT BORE DOUBLE U-2579AB\_GEO\_CULVERT\_FORSYTH\_30+13-Y15REV.GPJ NC\_DOT.GDT 2/17/21

REFERENCE: U-2579AB

PROJECT: 34839

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

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	U-2579AB	1	6

CONTENTS

SHEET NO.	DESCRIPTION
1	TITLE SHEET
2	LEGEND (SOIL & ROCK)
3	SITE PLAN
4	CROSS SECTION
5 - 6	BORING LOGS

**STRUCTURE**  
**SUBSURFACE INVESTIGATION**

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

SITE DESCRIPTION CULVERT ON FUTURE I-74 RAMP  
AT -YISRPDREV- STA. 35+54 OVER UNNAMED  
TRIBUTARY TO FIDDLER'S CREEK

CAUTION NOTICE

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PERSONNEL

J.K. STICKNEY

C.L. SMITH

B.E. FOSTER

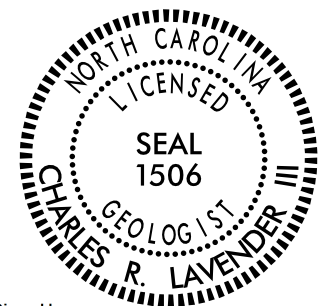
INVESTIGATED BY C.R. LAVENDER, III

DRAWN BY J.E. BEVERLY JEB

CHECKED BY K.B. MILLER

SUBMITTED BY K.B. MILLER

DATE FEBRUARY 2021



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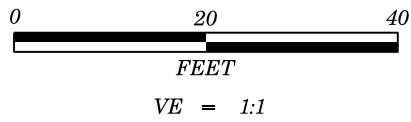
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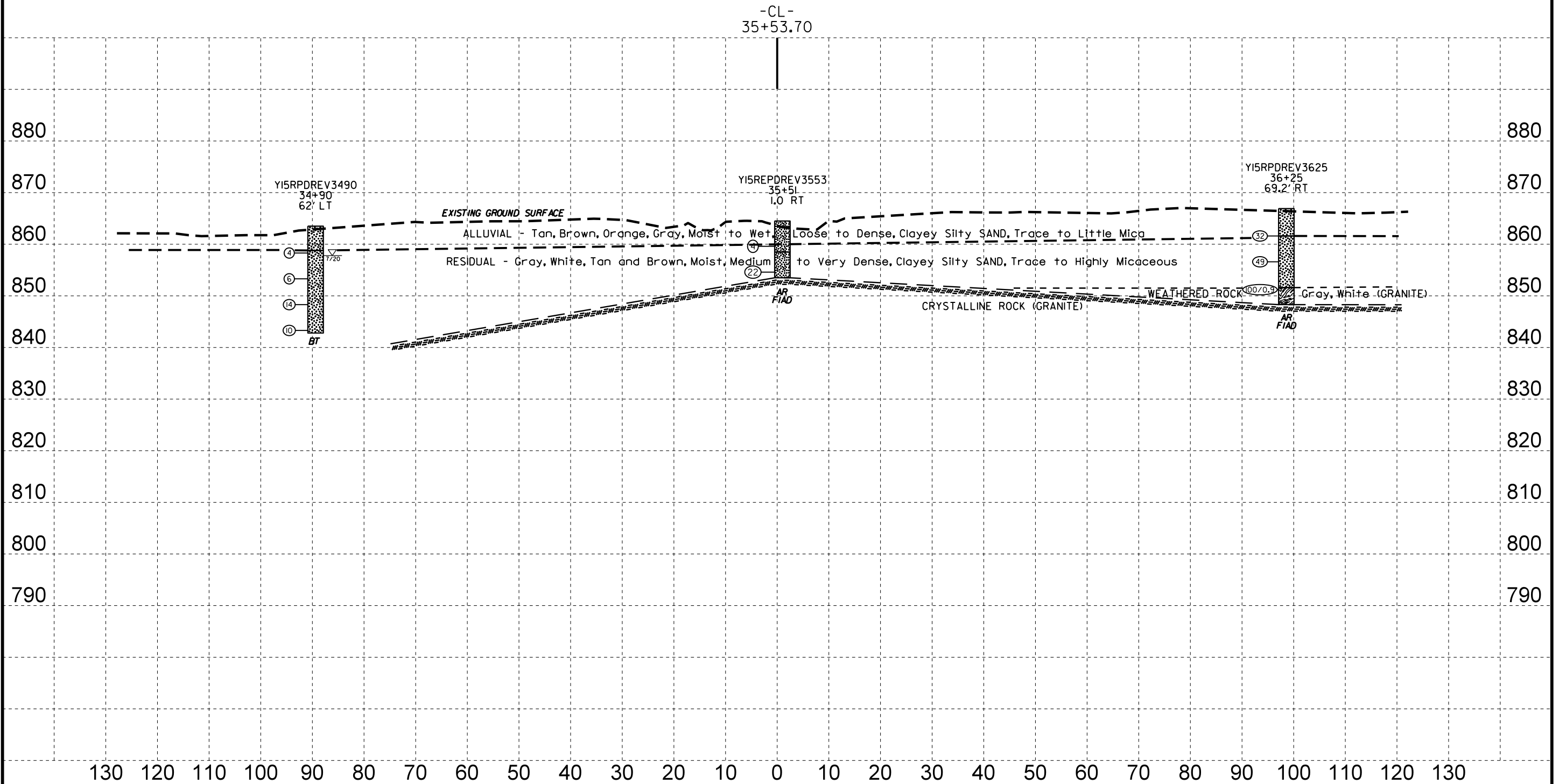
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Table with 4 main columns: SOIL DESCRIPTION, GRADATION, ROCK DESCRIPTION, and TERMS AND DEFINITIONS. It contains detailed technical specifications, classification charts, and symbols for geotechnical engineering.





PROJECT REFERENCE NO.	SHEET NO.
U-2579AB	4
SECTION ALONG CULVERT -CL- AT STA. 35+53.70 -Y15RPDREV-, SKEW: 44°	



# GEOTECHNICAL BORING REPORT

## BORE LOG

WBS 34839.1.8		TIP U-2579AB		COUNTY FORSYTH		GEOLOGIST Stickney, J. K.										
SITE DESCRIPTION Culvert on Future I-74 Ramp at -Y15RPDREV- Sta. 35+54 over Unnamed Tributary to Fiddler's Creek							GROUND WTR (ft)									
BORING NO. Y15RPDREV3490		STATION 34+90		OFFSET 62 ft LT		ALIGNMENT -Y15RPDREV-										
COLLAR ELEV. 863.5 ft		TOTAL DEPTH 20.7 ft		NORTHING 847,483		EASTING 1,664,130										
DRILL RIG/HAMMER EFF./DATE HFC0072 CME-550X 89% 12/16/2019				DRILL METHOD H.S. Augers		HAMMER TYPE Automatic										
DRILLER Smith, C. L.		START DATE 07/08/20		COMP. DATE 07/08/20		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						
865														863.5	GROUND SURFACE	0.0
860	859.3	4.2												858.8	ALLUVIAL Tan, Brown, Clayey Silty SAND, Trace to Little Mica	4.7
855	854.3	9.2	1	2	2										RESIDUAL Gray, White, Tan and Brown Clayey Silty SAND, Trace to Highly Micaceous	
850	849.3	14.2	2	3	3											
845	844.3	19.2	3	5	9											
			2	4	6									842.8	Boring Terminated at Elevation 842.8 ft in RESIDUAL, Clayey Silty SAND	20.7

WBS 34839.1.8		TIP U-2579AB		COUNTY FORSYTH		GEOLOGIST Stickney, J. K.										
SITE DESCRIPTION Culvert on Future I-74 Ramp at -Y15RPDREV- Sta. 35+54 over Unnamed Tributary to Fiddler's Creek							GROUND WTR (ft)									
BORING NO. Y15REPDREV3551		STATION 35+51		OFFSET 1 ft RT		ALIGNMENT -Y15RPDREV-										
COLLAR ELEV. 864.5 ft		TOTAL DEPTH 11.0 ft		NORTHING 847,476		EASTING 1,664,217										
DRILL RIG/HAMMER EFF./DATE HFC0072 CME-550X 89% 12/16/2019				DRILL METHOD H.S. Augers		HAMMER TYPE Automatic										
DRILLER Smith, C. L.		START DATE 01/29/21		COMP. DATE 01/29/21		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						
865														864.5	GROUND SURFACE	0.0
860	860.6	3.9	1	1	3									858.5	ALLUVIAL Tan, Orange, Gray, Moist To Wet, Loose, Clayey Silty SAND	6.0
855	855.6	8.9	7	9	13									853.5	RESIDUAL Gray, White, Brown, Moist, Medium To Very Dense, Clayey Silty SAND, Some Mica	11.0
															Boring Terminated by Auger Refusal at Elevation 853.5 ft on CRYSTALLINE ROCK (GRANITE)	

NCDOT BORE DOUBLE U-2579AB\_GEO\_CULV\_FORSYTH\_35+54-Y15RPDREV-GPJ\_NC\_DOT.GDT 2/3/21

# GEOTECHNICAL BORING REPORT

## BORE LOG





<b>WBS</b> 34839.1.8		<b>TIP</b> U-2579AB		<b>COUNTY</b> FORSYTH		<b>GEOLOGIST</b> Stickney, J. K.										
<b>SITE DESCRIPTION</b> Culvert on Future I-74 Ramp at -Y15RPDREV- Sta. 35+54 over Unnamed Tributary to Fiddler's Creek							<b>GROUND WTR (ft)</b>									
<b>BORING NO.</b> Y15RPDREV3625		<b>STATION</b> 36+25		<b>OFFSET</b> 69 ft RT		<b>ALIGNMENT</b> -Y15RPDREV-										
<b>COLLAR ELEV.</b> 866.9 ft		<b>TOTAL DEPTH</b> 18.6 ft		<b>NORTHING</b> 847,469		<b>EASTING</b> 1,664,317										
<b>DRILL RIG/HAMMER EFF./DATE</b> HFC0072 CME-550X 89% 12/16/2019				<b>DRILL METHOD</b> H.S. Augers		<b>HAMMER TYPE</b> Automatic										
<b>DRILLER</b> Smith, C. L.		<b>START DATE</b> 07/08/20		<b>COMP. DATE</b> 07/08/20		<b>SURFACE WATER DEPTH</b> 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)		
870														866.9	0.0	GROUND SURFACE
865																<b>ALLUVIAL</b> Tan, Brown, Clayey Silty SAND
860	862.6	4.3	2	6	26							M		861.6	5.3	<b>RESIDUAL</b> Gray, White, Brown and Tan, Clayey Silty SAND, Highly Micaceous
855	857.6	9.3	4	10	39							M				
850	852.6	14.3	4	8	92/0.4									851.6	15.3	<b>WEATHERED ROCK</b> Gray, White (GRANITE)
														848.3	18.6	Boring Terminated by Auger Refusal at Elevation 848.3 ft on CRYSTALLINE ROCK (GRANITE)

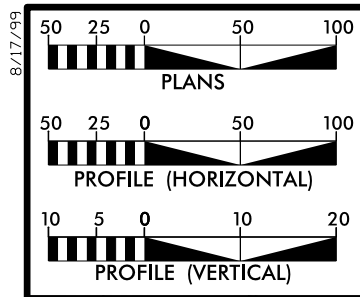
NCDOT BORE DOUBLE U-2579AB\_GEO\_CULV\_FORSYTH\_35+54\_-Y15RPDREV-.GPJ\_NC\_DOT.GDT 2/3/21





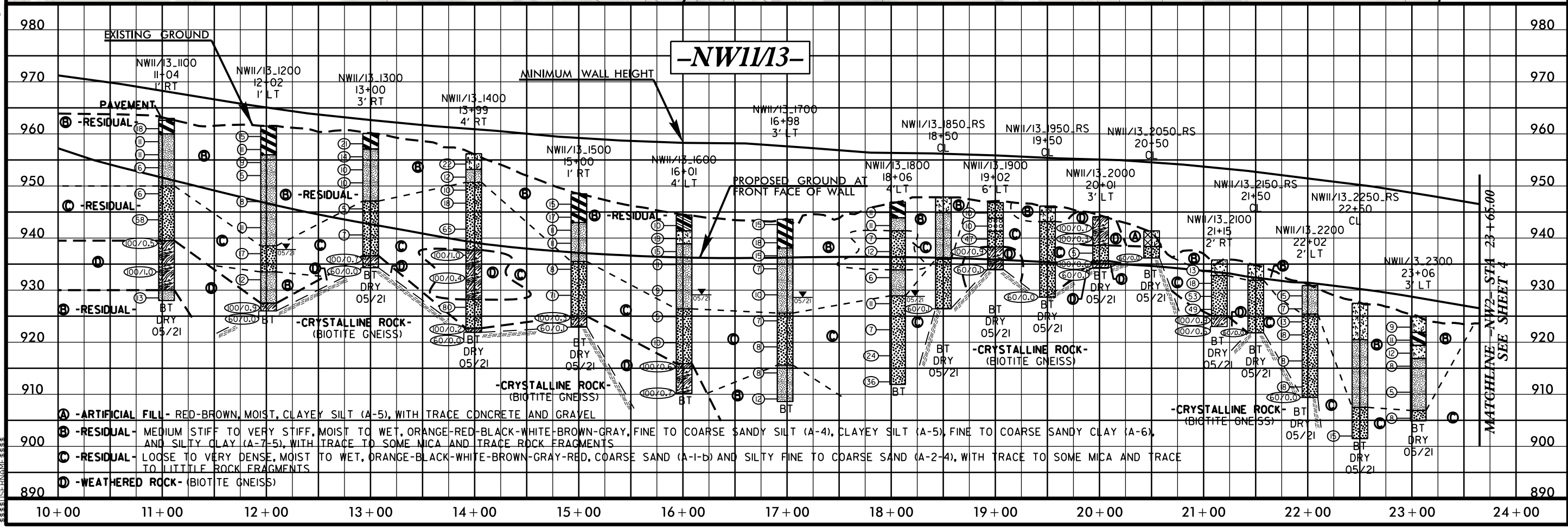
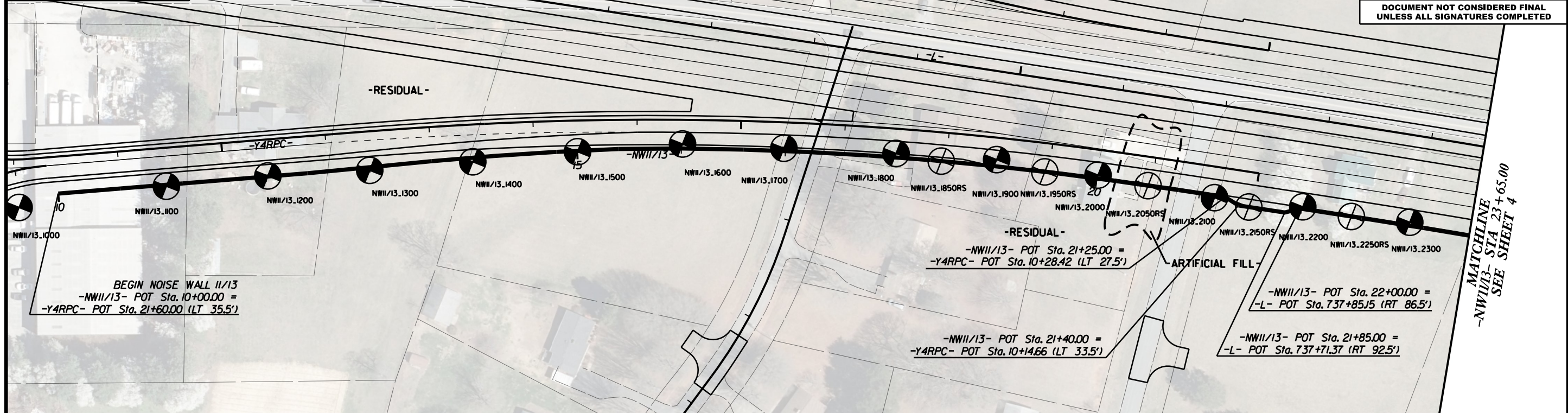
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION  
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**GEOTECHNICAL ENGINEERING UNIT**  
**SUBSURFACE INVESTIGATION**  
SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

SOIL DESCRIPTION										GRADATION										ROCK DESCRIPTION										TERMS AND DEFINITIONS																													
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 (ASHTO T 206, 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>										<b>WELL GRADED</b> - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE. <b>UNIFORMLY GRADED</b> - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE. <b>GAP-GRADED</b> - INDICATES A MIXTURE OF UNIFORM PARTICLE SIZES OF TWO OR MORE SIZES.										<b>HARD ROCK</b> 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:										<b>ALLUVIUM (ALLUV.)</b> - SOILS THAT HAVE BEEN TRANSPORTED BY WATER. <b>AQUIFER</b> - A WATER BEARING FORMATION OR STRATA. <b>ARENACEOUS</b> - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND. <b>ARGILLACEOUS</b> - 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. <b>ARTESIAN</b> - 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. <b>CALCAREOUS (CALC.)</b> - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE. <b>COLLUVIUM</b> - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE. <b>CORE RECOVERY (REC.)</b> - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED BY TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE. <b>DIKE</b> - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS MASSIVE ROCK. <b>DIP</b> - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL. <b>DIP DIRECTION (DIP AZIMUTH)</b> - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH. <b>FAULT</b> - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE. <b>FISSILE</b> - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES. <b>FLOAT</b> - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLOGGED FROM PARENT MATERIAL. <b>FLOOD PLAIN (FP)</b> - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM. <b>FORMATION (FM)</b> - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE FIELD. <b>JOINT</b> - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED. <b>LEDGE</b> - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO ITS LATERAL EXTENT. <b>LENS</b> - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS. <b>MOTTLED (MOT.)</b> - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS. MOTTLING IN SOILS USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE. <b>PERCHED WATER</b> - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN INTERVENING IMPERVIOUS STRATUM. <b>RESIDUAL (RES.) SOIL</b> - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK. <b>ROCK QUALITY DESIGNATION (RQD)</b> - 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. <b>SAPROLITE (SAP.)</b> - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK. <b>SILL</b> - 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. <b>SLICKENSIDE</b> - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE. <b>STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT)</b> - NUMBER OF BLOWS (IN 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. <b>STRATA CORE RECOVERY (SREC.)</b> - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE. <b>STRATA ROCK QUALITY DESIGNATION (SRQD)</b> - 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. <b>TOPSOIL (TS.)</b> - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.																													
<b>SOIL LEGEND AND AASHTO CLASSIFICATION</b>										<b>ANGULARITY OF GRAINS</b> THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS: <b>ANGULAR, SUBANGULAR, SUBROUNDED, OR ROUNDED.</b>										<b>WEATHERED ROCK (WR)</b>  NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT N VALUES > 100 BLOWS PER FOOT IF TESTED.										<b>CRYSTALLINE ROCK (CR)</b>  FINE TO COARSE GRAIN IGNEOUS AND METAMORPHIC ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES GRANITE, GNEISS, GABBRO, SCHIST, ETC.																													
<b>MINERALOGICAL COMPOSITION</b> MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHEN THEY ARE CONSIDERED OF SIGNIFICANCE.										<b>COMPRESSIONIBILITY</b> SLIGHTLY COMPRESSIBLE LL < 31 MODERATELY COMPRESSIBLE LL = 31 - 50 HIGHLY COMPRESSIBLE LL > 50										<b>NON-CRYSTALLINE ROCK (NCR)</b>  FINE TO COARSE GRAIN METAMORPHIC AND NON-COASTAL PLAIN SEDIMENTARY ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES PHYLLITE, SLATE, SANDSTONE, ETC.										<b>COASTAL PLAIN SEDIMENTARY ROCK (CP)</b>  COASTAL PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD SPT REFUSAL. ROCK TYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED SHELL BEDS, ETC.																													
<b>PERCENTAGE OF MATERIAL</b>										<b>GROUND WATER</b>										<b>WEATHERING</b>										<b>ORGANIC MATERIAL</b>																													
GRANULAR SOILS SILT - CLAY SOILS OTHER MATERIAL TRACE OF ORGANIC MATTER 2 - 3% 3 - 5% TRACE 1 - 10% LITTLE ORGANIC MATTER 3 - 5% 5 - 12% LITTLE 10 - 20% MODERATELY ORGANIC 5 - 10% 12 - 20% SOME 20 - 35% HIGHLY ORGANIC > 10% > 20% HIGHLY 35% AND ABOVE										WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING STATIC WATER LEVEL AFTER 24 HOURS PERCHED WATER, SATURATED ZONE, OR WATER BEARING STRATA SPRING OR SEEP										ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING. ROCK RINGS UNDER HAMMER IF CRYSTALLINE. 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. 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. 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. 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> 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 &gt; 100 BPF</i> 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 &lt; 100 BPF</i> 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.										SOILS WITH LITTLE OR MODERATE AMOUNTS OF ORGANIC MATTER HIGHLY ORGANIC SOILS																													
<b>TEXTURE OR GRAIN SIZE</b>										<b>MISCELLANEOUS SYMBOLS</b>										<b>ROCK HARDNESS</b>										<b>RECOMMENDATION SYMBOLS</b>																													
U.S. STD. SIEVE SIZE OPENING (MM) 4 10 40 60 200 270 4.76 2.00 0.42 0.25 0.075 0.053										ROADWAY EMBANKMENT (RE) WITH SOIL DESCRIPTION SOIL SYMBOL ARTIFICIAL FILL (AF) OTHER THAN ROADWAY EMBANKMENT INFERRED SOIL BOUNDARY INFERRED ROCK LINE ALLUVIAL SOIL BOUNDARY										DIP & DIP DIRECTION OF ROCK STRUCTURES SPT DMT TEST BORING AUGER BORING CORE BORING MONITORING WELL PIEZOMETER INSTALLATION SLOPE INDICATOR INSTALLATION CONE PENETROMETER TEST SOUNDING ROD TEST BORING WITH CORE SPT N-VALUE										UNDERCUT SHALLOW UNDERCUT UNCLASSIFIED EXCAVATION - UNSUITABLE WASTE UNCLASSIFIED EXCAVATION - ACCEPTABLE DEGRADABLE ROCK UNCLASSIFIED EXCAVATION - ACCEPTABLE, BUT NOT TO BE USED IN THE TOP 3 FEET OF EMBANKMENT OR BACKFILL																													
<b>CONSISTENCY OR DENSENESS</b>										<b>ABBREVIATIONS</b>										<b>FRACTURE SPACING</b>										<b>ABBREVIATIONS</b>																													
PRIMARY SOIL TYPE COMPACTNESS OR CONSISTENCY RANGE OF STANDARD PENETRATION RESISTANCE (N-VALUE) RANGE OF UNCONFINED COMPRESSIVE STRENGTH (TONS/FT <sup>2</sup> ) GENERALLY GRANULAR MATERIAL (NON-COHESIVE) VERY LOOSE 4 TO 10 MEDIUM DENSE 10 TO 30 DENSE 30 TO 50 VERY DENSE > 50 GENERALLY SILT-CLAY MATERIAL (COHESIVE) VERY SOFT 2 TO 4 SOFT 4 TO 8 MEDIUM STIFF 8 TO 15 STIFF 15 TO 30 VERY STIFF > 30										AR - AUGER REFUSAL BT - BORING TERMINATED CL - CLAY CPT - CONE PENETRATION TEST CSE - COARSE DMT - DILATOMETER TEST DPT - DYNAMIC PENETRATION TEST e - VOID RATIO F - FINE FOSS. - FOSSILIFEROUS FRAC. - FRACTURED, FRACTURES FRAGS. - FRAGMENTS HL. - HIGHLY MED. - MEDIUM MICA. - MICACEOUS MOD. - MODERATELY NP - NON PLASTIC ORG. - ORGANIC PMT - PRESSUREMETER TEST SAP. - SAPROLITIC SD. - SAND, SANDY SL. - SILT, SILTY SLI. - SLIGHTLY TCR - TRICONE REFUSAL w - MOISTURE CONTENT V - VERY VST - VANE SHEAR TEST WEA. - WEATHERED UNIT WEIGHT DRY UNIT WEIGHT SAMPLE ABBREVIATIONS S - BULK SS - SPLIT SPOON ST - SHELBY TUBE RS - ROCK RT - RECOMPACTED TRIAXIAL CBR - CALIFORNIA BEARING RATIO										VERY HARD CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK. BREAKING OF HAND SPECIMENS REQUIRES SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK. HARD CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED TO DETACH HAND SPECIMEN. MODERATELY HARD CAN BE SCRATCHED BY KNIFE OR PICK. GOUGES OR GROOVES TO 0.25 INCHES DEEP CAN BE EXCAVATED BY HARD BLOW OF A GEOLOGIST'S PICK. HAND SPECIMENS CAN BE DETACHED BY MODERATE BLOWS. MEDIUM HARD CAN BE GROOVED OR GOUGED 0.05 INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT. CAN BE EXCAVATED IN SMALL CHIPS TO PEICES 1 INCH MAXIMUM SIZE BY HARD BLOWS OF THE POINT OF A GEOLOGIST'S PICK. SOFT CAN BE 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. 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.										UNCLASSIFIED EXCAVATION - ACCEPTABLE, BUT NOT TO BE USED IN THE TOP 3 FEET OF EMBANKMENT OR BACKFILL																													
<b>SOIL MOISTURE - CORRELATION OF TERMS</b>										<b>EQUIPMENT USED ON SUBJECT PROJECT</b>										<b>BEDDING</b>										<b>ABBREVIATIONS</b>																													
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 SHRINKAGE LIMIT - MOIST - (M) SOLID; AT OR NEAR OPTIMUM MOISTURE SL - - DRY - (D) REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE										DRILL UNITS: <input type="checkbox"/> CME-45C <input type="checkbox"/> CME-55 <input checked="" type="checkbox"/> CME-550 <input type="checkbox"/> VANE SHEAR TEST <input type="checkbox"/> PORTABLE HOIST										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 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										HAMMER TYPE: <input checked="" type="checkbox"/> AUTOMATIC <input type="checkbox"/> MANUAL CORE SIZE: <input type="checkbox"/> -B <input type="checkbox"/> -H <input type="checkbox"/> -N HAND TOOLS: <input type="checkbox"/> POST HOLE DIGGER <input type="checkbox"/> HAND AUGER <input type="checkbox"/> SOUNDING ROD <input type="checkbox"/> VANE SHEAR TEST										TERM SPACING THICKNESS VERY WIDE MORE THAN 10 FEET 4 FEET WIDE 3 TO 10 FEET 1.5 - 4 FEET MODERATELY CLOSE 1 TO 3 FEET 0.16 - 1.5 FEET CLOSE 0.16 TO 1 FOOT VERY THINLY BEDDED 0.03 - 0.16 FEET VERY CLOSE LESS THAN 0.16 FEET THICKLY LAMINATED 0.008 - 0.03 FEET THINLY LAMINATED < 0.008 FEET										UNCLASSIFIED EXCAVATION - ACCEPTABLE, BUT NOT TO BE USED IN THE TOP 3 FEET OF EMBANKMENT OR BACKFILL									
<b>PLASTICITY</b>										<b>INDURATION</b>										<b>FRACTURE SPACING</b>										<b>ABBREVIATIONS</b>																													
NON PLASTIC 0-5 VERY LOW SLIGHTLY PLASTIC 6-15 LIGHT MODERATELY PLASTIC 16-25 MEDIUM HIGHLY PLASTIC 26 OR MORE HIGH										FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC. FRIABLE RUBBING WITH FINGER FREES NUMEROUS GRAINS; GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE. MODERATELY INDURATED GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE; BREAKS EASILY WHEN HIT WITH HAMMER. INDURATED GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE; DIFFICULT TO BREAK WITH HAMMER. EXTREMELY INDURATED SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE; SAMPLE BREAKS ACROSS GRAINS.										BENCH MARK: N/A ELEVATION: N/A FEET										NOTES: ROADWAY DESIGN FILES, .TIN, AND GPK FILE PROVIDED BY NCDOT NORTHING AND EASTING OBTAINED USING A TRIMBLE GEO7X. ELEVATIONS OBTAINED USING PROVIDED SURVEY INFORMATION.																													
<b>COLOR</b> DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-GRAY). MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.																																																											



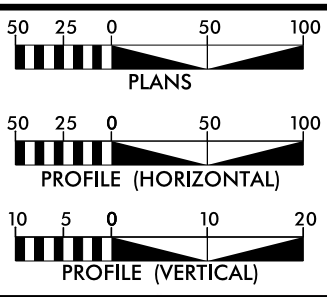
# PLAN AND PROFILE OF NOISE WALL 11/13

PROJECT REFERENCE NO. <b>U-2579AB</b>	SHEET NO. <b>3</b>
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
<b>INCOMPLETE PLANS</b> DO NOT USE FOR R/W ACQUISITION	
<b>DOCUMENT NOT CONSIDERED FINAL</b> UNLESS ALL SIGNATURES COMPLETED	



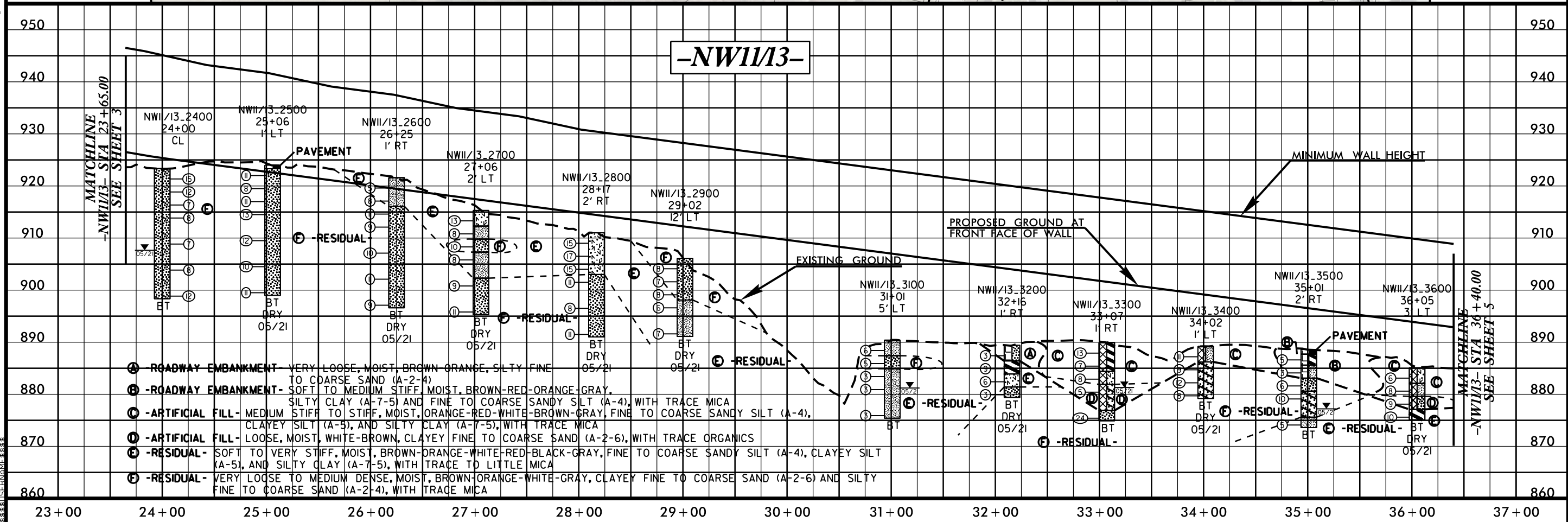
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8/17/99



# PLAN AND PROFILE OF NOISE WALL 11/3

PROJECT REFERENCE NO. <b>U-2579AB</b>	SHEET NO. <b>4</b>
R/W SHEET NO.	HYDRAULICS ENGINEER
ROADWAY DESIGN ENGINEER	
<b>INCOMPLETE PLANS</b> DO NOT USE FOR R/W ACQUISITION	
<b>DOCUMENT NOT CONSIDERED FINAL</b> UNLESS ALL SIGNATURES COMPLETED	



- Ⓐ ROADWAY EMBANKMENT - VERY LOOSE, MOIST, BROWN ORANGE, SILTY FINE TO COARSE SAND (A-2-4)
- Ⓑ -ROADWAY EMBANKMENT- SOFT TO MEDIUM STIFF, MOIST, BROWN-RED-ORANGE-GRAY, SILTY CLAY (A-7-5) AND FINE TO COARSE SANDY SILT (A-4), WITH TRACE MICA
- Ⓒ -ARTIFICIAL FILL- MEDIUM STIFF TO STIFF, MOIST, ORANGE-RED-WHITE-BROWN-GRAY, FINE TO COARSE SANDY SILT (A-4), CLAYEY SILT (A-5), AND SILTY CLAY (A-7-5), WITH TRACE MICA
- Ⓓ -ARTIFICIAL FILL- LOOSE, MOIST, WHITE-BROWN, CLAYEY FINE TO COARSE SAND (A-2-6), WITH TRACE ORGANICS
- Ⓔ -RESIDUAL- SOFT TO VERY STIFF, MOIST, BROWN-ORANGE-WHITE-RED-BLACK-GRAY, FINE TO COARSE SANDY SILT (A-4), CLAYEY SILT (A-5), AND SILTY CLAY (A-7-5), WITH TRACE TO LITTLE MICA
- Ⓕ -RESIDUAL- VERY LOOSE TO MEDIUM DENSE, MOIST, BROWN-ORANGE-WHITE-GRAY, CLAYEY FINE TO COARSE SAND (A-2-6) AND SILTY FINE TO COARSE SAND (A-2-4), WITH TRACE MICA

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# GEOTECHNICAL BORING REPORT

## BORE LOG

WBS 34839.1.8		TIP U-2579AB		COUNTY FORSYTH		GEOLOGIST A. Suttle											
SITE DESCRIPTION Winston-Salem Beltway from US 421/I-40 Business to I-40							GROUND WTR (ft)										
BORING NO. NW11/13_1000		STATION 9+61		OFFSET 10 ft RT		ALIGNMENT -NW11/13-											
COLLAR ELEV. 963.9 ft		TOTAL DEPTH 30.0 ft		NORTHING 854,142		EASTING 1,663,585											
DRILL RIG/HAMMER EFF./DATE TDD1893 CME-550X 79% 06/15/2021				DRILL METHOD H.S. Augers		HAMMER TYPE Automatic											
DRILLER J. Chambless		START DATE 05/17/21		COMP. DATE 05/17/21		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)			
965														963.9	0.0	GROUND SURFACE	
	962.9	1.0	9	7	10	17						M				<b>RESIDUAL</b> Very Stiff, Orange-Red, Silty CLAY (A-7-5)	
960	960.4	3.5	4	9	11	20						M					
	957.9	6.0	4	7	8	15						M			958.4	5.5	Medium Stiff to Stiff, Orange-Red-Black, Fine to Coarse Sandy SILT (A-4), with little mica
955	955.4	8.5	3	8	7	15						M					
	950.4	13.5	4	6	8	14						M					
945	945.4	18.5	2	4	4	8						M					
	940.4	23.5	3	5	5	10						M					
935	935.4	28.5	9	14	11	25						M			936.9	27.0	Medium Dense, Orange-Black-Brown, Silty Fine to Coarse SAND (A-2-4), with trace mica
															933.9	30.0	Boring Terminated at Elevation 933.9 ft In Residual Silty SAND (A-2-4)  Surficial Gravel 0.0 to 0.2 feet

NCDOT BORE DOUBLE U2579AB\_SWAL\_GEO.GPJ NC\_DOT.GDT 7/6/21

REFERENCE: U-2579AB

PROJECT: 34839

**CONTENTS**

<u>SHEET NO.</u>	<u>DESCRIPTION</u>
1	TITLE SHEET
2	LEGEND (SOIL & ROCK)
3-6	PLAN & PROFILE SHEETS

**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 SOUND WALL 1516

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	U-2579AB	1	6

**CAUTION NOTICE**

THE SUBSURFACE INFORMATION AND THE SUBSURFACE INVESTIGATION ON WHICH IT IS BASED WERE MADE FOR THE PURPOSE OF STUDY, PLANNING AND DESIGN, AND NOT FOR CONSTRUCTION OR PAY PURPOSES. THE VARIOUS FIELD BORING LOGS, ROCK CORES AND SOIL TEST DATA AVAILABLE MAY BE REVIEWED OR INSPECTED IN RALEIGH BY CONTACTING THE N. C. DEPARTMENT OF TRANSPORTATION, GEOTECHNICAL ENGINEERING UNIT AT (919) 707-6850. THE SUBSURFACE PLANS AND REPORTS, FIELD BORING LOGS, ROCK CORES AND SOIL TEST DATA ARE NOT PART OF THE CONTRACT.

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

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

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

**PERSONNEL**

A. SUTTLE, G.I.T.

**TOTAL DEPTH DRILLING**

J. GARRICK, G.I.T.

INVESTIGATED BY ECS SOUTHEAST, LLP

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SUBMITTED BY ECS SOUTHEAST, LLP

DATE JULY 2021

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SIGNATURE DATE

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

SOIL DESCRIPTION

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

SOIL LEGEND AND AASHTO CLASSIFICATION

Table with columns for GENERAL CLASS., GRANULAR MATERIALS (A-1 to A-7), SILT-CLAY MATERIALS (A-1 to A-7), ORGANIC MATERIALS (A-1, A-2, A-3, A-4, A-5, A-6, A-7), and SYMBOL. Includes a legend for % PASSING #10, #40, #200 and material types like MUCK, PEAT, and HIGHLY ORGANIC SOILS.

CONSISTENCY OR DENSENESS

Table mapping PRIMARY SOIL TYPE (e.g., GENERALLY GRANULAR MATERIAL) to COMPACTNESS OR CONSISTENCY (e.g., VERY LOOSE, MEDIUM DENSE) and RANGE OF STANDARD PENETRATION RESISTANCE (N-VALUE).

TEXTURE OR GRAIN SIZE

Table showing U.S. STD. SIEVE SIZE (4, 10, 40, 60, 200, 270) and corresponding BOULDER, COBBLE, GRAVEL, COARSE SAND, FINE SAND, SILT, and CLAY percentages.

SOIL MOISTURE - CORRELATION OF TERMS

Table correlating SOIL MOISTURE SCALE (LL, PL, OM, SL) with FIELD MOISTURE DESCRIPTION (SATURATED, WET, MOIST, DRY) and GUIDE FOR FIELD MOISTURE DESCRIPTION.

PLASTICITY

Table relating PLASTICITY INDEX (PI) to PLASTICITY (NON PLASTIC to HIGHLY PLASTIC) and DRY STRENGTH (VERY LOW to HIGH).

COLOR

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

GRADATION

WELL GRADED - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE. 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.

ANGULARITY OF GRAINS

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

MINERALOGICAL COMPOSITION

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

COMPRESSIBILITY

SLIGHTLY COMPRESSIBLE LL < 31
MODERATELY COMPRESSIBLE LL = 31 - 50
HIGHLY COMPRESSIBLE LL > 50

PERCENTAGE OF MATERIAL

Table showing PERCENTAGE OF MATERIAL for ORGANIC MATERIAL, GRANULAR SOILS, SILT-CLAY SOILS, and OTHER MATERIAL.

GROUND WATER

Water level symbols: WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING, STATIC WATER LEVEL AFTER 24 HOURS, PERCHED WATER, SATURATED ZONE, OR WATER BEARING STRATA, SPRING OR SEEP.

MISCELLANEOUS SYMBOLS

Complex block containing various symbols for ROADWAY EMBANKMENT, SOIL SYMBOL, ARTIFICIAL FILL, INFERRED SOIL BOUNDARY, INFERRED ROCK LINE, ALLUVIAL SOIL BOUNDARY, DIP & DIP DIRECTION, TEST BORING, AUGER BORING, CORE BORING, MONITORING WELL, PIEZOMETER INSTALLATION, SLOPE INDICATOR, CONE PENETROMETER TEST, SOUNDING ROD, TEST BORING WITH CORE, and SPT N-VALUE.

RECOMMENDATION SYMBOLS

Symbols for UNDERCUT, SHALLOW UNDERCUT, UNCLASSIFIED EXCAVATION - UNSUITABLE WASTE, UNCLASSIFIED EXCAVATION - ACCEPTABLE DEGRADABLE ROCK, UNCLASSIFIED EXCAVATION - ACCEPTABLE, BUT NOT TO BE USED IN THE TOP 3 FEET OF EMBANKMENT OR BACKFILL.

ABBREVIATIONS

- 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, HI. - HIGHLY, MED. - MEDIUM, MICA - MICACEOUS, MOD. - MODERATELY, NP - NON PLASTIC, ORG. - ORGANIC, PMT - PRESSUREMETER TEST, SAP. - SAPROLITIC, SD. - SAND, SANDY, SL. - SILT, SILTY, SLI. - SLIGHTLY, TCR - TRICONE REFUSAL, w - MOISTURE CONTENT, V - VERY, VST - VANE SHEAR TEST, WEA. - WEATHERED, UNIT WEIGHT, DRY UNIT WEIGHT, SAMPLE ABBREVIATIONS: S - BULK, SS - SPLIT SPOON, ST - SHELBY TUBE, RS - ROCK, RT - RECOMPACTED TRIAXIAL, CBR - CALIFORNIA BEARING RATIO.

EQUIPMENT USED ON SUBJECT PROJECT

- DRILL UNITS: CME-45C, CME-55, CME-550, VANE SHEAR TEST, PORTABLE HOIST. ADVANCING TOOLS: CLAY BITS, 6" CONTINUOUS FLIGHT AUGER, 8" HOLLOW AUGERS, HARD FACED FINGER BITS, TUNG-CARBIDE INSERTS, CASING w/ ADVANCER, TRICONE STEEL TEETH, TRICONE TUNG-CARB., CORE BIT. HAMMER TYPE: AUTOMATIC, MANUAL. CORE SIZE: B, H, N. HAND TOOLS: POST HOLE DIGGER, HAND AUGER, SOUNDING ROD, VANE SHEAR TEST.

ROCK DESCRIPTION

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:

Table describing WEATHERED ROCK (WR), CRYSTALLINE ROCK (CR), NON-CRYSTALLINE ROCK (NCR), and COASTAL PLAIN SEDIMENTARY ROCK (CP) with their respective characteristics and SPT values.

WEATHERING

ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING. ROCK RINGS UNDER HAMMER IF CRYSTALLINE. 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. 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. 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. ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. IN GRANITOID ROCKS, ALL FELDSPARS DULL AND DISCOLORED AND A MAJORITY SHOW KAOLINIZATION. ROCK SHOWS SEVERE LOSS OF STRENGTH AND CAN BE EXCAVATED WITH A GEOLOGIST'S PICK. ROCK GIVES 'CLUNK' SOUND WHEN STRUCK. IF TESTED, WOULD YIELD SPT REFUSAL. ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC CLEAR AND EVIDENT BUT REDUCED IN STRENGTH TO STRONG SOIL. IN GRANITOID ROCKS ALL FELDSPARS ARE KAOLINIZED TO SOME EXTENT. SOME FRAGMENTS OF STRONG ROCK USUALLY REMAIN. IF TESTED, WOULD YIELD SPT N VALUES > 100 BPF. 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. IF TESTED, WOULD YIELD SPT N VALUES < 100 BPF. ROCK REDUCED TO SOIL. ROCK FABRIC NOT DISCERNIBLE, OR DISCERNIBLE ONLY IN SMALL AND SCATTERED CONCENTRATIONS. FABRIC MAY BE PRESENT AS DIKES OR STRINGERS. SAPROLITE IS ALSO AN EXAMPLE.

ROCK HARDNESS

VERY HARD CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK. BREAKING OF HAND SPECIMENS REQUIRES SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK. HARD CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED TO DETACH HAND SPECIMEN. MODERATELY HARD CAN BE SCRATCHED BY KNIFE OR PICK. GOUGES OR GROOVES TO 0.25 INCHES DEEP CAN BE EXCAVATED BY HARD BLOW OF A GEOLOGIST'S PICK. HAND SPECIMENS CAN BE DETACHED BY MODERATE BLOWS. MEDIUM HARD CAN BE GROOVED OR GOUGED 0.05 INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT. CAN BE EXCAVATED IN SMALL CHIPS TO PIECES 1 INCH MAXIMUM SIZE BY HARD BLOWS OF THE POINT OF A GEOLOGIST'S PICK. 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. 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.

FRACTURE SPACING

Table mapping FRACTURE SPACING (VERY WIDE, WIDE, MODERATELY CLOSE, CLOSE, VERY CLOSE) to SPACING (MORE THAN 10 FEET, 3 TO 10 FEET, 1 TO 3 FEET, 0.16 TO 1 FOOT, LESS THAN 0.16 FEET).

BEDDING

Table mapping BEDDING (VERY THICKLY BEDDED, THICKLY BEDDED, THINLY BEDDED, VERY THINLY BEDDED, THICKLY LAMINATED, THINLY LAMINATED) to THICKNESS (4 FEET, 1.5 - 4 FEET, 0.16 - 1.5 FEET, 0.03 - 0.16 FEET, 0.008 - 0.03 FEET, < 0.008 FEET).

INDURATION

FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC. FRIABLE RUBBING WITH FINGER FREES NUMEROUS GRAINS; GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE. MODERATELY INDURATED GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE; BREAKS EASILY WHEN HIT WITH HAMMER. INDURATED GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE; DIFFICULT TO BREAK WITH HAMMER. EXTREMELY INDURATED SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE; SAMPLE BREAKS ACROSS GRAINS.

TERMS AND DEFINITIONS

- ALLUVIUM (ALLUV.) - SOILS THAT HAVE BEEN TRANSPORTED BY WATER. AQUIFER - A WATER BEARING FORMATION OR STRATA. ARENACEOUS - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND. ARGILLACEOUS - APPLIED TO ALL ROCKS OR SUBSTANCES COMPOSED OF CLAY MINERALS, OR HAVING A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION, 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.

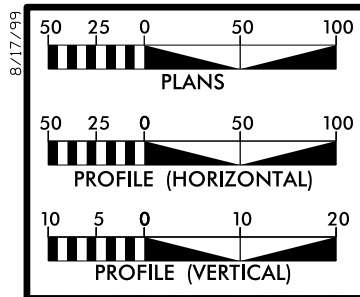
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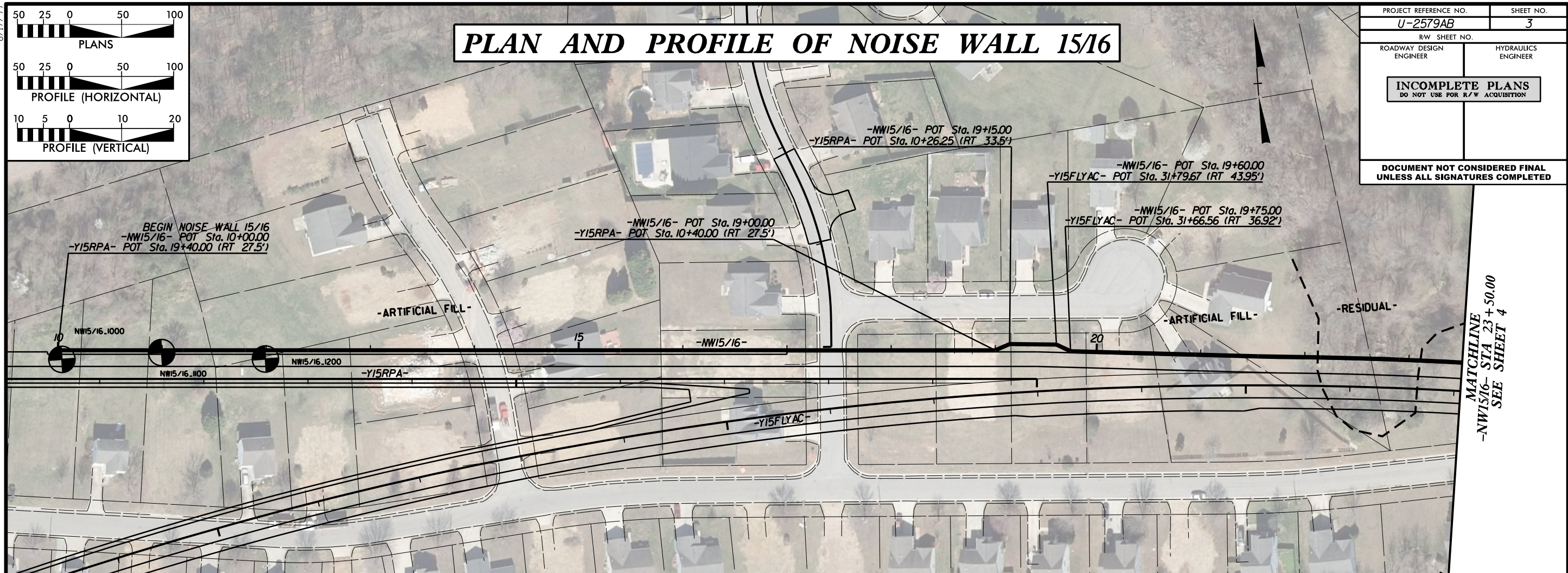
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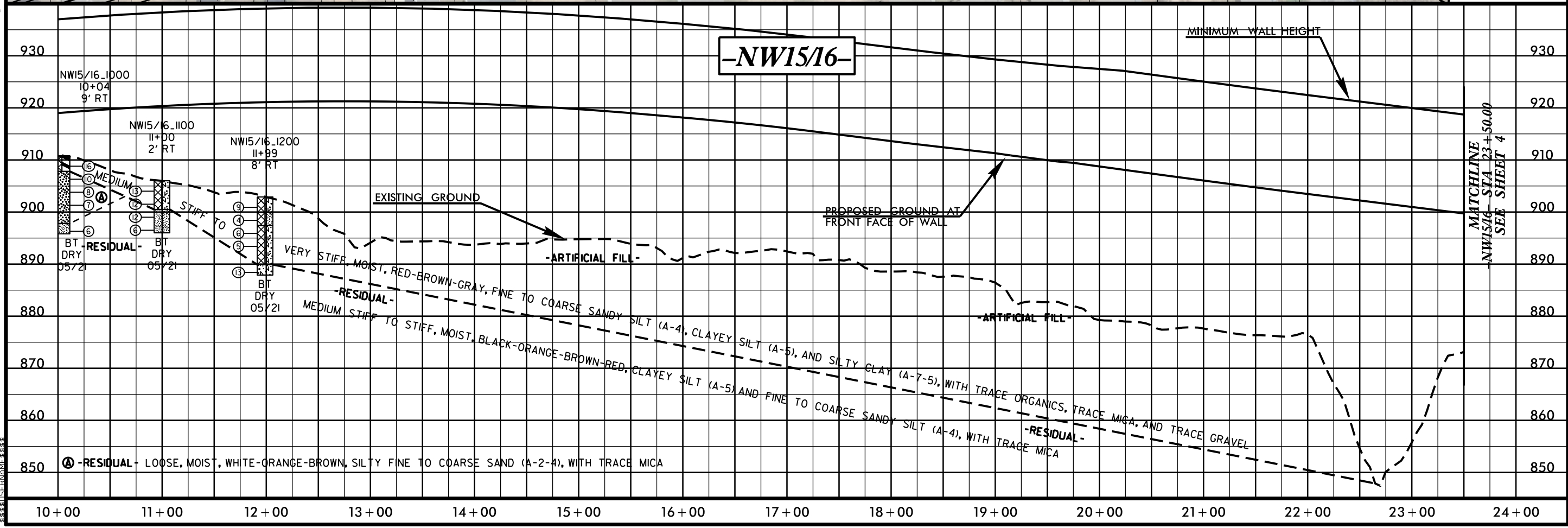


# PLAN AND PROFILE OF NOISE WALL 15/16

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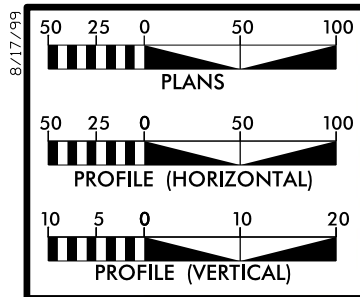


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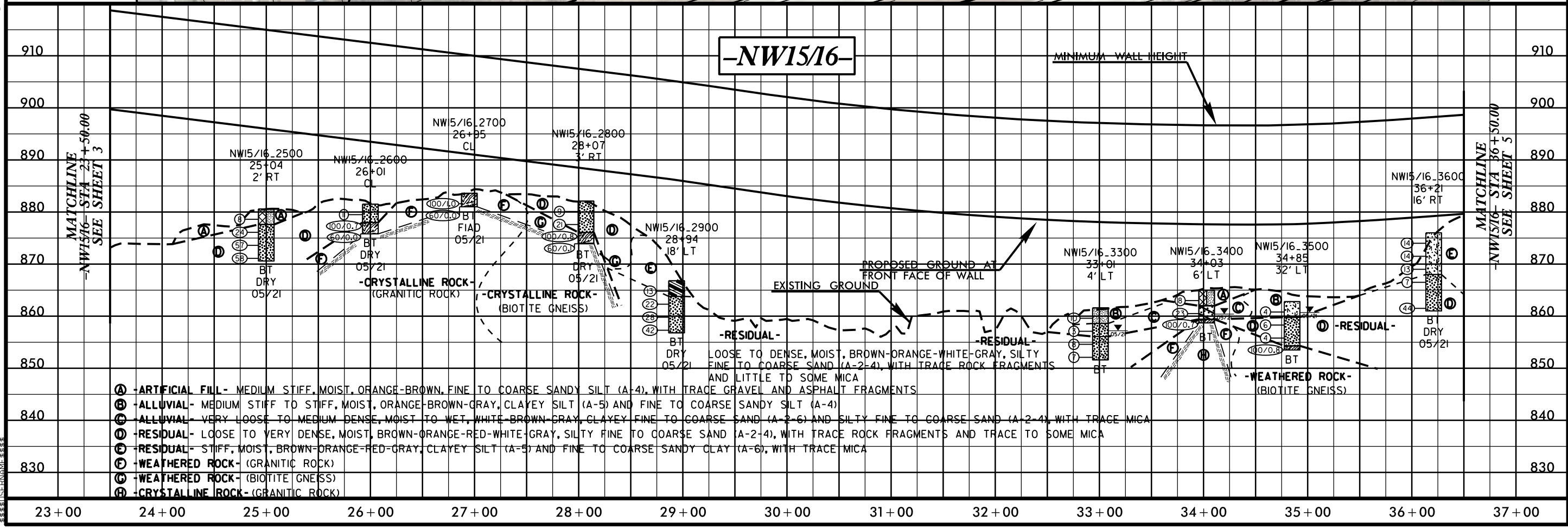
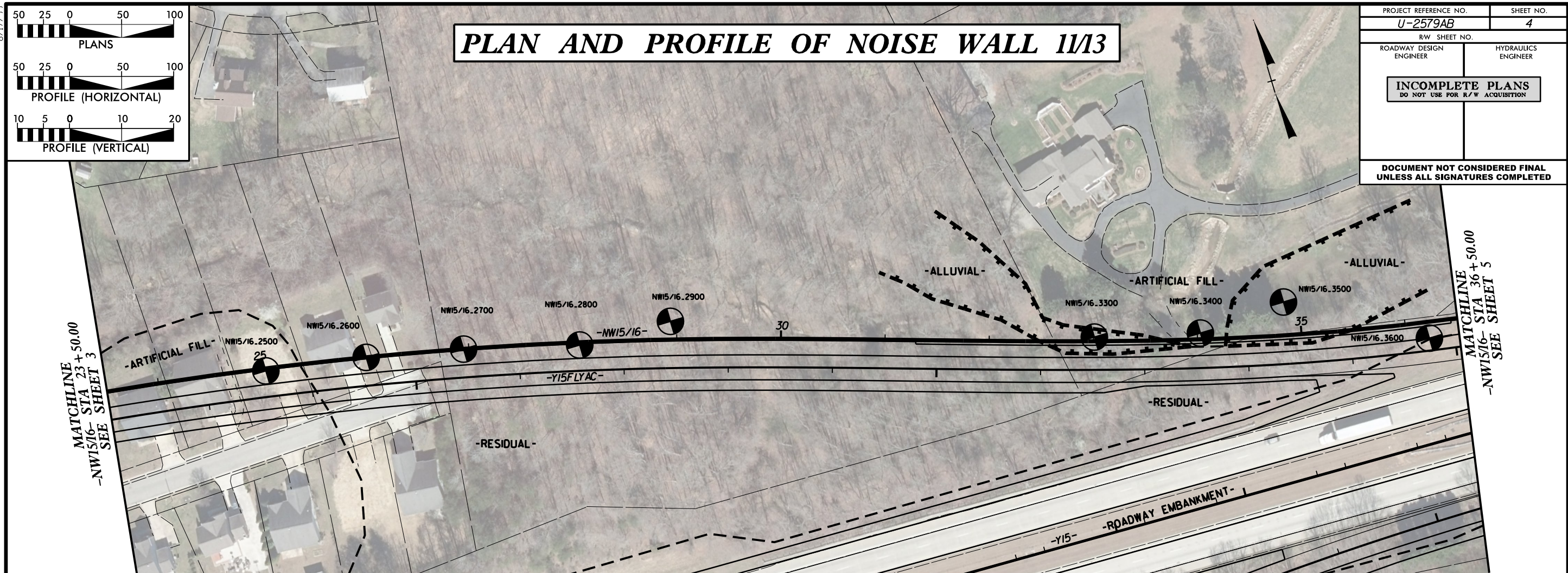
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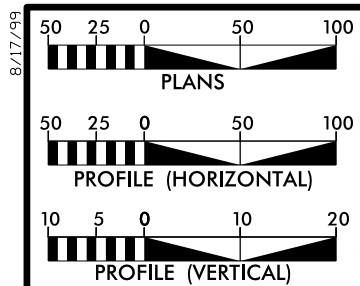
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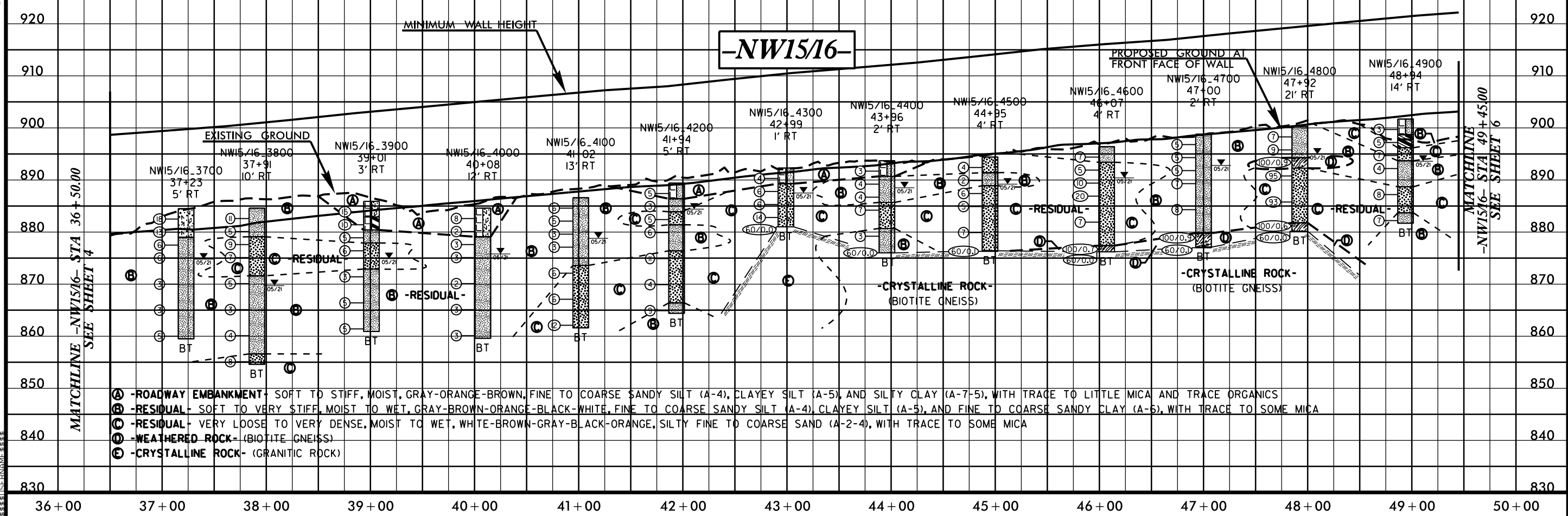
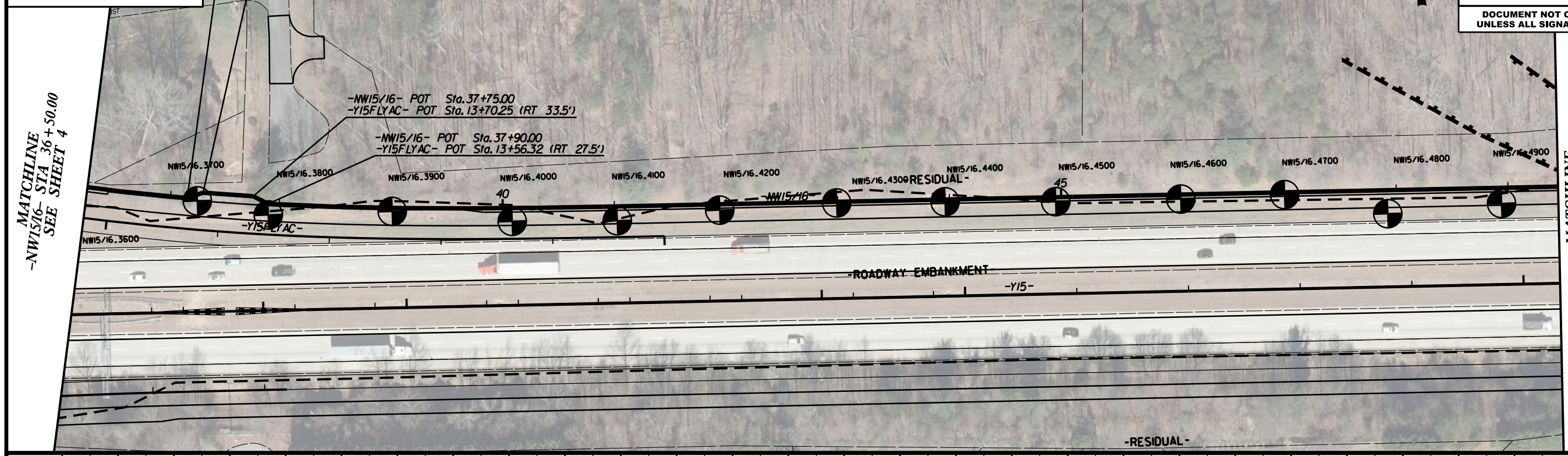
- (A) -ARTIFICIAL FILL- MEDIUM STIFF, MOIST, ORANGE-BROWN, FINE TO COARSE SANDY SILT (A-4), WITH TRACE GRAVEL AND ASPHALT FRAGMENTS
- (B) -ALLUVIAL- MEDIUM STIFF TO STIFF, MOIST, ORANGE-BROWN-GRAY, CLAYEY SILT (A-5) AND FINE TO COARSE SANDY SILT (A-4)
- (C) -ALLUVIAL- VERY LOOSE TO MEDIUM DENSE, MOIST TO WET, WHITE-BROWN-GRAY, CLAYEY FINE TO COARSE SAND (A-2-6) AND SILTY FINE TO COARSE SAND (A-2-4), WITH TRACE MICA
- (D) -RESIDUAL- LOOSE TO VERY DENSE, MOIST, BROWN-ORANGE-RED-WHITE-GRAY, SILTY FINE TO COARSE SAND (A-2-4), WITH TRACE ROCK FRAGMENTS AND TRACE TO SOME MICA
- (E) -RESIDUAL- STIFF, MOIST, BROWN-ORANGE-RED-GRAY, CLAYEY SILT (A-5) AND FINE TO COARSE SANDY CLAY (A-6), WITH TRACE MICA
- (F) -WEATHERED ROCK- (GRANITIC ROCK)
- (G) -WEATHERED ROCK- (BIOTITE GNEISS)
- (H) -CRYSTALLINE ROCK- (GRANITIC ROCK)

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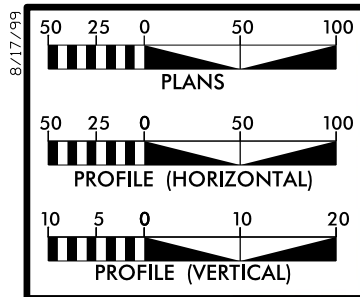


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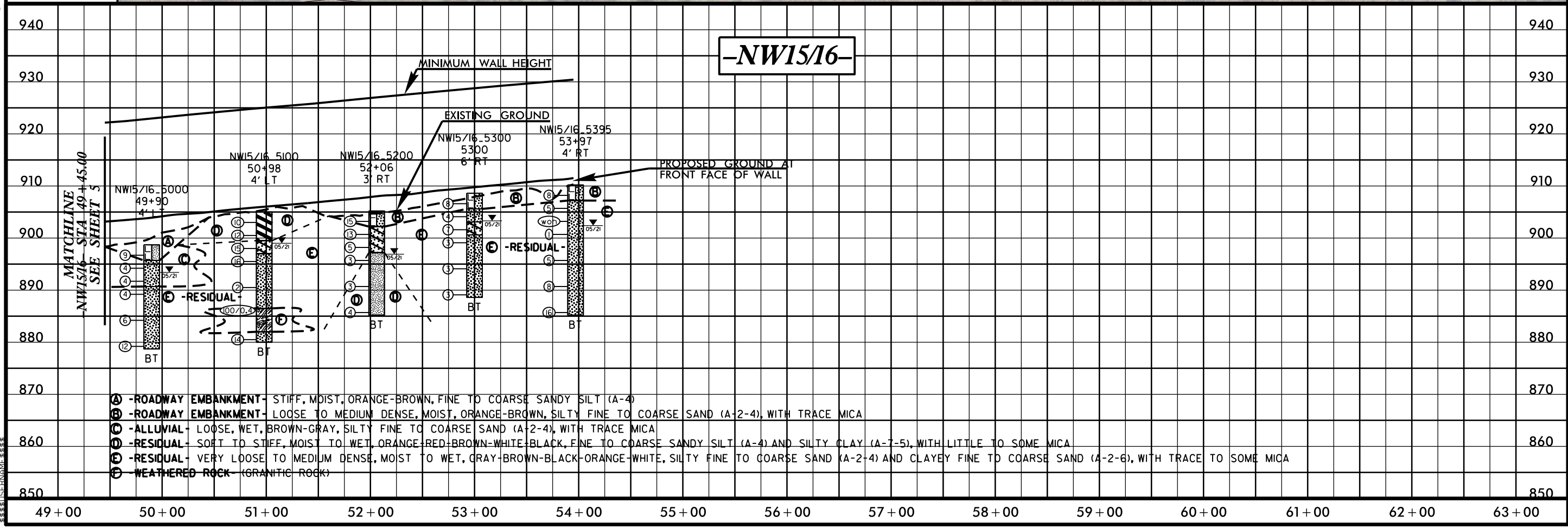
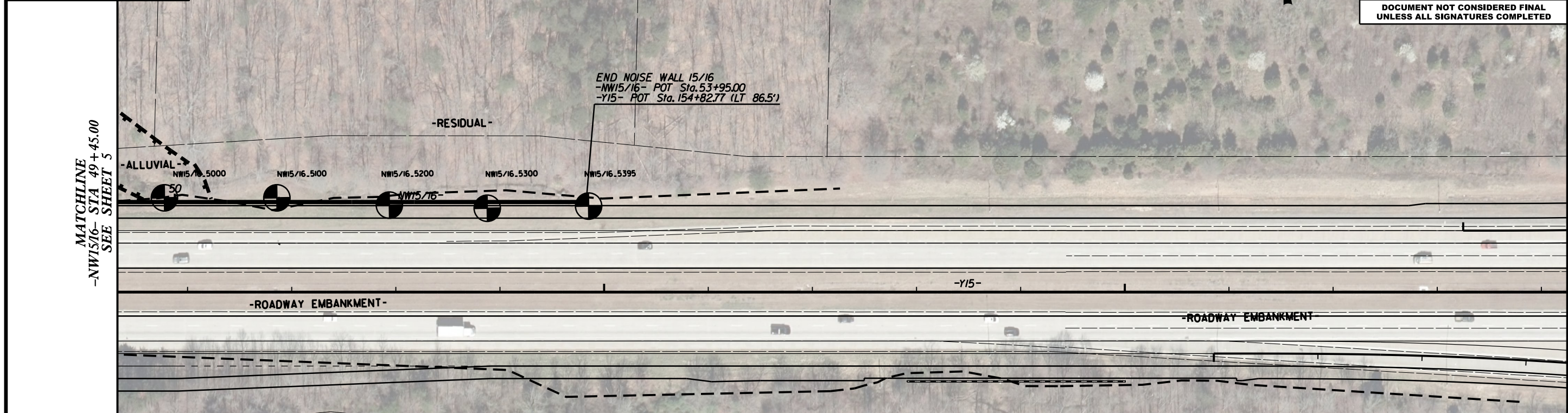


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REFERENCE: U-2579AB

PROJECT: 34839

**CONTENTS**

<u>SHEET NO.</u>	<u>DESCRIPTION</u>
1	TITLE SHEET
2	LEGEND (SOIL & ROCK)
3-7	PLAN & PROFILE SHEETS
8-14	BORELOGS

**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 421/40 BUS TO I-40

SITE DESCRIPTION SOUND WALL 17/18/19

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	U-2579AB	1	14

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PERSONNEL

A. SUTTLE, G.I.T.

**TOTAL DEPTH DRILLING**

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SUBMITTED BY ECS SOUTHEAST, LLP

DATE JULY 2021

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ENGINEERING  
FIRM # F-1078



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Kelly de Montbrun 7/13/2021

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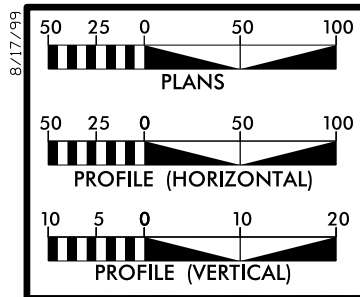
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**NORTH CAROLINA DEPARTMENT OF TRANSPORTATION  
DIVISION OF HIGHWAYS  
GEOTECHNICAL ENGINEERING UNIT**

# SUBSURFACE INVESTIGATION

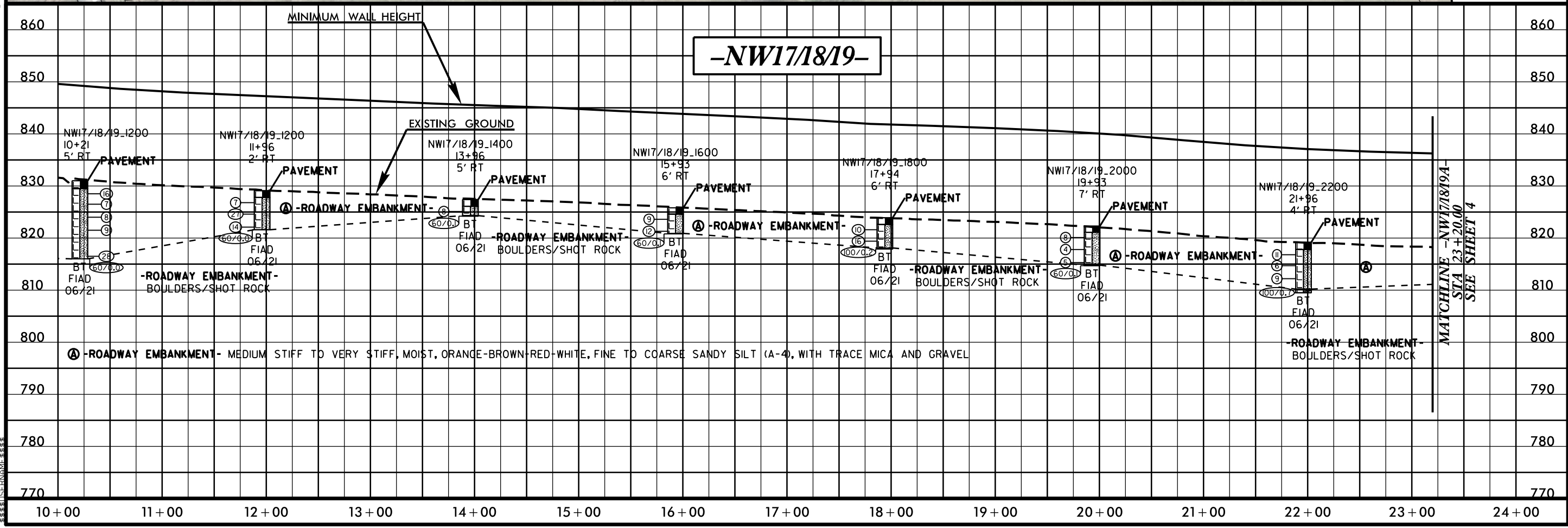
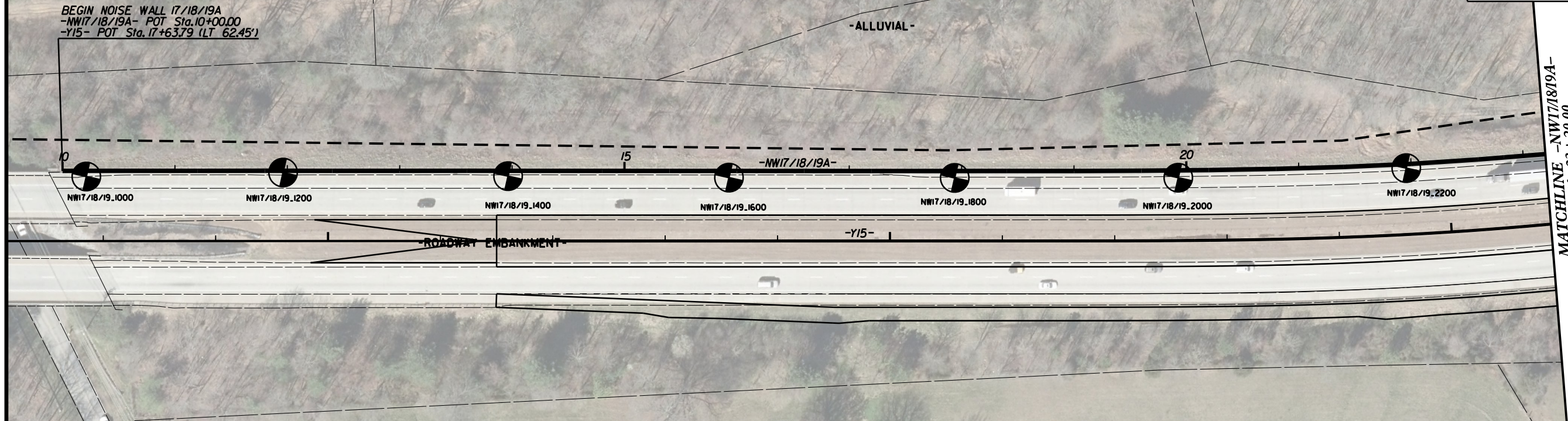
## SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

| 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><b>WELL GRADED</b> - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE.<br/><b>UNIFORMLY GRADED</b> - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE.<br/><b>GAP-GRADED</b> - 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><b>ALLUVIUM (ALLUV.)</b> - SOILS THAT HAVE BEEN TRANSPORTED BY WATER.<br/><b>AQUIFER</b> - A WATER BEARING FORMATION OR STRATA.<br/><b>ARENACEOUS</b> - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND.<br/><b>ARGILLACEOUS</b> - 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.<br/><b>ARTESIAN</b> - 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.<br/><b>CALCAREOUS (CALC.)</b> - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE.<br/><b>COLLUVIUM</b> - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE.<br/><b>CORE RECOVERY (REC.)</b> - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED BY TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.<br/><b>DIKE</b> - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS MASSIVE ROCK.<br/><b>DIP</b> - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL.<br/><b>DIP DIRECTION (DIP AZIMUTH)</b> - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH.<br/><b>FAULT</b> - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE.<br/><b>FISSILE</b> - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES.<br/><b>FLOAT</b> - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLOADED FROM PARENT MATERIAL.<br/><b>FLOOD PLAIN (FP)</b> - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM.<br/><b>FORMATION (FM)</b> - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE FIELD.<br/><b>JOINT</b> - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED.<br/><b>LEDGE</b> - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO ITS LATERAL EXTENT.<br/><b>LENS</b> - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS.<br/><b>MOTTLED (MOT.)</b> - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS. MOTTLING IN SOILS USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE.<br/><b>PERCHED WATER</b> - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN INTERVENING
IMPERVIOUS STRATUM.<br/><b>RESIDUAL (RES.) SOIL</b> - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK.<br/><b>ROCK QUALITY DESIGNATION (RQD)</b> - 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.<br/><b>SAPROLITE (SAP.)</b> - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK.<br/><b>SILL</b> - 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.<br/><b>SLICKENSIDE</b> - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE.<br/><b>STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT)</b> - 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.<br/><b>STRATA CORE RECOVERY (SREC.)</b> - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE.<br/><b>STRATA ROCK QUALITY DESIGNATION (SROD)</b> - 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.<br/><b>TOPSOIL (TS)</b> - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.</p> |                             |  |  |   |  |   |   |             |  |  |  |   |                    |             |  |                                     |                 |     |   |                                       |             |                       |                                   |  |                         |     |                              |          |                        |       |              |        |                       |  |             |  |  |  |  |  |                  |  |   |                   |             |   
   
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| <p style="text-align: center;"><b>SOIL LEGEND AND AASHTO CLASSIFICATION</b></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 (&gt; 35% PASSING #200)</th> <th colspan="5">ORGANIC MATERIALS</th> </tr> <tr> <th>A-1</th> <th>A-3</th> <th>A-2</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> <th></th> <th></th> <th></th> <th></th> </tr> <tr> <td>GROUP CLASS.</td> <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> <td>SYMBOL</td> <td colspan="5"></td> <td colspan="5"></td> <td colspan="5"></td> </tr> <tr> <td>% PASSING #10 #40 #200</td> <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 11 MN</td> <td>40 MX 41 MN 11 MN 11 MN</td> <td>40 MX 41 MN 11 MN 11 MN</td> <td>36 MN 36 MN 36 MN</td> <td>40 MX 41 MN 11 MN 11 MN</td> <td>40 MX 41 MN 11 MN 11 MN</td> <td>40 MX 41 MN 11 MN 11 MN</td> <td>40 MX 41 MN 11 MN 11 MN</td> <td>40 MX 41 MN 11 MN 11 MN</td> <td>40 MX 41 MN 11 MN 11 MN</td> <td>40 MX 41 MN 11 MN 11 MN</td> <td>40 MX 41 MN 11 MN 11 MN</td> <td>40 MX 41 MN 11 MN 11 MN</td> </tr> <tr> <td>MATERIAL PASSING #40 LL PI</td> <td colspan="2">-</td> <td>NP</td> <td>40 MX 41 MN 10 MX 11 MN</td> <td>40 MX 41 MN 11 MN 11 MN</td> <td>40 MX 41 MN 11 MN 11 MN</td> <td>40 MX 41 MN 11 MN 11 MN</td> <td>40 MX 41 MN 11 MN 11 MN</td> <td>40 MX 41 MN 11 MN 11 MN</td> <td>40 MX 41 MN 11 MN 11 MN</td> <td>40 MX 41 MN 11 MN 11 MN</td> <td>40 MX 41 MN 11 MN 11 MN</td> <td>40 MX 41 MN 11 MN 11 MN</td> <td>40 MX 41 MN 11 MN 11 MN</td> <td>40 MX 41 MN 11 MN 11 MN</td> </tr> <tr> <td>GROUP INDEX</td> <td colspan="2">0</td> <td>0</td> <td>4 MX</td> <td>8 MX</td> <td>12 MX</td> <td>16 MX</td> <td>NO MX</td> <td>NO MX</td> <td>NO MX</td> <td>NO MX</td> <td>NO MX</td> <td>NO MX</td> <td>NO MX</td> <td>NO MX</td> </tr> <tr> <td>USUAL TYPES OF MAJOR MATERIALS</td> <td colspan="2">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> </tr> <tr> <td>GEN. RATING AS SUBGRADE</td> <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> <td></td> </tr> <tr> <td colspan="10">PI OF A-7-5 SUBGROUP IS ≤ LL - 30 ; PI OF A-7-6 SUBGROUP IS &gt; LL - 30</td> <td colspan="10"></td> <td colspan="10"></td> </tr> <tr> <td colspan="10"> <p style="text-align: center;"><b>CONSISTENCY OR DENSENESS</b></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/FT<sup>2</sup>)</th> </tr> <tr> <td>GENERALLY GRANULAR MATERIAL (NON-COHESSIVE)</td> <td>VERY LOOSE<br/>LOOSE<br/>MEDIUM DENSE<br/>DENSE<br/>VERY DENSE</td> <td>&lt; 4<br/>4 TO 10<br/>10 TO 30<br/>30 TO 50<br/>&gt; 50</td> <td>N/A</td> </tr> <tr> <td>GENERALLY SILT-CLAY MATERIAL (COHESIVE)</td> <td>VERY SOFT<br/>SOFT<br/>MEDIUM STIFF<br/>STIFF<br/>VERY STIFF<br/>HARD</td> <td>&lt; 2<br/>2 TO 4<br/>4 TO 8<br/>8 TO 15<br/>15 TO 30<br/>&gt; 30</td> <td>&lt; 0.25<br/>0.25 TO 0.5<br/>0.5 TO 1.0<br/>1 TO 2<br/>2 TO 4<br/>&gt; 4</td> </tr> </table> </td> <td colspan="10"> <p style="text-align: center;"><b>MISCELLANEOUS SYMBOLS</b></p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td></td> <td>ROADWAY EMBANKMENT (RE) WITH SOIL DESCRIPTION</td> <td></td> <td>DIP &amp; DIP DIRECTION OF ROCK STRUCTURES</td> <td></td> <td>SOIL SYMBOL</td> <td></td> <td>ARTIFICIAL FILL (AF) OTHER THAN ROADWAY EMBANKMENT</td> <td></td> <td>INFERRED SOIL BOUNDARY</td> <td></td> <td>INFERRED ROCK LINE</td> <td></td> <td>ALLUVIAL SOIL BOUNDARY</td> </tr> <tr> <td></td> <td>SPT TEST BORING</td> <td></td> <td>AUGER BORING</td> <td></td> <td>CORE BORING</td> <td></td> <td>MONITORING WELL</td> <td></td> <td>PIEZOMETER INSTALLATION</td> <td></td> <td>SLOPE INDICATOR INSTALLATION</td> <td></td> <td>CONE PENETROMETER TEST</td> </tr> <tr> <td></td> <td>SOUNDING ROD</td> <td></td> <td>TEST BORING WITH CORE</td> <td></td> <td>SPT N-VALUE</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </table> </td> <td colspan="10"> <p style="text-align: center;"><b>ROCK HARDNESS</b></p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th>TERM</th> <th>DESCRIPTION</th> </tr> <tr> <td>VERY HARD</td> <td>CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK. BREAKING OF HAND SPECIMENS REQUIRES SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK.</td> </tr> <tr> <td>HARD</td> <td>CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED TO DETACH HAND SPECIMEN.</td> </tr> <tr> <td>MODERATELY HARD</td> <td>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.</td> </tr> <tr> <td>MEDIUM HARD</td> <td>CAN BE GROUDED 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.</td> </tr> <tr> <td>SOFT</td> <td>CAN BE GROUDED 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.</td> </tr> <tr> <td>VERY SOFT</td> <td>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.</td> </tr> </table> </td> </tr> <tr> <td colspan="10"> <p style="text-align: center;"><b>TEXTURE OR GRAIN SIZE</b></p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th>U.S. STD. SIEVE SIZE OPENING (MM)</th> <th>4</th> <th>10</th> <th>40</th> <th>60</th> <th>200</th> <th>270</th> </tr> <tr> <td></td> <td>4.76</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 (CS.E. 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> <th>MM</th> <th>305</th> <th>75</th> <th>2.0</th> <th>0.25</th> <th>0.05</th> <th>0.005</th> </tr> <tr> <td></td> <td>IN.</td> <td>12</td> <td>3</td> <td></td> <td></td> <td></td> <td></td> </tr> </table> </td> <td colspan="10"> <p style="text-align: center;"><b>RECOMMENDATION SYMBOLS</b></p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td></td> <td>UNDERCUT</td> <td></td> <td>UNCLASSIFIED EXCAVATION - UNSUITABLE WASTE</td> <td></td> <td>UNCLASSIFIED EXCAVATION - ACCEPTABLE, BUT NOT TO BE USED IN THE TOP 3 FEET OF EMBANKMENT OR BACKFILL</td> </tr> <tr> <td></td> <td>SHALLOW UNDERCUT</td> <td></td> <td>UNCLASSIFIED EXCAVATION - ACCEPTABLE DEGRADABLE ROCK</td> <td></td> <td></td> </tr> </table> </td> <td colspan="10"> <p style="text-align: center;"><b>ABBREVIATIONS</b></p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td>AR - AUGER REFUSAL</td> <td>CL. - CLAY</td> <td>CPT - CONE PENETRATION TEST</td> <td>CSE. - COARSE</td> <td>DMT - DILATOMETER TEST</td> <td>DPT - DYNAMIC PENETRATION TEST</td> <td>e - VOID RATIO</td> <td>F - FINE</td> <td>FOSS. - FOSSILIFEROUS</td> <td>FRAC. - FRACTURED, FRACTURES</td> <td>FRAGS. - FRAGMENTS</td> <td>HI. - HIGHLY</td> <td>MED. - MEDIUM</td> <td>MICA. - MICACEOUS</td> <td>MOD. - MODERATELY</td> <td>NP - NON PLASTIC</td> <td>ORG. - ORGANIC</td> <td>PMT - PRESSUREMETER TEST</td> <td>SAP. - SAPROLITIC</td> <td>SD. - SAND, SANDY</td> <td>SL. - SILT, SILTY</td> <td>SLI. - SLIGHTLY</td> <td>TCR - TRICONE REFUSAL</td> <td>w - MOISTURE CONTENT</td> <td>V - VERY</td> <td>VST - VANE SHEAR TEST</td> <td>WEA. - WEATHERED</td> <td>UNIT WEIGHT</td> <td>DRY UNIT WEIGHT</td> </tr> <tr> <td colspan="10"></td> <td colspan="10"> <p style="text-align: center;"><b>EQUIPMENT USED ON SUBJECT PROJECT</b></p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td><input type="checkbox"/> CME-45C</td> <td><input type="checkbox"/> CLAY BITS</td> <td><input checked="" type="checkbox"/> AUTOMATIC</td> <td><input type="checkbox"/> MANUAL</td> </tr> <tr> <td><input type="checkbox"/> CME-55</td> <td><input type="checkbox"/> 6" CONTINUOUS FLIGHT AUGER</td> <td colspan="2">CORE SIZE:</td> </tr> <tr> <td><input checked="" type="checkbox"/> CME-550</td> <td><input checked="" type="checkbox"/> 8" HOLLOW AUGERS</td> <td><input type="checkbox"/> -B</td> <td><input type="checkbox"/> -H</td> </tr> <tr> <td><input type="checkbox"/> VANE SHEAR TEST</td> <td><input type="checkbox"/> HARD FACED FINGER BITS</td> <td><input type="checkbox"/> -N</td> <td></td> </tr> <tr> <td><input type="checkbox"/> PORTABLE HOIST</td> <td><input type="checkbox"/> TUNG-CARBIDE INSERTS</td> <td colspan="2">HAND TOOLS:</td> </tr> <tr> <td><input checked="" type="checkbox"/> CME-75</td> <td><input type="checkbox"/> CASING <input type="checkbox"/> W/ ADVANCER</td> <td><input type="checkbox"/> POST HOLE DIGGER</td> <td></td> </tr> <tr> <td></td> <td><input type="checkbox"/> TRICONE * STEEL TEETH</td> <td><input type="checkbox"/> HAND AUGER</td> <td></td> </tr> <tr> <td></td> <td><input type="checkbox"/> TRICONE * TUNG-CARB.</td> <td><input type="checkbox"/> SOUNDING ROD</td> <td></td> </tr> <tr> <td></td>
<td><input type="checkbox"/> CORE BIT</td> <td><input type="checkbox"/> VANE SHEAR TEST</td> <td></td> </tr> </table> </td> </tr> <tr> <td colspan="10"> <p style="text-align: center;"><b>SOIL MOISTURE - CORRELATION OF TERMS</b></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</td> <td>LIQUID LIMIT</td> <td></td> </tr> <tr> <td>PL</td> <td>PLASTIC LIMIT</td> <td></td> </tr> <tr> <td>OM</td> <td>OPTIMUM MOISTURE SHRINKAGE LIMIT</td> <td></td> </tr> <tr> <td></td> <td>- SATURATED - (SAT.)</td> <td>USUALLY LIQUID; VERY WET, USUALLY FROM BELOW THE GROUND WATER TABLE</td> </tr> <tr> <td></td> <td>- WET - (W)</td> <td>SEMISOLID; REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE</td> </tr> <tr> <td></td> <td>- MOIST - (M)</td> <td>SOLID; AT OR NEAR OPTIMUM MOISTURE</td> </tr> <tr> <td></td> <td>- DRY - (D)</td> <td>REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE</td> </tr> </table> </td> <td colspan="10"> <p style="text-align: center;"><b>PLASTICITY</b></p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th>NON PLASTIC</th> <th>SLIGHTLY PLASTIC</th> <th>MODERATELY PLASTIC</th> <th>HIGHLY PLASTIC</th> </tr> <tr> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <th colspan="2">PLASTICITY INDEX (PI)</th> <th colspan="2">DRY STRENGTH</th> </tr> <tr> <td>0-5</td> <td>6-15</td> <td>VERY LOW</td> <td>SLIGHT</td> </tr> <tr> <td>16-25</td> <td>26 OR MORE</td> <td>MEDIUM</td> <td>HIGH</td> </tr> </table> </td> <td colspan="10"> <p style="text-align: center;"><b>FRACTURE SPACING</b></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> </td> <td colspan="10"> <p style="text-align: center;"><b>BEDDING</b></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>&lt; 0.008 FEET</td> </tr> </table> </td> </tr> <tr> <td colspan="10"> <p style="text-align: center;"><b>COLOR</b></p> <p>DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-GRAY). 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  | 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 11 MN | 40 MX 41 MN 11 MN 11 MN | 40 MX 41 MN 11 MN 11 MN | 36 MN 36 MN 36 MN | 40 MX 41 MN 11 MN 11 MN | 40 MX 41 MN 11 MN 11 MN | 40 MX 41 MN 11 MN 11 MN | 40 MX 41 MN 11 MN 11 MN | 40 MX 41 MN 11 MN 11 MN | 40 MX 41 MN 11 MN 11 MN   | 40 MX 41 MN 11 MN 11 MN | 40 MX 41 MN 11 MN 11 MN   | 40 MX 41 MN 11 MN 11 MN | MATERIAL PASSING #40 LL PI  | -                              |  | NP       | 40 MX 41 MN 10 MX 11 MN   | 40 MX 41 MN 11 MN 11 MN      | 40 MX 41 MN 11 MN 11 MN  | 40 MX 41 MN 11 MN 11 MN | 40 MX 41 MN 11 MN 11 MN | 40 MX 41 MN 11 MN 11 MN | 40 MX 41 MN 11 MN 11 MN | 40 MX 41 MN 11 MN 11 MN | 40 MX 41 MN 11 MN 11 MN | 40 MX 41 MN 11 MN 11 MN  | 40 MX 41 MN 11 MN 11 MN | 40 MX 41 MN 11 MN 11 MN | GROUP INDEX       | 0                 |                       | 0                    | 4 MX     | 8 MX                  | 12 MX            | 16 MX       | NO MX           | NO MX | NO MX | NO MX | NO MX | NO MX | NO MX | NO MX | USUAL TYPES OF MAJOR MATERIALS | STONE FRAGS. GRAVEL, AND SAND |  | FINE SAND   | SILTY OR CLAYEY GRAVEL AND SAND | SILTY SOILS | CLAYEY SOILS |  |  |  |  |  |  |                                  |                                    |   | GEN. RATING AS 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;"><b>CONSISTENCY OR DENSENESS</b></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/FT<sup>2</sup>)</th> </tr> <tr> <td>GENERALLY GRANULAR MATERIAL (NON-COHESSIVE)</td> <td>VERY LOOSE<br/>LOOSE<br/>MEDIUM DENSE<br/>DENSE<br/>VERY DENSE</td> <td>&lt; 4<br/>4 TO 10<br/>10 TO 30<br/>30 TO 50<br/>&gt; 50</td> <td>N/A</td> </tr> <tr> <td>GENERALLY SILT-CLAY MATERIAL (COHESIVE)</td> <td>VERY SOFT<br/>SOFT<br/>MEDIUM STIFF<br/>STIFF<br/>VERY STIFF<br/>HARD</td> <td>&lt; 2<br/>2 TO 4<br/>4 TO 8<br/>8 TO 15<br/>15 TO 30<br/>&gt; 30</td> <td>&lt; 0.25<br/>0.25 TO 0.5<br/>0.5 TO 1.0<br/>1 TO 2<br/>2 TO 4<br/>&gt; 4</td> </tr> </table> |    |              |  |    |               |  |    |                                  |  | PRIMARY SOIL TYPE | COMPACTNESS OR CONSISTENCY | RANGE OF STANDARD PENETRATION RESISTANCE (N-VALUE)                  | RANGE OF UNCONFINED COMPRESSIVE STRENGTH (TONS/FT <sup>2</sup> ) | GENERALLY GRANULAR MATERIAL (NON-COHESSIVE) | VERY LOOSE<br>LOOSE<br>MEDIUM DENSE<br>DENSE<br>VERY DENSE | < 4<br>4 TO 10<br>10 TO 30<br>30 TO 50<br>> 50 | N/A           | GENERALLY SILT-CLAY MATERIAL (COHESIVE) | VERY SOFT<br>SOFT<br>MEDIUM STIFF<br>STIFF<br>VERY STIFF<br>HARD | < 2<br>2 TO 4<br>4 TO 8<br>8 TO 15<br>15 TO 30<br>> 30 | < 0.25<br>0.25 TO 0.5<br>0.5 TO 1.0<br>1 TO 2<br>2 TO 4<br>> 4 | <p style="text-align: center;"><b>MISCELLANEOUS SYMBOLS</b></p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td></td> <td>ROADWAY EMBANKMENT (RE) WITH SOIL DESCRIPTION</td> <td></td> <td>DIP &amp; DIP DIRECTION OF ROCK STRUCTURES</td> <td></td> <td>SOIL SYMBOL</td> <td></td> <td>ARTIFICIAL FILL (AF) OTHER THAN ROADWAY EMBANKMENT</td> <td></td> <td>INFERRED SOIL BOUNDARY</td> <td></td> <td>INFERRED ROCK LINE</td> <td></td> <td>ALLUVIAL SOIL BOUNDARY</td> </tr> <tr> <td></td> <td>SPT TEST BORING</td> <td></td> <td>AUGER BORING</td> <td></td> <td>CORE BORING</td> <td></td> <td>MONITORING WELL</td> <td></td> <td>PIEZOMETER INSTALLATION</td> <td></td> <td>SLOPE INDICATOR INSTALLATION</td> <td></td> <td>CONE PENETROMETER TEST</td> </tr> <tr> <td></td> <td>SOUNDING ROD</td> <td></td> <td>TEST BORING WITH CORE</td> <td></td> <td>SPT N-VALUE</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </table> |  |  |  |  |  |  |  |  |  |             | ROADWAY EMBANKMENT (RE) WITH SOIL DESCRIPTION |                    | DIP & DIP DIRECTION OF ROCK STRUCTURES |  | SOIL SYMBOL |  | ARTIFICIAL FILL (AF) OTHER THAN ROADWAY EMBANKMENT |                       | INFERRED SOIL BOUNDARY |              | INFERRED ROCK LINE |     | ALLUVIAL SOIL BOUNDARY |          | SPT TEST BORING |       |
AUGER BORING |        | CORE BORING |  | MONITORING WELL |  | PIEZOMETER INSTALLATION |  | SLOPE INDICATOR INSTALLATION |  | CONE PENETROMETER TEST |  | SOUNDING ROD |      | TEST BORING WITH CORE |           | SPT N-VALUE       |      |              |                  |             |       |                |            | <p style="text-align: center;"><b>ROCK HARDNESS</b></p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th>TERM</th> <th>DESCRIPTION</th> </tr> <tr> <td>VERY HARD</td> <td>CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK. BREAKING OF HAND SPECIMENS REQUIRES SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK.</td> </tr> <tr> <td>HARD</td> <td>CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED TO DETACH HAND SPECIMEN.</td> </tr> <tr> <td>MODERATELY HARD</td> <td>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. 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SIEVE SIZE OPENING (MM) | 4   | 10 | 40 | 60 | 200 | 270 |  | 4.76 | 2.00 | 0.42 | 0.25 | 0.075       | 0.053   | BOULDER (BLDR.)  | COBBLE (COB.)        | GRAVEL (GR.)  | COARSE SAND (CS.E. 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;"><b>RECOMMENDATION SYMBOLS</b></p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td></td> <td>UNDERCUT</td> <td></td> <td>UNCLASSIFIED EXCAVATION - UNSUITABLE WASTE</td> <td></td> <td>UNCLASSIFIED EXCAVATION - ACCEPTABLE, BUT NOT TO BE USED IN THE TOP 3 FEET OF EMBANKMENT OR BACKFILL</td> </tr> <tr> <td></td> <td>SHALLOW UNDERCUT</td> <td></td> <td>UNCLASSIFIED EXCAVATION - ACCEPTABLE DEGRADABLE ROCK</td> <td></td> <td></td> </tr> </table> |  |  |  |  |  |  |  |  |  |  | UNDERCUT |  | UNCLASSIFIED EXCAVATION - UNSUITABLE WASTE |  | UNCLASSIFIED EXCAVATION - ACCEPTABLE, BUT NOT TO BE USED IN THE TOP 3 FEET OF EMBANKMENT OR BACKFILL |  | SHALLOW UNDERCUT   |  | UNCLASSIFIED EXCAVATION - ACCEPTABLE DEGRADABLE ROCK |  |  | <p style="text-align: center;"><b>ABBREVIATIONS</b></p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td>AR - AUGER REFUSAL</td> <td>CL. - CLAY</td> <td>CPT - CONE PENETRATION TEST</td> <td>CSE. - COARSE</td> <td>DMT - DILATOMETER TEST</td> <td>DPT - DYNAMIC PENETRATION TEST</td> <td>e - VOID RATIO</td> <td>F - FINE</td> <td>FOSS. - FOSSILIFEROUS</td> <td>FRAC. - FRACTURED, FRACTURES</td> <td>FRAGS. - FRAGMENTS</td> <td>HI. - HIGHLY</td> <td>MED. - MEDIUM</td> <td>MICA. - MICACEOUS</td> <td>MOD. - MODERATELY</td> <td>NP - NON PLASTIC</td> <td>ORG. - ORGANIC</td> <td>PMT - PRESSUREMETER TEST</td> <td>SAP. - SAPROLITIC</td> <td>SD. - SAND, SANDY</td> <td>SL. - SILT, SILTY</td> <td>SLI. - SLIGHTLY</td> <td>TCR - TRICONE REFUSAL</td> <td>w - MOISTURE CONTENT</td> <td>V - VERY</td> <td>VST - VANE SHEAR TEST</td> <td>WEA. - WEATHERED</td> <td>UNIT WEIGHT</td> <td>DRY UNIT WEIGHT</td> </tr> <tr> <td colspan="10"></td> <td colspan="10"> <p style="text-align: center;"><b>EQUIPMENT USED ON SUBJECT PROJECT</b></p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td><input type="checkbox"/> CME-45C</td> <td><input type="checkbox"/> CLAY BITS</td> <td><input checked="" type="checkbox"/> AUTOMATIC</td> <td><input type="checkbox"/> MANUAL</td> </tr> <tr> <td><input type="checkbox"/> CME-55</td> <td><input type="checkbox"/> 6" CONTINUOUS FLIGHT AUGER</td> <td colspan="2">CORE SIZE:</td> </tr> <tr> <td><input checked="" type="checkbox"/> CME-550</td> <td><input checked="" type="checkbox"/> 8" HOLLOW AUGERS</td> <td><input type="checkbox"/> -B</td> <td><input type="checkbox"/> -H</td> </tr> <tr> <td><input type="checkbox"/> VANE SHEAR TEST</td> <td><input type="checkbox"/> HARD FACED FINGER BITS</td> <td><input type="checkbox"/> -N</td>
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ARE USED TO DESCRIBE APPEARANCE.</p> |  |  |  |  |  |  |  |  |  | <p style="text-align: center;"><b>FRACTURE SPACING</b></p> <p>VERY WIDE MORE THAN 10 FEET<br/>WIDE 3 TO 10 FEET<br/>MODERATELY CLOSE 1 TO 3 FEET<br/>CLOSE 0.16 TO 1 FOOT<br/>VERY CLOSE LESS THAN 0.16 FEET</p> |  |  |  |  |  |  |  |  |  | <p style="text-align: center;"><b>BEDDING</b></p> <p>VERY THICKLY BEDDED 4 FEET<br/>THICKLY BEDDED 1.5 - 4 FEET<br/>THINLY BEDDED 0.16 - 1.5 FEET<br/>VERY THINLY BEDDED 0.03 - 0.16 FEET<br/>THICKLY LAMINATED 0.008 - 0.03 FEET<br/>THINLY LAMINATED &lt; 0.008 FEET</p> |  |  |  |  |  |  |  |  |  | <p style="text-align: center;"><b>PLASTICITY</b></p> <p>DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-GRAY). MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. 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ARE USED TO DESCRIBE APPEARANCE.</p> |  |  |  |  |  |  |  |  |  | <p style="text-align: center;"><b>FRACTURE SPACING</b></p> <p>VERY WIDE MORE THAN 10 FEET<br/>WIDE 3 TO 10 FEET<br/>MODERATELY CLOSE 1 TO 3 FEET<br/>CLOSE 0.16 TO 1 FOOT<br/>VERY CLOSE LESS THAN 0.16 FEET</p> |  |  |  |  |  |  |  |  |  | <p style="text-align: center;"><b>BEDDING</b></p> <p>VERY THICKLY BEDDED 4 FEET<br/>THICKLY BEDDED 1.5 -</p> |  |  |  |  |  |  |  |  |  |
| GENERAL CLASS.   
   
   | GRANULAR MATERIALS (≤ 35% PASSING #200)   |   |  |                                 |  | SILT-CLAY MATERIALS (> 35% PASSING #200) |  |                         |                              |   | ORGANIC MATERIALS                       |  |  |   |  |  |                          |   |  |  |  |  |  |   |   |                  |  |   |   |  
   |                             |  |  |   |  |   |   |             |  |  |  |   |                    |             |  |                                     |                 |     |   |                                       |             |                       |                                   |  |                         |     |                              |          |                        |       |              |        |                       |  |             |  |  |  |  |  |                  |  |   |                   |             |   
   
   |                         |                         |                         |                   |                         |                         |                         |                         |                         |   |                         |   |                         |   |                                |  |          |   |                              |  |                         |                         |                         |                         |                         |                         |                          |                         |                         |                   |                   |                       |                      |          |                       |                  |             |                 |       |       |       |       |       |       |       |                                |                               |  |   |                                 |             |              |  |  |  |  |  |  |                                  |                                    |   |                                 |                                 |   |            |  |   |  |                             |                             |  |   |                             |      |   |   |   |  |  |  |   |  |  |  |                                     |  |  |   |                                       |  |  |                                   |  |  |  |  |  |  |  |  |  |  |  |  |  |                            |  |    |              |  |    |               |  |    |                                  |  |                   |                            |   |  |   |  |  |               |   |  |  |  |  |  |  |  |  |  |  |  |  |  |             |   |                    |  |  |             |  |  |                       |                        |              |                    |     |                        |          |                 |       |          
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   | A-1   | A-3   | A-2  | A-4                             | A-5  | A-6                                      | A-7  | A-1, A-2                | A-3                          | A-4, A-5  | A-6, A-7                                |  |  |   |  |  |                          |   |  |  |  |  |  |   |   |                  |  |   |   |  
   |                             |  |  |   |  |   |   |             |  |  |  |   |                    |             |  |                                     |                 |     |   |                                       |             |                       |                                   |  |                         |     |                              |          |                        |       |              |        |                       |  |             |  |  |  |  |  |                  |  |   |                   |             |   
   
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   |        |             |  |                 |  |                         |  |                              |  |                        |  |              |      |                       |           |                   |      |              |                  |             |       |                |            |   |   |  |  |  |  |  |  |  |  |      |             |           |   |        |   |                 |   |                 |  |                  |   |                   |  |  |   |  |  |  |  |  |  |  |  |                                   |   |    |    |    |     |     |  |      |      |      |      |             |         |  |                      |   |                         |  |                     |   |  |  |  |  |  |  |  |            |    |     |  |     |      |      |       |  |     |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |          |  |  |  |  |  |  |  |  |  |  |   
   
   |  |  |  |  |  |  |  |  |  |                    |            |                             |               |                        |  |                |          |                       |                              |                    |              |               |                   |                   |  |                |                          |                   |                   |                   |                 |                       |                      |          |  |                  |             |                 |  |  |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |  |                                  |                                    |   |                                 |                                 |   |  |  |   |  |                             |                             |  |   |                             |  |  |   |             |  |  |  |   |  |  |  |  |  |  |   |                                       |  |  |                                   |  |  |  |  |  |  |  |  |  |  |  |  | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
                           |                            |                                      |    |              |  |    |               |  |    |  |  |  |                      |   |  |             |   |  |               |  |  |             |  |   |  |  |  |  |  |  |  |  |  |             |                  |                    |                |  |  |  |  |                       |  |              |  |     |      |          |        |  |            |        |      |  |  |  |  |  |  |  |  |  |  |      |         |           |                   |      |              |  |             |       |                |            |                     |   |  |  |  |  |  |  |  |  |  |      |           |                     |        |  |              |               |                 |                    |                  |                   |                   |                  |              |   |  |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |  |  |             |         |  |                      |   |           |  |                     |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |   
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| 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                                    |  |  |                          |   |  |  |  |  |  |   |   |                  |  |   |   |  
   |                             |  |  |   |  |   |   |             |  |  |  |   |                    |             |  |                                     |                 |     |   |                                       |             |                       |                                   |  |                         |     |                              |          |                        |       |              |        |                       |  |             |  |  |  |  |  |                  |  |   |                   |             |   
   
   |                         |                         |                         |                   |                         |                         |                         |                         |                         |   |                         |   |                         |   |                                |  |          |   |                              |  |                         |                         |                         |                         |                         |                         |                          |                         |                         |                   |                   |                       |                      |          |                       |                  |             |                 |       |       |       |       |       |       |       |                                |                               |  |   |                                 |             |              |  |  |  |  |  |  |                                  |                                    |   |                                 |                                 |   |            |  |   |  |                             |                             |  |   |                             |      |   |   |   |  |  |  |   |  |  |  |                                     |  |  |   |                                       |  |  |                                   |  |  |  |  |  |  |  |  |  |  |  |  |  |                            |  |    |              |  |    |               |  |    |                                  |  |                   |                            |   |  |   |  |  |               |   |  |  |  |  |  |  |  |  |  |  |  |  |  |             |   |                    |  |  |             |  |  |                       |                        |              |                    |     |                        |          |                 |       |          
   |        |             |  |                 |  |                         |  |                              |  |                        |  |              |      |                       |           |                   |      |              |                  |             |       |                |            |   |   |  |  |  |  |  |  |  |  |      |             |           |   |        |   |                 |   |                 |  |                  |   |                   |  |  |   |  |  |  |  |  |  |  |  |                                   |   |    |    |    |     |     |  |      |      |      |      |             |         |  |                      |   |                         |  |                     |   |  |  |  |  |  |  |  |            |    |     |  |     |      |      |       |  |     |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |          |  |  |  |  |  |  |  |  |  |  |   
   
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| SYMBOL   
   
   |   |   |  |                                 |  |  |  |                         |                              |   |   |  |  |   |  |  |                          |   |  |  |  |  |  |   |   |                  |  |   |   |  
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   | 50 MX 30 MX 15 MX   | 50 MX 25 MX   | 51 MN 35 MX 35 MX  | 40 MX 41 MN 10 MX 11 MN         | 40 MX 41 MN 11 MN 11 MN  | 40 MX 41 MN 11 MN 11 MN                  | 36 MN 36 MN 36 MN                                  | 40 MX 41 MN 11 MN 11 MN | 40 MX 41 MN 11 MN 11 MN      | 40 MX 41 MN 11 MN 11 MN   | 40 MX 41 MN 11 MN 11 MN                 | 40 MX 41 MN 11 MN 11 MN                            | 40 MX 41 MN 11 MN 11 MN  | 40 MX 41 MN 11 MN 11 MN                     | 40 MX 41 MN 11 MN 11 MN                                    | 40 MX 41 MN 11 MN 11 MN                        |                          |   |  |  |  |  |  |   |   |                  |  |   |   |  
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   | -   |   | NP   | 40 MX 41 MN 10 MX 11 MN         | 40 MX 41 MN 11 MN 11 MN  | 40 MX 41 MN 11 MN 11 MN                  | 40 MX 41 MN 11 MN 11 MN                            | 40 MX 41 MN 11 MN 11 MN | 40 MX 41 MN 11 MN 11 MN      | 40 MX 41 MN 11 MN 11 MN   | 40 MX 41 MN 11 MN 11 MN                 | 40 MX 41 MN 11 MN 11 MN                            | 40 MX 41 MN 11 MN 11 MN  | 40 MX 41 MN 11 MN 11 MN                     | 40 MX 41 MN 11 MN 11 MN                                    |  |                          |   |  |  |  |  |  |   |   |                  |  |   |   |  
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| GROUP INDEX  
   
   | 0   |   | 0  | 4 MX                            | 8 MX   | 12 MX                                    | 16 MX  | NO MX                   | NO MX                        | NO MX   | NO MX                                   | NO MX  | NO MX  | NO MX                                       | NO MX  |  |                          |   |  |  |  |  |  |   |   |                  |  |   |   |  
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| USUAL TYPES OF MAJOR MATERIALS   
   
   | STONE FRAGS. GRAVEL, AND SAND   |   | FINE SAND  | SILTY OR CLAYEY GRAVEL AND SAND | SILTY SOILS  | CLAYEY SOILS                             |  |                         |                              |   |   |  |  |   |  |  |                          |   |  |  |  |  |  |   |   |                  |  |   |   |  
   |                             |  |  |   |  |   |   |             |  |  |  |   |                    |             |  |                                     |                 |     |   |                                       |             |                       |                                   |  |                         |     |                              |          |                        |       |              |        |                       |  |             |  |  |  |  |  |                  |  |   |                   |             |   
   
   |                         |                         |                         |                   |                         |                         |                         |                         |                         |   |                         |   |                         |   |                                |  |          |   |                              |  |                         |                         |                         |                         |                         |                         |                          |                         |                         |                   |                   |                       |                      |          |                       |                  |             |                 |       |       |       |       |       |       |       |                                |                               |  |   |                                 |             |              |  |  |  |  |  |  |                                  |                                    |   |                                 |                                 |   |            |  |   |  |                             |                             |  |   |                             |      |   |   |   |  |  |  |   |  |  |  |                                     |  |  |   |                                       |  |  |                                   |  |  |  |  |  |  |  |  |  |  |  |  |  |                            |  |    |              |  |    |               |  |    |                                  |  |                   |                            |   |  |   |  |  |               |   |  |  |  |  |  |  |  |  |  |  |  |  |  |             |   |                    |  |  |             |  |  |                       |                        |              |                    |     |                        |          |                 |       |          
   |        |             |  |                 |  |                         |  |                              |  |                        |  |              |      |                       |           |                   |      |              |                  |             |       |                |            |   |   |  |  |  |  |  |  |  |  |      |             |           |   |        |   |                 |   |                 |  |                  |   |                   |  |  |   |  |  |  |  |  |  |  |  |                                   |   |    |    |    |     |     |  |      |      |      |      |             |         |  |                      |   |                         |  |                     |   |  |  |  |  |  |  |  |            |    |     |  |     |      |      |       |  |     |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |          |  |  |  |  |  |  |  |  |  |  |   
   
   |  |  |  |  |  |  |  |  |  |                    |            |                             |               |                        |  |                |          |                       |                              |                    |              |               |                   |                   |  |                |                          |                   |                   |                   |                 |                       |                      |          |  |                  |             |                 |  |  |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |  |                                  |                                    |   |                                 |                                 |   |  |  |   |  |                             |                             |  |   |                             |  |  |   |             |  |  |  |   |  |  |  |  |  |  |   |                                       |  |  |                                   |  |  |  |  |  |  |  |  |  |  |  |  | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| GEN. RATING AS SUBGRADE  
   
   | EXCELLENT TO GOOD   |   |  |                                 |  | FAIR TO POOR                             |  |                         |                              |   | FAIR TO POOR                            | POOR   | UNSATURABLE  |   |  |  |                          |   |  |  |  |  |  |   |   |                  |  |   |   |  
   |                             |  |  |   |  |   |   |             |  |  |  |   |                    |             |  |                                     |                 |     |   |                                       |             |                       |                                   |  |                         |     |                              |          |                        |       |              |        |                       |  |             |  |  |  |  |  |                  |  |   |                   |             |   
   
   |                         |                         |                         |                   |                         |                         |                         |                         |                         |   |                         |   |                         |   |                                |  |          |   |                              |  |                         |                         |                         |                         |                         |                         |                          |                         |                         |                   |                   |                       |                      |          |                       |                  |             |                 |       |       |       |       |       |       |       |                                |                               |  |   |                                 |             |              |  |  |  |  |  |  |                                  |                                    |   |                                 |                                 |   |            |  |   |  |                             |                             |  |   |                             |      |   |   |   |  |  |  |   |  |  |  |                                     |  |  |   |                                       |  |  |                                   |  |  |  |  |  |  |  |  |  |  |  |  |  |                            |  |    |              |  |    |               |  |    |                                  |  |                   |                            |   |  |   |  |  |               |   |  |  |  |  |  |  |  |  |  |  |  |  |  |             |   |                    |  |  |             |  |  |                       |                        |              |                    |     |                        |          |                 |       |          
   |        |             |  |                 |  |                         |  |                              |  |                        |  |              |      |                       |           |                   |      |              |                  |             |       |                |            |   |   |  |  |  |  |  |  |  |  |      |             |           |   |        |   |                 |   |                 |  |                  |   |                   |  |  |   |  |  |  |  |  |  |  |  |                                   |   |    |    |    |     |     |  |      |      |      |      |             |         |  |                      |   |                         |  |                     |   |  |  |  |  |  |  |  |            |    |     |  |     |      |      |       |  |     |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |          |  |  |  |  |  |  |  |  |  |  |   
   
   |  |  |  |  |  |  |  |  |  |                    |            |                             |               |                        |  |                |          |                       |                              |                    |              |               |                   |                   |  |                |                          |                   |                   |                   |                 |                       |                      |          |  |                  |             |                 |  |  |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |  |                                  |                                    |   |                                 |                                 |   |  |  |   |  |                             |                             |  |   |                             |  |  |   |             |  |  |  |   |  |  |  |  |  |  |   |                                       |  |  |                                   |  |  |  |  |  |  |  |  |  |  |  |  | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
                           |                            |                                      |    |              |  |    |               |  |    |  |  |  |                      |   |  |             |   |  |               |  |  |             |  |   |  |  |  |  |  |  |  |  |  |             |                  |                    |                |  |  |  |  |                       |  |              |  |     |      |          |        |  |            |        |      |  |  |  |  |  |  |  |  |  |  |      |         |           |                   |      |              |  |             |       |                |            |                     |   |  |  |  |  |  |  |  |  |  |      |           |                     |        |  |              |               |                 |                    |                  |                   |                   |                  |              |   |  |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |  |  |             |         |  |                      |   |           |  |                     |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |   
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| PI OF A-7-5 SUBGROUP IS ≤ LL - 30 ; PI OF A-7-6 SUBGROUP IS > LL - 30  
   
   |   |   |  |                                 |  |  |  |                         |                              |   |   |  |  |   |  |  |                          |   |  |  |  |  |  |   |   |                  |  |   |   |  
   |                             |  |  |   |  |   |   |             |  |  |  |   |                    |             |  |                                     |                 |     |   |                                       |             |                       |                                   |  |                         |     |                              |          |                        |       |              |        |                       |  |             |  |  |  |  |  |                  |  |   |                   |             |   
   
   |                         |                         |                         |                   |                         |                         |                         |                         |                         |   |                         |   |                         |   |                                |  |          |   |                              |  |                         |                         |                         |                         |                         |                         |                          |                         |                         |                   |                   |                       |                      |          |                       |                  |             |                 |       |       |       |       |       |       |       |                                |                               |  |   |                                 |             |              |  |  |  |  |  |  |                                  |                                    |   |                                 |                                 |   |            |  |   |  |                             |                             |  |   |                             |      |   |   |   |  |  |  |   |  |  |  |                                     |  |  |   |                                       |  |  |                                   |  |  |  |  |  |  |  |  |  |  |  |  |  |                            |  |    |              |  |    |               |  |    |                                  |  |                   |                            |   |  |   |  |  |               |   |  |  |  |  |  |  |  |  |  |  |  |  |  |             |   |                    |  |  |             |  |  |                       |                        |              |                    |     |                        |          |                 |       |          
   |        |             |  |                 |  |                         |  |                              |  |                        |  |              |      |                       |           |                   |      |              |                  |             |       |                |            |   |   |  |  |  |  |  |  |  |  |      |             |           |   |        |   |                 |   |                 |  |                  |   |                   |  |  |   |  |  |  |  |  |  |  |  |                                   |   |    |    |    |     |     |  |      |      |      |      |             |         |  |                      |   |                         |  |                     |   |  |  |  |  |  |  |  |            |    |     |  |     |      |      |       |  |     |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |          |  |  |  |  |  |  |  |  |  |  |   
   
   |  |  |  |  |  |  |  |  |  |                    |            |                             |               |                        |  |                |          |                       |                              |                    |              |               |                   |                   |  |                |                          |                   |                   |                   |                 |                       |                      |          |  |                  |             |                 |  |  |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |  |                                  |                                    |   |                                 |                                 |   |  |  |   |  |                             |                             |  |   |                             |  |  |   |             |  |  |  |   |  |  |  |  |  |  |   |                                       |  |  |                                   |  |  |  |  |  |  |  |  |  |  |  |  | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| <p style="text-align: center;"><b>CONSISTENCY OR DENSENESS</b></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/FT<sup>2</sup>)</th> </tr> <tr> <td>GENERALLY GRANULAR MATERIAL (NON-COHESSIVE)</td> <td>VERY LOOSE<br/>LOOSE<br/>MEDIUM DENSE<br/>DENSE<br/>VERY DENSE</td> <td>&lt; 4<br/>4 TO 10<br/>10 TO 30<br/>30 TO 50<br/>&gt; 50</td> <td>N/A</td> </tr> <tr> <td>GENERALLY SILT-CLAY MATERIAL (COHESIVE)</td> <td>VERY SOFT<br/>SOFT<br/>MEDIUM STIFF<br/>STIFF<br/>VERY STIFF<br/>HARD</td> <td>&lt; 2<br/>2 TO 4<br/>4 TO 8<br/>8 TO 15<br/>15 TO 30<br/>&gt; 30</td> <td>&lt; 0.25<br/>0.25 TO 0.5<br/>0.5 TO 1.0<br/>1 TO 2<br/>2 TO 4<br/>&gt; 4</td> </tr> </table>   
   
   |   |   |  |                                 |  |  |  |                         |                              | PRIMARY SOIL TYPE   | COMPACTNESS OR CONSISTENCY              | RANGE OF STANDARD PENETRATION RESISTANCE (N-VALUE) | RANGE OF UNCONFINED COMPRESSIVE STRENGTH (TONS/FT <sup>2</sup> ) | GENERALLY GRANULAR MATERIAL (NON-COHESSIVE) | VERY LOOSE<br>LOOSE<br>MEDIUM DENSE<br>DENSE<br>VERY DENSE | < 4<br>4 TO 10<br>10 TO 30<br>30 TO 50<br>> 50 | N/A                      | GENERALLY SILT-CLAY MATERIAL (COHESIVE) | VERY SOFT<br>SOFT<br>MEDIUM STIFF<br>STIFF<br>VERY STIFF<br>HARD | < 2<br>2 TO 4<br>4 TO 8<br>8 TO 15<br>15 TO 30<br>> 30   | < 0.25<br>0.25 TO 0.5<br>0.5 TO 1.0<br>1 TO 2<br>2 TO 4<br>> 4 | <p style="text-align: center;"><b>MISCELLANEOUS SYMBOLS</b></p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td></td> <td>ROADWAY EMBANKMENT (RE) WITH SOIL DESCRIPTION</td> <td></td> <td>DIP &amp; DIP DIRECTION OF ROCK STRUCTURES</td> <td></td> <td>SOIL SYMBOL</td> <td></td> <td>ARTIFICIAL FILL (AF) OTHER THAN ROADWAY EMBANKMENT</td> <td></td> <td>INFERRED SOIL BOUNDARY</td> <td></td> <td>INFERRED ROCK LINE</td> <td></td> <td>ALLUVIAL SOIL BOUNDARY</td> </tr> <tr> <td></td> <td>SPT TEST BORING</td> <td></td> <td>AUGER BORING</td> <td></td> <td>CORE BORING</td> <td></td> <td>MONITORING WELL</td> <td></td> <td>PIEZOMETER INSTALLATION</td> <td></td> <td>SLOPE INDICATOR INSTALLATION</td> <td></td> <td>CONE PENETROMETER TEST</td> </tr> <tr> <td></td> <td>SOUNDING ROD</td> <td></td> <td>TEST BORING WITH CORE</td> <td></td> <td>SPT N-VALUE</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </table> |  |   |   |                  |  |   |   |  
   |                             |  | ROADWAY EMBANKMENT (RE) WITH SOIL DESCRIPTION        |   | DIP & DIP DIRECTION OF ROCK STRUCTURES |   | SOIL SYMBOL                                   |             | ARTIFICIAL FILL (AF) OTHER THAN ROADWAY EMBANKMENT |  | INFERRED SOIL BOUNDARY   |   | INFERRED ROCK LINE |             | ALLUVIAL SOIL BOUNDARY                         |                                     | SPT TEST BORING |     | AUGER BORING                                  |                                       | CORE BORING |                       | MONITORING WELL                   |  | PIEZOMETER INSTALLATION |     | SLOPE INDICATOR INSTALLATION |          | CONE PENETROMETER TEST |       | SOUNDING ROD |        | TEST BORING WITH CORE |  | SPT N-VALUE |  |  |  |  |  |                  |  | <p style="text-align: center;"><b>ROCK HARDNESS</b></p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th>TERM</th> <th>DESCRIPTION</th> </tr> <tr> <td>VERY HARD</td> <td>CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK. BREAKING OF HAND SPECIMENS REQUIRES SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK.</td> </tr> <tr> <td>HARD</td> <td>CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED TO DETACH HAND SPECIMEN.</td> </tr> <tr> <td>MODERATELY HARD</td> <td>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.</td> </tr> <tr> <td>MEDIUM HARD</td> <td>CAN BE GROUDED 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.</td> </tr> <tr> <td>SOFT</td> <td>CAN BE GROUDED 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.</td> </tr> <tr> <td>VERY SOFT</td> <td>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.</td> </tr> </table> |                   |             |   
   
   |                         |                         |                         |                   |                         |                         | TERM                    | DESCRIPTION             | VERY HARD               | CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK. BREAKING OF HAND SPECIMENS REQUIRES SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK.   | HARD                    | CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED TO DETACH HAND SPECIMEN. | MODERATELY HARD         | CAN BE SCRATCHED BY KNIFE OR PICK. GOUGES OR GROOVES TO 0.25 INCHES DEEP CAN BE EXCAVATED BY HARD BLOW OF A GEOLOGIST'S PICK. HAND SPECIMENS CAN BE DETACHED BY MODERATE BLOWS. | MEDIUM HARD                    | CAN BE GROUDED 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. | SOFT     | CAN BE GROUDED OR GOUGED READILY BY KNIFE OR PICK. CAN BE EXCAVATED IN FRAGMENTS FROM CHIPS TO SEVERAL INCHES IN SIZE BY MODERATE BLOWS OF A PICK POINT. SMALL, THIN PIECES CAN BE BROKEN BY FINGER PRESSURE. | VERY SOFT                    | CAN BE CARVED WITH KNIFE. CAN BE EXCAVATED READILY WITH POINT OF PICK. PIECES 1 INCH OR MORE IN THICKNESS CAN BE BROKEN BY FINGER PRESSURE. CAN BE SCRATCHED READILY BY FINGER NAIL. |                         |                         |                         |                         |                         |                         |                          |                         |                         |                   |                   |                       |                      |          |                       |                  |             |                 |       |       |       |       |       |       |       |                                |                               |  |   |                                 |             |              |  |  |  |  |  |  |                                  |                                    |   |                                 |                                 |   |            |  |   |  |                             |                             |  |   |                             |      |   |   |   |  |  |  |   |  |  |  |                                     |  |  |   |                                       |  |  |                                   |  |  |  |  |  |  |  |  |  |  |  |  |  |                            |  |    |              |  |    |               |  |    |                                  |  |                   |                            |   |  |   |  |  |               |   |  |  |  |  |  |  |  |  |  |  |  |  |  |             |   |                    |  |  |             |  |  |                       |                        |              |                    |     |                        |          |                 |       |          
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| PRIMARY SOIL TYPE  
   
   | COMPACTNESS OR CONSISTENCY  | RANGE OF STANDARD PENETRATION RESISTANCE (N-VALUE)                  | RANGE OF UNCONFINED COMPRESSIVE STRENGTH (TONS/FT <sup>2</sup> ) |                                 |  |  |  |                         |                              |   |   |  |  |   |  |  |                          |   |  |  |  |  |  |   |   |                  |  |   |   |  
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| GENERALLY GRANULAR MATERIAL (NON-COHESSIVE)  
   
   | VERY LOOSE<br>LOOSE<br>MEDIUM DENSE<br>DENSE<br>VERY DENSE  | < 4<br>4 TO 10<br>10 TO 30<br>30 TO 50<br>> 50                      | N/A  |                                 |  |  |  |                         |                              |   |   |  |  |   |  |  |                          |   |  |  |  |  |  |   |   |                  |  |   |   |  
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   |                         |                         |                         |                   |                         |                         |                         |                         |                         |   |                         |   |                         |   |                                |  |          |   |                              |  |                         |                         |                         |                         |                         |                         |                          |                         |                         |                   |                   |                       |                      |          |                       |                  |             |                 |       |       |       |       |       |       |       |                                |                               |  |   |                                 |             |              |  |  |  |  |  |  |                                  |                                    |   |                                 |                                 |   |            |  |   |  |                             |                             |  |   |                             |      |   |   |   |  |  |  |   |  |  |  |                                     |  |  |   |                                       |  |  |                                   |  |  |  |  |  |  |  |  |  |  |  |  |  |                            |  |    |              |  |    |               |  |    |                                  |  |                   |                            |   |  |   |  |  |               |   |  |  |  |  |  |  |  |  |  |  |  |  |  |             |   |                    |  |  |             |  |  |                       |                        |              |                    |     |                        |          |                 |       |          
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| GENERALLY SILT-CLAY MATERIAL (COHESIVE)  
   
   | VERY SOFT<br>SOFT<br>MEDIUM STIFF<br>STIFF<br>VERY STIFF<br>HARD  | < 2<br>2 TO 4<br>4 TO 8<br>8 TO 15<br>15 TO 30<br>> 30              | < 0.25<br>0.25 TO 0.5<br>0.5 TO 1.0<br>1 TO 2<br>2 TO 4<br>> 4   |                                 |  |  |  |                         |                              |   |   |  |  |   |  |  |                          |   |  |  |  |  |  |   |   |                  |  |   |   |  
   |                             |  |  |   |  |   |   |             |  |  |  |   |                    |             |  |                                     |                 |     |   |                                       |             |                       |                                   |  |                         |     |                              |          |                        |       |              |        |                       |  |             |  |  |  |  |  |                  |  |   |                   |             |   
   
   |                         |                         |                         |                   |                         |                         |                         |                         |                         |   |                         |   |                         |   |                                |  |          |   |                              |  |                         |                         |                         |                         |                         |                         |                          |                         |                         |                   |                   |                       |                      |          |                       |                  |             |                 |       |       |       |       |       |       |       |                                |                               |  |   |                                 |             |              |  |  |  |  |  |  |                                  |                                    |   |                                 |                                 |   |            |  |   |  |                             |                             |  |   |                             |      |   |   |   |  |  |  |   |  |  |  |                                     |  |  |   |                                       |  |  |                                   |  |  |  |  |  |  |  |  |  |  |  |  |  |                            |  |    |              |  |    |               |  |    |                                  |  |                   |                            |   |  |   |  |  |               |   |  |  |  |  |  |  |  |  |  |  |  |  |  |             |   |                    |  |  |             |  |  |                       |                        |              |                    |     |                        |          |                 |       |          
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   | ROADWAY EMBANKMENT (RE) WITH SOIL DESCRIPTION   |   | DIP & DIP DIRECTION OF ROCK STRUCTURES                           |                                 | SOIL SYMBOL  |  | ARTIFICIAL FILL (AF) OTHER THAN ROADWAY EMBANKMENT |                         | INFERRED SOIL BOUNDARY       |   | INFERRED ROCK LINE                      |  | ALLUVIAL SOIL BOUNDARY   |   |  |  |                          |   |  |  |  |  |  |   |   |                  |  |   |   |  
   |                             |  |  |   |  |   |   |             |  |  |  |   |                    |             |  |                                     |                 |     |   |                                       |             |                       |                                   |  |                         |     |                              |          |                        |       |              |        |                       |  |             |  |  |  |  |  |                  |  |   |                   |             |   
   
   |                         |                         |                         |                   |                         |                         |                         |                         |                         |   |                         |   |                         |   |                                |  |          |   |                              |  |                         |                         |                         |                         |                         |                         |                          |                         |                         |                   |                   |                       |                      |          |                       |                  |             |                 |       |       |       |       |       |       |       |                                |                               |  |   |                                 |             |              |  |  |  |  |  |  |                                  |                                    |   |                                 |                                 |   |            |  |   |  |                             |                             |  |   |                             |      |   |   |   |  |  |  |   |  |  |  |                                     |  |  |   |                                       |  |  |                                   |  |  |  |  |  |  |  |  |  |  |  |  |  |                            |  |    |              |  |    |               |  |    |                                  |  |                   |                            |   |  |   |  |  |               |   |  |  |  |  |  |  |  |  |  |  |  |  |  |             |   |                    |  |  |             |  |  |                       |                        |              |                    |     |                        |          |                 |       |          
   |        |             |  |                 |  |                         |  |                              |  |                        |  |              |      |                       |           |                   |      |              |                  |             |       |                |            |   |   |  |  |  |  |  |  |  |  |      |             |           |   |        |   |                 |   |                 |  |                  |   |                   |  |  |   |  |  |  |  |  |  |  |  |                                   |   |    |    |    |     |     |  |      |      |      |      |             |         |  |                      |   |                         |  |                     |   |  |  |  |  |  |  |  |            |    |     |  |     |      |      |       |  |     |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |          |  |  |  |  |  |  |  |  |  |  |   
   
   |  |  |  |  |  |  |  |  |  |                    |            |                             |               |                        |  |                |          |                       |                              |                    |              |               |                   |                   |  |                |                          |                   |                   |                   |                 |                       |                      |          |  |                  |             |                 |  |  |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |  |                                  |                                    |   |                                 |                                 |   |  |  |   |  |                             |                             |  |   |                             |  |  |   |             |  |  |  |   |  |  |  |  |  |  |   |                                       |  |  |                                   |  |  |  |  |  |  |  |  |  |  |  |  | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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   | SPT TEST BORING   |   | AUGER BORING   |                                 | CORE BORING  |  | MONITORING WELL                                    |                         | PIEZOMETER INSTALLATION      |   | SLOPE INDICATOR INSTALLATION            |  | CONE PENETROMETER TEST   |   |  |  |                          |   |  |  |  |  |  |   |   |                  |  |   |   |  
   |                             |  |  |   |  |   |   |             |  |  |  |   |                    |             |  |                                     |                 |     |   |                                       |             |                       |                                   |  |                         |     |                              |          |                        |       |              |        |                       |  |             |  |  |  |  |  |                  |  |   |                   |             |   
   
   |                         |                         |                         |                   |                         |                         |                         |                         |                         |   |                         |   |                         |   |                                |  |          |   |                              |  |                         |                         |                         |                         |                         |                         |                          |                         |                         |                   |                   |                       |                      |          |                       |                  |             |                 |       |       |       |       |       |       |       |                                |                               |  |   |                                 |             |              |  |  |  |  |  |  |                                  |                                    |   |                                 |                                 |   |            |  |   |  |                             |                             |  |   |                             |      |   |   |   |  |  |  |   |  |  |  |                                     |  |  |   |                                       |  |  |                                   |  |  |  |  |  |  |  |  |  |  |  |  |  |                            |  |    |              |  |    |               |  |    |                                  |  |                   |                            |   |  |   |  |  |               |   |  |  |  |  |  |  |  |  |  |  |  |  |  |             |   |                    |  |  |             |  |  |                       |                        |              |                    |     |                        |          |                 |       |          
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   | CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK. BREAKING OF HAND SPECIMENS REQUIRES SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK.   |   |  |                                 |  |  |  |                         |                              |   |   |  |  |   |  |  |                          |   |  |  |  |  |  |   |   |                  |  |   |   |  
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| HARD   
   
   | CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED TO DETACH HAND SPECIMEN.   |   |  |                                 |  |  |  |                         |                              |   |   |  |  |   |  |  |                          |   |  |  |  |  |  |   |   |                  |  |   |   |  
   |                             |  |  |   |  |   |   |             |  |  |  |   |                    |             |  |                                     |                 |     |   |                                       |             |                       |                                   |  |                         |     |                              |          |                        |       |              |        |                       |  |             |  |  |  |  |  |                  |  |   |                   |             |   
   
   |                         |                         |                         |                   |                         |                         |                         |                         |                         |   |                         |   |                         |   |                                |  |          |   |                              |  |                         |                         |                         |                         |                         |                         |                          |                         |                         |                   |                   |                       |                      |          |                       |                  |             |                 |       |       |       |       |       |       |       |                                |                               |  |   |                                 |             |              |  |  |  |  |  |  |                                  |                                    |   |                                 |                                 |   |            |  |   |  |                             |                             |  |   |                             |      |   |   |   |  |  |  |   |  |  |  |                                     |  |  |   |                                       |  |  |                                   |  |  |  |  |  |  |  |  |  |  |  |  |  |                            |  |    |              |  |    |               |  |    |                                  |  |                   |                            |   |  |   |  |  |               |   |  |  |  |  |  |  |  |  |  |  |  |  |  |             |   |                    |  |  |             |  |  |                       |                        |              |                    |     |                        |          |                 |       |          
   |        |             |  |                 |  |                         |  |                              |  |                        |  |              |      |                       |           |                   |      |              |                  |             |       |                |            |   |   |  |  |  |  |  |  |  |  |      |             |           |   |        |   |                 |   |                 |  |                  |   |                   |  |  |   |  |  |  |  |  |  |  |  |                                   |   |    |    |    |     |     |  |      |      |      |      |             |         |  |                      |   |                         |  |                     |   |  |  |  |  |  |  |  |            |    |     |  |     |      |      |       |  |     |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |          |  |  |  |  |  |  |  |  |  |  |   
   
   |  |  |  |  |  |  |  |  |  |                    |            |                             |               |                        |  |                |          |                       |                              |                    |              |               |                   |                   |  |                |                          |                   |                   |                   |                 |                       |                      |          |  |                  |             |                 |  |  |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |  |                                  |                                    |   |                                 |                                 |   |  |  |   |  |                             |                             |  |   |                             |  |  |   |             |  |  |  |   |  |  |  |  |  |  |   |                                       |  |  |                                   |  |  |  |  |  |  |  |  |  |  |  |  | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| 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.                               |   |  |                                 |  |  |  |                         |                              |   |   |  |  |   |  |  |                          |   |  |  |  |  |  |   |   |                  |  |   |   |  
   |                             |  |  |   |  |   |   |             |  |  |  |   |                    |             |  |                                     |                 |     |   |                                       |             |                       |                                   |  |                         |     |                              |          |                        |       |              |        |                       |  |             |  |  |  |  |  |                  |  |   |                   |             |   
   
   |                         |                         |                         |                   |                         |                         |                         |                         |                         |   |                         |   |                         |   |                                |  |          |   |                              |  |                         |                         |                         |                         |                         |                         |                          |                         |                         |                   |                   |                       |                      |          |                       |                  |             |                 |       |       |       |       |       |       |       |                                |                               |  |   |                                 |             |              |  |  |  |  |  |  |                                  |                                    |   |                                 |                                 |   |            |  |   |  |                             |                             |  |   |                             |      |   |   |   |  |  |  |   |  |  |  |                                     |  |  |   |                                       |  |  |                                   |  |  |  |  |  |  |  |  |  |  |  |  |  |                            |  |    |              |  |    |               |  |    |                                  |  |                   |                            |   |  |   |  |  |               |   |  |  |  |  |  |  |  |  |  |  |  |  |  |             |   |                    |  |  |             |  |  |                       |                        |              |                    |     |                        |          |                 |       |          
   |        |             |  |                 |  |                         |  |                              |  |                        |  |              |      |                       |           |                   |      |              |                  |             |       |                |            |   |   |  |  |  |  |  |  |  |  |      |             |           |   |        |   |                 |   |                 |  |                  |   |                   |  |  |   |  |  |  |  |  |  |  |  |                                   |   |    |    |    |     |     |  |      |      |      |      |             |         |  |                      |   |                         |  |                     |   |  |  |  |  |  |  |  |            |    |     |  |     |      |      |       |  |     |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |          |  |  |  |  |  |  |  |  |  |  |   
   
   |  |  |  |  |  |  |  |  |  |                    |            |                             |               |                        |  |                |          |                       |                              |                    |              |               |                   |                   |  |                |                          |                   |                   |                   |                 |                       |                      |          |  |                  |             |                 |  |  |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |  |                                  |                                    |   |                                 |                                 |   |  |  |   |  |                             |                             |  |   |                             |  |  |   |             |  |  |  |   |  |  |  |  |  |  |   |                                       |  |  |                                   |  |  |  |  |  |  |  |  |  |  |  |  | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
                           |                            |                                      |    |              |  |    |               |  |    |  |  |  |                      |   |  |             |   |  |               |  |  |             |  |   |  |  |  |  |  |  |  |  |  |             |                  |                    |                |  |  |  |  |                       |  |              |  |     |      |          |        |  |            |        |      |  |  |  |  |  |  |  |  |  |  |      |         |           |                   |      |              |  |             |       |                |            |                     |   |  |  |  |  |  |  |  |  |  |      |           |                     |        |  |              |               |                 |                    |                  |                   |                   |                  |              |   |  |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |  |  |             |         |  |                      |   |           |  |                     |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |   
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| MEDIUM HARD  
   
   | CAN BE GROUDED 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.            |   |  |                                 |  |  |  |                         |                              |   |   |  |  |   |  |  |                          |   |  |  |  |  |  |   |   |                  |  |   |   |  
   |                             |  |  |   |  |   |   |             |  |  |  |   |                    |             |  |                                     |                 |     |   |                                       |             |                       |                                   |  |                         |     |                              |          |                        |       |              |        |                       |  |             |  |  |  |  |  |                  |  |   |                   |             |   
   
   |                         |                         |                         |                   |                         |                         |                         |                         |                         |   |                         |   |                         |   |                                |  |          |   |                              |  |                         |                         |                         |                         |                         |                         |                          |                         |                         |                   |                   |                       |                      |          |                       |                  |             |                 |       |       |       |       |       |       |       |                                |                               |  |   |                                 |             |              |  |  |  |  |  |  |                                  |                                    |   |                                 |                                 |   |            |  |   |  |                             |                             |  |   |                             |      |   |   |   |  |  |  |   |  |  |  |                                     |  |  |   |                                       |  |  |                                   |  |  |  |  |  |  |  |  |  |  |  |  |  |                            |  |    |              |  |    |               |  |    |                                  |  |                   |                            |   |  |   |  |  |               |   |  |  |  |  |  |  |  |  |  |  |  |  |  |             |   |                    |  |  |             |  |  |                       |                        |              |                    |     |                        |          |                 |       |          
   |        |             |  |                 |  |                         |  |                              |  |                        |  |              |      |                       |           |                   |      |              |                  |             |       |                |            |   |   |  |  |  |  |  |  |  |  |      |             |           |   |        |   |                 |   |                 |  |                  |   |                   |  |  |   |  |  |  |  |  |  |  |  |                                   |   |    |    |    |     |     |  |      |      |      |      |             |         |  |                      |   |                         |  |                     |   |  |  |  |  |  |  |  |            |    |     |  |     |      |      |       |  |     |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |          |  |  |  |  |  |  |  |  |  |  |   
   
   |  |  |  |  |  |  |  |  |  |                    |            |                             |               |                        |  |                |          |                       |                              |                    |              |               |                   |                   |  |                |                          |                   |                   |                   |                 |                       |                      |          |  |                  |             |                 |  |  |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |  |                                  |                                    |   |                                 |                                 |   |  |  |   |  |                             |                             |  |   |                             |  |  |   |             |  |  |  |   |  |  |  |  |  |  |   |                                       |  |  |                                   |  |  |  |  |  |  |  |  |  |  |  |  | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
                           |                            |                                      |    |              |  |    |               |  |    |  |  |  |                      |   |  |             |   |  |               |  |  |             |  |   |  |  |  |  |  |  |  |  |  |             |                  |                    |                |  |  |  |  |                       |  |              |  |     |      |          |        |  |            |        |      |  |  |  |  |  |  |  |  |  |  |      |         |           |                   |      |              |  |             |       |                |            |                     |   |  |  |  |  |  |  |  |  |  |      |           |                     |        |  |              |               |                 |                    |                  |                   |                   |                  |              |   |  |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |  |  |             |         |  |                      |   |           |  |                     |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |   
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| SOFT   
   
   | CAN BE GROUDED 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. |   |  |                                 |  |  |  |                         |                              |   |   |  |  |   |  |  |                          |   |  |  |  |  |  |   |   |                  |  |   |   |  
   |                             |  |  |   |  |   |   |             |  |  |  |   |                    |             |  |                                     |                 |     |   |                                       |             |                       |                                   |  |                         |     |                              |          |                        |       |              |        |                       |  |             |  |  |  |  |  |                  |  |   |                   |             |   
   
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   |        |             |  |                 |  |                         |  |                              |  |                        |  |              |      |                       |           |                   |      |              |                  |             |       |                |            |   |   |  |  |  |  |  |  |  |  |      |             |           |   |        |   |                 |   |                 |  |                  |   |                   |  |  |   |  |  |  |  |  |  |  |  |                                   |   |    |    |    |     |     |  |      |      |      |      |             |         |  |                      |   |                         |  |                     |   |  |  |  |  |  |  |  |            |    |     |  |     |      |      |       |  |     |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |          |  |  |  |  |  |  |  |  |  |  |   
   
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| 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.                          |   |  |                                 |  |  |  |                         |                              |   |   |  |  |   |  |  |                          |   |  |  |  |  |  |   |   |                  |  |   |   |  
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| <p style="text-align: center;"><b>TEXTURE OR GRAIN SIZE</b></p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th>U.S. STD. SIEVE SIZE OPENING (MM)</th> <th>4</th> <th>10</th> <th>40</th> <th>60</th> <th>200</th> <th>270</th> </tr> <tr> <td></td> <td>4.76</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 (CS.E. 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> <th>MM</th> <th>305</th> <th>75</th> <th>2.0</th> <th>0.25</th> <th>0.05</th> <th>0.005</th> </tr> <tr> <td></td> <td>IN.</td> <td>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  |                          | 4.76                                    | 2.00   | 0.42   | 0.25   | 0.075  | 0.053  | BOULDER (BLDR.)   | COBBLE (COB.)   | GRAVEL (GR.)     | COARSE SAND (CS.E. 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;"><b>RECOMMENDATION SYMBOLS</b></p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td></td> <td>UNDERCUT</td> <td></td> <td>UNCLASSIFIED EXCAVATION - UNSUITABLE WASTE</td> <td></td> <td>UNCLASSIFIED EXCAVATION - ACCEPTABLE, BUT NOT TO BE USED IN THE TOP 3 FEET OF EMBANKMENT OR BACKFILL</td> </tr> <tr> <td></td> <td>SHALLOW UNDERCUT</td> <td></td> <td>UNCLASSIFIED EXCAVATION - ACCEPTABLE DEGRADABLE ROCK</td> <td></td> <td></td> </tr> </table> |                         |     |                              |          |                        |       |              |        |                       |  | UNDERCUT    |  | UNCLASSIFIED EXCAVATION - UNSUITABLE WASTE |  | UNCLASSIFIED EXCAVATION - ACCEPTABLE, BUT NOT TO BE USED IN THE TOP 3 FEET OF EMBANKMENT OR BACKFILL |  | SHALLOW UNDERCUT |  | UNCLASSIFIED EXCAVATION - ACCEPTABLE DEGRADABLE ROCK  |                   |             | <p style="text-align: center;"><b>ABBREVIATIONS</b></p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td>AR - AUGER REFUSAL</td> <td>CL. - CLAY</td> <td>CPT - CONE PENETRATION TEST</td> <td>CSE. - COARSE</td> <td>DMT - DILATOMETER TEST</td> <td>DPT - DYNAMIC PENETRATION TEST</td> <td>e - VOID RATIO</td> <td>F - FINE</td> <td>FOSS. - FOSSILIFEROUS</td> <td>FRAC. - FRACTURED, FRACTURES</td> <td>FRAGS. - FRAGMENTS</td> <td>HI. - HIGHLY</td> <td>MED. - MEDIUM</td> <td>MICA. - MICACEOUS</td> <td>MOD. - MODERATELY</td> <td>NP - NON PLASTIC</td> <td>ORG. - ORGANIC</td> <td>PMT - PRESSUREMETER TEST</td> <td>SAP. - SAPROLITIC</td> <td>SD. - SAND, SANDY</td> <td>SL. - SILT, SILTY</td> <td>SLI. - SLIGHTLY</td> <td>TCR - TRICONE REFUSAL</td> <td>w - MOISTURE CONTENT</td> <td>V - VERY</td> <td>VST - VANE SHEAR TEST</td> <td>WEA. - WEATHERED</td> <td>UNIT WEIGHT</td> <td>DRY UNIT WEIGHT</td> </tr> <tr> <td colspan="10"></td> <td colspan="10"> <p style="text-align: center;"><b>EQUIPMENT USED ON SUBJECT PROJECT</b></p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td><input type="checkbox"/> CME-45C</td> <td><input type="checkbox"/> CLAY BITS</td> <td><input checked="" type="checkbox"/> AUTOMATIC</td> <td><input type="checkbox"/> MANUAL</td> </tr> <tr> <td><input type="checkbox"/> CME-55</td> <td><input type="checkbox"/> 6" CONTINUOUS FLIGHT AUGER</td> <td colspan="2">CORE SIZE:</td> </tr> <tr> <td><input checked="" type="checkbox"/> CME-550</td> <td><input checked="" type="checkbox"/> 8" HOLLOW AUGERS</td> <td><input type="checkbox"/> -B</td> <td><input type="checkbox"/> -H</td> </tr> <tr> <td><input type="checkbox"/> VANE SHEAR TEST</td> <td><input type="checkbox"/> HARD FACED FINGER BITS</td> <td><input type="checkbox"/> -N</td> <td></td> </tr> <tr> <td><input type="checkbox"/> PORTABLE HOIST</td> <td><input type="checkbox"/> TUNG-CARBIDE INSERTS</td> <td colspan="2">HAND TOOLS:</td> </tr> <tr> <td><input checked="" type="checkbox"/> CME-75</td> <td><input type="checkbox"/> CASING <input type="checkbox"/> W/ ADVANCER</td> <td><input type="checkbox"/> POST HOLE DIGGER</td> <td></td> </tr> <tr> <td></td> <td><input type="checkbox"/> TRICONE * STEEL TEETH</td> <td><input type="checkbox"/> HAND AUGER</td> <td></td> </tr> <tr> <td></td> <td><input type="checkbox"/> TRICONE * TUNG-CARB.</td> <td><input type="checkbox"/> SOUNDING ROD</td> <td></td> </tr> <tr> <td></td> <td><input type="checkbox"/> CORE BIT</td> <td><input type="checkbox"/> VANE SHEAR TEST</td> <td></td> </tr> </table> </td> </tr> <tr> <td colspan="10"> <p style="text-align: center;"><b>SOIL MOISTURE - CORRELATION OF TERMS</b></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</td> <td>LIQUID LIMIT</td> <td></td> </tr> <tr> <td>PL</td> <td>PLASTIC LIMIT</td> <td></td> </tr> <tr> <td>OM</td> <td>OPTIMUM MOISTURE SHRINKAGE LIMIT</td> <td></td> </tr> <tr> <td></td> <td>- SATURATED - (SAT.)</td> <td>USUALLY LIQUID; VERY WET, USUALLY FROM BELOW THE GROUND WATER TABLE</td> </tr> <tr> <td></td> <td>- WET - (W)</td> <td>SEMISOLID; REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE</td> </tr> <tr> <td></td> <td>- MOIST - (M)</td> <td>SOLID; AT OR NEAR OPTIMUM MOISTURE</td> </tr> <tr> <td></td> <td>- DRY - (D)</td> <td>REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE</td> </tr> </table> </td> <td colspan="10"> <p style="text-align: center;"><b>PLASTICITY</b></p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th>NON PLASTIC</th> <th>SLIGHTLY PLASTIC</th> <th>MODERATELY PLASTIC</th> <th>HIGHLY PLASTIC</th> </tr> <tr> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <th colspan="2">PLASTICITY INDEX (PI)</th> <th colspan="2">DRY STRENGTH</th> </tr> <tr> <td>0-5</td> <td>6-15</td> <td>VERY LOW</td> <td>SLIGHT</td> </tr> <tr> <td>16-25</td> <td>26 OR MORE</td> <td>MEDIUM</td> <td>HIGH</td> </tr> </table> </td> <td colspan="10"> <p style="text-align: center;"><b>FRACTURE SPACING</b></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> </td> <td colspan="10"> <p style="text-align: center;"><b>BEDDING</b></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>&lt; 0.008 FEET</td> </tr> </table> </td> </tr> <tr> <td colspan="10"> <p style="text-align: center;"><b>COLOR</b></p> <p>DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-GRAY). MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. 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| U.S. STD. SIEVE SIZE OPENING (MM)  
   
   | 4   | 10  | 40   | 60                              | 200  | 270                                      |  |                         |                              |   |   |  |  |   |  |  |                          |   |  |  |  |  |  |   |   |                  |  |   |   |  
   |                             |  |  |   |  |   |   |             |  |  |  |   |                    |             |  |                                     |                 |     |   |                                       |             |                       |                                   |  |                         |     |                              |          |                        |       |              |        |                       |  |             |  |  |  |  |  |                  |  |   |                   |             |   
   
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|  
   
   | 4.76  | 2.00  | 0.42   | 0.25                            | 0.075  | 0.053                                    |  |                         |                              |   |   |  |  |   |  |  |                          |   |  |  |  |  |  |   |   |                  |  |   |   |  
   |                             |  |  |   |  |   |   |             |  |  |  |   |                    |             |  |                                     |                 |     |   |                                       |             |                       |                                   |  |                         |     |                              |          |                        |       |              |        |                       |  |             |  |  |  |  |  |                  |  |   |                   |             |   
   
   |                         |                         |                         |                   |                         |                         |                         |                         |                         |   |                         |   |                         |   |                                |  |          |   |                              |  |                         |                         |                         |                         |                         |                         |                          |                         |                         |                   |                   |                       |                      |          |                       |                  |             |                 |       |       |       |       |       |       |       |                                |                               |  |   |                                 |             |              |  |  |  |  |  |  |                                  |                                    |   |                                 |                                 |   |            |  |   |  |                             |                             |  |   |                             |      |   |   |   |  |  |  |   |  |  |  |                                     |  |  |   |                                       |  |  |                                   |  |  |  |  |  |  |  |  |  |  |  |  |  |                            |  |    |              |  |    |               |  |    |                                  |  |                   |                            |   |  |   |  |  |               |   |  |  |  |  |  |  |  |  |  |  |  |  |  |             |   |                    |  |  |             |  |  |                       |                        |              |                    |     |                        |          |                 |       |          
   |        |             |  |                 |  |                         |  |                              |  |                        |  |              |      |                       |           |                   |      |              |                  |             |       |                |            |   |   |  |  |  |  |  |  |  |  |      |             |           |   |        |   |                 |   |                 |  |                  |   |                   |  |  |   |  |  |  |  |  |  |  |  |                                   |   |    |    |    |     |     |  |      |      |      |      |             |         |  |                      |   |                         |  |                     |   |  |  |  |  |  |  |  |            |    |     |  |     |      |      |       |  |     |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |          |  |  |  |  |  |  |  |  |  |  |   
   
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| BOULDER (BLDR.)  
   
   | COBBLE (COB.)   | GRAVEL (GR.)  | COARSE SAND (CS.E. SD.)  | FINE SAND (F SD.)               | SILT (SL.)   | CLAY (CL.)                               |  |                         |                              |   |   |  |  |   |  |  |                          |   |  |  |  |  |  |   |   |                  |  |   |   |  
   |                             |  |  |   |  |   |   |             |  |  |  |   |                    |             |  |                                     |                 |     |   |                                       |             |                       |                                   |  |                         |     |                              |          |                        |       |              |        |                       |  |             |  |  |  |  |  |                  |  |   |                   |             |   
   
   |                         |                         |                         |                   |                         |                         |                         |                         |                         |   |                         |   |                         |   |                                |  |          |   |                              |  |                         |                         |                         |                         |                         |                         |                          |                         |                         |                   |                   |                       |                      |          |                       |                  |             |                 |       |       |       |       |       |       |       |                                |                               |  |   |                                 |             |              |  |  |  |  |  |  |                                  |                                    |   |                                 |                                 |   |            |  |   |  |                             |                             |  |   |                             |      |   |   |   |  |  |  |   |  |  |  |                                     |  |  |   |                                       |  |  |                                   |  |  |  |  |  |  |  |  |  |  |  |  |  |                            |  |    |              |  |    |               |  |    |                                  |  |                   |                            |   |  |   |  |  |               |   |  |  |  |  |  |  |  |  |  |  |  |  |  |             |   |                    |  |  |             |  |  |                       |                        |              |                    |     |                        |          |                 |       |          
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   |                         |                         |                         |                   |                         |                         |                         |                         |                         |   |                         |   |                         |   |                                |  |          |   |                              |  |                         |                         |                         |                         |                         |                         |                          |                         |                         |                   |                   |                       |                      |          |                       |                  |             |                 |       |       |       |       |       |       |       |                                |                               |  |   |                                 |             |              |  |  |  |  |  |  |                                  |                                    |   |                                 |                                 |   |            |  |   |  |                             |                             |  |   |                             |      |   |   |   |  |  |  |   |  |  |  |                                     |  |  |   |                                       |  |  |                                   |  |  |  |  |  |  |  |  |  |  |  |  |  |                            |  |    |              |  |    |               |  |    |                                  |  |                   |                            |   |  |   |  |  |               |   |  |  |  |  |  |  |  |  |  |  |  |  |  |             |   |                    |  |  |             |  |  |                       |                        |              |                    |     |                        |          |                 |       |          
   |        |             |  |                 |  |                         |  |                              |  |                        |  |              |      |                       |           |                   |      |              |                  |             |       |                |            |   |   |  |  |  |  |  |  |  |  |      |             |           |   |        |   |                 |   |                 |  |                  |   |                   |  |  |   |  |  |  |  |  |  |  |  |                                   |   |    |    |    |     |     |  |      |      |      |      |             |         |  |                      |   |                         |  |                     |   |  |  |  |  |  |  |  |            |    |     |  |     |      |      |       |  |     |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |          |  |  |  |  |  |  |  |  |  |  |   
   
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| GRAIN SIZE   
   
   | MM  | 305   | 75   | 2.0                             | 0.25   | 0.05                                     | 0.005  |                         |                              |   |   |  |  |   |  |  |                          |   |  |  |  |  |  |   |   |                  |  |   |   |  
   |                             |  |  |   |  |   |   |             |  |  |  |   |                    |             |  |                                     |                 |     |   |                                       |             |                       |                                   |  |                         |     |                              |          |                        |       |              |        |                       |  |             |  |  |  |  |  |                  |  |   |                   |             |   
   
   |                         |                         |                         |                   |                         |                         |                         |                         |                         |   |                         |   |                         |   |                                |  |          |   |                              |  |                         |                         |                         |                         |                         |                         |                          |                         |                         |                   |                   |                       |                      |          |                       |                  |             |                 |       |       |       |       |       |       |       |                                |                               |  |   |                                 |             |              |  |  |  |  |  |  |                                  |                                    |   |                                 |                                 |   |            |  |   |  |                             |                             |  |   |                             |      |   |   |   |  |  |  |   |  |  |  |                                     |  |  |   |                                       |  |  |                                   |  |  |  |  |  |  |  |  |  |  |  |  |  |                            |  |    |              |  |    |               |  |    |                                  |  |                   |                            |   |  |   |  |  |               |   |  |  |  |  |  |  |  |  |  |  |  |  |  |             |   |                    |  |  |             |  |  |                       |                        |              |                    |     |                        |          |                 |       |          
   |        |             |  |                 |  |                         |  |                              |  |                        |  |              |      |                       |           |                   |      |              |                  |             |       |                |            |   |   |  |  |  |  |  |  |  |  |      |             |           |   |        |   |                 |   |                 |  |                  |   |                   |  |  |   |  |  |  |  |  |  |  |  |                                   |   |    |    |    |     |     |  |      |      |      |      |             |         |  |                      |   |                         |  |                     |   |  |  |  |  |  |  |  |            |    |     |  |     |      |      |       |  |     |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |          |  |  |  |  |  |  |  |  |  |  |   
   
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   | IN.   | 12  | 3  |                                 |  |  |  |                         |                              |   |   |  |  |   |  |  |                          |   |  |  |  |  |  |   |   |                  |  |   |   |  
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   |                         |                         |                         |                   |                         |                         |                         |                         |                         |   |                         |   |                         |   |                                |  |          |   |                              |  |                         |                         |                         |                         |                         |                         |                          |                         |                         |                   |                   |                       |                      |          |                       |                  |             |                 |       |       |       |       |       |       |       |                                |                               |  |   |                                 |             |              |  |  |  |  |  |  |                                  |                                    |   |                                 |                                 |   |            |  |   |  |                             |                             |  |   |                             |      |   |   |   |  |  |  |   |  |  |  |                                     |  |  |   |                                       |  |  |                                   |  |  |  |  |  |  |  |  |  |  |  |  |  |                            |  |    |              |  |    |               |  |    |                                  |  |                   |                            |   |  |   |  |  |               |   |  |  |  |  |  |  |  |  |  |  |  |  |  |             |   |                    |  |  |             |  |  |                       |                        |              |                    |     |                        |          |                 |       |          
   |        |             |  |                 |  |                         |  |                              |  |                        |  |              |      |                       |           |                   |      |              |                  |             |       |                |            |   |   |  |  |  |  |  |  |  |  |      |             |           |   |        |   |                 |   |                 |  |                  |   |                   |  |  |   |  |  |  |  |  |  |  |  |                                   |   |    |    |    |     |     |  |      |      |      |      |             |         |  |                      |   |                         |  |                     |   |  |  |  |  |  |  |  |            |    |     |  |     |      |      |       |  |     |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |          |  |  |  |  |  |  |  |  |  |  |   
   
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   | UNDERCUT  |   | UNCLASSIFIED EXCAVATION - UNSUITABLE WASTE                       |                                 | UNCLASSIFIED EXCAVATION - ACCEPTABLE, BUT NOT TO BE USED IN THE TOP 3 FEET OF EMBANKMENT OR BACKFILL |  |  |                         |                              |   |   |  |  |   |  |  |                          |   |  |  |  |  |  |   |   |                  |  |   |   |  
   |                             |  |  |   |  |   |   |             |  |  |  |   |                    |             |  |                                     |                 |     |   |                                       |             |                       |                                   |  |                         |     |                              |          |                        |       |              |        |                       |  |             |  |  |  |  |  |                  |  |   |                   |             |   
   
   |                         |                         |                         |                   |                         |                         |                         |                         |                         |   |                         |   |                         |   |                                |  |          |   |                              |  |                         |                         |                         |                         |                         |                         |                          |                         |                         |                   |                   |                       |                      |          |                       |                  |             |                 |       |       |       |       |       |       |       |                                |                               |  |   |                                 |             |              |  |  |  |  |  |  |                                  |                                    |   |                                 |                                 |   |            |  |   |  |                             |                             |  |   |                             |      |   |   |   |  |  |  |   |  |  |  |                                     |  |  |   |                                       |  |  |                                   |  |  |  |  |  |  |  |  |  |  |  |  |  |                            |  |    |              |  |    |               |  |    |                                  |  |                   |                            |   |  |   |  |  |               |   |  |  |  |  |  |  |  |  |  |  |  |  |  |             |   |                    |  |  |             |  |  |                       |                        |              |                    |     |                        |          |                 |       |          
   |        |             |  |                 |  |                         |  |                              |  |                        |  |              |      |                       |           |                   |      |              |                  |             |       |                |            |   |   |  |  |  |  |  |  |  |  |      |             |           |   |        |   |                 |   |                 |  |                  |   |                   |  |  |   |  |  |  |  |  |  |  |  |                                   |   |    |    |    |     |     |  |      |      |      |      |             |         |  |                      |   |                         |  |                     |   |  |  |  |  |  |  |  |            |    |     |  |     |      |      |       |  |     |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |          |  |  |  |  |  |  |  |  |  |  |   
   
   |  |  |  |  |  |  |  |  |  |                    |            |                             |               |                        |  |                |          |                       |                              |                    |              |               |                   |                   |  |                |                          |                   |                   |                   |                 |                       |                      |          |  |                  |             |                 |  |  |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |  |                                  |                                    |   |                                 |                                 |   |  |  |   |  |                             |                             |  |   |                             |  |  |   |             |  |  |  |   |  |  |  |  |  |  |   |                                       |  |  |                                   |  |  |  |  |  |  |  |  |  |  |  |  | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
                           |                            |                                      |    |              |  |    |               |  |    |  |  |  |                      |   |  |             |   |  |               |  |  |             |  |   |  |  |  |  |  |  |  |  |  |             |                  |                    |                |  |  |  |  |                       |  |              |  |     |      |          |        |  |            |        |      |  |  |  |  |  |  |  |  |  |  |      |         |           |                   |      |              |  |             |       |                |            |                     |   |  |  |  |  |  |  |  |  |  |      |           |                     |        |  |              |               |                 |                    |                  |                   |                   |                  |              |   |  |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |  |  |             |         |  |                      |   |           |  |                     |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |   
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   | SHALLOW UNDERCUT  |   | UNCLASSIFIED EXCAVATION - ACCEPTABLE DEGRADABLE ROCK             |                                 |  |  |  |                         |                              |   |   |  |  |   |  |  |                          |   |  |  |  |  |  |   |   |                  |  |   |   |  
   |                             |  |  |   |  |   |   |             |  |  |  |   |                    |             |  |                                     |                 |     |   |                                       |             |                       |                                   |  |                         |     |                              |          |                        |       |              |        |                       |  |             |  |  |  |  |  |                  |  |   |                   |             |   
   
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| AR - AUGER REFUSAL   
   
   | CL. - CLAY  | CPT - CONE PENETRATION TEST   | CSE. - COARSE  | DMT - DILATOMETER TEST          | DPT - DYNAMIC PENETRATION TEST   | e - VOID RATIO                           | F - FINE   | FOSS. - FOSSILIFEROUS   | FRAC. - FRACTURED, FRACTURES | FRAGS. - FRAGMENTS  | HI. - HIGHLY                            | MED. - MEDIUM                                      | MICA. - MICACEOUS  | MOD. - MODERATELY                           | NP - NON PLASTIC   | ORG. - ORGANIC                                 | PMT - PRESSUREMETER TEST | SAP. - SAPROLITIC                       | SD. - SAND, SANDY  | SL. - SILT, SILTY  | SLI. - SLIGHTLY  | TCR - TRICONE REFUSAL  | w - MOISTURE CONTENT   | V - VERY  | VST - VANE SHEAR TEST   | WEA. - WEATHERED | UNIT WEIGHT  | DRY UNIT WEIGHT                             |   |  
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   |   |   |  |                                 |  |  |  |                         |                              | <p style="text-align: center;"><b>EQUIPMENT USED ON SUBJECT PROJECT</b></p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td><input type="checkbox"/> CME-45C</td> <td><input type="checkbox"/> CLAY BITS</td> <td><input checked="" type="checkbox"/> AUTOMATIC</td> <td><input type="checkbox"/> MANUAL</td> </tr> <tr> <td><input type="checkbox"/> CME-55</td> <td><input type="checkbox"/> 6" CONTINUOUS FLIGHT AUGER</td> <td colspan="2">CORE SIZE:</td> </tr> <tr> <td><input checked="" type="checkbox"/> CME-550</td> <td><input checked="" type="checkbox"/> 8" HOLLOW AUGERS</td> <td><input type="checkbox"/> -B</td> <td><input type="checkbox"/> -H</td> </tr> <tr> <td><input type="checkbox"/> VANE SHEAR TEST</td> <td><input type="checkbox"/> HARD FACED FINGER BITS</td> <td><input type="checkbox"/> -N</td> <td></td> </tr> <tr> <td><input type="checkbox"/> PORTABLE HOIST</td> <td><input type="checkbox"/> TUNG-CARBIDE INSERTS</td> <td colspan="2">HAND TOOLS:</td> </tr> <tr> <td><input checked="" type="checkbox"/> CME-75</td> <td><input type="checkbox"/> CASING <input type="checkbox"/> W/ ADVANCER</td> <td><input type="checkbox"/> POST HOLE DIGGER</td> <td></td> </tr> <tr> <td></td> <td><input type="checkbox"/> TRICONE * STEEL TEETH</td> <td><input type="checkbox"/> HAND AUGER</td> <td></td> </tr> <tr> <td></td> <td><input type="checkbox"/> TRICONE * TUNG-CARB.</td> <td><input type="checkbox"/> SOUNDING ROD</td> <td></td> </tr> <tr> <td></td> <td><input type="checkbox"/> CORE BIT</td> <td><input type="checkbox"/> VANE SHEAR TEST</td> <td></td> </tr> </table> |   |  |  |   |  |  |                          |   |  | <input type="checkbox"/> CME-45C   | <input type="checkbox"/> CLAY BITS                             | <input checked="" type="checkbox"/> AUTOMATIC  | <input type="checkbox"/> MANUAL  | <input type="checkbox"/> CME-55                                     | <input type="checkbox"/> 6" CONTINUOUS FLIGHT AUGER                                       | CORE SIZE:       |  | <input checked="" type="checkbox"/> CME-550 | <input checked="" type="checkbox"/> 8" HOLLOW AUGERS                      | <input type="checkbox"/> -B  
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| <input type="checkbox"/> CME-55  
   
   | <input type="checkbox"/> 6" CONTINUOUS FLIGHT AUGER   | CORE SIZE:  |  |                                 |  |  |  |                         |                              |   |   |  |  |   |  |  |                          |   |  |  |  |  |  |   |   |                  |  |   |   |  
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   |        |             |  |                 |  |                         |  |                              |  |                        |  |              |      |                       |           |                   |      |              |                  |             |       |                |            |   |   |  |  |  |  |  |  |  |  |      |             |           |   |        |   |                 |   |                 |  |                  |   |                   |  |  |   |  |  |  |  |  |  |  |  |                                   |   |    |    |    |     |     |  |      |      |      |      |             |         |  |                      |   |                         |  |                     |   |  |  |  |  |  |  |  |            |    |     |  |     |      |      |       |  |     |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |          |  |  |  |  |  |  |  |  |  |  |   
   
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| <input checked="" type="checkbox"/> CME-550  
   
   | <input checked="" type="checkbox"/> 8" HOLLOW AUGERS  | <input type="checkbox"/> -B   | <input type="checkbox"/> -H                                      |                                 |  |  |  |                         |                              |   |   |  |  |   |  |  |                          |   |  |  |  |  |  |   |   |                  |  |   |   |  
   |                             |  |  |   |  |   |   |             |  |  |  |   |                    |             |  |                                     |                 |     |   |                                       |             |                       |                                   |  |                         |     |                              |          |                        |       |              |        |                       |  |             |  |  |  |  |  |                  |  |   |                   |             |   
   
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   |        |             |  |                 |  |                         |  |                              |  |                        |  |              |      |                       |           |                   |      |              |                  |             |       |                |            |   |   |  |  |  |  |  |  |  |  |      |             |           |   |        |   |                 |   |                 |  |                  |   |                   |  |  |   |  |  |  |  |  |  |  |  |                                   |   |    |    |    |     |     |  |      |      |      |      |             |         |  |                      |   |                         |  |                     |   |  |  |  |  |  |  |  |            |    |     |  |     |      |      |       |  |     |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |          |  |  |  |  |  |  |  |  |  |  |   
   
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                           |                            |                                      |    |              |  |    |               |  |    |  |  |  |                      |   |  |             |   |  |               |  |  |             |  |   |  |  |  |  |  |  |  |  |  |             |                  |                    |                |  |  |  |  |                       |  |              |  |     |      |          |        |  |            |        |      |  |  |  |  |  |  |  |  |  |  |      |         |           |                   |      |              |  |             |       |                |            |                     |   |  |  |  |  |  |  |  |  |  |      |           |                     |        |  |              |               |                 |                    |                  |                   |                   |                  |              |   |  |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |  |  |             |         |  |                      |   |           |  |                     |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |   
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| <input type="checkbox"/> VANE SHEAR TEST   
   
   | <input type="checkbox"/> HARD FACED FINGER BITS   | <input type="checkbox"/> -N   |  |                                 |  |  |  |                         |                              |   |   |  |  |   |  |  |                          |   |  |  |  |  |  |   |   |                  |  |   |   |  
   |                             |  |  |   |  |   |   |             |  |  |  |   |                    |             |  |                                     |                 |     |   |                                       |             |                       |                                   |  |                         |     |                              |          |                        |       |              |        |                       |  |             |  |  |  |  |  |                  |  |   |                   |             |   
   
   |                         |                         |                         |                   |                         |                         |                         |                         |                         |   |                         |   |                         |   |                                |  |          |   |                              |  |                         |                         |                         |                         |                         |                         |                          |                         |                         |                   |                   |                       |                      |          |                       |                  |             |                 |       |       |       |       |       |       |       |                                |                               |  |   |                                 |             |              |  |  |  |  |  |  |                                  |                                    |   |                                 |                                 |   |            |  |   |  |                             |                             |  |   |                             |      |   |   |   |  |  |  |   |  |  |  |                                     |  |  |   |                                       |  |  |                                   |  |  |  |  |  |  |  |  |  |  |  |  |  |                            |  |    |              |  |    |               |  |    |                                  |  |                   |                            |   |  |   |  |  |               |   |  |  |  |  |  |  |  |  |  |  |  |  |  |             |   |                    |  |  |             |  |  |                       |                        |              |                    |     |                        |          |                 |       |          
   |        |             |  |                 |  |                         |  |                              |  |                        |  |              |      |                       |           |                   |      |              |                  |             |       |                |            |   |   |  |  |  |  |  |  |  |  |      |             |           |   |        |   |                 |   |                 |  |                  |   |                   |  |  |   |  |  |  |  |  |  |  |  |                                   |   |    |    |    |     |     |  |      |      |      |      |             |         |  |                      |   |                         |  |                     |   |  |  |  |  |  |  |  |            |    |     |  |     |      |      |       |  |     |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |          |  |  |  |  |  |  |  |  |  |  |   
   
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| <input type="checkbox"/> PORTABLE HOIST  
   
   | <input type="checkbox"/> TUNG-CARBIDE INSERTS   | HAND TOOLS:   |  |                                 |  |  |  |                         |                              |   |   |  |  |   |  |  |                          |   |  |  |  |  |  |   |   |                  |  |   |   |  
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| <input checked="" type="checkbox"/> CME-75   
   
   | <input type="checkbox"/> CASING <input type="checkbox"/> W/ ADVANCER  | <input type="checkbox"/> POST HOLE DIGGER                           |  |                                 |  |  |  |                         |                              |   |   |  |  |   |  |  |                          |   |  |  |  |  |  |   |   |                  |  |   |   |  
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   | <input type="checkbox"/> TRICONE * STEEL TEETH  | <input type="checkbox"/> HAND AUGER                                 |  |                                 |  |  |  |                         |                              |   |   |  |  |   |  |  |                          |   |  |  |  |  |  |   |   |                  |  |   |   |  
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   |                         |                         |                         |                   |                         |                         |                         |                         |                         |   |                         |   |                         |   |                                |  |          |   |                              |  |                         |                         |                         |                         |                         |                         |                          |                         |                         |                   |                   |                       |                      |          |                       |                  |             |                 |       |       |       |       |       |       |       |                                |                               |  |   |                                 |             |              |  |  |  |  |  |  |                                  |                                    |   |                                 |                                 |   |            |  |   |  |                             |                             |  |   |                             |      |   |   |   |  |  |  |   |  |  |  |                                     |  |  |   |                                       |  |  |                                   |  |  |  |  |  |  |  |  |  |  |  |  |  |                            |  |    |              |  |    |               |  |    |                                  |  |                   |                            |   |  |   |  |  |               |   |  |  |  |  |  |  |  |  |  |  |  |  |  |             |   |                    |  |  |             |  |  |                       |                        |              |                    |     |                        |          |                 |       |          
   |        |             |  |                 |  |                         |  |                              |  |                        |  |              |      |                       |           |                   |      |              |                  |             |       |                |            |   |   |  |  |  |  |  |  |  |  |      |             |           |   |        |   |                 |   |                 |  |                  |   |                   |  |  |   |  |  |  |  |  |  |  |  |                                   |   |    |    |    |     |     |  |      |      |      |      |             |         |  |                      |   |                         |  |                     |   |  |  |  |  |  |  |  |            |    |     |  |     |      |      |       |  |     |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |          |  |  |  |  |  |  |  |  |  |  |   
   
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   | <input type="checkbox"/> TRICONE * TUNG-CARB.   | <input type="checkbox"/> SOUNDING ROD                               |  |                                 |  |  |  |                         |                              |   |   |  |  |   |  |  |                          |   |  |  |  |  |  |   |   |                  |  |   |   |  
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   | <input type="checkbox"/> CORE BIT   | <input type="checkbox"/> VANE SHEAR TEST                            |  |                                 |  |  |  |                         |                              |   |   |  |  |   |  |  |                          |   |  |  |  |  |  |   |   |                  |  |   |   |  
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| <p style="text-align: center;"><b>SOIL MOISTURE - CORRELATION OF TERMS</b></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</td> <td>LIQUID LIMIT</td> <td></td> </tr> <tr> <td>PL</td> <td>PLASTIC LIMIT</td> <td></td> </tr> <tr> <td>OM</td> <td>OPTIMUM MOISTURE SHRINKAGE LIMIT</td> <td></td> </tr> <tr> <td></td> <td>- SATURATED - (SAT.)</td> <td>USUALLY LIQUID; VERY WET, USUALLY FROM BELOW THE GROUND WATER TABLE</td> </tr> <tr> <td></td> <td>- WET - (W)</td> <td>SEMISOLID; REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE</td> </tr> <tr> <td></td> <td>- MOIST - (M)</td> <td>SOLID; AT OR NEAR OPTIMUM MOISTURE</td> </tr> <tr> <td></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                                |  | PL   | PLASTIC LIMIT            |   | OM   | OPTIMUM MOISTURE SHRINKAGE LIMIT   |  |  | - SATURATED - (SAT.)   | USUALLY LIQUID; VERY WET, USUALLY FROM BELOW THE GROUND WATER TABLE |   | - WET - (W)      | SEMISOLID; REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE                              |   | - MOIST - (M)   | SOLID; AT OR NEAR OPTIMUM MOISTURE   
   |                             | - DRY - (D)                              | REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE | <p style="text-align: center;"><b>PLASTICITY</b></p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th>NON PLASTIC</th> <th>SLIGHTLY PLASTIC</th> <th>MODERATELY PLASTIC</th> <th>HIGHLY PLASTIC</th> </tr> <tr> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <th colspan="2">PLASTICITY INDEX (PI)</th> <th colspan="2">DRY STRENGTH</th> </tr> <tr> <td>0-5</td> <td>6-15</td> <td>VERY LOW</td> <td>SLIGHT</td> </tr> <tr> <td>16-25</td> <td>26 OR MORE</td> <td>MEDIUM</td> <td>HIGH</td> </tr> </table> |  |   |   |             |  |  |  |   |                    | NON PLASTIC | SLIGHTLY PLASTIC                               | MODERATELY PLASTIC                  | HIGHLY PLASTIC  |     |   |                                       |             | PLASTICITY INDEX (PI) |                                   | DRY STRENGTH   |                         | 0-5 | 6-15                         | VERY LOW | SLIGHT                 | 16-25 | 26 OR MORE   | MEDIUM | HIGH                  | <p style="text-align: center;"><b>FRACTURE SPACING</b></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;"><b>BEDDING</b></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>&lt; 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         |          |                       |                  |             |                 |       |       |       |       |       |       |       |                                |                               |  |   |                                 |             |              |  |  |  |  |  |  |                                  |                                    |   |                                 |                                 |   |            |  |   |  |                             |                             |  |   |                             |      |   |   |   |  |  |  |   |  |  |  |                                     |  |  |   |                                       |  |  |                                   |  |  |  |  |  |  |  |  |  |  |  |  |  |                            |  |    |              |  |    |               |  |    |                                  |  |                   |                            |   |  |   |  |  |               |   |  |  |  |  |  |  |  |  |  |  |  |  |  |             |   |                    |  |  |             |  |  |                       |                        |              |                    |     |                        |          |                 |       |          
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| SOIL MOISTURE SCALE (ATTERBERG LIMITS)   
   
   | FIELD MOISTURE DESCRIPTION  | GUIDE FOR FIELD MOISTURE DESCRIPTION                                |  |                                 |  |  |  |                         |                              |   |   |  |  |   |  |  |                          |   |  |  |  |  |  |   |   |                  |  |   |   |  
   |                             |  |  |   |  |   |   |             |  |  |  |   |                    |             |  |                                     |                 |     |   |                                       |             |                       |                                   |  |                         |     |                              |          |                        |       |              |        |                       |  |             |  |  |  |  |  |                  |  |   |                   |             |   
   
   |                         |                         |                         |                   |                         |                         |                         |                         |                         |   |                         |   |                         |   |                                |  |          |   |                              |  |                         |                         |                         |                         |                         |                         |                          |                         |                         |                   |                   |                       |                      |          |                       |                  |             |                 |       |       |       |       |       |       |       |                                |                               |  |   |                                 |             |              |  |  |  |  |  |  |                                  |                                    |   |                                 |                                 |   |            |  |   |  |                             |                             |  |   |                             |      |   |   |   |  |  |  |   |  |  |  |                                     |  |  |   |                                       |  |  |                                   |  |  |  |  |  |  |  |  |  |  |  |  |  |                            |  |    |              |  |    |               |  |    |                                  |  |                   |                            |   |  |   |  |  |               |   |  |  |  |  |  |  |  |  |  |  |  |  |  |             |   |                    |  |  |             |  |  |                       |                        |              |                    |     |                        |          |                 |       |          
   |        |             |  |                 |  |                         |  |                              |  |                        |  |              |      |                       |           |                   |      |              |                  |             |       |                |            |   |   |  |  |  |  |  |  |  |  |      |             |           |   |        |   |                 |   |                 |  |                  |   |                   |  |  |   |  |  |  |  |  |  |  |  |                                   |   |    |    |    |     |     |  |      |      |      |      |             |         |  |                      |   |                         |  |                     |   |  |  |  |  |  |  |  |            |    |     |  |     |      |      |       |  |     |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |          |  |  |  |  |  |  |  |  |  |  |   
   
   |  |  |  |  |  |  |  |  |  |                    |            |                             |               |                        |  |                |          |                       |                              |                    |              |               |                   |                   |  |                |                          |                   |                   |                   |                 |                       |                      |          |  |                  |             |                 |  |  |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |  |                                  |                                    |   |                                 |                                 |   |  |  |   |  |                             |                             |  |   |                             |  |  |   |             |  |  |  |   |  |  |  |  |  |  |   |                                       |  |  |                                   |  |  |  |  |  |  |  |  |  |  |  |  | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| LL   
   
   | LIQUID LIMIT  |   |  |                                 |  |  |  |                         |                              |   |   |  |  |   |  |  |                          |   |  |  |  |  |  |   |   |                  |  |   |   |  
   |                             |  |  |   |  |   |   |             |  |  |  |   |                    |             |  |                                     |                 |     |   |                                       |             |                       |                                   |  |                         |     |                              |          |                        |       |              |        |                       |  |             |  |  |  |  |  |                  |  |   |                   |             |   
   
   |                         |                         |                         |                   |                         |                         |                         |                         |                         |   |                         |   |                         |   |                                |  |          |   |                              |  |                         |                         |                         |                         |                         |                         |                          |                         |                         |                   |                   |                       |                      |          |                       |                  |             |                 |       |       |       |       |       |       |       |                                |                               |  |   |                                 |             |              |  |  |  |  |  |  |                                  |                                    |   |                                 |                                 |   |            |  |   |  |                             |                             |  |   |                             |      |   |   |   |  |  |  |   |  |  |  |                                     |  |  |   |                                       |  |  |                                   |  |  |  |  |  |  |  |  |  |  |  |  |  |                            |  |    |              |  |    |               |  |    |                                  |  |                   |                            |   |  |   |  |  |               |   |  |  |  |  |  |  |  |  |  |  |  |  |  |             |   |                    |  |  |             |  |  |                       |                        |              |                    |     |                        |          |                 |       |          
   |        |             |  |                 |  |                         |  |                              |  |                        |  |              |      |                       |           |                   |      |              |                  |             |       |                |            |   |   |  |  |  |  |  |  |  |  |      |             |           |   |        |   |                 |   |                 |  |                  |   |                   |  |  |   |  |  |  |  |  |  |  |  |                                   |   |    |    |    |     |     |  |      |      |      |      |             |         |  |                      |   |                         |  |                     |   |  |  |  |  |  |  |  |            |    |     |  |     |      |      |       |  |     |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |          |  |  |  |  |  |  |  |  |  |  |   
   
   |  |  |  |  |  |  |  |  |  |                    |            |                             |               |                        |  |                |          |                       |                              |                    |              |               |                   |                   |  |                |                          |                   |                   |                   |                 |                       |                      |          |  |                  |             |                 |  |  |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |  |                                  |                                    |   |                                 |                                 |   |  |  |   |  |                             |                             |  |   |                             |  |  |   |             |  |  |  |   |  |  |  |  |  |  |   |                                       |  |  |                                   |  |  |  |  |  |  |  |  |  |  |  |  | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
                           |                            |                                      |    |              |  |    |               |  |    |  |  |  |                      |   |  |             |   |  |               |  |  |             |  |   |  |  |  |  |  |  |  |  |  |             |                  |                    |                |  |  |  |  |                       |  |              |  |     |      |          |        |  |            |        |      |  |  |  |  |  |  |  |  |  |  |      |         |           |                   |      |              |  |             |       |                |            |                     |   |  |  |  |  |  |  |  |  |  |      |           |                     |        |  |              |               |                 |                    |                  |                   |                   |                  |              |   |  |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |  |  |             |         |  |                      |   |           |  |                     |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |   
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| PL   
   
   | PLASTIC LIMIT   |   |  |                                 |  |  |  |                         |                              |   |   |  |  |   |  |  |                          |   |  |  |  |  |  |   |   |                  |  |   |   |  
   |                             |  |  |   |  |   |   |             |  |  |  |   |                    |             |  |                                     |                 |     |   |                                       |             |                       |                                   |  |                         |     |                              |          |                        |       |              |        |                       |  |             |  |  |  |  |  |                  |  |   |                   |             |   
   
   |                         |                         |                         |                   |                         |                         |                         |                         |                         |   |                         |   |                         |   |                                |  |          |   |                              |  |                         |                         |                         |                         |                         |                         |                          |                         |                         |                   |                   |                       |                      |          |                       |                  |             |                 |       |       |       |       |       |       |       |                                |                               |  |   |                                 |             |              |  |  |  |  |  |  |                                  |                                    |   |                                 |                                 |   |            |  |   |  |                             |                             |  |   |                             |      |   |   |   |  |  |  |   |  |  |  |                                     |  |  |   |                                       |  |  |                                   |  |  |  |  |  |  |  |  |  |  |  |  |  |                            |  |    |              |  |    |               |  |    |                                  |  |                   |                            |   |  |   |  |  |               |   |  |  |  |  |  |  |  |  |  |  |  |  |  |             |   |                    |  |  |             |  |  |                       |                        |              |                    |     |                        |          |                 |       |          
   |        |             |  |                 |  |                         |  |                              |  |                        |  |              |      |                       |           |                   |      |              |                  |             |       |                |            |   |   |  |  |  |  |  |  |  |  |      |             |           |   |        |   |                 |   |                 |  |                  |   |                   |  |  |   |  |  |  |  |  |  |  |  |                                   |   |    |    |    |     |     |  |      |      |      |      |             |         |  |                      |   |                         |  |                     |   |  |  |  |  |  |  |  |            |    |     |  |     |      |      |       |  |     |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |          |  |  |  |  |  |  |  |  |  |  |   
   
   |  |  |  |  |  |  |  |  |  |                    |            |                             |               |                        |  |                |          |                       |                              |                    |              |               |                   |                   |  |                |                          |                   |                   |                   |                 |                       |                      |          |  |                  |             |                 |  |  |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |  |                                  |                                    |   |                                 |                                 |   |  |  |   |  |                             |                             |  |   |                             |  |  |   |             |  |  |  |   |  |  |  |  |  |  |   |                                       |  |  |                                   |  |  |  |  |  |  |  |  |  |  |  |  | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
                           |                            |                                      |    |              |  |    |               |  |    |  |  |  |                      |   |  |             |   |  |               |  |  |             |  |   |  |  |  |  |  |  |  |  |  |             |                  |                    |                |  |  |  |  |                       |  |              |  |     |      |          |        |  |            |        |      |  |  |  |  |  |  |  |  |  |  |      |         |           |                   |      |              |  |             |       |                |            |                     |   |  |  |  |  |  |  |  |  |  |      |           |                     |        |  |              |               |                 |                    |                  |                   |                   |                  |              |   |  |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |  |  |             |         |  |                      |   |           |  |                     |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |   
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| OM   
   
   | OPTIMUM MOISTURE SHRINKAGE LIMIT  |   |  |                                 |  |  |  |                         |                              |   |   |  |  |   |  |  |                          |   |  |  |  |  |  |   |   |                  |  |   |   |  
   |                             |  |  |   |  |   |   |             |  |  |  |   |                    |             |  |                                     |                 |     |   |                                       |             |                       |                                   |  |                         |     |                              |          |                        |       |              |        |                       |  |             |  |  |  |  |  |                  |  |   |                   |             |   
   
   |                         |                         |                         |                   |                         |                         |                         |                         |                         |   |                         |   |                         |   |                                |  |          |   |                              |  |                         |                         |                         |                         |                         |                         |                          |                         |                         |                   |                   |                       |                      |          |                       |                  |             |                 |       |       |       |       |       |       |       |                                |                               |  |   |                                 |             |              |  |  |  |  |  |  |                                  |                                    |   |                                 |                                 |   |            |  |   |  |                             |                             |  |   |                             |      |   |   |   |  |  |  |   |  |  |  |                                     |  |  |   |                                       |  |  |                                   |  |  |  |  |  |  |  |  |  |  |  |  |  |                            |  |    |              |  |    |               |  |    |                                  |  |                   |                            |   |  |   |  |  |               |   |  |  |  |  |  |  |  |  |  |  |  |  |  |             |   |                    |  |  |             |  |  |                       |                        |              |                    |     |                        |          |                 |       |          
   |        |             |  |                 |  |                         |  |                              |  |                        |  |              |      |                       |           |                   |      |              |                  |             |       |                |            |   |   |  |  |  |  |  |  |  |  |      |             |           |   |        |   |                 |   |                 |  |                  |   |                   |  |  |   |  |  |  |  |  |  |  |  |                                   |   |    |    |    |     |     |  |      |      |      |      |             |         |  |                      |   |                         |  |                     |   |  |  |  |  |  |  |  |            |    |     |  |     |      |      |       |  |     |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |          |  |  |  |  |  |  |  |  |  |  |   
   
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   | - SATURATED - (SAT.)  | USUALLY LIQUID; VERY WET, USUALLY FROM BELOW THE GROUND WATER TABLE |  |                                 |  |  |  |                         |                              |   |   |  |  |   |  |  |                          |   |  |  |  |  |  |   |   |                  |  |   |   |  
   |                             |  |  |   |  |   |   |             |  |  |  |   |                    |             |  |                                     |                 |     |   |                                       |             |                       |                                   |  |                         |     |                              |          |                        |       |              |        |                       |  |             |  |  |  |  |  |                  |  |   |                   |             |   
   
   |                         |                         |                         |                   |                         |                         |                         |                         |                         |   |                         |   |                         |   |                                |  |          |   |                              |  |                         |                         |                         |                         |                         |                         |                          |                         |                         |                   |                   |                       |                      |          |                       |                  |             |                 |       |       |       |       |       |       |       |                                |                               |  |   |                                 |             |              |  |  |  |  |  |  |                                  |                                    |   |                                 |                                 |   |            |  |   |  |                             |                             |  |   |                             |      |   |   |   |  |  |  |   |  |  |  |                                     |  |  |   |                                       |  |  |                                   |  |  |  |  |  |  |  |  |  |  |  |  |  |                            |  |    |              |  |    |               |  |    |                                  |  |                   |                            |   |  |   |  |  |               |   |  |  |  |  |  |  |  |  |  |  |  |  |  |             |   |                    |  |  |             |  |  |                       |                        |              |                    |     |                        |          |                 |       |          
   |        |             |  |                 |  |                         |  |                              |  |                        |  |              |      |                       |           |                   |      |              |                  |             |       |                |            |   |   |  |  |  |  |  |  |  |  |      |             |           |   |        |   |                 |   |                 |  |                  |   |                   |  |  |   |  |  |  |  |  |  |  |  |                                   |   |    |    |    |     |     |  |      |      |      |      |             |         |  |                      |   |                         |  |                     |   |  |  |  |  |  |  |  |            |    |     |  |     |      |      |       |  |     |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |          |  |  |  |  |  |  |  |  |  |  |   
   
   |  |  |  |  |  |  |  |  |  |                    |            |                             |               |                        |  |                |          |                       |                              |                    |              |               |                   |                   |  |                |                          |                   |                   |                   |                 |                       |                      |          |  |                  |             |                 |  |  |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |  |                                  |                                    |   |                                 |                                 |   |  |  |   |  |                             |                             |  |   |                             |  |  |   |             |  |  |  |   |  |  |  |  |  |  |   |                                       |  |  |                                   |  |  |  |  |  |  |  |  |  |  |  |  | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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   | - WET - (W)   | SEMISOLID; REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE               |  |                                 |  |  |  |                         |                              |   |   |  |  |   |  |  |                          |   |  |  |  |  |  |   |   |                  |  |   |   |  
   |                             |  |  |   |  |   |   |             |  |  |  |   |                    |             |  |                                     |                 |     |   |                                       |             |                       |                                   |  |                         |     |                              |          |                        |       |              |        |                       |  |             |  |  |  |  |  |                  |  |   |                   |             |   
   
   |                         |                         |                         |                   |                         |                         |                         |                         |                         |   |                         |   |                         |   |                                |  |          |   |                              |  |                         |                         |                         |                         |                         |                         |                          |                         |                         |                   |                   |                       |                      |          |                       |                  |             |                 |       |       |       |       |       |       |       |                                |                               |  |   |                                 |             |              |  |  |  |  |  |  |                                  |                                    |   |                                 |                                 |   |            |  |   |  |                             |                             |  |   |                             |      |   |   |   |  |  |  |   |  |  |  |                                     |  |  |   |                                       |  |  |                                   |  |  |  |  |  |  |  |  |  |  |  |  |  |                            |  |    |              |  |    |               |  |    |                                  |  |                   |                            |   |  |   |  |  |               |   |  |  |  |  |  |  |  |  |  |  |  |  |  |             |   |                    |  |  |             |  |  |                       |                        |              |                    |     |                        |          |                 |       |          
   |        |             |  |                 |  |                         |  |                              |  |                        |  |              |      |                       |           |                   |      |              |                  |             |       |                |            |   |   |  |  |  |  |  |  |  |  |      |             |           |   |        |   |                 |   |                 |  |                  |   |                   |  |  |   |  |  |  |  |  |  |  |  |                                   |   |    |    |    |     |     |  |      |      |      |      |             |         |  |                      |   |                         |  |                     |   |  |  |  |  |  |  |  |            |    |     |  |     |      |      |       |  |     |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |          |  |  |  |  |  |  |  |  |  |  |   
   
   |  |  |  |  |  |  |  |  |  |                    |            |                             |               |                        |  |                |          |                       |                              |                    |              |               |                   |                   |  |                |                          |                   |                   |                   |                 |                       |                      |          |  |                  |             |                 |  |  |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |  |                                  |                                    |   |                                 |                                 |   |  |  |   |  |                             |                             |  |   |                             |  |  |   |             |  |  |  |   |  |  |  |  |  |  |   |                                       |  |  |                                   |  |  |  |  |  |  |  |  |  |  |  |  | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
                           |                            |                                      |    |              |  |    |               |  |    |  |  |  |                      |   |  |             |   |  |               |  |  |             |  |   |  |  |  |  |  |  |  |  |  |             |                  |                    |                |  |  |  |  |                       |  |              |  |     |      |          |        |  |            |        |      |  |  |  |  |  |  |  |  |  |  |      |         |           |                   |      |              |  |             |       |                |            |                     |   |  |  |  |  |  |  |  |  |  |      |           |                     |        |  |              |               |                 |                    |                  |                   |                   |                  |              |   |  |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |  |  |             |         |  |                      |   |           |  |                     |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |   
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   | - MOIST - (M)   | SOLID; AT OR NEAR OPTIMUM MOISTURE                                  |  |                                 |  |  |  |                         |                              |   |   |  |  |   |  |  |                          |   |  |  |  |  |  |   |   |                  |  |   |   |  
   |                             |  |  |   |  |   |   |             |  |  |  |   |                    |             |  |                                     |                 |     |   |                                       |             |                       |                                   |  |                         |     |                              |          |                        |       |              |        |                       |  |             |  |  |  |  |  |                  |  |   |                   |             |   
   
   |                         |                         |                         |                   |                         |                         |                         |                         |                         |   |                         |   |                         |   |                                |  |          |   |                              |  |                         |                         |                         |                         |                         |                         |                          |                         |                         |                   |                   |                       |                      |          |                       |                  |             |                 |       |       |       |       |       |       |       |                                |                               |  |   |                                 |             |              |  |  |  |  |  |  |                                  |                                    |   |                                 |                                 |   |            |  |   |  |                             |                             |  |   |                             |      |   |   |   |  |  |  |   |  |  |  |                                     |  |  |   |                                       |  |  |                                   |  |  |  |  |  |  |  |  |  |  |  |  |  |                            |  |    |              |  |    |               |  |    |                                  |  |                   |                            |   |  |   |  |  |               |   |  |  |  |  |  |  |  |  |  |  |  |  |  |             |   |                    |  |  |             |  |  |                       |                        |              |                    |     |                        |          |                 |       |          
   |        |             |  |                 |  |                         |  |                              |  |                        |  |              |      |                       |           |                   |      |              |                  |             |       |                |            |   |   |  |  |  |  |  |  |  |  |      |             |           |   |        |   |                 |   |                 |  |                  |   |                   |  |  |   |  |  |  |  |  |  |  |  |                                   |   |    |    |    |     |     |  |      |      |      |      |             |         |  |                      |   |                         |  |                     |   |  |  |  |  |  |  |  |            |    |     |  |     |      |      |       |  |     |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |          |  |  |  |  |  |  |  |  |  |  |   
   
   |  |  |  |  |  |  |  |  |  |                    |            |                             |               |                        |  |                |          |                       |                              |                    |              |               |                   |                   |  |                |                          |                   |                   |                   |                 |                       |                      |          |  |                  |             |                 |  |  |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |  |                                  |                                    |   |                                 |                                 |   |  |  |   |  |                             |                             |  |   |                             |  |  |   |             |  |  |  |   |  |  |  |  |  |  |   |                                       |  |  |                                   |  |  |  |  |  |  |  |  |  |  |  |  | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
                           |                            |                                      |    |              |  |    |               |  |    |  |  |  |                      |   |  |             |   |  |               |  |  |             |  |   |  |  |  |  |  |  |  |  |  |             |                  |                    |                |  |  |  |  |                       |  |              |  |     |      |          |        |  |            |        |      |  |  |  |  |  |  |  |  |  |  |      |         |           |                   |      |              |  |             |       |                |            |                     |   |  |  |  |  |  |  |  |  |  |      |           |                     |        |  |              |               |                 |                    |                  |                   |                   |                  |              |   |  |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |  |  |             |         |  |                      |   |           |  |                     |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |   
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   | - DRY - (D)   | REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE                |  |                                 |  |  |  |                         |                              |   |   |  |  |   |  |  |                          |   |  |  |  |  |  |   |   |                  |  |   |   |  
   |                             |  |  |   |  |   |   |             |  |  |  |   |                    |             |  |                                     |                 |     |   |                                       |             |                       |                                   |  |                         |     |                              |          |                        |       |              |        |                       |  |             |  |  |  |  |  |                  |  |   |                   |             |   
   
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   | SLIGHTLY PLASTIC  | MODERATELY PLASTIC  | HIGHLY PLASTIC   |                                 |  |  |  |                         |                              |   |   |  |  |   |  |  |                          |   |  |  |  |  |  |   |   |                  |  |   |   |  
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| PLASTICITY INDEX (PI)  
   
   |   | DRY STRENGTH  |  |                                 |  |  |  |                         |                              |   |   |  |  |   |  |  |                          |   |  |  |  |  |  |   |   |                  |  |   |   |  
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| 0-5  
   
   | 6-15  | VERY LOW  | SLIGHT   |                                 |  |  |  |                         |                              |   |   |  |  |   |  |  |                          |   |  |  |  |  |  |   |   |                  |  |   |   |  
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   | 26 OR MORE  | MEDIUM  | HIGH   |                                 |  |  |  |                         |                              |   |   |  |  |   |  |  |                          |   |  |  |  |  |  |   |   |                  |  |   |   |  
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   |                         |                         |                         |                   |                         |                         |                         |                         |                         |   |                         |   |                         |   |                                |  |          |   |                              |  |                         |                         |                         |                         |                         |                         |                          |                         |                         |                   |                   |                       |                      |          |                       |                  |             |                 |       |       |       |       |       |       |       |                                |                               |  |   |                                 |             |              |  |  |  |  |  |  |                                  |                                    |   |                                 |                                 |   |            |  |   |  |                             |                             |  |   |                             |      |   |   |   |  |  |  |   |  |  |  |                                     |  |  |   |                                       |  |  |                                   |  |  |  |  |  |  |  |  |  |  |  |  |  |                            |  |    |              |  |    |               |  |    |                                  |  |                   |                            |   |  |   |  |  |               |   |  |  |  |  |  |  |  |  |  |  |  |  |  |             |   |                    |  |  |             |  |  |                       |                        |              |                    |     |                        |          |                 |       |          
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| TERM   
   
   | SPACING   |   |  |                                 |  |  |  |                         |                              |   |   |  |  |   |  |  |                          |   |  |  |  |  |  |   |   |                  |  |   |   |  
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   |                         |                         |                         |                   |                         |                         |                         |                         |                         |   |                         |   |                         |   |                                |  |          |   |                              |  |                         |                         |                         |                         |                         |                         |                          |                         |                         |                   |                   |                       |                      |          |                       |                  |             |                 |       |       |       |       |       |       |       |                                |                               |  |   |                                 |             |              |  |  |  |  |  |  |                                  |                                    |   |                                 |                                 |   |            |  |   |  |                             |                             |  |   |                             |      |   |   |   |  |  |  |   |  |  |  |                                     |  |  |   |                                       |  |  |                                   |  |  |  |  |  |  |  |  |  |  |  |  |  |                            |  |    |              |  |    |               |  |    |                                  |  |                   |                            |   |  |   |  |  |               |   |  |  |  |  |  |  |  |  |  |  |  |  |  |             |   |                    |  |  |             |  |  |                       |                        |              |                    |     |                        |          |                 |       |          
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| VERY WIDE  
   
   | MORE THAN 10 FEET   |   |  |                                 |  |  |  |                         |                              |   |   |  |  |   |  |  |                          |   |  |  |  |  |  |   |   |                  |  |   |   |  
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   |                         |                         |                         |                   |                         |                         |                         |                         |                         |   |                         |   |                         |   |                                |  |          |   |                              |  |                         |                         |                         |                         |                         |                         |                          |                         |                         |                   |                   |                       |                      |          |                       |                  |             |                 |       |       |       |       |       |       |       |                                |                               |  |   |                                 |             |              |  |  |  |  |  |  |                                  |                                    |   |                                 |                                 |   |            |  |   |  |                             |                             |  |   |                             |      |   |   |   |  |  |  |   |  |  |  |                                     |  |  |   |                                       |  |  |                                   |  |  |  |  |  |  |  |  |  |  |  |  |  |                            |  |    |              |  |    |               |  |    |                                  |  |                   |                            |   |  |   |  |  |               |   |  |  |  |  |  |  |  |  |  |  |  |  |  |             |   |                    |  |  |             |  |  |                       |                        |              |                    |     |                        |          |                 |       |          
   |        |             |  |                 |  |                         |  |                              |  |                        |  |              |      |                       |           |                   |      |              |                  |             |       |                |            |   |   |  |  |  |  |  |  |  |  |      |             |           |   |        |   |                 |   |                 |  |                  |   |                   |  |  |   |  |  |  |  |  |  |  |  |                                   |   |    |    |    |     |     |  |      |      |      |      |             |         |  |                      |   |                         |  |                     |   |  |  |  |  |  |  |  |            |    |     |  |     |      |      |       |  |     |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |          |  |  |  |  |  |  |  |  |  |  |   
   
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| WIDE   
   
   | 3 TO 10 FEET  |   |  |                                 |  |  |  |                         |                              |   |   |  |  |   |  |  |                          |   |  |  |  |  |  |   |   |                  |  |   |   |  
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   |                         |                         |                         |                   |                         |                         |                         |                         |                         |   |                         |   |                         |   |                                |  |          |   |                              |  |                         |                         |                         |                         |                         |                         |                          |                         |                         |                   |                   |                       |                      |          |                       |                  |             |                 |       |       |       |       |       |       |       |                                |                               |  |   |                                 |             |              |  |  |  |  |  |  |                                  |                                    |   |                                 |                                 |   |            |  |   |  |                             |                             |  |   |                             |      |   |   |   |  |  |  |   |  |  |  |                                     |  |  |   |                                       |  |  |                                   |  |  |  |  |  |  |  |  |  |  |  |  |  |                            |  |    |              |  |    |               |  |    |                                  |  |                   |                            |   |  |   |  |  |               |   |  |  |  |  |  |  |  |  |  |  |  |  |  |             |   |                    |  |  |             |  |  |                       |                        |              |                    |     |                        |          |                 |       |          
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| MODERATELY CLOSE   
   
   | 1 TO 3 FEET   |   |  |                                 |  |  |  |                         |                              |   |   |  |  |   |  |  |                          |   |  |  |  |  |  |   |   |                  |  |   |   |  
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   |                         |                         |                         |                   |                         |                         |                         |                         |                         |   |                         |   |                         |   |                                |  |          |   |                              |  |                         |                         |                         |                         |                         |                         |                          |                         |                         |                   |                   |                       |                      |          |                       |                  |             |                 |       |       |       |       |       |       |       |                                |                               |  |   |                                 |             |              |  |  |  |  |  |  |                                  |                                    |   |                                 |                                 |   |            |  |   |  |                             |                             |  |   |                             |      |   |   |   |  |  |  |   |  |  |  |                                     |  |  |   |                                       |  |  |                                   |  |  |  |  |  |  |  |  |  |  |  |  |  |                            |  |    |              |  |    |               |  |    |                                  |  |                   |                            |   |  |   |  |  |               |   |  |  |  |  |  |  |  |  |  |  |  |  |  |             |   |                    |  |  |             |  |  |                       |                        |              |                    |     |                        |          |                 |       |          
   |        |             |  |                 |  |                         |  |                              |  |                        |  |              |      |                       |           |                   |      |              |                  |             |       |                |            |   |   |  |  |  |  |  |  |  |  |      |             |           |   |        |   |                 |   |                 |  |                  |   |                   |  |  |   |  |  |  |  |  |  |  |  |                                   |   |    |    |    |     |     |  |      |      |      |      |             |         |  |                      |   |                         |  |                     |   |  |  |  |  |  |  |  |            |    |     |  |     |      |      |       |  |     |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |          |  |  |  |  |  |  |  |  |  |  |   
   
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| CLOSE  
   
   | 0.16 TO 1 FOOT  |   |  |                                 |  |  |  |                         |                              |   |   |  |  |   |  |  |                          |   |  |  |  |  |  |   |   |                  |  |   |   |  
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   |                         |                         |                         |                   |                         |                         |                         |                         |                         |   |                         |   |                         |   |                                |  |          |   |                              |  |                         |                         |                         |                         |                         |                         |                          |                         |                         |                   |                   |                       |                      |          |                       |                  |             |                 |       |       |       |       |       |       |       |                                |                               |  |   |                                 |             |              |  |  |  |  |  |  |                                  |                                    |   |                                 |                                 |   |            |  |   |  |                             |                             |  |   |                             |      |   |   |   |  |  |  |   |  |  |  |                                     |  |  |   |                                       |  |  |                                   |  |  |  |  |  |  |  |  |  |  |  |  |  |                            |  |    |              |  |    |               |  |    |                                  |  |                   |                            |   |  |   |  |  |               |   |  |  |  |  |  |  |  |  |  |  |  |  |  |             |   |                    |  |  |             |  |  |                       |                        |              |                    |     |                        |          |                 |       |          
   |        |             |  |                 |  |                         |  |                              |  |                        |  |              |      |                       |           |                   |      |              |                  |             |       |                |            |   |   |  |  |  |  |  |  |  |  |      |             |           |   |        |   |                 |   |                 |  |                  |   |                   |  |  |   |  |  |  |  |  |  |  |  |                                   |   |    |    |    |     |     |  |      |      |      |      |             |         |  |                      |   |                         |  |                     |   |  |  |  |  |  |  |  |            |    |     |  |     |      |      |       |  |     |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |          |  |  |  |  |  |  |  |  |  |  |   
   
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| VERY CLOSE   
   
   | LESS THAN 0.16 FEET   |   |  |                                 |  |  |  |                         |                              |   |   |  |  |   |  |  |                          |   |  |  |  |  |  |   |   |                  |  |   |   |  
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| TERM   
   
   | THICKNESS   |   |  |                                 |  |  |  |                         |                              |   |   |  |  |   |  |  |                          |   |  |  |  |  |  |   |   |                  |  |   |   |  
   |                             |  |  |   |  |   |   |             |  |  |  |   |                    |             |  |                                     |                 |     |   |                                       |             |                       |                                   |  |                         |     |                              |          |                        |       |              |        |                       |  |             |  |  |  |  |  |                  |  |   |                   |             |   
   
   |                         |                         |                         |                   |                         |                         |                         |                         |                         |   |                         |   |                         |   |                                |  |          |   |                              |  |                         |                         |                         |                         |                         |                         |                          |                         |                         |                   |                   |                       |                      |          |                       |                  |             |                 |       |       |       |       |       |       |       |                                |                               |  |   |                                 |             |              |  |  |  |  |  |  |                                  |                                    |   |                                 |                                 |   |            |  |   |  |                             |                             |  |   |                             |      |   |   |   |  |  |  |   |  |  |  |                                     |  |  |   |                                       |  |  |                                   |  |  |  |  |  |  |  |  |  |  |  |  |  |                            |  |    |              |  |    |               |  |    |                                  |  |                   |                            |   |  |   |  |  |               |   |  |  |  |  |  |  |  |  |  |  |  |  |  |             |   |                    |  |  |             |  |  |                       |                        |              |                    |     |                        |          |                 |       |          
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| VERY THICKLY BEDDED  
   
   | 4 FEET  |   |  |                                 |  |  |  |                         |                              |   |   |  |  |   |  |  |                          |   |  |  |  |  |  |   |   |                  |  |   |   |  
   |                             |  |  |   |  |   |   |             |  |  |  |   |                    |             |  |                                     |                 |     |   |                                       |             |                       |                                   |  |                         |     |                              |          |                        |       |              |        |                       |  |             |  |  |  |  |  |                  |  |   |                   |             |   
   
   |                         |                         |                         |                   |                         |                         |                         |                         |                         |   |                         |   |                         |   |                                |  |          |   |                              |  |                         |                         |                         |                         |                         |                         |                          |                         |                         |                   |                   |                       |                      |          |                       |                  |             |                 |       |       |       |       |       |       |       |                                |                               |  |   |                                 |             |              |  |  |  |  |  |  |                                  |                                    |   |                                 |                                 |   |            |  |   |  |                             |                             |  |   |                             |      |   |   |   |  |  |  |   |  |  |  |                                     |  |  |   |                                       |  |  |                                   |  |  |  |  |  |  |  |  |  |  |  |  |  |                            |  |    |              |  |    |               |  |    |                                  |  |                   |                            |   |  |   |  |  |               |   |  |  |  |  |  |  |  |  |  |  |  |  |  |             |   |                    |  |  |             |  |  |                       |                        |              |                    |     |                        |          |                 |       |          
   |        |             |  |                 |  |                         |  |                              |  |                        |  |              |      |                       |           |                   |      |              |                  |             |       |                |            |   |   |  |  |  |  |  |  |  |  |      |             |           |   |        |   |                 |   |                 |  |                  |   |                   |  |  |   |  |  |  |  |  |  |  |  |                                   |   |    |    |    |     |     |  |      |      |      |      |             |         |  |                      |   |                         |  |                     |   |  |  |  |  |  |  |  |            |    |     |  |     |      |      |       |  |     |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |          |  |  |  |  |  |  |  |  |  |  |   
   
   |  |  |  |  |  |  |  |  |  |                    |            |                             |               |                        |  |                |          |                       |                              |                    |              |               |                   |                   |  |                |                          |                   |                   |                   |                 |                       |                      |          |  |                  |             |                 |  |  |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |  |                                  |                                    |   |                                 |                                 |   |  |  |   |  |                             |                             |  |   |                             |  |  |   |             |  |  |  |   |  |  |  |  |  |  |   |                                       |  |  |                                   |  |  |  |  |  |  |  |  |  |  |  |  | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| THICKLY BEDDED   
   
   | 1.5 - 4 FEET  |   |  |                                 |  |  |  |                         |                              |   |   |  |  |   |  |  |                          |   |  |  |  |  |  |   |   |                  |  |   |   |  
   |                             |  |  |   |  |   |   |             |  |  |  |   |                    |             |  |                                     |                 |     |   |                                       |             |                       |                                   |  |                         |     |                              |          |                        |       |              |        |                       |  |             |  |  |  |  |  |                  |  |   |                   |             |   
   
   |                         |                         |                         |                   |                         |                         |                         |                         |                         |   |                         |   |                         |   |                                |  |          |   |                              |  |                         |                         |                         |                         |                         |                         |                          |                         |                         |                   |                   |                       |                      |          |                       |                  |             |                 |       |       |       |       |       |       |       |                                |                               |  |   |                                 |             |              |  |  |  |  |  |  |                                  |                                    |   |                                 |                                 |   |            |  |   |  |                             |                             |  |   |                             |      |   |   |   |  |  |  |   |  |  |  |                                     |  |  |   |                                       |  |  |                                   |  |  |  |  |  |  |  |  |  |  |  |  |  |                            |  |    |              |  |    |               |  |    |                                  |  |                   |                            |   |  |   |  |  |               |   |  |  |  |  |  |  |  |  |  |  |  |  |  |             |   |                    |  |  |             |  |  |                       |                        |              |                    |     |                        |          |                 |       |          
   |        |             |  |                 |  |                         |  |                              |  |                        |  |              |      |                       |           |                   |      |              |                  |             |       |                |            |   |   |  |  |  |  |  |  |  |  |      |             |           |   |        |   |                 |   |                 |  |                  |   |                   |  |  |   |  |  |  |  |  |  |  |  |                                   |   |    |    |    |     |     |  |      |      |      |      |             |         |  |                      |   |                         |  |                     |   |  |  |  |  |  |  |  |            |    |     |  |     |      |      |       |  |     |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |          |  |  |  |  |  |  |  |  |  |  |   
   
   |  |  |  |  |  |  |  |  |  |                    |            |                             |               |                        |  |                |          |                       |                              |                    |              |               |                   |                   |  |                |                          |                   |                   |                   |                 |                       |                      |          |  |                  |             |                 |  |  |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |  |                                  |                                    |   |                                 |                                 |   |  |  |   |  |                             |                             |  |   |                             |  |  |   |             |  |  |  |   |  |  |  |  |  |  |   |                                       |  |  |                                   |  |  |  |  |  |  |  |  |  |  |  |  | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
                           |                            |                                      |    |              |  |    |               |  |    |  |  |  |                      |   |  |             |   |  |               |  |  |             |  |   |  |  |  |  |  |  |  |  |  |             |                  |                    |                |  |  |  |  |                       |  |              |  |     |      |          |        |  |            |        |      |  |  |  |  |  |  |  |  |  |  |      |         |           |                   |      |              |  |             |       |                |            |                     |   |  |  |  |  |  |  |  |  |  |      |           |                     |        |  |              |               |                 |                    |                  |                   |                   |                  |              |   |  |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |  |  |             |         |  |                      |   |           |  |                     |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |   
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| THINLY BEDDED  
   
   | 0.16 - 1.5 FEET   |   |  |                                 |  |  |  |                         |                              |   |   |  |  |   |  |  |                          |   |  |  |  |  |  |   |   |                  |  |   |   |  
   |                             |  |  |   |  |   |   |             |  |  |  |   |                    |             |  |                                     |                 |     |   |                                       |             |                       |                                   |  |                         |     |                              |          |                        |       |              |        |                       |  |             |  |  |  |  |  |                  |  |   |                   |             |   
   
   |                         |                         |                         |                   |                         |                         |                         |                         |                         |   |                         |   |                         |   |                                |  |          |   |                              |  |                         |                         |                         |                         |                         |                         |                          |                         |                         |                   |                   |                       |                      |          |                       |                  |             |                 |       |       |       |       |       |       |       |                                |                               |  |   |                                 |             |              |  |  |  |  |  |  |                                  |                                    |   |                                 |                                 |   |            |  |   |  |                             |                             |  |   |                             |      |   |   |   |  |  |  |   |  |  |  |                                     |  |  |   |                                       |  |  |                                   |  |  |  |  |  |  |  |  |  |  |  |  |  |                            |  |    |              |  |    |               |  |    |                                  |  |                   |                            |   |  |   |  |  |               |   |  |  |  |  |  |  |  |  |  |  |  |  |  |             |   |                    |  |  |             |  |  |                       |                        |              |                    |     |                        |          |                 |       |          
   |        |             |  |                 |  |                         |  |                              |  |                        |  |              |      |                       |           |                   |      |              |                  |             |       |                |            |   |   |  |  |  |  |  |  |  |  |      |             |           |   |        |   |                 |   |                 |  |                  |   |                   |  |  |   |  |  |  |  |  |  |  |  |                                   |   |    |    |    |     |     |  |      |      |      |      |             |         |  |                      |   |                         |  |                     |   |  |  |  |  |  |  |  |            |    |     |  |     |      |      |       |  |     |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |          |  |  |  |  |  |  |  |  |  |  |   
   
   |  |  |  |  |  |  |  |  |  |                    |            |                             |               |                        |  |                |          |                       |                              |                    |              |               |                   |                   |  |                |                          |                   |                   |                   |                 |                       |                      |          |  |                  |             |                 |  |  |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |  |                                  |                                    |   |                                 |                                 |   |  |  |   |  |                             |                             |  |   |                             |  |  |   |             |  |  |  |   |  |  |  |  |  |  |   |                                       |  |  |                                   |  |  |  |  |  |  |  |  |  |  |  |  | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
                           |                            |                                      |    |              |  |    |               |  |    |  |  |  |                      |   |  |             |   |  |               |  |  |             |  |   |  |  |  |  |  |  |  |  |  |             |                  |                    |                |  |  |  |  |                       |  |              |  |     |      |          |        |  |            |        |      |  |  |  |  |  |  |  |  |  |  |      |         |           |                   |      |              |  |             |       |                |            |                     |   |  |  |  |  |  |  |  |  |  |      |           |                     |        |  |              |               |                 |                    |                  |                   |                   |                  |              |   |  |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |  |  |             |         |  |                      |   |           |  |                     |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |   
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| VERY THINLY BEDDED   
   
   | 0.03 - 0.16 FEET  |   |  |                                 |  |  |  |                         |                              |   |   |  |  |   |  |  |                          |   |  |  |  |  |  |   |   |                  |  |   |   |  
   |                             |  |  |   |  |   |   |             |  |  |  |   |                    |             |  |                                     |                 |     |   |                                       |             |                       |                                   |  |                         |     |                              |          |                        |       |              |        |                       |  |             |  |  |  |  |  |                  |  |   |                   |             |   
   
   |                         |                         |                         |                   |                         |                         |                         |                         |                         |   |                         |   |                         |   |                                |  |          |   |                              |  |                         |                         |                         |                         |                         |                         |                          |                         |                         |                   |                   |                       |                      |          |                       |                  |             |                 |       |       |       |       |       |       |       |                                |                               |  |   |                                 |             |              |  |  |  |  |  |  |                                  |                                    |   |                                 |                                 |   |            |  |   |  |                             |                             |  |   |                             |      |   |   |   |  |  |  |   |  |  |  |                                     |  |  |   |                                       |  |  |                                   |  |  |  |  |  |  |  |  |  |  |  |  |  |                            |  |    |              |  |    |               |  |    |                                  |  |                   |                            |   |  |   |  |  |               |   |  |  |  |  |  |  |  |  |  |  |  |  |  |             |   |                    |  |  |             |  |  |                       |                        |              |                    |     |                        |          |                 |       |          
   |        |             |  |                 |  |                         |  |                              |  |                        |  |              |      |                       |           |                   |      |              |                  |             |       |                |            |   |   |  |  |  |  |  |  |  |  |      |             |           |   |        |   |                 |   |                 |  |                  |   |                   |  |  |   |  |  |  |  |  |  |  |  |                                   |   |    |    |    |     |     |  |      |      |      |      |             |         |  |                      |   |                         |  |                     |   |  |  |  |  |  |  |  |            |    |     |  |     |      |      |       |  |     |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |          |  |  |  |  |  |  |  |  |  |  |   
   
   |  |  |  |  |  |  |  |  |  |                    |            |                             |               |                        |  |                |          |                       |                              |                    |              |               |                   |                   |  |                |                          |                   |                   |                   |                 |                       |                      |          |  |                  |             |                 |  |  |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |  |                                  |                                    |   |                                 |                                 |   |  |  |   |  |                             |                             |  |   |                             |  |  |   |             |  |  |  |   |  |  |  |  |  |  |   |                                       |  |  |                                   |  |  |  |  |  |  |  |  |  |  |  |  | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
                           |                            |                                      |    |              |  |    |               |  |    |  |  |  |                      |   |  |             |   |  |               |  |  |             |  |   |  |  |  |  |  |  |  |  |  |             |                  |                    |                |  |  |  |  |                       |  |              |  |     |      |          |        |  |            |        |      |  |  |  |  |  |  |  |  |  |  |      |         |           |                   |      |              |  |             |       |                |            |                     |   |  |  |  |  |  |  |  |  |  |      |           |                     |        |  |              |               |                 |                    |                  |                   |                   |                  |              |   |  |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |  |  |             |         |  |                      |   |           |  |                     |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |   
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| THICKLY LAMINATED  
   
   | 0.008 - 0.03 FEET   |   |  |                                 |  |  |  |                         |                              |   |   |  |  |   |  |  |                          |   |  |  |  |  |  |   |   |                  |  |   |   |  
   |                             |  |  |   |  |   |   |             |  |  |  |   |                    |             |  |                                     |                 |     |   |                                       |             |                       |                                   |  |                         |     |                              |          |                        |       |              |        |                       |  |             |  |  |  |  |  |                  |  |   |                   |             |   
   
   |                         |                         |                         |                   |                         |                         |                         |                         |                         |   |                         |   |                         |   |                                |  |          |   |                              |  |                         |                         |                         |                         |                         |                         |                          |                         |                         |                   |                   |                       |                      |          |                       |                  |             |                 |       |       |       |       |       |       |       |                                |                               |  |   |                                 |             |              |  |  |  |  |  |  |                                  |                                    |   |                                 |                                 |   |            |  |   |  |                             |                             |  |   |                             |      |   |   |   |  |  |  |   |  |  |  |                                     |  |  |   |                                       |  |  |                                   |  |  |  |  |  |  |  |  |  |  |  |  |  |                            |  |    |              |  |    |               |  |    |                                  |  |                   |                            |   |  |   |  |  |               |   |  |  |  |  |  |  |  |  |  |  |  |  |  |             |   |                    |  |  |             |  |  |                       |                        |              |                    |     |                        |          |                 |       |          
   |        |             |  |                 |  |                         |  |                              |  |                        |  |              |      |                       |           |                   |      |              |                  |             |       |                |            |   |   |  |  |  |  |  |  |  |  |      |             |           |   |        |   |                 |   |                 |  |                  |   |                   |  |  |   |  |  |  |  |  |  |  |  |                                   |   |    |    |    |     |     |  |      |      |      |      |             |         |  |                      |   |                         |  |                     |   |  |  |  |  |  |  |  |            |    |     |  |     |      |      |       |  |     |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |          |  |  |  |  |  |  |  |  |  |  |   
   
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| <p style="text-align: center;"><b>COLOR</b></p> <p>DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-GRAY). MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.</p>  
   
   |   |   |  |                                 |  |  |  |                         |                              | <p style="text-align: center;"><b>INDURATION</b></p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th>TERM</th> <th>DESCRIPTION</th> </tr> <tr> <td>FRIABLE</td> <td>RUBBING WITH FINGER FREES NUMEROUS GRAINS; GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE.</td> </tr> <tr> <td>MODERATELY INDURATED</td> <td>GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE; BREAKS EASILY WHEN HIT WITH HAMMER.</td> </tr> <tr> <td>INDURATED</td> <td>GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE; DIFFICULT TO BREAK WITH HAMMER.</td> </tr> <tr> <td>EXTREMELY INDURATED</td> <td>SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE; SAMPLE BREAKS ACROSS GRAINS.</td> </tr> </table>   |   |  |  |   |  |  |                          |   |  | TERM   | DESCRIPTION  | FRIABLE  | RUBBING WITH FINGER FREES NUMEROUS GRAINS; GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE. | MODERATELY INDURATED  | GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE; BREAKS EASILY WHEN HIT WITH HAMMER. | INDURATED        | GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE; DIFFICULT TO BREAK WITH HAMMER. | EXTREMELY INDURATED                         | SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE; SAMPLE BREAKS ACROSS GRAINS. |  
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| FRIABLE  
   
   | RUBBING WITH FINGER FREES NUMEROUS GRAINS; GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE.  |   |  |                                 |  |  |  |                         |                              |   |   |  |  |   |  |  |                          |   |  |  |  |  |  |   |   |                  |  |   |   |  
   |                             |  |  |   |  |   |   |             |  |  |  |   |                    |             |  |                                     |                 |     |   |                                       |             |                       |                                   |  |                         |     |                              |          |                        |       |              |        |                       |  |             |  |  |  |  |  |                  |  |   |                   |             |   
   
   |                         |                         |                         |                   |                         |                         |                         |                         |                         |   |                         |   |                         |   |                                |  |          |   |                              |  |                         |                         |                         |                         |                         |                         |                          |                         |                         |                   |                   |                       |                      |          |                       |                  |             |                 |       |       |       |       |       |       |       |                                |                               |  |   |                                 |             |              |  |  |  |  |  |  |                                  |                                    |   |                                 |                                 |   |            |  |   |  |                             |                             |  |   |                             |      |   |   |   |  |  |  |   |  |  |  |                                     |  |  |   |                                       |  |  |                                   |  |  |  |  |  |  |  |  |  |  |  |  |  |                            |  |    |              |  |    |               |  |    |                                  |  |                   |                            |   |  |   |  |  |               |   |  |  |  |  |  |  |  |  |  |  |  |  |  |             |   |                    |  |  |             |  |  |                       |                        |              |                    |     |                        |          |                 |       |          
   |        |             |  |                 |  |                         |  |                              |  |                        |  |              |      |                       |           |                   |      |              |                  |             |       |                |            |   |   |  |  |  |  |  |  |  |  |      |             |           |   |        |   |                 |   |                 |  |                  |   |                   |  |  |   |  |  |  |  |  |  |  |  |                                   |   |    |    |    |     |     |  |      |      |      |      |             |         |  |                      |   |                         |  |                     |   |  |  |  |  |  |  |  |            |    |     |  |     |      |      |       |  |     |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |          |  |  |  |  |  |  |  |  |  |  |   
   
   |  |  |  |  |  |  |  |  |  |                    |            |                             |               |                        |  |                |          |                       |                              |                    |              |               |                   |                   |  |                |                          |                   |                   |                   |                 |                       |                      |          |  |                  |             |                 |  |  |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |  |                                  |                                    |   |                                 |                                 |   |  |  |   |  |                             |                             |  |   |                             |  |  |   |             |  |  |  |   |  |  |  |  |  |  |   |                                       |  |  |                                   |  |  |  |  |  |  |  |  |  |  |  |  | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| MODERATELY INDURATED   
   
   | GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE; BREAKS EASILY WHEN HIT WITH HAMMER.   |   |  |                                 |  |  |  |                         |                              |   |   |  |  |   |  |  |                          |   |  |  |  |  |  |   |   |                  |  |   |   |  
   |                             |  |  |   |  |   |   |             |  |  |  |   |                    |             |  |                                     |                 |     |   |                                       |             |                       |                                   |  |                         |     |                              |          |                        |       |              |        |                       |  |             |  |  |  |  |  |                  |  |   |                   |             |   
   
   |                         |                         |                         |                   |                         |                         |                         |                         |                         |   |                         |   |                         |   |                                |  |          |   |                              |  |                         |                         |                         |                         |                         |                         |                          |                         |                         |                   |                   |                       |                      |          |                       |                  |             |                 |       |       |       |       |       |       |       |                                |                               |  |   |                                 |             |              |  |  |  |  |  |  |                                  |                                    |   |                                 |                                 |   |            |  |   |  |                             |                             |  |   |                             |      |   |   |   |  |  |  |   |  |  |  |                                     |  |  |   |                                       |  |  |                                   |  |  |  |  |  |  |  |  |  |  |  |  |  |                            |  |    |              |  |    |               |  |    |                                  |  |                   |                            |   |  |   |  |  |               |   |  |  |  |  |  |  |  |  |  |  |  |  |  |             |   |                    |  |  |             |  |  |                       |                        |              |                    |     |                        |          |                 |       |          
   |        |             |  |                 |  |                         |  |                              |  |                        |  |              |      |                       |           |                   |      |              |                  |             |       |                |            |   |   |  |  |  |  |  |  |  |  |      |             |           |   |        |   |                 |   |                 |  |                  |   |                   |  |  |   |  |  |  |  |  |  |  |  |                                   |   |    |    |    |     |     |  |      |      |      |      |             |         |  |                      |   |                         |  |                     |   |  |  |  |  |  |  |  |            |    |     |  |     |      |      |       |  |     |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |          |  |  |  |  |  |  |  |  |  |  |   
   
   |  |  |  |  |  |  |  |  |  |                    |            |                             |               |                        |  |                |          |                       |                              |                    |              |               |                   |                   |  |                |                          |                   |                   |                   |                 |                       |                      |          |  |                  |             |                 |  |  |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |  |                                  |                                    |   |                                 |                                 |   |  |  |   |  |                             |                             |  |   |                             |  |  |   |             |  |  |  |   |  |  |  |  |  |  |   |                                       |  |  |                                   |  |  |  |  |  |  |  |  |  |  |  |  | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
                           |                            |                                      |    |              |  |    |               |  |    |  |  |  |                      |   |  |             |   |  |               |  |  |             |  |   |  |  |  |  |  |  |  |  |  |             |                  |                    |                |  |  |  |  |                       |  |              |  |     |      |          |        |  |            |        |      |  |  |  |  |  |  |  |  |  |  |      |         |           |                   |      |              |  |             |       |                |            |                     |   |  |  |  |  |  |  |  |  |  |      |           |                     |        |  |              |               |                 |                    |                  |                   |                   |                  |              |   |  |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |  |  |             |         |  |                      |   |           |  |                     |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |   
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| INDURATED  
   
   | GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE; DIFFICULT TO BREAK WITH HAMMER.  |   |  |                                 |  |  |  |                         |                              |   |   |  |  |   |  |  |                          |   |  |  |  |  |  |   |   |                  |  |   |   |  
   |                             |  |  |   |  |   |   |             |  |  |  |   |                    |             |  |                                     |                 |     |   |                                       |             |                       |                                   |  |                         |     |                              |          |                        |       |              |        |                       |  |             |  |  |  |  |  |                  |  |   |                   |             |   
   
   |                         |                         |                         |                   |                         |                         |                         |                         |                         |   |                         |   |                         |   |                                |  |          |   |                              |  |                         |                         |                         |                         |                         |                         |                          |                         |                         |                   |                   |                       |                      |          |                       |                  |             |                 |       |       |       |       |       |       |       |                                |                               |  |   |                                 |             |              |  |  |  |  |  |  |                                  |                                    |   |                                 |                                 |   |            |  |   |  |                             |                             |  |   |                             |      |   |   |   |  |  |  |   |  |  |  |                                     |  |  |   |                                       |  |  |                                   |  |  |  |  |  |  |  |  |  |  |  |  |  |                            |  |    |              |  |    |               |  |    |                                  |  |                   |                            |   |  |   |  |  |               |   |  |  |  |  |  |  |  |  |  |  |  |  |  |             |   |                    |  |  |             |  |  |                       |                        |              |                    |     |                        |          |                 |       |          
   |        |             |  |                 |  |                         |  |                              |  |                        |  |              |      |                       |           |                   |      |              |                  |             |       |                |            |   |   |  |  |  |  |  |  |  |  |      |             |           |   |        |   |                 |   |                 |  |                  |   |                   |  |  |   |  |  |  |  |  |  |  |  |                                   |   |    |    |    |     |     |  |      |      |      |      |             |         |  |                      |   |                         |  |                     |   |  |  |  |  |  |  |  |            |    |     |  |     |      |      |       |  |     |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |          |  |  |  |  |  |  |  |  |  |  |   
   
   |  |  |  |  |  |  |  |  |  |                    |            |                             |               |                        |  |                |          |                       |                              |                    |              |               |                   |                   |  |                |                          |                   |                   |                   |                 |                       |                      |          |  |                  |             |                 |  |  |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |  |                                  |                                    |   |                                 |                                 |   |  |  |   |  |                             |                             |  |   |                             |  |  |   |             |  |  |  |   |  |  |  |  |  |  |   |                                       |  |  |                                   |  |  |  |  |  |  |  |  |  |  |  |  | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
                           |                            |                                      |    |              |  |    |               |  |    |  |  |  |                      |   |  |             |   |  |               |  |  |             |  |   |  |  |  |  |  |  |  |  |  |             |                  |                    |                |  |  |  |  |                       |  |              |  |     |      |          |        |  |            |        |      |  |  |  |  |  |  |  |  |  |  |      |         |           |                   |      |              |  |             |       |                |            |                     |   |  |  |  |  |  |  |  |  |  |      |           |                     |        |  |              |               |                 |                    |                  |                   |                   |                  |              |   |  |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |  |  |             |         |  |                      |   |           |  |                     |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |   
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| EXTREMELY INDURATED  
   
   | SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE; SAMPLE BREAKS ACROSS GRAINS.   |   |  |                                 |  |  |  |                         |                              |   |   |  |  |   |  |  |                          |   |  |  |  |  |  |   |   |                  |  |   |   |  
   |                             |  |  |   |  |   |   |             |  |  |  |   |                    |             |  |                                     |                 |     |   |                                       |             |                       |                                   |  |                         |     |                              |          |                        |       |              |        |                       |  |             |  |  |  |  |  |                  |  |   |                   |             |   
   
   |                         |                         |                         |                   |                         |                         |                         |                         |                         |   |                         |   |                         |   |                                |  |          |   |                              |  |                         |                         |                         |                         |                         |                         |                          |                         |                         |                   |                   |                       |                      |          |                       |                  |             |                 |       |       |       |       |       |       |       |                                |                               |  |   |                                 |             |              |  |  |  |  |  |  |                                  |                                    |   |                                 |                                 |   |            |  |   |  |                             |                             |  |   |                             |      |   |   |   |  |  |  |   |  |  |  |                                     |  |  |   |                                       |  |  |                                   |  |  |  |  |  |  |  |  |  |  |  |  |  |                            |  |    |              |  |    |               |  |    |                                  |  |                   |                            |   |  |   |  |  |               |   |  |  |  |  |  |  |  |  |  |  |  |  |  |             |   |                    |  |  |             |  |  |                       |                        |              |                    |     |                        |          |                 |       |          
   |        |             |  |                 |  |                         |  |                              |  |                        |  |              |      |                       |           |                   |      |              |                  |             |       |                |            |   |   |  |  |  |  |  |  |  |  |      |             |           |   |        |   |                 |   |                 |  |                  |   |                   |  |  |   |  |  |  |  |  |  |  |  |                                   |   |    |    |    |     |     |  |      |      |      |      |             |         |  |                      |   |                         |  |                     |   |  |  |  |  |  |  |  |            |    |     |  |     |      |      |       |  |     |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |          |  |  |  |  |  |  |  |  |  |  |   
   
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| <p style="text-align: center;"><b>PLASTICITY</b></p> <p>DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-GRAY). MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.</p>   
   
   |   |   |  |                                 |  |  |  |                         |                              | <p style="text-align: center;"><b>FRACTURE SPACING</b></p> <p>VERY WIDE MORE THAN 10 FEET<br/>WIDE 3 TO 10 FEET<br/>MODERATELY CLOSE 1 TO 3 FEET<br/>CLOSE 0.16 TO 1 FOOT<br/>VERY CLOSE LESS THAN 0.16 FEET</p>  |   |  |  |   |  |  |                          |   |  | <p style="text-align: center;"><b>BEDDING</b></p> <p>VERY THICKLY BEDDED 4 FEET<br/>THICKLY BEDDED 1.5 - 4 FEET<br/>THINLY BEDDED 0.16 - 1.5 FEET<br/>VERY THINLY BEDDED 0.03 - 0.16 FEET<br/>THICKLY LAMINATED 0.008 - 0.03 FEET<br/>THINLY LAMINATED &lt; 0.008 FEET</p>   |  |  |  |   |   |                  |  |   |   |  
   |                             |  |  |   |  |   |   |             |  |  |  |   |                    |             |  |                                     |                 |     |   |                                       |             |                       |                                   |  |                         |     |                              |          |                        |       |              |        |                       |  |             |  |  |  |  |  |                  |  |   |                   |             |   
   
   |                         |                         |                         |                   |                         |                         |                         |                         |                         |   |                         |   |                         |   |                                |  |          |   |                              |  |                         |                         |                         |                         |                         |                         |                          |                         |                         |                   |                   |                       |                      |          |                       |                  |             |                 |       |       |       |       |       |       |       |                                |                               |  |   |                                 |             |              |  |  |  |  |  |  |                                  |                                    |   |                                 |                                 |   |            |  |   |  |                             |                             |  |   |                             |      |   |   |   |  |  |  |   |  |  |  |                                     |  |  |   |                                       |  |  |                                   |  |  |  |  |  |  |  |  |  |  |  |  |  |                            |  |    |              |  |    |               |  |    |                                  |  |                   |                            |   |  |   |  |  |               |   |  |  |  |  |  |  |  |  |  |  |  |  |  |             |   |                    |  |  |             |  |  |                       |                        |              |                    |     |                        |          |                 |       |          
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| <p style="text-align: center;"><b>PLASTICITY</b></p> <p>DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-GRAY). MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.</p>   
   
   |   |   |  |                                 |  |  |  |                         |                              | <p style="text-align: center;"><b>FRACTURE SPACING</b></p> <p>VERY WIDE MORE THAN 10 FEET<br/>WIDE 3 TO 10 FEET<br/>MODERATELY CLOSE 1 TO 3 FEET<br/>CLOSE 0.16 TO 1 FOOT<br/>VERY CLOSE LESS THAN 0.16 FEET</p>  |   |  |  |   |  |  |                          |   |  | <p style="text-align: center;"><b>BEDDING</b></p> <p>VERY THICKLY BEDDED 4 FEET<br/>THICKLY BEDDED 1.5 - 4 FEET<br/>THINLY BEDDED 0.16 - 1.5 FEET<br/>VERY THINLY BEDDED 0.03 - 0.16 FEET<br/>THICKLY LAMINATED 0.008 - 0.03 FEET<br/>THINLY LAMINATED &lt; 0.008 FEET</p>   |  |  |  |   |   |                  |  |   |   |  
   |                             |  |  |   |  |   |   |             |  |  |  |   |                    |             |  |                                     |                 |     |   |                                       |             |                       |                                   |  |                         |     |                              |          |                        |       |              |        |                       |  |             |  |  |  |  |  |                  |  |   |                   |             |   
   
   |                         |                         |                         |                   |                         |                         |                         |                         |                         |   |                         |   |                         |   |                                |  |          |   |                              |  |                         |                         |                         |                         |                         |                         |                          |                         |                         |                   |                   |                       |                      |          |                       |                  |             |                 |       |       |       |       |       |       |       |                                |                               |  |   |                                 |             |              |  |  |  |  |  |  |                                  |                                    |   |                                 |                                 |   |            |  |   |  |                             |                             |  |   |                             |      |   |   |   |  |  |  |   |  |  |  |                                     |  |  |   |                                       |  |  |                                   |  |  |  |  |  |  |  |  |  |  |  |  |  |                            |  |    |              |  |    |               |  |    |                                  |  |                   |                            |   |  |   |  |  |               |   |  |  |  |  |  |  |  |  |  |  |  |  |  |             |   |                    |  |  |             |  |  |                       |                        |              |                    |     |                        |          |                 |       |          
   |        |             |  |                 |  |                         |  |                              |  |                        |  |              |      |                       |           |                   |      |              |                  |             |       |                |            |   |   |  |  |  |  |  |  |  |  |      |             |           |   |        |   |                 |   |                 |  |                  |   |                   |  |  |   |  |  |  |  |  |  |  |  |                                   |   |    |    |    |     |     |  |      |      |      |      |             |         |  |                      |   |                         |  |                     |   |  |  |  |  |  |  |  |            |    |     |  |     |      |      |       |  |     |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |          |  |  |  |  |  |  |  |  |  |  |   
   
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| <p style="text-align: center;"><b>PLASTICITY</b></p> <p>DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-GRAY). MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.</p>   
   
   |   |   |  |                                 |  |  |  |                         |                              | <p style="text-align: center;"><b>FRACTURE SPACING</b></p> <p>VERY WIDE MORE THAN 10 FEET<br/>WIDE 3 TO 10 FEET<br/>MODERATELY CLOSE 1 TO 3 FEET<br/>CLOSE 0.16 TO 1 FOOT<br/>VERY CLOSE LESS THAN 0.16 FEET</p>  |   |  |  |   |  |  |                          |   |  | <p style="text-align: center;"><b>BEDDING</b></p> <p>VERY THICKLY BEDDED 4 FEET<br/>THICKLY BEDDED 1.5 - 4 FEET<br/>THINLY BEDDED 0.16 - 1.5 FEET<br/>VERY THINLY BEDDED 0.03 - 0.16 FEET<br/>THICKLY LAMINATED 0.008 - 0.03 FEET<br/>THINLY LAMINATED &lt; 0.008 FEET</p>   |  |  |  |   |   |                  |  |   |   |  
   |                             |  |  |   |  |   |   |             |  |  |  |   |                    |             |  |                                     |                 |     |   |                                       |             |                       |                                   |  |                         |     |                              |          |                        |       |              |        |                       |  |             |  |  |  |  |  |                  |  |   |                   |             |   
   
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| <p style="text-align: center;"><b>PLASTICITY</b></p> <p>DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-GRAY). MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.</p>   
   
   |   |   |  |                                 |  |  |  |                         |                              | <p style="text-align: center;"><b>FRACTURE SPACING</b></p> <p>VERY WIDE MORE THAN 10 FEET<br/>WIDE 3 TO 10 FEET<br/>MODERATELY CLOSE 1 TO 3 FEET<br/>CLOSE 0.16 TO 1 FOOT<br/>VERY CLOSE LESS THAN 0.16 FEET</p>  |   |  |  |   |  |  |                          |   |  | <p style="text-align: center;"><b>BEDDING</b></p> <p>VERY THICKLY BEDDED 4 FEET<br/>THICKLY BEDDED 1.5 - 4 FEET<br/>THINLY BEDDED 0.16 - 1.5 FEET<br/>VERY THINLY BEDDED 0.03 - 0.16 FEET<br/>THICKLY LAMINATED 0.008 - 0.03 FEET<br/>THINLY LAMINATED &lt; 0.008 FEET</p>   |  |  |  |   |   |                  |  |   |   |  
   |                             |  |  |   |  |   |   |             |  |  |  |   |                    |             |  |                                     |                 |     |   |                                       |             |                       |                                   |  |                         |     |                              |          |                        |       |              |        |                       |  |             |  |  |  |  |  |                  |  |   |                   |             |   
   
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| <p style="text-align: center;"><b>PLASTICITY</b></p> <p>DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-GRAY). MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.</p>   
   
   |   |   |  |                                 |  |  |  |                         |                              | <p style="text-align: center;"><b>FRACTURE SPACING</b></p> <p>VERY WIDE MORE THAN 10 FEET<br/>WIDE 3 TO 10 FEET<br/>MODERATELY CLOSE 1 TO 3 FEET<br/>CLOSE 0.16 TO 1 FOOT<br/>VERY CLOSE LESS THAN 0.16 FEET</p>  |   |  |  |   |  |  |                          |   |  | <p style="text-align: center;"><b>BEDDING</b></p> <p>VERY THICKLY BEDDED 4 FEET<br/>THICKLY BEDDED 1.5 - 4 FEET<br/>THINLY BEDDED 0.16 - 1.5 FEET<br/>VERY THINLY BEDDED 0.03 - 0.16 FEET<br/>THICKLY LAMINATED 0.008 - 0.03 FEET<br/>THINLY LAMINATED &lt; 0.008 FEET</p>   |  |  |  |   |   |                  |  |   |   |  
   |                             |  |  |   |  |   |   |             |  |  |  |   |                    |             |  |                                     |                 |     |   |                                       |             |                       |                                   |  |                         |     |                              |          |                        |       |              |        |                       |  |             |  |  |  |  |  |                  |  |   |                   |             |   
   
   |                         |                         |                         |                   |                         |                         |                         |                         |                         |   |                         |   |                         |   |                                |  |          |   |                              |  |                         |                         |                         |                         |                         |                         |                          |                         |                         |                   |                   |                       |                      |          |                       |                  |             |                 |       |       |       |       |       |       |       |                                |                               |  |   |                                 |             |              |  |  |  |  |  |  |                                  |                                    |   |                                 |                                 |   |            |  |   |  |                             |                             |  |   |                             |      |   |   |   |  |  |  |   |  |  |  |                                     |  |  |   |                                       |  |  |                                   |  |  |  |  |  |  |  |  |  |  |  |  |  |                            |  |    |              |  |    |               |  |    |                                  |  |                   |                            |   |  |   |  |  |               |   |  |  |  |  |  |  |  |  |  |  |  |  |  |             |   |                    |  |  |             |  |  |                       |                        |              |                    |     |                        |          |                 |       |          
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| <p style="text-align: center;"><b>PLASTICITY</b></p> <p>DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-GRAY). MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.</p>   
   
   |   |   |  |                                 |  |  |  |                         |                              | <p style="text-align: center;"><b>FRACTURE SPACING</b></p> <p>VERY WIDE MORE THAN 10 FEET<br/>WIDE 3 TO 10 FEET<br/>MODERATELY CLOSE 1 TO 3 FEET<br/>CLOSE 0.16 TO 1 FOOT<br/>VERY CLOSE LESS THAN 0.16 FEET</p>  |   |  |  |   |  |  |                          |   |  | <p style="text-align: center;"><b>BEDDING</b></p> <p>VERY THICKLY BEDDED 4 FEET<br/>THICKLY BEDDED 1.5 - 4 FEET<br/>THINLY BEDDED 0.16 - 1.5 FEET<br/>VERY THINLY BEDDED 0.03 - 0.16 FEET<br/>THICKLY LAMINATED 0.008 - 0.03 FEET<br/>THINLY LAMINATED &lt; 0.008 FEET</p>   |  |  |  |   |   |                  |  |   |   |  
   |                             |  |  |   |  |   |   |             |  |  |  |   |                    |             |  |                                     |                 |     |   |                                       |             |                       |                                   |  |                         |     |                              |          |                        |       |              |        |                       |  |             |  |  |  |  |  |                  |  |   |                   |             |   
   
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| <p style="text-align: center;"><b>PLASTICITY</b></p> <p>DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-GRAY). MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.</p>   
   
   |   |   |  |                                 |  |  |  |                         |                              | <p style="text-align: center;"><b>FRACTURE SPACING</b></p> <p>VERY WIDE MORE THAN 10 FEET<br/>WIDE 3 TO 10 FEET<br/>MODERATELY CLOSE 1 TO 3 FEET<br/>CLOSE 0.16 TO 1 FOOT<br/>VERY CLOSE LESS THAN 0.16 FEET</p>  |   |  |  |   |  |  |                          |   |  | <p style="text-align: center;"><b>BEDDING</b></p> <p>VERY THICKLY BEDDED 4 FEET<br/>THICKLY BEDDED 1.5 - 4 FEET<br/>THINLY BEDDED 0.16 - 1.5 FEET<br/>VERY THINLY BEDDED 0.03 - 0.16 FEET<br/>THICKLY LAMINATED 0.008 - 0.03 FEET<br/>THINLY LAMINATED &lt; 0.008 FEET</p>   |  |  |  |   |   |                  |  |   |   |  
   |                             |  |  |   |  |   |   |             |  |  |  |   |                    |             |  |                                     |                 |     |   |                                       |             |                       |                                   |  |                         |     |                              |          |                        |       |              |        |                       |  |             |  |  |  |  |  |                  |  |   |                   |             |   
   
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| <p style="text-align: center;"><b>PLASTICITY</b></p> <p>DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-GRAY). MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.</p>   
   
   |   |   |  |                                 |  |  |  |                         |                              | <p style="text-align: center;"><b>FRACTURE SPACING</b></p> <p>VERY WIDE MORE THAN 10 FEET<br/>WIDE 3 TO 10 FEET<br/>MODERATELY CLOSE 1 TO 3 FEET<br/>CLOSE 0.16 TO 1 FOOT<br/>VERY CLOSE LESS THAN 0.16 FEET</p>  |   |  |  |   |  |  |                          |   |  | <p style="text-align: center;"><b>BEDDING</b></p> <p>VERY THICKLY BEDDED 4 FEET<br/>THICKLY BEDDED 1.5 - 4 FEET<br/>THINLY BEDDED 0.16 - 1.5 FEET<br/>VERY THINLY BEDDED 0.03 - 0.16 FEET<br/>THICKLY LAMINATED 0.008 - 0.03 FEET<br/>THINLY LAMINATED &lt; 0.008 FEET</p>   |  |  |  |   |   |                  |  |   |   |  
   |                             |  |  |   |  |   |   |             |  |  |  |   |                    |             |  |                                     |                 |     |   |                                       |             |                       |                                   |  |                         |     |                              |          |                        |       |              |        |                       |  |             |  |  |  |  |  |                  |  |   |                   |             |   
   
   |                         |                         |                         |                   |                         |                         |                         |                         |                         |   |                         |   |                         |   |                                |  |          |   |                              |  |                         |                         |                         |                         |                         |                         |                          |                         |                         |                   |                   |                       |                      |          |                       |                  |             |                 |       |       |       |       |       |       |       |                                |                               |  |   |                                 |             |              |  |  |  |  |  |  |                                  |                                    |   |                                 |                                 |   |            |  |   |  |                             |                             |  |   |                             |      |   |   |   |  |  |  |   |  |  |  |                                     |  |  |   |                                       |  |  |                                   |  |  |  |  |  |  |  |  |  |  |  |  |  |                            |  |    |              |  |    |               |  |    |                                  |  |                   |                            |   |  |   |  |  |               |   |  |  |  |  |  |  |  |  |  |  |  |  |  |             |   |                    |  |  |             |  |  |                       |                        |              |                    |     |                        |          |                 |       |          
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| <p style="text-align: center;"><b>PLASTICITY</b></p> <p>DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-GRAY). MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.</p>   
   
   |   |   |  |                                 |  |  |  |                         |                              | <p style="text-align: center;"><b>FRACTURE SPACING</b></p> <p>VERY WIDE MORE THAN 10 FEET<br/>WIDE 3 TO 10 FEET<br/>MODERATELY CLOSE 1 TO 3 FEET<br/>CLOSE 0.16 TO 1 FOOT<br/>VERY CLOSE LESS THAN 0.16 FEET</p>  |   |  |  |   |  |  |                          |   |  | <p style="text-align: center;"><b>BEDDING</b></p> <p>VERY THICKLY BEDDED 4 FEET<br/>THICKLY BEDDED 1.5 - 4 FEET<br/>THINLY BEDDED 0.16 - 1.5 FEET<br/>VERY THINLY BEDDED 0.03 - 0.16 FEET<br/>THICKLY LAMINATED 0.008 - 0.03 FEET<br/>THINLY LAMINATED &lt; 0.008 FEET</p>   |  |  |  |   |   |                  |  |   |   |  
   |                             |  |  |   |  |   |   |             |  |  |  |   |                    |             |  |                                     |                 |     |   |                                       |             |                       |                                   |  |                         |     |                              |          |                        |       |              |        |                       |  |             |  |  |  |  |  |                  |  |   |                   |             |   
   
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| <p style="text-align: center;"><b>PLASTICITY</b></p> <p>DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-GRAY). MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.</p>   
   
   |   |   |  |                                 |  |  |  |                         |                              | <p style="text-align: center;"><b>FRACTURE SPACING</b></p> <p>VERY WIDE MORE THAN 10 FEET<br/>WIDE 3 TO 10 FEET<br/>MODERATELY CLOSE 1 TO 3 FEET<br/>CLOSE 0.16 TO 1 FOOT<br/>VERY CLOSE LESS THAN 0.16 FEET</p>  |   |  |  |   |  |  |                          |   |  | <p style="text-align: center;"><b>BEDDING</b></p> <p>VERY THICKLY BEDDED 4 FEET<br/>THICKLY BEDDED 1.5 - 4 FEET<br/>THINLY BEDDED 0.16 - 1.5 FEET<br/>VERY THINLY BEDDED 0.03 - 0.16 FEET<br/>THICKLY LAMINATED 0.008 - 0.03 FEET<br/>THINLY LAMINATED &lt; 0.008 FEET</p>   |  |  |  |   |   |                  |  |   |   |  
   |                             |  |  |   |  |   |   |             |  |  |  |   |                    |             |  |                                     |                 |     |   |                                       |             |                       |                                   |  |                         |     |                              |          |                        |       |              |        |                       |  |             |  |  |  |  |  |                  |  |   |                   |             |   
   
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| <p style="text-align: center;"><b>PLASTICITY</b></p> <p>DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-GRAY). MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.</p>   
   
   |   |   |  |                                 |  |  |  |                         |                              | <p style="text-align: center;"><b>FRACTURE SPACING</b></p> <p>VERY WIDE MORE THAN 10 FEET<br/>WIDE 3 TO 10 FEET<br/>MODERATELY CLOSE 1 TO 3 FEET<br/>CLOSE 0.16 TO 1 FOOT<br/>VERY CLOSE LESS THAN 0.16 FEET</p>  |   |  |  |   |  |  |                          |   |  | <p style="text-align: center;"><b>BEDDING</b></p> <p>VERY THICKLY BEDDED 4 FEET<br/>THICKLY BEDDED 1.5 - 4 FEET<br/>THINLY BEDDED 0.16 - 1.5 FEET<br/>VERY THINLY BEDDED 0.03 - 0.16 FEET<br/>THICKLY LAMINATED 0.008 - 0.03 FEET<br/>THINLY LAMINATED &lt; 0.008 FEET</p>   |  |  |  |   |   |                  |  |   |   |  
   |                             |  |  |   |  |   |   |             |  |  |  |   |                    |             |  |                                     |                 |     |   |                                       |             |                       |                                   |  |                         |     |                              |          |                        |       |              |        |                       |  |             |  |  |  |  |  |                  |  |   |                   |             |   
   
   |                         |                         |                         |                   |                         |                         |                         |                         |                         |   |                         |   |                         |   |                                |  |          |   |                              |  |                         |                         |                         |                         |                         |                         |                          |                         |                         |                   |                   |                       |                      |          |                       |                  |             |                 |       |       |       |       |       |       |       |                                |                               |  |   |                                 |             |              |  |  |  |  |  |  |                                  |                                    |   |                                 |                                 |   |            |  |   |  |                             |                             |  |   |                             |      |   |   |   |  |  |  |   |  |  |  |                                     |  |  |   |                                       |  |  |                                   |  |  |  |  |  |  |  |  |  |  |  |  |  |                            |  |    |              |  |    |               |  |    |                                  |  |                   |                            |   |  |   |  |  |               |   |  |  |  |  |  |  |  |  |  |  |  |  |  |             |   |                    |  |  |             |  |  |                       |                        |              |                    |     |                        |          |                 |       |          
   |        |             |  |                 |  |                         |  |                              |  |                        |  |              |      |                       |           |                   |      |              |                  |             |       |                |            |   |   |  |  |  |  |  |  |  |  |      |             |           |   |        |   |                 |   |                 |  |                  |   |                   |  |  |   |  |  |  |  |  |  |  |  |                                   |   |    |    |    |     |     |  |      |      |      |      |             |         |  |                      |   |                         |  |                     |   |  |  |  |  |  |  |  |            |    |     |  |     |      |      |       |  |     |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |          |  |  |  |  |  |  |  |  |  |  |   
   
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| <p style="text-align: center;"><b>PLASTICITY</b></p> <p>DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-GRAY). MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.</p>   
   
   |   |   |  |                                 |  |  |  |                         |                              | <p style="text-align: center;"><b>FRACTURE SPACING</b></p> <p>VERY WIDE MORE THAN 10 FEET<br/>WIDE 3 TO 10 FEET<br/>MODERATELY CLOSE 1 TO 3 FEET<br/>CLOSE 0.16 TO 1 FOOT<br/>VERY CLOSE LESS THAN 0.16 FEET</p>  |   |  |  |   |  |  |                          |   |  | <p style="text-align: center;"><b>BEDDING</b></p> <p>VERY THICKLY BEDDED 4 FEET<br/>THICKLY BEDDED 1.5 -</p>   |  |  |  |   |   |                  |  |   |   |  
   |                             |  |  |   |  |   |   |             |  |  |  |   |                    |             |  |                                     |                 |     |   |                                       |             |                       |                                   |  |                         |     |                              |          |                        |       |              |        |                       |  |             |  |  |  |  |  |                  |  |   |                   |             |   
   
   |                         |                         |                         |                   |                         |                         |                         |                         |                         |   |                         |   |                         |   |                                |  |          |   |                              |  |                         |                         |                         |                         |                         |                         |                          |                         |                         |                   |                   |                       |                      |          |                       |                  |             |                 |       |       |       |       |       |       |       |                                |                               |  |   |                                 |             |              |  |  |  |  |  |  |                                  |                                    |   |                                 |                                 |   |            |  |   |  |                             |                             |  |   |                             |      |   |   |   |  |  |  |   |  |  |  |                                     |  |  |   |                                       |  |  |                                   |  |  |  |  |  |  |  |  |  |  |  |  |  |                            |  |    |              |  |    |               |  |    |                                  |  |                   |                            |   |  |   |  |  |               |   |  |  |  |  |  |  |  |  |  |  |  |  |  |             |   |                    |  |  |             |  |  |                       |                        |              |                    |     |                        |          |                 |       |          
   |        |             |  |                 |  |                         |  |                              |  |                        |  |              |      |                       |           |                   |      |              |                  |             |       |                |            |   |   |  |  |  |  |  |  |  |  |      |             |           |   |        |   |                 |   |                 |  |                  |   |                   |  |  |   |  |  |  |  |  |  |  |  |                                   |   |    |    |    |     |     |  |      |      |      |      |             |         |  |                      |   |                         |  |                     |   |  |  |  |  |  |  |  |            |    |     |  |     |      |      |       |  |     |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |          |  |  |  |  |  |  |  |  |  |  |   
   
   |  |  |  |  |  |  |  |  |  |                    |            |                             |               |                        |  |                |          |                       |                              |                    |              |               |                   |                   |  |                |                          |                   |                   |                   |                 |                       |                      |          |  |                  |             |                 |  |  |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |  |                                  |                                    |   |                                 |                                 |   |  |  |   |  |                             |                             |  |   |                             |  |  |   |             |  |  |  |   |  |  |  |  |  |  |   |                                       |  |  |                                   |  |  |  |  |  |  |  |  |  |  |  |  | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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# PLAN AND PROFILE OF NOISE WALL 17/18/19

PROJECT REFERENCE NO. <b>U-2579AB</b>	SHEET NO. <b>3</b>
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
<b>INCOMPLETE PLANS</b> DO NOT USE FOR R/W ACQUISITION	
<b>DOCUMENT NOT CONSIDERED FINAL</b> UNLESS ALL SIGNATURES COMPLETED	



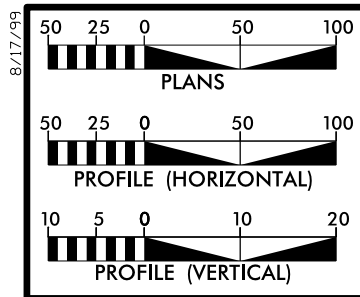
08-11-2021 15:30:00 -29433 U-2579AB SWAL (37946) CAD.D GEOTECH\PI\PrOf\U2579AB\_NW171819\_psh01.dgn  
 8/17/99





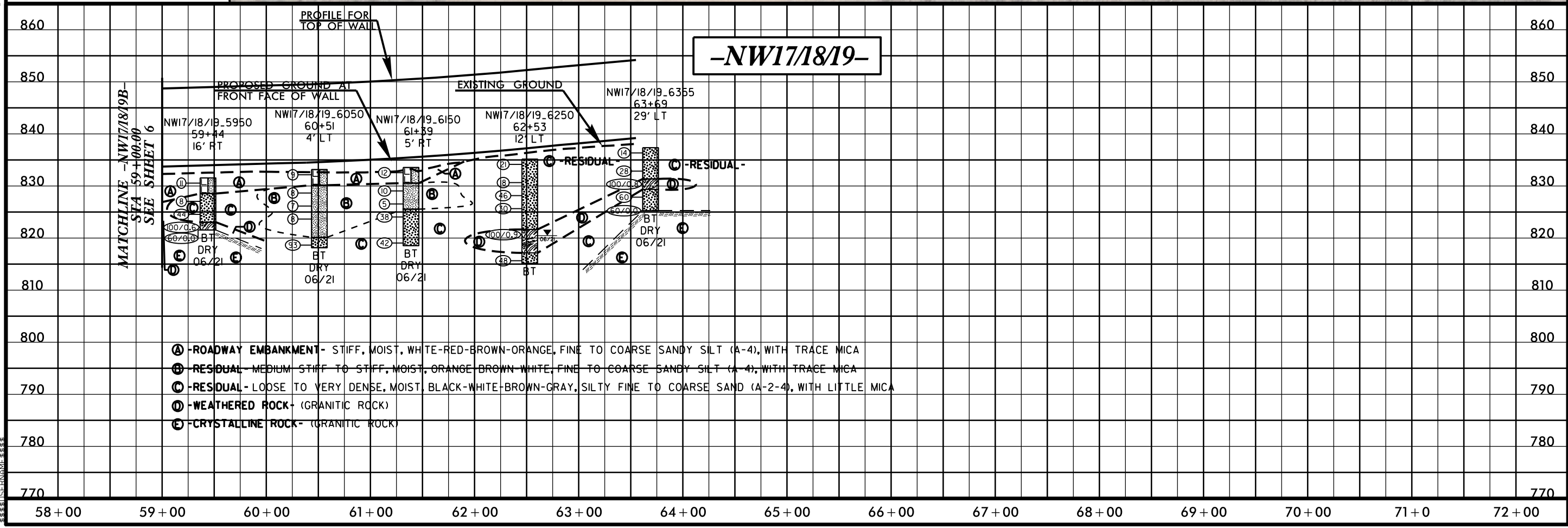
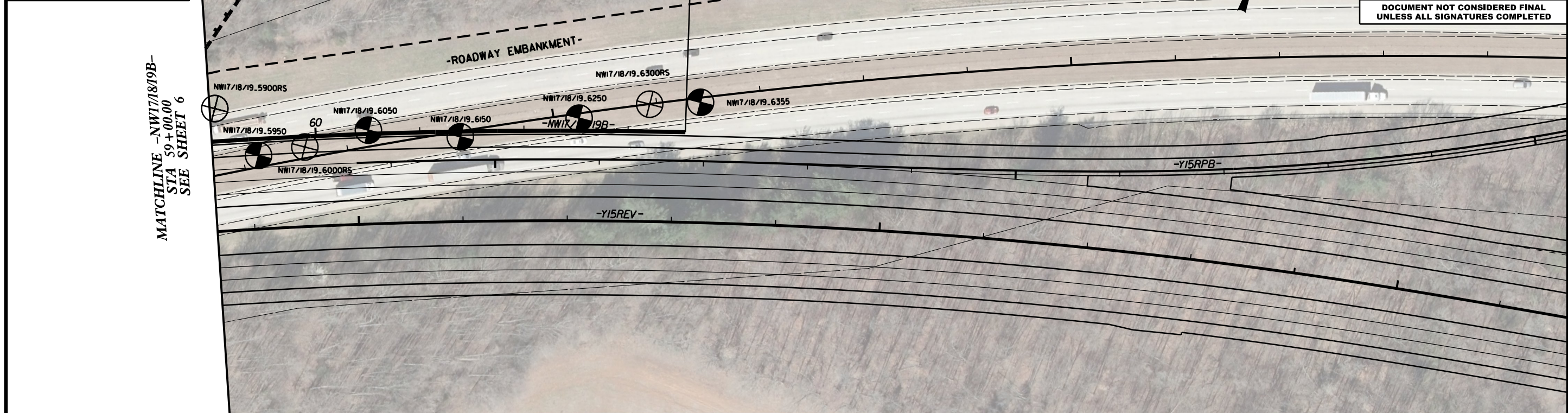






# PLAN AND PROFILE OF NOISE WALL 17/18/19

PROJECT REFERENCE NO. <b>U-2579AB</b>	SHEET NO. <b>7</b>
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
<b>INCOMPLETE PLANS</b> DO NOT USE FOR R/W ACQUISITION	
<b>DOCUMENT NOT CONSIDERED FINAL</b> UNLESS ALL SIGNATURES COMPLETED	



08-11-2021 13:41  
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# GEOTECHNICAL BORING REPORT

## BORE LOG

WBS 34839.1.8		TIP U-2579AB		COUNTY FORSYTH		GEOLOGIST J. Garrick									
SITE DESCRIPTION Winston-Salem Beltway from US 421/I-40 Business to I-40							GROUND WTR (ft)								
BORING NO. NW17/18/19_2350R		STATION 23+47		OFFSET 2 ft RT		ALIGNMENT -NW17/18/19-									
COLLAR ELEV. 818.0 ft		TOTAL DEPTH 7.6 ft		NORTHING 846,131		EASTING 1,657,853									
DRILL RIG/HAMMER EFF./DATE TDD5417 CME-75 83% 06/15/2021			DRILL METHOD H.S. Augers			HAMMER TYPE Automatic									
DRILLER D. Hamilton		START DATE 06/02/21		COMP. DATE 06/02/21		SURFACE WATER DEPTH N/A									
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	L O G	SOIL AND ROCK DESCRIPTION	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100					
820															
														818.0	0.0
														816.6	1.4
														ROADWAY EMBANKMENT Concrete Pavement (0.9'), Stone Base (0.5') Orange-Brown, Fine to Coarse Sandy SILT (A-4)	
														810.5	7.5
														810.4	7.6
														Boulders/Shot Rock Boring Terminated with Standard Penetration Test Refusal at Elevation 810.4 ft On Shot Rock/Boulders in Roadway Embankment	
	810.5	7.5													
			60/0.1												

WBS 34839.1.8		TIP U-2579AB		COUNTY FORSYTH		GEOLOGIST J. Garrick									
SITE DESCRIPTION Winston-Salem Beltway from US 421/I-40 Business to I-40							GROUND WTR (ft)								
BORING NO. NW17/18/19_2450R		STATION 24+48		OFFSET 3 ft LT		ALIGNMENT -NW17/18/19-									
COLLAR ELEV. 816.1 ft		TOTAL DEPTH 8.7 ft		NORTHING 846,170		EASTING 1,657,947									
DRILL RIG/HAMMER EFF./DATE TDD5417 CME-75 83% 06/15/2021			DRILL METHOD H.S. Augers			HAMMER TYPE Automatic									
DRILLER D. Hamilton		START DATE 06/02/21		COMP. DATE 06/02/21		SURFACE WATER DEPTH N/A									
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	L O G	SOIL AND ROCK DESCRIPTION	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100					
820															
														816.1	0.0
														814.9	1.2
														ROADWAY EMBANKMENT Concrete Pavement (0.8'), Stone Base (0.4') Brown, Fine to Coarse Sandy SILT (A-4)	
														807.4	8.7
														Boulders/Shot Rock Boring Terminated with Standard Penetration Test Refusal at Elevation 807.4 ft On Shot Rock/Boulders in Roadway Embankment	
	807.4	8.7													
			60/0.0												

NCDOT BORE DOUBLE U2579AB\_SWAL\_GEO.GPJ NC\_DOT.GDT 6/22/21

# GEOTECHNICAL BORING REPORT

## BORE LOG

# GEOTECHNICAL BORING REPORT

## CORE LOG

WBS 34839.1.8		TIP U-2579AB		COUNTY FORSYTH		GEOLOGIST J. Garrick										
SITE DESCRIPTION Winston-Salem Beltway from US 421/I-40 Business to I-40							GROUND WTR (ft)									
BORING NO. NW17/18/19_2800		STATION 28+08		OFFSET CL		ALIGNMENT -NW17/18/19-										
COLLAR ELEV. 814.0 ft		TOTAL DEPTH 11.5 ft		NORTHING 846,316		EASTING 1,658,275										
DRILL RIG/HAMMER EFF./DATE TDD5417 CME-75 83% 06/15/2021				DRILL METHOD Core Boring		HAMMER TYPE Automatic										
DRILLER D. Hamilton		START DATE 06/10/21		COMP. DATE 06/10/21		SURFACE WATER DEPTH N/A										
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION		
			0.5ft	0.5ft	0.5ft	0	25	50	75	100				ELEV. (ft)	DEPTH (ft)	
815															814.0	GROUND SURFACE
															811.5	ROADWAY EMBANKMENT Red-Brown, Fine to Coarse Sandy SILT (A-4)
810																Boulders / Shot Rock / Soil Fill
															804.0	ALLUVIAL
805	804.0	10.0	1	1	1										802.5	Soft, Brown-Gray, Clayey SILT (A-5) Boring Terminated at Elevation 802.5 ft In Alluvial Clayey SILT (A-5)

NCDOT BORE DOUBLE U2579AB\_SWAL\_GEO.GPJ NC\_DOT.GDT 7/6/21

WBS 34839.1.8		TIP U-2579AB		COUNTY FORSYTH		GEOLOGIST J. Garrick						
SITE DESCRIPTION Winston-Salem Beltway from US 421/I-40 Business to I-40							GROUND WTR (ft)					
BORING NO. NW17/18/19_2800		STATION 28+08		OFFSET CL		ALIGNMENT -NW17/18/19-						
COLLAR ELEV. 814.0 ft		TOTAL DEPTH 11.5 ft		NORTHING 846,316		EASTING 1,658,275						
DRILL RIG/HAMMER EFF./DATE TDD5417 CME-75 83% 06/15/2021				DRILL METHOD Core Boring		HAMMER TYPE Automatic						
DRILLER D. Hamilton		START DATE 06/10/21		COMP. DATE 06/10/21		SURFACE WATER DEPTH N/A						
CORE SIZE NQ-2		TOTAL RUN 7.5 ft										
ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN		SAMP. NO.	STRATA		LOG	DESCRIPTION AND REMARKS	
					REC (ft)	RQD (ft)		REC (ft)	RQD (ft)		ELEV. (ft)	DEPTH (ft)
811.5												Begin Coring @ 2.5 ft
	811.5	2.5	2.5	1:51/0.5	(1.5)	(1.1)					811.5	Boulders / Shot Rock / Soil Fill
	809.0	5.0		2:19/1.0 3:03/1.0	60%	44%						
			5.0	2:15/1.0 1:31/1.0 0:54/1.0 0:32/1.0 0:31/1.0	(1.2)	(0.5)						
				N=2								
	804.0	10.0									804.0	ALLUVIAL
											802.5	Boring Terminated at Elevation 802.5 ft In Alluvial Clayey SILT (A-5)

NCDOT BORE DOUBLE U2579AB\_SWAL\_GEO.GPJ NC\_DOT.GDT 7/6/21

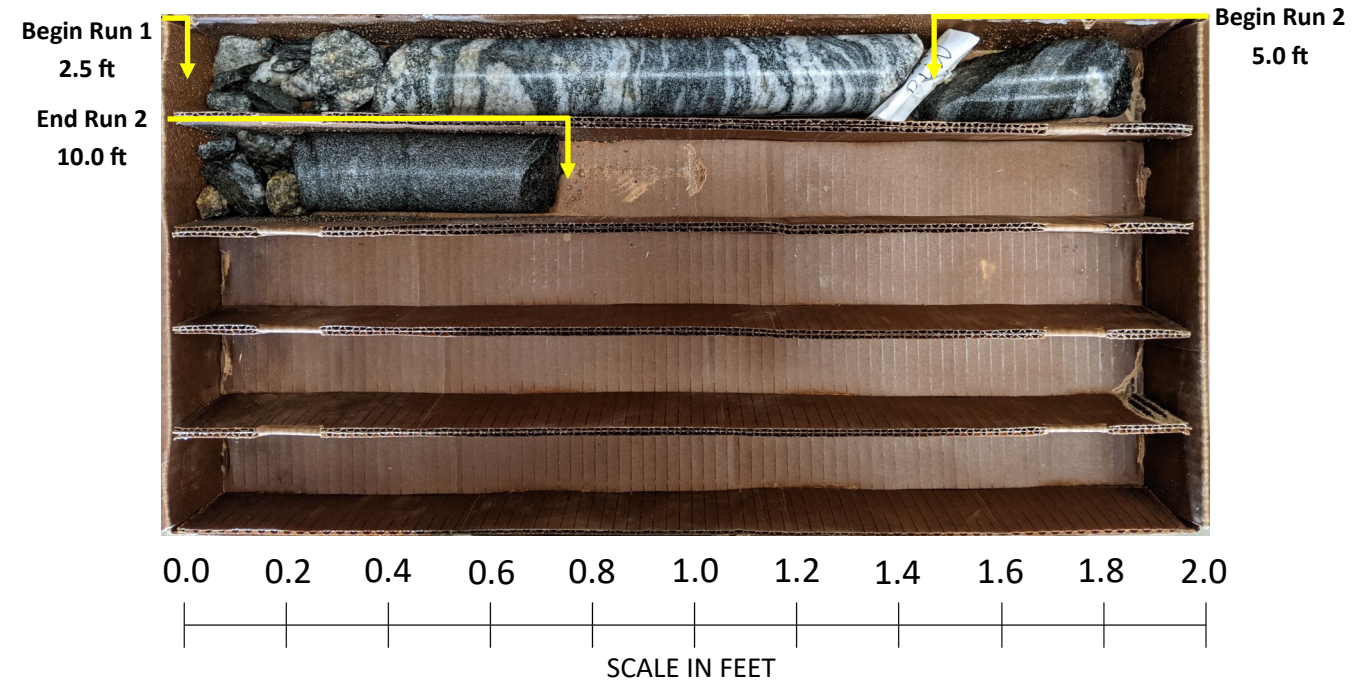


**Winston-Salem Beltway from  
US 421/I-40 BUS to I-40**

**WBS-34839 TIP No. U-2579AB**

**Rock Core Photographs: Boring - NW17/18/19\_2800**

**Station: 28+08 Offset: CL**





# GEOTECHNICAL BORING REPORT

## BORE LOG

WBS 34839.1.8		TIP U-2579AB		COUNTY FORSYTH		GEOLOGIST J. Garrick										
SITE DESCRIPTION Winston-Salem Beltway from US 421/I-40 Business to I-40							GROUND WTR (ft)									
BORING NO. NW17/18/19_3800R		STATION 37+99		OFFSET 3 ft RT		ALIGNMENT -NW17/18/19-										
COLLAR ELEV. 818.5 ft		TOTAL DEPTH 16.9 ft		NORTHING 846,760		EASTING 1,659,161										
DRILL RIG/HAMMER EFF./DATE TDD5417 CME-75 83% 06/15/2021			DRILL METHOD H.S. Augers			HAMMER TYPE Automatic										
DRILLER D. Hamilton		START DATE 06/01/21		COMP. DATE 06/01/21		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						
820														818.5	0.0	GROUND SURFACE
																ROADWAY EMBANKMENT Red-Brown, Fine to Coarse Sandy SILT (A-4)
815																
810														810.5	8.0	RESIDUAL Gray, Silty Fine to Coarse SAND (A-2-4)
805																
	801.6	16.9	60/0.0											801.6	16.9	Boring Terminated with Standard Penetration Test Refusal at Elevation 801.6 ft On Crystalline Rock (GRANITIC ROCK)

WBS 34839.1.8		TIP U-2579AB		COUNTY FORSYTH		GEOLOGIST J. Garrick										
SITE DESCRIPTION Winston-Salem Beltway from US 421/I-40 Business to I-40							GROUND WTR (ft)									
BORING NO. NW17/18/19_5700R		STATION 57+09		OFFSET 7 ft LT		ALIGNMENT -NW17/18/19-										
COLLAR ELEV. 829.4 ft		TOTAL DEPTH 15.0 ft		NORTHING 847,605		EASTING 1,660,874										
DRILL RIG/HAMMER EFF./DATE TDD5417 CME-75 83% 06/15/2021			DRILL METHOD H.S. Augers			HAMMER TYPE Automatic										
DRILLER D. Hamilton		START DATE 06/07/21		COMP. DATE 06/07/21		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						
830														829.4	0.0	GROUND SURFACE
														828.6	0.8	ROADWAY EMBANKMENT Concrete Pavement (0.8')
																Red-Brown, Fine to Coarse Sandy SILT (A-4)
825														824.4	5.0	ALLUVIAL Brown, Fine to Coarse Sandy SILT (A-4)
														821.4	8.0	RESIDUAL White-Brown Silty Fine to Coarse SAND (A-2-4)
820																
815																
														814.4	15.0	Boring Terminated at Elevation 814.4 ft In Residual Silty SAND (A-2-4)
															Notes: Boring offset onto shoulder due to drill rig access concerns.	

NCDOT BORE DOUBLE U2579AB\_SWAL\_GEO.GPJ NC\_DOT.GDT 6/23/21



# GEOTECHNICAL BORING REPORT

## BORE LOG

WBS 34839.1.8		TIP U-2579AB		COUNTY FORSYTH		GEOLOGIST J. Garrick									
SITE DESCRIPTION Winston-Salem Beltway from US 421/I-40 Business to I-40							GROUND WTR (ft)								
BORING NO. NW17/18/19_5800R		STATION 58+06		OFFSET 19 ft LT		ALIGNMENT -NW17/18/19-									
COLLAR ELEV. 830.6 ft		TOTAL DEPTH 5.8 ft		NORTHING 847,653		EASTING 1,660,966									
DRILL RIG/HAMMER EFF./DATE TDD5417 CME-75 83% 06/15/2021			DRILL METHOD H.S. Augers			HAMMER TYPE Automatic									
DRILLER D. Hamilton		START DATE 06/03/21		COMP. DATE 06/03/21		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					
835															
830														830.6	0.0
														829.3	1.3
825	824.8	5.8												824.8	5.8
		60/0.0													60/0.0
Boring Terminated with Standard Penetration Test Refusal at Elevation 824.8 ft On Crystalline Rock (GRANITIC ROCK) Notes: Boring offset onto shoulder due to drill rig access concerns.															

WBS 34839.1.8		TIP U-2579AB		COUNTY FORSYTH		GEOLOGIST J. Garrick									
SITE DESCRIPTION Winston-Salem Beltway from US 421/I-40 Business to I-40							GROUND WTR (ft)								
BORING NO. NW17/18/19_5900R		STATION 59+05		OFFSET 32 ft LT		ALIGNMENT -NW17/18/19-									
COLLAR ELEV. 832.3 ft		TOTAL DEPTH 8.1 ft		NORTHING 847,692		EASTING 1,661,049									
DRILL RIG/HAMMER EFF./DATE TDD5417 CME-75 83% 06/15/2021			DRILL METHOD H.S. Augers			HAMMER TYPE Automatic									
DRILLER D. Hamilton		START DATE 06/03/21		COMP. DATE 06/03/21		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					
835															
														832.3	0.0
830														831.0	1.3
825	824.3	8.0												824.3	8.0
		60/0.1												824.2	8.1
ROADWAY EMBANKMENT Concrete Pavement (0.8'), Stone Base (0.5') Red-Brown, Fine to Coarse Sandy SILT (A-4)															
CRYSTALLINE ROCK White-Brown (GRANITIC ROCK) Boring Terminated with Standard Penetration Test Refusal at Elevation 824.2 ft In Crystalline Rock (GRANITIC ROCK) Notes: Boring offset onto shoulder due to drill rig access concerns.															

NCDOT BORE DOUBLE U2579AB\_SWAL\_GEO.GPJ NC\_DOT.GDT 6/23/21

