STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

PAT MCCRORY
GOVERNOR

ANTHONY J. TATA
SECRETARY

November 7, 2014

MEMORANDUM TO: Judith Corley-Lay, P.E., Ph.D.
State Pavement Management Engineer

Glen W. Mumford, P.E.
State Roadway Design Engineer

FROM: J. L. Pilipchuk, P.E., L.G.
State Geotechnical Engineer

DS MAM DocuSigned by: John Pilipchuk 52C44B94B8BE444...

STATE PROJECT: 45849.1.FR1 (W-5519) – DDC
F. A. PROJECT: HSIP-095-2(128) 46
COUNTY: Cumberland
DESCRIPTION: I-95 Business / US 301 from NC 87 South to NC 59

SUBJECT: Geotechnical Recommendations for Pavement Design

The proposed work consists of converting the existing left turn lanes to directional crossovers.

Soil Type: The predominant soil types on the project consist of undivided Coastal Plain soils silty sand (A-2-4) and fine sand (A-3).

Anticipated borrow will likely consist of sandy soils. The design soil type is silty sand (A-2-4) and fine sand (A-3).

The length of this project is 3.814 miles

MAILING ADDRESS:
NC DEPARTMENT OF TRANSPORTATION
GEOTECHNICAL ENGINEERING UNIT
1589 MAIL SERVICE CENTER
RALEIGH NC 27699-1589

TELEPHONE: 919-707-6850
FAX: 919-250-4237

WEBSITE: WWW.NCDOT.GOV

LOCATION:
CENTURY CENTER COMPLEX
ENTRANCE B-2
1020 BIRCH RIDGE DRIVE
RALEIGH NC

DESIGN AND CONSTRUCTION RECOMMENDATIONS

I. Subgrade Stability

A. Aggregate Subgrade

Recommend a quantity of 500 cubic yards of shallow undercut to be included in the project contract as a contingency item.

B. Geotextile for Soil Stabilization

Recommend 1,500 square yards of Geotextile for Soil Stabilization to be included in the project contract as a contingency item.

C. Class IV Subgrade Stabilization

Recommend 1,000 tons of Class IV Subgrade Stabilization material to be included in the project contract as a contingency item.

II. Miscellaneous

A. Proof Rolling

It is recommended that proof rolling not performed on this project.

JLP/JBB

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
GEOTECHNICAL ENGINEERING UNIT
Summary of Quantities

WBS Number: 45849.1.FR1 | County: Cumberland | Project Engineer:
TIP Number: W-5519 | Field Office: Central | Project Geologist: J. B. Barfield
Description: I-95 Business/US 301 from NC 87 South to NC 59

Pay Item No.	Pay Item/ Quantity Adjustment	Spec Book Section No. or Special Provision (SP) Reference	Report Section	Alignment	Begin Station	End Station	Quantity	Units / %
0196000000-E	Geotextile for Soil Stabilization	270 - Geotextile for Soil Stabilization	I. A	Contingency	N/A	N/A	1,500	SY
						Total Quantity of Geotextile for Soil Stabilization =	**1,500**	**SY**
1099500000-E	Shallow Undercut	505 - Aggregate Subgrade	I. A	Contingency	N/A	N/A	500	CY
						Total Quantity of Shallow Undercut =	**500**	**CY**
1099700000-E	Class IV Subgrade Stabilization	505 - Aggregate Subgrade	I. A	Contingency	N/A	N/A	1,000	TON
						Total Quantity of Class IV Subgrade Stabilization =	**1,000**	**TON**

PAVEMENT CORES FOR ATTACHMENT 1

45849.1.FR1.1.1, W-5519, Cumberland County

LINE	STATION	ABC	LAYER THICKNESS (in)	LAYERS	REMARKS
-L-	106+00 SB LTL	-	4	S	3 lifts
	10 1/2" Asphalt		2 1/2	I	1 lift, moderate severity stripping
			4	B	1 lift
-L-	113+50 NB OSS	-	5 3/4	S	4 lifts, lifts 3 and 4 have sandy matrix
	11 1/2" Asphalt		4 3/4	B	1 lift, delaminated from surface, moderate severity stripping, missing 1" of base material
-L-	113+50 NB OSL	-	2 3/4	S	2 lifts, tack coat top of lift 2
	11 1/4" Asphalt		8 1/2	SD	1 lift, rounded agg., bottom up crack, horizontal break, high severity bleeding, tack coat top of sand layer, missing 1 1/4" of material
	6 1/2" Concrete		6 1/2	C	1 lift, bottom up crack, sub-rounded limestone agg., matrix is highly weathered, traces of grout
-L-	113+50 NB ISL	-	3 1/4	S	2 lifts, low severity stripping lift 2
	14" Asphalt		7 1/4	SD	1 lift, rounded agg., bottom up crack, 2 horizontal breaks, high severity bleeding, tack coat top of sand layer, last 9 1/2" of core in pieces, missing 4 1/2" of material
-L-	113+50 SB OSS	-	6 1/2	S	5 lifts, lift 5 has sandy matrix, low severity stripping at contact of lifts 2 and 3
	10 1/4" Asphalt		3 3/4	B	1 lift
-L-	113+50 SB OSL	-	9	S	6 lifts, lift 5 has sandy matrix
	11 1/4" Asphalt		2 1/4	B	1 lift, low severity stripping
-L-	113+00 SB ISS	-	10	S	8 lifts, lift 6 and 7 have sandy matrix, low severity stripping
	12" Asphalt		2	I	1 lift, low to moderate severity stripping
-L-	121+50 NB LTL	-	5 1/2	S	4 lifts, yellow line top of lifts 1 and 2, low severity stripping, low severity bleeding lift 3 and 4
	8" Asphalt		2 1/2	I	1 lift, low severity stripping
-L-	133+00 SB LTL	-	5	S	3 lifts, low severity stripping at contact of lifts 2 and 3
	11 1/4" Asphalt		6 1/4	B	1 lift, moderate severity stripping top 2 inches
-L-	142+50 NB LTL	-	4	S	3 lifts, low severity stripping at contact of lifts 2 and 3
	7" Asphalt		3	I	1 lift, high severity stripping and few missing agg. from bottom 1 inch
-L-	144+50 SB LTL	-	5	S	4 lifts
	8 1/2" Asphalt		3 1/2	I	1 lift, moderate severity stripping
-L-	206+50 NB LTL	-	4 1/4	S	3 lifts, low severity stripping
	8" Asphalt		3 3/4	I	1 lift, low severity stripping bottom 1 inch
-L-	208+00 SB LTL	-	4	S	3 lifts, lift 1 has low severity bleeding, yellow line top of lift 3, all lifts have low severity stripping at lift contacts
	8" Asphalt		4	I	1 lift, low severity stripping
-L-	218+50 NB LTL	-	4 1/2	S	3 lifts
	12 1/2" Asphalt		8	B	1 lift, last 1" broken with few missing agg.
-L-	220+25 SB LTL	-	4	S	3 lifts
	9 1/4" Asphalt		3/4	I	1 lift
			4 1/2	B	1 lift
-L-	232+00 NB LTL	-	4 1/4	S	3 lifts, lift 3 has yellow line, lifts 2 and 3 have moderate severity stripping at lift contact
	7 1/2" Asphalt		3 1/4	I	1 lift

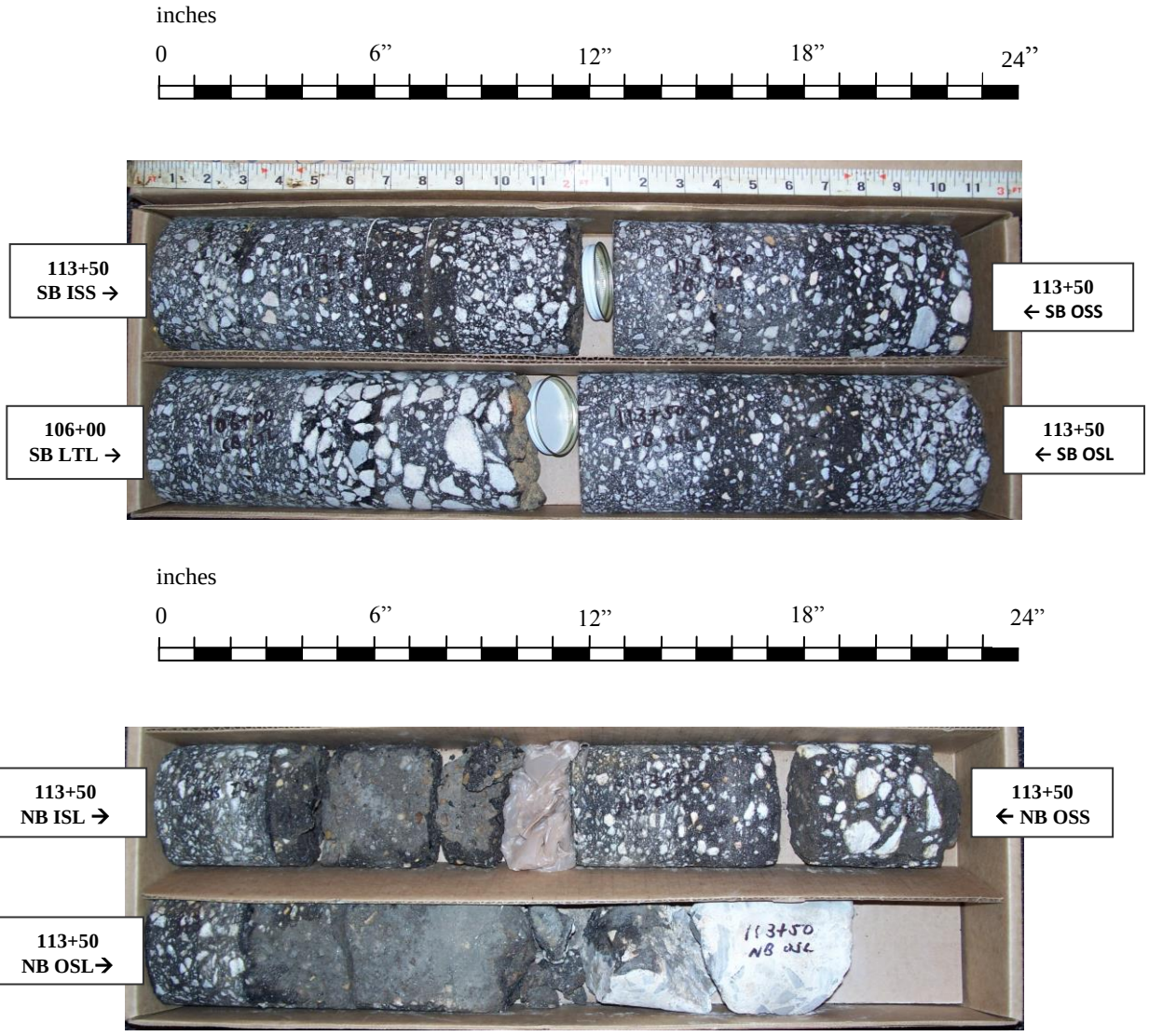
LINE	STATION	ABC	LAYER THICKNESS (IN)	LAYERS	REMARKS
-L-	233+75 SB LTL	-	4	S	3 lifts, low severity stripping at contacts of all lifts, yellow line between lift 2 and 3
	7 3/4" Asphalt		3 3/4	I	1 lift, low severity stripping
-L-	241+50 SB OSS	-	6 1/4	S	4 lifts, low severity stripping lifts 3 and 4
	10 1/2" Asphalt		4 1/4	B	1 lift, low severity stripping bottom 1 inch
-L-	241+50 SB OSL	-	7 3/4	S	5 lifts, lifts 3-5 have sandy matrix and low severity stripping
			3	I	1 lift, low severity stripping
	12 3/4" Asphalt		2	SD	1 lift, sand asphalt, horizontal crack, moderate severity stripping
	7 1/2" Concrete		7 1/2	C	1 lift, large agg.
-L-	241+50 SB ISS	-	7 1/2	S	5 lifts, lifts 2 and 3 and lifts 4 and 5 are delaminated, lifts 3-5 have sandy matrix
	11 1/2" Asphalt		4	B	1 lift, low severity stripping
-L-	243+00 NB OSS	-	7 1/4	S	5 lifts, lifts 3-5 have sandy matrix, low severity bleeding, and moderate severity stripping
	11" Asphalt		2 3/4	B	1 lift, moderate severity stripping, missing few agg., missing 1 inch of material
-L-	243+00 NB OSL	-	7 3/4	S	5 lifts, lifts 3-5 have sandy matrix and moderate severity stripping, lift 5 has white line
	11 1/4" Asphalt		3 1/2	I	1 lift, low severity stripping
-L-	243+00 NB ISL	-	8 3/4	S	6 lifts, lifts 3-5 have sandy matrix, low severity bleeding, and moderate severity stripping
	11 1/4" Asphalt		2 1/2	I	1 lift, low severity stripping
-L-	252+25 NB LTL	-	3 3/4	S	2 lifts
	9 1/4" Asphalt		5 1/2	B	1 lift, low severity stripping
-L-	254+00 SB LTL	-	3 1/2	S	3 lifts, lift 2 has low severity stripping
	6 1/4" Asphalt		2 3/4	I	1 lift, low severity stripping
-L-	264+75 NB LTL	-	5	S	3 lifts, low severity stripping lifts 2 and 3
	9" Asphalt		4	I	1 lift, low severity stripping bottom 1 inch
-L-	266+00 SB LTL	-	3 1/4	S	2 lifts, low severity stripping at contact between lifts 1 and 2
	10" Asphalt		2	I	1 lift, low severity stripping
			4 3/4	B	1 lift, some elongated and sub-rounded agg.
-L-	276+75 NB LTL	-	4 1/2	S	3 lifts
	7 3/4 Asphalt		3 1/4	I	1 lift, moderate severity stripping last 1 inch
-L-	278+25 SB LTL	-	4	S	3 lifts, lift 3 has sandy matrix, lifts 2 and 3 delaminated
	7 1/2" Asphalt		3 1/2	B	1 lift, low severity stripping
-L-	320+00 SB LTL	-	5 1/4	s	3 lifts, lift 2 has low severity stripping
	7 3/4" Asphalt		2 1/2	B	1 lift
-L-	329+75 NB LTL	-	5	S	4 lifts
	8" Asphalt		3	I	1 lift, low severity stripping bottom 1 inch
-L-	360+50 NB LTL	-	2 1/4	S	2 lifts, low severity stripping lift 2, yellow line top of lift 1
	8 " Asphalt		5 3/4	B	1 lift, low severity stripping
-L-	362+30 SB LTL	-	1 1/2	S	1 lift
	7" Asphalt		5 1/2	B	1 lift, sub-rounded and elongated agg., bottom 1" broken
-L-	368+65 SB OSS	-	4	S	3 lifts, low severity stripping lift 1
	7" Asphalt		3	B	1 lift, sandy matrix, round to sub-rounded agg.

LINE	STATION	ABC	LAYER THICKNESS (IN)	LAYERS	REMARKS
-L-	368+65 SB OSL 13" Asphalt 6" Concrete	-	4 1/4	S	4 lifts, lifts 2-4 have sandy matrix, low severity stripping
			5 1/4	I	3 lifts, sub-rounded agg.
			1 1/4	S	1 lift, 1 1/2" of surface missing, high severity stripping
			6	C	concrete not recovered
-L-	368+65 SB ISL 11 1/2" Asphalt	-	5	S	4 lifts
			6 1/2	I	2 lifts, sub-rounded agg.
-L-	368+65 NB OSS 7" Asphalt	-	3 1/4	S	2 lifts, lift 2 has sandy matrix and moderate severity stripping
			3 3/4	B	1 lift, moderate severity stripping
-L-	368+65 NB OSL 8 3/4" Asphalt	-	4	S	2 lifts, lift 2 has sandy matrix, low severity stripping, moderately weathered
			4 3/4	I	2 lifts, 4 3/4" bottom-up crack
-L-	368+65 NB ISL 9 1/4" Asphalt	-	6	S	3 lifts, lift 2 has sandy matrix and low severity stripping
			3 1/4	I	2 lifts, very low severity stripping
-L-	371+50 NB LTL 12" Asphalt	-	8	S	5 lifts, lifts 3-5 have sandy matrix and low severity stripping, contact of lift 2 and 3 has low severity stripping, delamination between lift 4 and 5
			4	I	1 lift, moderate severity stripping
-L-	375+75 NB LTL 8" Asphalt	-	2 1/2	S	2 lifts
			5 1/2	B	1 lift with rounded to sub-rounded quartz agg.
-L-	416+00 NB OSS 13 1/2" Asphalt	-	9 1/2	S	7 lifts, lifts 4 and 5 delaminated, lifts 4-7 have sandy matrix with moderate weathering
			4	B	1 lift, low severity stripping
-L-	416+00 NB OSL 14 3/4" Asphalt	-	8 1/2	S	lifts are indistiguishable, top 4 1/2" has elongated agg., bottom 4" has sandy matrix with sub-rounded agg. and moderate stripping
			2	SD	1 lift
			1 3/4	S	1 lift, high AC content, low severity stripping
			2 1/2	B	1 lift, moderate severity stripping
-L-	416+00 NB ISL 15" Asphalt	-	8	S	7 lifts, lifts 4-7 have sandy matrix
			2 1/4	SD	1 lift
			2 1/4	S	2 lifts
			2 1/2	I	1 lift
-L-	416+00 SB OSS 13" Asphalt	-	9 3/4	S	8 lifts, lifts 4-8 have sandy matrix and subrounded quartz agg.
			3 1/4	B	1 lift, sandy matrix, over 1 1/2" large sub-rounded quartx agg.

LINE	STATION	ABC	LAYER THICKNESS (IN)	LAYERS	REMARKS
-L-	416+00 SB OSL 14" Asphalt	-	8 1/4	S	6 lifts, lifts 4-6 have sandy matrix, sub-rounded quartx agg.
			1	SD	1 lift
			2 1/4	S	2 lifts
			2 1/2	I	1 lift, low severity stripping
-L-	416+00 SB ISL 14 1/2" Asphalt	-	8 3/4	S	6 lifts, lifts 4-6 have sandy matrix, low severity stripping
			1 3/4	SD	1 lift
			4	I	1 lift, low severity stripping

North Carolina Department of Transportation
Geotechnical Unit
Asphalt Core Photo

Project No.: 45849.1.FR1	*I.D. No.*: W-5519	*County:* Cumberland	*Dates:* 10/8-10/13/2014
Site Description: I-95 Business/US 301 from NC 87 to NC 59			
Driller: Ron Toothman & Willie Trapp	*Core Size*: 4 - inch	*Drill Machine:* Mobile B-55	
Geologist / Engineer: Paul Weaver			



Notes:
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LTL = Left Turn Lane
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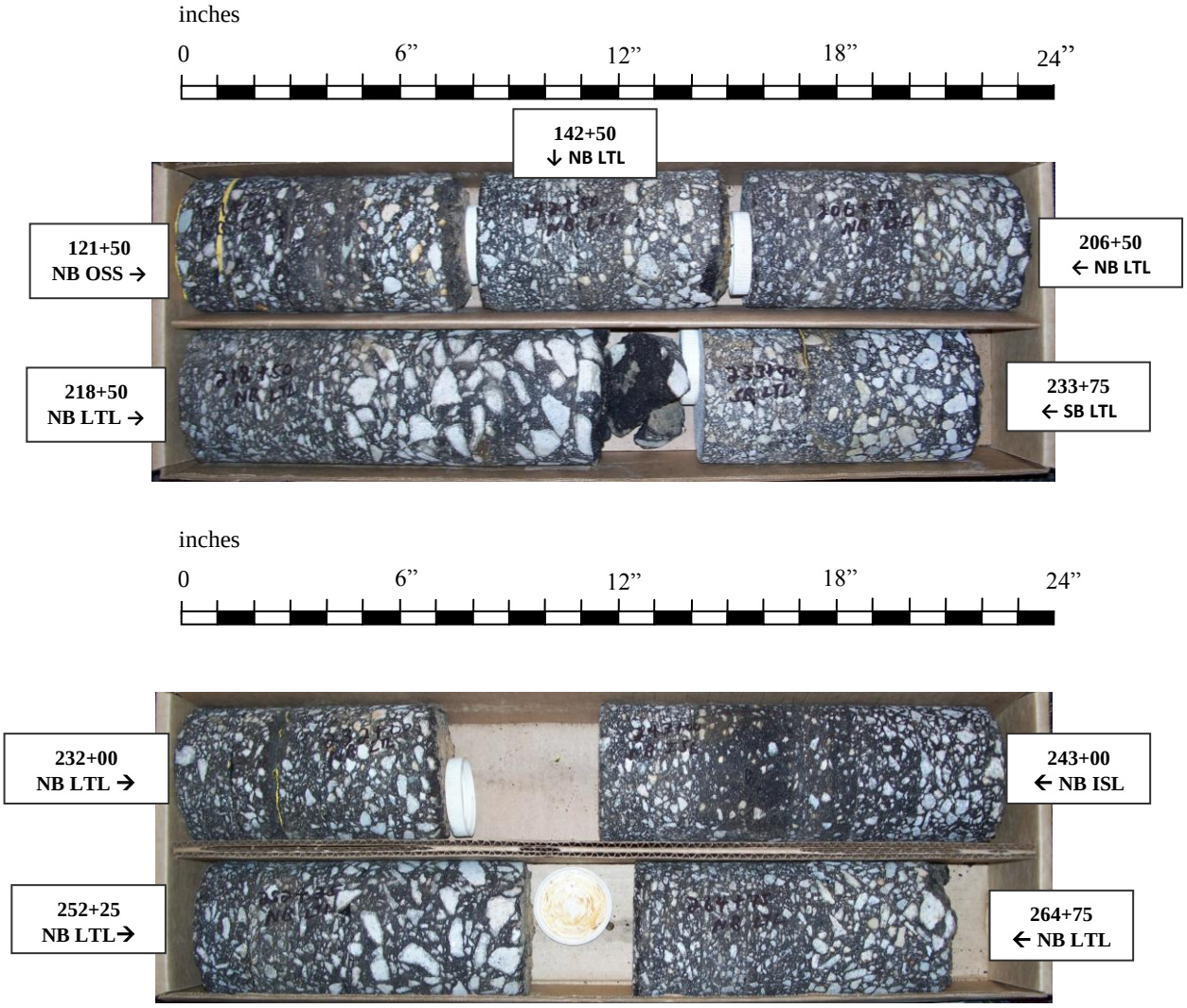
Geologist / Engineer: Paul Weaver



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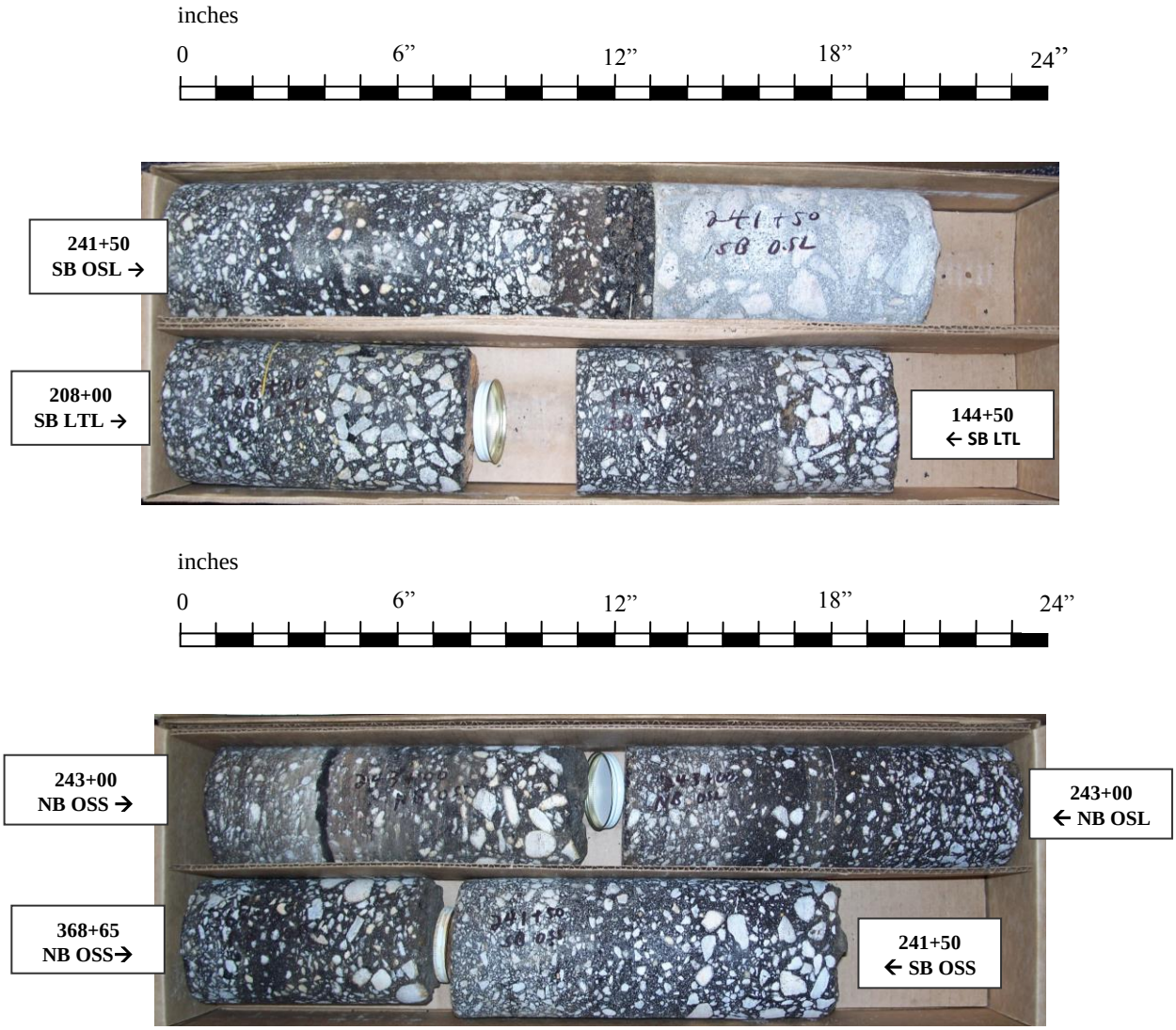

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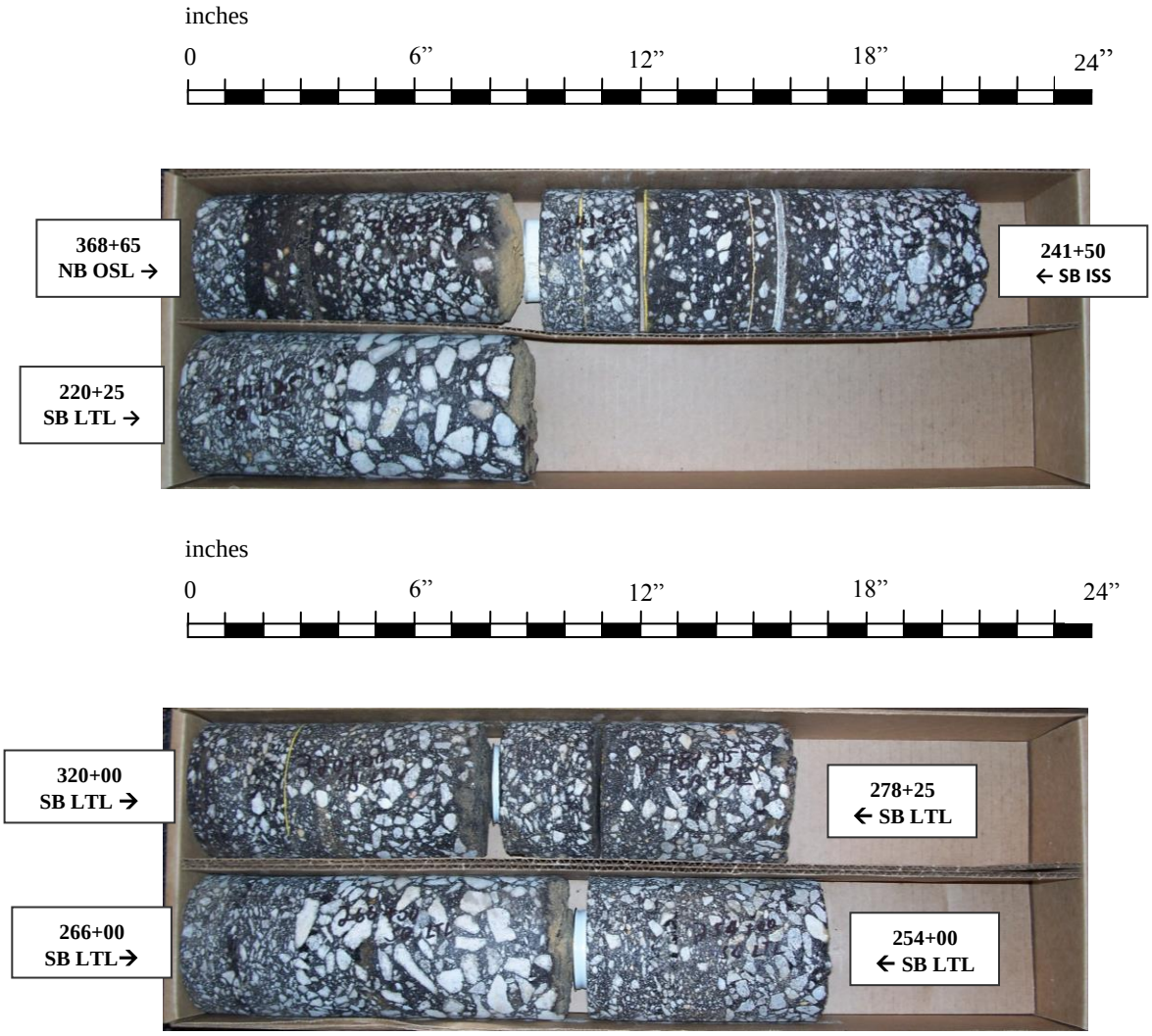

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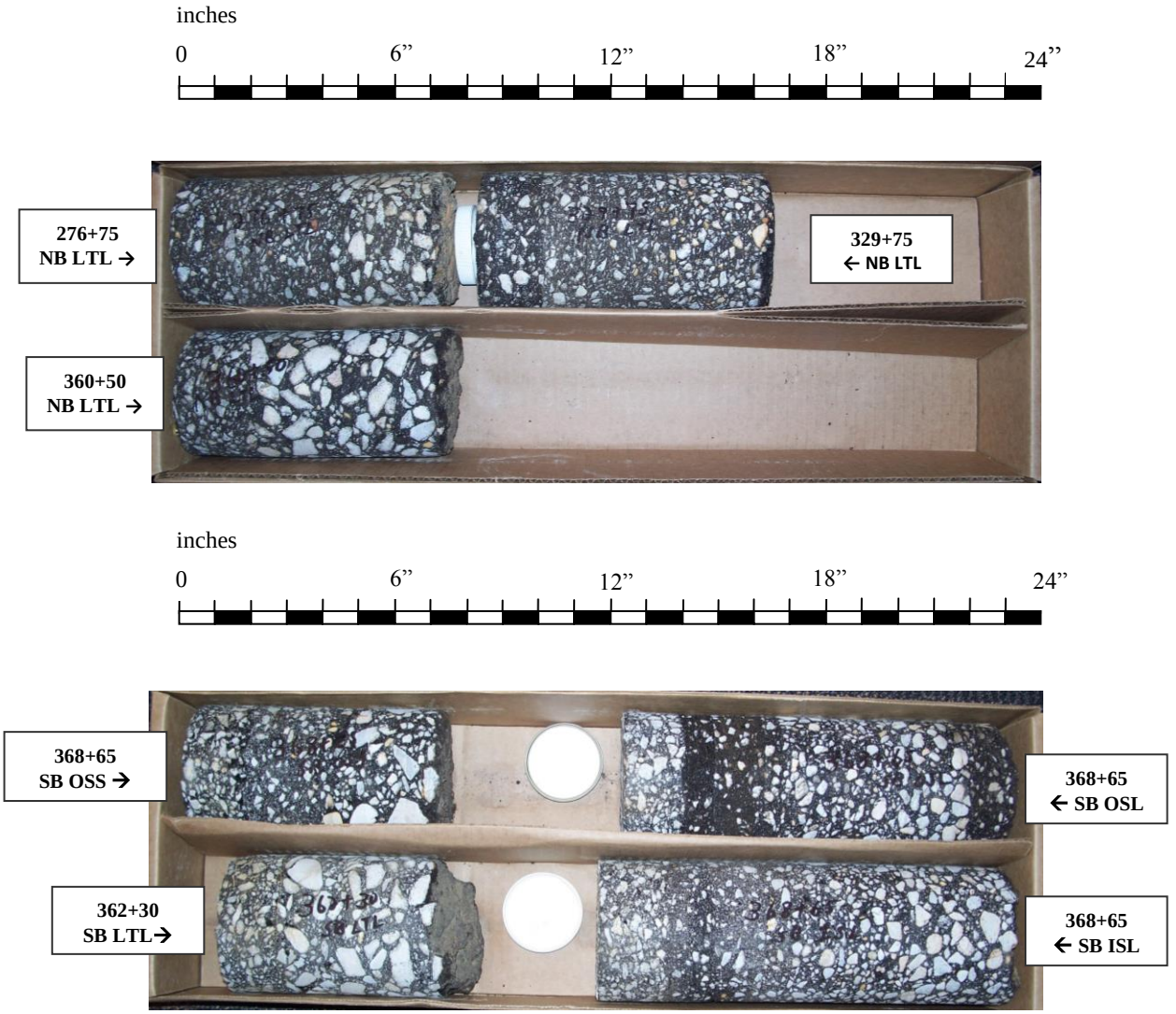

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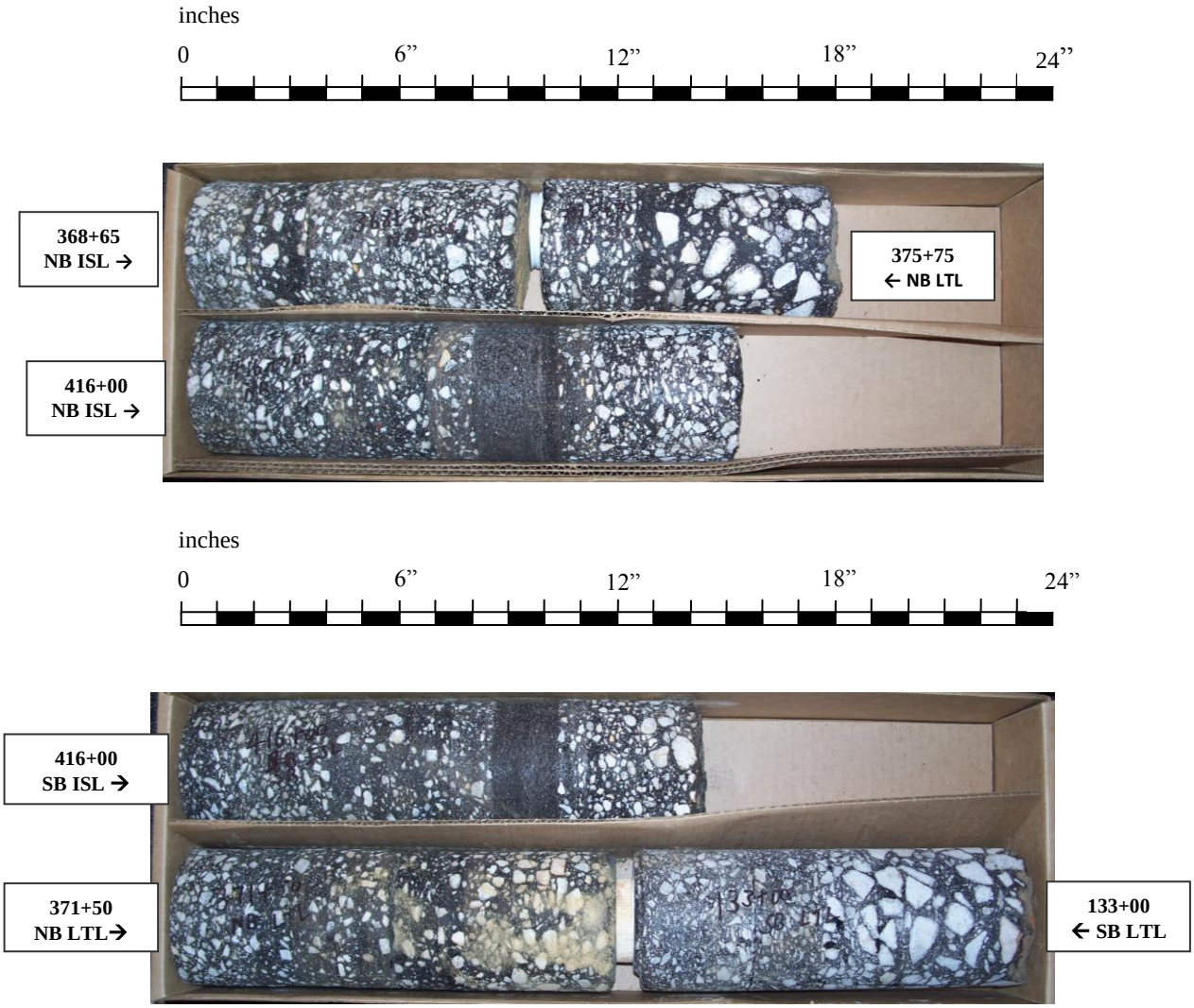

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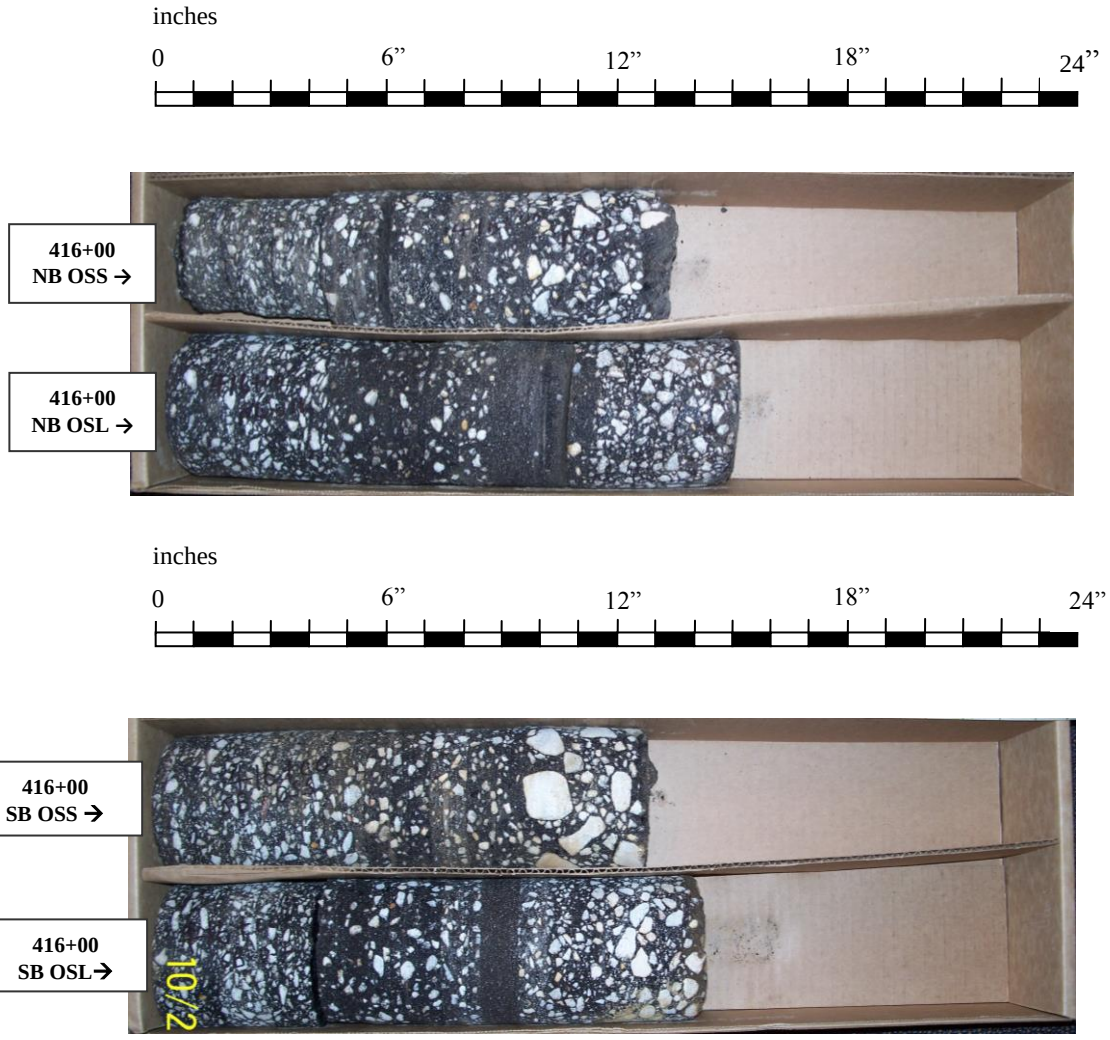

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CONE PENETROMETER RESULTS ATTACHMENT 3

NC - DOT, GEOTECHNICAL ENGINEERING UNIT Page 1

PROJECT NO.	45849.1.FR1
PROJECT ID	W-5519
ROUTE	I-95 BUS/US 301
COUNTY	CUMBERLAND

GEOLOGIST	J.B. BARFIELD
GEOTECHS	TRIGON

FILE	W-5519_CONEPEN1_...

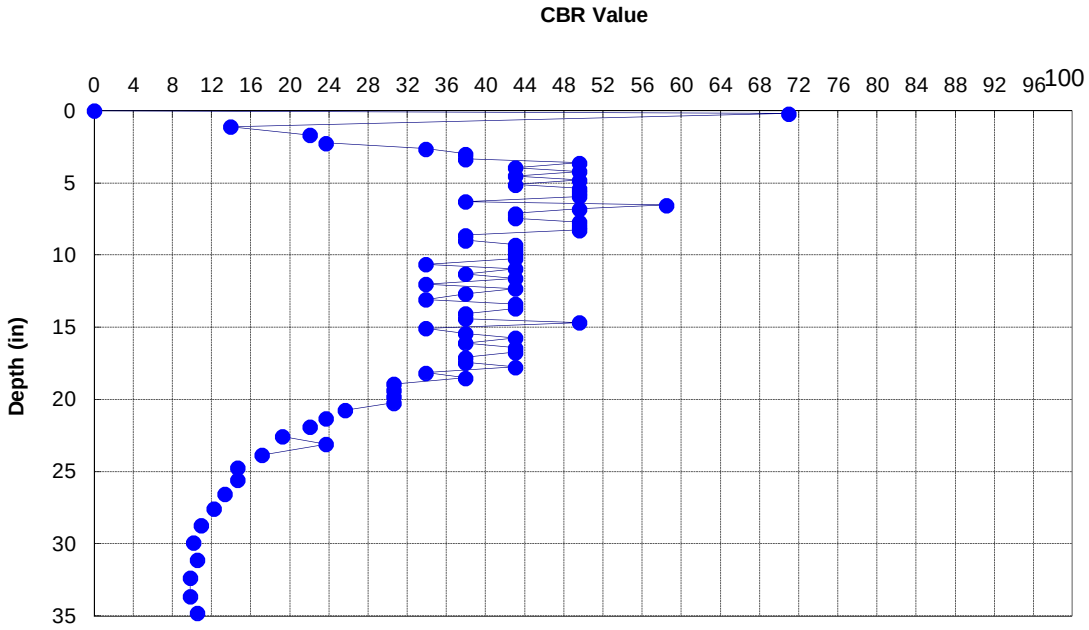
106+00 SB LTL RAW 1

0.5' FROM YELLOW FILL

Datum = SG 10/13/14

Interval 0.0 to 0.0	
# of Values	0
Avg CBR	#DIV/0!
Wghtd Avg.	#DIV/0!
Max CBR	0.0
Min CBR	0.0

Interval 0.0 to 36.1	
# of Values	75
Avg CBR	35.0
Wghtd Avg.	27.4
Max CBR	70.9
Min CBR	9.8



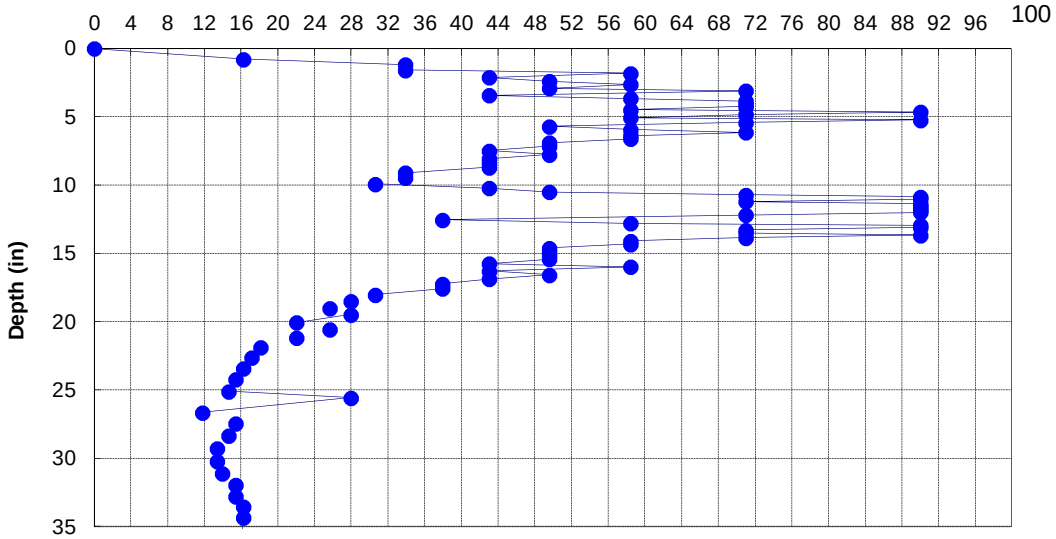
113+50 NB OSS RAW 2

2.2' RT GRADE

Datum = SG 10/08/14

Interval 0.0 to 0.0	
# of Values	0
Avg CBR	#DIV/0!
Wghtd Avg.	#DIV/0!
Max CBR	0.0
Min CBR	0.0

Interval 0.0 to 41.4	
# of Values	99
Avg CBR	46.3
Wghtd Avg.	31.8
Max CBR	90.0
Min CBR	7.9



CONE PENETROMETER RESULTS
NC - DOT, GEOTECHNICAL ENGINEERING UNIT

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PROJECT ID	W-5519
ROUTE	I-95 BUS/US 301
COUNTY	CUMBERLAND

GEOLOGIST	J.B. BARFIELD
GEOTECHS	TRIGON

FILE	W-5519_CONEPEN1_...

113+50 NB OSL
1.3' LT
Datum = SG

RAW
GRADE
10/08/14

3

Interval 0.0 to 0.0	
# of Values	0
Avg CBR	#DIV/0!
Wghtd Avg.	#DIV/0!
Max CBR	0.0
Min CBR	0.0

Interval 0.0 to 42.1	
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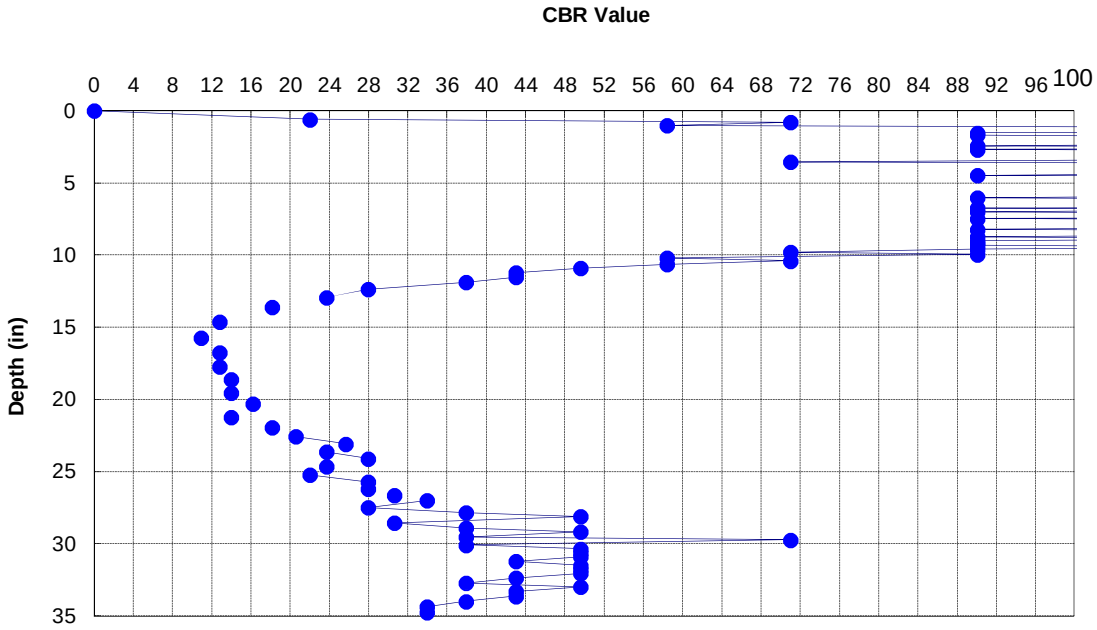
Avg CBR	82.1
Wghtd Avg.	44.1
Max CBR	100+
Min CBR	7.7



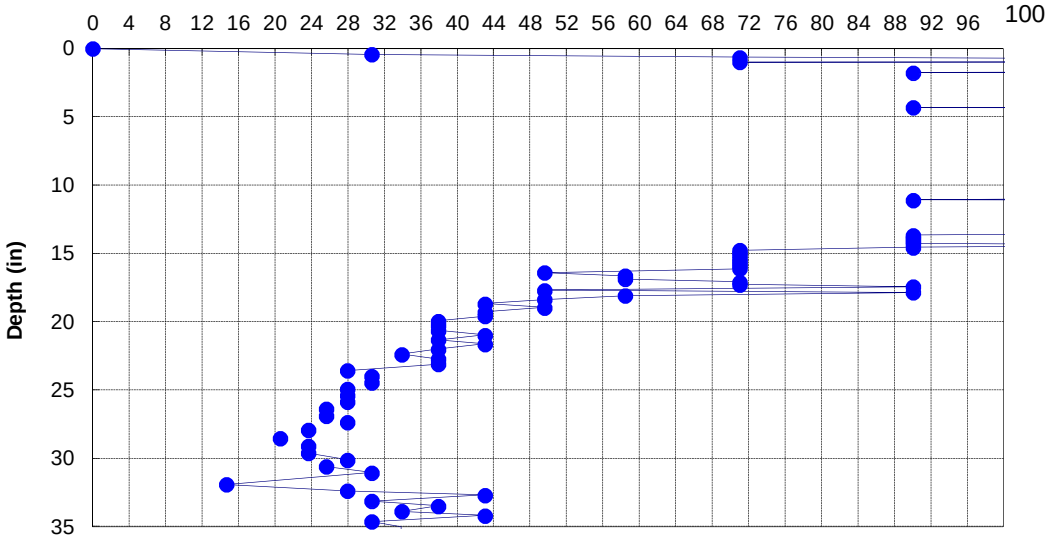
113+50 NB ISL
2.5' FROM YELLOW
Datum = SG

RAW
GRADE
10/09/14

4

Interval 0.0 to 0.0	
# of Values	0
Avg CBR	#DIV/0!
Wghtd Avg	#DIV/0!
Max CBR	0.0
Min CBR	0.0

Interval 0.0 to 38.9	
# of Values	221
Avg CBR	100+
Wghtd Avg.	80.0
Max CBR	100+
Min CBR	14.6



CONE PENETROMETER RESULTS
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GEOLOGIST	J.B. BARFIELD
GEOTECHS	TRIGON

FILE	W-5519_CONEPEN1_...

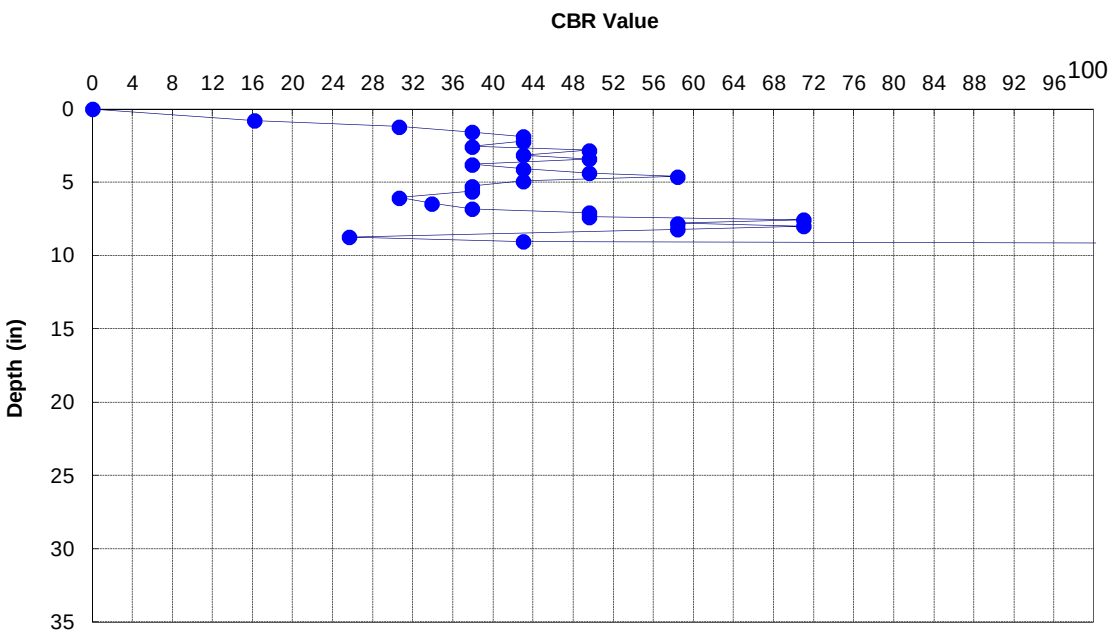
113+50 SB OSS
1.9' RT
Datum = SG

RAW
GRADE
10/13/14

5

Interval 0.0 to 0.0	
# of Values	0
Avg CBR	#DIV/0!
Wghtd Avg.	#DIV/0!
Max CBR	0.0
Min CBR	0.0

Interval 0.0 to 11.5	
# of Values	51
Avg CBR	93.8
Wghtd Avg.	61.4
Max CBR	100+
Min CBR	16.2



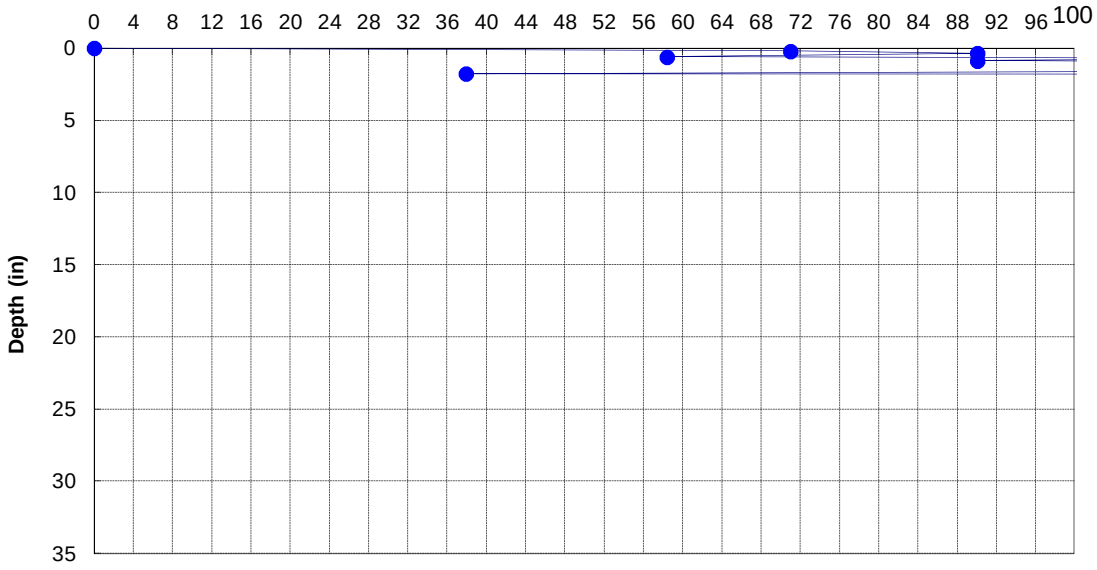
113+50 SB OSL
2.5' LT
Datum = SG

RAW
GRADE
10/13/14

6

Interval 0.0 to 0.0	
# of Values	0
Avg CBR	#DIV/0!
Wghtd Avg.	#DIV/0!
Max CBR	0.0
Min CBR	0.0

Interval 0.0 to 3.5	
# of Values	36
Avg CBR	100+
Wghtd Avg.	100+
Max CBR	100+
Min CBR	37.9



CONE PENETROMETER RESULTS
NC - DOT, GEOTECHNICAL ENGINEERING UNIT

PROJECT NO.	45849.1.FR1
PROJECT ID	W-5519
ROUTE	I-95 BUS/US 301
COUNTY	CUMBERLAND

GEOLOGIST	J.B. BARFIELD
GEOTECHS	TRIGON

FILE	W-5519_CONEPEN1_...

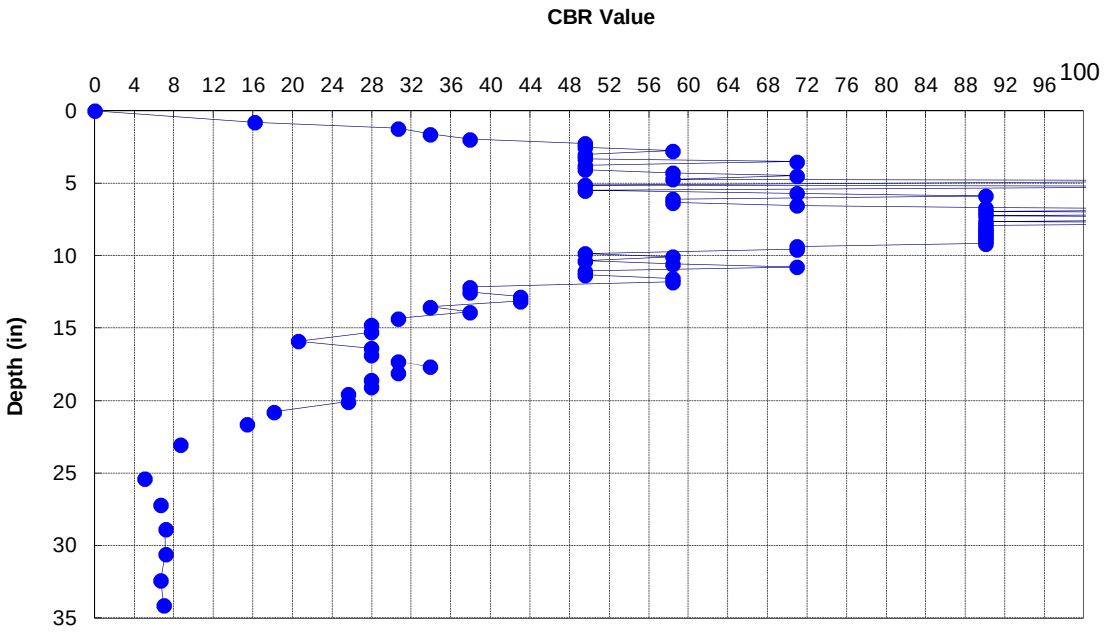
113+50 SB ISS
0.4' FROM YELLOW
Datum = SG

RAW
GRADE
10/11/14

7

Interval 0.0 to 0.0	
# of Values	0
Avg CBR	#DIV/0!
Wghtd Avg.	#DIV/0!
Max CBR	0.0
Min CBR	0.0

Interval 0.0 to 36.8	
# of Values	82
Avg CBR	55.3
Wghtd Avg.	29.5
Max CBR	100+
Min CBR	4.4



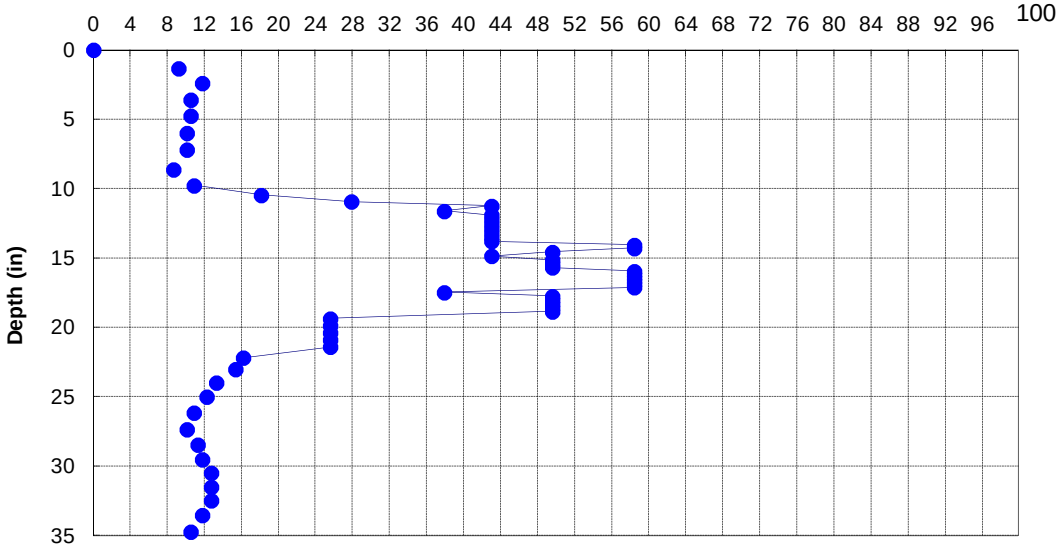
121+50 NB LTL
ON YELLOW
Datum = SG

RAW
FILL
10/08/14

8

Interval 0.0 to 0.0	
# of Values	0
Avg CBR	#DIV/0!
Wghtd Avg.	#DIV/0!
Max CBR	0.0
Min CBR	0.0

Interval 0.0 to 37.3	
# of Values	58
Avg CBR	31.3
Wghtd Avg.	20.1
Max CBR	58.4
Min CBR	8.6



CONE PENETROMETER RESULTS
NC - DOT, GEOTECHNICAL ENGINEERING UNIT

PROJECT NO.	45849.1.FR1
PROJECT ID	W-5519
ROUTE	I-95 BUS/US 301
COUNTY	CUMBERLAND

GEOLOGIST	J.B. BARFIELD
GEOTECHS	TRIGON

FILE	W-5519_CONEPEN1_...

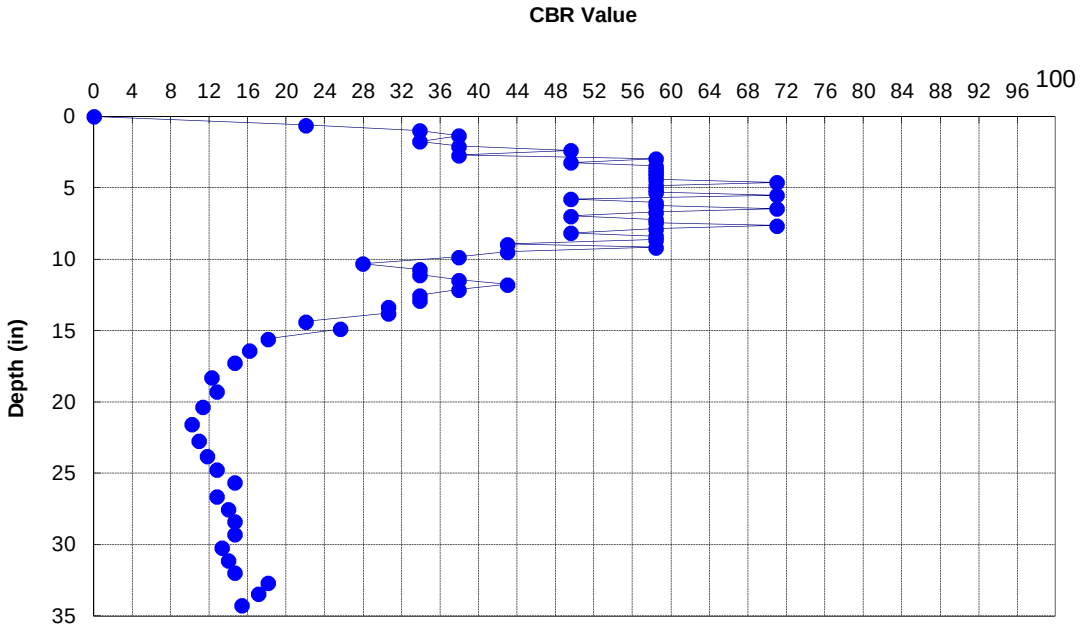
133+00 SB LTL
0.9' FROM YELLOW
Datum = SG

RAW
FILL
10/13/14

9

Interval 0.0 to 0.0	
# of Values	0
Avg CBR	#DIV/0!
Wghtd Avg.	#DIV/0!
Max CBR	0.0
Min CBR	0.0

Interval 0.0 to 35.9	
# of Values	71
Avg CBR	37.0
Wghtd Avg.	25.9
Max CBR	70.9
Min CBR	10.1



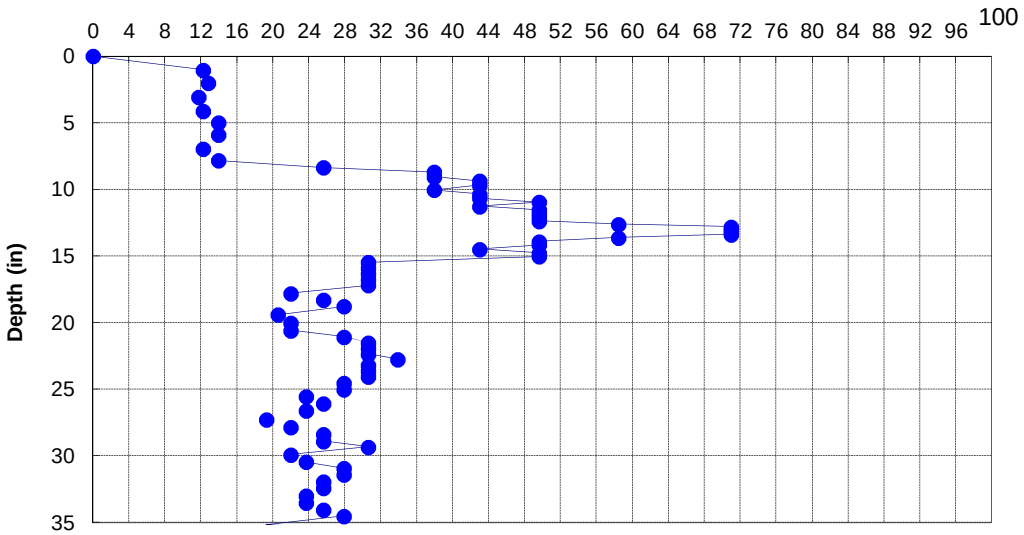
142+50 NB LTL
3.8' LT
Datum = SG

RAW
GRADE
10/08/14

10

Interval 0.0 to 0.0	
# of Values	0
Avg CBR	#DIV/0!
Wghtd Avg.	#DIV/0!
Max CBR	0.0
Min CBR	0.0

Interval 0.0 to 41.4	
# of Values	87
Avg CBR	32.6
Wghtd Avg.	27.7
Max CBR	70.9
Min CBR	11.8



CONE PENETROMETER RESULTS
NC - DOT, GEOTECHNICAL ENGINEERING UNIT

PROJECT NO.	45849.1.FR1
PROJECT ID	W-5519
ROUTE	I-95 BUS/US 301
COUNTY	CUMBERLAND

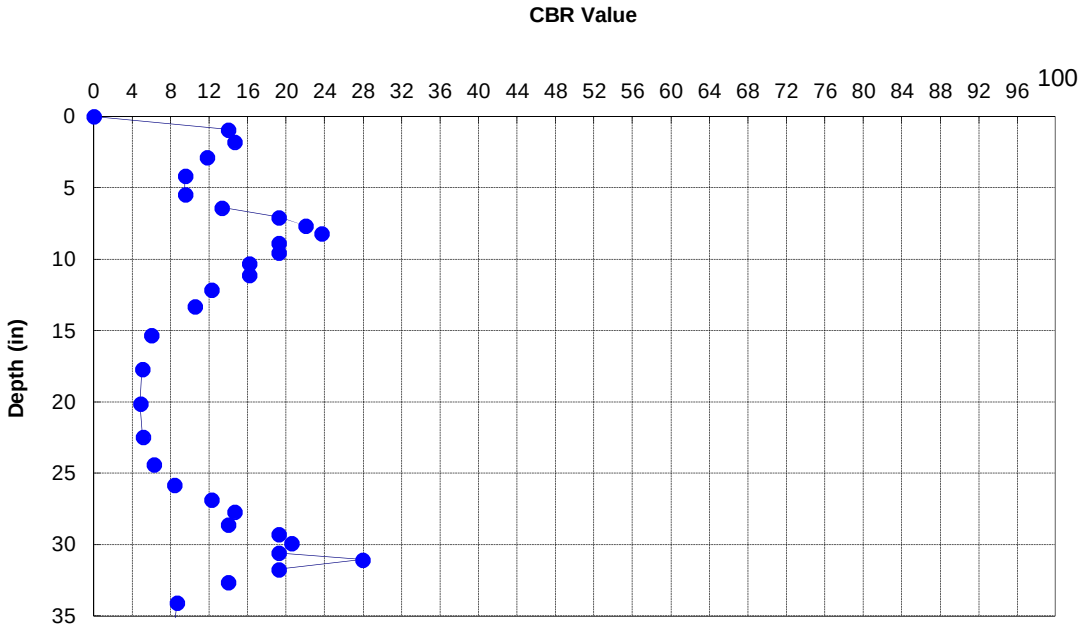
GEOLOGIST	J.B. BARFIELD
GEOTECHS	TRIGON

FILE	W-5519_CONEPEN1_...

144+25 SB LTL — RAW — 11
0.5' LT — GRADE
Datum = SG — 10/13/14

Interval 0.0 to 0.0	
# of Values	0
Avg CBR	#DIV/0!
Wghtd Avg.	#DIV/0!
Max CBR	0.0
Min CBR	0.0

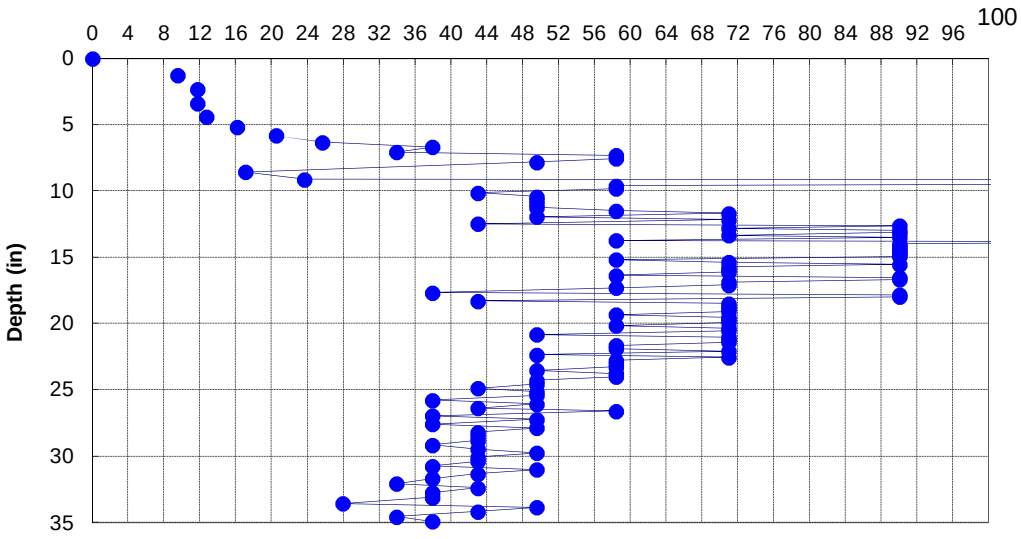
Interval 0.0 to 38.3	
# of Values	34
Avg CBR	13.6
Wghtd Avg.	11.1
Max CBR	27.9
Min CBR	4.8



206+50 NB LTL — RAW — 12
1.8' FROM YELLOW — FILL
Datum = SG — 10/08/14

Interval 0.0 to 0.0	
# of Values	0
Avg CBR	#DIV/0!
Wghtd Avg.	#DIV/0!
Max CBR	0.0
Min CBR	0.0

Interval 0.0 to 41.5	
# of Values	136
Avg CBR	56.6
Wghtd Avg.	44.4
Max CBR	100+
Min CBR	9.5



CONE PENETROMETER RESULTS
NC - DOT, GEOTECHNICAL ENGINEERING UNIT

PROJECT NO.	45849.1.FR1
PROJECT ID	W-5519
ROUTE	I-95 BUS/US 301
COUNTY	CUMBERLAND

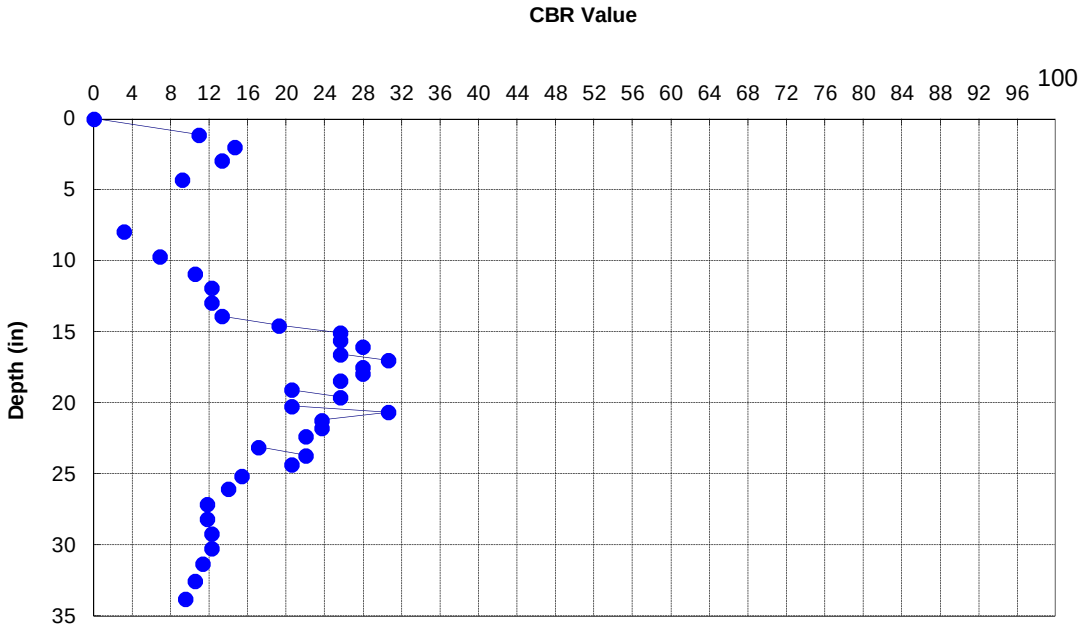
GEOLOGIST	J.B. BARFIELD
GEOTECHS	TRIGON

FILE	W-5519_CONEPEN1_...

208+00 SB LTL — RAW — 13
0.8' FROM YELLOW — FILL
Datum = SG — 10/11/14

Interval 0.0 to 0.0	
# of Values	0
Avg CBR	#DIV/0!
Wghtd Avg.	#DIV/0!
Max CBR	0.0
Min CBR	0.0

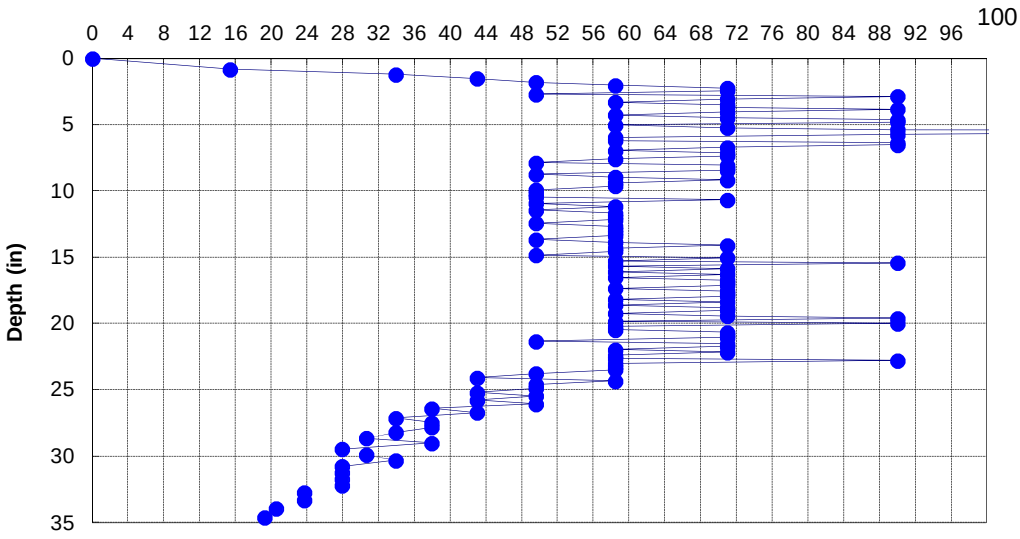
Interval 0.0 to 35.0	
# of Values	39
Avg CBR	17.6
Wghtd Avg.	14.1
Max CBR	30.6
Min CBR	3.1



218+50 NB LTL — RAW — 14
1.3' FROM YELLOW — FILL
Datum = SG — 10/08/14

Interval 0.0 to 0.0	
# of Values	0
Avg CBR	#DIV/0!
Wghtd Avg.	#DIV/0!
Max CBR	0.0
Min CBR	0.0

Interval 0.0 to 35.9	
# of Values	135
Avg CBR	59.4
Wghtd Avg.	51.5
Max CBR	100+
Min CBR	15.4



CONE PENETROMETER RESULTS
NC - DOT, GEOTECHNICAL ENGINEERING UNIT

PROJECT NO.	45849.1.FR1
PROJECT ID	W-5519
ROUTE	I-95 BUS/US 301
COUNTY	CUMBERLAND

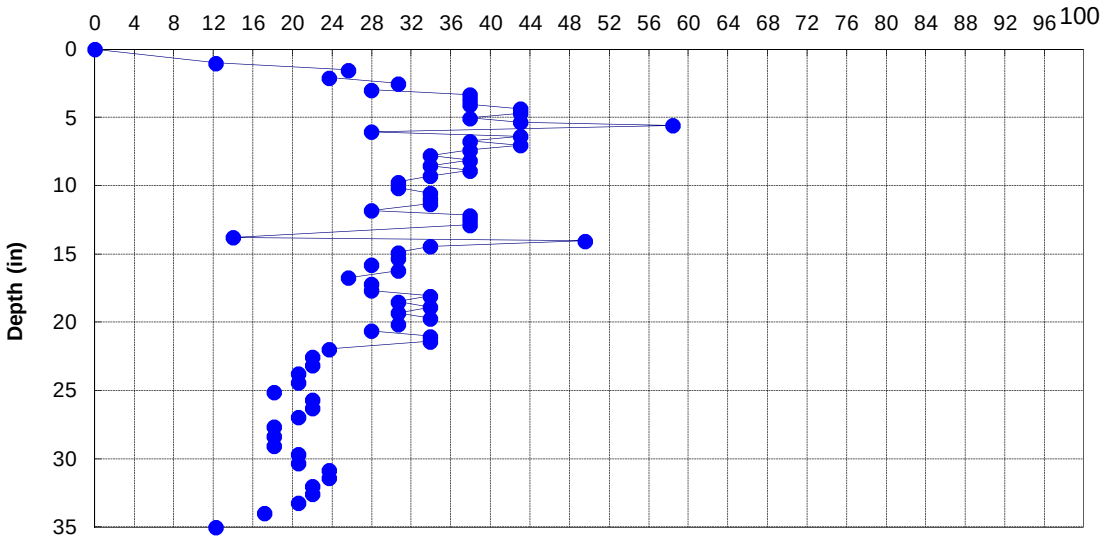
GEOLOGIST	J.B. BARFIELD
GEOTECHS	TRIGON

FILE	W-5519_CONEPEN1_...

220+25 SB LTL — RAW — 15
0.4' FROM YELLOW — FILL
Datum = SG — 10/11/14

Interval 0.0 to 0.0	
# of Values	0
Avg CBR	#DIV/0!
Wghtd Avg.	#DIV/0!
Max CBR	0.0
Min CBR	0.0

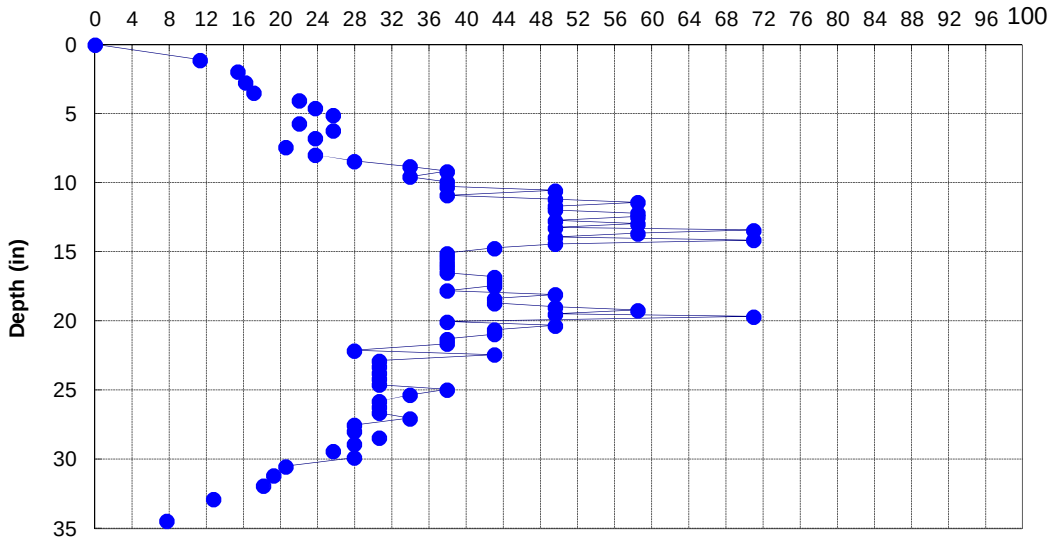
Interval 0.0 to 36.5	
# of Values	73
Avg CBR	29.5
Wghtd Avg.	26.1
Max CBR	58.4
Min CBR	8.4



232+50 NB LTL — RAW — 16
1.2' FROM YELLOW — FILL
Datum = SG — 10/08/14

Interval 0.0 to 0.0	
# of Values	0
Avg CBR	#DIV/0!
Wghtd Avg.	#DIV/0!
Max CBR	0.0
Min CBR	0.0

Interval 0.0 to 43.9	
# of Values	90
Avg CBR	35.4
Wghtd Avg.	27.0
Max CBR	70.9
Min CBR	2.9



CONE PENETROMETER RESULTS
NC - DOT, GEOTECHNICAL ENGINEERING UNIT

PROJECT NO.	45849.1.FR1
PROJECT ID	W-5519
ROUTE	I-95 BUS/US 301
COUNTY	CUMBERLAND

GEOLOGIST	J.B. BARFIELD
GEOTECHS	TRIGON

FILE	W-5519_CONEPEN1_...

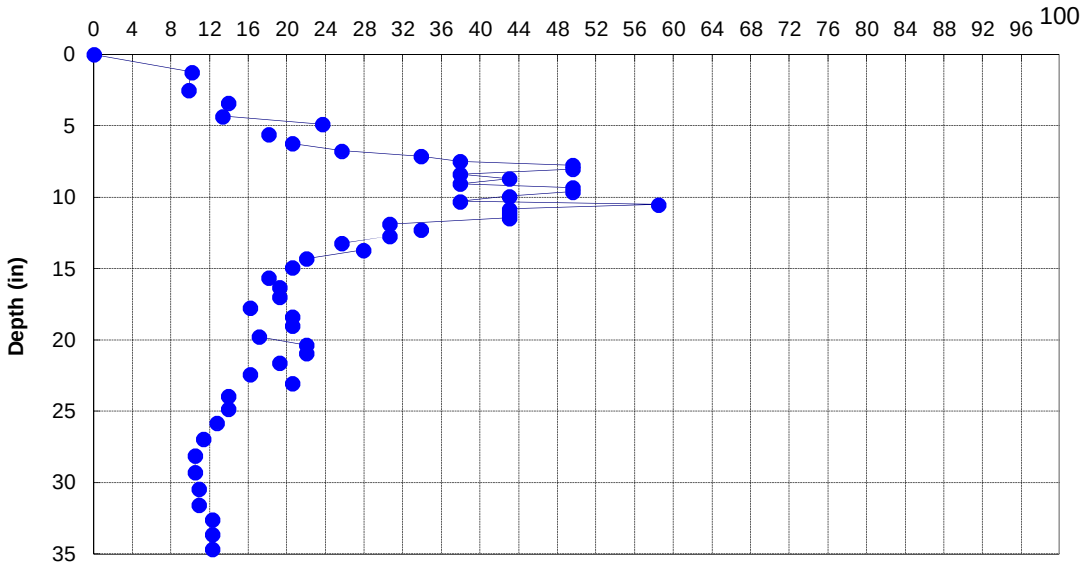
233+90 SB LTL
0.5' FROM YELLOW
Datum = SG

RAW
GRADE
10/11/14

17

Interval 0.0 to 0.0	
# of Values	0
Avg CBR	#DIV/0!
Wghtd Avg.	#DIV/0!
Max CBR	0.0
Min CBR	0.0

Interval 0.0 to 37.6	
# of Values	56
Avg CBR	24.7
Wghtd Avg.	19.2
Max CBR	58.4
Min CBR	9.8



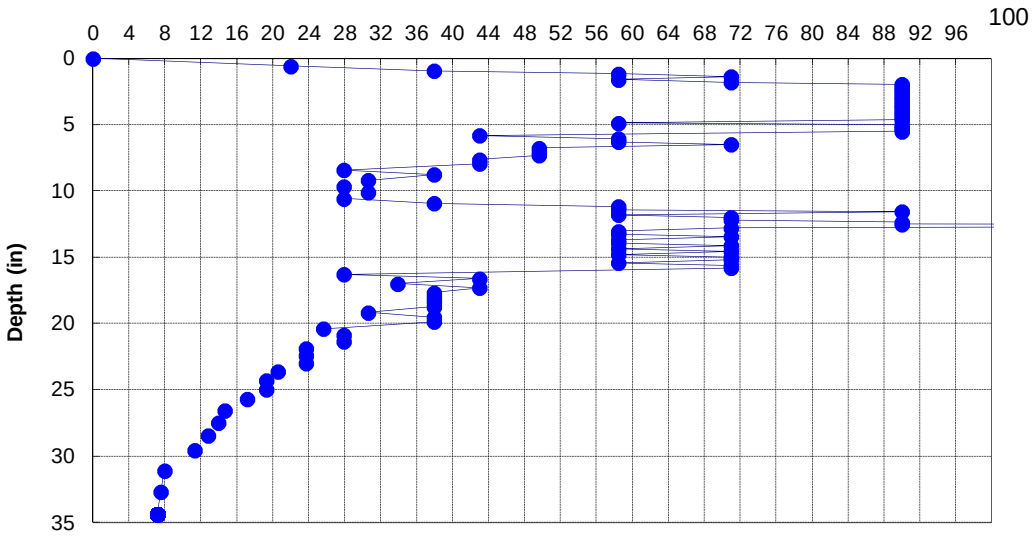
241+50 SB OSS
1.8' RT
Datum = SG

RAW
GRADE
10/11/14

18

Interval 0.0 to 0.0	
# of Values	0
Avg CBR	#DIV/0!
Wghtd Avg.	#DIV/0!
Max CBR	0.0
Min CBR	0.0

Interval 0.0 to 34.4	
# of Values	97
Avg CBR	56.7
Wghtd Avg.	37.9
Max CBR	100+
Min CBR	7.2



CONE PENETROMETER RESULTS
NC - DOT, GEOTECHNICAL ENGINEERING UNIT

PROJECT NO.	45849.1.FR1
PROJECT ID	W-5519
ROUTE	I-95 BUS/US 301
COUNTY	CUMBERLAND

GEOLOGIST	J.B. BARFIELD
GEOTECHS	TRIGON

FILE	W-5519_CONEPEN1_...

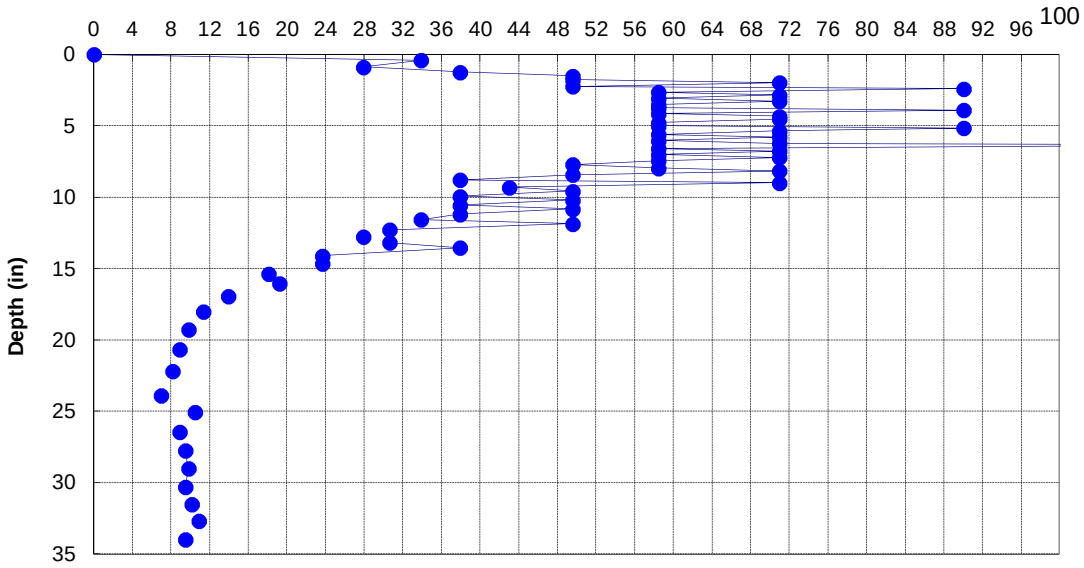
241+50 SB OSL
1.6' LT
Datum = SG

RAW
GRADE
10/11/14

19

Interval 0.0 to 0.0	
# of Values	0
Avg CBR	#DIV/0!
Wghtd Avg.	#DIV/0!
Max CBR	0.0
Min CBR	0.0

Interval 0.0 to 36.3	
# of Values	71
Avg CBR	44.3
Wghtd Avg.	25.6
Max CBR	100+
Min CBR	7.0



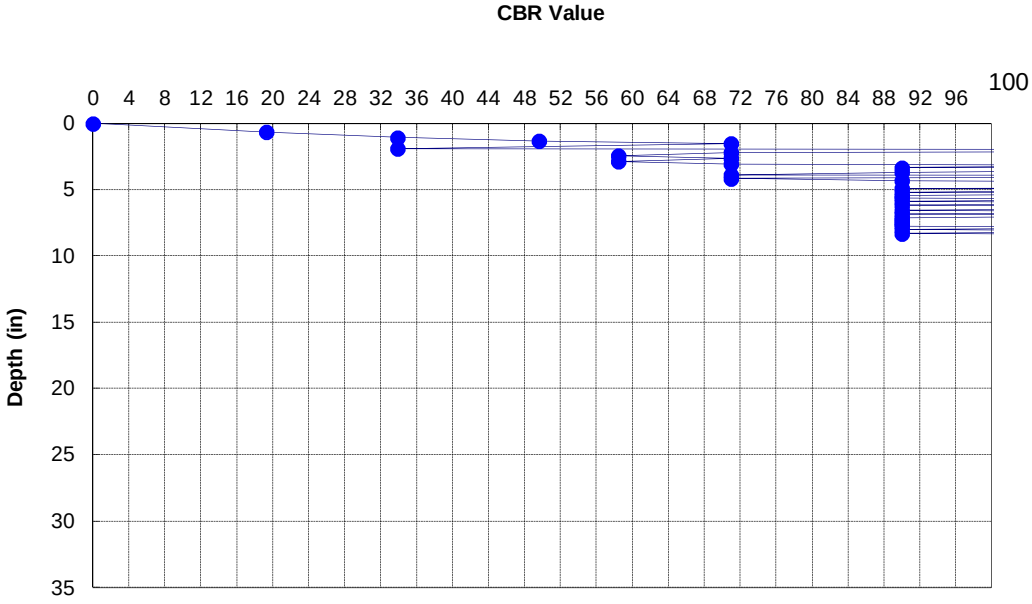
241+50 SB ISS
0.8' FROM YELLOW
Datum = SG

RAW
GRADE
10/11/14

20

Interval 0.0 to 0.0	
# of Values	0
Avg CBR	#DIV/0!
Wghtd Avg.	#DIV/0!
Max CBR	0.0
Min CBR	0.0

Interval 0.0 to 8.4	
# of Values	50
Avg CBR	100+
Wghtd Avg.	83.7
Max CBR	100+
Min CBR	19.2



CONE PENETROMETER RESULTS
NC - DOT, GEOTECHNICAL ENGINEERING UNIT

PROJECT NO.	45849.1.FR1
PROJECT ID	W-5519
ROUTE	I-95BUS/US 301
COUNTY	CUMBERLAND

GEOLOGIST	J.B. BARFIELD
GEOTECHS	TRIGON

FILE	W-5519_CONEPEN2

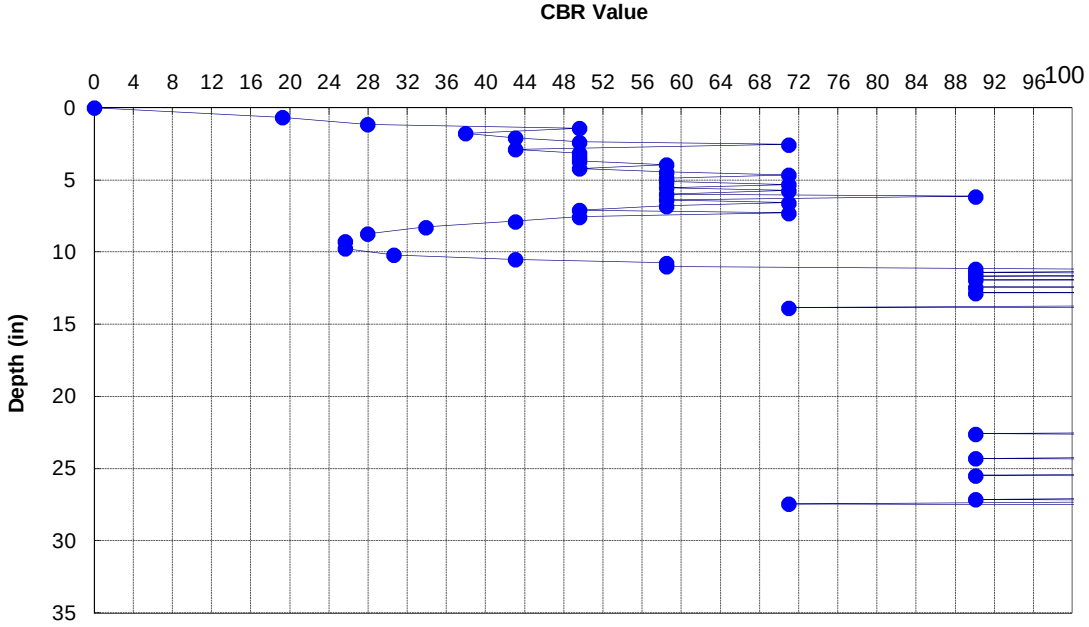
243+00 NB OSS
2.8' RT
Datum = SG

RAW
GRADE
10/09/14

21

Interval 0.0 to 0.0	
# of Values	0
Avg CBR	#DIV/0!
Wghtd Avg.	#DIV/0!
Max CBR	0.0
Min CBR	0.0

Interval 0.0 to 27.6	
# of Values	207
Avg CBR	100+
Wghtd Avg.	100+
Max CBR	100+
Min CBR	19.2



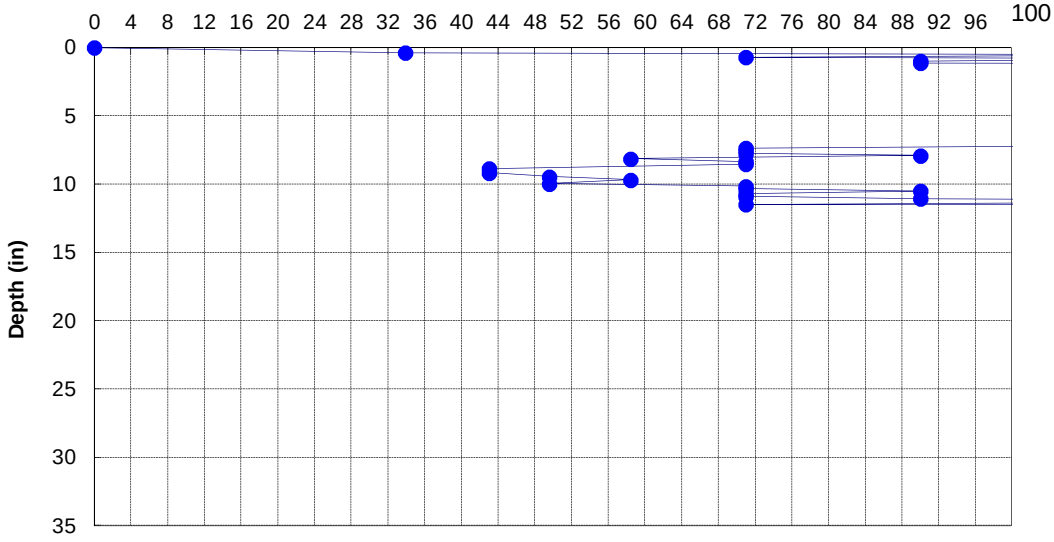
243+00 NB OSL
1.3' LT
Datum = SG

RAW
GRADE
10/09/14

22

Interval 0.0 to 0.0	
# of Values	0
Avg CBR	#DIV/0!
Wghtd Avg.	#DIV/0!
Max CBR	0.0
Min CBR	0.0

Interval 0.0 to 15.2	
# of Values	186
Avg CBR	100+
Wghtd Avg.	100+
Max CBR	100+
Min CBR	33.9



CONE PENETROMETER RESULTS
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PROJECT NO.	45849.1.FR1
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ROUTE	I-95BUS/US 301
COUNTY	CUMBERLAND

GEOLOGIST	J.B. BARFIELD
GEOTECHS	TRIGON

FILE	W-5519_CONEPEN2

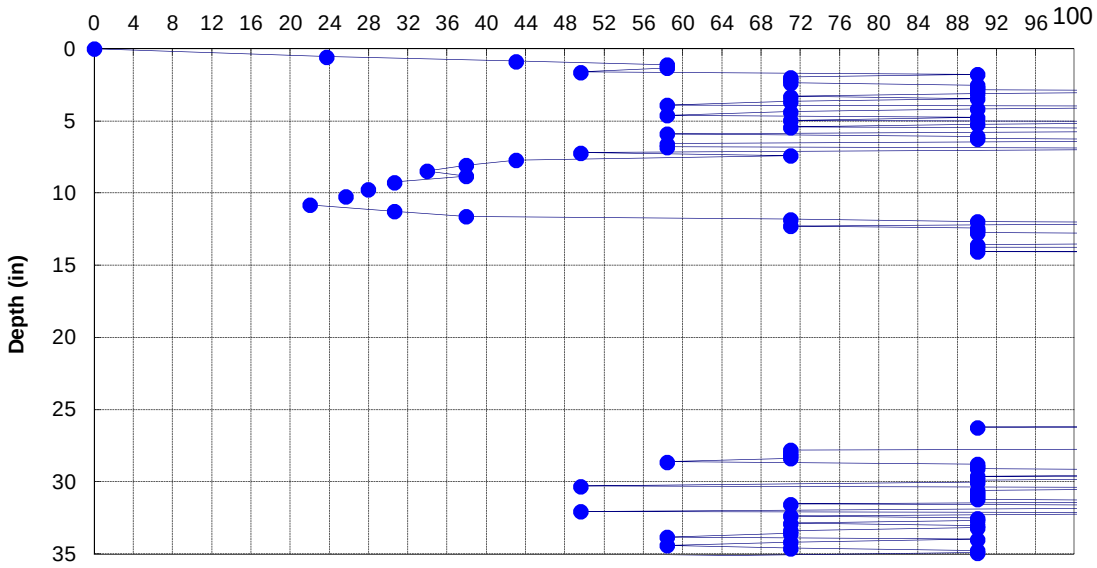
243+00 NB ISL
1.2' FROM YELLOW
Datum = SG

RAW
GRADE
10/09/14

23

Interval 0.0 to 0.0	
# of Values	0
Avg CBR	#DIV/0!
Wghtd Avg.	#DIV/0!
Max CBR	0.0
Min CBR	0.0

Interval 0.0 to 40.2	
# of Values	289
Avg CBR	100+
Wghtd Avg.	100+
Max CBR	100+
Min CBR	22.0



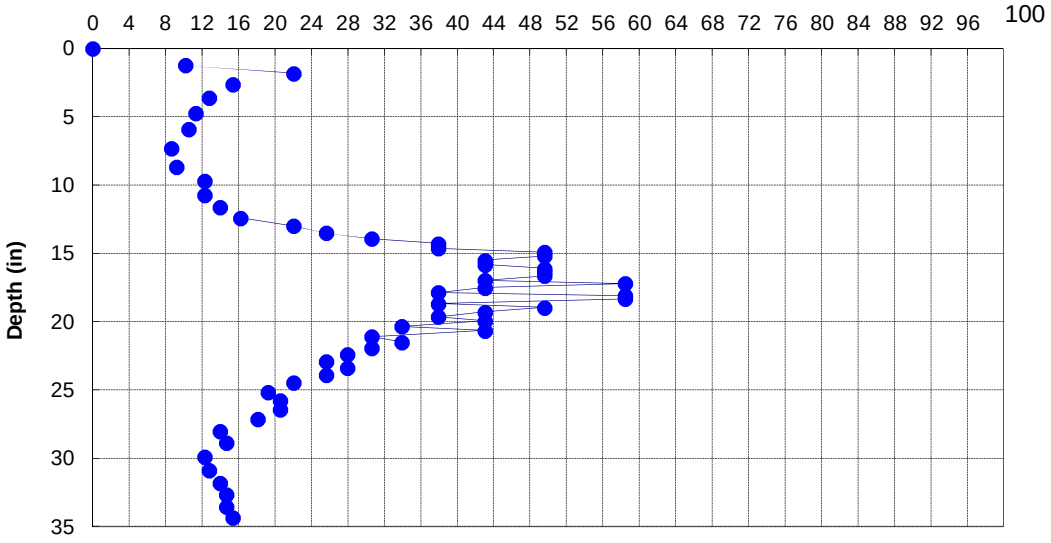
252+25 NB LTL
1.5' FROM YELLOW
Datum = SG

RAW
GRADE
10/08/14

24

Interval 0.0 to 0.0	
# of Values	0
Avg CBR	#DIV/0!
Wghtd Avg	#DIV/0!
Max CBR	0.0
Min CBR	0.0

Interval 0.0 to 38.2	
# of Values	62
Avg CBR	27.9
Wghtd Avg.	21.0
Max CBR	58.4
Min CBR	8.6



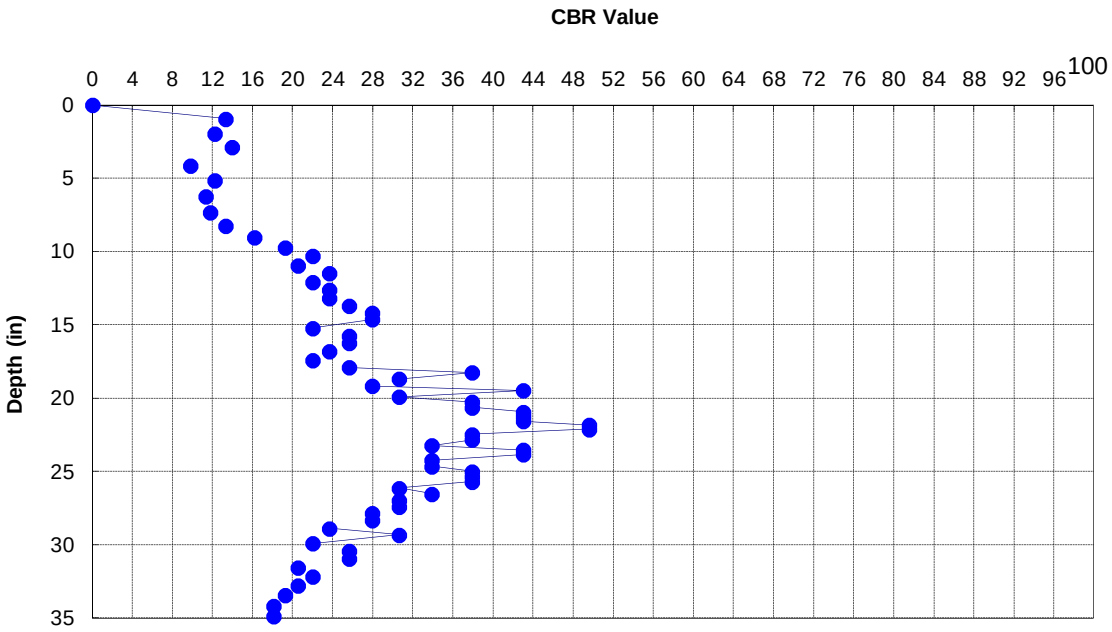
CONE PENETROMETER RESULTS
NC - DOT, GEOTECHNICAL ENGINEERING UNIT

PROJECT NO.	45849.1.FR1
PROJECT ID	W-5519
ROUTE	I-95BUS/US 301
COUNTY	CUMBERLAND

GEOLOGIST	J.B. BARFIELD
GEOTECHS	TRIGON

FILE	W-5519_CONEPEN2□

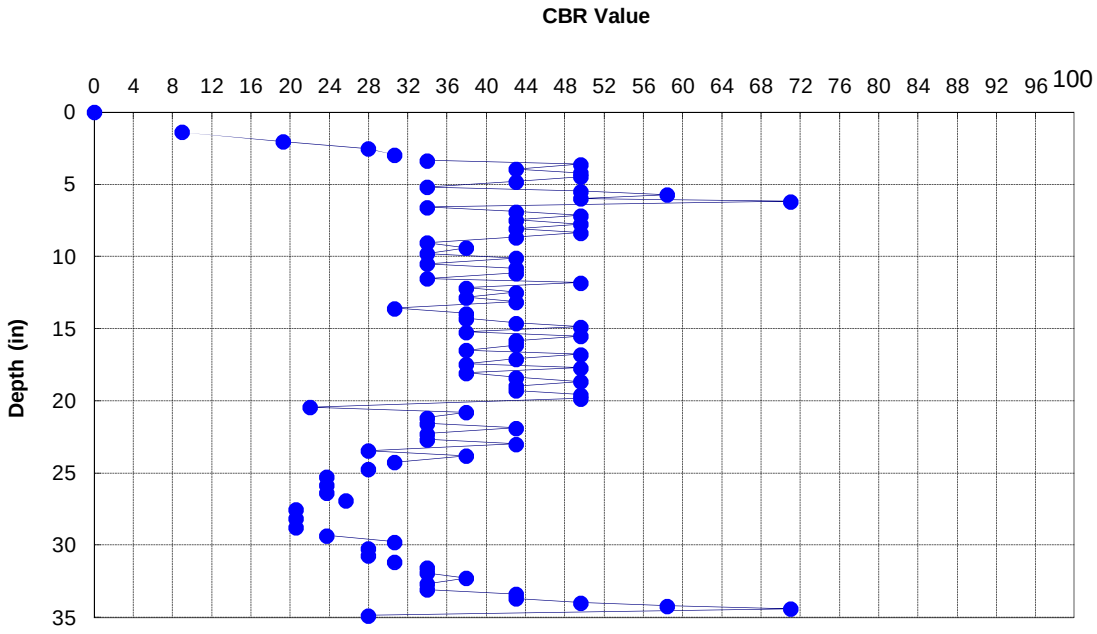
254+00 SB LTL — RAW — 25
1.5' FROM YELLOW — GRADE
Datum = SG — 10/11/14



Interval 0.0 to 0.0	
# of Values	0
Avg CBR	#DIV/0!
Wghtd Avg.	#DIV/0!
Max CBR	0.0
Min CBR	0.0

Interval 0.0 to 39.1	
# of Values	71
Avg CBR	27.1
Wghtd Avg.	23.7
Max CBR	49.6
Min CBR	9.8

264+75 NB LTL — RAW — 26
0.8' FROM YELLOW — FILL
Datum = SG — 10/08/14



Interval 0.0 to 0.0	
# of Values	0
Avg CBR	#DIV/0!
Wghtd Avg.	#DIV/0!
Max CBR	0.0
Min CBR	0.0

Interval 0.0 to 41.0	
# of Values	103
Avg CBR	37.3
Wghtd Avg.	33.5
Max CBR	70.9
Min CBR	8.9

CONE PENETROMETER RESULTS
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PROJECT NO.	45849.1.FR1
PROJECT ID	W-5519
ROUTE	I-95BUS/US 301
COUNTY	CUMBERLAND

GEOLOGIST	J.B. BARFIELD
GEOTECHS	TRIGON

FILE	W-5519_CONEPEN2□

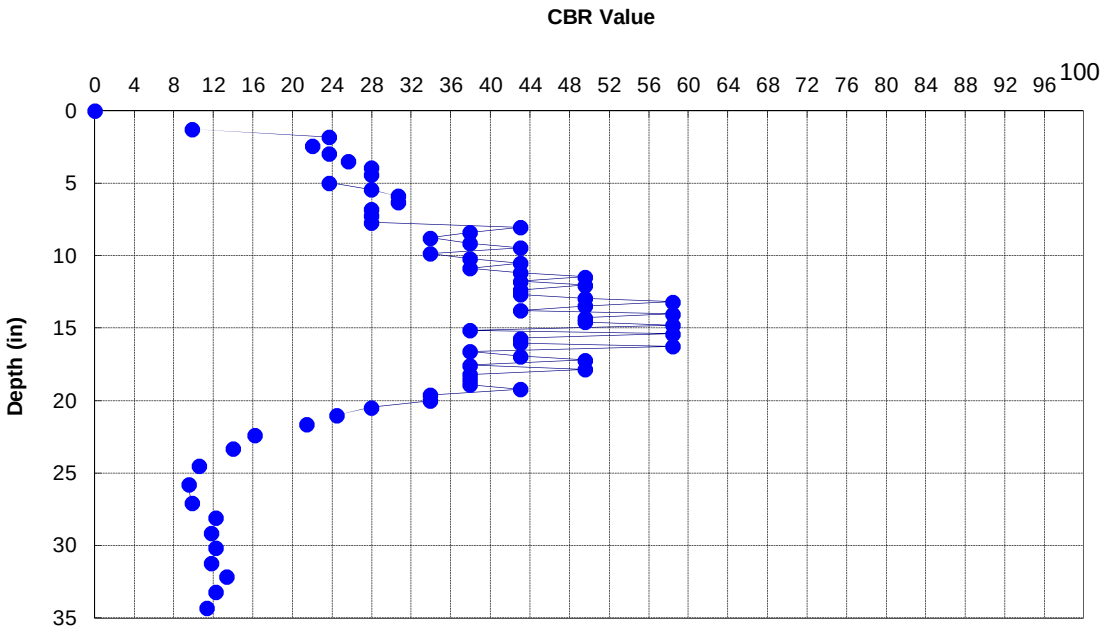
266+00 SB LTL
1.2' FROM C&G
Datum = SG

RAW
FILL
10/11/14

27

Interval 0.0 to 0.0	
# of Values	0
Avg CBR	#DIV/0!
Wghtd Avg.	#DIV/0!
Max CBR	0.0
Min CBR	0.0

Interval 0.0 to 35.2	
# of Values	69
Avg CBR	33.5
Wghtd Avg.	25.7
Max CBR	58.4
Min CBR	9.5



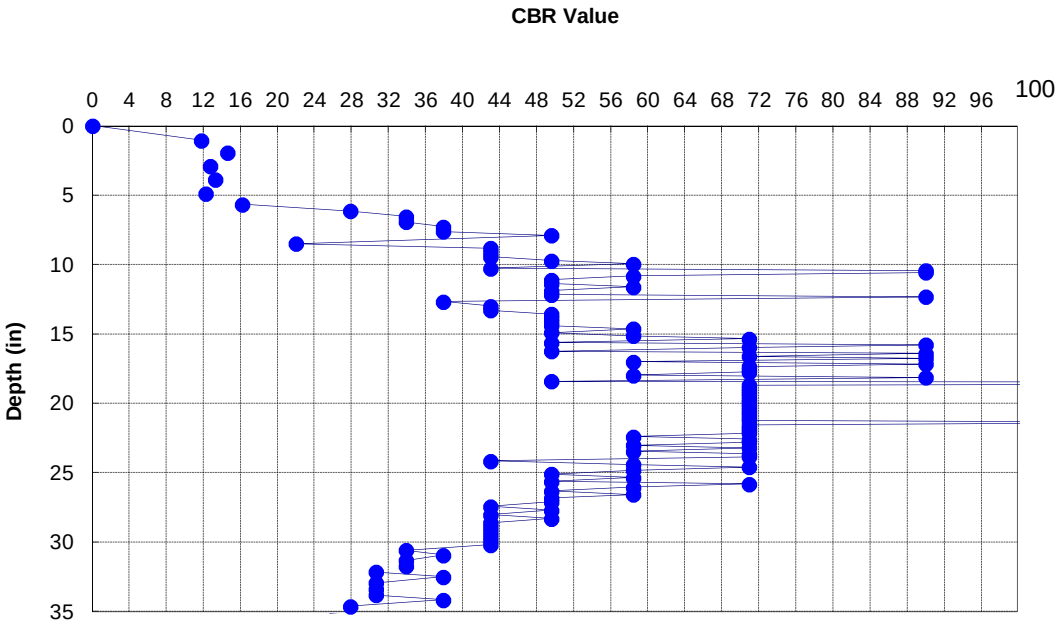
276+75 NB LTL
2.3' FROM YELLOW
Datum = SG

RAW
GRADE
10/09/14

28

Interval 0.0 to 0.0	
# of Values	0
Avg CBR	#DIV/0!
Wghtd Avg.	#DIV/0!
Max CBR	0.0
Min CBR	0.0

Interval 0.0 to 42.1	
# of Values	128
Avg CBR	52.6
Wghtd Avg.	41.1
Max CBR	100+
Min CBR	11.8



CONE PENETROMETER RESULTS
NC - DOT, GEOTECHNICAL ENGINEERING UNIT

PROJECT NO.	45849.1.FR1
PROJECT ID	W-5519
ROUTE	I-95BUS/US 301
COUNTY	CUMBERLAND

GEOLOGIST	J.B. BARFIELD
GEOTECHS	TRIGON

FILE	W-5519_CONEPEN2□

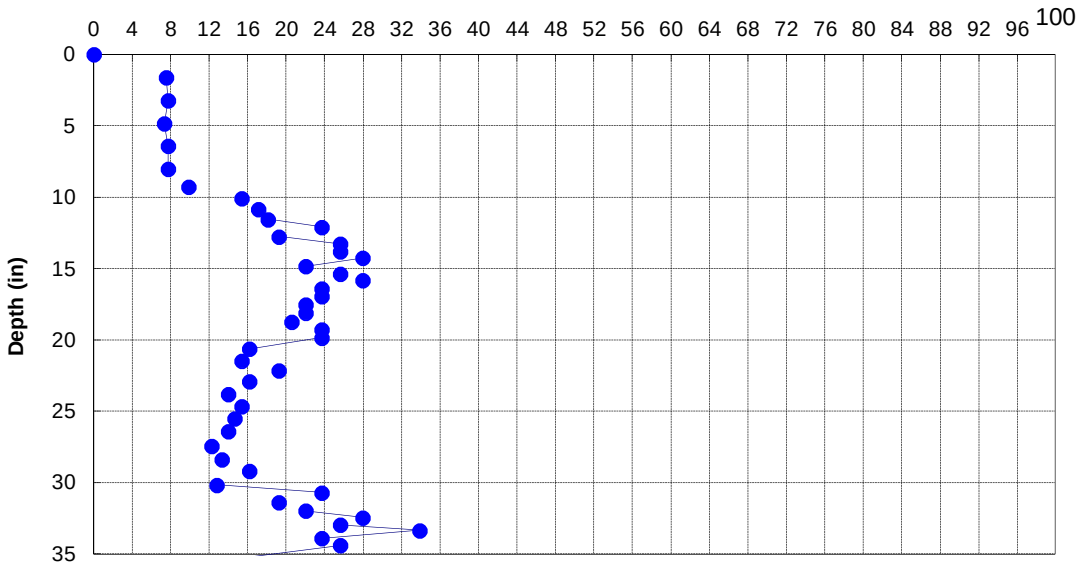
278+25 SB LTL
0.6' FROM YELLOW
Datum = SG

RAW
GRADE
10/11/14

29

Interval 0.0 to 0.0	
# of Values	0
Avg CBR	#DIV/0!
Wghtd Avg.	#DIV/0!
Max CBR	0.0
Min CBR	0.0

Interval 0.0 to 38.1	
# of Values	47
Avg CBR	18.5
Wghtd Avg.	15.7
Max CBR	33.9
Min CBR	7.3



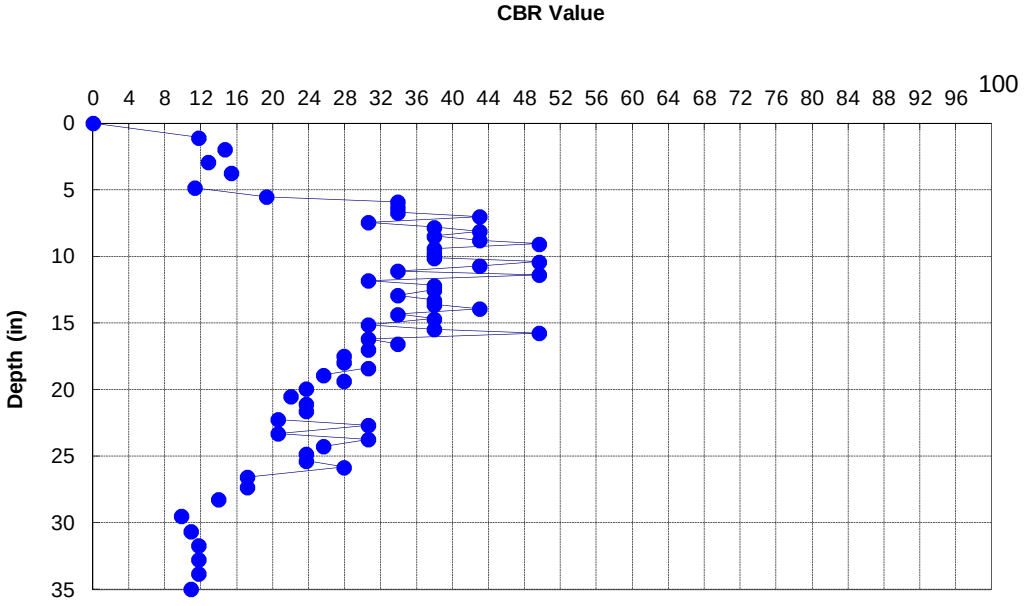
320+00 SB LTL
0.5' FROM YELLOW
Datum = SG

RAW
GRADE
10/11/14

30

Interval 0.0 to 0.0	
# of Values	0
Avg CBR	#DIV/0!
Wghtd Avg.	#DIV/0!
Max CBR	0.0
Min CBR	0.0

Interval 0.0 to 39.0	
# of Values	67
Avg CBR	28.1
Wghtd Avg.	22.3
Max CBR	49.6
Min CBR	8.9



CONE PENETROMETER RESULTS
NC - DOT, GEOTECHNICAL ENGINEERING UNIT

PROJECT NO.	45849.1.FR1
PROJECT ID	W-5519
ROUTE	I-95BUS/US 301
COUNTY	CUMBERLAND

GEOLOGIST	J.B. BARFIELD
GEOTECHS	TRIGON

FILE	W-5519_CONEPEN2□

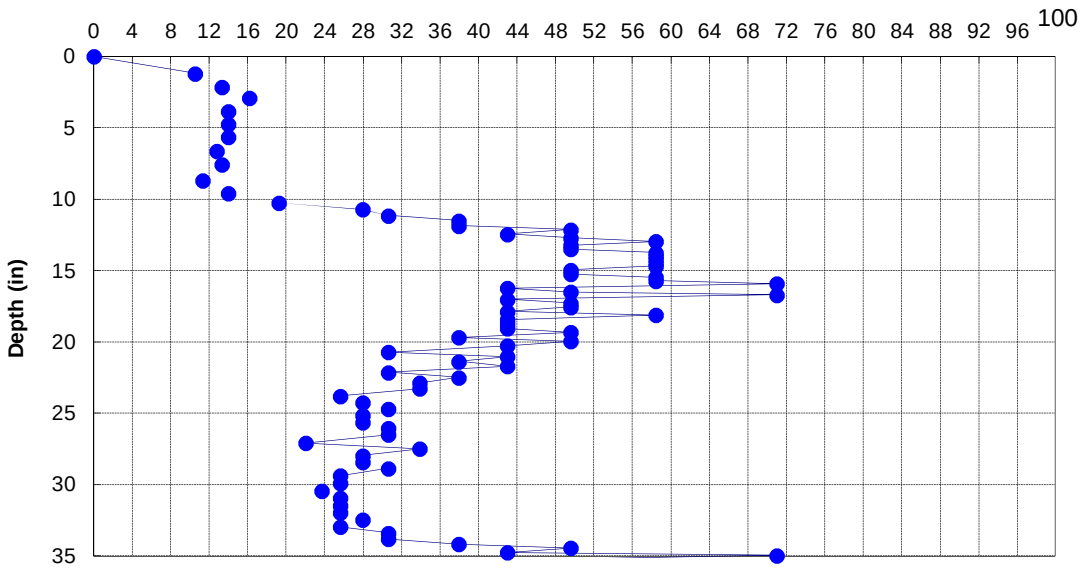
329+75 NB LTL
2.8' FROM YELLOW
Datum = SG

RAW
GRADE
10/09/14

31

Interval 0.0 to 0.0	
# of Values	0
Avg CBR	#DIV/0!
Wghtd Avg.	#DIV/0!
Max CBR	0.0
Min CBR	0.0

Interval 0.0 to 38.0	
# of Values	94
Avg CBR	42.1
Wghtd Avg.	33.0
Max CBR	100+
Min CBR	10.5



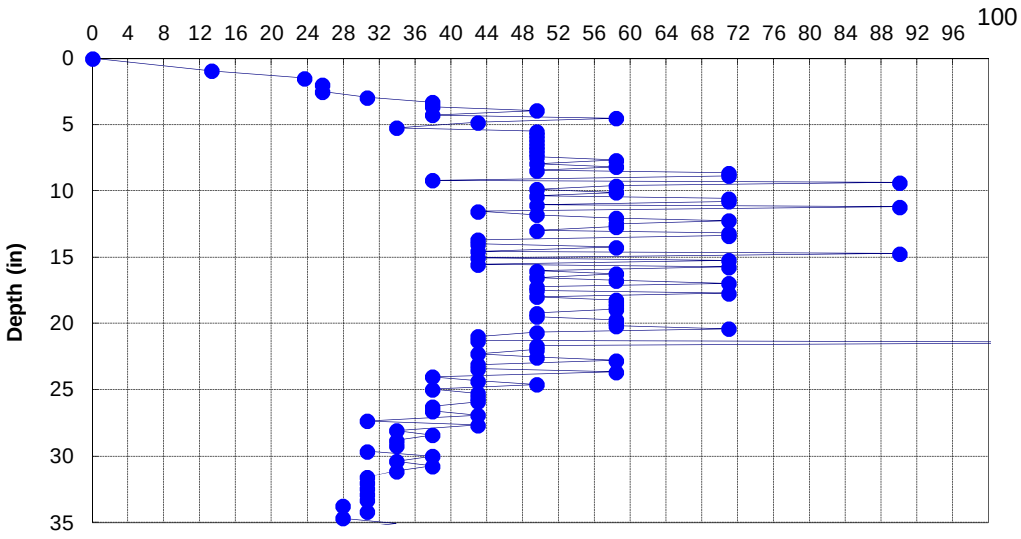
360+50 NB LTL
ON YELLOW
Datum = SG

RAW
FILL
10/09/14

32

Interval 0.0 to 0.0	
# of Values	0
Avg CBR	#DIV/0!
Wghtd Avg.	#DIV/0!
Max CBR	0.0
Min CBR	0.0

Interval 0.0 to 36.0	
# of Values	117
Avg CBR	48.7
Wghtd Avg.	44.0
Max CBR	100+
Min CBR	13.3



CONE PENETROMETER RESULTS
NC - DOT, GEOTECHNICAL ENGINEERING UNIT

PROJECT NO.	45849.1.FR1
PROJECT ID	W-5519
ROUTE	I-95BUS/US 301
COUNTY	CUMBERLAND

GEOLOGIST	J.B. BARFIELD
GEOTECHS	TRIGON

FILE	W-5519_CONEPEN2□

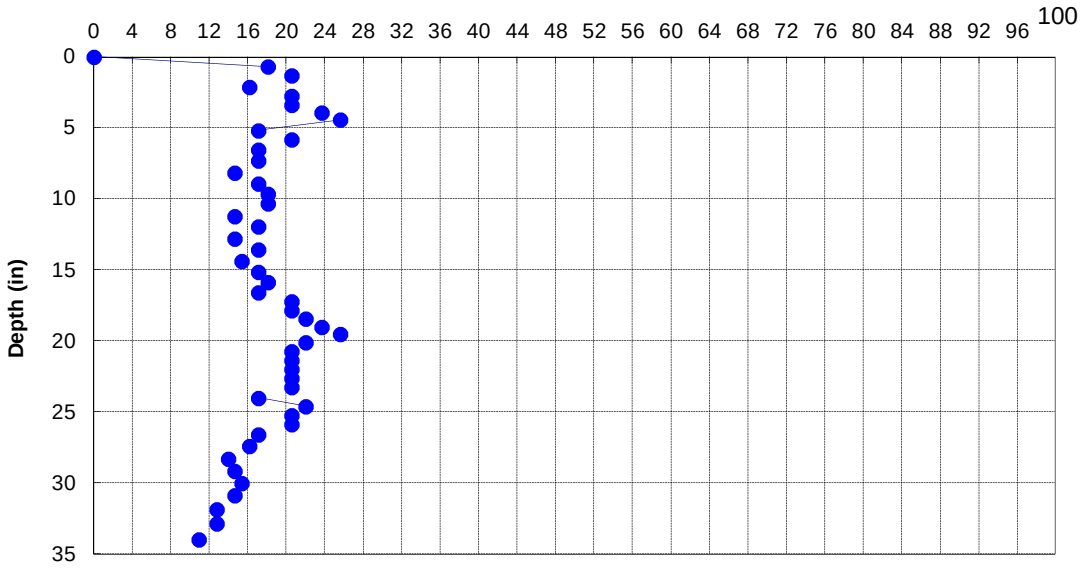
362+30 SB LTL
0.9' FROM YELLOW
Datum = SG

RAW
FILL
10/11/14

33

Interval 0.0 to 0.0	
# of Values	0
Avg CBR	#DIV/0!
Wghtd Avg.	#DIV/0!
Max CBR	0.0
Min CBR	0.0

Interval 0.0 to 37.7	
# of Values	50
Avg CBR	17.8
Wghtd Avg.	17.0
Max CBR	25.6
Min CBR	8.9



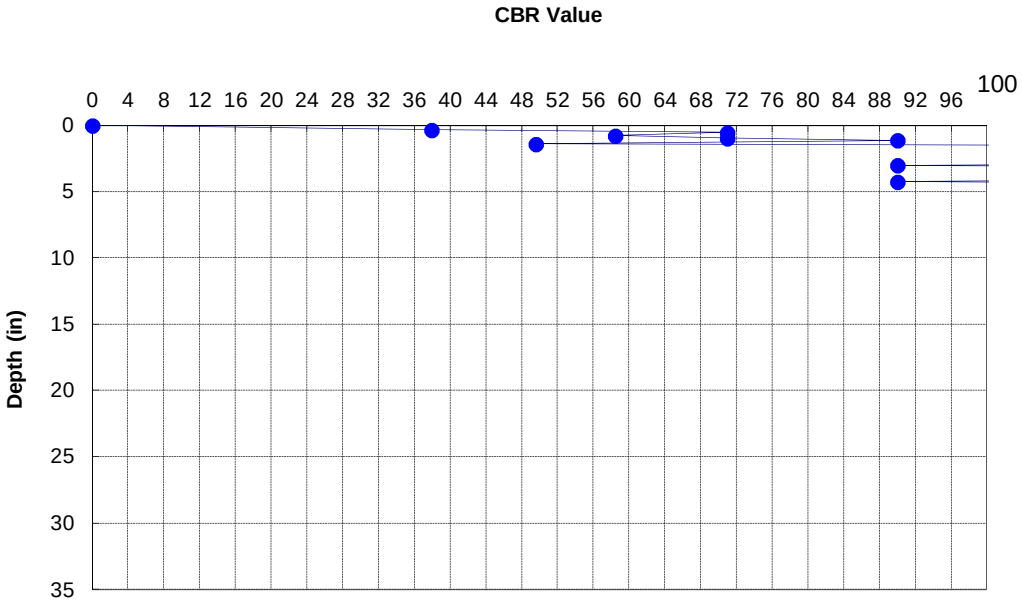
368+65 SB OSS
1.7' RT
Datum = SG

RAW
GRADE
10/11/14

34

Interval 0.0 to 0.0	
# of Values	0
Avg CBR	#DIV/0!
Wghtd Avg.	#DIV/0!
Max CBR	0.0
Min CBR	0.0

Interval 0.0 to 4.8	
# of Values	37
Avg CBR	100+
Wghtd Avg.	100+
Max CBR	100+
Min CBR	37.9



CONE PENETROMETER RESULTS
NC - DOT, GEOTECHNICAL ENGINEERING UNIT

PROJECT NO.	45849.1.FR1
PROJECT ID	W-5519
ROUTE	I-95BUS/US 301
COUNTY	CUMBERLAND

GEOLOGIST	J.B. BARFIELD
GEOTECHS	TRIGON

FILE	W-5519_CONEPEN2□

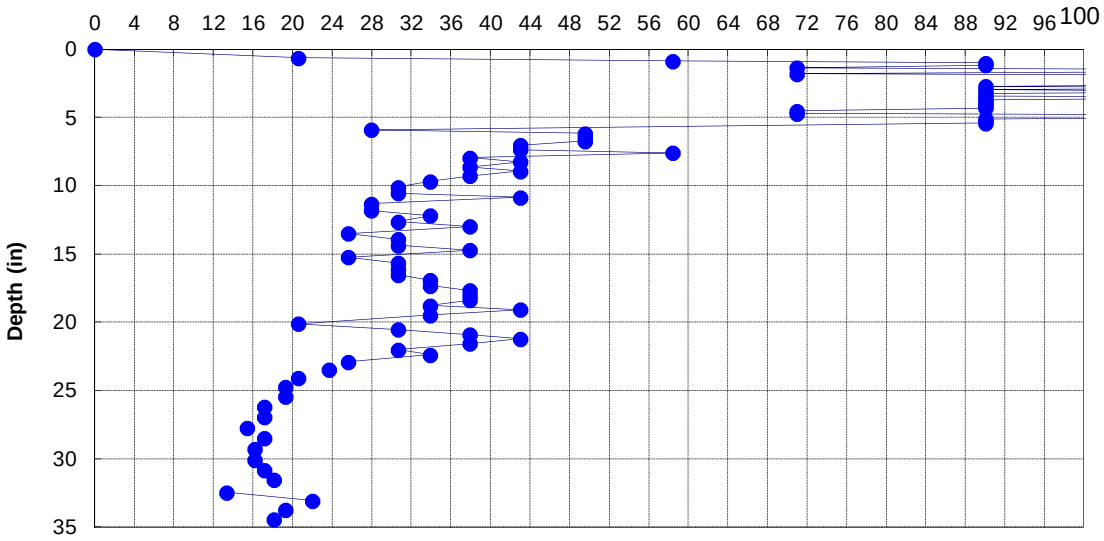
368+65 SB OSL
2.0' LT
Datum = SG

RAW
GRADE
10/11/14

35

Interval 0.0 to 0.0	
# of Values	0
Avg CBR	#DIV/0!
Wghtd Avg.	#DIV/0!
Max CBR	0.0
Min CBR	0.0

Interval 0.0 to 37.7	
# of Values	100
Avg CBR	54.7
Wghtd Avg.	35.2
Max CBR	100+
Min CBR	13.3



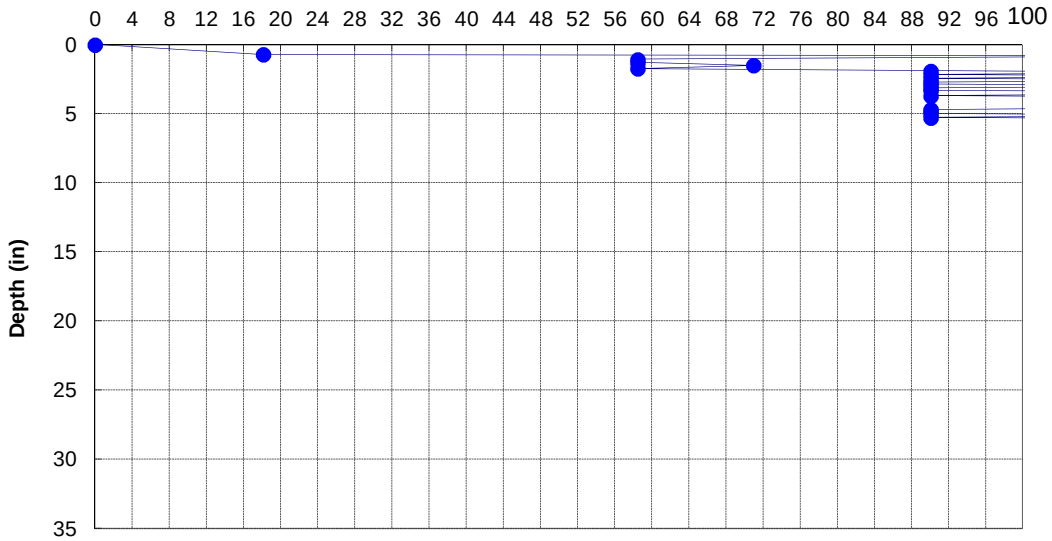
368+65 SB ISL
0.5' RT
Datum = SG

RAW
GRADE
10/11/14

36

Interval 0.0 to 0.0	
# of Values	0
Avg CBR	#DIV/0!
Wghtd Avg.	#DIV/0!
Max CBR	0.0
Min CBR	0.0

Interval 0.0 to 6.8	
# of Values	47
Avg CBR	100+
Wghtd Avg.	98.9
Max CBR	100+
Min CBR	18.1



CONE PENETROMETER RESULTS
NC - DOT, GEOTECHNICAL ENGINEERING UNIT

PROJECT NO.	45849.1.FR1
PROJECT ID	W-5519
ROUTE	I-95BUS/US 301
COUNTY	CUMBERLAND

GEOLOGIST	J.B. BARFIELD
GEOTECHS	TRIGON

FILE	W-5519_CONEPEN2□

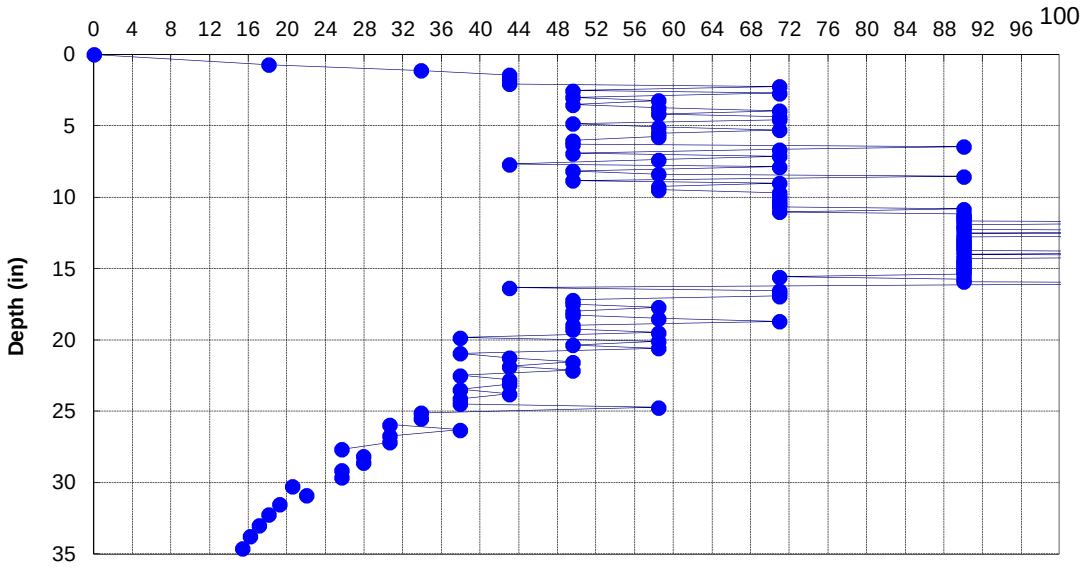
368+65 NB OSS
1.5' RT
Datum = SG

RAW
GRADE
10/09/14

37

Interval 0.0 to 0.0	
# of Values	0
Avg CBR	#DIV/0!
Wghtd Avg.	#DIV/0!
Max CBR	0.0
Min CBR	0.0

Interval 0.0 to 38.5	
# of Values	131
Avg CBR	60.7
Wghtd Avg.	46.3
Max CBR	100+
Min CBR	9.5



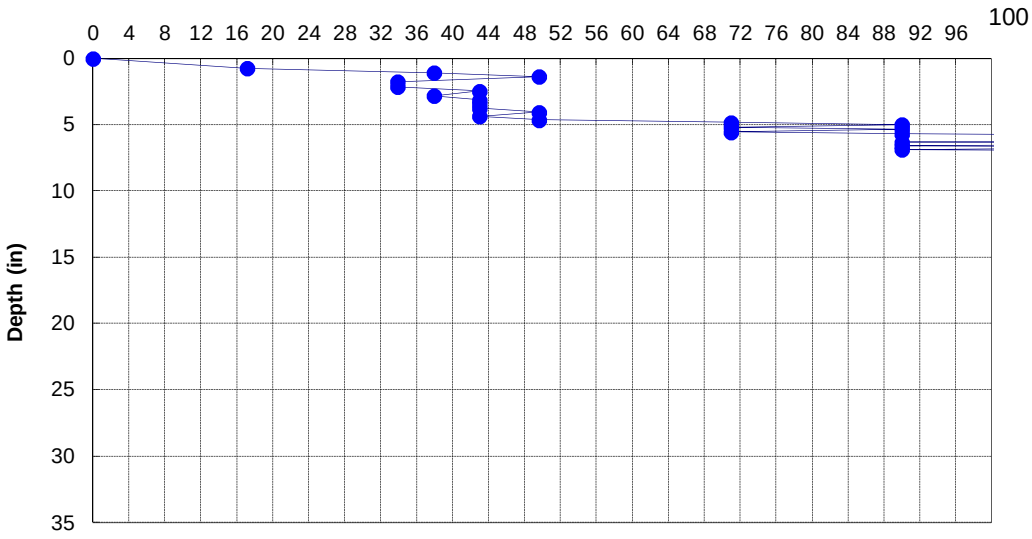
368+65 NB OSL
2.5' LT
Datum = SG

RAW
GRADE
10/09/14

38

Interval 0.0 to 0.0	
# of Values	0
Avg CBR	#DIV/0!
Wghtd Avg.	#DIV/0!
Max CBR	0.0
Min CBR	0.0

Interval 0.0 to 11.7	
# of Values	89
Avg CBR	100+
Wghtd Avg.	100+
Max CBR	100+
Min CBR	17.1



CONE PENETROMETER RESULTS
NC - DOT, GEOTECHNICAL ENGINEERING UNIT

PROJECT NO.	45849.1.FR1
PROJECT ID	W-5519
ROUTE	I-95BUS/US 301
COUNTY	CUMBERLAND

GEOLOGIST	J.B. BARFIELD
GEOTECHS	TRIGON

FILE	W-5519_CONEPEN2□

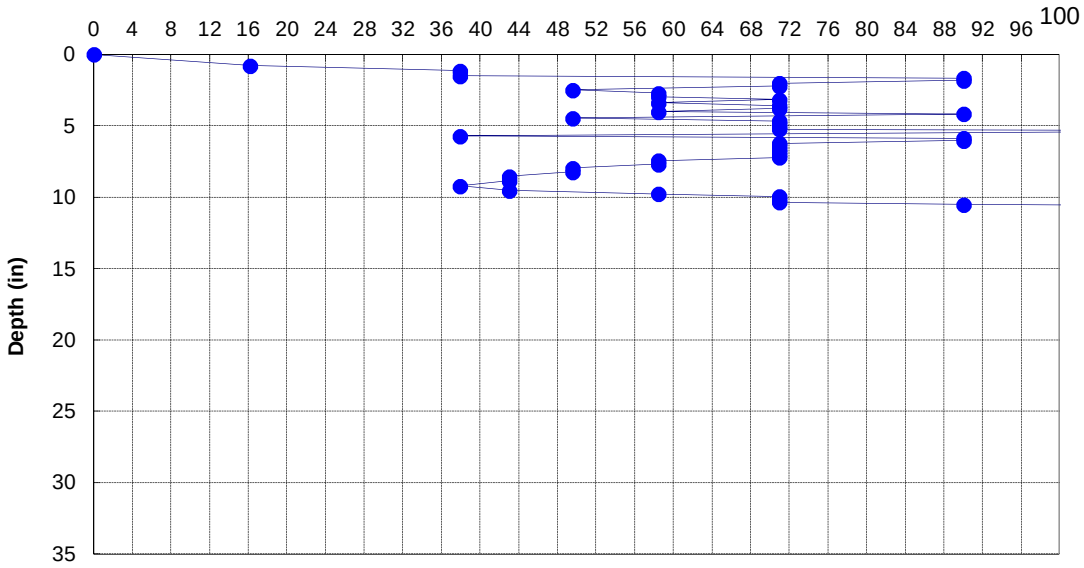
368+65 NB ISL
0.7' FROM YELLOW
Datum = SG

RAW
GRADE
10/10/14

39

Interval 0.0 to 0.0	
# of Values	0
Avg CBR	#DIV/0!
Wghtd Avg.	#DIV/0!
Max CBR	0.0
Min CBR	0.0

Interval 0.0 to 13.4	
# of Values	75
Avg CBR	100+
Wghtd Avg.	78.8
Max CBR	100+
Min CBR	16.2



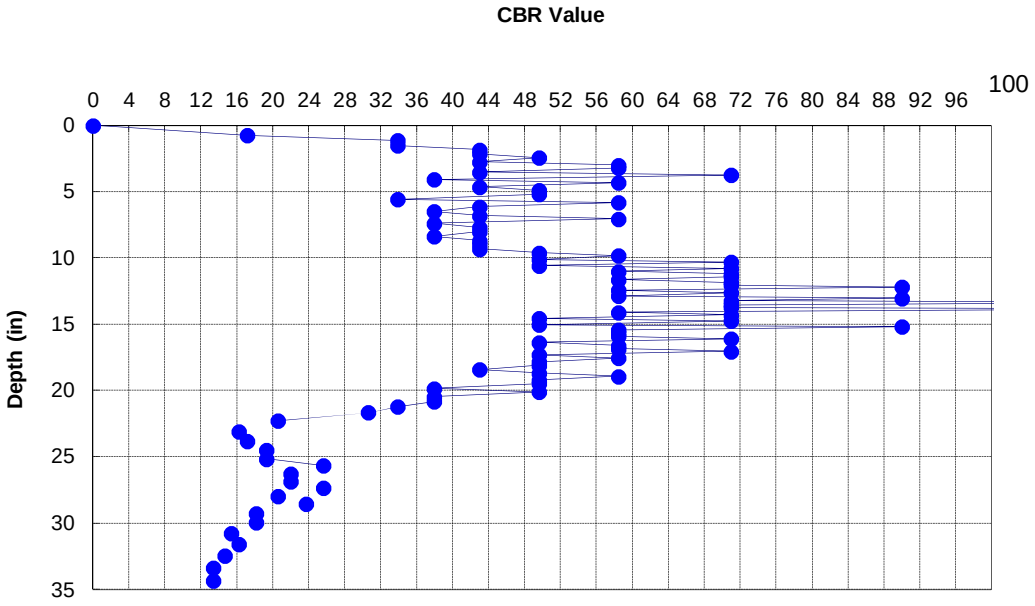
371+50 NB LTL
0.8' FROM YELLOW
Datum = SG

RAW
GRADE
10/10/14

40

Interval 0.0 to 0.0	
# of Values	0
Avg CBR	#DIV/0!
Wghtd Avg.	#DIV/0!
Max CBR	0.0
Min CBR	0.0

Interval 0.0 to 35.4	
# of Values	99
Avg CBR	48.3
Wghtd Avg.	37.5
Max CBR	100+
Min CBR	11.3



CONE PENETROMETER RESULTS
NC - DOT, GEOTECHNICAL ENGINEERING UNIT

PROJECT NO.	45849.1.FR1
PROJECT ID	W-5519
ROUTE	I-95BUS/ US 301
COUNTY	CUMBERLAND

GEOLOGIST	J. B. BARFIELD
GEOTECHS	TRIGON

FILE	w-5519_CONEPEN3

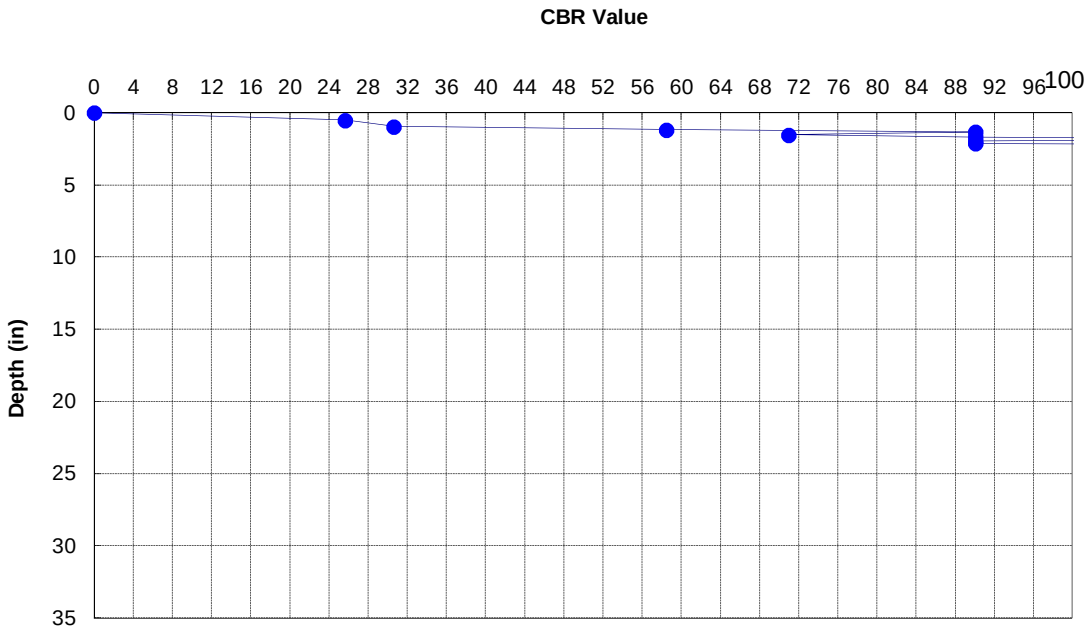
375+75 NB LTL
5' FROM MEDIAN
Datum = SG

RAW
GRADE
10/10/14

41

Interval 0.0 to 0.0	
# of Values	0
Avg CBR	#DIV/0!
Wghtd Avg.	#DIV/0!
Max CBR	0.0
Min CBR	0.0

Interval 0.0 to 8.7	
# of Values	71
Avg CBR	100+
Wghtd Avg.	100+
Max CBR	100+
Min CBR	25.6



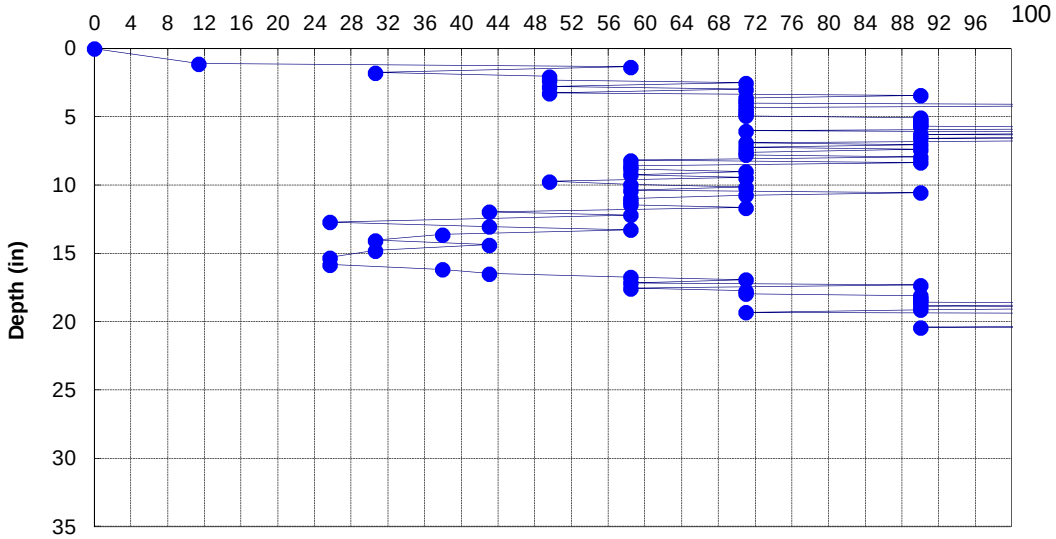
416+00 NB OSS
1.9' RT
Datum = SG

RAW
FILL
10/10/14

42

Interval 0.0 to 0.0	
# of Values	0
Avg CBR	#DIV/0!
Wghtd Avg.	#DIV/0!
Max CBR	0.0
Min CBR	0.0

Interval 0.0 to 22.2	
# of Values	107
Avg CBR	81.7
Wghtd Avg.	67.1
Max CBR	100+
Min CBR	11.3



CONE PENETROMETER RESULTS
NC - DOT, GEOTECHNICAL ENGINEERING UNIT

PROJECT NO.	45849.1.FR1
PROJECT ID	W-5519
ROUTE	I-95BUS/ US 301
COUNTY	CUMBERLAND

GEOLOGIST	J. B. BARFIELD
GEOTECHS	TRIGON

FILE	w-5519_CONEPEN3

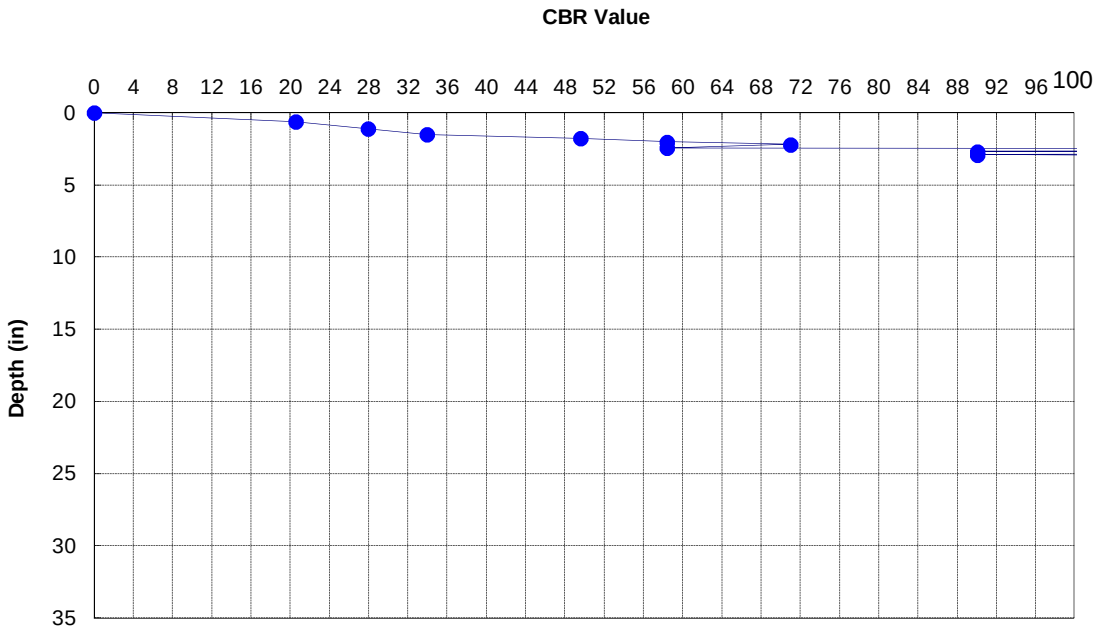
416+00 NB OSL
1.5' LT
Datum = SG

RAW
FILL
10/10/14

43

Interval 0.0 to 0.0	
# of Values	0
Avg CBR	#DIV/0!
Wghtd Avg.	#DIV/0!
Max CBR	0.0
Min CBR	0.0

Interval 0.0 to 6.3	
# of Values	62
Avg CBR	100+
Wghtd Avg.	100+
Max CBR	100+
Min CBR	20.5



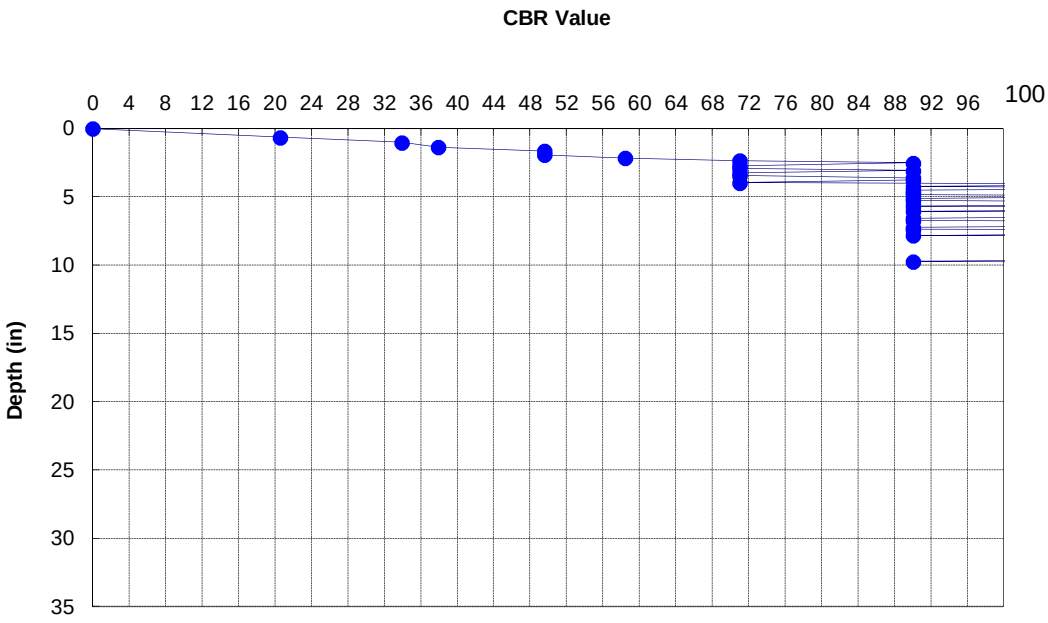
416+00 NB ISL
0.8' FROM YELLOW
Datum = SG

RAW
FILL
10/10/14

44

Interval 0.0 to 0.0	
# of Values	0
Avg CBR	#DIV/0!
Wghtd Avg	#DIV/0!
Max CBR	0.0
Min CBR	0.0

Interval 0.0 to 11.4	
# of Values	76
Avg CBR	100+
Wghtd Avg.	95.0
Max CBR	100+
Min CBR	20.5



CONE PENETROMETER RESULTS
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PROJECT NO.	45849.1.FR1
PROJECT ID	W-5519
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COUNTY	CUMBERLAND

GEOLOGIST	J. B. BARFIELD
GEOTECHS	TRIGON

FILE	w-5519_CONEPEN3

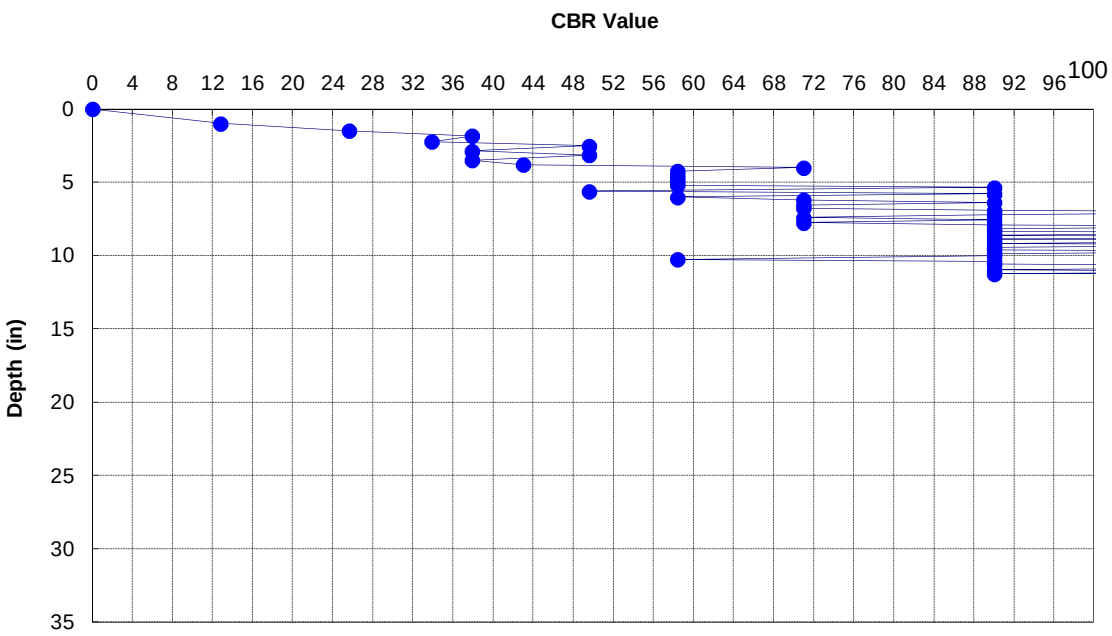
416+00 SB OSS
1.9' RT
Datum = SG

RAW
FILL
10/10/14

45

Interval 0.0 to 0.0	
# of Values	0
Avg CBR	#DIV/0!
Wghtd Avg.	#DIV/0!
Max CBR	0.0
Min CBR	0.0

Interval 0.0 to 11.5	
# of Values	55
Avg CBR	82.6
Wghtd Avg.	66.8
Max CBR	100+
Min CBR	12.8



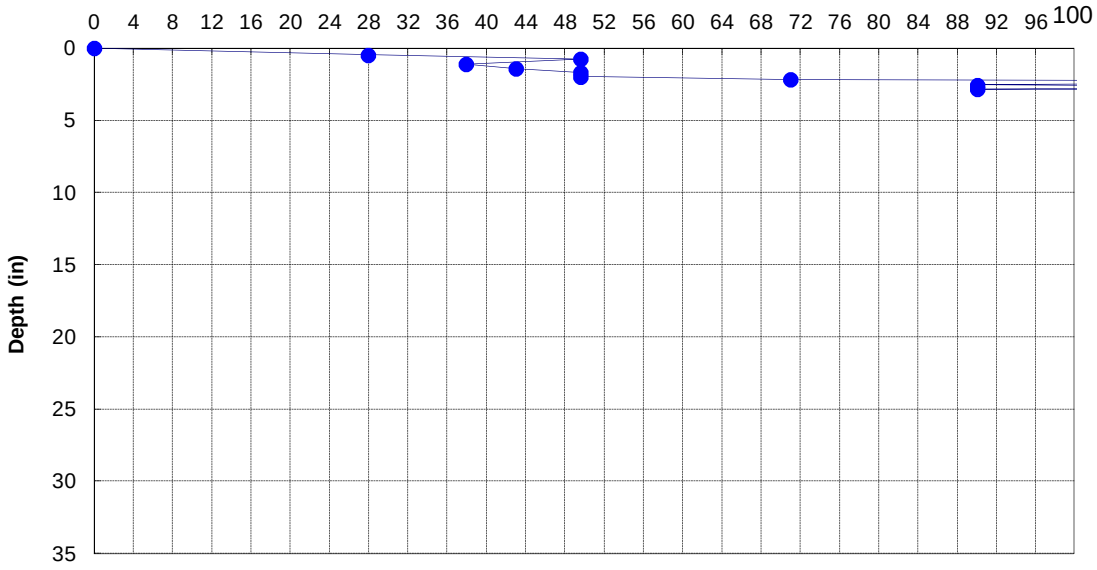
416+00 SB OSL
2.3' LT
Datum = SG

RAW
FILL
10/10/14

46

Interval 0.0 to 0.0	
# of Values	0
Avg CBR	#DIV/0!
Wghtd Avg.	#DIV/0!
Max CBR	0.0
Min CBR	0.0

Interval 0.0 to 6.3	
# of Values	64
Avg CBR	100+
Wghtd Avg.	100+
Max CBR	100+
Min CBR	27.9



CONE PENETROMETER RESULTS
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PROJECT NO.	45849.1.FR1
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COUNTY	CUMBERLAND

GEOLOGIST	J. B. BARFIELD
GEOTECHS	TRIGON

FILE	w-5519_CONEPEN3

416+00 SB ISL
0.5' FROM YELLOW
Datum = SG

RAW
FILL
10/10/14

47

Interval 0.0 to 0.0	
# of Values	0
Avg CBR	#DIV/0!
Wghtd Avg.	#DIV/0!
Max CBR	0.0
Min CBR	0.0

Interval 0.0 to 9.4	
# of Values	63
Avg CBR	100+
Wghtd Avg.	94.8
Max CBR	100+
Min CBR	13.9