



STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

MICHAEL F. EASLEY
GOVERNOR

May 2, 2005

ROADWAY DESIGN UNIT		
RECEIVED	FILE	
MAY 16 2005		
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<input type="checkbox"/> BREW	<input type="checkbox"/> C. HOUSER	<input type="checkbox"/> HOUSER
<input type="checkbox"/> LOVERING	<input type="checkbox"/> T. BRUTON	<input type="checkbox"/> GOODNIGHT
<input type="checkbox"/> J. MOORE	<input type="checkbox"/> T. THOMPSON	<input type="checkbox"/> SPEER
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<input type="checkbox"/> MUMFORD		<input type="checkbox"/> WALLS
		<input type="checkbox"/> THOMPSON
PREPARE REPLY FOR		SIGNATURE
F.Y.I.		
REVIEW/DISCUSS WITH		

MEMORANDUM TO: Dr. Judith Corley-Lay, P.E.
State Pavement Design Engineer

FROM: *for* *Ned Peterson*
N. W. Wainaina, P.E.
State Geotechnical Engineer

STATE PROJECT: 34445.1.1 (R-2518A) - Turnkey Project
F. A. PROJECT: N/A
COUNTY: Madison/Yancey
DESCRIPTION: US 19 from I-26 to 0.8 km East of the Yancey County Line

SUBJECT: Geotechnical Recommendations for Pavement Design

This report contains pavement design recommendations for the above referenced project. The proposed work consists of widening the existing two and three-lane roadway to construct a four-lane divided facility with a raised center median.

The length of this project is 10.582 km.

Soils: The predominant soils along this project generally consist of silty sand (A-2-4) and sandy silt (A-4). Other soils encountered were clayey silt (A-5) and sandy/silty clays (A-6, A-7). Approximately 30% of the project mainline is proposed embankment. Anticipate borrow for embankments will consist of the soil types listed above. CBR data for the project is as follows:

CLASS	A-2-4(0)	A-2-5(0)	A-4(1)	A-7-5(4)
CBR VALUE	*	*	*	*

*indicates CBR values forthcoming

The following design values are recommended:

S= 3.5

R=1.5

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

TELEPHONE: 919-250-4088
FAX: 919-250-4237

WEBSITE: WWW.DOH.DOT.STATE.NC.US

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

Drainage: The topography is mountainous and the project is generally well drained.

Existing Pavement: Data for existing pavement is as follows:

Original Mainline

-L- Sta. 9+25.000 (Begin Project) to -L- Sta. 115+06.547(End Project)

Pavement Structure: 180 - 290 mm Asphalt 6' - 0"
 250 - 450 mm ABC
 Subgrade

Width: 6.5± meters

Condition: Generally fair. Frequent, low to moderate severity longitudinal and transverse cracks are present. Occasional, low to moderate severity fatigue cracking is present in isolated areas along the project. The pavement cores from the original mainline appear friable and show signs of stripping in the bottom 50±mm. Pavement cores were taken in distressed locations along the project and typically indicate full-depth cracking.

Right Outside Lane (Three-Lane Section)

-L- Sta. 88+80± to -L- Sta. 100+66 (End Pavement Utilization)

Pavement Structure: 160 - 180 mm Asphalt
 320 - 370 mm ABC
 Subgrade

Width: 3.5± meters

Condition: Generally fair. Frequent, low to moderate, severity longitudinal and transverse cracks are present. Occasional, low to moderate, severity fatigue cracking appears in isolated areas.

DESIGN AND CONSTRUCTION RECOMMENDATIONS

I. Subgrade Stability

A. Stabilize subgrade of project (mainline) as follows:

(b) Cement Stabilization: 70% of project; 30 kg/m² @ 180mm depth. Also, 135 kg/m² of ABC for 5% of cement area.

A special provision will be submitted for this item.

(a) Lime Stabilization (method-slurry): 30% of project; 11kg/m² @ 200mm depth.

B. Aggregate for Aggregate Stabilization

A quantity of 500 metric tons of aggregate (ABC) for aggregate stabilization should be included in the project contract as a contingency item.

III. Miscellaneous

A. Proof Rolling

It is recommended that proof rolling be performed on this project and should conform to Standard Specifications, Article 260.

B. Blotting Sand

A quantity of 15 metric tons of blotting sand should be included in the project contract to be used at the discretion of the Engineer.

Note: For additional recommendations and quantities refer to the Geotechnical Report-Final Design and Construction Recommendations dated June 10, 2004.

NTR/JBB

CC: Mr. J. A. Bennett, PE
Mr. Jay Swain, PE
Mr. T. M. Hearne, PE
Mr. N. T. Roberson, LG

WBS Element No.: 34445.1.1

(U-2518A)

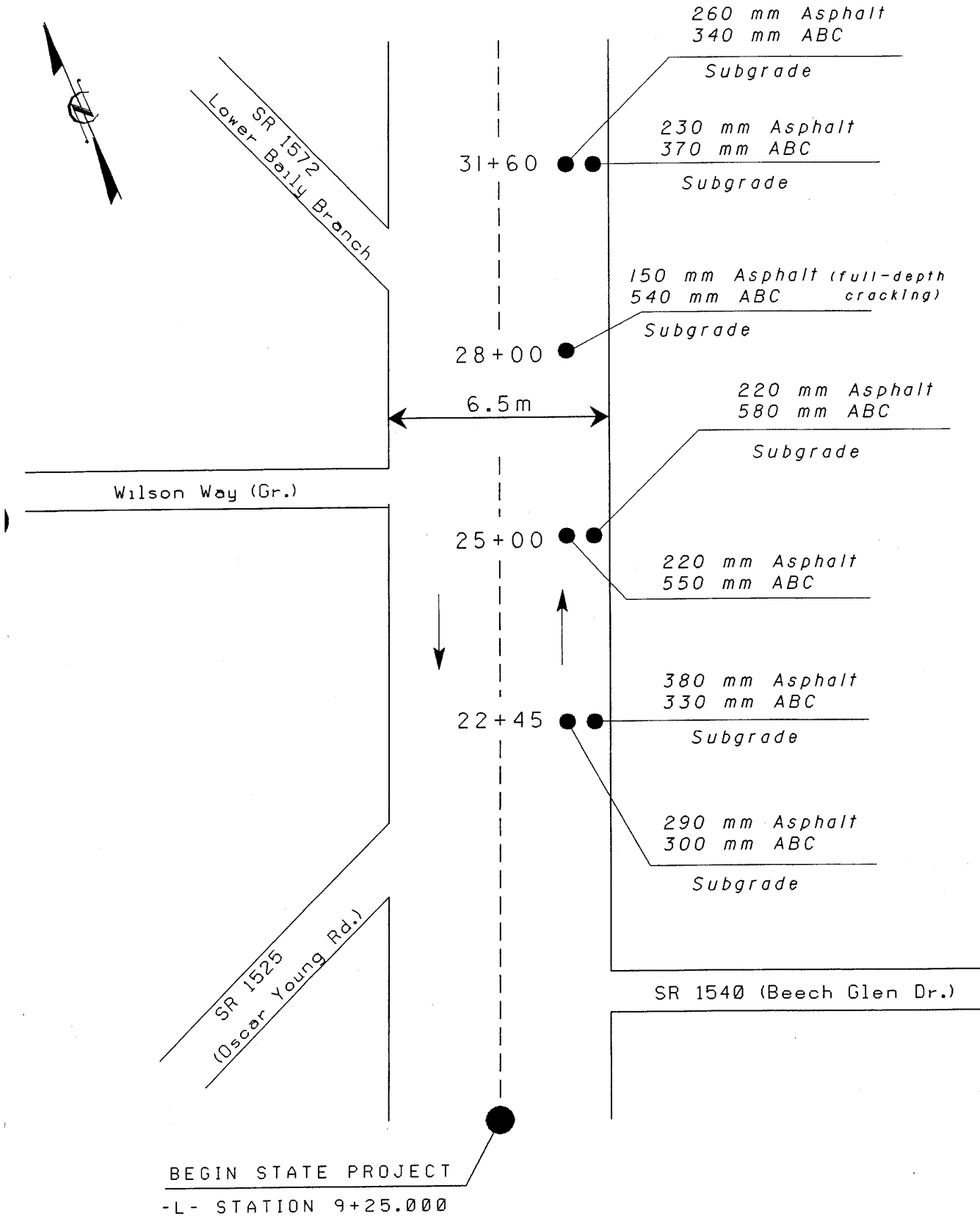
Madison/Yancey Co.

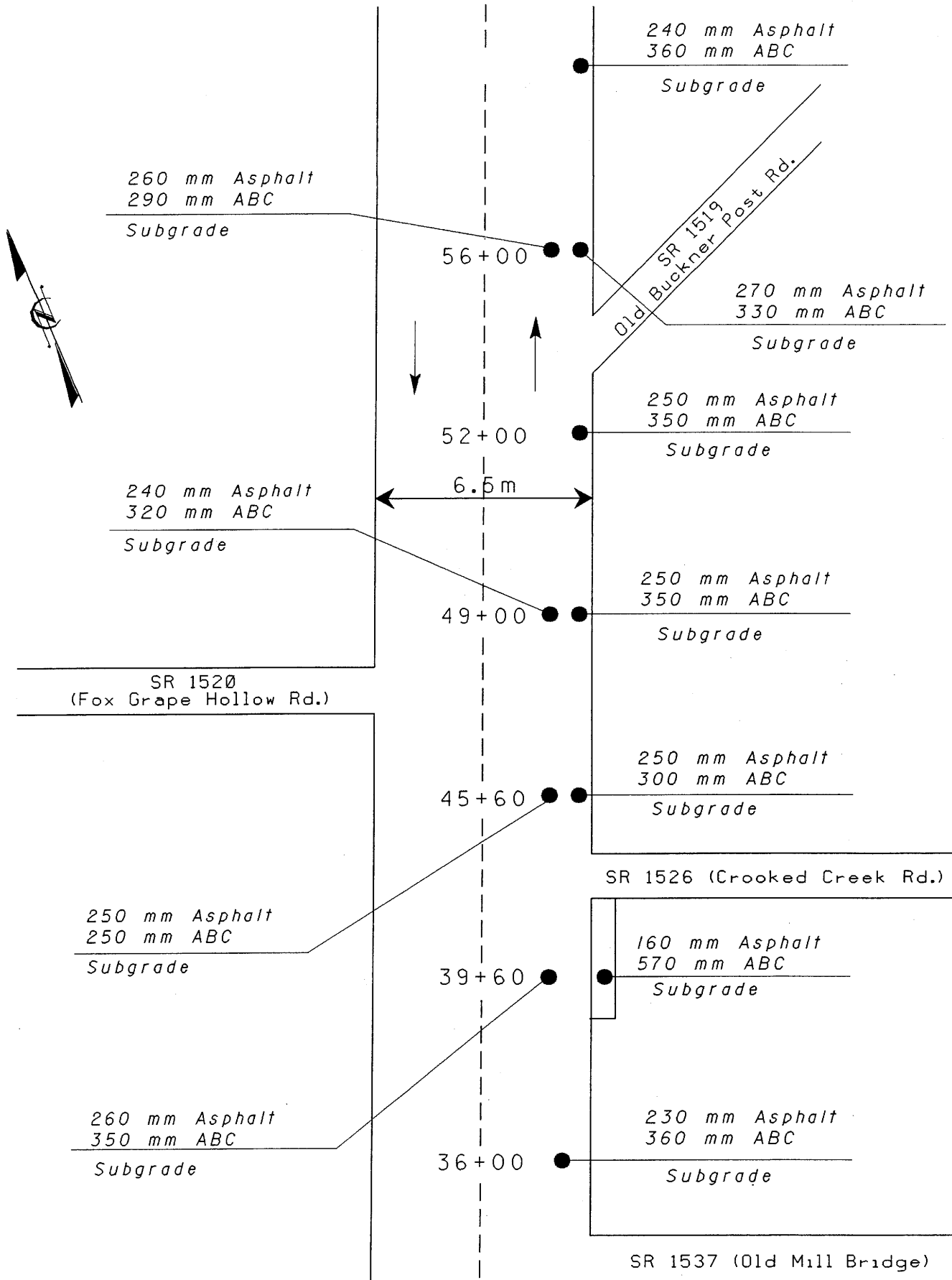
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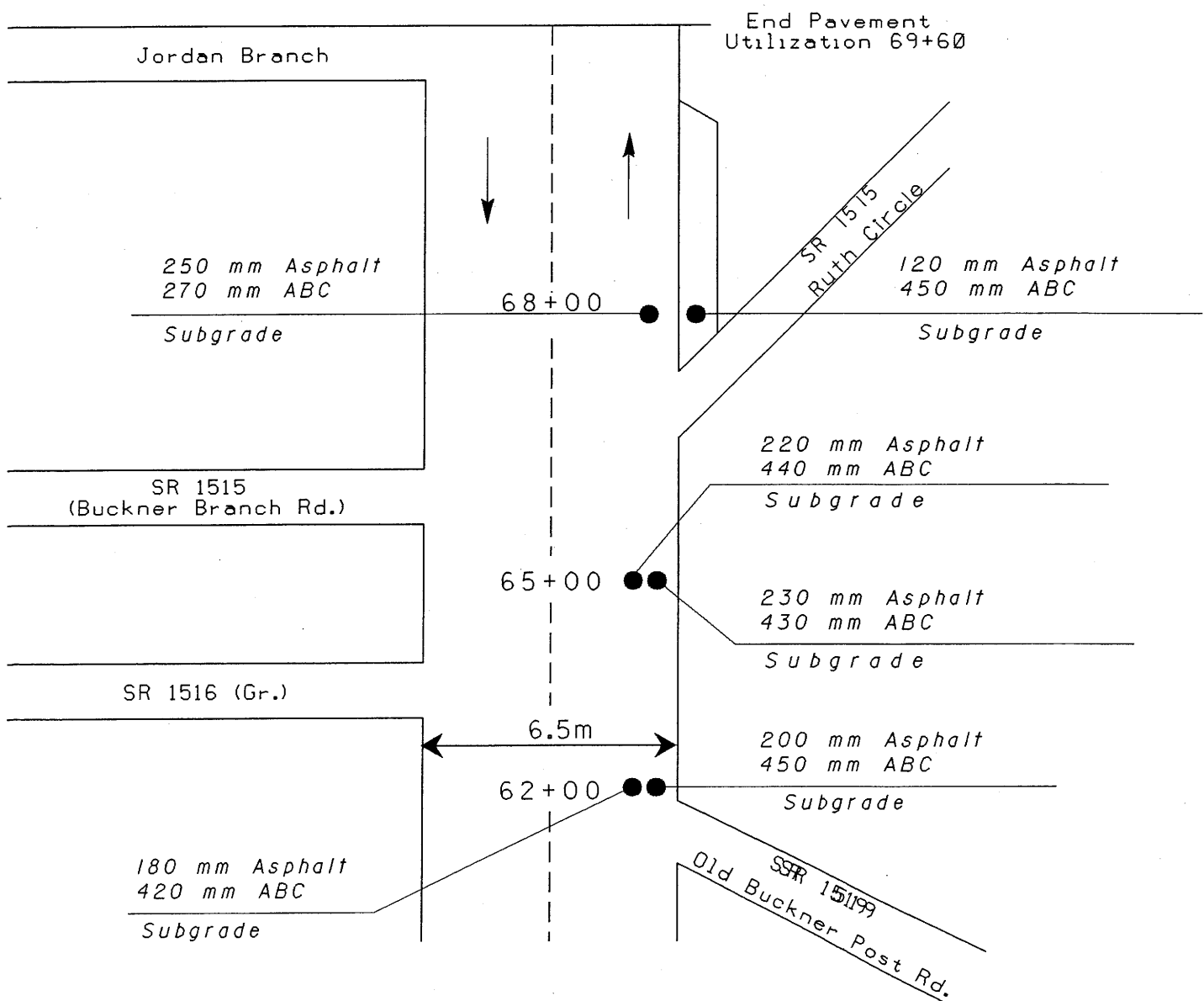
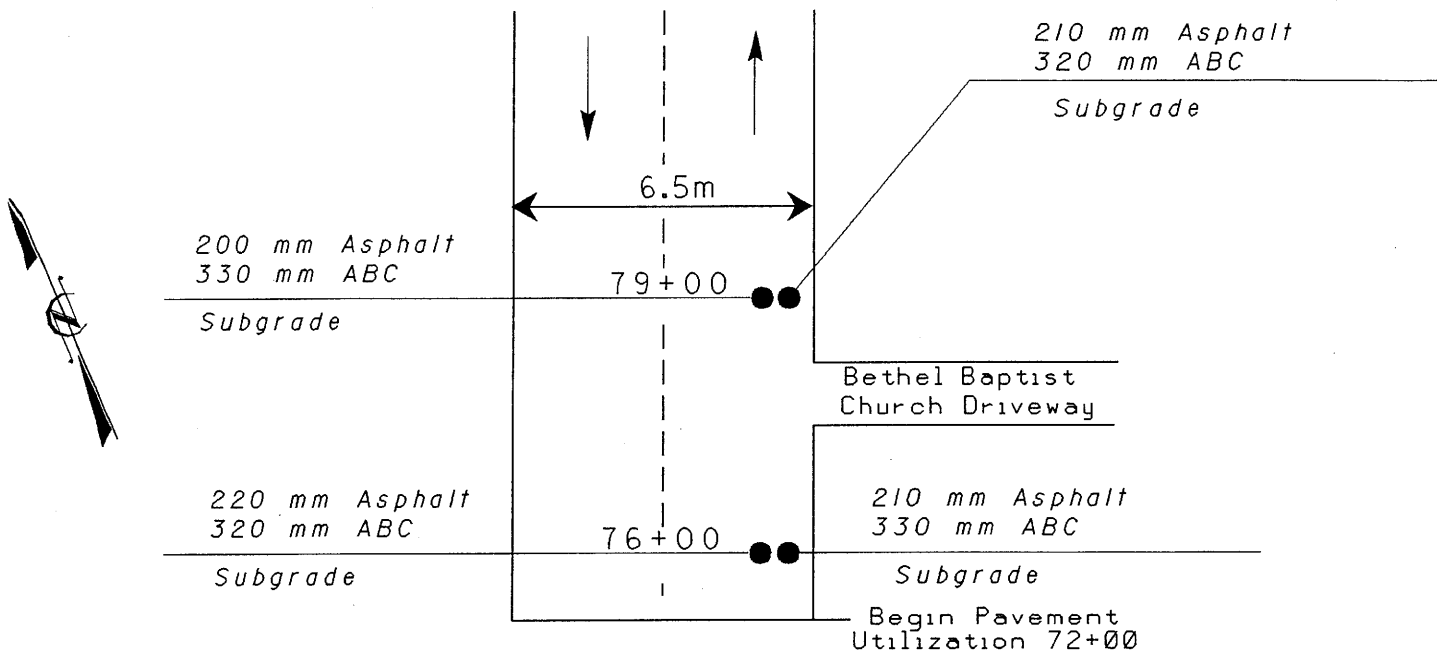
Investigated By: J. B. Barfield

4/19/05

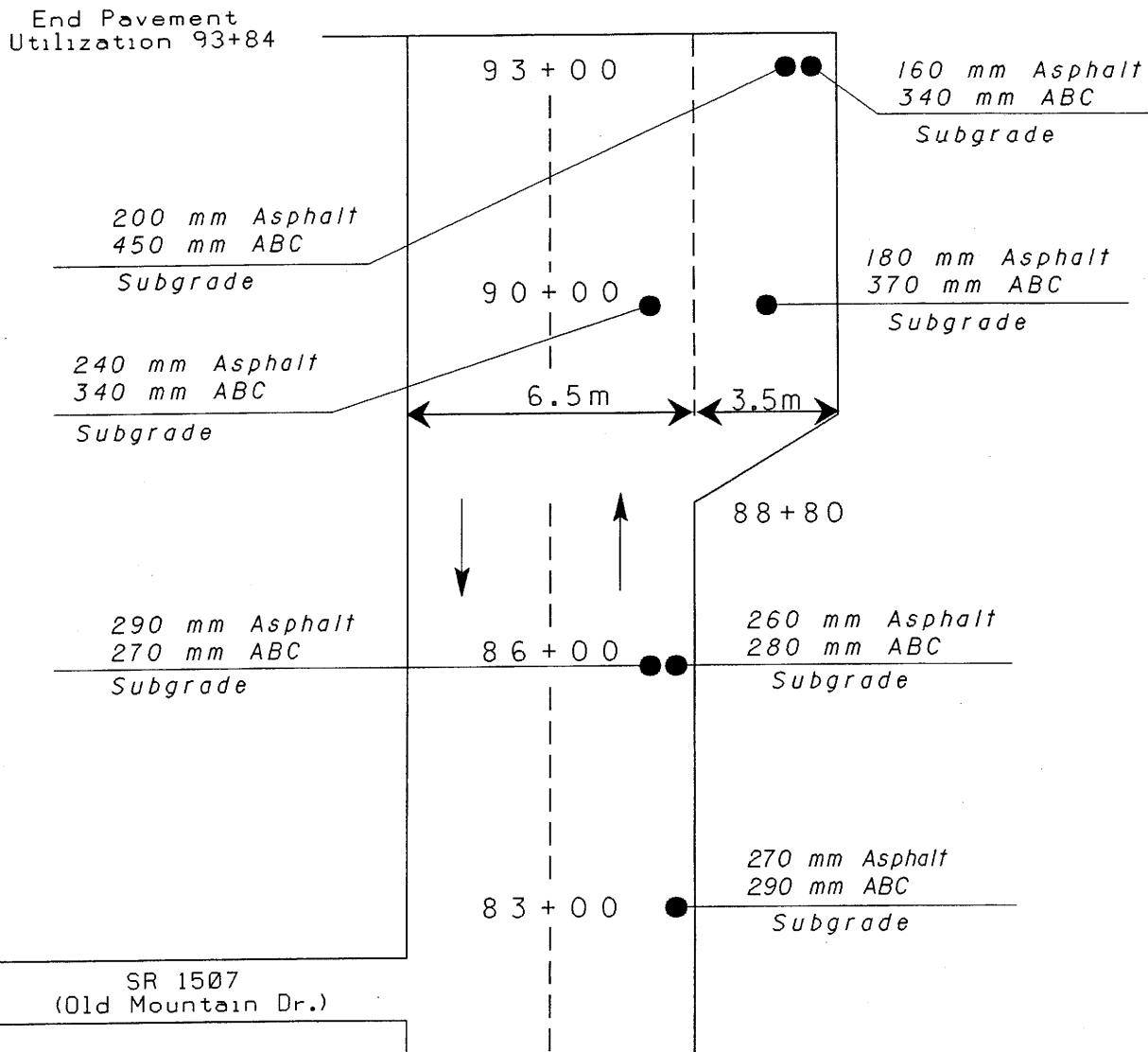
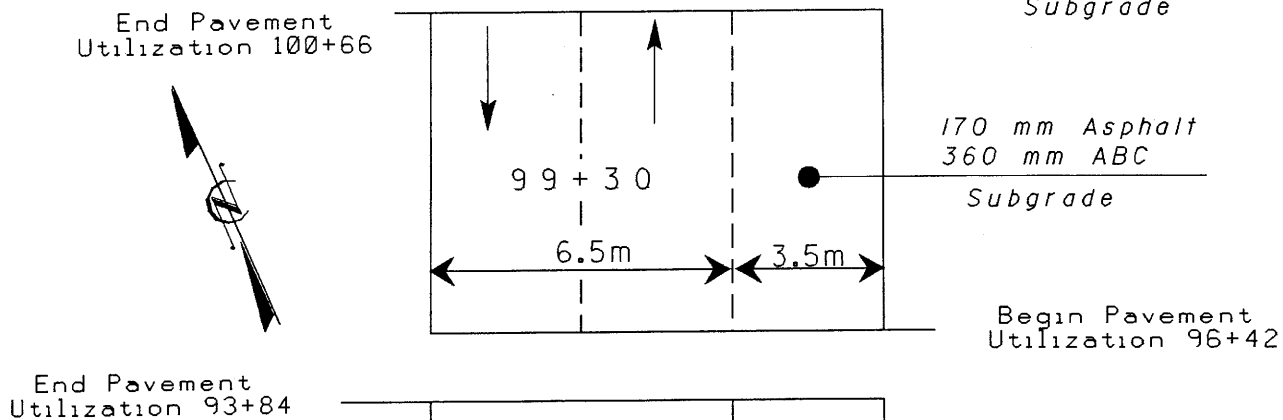
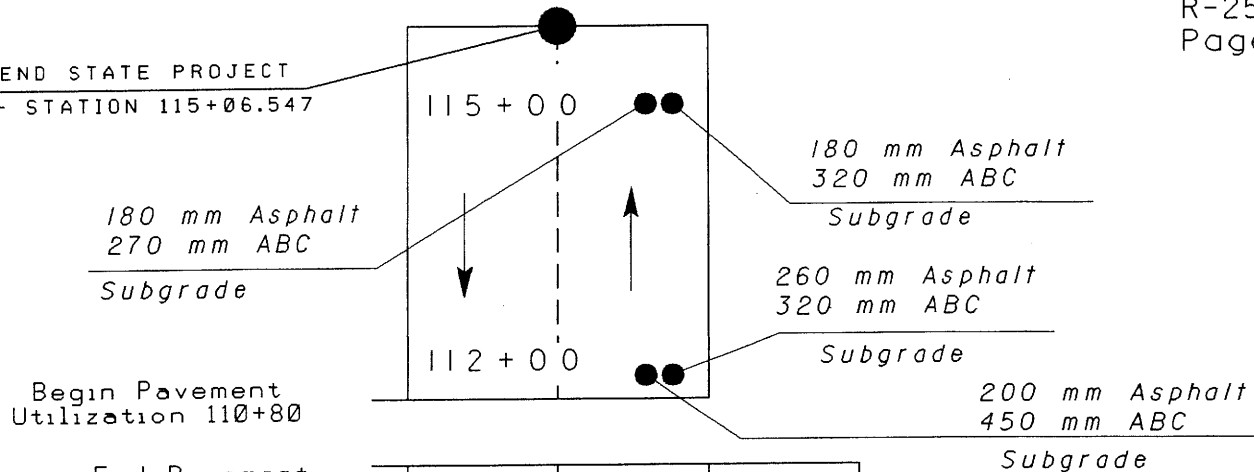
Sketch By: J. B. Barfield







END STATE PROJECT
-L- STATION 115+06.547

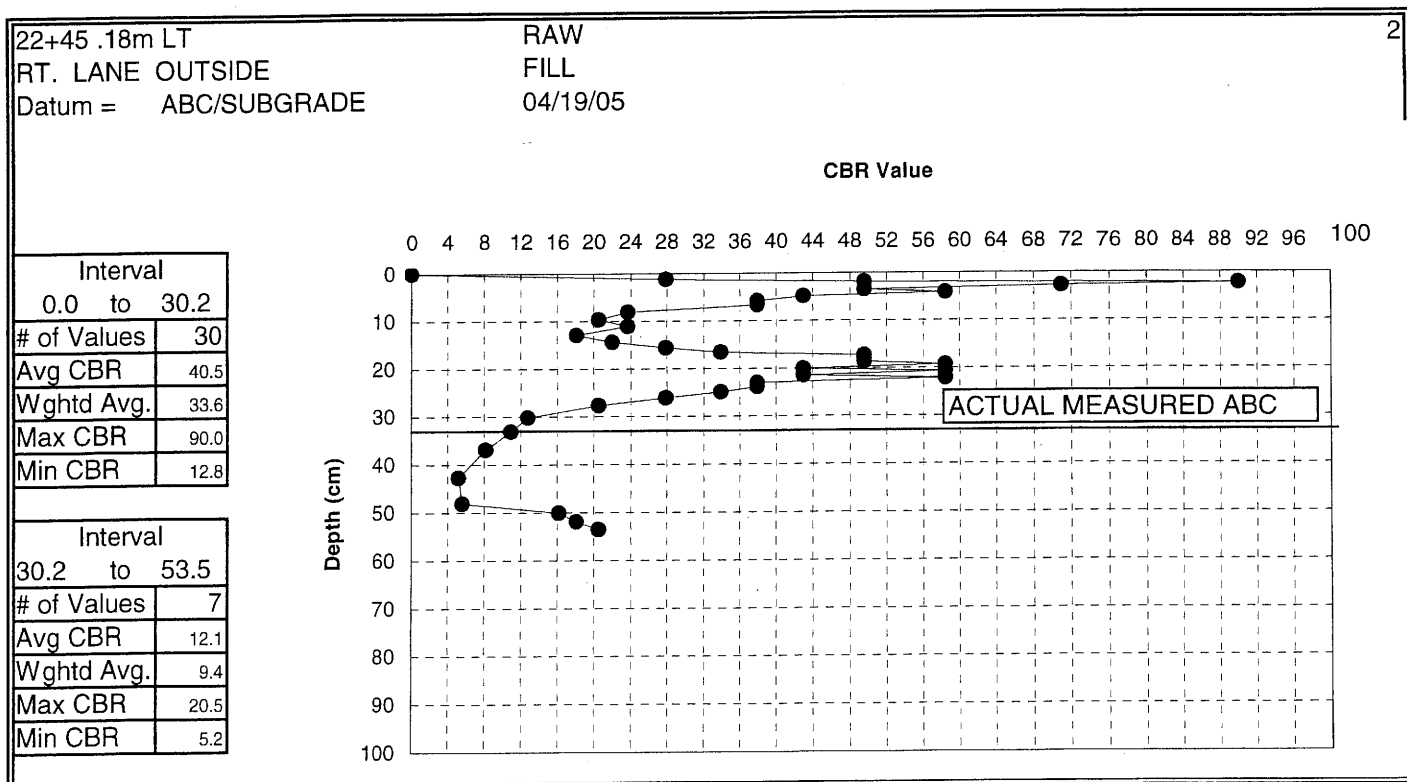
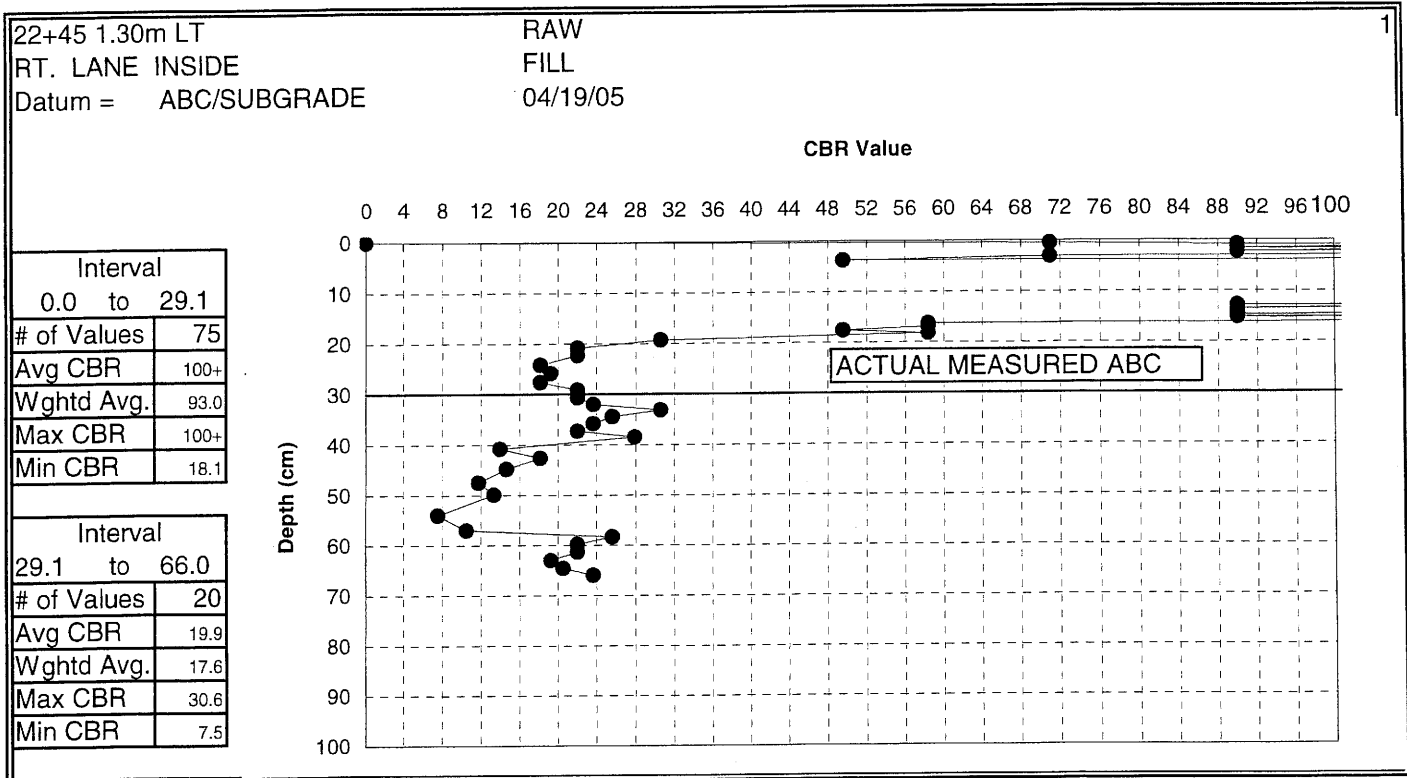


**CONE PENETROMETER RESULTS
NC - DOT, GEOTECHNICAL UNIT, SOILS SECTION**

PROJECT NO.	34445.1.1
PROJECT ID	R-2518A
ROUTE	US 19
COUNTY	Madison/Yancey

GEOLOGIST	J. B. Barfield
GEOTECHS	Trigon

FILE R2518A_dcp.xls

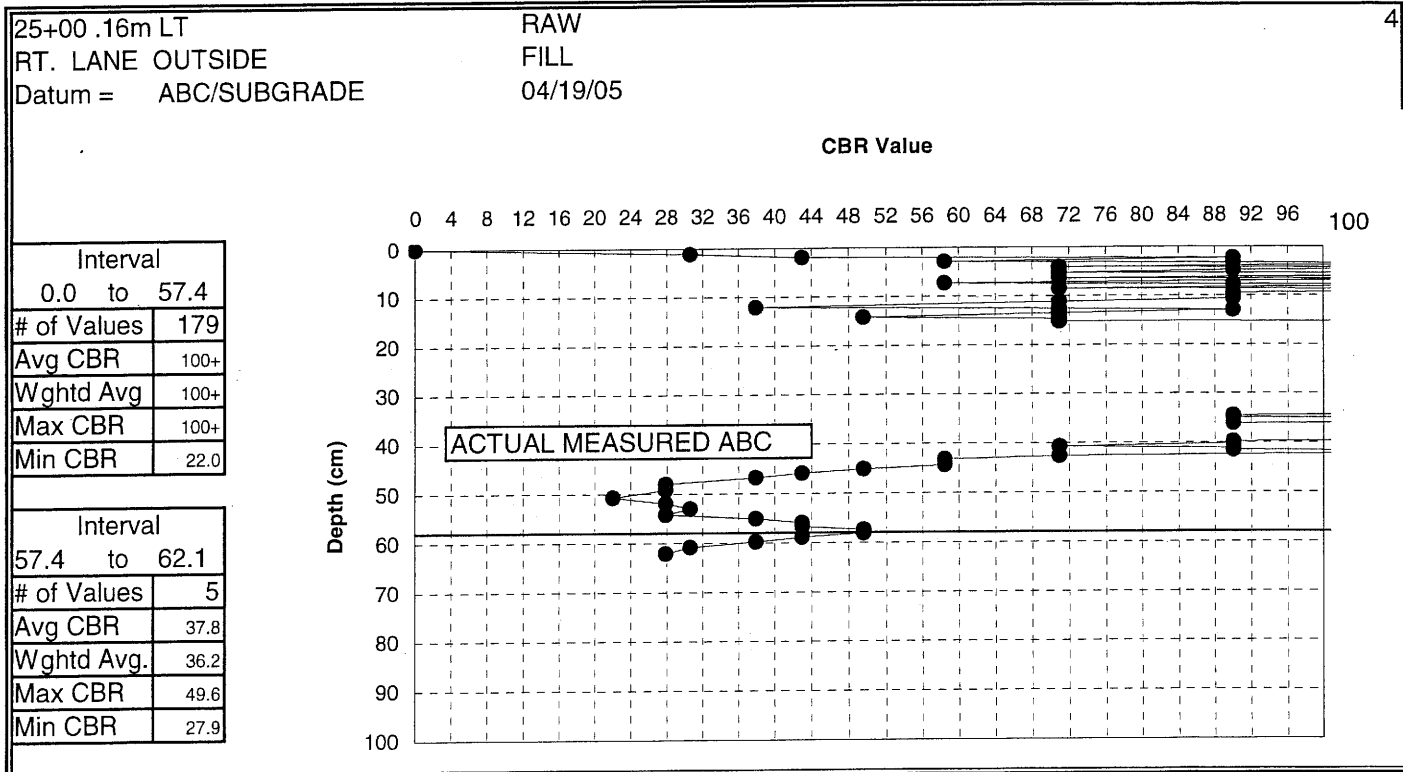
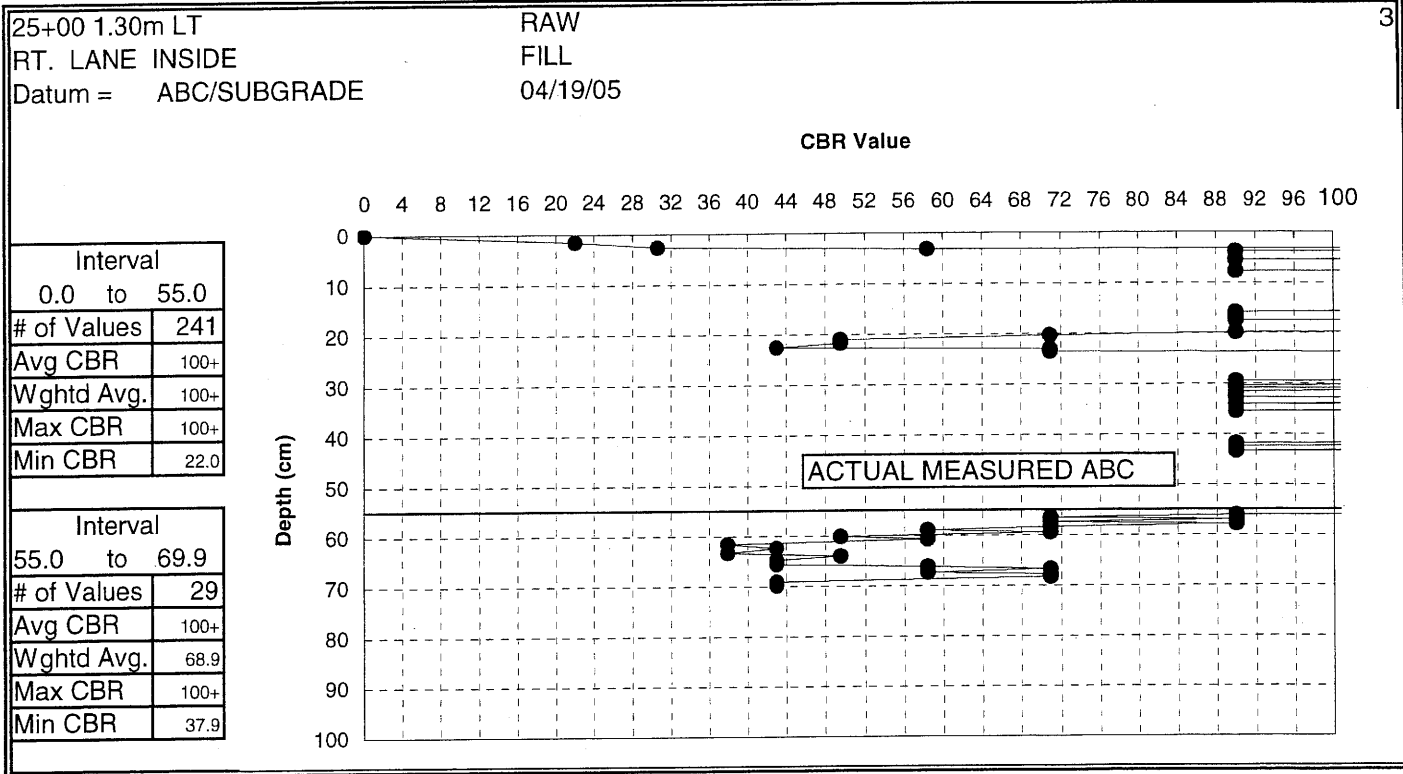


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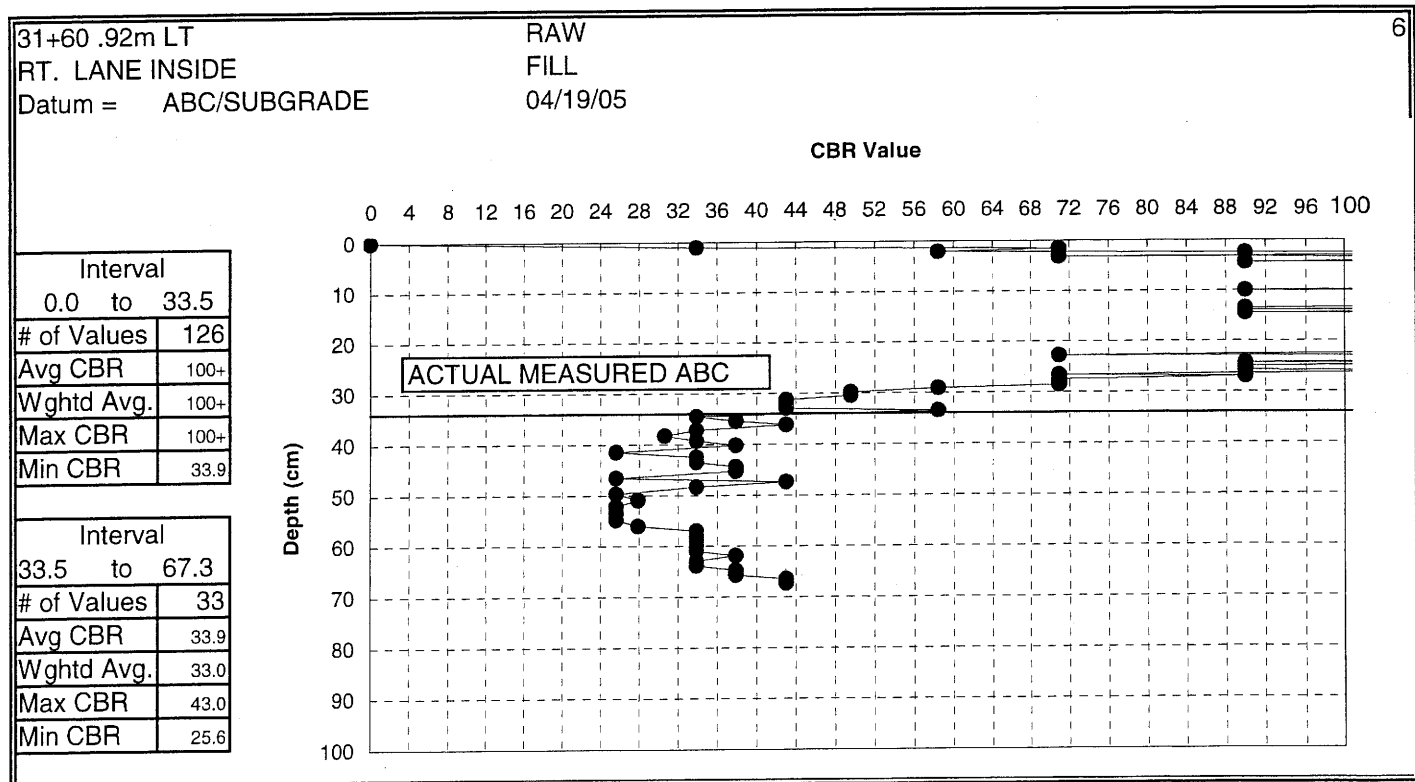
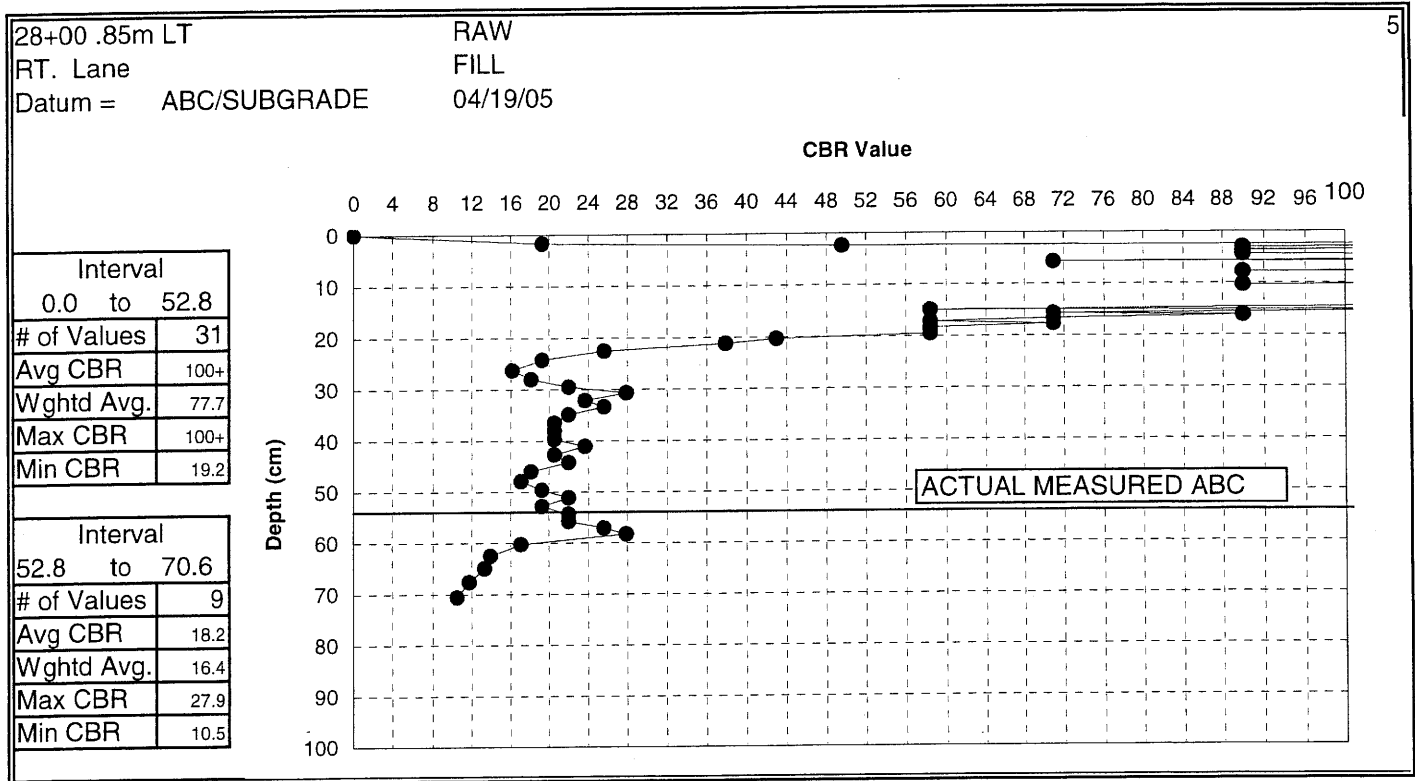


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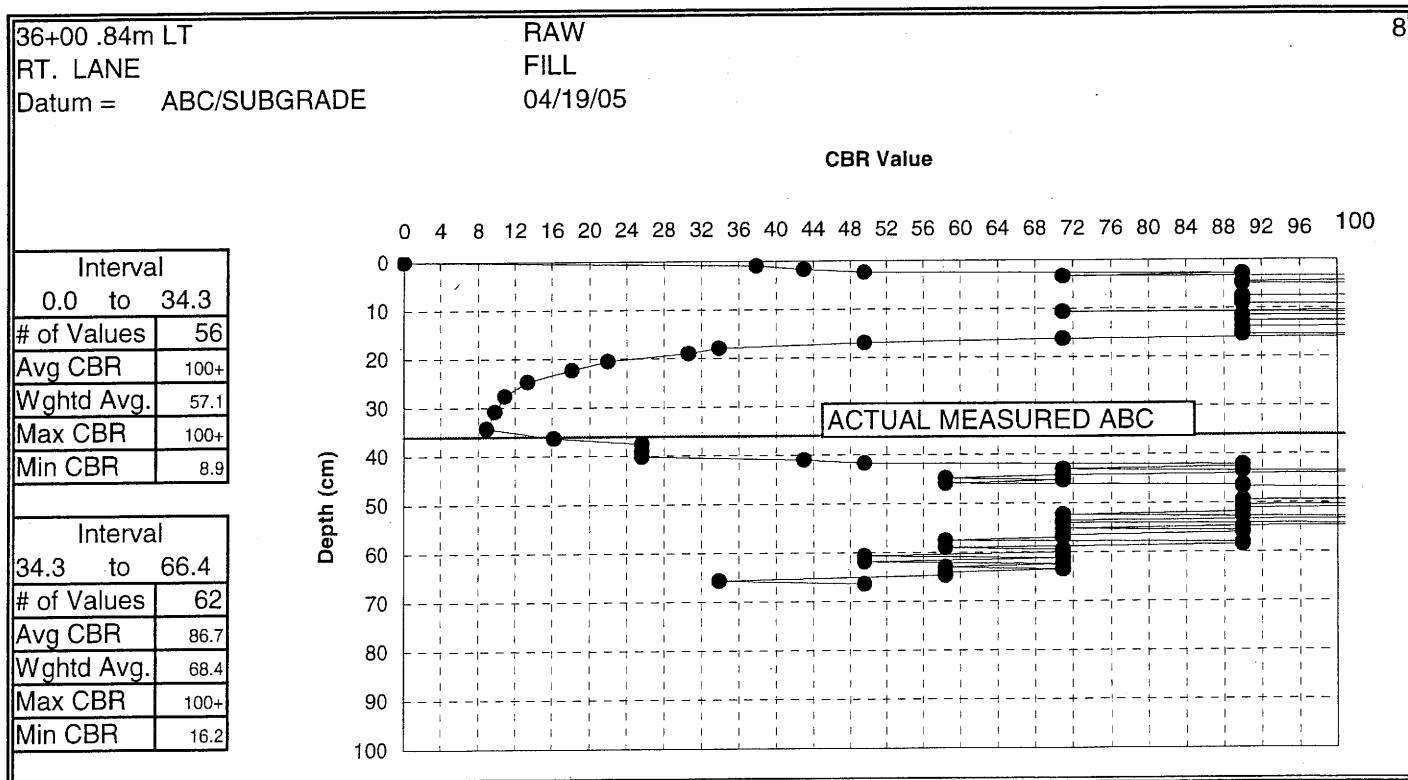
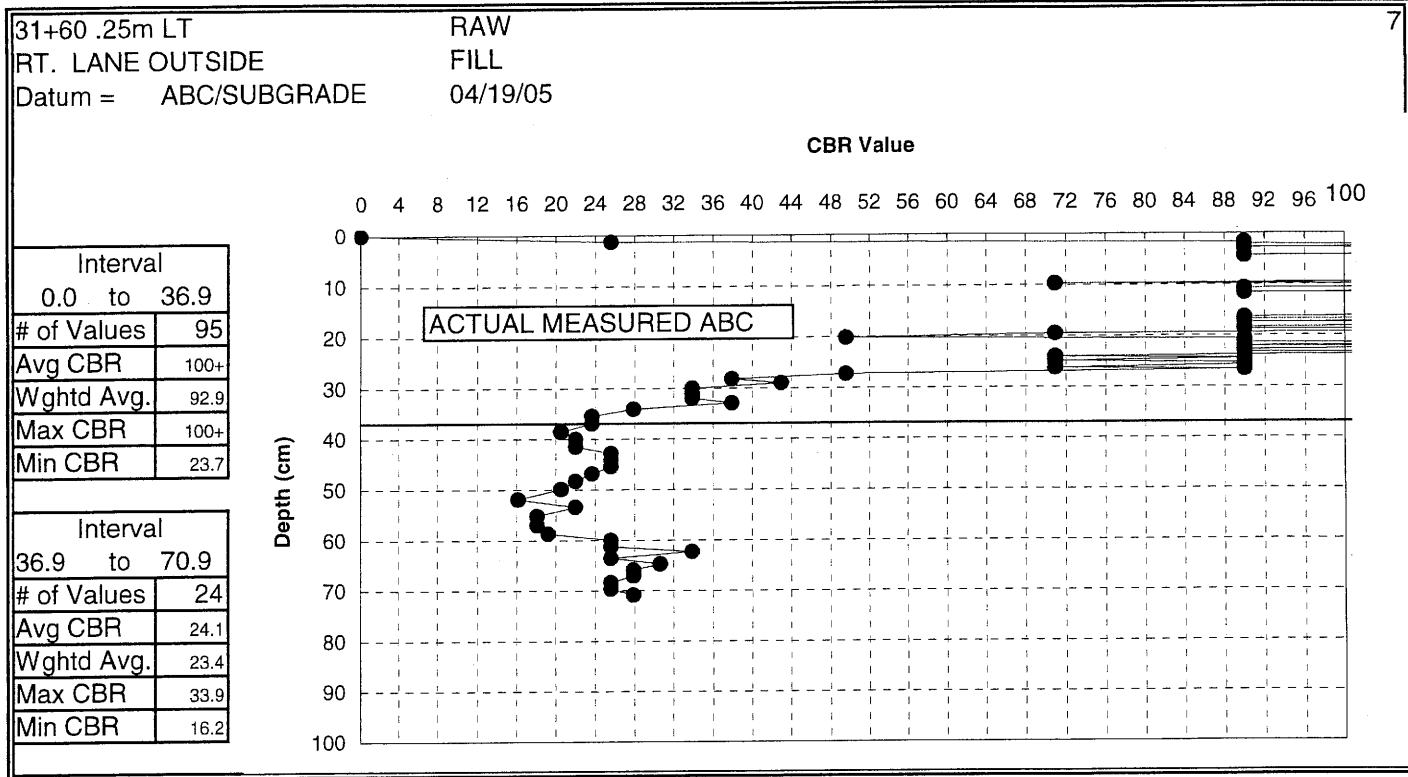


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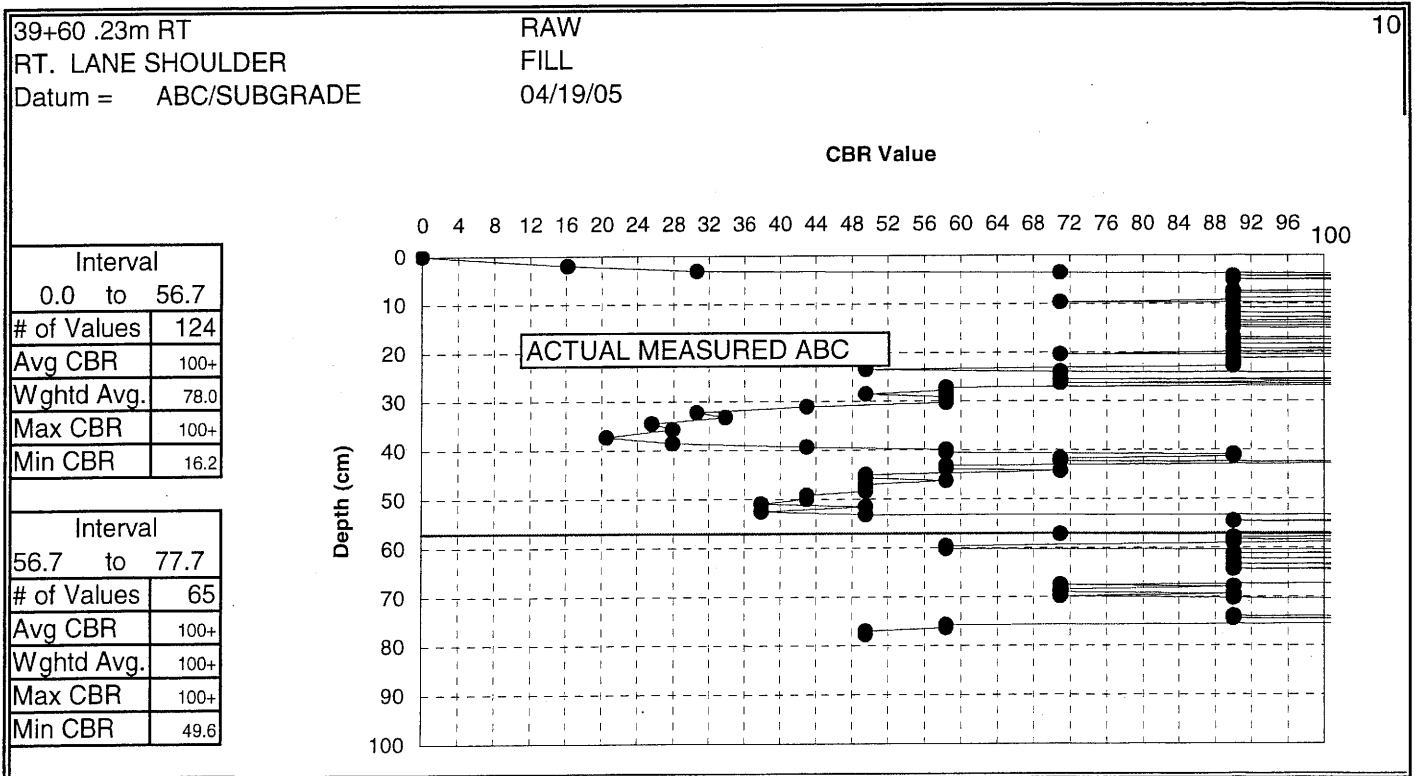
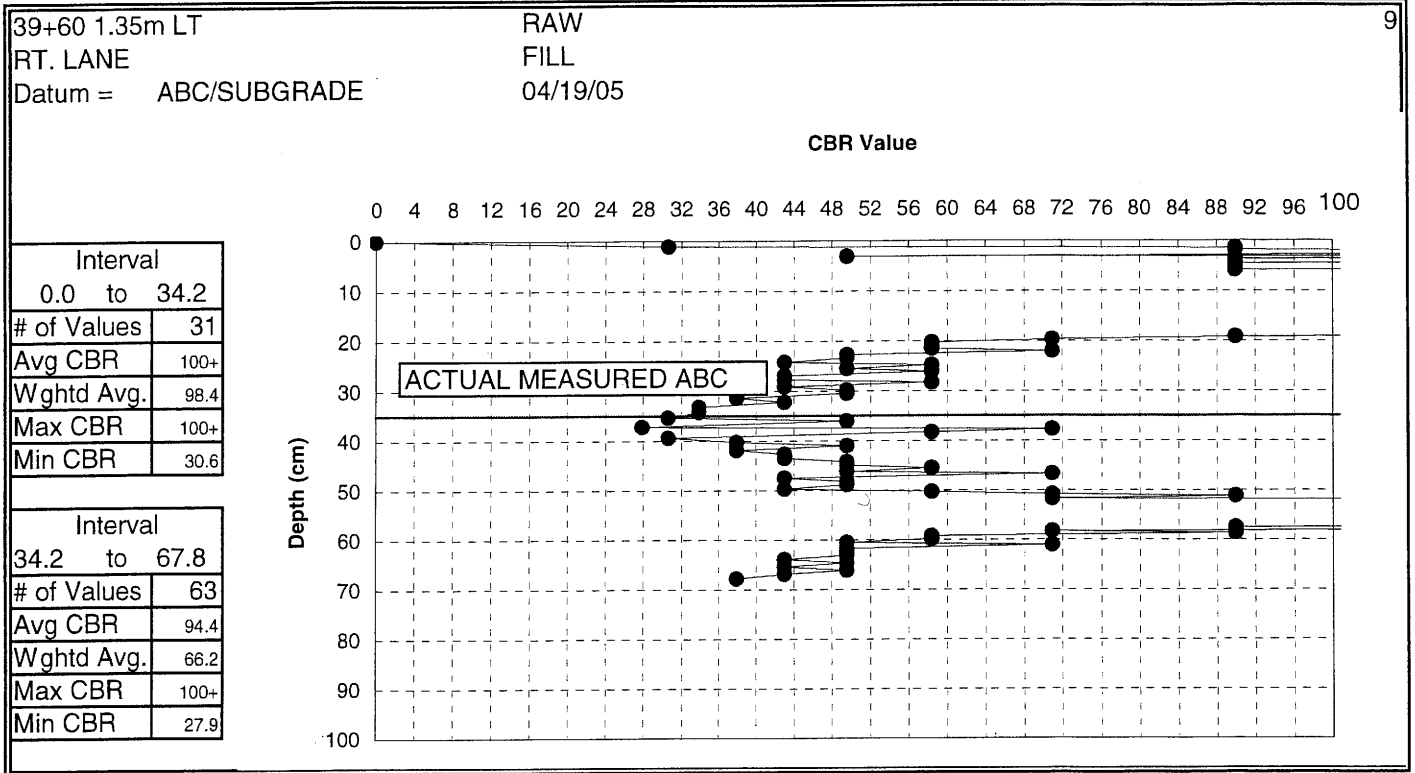


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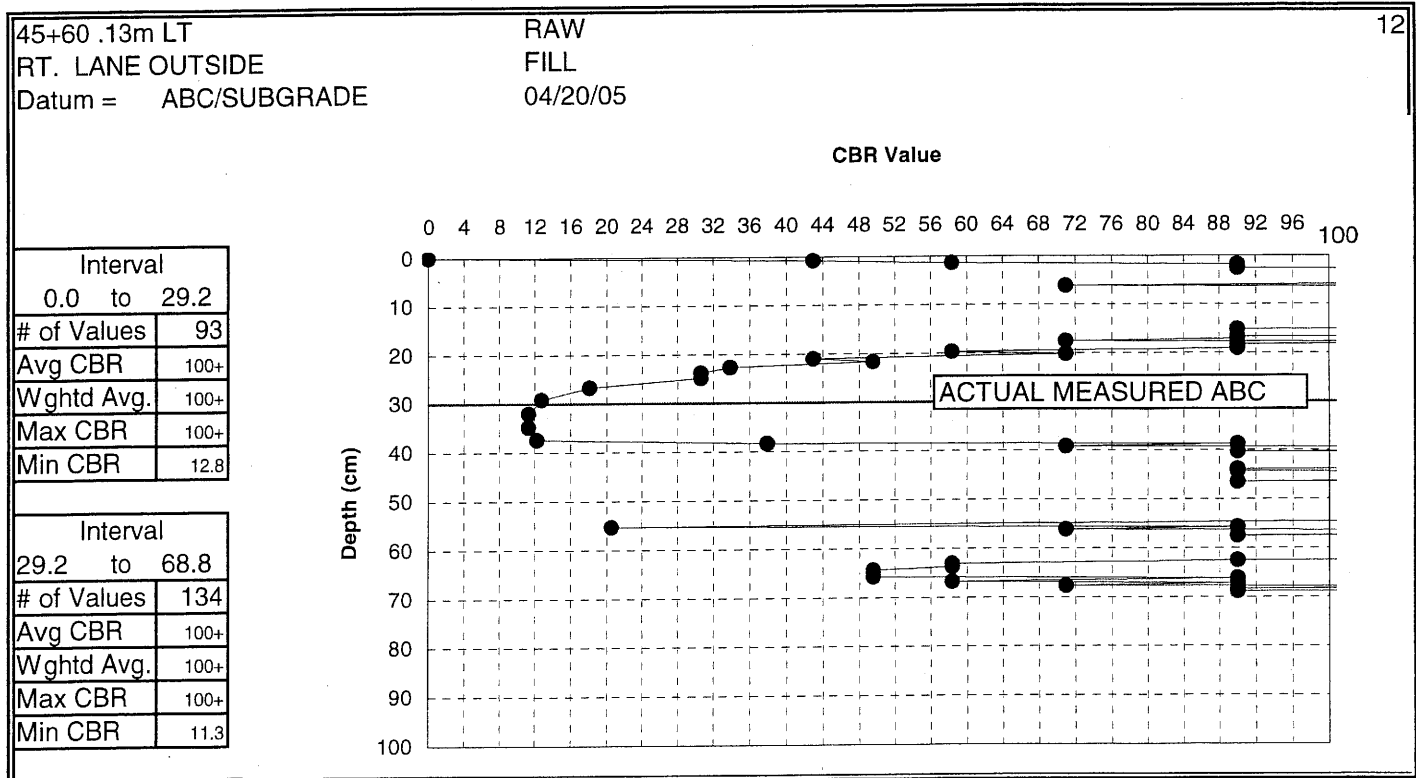
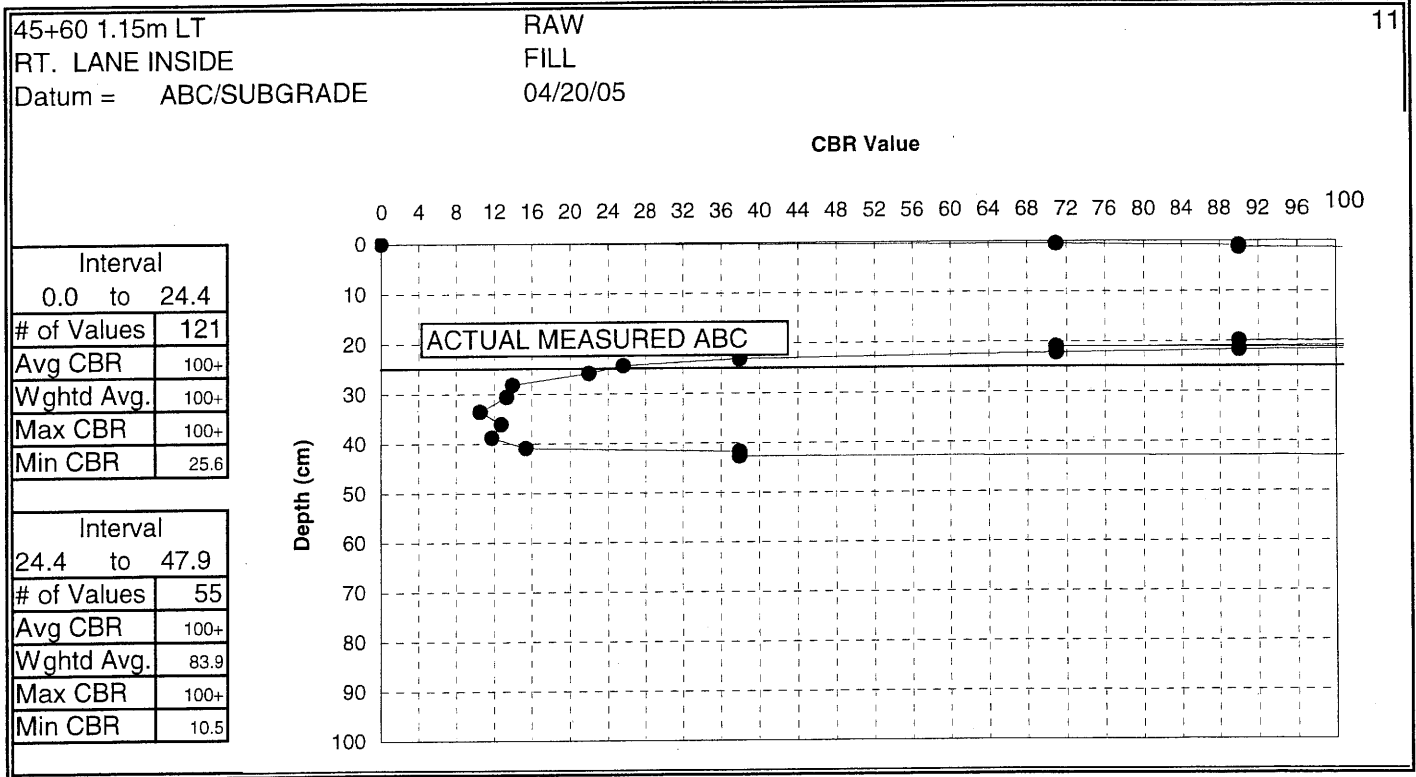


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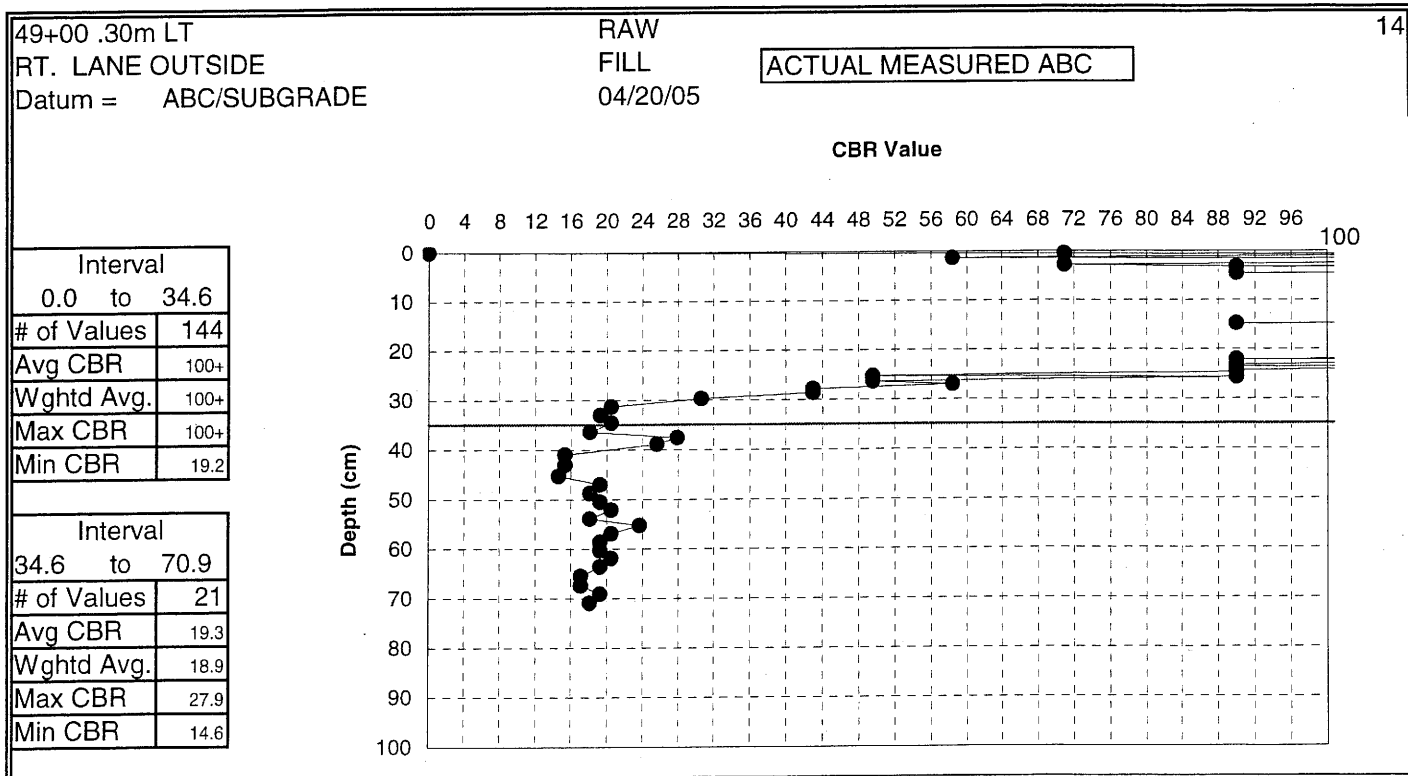
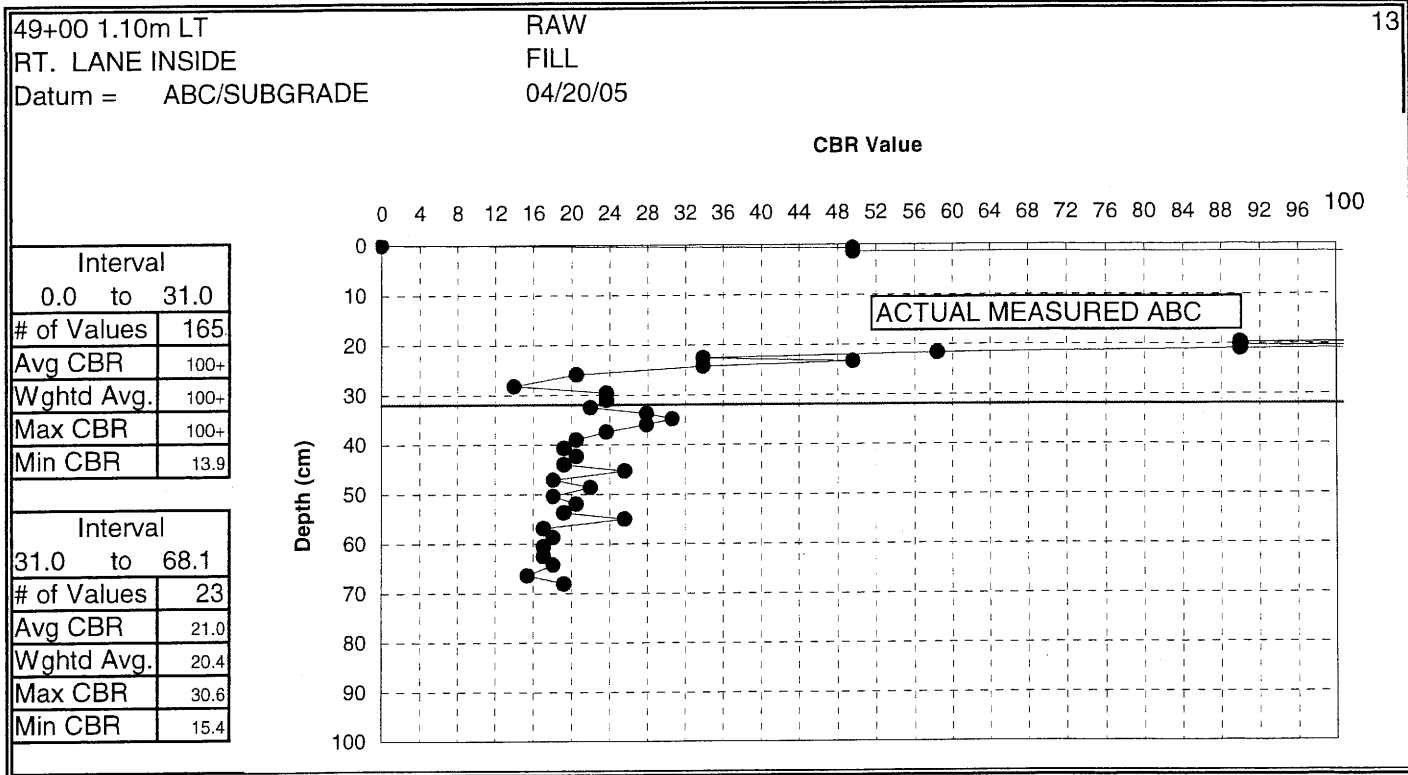


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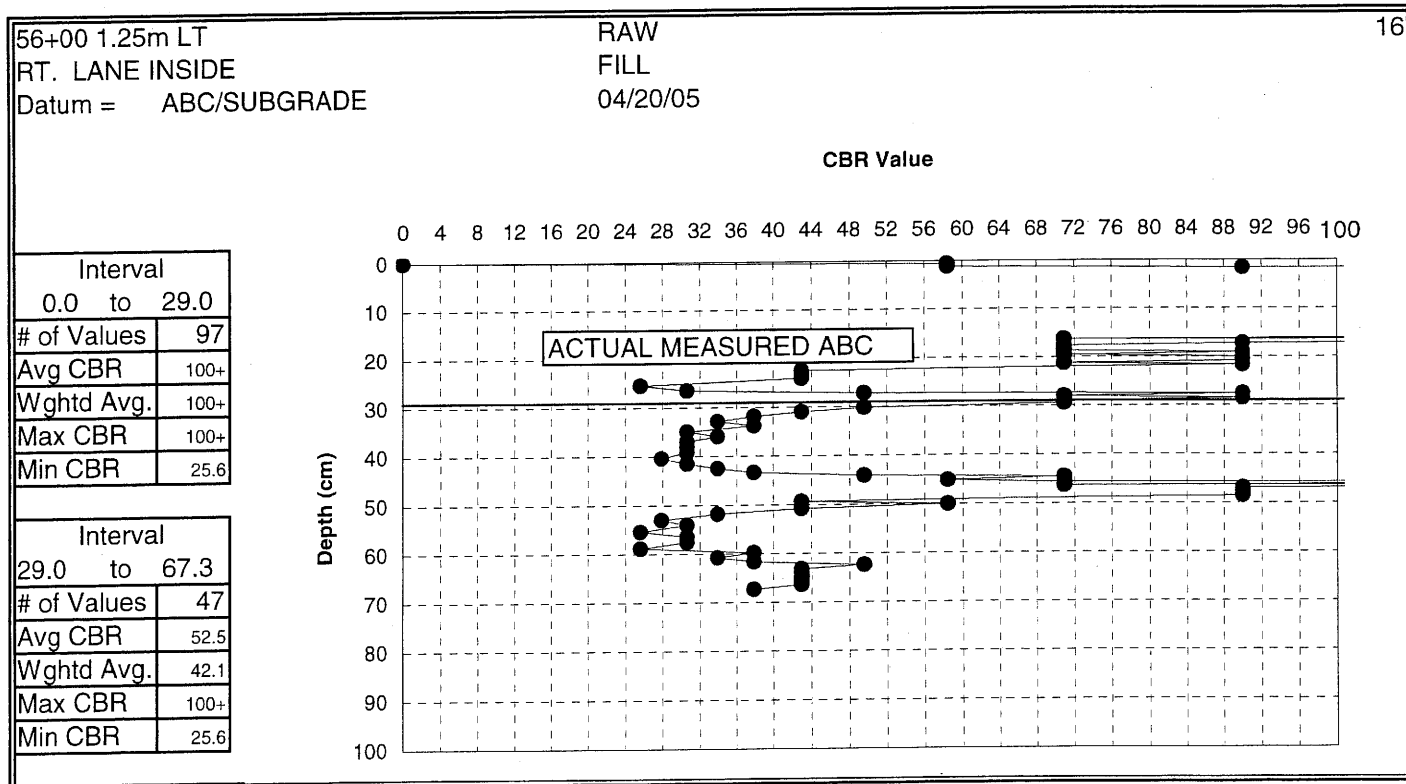
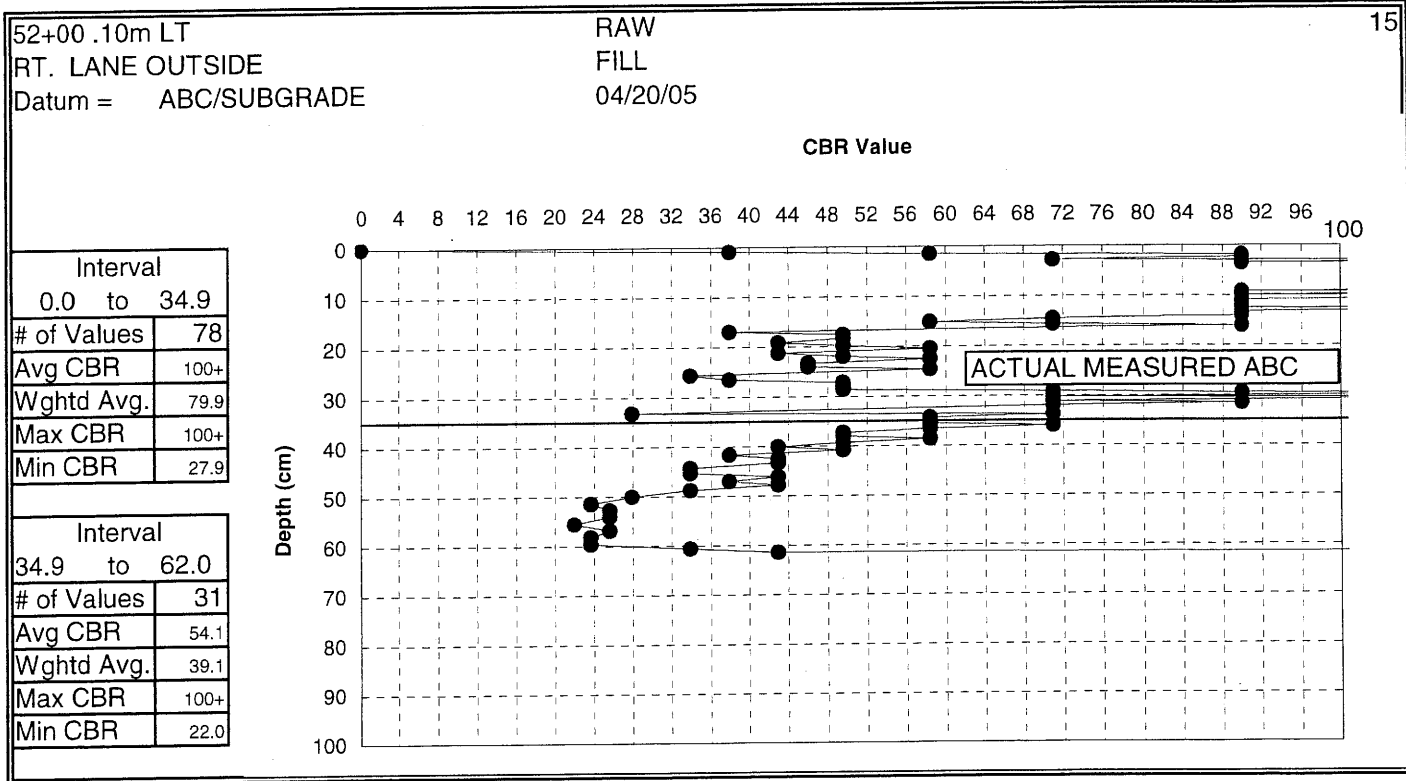


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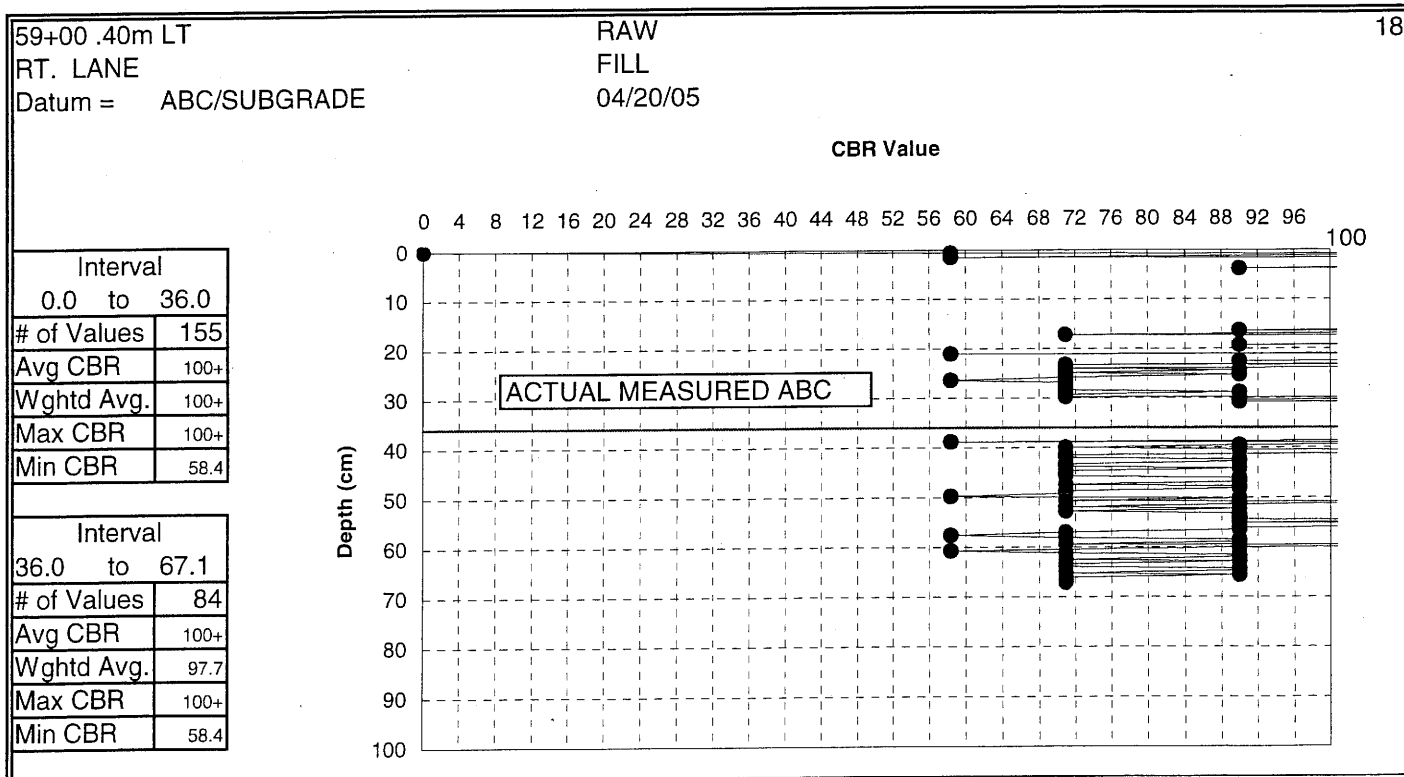
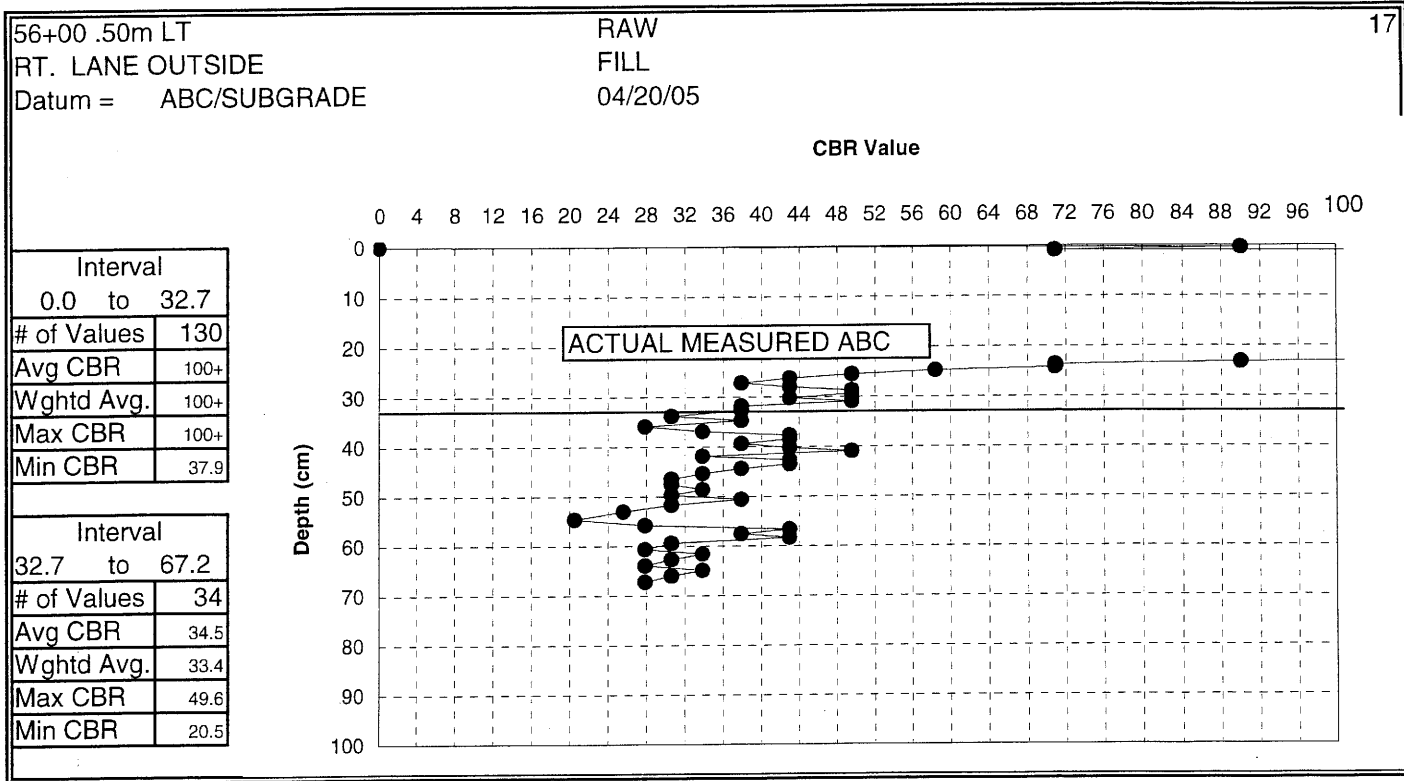


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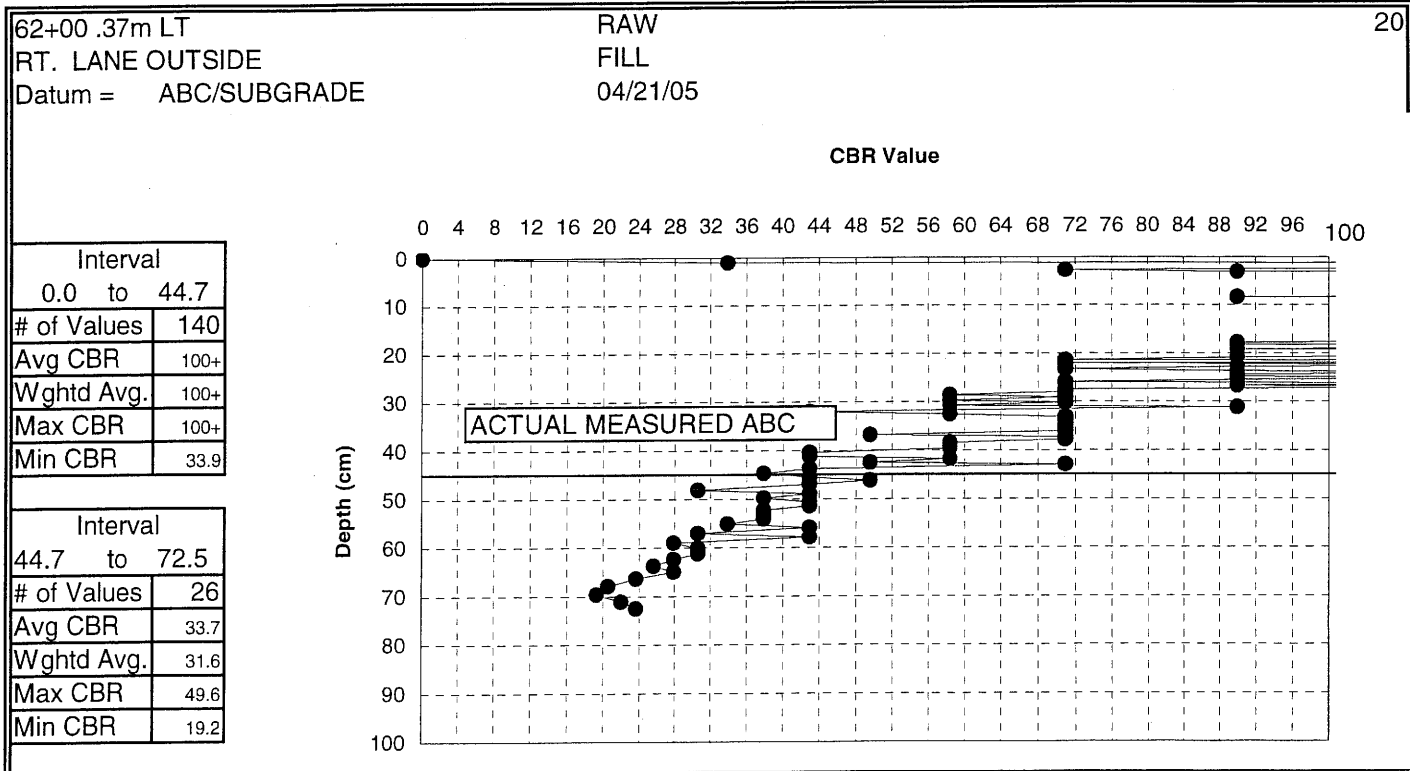
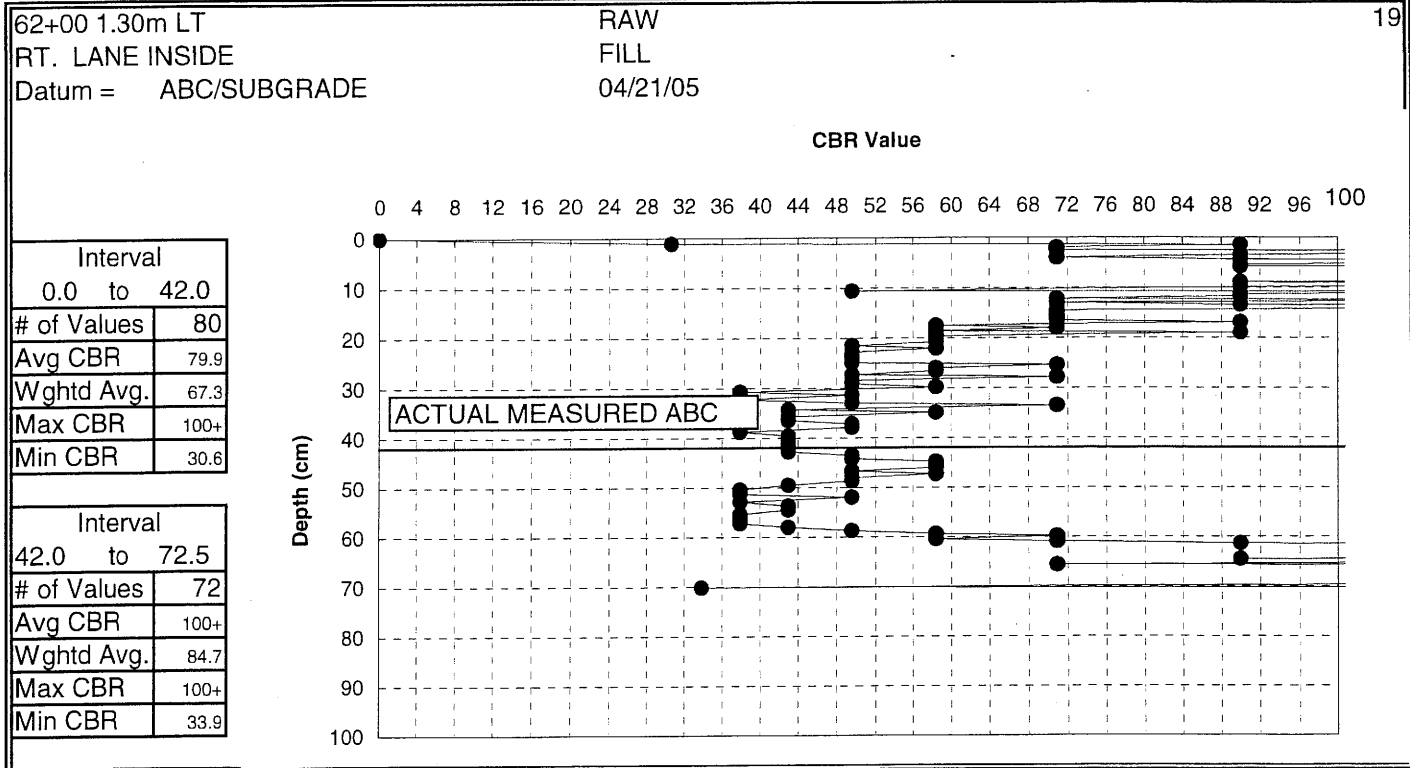


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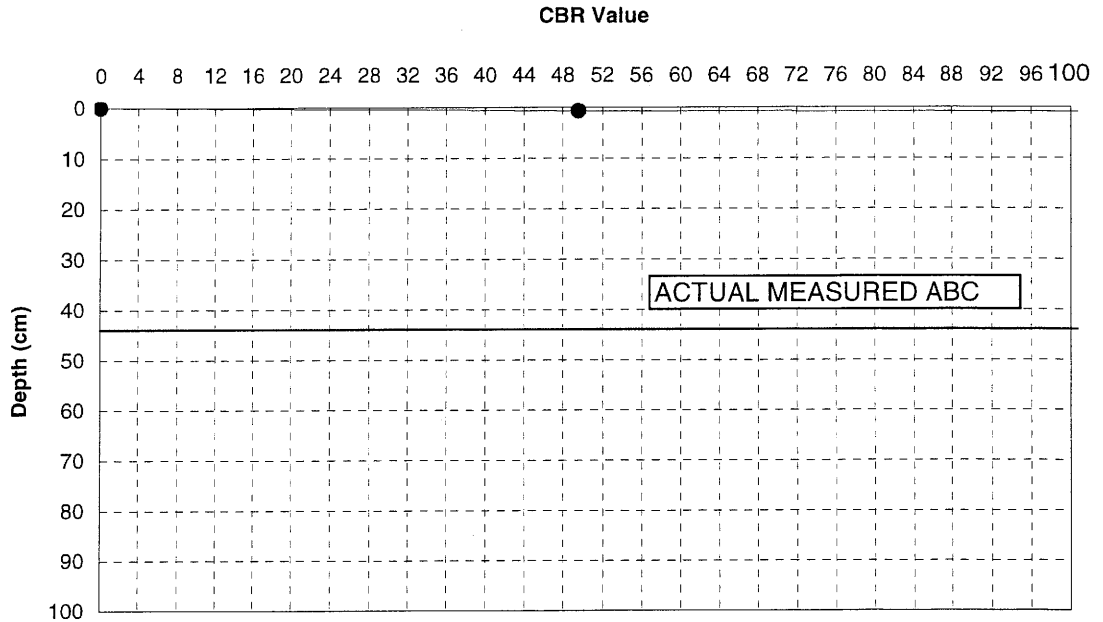
GEOLOGIST	J. B. Barfield
GEOTECHS	Trigon

FILE	R2518A_DCP2.xls
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65+00 .95m LT RAW
RT. LANE INSIDE FILL
Datum = ABC/SUBGRADE 04/21/05

1

Interval	
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# of Values	100
Avg CBR	100+
Wghtd Avg.	100+
Max CBR	100+
Min CBR	49.6

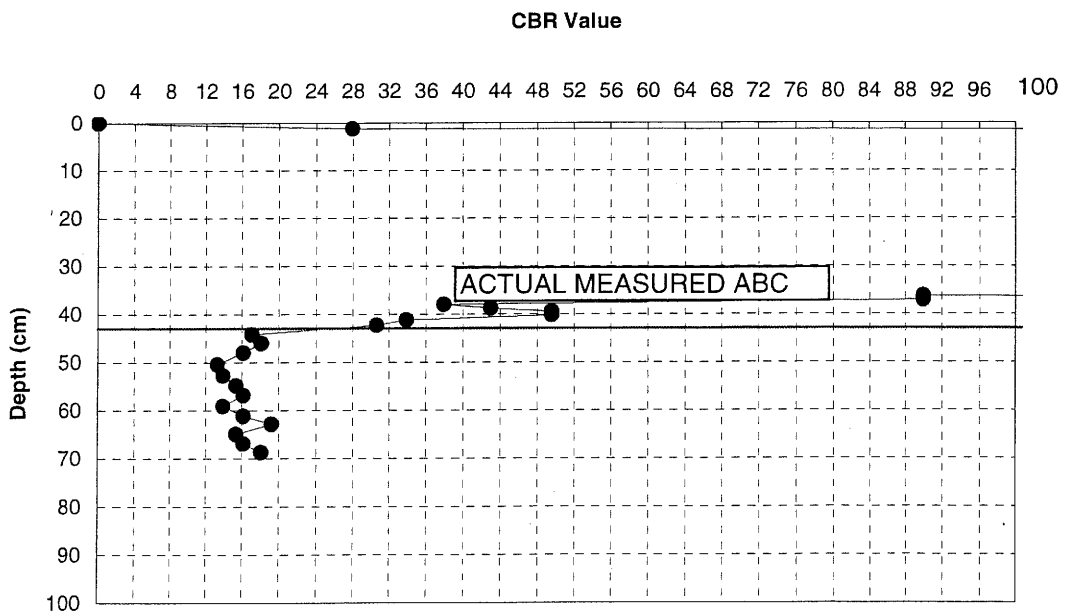


65+00 .30m LT RAW
RT. LANE OUTSIDE FILL
Datum = ABC/SUBGRADE 04/21/05

2

Interval	
0.0 to 42.3	
# of Values	343
Avg CBR	100+
Wghtd Avg.	100+
Max CBR	100+
Min CBR	27.9

Interval	
42.3 to 68.7	
# of Values	13
Avg CBR	16.1
Wghtd Avg.	15.9
Max CBR	19.2
Min CBR	13.3



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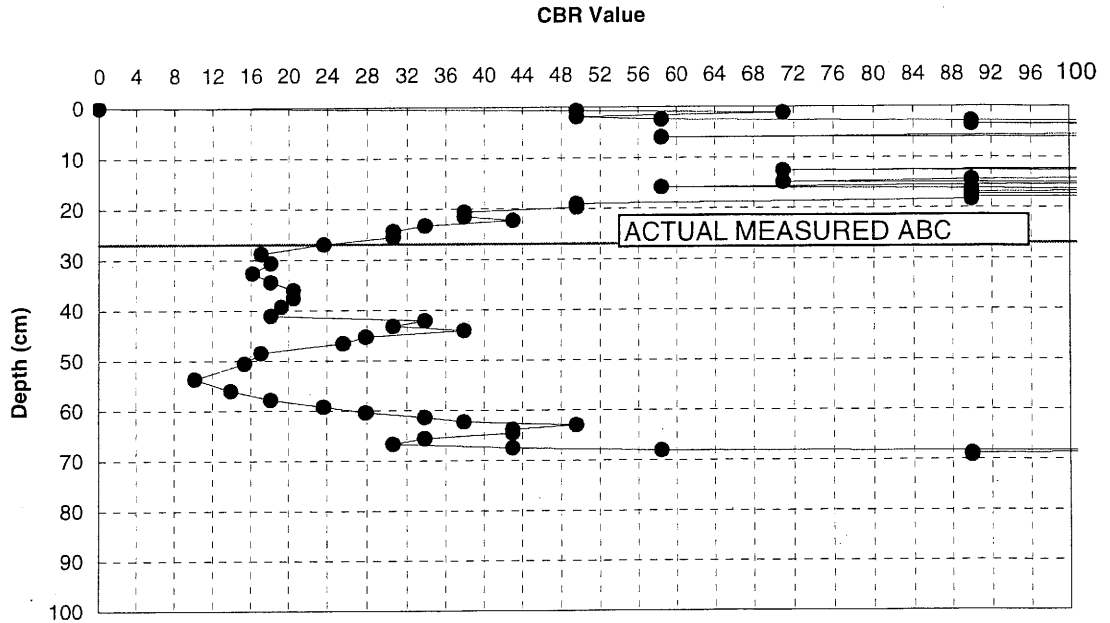
68+00 1.19m LT
RT. LANE
Datum = ABC/SUBGRADE

RAW
FILL
04/21/05

3

Interval	
0.0 to 26.9	
# of Values	68
Avg CBR	100+
Wghtd Avg.	91.1
Max CBR	100+
Min CBR	23.7

Interval	
26.9 to 69.2	
# of Values	32
Avg CBR	34.5
Wghtd Avg.	25.2
Max CBR	100+
Min CBR	10.1



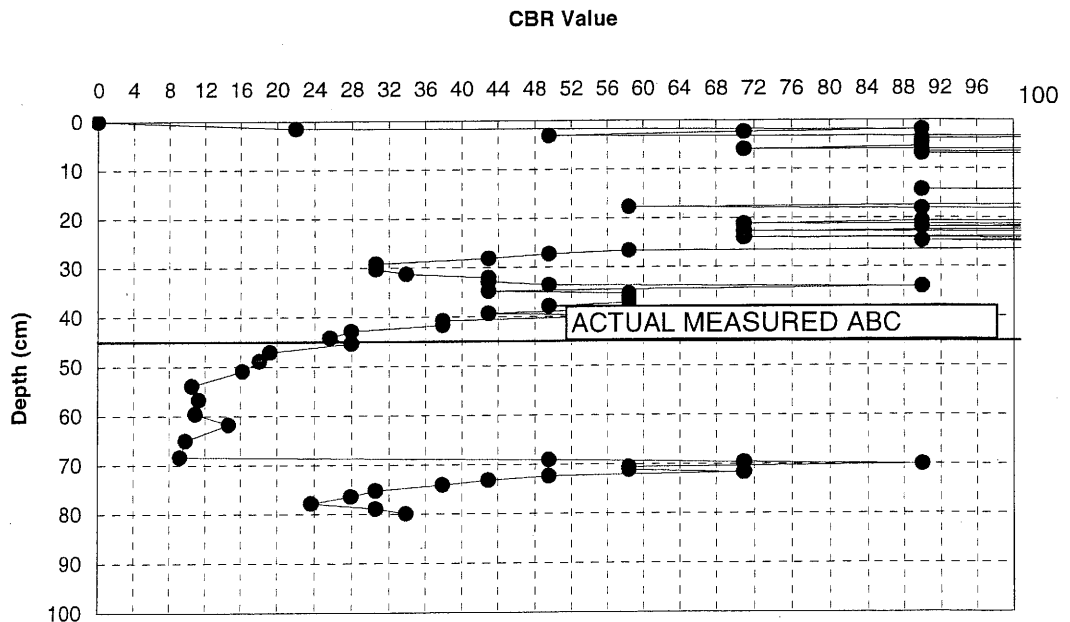
68+00 .26m RT
RT. LANE SHOULDER
Datum = ABC/SUBGRADE

RAW
FILL
04/21/05

4

Interval	
0.0 to 44.2	
# of Values	114
Avg CBR	100+
Wghtd Avg	93.0
Max CBR	100+
Min CBR	22.0

Interval	
44.2 to 79.9	
# of Values	24
Avg CBR	34.3
Wghtd Avg.	22.2
Max CBR	90.0
Min CBR	9.2

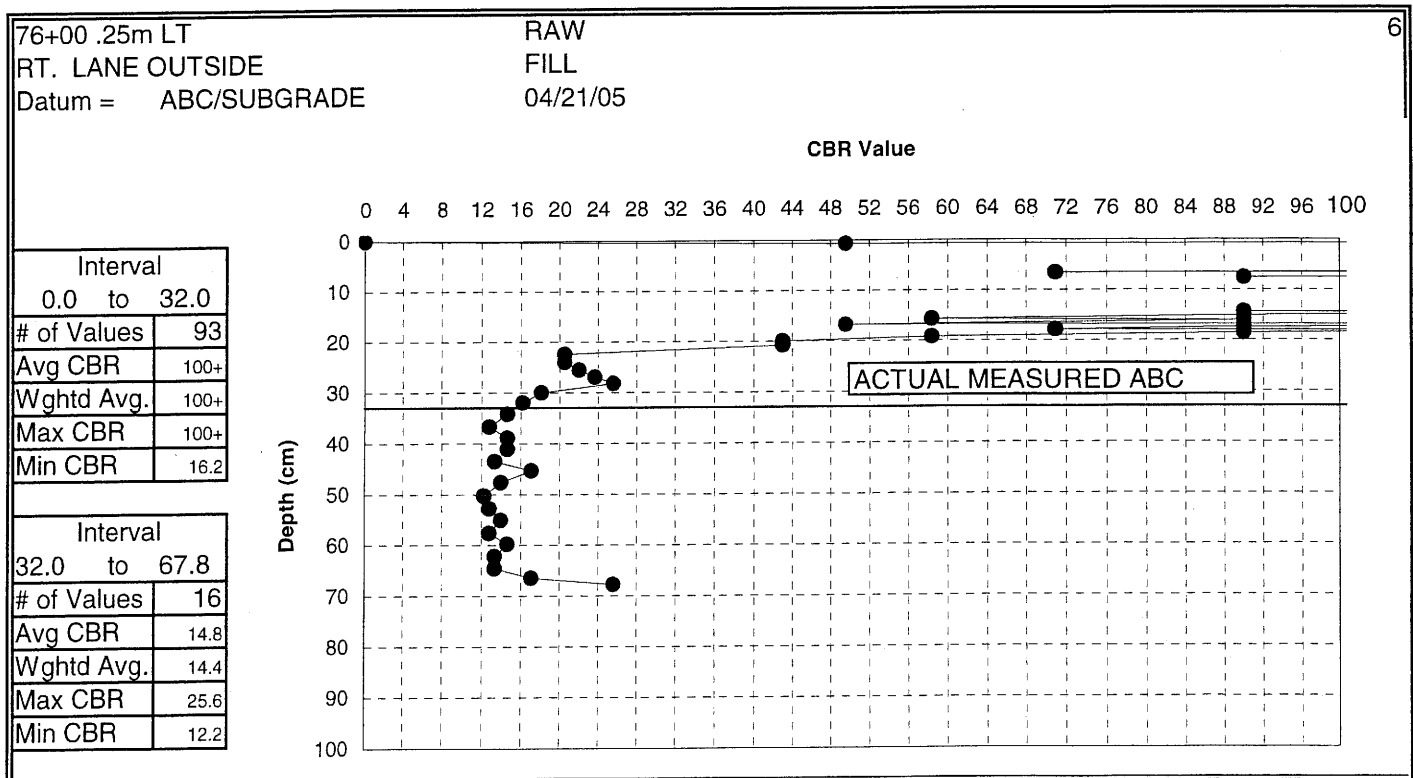
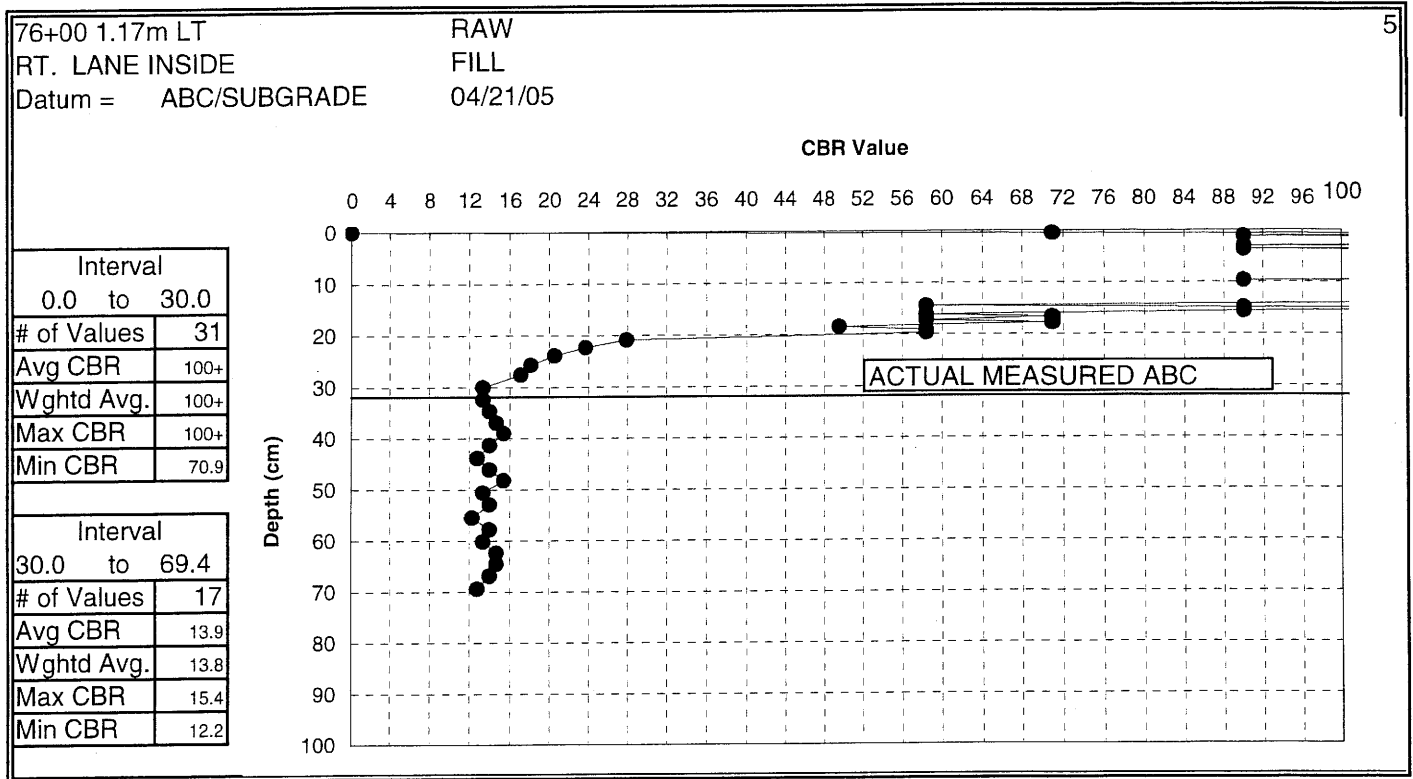


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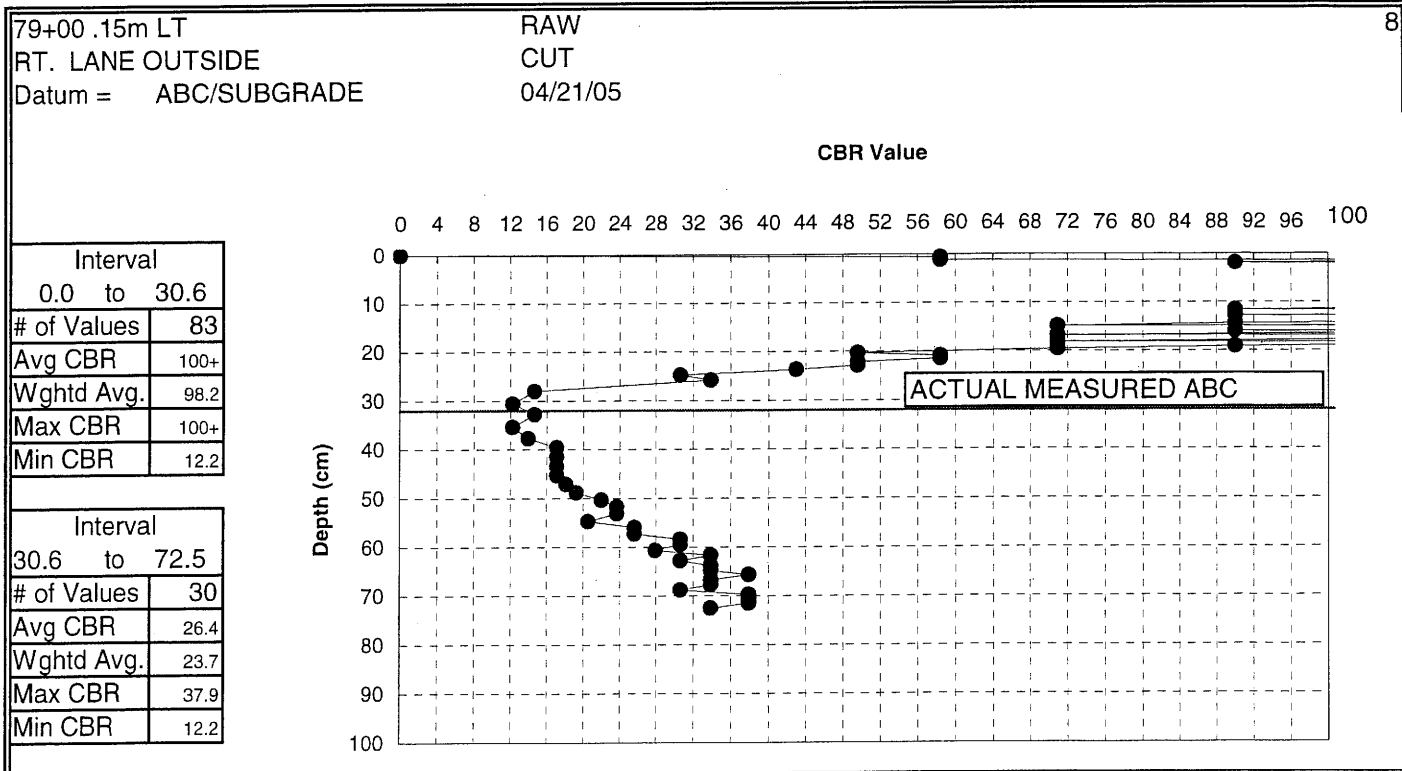
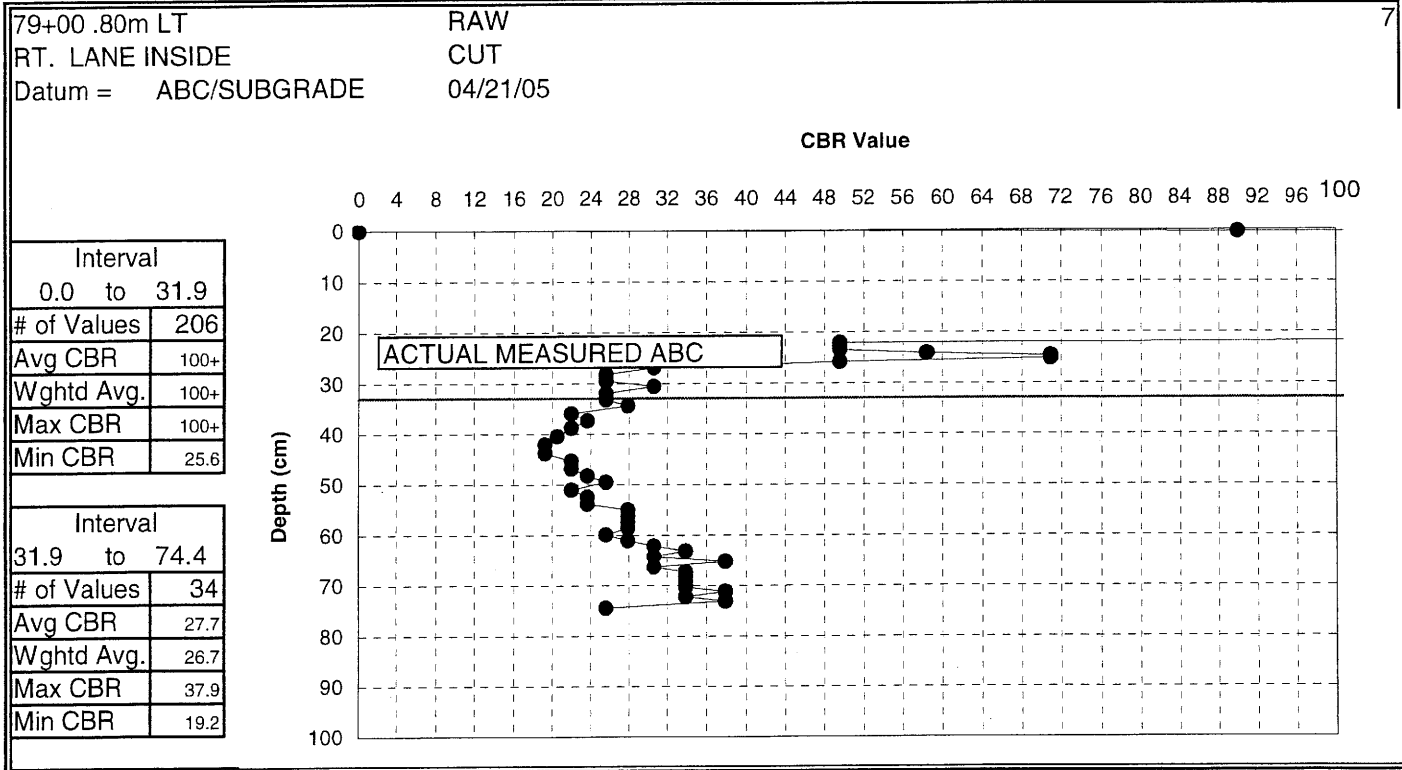


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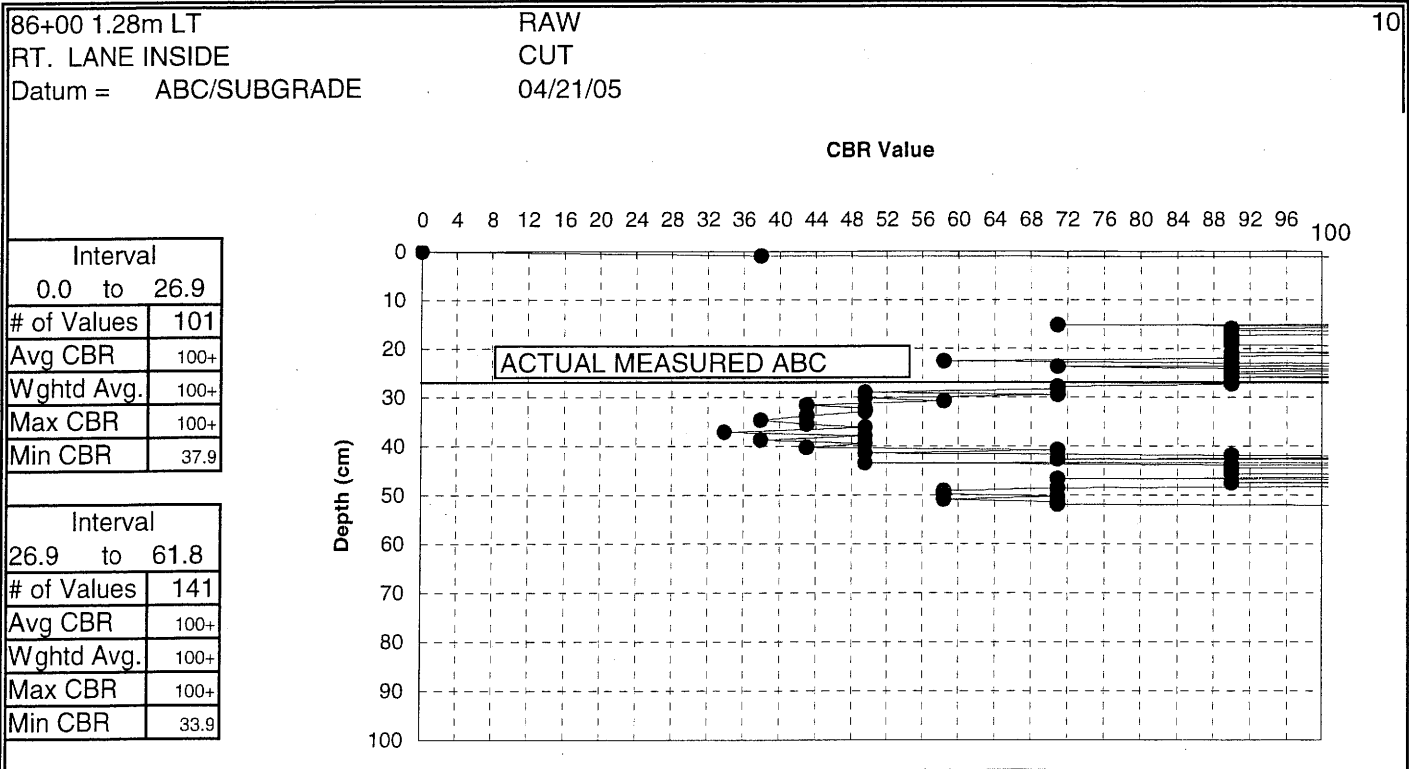
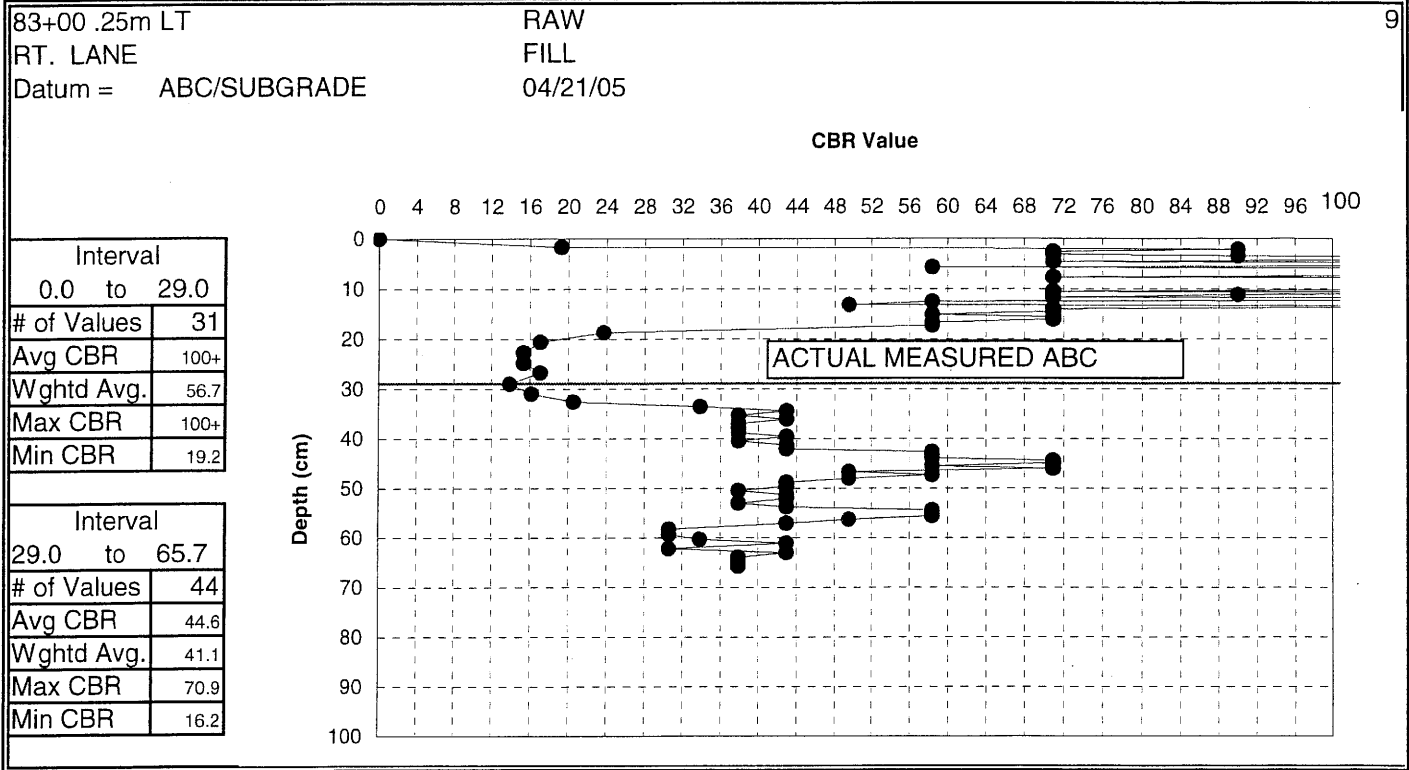


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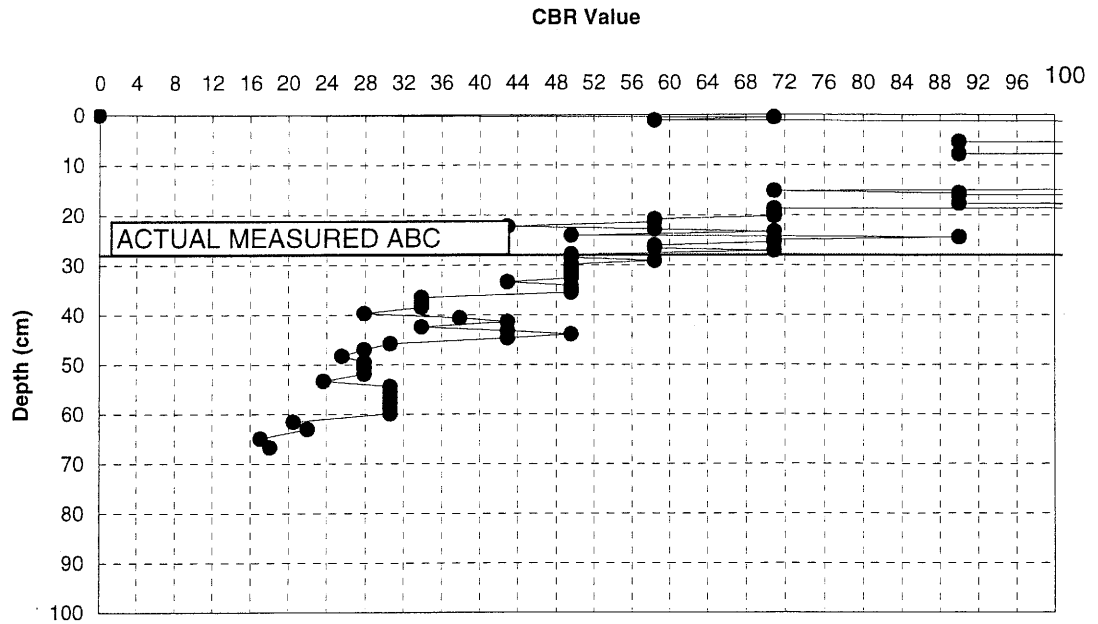
86+00 .87m LT
RT. LANE OUTSIDE
Datum = ABC/SUBGRADE

RAW
CUT
04/21/05

11

Interval	
0.0 to 27.8	
# of Values	88
Avg CBR	100+
Wghtd Avg.	100+
Max CBR	100+
Min CBR	43.0

Interval	
27.8 to 66.7	
# of Values	38
Avg CBR	36.3
Wghtd Avg.	33.0
Max CBR	58.4
Min CBR	17.1



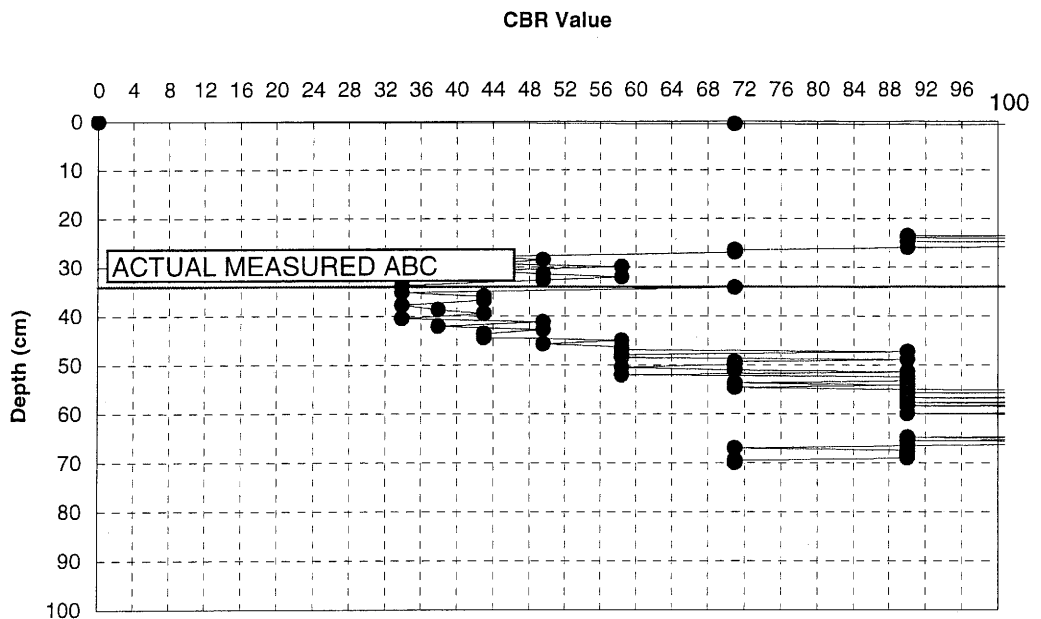
90+00 1.5m LT
RIGHT INSIDE LANE(MAINLINE)
Datum = ABC/SUBGRADE

RAW
CUT
04/22/05

12

Interval	
0.0 to 33.7	
# of Values	245
Avg CBR	100+
Wghtd Avg.	100+
Max CBR	100+
Min CBR	33.9

Interval	
33.7 to 70.0	
# of Values	79
Avg CBR	92.3
Wghtd Avg.	77.6
Max CBR	100+
Min CBR	33.9

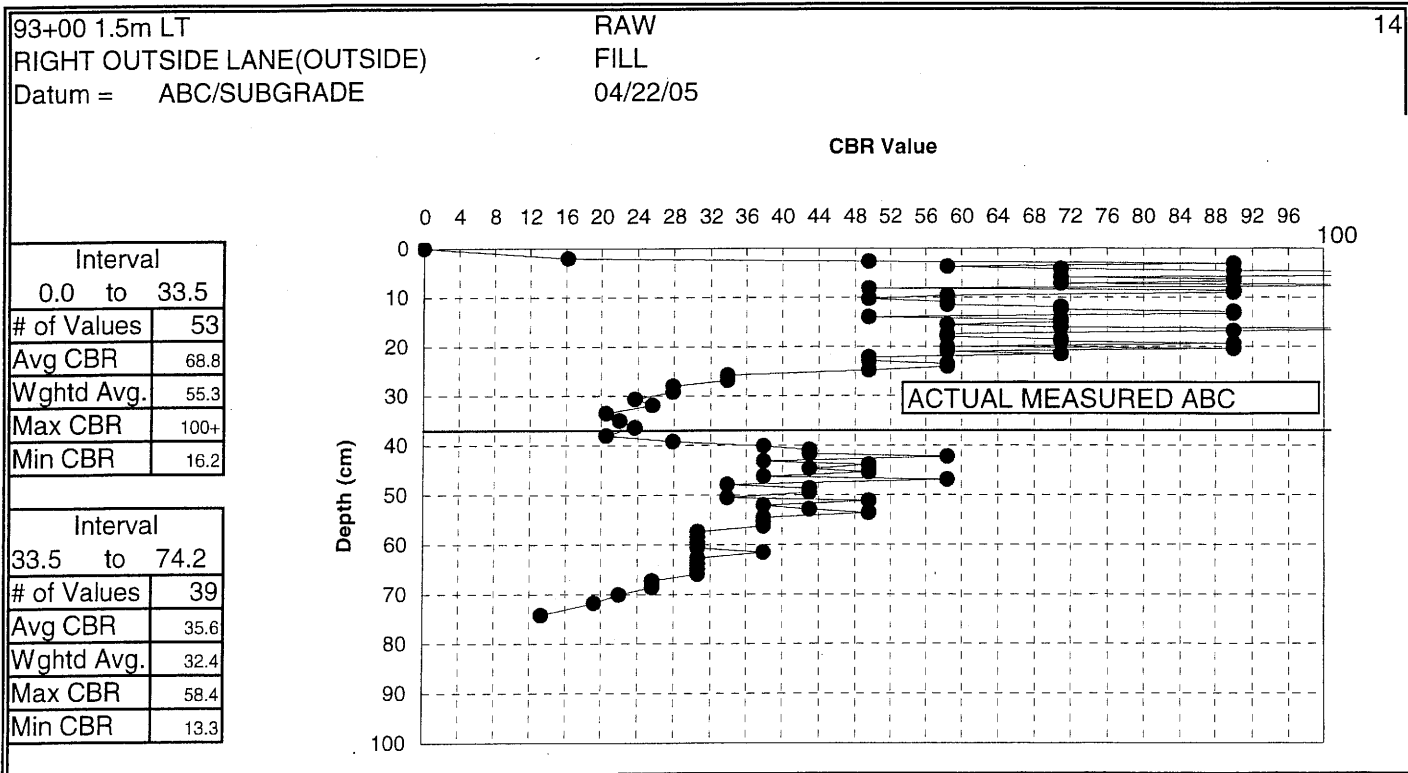
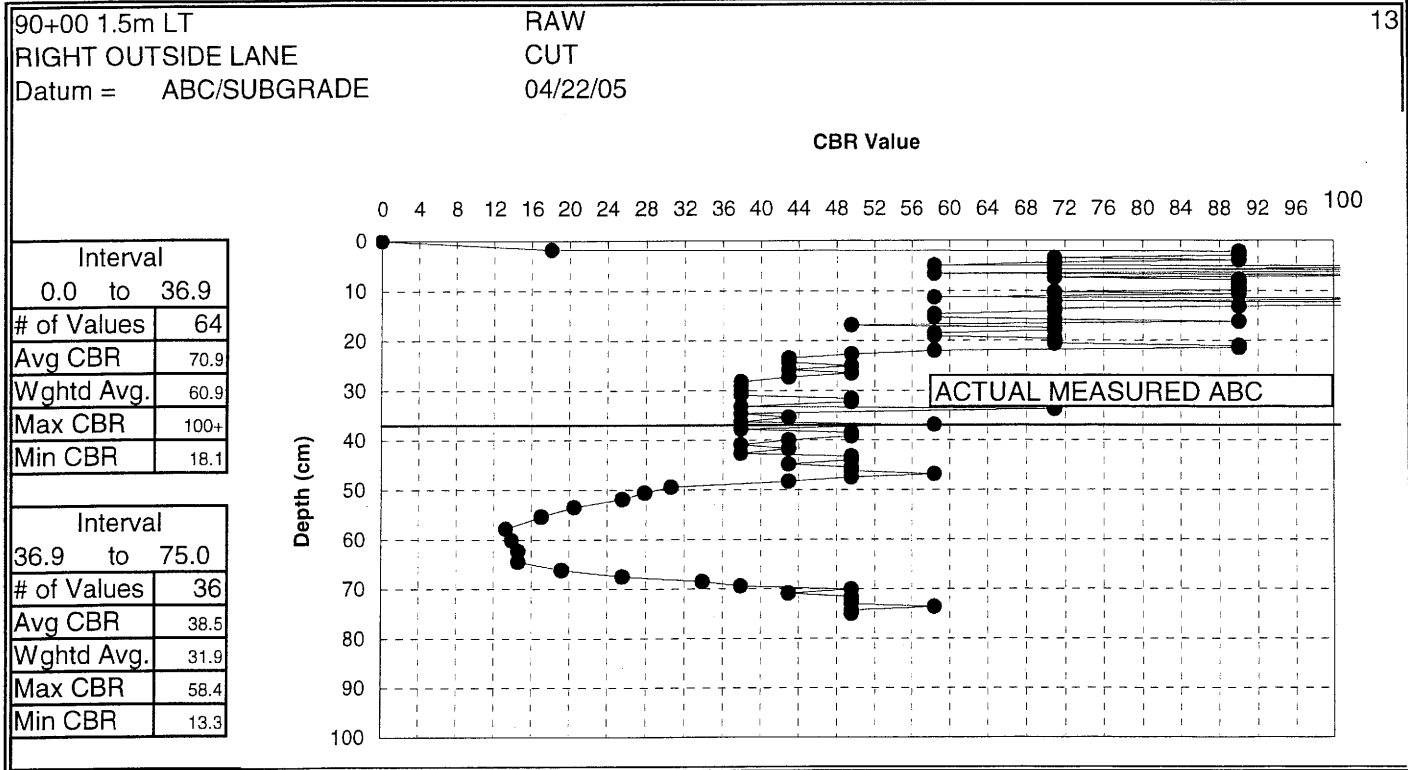


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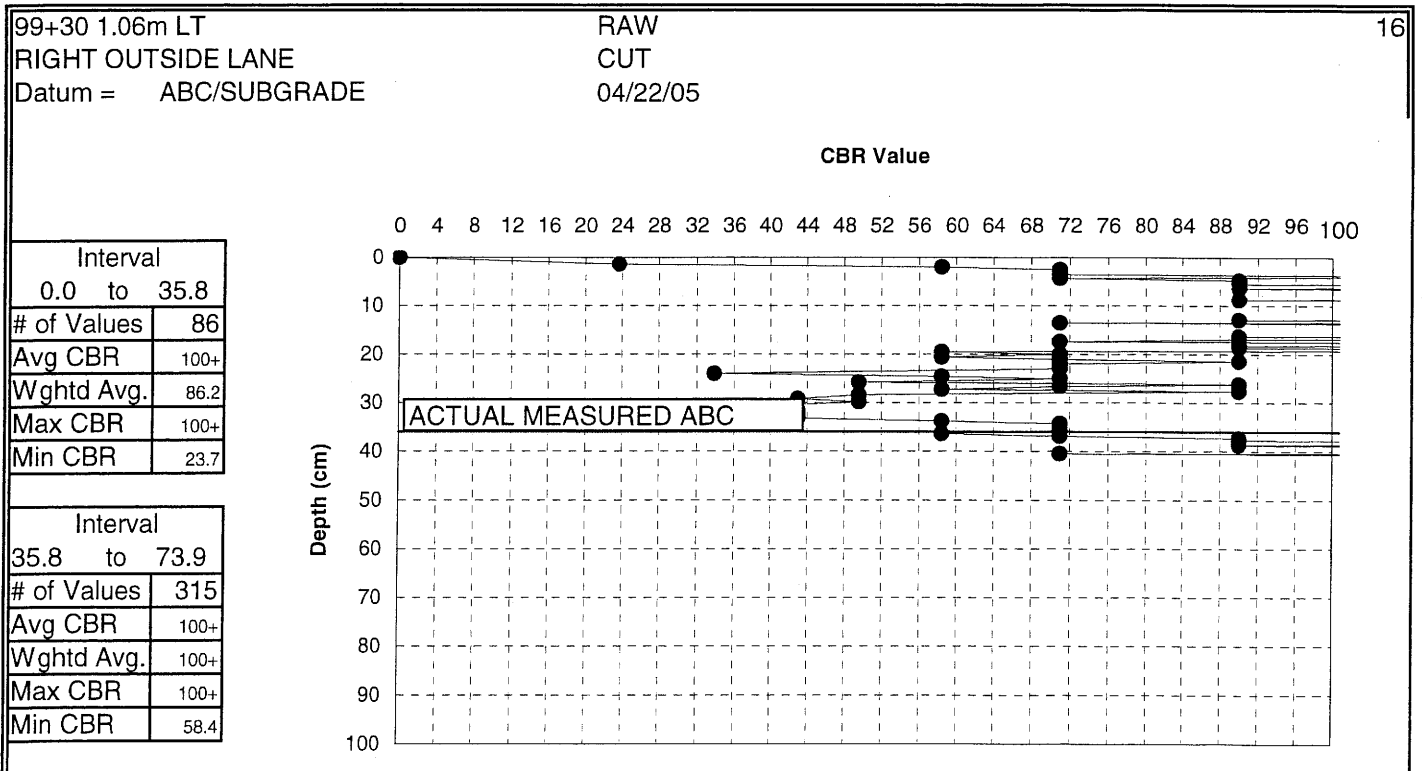
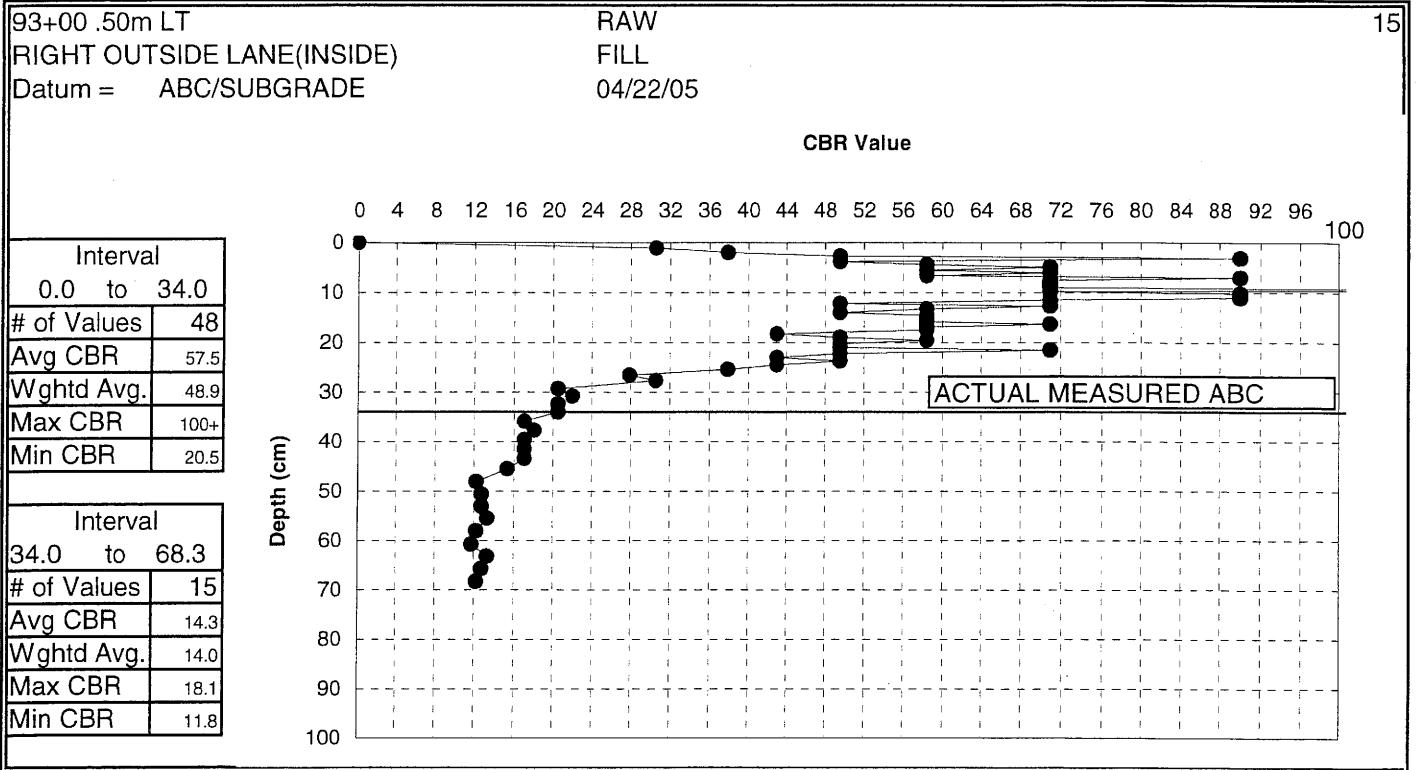


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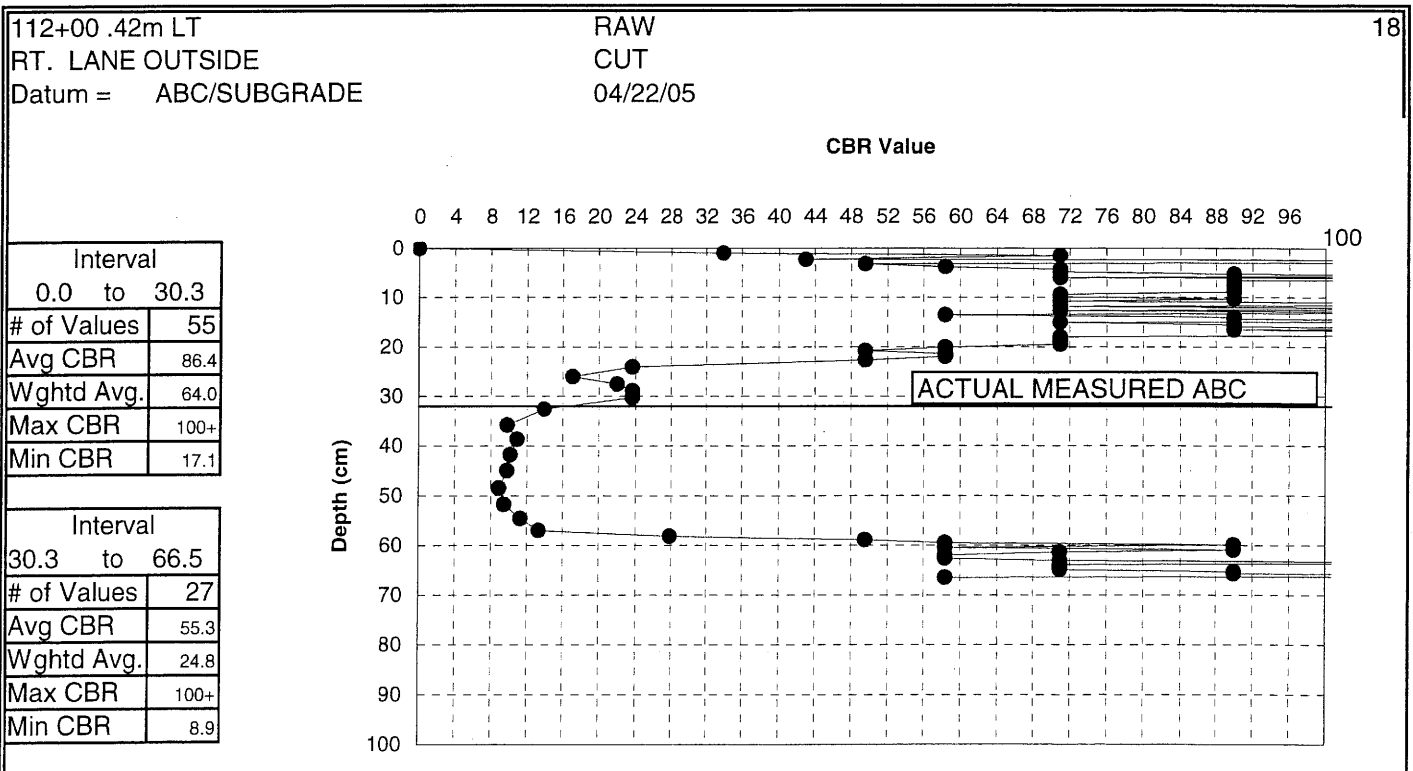
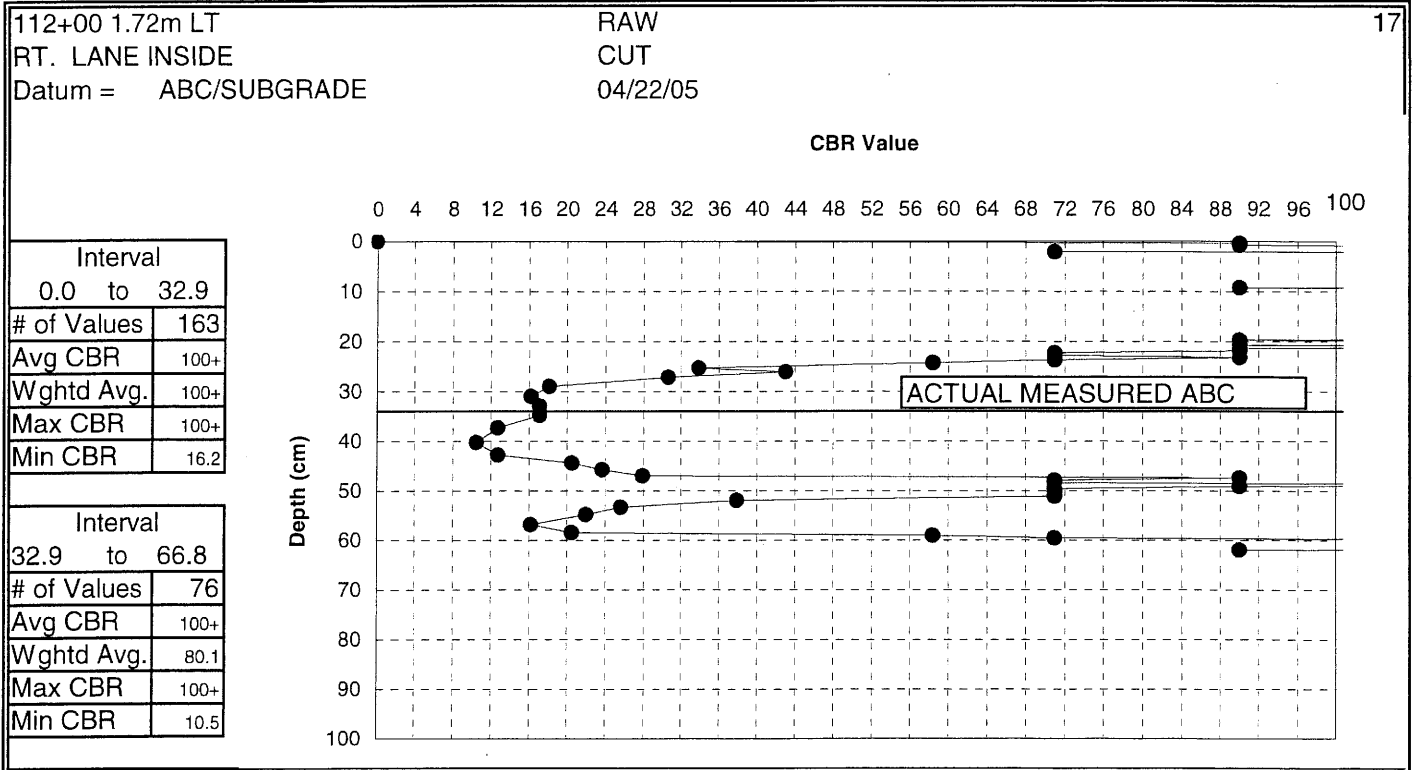


**CONE PENETROMETER RESULTS
NC - DOT, GEOTECHNICAL UNIT, SOILS SECTION**

PROJECT NO.	34445.1.1
PROJECT ID	R-2518A
ROUTE	US 19
COUNTY	Madison/Yancey

GEOLOGIST	J. B. Barfield
GEOTECHS	Trigon

FILE	R2518A_DCP2.xls
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