



STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

MICHAEL F. EASLEY
GOVERNOR

ROADWAY DESIGN UNIT		
MAR 13 2006		
___ ALLEN	___ BLEVINS	___ SYKES
___ BREW	___ C. HOUSER	___ T. HOUSER
___ LOVERING	___ D. TAYLOR	___ GOODNIGHT
___ J. MOORE	___ C. HAIRE	___ SPEER
___ B. MOORE	___	___ THOMAS
___ MUMFORD	___	___ WALLS
LYNDO TIPPETT THOMPSON		
SECRETARY		
PREPARE REPLY FOR SIGNATURE		
FYI.		
REVIEW/DISCUSS WITH		

January 21, 2006

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

FROM: N. W. Wainaina, P.E.
State Geotechnical Engineer

STATE PROJECT: 34445.1.1 (R-2518B) - Turnkey Project

F. A. PROJECT: N/A

COUNTY: Yancey

DESCRIPTION: US 19 from East of Madison County Line to SR 1336
(Jacks Creek Rd.)

SUBJECT: Geotechnical Recommendations for Pavement Design

This report contains pavement design recommendations for the above referenced project. The proposed work consists of upgrading the existing two-lane facility to a four-lane divided roadway.

The length of this project is 11.119 km.

Soils: The predominant soils along this project generally consist of saprolitic, micaceous, silty sand (A-2-4) and sandy/clayey silts (A-4, A-5). Approximately 50% 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-7-5(11)	A-7-6(13)	*A-2-4(0)	*A-4(1)	*A-7-5(4)
CBR VALUE	17.7	7.7	6.3	11.9	13.3	9.2

*indicates CBR values from project R-2518A

The following design values are recommended:

S=3.5

R=1.5

Drainage: The project traverses along a broad valley and the topography is gently to moderately rolling hills. The surface drainage for the project is good.

Existing Pavement: Data for existing pavement is as follows:

Mainline

-L- Sta. 115+06.547 (Begin Project) to -L- Sta. 137+00±

Pavement Structure: 170 - 240 mm Asphalt
 120 - 225 mm ABC
 Subgrade

Width: 7.4± meters

Condition: Generally fair to good. Occasional low to moderate severity longitudinal and fatigue cracking is present and typically occurs in the wheel paths. Occasional low severity transverse cracking is present. Pavement cores indicate full-depth cracking in distress areas.

Mainline

-L- Sta. 137+00± to -L- Sta. 226+25.844 (End Project)

Pavement Structure: 175 - 240 mm Asphalt
 Subgrade

Width: 7.4± meters

Condition: Generally fair to good. Occasional low to moderate severity longitudinal and fatigue cracking is present and typically occurs along the wheel paths. Occasional low to moderate severity transverse cracking is also present. Pavement cores indicate partial to full-depth cracking in distressed areas.

Turn Lanes

<u>-L- Station</u>	<u>Pavement Thickness</u>	<u>Pavement Condition</u>
157+00 (SR 1134)	220mm Asphalt / Subgrade	Good
178+75 (SR 1128)	220 mm Asphalt / Subgrade	Fair
179+30 (Hwy. 19W)	175 mm Asphalt / Subgrade	Fair
194+15 (SR 1121)	180 mm Asphalt / Subgrade	Fair
194+80 (SR 1136)	175 mm Asphalt / Subgrade	Fair
215+20 (SR 1136)	165 mm Asphalt / Subgrade	Fair
215+90 (SR 1454)	170 mm Asphalt / Subgrade	Good
222+50 (SR 1115)	190 mm Asphalt / Subgrade	Good
225+50 (Lt. Commercial)	220 mm Asphalt / Subgrade	Good
225+70 (SR 1336)	150 mm Asphalt / Subgrade	Good

DESIGN AND CONSTRUCTION RECOMMENDATIONS

I. Subgrade Stability

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

- (a) Cement Stabilization: 70% of project; 30 kg/m² @ 180mm depth. Also, 135 kg/m² of ABC for 10% of cement area.

A special provision will be submitted for this item.

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

B. Aggregate for Aggregate Stabilization

A quantity of 800 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 20 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 forthcoming Geotechnical Report- Final Design and Construction Recommendations.

TMH/LTP

File: R-2518B_GEO_PDI_rpt.doc



STATE OF NORTH CAROLINA

DEPARTMENT OF TRANSPORTATION

MICHAEL F. EASLEY
GOVERNOR

1501 MAIL SERVICE CENTER, RALEIGH, N.C. 27699-1501

LYNDO TIPPETT
SECRETARY

DATE: 2/21/06

PROJECT: 34445.1.1

TIP No: R-2518B

COUNTY: Yancey

ROUTE: US 19 from East of Madison County Line to SR 1336 (Jacks Creek Rd.)

MEMORANDUM TO: Mr. Randy Garris, PE
State Contract Officer

FROM: Njoroge W. Wainaina, PE
State Engineering Geologist

SUBJECT: Special Provision (Date 11/5/96)

- Soil-Cement Base (Section 542)
- Lime Treated Soil (Section 501)
- Cement Treated Base (Section 540, Plant Mixed)
(Section 541, Road Mixed)
- Borrow Criteria
- Select Backfill Material
- Embankments (Section 235)
- _____

The attached special provision for the designated material is transmitted for use on the subject project only.

NWW/jbb

cc:

File: spl

SPECIAL PROVISION
SOIL-CEMENT BASE
SECTION 542

The 1995 Standard Specifications shall be revised as follows:

Page 272, Article 542-1. Delete the first sentence and substitute the following:

The work covered by this section consists of constructing and curing a soil-cement base by treating the subgrade, existing subbase, or existing base, or any combination of these materials, by pulverizing, adding portland cement, adding aggregate when required, mixing, wetting, and compacting the mixture to the required density.

Page 272, Article 542-2. Add the following after line 3:

Aggregate, Std. Size ABC.....Section 1005

Page 274, Article 542-7. Add the following paragraph after the first paragraph:

Prior to spreading cement, aggregate shall be spread at the rate of approximately 135 kg/m² in areas designated by the Engineer.

Page 277, Article 542-16. Add the following paragraph after the first paragraph:

The quantity of aggregate to be paid for will be the number of metric tons of aggregate which has been incorporated into the completed and accepted work. The aggregate will be measured by weighing in trucks on certified platform scales or other certified weighing devices. No deductions will be made for any moisture contained in the aggregate at the time of weighing.

Page 277, Article 542-17. Add the following paragraph after the first paragraph:

The quantity of aggregate, measured as provided in Article 542-16, will be paid for at the contract unit price per metric ton for "Aggregate for Soil-Cement Base".

Add the following at the end of the last paragraph:

Aggregate for Soil-Cement Base.....Metric Ton

State Project No.: 34445.1.1

(R-2518B)

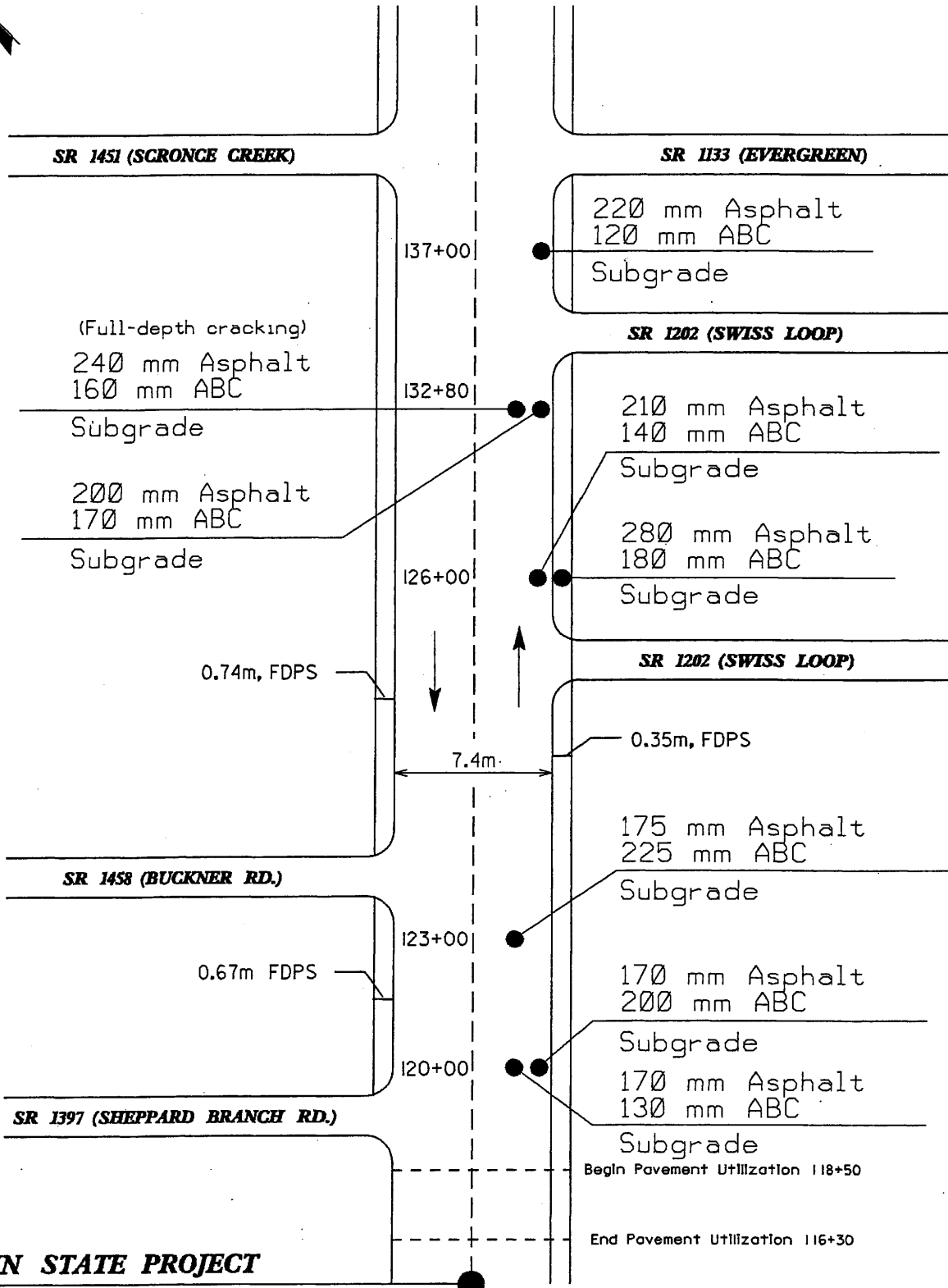
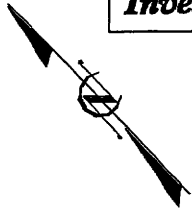
Yancey County

Description: US 19 from east of the Yancey Cootnry Line to SR 1336

Investigated By: J. B. Barfield

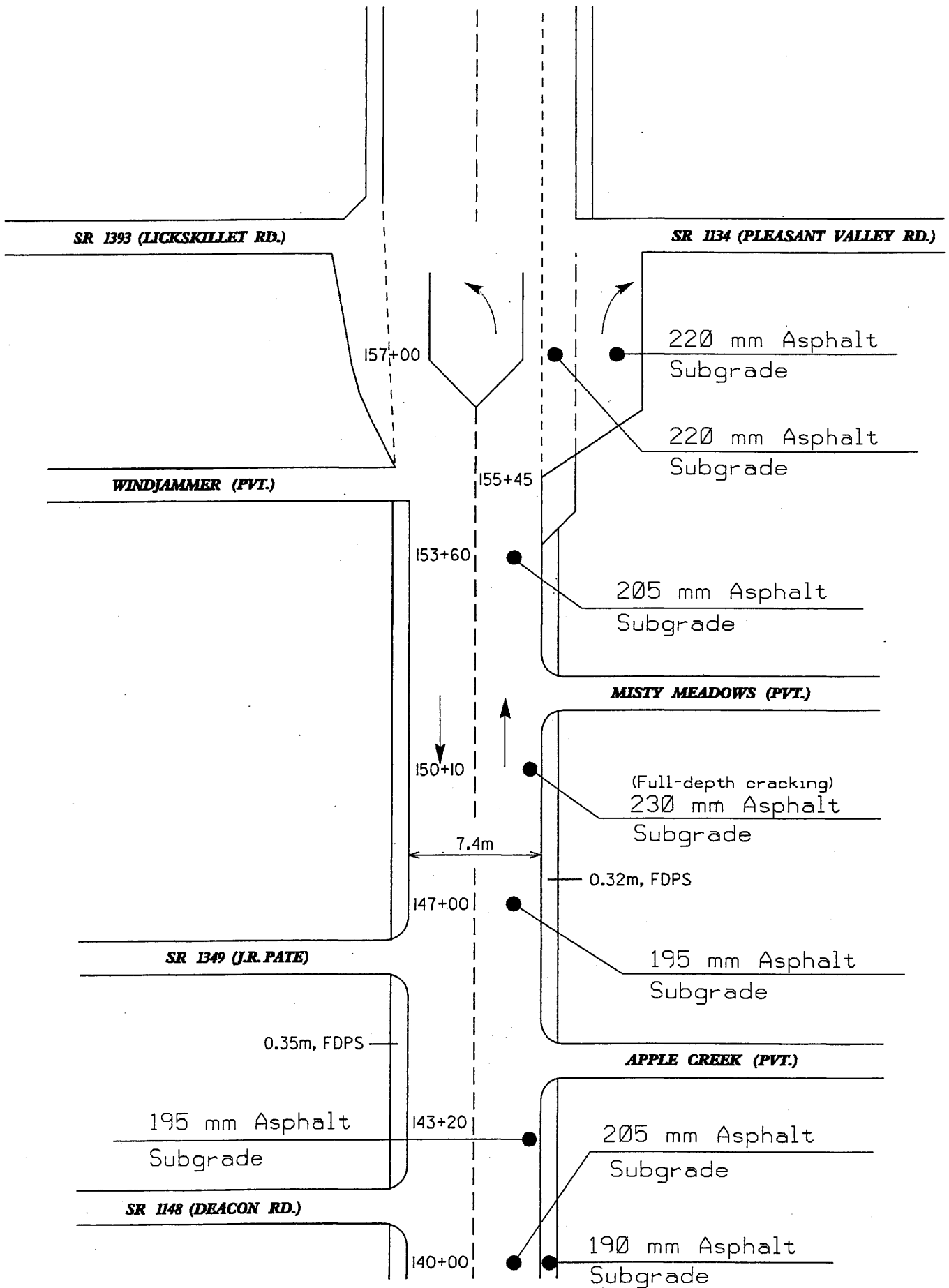
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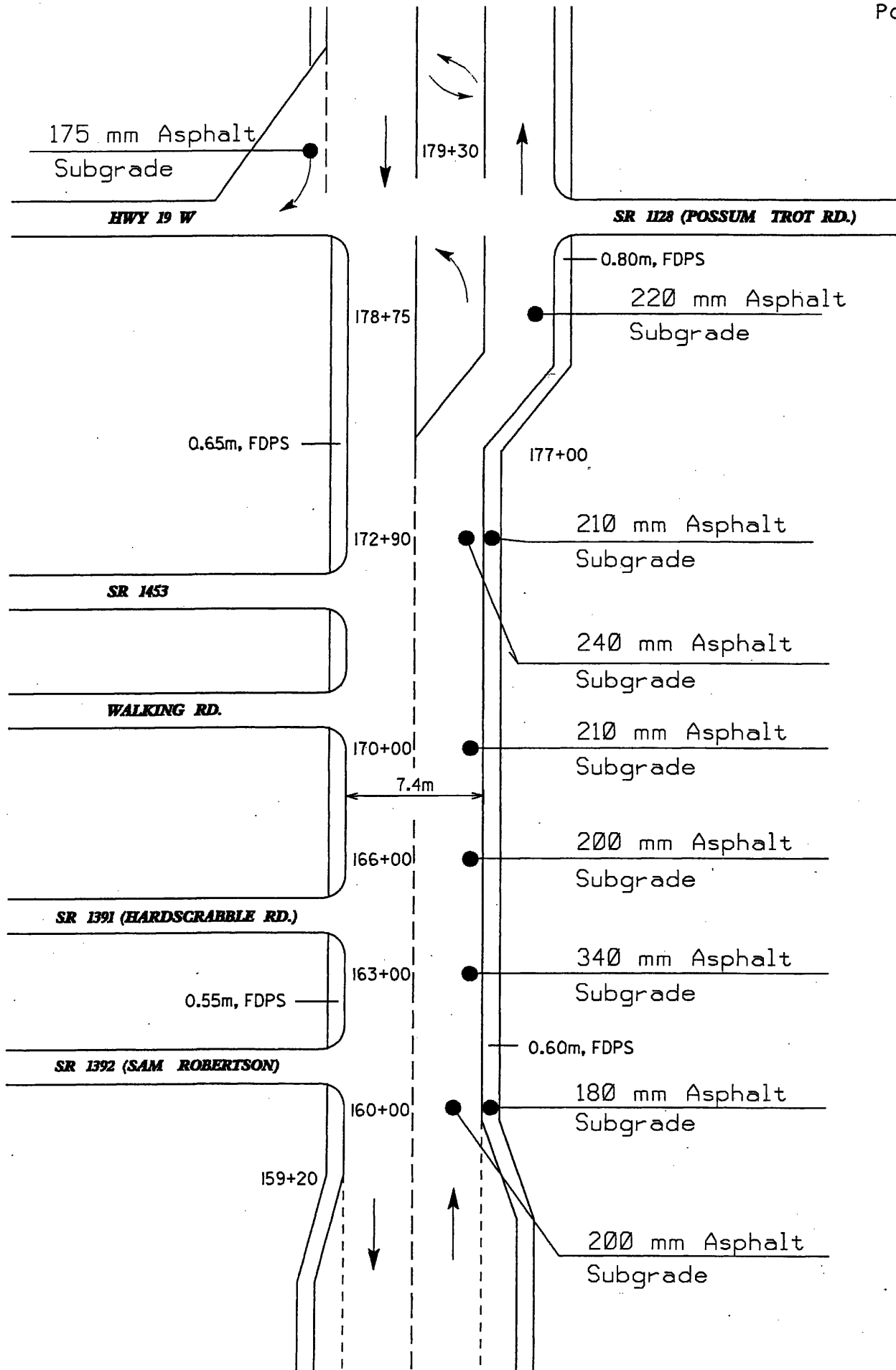
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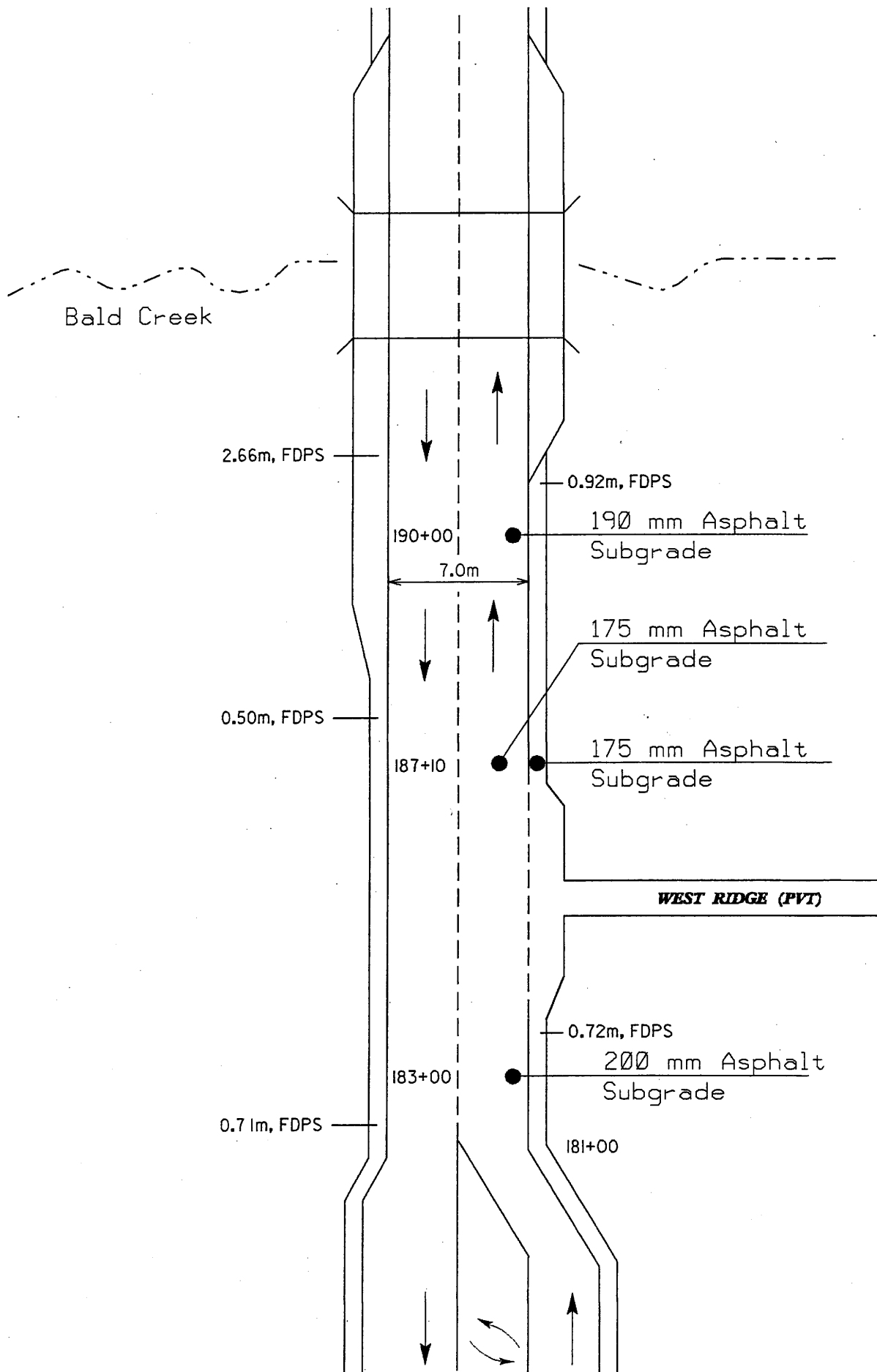


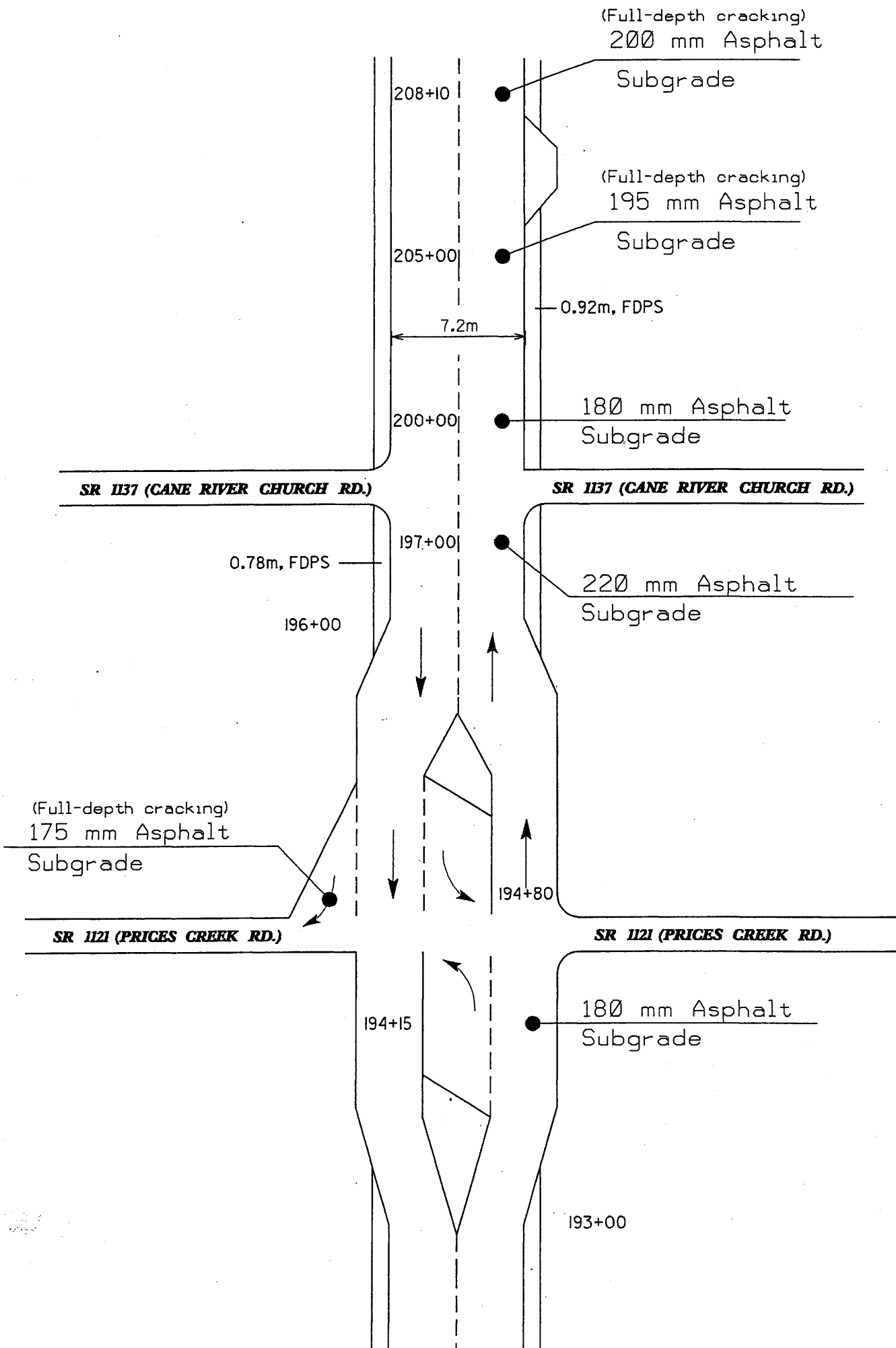
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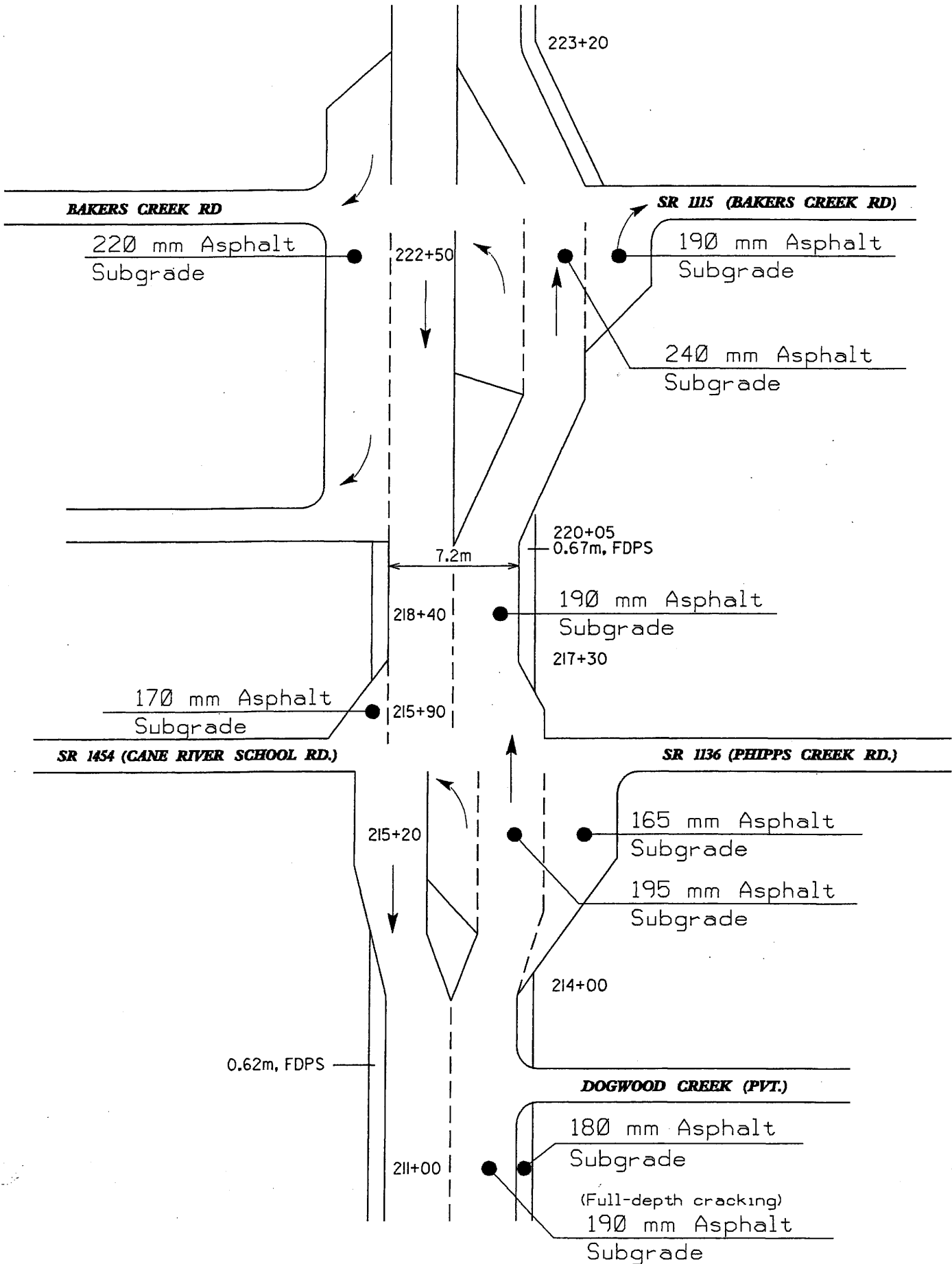
-L- STA. 115+06.547

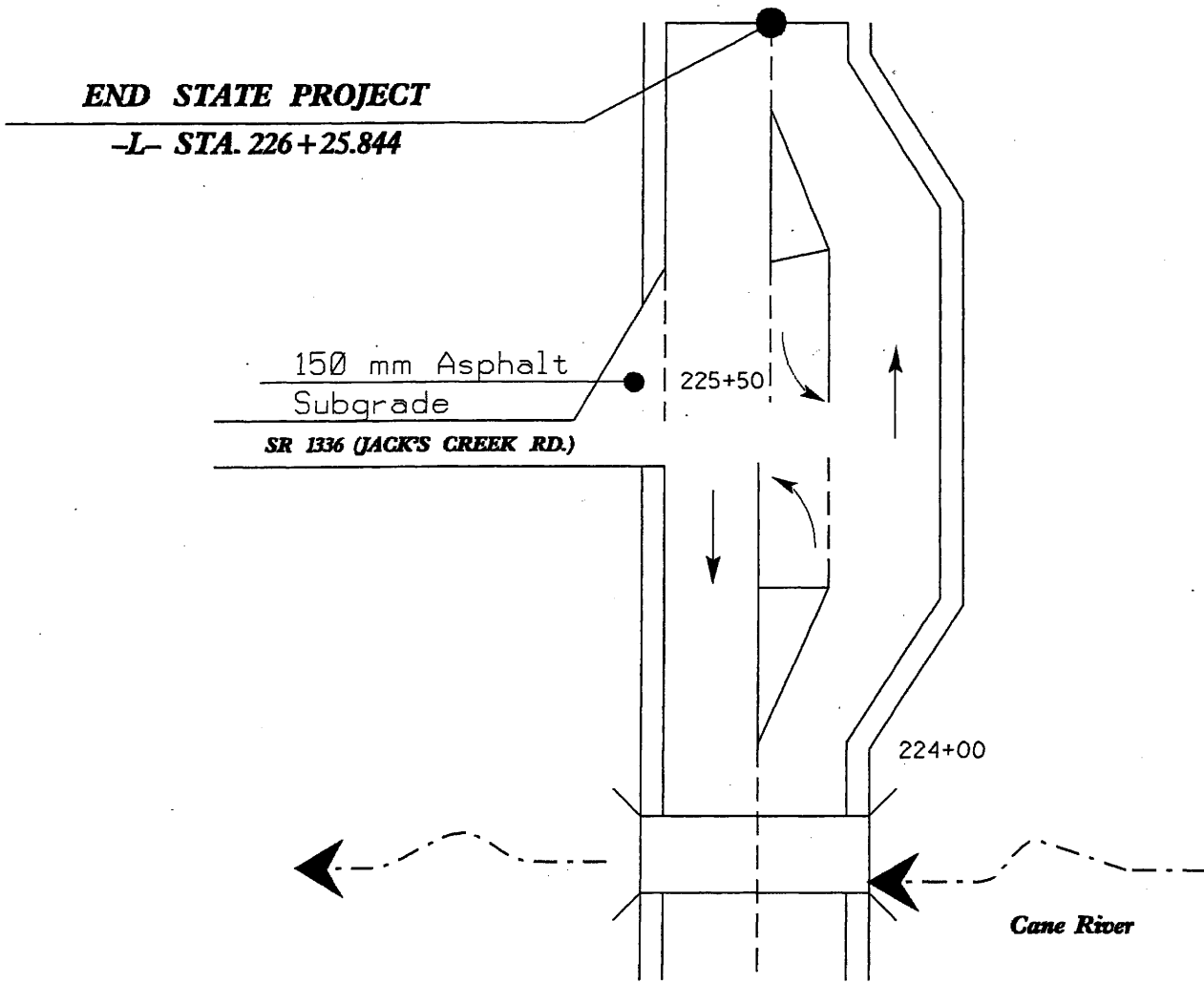










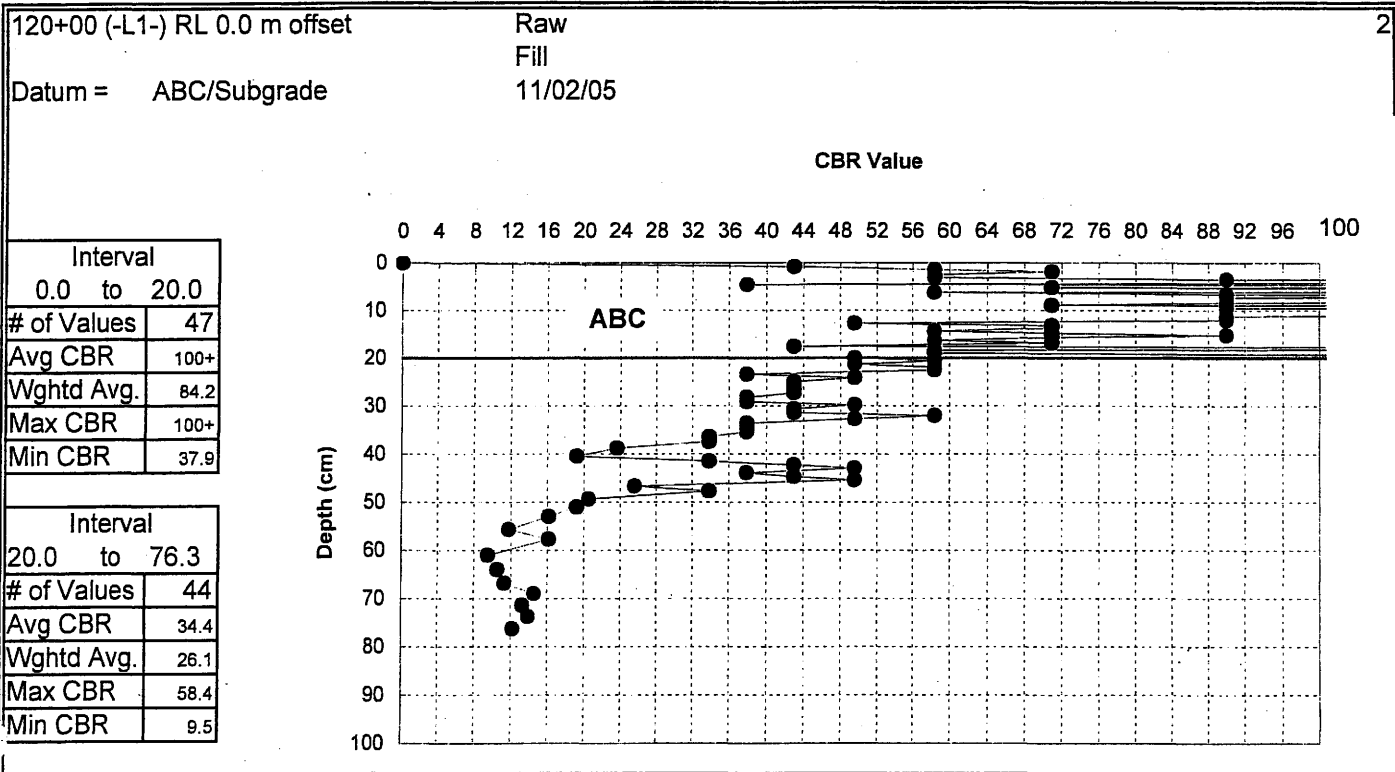
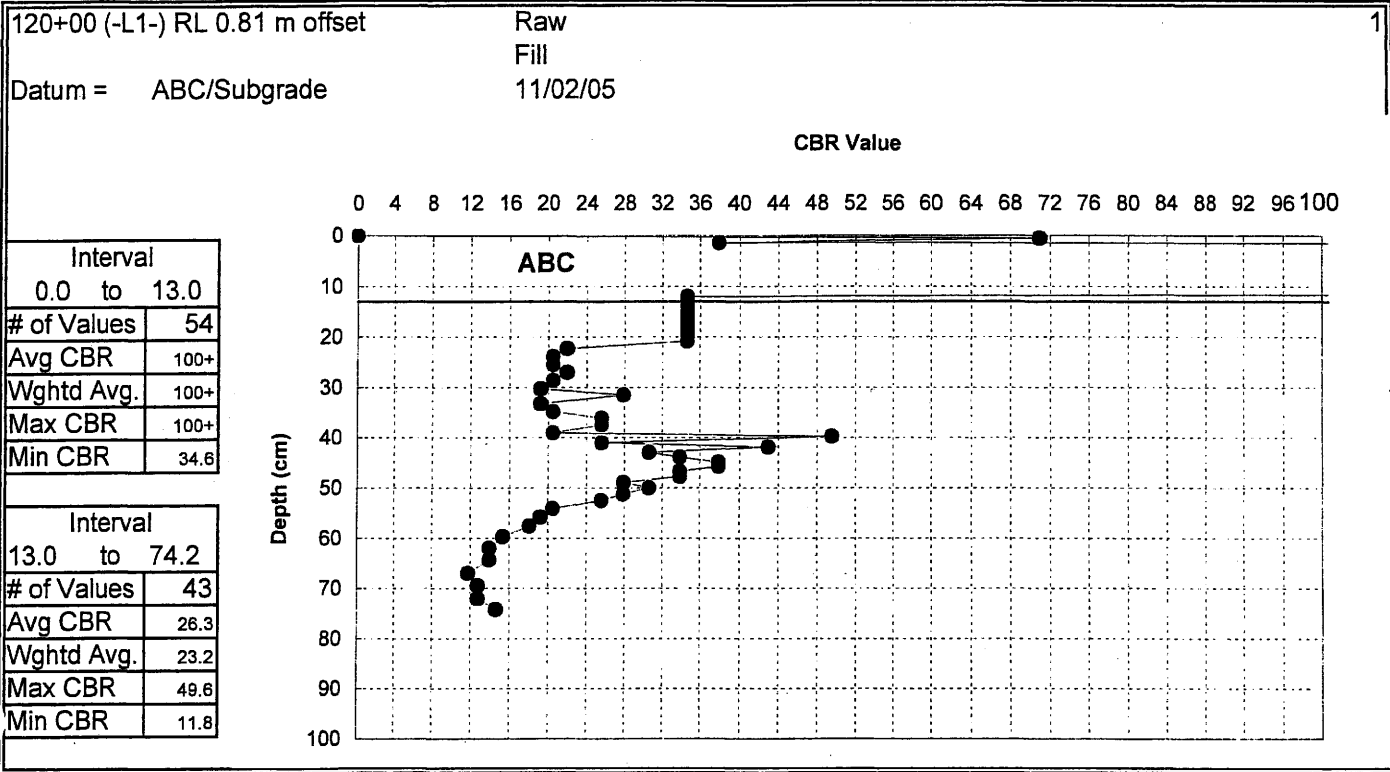


**CONE PENETROMETER RESULTS
NC - DOT, GEOTECHNICAL UNIT, SOILS SECTION**

PROJECT NO.	34445.1.1
PROJECT ID	R-2518B
ROUTE	US 19
COUNTY	Yancey

GEOLOGIST	JBB/LTP
GEOTECHS	S&ME

FILE	R2518B_GEO_PDI_dcp.xls
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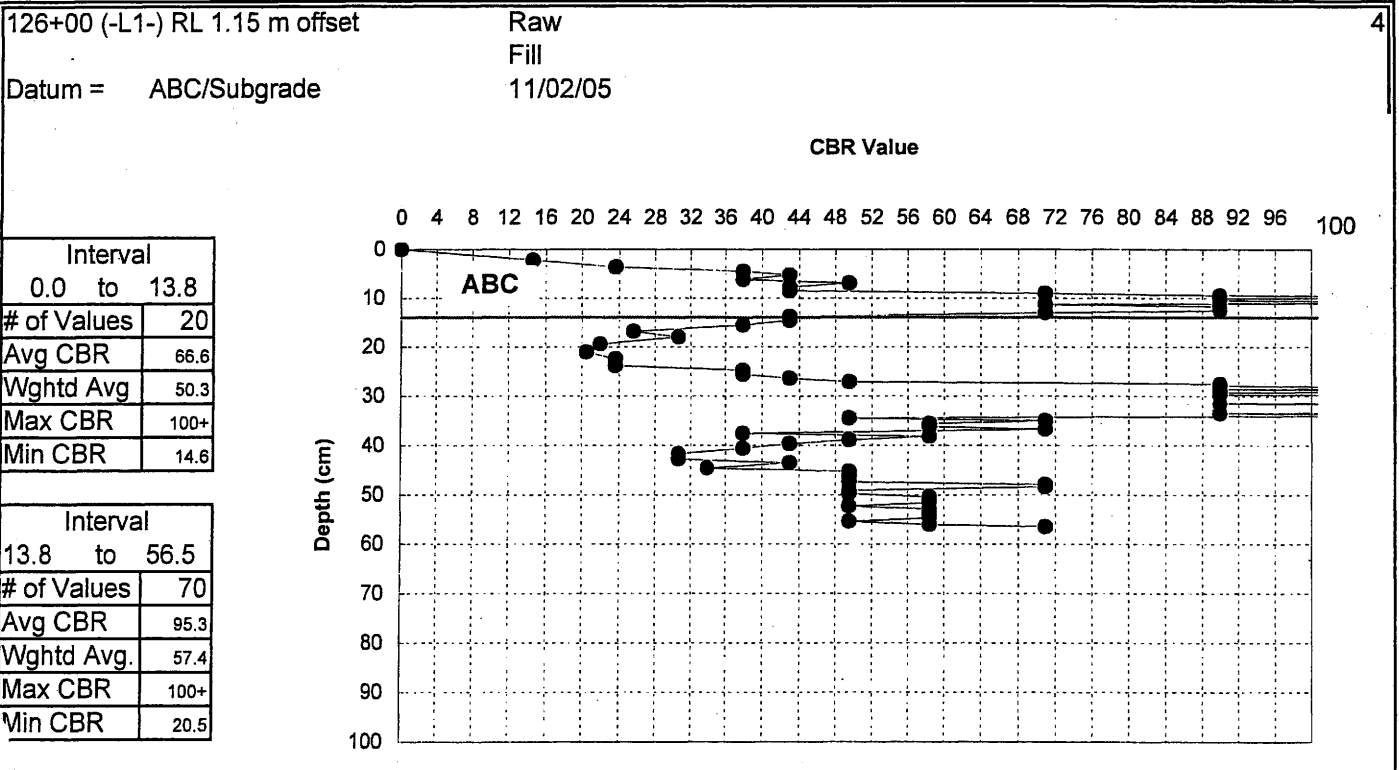
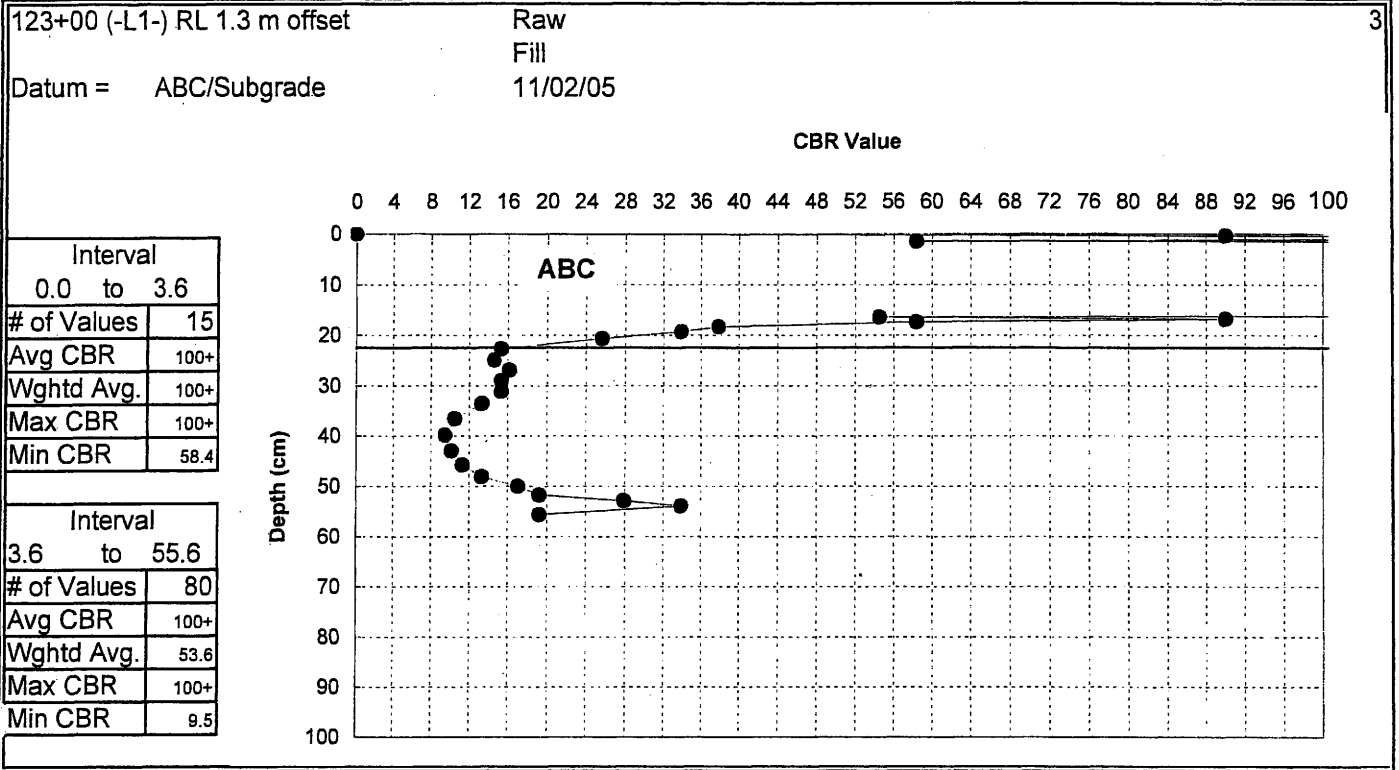


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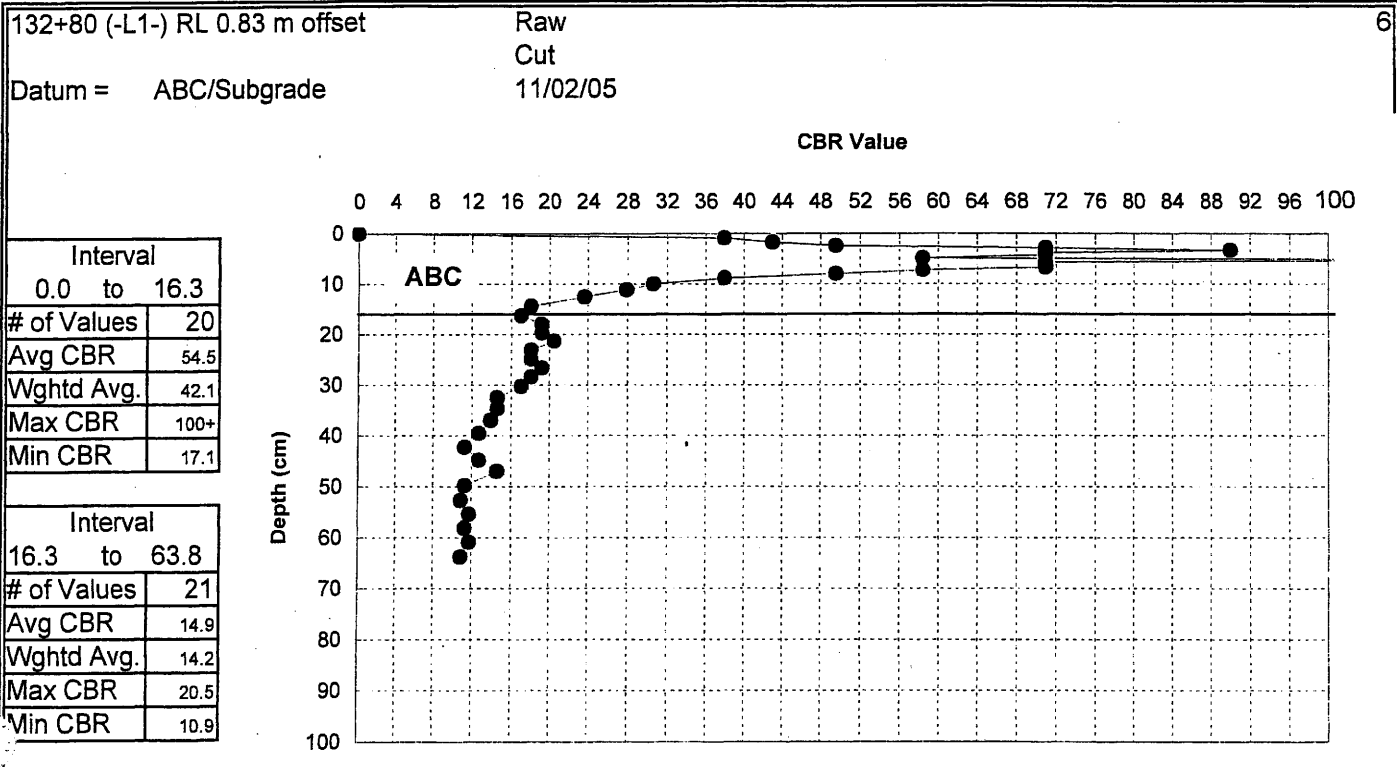
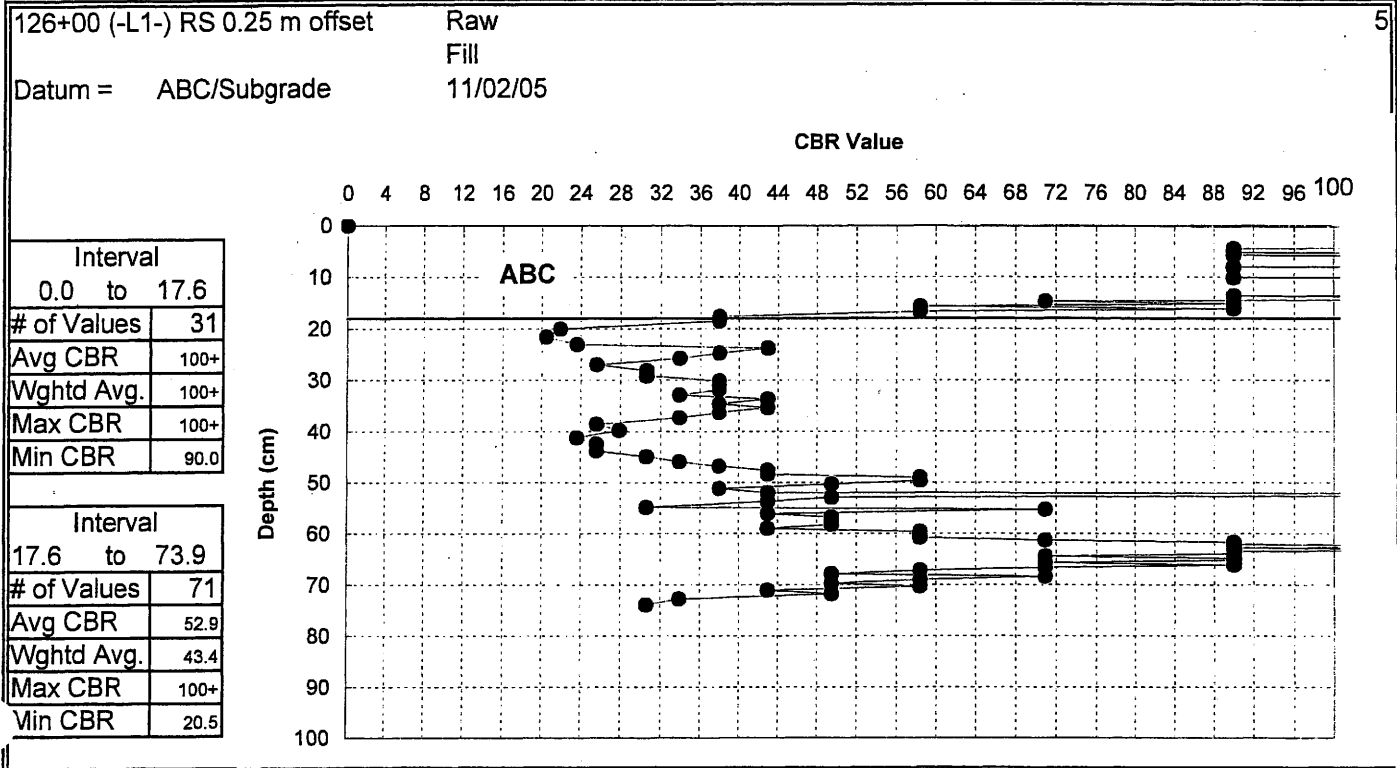


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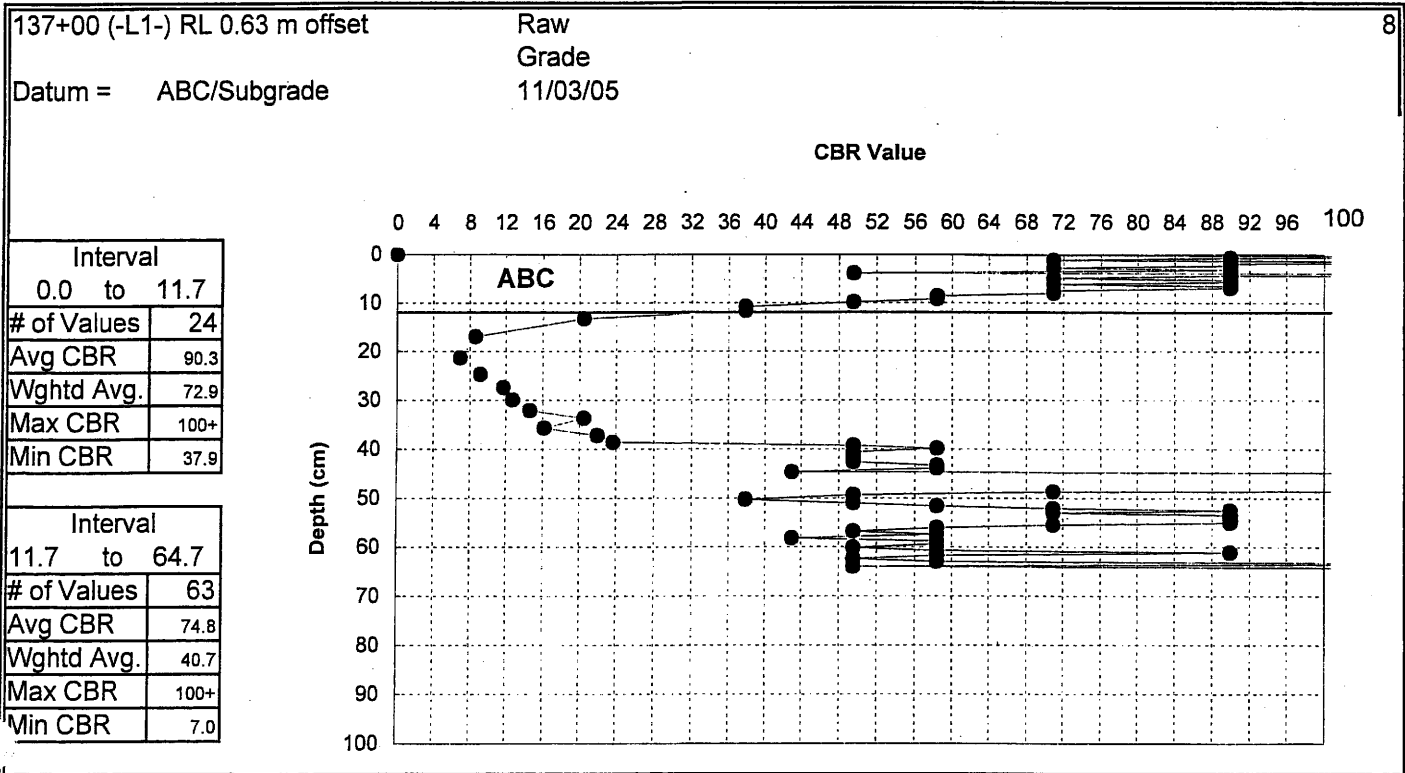
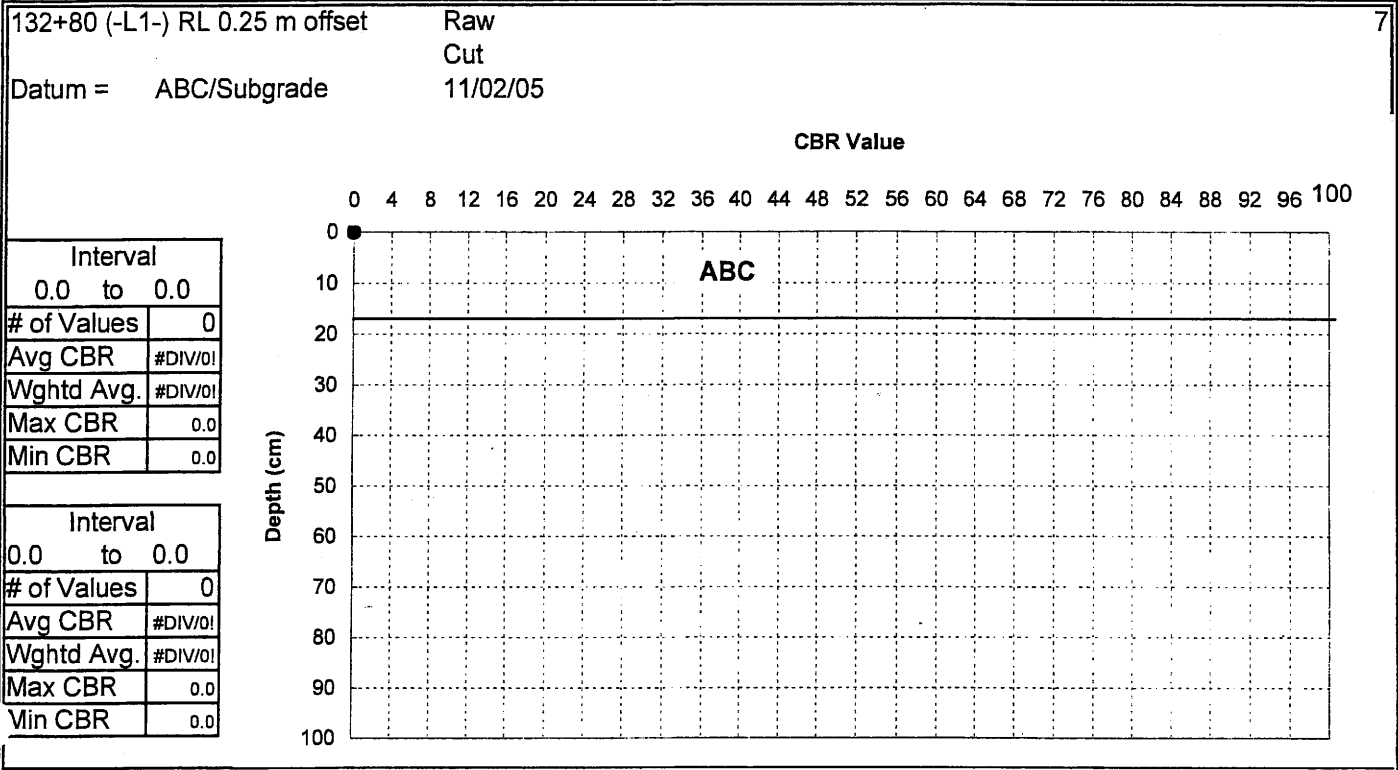


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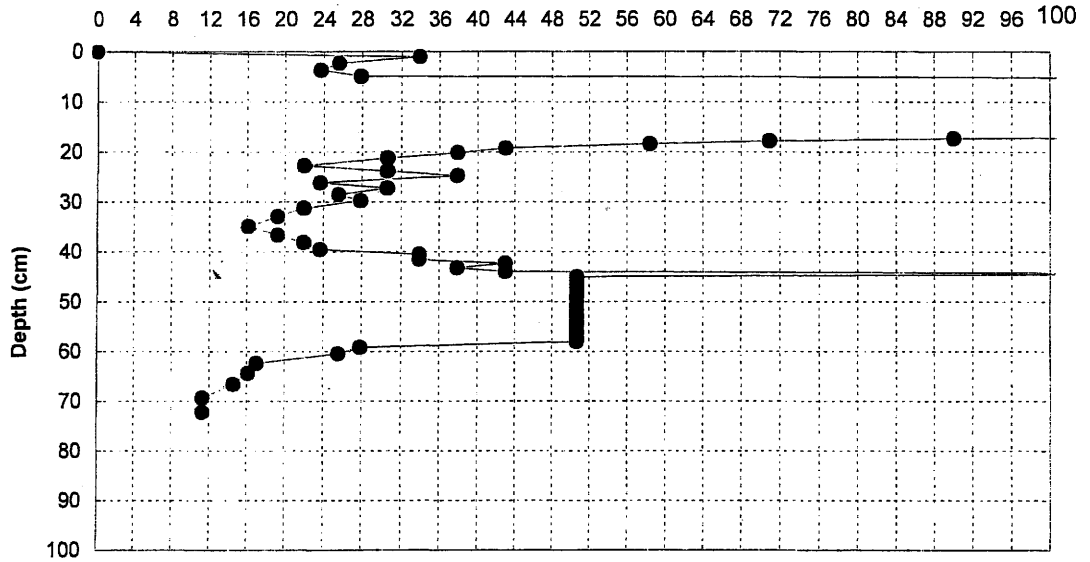
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Raw
Grade
11/03/05

9

Datum = Subgrade

CBR Value



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Avg CBR	100+
Wghtd Avg.	100+
Max CBR	100+
Min CBR	23.7

Interval 31.2 to 72.2	
# of Values	38
Avg CBR	40.9
Wghtd Avg.	31.2
Max CBR	100+
Min CBR	11.3

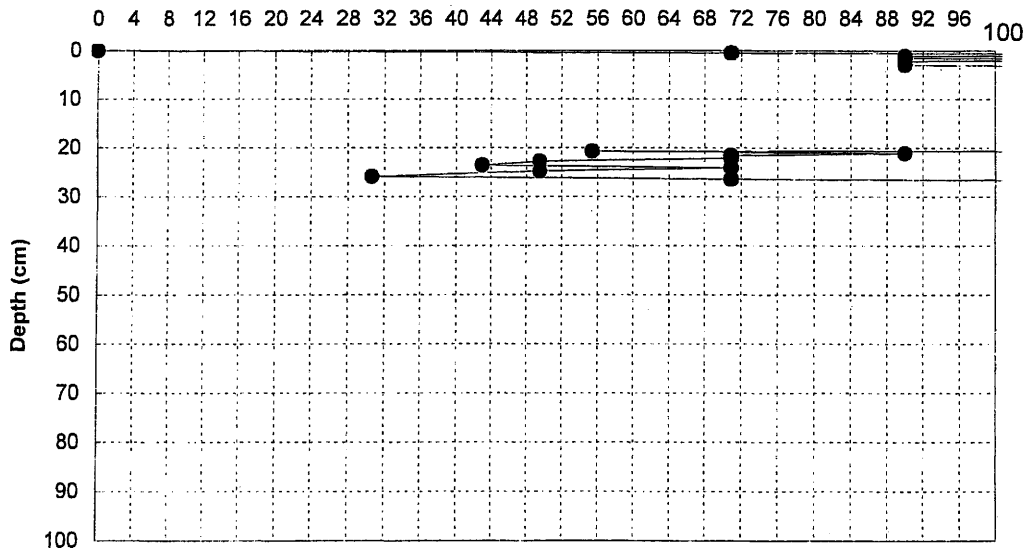
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Raw
Grade
11/03/05

10

Datum = Subgrade

CBR Value



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

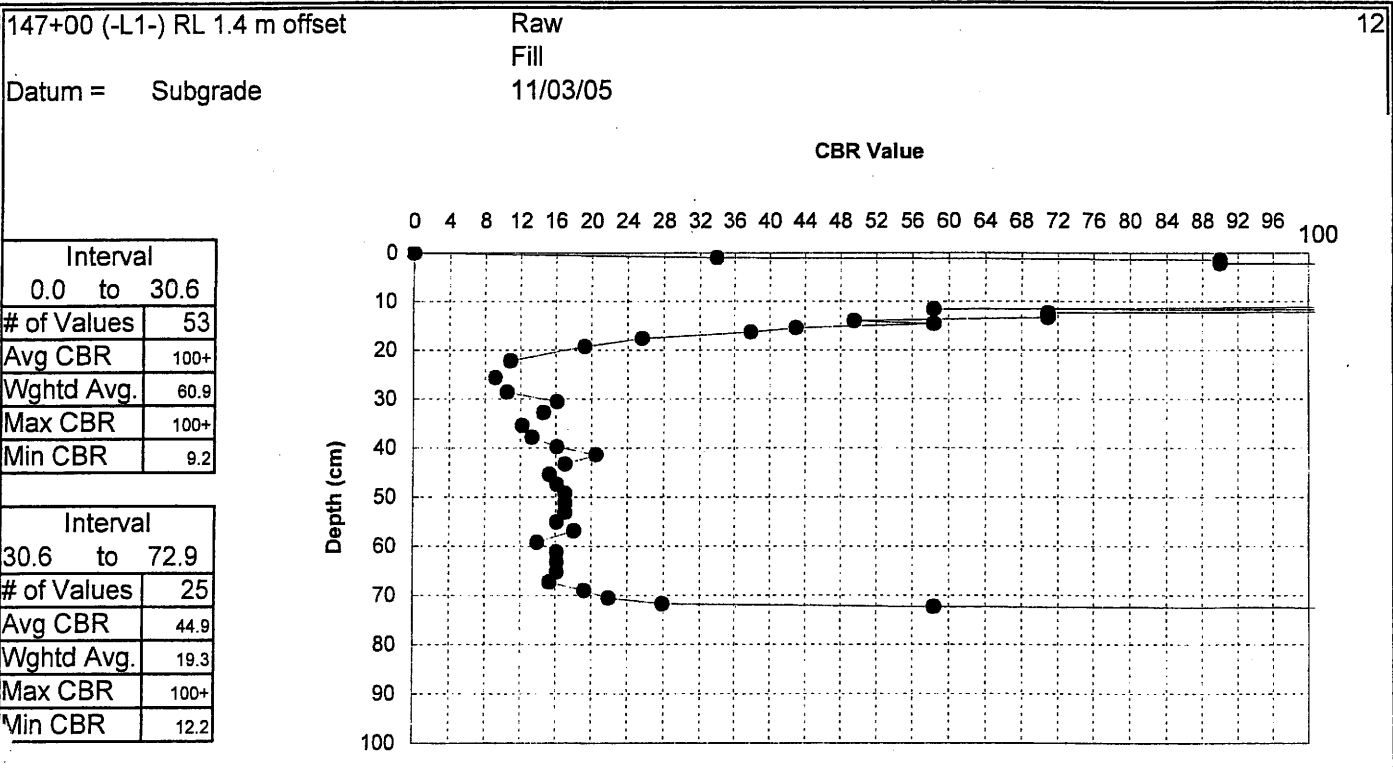
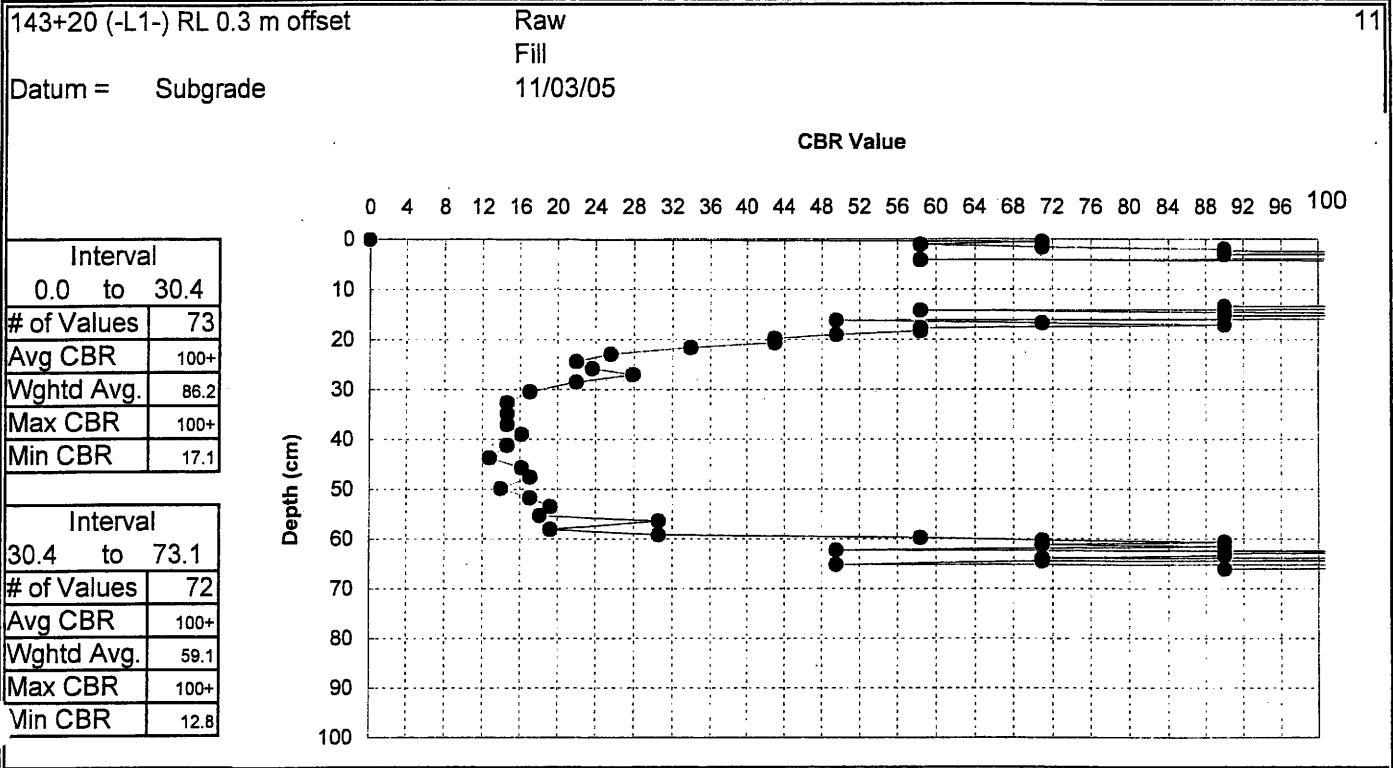
Interval 0.0 to 27.2	
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Avg CBR	100+
Wghtd Avg.	100+
Max CBR	100+
Min CBR	30.6

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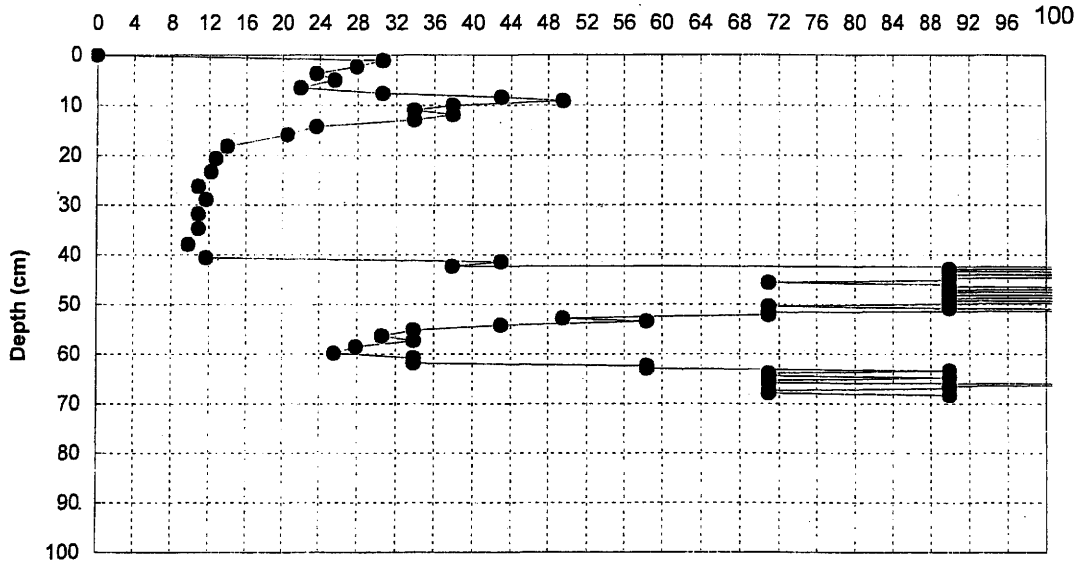
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10/03/05

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CBR Value



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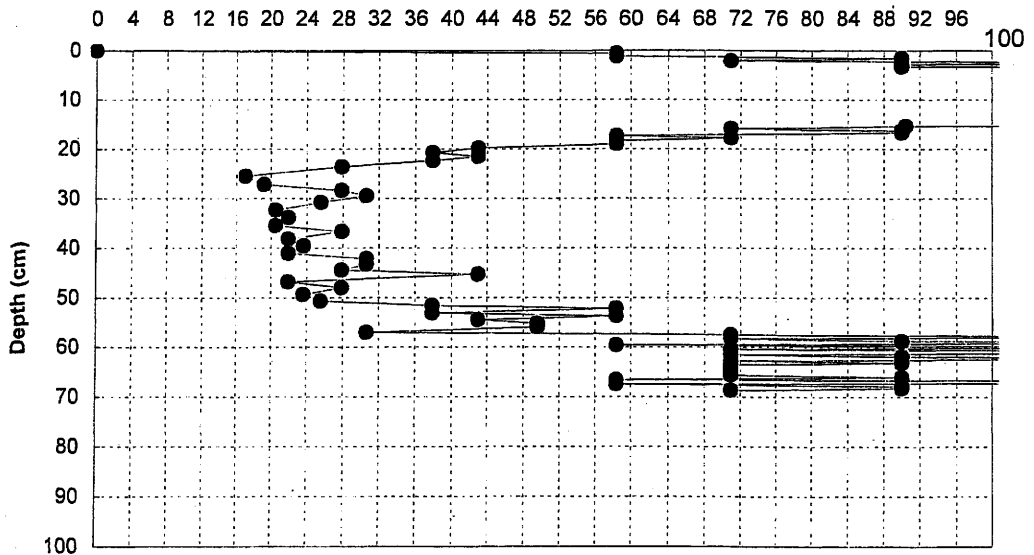
Grade

11/03/05

Datum = Subgrade

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CBR Value

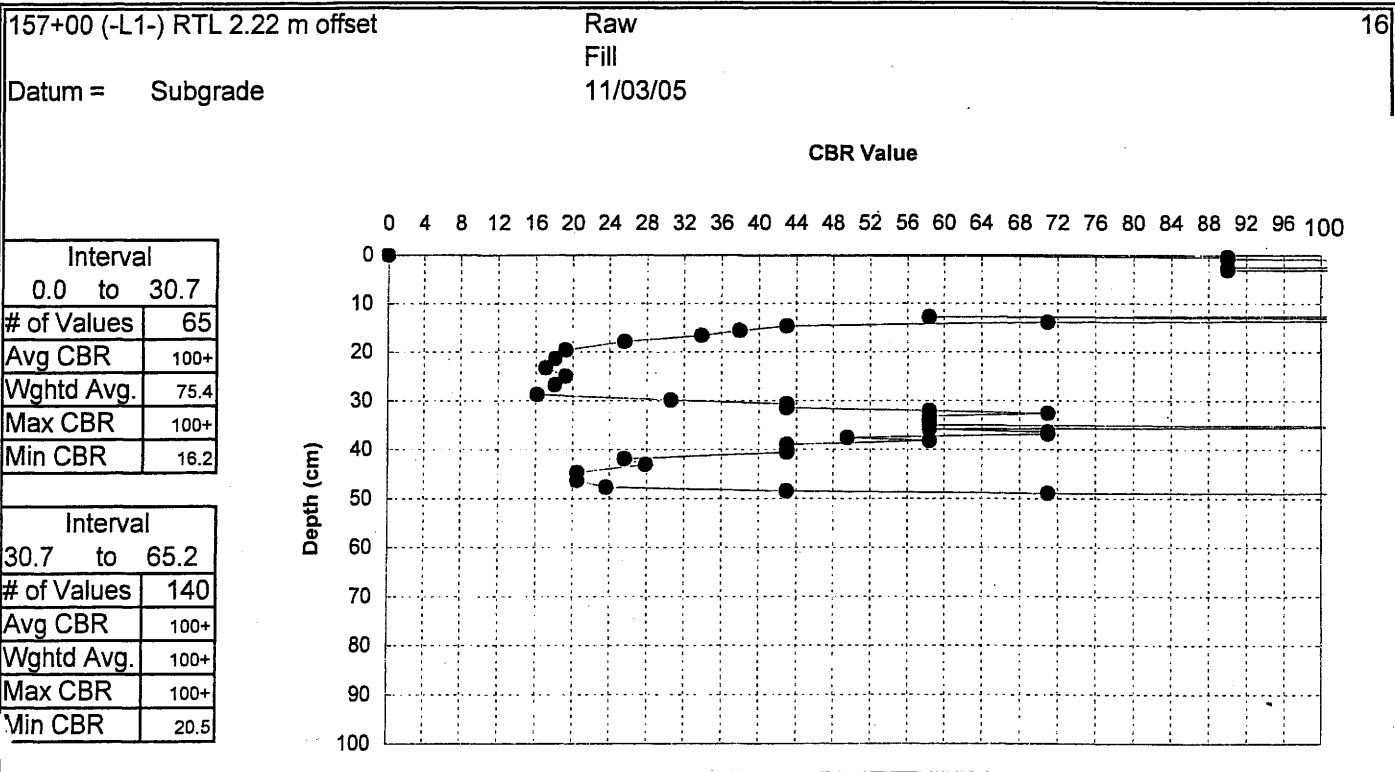
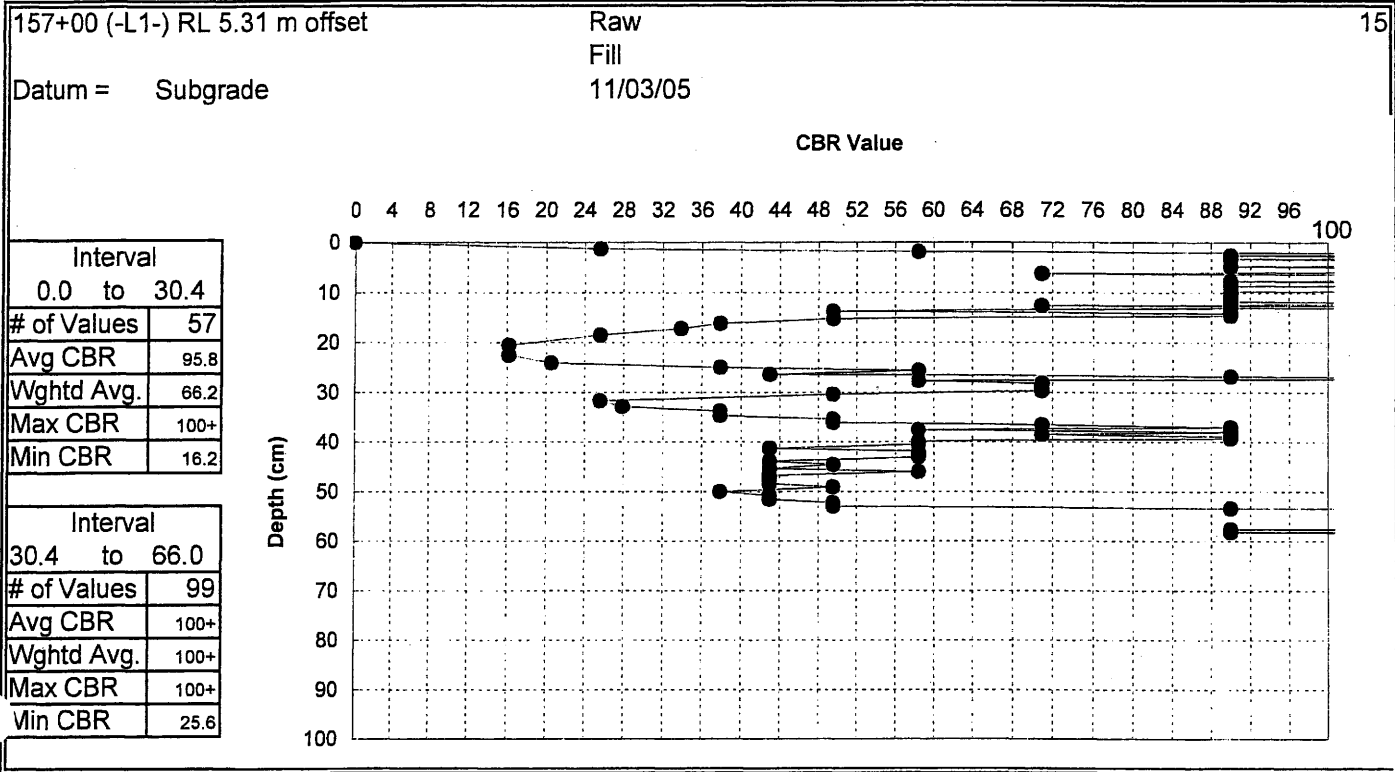


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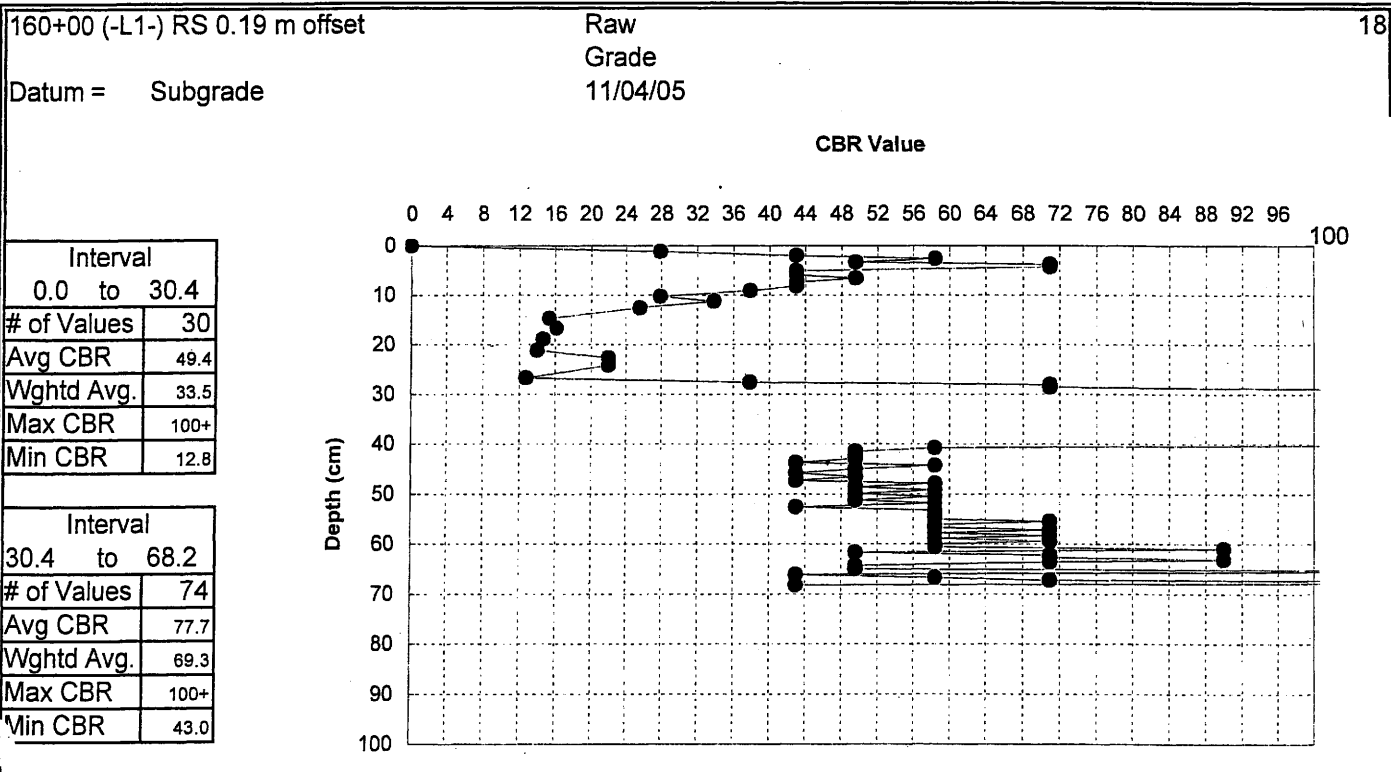
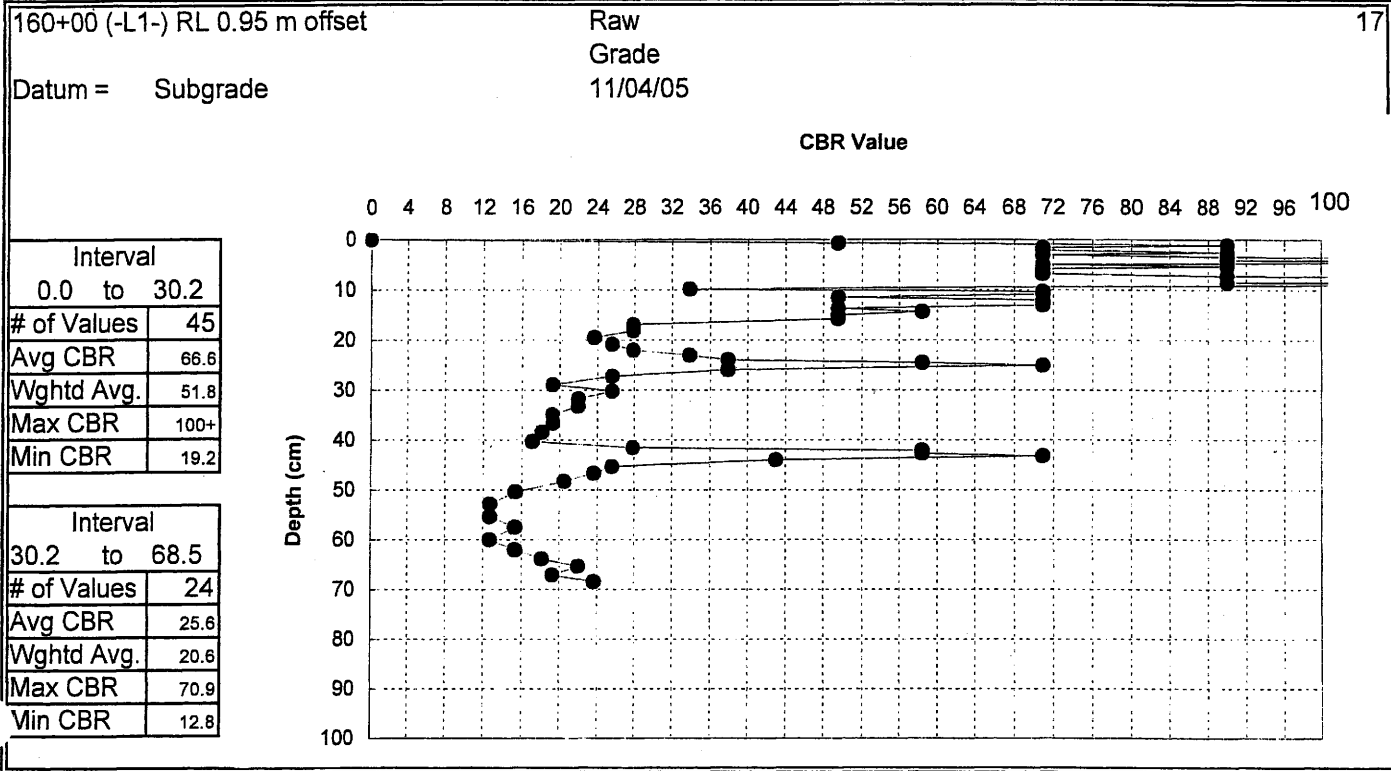


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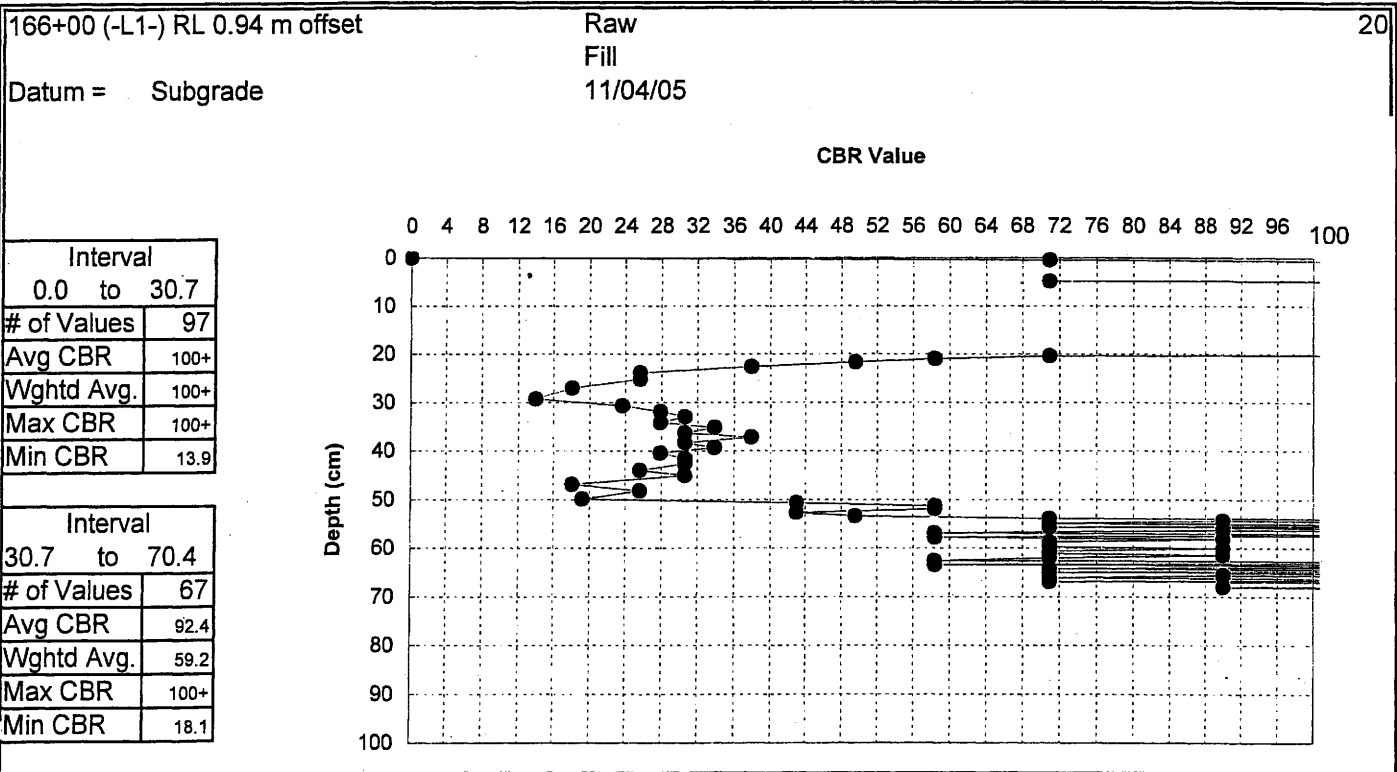
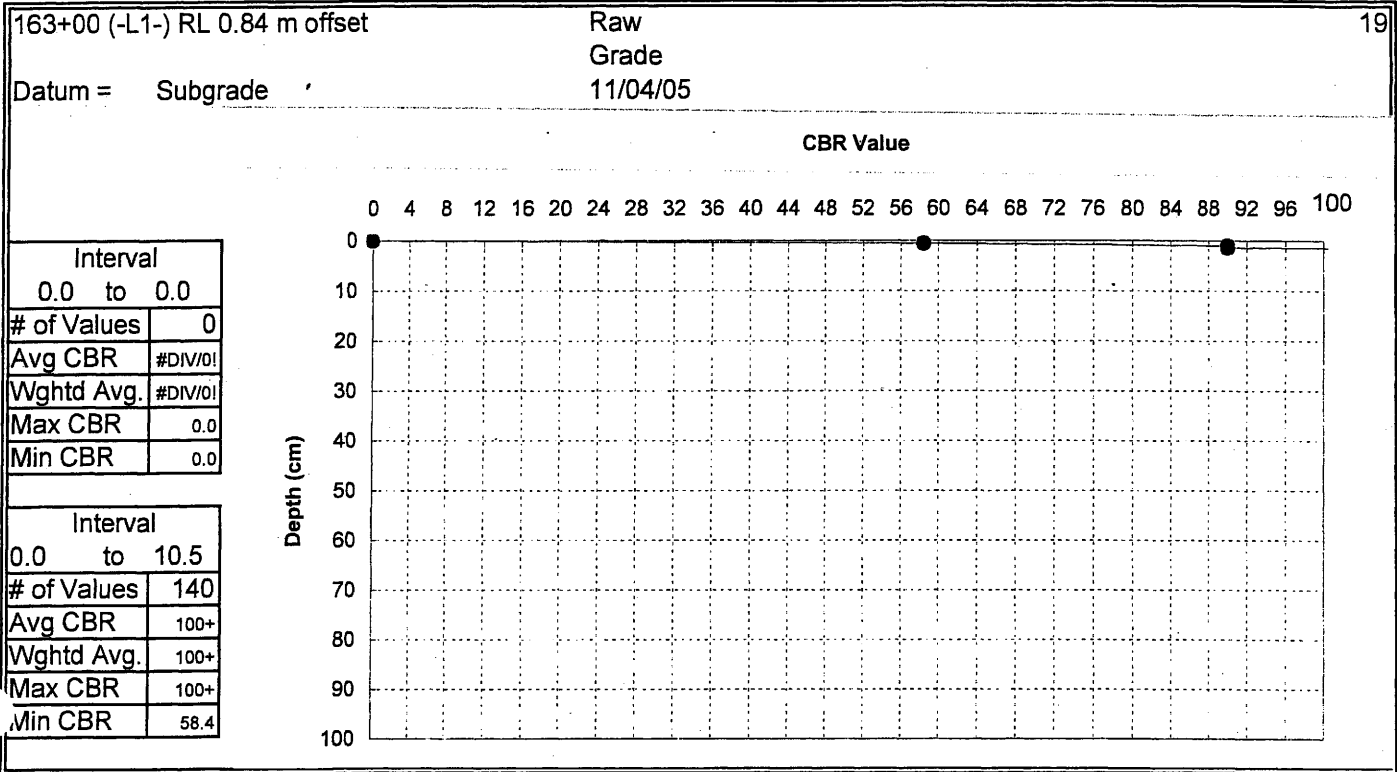


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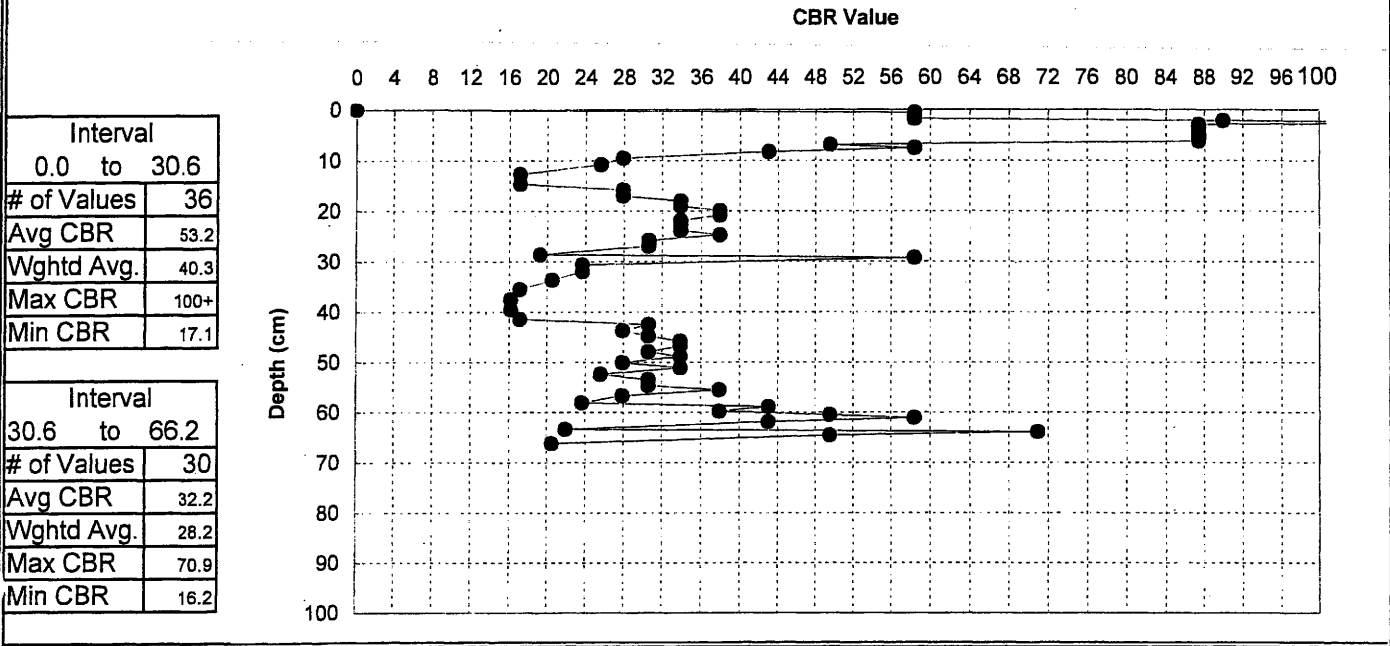
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Fill

Datum = Subgrade

11/04/05

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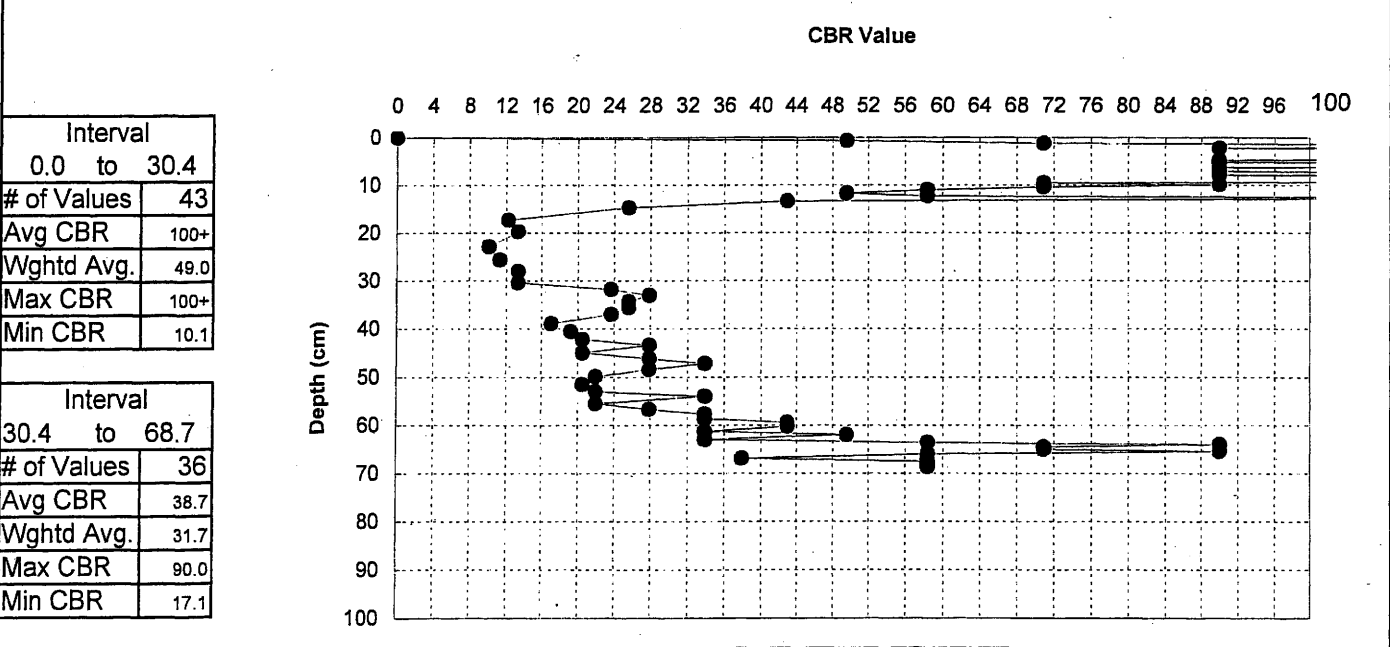
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11/04/05

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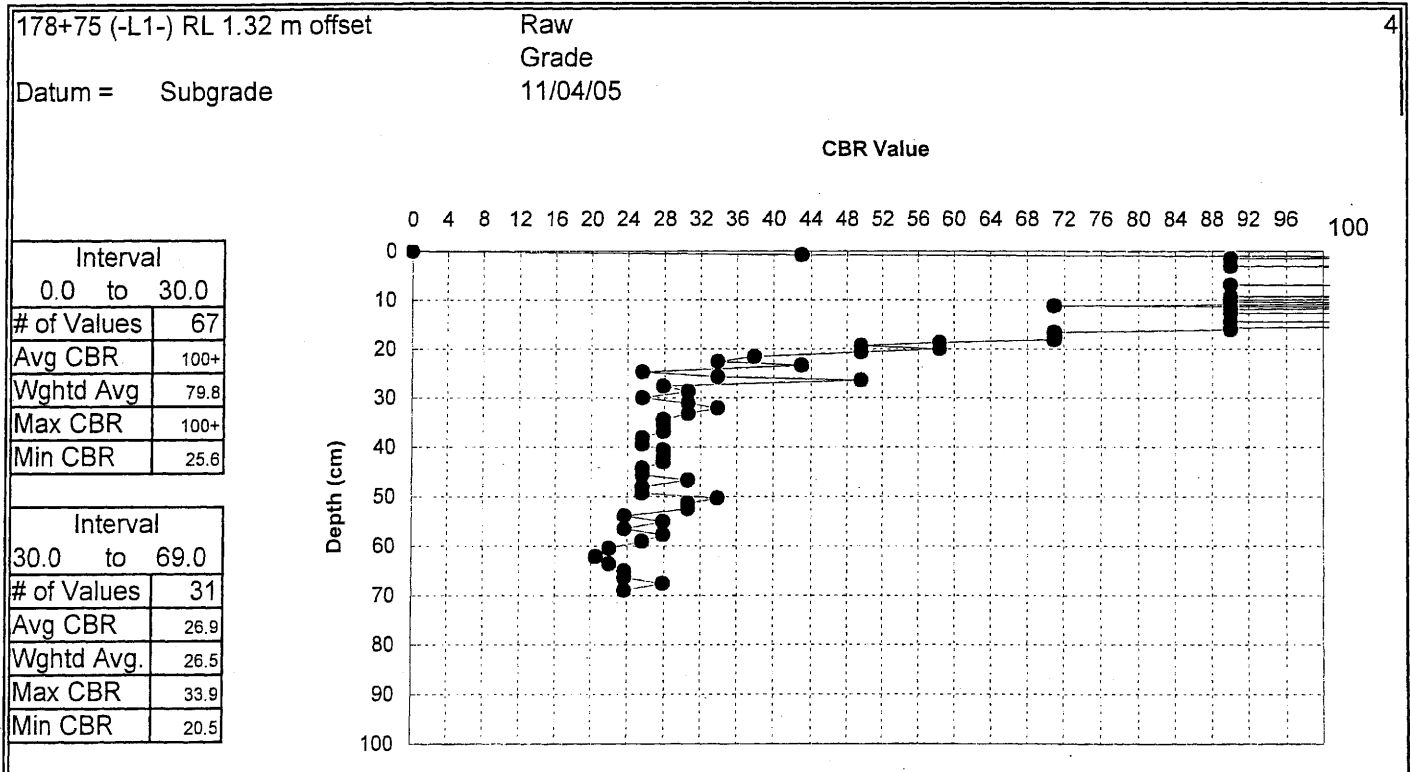
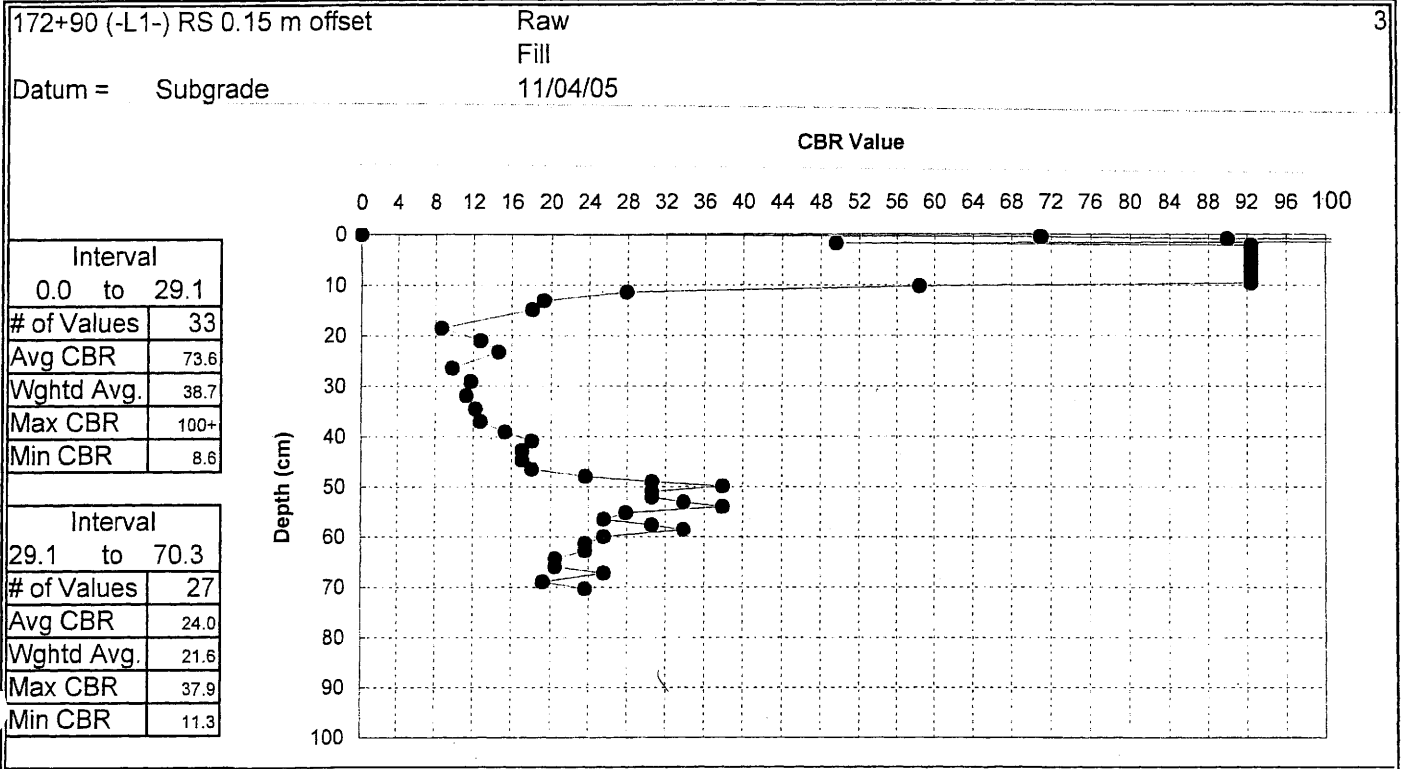


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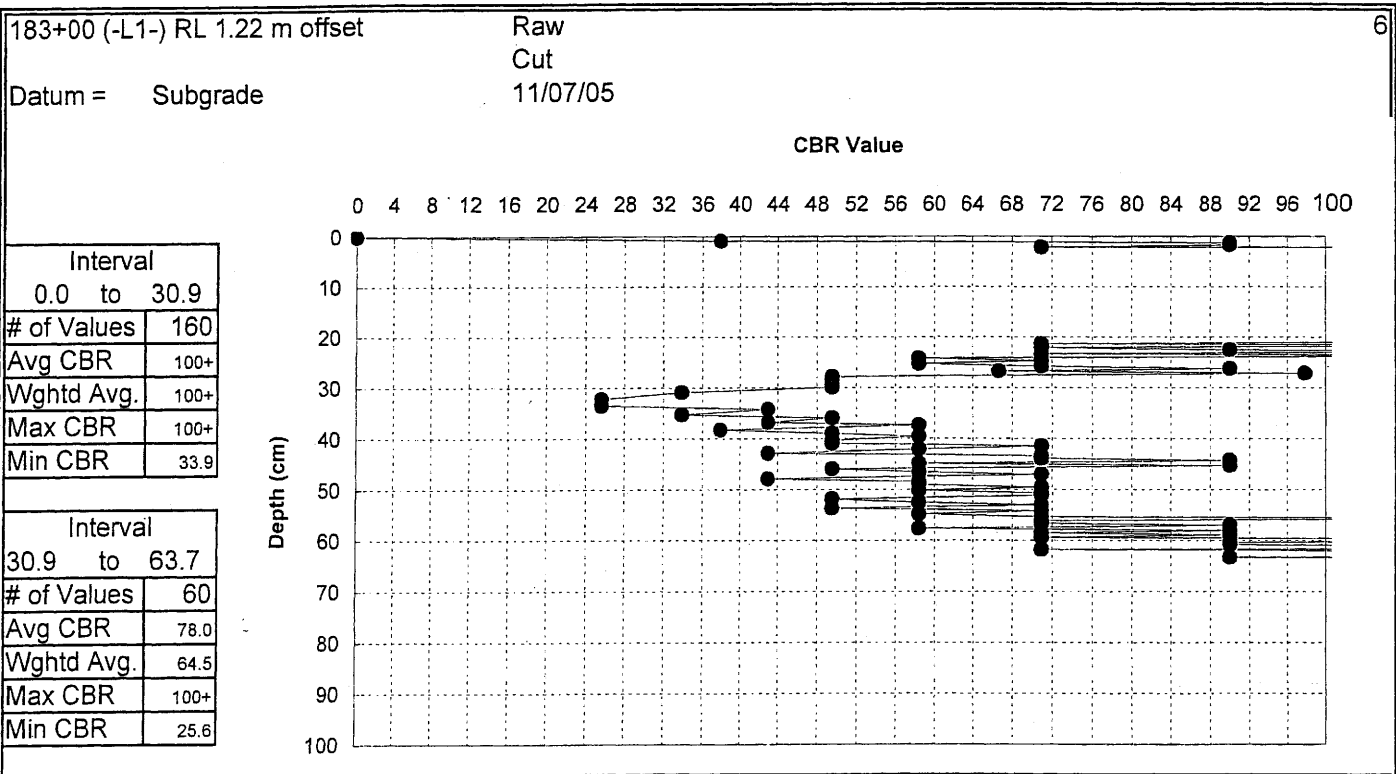
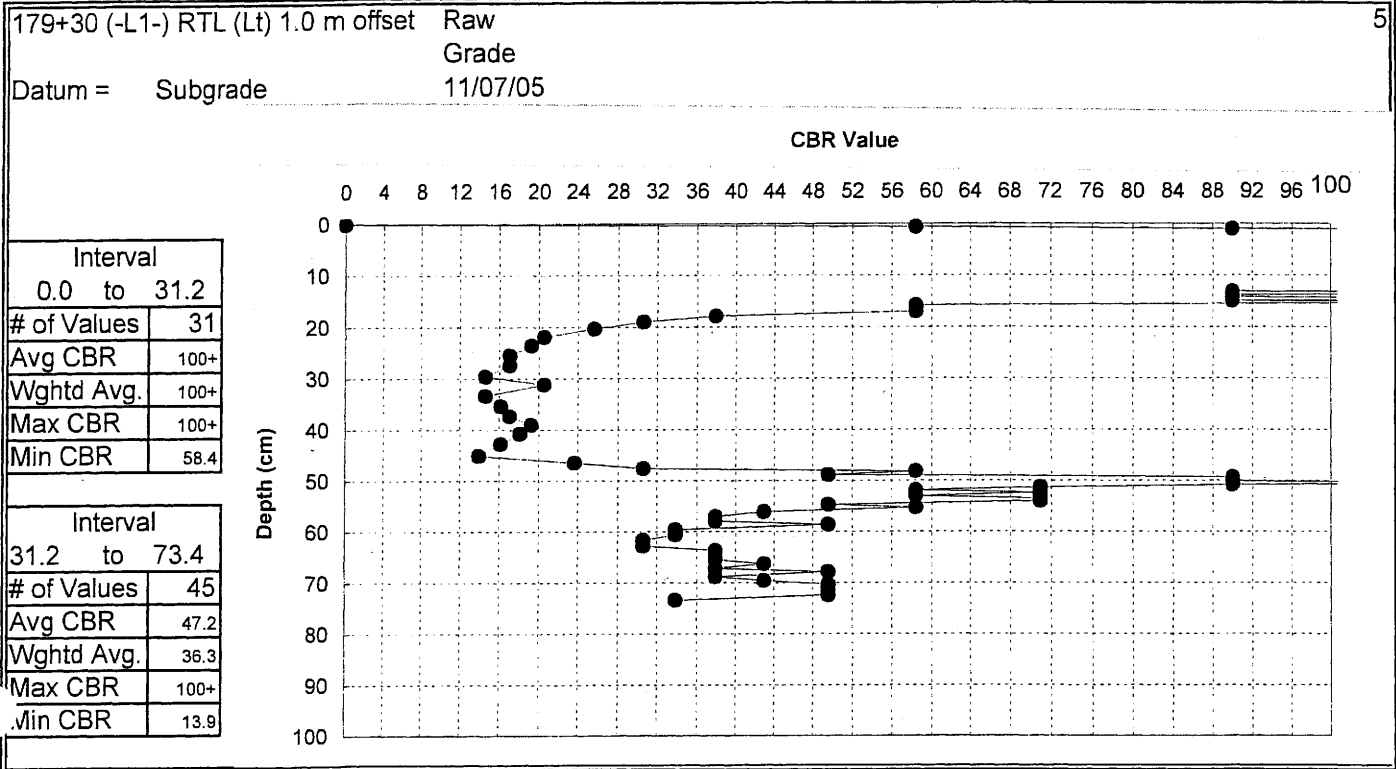


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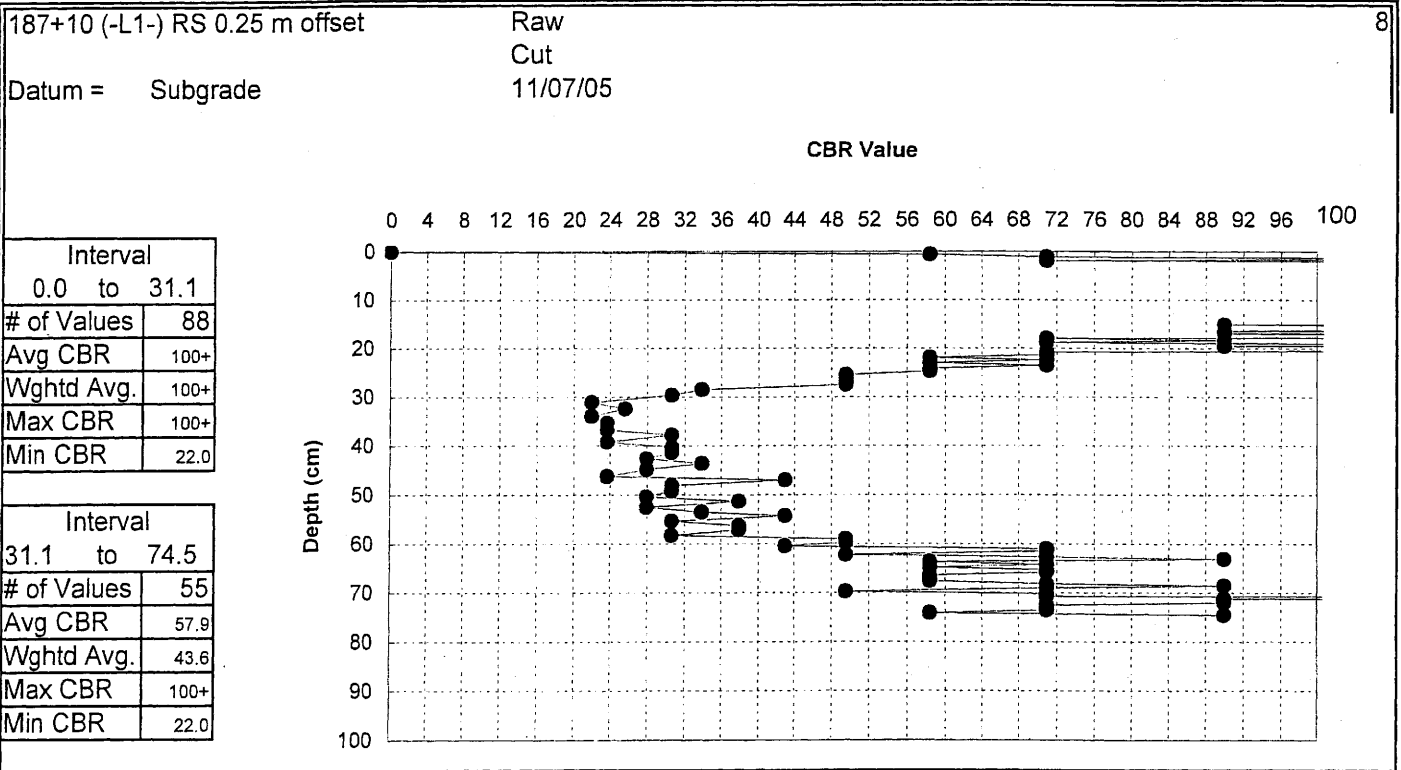
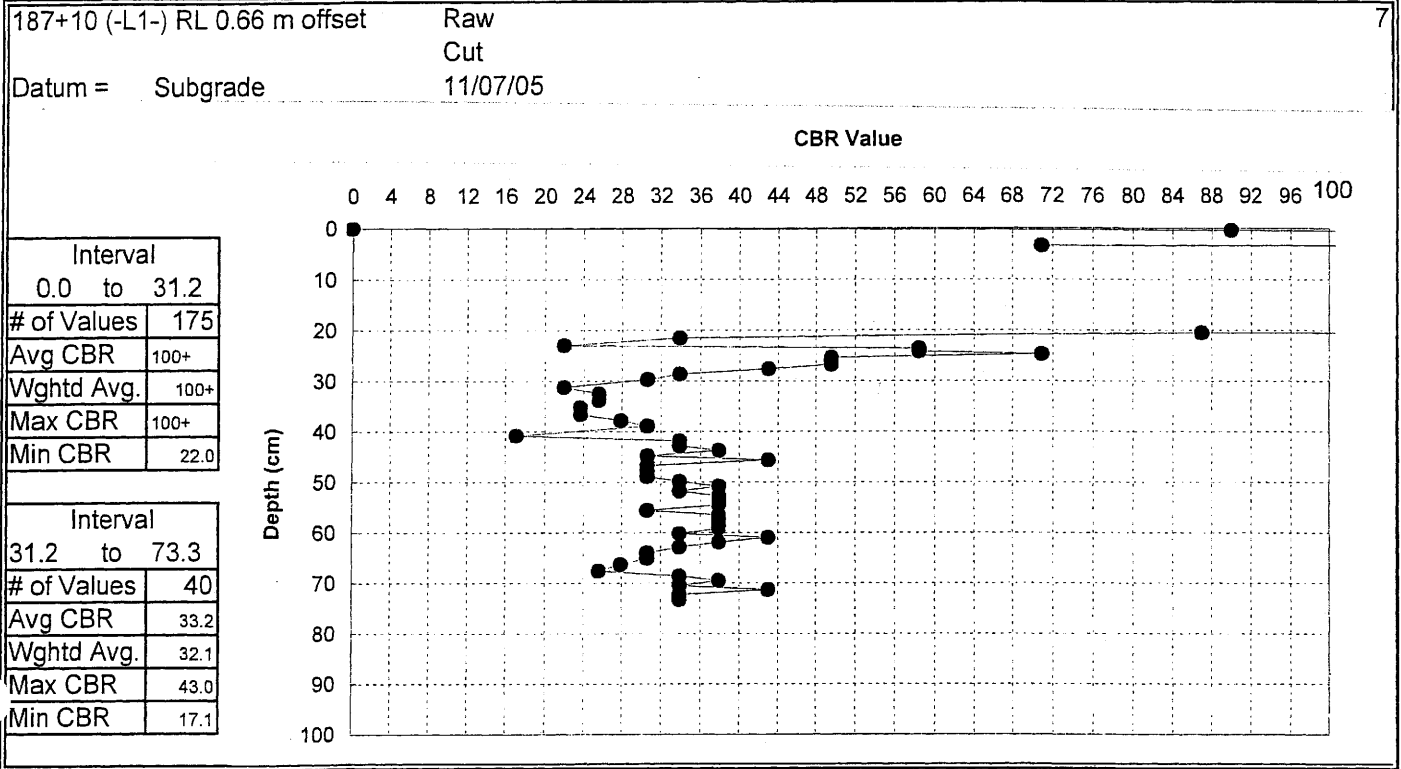


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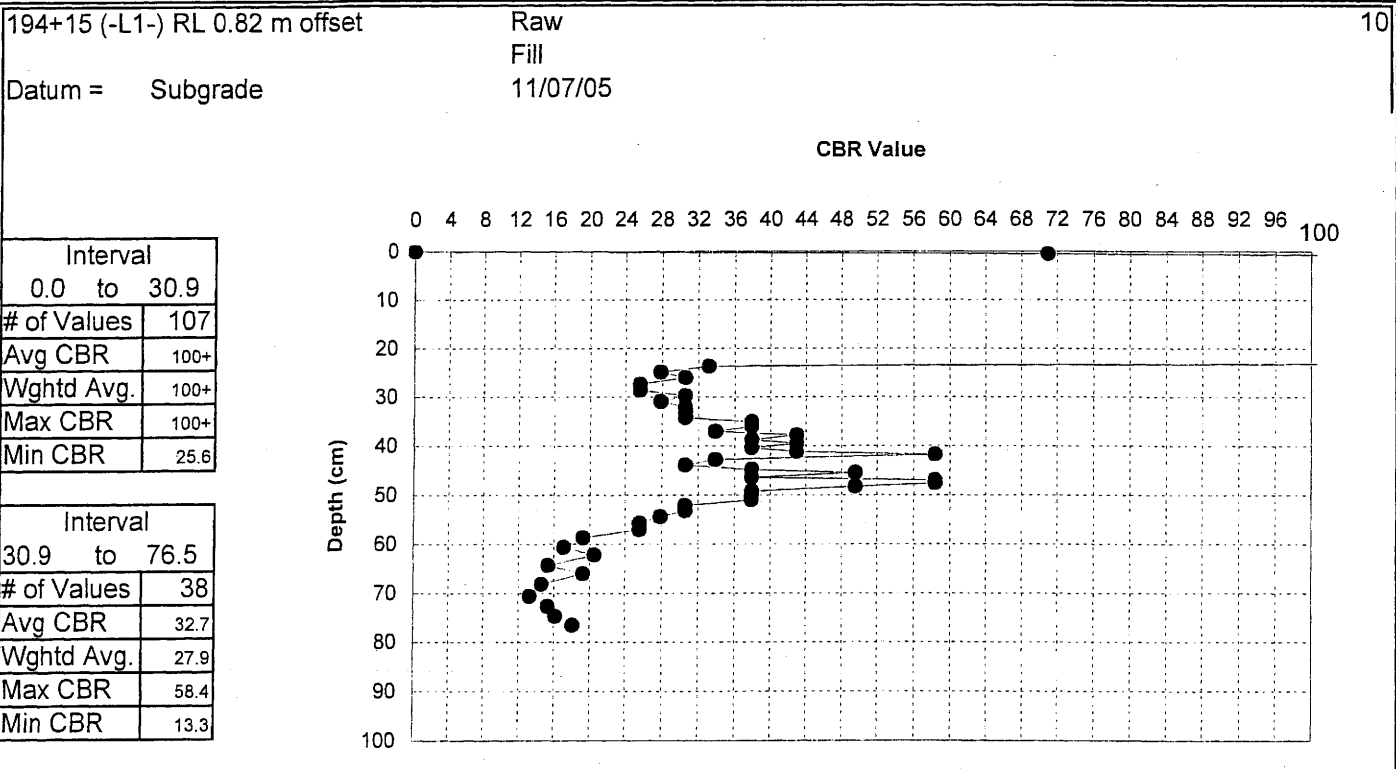
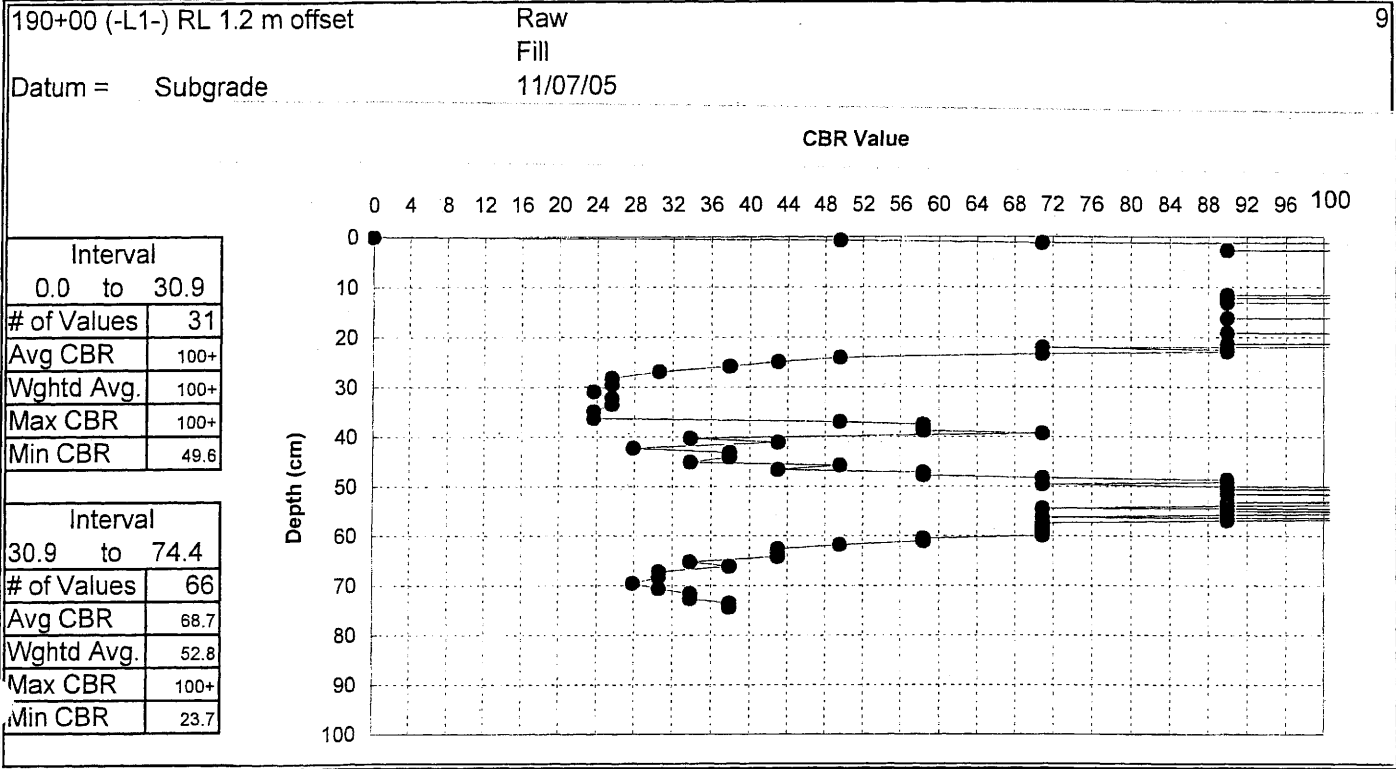


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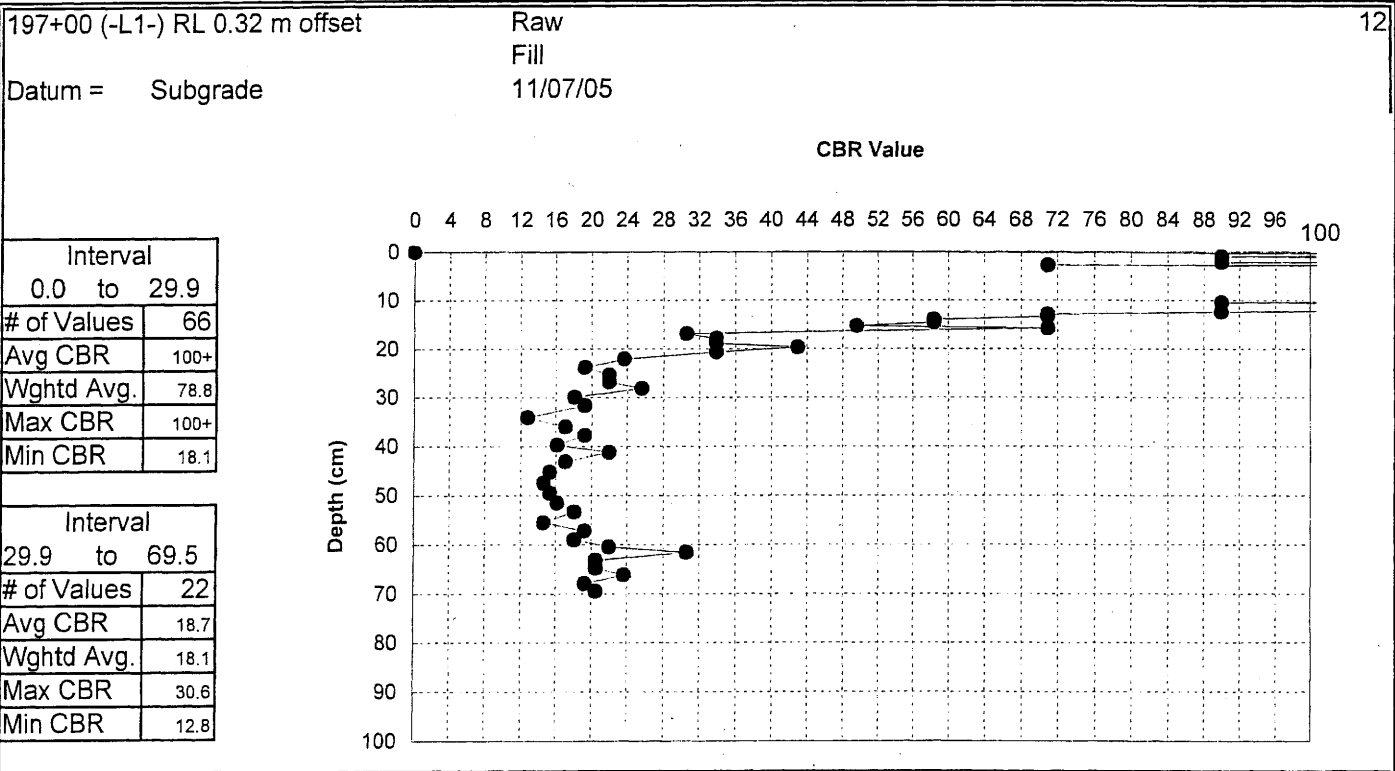
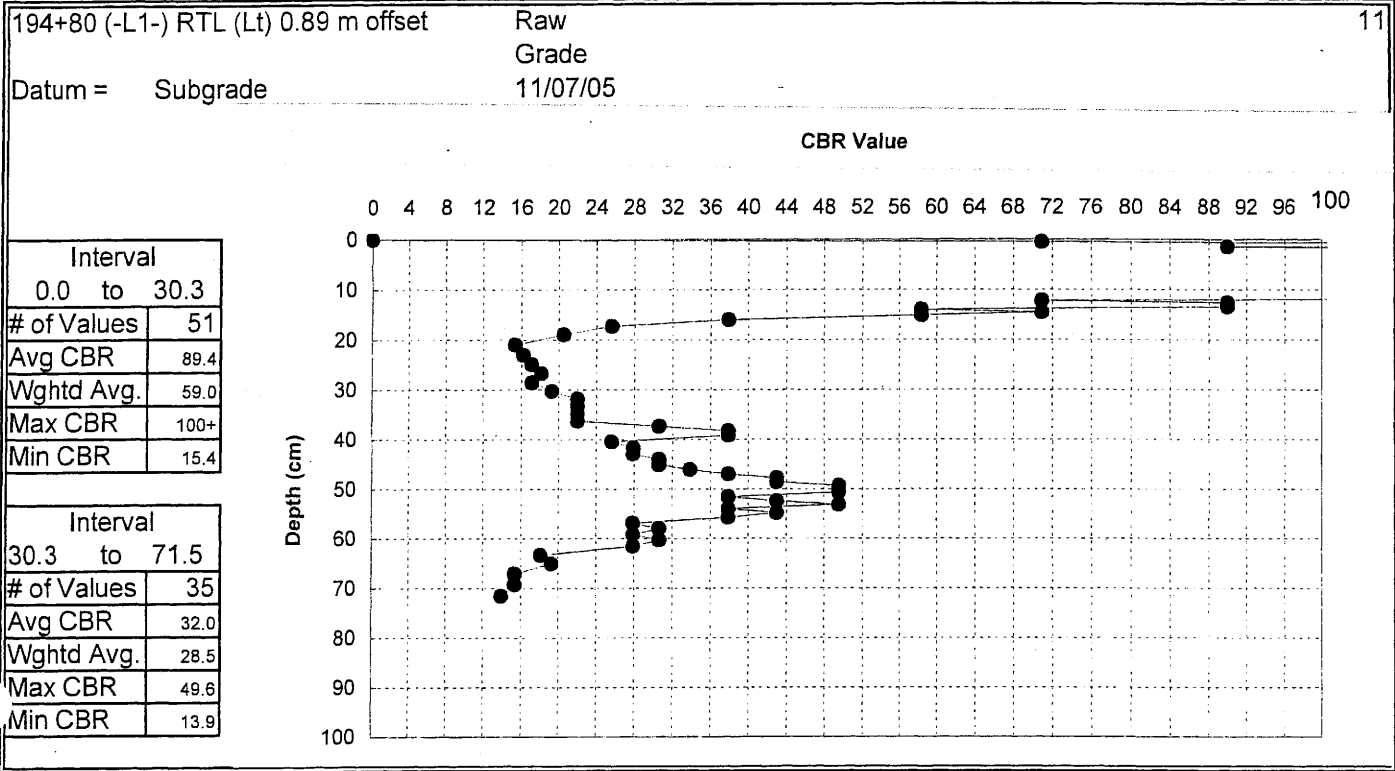


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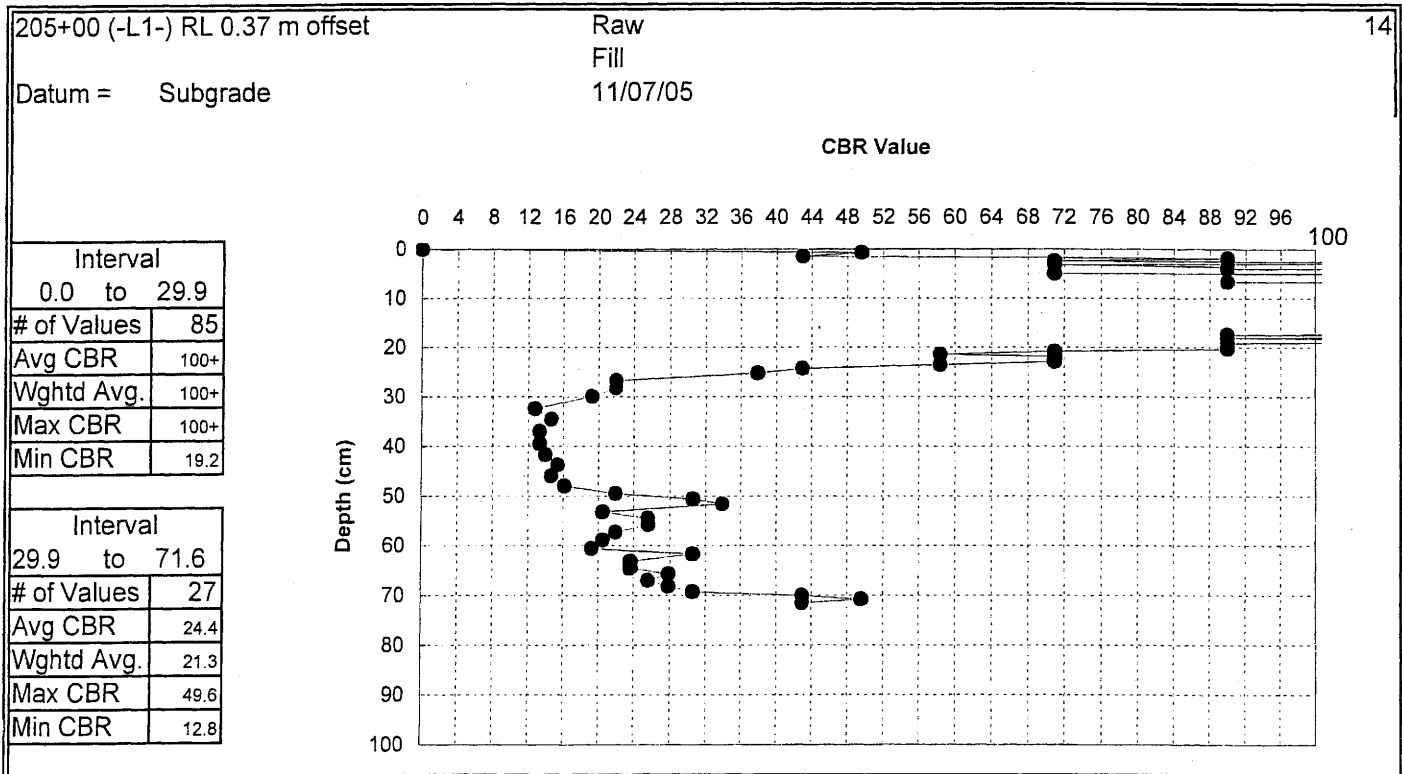
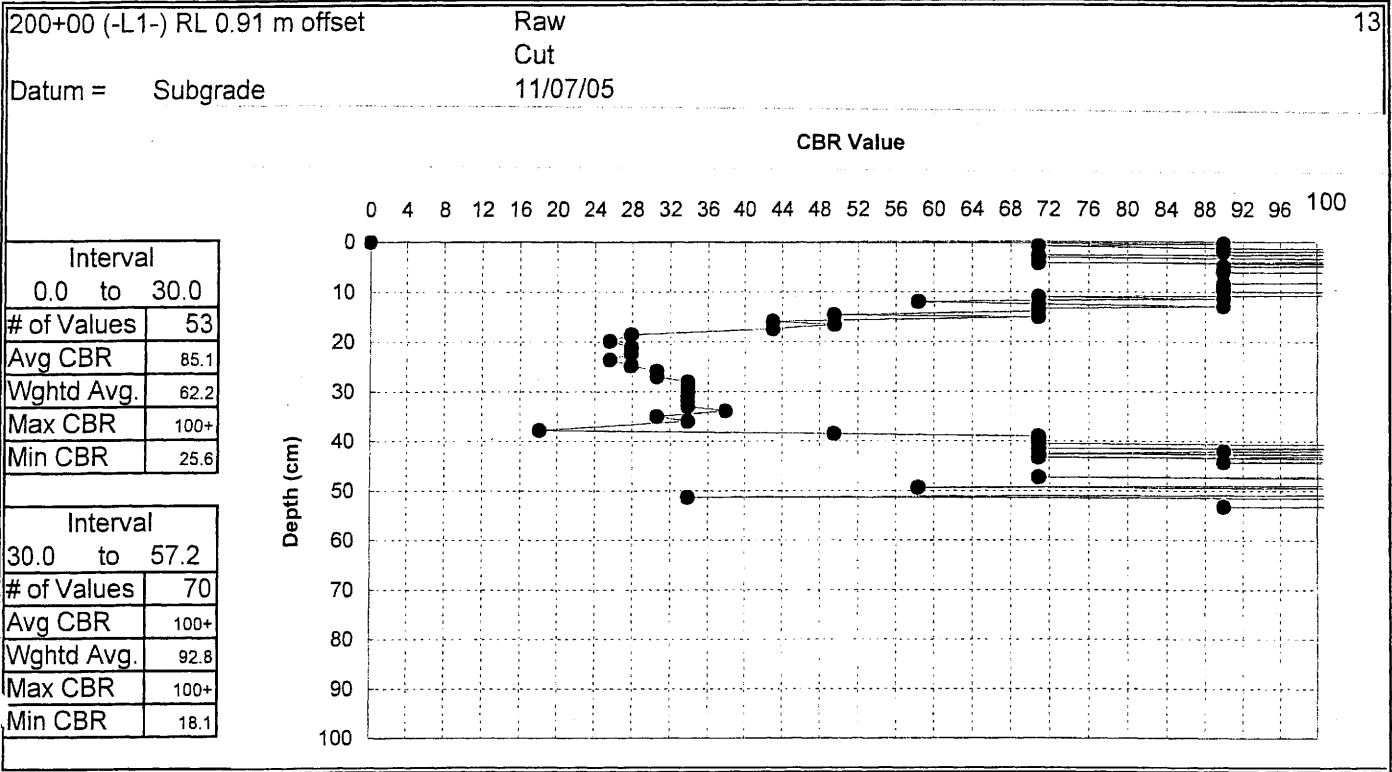


CONE PENETROMETER RESULTS
NC - DOT, GEOTECHNICAL UNIT, SOILS SECTION

PROJECT NO.	34445.1.1
PROJECT ID	R-2518B
ROUTE	US 19
COUNTY	Yancey

GEOLOGIST	JBB/LTP
GEOTECHS	S&ME

FILE	R-2518B_GEO_PDI_dcp.xls
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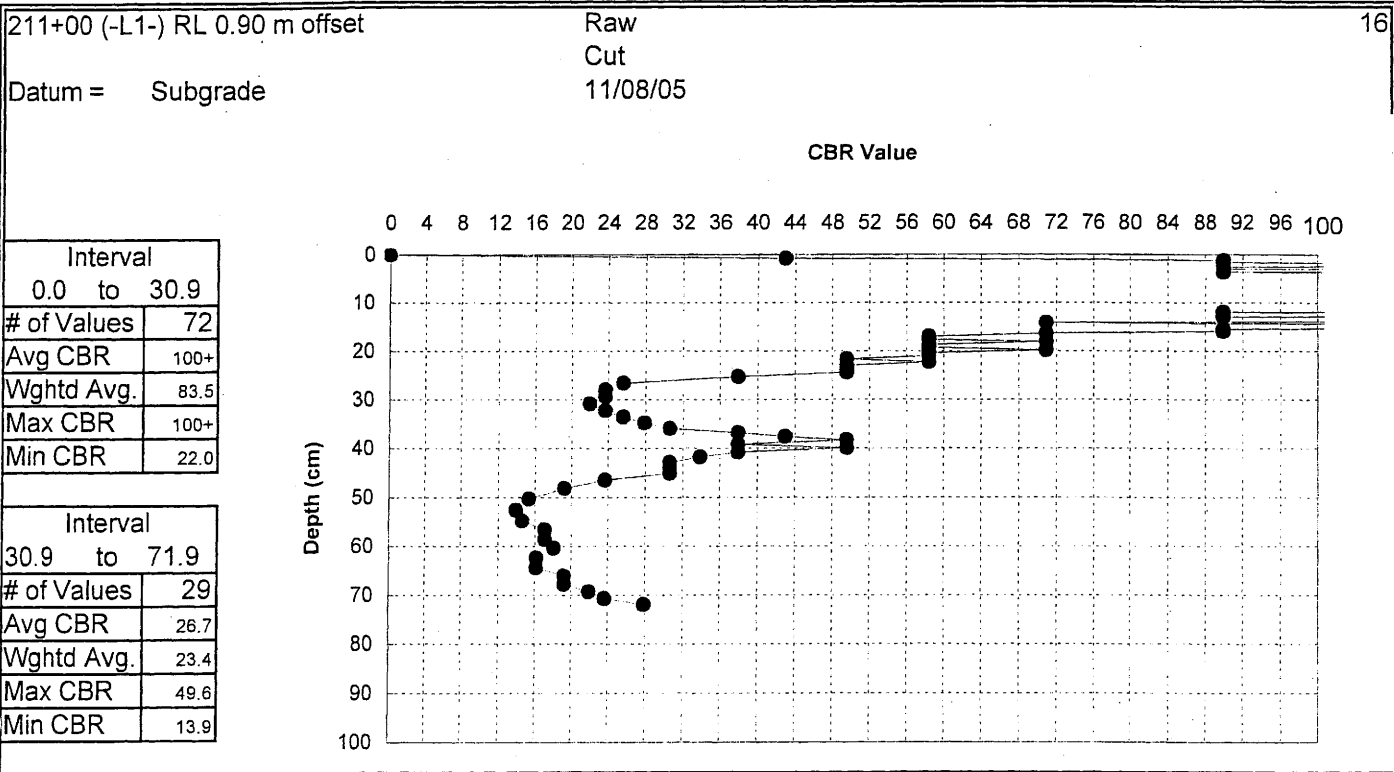
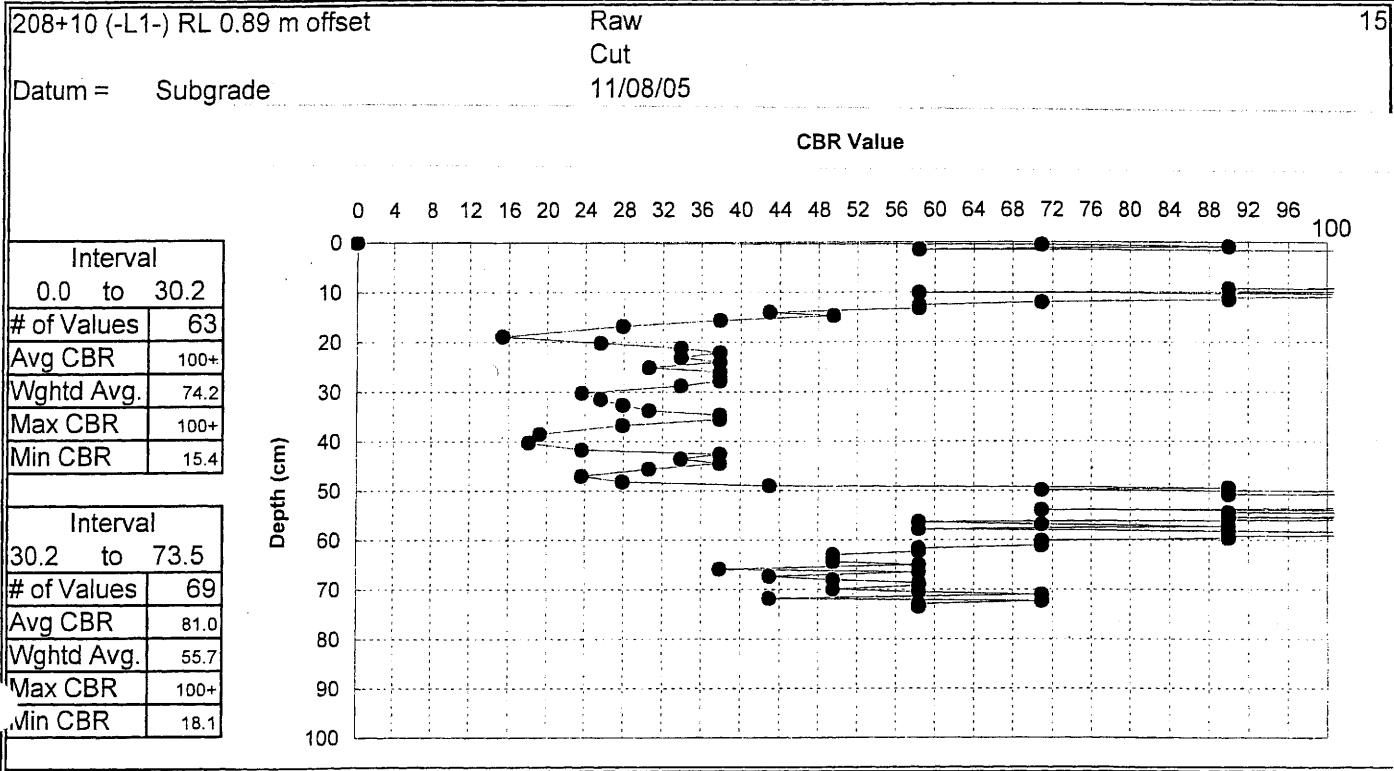


**CONE PENETROMETER RESULTS
NC - DOT, GEOTECHNICAL UNIT, SOILS SECTION**

PROJECT NO.	34445.1.1
PROJECT ID	R-2518B
ROUTE	US 19
COUNTY	Yancey

GEOLOGIST	JBB/LTP
GEOTECHS	S&ME

FILE	R-2518B_GEO_PDI_dcp.xls
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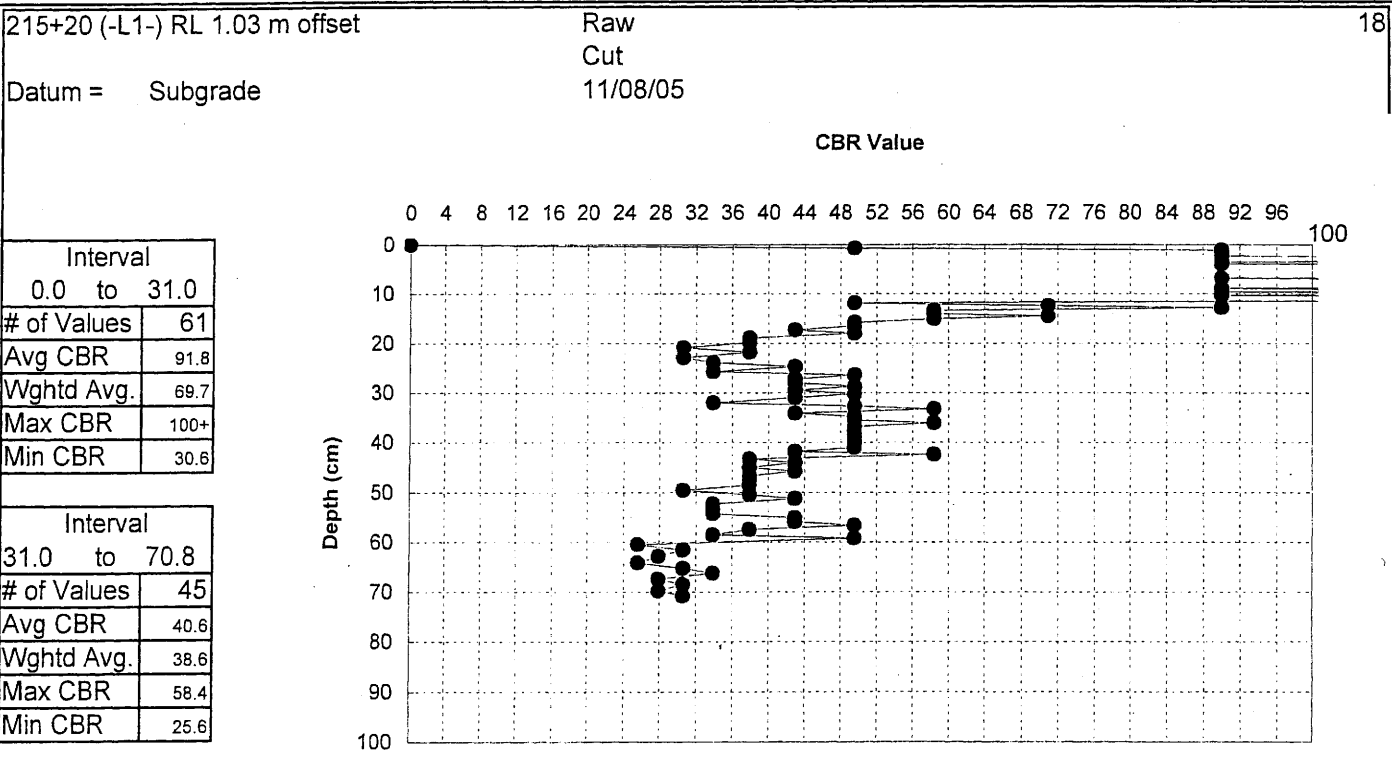
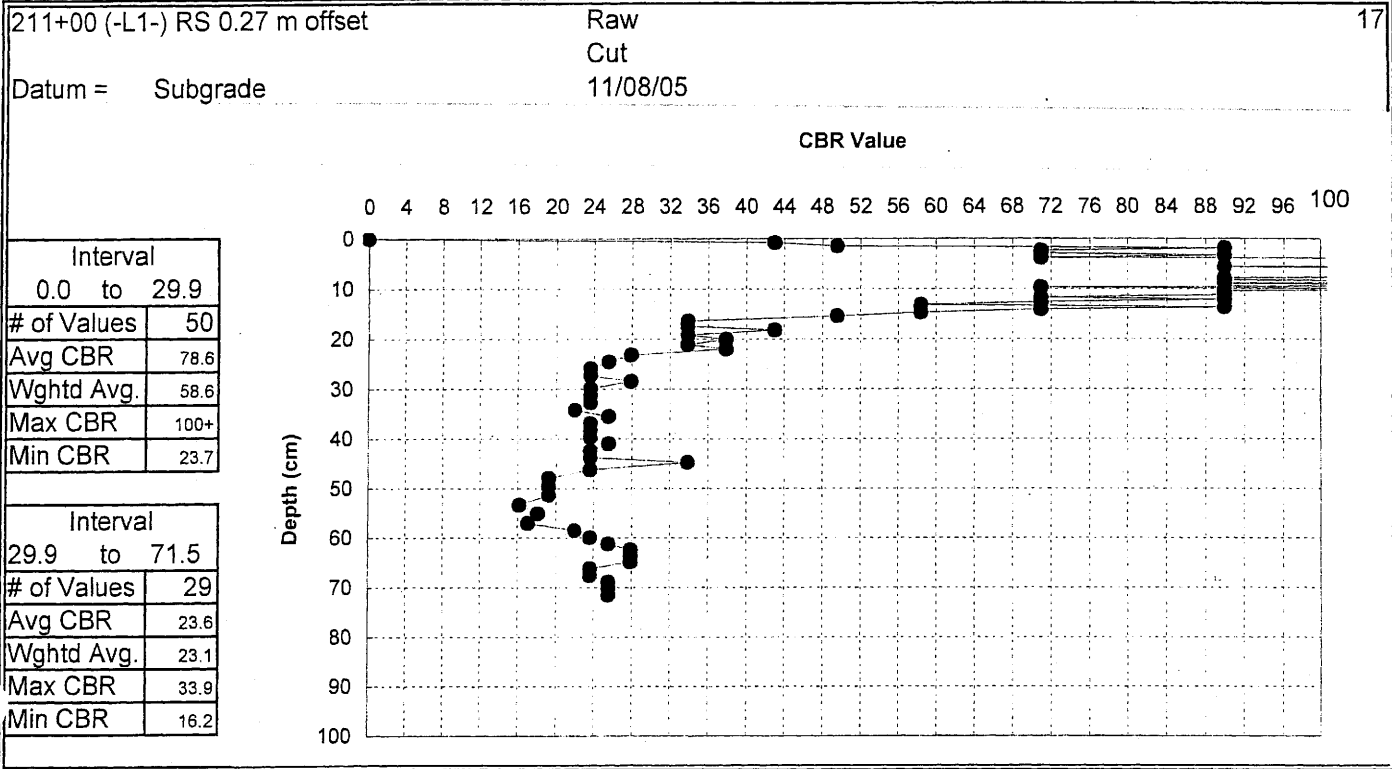


CONE PENETROMETER RESULTS
NC - DOT, GEOTECHNICAL UNIT, SOILS SECTION

PROJECT NO.	34445.1.1
PROJECT ID	R-2518B
ROUTE	US 19
COUNTY	Yancey

GEOLOGIST	JBB/LTP
GEOTECHS	S&ME

FILE	R-2518B_GEO_PDI_dcp.xls
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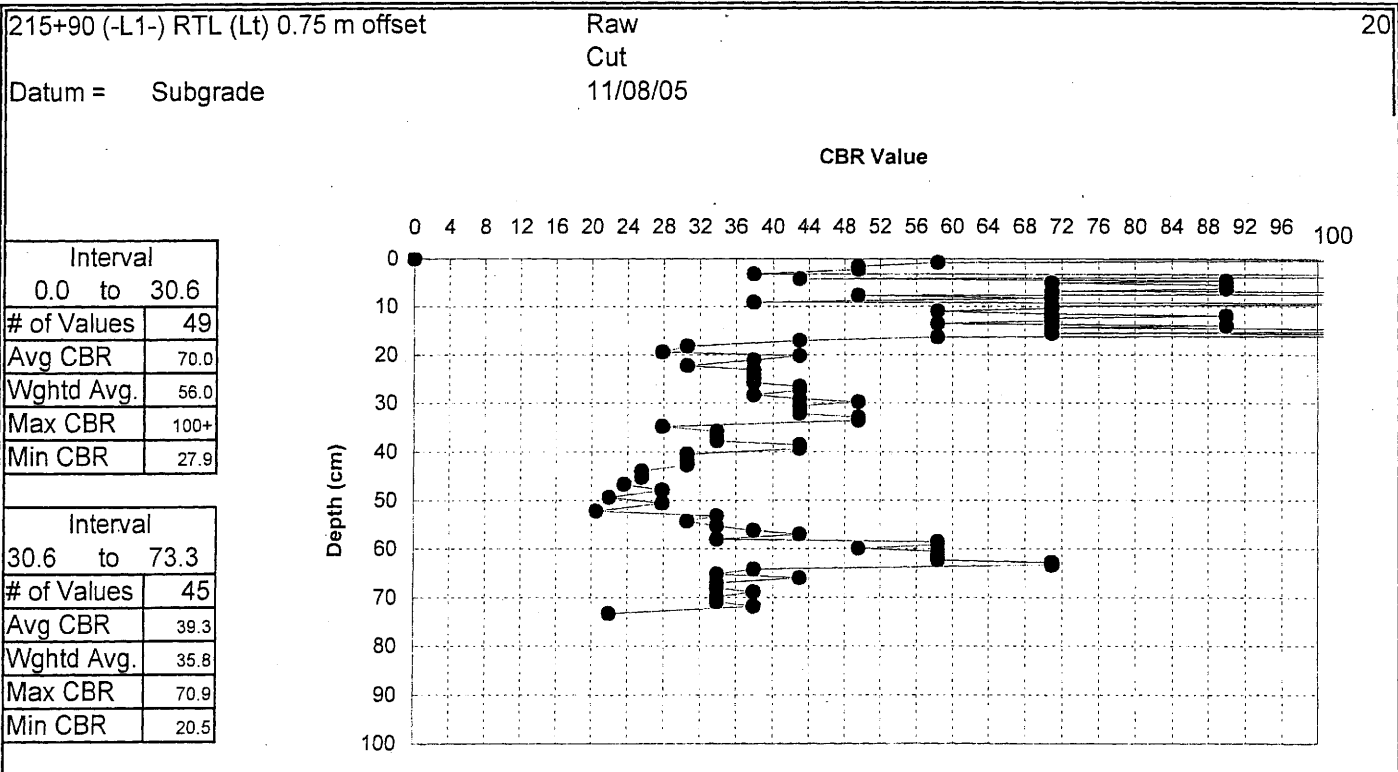
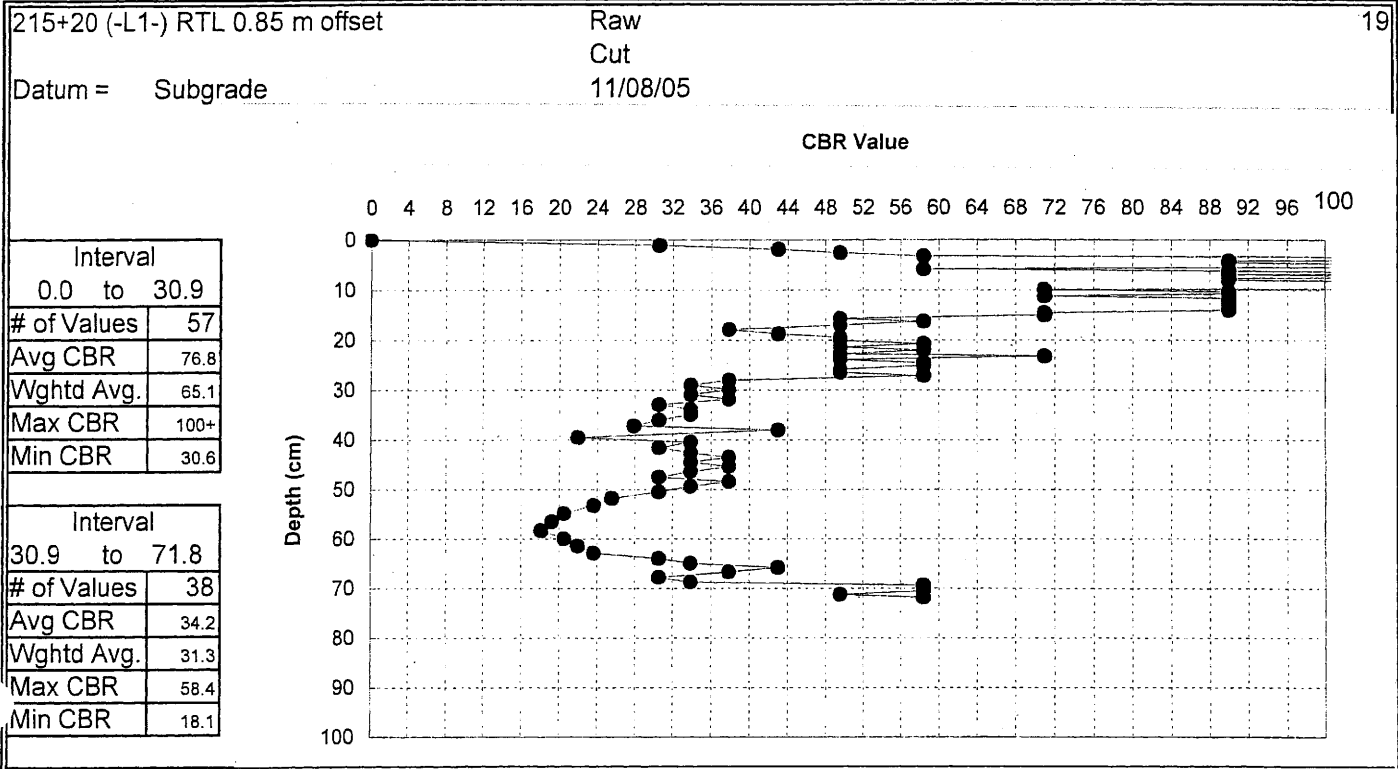


**CONE PENETROMETER RESULTS
NC - DOT, GEOTECHNICAL UNIT, SOILS SECTION**

PROJECT NO.	34445.1.1
PROJECT ID	R-2518B
ROUTE	US 19
COUNTY	Yancey

GEOLOGIST	JBB/LTP
GEOTECHS	S&ME

FILE	R-2518B_GEO_PDI_dcp.xls
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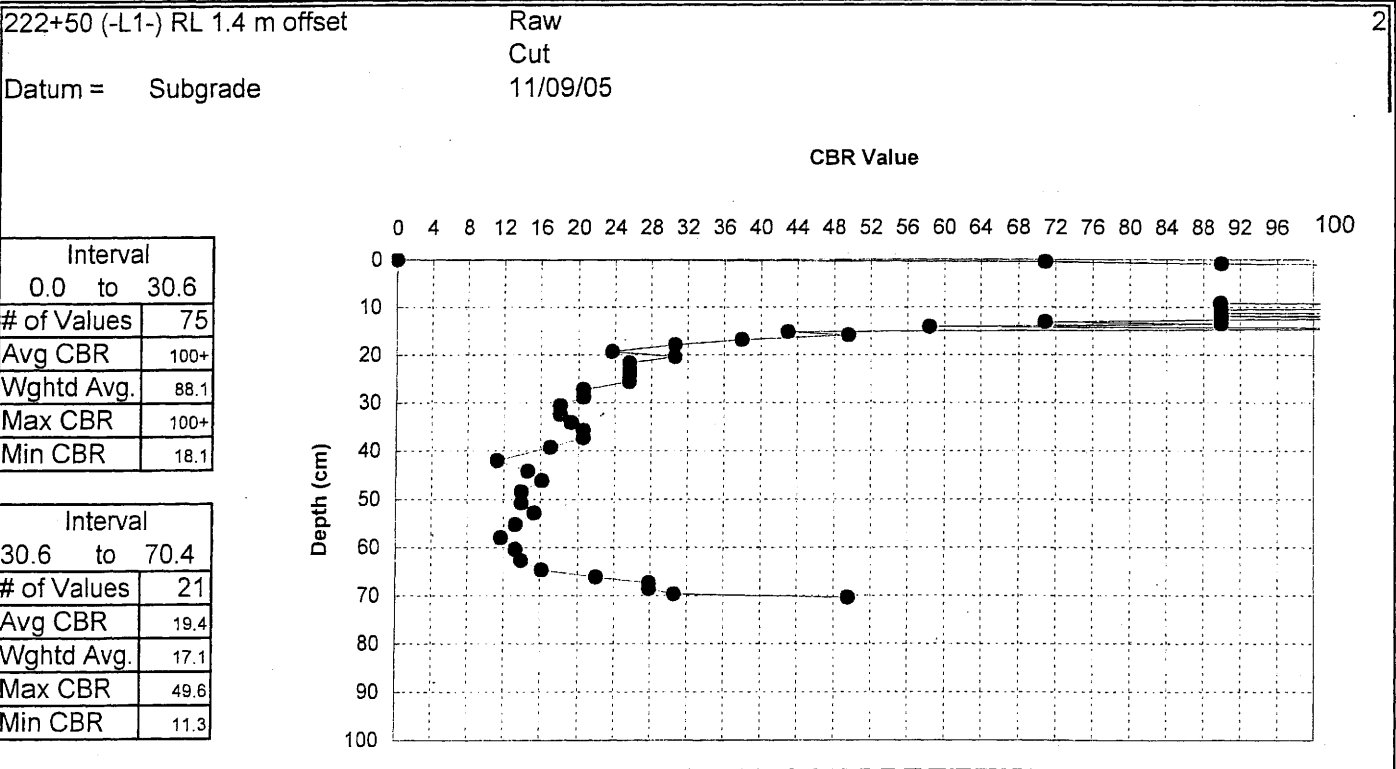
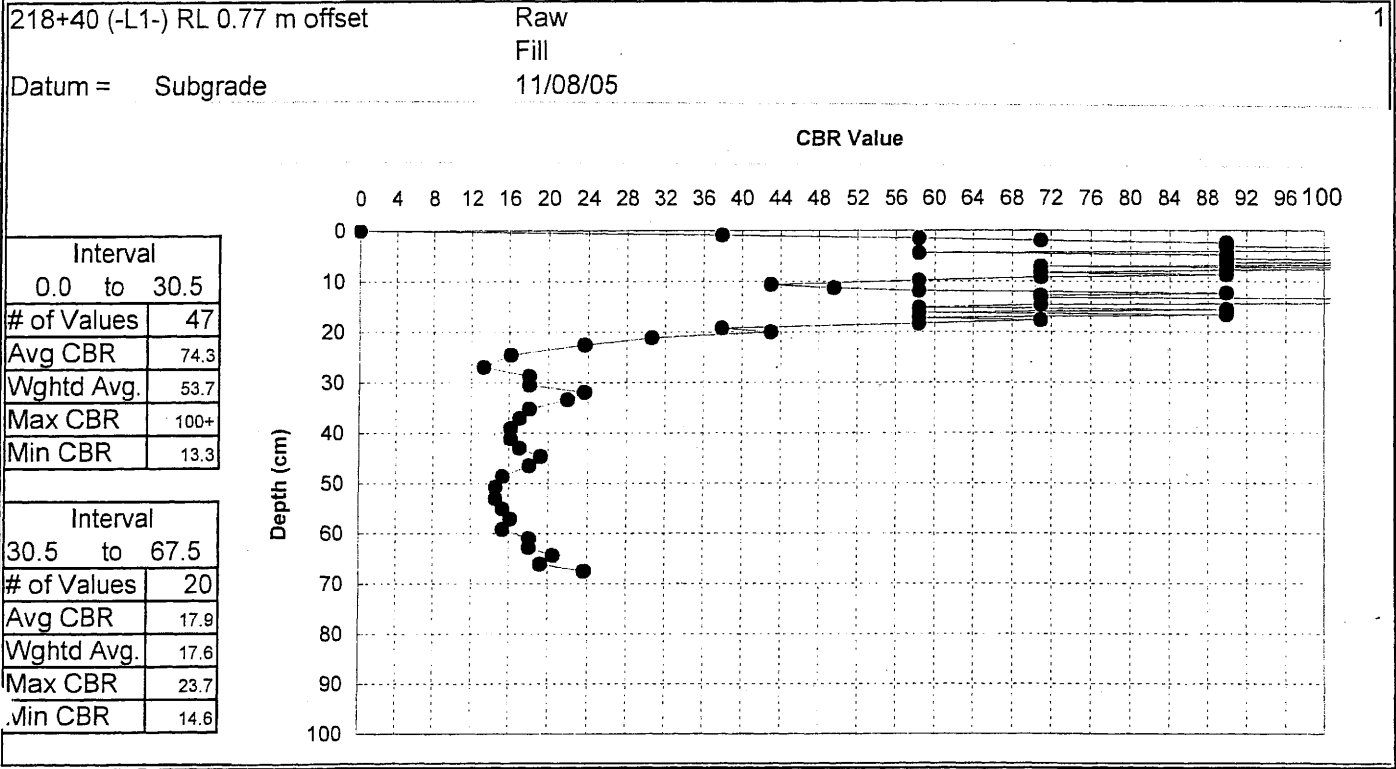


**CONE PENETROMETER RESULTS
NC - DOT, GEOTECHNICAL UNIT, SOILS SECTION**

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

GEOLOGIST	JBB?LTP
GEOTECHS	S&ME

FILE	R2518B_GEO_PDI_dcp.xls
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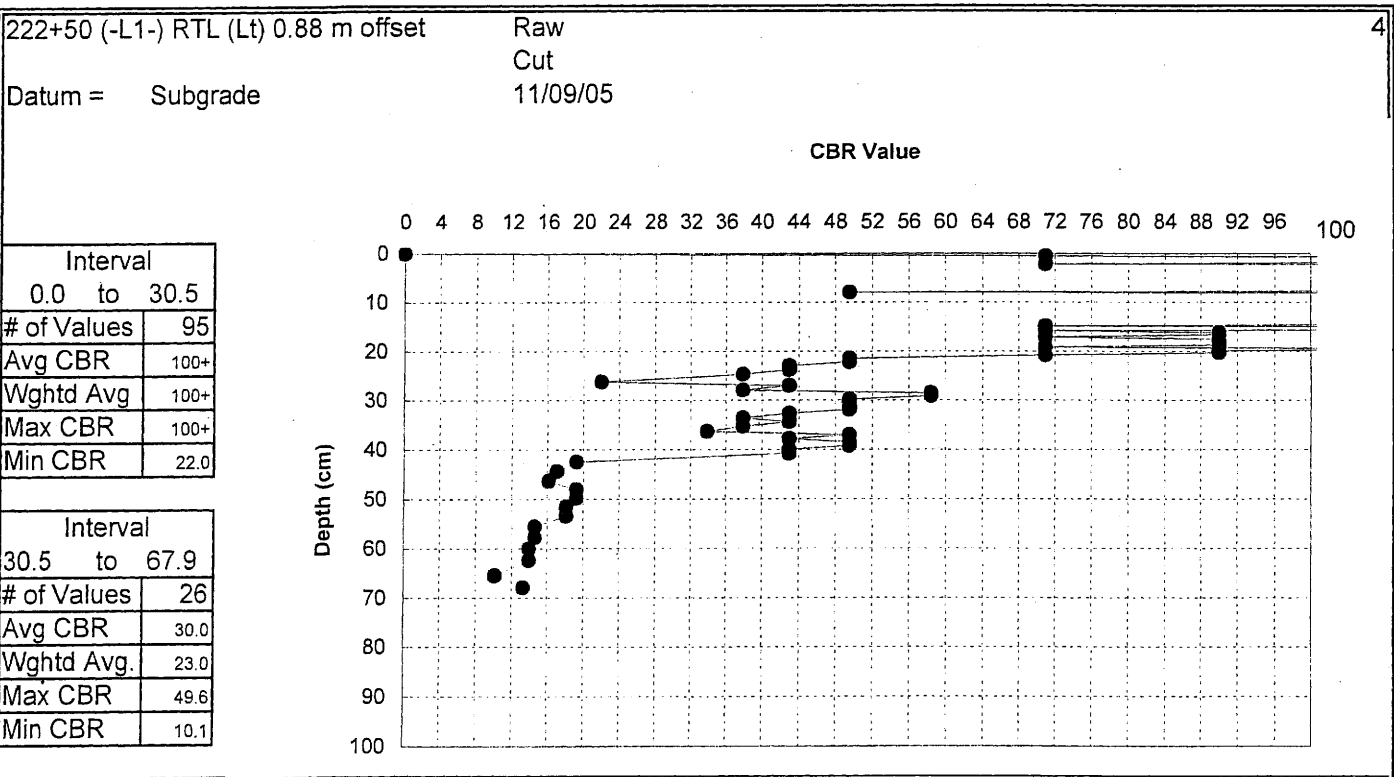
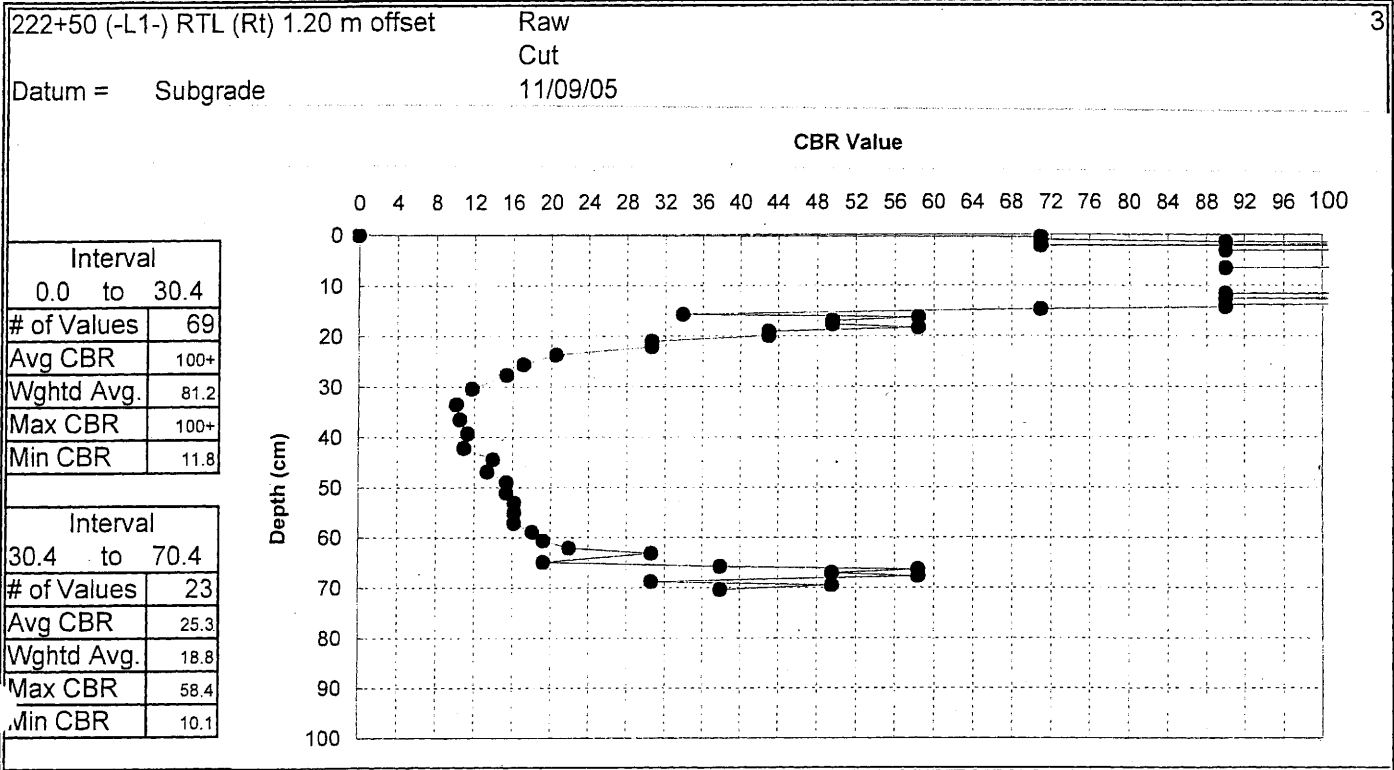


**CONE PENETROMETER RESULTS
NC - DOT, GEOTECHNICAL UNIT, SOILS SECTION**

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

GEOLOGIST	JBB?LTP
GEOTECHS	S&ME

FILE	R2518B_GEO_PDI_dcp.xls
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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	Yancey

GEOLOGIST	JBB?LTP
GEOTECHS	S&ME

FILE	R2518B GEO_PDI_dcp.xls
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