

APPENDIX F.3

**SOIL MOISTURE-DENSITY AND
CALIFORNIA BEARING RATIO TESTS**

NORTH ANNA COL

**DATA REPORT REV. 0
JANUARY 23, 2007**

MACTEC PROJECT NO. 6468-06-1472

COMPACTION TEST REPORT/ ASTM D-1557-02

Curve No.: TP-1-1

Project No.: 6468061472

Date: 12/1/06

Project: NORTH ANNA COL PROJECT

Location: TEST PIT No 1 23 ft / 22/07

Elev./Depth: 0-1.5'

Sample No. TP-1-1

Remarks: ND= NOT DETERMINED

MATERIAL DESCRIPTION

Description: Brown red silty sandy clay(VISUAL)

Classifications -

USCS: ND

AASHTO: ND

Nat. Moist. = 23.4 %

Sp.G. = ND

Liquid Limit = ND

Plasticity Index = ND

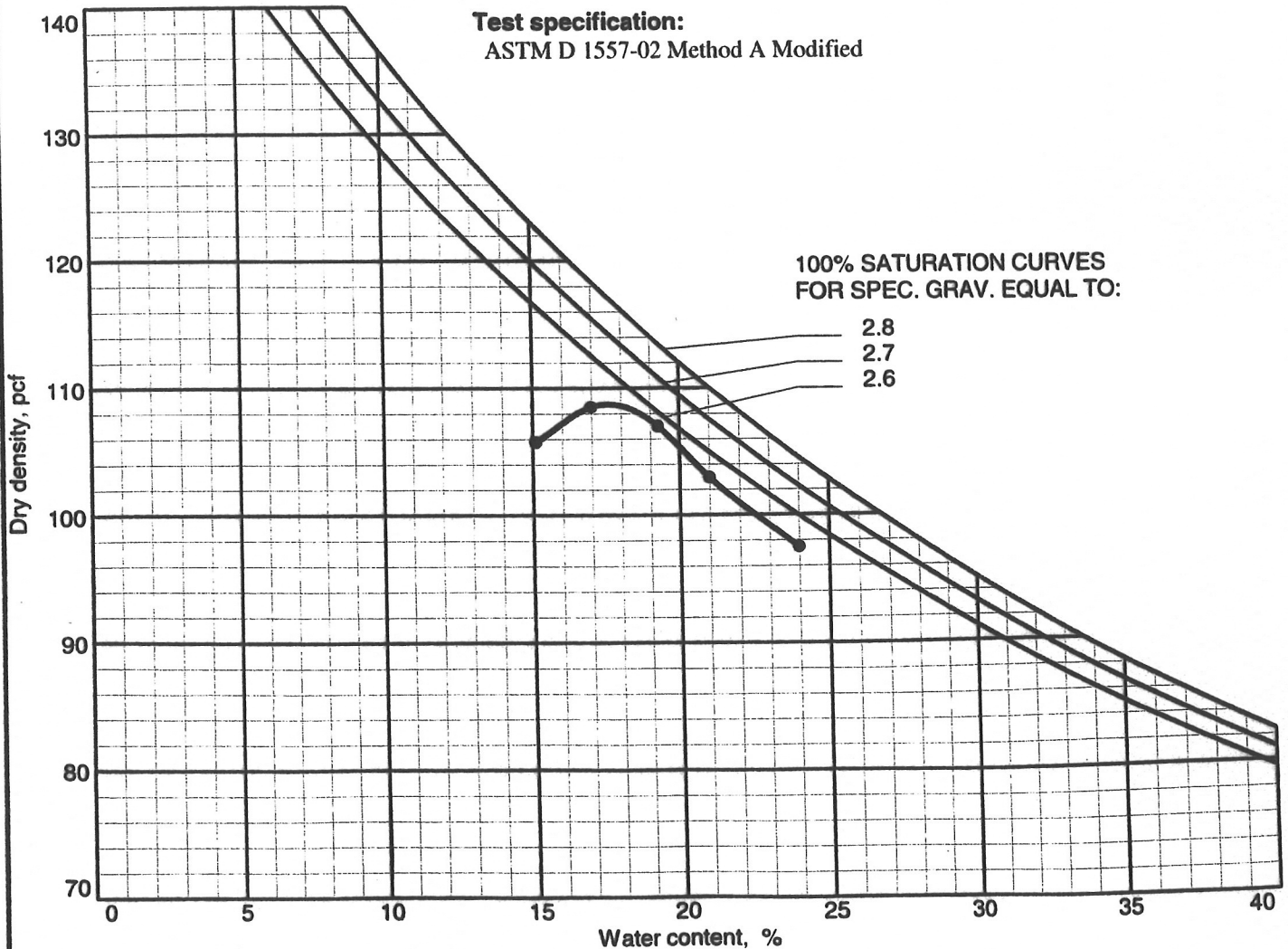
% > No.4 = 0.9 %

% < No.200 = ND %

TEST RESULTS

Maximum dry density = 108.7 pcf

Optimum moisture = 17.6 %



MOISTURE DENSITY TEST DATA

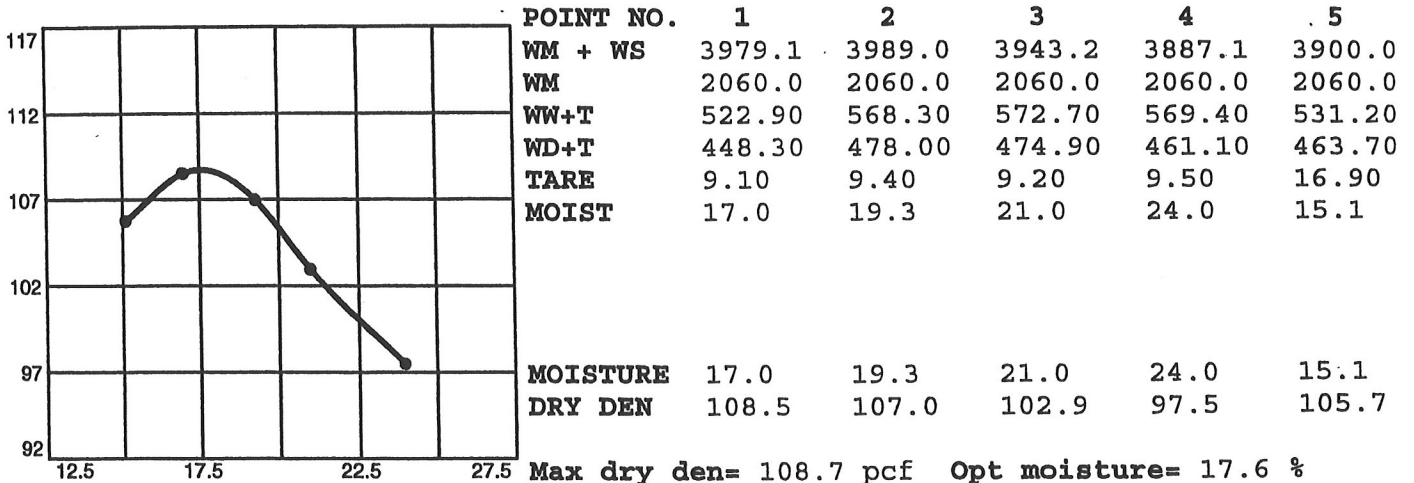
Client: Dominion Nuclear North Anna
Project: NORTH ANNA COL PROJECT
Project Number: 6468061472

Specimen Data

Source: TEST PIT 1
Sample No.: TP-1-1
Elev. or Depth: 0-1.5' **Sample Length(in./cm.):** 18
Location:
Description: Brown red silty sandy clay(VISUAL)
Liquid Limit: ND **Plasticity Index:** ND **Natural Moisture:** 23.4
Date: 12/1/06 **USCS Classification:** ND **AASHTO Classification:** ND
Testing Remarks: ND= NOT DETERMINED
Percent retained on No.4 sieve: 0.9
Percent passing No. 200 sieve: ND **Specific gravity:** ND

Test Data And Results For Curve TP-1-1

Type of test: ASTM D 1557-02 Method A Modified
Mold Dia.: 4.00 in. **Hammer Wt.:** 10 lb. **Drop:** 18 in.
Layers: five **Blows per Layer:** 25



COMPACTION TEST REPORT/ ASTM D-1557-02

Curve No.: TP-1-2

Project No.: 6468061472

Date: 12/1/06

Project: NORTH ANNA COL PROJECT

Location: TEST PIT No 1 28y 1/23/07

Elev./Depth: 1.5-4'

Sample No. TP-1-2

Remarks: ND = NOT DETERMINED

MATERIAL DESCRIPTION

Description: Yellow brown slightly silty sandy clay (VISUAL)

Classifications -

USCS: ND

AASHTO: ND

Nat. Moist. = 22.6 %

Sp.G. = ND

Liquid Limit = ND

Plasticity Index = ND

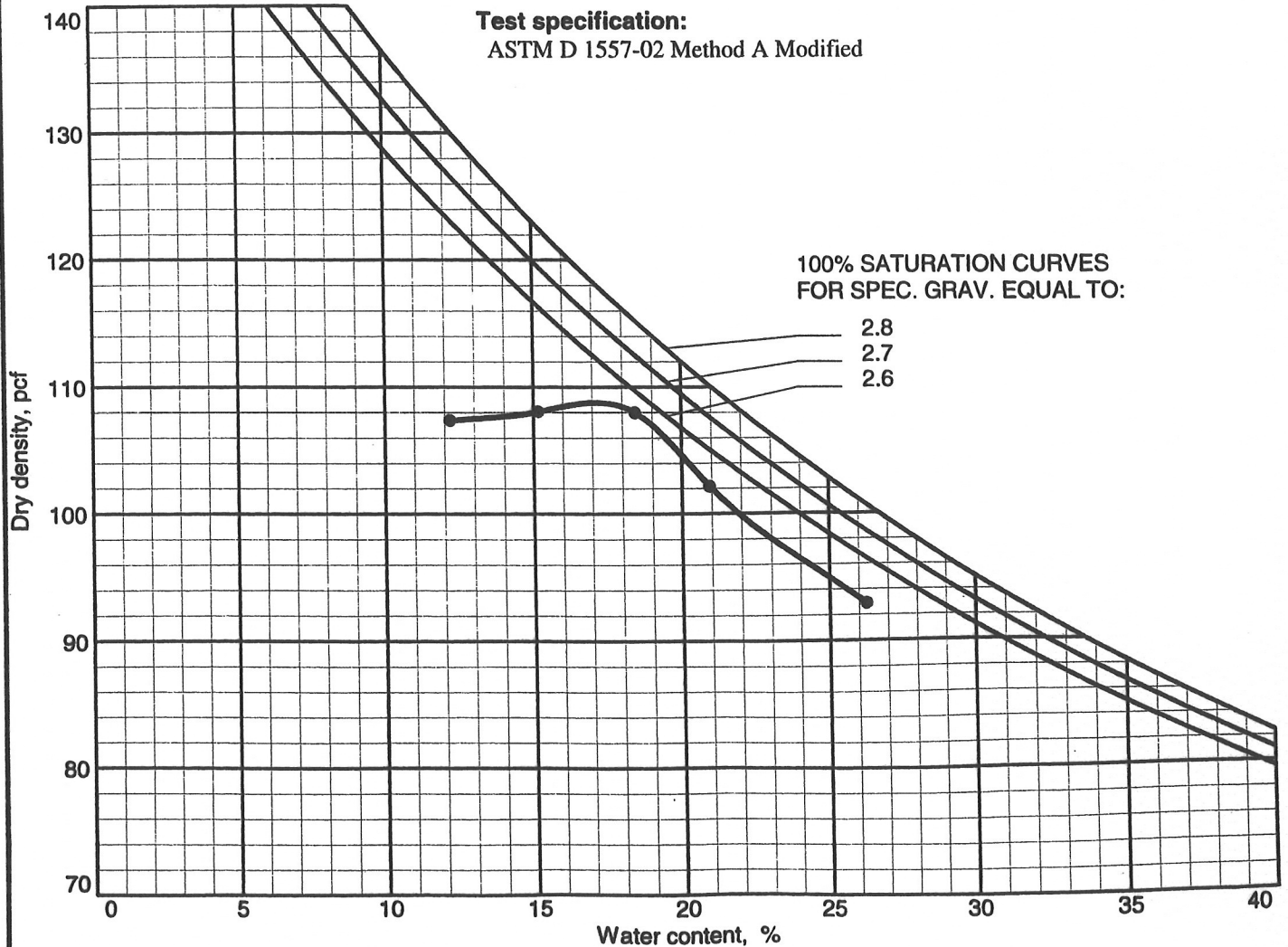
% > No.4 = 100.0 %

% < No.200 = ND %

TEST RESULTS

Maximum dry density = 108.8 pcf

Optimum moisture = 17.1 %



MOISTURE DENSITY TEST DATA

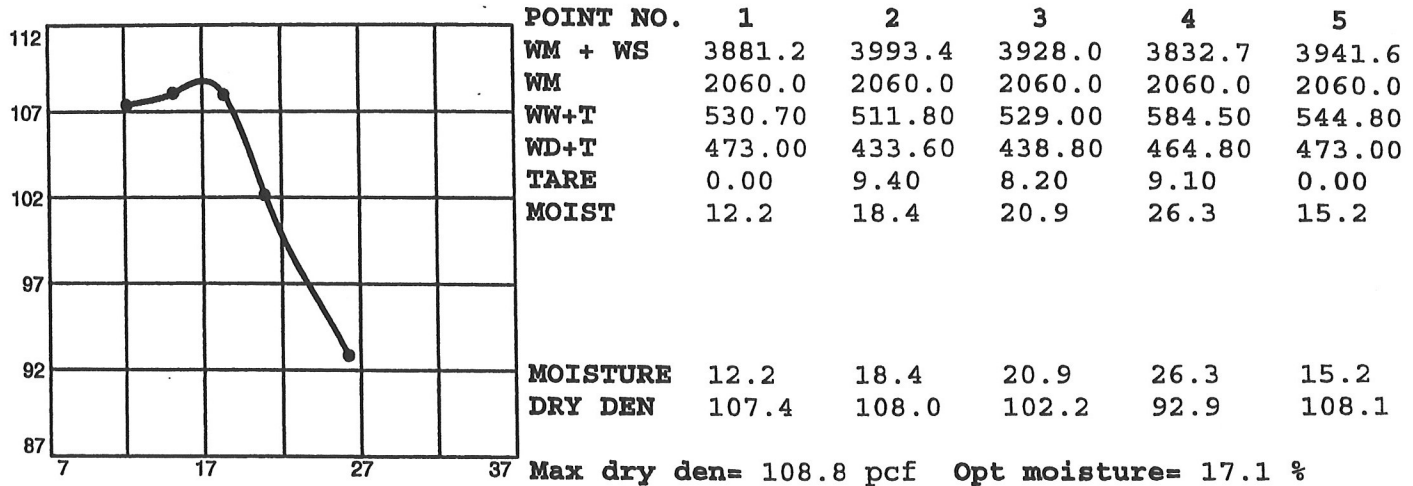
Client: Dominion Nuclear North Anna
Project: NORTH ANNA COL PROJECT
Project Number: 6468061472

Specimen Data

Source: TEST PIT 1
Sample No.: TP-1-2
Elev. or Depth: 1.5-4' **Sample Length(in./cm.):** 2.5
Location:
Description: Yellow brown slightly silty sandy clay (VISUAL)
Liquid Limit: ND **Plasticity Index:** ND **Natural Moisture:** 22.6
Date: 12/1/06 **USCS Classification:** ND **AASHTO Classification:** ND
Testing Remarks: ND = NOT DETERMINED
Percent retained on No.4 sieve: 100.0
Percent passing No. 200 sieve: ND **Specific gravity:** ND

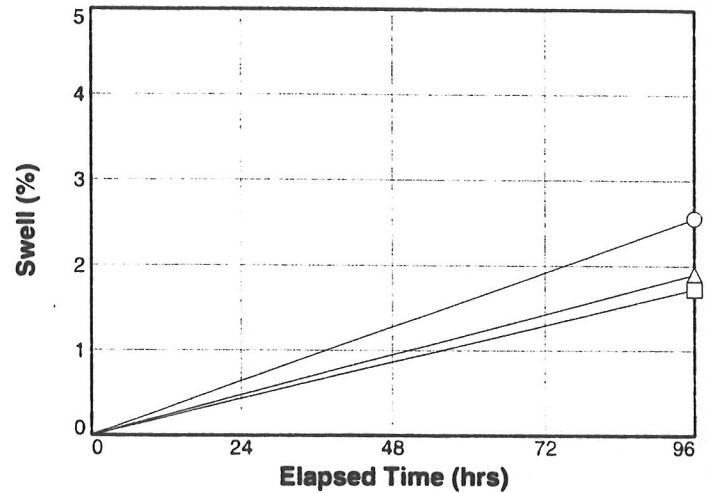
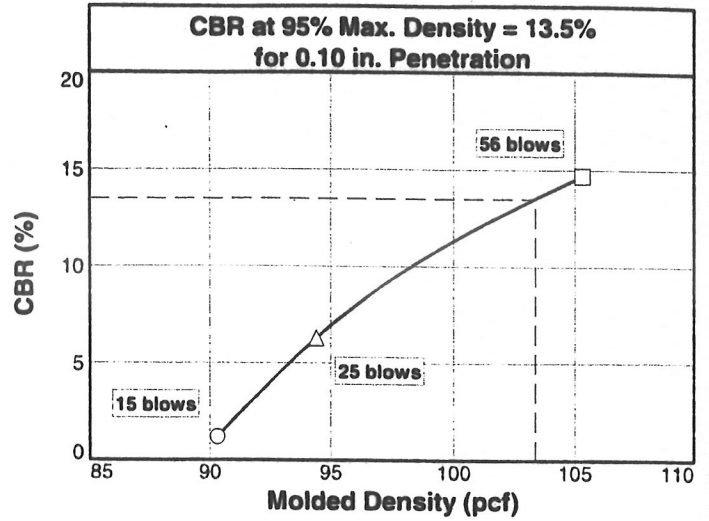
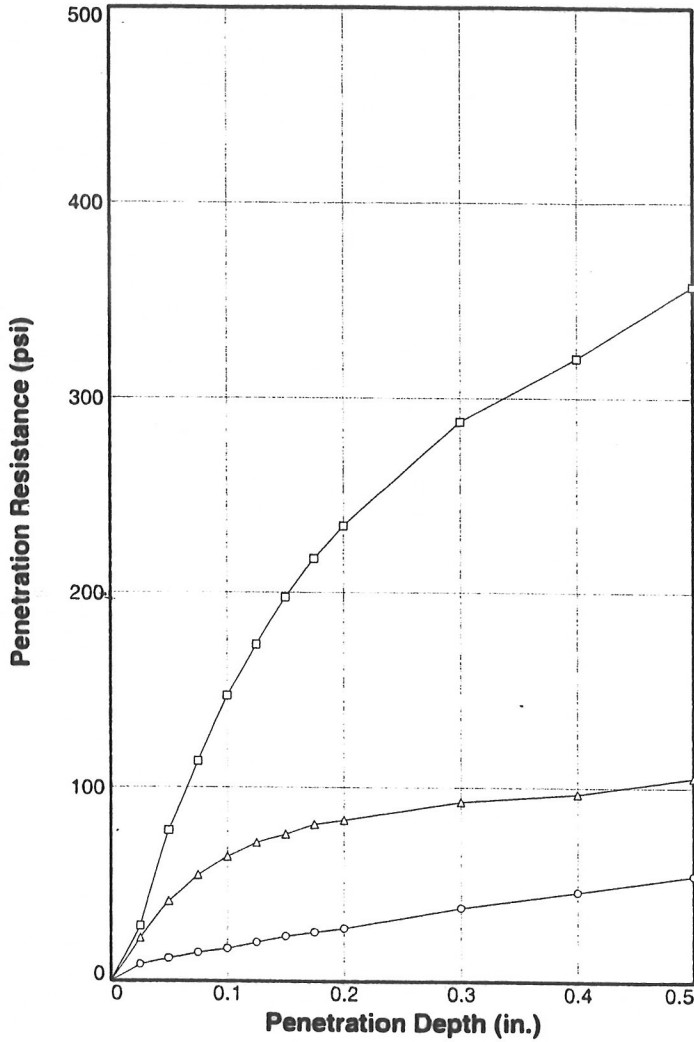
Test Data And Results For Curve TP-1-2

Type of test: ASTM D 1557-02 Method A Modified
Mold Dia.: 4.00 in. **Hammer Wt.:** 10 lb. **Drop:** 18 in.
Layers: five **Blows per Layer:** 25



BEARING RATIO TEST REPORT

ASTM D 1883-99 *05 LAB 1/23/07*



	Molded			Soaked			CBR (%)		Linearity Correction (in.)	Surcharge (lbs.)	Max. Swell (%)
	Density (pcf)	Percent of Max. Dens.	Moisture (%)	Density (pcf)	Percent of Max. Dens.	Moisture (%)	0.10 in.	0.20 in.			
1 ○	90.3	83	17.0	88.1	81	25.2	1.2	1.6	-0.048	10.01	2.6
2 △	94.4	86.8	17.0	92.6	85.2	22.8	6.3	5.5	-0.003	10.03	1.9
3 □	105.3	96.8	17.2	103.5	95.2	19.4	14.7	15.6	0.000	10.01	1.7

Material Description	USCS	Max. Dens. (pcf)	Optimum Moisture (%)	LL	PI
	Yellow brown slightly silty sandy clay (VISUAL)	ND	108.8	17.1	ND

Project No: 6468061472
Project: NORTH ANNA COL PROJECT
Source of Sample: TEST PIT 1 **Depth:** 1.5-4'
Sample Number: TP-1-2
Date:

BEARING RATIO TEST REPORT
MACTEC, Inc.

Test Description/Remarks:
 Tested in accordance with ASTM D-1883, section 7.1.2

Figure _____

BEARING RATIO TESTING RESULTS

(ASTM D 1883-99)(05) 1/23/07 UBJ

Date:
Project No.: 6468061472
Project: NORTH ANNA COL PROJECT
Location: TEST PIT 1
Depth: 1.5-4' **Sample Number:** TP-1-2
Material Description: Yellow brown slightly silty sandy clay (VISUAL)
USCS Classification: ND
Liquid Limit: ND **Plasticity Index:** ND

Test Description: Tested in accordance with ASTM D-1883, section 7.1.2
Maximum Dry Density: 108.8 **Optimum Moisture Content:** 17.1
Testing Remarks:

Sample 1 (15 Blows; Surcharge: 10.01 lbs.)

Water Content

Wt. Wet Soil+Tare, gms. 518.2 Wt. Soil+Tare, gms. 442.8 Wt. Tare, gms. 0 **Moisture, % 17.0**

Unit Weight

Wt. Mold+Soil, gms. 7782 Wt. Mold, gms. 4188 Ht. Soil, in. 4.581 **Density, pcf 90.3**

Swell Data

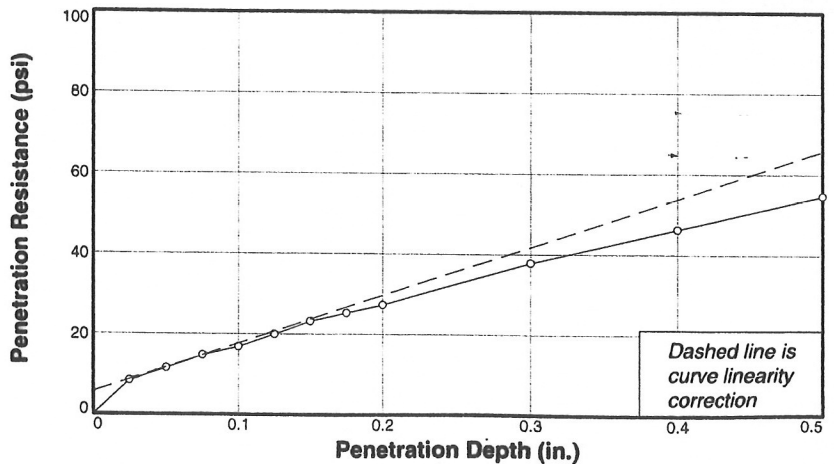
Elapsed Time, hrs.	Dial Reading in. x 1,000	Swell %
0	154	0.0
96	271	2.6

Final Water Content

	Wt. Wet Soil+Tare, gms.	Dry Soil+Tare	Tare	Moisture, %
Top	513.8	406.7	9.0	26.9
Middle	568.5	460.6	17.0	24.3
Bottom	568.5	460.6	17.0	24.3

Penetration Test Data

Pen. in.	Dial Reading in. x 1,000	Stress psi	CBR %
0.0	0	0.0	
0.025	8	8.4	
0.05	11	11.6	
0.075	14	14.7	
0.1	16	16.8	1.2
0.125	19	20.0	
0.15	22	23.1	
0.175	24	25.2	
0.2	26	27.3	1.6
0.3	36	37.8	1.7
0.4	44	46.2	1.8
0.5	52	54.6	1.9



Sample 2 (25 Blows; Surcharge: 10.03 lbs.)

Water Content

Wt. Wet Soil+Tare, gms. 371.1 Wt. Soil+Tare, gms. 317.2 Wt. Tare, gms. 0 **Moisture, % 17.0**

Unit Weight

Wt. Mold+Soil, gms. 7974 Wt. Mold, gms. 4218 Ht. Soil, in. 4.582 **Density, pcf 94.4**

Swell Data

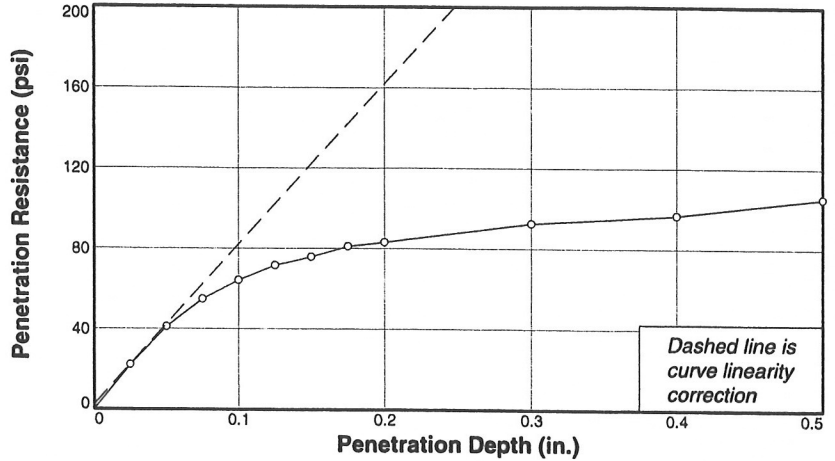
Elapsed Time, hrs.	Dial Reading in. x 1,000	Swell %
0	90	0.0
96	177	1.9

Final Water Content

	Wt. Wet Soil+Tare, gms.	Dry Soil+Tare	Tare	Moisture, %
Top	551.4	447.4	17.1	24.2
Middle	559.9	461.2	17.1	22.2
Bottom	559.2	461.2	17.1	22.1

Penetration Test Data

Pen. in.	Dial Reading in. x 1,000	Stress psi	CBR %
0.0	0	0.0	
0.025	21	22.1	
0.05	39	41.0	
0.075	52	54.6	
0.1	61	64.1	6.3
0.125	68	71.4	
0.15	72	75.6	
0.175	77	80.9	
0.2	79	83.0	5.5
0.3	88	92.4	4.9
0.4	92	96.6	4.2
0.5	100	105.0	4.0



Sample 3 (56 Blows; Surcharge: 10.01 lbs.)

Water Content

Wt. Wet Soil+Tare, gms. 414.3 Wt. Soil+Tare, gms. 353.5 Wt. Tare, gms. 0 **Moisture, % 17.2**

Unit Weight

Wt. Mold+Soil, gms. 8382 Wt. Mold, gms. 4188 Ht. Soil, in. 4.578 **Density, pcf 105.3**

Swell Data

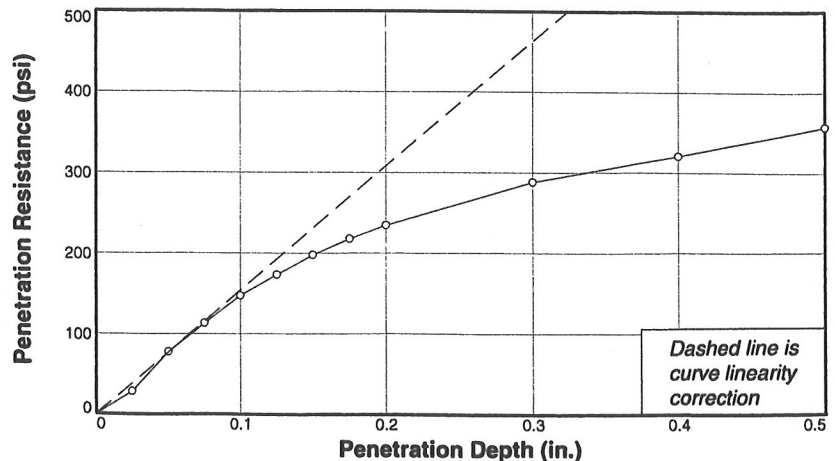
Elapsed Time, hrs.	Dial Reading in. x 1,000	Swell %
0	473	0.0
96	552	1.7

Final Water Content

	Wt. Wet Soil+Tare, gms.	Dry Soil+Tare	Tare	Moisture, %
Top	533.9	443.6	17	21.2
Middle	542.6	459.8	13.9	18.6
Bottom	542.6	459.8	13.9	18.6

Penetration Test Data

Pen. in.	Dial Reading in. x 1,000	Stress psi	CBR %
0.0	0	0.0	
0.025	27	28.4	
0.05	74	77.7	
0.075	108	113.5	
0.1	140	147.1	14.7
0.125	165	173.3	
0.15	188	197.5	
0.175	207	217.4	
0.2	223	234.3	15.6
0.3	274	287.8	15.1
0.4	305	320.4	13.9
0.5	340	357.2	13.7



COMPACTION TEST REPORT/ ASTM D-1557-02

Curve No.: TP-2

Project No.: 6468061472

Date: 12/2/06

Project: NORTH ANNA COL PROJECT

Location: *TEST PIT No 2 LABS 1/22/07*

Elev./Depth: 0-3.8

Sample No. TP-2

Remarks: ND= NOT DETERMINED

MATERIAL DESCRIPTION

Description: Brown slightly silty sandy clay

Classifications -

USCS: ND

AASHTO: ND

Nat. Moist. = 22.6 %

Sp.G. = ND

Liquid Limit = ND

Plasticity Index = ND

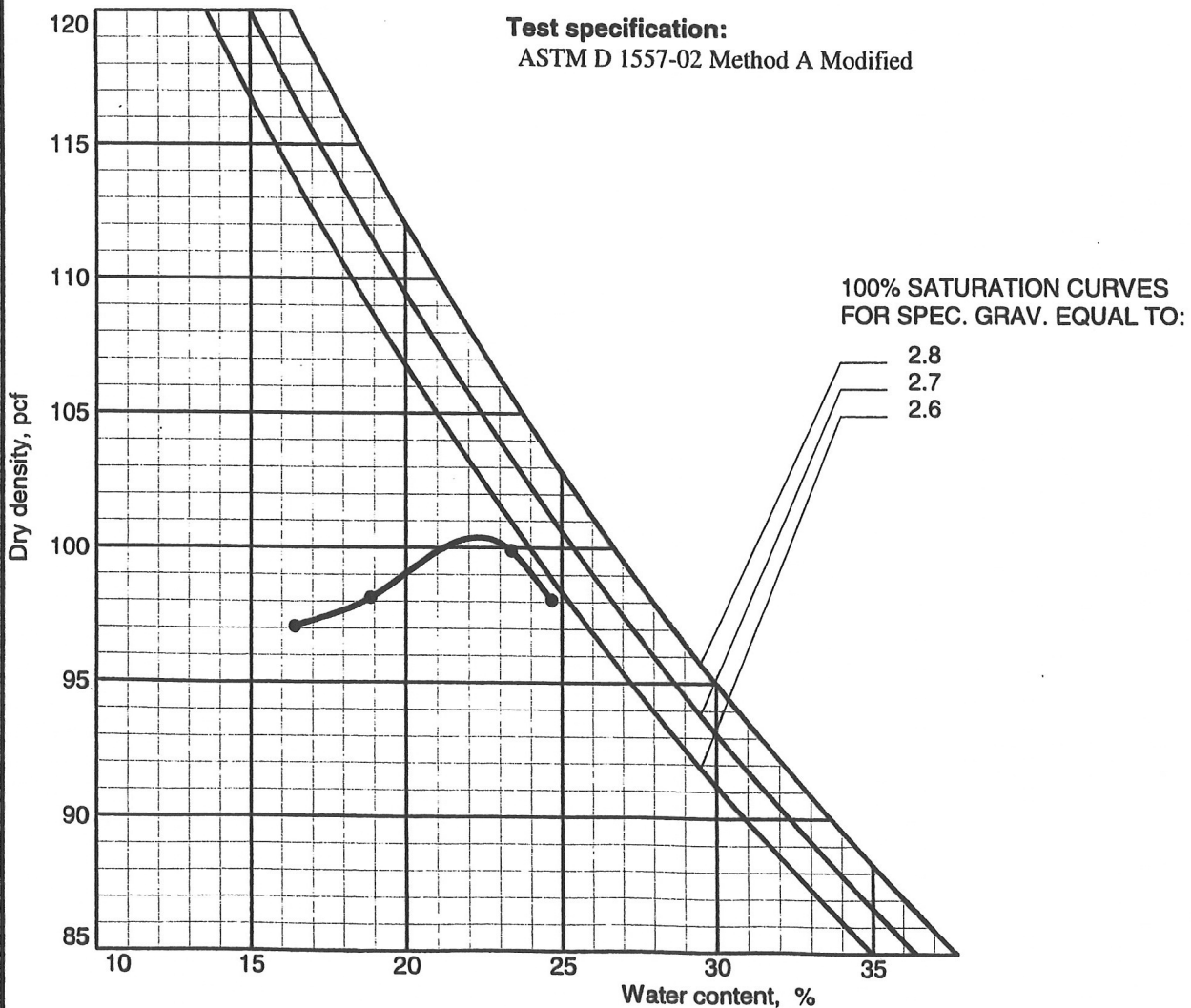
% > No.4 = 0.0 %

% < No.200 = ND %

TEST RESULTS

Maximum dry density = 100.4 pcf

Optimum moisture = 22.3 %

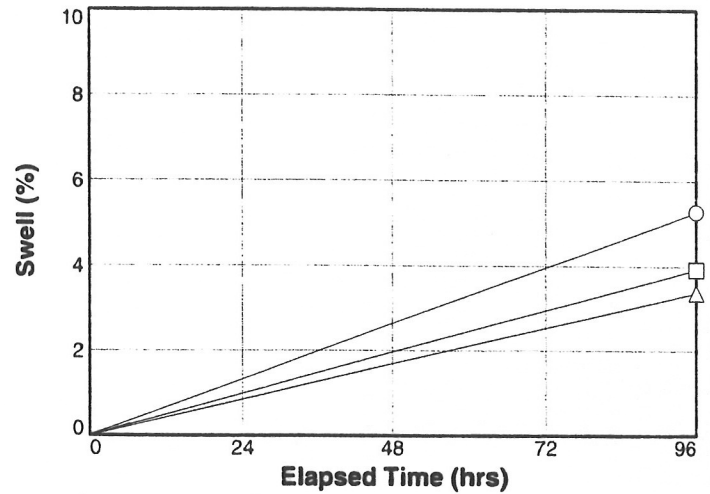
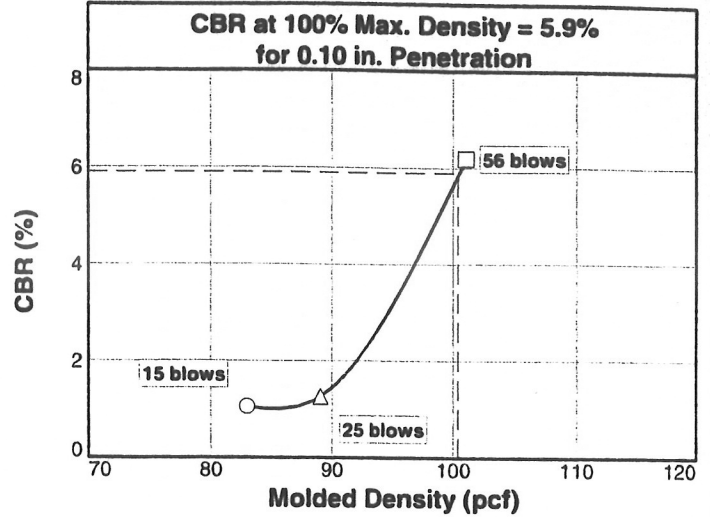
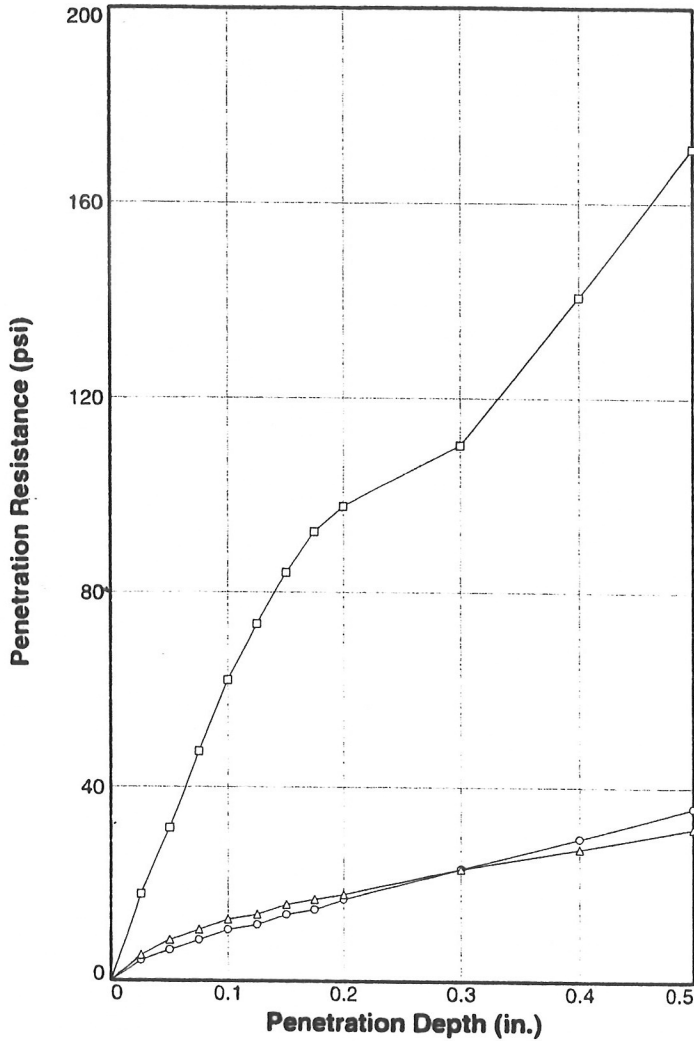


Figure

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BEARING RATIO TEST REPORT

ASTM D 1883-99 *05 L23 1/23/07*



	Molded			Soaked			CBR (%)		Linearity Correction (in.)	Surcharge (lbs.)	Max. Swell (%)
	Density (pcf)	Percent of Max. Dens.	Moisture (%)	Density (pcf)	Percent of Max. Dens.	Moisture (%)	0.10 in.	0.20 in.			
1 ○	83.0	82.7	22.8	78.8	78.5	36.8	1.1	1.1	0.000	10.0	5.3
2 △	89.1	88.7	22.0	86.2	85.8	37.1	1.3	1.2	0.000	10.0	3.4
3 □	101.0	100.6	22.0	97.2	96.8	30.0	6.2	6.5	0.000	10.0	3.9

Material Description	USCS	Max. Dens. (pcf)	Optimum Moisture (%)	LL	PI
	Brown slightly silty sandy clay	ND	100.4	22.3	ND

Project No: 6468061472
Project: NORTH ANNA COL PROJECT
Source of Sample: TEST PIT 2 **Depth:** 0-3.8
Sample Number: TP-2
Date: 11/15/06

Test Description/Remarks:

 Tested in accordance with ASTM D-1883-05, Section 7.1.2
 ND = NOT DETERMINED.

BEARING RATIO TEST REPORT
MACTEC, Inc.

Figure _____

BEARING RATIO TESTING RESULTS

(ASTM D 1883-99) 05 May 1/23/07

Date: 11/15/06
Project No.: 6468061472
Project: NORTH ANNA COL PROJECT
Location: TEST PIT 2
Depth: 0-3.8 **Sample Number:** TP-2
Material Description: Brown slightly silty sandy clay
USCS Classification: ND
Liquid Limit: ND **Plasticity Index:** ND

Test Description:
Maximum Dry Density: 100.4 **Optimum Moisture Content:** 22.3
Testing Remarks: Tested in accordance with ASTM D-1883-05, Section 7.1.2
 ND = NOT DETERMINED.

Sample 1 (15 Blows; Surcharge: 10.0 lbs.)

Water Content
 Wt. Wet Soil+Tare, gms. 794.4 Wt. Soil+Tare, gms. 653.05 Wt. Tare, gms. 33.9 **Moisture, % 22.8**

Unit Weight
 Wt. Mold+Soil, gms. 7664 Wt. Mold, gms. 4196 Ht. Soil, in. 4.585 **Density, pcf 83.0**

Swell Data

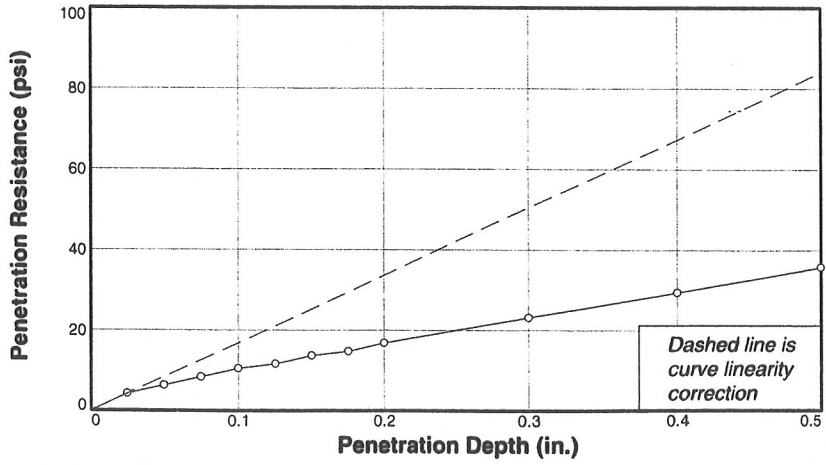
Elapsed Time, hrs.	Dial Reading in. x 1,000	Swell %
0	130	0.0
96	372	5.3

Final Water Content

	Wt. Wet Soil+Tare, gms.	Dry Soil+Tare	Tare	Moisture, %
Top	536.2	389.2	17.2	39.5
Middle	580.6	433.1	16.4	35.4
Bottom	580.6	433.1	16.4	35.4

Penetration Test Data

Pen. in.	Dial Reading in. x 1,000	Stress psi	CBR %
0.0	0	0.0	
0.025	4	4.2	
0.05	6	6.3	
0.075	8	8.4	
0.1	10	10.5	1.1
0.125	11	11.6	
0.15	13	13.7	
0.175	14	14.7	
0.2	16	16.8	1.1
0.3	22	23.1	1.2
0.4	28	29.4	1.3
0.5	34	35.7	1.4



Sample 2 (25 Blows; Surcharge: 10.0 lbs.)

Water Content

Wt. Wet Soil+Tare, gms. 476.1 Wt. Soil+Tare, gms. 393.2 Wt. Tare, gms. 17.2 **Moisture, % 22.0**

Unit Weight

Wt. Mold+Soil, gms. 7862 Wt. Mold, gms. 4156 Ht. Soil, in. 4.594 **Density, pcf 89.1**

Swell Data

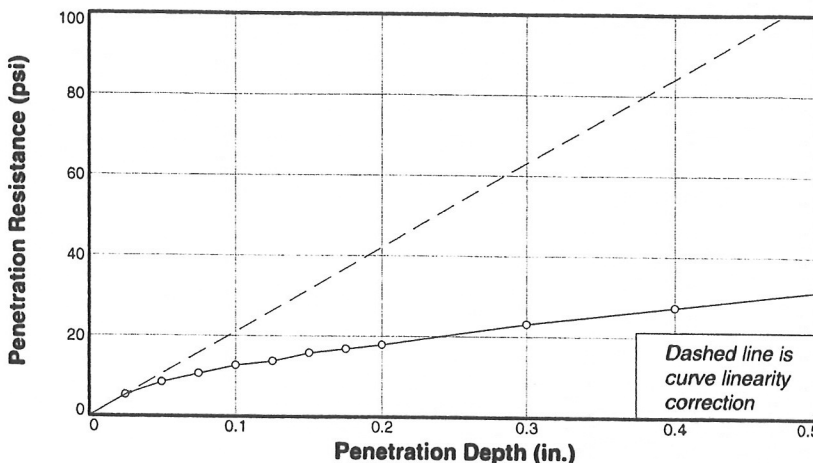
Elapsed Time, hrs.	Dial Reading in. x 1,000	Swell %
0	95	0.0
96	250	3.4

Final Water Content

	Wt. Wet Soil+Tare, gms.	Dry Soil+Tare	Tare	Moisture, %
Top	522.6	372.1	6.7	41.2
Middle	574.2	429.4	17.1	35.1
Bottom	574.2	429.4	17.1	35.1

Penetration Test Data

Pen. in.	Dial Reading in. x 1,000	Stress psi	CBR %
0.0	0	0.0	
0.025	5	5.3	
0.05	8	8.4	
0.075	10	10.5	
0.1	12	12.6	1.3
0.125	13	13.7	
0.15	15	15.8	
0.175	16	16.8	
0.2	17	17.9	1.2
0.3	22	23.1	1.2
0.4	26	27.3	1.2
0.5	30	31.5	1.2



Sample 3 (56 Blows; Surcharge: 10.0 lbs.)

Water Content

Wt. Wet Soil+Tare, gms. 462 Wt. Soil+Tare, gms. 384.7 Wt. Tare, gms. 33.7 **Moisture, % 22.0**

Unit Weight

Wt. Mold+Soil, gms. 8360 Wt. Mold, gms. 4166 Ht. Soil, in. 4.583 **Density, pcf 101.0**

Swell Data

Elapsed Time, hrs.	Dial Reading in. x 1,000	Swell %
0	83	0.0
96	263	3.9

Final Water Content

	Wt. Wet Soil+Tare, gms.	Dry Soil+Tare	Tare	Moisture, %
Top	542.4	411.8	9.3	32.4
Middle	545.9	427.9	16.9	28.7
Bottom	545.9	427.9	16.9	28.7

Penetration Test Data

Pen. in.	Dial Reading in. x 1,000	Stress psi	CBR %
0.0	0	0.0	
0.025	17	17.9	
0.05	30	31.5	
0.075	45	47.3	
0.1	59	62.0	6.2
0.125	70	73.5	
0.15	80	84.0	
0.175	88	92.4	
0.2	93	97.7	6.5
0.3	105	110.3	5.8
0.4	134	140.8	6.1
0.5	163	171.2	6.6

